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ENERGY EFFICIENT ENGINE HIGH PRESSURE COMPRESSOR DETAIL DESIGN REPORT

by

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GENERAL ELECTRIC COMPANY

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16. Abstract

A compressor optimization study defined a 10-stage configuration with a 22.6:1 pressure ratio, an adiabatic efficiency goal of 86.1%, and a polytropic efficiency of 90.6%; the corrected airflow is 53.5 kg/sec. Subsequent component testing included three full-scale tests: a six-stage rig test, a 10-stage rig test, and another 10-stage rig test completed in the second quarter of 1982. Information from these tests is being used to select the configuration for a core engine test scheduled for July 1982 and an integrated core/low spool test slated for early 1983. The test results will also provide data base for the flight propulsion system.

This report presents details of the compressor design, differences between the proposal compressor and the refined versions, and test results from the 6-stage and both 10-stage test rigs.

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FOREWORD

This report presents the results of the high pressure compressor aerodynamic and mechanical design performed by the General Electric Company for the National Aeronautics and Space Administration, Lewis Research Center, under Contract NAS3-20643. This work was performed as part of the Aircraft Energy Efficiency (ACEE) Program, Energy Efficient Engine (E^3) Project. Mr. C. C. Ciepluch is the NASA Project Manager, and Mr. P. G. Batterton is the NASA Assistant Project Manager. Mr. R. D. Hager is the NASA Project Engineer responsible for managing the effort associated with the high pressure compressor component design presented in this report. Mr. R. W. Bucy is the Manager of the Energy Efficient Engine Project for the General Electric Company. This report was prepared by Messrs. P.R. Holloway, C.C. Koch, G.L. Knight, and S.J. Shaffer of the General Electric Company, Evendale, Ohio.

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SYMBOLS AND NOMENCLATURE

Symbol	Description	Units
C	Absolute Velocity	m/sec (ft/sec)
P	Total or Stagnation Pressure	N/m^2 ($lb/in.^2$)
p	Static Pressure	N/m^2 ($lb/in.^2$)
r	Radius	m (in.)
$\bar{r}$	Mean Radius, average of streamline leading - trailing edge radii	m^2 ($in.^2$)
W	Air velocity in rotating coordinate system containing rotor blades	m/sec (ft/sec)
σ	Solidity, chord/spacing	--

Subscripts

ID	Ideal
u	Tangential Direction
Z	Axial Direction
1	Leading Edge
2	Trailing Edge

Superscript

$'$	Relative to Rotor

1.0 SUMMARY

This report summarizes the results of the detailed design and analysis efforts on the high pressure compressor (HPC) for General Electric's Energy Efficient Engine (E^3) System as presented at NASA-Lewis Research Center on July 28, 1981. Prior reviews were presented in a Compressor Preliminary Design Review (PDR) delivered at NASA-Lewis on February 8, 1978 and a Compressor Intermediate Design Review (IDR) held at General Electric's Evendale Plant on July 19, 1978.

During 1975 and 1976, an extensive compressor optimization study was carried out under the AMAC Contract (NAS3-19444) to identify desirable compressor design features for a subsonic transport engine. During 1977, the AMAC design was refined while carrying out Task 5 of the E^3 study effort (Contract NAS3-20627).

The selected compressor configuration has a cruise pressure ratio of 22.6:1 in 10 stages, an adiabatic efficiency goal of 86.1%, and a polytropic efficiency of 90.6%. The corrected airflow is 53.5 kg/sec (118.0 lbm/sec).

A trimetric of the E^3 including the high-stage-loading, 10-stage compressor is illustrated in Figure 1. The Compressor Detailed Design Review (DDR) included presentation of both aerodynamic and mechanical design information. Program goals and specific aerodynamic goals for the compressor are listed in Tables I and II.

Table I. E^3 Program Goals.

- Installed sfc: $\geq$12% Improvement Over CF6-50C at Mach 0.8, 10.7 km (35,000 ft), Max. Cruise
- Direct Operating Cost: 5% Improvement Over a Scaled CF6-50C, Same Advanced Aircraft
- Noise: Meet FAR Part 36 (March 1978) Provision for Engine Growth
- Emissions: Meet EPA January 1981 Standards
- Sfc Deterioration: 0.5 of CF6-50C
- Commercial Design Practices

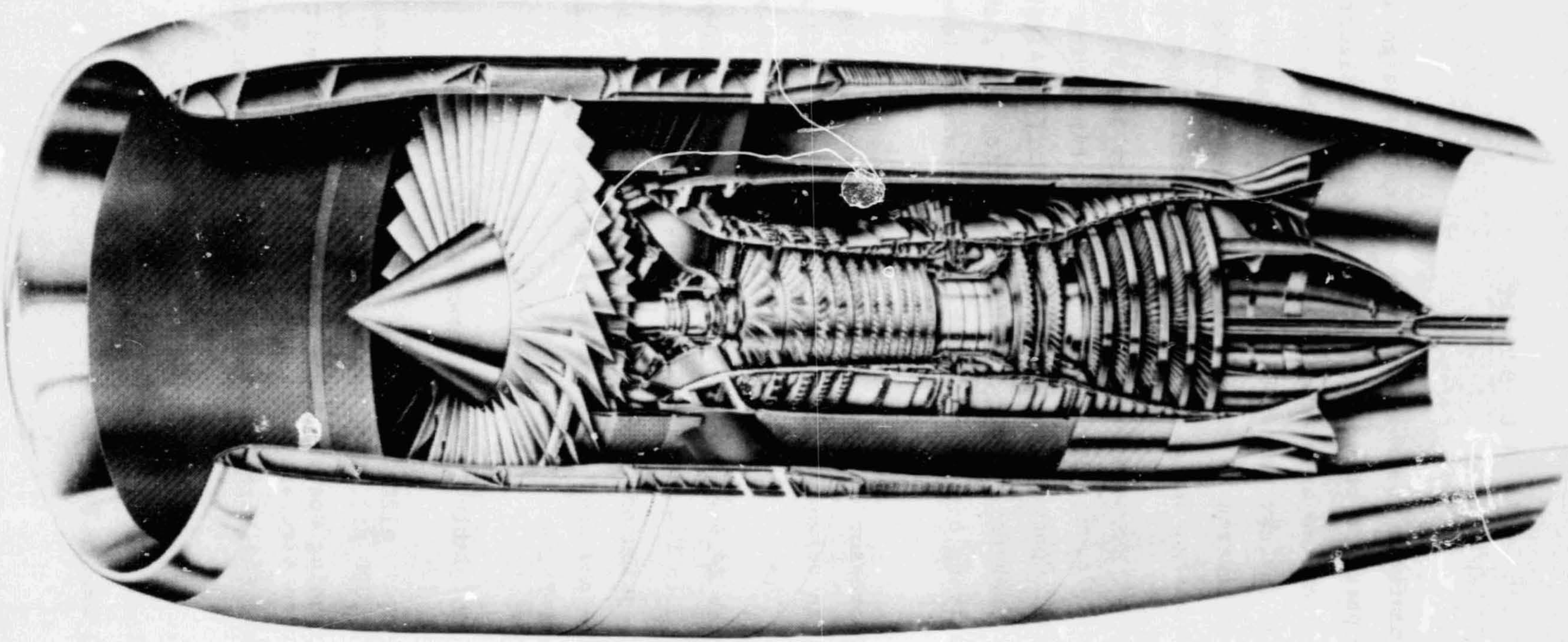


Figure 1. NASA/GE Energy Efficient Engine.

Table II. FPS Compressor Aerodynamic Design Goals.

- Evolved From AMAC Study
- Operating Parameters (Max. Cruise)

Pressure Ratio	22.6:1
Number of Stages	10
Goal Efficiencies	
Adiabatic	86.1%
Polytropic	90.6%
Corrected Airflow,	
53.5 kg/sec	(118.0 lbm/sec)

The component test program for the compressor (Figure 2) includes three full-scale tests: a 6-stage rig test completed in early 1980, a 10-stage rig test run in the first quarter of 1981, and a second 10-stage rig test planned for the last quarter of 1981. Information from these tests is being used to select a configuration for the core engine test scheduled for April 1982 and the Integrated Core/Low Spool (ICLS) test slated for late 1982. The test results will also be used to provide the technology base for the Flight Propulsion System (FPS) compressor configuration. Photographs of the six-stage rig and the first 10-stage rig are shown in Figures 3 and 4.

Figure 5 shows a view of General Electric's Full-Scale Compressor Test Facility (FSCT) and Table III lists the facility temperature and pressure limits along with the details of the external flow circuitry.

Cross sections of the compressor rigs are shown in Figures 6 and 7; the forward case assembly and rotor assembly (for the 10-stage rig) are illustrated in Figure 8. Test objectives, instrumentation, test summary, and results are listed in Tables IV through VI, and Table VII shows a list of hardware fabricated for the program.

The following sections present the details of the compressor design, differences between the proposal compressor and the refined versions, and test results from the six-stage and first 10-stage test rigs.

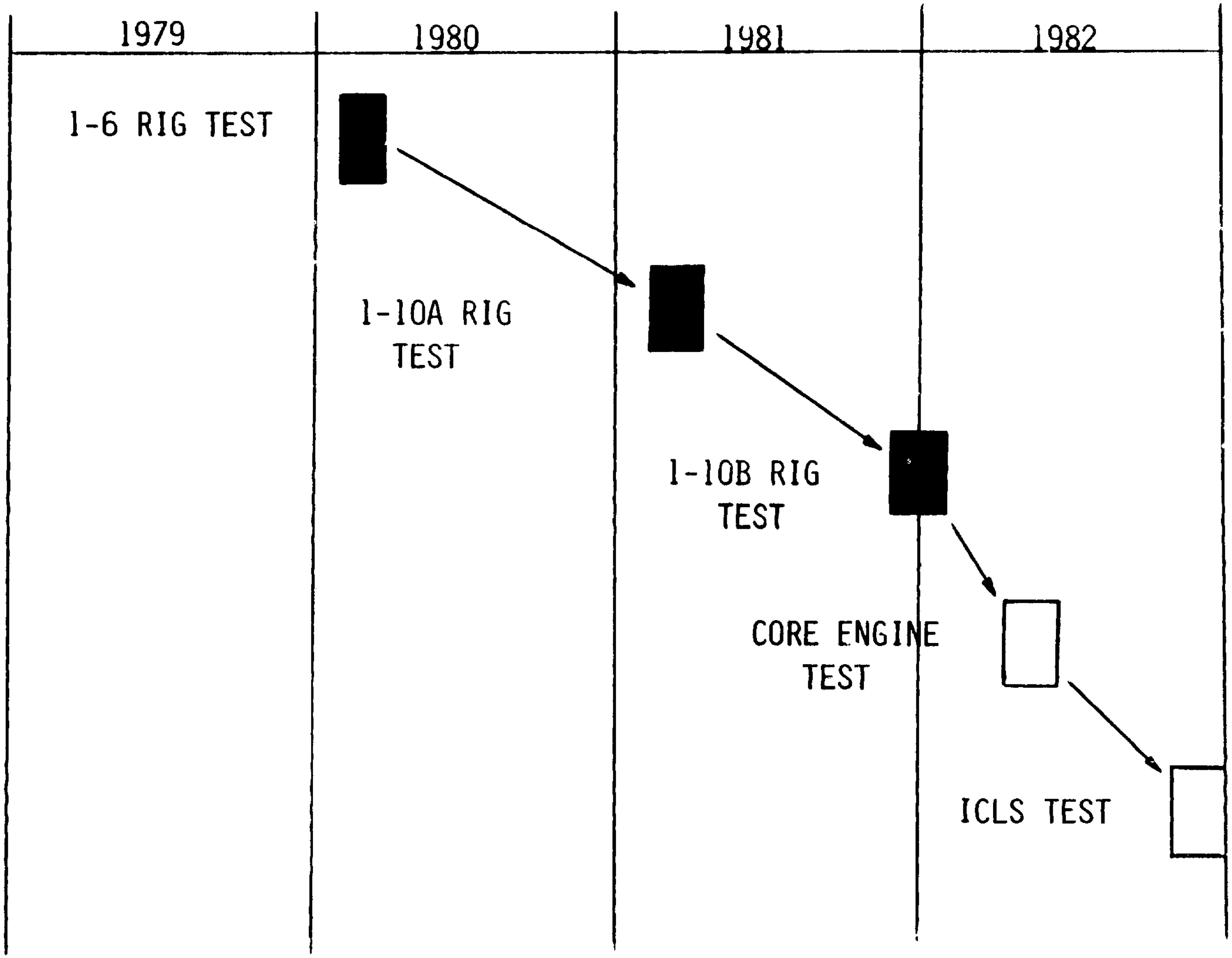


Figure 2. HPC Development Test Program.

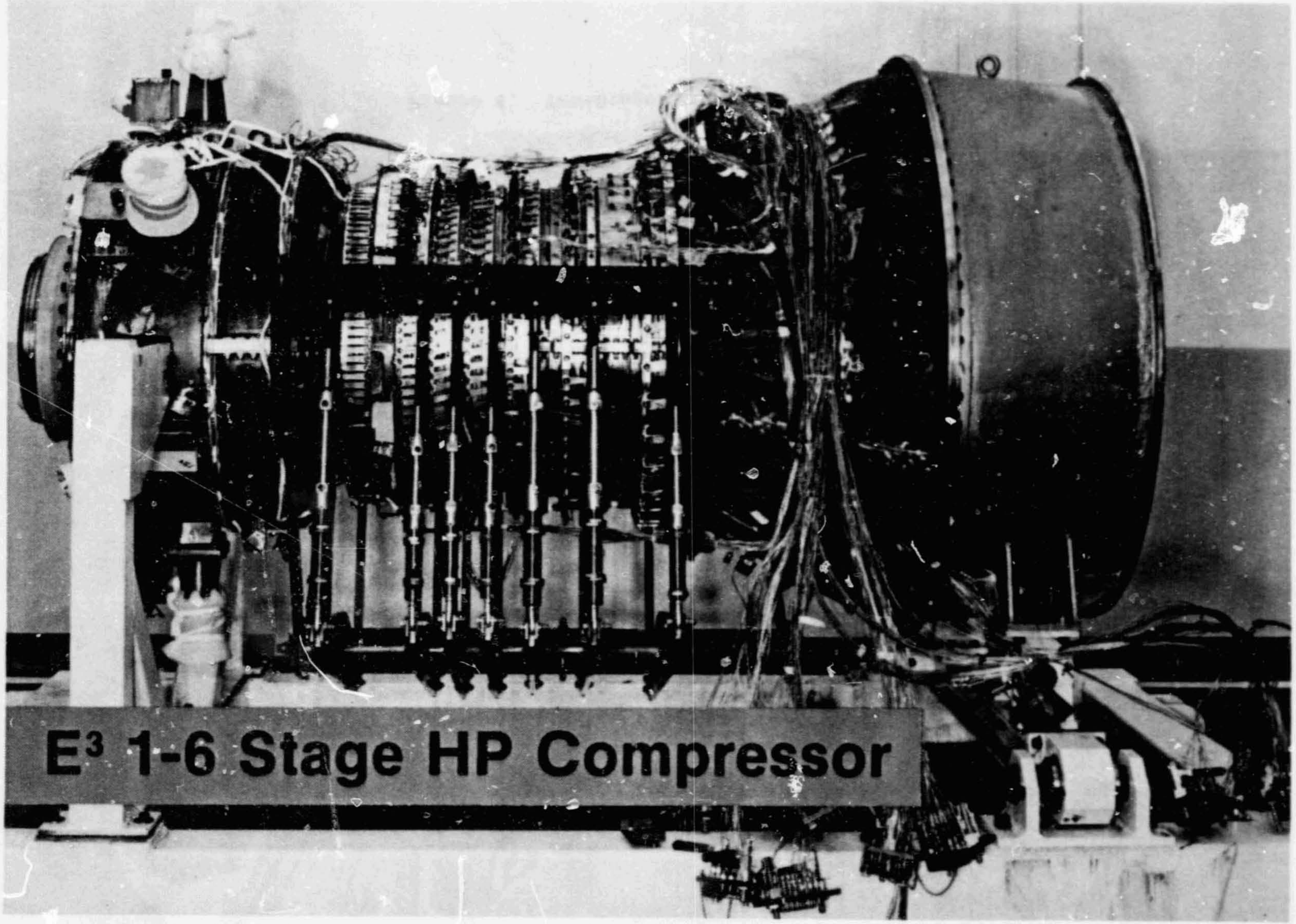


Figure 3. Six-Stage Compressor Rig.

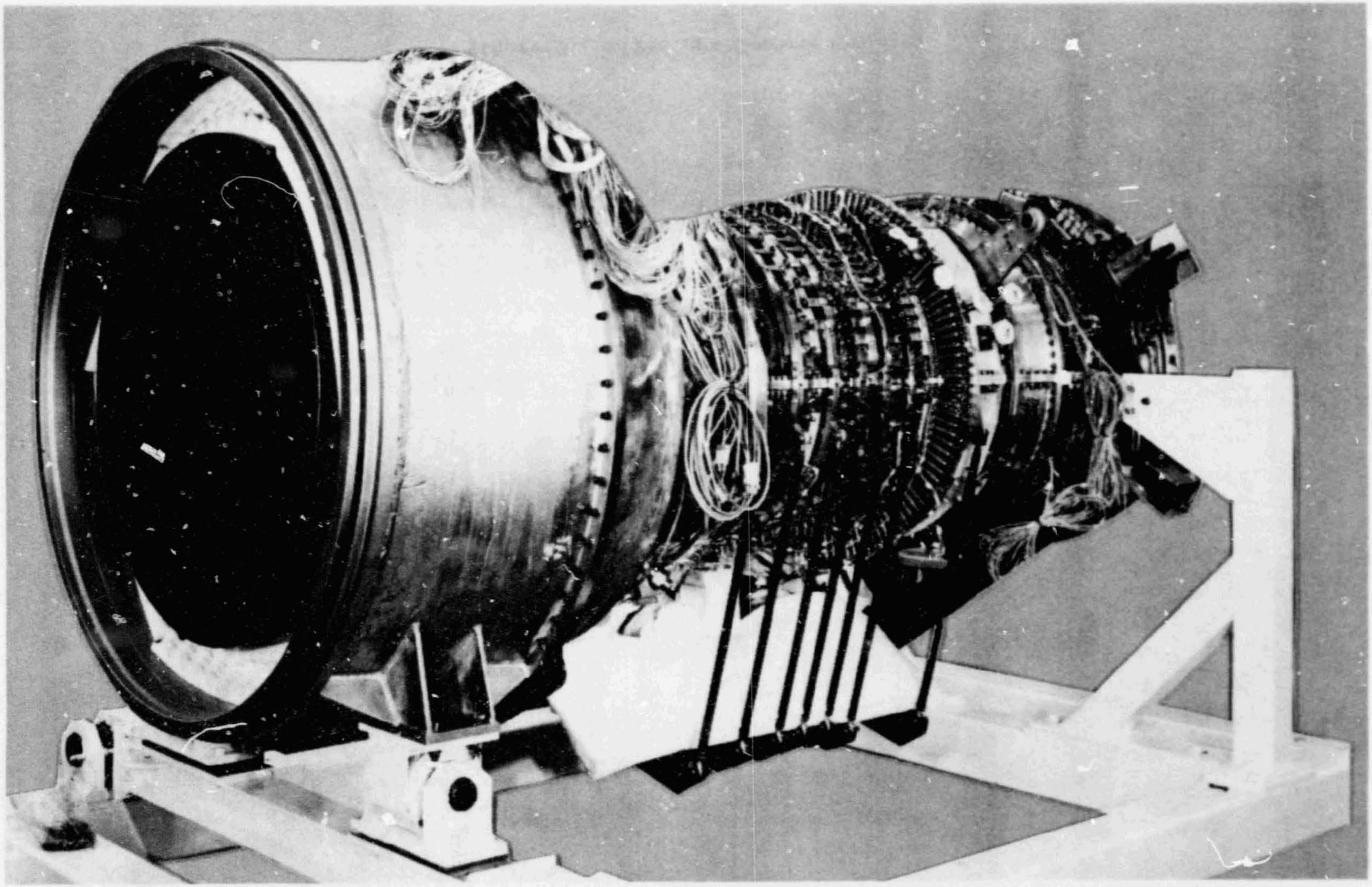


Figure 4. Ten-Stage Compressor Rig.

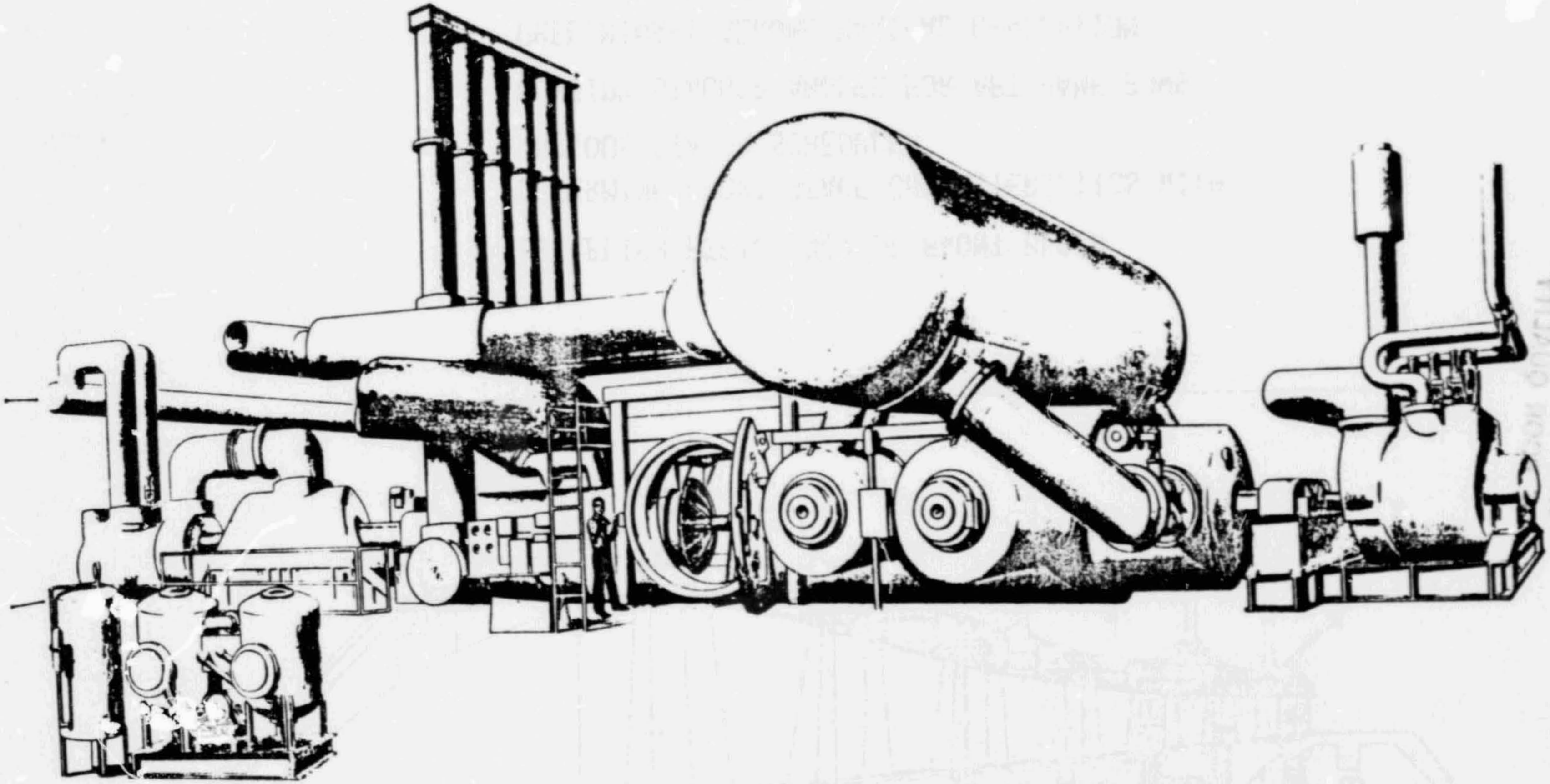
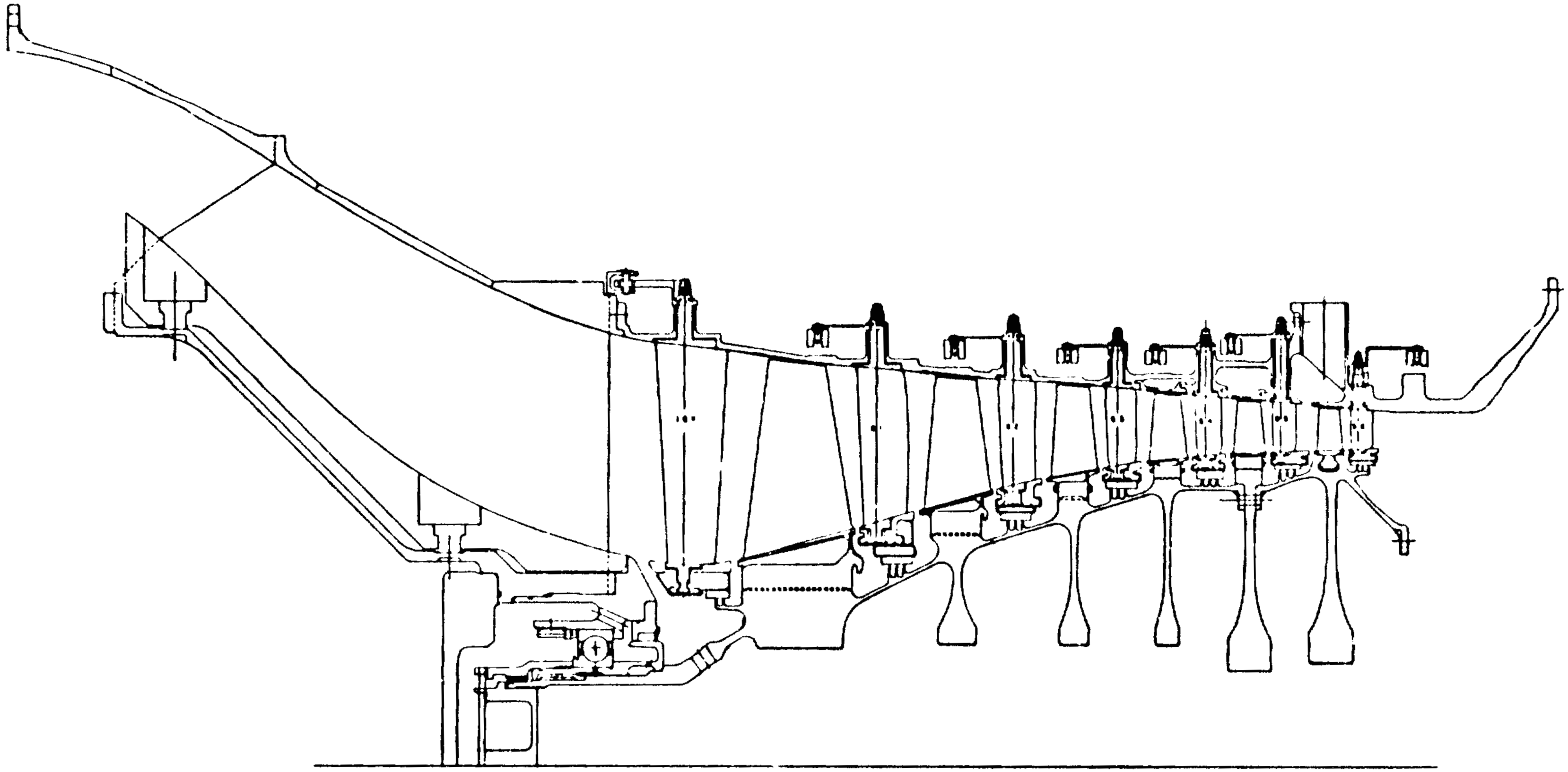
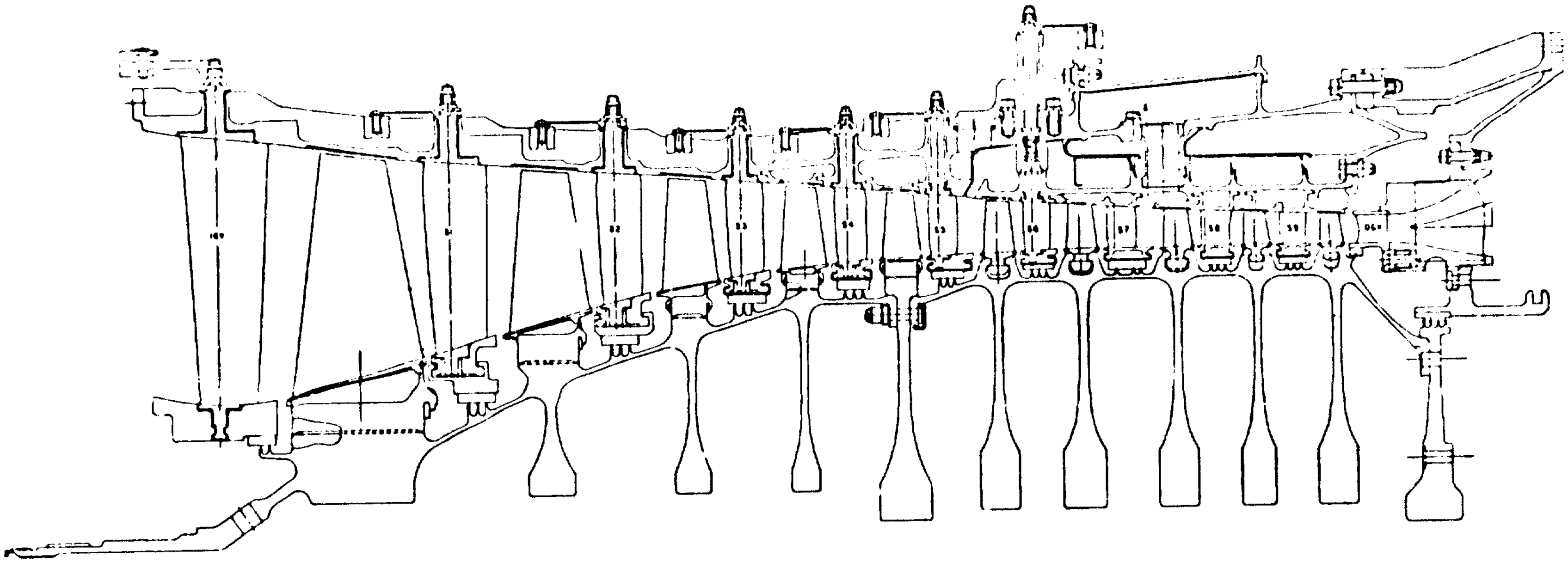


Figure 5. Lynn Full-Scale Compressor Test Facility.



- ESTABLISH EFFICIENCY OF FRONT BLOCK
- DETERMINE FRONT STAGE CHARACTERISTICS WITH VARIOUS STATOR SCHEDULES
- CONFIRM STAGGER ANGLES FOR AFT VANE ROWS
- PRELIMINARY AEROMECHANICAL EVALUATION

Figure 6. Cross Section of Six-Stage Compressor Rig.



- ESTABLISH STATUS EFFICIENCY LEVEL
- DETERMINE START REGION CAPABILITIES
- ESTABLISH STATUS STALL MARGIN
- PRELIMINARY AEROMECHANICAL EVALUATION
- EVALUATE ROTOR & CASING TEMPERATURES INCLUDING ACC EFFECTS

Figure 7. Cross Section of 10-Stage Compressor Rig.

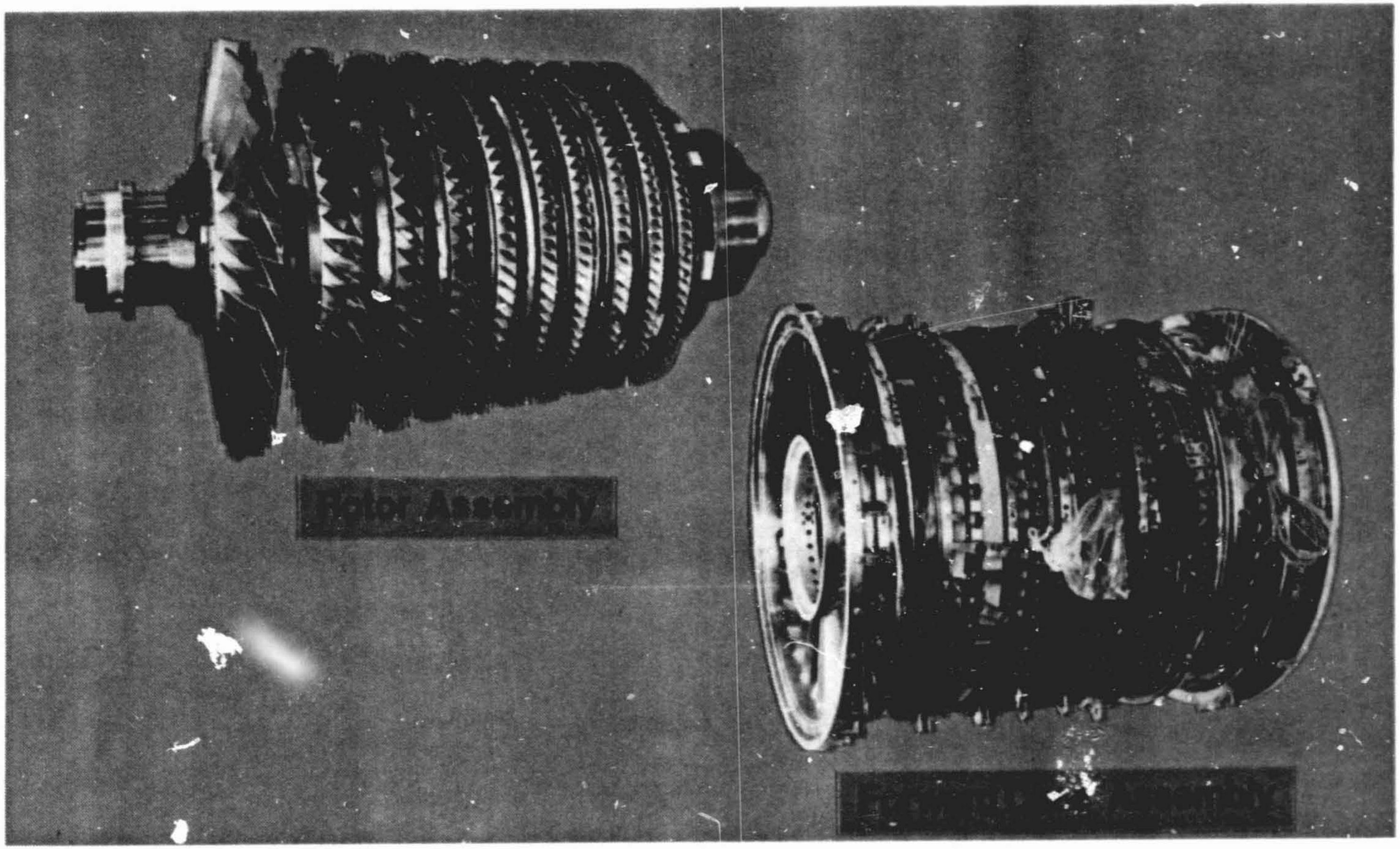


Figure 8. Ten-Stage Compressor Rig

Table III. Component Tests.

- Three Component Tests in Lynn FSCT Facility
- FSCT Facility Limited to 400° C (750° F) and 1.61 MPa (233 psia)
    - Ambient Inlet Temperature Running Limited to 92% Core Speed for Full 10-Stage Rig
- New Inlet Refrigeration System Used For Testing in High Speed Range
    - Inlet Temperatures of -62° C (-76° F)
    - Physical Flows Limited to 17.7 kg/sec (39 lbm/sec)
- Rotor Cooling Circuit Supplied by Separate Shop Air Line
- All Bleed Flows Measured Separately

Table IV. Six-Stage Rig Test Summary.

- 117:30 Hours of Testing, 1-25-80 through 2-29-80
- 44 Stalls (13 at 90% Core Speed or Above)
- Max. Physical Speed 12,700 rpm

Table V. Instrumentation for 10-Stage Rig Test.

- 753 Sensors
- Dynamic Strain Gages - 6 Per Vane Stage - Total 68
  - 4/5 Per Blade Stage - Total 44
- Total Pressure/Total Temperature
  - 5 Immersions, 2 Per S1 - S6
  - 3 Immersions, 2 Per S7 - S9
- Cobra Probes - 1 Each Exit R1 - R9
- Touch Probes - 1 Each R3, R5, R10
- Clearanceometers
  - R3, R5 2 Per
  - R10 3 Per
- Structure Thermocouples

Casing	Rotor
35 Skin	6 Skin
4 Air	4 Air

- Casing/Shroud Static Pressures
  - Before and After Each Stage
- Inlet Rakes, Boundary Layer Rakes, Exit Rakes (20 Total)
- Kulites - 16
- Operational Instrumentation - Pressures, Temperatures, Accelerometers

Table VI. Ten-Stage Rig Test Summary.

- 79:57 Hours of Testing, 3-20-81 Through 4-10-81
- 46 Stalls (11 at 85% Core Speed or Above)
- Max. Physical Speed 11,600 rpm
- 199 Test Data Points

Table VII. Hardware Fabrication List.

Major Items	Quantity
Rotor	
Blades	3-3/4 Sets Each Stage
Stages 1-4 Spool	2
Stage 5 Disk	2
Stages 6-10 Spool	2
CDP Seal Disk	1
Stator	
Forward Casing	2 + Slave 1-6
Rear Casing	2
Inlet Guide Vanes	3.5 Sets
Stator Vanes - Variable	3.5 Sets
Stator Vanes - Fixed	3.3 Sets
IGV and Stator Vane Actuation Rings	2 Sets
Diffuser	2 + Spare Casting
Wishbone	2 + Spare Forging
Stages 4 and 5 Liners	3 Sets Each Stage
Stages 1-9 Shrouds	2 Sets Each Stage
Stages 1-9 Seals	4 Sets

2.0 AERODYNAMIC DESIGN

2.1 INTRODUCTION

The core compressor for the GE/NASA E^3 is an advanced technology, 10-stage unit designed to produce an operating line total pressure ratio of 23 at a design corrected tip speed of 456 m/sec (1495 ft/sec). Because of the high speed, pressure ratio, and aerodynamic loading, it is one of the most technically challenging designs that General Electric has built. The basic configuration was selected during the GE/NASA AMAC preliminary design study (Reference 1). This contract was conducted in 1975-1976 to identify an optimum compressor configuration for use in a low-energy-consumption, subsonic, commercial turbofan.

In the AMAC study, a parametric screening study was conducted to determine the influence of the major compressor design features upon efficiency, weight, cost, aircraft direct operating cost (DOC), and fuel usage. Design parameters examined were: aspect ratio, solidity, inlet specific flow, exit Mach number, reaction ratio, inlet radius ratio, exit radius ratio, and number of stages. Compressor speed was set to allow each configuration studied to meet an objective level of stall margin. The study was conducted for two engine configurations: an engine having a core compressor total pressure ratio of 14 with booster stages on the low pressure spool and an unboosted engine having a core compressor total pressure ratio of 23. It was found that best compressor efficiency was obtained using medium values of average aspect ratio, solidity, and reaction ratio and using low values of inlet radius ratio, inlet specific flow, and exit Mach number. Reducing the number of stages by using higher speeds reduced compressor length and cost but did not necessarily reduce engine weight. Efficiency was not necessarily greatly reduced by using fewer stages, provided that blading Mach numbers did not become excessive. High rear radius ratios were beneficial when used to hold the front stage, rotor tip Mach numbers below the level at which high shock losses would be present. The optimum rear radius ratio tended to increase as the number of stages was reduced and the speed was increased.

At the conclusion of the AMAC study, a 10-stage, 23:1 pressure ratio design was recommended for further development. This design incorporated those features mentioned above as contributing to high efficiency. The choice of 10 stages was made because this appeared to offer the best overall combination of desirable features: compactness, low cost, high efficiency, low engine operating cost, and low fuel usage.

The decision to use the very high (23:1) pressure ratio core compressor in an unboosted engine configuration was made because this layout gave the lowest fuel consumption, resulting primarily from the use of a highly efficient, two-stage, pressure turbine (HPT) with relatively little penalty in direct operating cost. The technical challenge inherent in such a high total pressure ratio for this core compressor was not overlooked. It is the highest pressure ratio design General Electric has ever undertaken; the pressure rise is about 30% greater than that of any production aircraft engine single-spool compressor. Variable stators and starting bleed were both employed to aid in achieving adequate low speed stall margin; the challenge of developing stator and bleed schedules that avoid potential starting and idle-to-takeoff acceleration problems was expected to be substantial. Another challenge was to minimize the efficiency penalty that might result from blade shapes compromised for off-design operation. Off-design performance analyses were made during the final design process to establish design incidence angles and work input distributions that permitted both high efficiency near design speed and high stall margin at part speed.

Refinements to the core compressor design continued during the E^3 Preliminary Design Study (Reference 2). The more significant of these were to increase the inlet specific flow and exit Mach number somewhat and to reduce the speed, average aspect ratio, and average solidity. These changes were made mainly to reduce cost through use of fewer, longer chord airfoils and to increase blade erosion resistance and general ruggedness. An increase in stall margin potential was predicted, despite the lower speed, with only a small efficiency penalty.

Many of the advanced features incorporated into the detailed design of the E^3 core compressor were developed during a parallel, supporting, research program: the NASA-sponsored Core Compressor Exit Stage Study (Reference 3). This program utilized a low speed, four-stage model of the blading used in the middle and rear stages of the E^3 compressor to develop improved airfoil shapes and vector diagrams. A baseline stage and several modified stages were tested, and worthwhile improvements in both efficiency and stall margin were demonstrated by design refinements that improved the flow in the end-wall regions.

The current NASA/GE E^3 program involving the detailed design and development of the core compressor culminates in operation in a turbofan engine. This report documents the original aerodynamic design that was evaluated in a full-scale component test program. It also gives a brief summary of the experimental results and describes the final design that evolved from this development effort. The final design will be utilized in the core engine and turbofan engine test configurations.

2.2 SELECTION OF OVERALL CONFIGURATION

A summary of aerodynamic design parameters for the final E^3 core compressor configuration is given in Table VIII. Also listed are corresponding data for the original AMAC 10-stage compressor to illustrate the evolution of the design as described in the previous section.

Core compressor aerodynamic design requirements were established primarily for the maximum-climb-thrust engine power setting at a flight condition of Mach 0.8 at 10.67 km (35,000 ft) altitude on a -8° C (+18° F) day. This operating condition places the core compressor at maximum corrected speed, corrected airflow, and total pressure ratio and was therefore defined as 100% design corrected speed. Compressor efficiency requirements, however, were most important at altitude cruise. Performance requirements for these operating conditions as well as requirements for sea level takeoff are listed in Table IX. The operating line pressure ratios listed are for zero customer bleed air and zero power extraction, and the efficiency levels are those required for the fully developed, product level engine. At the end of the currently contracted development program, it is desired to be within one percentage point of these ultimate goals.

Table VIII. Aerodynamic Design Comparison of Final E^3 and Recommended AMAC Compressors.

Parameter	AMAC 10-Stage	E^3
Corrected Tip Speed, m/sec (ft/sec)	469 (1540)	456 (1495)
Inlet Radius Ratio	0.496	0.503
Flow/Annulus Area, kg/sec m^2 (lbm/sec ft^2)	178.2 (36.5)	185.5 (38.0)
Rotor 10 Exit Hub Speed, m/sec (ft/sec)	358.1 (1175)	352.7 (1157)
Rotor 10 Exit Radius Ratio	0.93	0.93
Outlet Guide Vane (OGV) Exit Mach Number	0.26	0.30
Number of Rotors and Stators	1956	1672
Average Aspect Ratio	1.72	1.48
Average Pitch Solidity	1.40	1.36
Adiabatic Efficiency	0.860	0.857
Stall Margin Potential, %	18	25

Table IX. Core Compressor Aerodynamic Operating Requirements

Parameter	Max. Climb	Max. Cruise	Takeoff
Corrected Speed, % Design	100.0	99.5	97.7
Corrected Airflow, kg/sec (lbm/sec)	54.4 (120.0)	53.5 (118.0)	49.3 (108.7)
Total Pressure Ratio	23.0	22.4	20.1
Adiabatic Efficiency	0.857	0.861	0.865
Polytropic Efficiency	0.903	0.905	0.908
Inlet Temperature, K (° R)	304.4 (547.9)	301.4 (542.5)	327.8 (590.1)
Inlet Pressure, N/m^2 ($lb/in.^2$)	59,641.8 (8.65)	58,055.9 (8.42)	150,586.8 (21.84)

The design speed stall margin potential (25%) was selected to be somewhat higher than experience (on current commercial engines) has indicated is required. It was thought that, by designing a configuration capable of generous stall margin at design speed, the prospects for achieving sufficient start-region stall margin would be improved. Design speed stall margin was estimated using correlations of General Electric compressor test data that account for the effects of blade speed, solidity, aspect ratio, clearance, reaction, and flow-through Mach numbers on achievable stall pressure rise.

The aerodynamic design calculations were conducted at 100% corrected speed (456.0 m/sec blade speed at the first rotor's inlet tip radius) and 100% corrected airflow (54.4 kg/sec) at a total pressure ratio of 25 and at an adiabatic efficiency of 0.847. Selecting a design pressure ratio approximately 9% above the operating line was done to help assure that high stall margin at design speed would be obtained. The design efficiency is the objective level for the ICLS demonstrator engine tests and is 1 point lower than the FPS goal listed in Tables VIII and IX.

The flowpath of the E^3 core compressor is shown in the cross section of the final design, Figure 9. The hub-to-tip radius ratio at the inlet of the first rotor is 0.503, about the minimum possible value considering the need to pass the low pressure spool shaft through the center of the compressor. Trade-off studies conducted during the AMAC preliminary design contract showed that a reduction in inlet radius ratio (with rear stage flowpath geometry fixed) required a slight increase in RPM for a given stall margin; however, this still produced lower front stage tip speed and inlet Mach number and resulted in a higher efficiency. The radius ratio at the exit of the last rotor is 0.931. Although this is higher than it is in current production designs, the trade-off studies again indicated that this was a favorable compromise. The efficiency penalties incurred by increasing rear stage radius ratio (thus increasing the clearance: blade-height ratio and end-wall losses) were outweighed by reductions in rpm that this made possible (thus reducing front stage tip speed and shock losses). The final flowpath has nearly constant pitch-line radii through the first six stages and constant hub radii from Stages 7 through 10. A casing port for customer bleed and turbine cooling air is located at Stage 5 exit, and another casing port for starting bleed

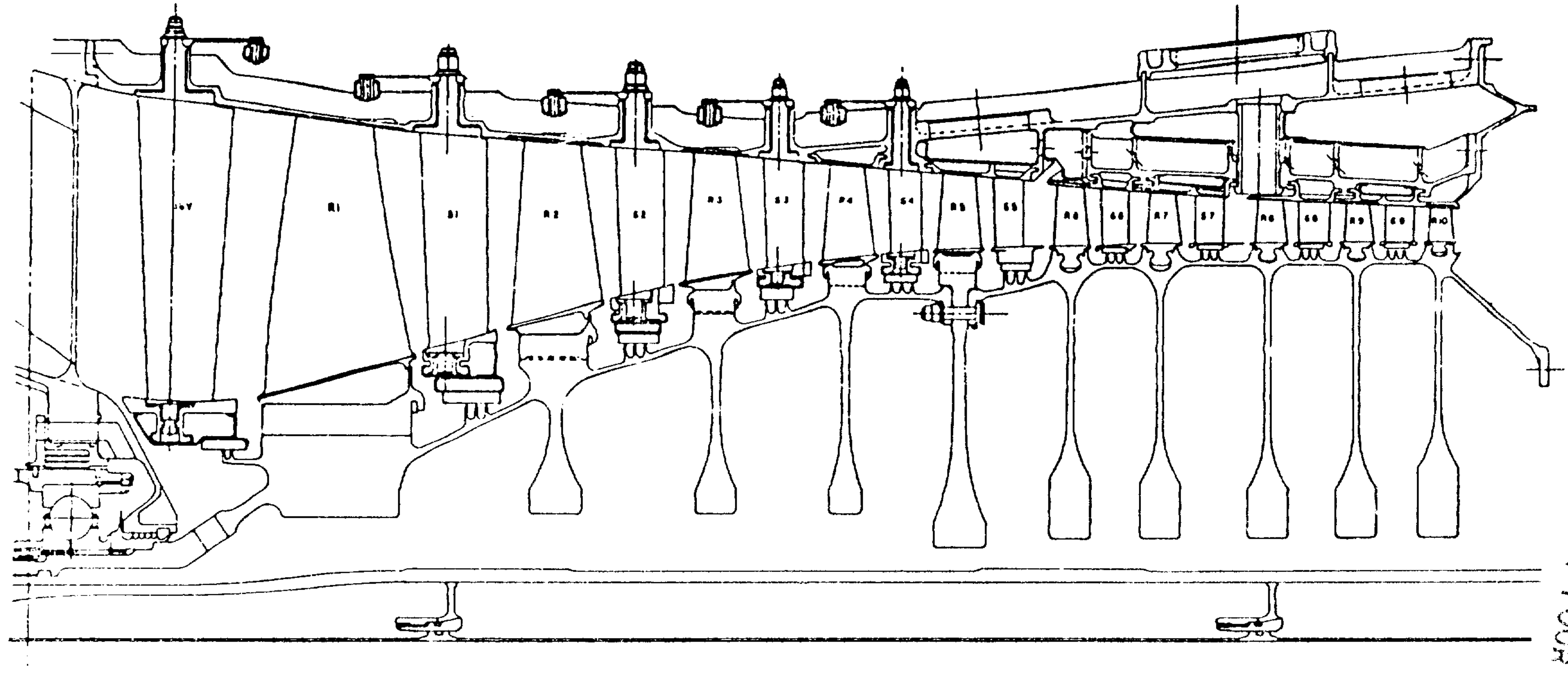


Figure 9. E^3 Core Compressor.

and turbine cooling air is located at Stage 7 exit. The inlet guide vane and first four stator vane rows are variable.

Stagewise distributions of rotor and stator aspect ratio and pitch-line solidity are shown in Figures 10 and 11. Rotor aspect ratios were selected to be low enough in the front stages to avoid use of part-span shrouds but high enough to keep the design as compact as possible. Medium front stator aspect ratios were also used for compactness. Rear stage rotor and stator aspect ratios were made fairly low for improved stall margin and ruggedness. Solidities were chosen primarily to control aerodynamic loadings, although front rotor tip solidities were also influenced by considerations of passage area distribution and shock structure. An effort was also made to keep solidities as low as possible in the front variable stators in order to assure that they could be closed sufficiently for good low speed stall margin. Pitch-line solidities in Stators 8 and 9 are lower than in the other rear stators because a highly nonuniform radial chord distribution is used to control vane natural frequencies. End-wall solidities in these vanes are comparable to those in the other rear stators, however.

The pitch-line meridional Mach number distribution through the compressor is shown in Figure 12 for the 25:1 design total pressure ratio condition. The first rotor inlet Mach number of 0.602 resulted from selecting a specific flow of 38 lbm/sec-ft^2 with an effective area coefficient (blockage factor) of 0.97. The design point exit Mach number of 0.28 (at an exit blockage factor of 0.90) becomes 0.30 at the 23:1 total pressure ratio operating line. The design calculations were performed for zero Stator 5 exit customer bleed at the more typical cruise operating condition when 2 to 4% bleed is extracted, the axial Mach number distribution in this region is slightly different but is still smooth and continuous.

Stage reaction ratios, blade row inlet Mach numbers, and aerodynamic loading levels were controlled by specifying radial and stagewise distributions of stator exit absolute swirl angles. Stagewise distributions of tip, pitch line, and hub swirl angles are shown in Figure 13. The swirl increases through the first several stages in order to hold down the level of rotor inlet relative Mach numbers, then drops to a lower level in the rear stages to hold down the diffusion factors in these highly loaded stages. The outlet

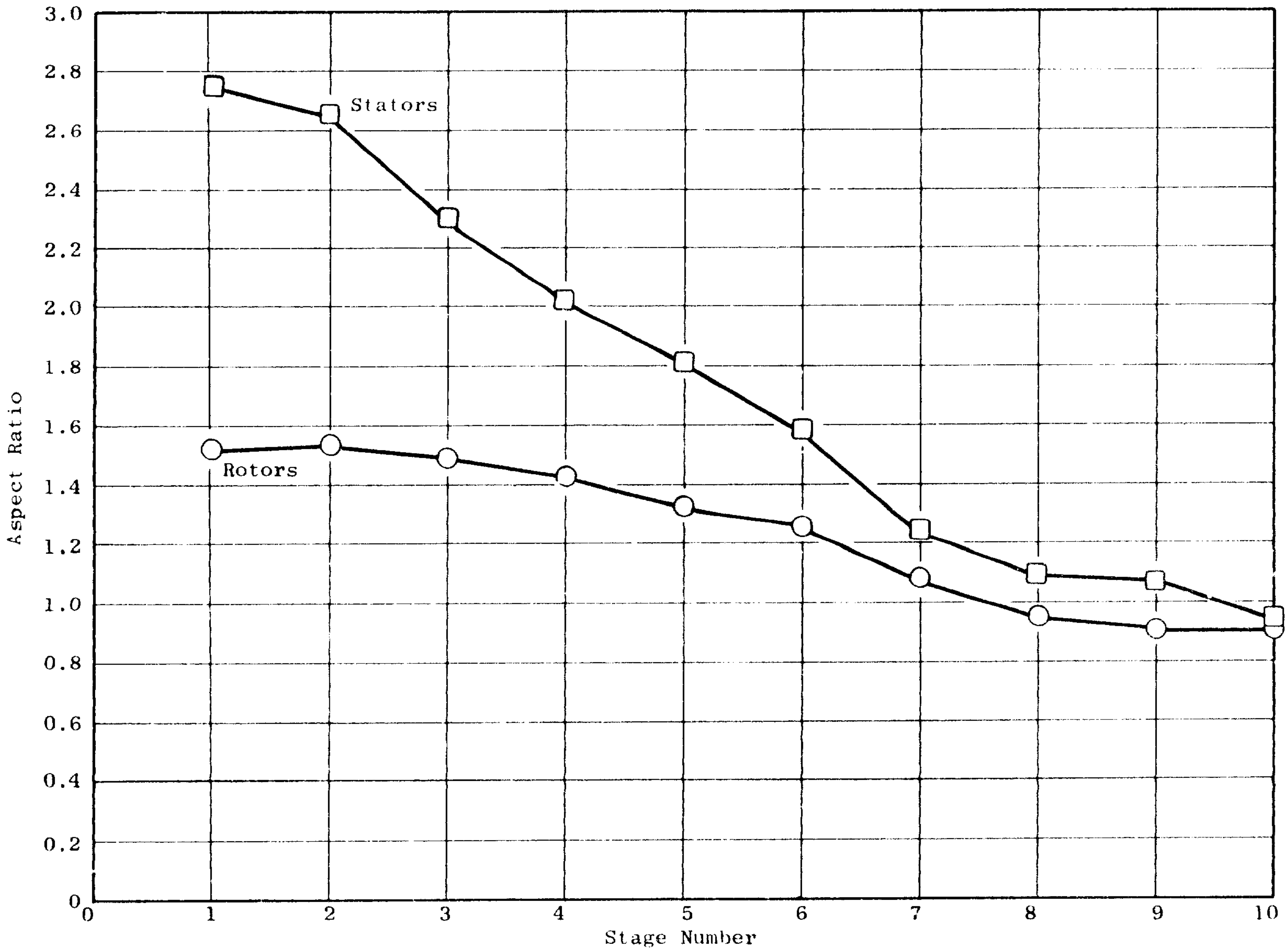


Figure 10. Stagewise Distribution of Rotor and Stator Aspect Ratios.

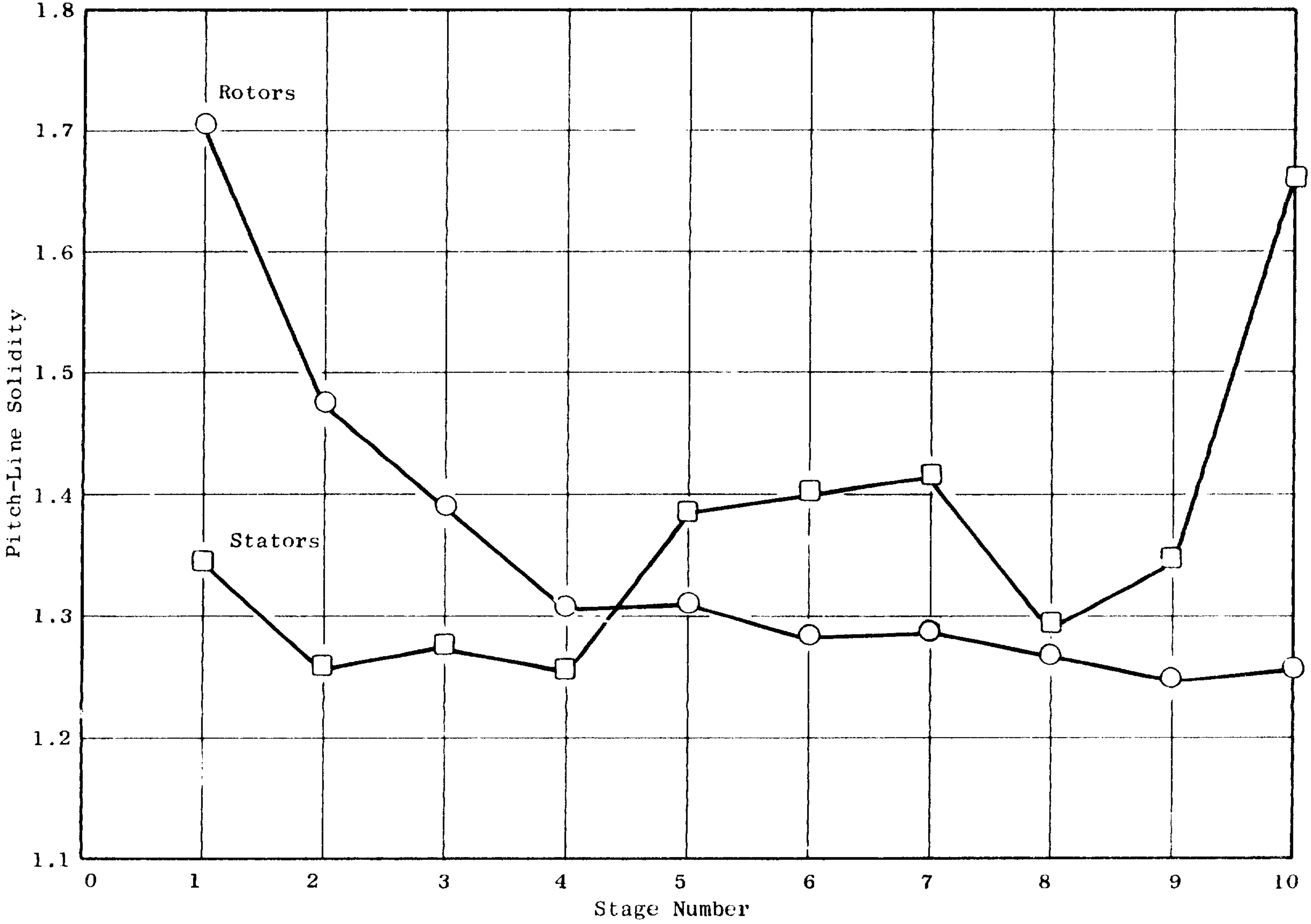


Figure 11. Stagewise Distribution of Rotor and Stator Pitch-Line Solidity.

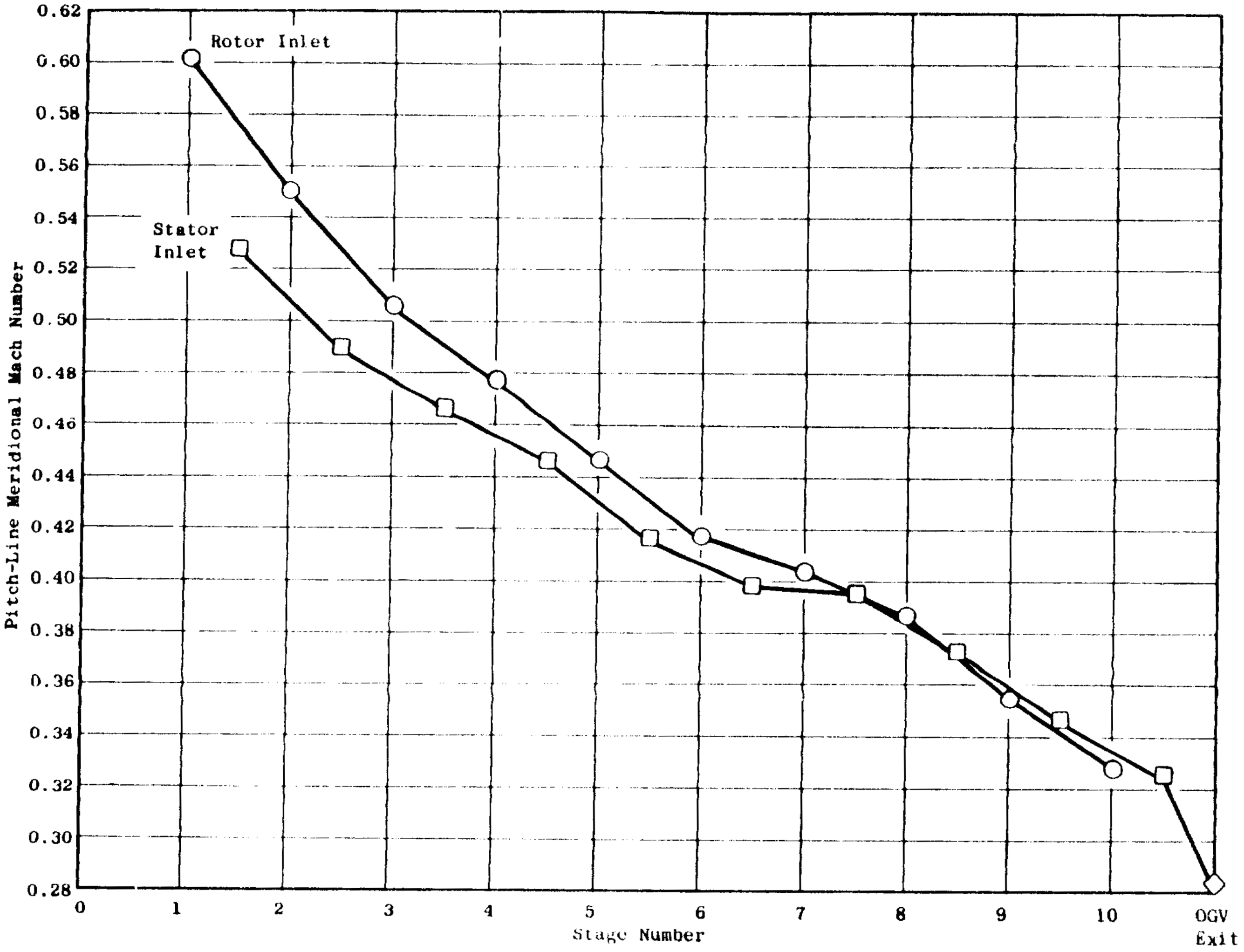


Figure 12. Distribution of Pitch-Line Meridional Mach Number.

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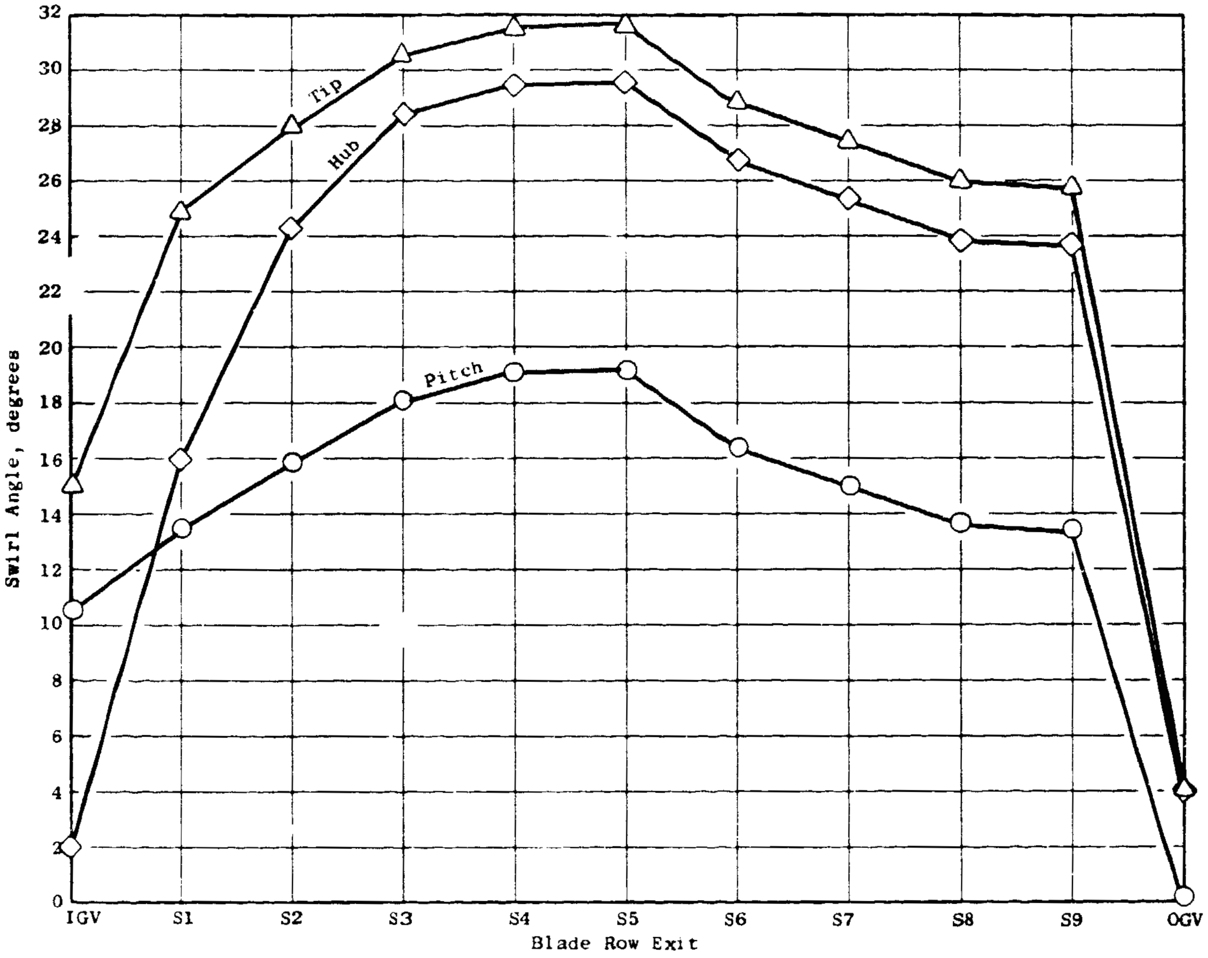

Figure 13. Stagewise Distribution of Stator Exit Swirl Angle.

guide vane (Stator 10) must remove the remaining swirl from the airflow; it is thus a very highly loaded airfoil and has been given a high solidity (Figure 11) in order to control its diffusion factors. The highly nonuniform radial distribution of swirl at each stator exit was selected based on favorable performance results in the supporting Low Speed Research Compressor program (References 3 and 4). An average pitch-line reaction ratio of 0.668 results from use of these swirl angles.

The stagewise distribution of total temperature rise in each stage at the 25:1 pressure ratio design point is shown in Figure 14. The reduced work inputs for Stages 6 and 7 are significant. These are the first two stages not controlled by upstream variable stators; and analysis of off-design operating characteristics showed that at part speed these stages became very heavily loaded at near-stall operating lines. To equalize part-speed, near-stall loadings among the five fixed geometry rear stages thus obtaining the highest possible part-speed stall margin, it was necessary to specify the rather nonuniform design point work input distribution shown in Figure 15. Near stall at design speed, Stages 8 through 10 are the most highly loaded in the compressor. At intermediate speeds, Stages 6 and 7 become highly loaded as well; and at low speeds, Stages 8 through 10 tend to unload while Stages 6 and 7 remain very highly loaded. Extraction of customer bleed air at Stage 5 exit at high speeds tends to reduce the loadings in Stages 1 through 5 and gives a somewhat more uniform work input distribution. Although use of this work input distribution may reduce design speed stall margin somewhat, off-design performance estimates indicated that the high speed stall margin goals could still be achieved while the low speed stall margin was improved.

2.3 ORIGINAL AERODYNAMIC DESIGN

2.3.1 Flowpath and Vector Diagram Design

The basic aerodynamic design tool employed was the General Electric Circumferential Average Flow Determination (CAFD) computer program. This program computed vector diagram and fluid properties along numerous stream surfaces for a specified flowpath geometry, stage work input distribution, and estimated loss levels. The resulting two-dimensional, steady-state, circumferential average flow solution included all effects of the full radial equilibrium

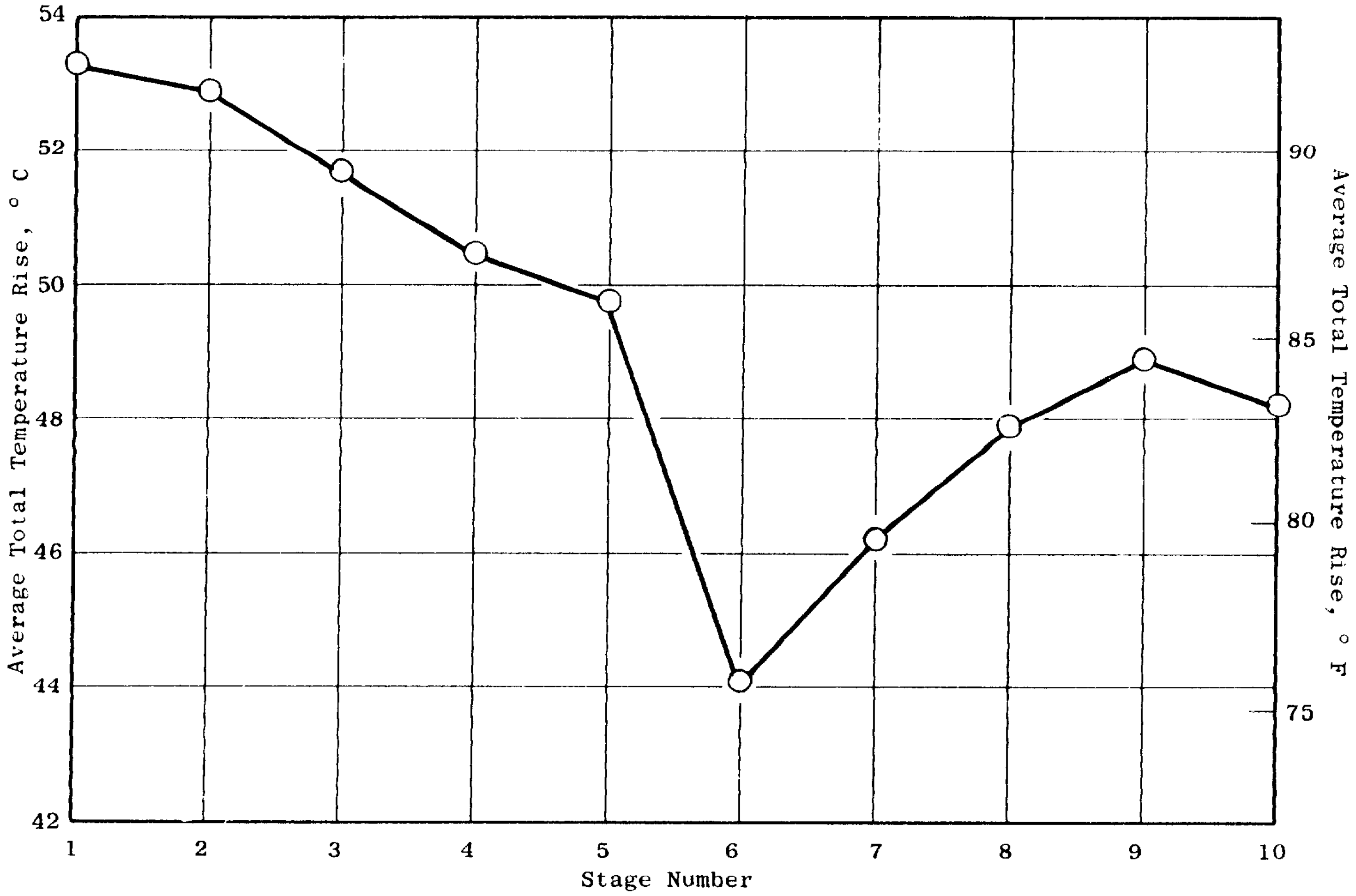

Figure 14. Stagewise Distribution of Average Temperature Rise.

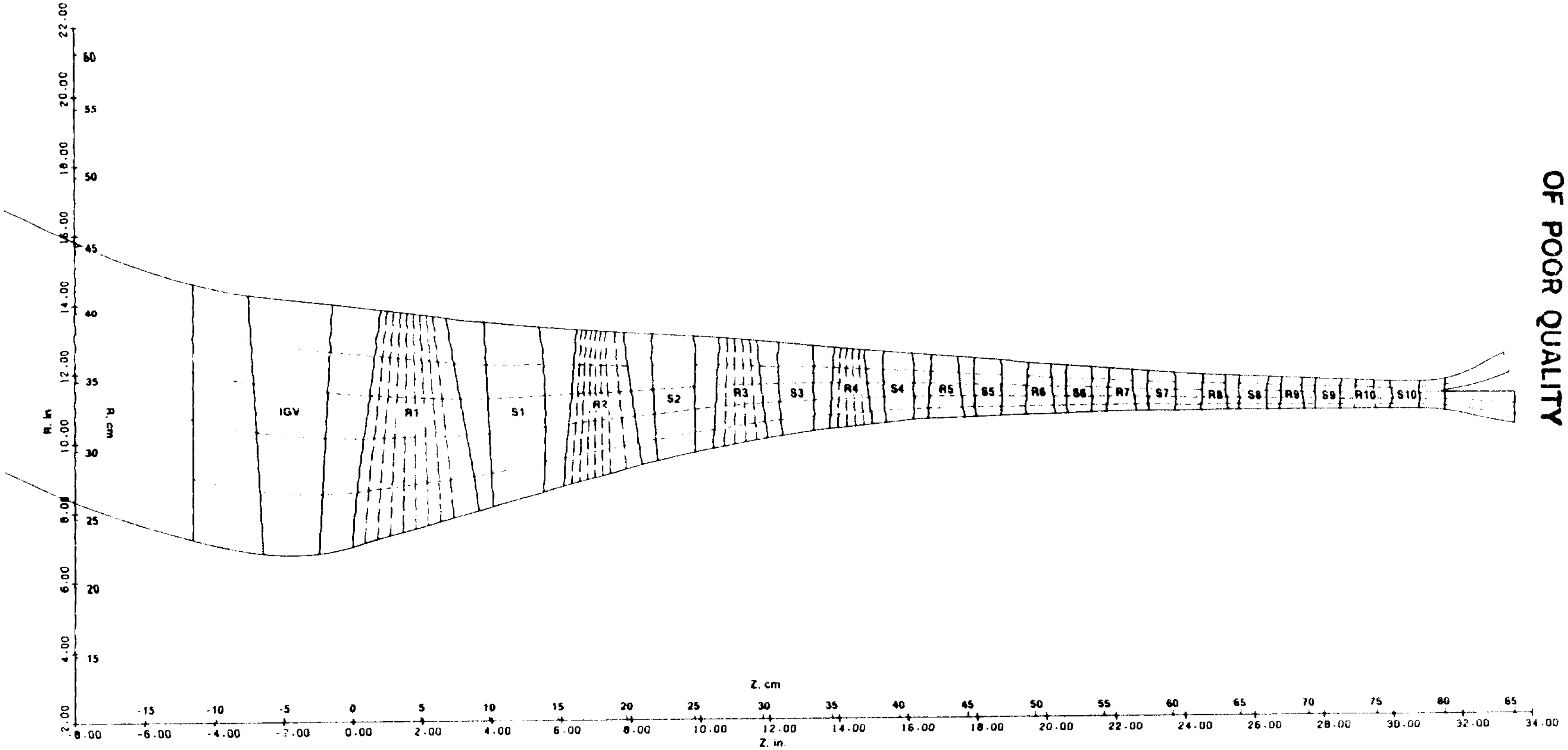

Figure 15. CAFD Flowpath.

equation and included internal blade row calculations for some stages. Vector diagrams determined by CAFD along blade and vane leading and trailing edges were then used with airfoil section design procedures and cascade analysis computer programs to determine the final blade shapes. This section of the report documents the required CAFD inputs and discusses the CAFD vector diagram selection.

There were three major areas of information necessary to completely specify the design point vector diagrams: (1) the overall compressor design operating point in terms of inlet conditions, corrected speed, and flow; (2) the geometry of the flowpath, blades, and vanes; and (3) the radial and stagewise distributions of stator exit swirl, rotor exit total pressure, and blade and vane loss coefficients. As described previously, the core compressor design point was chosen to be the altitude maximum-climb-thrust engine power setting in terms of inlet corrected airflow and corrected tip speed. The design point pressure ratio, however, was set at 25:1 rather than the maximum climb requirement of 23:1. The design point efficiency of 0.847 was selected to be the same as the target adiabatic efficiency of the test engines at the 23:1 pressure ratio operating line.

The flowpath employed in the calculations included the fan/core transition duct, the inlet guide vane, all 10 compressor stages, and the exit diffuser. Figure 15 is a cross section of the CAFD flowpath showing the computation stations and streamlines. Station locations were selected to coincide with blade edges. The front four stages also had internal blade row stations, because these front rotor blade rows had either supersonic or high subsonic inlet Mach numbers requiring particular attention in the selection of their passage area distributions. Additional stations were located through the inlet transition duct and the exit diffuser to refine the calculation grid, thus assuring an adequate flow field representation. Included in the flowpath definition were provisions for extracting bleed air from the stator casing aft of Stators 5 and 7. Bleed ports required increases in the axial spacings aft of these two stators and alterations in the flowpath downstream of the bleed ports to accommodate the reduced through-flow. The maximum allowable flow rate for the Stage 5 bleed was 10.3% of through-flow (9% maximum customer bleed plus 1.3% for low pressure turbine use). The Stage 7 bleed was sized to handle up to 22.3% of design flow (20% maximum starting bleed plus 2.3% for the HPT Stage 2 nozzle cooling system). For the design vector diagrams, the bleed flow rates employed were 1.3% fifth-stage bleed and 2.3% seventh-stage bleed, representing nominal cooling flow requirements only.

Standard General Electric compressor design practice has been to specify compressor hub flowpath shapes so as to avoid forward facing steps due to tolerance stackups at design operating conditions. The impact of this practice was that the actual hub flowpath at the aero design point was not smooth axially. Stator shrouds were tilted radially inward slightly at the leading edge and radially outward at the trailing edge for Stages 1 through 6. Rotor platforms were tilted similarly for Stages 7 through 10. The magnitude of the tilt was 2° to 3° from an otherwise smooth contour. The hub flowpath analyzed by CAFD and shown in Figure 15 is a smoothed-out, aerodynamic representation of the actual hardware.

The CAFD vector diagrams for the compressor are summarized in the Appendix (Table XXI) along with an overall description of the airfoils selected for each stage. Each page of Table XXI is devoted to a single blade row starting with the IGV. Four rows of information are included on each page for each blade row. The first two rows describe the inlet and exit station vector diagrams and fluid properties along 12 streamlines. The stations defined by the "radius" and "Z" columns lie along the blade edges at both inlet and exit. The hub coordinates are for the smoothed-out aerodynamic representation of the actual hardware. The third row, labeled "SL Data," contains streamline data relative to loading, losses, efficiency and blade setting angles. The bottom row, labeled "Plane Sections," provides a description of the airfoil geometry on flat plane manufacturing sections. These sections are generally located at the average radius of a calculated streamline, and thus part of the first and last sections may be outside the flowpath.

The average total pressure and total temperature at the inlet of the core compressor inlet guide vane were set at standard-day, sea level static conditions. Radial profiles of both pressure and temperature were specified to simulate typical core inlet distributions as experienced on similar turbofan engines. These profiles, plus the streamline slope and curvature distributions resulting from modeling the transition duct flowpath, provided a realistic description of the flow field entering the front stage of the core compressor.

Rotor energy input requirements were established by specifying radial distributions of rotor exit total pressure and loss coefficient. The rotor exit total pressure profile used for all 10 rotors was a linear distribution with the highest values being at the hub. This slightly hub-strong profile was established to produce good balance between hub and tip aerodynamic loadings and to help prevent premature hub flow breakdown when the compressor was throttled to elevated operating lines.

Average stator exit swirl angles for each stage were established during the overall configuration studies described in Section 2.2. The radial distributions, however, were an outgrowth of the NASA-sponsored Core Compressor Exit Stage Study (References 3 and 4). The swirl distribution selected for Stator 6 of the E^3 design is shown in Figure 16 and is typical, in shape, of the radial distributions of Stators 3 through 10. High end-wall swirl was the unique feature of this design distribution. As seen in Figure 16, the casing and hub swirl angles are 12.5° and 10.4° higher, respectively, than the pitch swirl angle. A 0.4 point improvement in operating line polytropic efficiency plus an improved near stall pumping characteristic were observed in the Core Compressor Exit Stage Study tests which employed a similar swirl distribution (Stator B). Stators 1 and 2 also had casing end-wall swirl gradients similar to those of Stators 3 through 10 to help reduce the tip relative Mach number into the following rotors. The stator hub swirl gradient, however, was allowed to build up through Stages 1 and 2.

The radial distribution of loss coefficient employed for each blade row is included in the Appendix (Table XXI) of the "SL Data" row under the heading "Loss." These loss coefficients were based on past experience with highly loaded multistage compressors, with appropriate adjustments for the particular flow environment of the E^3. This estimation of anticipated loss coefficients for this new design was carried out according to the procedures outlined in Reference 5. Blade profile losses, shock losses, and end-wall losses were modeled as functions of aerodynamic loading, Mach number, Reynolds

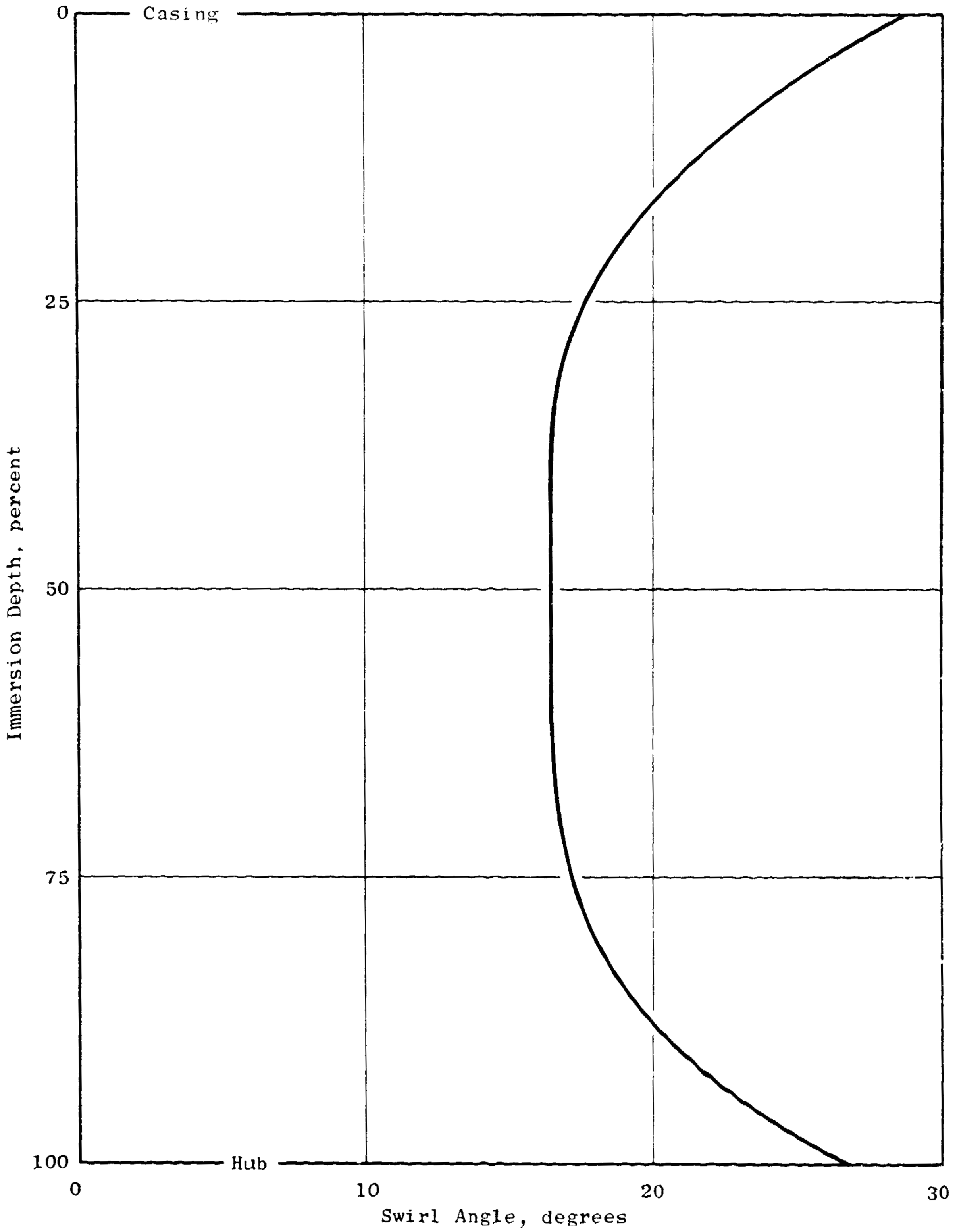

Figure 16. Radial Distribution of Stator 6 Exit Swirl.

number, and airfoil geometry. Losses predicted by that correlation were adjusted to reflect recent advancements in reducing end-wall losses through specially designed airfoil sections. Radial distributions of loss coefficient that resulted from this procedure had noticeably higher losses at the casing and hub than at the pitch line. The stagewise distribution of pitch-line loss coefficient is shown in Figure 17 for both rotors and stators. These axial distributions, in general, reflect the fact that the blade and vane inlet Mach numbers are highest in the front stages, resulting in higher losses. Aft of Stage 6, both rotor and stator pitch-line loss coefficients increase due to the higher aerodynamic loading and the increasing influence of end-wall boundary layers.

An additional term required to complete the CAFD input selection was the effective area coefficient, or blockage. Past experience in modeling test data from highly loaded multistage compressors with CAFD suggested that blockages of 0.97 and 0.90 at the inlet and exit, respectively, were consistent with the modeling philosophy used in the design of the E^3. The distribution of blockage through the compressor was approximately linear. The radial distribution was uniform at each calculation station.

The output data from the CAFD computer program were the vector diagrams at the intersection of the streamlines and the calculation stations. These vector diagrams, summarized in the Appendix (Table XXI), were used in the design of the E^3 blades and vanes as described in the next section. In addition, the vector diagrams were used to calculate blade and vane diffusion factors as an indication of the aerodynamic loading. Figure 18 shows the stagewise distributions of blade and vane diffusion factors for the pitch streamline for both rotors and stators. These, in general, are somewhat challenging for pitch-line design values and are higher than those in other General Electric commercial engines now in service or recently certified. However, the E^3 design point is on an elevated operating line which increases loadings in the rear stages. Also, the vector diagrams reflect zero customer bleed which increases loadings in Stages 1 through 5 above those normally experienced with bleed. The General Electric efficiency and stall margin correlations indicated that the performance goals could be met with this level of aerodynamic loading. The end-wall diffusion factors for the rotors are higher

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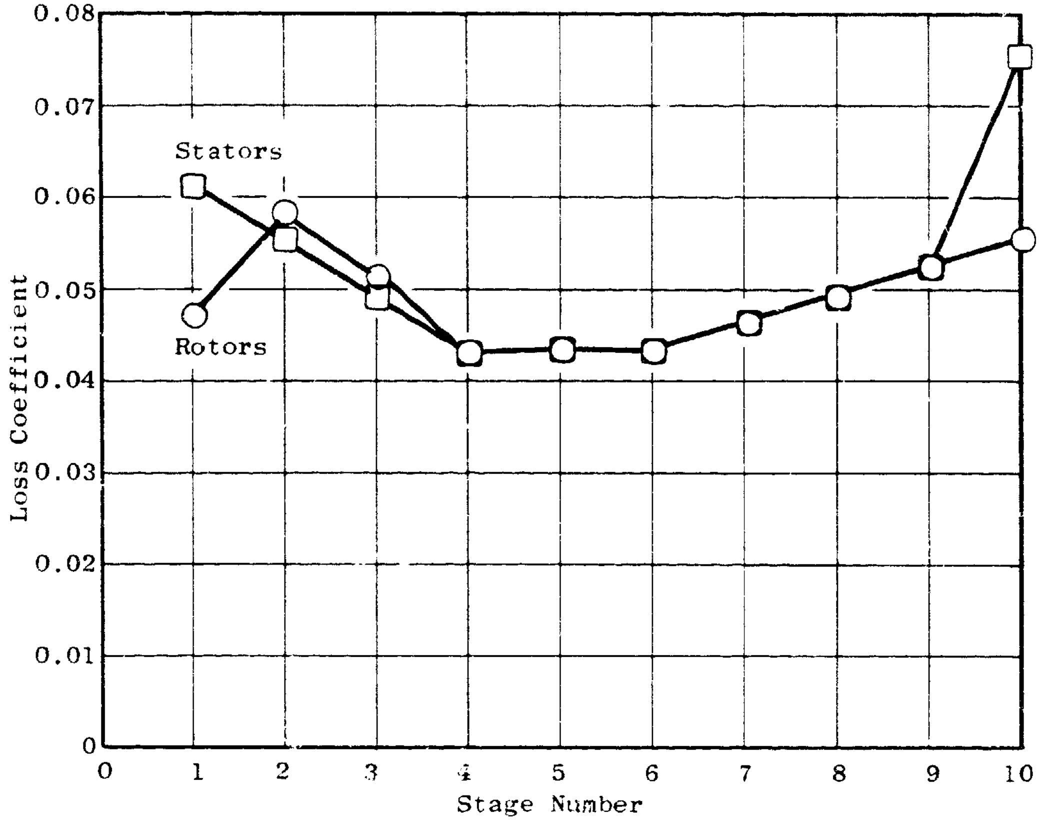

Figure 17. Rotor and Stator Pitch-Line Loss Coefficient.

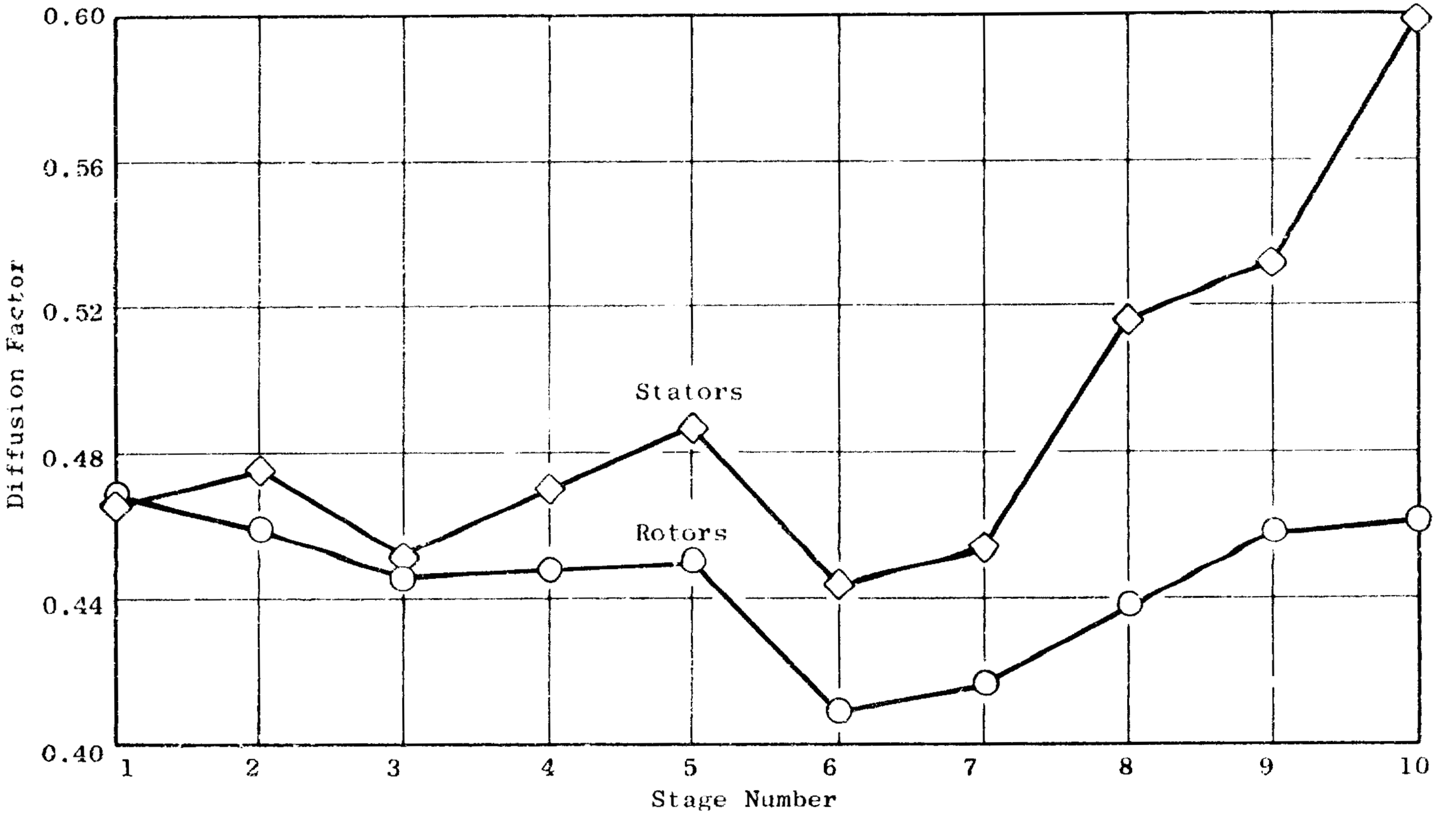

Figure 18. Stagewise Distribution of Rotor and Stator Pitch-Line Diffusion Factor.

than the end-wall values for the stators, but these high diffusion factors are very local, as evidenced in Figure 19. The selection of high end-wall swirl levels is the main cause of the high rotor end-wall diffusion factors. Test data from the Core Compressor Exit Stage Study, however, indicated improvements in both stall margin and operating line efficiency when the conventional relatively flat stator exit swirl distribution was replaced by a high end-wall swirl distribution similar to the E^3 Stator 6 distribution shown in Figure 16. One additional benefit from the high end-wall swirl was that the rotor blades had lower inlet relative Mach numbers locally at their tips. Figure 20 is a plot of the rotor tip and stator hub inlet relative Mach numbers for all 10 compressor stages. The maximum rotor inlet Mach number, which generally occurs at about 15% immersion as a result of the high stator exit tip swirl angle, is also plotted in this figure. The maximum stator inlet Mach number always occurs at the hub. Except for the tip of Rotor 1, the inlet Mach numbers are moderate despite the high tip speed.

2.3.2 Airfoil Design

The aerodynamic design of the airfoils for the E^3 core compressor included the design of both transonic and subsonic rotor blades, subsonic stator vanes, and an inlet guide vane. Fundamentally, the approach utilized for all blade and vane designs was one of tailoring stream surface blade shapes to produce specific airfoil surface velocity distributions. The first four rotors were transonic blade rows and were designed utilizing techniques employed for advanced fan stages. The remaining six stages of rotor blades and all stages of stator vanes operate in a predominately subsonic flow environment and were therefore designed somewhat differently. For the six subsonic rotor blade rows and for all stators, 5 of the 12 streamlines were analyzed in detail to determine the surface-velocity distributions with radial interpolation being employed to complete the airfoil definition. For the transonic rotors, however, all 12 streamlines were examined.

Rotors 1 Through 4

In addition to stations at both leading and trailing edges, several intrablade row stations were used to provide vector diagram and streamtube lamina thickness information for the transonic front rotor blades. This grid

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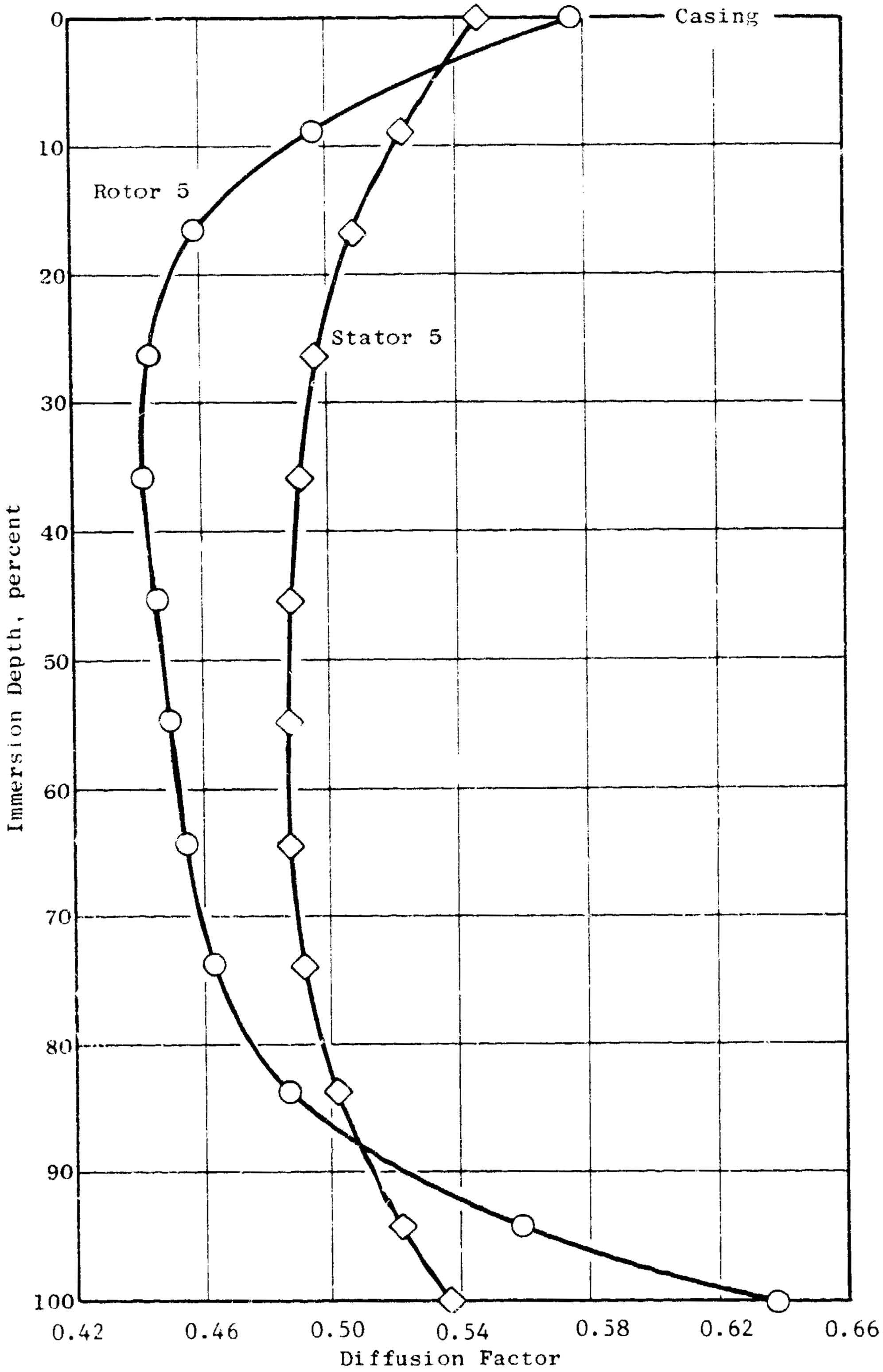

Figure 19. Radial Distribution of Rotor and Stator Diffusion Factor.

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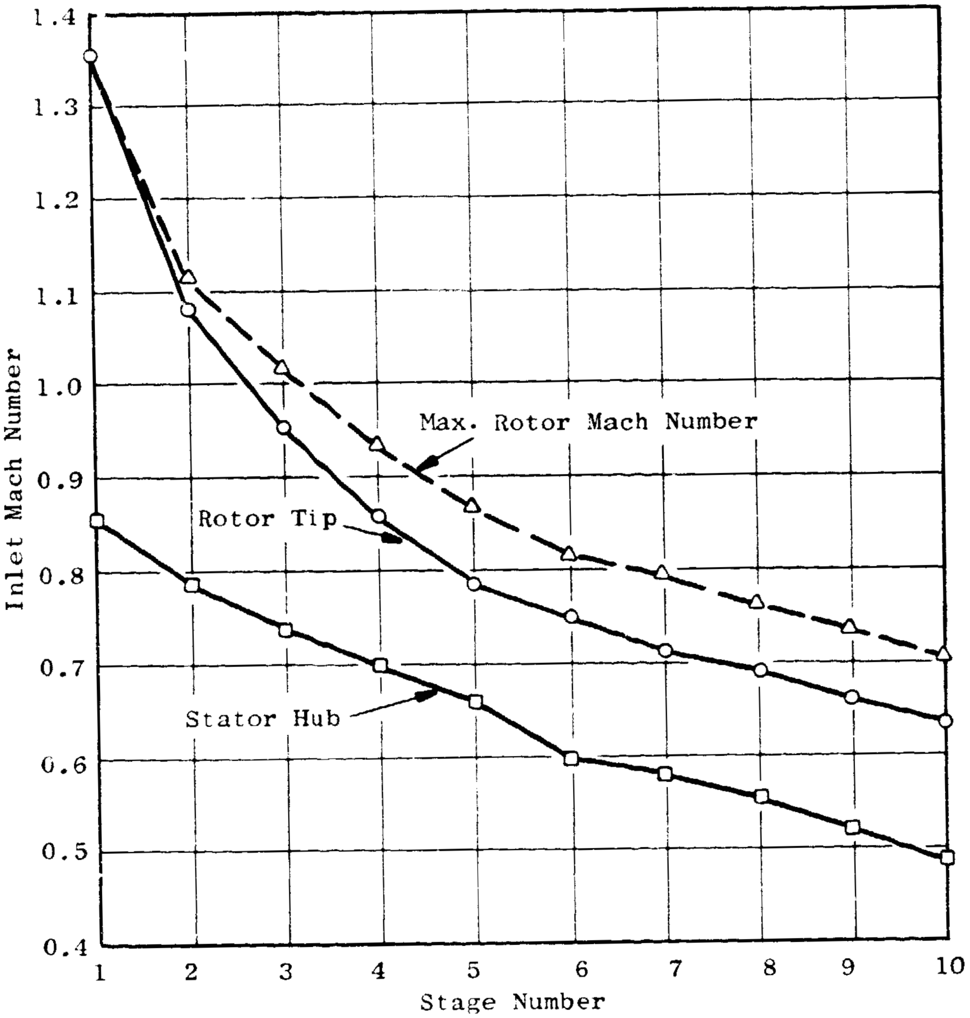

Figure 20. Stagewise Distribution of Rotor Tip and Stator Hub Inlet Mach Numbers.

of streamlines and calculation stations provided a model of the flow field through the blades including the effects of radial components of blade forces, flow field slopes and curvatures, blade thickness blockages, and axial gradients of work input and loss. Resulting vector diagrams and fluid properties at blade edges and within the blade, plus the geometry of the airfoil, were input into the General Electric Streamline Blade Section computer program, which provides an estimate of the suction surface Mach number distribution over the forward part of the airfoil and determines the passage area distribution along each streamline. The throat area for the transonic blade rows was set nominally at 6% above the critical value, assuming that one normal shock loss at the inlet Mach number would be incurred ahead of the throat. This target represented a compromise between the desire to maintain small throats, in order to minimize throat flow separation and the possibility of a strong second shock, and the need to maintain a large enough throat to assure a started shock system.

Shaping of the rotor blade forward of the passage mouth was accomplished by relating the suction surface shape to that of the "free-flow" streamline. The term "free-flow" applies to the path that a particle would follow through the blade row in the absence of all blade forces, energy input or losses, but with the effects of blade thickness blockage and annulus convergence on the axial velocity accounted for. It thus establishes a reference from which adjustments in the suction surface contour can be made in order to compensate for bow shock losses and leading edge thickness blockage. This is a convenient means for assuring that the supersonic flow minimum incidence constraint is observed and enabling the blade to pass the design airflow.

For the subsonic rotor sections near the hub, the General Electric Cascade Analysis by Streamline Curvature (CASC) computer program, which handles basically subsonic flows (although low supersonic flow regions are allowed) was employed to design the airfoils. This program was also employed to analyze the subsonic trailing edge region of the supersonic-inlet outboard sections. The exit flow angles predicted by the CASC program were related to the design exit air angles of the CAFD calculations through an empirical factor. The radial distributions of this empirical factor were derived from data analyses of the low speed research compressor and high speed compressor test configurations for which the rotor geometry similar to that of the E^3 core compressor, and also from calculations of secondary flow effects expected in these blade rows.

Figure 21 shows the first four rotors assembled into the front spool, the proportions of the blading, and some typical airfoil section shapes. The airfoil geometry for each blade row is summarized in Table XXI in the "Plane Section" data.

Rotors 5 Through 10

The inlet relative Mach numbers for Rotors 5 through 10 are subsonic, and the through-blade vector diagram calculation procedure used for the transonic rotors was not employed; vector diagrams were only determined at the blade edges. The axial distributions of streamtube height were approximated by linear distributions for these cases. In the middle stages, and especially in the rear stages, the overall annulus convergence is small and this linear approximation of streamtube contraction was considered to be adequate. In addition, for flow at the lower middle stage and rear stage Mach numbers, the sensitivity of surface Mach number to small area changes is not large.

Blade shapes developed for these rotors have a modified circular arc meanline with either a multicircular arc or a 65-series chordwise thickness distribution. As with the transonic rotors, the subsonic blades were tailored to have desirable suction surface velocity distributions along several of the design streamlines and determining the blade shapes necessary to produce these distributions. The design distributions employed are similar to those possessed by airfoils that had been found to have superior efficiency in the supporting research program conducted in the General Electric Low Speed Research Compressor (References 3 and 4). The resulting blade profile shape near the casing, relative to a conventional circular arc meanline, is lightly loaded over the forward part of the airfoil and more heavily loaded over the aft part. In the hub region, however, the blade is unloaded in the trailing edge region where the suction surface boundary layer is most likely

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Figure 21. Photograph of First Four Rotor Stages.

to separate. In the pitch-line region of each rear stage rotor blade, a circular arc meanline gave the desired velocity distribution. Final surface velocity distributions, as determined by the CASC computer program, are shown in Figure 22 for the tip, pitch, and hub streamlines of Rotor 6.

Incidence angles for these rotors were selected to best accommodate the off-design requirements. Off-design analyses were conducted to indicate how the incidence would change as the compressor was unthrottled to the normal operating line and throttled up to a near-stall point. Analyses were also conducted with the maximum anticipated customer bleed at Stage 5 exit and at a reduced corrected speed for which the front stators were substantially closed. It was found that the incidences at the tips of the rear rotors did not become much less than at design but did increase several degrees above the design values. Hub incidences tended to migrate somewhat more, particularly in the low incidence direction. This knowledge was employed when specifying the airfoil surface Mach number distributions at the design point, and the actual incidence angle was selected to obtain appropriate leading edge region surface velocity distributions at the design point. For Rotor 5, which has fairly high subsonic Mach numbers, CASC calculations were also made at the lowest expected incidence (high rates of customer bleed) to assure that its throat margin would still be adequate and that acceptable surface Mach number distributions would occur. Final design point incidence angles are tabulated in the column labeled "INC" in the third row of the Appendix (Table XXI) for each rotor.

Deviation angles were determined by applying empirical correction factors to the two-dimensional potential flow exit air angles calculated by the CASC computer program. The radial distributions of the empirical deviation angle factor were obtained in a manner similar to that described in connection with the first four rotors.

Throughout the iteration process used to arrive at acceptable blading designs for all blades and vanes, the implications of aerodynamically oriented changes upon the mechanical integrity of the airfoils were evaluated. Maximum thickness-to-chord ratio and trailing edge thickness-to-chord ratio levels and distributions were set to minimum values within the confines of acceptable

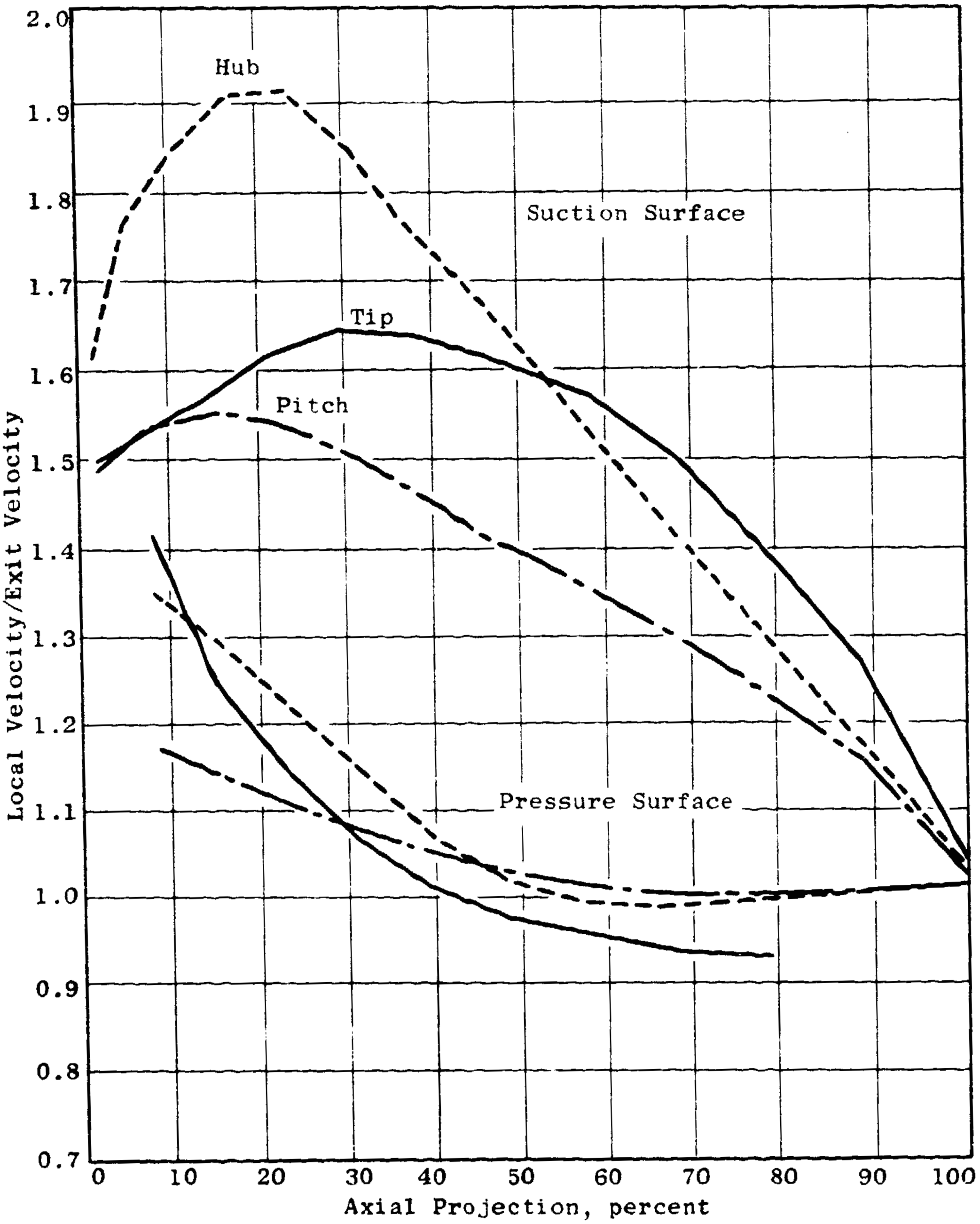

Figure 22. Rotor 6 Surface Velocity Distribution.

frequency response and the requirements necessary to achieve erosion life capabilities.

The geometric properties of the rotor blades are tabulated under the "Plane Section" data of the Appendix (Table XXI). A photo of Rotors 6 through 10 assembled into the rear spool is shown in Figure 23 and indicates typical airfoil sections used in the rear rotors.

Stators 1 Through 10

Methods used to design the stator vanes were the same as those used to design the subsonic rotors. That is, vector diagrams were determined along numerous streamlines at the leading and trailing edges of each vane row. Airfoils designed to perform as the vector diagrams indicated were analyzed with the CASC computer program, using linear distributions of streamtube contraction from leading edge to trailing edge. Blade selection considerations were the same as for the subsonic rotor sections, including the guiding influence of the off-design analyses to help select the design incidence from a range of acceptable incidence values. The dominant off-design consideration for the front stators derives from the fact that these stators are variable and run substantially closed down during part-speed operation. When closed down, these stators tend to have excessive camber and run at very low incidence. To help mitigate this condition, design point airfoil velocity distributions having relatively high leading edge loadings, produced by using relatively high design point incidences, were specified. The middle stages tend to migrate more toward high positive incidence rather than high negative; therefore, light leading edge loadings were employed at the design point. The rear stator incidences were set slightly high to reflect the unthrottled condition of the nominal operating line relative to that of the design point. Deviation angles were again established through an empirical adjustment to the calculated two-dimensional cascade values as mentioned previously.

Stator airfoil sections for Stages 1 through 4 consist of multicircular arc thickness distributions with modified circular arc meanlines. High end-wall swirl levels combined with medium to high inlet Mach numbers made it necessary to straighten the leading edge portions in the end-wall regions for these stages to keep the peak suction surface Mach numbers as low as possible.

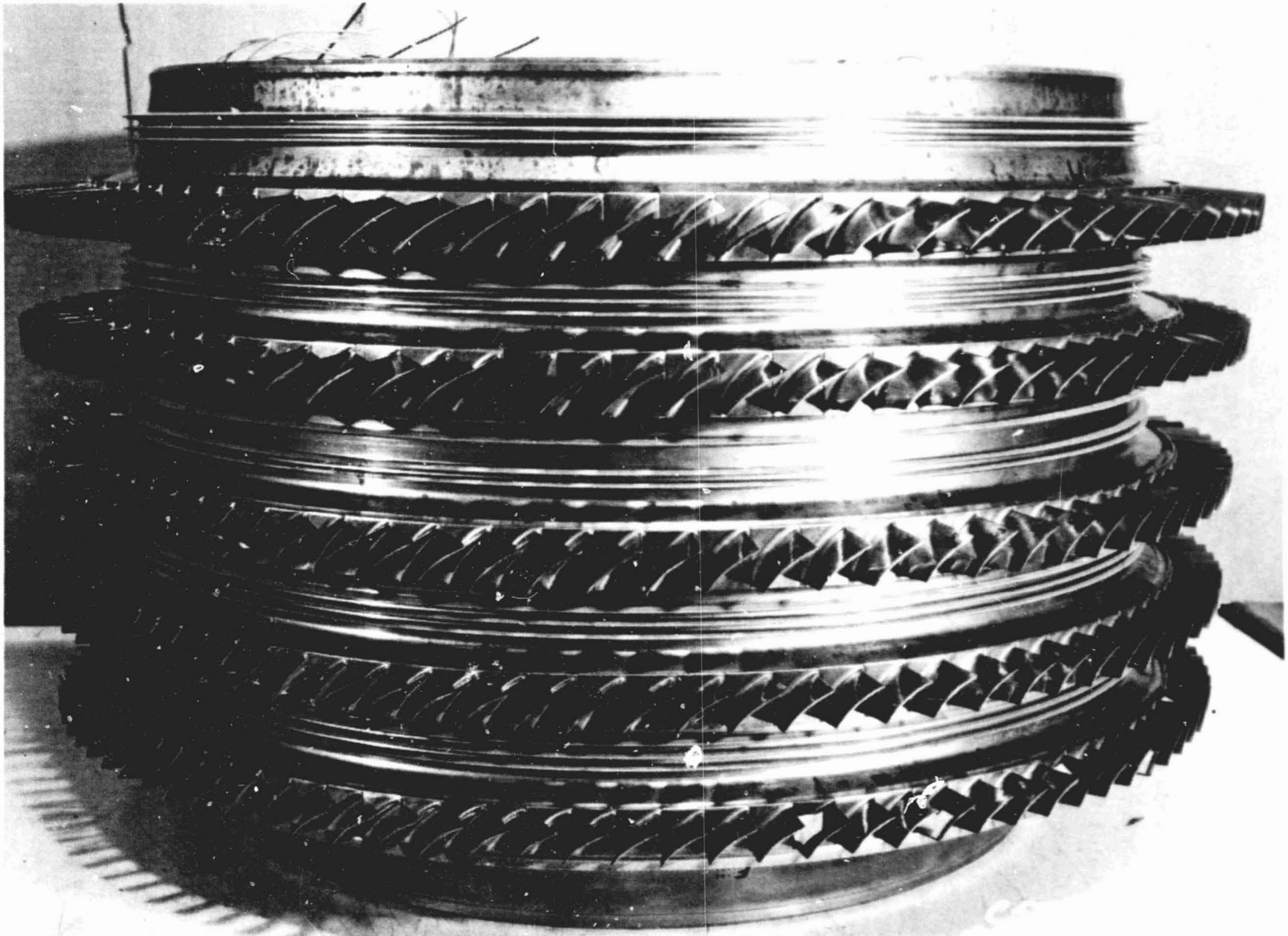

Figure 23. Photograph of Rear Rotor Stages.

The trailing edge regions of these front stators with multicircular arc thickness distributions were also straightened slightly to avoid excessive diffusion along the suction surface near the trailing edge where separation is most likely to occur. Stators 5 through 9 employ conventional circular arc meanline sections with NACA 65-series chordwise thickness distributions. Inlet Mach numbers for these stages are low enough that leading edge straightening was not required. Likewise, the 65-series thickness distribution has its maximum thickness forward of the midchord point and does not have a chordwise thickness gradient near the trailing edge that is as large as that of the multicircular arc distribution. This eliminated the need to straighten the trailing edge region of these airfoils. Figures 24 and 25 show the resulting surface velocity distributions for Stators 2 and 6, respectively, and Figure 26 shows a view of Stator 6 indicating typical airfoil sections used for the stator vanes, as well as the unique twist of these airfoils.

The stator exit swirl distribution employed had a rather dramatic effect on stator twist. The high stator exit end-wall swirl level produced a corresponding high stator inlet swirl in subsequent stages, with the result that the end-wall regions were staggered closed by 6° to 12° relative to the pitch section. The stator camber, however, was nearly uniform radially. This can be seen in Figure 26. As pointed out earlier, Stator B of the Core Compressor Exit Stage Study exhibited similar geometric properties; and for that design, worthwhile improvements in both stall margin and peak efficiency were noted. An additional feature of the NASA Stator B design that was included in the E^3 stator designs was the somewhat unconventional radial distribution of solidity. The chord was maintained constant over the inner half of the span but was increased as the radius increased outboard of midspan to maintain constant solidity. The pitch-line level of solidity for each stator was determined during the overall configuration studies discussed in Section B of this report. As can be seen in the Appendix (Table XXI), however, the solidity distributions for Stators 8, 9, and 10 do not exhibit the constant solidity feature over the outer half of the vane span. For these stators, the radial chord distribution had to be more nonuniform than that of the Stator B design to produce acceptable resonant frequencies. The resultant chord distributions are such that the solidity increases radially from the

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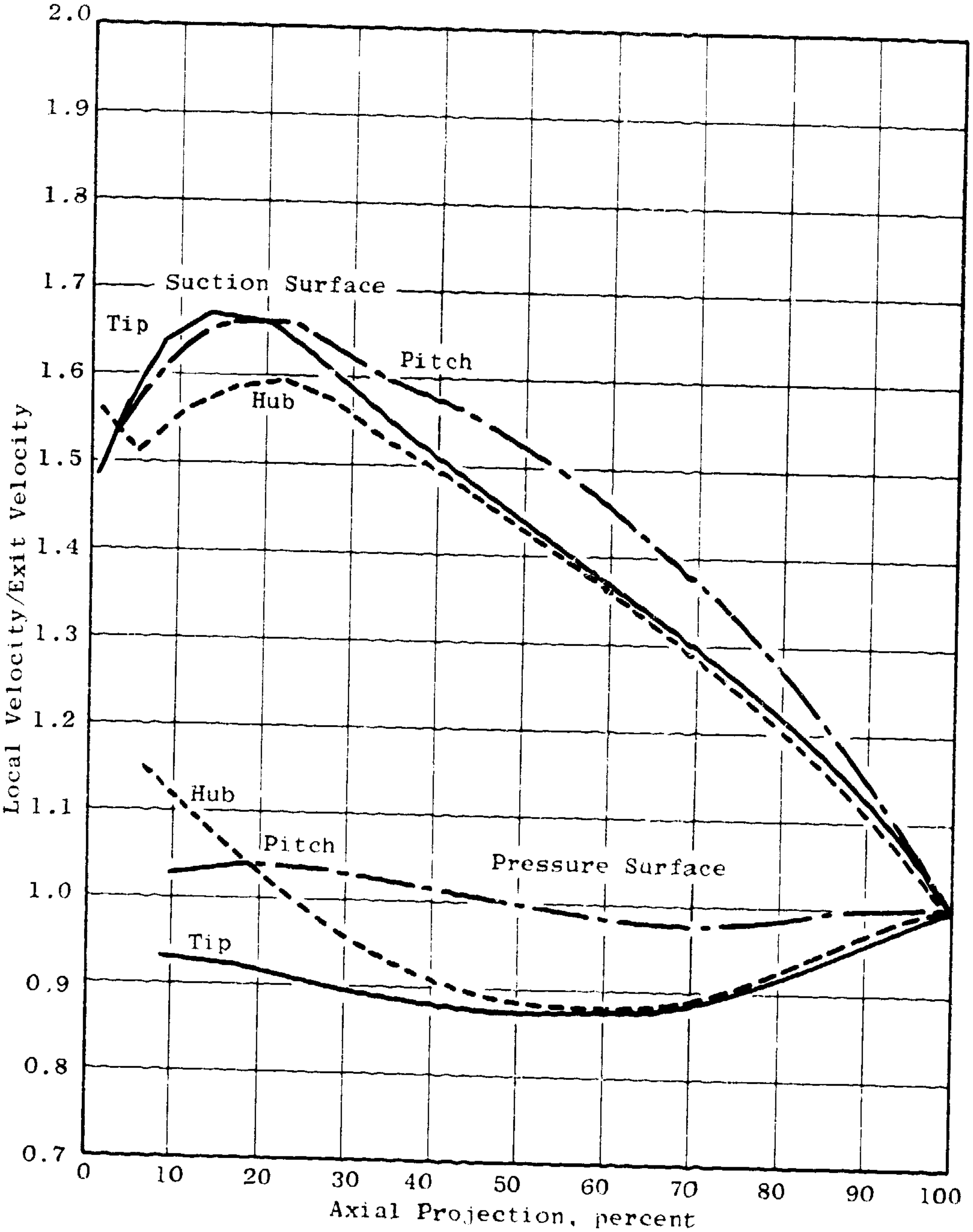

Figure 24. Stator 2 Surface Velocity Distribution.

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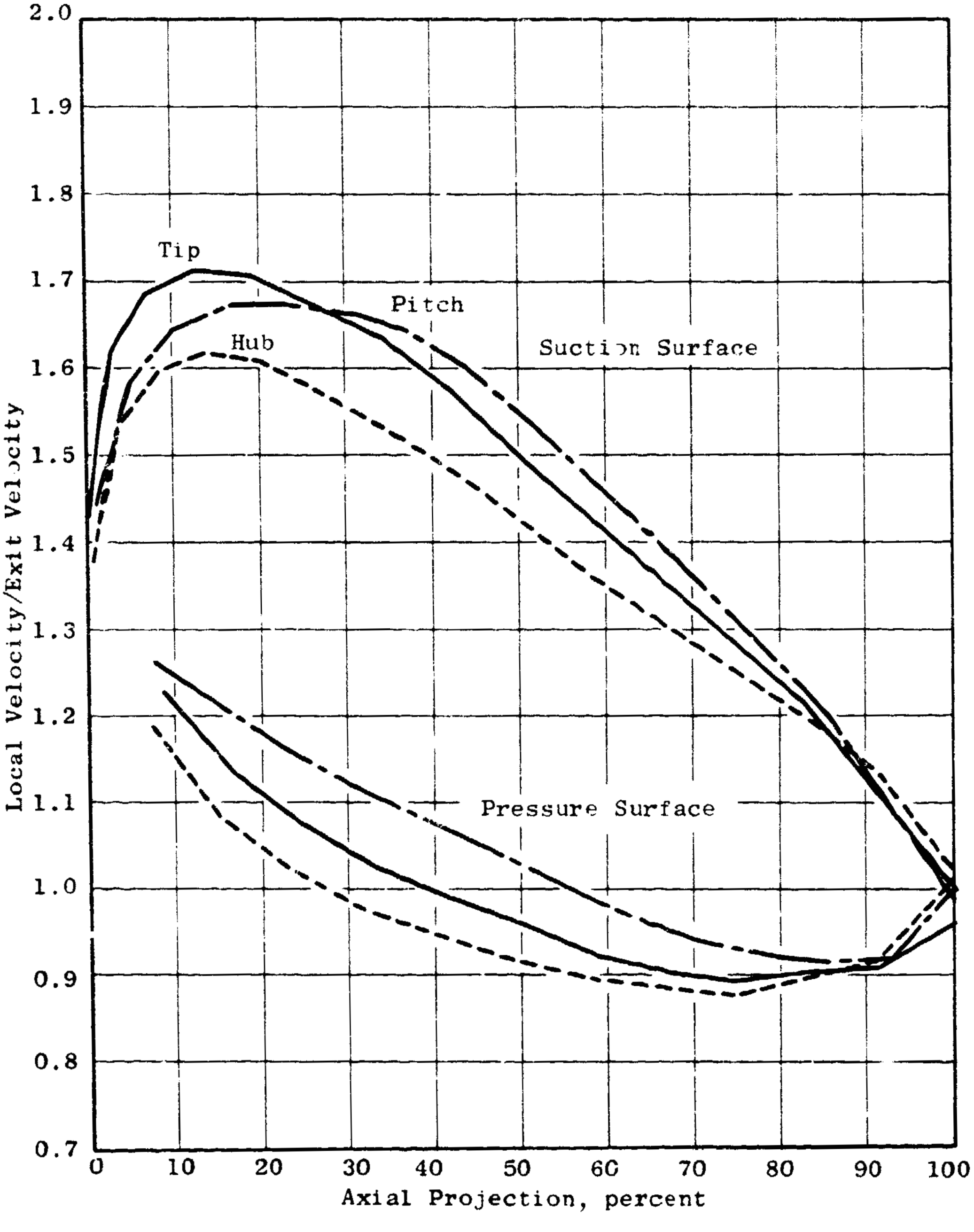

Figure 25. Stator 6 Surface Velocity Distribution.

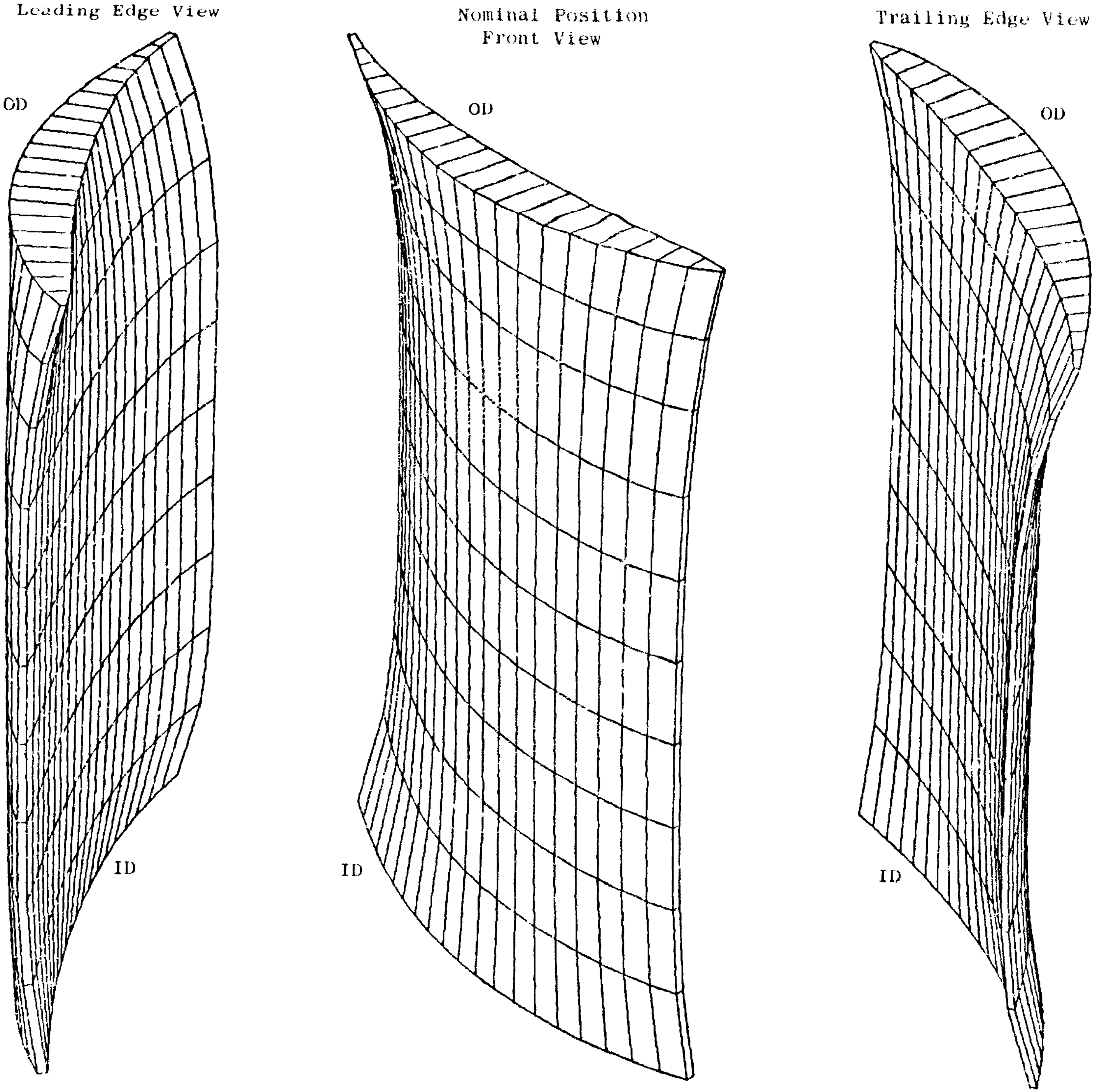

Figure 26. Three-Dimensional Sketch of Stator 6.

pitch line to the outer casing and increases more rapidly toward the hub than would occur with constant chord.

The last stator vane was a unique design; the incoming swirl distribution was similar to that of the other stators, but the desired exit swirl was nearly uniform radially. The combined effect of these two swirl distributions was to produce high end-wall turning requirements relative to the pitch-line values, and the leading edges of this vane had to be well closed at the end walls relative to the pitch line. For this vane the chord was set substantially higher at both ends than at the pitch line in order to reduce end-wall diffusion factors.

Inlet Guide Vane

The correlation of cascade data by Dunavant (Reference 6) was used to design the inlet guide vane. Two-dimensional, cascade design, exit air angles were related to the CAFD exit swirl angles by using a secondary flow calculation to predict end-wall overturning and/or underturning. Included in the secondary flow calculation were the radial gradient of circulation and the inlet vorticity associated with the boundary layer flow near the end walls. Nearly 3° of secondary flow overturning were calculated near the outer casing; and at the inner wall, the secondary flow effects amounted to slightly more than 2° of overturning. At the pitch line, the secondary flow effects combined to result in a very slight underturning. The vane lift coefficients and angles of attack (stagger) were selected to produce a radially smooth distribution of cascade exit-air angles. When the calculated overturnings were added (and underturnings were subtracted) to these two-dimensional cascade, exit air angles, the CAFD vector diagram exit air angles were produced. The final vane geometry is included in the Appendix (Table XXI).

2.4 COMPONENT TESTING AND DESIGN REFINEMENT

The original aerodynamic design of the core compressor was completed in the second quarter of 1979. Three component tests were conducted: the front six variable-stator stages were tested in the first quarter of 1980, the full 10-stage compressor was tested for the first time during the first quarter of

1981, and a second test of the full 10-stage compressor was conducted early in 1982. Various design refinements were made as a result of the data obtained during this experimental evaluation and development program, and the resulting final version of the core compressor is scheduled to be utilized in the E^3 core engine and ICLS turbofan engine tests in 1982 and 1983.

2.4.1 Six-Stage Component Test

The objective of this test was to determine the pumping, efficiency, and stall margin characteristics of the variable stator front stages. During this test, the design airflow and pressure ratio were demonstrated; and the efficiency goal for this first build was met. However, the high speed stall margin was below the required level, and blading modifications were required before testing the full 10-stage compressor.

The stall margin at 100% speed, the highest speed for which a stall was recorded with the selected stator schedule, was 6%, considerably below the objective level of 14% for this block of stages. The short fall in stall margin became progressively less as speed was reduced. Below the ground idle operating point, the stall margin met the requirements. The flow versus speed relationship for the compressor was very steep, since the stators had to be quite closed at idle in order to meet the low speed stall margin goal. The idle airflow of about 25% design flow was attained at 74% speed. Since the results indicated that the efficiency at overspeed conditions was not falling off abruptly, a stator schedule was selected that kept the IGV and first stator a few degrees closed from the design settings at high speed in order to improve the stall margin as much as possible. As a result of using this schedule, the design airflow was achieved at 102% design corrected speed. The unadjusted measured operating line efficiency was 84.1% at 103% speed (102% design flow) and met the goal for this test. The peak efficiency of 85.6% was measured at 100% speed, about 8% in stall margin below the design operating line.

Interstage, vane-mounted sensors and traverse probe data indicated that the hub region total pressures and axial velocities were less than the design intent at high speeds. This weakness in the hub flow was seen to some extent in the first two stages and became quite severe by Stage 3. It was clearly a major contributor to the insufficient stall margin and the low operating line along which the peak efficiency occurred. It was concluded that the primary source of the poor hub performance was most probably in the rotors due to insufficient allowance for hub deviation angles in the original design, and perhaps also to rotor dovetail and platform leakage paths that had not been sufficiently sealed.

Immediately following the six-stage component test, design activity was initiated to specify modifications to the front stages that would strengthen the hub region flow. The first-stage rotor was restaggered closed 2.5° at the tip to flatten the tip strong radial profile of total pressure. New rotor blades were designed for Stages 3 through 7 that had 6° higher trailing edge camber in the hub region. In addition, the IGV was twisted open 4° at the hub. The hub of the first stator was also twisted open 3.5°, plus it had 8° more hub camber added to its trailing edge region for a total decrease in its trailing edge angle of 11.5°. The intent of these modifications was to achieve the original design vector diagrams with blading having the larger deviation angles that were deduced from the six-stage test data. Airfoil geometry for these final, redesigned rotor blades is listed in the Appendix (Table XXII).

In case the rear stages should also prove to have insufficient hub camber, it was also decided at this time to design alternate high hub camber rear blading. Analysis indicated that in the rear stages the stators were likely to have insufficient camber, so new designs for Stators 7 through 9 were specified that had approximately 6.5° more trailing edge camber in the hub region. Again, the intent was to achieve the original design vector diagrams with blading having larger hub deviation angles. Airfoil geometry for these final, redesigned stator vanes is listed in Table XXII (in Appendix).

Representative sections of the modified airfoils were examined using the same cascade analysis computer codes that had been used in the original design to assure that the new shapes retained good velocity distributions.

2.4.2 First 10-Stage Component Test

The buildup schedule for the first 10-stage component test vehicle did not allow time for the procurement of the redesigned, high hub camber front rotors or rear stators. As an interim solution to the problem of the weak front block hub flows, all the existing front variable stator vane rows were twisted open and given increased hub camber. Each vane row was twisted open 3.5° at the hub and then additional trailing edge camber was provided: 8° more camber in the hub of Stators 1 through 4, and 5° more camber in Stators 5 through 6. The 4° open hub twist in the IGV row was also used. With the exception of 2.5° tip closure in the first rotor, the other front block rotors were unchanged. Rotor 7 retained its original design. The axial dovetails in the first five rotor blade rows were sealed with RTV for this build in order to reduce leakage effects.

In the rear stages, the Stage 7 through 10 stator vanes were the original design. The rotor blades used in Stages 8 through 10, however, were not the original design but instead were the alternate design that had approximately 6° more camber at all radii. This rotor selection was made primarily to assure that rear block pumping would equal or exceed design intent, thus avoiding the possibility of overloading the front stages at high speed. It was also done to assure that the first test build would meet low speed stall margin objectives.

The test results for this initial build of the full 10-stage compressor indicated that the interim front stage modifications had worked better than expected; the hub region pressure ratio now equalled or exceeded the design intent. The high camber rear rotors likewise showed no sign of having weak hubs, and as a result pumped higher than design intent corrected airflow. The high rear block pumping, however, matched the compressor so as to unload the front stages and to load up the rear stages. This mismatching limited the high speed stall margin to only about 11%, although the low speed stall margin (even without use of interstage bleed) exceeded the requirements for engine starting. The front stator vanes were set open relative to the design stagger angles in order to obtain the best possible matching, so design airflow and pressure ratio were achieved at 97.5% design speed. The major need evident in the test results was to achieve a better balance between front and rear block pumping so as to improve high speed stall margin.

The unadjusted measured efficiency of 81.8% at the design point met the goal for the test, as did the peak value of 82.6% measured near the cruise power setting. Adjustments totaling about 2 points in efficiency are believed to be appropriate to account for extensive instrumentation, low test Reynolds number, inlet duct loss bookkeeping, extra variable stator rows, and some hardware variances. The adjusted design point adiabatic efficiency of 83.8% is equivalent to a polytropic efficiency of 89.0%. Peak efficiency at each speed occurred on the operating line.

2.4.3 Second 10-Stage Compressor Test

The second full 10-stage compressor test vehicle first ran late in 1981. Buildup schedules for this test allowed the redesigned high hub camber Rotor 3 through 7 to be used, along with the twisted first rotor and original design second rotor. The front stages thus were the final configurations as specified after the six-stage test (modified rotors and original stators), and whose geometry is tabulated in Table XXII. However, schedules did not permit use of the redesigned rear stators, so the original design rear vanes were again used. The original design (lower camber) Rotors 8 through 10 were used in this build to reduce rear block pumping and achieve a better match with the front stages

Test results from this second 10-stage vehicle generally confirmed expectations. The redesigned front stages had about the same pumping as the modified blading used in the first 10-stage vehicle, and had a satisfactgory hub-strong profile of total pressure. The pumping of the fixed geometry rear stages was reduced so as to match that of the front stages; and as a result, the high speed cruise region stall margin was improved to levels of about 14% to 17%. Low speed stall margin was also improved slightly; and, again it was possible to achieve engine start region stall margin goals without the use of Stage 7 exit start bleed. Overall adiabatic efficiency was also improved somewhat; a peak unadjusted value of 83.2% was measured at 97.5% corrected speed, near the 80% cruise thrust airflow.

2.4.4 Final Compressor Configuration

The core compressor for the E^3 core engine and ICLS turbofan engine will incorporate the redesigned, high-hub-camber rear stators as well as the redesigned front stages used in the second 10-stage component test. The rear rotors will use the original design airfoils but will be staggered closed 2°, relative to the original design, at all radii. This is expected to maintain the original design pumping with the opened up rear stator hubs. The blading geometry for this final version of the core compressor is documented in the Appendix (Table XXII).

An off-design performance estimate for this final configuration was made using loss coefficients and deviation angles deduced from the first 10-stage compressor test. This analysis indicated that the design intent airflow and a 23:1 pressure ratio should be achieved at very close to 100% design speed with all stators set at essentially their design tip stagger angle. At this condition the blading should produce vector diagrams that are very close to the original design intent, as listed in the Appendix (Table XXI). The anticipated stagewise distribution of work input for the final configurations is compared to the original design intent in Figure 27. The differences observed seem to be minor.

The extensive testing, posttest analysis, and design refinement process described in this report have developed a fully satisfactory final aerodynamic and mechanical design configuration for the E^3 core compressor. This design should be capable of meeting nearly all program efficiency and stall margin goals when evaluated during the core engine and ICLS turbofan engine testing scheduled for 1982 and 1983.

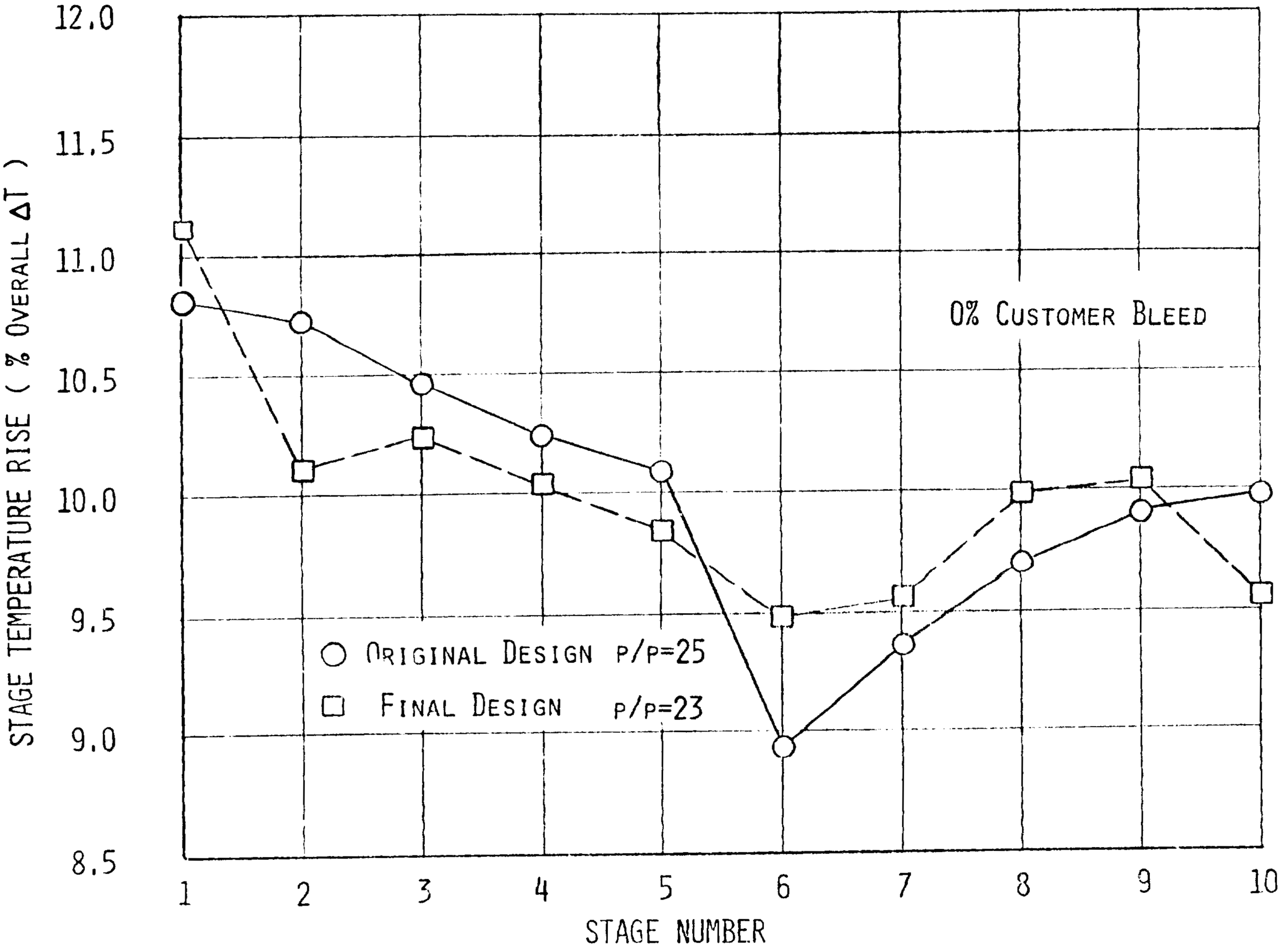

Figure 27. Stagewise Work Input Distribution.

3.0 MECHANICAL DESIGN

3.1 INTRODUCTION

The following sections discuss the detailed mechanical design aspects of the E^3 high pressure compressor rotor and stator. Included in the information are design features, materials, blade and vane frequency plots, airfoil geometry and stresses, stability plots, and measured stall stress data from rig tests. A section on active clearance control is also included.

Figure 28 shows an over and under cross section of the E^3 proposed configuration and the current FPS configuration. Some of the major changes from the proposed configuration are the use of booster discharge air to cool the internal structure of the rotor, the removal of ID bleed air extraction tubes, and an improved active clearance control system. In addition, the compressor casing material was changed from titanium to steel and axial dovetails replaced the circumferential type in the forward spool.

Listed in Figure 29 are some of the more important design features of the compressor, many of which are addressed in the following pages.

The FPS compressor will be designed for an installed service life of 18,000 hours without removal. Inspections and minor repairs will be allowed to attain a total useful engine life of 36,000 hours over a fifteen year time period. This will include 40,000 starts and 38,000 thrust reversals. Stalls of the compressor will not cause mechanical damage to the rugged, low aspect ratio compressor blades.

3.2 COMPRESSOR ROTOR MECHANICAL DESIGN

3.2.1 Features

Figure 30 shows a cross section of the compressor rotor to be used in the core and ICLS engine tests. The rotor unique design features are also noted on the cross section. The basic mechanical design objective was to produce a lightweight, rugged, cost effective compressor rotor. The features which contribute the most to meeting this objective are the use of lightweight, high

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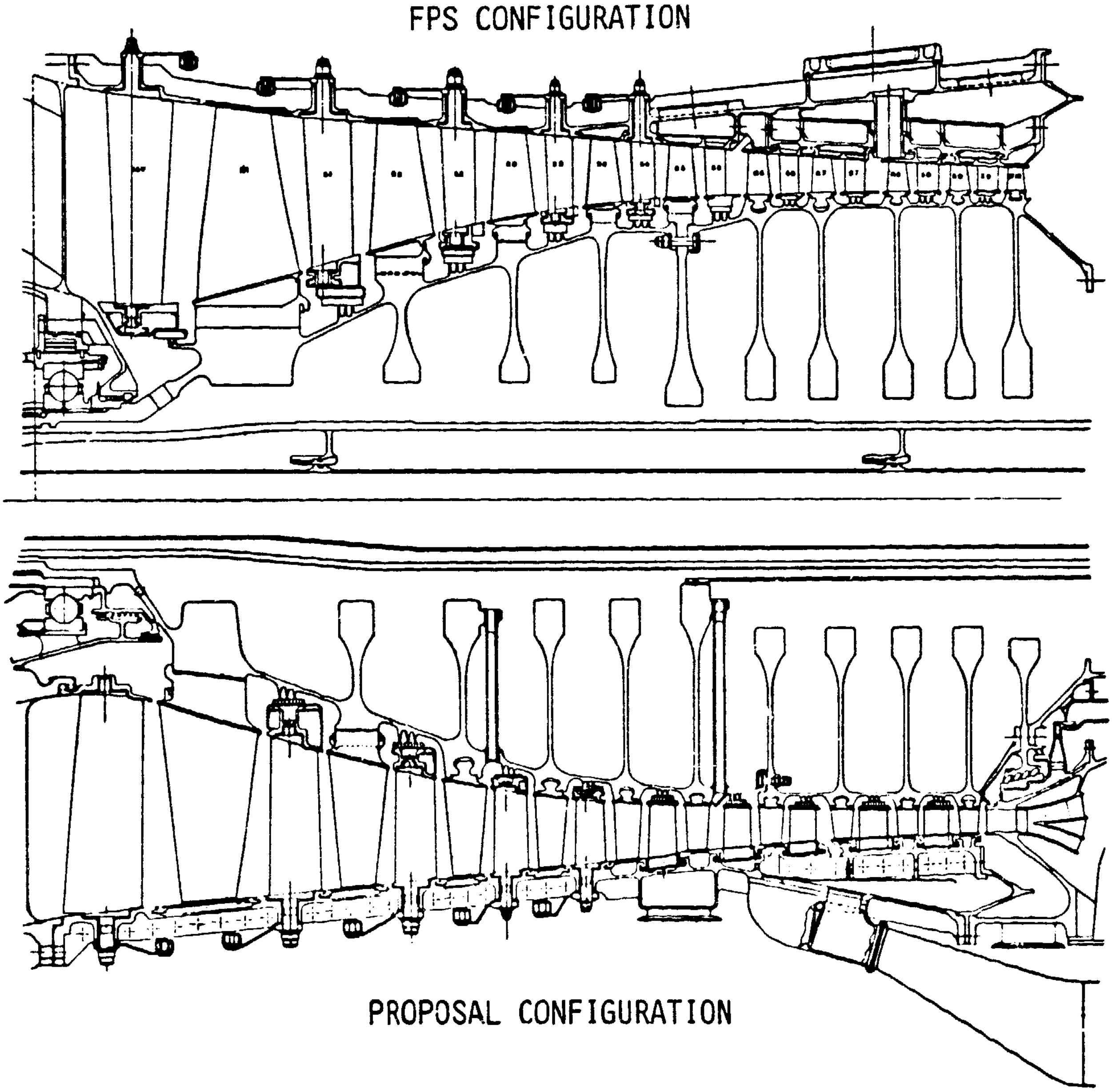
FPS CONFIGURATION

PROPOSAL CONFIGURATION

Figure 28. Evolution of the Compressor Design.

- 10 STAGES/23:1 COMP. RATIO/120 PPS Wc
- LOW ASPECT RATIO AIRFOILS
- ROTOR BORE COOLING
- MINIMAL ROTOR BOLT JOINTS
- 3 TOOTH CDP SEAL
- ALL STEEL CASING/R1-3 UNLINED
- VARIABLE VANE LE ON TRUNIONS
- TWISTED ENDWALL FIXED STATOR
- CAST AFT STATOR WITH INTEGRAL LINERS
- INTERSTAGE CAVITY VOLUMES MINIMIZED
- HIGHLY POLISHED AIRFOILS
- RECESSED ROTOR BLADE TIPS
- ACTIVE CLEARANCE CONTROL
- CAST SPLIT DIFFUSER WITH INBOARD BLEED

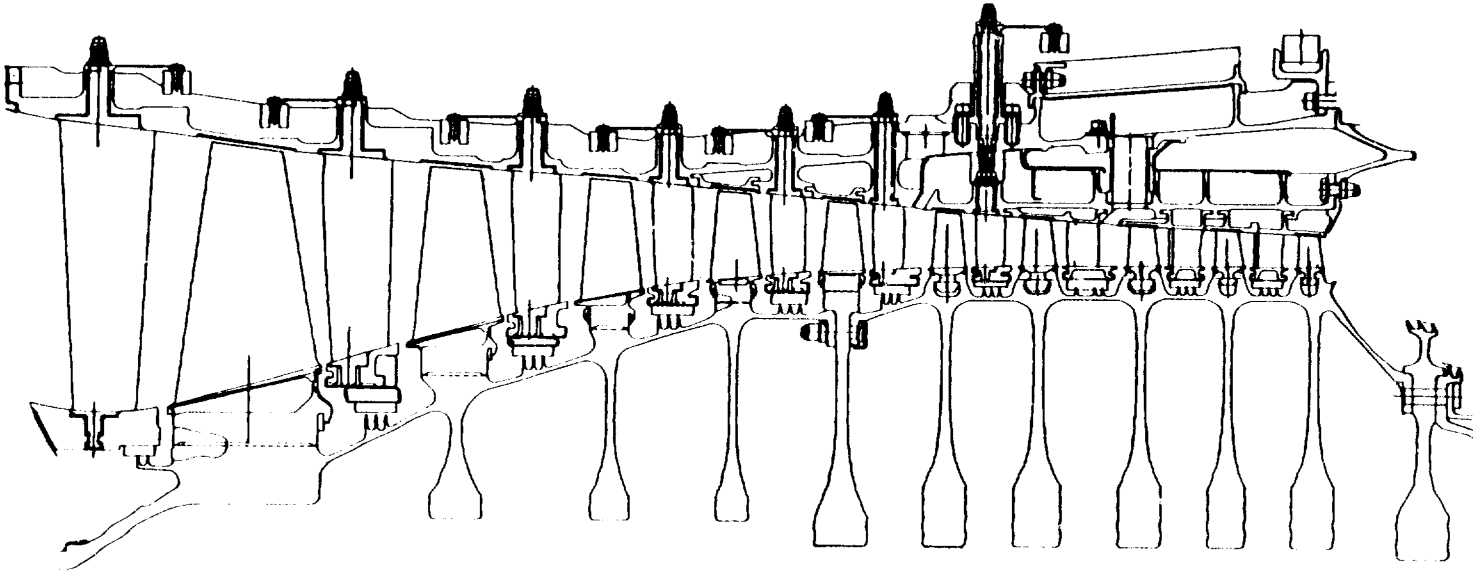

Figure 29. E^3 Core Engine HPC

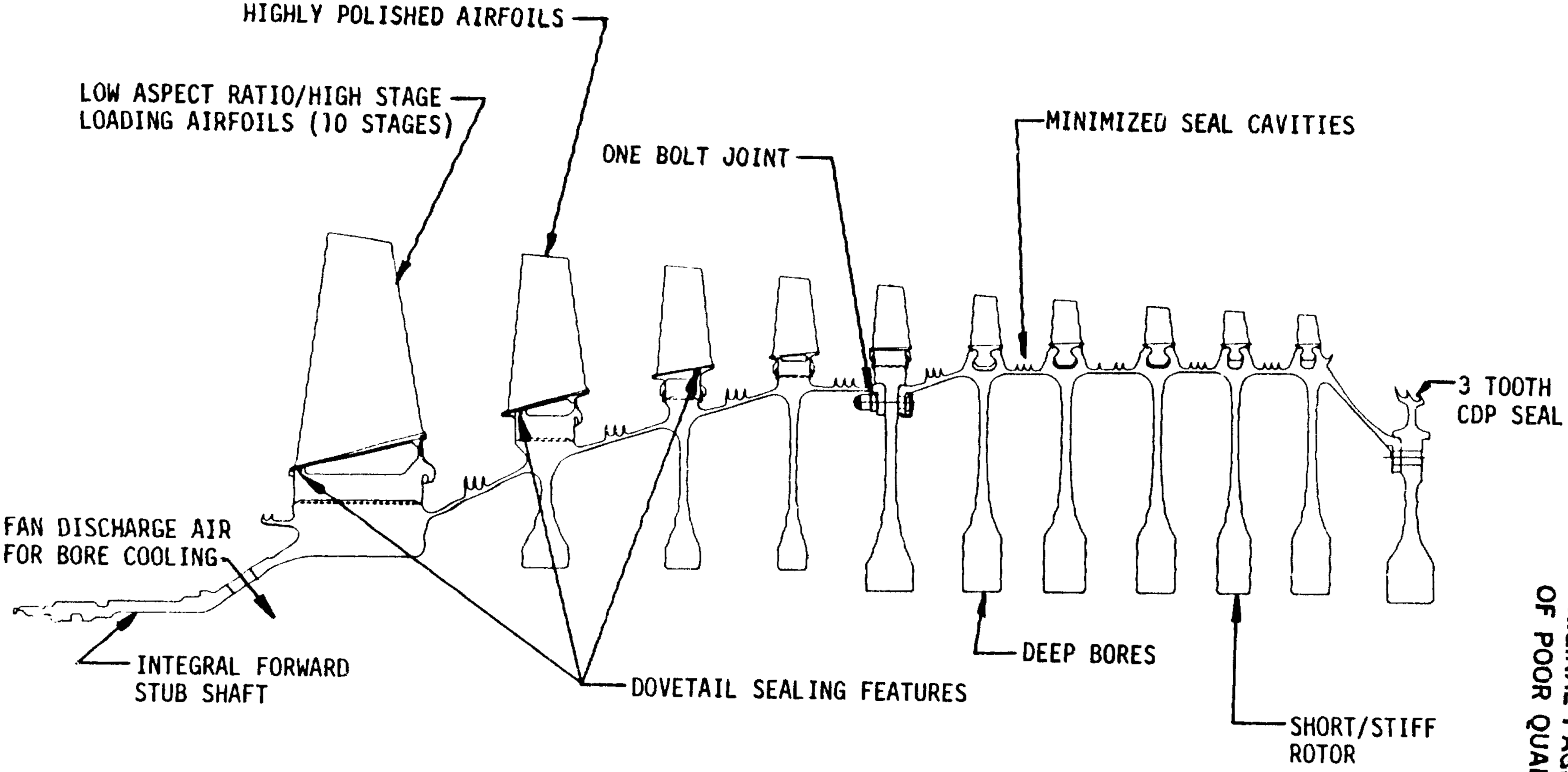

Figure 30. Rotor Design Features.

strength materials; the utilization of low aspect ratio (LAR) airfoils; and a short/stiff three-piece rotor structure with only one bolted joint.

The materials used in the compressor rotor are shown in Figure 31. One basic guideline was to maximize the use of titanium for weight considerations. The selections shown maximize the use of titanium based on the growth engine cycle. In the FPS design, the titanium is moved back one stage thereby saving considerable weight. The basic reasons for the selections made are as follows:

- Titanium blades (Ti 8-1-1 versus Ti 6-4 or Ti 6-2-4-2 - Ti 8-1-1) were chosen because of better low cycle fatigue (LCF) strength and higher stiffness-to-weight (E/ρ) ratio.
- Nickel blades (Inco 718 versus A286 B) - Based on current experience, Inco 718 is superior to A286 in HCF and temperature capability.
- Titanium spools (Ti-17 versus Ti 6-4 or Ti 6-2-4-2) - Ti-17 has better LCF strength and much better ultimate tensile strength (UTS) which was important in meeting burst margin criteria while minimizing weight.
- Steel rotors (René 95 powder versus Inco 718) - Like the Ti-17 in the forward spool, René 95 has better LCF and much better UTS than Inco 718. It also has superior high temperature creep resistance and in production should be competitive with Inco 718 when produced in near net shape form.

The compressor incorporates the use of low aspect ratio airfoils. They have excellent resistance to impact damage and, most importantly, can withstand repeated stalls. Figure 32 illustrates the experimentally derived relationship between airfoil stall stress and airfoil aspect ratio. Data are plotted from the rig tests which agree favorably with the derived relationship; and, based on other engine experience, the airfoil design will withstand repeated stalls during operation.

3.2.2 Rotor Structure Design

The rotor structure was designed as short as possible and the large diameter, load-carrying drum configuration makes the rotor very stiff which

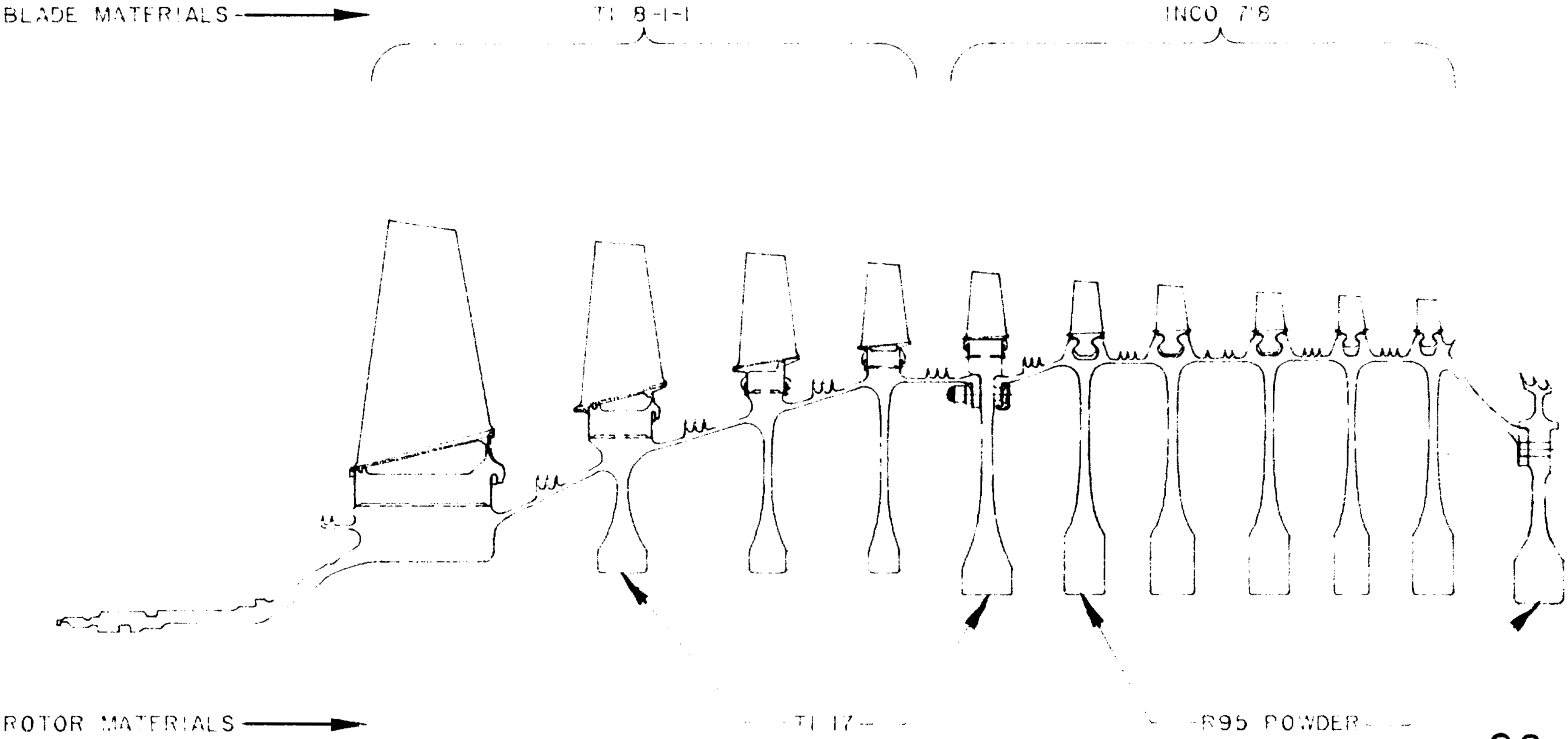

Figure 31. E^3 Core and ICLS Compressor Rotor Materials.

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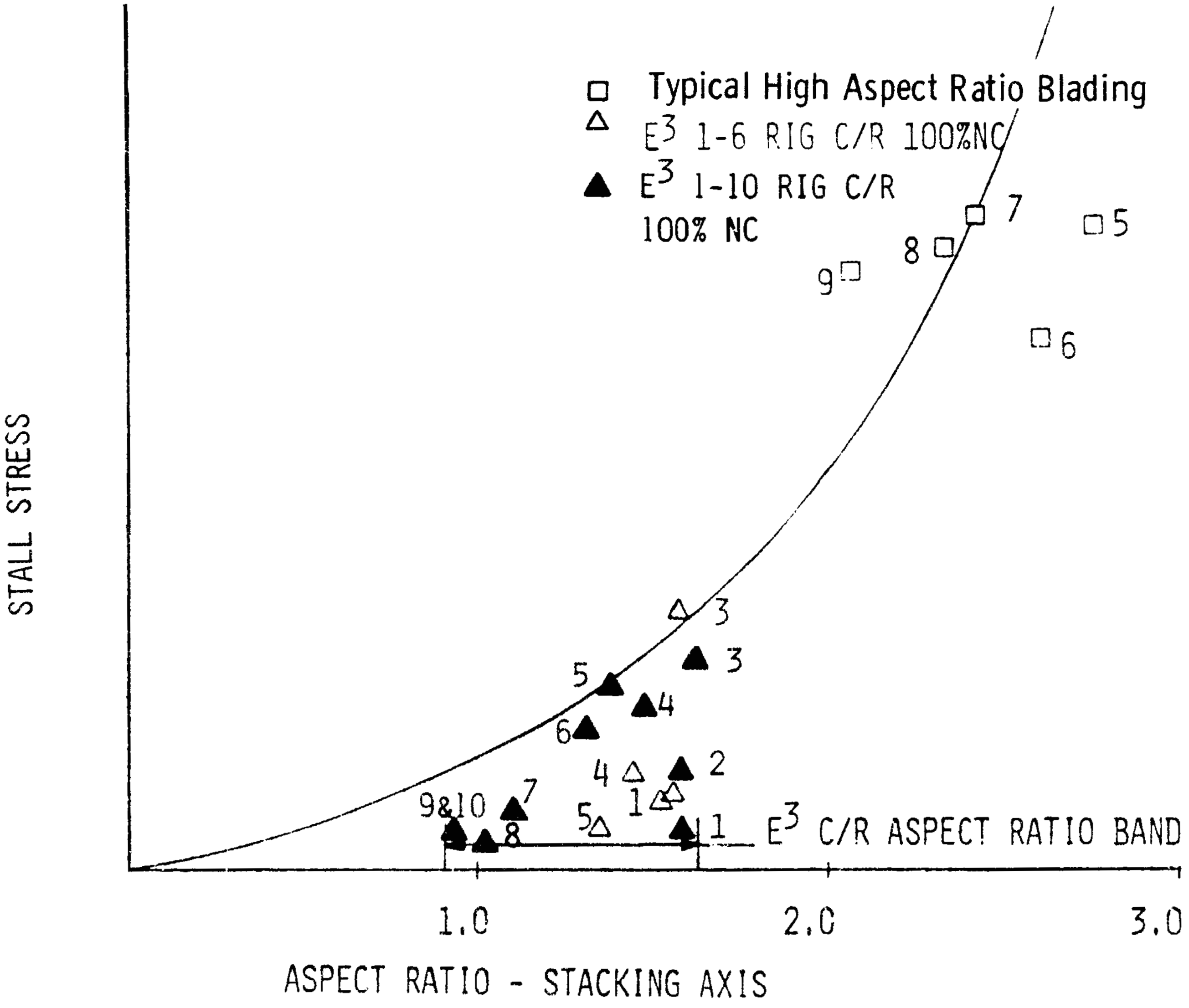


Figure 32. Comparison Of Stall Stress Versus Aspect Ratio

minimizes bowing during maneuvers. The multistage integral forward and aft spools minimize the number of rotor parts, eliminate possible bolt-related problems, and minimizes weight. The forward shaft is an integral part of the forward spool which again minimizes the weight as do the deep bores in the aft spool. The rotor structure is designed to meet the life usage as defined in the technical requirements. In addition, it has an overspeed capability of $\geq$120% of maximum physical rotor speed based on growth engine conditions and meets other General Electric established design criteria.

The rotor inner cavity is ventilated/cooled by bringing booster discharge air into the rotor through slots in the forward stub shaft. Various schemes were studied including ones bringing in Stage 5 and/or Stage 6 rotor exit air. The booster discharge air approach was selected because it gives the best balance of rotor structure stress/life, enhances the rotor clearance control, and eliminates expensive, weighty, inflow-bleed schemes.

Features incorporated into the design which increase aerodynamic performance include:

- Highly polished airfoils to reduce airfoil drag losses
- Improved sealing of axial dovetails to prevent recirculation
- Minimized interstage seal cavities to reduce windage losses
- Three-tooth CDP seal which gives best balance of leakage loss and windage losses.

3.2.3 Rotor Blade Design

The rotor blades were designed following well-established design criteria. These criteria include:

- Airfoils
  - Maintain 15% first flex margin over 2/rev at maximum rotor speed.
  - Maintain 10% first flex/first torsion margin over low or known per rev stimuli throughout engine operating range.
  - Restrict reduced velocity parameter/incidence angle combinations to General Electric established acceptable values (includes experimental and in-service data).

  - Optimize airfoil tilt to minimize gas bending stress.

- Dovetails

  - Meet weak link criteria (HCF strength of disk dovetail > HCF strength of blade dovetail > HCF strength of airfoil in first three beam modes).

  - Optimize dovetail offset to provide maximum allowable vibratory stress.

  - Provide adequate margins in neck tensile and tang shear stress.

  - Design to acceptable crush stresses.

  - Prevent "domino" effect at maximum physical speed.

A summary of the key blade design parameters is shown in Table X. Campbell diagrams for all 10 stages of blades are presented in Figures 33 through 42. Also shown on the Campbell diagrams are data points obtained during the 1-6 and 1-10 compressor rig tests which show excellent agreement with the predicted values. A composite stability plot, one for torsional stability and one for flexural stability, is presented in Figures 43 and 44. Based on these plots, no aero instabilities are expected.

Blade vibratory stresses for steady-state and stall operations have been recorded, using strain gage measurement systems, during the 1-6 and 1-10 compressor rig tests. The stresses observed, as a function of percent limits, are given in Table XI. The Stage 3 blade airfoil root was thickened for the core engine design to raise the first flexural frequency above 4/rev at the maximum spread. The original design of the Stage 3 blade had a 4/rev crossover in the operating speed range.

3.3 COMPRESSOR STATOR MECHANICAL DESIGN

The product engine will have the inlet guide vanes and first five rows of stator vanes variable to achieve desired compressor performance. E^3 development compressors have IGV's plus six rows of vanes variable to allow performance mapping throughout the engine operating range. Table XII presents the goals that were established for the mechanical design of the compressor stator. Materials selected for the 1-10 compressor stator and, with the exception of the Vespel VSV bushings, for the core engine are presented on Figure

Table X. E^3 Compressor Rotor Blade Summary (Metric Units).

Stage Number	1	2	3	4	5	6	7	8	9	10
Number of Blades	28	38	50	60	70	80	82	84	86	94
Coordinate Tape Number	35884	28083	37917	16813	51756	51756	57181	47125	00538	00538
*Airfoil Length (cm)	15.657	10.617	7.579	5.717	4.582	3.691	3.078	2.616	2.332	1.094
Radius Root (cm)	19.068	22.837	25.143	26.312	26.866	27.102	27.287	27.308	27.341	27.343
Radius Tip (LE) (cm)	35.083	33.604	32.832	32.118	31.511	30.848	30.427	29.957	29.703	29.467
Radius Root (LE) (cm)	17.795	22.050	24.785	26.154	26.825	27.069	27.249	27.269	27.308	27.313
Orient Angle, Tip (Deg)	65.21	60.93	58.98	57.50	56.318	55.910	54.071	55.53	57.95	57.48
Orient Angle, Root (Deg)	23.18	28.29	30.88	32.92	32.731	36.836	36.082	42.74	45.21	47.65
Camber Tip (Deg)	9.66	12.96	20.36	22.35	10.996	23.178	25.844	27.65	27.55	29.22
Camber Root (Deg)	64.04	50.34	46.59	39.84	36.837	33.381	38.282	34.04	33.36	32.02
Chord Tip (cm)	10.276	7.034	5.034	4.002	3.427	2.919	2.845	2.718	2.540	2.286
Chord Root (cm)	10.106	6.548	4.633	3.919	3.350	2.867	2.845	2.713	2.540	2.286
Aspect Ratio Tip	1.523	1.509	1.505	1.4287	1.337	1.264	1.082	0.964	0.918	0.916
Aspect Ratio Root	1.549	1.621	1.636	1.459	1.368	1.287	1.082	0.964	0.918	0.916
Radius Ratio (Aero)	0.507	0.656	0.7549	0.814	0.85	0.877	0.895	0.91	0.919	0.926
Tm/C Tip	0.02502	0.02597	0.02605	0.0334	0.03341	0.03526	0.039	0.038	0.039	0.0435
Tm/C Root	0.09655	0.08699	0.1087	0.0810	0.08039	0.08042	0.096	0.080	0.075	0.0850
Te/C Tip	0.0046	0.0078	0.0086	0.0118	0.0116	0.0116	0.011	0.011	0.011	0.011
Te/C Root	0.016	0.0148	0.0144	0.0164	0.0166	0.0168	0.015	0.015	0.015	0.015
Solidity Tip	1.318	1.271	1.224	1.19	1.212	1.207	1.222	1.214	1.17	1.164
Solidity Root	2.367	1.737	1.487	1.431	1.391	1.347	1.361	1.376	1.27	1.25
+Tilt (TANG) (Rad)	-0.0214	-0-	-0.0531	-0.034	-0.0487	-0.0256	-0.0281	4.35% LMI	8.2% LMI	6.82% LMI
♦Pretwist (Deg) ♦	1.213	1.256	0.897	1.018	0.727	0.642	0.470	0.424	0.400	0.350
Airfoil Type	Special			Bi Convex			Series 65			
Airfoil Weight (kg)	0.284	0.0786	0.0356	0.018	0.0198	0.0122	0.0094	0.0066	0.0045	0.0040
Blade Weight (kg)	0.55	0.1833	0.0824	0.0477	0.0628	0.0445	0.0433	0.0295	0.0201	0.0155
Tip Area (cm^2)	1.897	0.944	0.537	0.417	0.313	0.238	0.216	0.204	0.183	0.163
Root Area (cm^2)	6.915	2.596	1.634	0.908	0.665	0.485	0.542	0.418	0.344	0.313
Material	TI 8-1-1				INCO 718					
+Temperature (° C)	113	178	235	299	361	423	480	540	599	655
Part Number 4013267-	891	892	893	894	895	896	897	898	899	900
+Airfoil Stress (KN/cm^2)										
Max Root SS	36.5	27.6	34.5	20.7	30.3	28.3	25.5	24.8	30.3	29.6
σCent	21.1	16.5	13.1	11	17.2	14.5	11	9	8.3	7.6
σBuc	5.5	12.4	13.8	20	24.1	24.1	15.8	22.7	26.9	24.8

*Unless otherwise noted, all geometry at stacking axis.

+Used cycle case 26 - Max pressure, with cycle case 27 - Max temperature, and deteriorated engine (Nc=13948 rpm).

♦Used FPS cycle case 41 (100% XNHR = 12303 rpm, XNH = 12645 rpm) Max climb - Aero Design Point.

Table X. E^3 Compressor Rotor Blade Summary (U.S. Units).

Stage Number	1	2	3	4	5	6	7	8	9	10
Number of Blades	28	38	50	60	70	80	82	84	86	94
Coordinate Tape Number	35884	28083	37917	16813	51756	51756	57181	47125	00538	00538
*Airfoil Length (inch)	6.164	4.180	2.984	2.251	1.804	1.453	1.212	1.030	0.918	0.8245
Radius Root (inch)	7.507	8.991	9.899	10.359	10.577	10.670	10.743	10.751	10.764	10.765
Radius Tip (LE) (inch)	13.812	13.23	12.926	12.645	12.406	12.145	11.979	11.794	11.694	11.601
Radius Root (LE) (inch)	7.006	8.681	9.758	10.297	10.561	10.657	10.728	10.736	10.751	10.753
Orient Angle, Tip (Deg)	65.21	60.93	58.98	57.50	56.318	55.910	54.071	55.53	57.95	57.48
Orient Angle, Root (Deg)	23.18	28.29	30.88	32.92	32.731	36.836	36.082	42.74	45.21	47.65
Camber Tip (Deg)	9.66	12.96	20.36	22.35	10.996	23.178	25.844	27.65	27.55	29.22
Camber Root (Deg)	64.04	50.34	46.59	39.84	36.837	33.381	38.282	34.04	33.36	32.02
Chord Tip (inch)	4.0457	2.7692	1.982	1.5756	1.3494	1.1494	1.12	1.07	1.00	0.90
Chord Root (inch)	3.9788	2.5778	1.824	1.5428	1.3190	1.1286	1.12	1.068	1.00	0.90
Aspect Ratio Tip	1.523	1.509	1.505	1.4287	1.337	1.264	1.082	0.964	0.918	0.916
Aspect Ratio Root	1.549	1.621	1.636	1.459	1.368	1.287	1.082	0.964	0.918	0.916
Radius Ratio (Aero)	0.507	0.656	0.7549	0.814	0.85	0.877	0.895	0.91	0.919	0.926
Tm/C Tip	0.02502	0.02597	0.02605	0.0334	0.03341	0.03526	0.039	0.038	0.039	0.0435
Tm/C Root	0.09655	0.08699	0.1087	0.0810	0.08039	0.08042	0.096	0.080	0.075	0.0850
Te/C Tip	0.0046	0.0078	0.0086	0.0118	0.0116	0.0116	0.011	0.011	0.011	0.011
Te/C Root	0.016	0.0148	0.0144	0.0164	0.0166	0.0168	0.015	0.015	0.015	0.015
Solidity Tip	1.318	1.271	1.224	1.19	1.212	1.207	1.222	1.214	1.17	1.164
Solidity Root	2.367	1.737	1.487	1.431	1.391	1.347	1.361	1.376	1.27	1.25
+Tilt (TANG) (Rad)	-0.0214	-0-	-0.0531	-0.034	-0.0487	-0.0256	-0.0281	4.35% LMI	8.2% LMI	6.82% LMI
ϕPretwist (Deg)	1.213	1.256	0.897	1.018	0.727	0.642	0.470	0.424	0.400	0.350
Airfoil Type	Special			Bi-Convex			Series 65			
Airfoil Weight (lb)	0.6268	0.1734	0.0784	0.0398	0.0436	0.0269	0.0208	0.0146	0.0100	0.0088
Blade Weight (lb)	1.2125	0.4042	0.1816	0.1052	0.1384	0.0982	0.0955	0.0651	0.0443	0.0342
Tip Area (in.^{2})	0.294	0.1463	0.0832	0.0647	0.0485	0.0369	0.03548	0.03167	0.02831	0.02534
Root Area (in.^{2})	1.07188	0.40247	0.2533	0.14083	0.103018	0.07524	0.08408	0.06484	0.05328	0.04849
Material	TI 8-1-1				INCO 718					
+Temperature (° F)	235	352	456	571	682	783	896	1004	1111	1212
Part Number 4013267-	891	892	893	894	895	896	897	898	899	900
+Airfoil Stress (KSI)										
Max Root SS	53	40	50	30	44	41	37	36	44	43
σCent	30.6	24	19	16	25	21	16	13	12	11
σBuc	8	18	20	29	35	35	23	33	39	36

*Unless otherwise noted, all geometry at stacking axis.

+Used cycle case 26 - Max pressure, with cycle case 27 - Max temperature, and deteriorated engine (Nc=13948 rpm).

ϕUsed FPS cycle case 41 (100% XNHR = 12303 rpm, XNH = 12645 rpm) Max climb - Aero Design Point.

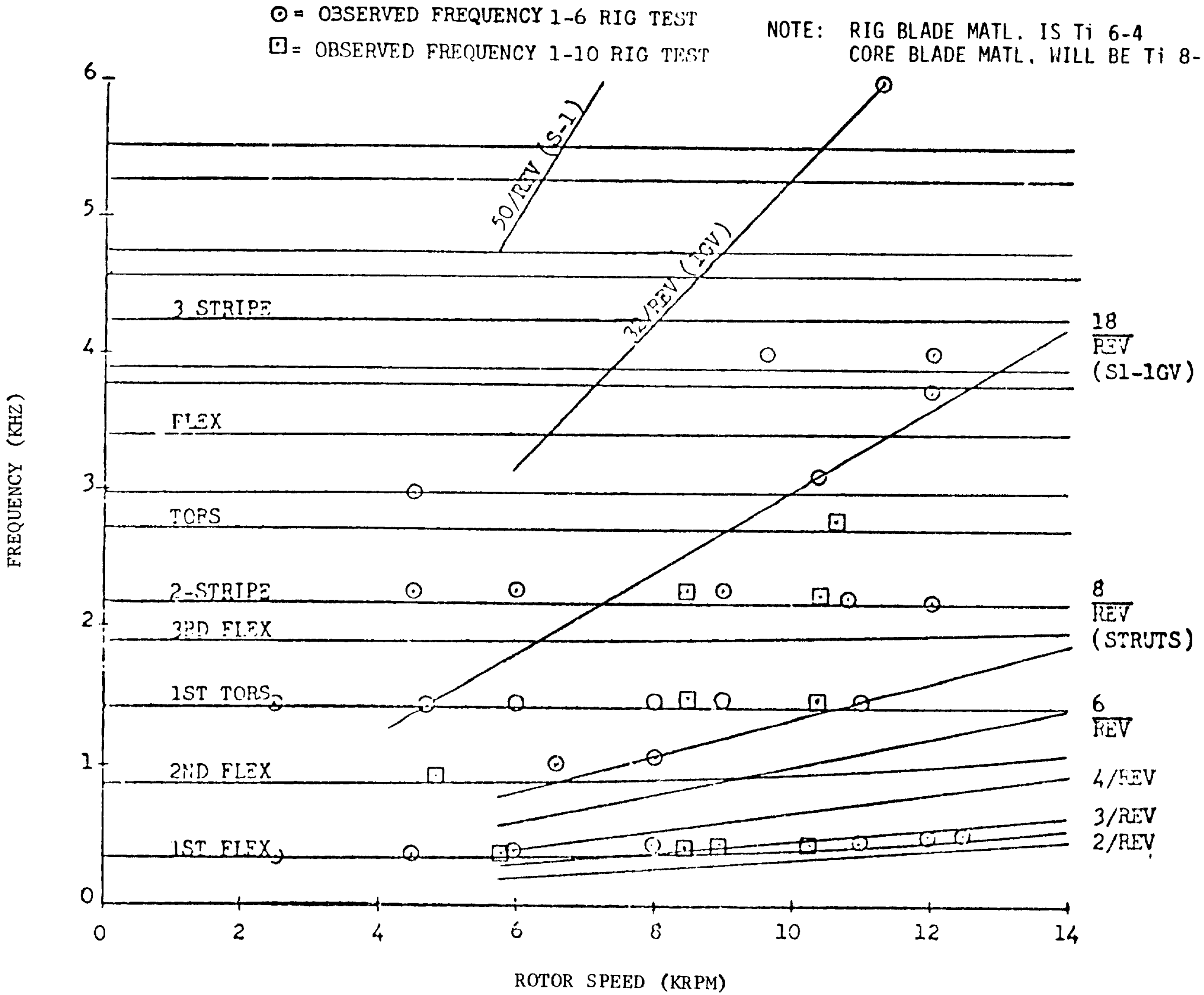


Figure 33. Compressor Rotor Stage 1 Blade Campbell Diagram.

NOTE: RIG BLADE MATL. IS Ti 6-4
CORE BLADE MATL. WILL BE Ti 8-1-1

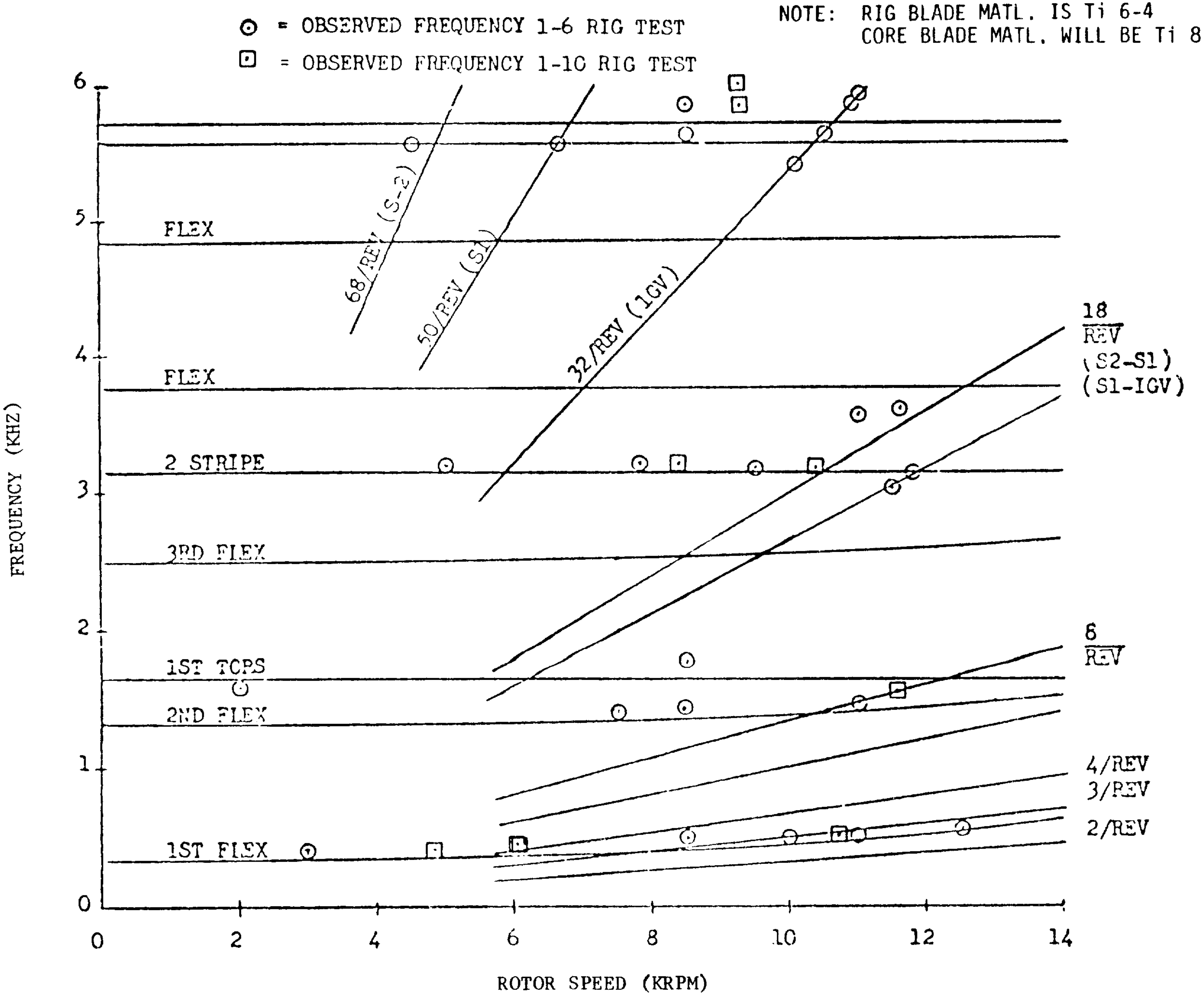


Figure 34. Compressor Rotor Stage 2 Blade Campbell Diagram.

NOTE: RIG BLADE MATL. IS Ti 6-4
CORE BLADE MATL. WILL BE Ti 8-1-1

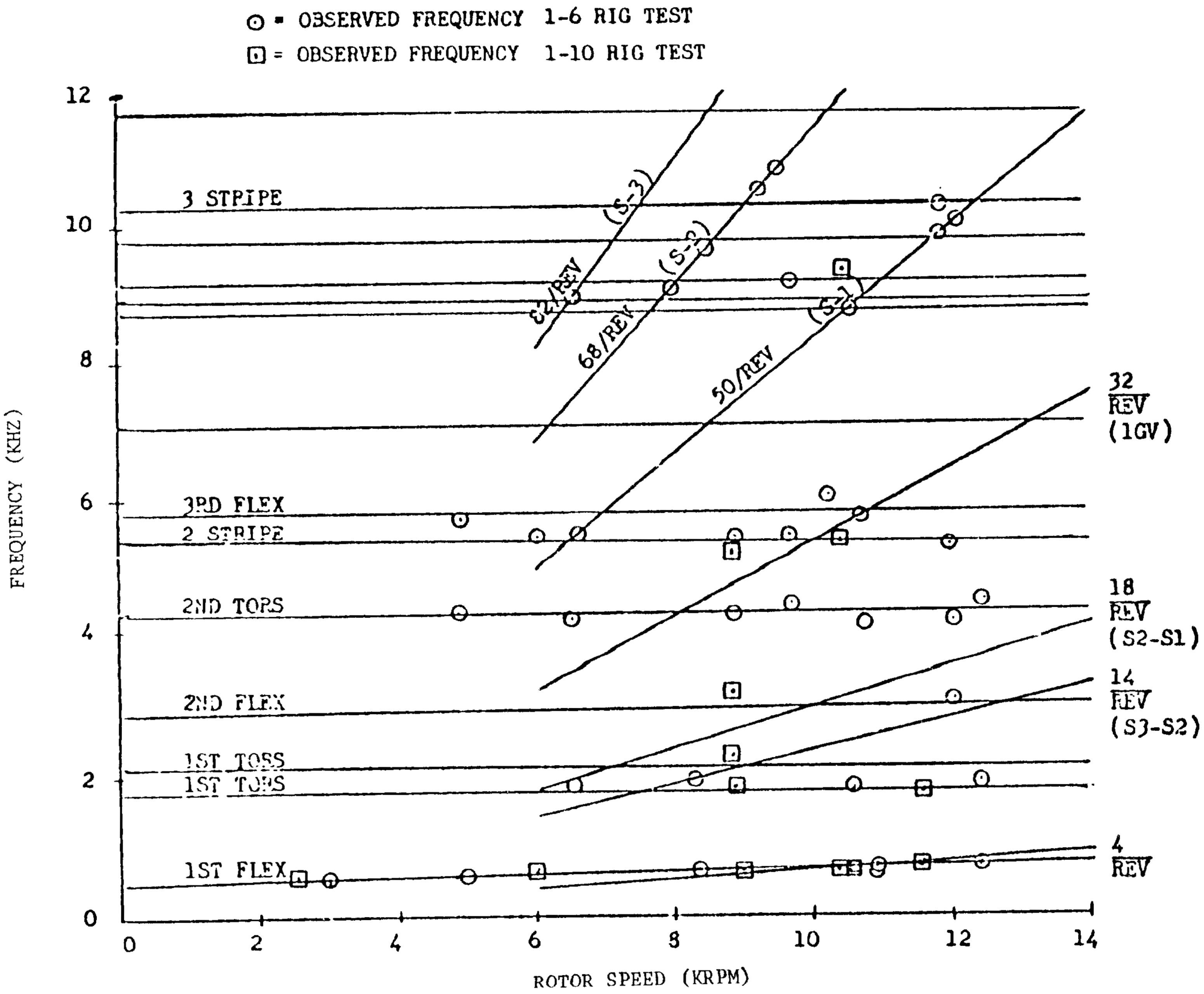
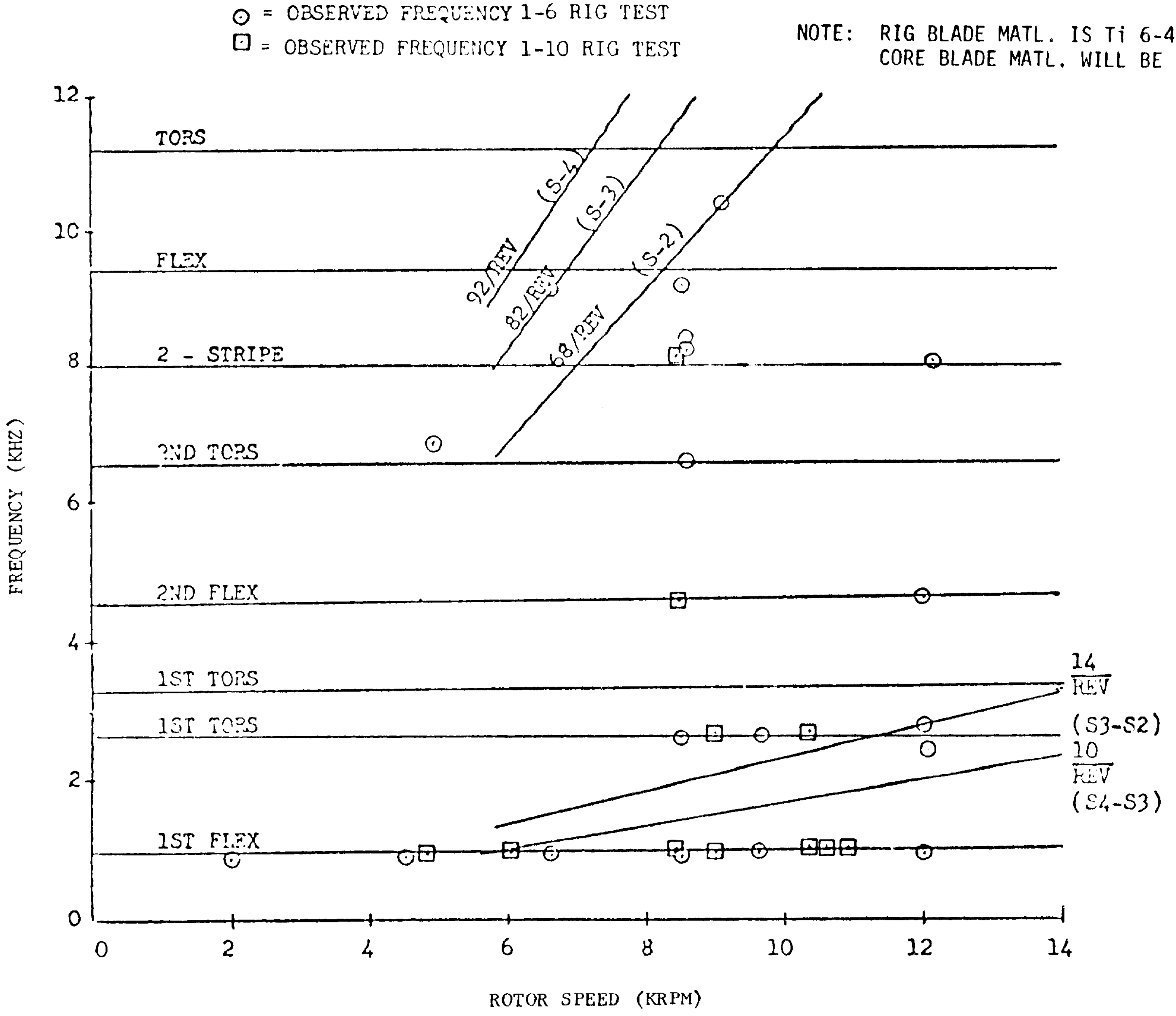


Figure 35. Compressor Rotor Stage 3 Blade Campbell Diagram.



NOTE: RIG BLADE MATL. IS Ti 6-4
CORE BLADE MATL. WILL BE Ti 8-1-1

Figure 36. Compressor Rotor Stage 4 Blade Campbell Diagram.

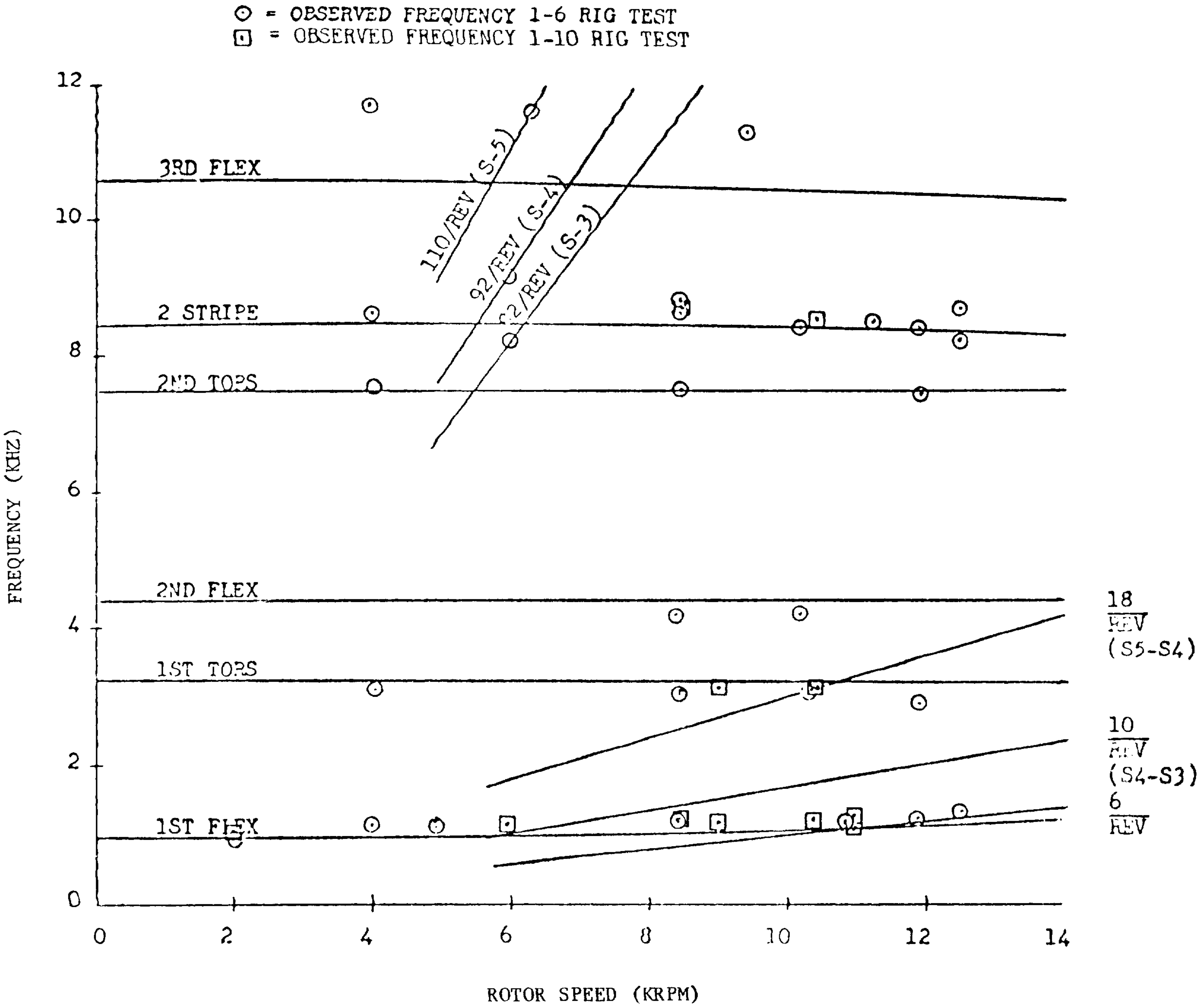


Figure 37. Compressor Rotor Stage 5 Blade Campbell Diagram.

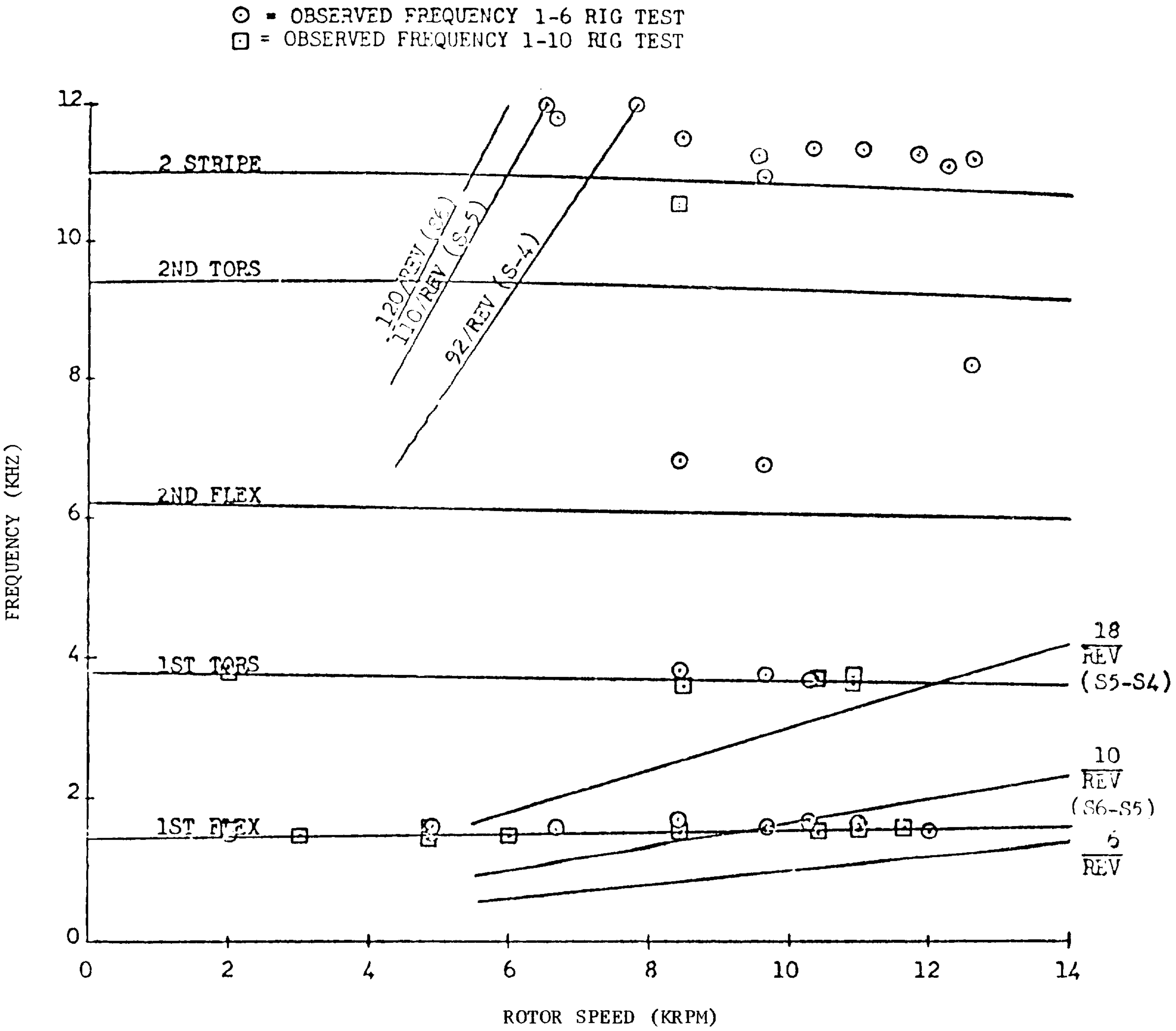


Figure 38. Compressor Rotor Stage 6 Blade Campbell Diagram.

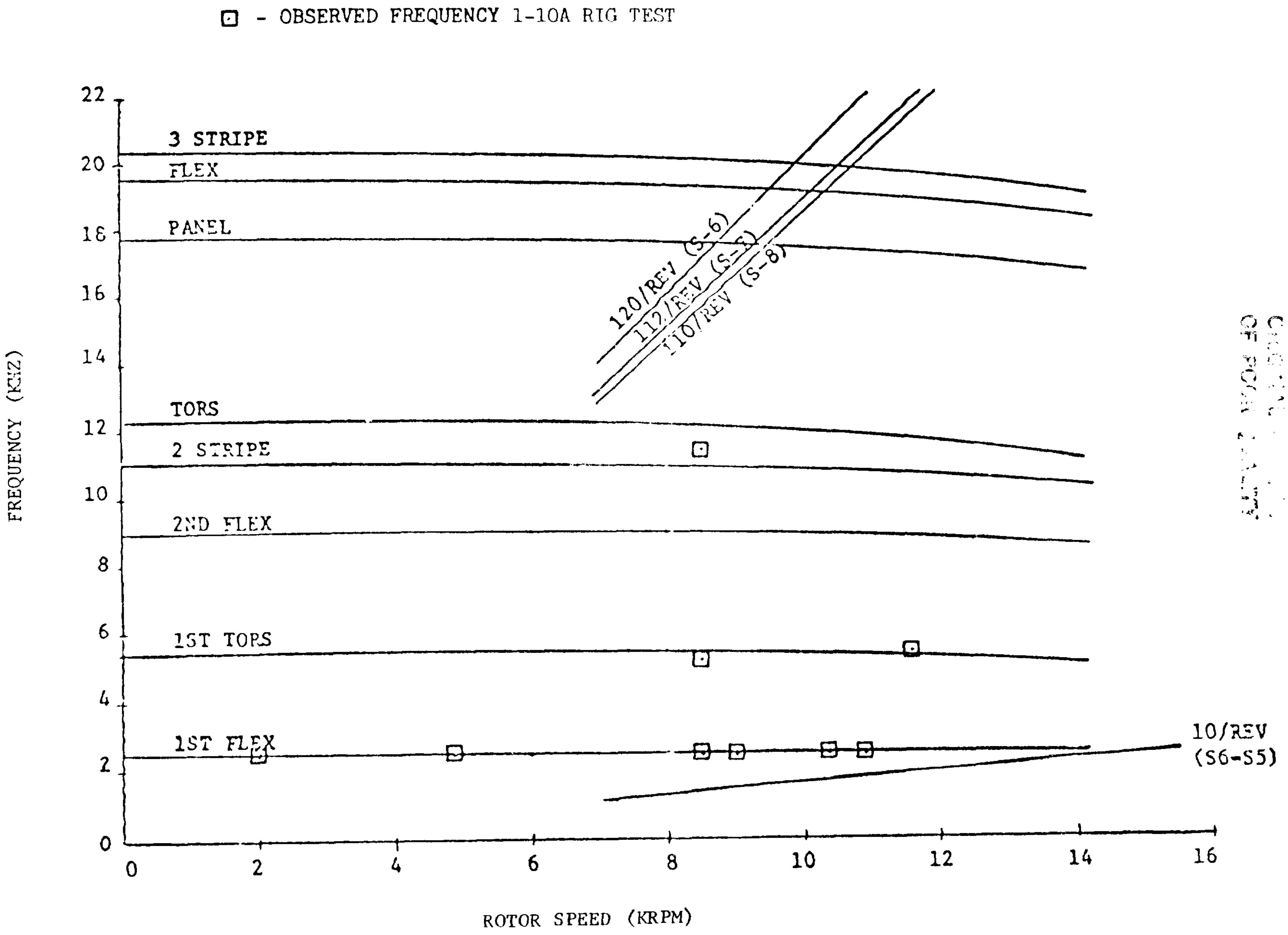


Figure 39. Compressor Rotor Stage 7 Blade Campbell Diagram.

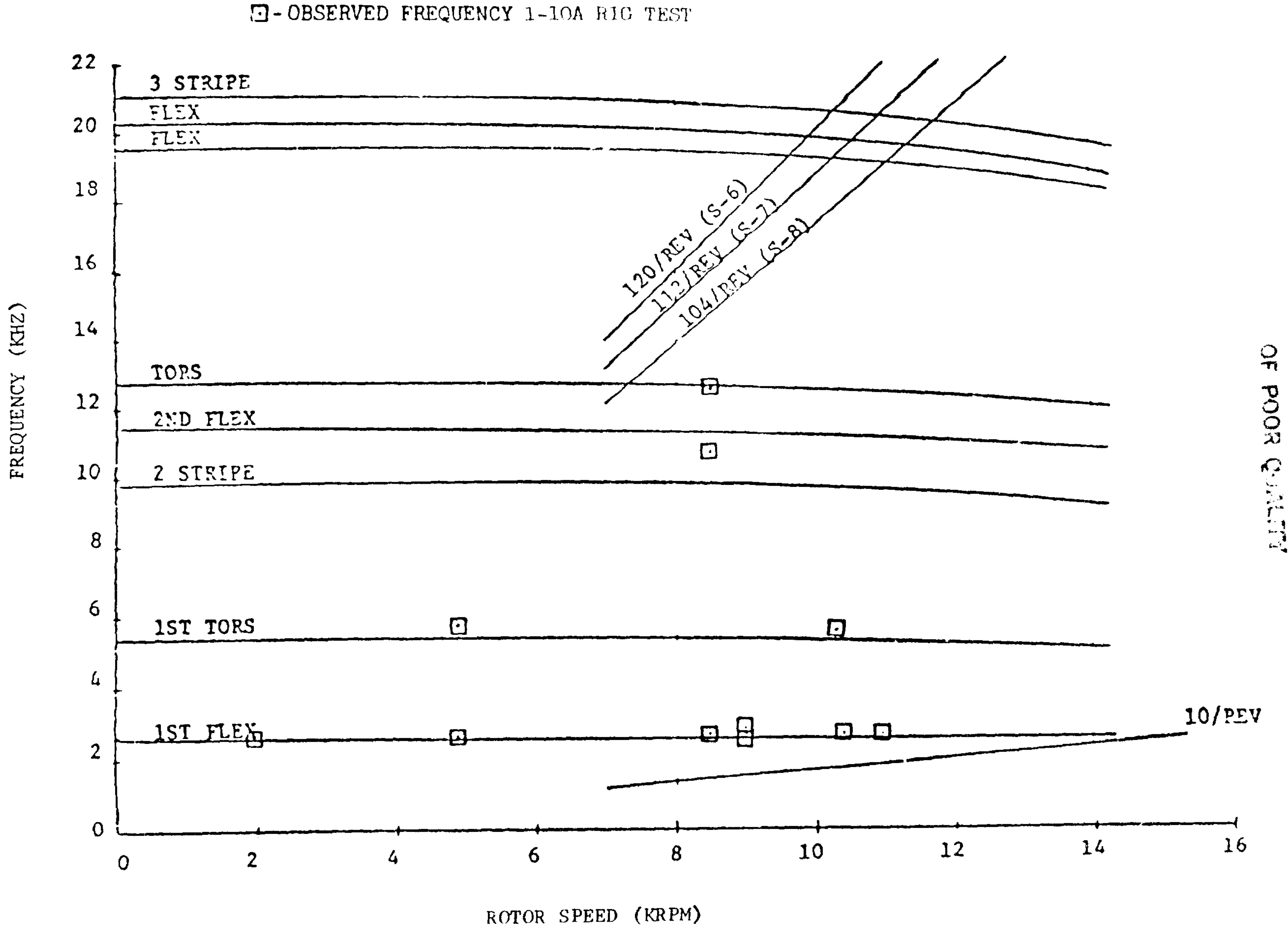


Figure 40. Compressor Rotor Stage 8 Blade Campbell Diagram.

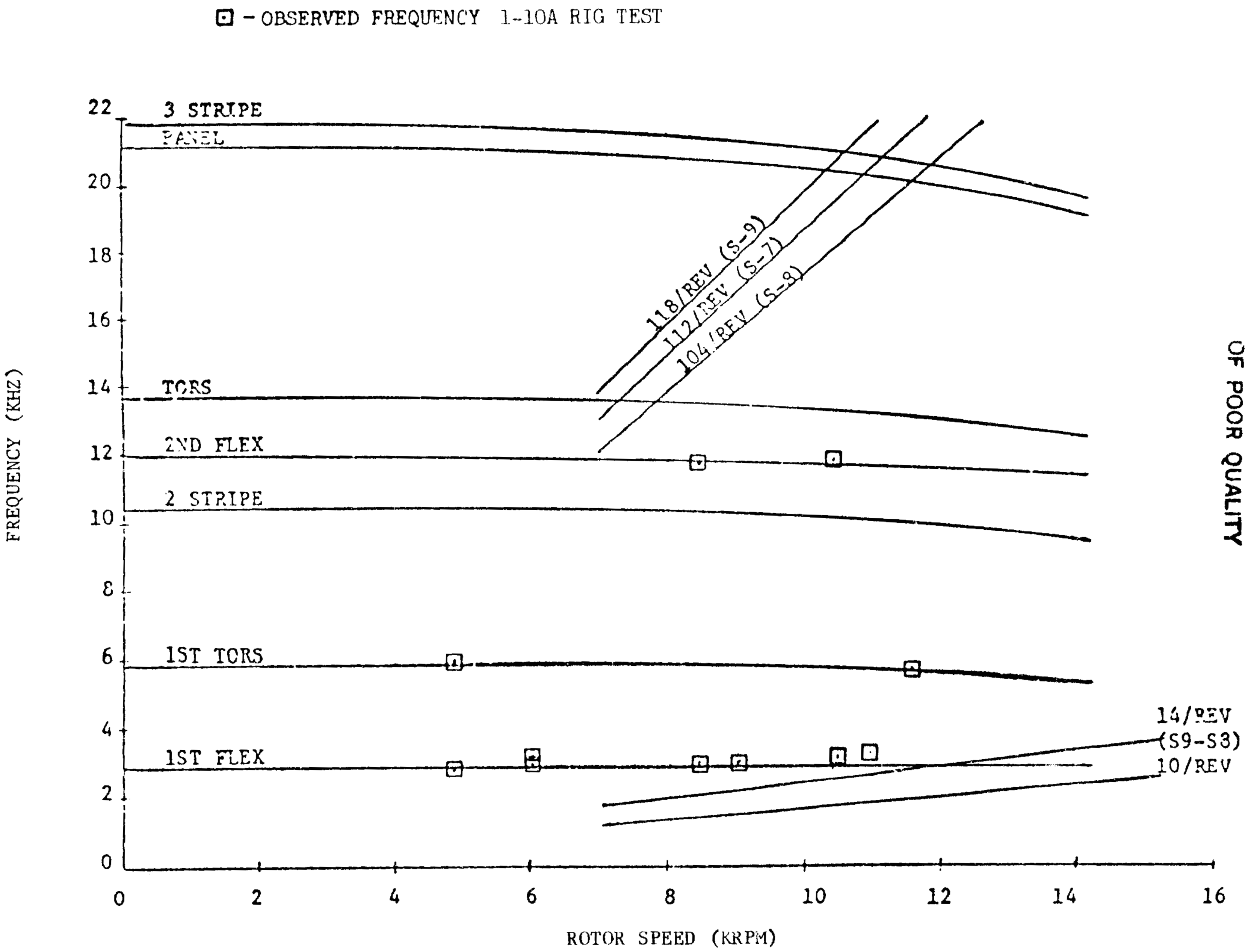


Figure 41. Compressor Rotor Stage 9 Blade Campbell Diagram.

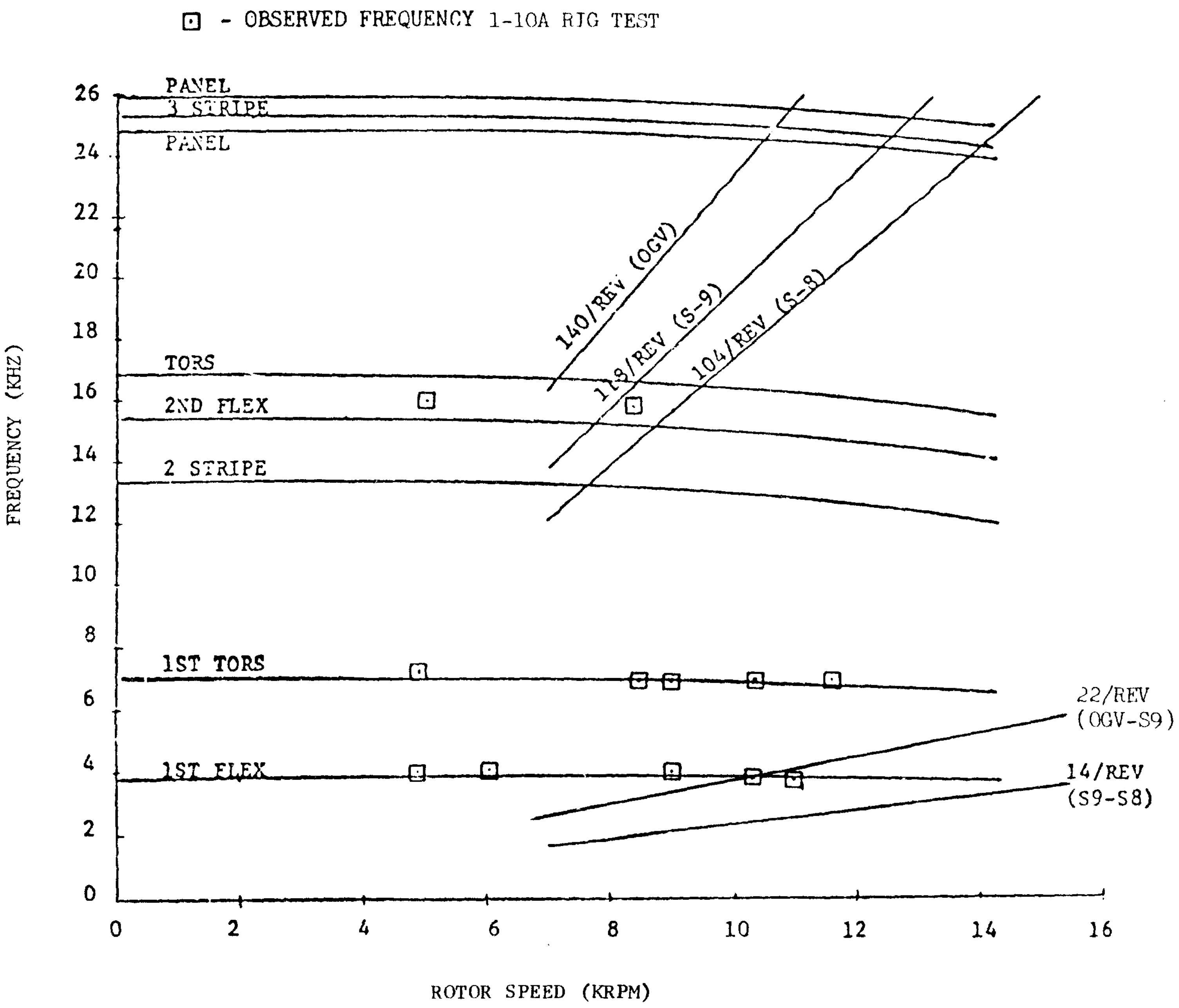


Figure 42. Compressor Rotor Stage 10 Blade Campbell Diagram.

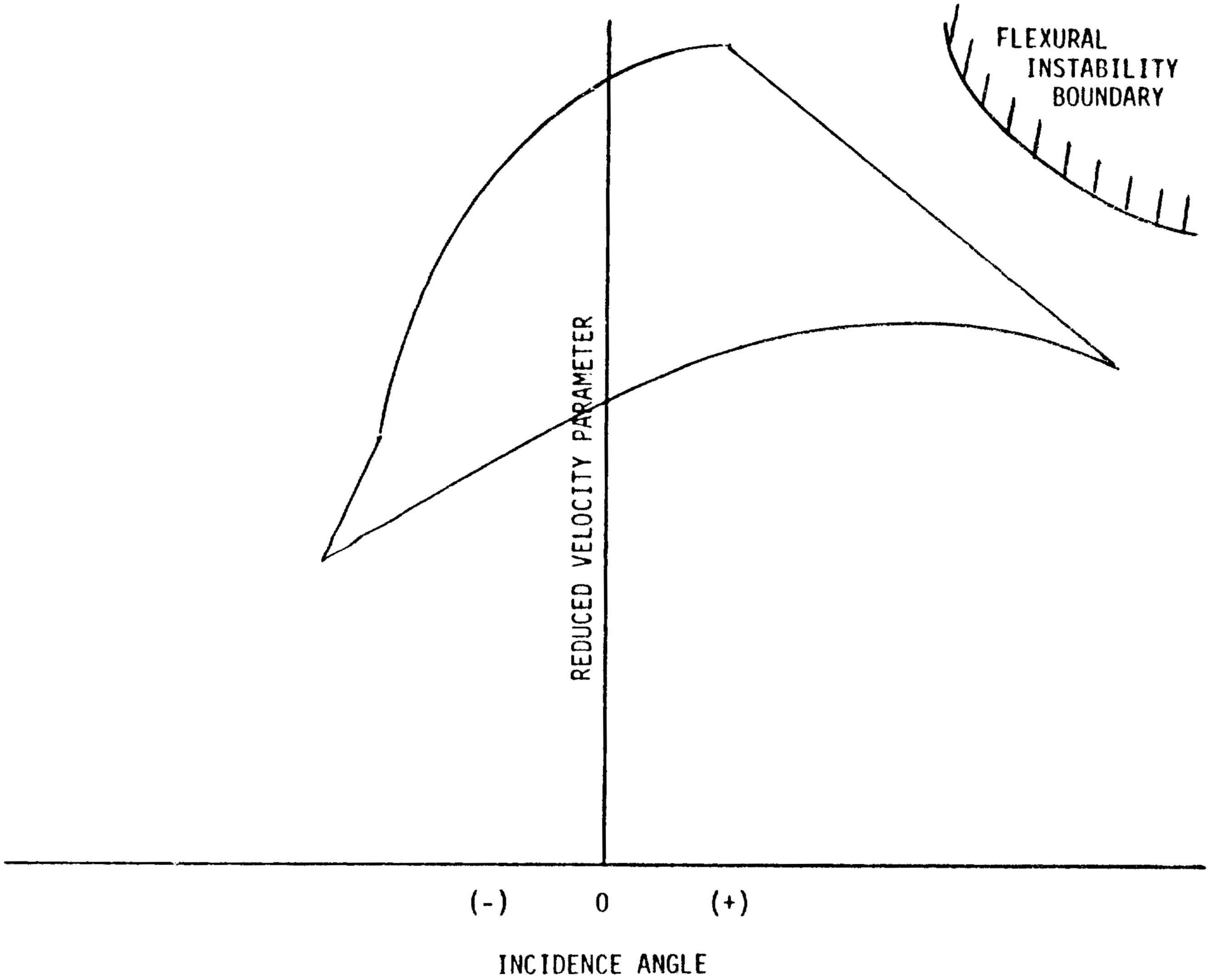


Figure 43. Rotor Blade Stages 1 Through 10 Flexural Stability Plot.

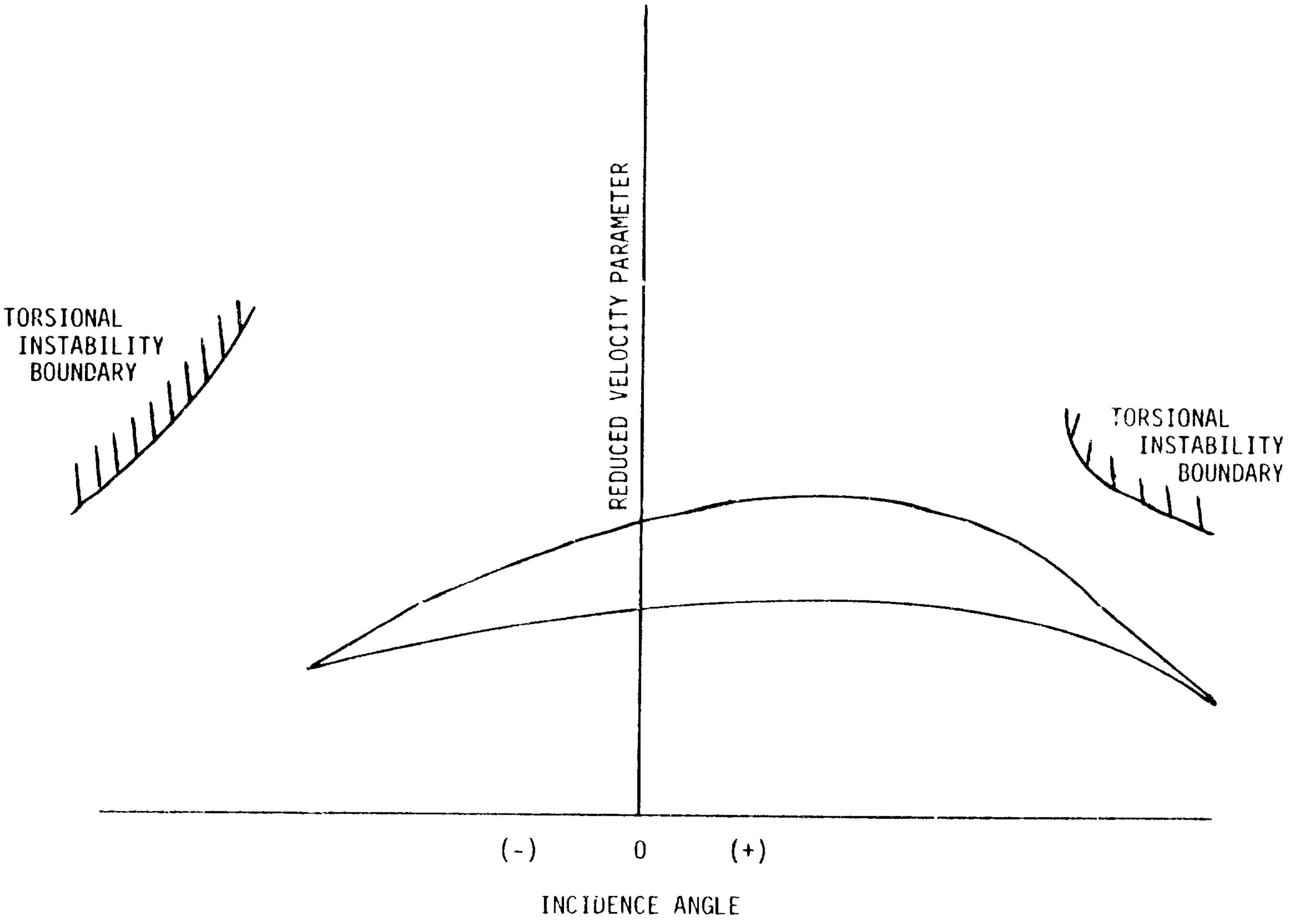


Figure 44. Rotor Blade Stages 1 Through 10 Torsional Stability Plot.

Table XI. Test Measured Blade Stress.

Stage	% Limits			
	1-6 Rig FSCT		1-10 Rig FSCT	
	Steady State	Stall	Steady State	Stall
1	35	71	12	30
2	21	69	11	100
3	31	277	29	250**
4	22	170	24	175
5	18	88	120*	168
6	18	97	92*	118
7	--	--	42	70
8	--	--	33	30
9	--	--	15	30
10	--	--	17	30

*Strong 1/rev stimulus from Stage 6 vane with uncambered trailing edge.

**Core engine blade redesigned from low flex to high flex airfoil - more stall tolerant.

Table XII. Stator Mechanical Design Goals.

- No Aeromechanical Instabilities
- Components Capable of Growth Cycle
- Low Vibratory Stresses in Vanes
- Titanium Fire Safety
- Aft Stages Active Clearance Control

45. Note that the titanium fire safety goal is satisfied by the steel vanes and casings. Rotor rub land materials are compatible with current, proven engine applications.

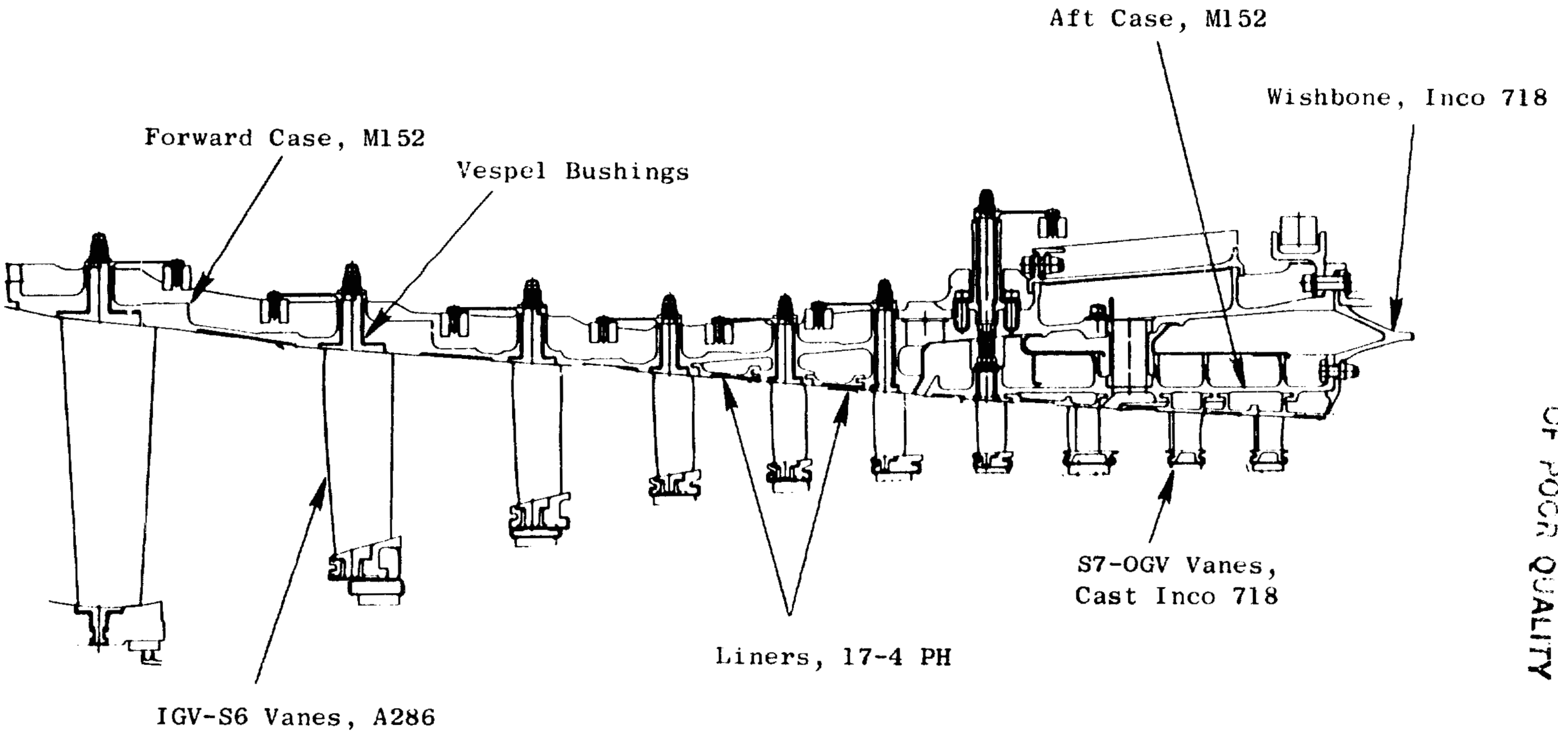
The aeromechanical, performance, and structural considerations for design of the vanes are listed on Table XIII. Discussion of vane material selections is presented on Table XIV. As discussed earlier in the aerodynamic section, the core IGV, S1, and S6 airfoils have been restaggered 3.5° to 4.0° and recambered 5° to 8° from the 1-6 rig design. Stator 2 through 5 airfoils have been changed from the 1-10 rig design. OGV airfoil design remains the same as that of the 1-10 rig.

Campbell diagrams for IGV through Stage 10 (OGV) are presented on Figures 46 through 56. The 1-6 rig and 1-10 rig data are shown on the diagrams. It can be noted that the test data correlate well with the analytical predictions. Flexural and torsional stability envelopes are plotted on Figures 57 and 58 and for Stators 1 through 10. The envelopes fall well within the stable regime. Airfoil vibratory stress responses during normal operation and at peak stall are tabulated in Table XV as percent of scope limits. The low responses are attributed to the rugged design of the vanes.

Casing temperatures were recorded during the 1-10A rig test. Results are compared with the analytical temperatures on Figure 59. The casing heat transfer model has been updated to reflect the test results.

Compressor bleeds are summarized on Figure 60 for the 1-10 rig and the core (dashed lines). Zero to 9% of Rotor 5 tip discharge air is extracted aft of Stator 5 for customer bleed, HP turbine rotor cavity purge, and the aft case active clearance control. Zero to 30% of Rotor 7 tip discharge, extracted aft of Stator 7, is utilized for start bleed and HP turbine nozzle cooling. Zero to 9% of CDP air is extracted for customer bleed; 5.6% of diffuser discharge air is extracted at the trailing edge of the splitter through holes in the walls of the diffuser struts and ducted inboard for HP turbine rotor cooling.

Compressor clearances were calculated considering the elements listed on Table XVI. Buildup and cruise clearances (with active clearance control) for



Rub Material	Honeycomb	Shrouds	Interstage Seals
Stages 1 - 4, Al-Br-Ni-Cg	Hastelloy X	IGV and S1, 6061-T6	Inco 600
Stages 5 - 10, Metco 443 Ni-Cg		S2 - S4, 17-4 PH	
		S5 - S6, Inco 718	

Figure 45. Compressor Stages 1 Through 10 Rig Materials.

Table XIII. Vane Design Considerations.

- Primary Flex and Torsion Modes Should Not Coincide With Blade Passing Stimuli in Operating Range
  - 2 Stages Forward
  - 1 Stage Aft
- Two Stripe Mode (Chordwise Bending)
  - Out of Operating Range
- Stability (Flex and Torsion)
- Vane Leading Edge Covered by Buttons
  - Prevents Cross Flow Within Cascade
- Material to Minimize Ti Fire Risk
- High Boss

Table XIV. Vane Material.

IGV - S6 (A286)

- Eliminates Titanium "Fuel" in Stators
- Corrosion and Oxidation Resistant
- Production Engine Experience (CF6-50 Stage 3 - OGV)

S7 - OGV, Diffuser (Inco 718)

- Castable
- Weldable
- Good Strength at High Temperature
- Corrosion and Oxidation Resistant

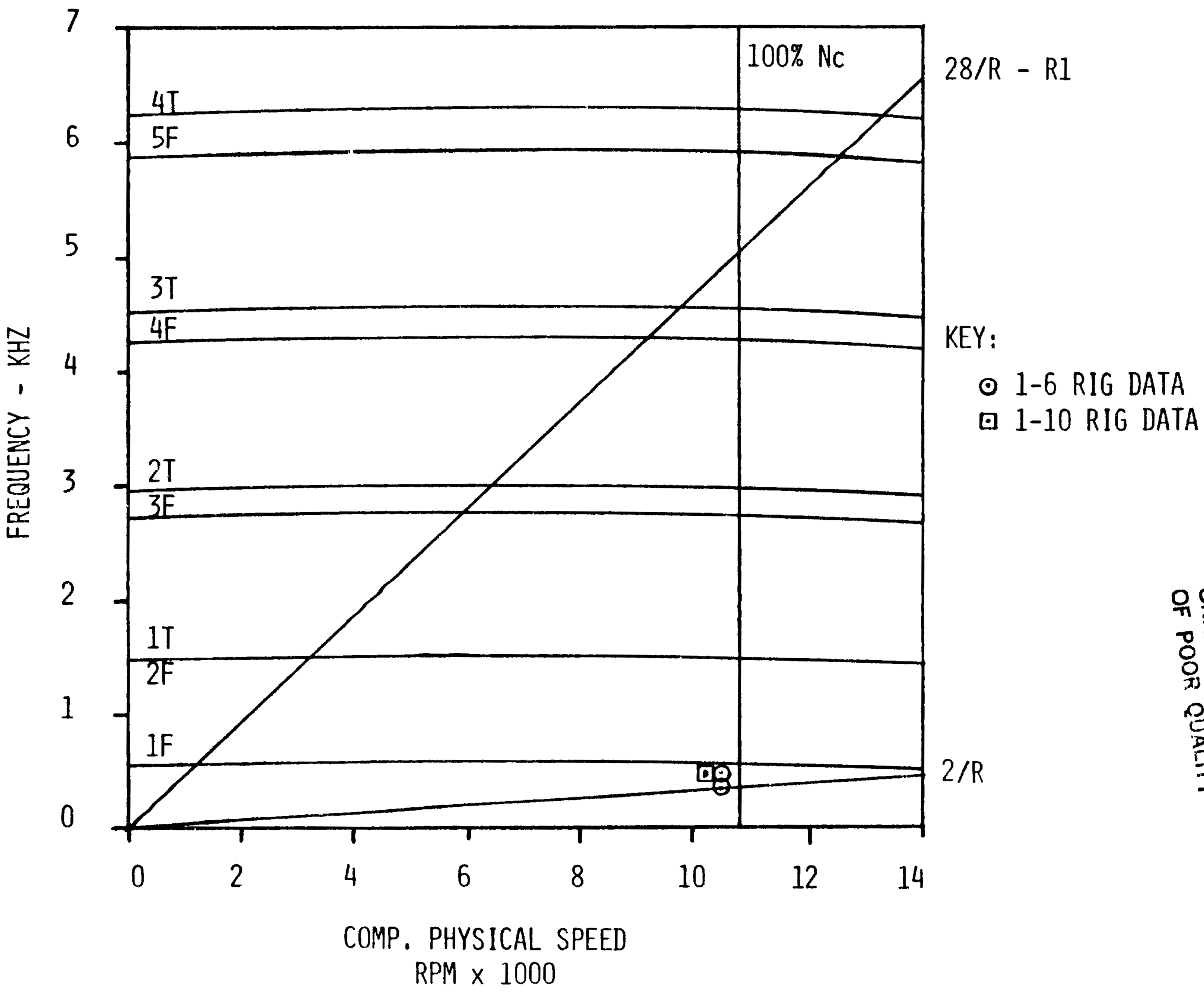


Figure 46. Inlet Guide Vane 10A Rig Campbell Diagram.

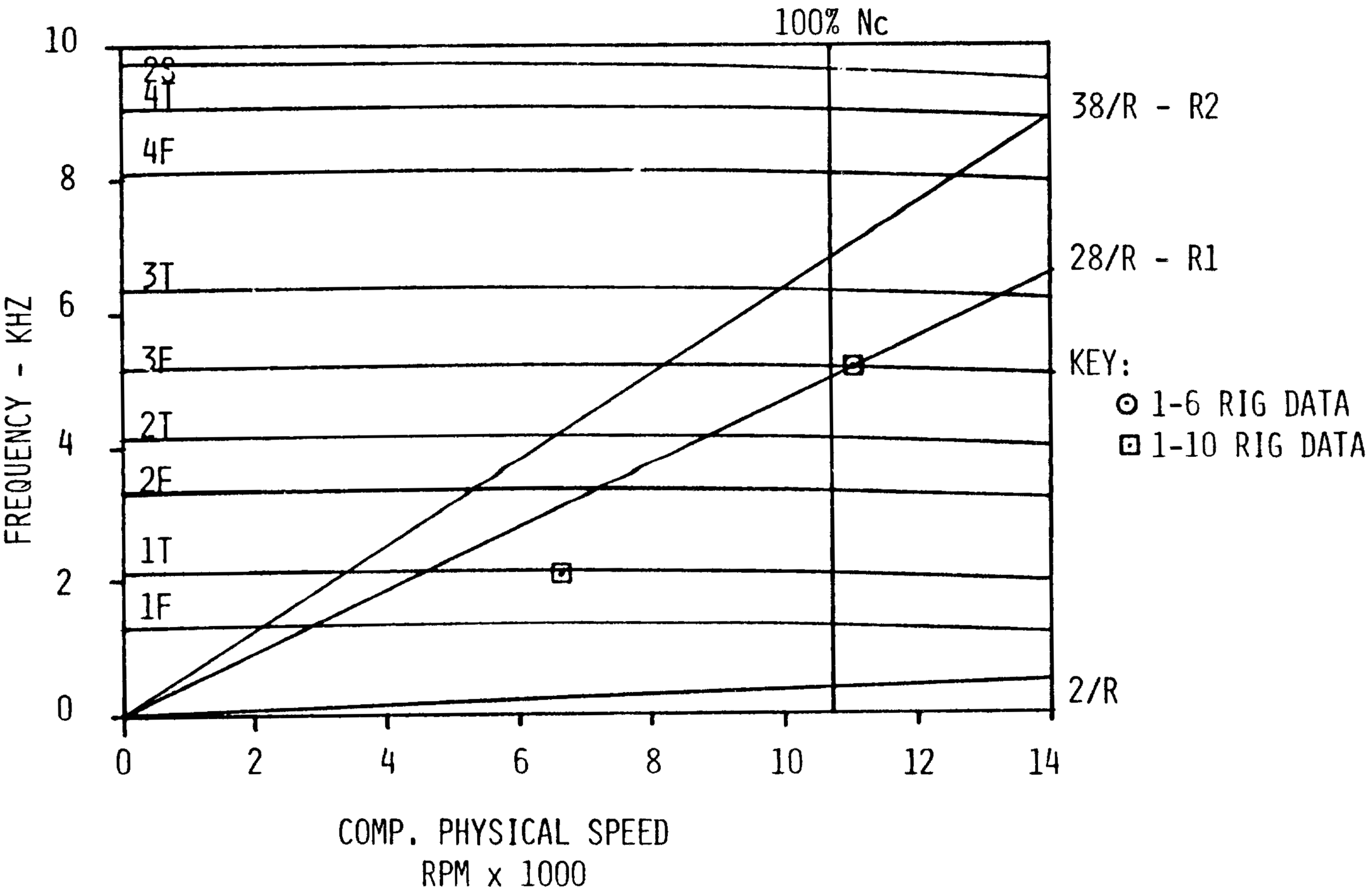


Figure 47. Stage 1 Vane 10A Rig Campbell Diagram.

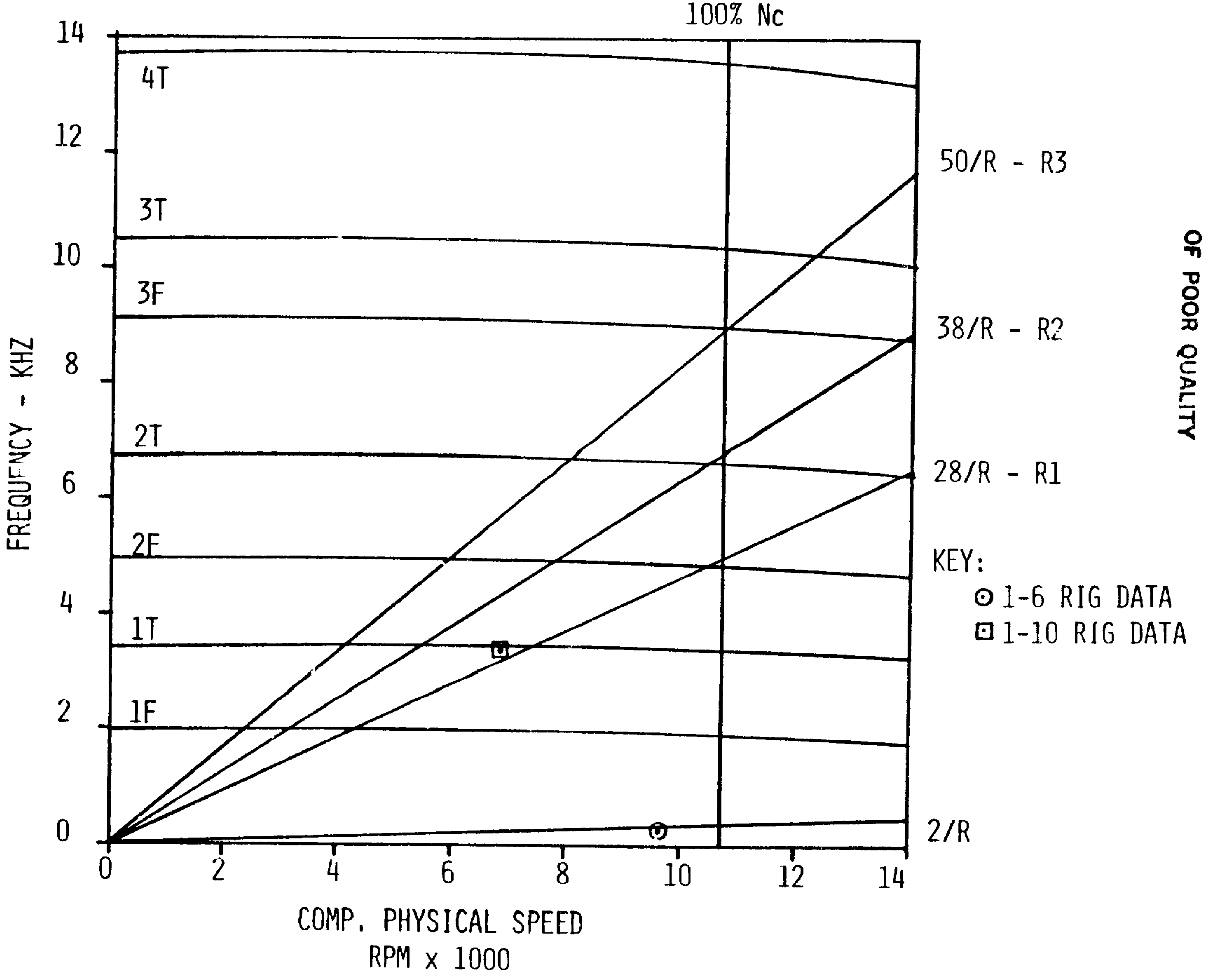


Figure 48. Stage 2 Vane 10A Rig Campbell Diagram

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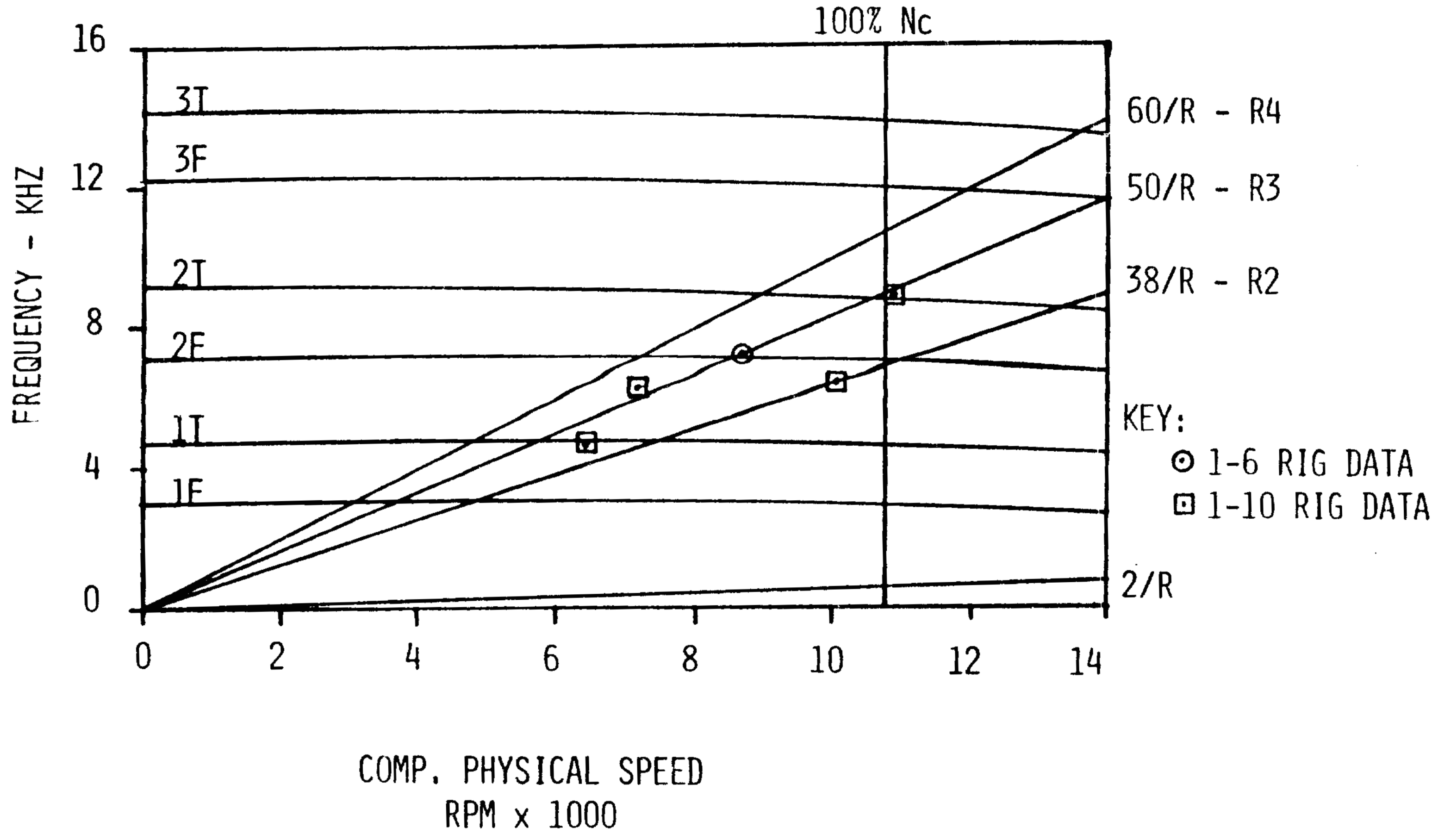


Figure 49. Stage 3 Vane 10A Rig Campbell Diagram.

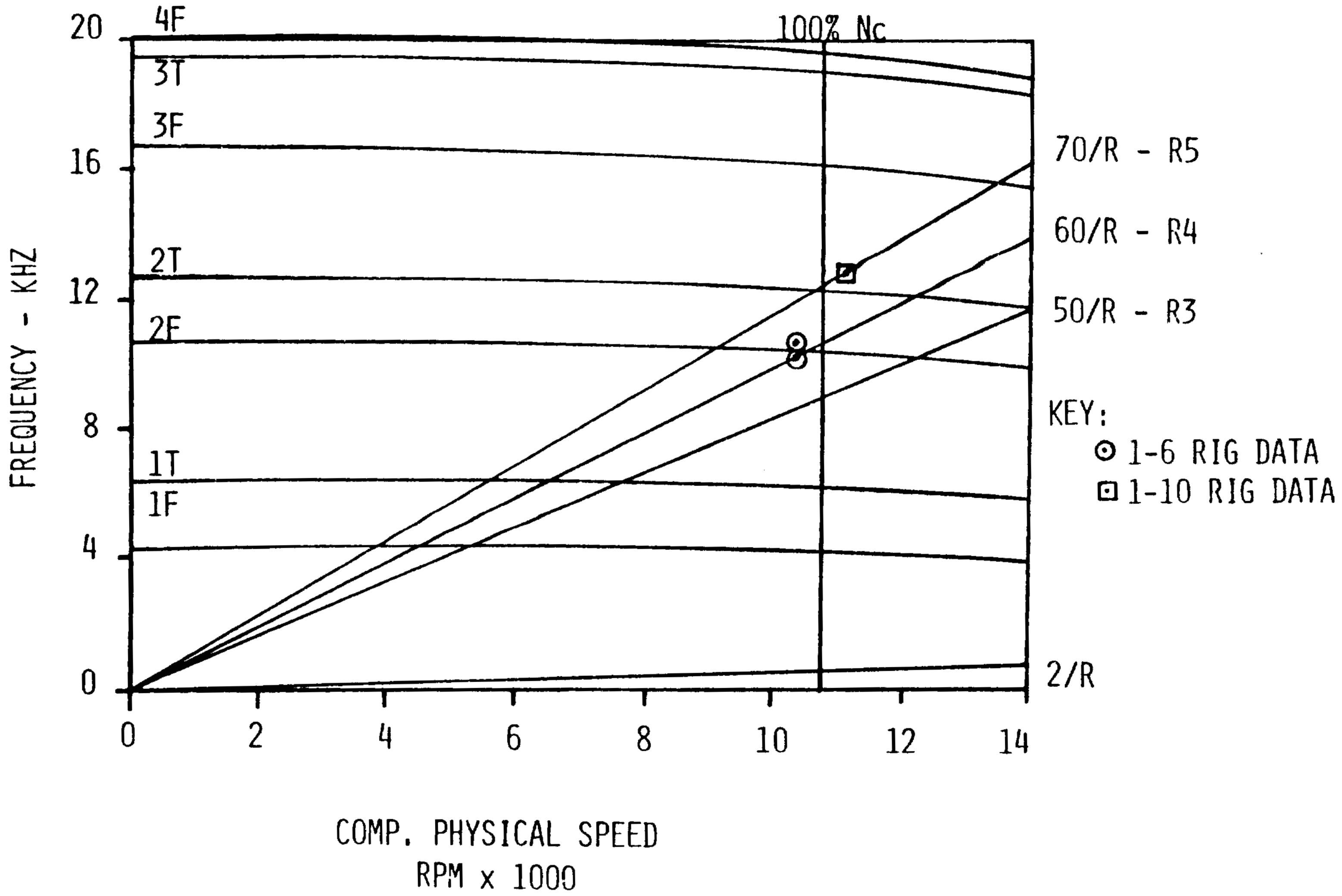


Figure 50. Stage 4 Vane 10A Rig Campbell Diagram

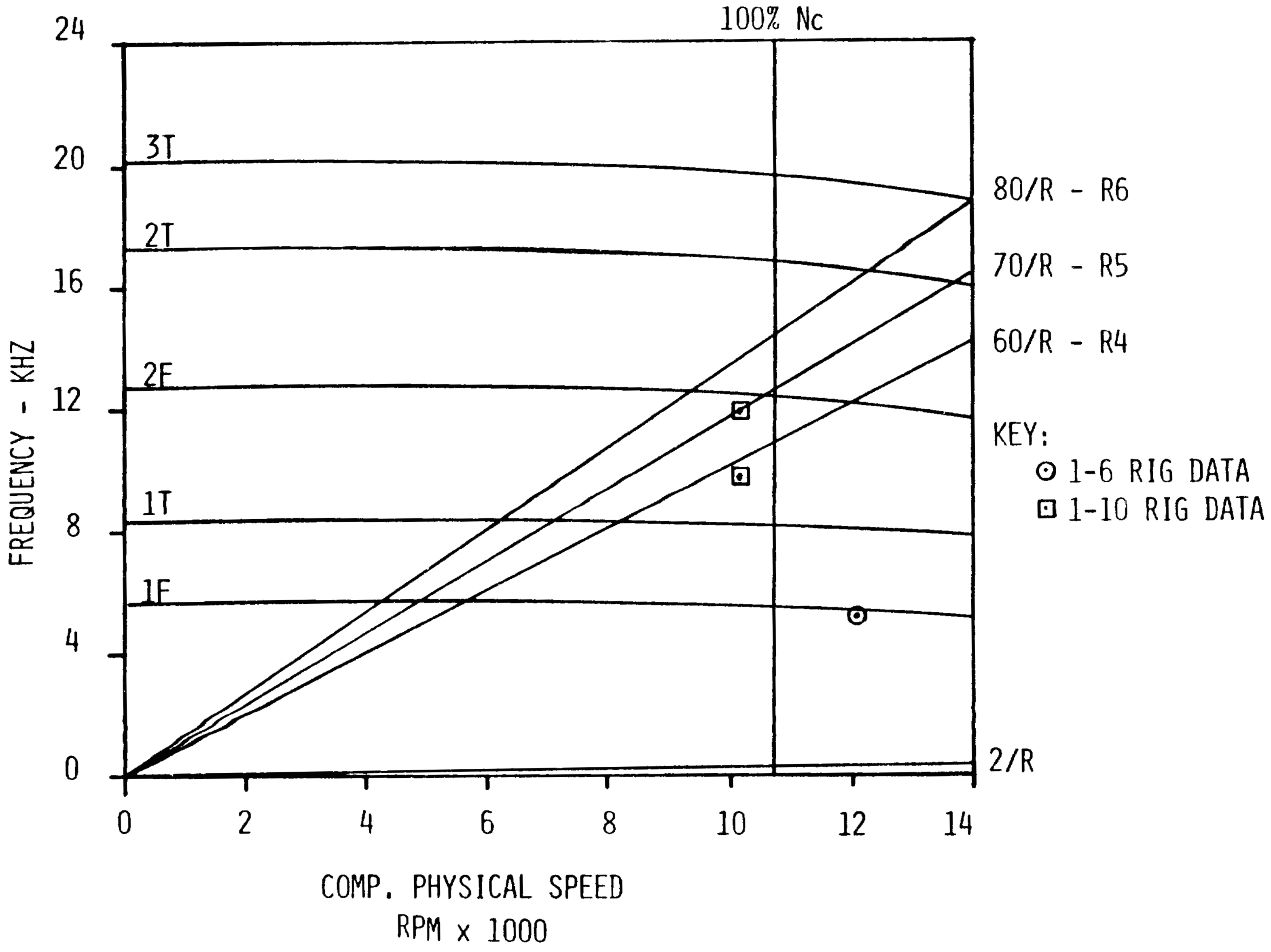


Figure 51. Stage 5 Vane 10A Rig Campbell Diagram

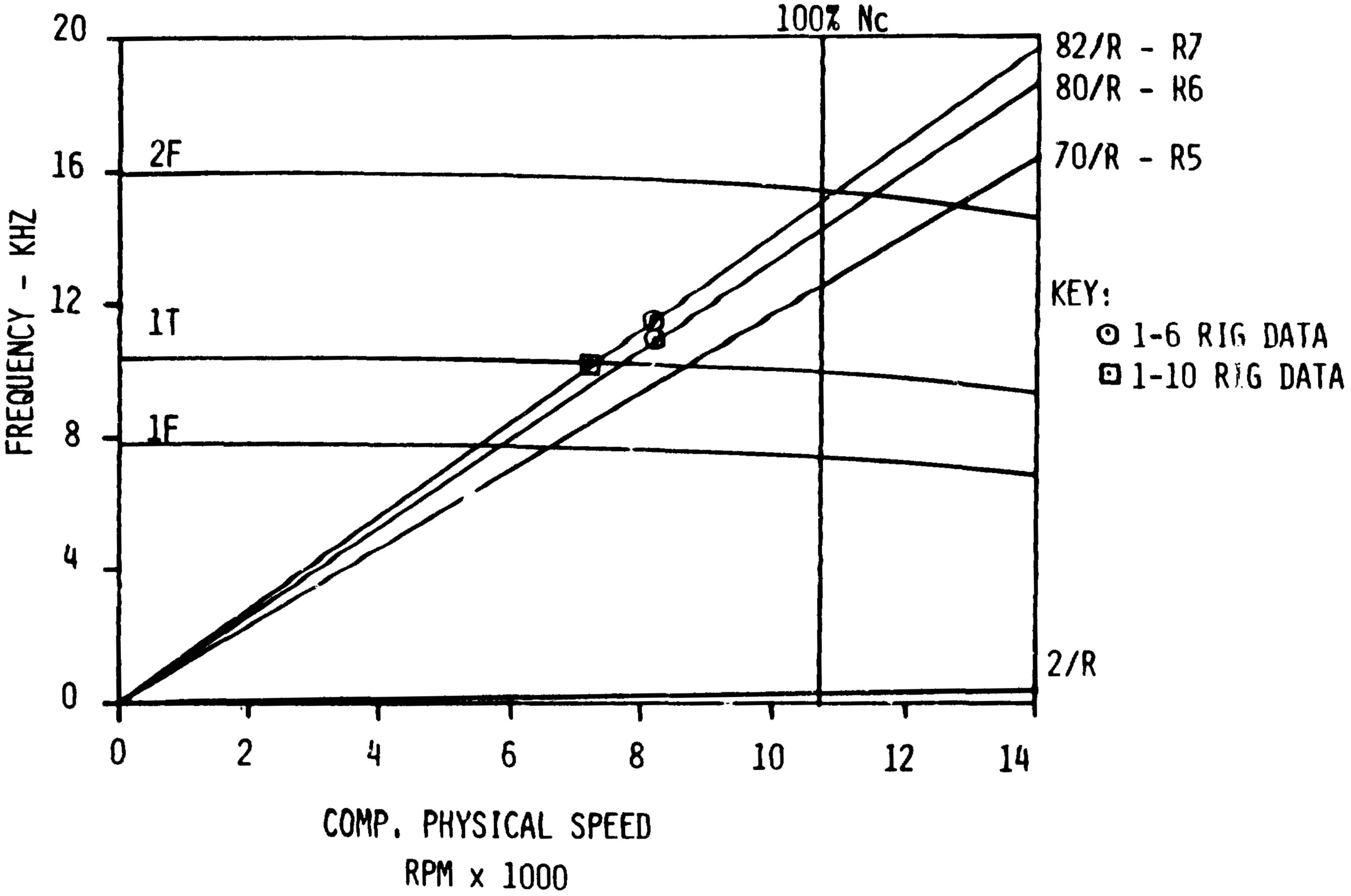


Figure 52. Stage 6 Vane 10A Rig Campbell Diagram

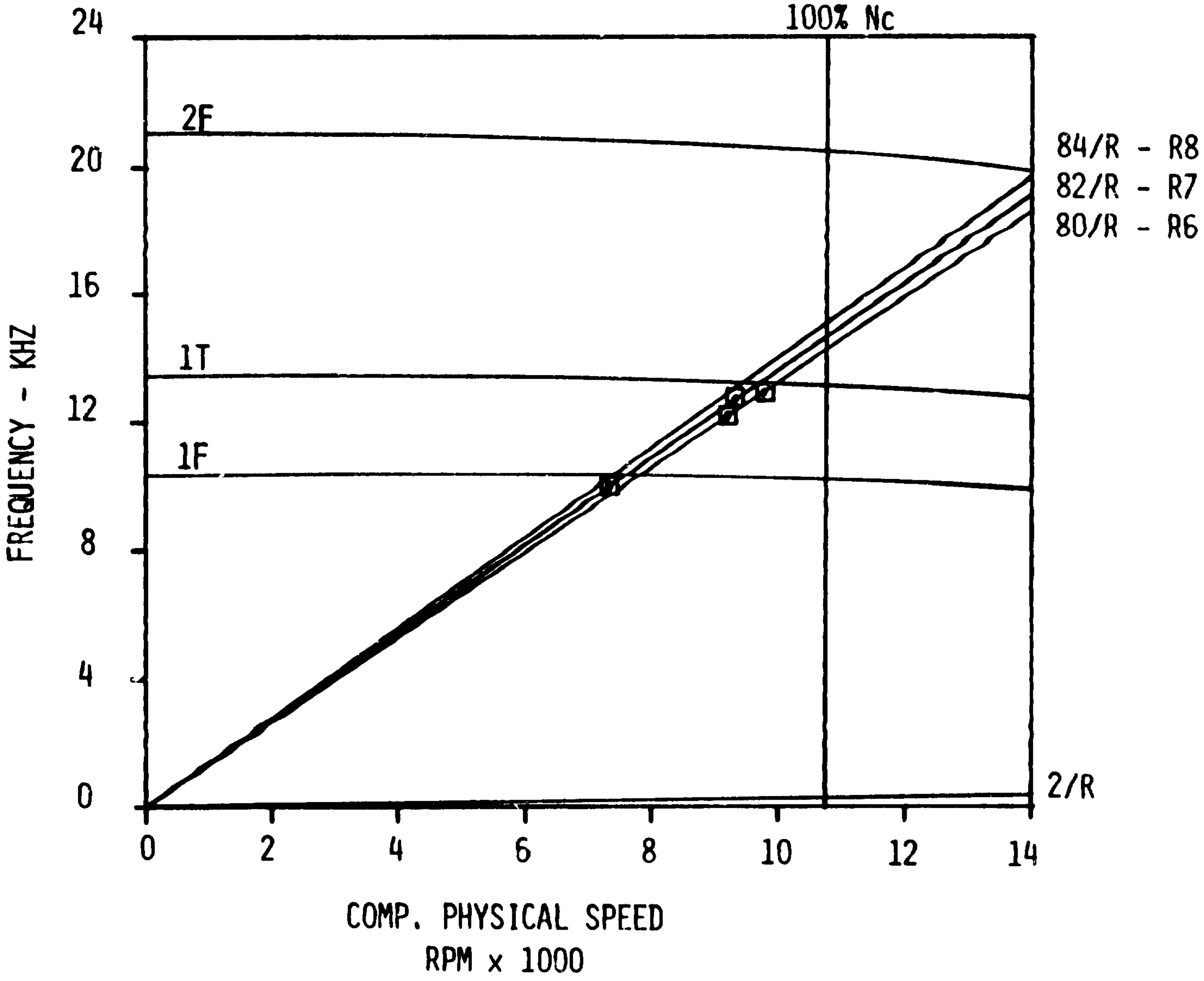


Figure 53. Stage 7 Vane 10A Rig Campbell Diagram

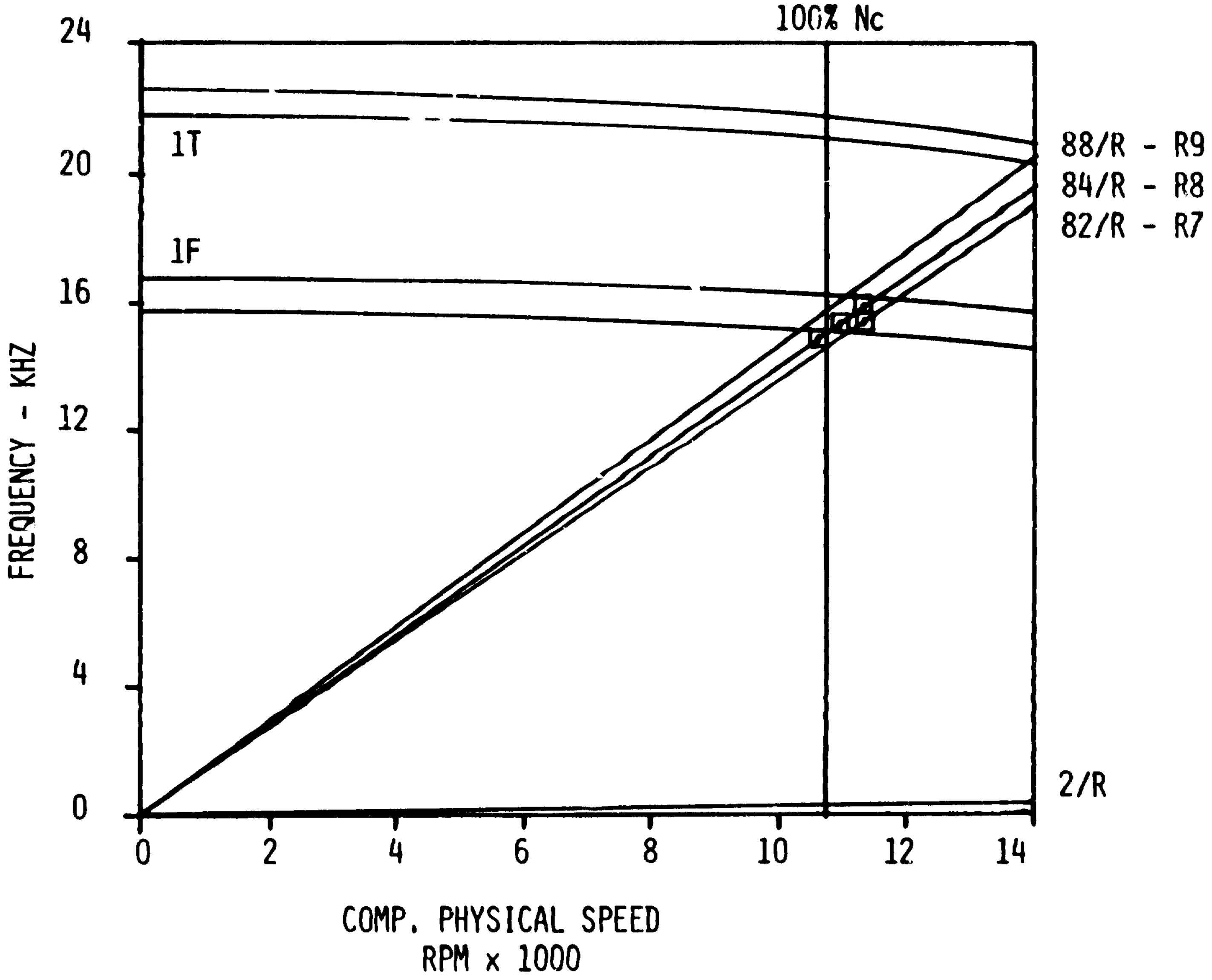


Figure 54. Stage 8 Vane 10A Rig Campbell Diagram

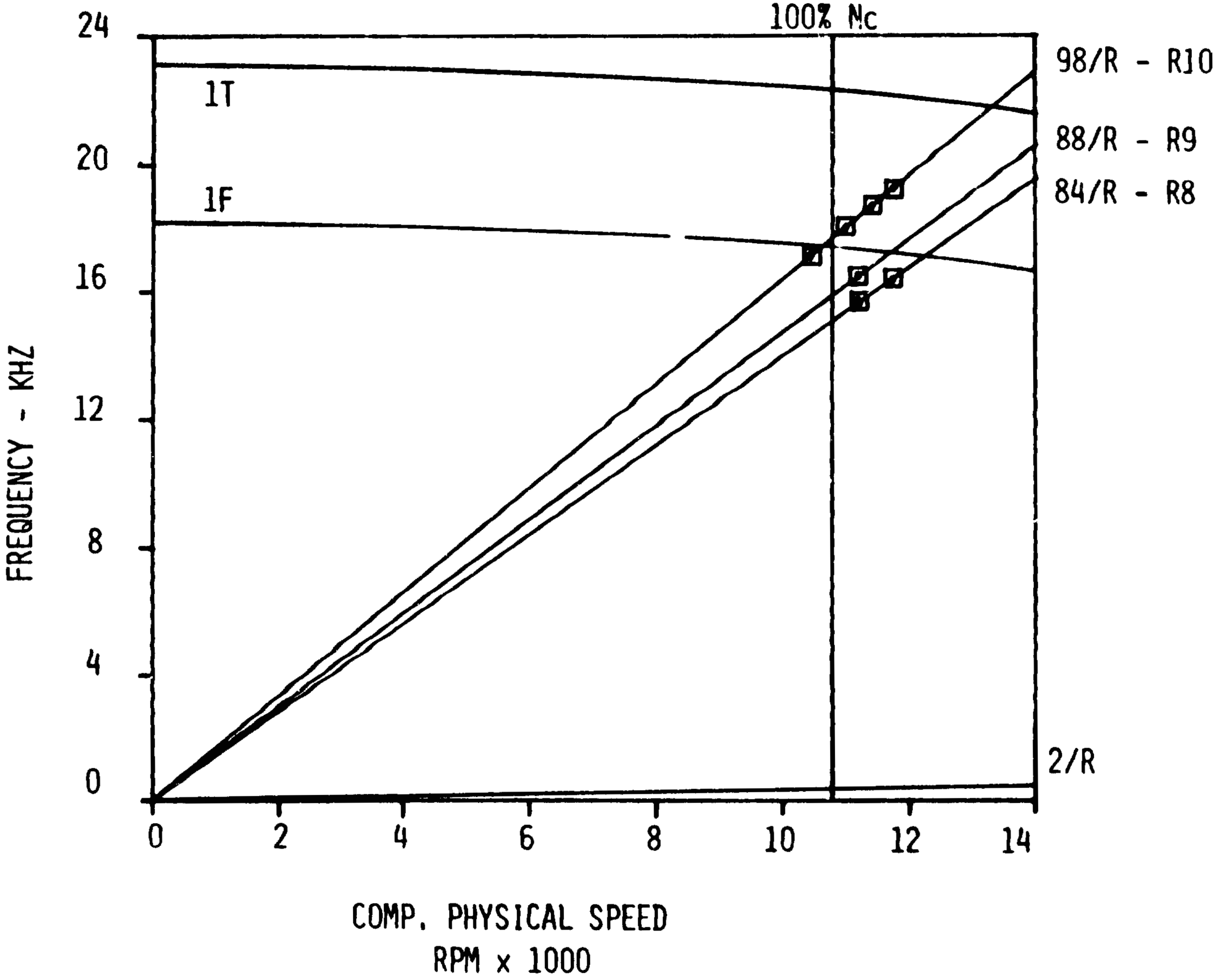


Figure 55. Stage 9 Vane 10A Rig Campbell Diagram

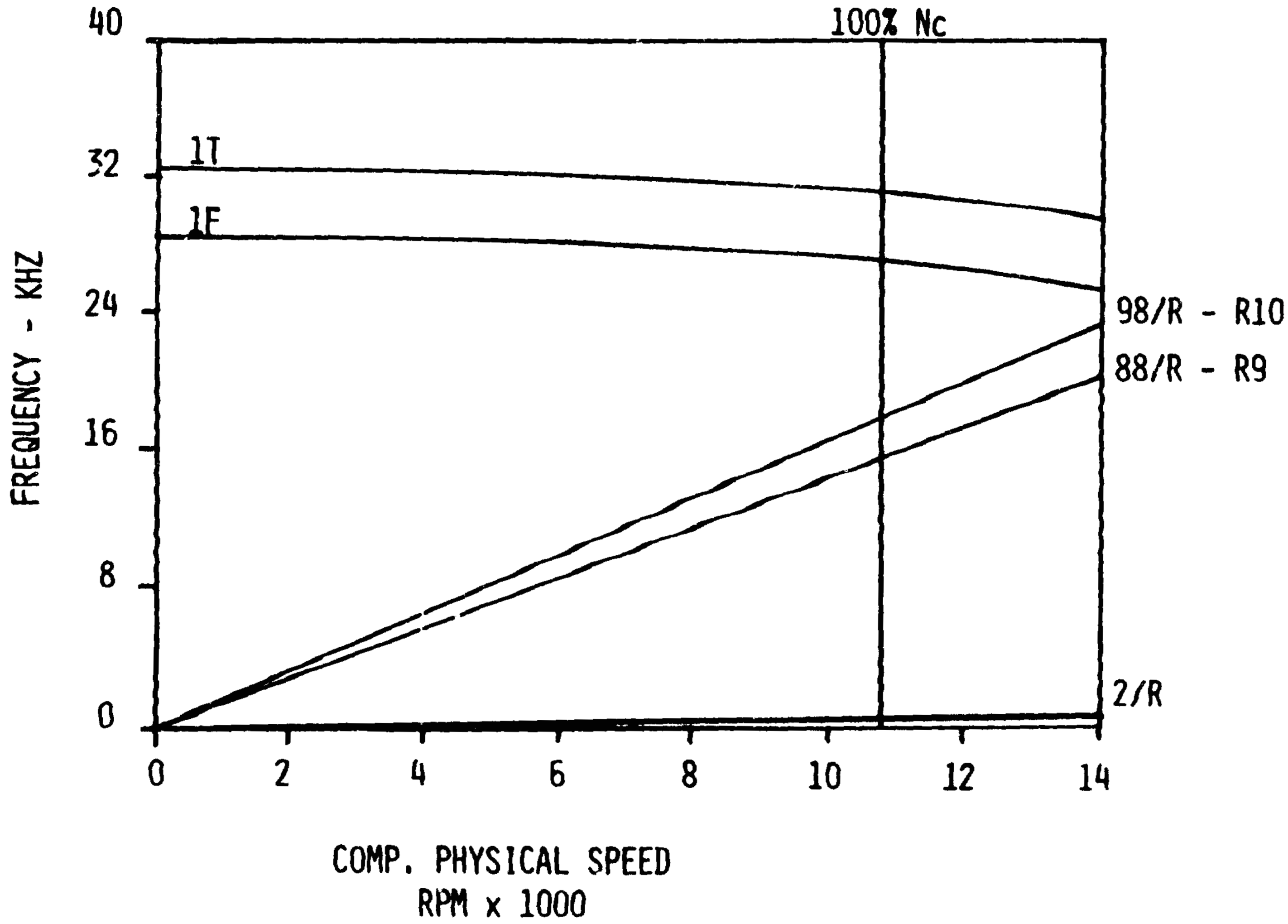


Figure 56. Stage 10 Vane 10A Rig Campbell Diagram

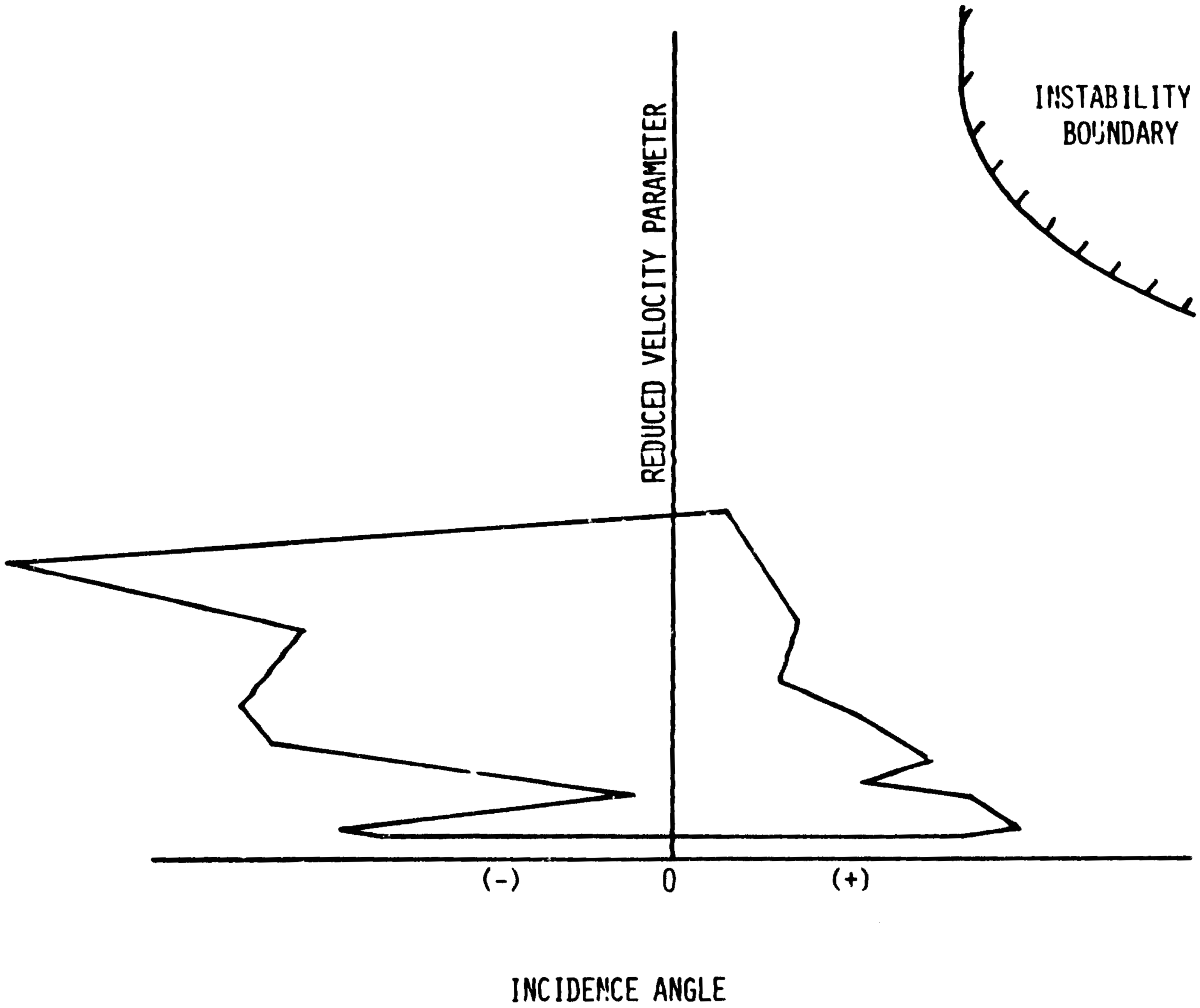


Figure 57. Compressor Stator Flexural Stability, Stages 1 Through 10.

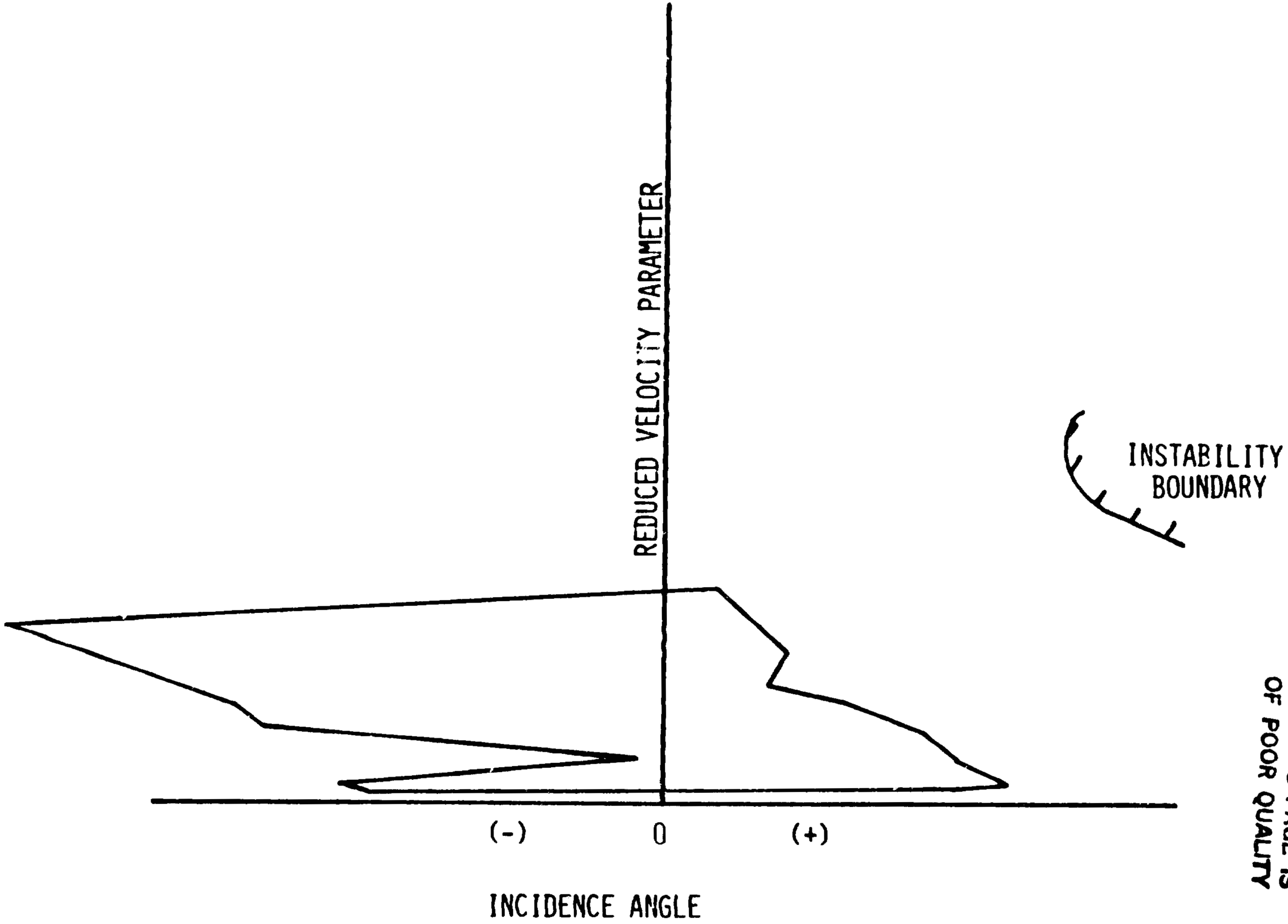


Figure 58. Compressor Stator Torsional Stability, Stages 1 Through 10.

Table XV. E^3 10A Compressor Test Aeromechanical Summary, Stator Vanes.

Stage	Maximum Steady-State Response to 11,600 rpm, % Limits	Peak Stall Response, % Limits
IGV	3	<40
1	7	<40
2	11	<40
3	4	<40
4	24	<40
5	30	<40
6	30	<40
7	30	<40
8	40	<40
9	56	<40
OGV	1F and 1T Not Excited	<40

Table XVI. Elements of E^3 Compressor Clearances.

- Axisymmetric Closures
  - Flight Condition
  - Transient Response

- Beam Bending Deflections
  - Thrust
  - Gyro BB = Inlet Loads + Thrust + $\sqrt{\text{Gyro}^2 + (\text{G-Loads})^2}$
  - Inlet Loads
  - G-Loads

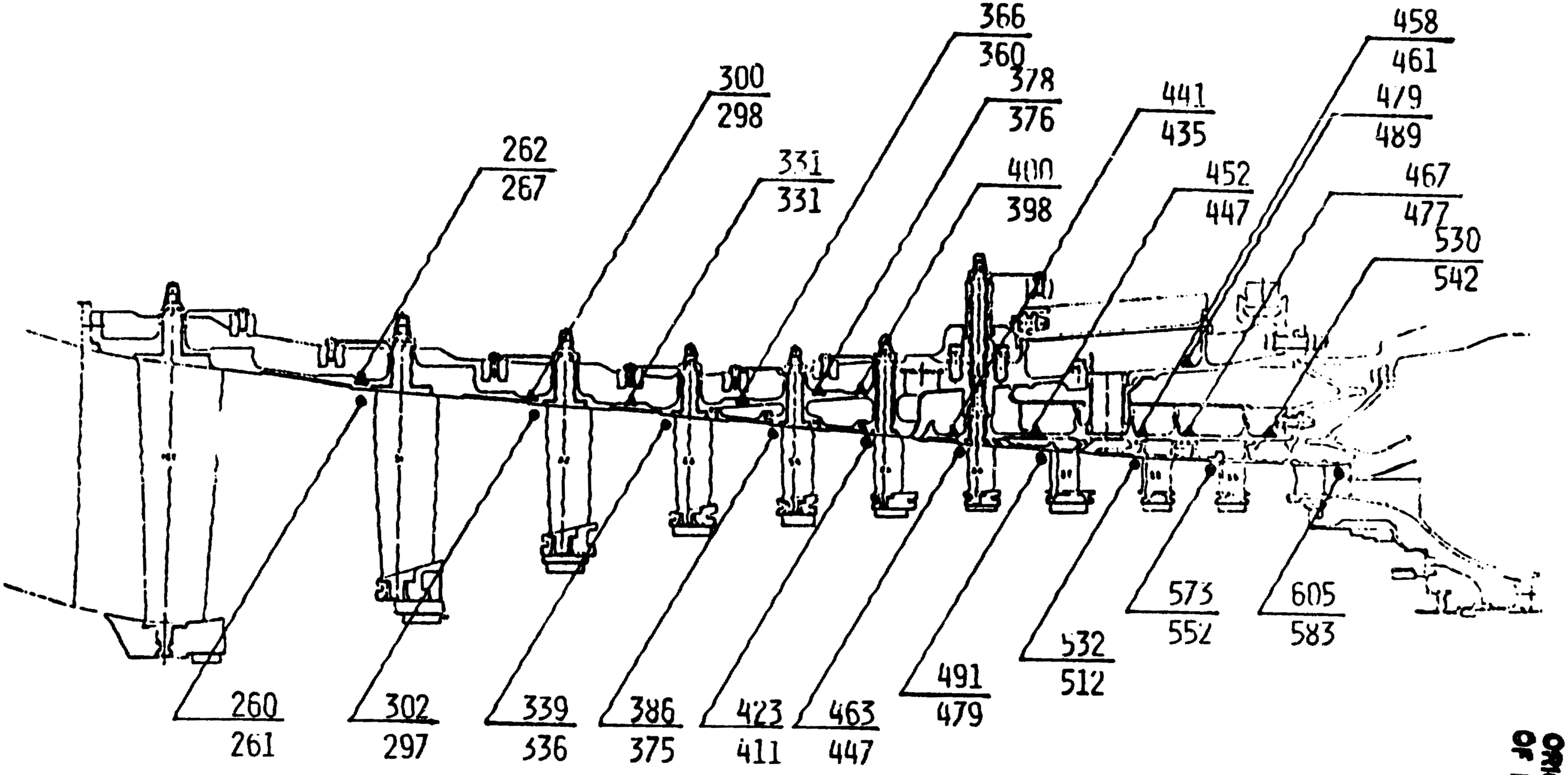
- Casing Distortion (Ovalization)
  - Mount Reaction Loads

- System Vibration
  - Steady State
  - HP 381 g/cm (150 g/in.) Unbalance
  - LP 1270 g/cm (500 g/in.) Unbalance

- Manufacturing and Assembly Tolerances - RSS

- Rub Allowance
  - 0.013 cm (0.005 in.)

- Stall Allowance
  - 0.025 cm (0.010 in.) Stage 1 Only



$T_{25} (^{\circ}K) = \frac{-67}{-73}$ $\quad P_{25}\ (N/cm^2) = \frac{2.615}{2.181}$

$T_3\ (^{\circ}K) = \frac{605}{583}$ $\quad P_3\ (N/cm^2) = \frac{61.159}{58.056}$

THE RATIOS ARE: $\frac{\text{ANALYSIS}}{\text{TEST RESULTS}}$

Figure 59. E^3 10A Casing Temperature Distribution

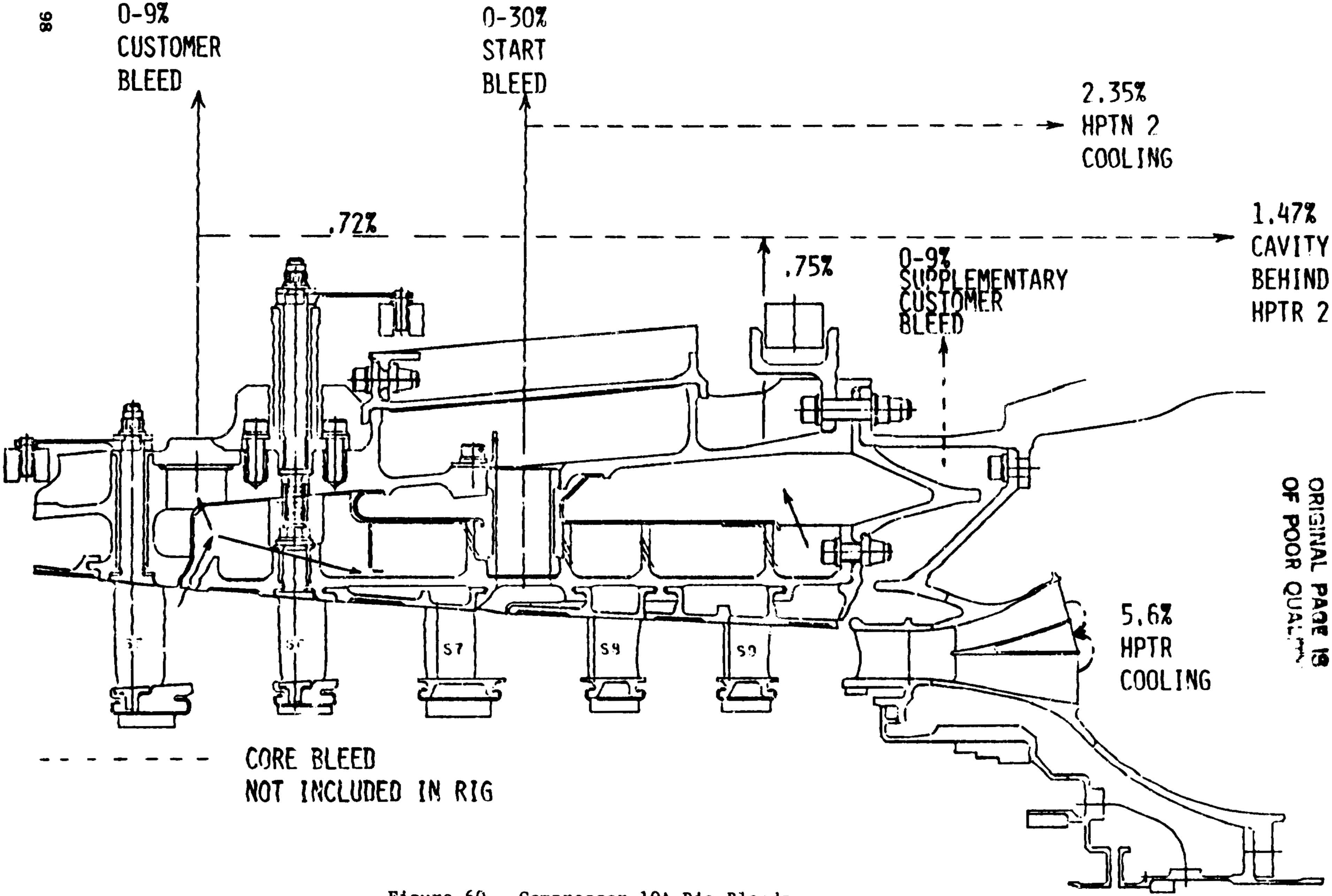


Figure 60. Compressor 10A Rig Bleeds

the FPS engine are plotted on Figure 61 and are compared with the E^3 efficiency objective. Predicted 1-10A rig clearances are plotted on Figure 62 and compared with the FPS cruise goal. Also shown on the graph are Stage 3, 9, and 10 touch probe test results. Discrepancies between the test and analytical results are attributed to scatter in the test data.

Data from GE's low speed research vehicle reveal that compressor performance can be enhanced by grinding recesses in the flowpath over the rotor tips. This feature is incorporated in the E^3 compressor cases.

Casing flange bolts required to prevent axial flange separation at two times maximum ICLS operating pressure are summarized on Table XVII.

Materials have been selected for the variable stator vane bushings as listed on Table XVIII. Two materials, ZX (703 Resin) and Fabroid XV, are candidates for IGV through Stage 3. The Fabroid XV has the potential of being extended to Stage 4, hence the overlap with the high temperature PBH-20 carbon. The operating characteristics of these materials will be evaluated during the core and ICLS tests. To date, all materials except the Stage 4 Fabroid have been endurance tested. The test parameters and results are presented on Table XIX. The ZX bushing with NR150 resin, which was run only as a data point, is the only bushing that failed the endurance test.

Results of the thermal and stress analyses of the diffuser are presented on Figures 63 and 64, respectively. These results are for the worst transient case growth engine. The diffuser will meet life requirements as defined previously.

Figure 65 presents a typical torsion bar actuation system which is similar to that designed for the ICLS engine. The ICLS system and features are discussed in Table XX.

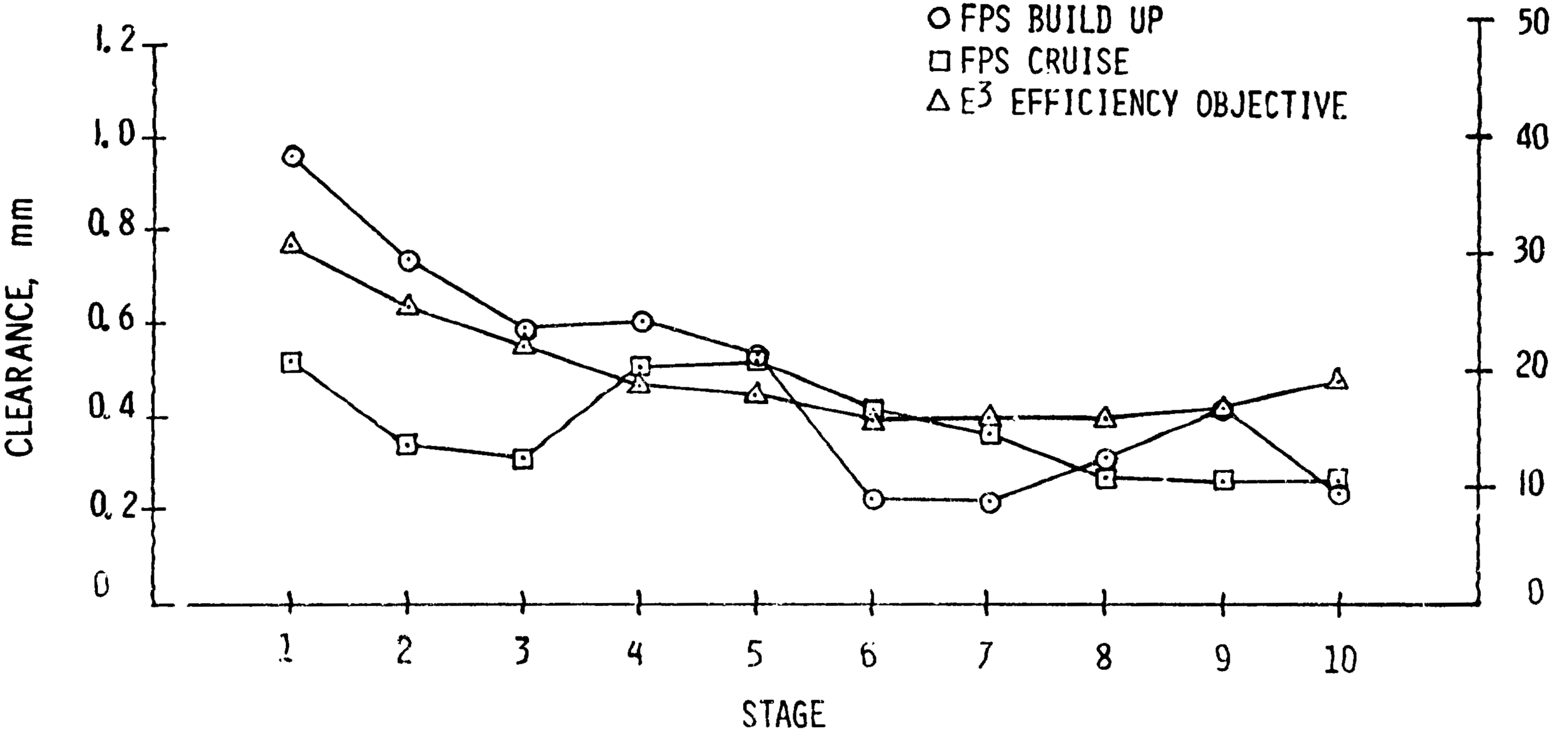


Figure 61. Compressor Clearances

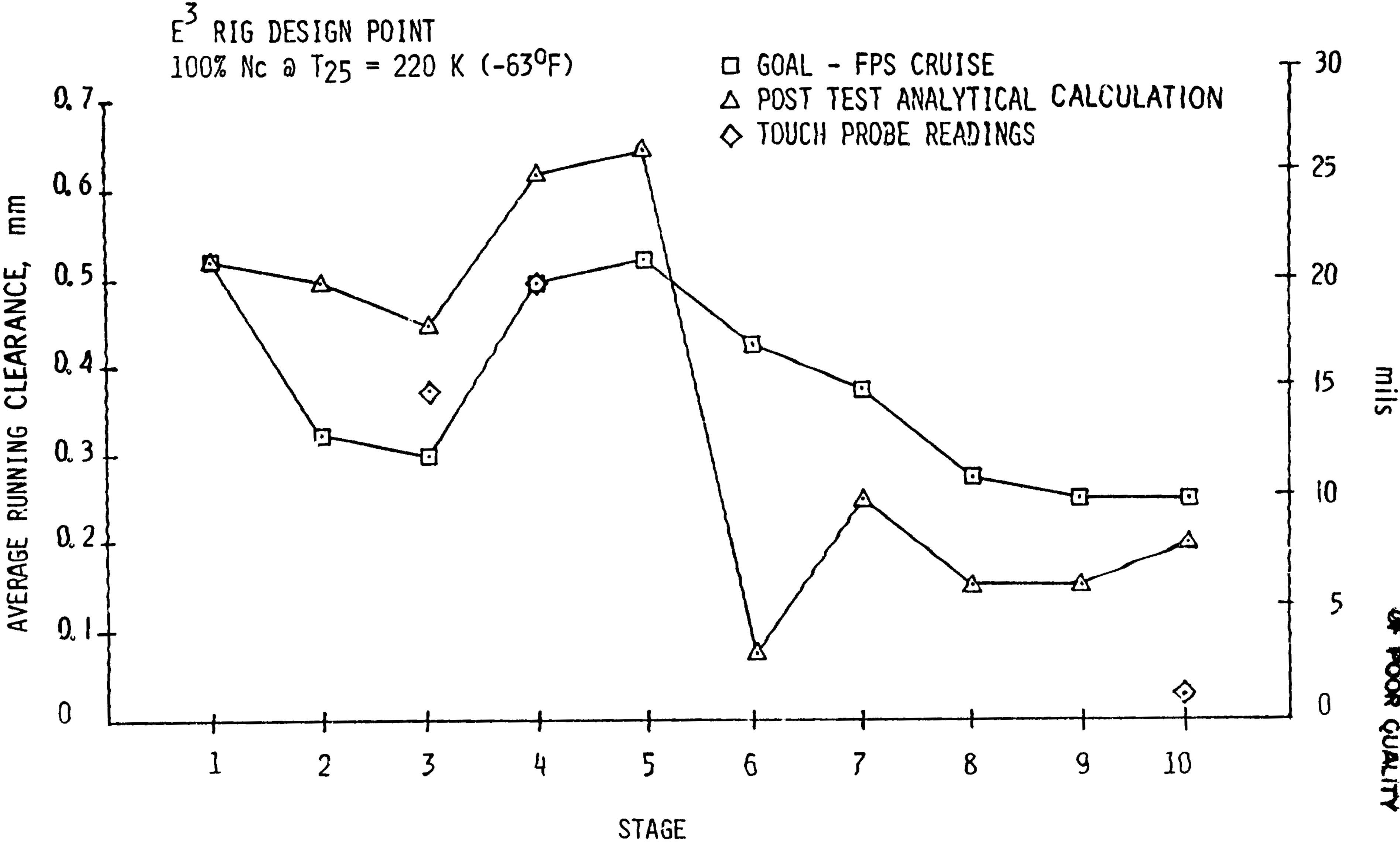


Figure 62. E^3 10A Compressor Clearances

Table XVII. Compressor Casing Bolting.

- Criteria 2 x Maximum ICLS Operating Pressure
- Front Casing: 60 - 0.953 cm (3/8 in.) Diameter Bolts
- Aft Casing: 32 - 0.953 cm (3/8 in.) Diameter Bolts
- Manifold Casing: 28 - 0.953 cm (3/8 in.) Diameter Bolts

Table XVIII. E^3 VSV Bushing Material Selection.

Maximum Operating Temperatures (K)					VSV Bushing Selection		
	FPS		Growth				
Stage	HDTO	Cruise	HDTO	Cruise	ZX	Fabroid XV	PBH-20
IGV	367	301	393	321	X	X	
1	431	361	461	391	X	X	
2	489	415	523	432	X	X	
3	546	470	585	487	X	X	
4	601	525	643	563		X	X
5	657	578	707	618			X
6	701	625	749	665			X

ZX: A free-standing TFE-glass/polyimide composite. A 1.02-mm thick bushing structure consisting of a layer of glass sandwiched between two layers of fabric composite using 703 resin.

Fabroid: A 0.38-mm thick TFE-glass fabric/polyimide composite lined with a 0.64 mm metal (bushing OD) jacket (17-4 PH).

PBH-20: Mechanical carbon bushing with carbon compressively prestressed into a 0.51 mm thick metal sleeve (17-4 PH).

Table XIX. E^3 VSV Bushing and Spacer Endurance Test Parameters.

Material	Geometry	Load	Pressure N/cm^2) FPS HDTO/Cruise	Temperature (K) FPS HDTO/Cruise	Temperature (K) Growth HDTO/Cruise	Total Wear (mm)	
						Bushing	Spacer
Zx (703)	Stage 1	Stage 1	20.82/7.46	431/361	(461/391)	0.152	0.076
Zx (NR150)	Stage 4	Stage 3	51.71/27.09	601/525	(643/563)	0.838*	0.254
Fabroid	Stage 1	Stage 1	20.82/7.46	431/361	(461/391)	0.251	0.127
Fabroid	Stage 4	Stage 3	51.71/27.09	601/525	(643/563)		
PBH -20	Stage 4	Stage 4	51.92/37.23	657/578	(643/563)	0.330	0.203

Test: 0.2 x 10^6 Cycles at HDTO conditions
2.3 x 10^6 Cycles at cruise conditions
Equivalent to FPS mission mix life

*Failed at (0.2 + 1.946) x 10^6 Cycles

(HDTO Transient Case - Growth Engine)

Temperature K

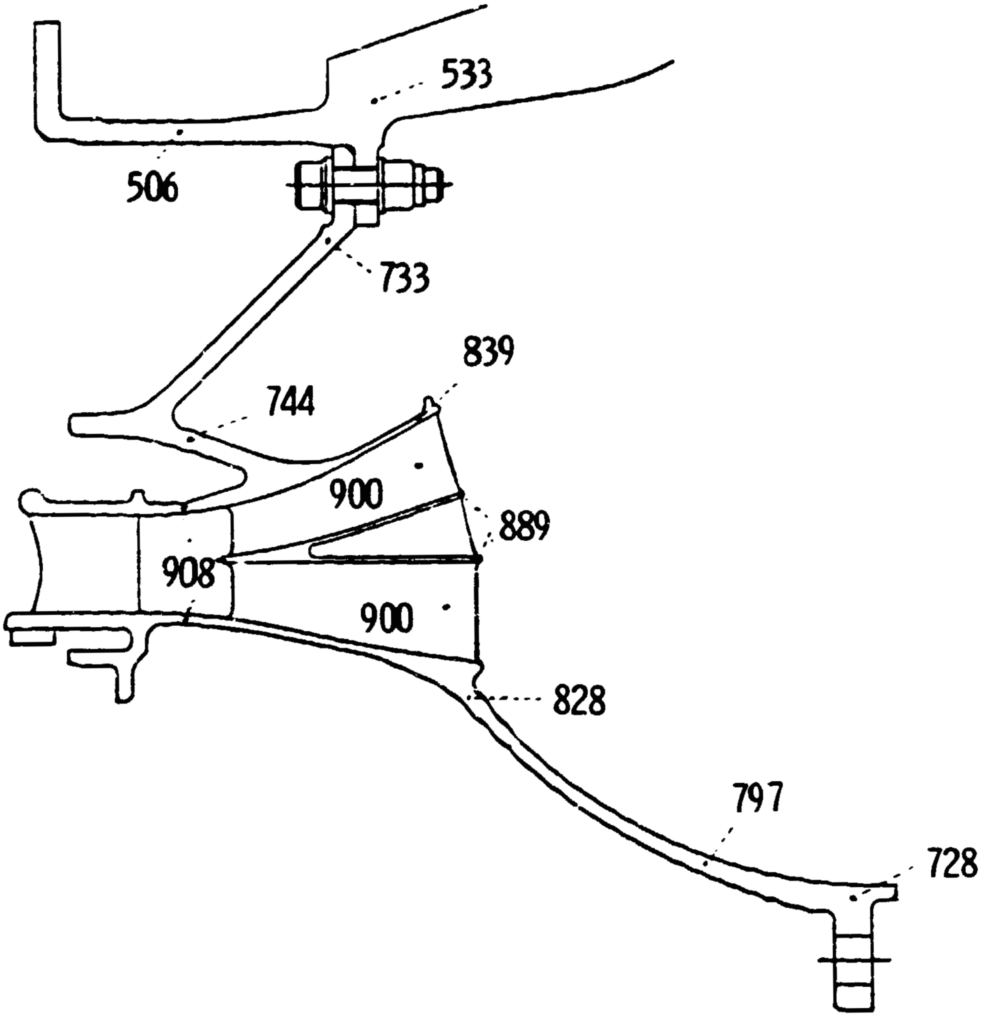


Figure 63. Core Diffuser Temperature Distribution.

(HDTO Transient Case - Growth Engine)

$N/cm^2 \times 10^{-3}$

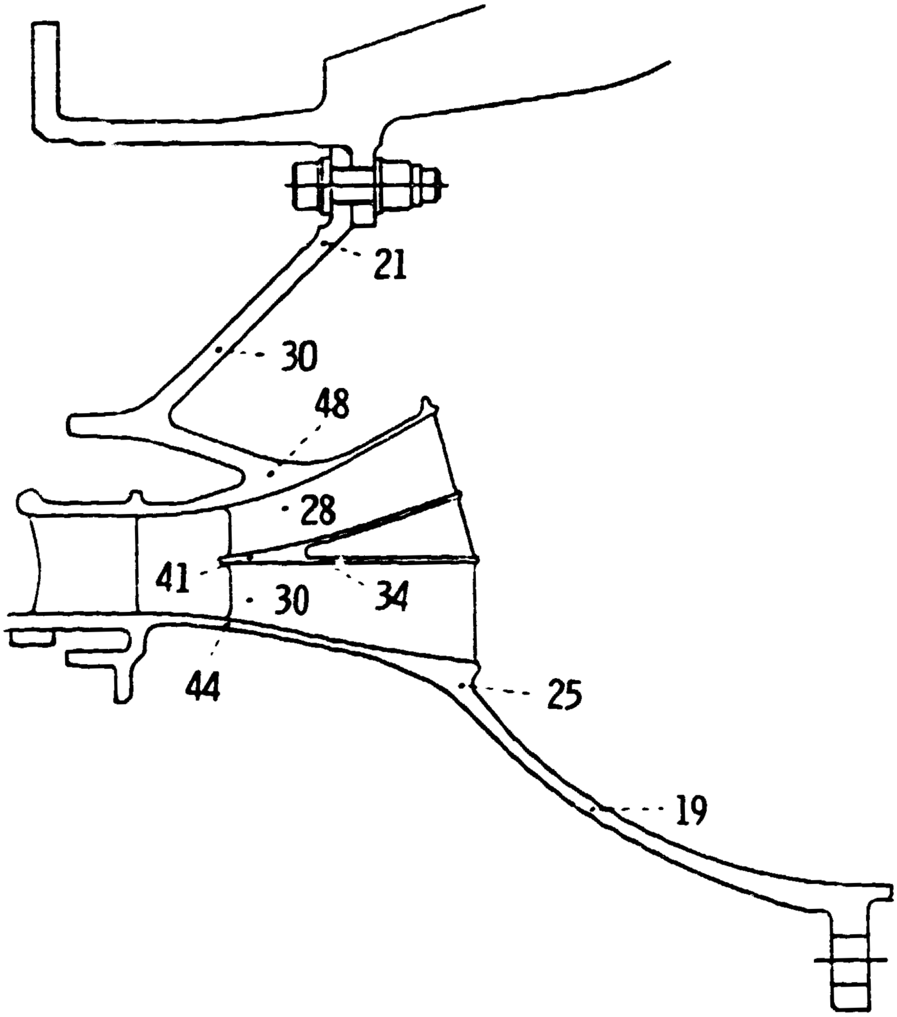


Figure 64. Core Diffuser Stress Distribution.

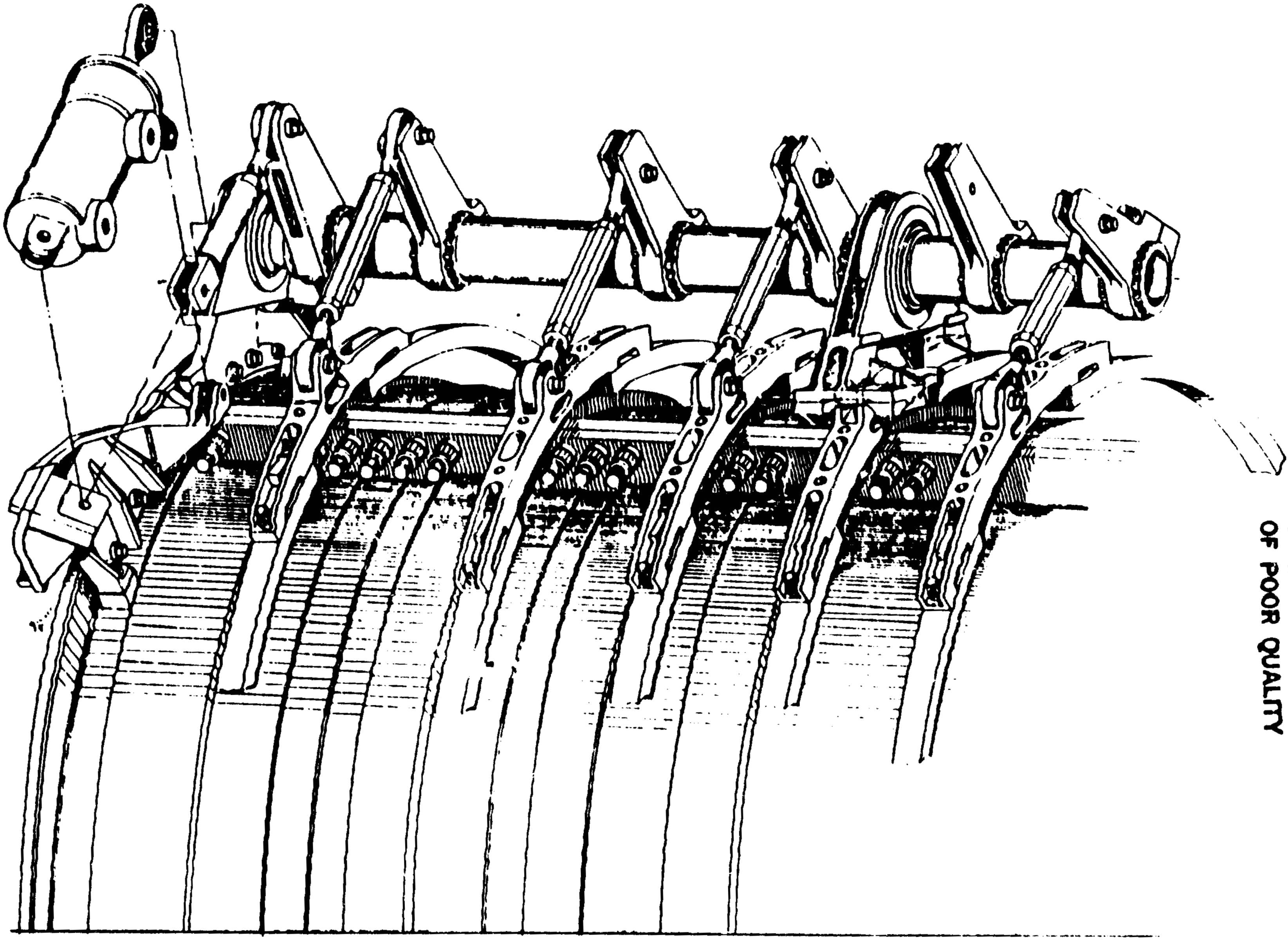


Figure 65. Typical Torsion Bar Actuation System.

Table XX. VSV Actuation System - Torsion Bar.

Advantages

- Permits Adaptability in Stator Scheduling and Stage to Stage Variation
- Rigid
- Minimizes Side Loads in Unison Ring at the Clevis Point

Feedback System

- Linear Variable Phase Transducer (LVPT) - Electrical
- Feedback Cable Control - Mechanical

Actuator

- CF6-50

Design Goals

- Design for ±8° Band (Flexibility for Stator Schedule Changes by Simple Hardware Modifications)

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2. "Energy Efficient Engine, Preliminary Design and Integration Studies, Final Report," Advanced Engineering and Technology Programs Department of General Electric, NASA CR-135444, R78AEG510, September 1978.

3. Wisler, D.C., "Core Compressor Exit Stage Study, Volume I - Blading Design," NASA CR-135391, R77AEG400, December 1977.

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5. Koch, C.C. and Smith, L.H., Jr., "Loss Sources and Magnitudes in Axial Flow Compressors," Transactions of ASME, Journal of Engineering for Power, Volume 98, Series A, No. 3, July 1976, p. 411.

6. Dunavant, James C., "Cascade Investigation of a Related Series of 6-Percent Thick Guide-Vanes Profiles and Design Charts," NACA Technical Note 3959, May 1957.

APPENDIX

The nomenclature of Tables XXI and XXII is listed below. Table XXI presents airfoil-geometry data for the original-design blading; data in SI units (even-numbered pages) are followed by the corresponding data in English units on the facing (odd numbered) pages. Table XXII presents final-design, airfoil-geometry data in SI units with the corresponding data in English units in parentheses on the same page.

NOMENCLATURE FOR TABLES XXI AND XXII

Heading	Identification	Units
General		
SL	Streamline Number	--
% IMM	Percent Immersion from Outer Wall	%
RADIUS	Streamline Radius	cm (in.)
Z	Axial Dimension	cm (in.)
R-BAR	Average Streamline Radius Based on Streamline Radii at Blade Edges	cm (in.)
SECT. HT.	Height of Plane Sections from Compressor Centerline	cm (in.)
Angles and Mach Numbers		
BETA	Relative Flow Angle, Arctan -Wu/Cz	deg
ALPHA	Absolute Flow Angle, Arctan Cu/Cz	deg
PHI	Meridional Flow Angle	deg
M-REL	Relative Mach Number	--
M-ABS	Absolute Mach Number	--
Velocities		
U	Blade Speed	m/sec (ft/sec)
CZ	Axial Velocity	m/sec (ft/sec)
Fluid Properties		
PT/PTI	Streamline Absolute Total Pressure/Compressor Inlet Average Absolute Total Pressure	--

Heading	Identification	Units
TT/TTI	Streamline Absolute Total Temperature/Compressor Inlet Average Absolute Total Temperature	—
Aerodynamic Blade Parameters		
SOL	Solidity, Local Blade Chord/Local Blade Spacing	--
DF	Diffusion Factor $DF_{Rotor} = 1 - \frac{W_2}{W_1} + \frac{r_2 C_{u_2} - r_1 C_{u_1}}{2 \bar{r} \sigma W_1}$ $DF_{Stator} = 1 - \frac{C_2}{C_1} + \frac{r_2 C_{u_2} - r_1 C_{u_1}}{2 \bar{r} \sigma C_1}$	
LOSS	Total Pressure Loss Coefficient $LOSS_{Rotor} = \frac{P_{2ID} - P_2'}{P_1' - p_1}$ $LOSS_{Stator} = \frac{P_2 - P_1}{P_1 - p_1}$	--
CUM EFF	Cumulative Adiabatic Efficiency Referenced to PTI,TTI	--
INC	Incidence Angle, difference between flow angle and camber line angle at leading edge in cascade projection	deg
DEV	Deviation Angle, difference between flow angle and camber line angle at trailing edge in cascade projection	deg
Plane Section Parameters		
CHORD	Length of straight line connecting intersection points of camber line and blade leading and trailing edges in plane section normal to blade stacking axis	cm (in.)

Heading	Identification	Units
CAMBER	Camber Angle, difference between angles of tangents to camber line at extremes of camber line arc in plane section normal to stacking axis	deg
STAGGER	Blade Chord Angle, angle in plane section normal to stacking axis between blade chord and axial direction	deg
BETA1*	Leading Edge Metal Angle, angle between tangent to camber line and axial direction at the leading edge in a plane section normal to stacking axis	deg
BETA2*	Trailing Edge Metal Angle, angle between tangent to camber line and axial direction at the trailing edge in a plane section normal to stacking axis	deg
TM/C	Maximum Thickness/Chord Ratio in a plane section normal to stacking axis	--
%C TM	Location of Maximum Thickness in Percent of Chord, in a plane section normal to blade stacking axis	--
TTE/c	Trailing Edge Thickness/Chord Ratio in a plane section normal to blade stacking axis	--

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading. (SI Units)

EEE CORE COMPRESSOR IGV - 32 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	36.211	-7.658	0.9799	0.9951	0.552	181.0	0.	-6.22	1
	2	5.3	35.213	-7.595	0.9919	0.9951	0.555	180.9	0.	-8.75	2
	3	10.7	34.189	-7.532	0.9995	0.9951	0.551	179.4	0.	-9.17	3
	4	18.2	32.771	-7.442	1.0041	0.9951	0.544	177.1	0.	-9.52	4
IGV	5	26.2	31.276	-7.347	1.0051	0.9951	0.535	174.1	0.	-9.66	5
	6	34.6	29.685	-7.249	1.0049	0.9959	0.524	171.0	0.	-9.58	6
INLET	7	43.6	27.982	-7.145	1.0049	0.9971	0.514	168.0	0.	-9.30	7
	8	53.4	26.140	-7.034	1.0051	0.9996	0.502	164.7	0.	-8.81	8
	9	64.1	24.117	-6.915	1.0041	1.0031	0.485	160.1	0.	-8.11	9
	10	76.2	21.823	-6.785	0.9995	1.0081	0.458	152.1	0.	-7.23	10
	11	90.9	19.049	-6.634	0.9884	1.0151	0.410	137.3	0.	-6.39	11
	12	100.0	17.337	-6.543	0.9799	1.0201	0.372	125.3	0.	-6.54	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	35.540	-1.458	0.9652	0.9951	0.536	170.2	15.00	-6.00	1
	2	5.8	34.483	-1.523	0.9793	0.9951	0.559	177.2	14.55	-6.79	2
	3	11.6	33.430	-1.584	0.9886	0.9951	0.574	181.8	14.06	-6.79	3
	4	19.4	32.006	-1.656	0.9949	0.9951	0.582	185.0	13.36	-6.60	4
IGV	5	27.4	30.524	-1.730	0.9970	0.9951	0.583	185.9	12.63	-6.19	5
	6	35.9	28.992	-1.806	0.9978	0.9959	0.579	185.5	11.88	-5.56	6
EXIT	7	44.8	27.360	-1.889	0.9984	0.9971	0.572	184.3	11.03	-4.69	7
	8	54.4	25.610	-1.980	0.9990	0.9996	0.560	181.9	10.03	-3.52	8
	9	64.9	23.703	-2.084	0.9983	1.0031	0.542	177.4	8.79	-1.94	9
	10	76.6	21.551	-2.206	0.9939	1.0081	0.509	168.3	7.14	0.34	10
	11	91.0	18.939	-2.362	0.9830	1.0151	0.444	148.4	4.38	4.09	11
	12	100.0	17.288	-2.464	0.9745	1.0201	0.385	129.7	2.00	6.33	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	SL
	1	0.	35.876	0.8925	-0.1116	0.0800	1
	2	5.5	34.848	0.9006	-0.1449	0.0672	2
	3	11.1	33.810	0.9097	-0.1749	0.0580	3
	4	18.8	32.388	0.9235	-0.1963	0.0504	4
IGV	5	26.8	30.905	0.9397	-0.2088	0.0453	5
	6	35.2	29.339	0.9568	-0.2145	0.0413	6
SL DATA	7	44.2	27.671	0.9776	-0.2131	0.0393	7
	8	53.9	25.875	1.0041	-0.2053	0.0384	8
	9	64.5	23.910	1.0379	-0.1910	0.0387	9
	10	76.4	21.687	1.0859	-0.1693	0.0418	10
	11	90.9	18.994	1.1595	-0.1156	0.0499	11
	12	100.0	17.312	1.2126	-0.0499	0.0610	12

	SECT. HT.	CHORD	STAGGER	CLO	TM/C	%C TM	TTE/C
	35.876	6.2627	8.03	0.71	0.0850	35.00	0.0163
	34.848	6.1418	8.69	0.77	0.0850	35.00	0.0163
	33.810	6.0197	9.06	0.80	0.0850	35.00	0.0163
	32.388	5.8526	9.03	0.79	0.0850	35.00	0.0163
IGV	30.905	5.6781	8.68	0.76	0.0850	35.00	0.0163
	29.339	5.4937	8.16	0.71	0.0850	35.00	0.0163
PLANE	27.671	5.2975	7.45	0.65	0.0850	35.00	0.0163
SECTIONS	25.875	5.0863	6.71	0.57	0.0850	35.00	0.0163
	23.910	4.8552	5.85	0.50	0.0850	35.00	0.0163
	21.687	4.5938	4.68	0.39	0.0850	35.00	0.0163
	18.994	4.2771	2.65	0.22	0.0850	35.00	0.0163
	17.312	4.0793	1.01	0.08	0.0850	35.00	0.0163

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR ROTOR 1 - 28 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	35.070	2.085	0.9653	0.9951	0.578	1.353	451.8	182.3	65.76	-8.19	1
	2	5.9	34.059	1.946	0.9792	0.9951	0.600	1.328	438.8	189.3	64.20	-7.77	2
	3	11.7	33.051	1.813	0.9886	0.9951	0.617	1.304	425.8	195.0	62.77	-7.12	3
	4	19.6	31.691	1.641	0.9950	0.9951	0.631	1.270	408.3	200.0	61.16	-6.15	4
ROTOR	5	27.7	30.292	1.470	0.9970	0.9951	0.636	1.233	390.3	202.6	59.76	-4.96	5
1	6	36.1	28.833	1.288	0.9978	0.9959	0.636	1.191	371.5	203.6	58.45	-3.48	6
INLET	7	45.0	27.294	1.083	0.9984	0.9971	0.629	1.145	351.6	202.4	57.28	-1.71	7
	8	54.6	25.643	0.845	0.9990	0.9996	0.613	1.091	330.4	198.7	56.30	0.31	8
	9	65.0	23.833	0.580	0.9984	1.0031	0.586	1.027	307.1	191.1	55.64	2.58	9
	10	76.9	21.781	0.314	0.9939	1.0081	0.547	0.952	280.6	179.6	55.34	5.39	10
	11	91.3	19.306	0.088	0.9830	1.0151	0.484	0.857	248.7	159.2	56.17	10.20	11
	12	100.0	17.795	-0.000	0.9745	1.0201	0.448	0.804	229.3	145.7	57.08	15.39	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	34.379	6.891	1.6882	1.2273	0.663	0.767	442.9	131.3	61.65	-8.19	1
	2	7.5	33.332	7.044	1.6929	1.1986	0.673	0.807	429.4	151.2	58.22	-7.69	2
	3	14.3	32.367	7.210	1.6976	1.1835	0.677	0.811	417.0	159.3	56.28	-6.51	3
	4	23.3	31.106	7.432	1.7039	1.1762	0.684	0.788	400.7	164.1	53.79	-4.80	4
ROTOR	5	32.4	29.835	7.655	1.7102	1.1737	0.694	0.756	384.4	167.5	50.99	-3.07	5
1	6	41.6	28.538	7.886	1.7165	1.1735	0.705	0.721	367.7	170.5	47.76	-1.28	6
EXIT	7	51.1	27.205	8.127	1.7227	1.1745	0.718	0.687	350.5	173.4	44.02	0.71	7
	8	60.9	25.826	8.377	1.7291	1.1775	0.732	0.652	332.7	176.2	39.62	3.02	8
	9	71.2	24.391	8.641	1.7353	1.1826	0.750	0.620	314.2	179.0	34.34	5.85	9
	10	82.0	22.874	8.904	1.7416	1.1918	0.774	0.588	294.7	181.2	27.54	9.30	10
	11	93.7	21.232	9.149	1.7479	1.2074	0.809	0.561	273.5	182.9	18.19	13.41	11
	12	100.0	20.343	9.254	1.7510	1.2190	0.835	0.554	262.1	184.2	11.90	15.39	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	34.725	1.3195	0.5046	0.2318	0.6925	3.00	8.69	1
	2	6.6	33.695	1.3598	0.4535	0.1439	0.7950	3.10	4.20	2
	3	12.9	32.709	1.4008	0.4348	0.0951	0.8636	3.50	2.88	3
	4	21.2	31.399	1.4593	0.4368	0.0704	0.9053	3.80	2.81	4
ROTOR	5	29.8	30.063	1.5241	0.4475	0.0589	0.9250	4.00	2.99	5
1	6	38.6	28.685	1.5974	0.4601	0.0516	0.9378	4.20	3.49	6
SL DATA	7	47.7	27.249	1.6815	0.4721	0.0469	0.9470	4.40	4.18	7
	8	57.4	25.735	1.7805	0.4823	0.0452	0.9531	4.60	4.90	8
	9	67.8	24.112	1.9003	0.4876	0.0465	0.9550	4.80	5.90	9
	10	79.2	22.328	2.0521	0.4890	0.0566	0.9440	4.70	6.91	10
	11	92.3	20.269	2.2606	0.4772	0.0862	0.9141	4.30	7.60	11
	12	100.0	19.069	2.4029	0.4606	0.1142	0.8911	4.00	7.80	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	34.725	10.2761	9.66	62.71	63.38	53.72	0.0250	63.20	0.0044
	33.695	10.2598	7.17	60.85	61.54	54.37	0.0260	61.66	0.0046
	32.709	10.2577	4.67	59.01	59.82	55.15	0.0276	60.35	0.0048
	31.399	10.2623	4.42	56.40	57.95	53.54	0.0307	58.75	0.0050
ROTOR	30.063	10.2606	5.94	53.68	56.42	50.48	0.0340	57.24	0.0054
1	28.685	10.2608	8.38	50.73	55.04	46.67	0.0391	56.06	0.0059
PLANE	27.249	10.2605	12.08	47.38	53.85	41.77	0.0475	55.16	0.0064
SECTIONS	25.735	10.2602	17.22	43.49	52.87	35.65	0.0607	54.66	0.0070
	24.112	10.2587	24.67	38.86	52.06	27.39	0.0770	54.57	0.0079
	22.328	10.2573	35.88	33.58	51.54	15.66	0.0895	54.86	0.0096
	20.269	10.1732	53.24	27.14	51.70	-1.55	0.0948	55.51	0.0124
	19.069	10.1062	65.20	23.22	52.21	-12.99	0.0960	56.00	0.0141

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR STATOR 1 - 50 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	34.103	9.655	1.6882	1.2273	0.661	129.7	57.08	-4.31	1
	2	7.7	33.067	9.698	1.6929	1.1984	0.677	153.6	50.44	-3.14	2
	3	14.6	32.133	9.741	1.6976	1.1834	0.688	164.9	47.32	-2.06	3
	4	23.6	30.925	9.799	1.7039	1.1761	0.701	172.2	45.75	-0.72	4
STATOR	5	32.6	29.712	9.858	1.7102	1.1736	0.713	176.8	45.12	0.75	5
1	6	41.8	28.475	9.916	1.7165	1.1735	0.727	180.7	44.83	2.37	6
INLET	7	51.2	27.204	9.977	1.7228	1.1744	0.742	184.5	44.66	4.18	7
	8	61.0	25.888	10.041	1.7291	1.1776	0.759	188.1	44.69	6.20	8
	9	71.2	24.514	10.107	1.7353	1.1825	0.778	191.7	44.86	8.46	9
	10	82.0	23.061	10.178	1.7416	1.1918	0.802	194.4	45.56	11.03	10
	11	93.7	21.489	10.259	1.7479	1.2074	0.833	195.8	47.13	14.09	11
	12	100.0	20.641	10.307	1.7511	1.2190	0.855	196.0	48.32	15.96	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
	1	0.	33.804	13.630	1.6483	1.2273	0.450	150.5	24.90	-4.31	1
	2	7.3	32.917	13.812	1.6560	1.1984	0.465	159.3	19.96	-2.52	2
	3	14.3	32.071	13.917	1.6640	1.1834	0.479	165.7	17.12	-1.36	3
	4	23.4	30.965	14.003	1.6730	1.1761	0.495	171.8	15.45	0.06	4
STATOR	5	32.6	29.857	14.064	1.6794	1.1736	0.507	176.3	14.80	1.56	5
1	6	41.9	28.734	14.107	1.6850	1.1735	0.518	180.1	14.16	3.19	6
EXIT	7	51.3	27.587	14.132	1.6905	1.1744	0.528	183.5	13.51	4.94	7
	8	61.1	26.405	14.136	1.6950	1.1776	0.535	186.1	12.92	6.86	8
	9	71.3	25.174	14.119	1.6991	1.1825	0.542	188.1	12.47	8.96	9
	10	82.0	23.875	14.088	1.6994	1.1918	0.545	188.4	12.71	11.34	10
	11	93.6	22.464	14.030	1.6916	1.2074	0.541	185.1	14.31	12.95	11
	12	100.0	21.693	13.984	1.6846	1.2190	0.532	180.3	16.00	15.96	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	33.953	1.1062	0.5528	0.0930	0.6587	1.35	12.26	1
	2	7.5	32.992	1.1375	0.5313	0.0824	0.7300	0.15	9.67	2
	3	14.5	32.102	1.1700	0.5123	0.0730	0.8291	0.	7.62	3
	4	23.5	30.945	1.2130	0.4932	0.0649	0.8725	0.	6.08	4
STATOR	5	32.6	29.785	1.2579	0.4793	0.0626	0.8917	0.	5.73	5
1	6	41.8	28.605	1.3018	0.4709	0.0617	0.9033	0.	5.37	6
SL DATA	7	51.3	27.396	1.3466	0.4662	0.0611	0.9120	0.	5.00	7
	8	61.1	26.146	1.3911	0.4665	0.0620	0.9157	0.	4.76	8
	9	71.2	24.844	1.4366	0.4703	0.0633	0.9154	0.20	4.54	9
	10	82.0	23.468	1.4850	0.4806	0.0703	0.8993	0.50	5.23	10
	11	93.7	21.977	1.5379	0.5029	0.0881	0.8565	1.70	7.05	11
	12	100.0	21.167	1.5682	0.5235	0.1000	0.8250	2.60	8.29	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	33.953	4.7199	40.51	33.54	54.44	13.92	0.1128	50.00	0.0120
	32.992	4.7163	38.90	29.65	49.74	10.84	0.1070	50.00	0.0120
	32.102	4.7198	37.60	27.79	47.22	9.63	0.1014	50.00	0.0120
	30.945	4.7166	36.38	26.93	45.76	9.38	0.0945	50.00	0.0120
STATOR	29.785	4.7081	36.05	26.47	45.13	9.08	0.0881	50.00	0.0120
1	28.605	4.6795	35.99	26.17	44.81	8.81	0.0818	50.00	0.0120
PLANE	27.396	4.6360	36.07	25.97	44.59	8.52	0.0759	49.99	0.0120
SECTIONS	26.146	4.5707	36.30	26.10	44.53	8.23	0.0702	50.15	0.0120
	24.844	4.4854	36.61	26.29	44.50	7.90	0.0656	51.80	0.0123
	23.468	4.3794	36.96	26.55	44.56	7.61	0.0625	55.57	0.0131
	21.977	4.2470	36.48	27.45	44.81	8.33	0.0606	61.32	0.0142
	21.167	4.1712	35.77	28.25	45.03	9.26	0.0599	64.90	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR ROTOR 2 - 38 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	33.589	16.418	1.6481	1.2273	0.495	1.082	432.7	167.2	65.17	-4.52	1
	2	7.1	32.779	16.356	1.6557	1.1986	0.506	1.108	422.3	173.7	64.43	-3.85	2
	3	13.9	31.991	16.293	1.6635	1.1835	0.520	1.116	412.1	179.8	63.47	-2.84	3
	4	22.9	30.953	16.206	1.6726	1.1762	0.536	1.106	398.8	186.2	62.04	-1.23	4
ROTOR 2 INLET	5	32.0	29.909	16.123	1.6792	1.1737	0.548	1.085	385.3	190.6	60.63	0.52	5
	6	41.3	28.846	16.040	1.6848	1.1735	0.558	1.062	371.6	194.2	59.25	2.38	6
	7	50.8	27.757	15.954	1.6904	1.1745	0.567	1.038	357.6	197.2	57.86	4.38	7
	8	60.6	26.630	15.846	1.6949	1.1775	0.573	1.011	343.1	199.5	56.47	6.54	8
	9	70.8	25.450	15.715	1.6990	1.1826	0.577	0.980	327.9	200.0	55.13	9.04	9
	10	81.7	24.198	15.577	1.6994	1.1918	0.572	0.937	311.7	197.4	53.86	11.76	10
	11	93.6	22.836	15.494	1.6914	1.2074	0.556	0.872	294.2	190.5	52.48	14.21	11
	12	100 0	22.100	15.464	1.6842	1.2190	0.546	0.830	284.7	186.0	51.52	14.96	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	33.317	19.865	2.6498	1.4272	0.614	0.645	429.2	120.9	61.40	-4.52	1
	2	8.5	32.494	19.926	2.6569	1.3894	0.623	0.695	418.6	144.2	57.49	-4.12	2
	3	16.0	31.765	20.013	2.6641	1.3690	0.630	0.714	409.2	155.5	55.36	-2.83	3
	4	25.6	30.838	20.139	2.6736	1.3576	0.639	0.711	397.3	163.0	53.02	-0.94	4
ROTOR 2 EXIT	5	35.0	29.922	20.265	2.6831	1.3536	0.650	0.692	385.5	166.7	50.65	0.94	5
	6	44.5	29.002	20.393	2.6927	1.3528	0.663	0.672	373.6	170.7	47.95	2.78	6
	7	54.1	28.076	20.527	2.7022	1.3534	0.678	0.655	361.7	175.3	44.93	4.66	7
	8	63.7	27.142	20.666	2.7117	1.3571	0.695	0.637	349.7	180.0	41.50	6.57	8
	9	73.5	26.191	20.798	2.7213	1.3632	0.714	0.621	337.4	184.9	37.58	8.48	9
	10	83.6	25.214	20.936	2.7308	1.3756	0.738	0.596	324.8	187.6	32.74	10.49	10
	11	94.3	24.179	21.086	2.7403	1.3975	0.768	0.556	311.5	186.2	25.92	12.92	11
	12	100.0	23.623	21.168	2.7451	1.4135	0.785	0.526	304.3	181.4	21.37	14.96	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	33.453	1.2729	0.4989	0.1035	0.7380	2.00	10.51	1
	2	7.7	32.637	1.3000	0.4592	0.0834	0.8118	2.15	4.98	2
	3	14.9	31.878	1.3262	0.4430	0.0725	0.8591	2.30	4.00	3
	4	24.1	30.895	1.3625	0.4399	0.0634	0.8899	2.50	3.90	4
ROTOR 2 SL DATA	5	33.4	29.916	1.4010	0.4478	0.0603	0.9038	2.70	3.90	5
	6	42.8	28.924	1.4422	0.4562	0.0592	0.9122	2.90	3.91	6
	7	52.3	27.917	1.4874	0.4624	0.0581	0.9187	3.10	3.81	7
	8	62.0	26.886	1.5371	0.4685	0.0594	0.9216	3.30	3.80	8
	9	72.1	25.821	1.5904	0.4726	0.0624	0.9216	3.50	4 01	9
	10	82.6	24.706	1.6466	0.4816	0.0696	0.9111	3.70	4.42	10
	11	93.9	23.508	1.7068	0.5011	0.0832	0.8846	3.90	5.56	11
	12	100.0	22.862	1.7364	0.5204	0.0920	8654	4.00	7.21	12

	SECT. HT	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	33.453	7.0337	12.95	60.92	63.56	50.61	0.0260	64.09	0.0074
	32.637	7.0130	10.15	59.72	62.65	52.50	0.0291	61.30	0.0075
	31.878	6.9876	9.11	58.25	61.61	52.50	0.0321	59.24	0.0075
	30.895	6 9570	10.01	56.00	60.13	50.12	0.0360	57.05	0.0076
ROTOR 2 PLANE SECTIONS	29.916	6.9271	11.21	53.66	58.65	47.45	0.0399	54.69	0.0077
	28.924	6.8948	12.72	51.20	57.21	44.49	0.0437	52.24	0.0079
	27.917	6.8638	14.83	48.52	55.82	40.99	0.0475	50.36	0.0083
	26.886	6.8282	17.79	45.43	54.50	36.71	0.0512	49.39	0.0088
	25.821	6.7840	22.19	41.86	53.29	31.10	0.0551	49.20	0.0095
	24.705	6.7282	29.28	37.50	52.03	22.74	0.0633	49.53	0.0105
	23.508	6.6164	42.69	31.77	50.56	7.87	0.0786	49.93	0.0120
	22.862	6.5498	50.02	28.42	49.75	-0.27	0.0849	50.19	0.0128

EEE CORE COMPRESSOR ROTOR 3-50 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	32.833	26.886	2.5959	1.4272	0.462	0.959	423.0	165.2	64.32	-4.84	1
	2	7.6	32.225	26.844	2.6081	1.3894	0.473	0.993	415.2	172.7	63.66	3.58	2
	3	14.8	31.642	26.801	2.6204	1.3690	0.485	1.015	407.7	179.9	62.87	2.25	3
	4	24.3	30.884	26.743	2.6337	1.3576	0.498	1.019	397.9	186.0	61.83	0.61	4
ROTOR	5	33.7	30.129	26.693	2.6433	1.3536	0.508	1.004	388.2	189.5	60.70	0.80	5
3	6	43.2	29.369	26.651	2.6520	1.3528	0.518	0.986	378.4	192.8	59.50	2.26	6
INLET	7	52.7	28.598	26.612	2.6603	1.3534	0.527	0.968	368.4	195.9	58.26	3.85	7
	8	62.5	27.815	26.574	2.6676	1.3571	0.535	0.948	358.3	198.5	57.03	5.56	8
	9	72.5	27.011	26.523	2.6739	1.3632	0.541	0.924	348.0	200.1	55.76	7.34	9
	10	82.9	26.174	26.460	2.6746	1.3756	0.541	0.885	337.2	198.5	54.46	9.09	10
	11	94.1	25.281	26.399	2.6657	1.3975	0.533	0.819	325.7	192.3	52.81	10.29	11
	12	100.0	24.805	26.380	2.6580	1.4135	0.527	0.774	319.6	187.5	51.72	9.94	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	M REL	U	CZ	BETA	PHI	SL
	1	0.	32.601	29.629	3.9301	1.6228	0.598	0.571	420.0	124.6	58.52	-4.84	1
	2	8.7	31.981	29.654	3.9334	1.5761	0.604	0.629	412.0	147.8	55.17	-4.95	2
	3	16.4	31.438	29.700	3.9427	1.5501	0.608	0.665	405.0	162.2	53.26	-4.20	3
	4	25.9	30.760	29.769	3.9551	1.5348	0.614	0.676	396.3	170.6	51.53	2.62	4
ROTOR	5	35.3	30.095	29.834	3.9677	1.5292	0.622	0.662	387.7	172.9	49.81	0.82	5
3	6	44.7	29.427	29.903	3.9801	1.5277	0.633	0.646	379.1	175.7	47.74	0.87	6
EXIT	7	54.2	28.755	29.975	3.9926	1.5283	0.646	0.631	370.5	178.8	45.35	2.44	7
	8	63.7	28.078	30.051	4.0050	1.5325	0.660	0.616	361.7	182.5	42.63	3.94	8
	9	73.4	27.393	30.134	4.0175	1.5395	0.677	0.600	352.9	186.2	39.52	5.45	9
	10	83.3	26.689	30.222	4.0300	1.5551	0.697	0.568	343.8	185.9	35.57	6.99	10
	11	94.0	25.930	30.329	4.0424	1.5836	0.722	0.502	334.1	176.1	29.71	8.68	11
	12	100.0	25.505	30.372	4.0487	1.6042	0.735	0.452	328.6	164.5	25.56	9.94	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	32.717	1.2726	0.5142	0.0886	0.7544	1.00	13.97	1
	2	8.1	32.103	1.2901	0.4660	0.0738	0.8164	1.70	6.00	2
	3	15.6	31.540	1.3066	0.4384	0.0626	0.8569	2.10	3.80	3
	4	25.1	30.822	1.3287	0.4281	0.0550	0.8837	2.50	3.70	4
ROTOR	5	34.4	30.112	1.3515	0.4344	0.0523	0.8956	2.70	3.59	5
3	6	43.9	29.398	1.3756	0.4416	0.0507	0.9028	2.90	3.60	6
SL DATA	7	53.4	28.677	1.4012	0.4494	0.0518	0.9073	3.10	3.59	7
	8	63.1	27.946	1.4284	0.4564	0.0533	0.9090	3.30	3.80	8
	9	72.9	27.202	1.4577	0.4625	0.0539	0.9086	3.50	4.00	9
	10	83.1	26.432	1.4896	0.4814	0.0606	0.8975	3.50	4.80	10
	11	94.0	25.605	1.5261	0.5302	0.0747	0.8712	3.30	6.38	11
	12	100.0	25.155	1.5470	0.5766	0.0858	0.8527	3.00	7.96	12

	SECT. HT	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	32.717	5.2233	20.18	58.46	63.46	43.28	0.0265	66.06	0.0081
	32.103	5.2044	13.88	57.53	62.11	48.24	0.0299	63.10	0.0082
	31.540	5.1793	10.02	56.26	61.00	50.08	0.0358	61.15	0.0082
	30.822	5.1461	11.02	54.30	59.67	48.65	0.0497	58.97	0.0082
ROTOR	30.112	5.1144	11.73	52.38	58.41	46.68	0.0570	56.96	0.0084
3	29.398	5.0817	12.65	50.46	57.14	44.49	0.0581	54.98	0.0085
PLANE	28.677	5.0490	14.11	48.44	55.83	41.72	0.0579	53.04	0.0087
SECTIONS	27.946	5.0158	16.10	46.25	54.53	38.43	0.0579	51.24	0.0091
	27.202	4.9820	19.08	43.70	53.28	34.19	0.0592	49.53	0.0096
	26.432	4.9472	24.44	40.54	52.14	27.70	0.0634	47.97	0.0104
	25.605	4.8637	34.24	36.13	51.01	16.77	0.0749	46.49	0.0117
	25.155	4.7821	40.67	33.35	50.30	9.63	0.0875	45.91	0.0126

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR STATOR 2 68 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
	1	0.	33.171	21.974	2.6498	1.4273	0.624	128.4	58.25	3.77	1
	2	8.4	32.397	21.894	2.6569	1.3895	0.637	153.1	51.41	1.88	2
	3	15.8	31.708	21.879	2.6641	1.3689	0.647	165.7	47.93	0.72	3
	4	25.2	30.832	21.910	2.6736	1.3576	0.659	173.9	46.06	0.65	4
STATOR	5	34.6	29.965	21.957	2.6831	1.3535	0.672	178.2	45.56	2.04	5
2	6	44.0	29.093	22.007	2.6927	1.3527	0.685	182.3	45.23	3.52	6
INLET	7	53.5	28.211	22.050	2.7022	1.3534	0.699	186.5	44.94	5.05	7
	8	63.2	27.314	22.085	2.7117	1.3571	0.714	190.7	44.82	6.65	8
	9	73.1	26.390	22.122	2.7213	1.3631	0.731	194.5	44.91	8.32	9
	10	83.3	25.451	22.178	2.7308	1.3756	0.751	195.7	46.02	10.13	10
	11	94.2	24.443	22.266	2.7403	1.3976	0.773	191.5	48.84	12.19	11
	12	100.0	23.902	22.325	2.7451	1.4136	0.786	186.8	51.02	13.14	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
	1	0.	32.971	25.008	2.5967	1,4273	0.425	149.3	28.00	3.77	1
	2	7.8	32.311	25.084	2.6089	1.3895	0.437	160.2	21.30	2.30	2
	3	15.2	31.691	25.099	2.6209	1.3689	0.450	167.0	17.88	1.70	3
	4	24.7	30.887	25.082	2.6341	1.3576	0.464	172.9	16.23	0.13	4
STATOR	5	34.2	30.089	25.057	2.6437	1.3535	0.475	176.8	15.87	1.49	5
2	6	43.7	29.286	25.031	2.6524	1.3527	0.485	180.3	15.79	2.91	6
EXIT	7	53.3	28.474	25.023	2.6607	1.3534	0.495	183.4	15.79	4.36	7
	8	63.1	27.652	25.036	2.6679	1.3571	0.504	186.4	15.78	5.83	8
	9	73.0	26.816	25.061	2.6742	1.3631	0.512	189.1	16.04	7.32	9
	10	83.2	25.951	25.075	2.6748	1.3756	0.518	190.0	17.42	8.90	10
	11	94.1	25.032	25.064	2.6662	1.3976	0.519	186.8	21.14	10.76	11
	12	100.0	24.536	25.044	2.6587	1.4136	0.514	180.6	24.30	13.14	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	33.071	1.2460	0.5182	0.0870	0.7204	-1.94	10.38	1
	2	8.1	32.354	1.2460	0.5114	0.0758	0.7943	-1.12	8.17	2
	3	15.5	31.699	1.2460	0.5008	0.0661	0.8429	-0.30	6.42	3
	4	25.0	30.860	1.2459	0.4896	0.0584	0.8745	0.04	5.03	4
STATOR	5	34.4	30.027	1.2458	0.4841	0.0564	0.8885	0.46	4.55	5
2	6	43.9	29.189	1.2497	0.4799	0.0555	0.8965	0.56	4.31	6
SL DATA	7	53.4	28.342	1.2665	0.4753	0.0552	0.9021	0.47	4.20	7
	8	63.1	27.483	1.2997	0.4712	0.0561	0.9042	0.50	3.77	8
	9	73.0	26.607	1.3431	0.4676	0.0578	0.9032	0.43	4.21	9
	10	83.3	25.701	1.3905	0.4690	0.0658	0.8894	0.25	4.87	10
	11	94.1	24.737	1.4447	0.4767	0.0829	0.8568	-0.16	6.51	11
	12	100.0	24.219	1.4755	0.4888	0.0940	0.8339	0.02	7.91	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	33.071	3.8053	39.41	37.21	58.87	19.45	0.0958	50.00	0.0120
	32.354	3.7228	38.23	30.95	52.02	13.79	0.0958	50.00	0.0120
	31.699	3.6477	36.58	27.88	48.12	11.55	0.0958	50.00	0.0120
	30.860	3.5507	34.71	26.62	45.93	11.23	0.0955	50.00	0.0120
STATOR	30.027	3.4548	33.55	26.20	44.94	11.39	0.0943	50.00	0.0120
2	29.189	3.3693	32.86	26.05	44.45	11.59	0.0920	50.00	0.0120
PLANE	28.342	3.3155	32.35	26.06	44.19	11.84	0.0884	50.00	0.0120
SECTIONS	27.483	3.2987	31.87	26.17	44.02	12.14	0.0829	50.00	0.0120
	26.607	3.2998	31.65	26.45	43.98	12.33	0.0749	50.00	0.0120
	25.701	3.3009	30.71	27.99	44.64	13.93	0.0648	50.00	0.0120
	24.737	3.3007	29.34	31.51	46.81	17.46	0.0528	50.00	0.0120
	24.219	3.3008	28.57	34.05	48.50	19.93	0.0462	50.00	0.0120

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR STATOR 3 82 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
STATOR 3 INLET	1	0.	32.466	31.219	3.9240	1.6228	0.604	126.7	59.31	-4.84	1
	2	8.7	31.874	31.139	3.9333	1.5764	0.614	158.2	51.18	-2.94	2
	3	16.2	31.364	31.121	3.9427	1.5502	0.621	172.2	47.15	-2.01	3
	4	25.7	30.721	31.139	3.9552	1.5349	0.631	180.1	45.23	-0.97	4
	5	35.1	30.087	31.170	3.9676	1.5291	0.641	183.7	44.84	0.06	5
	6	44.4	29.452	31.204	3.9801	1.5277	0.653	186.7	44.81	1.14	6
	7	53.9	28.811	31.234	3.9926	1.5281	0.665	189.6	44.88	2.27	7
	8	63.4	28.163	31.260	4.0050	1.5324	0.678	192.8	45.02	3.46	8
	9	73.1	27.504	31.291	4.0175	1.5395	0.693	195.4	45.46	4.71	9
	10	83.2	26.823	31.334	4.0300	1.5550	0.708	193.8	47.24	6.09	10
	11	94.0	26.087	31.413	4.0425	1.5834	0.726	182.0	51.80	7.36	11
	12	100.0	25.681	31.474	4.0487	1.6042	0.736	170.3	55.39	8.88	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
STATOR 3 EXIT	1	0.	32.262	33.637	3.8549	1.6228	0.417	152.2	30.60	-4.84	1
	2	8.2	31.754	33.742	3.8726	1.5764	0.431	165.0	23.56	3.25	2
	3	15.7	31.285	33.777	3.8880	1.5502	0.442	172.0	19.96	-2.42	3
	4	25.3	30.683	33.776	3.9058	1.5349	0.454	177.6	18.24	-1.49	4
	5	34.9	30.088	33.760	3.9196	1.5291	0.463	181.1	18.05	0.55	5
	6	44.4	29.493	33.749	3.9313	1.5277	0.471	183.9	18.10	0.43	6
	7	54.0	28.895	33.751	3.9422	1.5281	0.478	186.6	18.10	1.45	7
	8	63.7	28.292	33.764	3.9521	1.5324	0.485	189.3	18.06	2.51	8
	9	73.5	27.682	33.783	3.9595	1.5395	0.490	191.5	18.13	3.60	9
	10	83.5	27.056	33.792	3.9591	1.5550	0.493	191.8	19.48	4.78	10
	11	94.2	26.391	33.755	3.9499	1.5834	0.493	186.7	24.22	6.37	11
	12	100.0	26.029	33.702	3.9412	1.6042	0.487	178.2	28.50	8.88	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
STATOR 3 SL DATA	1	0.	32.364	1.2640	0.4984	0.0810	0.7416	-1.71	9.20	1
	2	8.5	31.814	1.2640	0.4820	0.0691	0.8048	-1.13	7.53	2
	3	16.0	31.324	1.2640	0.4698	0.0607	0.8462	-0.65	6.08	3
	4	25.5	30.702	1.2640	0.4592	0.0532	0.8739	-0.30	4.68	4
	5	35.0	30.088	1.2634	0.4540	0.0502	0.8862	-0.10	4.45	5
	6	44.4	29.473	1.2667	0.4525	0.0494	0.8931	0.	4.50	6
	7	53.9	28.853	1.2809	0.4524	0.0493	0.8975	0.	4.52	7
	8	63.6	28.227	1.3047	0.4536	0.0500	0.8988	0.05	4.51	8
	9	73.3	27.593	1.3334	0.4578	0.0528	0.8970	0.	4.60	9
	10	83.3	26.939	1.3659	0.4669	0.0620	0.8838	-0.20	5.84	10
	11	94.1	26.239	1.4024	0.4790	0.0776	0.8541	-0.40	7.28	11
	12	100.0	25.855	1.4232	0.4921	0.0880	0.8331	-0.48	8.19	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	XC TM	TTE/C
STATOR 3 PLANE SECTIONS	32.364	3.1331	34.46	39.86	59.05	24.59	0.0898	50.00	0.0120
	31.814	3.0798	33.44	32.38	51.06	17.63	0.0898	50.00	0.0120
	31.324	3.0323	33.00	28.87	47.33	14.34	0.0898	50.00	0.0120
	30.702	2.9721	31.74	27.50	45.33	13.60	0.0898	50.00	0.0120
	30.088	2.9115	31.20	27.23	44.80	13.60	0.0897	50.00	0.0120
	29.473	2.8593	31.07	27.17	44.67	13.60	0.0890	50.00	0.0120
	28.853	2.8300	31.12	27.19	44.72	13.60	0.0872	50.00	0.0120
	28.227	2.8205	31.17	27.26	44.77	13.60	0.0840	50.00	0.0120
	27.593	2.8179	31.53	27.53	45.09	13.56	0.0793	50.00	0.0120
	26.939	2.8182	31.85	28.97	46.47	14.62	0.0736	50.00	0.0120
	26.239	2.8184	29.65	33.73	49.83	20.18	0.0667	50.00	0.0120
	25.855	2.8184	27.89	37.86	52.91	25.02	0.0626	50.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR ROTOR 4 60 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	32.123	35.279	3.8544	1.6228	0.440	0.857	413.8	163.2	63.30	-4.84	1
	2	8.0	31.648	35.256	3.8717	1.5761	0.451	0.904	407.7	173.2	62.67	-4.62	2
	3	15.5	31.200	35.232	3.8873	1.5501	0.463	0.928	402.0	180.4	61.96	-4.07	3
	4	25.2	30.623	35.192	3.9053	1.5348	0.477	0.934	394.5	187.0	60.87	-3.08	4
ROTOR	5	34.8	30.054	35.150	3.9192	1.5292	0.488	0.926	387.2	191.4	59.74	-1.94	5
4	6	44.3	29.485	35.110	3.9309	1.5277	0.497	0.913	379.9	194.7	58.65	-0.71	6
INLET	7	53.9	28.913	35.072	3.9419	1.5283	0.505	0.901	372.5	197.7	57.60	0.55	7
	8	63.7	28.336	35.036	3.9518	1.5325	0.512	0.887	365.1	200.4	56.55	1.83	8
	9	73.5	27.751	35.003	3.9594	1.5395	0.517	0.871	357.5	202.5	55.51	3.07	9
	10	83.6	27.149	34.969	3.9590	1.5551	0.517	0.840	349.8	201.7	54.39	4.30	10
	11	94.3	26.513	34.916	3.9496	1.5836	0.513	0.777	341.6	195.5	52.78	5.33	11
	12	100.0	26.173	34.908	3.9406	1.6042	0.507	0.730	337.2	188.4	51.93	5.31	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	31.934	37.512	5.5579	1.8133	0.584	0.501	411.4	122.1	56.48	4.84	1
	2	9.1	31.439	37.516	5.5700	1.7591	0.588	0.574	405.0	150.7	52.79	-5.06	2
	3	16.8	31.015	37.536	5.5821	1.7276	0.591	0.610	399.6	164.2	51.29	-4.08	3
	4	26.5	30.485	37.585	5.5983	1.7082	0.597	0.622	392.7	172.3	49.75	-2.60	4
ROTOR	5	36.0	29.967	37.644	5.6144	1.7007	0.606	0.616	386.1	175.6	48.12	-1.25	5
4	6	45.4	29.452	37.706	5.6306	1.6985	0.616	0.605	379.4	178.4	46.27	-0.05	6
EXIT	7	54.9	28.936	37.769	5.6467	1.6989	0.627	0.596	372.8	181.9	44.22	1.09	7
	8	64.3	28.419	37.834	5.6629	1.7037	0.640	0.586	366.1	185.7	41.92	2.23	8
	9	73.8	27.901	37.899	5.6790	1.7122	0.654	0.575	359.5	189.5	39.33	3.37	9
	10	83.5	27.371	37.974	5.6952	1.7315	0.670	0.547	352.6	188.9	36.03	4.46	10
	11	94.0	26.799	38.080	5.7114	1.7662	0.689	0.475	345.3	174.6	31.18	5.34	11
	12	100.0	26.471	38.112	5.7194	1.7915	0.699	0.413	341.0	158.2	27.67	5.31	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	32.028	1.1912	0.5488	0.0814	0.7614	0.	17.61	1
	2	8.5	31.543	1.2095	0.4846	0.0685	0.8177	0.20	12.58	2
	3	16.1	31.107	1.2265	0.4544	0.0577	0.8548	0.30	8.82	3
	4	25.8	30.554	1.2488	0.4413	0.0486	0.8804	0.60	6.00	4
ROTOR	5	35.4	30.011	1.2714	0.4425	0.0444	0.8918	0.80	4.67	5
4	6	44.9	29.468	1.2945	0.4473	0.0434	0.8982	1.00	4.11	6
SL DATA	7	54.4	28.924	1.3180	0.4509	0.0430	0.9021	1.20	3.78	7
	8	64.0	28.378	1.3415	0.4548	0.0439	0.9032	1.40	3.50	8
	9	73.6	27.826	1.3646	0.4599	0.0472	0.9016	1.50	3.28	9
	10	83.6	27.260	1.3869	0.4791	0.0534	0.8895	1.40	3.46	10
	11	94.1	26.656	1.4085	0.5401	0.0644	0.8636	0.70	4.47	11
	12	100.0	26.322	1.4193	0.6025	0.0754	0.8453	0.	9.16	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	32.028	4.0020	22.84	57.53	63.72	40.87	0.0334	59.10	0.0111
	31.543	3.9932	18.06	56.14	62.64	44.58	0.0374	57.16	0.0114
	31.107	3.9930	15.59	54.91	61.55	45.96	0.0413	55.43	0.0117
	30.554	3.9933	15.19	53.22	60.02	44.83	0.0454	53.16	0.0121
ROTOR	30.011	3.9931	15.18	51.53	58.51	43.33	0.0497	50.97	0.0125
4	29.468	3.9924	15.49	49.80	57.10	41.61	0.0542	48.83	0.0127
PLANE	28.924	3.9901	16.11	47.99	55.75	39.64	0.0589	46.73	0.0130
SECTIONS	28.378	3.9845	17.11	46.08	54.41	37.30	0.0635	44.75	0.0132
	27.826	3.9741	19.07	43.98	53.15	34.08	0.0677	42.94	0.0135
	27.260	3.9574	22.53	41.47	51.90	29.37	0.0717	41.02	0.0139
	26.656	3.9286	27.93	37.74	50.32	22.39	0.0767	39.08	0.0145
	26.322	3.9189	30.94	35.21	49.34	18.40	0.0792	38.03	0.0147

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR STATOR 4 - 92 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
	1	0.	31.813	38.946	5.5579	1.8133	0.595	127.6	60.88	-4.84	1
	2	9.0	31.344	38.871	5.5700	1.7593	0.603	160.6	52.16	-3.25	2
	3	16.6	30.944	38.849	5.5821	1.7278	0.609	175.6	47.94	-2.55	3
	4	26.1	30.444	38.858	5.5983	1.7081	0.617	183.9	45.82	-1.83	4
STATOR	5	35.5	29.954	38.875	5.6144	1.7005	0.625	186.8	45.51	-1.13	5
4	6	44.9	29.403	38.900	5.6306	1.6984	0.634	189.0	45.55	-0.36	6
INLET	7	54.3	28.970	38.922	5.6467	1.6988	0.644	191.7	45.57	0.46	7
	8	63.8	28.473	38.936	5.6629	1.7037	0.654	194.6	45.64	1.33	8
	9	73.4	27.971	38.956	5.6791	1.7122	0.666	197.2	45.88	2.24	9
	10	83.2	27.455	38.984	5.6952	1.7314	0.678	195.0	47.65	3.24	10
	11	93.9	26.893	39.059	5.7114	1.7661	0.691	178.3	53.19	4.74	11
	12	100.0	26.576	39.129	5.7195	1.7914	0.699	160.7	57.95	5.91	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	31.639	41.001	5.4698	1.8133	0.398	151.8	31.60	-4.84	1
	2	8.4	31.231	41.097	5.4955	1.7593	0.411	164.6	24.84	-3.50	2
	3	16.1	30.857	41.132	5.5159	1.7278	0.421	171.6	21.30	-2.90	3
	4	25.9	30.379	41.136	5.5391	1.7081	0.432	177.2	19.42	-2.28	4
STATOR	5	35.5	29.910	41.123	5.5573	1.7005	0.441	180.7	19.08	-1.65	5
4	6	45.1	29.444	41.115	5.5729	1.6984	0.448	183.6	19.09	-0.98	6
EXIT	7	54.7	28.977	41.117	5.5875	1.6988	0.455	186.4	19.10	-0.27	7
	8	64.4	28.509	41.125	5.6003	1.7037	0.462	189.1	19.06	0.48	8
	9	74.1	28.037	41.141	5.6084	1.7122	0.466	191.3	19.22	1.22	9
	10	83.9	27.555	41.145	5.6079	1.7314	0.469	191.9	20.47	2.03	10
	11	94.4	27.049	41.106	5.5989	1.7661	0.470	187.4	24.97	3.27	11
	12	100.0	26.775	41.054	5.5895	1.7914	0.464	178.7	29.50	5.91	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	31.726	1.2480	0.5276	0.0750	0.7525	-1.97	9.56	1
	2	8.7	31.287	1.2480	0.5068	0.0618	0.8095	-1.48	8.06	2
	3	16.3	30.900	1.2480	0.4924	0.0538	0.8472	-0.83	6.44	3
	4	26.0	30.411	1.2480	0.4802	0.0469	0.8736	-0.75	5.08	4
STATOR	5	35.5	29.932	1.2477	0.4745	0.0441	0.8853	-0.61	4.66	5
4	6	45.0	29.454	1.2497	0.4718	0.0434	0.8915	-0.50	4.66	6
SL DATA	7	54.5	28.973	1.2599	0.4696	0.0433	0.8954	-0.50	4.62	7
	8	64.1	28.491	1.2789	0.4685	0.0444	0.8960	-0.50	4.49	8
	9	73.7	28.004	1.3015	0.4698	0.0486	0.8933	-0.48	4.60	9
	10	83.6	27.505	1.3252	0.4773	0.0582	0.8797	-0.44	5.13	10
	11	94.1	26.971	1.3517	0.4913	0.0724	0.8513	-1.49	6.79	11
	12	100.0	26.675	1.3664	0.5063	0.0820	0.8314	-2.64	8.15	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	31.726	2.7027	35.04	40.91	60.39	25.35	0.0998	50.00	0.0120
	31.287	2.6654	33.74	33.39	52.23	18.49	0.0970	50.00	0.0120
	30.900	2.6324	32.80	29.89	48.25	15.15	0.0944	50.00	0.0120
	30.411	2.5908	31.95	28.41	46.35	14.40	0.0911	50.00	0.0120
STATOR	29.932	2.5494	31.54	28.22	45.96	14.42	0.0880	50.00	0.0120
4	29.454	2.5126	31.47	28.20	45.90	14.43	0.0849	50.00	0.0120
PLANE	28.973	2.4919	31.40	28.23	45.90	14.50	0.0817	50.00	0.0120
SECTIONS	28.491	2.4874	31.34	28.30	45.94	14.60	0.0785	50.00	0.0120
	28.004	2.4881	31.38	28.42	46.08	14.70	0.0755	50.00	0.0120
	27.505	2.4882	31.60	29.66	47.43	15.83	0.0722	50.00	0.0120
	26.971	2.4885	32.00	34.45	52.42	20.42	0.0686	50.00	0.0120
	26.675	2.4881	32.20	39.53	57.59	25.39	0.0666	50.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR ROTOR 5 - 70 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	31.514	42.479	5.4698	1.8133	0.417	0.784	406.0	161.0	62.72	4.84	1
	2	8.1	31.133	42.446	5.4955	1.7593	0.428	0.833	401.1	172.0	62.08	-5.00	2
	3	15.8	30.776	42.418	5.5159	1.7278	0.438	0.858	396.5	179.0	61.48	-4.45	3
	4	25.6	30.317	42.380	5.5391	1.7081	0.450	0.867	390.6	185.1	60.56	-3.51	4
ROTOR	5	35.3	29.866	42.345	5.5573	1.7005	0.460	0.862	384.8	189.0	59.60	2.55	5
5	6	44.9	29.416	42.314	5.5729	1.6984	0.468	0.853	379.0	192.0	58.67	-1.63	6
INLET	7	54.5	28.966	42.283	5.5875	1.6988	0.474	0.844	373.2	194.6	57.76	-0.74	7
	8	64.2	28.514	42.253	5.6003	1.7037	0.480	0.833	367.4	197.1	56.88	0.13	8
	9	74.0	28.056	42.227	5.6084	1.7122	0.483	0.819	361.5	198.7	56.02	0.98	9
	10	84.0	27.588	42.202	5.6079	1.7314	0.484	0.794	355.4	198.4	55.05	1.76	10
	11	94.5	27.099	42.171	5.5989	1.7661	0.484	0.741	349.1	194.2	53.45	2.41	11
	12	100.0	26.840	42.157	5.5895	1.7914	0.483	0.698	345.8	[illegible]	52.33	1.69	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	31.352	44.386	7.5998	2.0011	0.561	0.444	403.9	1?5.4	55.90	-4.84	1
	2	9.4	30.935	44.406	7.6157	1.9392	0.568	0.525	398.5	150.0	51.24	-4.89	2
	3	17.2	30.590	44.427	7.6315	1.9024	0.573	0.565	394.1	165.3	49.66	-4.39	3
	4	26.8	30.164	44.460	7.6527	1.8785	0.579	0.582	388.6	174.0	48.30	-3.54	4
ROTOR	5	36.1	29.750	44.499	7.6738	1.8691	0.585	0.579	383.3	177.0	46.97	-2.70	5
5	6	45.4	29.338	44.539	7.6950	1.8665	0.593	0.570	378.0	179.0	45.47	-1.90	6
EXIT	7	54.8	28.924	44.584	7.7161	1.8667	0.601	0.562	372.6	181.4	43.81	-1.13	7
	8	64.1	28.510	44.631	7.7373	1.8724	0.611	0.553	367.3	184.1	41.94	-0.38	8
	9	73.5	28.092	44.684	7.7584	1.8826	0.620	0.541	361.9	186.1	39.83	0.35	9
	10	83.2	27.664	44.742	7.7796	1.9056	0.631	0.512	356.4	183.7	37.18	1.06	10
	11	93.8	27.194	44.813	7.8007	1.9467	[illegible]	0.438	350.3	166.0	33.43	1.73	11
	12	100.0	26.919	44.857	7.8113	1.9764	[illegible]	0.368	346.8	144.4	30.97	1.69	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	31.433	1.2153	0.5764	0.0830	0.7648	0.09	14.17	1
	2	8.8	31.034	1.2310	0.4957	0.0679	0.8173	0.27	8.78	2
	3	16.5	30.683	1.2450	0.4594	0.0573	0.8524	0.37	6.81	3
	4	26.2	30.241	1.2631	0.4420	0.0480	0.8776	0.42	5.64	4
ROTOR	5	35.7	29.808	1.2816	0.4416	0.0444	0.8888	0.44	5.12	5
5	6	45.2	29.377	1.3004	0.4459	0.0433	0.8946	0.46	4.90	6
SL DATA	7	54.6	28.945	1.3199	0.4502	0.0433	0.8982	0.54	4.88	7
	8	64.2	28.512	1.3399	0.4553	0.0446	0.8987	0.55	4.81	8
	9	73.8	28.074	1.3590	0.4635	0.0473	0.8960	0.51	5.10	9
	10	83.6	27.626	1.3747	0.4874	0.0533	0.8834	0.39	5.81	10
	11	94.1	27.146	1.3871	0.5604	0.0649	0.8575	-0.05	7.10	11
	12	100.0	26.879	1.3921	0.6411	0.0750	0.8394	0.51	8.05	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	31.433	3.4275	20.67	56.10	62.43	41.76	0.0340	59.97	0.0110
	31.034	3.4275	19.07	55.03	61.58	42.51	0.0371	58.27	0.0114
	30.683	3.4275	17.97	54.06	60.84	42.87	0.0397	56.70	0.0117
	30.241	3.4274	17.20	52.66	59.90	42.70	0.0430	54.77	0.0121
ROTOR	29.808	3.4272	17.05	51.11	58.95	41.90	0.0470	52.85	0.0124
5	29.377	3.4272	17.40	49.56	58.05	40.65	0.0509	50.95	0.0128
PLANE	28.945	3.4270	18.12	47.86	57.12	39.01	0.0552	49.12	0.0132
SECTIONS	28.512	3.4267	19.10	46.09	56.30	37.20	0.0604	47.20	0.0136
	28.074	3.4220	20.75	44.08	55.55	34.80	0.0661	45.28	0.0139
	27.626	3.4059	23.42	41.71	54.80	31.38	0.0722	43.26	0.0143
	27.146	3.3767	27.46	38.41	53.75	26.28	0.0777	41.30	0.0148
	26.879	3.3550	30.07	36.27	52.98	22.91	0.0799	40.08	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR STATOR 5 - 110 VANES

STATOR 5 INLET

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
1	0.	31.246	45.647	7.5998	2.0011	0.570	122.2	62.45	-4.84	1
2	9.2	30.852	45.569	7.6157	1.9392	0.577	155.9	53.70	-3.52	2
3	16.9	30.520	45.542	7.6315	1.9024	0.582	171.2	49.42	-3.04	3
4	26.5	30.108	45.537	7.6527	1.8785	0.589	180.1	47.09	-2.59	4
5	35.9	29.706	45.546	7.6738	1.8691	0.596	183.2	46.63	-2.15	5
6	45.2	29.306	45.559	7.6950	1.8665	0.603	185.2	46.65	-1.67	6
7	54.6	28.905	45.568	7.7161	1.8667	0.612	187.4	46.69	-1.17	7
8	64.0	28.501	45.578	7.7373	1.8724	0.620	190.0	46.76	-0.63	8
9	73.4	28.094	45.590	7.7584	1.8826	0.630	191.8	47.14	-0.10	9
10	83.2	27.675	45.611	7.7796	1.9056	0.640	189.3	48.90	0.50	10
11	93.9	27.218	45.670	7.8007	1.9467	0.652	172.3	54.39	1.45	11
12	100.0	26.955	45.727	7.8113	1.9764	0.659	152.0	59.67	2.48	12

STATOR 5 EXIT

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
1	0.	31.088	47.505	7.4883	2.0011	0.365	146.4	31.70	-4.84	1
2	6.5	30.745	47.576	7.5216	1.9392	0.378	158.2	25.48	-3.57	2
3	16.2	30.430	47.598	7.5480	1.9024	0.387	165.0	21.97	-2.98	3
4	26.1	30.029	47.601	7.5783	1.8785	0.397	170.6	19.76	-2.51	4
5	35.7	29.638	47.591	7.6021	1.8691	0.405	174.0	19.19	-2.10	5
6	45.3	29.250	47.585	7.6228	1.8665	0.411	176.5	19.19	-1.67	6
7	54.9	28.862	47.587	7.6421	1.8667	0.416	178.8	19.20	-1.20	7
8	64.5	28.473	47.592	7.6593	1.8724	0.421	181.0	19.14	-0.72	8
9	74.1	28.081	47.595	7.6707	1.8826	0.423	182.2	19.43	-0.21	9
10	84.0	27.680	47.587	7.6715	1.9056	0.423	181.4	20.99	0.37	10
11	94.4	27.257	47.538	7.6617	1.9467	0.420	175.9	25.45	1.36	11
12	100.0	27.031	47.485	7.6508	1.9764	0.416	169.1	29.60	2.48	12

STATOR 5 SL DATA

SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
1	0.	31.167	1.3769	0.5465	0.0750	0.7575	-1.52	12.81	1
2	8.8	30.798	1.3770	0.5233	0.0617	0.8108	-0.70	11.76	2
3	16.6	30.475	1.3770	0.5082	0.0538	0.8464	-0.35	9.72	3
4	26.3	30.069	1.3769	0.4964	0.0468	0.8720	-0.12	8.27	4
5	35.8	29.672	1.3770	0.4911	0.0441	0.8834	0.	7.84	5
6	45.3	29.278	1.3818	0.4883	0.0433	0.8892	-0.01	8.12	6
7	54.7	28.883	1.3953	0.4865	0.0433	0.8926	0.	8.31	7
8	64.2	28.487	1.4121	0.4871	0.0444	0.8928	-0.19	8.42	8
9	73.8	28.087	1.4312	0.4911	0.0486	0.8895	-0.60	8.82	9
10	83.6	27.678	1.4524	0.5012	0.0581	0.8755	-1.10	9.68	10
11	94.1	27.238	1.4758	0.5207	0.0724	0.8476	-1.70	10.63	11
12	100.0	26.993	1.4892	0.5356	0.0820	0.8283	-1.99	11.40	12

STATOR 5 PLANE SECTIONS

SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
31.167	2.4513	40.18	40.99	61.08	20.90	0.0999	42.00	0.0120
30.798	2.4224	37.67	34.03	52.86	15.19	0.1000	42.00	0.0120
30.475	2.3969	36.44	30.94	49.16	12.73	0.0999	42.00	0.0120
30.069	2.3649	35.39	29.30	46.99	11.60	0.1000	42.00	0.0120
29.672	2.3339	35.23	28.96	46.58	11.35	0.0997	42.00	0.0120
29.278	2.3110	35.56	28.83	46.61	11.05	0.0988	42.00	0.0120
28.883	2.3019	35.79	28.74	46.64	10.85	0.0970	42.00	0.0120
28.487	2.2978	36.22	28.79	46.91	10.68	0.0932	42.00	0.0120
28.087	2.2962	37.10	29.14	47.69	10.59	0.0878	42.00	0.0120
27.678	2.2962	38.47	30.63	49.87	11.40	0.0813	42.00	0.0120
27.238	2.2962	39.89	35.55	55.50	15.61	0.0743	42.00	0.0120
26.993	2.2962	40.76	40.09	60.47	19.71	0.0703	42.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR ROTOR 6 - 80 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	30.849	49.563	7.4947	1.9883	0.399	0.748	397.4	165.2	61.92	-4.09	1
	2	6.7	30.597	49.543	7.5216	1.9392	0.407	0.781	394.2	172.0	61.62	-4.71	2
	3	14.5	30.305	49.522	7.5480	1.9024	0.414	0.805	390.4	177.5	61.25	-4.36	3
	4	24.6	29.928	49.494	7.5783	1.8785	0.424	0.816	385.6	182.7	60.59	3.59	4
ROTOR	5	34.4	29.559	49.467	7.6021	1.8691	0.431	0.815	380.8	186.0	59.84	-2.76	5
6	6	44.2	29.191	49.446	7.6228	1.8665	0.437	0.808	376.1	188.4	59.08	-1.96	6
INLET	7	54.0	28.824	49.426	7.6421	1.8667	0.442	0.800	371.3	190.6	58.33	-1.19	7
	8	63.8	28.455	49.406	7.6593	1.8724	0.446	0.792	366.6	192.8	57.60	-0.43	8
	9	73.7	28.083	49.383	7.6707	1.8826	0.449	0.780	361.8	194.1	56.83	0.31	9
	10	83.9	27.703	49.367	7.6715	1.9056	0.449	0.756	356.9	193.6	56.03	1.03	10
	11	94.4	27.307	49.355	7.6617	1.9467	0.448	0.710	351.8	189.8	54.72	1.55	11
	12	100.0	27.098	49.346	7.6508	1.9764	0.447	0.673	349.1	185.1	53.84	1.23	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	30.732	51.201	9.8070	2.1550	0.518	0.457	395.9	127.4	54.78	-4.09	1
	2	7.6	30.459	51.208	9.8250	2.1001	0.524	0.512	392.4	149.6	52.18	-4.10	2
	3	15.7	30.170	51.219	9.8430	2.0581	0.528	0.549	388.7	163.7	50.84	-3.77	3
	4	25.6	29.813	51.240	9.8671	2.0298	0.533	0.571	384.1	173.0	49.71	-3.12	4
ROTOR	5	35.2	29.468	51.267	9.8911	2.0184	0.538	0.572	379.7	176.6	48.65	-2.41	5
6	6	44.8	29.127	51.295	9.9151	2.0151	0.544	0.566	375.2	178.5	47.48	-1.71	6
EXIT	7	54.3	28.785	51.327	9.9391	2.0152	0.550	0.559	370.8	180.6	46.20	1.02	7
	8	63.8	28.443	51.365	9.9631	2.0214	0.557	0.552	366.4	183.1	44.75	-0.35	8
	9	73.4	28.099	51.405	9.9871	2.0332	0.565	0.540	362.0	184.6	43.12	0.32	9
	10	83.2	27.746	51.450	10.0111	2.0598	0.573	0.512	357.5	181.6	41.07	0.97	10
	11	93.9	27.363	51.497	10.0351	2.1068	0.582	0.448	352.5	166.7	38.38	1.57	11
	12	100.0	27.144	51.527	10.0471	2.1408	0.587	0.390	349.7	149.3	36.86	1.23	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	30.791	1.2078	0.5204	0.0820	0.7737	-1.43	13.82	1
	2	7.2	30.528	1.2182	0.4658	0.0704	0.8142	-1.00	10.15	2
	3	15.1	30.237	1.2300	0.4297	0.0593	0.8482	-0.64	8.11	3
	4	25.1	29.871	1.2451	0.4083	0.0489	0.8733	-0.32	6.84	4
ROTOR	5	34.8	29.514	1.2602	0.4042	0.0445	0.8845	-0.18	6.19	5
6	6	44.5	29.159	1.2754	0.4065	0.0433	0.8902	-0.11	5.79	6
SL DATA	7	54.1	28.804	1.2912	0.4094	0.0432	0.8935	-0.07	5.68	7
	8	63.8	28.449	1.3073	0.4132	0.0445	0.8936	-0.08	5.74	8
	9	73.6	28.091	1.3228	0.4213	0.0473	0.8902	-0.03	6.04	9
	10	83.6	27.725	1.3320	0.4453	0.0533	0.8769	-0.01	6.62	10
	11	94.2	27.335	1.3394	0.5085	0.0651	0.8505	-0.32	7.54	11
	12	100.0	27.121	1.3473	0.5735	0.0750	0.8323	-0.67	8.59	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	30.791	2.9195	22.76	55.77	63.14	40.37	0.0359	59.98	0.0110
	30.528	2.9195	20.93	55.13	62.43	41.50	0.0391	58.55	0.0113
	30.237	2.9195	19.23	54.40	61.67	42.44	0.0424	57.03	0.0116
	29.871	2.9195	17.82	53.26	60.71	42.90	0.0467	55.00	0.0120
ROTOR	29.514	2.9195	17.24	51.98	59.85	42.61	0.0512	53.06	0.0123
6	29.159	2.9195	17.17	50.72	59.05	41.88	0.0555	51.13	0.0127
PLANE	28.804	2.9193	17.60	49.37	58.30	40.71	0.0596	49.21	0.0132
SECTIONS	28.449	2.9192	18.52	47.84	57.62	39.11	0.0639	47.28	0.0135
	28.091	2.9164	19.85	46.09	56.90	37.06	0.0681	45.25	0.0139
	27.725	2.8982	21.90	44.04	56.10	34.20	0.0726	43.31	0.0143
	27.335	2.8734	24.74	41.67	55.13	30.39	0.0773	41.15	0.0148
	27.121	2.8674	26.60	40.31	54.55	27.94	0.0797	40.06	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR STATOR 6 - 120 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
	1	0.	30.649	52.369	9.8070	2.1550	0.527	134.1	58.18	-4.09	1
	2	7.5	30.389	52.324	9.8250	2.1001	0.532	155.5	52.16	-3.26	2
	3	15.5	30.110	52.301	9.8430	2.0581	0.537	169.7	47.93	2.73	3
	4	25.5	29.765	52.294	9.8671	2.0298	0.543	179.1	45.19	-2.25	4
STATOR 6 INLET	5	35.1	29.431	52.301	9.8911	2.0184	0.549	182.9	44.41	-1.83	5
	6	44.7	29.100	52.311	9.9151	2.0151	0.555	185.0	44.33	-1.37	6
	7	54.2	28.769	52.319	9.9391	2.0152	0.561	187.1	44.31	-0.89	7
	8	63.8	28.437	52.326	9.9631	2.0214	0.568	189.5	44.31	-0.41	8
	9	73.4	28.103	52.336	9.9871	2.0332	0.575	190.8	44.75	0.11	9
	10	83.3	27.759	52.355	10.0111	2.0598	0.582	187.9	46.65	0.68	10
	11	94.0	27.388	52.403	10.0351	2.1068	0.591	174.0	51.69	1.58	11
	12	100.0	27.180	52.448	10.0471	2.1408	0.597	157.9	56.37	2.43	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
	1	0.	30.521	54.158	9.6820	2.1550	0.361	154.4	28.90	4.09	1
	2	7.0	30.292	54.193	9.7165	2.1001	0.370	162.9	24.17	3.28	2
	3	15.0	30.031	54.216	9.7479	2.0581	0.378	169.2	20.46	-2.76	3
	4	25.1	29.699	54.224	9.7831	2.0298	0.387	174.9	17.67	-2.30	4
STATOR 6 EXIT	5	35.0	29.377	54.218	9.8111	2.0184	0.394	178.6	16.52	-1.89	5
	6	44.7	29.058	54.208	9.8348	2.0151	0.400	181.1	16.37	-1.45	6
	7	54.5	28.740	54.206	9.8572	2.0152	0.405	183.4	16.39	-1.00	7
	8	64.2	28.421	54.211	9.8771	2.0214	0.409	185.6	16.40	-0.53	8
	9	74.0	28.101	54.214	9.8909	2.0332	0.412	186.9	16.94	-0.05	9
	10	84.0	27.775	54.207	9.8928	2.0598	0.413	186.4	18.79	0.50	10
	11	94.5	27.433	54.173	9.8837	2.1068	0.411	182.3	23.11	1.32	11
	12	100.0	27.252	54.134	9.8730	2.1408	0.408	177.0	26.80	2.43	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV		SL
	1	0.	30.585	1.3991	0.4902	0.0750	0.7678	-2.68	15.03		1
	2	7.0	30.340	1.3985	0.4751	0.0638	0.8088	-2.13	12.71		2
	3	15.3	30.071	1.3984	0.4630	0.0549	0.8433	-1.83	11.06		3
	4	25.3	29.732	1.3983	0.4532	0.0474	0.8689	-1.80	9.47		4
STATOR 6 SL DATA	5	35.0	29.404	1.3979	0.4490	0.0442	0.8803	-1.92	8.59		5
	6	44.7	29.079	1.3989	0.4465	0.0434	0.8859	-2.02	8.50		6
	7	54.3	28.754	1.4068	0.4441	0.0433	0.8891	-2.11	8.60		7
	8	64.0	28.429	1.4214	0.4428	0.0444	0.8890	-2.22	8.66		8
	9	73.7	28.102	1.4380	0.4440	0.0485	0.8851	-2.30	9.08		9
	10	83.6	27.767	1.4553	0.4509	0.0582	0.8708	-2.43	10.04		10
	11	94.2	27.411	1.4743	0.4656	0.0725	0.8429	-2.88	11.44		11
	12	100.0	27.216	1.4848	0.4788	0.0820	0.8237	-3.37	12.33		12

	SECT. HT.	CHORD	CAMBER	S AGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	30.585	2.2405	42.67	37.10	58.43	15.77	0.1090	42.00	0.0120
	30.340	2.2217	40.01	32.76	52.76	12.75	0.1063	42.00	0.0120
	30.071	2.2018	38.95	29.60	49.07	10.12	0.1035	42.00	0.0120
	29.732	2.1769	38.36	27.56	46.74	8.38	0.0999	42.00	0.0120
STATOR 6 PLANE SECTIONS	29.404	2.1523	38.32	27.10	46.26	7.94	0.0963	42.00	0.0120
	29.079	2.1299	38.44	27.07	46.29	7.85	0.0929	42.00	0.0120
	28.754	2.1179	38.56	27.06	46.34	7.78	0.0894	42.00	0.0120
	28.429	2.1158	38.69	27.09	46.44	7.75	0.0860	42.00	0.0120
	28.102	2.1158	39.03	27.41	46.93	7.89	0.0825	42.00	0.0120
	27.767	2.1158	39.98	28.87	48.86	8.88	0.0789	42.00	0.0120
	27.411	2.1158	41.27	33.10	53.73	12.46	0.0751	42.00	0.0120
	27.216	2.1158	42.17	37.22	58.31	16.14	0.0730	42.00	0.0120

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR ROTOR 7 - 82 BLADES

ROTOR 7 INLET

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
1	0.	30.425	55.498	9.6820	2.1550	0.378	0.711	392.0	163.0	61.99	-4.09	1
2	6.9	30.208	55.483	9.7165	2.1001	0.385	0.745	389.2	170.4	61.66	-4.28	2
3	14.8	29.959	55.469	9.7479	2.0581	0.394	0.771	386.0	176.6	61.31	-4.02	3
4	25.0	29.640	55.452	9.7831	2.0298	0.403	0.789	381.9	182.6	60.75	-3.40	4
5	34.9	29.330	55.427	9.8111	2.0184	0.411	0.793	377.9	186.7	60.11	-2.68	5
6	44.7	29.023	55.405	9.8348	2.0151	0.417	0.790	373.9	189.5	59.42	-1.94	6
7	54.4	28.717	55.397	9.8572	2.0152	0.423	0.784	370.0	191.8	58.74	1.22	7
8	64.2	28.411	55.379	9.8771	2.0214	0.427	0.777	366.0	193.9	58.08	-0.51	8
9	74.0	28.102	55.359	9.8909	2.0332	0.429	0.765	362.0	195.0	57.41	0.17	9
10	84.1	27.787	55.334	9.8928	2.0598	0.429	0.741	358.0	194.3	56.59	0.80	10
11	94.5	27.453	55.304	9.8837	2.1068	0.428	0.697	353.8	190.8	55.34	1.33	11
12	100.0	27.286	55.288	9.8730	2.1408	0.427	0.664	351.5	187.0	54.51	1.07	12

ROTOR 7 EXIT

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
1	0.	30.306	57.164	12.5699	2.3285	0.507	0.418	390.4	124.8	53.51	-4.09	1
2	8.0	30.069	57.165	12.5919	2.2679	0.512	0.474	387.4	148.1	50.82	-4.18	2
3	16.3	29.821	57.167	12.6138	2.2209	0.516	0.515	384.2	167.9	49.49	-3.96	3
4	26.4	29.520	57.180	12.6431	2.1884	0.520	0.543	380.3	175.3	48.44	-3.42	4
5	36.0	29.233	57.201	12.6723	2.1746	0.525	0.553	376.6	181.2	47.49	-2.80	5
6	45.5	28.951	57.229	12.7016	2.1701	0.531	0.552	373.0	184.1	46.46	-2.17	6
7	54.9	28.671	57.264	12.7308	2.1701	0.537	0.547	369.4	186.3	45.30	-1.57	7
8	64.3	28.391	57.302	12.7601	2.1774	0.544	0.540	365.8	188.5	43.96	-1.01	8
9	73.8	28.109	57.344	12.7894	2.1914	0.551	0.527	362.1	189.1	42.40	0.49	9
10	83.5	27.818	57.394	12.8186	2.2221	0.559	0.498	358.4	185.3	40.35	-0.04	10
11	94.1	27.503	57.450	12.8479	2.2751	0.569	0.438	354.3	171.6	37.55	0.24	11
12	100.0	27.327	57.481	12.8625	2.3130	0.574	0.390	352.1	157.0	35.86	1.07	12

ROTOR 7 SL DATA

SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
1	0.	30.365	1.2227	0.5551	0.0880	0.7718	-1.70	15.58	1
2	7.4	30.139	1.2318	0.4955	0.0776	0.8107	-0.83	11.69	2
3	15.5	29.890	1.2421	0.4544	0.0673	0.8437	-0.13	9.26	3
4	25.7	29.580	1.2551	0.4271	0.0577	0.8686	0.45	7.91	4
5	35.4	29.282	1.2679	0.4161	0.0506	0.8802	0.80	7.37	5
6	45.0	28.987	1.2808	0.4142	0.0464	0.8861	0.97	7.17	6
7	54.6	28.694	1.2939	0.4162	0.0465	0.8892	1.00	7.19	7
8	64.2	28.401	1.3072	0.4207	0.0496	0.8887	0.94	7.45	8
9	73.9	28.105	1.3210	0.4313	0.0555	0.8844	0.70	8.02	9
10	83.8	27.802	1.3354	0.4572	0.0642	0.8703	0.17	9.00	10
11	94.3	27.481	1.3510	0.5147	0.0756	0.8439	-0.78	10.11	11
12	100.0	27.307	1.3596	0.5691	0.0830	0.8260	-1.50	10.59	12

ROTOR 7 PLANE SECTIONS

SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
30.365	2.8448	25.83	54.07	63.29	37.46	0.0390	59.99	0.0110
30.139	2.8448	23.62	53.62	62.15	38.53	0.0415	58.52	0.0113
29.890	2.8448	21.44	53.25	61.16	39.72	0.0441	56.90	0.0116
29.580	2.8448	19.53	52.58	60.06	40.53	0.0472	54.89	0.0120
29.282	2.8448	18.77	51.57	59.11	40.34	0.0505	52.95	0.0124
28.987	2.8448	18.75	50.38	58.32	39.66	0.0564	51.04	0.0128
28.694	2.8448	19.28	49.01	57.65	38.37	0.0665	49.14	0.0132
28.401	2.8448	20.38	47.51	57.11	36.73	0.0784	47.23	0.0136
28.105	2.8448	22.30	45.75	56.72	34.43	0.0877	45.31	0.0139
27.802	2.8448	25.25	43.58	56.46	31.21	0.0931	43.35	0.0143
27.481	2.8448	29.15	40.97	56.22	27.07	0.0957	41.26	0.0147
27.307	2.8448	31.46	39.50	56.09	24.64	0.0960	40.13	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR STATOR 7 - 112 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	30.219	58.370	12.5699	2.3285	0.515	131.2	59.45	-4.09	1
	2	7.8	29.995	58.317	12.5919	2.2679	0.520	153.9	53.27	-3.42	2
	3	16.0	29.756	58.285	12.6138	2.2209	0.524	169.7	48.64	-2.94	3
	4	26.1	29.465	58.272	12.6431	2.1884	0.530	181.4	45.23	2.55	4
STATOR	5	35.7	29.187	58.271	12.6723	2.1746	0.535	187.5	43.71	-2.26	5
7	6	45.1	28.914	58.278	12.7016	2.1701	0.541	190.3	43.33	-1.99	6
INLET	7	54.5	28.641	58.284	12.7308	2.1701	0.547	192.4	43.31	-1.73	7
	8	64.0	28.369	58.290	12.7601	2.1774	0.553	194.2	43.47	-1.47	8
	9	73.5	28.093	58.302	12.7894	2.1914	0.559	194.4	44.28	-1.23	9
	10	83.3	27.809	58.325	12.8186	2.2221	0.567	190.1	46.60	-0.97	10
	11	94.0	27.499	58.374	12.8479	2.2751	0.575	176.0	51.64	-0.57	11
	12	100.0	27.326	58.418	12.8625	2.3130	0.579	161.3	55.93	-0.30	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	30.084	60.255	12.4023	2.3285	0.355	159.6	27.50	-4.09	1
	2	7.0	29.892	60.297	12.4374	2.2679	0.364	167.0	23.49	-2.07	2
	3	14.9	29.672	60.322	12.4742	2.2209	0.369	172.0	20.03	-1.69	3
	4	25.0	29.392	60.335	12.5203	2.1884	0.376	176.7	17.10	-1.50	4
STATOR	5	34.9	29.119	60.338	12.5613	2.1746	0.381	180.3	15.52	-1.42	5
7	6	44.6	28.849	60.339	12.5962	2.1701	0.386	182.7	14.98	-1.36	6
EXIT	7	54.3	28.581	60.342	12.6239	2.1701	0.390	184.4	14.99	-1.28	7
	8	64.1	28.311	60.346	12.6410	2.1774	0.392	185.3	15.29	-1.19	8
	9	73.9	28.038	60.348	12.6498	2.1914	0.392	185.2	16.29	-1.10	9
	10	84.0	27.760	60.341	12.6520	2.2221	0.392	184.2	18.27	-0.95	10
	11	94.5	27.469	60.308	12.6432	2.2751	0.390	180.7	22.19	-0.58	11
	12	100.0	27.317	60.276	12.6359	2.3130	0.388	177.2	25.40	-0.30	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	30.152	1.4000	0.4958	0.0820	0.7661	-2.30	14.59	1
	2	7.4	29.943	1.4000	0.4781	0.0741	0.8052	-1.60	12.75	2
	3	15.5	29.714	1.3999	0.4687	0.0658	0.8386	-1.20	11.22	3
	4	25.6	29.428	1.4003	0.4608	0.0566	0.8639	-1.00	9.64	4
STATOR	5	35.3	29.153	1.4030	0.4564	0.0501	0.8759	-1.02	8.72	5
7	6	44.9	28.881	1.4094	0.4545	0.0466	0.8821	-1.07	8.31	6
SL DATA	7	54.4	28.611	1.4197	0.4541	0.0463	0.8850	-1.10	8.29	7
	8	64.0	28.340	1.4329	0.4566	0.0505	0.8841	-1.12	8.73	8
	9	73.7	28.066	1.4470	0.4621	0.0578	0.8791	-1.22	9.56	9
	10	83.7	27.784	1.4617	0.4725	0.0674	0.8641	-1.50	10.80	10
	11	94.3	27.484	1.4777	0.4894	0.0806	0.8365	-2.15	12.49	11
	12	100.0	27.322	1.4865	0.4992	0.0880	0.8180	-2.82	13.48	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	30.152	2.3682	42.96	37.32	58.80	15.84	0.1009	42.00	0.0120
	29.943	2.3518	40.66	32.53	52.86	12.19	0.0985	42.00	0.0120
	29.714	2.3336	39.19	29.11	48.70	9.52	0.0957	42.00	0.0120
	29.428	2.3119	38.08	26.78	45.82	7.74	0.0922	42.00	0.0120
STATOR	29.153	2.2946	37.68	25.76	44.60	6.92	0.0890	42.00	0.0120
7	28.881	2.2835	37.72	25.53	44.40	6.67	0.0858	42.00	0.0120
PLANE	28.611	2.2788	37.75	25.53	44.41	6.66	0.0826	42.00	0.0120
SECTIONS	28.340	2.2780	38.11	25.61	44.66	6.56	0.0793	42.00	0.0120
	28.066	2.2782	39.15	26.17	45.75	6.59	0.0760	42.00	0.0120
	27.784	2.2784	41.37	27.85	48.53	7.17	0.0727	42.00	0.0120
	27.484	2.2784	45.00	31.86	54.36	9.36	0.0691	42.00	0.0120
	27.322	2.2784	47.26	35.33	58.96	11.70	0.0670	42.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EFE CORE COMPRESSOR ROTOR 8 - 84 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	29.957	62.353	12.4159	2.3036	0.360	0.689	385.9	163.4	61.97	-2.52	1
	2	4.4	29.840	62.348	12.4374	2.2679	0.364	0.706	384.4	167.1	61.81	-2.30	2
	3	12.7	29.622	62.338	12.4742	2.2209	0.372	0.732	381.6	173.3	61.47	-2.47	3
	4	23.2	29.345	62.323	12.5203	2.1884	0.382	0.752	378.1	179.8	60.94	-2.21	4
ROTOR	5	33.4	29.077	62.309	12.5613	2.1746	0.391	0.762	374.6	184.7	60.34	-1.76	5
8	6	43.4	28.814	62.294	12.5962	2.1701	0.397	0.762	371.2	188.2	59.72	-1.23	6
INLET	7	53.3	28.552	62.277	12.6239	2.1701	0.402	0.758	367.8	190.4	59.12	-0.69	7
	8	63.3	28.290	62.261	12.6410	2.1774	0.404	0.750	364.5	191.6	58.59	-0.16	8
	9	73.4	28.025	62.243	12.6498	2.1914	0.405	0.736	361.1	191.6	58.03	0.33	9
	10	83.7	27.754	62.224	12.6520	2.2221	0.404	0.713	357.6	190.5	57.30	0.74	10
	11	94.4	27.471	62.201	12.6432	2.2751	0.402	0.673	353.9	187.0	56.27	0.94	11
	12	100.0	27.323	62.186	12.6359	2.3130	0.401	0.644	352.0	183.7	55.56	1.26	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	29.885	63.974	16.0132	2.4824	0.493	0.395	385.0	124.9	52.42	-2.52	1
	2	5.2	29.755	63.962	16.0362	2.4436	0.496	0.426	383.3	138.8	50.65	-2.72	2
	3	14.1	29.531	63.960	16.0593	2.3913	0.500	0.469	380.5	156.4	49.00	2.67	3
	4	24.7	29.263	63.975	16.0900	2.3540	0.504	0.502	377.0	170.1	47.83	2.32	4
ROTOR	5	34.7	29.013	63.990	16.1208	2.3372	0.508	0.518	373.8	178.0	46.91	-1.85	5
8	6	44.3	28.770	64.006	16.1516	2.3309	0.513	0.523	370.7	182.4	46.00	-1.37	6
EXIT	7	53.8	28.531	64.029	16.1823	2.3305	0.518	0.520	367.6	184.7	44.98	-0.89	7
	8	63.4	28.290	64.056	16.2131	2.3390	0.524	0.512	364.5	185.9	43.76	-0.45	8
	9	73.0	28.047	64.089	16.2438	2.3555	0.531	0.496	361.3	184.7	42.30	-0.05	9
	10	83.1	27.794	64.134	16.2746	2.3902	0.538	0.466	358.1	180.0	40.39	0.25	10
	11	93.9	27.520	64.189	16.3054	2.4491	0.547	0.413	354.6	167.1	37.82	0.40	11
	12	100.0	27.368	64.226	16.3207	2.4906	0.551	0.370	352.6	153.8	36.30	1.26	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	29.921	1.2144	0.5803	0.0910	0.7839	-2.00	15.73	1
	2	4.8	29.797	1.2194	0.5445	0.0842	0.8064	-1.30	12.84	2
	3	13.4	29.576	1.2283	0.4969	0.0729	0.8386	-0.68	10.78	3
	4	24.0	29.304	1.2395	0.4619	0.0621	0.8633	-0.27	9.57	4
ROTOR	5	34.0	29.045	1.2504	0.4442	0.0545	0.8754	-0.08	8.87	5
8	6	43.8	28.792	1.2613	0.4372	0.0497	0.8818	0.	8.49	6
SL DATA	7	53.6	28.541	1.2721	0.4378	0.0493	0.8847	0.	8.30	7
	8	63.3	28.290	1.2833	0.4439	0.0522	0.8836	-0.07	8.27	8
	9	73.2	28.036	1.2948	0.4583	0.0579	0.8784	-0.28	8.50	9
	10	83.4	27.774	1.3067	0.4864	0.0667	0.8637	-0.70	9.10	10
	11	94.2	27.496	1.3198	0.5425	0.0781	0.8373	-1.42	10.30	11
	12	100.0	27.346	1.3269	0.5933	0.0850	0.8198	-2.00	11.32	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.921	2.7180	27.60	53.53	63.69	36.09	0.0380	59.98	0.0110
	29.797	2.7178	25.70	53.57	62.94	37.24	0.0391	59.03	0.0112
	29.576	2.7174	23.68	53.28	61.95	38.27	0.0411	57.34	0.0115
	29.304	2.7168	22.74	52.55	61.08	38.34	0.0438	55.26	0.0120
ROTOR	29.045	2.7164	22.15	51.82	60.32	38.16	0.0466	53.28	0.0123
8	28.792	2.7162	21.98	50.96	59.66	37.68	0.0497	51.35	0.0127
PLANE	28.541	2.7159	22.26	49.87	59.10	36.84	0.0532	49.43	0.0131
SECTIONS	28.290	2.7155	23.08	48.67	58.67	35.59	0.0573	47.51	0.0135
	28.036	2.7152	24.57	47.16	58.34	33.77	0.0617	45.57	0.0139
	27.774	2.7147	26.97	45.23	58.05	31.09	0.0669	43.57	0.0143
	27.496	2.7144	30.70	42.74	57.77	27.07	0.0741	41.44	0.0147
	27.346	2.7141	33.32	41.16	57.63	24.33	0.0786	40.29	0.0149

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Desing Blading (Continued). (SI Units)

EEE CORE COMPRESSOR STATOR 8 - 104 VANES

STATOR 8 INLET

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
1	0.	29.840	64.995	16.0132	2.4824	0.497	128.8	59.99	-2.52	1
2	5.1	29.713	64.985	16.0362	2.4436	0.501	142.3	56.43	-2.13	2
3	14.0	29.494	64.974	16.0593	2.3913	0.505	160.0	51.45	-1.72	3
4	24.6	29.232	64.973	16.0900	2.3540	0.510	173.9	47.44	-1.46	4
5	34.5	28.987	64.973	16.1208	2.3372	0.514	182.0	45.24	-1.32	5
6	44.1	28.749	64.974	16.1516	2.3309	0.519	186.4	44.30	-1.22	6
7	53.6	28.514	64.976	16.1823	2.3305	0.524	188.6	44.17	-1.13	7
8	63.2	28.278	64.979	16.2131	2.3390	0.530	189.5	44.55	-1.03	8
9	72.9	28.038	64.981	16.2438	2.3555	0.535	188.0	45.80	0.93	9
10	82.9	27.789	64.984	16.2746	2.3902	0.542	182.9	48.26	-0.79	10
11	93.9	27.518	64.992	16.3054	2.4491	0.549	169.2	53.05	-0.51	11
12	100.0	27.367	65.002	16.3207	2.4906	0.553	155.3	57.06	-0.39	12

STATOR 8 EXIT

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
1	0.	29.745	67.158	15.8059	2.4824	0.321	151.4	26.00	-2.52	1
2	4.5	29.638	67.139	15.8383	2.4436	0.326	155.5	23.50	-2.21	2
3	12.7	29.442	67.096	15.8804	2.3913	0.332	160.9	19.79	-1.84	3
4	23.2	29.190	67.047	15.9335	2.3540	0.341	166.7	16.54	-1.57	4
5	33.4	28.946	67.019	15.9800	2.3372	0.348	171.2	14.54	-1.41	5
6	43.4	28.707	67.000	16.0187	2.3309	0.353	174.3	13.71	-1.30	6
7	53.3	28.469	66.986	16.0487	2.3305	0.357	176.4	13.63	-1.20	7
8	63.3	28.232	66.976	16.0662	2.3390	0.359	177.3	14.15	-1.09	8
9	73.3	27.991	66.979	16.0728	2.3555	0.360	177.0	15.40	-0.95	9
10	83.6	27.744	66.999	16.0717	2.3902	0.359	175.9	17.56	-0.74	10
11	94.4	27.487	67.033	16.0574	2.4491	0.357	172.8	21.22	0.33	11
12	100.0	27.353	67.053	16.0474	2.4906	0.355	170.2	23.90	-0.39	12

STATOR 8 SL DATA

SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
1	0.	29.793	1.5007	0.5392	0.0850	0.7786	-1.00	14.91	1
2	4.8	29.676	1.4500	0.5379	0.0799	0.8013	-1.10	14.23	2
3	13.4	29.468	1.3796	0.5356	0.0710	0.8337	-1.32	12.72	3
4	23.9	29.211	1.3228	0.5296	0.0609	0.8589	-1.59	10.89	4
5	34.0	28.966	1.3019	0.5228	0.0538	0.8714	-1.81	9.78	5
6	43.8	28.728	1.2923	0.5183	0.0499	0.8781	-1.95	9.27	6
7	53.5	28.492	1.2926	0.5164	0.0492	0.8809	-2.00	9.20	7
8	63.2	28.255	1.2975	0.5183	0.0530	0.8794	-1.89	9.65	8
9	73.1	28.014	1.3116	0.5237	0.0604	0.8736	-1.70	10.81	9
10	83.3	27.766	1.3532	0.5295	0.0701	0.8581	-1.45	12.39	10
11	94.1	27.503	1.4234	0.5384	0.0836	0.8307	-1.16	14.55	11
12	100.0	27.360	1.4802	0.5424	0.0910	0.8127	-1.00	15.79	12

STATOR 8 PLANE SECTIONS

SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
29.793	2.7006	45.55	36.40	59.17	13.62	0.1153	42.00	0.0120
29.676	2.6010	45.17	33.62	56.20	11.04	0.1086	42.00	0.0120
29.468	2.4553	44.21	29.96	52.06	7.86	0.0965	42.00	0.0120
29.211	2.3366	42.79	27.33	48.73	5.94	0.0816	42.00	0.0120
28.956	2.2767	41.96	25.94	46.92	4.96	0.0700	42.00	0.0120
28.728	2.2438	41.77	25.37	46.25	4.48	0.0650	42.00	0.0120
28.492	2.2243	41.77	25.30	46.18	4.41	0.0645	42.00	0.0120
28.255	2.2141	42.11	25.50	46.5[illegible]	4.44	0.0669	42.00	0.0120
28.014	2.2214	43.19	26.09	47.68	4.50	0.0733	42.00	0.0120
27.766	2.2682	45.10	27.48	50.03	4.93	0.0814	42.00	0.0120
27.503	2.3663	48.25	30.54	54.66	6.41	0.0903	42.00	0.0120
27.360	2.4458	50.44	33.08	58.30	7.86	0.0950	42.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR ROTOR 9 - 88 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	29.703	68.113	15.8059	2.4824	0.326	0.658	382.7	154.0	63.49	-2.52	1
	2	4.5	29.598	68.104	15.8383	2.4436	0.331	0.675	381.3	158.2	63.23	-2.80	2
	3	12.8	29.402	68.091	15.8804	2.3913	0.339	0.700	378.8	164.1	62.91	2.90	3
	4	23.4	29.154	68.079	15.9335	2.3540	0.348	0.721	375.6	170.5	62.40	-2.63	4
ROTOR	5	33.6	28.915	68.066	15.9800	2.3372	0.356	0.732	372.5	175.4	61.86	-2.16	5
9	6	43.6	28.681	68.053	16.0187	2.3309	0.362	0.734	369.5	178.9	61.31	-1.62	6
INLET	7	53.5	28.449	68.038	16.0487	2.3305	0.367	0.731	366.5	181.1	60.78	-1.08	7
	8	63.4	28.216	68.023	16.0662	2.3390	0.369	0.722	363.5	182.0	60.28	-0.57	8
	9	73.4	27.981	68.007	16.0728	2.3555	0.369	0.707	360.5	181.6	59.77	0.10	9
	10	83.7	27.739	67.991	16.0717	2.3902	0.367	0.684	357.4	180.3	59.[illegible]3	0.28	10
	11	94.4	27.488	67.972	16.0574	2.4491	0.365	0.649	354.1	177.3	58.29	0.49	11
	12	100.0	27.357	67.961	16.0474	2.4906	0.364	0.625	352.5	175.0	57.72	0.61	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	29.639	69.571	20.1958	2.6654	0.467	0.362	381.8	113.3	54.35	2.52	1
	2	5.4	29.516	69.574	20.2199	2.6231	0.470	0.393	380.3	126.7	52.10	2.77	2
	3	14.5	29.311	69.577	20.2439	2.5654	0.473	0.436	377.6	147.4	50.10	-2.82	3
	4	25.1	29.070	69.581	20.2760	2.5232	0.477	0.470	374.5	161.9	48.79	2.53	4
ROTOR	5	35.0	28.847	69.589	20.3081	2.5033	0.480	0.489	371.6	170.7	47.88	2.08	5
9	6	44.5	28.632	69.603	20.3402	2.4951	0.484	0.496	368.9	175.5	47.05	1.59	6
EXIT	7	53.9	28.420	69.622	20.3723	2.4944	0.488	0.494	366.1	177.7	46.14	-1.10	7
	8	63.3	28.207	69.648	20.4043	2.5041	0.493	0.484	363.4	177.8	45.06	-0.65	8
	9	72.9	27.990	69.679	20.4364	2.5230	0.499	0.465	360.6	175.3	43.77	-0.27	9
	10	82.9	27.763	69.718	20.4685	2.5619	0.505	0.434	357.7	169.2	42.12	0.03	10
	11	93.9	27.515	69.774	20.5006	2.6269	0.512	0.383	354.5	155.8	40.08	0.12	11
	12	100.0	27.377	69.804	20.5166	2.6721	0.516	0.345	352.7	143.8	39.01	0.61	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	29.671	1.1990	0.6171	0.0940	0.7803	-2.00	16.59	1
	2	4.9	29.557	1.2036	0.5772	0.0869	0.8021	-1.30	13.94	2
	3	13.6	29.357	1.2118	0.5256	0.0754	0.8335	-0.68	11.20	3
	4	24.3	29.112	1.2220	0.4871	0.0647	0.8582	-0.27	9.44	4
ROTOR	5	34.3	28.881	1.2318	0.4662	0.0573	0.8707	-0.08	8.58	5
9	6	44.0	28.656	1.2414	0.4573	0.0526	0.8775	0.	8.18	6
SL DATA	7	53.7	28.434	1.2511	0.4577	0.0523	0.8803	0.	8.07	7
	8	63.3	28.212	1.2610	0.4662	0.0552	0.8787	-0.07	8.17	8
	9	73.2	27.985	1.2712	0.4839	0.0608	0.8728	-0.28	8.55	9
	10	83.3	27.751	1.2819	0.5164	0.0695	0.8575	-0.70	9.32	10
	11	94.2	27.502	1.2936	0.5756	0.0810	0.8311	-1.42	10.70	11
	12	100.0	27.367	1.2999	0.6242	0.0880	0.8139	-2.00	11.80	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.671	2.5400	27.53	54.94	65.06	37.53	0.0390	59.99	0.0110
	29.557	2.5400	26.41	54.55	64.30	37.39	0.0397	59.01	0.0112
	29.357	2.5400	24.76	54.11	63.34	38.58	0.0410	57.29	0.0115
	29.112	2.5400	23.27	53.71	62.52	39.25	0.0426	55.19	0.0120
ROTOR	28.881	2.5400	22.45	53.11	61.80	39.35	0.0442	53.21	0.0123
9	28.656	2.5400	22.23	52.35	61.22	38.99	0.0462	51.28	0.0127
PLANE	28.434	2.5400	22.51	51.38	60.72	38.21	0.0488	49.38	0.0131
SECTIONS	28.212	2.5400	23.35	50.19	60.33	36.98	0.0520	47.47	0.0135
	27.985	2.5400	24.85	48.75	60.05	35.20	0.0566	45.53	0.0139
	27.751	2.5400	27.19	46.97	59.84	32.65	0.0625	43.52	0.0143
	27.502	2.5400	30.62	44.77	59.73	29.11	0.0697	41.38	0.0147
	27.367	2.5400	32.88	43.47	59.73	26.84	0.0741	40.23	0.0150

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

FEE CORE COMPRESSOR STATOR 9 - 118 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	29.593	70.612	20.1958	2.6654	0.471	117.1	62.42	-2.52	1
	2	5.3	29.474	70.591	20.2199	2.6231	0.474	132.1	58.47	-2.08	2
	3	14.3	29.274	70.570	20.2439	2.5654	0.478	150.8	53.20	-1.63	3
	4	25.0	29.038	70.562	20.2760	2.5232	0.482	165.5	48.92	1.37	4
STATOR	5	34.8	28.819	70.557	20.3081	2.5033	0.486	174.5	46.36	-1.27	5
9	6	44.3	28.609	70.554	20.3402	2.4951	0.490	179.3	45.18	1.23	6
INLET	7	53.7	28.401	70.558	20.3723	2.4944	0.494	181.3	45.01	-1.20	7
	8	63.1	28.192	70.565	20.4043	2.5041	0.498	181.2	45.65	-1.17	8
	9	72.7	27.978	70.573	20.4364	2.5230	0.503	178.5	47.20	1.11	9
	10	82.8	27.755	70.582	20.4685	2.5619	0.509	172.1	49.95	0.97	10
	11	93.8	27.510	70.593	20.5006	2.6269	0.515	158.4	54.66	0.67	11
	12	100.0	27.374	70.603	20.5166	2.6721	0.519	146.2	58.24	-0.46	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	29.511	72.473	19.9513	2.6654	0.294	143.9	25.80	2.52	1
	2	4.5	29.414	72.465	19.9862	2.6231	0.293	147.8	23.30	-2.11	2
	3	12.8	29.236	72.442	20.0320	2.5654	0.305	153.1	19.61	-1.65	3
	4	23.3	29.009	72.413	20.0895	2.5232	0.313	158.6	16.37	-1.38	4
STATOR	5	33.5	28.789	72.398	20.1397	2.5033	0.320	162.9	14.36	1.26	5
9	6	43.5	28.574	72.392	20.1809	2.4951	0.325	166.0	13.46	-1.21	6
EXIT	7	53.4	28.361	72.382	20.2125	2.4944	0.329	167.9	13.41	1.18	7
	8	63.3	28.148	72.369	20.2300	2.5041	0.330	168.5	14.22	-1.14	8
	9	73.4	27.932	72.362	20.2353	2.5230	0.331	168.1	15.59	-1.07	9
	10	83.7	27.710	72.376	20.2319	2.5619	0.330	167.0	17.70	0.90	10
	11	94.4	27.479	72.414	20.2136	2.6269	0.327	164.2	21.18	0.48	11
	12	100.0	27.359	72.443	20.2008	2.6721	0.326	161.9	23.70	0.46	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	29.552	1.5045	0.5715	0.0880	0.7757	-1.50	15.04	1
	2	4.9	29.444	1.4617	0.5681	0.0829	0.7975	-1.60	14.45	2
	3	13.6	29.255	1.4026	0.5627	0.0741	0.8292	-1.82	13.05	3
	4	24.2	29.023	1.3582	0.5529	0.0640	0.8543	-2.09	11.27	4
STATOR	5	34.2	28.804	1.3436	0.5426	0.0569	0.8672	-2.31	9.76	5
9	6	43.9	28.591	1.3443	0.5348	0.0529	0.8741	-2.45	8.84	6
SL DATA	7	53.6	28.331	1.3450	0.5319	0.0522	0.8769	-2.50	8.81	7
	8	63.2	28.170	1.3433	0.5343	0.0559	0.8750	-2.39	9.54	8
	9	73.1	27.955	1.3489	0.5416	0.0633	0.8686	-2.20	10.92	9
	10	83.2	27.732	1.3796	0.5500	0.0729	0.8527	-1.95	12.68	10
	11	94.1	27.495	1.4555	0.5578	0.0864	0.8254	-1.66	14.61	11
	12	100.0	27.366	1.5188	0.5597	0.0940	0.8078	-1.50	15.56	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.552	2.3674	48.52	37.65	61.91	13.39	0.1148	42.00	0.0120
	29.444	2.2926	48.11	34.63	58.69	10.57	0.1080	42.00	0.0120
	29.255	2.1852	47.11	30.73	54.29	7.18	0.0959	42.00	0.0120
	29.023	2.0991	45.43	27.98	50.69	5.27	0.0814	42.00	0.0120
STATOR	28.804	2.0609	43.89	26.59	48.53	4.65	0.0704	42.00	0.0120
9	28.591	2.0466	43.06	26.10	47.63	4.57	0.0650	42.00	0.0120
PLANE	28.381	2.0325	42.98	26.10	47.59	4.61	0.0644	42.00	0.0120
SECTIONS	28.170	2.0150	43.60	26.44	48.24	4.64	0.0673	42.00	0.0120
	27.955	2.0078	45.09	27.17	49.72	4.62	0.0735	42.00	0.0120
	27.732	2.0370	47.49	28.60	52.34	4.85	0.0813	42.00	0.0120
	27.495	2.1308	50.55	31.55	56.83	6.28	0.0899	42.00	0.0120
	27.366	2.2132	52.21	33.95	60.06	7.84	0.0945	42.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

EEE CORE COMPRESSOR ROTOR 10 - 96 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	29.463	73.552	19.9513	2.6654	0.301	0.633	379.6	147.9	64.50	2.52	1
	2	4.5	29.369	73.547	19.9862	2.6231	0.306	0.649	378.4	151.7	64.25	2.83	2
	3	12.8	29.194	73.539	20.0320	2.5654	0.312	0.672	376.1	157.1	63.96	2.94	3
	4	23.4	28.971	73.528	20.0895	2.5232	0.321	0.691	373.2	163.0	63.48	2.63	4
ROTOR	5	33.6	28.757	73.515	20.1397	2.5033	0.328	0.701	370.5	167.5	62.99	2.12	5
10	6	43.6	28.548	73.502	20.1809	2.4951	0.334	0.704	367.8	170.7	62.50	1.55	6
INLET	7	53.4	28.340	73.490	20.2125	2.4944	0.338	0.701	365.1	172.6	62.03	0.99	7
	8	63.4	28.131	73.477	20.2300	2.5041	0.339	0.691	362.4	173.1	61.56	0.47	8
	9	73.4	27.920	73.466	20.2353	2.5230	0.339	0.677	359.7	172.6	61.12	0.01	9
	10	83.7	27.704	73.453	20.2319	2.5619	0.337	0.656	356.9	171.3	60.57	0.33	10
	11	94.4	27.479	73.440	20.2136	2.6269	0.335	0.624	354.0	168.4	59.89	0.45	11
	12	100.0	27.361	73.432	20.2008	2.6721	0.333	0.603	352.5	166.3	59.43	0.50	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	29.406	74.843	25.0952	2.8472	0.446	0.346	378.8	110.3	54.98	2.52	1
	2	5.4	29.297	74.838	25.1129	2.8012	0.448	0.376	377.4	125.0	52.83	2.74	2
	3	14.4	29.114	74.839	25.1306	2.7379	0.450	0.416	375.1	142.9	50.91	2.78	3
	4	25.0	28.899	74.848	25.1541	2.6906	0.453	0.449	372.3	156.6	49.71	2.45	4
ROTOR	5	34.8	28.700	74.857	25.1777	2.6674	0.455	0.467	369.7	164.9	48.91	1.95	5
10	6	44.2	28.508	74.870	25.2013	2.6572	0.457	0.474	367.3	169.5	48.21	1.39	6
EXIT	7	53.6	28.318	74.885	25.2248	2.6558	0.461	0.472	364.8	171.1	47.48	-0.86	7
	8	62.9	28.128	74.907	25.2484	2.6663	0.464	0.460	362.4	169.9	46.61	0.40	8
	9	72.6	27.932	74.936	25.2719	2.6874	0.469	0.441	359.9	166.6	45.57	-0.03	9
	10	82.7	27.727	74.972	25.2955	2.7301	0.473	0.412	357.2	160.2	44.27	0.20	10
	11	93.8	27.501	75.009	25.3190	2.8009	0.479	0.364	354.3	146.9	42.80	0.20	11
	12	100.0	27.375	75.025	25.3308	2.8496	0.482	0.329	352.7	135.1	42.22	0.50	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	29.435	1.2113	0.6221	0.0970	0.7766	-2.20	16.96	1
	2	4.9	29.333	1.2155	0.5825	0.0899	0.7978	-1.70	13.79	2
	3	13.6	29.154	1.2230	0.5312	0.0785	0.8286	-1.10	11.37	3
	4	24.2	28.935	1.2322	0.4926	0.0678	0.8533	-0.60	9.90	4
ROTOR	5	34.2	28.728	1.2411	0.4711	0.0604	0.8661	-0.27	9.15	5
10	6	43.9	28.528	1.2499	0.4613	0.0557	0.8732	-0.09	8.75	6
SL DATA	7	53.5	28.329	1.2586	0.4614	0.0553	0.8760	0	8.58	7
	8	63.2	28.130	1.2675	0.4718	0.0581	0.8740	-0.07	8.76	8
	9	73.0	27.926	1.2768	0.4905	0.0637	0.8675	0.23	9.20	9
	10	83.2	27.715	1.2865	0.5231	0.0724	0.8518	0.62	10.00	10
	11	94.1	27.490	1.2970	0.5814	0.0840	0.8254	1.35	11.40	11
	12	100.0	27.368	1.3028	0.6288	0.0910	0.8084	2.00	12.35	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.435	2.2860	29.17	55.49	66.48	37.32	0.0435	59.97	0.0110
	29.333	2.2860	27.39	55.52	65.80	38.41	0.0448	59.00	0.0112
	29.154	2.2860	25.36	55.30	64.84	39.48	0.0471	57.29	0.0115
	28.935	2.2860	24.11	54.69	63.92	39.82	0.0500	55.20	0.0120
ROTOR	28.728	2.2860	23.30	54.03	63.14	39.84	0.0525	53.23	0.0124
10	28.528	2.2860	22.92	53.28	62.52	39.60	0.0550	51.31	0.0127
PLANE	28.329	2.2860	22.39	52.40	62.00	39.01	0.0588	49.42	0.0131
SECTIONS	28.130	2.2860	23.70	51.33	61.63	37.93	0.0653	47.51	0.0135
	27.926	2.2860	25.02	49.99	61.37	36.35	0.0742	45.57	0.0139
	27.715	2.2860	27.08	48.39	61.22	34.14	0.0812	43.55	0.0143
	27.490	2.2860	29.96	46.63	61.26	31.30	0.0846	41.40	0.0147
	27.368	2.2860	31.66	45.81	61.44	29.78	0.0850	40.24	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (SI Units)

E³ CORE COMPRESSOR STATOR 10 140 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
	1	0.	29.358	75.974	25.0952	2.8472	0.453	118.0	61.99	0.44	1
	2	5.2	29.254	76.004	25.1129	2.8012	0.454	131.0	58.41	-1.34	2
	3	14.1	29.077	76.053	25.1306	2.7379	0.456	147.9	53.45	0.80	3
	4	24.7	28.867	76.112	25.1541	2.6906	0.458	161.3	49.33	0.49	4
STATOR	5	34.5	28.673	76.161	25.1777	2.6674	0.460	169.1	46.90	-0.40	5
10	6	43.9	28.485	76.195	25.2013	2.6572	0.463	173.2	45.76	-0.51	6
INLET	7	53.3	28.299	76.210	25.2248	2.6558	0.465	174.4	45.66	-0.68	7
	8	62.7	28.111	76.204	25.2484	2.6663	0.468	172.8	46.61	-0.80	8
	9	72.4	27.919	76.176	25.2719	2.6874	0.472	169.2	48.31	-0.87	9
	10	82.6	27.717	76.128	25.2955	2.7301	0.476	162.5	51.07	-0.82	10
	11	93.7	27.495	76.068	25.3190	2.8009	0.481	148.7	55.74	-0.56	11
	12	100.0	27.370	76.036	25.3308	2.8496	0.484	136.9	59.26	0.36	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
	1	0.	29.342	78.207	24.7401	2.8472	0.263	146.9	4.00	0.	1
	2	4.2	29.259	78.207	24.7704	2.8012	0.265	147.4	3.38	1.84	2
	3	12.2	29.101	78.207	24.8128	2.7379	0.269	147.8	2.34	1.93	3
	4	22.6	28.894	78.207	24.8655	2.6906	0.274	149.4	1.27	1.70	4
STATOR	5	32.8	28.691	78.207	24.9109	2.6674	0.278	151.2	0.53	1.17	5
10	6	42.9	28.490	78.207	24.9461	2.6572	0.282	152.7	0.11	0.78	6
EXIT	7	53.0	28.290	78.207	24.9700	2.6558	0.283	153.7	0.02	0.41	7
	8	63.1	28.089	78.207	24.9774	2.6663	0.283	154.0	0.32	-0.22	8
	9	73.3	27.886	78.207	24.9706	2.6874	0.282	154.0	0.93	0.75	9
	10	83.8	27.679	78.207	24.9543	2.7301	0.281	154.1	1.88	-1.15	10
	11	94.5	27.466	78.207	24.9232	2.8009	0.278	154.3	3.19	1.36	11
	12	100.0	27.357	78.207	24.9047	2.8496	0.276	154.6	4.00	-0.36	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	29.350	1.9253	0.6324	0.1110	0.7714	-3.00	12.93	1
	2	4.7	29.257	1.8781	0.6265	0.1063	0.7927	-2.03	11.06	2
	3	13.2	29.089	1.8056	0.6194	0.0977	0.8237	-0.83	8.84	3
	4	23.6	28.881	1.7358	0.6107	0.0877	0.8487	-0.06	6.68	4
STATOR	5	33.6	28.682	1.6882	0.6037	0.0803	0.8618	0.	5.42	5
10	6	43.4	28.488	1.6625	0.5997	0.0761	0.8690	0.	4.91	6
SL DATA	7	53.1	28.295	1.6611	0.5992	0.0751	0.8718	0.	4.90	7
	8	62.9	28.100	1.6872	0.6021	0.0788	0.8695	0.	5.37	8
	9	72.9	27.902	1.7389	0.6067	0.0864	0.8626	0.	6.49	9
	10	83.2	27.698	1.8173	0.6124	0.0962	0.8464	-0.48	8.34	10
	11	94.1	27.480	1.9300	0.6206	0.1097	0.8193	-1.83	10.98	11
	12	100.0	27.364	2.0016	0.6259	0.1170	0.8020	3.00	12.65	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.350	2.5360	73.54	28.45	64.47	9.07	0.0750	42.00	0.0120
	29.257	2.4659	68.34	26.67	60.31	8.03	0.0743	42.00	0.0120
	29.089	2.3572	61.12	23.75	54.44	-6.67	0.0730	42.00	0.0120
	28.881	2.2496	55.08	21.12	49.58	5.50	0.0715	42.00	0.0120
STATOR	28.682	2.1732	51.88	19.59	46.94	-4.94	0.0700	42.00	0.0120
10	28.488	2.1255	50.56	18.87	45.74	4.82	0.0685	42.00	0.0120
PLANE	28.295	2.1095	50.55	18.90	45.70	4.86	0.0671	42.00	0.0120
SECTIONS	28.100	2.1278	51.73	19.65	46.68	-5.04	0.0656	42.00	0.0120
	27.902	2.1773	54.11	20.86	48.57	-5.54	0.0641	42.00	0.0120
	27.698	2.2588	58.52	22.76	52.06	6.46	0.0626	42.00	0.0120
	27.480	2.3801	66.20	25.79	58.24	-7.96	0.0609	42.00	0.0120
	27.364	2.4582	71.28	27.85	62.58	-8.70	0.0601	42.00	0.0120

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

FEE CORE COMPRESSOR IGV - 32 VANES

IGV INLET

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
1	0.	14.256	-3.015	0.9799	0.9951	0.552	594.0	0.	6.22	1
2	5.3	13.863	-2.990	0.9919	0.9951	0.555	593.6	0.	-8.75	2
3	10.7	13.460	-2.965	0.9995	0.9951	0.551	588.5	0.	-9.17	3
4	18.2	12.902	-2.930	1.0041	0.9951	0.544	581.0	0.	-9.52	4
5	26.2	12.313	-2.893	1.0051	0.9951	0.535	571.1	0.	-9.66	5
6	34.6	11.687	-2.854	1.0049	0.9959	0.524	561.0	0.	9.58	6
7	43.6	11.016	-2.813	1.0049	0.9971	0.514	551.1	0	9.30	7
8	53.4	10.291	-2.769	1.0051	0.9996	0.502	540.4	0.	8.81	8
9	64.1	9.495	-2.722	1.0041	1.0031	0.485	525.4	0	-8.11	9
10	76.2	8.592	-2.671	0.9995	1.0081	0.458	499.1	0	-7.23	10
11	90.9	7.500	-2.612	0.9884	1.0151	0.410	450.5	0	-6.39	11
12	100.0	6.826	-2.576	0.9799	1.0201	0.372	411.2	0	6.54	12

IGV EXIT

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
1	0.	13.992	-0.574	0.9652	0.9951	0.536	558.4	15.00	-6.00	1
2	5.8	13.576	-0.600	0.9793	0.9951	0.559	581.4	14.55	-6.79	2
3	11.6	13.162	-0.624	0.9886	0.9951	0.574	596.6	14.06	-6.79	3
4	19.4	12.601	-0.652	0.9949	0.9951	0.582	606.9	13.36	-6.60	4
5	27.4	12.021	-0.681	0.9970	0.9951	0.583	609.8	12.63	-6.19	5
6	35.9	11.414	-0.711	0.9978	0.9959	0.579	608.7	11.88	-5.56	6
7	44.8	10.771	-0.744	0.9984	0.9971	0.572	604.5	11.03	-4.69	7
8	54.4	10.083	-0.780	0.9990	0.9996	0.560	596.7	10.03	-3.52	8
9	64.9	9.332	-0.820	0.9983	1.0031	0.542	581.9	8.79	1.94	9
10	76.6	8.485	-0.869	0.9939	1.0081	0.509	552.2	7.14	0.34	10
11	91.0	7.456	-0.930	0.9830	1.0151	0.444	487.0	4.38	4.09	11
12	100.0	6.806	-0.970	0.9745	1.0201	0.385	425.6	2.00	6.33	12

IGV SL DATA

SL	% IMM	R-BAR	SOL	DF	LOSS	SL
1	0.	14.124	0.8925	-0.1116	0.0800	1
2	5.5	13.720	0.9006	-0.1449	0.0672	2
3	11.1	13.311	0.9097	-0.1749	0.0580	3
4	18.8	12.751	0.9235	-0.1963	0.0504	4
5	26.8	12.167	0.9397	-0.2088	0.0453	5
6	35.2	11.551	0.9568	-0.2145	0.04[illegible]	6
7	44.2	10.894	0.9776	-0.2131	0.0393	7
8	53.9	10.187	1.0041	-0.2053	0.0384	8
9	64.5	9.413	1.0379	-0.1910	0.0387	9
10	76.4	8.538	1.0859	0.1693	0.0418	10
11	90.9	7.478	1.1595	-0.1156	0.0499	11
12	100.0	6.816	1.2126	-0.0499	0.0610	12

IGV PLANE SECTIONS

SECT. HT.	CHORD	STAGGER	CLO	TM/C	%C TM	TTE/C
14.124	2.4656	8.03	0.71	0.0850	35.00	0.0163
13.720	2.4180	8.69	0.77	0.0850	35.00	0.0163
13.311	2.3700	9.06	0.80	0.0850	35.00	0.0163
12.751	2.3042	9.03	0.79	0.0850	35.00	0.0163
12.167	2.2355	8.68	0.76	0.0850	35.00	0.0163
11.551	2.1629	8.16	0.71	0.0850	35.00	0.0163
10.894	2.0856	7.45	0.65	0.0850	35.00	0.0163
10.187	2.0025	6.71	0.57	0.0850	35.00	0.0163
9.413	1.9115	5.85	0.50	0.0850	35.00	0.0163
8.538	1.8086	4.68	0.39	0.0850	35.00	0.0163
7.478	1.6839	2.65	0.22	0.0850	35.00	0.0163
6.816	1.6060	1.01	0.08	0.0850	35.00	0.0163

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 1 - 28 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M REL	U	CZ	BETA	PHI	SL
ROTOR 1 INLET	1	0.	13.807	0.821	0.9653	0.9951	0.578	1.353	1482.4	598.2	65.76	-8.19	1
	2	5.9	13.409	0.766	0.9792	0.9951	0.600	1.328	1439.6	621.0	64.20	-7.77	2
	3	11.7	13.012	0.714	0.9886	0.9951	0.617	1.304	1397.0	639.7	62.77	-7.12	3
	4	19.6	12.477	0.646	0.9950	0.9951	0.631	1.270	1339.5	656.2	61.16	-6.15	4
	5	27.7	11.926	0.579	0.9970	0.9951	0.636	1.233	1280.4	664.8	59.76	-4.96	5
	6	36.1	11.352	0.507	0.9978	0.9959	0.636	1.191	1219.7	668.0	58.45	-3.48	6
	7	45.0	10.746	0.426	0.9984	0.9971	0.629	1.145	1153.7	664.2	57.28	-1.71	7
	8	54.6	10.096	0.333	0.9990	0.9996	0.613	1.091	1083.9	651.8	56.30	0.31	8
	9	65.0	9.383	0.228	0.9984	1.0031	0.586	1.027	1007.4	627.1	55.64	2.58	9
	10	76.9	8.575	0.124	0.9939	1.0081	0.547	0.952	920.6	589.1	55.34	5.39	10
	11	91.3	7.601	0.035	0.9830	1.0151	0.484	0.857	816.0	522.4	56.17	10.20	11
	12	100.0	7.006	-0.000	0.9745	1.0201	0.448	0.804	752.2	477.9	57.08	15.39	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M REL	U	CZ	BETA	PHI	SL
ROTOR 1 EXIT	1	0.	13.535	2.713	1.6882	1.2273	0.663	0.767	1453.1	430.9	61.65	8.19	1
	2	7.5	13.123	2.773	1.6929	1.1986	0.673	0.807	1408.9	496.2	58.22	-7.69	2
	3	14.3	12.743	2.839	1.6976	1.1835	0.677	0.811	1368.1	522.5	56.28	-6.51	3
	4	23.3	12.246	2.926	1.7039	1.1762	0.684	0.788	1314.8	538.5	53.79	-4.80	4
	5	32.4	11.746	3.014	1.7102	1.1737	0.694	0.756	1261.1	549.4	50.99	-3.07	5
	6	41.6	11.235	3.105	1.7165	1.1735	0.705	0.721	1206.2	559.4	47.76	-1.28	6
	7	51.1	10.711	3.200	1.7227	1.1745	0.718	0.687	1149.9	569.0	44.02	0.71	7
	8	60.9	10.168	3.298	1.7291	1.1775	0.732	0.652	1091.6	578.1	39.62	3.02	8
	9	71.2	9.603	3.402	1.7353	1.1826	0.750	0.620	1030.9	587.3	34.34	5.85	9
	10	82.0	9.006	3.505	1.7416	1.1918	0.774	0.588	966.9	594.6	27.54	9.30	10
	11	93.7	8.359	3.602	1.7479	1.2074	0.809	0.561	897.5	600.0	18.19	13.41	11
	12	100.0	8.009	3.643	1.7510	1.2190	0.835	0.554	859.8	604.3	11.90	15.39	12

	SL	% IMM	R-BAR	SDL	DF	LOSS	CUM EFF	INC	DEV	SL
ROTOR 1 SL DATA	1	0.	13.671	1.3195	0.5046	0.2318	0.6925	3.00	8.69	1
	2	6.6	13.266	1.3598	0.4535	0.1439	0.7950	3.20	4.20	2
	3	12.9	12.878	1.4008	0.4348	0.0951	0.8636	3.50	2.88	3
	4	21.2	12.362	1.4593	0.4368	0.0704	0.9053	3.80	2.81	4
	5	29.8	11.836	1.5241	0.4475	0.0589	0.9250	4.00	2.99	5
	6	38.6	11.293	1.5974	0.4601	0.0516	0.9378	4.20	3.49	6
	7	47.7	10.728	1.6815	0.4721	0.0469	0.9470	4.40	4.18	7
	8	57.4	10.132	1.7805	0.4823	0.0452	0.9531	4.60	4.90	8
	9	67.8	9.493	1.9003	0.4876	0.0465	0.9550	4.80	5.90	9
	10	79.2	8.790	2.0521	0.4890	0.0566	0.9440	4.70	6.91	10
	11	92.3	7.980	2.2606	0.4772	0.0862	0.9141	4.30	7.60	11
	12	100.0	7.507	2.4029	0.4606	0.1142	0.8911	4.00	7.80	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
ROTOR 1 PLANE SECTIONS	13.671	4.0457	9.66	62.71	63.38	53.72	0.0250	63.20	0.0044
	13.266	4.0393	7.17	60.85	61.54	54.37	0.0260	61.66	0.0046
	12.878	4.0385	4.67	59.01	59.82	55.15	0.0276	60.35	0.0048
	12.362	4.0403	4.42	56.40	57.95	53.54	0.0307	58.75	0.0050
	11.836	4.0396	5.94	53.68	56.42	50.48	0.0340	57.24	0.0054
	11.293	4.0397	8.38	50.73	55.04	46.67	0.0391	56.06	0.0059
	10.728	4.0396	12.08	47.38	53.85	41.77	0.0475	55.16	0.0064
	10.132	4.0394	17.22	43.49	52.87	35.65	0.0607	54.66	0.0070
	9.493	4.0389	24.67	38.86	52.06	27.39	0.0770	54.57	0.0079
	8.790	4.0383	35.88	33.58	51.54	15.66	0.0895	54.86	0.0096
	7.980	4.0052	53.24	27.14	51.70	-1.55	0.0948	55.51	0.0124
	7.507	3.9788	65.20	23.22	52.21	-12.99	0.0960	56.00	0.0141

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR STATOR 1 - 50 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	13.426	3.801	1.6882	1.2273	0.661	425.6	57.08	-4.31	1
	2	7.7	13.019	3.818	1.6929	1.1984	0.677	503.9	50.44	-3.14	2
	3	14.6	12.651	3.835	1.6976	1.1834	0.688	541.2	47.32	-2.06	3
	4	23.6	12.175	3.858	1.7039	1.1761	0.701	565.0	45.75	-0.72	4
STATOR	5	32.6	11.698	3.881	1.7102	1.1736	0.713	580.1	45.12	0.75	5
1	6	41.8	11.211	3.904	1.7165	1.1735	0.727	592.9	44.83	2.37	6
INLET	7	51.2	10.710	3.928	1.7228	1.1744	0.742	605.3	44.66	4.18	7
	8	61.0	10.192	3.953	1.7291	1.1776	0.759	617.1	44.69	6.20	8
	9	71.2	9.651	3.979	1.7353	1.1825	0.778	629.0	44.86	8.46	9
	10	82.0	9.079	4.007	1.7416	1.1918	0.802	638.0	45.58	11.03	10
	11	93.7	8.460	4.039	1.7479	1.2074	0.833	642.3	47.13	14.09	11
	12	100.0	8.126	4.058	1.7511	1.2190	0.855	643.0	48.32	15.96	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	13.308	5.366	1.6483	1.2273	0.450	493.9	24.90	4.31	1
	2	7.3	12.960	5.438	1.6560	1.1984	0.465	522.7	19.96	-2.52	2
	3	14.3	12.627	5.479	1.6640	1.1834	0.479	543.6	17.12	1.36	3
	4	23.4	12.191	5.513	1.6730	1.1761	0.495	563.8	15.45	0.06	4
STATOR	5	32.6	11.755	5.537	1.6794	1.1736	0.507	578.3	14.80	1.56	5
1	6	41.9	11.313	5.554	1.6850	1.1735	0.518	591.0	14.16	3.19	6
EXIT	7	51.3	10.861	5.564	1.6905	1.1744	0.528	602.0	13.51	4.94	7
	8	61.1	10.396	5.565	1.6950	1.1776	0.535	610.7	12.92	6.86	8
	9	71.3	9.911	5.559	1.6991	1.1825	0.542	617.3	12.47	8.96	9
	10	82.0	9.400	5.546	1.6994	1.1918	0.545	618.0	12.71	11.34	10
	11	93.6	8.844	5.524	1.6916	1.2074	0.541	607.3	14.31	13.95	11
	12	100.0	8.540	5.505	1.6846	1.2190	0.532	591.5	16.00	15.96	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	13.367	1.1062	0.5528	0.0930	0.6587	1.35	12.26	1
	2	7.5	12.989	1.1375	0.5313	0.0824	0.7600	0.15	9.67	2
	3	14.5	12.639	1.1700	0.5123	0.0730	0.8291	0.	7.62	3
	4	23.5	12.183	1.2130	0.4932	0.0649	0.8725	0.	6.08	4
STATOR	5	32.6	11.726	1.2579	0.4793	0.0626	0.8917	0.	5.73	5
1	6	41.8	11.262	1.3016	0.4709	0.0617	0.9033	0.	5.37	6
SL DATA	7	51.3	10.786	1.3466	0.4662	0.0611	0.9120	0.	5.00	7
	8	61.1	10.294	1.3911	0.4665	0.0620	0.9157	0.	4.76	8
	9	71.2	9.781	1.4366	0.4703	0.0633	0.9154	0.20	4.54	9
	10	82.0	9.239	1.4850	0.4806	0.0703	0.8993	0.50	5.23	10
	11	93.7	8.652	1.5379	0.5029	0.0881	0.8565	1.70	7.05	11
	12	100.0	8.333	1.5682	0.5235	0.1000	0.8250	2.60	8.29	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	13.367	1.8582	40.51	33.54	54.44	13.92	0.1128	50.00	0.0120
	12.989	1.8568	38.90	29.65	49.74	10.84	0.1070	50.00	0.0120
	12.639	1.8582	37.60	27.79	47.22	9.63	0.1014	50.00	0.0120
	12.183	1.8569	36.38	26.93	45.76	9.38	0.0945	50.00	0.0120
STATOR	11.726	1.8536	36.05	26.47	45.13	9.08	0.0881	50.00	0.0120
1	11.262	1.8423	35.99	26.17	44.81	8.81	0.0818	50.00	0.0120
PLANE	10.786	1.8252	36.07	25.97	44.59	8.52	0.0759	49.99	0.0120
SECTIONS	10.294	1.7995	36.30	26.10	44.53	8.23	0.0702	50.15	0.0120
	9.781	1.7659	36.61	26.29	44.50	7.90	0.0656	51.80	0.0123
	9.239	1.7242	36.96	26.55	44.56	7.61	0.0625	55.57	0.0131
	8.652	1.6720	36.48	27.45	44.81	8.33	0.0606	61.32	0.0142
	8.333	1.6422	35.77	28.25	45.03	9.26	0.0599	64.90	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 2 - 38 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	13.224	6.464	1.6481	1.2273	0.495	1.082	1419.8	548.6	65.17	-4.52	1
	2	7.1	12.905	6.439	1.6557	1.1986	0.506	1.108	1385.5	569.7	64.43	-3.85	2
	3	13.9	12.595	6.414	1.6635	1.1835	0.520	1.116	1352.2	589.8	63.47	-2.84	3
	4	22.9	12.186	6.380	1.6726	1.1762	0.536	1.106	1308.3	610.8	62.01	-1.23	4
ROTOR	5	32.0	11.775	6.348	1.6792	1.1737	0.548	1.085	1264.2	625.2	60.63	0.52	5
2	6	41.3	11.357	6.315	1.6848	1.1735	0.558	1.062	1219.3	637.1	59.25	2.38	6
INLET	7	50.8	10.928	6.281	1.6904	1.1745	0.567	1.038	1173.2	647.0	57.86	4.38	7
	8	60.6	10.484	6.239	1.6949	1.1775	0.573	1.011	1125.6	654.4	56.47	6.54	8
	9	70.8	10.020	6.187	1.6990	1.1826	0.577	0.980	1075.7	656.3	55.13	9.04	9
	10	81.7	9.527	6.133	1.6994	1.1918	0.572	0.937	1022.8	647.6	53.86	11.76	10
	11	93.6	8.991	6.100	1.6914	1.2074	0.556	0.872	965.3	625.0	52.48	14.21	11
	12	100.0	8.701	6.088	1.6842	1.2190	0.546	0.830	934.1	610.4	51.52	14.96	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	13.117	7.821	2.6498	1.4272	0.614	0.645	1408.2	396.5	61.40	-4.52	1
	2	8.5	12.793	7.845	2.6569	1.3894	0.623	0.695	1373.5	472.9	57.49	-4.12	2
	3	16.0	12.506	7.879	2.6641	1.3690	0.630	0.714	1342.6	510.2	55.36	2.83	3
	4	25.6	12.141	7.929	2.6735	1.3576	0.639	0.711	1303.5	534.8	53.02	-0.94	4
ROTOR	5	35.0	11.780	7.978	2.6831	1.3536	0.650	0.692	1264.8	547.0	50.65	0.94	5
2	6	44.5	11.418	8.029	2.6927	1.3528	0.663	0.672	1225.9	560.1	47.95	2.78	6
EXIT	7	54.1	11.054	8.082	2.7022	1.3534	0.678	0.655	1186.7	575.1	44.93	4.66	7
	8	63.7	10.686	8.136	2.7117	1.3571	0.695	0.637	1147.2	590.6	41.50	6.57	8
	9	73.5	10.311	8.188	2.7213	1.3632	0.714	0.621	1107.1	606.5	37.58	8.48	9
	10	83.6	9.927	8.242	2.7308	1.3756	0.738	0.596	1065.7	615.5	32.74	10.49	10
	11	94.3	9.519	8.302	2.7403	1.3975	0.768	0.556	1022.0	610.8	25.92	12.92	11
	12	100.0	9.301	8.334	2.7451	1.4135	0.785	0.526	998.5	595.0	21.37	14.96	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	13.170	1.2729	0.4989	0.1035	0.7380	2.00	10.51	1
	2	7.7	12.849	1.3000	0.4592	0.0834	0.8118	2.15	4.98	2
	3	14.9	12.550	1.3262	0.4430	0.0725	0.8591	2.30	4.00	3
	4	24.1	12.163	1.3625	0.4399	0.0634	0.8899	2.50	3.90	4
ROTOR	5	33.4	11.778	1.4010	0.4478	0.0603	0.9038	2.70	3.90	5
2	6	42.8	11.388	1.4422	0.4562	0.0592	0.9122	2.90	3.91	6
SL DATA	7	52.3	10.991	1.4874	0.4624	0.0581	0.9187	3.10	3.81	7
	8	62.0	10.585	1.5371	0.4685	0.0594	0.9216	3.30	3.80	8
	9	72.1	10.166	1.5904	0.4726	0.0624	0.9216	3.50	4.01	9
	10	82.6	9.727	1.6466	0.4816	0.0696	0.9111	3.70	4.42	10
	11	93.9	9.255	1.7068	0.5011	0.0832	0.8846	3.90	5.56	11
	12	100.0	9.001	1.7364	0.5204	0.0920	0.8654	4.00	7.21	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	13.170	2.7692	12.95	60.92	63.56	50.61	0.0260	64.09	0.0074
	12.849	2.7610	10.15	59.72	62.65	52.50	0.0291	61.30	0.0075
	12.550	2.7510	9.11	58.25	61.61	52.50	0.0321	59.24	0.0075
	12.163	2.7390	10.01	56.00	60.13	50.12	0.0360	57.05	0.0076
ROTOR	11.778	2.7272	11.21	53.66	58.65	47.45	0.0399	54.69	0.0077
2	11.388	2.7145	12.72	51.20	57.21	44.49	0.0437	52.24	0.0079
PLANE	10.991	2.7023	14.83	48.52	55.82	40.99	0.0475	50.36	0.0083
SECTIONS	10.585	2.6883	17.79	45.43	54.50	36.71	0.0512	49.39	0.0088
	10.166	2.6709	22.19	41.86	53.29	31.10	0.0551	49.20	0.0095
	9.727	2.6489	29.28	37.50	52.03	22.74	0.0633	49.53	0.0105
	9.255	2.6049	42.69	31.77	50.56	7.87	0.0786	49.93	0.0120
	9.001	2.5787	50.02	28.42	49.75	-0.27	0.0849	50.19	0.0128

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR STATOR 2 - 68 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	13.059	8.651	2.6498	1.4273	0.624	421.2	58.25	-3.77	1
	2	8.4	12.755	8.620	2.6569	1.3895	0.637	502.3	51.41	-1.88	2
	3	15.8	12.483	8.614	2.6641	1.3689	0.647	543.6	47.93	-0.72	3
	4	25.2	12.139	8.626	2.6736	1.3576	0.659	570.5	46.06	0.65	4
STATOR	5	34.6	11.797	8.645	2.6831	1.3535	0.672	584.6	45.56	2.04	5
2	6	44.0	11.454	8.664	2.6927	1.3527	0.685	598.2	45.23	3.52	6
INLET	7	53.5	11.107	8.681	2.7022	1.3534	0.699	612.0	44.94	5.05	7
	8	63.2	10.754	8.695	2.7117	1.3571	0.714	625.6	44.82	6.65	8
	9	73.1	10.393	8.709	2.7213	1.3631	0.731	638.2	44.91	8.32	9
	10	83.3	10.020	8.731	2.7308	1.3756	0.751	641.9	46.02	10.13	10
	11	94.2	9.623	8.766	2.7403	1.3976	0.773	628.2	48.84	12.19	11
	12	100.0	9.410	8.790	2.7451	1.4136	0.786	612.8	51.02	13.14	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	12.981	9.846	2.5967	1.4273	0.425	489.8	28.00	-3.77	1
	2	7.8	12.721	9.876	2.6089	1.3895	0.437	525.5	21.30	-2.30	2
	3	15.2	12.477	9.881	2.6209	1.3689	0.450	547.9	17.88	-1.20	3
	4	24.7	12.160	9.875	2.6341	1.3576	0.464	567.2	16.23	0.13	4
STATOR	5	34.2	11.846	9.865	2.6437	1.3535	0.475	580.2	15.87	1.49	5
2	6	43.7	11.530	9.855	2.6524	1.3527	0.485	591.5	15.79	2.91	6
EXIT	7	53.3	11.210	9.852	2.6607	1.3534	0.495	601.8	15.79	4.36	7
	8	63.1	10.887	9.857	2.6679	1.3571	0.504	611.7	15.78	5.83	8
	9	73.0	10.557	9.867	2.6742	1.3631	0.512	620.4	16.04	7.32	9
	10	83.2	10.217	9.872	2.6748	1.3756	0.518	623.3	17.42	8.90	10
	11	94.1	9.855	9.868	2.6662	1.3976	0.519	612.8	21.14	10.76	11
	12	100.0	9.660	9.860	2.6587	1.4136	0.514	592.5	24.30	13.14	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	13.020	1.2460	0.5182	0.0870	0.7204	-1.94	10.38	1
	2	8.1	12.738	1.2460	0.5114	0.0758	0.7943	-1.12	8.17	2
	3	15.5	12.480	1.2460	0.5008	0.0661	0.8429	-0.30	6.42	3
	4	25.0	12.149	1.2459	0.4896	0.0584	0.8745	0.04	5.03	4
STATOR	5	34.4	11.822	1.2458	0.4841	0.0564	0.8885	0.46	4.55	5
2	6	43.9	11.492	1.2497	0.4799	0.0555	0.8965	0.56	4.31	6
SL DATA	7	53.4	11.158	1.2665	0.4753	0.0552	0.9021	0.47	4.20	7
	8	63.1	10.820	1.2997	0.4712	0.0561	0.9042	0.50	3.77	8
	9	73.0	10.475	1.3431	0.4676	0.0578	0.9032	0.43	4.21	9
	10	83.3	10.118	1.3905	0.4690	0.0658	0.8894	0.25	4.87	10
	11	94.1	9.739	1.4447	0.4767	0.0829	0.8568	-0.16	6.51	11
	12	100.0	9.535	1.4755	0.4888	0.0940	0.8339	0.02	7.91	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	13.020	1.4981	39.4[illegible]	37.21	58.87	19.45	0.0958	50.00	0.0120
	12.738	1.4657	38.23	30.95	52.02	13.79	0.0958	50.00	0.0120
	12.480	1.4361	36.58	27.88	48.12	11.55	0.0958	50.00	0.0120
	12.149	1.3979	34.71	26.62	45.93	11.23	0.0955	50.00	0.0120
STATOR	11.822	1.3601	33.55	26.20	44.94	11.39	0.0943	50.00	0.0120
2	11.492	1.3265	32.86	26.05	44.45	11.59	0.0920	50.00	0.0120
PLANE	11.158	1.3053	32.35	26.06	44.19	11.84	0.0884	50.00	0.0120
SECTIONS	10.820	1.2987	31.87	26.17	44.02	12.14	0.0829	50.00	0.0120
	10.475	1.2991	31.65	26.45	43.98	12.33	0.0749	50.00	0.0120
	10.118	1.2996	30.71	27.99	44.64	13.93	0.0648	50.00	0.0120
	9.739	1.2995	29.34	31.51	46.81	17.46	0.0528	50.00	0.0120
	9.535	1.2995	28.57	34.05	48.50	19.93	0.0462	50.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 3-50 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
ROTOR 3 INLET	1	0.	12.926	10.585	2.5959	1.4272	0.462	0.959	1387.8	541.9	64.32	-4.84	1
	2	7.6	12.687	10.569	2.6081	1.3894	0.473	0.993	1362.1	566.5	63.66	-3.58	2
	3	14.8	12.458	10.552	2.6204	1.3690	0.485	1.015	1337.4	590.2	62.87	-2.25	3
	4	24.3	12.159	10.529	2.6337	1.3576	0.498	1.019	1305.4	610.2	61.83	-0.61	4
	5	33.7	11.862	10.509	2.6433	1.3536	0.508	1.004	1273.5	621.7	60.70	0.80	5
	6	43.2	11.562	10.493	2.6520	1.3528	0.518	0.986	1241.3	632.6	59.50	2.26	6
	7	52.7	11.259	10.477	2.6603	1.3534	0.527	0.968	1208.8	642.6	58.26	3.85	7
	8	62.5	10.951	10.462	2.6676	1.3571	0.535	0.948	1175.7	651.2	57.03	5.56	8
	9	72.5	10.634	10.442	2.6735	1.3632	0.541	0.924	1141.7	656.4	55.76	7.34	9
	10	82.9	10.305	10.417	2.6746	1.3756	0.541	0.885	1106.3	651.4	54.46	9.09	10
	11	94.1	9.953	10.393	2.6657	1.3975	0.533	0.819	1068.6	631.0	52.81	10.29	11
	12	100.0	9.766	10.386	2.6580	1.4135	0.527	0.774	1048.5	615.2	51.72	9.94	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
ROTOR 3 EXIT	1	0.	12.835	11.665	3.9301	1.6228	0.598	0.571	1378.0	408.7	58.52	-4.84	1
	2	8.7	12.591	11.675	3.9334	1.5761	0.604	0.629	1351.8	484.9	55.17	-4.95	2
	3	16.4	12.377	11.693	3.9427	1.5501	0.608	0.665	1328.8	532.2	53.26	-4.20	3
	4	25.9	12.110	11.720	3.9551	1.5348	0.614	0.676	1300.2	559.8	51.53	-2.62	4
	5	35.3	11.848	11.746	3.9677	1.5292	0.622	0.662	1272.1	567.2	49.81	-0.82	5
	6	44.7	11.586	11.773	3.9801	1.5277	0.633	0.646	1243.8	576.4	47.74	0.87	6
	7	54.2	11.321	11.801	3.9926	1.5283	0.646	0.631	1215.4	586.6	45.35	2.44	7
	8	63.7	11.054	11.831	4.0050	1.5325	0.660	0.616	1186.8	598.9	42.63	3.94	8
	9	73.4	10.785	11.864	4.0175	1.5395	0.677	0.600	1157.8	611.0	39.52	5.45	9
	10	83.3	10.507	11.899	4.0300	1.5551	0.697	0.568	1128.1	609.9	35.57	6.99	10
	11	94.0	10.208	11.941	4.0424	1.5836	0.722	0.502	1096.0	577.7	29.71	8.68	11
	12	100.0	10.041	11.957	4.0487	1.6042	0.735	0.452	1078.0	539.8	25.56	9.94	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
ROTOR 3 SL DATA	1	0.	12.881	1.2726	0.5142	0.0886	0.7544	1.00	13.97	1
	2	8.1	12.639	1.2901	0.4660	0.0738	0.8164	1.70	6.00	2
	3	15.6	12.417	1.3066	0.4384	0.0626	0.8569	2.10	3.80	3
	4	25.1	12.135	1.3287	0.4281	0.0550	0.8837	2.50	3.70	4
	5	34.4	11.855	1.3515	0.4344	0.0523	0.8956	2.70	3.59	5
	6	43.9	11.574	1.3756	0.4416	0.0507	0.9028	2.90	3.60	6
	7	53.4	11.290	1.4012	0.4494	0.0518	0.9073	3.10	3.59	7
	8	63.1	11.002	1.4284	0.4564	0.0533	0.9090	3.30	3.80	8
	9	72.9	10.710	1.4577	0.4625	0.0539	0.9086	3.50	4.00	9
	10	83.1	10.406	1.4896	0.4814	0.0606	0.8975	3.50	4.80	10
	11	94.0	10.081	1.5261	0.5302	0.0747	0.8712	3.30	6.38	11
	12	100.0	9.903	1.5470	0.5766	0.0858	0.8527	[illegible].00	7.96	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
ROTOR 3 PLANE SECTIONS	12.881	2.0564	20.18	58.46	63.46	43.28	0.0265	66.06	0.0081
	12.639	2.0490	13.88	57.53	62.11	48.24	0.0299	63.10	0.0082
	12.417	2.0391	10.92	56.26	61.00	50.08	0.0358	61.15	0.0082
	12.135	2.0260	11.02	54.30	59.67	48.65	0.0497	58.97	0.0082
	11.855	2.0135	11.73	52.38	58.41	46.68	0.0570	56.96	0.0084
	11.574	2.0007	12.65	50.46	57.14	44.49	0.0581	54.98	0.0085
	11.290	1.9878	14.11	48.44	55.83	41.72	0.0579	53.04	0.0087
	11.002	1.9747	16.10	46.25	54.53	38.43	0.0579	51.24	0.0091
	10.710	1.9614	19.08	43.70	53.28	34.19	0.0592	49.53	0.0096
	10.406	1.9477	24.44	40.54	52.14	27.70	0.0634	47.97	0.0104
	10.081	1.9148	34.24	36.13	51.01	16.77	0.0749	46.49	0.0117
	9.903	1.8827	40.67	33.35	50.30	9.63	0.0875	45.91	0.0126

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR STATOR 3-82 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
STATOR 3 INLET	1	0.	12.782	12.291	3.9240	1.6228	0.604	415.6	59.81	-4.84	1
	2	8.7	12.549	12.259	3.9333	1.5764	0.614	518.9	51.18	-2.94	2
	3	16.2	12.348	12.252	3.9427	1.5502	0.621	565.0	47.15	-2.01	3
	4	25.7	12.095	12.259	9552	1.5349	0.631	590.9	45.23	-0.97	4
	5	35.1	11.845	12.272	3.9676	1.5291	0.641	602.8	44.84	0.06	5
	6	44.4	11.595	12.285	3.9801	1.5277	0.653	612.5	44.81	1.14	6
	7	53.9	11.343	12.297	3.9926	1.5281	0.665	622.2	44.88	2.27	7
	8	63.4	11.088	12.307	4.0050	1.5324	0.678	632.6	45.02	3.46	8
	9	73.1	10.828	12.319	4.0175	1.5395	0.693	640.9	45.46	4.71	9
	10	83.2	10.560	12.336	4.0300	1.5550	0.708	635.9	47.24	6.09	10
	11	94.0	10.271	12.367	4.0425	1.5834	0.726	597.0	51.80	7.86	11
	12	100.0	10.111	12.391	4.0487	1.6042	0.736	558.6	55.39	8.88	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
STATOR 3 EXIT	1	0.	12.701	13.243	3.8549	1.6228	0.417	499.5	30.60	-4.84	1
	2	8.2	12.501	13.284	3.8726	1.5764	0.431	541.4	23.56	-3.25	2
	3	15.7	12.317	13.298	3.8880	1.5502	0.442	564.4	19.96	-2.42	3
	4	25.3	12.080	13.298	3.9058	1.5349	0.454	582.7	18.24	-1.49	4
	5	34.9	11.846	13.291	3.9196	1.5291	0.463	594.0	18.05	-0.55	5
	6	44.4	11.611	13.287	3.9313	1.5277	0.471	603.4	18.10	0.43	6
	7	54.0	11.376	13.288	3.9422	1.5281	0.478	612.2	18.10	1.45	7
	8	63.7	11.139	13.293	3.9521	1.5324	0.485	620.9	18.06	2.51	8
	9	73.5	10.898	13.300	3.9595	1.5395	0.490	628.4	18.13	3.60	9
	10	83.5	10.652	13.304	3.9591	1.5550	0.493	629.2	19.48	4.78	10
	11	94.2	10.390	13.290	3.9499	1.5834	0.493	612.4	24.22	6.37	11
	12	100.0	10.248	13.269	3.9412	1.6042	0.487	584.8	28.50	8.88	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
STATOR 3 SL DATA	1	0.	12.742	1.2640	0.4984	0.0810	0.7416	-1.71	9.20	1
	2	8.5	12.525	1.2640	0.4820	0.0691	0.8048	-1.13	7.53	2
	3	16.0	12.332	1.2640	0.4698	0.0607	0.8462	-0.65	6.08	3
	4	25.5	12.087	1.2640	0.4592	0.0532	0.8739	-0.30	4.68	4
	5	35.0	11.846	1.2634	0.4540	0.0502	0.8862	-0.10	4.45	5
	6	44.4	11.603	1.2667	0.4525	0.0494	0.8931	0.	4.50	6
	7	53.9	11.359	1.2809	0.4524	0.0493	0.8975	0.	4.52	7
	8	63.6	11.113	1.3047	0.4536	0.0500	0.8988	0.05	4.51	8
	9	73.3	10.863	1.3334	0.4578	0.0528	0.8970	0.	4.60	9
	10	83.3	10.606	1.3659	0.4669	0.0620	0.8838	-0.20	5.84	10
	11	94.1	10.330	1.4024	0.4790	0.0776	0.8541	-0.40	7.28	11
	12	100.0	10.179	1.4232	0.4921	0.0880	0.8331	-0.48	8.19	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
STATOR 3 PLANE SECTIONS	12.742	1.2335	34.46	39.86	59.05	24.59	0.0898	50.00	0.0120
	12.525	1.2125	33.44	32.38	51.06	17.63	0.0898	50.00	0.0120
	12.332	1.1938	33.00	28.87	47.33	14.34	0.0898	50.00	0.0120
	12.087	1.1701	31.74	27.50	45.33	13.60	0.0898	50.00	0.0120
	11.846	1.1463	31.20	27.23	44.80	13.60	0.0897	50.00	0.0120
	11.603	1.1257	31.07	27.17	44.67	13.60	0.0890	50.00	0.0120
	11.359	1.1144	31.12	27.19	44.72	13.60	0.0872	50.00	0.0120
	11.113	1.1104	31.17	27.26	44.77	13.60	0.0840	50.00	0.0120
	10.863	1.1094	31.53	27.53	45.09	13.56	0.0793	50.00	0.0120
	10.606	1.1095	31.85	28.97	46.47	14.62	0.0736	50.00	0.0120
	10.330	1.1096	29.65	33.73	49.83	20.18	0.0667	50.00	0.0120
	10.179	1.1096	27.89	37.86	52.91	25.02	0.0626	50.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 4 60 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M REL	U	CZ	BETA	PHI	SL
	1	0.	12.647	13.889	3.8544	1.6228	0.440	0.857	1357.8	535.5	63.30	4.84	1
	2	8.0	12.460	13.880	3.8717	1.5761	0.451	0.904	1337.7	568.3	62.67	-4.62	2
	3	15.5	12.284	13.871	3.8873	1.5501	0.463	0.928	1318.8	592.0	61.96	4.07	3
	4	25.2	12.056	13.855	3.9053	1.5348	0.477	0.934	1294.4	613.7	60.87	-3.08	4
ROTOR	5	34.8	11.832	13.839	3.9192	1.5292	0.488	0.926	1270.3	627.8	59.74	-1.94	5
4	6	44.3	11.608	13.823	3.9309	1.5277	0.497	0.913	1246.3	638.9	58.65	0.71	6
INLET	7	53.9	11.383	13.808	3.9419	1.5283	0.505	0.901	1222.1	648.6	57.60	0.55	7
	8	63.7	11.156	13.794	3.9518	1.5325	0.512	0.887	1197.7	657.5	56.55	1.83	8
	9	73.5	10.925	13.781	3.9594	1.5395	0.517	0.871	1173.0	664.3	55.51	3.07	9
	10	83.6	10.688	13.767	3.9590	1.5551	0.517	0.840	1147.5	661.8	54.39	4.30	10
	11	94.3	10.438	13.746	3.9496	1.5836	0.513	0.777	1120.6	641.3	52.78	5.33	11
	12	100.0	10.304	13.743	3.9406	1.6042	0.507	0.730	1106.3	618.0	51.93	5.31	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	12.572	14.768	5.5579	1.8133	0.584	0.501	1349.8	400.7	56.48	4.84	1
	2	9.1	12.377	14.770	5.5700	1.7591	0.588	0.574	1328.9	494.5	52.79	-5.06	2
	3	16.8	12.210	14.778	5.5821	1.7276	0.591	0.610	1310.9	538.8	51.29	4.08	3
	4	26.5	12.002	14.797	5.5983	1.7082	0.597	0.622	1288.5	565.2	49.75	-2.60	4
ROTOR	5	36.0	11.798	14.821	5.6144	1.7007	0.606	0.616	1266.7	576.2	48.12	-1.25	5
4	6	45.4	11.595	14.845	5.6306	1.6985	0.616	0.605	1244.9	585.4	46.27	0.05	6
EXIT	7	54.9	11.392	14.870	5.6467	1.6989	0.627	0.596	1223.1	596.7	44.22	1.09	7
	8	64.3	11.189	14.895	5.6629	1.7037	0.640	0.586	1201.2	609.3	41.92	2.23	8
	9	73.8	10.985	14.921	5.6790	1.7122	0.654	0.575	1179.3	621.8	39.33	3.37	9
	10	83.5	10.776	14.950	5.6952	1.7315	0.670	0.547	1156.9	619.8	36.03	4.46	10
	11	94.0	10.551	14.992	5.7114	1.7662	0.689	0.475	1132.8	572.7	31.18	5.34	11
	12	100.0	10.422	15.005	5.7194	1.7915	0.699	0.413	1118.9	519.0	27.67	5.31	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	12.610	1.1912	0.5488	0.0814	0.7614	0	17.61	1
	2	8.5	12.419	1.2095	0.4846	0.0685	0.8177	0.20	12.53	2
	3	16.1	12.247	1.2265	0.4544	0.0577	0.8548	0.30	8.82	3
	4	25.8	12.029	1.2488	0.4413	0.0486	0.8804	0.60	6.00	4
ROTOR	5	*35.4*	*11.815*	*1.2714*	*0.4425*	*0.0444*	*0.8918*	*0.80*	*4.67*	5
4	6	44.9	11.602	1.2945	0.4473	0.0434	0.8982	1.00	4.11	6
SL DATA	7	54.4	11.388	1.3180	0.4509	0.0430	0.9021	1.20	3.78	7
	8	64.0	11.172	1.3415	0.4548	0.0439	0.9032	1.40	3.50	8
	9	73.6	10.955	1.3646	0.4599	0.0472	0.9016	1.50	3.28	9
	10	83.6	10.732	1.3869	0.4791	0.0534	0.8895	1.40	3.46	10
	11	94.1	10.495	1.4085	0.5401	0.0644	0.8636	0.70	4.47	11
	12	100.0	10.363	1.4193	0.6025	0.0754	0.8453	0.	9.15	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	12.610	1.5756	22.84	57.53	63.72	40.87	0.0334	59.10	0.0111
	12.419	1.5721	18.06	56.14	62.64	44.58	0.0374	57.16	0.0114
	12.247	1.5721	15.59	54.91	61.55	45.96	0.0413	55.43	0.0117
	12.029	1.5722	15.19	53.22	60.02	44.83	0.0454	53.16	0.0121
ROTOR	11.815	1.5721	15.18	51.53	58.51	43.33	0.0497	50.97	0.0125
4	11.602	1.5718	15.49	49.80	57.10	41.61	0.0542	48.83	0.0127
PLANE	11.388	1.5709	16.11	47.99	55.75	39.64	0.0589	46.73	0.0130
SECTIONS	11.172	1.5687	17.11	46.08	54.41	37.30	0.0635	44.75	0.0132
	10.955	1.5646	19.07	43.98	53.15	34.08	0.0677	42.94	0.0135
	10.732	1.5580	22.53	41.47	51.90	29.37	0.0717	41.02	0.0139
	10.495	1.5467	27.93	37.74	50.32	22.39	0.0767	39.08	0.0145
	10.363	1.5429	30.94	35.21	49.34	18.40	0.0792	38.03	0.0147

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR STATOR 4 - 92 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	12.525	15.333	5.5579	1.8133	0.595	418.6	60.88	-4.84	1
	2	9.0	12.340	15.304	5.5700	1.7593	0.603	526.9	52.16	-3.25	2
	3	16.6	12.183	15.295	5.5821	1.7278	0.609	576.0	47.94	-2.55	3
	4	26.1	11.986	15.298	5.5983	1.7081	0.617	603.2	45.82	-1.83	4
STATOR	5	35.5	11.793	15.305	5.6144	1.7005	0.625	612.9	45.51	-1.13	5
4	6	44.9	11.600	15.315	5.6306	1.6984	0.634	620.2	45.55	-0.36	6
INLET	7	54.3	11.405	15.324	5.6467	1.6988	0.644	628.9	45.57	0.46	7
	8	63.8	11.210	15.329	5.6629	1.7037	0.654	638.4	45.64	1.33	8
	9	73.4	11.012	15.337	5.6791	1.7122	0.666	647.0	45.88	2.24	9
	10	83.2	10.809	15.348	5.6952	1.7314	0.678	639.9	47.65	3.24	10
	11	93.9	10.588	15.378	5.7114	1.7661	0.691	585.0	53.19	4.74	11
	12	100.0	10.463	15.405	5.7195	1.7914	0.699	527.1	57.95	5.91	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	12.456	16.142	5.4698	1.8133	0.398	497.9	31.60	-4.84	1
	2	8.4	12.296	16.180	5.4955	1.7593	0.411	540.1	24.81	-3.50	2
	3	16.1	12.148	16.194	5.5159	1.7278	0.421	563.0	21.30	-2.90	3
	4	25.9	11.960	16.195	5.5391	1.7081	0.432	581.4	19.42	-2.28	4
STATOR	5	35.5	11.776	16.190	5.5573	1.7005	0.441	593.0	19.08	-1.65	5
4	6	45.1	11.592	16.187	5.5729	1.6984	0.448	602.4	19.09	-0.98	6
EXIT	7	54.7	11.408	16.188	5.5875	1.6988	0.455	611.4	19.10	-0.27	7
	8	64.4	11.224	16.191	5.6003	1.7037	0.462	620.5	19.06	0.48	8
	9	74.1	11.038	16.197	5.6084	1.7122	0.466	627.7	19.22	1.22	9
	10	83.9	10.849	16.199	5.6079	1.7314	0.469	629.6	20.47	2.03	10
	11	94.4	10.649	16.184	5.5989	1.7661	0.470	615.0	24.97	3.27	11
	12	100.0	10.541	16.163	5.5895	1.7914	0.464	586.2	29.50	5.91	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	12.490	1.2480	0.5276	0.0750	0.7525	-1.97	9.56	1
	2	8.7	12.318	1.2480	0.5068	0.0618	0.8095	-1.48	8.06	2
	3	16.3	12.165	1.2480	0.4924	0.0538	0.8472	-0.83	6.44	3
	4	26.0	11.973	1.2480	0.4802	0.0469	0.8736	-0.75	5.08	4
STATOR	5	35.5	11.784	1.2477	0.4745	0.0441	0.8853	-0.61	4.66	5
4	6	45.0	11.596	1.2497	0.4718	0.0434	0.8915	-0.50	4.66	6
SL DATA	7	54.5	11.407	1.2599	0.4696	0.0433	0.8954	-0.50	4.62	7
	8	64.1	11.217	1.2789	0.4685	0.0444	0.8960	-0.50	4.49	8
	9	73.7	11.025	1.3015	0.4698	0.0486	0.8933	-0.48	4.60	9
	10	83.6	10.829	1.3252	0.4773	0.0582	0.8797	-0.44	5.13	10
	11	94.1	10.619	1.3517	0.4913	0.0724	0.8513	-1.49	6.79	11
	12	100.0	10.502	1.3664	0.5063	0.0820	0.8314	-2.64	8.15	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	12.490	1.0640	35.04	40.91	60.39	25.35	0.0998	50.00	0.0120
	12.318	1.0494	33.74	33.39	52.23	18.49	0.0970	50.00	0.0120
	12.165	1.0364	32.80	29.89	48.25	15.45	0.0944	50.00	0.0120
	11.973	1.0200	31.95	28.41	46.35	14.40	0.0911	50.00	0.0120
STATOR	11.784	1.0037	31.54	28.22	45.96	14.42	0.0880	50.00	0.0120
4	11.596	0.9892	31.47	28.20	45.90	14.43	0.0849	50.00	0.0120
PLANE	11.407	0.9810	31.40	28.23	45.90	14.50	0.0817	50.00	0.0120
SECTIONS	11.217	0.9793	31.34	28.30	45.94	14.60	0.0785	50.00	0.0120
	11.025	0.9796	31.38	28.42	46.08	14.70	0.0755	50.00	0.0120
	10.829	0.9796	31.60	29.66	47.43	15.83	0.0722	50.00	0.0120
	10.619	0.9797	32.00	34.45	52.42	20.42	0.0686	50.00	0.0120
	10.502	0.9796	32.20	39.53	57.59	25.39	0.0666	50.00	0.0120

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 5 - 70 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	12.407	16.724	5.4698	1.8133	0.417	0.784	1332.0	528.3	62.72	4.84	1
	2	8.1	12.257	16.711	5.4955	1.7593	0.428	0.833	1315.9	564.4	62.08	-5.00	2
	3	15.8	12.117	16.700	5.5159	1.7278	0.438	0.858	1300.8	587.4	61.48	-4.45	3
	4	25.6	11.936	16.685	5.5391	1.7081	0.450	0.867	1281.4	607.4	60.56	-3.51	4
ROTOR 5 INLET	5	35.3	11.758	16.671	5.5573	1.7005	0.460	0.862	1262.4	620.1	59.60	-2.55	5
	6	44.9	11.581	16.659	5.5729	1.6984	0.468	0.853	1243.4	629.9	58.67	-1.63	6
	7	54.5	11.404	16.647	5.5875	1.6988	0.474	0.844	1224.3	638.6	57.76	-0.74	7
	8	64.2	11.226	16.635	5.6003	1.7037	0.480	0.833	1205.2	646.6	56.88	0.13	8
	9	74.0	11.046	16.625	5.6084	1.7122	0.483	0.819	1185.9	651.9	56.02	0.98	9
	10	84.0	10.862	16.615	5.6079	1.7314	0.484	0.794	1166.1	651.0	55.05	1.76	10
	11	94.5	10.669	16.603	5.5989	1.7661	0.484	0.741	1145.4	637.3	53.45	2.41	11
	12	100.0	10.567	16.597	5.5895	1.7914	0.483	0.698	1134.5	620.4	52.33	1.69	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	12.343	17.475	7.5998	2.0011	0.561	0.444	1325.2	378.7	55.90	-4.84	1
	2	9.4	12.179	17.483	7.6157	1.9392	0.568	0.525	1307.6	492.3	51.24	-4.89	2
	3	17.2	12.043	17.491	7.6315	1.9024	0.573	0.565	1293.0	542.3	49.66	-4.39	3
	4	26.8	11.876	17.504	7.6527	1.8785	0.579	0.582	1275.0	570.7	48.30	-3.54	4
ROTOR 5 EXIT	5	36.1	11.713	17.519	7.6738	1.8691	0.585	0.579	1257.5	580.8	46.97	-2.70	5
	6	45.4	11.550	17.535	7.6950	1.8665	0.593	0.570	1240.0	587.4	45.47	-1.90	6
	7	54.8	11.388	17.553	7.7161	1.8667	0.601	0.562	1222.6	595.0	43.81	-1.13	7
	8	64.1	11.224	17.571	7.7373	1.8724	0.611	0.553	1205.1	603.8	41.94	-0.38	8
	9	73.5	11.060	17.592	7.7584	1.8826	0.620	0.541	1187.4	610.5	39.83	0.35	9
	10	83.2	10.891	17.615	7.7796	1.9056	0.631	0.512	1169.3	602.8	37.18	1.06	10
	11	93.8	10.706	17.643	7.8007	1.9467	0.644	0.438	1149.4	544.6	33.43	1.73	11
	12	100.0	10.598	17.663	7.8113	1.9764	0.650	0.368	1137.8	473.8	30.97	1.69	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	12.375	1.2153	0.5764	0.0830	0.7648	0.09	14.17	1
	2	8.8	12.218	1.2310	0.4957	0.0679	0.8173	0.27	8.78	2
	3	16.5	12.080	1.2450	0.4594	0.0573	0.8524	0.37	6.81	3
	4	26.2	11.906	1.2631	0.4420	0.0480	0.8776	0.42	5.64	4
ROTOR 5 SL DATA	5	35.7	11.735	1.2816	0.4416	0.0444	0.8888	0.44	5.12	5
	6	45.2	11.566	1.3004	0.4459	0.0433	0.8946	0.46	4.90	6
	7	54.6	11.396	1.3199	0.4502	0.0433	0.8982	0.54	4.88	7
	8	64.2	11.225	1.3399	0.4553	0.0446	0.8987	0.55	4.81	8
	9	73.8	11.053	1.3590	0.4635	0.0473	0.8960	0.51	5.10	9
	10	83.6	10.876	1.3747	0.4874	0.0533	0.8834	0.39	5.81	10
	11	94.1	10.687	1.3871	0.5604	0.0649	0.8575	-0.05	7.10	11
	12	100.0	10.582	1.3921	0.6411	0.0750	0.8394	-0.51	8.05	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	12.375	1.3494	20.67	56.10	62.45	41.76	0.0340	59.97	0.0110
	12.218	1.3494	19.07	55.03	61.58	42.5[illegible]	0.0371	58.27	0.0114
	12.080	1.3494	17.97	54.06	60.84	42.87	0.0397	56.70	0.0117
	11.906	1.3494	17.20	52.66	59.90	42.70	0.0430	54.77	0.0121
ROTOR 5 PLANE SECTIONS	11.735	1.3493	17.05	51.11	58.95	41.90	0.0470	52.85	0.0124
	11.566	1.3493	17.40	49.56	58.05	40.65	0.0509	50.95	0.0128
	11.396	1.3492	18.12	47.86	57.12	39.01	0.0552	49.12	0.0132
	11.225	1.3491	19.10	46.0[illegible]	56.30	37.20	0.0604	47.20	0.0136
	11.053	1.3472	20.75	44.08	55.55	34.80	0.0661	45.28	0.0139
	10.876	1.3409	23.42	41.71	54.80	31.38	0.0722	43.26	0.0143
	10.687	1.3294	27.46	38.41	53.75	26.28	0.0777	41.30	0.0148
	10.582	1.3209	30.07	36.27	52.98	22.91	0.0799	40.08	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR STATOR 5 - 110 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	12.301	17.971	7.5998	2.0011	0.570	401.0	62.45	-4.84	1
	2	9.2	12.146	17.941	7.6157	1.9392	0.577	511.5	53.70	3.52	2
	3	16.9	12.016	17.930	7.6315	1.9024	0.582	561.8	49.42	-3.04	3
	4	26.5	11.853	17.928	7.6527	1.8785	0.589	590.8	47.09	-2.59	4
STATOR	5	35.9	11.695	17.932	7.6738	1.8691	0.596	601.1	46.63	2.15	5
5	6	45.2	11.538	17.937	7.6950	1.8665	0.603	607.7	46.65	1.67	6
INLET	7	54.6	11.380	17.940	7.7161	1.8667	0.612	614.9	46.69	-1.17	7
	8	64.0	11.221	17.944	7.7373	1.8724	0.620	623.2	46.76	-0.63	8
	9	73.4	11.061	17.949	7.7584	1.8826	0.630	629.1	47.[illegible]4	-0.10	9
	10	83.2	10.896	17.957	7.7796	1.9056	0.640	620.9	48.90	0.50	10
	11	93.9	10.716	17.980	7.8007	1.9467	0.652	565.2	54.39	1.45	11
	12	100.0	10.612	18.003	7.8113	1.9764	0.659	498.7	59.67	2.4[illegible]	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	12.240	18.703	7.4883	2.0011	0.365	480.2	31.70	4.84	1
	2	8.5	12.104	18.731	7.5216	1.9392	0.378	519.0	25.48	-3.57	2
	3	16.2	11.980	18.739	7.5480	1.9024	0.387	541.3	21.97	2.98	3
	4	26.1	11.823	18.740	7.5783	1.8785	0.397	559.8	19.76	-2.51	4
STATOR	5	35.7	11.669	18.737	7.6021	1.8691	0.405	570.9	19.19	-2.10	5
5	6	45.3	11.516	18.734	7.6228	1.8665	0.411	579.0	19.19	1.67	6
EXIT	7	54.9	11.363	18.735	7.6421	1.8667	0.416	586.5	19.20	-1.20	7
	8	64.5	11.210	18.737	7.6593	1.8724	0.421	593.7	19.14	-0.72	8
	9	74.1	11.055	18.738	7.6707	1.8826	0.423	597.9	19.43	0.21	9
	10	84.0	10.898	18.735	7.6715	1.9056	0.423	595.2	20.99	0.37	10
	11	94.4	10.731	18.716	7.6617	1.9467	0.420	577.2	25.45	1.36	11
	12	100.0	10.642	18.695	7.6508	1.9764	0.416	554.8	29.60	2.48	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	12.270	1.3769	0.5465	0.0750	0.7575	-1.52	13.81	1
	2	8.8	12.125	1.3770	0.5233	0.0617	0.8108	-0.70	11.76	2
	3	16.6	11.998	1.3770	0.5082	0.0538	0.8464	-0.35	9.72	3
	4	26.3	11.838	1.3769	0.4964	0.0468	0.8720	-0.12	8.27	4
STATOR	5	35.8	11.682	1.3770	0.4911	0.0441	0.8834	0.	7.84	5
5	6	45.3	11.527	1.3818	0.4883	0.0433	0.8892	-0.01	8.12	6
SL DATA	7	54.7	11.371	1.3953	0.4865	0.0433	0.8926	0.	8.31	7
	8	64.2	11.215	1.4121	0.4871	0.0444	0.8928	-0.19	8.42	8
	9	73.8	11.058	1.4312	0.4911	0.0486	0.8895	-0.60	8.82	9
	10	83.6	10.897	1.4524	0.5012	0.0581	0.8755	-1.10	9.68	10
	11	94.1	10.723	1.4758	0.5207	0.0724	0.8476	-1.70	10.63	11
	12	100.0	10.627	1.4892	0.5356	0.0820	0.8283	-1.99	11.40	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	12.270	0.9651	40.18	40.99	61.08	20.90	0.0999	42.00	0.0120
	12.125	0.9537	37.67	34.03	52.86	15.19	0.1000	42.00	0.0120
	11.998	0.9437	36.44	30.94	49.16	12.73	0.0999	42.00	0.0120
	11.838	0.9311	35.39	29.30	46.99	11.60	0.1000	42.00	0.0120
STATOR	11.682	0.9189	35.23	28.96	46.58	11.35	0.0997	42.00	0.0120
5	11.527	0.9098	35.56	28.83	46.61	11.05	0.0988	42.00	0.0120
PLANE	11.371	0.9063	35.79	28.74	46.64	10.85	0.0970	42.00	0.0120
SECTIONS	11.215	0.9047	36.22	28.79	46.91	10.68	0.0932	42.00	0.0120
	11.058	0.9040	37.10	29.14	47.69	10.59	0.0878	42.00	0.0120
	10.897	0.9040	38.47	30.63	49.87	11.40	0.0813	42.00	0.0120
	10.723	0.9040	39.89	35.5[illegible]	55.50	15.61	0.0743	42.00	0.0120
	10.627	0.9040	40.76	40.03	60.47	19.71	0.0703	42.00	0.0120

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 6 · 80 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	M REL	U	CZ	BETA	PHI	SL
	1	0	12.145	19.513	7.4947	1.9883	0.399	0.748	1303.9	542.0	61.92	4.09	1
	2	6.7	12.046	19.505	7.5216	1.9392	0.407	0.781	1293.3	564.4	61.62	4.71	2
	3	14.[illegible]	11.931	19.497	7.5480	1.9024	0.414	0.805	1280.9	582.5	61.25	-4.36	3
	4	24.6	11.783	19.486	7.5783	1.8785	0.424	0.816	1265.0	599.4	60.59	3.59	4
ROTOR	5	34.4	11.637	19.475	7.6021	1.8691	0.431	0.815	1249.4	610.1	59.84	2.76	5
6	6	44.2	11.493	19.467	7.6228	1.8665	0.437	0.808	1233.9	618.2	59.08	1.96	6
INLET	7	54.0	11.348	19.459	7.6421	1.8667	0.442	0.800	1218.3	625.5	58.33	-1.19	7
	8	63.8	11.203	19.451	7.6593	1.8724	0.446	0.792	1202.7	632.5	57.60	-0.43	8
	9	73.7	11.056	19.442	7.6707	1.8826	0.449	0.780	1187.0	636.8	56.88	0.31	9
	10	83.9	10.907	19.436	7.6715	1.9056	0.449	0.756	1171.0	635.2	56.03	1.03	10
	11	94.4	10.751	19.431	7.6617	1.9467	0.448	0.710	1154.2	622.7	54.72	1.55	11
	12	100.0	10.668	19.428	7.65[illegible]8	1.9764	0.447	0.673	1145.4	607.2	53.84	1.23	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	M REL	U	CZ	BETA	PHI	SL
	1	0.	12.099	20.158	9.8070	2.1550	0.518	0.457	1299.0	417.9	54.78	4.09	1
	2	7.6	11.992	20.161	9.8250	2.1001	0.524	0.512	1287.4	490.7	52.18	-4.10	2
	3	15.7	11.878	20.165	9.8430	2.0581	0.528	0.549	1275.2	537.2	50.84	-3.77	3
	4	25.6	11.737	20.173	9.8671	2.0298	0.533	0.571	1260.1	567.5	49.71	3.12	4
ROTOR	5	35.2	11.602	20.184	9.8911	2.0194	0.538	0.572	1245.6	579.4	48.65	2.41	5
6	6	44.8	11.467	20.195	9.9151	2.0151	0.544	0.566	1231.1	585.7	47.48	1.71	6
EXIT	7	54.3	11.333	20.207	9.9391	2.0152	0.550	0.559	1216.7	592.5	46.20	-1.02	7
	8	63.8	11.198	20.222	9.9631	2.0214	0.557	0.552	1202.2	600.7	44.75	0.35	8
	9	73.4	11.063	20.238	9.9871	2.0332	0.565	0.540	1187.7	605.5	43.12	0.32	9
	10	83.2	10.924	20.256	10.0111	2.0598	0.573	0.512	1172.8	596.0	41.07	0.97	10
	11	93.9	10.773	20.274	10.0351	2.1068	0.582	0.448	1156.6	547.1	38.38	1.57	11
	12	100.0	10.687	20.286	10.0471	2.1408	0.587	0.390	1147.3	489.7	36.86	1.23	12

	SL	% IMM	R BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	12.122	1.2078	0.5204	0.0820	0.7737	1.43	13.82	1
	2	7.2	12.019	1.2182	0.4658	0.0704	0.8142	-1.00	10.15	2
	3	15.1	11.904	1.2300	0.4297	0.0593	0.8482	0.64	8.11	3
	4	25.1	11.760	1.2451	0.4083	0.0489	0.8733	0.32	6.84	4
ROTOR	5	34.8	11.620	1.2602	0.4042	0.0445	0.8845	-0.18	6.19	5
6	6	44.5	11.480	1.2754	0.4065	0.0433	0.8902	0.11	5.79	6
SL DATA	7	54.1	11.340	1.2912	0.4094	0.0432	0.8935	0.07	5.68	
	8	63.8	11.200	1.3073	0.4132	0.0445	0.8936	-0.08	5.74	8
	9	73.6	11.059	1.3228	0.4213	0.0473	0.8902	0.03	6.04	9
	10	83.6	10.915	1.3320	0.4453	0.0533	0.8769	0.01	6.62	10
	11	94.2	10.762	1.3394	0.5085	0.0651	0.8505	0.32	7.54	11
	12	100.0	10.678	1.3473	0.5735	0.0750	0.8323	0.67	8.59	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	12.122	1.1494	22.76	55.77	63.14	40.37	0.0359	59.98	0.0110
	12.019	1.1494	20.93	55.13	62.43	41.50	0.0391	58.55	0.0113
	11.904	1.1494	19.23	54.40	61.67	42.44	0.0424	57.03	0.0116
	11.760	1.1494	17.82	53.26	60.71	42.90	0.0467	55.00	0.0120
ROTOR	11.620	1.1494	17.24	51.98	59.85	42.61	0.0512	53.06	0.0123
6	11.480	1.1494	17.17	50.72	59.05	41.88	0.0555	51.13	0.0127
PLANE	11.340	1.1493	17.60	49.37	58.30	40.71	0.0596	49.21	0.0132
SECTIONS	11.200	1.1493	18.52	47.84	57.62	39.11	0.0639	47.28	0.0135
	11.059	1.1482	19.85	46.09	56.90	37.06	0.0681	45.25	0.0139
	10.915	1.1410	21.90	44.04	56.10	34.20	0.0726	43.31	0.0143
	10.762	1.1313	24.74	41.67	55.13	30.39	0.0773	41.15	0.0148
	10.678	1.1289	25.60	40.31	54.55	27.94	0.0797	40.06	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

FEE CORE COMPRESSOR STATOR 6 · 120 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	12.066	20.618	9.8070	2.1550	0.527	440.0	58.18	-4.09	1
	2	7.5	11.964	20.600	9.8250	2.1001	0.532	510.3	52.16	3.26	2
	3	15.5	11.854	20.591	9.8430	2.0581	0.537	556.7	47.93	2.73	3
	4	25.5	11.719	20.588	9.8671	2.0298	0.543	587.7	45.19	2.25	4
STATOR	5	35.1	11.587	20.591	9.8911	2.0184	0.549	600.2	44.41	1.83	5
6	6	44.7	11.457	20.595	9.9151	2.0151	0.555	606.9	44.33	1.37	6
INLET	7	54.2	11.326	20.598	9.9391	2.0152	0.561	612.8	44.31	-0.89	7
	8	63.8	11.196	20.601	9.9631	2.0214	0.568	621.7	44.31	-0.41	8
	9	73.4	11.064	20.605	9.9871	2.0332	0.575	626.1	44.75	0.11	9
	10	83.3	10.929	20.612	10.0111	2.0598	0.582	616.6	46.65	0.68	10
	11	94.0	10.783	20.631	10.0351	2.1068	0.591	570.9	51.69	1.58	11
	12	100.0	10.701	20.649	10.0471	2.1408	0.597	518.2	56.37	2.43	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	12.016	21.322	9.6820	2.1550	0.361	506.7	28.90	4.09	1
	2	7.0	11.926	21.335	9.7165	2.1001	0.370	534.4	24.17	-3.28	2
	3	15.0	11.823	21.345	9.7479	2.0581	0.378	555.3	20.46	2.76	3
	4	25.1	11.693	21.348	9.7831	2.0298	0.387	573.9	17.67	-2.30	4
STATOR	5	35.0	11.566	21.345	9.8111	2.0184	0.394	585.9	16.52	-1.89	5
6	6	44.7	11.440	21.342	9.8348	2.0151	0.400	594.1	16.37	1.45	6
EXIT	7	54.5	11.315	21.341	9.8572	2.0152	0.405	601.6	16.39	-1.00	7
	8	64.2	11.190	21.343	9.8771	2.0214	0.409	608.8	16.40	0.53	8
	9	74.0	11.063	21.344	9.8909	2.0332	0.412	613.2	16.94	-0.05	9
	10	84.0	10.935	21.341	9.8928	2.0598	0.413	611.6	18.79	0.50	10
	11	94.5	10.800	21.328	9.8837	2.1068	0.411	598.2	23.11	1.32	11
	12	100.0	10.729	21.313	9.8730	2.1408	0.408	580.6	26.80	2.43	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	12.041	1.3991	0.4902	0.0750	0.7578	-2.68	15.03	1
	2	7.3	11.945	1.3985	0.4751	0.0638	0.8088	-2.13	12.71	2
	3	15.3	11.839	1.3984	0.4630	0.0549	0.8433	-1.83	11.06	3
	4	25.3	11.706	1.3983	0.4532	0.0474	0.8689	-1.80	9.47	4
STATOR	5	35.0	11.576	1.3979	0.4490	0.0442	0.8803	-1.92	8.59	5
6	6	44.7	11.448	1.3989	0.4465	0.0434	0.8859	-2.02	8.50	6
SL DATA	7	54.3	11.321	1.4068	0.4441	0.0433	0.8891	-2.11	8.60	7
	8	64.0	11.193	1.4214	0.4428	0.0444	0.8890	-2.22	8.66	8
	9	73.7	11.064	1.4380	0.4440	0.0485	0.8851	-2.30	9.08	9
	10	83.6	10.932	1.4553	0.4509	0.0582	0.8708	-2.43	10.04	10
	11	94.2	10.792	1.4743	0.4656	0.0725	0.8429	2.88	11.44	11
	12	100.0	10.715	1.4848	0.4788	0.0820	0.8237	-3.37	12.33	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TIE/C
	12.041	0.8821	42.67	37.10	58.43	15.77	0.1090	42.00	0.0120
	11.945	0.8747	40.01	32.76	52.76	12.75	0.1063	42.00	0.0120
	11.839	0.8669	38.95	29.60	49.07	10.12	0.1035	42.00	0.0120
	11.706	0.8570	38.36	27.56	46.74	8.38	0.0999	42.00	0.0120
STATOR	11.576	0.8473	38.32	27.10	46.26	7.94	0.0963	42.00	0.0120
6	11.448	0.8385	38.44	27.07	46.29	7.85	0.0929	42.00	0.0120
PLANE	11.321	0.8338	38.56	27.06	46.34	7.78	0.0894	42.00	0.0120
SECTIONS	11.193	0.8330	38.69	27.09	46.44	7.75	0.0860	42.00	0.0120
	11.064	0.8330	39.03	27.41	46.93	7.89	0.0825	42.00	0.0120
	10.932	0.8330	39.98	28.87	48.86	8.88	0.0789	42.00	0.0120
	10.792	0.8330	41.27	33.10	53.73	12.46	0.0751	42.00	0.0120
	10.715	0.8330	42.17	37.22	58.31	16.14	0.0730	42.00	0.0120

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 7 - 82 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	11.978	21.850	9.6820	2.1550	0.378	0.711	1286.0	534.8	61.99	4.09	1
	2	6.9	11.893	21.844	9.7165	2.1001	0.385	0.745	1276.8	559.0	61.66	-4.28	2
	3	14.8	11.795	21.838	9.7479	2.0581	0.394	0.771	1266.3	579.3	61.31	4.02	3
	4	25.0	11.669	21.831	9.7831	2.0298	0.403	0.789	1252.8	599.0	60.75	-3.40	4
ROTOR	5	34.9	11.547	21.822	9.8111	2.0184	0.411	0.793	1239.7	612.5	60.11	-2.68	5
7	6	44.7	11.427	21.813	9.8348	2.0151	0.417	0.790	1226.8	621.8	59.42	-1.94	6
INLET	7	54.4	11.306	21.810	9.8572	2.0152	0.423	0.784	1213.8	629.4	58.74	1.22	7
	8	64.2	11.185	21.803	9.8771	2.0214	0.427	0.777	1200.9	636.3	58.08	0.51	8
	9	74.0	11.064	21.795	9.8909	2.0332	0.429	0.765	1187.8	639.8	57.41	0.17	9
	10	84.1	10.940	21.785	9.8928	2.0598	0.429	0.741	1174.5	637.6	56.59	0.80	10
	11	94.5	10.810	21.773	9.8837	2.1068	0.428	0.697	1160.6	626.1	55.34	1.33	11
	12	100.0	10.743	21.767	9.8730	2.1408	0.427	0.664	1153.3	613.6	54.51	1.07	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	11.931	22.505	12.5699	2.3285	0.507	0.418	1281.0	409.4	53.51	-4.09	1
	2	8.0	11.838	22.506	12.5919	2.2679	0.512	0.474	1270.9	485.9	50.82	-4.18	2
	3	16.3	11.741	22.507	12.6138	2.2209	0.516	0.515	1260.5	537.6	49.49	3.96	3
	4	26.4	11.622	22.512	12.6431	2.1884	0.520	0.543	1247.7	575.1	48.44	3.42	4
ROTOR	5	36.0	11.509	22.520	12.6723	2.1746	0.525	0.553	1235.6	594.4	47.49	-2.80	5
7	6	45.5	11.398	22.531	12.7016	2.1701	0.531	0.552	1223.7	603.9	46.46	2.17	6
EXIT	7	54.9	11.288	22.545	12.7308	2.1701	0.537	0.547	1211.9	611.1	45.30	-1.57	7
	8	64.3	11.178	22.560	12.7601	2.1774	0.544	0.540	1200.0	618.5	43.96	1.01	8
	9	73.8	11.066	22.576	12.7894	2.1914	0.551	0.527	1188.1	620.5	42.40	-0.49	9
	10	83.5	10.952	22.596	12.8186	2.2221	0.559	0.498	1175.8	607.9	40.35	-0.04	10
	11	94.1	10.828	22.618	12.8479	2.2751	0.569	0.438	1162.5	563.1	37.55	0.24	11
	12	100.0	10.759	22.630	12.8625	2.3130	0.574	0.390	1155.1	515.2	35.86	1.07	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	11.955	1.2227	0.5551	0.0880	0.7718	1.70	15.58	1
	2	7.4	11.866	1.2318	0.4955	0.0776	0.8107	-0.83	11.69	2
	3	15.5	11.768	1.2421	0.4544	0.0673	0.8437	-0.13	9.26	3
	4	25.7	11.646	1.2551	0.4271	0.0577	0.8686	0.45	7.91	4
ROTOR	5	35.4	11.528	1.2679	0.4161	0.0506	0.8802	0.80	7.37	5
7	6	45.0	11.412	1.2808	0.4142	0.0464	0.8861	0.97	7.17	6
SL DATA	7	54.6	11.297	1.2939	0.4162	0.0465	0.8892	1.00	7.19	7
	8	64.2	11.181	1.3072	0.4207	0.0496	0.8887	0.94	7.45	8
	9	73.9	11.065	1.3210	0.4313	0.0555	0.8844	0.70	8.02	9
	10	83.8	10.946	1.3354	0.4572	0.0642	0.8703	0.17	9.00	10
	11	94.3	10.819	1.3510	0.5147	0.0756	0.8439	-0.78	10.11	11
	12	100.0	10.751	1.3596	0.5691	0.0830	0.8260	-1.50	10.59	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	11.955	1.1200	25.83	54.07	63.29	37.46	0.0390	59.99	0.0110
	11.866	1.1200	23.62	53.62	62.15	38.53	0.0415	58.52	0.0113
	11.768	1.1200	21.44	53.25	61.16	39.72	0.0441	56.90	0.0116
	11.646	1.1200	19.53	52.58	60.06	40.53	0.0472	54.89	0.0120
ROTOR	11.528	1.1200	18.77	51.57	59.11	40.34	0.0505	52.95	0.0124
7	11.412	1.1200	18.75	50.38	58.32	39.56	0.0564	51.04	0.0128
PLANE	11.297	1.1200	19.28	49.01	57.35	38.37	0.0665	49.14	0.0132
SECTIONS	11.181	1.1200	20.38	47.51	57.11	36.73	0.0784	47.23	0.0136
	11.065	1.1200	22.30	45.75	56.72	34.43	0.0877	45.31	0.0139
	10.946	1.1200	25.25	43.58	56.46	31.21	0.0931	43.35	0.0143
	10.819	1.1200	29.15	40.97	56.22	27.07	0.0957	41.26	0.0147
	10.751	1.1200	31.46	39.50	56.09	24.64	0.0960	40.13	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR STATOR 7 - 112 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
STATOR 7 INLET	1	0.	11.897	22.980	12.5699	2.3285	0.515	430.6	59.45	4.09	1
	2	7.8	11.809	22.959	12.5919	2.2679	0.520	504.8	53.27	-3.42	2
	3	16.0	11.715	22.947	12.6138	2.2209	0.524	556.8	48.64	-2.94	3
	4	26.1	11.600	22.942	12.6431	2.1884	0.530	595.2	45.23	-2.55	4
	5	35.7	11.491	22.941	12.6723	2.1746	0.535	615.0	43.71	-2.26	5
	6	45.1	11.383	22.944	12.7016	2.1701	0.541	624.5	43.33	-1.99	6
	7	54.5	11.276	22.947	12.7308	2.1701	0.547	631.1	43.31	-1.73	7
	8	64.0	11.169	22.949	12.7601	2.1774	0.553	637.2	43.47	-1.47	8
	9	73.5	11.060	22.953	12.7894	2.1914	0.559	637.7	44.28	-1.23	9
	10	83.3	10.948	22.963	12.8186	2.2221	0.567	623.7	46.60	-0.97	10
	11	94.0	10.826	22.982	12.8479	2.2751	0.575	577.5	51.64	-0.57	11
	12	100.0	10.758	22.999	12.8625	2.3130	0.579	529.3	55.93	-0.30	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
STATOR 7 EXIT	1	0.	11.844	23.722	12.4023	2.3285	0.355	523.6	27.50	-4.09	1
	2	7.0	11.768	23.739	12.4374	2.2679	0.364	548.0	23.49	-2.07	2
	3	14.9	11.682	23.749	12.4742	2.2209	0.369	564.3	20.03	-1.69	3
	4	25.0	11.572	23.754	12.5203	2.1884	0.376	579.9	17.10	-1.50	4
	5	34.9	11.464	23.755	12.5613	2.1746	0.381	591.5	15.52	1.42	5
	6	44.6	11.358	23.755	12.5962	2.1701	0.386	599.5	14.98	1.36	6
	7	54.3	11.252	23.756	12.6239	2.1701	0.390	604.8	14.99	1.28	7
	8	64.1	11.146	23.758	12.6410	2.1774	0.392	607.8	15.29	-1.19	8
	9	73.9	11.039	23.759	12.6498	2.1914	0.392	607.5	16.29	1.10	9
	10	84.0	10.929	23.756	12.6520	2.2221	0.392	604.3	18.27	-0.95	10
	11	94.5	10.815	23.743	12.6432	2.2751	0.390	593.0	22.19	-0.58	11
	12	100.0	10.755	23.731	12.6359	2.3130	0.388	581.4	25.40	-0.30	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
STATOR 7 SL DATA	1	0.	11.871	1.4000	0.4958	0.0820	0.7661	-2.30	14.59	1
	2	7.4	11.789	1.4000	0.4781	0.0741	0.8052	-1.60	12.75	2
	3	15.5	11.699	1.3999	0.4687	0.0658	0.8386	-1.20	11.22	3
	4	25.6	11.586	1.4003	0.4608	0.0566	0.8639	-1.00	9.64	4
	5	35.3	11.477	1.4030	0.4564	0.0501	0.8759	-1.02	8.72	5
	6	44.9	11.371	1.4094	0.4545	0.0466	0.8821	-1.07	8.31	6
	7	54.4	11.264	1.4197	0.4541	0.0463	0.8850	-1.10	8.29	7
	8	64.0	11.157	1.4329	0.4566	0.0505	0.8841	-1.12	8.73	8
	9	73.7	11.050	1.4470	0.4621	0.0578	0.8791	-1.22	9.56	9
	10	83.7	10.939	1.4617	0.4725	0.0674	0.8641	-1.50	10.80	10
	11	94.3	10.821	1.4777	0.4894	0.0806	0.8365	-2.15	12.49	11
	12	100.0	10.757	1.4865	0.4992	0.0880	0.8180	-2.82	13.48	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
STATOR 7 PLANE SECTIONS	11.871	0.9324	42.96	37.32	58.80	15.84	0.1009	42.00	0.0120
	11.789	0.9259	40.66	32.53	52.86	12.19	0.0985	42.00	0.0120
	11.699	0.9188	39.19	29.11	48.70	9.52	0.0957	42.00	0.0120
	11.586	0.9102	38.08	26.78	45.82	7.74	0.0922	42.00	0.0120
	11.477	0.9034	37.68	25.76	44.60	6.92	0.0890	42.00	0.0120
	11.371	0.8990	37.72	25.53	44.40	6.67	0.0858	42.00	0.0120
	11.264	0.8972	37.75	25.53	44.41	6.66	0.0826	42.00	0.0120
	11.157	0.8968	38.11	25.61	44.66	6.56	0.0793	42.00	0.0120
	11.050	0.8969	39.15	26.17	45.75	6.59	0.0760	42.00	0.0120
	10.939	0.8970	41.37	27.85	48.53	7.17	0.0727	42.00	0.0120
	10.821	0.8970	45.00	31.86	54.36	9.36	0.0691	42.00	0.0120
	10.757	0.8970	47.26	35.33	58.96	11.70	0.0670	42.00	0.0120

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 8 - 84 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	11.794	24.549	12.4159	2.3036	0.360	0.689	1266.2	536.0	61.97	2.52	1
	2	4.4	11.748	24.547	12.4374	2.2679	0.364	0.706	1261.3	548.2	61.81	-2.30	2
	3	12.7	11.662	24.543	12.4742	2.2209	0.372	0.732	1252.1	568.5	61.47	2.47	3
	4	23.2	11.553	24.537	12.5203	2.1884	0.382	0.752	1240.4	590.0	60.94	-2.21	4
ROTOR	5	33.4	11.448	24.531	12.5613	2.1746	0.391	0.762	1229.0	606.1	60.34	-1.76	5
8	6	43.4	11.344	24.525	12.5962	2.1701	0.397	0.762	1217.9	617.4	59.72	-1.23	6
INLET	7	53.3	11.241	24.519	12.6239	2.1701	0.402	0.758	1206.8	624.7	59.12	-0.69	7
	8	63.3	11.138	24.512	12.6410	2.1774	0.404	0.750	1195.8	628.6	58.59	-0.16	8
	9	73.4	11.033	24.505	12.6498	2.1914	0.405	0.736	1184.6	628.5	58.03	0.33	9
	10	83.7	10.927	24.498	12.6520	2.2221	0.404	0.713	1173.1	625.0	57.30	0.74	10
	11	94.4	10.815	24.488	12.6432	2.2751	0.402	0.673	1161.2	613.6	56.27	0.94	11
	12	100.0	10.757	24.483	12.6359	2.3130	0.401	0.644	1154.9	602.8	55.56	1.26	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	11.766	25.187	16.0132	2.4824	0.493	0.395	1263.2	409.9	52.42	-2.52	1
	2	5.2	11.715	25.182	16.0362	2.4436	0.496	0.426	1257.7	455.2	50.65	2.72	2
	3	14.1	11.626	25.181	16.0593	2.3913	0.500	0.469	1248.2	513.1	49.00	-2.67	3
	4	24.7	11.521	25.187	16.0900	2.3540	0.504	0.502	1236.9	558.1	47.83	2.32	4
ROTOR	5	34.7	11.422	25.193	16.1208	2.3372	0.508	0.518	1226.3	584.1	46.91	1.85	5
8	6	44.3	11.327	25.199	16.1516	2.3309	0.513	0.523	1216.1	598.5	46.00	-1.37	6
EXIT	7	53.8	11.233	25.208	16.1823	2.3305	0.518	0.520	1205.9	605.8	44.98	0.89	7
	8	63.4	11.138	25.219	16.2131	2.3390	0.524	0.512	1195.8	609.8	43.76	-0.45	8
	9	73.0	11.042	25.232	16.2438	2.3555	0.531	0.496	1185.5	606.0	42.30	-0.05	9
	10	83.1	10.943	25.249	16.2746	2.3902	0.538	0.466	1174.8	590.5	40.39	0.25	10
	11	93.9	10.835	25.271	16.3054	2.4491	0.547	0.413	1163.2	548.2	37.82	0.40	11
	12	100.0	10.775	25.286	16.3207	2.4906	0.551	0.370	1156.8	504.5	36.30	1.26	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	11.780	1.2144	0.5803	0.0910	0.7839	-2.00	15.73	1
	2	4.8	11.731	1.2194	0.5445	0.0842	0.8064	-1.30	12.84	2
	3	13.4	11.644	1.2283	0.4969	0.0729	0.8386	-0.68	10.78	3
	4	24.0	11.537	1.2395	0.4619	0.0621	0.8633	-0.27	9.57	4
ROTOR	5	34.0	11.435	1.2504	0.4442	0.0545	0.8754	0.08	8.87	5
8	6	43.8	11.335	1.2613	0.4372	0.0497	0.8818	0.	8.49	6
SL DATA	7	53.6	11.237	1.2721	0.4378	0.0493	0.8847	0	8.30	7
	8	63.3	11.138	1.2833	0.4439	0.0522	0.8836	0.07	8.27	8
	9	73.2	11.038	1.2948	0.4583	0.0579	0.8784	0.28	8.50	9
	10	83.4	10.935	1.3067	0.4864	0.0667	0.8637	0.70	9.10	10
	11	94.2	10.825	1.3198	0.5425	0.0781	0.8373	-1.42	10.30	11
	12	100.0	10.766	1.3269	0.5933	0.0850	0.8198	-2.00	11.32	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	11.780	1.0701	27.60	53.53	63.69	36.09	0.0380	59.98	0.0110
	11.731	1.0700	25.70	53.57	62.94	37.24	0.0391	59.03	0.0112
	11.644	1.0698	23.68	53.28	61.95	38.27	0.0411	57.34	0.0115
	11.537	1.0696	22.74	52.55	61.08	38.34	0.0438	55.26	0.0120
ROTOR	11.435	1.0695	22.15	51.82	60.32	38.16	0.0466	53.28	0.0123
8	11.335	1.0694	21.98	50.96	59.66	37.68	0.0497	51.35	0.0127
PLANE	11.237	1.0692	22.26	49.87	59.10	36.84	0.0532	49.43	0.0131
SECTIONS	11.138	1.0691	23.08	48.67	58.67	35.59	0.0573	47.51	0.0135
	11.038	1.0690	24.57	47.06	58.34	33.77	0.0617	45.57	0.0139
	10.935	1.0688	26.97	45.23	58.05	31.09	0.0669	43.57	0.0143
	10.825	1.0687	30.70	42.74	57.77	27.07	0.0741	41.44	0.0147
	10.766	1.0685	33.32	41.16	57.65	24.33	0.0786	40.29	0.0149

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR STATOR 8 - 104 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
STATOR 8 INLET	1	0.	11.748	25.589	16.0132	2.4824	0.497	422.6	59.99	-2.52	1
	2	5.1	11.698	25.584	16.0362	2.4436	0.501	466.9	56.43	-2.13	2
	3	14.0	11.612	25.580	16.0593	2.3913	0.505	525.0	51.45	-1.72	3
	4	24.6	11.509	25.580	16.0900	2.3540	0.510	570.7	47.44	1.45	4
	5	34.5	11.412	25.580	16.1208	2.3372	0.514	597.2	45.24	-1.32	5
	6	44.1	11.319	25.580	16.1516	2.3309	0.519	611.6	44.30	-1.22	6
	7	53.6	11.226	25.581	16.1823	2.3305	0.524	618.6	44.17	-1.13	7
	8	63.2	11.133	25.582	16.2131	2.3390	0.530	621.7	44.55	-1.03	8
	9	72.9	11.039	25.583	16.2438	2.3555	0.535	616.8	45.80	-0.93	9
	10	82.9	10.941	25.584	16.2746	2.3902	0.542	599.9	48.26	0.79	10
	11	93.9	10.834	25.588	16.3054	2.4491	0.549	555.0	53.05	-0.51	11
	12	100.0	10.774	25.591	16.3207	2.4906	0.553	509.5	57.06	0.39	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M ABS	CZ	ALPHA	PHI	SL
STATOR 8 EXIT	1	0.	11.711	26.440	15.8059	2.4824	0.321	496.6	26.00	-2.52	1
	2	4.5	11.669	26.433	15.8383	2.4436	0.326	510.2	23.50	-2.21	2
	3	12.7	11.591	26.416	15.8804	2.3913	0.332	528.0	19.79	1.84	3
	4	23.2	11.492	26.397	15.9335	2.3540	0.341	546.9	16.54	-1.57	4
	5	33.4	11.396	26.385	15.9800	2.3372	0.348	561.6	14.54	1.41	5
	6	43.4	11.302	26.378	16.0187	2.3309	0.353	572.0	13.71	-1.30	6
	7	53.3	11.208	26.373	16.0487	2.3305	0.357	578.6	13.63	-1.20	7
	8	63.3	11.115	26.369	16.0662	2.3390	0.359	581.6	14.15	-1.09	8
	9	73.3	11.020	26.370	16.0728	2.3555	0.360	58[illegible].7	15.40	0.95	9
	10	83.6	10.923	26.378	16.0717	2.3902	0.359	577.1	17.56	-0.74	10
	11	94.4	10.822	26.391	16.0574	2.4491	0.357	566.9	21.22	-0.33	11
	12	100.0	10.769	26.399	16.0474	2.4906	0.355	558.4	23.90	0.39	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
STATOR 8 SL DATA	1	0.	11.729	1.5007	0.5392	0.0850	0.7786	-1.00	14.91	1
	2	4.8	11.683	1.4500	0.5379	0.0799	0.8013	-1.10	14.23	2
	3	13.4	11.601	1.3796	0.5356	0.0710	0.8337	-1.32	12.72	3
	4	23.9	11.500	1.3228	0.5296	0.0609	0.8589	-1.59	10.89	4
	5	34.0	11.404	1.3019	0.5228	0.0538	0.8714	-1.81	9.78	5
	6	43.8	11.310	1.2923	0.5183	0.0499	0.8781	-1.95	9.27	6
	7	53.5	11.217	1.2926	0.5164	0.0492	0.8809	-2.00	9.20	7
	8	63.2	11.124	1.2975	0.5183	0.0530	0.8794	-1.89	9.65	8
	9	73.1	11.029	1.3116	0.5237	0.0604	0.8736	-1.70	10.81	9
	10	83.3	10.932	1.3532	0.5295	0.0701	0.8581	-1.45	12.39	10
	11	94.1	10.828	1.4234	0.5384	0.0836	0.8307	-1.16	14.55	11
	12	100.0	10.772	1.4802	0.5424	0.0910	0.8127	-1.00	15.79	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
STATOR 8 PLANE SECTIONS	11.729	1.0632	45.55	36.40	59.17	13.62	0.1153	42.00	0.0120
	11.683	1.0240	45.17	33.62	56.20	11.04	0.1086	42.00	0.0120
	11.601	0.9667	44.21	29.96	52.06	7.86	0.0965	42.00	0.0120
	11.500	0.9199	42.79	27.33	48.73	5.94	0.0816	42.00	0.0120
	11.404	0.8963	41.96	25.94	46.92	4.96	0.0700	42.00	0.0120
	11.310	0.8834	41.77	25.37	46.25	4.48	0.0650	42.00	0.0120
	11.217	0.8757	41.77	25.30	46.18	4.41	0.0645	42.00	0.0120
	11.124	0.8717	42.11	25.50	46.56	4.44	0.0669	42.00	0.0120
	11.029	0.8746	43.19	26.09	47.68	4.50	0.0733	42.00	0.0120
	10.932	0.8930	45.10	27.48	50.03	4.93	0.0814	42.00	0.0120
	10.828	0.9316	48.25	30.54	54.66	6.41	0.0903	42.00	0.0120
	10.772	0.9629	50.44	33.08	58.30	7.86	0.0950	42.00	0.0120

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 9 - 88 BLADES

ROTOR 9 INLET

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
1	0.	11.694	26.816	15.8059	2.4824	0.326	0.658	1255.5	505.2	63.49	-2.52	1
2	4.5	11.653	26.813	15.8383	2.4436	0.331	0.675	1251.0	519.1	63.23	-2.80	2
3	12.8	11.576	26.807	15.8804	2.3913	0.339	0.700	1242.8	538.3	62.91	2.90	3
4	23.4	11.478	26.803	15.9335	2.3540	0.348	0.721	1232.3	559.2	62.40	-2.63	4
5	33.6	11.384	26.798	15.9800	2.3372	0.356	0.732	1222.2	575.6	61.86	-2.16	5
6	43.6	11.292	26.793	16.0187	2.3309	0.362	0.734	1212.3	587.0	61.31	-1.62	6
7	53.5	11.200	26.787	16.0487	2.3305	0.367	0.731	1202.5	594.1	60.78	-1.08	7
8	63.4	11.109	26.781	16.0662	2.3390	0.369	0.722	1192.6	597.0	60.28	-0.57	8
9	73.4	11.016	26.775	16.0728	2.3555	0.369	0.707	1182.7	595.8	59.77	-0.10	9
10	83.7	10.921	26.768	16.0717	2.3902	0.367	0.684	1172.5	591.7	59.13	0.28	10
11	94.4	10.822	26.760	16.0574	2.4491	0.365	0.649	1161.9	581.8	58.29	0.49	11
12	100.0	10.771	26.756	16.0474	2.4906	0.364	0.625	1156.3	574.1	57.72	0.61	12

ROTOR 9 EXIT

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
1	0.	11.669	27.390	20.1958	2.6654	0.467	0.362	1252.8	371.8	54.35	-2.52	1
2	5.4	11.621	27.391	20.2199	2.6231	0.470	0.393	1247.6	422.1	52.10	-2.77	2
3	14.5	11.540	27.392	20.2439	2.5654	0.473	0.436	1238.9	483.7	50.10	-2.82	3
4	25.1	11.445	27.394	20.2760	2.5232	0.477	0.470	1228.7	531.2	48.79	2.53	4
5	35.0	11.357	27.397	20.3081	2.5033	0.480	0.489	1219.3	560.2	47.88	2.08	5
6	44.5	11.272	27.403	20.3402	2.4951	0.484	0.496	1210.2	575.9	47.05	-1.59	6
7	53.9	11.189	27.410	20.3723	2.4944	0.488	0.494	1201.2	582.9	46.14	-1.10	7
8	63.3	11.105	27.420	20.4043	2.5041	0.493	0.484	1192.3	583.2	45.06	-0.65	8
9	72.9	11.020	27.432	20.4364	2.5230	0.499	0.465	1183.1	575.2	43.77	-0.27	9
10	82.9	10.930	27.448	20.4685	2.5619	0.505	0.434	1173.5	555.1	42.12	0.03	10
11	93.9	10.833	27.470	20.5006	2.6269	0.512	0.383	1163.0	511.3	40.08	0.12	11
12	100.0	10.778	27.482	20.5166	2.6721	0.516	0.345	1157.2	471.7	39.01	0.61	12

ROTOR 9 SL DATA

SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
1	0.	11.681	1.1990	0.6171	0.0940	0.7803	-2.00	16.59	1
2	4.9	11.637	1.2036	0.5772	0.0869	0.8021	-1.30	13.94	2
3	13.6	11.558	1.2118	0.5256	0.0754	0.8335	-0.68	11.20	3
4	24.3	11.461	1.2220	0.4871	0.0647	0.8582	-0.27	9.44	4
5	34.3	11.370	1.2318	0.4662	0.0573	0.8707	-0.08	8.58	5
6	44.0	11.282	1.2414	0.4573	0.0526	0.8775	0.	8.18	6
7	53.7	11.195	1.2511	0.4577	0.0523	0.8803	0.	8.07	7
8	63.3	11.107	1.2610	0.4662	0.0552	0.8787	0.07	8.17	8
9	73.2	11.018	1.2712	0.4839	0.0608	0.8728	-0.26	8.55	9
10	83.3	10.926	1.2819	0.5164	0.0695	0.8575	0.70	9.32	10
11	94.2	10.827	1.2936	0.5756	0.0810	0.8311	-1.42	10.70	11
12	100.0	10.774	1.2999	0.6242	0.0880	0.8139	-2.00	11.80	12

ROTOR 9 PLANE SECTIONS

SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
11.681	1.0000	27.53	54.94	65.06	37.53	0.0390	59.99	0.0110
11.637	1.0000	26.41	54.55	64.30	37.89	0.0397	59.01	0.0112
11.558	1.0000	24.76	54.11	63.34	38.58	0.0410	57.29	0.0115
11.461	1.0000	23.27	53.71	62.52	39.25	0.0426	55.19	0.0120
11.370	1.0000	22.45	53.11	61.80	39.35	0.0442	53.21	0.0123
11.282	1.0000	22.23	52.35	61.22	38.99	0.0462	51.28	0.0127
11.195	1.0000	22.51	51.38	60.72	38.21	0.0488	49.38	0.0131
11.107	1.0000	23.35	50.19	60.33	36.98	0.0520	47.47	0.0135
11.018	1.0000	24.85	48.75	60.05	35.20	0.0566	45.53	0.0139
10.926	1.0000	27.19	46.97	59.84	32.65	0.0625	43.52	0.0143
10.827	1.0000	30.62	44.77	59.73	29.11	0.0697	41.38	0.0147
10.774	1.0000	32.88	43.47	59.73	26.84	0.0741	40.23	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR STATOR 9 - 118 VANES

STATOR 9 INLET

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
1	0.	11.651	27.800	20.1958	2.6654	0.471	384.2	62.42	-2.52	1
2	5.3	11.604	27.792	20.2199	2.6231	0.474	433.4	58.47	-2.08	2
3	14.3	11.525	27.783	20.2439	2.5654	0.478	494.8	53.20	1.63	3
4	25.0	11.432	27.780	20.2760	2.5232	0.482	542.9	48.92	-1.37	4
5	34.8	11.346	27.778	20.3081	2.5033	0.486	572.4	46.36	-1.27	5
6	44.3	11.263	27.777	20.3402	2.4951	0.490	588.2	45.18	-1.23	6
7	53.7	11.181	27.779	20.3723	2.4944	0.494	594.8	45.01	1.20	7
8	63.1	11.097	27.781	20.4043	2.5041	0.498	594.4	45.65	-1.17	8
9	72.7	11.015	27.785	20.4364	2.5230	0.503	585.5	47.20	-1.11	9
10	82.8	10.927	27.788	20.4685	2.5619	0.509	564.6	49.95	-0.97	10
11	93.8	10.831	27.793	20.5006	2.6269	0.515	519.8	54.66	-0.67	11
12	100.0	10.777	27.796	20.5166	2.6721	0.519	479.8	58.24	-0.46	12

STATOR 9 EXIT

SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
1	0.	11.618	28.533	19.9513	2.6654	0.294	472.0	25.80	2.52	1
2	4.5	11.580	28.529	19.9862	2.6231	0.299	485.1	23.30	2.11	2
3	12.8	11.510	28.520	20.0320	2.5654	0.305	502.2	19.61	-1.65	3
4	23.3	11.421	28.509	20.0895	2.5232	0.313	520.4	16.37	-1.38	4
5	33.5	11.334	28.503	20.1397	2.5033	0.320	534.6	14.36	-1.26	5
6	43.5	11.250	28.501	20.1809	2.4951	0.325	544.6	13.46	-1.21	6
7	53.4	11.166	28.497	20.2125	2.4944	0.329	550.9	13.41	-1.18	7
8	63.3	11.082	28.492	20.2300	2.5041	0.330	552.9	14.22	-1.14	8
9	73.4	10.997	28.489	20.2353	2.5230	0.331	551.5	15.59	-1.07	9
10	83.7	10.910	28.494	20.2319	2.5619	0.330	547.9	17.70	0.90	10
11	94.4	10.819	28.509	20.2136	2.6263	0.327	538.7	21.18	-0.48	11
12	100.0	10.771	28.521	20.2008	2.6721	0.326	531.0	23.70	-0.46	12

STATOR 9 SL DATA

SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
1	0.	11.635	1.5045	0.5715	0.0880	0.7757	-1.50	15.04	1
2	4.9	11.592	1.4617	0.5681	0.0829	0.7975	-1.60	14.45	2
3	13.6	11.518	1.4026	0.5627	0.0741	0.8292	-1.82	13.05	3
4	24.2	11.427	1.3582	0.5529	0.0640	0.8543	-2.09	11.27	4
5	34.2	11.340	1.3436	0.5426	0.0569	0.8672	2.31	9.76	5
6	43.9	11.256	1.3443	0.5348	0.0529	0.8741	-2.45	8.84	6
7	53.6	11.174	1.3450	0.5319	0.0522	0.8769	-2.50	8.81	7
8	63.2	11.091	1.3433	0.5343	0.0559	0.8750	-2.39	9.54	8
9	73.[illegible]	11.006	1.3489	0.5416	0.0633	0.8686	-2.20	10.92	9
10	83.2	10.918	1.3796	0.5500	0.0729	0.8527	-1.95	12.68	10
11	94.1	10.825	1.4555	0.5578	0.0864	0.8254	-1.66	14.61	11
12	100.0	10.774	1.5188	0.5597	0.0940	0.8078	-1.50	15.56	12

STATOR 9 PLANE SECTIONS

SECT. HT	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
11.635	0.9321	48.52	37.65	61.91	13.39	0.1148	42.00	0.0120
11.592	0.9026	48.11	34.63	58.69	10.57	0.1080	42.00	0.0120
11.518	0.8603	47.11	30.73	54.29	7.18	0.0959	42.00	0.0120
11.427	0.8264	45.43	27.98	50.69	5.27	0.0814	42.00	0.0120
11.340	0.8114	43.89	26.59	48.53	4.65	0.0704	42.00	0.0120
11.256	0.8058	43.06	26.10	47.63	4.57	0.0650	42.00	0.0120
11.174	0.8002	42.98	26.10	47.59	4.61	0.0644	42.00	0.0120
11.091	0.7933	43.60	26.44	48.24	4.64	0.0673	42.00	0.0120
11.006	0.7905	45.09	27.17	49.72	4.62	0.0735	42.00	0.0120
10.918	0.8020	47.49	28.60	52.34	4.85	0.0813	42.00	0.0120
10.825	0.8389	50.55	31.55	56.83	6.28	0.0899	42.00	0.0120
10.774	0.8713	52.21	33.95	60.06	7.84	0.0945	42.00	0.0120

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Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Continued). (U.S. Units)

EEE CORE COMPRESSOR ROTOR 10 - 96 BLADES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	11.600	28.957	19.9513	2.6654	0.301	0.633	1245.3	485.1	64.50	2.52	1
	2	4.5	11.562	28.956	19.9862	2.6231	0.306	0.649	1241.4	497.7	64.25	2.83	2
	3	12.8	11.494	28.952	20.0320	2.5654	0.312	0.672	1234.0	515.4	63.96	-2.94	3
	4	23.4	11.406	28.948	20.0895	2.5232	0.321	0.691	1224.6	534.6	63.48	-2.63	4
ROTOR	5	33.6	11.322	28.943	20.1397	2.5033	0.328	0.701	1215.5	549.7	62.99	-2.12	5
10	6	43.6	11.239	28.938	20.1809	2.4951	0.334	0.704	1206.6	560.1	62.50	-1.55	6
INLET	7	53.4	11.157	28.933	20.2125	2.4944	0.338	0.701	1197.9	566.3	62.03	0.99	7
	8	63.4	11.075	28.929	20.2300	2.5041	0.339	0.691	1189.1	568.0	61.56	-0.47	8
	9	73.4	10.992	28.924	20.2353	2.5230	0.339	0.677	1180.1	566.1	61.12	-0.01	9
	10	83.7	10.907	28.919	20.2319	2.5619	0.337	0.656	1171.0	561.9	60.57	0.33	10
	11	94.4	10.818	28.913	20.2136	2.6269	0.335	0.624	1161.5	552.6	59.89	0.45	11
	12	100.0	10.772	28.910	20.2008	2.6721	0.333	0.603	1156.5	545.5	59.43	0.50	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	M-REL	U	CZ	BETA	PHI	SL
	1	0.	11.577	29.466	25.0952	2.8472	0.446	0.346	1242.9	362.0	54.98	-2.52	1
	2	5.4	11.534	29.464	25.1129	2.8012	0.448	0.376	1238.3	410.0	52.83	-2.74	2
	3	14.4	11.462	29.464	25.1306	2.7379	0.450	0.416	1230.6	468.8	50.91	-2.78	3
	4	25.0	11.378	29.468	25.1541	2.6906	0.453	0.449	1221.5	513.8	49.71	-2.45	4
ROTOR	5	34.8	11.299	29.471	25.1777	2.6674	0.455	0.467	1213.1	541.1	48.91	-1.95	5
10	6	44.2	11.224	29.476	25.2013	2.6572	0.457	0.474	1205.0	556.0	48.21	-1.39	6
EXIT	7	53.6	11.149	29.482	25.2248	2.6558	0.461	0.472	1197.0	561.2	47.48	-0.86	7
	8	62.9	11.074	29.491	25.2484	2.6663	0.464	0.460	1188.9	557.3	46.61	-0.40	8
	9	72.6	10.997	29.502	25.2719	2.6874	0.469	0.441	1180.6	546.6	45.57	-0.03	9
	10	82.7	10.916	29.516	25.2955	2.7301	0.473	0.412	1172.0	525.5	44.27	0.20	10
	11	93.8	10.827	29.531	25.3190	2.8009	0.479	0.364	1162.4	481.9	42.80	0.20	11
	12	100.0	10.778	29.538	25.3308	2.8496	0.482	0.329	1157.1	443.2	42.22	0.50	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	11.588	1.2113	0.6221	0.0970	0.7766	-2.20	16.96	1
	2	4.9	11.548	1.2155	0.5825	0.0899	0.7978	-1.70	13.79	2
	3	13.6	11.478	1.2230	0.5312	0.0785	0.8286	-1.10	11.37	3
	4	24.2	11.392	1.2322	0.4926	0.0678	0.8533	-0.60	9.90	4
ROTOR	5	34.2	11.310	1.2411	0.4711	0.0604	0.8661	-0.27	9.15	5
10	6	43.9	11.231	1.2499	0.4613	0.0557	0.8732	-0.09	8.75	6
SL DATA	7	53.5	11.153	1.2586	0.4614	0.0553	0.8760	0.	8.58	7
	8	63.2	11.075	1.2675	0.4718	0.0581	0.8740	-0.07	8.76	8
	9	73.0	10.995	1.2768	0.4905	0.0637	0.8675	-0.23	9.20	9
	10	83.2	10.912	1.2865	0.5231	0.0724	0.8518	-0.62	10.00	10
	11	94.1	10.823	1.2970	0.5814	0.0840	0.8254	-1.35	11.40	11
	12	100.0	10.775	1.3028	0.6288	0.0910	0.8084	-2.00	12.35	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	11.588	0.9000	29.17	55.49	66.48	37.32	0.0435	59.97	0.0110
	11.548	0.9000	27.39	55.52	65.80	38.41	0.0448	59.00	0.0112
	11.478	0.9000	25.36	55.[illegible]0	64.84	39.48	0.0471	57.29	0.0115
	11.392	0.9000	24.11	54.69	63.92	39.82	0.0500	55.20	0.0120
ROTOR	11.310	0.9000	23.30	54.03	63.14	39.84	0.0525	53.23	0.0124
10	11.231	0.9000	22.92	53.28	62.52	39.60	0.0550	51.31	0.0127
PLANE	11.153	0.9000	22.99	52.40	62.00	39.01	0.0588	49.42	0.0131
SECTIONS	11.075	0.9000	23.70	51.33	61.63	37.93	0.0653	47.51	0.0135
	10.995	0.9000	25.02	49.99	61.37	36.35	0.0742	45.57	0.0139
	10.912	0.9000	27.08	48.39	61.22	34.14	0.0812	43.55	0.0143
	10.823	0.9000	29.96	46.63	61.26	31.30	0.0846	41.40	0.0147
	10.775	0.9000	31.66	45.81	61.44	29.78	0.0850	40.24	0.0150

Table XXI. Vector Diagram and Airfoil Geometry Data for Original-Design Blading (Concluded). (U.S. Units)

EEE CORE COMPRESSOR STATOR 10 - 140 VANES

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	11.558	29.911	25.0952	2.8472	0.453	387.0	61.99	-0.44	1
	2	5.2	11.517	29.923	25.1129	2.8012	0.454	429.7	58.41	-1.34	2
	3	14.1	11.448	29.942	25.1306	2.7379	0.456	485.1	53.45	-0.80	3
	4	24.7	11.365	29.965	25.1541	2.6906	0.458	529.2	49.33	-0.49	4
STATOR	5	34.5	11.289	29.984	25.1777	2.6674	0.460	554.9	46.90	-0.40	5
10	6	43.9	11.215	29.998	25.2013	2.6572	0.463	568.2	45.76	-0.51	6
INLET	7	53.3	11.141	30.004	25.2248	2.6558	0.465	572.1	45.66	-0.68	7
	8	62.7	11.067	30.001	25.2484	2.6663	0.468	567.1	46.61	-0.90	8
	9	72.4	10.992	29.990	25.2719	2.6874	0.472	555.2	48.31	-0.87	9
	10	82.6	10.912	29.972	25.2955	2.7301	0.476	533.0	51.07	-0.82	10
	11	93.7	10.825	29.948	25.3190	2.8009	0.481	488.0	55.74	-0.56	11
	12	100.0	10.776	29.935	25.3308	2.8496	0.484	449.1	59.26	-0.36	12

	SL	% IMM	RADIUS	Z	PT/PTI	TT/TTI	M-ABS	CZ	ALPHA	PHI	SL
	1	0.	11.552	30.790	24.7401	2.8472	0.263	482.0	4.00	0.	1
	2	4.2	11.519	30.790	24.7704	2.8012	0.265	483.6	3.38	1.84	2
	3	12.2	11.457	30.790	24.8128	2.7379	0.269	485.0	2.34	1.93	3
	4	22.6	11.376	30.790	24.8655	2.6906	0.274	490.0	1.27	1.70	4
STATOR	5	32.8	11.296	30.790	24.9109	2.6674	0.278	496.0	0.53	1.17	5
10	6	42.9	11.217	30.790	24.9461	2.6572	0.282	501.1	0.11	0.78	6
EXIT	7	53.0	11.138	30.790	24.9700	2.6558	0.283	504.2	0.02	0.41	7
	8	63.1	11.059	30.790	24.9774	2.6663	0.283	505.4	0.32	-0.22	8
	9	73.3	10.979	30.790	24.9706	2.6874	0.282	505.2	0.93	0.75	9
	10	83.8	10.897	30.790	24.9543	2.7301	0.281	505.6	1.88	-1.15	10
	11	94.5	10.813	30.790	24.9232	2.8009	0.278	506.3	3.19	-1.36	11
	12	100.0	10.770	30.790	24.9047	2.8496	0.276	507.2	4.00	-0.36	12

	SL	% IMM	R-BAR	SOL	DF	LOSS	CUM EFF	INC	DEV	SL
	1	0.	11.555	1.9253	0.6324	0.1110	0.7714	-3.00	12.93	1
	2	4.7	11.518	1.8781	0.6265	0.1063	0.7927	-2.03	11.06	2
	3	13.2	11.452	1.8056	0.6194	0.0977	0.8237	-0.83	8.84	3
	4	23.6	11.370	1.7358	0.6107	0.0877	0.8487	-0.06	6.68	4
STATOR	5	33.6	11.292	1.6882	0.6037	0.0803	0.8618	0.	5.42	5
10	6	43.4	11.216	1.6625	0.5997	0.0761	0.8690	0.	4.91	6
SL DATA	7	53.1	11.140	1.6611	0.5992	0.0751	0.8718	0.	4.90	7
	8	62.9	11.063	1.6872	0.6021	0.0788	0.8695	0.	5.37	8
	9	72.9	10.985	1.7389	0.6067	0.0864	0.8626	0.	6.49	9
	10	83.2	10.905	1.8173	0.6124	0.0962	0.8464	-0.48	8.34	10
	11	94.1	10.819	1.9300	0.6206	0.1097	0.8193	-1.83	10.98	11
	12	100.0	10.773	2.0016	0.6259	0.1170	0.8020	-3.00	12.65	12

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	11.555	0.9984	73.54	28.45	64.47	-9.07	0.0750	42.00	0.0120
	11.518	0.9708	68.34	26.67	60.31	-8.03	0.0743	42.00	0.0120
	11.452	0.9281	61.12	23.75	54.44	-6.67	0.0730	42.00	0.0120
	11.370	0.8857	55.08	21.12	49.58	-5.50	0.0715	42.00	0.0120
STATOR	11.292	0.8556	51.88	19.59	46.94	-4.94	0.0700	42.00	0.0120
10	11.216	0.8368	50.56	18.87	45.74	-4.82	0.0685	42.00	0.0120
PLANE	11.140	0.8305	50.55	18.90	45.70	-4.86	0.0671	42.00	0.0120
SECTIONS	11.063	0.8377	51.73	19.65	46.68	-5.04	0.0656	42.00	0.0120
	10.985	0.8572	54.11	20.86	48.57	-5.54	0.0641	42.00	0.0120
	10.905	0.8893	58.52	22.76	52.06	-6.46	0.0626	42.00	0.0120
	10.819	0.9371	66.20	25.79	58.24	-7.96	0.0609	42.00	0.0120
	10.773	0.9678	71.28	27.85	62.58	-8.70	0.0601	42.00	0.0120

Table XXII. Airfoil Geometry Data for Final-Design Blading.

EEE CORE COMPRESSOR ROTOR GEOMETRY

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	34.725 (13.671)	10.2761 (4.046)	9.65	65.21	65.88	56.22	0.0250	63.20	0.0044
	33.695 (13.266)	10.2597 (4.039)	7.17	63.35	64.04	56.87	0.0260	61.66	0.0046
	32.709 (12.878)	10.2575 (4.038)	4.66	61.51	62.33	57.66	0.0276	60.35	0.0048
ROTOR 1	31.399 (12.362)	10.2623 (4.040)	4.42	58.92	60.46	56.05	0.0307	58.75	0.0050
28 BLADES	30.063 (11.836)	10.2606 (4.040)	5.92	56.19	58.97	53.04	0.0340	57.24	0.0054
	28.685 (11.293)	10.2608 (4.040)	8.28	52.99	57.37	49.09	0.0391	56.06	0.0059
PLANE	27.249 (10.728)	10.2603 (4.039)	12.06	49.31	55.88	13.82	0.0475	55.16	0.0064
SECTIONS	25.735 (10.132)	10.2598 (4.039)	17.36	45.06	54.60	37.24	0.0607	54.66	0.0070
	24.112 (9.493)	10.2573 (4.038)	25.02	40.06	53.48	28.45	0.0770	54.57	0.0079
	22.328 (8.790)	10.2537 (4.037)	36.55	34.35	52.63	16.07	0.0896	54.86	0.0096
	20.269 (7.980)	10.1638 (4.001)	54.35	27.40	52.41	-1.94	0.0949	55.51	0.0124
	19.069 (7.507)	10.0971 (3.975)	65.24	23.18	52.73	-12.51	0.0961	56.00	0.0141

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	33.453 (13.170)	7.0337 (2.769)	12.95	60.92	63.56	50.61	0.0260	64.09	0.0074
	32.637 (12.849)	7.0130 (2.761)	10.15	59.72	62.65	52.50	0.0291	61.30	0.0075
	31.878 (12.550)	6.9876 (2.751)	9.11	58.25	61.61	52.50	0.0321	59.24	0.0075
ROTOR 2	30.895 (12.163)	6.9570 (2.739)	10.01	56.00	60.13	50.12	0.0360	57.05	0.0076
38 BLADES	29.916 (11.778)	6.9271 (2.727)	11.21	53.66	58.65	47.45	0.0399	54.69	0.0077
	28.924 (11.388)	6.8948 (2.714)	12.72	51.20	57.21	44.49	0.0437	52.24	0.0079
PLANE	27.917 (10.991)	6.8638 (2.702)	14.83	48.52	55.82	40.99	0.0475	50.36	0.0083
SECTIONS	26.886 (10.585)	6.8282 (2.688)	17.79	45.43	54.50	36.71	0.0512	49.39	0.0088
	25.821 (10.166)	6.7840 (2.671)	22.19	41.86	53.29	31.10	0.0551	49.20	0.0095
	24.706 (9.727)	6.7282 (2.649)	29.28	37.50	52.03	22.74	0.0633	49.53	0.0105
	23.508 (9.255)	6.6164 (2.605)	42.87	31.77	50.56	7.69	0.0786	49.93	0.0120
	22.862 (9.001)	6.5498 (2.579)	50.07	28.42	49.75	-0.33	0.0849	50.19	0.0128

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	32.717 (12.881)	5.0342 (1.982)	20.29	58.97	64.45	44.16	0.0261	66.17	0.0084
	32.103 (12.639)	5.0514 (1.989)	14.02	58.15	63.20	49.18	0.0263	63.25	0.0084
	31.540 (12.417)	5.0522 (1.989)	11.11	57.00	62.02	50.92	0.0281	61.17	0.0084
ROTOR 3	30.822 (12.135)	5.0511 (1.989)	11.04	55.15	60.56	49.53	0.0325	59.14	0.0084
50 BLADES	30.112 (11.855)	5.0518 (1.989)	11.78	53.12	59.14	47.36	0.0418	57.12	0.0085
	29.398 (11.574)	5.0511 (1.989)	13.20	50.80	57.69	44.48	0.0538	55.12	0.0086
PLANE	28.677 (11.290)	5.0520 (1.989)	15.49	48.08	56.16	40.67	0.0646	53.21	0.0088
SECTIONS	27.946 (11.002)	5.0505 (1.988)	18.53	44.95	54.61	36.08	0.0759	51.33	0.0091
	27.202 (10.710)	5.0498 (1.988)	22.90	41.41	53.07	30.16	0.0876	49.63	0.0095
	26.432 (10.406)	5.0587 (1.992)	29.43	37.47	51.64	22.21	0.0952	48.07	0.0102
	25.606 (10.081)	4.8724 (1.918)	39.53	33.22	50.12	10.59	0.1028	46.67	0.0116
	25.155 (9.903)	4.6388 (1.826)	46.40	30.94	49.24	2.84	0.1085	46.02	0.0128

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	32.028 (12.610)	3.9878 (1.570)	22.35	57.50	63.71	41.37	0.0335	59.59	0.0111
	31.544 (12.419)	3.9929 (1.572)	17.88	56.40	62.64	44.76	0.0375	57.18	0.0114
	31.107 (12.247)	3.9930 (1.572)	15.54	55.08	61.55	46.02	0.0413	55.36	0.0117
ROTOR 4	30.554 (12.029)	3.9932 (1.572)	15.15	53.30	60.02	44.87	0.0454	53.16	0.0121
60 BLADES	30.011 (11.815)	3.9932 (1.572)	15.17	51.59	58.51	43.34	0.0497	50.98	0.0125
	29.468 (11.602)	3.9927 (1.572)	15.51	49.85	57.11	41.60	0.0542	48.78	0.0127
PLANE	28.924 (11.388)	3.9897 (1.571)	16.27	47.97	55.77	39.50	0.0589	46.67	0.0130
SECTIONS	28.378 (11.172)	3.9856 (1.569)	17.91	45.85	54.44	36.53	0.0634	44.75	0.0133
	27.826 (10.955)	3.9734 (1.564)	21.48	43.24	53.10	31.62	0.0676	42.99	0.0135
	27.260 (10.732)	3.9558 (1.557)	27.35	39.87	51.70	24.30	0.0717	41.29	0.0139
	26.656 (10.495)	3.9368 (1.550)	35.33	35.80	50.24	14.91	0.0765	39.64	0.0145
	26.322 (10.363)	3.8165 (1.503)	39.71	33.02	49.33	9.63	0.0813	38.73	0.0151

Table XXII. Airfoil Geometry Data for Final-Design Blading (Continued).

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	31.433 (12.375)	3.4275 (1.349)	20.67	56.10	62.43	41.76	0.0340	59.97	0.0110
	31.034 (12.218)	3.4275 (1.349)	19.07	55.03	61.58	42.51	0.0371	58.27	0.0114
	30.683 (12.080)	3.4275 (1.349)	17.97	54.06	60.84	42.87	0.0397	56.70	0.0117
ROTOR 5	30.241 (11.906)	3.4274 (1.349)	17.20	52.66	59.90	42.70	0.0430	54.77	0.0121
70 BLADES	29.808 (11.735)	3.4272 (1.349)	17.05	51.11	58.95	41.90	0.0470	52.85	0.0124
	29.377 (11.566)	3.4272 (1.349)	17.40	49.56	58.05	40.65	0.0509	50.95	0.0128
PLANE	28.945 (11.396)	3.4270 (1.349)	18.24	47.80	57.12	38.89	0.0552	49.12	0.0132
SECTIONS	28.512 (11.225)	3.4267 (1.349)	19.78	45.75	56.30	36.52	0.0604	47.20	0.0136
	28.074 (11.053)	3.4217 (1.347)	22.62	43.15	55.55	32.93	0.0661	45.28	0.0139
	27.626 (10.876)	3.4057 (1.341)	26.98	39.93	54.80	27.82	0.0722	43.26	0.0143
	27.146 (10.687)	3.3760 (1.329)	32.75	35.78	53.75	21.00	0.0777	41.30	0.0148
	26.879 (10.582)	3.3545 (1.321)	36.15	33.26	52.98	16.84	0.0799	40.08	0.0150

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	30.791 (12.122)	2.9195 (1.149)	22.76	55.77	63.14	40.37	0.0359	59.98	0.0110
	30.528 (12.019)	2.9195 (1.149)	20.93	55.13	62.43	41.50	0.0391	58.55	0.0113
	30.237 (11.904)	2.9195 (1.149)	19.23	54.40	61.67	42.44	0.0424	57.03	0.0116
ROTOR 6	29.871 (11.760)	2.9195 (1.149)	17.82	53.26	60.71	42.90	0.0467	55.00	0.0120
80 BLADES	29.514 (11.620)	2.9195 (1.149)	17.24	51.98	59.85	42.61	0.0512	53.06	0.0123
	29.159 (11.480)	2.9195 (1.149)	17.17	50.72	59.05	41.89	0.0555	51.13	0.0127
PLANE	28.804 (11.340)	2.9192 (1.149)	17.70	49.32	58.30	40.61	0.0596	49.21	0.0132
SECTIONS	28.449 (11.200)	2.9190 (1.149)	19.16	47.52	57.62	38.46	0.0639	47.28	0.0135
	28.091 (11.059)	2.9161 (1.148)	21.67	45.18	56.90	35.23	0.0681	45.25	0.0139
	27.725 (10.915)	2.8980 (1.141)	25.40	42.29	56.10	30.70	0.0726	43.31	0.0143
	27.335 (10.762)	2.8729 (1.131)	30.02	39.05	55.13	25.11	0.0773	41.15	0.0148
	27.121 (10.678)	2.8671 (1.129)	32.71	37.27	54.55	21.83	0.0797	40.06	0.0150

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	30.365 (11.955)	2.8448 (1.120)	25.83	54.07	63.29	37.46	0.0390	59.99	0.0110
	30.139 (11.866)	2.8448 (1.120)	23.62	53.62	62.15	38.53	0.0415	58.52	0.0113
	29.890 (11.768)	2.8448 (1.120)	21.44	53.25	61.16	39.72	0.0441	56.90	0.0116
ROTOR 7	29.580 (11.646)	2.8448 (1.120)	19.53	52.58	60.06	40.53	0.0472	54.89	0.0120
82 BLADES	29.282 (11.528)	2.8448 (1.120)	18.77	51.58	59.11	40.34	0.0505	52.95	0.0124
	28.987 (11.412)	2.8448 (1.120)	18.74	50.39	58.32	39.58	0.0564	51.04	0.0128
PLANE	28.694 (11.297)	2.8448 (1.120)	19.41	48.94	57.65	38.24	0.0665	49.14	0.0132
SECTIONS	28.401 (11.181)	2.8448 (1.120)	21.20	47.09	57.11	35.90	0.0784	47.23	0.0136
	28.105 (11.065)	2.8448 (1.120)	24.50	44.65	56.73	32.22	0.0877	45.31	0.0139
	27.802 (10.946)	2.8448 (1.120)	29.20	41.62	56.48	27.27	0.0931	43.35	0.0143
	27.481 (10.819)	2.8448 (1.120)	34.81	38.18	56.24	21.43	0.0957	41.26	0.0147
	27.307 (10.751)	2.8448 (1.120)	37.93	36.29	56.11	18.18	0.0960	40.13	0.0150

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.921 (11.780)	2.7180 (1.070)	27.60	55.53	65.69	38.09	0.0380	59.98	0.0110
	29.797 (11.731)	2.7178 (1.070)	25.70	55.57	64.94	39.24	0.0391	59.03	0.0112
	29.576 (11.644)	2.7174 (1.070)	23.68	55.28	63.95	40.27	0.0411	57.34	0.0115
ROTOR 8	29.304 (11.537)	2.7168 (1.070)	22.74	54.55	63.08	40.34	0.0438	55.26	0.0120
84 BLADES	29.045 (11.435)	2.7164 (1.069)	22.15	53.82	62.32	40.16	0.0466	53.28	0.0123
	28.792 (11.335)	2.7162 (1.069)	21.98	52.96	61.66	39.68	0.0497	51.35	0.0127
PLANE	28.541 (11.237)	2.7159 (1.069)	22.26	51.87	61.10	38.84	0.0532	49.43	0.0131
SECTIONS	28.290 (11.138)	2.7155 (1.069)	23.08	50.67	60.67	37.59	0.0573	47.51	0.0135
	28.036 (11.038)	2.7152 (1.069)	24.57	49.16	60.34	35.77	0.0617	45.57	0.0139
	27.774 (10.935)	2.7147 (1.069)	26.97	47.23	60.05	33.09	0.0669	43.57	0.0143
	27.496 (10.825)	2.7144 (1.069)	30.70	44.74	59.77	29.07	0.0741	41.44	0.0147
	27.346 (10.766)	2.7141 (1.069)	33.32	43.16	59.65	26.33	0.0786	40.29	0.0149

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Table XXII. Airfoil Geometry Data for Final-Design Blading (Continued).

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.671 (11.681)	2.5400 (1.000)	27.53	56.94	67.06	39.53	0.0390	59.99	0.0110
	29.557 (11.637)	2.5400 (1.000)	26.41	56.55	66.30	39.89	0.0397	59.01	0.0112
	29.357 (11.558)	2.5400 (1.000)	24.76	56.11	65.34	40.58	0.0410	57.29	0.0115
ROTOR 9	29.112 (11.461)	2.5400 (1.000)	23.27	55.71	64.52	41.25	0.0426	55.19	0.0120
86 BLADES	28.881 (11.370)	2.5400 (1.000)	22.45	55.11	63.80	41.35	0.0442	53.21	0.0123
	28.656 (11.282)	2.5400 (1.000)	22.23	54.35	63.22	40.99	0.0462	51.28	0.0127
PLANE	28.434 (11.195)	2.5400 (1.000)	22.51	53.38	62.72	40.21	0.0488	49.38	0.0131
SECTIONS	28.212 (11.107)	2.5400 (1.000)	23.35	52.19	62.33	38.98	0.0520	47.47	0.0135
	27.985 (11.018)	2.5400 (1.000)	24.85	50.75	62.05	37.20	0.0566	45.53	0.0139
	27.751 (10.926)	2.5400 (1.000)	27.19	48.97	61.84	34.65	0.0625	43.52	0.0143
	27.502 (10.827)	2.5400 (1.000)	30.62	46.77	61.73	31.11	0.0697	41.38	0.0147
	27.367 (10.774)	2.5400 (1.000)	32.88	45.47	61.73	28.84	0.0741	40.23	0.0150

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.435 (11.588)	2.2860 (0.900)	29.17	57.49	68.48	39.32	0.0435	59.97	0.0110
	29.333 (11.548)	2.2860 (0.900)	27.39	57.52	67.80	40.41	0.0448	59.00	0.0112
	29.154 (11.478)	2.2860 (0.900)	25.36	57.30	66.84	41.48	0.0471	57.29	0.0115
ROTOR 10	28.935 (11.392)	2.2860 (0.900)	24.11	56.69	65.92	41.82	0.0500	55.20	0.0120
94 BLADES	28.728 (11.310)	2.2860 (0.900)	23.30	56.03	65.14	41.84	0.0525	53.23	0.0124
	28.528 (11.231)	2.2860 (0.900)	22.92	55.28	64.52	41.60	0.0550	51.31	0.0127
PLANE	28.329 (11.153)	2.2860 (0.900)	22.99	54.40	64.00	41.01	0.0588	49.42	0.0131
SECTIONS	28.130 (11.075)	2.2860 (0.900)	23.70	53.33	63.63	39.93	0.0653	47.51	0.0135
	27.926 (10.995)	2.2860 (0.900)	25.02	51.99	63.37	38.35	0.0742	45.57	0.0139
	27.715 (10.912)	2.2860 (0.900)	27.08	50.39	63.22	36.14	0.0812	43.55	0.0143
	27.490 (10.823)	2.2860 (0.900)	29.96	48.63	63.26	33.30	0.0846	41.40	0.0147
	27.368 (10.775)	2.2860 (0.900)	31.66	47.81	63.44	31.78	0.0850	40.24	0.0150

Table XXII. Airfoil Geometry Data for Final-Design Blading (Continued).

EEE CORE COMPRESSOR STATOR GEOMETRY

	SECT. HT.	CHORD	STAGGER	CLO	TM/C	%C TM	TTE/C
	35.876 (14.124)	6.2627 (2.466)	8.04	0.71	0.0850	35.00	0.0163
	34.848 (13.720)	6.1418 (2.418)	8.53	0.77	0.0850	35.00	0.0163
	33.810 (13.311)	6.0197 (2.370)	8.67	0.80	0.0850	35.00	0.0163
IGV	32.388 (12.751)	5.8526 (2.304)	8.32	0.79	0.0850	35.00	0.0163
32 VANES	30.905 (12.167)	5.6781 (2.235)	7.64	0.76	0.0850	35.00	0.0163
	29.339 (11.551)	5.4937 (2.163)	6.78	0.71	0.0850	35.00	0.0163
PLANE	27.671 (10.894)	5.2975 (2.086)	5.71	0.65	0.0850	35.00	0.0163
SECTIONS	25.875 (10.187)	5.0863 (2.002)	4.56	0.57	0.0850	35.00	0.0163
	23.910 (9.413)	4.8552 (1.911)	3.26	0.50	0.0850	35.00	0.0163
	21.687 (8.538)	4.5938 (1.803)	1.60	0.39	0.0850	35.00	0.0163
	18.994 (7.478)	4.2771 (1.684)	-1.02	0.22	0.0850	35.00	0.0163
	17.312 (6.816)	4.0793 (1.606)	-3.00	0.08	0.0850	35.00	0.0163

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	33.953 (13.367)	4.7199 (1.858)	40.43	33.51	54.40	13.97	0.1128	50.00	0.0120
	32.992 (12.989)	4.7163 (1.857)	38.83	29.36	49.45	10.62	0.1070	50.00	0.0120
	32.102 (12.639)	4.7198 (1.858)	37.58	27.27	46.70	9.12	0.1014	50.00	0.0120
STATOR 1	30.945 (12.183)	4.7166 (1.857)	37.19	26.10	44.93	7.74	0.0945	50.00	0.0120
50 VANES	29.785 (11.726)	4.7067 (1.853)	37.79	25.30	44.00	6.20	0.0881	50.00	0.0120
	28.605 (11.262)	4.6764 (1.841)	38.69	24.61	43.37	4.68	0.0818	50.00	0.0120
PLANE	27.396 (10.786)	4.6308 (1.823)	39.73	23.98	42.84	3.11	0.0759	49.99	0.0120
SECTIONS	26.146 (10.294)	4.5615 (1.796)	40.99	23.62	42.46	1.47	0.0702	50.15	0.0120
	24.844 (9.781)	4.4713 (1.760)	42.34	23.24	42.10	-0.24	0.0656	51.80	0.0123
	23.468 (9.239)	4.3588 (1.716)	43.79	22.84	41.81	-1.98	0.0625	55.57	0.0131
	21.977 (8.652)	4.2193 (1.661)	44.55	22.94	41.67	2.89	0.0606	61.32	0.0142
	21.167 (8.333)	4.1406 (1.630)	44.60	23.28	41.67	-2.93	0.0599	64.90	0.0150

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	33.071 (13.020)	3.8053 (1.498)	39.41	37.21	58.87	19.45	0.0958	50.00	0.0120
	32.354 (12.738)	3.7228 (1.466)	38.23	30.95	52.02	13.79	0.0958	50.00	0.0120
	31.699 (12.480)	3.6477 (1.436)	36.58	27.88	48.12	11.55	0.0958	50.00	0.0120
STATOR 2	30.860 (12.149)	3.5507 (1.398)	34.71	26.62	45.93	11.23	0.0955	50.00	0.0120
68 VANES	30.027 (11.822)	3.4548 (1.360)	33.55	26.20	44.94	11.39	0.0943	50.00	0.0120
	29.189 (11.492)	3.3693 (1.326)	32.86	26.05	44.45	11.59	0.0920	50.00	0.0120
PLANE	28.342 (11.158)	3.3155 (1.305)	32.35	26.06	44.19	11.84	0.0884	50.00	0.0120
SECTIONS	27.483 (10.820)	3.2987 (1.299)	31.87	26.17	44.02	12.14	0.0829	50.00	0.0120
	26.607 (10.475)	3.2998 (1.299)	31.65	26.45	43.98	12.33	0.0749	50.00	0.0120
	25.701 (10.118)	3.3009 (1.300)	30.71	27.99	44.64	13.93	0.0648	50.00	0.0120
	24.737 (9.739)	3.3007 (1.300)	29.34	31.51	46.81	17.46	0.0528	50.00	0.0120
	24.219 (9.535)	3.3008 (1.300)	28.57	34.05	48.50	19.93	0.0462	50.00	0.0120

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	32.364 (12.742)	3.1331 (1.234)	34.46	39.86	59.05	24.59	0.0898	50.00	0.0120
	31.814 (12.525)	3.0798 (1.213)	33.44	32.38	51.06	17.63	0.0898	50.00	0.0120
	31.324 (12.332)	3.0323 (1.194)	33.00	28.87	47.33	14.34	0.0898	50.00	0.0120
STATOR 3	30.702 (12.087)	2.9721 (1.170)	31.74	27.50	45.33	13.60	0.0898	50.00	0.0120
82 VANES	30.088 (11.846)	2.9115 (1.146)	31.20	27.23	44.80	13.60	0.0897	50.00	0.0120
	29.473 (11.603)	2.8593 (1.126)	31.07	27.17	44.67	13.60	0.0890	50.00	0.0120
PLANE	28.853 (11.359)	2.8306 (1.114)	31.12	27.19	44.72	13.60	0.0872	50.00	0.0120
SECTIONS	28.227 (11.113)	2.8205 (1.110)	31.17	27.26	44.77	13.60	0.0840	50.00	0.0120
	27.593 (10.863)	2.8179 (1.109)	31.53	27.53	45.09	13.56	0.0793	50.00	0.0120
	26.939 (10.606)	2.8182 (1.110)	31.35	28.97	46.47	14.62	0.0736	50.00	0.0120
	26.239 (10.330)	2.8184 (1.110)	29.65	33.73	49.83	20.18	0.0667	50.00	0.0120
	25.855 (10.179)	2.8184 (1.110)	27.89	37.86	52.91	25.02	0.0626	50.00	0.0120

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Table XXII. Airfoil Geometry Data for Final-Design Blading (Continued).

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	31.726 (12.490)	2.7027 (1.064)	35.04	40.91	60.39	25.35	0.0998	50.00	0.0120
	31.287 (12.318)	2.6654 (1.049)	33.74	33.39	52.23	18.49	0.0970	50.00	0.0120
	30.900 (12.165)	2.6324 (1.036)	32.80	29.89	48.25	15.45	0.0944	50.00	0.0120
STATOR 4	30.411 (11.973)	2.5908 (1.020)	31.95	28.41	46.35	14.40	0.0911	50.00	0.0120
92 VANES	29.932 (11.784)	2.5494 (1.004)	31.54	28.22	45.96	14.42	0.0880	50.00	0.0120
	29.454 (11.596)	2.5126 (0.989)	31.47	28.20	45.90	14.43	0.0849	50.00	0.0120
PLANE	28.973 (11.407)	2.4919 (0.981)	31.40	28.23	45.90	14.50	0.0817	50.00	0.0120
SECTIONS	28.491 (11.217)	2.4874 (0.979)	31.34	28.30	45.94	14.60	0.0785	50.00	0.0120
	28.004 (11.025)	2.4891 (0.980)	31.38	28.42	46.08	14.70	0.0755	50.00	0.0120
	27.505 (10.829)	2.4882 (0.980)	31.60	29.66	47.43	15.83	0.0722	50.00	0.0120
	26.971 (10.619)	2.4885 (0.980)	32.00	34.45	52.42	20.42	0.0686	50.00	0.0120
	26.675 (10.502)	2.4881 (0.980)	32.20	39.53	57.59	25.39	0.0666	50.00	0.0120

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	31.167 (12.270)	2.4513 (0.965)	40.18	40.99	61.08	20.90	0.0999	42.00	0.0120
	30.798 (12.125)	2.4224 (0.954)	37.67	34.03	52.86	15.19	0.1000	42.00	0.0120
	30.475 (11.998)	2.3969 (0.944)	36.44	30.94	49.16	12.73	0.0999	42.00	0.0120
STATOR 5	30.069 (11.838)	2.3649 (0.931)	35.39	29.30	46.99	11.60	0.1000	42.00	0.0120
110 VANES	29.672 (11.682)	2.3339 (0.919)	35.23	28.96	46.58	11.35	0.0997	42.00	0.0120
	29.278 (11.527)	2.3110 (0.910)	35.56	28.83	46.61	11.05	0.0988	42.00	0.0120
PLANE	28.883 (11.371)	2.3019 (0.906)	35.79	28.74	46.64	10.85	0.0970	42.00	0.0120
SECTIONS	28.487 (11.215)	2.2978 (0.905)	36.22	28.79	46.91	10.68	0.0932	42.00	0.0120
	28.087 (11.058)	2.2962 (0.904)	37.10	29.14	47.69	10.59	0.0878	42.00	0.0120
	27.678 (10.897)	2.2962 (0.904)	38.47	30.63	49.87	11.40	0.0813	42.00	0.0120
	27.238 (10.723)	2.2962 (0.904)	39.89	35.55	55.50	15.61	0.0743	42.00	0.0120
	26.993 (10.627)	2.2962 (0.904)	40.76	40.09	60.47	19.71	0.0703	42.00	0.0120

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	30.585 (12.041)	2.2404 (0.882)	42.62	37.04	58.36	15.74	0.1090	42.00	0.0120
	30.340 (11.945)	2.2216 (0.875)	39.95	32.45	52.44	12.49	0.1063	42.00	0.0120
	30.071 (11.839)	2.2018 (0.867)	38.93	29.01	48.48	9.55	0.1035	42.00	0.0120
STATOR 6	29.732 (11.706)	2.1745 (0.856)	38.86	26.51	45.81	6.95	0.0999	42.00	0.0120
120 VANES	29.404 (11.576)	2.1496 (0.846)	39.42	25.59	45.00	5.58	0.0963	42.00	0.0120
	29.079 (11.448)	2.1260 (0.837)	40.12	25.10	44.70	4.58	0.0929	42.00	0.0120
PLANE	28.754 (11.321)	2.1128 (0.832)	40.83	24.62	44.42	3.59	0.0894	42.00	0.0120
SECTIONS	28.429 (11.193)	2.1097 (0.831)	41.55	24.18	44.18	2.63	0.0860	42.00	0.0120
	28.102 (11.064)	2.1072 (0.830)	42.49	24.04	44.35	1.86	0.0825	42.00	0.0120
	27.767 (10.932)	2.1074 (0.830)	44.05	25.01	45.95	1.90	0.0789	42.00	0.0120
	27.411 (10.792)	2.1053 (0.829)	46.00	28.72	50.47	4.47	0.0751	42.00	0.0120
	27.216 (10.715)	2.1049 (0.829)	47.24	32.55	54.85	7.60	0.0730	42.00	0.0120

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	30.152 (11.871)	2.3682 (0.932)	47.91	37.79	61.75	13.84	0.0949	42.00	0.0143
	29.943 (11.789)	2.3518 (0.926)	45.43	32.91	55.62	10.20	0.0930	42.00	0.0133
	29.714 (11.699)	2.3336 (0.919)	43.77	29.44	51.32	7.55	0.0907	42.00	0.0126
STATOR 7	29.428 (11.586)	2.3119 (0.910)	42.59	26.96	48.25	5.66	0.0878	42.00	0.0122
112 VANES*	29.153 (11.477)	2.2946 (0.903)	42.19	25.74	46.84	4.65	0.0852	42.00	0.0120
	28.881 (11.371)	2.2835 (0.899)	42.31	25.31	46.45	4.13	0.0824	42.00	0.0120
PLANE	28.611 (11.264)	2.2788 (0.897)	42.48	24.92	46.29	3.80	0.0798	42.00	0.0120
SECTIONS	28.340 (11.157)	2.2780 (0.897)	42.94	24.41	46.37	3.44	0.0772	42.00	0.0120
	28.066 (11.050)	2.2782 (0.897)	44.04	24.36	47.26	3.22	0.0745	42.00	0.0120
	27.784 (10.939)	2.2784 (0.897)	46.33	25.42	49.85	3.52	0.0717	42.00	0.0121
	27.484 (10.821)	2.2784 (0.897)	50.08	28.76	55.47	5.38	0.0687	42.00	0.0128
	27.322 (10.757)	2.2784 (0.897)	52.43	31.85	59.93	7.51	0.0671	42.00	0.0134

Table XXII. Airfoil Geometry Data for Final-Design Blading (Concluded).

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.793 (11.729)	2.6465 (1.042)	50.91	36.66	62.11	11.20	0.1000	42.00	0.0165
	29.676 (11.683)	2.6001 (1.024)	50.09	33.99	59.03	8.94	0.0968	42.00	0.0155
	29.468 (11.601)	2.5308 (0.996)	48.58	30.42	54.71	6.12	0.0910	42.00	0.0136
STATOR 8	29.211 (11.500)	2.4700 (0.972)	46.93	27.70	51.17	4.24	0.0837	42.00	0.0125
104 VANES	28.966 (11.404)	2.4334 (0.958)	46.12	26.11	48.17	3.05	0.0779	42.00	0.0121
	28.728 (11.310)	2.4068 (0.948)	45.99	25.34	48.31	2.32	0.0747	42.00	0.0120
PLANE	28.492 (11.217)	2.3882 (0.940)	46.08	24.93	48.07	1.99	0.0733	42.00	0.0120
SECTIONS	28.255 (11.124)	2.3825 (0.938)	46.51	24.54	48.27	1.76	0.0732	42.00	0.0120
	28.014 (11.029)	2.3861 (0.939)	47.66	24.53	49.22	1.54	0.0745	42.00	0.0120
	27.766 (10.932)	2.4048 (0.947)	49.75	25.28	51.39	1.65	0.0766	42.00	0.0123
	27.503 (10.828)	2.4441 (0.962)	53.12	27.61	55.81	2.69	0.0788	42.00	0.0134
	27.360 (10.772)	2.4760 (0.975)	55.48	29.71	59.30	3.82	0.0799	42.00	0.0141

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.552 (11.635)	2.3158 (0.912)	54.09	37.98	65.03	10.94	0.1000	42.00	0.0158
	29.444 (11.592)	2.2809 (0.898)	53.18	35.06	61.65	8.47	0.0966	42.00	0.0147
	29.255 (11.518)	2.2293 (0.878)	51.56	31.23	57.01	5.45	0.0906	42.00	0.0132
STATOR 9	29.023 (11.427)	2.1844 (0.860)	49.59	28.36	53.15	3.56	0.0836	42.00	0.0123
118 VANES	28.804 (11.340)	2.1585 (0.850)	48.08	26.74	50.78	2.70	0.0781	42.00	0.0121
	28.591 (11.256)	2.1425 (0.843)	47.36	26.01	49.67	2.31	0.0748	42.00	0.0120
PLANE	28.381 (11.174)	2.1310 (0.839)	47.39	25.65	49.44	2.05	0.0734	42.00	0.0120
SECTIONS	28.170 (11.091)	2.1236 (0.836)	48.09	25.40	49.91	1.82	0.0733	42.00	0.0120
	27.955 (11.006)	2.1214 (0.835)	49.66	25.53	51.20	1.55	0.0746	42.00	0.0121
	27.732 (10.918)	2.1330 (0.840)	52.20	26.33	53.65	1.45	0.0765	42.00	0.0126
	27.495 (10.825)	2.1706 (0.855)	55.48	28.55	57.92	2.43	0.0787	42.00	0.0138
	27.366 (10.774)	2.2033 (0.867)	57.29	30.50	60.99	3.69	0.0799	42.00	0.0145

	SECT. HT.	CHORD	CAMBER	STAGGER	BETA1*	BETA2*	TM/C	%C TM	TTE/C
	29.350 (11.555)	2.5360 (0.998)	73.54	28.45	64.47	-9.07	0.0750	42.00	0.0120
	29.257 (11.518)	2.4659 (0.971)	68.34	26.67	60.31	-8.03	0.0743	42.00	0.0120
	29.089 (11.452)	2.3572 (0.928)	61.12	23.75	54.44	-6.67	0.0730	42.00	0.0120
STATOR 10	28.881 (11.370)	2.2496 (0.886)	55.08	21.12	49.58	-5.50	0.0715	42.00	0.0120
140 VANES	28.682 (11.292)	2.1732 (0.856)	51.88	19.59	46.94	-4.94	0.0700	42.00	0.0120
	28.488 (11.216)	2.1255 (0.837)	50.56	18.87	45.74	-4.82	0.0685	42.00	0.0120
PLANE	28.295 (11.140)	2.1095 (0.831)	50.55	18.90	45.70	-4.86	0.0671	42.00	0.0120
SECTIONS	28.100 (11.063)	2.1278 (0.838)	51.73	19.65	46.68	-5.04	0.0656	42.00	0.0120
	27.902 (10.985)	2.1773 (0.857)	54.11	20.86	48.57	-5.54	0.0641	42.00	0.0120
	27.698 (10.905)	2.2588 (0.889)	58.52	22.76	52.06	-6.46	0.0626	42.00	0.0120
	27.480 (10.819)	2.3801 (0.937)	66.20	25.79	58.24	-7.96	0.0609	42.00	0.0120
	27.364 (10.773)	2.4582 (0.968)	71.28	27.85	62.58	-8.70	0.0601	42.00	0.0120

END

DATE

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JAN 16 1985