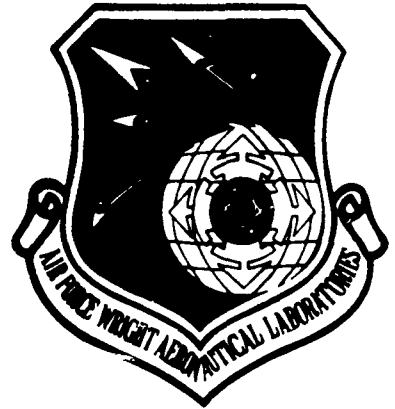


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AFWAL-TR-82-2017



TRANSONIC FAN/COMPRESSOR ROTOR DESIGN STUDY

Volume V

D.E. Parker and M.R. Simonson
General Electric Company
Aircraft Engine Business Group
Advanced Technology Programs Dept.
Cincinnati, Ohio 45215

February 1982

Final Report for Period September 1980 - February 1982

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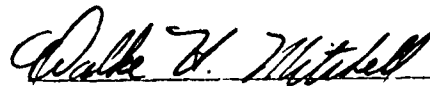
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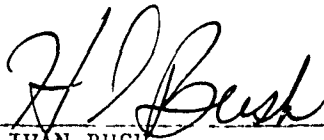


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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AFWAL-TR-82-2017	2. GOVT ACCESSION NO. AD-B069405L	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Transonic Fan/Compressor Rotor Design Study Volume V		5. TYPE OF REPORT & PERIOD COVERED Final Technical Report September 1980 - July 1982
		6. PERFORMING ORG. REPORT NUMBER R82AEB328, Volume V
7. AUTHOR(s) D.E. Parker M.R. Simonson		8. CONTRACT OR GRANT NUMBER(s) F33615-80-C-2059
9. PERFORMING ORGANIZATION NAME AND ADDRESS General Electric Company Aircraft Engine Business Group Cincinnati, Ohio 45215		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS Project 2307 Task S1 Work Unit 38
11. CONTROLLING OFFICE NAME AND ADDRESS Aero Propulsion Laboratory (AFWAL/POT) Air Force Wright Aeronautical Laboratories Air Force System Command Wright-Patterson Air Force Base, Ohio 45433		12. REPORT DATE <i>September</i> 1982
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES 117
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Distribution limited to U.S. Government agencies only: Test and Evaluation, <i>September 1982</i> Other requests for this document must be referred to Air Force Aero Propulsion Laboratory (AFWAL/POTX), Wright-Patterson AFB, OH 45433.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Fan Aircraft Engines Compressor Blade Thickness Rotor Camber Distribution Aerodesign Throat Margin Aerodynamics		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Volumes I through VI of this report describes the aerodynamic design of a series of five transonic rotors all parametrically related to a baseline design documented in Technical Report AFAPL-TR-79-2078. Each of the five designs deviate from the base line, in so far as practical, by a variation of one parameter only. The parametric variations are specified at the rotor tip. The original hub characteristics were pre- served to the maximum extent practical. The varied parameter was adjusted		

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along the span.

→ This volume describes the aerodynamic design details of the Phase IV rotor. The Phase IV rotor as well as the Phase III rotor described in detail in Volume IV of this report, was designed to have a steeper average suction surface angle in the supersonic region ahead of the shock than the baseline rotor. This results in a smaller cascade throat area in the outer 80% of the blade than the baseline rotor. While the throat areas of the Phase III and Phase IV rotors are essentially the same, the Phase IV blade has some what less external compression and some what more internal compression. As a result, the Phase IV blade has less suction surface (and meanline) curvatures in the region of the cascade mouth than does the Phase III rotor.

The hub region was kept essentially the same as the baseline rotor. The location of maximum airfoil thickness is 70% of length at the tip and 56% at the hub which is the same as the baseline rotor. ←

VOLUME V

PHASE IV ROTOR DESIGN

Foreword

This Final Technical Report was prepared by the Advanced Technology Programs Department, Aircraft Engine Business Group, General Electric Company, Evendale, Ohio for the United States Air Force Systems Command, Air Force Wright Aeronautical Laboratories Wright-Patterson Air Force Base, Ohio under Contract F33615-80-C-2059. The work was performed over a period of one year starting in September 1980. Effren Strain (Captain USAF) was the Air Force Project Engineer for this program.

This report describes the results of an effort to aerodynamically define five rotor designs, all parametrically related to a base line design which could be evaluated by future testing in order to define the sensitivity of transonic blade rows to several design variables.

For the General Electric Company Mr. D.E. Parker was the Technical Program Manager for this program. Mr. M.R. Simonson was the principal investigator. Mr. A.J. Bilhardt was the overall Program Manager.



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LIST OF SYMBOLS AND ABBREVIATIONS

1. Used in Circumferential Average Flow Output Tables

STA	calculation station number	
WTF	total airflow	
PSIC	stream function (0 = tip (OD), 1 = hub (ID))	
Z	axial location	inches
R	radius	inches
PHI	streamline slope	degrees
CURV	streamline curvature  = neg.,  = pos.	1/inches
VM	meridional velocity	ft/sec
CU	absolute tangential velocity	ft/sec
ALPHAM	absolute flow angle on stream surface	degrees
MM	meridional Mach number	
SL	calculation streamline number	
BLDBLK	flow blockage factor	(free area - blocked area)/free area
PS	static pressure	psia
PT	total pressure	psia
TT	total temperature	degrees
BETAM	relative flow angle on stream surface	degrees
UREL	relative velocity	ft/sec
MREL	relative Mach number	
VABS	absolute velocity	ft/sec
MABS	absolute Mach number	
GAMMA	specific heat ratio	
PT-RAT	total pressure/inlet total pressure	
TT-RAT	total temperature/inlet total temperature	
RCU	radius x tangential velocity	in-ft/sec
CZ	axial velocity	ft/sec
PCT IMM	percent annulus immersion from tip (OD)	
RAD	average of leading and trailing edge streamline radii	inches
ACC PT RATIO	cumulative total pressure ratio	
ACC TT RATIO	cumulative total temperature ratio	

LIST OF SYMBOLS AND ABBREVIATIONS

1. Used in Circumferential Average Flow Output Tables (Cont'd)

AD.	adiabatic efficiency
POLY	polytropic efficiency
Axial VEL R	axial velocity ratio across blade row

2. Used in Stream Surface Blade Coordinate Tables

PT	point number	
PCT X	fraction of meridional distance from leading edge	
X	meridional coordinate on meanline	inches
Y	tangential coordinate on meanline	inches
B*M	meanline angle on stream surface	degrees
T(M)	thickness of blade perpendicular to meanline	inches
XS	meridional coordinate on suction surface	inches
YS	tangential coordinate on suction surface	inches
XP	meridional coordinate on pressure surface	inches
YP	tangential coordinate on pressure surface	inches

3. Used in Plane Section Coordinate Tables

Z	axial coordinate of stacking axis	inches
R	radius of coordinate system origin	inches
MU	tilt angle in axial direction	degrees
ETA	tilt angle in tangential direction	degrees
RHO	section height	inches
PT	point number	
ALPHA	axial coordinate	inches
ZETA*	meanline angle from axial	degrees
UPSILON	coordinate perpendicular to ALPHA and radius	inches
PCT AL	fraction of axial distance from leading edge	
T/C	local thickness/chord ratio	

SECTION XVI
DESIGN OF PHASE IV ROTOR

1. INTRODUCTION

The efficiency of a transonic rotor is influenced by shock losses as well as losses due to cascade diffusion and secondary flow effects. The magnitude of the shock losses increase rapidly as the inlet Mach number increases. The average Mach number just ahead of the leading edge passage shock is influenced by the shape of the blade suction surface ahead of the shock. Increasing the average suction surface angle ahead of the shock reduces the average Mach number ahead of the shock and presumably reduces the shock losses. However, this results in a reduced cascade throat area. If the throat is too small, the cascade will not pass the design flow and may not achieve the attached shock pattern which is desired for minimum loss.

Also if the blade suction surface angle is made steep ahead of the cascade mouth, or covered portion, it may be necessary to have a rapid change in blade meanline angle at the cascade mouth to prevent the throat from becoming too small within the covered channel. A rapid change of suction surface angle increases the surface Mach number ahead of the shock and tends to worsen the shock-boundary layer interaction. This consideration may influence the optimum throat margin for best efficiency.

For cascades having an inlet Mach number greater than about 1.3, it is possible to achieve a net precompression of the flow ahead of the passage shock and still maintain a throat area sufficiently large to pass the flow.

The maximum flow that a transonic cascade can pass is set by the average suction surface angle in the flow induction region ahead of the first captured Mach wave, provided that the throat area is sufficient and not limiting. Hence any increase in suction surface angle must take place aft of the flow induction region or there will be a reduction of flow.

To get more definitive data on the effect of the suction surface shape ahead of the leading edge passage shock, and on the interrelation of the suction surface shape and the cascade throat area, the Phase III and the Phase IV blades were designed to have smaller throat areas in the outer 80% of the blade than the base line rotor. While the throat areas of the Phase III and Phase IV rotors were essentially the same, the Phase IV blade has some what less external compression and some what more internal compression. As a result, the Phase IV

blade has less suction surface (and meanline) curvatures in the region of the cascade mouth than does the Phase III rotor.

2. DESIGN PROCEDURE

The "data match" circumferential average flow solution and the Stream Surface Blade Sections (SBS) analysis of the baseline rotor previously described in Volume I were used as a starting point for the design of the Phase IV rotor. Since both the Phase III and Phase IV rotors incorporated reduced throat area in the outer portion of the blade many of the design assumptions were kept the same for the two rotors. For both rotors, a higher efficiency was assumed for the outer 80% of the flow since it was believed that these blades should reduced shock losses relative to the baseline rotor. The rotor exit total pressure was maintained the same as the baseline rotor while the total temperature was reduced to reflect the assumed higher efficiency. The assumed chord-wise distribution of work was iteratively adjusted for the Phase III rotor to obtain a calculated chord-wise distribution of static pressure which had a shape similar to that of the data match calculations of the baseline rotor. However, the level of static pressure was higher in the outer portion at the rotor exit as a result of the assumed higher efficiency and consequent reduced energy input of the Phase III and IV rotors. The chord-wise distribution of work input was maintained the same for the Phase IV rotor as for the Phase III rotor. Since the blade thickness distributions were the same for both rotors, the calculated static pressure distributions were nearly the same.

The resulting streamline static pressure distribution for the Phase IV blade is compared with the data match of the baseline rotor on Figure 56.

The assumed streamline work input (as a fraction of the total streamline work) is plotted versus axial projection in Figure 57. The assumed Phase IV and Phase III work inputs are the same as previously mentioned. In Figure 57, the tip streamline is the one on the left. Each subsequent streamline is indexed to the right by the value of its stream function (fraction of the total flow from the tip). The dashed lines are lines of constant percent axial projection.

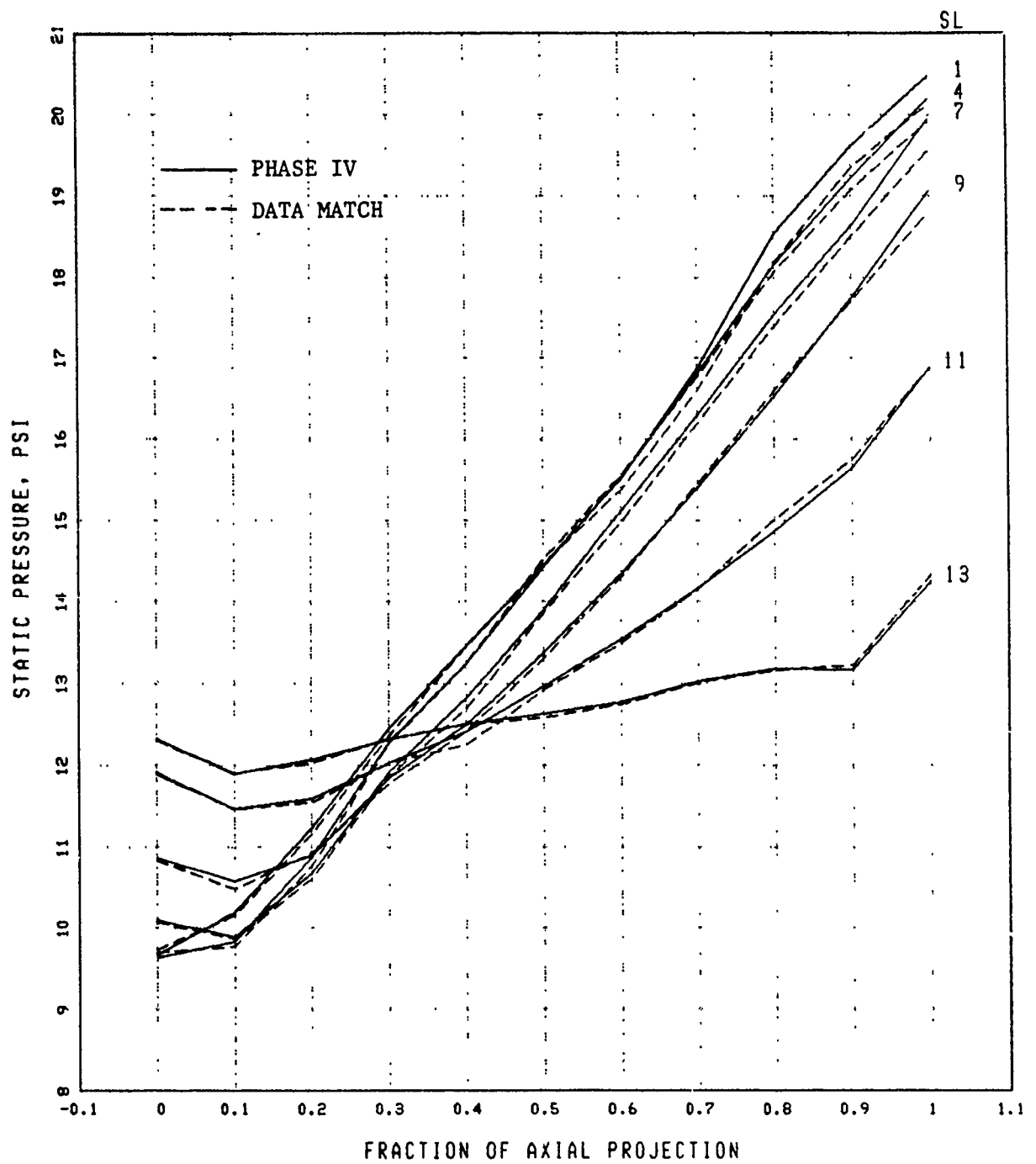


Figure 56 . Phase IV Rotor Static Pressure Distribution

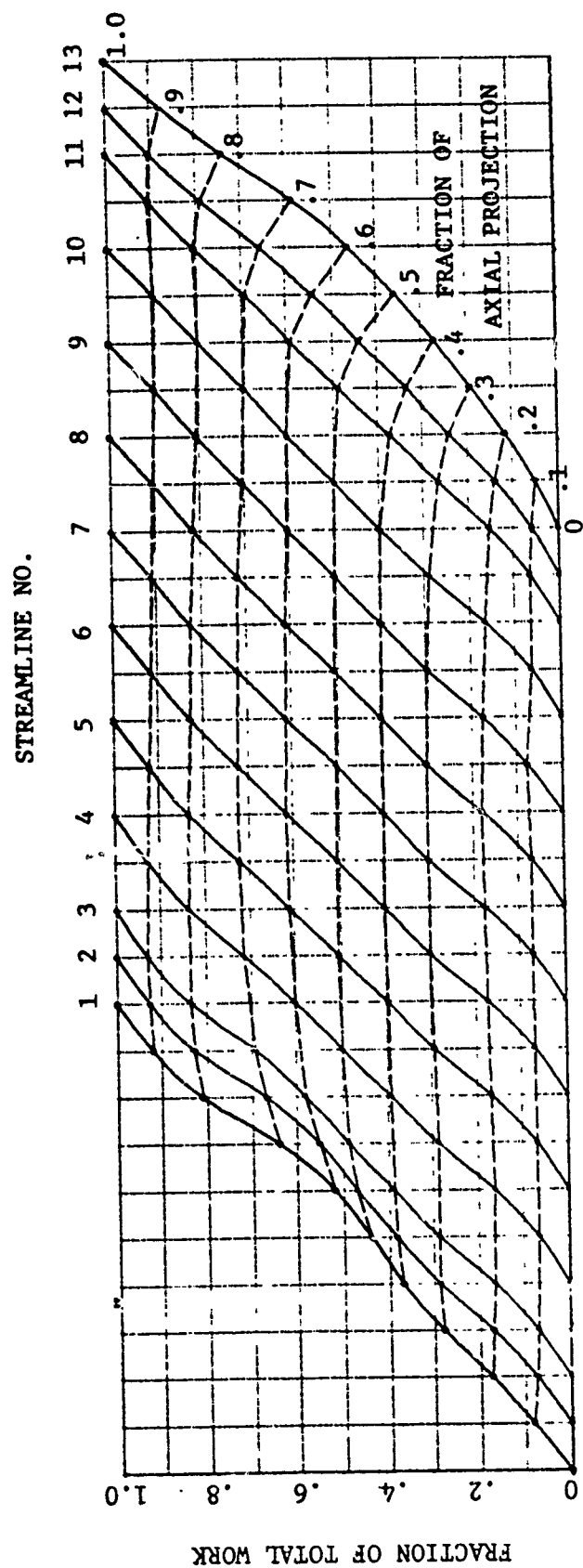


Figure 57. Phase IV Rotor Intrablade Work Distribution

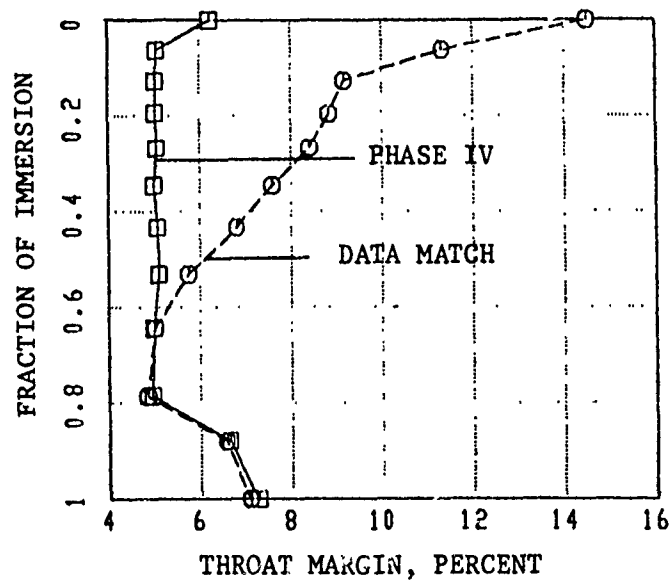


Figure 58. Phase IV Rotor Throat Margin Compared With Data Match

The blade meanline departure angles (the difference between the air angle and the meanline angle) were adjusted to achieve the desired suction surface contour in the forward part of the blade and yet maintain sufficient throat area to pass the desired flow.

After each modification to the chordwise work distribution and/or departure angles, revised blade annulus blockage and blade lean angles were calculated and input to the circumferential Average Flow Determination (CAFD) computer program for the next iteration.

A method of characteristics computer program was used to analyze the flow in the cascade flow induction region for streamlines 3 and 6 to assure that the rotor would achieve the design flow. For other streamlines the difference between the suction surface angle and the "free-flow" streamline angle was compared with similar data from the data match calculations of the baseline rotor. This, then, was used as a guide in setting the suction surface angle in the flow induction region.

Figure 58 shows the radial distribution of the Phase IV rotor throat margin compared with the data match above. Both the Phase III and IV rotors have essentially 5 percent throat margin in the outer 80% span, except locally at the tip where the margin is a little over 6 percent. The throat margin for a stream-surface blade section is defined here as the percent of excess throat area over and above the minimum theoretical area required to pass the streamtube flow at a throat Mach number of 1.0 and assuming a total pressure loss equivalent to a normal shock at the upstream Mach number. In a rotor the effect of radius change (between the leading edge and throat) on the relative total enthalpy and pressure is included.

The radial variation of incidence angle for the Phase IV blade is shown on Figure 59. Both the Phase III and Phase IV incidence angles are nearly the same as the data match of the baseline rotor.

A modified version of Carter's Rule was used to calculate a reference deviation angle for the baseline rotor. This procedure converts the vector diagrams (from the data match calculations) to an equivalent two-dimensional set of vectors which would produce the same circulation as the actual blade taking into account the change in streamline radius and meridional velocity. The

difference between the deviation angle implied by the data match calculations and the reference deviation angle was then added to the reference deviation angle calculated from the modified Carter's Rule for the Phase IV blade.

The radial distribution of the Phase IV rotor deviation angle is shown on Figure 60 and the deviation angle minus the reference deviation angle is compared with the data match values in Figure 61.

A plot of departure angles for each streamsurface section is shown in Figure 62. Once the intrablade work distribution was chosen these departure angles were required to satisfy the desired incidence angles, deviation angles, and passage area ratios. The resulting streamsurface tip section of the Phase IV rotor is compared to that of the baseline rotor in Figure 63.

The radial distribution of the stator incidence angle for the Phase IV rotor is compared with the data match of the baseline rotor in Figure 64. The lower stator incidence angle in the outer 40 percent of span for the Phase IV design is largely the result of the assumed higher efficiency in the outer portion of the rotor.

Details of the Phase IV rotor design are given in Section XVIII.

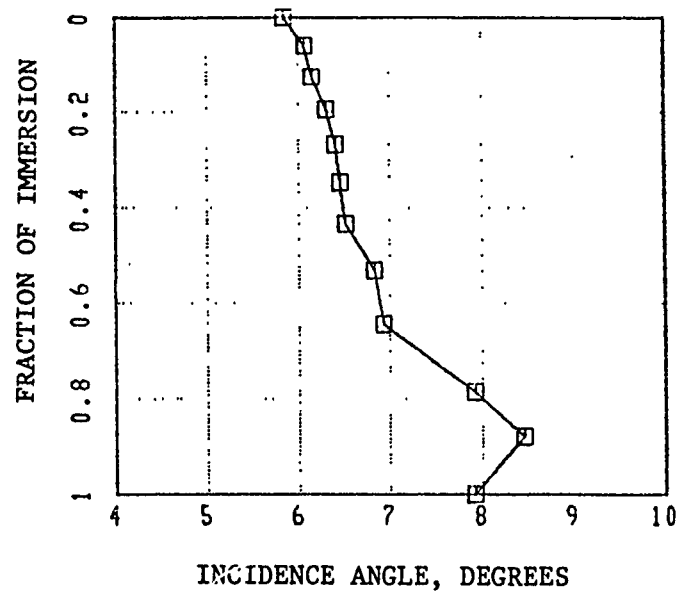


Figure 59. Phase IV Rotor Incidence Angle Versus Fractional Immersion

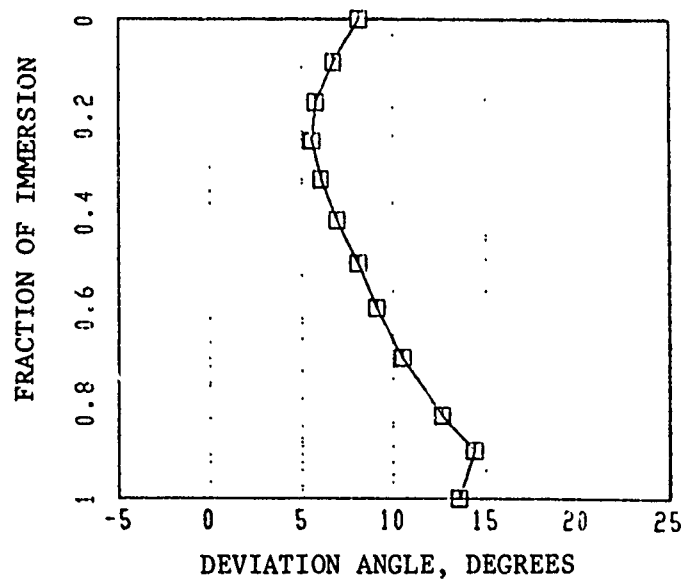


Figure 60. Phase IV Rotor Deviation Angle Versus Fractional Immersion

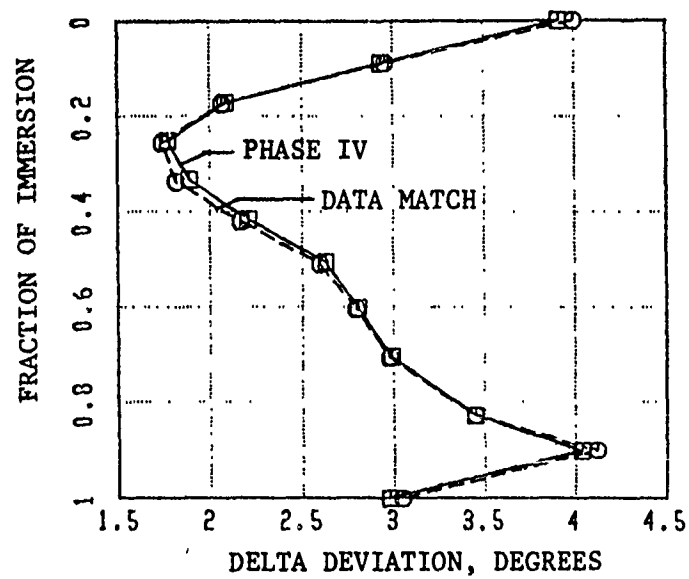


Figure 61. Phase IV Rotor Deviation Angle Minus Reference Deviation Angle

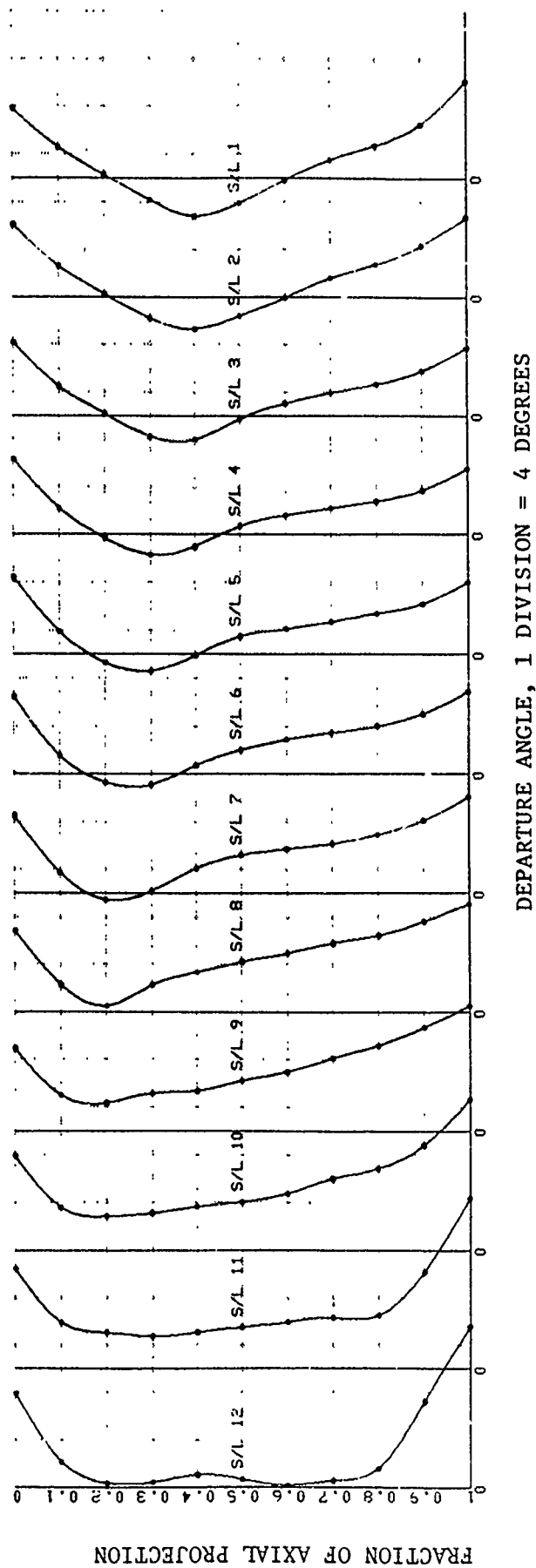


Figure 62. Phase IV Rotor Intrablade Departure Angle Distribution

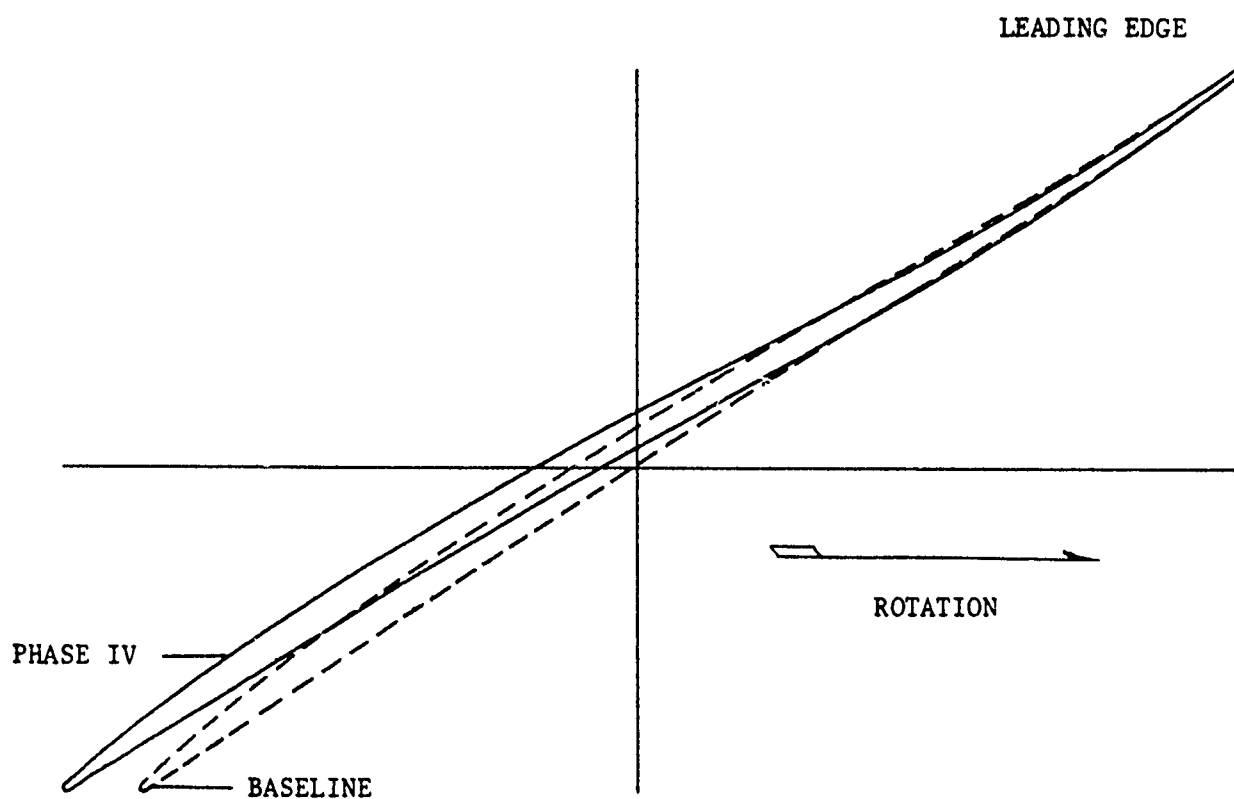


Figure 63. Phase IV Rotor Streamsurface Tip Section Compared with Baseline Design

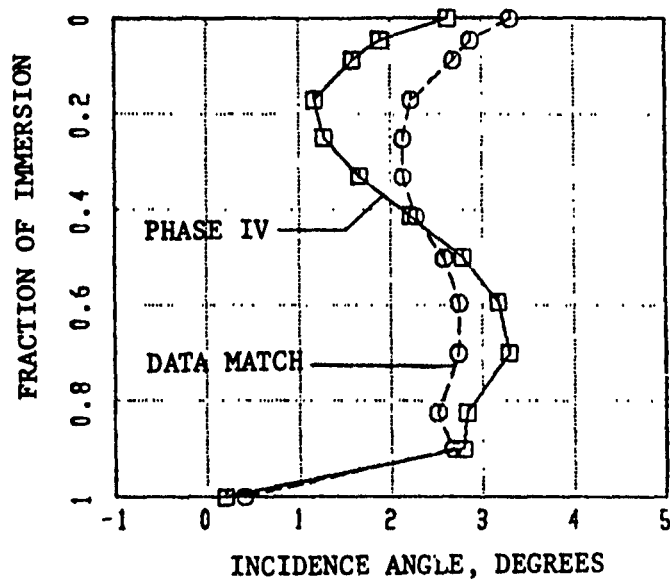


Figure 64. Phase IV Stator Incidence Angle Compared With Data Match

SECTION XVII
DETAILS OF PHASE IV ROTOR DESIGN

1. CIRCUMFERENTIAL AVERAGE FLOW SOLUTION

The following tabulation presents the detail results of the Phase IV rotor circumferential average flow computation. Each page of the tabulation gives results for one calculation station. Figure 65 shows the calculation station locations within the gas flowpath. At each calculation station various aerodynamic parameters are given on each of thirteen calculation streamlines. Also given are several mass averaged station flow properties. The Phase IV rotor blade forces are included at the end of this tabulation.

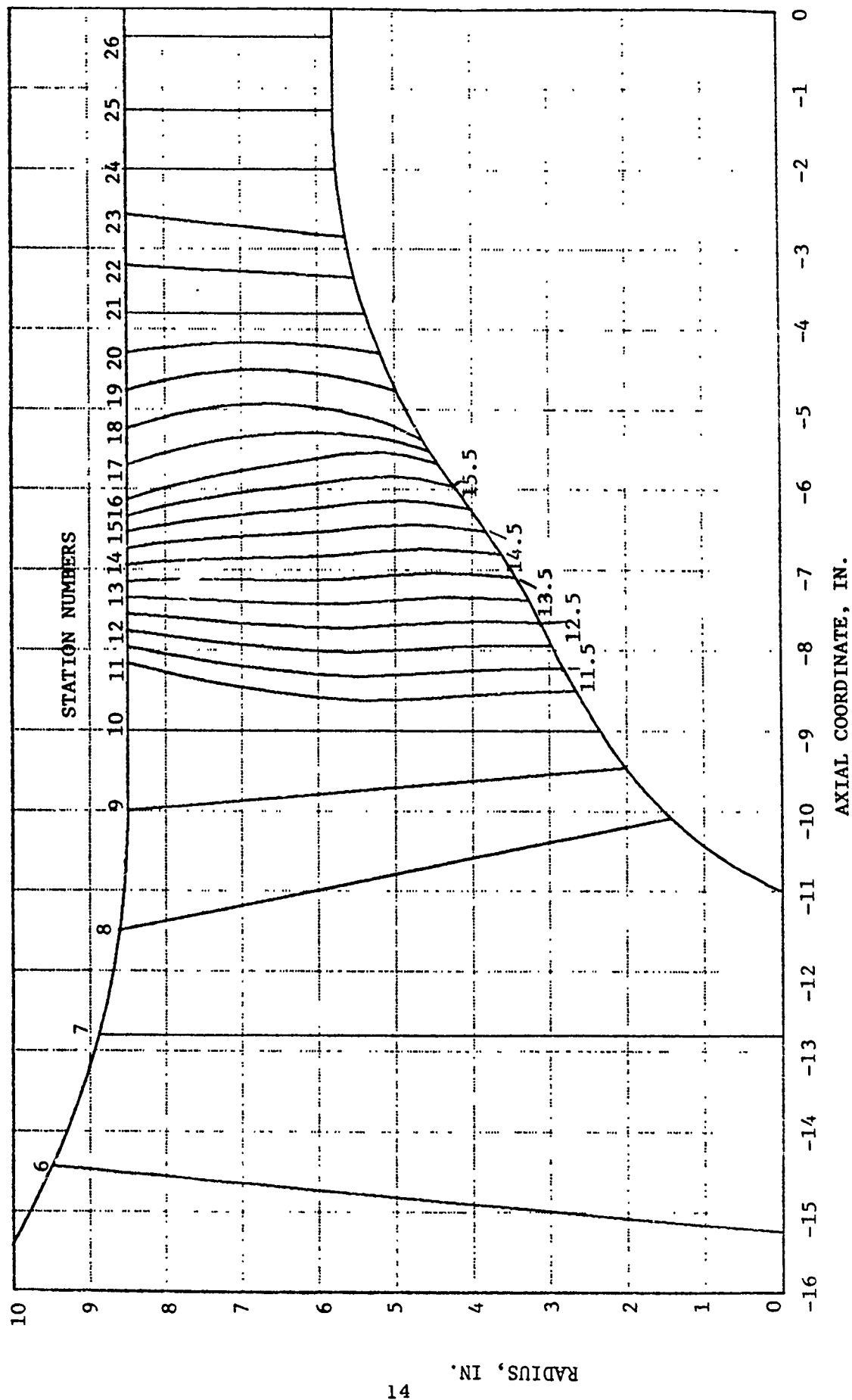


Figure 65. Compressor Flowpath With Calculation Stations

INLET STA= 5.000
 WTF= 61.365 I= 1 OPTX=DPP OPTV=FREE AFLOW= 478.13 D+C=O. D*H=O.
 PSIC Z R PHI CURV VM CU ALPHAM ABH=O. MM
 0. -18.800 13.207 -50.10 0.0831 150.4 0. 0. 0.135
 0.050 -18.800 12.564 -43.54 0. 181.0 0. 0. 0.163
 0.100 -18.800 12.020 -40.31 0. 195.9 0. 0. 0.176
 0.200 -18.800 11.027 -34.70 0. 218.6 0. 0. 0.196
 0.300 -18.800 10.099 -29.90 0. 237.1 0. 0. 0.213
 0.400 -18.800 9.193 -25.65 0. 252.4 0. 0. 0.227
 0.500 -18.800 8.277 -21.78 0. 265.2 0. 0. 0.239
 0.600 -18.800 7.319 -18.16 0. 275.9 0. 0. 0.248
 0.700 -18.800 6.277 -14.68 0. 284.9 0. 0. 0.257
 0.800 -18.800 5.083 -11.18 0. 292.5 0. 0. 0.264
 0.900 -18.800 3.569 -7.34 0. 298.9 0. 0. 0.270
 0.950 -18.800 2.516 -4.92 0. 301.6 0. 0. 0.272
 1.000 -18.800 0.000 0. 303.9 0. 0. 0.274

SL BLDLCK PS PT TT BETAM VREL MREL VABS MABS
 1 0.997 14.510 14.696 518.7 86.31 2335.4 2.095 150.4 0.135
 2 0.997 14.427 14.696 518.7 85.33 2224.5 1.997 181.0 0.163
 3 0.997 14.382 14.696 518.7 84.72 2130.2 1.913 195.9 0.176
 4 0.997 14.305 14.696 518.7 83.59 1958.1 1.760 218.6 0.196
 5 0.997 14.237 14.696 518.7 82.42 1797.9 1.617 237.1 0.213
 6 0.997 14.177 14.696 518.7 81.16 1641.9 1.477 252.4 0.227
 7 0.997 14.124 14.696 518.7 79.71 1484.6 1.337 265.2 0.239
 8 0.997 14.077 14.696 518.7 77.94 1320.6 1.190 275.9 0.248
 9 0.997 14.037 14.696 518.7 75.57 1143.7 1.031 284.9 0.257
 10 0.997 14.002 14.696 518.7 71.94 943.5 0.850 292.5 0.264
 11 0.997 13.972 14.696 518.7 64.61 697.2 0.629 298.9 0.270
 12 0.997 13.959 14.696 518.7 55.81 536.8 0.484 301.6 0.272
 13 0.997 13.947 14.696 518.7 0.00 303.9 0.274

STA 5.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA=1.4015 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 0. VM= 255.3 CZ= 233.4 MM=0.230 MABS=0.230 MREL=1.300

INLET		STA= 6.000										FREE	
WTF= 61.365		I= 2		MTIP= 14		AFLOW= 277.56		D+C=O.		D+H=O.			
PSIC		OPTX=DPP		PHI		CURV		VM		CU			
Z		R		PHI		CURV		VM		CU			
Z		R		PHI		CURV		VM		CU			
0.	-14.431	9.481	-24.96	-0.0952	514.7	0.	0.	0.	0.471	0.	0.471		
0.050	-14.450	9.254	-24.10	-0.1028	507.6	0.	0.	0.	0.464	0.	0.464		
0.100	-14.470	9.020	-22.95	-0.0955	501.1	0.	0.	0.	0.458	0.	0.458		
0.200	-14.513	8.532	-20.65	-0.0825	489.4	0.	0.	0.	0.447	0.	0.447		
0.300	-14.558	8.010	-18.38	-0.0712	478.4	0.	0.	0.	0.436	0.	0.436		
0.400	-14.606	7.446	-16.13	-0.0614	467.8	0.	0.	0.	0.426	0.	0.426		
0.500	-14.660	6.829	-13.87	-0.0529	457.2	0.	0.	0.	0.416	0.	0.416		
0.600	-14.719	6.141	-11.58	-0.0455	446.4	0.	0.	0.	0.406	0.	0.406		
0.700	-14.787	5.352	-9.23	-0.0390	434.9	0.	0.	0.	0.395	0.	0.395		
0.800	-14.869	4.403	-6.73	-0.0330	422.1	0.	0.	0.	0.383	0.	0.383		
0.900	-14.978	3.142	-4.03	-0.0257	406.9	0.	0.	0.	0.369	0.	0.369		
0.950	-15.057	2.234	-2.57	-0.0190	398.1	0.	0.	0.	0.361	0.	0.361		
1.000	-15.250	-0.000	0.	0.	387.1	0.	0.	0.	0.351	0.	0.351		

SL		BLDBLK		PS		PT		TT		BETAM		VREL		MREL		VABS		MABS	
1	0.997	12.623	14.696	518.7	72.90	1750.4	1.601	514.7	0.471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.997	12.676	14.696	518.7	72.73	1710.1	1.564	507.6	0.464	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.997	12.726	14.696	518.7	72.53	1668.8	1.525	501.1	0.458	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	0.997	12.812	14.696	518.7	71.99	1583.2	1.445	489.4	0.447	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	0.997	12.892	14.696	518.7	71.30	1492.3	1.361	478.4	0.436	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	0.997	12.968	14.696	518.7	70.40	1394.8	1.271	467.8	0.426	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7	0.997	13.041	14.696	518.7	69.22	1288.9	1.174	457.2	0.416	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
8	0.997	13.116	14.696	518.7	67.61	1172.0	1.066	446.4	0.406	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
9	0.997	13.193	14.696	518.7	65.27	1039.7	0.945	434.9	0.395	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
10	0.997	13.277	14.696	518.7	61.49	884.2	0.803	422.1	0.383	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.997	13.374	14.696	518.7	53.72	687.7	0.624	406.9	0.369	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
12	0.997	13.429	14.696	518.7	44.72	560.3	0.508	398.1	0.361	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
13	0.997	13.496	14.696	518.7	-0.00	387.1	0.351	387.1	0.351	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STA 6.000 MASS AVERAGED PROPERTIES
PT= 14.696 TT= 518.69 GAMMA=1.4016 PT-RAT= 1.000 TT-RAT= 1.000
RCU= 0. VM= 455.6 CZ= 438.5 MM=0.415 MABS=0.415 MREL=1.120

INLET STA= 7.000 FREE
 WTF= 61.365 I= 3 MTIP= 27 AFLOW= 244.35 D+C=O. D+H=O.
 PSIC Z OPTX=DPP PHI CURV VM CU ALPHAM ABH=O.
 0. -12.800 8.830 -15.47 -0.0952 625.2 0. 0. 0.578
 0.050 -12.800 8.675 -14.65 -0.0872 617.9 0 0. 0.571
 0.100 -12.800 8.454 -13.90 -0.0849 610.4 0. 0. 0.564
 0.200 -12.800 8.021 -12.40 -0.0795 595.2 0. 0. 0.549
 0.300 -12.800 7.546 -10.86 -0.0737 579.7 0. 0. 0.534
 0.400 -12.800 7.032 -9.27 -0.0680 563.9 0. 0. 0.518
 0.500 -12.800 6.468 -7.60 -0.0629 547.6 0. 0. 0.503
 0.600 -12.800 5.837 -5.79 -0.0587 530.4 0. 0. 0.486
 0.700 -12.800 5.112 -3.78 -0.0560 511.3 0. 0. 0.468
 0.800 -12.800 4.237 -1.45 -0.0559 488.4 0. 0. 0.446
 0.900 -12.800 3.064 1.53 -0.0634 455.8 0. 0. 0.415
 0.950 -12.800 2.206 3.55 -0.0759 428.6 0. 0. 0.389
 1.000 -12.800 0.000 0. 0. 383.5 0. 0. 0.347

SL BLDLTK PS PT TT BETAM VREL MREL VABS MABS
 1 0.998 11.714 14.696 518.7 68.25 1687.2 1.560 625.2 0.578
 2 0.998 11.779 14.696 518.7 68.02 1650.9 1.525 617.9 0.571
 3 0.998 11.843 14.696 518.7 67.77 1613.5 1.490 610.4 0.564
 4 0.998 11.974 14.696 518.7 67.19 1535.5 1.415 595.2 0.549
 5 0.998 12.104 14.696 518.7 66.48 1452.4 1.337 579.7 0.534
 6 0.998 12.234 14.696 518.7 65.56 1363.1 1.253 563.9 0.518
 7 0.998 12.366 14.696 518.7 64.37 1266.0 1.162 547.6 0.503
 8 0.998 12.502 14.696 518.7 62.76 1158.7 1.062 530.4 0.486
 9 0.998 12.649 14.696 518.7 60.46 1037.0 0.948 511.3 0.468
 10 0.998 12.820 14.696 518.7 56.85 893.1 0.815 488.4 0.446
 11 0.998 13.051 14.696 518.7 49.87 707.2 0.644 455.8 0.415
 12 0.998 13.235 14.696 518.7 42.25 579.0 0.526 428.6 0.389
 13 0.998 13.517 14.696 518.7 0.00 383.5 0.347

STA 7.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA=1.4017 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 0. VM= 539.2 CZ= 532.1 MM=0.495 MABS=0.495 MREL=1.109

INLET STA= 8.000
 WTF= 61.365 I= 4 OPTX=DPP R
 PSIC Z OPTV=FREE ITYPE=O AFLOW= 224.07 D+C=O. D*H=O.
 ABH=O. FREE

SL	BDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.997	10.918	14.696	518.7	64.88	1677.6	1.567	712.1	0.665
2	0.997	11.002	14.696	518.7	64.65	1642.6	1.533	703.3	0.656
3	0.997	11.090	14.696	518.7	64.41	1606.5	1.497	693.9	0.647
4	0.997	11.258	14.696	518.7	63.82	1531.9	1.425	675.9	0.629
5	0.997	11.414	14.696	518.7	63.04	1453.4	1.349	658.9	0.612
6	0.997	11.564	14.696	518.7	62.05	1370.2	1.269	642.2	0.595
7	0.997	11.715	14.696	518.7	60.78	1280.6	1.184	625.1	0.578
8	0.997	11.879	14.696	518.7	59.16	1182.6	1.091	606.2	0.559
9	0.997	12.070	14.696	518.7	57.02	1072.3	0.987	583.7	0.537
10	0.997	12.312	14.696	518.7	53.98	942.6	0.865	554.3	0.509
11	0.997	12.656	14.696	518.7	48.93	776.8	0.710	510.4	0.467
12	0.997	12.967	14.696	518.7	44.76	658.9	0.601	467.9	0.426
13	0.997	13.200	14.696	518.7	30.03	501.1	0.455	433.8	0.394

STA 8.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA=1.4017 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= O. VM= 612.2 CZ= 604.7 MM=0.566 MABS=0.566 MREL=1.140

INLET STA= 9.000 FREE
 WTF= 61.365 I= 5 MTIP= 53 AFLW= 211.87 D+H=O.
 PSIC Z OPTX=DPP PHI CURV VM CU ALPHAM ABH=O.
 0. -9.999 8.500 0. 0. 759.3 0. 0. 0.714
 0.050 -9.984 8.315 -1.10 -0.0544 752.4 0. 0. 0.706
 0.100 -9.968 8.125 -0.87 -0.0527 744.4 0. 0. 0.698
 0.200 -9.935 7.728 -0.24 -0.0512 730.6 0. 0. 0.684
 0.300 -9.900 7.305 0.64 -0.0516 716.4 0. 0. 0.669
 0.400 -9.862 6.852 1.81 -0.0538 700.8 0. 0. 0.654
 0.500 -9.821 6.360 3.33 -0.0581 682.8 0. 0. 0.635
 0.600 -9.776 5.817 5.26 -0.0637 660.8 0. 0. 0.613
 0.700 -9.725 5.202 7.78 -0.0715 632.8 0. 0. 0.586
 0.800 -9.665 4.476 11.19 -0.0791 596.1 0. 0. 0.550
 0.900 -9.587 3.542 16.60 -0.0811 545.9 0. 0. 0.501
 0.950 -9.536 2.920 21.65 -0.0409 515.1 0. 0. 0.471
 1.000 -9.460 2.011 38.65 0.1881 511.2 0. 0. 0.468

SL BDBLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.996 10.461 14.696 518.7 63.15 1681.2 1.580 759.3 0.714
 2 0.996 10.530 14.696 518.7 62.85 1649.0 1.548 752.4 0.706
 3 0.996 10.607 14.696 518.7 62.56 1615.6 1.515 744.4 0.698
 4 0.996 10.741 14.696 518.7 61.82 1547.1 1.448 730.6 0.684
 5 0.996 10.878 14.696 518.7 60.94 1474.8 1.378 716.4 0.669
 6 0.996 11.025 14.696 518.7 59.90 1397.6 1.304 700.8 0.654
 7 0.996 11.194 14.696 518.7 58.69 1313.7 1.223 682.8 0.635
 8 0.996 11.396 14.696 518.7 57.23 1220.8 1.133 660.8 0.613
 9 0.996 11.647 14.696 518.7 55.42 1115.0 1.032 632.8 0.586
 10 0.996 11.966 14.696 518.7 52.96 989.5 0.912 596.1 0.550
 11 0.996 12.379 14.696 518.7 48.87 830.0 0.761 545.9 0.501
 12 0.996 12.620 14.696 518.7 45.01 728.5 0.667 515.1 0.471
 13 0.996 12.650 14.696 518.7 34.77 622.3 0.569 511.2 0.468

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STA 9.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA=1.4018 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 0. VM= 663.9 CZ= 655.4 MM=0.617 MABS=0.617 MREL=1.178

INLET STA= 10.000
 WTF= 61.365 I= 6 AFLOW= 204.12 D+C=O. D+H=O.
 PSIC 61.365 OPTX=DPP R PHI CURV VM CU ALPHAM ABH=O. MM
 0. -9.000 8.500 0. 0. 775.8 0. 0. 0.731
 0.050 -9.000 8.317 0.34 0.0031 776.1 0. 0. 0.731
 0.100 -9.000 8.131 0.66 -0.0023 776.1 0. 0. 0.731
 0.200 -9.000 7.743 1.48 -0.0130 773.3 0. 0. 0.728
 0.300 -9.000 7.334 2.55 -0.0226 766.7 0. 0. 0.721
 0.400 -9.000 6.898 3.95 -0.0330 755.6 0. 0. 0.710
 0.500 -9.000 6.426 5.71 -0.0429 739.0 0. 0. 0.693
 0.600 -9.000 5.908 8.00 -0.0528 714.7 0. 0. 0.668
 0.700 -9.000 5.321 10.83 -0.0732 680.2 0. 0. 0.633
 0.800 -9.000 4.626 14.41 -0.0859 633.9 0. 0. 0.587
 0.900 -9.000 3.734 19.55 -0.0852 575.0 0. 0. 0.529
 0.950 -9.000 3.142 23.73 -0.0845 535.5 0. 0. 0.491
 1.000 -9.000 2.340 32.46 0.1922 543.3 0. 0. 0.498

SL BLDLCK PS PT TT BETAM VREL MREL VABS MABS
 1 0.994 10.293 14.696 518.7 62.65 1688.8 1.591 775.8 0.731
 2 0.994 10.296 14.696 518.7 62.13 1660.3 1.564 776.1 0.731
 3 0.994 10.296 14.696 518.7 61.59 1631.3 1.537 776.1 0.731
 4 0.994 10.323 14.696 518.7 60.49 1570.1 1.478 773.3 0.728
 5 0.994 10.388 14.696 518.7 59.36 1504.3 1.415 766.7 0.721
 6 0.994 10.498 14.696 518.7 58.17 1432.7 1.346 755.6 0.710
 7 0.994 10.660 14.696 518.7 56.91 1352.6 1.269 739.0 0.693
 8 0.994 10.894 14.696 518.7 55.57 1264.0 1.181 714.7 0.668
 9 0.994 11.218 14.696 518.7 54.08 1155.5 1.079 680.2 0.633
 10 0.994 11.637 14.696 518.7 52.17 1033.6 0.957 633.9 0.587
 11 0.994 12.143 14.696 518.7 48.89 874.6 0.805 575.0 0.529
 12 0.994 12.462 14.696 518.7 45.99 770.8 0.706 535.5 0.491
 13 0.994 12.400 14.696 518.7 37.23 682.4 0.626 543.3 0.498

STA 10.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA=1.4018 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 3. VM= 706.2 CZ= 694.8 MM=0.660 MABS=0.660 MREL=1.217

ROTOR1 STA= 11.000 LE ROTOR
 WTF= 61.365 I= 7 MTIP= 79 AFLOW= 197.31 D+C=0. D+H=0.
 PSIC Z OPTX=OPP PHI CURV VM CU ALPHAM MM
 0. -8.166 8.500 0. 0. 838.0 0. 0. 0.796
 0.050 -8.204 8.322 0.42 -0.0063 840.0 0. 0. 0.799
 0.100 -8.242 8.141 0.82 -0.0050 841.3 0. 0. 0.800
 0.200 -8.321 7.764 1.83 -0.0054 841.9 0. 0. 0.801
 0.300 -8.396 7.365 3.22 -0.0160 836.5 0. 0. 0.795
 0.400 -8.465 6.940 4.95 -0.0321 822.1 0. 0. 0.780
 0.500 -8.531 6.478 6.98 -0.0509 795.9 0. 0. 0.752
 0.600 -8.592 5.970 9.30 -0.0504 760.8 0. 0. 0.715
 0.700 -8.624 5.398 12.33 -0.0637 718.3 0. 0. 0.671
 0.800 -8.604 4.735 16.17 -0.0637 668.0 0. 0. 0.621
 0.900 -8.548 3.905 21.65 -0.0665 604.0 0. 0. 0.557
 0.950 -8.526 3.362 25.91 -0.0614 560.2 0. 0. 0.515
 1.000 -8.507 2.653 31.20 0.1471 552.0 0. 0. 0.507

SL BLDLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.990 9.670 14.696 518.7 60.81 1718.2 1.633 838.0 0.796
 2 0.990 9.649 14.696 518.7 60.23 1691.9 1.609 840.0 0.799
 3 0.990 9.636 14.696 518.7 59.64 1664.8 1.583 841.3 0.800
 4 0.990 9.630 14.696 518.7 58.43 1608.0 1.529 841.9 0.801
 5 0.990 9.685 14.696 518.7 57.23 1545.6 1.469 836.5 0.795
 6 0.990 9.832 14.696 518.7 56.13 1475.0 1.399 822.1 0.780
 7 0.990 10.098 14.696 518.7 55.15 1393.0 1.316 795.9 0.752
 8 0.990 10.447 14.696 518.7 54.17 1299.5 1.222 760.8 0.715
 9 0.990 10.859 14.696 518.7 52.98 1193.1 1.115 718.3 0.671
 10 0.990 11.330 14.696 518.7 51.36 1069.8 0.994 668.0 0.621
 11 0.990 11.898 14.696 518.7 46.76 916.3 0.845 604.0 0.557
 12 0.990 12.265 14.696 518.7 46.64 816.0 0.750 560.2 0.515
 13 0.990 12.331 14.696 518.7 40.31 723.8 0.664 552.0 0.507

STA 11.000 MASS AVERAGED PROPERTIES
 PT= 14.696 TT= 518.69 GAMMA=1.4018 PT-RAT= 1.000 TT-RAT= 1.000
 RCU= 0. VM= 757.5 CZ= 743.1 MM=0.713 MABS=0.713 MREL=1.262

IN ROTOR									
STA= 11.500									
AFLOW= 181.03 D+C=0. D*H=0.									
WTF= 61.365 I= 8 MTIP= 92 OPTY=PT ITYPE=5 INBR=3 ABC=0. ASH=0.									
PSIC Z R PHI CURV VM CU ALPHAM MM									
0.	-7.963	8.500	0.	0.	847.7	45.6	3.08	0.797	
0.050	-7.991	8.324	0.34	0.0190	851.3	41.3	2.77	0.802	
0.100	-8.020	8.144	0.74	0.0163	858.9	39.2	2.62	0.811	
0.200	-8.083	7.771	1.82	0.0078	874.7	37.6	2.46	0.828	
0.300	-8.143	7.380	3.39	-0.0073	886.4	39.6	2.56	0.841	
0.400	-8.198	6.964	5.33	-0.0167	885.6	42.0	2.71	0.840	
0.500	-8.251	6.514	7.51	-0.0143	874.2	44.9	2.94	0.828	
0.600	-8.301	6.020	9.95	-0.0273	846.4	47.5	3.21	0.798	
0.700	-8.324	5.466	12.92	-0.0026	813.9	56.0	3.93	0.764	
0.800	-8.299	4.826	16.64	0.0116	766.1	52.2	3.89	0.715	
0.900	-8.247	4.027	22.15	0.0120	713.2	61.7	4.94	0.661	
0.950	-8.231	3.508	25.93	0.0593	677.2	65.0	5.48	0.626	
1.000	-8.224	2.817	29.07	0.0800	653.0	68.9	6.02	0.602	

IN ROTOR									
STA 11.500 MASS AVERAGED PROPERTIES									
PT= 15.471 TT= 527.14 GAMMA=1.4018 PT-RAT= 1.053 TT-RAT= 1.016									
RCU= 287.0 VM= 826.6 CZ= 809.3 MM=0.778 MABS=0.780 MREL=1.273									
SL	BDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.957	10.188	15.513	530.1	59.76	1683.4	1.583	849.0	0.798
2	0.956	10.106	15.460	528.8	59.19	1662.2	1.566	852.3	0.803
3	0.955	10.007	15.440	528.1	58.43	1640.6	1.549	859.8	0.812
4	0.953	9.825	15.432	527.3	56.74	1595.0	1.511	875.5	0.829
5	0.949	9.725	15.474	527.3	54.93	1542.7	1.464	887.3	0.842
6	0.944	9.751	15.506	527.3	53.27	1480.9	1.405	886.6	0.841
7	0.935	9.886	15.525	527.3	51.64	1408.8	1.334	875.4	0.829
8	0.925	10.179	15.518	527.1	50.17	1321.5	1.247	847.8	0.800
9	0.914	10.572	15.587	527.7	48.15	1219.9	1.144	815.8	0.765
10	0.897	10.951	15.430	526.1	46.22	1107.3	1.034	767.9	0.717
11	0.880	11.468	15.419	526.0	42.30	964.3	0.894	715.9	0.664
12	0.849	11.762	15.354	525.4	39.29	874.9	0.808	680.3	0.629
13	0.812	11.897	15.248	524.4	33.26	780.9	0.720	656.6	0.606

ROTOR 1 STA= 12.000
 WTF= 61.365 I= 9 OPTX=TT AFLOW= 170.42 D*H=O.
 PSIC Z R PHI OPTY=PT INTR=3 ABC=O. ABH=O.
 0. -7.759 8.500 0. 0. 815.7 96.7 6.76 0.754
 0.050 -7.778 8.325 0.03 0.0004 821.5 94.3 6.55 0.761
 0.100 -7.798 8.146 0.39 0.0087 830.2 92.2 6.34 0.770
 0.200 -7.844 7.779 1.64 0.0185 850.9 92.2 6.18 0.793
 0.300 -7.889 7.395 3.34 0.0140 870.0 97.0 6.36 0.813
 0.400 -7.931 6.989 5.42 0.0045 881.0 103.1 6.67 0.825
 0.500 -7.972 6.552 7.64 -0.0022 880.7 110.0 7.12 0.825
 0.600 -8.010 6.072 10.07 0.0132 875.0 118.6 7.72 0.819
 0.700 -8.025 5.535 12.85 0.0107 856.9 124.6 8.27 0.800
 0.800 -7.995 4.917 16.54 -0.0004 821.1 131.3 9.09 0.764
 0.900 -7.946 4.149 21.89 0.0168 770.5 142.5 10.48 0.713
 0.950 -7.936 3.548 25.23 0.0161 734.1 147.2 11.34 0.678
 1.000 -7.941 2.971 28.21 0.0136 685.7 149.9 12.33 0.631

IN ROTOR
 CU ALPHAM MM
 815.7 96.7 6.76 0.754
 821.5 94.3 6.55 0.761
 830.2 92.2 6.34 0.770
 850.9 92.2 6.18 0.793
 870.0 97.0 6.36 0.813
 881.0 103.1 6.67 0.825
 880.7 110.0 7.12 0.825
 875.0 118.6 7.72 0.819
 856.9 124.6 8.27 0.800
 821.1 131.3 9.09 0.764
 770.5 142.5 10.48 0.713
 734.1 147.2 11.34 0.678
 685.7 149.9 12.33 0.631

SL BLDLCK PS PT TT BETAM VREL MREL VABS MABS
 1 0.935 11.232 16.462 542.9 59.83 1623.1 1.500 821.4 0.759
 2 0.934 11.174 16.479 541.8 59.14 1601.5 1.483 826.9 0.766
 3 0.932 11.074 16.482 540.8 58.32 1580.9 1.467 835.3 0.775
 4 0.928 10.874 16.544 539.8 56.40 1537.5 1.433 855.9 0.798
 5 0.922 10.725 16.655 539.8 54.24 1488.7 1.391 875.4 0.818
 6 0.911 10.649 16.747 539.9 52.06 1433.1 1.342 887.0 0.830
 7 0.897 10.677 16.799 539.9 49.91 1367.6 1.280 887.5 0.831
 8 0.880 10.751 16.832 539.9 47.44 1293.6 1.210 883.0 0.826
 9 0.862 10.894 16.760 539.0 44.84 1208.5 1.129 866.0 0.809
 10 0.840 11.190 16.633 537.7 41.88 1102.9 1.026 831.6 0.774
 11 0.818 11.592 16.461 536.1 37.43 970.2 0.898 783.5 0.725
 12 0.776 11.826 16.281 534.5 34.08 886.3 0.818 748.7 0.691
 13 0.733 12.071 15.985 531.8 28.63 781.2 0.719 701.9 0.646

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STA 12.000 MASS AVERAGED PROPERTIES
 PT= 16.616 TT= 539.05 GAMMA=1.4018 PT-RAT= 1.131 TT-RAT= 1.039
 RCU= 691.5 VM= 838.9 CZ= 821.0 MM=0.782 MABS=0.789 MREL=1.229

ROTOR1 STA= 12.500
 WTF= 61.365 I=10 MTIP=118 AFLOW= 161.85 D+C=0. D+H=0.
 PSIC Z OPTX=TT OPTV=PT PHI ITYPE=5 INBR=3 ABC=0. ABH=0.
 O. -7.556 8.500 0. 0. 778.3 155.1 11.27 0.706
 O.050 -7.565 8.324 -0.22 0.0085 789.5 159.6 11.43 0.717
 O.100 -7.576 8.147 0.01 0.0222 796.0 159.8 11.35 0.724
 O.200 -7.606 7.785 1.19 0.0467 817.1 161.5 11.18 0.747
 O.300 -7.636 7.409 3.04 0.0269 838.9 168.3 11.35 0.769
 O.400 -7.664 7.014 5.14 0.0325 852.8 176.8 11.71 0.784
 O.500 -7.692 6.589 7.40 0.0314 861.2 185.1 12.13 0.793
 O.600 -7.720 6.123 9.80 0.0183 864.1 195.9 12.77 0.797
 O.700 -7.725 5.603 12.64 0.0124 856.6 208.6 13.69 0.790
 O.800 -7.690 5.007 16.35 0.0208 838.9 224.6 14.99 0.774
 O.900 -7.646 4.269 21.55 0.0199 803.2 239.6 16.61 0.740
 O.950 -7.641 3.786 25.03 0.0045 769.9 243.2 17.53 0.708
 1.000 -7.658 3.123 28.51 -0.0461 708.8 236.1 18.42 0.650

IN ROTOR
 VABS MABS
 793.7 0.720
 805.4 0.732
 811.9 0.739
 832.9 0.761
 855.6 0.785
 870.9 0.801
 880.9 0.811
 886.0 0.817
 881.7 0.813
 868.5 0.801
 838.1 0.772
 807.4 0.743
 747.1 0.685

SL BLDLKL PS PT TT BETAM VREL MREL VABS MABS
 1 0.911 12.446 17.585 557.5 59.94 1553.9 1.410 793.7 0.720
 2 0.910 12.456 17.789 557.8 58.91 1528.9 1.389 805.4 0.732
 3 0.908 12.435 17.875 557.0 58.08 1505.5 1.370 811.9 0.739
 4 0.903 12.283 18.034 555.7 56.02 1462.0 1.336 832.9 0.761
 5 0.896 12.126 18.213 555.4 53.63 1414.7 1.297 855.6 0.785
 6 0.883 12.023 18.344 555.2 51.21 1361.2 1.251 870.9 0.801
 7 0.866 11.912 18.375 554.6 48.62 1302.9 1.200 880.9 0.811
 8 0.846 11.838 18.368 554.0 45.67 1236.6 1.141 886.0 0.817
 9 0.827 11.845 18.309 553.1 42.32 1158.6 1.069 881.7 0.813
 10 0.802 11.913 13.182 551.8 38.15 1066.8 0.984 868.5 0.801
 11 0.776 12.027 17.841 548.8 32.60 953.4 0.878 838.1 0.772
 12 0.728 12.121 17.487 545.8 28.90 879.3 0.809 807.4 0.743
 13 0.583 12.318 16.873 540.4 23.96 775.6 0.712 747.1 0.685

STA 12.500 MASS AVERAGED PROPERTIES
 PT= 18.084 TT= 553.54 GAMMA=1.4017 PT-RAT= 1.231 TT-RAT= 1.067
 RCU= 1184.0 VM= 828.1 CZ= 810.1 MM=0.760 MABS=0.781 MREL=1.159

ROTOR 1 STA= 13.000 AFLOW= 155.06 D+C=0. D+H=0. ABH=0.
 WTF= 61.365 I=11 MTIP=131 OPTV=PT PHI CURV VM CU ALPHAM MM
 PSIC Z OPTX=TT R
 0. -7.352 8.500 0. 0. 749.6 205.9 15.36 0.670
 0.050 -7.352 8.323 -0.54 0.0431 768.1 212.7 15.48 0.688
 0.100 -7.354 8.146 -0.45 0.0491 783.6 215.7 15.39 0.704
 0.200 -7.367 7.789 0.69 0.0261 809.7 220.8 15.25 0.731
 0.300 -7.382 7.422 2.53 0.0430 831.2 227.1 15.28 0.753
 0.400 -7.397 7.037 4.72 0.0220 848.0 236.6 15.59 0.771
 0.500 -7.413 6.624 6.97 0.0228 853.6 245.7 16.06 0.778
 0.600 -7.429 6.172 9.45 0.0240 862.9 260.4 16.79 0.788
 0.700 -7.425 5.670 12.40 0.0149 865.8 277.5 17.77 0.793
 0.800 -7.386 5.095 16.08 0.0093 857.7 304.1 19.52 0.786
 0.900 -7.345 4.387 21.27 0.0036 828.8 327.7 21.57 0.760
 0.950 -7.346 3.924 25.12 -0.0137 800.0 328.2 22.31 0.734
 1.000 -7.375 3.281 29.92 -0.1052 732.1 319.0 23.55 0.670

SL	BLOBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.888	13.462	18.599	570.2	59.92	1495.5	1.337	777.4	0.595
2	0.889	13.449	18.899	570.8	58.55	1472.3	1.319	797.0	0.714
3	0.888	13.384	19.083	570.4	57.33	1451.5	1.304	812.7	0.730
4	0.884	13.247	19.377	569.3	54.94	1409.4	1.272	839.3	0.757
5	0.877	13.082	19.574	568.3	52.48	1364.9	1.237	861.7	0.781
6	0.864	12.932	19.726	567.7	49.85	1315.1	1.195	880.4	0.800
7	0.845	12.823	19.737	566.6	47.24	1257.4	1.146	888.3	0.809
8	0.825	12.652	19.751	566.0	43.84	1196.4	1.093	901.4	0.823
9	0.803	12.500	19.693	565.0	39.86	1128.0	1.033	909.2	0.832
10	0.776	12.448	19.639	564.3	34.75	1043.9	0.956	910.0	0.834
11	0.748	12.406	19.241	561.0	28.31	941.4	0.863	891.2	0.817
12	0.702	12.346	18.696	556.6	24.48	879.0	0.806	864.7	0.793
13	0.654	12.509	17.850	549.5	19.55	776.8	0.711	798.6	0.731

STA 13.000 MASS AVERAGED PROPERTIES
 PT= 19.412 TT= 565.94 GAMMA=1.4016 PT-RAT= 1.321 TT-RAT= 1.091
 R2U= 1605.3 VM= 829.3 CZ= 811.3 MM=0.754 MABS=0.791 MREL=1.113

ROTOR1
 WTF= 61.365 I=12 STA= 13.500
 PSIC Z OPTX=TT R OPTV=PT AFLOW= 150.69 IN ROTOR
 PHI CURV VM CU ABC=O. D*H=O.
 0. -7.148 8.500 0. 707.1 243.5 19.00 0.624
 0.050 -7.139 8.320 -0.72 -0.0130 735.9 260.6 19.50 0.651
 0.100 -7.132 8.143 -0.74 -0.0038 754.3 270.5 19.73 0.668
 0.200 -7.128 7.791 0.37 0.0210 783.8 280.1 19.66 0.697
 0.300 -7.129 7.432 2.13 0.0126 806.2 289.1 19.73 0.720
 0.400 -7.130 7.058 4.22 0.0437 821.3 297.6 19.92 0.737
 0.500 -7.133 6.657 6.53 0.0306 833.2 307.3 20.25 0.750
 0.600 -7.138 6.220 9.10 0.0166 846.2 324.6 20.99 0.764
 0.700 -7.125 5.735 12.12 0.0169 854.1 344.3 21.96 0.774
 0.800 -7.081 5.183 16.02 -0.0023 854.1 375.1 23.71 0.776
 0.900 -7.043 4.504 21.32 -0.0151 834.6 415.8 26.48 0.760
 0.950 -7.051 4.063 25.51 -0.0280 810.5 414.9 27.11 0.740
 1.000 -7.092 3.450 31.86 -0.0937 759.3 402.8 27.95 0.694

SL BLDLTK PS PT TT BETAM VREL MREL VABS MABS
 1 0.878 14.451 19.371 579.6 60.63 1441.8 1.273 747.8 0.660
 2 0.879 14.491 19.934 582.5 58.64 1414.2 1.251 780.7 0.690
 3 0.880 14.513 20.312 583.5 57.11 1389.2 1.230 801.3 0.710
 4 0.877 14.435 20.785 582.9 54.40 1346.4 1.198 832.4 0.741
 5 0.870 14.304 21.082 581.9 51.74 1302.0 1.163 856.4 0.765
 6 0.856 14.141 21.213 580.5 49.09 1254.2 1.125 873.6 0.783
 7 0.836 13.915 21.204 578.9 46.16 1202.8 1.083 888.1 0.799
 8 0.815 13.658 21.218 578.1 42.41 1146.1 1.035 906.4 0.819
 9 0.793 13.385 21.137 576.8 38.02 1084.2 0.983 920.9 0.835
 10 0.766 13.158 21.063 575.9 32.28 1010.2 0.918 932.9 0.848
 11 0.737 12.971 20.793 573.8 24.42 916.6 0.835 932.5 0.849
 12 0.699 12.759 20.072 568.3 20.45 865.0 0.789 910.5 0.831
 13 0.649 12.629 18.981 559.6 15.13 786.7 0.719 859.5 0.785

STA 13.500 MASS AVERAGED PROPERTIES
 PT= 20.807 TT= 578.32 GAMMA=1.4015 PT-RAT= 1.416 TT-RAT= 1.115
 RCU= 2026.3 VM= 813.1 CZ= 794.8 MN=0.731 MABS=0.788 MRFL=1.057

ROTOR1 STA= 14.000
 WTF= 61.355 I=13 MTIP=157 AFLOW= 147.28 D+C=0. D+H=0.
 PSIC Z OPTX=TT R PHI CURV VM CU ALPHAM MM ABH=0.
 0 -6.945 8.500 0. 0. 668.4 289.2 23.39 0.583
 0.050 -6.925 8.318 -0.58 -0.0109 702.2 307.4 23.64 0.613
 0.100 -6.910 8.141 -0.61 -0.0153 730.2 323.2 23.88 0.639
 0.200 -6.890 7.792 0.28 -0.0077 764.1 336.8 23.79 0.672
 0.300 -6.876 7.441 1.94 0.0134 789.2 348.6 23.83 0.697
 0.400 -6.864 7.076 3.84 0.0054 802.4 360.3 24.18 0.711
 0.500 -6.854 6.688 6.08 0.0259 808.1 372.1 24.72 0.718
 0.600 -6.847 6.265 8.73 0.0281 823.9 389.6 25.31 0.736
 0.700 -6.825 5.799 11.87 0.0116 835.5 409.2 26.09 0.750
 0.800 -6.777 5.270 16.07 -0.0040 841.4 443.8 27.81 0.758
 0.900 -6.742 4.622 21.73 -0.0291 831.5 490.5 30.54 0.752
 0.950 -6.756 4.26 26.23 -0.0491 814.0 494.6 31.28 0.739
 1.000 -6.809 3.632 33.48 -0.0749 782.7 490.3 32.07 0.714

IN ROTOR
 VABS MABS
 1 0.873 15.496 20.333 591.0 61.10 1383.1 1.206 728.2 0.635
 2 0.875 15.529 20.975 593.9 58.82 1356.4 1.185 766.5 0.670
 3 0.876 15.543 21.541 596.1 56.74 1331.5 1.165 798.6 0.699
 4 0.873 15.505 22.193 595.9 53.65 1289.1 1.133 835.1 0.734
 5 0.866 15.387 22.608 595.0 50.71 1246.2 1.101 862.8 0.762
 6 0.852 15.275 22.827 593.7 47.92 1197.2 1.061 879.6 0.780
 7 0.832 15.111 22.836 591.9 45.00 1142.9 1.015 889.6 0.791
 8 0.812 14.746 22.800 590.5 40.99 1091.6 0.975 911.4 0.814
 9 0.792 14.337 22.642 588.5 36.32 1036.9 0.930 930.3 0.835
 10 0.768 13.957 22.559 587.5 30.02 971.8 0.876 951.3 0.857
 11 0.738 13.543 22.274 585.4 21.36 892.8 0.808 965.4 0.874
 12 0.713 13.198 21.506 579.9 16.92 850.8 0.772 952.5 0.865
 13 0.662 12.772 20.328 571.1 10.89 797.1 0.727 923.6 0.842

STA 14.000 MASS AVERAGED PROPERTIES
 PT= 22.266 TT= 590.66 GAMMA=1.4014 PT-RAT= 1.515 TT-RAT= 1.139
 RCU= 2446.1 VM= 795.7 CZ= 777.1 MM=0.709 MABS=0.789 MREL=1.003

ROTOR 1 STA= 14.500
 W/F= 61.365 I=14 MTIP=170 AFLOW= 145.21 D+C=0. D+H=0.
 PSIC Z OPTX=TT PHI OPTY=PT ITYPE=5 INBR=3 CU ALPHAM MM ABH=0.
 0. -6.741 8.500 0. 0. 624.1 355.6 29.68 0.536
 0.050 -6.712 8.316 -0.39 -0.0189 662.5 372.5 29.35 0.570
 0.100 -6.688 8.139 -0.36 -0.0253 691.8 385.7 29.14 0.597
 0.200 -6.651 7.793 0.42 -0.0128 734.7 401.4 28.65 0.637
 0.300 -6.622 7.449 1.81 0.0049 760.0 411.8 28.45 0.663
 0.400 -6.596 7.094 3.63 0.0216 775.4 422.8 28.60 0.679
 0.500 -6.574 6.717 5.79 0.0102 782.9 435.3 29.08 0.688
 0.600 -6.556 6.309 8.38 0.0128 795.6 453.8 29.70 0.703
 0.700 -6.525 5.861 11.70 0.0083 807.3 472.8 30.35 0.717
 0.800 -6.473 5.358 16.21 -0.0106 818.2 505.7 31.72 0.731
 0.900 -6.441 4.744 22.49 -0.0519 821.9 561.1 34.32 0.739
 0.950 -6.461 4.354 27.41 -0.0752 812.2 580.1 35.53 0.733
 1.000 -6.526 3.824 34.87 -0.0668 795.7 588.4 36.48 0.723

SL	BDBLK	PS	PT	TT	BETAM	VREL	MREL	VABS	MABS
1	0.873	16.855	21.783	607.6	61.39	1303.5	1.119	718.3	0.616
2	0.876	16.867	22.483	609.8	58.82	1279.8	1.101	760.1	0.654
3	0.877	16.865	23.053	611.0	56.64	1257.9	1.085	792.0	0.683
4	0.875	16.793	23.871	610.7	52.97	1219.9	1.058	837.2	0.726
5	0.867	16.673	24.307	608.9	49.91	1180.0	1.029	864.4	0.754
6	0.855	16.507	24.524	606.9	46.92	1135.2	0.994	883.1	0.774
7	0.837	16.284	24.527	604.7	43.77	1084.2	0.953	895.8	0.788
8	0.819	15.902	24.463	602.9	39.66	1033.4	0.913	915.9	0.809
9	0.802	15.399	24.220	600.2	34.82	983.4	0.873	935.6	0.831
10	0.784	14.840	24.032	598.4	28.26	928.9	0.830	961.9	0.859
11	0.753	14.165	23.828	597.0	18.57	867.1	0.779	995.2	0.895
12	0.745	13.701	23.210	593.0	13.06	833.8	0.753	998.1	0.901
13	0.696	13.028	22.032	584.9	6.20	800.4	0.727	989.7	0.899

STA 14.500 MASS AVERAGED PROPERTIES
 PT= 23.883 TT= 603.82 GAMMA=1.4012 PT-RAT= 1.625 TT-RAT= 1.164
 RCU= 2894.4 VM= 770.2 CZ= 751.0 MM=0.679 MABS=0.788 MREL=0.944

IN ROTOR									
STA= 15.000									
MTIP=183									
AFLOW= 144.25									
D+C=0.									
D+H=0.									
ABH=0.									
IN ROTOR									
WTF= 61.365									
I=15									
OPTX=TT									
PT									
CURV									
VM									
CU									
ALPHAM									
MM									
PSIC									
Z									
R									
PT									
TT									
PS									
PT									
TT									
BETAM									
VREL									
MREL									
VABS									
MABS									
SL									
BLDBLK									
1									
2									
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5									
6									
7									
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9									
10									
11									
12									
13									

STA 15.000 MASS AVERAGED PROPERTIES
PT= 25.689 TT= 617.96 GAMMA=1.4010 PT-RAT= 1.748 TT-RAT= 1.191
RCU= 3375.9 VM= 740.5 CZ= 720.4 MM=0.646 MABS=0.791 MREL=0.881

ROTOR1 STA= 15.500
 MTIP=196 AFLOW= 145.07 IN ROTOR
 WTF= 61.365 OPTX=TT ITYPE=5 INBR=3 D=C=O. D*H=O.
 PSIC Z R CURV VM CU ALPHAM MM ABH=O.
 0. -6.334 8.500 0. 0. 542.5 512.5 43.37 0.452
 0.050 -6.286 8.313 -0.38 0.0038 587.5 515.8 41.28 0.492
 0.100 -6.244 8.137 -0.35 0.0017 621.4 518.2 39.82 0.523
 0.200 -6.174 7.797 0.38 0.0035 671.1 519.7 37.76 0.569
 0.300 -6.115 7.464 1.69 0.0004 699.7 524.2 36.84 0.598
 0.400 -6.062 7.126 3.47 -0.0104 712.2 532.3 36.77 0.611
 0.500 -6.015 6.772 5.77 -0.0266 714.6 546.0 37.38 0.616
 0.600 -5.975 6.394 8.66 -0.0438 719.4 565.0 38.15 0.623
 0.700 -5.926 5.986 12.31 -0.0503 727.6 590.4 39.05 0.633
 0.800 -5.864 5.539 17.17 -0.0500 741.6 629.4 40.32 0.649
 0.900 -5.838 5.007 24.50 -0.0436 783.4 695.0 41.58 0.694
 0.950 -5.871 4.677 29.65 -0.0480 805.8 740.4 42.58 0.720
 1.000 -5.960 4.235 36.53 0.0158 842.2 799.9 43.53 0.763

SL BLOBLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.898 19.610 25.440 646.7 61.22 1126.7 0.938 746.3 0.621
 2 0.900 19.519 26.024 644.7 58.30 1118.1 0.936 781.8 0.654
 3 0.901 19.421 26.481 642.6 55.90 1108.3 0.932 809.1 0.681
 4 0.899 19.222 27.158 637.8 51.91 1087.8 0.923 848.8 0.720
 5 0.895 19.027 27.552 633.7 48.58 1057.6 0.903 874.2 0.747
 6 0.890 18.851 27.730 630.2 45.52 1016.5 0.873 889.1 0.763
 7 0.881 18.645 27.738 627.4 42.25 965.4 0.832 899.3 0.775
 8 0.874 18.266 27.621 624.9 38.07 913.7 0.791 914.7 0.792
 9 0.868 17.737 27.457 622.6 32.64 864.1 0.752 937.0 0.815
 10 0.862 17.007 27.332 621.2 25.14 819.2 0.717 972.7 0.852
 11 0.842 15.642 27.285 621.0 13.53 805.8 0.714 1047.2 0.928
 12 0.847 14.681 27.095 620.5 6.02 810.3 0.724 1094.3 0.978
 13 0.800 13.174 26.567 618.3 -3.57 843.8 0.765 1161.5 1.053

STA 15.500 MASS AVERAGED PROPERTIES
 PT= 27.244 TT= 629.44 GAMMA=1.4008 P*-RAT= 1.854 TT-RAT= 1.214
 RCU= 3767.1 VM= 708.3 CZ= 687.2 MM=0.612 MABS=0.790 MREL=0.828

ROTOR1
 WTF= 61.365 I=17 STA= 16.000
 PSIC Z OPTX=TT MTIP=209 AFLOW= 148.29 D=C=O. D*H=O.
 PHI CURV VM CU ALPHAM MM ABH=O.
 0. -6.131 8.500 0. 505.7 557.9 47.81 0.417
 0.050 -6.073 8.312 -0.17 -0.0379 555.1 557.7 45.14 0.461
 0.100 -6.022 8.135 0.02 -0.0595 588.4 557.7 43.46 0.491
 0.200 -5.936 7.799 0.92 -0.0831 636.9 561.6 41.41 0.536
 0.300 -5.862 7.472 2.33 -0.0878 659.9 569.3 40.78 0.559
 0.400 -5.795 7.143 4.16 -0.0791 668.5 581.6 41.02 0.568
 0.500 -5.736 6.802 6.51 -0.0649 667.3 598.3 41.88 0.569
 0.600 -5.684 6.440 9.42 -0.0457 668.2 620.7 42.89 0.572
 0.700 -5.626 6.054 12.94 -0.0213 675.9 650.2 43.89 0.582
 0.800 -5.560 5.635 17.44 0.0205 690.9 690.1 44.97 0.599
 0.900 -5.537 5.145 24.03 0.0932 724.5 746.5 45.86 0.635
 0.950 -5.576 4.845 28.42 0.1739 761.0 792.1 46.14 0.673
 1.000 -5.677 4.442 35.49 0.0883 785.8 870.1 47.91 0.704

SL BLDLTK PS PT TT BETAM VREL MREL VABS MABS
 1 0.528 20.471 26.560 658.0 61.77 1069.3 0.883 753.0 0.622
 2 0.927 20.358 27.120 654.9 58.59 1065.2 0.885 786.9 0.653
 3 0.927 20.281 27.560 652.0 56.17 1056.9 0.882 810.7 0.677
 4 0.927 20.198 28.390 647.4 51.98 1034.1 0.870 849.1 0.715
 5 0.928 20.155 28.940 643.7 48.63 998.5 0.845 871.5 0.738
 6 0.928 20.094 29.280 640.8 45.44 952.8 0.810 886.1 0.753
 7 0.928 19.948 29.380 638.3 42.06 898.8 0.767 896.2 0.765
 8 0.928 19.611 29.350 636.2 37.66 844.1 0.723 912.1 0.781
 9 0.928 19.063 29.280 634.4 31.74 794.7 0.684 937.9 0.807
 10 0.928 18.246 29.160 633.0 23.77 754.9 0.654 976.5 0.846
 11 0.930 16.879 28.920 631.6 12.56 742.2 0.650 1040.3 0.912
 12 0.914 15.693 28.770 631.5 4.73 763.6 0.676 1098.4 0.972
 13 0.875 14.247 28.650 632.3 -6.27 790.6 0.708 1172.5 1.051

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STA. 16.000 MASS AVERAGED PROPERTIES
 PT= 28.783 TT= 640.23 GAMMA=1.4006 PT-RAT= 1.959 TT-RAT= 1.234
 RCU= 4135.2 VN= 663.3 CZ= 643.9 MM=0.568 MABS=0.783 MREL=0.768

AVERAGE BLADE SPEED ACC PT ACC TT EFFICIENCY AXIAL
 PCT I MM RAD IN OUT RATIO AD. POLY VEL R
 0. 8.500 1500.0 1500.0 1.8073 1.2686 0.686 0.711 0.604
 3.7 8.317 1468.6 1466.9 1.8454 1.2626 0.729 0.751 0.661
 7.3 8.138 1435.6 1435.7 1.8753 1.2570 0.766 0.786 0.699
 14.5 7.781 1370.1 1376.3 1.9318 1.2481 0.835 0.849 0.757
 21.8 7.419 1299.7 1318.6 1.9692 1.2410 0.887 0.897 0.789
 29.5 7.041 1224.6 1260.6 1.9924 1.2354 0.925 0.932 0.814
 37.6 6.640 1143.3 1200.4 1.9992 1.2306 0.950 0.955 0.839
 46.3 6.205 1053.6 1136.5 1.9971 1.2266 0.965 0.969 0.878
 56.0 5.726 952.6 1068.3 1.9924 1.2231 0.977 0.979 0.939
 66.9 5.185 835.6 994.4 1.9842 1.2204 0.982 0.984 1.027
 80.3 4.525 689.0 907.9 1.9679 1.2177 0.981 0.983 1.179
 88.8 4.103 593.3 855.0 1.9577 1.2175 0.974 0.976 1.328
 100.0 3.547 468.2 783.8 1.9495 1.2190 0.960 0.964 1.355

SL	BIDBLK	PS	PT	T†	BETAM	VREL	MREL	VABS	MABS
1	0.940	20.488	26.533	658.0	61.96	1067.5	0.881	750.4	0.619
2	0.940	20.348	27.093	654.9	58.65	1065.2	0.885	786.2	0.653
3	0.940	20.251	27.532	652.0	56.16	1058.8	0.884	811.3	0.677
4	0.940	20.112	28.390	647.4	51.77	1041.6	0.877	854.2	0.719
5	0.940	19.989	28.940	643.7	48.28	1012.5	0.858	880.9	0.747
6	0.940	19.834	29.280	640.8	44.93	974.7	0.830	900.5	0.767
7	0.940	19.610	29.380	638.3	41.50	928.8	0.794	914.7	0.782
8	0.940	19.280	29.350	636.2	37.39	878.6	0.754	930.0	0.798
9	0.940	18.806	29.280	634.4	32.05	828.8	0.715	951.7	0.821
10	0.940	18.149	29.160	633.0	24.86	779.8	0.676	981.7	0.851
11	0.940	17.052	28.920	631.6	14.51	747.0	0.654	1031.1	0.902
12	0.940	16.124	28.770	631.5	7.12	748.7	0.660	1075.6	0.948
13	0.940	15.135	28.564	632.3	-3.63	735.8	0.653	1122.9	0.997

STA 17.000 MASS AVERAGED PROPERTIES
PT= 28.777 γ^* = 640.23 GAMMA=1.4006 P^* -RAT= 1.958 TT-RAT= 1.234
RCU= 4135.2 VM= 675.4 CZ= 657.4 MM=0.578 MABS=0.788 MREL=0.781

STA= 18.000
 MTIP=235 AFLOW= 141.61 D+C=0. D+H=0.
 OPTV=FREE ITYPE=1 INBR=4 ABC=0. ABH=0.
 LE STATOR
 WTF= 61.365 I=19 OPTX=DPP
 PSIC Z R PHI CURV VM CU ALPHAM MM
 0. -5.250 8.500 0. 0. 540.3 557.9 45.92 0.447
 0.050 -5.193 8.324 1.41 -0.0113 583.1 557.0 43.69 0.485
 0.100 -5.143 8.157 2.40 -0.0179 613.9 556.2 42.17 0.513
 0.200 -5.064 7.840 3.87 -0.0218 666.1 558.7 39.99 0.562
 0.300 -5.005 7.533 5.07 -0.0186 697.4 564.7 39.00 0.592
 0.400 -4.963 7.224 6.34 -0.0144 717.4 575.1 38.72 0.613
 0.500 -4.938 6.906 7.85 -0.0108 727.5 589.2 39.01 0.624
 0.600 -4.932 6.569 9.77 -0.0077 733.7 608.5 39.67 0.632
 0.700 -4.952 6.206 12.30 -0.0034 740.9 634.3 40.57 0.641
 0.800 -5.003 5.801 15.81 0.0102 749.1 670.4 41.82 0.652
 0.900 -5.107 5.322 21.14 0.0299 759.8 721.7 43.53 0.667
 0.950 -5.201 5.029 24.69 0.0250 752.4 763.0 45.40 0.663
 1.000 -5.375 4.643 31.23 0.3271 804.6 832.3 45.97 0.719
 LE STATOR
 SL BLDLCK PS PT TT BETAM VREL MREL VABS MABS
 1 0.940 20.100 26.533 658.0 60.17 1086.1 0.899 776.6 0.643
 2 0.940 20.035 27.093 654.9 57.41 1082.4 0.901 806.3 0.671
 3 0.940 19.976 27.532 652.0 55.20 1075.7 0.900 828.4 0.693
 4 0.940 19.852 28.390 647.4 51.08 1050.3 0.894 869.4 0.733
 5 0.940 19.697 28.940 643.7 47.64 1034.9 0.879 897.3 0.762
 6 0.940 19.489 29.280 640.8 44.29 1002.2 0.856 919.4 0.785
 7 0.940 19.213 29.380 638.3 40.87 962.0 0.825 936.2 0.803
 8 0.940 18.848 29.350 636.2 36.89 917.4 0.790 953.2 0.821
 9 0.940 18.364 29.280 634.4 31.88 872.5 0.755 975.3 0.844
 10 0.940 17.704 29.160 633.0 25.25 828.3 0.721 1005.3 0.875
 11 0.940 16.734 28.920 631.6 15.97 790.3 0.693 1048.0 0.919
 12 0.940 16.199 28.770 631.5 9.39 762.7 0.672 1071.6 0.944
 13 0.940 14.482 28.564 632.3 -0.92 804.7 0.719 1157.6 1.034

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STA 18.000 MASS AVERAGED PROPERTIES
 PT= 28.777 TT= 640.23 GAMMA=1.4007 PT-RAT= 1.958 TT-RAT= 1.234
 RCU= 4135.2 VM= 706.6 CZ= 689.3 MM=0.607 MABS=0.806 MREL=0.811

STATOR STA= 19.000
 WTF= 61.365 I=20 MTIP=248 AFLOW= 126.06 IN STATOR
 PSIC Z R OPTX=DPP PHI CURV VM CU ALPHAM MM D"H=O.
 0. -4.770 8.500 0. 0. 611.1 373.3 31.42 0.503
 0.050 -4.724 8.336 1.11 0.0336 640.5 382.7 30.86 0.530
 0.100 -4.683 8.177 1.97 0.0504 664.5 389.5 30.38 0.552
 0.200 -4.617 7.871 3.38 0.0600 709.7 404.7 29.69 0.595
 0.300 -4.567 7.572 4.63 0.0536 740.7 415.4 29.29 0.625
 0.400 -4.532 7.273 5.98 0.0439 762.5 425.0 29.13 0.647
 0.500 -4.512 6.965 7.55 0.0347 775.3 433.6 29.22 0.661
 0.600 -4.508 6.643 9.49 0.0298 785.2 444.3 29.50 0.672
 0.700 -4.524 6.298 11.93 0.0332 798.0 461.6 30.05 0.685
 0.800 -4.565 5.923 15.09 0.0448 816.4 489.2 30.93 0.705
 0.900 -4.640 5.497 19.47 0.0875 845.4 529.3 32.05 0.736
 0.950 -4.696 5.254 22.44 0.1170 870.3 556.9 32.61 0.762
 1.000 -4.770 4.975 26.23 0.1265 902.6 595.0 33.40 0.796

SL BLDLCK PS PT TT BETAM VREL MREL VABS MABS
 1 0.875 20.984 26.533 658.0 61.53 1281.8 1.054 716.1 0.589
 2 0.877 20.957 27.093 654.9 59.52 1262.8 1.044 746.1 0.617
 3 0.878 20.900 27.532 652.0 57.76 1245.5 1.035 770.2 0.640
 4 0.879 20.739 28.390 647.4 54.21 1213.5 1.017 817.0 0.685
 5 0.880 20.546 28.940 643.7 51.19 1181.8 0.998 849.2 0.717
 6 0.881 20.332 29.280 640.8 48.39 1148.2 0.975 872.9 0.741
 7 0.880 20.092 29.380 638.3 45.74 1110.8 0.947 888.3 0.757
 8 0.880 19.792 29.350 636.2 42.83 1070.7 0.916 902.2 0.772
 9 0.878 19.360 29.280 634.4 39.16 1029.1 0.884 921.9 0.792
 10 0.875 18.708 29.160 633.0 34.26 987.8 0.853 951.8 0.822
 11 0.867 17.686 28.920 631.6 27.53 953.3 0.830 997.4 0.868
 12 0.857 16.922 28.770 631.5 23.04 945.8 0.828 1033.2 0.904
 13 0.837 15.919 28.564 632.3 17.40 945.9 0.834 1081.1 0.953

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STA 19.000 MASS AVERAGED PROPERTIES
 PT= 28.777 TT= 640.23 GAMMA=1.4005 PT-RAT= 1.958 TT-RAT= 1.234
 RCU= 3035.9 VM= 765.4 CZ= 749.0 MM=0.653 MABS=0.756 MREL=0.940

STATOR STA= 20.000 AFLOW= 118.88 D+C=O. IN STATOR
 WTF= 61.365 I=21 MTIP=261 OPTX=BETM ITYPE=2 INBR=4 ABC=O. D*H=O.
 PSIC Z R PHI CURV VM CU ALPHAM MM
 0. -4.300 8.500 0. 0. 650.4 260.5 21.82 0.534
 0.050 -4.277 8.342 0.62 0.0043 680.0 269.8 21.64 0.561
 0.100 -4.258 8.188 1.25 0.0088 702.1 276.4 21.49 0.582
 0.200 -4.225 7.890 2.52 0.0159 743.0 288.8 21.24 0.622
 0.300 -4.201 7.599 3.86 0.0202 769.5 295.9 21.03 0.648
 0.400 -4.184 7.307 5.30 0.0237 787.9 300.9 20.90 0.666
 0.500 -4.174 7.008 6.92 0.0298 798.3 304.2 20.86 0.677
 0.600 -4.173 6.697 8.82 0.0399 806.6 308.4 20.93 0.687
 0.700 -4.180 6.369 11.06 0.0535 818.1 316.5 21.15 0.699
 0.800 -4.199 6.018 13.80 0.0746 835.5 330.6 21.59 0.716
 0.900 -4.222 5.632 17.31 0.0876 859.0 350.6 22.20 0.740
 0.950 -4.260 5.420 19.54 0.1002 875.5 363.0 22.52 0.757
 1.000 -4.300 5.188 22.50 0.1259 896.3 378.8 22.91 0.777

SL BLDLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.849 21.202 26.533 658.0 62.31 1399.8 1.150 700.7 0.575
 2 0.851 21.174 27.093 654.9 60.51 1381.2 1.141 731.5 0.604
 3 0.852 21.143 27.532 652.0 59.00 1363.3 1.131 754.6 0.626
 4 0.855 21.068 28.390 647.4 56.05 1330.4 1.113 797.2 0.667
 5 0.857 20.974 28.940 643.7 53.63 1297.8 1.092 824.5 0.694
 6 0.859 20.855 29.280 640.8 51.44 1264.1 1.069 843.4 0.713
 7 0.860 20.704 29.380 638.3 49.43 1227.5 1.042 854.3 0.725
 8 0.860 20.492 29.350 636.2 47.28 1188.9 1.012 863.6 0.735
 9 0.858 20.176 29.280 634.4 44.63 1149.4 0.982 877.1 0.749
 10 0.855 19.688 29.160 633.0 41.20 1110.4 0.952 898.6 0.770
 11 0.847 18.975 28.920 631.6 36.83 1073.2 0.925 927.8 0.800
 12 0.840 18.511 28.770 631.5 34.14 1057.7 0.914 947.7 0.819
 13 0.828 17.927 28.564 632.3 30.91 1044.7 0.906 973.0 0.843

STA 20.000 MASS AVERAGED PROPERTIES
 PT= 28.777 TT= 640.23 GAMMA=1.4004 PT-RAT= 1.958 TT-RAT= 1.234
 RCU= 2126.1 VM= 789.4 CZ= 776.2 MM=0.669 MABS=0.719 MREL=1.034

STATOR STA= 21.000
 WTF= 61.365 I=22 MTIP=274 AFLOW= 115.15 D+C=O. D+H=O.
 PSIC Z OPTX=DPP PHI OPTY=BETM ITYPE=2 INBR=4 CU ALPHAM MM ABH=O.
 0. -3.800 8.500 0. 0. 666.1 168.6 14.20 0.546
 0.050 -3.800 8.346 0.53 0.0025 696.9 174.0 14.02 0.575
 0.100 -3.800 8.197 1.07 0.0044 719.7 177.6 13.86 0.596
 0.200 -3.800 7.907 2.22 0.0087 761.5 184.2 13.59 0.636
 0.300 -3.800 7.624 3.46 0.0148 787.7 187.9 13.41 0.662
 0.400 -3.800 7.340 4.79 0.0223 805.7 190.3 13.29 0.680
 0.500 -3.800 7.051 6.26 0.0314 815.7 191.4 13.21 0.691
 0.600 -3.800 6.752 7.93 0.0424 823.2 192.4 13.16 0.699
 0.700 -3.800 6.439 9.85 0.0550 832.6 195.4 13.20 0.709
 0.800 -3.800 6.109 12.10 0.0701 844.7 201.9 13.44 0.721
 0.900 -3.800 5.757 14.93 0.0973 860.2 211.2 13.79 0.737
 0.950 -3.800 5.571 16.61 0.1113 872.3 215.8 13.90 0.749
 1.000 -3.800 5.376 18.63 0.1266 886.3 220.6 13.98 0.762

IN STATOR
 MABS
 1 0.849 21.391 26.533 658.0 TT BETAM VREL MREL VABS
 2 0.850 21.369 27.093 654.9 61.78 1474.0 1.216 718.3 0.592
 3 0.851 21.345 27.532 652.0 60.44 1458.9 1.209 741.3 0.614
 4 0.853 21.293 28.390 647.4 57.84 1430.8 1.195 783.4 0.654
 5 0.855 21.224 28.940 643.7 55.77 1400.2 1.177 809.8 0.681
 6 0.856 21.128 29.280 640.8 53.90 1367.6 1.155 827.9 0.699
 7 0.858 20.996 29.380 638.3 52.23 1331.9 1.128 837.8 0.710
 8 0.858 20.817 29.350 636.2 50.51 1294.5 1.099 845.3 0.718
 9 0.859 20.571 29.280 634.4 48.50 1256.4 1.070 855.2 0.728
 10 0.858 20.232 29.160 633.0 46.05 1217.1 1.039 868.4 0.742
 11 0.855 19.739 28.920 631.6 43.10 1178.0 1.010 885.7 0.759
 12 0.854 19.404 28.770 631.5 41.33 1161.7 0.997 898.6 0.771
 13 0.852 19.011 28.564 632.3 39.40 1147.0 0.986 913.4 0.785

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STA 21.000 MASS AVERAGED PROPERTIES
 PT= 28.776 TT= 640.23 GAMMA=1.4003 PT-RAT= 1.958 TT-RAT= 1.234
 RCU= 1341.1 VM= 802.9 CZ= 792.8 MM=0.679 MABS=0.698 MREL=1.119

STATOR STA= 22.000
 WTF= 61.365 I=23 OPTX=DPP AFLOW= 114.73 D+C=0. D*H=0. ABH=0.
 PSIC Z OPTX=DPP R PHI CURV VM CU ALPHAM MM
 0. -3.204 8.500 0. 0. 556.9 82.9 7.19 0.538
 0.050 -3.211 8.351 0.54 -0.0034 688.5 85.5 7.08 0.566
 0.100 -3.218 8.207 1.03 -0.0021 711.4 87.0 6.97 0.588
 0.200 -3.232 7.928 1.98 0.0060 753.6 89.8 6.79 0.628
 0.300 -3.245 7.655 2.99 0.0147 780.3 91.1 6.66 0.654
 0.400 -3.259 7.383 4.08 0.0234 798.8 91.8 6.56 0.672
 0.500 -3.272 7.105 5.30 0.0318 808.9 91.9 6.48 0.683
 0.600 -3.286 6.818 6.68 0.0418 816.1 92.0 6.43 0.691
 0.700 -3.301 6.519 8.28 0.0537 825.0 92.9 6.43 0.700
 0.800 -3.316 6.205 10.31 0.0570 835.1 95.2 6.51 0.711
 0.900 -3.333 5.871 12.71 0.0637 842.5 98.2 6.65 0.719
 0.950 -3.341 5.696 13.98 0.0820 847.8 99.8 6.72 0.724
 1.000 -3.350 5.512 15.23 0.1249 857.3 101.8 6.77 0.732

IN STATOR
 VABS MABS
 562.1 0.542
 693.8 0.571
 716.7 0.592
 758.9 0.632
 785.6 0.658
 804.0 0.677
 814.1 0.688
 821.3 0.696
 830.2 0.705
 840.5 0.715
 848.2 0.723
 853.7 0.729
 863.3 0.737

SL BLDLK PS PT TT BETAM VREL MREL VABS MABS
 1 0.880 21.733 26.533 658.0 65.13 1562.0 1.278 562.1 0.542
 2 0.880 21.723 27.093 654.9 63.62 1549.6 1.275 693.8 0.571
 3 0.881 21.716 27.532 652.0 62.41 1536.0 1.270 716.7 0.592
 4 0.882 21.688 28.390 647.4 60.08 1510.7 1.259 758.9 0.632
 5 0.883 21.632 28.940 643.7 58.23 1481.9 1.242 785.6 0.658
 6 0.883 21.541 29.280 640.8 56.59 1450.7 1.221 804.0 0.677
 7 0.884 21.413 29.380 638.3 55.15 1415.7 1.196 814.1 0.688
 8 0.885 21.242 29.350 636.2 53.70 1378.6 1.167 821.3 0.696
 9 0.886 21.014 29.280 634.4 52.04 1341.2 1.139 830.2 0.705
 10 0.886 20.731 29.160 633.0 50.13 1302.6 1.109 840.5 0.715
 11 0.886 20.408 28.920 631.6 48.07 1260.7 1.075 848.2 0.723
 12 0.887 20.204 28.770 631.5 46.88 1240.3 1.059 853.7 0.729
 13 0.887 19.900 28.564 632.3 45.45 1222.1 1.044 863.3 0.737

STA 22.000 MASS AVERAGED PROPERTIES
 PT= 28.776 TT= 640.23 GAMMA=1.4002 PT-RAT= 1.958 TT-RAT= 1.234
 RCU= 649.0 VM= 793.0 CZ= 786.0 MM=0.668 MABS=0.673 MREL=1.184

STATOR
 WTF= 61.365 I=24 STA= 23.000
 PSIC Z R OPTX=DPP MTIP=300 AFLOW= 118.18 D=C=O. D*H=O.
 PHI OPTV=BETM ITYPE=3 INBR=4 ABC=O. ABH=O.
 CURV VM CU ALPHAM MM
 0.567 8.500 0. 0. 651.5 0. 0. 0.533
 0.050 -2.581 8.358 0.49 0.0062 678.5 0. 0. 0.557
 0.100 -2.595 8.213 0.91 0.0089 696.1 0. 0. 0.574
 0.200 -2.622 7.948 1.67 0.0120 738.2 0. 0. 0.614
 0.300 -2.648 7.684 2.43 0.0177 764.1 0. 0. 0.639
 0.400 -2.674 7.420 3.25 0.0260 782.7 0. 0. 0.657
 0.500 -2.700 7.152 4.17 0.0370 792.7 0. 0. 0.668
 0.600 -2.727 6.876 5.21 0.0497 798.8 0. 0. 0.675
 0.700 -2.756 6.589 6.41 0.0647 807.6 0. 0. 0.684
 0.800 -2.785 6.292 7.99 0.0931 827.6 0. 0. 0.703
 0.900 -2.816 5.977 9.87 0.1246 827.3 0. 0. 0.704
 0.950 -2.832 5.809 10.79 0.1318 827.1 0. 0. 0.704
 1.000 -2.850 5.631 11.52 0.1267 815.1 0. 0. 0.692

TE STATOR
 MABS
 0.533
 0.557
 0.574
 0.614
 0.639
 0.657
 0.668
 0.675
 0.684
 0.703
 0.704
 0.704
 0.692

SL BLDLCK PS PT TT BETAM VREL MREL VABS MABS
 1 0.940 21.525 26.109 658.0 66.52 1635.4 1.337 651.5 0.533
 2 0.940 21.526 26.581 654.9 65.30 1623.4 1.334 678.5 0.557
 3 0.940 21.522 26.910 652.0 64.36 1608.7 1.327 696.1 0.574
 4 0.940 21.507 27.731 647.4 62.24 1585.0 1.318 738.2 0.614
 5 0.940 21.477 28.269 643.7 60.60 1556.5 1.301 764.1 0.639
 6 0.940 21.425 28.638 640.8 59.13 1525.5 1.281 782.7 0.657
 7 0.940 21.337 28.780 638.3 57.87 1490.5 1.256 792.7 0.668
 8 0.940 21.204 28.769 636.2 56.64 1452.8 1.227 798.8 0.675
 9 0.940 21.020 28.749 634.4 55.22 1415.8 1.199 807.6 0.684
 10 0.940 20.735 28.851 633.0 53.30 1384.8 1.177 827.6 0.703
 11 0.940 20.295 28.252 631.6 51.89 1340.5 1.140 827.3 0.704
 12 0.940 20.015 27.861 631.5 51.10 1317.2 1.121 827.1 0.704
 13 0.940 19.716 27.159 632.3 50.64 1285.3 1.091 815.1 0.692

STA 23.000 MASS AVERAGED PROPERTIES
 PT= 28.163 TT= 640.23 GAMMA=1.4002 PT-RAT= 1.916 TT-RAT= 1.234
 RCU= 0. VM= 777.4 CZ= 773.2 MM=0.654 MABS=0.654 MREL=1.244

AVERAGE
 PCT IMM RAD
 0. 8.500
 4.7 8.341
 9.3 8.188
 18.0 7.894
 26.5 7.608
 35.0 7.322
 43.7 7.029
 52.9 6.723
 62.5 6.398
 73.0 6.046
 84.8 5.649
 91.6 5.419
 100.0 5.137

BLADE SPEED
 IN OUT
 1.7766 1.2686
 1.8088 1.2626
 1.8311 1.2570
 1.8870 1.2481
 1.9236 1.2410
 1.9487 1.2354
 1.9584 1.2306
 1.9576 1.2266
 1.9562 1.2231
 1.9632 1.2204
 1.9224 1.2177
 1.8958 1.2175
 1.8480 1.2190

ACC PT
 RATIO
 1.7766
 1.8088
 1.8311
 1.8870
 1.9236
 1.9487
 1.9584
 1.9576
 1.9562
 1.9632
 1.9224
 1.8958
 1.8480

ACC TT
 RATIO
 1.2686
 1.2626
 1.2570
 1.2481
 1.2410
 1.2354
 1.2306
 1.2266
 1.2231
 1.2204
 1.2177
 1.2175
 1.2190

EFFICIENCY
 AD. POLY
 0.665
 0.703
 0.734
 0.802
 0.853
 0.893
 0.919
 0.935
 0.948
 0.965
 0.944
 0.923
 0.876

AXIAL
 VEL R
 1.206
 1.164
 1.135
 1.110
 1.099
 1.096
 1.097
 1.100
 1.109
 1.137
 1.150
 1.189
 1.161

EXIT STA= 24.000
 WTF= 61.365 I=25 OPTX=PPP R PHI CURV VM CU ALPHAM MM
 PSIC -2.000 8.500 0. 0. 668.7 0. 0. 0.548
 0.050 -2.000 8.362 0.32 0.0035 695.2 0. 0. 0.572
 0.100 -2.000 8.226 0.62 0.0079 712.5 0. 0. 0.589
 0.200 -2.000 7.964 1.18 0.0157 754.6 0. 0. 0.628
 0.300 -2.000 7.707 1.67 0.0231 781.5 0. 0. 0.655
 0.400 -2.000 7.452 2.15 0.0309 801.4 0. 0. 0.675
 0.500 -2.000 7.194 2.63 0.0398 812.9 0. 0. 0.687
 0.600 -2.000 6.929 3.12 0.0505 820.3 0. 0. 0.695
 0.700 -2.000 6.656 3.62 0.0640 830.7 0. 0. 0.705
 0.800 -2.000 6.374 4.11 0.0789 850.3 0. 0. 0.725
 0.900 -2.000 6.078 4.59 0.0994 846.8 0. 0. 0.722
 0.950 -2.000 5.922 4.85 0.1149 844.4 0. 0. 0.720
 1.000 -2.000 5.757 5.28 0.1260 831.1 0. 0. 0.707

STA= 24.000 AFLOW= 116.57 D=C=O. D*H=O.
 MTIP=313 OPTV=FREE ITYPE=O INBR=O ABC=O. ARH=O.
 FREE

SL BLDLWK PS PT TT BETAM VREL MREL VABS MABS
 1 0.950 21.296 26.109 658.0 65.97 1642.3 1.345 668.7 0.548
 2 0.950 21.294 26.581 654.9 64.77 1631.1 1.342 695.2 0.572
 3 0.950 21.286 26.910 652.0 63.86 1617.2 1.336 712.5 0.589
 4 0.950 21.254 27.731 647.4 61.77 1595.1 1.328 754.6 0.628
 5 0.950 21.197 28.269 643.7 60.12 1568.7 1.314 781.5 0.655
 6 0.950 21.112 28.638 640.8 58.64 1540.1 1.296 801.4 0.675
 7 0.950 20.995 28.780 638.3 57.37 1507.5 1.273 812.9 0.687
 8 0.950 20.837 28.769 636.2 56.14 1472.5 1.247 820.3 0.695
 9 0.950 20.624 28.749 634.4 54.73 1438.6 1.222 830.7 0.705
 10 0.950 20.339 28.851 633.0 52.91 1410.0 1.202 850.3 0.725
 11 0.950 19.960 28.252 631.6 51.71 1366.6 1.165 846.8 0.722
 12 0.950 19.723 27.861 631.5 51.06 1343.5 1.146 844.4 0.720
 13 0.950 19.454 27.159 632.3 50.71 1312.6 1.117 831.1 0.707

STA 24.000 MASS AVERAGED PROPERTIES
 PT= 28.163 TT= 640.23 GAMMA=1.4002 PT-RAT= 1.916 TT-RAT= 1.234
 RCU= 0. VM= 796.6 CZ= 795.5 MM=0.671 MABS=0.671 MREL=1.262

STA= 25.000									
FREE									
D*H=O.									
ABH=O.									
D+C=O.									
ABC=O.									
INBR=O									
AFLOW= 116.27									
ITYPE=O									
CURV									
VM									
CU									
ALPHAM									
MM									
MABS									
MREL									
VREL									
BETAM									
TT									
PT									
PS									
BDBLK									
SL									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

STA 25.000 MASS AVERAGED PROPERTIES
PT= 28.163 TT= 640.23 GAMMA=1.4002 PT-RAT= 1.916 TT-RAT= 1.234
RCU= O. VM= 797.9 CZ= 797.7 MM=0.672 MABS=0.672 MREL=1.264

EXIT STA= 26.000 FREE
 1=27
 WTF= 61.365 OPTX=DPP AFLOW= 116.28 D=C=O. D*H=O.
 PSIC Z R PHI CURV VM C11 ALPHAM MM ABH=O.
 0. -0.350 8.500 0. 0. 703.4 0. 0. 0.578
 0.050 -0.350 8.367 0.11 -0.0000 728.2 0. 0. 0.601
 0.100 -0.350 8.237 0.21 -0.0000 743.9 0. 0. 0.617
 0.200 -0.350 7.982 0.38 -0.0000 781.9 0. 0. 0.653
 0.300 -0.350 7.733 0.49 -0.0000 804.2 0. 0. 0.675
 0.400 -0.350 7.484 0.57 -0.0000 818.5 0. 0. 0.690
 0.500 -0.350 7.231 0.62 -0.0000 823.0 0. 0. 0.696
 0.600 -0.350 6.970 0.61 -0.0000 821.1 0. 0. 0.695
 0.700 -0.350 6.700 0.55 -0.0000 819.2 0. 0. 0.695
 0.800 -0.350 6.419 0.40 -0.0000 822.6 0. 0. 0.699
 0.900 -0.350 6.121 0.12 -0.0000 796.0 0. 0. 0.675
 0.950 -0.350 5.961 -0.10 -0.0000 778.3 0. 0. 0.659
 1.000 -0.350 5.791 0. 0. 745.2 0. 0. 0.628

SL BLDLTK PS PT TT BETAM VREL MREL VABS MABS
 1 0.956 20.824 26.109 658.0 64.88 1656.8 1.361 703.4 0.578
 2 0.956 20.824 26.581 654.9 63.75 1646.3 1.359 728.2 0.601
 3 0.956 20.823 26.910 652.0 62.90 1632.8 1.353 743.9 0.617
 4 0.956 20.823 27.731 647.4 60.97 1611.1 1.346 781.9 0.653
 5 0.956 20.824 28.269 643.7 59.49 1584.0 1.330 804.2 0.675
 6 0.956 20.824 28.638 640.8 58.21 1553.8 1.310 818.5 0.690
 7 0.956 20.824 28.780 638.3 57.18 1518.4 1.284 823.0 0.696
 8 0.956 20.824 28.769 636.2 56.28 1479.0 1.252 821.1 0.695
 9 0.956 20.823 28.749 634.4 55.28 1438.4 1.220 819.2 0.695
 10 0.956 20.822 28.851 633.0 54.01 1399.9 1.185 822.6 0.693
 11 0.956 20.822 28.252 631.6 53.61 1341.8 1.137 796.0 0.675
 12 0.956 20.822 27.861 631.5 53.50 1308.6 1.107 778.3 0.659
 13 0.956 20.822 27.159 632.3 53.90 1264.7 1.066 745.2 0.628

STA 26.000 MASS AVERAGED PROPERTIES
 PT= 28.163 TT= 640.23 GAMMA=1.4002 PT-RAT= 1.916 TT-RAT= 1.234
 RCU= 0. VM= 796.1 CZ= 796.1 MM=0.670 MABS=0.670 MREL=1.264

PHASE IV ROTOR BLADE FORCES

THE FORCE CALCULATIONS ARE 'PER BLADE ROW'.
TO FIND THE FORCE ON A SINGLE BLADE, DIVIDE BY 'NB'

THE FORCES ARE THAT OF THE AIR ON THE BLADES.
POSITIVE AXIAL IS AFT; POSITIVE TANGENTIAL IS IN ROTATION DIRECTION.
THE COLUMNS HEADED BY F-TAN*, F-AXL*, AND F-RAD* ARE THE TANGENTIAL,
AXIAL, AND RADIAL FORCES PER INCH OF CHANGE IN R-AVG.

SL	R-AVG (IN.)	H-AVG (IN.)	F-TAN* (LB/IN)	F-AXL* (LB/IN)	F-RAD* (LB/IN)
1	8.500	0.	-289.5	-491.3	-34.1
2	8.317	0.183	-293.6	-402.9	-32.1
3	8.138	0.362	-298.4	-404.7	-28.0
4	7.781	0.719	-299.6	-400.7	-20.8
5	7.419	1.081	-296.9	-387.5	-9.4
6	7.041	1.459	-290.3	-367.9	2.5
7	6.640	1.860	-280.8	-339.0	-2.7
8	6.205	2.295	-269.9	-302.0	-18.3
9	5.726	2.774	-259.7	-259.1	-28.6
10	5.185	3.315	-244.2	-207.1	-30.0
11	4.525	3.975	-214.1	-135.4	-26.8
12	4.103	4.397	-186.9	-83.3	-27.4
13	3.547	4.953	-165.4	-46.4	-28.0

NET TORQUE = -7884.4 IN-LB
NET TAN. FORCE = -1262.7 LB
NET AXIAL FORCE = -1310.9 LB
NET RADIAL FORCE = -104.1 LB

2. STREAMSURFACE BLADE COORDINATES

Figure 66 shows the stacked Phase IV rotor streamsurface sections. Each page of the following tabulation gives the coordinates for one of these sections. The streamline designation for these sections corresponds to the calculation streamlines of the circumferential average flow calculation. Streamline 1 is at the casing and streamline 13 is at the hub. Also given in the tabulations are coordinates for the section meanline, the meanline angle, and the section thickness at each point. Streamsurface section chord, camber angle, and stagger angle are also given. All dimensions in this tabulation are in inches or degrees.

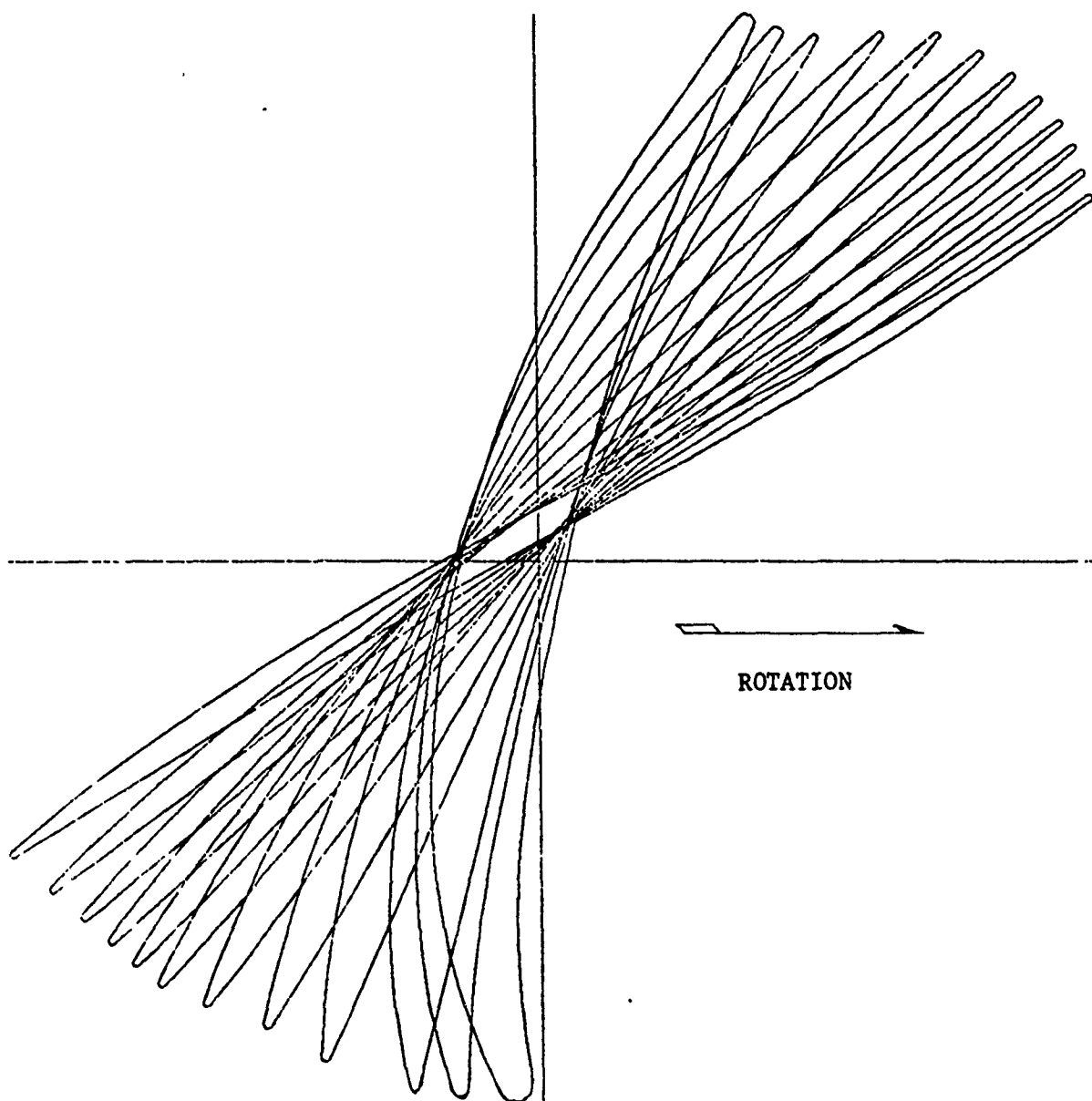


Figure 66. Stacked Phase IV Rotor Streamsurface Sections

PHASE IV ROTOR

NR 20

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 1

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.12800	8.50000	0.21035	-54.960	0.01884	0.	-1.12800	-54.960	0.01884
2	-1.07710	8.50000	0.20172	-55.530	0.02248	0.	-1.07710	-55.530	0.02248
3	-0.97530	8.50000	0.18391	-56.650	0.02990	0.	-0.97530	-56.650	0.02990
4	-0.87360	8.50000	0.16532	-57.786	0.03745	0.	-0.87360	-57.786	0.03745
5	-0.77180	8.50000	0.14588	-58.948	0.04507	0.	-0.77180	-58.948	0.04507
6	-0.65980	8.50000	0.12344	-60.229	0.05344	0.	-0.65980	-60.229	0.05344
7	-0.53770	8.50000	0.09762	-61.540	0.06245	0.	-0.53770	-61.540	0.06245
8	-0.41560	8.50000	0.07047	-62.612	0.07105	0.	-0.41560	-62.612	0.07105
9	-0.29340	8.50000	0.04234	-63.159	0.07889	0.	-0.29340	-63.159	0.07889
10	0.17130	8.50000	0.01397	-63.010	0.08554	0.	-0.17130	-63.010	0.08554
11	-0.04920	8.50000	-0.01388	-62.356	0.09068	0.	-0.04920	-62.356	0.09068
12	0.07290	8.50000	-0.04081	-61.454	0.09416	0.	0.07290	-61.454	0.09416
13	0.19510	8.50000	-0.06675	-60.585	0.09593	0.	0.19510	-60.585	0.09593
14	0.31720	8.50000	-0.09181	-59.753	0.09593	0.	0.31720	-59.753	0.09593
15	0.43930	8.50000	-0.11602	-58.872	0.09296	0.	0.43930	-58.872	0.09296
16	0.56150	8.50000	-0.13940	-57.962	0.08481	0.	0.56150	-57.962	0.08481
17	0.68360	8.50000	-0.16192	-56.924	0.06960	0.	0.68360	-56.924	0.06960
18	0.80570	8.50000	-0.18344	-55.525	0.04596	0.	0.80570	-55.525	0.04596
19	0.90750	8.50000	-0.20043	-54.104	0.01923	0.	0.90750	-54.104	0.01923

MEANLINE INPUT DATA - STREAMLINE 3

PT	Z	R	THETA	B*	T(Z)	PHI	Y	B*M	T(M)
1	-1.20400	8.14050	0.21625	-53.577	0.01946	0.815	-1.20406	-53.574	0.01946
2	-1.14850	8.14130	0.20691	-54.153	0.02352	0.814	-1.14855	-54.150	0.02352
3	-1.03750	8.14290	0.18765	-55.278	0.03178	0.785	-1.03754	-55.276	0.03178
4	-0.92650	8.14440	0.16756	-56.398	0.04017	0.676	-0.92653	-56.396	0.04017
5	-0.81550	8.14560	0.14661	-57.518	0.04858	0.492	-0.81553	-57.518	0.04858
6	-0.69340	8.14640	0.12250	-58.725	0.05775	0.278	-0.69342	-58.724	0.05775
7	-0.56020	8.14670	0.09498	-59.765	0.06742	0.047	-0.56022	-59.765	0.06742
8	-0.42700	8.14660	0.06663	-60.176	0.07637	-0.221	-0.42702	-60.176	0.07637
9	-0.29380	8.14590	0.03818	-59.951	0.08418	-0.490	-0.29382	-59.950	0.08418
10	-0.16060	8.14430	0.01029	-59.213	0.09053	-0.689	-0.16061	-59.211	0.09053
11	-0.02740	8.14250	-0.01662	-58.171	0.09521	-0.737	-0.02740	-58.169	0.09522
12	0.10570	8.14090	-0.04240	-57.028	0.09817	-0.639	0.10571	-57.026	0.09817
13	0.23890	8.13950	-0.06710	-55.942	0.09939	-0.481	0.23891	-55.941	0.09939
14	0.37210	8.13860	-0.09085	-54.915	0.09867	-0.335	0.37212	-54.915	0.09867
15	0.50530	8.13800	-0.11371	-53.883	0.09461	-0.260	0.50532	-53.883	0.09461
16	0.63850	8.13740	-0.13572	-52.825	0.08547	-0.300	0.63852	-52.825	0.08547
17	0.77170	8.13660	-0.15689	-51.766	0.06979	-0.353	0.77172	-51.766	0.06979
18	0.90490	8.13590	-0.17730	-50.765	0.04631	-0.210	0.90492	-50.764	0.04631
19	1.01590	8.13540	-0.19377	-49.952	0.01997	0.022	1.01593	-49.952	0.01997

PHASE IV ROTOR

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MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 4

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.28340	7.76360	0.22304	-52.294	0.02006	1.832	-1.28375	-52.280	0.02007
2	-1.22380	7.76560	0.21301	-52.811	0.02481	1.834	-1.22412	-52.796	0.02482
3	-1.10450	7.76940	0.19239	-53.814	0.03442	1.829	-1.10476	-53.801	0.03443
4	-0.98520	7.77320	0.17102	-54.789	0.04411	1.793	-0.98540	-54.776	0.04412
5	-0.86590	7.7690	0.14889	-55.759	0.05377	1.706	-0.86604	-55.748	0.05379
6	-0.73460	7.78070	0.12358	-56.848	0.06420	1.525	-0.73469	-56.839	0.06422
7	-0.59150	7.78420	0.09489	-57.709	0.07509	1.242	-0.59155	-57.703	0.07510
8	-0.44830	7.78690	0.06573	-57.669	0.08479	0.931	-0.44832	-57.666	0.08500
9	-0.30520	7.78880	0.03710	-56.800	0.09343	0.652	-0.30521	-56.798	0.09343
10	-0.16200	7.73020	0.00971	-55.430	0.10010	0.446	-0.16200	-55.429	0.10010
11	-0.01890	7.79110	-0.01626	-54.016	0.10491	0.317	-0.01890	-54.016	0.10491
12	0.12430	7.79170	-0.04100	-52.824	0.10788	0.277	0.12430	-52.824	0.10788
13	0.26740	7.79240	-0.06478	-51.819	0.10898	0.339	0.26740	-51.818	0.10898
14	0.41060	7.79340	-0.08777	-50.924	0.10794	0.434	0.41061	-50.923	0.10794
15	0.55380	7.79460	-0.11004	-50.063	0.10319	0.474	0.55381	-50.062	0.10319
16	0.69690	7.79570	-0.13165	-49.206	0.09294	0.408	0.69692	-49.205	0.09294
17	0.84010	7.79670	-0.15261	-48.351	0.07559	0.363	0.84012	-48.350	0.07559
18	0.98320	7.79780	-0.17295	-47.516	0.04969	0.586	0.98322	-47.514	0.04969
19	1.10250	7.79880	-0.18945	-46.823	0.02062	0.922	1.10253	-46.819	0.02062

MEANLINE INPUT DATA - STREAMLINE 5

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.35810	7.36510	0.22850	-50.976	0.02034	3.221	-1.35994	-50.932	0.02036
2	-1.26810	7.36870	0.21780	-51.425	0.02611	3.274	-1.26954	-51.379	0.02614
3	-1.16940	7.37610	0.19590	-52.321	0.03777	3.362	-1.16962	-52.273	0.03781
4	-1.04130	7.38360	0.17329	-53.246	0.04946	3.401	-1.04260	-53.198	0.04952
5	-0.91460	7.39120	0.14993	-54.163	0.06107	3.376	-0.91568	-54.116	0.06114
6	-0.77520	7.39930	0.12339	-55.029	0.07352	3.279	-0.77604	-54.985	0.07360
7	-0.62320	7.40780	0.09373	-55.409	0.08631	3.085	-0.62381	-55.370	0.08639
8	-0.47110	7.41570	0.06428	-54.650	0.09770	2.797	-0.47150	-54.658	0.09778
9	-0.31900	7.42280	0.03606	-53.258	0.10721	2.484	-0.31924	-53.232	0.10727
10	-0.16700	7.42890	0.00937	-51.765	0.11464	2.227	-0.16712	-51.744	0.11469
11	-0.01490	7.43450	-0.01597	-50.414	0.11996	2.057	-0.01491	-50.396	0.12001
12	0.13720	7.43990	-0.04020	-49.287	0.12315	1.955	0.13728	-49.271	0.12319
13	0.28920	7.44490	-0.06356	-48.390	0.12415	1.866	0.28937	-48.375	0.12419
14	0.44130	7.44970	-0.08622	-47.585	0.12252	1.799	0.44155	-47.571	0.12255
15	0.59340	7.45450	-0.10823	-46.735	0.11649	1.763	0.59372	-46.722	0.11652
16	0.74540	7.45900	-0.12958	-45.884	0.10420	1.687	0.74579	-45.871	0.10422
17	0.89750	7.46350	-0.15030	-45.073	0.08393	1.669	0.89795	-45.061	0.08395
18	1.04960	7.46820	-0.17045	-44.307	0.05410	1.942	1.05013	-44.290	0.05412
19	1.17630	7.47230	-0.18693	-43.683	0.02096	2.326	1.17691	-43.660	0.02097

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE G

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.42690	6.93960	0.23262	-49.825	0.02048	4.953	-1.43237	-49.720	0.02052
2	-1.36020	6.94550	0.22115	-50.247	0.02793	5.059	-1.36542	-50.137	0.02799
3	-1.22670	6.95760	0.19772	-51.078	0.04295	5.251	-1.27138	-50.960	0.04306
4	-1.09320	6.97000	0.17363	-51.901	0.05797	5.387	-1.09730	-51.778	0.05813
5	-0.95970	6.98270	0.14890	-52.623	0.07276	5.436	-0.96320	-52.498	0.07297
6	-0.81290	6.99680	0.12113	-53.084	0.08842	5.367	-0.81574	-52.963	0.08867
7	-0.65270	7.01170	0.09072	-52.862	0.10422	5.175	-0.65486	-52.750	0.10449
8	-0.49260	7.02580	0.06120	-51.554	0.11801	4.941	-0.49413	-51.450	0.11828
9	-0.33240	7.03930	0.03342	-49.756	0.12931	4.670	-0.33337	-49.662	0.12956
10	-0.17220	7.05210	0.00727	-48.286	0.13802	4.363	-0.17267	-48.203	0.13824
11	-0.01200	7.06380	-0.01765	-47.097	0.14411	4.081	-0.01203	-47.025	0.14431
12	0.14810	7.07470	-0.04158	-46.044	0.14750	3.867	0.14845	-45.979	0.14767
13	0.30830	7.08540	-0.06464	-45.052	0.14807	3.727	0.30901	-45.001	0.14823
14	0.46850	7.09580	-0.08691	-44.122	0.14502	3.612	0.46954	-44.065	0.14816
15	0.62860	7.10560	-0.10844	-43.214	0.13646	3.485	0.62994	-43.162	0.13658
16	0.78880	7.11510	-0.12928	-42.342	0.12056	3.390	0.79043	-42.292	0.12066
17	0.94900	7.12460	-0.14949	-41.509	0.09560	3.437	0.95091	-41.457	0.09568
18	1.10920	7.13470	-0.16909	-40.712	0.05956*	3.755	1.11142	-40.651	0.06001
19	1.24260	7.14330	-0.18499	-40.059	0.02102	4.156	1.24514	-39.984	0.02104

MEANLINE INPUT DATA - STREAMLINE 7

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.49240	6.47850	0.23543	-48.905	0.02013	6.980	-1.50436	-48.693	0.02021
2	-1.42250	6.48740	0.22298	-49.305	0.02995	7.131	-1.43393	-49.085	0.03008
3	-1.28280	6.50530	0.19763	-50.033	0.04972	7.402	-1.29309	-49.797	0.04996
4	-1.14300	6.52370	0.17177	-50.577	0.06937	7.581	-1.15209	-50.330	0.06973
5	-1.00330	6.54240	0.14560	-50.851	0.08852	7.645	-1.01114	-50.600	0.08899
6	-0.84960	6.56310	0.11680	-50.743	0.10850	7.601	-0.85607	-50.495	0.10907
7	-0.68190	6.58540	0.08595	-49.970	0.12833	7.439	-0.68691	-49.731	0.12897
8	-0.51420	6.60690	0.05647	-48.352	0.14543	7.192	-0.51783	-48.127	0.14607
9	-0.34650	6.62770	0.02892	-46.460	0.15934	6.921	-0.34885	-46.251	0.15995
10	-0.17880	6.64770	0.00304	-44.981	0.16995	6.666	-0.17997	-44.786	0.17053
11	-0.01110	6.66690	-0.02158	-43.704	0.17719	6.393	-0.01117	-43.526	0.17772
12	0.15650	6.68520	-0.04507	-42.463	0.18092	6.119	0.15743	-42.300	0.18139
13	0.32420	6.70280	-0.06753	-41.324	0.18095	5.913	0.32606	-41.172	0.18137
14	0.49190	6.71990	-0.08910	-40.303	0.17610	5.767	0.49463	-40.160	0.17647
15	0.65960	6.73670	-0.10989	-39.371	0.16433	5.662	0.66317	-39.234	0.16465
16	0.82730	6.75310	-0.12997	-38.462	0.14366	5.622	0.83169	-38.328	0.14393
17	0.99500	6.76960	-0.14935	-37.548	0.11226	5.729	1.00021	-37.409	0.11247
18	1.16270	6.78700	-0.16805	-36.640	0.06836	6.086	1.16890	-36.485	0.06850
19	1.30240	6.80200	-0.18314	-35.881	0.02110	6.507	1.30734	-35.706	0.02115

PHASE IV ROTOR

NB 20

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 8

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.55210	5.97040	0.23707	-48.026	0.01915	9.300	-1.57450	-47.649	0.01929
2	-1.47940	5.98270	0.22349	-48.284	0.03177	9.492	-1.50082	-47.891	0.03201
3	-1.33410	6.00750	0.19607	-48.715	0.05705	9.830	-1.35342	-48.294	0.05753
4	-1.18870	6.03290	0.16846	-48.906	0.08195	10.038	-1.20580	-48.467	0.08267
5	-1.04340	6.05900	0.14096	-48.712	0.10599	10.091	-1.05823	-48.269	0.10692
6	-0.88350	6.08750	0.11135	-47.883	0.13069	10.016	-0.89583	-47.445	0.13179
7	-0.70910	6.11800	0.08058	-46.219	0.15471	9.838	-0.71877	-45.794	0.15590
8	-0.53470	6.14790	0.05200	-43.985	0.17501	9.625	-0.54183	-43.580	0.17620
9	-0.36030	6.17720	0.02574	-41.792	0.19130	9.411	-0.36499	-41.407	0.19245
10	-0.18590	6.20570	0.00129	-40.203	0.20349	9.207	-0.18827	-39.837	0.20458
11	0.01150	6.23370	-0.02188	-38.956	0.21148	8.993	-0.01164	-38.609	0.21251
12	0.16290	6.26100	-0.04399	-37.803	0.21507	8.764	0.16487	-37.477	0.21601
13	0.33730	6.28750	-0.06513	-36.699	0.21388	8.538	0.34128	-36.394	0.21473
14	0.51180	6.31330	-0.08536	-35.628	0.20640	8.356	0.51769	-35.339	0.20714
15	0.68620	6.33870	-0.10474	-34.575	0.19064	8.270	0.69394	-34.296	0.19128
16	0.86060	6.36390	-0.12330	-33.523	0.16472	8.345	0.87018	-33.243	0.16525
17	1.03500	6.38970	-0.14105	-32.461	0.12689	8.603	1.04650	-32.168	0.12730
18	1.20940	6.41690	-0.15802	-31.383	0.07546	9.013	1.22297	-31.068	0.07571
19	1.35470	6.44030	-0.17157	-30.466	0.02109	9.417	1.37017	-30.128	0.02116

MEANLINE INPUT DATA - STREAMLINE 9

PT	Z	R	THETA	B*	T(Z)	PHI	X	R*M	T(M)
1	-1.59030	5.39730	0.23545	-46.823	0.01860	12.323	-1.62953	-46.156	0.01883
2	-1.51530	5.41430	0.22067	-46.817	0.03407	12.509	-1.55274	-46.129	0.03450
3	-1.36530	5.44830	0.19128	-46.739	0.06480	12.820	-1.39899	-46.017	0.06566
4	-1.21540	5.48260	0.16224	-46.464	0.09478	12.952	-1.24520	-45.726	0.09606
5	-1.06540	5.51710	0.13384	-45.749	0.12340	12.903	-1.09130	-45.016	0.12501
6	-0.90040	5.55480	0.10406	-44.014	0.15241	12.787	-0.92206	-43.295	0.15424
7	-0.72050	5.59540	0.07431	-41.242	0.18017	12.667	-0.73763	-40.543	0.18208
8	-0.54050	5.63560	0.04745	-38.786	0.20336	12.533	-0.55319	-38.113	0.20527
9	-0.36050	5.67540	0.02277	-36.868	0.22188	12.380	-0.36885	-36.223	0.22374
10	-0.18060	5.71470	-0.00020	-35.165	0.23555	12.211	-0.18472	-34.550	0.23732
11	0.00060	5.75330	-0.02168	-33.622	0.24407	12.046	-0.00061	-33.037	0.24572
12	0.17930	5.79140	-0.04184	-32.178	0.24715	11.899	0.36720	-31.620	0.24865
13	0.35930	5.82910	-0.06079	-30.728	0.24423	11.776	0.55103	-30.195	0.24557
14	0.53930	5.86650	-0.07858	-29.343	0.23374	11.689	0.73473	-28.833	0.23490
15	0.71920	5.90360	-0.09533	-28.115	0.21389	11.680	0.91859	-27.620	0.21487
16	0.89920	5.94080	-0.11117	-26.937	0.18298	11.868	1.10254	-26.440	0.18378
17	1.07910	5.97900	-0.12613	-25.759	0.13936	12.236	1.28686	-25.247	0.13995
18	1.25910	6.01890	-0.14024	-24.629	0.08140	12.623	1.44067	-24.102	0.08174
19	1.40910	6.05310	-0.15139	-23.706	0.02102	12.933		-23.169	0.02111

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 10

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.56520	4.73540	0.22870	-45.583	0.02076	16.169	-1.63112	-44.427	0.02118
2	-1.48910	4.75810	0.21238	-45.433	0.03875	16.322	-1.55185	-44.254	0.03955
3	-1.33690	4.80350	0.18031	-44.917	0.07436	16.573	-1.39315	-43.702	0.07592
4	-1.18470	4.84890	0.14941	-43.755	0.10879	16.659	-1.23430	-42.529	0.11099
5	-1.03250	4.89420	0.12042	-41.858	0.14117	16.571	-1.07546	-40.650	0.14380
6	-0.86500	4.94400	0.09122	-39.323	0.17356	16.486	-0.90073	-38.149	0.17644
7	-0.68240	4.99800	0.06260	-36.530	0.20445	16.377	-0.71035	-35.402	0.20739
8	-0.49970	5.05140	0.03685	-34.158	0.23028	16.211	-0.52000	-33.087	0.23316
9	-0.31710	5.10410	0.01338	-32.084	0.25072	16.062	-0.32997	-31.067	0.25747
10	-0.13440	5.15660	-0.00806	-30.012	0.26539	16.015	-0.13983	-29.039	0.26795
11	0.04830	5.20900	-0.02761	-28.046	0.27389	16.026	0.05025	-27.114	0.27623
12	0.23090	5.26150	-0.04548	-26.220	0.27584	16.065	0.24025	-25.327	0.27793
13	0.41360	5.31420	-0.06183	-24.420	0.27049	16.132	0.43041	-23.565	0.27229
14	0.59620	5.36710	-0.07672	-22.644	0.25644	16.224	0.62053	-21.828	0.25794
15	0.77890	5.42050	-0.09025	-20.917	0.23227	16.374	0.81087	-20.138	0.23346
16	0.96150	5.47450	-0.10250	-19.184	0.19657	16.703	1.00134	-18.430	0.19745
17	1.14420	5.52980	-0.11348	-17.440	0.14801	17.118	1.19230	-16.711	0.14859
18	1.32680	5.58680	-0.12327	-15.735	0.08520	17.356	1.38351	-15.051	0.08548
19	1.47910	5.63520	-0.13056	-14.318	0.02103	17.443	1.54311	-13.685	0.02109

MEANLINE INPUT DATA - STREAMLINE 11

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.50840	3.90540	0.22113	-42.927	0.02534	21.651	-1.62321	-40.844	0.02618
2	-1.43310	3.93600	0.20338	-42.537	0.04357	21.825	-1.54214	-40.423	0.04502
3	-1.28240	3.99720	0.16909	-41.555	0.07963	22.096	-1.37964	-39.397	0.09223
4	-1.13180	4.05840	0.13676	-40.007	0.11465	22.144	-1.21705	-37.861	0.11817
5	-0.98120	4.11950	0.10696	-37.820	0.14793	21.986	-1.05453	-35.746	0.15199
6	-0.81550	4.18610	0.07749	-35.010	0.18172	21.772	-0.87598	-33.044	0.18598
7	-0.63470	4.25800	0.04924	-31.798	0.21456	21.576	-0.68142	-29.965	0.21870
8	-0.45390	4.32900	0.02471	-28.655	0.24270	21.384	-0.48713	-26.969	0.24650
9	-0.27320	4.39950	0.00345	-25.702	0.26570	21.260	-0.29317	-24.159	0.26905
10	-0.09240	4.46960	-0.01498	-22.996	0.28315	21.271	-0.09917	-21.577	0.28604
11	0.08830	4.54010	-0.03100	-20.541	0.29470	21.413	0.09482	-19.231	0.29715
12	0.26910	4.61140	-0.04489	-18.188	0.29997	21.683	0.28919	-16.977	0.30198
13	0.44990	4.68380	-0.05675	-15.677	0.29838	22.081	0.48401	-14.578	0.29993
14	0.63060	4.75790	-0.06558	-13.111	0.28786	22.588	0.67936	-12.136	0.28896
15	0.81140	4.83420	-0.07450	-10.653	0.26561	23.194	0.87560	-9.810	0.26632
16	0.99220	4.91310	-0.08067	-8.210	0.22883	23.913	1.07283	-7.514	0.22921
17	1.17290	4.99430	-0.08512	-5.624	0.17473	24.468	1.27098	-5.121	0.17487
18	1.35370	5.07700	-0.08776	-2.747	0.10058	24.402	1.46965	-2.502	0.10060
19	1.50430	5.14630	-0.08852	-0.167	0.02160	24.022	1.63479	-0.152	0.02160

MERIDIONAL AIRFOIL GEOMETRY

MEANLINE INPUT DATA - STREAMLINE 12

PT	Z	R	THETA	B*	T(Z)	PHI	X	B*M	T(M)
1	-1.48860	3.36160	0.22120	-41.159	0.03327	25.911	-1.64796	-38.178	0.03474
2	-1.41480	3.39830	0.20233	-40.564	0.05424	25.969	-1.56589	-37.581	0.05658
3	-1.26740	3.47110	0.16644	-39.168	0.09583	26.001	-1.40189	-36.212	0.09963
4	-1.12000	3.54270	0.13326	-37.285	0.13583	25.789	-1.23801	-34.432	0.14081
5	-0.97250	3.61290	0.10317	-34.893	0.17360	25.398	-1.07446	-32.212	0.17907
6	-0.81030	3.68920	0.07378	-32.054	0.21140	25.102	-0.89516	-29.555	0.21697
7	-0.63340	3.77200	0.04582	-28.978	0.24716	25.034	-0.69988	-26.647	0.25252
8	-0.45350	3.85450	0.02170	-25.926	0.27645	25.051	-0.50464	-23.769	0.28131
9	-0.27960	3.93720	0.00107	-22.918	0.29844	25.144	-0.30931	-20.943	0.30261
10	-0.10260	4.02050	-0.01641	-20.023	0.31232	25.361	-0.11362	-18.227	0.31573
11	0.07430	4.10490	-0.03114	-17.379	0.31731	25.681	0.08239	-15.752	0.32000
12	0.25120	4.19060	-0.04349	-14.881	0.31283	26.135	0.27903	-13.418	0.31485
13	0.42810	4.27850	-0.05356	-12.184	0.29910	26.787	0.47661	-10.910	0.30046
14	0.60510	4.36900	-0.06137	-9.408	0.27635	27.526	0.67554	-8.359	0.27714
15	0.78200	4.46290	-0.06703	-6.594	0.24465	28.252	0.87568	-5.814	0.24501
16	0.95890	4.55990	-0.07038	-2.969	0.20421	29.071	1.07728	-2.596	0.20427
17	1.13580	4.65920	-0.07087	1.629	0.15510	29.637	1.28035	1.416	0.15512
18	1.31280	4.75970	-0.06820	6.541	0.09749	29.260	1.48377	5.712	0.09764
19	1.46020	4.84390	-0.06355	10.688	0.04315	28.434	1.65209	9.424	0.04332

MEANLINE INPUT DATA - STREAMLINE 13

PT	Z	R	THETA	R*	T(Z)	PHI	X	B*M	T(M)
1	-1.46880	2.65330	0.23827	-36.560	0.05041	31.199	-1.68772	-32.388	0.05300
2	-1.39810	2.69470	0.21880	-36.136	0.06912	30.603	-1.60533	-32.148	0.07246
3	-1.25660	2.77680	0.18168	-35.157	0.10653	29.513	-1.44187	-31.505	0.11109
4	-1.11510	2.85610	0.14705	-33.934	0.14307	28.724	-1.27994	-30.542	0.14851
5	-0.97360	2.93290	0.11508	-32.353	0.17792	28.302	-1.11895	-29.150	0.18394
6	-0.81790	3.01620	0.08332	-30.025	0.21366	28.181	-0.94226	-26.995	0.21989
7	-0.64810	3.10760	0.05320	-26.879	0.24875	28.431	-0.74946	-24.024	0.25472
8	-0.47830	3.20060	0.02781	-23.606	0.27874	29.100	-0.55582	-20.900	0.28418
9	-0.30850	3.29700	0.00660	-20.610	0.30281	30.104	-0.36057	-18.022	0.30764
10	-0.13870	3.39790	-0.01119	-18.079	0.32014	31.281	-0.16311	15.588	0.32438
11	0.03110	3.50340	-0.02616	-15.758	0.32993	32.389	0.03679	13.403	0.33348
12	0.20090	3.61310	-0.03855	-13.254	0.33123	33.335	0.23897	11.133	0.33389
13	0.37070	3.72660	-0.04819	-10.127	0.32357	34.186	0.44323	8.404	0.32516
14	0.54050	3.84380	-0.05466	-6.093	0.30692	35.003	0.64950	4.997	0.30749
15	0.71030	3.96430	-0.05743	-0.985	0.28111	35.786	0.85782	-0.799	0.28112
16	0.88010	4.08830	-0.05595	5.212	0.24577	36.379	1.06799	4.200	0.24613
17	1.04990	4.21400	-0.04973	12.158	0.20093	36.561	1.27927	9.817	0.20253
18	1.21970	4.33860	-0.03857	19.209	0.14739	36.136	1.49021	15.716	0.15024
19	1.36120	4.44150	-0.02549	24.909	0.09632	35.488	1.66473	20.712	0.09934

PHASE IV ROTOR

NB 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 1

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	B*M	T(M)	PT	XS	YS	XP	YP									
1	0.	-1.12800	1.78797	-54.960	0.01884	1	-1.12800	1.78797	-1.12800	1.78797									
2	0.02500	-1.07711	1.71453	-55.530	0.02248	2	-1.13201	1.78140	-1.12031	1.78946									
3	0.05000	-1.02623	1.63972	-56.090	0.02617	3	-1.13047	1.77475	-1.11473	1.78577									
4	0.07500	-0.97534	1.56321	-56.650	0.02990	4	-1.08638	1.70827	-1.06785	1.72099									
5	0.10000	-0.92445	1.48505	-57.215	0.03366	5	-1.03708	1.63242	-1.01537	1.64702									
6	0.12500	-0.87356	1.40517	-57.786	0.03745	6	-0.98782	1.55499	-0.96285	1.57143									
7	0.15000	-0.82268	1.32350	-58.364	0.04126	7	-0.93860	1.47594	-0.91030	1.49417									
8	0.17500	-0.77179	1.23994	-58.948	0.04507	8	-0.88941	1.39519	-0.85772	1.41516									
9	0.20000	-0.72090	1.15444	-59.533	0.04888	9	-0.84024	1.31268	-0.80511	1.33432									
10	0.23000	-0.65984	1.04917	-60.228	0.05344	10	-0.79109	1.22832	-0.75248	1.25157									
11	0.26000	-0.59877	0.94093	-60.902	0.05797	11	-0.74196	1.14205	-0.69984	1.16683									
12	0.29000	-0.53771	0.82974	-61.540	0.06245	12	-0.68303	1.03590	-0.63664	1.06243									
13	0.32000	-0.47664	0.71567	-62.123	0.06682	13	-0.62410	0.92684	-0.57344	0.95503									
14	0.35000	-0.41557	0.59897	-62.613	0.07105	14	-0.56516	0.81486	-0.51025	0.84462									
15	0.38000	-0.35451	0.48013	-62.969	0.07509	15	-0.50617	0.70005	-0.44711	0.73129									
16	0.41000	-0.29344	0.35988	-63.159	0.07889	16	-0.44712	0.58263	-0.38403	0.61531									
17	0.44000	-0.23238	0.23911	-63.164	0.08239	17	-0.38795	0.46307	-0.32107	0.49720									
18	0.47000	-0.17131	0.11875	-63.010	0.08554	18	-0.32864	0.34207	-0.25825	0.37769									
19	0.50000	-0.11025	-0.00047	-62.731	0.08831	19	-0.26914	0.22052	-0.19562	0.25771									
20	0.53000	-0.04918	-0.11803	-62.356	0.09068	20	-0.20943	0.09934	-0.13320	0.13816									
21	0.56000	0.01188	-0.23356	-61.916	0.09264	21	-0.14950	-0.02070	-0.07100	0.01976									
22	0.59000	0.07295	-0.34690	-61.454	0.09416	22	-0.08935	-0.13907	-0.00902	-0.09699									
23	0.62000	0.13401	-0.45811	-61.009	0.09525	23	-0.02898	-0.25536	0.05774	-0.21175									
24	0.65000	0.19508	-0.56736	-60.585	0.09593	24	0.03159	-0.36940	0.11430	-0.32440									
25	0.68000	0.25614	-0.67476	-60.171	0.09620	25	0.09235	-0.48120	0.17567	-0.43503									
26	0.71000	0.31721	-0.78037	-59.753	0.09593	26	0.15329	-0.59092	0.23686	-0.54380									
27	0.74000	0.37827	-0.88420	-59.318	0.09494	27	0.21441	-0.69868	0.29787	-0.65083									
28	0.77000	0.43934	-0.98621	-58.872	0.09296	28	0.27577	-0.80453	0.35864	-0.75621									
29	0.80000	0.50040	-1.08644	-58.422	0.08967	29	0.33744	-0.90842	0.41910	-0.85997									
30	0.83000	0.56147	-1.18491	-57.962	0.08481	30	0.39955	-1.01024	0.47912	-0.96219									
31	0.86000	0.62253	-1.28159	-57.475	0.07816	31	0.46220	-1.10992	0.53860	-1.06296									
32	0.89000	0.68360	-1.37637	-56.924	0.06960	32	0.52552	-1.20740	0.59741	-1.16241									
33	0.92000	0.74466	-1.46901	-56.273	0.05900	33	0.58958	-1.30260	0.65548	-1.26058									
34	0.95000	0.80573	-1.55923	-55.524	0.04595	34	0.65443	-1.39536	0.71276	-1.35738									
35	0.97500	0.85661	-1.63241	-54.836	0.03310	35	0.72013	-1.48539	0.76919	-1.45263									
36	1.00000	0.90750	-1.70368	-54.104	0.01923	36	0.78678	-1.57224	0.82467	-1.54622									
						37	0.84308	-1.64194	0.87014	-1.62288									
						38	0.89346	-1.70199	0.91031	-1.68983									
						39	0.89943	-1.70547	0.91170	-1.67680									
						40	0.90750	-1.70368	0.90750	-1.70368									

CHORD 4.04165 CAMBER 0.856 STAGGER -59.759

PHASE IV ROTOR

NR 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 3

MEANLINE DATA						SURFACE COORDINATES					
PT	PCT X	X	Y	B+M	T(M)	PT	XS	YS	VP	YP	
1	0	-1.20406	1.76155	-53.574	0.01946	1	-1.20406	1.76155	-1.20406	1.76155	
2	0.02500	-1.14856	1.68554	-54.150	0.02352	2	-1.20804	1.75466	-1.19614	1.76328	
3	0.05000	-1.09306	1.60792	-54.715	0.02763	3	-1.20629	1.74783	-1.19029	1.75961	
4	0.07500	-1.03756	1.52867	-55.276	0.03178	4	-1.15809	1.67866	-1.13903	1.69243	
5	0.10000	-0.98206	1.44775	-55.836	0.03597	5	-1.10434	1.59995	-1.08178	1.61590	
6	0.12500	-0.92656	1.36511	-56.396	0.04017	6	-1.05062	1.51962	-1.02450	1.53773	
7	0.15000	-0.87106	1.28070	-56.956	0.04438	7	-0.99694	1.43765	-0.96718	1.45785	
8	0.17500	-0.81556	1.19445	-57.517	0.04858	8	-0.94329	1.35399	-0.90983	1.37623	
9	0.20000	-0.76006	1.10633	-58.077	0.05277	9	-0.88966	1.26860	-0.85246	1.29279	
10	0.23000	-0.69346	0.99805	-58.724	0.05775	10	-0.83605	1.18141	-0.79507	1.20750	
11	0.26000	-0.62686	0.88711	-59.306	0.06265	11	-0.78245	1.09238	-0.73767	1.12028	
12	0.29000	-0.56026	0.77382	-59.765	0.06742	12	-0.71814	0.98306	-0.66878	1.01304	
13	0.32000	-0.49366	0.65882	-60.055	0.07201	13	-0.65380	0.87112	-0.59993	0.90310	
14	0.35000	-0.42706	0.54286	-60.176	0.07637	14	-0.58939	0.75685	-0.53114	0.79080	
15	0.38000	-0.36046	0.42672	-60.136	0.08044	15	-0.52486	0.64084	-0.46247	0.67679	
16	0.41000	-0.29387	0.31111	-59.950	0.08418	16	-0.46019	0.52387	-0.39394	0.56185	
17	0.44000	-0.22727	0.19667	-59.633	0.08756	17	-0.39534	0.40669	-0.32559	0.44674	
18	0.47000	-0.16067	0.08392	-59.211	0.09053	18	-0.33030	0.29003	-0.25743	0.33218	
19	0.50000	-0.09407	-0.02678	-58.716	0.09309	19	-0.26504	0.17454	-0.18949	0.21880	
20	0.53000	-0.02747	-0.13524	-58.170	0.09521	20	-0.19955	0.06075	-0.12178	0.10709	
21	0.56000	0.03913	-0.24135	-57.599	0.09691	21	-0.13384	-0.05095	-0.05429	-0.00261	
22	0.59000	0.10573	-0.34514	-57.026	0.09817	22	-0.06791	-0.16034	0.01298	-0.11013	
23	0.62000	0.17233	-0.44671	-56.473	0.09900	23	-0.00178	-0.26731	0.08004	-0.21538	
24	0.65000	0.23893	-0.54622	-55.941	0.09939	24	0.06455	-0.37185	0.14691	-0.31842	
25	0.68000	0.30553	-0.64379	-55.425	0.09934	25	0.13107	-0.47405	0.21359	-0.41937	
26	0.71000	0.37213	-0.73950	-54.915	0.09867	26	0.19776	-0.57405	0.28010	-0.51839	
27	0.74000	0.43873	-0.83342	-54.402	0.09717	27	0.26463	-0.67197	0.34643	-0.61560	
28	0.77000	0.50533	-0.92557	-53.883	0.09461	28	0.33176	-0.76786	0.41250	-0.71115	
29	0.80000	0.57193	-1.01597	-53.356	0.09078	29	0.39923	-0.86170	0.47823	-0.80514	
30	0.83000	0.63853	-1.10465	-52.825	0.08547	30	0.46712	-0.95346	0.54354	-0.89769	
31	0.86000	0.70513	-1.19163	-52.291	0.07850	31	0.53551	-1.04306	0.60835	-0.98888	
32	0.89000	0.77173	-1.27695	-51.766	0.06979	32	0.60448	-1.13047	0.67258	-1.07883	
33	0.92000	0.83833	-1.36071	-51.258	0.05921	33	0.67408	-1.21563	0.73618	-1.16762	
34	0.95000	0.90493	-1.44299	-50.764	0.04631	34	0.74432	-1.29855	0.79914	-1.25536	
35	0.97500	0.96043	-1.51046	-50.358	0.03363	35	0.81524	-1.37924	0.86142	-1.34219	
36	1.00000	1.01593	-1.57697	-49.952	0.01997	36	0.88699	-1.45764	0.92286	-1.42834	
						37	0.94748	-1.52119	0.97337	-1.49973	
						38	1.00126	-1.57628	1.01778	-1.56242	
						39	1.00775	-1.57944	1.01975	-1.56949	
						40	1.01593	-1.57697	1.01593	-1.57697	

CHORD 4.00925 CAMBER 3.622 STAGGER -56.378

PHASE IV ROTOR

NB 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 4

MEANLINE DATA						SURFACE COORDINATES					
PT	PCT X	X	Y	B+M	T(M)	PT	XS	YS	XP	YP	
1	0.	-1.28375	1.73528	-52.280	0.02007	1	-1.28375	1.73528	-1.28375	1.73528	
2	0.02500	-1.22409	1.65742	-52.797	0.02482	2	-1.28771	1.72807	-1.27563	1.73726	
3	0.05000	-1.16444	1.57811	-53.303	0.02961	3	-1.28576	1.72106	-1.26949	1.73367	
4	0.07500	-1.10478	1.49733	-53.800	0.03443	4	-1.23398	1.64992	-1.21421	1.66492	
5	0.10000	-1.04512	1.41508	-54.291	0.03927	5	-1.17631	1.56926	-1.15257	1.58695	
6	0.12500	-0.98547	1.33134	-54.775	0.04412	6	-1.11867	1.48716	-1.09089	1.50749	
7	0.15000	-0.92581	1.24608	-55.257	0.04896	7	-1.06107	1.40362	-1.02918	1.42654	
8	0.17500	-0.86615	1.15928	-55.747	0.05378	8	-1.00349	1.31861	-0.96745	1.34406	
9	0.20000	-0.80649	1.07084	-56.249	0.05855	9	-0.94592	1.23213	-0.90569	1.26004	
10	0.23000	-0.73491	0.96249	-56.837	0.06420	10	-0.88838	1.14414	-0.84393	1.17441	
11	0.26000	-0.66332	0.85181	-57.354	0.06973	11	-0.83084	1.05458	-0.78215	1.08710	
12	0.29000	-0.59173	0.73923	-57.703	0.07509	12	-0.76178	0.94493	-0.70803	0.98005	
13	0.32000	-0.52014	0.62566	-57.804	0.08019	13	-0.69268	0.83300	-0.63396	0.87062	
14	0.35000	-0.44855	0.51219	-57.667	0.08498	14	-0.62347	0.71917	-0.55939	0.75929	
15	0.38000	-0.37696	0.39977	-57.319	0.08941	15	-0.55407	0.60430	-0.48621	0.64703	
16	0.41000	-0.30537	0.28923	-56.799	0.09343	16	-0.48446	0.48946	0.41265	0.53491	
17	0.44000	-0.23379	0.18114	-56.150	0.09699	17	-0.41459	0.37563	-0.33934	0.42391	
18	0.47000	-0.16220	0.07582	-55.431	0.10009	18	-0.34446	0.26365	-0.26629	0.31481	
19	0.50000	-0.09061	-0.02668	-54.706	0.10273	19	-0.27406	0.15412	-0.19351	0.20815	
20	0.53000	-0.01902	-0.12652	-54.017	0.10491	20	-0.20341	0.04742	-0.12099	0.10421	
21	0.56000	0.05257	-0.22398	-53.391	0.10663	21	-0.13253	-0.05636	-0.04868	0.00299	
22	0.59000	0.12416	-0.31934	-52.825	0.10788	22	-0.06147	-0.15734	0.02342	-0.09570	
23	0.62000	0.19575	-0.41284	-52.304	0.10866	23	0.00977	-0.25577	0.09536	-0.19218	
24	0.65000	0.26733	-0.50466	-51.813	0.10898	24	0.08118	-0.35193	0.16714	-0.28674	
25	0.68000	0.33892	-0.59495	-51.362	0.10881	25	0.15276	-0.44606	0.23873	-0.37962	
26	0.71000	0.41051	-0.68380	-50.923	0.10794	26	0.22450	-0.53835	0.31017	-0.47098	
27	0.74000	0.48210	-0.77129	-50.491	0.10615	27	0.29643	-0.62892	0.38142	-0.56098	
28	0.77000	0.55369	-0.85745	-50.063	0.10320	28	0.36861	-0.71783	0.45241	-0.64978	
29	0.80000	0.62528	-0.94231	-49.634	0.09887	29	0.44115	-0.80506	0.52305	-0.73753	
30	0.83000	0.69687	-1.02589	-49.205	0.09295	30	0.51412	-0.89058	0.59325	-0.82433	
31	0.86000	0.76845	-1.10822	-48.777	0.08522	31	0.58761	-0.97433	0.66294	-0.91029	
32	0.89000	0.84004	-1.18932	-48.351	0.07560	32	0.66168	-1.05626	0.73205	-0.99553	
33	0.92000	0.91163	-1.26922	-47.930	0.06392	33	0.73640	-1.13630	0.80050	-1.08014	
34	0.95000	0.98322	-1.34795	-47.514	0.04969	34	0.81180	-1.21444	0.86829	-1.16420	
35	0.97500	1.04288	-1.41270	-47.168	0.03570	35	0.88790	-1.29063	0.93536	-1.24780	
36	1.00000	1.10253	-1.47666	-46.819	0.02062	36	0.96490	-1.36474	1.00154	-1.33117	
						37	1.02979	-1.42483	1.05597	-1.40056	
						38	1.08733	-1.47683	1.10369	-1.46150	
						39	1.09423	-1.47969	1.10609	-1.46869	
						40	1.10253	-1.47666	1.10253	-1.47666	

CHORD 4.00136 CAMBER 5.460 STAGGER -53.390

PHASE IV ROTOR

NR 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 5

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	B+M	T(M)	PT	XS	YS	XP	YP									
1	0.	-1.35994	1.69094	-50.932	0.02036	1	-1.35994	1.69094	-1.35994	1.69094									
2	0.02500	-1.29652	1.61218	-51.379	0.02614	2	-1.36379	1.68351	-1.35174	1.69315									
3	0.05000	-1.23310	1.53216	-51.824	0.03196	3	-1.36166	1.67644	-1.34540	1.68962									
4	0.07500	-1.16967	1.45084	-52.273	0.03781	4	-1.30673	1.60402	-1.28631	1.62034									
5	0.10000	-1.10625	1.36818	-52.731	0.04365	5	-1.24566	1.52228	-1.22053	1.54203									
6	0.12500	-1.04283	1.28413	-53.196	0.04949	6	-1.18463	1.43927	-1.15472	1.46241									
7	0.15000	-0.97941	1.19854	-53.660	0.05532	7	-1.12362	1.35497	-1.08888	1.38140									
8	0.17500	-0.91599	1.11171	-54.113	0.06111	8	-1.06265	1.26930	-1.02302	1.29896									
9	0.20000	-0.85257	1.02335	-54.541	0.06683	9	-1.00169	1.18225	-0.95713	1.21503									
10	0.23000	-0.77646	0.91558	-54.983	0.07356	10	-0.94074	1.03380	-0.89123	1.12962									
11	0.26000	-0.70036	0.80627	-55.291	0.08010	11	-0.87979	1.00395	-0.82535	1.04273									
12	0.29000	-0.62425	0.69614	-55.371	0.08636	12	-0.80659	0.89447	-0.74634	0.93668									
13	0.32000	-0.54815	0.58630	-55.146	0.09226	13	-0.73328	0.78347	-0.66743	0.82908									
14	0.35000	-0.47204	0.47792	-54.662	0.09774	14	-0.65978	0.67160	-0.58872	0.72068									
15	0.38000	-0.39593	0.37184	-53.995	0.10274	15	-0.58600	0.55994	-0.51029	0.61266									
16	0.41000	-0.31983	0.26854	-53.238	0.10724	16	-0.51191	0.44965	-0.43217	0.50618									
17	0.44000	-0.24372	0.16806	-52.481	0.11122	17	-0.43749	0.34165	-0.35438	0.40204									
18	0.47000	-0.16762	0.07025	-51.749	0.11467	18	-0.36279	0.23645	-0.27687	0.30063									
19	0.50000	-0.09151	0.02508	-51.051	0.11760	19	-0.28783	0.13419	-0.19962	0.20193									
20	0.53000	0.01541	-0.11614	-50.400	0.11999	20	-0.21264	0.03475	-0.12259	0.10575									
21	0.56000	0.08070	-0.20915	-49.806	0.12186	21	-0.13724	-0.06204	-0.04578	0.01198									
22	0.59000	0.13680	-0.29837	-49.274	0.12318	22	-0.06163	-0.15638	0.03082	-0.07989									
23	0.62000	0.21291	-0.38602	-48.803	0.12397	23	0.01416	-0.24847	0.10724	-0.16983									
24	0.65000	0.28902	-0.47231	-48.377	0.12419	24	0.09013	-0.33855	0.18348	-0.25818									
25	0.68000	0.36512	-0.55735	-47.975	0.12380	25	0.16627	-0.42685	0.25955	-0.34520									
26	0.71000	0.44123	-0.64121	-47.573	0.12256	26	0.24260	-0.51355	0.33543	-0.43107									
27	0.74000	0.51733	-0.72388	-47.154	0.12022	27	0.31914	-0.59879	0.41110	-0.51592									
28	0.77000	0.59344	-0.80532	-46.723	0.11654	28	0.39599	-0.68256	0.48646	-0.59987									
29	0.80000	0.66954	-0.88554	-46.294	0.11129	29	0.47326	-0.76475	0.56140	-0.68300									
30	0.83000	0.74565	-0.95458	-45.872	0.10424	30	0.55102	-0.84526	0.63586	-0.76537									
31	0.86000	0.82175	-1.04247	-45.461	0.09516	31	0.62932	-0.92399	0.70977	-0.84709									
32	0.89000	0.89786	-1.11927	-45.061	0.08396	32	0.70824	-1.00086	0.78306	-0.92829									
33	0.92000	0.97397	-1.19502	-44.672	0.07047	33	0.78784	-1.07584	0.85567	-1.00910									
34	0.95000	1.05007	-1.26976	-44.291	0.05413	34	0.86814	-1.14892	0.92758	-1.08962									
35	0.97500	1.11349	-1.33129	-43.975	0.03811	35	0.94919	-1.22008	0.99874	-1.16996									
36	1.00000	1.17691	-1.39215	-43.660	0.02087	36	1.03117	-1.28913	1.06897	-1.25039									
						37	1.10026	-1.34500	1.12672	-1.31758									
						38	1.16148	-1.39327	1.17733	-1.37669									
						39	1.16867	-1.39572	1.18010	-1.38386									
						40	1.17691	-1.39215	1.17691	-1.39215									

CHORD 3.99262 CAMBER 7.272 STAGGER -50.551

PHASE IV ROTOR

NB 20

MERIDIONAL AIRFOIL GEOMETRY : STREAMLINE G

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	B*M	T(M)	PT	XS	YS	XP	YP									
1	0	-1.43237	1.62794	-49.720	0.02052	1	-1.43237	1.62794	1.43237	1.62794									
2	0.02500	-1.36544	1.54837	-50.137	0.02799	2	-1.43612	1.62034	-1.42414	1.62037									
3	0.05000	-1.29850	1.46761	-50.548	0.03550	3	-1.43386	1.61325	-1.41763	1.62698									
4	0.07500	-1.23156	1.38568	-50.959	0.04304	4	-1.37618	1.53939	1.35469	1.55734									
5	0.10000	-1.16462	1.30252	-51.371	0.05058	5	-1.31220	1.45634	-1.28479	1.47889									
6	0.12500	-1.09768	1.21815	-51.775	0.05809	6	-1.24827	1.37212	-1.21485	1.39923									
7	0.15000	-1.03075	1.13256	-52.158	0.06554	7	-1.18438	1.28674	-1.14487	1.31831									
8	0.17500	-0.96381	1.04586	-52.496	0.07290	8	-1.12050	1.20018	-1.07487	1.23612									
9	0.20000	-0.89687	0.95819	-52.764	0.08014	9	-1.05662	1.11246	-1.00487	1.15267									
10	0.22500	-0.81654	0.85207	-52.962	0.08859	10	-0.99272	1.02367	0.93489	1.06805									
11	0.25000	-0.73622	0.74552	-52.982	0.09670	11	-0.92877	0.93394	-0.86497	0.98243									
12	0.27500	-0.65582	0.63934	-52.755	0.10439	12	-0.85190	0.82539	-0.78119	0.87875									
13	0.30000	-0.57557	0.53460	-52.226	0.11158	13	-0.77482	0.71641	-0.69761	0.77463									
14	0.35000	-0.49524	0.43230	-51.462	0.11819	14	-0.69745	0.60774	-0.61431	0.67093									
15	0.38000	-0.41492	0.33303	-50.570	0.12416	15	-0.61967	0.50042	-0.53147	0.56877									
16	0.41000	-0.33459	0.23690	-49.675	0.12948	16	-0.54147	0.39548	-0.44902	0.46912									
17	0.44000	-0.25427	0.14360	-48.892	0.13416	17	-0.46287	0.29360	-0.36697	0.37246									
18	0.47000	-0.17394	0.05266	-48.214	0.13818	18	-0.38395	0.19500	-0.28523	0.27879									
19	0.50000	-0.09362	-0.03625	-47.601	0.14156	19	-0.30481	0.09949	-0.20372	0.18770									
20	0.53000	-0.01329	-0.12334	-47.033	0.14427	20	-0.22546	0.00662	-0.12242	0.09870									
21	0.56000	0.06704	-0.20877	-46.498	0.14630	21	-0.14588	-0.08398	-0.04135	0.01148									
22	0.59000	0.14736	-0.29265	-45.986	0.14766	22	-0.06607	-0.17251	0.03949	-0.07418									
23	0.62000	0.22769	-0.37537	-45.490	0.14833	23	0.01397	-0.25913	0.12010	-0.15842									
24	0.65000	0.30801	-0.45610	-45.007	0.14873	24	0.09426	-0.34395	0.20046	-0.24135									
25	0.68000	0.38834	-0.53578	-44.534	0.14727	25	0.17480	-0.42706	0.28057	-0.32308									
26	0.71000	0.46866	-0.61417	-44.070	0.14519	26	0.25560	-0.50850	0.36043	-0.40370									
27	0.74000	0.54899	-0.69131	-43.613	0.14171	27	0.33669	-0.58627	0.43998	-0.48329									
28	0.77000	0.62931	-0.76724	-43.165	0.13663	28	0.41817	-0.66633	0.51916	-0.56201									
29	0.80000	0.70964	-0.84200	-42.726	0.12971	29	0.50011	-0.74261	0.59787	-0.64001									
30	0.83000	0.78997	-0.91563	-42.295	0.12071	30	0.58258	-0.81707	0.67605	-0.71742									
31	0.86000	0.87029	-0.98817	-41.873	0.10942	31	0.66564	-0.88965	0.75364	-0.79436									
32	0.89000	0.95062	-1.05965	-41.459	0.09573	32	0.74925	-0.96028	0.83058	-0.87099									
33	0.92000	1.03094	-1.13011	-41.053	0.07918	33	0.83377	-1.02891	0.90681	-0.94743									
34	0.95000	1.11127	-1.19957	-40.652	0.06006	34	0.91893	-1.09552	0.98231	-1.02378									
35	0.97500	1.17821	-1.25671	-40.319	0.04123	35	1.00484	-1.16008	1.05704	-1.10014									
36	1.00000	1.24514	-1.31318	-39.984	0.02104	36	1.09170	-1.22235	1.13083	-1.17679									
37						37	1.16487	-1.27243	1.19154	-1.24100									
38						38	1.22958	-1.31546	1.24469	-1.29748									
39						39	1.23703	-1.31737	1.24787	-1.30459									
40						40	1.24514	-1.31318	1.24514	-1.31318									

CHORD 3.97735 CAMBER 9.735 STAGGER 47.686

PHASE IV ROTOR

NB 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 7

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	R-M	T(M)	PT	XS	YS	XP	YP									
1	0.	-1.50436	1.54495	-48.693	0.02021	1	-1.50436	1.54495	-1.50436	1.54495									
2	0.02500	-1.43402	1.46435	-49.084	0.03007	2	-1.50795	1.53738	-1.49627	1.54753									
3	0.05000	-1.36367	1.38265	-49.456	0.03999	3	-1.50564	1.53040	-1.48975	1.54434									
4	0.07500	-1.29333	1.29991	-49.796	0.04993	4	-1.44538	1.45450	-1.42265	1.47419									
5	0.10000	-1.22299	1.21623	-50.090	0.05983	5	-1.37887	1.36965	-1.34848	1.39564									
6	0.12500	-1.15265	1.13176	-50.329	0.06966	6	-1.31240	1.28379	-1.27426	1.31602									
7	0.15000	-1.08230	1.04667	-50.502	0.07936	7	-1.24594	1.19704	-1.20004	1.23543									
8	0.17500	-1.01196	0.96116	-50.599	0.08889	8	-1.17945	1.10953	-1.12584	1.15400									
9	0.20000	-0.94162	0.87549	-50.612	0.09818	9	-1.11292	1.02143	-1.05169	1.07191									
10	0.23000	-0.85721	0.77284	-50.498	0.10893	10	-1.04630	0.93295	-0.97762	0.98937									
11	0.26000	-0.77280	0.67090	-50.222	0.11917	11	-0.97956	0.84434	-0.90368	0.90664									
12	0.29000	-0.68839	0.57029	-49.742	0.12880	12	-0.89923	0.73820	-0.81518	0.80749									
13	0.32000	-0.60397	0.47180	-49.029	0.13774	13	-0.81859	0.63277	-0.72700	0.70902									
14	0.35000	-0.51956	0.37605	-48.146	0.14591	14	-0.73753	0.52868	-0.63924	0.61191									
15	0.38000	-0.43515	0.28338	-47.189	0.15327	15	-0.65597	0.42664	-0.55198	0.51695									
16	0.41000	-0.35074	0.19373	-46.270	0.15981	16	-0.57390	0.32737	-0.46522	0.42473									
17	0.44000	-0.26633	0.10673	-45.433	0.16553	17	-0.49137	0.23130	-0.37893	0.33546									
18	0.47000	-0.18192	0.02192	-44.802	0.17042	18	-0.40848	0.13850	-0.29300	0.24897									
19	0.50000	-0.09751	-0.06098	-44.163	0.17447	19	-0.32535	0.04870	-0.20731	0.16476									
20	0.53000	-0.01310	-0.14207	-43.540	0.17765	20	-0.24196	-0.03855	-0.12187	0.08238									
21	0.56000	0.07131	-0.22142	-42.920	0.17995	21	-0.15828	-0.12356	-0.03673	0.00160									
22	0.59000	0.15573	-0.29908	-42.312	0.18137	22	-0.07429	-0.20646	0.04809	-0.07768									
23	0.62000	0.24014	-0.37514	-41.732	0.18189	23	0.01004	-0.28731	0.13259	-0.15553									
24	0.65000	0.32455	-0.44970	-41.182	0.18139	24	0.09468	-0.36614	0.21677	-0.23202									
25	0.68000	0.40896	-0.52287	-40.661	0.17969	25	0.17960	-0.44301	0.30067	-0.30727									
26	0.71000	0.49337	-0.59474	-40.167	0.17653	26	0.26483	-0.51796	0.38427	-0.38144									
27	0.74000	0.57778	-0.66539	-39.696	0.17163	27	0.35042	-0.59103	0.46750	-0.45471									
28	0.77000	0.66219	-0.73489	-39.239	0.16475	28	0.43644	-0.66219	0.55030	-0.52729									
29	0.80000	0.74660	-0.80328	-38.786	0.15563	29	0.52297	-0.73142	0.63259	-0.59936									
30	0.83000	0.83101	-0.87057	-38.332	0.14403	30	0.61009	-0.79869	0.71430	-0.67110									
31	0.86000	0.91543	-0.93676	-37.873	0.12970	31	0.69786	-0.86394	0.79535	-0.74262									
32	0.89000	0.99984	-1.00186	-37.411	0.11255	32	0.78635	-0.92706	0.87568	-0.81408									
33	0.92000	1.08425	-1.06589	-36.949	0.09238	33	0.87561	-0.98795	0.95524	-0.88557									
34	0.95000	1.16866	-1.12885	-36.486	0.06854	34	0.96565	-1.04656	1.03402	-0.95717									
35	0.97500	1.23900	-1.18051	-36.098	0.04562	35	1.05648	-1.10281	1.11201	-1.02898									
36	1.00000	1.30934	-1.23143	-35.706	0.02115	36	1.14828	-1.15640	1.18904	-1.10130									
						37	1.22556	-1.19894	1.25244	-1.16208									
						38	1.29379	-1.23512	1.30790	-1.21552									
						39	1.30145	-1.23634	1.31151	-1.22253									
						40	1.30934	-1.23143	1.30934	-1.23143									

CHORD 3.95288 CAMBER 12.987 STAGGER -44.618

PHASE IV ROTOR

NR 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 8

MEANLINE DATA						SURFACE COORDINATES					
PT	PCT X	X	Y	B+M	T(M)	PT	XS	YS	XP	YP	
1	0.	-1.57450	1.44175	-47.649	0.01929	1	-1.57450	1.44175	-1.57450	1.44175	
2	0.02500	-1.50089	1.36065	-47.891	0.03200	2	-1.57784	1.43441	-1.56681	1.44439	
3	0.05000	-1.42727	1.27888	-48.112	0.04476	3	-1.57556	1.42777	-1.56048	1.44151	
4	0.07500	-1.35365	1.19652	-48.294	0.05749	4	-1.51276	1.34992	-1.48902	1.37138	
5	0.10000	-1.28004	1.11372	-48.417	0.07010	5	-1.44393	1.26393	-1.41061	1.29382	
6	0.12500	-1.20642	1.03066	-48.467	0.08256	6	-1.37511	1.17740	-1.33220	1.21564	
7	0.15000	-1.13280	0.94758	-48.426	0.09481	7	-1.30626	1.09045	-1.25382	1.13698	
8	0.17500	-1.05919	0.86478	-48.272	0.10677	8	-1.23732	1.00328	-1.17552	1.05803	
9	0.20000	-0.98557	0.78262	-47.984	0.11833	9	-1.16827	0.91612	-1.09734	0.97904	
10	0.23000	-0.89723	0.68541	-47.455	0.13159	10	-1.09903	0.82925	-1.01934	0.90031	
11	0.26000	-0.80889	0.59032	-46.726	0.14407	11	-1.02953	0.74302	-0.94161	0.82222	
12	0.29000	-0.72055	0.49792	-45.814	0.15568	12	-0.94570	0.64092	-0.84876	0.72990	
13	0.32000	-0.63221	0.40867	-44.751	0.16633	13	-0.86133	0.54094	-0.75644	0.63970	
14	0.35000	-0.54387	0.32281	-43.606	0.17599	14	-0.77636	0.44367	-0.66473	0.55218	
15	0.38000	-0.45553	0.24033	-42.468	0.18464	15	-0.69076	0.34961	-0.57366	0.46773	
16	0.41000	-0.36719	0.16096	-41.431	0.19227	16	-0.60456	0.25909	-0.48318	0.38653	
17	0.44000	-0.27885	0.08420	-40.571	0.19888	17	-0.51786	0.17223	-0.39319	0.30843	
18	0.47000	-0.19051	0.00954	-39.854	0.20446	18	-0.43080	0.08888	-0.30357	0.23304	
19	0.50000	-0.10217	-0.06336	-39.217	0.20899	19	-0.34352	0.00867	-0.21417	0.15974	
20	0.53000	-0.01382	-0.13469	-38.624	0.21244	20	-0.25602	-0.06894	-0.12499	0.08802	
21	0.56000	0.07452	-0.20455	-38.050	0.21478	21	-0.16823	-0.14432	-0.03610	0.01759	
22	0.59000	0.16286	-0.27300	-37.490	0.21600	22	-0.08013	-0.21768	0.05248	-0.05171	
23	0.62000	0.25120	-0.34009	-36.942	0.21605	23	0.00833	-0.28912	0.14071	-0.11998	
24	0.65000	0.33954	-0.40587	-36.404	0.21477	24	0.09713	-0.35869	0.22859	-0.18730	
25	0.68000	0.42788	-0.47038	-35.873	0.21191	25	0.18627	-0.42643	0.31612	-0.25375	
26	0.71000	0.51622	-0.53365	-35.347	0.20724	26	0.27581	-0.49230	0.40327	-0.31944	
27	0.74000	0.60456	-0.59570	-34.824	0.20048	27	0.36579	-0.55624	0.48997	-0.38452	
28	0.77000	0.69290	-0.65656	-34.302	0.19140	28	0.45627	-0.61817	0.57616	-0.44913	
29	0.80000	0.78124	-0.71624	-33.777	0.17978	29	0.54732	-0.67799	0.66180	-0.51342	
30	0.83000	0.86958	-0.77474	-33.247	0.16536	30	0.63897	-0.73562	0.74683	-0.57751	
31	0.86000	0.95792	-0.83206	-32.711	0.14791	31	0.73126	-0.79096	0.83121	-0.64152	
32	0.89000	1.04626	-0.88821	-32.169	0.12736	32	0.82425	-0.84388	0.91491	-0.70559	
33	0.92000	1.13460	-0.94319	-31.622	0.10353	33	0.91795	-0.89429	0.99789	-0.76983	
34	0.95000	1.22294	-0.99700	-31.068	0.07572	34	1.01235	-0.94212	1.08016	-0.83431	
35	0.97500	1.29556	-1.04095	-30.600	0.04928	35	1.10746	-0.98727	1.16174	-0.89911	
36	1.00000	1.37017	-1.08407	-30.128	0.02116	36	1.20340	-1.02943	1.24248	-0.96457	
37						37	1.28402	-1.06215	1.30910	-1.01974	
38						38	1.35495	-1.08949	1.36735	-1.06817	
39						39	1.36273	-1.08983	1.37153	-1.07493	
40						40	1.37017	-1.08407	1.37017	-1.08407	

CHORD 3.87955 CAMBER 17.521 STAGGER -40 622

PHASE IV ROTOR

NB 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 9

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	B-M	T(M)	PT	XS	YS	XP	YP									
1	0.	-1.62953	1.30478	-46.156	0.01883	1	-1.62953	1.30478	-1.62953	1.30478									
2	0.02500	-1.55278	1.22490	-46.129	0.03449	2	-1.63264	1.29746	-1.622 0	1.30759									
3	0.05000	-1.47602	1.14511	-46.087	0.05011	3	-1.63029	1.29103	-1.61576	1.30499									
4	0.07500	-1.39927	1.06548	-46.017	0.06561	4	-1.56521	1.21295	-1.54034	1.23686									
5	0.10000	-1.32251	0.98609	-45.905	0.08091	5	-1.49407	1.12774	-1.45797	1.16249									
6	0.12500	-1.24576	0.90710	-45.728	0.09595	6	-1.42287	1.04270	-1.37566	1.08826									
7	0.15000	-1.16900	0.82872	-45.454	0.11062	7	-1.35157	0.95794	-1.29346	1.01425									
8	0.17500	-1.09225	0.75128	-45.023	0.12484	8	-1.28011	0.87361	-1.21140	0.94059									
9	0.20000	-1.01549	0.67527	-44.376	0.13849	9	-1.20842	0.78992	-1.12958	0.86752									
10	0.23000	-0.92338	0.58673	-43.313	0.15403	10	-1.13640	0.70716	-1.04809	0.79540									
11	0.26000	-0.83128	0.50183	-41.983	0.16851	11	-1.06392	0.62578	-0.96706	0.72477									
12	0.29000	-0.73917	0.42099	-40.566	0.18187	12	-0.97622	0.53069	-0.87055	0.64776									
13	0.32000	-0.64707	0.34396	-39.269	0.19405	13	-0.88764	0.43920	-0.77492	0.56446									
14	0.35000	-0.55496	0.27019	-38.133	0.20506	14	-0.79831	0.35191	-0.68004	0.49007									
15	0.38000	-0.46285	0.19919	-37.140	0.21491	15	-0.70848	0.26884	-0.58565	0.41907									
16	0.41000	-0.37075	0.13057	-36.241	0.22357	16	-0.61827	0.18954	-0.49165	0.35084									
17	0.44000	-0.27864	0.06412	-35.385	0.23102	17	-0.52773	0.11353	-0.39798	0.28485									
18	0.47000	-0.18654	-0.00031	-34.566	0.23721	18	-0.43684	0.04041	-0.30466	0.22073									
19	0.50000	-0.09443	-0.06285	-33.790	0.24210	19	-0.34553	-0.03005	-0.21175	0.15829									
20	0.53000	-0.00232	-0.12362	-33.050	0.24566	20	-0.25383	-0.09798	-0.11925	0.09736									
21	0.56000	0.08978	-0.18274	-32.337	0.24786	21	-0.16175	-0.16345	0.02711	0.03776									
22	0.59000	0.18189	-0.24025	-31.631	0.24865	22	-0.06931	-0.22658	0.06466	-0.02067									
23	0.62000	0.27399	-0.29620	-30.917	0.24797	23	0.02349	-0.28745	0.15607	-0.07802									
24	0.65000	0.36610	-0.35059	-30.203	0.24561	24	0.11669	-0.34611	0.24709	-0.13440									
25	0.68000	0.45821	-0.40345	-29.504	0.24135	25	0.21029	-0.40257	0.33770	-0.18983									
26	0.71000	0.55031	-0.45486	-28.838	0.23496	26	0.30432	-0.45672	0.42788	-0.24445									
27	0.74000	0.64242	-0.50492	-28.216	0.22621	27	0.39877	-0.50847	0.51764	-0.29842									
28	0.77000	0.73452	-0.55372	-27.621	0.21490	28	0.49365	-0.55777	0.60698	-0.35195									
29	0.80000	0.82663	-0.60131	-27.032	0.20083	29	0.58894	-0.60458	0.69589	-0.40525									
30	0.83000	0.91874	-0.64771	-26.439	0.18375	30	0.68471	-0.64892	0.78434	-0.45852									
31	0.86000	1.01084	-0.69291	-25.839	0.16344	31	0.78099	-0.69076	0.87227	-0.51187									
32	0.89000	1.10295	-0.73693	-25.244	0.13984	32	0.87783	-0.72998	0.95964	-0.56545									
33	0.92000	1.19505	-0.77979	-24.666	0.11281	33	0.97523	-0.76646	1.04646	-0.61936									
34	0.95000	1.28716	-0.82153	-24.101	0.08163	34	1.07313	-0.80017	1.13277	-0.67368									
35	0.97500	1.36392	-0.85550	-23.634	0.05223	35	1.17152	-0.83105	1.21859	-0.72853									
36	1.00000	1.44067	-0.88871	-23.169	0.02111	36	1.27049	-0.85879	1.30383	-0.78428									
37						37	1.35345	-0.87942	1.37439	-0.83157									
38						38	1.42620	-0.89612	1.43607	-0.87313									
39						39	1.43398	-0.89540	1.44096	-0.87941									
40						40	1.44067	-0.88871	1.44067	-0.88871									

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CHORD 3.77327 CAMBER 22.987 STAGGER -35.544

PHASE IV ROTOR

NR 20

MERIDIONAL AIRFOIL GEOMETRY - STPEAMLINE 10

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	B·M	T(M)	Pf	XS	YS	XP	YP									
1	0.	-1.63112	1.12339	-44.427	0.02118	1	-1.63112	1.12339	-1.63112	1.12339									
2	0.02500	-1.55176	1.04583	-44.254	0.03957	2	-1.63440	1.11498	-1.62284	1.12684									
3	0.05000	-1.47240	0.96880	-44.032	0.05786	3	-1.63160	1.10781	-1.61556	1.12419									
4	0.07500	-1.39305	0.89249	-43.701	0.07594	4	-1.55557	1.03166	-1.53795	1.06000									
5	0.10000	-1.31369	0.81726	-43.207	0.09369	5	-1.49251	0.94800	-1.45230	0.98960									
6	0.12500	-1.23434	0.74356	-42.530	0.11099	6	-1.41928	0.86504	-1.36682	0.91994									
7	0.15000	-1.15498	0.67182	-41.664	0.12771	7	-1.34576	0.78312	-1.28162	0.85141									
8	0.17500	-1.07563	0.60243	-40.652	0.14377	8	-1.27185	0.70266	-1.19683	0.78445									
9	0.20000	-0.99627	0.53559	-39.548	0.15907	9	-1.19743	0.62412	-1.11253	0.71953									
10	0.23000	-0.90104	0.45887	-38.154	0.17638	10	-1.12246	0.54789	-1.02879	0.65697									
11	0.26000	-0.80582	0.38593	-36.748	0.19249	11	-1.04691	0.47426	-0.94563	0.59692									
12	0.29000	-0.71059	0.31656	-35.405	0.20736	12	-0.95553	0.38952	-0.84656	0.52822									
13	0.32000	-0.61536	0.25041	-34.189	0.22091	13	-0.86340	0.30880	-0.74823	0.46305									
14	0.35000	-0.52014	0.18706	-33.088	0.23315	14	-0.77066	0.23206	-0.65052	0.40107									
15	0.38000	-0.42491	0.12623	-32.063	0.24402	15	-0.67743	0.15904	-0.55329	0.34178									
16	0.41000	-0.32968	0.06772	-31.064	0.25349	16	-0.58378	0.08939	-0.45650	0.28473									
17	0.44000	-0.23445	0.01150	-30.048	0.26150	17	-0.48968	0.02283	-0.36014	0.22963									
18	0.47000	-0.13923	-0.04246	-29.033	0.26799	18	-0.39508	-0.04085	-0.26428	0.17629									
19	0.50000	-0.04400	-0.09425	-28.049	0.27292	19	-0.29992	-0.10168	-0.16899	0.12468									
20	0.53000	0.05123	-0.14398	-27.104	0.27625	20	-0.20426	-0.15962	-0.07420	0.07469									
21	0.56000	0.14645	-0.2177	-26.199	0.27794	21	-0.10817	-0.21468	0.02017	0.02618									
22	0.59000	0.24168	-0.23771	-25.314	0.27791	22	-0.01171	-0.26693	0.11416	-0.02102									
23	0.62000	0.33691	-0.28186	-24.431	0.27506	23	0.08510	-0.31646	0.20781	-0.06707									
24	0.65000	0.43213	-0.32424	-23.549	0.27220	24	0.18227	-0.36332	0.30109	-0.11210									
25	0.68000	0.52736	-0.36488	-22.673	0.26615	25	0.27982	-0.40753	0.39399	-0.15619									
26	0.71000	0.62259	-0.40382	-21.810	0.25773	26	0.37776	-0.44900	0.48651	-0.19947									
27	0.74000	0.71781	-0.44111	-20.962	0.24677	27	0.47606	-0.48767	0.57866	-0.24208									
28	0.77000	0.81304	-0.47679	-20.118	0.23311	28	0.57471	-0.52346	0.67046	-0.28417									
29	0.80000	0.90827	-0.51087	-19.268	0.21657	29	0.67367	-0.55633	0.76195	-0.32588									
30	0.83000	1.00349	-0.54337	-18.411	0.19697	30	0.77295	-0.58623	0.85313	-0.36734									
31	0.86000	1.09872	-0.57427	-17.549	0.17417	31	0.87253	-0.61309	0.94400	-0.40865									
32	0.89000	1.19395	-0.60361	-16.696	0.14811	32	0.97239	-0.63681	1.03460	-0.44992									
33	0.92000	1.28918	-0.63141	-15.863	0.11865	33	1.07246	-0.65730	1.12498	-0.49124									
34	0.95000	1.38440	-0.65774	-15.044	0.08514	34	1.17267	-0.67454	1.21522	-0.53267									
35	0.97500	1.46376	-0.67856	-14.365	0.05394	35	1.27296	-0.68848	1.30539	-0.57435									
36	1.00000	1.54311	-0.69838	-13.685	0.02109	36	1.37335	-0.69885	1.39545	-0.61662									
						37	1.45707	-0.70469	1.47045	-0.65243									
						38	1.53006	-0.70822	1.53609	-0.68365									
						39	1.53757	-0.70616	1.54191	-0.68915									
						40	1.54311	0.69838	1.54311	-0.69838									

CHORD 3.65986 CAMBER 30.742 STAGGER -29.853

PHASE IV ROTOR

NR 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 11

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	B+M	T(M)	PT	XS	YS	XP	YP									
1	0.	-1.62321	0.91141	-40.844	0.02618	1	-1.62321	0.91141	-1.62321	0.91141									
2	0.02500	-1.54176	0.84152	-40.421	0.04510	2	-1.62662	0.90071	-1.61331	0.91633									
3	0.05000	-1.46031	0.77270	-39.952	0.06388	3	-1.62264	0.89211	-1.60405	0.91367									
4	0.07500	-1.37886	0.70513	-39.391	0.08241	4	-1.55638	0.82435	-1.52714	0.85868									
5	0.10000	-1.29741	0.63904	-38.696	0.10062	5	-1.48082	0.74822	-1.43980	0.79719									
6	0.12500	-1.21596	0.57474	-37.849	0.11841	6	-1.40501	0.67328	-1.35271	0.73697									
7	0.15000	-1.13451	0.51256	-36.847	0.13566	7	-1.32886	0.59977	-1.26596	0.67830									
8	0.17500	-1.05306	0.45274	-35.724	0.15228	8	-1.25229	0.52799	-1.17963	0.62149									
9	0.20000	-0.97161	0.39543	-34.522	0.16822	9	-1.17518	0.45828	-1.09383	0.56683									
10	0.23000	-0.87387	0.33006	-33.011	0.18636	10	-1.09752	0.39092	-1.00860	0.51455									
11	0.26000	-0.77613	0.26841	-31.466	0.20336	11	-1.01928	0.32613	-0.92394	0.46473									
12	0.29000	-0.67839	0.21039	-29.917	0.21918	12	-0.92463	0.25193	-0.82310	0.40820									
13	0.32000	-0.58065	0.15587	-28.392	0.23375	13	-0.82921	0.18158	-0.72305	0.35514									
14	0.35000	-0.48291	0.10467	-26.905	0.24704	14	-0.73305	0.11541	-0.62373	0.30538									
15	0.38000	-0.38517	0.05661	-25.465	0.25902	15	-0.63622	0.05305	-0.52507	0.25869									
16	0.41000	-0.28743	0.01152	-24.079	0.26963	16	-0.53880	-0.00548	-0.42701	0.21482									
17	0.44000	-0.18969	-0.03080	-22.751	0.27882	17	-0.44085	-0.06031	-0.32948	0.17354									
18	0.47000	-0.09195	-0.07052	-21.486	0.28656	18	-0.34243	-0.11157	-0.23242	0.13460									
19	0.50000	0.00579	-0.10780	-20.283	0.29281	19	-0.24360	-0.15937	-0.13577	0.09776									
20	0.53000	0.10353	-0.14281	-19.129	0.29750	20	-0.14443	-0.20384	-0.03947	0.06280									
21	0.56000	0.20127	-0.17564	-18.003	0.30060	21	-0.04496	-0.24513	0.05654	0.02952									
22	0.59000	0.29901	-0.20633	-16.861	0.30206	22	0.05479	-0.28334	0.15228	-0.00227									
23	0.62000	0.39675	-0.23486	-15.670	0.30181	23	0.15482	-0.31857	0.24772	-0.03270									
24	0.65000	0.49449	-0.26116	-14.446	0.29959	24	0.25521	-0.35087	0.34282	-0.06180									
25	0.68000	0.59223	-0.28522	-13.216	0.29512	25	0.35599	-0.38015	0.43751	-0.08956									
26	0.71000	0.68997	-0.30708	-12.007	0.28806	26*	0.45712	-0.40622	0.53186	-0.11610									
27	0.74000	0.78771	-0.32682	-10.838	0.27806	27	0.55850	-0.42887	0.62597	-0.14157									
28	0.77000	0.88545	-0.34453	-9.695	0.26483	28	0.66001	-0.44796	0.71993	-0.16621									
29	0.80000	0.98319	-0.36023	-8.560	0.24805	29	0.76157	-0.46337	0.81385	-0.19027									
30	0.83000	1.08093	-0.37395	-7.419	0.22734	30	0.86315	-0.47505	0.90775	-0.21400									
31	0.86000	1.17867	-0.38568	-6.256	0.20240	31	0.96473	-0.48287	1.00165	-0.23759									
32	0.89000	1.27641	-0.39536	-5.053	0.17313	32	1.06625	-0.48667	1.09561	-0.26123									
33	0.92000	1.37415	-0.40293	-3.793	0.13925	33	1.16764	-0.48627	1.18970	-0.28508									
34	0.95000	1.47189	-0.40829	-2.471	0.09962	34	1.26879	-0.48159	1.28404	-0.30913									
35	0.97500	1.55334	-0.41099	-1.323	0.06181	35	1.36955	-0.47240	1.37876	-0.33346									
36	1.00000	1.63479	-0.41204	-0.152	0.02160	36	1.46974	-0.45805	1.47404	-0.35853									
						37	1.55263	-0.44189	1.55406	-0.38009									
						38	1.62423	-0.42543	1.62439	-0.39858									
						39	1.63110	-0.42139	1.63148	-0.40301									
						40	1.63479	-0.41204	1.63479	-0.41204									

CHORD 3.51655 CAMBER 40.691 STAGGER -23.108

PHASE IV ROTOR

NR 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 12

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	B-M	T(M)	PT	XS	YS	XP	YP									
1	0.	-1.64796	0.79749	-38.178	0.03474	1	-1.64796	0.79749	-1.64796	0.79749									
2	0.02500	-1.56546	0.73331	-37.578	0.05670	2	-1.65189	0.78296	-1.63511	0.80473									
3	0.05000	-1.48296	0.67055	-36.928	0.07850	3	-1.64620	0.77173	-1.62255	0.80193									
4	0.07500	-1.40046	0.60935	-36.198	0.10000	4	-1.58275	0.71084	-1.54817	0.75578									
5	0.10000	-1.31796	0.54987	-35.360	0.12102	5	-1.50654	0.63918	-1.45938	0.70193									
6	0.12500	-1.23545	0.49233	-34.401	0.14143	6	-1.42999	0.56900	-1.37093	0.64969									
7	0.15000	-1.15295	0.43695	-33.321	0.16111	7	-1.35297	0.50052	-1.28294	0.59921									
8	0.17500	-1.07045	0.38390	-32.154	0.17997	8	-1.27541	0.43398	-1.19550	0.55068									
9	0.20000	-0.98795	0.33324	-30.942	0.19794	9	-1.19720	0.36964	-1.10870	0.50427									
10	0.23000	-0.88895	0.27561	-29.462	0.21820	10	-1.11834	0.30772	-1.02256	0.46008									
11	0.26000	-0.78995	0.22135	-27.984	0.23692	11	-1.03884	0.24836	-0.93706	0.41812									
12	0.29000	-0.69095	0.17036	-26.514	0.25400	12	-0.94261	0.18062	-0.83529	0.37060									
13	0.32000	-0.59194	0.12254	-25.051	0.26932	13	-0.84553	0.11674	-0.73436	0.32596									
14	0.35000	-0.49294	0.07779	-23.598	0.28281	14	-0.74764	0.05672	-0.63425	0.28400									
15	0.38000	-0.39394	0.03601	-22.159	0.29435	15	-0.64896	0.00054	-0.53493	0.24453									
16	0.41000	-0.29494	-0.00288	-20.739	0.30386	16	-0.54955	-0.05179	-0.45634	0.20736									
17	0.44000	-0.19594	-0.03900	-19.346	0.31126	17	-0.44945	-0.10029	-0.33843	0.17232									
18	0.47000	-0.09694	-0.07245	-18.006	0.31645	18	-0.34874	0.14497	-0.24114	0.13920									
19	0.50000	0.00207	-0.10341	-16.735	0.31937	19	-0.24749	-0.18584	-0.14438	0.10784									
20	0.53000	0.10107	-0.13204	-15.528	0.31992	20	-0.14585	-0.22293	-0.04803	0.07803									
21	0.56000	0.20007	-0.15846	-14.361	0.31805	21	-0.04392	-0.25633	0.04805	0.04951									
22	0.59000	0.29907	-0.18273	-13.173	0.31380	22	0.05824	-0.28616	0.14389	0.02208									
23	0.62000	0.39807	-0.20477	-11.925	0.30725	23	0.16063	-0.31752	0.23951	-0.00441									
24	0.65000	0.49707	-0.22453	-10.644	0.29847	24	0.26332	-0.33550	0.33483	-0.02995									
25	0.68000	0.59608	-0.24199	-9.364	0.28750	25	0.36633	-0.35508	0.42982	0.05446									
26	0.71000	0.69508	-0.25721	-8.116	0.27438	26	0.46951	-0.37120	0.52464	-0.07786									
27	0.74000	0.79408	-0.27025	-6.890	0.25914	27	0.57269	-0.38383	0.61946	-0.10016									
28	0.77000	0.89308	-0.28108	-5.570	0.24182	28	0.67571	-0.39302	0.71445	-0.12139									
29	0.80000	0.99208	-0.28945	-4.062	0.22250	29	0.77854	-0.39888	0.80962	-0.14162									
30	0.83000	1.09108	-0.29502	-2.343	0.20119	30	0.88134	-0.40142	0.90482	-0.16074									
31	0.86000	1.19009	-0.29744	-0.429	0.17793	31	0.98470	-0.40042	0.99996	-0.17849									
32	0.89000	1.28909	-0.29644	1.597	0.15283	32	1.08637	-0.39553	1.09520	-0.19451									
33	0.92000	1.38809	-0.29190	3.665	0.12585	33	1.18942	-0.38641	1.19075	-0.20848									
34	0.95000	1.48709	-0.28373	5.784	0.09662	34	1.29122	-0.37283	1.28696	-0.22006									
35	0.97500	1.56959	-0.27405	7.597	0.07043	35	1.39211	-0.35470	1.38407	-0.22910									
36	1.00000	1.65209	-0.26170	9.424	0.04332	36	1.49196	-0.33179	1.48222	-0.23566									
						37	1.57425	-0.30896	1.56494	-0.23915									
						38	1.63487	-0.28998	1.62711	-0.24028									
						39	1.64746	-0.28086	1.64276	-0.24579									
						40	1.65209	-0.26170	1.65209	-0.25170									

CHORD 3.46587 CAMBER 47.602 STAGGER -17.795

PHASE IV ROTOR

NE 20

MERIDIONAL AIRFOIL GEOMETRY - STREAMLINE 13

MEANLINE DATA										SURFACE COORDINATES									
PT	PCT X	X	Y	B*M	T(M)	PT	XS	YS	XP	YP									
1	0.	-1.68772	0.69918	-32.388	0.05300	1	-1.68772	0.69918	-1.68772	0.69918									
2	0.02500	-1.60391	0.64626	-32.144	0.07280	2	-1.69146	0.67671	-1.66922	0.71212									
3	0.05000	-1.52010	0.59389	-31.847	0.09264	3	-1.68102	0.66046	-1.64988	0.70969									
4	0.07500	-1.43629	0.54219	-31.478	0.11240	4	-1.62328	0.61544	-1.58455	0.67709									
5	0.10000	-1.35248	0.49132	-31.020	0.13192	5	-1.54454	0.55454	-1.49566	0.63324									
6	0.12500	-1.26867	0.44146	-30.460	0.15106	6	-1.46564	0.49424	-1.40694	0.59012									
7	0.15000	-1.18486	0.39281	-29.781	0.16970	7	-1.38647	0.43479	-1.31849	0.54785									
8	0.17500	-1.10104	0.34561	-28.962	0.18774	8	-1.30696	0.37635	-1.23038	0.50656									
9	0.20000	-1.01723	0.30013	-27.990	0.20506	9	-1.22700	0.31916	-1.14271	0.46646									
10	0.23000	-0.91666	0.24816	-26.630	0.22480	10	-1.14650	0.26349	-1.05559	0.42774									
11	0.26000	-0.81609	0.19937	-25.095	0.24326	11	-1.06535	0.20959	-0.96911	0.39066									
12	0.29000	-0.71551	0.15399	-23.473	0.26031	12	-0.96704	0.14768	-0.86628	0.34863									
13	0.32000	-0.61494	0.11200	-21.841	0.27581	13	-0.86767	0.08922	-0.76450	0.30952									
14	0.35000	-0.51436	0.07331	-20.255	0.28971	14	-0.76735	0.03460	-0.66367	0.27337									
15	0.38000	-0.41379	0.03769	-18.762	0.30190	15	-0.66624	-0.01600	-0.56353	0.24001									
16	0.41000	-0.31322	0.00488	-17.397	0.31232	16	-0.56451	-0.06259	-0.46422	0.20921									
17	0.44000	-0.21264	-0.02543	-16.161	0.32087	17	-0.46234	-0.10524	-0.36524	0.18062									
18	0.47000	-0.11207	-0.05348	-15.016	0.32748	18	-0.35991	-0.14414	-0.26653	0.15390									
19	0.50000	-0.01150	-0.07942	-13.922	0.33205	19	-0.25730	-0.17952	-0.16799	0.12867									
20	0.53000	0.08908	-0.10335	-12.837	0.33445	20	-0.15449	-0.21163	-0.06965	0.10467									
21	0.56000	0.18965	-0.12524	-11.713	0.33463	21	-0.05144	-0.24057	0.02845	0.08172									
22	0.59000	0.29022	-0.14501	-10.500	0.33255	22	0.05192	-0.26640	0.12623	0.05970									
23	0.62000	0.39080	-0.16245	-9.160	0.32826	23	0.15568	-0.28907	0.22362	0.03859									
24	0.65000	0.49137	-0.17736	-7.672	0.32181	24	0.25992	-0.30850	0.32053	0.01849									
25	0.68000	0.59195	-0.18946	-6.020	0.31328	25	0.36467	-0.32443	0.41693	-0.00042									
26	0.71000	0.69252	-0.19848	-4.194	0.30273	26	0.46989	-0.33682	0.51285	0.01789									
27	0.74000	0.79309	-0.20411	-2.187	0.29021	27	0.57552	-0.34524	0.60837	-0.03368									
28	0.77000	0.89367	-0.20605	0.001	0.27575	28	0.68145	-0.34944	0.70359	-0.04751									
29	0.80000	0.99424	-0.20400	2.365	0.25937	29	0.78756	-0.34911	0.79863	-0.05911									
30	0.83000	1.09481	-0.19765	4.887	0.24105	30	0.89367	-0.34393	0.89366	-0.06818									
31	0.86000	1.19539	-0.18671	7.539	0.22081	31	0.99959	-0.33358	0.98889	-0.07443									
32	0.89000	1.29596	-0.17096	10.275	0.19874	32	1.10508	-0.31774	1.08455	-0.07756									
33	0.92000	1.39653	-0.15019	13.065	0.17476	33	1.20987	-0.29617	1.18090	-0.07726									
34	0.95000	1.49711	-0.12420	15.913	0.14834	34	1.31369	-0.26873	1.27823	-0.07318									
35	0.97500	1.58092	-0.09839	18.322	0.12434	35	1.41629	-0.23531	1.37678	-0.06507									
36	1.00000	1.66473	-0.06867	20.712	0.09934	36	1.51744	-0.19553	1.47677	-0.05287									
						37	1.60046	-0.15740	1.56138	-0.03937									
						38	1.63713	-0.13902	1.59994	-0.03212									
						39	1.66212	-0.11378	1.63735	-0.03747									
						40	1.66473	-0.06867	1.66473	-0.06867									

CHORD 3.43927 CAMBER 53.100 STAGGER -12.901

3. PLANE SECTION BLADE COORDINATES

Figure 67 shows the stacked Phase IV rotor plane sections. The following tabulation gives the coordinates for these sections. These sections are spaced one half inch apart, beginning at the tip height of 8.5 inches and progressing inward to 2.5 inches. These are the same section locations as given for the baseline rotor in Reference 1. Also included in the tabulation are coordinates for the section meanline, the meanline angle, and the section percent thickness at each point. Plane section chord, camber angle, and stagger angle are also given. These coordinates are intended to represent the blade under hot running conditions and do not include any corrections for blade untwist, meanline deformation, centrifugal growth or thermal growth.

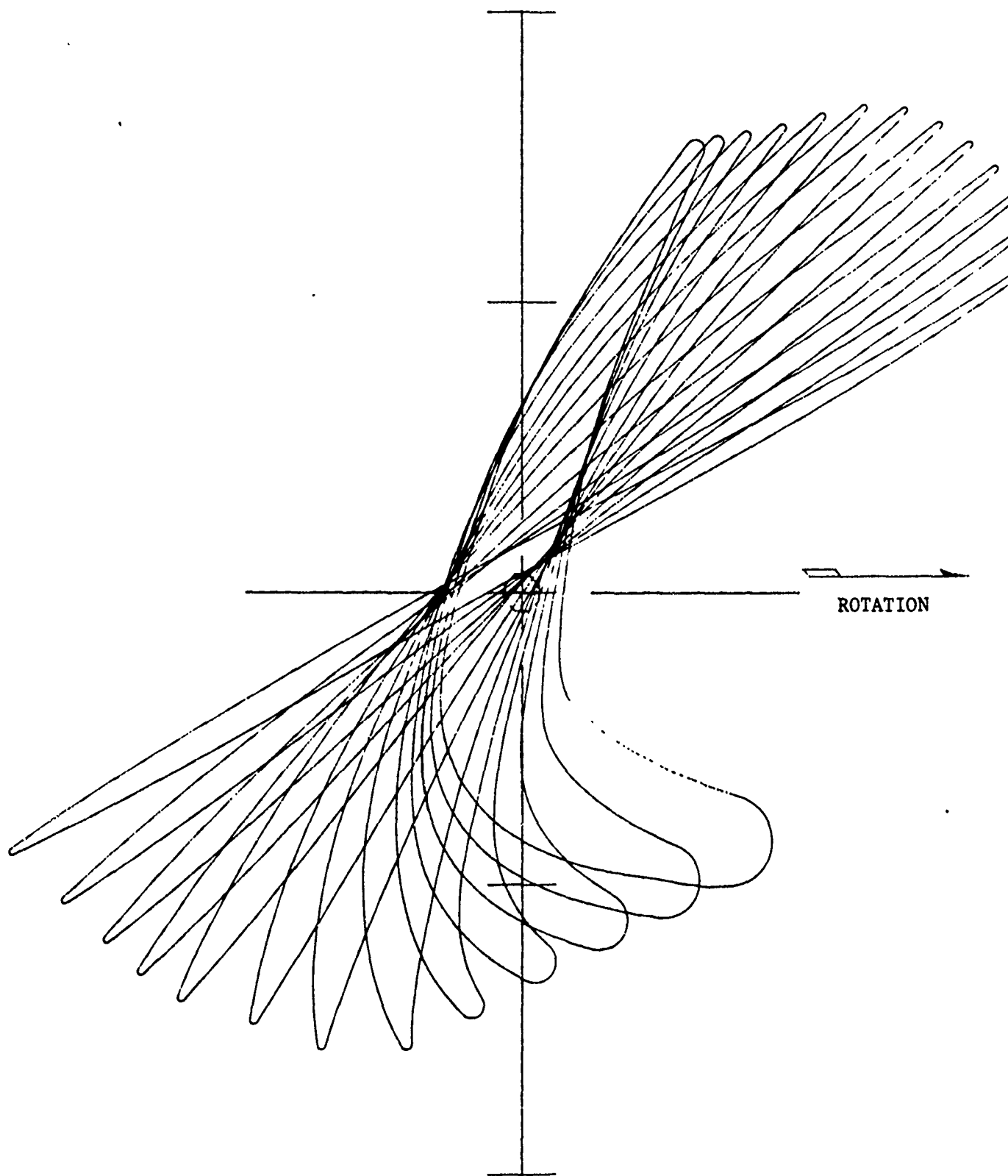


Figure 67 . Stacked Phase IV Rotor Plane Sections

PHASE V ROTOR

•ZPC•

COORD SYSTEM ORIGIN	Z	-7.03550	R	O.	MU	O	ETA	O.
STAGE	5	POTOR			NR	20		
SECTION NO	3	SFCION	CC		RHO	7	5000	
CHORD	7 9448	STAGGER			CAMBER	7.530		
AREA	0.379480	SURFACE ARC LENGTH				7.92963		
SECTION C G		ALPHA			UPSILON			
STREAMSURFACE SECTION C G.		-0.00811			-0.04336			
BLADE AXIS		-0.01733			-0.03538			
STACKING AXIS (RADIAL)		-0.01733			-0.03538			
		-0.00210			O.			

PHASE V ROTOR

•ZPC•

COORD SYSTFM ORIGIN Z -7.03550 R O MU O. EIA O.
 SECTION NO 3 SECTION CC RHO 7 5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	UPPER		LOWER	
		ALPHA	UPSILON	ALPHA	UPSILON
15	0 02283	-0.55613	0 54881	-0.48278	0 60110
16	0 02415	-0.48474	0 44535	-0.40778	0 50149
17	0 02535	-0.41311	0 34435	-0.33301	0 40423
18	0 02644	-0.34123	0 24590	-0.25849	0 30940
19	0 02741	-0.26915	0 15004	-0.18419	0 21690
20	0 02825	-0.19687	0 05658	-0.11007	0 12647
21	0 02897	-0.12444	-0.03473	-0.03610	0 03777
22	0 02957	-0.05186	-0.12430	0 03774	-0.04965
23	0 03004	0 02082	-0.21250	0 11143	-0.13615
24	0 03038	0 09368	-0.29960	0 18497	-0.22197
25	0 03059	0 16671	-0.38579	0 25833	-0.30729
26	0 03067	0 23992	-0.47119	0 33152	-0.39216
27	0 03061	0 31332	-0.55584	0 40451	-0.47670
28	0 03036	0 38698	-0.63977	0 47725	-0.56108
29	0 02985	0 46100	-0.72300	0 54962	-0 64547
30	0 02902	0 53548	-0.80552	0 62153	-0 73002
31	0 02780	0 61054	-0 88731	0 69287	0 81484
32	0 02614	0 68629	0 96819	0 76352	-0 89989
33	0 02495	0 76281	-1 04797	0 83339	-0 98515
34	0 02121	0 84017	-1 12640	0 90243	-1 07048
35	0 01788	0 91840	-1 20320	0 97059	-1 15574
36	0 01381	0 99768	-1 27786	1 03771	-1 24088
37	0 00980	1 06459	1 33812	1 09279	-1 31167
38	0 00547	1 12371	-1 38981	1 14087	-1 37350
39	0 00547	1 13098	-1 39270	1 14338	-1 38105
40	0 00547	1 13969	-1 38943	1 13969	-1 38943
LF RAD	0 01052	CENTER AT ALPHA	-1 29405	UPSILON	1 70174
TE RAD	0 01190	CENTER AT ALPHA	1 13148	UPSILON	-1 38081

PHASE V ROTOR

7PC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O.
 SECTION NO 3 SECTION CC RHO 7.5000

MEAN LINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0 4700	0 02825	-0 15347	0 09153	51.161
19	0 5000	0 02897	-0 08027	0 03152	50.621
20	0 5300	0 02957	-0 00707	-0 08697	50.206
21	0 5600	0 03004	0 06612	-0 17432	49.882
22	0 5900	0 03038	0 13932	-0 26078	49.626
23	0 6200	0 03059	0 21252	0 34654	49.411
24	0 6500	0 03067	0 28572	-0 43167	49.217
25	0 6800	0 03061	0 35891	-0 51627	49.051
26	0 7100	0 03036	0 43211	-0 60042	48.921
27	0 7400	0 02985	0 50531	-0 68423	48.818
28	0 7700	0 02902	0 57851	-0 76777	48.735
29	0 8000	0 02780	0 65170	-0 85107	48.644
30	0 8300	0 02614	0 72490	-0 93404	48.512
31	0 8600	0 02395	0 79810	-1 01656	48.326
32	0 8900	0 02121	0 87130	-1 09844	48.070
33	0 9200	0 01788	0 94450	-1 17947	47.726
34	0 9500	0 01381	1 01769	-1 25937	47.267
35	0 9750	0 00980	1 07869	-1 32490	46.832
36	1 0000	0 00547	1 13969	-1 38943	46.392

CHORD 3 9448 STAGGER 51.792 CAMBER 7.530

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER	UPSILON	LOWER	UPSILON
1	0 00519	-1 30023	1 71024	-1 30023	1 71024	1 71024
2	0 00519	-1 30448	1 70301	-1 29186	1 71203	1 71203
3	0 00519	-1 30271	1 69578	-1 28570	1 70814	1 70814
4	0 00659	-1 24982	1 61795	-1 22864	1 63301	1 63301
5	0 00801	-1 19120	1 52976	-1 16527	1 54782	1 54782
6	0 00946	-1 13263	1 43986	-1 10184	1 46093	1 46093
7	0 01092	-1 07408	1 34859	-0 97498	1 37272	1 37272
8	0 01238	-1 01550	1 25655	-0 91159	1 28383	1 28383
9	0 01384	-0 95689	1 16428	-0 84826	1 19475	1 19475
10	0 01528	-0 89823	1 07208	-0 78499	1 10577	1 10577
11	0 01669	-0 83950	0 98019	-0 70917	1 01709	1 01709
12	0 01833	-0 76892	0 87052	-0 63351	0 91126	0 91126
13	0 01991	-0 69819	0 76178	-0 55804	0 80636	0 80636
14	0 02142	-0 62727	0 65441		0 70285	0 70285

PHASE V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z -7.03550 R 0. MU 0. ETA 0.
 SECTION NO 3 SECTION CC RHO 7.5000

MEANLINE INPUT DATA

PT	ALPHA	ZETA	THICKNESS	UPSILON
1	-1.30023	53.922	0.02049	1.71024
2	-1.24343	54.531	0.02550	1.63138
3	-1.12853	55.524	0.03624	1.46688
4	-1.01194	56.016	0.04727	1.29500
5	-0.89343	56.027	0.05839	1.11888
6	0.76124	55.743	0.07037	0.92347
7	0.61505	55.126	0.08771	0.71072
8	-0.46715	54.052	0.09382	0.50216
9	-0.31805	52.665	0.10327	0.30142
10	-0.16806	51.281	0.11082	0.10969
11	-0.01765	50.263	0.11633	-0.07426
12	0.13282	49.659	0.11973	-0.25313
13	0.28305	49.227	0.12098	-0.42858
14	0.43272	48.922	0.11974	-0.60112
15	0.58155	48.740	0.11431	-0.77123
16	0.72923	48.517	0.10265	-0.93894
17	0.87550	48.074	0.08300	-1.10312
18	1.02021	47.280	0.05389	-1.26209
19	1.13969	46.392	0.02157	-1.38943

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT	AI	T/C	ALPHA	UPSILON	ZETA
1	0	0.00519	-1.30023	1.71024	53.922	
2	0.0250	0.00659	-1.23923	1.62548	54.580	
3	0.0500	0.00801	-1.17823	1.53879	55.145	
4	0.0750	0.00946	-1.11724	1.45039	55.621	
5	0.1000	0.01092	-1.05624	1.36066	55.934	
6	0.1250	0.01238	-0.99524	1.27019	56.057	
7	0.1500	0.01384	-0.93424	1.17952	56.071	
8	0.1750	0.01528	-0.87324	1.08893	56.010	
9	0.2000	0.01669	-0.81225	0.99864	55.900	
10	0.2300	0.01833	-0.73905	0.89089	55.711	
11	0.2600	0.01991	-0.66585	0.78407	55.424	
12	0.2900	0.02142	-0.59265	0.67863	55.022	
13	0.3200	0.02283	-0.51946	0.57495	54.511	
14	0.3500	0.02415	-0.44626	0.47342	53.893	
15	0.3800	0.02535	-0.37306	0.37429	53.215	
16	0.4100	0.02644	-0.29986	0.27765	52.496	
17	0.4400	0.02741	-0.22667	0.18347	51.801	

PHASE V ROTOR

COORD SYSTEM ORIGIN	Z	-7.03550	R	O.	MU	O.	ETA	O.
STAGE	5	ROTOR		NB		20		
SECTION NO	2	SECTION BB		RHO		8	0000	
CHORD	3	STAGGER		CAMBER				
	9139	55.634		4.312				
AREA	0	289956	SURFACE ARC LENGTH		7.85816			
SECTION C.G.		ALPHA		UPSILON				
STREAMEX SURFACE		-0.01456		-0.04949				
SECTION C G		0.01590		-0.04701				
BLADE AXIS		-0.01590		-0.04701				
STACKING AXIS (RADIAL)		-0.00210		0.				

PHASE V ROTOR

ZPC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O.
SECTION NO 2 SECTION RB RHO 8.0000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	UPPER ALPHA	UPSILON	LOWER ALPHA	UPSILON
15	0 01943	-0.52139	0.60793	-0.45692	0.64830
16	0 02052	-0.45675	0.50152	-0.38900	0.54463
17	0 02151	-0.39192	0.39698	-0.32127	0.44279
18	0 02241	-0.32689	0.29449	-0.25374	0.34291
19	0 02322	-0.26168	0.19416	-0.18639	0.24505
20	0 02393	-0.19629	0.09596	-0.11921	0.14914
21	0 02454	-0.13077	-0.00024	-0.05218	0.05494
22	0 02505	-0.06514	-0.09480	-0.01475	-0.03795
23	0 02547	0.00061	-0.18813	0.08157	-0.12998
24	0 02579	0.06646	-0.28059	0.14827	-0.22149
25	0 02601	0.13243	-0.37251	0.21486	-0.31279
26	0 02613	0.19854	-0.46409	0.28132	-0.40404
27	0 02615	0.26479	-0.55547	0.34762	-0.49537
28	0 02603	0.33126	-0.64669	0.41372	-0.58688
29	0 02571	0.39803	-0.73772	0.47950	-0.67853
30	0 02514	0.46523	-0.82844	0.54486	-0.77063
31	0 02424	0.53296	-0.91866	0.60969	-0.86286
32	0 02294	0.60133	-1.00824	0.67388	-0.95536
33	0 02117	0.67046	-1.09704	0.73732	-1.04810
34	0 01889	0.74044	-1.18470	0.79990	-1.14077
35	0 01606	0.81131	-1.27068	0.86159	-1.23298
36	0 01255	0.88323	-1.35429	0.92223	-1.32443
37	0 00905	0.94402	-1.42165	0.97190	-1.39982
38	0 00524	0.99807	-1.47935	1.01460	-1.46414
39	0 00324	1.00468	-1.48273	1.01743	-1.47207
40	0 00524	1.01319	-1.48040	1.01319	-1.48040
LE RAD	0 01010	CENTER AT ALPHA	-1.19042	UPSILON	1.74202
TE RAD	0 01123	CENTER AT ALPHA	1.00621	UPSILON	-1.47160

PHASE V ROTOR

ZPC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O

SECTION NO 2 SECTION BB RHO 8 0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0.4700	0.02393	-0.15775	0.12255	55.400
19	0.5000	0.02454	-0.09147	0.02735	54.923
20	0.5700	0.02505	-0.02519	-0.06638	54.563
21	0.5600	0.02547	0.04109	-0.15906	54.312
22	0.5900	0.02579	0.10737	-0.25104	54.157
23	0.6200	0.02601	0.17365	-0.34265	54.078
24	0.6500	0.02613	0.23993	-0.43407	54.042
25	0.6800	0.02615	0.30621	-0.52542	54.037
26	0.7100	0.02603	0.37249	-0.61678	54.045
27	0.7400	0.02571	0.43877	-0.70818	54.050
28	0.7700	0.02514	0.50505	-0.79954	54.024
29	0.8000	0.02424	0.57133	-0.89076	53.973
30	0.8300	0.02294	0.63761	-0.98180	53.911
31	0.8600	0.02117	0.70389	-1.07257	53.795
32	0.8900	0.01889	0.77017	-1.16274	53.542
33	0.9200	0.01606	0.83645	-1.25183	53.138
34	0.9500	0.01255	0.90273	-1.33936	52.562
35	0.9750	0.00905	0.95796	-1.41074	51.947
36	1.0000	0.00524	1.01319	-1.48040	51.209

CHORD 3 9139 STAGGER 55.634 CAMBER 4.312

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0.00504	-1.19614	1.75034	-1.19614	1.75034
2	0.00504	-1.20041	1.74350	-1.18771	1.75175
3	0.00504	-1.19888	1.73651	-1.18180	1.74729
4	0.00619	-1.15096	1.66220	-1.13085	1.67569
5	0.00735	-1.09770	1.57783	-1.07365	1.59363
6	0.00853	-1.04448	1.49175	-1.01640	1.50983
7	0.00972	-0.99128	1.40410	-0.95914	1.42446
8	0.01091	-0.93807	1.31521	-0.90188	1.33786
9	0.01209	-0.88485	1.22537	-0.84463	1.25030
10	0.01326	-0.83161	1.13478	-0.78741	1.16197
11	0.01441	-0.77832	1.04364	-0.73023	1.07309
12	0.01575	-0.71428	0.93400	-0.66171	0.96620
13	0.01704	-0.65013	0.82459	-0.59330	0.85957
14	0.01827	-0.58584	0.71577	-0.52503	0.75372

PHASE V ROTOR

7PC

COORD SYSTEM ORIGIN Z -7.03550 R 0. MU 0. ETA 0.
STAGE 5. ROTOR NB 20
SECTION NO 2 SECTION BB RHO 8 0000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	1.19614	55.521	0.01972	1.75034
2	-1.14458	56.106	0.02392	1.67441
3	-1.04012	57.130	0.03259	1.51580
4	-0.93390	57.895	0.04152	1.34875
5	-0.82589	58.349	0.05055	1.17498
6	-0.70527	58.520	0.06030	0.97832
7	-0.57160	58.312	0.07037	0.76073
8	-0.43629	57.622	0.07947	0.54420
9	-0.29977	56.580	0.08724	0.33300
10	0.16265	55.425	0.09345	0.12965
11	-0.02539	54.558	0.09804	-0.06610
12	0.11160	54.145	0.10100	-0.25690
13	0.24802	54.021	0.10230	-0.44522
14	0.38343	54.026	0.10173	-0.63187
15	0.51754	54.007	0.09785	-0.81674
16	0.64994	53.878	0.08864	-0.99871
17	0.78021	53.473	0.07239	-1.17632
18	0.90823	52.474	0.04785	-1.34654
19	1.01319	51.209	0.02050	-1.48040

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

P.T	P.C.T	AL	T/C	ALPHA	UPSILON	ZETA*
1	0		0.00504	-1.19614	1.75034	55.521
2	0.0250		0.00619	-1.14091	1.66894	56.144
3	0.0500		0.00735	-1.08568	1.58573	56.701
4	0.0750		0.00853	-1.03044	1.50079	57.220
5	0.1000		0.00972	-0.97521	1.41428	57.646
6	0.1250		0.01091	-0.91997	1.32653	57.960
7	0.1500		0.01209	0.86474	1.23784	58.207
8	0.1750		0.01326	-0.80951	1.14837	58.403
9	0.2000		0.01441	-0.75427	1.05836	58.512
10	0.2300		0.01575	-0.68799	0.95010	58.514
11	0.2600		0.01704	-0.62171	0.84206	58.417
12	0.2900		0.01827	-0.55543	0.73460	58.236
13	0.3200		0.01943	-0.48915	0.62811	57.944
14	0.3500		0.02052	-0.42287	0.52308	57.529
15	0.3800		0.02151	-0.35659	0.41988	57.039
16	0.4100		0.02241	-0.29031	0.31870	56.499
17	0.4400		0.02322	-0.22403	0.21961	55.945

•7PC•

PHASE V ROTOR

STAGE 5. ROTOR NB 20
COORD SYSTEM ORIGIN Z -7.03550 R 0. MU 0. ETA 0.

SECTION NO 1 SECTION AA RHO 8.5000

CHORD STAGGER CAMBER
3 8302 59.293 1.184

ARFA 0 267566 SURFACE ARC LENGTH 7.68670

SECTION C.G. ALPHA UPSILON
SURFACE SECTION C.G. -0 02768 -0 04164
BLADE AXIS -0.02704 -0 04291
STACKING AXIS (RADIAL) -0 02704 -0.04291
-0.00710 0

PHASE V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z -7 03550 R O. MJD O FTA O. NR 20

SECTION NO 1 SECTION AA RHO 8.5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0.01817	-0.49606	0.67538	-0.43508	0.70889
16	0.01919	-0.43899	0.56816	-0.37479	0.60394
17	0.02013	-0.38176	0.46263	-0.31467	0.50066
18	0.02100	-0.32438	0.35890	-0.25469	0.39907
19	0.02179	-0.26686	0.25695	-0.19485	0.29914
20	0.02250	-0.20922	0.15661	-0.13514	0.20064
21	0.02313	-0.15146	0.05767	-0.07554	0.10331
22	0.02367	-0.09360	-0.04019	-0.01605	0.00681
23	0.02414	-0.03563	-0.13729	0.04334	-0.08919
24	0.02452	0.02245	-0.23391	0.10261	-0.18496
25	0.02481	0.08066	-0.33027	0.16176	-0.28073
26	0.02502	0.13839	-0.42657	0.22079	-0.37666
27	0.02513	0.19745	-0.52294	0.27968	-0.47288
28	0.02514	0.25611	-0.61937	0.33838	-0.56934
29	0.02499	0.31503	-0.71573	0.39682	-0.66599
30	0.02462	0.37433	-0.81181	0.45487	-0.76274
31	0.02394	0.43415	-0.90736	0.51240	-0.85953
32	0.02285	0.49466	-1.00214	0.56925	-0.95635
33	0.02126	0.55599	-1.09595	0.62528	-1.05316
34	0.01911	0.61825	-1.18850	0.68037	-1.14977
35	0.01633	0.68155	-1.27935	0.73442	-1.24590
36	0.01277	0.74613	-1.36772	0.78720	-1.34117
37	0.00910	0.80101	-1.45892	0.83012	-1.43976
38	0.00505	0.85035	-1.50112	0.86792	-1.48948
39	0.00505	0.85630	-1.50484	0.86900	-1.49651
40	0.00505	0.86446	-1.50333	0.86446	-1.50333
1E RAD	0.00965	CENTER AT ALPHA	-1.08627	UPSILON	1.78172
1E RAD	0.01058	CENTER AT ALPHA	0.85861	UPSILON	-1.49451

PHASE V ROTOR

•ZPC•

COORD SYSIFM ORIGIN Z -7.03550 R 0. MUJ 0. FTA 0
STAGE 5. ROTOR NB 20

SECTION NO 1 SECTION AA RHO 8.5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	FCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0 4700	0 02250	-0.17218	0.17862	59.275
19	0 5000	0 02313	-0.11350	0.08049	58.985
20	0 5300	0 02367	-0.05482	-0.01669	58.781
21	0 5600	0 02414	0 00385	-0.11374	58.654
22	0 5900	0 02452	0 06253	-0.20943	58.591
23	0 6200	0 02481	0 12121	-0.30550	58.583
24	0 6500	0 02502	0.17989	-0.40162	58.616
25	0 6800	0 02513	0 23857	-0.49791	58.668
26	0 7100	0 02514	0 29724	-0.59435	58.695
27	0 7400	0 02439	0 35592	-0.69086	58.695
28	0 7700	0 02462	0 41460	-0.78728	58.650
29	0 8000	0 02394	0 47328	-0.88345	58.566
30	0 8300	0 02285	0 53195	-0.97924	58.453
31	0 8600	0 02126	0.59063	-1.07455	58.297
32	0 8900	0 01911	0 64931	-1.16913	58.055
33	0 9200	0 01633	0 70799	-1.26262	57.687
34	0 9500	0 01277	0 76666	-1.35445	57.115
35	0 9750	0 00910	0 81556	-1.42934	56.648
36	1 0000	0 00505	0 86446	-1.50333	56.488

CHORD 7 8302 STAGGER 59.293 CAMBER 1.184

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0 00492	-1.09146	1.78985	-1.09146	1.78985
2	0 00492	-1.09575	1.78347	-1.08333	1.79092
3	0 00492	-1.03452	1.77673	-1.07785	1.78644
4	0 00597	-1.05228	1.70608	-1.03285	1.71816
5	0 00704	-1.00521	1.62528	-0.98212	1.63922
6	0 00812	-0.95816	1.54243	-0.93137	1.55826
7	0 00921	-0.91113	1.45799	-0.88061	1.47570
8	0 01030	-0.86409	1.37219	-0.82986	1.39178
9	0 01137	-0.81703	1.28525	-0.77911	1.30568
10	0 01244	-0.76996	1.19734	-0.72839	1.22050
11	0 01349	-0.72287	1.10859	-0.67769	1.13362
12	0 01472	-0.66633	1.00103	-0.61687	1.02812
13	0 01502	-0.60970	0 89252	-0.55615	0 92163
14	0 01707	-0.55295	0 78373	-0 49554	0 81504

PHASE V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z -7.03550 R 0. MUJ 0 ETA 0.
 SECTION NO 4 SECTION DD RHO 7.0000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	1.39014	52.582	0.02080	1.64232
2	1.32877	53.126	0.02750	1.56135
3	-1.20477	53.933	0.04157	1.39339
4	-1.07906	54.151	0.05627	1.21990
5	-0.95168	53.787	0.07115	1.04464
6	0.00989	53.005	0.08720	0.85359
7	0.65330	51.831	0.10372	0.64989
8	-0.49503	50.259	0.11859	0.45394
9	0.33535	48.549	0.13124	0.26769
10	0.17482	47.070	0.14140	0.09073
11	-0.01364	45.876	0.14887	-0.07888
12	0.14793	44.904	0.15345	-0.24265
13	0.30964	44.047	0.15493	-0.40141
14	0.47125	43.329	0.15245	-0.55575
15	0.63258	42.758	0.14399	-0.70643
16	0.79356	42.163	0.12759	-0.85376
17	0.95389	41.448	0.10139	-0.99726
18	1.11364	40.647	0.06368	-1.12632
19	1.24623	39.930	0.02218	-1.24892

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.0531	-1.39014	1.64232	52.582
2	0	0.0716	-1.32423	1.55530	53.145
3	0	0.0905	-1.25832	1.46653	53.638
4	0	0.1099	-1.19241	1.37643	53.968
5	0	0.1296	-1.12650	1.28551	54.123
6	0	0.1494	-1.06059	1.19437	54.102
7	0	0.1691	-0.99468	1.10354	53.947
8	0	0.1886	-0.92877	1.01342	53.674
9	0	0.2078	-0.86287	0.92433	53.329
10	0	0.2302	-0.78377	0.81902	52.836
11	0	0.2517	-0.70468	0.71575	52.252
12	0	0.2721	-0.62559	0.61481	51.574
13	0	0.2913	-0.54650	0.51645	50.804
14	0	0.3091	-0.46741	0.42090	49.947
15	0	0.3254	-0.38832	0.32824	49.096
16	0	0.3401	-0.30923	0.23825	48.286
17	0	0.3532	-0.23014	0.15068	47.544

PHASE V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z -7.03550 R 0 MU 0. FTA 0
STAGE 5. ROTOR NB 20

SECTION NO 4 SECTION DD RHO 7 0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0 4700	0.03646	-0.15105	0.06525	46.881
19	0 5000	0.03744	-0.07195	-0.01832	46.285
20	0 5300	0.03824	0.00714	-0.10026	45.753
21	0 5600	0.03886	0.08623	-0.18076	45.265
22	0 5900	0.03930	0.16532	-0.25995	44.812
23	0 6200	0.03955	0.24441	0.33794	44.386
24	0 6500	0.03959	0.32350	-0.41481	43.984
25	0 6800	0.03939	0.40259	-0.49065	43.620
26	0 7100	0.03887	0.48168	-0.56559	43.303
27	0 7400	0.03798	0.56077	-0.63975	43.010
28	0 7700	0.03666	0.63987	-0.71316	42.727
29	0 8000	0.03484	0.71896	-0.78586	42.444
30	0 8300	0.03246	0.79805	-0.85782	42.154
31	0 8600	0.02945	0.87714	-0.92903	41.824
32	0 8900	0.02580	0.95623	-0.99932	41.426
33	0 9200	0.02144	1.03532	-1.06861	41.023
34	0 9500	0.01622	1.11441	-1.13699	40.673
35	0 9750	0.01113	1.18032	-1.19332	40.353
36	1 0000	0.00567	1.24623	-1.24892	39.930

CHORD 3 9128 STAGGER 47.640 CAMBER 12 652

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0 00531	-1.39014	1.64232	-1.39014	1.64232
2	0 00531	-1.39430	1.63485	-1.38168	1.64435
3	0 00531	-1.39236	1.62755	-1.37530	1.64059
4	0 00716	-1.33543	1.54690	-1.31303	1.54770
5	0 00905	-1.27258	1.45604	-1.24406	1.47703
6	0 01099	-1.20980	1.36378	-1.17502	1.38907
7	0 01296	-1.14704	1.27065	-1.10596	1.30036
8	0 01494	-1.08426	1.17724	-1.03692	1.21150
9	0 01691	-1.02143	1.08407	-0.96794	1.12300
10	0 01886	-0.95850	0.99156	-0.89905	1.03528
11	0 02078	-0.89547	0.90005	-0.83026	0.94860
12	0 02202	-0.81966	0.79182	-0.74789	0.84623
13	0 02517	-0.74362	0.68561	-0.66575	0.74590
14	0 02721	-0.66730	0.58172	-0.58389	0.64789

PHASE V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O ETA O.
SECTION NO 4 SECTION DD RHO 7.0000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0 02913	-0.59067	0.48043	-0.50233	0.55246
16	0 03091	-0.51370	0.38199	-0.42112	0.45982
17	0 03254	-0.43643	0.28655	-0.34021	0.36992
18	0 03401	-0.35889	0.19397	-0.25956	0.28252
19	0 03532	-0.28112	0.10404	-0.17916	0.19737
20	0 03646	-0.20312	0.01650	-0.09897	0.11401
21	0 03744	-0.12489	-0.06894	-0.01901	0.03230
22	0 03824	-0.04645	-0.15246	0.06073	-0.04806
23	0 03886	0.03222	0.23427	0.14023	0.12725
24	0 03930	0.11113	-0.31449	0.21950	-0.20541
25	0 03955	0.19029	-0.39323	0.29853	-0.28265
26	0 03959	0.26972	-0.47053	0.37729	-0.35908
27	0 03939	0.34943	0.54643	0.45575	-0.43487
28	0 03887	0.42952	-0.62094	0.53384	-0.51025
29	0 03798	0.51009	-0.69409	0.61146	-0.58541
30	0 03666	0.59120	-0.76585	0.68853	-0.66048
31	0 03484	0.67296	-0.83615	0.76495	-0.73556
32	0 03246	0.75543	-0.90490	0.84056	-0.81075
33	0 02945	0.83872	-0.97196	0.91556	-0.88609
34	0 02580	0.92284	-1.03716	0.98962	-0.96148
35	0 02144	1.00778	-1.10026	1.06286	-1.03696
36	0 01622	1.09373	-1.16105	1.13509	-1.11292
37	0 01113	1.16622	-1.20992	1.19442	-1.17673
38	0 00567	1.22977	1.25141	1.24582	-1.23229
39	0 00567	1.23765	1.25337	1.24913	-1.23983
40	0 00567	1.24623	-1.24892	1.24623	-1.24892
LF RAD	0 01074	CENTER AT ALPHA	-1.38361	UPSILON	1.63379
TF RAD	0 01258	CENTER AT ALPHA	1.23659	UPSILON	-1.24084

•7PC•

PHASE V ROTOR

COORD SYSTEM ORIGIN	Z	-7	03550	R	O.	MU	O.	ETA	O.
STAGE	5.	ROTOR				NR	20		
SECTION NO	4	SECTION DD				RHO	7.0000		
CHORD	3	STAGGER				CAMBER	12.652		
	9128	47.640							
AREA	0.419325	SURFACE ARC LENGTH				7.88478			
SECTION C G.		ALPHA				UPSILON			
STREAMSURFACE	SECTION C.G.	-0.00357				-0.03695			
BLADE AXIS		-0.02735				-0.02172			
STACKING AXIS (RADIAL)		-0.02735				-0.02172			
		-0.00210				0			

47PC

PHASE V ROTOR

COORD SYSTEM ORIGIN 2 -7.03550 R 0 MU 0. ETA 0.
 SECTION NO 5 SECTION FE RHO 6 5000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1 46708	51.372	0.02070	1.55249
2	-1 40196	51.742	0.02986	1.47035
3	-1 27043	52.200	0.04902	1.30186
4	-1 13736	52.077	0.06890	1.13030
5	-1 00274	51.398	0.08889	0.95933
6	-0.85295	50.317	0.11027	0.77509
7	-0.68762	48.715	0.13210	0.58110
8	-0.52075	46.394	0.15155	0.39836
9	0 35260	43.851	0.16797	0.22963
10	0 18340	41.779	0.18110	0.07328
11	0 01338	40.202	0.19074	0.07416
12	0 15727	38.955	0.19659	-0.21494
13	0 32840	37.871	0.19830	-0.35041
14	0 49990	36.891	0.19446	-0.48114
15	0 67162	35.987	0.18277	-0.60769
16	0 84358	35.125	0.16092	-0.73025
17	1 01576	34.148	0.12655	-0.84893
18	1 18326	32.797	0.07712	0.96261
19	1 33224	31.426	0.02260	-1.05267

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT	AL	T/C	ALPHA	UPSILON	ZETA*
1	0		0.00541	-1 46708	1.55249	51.372
2	0 0250		0 00799	-1 39710	1.46417	51.801
3	0 0500		0 01063	-1 32712	1.37478	52.066
4	0 0750		0 01334	-1 25713	1.28471	52.222
5	0 1000		0 01607	-1 18715	1.19438	52.212
6	0 1250		0 01881	-1 11717	1.10440	52.010
7	0 1500		0 02153	-1 04718	1.01530	51.679
8	0 1750		0 02422	-0 97720	0.92742	51.243
9	0 2000		0 02685	-0 90722	0.84100	50.744
10	0 2300		0 02990	-0 83224	0.73942	50.072
11	0 2600		0 03282	-0 73926	0.64046	49.263
12	0 2900		0 03559	-0 65528	0.54456	48.291
13	0 3200		0 03817	-0 57130	0.45214	47.153
14	0 3500		0 04055	-0 48732	0.36360	45.857
15	0 3800		0 04272	-0 40334	0.27899	44.576
16	0 4100		0 04467	-0 31936	0.19798	43.373
17	0 4400		0 04640	-0 23538	0.12013	42.314

PHASE V ROTOR

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O
SECTION NO 5 SECTION FE RHO 6 5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AT	T/C	ALPHA	UPSILON	ZETA
18	0 4700	0 04791	-0.15140	0.04489	41.423
19	0 5000	0 04918	-0.06742	-0.02817	40.634
20	0 5300	0 05022	0 01656	-0.09933	39.932
21	0 5600	0 05101	0 10054	-0.16883	39.301
22	0 5900	0 05156	0 18452	-0.23687	38.736
23	0 6200	0 05184	0 26850	-0.30359	38.197
24	0 6500	0 05182	0 35248	-0.36905	37.672
25	0 6800	0 05143	0 43646	-0.43331	37.183
26	0 7100	0 05061	0 52044	-0.49649	36.734
27	0 7400	0 04927	0 60442	-0.55866	36.291
28	0 7700	0 04736	0 68840	-0.61983	35.837
29	0 8000	0 04481	0 77238	-0.67998	35.399
30	0 8300	0 04153	0 85636	-0.73921	34.986
31	0 8600	0 03746	0 94034	-0.79750	34.529
32	0 8900	0 03255	1 02432	-0.85471	33.984
33	0 9200	0 02675	1 10830	-0.91066	33.348
34	0 9500	0 01981	1 19228	-0.96518	32.614
35	0 9750	0 01309	1 26226	-1.00943	32.000
36	1 0000	0 00591	1 33224	-1 05267	31.426

CHORD STAGGER CAMBER
3 8240 42 942 19.946

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPSILON	LOWER ALPHA	UPSILON
1	0 00541	-1.46708	1.55249	-1.46708	1 55249
2	0 00541	-1.47112	1.54491	-1.45870	1.55472
3	0 00541	-1.46908	1 53767	-1.45219	1.55114
4	0 00799	-1.40911	1.45472	-1.38510	1.47362
5	0 01063	-1.34315	1.36228	-1.31108	1.38728
6	0 01334	-1.27729	1.26909	-1.23698	1.30033
7	0 01607	-1.21143	1.17556	-1.16287	1.21321
8	0 01981	-1.14551	1.08227	-1.08883	1.12654
9	0 02153	-1.07948	0 98977	-1 01489	1 04083
10	0 02422	-1.01331	0 89843	-0.94109	0.95641
11	0 02685	-0.94697	0 80852	-0 86747	0 87348
12	0 02990	-0.86708	0 70273	-0.77939	0.77612
13	0 03282	-0.78681	0 59950	-0.69170	0 68142
14	0 03559	-0 70608	0 49928	-0.60448	0.58983

PHASE V ROTOR

7P.C

COORD SYSTEM ORIGIN Z -7.03550 R 0 MU 0 ETA 0.
 SECTION NO 5 SECTION EE RHO 6.5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	UPPER ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0 03817	-0.62481	0.40251	-0.51779	0.50178
16	0 04055	-0.54296	0.30959	-0.43168	0.41760
17	0 04272	-0.46067	0.22080	-0.34601	0.33717
18	0 04467	-0.37801	0.13590	-0.26071	0.26006
19	0 04640	-0.29510	0.05452	-0.17566	0.18573
20	0 04791	-0.21200	-0.02379	-0.09080	0.11357
21	0 04918	-0.12866	-0.09953	-0.00618	0.04320
22	0 05022	-0.04508	-0.17256	0.07819	-0.02570
23	0 05101	0.03876	-0.24431	0.16232	-0.09336
24	0 05156	0.12283	-0.31377	0.24620	-0.15998
25	0 05184	0.20721	-0.38149	0.32979	-0.22570
26	0 05182	0.29193	-0.44746	0.41302	-0.29063
27	0 05143	0.37703	-0.51165	0.49589	-0.35497
28	0 05061	0.46257	-0.57404	0.57831	-0.41895
29	0 04927	0.54866	-0.63460	0.66018	-0.48273
30	0 04736	0.63538	-0.69324	0.74142	-0.54641
31	0 04481	0.72275	-0.74983	0.82201	-0.61014
32	0 04153	0.81083	-0.80426	0.90189	-0.67415
33	0 03746	0.89974	-0.85650	0.98093	-0.73849
34	0 03255	0.91952	-0.90632	1.05911	-0.80309
35	0 02675	1.08018	-0.95339	1.13641	-0.86794
36	0 01981	1.17186	-0.99708	1.21269	-0.93328
37	0 01309	1.24899	-1.03066	1.27552	-0.98820
38	0 00591	1.31584	-1.05810	1.32963	-1.03561
39	0 00591	1.32413	-1.05865	1.33393	-1.04295
40	0 00591	1.33224	-1.05267	1.33224	-1.05267
LE RAD	0 01081	CENTER AT ALPHA	-1.46034	UPSILON	1.54404
TF RAD	0 01338	CENTER AT ALPHA	1.32083	UPSILON	-1.04568

PHASE V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z	-7.03550	R O.	MU	O.	ETA	O.
STAGE	5.	ROTOR		NR	20	
SECTION NO	5	SECTION FE		RHO	6	5000
CHORD	3.8240	STAGGER		CAMBER		
		42.942		19.946		
AREA	0.516253	SURFACE ARC LENGTH		7.74257		
SECTION C.G.		ALPHA		UPSILON		
SURFACESURFACE SECTION C G.		-0.00538		-0.01698		
BLADE AXIS		-0.03739		-0.00755		
STACKING AXIS (RADIAL)		-0.03739		-0.00755		
		-0.00210		O.		

PHASE V ROTOR

ZPC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O.
 SECTION NO 6 SECTION FF RHO 6.0000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	53280	50.437	0.01987	1.44767
2	1 46439	50.649	0 03189	1.36461
3	-1 32630	50.825	0 05675	1.19563
4	1 18668	50.403	0 08212	1.02534
5	-1 04556	49.288	0 10716	0.85779
6	0 88863	47 390	0 13340	0 68108
7	-0.71589	44 659	0 15951	0 50142
8	0 54153	41 692	0 18232	0 33765
9	-0 36594	39 083	0 20139	0 18820
10	-0 18921	37 000	0 21644	0 04983
11	-0 01178	35 232	0 22718	-0 08004
12	0 16657	33 646	0 23328	-0 20269
13	0 34556	32 136	0 23413	-0 31894
14	0 52520	30 602	0 22789	-0 42906
15	0 70548	28 962	0 21239	-0 53291
16	0 88652	27 157	0 18534	0 63019
17	1 06845	25 120	0 14421	-0 72029
18	1 25160	22 819	0 08613	-0 80232
19	1 40510	20 698	0 02262	-0 86394

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.00531	-1 53280	1.44767	50.437
2	0.0250	0.00877	-1.45936	1.35848	50.630
3	0.0500	0.01229	-1.38591	1.26870	50.776
4	0 0750	0 01585	-1 31246	1 17266	50 788
5	0 1000	0 01943	-1 23901	1 08885	50 625
6	0 1250	0 02299	-1 16557	0 99988	50 265
7	0 1500	0 02649	-1 09212	0 91232	49 721
8	0 1750	0 02991	1 01867	0 82671	48 996
9	0 2000	0 03322	-0 94522	0 74346	48 144
10	0 2300	0 03702	-0 85709	0 64703	46 965
11	0 2600	0 04062	0 76895	0 55478	45 611
12	0 2900	0 04398	-0 68081	0 46707	44 085
13	0 3200	0 04709	-0 59267	0 38394	42 574
14	0 3500	0 04993	-0 50454	0 30499	41 142
15	0 3800	0 05252	-0 41640	0 22977	39 831
16	0 4100	0 05483	-0 32826	0 15779	38 665
17	0 4400	0 05686	-0 24013	0 08860	37 619

PHASE V ROTOR

COORD SYSTEM ORIGIN Z -7.03550 R 0. MU 0. ETA 0

SECTION NO δ SECTION FF RHO 6.0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AT	T/C	ALPHA	UPSILON	7ETA*
18	0 4700	0 05860	0 15199	0 02183	36.692
19	0 5000	0 06005	0 06385	-0 04280	35.817
20	0 5300	0 06121	0 02428	-0 10543	34.984
21	0 5600	0 06205	0 11242	-0 16620	34.198
22	0 5900	0 06257	0 20056	-0 22527	33.460
23	0 6200	0 06273	0 28870	-0 28272	32.731
24	0 6500	0 06249	0 37683	-0 33858	32.000
25	0 6800	0 06177	0 46497	-0 39286	31.258
26	0 7100	0 06050	0 55311	-0 44557	30.500
27	0 7400	0 05861	0 64124	-0 49669	29.715
28	0 7700	0 05605	0 72938	-0 54617	28.897
29	0 8000	0 05274	0 81752	-0 59397	28.042
30	0 8300	0 04861	0 90566	-0 64004	27.146
31	0 8600	0 04357	0 99379	-0 68431	26.175
32	0 8900	0 03760	1 08193	-0 72664	25.110
33	0 9200	0 03062	1 17007	-0 76691	23.998
34	0 9500	0 02237	1 25820	-0 80511	22.867
35	0 9750	0 01447	1 33165	-0 83573	21.845
36	1 0000	0 00605	1 40510	-0 86394	20.698

CHORD 3 7383 STAGGER 38 197 CAMBER 29.739

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0 00531	-1 53280	1 44767	-1 53280	1 44767
2	0 00531	-1 53559	1 44027	-1 52478	1 44999
3	0 00531	-1 53456	1 43335	-1 51840	1 44670
4	0 00877	-1 47203	1 34808	-1 44669	1 36888
5	0 01229	-1 40370	1 25418	-1 36811	1 28323
6	0 01585	-1 33542	1 15993	-1 28950	1 19740
7	0 01943	-1 26709	1 06581	-1 21094	1 11190
8	0 02299	-1 19861	0 97241	-1 13253	1 02734
9	0 02649	-1 12989	0 88031	-1 05435	0 94433
10	0 02991	-1 06086	0 79003	-0 97648	0 86339
11	0 03322	-0 99147	0 70203	-0 89898	0 78489
12	0 03702	-0 90767	0 59980	-0 80650	0 69426
13	0 04062	-0 82320	0 50167	-0 71470	0 60789
14	0 04398	-0 73800	0 40803	-0 62362	0 52612

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O.
 SECTION NO 6 SECTION FF RHO 6.0000

SURFACE COORDINATES WITH ORIGIN A1 SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0 04709	-0 65222	0 31913	-0 53313	0 44875
16	0 04993	-0 56594	0 23470	-0 44313	0 37528
17	0 05252	-0 47928	0 15439	-0 35353	0 30515
18	0 05483	-0 39229	0 07778	-0 26424	0 23781
19	0 05686	-0 30500	0 00443	-0 17526	0 17278
20	0 05860	-0 21744	-0 06600	-0 08654	0 10966
21	0 06005	-0 12954	-0 13383	0 00184	0 04822
22	0 06121	-0 04131	-0 19916	0 08988	-0 01170
23	0 06205	0 04724	-0 26212	0 17760	-0 07028
24	0 06257	0 13608	-0 32283	0 26504	-0 17711
25	0 06273	0 22529	-0 38136	0 35210	-0 18107
26	0 06249	0 31494	-0 43763	0 43873	-0 23952
27	0 06177	0 40506	-0 49156	0 52488	-0 29417
28	0 06050	0 49572	-0 54300	0 61050	-0 34814
29	0 05861	0 58694	-0 59183	0 69555	-0 40154
30	0 05605	0 67875	-0 63789	0 78001	-0 45445
31	0 05274	0 77117	-0 68098	0 86387	-0 50696
32	0 04861	0 86420	-0 72089	0 94711	-0 55920
33	0 04357	0 95787	-0 75739	1 02971	-0 61123
34	0 03760	1 05210	-0 79028	1 11176	-0 66299
35	0 03062	1 14679	-0 81920	1 19335	-0 71462
36	0 02237	1 24196	-0 84364	1 27445	-0 76658
37	0 01447	1 32159	-0 86043	1 34171	-0 81024
38	0 00605	1 38989	-0 87268	1 39957	-0 84735
39	0 00605	1 39810	-0 87153	1 40507	-0 85403
40	0 00605	1 40510	-0 86394	1 40510	-0 86394
LE RAD	0 01050	CENTER AT ALPHA	-1 52611	UPSILON	1 43958
TE RAD	0 01383	CENTER A1 ALPHA	1 39217	UPSILON	-0 85903

PHASE V ROTOR

ZPC

COORD SYSTEM ORIGIN	Z	-7.03550	R	O	MU	O.	ETA	O.
STAGE	5.	ROTOR	NR	20				
SECTION NO	6	SECTION	FF	RHO	6.0000			
CHORD	3.7383	STAGGER	38.197	CAMBER	29.739			
AREA	0.596107	SURFACE ARC LENGTH	7.62101					
SECTION C.G.		ALPHA	UPSILON					
SURFACE		-0.01668	-0.00549					
BLADE AXIS		-0.05114	-0.00166					
STACKING AXIS (RADIAL)		-0.00210	0.					

PHASE V ROTOR

ZPC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. FTA O.
STAGE 5 ROTOR NB 20
SECTION NO 7 SECTION GG RHO 5.5000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.58170	49.153	0.01885	1.32741
2	-1.50965	49.193	0.03348	1.24375
3	-1.36416	48.996	0.06339	1.07521
4	-1.21686	48.141	0.09355	0.90759
5	-1.06785	46.504	0.12305	0.74546
6	-0.90245	43.893	0.15365	0.57843
7	-0.72050	40.531	0.18373	0.41343
8	-0.53740	37.589	0.20973	0.26540
9	-0.35336	35.115	0.23121	0.13038
10	0.16859	32.723	0.24770	0.00661
11	0.01676	30.400	0.25866	-0.10673
12	0.20282	28.063	0.26361	-0.21029
13	0.38937	25.555	0.26176	-0.30398
14	0.57652	22.717	0.25159	-0.38734
15	0.76424	19.444	0.23158	-0.45929
16	0.95269	15.918	0.20008	-0.51889
17	1.14181	12.231	0.15485	-0.56615
18	1.33143	8.224	0.09199	-0.60052
19	1.48952	4.381	0.02145	-0.61826

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PPT	PCT	AL	T/C	ALPHA	UPSILON	ZETA*
1	0.		0.00518	-1.58170	1.32741	49.153
2	0.0250		0.00947	-1.50492	1.23825	49.300
3	0.0500		0.01381	-1.42814	1.14913	49.194
4	0.0750		0.01816	-1.35136	1.06047	49.004
5	0.1000		0.02250	-1.27458	0.97265	48.630
6	0.1250		0.02679	-1.19780	0.88635	48.011
7	0.1500		0.03100	-1.12102	0.80221	47.195
8	0.1750		0.03509	-1.04423	0.72069	46.195
9	0.2000		0.03904	-0.96745	0.64222	45.019
10	0.2300		0.04357	-0.87532	0.55257	43.374
11	0.2600		0.04781	-0.78318	0.46808	41.662
12	0.2900		0.05177	-0.69104	0.38850	39.970
13	0.3200		0.05542	-0.59891	0.31340	38.430
14	0.3500		0.05876	0.50677	0.24206	37.096
15	0.3800		0.06178	-0.41464	0.17397	35.837
16	0.4100		0.06445	-0.32250	0.10892	34.613
17	0.4400		0.06678	-0.23036	0.04674	33.410

PHASE V ROTOR

ZPC

COORD SYSTM ORIGIN Z -7 03550 R O MU O. ETA O.
STAGE 5. ROTOR NB 20

SECTION NO 7 SECTION GG RHO 5.5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0.4700	0.06873	-0.13823	-0.01268	32.228
19	0.5000	0.07030	-0.04609	-0.06946	31.060
20	0.5300	0.07147	0.04605	-0.12370	29.905
21	0.5600	0.07223	0.13818	-0.17545	28.737
22	0.5900	0.07256	0.23032	-0.22474	27.547
23	0.6200	0.07242	0.32246	-0.27156	26.313
24	0.6500	0.07176	0.41459	-0.31585	25.026
25	0.6800	0.07054	0.50673	-0.35755	23.658
26	0.7100	0.06870	0.59887	-0.39654	22.195
27	0.7400	0.06619	0.69100	-0.43269	20.625
28	0.7700	0.06298	0.78314	-0.46584	18.940
29	0.8000	0.05901	0.87528	-0.49593	17.228
30	0.8300	0.05421	0.96741	-0.52301	15.534
31	0.8600	0.04849	1.05955	-0.54714	13.804
32	0.8900	0.04183	1.15169	-0.56827	12.009
33	0.9200	0.03409	1.24382	-0.58631	10.135
34	0.9500	0.02480	1.33596	-0.60117	8.173
35	0.9750	0.01570	1.41274	-0.61100	6.386
36	1.0000	0.00590	1.48952	-0.61826	4.381

CHORD 3.6357 STAGGER 32.355 CAMBER 44.772

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0.00518	-1.58170	1.32741	-1.58170	1.32741
2	0.00518	-1.58518	1.32027	-1.57413	1.32980
3	0.00518	-1.58316	1.31373	-1.56795	1.32684
4	0.00947	-1.51797	1.22702	-1.49186	1.24948
5	0.01381	-1.44714	1.13273	-1.40914	1.16553
6	0.01816	-1.37628	1.03981	-1.32644	1.08213
7	0.02250	-1.30527	0.94561	-1.24388	0.99968
8	0.02679	-1.23399	0.85377	-1.16160	0.91892
9	0.03100	-1.16235	0.76392	-1.07968	0.84049
10	0.03509	-1.09027	0.67654	-0.99820	0.76485
11	0.03904	-1.01766	0.59205	-0.91725	0.69240
12	0.04357	-0.92971	0.49500	-0.82093	0.61013
13	0.04781	-0.84096	0.40314	-0.72541	0.53301
14	0.05177	-0.75150	0.31638	-0.63059	0.46063

PHASE V ROTOR

7PC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O.
 SECTION NO 7 SECTION GG RHO 5.5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER	UPSILON	LOWER	UPSILON
		ALPHA	UPSILON	ALPHA	UPSILON	
15	0 05542	-0.66153	0.23448	-0.53629	0.39232	
16	0 05876	-0.57120	0.15686	-0.44234	0.32726	
17	0 06178	-0.48038	0.08293	-0.34889	0.26501	
18	0 06445	-0.38905	0.01249	-0.25595	0.20534	
19	0 06678	-0.29720	-0.05459	-0.16352	0.14807	
20	0 06873	-0.20486	-0.11837	-0.07159	0.09302	
21	0 07030	-0.11202	-0.17893	0.01985	0.04001	
22	0 07147	-0.01873	-0.23632	0.11082	-0.01107	
23	0 07223	0.07505	-0.29058	0.20131	-0.06032	
24	0 07256	0.16932	-0.34169	0.29132	-0.10780	
25	0 07242	0.26410	-0.38956	0.38081	-0.15355	
26	0 07176	0.35941	-0.43406	0.46978	-0.19764	
27	0 07054	0.45528	-0.47500	0.55818	-0.24010	
28	0 06870	0.55169	-0.51216	0.64604	-0.28092	
29	0 06619	0.64862	-0.54530	0.73338	-0.32008	
30	0 06298	0.74598	-0.57413	0.82030	-0.35756	
31	0 05901	0.84350	-0.59839	0.90705	-0.39347	
32	0 05421	0.94102	-0.61795	0.99380	-0.42808	
33	0 04849	1.03852	-0.63275	1.08058	-0.46154	
34	0 04183	1.13586	-0.64265	1.16751	-0.49389	
35	0 03409	1.23292	-0.64732	1.25473	-0.52531	
36	0 02480	1.32955	-0.64580	1.34237	-0.55655	
37	0 01570	1.40957	-0.63936	1.41591	-0.58265	
38	0 00590	1.47801	-0.63058	1.48020	-0.60431	
39	0 00590	1.48505	-0.62728	1.48698	-0.60924	
40	0.00590	1.48952	-0.61826	1.48352	-0.61826	
LE RAD 0 01007 CENTER AT ALPHA -1.57512 UPSILON 1.31978						
Tf RAD 0 01354 CENTER AT ALPHA 1.47602 UPSILON -0.61719						

PHASE V ROTOR

+7PC+

COORD SYSTEM ORIGIN	7	-7	03550	R	O.	MU	0	ETA	0.
STAGE	5	ROTOR				NB	20		
SECTION NO	7	SECTION GG				RHO	5.5000		
CHORD	3	6357	STAGGER	32	355	CAMBER	44.772		
ARFA	0	656981	SURFACE ARC LENGTH		7	51481			

SECTION C.G	ALPHA	UPSILON
STREAMSURFACE	0 01411	-0 00097
SECTION C G.	0 04603	-0 01576
BLADE AXIS	-0.04603	-0 01576
STACKING AXIS (RADIAL)	-0 00210	0

PHASE V ROTOR

ZPC

COORD SYSTEM ORIGIN Z -7.03550 R 0. MU 0 E1A 0
SECTION 10 8 SECTION HH RHD 5.0000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	* UPSILON
1	1 59027	47.285	0.01944	1.18793
2	-1.51320	47.101	0.03669	1.10485
3	1.35817	46.453	0.07156	0.93999
4	-1.20233	45.242	0.10601	0.77953
5	-1.04599	43.375	0.13892	0.62711
6	0.87373	40.647	0.17213	0.47215
7	-0.68577	37.279	0.20380	0.32035
8	-0.49799	34.057	0.23028	0.18563
9	-0.31027	30.994	0.25160	0.06573
10	-0.12274	28.012	0.26794	-0.04073
11	0.06444	24.939	0.27949	-0.13463
12	0.25134	21.658	0.28644	-0.21586
13	0.43784	18.221	0.28833	-0.28433
14	0.62364	14.624	0.28291	-0.33991
15	0.80826	10.868	0.26633	-0.38235
16	0.99125	6.653	0.23347	-0.41110
17	1.17130	1.116	0.17895	-0.42383
18	1.34660	-6.850	0.10150	-0.41583
19	1.48772	-16.226	0.02849	-0.38711

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0.	0.00562	-1.59027	1.18793	47.285
2	0.0250	0.01060	-1.51332	1.10497	47.039
3	0.0500	0.01561	-1.43637	1.02268	46.781
4	0.0750	0.02062	-1.35942	0.94130	46.402
5	0.1000	0.02558	-1.28247	0.86118	45.881
6	0.1250	0.03046	-1.20552	0.78274	45.193
7	0.1500	0.03523	-1.12857	0.70637	44.346
8	0.1750	0.03985	-1.05162	0.63242	43.351
9	0.2000	0.04428	-0.97467	0.56117	42.219
10	0.2300	0.04933	-0.88233	0.47953	40.709
11	0.2600	0.05405	-0.78999	0.40231	39.091
12	0.2900	0.05841	-0.69765	0.32943	37.469
13	0.3200	0.06241	-0.60531	0.26069	35.866
14	0.3500	0.06605	-0.51297	0.19581	34.320
15	0.3800	0.06932	-0.42063	0.13453	32.822
16	0.4100	0.07224	-0.32830	0.07664	31.339
17	0.4400	0.07481	-0.23596	0.02202	29.877

PHASE V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z -7.03550 R 0 MU 0. F1A 0
STAGE 5 ROTOR NB 20

SECTION NO 8 SECTION HH RHO 5.0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT	AI	T/C	ALPHA	UPSILON	7ETA
18	0.4700	0.07704	-0.14362	-0.02950	28.440	
19	0.5000	0.07893	-0.05128	-0.07804	27.001	
20	0.5300	0.08049	0.04106	-0.12358	25.492	
21	0.5600	0.08173	0.13340	-0.16607	23.917	
22	0.5900	0.08265	0.22574	-0.20549	22.301	
23	0.6200	0.08323	0.31808	-0.24182	20.643	
24	0.6500	0.08342	0.41042	-0.27506	18.942	
25	0.6800	0.08313	0.50276	-0.30519	17.196	
26	0.7100	0.08224	0.59510	-0.33220	15.395	
27	0.7400	0.08061	0.68744	-0.35603	13.539	
28	0.7700	0.07804	0.77978	-0.37655	11.624	
29	0.8000	0.07434	0.87212	-0.39399	9.608	
30	0.8300	0.06928	0.96446	-0.40780	7.365	
31	0.8600	0.06262	1.05680	-0.41773	4.841	
32	0.8900	0.05411	1.14914	-0.42323	1.913	
33	0.9200	0.04353	1.24148	-0.42359	-1.639	
34	0.9500	0.03118	1.3382	-0.41733	-6.308	
35	0.9750	0.01993	1.41077	-0.40569	-10.983	
36	1.0000	0.00824	1.48772	-0.38711	-16.226	

CHORDS 3 4576 STAGGER 27.099 CAMBER 63.511

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	UPPER		LOWER		UPSILON
		ALPHA	UPSILON	ALPHA		
1	0.00562	-1.59027	1.18793	-1.59027		1.18793
2	0.00562	-1.59264	1.18039	-1.58256		1.19070
3	0.00562	-1.59136	1.17372	-1.57602		1.18792
4	0.01050	-1.52674	1.09248	-1.49990		1.11746
5	0.01561	-1.45604	1.00420	-1.41670		1.04116
6	0.02062	-1.38523	0.91673	-1.33361		0.96588
7	0.02558	-1.31421	0.83040	-1.25073		0.89197
8	0.03046	-1.24288	0.74563	-1.16816		0.81985
9	0.03523	-1.17114	0.66282	-1.08600		0.74932
10	0.03985	-1.09891	0.58232	-1.00433		0.68251
11	0.04428	-1.02612	0.50447	-0.92323		0.61787
12	0.04933	-0.93796	0.41488	-0.82671		0.54418
13	0.05405	-0.84831	0.32979	-0.73108		0.47483
14	0.05841	-0.75908	0.24929	-0.63623		0.40957

PHASE V ROTOR

7PC

COORD SYSTEM ORIGIN Z -7.03550 R O MU O. ETA O.									
SECTION NO 8									
STAGE 5 ROTOR									
SECTION HH									
SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS									
PT	T/C	ALPHA	UPPER	UPSILON	LOWER	ALPHA	UPSILON		
15	0 06241	-0.66853		0.17325	-0.54210		0.34812		
16	0 06605	-0.57735		0.10151	-0.44860		0.29011		
17	0 06932	-0.48559		0.03382	-0.35568		0.23523		
18	0 07224	-0.39325		-0.03002	-0.26334		0.18331		
19	0 07481	-0.30038		-0.09012	-0.17153		0.13416		
20	0 07704	-0.20704		-0.14661	-0.08019		0.08761		
21	0 07893	-0.11323		-0.19961	-0.01067		0.04354		
22	0 08049	-0.01882		-0.24918	0.10095		0.00202		
23	0 08173	0.07612		-0.29523	0.19069		-0.03691		
24	0 08265	0.17152		-0.33768	0.27996		-0.07329		
25	0 08323	0.26735		-0.37647	0.36881		-0.10716		
26	0 08342	0.36361		-0.41146	0.45724		0.13865		
27	0 08313	0.46027		-0.44249	0.54525		-0.16790		
28	0 08224	0.55735		-0.46928	0.63285		-0.19512		
29	0 08061	0.65482		-0.49151	0.72006		0.22055		
30	0 07804	0.75260		-0.50880	0.80696		-0.24450		
31	0 07434	0.85067		-0.52070	0.89357		-0.26727		
32	0 06928	0.94910		-0.5265	0.97981		-0.28902		
33	0 06262	1.04766		-0.52560	1.06593		-0.30985		
34	0 05411	1.14601		-0.51672	1.15226		-0.32975		
35	0 04353	1.24363		-0.49881	1.23933		-0.34838		
36	0 03118	1.33974		-0.47090	1.32790		-0.36376		
37	0 01993	1.41733		-0.43951	1.40420		-0.37187		
38	0 00824	1.47905		-0.40802	1.46985		-0.37376		
39	0 00824	1.48590		-0.40130	1.48097		-0.37734		
40	0 00824	1.48772		-0.38711	1.48772		-0.38711		
LE RAD	0 01048	CENTER AT ALPHA		-1.58315	UPSILON		1.18024		
TF RAD	0 01831	CENTER AT ALPHA		1.47009	UPSILON		-0.39206		

PHASE V ROTOR

780

COORD SYSTEM ORIGIN	Z	-7.03550	R	O.	MU	O.	ETA	O.
STAGE	5	ROTOR			NB	20		
SECTION NO	8	SECTION	HH		RHO	5.0000		
CHORD	3.4576	STAGGER	27.099		CAMBER	63.511		
AREA	0.701672	SURFACE	ARC LENGTH	7.27336				
SECTION C.G.		ALPHA		UPSILON				
STREAMSURFACE	SECTION C.G.	0.01262		-0.00851				
BLADE AXIS		0.00325		-0.03786				
STACKING AXIS (RADIAL)		0.00325		0.03786				
		-0.00210		0				

PHASE V ROTOR

7PC

COORD SYSIFM ORIGIN Z -7.03550 R 0 MU 0. FTA 0.
STAGE 5 ROTOR NB 20

SECTION NO 9 SECTION JJ RHO 4 5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	UPPER ALPHA	UPSILON	LOWER ALPHA	UPSILON
15	0 06687	-0.67924	0.12629	-0.56179	0.30215
16	0 07117	-0.59213	0.06189	-0.47285	0.25276
17	0 07524	-0.50440	0.00140	-0.38453	0.20691
18	0 07905	-0.41610	-0.05525	-0.29678	0.16143
19	0 08262	-0.32728	-0.10813	-0.20954	0.12508
20	0 08590	-0.23793	-0.15735	-0.12284	0.08870
21	0 08887	-0.14804	-0.20291	-0.03667	0.05511
22	0 09148	-0.05765	-0.24480	0.04899	0.02412
23	0 09364	0.03326	-0.28293	0.13413	-0.00454
24	0 09522	0.12467	-0.31717	0.21877	-0.03115
25	0 09609	0.21659	-0.34735	0.30292	-0.05601
26	0 09611	0.30895	-0.37326	0.38660	-0.07944
27	0 09509	0.40171	-0.39465	0.46990	-0.10180
28	0 09287	0.49489	-0.41129	0.55278	-0.12337
29	0 08937	0.58848	-0.42293	0.63523	-0.14423
30	0 08454	0.68268	-0.42928	0.71709	-0.16418
31	0 07854	0.77756	-0.42993	0.79827	-0.18245
32	0 07158	0.87341	-0.42416	0.87847	-0.19787
33	0 06389	0.97007	-0.41033	0.95786	-0.20865
34	0 05569	1.06676	-0.38636	1.03723	-0.21276
35	0 04703	1.16215	-0.34964	1.11789	-0.20767
36	0 03799	1.25545	-0.29631	1.20065	-0.18940
37	0 03025	1.32934	-0.23653	1.27346	-0.15888
38	0 02241	1.37416	0.19146	1.32489	-0.12898
39	0 02241	1.38415	-0.17146	* 1.35207	-0.12459
40	0 02241	1.37476	-0.13754	1.37476	-0.13754
LF RAD	0 01166	CENTER AT ALPHA	-1.55132	UPSILON	1.03305
TF RAD	0 04030	CENTER AT ALPHA	1.34452	UPSILON	-0.16417

PHASE V ROTOR

COORD SYSTEM ORIGIN Z -7 03550 R O. MU O. ETA O.
 STAGE 5 ROTOR NB 20

SECTION NO 9 SECTION JU RHO 4.5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA
18	0 4700	0.08590	-0.18038	-0.03432	25.067
19	0 5000	0.08887	-0.09236	-0.07390	23.347
20	0 5300	0.09148	-0.00433	-0.11034	21.629
21	0 5600	0.09364	0.08370	-0.14374	19.918
22	0 5900	0.09522	0.17172	-0.17416	18.211
23	0 6200	0.09609	0.25975	-0.20168	16.506
24	0 6500	0.09611	0.34778	-0.22635	14.804
25	0 6800	0.09509	0.43580	-0.24822	13.107
26	0 7100	0.09287	0.52383	-0.26733	11.368
27	0 7400	0.08937	0.61186	-0.28358	9.522
28	0 7700	0.08454	0.69989	-0.29673	7.396
29	0 8000	0.07854	0.78791	-0.30619	4.784
30	0 8300	0.07158	0.87594	-0.31101	1.279
31	0 8600	0.06389	0.96397	-0.30949	-3.464
32	0 8900	0.05569	1.05199	-0.29956	-9.654
33	0 9200	0.04703	1.14002	-0.27865	-17.318
34	0 9500	0.03799	1.22805	-0.24285	-27.138
35	0 9750	0.03025	1.30140	-0.19771	-35.738
36	1 0000	0.02241	1.37476	-0.13754	-42.577

CHORD STAGGER CAMBER
 3 1622 21 889 88.239

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPSILON	LOWER ALPHA	UPSILON
1	0.00680	-1.55947	1.04138	-1.55947	1.04138
2	0.00680	-1.56298	1.03290	-1.55103	1.04470
3	0.00680	-1.56029	1.02560	-1.54369	1.04185
4	0 0120	-1.49984	0.95318	-1.47239	0.98031
5	0 01755	-1.43237	0.87335	-1.39315	0.91261
6	0 02281	-1.36470	0.79451	-1.31410	0.84590
7	0 02796	-1.29678	0.71681	-1.23531	0.78038
8	0 03300	-1.22851	0.64053	-1.15688	0.71643
9	0 03791	-1.15980	0.56605	-1.07887	0.65447
10	0 04266	-1.09062	0.49372	-1.00134	0.59484
11	0 04724	-1.02090	0.42382	-0.92435	0.53781
12	0 05252	-0.93657	0.34344	-0.83263	0.47299
13	0 05755	-0.85149	0.26702	-0.74165	0.41214
14	0 06234	-0.76571	0.19465	-0.65138	0.35523

PHASE V ROTOR

7PC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O.
 STAGE 5. ROTOR NB 20
 SECTION NO 9 SECTION JJ RHO 4.5000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	1.55947	45.662	0.02149	1.04138
2	-1.48029	45.333	0.03994	0.96095
3	-1.32200	44.458	0.07602	0.80310
4	1.16425	47.985	0.11043	0.65178
5	-1.00704	40.735	0.14265	0.51026
6	-0.83489	37.673	0.17517	0.36896
7	0.64820	34.102	0.20704	0.23290
8	-0.46262	30.458	0.23533	0.11482
9	0.27835	26.846	0.26002	0.01351
10	-0.09541	23.354	0.28072	-0.07258
11	0.08582	19.896	0.29624	-0.14450
12	0.26491	16.497	0.30394	-0.20320
13	0.44161	13.125	0.30034	-0.24957
14	0.61525	9.527	0.28208	-0.28414
15	0.78481	4.872	0.24908	-0.30593
16	0.94915	-2.609	0.20626	-0.31027
17	1.10692	-14.408	0.15916	-0.28798
18	1.25663	-29.626	0.11066	0.22708
19	1.37476	-42.577	0.07088	-0.13754

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0.	0.00680	-1.55947	1.04138	45.662
2	0.0250	0.01220	-1.48612	0.96674	45.331
3	0.0500	0.01755	-1.41276	0.89298	44.976
4	0.0750	0.02281	-1.33940	0.82021	44.556
5	0.1000	0.02796	-1.26605	0.74859	44.038
6	0.1250	0.03300	-1.19269	0.67848	43.344
7	0.1500	0.03791	-1.11934	0.61026	42.470
8	0.1750	0.04266	-1.04598	0.54428	41.442
9	0.2000	0.04724	-0.97263	0.48081	40.264
10	0.2300	0.05252	0.88460	0.40821	38.743
11	0.2600	0.05755	-0.79657	0.33958	37.121
12	0.2900	0.06234	-0.70855	0.27494	35.449
13	0.3200	0.06687	0.62055	0.21422	33.738
14	0.3500	0.07117	-0.53249	0.15732	32.003
15	0.3800	0.07524	-0.44446	0.10416	30.254
16	0.4100	0.07905	-0.35644	0.05459	28.510
17	0.4400	0.08262	-0.26841	0.00848	26.785

PHASE V ROTOR

7PC

COORD SYSTEM ORIGIN	Z	-7.03550	R	O	MU	O.	ETA	O
STAGE	5	ROTOR			NB 20			
SECTION NO	9	SECTION JJ			RHO 4.5000			
CHORD	3 1622	STAGGER			CAMBER			
		21 889			88 239			
AREA	O 665583	SURFACE ARC LENGTH			6.88268			
SECTION C.G.		ALPHA		UPSILON				
STREAMSURFACE SECTION C.G.		-O 00938		-O 00316				
BLADE AXIS		O.04395		-O.05982				
STACKING AXIS (RADIAL)		O.04395		-O.05982				
		-O.00210		O				

•7PC•

PHASE V ROTOR

COORD SYSTEM ORIGIN 7 -7.03550 R 0. MU 0 FTA 0
STAGE 5 ROTOR NR 20
SECTION NO 10 SECTION KK RHD 4.0000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.52210	44.396	0.02404	0.90484
2	-1.44396	43.947	0.04250	0.82906
3	-1.28795	42.677	0.07937	0.68228
4	-1.13352	40.558	0.11621	0.54474
5	-0.98049	37.668	0.15281	0.42014
6	0.81387	34.261	0.19189	0.29931
7	0.63404	30.576	0.23169	0.18527
8	-0.45599	26.824	0.26673	0.08810
9	0.28001	23.098	0.29489	0.00642
10	-0.10612	19.609	0.31396	-0.06143
11	0.06547	16.534	0.32236	-0.11753
12	0.23405	13.706	0.32021	-0.16347
13	0.39900	10.406	0.30992	-0.19948
14	0.55945	5.527	0.29519	-0.22290
15	0.71428	-2.504	0.27795	-0.22782
16	0.86246	-15.153	0.25417	-0.20468
17	1.00295	-31.540	0.21647	-0.14118
18	1.13541	-47.432	0.16550	-0.02427
19	1.23939	-57.937	0.11774	0.12411

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.00838	-1.52240	0.90484	44.396
2	0.0250	0.01404	-1.45336	0.83806	43.777
3	0.0500	0.01971	-1.38431	0.77230	43.413
4	0.0750	0.02540	-1.31527	0.70754	42.887
5	0.1000	0.03111	-1.24622	0.64416	42.178
6	0.1250	0.03685	-1.17718	0.58257	41.253
7	0.1500	0.04261	-1.10813	0.52319	40.102
8	0.1750	0.04837	-1.03909	0.46633	38.823
9	0.2000	0.05411	-0.97004	0.41211	37.438
10	0.2300	0.05093	0.88719	0.35061	35.730
11	0.2600	0.06762	-0.80433	0.29284	34.031
12	0.2900	0.07413	-0.72148	0.23867	32.321
13	0.3200	0.08039	-0.63863	0.18798	30.587
14	0.3500	0.08633	0.55577	0.14069	28.840
15	0.3800	0.09186	-0.47292	0.09569	27.093
16	0.4100	0.09692	-0.39007	0.05588	25.350
17	0.4400	0.10141	0.30721	0.01815	23.616

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PHASE V ROTOR

CHORD SYSTEM ORIGIN Z -7.03550 R O. MU O ETA O

SECTION NO 10 SECTION KK RHO 4 0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0 4700	0 10524	-0 22436	-0 01661	21 913
19	0 5000	0 10833	-0 14151	-0 04858	20 294
20	0 5300	0 11058	-0 05865	-0 07796	18 767
21	0 5600	0 11196	0 02420	-0 10434	17 319
22	0 5900	0 11246	0 10706	-0 12968	15 943
23	0 6200	0 11209	0 18991	-0 15229	14 577
24	0 6500	0 11094	0 27276	-0 17278	13 184
25	0 6800	0 10914	0 35562	-0 19099	11 554
26	0 7100	0 10683	0 43847	-0 20651	9 596
27	0 7400	0 10417	0 52132	-0 21869	7 005
28	0 7700	0 10125	0 60418	-0 22653	3 639
29	0 8000	0 09802	0 68703	-0 22866	-0 897
30	0 8300	0 09421	0 76989	-0 22326	-6 904
31	0 8600	0 08925	0 85274	-0 20739	-15 076
32	0 8900	0 08247	0 93559	-0 17756	-24 492
33	0 9200	0 07360	1 01845	-0 13111	-33 928
34	0 9500	0 06269	1 10130	-0 06226	-45 542
35	0 9750	0 05224	1 17034	0 02147	-54 319
36	1 0000	0 04103	1 23939	0 12411	-56 894

CHORD STAGGER CAMFER
2 8700 15.785 101.291

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0 00838	-1 52240	0 90484	-1 52240	0 90484
2	0 00838	-1 52610	0 89524	-1 51307	0 90879
3	0 00838	-1 52291	0 88715	-1 50475	0 90583
4	0 01404	-1 46729	0 82352	-1 43942	0 85260
5	0 01971	-1 40375	0 75175	-1 36488	0 79284
6	0 02540	-1 34007	0 68084	-1 29046	0 73424
7	0 03111	-1 27620	0 61108	-1 21624	0 67725
8	0 03685	-1 21205	0 54281	-1 14231	0 62233
9	0 04261	-1 14752	0 47642	-1 06874	0 56996
10	0 04837	-1 08260	0 41225	-0 99557	0 52041
11	0 05411	-1 01724	0 35046	-0 92784	0 47376
12	0 06093	-0 93825	0 27963	-0 83613	0 42158
13	0 06762	-0 85864	0 21243	-0 75003	0 37326
14	0 07413	-0 77836	0 14877	-0 66460	0 32857

•7PC•

PHASE V ROTOR

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. NB 20 ETA 0

SECTION NO 10 SECTION KK RHO 4.0000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PI	I/C	UPPER ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0 08039	-0.69733	0.08867	-0.57993	0.28729
16	0 08633	-0.61553	0.03217	-0.49602	0.24920
17	0 09186	-0.53296	-0.02067	-0.41288	0.21405
18	0 09692	-0.44961	-0.06981	-0.33052	0.18157
19	0 10141	-0.36551	-0.11519	-0.24891	0.15149
20	0 10524	-0.28072	-0.15672	-0.16800	0.12350
21	0 10813	0.19542	-0.19438	-0.08759	0.09722
22	0 11058	-0.10970	-0.22821	-0.00760	0.07229
23	0 11196	-0.02363	-0.25832	0.07203	0.04845
24	0 11246	0.06273	-0.28485	0.15138	0.02549
25	0 11209	0.14943	0.30796	0.23039	0.00338
26	0 11094	0.23645	-0.32779	0.30908	-0.01777
27	0 10914	0.32425	-0.34443	0.38699	-0.03754
28	0 10683	0.41291	-0.35768	0.46403	-0.05535
29	0 10417	0.50309	-0.36705	0.53956	-0.07033
30	0 10125	0.59496	-0.37153	0.61340	-0.08153
31	0 09802	0.68923	-0.36930	0.68483	-0.08802
32	0 09421	0.78614	-0.35747	0.75363	-0.08905
33	0 08925	0.88605	-0.33106	0.81943	-0.08372
34	0 08247	0.98465	-0.28525	0.88653	-0.06987
35	0 07360	1.07740	-0.21875	0.95949	-0.04747
36	0 06269	1.16551	-0.12527	1.03709	0.00075
37	0 05224	1.23123	-0.02225	1.10946	0.06519
38	0 04103	1.26270	0.03807	1.15183	0.11203
39	0 04103	1.26918	0.07637	1.19352	0.13452
40	0 04103	1.23939	0.12411	1.23939	0.12411
LE RAD	0 01307	CENTER AT ALPHA	-1.51304	UPSILON	0.89572
TE RAD	0 06718	CENTER AT ALPHA	1.20253	UPSILON	0.06795

•7PC•

PIASE V ROTOR

STAGE 5 ROTOR NB 20
COORD SYSTEM ORIGIN Z -7 03550 R 0 MU 0. FIA 0.

SECTION NO 10 SECTION KK RH0 4.0000
CHORD STAGGER CAMBER
2 8700 15.785 101.291

AREA 0 700832 SURFACE ARC LENGTH 6.57755

SECTION C.G. ALPHA UPSILON
STREAMSURFACE SECTION C G 0.01098 0 00936
BLADE AXIS -0.02331 -0.02376
STACKING AXIS (RADIAL) -0.02331 -0 02376
-0 00210 0.

PHASE V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z -7.03550 R 0 MU 0 EIA 0
 SECTION NO 11 SECTION LL RHO 3 5000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.49793	41.682	0.02984	0.78342
2	-1.42205	40.787	0.05116	0.71635
3	-1.27143	38.665	0.09443	0.59017
4	1.12240	36.218	0.13720	0.47549
5	-0.97488	33.728	0.17757	0.37206
6	-0.81420	30.947	0.21752	0.27010
7	0.64094	27.638	0.25461	0.17247
8	0.46974	24.065	0.28432	0.08921
9	-0.30092	20.569	0.30660	0.01979
10	0.13476	17.672	0.32178	-0.03764
11	0.02831	15.266	0.33091	-0.08560
12	0.18773	12.582	0.33578	-0.12478
13	0.34279	8.419	0.33830	-0.15295
14	0.49243	1.293	0.33950	0.16443
15	0.63570	-10.440	0.33650	-0.15032
16	0.77103	-26.849	0.32003	-0.09833
17	0.89589	-44.291	0.28024	0.00642
18	1.01370	-58.153	0.22120	0.17879
19	1.0399	-66.264	0.16462	0.38579

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.01136	-1.49793	0.78342	41.682
2	0.0250	0.01828	-1.43288	0.72582	41.238
3	0.0500	0.02531	-1.36783	0.66973	40.290
4	0.0750	0.03243	-1.30278	0.61554	39.287
5	0.1000	0.03958	-1.23774	0.56330	38.242
6	0.1250	0.04669	-1.17269	0.51302	37.159
7	0.1500	0.05370	-1.10764	0.46470	36.042
8	0.1750	0.06056	-1.042	0.41833	34.922
9	0.2000	0.06720	-0.97754	0.37385	33.814
10	0.2200	0.07481	-0.89949	0.32286	32.482
11	0.2400	0.08200	-0.82143	0.27445	31.122
12	0.2600	0.08871	-0.74337	0.22861	29.707
13	0.2800	0.09491	-0.66531	0.18541	28.198
14	0.3000	0.10056	-0.58726	0.14494	26.602
15	0.3200	0.10566	-0.50920	0.10722	24.964
16	0.3400	0.11019	-0.43114	0.07225	23.297
17	0.3600	0.11415	-0.35308	0.03995	21.667

PHASE V ROTOR

COORD SYSTEM ORIGIN Z -7.03550 R 0.0 MU 0 FTA 0
STAGE 5 ROTOR NR 20
SECTION NO 11 SECTION LI RHO 3 5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT	AL	T/C	ALPHA	UPSILON	ZETA
18	0	4700	0	11755	-0.27502	0.01019
19	0	5000	0	12038	0	0.01725
20	0	5300	0	12267	-0	0.04264
21	0	5600	0	12448	-0	0.06620
22	0	5900	0	12586	0.03721	0.08800
23	0	6200	0	12688	0.11526	0.10802
24	0	6500	0	12761	0	0.12600
25	0	6800	0	12815	0	0.14153
26	0	7100	0	12856	0	0.15386
27	0	7400	0	12887	0.42749	0.16197
28	0	7700	0	12898	0	0.16436
29	0	8000	0	12863	0	0.15918
30	0	8300	0	12721	0	0.14399
31	0	8600	0	12381	0	0.11506
32	0	8900	0	11712	0	0.06680
33	0	9200	0	10663	0	0.00527
34	0	9500	0	09252	0	0.10802
35	0	9750	0	07826	1.03894	0
36	1	0000	0	06254	1.10399	0

CHORD 2.6321
STAGGER 8 689
CAMBER 109.491

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPSILON	LOWER ALPHA	UPSILON
1	0	01136	-1.49793	0.78342	-1.49793
2	0	01136	-1.50209	0	0.78342
3	0	01136	-1.49781	0	0.78342
4	0	01228	-1.44873	0	0.78582
5	0	02531	-1.38937	0	0.74391
6	0	03243	-1.32981	0	0.69513
7	0	03558	-1.26998	0	0.64858
8	0	04069	-1.20981	0	0.60422
9	0	05170	-1.14922	0	0.56199
10	0	06056	-1.08821	0	0.52185
11	0	06720	-1.02676	0	0.48368
12	0	07181	-0.95236	0	0.44732
13	0	08200	-0.87721	0	0.40592
14	0	08871	-0.80123	0	0.36684

•ZPC•

PHASE V ROTOR

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O ETA O
SECTION NO 11 SECTION LL RH0 3.5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	UPPER ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
15	0 09491	-0.72433	0 07533	-0 60629	0 29549
16	0 10056	-0.64652	0 02660	-0.52~99	0 26327
17	0 10566	-0.56788	-0.01884	-0.45051	0 23328
18	0 11019	-0.48849	-0.06094	-0.37379	0 20545
19	0 11415	-0.40855	0 09967	-0 29762	0 17958
20	0 11755	-0.32818	0 13510	-0.22187	0 15547
21	0 12038	-0 24766	-0.16735	-0.14627	0 13284
22	0 12267	-0.16718	-0.19670	-0.07064	0 11142
23	0 12448	-0.08655	-0.22352	0 00484	0 09112
24	0 12586	-0.00571	-0.24798	0 08012	0 07198
25	0 12688	0.07568	-0.27024	0 15485	0 05420
26	0 12761	0.15786	0 29016	0 22878	0 03817
27	0 12815	0 24146	0 30751	0 30129	0 02445
28	0 12856	0 32701	-0.32155	0 37187	0 01384
29	0 12887	0 41553	-0.33115	0 43946	0 00721
30	0 12898	0 50778	-0.33409	0 50332	0 00537
31	0 12863	0 60461	-0.32715	0 56261	0 00880
32	0 12721	0 70549	-0.30557	0 61784	0 01759
33	0 12381	0 81054	-0.26181	0 66891	0 03169
34	0 11712	0 91130	-0.18933	0 72427	0 05574
35	0 10663	0 99927	-0.08958	0 79240	0 10011
36	0 09252	1 07706	0 04334	0 87074	0 17269
37	0 07826	1 13274	0 18913	0 94515	0 27424
38	0 06254	1 15816	0 27426	0 98724	0 34559
39	0 06254	1 15667	0 32967	1 03737	0 38755
40	0 06254	1 10399	0 38579	1 10399	0 38579
LE RAD	0 01658	CENTER AT ALPHA	-1.48556	UPSILON	0 77237
TF RAD	0 09328	CENTER AT ALPHA	1.06838	UPSILON	0 29957

•ZPC•

PHASE V ROTOR

COORD SYSTEM ORIGIN	Z	-7.03550	R	O.	MU	O.	ETA	O
STAGE	5	ROTOR			NR	20		
SECTION NO	11	SECTION	LI		RHO	3.5000		
CHORD	2	STAGGER	8.689		CAMBER	109.491		
AREA	0.766460	SURFACE ARC LENGTH	6.41009					
SECTION C.G.		ALPHA	0.03179		UPSILON	0.04938		
STREAMSURFACE SECTION C.G.			-0.00140			-0.00773		
BLADE AXIS			-0.00140			0.00773		
STACKING AXIS (RADIAL)			-0.00210			0.		

PHASE V ROTOR

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COORD SYSTEM ORIGIN Z -7.03550 R 0. MU 0 EIA 0.
SECTION NO 12 SECTION MM RHC 3.0000

MEANLINE INPUT DATA				
PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.48310	37.748	0.04055	0.68860
2	-1.40932	36.771	0.06281	0.63297
3	-1.26309	34.892	0.10561	0.52856
4	-1.1859	33.152	0.14519	0.43207
5	0.97584	31.382	0.18088	0.34260
6	0.82058	29.012	0.21549	0.25268
7	0.55338	25.717	0.24812	0.16638
8	0.48848	22.016	0.27578	0.09433
9	-0.32613	18.625	0.29906	0.03552
10	-0.16679	16.303	0.31846	-0.01292
11	-0.01123	14.402	0.33529	-0.05375
12	0.13997	11.633	0.35127	0.08649
13	0.28593	6.450	0.36773	-0.10666
14	0.42525	-2.957	0.36429	-0.10600
15	0.55711	-17.994	0.39506	-0.07281
16	0.67960	-36.561	0.38589	0.00802
17	0.79084	-53.213	0.34401	0.15401
18	0.89200	-64.861	0.27691	0.38185
19	0.96860	-71.285	0.21149	0.64746

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS				
PT	PCT AL	T/C	ALPHA	ZETA*
1	0.	0.01654	-1.48310	37.748
2	0.0250	0.02409	-1.42181	36.583
3	0.0500	0.03154	-1.36052	35.828
4	0.0750	0.03885	-1.29923	35.067
5	0.1000	0.04597	-1.23793	34.291
6	0.1250	0.05288	-1.17664	33.552
7	0.1500	0.05956	-1.11535	32.865
8	0.1750	0.06598	-1.05406	32.171
9	0.2000	0.07212	-0.99276	31.419
10	0.2300	0.07912	-0.91921	30.417
11	0.2600	0.08572	-0.84566	29.259
12	0.2900	0.09194	-0.77211	27.943
13	0.3200	0.09775	-0.69856	26.488
14	0.3500	0.10326	-0.62501	24.896
15	0.3800	0.10837	-0.55146	23.218
16	0.4100	0.11314	-0.47791	21.470
17	0.4400	0.11758	0.40436	19.805

PHASE V ROTOR

7PC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. FTA O

SECTION NO 12 SECTION MM RHO 3.0000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0.4700	0.12171	-0.33080	0.03706	18.323
19	0.5000	0.12553	-0.25725	0.01364	17.038
20	0.5300	0.12909	-0.18370	0.00812	15.956
21	0.5600	0.13244	-0.11015	-0.02849	15.003
22	0.5900	0.13565	-0.03660	-0.04752	13.991
23	0.6200	0.13880	0.03695	-0.06510	12.832
24	0.6500	0.14197	0.11050	-0.08083	11.245
25	0.6800	0.14522	0.18405	-0.09413	9.109
26	0.7100	0.14861	0.25760	-0.10401	6.038
27	0.7400	0.15218	0.33115	-0.10923	1.807
28	0.7700	0.15576	0.40471	-0.10787	-4.221
29	0.8000	0.15900	0.47826	-0.09751	-12.162
30	0.8300	0.16105	0.55181	-0.07500	-22.031
31	0.8600	0.16058	0.62536	-0.03602	-34.076
32	0.8900	0.15544	0.69891	0.02765	-47.059
33	0.9200	0.14409	0.77246	0.12412	-57.353
34	0.9500	0.12670	0.84601	0.26172	-66.187
35	0.9750	0.10788	0.90730	0.42974	-72.902
36	1.0000	0.08625	0.96860	0.64746	-74.886

CHORD 4520 STAGGER 0.961 CAMBER 112.634

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPSILON	LOWER ALPHA	UPSILON
1	0.01654	-1.48310	0.68860	-1.48310	0.68860
2	0.01654	-1.48758	0.67139	-1.46822	0.69732
3	0.01654	-1.48089	0.65830	-1.45338	0.69440
4	0.02409	-1.43941	0.61850	-1.40421	0.66593
5	0.03154	-1.38315	0.56500	-1.33788	0.62871
6	0.03885	-1.32659	0.51473	-1.27186	0.59270
7	0.04597	-1.26969	0.46474	-1.20618	0.55787
8	0.05288	-1.21248	0.41606	-1.14081	0.52413
9	0.05956	-1.15497	0.36864	-1.07572	0.49131
10	0.06598	-1.09713	0.32243	-1.01099	0.45936
11	0.07212	-1.03886	0.27743	-0.94667	0.42835
12	0.07912	-0.96832	0.22516	-0.87010	0.39247
13	0.08572	-0.89703	0.17492	-0.79430	0.35829
14	0.09194	-0.82493	0.12690	-0.71929	0.32606

PHASE V ROTOR

7PC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O ETA O.
SECTION NO 12 SECTION MM RHO 3.0000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER	UPSILON	LOWER	ALPHA	UPSILON
15	0 09778	-0 75203		0 08133	-0 64509		0 29593
16	0 10326	-0 67830		0 03840	-0 57172		0 26806
17	0 10837	-0 60384		-0 00172	-0 49908		0 24248
18	0 11314	-0 52868		-0 03894	-0 42714		0 21922
19	0 11758	-0 45320		-0 07318	-0 35551		0 19809
20	0 12171	-0 37772		-0 10460	-0 28389		0 17872
21	0 12553	-0 30235		-0 13351	-0 21216		0 16079
22	0 12909	-0 22721		-0 16029	-0 14020		0 14405
23	0 13244	-0 15219		-0 18533	-0 06812		0 12834
24	0 13565	-0 07681		-0 20889	0 00361		0 11385
25	0 13880	-0 00084		-0 23102	0 07474		0 10083
26	0 14197	0 07656		-0 25155	0 14444		0 08988
27	0 14522	0 15587		-0 26992	0 21224		0 08167
28	0 14861	0 23844		-0 28521	0 27677		0 07718
29	0 15218	C 32527		-0 29572	0 33704		0 07725
30	0 15576	0 41876		-C 29832	0 39065		0 08258
31	0 15900	0 51933		-0 28808	0 43719		0 09305
32	0 16105	0 62587		-0 25803	0 47774		0 10803
33	0 16058	0 73567		-0 19909	0 51505		0 12705
34	0 15544	0 83842		-0 10218	0 55940		0 15747
35	0 14409	0 92120		0 02882	0 62372		0 21942
36	0 12670	0 98812		0 19900	0 70390		0 32443
37	0 10788	1 03372		0 39085	0 78089		0 46862
38	0 08625	1 05462		0 51450	0 82696		0 57737
39	0 08625	1 04359		0 58578	0 88283		0 63854
40	0 08625	0 96860		0 64746	0 96860		0 64746

LE RAD 0.02286 CENTER AT ALPHA -1 46496 UPSILON 0.67469
1F RAD 0.11888 CENTER AT ALPHA 0.93717 UPSILON 0.53281

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PIASF V MOTOR

COORD SYSTEM ORIGIN Z	-7	03550	R	O.	MU	O.	EIA	O.
STAGE	5	ROTOR						
						NB	20	
SECTION NO	12	SECTION MM				RHO	3.0000	
CHORD		STAGGER				CAMBER		
2	4520	0.961				112.634		
AREA	0	825127	SURFACE ARC LENGTH			6.37144		
SECTION C G			ALPHA			UPSILON		
SURFACE			0 07309			0.10928		
BLADE AXIS			0.04568			0 00113		
STACKING AXIS (RADIAL)			0.04568			0 00113		
			-0 00210			0.		

PHASE V ROTOR

ZPC

COORD SYSTEM ORIGIN Z -7.03550 R O. MU O. ETA O.
 SECTION NO 13 SECTION NN RHO 2.5000

MEANLINE INPUT DATA

PT	ALPHA	ZETA*	THICKNESS	UPSILON
1	-1.46924	33.576	0.05423	0.61513
2	-1.39769	32.933	0.07404	0.56886
3	-1.25591	31.859	0.11165	0.48032
4	-1.11609	30.865	0.14611	0.39628
5	0.97791	29.543	0.17726	0.31695
6	0.82781	27.313	0.20803	0.23691
7	0.66636	23.866	0.23829	0.16134
8	0.50752	19.957	0.26566	0.09967
9	-0.35145	16.652	0.29103	0.05131
10	-0.19882	14.917	0.31509	0.01180
11	0.05078	13.531	0.33966	-0.02190
12	0.09221	10.677	0.36676	-0.04820
13	0.22907	4.465	0.39715	-0.06036
14	0.35807	-7.175	0.42909	-0.04757
15	0.47852	-24.955	0.45363	0.00470
16	0.58818	-44.334	0.45175	0.11437
17	0.68478	-59.522	0.40778	0.30161
18	0.77029	-69.341	0.33261	0.58491
19	0.83320	-74.596	0.25837	0.90913

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PC1 AL	T/C	ALPHA	UPSILON	ZETA*
1	0	0.02337	-1.46924	0.61513	33.023
2	0.0250	0.03024	-1.41168	0.57784	32.771
3	0.0500	0.03699	-1.35412	0.54120	32.192
4	0.0750	0.04357	-1.29656	0.50531	31.716
5	0.1000	0.04996	-1.23900	0.47000	31.358
6	0.1250	0.05616	-1.18144	0.43516	30.990
7	0.1500	0.06215	-1.12387	0.40088	30.564
8	0.1750	0.06793	-1.06631	0.36721	30.069
9	0.2000	0.07348	-1.00875	0.33426	29.486
10	0.2300	0.07986	-0.93968	0.29584	28.650
11	0.2600	0.08597	0.87061	0.25890	27.581
12	0.2900	0.09183	-0.80153	0.22379	26.263
13	0.3200	0.09746	-0.73246	0.19079	24.783
14	0.3500	0.10289	-0.66339	0.16006	23.160
15	0.3800	0.10811	-0.59431	0.13173	21.419
16	0.4100	0.11317	0.52524	0.10589	19.584
17	0.4400	0.11811	-0.45617	0.08257	17.767

COORD SYSTEM ORIGIN Z -7.03550 R 0 MU C ETA 0.
SECTION NO 13 SECTION NN RHO 2.5000

MEANLINE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	PCT AL	T/C	ALPHA	UPSILON	ZETA*
18	0.4700	0.12293	-0.38709	0.06147	16.255
19	0.5000	0.12766	-0.31802	0.04214	15.068
20	0.5300	0.13234	-0.24895	0.02417	14.136
21	0.5600	0.13705	-0.17987	0.00724	13.437
22	0.5900	0.14191	-0.11080	-0.00880	12.690
23	0.6200	0.14702	-0.04173	-0.02380	11.783
24	0.6500	0.15249	0.02735	-0.03741	10.379
25	0.6800	0.15838	0.09642	-0.04882	8.256
26	0.7100	0.16476	0.16549	-0.05701	5.029
27	0.7400	0.17167	0.23457	-0.06042	0.382
28	0.7700	0.17903	0.30364	-0.05704	-6.420
29	0.8000	0.18640	0.37271	-0.04377	-15.653
30	0.8300	0.19289	0.44178	-0.01683	-27.093
31	0.8600	0.19684	0.51086	0.02872	-39.718
32	0.8900	0.19535	0.57993	0.10289	-53.564
33	0.9200	0.18490	0.64900	0.22029	-64.177
34	0.9500	0.16482	0.71808	0.39266	-71.738
35	0.9750	0.14078	0.77564	0.60915	-77.786
36	1.0000	0.11131	0.83320	0.90913	79.709

CHORD 2.3211 STAGGER -7.277 CAMBER 112.731

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	ALPHA	UPPER UPSILON	LOWER ALPHA	UPSILON
1	0.02337	-1.46924	0.61513	-1.46924	0.61513
2	0.02337	-1.47346	0.59194	-1.45012	0.62830
3	0.02337	-1.46314	0.57505	-1.43019	0.62582
4	0.03024	-1.43068	0.54833	-1.39268	0.60735
5	0.03699	-1.37699	0.50487	-1.33125	0.57753
6	0.04357	-1.32314	0.46230	-1.26998	0.54832
7	0.04916	-1.26917	0.42049	-1.20882	0.51951
8	0.05616	-1.21500	0.37929	-1.14788	0.49104
9	0.06215	-1.16056	0.33876	-1.08719	0.46299
10	0.06793	-1.10581	0.29898	-1.02681	0.43543
11	0.07348	-1.05073	0.26003	-0.96678	0.40850
12	0.07986	-0.98412	0.21450	-0.89524	0.37718
13	0.08597	-0.91680	0.17047	-0.82441	0.34733
14	0.09183	-0.84869	0.12823	-0.75438	0.31936

PIALET V ROTOR

•7PC•

COORD SYSTEM ORIGIN Z -7.03550 R 0 MU 0 NR 20
 SECTION NO 13 SECTION NN RHO 2.5000

SURFACE COORDINATES WITH ORIGIN AT SECTION AXIS

PT	T/C	UPPER		LOWER		UPSILON	
		ALPHA	UPSILON	ALPHA	UPSILON	ALPHA	UPSILON
15	0 09746	-0 77988	0 08810	-0 68504	0 29349	0 29349	0 29349
16	0 10289	-0 71035	0 05027	-0 61642	0 26985	0 26985	0 26985
17	0 10811	-0 64013	0 01493	-0 54849	0 24854	0 24854	0 24854
18	0 11317	-0 56927	-0 01785	-0 48121	0 22964	0 22964	0 22964
19	0 11811	-0 49799	-0 04796	-0 41434	0 21311	0 21311	0 21311
20	0 12293	-0 42703	-0 07550	-0 34716	0 19844	0 19844	0 19844
21	0 12766	-0 35654	-0 10092	-0 27950	0 18520	0 18520	0 18520
22	0 13234	-0 28646	-0 12476	-0 21144	0 17310	0 17310	0 17310
23	0 13705	-0 21683	-0 14747	-0 14291	0 16194	0 16194	0 16194
24	0 14191	-0 14698	-0 16948	-0 07462	0 15187	0 15187	0 15187
25	0 14702	-0 07657	-0 19084	-0 00688	0 14323	0 14323	0 14323
26	0 15249	-0 00454	-0 21148	0 05923	0 13667	0 13667	0 13667
27	0 15838	0 07002	-0 23072	0 12281	0 13309	0 13309	0 13309
28	0 16476	0 14873	-0 24749	0 18225	0 13348	0 13348	0 13348
29	0 17167	0 23324	-0 25965	0 23590	0 13882	0 13882	0 13882
30	0 17903	0 32687	-0 26352	0 28041	0 14944	0 14944	0 14944
31	0 18540	0 43108	-0 25207	0 31434	0 16454	0 16454	0 16454
32	0 19289	0 54374	-0 21613	0 33983	0 18247	0 18247	0 18247
33	0 19684	0 65683	-0 14700	0 36488	0 20443	0 20443	0 20443
34	0 19515	0 76233	0 03177	0 39753	0 23754	0 23754	0 23754
35	0 18490	0 84216	0 12681	0 45584	0 31376	0 31376	0 31376
36	0 16482	0 89973	0 33272	0 53643	0 45260	0 45260	0 45260
37	0 14078	0 93533	0 57458	0 61595	0 64371	0 64371	0 64371
38	0 11131	0 95078	0 75686	0 66921	0 80908	0 80908	0 80908
39	0 11131	0 92975	0 84303	0 72959	0 88886	0 88886	0 88886
40	0 11131	0 83320	0 90913	0 83320	0 90913	0 90913	0 90913
LE RAD	0 03047	CENTER AT ALPHA	-1.44371	UPSILON	0 59852	0 59852	0 59852
TE RAD	0 14405	CENTER AT ALPHA	0 80712	UPSILON	0 76746	0 76746	0 76746

PHASE V ROTOR

7PC

(COORD) SYSTEM ORIGIN 7 -7 03550 R 0 MU O. ETA 0

STAGE 5 ROTOR NR 20

SECTION NO 13 SECTION NN RHO 2.5000

CHORD STAGGER CAMBER

2 3211 -7 277 112 731

AREA 0.902026 SURFACE ARC LENGTH 6 42542

SECTION C G. ALPHA UPSILON

SURFAMSURFACE SECTION C G 0.10985 0 19507

PLATE AXIS 0 09277 0 00999

STAIRING AXIS (RADIAL) 0 09277 0 00999

0 00210 0

PHASE V ROTOR

ZPC

SECT	ID	RID	STAGE	5	ROTOR	NB	20
			CHORD	STAGGER	CAMBER	TM/C	ZETA1* 711A2*
AA	1	8 50000	3.8302	59.29	1.18	0.02514	57.67 56.49
BB	2	8 00000	3.9139	55.63	4.31	0.02615	55.32 51.21
CC	3	7.50000	3.9448	51.79	7.53	0.03067	53.92 46.39
DD	4	7 00000	3.9128	47.64	12.65	0.03459	52.58 39.93
EE	5	6 50000	3.8240	42.94	19.95	0.05184	51.37 31.43
FF	6	6 00000	3.7383	38.20	29.74	0.06273	50.44 20.70
GG	7	5.50000	3.6357	32.36	44.77	0.07256	49.15 4.38
HH	8	5.00000	3.4576	27.10	63.51	0.08342	47.28 -16.23
IJ	9	4 50000	3.1622	21.89	88.24	0.09611	45.66 -42.58
KK	10	4 00000	2.8700	15.79	101.29	0.11246	44.40 -56.89
LL	11	3.50000	2.6321	8.69	109.49	0.12898	41.68 -67.81
MM	12	3 00000	2.4520	0.96	112.63	0.16105	37.75 74.89
NN	13	2 50000	2.3211	-7.28	112.73	0.19684	33.02 79.71

THE COORDINATES FOR THIS BLADE WERE PUT ON TAPE
IN THE SAME ORDER AS PRINTED ABOVE

SECTION XVIII

REFERENCES

1. A.J. Wennerstrom, and W.A. Buzzell, Redesign of a Rotor for a 1500 ft/sec Transonic, High-Through-Flow, Single-Stage Axial-Flow Compressor with Low Hub/Tip Ratio, Air Force Aero Propulsion Laboratory, Wright-Patterson AFB, Ohio 45433, AFAPL-TR-2078, September 1979.
2. George R. Frost, Richard M. Hearsey, Arthur J. Wennerstrom, A Computer Program for the Specification of Axial Compressor Airfoils, Aerospace Research Laboratories, Wright-Patterson Air Force Base, Ohio 45433, ARL 72-0171,
3. Richard M. Hearsey, A Revised Computer Program for Axial Compressor Design Volume I, Aerospace Research Laboratories, Wright-Patterson Air Force Base, Ohio 45433, ARL TF 75-0001, January 1975.
4. Arthur J. Wennerstrom, Personal Communication to L.H. Smith of General Electric Company, September 12, 1980.