NASA Contractor Report 198362

IN-07
60537
P. 93

# Off-Design Computer Code for Calculating the Aerodynamic Performance of Axial-Flow Fans and Compressors

User's Manual

James F. Schmidt
*NYMA, Inc.*
*Brook Park, Ohio*

(NASA-CR-198362) OFF-DESIGN COMPUTER CODE FOR CALCULATING THE AERODYNAMIC PERFORMANCE OF AXIAL-FLOW FANS AND COMPRESSORS Final Report (NYMA) 93 p

N96-12502

Unclas

G3/07 0060537

July 1995

Prepared for
Lewis Research Center
Under Contract NAS3–27186

National Aeronautics and
Space Administration

## TABLE OF CONTENTS


| | Page |
|---|---|
| Summary | 1 |
| 1.0 Introduction | 2 |
| 2.0 Off-Design Compressor Calculation Procedure | 4 |
| 3.0 Input Data | 5 |
| 3.1 General Input | 5 |
| 3.2 Calculation Station and Blade Row Input | 6 |
| 4.0 Aerodynamic Flow Solution | 9 |
| 4.1 Flow Loss and Deviation Prediction Models | 9 |
| 5.0 Exit Calculation Routine | 11 |
| 6.0 Controlling Recalculation Main Routine | 12 |
| 7.0 User Example Compressor Case | 13 |
| 8.0 Acknowledgement | 15 |
| 9.0 References | 16 |
| Appendix | |
| A Symbols | 17 |
| B Input Parameters for Off-Design Compressor Code | 18 |
| Tables | |
| 1 Example Input Data Set (no Stator Resets) | 32 |
| 2 Example Output Data Set (no Stator Resets) | 36 |
| 3 Example Output Data Set (with Stator Resets) | 64 |




PRECEDING PAGE BLANK NOT FILMED

PAGE ii INTENTIONALLY BLANK

## SUMMARY

An off-design axial-flow compressor code is presented and is available from COSMIC for predicting the aerodynamic performance maps of fans and compressors. Steady axisymmetric flow is assumed and the aerodynamic solution reduces to solving the two-dimensional flow field in the meridional plane. A streamline curvature method is used for calculating this flow-field outside the blade rows. This code allows for bleed flows and the first five stators can be reset for each rotational speed; capabilities which are necessary for large multi-stage compressors. The accuracy of the off-design performance predictions depend upon the validity of the flow loss and deviation correlation models. These empirical correlations for the flow loss and deviation are used to model the real flow effects and the off-design code will compute through small reverse flow regions.

The input to this off-design code is fully described and a user's example case for a two-stage fan is included with complete input and output data sets. Also, a comparison of the off-design code predictions with experimental data is included which generally shows good agreement.

## 1.0 INTRODUCTION

If a reliable off-design axial compressor code is available for predicting the performance maps of compressor designs, costly and time consuming testing can be kept to a minimum. In addition, reliable flow property prediction at off-design speeds can be used as a good starting point for full three dimensional flow analyses to reduce their long computing times. Off-design compressor performance, which is the performance of a compressor at flow conditions and rotational speeds other than the design point is an important aspect of compressor design. A good design for a multistage axial compressor requires an adequate part-speed performance with sufficient part-speed stall margin and determination of required starting bleed flows along with any guide vane or stator resets needed to better match the stages (Ref. 1). The off-design flow analysis is different from the compressor design analysis in that the compressor blade geometry is now fixed and the off-design requirement is to determine the compressor performance for a range of speeds and weight flows i.e. to determine the compressor map.

This off-design, two-dimensional, axial compressor code was originally developed by James Crouse as an analysis code to be used in tandem with his compressor design code (Ref. 2). This off-design code has never been published and many modifications to the original code have been made over the last 12 years. In order to successfully use this off-design code, the compressor design code must first be used to generate the necessary blade geometry block of data that is part of the required input to the off-design code. Actually, the general design procedure is to first produce a preliminary initial blade design with the compressor design code. In cases where the compressor blade design is obtained from an old design or an outside source, the compressor design code must be used to duplicate the blade design and obtain the necessary input to the off-design code.

Steady, axisymmetric, two-dimensional flow in the meridional plane is as-

sumed and the equations of motion as developed in reference 1 are only applicable for calculation stations outside the blade rows, Also, empirical correlations for the flow losses and deviation angle are used to model real flow effects and the off-design code will compute through small reverse flow regions.

The blade geometry description is essentially the same as that for the compressor design code (Ref. 2) and the aerodynamic solution uses a streamline curvature method for calculating the flow at stations outside the blade rows. The aerodynamic calculation structure for the off-design code is set up such that the aerodynamic flow field and selected streamlines are recalculated for each new rotational speed with the flow rate increased to the choke condition, and then decreased to the stall condition. In addition, this code has the capability to include bleed flows as well as reset adjustments for the first five stators.

The purpose of this report was not intended to give a detailed description of the development of the off-design code but to give the user a manual for properly using this code.

A user's example case for a two-stage fan is included to demonstrate the necessary input required to run this off-design code as well as the resulting output produced by this code. A comparison of the off-design code performance predictions with experimental data for this two- stage fan is made with and without stator resets.

## 2.0 OFF-DESIGN CALCULATION PROCEDURE

Similar to the compressor design code (Ref. 2) the off-design code is separated into three main regions of calculation: the input and setup, the aerodynamic flow solution and exit calculation routines. In addition, a reset or recalculation routine is included for a recalculation of the flow field and streamlines as the flow is increased toward the choke point and decreased toward the stall condition. This general procedure is repeated for each desired rotational speed.

For the input and setup routine the input data are read and interpreted and the streamlines are located on the basis of annulus area. For the flow field solution phase the equations of motion are satisfied in the meridional ($r-z$) plane at calculation stations along the compressor flow path (see Figure 1). At the stations, the equations of motion and overall flow continuity are satisfied using a streamline curvature method of solution. The exit calculation routine makes the final calculations and prints the output. First the mass averaged parameters for the individual and cumulative compressor blade rows are calculated and printed and then the detailed tabulated local values (tip to hub) of the aerodynamic and blading parameters for each calculation stations are computed and printed. A recalculation phase or controlling main routine is used to recalculate the flow field and streamlines as the inlet flow rate is increased toward the choke point and decreased toward the stall condition. This procedure is repeated for each desired compressor rotational speed.

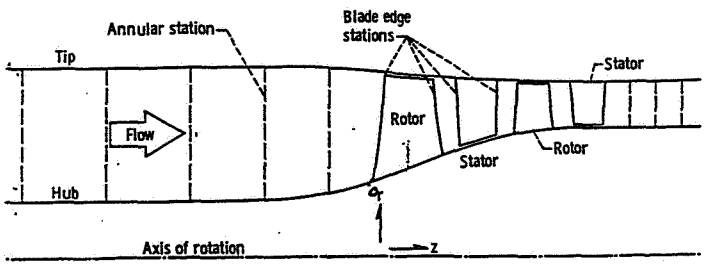



Figure 1. - Calculation stations in compressor flow path.

## 3.0 INPUT DATA

The basic meridional $(r, z)$ computational plane is shown in Figure 1 for a typical compressor configuration. As indicated in Figure 1 the calculation stations are located at the blade-row leading and trailing edges and at other annular locations needed for proper determination of the streamlines. The input data are divided into two categories of input: general input data and calculation station and blade row input data. All the input parameters and options as well as the input data format are described in Appendix B. The mathematical symbols used for defining these input parameters are given in Appendix A. Except for a few modifications the general input data for the off-design code are similar to the general input data for the design code (Ref. 2).

### 3.1 General Input Data

The input data consist of the following information:

1). Number of desired compressor speeds.

2). Normalized range for the choke region.

3). Normalized step increment for the choke region.

4). Normalized range for the stall region.

5). Normalized step increment for the stall region.

6). Fraction of desired rotation speeds.

7). Stator reset angle for first 5 stators.

8). Number of streamlines.

9). Number of blade rows.

10). Number of annular stations.

11). Compressor rotational speed.

12). Inlet flow rate.

13). Desired compressor pressure ratio.

14). Gas molecular weight.

15). Coefficients for $Cp$ as a fifth-degree polynomial function of temperature.

16). Upstream values of total temperature, total pressure, and inlet tangential velocity for each streamline.

17). Streamtube mass flow fractions between streamlines.

18). Sets of points to define tip and hub casing contours.

19). Sets of blade element profile loss parameters that are tabulated as functions of blade element loading parameter (D Factor) and fraction of passage height.

Except for the above first seven input data items the remaining list of the general input data is identical to the general input data for the design code (Ref. 2). Therefore, once the design code is run most of the general input data for the off-design code are already known.

### 3.2 Calculation Station and Blade Row Input

The input data for the annulus calculation stations and blade rows are read in order from annulus inlet to outlet. The calculation stations and blade row input consist of the following information:

I. Type of calculation station: annular, rotor or stator.

If annular - only one line.

1). The tip and hub axial locations.

2). The tip and hub blockage displacement thickness.

3). The cumulative bleed fraction of inlet flow

If rotor - first line.

1). The tip and hub stacking-point axial locations.

2). The inlet tip and hub blockage displacement thicknesses.

3). The cumulative bleed fraction of inlet flow.

If rotor - second line.

1). Number of streamlines (maximum of 11).

2). Loss set number (maximum of 9).

3). Blade definition index.

4). Option parameter for part span shroud (IDAMP = 0 for no damper).

5). The cumulative bleed factor of inlet flow.

6). Number of blades.

7). The outlet tip and hub blockage displacement thicknesses.

8). The angle of stacking axis tilt (degrees) or lean in circumferential direction ($r$, $\theta$ plane).

9). The estimated cumulative stage adiabatic efficiency for the first iteration.

10). Desired cumulative energy addition factor through particular rotor to total energy addition of compressor. The last rotor must have CRENGY = 1.0 to meet the input total pressure ratio.

If stator - first line.

1). The tip and hub stacking-point axial location.

2). The inlet tip and hub blockage displacement thicknesses.

3). The cumulative bleed fraction of inlet flow.

If stator - second line.

1). Number of streamlines (maximum of 11).

2). Loss set number (maximum of 9).

3). Blade definition index.

4). Option parameter for part span shroud (IDAMP = 0 for no damper).

5). The cumulative bleed fraction of inlet flow.

6). Number of blades.

7). The outlet tip and hub blockage displacement thicknesses.

If IDAMP > 0, then the following information line needs to be included after the second line of the rotor or stator input.

1). Radial location of the leading edge or the part-span shroud.

2). Slope angle of the damper centerline in the meridional view.

3). Chord length of mid-span shroud.

4). Maximum thickness-to-chord ratio of damper.

5). Leading edge to chord ratio of a part-span shroud.

6). Trailing edge to chord ratio of a part-span shroud.

The basic blade row geometry block of information is included after the second line of the rotor or stator blade row input. This basic blade row geometry data is automatically obtained using an option in the compressor design code (Ref. 1). Again, as previously stated, the order and format for all of the off-design input is shown in Appendix B along with a complete description of the input parameters.

## 4.0 AERODYNAMIC FLOW SOLUTION

The aerodynamic flow solution determines the velocity diagrams and fluid state properties on the calculated streamlines at the annular and blade row inlet and exit stations. The flow solution results from an inner and outer iteration scheme. For the outer loop iteration the calculated variables are the stagnation temperature and pressure, the tangential component of velocity, and the streamline location, slope, and curvature. The inner loop iteration is the spanwise flow calculation, solving continuity and radial equilibrium at each station, where the axial velocity distribution is calculated as the outer loop variables are held fixed and then the streamline location is reset. The overall procedure is station marching from inlet to outlet with streamline parameters fixed and a maximum of 20 cycles to converge to a solution.

### 4.1 Flow Loss and Deviation Prediction Models

Accuracy of the off-design performance predictions depends upon the validity of the flow loss and deviation correlation models. The total loss coefficient is defined as:

$$\overline{w} = \frac{(PO_i')_2 - PO_2'}{PO_1' - p_1} \tag{1}$$

In this code the losses consist of two additive components: shock losses and all other losses (considered as a profile loss). The shock loss is assumed to be approximately equal to the computed normal shock loss divided by the square of the inlet relative Mach number. The profile loss coefficient is given by:

$$\overline{w}_p = \overline{w} - \overline{w}_s \tag{2}$$

where $\overline{w}_s$ is the shock loss coefficient.

The profile loss is represented by a correlation parameter as a function of passage height and aerodynamic blade loading. The values for this loss parameter correlation are input in tabular form in the input data and are usually called

loss parameter data sets. The aerodynamic blade loading parameter (more commonly called D-factor) is defined as:

$$D = 1 - \frac{V_2'}{V_1'} + \frac{[(rV_\theta)_2 - (rV_\theta)_1]}{\sigma(r_1 + r_2)V_1'} \tag{3}$$

where $V_\theta$ is the tangential flow velocity and $\sigma$ is the blade element solidity and the loss parameter in the input table is defined as:

$$\frac{\overline{w}_p \cos \beta_2'}{2\sigma} \tag{4}$$

Loss parameter data sets determined from experimental data over many years are often stored in data banks for different types of compressors.

In this off-design code a deviation subroutine is used to iterate for the blade row outlet flow angle and thus with fixed blade geometry determines the deviation angle. A correction to Carter's deviation angle rule (Ref. 1) due to changes in blade camber in the streamline direction was developed by James Crouse in his original development of the off-design code. This correlation for the deviation coefficient used in the iteration for the outlet blade flow angle is given by:

$$\begin{aligned} C_m = {} & (0.219 + \gamma(0.051085 + 0.088915\gamma)) \\ & \times \{1.620 + \gamma(0.72365 - 0.27871\gamma) \\ & + \phi[-1.415 + \gamma(1.85240 - 0.75964\gamma) \\ & + \phi(0.352 - \gamma(0.810816 - 0.40444\gamma))]\}^{2.4} \end{aligned}$$

where: $\gamma$ is the blade setting angle (rad.), $c$ is the chord, and $\phi$ is the ratio of front to total camber of each blade element.

These loss and deviation coefficient correlations are the primary unknown factors in the off- design code. Generally, the off-design code predictions compare quite well with experimental data for fans and lightly to moderately loaded

multi-stage compressors. However, for highly-loaded, large multistage compressors very large reset guide vane and stator adjustments are needed to match the stages, especially at low wheel speeds. These large reset adjustments greatly increase the pressure losses and deviation angles in these front stators and guide vane. Therefore, the loss and deviation correlations need to be improved for highly-loaded, large, multistage compressors.

## 5.0 EXIT CALCULATION ROUTINE

After the iterated solution for the aerodynamic flow field is obtained the off-design code calculates and prints the overall mass-averaged parameters for the individual and cumulative compressor blade rows. In addition, the detailed tabulated local values (tip to hub) of the aerodynamic and blading parameters for each calculation station are computed and printed.

## 6.0 CONTROLLING RECALCULATION MAIN ROUTINE

The first flow field and performance calculation for this off-design code is the design point case and the results should compare very well with the results for the design code (Ref. 2). Then, the step-choke increment is used to calculate an increased flow rate and the flow field with new streamlines are recalculated. This process is repeated until the input range-choke value is reached and all the performance calculations on the choke side are completed. A word of caution is needed at this point because if too large a value for the input range-choke is used, the code will try to calculate a very hard choke condition which may cause a divide by almost zero and other numerical difficulties. After the choke-side calculation is completed, the off-design code then uses the step-stall increment to reduce the flow rate from the design value and the flow field with new streamlines are calculated. This process on the stall side is repeated until the desired input range-stall value is reached. Again, caution is needed because if too large a value for the input range-stall is used, the code will try to calculate a stall condition with very high D-factors (Eq. 3) resulting in severe numerical difficulties which can stop the code. Now, all the flow-field overall and blade row performance calculations have been obtained for one complete speedline (100 percent or fraction of speed of 1.0). This same general procedure is repeated for additional speedlines except that instead of marching away from design point values the controlling main routine calculates a reduced flow rate and rotational speed for each additional desired input fraction of speed. Speedlines greater than 100 percent or fraction of speed greater than 1.0 can also be calculated.

## 7.0 USER EXAMPLE COMPRESSOR CASE

A user's example case for a two-stage fan (Ref. 3) shows the necessary detailed input data set needed to run this off-design code (see Table 1). This two-stage fan example case is the same example case that was used for the compressor design code (Ref. 2). In addition, the off-design output prediction results for this example case with and without stator resets are shown in Table 2 and Table 3, respectively. A comparison of the off-design predictions is generally in good agreement with the experimental data (see Fig. 2), especially for the 70 percent speed case.

This compressor off-design computer code (written in Fortran) along with the example input case can be obtained from COSMIC, 112 Barrow Hall, University of Georgia, 30601. The COSMIC program number is LEW-16176.

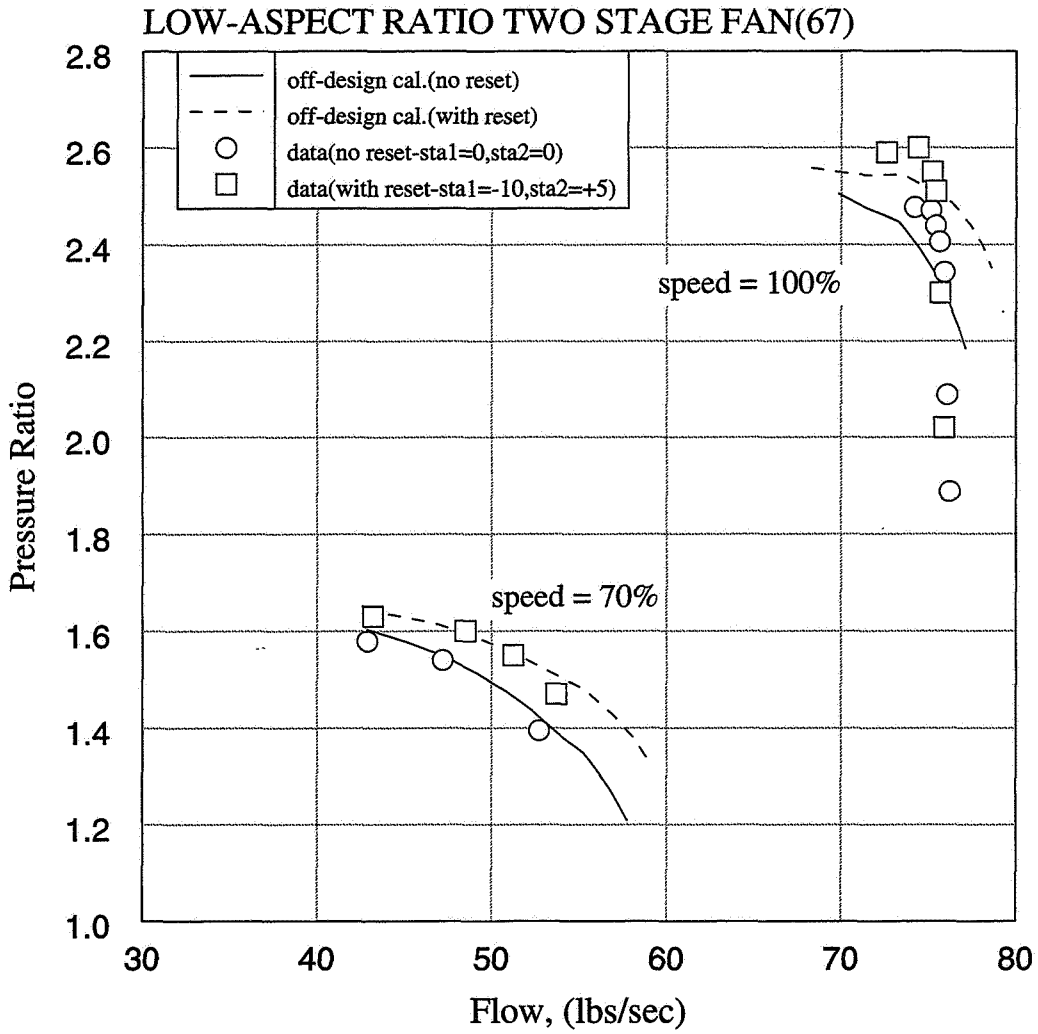



Figure 2 - Comparison of the off-design code performance predictions with experimental data for a low-aspect-ratio two-stage fan with and without stator reset.

## 8.0 ACKNOWLEDGEMENT

The original version of this off-design code was developed by James Crouse while he was an employee of NASA. Even after he left NASA James Crouse has provided several corrections and additions as well as many suggestions to improve this code and his valuable help is greatly appreciated.

## 9.0 REFERENCES


1. Johnson, I.A., and Bullock, R.O. eds., "Aerodynamic Design of Axial-Flow Compressors", NASA SP-36, 1965.

2. Crouse, J.E., "Computer Program for Aerodynamic and Blading Design of Multi- Stage Axial-Flow Compressors", NASA TP-1946, 1981.

3. Urasek, D.C., Gorrell, W.T., and Cunnam, W.S., "Performance of Two-Stage Fan Having Low-Aspect Ratio, First-Stage Rotor Blading", NASA TP-1493, 1979.

# APPENDIX A

## Symbols

| | |
|---|---|
| $A$ | annulus area, $ft^2$ |
| $c$ | blade chord, in. |
| $C_p(T)$ | specific heat function for constant pressure, ft/sec$^2$ $^\circ R$ |
| $C_m$ | empirical correlation for the deviation angle coefficient |
| $D$ | blade element diffusion factor |
| $I$ | integer station index |
| $i$ | incidence angle, deg. |
| $J$ | integer streamline index |
| $K$ | ineger loss set index |
| $k$ | curvature in curvilinear co-ordinate system |
| $L$ | distance along chord line, in. |
| $M$ | Mach number |
| $m$ | streamline direction in meridional plane, in. |
| $p$ | static pressure, lb/ft$^2$ |
| $PO$ | stagnation pressure, lb/ft$^2$; input values; lb/in$^2$ |
| $\mathcal{R}$ | gas constant for air, ft-lb/slug °R |
| $r$ | radius from axis of rotation, in. |
| $S$ | blade element path distance, in. |
| $TO$ | stagnation temperature, °R |
| $t$ | static temperature, °R; also, blade element thickness, in. |
| $U$ | local blade velocity, ft/sec. |
| $V$ | velocity, ft/sec. |
| $W$ | weight flow, ft/sec. |
| $z$ | axial distance, in. |
| $\alpha$ | angle of streamline with reference to axial direction, deg. |
| $\beta$ | flow angle relative to meridional direction, deg. |
| $\gamma$ | blade setting angle, deg. |
| $\delta$ | deviation angle, deg. |
| $\theta$ | circumferential direction, rad |
| $\phi$ | ratio of front to total camber |
| $\kappa$ | blade angle relative to local conic co-ordinate ray, deg. |
| $\rho$ | local density, slugs/ft$^3$ |
| $\sigma$ | local blade solidity, ratio of chord to circumferential spacing |
| $\overline{\omega}$ | total loss coefficient |
| $\overline{\omega}_s$ | shock loss coefficient |
| $\overline{\omega}_p$ | profile loss coefficient |

Subscripts:

| | |
|---|---|
| $I$ | calculation station index |
| $i$ | ideal value, as by an isentropic process |
| $le$ | leading edge |
| $m$ | streamline dirction in meridional plane; also, maximum blade thickness |
| $o$ | initial value |
| $t$ | transition point |
| $te$ | trailing edge |
| $\theta$ | circumferential direction |
| 1 | blade row inlet |
| 2 | blade row outlet |

Superscripts:

| | |
|---|---|
| $(\ )'$ | relative to rotor |

## APPENDIX B

### Input Parameters for the Off-Design Compressor Code

The input variables for the off-design compressor code and various options are described in this Appendix. The calculation station and blade row data sets are input in the order in which they occur in the compressor. The format for the input data is given in the following block diagrams.

```
         1         2         3         4         5         6         7         8
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0
                                  T I T L E ( I ) , I = 1 , 1 8
```

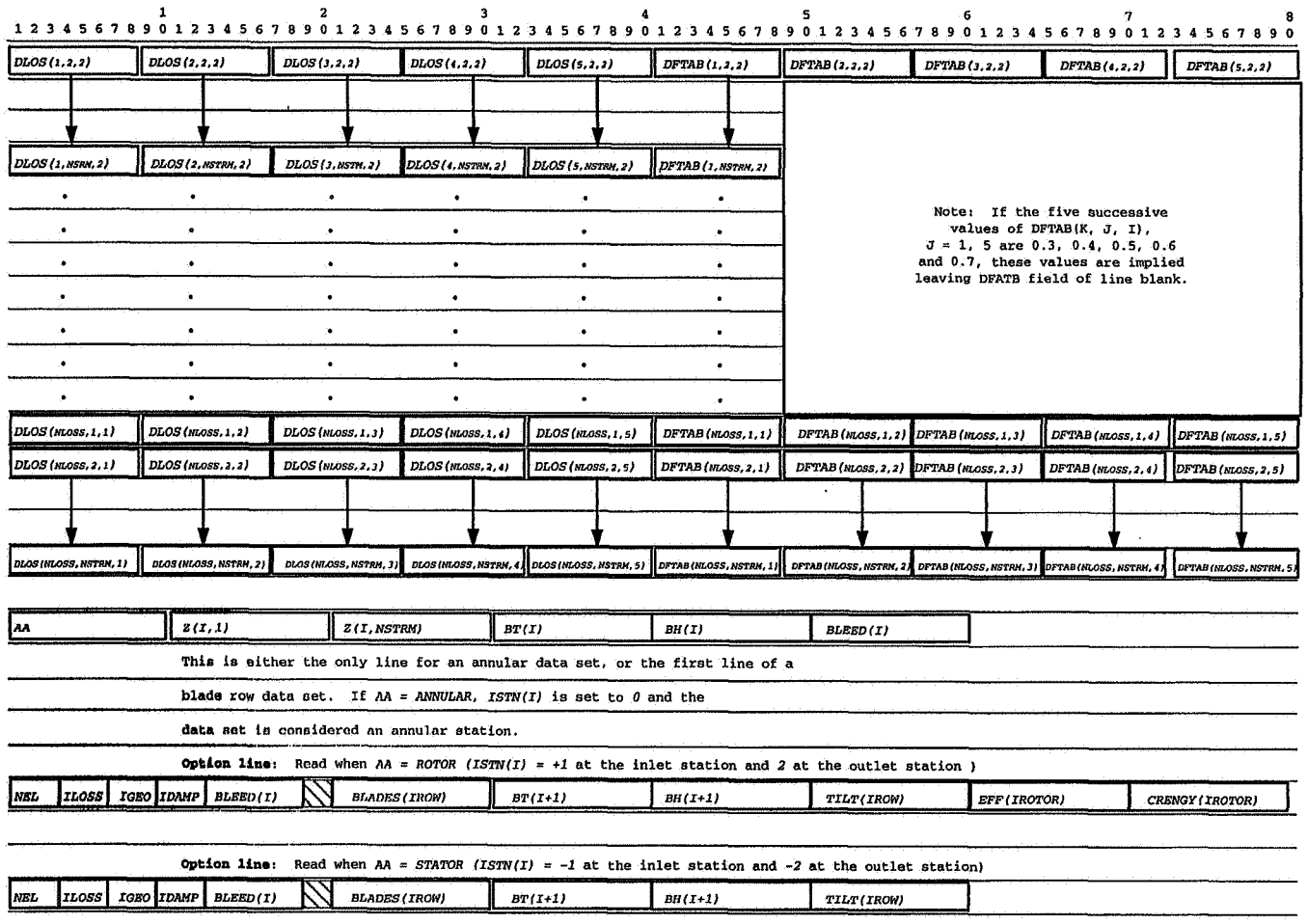
| | | | | |
|---|---|---|---|---|
| NSPEED | RANGE-CHOKE | STEP-CHOKE | RANGE-STALL | STEP-STALL |
| SPEED(1) | SPEED(2) | SPEED(3) | → | SPEED(NSPEED) |
| RESET-IGV(1) | RESET-IGV(2) | RESET-IGV(3) | → | RESET-IGV(NSPEED) |
| RESET-STA1(1) | RESET-STA1(2) | RESET-STA1(3) | → | RESET-STA1(NSPEED) |
| RESET-STA2(1) | RESET-STA2(2) | RESET-STA2(3) | → | RESET-STA2(NSPEED) |
| RESET-STA3(1) | RESET-STA3(2) | RESET-STA3(3) | → | RESET-STA3(NSPEED) |
| RESET-STA4(1) | RESET-STA4(2) | RESET-STA4(3) | → | RESET-STA4(NSPEED) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| N S T R M | NBROWS | N A | N L O S S | N T I P | N H U B | R O T | F L O W ( 1 ) | P R | M O L E |
| C P C O ( 1 ) | | | | C P C O ( 2 ) | | | C P C O ( 3 ) | | |
| C P C O ( 4 ) | | | | C P C O ( 5 ) | | | C P C O ( 6 ) | | |

| | | | | |
|---|---|---|---|---|
| F L O F R A ( 1 ) | F L O F R A ( 2 ) | F L O F R A ( 3 ) | → | FLOFRA(NTUBES) |
| T O ( 1 , 1 ) | T O ( 1 , 2 ) | T O ( 1 , 3 ) | → | TO(1,NSTRM) |
| P O ( 1 , 1 ) | P O ( 1 , 2 ) | P O ( 1 , 3 ) | → | PO(1,NSTRM) |
| V T H ( 1 , 1 ) | V T H ( 1 , 2 ) | V T H ( 1 , 3 ) | → | VTH(1,NSTRM) |
| X T I P ( 1 ) | X T I P ( 2 ) | X T I P ( 3 ) | → | XTIP(NTIP) |
| R T I P ( 1 ) | R T I P ( 2 ) | R T I P ( 3 ) | → | RTIP(NTIP) |
| X H U B ( 1 ) | X H U B ( 2 ) | X H U B ( 3 ) | → | RHUB(NHUB) |
| R H U B ( 1 ) | R H U B ( 2 ) | R H U B ( 3 ) | → | RHUB(NHUB) |

Use as many lines as necessary for each variable. Start each new vairalbe on a new line.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DLOS(1,1,1) | DLOS(2,1,1) | DLOS(3,1,1) | DLOS(4,1,1) | DLOS(5,1,1) | DFTAB(1,1,1) | DFTAB(2,1,1) | DFTAB(3,1,1) | DFTAB(4,1,1) | DFTAB(5,1,1) |
| DLOS(1,2,1) | DLOS(2,2,1) | DLOS(3,2,1) | DLOS(4,2,1) | DLOS(5,2,1) | DFTAB(1,2,1) | DFTAB(2,2,1) | DFTAB(3,2,1) | DFTAB(4,2,1) | DFTAB(5,2,1) |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| DLOS(1,NSTRM,1) | DLOS(2,NSTRM,1) | DLOS(3,NSTRM,1) | DLOS(4,NSTRM,1) | DLOS(5,NSTRM,1) | DFTAB(1,NSTRM,1) | DFTAB(2,NSTRM,1) | DFTAB(3,NSTRM,1) | DFTAB(4,NSTRM,1) | DFTAB(5,NSTRM,1) |
| DLOS(1,1,2) | DLOS(2,1,2) | DLOS(3,1,2) | DLOS(4,1,2) | DLOS(5,1,2) | DFTAB(1,1,2) | DFTAB(2,1,2) | DFTAB(3,1,2) | DFTAB(4,1,2) | DFTAB(5,1,2) |




| AA | Z(I,1) | Z(I,NSTRM) | BT(I) | BH(I) | BLEED(I) |
|---|---|---|---|---|---|

This is either the only line for an annular data set, or the first line of a blade row data set. If *AA = ANNULAR*, *ISTN(I)* is set to *0* and the data set is considered an annular station.

**Option line:** Read when *AA = ROTOR* (*ISTN(I) = +1* at the inlet station and *2* at the outlet station )

| NEL | ILOSS | IGEO | IDAMP | BLEED(I) | | BLADES(IROW) | BT(I+1) | BH(I+1) | TILT(IROW) | EFF(IROTOR) | CRENGY(IROTOR) |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Option line:** Read when *AA = STATOR* (*ISTN(I) = -1* at the inlet station and *-2* at the outlet station)

| NEL | ILOSS | IGEO | IDAMP | BLEED(I) | | BLADES(IROW) | BT(I+1) | BH(I+1) | TILT(IROW) |
|---|---|---|---|---|---|---|---|---|---|

1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0

**Option line:** Read when *IDAMP > 0* (blade row damper geometry)

| | | | | | |
|---|---|---|---|---|---|
| *RDAMP(IROW)* | *ADAMP(IROW)* | *CDAMP(IROW)* | *TDAMP(IROW)* | *RDLE(IROW)* | *RDTE(IROW)* |

Basic blade row geometry . . . All the following blade row geometry input is

automatically obtained using an option in the compressor design code (NASA TP-1946).

| | | | | | | |
|---|---|---|---|---|---|---|
| *THLE(1)* | *THTE(1)* | *THMAX(1)* | *ZM(1)* | *T(1)* | *P(1)* | |
| *KIC(1)* | *KOC(1)* | *CHORD(1)* | *ALP(1)* | *RSP(IROW,1)* | *ZS(1)* | *TS(1)* |
| *THLE(2)* | *THTE(2)* | *THMAX(2)* | *ZM(2)* | *T(2)* | *P(2)* | |
| *KIC(2)* | *KOC(2)* | *CHORD(2)* | *ALP(2)* | *RSP(IROW,2)* | *ZS(2)* | *TS(2)* |
| *THLE(NEL)* | *THTE(NEL)* | *THMAX(NEL)* | *ZM(NEL)* | *T(NEL)* | *P(NEL)* | |
| *KIC(NEL)* | *KOC(NEL)* | *CHORD(NEL)* | *ALP(NEL)* | *RSP(IROW,NEL)* | *ZS(NEL)* | *TS(NEL)* |

**Option:** When *IGEO > 0* (additional blading geometry

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *ACF(IROW,1)* | *BCF(IROW,1)* | *CCF(IROW,1)* | *DCF(IROW,1)* | *ACR(IROW,1)* | *BCR(IROW,1)* | *CCR(IROW,1)* | *DCR(IROW,1)* |
| *ATF(IROW,1)* | *BTF(IROW,1)* | *CTF(IROW,1)* | *DTF(IROW,1)* | *ATR(IROW,1)* | *BTR(IROW,1)* | *CTR(IROW,1)* | *DTR(IROW,1)* |
| *ELE(IROW,1)* | *ETE(IROW,1)* | | | | | | |
| *ACF(IROW,2)* | *BCR(IROW,2)* | *CCF(IROW,2)* | *DCF(IROW,2)* | *ACR(IROW,2)* | *BCR(IROW,2)* | *CCR(IROW,2)* | *DCR(IROW,2)* |
| *ATF(IROW,2)* | *BTF(IROW,2)* | *CTF(IROW,2)* | *DTF(IROW,2)* | *ATF(IROW,2)* | *BTR(IROW,2)* | *CTR(IROW,2)* | *DTR(IROW,2)* |
| *ELE(IROW,2)* | *ETE(IROW,2)* | | | | | | |
| *ACF(IROW,NEL)* | *BCF(IROW,NEL)* | *CCF(IROW,NEL)* | *DCF(IROW,NEL)* | *ACR(IROW,NEL)* | *BCR(IROW,NEL)* | *CCR(IROW,NEL)* | *DCR(IROW,NEL)* |
| *ATF(IROW,NEL)* | *BTF(IROW,NEL)* | *CTF(IROW,NEL)* | *DTF(IROW,NEL)* | *ATR(IROW,NEL)* | *BTR(IROW,NEL)* | *CTR(IROW,NEL)* | *DTR(IROW,NEL)* |
| *ELE(IROW,NEL)* | *ETE(IROW,NEL)* | | | | | | |

## DESCRIPTION OF THE INPUT PARAMETERS

| Parameter | Description | Format |
|---|---|---|
| AA | Type of calculating station or blade row (ANNULAR, ROTOR or STATOR). The default is ANNULAR. | A4 |
| ACF(J) | The linear coefficient for the blade element centerline angle equation for the front segment, $\kappa = \kappa_t + \mathrm{ACF} \times \mathrm{S} + \mathrm{BCF} \times \mathrm{S}^2 + \mathrm{CCF} \times \mathrm{S}^3 + \mathrm{DCF} \times \mathrm{S}^4$ (Note: See IGEO for the definition of S) | F10.4 |
| ACR(J) | The linear coefficient for the blade element centerline angle equation for the rear segment, $\kappa = \kappa_t + \mathrm{ACR} \times \mathrm{S} + \mathrm{BCR} \times \mathrm{S}^2 + \mathrm{CCR} \times \mathrm{S}^3 + \mathrm{DCR} \times \mathrm{S}^4$ | F10.4 |
| ADAMP | Slope angle of the damper centerline in the meridional view (deg.) | F10.4 |
| ALP(J) | Slope angle of the blade element in the meridional view (deg.) | F10.4 |
| ATF(J) | The first coefficient of the blade element thickness equation forward of the maximum thickness point, $\frac{t}{2c} = \frac{t_m}{2c} - \mathrm{ATF}\left(\sqrt{S_o - S} - \sqrt{S_o} + \frac{S}{2\sqrt{S_o}}\right) - \mathrm{BTF} \times \mathrm{S}^2 - \mathrm{CTF} \times \mathrm{S}^3 - \mathrm{DTF} \times \mathrm{S}^4$ | F10.4 |
| ATR(J) | The first coefficient of the blade element thickness equation rearward of the maximum thickness point, $\frac{t}{2c} = \frac{t_m}{2c} - \mathrm{ATR}\left(\sqrt{S_o - S} - \sqrt{S_o} + \frac{S}{2\sqrt{S_o}}\right) - \mathrm{BTR} \times \mathrm{S}^2 - \mathrm{CTR} \times \mathrm{S}^3 - \mathrm{DTR} \times \mathrm{S}^4$ | F10.4 |
| BCF(J) | The quadratic coefficient for the blade element centerline angle equation for the front segment, $\kappa = \kappa_t + \mathrm{ACF} \times \mathrm{S} + \mathrm{BCF} \times \mathrm{S}^2 + \mathrm{CCF} \times \mathrm{S}^3 + \mathrm{DCF} \times \mathrm{S}^4$ | F10.4 |

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| BCR(J) | The quadratic coefficient for the blade element centerline angle equation for the rear segment, $\kappa = \kappa_t + \mathrm{ACR} \times \mathrm{S} + \mathrm{BCR} \times \mathrm{S}^2 + \mathrm{CCR} \times \mathrm{S}^3 + \mathrm{DCR} \times \mathrm{S}^4$ | F10.4 |
| BH(I) | Boundary layer displacement from the hub (in.). | F10.4 |
| BLADES | The number of blades in each rotor or stator blade row. | F10.4 |
| BT(I) | Boundary layer displacement from the casing (in.). | F10.4 |
| BTF(J) | Quadratic coefficient of the blade element thickness equation forward of the maximum thickness point, $\frac{t}{2c} = \frac{t_m}{2c} - \mathrm{ATF}\left(\sqrt{S_o - S} - \sqrt{S_o} + \frac{S}{2\sqrt{S_o}}\right) - \mathrm{BTF} \times \mathrm{S}^2 - \mathrm{CTF} \times \mathrm{S}^3 - \mathrm{DTF} \times \mathrm{S}^4$ | F10.4 |
| BTR(J) | Quadratic coefficient of the blade element thickness equation rearward of the maximum thickness point, $\frac{t}{2c} = \frac{t_m}{2c} - \mathrm{ATR}\left(\sqrt{S_o - S} - \sqrt{S_o} + \frac{S}{2\sqrt{S_o}}\right) - \mathrm{BTR} \times \mathrm{S}^2 - \mathrm{CTR} \times \mathrm{S}^3 - \mathrm{DTR} \times \mathrm{S}^4$ | F10.4 |
| CCF(J) | The cubic coefficient for the blade element centerline angle equation for the front segment, $\kappa = \kappa_t + \mathrm{ACF} \times \mathrm{S} + \mathrm{BCF} \times \mathrm{S}^2 + \mathrm{CCF} \times \mathrm{S}^3 + \mathrm{DCF} \times \mathrm{S}^4$ | F10.4 |
| CCR(J) | The cubic coefficient for the blade element centerline angle equation for the rear segment, $\kappa = \kappa_t + \mathrm{ACR} \times \mathrm{S} + \mathrm{BCR} \times \mathrm{S}^2 + \mathrm{CCR} \times \mathrm{S}^3 + \mathrm{DCR} \times \mathrm{S}^4$ | F10.4 |
| CHORD(J) | Chord length of a blade element (in.). | F10.4 |

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| CDAMP | Chord length of a mid-span shroud in the meridional plane (in.). | F10.4 |
| CPCO(I2)<br>For I2 = 1,6 | Constants for the specific heat polynomial function of temperature,<br>$C_p = CPCO(1) + CPCO(2) \times T + CPCO(3) \times T^2 +$<br>$CPCO(4) \times T^3 + CPCO(5) \times T^4 + CPCO(6) \times T^5$ | E20.8 |
| CRENGY | An estimate of the cumulative energy addition fraction through a particular rotor to the total energy addition of the compressor. Thus, the fractions are progressively larger positive numbers through successive rotors. For the last rotor, CRENGY should be 1.0. | F10.4 |
| CTF(J) | The cubic coefficient of the blade element thickness equation forward of the maximum thickness point,<br>$\frac{t}{2c} = \frac{t_m}{2c} - \mathrm{ATF}\left(\sqrt{S_o - S} - \sqrt{S_o} + \frac{S}{2\sqrt{S_o}}\right) - \mathrm{BTF} \times \mathrm{S}^2 - \mathrm{CTF} \times \mathrm{S}^3 - \mathrm{DTF} \times \mathrm{S}^4$ | F10.4 |
| CTR(J) | The cubic coefficient of the blade element thickness equation rearward of the maximum thickness point,<br>$\frac{t}{2c} = \frac{t_m}{2c} - \mathrm{ATR}\left(\sqrt{S_o - S} - \sqrt{S_o} + \frac{S}{2\sqrt{S_o}}\right) - \mathrm{BTR} \times \mathrm{S}^2 - \mathrm{CTR} \times \mathrm{S}^3 - \mathrm{DTR} \times \mathrm{S}^4$ | F10.4 |
| DCF(J) | The quartic coefficient for the blade element centerline angle equation for the front segment,<br>$\kappa = \kappa_t + \mathrm{ACF} \times \mathrm{S} + \mathrm{BCF} \times \mathrm{S}^2 + \mathrm{CCF} \times \mathrm{S}^3 + \mathrm{DCF} \times \mathrm{S}^4$ | F10.4 |
| DCR(J) | The quartic coefficient for the blade element centerline angle equation for the rear segment,<br>$\kappa = \kappa_t + \mathrm{ACR} \times \mathrm{S} + \mathrm{BCR} \times \mathrm{S}^2 + \mathrm{CCR} \times \mathrm{S}^3 + \mathrm{DCR} \times \mathrm{S}^4$ | F10.4 |

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| DFTAB(K,J,I) | The blade element diffusion factor (D-factor from which profile losses are tabulated. Five values are input for each streamline; that is, K always has from 1 to 5, J is the streamline index, and I is the loss set index. The maximum number of loss sets is 9. Since D-factor values normally fall between 0.3 and 0.7, values of 0.3, 0.4, 0.5, 0.6, and 0.7 for DFTAB on a streamline can be implied by leaving the DFTAB values blank. Note that you cannot set DFTAB(1,K,I) to exactly 0.0 when you do not intend to use the implied values of DFTAB. | F8.4 |
| DLOS(K,J,I) | Profile loss parameter $\overline{\omega}_p \cos \frac{\beta_2'}{2\sigma}$, associated with the DFTAB reference arrays. | F8.4 |
| DTF(J) | The quartic coefficient of the blade element thickness equation forward of the maximum thickness point, $\frac{t}{2c} = \frac{t_m}{2c} - \mathrm{ATF}\left(\sqrt{S_o - S} - \sqrt{S_o} + \frac{S}{2\sqrt{S_o}}\right) - \mathrm{BTF} \times S^2 - \mathrm{CTF} \times S^3 - \mathrm{DTF} \times S^4$ | F10.4 |
| DTR(J) | The quartic coefficient of the blade element thickness equation rearward of the maximum thickness point, $\frac{t}{2c} = \frac{t_m}{2c} - \mathrm{ATR}\left(\sqrt{S_o - S} - \sqrt{S_o} + \frac{S}{2\sqrt{S_o}}\right) - \mathrm{BTR} \times S^2 - \mathrm{CTR} \times S^3 - \mathrm{DTR} \times S^4$ | F10.4 |
| EFF | The estimated stage adiabatic efficiency for the first iteration. | F10.4 |
| ELE(J) | Coefficients for the leading edge ellipse ratio of semimajor to semiminor axes minus 1.0, $e = \frac{b}{a} - 1.0 = \mathrm{ELE}$ | F10.4 |
| ETE(J) | Coefficients for the trailing edge ellipse ratio of semimajor to semiminor axes minus 1.0, $e = \frac{b}{a} - 1.0 = \mathrm{ETE}$ | F10.4 |

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| FLOFRA(J) | The cumulative weight-flow split between streamlines starting from the tip. NTUBES, which is NSTRM - 1, values are read. Thus, the first value is greater than zero; and succeeding values must increase to 1.0 to make the accumulation target a given overall flow rate. | F10.4 |
| FLOW | The initial reference flow rate (lb/sec). | F10.4 |
| BLEED(I) | Bleed flow as fraction of flow at calculating stations; i.e., a simulation casing bleed to get a high pressure ratio compressor through the part speed area mismatch. | F8.4 |
| I | Calculation station index. (Maximum of 100). | I3 |
| J | Streamline index. (Maximum of 11). | I2 |
| IDAMP | Option parameter for a part span shroud. If IDAMP > 0, a read of damper geometry information on the next line is activated. | I5 |
| IGEO | A blade definition index. When IGEO is 0, the blade segment centerline and surfaces are defined by $d\kappa/dS$ = Constant. When IGEO is not 0, the segment centerline and surfaces are defined with 4th degree functions of path distance(s) from the transition point and maximum thickness points respectively. The specification of the coefficients for these functions is extra input.<br><br>If IGEO is positive, the coefficients for the definition polynomials are interpreted to be functions of segment length normalized to 1.0; but if IGEO is negative, the coefficients are interpreted to be functions of segment length normalized by chord. | I5 |

| Parameter | Description | Format |
|---|---|---|

The reference point for the centerline polynomials can be either the transition point or the segment ends. The IGEO options are given by the following table:

Table of the IGEO Options

| IGEO | Centerline | | Thickness | | Centerline | | Thickness | |
|---|---|---|---|---|---|---|---|---|
| | $S_1$ | $S_2$ | $S_{m,1}$ | $S_{m,2}$ | $S_1$ | $S_2$ | $S_{m,1}$ | $S_{m,2}$ |
| | Origin | | | | Range (all positive $S$) | | | |
| -4 | Leading edge | Trailing edge | Maximum thickness | Maximum thickness | 0 to $\frac{S_1}{c}$ | 0 to $\frac{S_2}{c}$ | 0 to $\frac{S_{m,1}}{c}$ | 0 to $\frac{S_{m,2}}{c}$ |
| -3 | Transition point | Trailing edge | | | | | | |
| -2 | Leading edge | Transition point | | | | | | |
| -1 or < -4 | Transition point | Transition point | | | | | | |
| 1 or > 4 | Transition point | Transition point | Maximum thickness | Maximum thickness | 0 to 1.0 | 0 to 1.0 | 0 to 1.0 | 0 to 1.0 |
| 2 | Leading edge | Transition point | | | | | | |
| 3 | Transition point | Trailing edge | | | | | | |
| 4 | Leading edge | Trailing edge | | | | | | |

ILOSS Indicator designation of which profile loss set [I variable in DLOS(K,J,I)] to use with a particular blade row. I5

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| IROTOR | Rotor index. | |
| IROW | Blade row index. | |
| ITER | Iteration counter. | |
| ISTN(I) | Integer designation of calculating station type:<br>1 - Rotor inlet<br>2 - Rotor outlet<br>-1 - Stator inlet<br>-2 - Stator outlet<br>0 - ANNULAR | |
| KIC(J) | Local blade element inlet angle at the centerline (deg.). | F10.4 |
| KOC(J) | Local blade element outlet angle at the centerline (deg.). | F10.4 |
| MOLE | Molecular weight of the gas (28.97 for dry air). | F10.4 |
| NA | Number of annular stations at which radial velocity profiles are constructed during computation. | I5 |
| NEL | Number of blade definition elements in a blade row, usually 11. | I5 |
| NHUB | Number of input points to describe the hub geometric boundary (Maximum of 100). | I5 |
| NLOSS | Number of loss sets (Maximum of 9). | I5 |

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| NBROWS | Number of blade rows (Maximum of 40). | I5 |
| NSTRM | Number of streamlines (Maximum of 11). | I5 |
| NSPD | Number of speed lines (Maximum of 10). | I5 |
| NTIP | Number of input points to describe the casing geometric boundary (Maximum of 100). | I5 |
| P(J) | Ratio of inlet segment turning rate to outlet turning rate, $[(\frac{d\kappa}{dS})_I]/[(\frac{d\kappa}{dS})_o]$ at the transition point of a blade element. | F10.4 |
| PO(I,J) | General stagnation pressure array, which is in $Lb/ft^2$ units internal to the program. I is the calculation station index; and J is the streamline index. Only [PO(1,J), J = 1, NSTRM] values are input; i.e., the streamline values for the 1st calculating station. The input values are in $lb/in^2$ | F10.4 |
| PR | The desired overall compressor pressure ratio. | F10.4 |
| RANGE-CHOKE | The normalized calculation curve distance from the design point to the near choke point for each calculated speed line (a value of 0.1 to 0.2 is typical). | F10.4 |
| RANGE-STALL | The normalized calculation curve distance from the design point to the near stall point for each calculated speed line (a value of 0.1 to 0.2 is typical). | F10.4 |
| RDAMP | Radial location of the leading edge of a part-span shroud (in.). | F10.4 |
| RDLE | Leading edge to chord ratio of a part-span shroud. | F10.4 |
| RDTE | Trailing edge to chord ratio of a part-span shroud. | F10.4 |

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| RESET-IGV(IP) | Guide vane reset for each speed (deg.). | |
| RESET-STA1(IP) | Stator 1 reset for each speed (deg.). | |
| RESET-STA2(IP) | Stator 2 reset for each speed (deg.). | |
| RESET-STA3(IP) | Stator 3 reset for each speed (deg.). | |
| RESET-STA4(IP) | Stator 4 reset for each speed (deg.). | |
| RHUB(I) | Radial coordinates (in.) of the set of points used to define the hub geometric boundary (Maximum of 100). | F10.4 |
| ROT | The compressor rotational speed (rpm). | F10.4 |
| RSP(J) | Radial location of blade element intersection with the blade stacking line (in.). | F10.4 |
| RTIP(I) | Radial coordinates (in.) of the set of points used to define the casing geometric boundary (Maximum of 100). | F10.4 |
| SPEED(IP) | Speed line values to be investigated (values are relative to the input rotational speed; i.e., 1.1, 1.0, 0.9, 0.8). (Maximum of 10). | F10.4 |
| STEP-CHOKE | The step increment along the normalized curve distance for the choke side of each calculated speed line. The STEP value is usually about 25% of the RANGE value. | F10.4 |
| STEP-STALL | The step increment along the normalized curve distance for the stall side of each calculated speed line. The STEP value is usually about 25% of the RANGE value. | F10.4 |

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| T(J) | Transition point location between the two segments of a blade element as a fraction of chord. | F10.4 |
| TDAMP | Maximum thickness to chord ratio of the damper. | F10.4 |
| THLE(J) | Leading edge radius to chord ratio of a blade element. | F10.4 |
| THMAX(J) | A blade element maximum thickness to chord ratio | F10.4 |
| THTE(J) | Trailing edge radius to chord ratio of a blade element. | F10.4 |
| TTILT | Angle of the stacking axis tilt (deg.) in the circumferential direction ($r - \theta$ plane). The angle is positive in the direction of rotor rotation. | F10.4 |
| TITLE(I) | Description of the compressor for printout. | 18A4 |
| TO(I,J) | General stagnation temperature array, which is in Deg. $R$ units internal to the program. I is the calculation station index; and J is the streamline index. Only [TO(1,J), J = 1, NSTRM] values are input, i.e., the streamline values for the 1st calculating station. The input values Deg. $R$ units. | F10.4 |
| TS(J) | Blade element leading edge circle center angular location ($\theta$) relative to blade stacking line (Deg.). The angle is positive in the direction of rotation. | F10.4 |
| VTH(I,J) | General tangential component of velocity array in the program. Only the [VTH(1,J), J = 1, NSTRM] values are input; i.e., the streamline values for the 1st calculating station. The input values are in ft/sec. | F10.4 |

DESCRIPTION OF THE INPUT PARAMETERS (con't)

| Parameter | Description | Format |
|---|---|---|
| XHUB(I) | Axial coordinates of the set of points used to define the hub geometric boundary (in.). The data range must at least reach from the furthest upstream annular calculating station to the furthest downstream calculating station. The maximum number of points is 100; and the minimum is 4. | F10.4 |
| XTIP(I) | Axial coordinates of the set of points used to define the casing geometric boundary (in.). The conditions and limitations are the same as those on XHUB. | F10.4 |
| ZHUB(INAB) | The hub axial coordinate (in.). When the data set is a blade rather than an ANNULAR station, ZHUB(INAB) is the axial location of the axial location of the blade stacking line at the hub. | F10.4 |
| ZM(J) | Location of the maximum thickness point as a fraction of blade element chord. | F10.4 |
| ZS(J) | Blade element leading edge circle center axial location relative to that of the blade element intersection with the blade stacking line (in.). | F10.4 |
| ZTIP(INAB) | The casing axial coordinate (in.). When the data set is a blade rather than an ANNU station, ZHUB(INAB) is the axial location of the blade stacking line at the hub. | F10.4 |

**TABLE 1 - EXAMPLE INPUT DATA SET(no stator resets)**

```
low aspect ratio two stage nasa fan-- same as used in design report-offdes
    2      .20000    .02900   0.05000  0.02000
  1.0000   0.9000
  0.0000   0.0000
  0.0000   0.0000
  0.0000   0.0000
  0.0000   0.0000
  0.0000   0.0000
   11    4   17    2   25   33  16042.80  73.30000   2.40000  28.96175
       .23762070e+00    '   .39556990e-04      -.28462990e-06
       .81650840e-09      -.81993710e-12       .28442580e-15
    .10000    .20000    .30000    .40000    .50000    .60000    .70000    .80000
    .90000   1.00000
   518.700   518.700   518.700   518.700   518.700   518.700   518.700   518.700
   518.700   518.700   518.700
    14.125    14.670    14.700    14.700    14.700    14.700    14.700    14.700
    14.700    14.700    14.660
    .00000    .00000    .00000    .00000    .00000    .00000    .00000    .00000
    .00000    .00000    .00000
 -14.00000  -7.00000  -3.00000  -1.10000   -.20000    .52700   1.10000   2.70000
   4.00000   5.61000   7.20000   7.80000   8.40000   9.15000   9.90000  10.60000
  11.60000  13.00000  15.30000  16.45900  17.00000  18.00000  18.68300  20.00000
  22.00000
  10.10000  10.10000  10.10000  10.10000  10.08000   9.98000   9.87000   9.65080
   9.60000   9.60000   9.60000   9.60000   9.54000   9.44000   9.36000   9.32800
   9.30000   9.30000   9.30000   9.30000   9.31900   9.45300   9.62300  10.14900
  11.60500
 -14.00000 -13.10000 -12.20000 -11.30000  -9.90000  -7.80000  -5.70000  -4.80000
  -3.59000  -2.00000  -1.25000    .00000   1.00000   2.50000   3.70000   5.30000
   6.10000   6.90000   7.60000   8.70000   9.30000   9.90000  10.70000  11.30000
  12.50000  13.70000  14.90000  16.00000  17.00000  18.00000  18.68300  20.00000
  22.00000
   3.75000   3.75000   3.75000   3.72500   3.67500   3.60000   3.52500   3.50000
   3.52000   3.58000   3.69000   4.00000   4.32000   4.63000   4.80000   4.94000
   5.02000   5.09000   5.16000   5.33000   5.45000   5.60000   5.72000   5.80000
   5.86000   5.92000   5.96000   6.00000   6.08000   6.25300   6.43000   6.91700
   8.09300
   .0139    .0166    .0203    .0260    .0338    .3000    .4000    .5000    .6000    .7000
   .0112    .0130    .0160    .0202    .0263    .3000    .4000    .5000    .6000    .7000
   .0100    .0113    .0132    .0163    .0210    .3000    .4000    .5000    .6000    .7000
   .0080    .0089    .0103    .0130    .0165    .3000    .4000    .5000    .6000    .7000
   .0080    .0089    .0103    .0130    .0165    .3000    .4000    .5000    .6000    .7000
   .0080    .0089    .0103    .0130    .0165    .3000    .4000    .5000    .6000    .7000
   .0080    .0089    .0103    .0130    .0165    .3000    .4000    .5000    .6000    .7000
   .0080    .0089    .0103    .0130    .0165    .3000    .4000    .5000    .6000    .7000
   .0090    .0103    .0122    .0153    .0200    .3000    .4000    .5000    .6000    .7000
   .0092    .0110    .0140    .0182    .0243    .3000    .4000    .5000    .6000    .7000
   .0104    .0127    .0168    .0221    .0296    .3000    .4000    .5000    .6000    .7000
   .0309    .0336    .0373    .0430    .0508    .3000    .4000    .5000    .6000    .7000
   .0272    .0290    .0320    .0362    .0423    .3000    .4000    .5000    .6000    .7000
   .0250    .0263    .0282    .0313    .0360    .3000    .4000    .5000    .6000    .7000
   .0230    .0239    .0253    .0280    .0310    .3000    .4000    .5000    .6000    .7000
   .0211    .0220    .0234    .0261    .0296    .3000    .4000    .5000    .6000    .7000
   .0212    .0222    .0236    .0264    .0299    .3000    .4000    .5000    .6000    .7000
   .0214    .0226    .0241    .0269    .0306    .3000    .4000    .5000    .6000    .7000
   .0218    .0231    .0248    .0278    .0317    .3000    .4000    .5000    .6000    .7000
   .0233    .0248    .0270    .0303    .0347    .3000    .4000    .5000    .6000    .7000
   .0272    .0290    .0320    .0362    .0423    .3000    .4000    .5000    .6000    .7000
   .0294    .0317    .0358    .0441    .0486    .3000    .4000    .5000    .6000    .7000
annular   -11.00000 -11.00000    .00000    .00000   0.0000
annular    -9.00000  -9.00000    .00439    .01217   0.0000
annular    -7.00000  -7.00000    .00884    .02492   0.0000
annular    -5.20000  -5.20000    .01333    .03817   0.0000
annular    -3.70000  -3.70000    .02221    .06316   0.0000
annular    -2.30000  -2.60000    .02889    .08182   0.0000
```

**TABLE 1 - EXAMPLE INPUT DATA SET(no stator resets)**

```
annular      -1.00000  -1.50000    .03540    .09903   0.0000
rotor         .94100    .94100    .04571    .12259   0.0000
 11  1  1  0  0.000    22.0        .0524     .1026   0.0000     .8569     .5000
   .001800   .001801   .029008   .640000   .700000   .075000
 67.263710 53.819990 3.664327-10.148210 9.855471   .742835-10.112840
   .001854   .001868   .029998   .630000   .647400   .180000
 63.414730 52.954860 3.670819 -7.508253 9.419851   .877825-10.289330
   .001984   .002026   .032414   .620000   .604200   .430000
 61.345810 52.732890 3.668617 -5.697886 8.993848   .943206-10.565180
   .002187   .002267   .036168   .610000   .562700   .660000
 59.472620 50.578800 3.666607 -3.908523 8.553914  1.004472-10.879460
   .002459   .002582   .041154   .600000   .519300   .790000
 57.361910 47.352410 3.665117 -2.152351 8.094000  1.077046-11.211970
   .002793   .002957   .047256   .580000   .470500   .830000
 55.066130 42.201420 3.664356  -.383670 7.608888  1.158294-11.490080
   .003185   .003377   .054318   .560000   .418000   .860000
 52.454880 36.314500 3.664808  1.442794 7.090268  1.250203-11.752500
   .003623   .003818   .062085   .540000   .359200   .960000
 49.456170 27.960340 3.667629  3.459608 6.528422  1.362129-11.896410
   .004085   .004243   .070067   .500000   .286200   .980000
 45.821740 17.331430 3.675878  5.871156 5.906867  1.483685-11.707410
   .004525   .004602   .077171   .500000   .224300  1.000000
 41.865530  2.559158 3.697754  8.993676 5.197867  1.644855-11.116670
   .004797   .004796   .080222   .500000   .162900  1.000000
 36.960720-16.395800 3.761671 13.852820 4.331938  1.802996 -9.081044
   .350682   .691483   .000000  -.691483  -.696423   .000000  -.691483   .000000
   .000000   .027085   .000000   .000000   .000076   .000000   .271992   .000000
   .992906   .000000
   .348614   .594778   .000000  -.594778  -.646003   .000000  -.594778   .000000
   .000000   .029343   .000000   .000000   .000852   .000000   .256331   .000000
   .920705   .000000
   .348777   .514857   .000000  -.514857  -.606206   .000000  -.514857   .000000
   .000000   .033250   .000000   .000000   .001702   .000000   .252549   .000000
   .849311   .000000
   .345669   .437443   .000000  -.437443  -.564391   .000000  -.437443   .000000
   .000000   .038936   .000000   .000000   .002757   .000000   .256919   .000000
   .775071   .000000
   .338194   .361985   .000000  -.361985  -.519186   .000000  -.361985   .000000
   .000000   .046518   .000000   .000000   .004110   .000000   .266956   .000000
   .697216   .000000
   .325372   .288689   .000000  -.288689  -.469716   .000000  -.288689   .000000
   .000000   .058034   .000000   .000000   .005776   .000000   .260320   .000000
   .614603   .000000
   .307296   .219088   .000000  -.219088  -.416840   .000000  -.219088   .000000
   .000000   .072581   .000000   .000000   .007863   .000000   .255666   .000000
   .525593   .000000
   .282069   .153511   .000000  -.153511  -.358824   .000000  -.153511   .000000
   .000000   .090267   .000000   .000000   .010427   .000000   .250194   .000000
   .427815   .000000
   .247833   .093499   .000000  -.093499  -.294583   .000000  -.093499   .000000
   .000000   .119800   .000000   .000000   .013199   .000000   .213884   .000000
   .317394   .000000
   .206065   .042507   .000000  -.042507  -.227319   .000000  -.042507   .000000
   .000000   .131741   .000000   .000000   .016899   .000000   .225236   .000000
   .186993   .000000
   .151836   .002953   .000000  -.002953  -.153313   .000000  -.002953   .000000
   .000000   .134921   .000000   .000000   .020384   .000000   .215452   .000000
   .019264   .000000
annular      3.00000   3.30000    .05534    .10998   0.0000
stator       5.20000   5.20000    .06098    .11928   0.0000
 11  2  1  0  0.000    34.0        .0697     .1309   0.0000
   .012897   .012878   .079743   .500000   .400000  1.000000
 36.693180-16.091950 2.270252  -.289535 9.532545  1.053663  2.319497
   .012291   .012281   .078228   .500000   .400000  1.000000
 33.496100-12.257040 2.270269   .237212 9.182470  1.057440  2.291867
```

**TABLE 1 - EXAMPLE INPUT DATA SET(no stator resets)**

```
   .011681   .011666   .076701   .500000   .400000  1.000000
 33.488160-10.482750  2.270352   .566814  8.825970  1.054125  2.455457
   .011047   .011029   .075118   .500000   .400000  1.000000
 33.898910 -9.693403  2.270517   .924599  8.456358  1.051422  2.635809
   .010385   .010367   .073463   .500000   .400000  1.000000
 34.603690 -9.097510  2.270816  1.349323  8.071085  1.047920  2.858991
   .009687   .009675   .071719   .500000   .400000  1.000000
 35.844540 -8.800952  2.271337  1.878423  7.666330  1.042652  3.153324
   .008944   .008943   .069861   .500000   .400000  1.000000
 37.274850 -8.604356  2.272220  2.539784  7.236899  1.036445  3.509247
   .008146   .008162   .067864   .500000   .400000  1.000000
 38.927800 -8.807656  2.273599  3.328634  6.776628  1.029862  3.937878
   .007277   .007317   .065693   .500000   .400000  1.000000
 40.825370 -9.008737  2.275653  4.252992  6.276914  1.021594  4.491714
   .006312   .006374   .063281   .500000   .400000  1.000000
 43.448150-10.287890  2.278276  5.229607  5.720603  1.012673  5.234231
   .005201   .005230   .060502   .500000   .400000  1.000000
 46.876120-14.152360  2.278774  5.458222  5.063943  1.008646  6.219320
   .334333   .000000   .000000   .000000  -.334333   .000000   .000000   .000000
   .000000   .105577   .000000   .000000   .000000   .105650   .000000   .000000
   .000000   .000000
   .309119   .000000   .000000   .000000  -.309119   .000000   .000000   .000000
   .000000   .106627   .000000   .000000   .000000   .106658   .000000   .000000
   .000000   .000000
   .302450   .000000   .000000   .000000  -.302450   .000000   .000000   .000000
   .000000   .106211   .000000   .000000   .000000   .106252   .000000   .000000
   .000000   .000000
   .296337   .000000   .000000   .000000  -.296337   .000000   .000000   .000000
   .000000   .105421   .000000   .000000   .000000   .105468   .000000   .000000
   .000000   .000000
   .290864   .000000   .000000   .000000  -.290864   .000000   .000000   .000000
   .000000   .104481   .000000   .000000   .000000   .104523   .000000   .000000
   .000000   .000000
   .286973   .000000   .000000   .000000  -.286973   .000000   .000000   .000000
   .000000   .103307   .000000   .000000   .000000   .103321   .000000   .000000
   .000000   .000000
   .282111   .000000   .000000   .000000  -.282111   .000000   .000000   .000000
   .000000   .102012   .000000   .000000   .000000   .101972   .000000   .000000
   .000000   .000000
   .275536   .000000   .000000   .000000  -.275536   .000000   .000000   .000000
   .000000   .100507   .000000   .000000   .000000   .100381   .000000   .000000
   .000000   .000000
   .267078   .000000   .000000   .000000  -.267078   .000000   .000000   .000000
   .000000   .098860   .000000   .000000   .000000   .098624   .000000   .000000
   .000000   .000000
   .256524   .000000   .000000   .000000  -.256524   .000000   .000000   .000000
   .000000   .096641   .000000   .000000   .000000   .096274   .000000   .000000
   .000000   .000000
   .240341   .000000   .000000   .000000  -.240341   .000000   .000000   .000000
   .000000   .093245   .000000   .000000   .000000   .092896   .000000   .000000
   .000000   .000000
annular      7.34000   7.34000    .06886    .12756   0.0000
rotor        9.20000   9.20000    .06634    .12314   0.0000
 11  1  0  0  0.000    38.0        .0608     .0995   0.0000     .8526    1.0000
   .006141   .006147   .034033   .500000   .662701   .610000
 62.045680 56.549140  2.025434 -6.611087  9.375244   .484734 -5.280378
   .006818   .006860   .035070   .500000   .635082   .663000
 61.064560 55.480270  2.027373 -5.160486  9.067986   .501454 -5.406044
   .007507   .007589   .037438   .500000   .605315   .767000
 59.944920 53.732040  2.026563 -3.787091  8.754455   .522647 -5.518399
   .008217   .008338   .041001   .500000   .573424   .886000
 58.659890 51.710970  2.025942 -2.438716  8.431924   .546953 -5.630420
   .008953   .009109   .045609   .500000   .539545   .981000
 57.239140 49.220690  2.025542 -1.075742  8.098637   .574187 -5.740963
   .009722   .009910   .051095   .500000   .503937  1.000000
```



ORIGINAL PAGE IS
OF POOR QUALITY

**TABLE 1 - EXAMPLE INPUT DATA SET(no stator resets)**

```
 55.717650 46.031280  2.025443   .303339  7.751405   .604001 -5.849570
   .010534   .010749   .057261   .500000   .466535  1.000000
 54.154580 41.967840  2.025782  1.745823  7.386182   .636846 -5.951947
   .011403   .011631   .063831   .500000   .427253  1.000000
 52.589490 36.760390  2.026887  3.363187  6.998212   .673513 -6.043245
   .012349   .012564   .070378   .500000   .400000  1.000000
 51.127640 30.008670  2.029568  5.318213  6.581101   .714439 -6.121232
   .013414   .013573   .076219   .500000   .400000  1.000000
 50.351580 20.164020  2.035773  7.810988  6.119192   .760650 -6.179757
   .014740   .014763   .079887   .500000   .400000  1.000000
 52.661920  -.227603  2.051764 11.213100  5.558432   .833684 -6.192075
annular     11.01000  11.01000    .05768    .09283   0.0000
stator      12.70000  12.70000    .05645    .08902   0.0000
 11  2  0  0  0.000    42.0        .0556     .0866   0.0000
   .013869   .013869   .079673   .500000   .400000  1.000000
 35.156360-15.591150  1.752965   .218228  9.243720   .815766  1.758464
   .013226   .013227   .078066   .500000   .400000  1.000000
 34.570910-12.796350  1.753006   .412958  8.968904   .812966  1.857296
   .012573   .012572   .076432   .500000   .400000  1.000000
 34.650860-10.899650  1.753047   .584015  8.689082   .809901  1.981077
   .011903   .011900   .074758   .500000   .400000  1.000000
 34.761940 -9.900812  1.753097   .742997  8.402148   .808503  2.090629
   .011214   .011209   .073036   .500000   .400000  1.000000
 35.247040 -9.401468  1.753158   .900391  8.106925   .806894  2.221860
   .010500   .010493   .071251   .500000   .400000  1.000000
 36.187140 -9.202477  1.753240  1.076967  7.800988   .804274  2.390367
   .009754   .009746   .069385   .500000   .400000  1.000000
 37.385810 -9.103498  1.753351  1.279858  7.481543   .800841  2.594133
   .008970   .008961   .067425   .500000   .400000  1.000000
 38.802670 -9.304166  1.753489  1.496732  7.145767   .797099  2.830565
   .008140   .008129   .065350   .500000   .400000  1.000000
 40.461510 -9.603374  1.753636  1.703145  6.790201   .792491  3.117419
   .007245   .007229   .063113   .500000   .400000  1.000000
 43.768870-11.098900  1.753786  1.906015  6.406141   .783899  3.555653
   .006206   .006204   .060514   .500000   .400000  1.000000
 52.207230-15.989800  1.754217  2.433165  5.963572   .760492  4.456488
annular     14.44000  14.44000    .05518    .08551   0.0000
annular     15.70000  16.00000    .05486    .08391   0.0000
annular     17.00000  17.60000    .05383    .07992   0.0000
annular     17.75000  18.60000    .05288    .07654   0.0000
annular     18.50000  19.60000    .05214    .07300   0.0000
annular     19.25000  20.60000    .05113    .06867   0.0000
annular     20.00000  21.50000    .05004    .06492   0.0000
0000000000000000000000000000000000000
```

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

1

*** input data for axial-flow compressor off-design performance prediction program ***

low aspect ratio two stage nasa fan-- same as used in design report-offd

stator reset

| fraction design speed | reset guide vane angle | reset stator 1 angle | reset stator 2 angle | reset stator 3 angle | reset stator 4 angle |
|---|---|---|---|---|---|
| 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 0.90000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |

the comp. design rotational speed is 16042.8 rpm.

the design inlet flow rate is 73.300 (lb/sec).

the compressor design pressure ratio is 2.400 .

the range to be covered to the choke side is 0.200 .

the range to be covered to the stall side is 0.050 .

calcs. will be made on 11 streamlines.

the compressor has 4 blade rows.

the molecular weight is 28.96 .

the choke point interval is 0.029 .

the stall point interval is 0.020 .

calculations will be made at the blade edges and at 17 annular stations.

the fractions of design speed to be investigated are 1.000 0.900

the specific heat polynomial is in the following form

cp = 0.23762E+00 + 0.39557E-04*t + -0.28463E-06*t**2 + 0.81651E-09*t**3 + -0.81994E-12*t**4 + 0.28443E-15*t**5

input distributions by streamline or streamtube

| streamline no. | inlet total temperature (deg. r.) | inlet total pressure (psia) | inlet whirl velocity (ft/sec) | streamtube no. | streamtube flow fraction |
|---|---|---|---|---|---|
| 1 | 518.700 | 14.125 | 0.000 | 1 | 0.1000 |
| 2 | 518.700 | 14.670 | 0.000 | 2 | 0.2000 |
| 3 | 518.700 | 14.700 | 0.000 | 3 | 0.3000 |
| 4 | 518.700 | 14.700 | 0.000 | 4 | 0.4000 |
| 5 | 518.700 | 14.700 | 0.000 | 5 | 0.5000 |
| 6 | 518.700 | 14.700 | 0.000 | 6 | 0.6000 |
| 7 | 518.700 | 14.700 | 0.000 | 7 | 0.7000 |
| 8 | 518.700 | 14.700 | 0.000 | 8 | 0.8000 |
| 9 | 518.700 | 14.700 | 0.000 | 9 | 0.9000 |
| 10 | 518.700 | 14.700 | 0.000 | 10 | 1.0000 |

ORIGINAL PAGE IS OF POOR QUALITY

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

11 518.700 14.660 0.000

1

input data points for tip and hub contours.

| tip axial coordinate (inches) | tip radius (inches) | hub axial coordinate (inches) | hub radius (inches) |
|---|---|---|---|
| -14.000 | 10.100 | -14.000 | 3.750 |
| -7.000 | 10.100 | -13.100 | 3.750 |
| -3.000 | 10.100 | -12.200 | 3.750 |
| -1.100 | 10.100 | -11.300 | 3.725 |
| -0.200 | 10.080 | -9.900 | 3.675 |
| 0.527 | 9.980 | -7.800 | 3.600 |
| 1.100 | 9.870 | -5.700 | 3.525 |
| 2.700 | 9.651 | -4.800 | 3.500 |
| 4.000 | 9.600 | -3.590 | 3.520 |
| 5.610 | 9.600 | -2.000 | 3.580 |
| 7.200 | 9.600 | -1.250 | 3.690 |
| 7.800 | 9.600 | 0.000 | 4.000 |
| 8.400 | 9.540 | 1.000 | 4.320 |
| 9.150 | 9.440 | 2.500 | 4.630 |
| 9.900 | 9.360 | 3.700 | 4.800 |
| 10.600 | 9.328 | 5.300 | 4.940 |
| 11.600 | 9.300 | 6.100 | 5.020 |
| 13.000 | 9.300 | 6.900 | 5.090 |
| 15.300 | 9.300 | 7.600 | 5.160 |
| 16.459 | 9.300 | 8.700 | 5.330 |
| 17.000 | 9.319 | 9.300 | 5.450 |
| 18.000 | 9.453 | 9.900 | 5.600 |
| 18.683 | 9.623 | 10.700 | 5.720 |
| 20.000 | 10.149 | 11.300 | 5.800 |
| 22.000 | 11.605 | 12.500 | 5.860 |
| | | 13.700 | 5.920 |
| | | 14.900 | 5.960 |
| | | 16.000 | 6.000 |
| | | 17.000 | 6.080 |
| | | 18.000 | 6.253 |
| | | 18.683 | 6.430 |
| | | 20.000 | 6.917 |
| | | 22.000 | 8.093 |

1 the input reference profile loss tables --- omega(bar)*cos(beta)/(2.0*sigma)

** profile loss table no. 1 **

| pct. pass. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.3000 | 0.0139 | 0.4000 | 0.0166 | 0.5000 | 0.0203 | 0.6000 | 0.0260 | 0.7000 | 0.0338 |
| 10.00 | 0.3000 | 0.0112 | 0.4000 | 0.0130 | 0.5000 | 0.0160 | 0.6000 | 0.0202 | 0.7000 | 0.0263 |
| 20.00 | 0.3000 | 0.0100 | 0.4000 | 0.0113 | 0.5000 | 0.0132 | 0.6000 | 0.0163 | 0.7000 | 0.0210 |
| 30.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 40.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 50.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 60.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 70.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 80.00 | 0.3000 | 0.0090 | 0.4000 | 0.0103 | 0.5000 | 0.0122 | 0.6000 | 0.0153 | 0.7000 | 0.0200 |
| 90.00 | 0.3000 | 0.0092 | 0.4000 | 0.0110 | 0.5000 | 0.0140 | 0.6000 | 0.0182 | 0.7000 | 0.0243 |
| 100.00 | 0.3000 | 0.0104 | 0.4000 | 0.0127 | 0.5000 | 0.0168 | 0.6000 | 0.0221 | 0.7000 | 0.0296 |

** profile loss table no. 2 **

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| pct. pass. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.3000 | 0.0309 | 0.4000 | 0.0336 | 0.5000 | 0.0373 | 0.6000 | 0.0430 | 0.7000 | 0.0508 |
| 10.00 | 0.3000 | 0.0272 | 0.4000 | 0.0290 | 0.5000 | 0.0320 | 0.6000 | 0.0362 | 0.7000 | 0.0423 |
| 20.00 | 0.3000 | 0.0250 | 0.4000 | 0.0263 | 0.5000 | 0.0282 | 0.6000 | 0.0313 | 0.7000 | 0.0360 |
| 30.00 | 0.3000 | 0.0230 | 0.4000 | 0.0239 | 0.5000 | 0.0253 | 0.6000 | 0.0280 | 0.7000 | 0.0310 |
| 40.00 | 0.3000 | 0.0211 | 0.4000 | 0.0220 | 0.5000 | 0.0234 | 0.6000 | 0.0261 | 0.7000 | 0.0296 |
| 50.00 | 0.3000 | 0.0212 | 0.4000 | 0.0222 | 0.5000 | 0.0236 | 0.6000 | 0.0264 | 0.7000 | 0.0299 |
| 60.00 | 0.3000 | 0.0214 | 0.4000 | 0.0226 | 0.5000 | 0.0241 | 0.6000 | 0.0269 | 0.7000 | 0.0306 |
| 70.00 | 0.3000 | 0.0218 | 0.4000 | 0.0231 | 0.5000 | 0.0248 | 0.6000 | 0.0278 | 0.7000 | 0.0317 |
| 80.00 | 0.3000 | 0.0233 | 0.4000 | 0.0248 | 0.5000 | 0.0270 | 0.6000 | 0.0303 | 0.7000 | 0.0347 |
| 90.00 | 0.3000 | 0.0272 | 0.4000 | 0.0290 | 0.5000 | 0.0320 | 0.6000 | 0.0362 | 0.7000 | 0.0423 |
| 100.00 | 0.3000 | 0.0294 | 0.4000 | 0.0317 | 0.5000 | 0.0358 | 0.6000 | 0.0441 | 0.7000 | 0.0486 |

1

*** input station data ***

** input set no. 1 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -11.0000 | -11.0000 | 0.0000 | 0.0000 |

** input set no. 2 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -9.0000 | -9.0000 | 0.0044 | 0.0122 |

** input set no. 3 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -7.0000 | -7.0000 | 0.0088 | 0.0249 |

** input set no. 4 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -5.2000 | -5.2000 | 0.0133 | 0.0382 |

** input set no. 5 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -3.7000 | -3.7000 | 0.0222 | 0.0632 |

** input set no. 6 is an annular station **

| tip axial location | hub axial location | tip b. layer thick. | hub b. layer thick. |
|---|---|---|---|



ORIGINAL PAGE IS OF POOR QUALITY

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| (inches) | (inches) | (inches) | (inches) |
|---|---|---|---|
| -2.3000 | -2.6000 | 0.0289 | 0.0818 |

1 *** input station data ***

** input set no. 7 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -1.0000 | -1.5000 | 0.0354 | 0.0990 |

1 *** input station data ***

** input set no. 8 is rotor no. 1 **

| tip c.g. axial location (inches) | hub c.g. axial location (inches) | inlet tip b. layer thick. (inches) | inlet hub b. layer thick. (inches) | blade dihedral angle (degrees) | range improvement bleed option |
|---|---|---|---|---|---|
| 0.9410 | 0.9410 | 0.0457 | 0.1226 | 0.00 | 0.00000 |

+

| number of blades | adia. eff. of cum. comp. stages at design | outlet tip b. layer thick. (inches) | outlet hub b. layer thick. (inches) | cum. energy addition fract. thru this stage |
|---|---|---|---|---|
| 22 | 0.8569 | 0.0524 | 0.1026 | 0.5000 |

* table of input blade element definition parameters *

| strm. no. | l.e.rad. /chord | t.e.rad. /chord | max.th. /chord | max.th. pt.loc. /chord | tran.pt. location /chord | segment in/out turn.rate | in.blade angle (deg) | out.blade angle (deg) | aero. chord (in.) | layout cone ang. (deg) | stack pt. radius (in.) | l.e.cir.cen.loc. from stack. line z (in.) | o (deg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00180 | 0.00180 | 0.02901 | 0.64000 | 0.70000 | 0.07500 | 67.264 | 53.820 | 3.66433 | -10.148 | 9.8555 | 0.74283 | -10.113 |
| 2 | 0.00185 | 0.00187 | 0.03000 | 0.63000 | 0.64740 | 0.18000 | 63.415 | 52.955 | 3.67082 | -7.508 | 9.4199 | 0.87783 | -10.289 |
| 3 | 0.00198 | 0.00203 | 0.03241 | 0.62000 | 0.60420 | 0.43000 | 61.346 | 52.733 | 3.66862 | -5.698 | 8.9938 | 0.94321 | -10.565 |
| 4 | 0.00219 | 0.00227 | 0.03617 | 0.61000 | 0.56270 | 0.66000 | 59.473 | 50.579 | 3.66661 | -3.909 | 8.5539 | 1.00447 | -10.879 |
| 5 | 0.00246 | 0.00258 | 0.04115 | 0.60000 | 0.51930 | 0.79000 | 57.362 | 47.352 | 3.66512 | -2.152 | 8.0940 | 1.07705 | -11.212 |
| 6 | 0.00279 | 0.00296 | 0.04726 | 0.58000 | 0.47050 | 0.83000 | 55.066 | 42.201 | 3.66436 | -0.384 | 7.6089 | 1.15829 | -11.490 |
| 7 | 0.00319 | 0.00338 | 0.05432 | 0.56000 | 0.41800 | 0.86000 | 52.455 | 36.314 | 3.66481 | 1.443 | 7.0903 | 1.25020 | -11.752 |
| 8 | 0.00362 | 0.00382 | 0.06208 | 0.54000 | 0.35920 | 0.96000 | 49.456 | 27.960 | 3.66763 | 3.460 | 6.5284 | 1.36213 | -11.896 |
| 9 | 0.00409 | 0.00424 | 0.07007 | 0.50000 | 0.28620 | 0.98000 | 45.822 | 17.331 | 3.67588 | 5.871 | 5.9069 | 1.48369 | -11.707 |
| 10 | 0.00453 | 0.00460 | 0.07717 | 0.50000 | 0.22430 | 1.00000 | 41.866 | 2.559 | 3.69775 | 8.994 | 5.1979 | 1.64486 | -11.117 |
| 11 | 0.00480 | 0.00480 | 0.08022 | 0.50000 | 0.16290 | 1.00000 | 36.961 | -16.396 | 3.76167 | 13.853 | 4.3319 | 1.80300 | -9.081 |

1 * parameters for greater specification of blade element geometry *

| strm. no. | poly. coef. for 1st seg. centerline angle (function of path dist. from trans. pt.) linear | quadratic | cubic | quartic | poly. coef. for 2nd seg. centerline angle (function of path dist. from trans. pt.) linear | quadratic | cubic | quartic |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.35068 | 0.69148 | 0.00000 | -0.69148 | -0.69642 | 0.00000 | -0.69148 | 0.00000 |
| 2 | 0.34861 | 0.59478 | 0.00000 | -0.59478 | -0.64600 | 0.00000 | -0.59478 | 0.00000 |
| 3 | 0.34878 | 0.51486 | 0.00000 | -0.51486 | -0.60621 | 0.00000 | -0.51486 | 0.00000 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | 0.34567 | 0.43744 | 0.00000 | -0.43744 | -0.56439 | 0.00000 | -0.43744 | 0.00000 |
| 5 | 0.33819 | 0.36198 | 0.00000 | -0.36198 | -0.51919 | 0.00000 | -0.36198 | 0.00000 |
| 6 | 0.32537 | 0.28869 | 0.00000 | -0.28869 | -0.46972 | 0.00000 | -0.28869 | 0.00000 |
| 7 | 0.30730 | 0.21909 | 0.00000 | -0.21909 | -0.41684 | 0.00000 | -0.21909 | 0.00000 |
| 8 | 0.28207 | 0.15351 | 0.00000 | -0.15351 | -0.35882 | 0.00000 | -0.15351 | 0.00000 |
| 9 | 0.24783 | 0.09350 | 0.00000 | -0.09350 | -0.29458 | 0.00000 | -0.09350 | 0.00000 |
| 10 | 0.20606 | 0.04251 | 0.00000 | -0.04251 | -0.22732 | 0.00000 | -0.04251 | 0.00000 |
| 11 | 0.15184 | 0.00295 | 0.00000 | -0.00295 | -0.15331 | 0.00000 | -0.00295 | 0.00000 |

| strm. no. | poly. coef. for 1st segment thickness (function of path dist. from max.th. pt.) | | | | poly. coef. for 2nd segment thickness (function of path dist. from max.th. pt.) | | | | ellipse major/minor axis ratio minus 1.0 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | sq.root | quadratic | cubic | quartic | sq.root | quadratic | cubic | quartic | lead.edge | trail.edge |
| 1 | 0.00000 | 0.02709 | 0.00000 | 0.00000 | 0.00008 | 0.00000 | 0.27199 | 0.00000 | 0.99291 | 0.00000 |
| 2 | 0.00000 | 0.02934 | 0.00000 | 0.00000 | 0.00085 | 0.00000 | 0.25633 | 0.00000 | 0.92071 | 0.00000 |
| 3 | 0.00000 | 0.03325 | 0.00000 | 0.00000 | 0.00170 | 0.00000 | 0.25255 | 0.00000 | 0.84931 | 0.00000 |
| 4 | 0.00000 | 0.03894 | 0.00000 | 0.00000 | 0.00276 | 0.00000 | 0.25692 | 0.00000 | 0.77507 | 0.00000 |
| 5 | 0.00000 | 0.04652 | 0.00000 | 0.00000 | 0.00411 | 0.00000 | 0.26696 | 0.00000 | 0.69722 | 0.00000 |
| 6 | 0.00000 | 0.05803 | 0.00000 | 0.00000 | 0.00578 | 0.00000 | 0.26032 | 0.00000 | 0.61460 | 0.00000 |
| 7 | 0.00000 | 0.07258 | 0.00000 | 0.00000 | 0.00786 | 0.00000 | 0.25567 | 0.00000 | 0.52559 | 0.00000 |
| 8 | 0.00000 | 0.09027 | 0.00000 | 0.00000 | 0.01043 | 0.00000 | 0.25019 | 0.00000 | 0.42781 | 0.00000 |
| 9 | 0.00000 | 0.11980 | 0.00000 | 0.00000 | 0.01320 | 0.00000 | 0.21388 | 0.00000 | 0.31739 | 0.00000 |
| 10 | 0.00000 | 0.13174 | 0.00000 | 0.00000 | 0.01690 | 0.00000 | 0.22524 | 0.00000 | 0.18699 | 0.00000 |
| 11 | 0.00000 | 0.13492 | 0.00000 | 0.00000 | 0.02038 | 0.00000 | 0.21545 | 0.00000 | 0.01926 | 0.00000 |

1 *** input station data ***

** input set no. 9 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 3.0000 | 3.3000 | 0.0553 | 0.1100 |

1 *** input station data ***

** input set no. 10 is a guide vane or stator **

| tip c.g. axial location (inches) | hub c.g. axial location (inches) | inlet tip b. layer thick. (inches) | inlet hub b. layer thick. (inches) | blade dihedral angle (degrees) | range improvement bleed option |
|---|---|---|---|---|---|
| 5.2000 | 5.2000 | 0.0610 | 0.1193 | 0.00 | 0.00000 |

+

| number of blades | blade rotation option for stall margin | outlet tip b. layer thick. (inches) | outlet hub b. layer thick. (inches) |
|---|---|---|---|
| 34 | | 0.0697 | 0.1309 |

* table of input blade element definition parameters *

| strm. no. | l.e.rad. /chord | t.e.rad. /chord | max.th. /chord | max.th. pt.loc. /chord | tran.pt. location /chord | segment in/out turn.rate | in.blade angle (deg) | out.blade angle (deg) | aero. chord (in.) | layout cone ang. (deg) | stack pt. radius (in.) | l.e.cir.cen.loc. from stack. line z (in.) | o (deg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

+ -

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.01290 | 0.01288 | 0.07974 | 0.50000 | 0.40000 | 1.00000 | 36.693 | -16.092 | 2.27025 | -0.290 | 9.5325 | 1.05366 | 2.319 |
| 2 | 0.01229 | 0.01228 | 0.07823 | 0.50000 | 0.40000 | 1.00000 | 33.496 | -12.257 | 2.27027 | 0.237 | 9.1825 | 1.05744 | 2.292 |
| 3 | 0.01168 | 0.01167 | 0.07670 | 0.50000 | 0.40000 | 1.00000 | 33.488 | -10.483 | 2.27035 | 0.567 | 8.8260 | 1.05412 | 2.455 |
| 4 | 0.01105 | 0.01103 | 0.07512 | 0.50000 | 0.40000 | 1.00000 | 33.899 | -9.693 | 2.27052 | 0.925 | 8.4564 | 1.05142 | 2.636 |
| 5 | 0.01039 | 0.01037 | 0.07346 | 0.50000 | 0.40000 | 1.00000 | 34.604 | -9.098 | 2.27082 | 1.349 | 8.0711 | 1.04792 | 2.859 |
| 6 | 0.00969 | 0.00967 | 0.07172 | 0.50000 | 0.40000 | 1.00000 | 35.845 | -8.801 | 2.27134 | 1.878 | 7.6663 | 1.04265 | 3.153 |
| 7 | 0.00894 | 0.00894 | 0.06986 | 0.50000 | 0.40000 | 1.00000 | 37.275 | -8.604 | 2.27222 | 2.540 | 7.2369 | 1.03645 | 3.509 |
| 8 | 0.00815 | 0.00816 | 0.06786 | 0.50000 | 0.40000 | 1.00000 | 38.928 | -8.808 | 2.27360 | 3.329 | 6.7766 | 1.02986 | 3.938 |
| 9 | 0.00728 | 0.00732 | 0.06569 | 0.50000 | 0.40000 | 1.00000 | 40.825 | -9.009 | 2.27565 | 4.253 | 6.2769 | 1.02159 | 4.492 |
| 10 | 0.00631 | 0.00637 | 0.06328 | 0.50000 | 0.40000 | 1.00000 | 43.448 | -10.288 | 2.27828 | 5.230 | 5.7206 | 1.01267 | 5.234 |
| 11 | 0.00520 | 0.00523 | 0.06050 | 0.50000 | 0.40000 | 1.00000 | 46.876 | -14.152 | 2.27877 | 5.458 | 5.0639 | 1.00865 | 6.219 |

1 * parameters for greater specification of blade element geometry *

| strm. no. | poly. coef. for 1st seg. centerline angle (function of path dist. from trans. pt.) | | | | poly. coef. for 2nd seg. centerline angle (function of path dist. from trans. pt.) | | | |
|---|---|---|---|---|---|---|---|---|
| | linear | quadratic | cubic | quartic | linear | quadratic | cubic | quartic |
| 1 | 0.33433 | 0.00000 | 0.00000 | 0.00000 | -0.33433 | 0.00000 | 0.00000 | 0.00000 |
| 2 | 0.30912 | 0.00000 | 0.00000 | 0.00000 | -0.30912 | 0.00000 | 0.00000 | 0.00000 |
| 3 | 0.30245 | 0.00000 | 0.00000 | 0.00000 | -0.30245 | 0.00000 | 0.00000 | 0.00000 |
| 4 | 0.29634 | 0.00000 | 0.00000 | 0.00000 | -0.29634 | 0.00000 | 0.00000 | 0.00000 |
| 5 | 0.29086 | 0.00000 | 0.00000 | 0.00000 | -0.29086 | 0.00000 | 0.00000 | 0.00000 |
| 6 | 0.28697 | 0.00000 | 0.00000 | 0.00000 | -0.28697 | 0.00000 | 0.00000 | 0.00000 |
| 7 | 0.28211 | 0.00000 | 0.00000 | 0.00000 | -0.28211 | 0.00000 | 0.00000 | 0.00000 |
| 8 | 0.27554 | 0.00000 | 0.00000 | 0.00000 | -0.27554 | 0.00000 | 0.00000 | 0.00000 |
| 9 | 0.26708 | 0.00000 | 0.00000 | 0.00000 | -0.26708 | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.25652 | 0.00000 | 0.00000 | 0.00000 | -0.25652 | 0.00000 | 0.00000 | 0.00000 |
| 11 | 0.24034 | 0.00000 | 0.00000 | 0.00000 | -0.24034 | 0.00000 | 0.00000 | 0.00000 |

| strm. no. | poly. coef. for 1st segment thickness (function of path dist. from max.th. pt.) | | | | poly. coef. for 2nd segment thickness (function of path dist. from max.th. pt.) | | | | ellipse major/minor axis ratio minus 1.0 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | sq.root | quadratic | cubic | quartic | sq.root | quadratic | cubic | quartic | lead.edge | trail.edge |
| 1 | 0.00000 | 0.10558 | 0.00000 | 0.00000 | 0.00000 | 0.10565 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 2 | 0.00000 | 0.10663 | 0.00000 | 0.00000 | 0.00000 | 0.10666 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 3 | 0.00000 | 0.10621 | 0.00000 | 0.00000 | 0.00000 | 0.10625 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 4 | 0.00000 | 0.10542 | 0.00000 | 0.00000 | 0.00000 | 0.10547 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 5 | 0.00000 | 0.10448 | 0.00000 | 0.00000 | 0.00000 | 0.10452 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 6 | 0.00000 | 0.10331 | 0.00000 | 0.00000 | 0.00000 | 0.10332 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 7 | 0.00000 | 0.10201 | 0.00000 | 0.00000 | 0.00000 | 0.10197 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 8 | 0.00000 | 0.10051 | 0.00000 | 0.00000 | 0.00000 | 0.10038 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 9 | 0.00000 | 0.09886 | 0.00000 | 0.00000 | 0.00000 | 0.09862 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.00000 | 0.09664 | 0.00000 | 0.00000 | 0.00000 | 0.09627 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 11 | 0.00000 | 0.09324 | 0.00000 | 0.00000 | 0.00000 | 0.09290 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |

1 *** input station data ***

** input set no. 11 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 7.3400 | 7.3400 | 0.0689 | 0.1276 |

1 *** input station data ***

** input set no. 12 is rotor no. 2 **

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| tip c.g. axial location (inches) | hub c.g. axial location (inches) | inlet tip b. layer thick. (inches) | inlet hub b. layer thick. (inches) | blade dihedral angle (degrees) | range improvement bleed option |
|---|---|---|---|---|---|
| 9.2000 | 9.2000 | 0.0663 | 0.1231 | 0.00 | 0.00000 |

| number of blades | adia. eff. of cum. comp. stages at design | outlet tip b. layer thick. (inches) | outlet hub b. layer thick. (inches) | cum. energy addition fract. thru this stage |
|---|---|---|---|---|
| 38 | 0.8526 | 0.0608 | 0.0995 | 1.0000 |

* table of input blade element definition parameters *

| strm. no. | l.e.rad. /chord | t.e.rad. /chord | max.th. /chord | max.th. pt.loc. /chord | tran.pt. location /chord | segment in/out turn.rate | in.blade angle (deg) | out.blade angle (deg) | aero. chord (in.) | layout cone ang. (deg) | stack pt. radius (in.) | l.e.cir.cen. from stack. z (in.) | loc. line o (deg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00614 | 0.00615 | 0.03403 | 0.50000 | 0.66270 | 0.61000 | 62.046 | 56.549 | 2.02543 | -6.611 | 9.3752 | 0.48473 | -5.280 |
| 2 | 0.00682 | 0.00686 | 0.03507 | 0.50000 | 0.63508 | 0.66300 | 61.065 | 55.480 | 2.02737 | -5.160 | 9.0680 | 0.50145 | -5.406 |
| 3 | 0.00751 | 0.00759 | 0.03744 | 0.50000 | 0.60532 | 0.76700 | 59.945 | 53.732 | 2.02656 | -3.787 | 8.7545 | 0.52265 | -5.518 |
| 4 | 0.00822 | 0.00834 | 0.04100 | 0.50000 | 0.57342 | 0.88600 | 58.660 | 51.711 | 2.02594 | -2.439 | 8.4319 | 0.54695 | -5.630 |
| 5 | 0.00895 | 0.00911 | 0.04561 | 0.50000 | 0.53954 | 0.98100 | 57.239 | 49.221 | 2.02554 | -1.076 | 8.0986 | 0.57419 | -5.741 |
| 6 | 0.00972 | 0.00991 | 0.05110 | 0.50000 | 0.50394 | 1.00000 | 55.718 | 46.031 | 2.02544 | 0.303 | 7.7514 | 0.60400 | -5.850 |
| 7 | 0.01053 | 0.01075 | 0.05726 | 0.50000 | 0.46654 | 1.00000 | 54.155 | 41.968 | 2.02578 | 1.746 | 7.3862 | 0.63685 | -5.952 |
| 8 | 0.01140 | 0.01163 | 0.06383 | 0.50000 | 0.42725 | 1.00000 | 52.589 | 36.760 | 2.02689 | 3.363 | 6.9982 | 0.67351 | -6.043 |
| 9 | 0.01235 | 0.01256 | 0.07038 | 0.50000 | 0.40000 | 1.00000 | 51.128 | 30.009 | 2.02957 | 5.318 | 6.5811 | 0.71444 | -6.121 |
| 10 | 0.01341 | 0.01357 | 0.07622 | 0.50000 | 0.40000 | 1.00000 | 50.352 | 20.164 | 2.03577 | 7.811 | 6.1192 | 0.76065 | -6.180 |
| 11 | 0.01474 | 0.01476 | 0.07989 | 0.50000 | 0.40000 | 1.00000 | 52.662 | -0.228 | 2.05176 | 11.213 | 5.5584 | 0.83368 | -6.192 |

*** input station data ***

** input set no. 13 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 11.0100 | 11.0100 | 0.0577 | 0.0928 |

*** input station data ***

** input set no. 14 is a guide vane or stator **

| tip c.g. axial location (inches) | hub c.g. axial location (inches) | inlet tip b. layer thick. (inches) | inlet hub b. layer thick. (inches) | blade dihedral angle (degrees) | range improvement bleed option |
|---|---|---|---|---|---|
| 12.7000 | 12.7000 | 0.0564 | 0.0890 | 0.00 | 0.00000 |

| number of blades | blade rotation option for stall margin | outlet tip b. layer thick. (inches) | outlet hub b. layer thick. (inches) |
|---|---|---|---|
| 42 | | 0.0556 | 0.0866 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

* table of input blade element definition parameters *

| strm. no. | l.e.rad. /chord | t.e.rad. /chord | max.th. /chord | max.th. pt.loc. /chord | tran.pt. location /chord | segment in/out turn.rate | in.blade angle (deg) | out.blade angle (deg) | aero. chord (in.) | layout cone ang. (deg) | stack pt. radius (in.) | l.e.cir.cen.loc. from stack. z (in.) | line o (deg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.01387 | 0.01387 | 0.07967 | 0.50000 | 0.40000 | 1.00000 | 35.156 | -15.591 | 1.75296 | 0.218 | 9.2437 | 0.81577 | 1.758 |
| 2 | 0.01323 | 0.01323 | 0.07807 | 0.50000 | 0.40000 | 1.00000 | 34.571 | -12.796 | 1.75301 | 0.413 | 8.9689 | 0.81297 | 1.857 |
| 3 | 0.01257 | 0.01257 | 0.07643 | 0.50000 | 0.40000 | 1.00000 | 34.651 | -10.900 | 1.75305 | 0.584 | 8.6891 | 0.80990 | 1.981 |
| 4 | 0.01190 | 0.01190 | 0.07476 | 0.50000 | 0.40000 | 1.00000 | 34.762 | -9.901 | 1.75310 | 0.743 | 8.4021 | 0.80850 | 2.091 |
| 5 | 0.01121 | 0.01121 | 0.07304 | 0.50000 | 0.40000 | 1.00000 | 35.247 | -9.401 | 1.75316 | 0.900 | 8.1069 | 0.80689 | 2.222 |
| 6 | 0.01050 | 0.01049 | 0.07125 | 0.50000 | 0.40000 | 1.00000 | 36.187 | -9.202 | 1.75324 | 1.077 | 7.8010 | 0.80427 | 2.390 |
| 7 | 0.00975 | 0.00975 | 0.06938 | 0.50000 | 0.40000 | 1.00000 | 37.386 | -9.103 | 1.75335 | 1.280 | 7.4815 | 0.80084 | 2.594 |
| 8 | 0.00897 | 0.00896 | 0.06742 | 0.50000 | 0.40000 | 1.00000 | 38.803 | -9.304 | 1.75349 | 1.497 | 7.1458 | 0.79710 | 2.831 |
| 9 | 0.00814 | 0.00813 | 0.06535 | 0.50000 | 0.40000 | 1.00000 | 40.462 | -9.603 | 1.75364 | 1.703 | 6.7902 | 0.79249 | 3.117 |
| 10 | 0.00724 | 0.00723 | 0.06311 | 0.50000 | 0.40000 | 1.00000 | 43.769 | -11.099 | 1.75379 | 1.906 | 6.4061 | 0.78390 | 3.556 |
| 11 | 0.00621 | 0.00620 | 0.06051 | 0.50000 | 0.40000 | 1.00000 | 52.207 | -15.990 | 1.75422 | 2.433 | 5.9636 | 0.76049 | 4.456 |

*** input station data ***

** input set no. 15 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 14.4400 | 14.4400 | 0.0552 | 0.0855 |

** input set no. 16 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 15.7000 | 16.0000 | 0.0549 | 0.0839 |

** input set no. 17 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 17.0000 | 17.6000 | 0.0538 | 0.0799 |

** input set no. 18 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 17.7500 | 18.6000 | 0.0529 | 0.0765 |

** input set no. 19 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | |
|---|---|---|---|
| 18.5000 | 19.6000 | 0.0521 | 0.0730 |

** input set no. 20 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 19.2500 | 20.6000 | 0.0511 | 0.0687 |

1 *** input station data ***

:

** input set no. 21 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 20.0000 | 21.5000 | 0.0500 | 0.0649 |

radius array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * | 10.0990 | 9.6525 | 9.1843 | 8.6909 | 8.1678 | 7.6088 | 7.0053 | 6.3447 | 5.6067 | 4.7556 | 3.7144 |
| 2 | * | 10.0948 | 9.6462 | 9.1758 | 8.6799 | 8.1539 | 7.5915 | 6.9840 | 6.3184 | 5.5738 | 4.7130 | 3.6548 |
| 3 | * | 10.0912 | 9.6407 | 9.1680 | 8.6697 | 8.1409 | 7.5753 | 6.9639 | 6.2933 | 5.5422 | 4.6720 | 3.5969 |
| 4 | * | 10.0878 | 9.6356 | 9.1611 | 8.6606 | 8.1294 | 7.5609 | 6.9461 | 6.2713 | 5.5145 | 4.6358 | 3.5457 |
| 5 | * | 10.0787 | 9.6283 | 9.1558 | 8.6575 | 8.1288 | 7.5632 | 6.9517 | 6.2809 | 5.5294 | 4.6582 | 3.5810 |
| 6 | * | 10.0698 | 9.6215 | 9.1513 | 8.6556 | 8.1297 | 7.5673 | 6.9596 | 6.2935 | 5.5480 | 4.6854 | 3.6229 |
| 7 | * | 10.0652 | 9.6219 | 9.1573 | 8.6677 | 8.1488 | 7.5945 | 6.9964 | 6.3422 | 5.6123 | 4.7719 | 3.7477 |
| 8 | * | 10.0542 | 9.6149 | 9.1545 | 8.6696 | 8.1560 | 7.6078 | 7.0170 | 6.3715 | 5.6528 | 4.8283 | 3.8302 |
| 9 | * | 9.6872 | 9.3116 | 8.9202 | 8.5109 | 8.0808 | 7.6265 | 7.1434 | 6.6251 | 6.0627 | 5.4425 | 4.7419 |
| 10 | * | 9.5746 | 9.2124 | 8.8353 | 8.4414 | 8.0283 | 7.5926 | 7.1304 | 6.6361 | 6.1019 | 5.5161 | 4.8603 |
| 11 | * | 9.5376 | 9.1835 | 8.8151 | 8.4307 | 8.0280 | 7.6039 | 7.1547 | 6.6753 | 6.1588 | 5.5947 | 4.9671 |
| 12 | * | 9.5268 | 9.1849 | 8.8297 | 8.4597 | 8.0727 | 7.6662 | 7.2370 | 6.7806 | 6.2911 | 5.7603 | 5.1752 |
| 13 | * | 9.5337 | 9.1961 | 8.8456 | 8.4807 | 8.0993 | 7.6991 | 7.2769 | 6.8287 | 6.3489 | 5.8297 | 5.2595 |
| 14 | * | 9.4327 | 9.1096 | 8.7747 | 8.4264 | 8.0631 | 7.6826 | 7.2823 | 6.8587 | 6.4071 | 5.9212 | 5.3916 |
| 15 | * | 9.3129 | 9.0199 | 8.7171 | 8.4033 | 8.0774 | 7.7378 | 7.3825 | 7.0093 | 6.6150 | 6.1957 | 5.7459 |
| 16 | * | 9.2570 | 8.9751 | 8.6841 | 8.3830 | 8.0706 | 7.7457 | 7.4065 | 7.0511 | 6.6767 | 6.2800 | 5.8566 |
| 17 | * | 9.2405 | 8.9647 | 8.6801 | 8.3859 | 8.0810 | 7.7641 | 7.4338 | 7.0880 | 6.7245 | 6.3402 | 5.9310 |
| 18 | * | 9.2471 | 8.9755 | 8.6954 | 8.4060 | 8.1063 | 7.7951 | 7.4709 | 7.1320 | 6.7761 | 6.4005 | 6.0015 |
| 19 | * | 9.2481 | 8.9785 | 8.7006 | 8.4135 | 8.1162 | 7.8077 | 7.4864 | 7.1507 | 6.7985 | 6.4269 | 6.0326 |
| 20 | * | 9.2428 | 8.9771 | 8.7032 | 8.4204 | 8.1278 | 7.8243 | 7.5085 | 7.1788 | 6.8333 | 6.4693 | 6.0836 |
| 21 | * | 9.2657 | 9.0097 | 8.7461 | 8.4744 | 8.1937 | 7.9030 | 7.6012 | 7.2869 | 6.9584 | 6.6136 | 6.2499 |
| 22 | * | 9.3553 | 9.1087 | 8.8552 | 8.5942 | 8.3251 | 8.0470 | 7.7589 | 7.4597 | 7.1479 | 6.8220 | 6.4797 |
| 23 | * | 9.5226 | 9.2873 | 9.0459 | 8.7979 | 8.5426 | 8.2795 | 8.0078 | 7.7265 | 7.4346 | 7.1307 | 6.8133 |
| 24 | * | 9.7661 | 9.5467 | 9.3221 | 9.0919 | 8.8558 | 8.6132 | 8.3635 | 8.1062 | 7.8404 | 7.5653 | 7.2798 |
| 25 | * | 10.1062 | 9.9008 | 9.6911 | 9.4767 | 9.2573 | 9.0326 | 8.8022 | 8.5656 | 8.3223 | 8.0716 | 7.8129 |

| i | ift | z(ift,jm) | i | z(i,j) | ar |
|---|---|---|---|---|---|
| 1 | 1 | -11.0000 | 1 | -11.0000 | 0.0000 |
| 2 | 2 | -9.0000 | 2 | -9.0000 | 3.2200 |
| 3 | 3 | -7.0000 | 3 | -7.0000 | 3.2471 |
| 4 | 4 | -5.2000 | 4 | -5.2000 | 3.6345 |
| 5 | 5 | -3.7000 | 5 | -3.7000 | 4.3318 |
| 6 | 6 | -2.4158 | 6 | -2.4158 | 5.0202 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | |
|---|---|---|---|---|---|
| 7 | 7 | -1.1941 | 7 | -1.1941 | 5.1713 |
| 8 | 9 | 2.6524 | 8 | -0.5437 | 9.5688 |
| 9 | 11 | 4.1961 | 9 | 2.6524 | 1.5473 |
| 10 | 12 | 6.3346 | 10 | 3.1253 | 9.9685 |
| 11 | 13 | 7.3400 | 11 | 4.1961 | 4.2681 |
| 12 | 14 | 8.5705 | 12 | 6.3346 | 2.0348 |
| 13 | 15 | 9.8709 | 13 | 7.3400 | 4.2514 |
| 14 | 16 | 11.0100 | 14 | 8.5705 | 3.2841 |
| 15 | 17 | 11.8776 | 15 | 9.8709 | 2.7429 |
| 16 | 18 | 13.5824 | 16 | 11.0100 | 2.9852 |
| 17 | 19 | 14.4400 | 17 | 11.8776 | 3.8144 |
| 18 | 20 | 15.8340 | 18 | 13.5824 | 1.9039 |
| 19 | 21 | 17.2699 | 19 | 14.4400 | 3.7493 |
| 20 | 22 | 18.1351 | 20 | 15.8340 | 2.2663 |
| 21 | 23 | 19.0028 | 21 | 17.2699 | 2.1003 |
| 22 | 24 | 19.8740 | 22 | 18.1351 | 3.3236 |
| 23 | 25 | 20.7003 | 23 | 19.0028 | 3.1223 |
| | | | 24 | 19.8740 | 2.8540 |
| | | | 25 | 20.7003 | 2.7754 |

z array

| i * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | | | | | | | | | | | |
| 1 * | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 |
| 2 * | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 |
| 3 * | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 |
| 4 * | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 |
| 5 * | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 |
| 6 * | -2.3013 | -2.3218 | -2.3433 | -2.3660 | -2.3901 | -2.4158 | -2.4436 | -2.4741 | -2.5081 | -2.5476 | -2.5962 |
| 7 * | -1.0027 | -1.0371 | -1.0731 | -1.1110 | -1.1512 | -1.1941 | -1.2405 | -1.2911 | -1.3477 | -1.4128 | -1.4921 |
| 8 * | -0.9429 | -0.7890 | -0.6785 | -0.6087 | -0.5633 | -0.5437 | -0.5600 | -0.6198 | -0.7618 | -0.9417 | -1.1249 |
| 9 * | 1.5889 | 2.0072 | 2.2943 | 2.4444 | 2.5573 | 2.6524 | 2.7209 | 2.7631 | 2.7053 | 2.6886 | 2.7828 |
| 10 * | 3.0034 | 3.0257 | 3.0489 | 3.0731 | 3.0985 | 3.1253 | 3.1537 | 3.1841 | 3.2169 | 3.2529 | 3.2932 |
| 11 * | 4.1826 | 4.1922 | 4.1947 | 4.1959 | 4.1964 | 4.1961 | 4.1955 | 4.1945 | 4.1925 | 4.1864 | 4.1742 |
| 12 * | 6.3435 | 6.3343 | 6.3326 | 6.3325 | 6.3331 | 6.3346 | 6.3367 | 6.3394 | 6.3430 | 6.3492 | 6.3592 |
| 13 * | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 |
| 14 * | 8.7029 | 8.6845 | 8.6610 | 8.6340 | 8.6037 | 8.5705 | 8.5341 | 8.4939 | 8.4507 | 8.4027 | 8.3373 |
| 15 * | 9.7328 | 9.7515 | 9.7763 | 9.8038 | 9.8351 | 9.8709 | 9.9123 | 9.9596 | 10.0125 | 10.0734 | 10.1427 |
| 16 * | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 |
| 17 * | 11.8599 | 11.8638 | 11.8681 | 11.8707 | 11.8736 | 11.8776 | 11.8825 | 11.8877 | 11.8940 | 11.9050 | 11.9286 |
| 18 * | 13.5877 | 13.5857 | 13.5840 | 13.5830 | 13.5825 | 13.5824 | 13.5823 | 13.5827 | 13.5832 | 13.5857 | 13.5931 |
| 19 * | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 |
| 20 * | 15.7050 | 15.7292 | 15.7541 | 15.7798 | 15.8064 | 15.8340 | 15.8628 | 15.8928 | 15.9242 | 15.9573 | 15.9924 |
| 21 * | 17.0102 | 17.0590 | 17.1092 | 17.1610 | 17.2145 | 17.2699 | 17.3274 | 17.3874 | 17.4500 | 17.5157 | 17.5850 |
| 22 * | 17.7645 | 17.8344 | 17.9062 | 17.9801 | 18.0563 | 18.1351 | 18.2167 | 18.3015 | 18.3898 | 18.4822 | 18.5791 |
| 23 * | 18.5190 | 18.6106 | 18.7046 | 18.8011 | 18.9004 | 19.0028 | 19.1086 | 19.2181 | 19.3317 | 19.4500 | 19.5735 |
| 24 * | 19.2737 | 19.3879 | 19.5049 | 19.6247 | 19.7477 | 19.8740 | 20.0040 | 20.1380 | 20.2764 | 20.4196 | 20.5683 |
| 25 * | 20.0268 | 20.1557 | 20.2873 | 20.4218 | 20.5594 | 20.7003 | 20.8449 | 20.9933 | 21.1459 | 21.3032 | 21.4655 |

to array

| i * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | | | | | | | | | | | |
| 1 * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 2 * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 3 * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 4 * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 5 * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 6 * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 7 * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 9 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 10 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 11 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 12 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 13 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 14 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 15 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 16 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 17 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 18 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 19 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 20 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 21 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 22 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 23 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 24 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 25 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |

po array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 2 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 3 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 4 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 5 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 6 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 7 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 8 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 9 | * | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 |
| 10 | * | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 |
| 11 | * | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 |
| 12 | * | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 |
| 13 | * | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 |
| 14 | * | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 |
| 15 | * | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 |
| 16 | * | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 |
| 17 | * | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 |
| 18 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 19 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 20 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 21 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 22 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 23 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 24 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 25 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |

vz array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 |
| 2 | * | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 |
| 3 | * | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 |
| 4 | * | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 |
| 5 | * | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 |
| 6 | * | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 |
| 7 | * | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 |
| 8 | * | 584.74 | 584.74 | 584.74 | 584.74 | 584.74 | 584.74 | 584.74 | 584.74 | 584.74 | 584.74 | 584.74 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | * | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 |
| 10 | * | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 |
| 11 | * | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 |
| 12 | * | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 |
| 13 | * | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 |
| 14 | * | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 |
| 15 | * | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 |
| 16 | * | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 |
| 17 | * | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 |
| 18 | * | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 |
| 19 | * | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 |
| 20 | * | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 |
| 21 | * | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 |
| 22 | * | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 |
| 23 | * | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 |
| 24 | * | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 |
| 25 | * | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 |

vth array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9 | * | 381.89 | 397.29 | 414.72 | 434.67 | 457.80 | 485.07 | 517.88 | 558.39 | 610.19 | 679.72 | 780.15 |
| 10 | * | 386.38 | 401.57 | 418.71 | 438.25 | 460.80 | 487.24 | 518.82 | 557.47 | 606.28 | 670.65 | 761.15 |
| 11 | * | 387.88 | 402.83 | 419.67 | 438.80 | 460.82 | 486.52 | 517.06 | 554.19 | 600.67 | 661.23 | 744.79 |
| 12 | * | 19.45 | 20.18 | 20.99 | 21.91 | 22.96 | 24.17 | 25.61 | 27.33 | 29.46 | 32.17 | 35.81 |
| 13 | * | 19.44 | 20.15 | 20.95 | 21.85 | 22.88 | 24.07 | 25.47 | 27.14 | 29.19 | 31.79 | 35.24 |
| 14 | * | 19.65 | 20.34 | 21.12 | 21.99 | 22.98 | 24.12 | 25.45 | 27.02 | 28.93 | 31.30 | 34.37 |
| 15 | * | 417.13 | 430.68 | 445.65 | 462.29 | 480.94 | 502.05 | 526.21 | 554.23 | 587.26 | 627.01 | 676.09 |
| 16 | * | 419.66 | 432.84 | 447.34 | 463.41 | 481.34 | 501.54 | 524.50 | 550.95 | 581.84 | 618.59 | 663.31 |
| 17 | * | 420.40 | 433.34 | 447.54 | 463.25 | 480.73 | 500.35 | 522.58 | 548.07 | 577.70 | 612.72 | 654.99 |
| 18 | * | 18.16 | 18.71 | 19.32 | 19.98 | 20.72 | 21.55 | 22.48 | 23.55 | 24.79 | 26.24 | 27.99 |
| 19 | * | 18.16 | 18.71 | 19.31 | 19.96 | 20.70 | 21.51 | 22.44 | 23.49 | 24.71 | 26.14 | 27.84 |
| 20 | * | 18.17 | 18.71 | 19.30 | 19.95 | 20.67 | 21.47 | 22.37 | 23.40 | 24.58 | 25.96 | 27.61 |
| 21 | * | 18.13 | 18.64 | 19.20 | 19.82 | 20.50 | 21.25 | 22.10 | 23.05 | 24.14 | 25.40 | 26.88 |
| 22 | * | 17.95 | 18.44 | 18.97 | 19.54 | 20.18 | 20.87 | 21.65 | 22.52 | 23.50 | 24.62 | 25.92 |
| 23 | * | 17.64 | 18.09 | 18.57 | 19.09 | 19.66 | 20.29 | 20.98 | 21.74 | 22.59 | 23.56 | 24.65 |
| 24 | * | 17.20 | 17.59 | 18.02 | 18.47 | 18.97 | 19.50 | 20.08 | 20.72 | 21.42 | 22.20 | 23.07 |
| 25 | * | 16.62 | 16.97 | 17.33 | 17.72 | 18.14 | 18.60 | 19.08 | 19.61 | 20.18 | 20.81 | 21.50 |

slope array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | -0.0022 | -0.0033 | -0.0045 | -0.0059 | -0.0075 | -0.0093 | -0.0114 | -0.0142 | -0.0178 | -0.0230 | -0.0321 |
| 2 | * | -0.0020 | -0.0029 | -0.0039 | -0.0051 | -0.0064 | -0.0078 | -0.0096 | -0.0119 | -0.0148 | -0.0192 | -0.0268 |
| 3 | * | -0.0015 | -0.0027 | -0.0041 | -0.0057 | -0.0075 | -0.0096 | -0.0122 | -0.0154 | -0.0196 | -0.0258 | -0.0368 |
| 4 | * | -0.0028 | -0.0030 | -0.0029 | -0.0027 | -0.0025 | -0.0022 | -0.0019 | -0.0015 | -0.0010 | -0.0005 | 0.0004 |
| 5 | * | -0.0113 | -0.0085 | -0.0062 | -0.0040 | -0.0018 | 0.0007 | 0.0035 | 0.0069 | 0.0114 | 0.0178 | 0.0286 |
| 6 | * | 0.0103 | 0.0071 | 0.0066 | 0.0078 | 0.0098 | 0.0128 | 0.0169 | 0.0226 | 0.0304 | 0.0426 | 0.0663 |
| 7 | * | -0.0577 | -0.0325 | -0.0152 | -0.0015 | 0.0118 | 0.0255 | 0.0403 | 0.0576 | 0.0805 | 0.1118 | 0.1594 |
| 8 | * | -0.0662 | -0.0538 | -0.0368 | -0.0192 | 0.0002 | 0.0215 | 0.0447 | 0.0707 | 0.1024 | 0.1395 | 0.2093 |
| 9 | * | -0.1340 | -0.1015 | -0.0805 | -0.0610 | -0.0399 | -0.0159 | 0.0121 | 0.0455 | 0.0840 | 0.1318 | 0.2013 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | * | -0.0437 | -0.0594 | -0.0623 | -0.0536 | -0.0393 | -0.0197 | 0.0053 | 0.0357 | 0.0667 | 0.1052 | 0.1863 |
| 11 | * | -0.0169 | -0.0234 | -0.0245 | -0.0196 | -0.0113 | 0.0004 | 0.0161 | 0.0357 | 0.0569 | 0.0833 | 0.1271 |
| 12 | * | 0.0143 | 0.0217 | 0.0286 | 0.0347 | 0.0407 | 0.0465 | 0.0523 | 0.0581 | 0.0647 | 0.0721 | 0.0786 |
| 13 | * | -0.0202 | -0.0184 | -0.0156 | -0.0113 | -0.0055 | 0.0023 | 0.0125 | 0.0259 | 0.0433 | 0.0668 | 0.1013 |
| 14 | * | -0.1177 | -0.0911 | -0.0646 | -0.0385 | -0.0129 | 0.0127 | 0.0387 | 0.0658 | 0.0954 | 0.1293 | 0.1711 |
| 15 | * | -0.0882 | -0.0639 | -0.0396 | -0.0160 | 0.0071 | 0.0298 | 0.0525 | 0.0756 | 0.1005 | 0.1289 | 0.1632 |
| 16 | * | -0.0228 | -0.0183 | -0.0132 | -0.0071 | 0.0003 | 0.0092 | 0.0200 | 0.0334 | 0.0502 | 0.0718 | 0.1005 |
| 17 | * | -0.0109 | -0.0042 | 0.0028 | 0.0099 | 0.0172 | 0.0246 | 0.0323 | 0.0402 | 0.0481 | 0.0558 | 0.0620 |
| 18 | * | 0.0054 | 0.0071 | 0.0089 | 0.0109 | 0.0131 | 0.0156 | 0.0184 | 0.0218 | 0.0257 | 0.0304 | 0.0368 |
| 19 | * | -0.0017 | 0.0008 | 0.0035 | 0.0062 | 0.0091 | 0.0122 | 0.0155 | 0.0191 | 0.0230 | 0.0273 | 0.0323 |
| 20 | * | -0.0069 | -0.0022 | 0.0026 | 0.0075 | 0.0126 | 0.0180 | 0.0236 | 0.0295 | 0.0358 | 0.0427 | 0.0503 |
| 21 | * | 0.0697 | 0.0783 | 0.0872 | 0.0963 | 0.1058 | 0.1157 | 0.1262 | 0.1374 | 0.1495 | 0.1627 | 0.1774 |
| 22 | * | 0.1708 | 0.1792 | 0.1879 | 0.1969 | 0.2064 | 0.2165 | 0.2272 | 0.2388 | 0.2514 | 0.2654 | 0.2812 |
| 23 | * | 0.2687 | 0.2783 | 0.2883 | 0.2987 | 0.3098 | 0.3216 | 0.3342 | 0.3478 | 0.3628 | 0.3794 | 0.3980 |
| 24 | * | 0.3879 | 0.3991 | 0.4108 | 0.4231 | 0.4362 | 0.4501 | 0.4650 | 0.4812 | 0.4990 | 0.5185 | 0.5403 |
| 25 | * | 0.5024 | 0.5110 | 0.5203 | 0.5304 | 0.5415 | 0.5537 | 0.5671 | 0.5819 | 0.5983 | 0.6166 | 0.6373 |

rcurve array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0009 | 0.0010 |
| 2 | * | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | -0.0001 | -0.0002 | 0.0020 |
| 3 | * | 0.0001 | -0.0001 | 0.0002 | 0.0006 | 0.0010 | 0.0016 | 0.0022 | 0.0030 | 0.0040 | 0.0055 | -0.0066 |
| 4 | * | -0.0021 | -0.0013 | -0.0003 | 0.0007 | 0.0018 | 0.0031 | 0.0046 | 0.0065 | 0.0090 | 0.0127 | 0.0432 |
| 5 | * | -0.0049 | 0.0022 | 0.0026 | 0.0034 | 0.0044 | 0.0058 | 0.0075 | 0.0099 | 0.0132 | 0.0184 | -0.0031 |
| 6 | * | 0.0212 | -0.0098 | -0.0045 | -0.0002 | 0.0039 | 0.0082 | 0.0130 | 0.0187 | 0.0263 | 0.0368 | 0.0762 |
| 7 | * | -0.1086 | -0.0227 | -0.0158 | -0.0106 | -0.0057 | -0.0006 | 0.0048 | 0.0110 | 0.0184 | 0.0275 | 0.0614 |
| 8 | * | -0.1046 | -0.0400 | -0.0277 | -0.0200 | -0.0136 | -0.0077 | -0.0018 | 0.0045 | 0.0124 | 0.0218 | 0.0432 |
| 9 | * | 0.0586 | 0.0047 | 0.0037 | 0.0026 | 0.0014 | 0.0001 | -0.0014 | -0.0033 | -0.0060 | -0.0096 | -0.0417 |
| 10 | * | 0.0344 | 0.0287 | 0.0227 | 0.0168 | 0.0110 | 0.0050 | -0.0013 | -0.0080 | -0.0160 | -0.0263 | -0.0414 |
| 11 | * | 0.0131 | 0.0238 | 0.0226 | 0.0204 | 0.0173 | 0.0132 | 0.0079 | 0.0012 | -0.0064 | -0.0158 | -0.0392 |
| 12 | * | 0.0162 | -0.0076 | -0.0069 | -0.0069 | -0.0071 | -0.0072 | -0.0073 | -0.0072 | -0.0059 | -0.0034 | -0.0036 |
| 13 | * | -0.0813 | -0.0407 | -0.0342 | -0.0275 | -0.0206 | -0.0134 | -0.0058 | 0.0026 | 0.0120 | 0.0233 | 0.0467 |
| 14 | * | -0.0413 | -0.0140 | -0.0081 | -0.0025 | 0.0028 | 0.0077 | 0.0121 | 0.0160 | 0.0197 | 0.0232 | 0.0660 |
| 15 | * | 0.0836 | 0.0264 | 0.0191 | 0.0120 | 0.0052 | -0.0012 | -0.0072 | -0.0131 | -0.0188 | -0.0249 | -0.0732 |
| 16 | * | 0.0095 | 0.0257 | 0.0193 | 0.0128 | 0.0063 | -0.0004 | -0.0075 | -0.0152 | -0.0242 | -0.0355 | -0.0471 |
| 17 | * | 0.0251 | 0.0119 | 0.0105 | 0.0088 | 0.0067 | 0.0040 | 0.0005 | -0.0040 | -0.0099 | -0.0178 | -0.0350 |
| 18 | * | -0.0076 | 0.0005 | -0.0004 | -0.0014 | -0.0025 | -0.0036 | -0.0048 | -0.0061 | -0.0075 | -0.0090 | 0.0029 |
| 19 | * | -0.0043 | -0.0013 | -0.0002 | 0.0009 | 0.0019 | 0.0029 | 0.0038 | 0.0045 | 0.0052 | 0.0057 | -0.0121 |
| 20 | * | 0.0060 | 0.0309 | 0.0324 | 0.0340 | 0.0354 | 0.0369 | 0.0384 | 0.0399 | 0.0415 | 0.0431 | 0.0447 |
| 21 | * | 0.1095 | 0.0891 | 0.0881 | 0.0873 | 0.0865 | 0.0858 | 0.0853 | 0.0848 | 0.0845 | 0.0843 | 0.1019 |
| 22 | * | 0.1352 | 0.1197 | 0.1167 | 0.1138 | 0.1111 | 0.1085 | 0.1061 | 0.1038 | 0.1015 | 0.0994 | 0.0884 |
| 23 | * | 0.1114 | 0.1241 | 0.1211 | 0.1182 | 0.1155 | 0.1129 | 0.1104 | 0.1080 | 0.1057 | 0.1033 | 0.1106 |
| 24 | * | 0.1513 | 0.1158 | 0.1117 | 0.1078 | 0.1042 | 0.1007 | 0.0975 | 0.0943 | 0.0912 | 0.0882 | 0.0942 |
| 25 | * | 0.0666 | 0.0836 | 0.0796 | 0.0759 | 0.0725 | 0.0692 | 0.0661 | 0.0631 | 0.0603 | 0.0574 | 0.0415 |

1

*** computed compressor parameters for a rotational speed of 16042.8 rpm which is a speed fraction of 1.0000 ***

** the corrected weightflow per unit of casing annular area at the inlet face of the first blade row is 38.90 lbs/sec/ft sq **

** mass averaged rotor and stage aerodynamic parameters **

| stage no. | blade type | flow coef. | head coef. | id. head coef. | press. ratio | temp. ratio | adia. eff. | poly. eff. | reset angle (deg) | for. ax. thrust (lbs) | gas bending moments for. ax. (ft-lbs) | tang. (ft-lbs) | torque (ft-lbs) | power (hp) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | rotor | 0.4445 | 0.2412 | 0.2630 | 1.6462 | 1.1605 | 0.9170 | 0.9224 | 0.00 | 1057.26 | 17.651 | -12.757 | 703.85 | 2149.95 |
| 1 | stator | 0.4149 | 0.2284 | 0.2630 | 1.6061 | 1.1605 | 0.8686 | 0.8768 | 0.00 | -229.24 | 2.376 | 6.061 | | |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | rotor | 0.4607 | 0.2731 | 0.2906 | 1.5527 | 1.1345 | 0.9397 | 0.9431 | 0.00 | 1208.74 | 7.058 | -4.819 | 697.02 | 2129.08 |
| 2 | stator | 0.4161 | 0.2607 | 0.2906 | 1.5235 | 1.1346 | 0.8969 | 0.9022 | 0.00 | -257.39 | 1.498 | 3.614 | | |

** cumulative sums of mass averaged rotor and stage aerodydamic parameters **

| stage no. | blade type | weight flow (lbs/sec) | total press. (psia) | total temp. (deg. r.) | press. ratio | temp. ratio | head coef. | ideal head coef. | adia. eff. | poly. eff. | for. ax. thrust (lbs) | torque (ft-lbs) | power (hp) | fract energy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | inlet | 73.30 | 14.666 | 518.70 | | | | | | | | | | |
| 1 | rotor | 73.30 | 24.143 | 601.97 | 1.6462 | 1.1605 | 0.2412 | 0.2630 | 0.9170 | 0.9224 | 1057.26 | 703.85 | 2149.95 | 0.5023 |
| 1 | stator | 73.30 | 23.555 | 601.97 | 1.6061 | 1.1605 | 0.2284 | 0.2630 | 0.8686 | 0.8768 | 828.03 | | | |
| 2 | rotor | 73.30 | 36.572 | 682.98 | 2.4937 | 1.3167 | 0.4688 | 0.5236 | 0.8954 | 0.9073 | 1889.22 | 1401.16 | 4279.91 | 1.0000 |
| 2 | stator | 73.30 | 35.887 | 682.98 | 2.4470 | 1.3167 | 0.4579 | 0.5236 | 0.8745 | 0.8885 | 1631.83 | | | |

1

** values of parameters on streamlines at station, 1, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.099 | -11.000 | | | | | | | | | | | | |
| 1 | 10.099 | -11.000 | 514.40 | 514.40 | 0.00 | 514.40 | 0.4727 | 0.00 | -0.13 | 0.000 | 14.142 | 518.70 | 12.151 | 497.25 |
| 2 | 9.632 | -11.000 | 571.81 | 571.82 | 0.00 | 571.82 | 0.5281 | 0.00 | -0.15 | 0.000 | 14.670 | 518.70 | 12.150 | 492.18 |
| 3 | 9.167 | -11.000 | 574.77 | 574.78 | 0.00 | 574.78 | 0.5310 | 0.00 | -0.22 | 0.000 | 14.700 | 518.70 | 12.151 | 491.90 |
| 4 | 8.675 | -11.000 | 574.69 | 574.69 | 0.00 | 574.69 | 0.5309 | 0.00 | -0.30 | 0.000 | 14.700 | 518.70 | 12.152 | 491.91 |
| 5 | 8.154 | -11.000 | 574.57 | 574.58 | 0.00 | 574.58 | 0.5308 | 0.00 | -0.38 | 0.000 | 14.700 | 518.70 | 12.152 | 491.92 |
| 6 | 7.597 | -11.000 | 574.41 | 574.43 | 0.00 | 574.43 | 0.5306 | 0.00 | -0.48 | 0.000 | 14.700 | 518.70 | 12.154 | 491.93 |
| 7 | 6.996 | -11.000 | 574.20 | 574.23 | 0.00 | 574.23 | 0.5305 | 0.00 | -0.60 | 0.001 | 14.700 | 518.70 | 12.155 | 491.95 |
| 8 | 6.338 | -11.000 | 573.95 | 573.99 | 0.00 | 573.99 | 0.5302 | 0.00 | -0.75 | 0.001 | 14.700 | 518.70 | 12.157 | 491.97 |
| 9 | 5.603 | -11.000 | 573.64 | 573.72 | 0.00 | 573.72 | 0.5300 | 0.00 | -0.94 | 0.001 | 14.700 | 518.70 | 12.160 | 492.00 |
| 10 | 4.755 | -11.000 | 573.30 | 573.43 | 0.00 | 573.43 | 0.5297 | 0.00 | -1.23 | 0.000 | 14.700 | 518.70 | 12.162 | 492.03 |
| 11 | 3.714 | -11.000 | 568.59 | 568.88 | 0.00 | 568.88 | 0.5253 | 0.00 | -1.84 | 0.001 | 14.660 | 518.70 | 12.166 | 492.45 |
| hub | 3.714 | -11.000 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 2, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.099 | -9.000 | | | | | | | | | | | | |
| 1 | 10.095 | -9.000 | 516.05 | 516.05 | 0.00 | 516.05 | 0.4743 | 0.00 | -0.11 | 0.000 | 14.178 | 518.70 | 12.170 | 497.11 |
| 2 | 9.627 | -9.000 | 569.34 | 569.34 | 0.00 | 569.34 | 0.5257 | 0.00 | -0.13 | 0.000 | 14.669 | 518.70 | 12.170 | 492.41 |
| 3 | 9.160 | -9.000 | 572.19 | 572.19 | 0.00 | 572.19 | 0.5285 | 0.00 | -0.18 | 0.000 | 14.698 | 518.70 | 12.170 | 492.14 |
| 4 | 8.666 | -9.000 | 572.03 | 572.03 | 0.00 | 572.03 | 0.5283 | 0.00 | -0.24 | 0.001 | 14.698 | 518.70 | 12.172 | 492.16 |
| 5 | 8.142 | -9.000 | 571.80 | 571.81 | 0.00 | 571.81 | 0.5281 | 0.00 | -0.31 | 0.001 | 14.698 | 518.70 | 12.174 | 492.18 |
| 6 | 7.582 | -9.000 | 571.50 | 571.52 | 0.00 | 571.52 | 0.5278 | 0.00 | -0.40 | 0.001 | 14.698 | 518.70 | 12.176 | 492.20 |
| 7 | 6.977 | -9.000 | 571.12 | 571.15 | 0.00 | 571.15 | 0.5275 | 0.00 | -0.51 | 0.001 | 14.698 | 518.70 | 12.179 | 492.24 |
| 8 | 6.314 | -9.000 | 570.66 | 570.69 | 0.00 | 570.69 | 0.5270 | 0.00 | -0.65 | 0.001 | 14.698 | 518.70 | 12.183 | 492.28 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 5.572 | -9.000 | 570.11 | 570.18 | 0.00 | 570.18 | 0.5265 | 0.00 | -0.85 | 0.001 | 14.698 | 518.70 | 12.187 | 492.33 |
| 10 | 4.713 | -9.000 | 569.52 | 569.64 | 0.00 | 569.64 | 0.5260 | 0.00 | -1.15 | 0.001 | 14.698 | 518.70 | 12.192 | 492.38 |
| 11 | 3.655 | -9.000 | 564.50 | 564.71 | 0.00 | 564.71 | 0.5212 | 0.00 | -1.54 | 0.002 | 14.658 | 518.70 | 12.199 | 492.83 |
| hub | 3.643 | -9.000 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 3, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.100 | -7.000 | | | | | | | | | | | | |
| 1 | 10.091 | -7.000 | 517.54 | 517.54 | 0.00 | 517.54 | 0.4758 | 0.00 | -0.09 | 0.000 | 14.209 | 518.70 | 12.186 | 496.98 |
| 2 | 9.624 | -7.000 | 567.28 | 567.28 | 0.00 | 567.28 | 0.5237 | 0.00 | -0.08 | 0.000 | 14.668 | 518.70 | 12.186 | 492.60 |
| 3 | 9.154 | -7.000 | 570.02 | 570.02 | 0.00 | 570.02 | 0.5264 | 0.00 | -0.11 | 0.001 | 14.696 | 518.70 | 12.187 | 492.34 |
| 4 | 8.659 | -7.000 | 569.76 | 569.76 | 0.00 | 569.76 | 0.5261 | 0.00 | -0.14 | 0.001 | 14.696 | 518.70 | 12.189 | 492.37 |
| 5 | 8.134 | -7.000 | 569.35 | 569.36 | 0.00 | 569.36 | 0.5257 | 0.00 | -0.18 | 0.002 | 14.696 | 518.70 | 12.192 | 492.40 |
| 6 | 7.571 | -7.000 | 568.75 | 568.75 | 0.00 | 568.75 | 0.5251 | 0.00 | -0.23 | 0.002 | 14.696 | 518.70 | 12.197 | 492.46 |
| 7 | 6.963 | -7.000 | 567.88 | 567.89 | 0.00 | 567.89 | 0.5243 | 0.00 | -0.30 | 0.003 | 14.696 | 518.70 | 12.204 | 492.54 |
| 8 | 6.295 | -7.000 | 566.67 | 566.68 | 0.00 | 566.68 | 0.5231 | 0.00 | -0.41 | 0.003 | 14.696 | 518.70 | 12.214 | 492.65 |
| 9 | 5.546 | -7.000 | 565.07 | 565.10 | 0.00 | 565.10 | 0.5216 | 0.00 | -0.60 | 0.004 | 14.696 | 518.70 | 12.227 | 492.80 |
| 10 | 4.676 | -7.000 | 563.17 | 563.25 | 0.00 | 563.25 | 0.5198 | 0.00 | -0.98 | 0.003 | 14.696 | 518.70 | 12.242 | 492.97 |
| 11 | 3.597 | -7.000 | 559.49 | 559.87 | 0.00 | 559.87 | 0.5165 | 0.00 | -2.11 | -0.007 | 14.656 | 518.70 | 12.237 | 493.28 |
| hub | 3.572 | -7.000 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 4, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.101 | -5.200 | | | | | | | | | | | | |
| 1 | 10.088 | -5.200 | 520.17 | 520.17 | 0.00 | 520.17 | 0.4783 | 0.00 | -0.16 | -0.002 | 14.234 | 518.70 | 12.187 | 496.76 |
| 2 | 9.621 | -5.200 | 567.49 | 567.49 | 0.00 | 567.49 | 0.5239 | 0.00 | -0.13 | -0.001 | 14.667 | 518.70 | 12.183 | 492.58 |
| 3 | 9.152 | -5.200 | 570.56 | 570.56 | 0.00 | 570.56 | 0.5269 | 0.00 | -0.09 | 0.000 | 14.695 | 518.70 | 12.181 | 492.29 |
| 4 | 8.657 | -5.200 | 570.47 | 570.47 | 0.00 | 570.47 | 0.5268 | 0.00 | -0.04 | 0.001 | 14.695 | 518.70 | 12.182 | 492.30 |
| 5 | 8.131 | -5.200 | 569.98 | 569.98 | 0.00 | 569.98 | 0.5263 | 0.00 | 0.03 | 0.002 | 14.695 | 518.70 | 12.186 | 492.35 |
| 6 | 7.568 | -5.200 | 569.00 | 569.00 | 0.00 | 569.00 | 0.5254 | 0.00 | 0.09 | 0.004 | 14.695 | 518.70 | 12.194 | 492.44 |
| 7 | 6.959 | -5.200 | 567.39 | 567.39 | 0.00 | 567.39 | 0.5238 | 0.00 | 0.14 | 0.005 | 14.695 | 518.70 | 12.207 | 492.59 |
| 8 | 6.290 | -5.200 | 564.90 | 564.90 | 0.00 | 564.90 | 0.5214 | 0.00 | 0.17 | 0.008 | 14.695 | 518.70 | 12.228 | 492.82 |
| 9 | 5.537 | -5.200 | 560.98 | 560.98 | 0.00 | 560.98 | 0.5176 | 0.00 | 0.17 | 0.011 | 14.695 | 518.70 | 12.260 | 493.17 |
| 10 | 4.658 | -5.200 | 554.29 | 554.29 | 0.00 | 554.29 | 0.5111 | 0.00 | 0.07 | 0.017 | 14.695 | 518.70 | 12.314 | 493.78 |
| 11 | 3.546 | -5.200 | 532.01 | 532.01 | 0.00 | 532.01 | 0.4896 | 0.00 | 0.02 | 0.043 | 14.655 | 518.70 | 12.457 | 495.75 |
| hub | 3.507 | -5.200 | | | | | | | | | | | | |

1

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

** values of parameters on streamlines at station, 5, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.101 | -3.700 | | | | | | | | | | | | |
| 1 | 10.079 | -3.700 | 527.31 | 527.34 | 0.00 | 527.34 | 0.4852 | 0.00 | -0.65 | -0.005 | 14.253 | 518.70 | 12.150 | 496.15 |
| 2 | 9.616 | -3.700 | 572.30 | 572.31 | 0.00 | 572.31 | 0.5286 | 0.00 | -0.29 | -0.001 | 14.666 | 518.70 | 12.143 | 492.13 |
| 3 | 9.149 | -3.700 | 575.09 | 575.10 | 0.00 | 575.10 | 0.5313 | 0.00 | -0.09 | 0.001 | 14.694 | 518.70 | 12.143 | 491.87 |
| 4 | 8.657 | -3.700 | 574.82 | 574.82 | 0.00 | 574.82 | 0.5310 | 0.00 | 0.08 | 0.001 | 14.694 | 518.70 | 12.145 | 491.90 |
| 5 | 8.134 | -3.700 | 574.22 | 574.23 | 0.00 | 574.23 | 0.5305 | 0.00 | 0.25 | 0.003 | 14.694 | 518.70 | 12.150 | 491.95 |
| 6 | 7.575 | -3.700 | 573.10 | 573.11 | 0.00 | 573.11 | 0.5294 | 0.00 | 0.45 | 0.004 | 14.694 | 518.70 | 12.159 | 492.06 |
| 7 | 6.970 | -3.700 | 571.07 | 571.11 | 0.00 | 571.11 | 0.5274 | 0.00 | 0.69 | 0.007 | 14.694 | 518.70 | 12.176 | 492.24 |
| 8 | 6.305 | -3.700 | 567.60 | 567.68 | 0.00 | 567.68 | 0.5241 | 0.00 | 0.97 | 0.011 | 14.694 | 518.70 | 12.204 | 492.56 |
| 9 | 5.556 | -3.700 | 561.94 | 562.09 | 0.00 | 562.09 | 0.5187 | 0.00 | 1.30 | 0.015 | 14.694 | 518.70 | 12.250 | 493.07 |
| 10 | 4.681 | -3.700 | 553.23 | 553.46 | 0.00 | 553.46 | 0.5103 | 0.00 | 1.64 | 0.020 | 14.694 | 518.70 | 12.320 | 493.86 |
| 11 | 3.581 | -3.700 | 544.15 | 544.37 | 0.00 | 544.37 | 0.5015 | 0.00 | 1.64 | -0.003 | 14.654 | 518.70 | 12.359 | 494.67 |
| hub | 3.518 | -3.700 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 6, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.099 | -2.300 | | | | | | | | | | | | |
| 1 | 10.070 | -2.301 | 538.38 | 538.41 | 0.00 | 538.41 | 0.4958 | 0.00 | 0.59 | 0.021 | 14.269 | 518.70 | 12.079 | 495.19 |
| 2 | 9.611 | -2.322 | 577.50 | 577.50 | 0.00 | 577.50 | 0.5336 | 0.00 | 0.11 | 0.002 | 14.666 | 518.70 | 12.100 | 491.64 |
| 3 | 9.147 | -2.344 | 580.54 | 580.54 | 0.00 | 580.54 | 0.5366 | 0.00 | -0.02 | -0.004 | 14.693 | 518.70 | 12.097 | 491.36 |
| 4 | 8.658 | -2.366 | 581.80 | 581.80 | 0.00 | 581.80 | 0.5378 | 0.00 | 0.06 | -0.005 | 14.693 | 518.70 | 12.087 | 491.24 |
| 5 | 8.140 | -2.390 | 582.87 | 582.88 | 0.00 | 582.88 | 0.5389 | 0.00 | 0.30 | -0.003 | 14.693 | 518.70 | 12.078 | 491.14 |
| 6 | 7.588 | -2.415 | 582.88 | 582.92 | 0.00 | 582.92 | 0.5389 | 0.00 | 0.69 | 0.001 | 14.693 | 518.70 | 12.077 | 491.13 |
| 7 | 6.991 | -2.442 | 581.06 | 581.18 | 0.00 | 581.18 | 0.5372 | 0.00 | 1.20 | 0.007 | 14.693 | 518.70 | 12.092 | 491.30 |
| 8 | 6.335 | -2.472 | 576.53 | 576.83 | 0.00 | 576.83 | 0.5330 | 0.00 | 1.83 | 0.014 | 14.693 | 518.70 | 12.128 | 491.71 |
| 9 | 5.597 | -2.506 | 568.08 | 568.65 | 0.00 | 568.65 | 0.5250 | 0.00 | 2.57 | 0.022 | 14.693 | 518.70 | 12.195 | 492.47 |
| 10 | 4.730 | -2.546 | 553.40 | 554.36 | 0.00 | 554.36 | 0.5112 | 0.00 | 3.37 | 0.034 | 14.693 | 518.70 | 12.311 | 493.77 |
| 11 | 3.623 | -2.596 | 516.51 | 517.64 | 0.00 | 517.64 | 0.4758 | 0.00 | 3.79 | 0.076 | 14.653 | 518.70 | 12.566 | 496.97 |
| hub | 3.540 | -2.600 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 7, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.100 | -1.000 | | | | | | | | | | | | |
| 1 | 10.065 | -1.003 | 503.32 | 504.16 | 0.00 | 504.16 | 0.4629 | 0.00 | -3.30 | -0.109 | 14.282 | 518.70 | 12.347 | 498.09 |
| 2 | 9.594 | -1.039 | 567.73 | 568.38 | 0.00 | 568.38 | 0.5248 | 0.00 | -2.75 | -0.066 | 14.665 | 518.70 | 12.175 | 492.49 |
| 3 | 9.129 | -1.075 | 585.24 | 585.66 | 0.00 | 585.66 | 0.5416 | 0.00 | -2.15 | -0.044 | 14.692 | 518.70 | 12.054 | 490.87 |
| 4 | 8.647 | -1.113 | 595.48 | 595.67 | 0.00 | 595.67 | 0.5514 | 0.00 | -1.45 | -0.029 | 14.692 | 518.70 | 11.969 | 489.91 |
| 5 | 8.139 | -1.152 | 601.95 | 601.98 | 0.00 | 601.98 | 0.5575 | 0.00 | -0.60 | -0.017 | 14.692 | 518.70 | 11.916 | 489.30 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 7.601 | -1.194 | 604.69 | 604.70 | 0.00 | 604.70 | 0.5602 | 0.00 | 0.42 | -0.006 | 14.692 | 518.70 | 11.892 | 489.03 |
| 7 | 7.021 | -1.239 | 603.31 | 603.54 | 0.00 | 603.54 | 0.5591 | 0.00 | 1.59 | 0.004 | 14.692 | 518.70 | 11.902 | 489.14 |
| 8 | 6.384 | -1.288 | 597.19 | 597.97 | 0.00 | 597.97 | 0.5536 | 0.00 | 2.92 | 0.014 | 14.692 | 518.70 | 11.950 | 489.69 |
| 9 | 5.667 | -1.343 | 585.12 | 586.88 | 0.00 | 586.88 | 0.5428 | 0.00 | 4.44 | 0.026 | 14.692 | 518.70 | 12.043 | 490.76 |
| 10 | 4.825 | -1.409 | 564.31 | 567.72 | 0.00 | 567.72 | 0.5241 | 0.00 | 6.28 | 0.041 | 14.692 | 518.70 | 12.202 | 492.56 |
| 11 | 3.748 | -1.492 | 523.13 | 529.73 | 0.00 | 529.73 | 0.4875 | 0.00 | 9.05 | 0.061 | 14.653 | 518.70 | 12.472 | 495.94 |
| hub | 3.646 | -1.500 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 8, which is the inlet of rotor number, 1 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.034 | 0.197 | | | | | | | | | | | | |
| 1 | 9.913 | 0.164 | 583.34 | 584.62 | 0.00 | 584.62 | 0.5406 | 0.00 | -3.79 | -0.105 | 14.294 | 518.70 | 11.736 | 490.97 |
| 2 | 9.490 | 0.049 | 633.04 | 637.15 | 0.00 | 637.15 | 0.5922 | 0.00 | -6.51 | -0.026 | 14.665 | 518.70 | 11.588 | 485.75 |
| 3 | 9.055 | -0.008 | 641.47 | 643.60 | 0.00 | 643.60 | 0.5986 | 0.00 | -4.66 | -0.018 | 14.691 | 518.70 | 11.551 | 485.08 |
| 4 | 8.599 | -0.072 | 645.10 | 646.04 | 0.00 | 646.04 | 0.6010 | 0.00 | -3.09 | -0.012 | 14.691 | 518.70 | 11.530 | 484.82 |
| 5 | 8.117 | -0.146 | 645.55 | 645.79 | 0.00 | 645.79 | 0.6008 | 0.00 | -1.57 | -0.007 | 14.691 | 518.70 | 11.532 | 484.85 |
| 6 | 7.601 | -0.228 | 643.05 | 643.06 | 0.00 | 643.06 | 0.5981 | 0.00 | 0.06 | -0.002 | 14.691 | 518.70 | 11.556 | 485.13 |
| 7 | 7.043 | -0.322 | 637.10 | 637.41 | 0.00 | 637.41 | 0.5925 | 0.00 | 1.80 | 0.003 | 14.691 | 518.70 | 11.607 | 485.72 |
| 8 | 6.428 | -0.435 | 627.22 | 628.49 | 0.00 | 628.49 | 0.5836 | 0.00 | 3.65 | 0.010 | 14.691 | 518.70 | 11.685 | 486.64 |
| 9 | 5.733 | -0.561 | 612.28 | 615.33 | 0.00 | 615.33 | 0.5707 | 0.00 | 5.70 | 0.018 | 14.691 | 518.70 | 11.800 | 487.97 |
| 10 | 4.914 | -0.722 | 589.87 | 595.80 | 0.00 | 595.80 | 0.5515 | 0.00 | 8.09 | 0.029 | 14.691 | 518.70 | 11.968 | 489.90 |
| 11 | 3.883 | -0.879 | 557.25 | 569.33 | 0.00 | 569.33 | 0.5257 | 0.00 | 11.82 | 0.043 | 14.652 | 518.70 | 12.156 | 492.41 |
| hub | 3.762 | -0.898 | | | | | | | | | | | | |

| streamline no. | r/rtip | rel.flow angle (deg) | rel. tang.vel. (ft/sec) | rel. vel. (ft/sec) | rel.mach number | wheel speed (ft/sec) | flow coef. |
|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | 1404.81 | |
| 1 | 0.9879 | 67.16 | 1387.87 | 1505.98 | 1.3925 | 1387.87 | 0.4152 |
| 2 | 0.9457 | 64.38 | 1328.58 | 1473.46 | 1.3695 | 1328.58 | 0.4506 |
| 3 | 0.9024 | 63.08 | 1267.74 | 1421.76 | 1.3223 | 1267.74 | 0.4566 |
| 4 | 0.8569 | 61.78 | 1203.82 | 1366.22 | 1.2710 | 1203.82 | 0.4592 |
| 5 | 0.8089 | 60.39 | 1136.32 | 1307.01 | 1.2159 | 1136.32 | 0.4595 |
| 6 | 0.7575 | 58.86 | 1064.19 | 1243.39 | 1.1564 | 1064.19 | 0.4578 |
| 7 | 0.7019 | 57.12 | 986.07 | 1174.15 | 1.0913 | 986.07 | 0.4535 |
| 8 | 0.6406 | 55.07 | 899.95 | 1097.68 | 1.0193 | 899.95 | 0.4465 |
| 9 | 0.5713 | 52.52 | 802.57 | 1011.31 | 0.9379 | 802.57 | 0.4358 |
| 10 | 0.4898 | 49.11 | 688.02 | 910.14 | 0.8425 | 688.02 | 0.4199 |
| 11 | 0.3870 | 43.68 | 543.68 | 787.23 | 0.7269 | 543.68 | 0.3967 |
| hub | 0.3749 | | | | | | |

| streamline no. | pct. pass. | inlet streamline: inc. angle (deg) | inlet streamline: ref. inc. (deg) | inlet streamline: s.s.inc. angle (deg) | inlet streamline: in.blade angle (deg) | streamline element: element slope (deg) | streamline element: mach no. at shock location | streamline element: sh.loc. as fract of s.s. | streamline element: cov.chan. as fract of s.s. | streamline element: min.chk. area margin | streamline element: min.chk. pt.loc.in cov.chan. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.93 | 1.19 | -2.25 | -0.92 | 65.97 | -8.82 | 1.4852 | 0.6871 | 0.3129 | -0.0049 | 0.2135 |
| 2 | 8.68 | 1.24 | -2.08 | -0.94 | 63.14 | -6.37 | 1.4479 | 0.6422 | 0.3578 | 0.0012 | 0.3969 |
| 3 | 15.61 | 1.87 | -1.96 | -0.53 | 61.22 | -4.60 | 1.4004 | 0.6047 | 0.3953 | 0.0086 | 0.4483 |
| 4 | 22.89 | 2.41 | -1.88 | -0.33 | 59.37 | -3.04 | 1.3574 | 0.5629 | 0.4371 | 0.0087 | 0.4400 |
| 5 | 30.57 | 3.12 | -1.86 | -0.09 | 57.27 | -1.48 | 1.3171 | 0.5177 | 0.4823 | 0.0075 | 0.4327 |
| 6 | 38.79 | 3.88 | -1.86 | 0.03 | 54.98 | 0.24 | 1.2812 | 0.4684 | 0.5316 | 0.0100 | 0.4048 |
| 7 | 47.68 | 4.76 | -1.89 | 0.13 | 52.36 | 2.12 | 1.2434 | 0.4156 | 0.5844 | 0.0142 | 0.3658 |
| 8 | 57.49 | 5.72 | -1.92 | 0.17 | 49.35 | 4.14 | 1.2109 | 0.3579 | 0.6421 | 0.0259 | 0.2718 |
| 9 | 68.58 | 6.76 | -1.97 | -0.03 | 45.76 | 6.44 | 1.1438 | 0.2947 | 0.7053 | 0.0412 | 0.2730 |
| 10 | 81.62 | 7.12 | -2.13 | -0.37 | 41.99 | 9.24 | 1.0348 | 0.2296 | 0.7704 | 0.0400 | 0.2540 |
| 11 | 98.06 | 6.15 | -2.57 | -1.66 | 37.53 | 13.26 | 0.8730 | 0.1548 | 0.7730 | 0.0542 | 0.2870 |

1

** values of parameters on streamlines at station, 9, which is the outlet of rotor number, 1 **

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.756 | 1.778 | | | | | | | | | | | | |
| 1 | 9.661 | 1.793 | 525.38 | 530.08 | 460.98 | 702.48 | 0.6001 | 41.01 | -7.63 | 0.059 | 24.679 | 618.54 | 19.412 | 579.29 |
| 2 | 9.288 | 1.852 | 535.09 | 537.32 | 438.42 | 693.49 | 0.5961 | 39.21 | -5.22 | 0.042 | 24.587 | 610.08 | 19.397 | 571.76 |
| 3 | 8.903 | 1.887 | 519.13 | 520.23 | 430.07 | 674.98 | 0.5818 | 39.58 | -3.73 | 0.030 | 24.175 | 604.67 | 19.279 | 568.33 |
| 4 | 8.492 | 1.943 | 517.84 | 518.26 | 436.02 | 677.28 | 0.5853 | 40.07 | -2.30 | 0.022 | 24.053 | 601.86 | 19.130 | 565.25 |
| 5 | 8.061 | 2.012 | 522.04 | 522.10 | 449.18 | 688.73 | 0.5968 | 40.71 | -0.87 | 0.016 | 24.025 | 600.04 | 18.940 | 562.16 |
| 6 | 7.611 | 2.105 | 531.22 | 531.25 | 476.79 | 713.83 | 0.6199 | 41.91 | 0.62 | 0.010 | 24.147 | 600.22 | 18.693 | 559.52 |
| 7 | 7.137 | 2.208 | 533.53 | 533.91 | 504.80 | 734.77 | 0.6398 | 43.39 | 2.16 | 0.002 | 24.124 | 599.64 | 18.377 | 556.49 |
| 8 | 6.628 | 2.331 | 537.45 | 538.65 | 542.54 | 764.52 | 0.6678 | 45.21 | 3.83 | -0.006 | 24.132 | 599.49 | 17.956 | 552.76 |
| 9 | 6.075 | 2.477 | 541.12 | 543.82 | 583.81 | 797.85 | 0.7001 | 47.03 | 5.70 | -0.015 | 24.025 | 598.39 | 17.380 | 547.47 |
| 10 | 5.456 | 2.609 | 546.02 | 551.45 | 642.44 | 846.65 | 0.7478 | 49.36 | 8.04 | -0.026 | 23.912 | 597.47 | 16.562 | 540.07 |
| 11 | 4.728 | 2.703 | 554.54 | 565.66 | 737.20 | 929.22 | 0.8298 | 52.50 | 11.38 | -0.042 | 23.832 | 597.02 | 15.232 | 527.79 |
| hub | 4.664 | 2.712 | | | | | | | | | | | | |

| streamline no. | r/rtip | rel.flow angle (deg) | rel. tang.vel. (ft/sec) | rel. vel. (ft/sec) | rel.mach number | wheel speed (ft/sec) | flow coef. | head coef. | ideal head coef. | adiab. eff. | diffusion factor | loss coef. | shock loss coef. | element solidity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | | | | | | | | | |
| 1 | 0.9902 | 59.26 | 891.51 | 1037.20 | 0.8860 | 1352.49 | 0.3740 | 0.2660 | 0.3159 | 0.8419 | 0.4271 | 0.1262 | 0.0439 | 1.3046 |
| 2 | 0.9521 | 58.06 | 861.97 | 1015.73 | 0.8730 | 1300.39 | 0.3809 | 0.2507 | 0.2889 | 0.8677 | 0.4186 | 0.1012 | 0.0390 | 1.3630 |
| 3 | 0.9126 | 57.49 | 816.33 | 968.00 | 0.8344 | 1246.40 | 0.3695 | 0.2410 | 0.2716 | 0.8871 | 0.4244 | 0.0859 | 0.0331 | 1.4253 |
| 4 | 0.8704 | 55.46 | 752.83 | 913.97 | 0.7899 | 1188.84 | 0.3686 | 0.2383 | 0.2627 | 0.9074 | 0.4369 | 0.0721 | 0.0279 | 1.4979 |
| 5 | 0.8263 | 52.46 | 679.34 | 856.79 | 0.7424 | 1128.52 | 0.3716 | 0.2377 | 0.2569 | 0.9255 | 0.4527 | 0.0603 | 0.0231 | 1.5826 |
| 6 | 0.7802 | 47.94 | 588.78 | 793.02 | 0.6887 | 1065.57 | 0.3781 | 0.2404 | 0.2574 | 0.9336 | 0.4762 | 0.0576 | 0.0191 | 1.6832 |
| 7 | 0.7315 | 42.80 | 494.37 | 727.64 | 0.6336 | 999.17 | 0.3798 | 0.2399 | 0.2556 | 0.9385 | 0.5001 | 0.0575 | 0.0149 | 1.8065 |
| 8 | 0.6794 | 35.59 | 385.43 | 662.35 | 0.5786 | 927.96 | 0.3826 | 0.2400 | 0.2551 | 0.9409 | 0.5244 | 0.0609 | 0.0118 | 1.9636 |
| 9 | 0.6227 | 26.13 | 266.74 | 605.71 | 0.5315 | 850.54 | 0.3852 | 0.2377 | 0.2516 | 0.9448 | 0.5375 | 0.0638 | 0.0052 | 2.1763 |
| 10 | 0.5593 | 12.42 | 121.41 | 564.65 | 0.4987 | 763.84 | 0.3887 | 0.2353 | 0.2487 | 0.9463 | 0.5286 | 0.0729 | 0.0001 | 2.4929 |
| 11 | 0.4846 | -7.58 | -75.32 | 570.66 | 0.5096 | 661.88 | 0.3947 | 0.2350 | 0.2472 | 0.9503 | 0.4435 | 0.0859 | 0.0000 | 3.0528 |
| hub | 0.4780 | | | | | | | | | | | | | |

| streamline no. | pct. pass. | press. ratio | temp. ratio | local blade forces radius (in.) | for.axial (lbs/in) | tang. (lbs/in) | -- out. stream. -- dev. angle (deg) | out.blade angle (deg) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1.87 | 1.7265 | 1.1925 | 9.7870 | 20.0553 | -11.9990 | 5.26 | 54.01 |
| 2 | 9.18 | 1.6766 | 1.1762 | 9.3892 | 18.5167 | -11.2417 | 4.95 | 53.11 |
| 3 | 16.75 | 1.6455 | 1.1657 | 8.9791 | 16.8884 | -10.5630 | 4.66 | 52.83 |
| 4 | 24.83 | 1.6372 | 1.1603 | 8.5452 | 15.6417 | -10.1490 | 4.71 | 50.75 |
| 5 | 33.29 | 1.6353 | 1.1568 | 8.0887 | 14.4177 | -9.9156 | 4.92 | 47.53 |
| 6 | 42.12 | 1.6436 | 1.1572 | 7.6063 | 13.1753 | -9.9002 | 5.49 | 42.45 |
| 7 | 51.43 | 1.6420 | 1.1560 | 7.0902 | 11.6547 | -9.7158 | 6.18 | 36.62 |
| 8 | 61.42 | 1.6426 | 1.1558 | 6.5283 | 9.9691 | -9.4993 | 7.25 | 28.33 |
| 9 | 72.28 | 1.6353 | 1.1536 | 5.9040 | 8.0061 | -9.0478 | 8.61 | 17.52 |
| 10 | 84.44 | 1.6276 | 1.1519 | 5.1852 | 5.6451 | -8.4096 | 10.49 | 1.92 |
| 11 | 98.74 | 1.6265 | 1.1510 | 4.3056 | 2.6711 | -8.6788 | 11.84 | -19.42 |

1

** values of parameters on streamlines at station, 10, which is an annulus **

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.630 | 3.000 | | | | | | | | | | | | |
| 1 | 9.575 | 3.003 | 561.33 | 561.86 | 465.12 | 729.40 | 0.6251 | 39.62 | -2.50 | 0.034 | 24.669 | 617.67 | 19.024 | 575.32 |
| 2 | 9.226 | 3.025 | 574.95 | 575.30 | 441.38 | 725.11 | 0.6253 | 37.50 | -2.01 | 0.029 | 24.580 | 609.83 | 18.950 | 567.91 |
| 3 | 8.862 | 3.047 | 558.21 | 558.38 | 432.04 | 706.01 | 0.6103 | 37.73 | -1.40 | 0.024 | 24.175 | 604.67 | 18.859 | 564.90 |
| 4 | 8.474 | 3.071 | 555.03 | 555.06 | 436.90 | 706.38 | 0.6121 | 38.21 | -0.61 | 0.018 | 24.055 | 601.93 | 18.738 | 562.09 |
| 5 | 8.067 | 3.096 | 556.48 | 556.49 | 448.82 | 714.92 | 0.6210 | 38.89 | 0.29 | 0.013 | 24.027 | 600.14 | 18.584 | 559.30 |
| 6 | 7.640 | 3.122 | 562.34 | 562.47 | 475.01 | 736.21 | 0.6407 | 40.18 | 1.23 | 0.008 | 24.148 | 600.32 | 18.381 | 557.01 |
| 7 | 7.186 | 3.150 | 562.11 | 562.55 | 501.35 | 753.53 | 0.6573 | 41.71 | 2.27 | 0.002 | 24.125 | 599.73 | 18.112 | 554.35 |
| 8 | 6.697 | 3.180 | 563.16 | 564.20 | 537.02 | 778.92 | 0.6814 | 43.59 | 3.48 | -0.004 | 24.133 | 599.59 | 17.749 | 551.07 |
| 9 | 6.160 | 3.213 | 563.37 | 565.47 | 575.77 | 807.01 | 0.7088 | 45.52 | 4.93 | -0.011 | 24.026 | 598.49 | 17.247 | 546.38 |
| 10 | 5.559 | 3.250 | 565.13 | 569.14 | 630.52 | 849.40 | 0.7504 | 47.93 | 6.80 | -0.022 | 23.914 | 597.57 | 16.522 | 539.79 |
| 11 | 4.860 | 3.293 | 567.77 | 577.54 | 717.09 | 920.74 | 0.8212 | 51.15 | 10.55 | -0.041 | 23.834 | 597.13 | 15.367 | 529.16 |
| hub | 4.750 | 3.300 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 11, which is the inlet of stator number, 1, of stage number, 1 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.599 | 4.118 | | | | | | | | | | | | |
| 1 | 9.538 | 4.117 | 578.27 | 578.35 | 466.89 | 743.29 | 0.6382 | 38.91 | -0.97 | 0.013 | 24.660 | 616.95 | 18.814 | 572.96 |
| 2 | 9.197 | 4.115 | 594.55 | 594.57 | 442.77 | 741.32 | 0.6404 | 36.67 | -0.45 | 0.017 | 24.573 | 609.60 | 18.713 | 565.78 |
| 3 | 8.843 | 4.119 | 579.89 | 579.89 | 433.00 | 723.72 | 0.6267 | 36.75 | 0.03 | 0.017 | 24.174 | 604.67 | 18.614 | 562.86 |
| 4 | 8.466 | 4.123 | 576.92 | 576.95 | 437.34 | 723.97 | 0.6284 | 37.16 | 0.54 | 0.014 | 24.056 | 601.99 | 18.497 | 560.13 |
| 5 | 8.071 | 4.128 | 578.13 | 578.23 | 448.64 | 731.87 | 0.6367 | 37.81 | 1.08 | 0.010 | 24.028 | 600.21 | 18.350 | 557.42 |
| 6 | 7.655 | 4.135 | 583.61 | 583.87 | 474.04 | 752.08 | 0.6556 | 39.07 | 1.70 | 0.006 | 24.150 | 600.40 | 18.157 | 555.19 |
| 7 | 7.215 | 4.143 | 583.06 | 583.59 | 499.34 | 768.06 | 0.6710 | 40.55 | 2.45 | 0.002 | 24.126 | 599.81 | 17.904 | 552.65 |
| 8 | 6.740 | 4.151 | 583.41 | 584.40 | 533.53 | 791.32 | 0.6931 | 42.39 | 3.35 | -0.001 | 24.134 | 599.67 | 17.568 | 549.59 |
| 9 | 6.221 | 4.161 | 582.38 | 584.13 | 570.14 | 816.26 | 0.7177 | 44.31 | 4.44 | -0.006 | 24.028 | 598.58 | 17.111 | 545.26 |
| 10 | 5.640 | 4.173 | 582.71 | 585.61 | 621.47 | 853.91 | 0.7548 | 46.70 | 5.71 | -0.015 | 23.916 | 597.66 | 16.456 | 539.26 |
| 11 | 4.969 | 4.180 | 589.30 | 594.04 | 701.35 | 919.12 | 0.8196 | 49.74 | 7.25 | -0.039 | 23.836 | 597.22 | 15.395 | 529.49 |
| hub | 4.847 | 4.181 | | | | | | | | | | | | |

| streamline no. | r/rtip | flow coef. | rel.flow angle (deg) |
|---|---|---|---|
| tip | 1.0000 | | |
| 1 | 0.9937 | 0.4116 | 56.34 |
| 2 | 0.9581 | 0.4232 | 54.86 |
| 3 | 0.9212 | 0.4128 | 54.23 |
| 4 | 0.8820 | 0.4107 | 52.35 |
| 5 | 0.8408 | 0.4115 | 49.68 |
| 6 | 0.7975 | 0.4154 | 45.67 |
| 7 | 0.7516 | 0.4150 | 41.19 |
| 8 | 0.7022 | 0.4153 | 35.06 |
| 9 | 0.6481 | 0.4146 | 27.24 |
| 10 | 0.5876 | 0.4148 | 16.02 |
| 11 | 0.5177 | 0.4195 | -0.54 |
| hub | 0.5050 | | |

| | | ------ inlet streamline ------ | | | | ---------- streamline element ---------- | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| streamline no. | pct. pass. | inc. angle (deg) | ref. inc. (deg) | s.s.inc. angle (deg) | in.blade angle (deg) | element slope (deg) | mach no. at shock location | sh.loc. as fract of s.s. | cov.chan. as fract of s.s. | min.chk. area margin | min.chk. pt.loc.in cov.chan. |
| 1 | 1.28 | 2.18 | -2.25 | -3.99 | 36.73 | -0.30 | 0.8593 | 0.3342 | 0.5159 | 0.1942 | 0.0000 |
| 2 | 8.45 | 3.13 | -2.08 | -3.04 | 33.54 | 0.27 | 0.8318 | 0.3097 | 0.5727 | 0.1761 | 0.0000 |
| 3 | 15.92 | 3.34 | -1.96 | -2.80 | 33.41 | 0.67 | 0.8057 | 0.3026 | 0.5989 | 0.1905 | 0.0000 |
| 4 | 23.84 | 3.32 | -1.88 | -2.78 | 33.84 | 1.00 | 0.8033 | 0.2967 | 0.6153 | 0.1888 | 0.0000 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 32.17 | 3.27 | -1.86 | -2.78 | 34.54 | 1.35 | 0.8106 | 0.2911 | 0.6293 | 0.1799 | 0.0000 |
| 6 | 40.90 | 3.32 | -1.86 | -2.68 | 35.76 | 1.82 | 0.8359 | 0.2872 | 0.6393 | 0.1656 | 0.0000 |
| 7 | 50.17 | 3.36 | -1.89 | -2.57 | 37.19 | 2.45 | 0.8573 | 0.2824 | 0.6493 | 0.1573 | 0.0000 |
| 8 | 60.16 | 3.55 | -1.92 | -2.31 | 38.84 | 3.21 | 0.8898 | 0.2759 | 0.6583 | 0.1495 | 0.0000 |
| 9 | 71.09 | 3.56 | -1.97 | -2.23 | 40.75 | 4.10 | 0.9226 | 0.2674 | 0.6698 | 0.1409 | 0.0000 |
| 10 | 83.31 | 3.30 | -2.13 | -2.38 | 43.40 | 4.99 | 0.9723 | 0.2568 | 0.6777 | 0.1300 | 0.0000 |
| 11 | 97.43 | 2.86 | -2.57 | -2.67 | 46.87 | 5.41 | 1.0608 | 0.2402 | 0.6804 | 0.1134 | 0.0000 |

1

** values of parameters on streamlines at station, 12, which is the outlet of stator number, 1, of stage number, 1 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.596 | 6.353 | | | | | | | | | | | | |
| 1 | 9.526 | 6.352 | 601.43 | 601.49 | -44.71 | 603.15 | 0.5131 | -4.25 | 0.82 | 0.016 | 24.147 | 613.29 | 20.231 | 584.35 |
| 2 | 9.208 | 6.347 | 594.78 | 594.84 | -23.36 | 595.30 | 0.5081 | -2.25 | 0.79 | 0.002 | 24.094 | 608.37 | 20.252 | 580.15 |
| 3 | 8.869 | 6.345 | 567.57 | 567.62 | -10.07 | 567.71 | 0.4851 | -1.02 | 0.80 | -0.006 | 23.731 | 604.58 | 20.250 | 578.90 |
| 4 | 8.505 | 6.344 | 559.73 | 559.80 | -4.88 | 559.82 | 0.4790 | -0.50 | 0.93 | -0.008 | 23.623 | 602.26 | 20.235 | 577.28 |
| 5 | 8.123 | 6.344 | 558.40 | 558.52 | -1.26 | 558.53 | 0.4785 | -0.13 | 1.22 | -0.008 | 23.595 | 600.63 | 20.218 | 575.76 |
| 6 | 7.726 | 6.343 | 567.44 | 567.68 | 0.98 | 567.68 | 0.4866 | 0.10 | 1.64 | -0.007 | 23.697 | 600.81 | 20.201 | 575.11 |
| 7 | 7.309 | 6.343 | 562.91 | 563.32 | 2.63 | 563.33 | 0.4829 | 0.27 | 2.20 | -0.007 | 23.624 | 600.24 | 20.185 | 574.93 |
| 8 | 6.863 | 6.344 | 558.80 | 559.51 | 1.23 | 559.51 | 0.4796 | 0.13 | 2.87 | -0.007 | 23.555 | 600.09 | 20.169 | 575.13 |
| 9 | 6.377 | 6.345 | 543.60 | 544.68 | -0.23 | 544.68 | 0.4668 | -0.02 | 3.61 | -0.008 | 23.347 | 599.04 | 20.152 | 575.38 |
| 10 | 5.830 | 6.347 | 518.00 | 519.45 | -9.19 | 519.53 | 0.4447 | -1.01 | 4.28 | -0.008 | 23.012 | 598.15 | 20.129 | 576.62 |
| 11 | 5.175 | 6.355 | 468.52 | 469.96 | -31.38 | 471.01 | 0.4021 | -3.82 | 4.49 | -0.004 | 22.438 | 597.72 | 20.107 | 580.03 |
| hub | 5.043 | 6.356 | | | | | | | | | | | | |

| streamline no. | r/rtip | flow coef. | head coef. | ideal head coef. | stator po.ratio | stage po.ratio | stage ad.eff. | diffusion factor | stator loss coef. | shock loss coef. | element solidity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | | | | | | |
| 1 | 0.9927 | 0.4281 | 0.2546 | 0.3159 | 0.9792 | 1.6893 | 0.8059 | 0.4555 | 0.0876 | 0.0000 | 1.2900 |
| 2 | 0.9595 | 0.4234 | 0.2401 | 0.2889 | 0.9805 | 1.6429 | 0.8312 | 0.4322 | 0.0818 | 0.0000 | 1.3361 |
| 3 | 0.9241 | 0.4040 | 0.2314 | 0.2716 | 0.9817 | 1.6153 | 0.8519 | 0.4357 | 0.0797 | 0.0000 | 1.3885 |
| 4 | 0.8862 | 0.3984 | 0.2290 | 0.2627 | 0.9820 | 1.6079 | 0.8720 | 0.4370 | 0.0780 | 0.0000 | 1.4493 |
| 5 | 0.8464 | 0.3975 | 0.2284 | 0.2569 | 0.9820 | 1.6060 | 0.8893 | 0.4385 | 0.0763 | 0.0000 | 1.5191 |
| 6 | 0.8050 | 0.4039 | 0.2306 | 0.2574 | 0.9813 | 1.6130 | 0.8959 | 0.4409 | 0.0755 | 0.0000 | 1.5997 |
| 7 | 0.7616 | 0.4007 | 0.2290 | 0.2556 | 0.9792 | 1.6080 | 0.8962 | 0.4561 | 0.0808 | 0.0000 | 1.6947 |
| 8 | 0.7152 | 0.3978 | 0.2276 | 0.2551 | 0.9760 | 1.6033 | 0.8920 | 0.4770 | 0.0882 | 0.0000 | 1.8104 |
| 9 | 0.6646 | 0.3870 | 0.2230 | 0.2516 | 0.9716 | 1.5891 | 0.8862 | 0.5091 | 0.0985 | 0.0000 | 1.9565 |
| 10 | 0.6075 | 0.3687 | 0.2156 | 0.2487 | 0.9622 | 1.5663 | 0.8670 | 0.5605 | 0.1213 | 0.0000 | 2.1509 |
| 11 | 0.5393 | 0.3335 | 0.2041 | 0.2472 | 0.9414 | 1.5314 | 0.8256 | 0.6484 | 0.1656 | 0.0007 | 2.4327 |
| hub | 0.5256 | | | | | | | | | | |

| streamline no. | pct. pass. | local blade forces radius (in.) | for.axial (lbs/in) | tang. (lbs/in) | -- out. stream. -- dev. angle (deg) | out.blade angle (deg) |
|---|---|---|---|---|---|---|
| 1 | 1.54 | 9.5323 | 2.9684 | 10.3937 | 11.93 | -16.18 |
| 2 | 8.54 | 9.2025 | 2.6194 | 9.2374 | 10.21 | -12.46 |
| 3 | 15.99 | 8.8556 | 2.4400 | 8.2889 | 9.58 | -10.60 |
| 4 | 23.98 | 8.4854 | 2.4109 | 7.8124 | 9.24 | -9.74 |
| 5 | 32.37 | 8.0966 | 2.4442 | 7.5881 | 8.99 | -9.12 |
| 6 | 41.09 | 7.6904 | 2.6172 | 7.6009 | 8.90 | -8.81 |
| 7 | 50.24 | 7.2619 | 2.7153 | 7.4989 | 8.87 | -8.60 |
| 8 | 60.03 | 6.8016 | 2.8632 | 7.4237 | 8.91 | -8.79 |
| 9 | 70.70 | 6.2992 | 2.9580 | 7.1902 | 8.96 | -8.98 |
| 10 | 82.73 | 5.7349 | 3.0462 | 6.9337 | 9.27 | -10.28 |
| 11 | 97.10 | 5.0724 | 3.0197 | 7.4102 | 10.39 | -14.21 |

1

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

** values of parameters on streamlines at station, 13, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.603 | 7.340 | | | | | | | | | | | | |
| 1 | 9.534 | 7.340 | 578.89 | 579.01 | -44.68 | 580.73 | 0.4933 | -4.41 | -1.16 | -0.081 | 24.139 | 612.98 | 20.491 | 586.15 |
| 2 | 9.210 | 7.340 | 587.79 | 587.92 | -23.35 | 588.39 | 0.5020 | -2.27 | -1.20 | -0.065 | 24.087 | 608.24 | 20.328 | 580.67 |
| 3 | 8.871 | 7.340 | 571.74 | 571.82 | -10.06 | 571.91 | 0.4888 | -1.01 | -0.92 | -0.047 | 23.729 | 604.56 | 20.199 | 578.49 |
| 4 | 8.511 | 7.340 | 571.15 | 571.17 | -4.87 | 571.19 | 0.4891 | -0.49 | -0.43 | -0.033 | 23.622 | 602.28 | 20.104 | 576.27 |
| 5 | 8.137 | 7.340 | 574.28 | 574.28 | -1.26 | 574.28 | 0.4925 | -0.13 | 0.21 | -0.022 | 23.595 | 600.67 | 20.036 | 574.37 |
| 6 | 7.749 | 7.340 | 585.52 | 585.60 | 0.98 | 585.60 | 0.5026 | 0.10 | 0.94 | -0.013 | 23.697 | 600.85 | 19.990 | 573.50 |
| 7 | 7.344 | 7.340 | 581.85 | 582.12 | 2.62 | 582.13 | 0.4997 | 0.26 | 1.75 | -0.006 | 23.624 | 600.28 | 19.966 | 573.25 |
| 8 | 6.911 | 7.340 | 576.59 | 577.21 | 1.22 | 577.21 | 0.4954 | 0.12 | 2.66 | 0.002 | 23.555 | 600.13 | 19.965 | 573.56 |
| 9 | 6.439 | 7.340 | 557.94 | 559.08 | -0.23 | 559.08 | 0.4796 | -0.02 | 3.65 | 0.011 | 23.348 | 599.09 | 19.992 | 574.15 |
| 10 | 5.906 | 7.340 | 524.75 | 526.57 | -9.08 | 526.65 | 0.4510 | -0.99 | 4.77 | 0.026 | 23.017 | 598.20 | 20.059 | 576.08 |
| 11 | 5.259 | 7.340 | 461.30 | 463.66 | -30.88 | 464.68 | 0.3965 | -3.81 | 5.78 | 0.047 | 22.453 | 597.77 | 20.180 | 580.55 |
| hub | 5.131 | 7.340 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 14, which is the inlet of rotor number, 2 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.499 | 8.707 | | | | | | | | | | | | |
| 1 | 9.430 | 8.703 | 645.23 | 649.68 | -45.17 | 651.25 | 0.5565 | -3.98 | -6.71 | -0.041 | 24.128 | 612.56 | 19.609 | 578.79 |
| 2 | 9.128 | 8.686 | 650.44 | 653.21 | -23.57 | 653.63 | 0.5608 | -2.07 | -5.27 | -0.027 | 24.077 | 608.07 | 19.506 | 574.02 |
| 3 | 8.812 | 8.664 | 632.72 | 634.17 | -10.13 | 634.25 | 0.5448 | -0.92 | -3.87 | -0.020 | 23.727 | 604.53 | 19.443 | 572.45 |
| 4 | 8.477 | 8.638 | 628.51 | 629.06 | -4.89 | 629.08 | 0.5412 | -0.45 | -2.41 | -0.014 | 23.622 | 602.31 | 19.407 | 570.74 |
| 5 | 8.127 | 8.609 | 627.24 | 627.33 | -1.26 | 627.33 | 0.5403 | -0.12 | -0.96 | -0.007 | 23.594 | 600.73 | 19.396 | 569.32 |
| 6 | 7.762 | 8.578 | 633.21 | 633.23 | 0.98 | 633.23 | 0.5456 | 0.09 | 0.41 | -0.001 | 23.696 | 600.90 | 19.407 | 568.90 |
| 7 | 7.379 | 8.543 | 625.39 | 625.68 | 2.60 | 625.68 | 0.5390 | 0.24 | 1.73 | 0.003 | 23.624 | 600.33 | 19.438 | 569.09 |
| 8 | 6.969 | 8.504 | 615.96 | 616.88 | 1.21 | 616.88 | 0.5311 | 0.11 | 3.13 | 0.009 | 23.555 | 600.19 | 19.490 | 569.83 |
| 9 | 6.521 | 8.462 | 593.50 | 595.54 | -0.22 | 595.54 | 0.5123 | -0.02 | 4.74 | 0.016 | 23.351 | 599.15 | 19.571 | 570.85 |
| 10 | 6.014 | 8.412 | 556.00 | 559.96 | -8.91 | 560.03 | 0.4808 | -0.91 | 6.81 | 0.028 | 23.024 | 598.27 | 19.699 | 573.25 |
| 11 | 5.397 | 8.337 | 483.51 | 490.54 | -30.09 | 491.46 | 0.4200 | -3.51 | 9.71 | 0.066 | 22.469 | 597.84 | 19.936 | 578.58 |
| hub | 5.265 | 8.321 | | | | | | | | | | | | |

| streamline no. | r/rtip | rel.flow angle (deg) | rel. tang.vel. (ft/sec) | rel. vel. (ft/sec) | rel.mach number | wheel speed (ft/sec) | flow coef. |
|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | 1329.87 | |
| 1 | 0.9927 | 64.55 | 1365.35 | 1512.04 | 1.2921 | 1320.18 | 0.4852 |
| 2 | 0.9610 | 63.33 | 1301.51 | 1456.23 | 1.2493 | 1277.95 | 0.4891 |
| 3 | 0.9277 | 62.98 | 1243.79 | 1396.14 | 1.1993 | 1233.66 | 0.4758 |
| 4 | 0.8924 | 62.17 | 1191.64 | 1347.49 | 1.1592 | 1186.75 | 0.4726 |
| 5 | 0.8555 | 61.15 | 1138.97 | 1300.31 | 1.1199 | 1137.71 | 0.4717 |
| 6 | 0.8171 | 59.75 | 1085.70 | 1256.87 | 1.0829 | 1086.68 | 0.4761 |
| 7 | 0.7768 | 58.73 | 1030.45 | 1205.53 | 1.0385 | 1033.06 | 0.4703 |
| 8 | 0.7336 | 57.66 | 974.39 | 1153.25 | 0.9928 | 975.60 | 0.4632 |
| 9 | 0.6865 | 56.89 | 913.13 | 1090.17 | 0.9377 | 912.90 | 0.4463 |
| 10 | 0.6331 | 56.65 | 850.81 | 1018.54 | 0.8744 | 841.89 | 0.4181 |
| 11 | 0.5682 | 58.02 | 785.70 | 926.26 | 0.7917 | 755.61 | 0.3636 |
| hub | 0.5543 | | | | | | |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| streamline no. | pct. pass. | inlet streamline: inc. angle (deg) | ref. inc. (deg) | s.s.inc. angle (deg) | in.blade angle (deg) | streamline element: element slope (deg) | mach no. at shock location | sh.loc. as fract of s.s. | cov.chan. as fract of s.s. | min.chk. area margin | min.chk. pt.loc.in cov.chan. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.63 | 2.52 | -2.25 | -0.02 | 62.03 | -6.58 | 1.4015 | 0.6639 | 0.3361 | 0.0575 | 0.5213 |
| 2 | 8.76 | 2.24 | -2.08 | -0.26 | 61.11 | -5.08 | 1.3534 | 0.6378 | 0.3622 | 0.0348 | 0.4299 |
| 3 | 16.23 | 2.96 | -1.96 | 0.36 | 60.02 | -3.75 | 1.3227 | 0.6087 | 0.3913 | 0.0494 | 0.3074 |
| 4 | 24.14 | 3.43 | -1.88 | 0.58 | 58.74 | -2.32 | 1.2989 | 0.5766 | 0.4234 | 0.0528 | 0.1937 |
| 5 | 32.42 | 3.85 | -1.86 | 0.64 | 57.31 | -0.88 | 1.2774 | 0.5420 | 0.4580 | 0.0543 | 0.1577 |
| 6 | 41.03 | 3.98 | -1.86 | 0.31 | 55.77 | 0.48 | 1.2549 | 0.5055 | 0.4945 | 0.0457 | 0.1061 |
| 7 | 50.07 | 4.53 | -1.89 | 0.34 | 54.20 | 1.79 | 1.2386 | 0.4673 | 0.5327 | 0.0493 | 0.0727 |
| 8 | 59.76 | 5.02 | -1.92 | 0.30 | 52.64 | 3.23 | 1.2242 | 0.4270 | 0.5730 | 0.0530 | 0.0000 |
| 9 | 70.34 | 5.70 | -1.97 | 0.49 | 51.19 | 4.93 | 1.1806 | 0.3851 | 0.6149 | 0.0672 | 0.0000 |
| 10 | 82.32 | 6.20 | -2.13 | 0.68 | 50.45 | 7.22 | 1.1325 | 0.3420 | 0.6580 | 0.0914 | 0.0000 |
| 11 | 96.88 | 5.22 | -2.57 | -0.09 | 52.80 | 10.98 | 1.0776 | 0.2976 | 0.6977 | 0.1490 | 0.0000 |

1

** values of parameters on streamlines at station, 15, which is the outlet of rotor number, 2 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.374 | 9.729 | | | | | | | | | | | | |
| 1 | 9.311 | 9.733 | 546.69 | 548.82 | 365.30 | 659.28 | 0.5283 | 33.65 | -5.04 | 0.084 | 36.433 | 696.74 | 30.242 | 662.79 |
| 2 | 9.034 | 9.750 | 526.28 | 527.50 | 384.77 | 652.92 | 0.5258 | 36.11 | -3.91 | 0.060 | 36.354 | 689.37 | 30.226 | 656.01 |
| 3 | 8.739 | 9.774 | 511.70 | 512.36 | 419.50 | 662.19 | 0.5344 | 39.31 | -2.90 | 0.043 | 36.501 | 687.30 | 30.167 | 652.97 |
| 4 | 8.430 | 9.801 | 506.62 | 506.86 | 439.02 | 670.56 | 0.5425 | 40.90 | -1.76 | 0.028 | 36.603 | 684.84 | 30.079 | 649.61 |
| 5 | 8.108 | 9.832 | 506.47 | 506.50 | 454.57 | 680.57 | 0.5521 | 41.91 | -0.59 | 0.014 | 36.593 | 682.27 | 29.866 | 645.96 |
| 6 | 7.773 | 9.867 | 507.57 | 507.60 | 470.49 | 692.11 | 0.5623 | 42.83 | 0.58 | 0.004 | 36.629 | 681.42 | 29.674 | 643.86 |
| 7 | 7.422 | 9.908 | 506.49 | 506.72 | 495.05 | 708.41 | 0.5765 | 44.33 | 1.75 | -0.004 | 36.594 | 680.99 | 29.336 | 641.62 |
| 8 | 7.050 | 9.954 | 506.18 | 506.89 | 522.76 | 728.16 | 0.5934 | 45.88 | 3.04 | -0.012 | 36.616 | 681.33 | 28.981 | 639.74 |
| 9 | 6.654 | 10.007 | 502.58 | 504.16 | 557.68 | 751.79 | 0.6140 | 47.89 | 4.54 | -0.020 | 36.542 | 681.08 | 28.462 | 636.72 |
| 10 | 6.224 | 10.069 | 497.03 | 500.16 | 605.59 | 785.43 | 0.6427 | 50.45 | 6.41 | -0.036 | 36.525 | 682.62 | 27.800 | 634.20 |
| 11 | 5.747 | 10.143 | 494.10 | 500.63 | 698.32 | 859.23 | 0.7042 | 54.36 | 9.27 | -0.073 | 37.107 | 689.92 | 26.798 | 632.00 |
| hub | 5.647 | 10.158 | | | | | | | | | | | | |

| streamline no. | r/rtip | rel.flow angle (deg) | rel. tang.vel. (ft/sec) | rel. vel. (ft/sec) | rel.mach number | wheel speed (ft/sec) | flow coef. | head coef. | ideal head coef. | adiab. eff. | diffusion factor | loss coef. | shock loss coef. | element solidity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | | | | | | | | | |
| 1 | 0.9933 | 59.67 | 938.24 | 1086.97 | 0.8711 | 1303.54 | 0.4111 | 0.2593 | 0.3030 | 0.8557 | 0.3844 | 0.0981 | 0.0343 | 1.3075 |
| 2 | 0.9637 | 59.06 | 879.93 | 1025.94 | 0.8261 | 1264.70 | 0.3957 | 0.2573 | 0.2922 | 0.8808 | 0.3988 | 0.0825 | 0.0279 | 1.3503 |
| 3 | 0.9323 | 57.49 | 803.98 | 953.36 | 0.7694 | 1223.48 | 0.3848 | 0.2681 | 0.2973 | 0.9020 | 0.4269 | 0.0728 | 0.0244 | 1.3968 |
| 4 | 0.8992 | 55.63 | 741.13 | 897.88 | 0.7264 | 1180.15 | 0.3810 | 0.2719 | 0.2962 | 0.9179 | 0.4470 | 0.0638 | 0.0217 | 1.4496 |
| 5 | 0.8649 | 53.34 | 680.50 | 848.30 | 0.6881 | 1135.07 | 0.3808 | 0.2718 | 0.2926 | 0.9290 | 0.4636 | 0.0572 | 0.0193 | 1.5093 |
| 6 | 0.8292 | 50.59 | 617.69 | 799.50 | 0.6495 | 1088.18 | 0.3817 | 0.2697 | 0.2889 | 0.9336 | 0.4824 | 0.0554 | 0.0168 | 1.5771 |
| 7 | 0.7917 | 47.03 | 543.99 | 743.43 | 0.6050 | 1039.03 | 0.3809 | 0.2708 | 0.2893 | 0.9361 | 0.5070 | 0.0566 | 0.0153 | 1.6555 |
| 8 | 0.7521 | 42.49 | 464.30 | 687.39 | 0.5601 | 987.06 | 0.3806 | 0.2731 | 0.2911 | 0.9380 | 0.5340 | 0.0588 | 0.0141 | 1.7485 |
| 9 | 0.7098 | 36.56 | 373.90 | 627.67 | 0.5126 | 931.58 | 0.3779 | 0.2770 | 0.2939 | 0.9425 | 0.5630 | 0.0598 | 0.0092 | 1.8623 |
| 10 | 0.6639 | 27.98 | 265.71 | 566.36 | 0.4634 | 871.30 | 0.3737 | 0.2855 | 0.3026 | 0.9436 | 0.5966 | 0.0671 | 0.0047 | 2.0094 |
| 11 | 0.6131 | 11.99 | 106.31 | 511.80 | 0.4195 | 804.63 | 0.3715 | 0.3119 | 0.3306 | 0.9435 | 0.6294 | 0.0852 | 0.0013 | 2.2239 |
| hub | 0.6024 | | | | | | | | | | | | | |

| streamline no. | pct. pass. | press. ratio | temp. ratio | local blade forces: radius (in.) | for.axial (lbs/in) | tang. (lbs/in) | -- out. stream. --: dev. angle (deg) | out.blade angle (deg) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1.69 | 1.5100 | 1.1374 | 9.3705 | 14.4687 | -8.4990 | 3.06 | 56.61 |
| 2 | 9.14 | 1.5099 | 1.1337 | 9.0809 | 13.6194 | -8.2358 | 3.43 | 55.62 |
| 3 | 17.04 | 1.5384 | 1.1369 | 8.7755 | 13.2667 | -8.2137 | 3.56 | 53.93 |
| 4 | 25.34 | 1.5495 | 1.1370 | 8.4532 | 12.7130 | -8.0875 | 3.72 | 51.91 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | 33.98 | 1.5509 | 1.1357 | 8.1171 | 11.9473 | -7.9722 | 3.91 | 49.43 |
| 6 | 42.97 | 1.5458 | 1.1340 | 7.7674 | 11.0785 | -7.8593 | 4.35 | 46.24 |
| 7 | 52.39 | 1.5490 | 1.1343 | 7.4003 | 10.2062 | -7.7991 | 4.88 | 42.15 |
| 8 | 62.35 | 1.5545 | 1.1352 | 7.0095 | 9.3319 | -7.7048 | 5.62 | 36.87 |
| 9 | 72.98 | 1.5649 | 1.1367 | 6.5875 | 8.3685 | -7.5292 | 6.65 | 29.91 |
| 10 | 84.53 | 1.5864 | 1.1410 | 6.1186 | 7.3275 | -7.3006 | 8.51 | 19.47 |
| 11 | 97.31 | 1.6515 | 1.1540 | 5.5723 | 6.1037 | -7.9941 | 12.86 | -0.87 |

1

** values of parameters on streamlines at station, 16, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.315 | 11.010 | | | | | | | | | | | | |
| 1 | 9.257 | 11.010 | 566.59 | 566.74 | 367.43 | 675.42 | 0.5422 | 32.96 | -1.31 | 0.010 | 36.434 | 695.88 | 29.950 | 660.23 |
| 2 | 8.989 | 11.010 | 550.48 | 550.57 | 386.69 | 672.80 | 0.5426 | 35.08 | -1.04 | 0.012 | 36.356 | 689.26 | 29.875 | 653.83 |
| 3 | 8.706 | 11.010 | 539.61 | 539.65 | 421.10 | 684.50 | 0.5534 | 37.97 | -0.71 | 0.012 | 36.502 | 687.28 | 29.765 | 650.58 |
| 4 | 8.411 | 11.010 | 538.76 | 538.77 | 439.99 | 695.60 | 0.5638 | 39.24 | -0.32 | 0.010 | 36.603 | 684.88 | 29.621 | 646.96 |
| 5 | 8.105 | 11.010 | 536.59 | 536.59 | 454.73 | 703.35 | 0.5715 | 40.28 | 0.15 | 0.006 | 36.593 | 682.37 | 29.444 | 643.58 |
| 6 | 7.786 | 11.010 | 540.32 | 540.36 | 469.68 | 715.95 | 0.5827 | 41.00 | 0.73 | 0.001 | 36.629 | 681.54 | 29.227 | 641.33 |
| 7 | 7.452 | 11.010 | 536.05 | 536.22 | 493.02 | 728.42 | 0.5937 | 42.60 | 1.42 | -0.005 | 36.594 | 681.10 | 28.956 | 639.47 |
| 8 | 7.099 | 11.010 | 537.26 | 537.66 | 519.22 | 747.44 | 0.6100 | 44.00 | 2.22 | -0.012 | 36.616 | 681.45 | 28.609 | 637.61 |
| 9 | 6.721 | 11.010 | 531.77 | 532.59 | 552.13 | 767.13 | 0.6273 | 46.03 | 3.18 | -0.021 | 36.542 | 681.19 | 28.161 | 635.00 |
| 10 | 6.311 | 11.010 | 526.58 | 528.09 | 597.24 | 797.23 | 0.6530 | 48.52 | 4.34 | -0.031 | 36.526 | 682.71 | 27.563 | 632.81 |
| 11 | 5.857 | 11.010 | 522.61 | 525.24 | 685.29 | 863.42 | 0.7081 | 52.53 | 5.74 | -0.047 | 37.096 | 689.69 | 26.698 | 631.20 |
| hub | 5.763 | 11.010 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 17, which is the inlet of stator number, 1, of stage number, 2 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.297 | 11.859 | | | | | | | | | | | | |
| 1 | 9.240 | 11.860 | 579.48 | 579.51 | 368.11 | 686.54 | 0.5518 | 32.42 | -0.62 | 0.025 | 36.435 | 695.39 | 29.746 | 658.55 |
| 2 | 8.976 | 11.864 | 562.57 | 562.60 | 387.24 | 682.99 | 0.5513 | 34.54 | -0.59 | 0.012 | 36.358 | 689.19 | 29.692 | 652.68 |
| 3 | 8.698 | 11.868 | 552.31 | 552.32 | 421.49 | 694.78 | 0.5621 | 37.35 | -0.40 | 0.005 | 36.503 | 687.26 | 29.577 | 649.45 |
| 4 | 8.409 | 11.871 | 552.52 | 552.52 | 440.13 | 706.39 | 0.5731 | 38.54 | -0.10 | 0.002 | 36.603 | 684.90 | 29.420 | 645.79 |
| 5 | 8.109 | 11.873 | 551.43 | 551.44 | 454.52 | 714.61 | 0.5812 | 39.50 | 0.27 | 0.000 | 36.594 | 682.44 | 29.233 | 642.39 |
| 6 | 7.797 | 11.877 | 555.91 | 555.94 | 469.01 | 727.35 | 0.5925 | 40.15 | 0.67 | -0.003 | 36.630 | 681.61 | 29.010 | 640.11 |
| 7 | 7.472 | 11.882 | 552.40 | 552.50 | 491.72 | 739.62 | 0.6034 | 41.67 | 1.11 | -0.006 | 36.594 | 681.18 | 28.741 | 638.25 |
| 8 | 7.128 | 11.887 | 553.94 | 554.16 | 517.06 | 757.92 | 0.6191 | 43.02 | 1.61 | -0.011 | 36.617 | 681.53 | 28.405 | 636.44 |
| 9 | 6.763 | 11.893 | 548.73 | 549.13 | 548.74 | 776.31 | 0.6353 | 44.98 | 2.18 | -0.017 | 36.543 | 681.27 | 27.980 | 633.96 |
| 10 | 6.367 | 11.904 | 543.94 | 544.60 | 591.98 | 804.38 | 0.6593 | 47.39 | 2.82 | -0.026 | 36.526 | 682.75 | 27.419 | 631.95 |
| 11 | 5.932 | 11.929 | 540.01 | 541.05 | 676.57 | 866.31 | 0.7108 | 51.35 | 3.55 | -0.035 | 37.084 | 689.43 | 26.625 | 630.54 |
| hub | 5.842 | 11.934 | | | | | | | | | | | | |

| streamline no. | r/rtip | flow coef. | rel.flow angle (deg) |
|---|---|---|---|
| tip | 1.0000 | | |
| 1 | 0.9939 | 0.4357 | 57.95 |
| 2 | 0.9655 | 0.4230 | 57.09 |
| 3 | 0.9356 | 0.4153 | 55.25 |
| 4 | 0.9044 | 0.4155 | 53.14 |
| 5 | 0.8722 | 0.4147 | 50.99 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | |
|---|---|---|---|
| 6 | 0.8387 | 0.4180 | 48.24 |
| 7 | 0.8037 | 0.4154 | 45.10 |
| 8 | 0.7667 | 0.4165 | 40.95 |
| 9 | 0.7274 | 0.4126 | 35.94 |
| 10 | 0.6848 | 0.4090 | 28.80 |
| 11 | 0.6381 | 0.4061 | 15.88 |
| hub | 0.6284 | | |

| | | ------ inlet streamline ------- | | | | ---------- streamline element ---------- | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| streamline no. | pct. pass. | inc. angle (deg) | ref. inc. (deg) | s.s.inc. angle (deg) | in.blade angle (deg) | element slope (deg) | mach no. at shock location | sh.loc. as fract of s.s. | cov.chan. as fract of s.s. | min.chk. area margin | min.chk. pt.loc.in cov.chan. |
| 1 | 1.65 | -2.70 | -2.25 | -8.46 | 35.13 | 0.23 | 0.6870 | 0.3285 | 0.5242 | 0.2358 | 0.0000 |
| 2 | 9.29 | 0.01 | -2.08 | -5.74 | 34.53 | -0.09 | 0.6978 | 0.3218 | 0.5579 | 0.2624 | 0.0000 |
| 3 | 17.34 | 2.76 | -1.96 | -2.97 | 34.69 | -0.10 | 0.7296 | 0.3177 | 0.5811 | 0.2804 | 0.0000 |
| 4 | 25.71 | 3.82 | -1.88 | -1.87 | 34.72 | 0.10 | 0.7484 | 0.3120 | 0.5978 | 0.2781 | 0.0000 |
| 5 | 34.40 | 4.31 | -1.86 | -1.33 | 35.19 | 0.37 | 0.7611 | 0.3072 | 0.6094 | 0.2766 | 0.0000 |
| 6 | 43.40 | 4.03 | -1.86 | -1.56 | 36.13 | 0.65 | 0.7740 | 0.3042 | 0.6168 | 0.2621 | 0.0000 |
| 7 | 52.82 | 4.33 | -1.89 | -1.19 | 37.34 | 0.94 | 0.7934 | 0.3017 | 0.6231 | 0.2623 | 0.0000 |
| 8 | 62.77 | 4.23 | -1.92 | -1.22 | 38.79 | 1.27 | 0.8167 | 0.2987 | 0.6278 | 0.2523 | 0.0000 |
| 9 | 73.35 | 4.47 | -1.97 | -0.88 | 40.51 | 1.61 | 0.8452 | 0.2952 | 0.6326 | 0.2536 | 0.0000 |
| 10 | 84.81 | 3.39 | -2.13 | -1.84 | 44.00 | 1.95 | 0.8832 | 0.2964 | 0.6253 | 0.2388 | 0.0000 |
| 11 | 97.39 | -0.94 | -2.57 | -5.93 | 52.29 | 2.39 | 0.9593 | 0.3093 | 0.5909 | 0.1788 | 0.0000 |

1

** values of parameters on streamlines at station, 18, which is the outlet of stator number, 1, of stage number, 2 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.303 | 13.588 | | | | | | | | | | | | |
| 1 | 9.247 | 13.588 | 528.09 | 528.10 | -40.88 | 529.68 | 0.4219 | -4.43 | 0.31 | -0.008 | 35.858 | 693.15 | 31.810 | 671.25 |
| 2 | 8.973 | 13.586 | 526.54 | 526.55 | -21.33 | 526.98 | 0.4210 | -2.32 | 0.22 | 0.004 | 35.838 | 688.79 | 31.808 | 667.09 |
| 3 | 8.695 | 13.584 | 533.59 | 533.59 | -6.96 | 533.64 | 0.4270 | -0.75 | 0.25 | 0.008 | 35.975 | 687.11 | 31.821 | 664.84 |
| 4 | 8.412 | 13.583 | 536.76 | 536.77 | -0.47 | 536.77 | 0.4303 | -0.05 | 0.39 | 0.008 | 36.065 | 684.99 | 31.841 | 662.45 |
| 5 | 8.120 | 13.583 | 533.82 | 533.84 | 2.59 | 533.85 | 0.4285 | 0.28 | 0.58 | 0.007 | 36.052 | 682.78 | 31.860 | 660.48 |
| 6 | 7.817 | 13.582 | 533.60 | 533.65 | 3.55 | 533.66 | 0.4286 | 0.38 | 0.78 | 0.005 | 36.071 | 682.01 | 31.876 | 659.71 |
| 7 | 7.500 | 13.582 | 527.22 | 527.30 | 4.77 | 527.32 | 0.4235 | 0.52 | 0.99 | 0.004 | 35.982 | 681.58 | 31.889 | 659.81 |
| 8 | 7.166 | 13.583 | 523.79 | 523.91 | 3.63 | 523.92 | 0.4206 | 0.40 | 1.21 | 0.003 | 35.934 | 681.93 | 31.898 | 660.44 |
| 9 | 6.810 | 13.583 | 512.27 | 512.43 | 2.46 | 512.44 | 0.4111 | 0.27 | 1.45 | 0.002 | 35.755 | 681.67 | 31.905 | 661.12 |
| 10 | 6.424 | 13.585 | 498.12 | 498.34 | -5.41 | 498.37 | 0.3992 | -0.62 | 1.69 | 0.002 | 35.530 | 682.99 | 31.910 | 663.56 |
| 11 | 6.002 | 13.593 | 495.60 | 495.93 | -28.35 | 496.74 | 0.3963 | -3.27 | 2.11 | 0.003 | 35.480 | 688.26 | 31.915 | 668.98 |
| hub | 5.915 | 13.595 | | | | | | | | | | | | |

| streamline no. | r/rtip | flow coef. | head coef. | ideal head coef. | stator po.ratio | stage po.ratio | stage ad.eff. | diffusion factor | stator loss coef. | shock loss coef. | element solidity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | | | | | | |
| 1 | 0.9940 | 0.3971 | 0.2487 | 0.3030 | 0.9842 | 1.4862 | 0.8209 | 0.4632 | 0.0862 | 0.0000 | 1.2688 |
| 2 | 0.9646 | 0.3959 | 0.2479 | 0.2922 | 0.9857 | 1.4885 | 0.8485 | 0.4573 | 0.0779 | 0.0000 | 1.3070 |
| 3 | 0.9347 | 0.4012 | 0.2586 | 0.2973 | 0.9855 | 1.5162 | 0.8698 | 0.4606 | 0.0762 | 0.0000 | 1.3489 |
| 4 | 0.9042 | 0.4036 | 0.2622 | 0.2962 | 0.9853 | 1.5268 | 0.8851 | 0.4637 | 0.0749 | 0.0000 | 1.3948 |
| 5 | 0.8728 | 0.4014 | 0.2620 | 0.2926 | 0.9852 | 1.5280 | 0.8956 | 0.4715 | 0.0737 | 0.0000 | 1.4457 |
| 6 | 0.8402 | 0.4012 | 0.2596 | 0.2889 | 0.9848 | 1.5222 | 0.8987 | 0.4790 | 0.0733 | 0.0000 | 1.5026 |
| 7 | 0.8062 | 0.3964 | 0.2598 | 0.2893 | 0.9833 | 1.5231 | 0.8979 | 0.4967 | 0.0780 | 0.0000 | 1.5672 |
| 8 | 0.7703 | 0.3939 | 0.2607 | 0.2911 | 0.9813 | 1.5255 | 0.8957 | 0.5145 | 0.0832 | 0.0000 | 1.6417 |
| 9 | 0.7321 | 0.3852 | 0.2627 | 0.2939 | 0.9784 | 1.5312 | 0.8940 | 0.5427 | 0.0920 | 0.0000 | 1.7292 |
| 10 | 0.6905 | 0.3746 | 0.2674 | 0.3026 | 0.9727 | 1.5432 | 0.8837 | 0.5819 | 0.1094 | 0.0000 | 1.8353 |
| 11 | 0.6452 | 0.3727 | 0.2823 | 0.3306 | 0.9567 | 1.5791 | 0.8539 | 0.6322 | 0.1534 | 0.0000 | 1.9679 |
| hub | 0.6358 | | | | | | | | | | |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| streamline no. | pct. pass. | local blade forces radius (in.) | for.axial (lbs/in) | tang. (lbs/in) | -- out. stream. -- dev. angle (deg) | out.blade angle (deg) |
|---|---|---|---|---|---|---|
| 1 | 1.64 | 9.2436 | 1.8168 | 8.2495 | 11.17 | -15.60 |
| 2 | 9.72 | 8.9747 | 2.1263 | 8.1033 | 10.45 | -12.76 |
| 3 | 17.94 | 8.6964 | 2.5607 | 8.2336 | 10.12 | -10.87 |
| 4 | 26.31 | 8.4100 | 2.7518 | 8.2094 | 9.83 | -9.88 |
| 5 | 34.92 | 8.1140 | 2.8679 | 8.1327 | 9.67 | -9.39 |
| 6 | 43.87 | 7.8070 | 2.9531 | 8.0424 | 9.57 | -9.19 |
| 7 | 53.22 | 7.4858 | 3.0974 | 8.0104 | 9.61 | -9.10 |
| 8 | 63.08 | 7.1470 | 3.2468 | 7.9707 | 9.70 | -9.30 |
| 9 | 73.57 | 6.7864 | 3.4273 | 7.8970 | 9.88 | -9.61 |
| 10 | 84.97 | 6.3953 | 3.6452 | 7.9247 | 10.56 | -11.18 |
| 11 | 97.44 | 5.9668 | 4.0972 | 8.9249 | 12.72 | -16.00 |

1

** values of parameters on streamlines at station, 19, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.303 | 14.440 | | | | | | | | | | | | |
| 1 | 9.248 | 14.440 | 532.50 | 532.50 | -40.87 | 534.06 | 0.4256 | -4.39 | -0.10 | -0.004 | 35.858 | 692.92 | 31.745 | 670.65 |
| 2 | 8.977 | 14.440 | 531.03 | 531.03 | -21.32 | 531.46 | 0.4247 | -2.30 | 0.20 | -0.002 | 35.839 | 688.73 | 31.742 | 666.66 |
| 3 | 8.701 | 14.440 | 538.74 | 538.76 | -6.96 | 538.81 | 0.4313 | -0.74 | 0.45 | 0.002 | 35.975 | 687.08 | 31.744 | 664.38 |
| 4 | 8.420 | 14.440 | 542.48 | 542.52 | -0.47 | 542.52 | 0.4350 | -0.05 | 0.67 | 0.005 | 36.064 | 685.00 | 31.754 | 661.97 |
| 5 | 8.131 | 14.440 | 539.67 | 539.74 | 2.59 | 539.74 | 0.4334 | 0.27 | 0.88 | 0.007 | 36.051 | 682.82 | 31.771 | 660.02 |
| 6 | 7.831 | 14.440 | 539.07 | 539.17 | 3.54 | 539.18 | 0.4332 | 0.38 | 1.09 | 0.009 | 36.070 | 682.05 | 31.792 | 659.30 |
| 7 | 7.517 | 14.440 | 532.02 | 532.16 | 4.76 | 532.18 | 0.4275 | 0.51 | 1.28 | 0.009 | 35.981 | 681.63 | 31.816 | 659.46 |
| 8 | 7.186 | 14.440 | 527.71 | 527.88 | 3.62 | 527.89 | 0.4238 | 0.39 | 1.45 | 0.009 | 35.933 | 681.98 | 31.840 | 660.17 |
| 9 | 6.833 | 14.440 | 515.43 | 515.63 | 2.45 | 515.63 | 0.4138 | 0.27 | 1.60 | 0.006 | 35.755 | 681.72 | 31.860 | 660.91 |
| 10 | 6.450 | 14.440 | 501.21 | 501.44 | -5.39 | 501.47 | 0.4017 | -0.62 | 1.72 | 0.000 | 35.532 | 683.02 | 31.869 | 663.35 |
| 11 | 6.033 | 14.440 | 500.57 | 500.83 | -28.21 | 501.63 | 0.4004 | -3.22 | 1.85 | -0.012 | 35.482 | 688.12 | 31.848 | 668.46 |
| hub | 5.947 | 14.440 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 20, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.298 | 15.700 | | | | | | | | | | | | |
| 1 | 9.243 | 15.705 | 558.96 | 558.98 | -40.90 | 560.47 | 0.4475 | -4.18 | -0.40 | 0.006 | 35.858 | 692.59 | 31.346 | 668.05 |
| 2 | 8.982 | 15.729 | 556.35 | 556.37 | -21.31 | 556.77 | 0.4457 | -2.19 | 0.39 | 0.017 | 35.839 | 688.64 | 31.362 | 664.41 |
| 3 | 8.716 | 15.753 | 561.17 | 561.28 | -6.95 | 561.32 | 0.4499 | -0.71 | 1.09 | 0.024 | 35.974 | 687.03 | 31.399 | 662.39 |
| 4 | 8.445 | 15.778 | 561.45 | 561.70 | -0.47 | 561.70 | 0.4509 | -0.05 | 1.69 | 0.029 | 36.063 | 685.00 | 31.458 | 660.32 |
| 5 | 8.165 | 15.803 | 554.93 | 555.35 | 2.58 | 555.35 | 0.4463 | 0.27 | 2.21 | 0.033 | 36.049 | 682.88 | 31.531 | 658.74 |
| 6 | 7.873 | 15.830 | 550.10 | 550.69 | 3.53 | 550.70 | 0.4427 | 0.37 | 2.65 | 0.036 | 36.069 | 682.13 | 31.615 | 658.39 |
| 7 | 7.566 | 15.858 | 538.46 | 539.20 | 4.73 | 539.22 | 0.4333 | 0.50 | 3.00 | 0.038 | 35.980 | 681.71 | 31.710 | 658.95 |
| 8 | 7.241 | 15.887 | 528.88 | 529.74 | 3.60 | 529.75 | 0.4253 | 0.30 | 3.25 | 0.040 | 35.932 | 682.05 | 31.812 | 660.00 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 6.892 | 15.919 | 510.52 | 511.41 | 2.43 | 511.42 | 0.4103 | 0.27 | 3.38 | 0.042 | 35.756 | 681.80 | 31.922 | 661.33 |
| 10 | 6.508 | 15.954 | 488.67 | 489.48 | -5.34 | 489.51 | 0.3918 | -0.62 | 3.31 | 0.043 | 35.535 | 683.06 | 32.038 | 664.32 |
| 11 | 6.084 | 15.992 | 477.54 | 478.14 | -27.97 | 478.96 | 0.3819 | -3.35 | 2.88 | 0.045 | 35.486 | 687.89 | 32.160 | 669.97 |
| hub | 6.000 | 16.000 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 21, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.319 | 17.000 | | | | | | | | | | | | |
| 1 | 9.266 | 17.010 | 626.06 | 627.58 | -40.80 | 628.91 | 0.5045 | -3.72 | 3.99 | 0.109 | 35.859 | 692.24 | 30.246 | 661.33 |
| 2 | 9.029 | 17.055 | 609.03 | 611.31 | -21.20 | 611.67 | 0.4914 | -1.99 | 4.94 | 0.100 | 35.840 | 688.55 | 30.488 | 659.28 |
| 3 | 8.785 | 17.102 | 600.93 | 603.98 | -6.89 | 604.02 | 0.4855 | -0.65 | 5.76 | 0.094 | 35.974 | 686.98 | 30.717 | 658.44 |
| 4 | 8.532 | 17.150 | 590.29 | 594.07 | -0.47 | 594.07 | 0.4779 | -0.04 | 6.47 | 0.089 | 36.061 | 685.01 | 30.941 | 657.39 |
| 5 | 8.269 | 17.200 | 574.52 | 578.96 | 2.54 | 578.97 | 0.4660 | 0.25 | 7.10 | 0.085 | 36.048 | 682.95 | 31.159 | 656.70 |
| 6 | 7.993 | 17.253 | 561.25 | 566.32 | 3.47 | 566.33 | 0.4557 | 0.35 | 7.67 | 0.083 | 36.067 | 682.20 | 31.371 | 657.09 |
| 7 | 7.700 | 17.309 | 541.86 | 547.45 | 4.65 | 547.47 | 0.4401 | 0.49 | 8.20 | 0.082 | 35.979 | 681.79 | 31.584 | 658.32 |
| 8 | 7.387 | 17.368 | 524.67 | 530.76 | 3.52 | 530.77 | 0.4262 | 0.38 | 8.68 | 0.083 | 35.931 | 682.13 | 31.796 | 660.08 |
| 9 | 7.049 | 17.433 | 498.56 | 504.97 | 2.38 | 504.97 | 0.4049 | 0.27 | 9.14 | 0.085 | 35.757 | 681.88 | 32.016 | 661.92 |
| 10 | 6.673 | 17.504 | 468.04 | 474.66 | -5.21 | 474.69 | 0.3797 | -0.63 | 9.58 | 0.090 | 35.538 | 683.11 | 32.243 | 665.48 |
| 11 | 6.250 | 17.585 | 446.26 | 453.23 | -27.23 | 454.05 | 0.3616 | -3.44 | 10.06 | 0.102 | 35.490 | 687.68 | 32.489 | 671.58 |
| hub | 6.171 | 17.600 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 22, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.406 | 17.750 | | | | | | | | | | | | |
| 1 | 9.355 | 17.764 | 639.16 | 648.41 | -40.40 | 649.67 | 0.5220 | -3.57 | 9.69 | 0.135 | 35.859 | 692.05 | 29.892 | 659.05 |
| 2 | 9.131 | 17.828 | 617.82 | 627.74 | -20.96 | 628.09 | 0.5052 | -1.91 | 10.20 | 0.122 | 35.840 | 688.49 | 30.215 | 657.63 |
| 3 | 8.899 | 17.894 | 605.89 | 616.67 | -6.80 | 616.71 | 0.4962 | -0.63 | 10.73 | 0.113 | 35.973 | 686.95 | 30.507 | 657.19 |
| 4 | 8.658 | 17.962 | 591.99 | 603.61 | -0.46 | 603.61 | 0.4859 | -0.04 | 11.26 | 0.107 | 36.060 | 685.01 | 30.784 | 656.49 |
| 5 | 8.407 | 18.033 | 573.39 | 585.77 | 2.50 | 585.77 | 0.4717 | 0.24 | 11.80 | 0.102 | 36.047 | 682.98 | 31.049 | 656.12 |
| 6 | 8.143 | 18.108 | 557.48 | 570.69 | 3.41 | 570.70 | 0.4593 | 0.34 | 12.35 | 0.099 | 36.066 | 682.25 | 31.302 | 656.75 |
| 7 | 7.863 | 18.187 | 535.70 | 549.60 | 4.55 | 549.62 | 0.4419 | 0.47 | 12.92 | 0.096 | 35.978 | 681.83 | 31.551 | 658.18 |
| 8 | 7.564 | 18.272 | 516.34 | 531.03 | 3.44 | 531.04 | 0.4264 | 0.37 | 13.51 | 0.095 | 35.931 | 682.18 | 31.792 | 660.11 |
| 9 | 7.240 | 18.364 | 488.53 | 503.80 | 2.31 | 503.81 | 0.4039 | 0.26 | 14.15 | 0.094 | 35.758 | 681.92 | 32.033 | 662.06 |
| 10 | 6.881 | 18.465 | 457.14 | 472.96 | -5.05 | 472.99 | 0.3783 | -0.61 | 14.86 | 0.093 | 35.541 | 683.13 | 32.267 | 665.64 |
| 11 | 6.480 | 18.579 | 436.34 | 453.25 | -26.26 | 454.01 | 0.3616 | -3.32 | 15.70 | 0.088 | 35.493 | 687.56 | 32.492 | 671.46 |
| hub | 6.406 | 18.600 | | | | | | | | | | | | |

1

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

** values of parameters on streamlines at station, 23, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.572 | 18.500 | | | | | | | | | | | | |
| 1 | 9.523 | 18.519 | 621.39 | 643.42 | -39.69 | 644.65 | 0.5179 | -3.53 | 15.04 | 0.111 | 35.859 | 691.87 | 29.977 | 659.37 |
| 2 | 9.309 | 18.602 | 602.53 | 625.32 | -20.56 | 625.66 | 0.5032 | -1.88 | 15.52 | 0.114 | 35.840 | 688.43 | 30.256 | 657.81 |
| 3 | 9.088 | 18.688 | 591.33 | 615.11 | -6.66 | 615.15 | 0.4949 | -0.62 | 15.98 | 0.112 | 35.973 | 686.92 | 30.532 | 657.31 |
| 4 | 8.859 | 18.777 | 577.51 | 602.19 | -0.45 | 602.19 | 0.4847 | -0.04 | 16.46 | 0.108 | 36.059 | 685.01 | 30.806 | 656.63 |
| 5 | 8.621 | 18.870 | 558.78 | 584.19 | 2.44 | 584.20 | 0.4703 | 0.24 | 16.96 | 0.105 | 36.046 | 683.02 | 31.073 | 656.30 |
| 6 | 8.371 | 18.967 | 542.67 | 569.03 | 3.32 | 569.04 | 0.4579 | 0.33 | 17.51 | 0.102 | 36.065 | 682.29 | 31.327 | 656.94 |
| 7 | 8.107 | 19.070 | 520.63 | 547.77 | 4.41 | 547.79 | 0.4404 | 0.46 | 18.11 | 0.099 | 35.977 | 681.88 | 31.578 | 658.39 |
| 8 | 7.826 | 19.179 | 500.95 | 529.19 | 3.33 | 529.20 | 0.4248 | 0.36 | 18.80 | 0.099 | 35.930 | 682.22 | 31.819 | 660.31 |
| 9 | 7.522 | 19.298 | 472.68 | 501.77 | 2.23 | 501.78 | 0.4023 | 0.25 | 19.61 | 0.099 | 35.759 | 681.97 | 32.063 | 662.27 |
| 10 | 7.187 | 19.428 | 440.31 | 470.27 | -4.83 | 470.30 | 0.3761 | -0.59 | 20.56 | 0.103 | 35.543 | 683.16 | 32.305 | 665.86 |
| 11 | 6.813 | 19.574 | 416.66 | 448.46 | -24.98 | 449.15 | 0.3577 | -3.19 | 21.70 | 0.111 | 35.496 | 687.44 | 32.556 | 671.68 |
| hub | 6.745 | 19.600 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 24, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.812 | 19.250 | | | | | | | | | | | | |
| 1 | 9.766 | 19.274 | 592.88 | 635.94 | -38.71 | 637.11 | 0.5116 | -3.48 | 21.20 | 0.151 | 35.859 | 691.68 | 30.104 | 659.94 |
| 2 | 9.565 | 19.378 | 571.67 | 613.78 | -20.01 | 614.10 | 0.4935 | -1.87 | 21.35 | 0.128 | 35.841 | 688.37 | 30.448 | 658.87 |
| 3 | 9.358 | 19.486 | 560.64 | 602.71 | -6.47 | 602.74 | 0.4845 | -0.62 | 21.54 | 0.111 | 35.972 | 686.89 | 30.736 | 658.46 |
| 4 | 9.143 | 19.598 | 548.35 | 590.60 | -0.44 | 590.60 | 0.4750 | -0.04 | 21.80 | 0.100 | 36.058 | 685.02 | 30.995 | 657.72 |
| 5 | 8.921 | 19.714 | 531.84 | 574.29 | 2.36 | 574.30 | 0.4620 | 0.24 | 22.17 | 0.092 | 36.045 | 683.06 | 31.231 | 657.24 |
| 6 | 8.688 | 19.835 | 518.32 | 561.65 | 3.19 | 561.65 | 0.4517 | 0.33 | 22.65 | 0.087 | 36.064 | 682.34 | 31.443 | 657.64 |
| 7 | 8.444 | 19.962 | 498.81 | 543.02 | 4.24 | 543.04 | 0.4364 | 0.45 | 23.28 | 0.084 | 35.976 | 681.93 | 31.650 | 658.84 |
| 8 | 8.186 | 20.097 | 481.65 | 527.62 | 3.18 | 527.63 | 0.4235 | 0.35 | 24.10 | 0.083 | 35.929 | 682.27 | 31.842 | 660.48 |
| 9 | 7.910 | 20.240 | 455.79 | 503.51 | 2.12 | 503.51 | 0.4037 | 0.24 | 25.15 | 0.084 | 35.760 | 682.02 | 32.039 | 662.18 |
| 10 | 7.610 | 20.397 | 425.52 | 475.60 | -4.57 | 475.62 | 0.3804 | -0.55 | 26.53 | 0.088 | 35.545 | 683.18 | 32.237 | 665.49 |
| 11 | 7.280 | 20.568 | 402.73 | 457.75 | -23.38 | 458.35 | 0.3652 | -2.92 | 28.38 | 0.094 | 35.499 | 687.30 | 32.440 | 670.89 |
| hub | 7.219 | 20.600 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 25, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.149 | 20.000 | | | | | | | | | | | | |
| 1 | 10.106 | 20.027 | 518.11 | 579.82 | -37.40 | 581.03 | 0.4648 | -3.69 | 26.68 | 0.067 | 35.859 | 691.50 | 31.020 | 665.12 |
| 2 | 9.909 | 20.151 | 510.50 | 568.30 | -19.31 | 568.62 | 0.4556 | -1.95 | 26.06 | 0.058 | 35.841 | 688.31 | 31.178 | 663.03 |
| 3 | 9.707 | 20.277 | 510.59 | 566.80 | -6.24 | 566.84 | 0.4546 | -0.63 | 25.73 | 0.051 | 35.972 | 686.85 | 31.310 | 661.72 |
| 4 | 9.501 | 20.407 | 507.58 | 563.06 | -0.42 | 563.06 | 0.4520 | -0.04 | 25.65 | 0.046 | 36.057 | 685.02 | 31.432 | 660.21 |
| 5 | 9.289 | 20.539 | 488.99 | 554.15 | 2.27 | 554.16 | 0.4453 | 0.23 | 25.78 | 0.043 | 36.044 | 683.09 | 31.546 | 659.06 |

**TABLE 2 - EXAMPLE OUTPUT DATA SET(no stator reset)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 9.071 | 20.676 | 492.75 | 548.86 | 3.06 | 548.87 | 0.4411 | 0.32 | 26.13 | 0.040 | 36.063 | 682.38 | 31.640 | 658.80 |
| 7 | 8.844 | 20.819 | 479.86 | 537.20 | 4.05 | 537.22 | 0.4316 | 0.43 | 26.71 | 0.039 | 35.976 | 681.97 | 31.738 | 659.38 |
| 8 | 8.608 | 20.967 | 469.15 | 529.22 | 3.02 | 529.23 | 0.4248 | 0.33 | 27.56 | 0.038 | 35.929 | 682.32 | 31.818 | 660.40 |
| 9 | 8.360 | 21.122 | 449.79 | 512.96 | 2.00 | 512.96 | 0.4115 | 0.22 | 28.73 | 0.039 | 35.760 | 682.07 | 31.905 | 661.47 |
| 10 | 8.096 | 21.288 | 426.16 | 493.78 | -4.29 | 493.80 | 0.3953 | -0.50 | 30.34 | 0.040 | 35.548 | 683.21 | 31.991 | 664.13 |
| 11 | 7.813 | 21.465 | 409.35 | 485.41 | -21.78 | 485.90 | 0.3877 | -2.57 | 32.51 | 0.041 | 35.502 | 687.17 | 32.077 | 668.72 |
| hub | 7.758 | 21.500 | | | | | | | | | | | | |

1

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

1

*** input data for axial-flow compressor off-design performance prediction program ***

low aspect ratio two stage nasa fan-- with stator resets

stator reset

| fraction design speed | reset guide vane angle | reset stator 1 angle | reset stator 2 angle | reset stator 3 angle | reset stator 4 angle |
|---|---|---|---|---|---|
| 1.00000 | 0.00000 | -10.00000 | 5.00000 | 0.00000 | 0.00000 |
| 0.70000 | 0.00000 | -10.00000 | 5.00000 | 0.00000 | 0.00000 |

the comp. design rotational speed is 16042.8 rpm.

the design inlet flow rate is 73.300 (lb/sec).

the compressor design pressure ratio is 2.400 .

the range to be covered to the choke side is 0.143 .

the range to be covered to the stall side is 0.190 .

calcs. will be made on 11 streamlines.

the compressor has 4 blade rows.

the molecular weight is 28.96 .

the choke point interval is 0.025 .

the stall point interval is 0.027 .

calculations will be made at the blade edges and at 17 annular stations.

the fractions of design speed to be investigated are 1.000 0.700

the specific heat polynomial is in the following form

cp = 0.23762E+00 + 0.39557E-04*t + -0.28463E-06*t**2 + 0.81651E-09*t**3 + -0.81994E-12*t**4 + 0.28443E-15*t**5

input distributions by streamline or streamtube

| streamline no. | inlet total temperature (deg. r.) | inlet total pressure (psia) | inlet whirl velocity (ft/sec) | streamtube no. | streamtube flow fraction |
|---|---|---|---|---|---|
| 1 | 518.700 | 14.125 | 0.000 | 1 | 0.1000 |
| 2 | 518.700 | 14.670 | 0.000 | 2 | 0.2000 |
| 3 | 518.700 | 14.700 | 0.000 | 3 | 0.3000 |
| 4 | 518.700 | 14.700 | 0.000 | 4 | 0.4000 |
| 5 | 518.700 | 14.700 | 0.000 | 5 | 0.5000 |
| 6 | 518.700 | 14.700 | 0.000 | 6 | 0.6000 |
| 7 | 518.700 | 14.700 | 0.000 | 7 | 0.7000 |
| 8 | 518.700 | 14.700 | 0.000 | 8 | 0.8000 |
| 9 | 518.700 | 14.700 | 0.000 | 9 | 0.9000 |
| 10 | 518.700 | 14.700 | 0.000 | 10 | 1.0000 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

11 518.700 14.660 0.000

1

input data points for tip and hub contours.

| tip axial coordinate (inches) | tip radius (inches) | hub axial coordinate (inches) | hub radius (inches) |
|---|---|---|---|
| -14.000 | 10.100 | -14.000 | 3.750 |
| -7.000 | 10.100 | -13.100 | 3.750 |
| -3.000 | 10.100 | -12.200 | 3.750 |
| -1.100 | 10.100 | -11.300 | 3.725 |
| -0.200 | 10.080 | -9.900 | 3.675 |
| 0.527 | 9.980 | -7.800 | 3.600 |
| 1.100 | 9.870 | -5.700 | 3.525 |
| 2.700 | 9.651 | -4.800 | 3.500 |
| 4.000 | 9.600 | -3.590 | 3.520 |
| 5.610 | 9.600 | -2.000 | 3.580 |
| 7.200 | 9.600 | -1.250 | 3.690 |
| 7.800 | 9.600 | 0.000 | 4.000 |
| 8.400 | 9.540 | 1.000 | 4.320 |
| 9.150 | 9.440 | 2.500 | 4.630 |
| 9.900 | 9.360 | 3.700 | 4.800 |
| 10.600 | 9.328 | 5.300 | 4.940 |
| 11.600 | 9.300 | 6.100 | 5.020 |
| 13.000 | 9.300 | 6.900 | 5.090 |
| 15.300 | 9.300 | 7.600 | 5.160 |
| 16.459 | 9.300 | 8.700 | 5.330 |
| 17.000 | 9.319 | 9.300 | 5.450 |
| 18.000 | 9.453 | 9.900 | 5.600 |
| 18.683 | 9.623 | 10.700 | 5.720 |
| 20.000 | 10.149 | 11.300 | 5.800 |
| 22.000 | 11.605 | 12.500 | 5.860 |
| | | 13.700 | 5.920 |
| | | 14.900 | 5.960 |
| | | 16.000 | 6.000 |
| | | 17.000 | 6.080 |
| | | 18.000 | 6.253 |
| | | 18.683 | 6.430 |
| | | 20.000 | 6.917 |
| | | 22.000 | 8.093 |

1 the input reference profile loss tables --- omega(bar)*cos(beta)/(2.0*sigma)

** profile loss table no. 1 **

| pct. pass. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.3000 | 0.0139 | 0.4000 | 0.0166 | 0.5000 | 0.0203 | 0.6000 | 0.0260 | 0.7000 | 0.0338 |
| 10.00 | 0.3000 | 0.0112 | 0.4000 | 0.0130 | 0.5000 | 0.0160 | 0.6000 | 0.0202 | 0.7000 | 0.0263 |
| 20.00 | 0.3000 | 0.0100 | 0.4000 | 0.0113 | 0.5000 | 0.0132 | 0.6000 | 0.0163 | 0.7000 | 0.0210 |
| 30.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 40.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 50.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 60.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 70.00 | 0.3000 | 0.0080 | 0.4000 | 0.0089 | 0.5000 | 0.0103 | 0.6000 | 0.0130 | 0.7000 | 0.0165 |
| 80.00 | 0.3000 | 0.0090 | 0.4000 | 0.0103 | 0.5000 | 0.0122 | 0.6000 | 0.0153 | 0.7000 | 0.0200 |
| 90.00 | 0.3000 | 0.0092 | 0.4000 | 0.0110 | 0.5000 | 0.0140 | 0.6000 | 0.0182 | 0.7000 | 0.0243 |
| 100.00 | 0.3000 | 0.0104 | 0.4000 | 0.0127 | 0.5000 | 0.0168 | 0.6000 | 0.0221 | 0.7000 | 0.0296 |

** profile loss table no. 2 **

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| pct. pass. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. | d-factor | loss param. |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.3000 | 0.0309 | 0.4000 | 0.0336 | 0.5000 | 0.0373 | 0.6000 | 0.0430 | 0.7000 | 0.0508 |
| 10.00 | 0.3000 | 0.0272 | 0.4000 | 0.0290 | 0.5000 | 0.0320 | 0.6000 | 0.0362 | 0.7000 | 0.0423 |
| 20.00 | 0.3000 | 0.0250 | 0.4000 | 0.0263 | 0.5000 | 0.0282 | 0.6000 | 0.0313 | 0.7000 | 0.0360 |
| 30.00 | 0.3000 | 0.0230 | 0.4000 | 0.0239 | 0.5000 | 0.0253 | 0.6000 | 0.0280 | 0.7000 | 0.0310 |
| 40.00 | 0.3000 | 0.0211 | 0.4000 | 0.0220 | 0.5000 | 0.0234 | 0.6000 | 0.0261 | 0.7000 | 0.0296 |
| 50.00 | 0.3000 | 0.0212 | 0.4000 | 0.0222 | 0.5000 | 0.0236 | 0.6000 | 0.0264 | 0.7000 | 0.0299 |
| 60.00 | 0.3000 | 0.0214 | 0.4000 | 0.0226 | 0.5000 | 0.0241 | 0.6000 | 0.0269 | 0.7000 | 0.0306 |
| 70.00 | 0.3000 | 0.0218 | 0.4000 | 0.0231 | 0.5000 | 0.0248 | 0.6000 | 0.0278 | 0.7000 | 0.0317 |
| 80.00 | 0.3000 | 0.0233 | 0.4000 | 0.0248 | 0.5000 | 0.0270 | 0.6000 | 0.0303 | 0.7000 | 0.0347 |
| 90.00 | 0.3000 | 0.0272 | 0.4000 | 0.0290 | 0.5000 | 0.0320 | 0.6000 | 0.0362 | 0.7000 | 0.0423 |
| 100.00 | 0.3000 | 0.0294 | 0.4000 | 0.0317 | 0.5000 | 0.0358 | 0.6000 | 0.0441 | 0.7000 | 0.0486 |

1 *** input station data ***

** input set no. 1 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -11.0000 | -11.0000 | 0.0000 | 0.0000 |

** input set no. 2 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -9.0000 | -9.0000 | 0.0044 | 0.0122 |

** input set no. 3 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -7.0000 | -7.0000 | 0.0088 | 0.0249 |

** input set no. 4 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -5.2000 | -5.2000 | 0.0133 | 0.0382 |

** input set no. 5 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -3.7000 | -3.7000 | 0.0222 | 0.0632 |

** input set no. 6 is an annular station **

| tip axial location | hub axial location | tip b. layer thick. | hub b. layer thick. |
|---|---|---|---|

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | (inches) | (inches) | (inches) | (inches) |
|---|---|---|---|---|
| | -2.3000 | -2.6000 | 0.0289 | 0.0818 |

1 *** input station data ***

** input set no. 7 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| -1.0000 | -1.5000 | 0.0354 | 0.0990 |

1 *** input station data ***

** input set no. 8 is rotor no. 1 **

| tip c.g. axial location (inches) | hub c.g. axial location (inches) | inlet tip b. layer thick. (inches) | inlet hub b. layer thick. (inches) | blade dihedral angle (degrees) | range improvement bleed option |
|---|---|---|---|---|---|
| 0.9410 | 0.9410 | 0.0457 | 0.1226 | 0.00 | 0.00000 |

+

| number of blades | adia. eff. of cum. comp. stages at design | outlet tip b. layer thick. (inches) | outlet hub b. layer thick. (inches) | cum. energy addition fract. thru this stage |
|---|---|---|---|---|
| 22 | 0.8569 | 0.0524 | 0.1026 | 0.5000 |

* table of input blade element definition parameters *

| strm. no. | l.e.rad. /chord | t.e.rad. /chord | max.th. /chord | max.th. pt.loc. /chord | tran.pt. location /chord | segment in/out turn.rate | in.blade angle (deg) | out.blade angle (deg) | aero. chord (in.) | layout cone ang. (deg) | stack pt. radius (in.) | l.e.cir.cen.loc. from stack. z (in.) | line o (deg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00180 | 0.00180 | 0.02901 | 0.64000 | 0.70000 | 0.07500 | 67.264 | 53.820 | 3.66433 | -10.148 | 9.8555 | 0.74283 | -10.113 |
| 2 | 0.00185 | 0.00187 | 0.03000 | 0.63000 | 0.64740 | 0.18000 | 63.415 | 52.955 | 3.67082 | -7.508 | 9.4199 | 0.87783 | -10.289 |
| 3 | 0.00198 | 0.00203 | 0.03241 | 0.62000 | 0.60420 | 0.43000 | 61.346 | 52.733 | 3.66862 | -5.698 | 8.9938 | 0.94321 | -10.565 |
| 4 | 0.00219 | 0.00227 | 0.03617 | 0.61000 | 0.56270 | 0.66000 | 59.473 | 50.579 | 3.66661 | -3.909 | 8.5539 | 1.00447 | -10.879 |
| 5 | 0.00246 | 0.00258 | 0.04115 | 0.60000 | 0.51930 | 0.79000 | 57.362 | 47.352 | 3.66512 | -2.152 | 8.0940 | 1.07705 | -11.212 |
| 6 | 0.00279 | 0.00296 | 0.04726 | 0.58000 | 0.47050 | 0.83000 | 55.066 | 42.201 | 3.66436 | -0.384 | 7.6089 | 1.15829 | -11.490 |
| 7 | 0.00319 | 0.00338 | 0.05432 | 0.56000 | 0.41800 | 0.86000 | 52.455 | 36.314 | 3.66481 | 1.443 | 7.0903 | 1.25020 | -11.752 |
| 8 | 0.00362 | 0.00382 | 0.06208 | 0.54000 | 0.35920 | 0.96000 | 49.456 | 27.960 | 3.66763 | 3.460 | 6.5284 | 1.36213 | -11.896 |
| 9 | 0.00409 | 0.00424 | 0.07007 | 0.50000 | 0.28620 | 0.98000 | 45.822 | 17.331 | 3.67588 | 5.871 | 5.9069 | 1.48369 | -11.707 |
| 10 | 0.00453 | 0.00460 | 0.07717 | 0.50000 | 0.22430 | 1.00000 | 41.866 | 2.559 | 3.69775 | 8.994 | 5.1979 | 1.64486 | -11.117 |
| 11 | 0.00480 | 0.00480 | 0.08022 | 0.50000 | 0.16290 | 1.00000 | 36.961 | -16.396 | 3.76167 | 13.853 | 4.3319 | 1.80300 | -9.081 |

1 * parameters for greater specification of blade element geometry *

| strm. no. | poly. coef. for 1st seg. centerline angle (function of path dist. from trans. pt.) linear | quadratic | cubic | quartic | poly. coef. for 2nd seg. centerline angle (function of path dist. from trans. pt.) linear | quadratic | cubic | quartic |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.35068 | 0.69148 | 0.00000 | -0.69148 | -0.69642 | 0.00000 | -0.69148 | 0.00000 |
| 2 | 0.34861 | 0.59478 | 0.00000 | -0.59478 | -0.64600 | 0.00000 | -0.59478 | 0.00000 |
| 3 | 0.34878 | 0.51486 | 0.00000 | -0.51486 | -0.60621 | 0.00000 | -0.51486 | 0.00000 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | 0.34567 | 0.43744 | 0.00000 | -0.43744 | -0.56439 | 0.00000 | -0.43744 | 0.00000 |
| 5 | 0.33819 | 0.36198 | 0.00000 | -0.36198 | -0.51919 | 0.00000 | -0.36198 | 0.00000 |
| 6 | 0.32537 | 0.28869 | 0.00000 | -0.28869 | -0.46972 | 0.00000 | -0.28869 | 0.00000 |
| 7 | 0.30730 | 0.21909 | 0.00000 | -0.21909 | -0.41684 | 0.00000 | -0.21909 | 0.00000 |
| 8 | 0.28207 | 0.15351 | 0.00000 | -0.15351 | -0.35882 | 0.00000 | -0.15351 | 0.00000 |
| 9 | 0.24783 | 0.09350 | 0.00000 | -0.09350 | -0.29458 | 0.00000 | -0.09350 | 0.00000 |
| 10 | 0.20606 | 0.04251 | 0.00000 | -0.04251 | -0.22732 | 0.00000 | -0.04251 | 0.00000 |
| 11 | 0.15184 | 0.00295 | 0.00000 | -0.00295 | -0.15331 | 0.00000 | -0.00295 | 0.00000 |

| strm. no. | poly. coef. for 1st segment thickness (function of path dist. from max.th. pt.) | | | | poly. coef. for 2nd segment thickness (function of path dist. from max.th. pt.) | | | | ellipse major/minor axis ratio minus 1.0 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | sq.root | quadratic | cubic | quartic | sq.root | quadratic | cubic | quartic | lead.edge | trail.edge |
| 1 | 0.00000 | 0.02709 | 0.00000 | 0.00000 | 0.00008 | 0.00000 | 0.27199 | 0.00000 | 0.99291 | 0.00000 |
| 2 | 0.00000 | 0.02934 | 0.00000 | 0.00000 | 0.00085 | 0.00000 | 0.25633 | 0.00000 | 0.92071 | 0.00000 |
| 3 | 0.00000 | 0.03325 | 0.00000 | 0.00000 | 0.00170 | 0.00000 | 0.25255 | 0.00000 | 0.84931 | 0.00000 |
| 4 | 0.00000 | 0.03894 | 0.00000 | 0.00000 | 0.00276 | 0.00000 | 0.25692 | 0.00000 | 0.77507 | 0.00000 |
| 5 | 0.00000 | 0.04652 | 0.00000 | 0.00000 | 0.00411 | 0.00000 | 0.26696 | 0.00000 | 0.69722 | 0.00000 |
| 6 | 0.00000 | 0.05803 | 0.00000 | 0.00000 | 0.00578 | 0.00000 | 0.26032 | 0.00000 | 0.61460 | 0.00000 |
| 7 | 0.00000 | 0.07258 | 0.00000 | 0.00000 | 0.00786 | 0.00000 | 0.25567 | 0.00000 | 0.52559 | 0.00000 |
| 8 | 0.00000 | 0.09027 | 0.00000 | 0.00000 | 0.01043 | 0.00000 | 0.25019 | 0.00000 | 0.42781 | 0.00000 |
| 9 | 0.00000 | 0.11980 | 0.00000 | 0.00000 | 0.01320 | 0.00000 | 0.21388 | 0.00000 | 0.31739 | 0.00000 |
| 10 | 0.00000 | 0.13174 | 0.00000 | 0.00000 | 0.01690 | 0.00000 | 0.22524 | 0.00000 | 0.18699 | 0.00000 |
| 11 | 0.00000 | 0.13492 | 0.00000 | 0.00000 | 0.02038 | 0.00000 | 0.21545 | 0.00000 | 0.01926 | 0.00000 |

1 *** input station data ***

** input set no. 9 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 3.0000 | 3.3000 | 0.0553 | 0.1100 |

1 *** input station data ***

** input set no. 10 is a guide vane or stator **

| tip c.g. axial location (inches) | hub c.g. axial location (inches) | inlet tip b. layer thick. (inches) | inlet hub b. layer thick. (inches) | blade dihedral angle (degrees) | range improvement bleed option |
|---|---|---|---|---|---|
| 5.2000 | 5.2000 | 0.0610 | 0.1193 | 0.00 | 0.00000 |

+

| number of blades | blade rotation option for stall margin | outlet tip b. layer thick. (inches) | outlet hub b. layer thick. (inches) |
|---|---|---|---|
| 34 | | 0.0697 | 0.1309 |

* table of input blade element definition parameters *

| strm. no. | l.e.rad. /chord | t.e.rad. /chord | max.th. /chord | max.th. pt.loc. /chord | tran.pt. location /chord | segment in/out turn rate | in.blade angle (deg) | out.blade angle (deg) | aero. chord (in.) | layout cone ang. (deg) | stack pt. radius (in.) | l.e.cir.cen.loc. from stack. line z (in.) | o (deg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

+ -

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.01290 | 0.01288 | 0.07974 | 0.50000 | 0.40000 | 1.00000 | 36.693 | -16.092 | 2.27025 | -0.290 | 9.5325 | 1.05366 | 2.319 |
| 2 | 0.01229 | 0.01228 | 0.07823 | 0.50000 | 0.40000 | 1.00000 | 33.496 | -12.257 | 2.27027 | 0.237 | 9.1825 | 1.05744 | 2.292 |
| 3 | 0.01168 | 0.01167 | 0.07670 | 0.50000 | 0.40000 | 1.00000 | 33.488 | -10.483 | 2.27035 | 0.567 | 8.8260 | 1.05412 | 2.455 |
| 4 | 0.01105 | 0.01103 | 0.07512 | 0.50000 | 0.40000 | 1.00000 | 33.899 | -9.693 | 2.27052 | 0.925 | 8.4564 | 1.05142 | 2.636 |
| 5 | 0.01039 | 0.01037 | 0.07346 | 0.50000 | 0.40000 | 1.00000 | 34.604 | -9.098 | 2.27082 | 1.349 | 8.0711 | 1.04792 | 2.859 |
| 6 | 0.00969 | 0.00967 | 0.07172 | 0.50000 | 0.40000 | 1.00000 | 35.845 | -8.801 | 2.27134 | 1.878 | 7.6663 | 1.04265 | 3.153 |
| 7 | 0.00894 | 0.00894 | 0.06986 | 0.50000 | 0.40000 | 1.00000 | 37.275 | -8.604 | 2.27222 | 2.540 | 7.2369 | 1.03645 | 3.509 |
| 8 | 0.00815 | 0.00816 | 0.06786 | 0.50000 | 0.40000 | 1.00000 | 38.928 | -8.808 | 2.27360 | 3.329 | 6.7766 | 1.02986 | 3.938 |
| 9 | 0.00728 | 0.00732 | 0.06569 | 0.50000 | 0.40000 | 1.00000 | 40.825 | -9.009 | 2.27565 | 4.253 | 6.2769 | 1.02159 | 4.492 |
| 10 | 0.00631 | 0.00637 | 0.06328 | 0.50000 | 0.40000 | 1.00000 | 43.448 | -10.288 | 2.27828 | 5.230 | 5.7206 | 1.01267 | 5.234 |
| 11 | 0.00520 | 0.00523 | 0.06050 | 0.50000 | 0.40000 | 1.00000 | 46.876 | -14.152 | 2.27877 | 5.458 | 5.0639 | 1.00865 | 6.219 |

1 * parameters for greater specification of blade element geometry *

| strm. no. | poly. coef. for 1st seg. centerline angle (function of path dist. from trans. pt.) | | | | poly. coef. for 2nd seg. centerline angle (function of path dist. from trans. pt.) | | | |
|---|---|---|---|---|---|---|---|---|
| | linear | quadratic | cubic | quartic | linear | quadratic | cubic | quartic |
| 1 | 0.33433 | 0.00000 | 0.00000 | 0.00000 | -0.33433 | 0.00000 | 0.00000 | 0.00000 |
| 2 | 0.30912 | 0.00000 | 0.00000 | 0.00000 | -0.30912 | 0.00000 | 0.00000 | 0.00000 |
| 3 | 0.30245 | 0.00000 | 0.00000 | 0.00000 | -0.30245 | 0.00000 | 0.00000 | 0.00000 |
| 4 | 0.29634 | 0.00000 | 0.00000 | 0.00000 | -0.29634 | 0.00000 | 0.00000 | 0.00000 |
| 5 | 0.29086 | 0.00000 | 0.00000 | 0.00000 | -0.29086 | 0.00000 | 0.00000 | 0.00000 |
| 6 | 0.28697 | 0.00000 | 0.00000 | 0.00000 | -0.28697 | 0.00000 | 0.00000 | 0.00000 |
| 7 | 0.28211 | 0.00000 | 0.00000 | 0.00000 | -0.28211 | 0.00000 | 0.00000 | 0.00000 |
| 8 | 0.27554 | 0.00000 | 0.00000 | 0.00000 | -0.27554 | 0.00000 | 0.00000 | 0.00000 |
| 9 | 0.26708 | 0.00000 | 0.00000 | 0.00000 | -0.26708 | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.25652 | 0.00000 | 0.00000 | 0.00000 | -0.25652 | 0.00000 | 0.00000 | 0.00000 |
| 11 | 0.24034 | 0.00000 | 0.00000 | 0.00000 | -0.24034 | 0.00000 | 0.00000 | 0.00000 |

| strm. no. | poly. coef. for 1st segment thickness (function of path dist. from max.th. pt.) | | | | poly. coef. for 2nd segment thickness (function of path dist. from max.th. pt.) | | | | ellipse major/minor axis ratio minus 1.0 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | sq.root | quadratic | cubic | quartic | sq.root | quadratic | cubic | quartic | lead.edge | trail.edge |
| 1 | 0.00000 | 0.10558 | 0.00000 | 0.00000 | 0.00000 | 0.10565 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 2 | 0.00000 | 0.10663 | 0.00000 | 0.00000 | 0.00000 | 0.10666 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 3 | 0.00000 | 0.10621 | 0.00000 | 0.00000 | 0.00000 | 0.10625 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 4 | 0.00000 | 0.10542 | 0.00000 | 0.00000 | 0.00000 | 0.10547 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 5 | 0.00000 | 0.10448 | 0.00000 | 0.00000 | 0.00000 | 0.10452 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 6 | 0.00000 | 0.10331 | 0.00000 | 0.00000 | 0.00000 | 0.10332 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 7 | 0.00000 | 0.10201 | 0.00000 | 0.00000 | 0.00000 | 0.10197 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 8 | 0.00000 | 0.10051 | 0.00000 | 0.00000 | 0.00000 | 0.10038 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 9 | 0.00000 | 0.09886 | 0.00000 | 0.00000 | 0.00000 | 0.09862 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.00000 | 0.09664 | 0.00000 | 0.00000 | 0.00000 | 0.09627 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 11 | 0.00000 | 0.09324 | 0.00000 | 0.00000 | 0.00000 | 0.09290 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |

1 *** input station data ***

** input set no. 11 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 7.3400 | 7.3400 | 0.0689 | 0.1276 |

1 *** input station data ***

** input set no. 12 is rotor no. 2 **

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| tip c.g. axial location (inches) | hub c.g. axial location (inches) | inlet tip b. layer thick. (inches) | inlet hub b. layer thick. (inches) | blade dihedral angle (degrees) | range improvement bleed option |
|---|---|---|---|---|---|
| 9.2000 | 9.2000 | 0.0663 | 0.1231 | 0.00 | 0.00000 |

+

| number of blades | adia. eff. of cum. comp. stages at design | outlet tip b. layer thick. (inches) | outlet hub b. layer thick. (inches) | cum. energy addition fract. thru this stage |
|---|---|---|---|---|
| 38 | 0.8526 | 0.0608 | 0.0995 | 1.0000 |

* table of input blade element definition parameters *

| strm. no. | l.e.rad. /chord | t.e.rad. /chord | max.th. /chord | max.th. pt.loc. /chord | tran.pt. location /chord | segment in/out turn.rate | in.blade angle (deg) | out.blade angle (deg) | aero. chord (in.) | layout cone ang. (deg) | stack pt. radius (in.) | l.e.cir.cen.loc. from stack. z (in.) | line o (deg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00614 | 0.00615 | 0.03403 | 0.50000 | 0.66270 | 0.61000 | 62.046 | 56.549 | 2.02543 | -6.611 | 9.3752 | 0.48473 | -5.280 |
| 2 | 0.00682 | 0.00686 | 0.03507 | 0.50000 | 0.63508 | 0.66300 | 61.065 | 55.480 | 2.02737 | -5.160 | 9.0680 | 0.50145 | -5.406 |
| 3 | 0.00751 | 0.00759 | 0.03744 | 0.50000 | 0.60532 | 0.76700 | 59.945 | 53.732 | 2.02656 | -3.787 | 8.7545 | 0.52265 | -5.518 |
| 4 | 0.00822 | 0.00834 | 0.04100 | 0.50000 | 0.57342 | 0.88600 | 58.660 | 51.711 | 2.02594 | -2.439 | 8.4319 | 0.54695 | -5.630 |
| 5 | 0.00895 | 0.00911 | 0.04561 | 0.50000 | 0.53954 | 0.98100 | 57.239 | 49.221 | 2.02554 | -1.076 | 8.0986 | 0.57419 | -5.741 |
| 6 | 0.00972 | 0.00991 | 0.05110 | 0.50000 | 0.50394 | 1.00000 | 55.718 | 46.031 | 2.02544 | 0.303 | 7.7514 | 0.60400 | -5.850 |
| 7 | 0.01053 | 0.01075 | 0.05726 | 0.50000 | 0.46654 | 1.00000 | 54.155 | 41.968 | 2.02578 | 1.746 | 7.3862 | 0.63685 | -5.952 |
| 8 | 0.01140 | 0.01163 | 0.06383 | 0.50000 | 0.42725 | 1.00000 | 52.589 | 36.760 | 2.02689 | 3.363 | 6.9982 | 0.67351 | -6.043 |
| 9 | 0.01235 | 0.01256 | 0.07038 | 0.50000 | 0.40000 | 1.00000 | 51.128 | 30.009 | 2.02957 | 5.318 | 6.5811 | 0.71444 | -6.121 |
| 10 | 0.01341 | 0.01357 | 0.07622 | 0.50000 | 0.40000 | 1.00000 | 50.352 | 20.164 | 2.03577 | 7.811 | 6.1192 | 0.76065 | -6.180 |
| 11 | 0.01474 | 0.01476 | 0.07989 | 0.50000 | 0.40000 | 1.00000 | 52.662 | -0.228 | 2.05176 | 11.213 | 5.5584 | 0.83368 | -6.192 |

1 *** input station data ***

** input set no. 13 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 11.0100 | 11.0100 | 0.0577 | 0.0928 |

1 *** input station data ***

** input set no. 14 is a guide vane or stator **

| tip c.g. axial location (inches) | hub c.g. axial location (inches) | inlet tip b. layer thick. (inches) | inlet hub b. layer thick. (inches) | blade dihedral angle (degrees) | range improvement bleed option |
|---|---|---|---|---|---|
| 12.7000 | 12.7000 | 0.0564 | 0.0890 | 0.00 | 0.00000 |

+

| number of blades | blade rotation option for stall margin | outlet tip b. layer thick. (inches) | outlet hub b. layer thick. (inches) |
|---|---|---|---|
| 42 | | 0.0556 | 0.0866 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

* table of input blade element definition parameters *

| strm. no. | l.e.rad. /chord | t.e.rad. /chord | max.th. /chord | max.th. pt.loc. /chord | tran.pt. location /chord | segment in/out turn.rate | in.blade angle (deg) | out.blade angle (deg) | aero. chord (in.) | layout cone ang. (deg) | stack pt. radius (in.) | l.e.cir.cen.loc. from stack. z (in.) | line o (deg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.01387 | 0.01387 | 0.07967 | 0.50000 | 0.40000 | 1.00000 | 35.156 | -15.591 | 1.75296 | 0.218 | 9.2437 | 0.81577 | 1.758 |
| 2 | 0.01323 | 0.01323 | 0.07807 | 0.50000 | 0.40000 | 1.00000 | 34.571 | -12.796 | 1.75301 | 0.413 | 8.9689 | 0.81297 | 1.857 |
| 3 | 0.01257 | 0.01257 | 0.07643 | 0.50000 | 0.40000 | 1.00000 | 34.651 | -10.900 | 1.75305 | 0.584 | 8.6891 | 0.80990 | 1.981 |
| 4 | 0.01190 | 0.01190 | 0.07476 | 0.50000 | 0.40000 | 1.00000 | 34.762 | -9.901 | 1.75310 | 0.743 | 8.4021 | 0.80850 | 2.091 |
| 5 | 0.01121 | 0.01121 | 0.07304 | 0.50000 | 0.40000 | 1.00000 | 35.247 | -9.401 | 1.75316 | 0.900 | 8.1069 | 0.80689 | 2.222 |
| 6 | 0.01050 | 0.01049 | 0.07125 | 0.50000 | 0.40000 | 1.00000 | 36.187 | -9.202 | 1.75324 | 1.077 | 7.8010 | 0.80427 | 2.390 |
| 7 | 0.00975 | 0.00975 | 0.06938 | 0.50000 | 0.40000 | 1.00000 | 37.386 | -9.103 | 1.75335 | 1.280 | 7.4815 | 0.80084 | 2.594 |
| 8 | 0.00897 | 0.00896 | 0.06742 | 0.50000 | 0.40000 | 1.00000 | 38.803 | -9.304 | 1.75349 | 1.497 | 7.1458 | 0.79710 | 2.831 |
| 9 | 0.00814 | 0.00813 | 0.06535 | 0.50000 | 0.40000 | 1.00000 | 40.462 | -9.603 | 1.75364 | 1.703 | 6.7902 | 0.79249 | 3.117 |
| 10 | 0.00724 | 0.00723 | 0.06311 | 0.50000 | 0.40000 | 1.00000 | 43.769 | -11.099 | 1.75379 | 1.906 | 6.4061 | 0.78390 | 3.556 |
| 11 | 0.00621 | 0.00620 | 0.06051 | 0.50000 | 0.40000 | 1.00000 | 52.207 | -15.990 | 1.75422 | 2.433 | 5.9636 | 0.76049 | 4.456 |

*** input station data ***

** input set no. 15 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 14.4400 | 14.4400 | 0.0552 | 0.0855 |

** input set no. 16 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 15.7000 | 16.0000 | 0.0549 | 0.0839 |

** input set no. 17 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 17.0000 | 17.6000 | 0.0538 | 0.0799 |

** input set no. 18 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 17.7500 | 18.6000 | 0.0529 | 0.0765 |

** input set no. 19 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | |
|---|---|---|---|
| 18.5000 | 19.6000 | 0.0521 | 0.0730 |

** input set no. 20 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 19.2500 | 20.6000 | 0.0511 | 0.0687 |

1 *** input station data ***

:

** input set no. 21 is an annular station **

| tip axial location (inches) | hub axial location (inches) | tip b. layer thick. (inches) | hub b. layer thick. (inches) |
|---|---|---|---|
| 20.0000 | 21.5000 | 0.0500 | 0.0649 |

radius array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 10.0990 | 9.6525 | 9.1843 | 8.6909 | 8.1678 | 7.6088 | 7.0053 | 6.3447 | 5.6067 | 4.7556 | 3.7144 |
| 2 | * | 10.0948 | 9.6462 | 9.1758 | 8.6799 | 8.1539 | 7.5915 | 6.9840 | 6.3184 | 5.5738 | 4.7130 | 3.6548 |
| 3 | * | 10.0912 | 9.6407 | 9.1680 | 8.6697 | 8.1409 | 7.5753 | 6.9639 | 6.2933 | 5.5422 | 4.6720 | 3.5969 |
| 4 | * | 10.0878 | 9.6356 | 9.1611 | 8.6606 | 8.1294 | 7.5609 | 6.9461 | 6.2713 | 5.5145 | 4.6358 | 3.5457 |
| 5 | * | 10.0787 | 9.6283 | 9.1558 | 8.6575 | 8.1288 | 7.5632 | 6.9517 | 6.2809 | 5.5294 | 4.6582 | 3.5810 |
| 6 | * | 10.0698 | 9.6215 | 9.1513 | 8.6556 | 8.1297 | 7.5673 | 6.9596 | 6.2935 | 5.5480 | 4.6854 | 3.6229 |
| 7 | * | 10.0652 | 9.6219 | 9.1573 | 8.6677 | 8.1488 | 7.5945 | 6.9964 | 6.3422 | 5.6123 | 4.7719 | 3.7477 |
| 8 | * | 10.0542 | 9.6149 | 9.1545 | 8.6696 | 8.1560 | 7.6078 | 7.0170 | 6.3715 | 5.6528 | 4.8283 | 3.8302 |
| 9 | * | 9.6872 | 9.3116 | 8.9202 | 8.5109 | 8.0808 | 7.6265 | 7.1434 | 6.6251 | 6.0627 | 5.4425 | 4.7419 |
| 10 | * | 9.5746 | 9.2124 | 8.8353 | 8.4414 | 8.0283 | 7.5926 | 7.1304 | 6.6361 | 6.1019 | 5.5161 | 4.8603 |
| 11 | * | 9.5376 | 9.1835 | 8.8151 | 8.4307 | 8.0280 | 7.6039 | 7.1547 | 6.6753 | 6.1588 | 5.5947 | 4.9671 |
| 12 | * | 9.5268 | 9.1849 | 8.8297 | 8.4597 | 8.0727 | 7.6662 | 7.2370 | 6.7806 | 6.2911 | 5.7603 | 5.1752 |
| 13 | * | 9.5337 | 9.1961 | 8.8456 | 8.4807 | 8.0993 | 7.6991 | 7.2769 | 6.8287 | 6.3489 | 5.8297 | 5.2595 |
| 14 | * | 9.4327 | 9.1096 | 8.7747 | 8.4264 | 8.0631 | 7.6826 | 7.2823 | 6.8587 | 6.4071 | 5.9212 | 5.3916 |
| 15 | * | 9.3129 | 9.0199 | 8.7171 | 8.4033 | 8.0774 | 7.7378 | 7.3825 | 7.0093 | 6.6150 | 6.1957 | 5.7459 |
| 16 | * | 9.2570 | 8.9751 | 8.6841 | 8.3830 | 8.0706 | 7.7457 | 7.4065 | 7.0511 | 6.6767 | 6.2800 | 5.8566 |
| 17 | * | 9.2405 | 8.9647 | 8.6801 | 8.3859 | 8.0810 | 7.7641 | 7.4338 | 7.0880 | 6.7245 | 6.3402 | 5.9310 |
| 18 | * | 9.2471 | 8.9755 | 8.6954 | 8.4060 | 8.1063 | 7.7951 | 7.4709 | 7.1320 | 6.7761 | 6.4005 | 6.0015 |
| 19 | * | 9.2481 | 8.9785 | 8.7006 | 8.4135 | 8.1162 | 7.8077 | 7.4864 | 7.1507 | 6.7985 | 6.4269 | 6.0326 |
| 20 | * | 9.2428 | 8.9771 | 8.7032 | 8.4204 | 8.1278 | 7.8243 | 7.5085 | 7.1788 | 6.8333 | 6.4693 | 6.0836 |
| 21 | * | 9.2657 | 9.0097 | 8.7461 | 8.4744 | 8.1937 | 7.9030 | 7.6012 | 7.2869 | 6.9584 | 6.6136 | 6.2499 |
| 22 | * | 9.3553 | 9.1087 | 8.8552 | 8.5942 | 8.3251 | 8.0470 | 7.7589 | 7.4597 | 7.1479 | 6.8220 | 6.4797 |
| 23 | * | 9.5226 | 9.2873 | 9.0459 | 8.7979 | 8.5426 | 8.2795 | 8.0078 | 7.7265 | 7.4346 | 7.1307 | 6.8133 |
| 24 | * | 9.7661 | 9.5467 | 9.3221 | 9.0919 | 8.8558 | 8.6132 | 8.3635 | 8.1062 | 7.8404 | 7.5653 | 7.2798 |
| 25 | * | 10.1062 | 9.9008 | 9.6911 | 9.4767 | 9.2573 | 9.0326 | 8.8022 | 8.5656 | 8.3223 | 8.0716 | 7.8129 |

| i | ift | z(ift,jm) | i | z(i,j) | ar |
|---|---|---|---|---|---|
| 1 | 1 | -11.0000 | 1 | -11.0000 | 0.0000 |
| 2 | 2 | -9.0000 | 2 | -9.0000 | 3.2200 |
| 3 | 3 | -7.0000 | 3 | -7.0000 | 3.2471 |
| 4 | 4 | -5.2000 | 4 | -5.2000 | 3.6345 |
| 5 | 5 | -3.7000 | 5 | -3.7000 | 4.3318 |
| 6 | 6 | -2.4158 | 6 | -2.4158 | 5.0202 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | |
|---|---|---|---|---|---|
| 7 | 7 | -1.1941 | 7 | -1.1941 | 5.1713 |
| 8 | 9 | 2.6524 | 8 | -0.5437 | 9.5688 |
| 9 | 11 | 4.1961 | 9 | 2.6524 | 1.5473 |
| 10 | 12 | 6.3346 | 10 | 3.1253 | 9.9685 |
| 11 | 13 | 7.3400 | 11 | 4.1961 | 4.2681 |
| 12 | 14 | 8.5705 | 12 | 6.3346 | 2.0348 |
| 13 | 15 | 9.8709 | 13 | 7.3400 | 4.2514 |
| 14 | 16 | 11.0100 | 14 | 8.5705 | 3.2841 |
| 15 | 17 | 11.8776 | 15 | 9.8709 | 2.7429 |
| 16 | 18 | 13.5824 | 16 | 11.0100 | 2.9852 |
| 17 | 19 | 14.4400 | 17 | 11.8776 | 3.8144 |
| 18 | 20 | 15.8340 | 18 | 13.5824 | 1.9039 |
| 19 | 21 | 17.2699 | 19 | 14.4400 | 3.7493 |
| 20 | 22 | 18.1351 | 20 | 15.8340 | 2.2663 |
| 21 | 23 | 19.0028 | 21 | 17.2699 | 2.1003 |
| 22 | 24 | 19.8740 | 22 | 18.1351 | 3.3236 |
| 23 | 25 | 20.7003 | 23 | 19.0028 | 3.1223 |
| | | | 24 | 19.8740 | 2.8540 |
| | | | 25 | 20.7003 | 2.7754 |

z array

| i | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 | -11.0000 |
| 2 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 | -9.0000 |
| 3 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 | -7.0000 |
| 4 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 | -5.2000 |
| 5 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 | -3.7000 |
| 6 | -2.3013 | -2.3218 | -2.3433 | -2.3660 | -2.3901 | -2.4158 | -2.4436 | -2.4741 | -2.5081 | -2.5476 | -2.5962 |
| 7 | -1.0027 | -1.0371 | -1.0731 | -1.1110 | -1.1512 | -1.1941 | -1.2405 | -1.2911 | -1.3477 | -1.4128 | -1.4921 |
| 8 | -0.9429 | -0.7890 | -0.6785 | -0.6087 | -0.5633 | -0.5437 | -0.5600 | -0.6198 | -0.7618 | -0.9417 | -1.1249 |
| 9 | 1.5889 | 2.0072 | 2.2943 | 2.4444 | 2.5573 | 2.6524 | 2.7209 | 2.7631 | 2.7053 | 2.6886 | 2.7828 |
| 10 | 3.0034 | 3.0257 | 3.0489 | 3.0731 | 3.0985 | 3.1253 | 3.1537 | 3.1841 | 3.2169 | 3.2529 | 3.2932 |
| 11 | 4.1826 | 4.1922 | 4.1947 | 4.1959 | 4.1964 | 4.1961 | 4.1955 | 4.1945 | 4.1925 | 4.1864 | 4.1742 |
| 12 | 6.3435 | 6.3343 | 6.3326 | 6.3325 | 6.3331 | 6.3346 | 6.3367 | 6.3394 | 6.3430 | 6.3492 | 6.3592 |
| 13 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 | 7.3400 |
| 14 | 8.7029 | 8.6845 | 8.6610 | 8.6340 | 8.6037 | 8.5705 | 8.5341 | 8.4939 | 8.4507 | 8.4027 | 8.3373 |
| 15 | 9.7328 | 9.7515 | 9.7763 | 9.8038 | 9.8351 | 9.8709 | 9.9123 | 9.9596 | 10.0125 | 10.0734 | 10.1427 |
| 16 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 | 11.0100 |
| 17 | 11.8599 | 11.8638 | 11.8681 | 11.8707 | 11.8736 | 11.8776 | 11.8825 | 11.8877 | 11.8940 | 11.9050 | 11.9286 |
| 18 | 13.5877 | 13.5857 | 13.5840 | 13.5830 | 13.5825 | 13.5824 | 13.5823 | 13.5827 | 13.5832 | 13.5857 | 13.5931 |
| 19 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 | 14.4400 |
| 20 | 15.7050 | 15.7292 | 15.7541 | 15.7798 | 15.8064 | 15.8340 | 15.8628 | 15.8928 | 15.9242 | 15.9573 | 15.9924 |
| 21 | 17.0102 | 17.0590 | 17.1092 | 17.1610 | 17.2145 | 17.2699 | 17.3274 | 17.3874 | 17.4500 | 17.5157 | 17.5850 |
| 22 | 17.7645 | 17.8344 | 17.9062 | 17.9801 | 18.0563 | 18.1351 | 18.2167 | 18.3015 | 18.3898 | 18.4822 | 18.5791 |
| 23 | 18.5190 | 18.6106 | 18.7046 | 18.8011 | 18.9004 | 19.0028 | 19.1086 | 19.2181 | 19.3317 | 19.4500 | 19.5735 |
| 24 | 19.2737 | 19.3879 | 19.5049 | 19.6247 | 19.7477 | 19.8740 | 20.0040 | 20.1380 | 20.2764 | 20.4196 | 20.5683 |
| 25 | 20.0268 | 20.1557 | 20.2873 | 20.4218 | 20.5594 | 20.7003 | 20.8449 | 20.9933 | 21.1459 | 21.3032 | 21.4655 |

to array

| i | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 2 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 3 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 4 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 5 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 6 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 7 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | * | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 | 518.70 |
| 9 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 10 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 11 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 12 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 13 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 14 | * | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 | 602.51 |
| 15 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 16 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 17 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 18 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 19 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 20 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 21 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 22 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 23 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 24 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |
| 25 | * | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 | 686.33 |

po array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 2 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 3 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 4 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 5 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 6 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 7 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 8 | * | 2034.00 | 2112.48 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2116.80 | 2111.04 |
| 9 | * | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 |
| 10 | * | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 |
| 11 | * | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 | 3429.20 |
| 12 | * | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 |
| 13 | * | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 |
| 14 | * | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 | 3390.83 |
| 15 | * | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 |
| 16 | * | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 |
| 17 | * | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 | 5187.86 |
| 18 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 19 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 20 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 21 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 22 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 23 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 24 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |
| 25 | * | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 | 5135.52 |

vz array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 | 569.25 |
| 2 | * | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 | 566.23 |
| 3 | * | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 | 563.27 |
| 4 | * | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 | 560.77 |
| 5 | * | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 | 564.44 |
| 6 | * | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 | 567.74 |
| 7 | * | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 | 575.11 |
| [illegible] | * | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | * | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 | 519.02 |
| 10 | * | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 | 559.25 |
| 11 | * | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 | 586.47 |
| 12 | * | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 | 552.24 |
| 13 | * | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 | 558.77 |
| 14 | * | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 | 602.66 |
| 15 | * | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 | 516.57 |
| 16 | * | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 | 555.17 |
| 17 | * | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 | 567.90 |
| 18 | * | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 | 527.93 |
| 19 | * | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 | 532.63 |
| 20 | * | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 | 539.61 |
| 21 | * | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 | 557.80 |
| 22 | * | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 | 561.43 |
| 23 | * | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 | 559.47 |
| 24 | * | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 | 556.07 |
| 25 | * | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 | 547.72 |

vth array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8 | * | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9 | * | 381.89 | 397.29 | 414.72 | 434.67 | 457.80 | 485.07 | 517.88 | 558.39 | 610.19 | 679.72 | 780.15 |
| 10 | * | 386.38 | 401.57 | 418.71 | 438.25 | 460.80 | 487.24 | 518.82 | 557.47 | 606.28 | 670.65 | 761.15 |
| 11 | * | 387.88 | 402.83 | 419.67 | 438.80 | 460.82 | 486.52 | 517.06 | 554.19 | 600.67 | 661.23 | 744.79 |
| 12 | * | 19.45 | 20.18 | 20.99 | 21.91 | 22.96 | 24.17 | 25.61 | 27.33 | 29.46 | 32.17 | 35.81 |
| 13 | * | 19.44 | 20.15 | 20.95 | 21.85 | 22.88 | 24.07 | 25.47 | 27.14 | 29.19 | 31.79 | 35.24 |
| 14 | * | 19.65 | 20.34 | 21.12 | 21.99 | 22.98 | 24.12 | 25.45 | 27.02 | 28.93 | 31.30 | 34.37 |
| 15 | * | 417.13 | 430.68 | 445.65 | 462.29 | 480.94 | 502.05 | 526.21 | 554.23 | 587.26 | 627.01 | 676.09 |
| 16 | * | 419.66 | 432.84 | 447.34 | 463.41 | 481.34 | 501.54 | 524.50 | 550.95 | 581.84 | 618.59 | 663.31 |
| 17 | * | 420.40 | 433.34 | 447.54 | 463.25 | 480.73 | 500.35 | 522.58 | 548.07 | 577.70 | 612.72 | 654.99 |
| 18 | * | 18.16 | 18.71 | 19.32 | 19.98 | 20.72 | 21.55 | 22.48 | 23.55 | 24.79 | 26.24 | 27.99 |
| 19 | * | 18.16 | 18.71 | 19.31 | 19.96 | 20.70 | 21.51 | 22.44 | 23.49 | 24.71 | 26.14 | 27.84 |
| 20 | * | 18.17 | 18.71 | 19.30 | 19.95 | 20.67 | 21.47 | 22.37 | 23.40 | 24.58 | 25.96 | 27.61 |
| 21 | * | 18.13 | 18.64 | 19.20 | 19.82 | 20.50 | 21.25 | 22.10 | 23.05 | 24.14 | 25.40 | 26.88 |
| 22 | * | 17.95 | 18.44 | 18.97 | 19.54 | 20.18 | 20.87 | 21.65 | 22.52 | 23.50 | 24.62 | 25.92 |
| 23 | * | 17.64 | 18.09 | 18.57 | 19.09 | 19.66 | 20.29 | 20.98 | 21.74 | 22.59 | 23.56 | 24.65 |
| 24 | * | 17.20 | 17.59 | 18.02 | 18.47 | 18.97 | 19.50 | 20.08 | 20.72 | 21.42 | 22.20 | 23.07 |
| 25 | * | 16.62 | 16.97 | 17.33 | 17.72 | 18.14 | 18.60 | 19.08 | 19.61 | 20.18 | 20.81 | 21.50 |

slope array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | -0.0022 | -0.0033 | -0.0045 | -0.0059 | -0.0075 | -0.0093 | -0.0114 | -0.0142 | -0.0178 | -0.0230 | -0.0321 |
| 2 | * | -0.0020 | -0.0029 | -0.0039 | -0.0051 | -0.0064 | -0.0078 | -0.0096 | -0.0119 | -0.0148 | -0.0192 | -0.0268 |
| 3 | * | -0.0015 | -0.0027 | -0.0041 | -0.0057 | -0.0075 | -0.0096 | -0.0122 | -0.0154 | -0.0196 | -0.0258 | -0.0368 |
| 4 | * | -0.0028 | -0.0030 | -0.0029 | -0.0027 | -0.0025 | -0.0022 | -0.0019 | -0.0015 | -0.0010 | -0.0005 | 0.0004 |
| 5 | * | -0.0113 | -0.0085 | -0.0062 | -0.0040 | -0.0018 | 0.0007 | 0.0035 | 0.0069 | 0.0114 | 0.0178 | 0.0286 |
| 6 | * | 0.0103 | 0.0071 | 0.0066 | 0.0078 | 0.0098 | 0.0128 | 0.0169 | 0.0226 | 0.0304 | 0.0426 | 0.0663 |
| 7 | * | -0.0577 | -0.0325 | -0.0152 | -0.0015 | 0.0118 | 0.0255 | 0.0403 | 0.0576 | 0.0805 | 0.1118 | 0.1594 |
| 8 | * | -0.0662 | -0.0538 | -0.0368 | -0.0192 | 0.0002 | 0.0215 | 0.0447 | 0.0707 | 0.1024 | 0.1395 | 0.2093 |
| 9 | * | -0.1340 | -0.1015 | -0.0805 | -0.0610 | -0.0399 | -0.0159 | 0.0121 | 0.0455 | 0.0840 | 0.1318 | 0.2013 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | * | -0.0437 | -0.0594 | -0.0623 | -0.0536 | -0.0393 | -0.0197 | 0.0053 | 0.0357 | 0.0667 | 0.1052 | 0.1863 |
| 11 | * | -0.0169 | -0.0234 | -0.0245 | -0.0196 | -0.0113 | 0.0004 | 0.0161 | 0.0357 | 0.0569 | 0.0833 | 0.1271 |
| 12 | * | 0.0143 | 0.0217 | 0.0286 | 0.0347 | 0.0407 | 0.0465 | 0.0523 | 0.0581 | 0.0647 | 0.0721 | 0.0786 |
| 13 | * | -0.0202 | -0.0184 | -0.0156 | -0.0113 | -0.0055 | 0.0023 | 0.0125 | 0.0259 | 0.0433 | 0.0668 | 0.1013 |
| 14 | * | -0.1177 | -0.0911 | -0.0646 | -0.0385 | -0.0129 | 0.0127 | 0.0387 | 0.0658 | 0.0954 | 0.1293 | 0.1711 |
| 15 | * | -0.0882 | -0.0639 | -0.0396 | -0.0160 | 0.0071 | 0.0298 | 0.0525 | 0.0756 | 0.1005 | 0.1289 | 0.1632 |
| 16 | * | -0.0228 | -0.0183 | -0.0132 | -0.0071 | 0.0003 | 0.0092 | 0.0200 | 0.0334 | 0.0502 | 0.0718 | 0.1005 |
| 17 | * | -0.0109 | -0.0042 | 0.0028 | 0.0099 | 0.0172 | 0.0246 | 0.0323 | 0.0402 | 0.0481 | 0.0558 | 0.0620 |
| 18 | * | 0.0054 | 0.0071 | 0.0089 | 0.0109 | 0.0131 | 0.0156 | 0.0184 | 0.0218 | 0.0257 | 0.0304 | 0.0368 |
| 19 | * | -0.0017 | -0.0008 | 0.0035 | 0.0062 | 0.0091 | 0.0122 | 0.0155 | 0.0191 | 0.0230 | 0.0273 | 0.0323 |
| 20 | * | -0.0069 | -0.0022 | 0.0026 | 0.0075 | 0.0126 | 0.0180 | 0.0236 | 0.0295 | 0.0358 | 0.0427 | 0.0503 |
| 21 | * | 0.0697 | 0.0783 | 0.0872 | 0.0963 | 0.1058 | 0.1157 | 0.1262 | 0.1374 | 0.1495 | 0.1627 | 0.1774 |
| 22 | * | 0.1708 | 0.1792 | 0.1879 | 0.1969 | 0.2064 | 0.2165 | 0.2272 | 0.2388 | 0.2514 | 0.2654 | 0.2812 |
| 23 | * | 0.2687 | 0.2783 | 0.2883 | 0.2987 | 0.3098 | 0.3216 | 0.3342 | 0.3478 | 0.3628 | 0.3794 | 0.3980 |
| 24 | * | 0.3879 | 0.3991 | 0.4108 | 0.4231 | 0.4362 | 0.4501 | 0.4650 | 0.4812 | 0.4990 | 0.5185 | 0.5403 |
| 25 | * | 0.5024 | 0.5110 | 0.5203 | 0.5304 | 0.5415 | 0.5537 | 0.5671 | 0.5819 | 0.5983 | 0.6166 | 0.6373 |

rcurve array

| i | * | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | | |
| 1 | * | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0009 | 0.0010 |
| 2 | * | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | -0.0001 | -0.0002 | 0.0020 |
| 3 | * | 0.0001 | -0.0001 | 0.0002 | 0.0006 | 0.0010 | 0.0016 | 0.0022 | 0.0030 | 0.0040 | 0.0055 | -0.0066 |
| 4 | * | -0.0021 | -0.0013 | -0.0003 | 0.0007 | 0.0018 | 0.0031 | 0.0046 | 0.0065 | 0.0090 | 0.0127 | 0.0432 |
| 5 | * | -0.0049 | 0.0022 | 0.0026 | 0.0034 | 0.0044 | 0.0058 | 0.0075 | 0.0099 | 0.0132 | 0.0184 | -0.0031 |
| 6 | * | 0.0212 | -0.0098 | -0.0045 | -0.0002 | 0.0039 | 0.0082 | 0.0130 | 0.0187 | 0.0263 | 0.0368 | 0.0762 |
| 7 | * | -0.1086 | -0.0227 | -0.0158 | -0.0106 | -0.0057 | -0.0006 | 0.0048 | 0.0110 | 0.0184 | 0.0275 | 0.0614 |
| 8 | * | -0.1046 | -0.0400 | -0.0277 | -0.0200 | -0.0136 | -0.0077 | -0.0018 | 0.0045 | 0.0124 | 0.0218 | 0.0432 |
| 9 | * | 0.0586 | 0.0047 | 0.0037 | 0.0026 | 0.0014 | 0.0001 | -0.0014 | -0.0033 | -0.0060 | -0.0096 | -0.0417 |
| 10 | * | 0.0344 | 0.0287 | 0.0227 | 0.0168 | 0.0110 | 0.0050 | -0.0013 | -0.0080 | -0.0160 | -0.0263 | -0.0414 |
| 11 | * | 0.0131 | 0.0238 | 0.0226 | 0.0204 | 0.0173 | 0.0132 | 0.0079 | 0.0012 | -0.0064 | -0.0158 | -0.0392 |
| 12 | * | 0.0162 | -0.0076 | -0.0069 | -0.0069 | -0.0071 | -0.0072 | -0.0073 | -0.0072 | -0.0059 | -0.0034 | -0.0036 |
| 13 | * | -0.0813 | -0.0407 | -0.0342 | -0.0275 | -0.0206 | -0.0134 | -0.0058 | 0.0026 | 0.0120 | 0.0233 | 0.0467 |
| 14 | * | -0.0413 | -0.0140 | -0.0081 | -0.0025 | 0.0028 | 0.0077 | 0.0121 | 0.0160 | 0.0197 | 0.0232 | 0.0660 |
| 15 | * | 0.0836 | 0.0264 | 0.0191 | 0.0120 | 0.0052 | -0.0012 | -0.0072 | -0.0131 | -0.0188 | -0.0249 | -0.0732 |
| 16 | * | 0.0095 | 0.0257 | 0.0193 | 0.0128 | 0.0063 | -0.0004 | -0.0075 | -0.0152 | -0.0242 | -0.0355 | -0.0471 |
| 17 | * | 0.0251 | 0.0119 | 0.0105 | 0.0088 | 0.0067 | 0.0040 | 0.0005 | -0.0040 | -0.0099 | -0.0178 | -0.0350 |
| 18 | * | -0.0076 | 0.0005 | -0.0004 | -0.0014 | -0.0025 | -0.0036 | -0.0048 | -0.0061 | -0.0075 | -0.0090 | 0.0029 |
| 19 | * | -0.0043 | -0.0013 | -0.0002 | 0.0009 | 0.0019 | 0.0029 | 0.0038 | 0.0045 | 0.0052 | 0.0057 | -0.0121 |
| 20 | * | 0.0060 | 0.0309 | 0.0324 | 0.0340 | 0.0354 | 0.0369 | 0.0384 | 0.0399 | 0.0415 | 0.0431 | 0.0447 |
| 21 | * | 0.1095 | 0.0891 | 0.0881 | 0.0873 | 0.0865 | 0.0858 | 0.0853 | 0.0848 | 0.0845 | 0.0843 | 0.1019 |
| 22 | * | 0.1352 | 0.1197 | 0.1167 | 0.1138 | 0.1111 | 0.1085 | 0.1061 | 0.1038 | 0.1015 | 0.0994 | 0.0884 |
| 23 | * | 0.1114 | 0.1241 | 0.1211 | 0.1182 | 0.1155 | 0.1129 | 0.1104 | 0.1080 | 0.1057 | 0.1033 | 0.1106 |
| 24 | * | 0.1513 | 0.1158 | 0.1117 | 0.1078 | 0.1042 | 0.1007 | 0.0975 | 0.0943 | 0.0912 | 0.0882 | 0.0942 |
| 25 | * | 0.0666 | 0.0836 | 0.0796 | 0.0759 | 0.0725 | 0.0692 | 0.0661 | 0.0631 | 0.0603 | 0.0574 | 0.0415 |

1

*** computed compressor parameters for a rotational speed of 16042.8 rpm which is a speed fraction of 1.0000 ***

** the corrected weightflow per unit of casing annular area at the inlet face of the first blade row is 38.90 lbs/sec/ft sq **

** mass averaged rotor and stage aerodynamic parameters **

| stage no. | blade type | flow coef. | head coef. | id. head coef. | press. ratio | temp. ratio | adia. eff. | poly. eff. | reset angle (deg) | for. ax. thrust (lbs) | gas bending moments for. ax. (ft-lbs) | tang. (ft-lbs) | torque (ft-lbs) | power (hp) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | rotor | 0.4446 | 0.2411 | 0.2629 | 1.6460 | 1.1605 | 0.9169 | 0.9223 | 0.00 | 1057.92 | 17.671 | -12.757 | 703.71 | 2149.53 |
| 1 | stator | 0.4159 | 0.2207 | 0.2629 | 1.5822 | 1.1605 | 0.8395 | 0.8492 | -10.01 | -229.94 | 1.918 | 7.047 | | |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | rotor | 0.4774 | 0.3133 | 0.3366 | 1.6497 | 1.1556 | 0.9307 | 0.9352 | 0.00 | 1563.20 | 8.841 | -5.775 | 807.37 | 2466.15 |
| 2 | stator | 0.4065 | 0.3021 | 0.3366 | 1.6221 | 1.1577 | 0.8973 | 0.8926 | 5.00 | -273.17 | 1.439 | 2.994 | | |

** cumulative sums of mass averaged rotor and stage aerodydamic parameters **

| stage no. | blade type | weight flow (lbs/sec) | total press. (psia) | total temp. (deg. r.) | press. ratio | temp. ratio | head coef. | ideal head coef. | adia. eff. | poly. eff. | for. ax. thrust (lbs) | torque (ft-lbs) | power (hp) | fract energy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | inlet | 73.30 | 14.666 | 518.70 | | | | | | | | | | |
| 1 | rotor | 73.30 | 24.140 | 601.95 | 1.6460 | 1.1605 | 0.2411 | 0.2629 | 0.9169 | 0.9223 | 1057.92 | 703.71 | 2149.53 | 0.4624 |
| 1 | stator | 73.30 | 23.204 | 601.95 | 1.5822 | 1.1605 | 0.2207 | 0.2629 | 0.8395 | 0.8492 | 827.97 | | | |
| 2 | rotor | 73.30 | 38.280 | 696.86 | 2.6102 | 1.3435 | 0.4954 | 0.5686 | 0.8712 | 0.8865 | 2250.97 | 1521.84 | 4648.54 | 1.0000 |
| 2 | stator | 73.30 | 37.641 | 696.86 | 2.5666 | 1.3435 | 0.4855 | 0.5686 | 0.8539 | 0.8709 | 1977.79 | | | |

1

** values of parameters on streamlines at station, 1, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.099 | -11.000 | | | | | | | | | | | | |
| 1 | 10.099 | -11.000 | 514.73 | 514.73 | 0.00 | 514.73 | 0.4731 | 0.00 | -0.13 | 0.000 | 14.144 | 518.70 | 12.150 | 497.22 |
| 2 | 9.632 | -11.000 | 571.93 | 571.93 | 0.00 | 571.93 | 0.5282 | 0.00 | -0.15 | 0.000 | 14.670 | 518.70 | 12.149 | 492.17 |
| 3 | 9.167 | -11.000 | 574.89 | 574.89 | 0.00 | 574.89 | 0.5311 | 0.00 | -0.22 | 0.000 | 14.700 | 518.70 | 12.150 | 491.89 |
| 4 | 8.675 | -11.000 | 574.81 | 574.82 | 0.00 | 574.82 | 0.5310 | 0.00 | -0.29 | 0.000 | 14.700 | 518.70 | 12.151 | 491.90 |
| 5 | 8.154 | -11.000 | 574.69 | 574.70 | 0.00 | 574.70 | 0.5309 | 0.00 | -0.37 | 0.000 | 14.700 | 518.70 | 12.151 | 491.91 |
| 6 | 7.597 | -11.000 | 574.54 | 574.56 | 0.00 | 574.56 | 0.5308 | 0.00 | -0.47 | 0.000 | 14.700 | 518.70 | 12.153 | 491.92 |
| 7 | 6.996 | -11.000 | 574.34 | 574.37 | 0.00 | 574.37 | 0.5306 | 0.00 | -0.59 | 0.001 | 14.700 | 518.70 | 12.154 | 491.94 |
| 8 | 6.338 | -11.000 | 574.09 | 574.14 | 0.00 | 574.14 | 0.5304 | 0.00 | -0.74 | 0.001 | 14.700 | 518.70 | 12.156 | 491.96 |
| 9 | 5.603 | -11.000 | 573.80 | 573.88 | 0.00 | 573.88 | 0.5301 | 0.00 | -0.93 | 0.001 | 14.700 | 518.70 | 12.158 | 491.98 |
| 10 | 4.755 | -11.000 | 573.47 | 573.60 | 0.00 | 573.60 | 0.5298 | 0.00 | -1.22 | 0.000 | 14.700 | 518.70 | 12.161 | 492.01 |
| 11 | 3.714 | -11.000 | 568.75 | 569.05 | 0.00 | 569.05 | 0.5254 | 0.00 | -1.84 | 0.001 | 14.660 | 518.70 | 12.165 | 492.43 |
| hub | 3.714 | -11.000 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 2, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.099 | -9.000 | | | | | | | | | | | | |
| 1 | 10.095 | -9.000 | 515.97 | 515.97 | 0.00 | 515.97 | 0.4742 | 0.00 | -0.11 | 0.000 | 14.180 | 518.70 | 12.172 | 497.11 |
| 2 | 9.627 | -9.000 | 569.12 | 569.12 | 0.00 | 569.12 | 0.5255 | 0.00 | -0.13 | 0.000 | 14.669 | 518.70 | 12.172 | 492.43 |
| 3 | 9.160 | -9.000 | 571.97 | 571.97 | 0.00 | 571.97 | 0.5283 | 0.00 | -0.18 | 0.000 | 14.698 | 518.70 | 12.172 | 492.16 |
| 4 | 8.666 | -9.000 | 571.81 | 571.82 | 0.00 | 571.82 | 0.5281 | 0.00 | -0.24 | 0.001 | 14.698 | 518.70 | 12.174 | 492.18 |
| 5 | 8.142 | -9.000 | 571.60 | 571.60 | 0.00 | 571.60 | 0.5279 | 0.00 | -0.31 | 0.001 | 14.698 | 518.70 | 12.175 | 492.20 |
| 6 | 7.582 | -9.000 | 571.31 | 571.32 | 0.00 | 571.32 | 0.5276 | 0.00 | -0.39 | 0.001 | 14.698 | 518.70 | 12.178 | 492.22 |
| 7 | 6.977 | -9.000 | 570.94 | 570.96 | 0.00 | 570.96 | 0.5273 | 0.00 | -0.50 | 0.001 | 14.698 | 518.70 | 12.181 | 492.26 |
| 8 | 6.314 | -9.000 | 570.48 | 570.52 | 0.00 | 570.52 | 0.5269 | 0.00 | -0.65 | 0.001 | 14.698 | 518.70 | 12.184 | 492.30 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 5.571 | -9.000 | 569.95 | 570.01 | 0.00 | 570.01 | 0.5264 | 0.00 | -0.85 | 0.001 | 14.698 | 518.70 | 12.188 | 492.34 |
| 10 | 4.713 | -9.000 | 569.36 | 569.48 | 0.00 | 569.48 | 0.5258 | 0.00 | -1.15 | 0.001 | 14.698 | 518.70 | 12.193 | 492.39 |
| 11 | 3.655 | -9.000 | 564.35 | 564.55 | 0.00 | 564.55 | 0.5211 | 0.00 | -1.54 | 0.002 | 14.658 | 518.70 | 12.200 | 492.85 |
| hub | 3.643 | -9.000 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 3, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.100 | -7.000 | | | | | | | | | | | | |
| 1 | 10.091 | -7.000 | 517.71 | 517.71 | 0.00 | 517.71 | 0.4759 | 0.00 | -0.09 | 0.000 | 14.211 | 518.70 | 12.186 | 496.97 |
| 2 | 9.624 | -7.000 | 567.30 | 567.30 | 0.00 | 567.30 | 0.5237 | 0.00 | -0.08 | 0.000 | 14.668 | 518.70 | 12.186 | 492.59 |
| 3 | 9.154 | -7.000 | 570.04 | 570.04 | 0.00 | 570.04 | 0.5264 | 0.00 | -0.11 | 0.001 | 14.696 | 518.70 | 12.187 | 492.34 |
| 4 | 8.659 | -7.000 | 569.79 | 569.79 | 0.00 | 569.79 | 0.5261 | 0.00 | -0.14 | 0.001 | 14.696 | 518.70 | 12.189 | 492.36 |
| 5 | 8.133 | -7.000 | 569.39 | 569.40 | 0.00 | 569.40 | 0.5258 | 0.00 | -0.18 | 0.002 | 14.696 | 518.70 | 12.192 | 492.40 |
| 6 | 7.571 | -7.000 | 568.80 | 568.80 | 0.00 | 568.80 | 0.5252 | 0.00 | -0.22 | 0.002 | 14.696 | 518.70 | 12.197 | 492.46 |
| 7 | 6.963 | -7.000 | 567.94 | 567.95 | 0.00 | 567.95 | 0.5244 | 0.00 | -0.29 | 0.003 | 14.696 | 518.70 | 12.204 | 492.53 |
| 8 | 6.295 | -7.000 | 566.75 | 566.76 | 0.00 | 566.76 | 0.5232 | 0.00 | -0.40 | 0.003 | 14.696 | 518.70 | 12.214 | 492.64 |
| 9 | 5.546 | -7.000 | 565.17 | 565.20 | 0.00 | 565.20 | 0.5217 | 0.00 | -0.60 | 0.004 | 14.696 | 518.70 | 12.226 | 492.79 |
| 10 | 4.676 | -7.000 | 563.29 | 563.37 | 0.00 | 563.37 | 0.5199 | 0.00 | -0.97 | 0.003 | 14.696 | 518.70 | 12.241 | 492.96 |
| 11 | 3.597 | -7.000 | 559.62 | 560.00 | 0.00 | 560.00 | 0.5166 | 0.00 | -2.11 | -0.007 | 14.656 | 518.70 | 12.236 | 493.26 |
| hub | 3.572 | -7.000 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 4, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.101 | -5.200 | | | | | | | | | | | | |
| 1 | 10.088 | -5.200 | 520.23 | 520.23 | 0.00 | 520.23 | 0.4783 | 0.00 | -0.16 | -0.002 | 14.235 | 518.70 | 12.188 | 496.76 |
| 2 | 9.621 | -5.200 | 567.43 | 567.43 | 0.00 | 567.43 | 0.5239 | 0.00 | -0.13 | -0.001 | 14.667 | 518.70 | 12.184 | 492.58 |
| 3 | 9.152 | -5.200 | 570.50 | 570.50 | 0.00 | 570.50 | 0.5268 | 0.00 | -0.09 | 0.000 | 14.695 | 518.70 | 12.182 | 492.30 |
| 4 | 8.656 | -5.200 | 570.43 | 570.43 | 0.00 | 570.43 | 0.5268 | 0.00 | -0.04 | 0.001 | 14.695 | 518.70 | 12.182 | 492.31 |
| 5 | 8.131 | -5.200 | 569.95 | 569.95 | 0.00 | 569.95 | 0.5263 | 0.00 | 0.02 | 0.002 | 14.695 | 518.70 | 12.186 | 492.35 |
| 6 | 7.568 | -5.200 | 568.99 | 568.99 | 0.00 | 568.99 | 0.5254 | 0.00 | 0.08 | 0.004 | 14.695 | 518.70 | 12.194 | 492.44 |
| 7 | 6.959 | -5.200 | 567.40 | 567.40 | 0.00 | 567.40 | 0.5238 | 0.00 | 0.14 | 0.005 | 14.695 | 518.70 | 12.207 | 492.59 |
| 8 | 6.290 | -5.200 | 564.88 | 564.88 | 0.00 | 564.88 | 0.5214 | 0.00 | 0.18 | 0.008 | 14.695 | 518.70 | 12.228 | 492.82 |
| 9 | 5.537 | -5.200 | 560.91 | 560.91 | 0.00 | 560.91 | 0.5175 | 0.00 | 0.17 | 0.011 | 14.695 | 518.70 | 12.260 | 493.18 |
| 10 | 4.658 | -5.200 | 554.14 | 554.14 | 0.00 | 554.14 | 0.5110 | 0.00 | 0.08 | 0.017 | 14.695 | 518.70 | 12.315 | 493.79 |
| 11 | 3.546 | -5.200 | 531.82 | 531.82 | 0.00 | 531.82 | 0.4895 | 0.00 | 0.02 | 0.043 | 14.655 | 518.70 | 12.458 | 495.76 |
| hub | 3.507 | -5.200 | | | | | | | | | | | | |

1

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

** values of parameters on streamlines at station, 5, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.101 | -3.700 | | | | | | | | | | | | |
| 1 | 10.079 | -3.700 | 527.34 | 527.37 | 0.00 | 527.37 | 0.4852 | 0.00 | -0.65 | -0.005 | 14.254 | 518.70 | 12.150 | 496.15 |
| 2 | 9.615 | -3.700 | 572.23 | 572.24 | 0.00 | 572.24 | 0.5285 | 0.00 | -0.29 | -0.001 | 14.666 | 518.70 | 12.144 | 492.14 |
| 3 | 9.149 | -3.700 | 575.06 | 575.06 | 0.00 | 575.06 | 0.5313 | 0.00 | -0.10 | 0.000 | 14.694 | 518.70 | 12.143 | 491.87 |
| 4 | 8.656 | -3.700 | 574.83 | 574.83 | 0.00 | 574.83 | 0.5310 | 0.00 | 0.06 | 0.001 | 14.694 | 518.70 | 12.145 | 491.90 |
| 5 | 8.134 | -3.700 | 574.28 | 574.28 | 0.00 | 574.28 | 0.5305 | 0.00 | 0.24 | 0.002 | 14.694 | 518.70 | 12.150 | 491.95 |
| 6 | 7.575 | -3.700 | 573.19 | 573.20 | 0.00 | 573.20 | 0.5295 | 0.00 | 0.44 | 0.004 | 14.694 | 518.70 | 12.159 | 492.05 |
| 7 | 6.970 | -3.700 | 571.16 | 571.20 | 0.00 | 571.20 | 0.5275 | 0.00 | 0.69 | 0.007 | 14.694 | 518.70 | 12.175 | 492.23 |
| 8 | 6.305 | -3.700 | 567.66 | 567.75 | 0.00 | 567.75 | 0.5242 | 0.00 | 0.99 | 0.011 | 14.694 | 518.70 | 12.204 | 492.55 |
| 9 | 5.556 | -3.700 | 561.98 | 562.13 | 0.00 | 562.13 | 0.5187 | 0.00 | 1.32 | 0.015 | 14.694 | 518.70 | 12.249 | 493.07 |
| 10 | 4.681 | -3.700 | 553.27 | 553.50 | 0.00 | 553.50 | 0.5104 | 0.00 | 1.65 | 0.020 | 14.694 | 518.70 | 12.319 | 493.85 |
| 11 | 3.581 | -3.700 | 544.21 | 544.43 | 0.00 | 544.43 | 0.5016 | 0.00 | 1.64 | -0.003 | 14.654 | 518.70 | 12.358 | 494.66 |
| hub | 3.518 | -3.700 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 6, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.099 | -2.300 | | | | | | | | | | | | |
| 1 | 10.070 | -2.301 | 538.46 | 538.49 | 0.00 | 538.49 | 0.4959 | 0.00 | 0.59 | 0.021 | 14.270 | 518.70 | 12.080 | 495.18 |
| 2 | 9.611 | -2.322 | 577.51 | 577.51 | 0.00 | 577.51 | 0.5337 | 0.00 | 0.09 | 0.002 | 14.666 | 518.70 | 12.100 | 491.64 |
| 3 | 9.147 | -2.344 | 580.60 | 580.60 | 0.00 | 580.60 | 0.5367 | 0.00 | -0.05 | -0.004 | 14.693 | 518.70 | 12.097 | 491.35 |
| 4 | 8.658 | -2.366 | 581.90 | 581.90 | 0.00 | 581.90 | 0.5379 | 0.00 | 0.03 | -0.005 | 14.693 | 518.70 | 12.086 | 491.23 |
| 5 | 8.140 | -2.390 | 582.96 | 582.97 | 0.00 | 582.97 | 0.5390 | 0.00 | 0.28 | -0.003 | 14.693 | 518.70 | 12.077 | 491.13 |
| 6 | 7.588 | -2.415 | 582.94 | 582.98 | 0.00 | 582.98 | 0.5390 | 0.00 | 0.68 | 0.001 | 14.693 | 518.70 | 12.077 | 491.13 |
| 7 | 6.991 | -2.442 | 581.10 | 581.23 | 0.00 | 581.23 | 0.5373 | 0.00 | 1.20 | 0.007 | 14.693 | 518.70 | 12.091 | 491.29 |
| 8 | 6.335 | -2.472 | 576.58 | 576.88 | 0.00 | 576.88 | 0.5330 | 0.00 | 1.84 | 0.014 | 14.693 | 518.70 | 12.128 | 491.70 |
| 9 | 5.597 | -2.506 | 568.14 | 568.72 | 0.00 | 568.72 | 0.5251 | 0.00 | 2.59 | 0.022 | 14.693 | 518.70 | 12.195 | 492.46 |
| 10 | 4.730 | -2.546 | 553.47 | 554.45 | 0.00 | 554.45 | 0.5113 | 0.00 | 3.40 | 0.034 | 14.693 | 518.70 | 12.311 | 493.77 |
| 11 | 3.623 | -2.596 | 516.62 | 517.75 | 0.00 | 517.75 | 0.4759 | 0.00 | 3.79 | 0.076 | 14.653 | 518.70 | 12.565 | 496.96 |
| hub | 3.540 | -2.600 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 7, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.100 | -1.000 | | | | | | | | | | | | |
| 1 | 10.065 | -1.003 | 503.22 | 504.06 | 0.00 | 504.06 | 0.4629 | 0.00 | -3.30 | -0.109 | 14.283 | 518.70 | 12.348 | 498.10 |
| 2 | 9.594 | -1.039 | 567.58 | 568.25 | 0.00 | 568.25 | 0.5246 | 0.00 | -2.78 | -0.067 | 14.665 | 518.70 | 12.176 | 492.51 |
| 3 | 9.129 | -1.075 | 585.14 | 585.57 | 0.00 | 585.57 | 0.5415 | 0.00 | -2.19 | -0.044 | 14.692 | 518.70 | 12.055 | 490.88 |
| 4 | 8.646 | -1.113 | 595.39 | 595.59 | 0.00 | 595.59 | 0.5513 | 0.00 | -1.48 | -0.029 | 14.692 | 518.70 | 11.970 | 489.92 |
| 5 | 8.139 | -1.152 | 601.86 | 601.89 | 0.00 | 601.89 | 0.5575 | 0.00 | -0.62 | -0.017 | 14.692 | 518.70 | 11.916 | 489.30 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 7.601 | -1.194 | 604.58 | 604.60 | 0.00 | 604.60 | 0.5601 | 0.00 | 0.41 | -0.006 | 14.692 | 518.70 | 11.893 | 489.04 |
| 7 | 7.021 | -1.239 | 603.18 | 603.41 | 0.00 | 603.41 | 0.5590 | 0.00 | 1.59 | 0.004 | 14.692 | 518.70 | 11.903 | 489.16 |
| 8 | 6.384 | -1.288 | 597.05 | 597.82 | 0.00 | 597.82 | 0.5535 | 0.00 | 2.92 | 0.015 | 14.692 | 518.70 | 11.951 | 489.70 |
| 9 | 5.667 | -1.343 | 585.01 | 586.77 | 0.00 | 586.77 | 0.5427 | 0.00 | 4.44 | 0.026 | 14.692 | 518.70 | 12.044 | 490.77 |
| 10 | 4.824 | -1.409 | 564.37 | 567.75 | 0.00 | 567.75 | 0.5242 | 0.00 | 6.26 | 0.041 | 14.692 | 518.70 | 12.202 | 492.55 |
| 11 | 3.748 | -1.492 | 523.24 | 529.84 | 0.00 | 529.84 | 0.4876 | 0.00 | 9.05 | 0.061 | 14.653 | 518.70 | 12.471 | 495.94 |
| hub | 3.646 | -1.500 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 8, which is the inlet of rotor number, 1 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.034 | 0.197 | | | | | | | | | | | | |
| 1 | 9.913 | 0.164 | 583.64 | 584.91 | 0.00 | 584.91 | 0.5409 | 0.00 | -3.79 | -0.105 | 14.295 | 518.70 | 11.734 | 490.94 |
| 2 | 9.490 | 0.049 | 633.25 | 637.42 | 0.00 | 637.42 | 0.5925 | 0.00 | -6.56 | -0.025 | 14.665 | 518.70 | 11.586 | 485.72 |
| 3 | 9.056 | -0.008 | 641.63 | 643.79 | 0.00 | 643.79 | 0.5988 | 0.00 | -4.70 | -0.018 | 14.691 | 518.70 | 11.550 | 485.06 |
| 4 | 8.599 | -0.072 | 645.20 | 646.15 | 0.00 | 646.15 | 0.6011 | 0.00 | -3.11 | -0.012 | 14.691 | 518.70 | 11.529 | 484.81 |
| 5 | 8.117 | -0.146 | 645.58 | 645.82 | 0.00 | 645.82 | 0.6008 | 0.00 | -1.58 | -0.007 | 14.691 | 518.70 | 11.532 | 484.84 |
| 6 | 7.602 | -0.228 | 643.01 | 643.01 | 0.00 | 643.01 | 0.5980 | 0.00 | 0.05 | -0.002 | 14.691 | 518.70 | 11.557 | 485.14 |
| 7 | 7.044 | -0.322 | 636.98 | 637.30 | 0.00 | 637.30 | 0.5923 | 0.00 | 1.80 | 0.004 | 14.691 | 518.70 | 11.608 | 485.73 |
| 8 | 6.429 | -0.435 | 627.04 | 628.31 | 0.00 | 628.31 | 0.5835 | 0.00 | 3.65 | 0.010 | 14.691 | 518.70 | 11.687 | 486.66 |
| 9 | 5.733 | -0.561 | 612.12 | 615.15 | 0.00 | 615.15 | 0.5705 | 0.00 | 5.69 | 0.018 | 14.691 | 518.70 | 11.802 | 487.99 |
| 10 | 4.914 | -0.722 | 589.84 | 595.71 | 0.00 | 595.71 | 0.5514 | 0.00 | 8.05 | 0.029 | 14.691 | 518.70 | 11.968 | 489.91 |
| 11 | 3.883 | -0.879 | 557.41 | 569.50 | 0.00 | 569.50 | 0.5259 | 0.00 | 11.82 | 0.043 | 14.652 | 518.70 | 12.155 | 492.39 |
| hub | 3.762 | -0.898 | | | | | | | | | | | | |

| streamline no. | r/rtip | rel.flow angle (deg) | rel. tang.vel. (ft/sec) | rel. vel. (ft/sec) | rel.mach number | wheel speed (ft/sec) | flow coef. |
|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | 1404.81 | |
| 1 | 0.9879 | 67.15 | 1387.87 | 1506.09 | 1.3927 | 1387.87 | 0.4155 |
| 2 | 0.9457 | 64.37 | 1328.60 | 1473.60 | 1.3697 | 1328.60 | 0.4508 |
| 3 | 0.9025 | 63.08 | 1267.79 | 1421.89 | 1.3225 | 1267.79 | 0.4567 |
| 4 | 0.8570 | 61.78 | 1203.88 | 1366.32 | 1.2711 | 1203.88 | 0.4593 |
| 5 | 0.8089 | 60.39 | 1136.40 | 1307.09 | 1.2160 | 1136.40 | 0.4595 |
| 6 | 0.7576 | 58.86 | 1064.27 | 1243.43 | 1.1564 | 1064.27 | 0.4577 |
| 7 | 0.7020 | 57.13 | 986.14 | 1174.15 | 1.0913 | 986.14 | 0.4534 |
| 8 | 0.6407 | 55.08 | 900.00 | 1097.62 | 1.0193 | 900.00 | 0.4464 |
| 9 | 0.5713 | 52.53 | 802.59 | 1011.22 | 0.9378 | 802.59 | 0.4357 |
| 10 | 0.4898 | 49.11 | 688.01 | 910.07 | 0.8424 | 688.01 | 0.4199 |
| 11 | 0.3870 | 43.67 | 543.68 | 787.35 | 0.7270 | 543.68 | 0.3968 |
| hub | 0.3749 | | | | | | |

| | ------ inlet streamline ------- | | | | | ---------- streamline element ---------- | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| streamline *no.* | *pct.* pass. | inc. *angle* (deg) | ref. *inc.* (deg) | s.s.inc. *angle* (deg) | in.blade *angle* (deg) | element *slope* (deg) | mach no. *at shock* location | sh.loc. *as fract* of s.s. | cov.chan. *as fract* of s.s. | min.chk. area margin | min.chk. pt.loc.in cov.chan. |
| 1 | 1.93 | 1.18 | -2.24 | -0.93 | 65.97 | -8.82 | 1.4851 | 0.6871 | 0.3129 | -0.0050 | 0.2123 |
| 2 | 8.68 | 1.23 | -2.08 | -0.95 | 63.14 | -6.38 | 1.4480 | 0.6422 | 0.3578 | 0.0011 | 0.3962 |
| 3 | 15.60 | 1.86 | -1.97 | -0.54 | 61.22 | -4.61 | 1.4005 | 0.6047 | 0.3953 | 0.0083 | 0.4489 |
| 4 | 22.88 | 2.41 | -1.90 | -0.33 | 59.37 | -3.05 | 1.3575 | 0.5629 | 0.4371 | 0.0084 | 0.4407 |
| 5 | 30.57 | 3.12 | -1.88 | -0.09 | 57.27 | -1.48 | 1.3172 | 0.5178 | 0.4822 | 0.0073 | 0.4337 |
| 6 | 38.78 | 3.88 | -1.88 | 0.03 | 54.98 | 0.24 | 1.2812 | 0.4684 | 0.5316 | 0.0098 | 0.4059 |
| 7 | 47.68 | 4.77 | -1.90 | 0.13 | 52.36 | 2.12 | 1.2434 | 0.4157 | 0.5843 | 0.0141 | 0.3670 |
| 8 | 57.49 | 5.73 | -1.94 | 0.18 | 49.35 | 4.15 | 1.2109 | 0.3580 | 0.6420 | 0.0259 | 0.2725 |
| 9 | 68.58 | 6.77 | -2.01 | -0.02 | 45.76 | 6.46 | 1.1438 | 0.2947 | 0.7053 | 0.0413 | 0.2730 |
| 10 | 81.63 | 7.12 | -2.22 | -0.37 | 42.00 | 9.26 | 1.0347 | 0.2296 | 0.7704 | 0.0402 | 0.2532 |
| 11 | 98.06 | 6.14 | -3.03 | -1.67 | 37.53 | 13.26 | 0.8731 | 0.1548 | 0.7730 | 0.0544 | 0.2864 |

1

** values of parameters on streamlines at station, 9, which is the outlet of rotor number, 1 **

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.756 | 1.778 | | | | | | | | | | | | |
| 1 | 9.661 | 1.793 | 521.01 | 525.67 | 465.33 | 702.04 | 0.5992 | 41.52 | -7.63 | 0.059 | 24.816 | 619.48 | 19.533 | 580.28 |
| 2 | 9.288 | 1.852 | 535.70 | 537.90 | 437.69 | 693.48 | 0.5961 | 39.14 | -5.19 | 0.042 | 24.564 | 609.93 | 19.377 | 571.60 |
| 3 | 8.903 | 1.887 | 519.70 | 520.78 | 429.46 | 675.01 | 0.5819 | 39.51 | -3.69 | 0.030 | 24.156 | 604.55 | 19.263 | 568.20 |
| 4 | 8.492 | 1.942 | 518.33 | 518.74 | 435.52 | 677.33 | 0.5854 | 40.02 | -2.27 | 0.022 | 24.039 | 601.77 | 19.118 | 565.15 |
| 5 | 8.061 | 2.012 | 522.44 | 522.49 | 448.80 | 688.78 | 0.5969 | 40.66 | -0.84 | 0.016 | 24.015 | 599.98 | 18.931 | 562.09 |
| 6 | 7.612 | 2.105 | 531.48 | 531.51 | 476.53 | 713.85 | 0.6200 | 41.88 | 0.65 | 0.010 | 24.141 | 600.18 | 18.688 | 559.48 |
| 7 | 7.138 | 2.208 | 533.79 | 534.18 | 504.52 | 734.78 | 0.6398 | 43.36 | 2.21 | 0.002 | 24.118 | 599.60 | 18.372 | 556.46 |
| 8 | 6.629 | 2.331 | 537.61 | 538.85 | 542.25 | 764.46 | 0.6678 | 45.18 | 3.89 | -0.005 | 24.127 | 599.46 | 17.953 | 552.74 |
| 9 | 6.077 | 2.476 | 540.99 | 543.79 | 583.50 | 797.61 | 0.6999 | 47.02 | 5.81 | -0.013 | 24.021 | 598.37 | 17.380 | 547.47 |
| 10 | 5.457 | 2.608 | 545.14 | 550.80 | 641.90 | 845.82 | 0.7470 | 49.37 | 8.22 | -0.024 | 23.906 | 597.42 | 16.569 | 540.13 |
| 11 | 4.728 | 2.703 | 552.04 | 563.11 | 736.87 | 927.40 | 0.8280 | 52.61 | 11.38 | -0.042 | 23.826 | 596.99 | 15.257 | 528.03 |
| hub | 4.664 | 2.712 | | | | | | | | | | | | |

| streamline no. | r/rtip | rel.flow angle (deg) | rel. tang.vel. (ft/sec) | rel. vel. (ft/sec) | rel.mach number | wheel speed (ft/sec) | flow coef. | head coef. | ideal head coef. | adiab. eff. | diffusion factor | loss coef. | shock loss coef. | element solidity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | | | | | | | | | |
| 1 | 0.9902 | 59.35 | 887.16 | 1031.20 | 0.8801 | 1352.49 | 0.3709 | 0.2688 | 0.3189 | 0.8430 | 0.4322 | 0.1263 | 0.0439 | 1.3046 |
| 2 | 0.9521 | 58.05 | 862.66 | 1016.63 | 0.8739 | 1300.35 | 0.3813 | 0.2502 | 0.2884 | 0.8674 | 0.4179 | 0.1012 | 0.0390 | 1.3630 |
| 3 | 0.9125 | 57.48 | 816.93 | 968.80 | 0.8352 | 1246.39 | 0.3699 | 0.2405 | 0.2712 | 0.8869 | 0.4237 | 0.0859 | 0.0331 | 1.4253 |
| 4 | 0.8704 | 55.45 | 753.33 | 914.66 | 0.7905 | 1188.86 | 0.3690 | 0.2380 | 0.2624 | 0.9073 | 0.4363 | 0.0721 | 0.0279 | 1.4979 |
| 5 | 0.8263 | 52.45 | 679.77 | 857.37 | 0.7430 | 1128.57 | 0.3719 | 0.2375 | 0.2566 | 0.9255 | 0.4522 | 0.0603 | 0.0231 | 1.5825 |
| 6 | 0.7802 | 47.94 | 589.11 | 793.45 | 0.6891 | 1065.64 | 0.3783 | 0.2402 | 0.2573 | 0.9336 | 0.4758 | 0.0576 | 0.0191 | 1.6830 |
| 7 | 0.7316 | 42.81 | 494.75 | 728.10 | 0.6340 | 999.27 | 0.3800 | 0.2397 | 0.2555 | 0.9384 | 0.4996 | 0.0576 | 0.0149 | 1.8063 |
| 8 | 0.6795 | 35.61 | 385.85 | 662.75 | 0.5789 | 928.10 | 0.3827 | 0.2399 | 0.2550 | 0.9408 | 0.5239 | 0.0610 | 0.0118 | 1.9635 |
| 9 | 0.6229 | 26.17 | 267.21 | 605.90 | 0.5317 | 850.71 | 0.3851 | 0.2376 | 0.2515 | 0.9448 | 0.5373 | 0.0638 | 0.0052 | 2.1761 |
| 10 | 0.5594 | 12.50 | 122.11 | 564.17 | 0.4983 | 764.01 | 0.3880 | 0.2352 | 0.2485 | 0.9463 | 0.5290 | 0.0729 | 0.0001 | 2.4929 |
| 11 | 0.4846 | -7.59 | -74.99 | 568.08 | 0.5072 | 661.88 | 0.3930 | 0.2348 | 0.2471 | 0.9502 | 0.4468 | 0.0860 | 0.0000 | 3.0528 |
| hub | 0.4780 | | | | | | | | | | | | | |

| streamline no. | pct. pass. | press. ratio | temp. ratio | local blade forces radius (in.) | for.axial (lbs/in) | tang. (lbs/in) | -- out. dev. angle (deg) | stream. -- out.blade angle (deg) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1.87 | 1.7359 | 1.1943 | 9.7870 | 20.5025 | -12.1113 | 5.34 | 54.01 |
| 2 | 9.18 | 1.6750 | 1.1759 | 9.3891 | 18.5443 | -11.2246 | 4.94 | 53.11 |
| 3 | 16.75 | 1.6442 | 1.1655 | 8.9792 | 16.8583 | -10.5517 | 4.65 | 52.83 |
| 4 | 24.82 | 1.6363 | 1.1601 | 8.5455 | 15.6210 | -10.1409 | 4.70 | 50.75 |
| 5 | 33.28 | 1.6346 | 1.1567 | 8.0892 | 14.4054 | -9.9099 | 4.91 | 47.54 |
| 6 | 42.11 | 1.6432 | 1.1571 | 7.6068 | 13.1701 | -9.8967 | 5.49 | 42.46 |
| 7 | 51.42 | 1.6416 | 1.1560 | 7.0908 | 11.6515 | -9.7118 | 6.17 | 36.63 |
| 8 | 61.40 | 1.6422 | 1.1557 | 6.5289 | 9.9680 | -9.4948 | 7.24 | 28.36 |
| 9 | 72.26 | 1.6350 | 1.1536 | 5.9047 | 8.0075 | -9.0424 | 8.59 | 17.58 |
| 10 | 84.42 | 1.6272 | 1.1518 | 5.1858 | 5.6512 | -8.3995 | 10.45 | 2.05 |
| 11 | 98.74 | 1.6261 | 1.1509 | 4.3056 | 2.6904 | -8.6693 | 11.84 | -19.42 |

1

** values of parameters on streamlines at station, 10, which is an annulus **

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.630 | 3.000 | | | | | | | | | | | | |
| 1 | 9.575 | 3.003 | 568.10 | 568.64 | 469.51 | 737.42 | 0.6321 | 39.55 | -2.50 | 0.034 | 24.803 | 618.42 | 19.020 | 575.14 |
| 2 | 9.227 | 3.025 | 574.29 | 574.64 | 440.60 | 724.11 | 0.6244 | 37.48 | -2.01 | 0.028 | 24.556 | 609.68 | 18.944 | 567.87 |
| 3 | 8.863 | 3.047 | 558.01 | 558.17 | 431.40 | 705.45 | 0.6099 | 37.70 | -1.39 | 0.023 | 24.156 | 604.56 | 18.851 | 564.85 |
| 4 | 8.475 | 3.071 | 555.13 | 555.16 | 436.39 | 706.15 | 0.6119 | 38.17 | -0.58 | 0.018 | 24.041 | 601.85 | 18.730 | 562.03 |
| 5 | 8.068 | 3.096 | 556.81 | 556.82 | 448.43 | 714.94 | 0.6210 | 38.85 | 0.32 | 0.013 | 24.017 | 600.08 | 18.576 | 559.25 |
| 6 | 7.641 | 3.122 | 562.76 | 562.90 | 474.73 | 736.36 | 0.6409 | 40.14 | 1.29 | 0.008 | 24.143 | 600.29 | 18.374 | 556.96 |
| 7 | 7.187 | 3.150 | 562.36 | 562.83 | 501.05 | 753.54 | 0.6573 | 41.68 | 2.35 | 0.003 | 24.120 | 599.71 | 18.107 | 554.32 |
| 8 | 6.698 | 3.180 | 563.18 | 564.28 | 536.72 | 778.77 | 0.6812 | 43.57 | 3.58 | -0.003 | 24.129 | 599.57 | 17.747 | 551.07 |
| 9 | 6.162 | 3.213 | 563.06 | 565.29 | 575.46 | 806.66 | 0.7085 | 45.51 | 5.09 | -0.010 | 24.023 | 598.48 | 17.249 | 546.41 |
| 10 | 5.560 | 3.250 | 564.28 | 568.59 | 630.04 | 848.67 | 0.7497 | 47.93 | 7.06 | -0.021 | 23.908 | 597.53 | 16.529 | 539.85 |
| 11 | 4.860 | 3.293 | 567.36 | 577.12 | 716.77 | 920.23 | 0.8208 | 51.16 | 10.55 | -0.041 | 23.829 | 597.10 | 15.371 | 529.21 |
| hub | 4.750 | 3.300 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 11, which is the inlet of stator number, 1, of stage number, 1 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.599 | 4.066 | | | | | | | | | | | | |
| 1 | 9.535 | 4.066 | 585.76 | 585.85 | 471.44 | 751.98 | 0.6459 | 38.82 | -0.97 | 0.013 | 24.793 | 617.60 | 18.797 | 572.58 |
| 2 | 9.196 | 4.067 | 595.13 | 595.17 | 442.10 | 741.40 | 0.6405 | 36.61 | -0.64 | 0.016 | 24.549 | 609.47 | 18.692 | 565.63 |
| 3 | 8.841 | 4.069 | 581.04 | 581.04 | 432.47 | 724.32 | 0.6273 | 36.66 | -0.12 | 0.016 | 24.156 | 604.57 | 18.591 | 562.69 |
| 4 | 8.465 | 4.072 | 578.40 | 578.41 | 436.92 | 724.89 | 0.6293 | 37.07 | 0.45 | 0.014 | 24.042 | 601.91 | 18.473 | 559.94 |
| 5 | 8.070 | 4.074 | 579.74 | 579.84 | 448.32 | 732.94 | 0.6378 | 37.71 | 1.07 | 0.010 | 24.019 | 600.16 | 18.327 | 557.24 |
| 6 | 7.655 | 4.078 | 585.13 | 585.40 | 473.82 | 753.13 | 0.6566 | 38.99 | 1.75 | 0.007 | 24.144 | 600.37 | 18.137 | 555.04 |
| 7 | 7.216 | 4.082 | 584.21 | 584.79 | 499.08 | 768.80 | 0.6717 | 40.48 | 2.55 | 0.003 | 24.121 | 599.79 | 17.889 | 552.54 |
| 8 | 6.741 | 4.087 | 584.14 | 585.23 | 533.25 | 791.74 | 0.6935 | 42.34 | 3.50 | 0.000 | 24.130 | 599.65 | 17.559 | 549.52 |
| 9 | 6.222 | 4.092 | 582.81 | 584.73 | 569.84 | 816.47 | 0.7179 | 44.26 | 4.65 | -0.006 | 24.024 | 598.57 | 17.105 | 545.22 |
| 10 | 5.641 | 4.099 | 583.14 | 586.36 | 620.94 | 854.04 | 0.7549 | 46.64 | 6.00 | -0.016 | 23.910 | 597.62 | 16.450 | 539.21 |
| 11 | 4.971 | 4.101 | 590.85 | 595.61 | 700.78 | 919.70 | 0.8201 | 49.64 | 7.25 | -0.039 | 23.831 | 597.19 | 15.382 | 529.38 |
| hub | 4.840 | 4.102 | | | | | | | | | | | | |

| streamline no. | r/rtip | flow coef. | rel.flow angle (deg) |
|---|---|---|---|
| tip | 1.0000 | | |
| 1 | 0.9933 | 0.4170 | 55.84 |
| 2 | 0.9579 | 0.4236 | 54.85 |
| 3 | 0.9210 | 0.4136 | 54.19 |
| 4 | 0.8818 | 0.4117 | 52.29 |
| 5 | 0.8407 | 0.4127 | 49.61 |
| 6 | 0.7975 | 0.4165 | 45.61 |
| 7 | 0.7517 | 0.4159 | 41.15 |
| 8 | 0.7023 | 0.4158 | 35.05 |
| 9 | 0.6482 | 0.4149 | 27.26 |
| 10 | 0.5877 | 0.4151 | 16.07 |
| 11 | 0.5179 | 0.4206 | -0.46 |
| hub | 0.5042 | | |

| | | ------ inlet streamline ------ | | | | ---------- streamline element ---------- | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| streamline no. | pct. pass. | inc. angle (deg) | ref. inc. (deg) | s.s.inc. angle (deg) | in.blade angle (deg) | element slope (deg) | mach no. at shock location | sh.loc. as fract of s.s. | cov.chan. as fract of s.s. | min.chk. area margin | min.chk. pt.loc.in cov.chan. |
| 1 | 1.35 | 12.20 | -2.24 | 5.97 | 26.63 | -0.43 | 0.9149 | 0.2453 | 0.5151 | 0.1852 | 1.0000 |
| 2 | 8.49 | 13.04 | -2.08 | 6.87 | 23.57 | 0.14 | 0.8825 | 0.2201 | 0.5703 | 0.1816 | 1.0000 |
| 3 | 15.94 | 13.18 | -1.97 | 7.07 | 23.48 | 0.58 | 0.8586 | 0.2152 | 0.5952 | 0.2208 | 1.0000 |
| 4 | 23.84 | 13.16 | -1.90 | 7.08 | 23.91 | 1.00 | 0.8588 | 0.2123 | 0.6109 | 0.2336 | 1.0000 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 32.14 | 13.08 | -1.88 | 7.06 | 24.63 | 1.44 | 0.8692 | 0.2104 | 0.6240 | 0.2350 | 0.8811 |
| 6 | 40.85 | 13.10 | -1.88 | 7.15 | 25.89 | 1.98 | 0.8981 | 0.2108 | 0.6332 | 0.2302 | 0.8082 |
| 7 | 50.09 | 13.13 | -1.90 | 7.25 | 27.35 | 2.64 | 0.9228 | 0.2108 | 0.6422 | 0.2353 | 0.6963 |
| 8 | 60.06 | 13.31 | -1.94 | 7.50 | 29.03 | 3.42 | 0.9594 | 0.2096 | 0.6504 | 0.2445 | 0.5927 |
| 9 | 70.96 | 13.27 | -2.01 | 7.55 | 30.99 | 4.29 | 0.9972 | 0.2071 | 0.6608 | 0.2574 | 0.3528 |
| 10 | 83.16 | 12.98 | -2.22 | 7.36 | 33.66 | 5.11 | 1.0534 | 0.2033 | 0.6680 | 0.2621 | 0.0000 |
| 11 | 97.25 | 12.56 | -3.03 | 7.07 | 37.07 | 5.31 | 1.1521 | 0.1948 | 0.6708 | 0.2572 | 0.0000 |

1

** values of parameters on streamlines at station, 12, which is the outlet of stator number, 1, of stage number, 1 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.597 | 6.336 | | | | | | | | | | | | |
| 1 | 9.518 | 6.336 | 626.76 | 626.82 | -145.44 | 643.47 | 0.5491 | -13.06 | 0.82 | 0.016 | 24.024 | 613.36 | 19.628 | 580.41 |
| 2 | 9.201 | 6.337 | 611.41 | 611.51 | -120.30 | 623.23 | 0.5332 | -11.13 | 1.02 | 0.009 | 23.779 | 608.22 | 19.647 | 577.27 |
| 3 | 8.864 | 6.339 | 588.26 | 588.35 | -103.92 | 597.46 | 0.5117 | -10.02 | 1.01 | 0.000 | 23.436 | 604.52 | 19.651 | 576.06 |
| 4 | 8.504 | 6.340 | 580.85 | 580.97 | -98.17 | 589.20 | 0.5053 | -9.59 | 1.17 | -0.003 | 23.326 | 602.22 | 19.643 | 574.53 |
| 5 | 8.127 | 6.342 | 579.14 | 579.34 | -95.04 | 587.08 | 0.5040 | -9.32 | 1.49 | -0.003 | 23.289 | 600.62 | 19.627 | 573.12 |
| 6 | 7.734 | 6.344 | 585.97 | 586.31 | -94.44 | 593.87 | 0.5101 | -9.15 | 1.94 | -0.003 | 23.365 | 600.82 | 19.612 | 572.69 |
| 7 | 7.320 | 6.345 | 580.52 | 581.08 | -92.79 | 588.45 | 0.5054 | -9.07 | 2.52 | -0.004 | 23.271 | 600.25 | 19.594 | 572.63 |
| 8 | 6.876 | 6.347 | 573.98 | 574.85 | -94.05 | 582.50 | 0.5001 | -9.29 | 3.17 | -0.005 | 23.167 | 600.11 | 19.575 | 573.05 |
| 9 | 6.391 | 6.349 | 557.56 | 558.82 | -94.39 | 566.73 | 0.4864 | -9.59 | 3.84 | -0.006 | 22.930 | 599.06 | 19.548 | 573.44 |
| 10 | 5.843 | 6.351 | 529.73 | 531.28 | -100.87 | 540.77 | 0.4636 | -10.75 | 4.38 | -0.008 | 22.559 | 598.15 | 19.510 | 574.83 |
| 11 | 5.181 | 6.353 | 471.74 | 473.20 | -116.32 | 487.28 | 0.4164 | -13.81 | 4.49 | -0.004 | 21.884 | 597.73 | 19.457 | 578.80 |
| hub | 5.043 | 6.354 | | | | | | | | | | | | |

| streamline no. | r/rtip | flow coef. | head coef. | ideal head coef. | stator po.ratio | stage po.ratio | stage ad.eff. | diffusion factor | stator loss coef. | shock loss coef. | element solidity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | | | | | | |
| 1 | 0.9918 | 0.4462 | 0.2519 | 0.3189 | 0.9690 | 1.6805 | 0.7898 | 0.4625 | 0.1283 | 0.0000 | 1.2896 |
| 2 | 0.9588 | 0.4352 | 0.2333 | 0.2884 | 0.9686 | 1.6215 | 0.8091 | 0.4433 | 0.1315 | 0.0000 | 1.3356 |
| 3 | 0.9237 | 0.4187 | 0.2250 | 0.2712 | 0.9702 | 1.5952 | 0.8294 | 0.4417 | 0.1294 | 0.0000 | 1.3878 |
| 4 | 0.8862 | 0.4135 | 0.2225 | 0.2624 | 0.9702 | 1.5877 | 0.8482 | 0.4417 | 0.1286 | 0.0000 | 1.4481 |
| 5 | 0.8469 | 0.4123 | 0.2217 | 0.2566 | 0.9696 | 1.5852 | 0.8639 | 0.4427 | 0.1282 | 0.0000 | 1.5174 |
| 6 | 0.8059 | 0.4171 | 0.2234 | 0.2573 | 0.9677 | 1.5904 | 0.8681 | 0.4468 | 0.1297 | 0.0000 | 1.5974 |
| 7 | 0.7628 | 0.4132 | 0.2213 | 0.2555 | 0.9648 | 1.5840 | 0.8664 | 0.4610 | 0.1364 | 0.0000 | 1.6918 |
| 8 | 0.7165 | 0.4086 | 0.2190 | 0.2550 | 0.9601 | 1.5769 | 0.8589 | 0.4820 | 0.1465 | 0.0000 | 1.8070 |
| 9 | 0.6660 | 0.3969 | 0.2138 | 0.2515 | 0.9545 | 1.5608 | 0.8499 | 0.5122 | 0.1581 | 0.0000 | 1.9525 |
| 10 | 0.6089 | 0.3771 | 0.2055 | 0.2485 | 0.9435 | 1.5355 | 0.8269 | 0.5612 | 0.1811 | 0.0005 | 2.1463 |
| 11 | 0.5398 | 0.3358 | 0.1915 | 0.2471 | 0.9183 | 1.4936 | 0.7748 | 0.6504 | 0.2304 | 0.0073 | 2.4278 |
| hub | 0.5255 | | | | | | | | | | |

| streamline no. | pct. pass. | local blade forces radius (in.) | for.axial (lbs/in) | tang. (lbs/in) | -- out. stream. -- dev. angle (deg) | out.blade angle (deg) |
|---|---|---|---|---|---|---|
| 1 | 1.72 | 9.5267 | 2.3036 | 12.5891 | 13.02 | -26.08 |
| 2 | 8.68 | 9.1984 | 1.9452 | 11.1844 | 11.33 | -22.46 |
| 3 | 16.09 | 8.8524 | 1.8651 | 10.0780 | 10.60 | -20.62 |
| 4 | 23.99 | 8.4844 | 1.8665 | 9.5151 | 10.17 | -19.77 |
| 5 | 32.28 | 8.0983 | 1.9164 | 9.2222 | 9.85 | -19.17 |
| 6 | 40.91 | 7.6944 | 2.0805 | 9.1769 | 9.71 | -18.86 |
| 7 | 50.00 | 7.2678 | 2.1879 | 8.9677 | 9.59 | -18.67 |
| 8 | 59.74 | 6.8088 | 2.3256 | 8.7651 | 9.57 | -18.86 |
| 9 | 70.39 | 6.3068 | 2.4268 | 8.3748 | 9.49 | -19.08 |
| 10 | 82.44 | 5.7422 | 2.5138 | 7.9126 | 9.62 | -20.37 |
| 11 | 96.98 | 5.0759 | 2.4395 | 8.2169 | 10.43 | -24.24 |

1

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

** values of parameters on streamlines at station, 13, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.603 | 7.340 | | | | | | | | | | | | |
| 1 | 9.534 | 7.340 | 600.19 | 600.31 | -145.20 | 617.62 | 0.5261 | -13.60 | -1.16 | -0.081 | 24.012 | 613.03 | 19.940 | 582.68 |
| 2 | 9.212 | 7.340 | 601.75 | 601.83 | -120.16 | 613.71 | 0.5247 | -11.29 | -0.93 | -0.069 | 23.771 | 608.09 | 19.757 | 578.09 |
| 3 | 8.874 | 7.340 | 591.85 | 591.88 | -103.81 | 600.91 | 0.5148 | -9.95 | -0.58 | -0.049 | 23.434 | 604.50 | 19.608 | 575.71 |
| 4 | 8.518 | 7.340 | 592.91 | 592.91 | -98.01 | 600.96 | 0.5158 | -9.39 | 0.01 | -0.031 | 23.325 | 602.24 | 19.503 | 573.44 |
| 5 | 8.148 | 7.340 | 595.88 | 595.92 | -94.79 | 603.42 | 0.5187 | -9.04 | 0.73 | -0.018 | 23.288 | 600.66 | 19.433 | 571.61 |
| 6 | 7.765 | 7.340 | 604.62 | 604.83 | -94.06 | 612.10 | 0.5265 | -8.84 | 1.51 | -0.007 | 23.364 | 600.86 | 19.393 | 570.97 |
| 7 | 7.362 | 7.340 | 598.84 | 599.34 | -92.25 | 606.40 | 0.5216 | -8.75 | 2.34 | 0.002 | 23.271 | 600.29 | 19.381 | 570.95 |
| 8 | 6.931 | 7.340 | 589.67 | 590.59 | -93.31 | 597.92 | 0.5140 | -8.98 | 3.20 | 0.010 | 23.167 | 600.16 | 19.395 | 571.63 |
| 9 | 6.458 | 7.340 | 567.79 | 569.24 | -93.41 | 576.85 | 0.4955 | -9.32 | 4.09 | 0.019 | 22.933 | 599.11 | 19.436 | 572.56 |
| 10 | 5.920 | 7.340 | 530.39 | 532.37 | -99.55 | 541.60 | 0.4643 | -10.59 | 4.95 | 0.031 | 22.566 | 598.21 | 19.507 | 574.81 |
| 11 | 5.259 | 7.340 | 456.61 | 458.95 | -114.57 | 473.03 | 0.4038 | -14.02 | 5.78 | 0.047 | 21.904 | 597.79 | 19.609 | 579.95 |
| hub | 5.131 | 7.340 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 14, which is the inlet of rotor number, 2 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.499 | 8.707 | | | | | | | | | | | | |
| 1 | 9.430 | 8.703 | 685.89 | 690.63 | -146.80 | 706.06 | 0.6063 | -12.00 | -6.71 | -0.041 | 23.997 | 612.58 | 18.782 | 572.86 |
| 2 | 9.134 | 8.686 | 685.26 | 687.79 | -121.18 | 698.38 | 0.6016 | -9.99 | -4.91 | -0.020 | 23.761 | 607.92 | 18.664 | 569.03 |
| 3 | 8.824 | 8.665 | 671.43 | 672.46 | -104.39 | 680.52 | 0.5870 | -8.82 | -3.18 | -0.012 | 23.431 | 604.47 | 18.613 | 567.52 |
| 4 | 8.498 | 8.640 | 666.29 | 666.51 | -98.25 | 673.72 | 0.5819 | -8.39 | -1.48 | -0.004 | 23.324 | 602.27 | 18.599 | 566.04 |
| 5 | 8.156 | 8.612 | 662.23 | 662.23 | -94.71 | 668.97 | 0.5783 | -8.14 | 0.21 | 0.004 | 23.287 | 600.71 | 18.620 | 564.99 |
| 6 | 7.798 | 8.581 | 662.55 | 662.89 | -93.66 | 669.47 | 0.5786 | -8.04 | 1.85 | 0.014 | 23.363 | 600.91 | 18.675 | 565.13 |
| 7 | 7.420 | 8.547 | 648.50 | 649.67 | -91.54 | 656.08 | 0.5667 | -8.02 | 3.43 | 0.023 | 23.271 | 600.35 | 18.768 | 565.99 |
| 8 | 7.012 | 8.509 | 629.78 | 632.22 | -92.23 | 638.91 | 0.5511 | -8.30 | 5.03 | 0.034 | 23.168 | 600.21 | 18.899 | 567.63 |
| 9 | 6.560 | 8.465 | 597.41 | 601.47 | -91.96 | 608.46 | 0.5239 | -8.69 | 6.66 | 0.045 | 22.935 | 599.18 | 19.071 | 569.63 |
| 10 | 6.041 | 8.415 | 548.90 | 554.77 | -97.56 | 563.29 | 0.4837 | -9.97 | 8.34 | 0.058 | 22.574 | 598.28 | 19.278 | 572.96 |
| 11 | 5.397 | 8.337 | 467.96 | 474.76 | -111.65 | 487.71 | 0.4167 | -13.23 | 9.71 | 0.066 | 21.925 | 597.86 | 19.489 | 578.89 |
| hub | 5.265 | 8.322 | | | | | | | | | | | | |

| streamline no. | r/rtip | rel.flow angle (deg) | rel. tang.vel. (ft/sec) | rel. vel. (ft/sec) | rel.mach number | wheel speed (ft/sec) | flow coef. |
|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | 1329.87 | |
| 1 | 0.9927 | 64.79 | 1466.98 | 1621.42 | 1.3924 | 1320.18 | 0.5158 |
| 2 | 0.9616 | 63.84 | 1399.96 | 1559.79 | 1.3437 | 1278.77 | 0.5153 |
| 3 | 0.9290 | 63.35 | 1339.77 | 1499.06 | 1.2931 | 1235.38 | 0.5049 |
| 4 | 0.8946 | 62.64 | 1287.90 | 1450.15 | 1.2524 | 1189.66 | 0.5010 |
| 5 | 0.8586 | 61.83 | 1236.51 | 1402.68 | 1.2125 | 1141.80 | 0.4980 |
| 6 | 0.8210 | 60.79 | 1185.42 | 1358.18 | 1.1739 | 1091.76 | 0.4982 |
| 7 | 0.7812 | 60.11 | 1130.37 | 1303.76 | 1.1260 | 1038.83 | 0.4876 |
| 8 | 0.7381 | 59.51 | 1073.85 | 1246.13 | 1.0748 | 981.62 | 0.4736 |
| 9 | 0.6906 | 59.24 | 1010.38 | 1175.85 | 1.0125 | 918.42 | 0.4492 |
| 10 | 0.6360 | 59.54 | 943.33 | 1094.37 | 0.9397 | 845.77 | 0.4128 |
| 11 | 0.5682 | 61.30 | 867.26 | 988.70 | 0.8448 | 755.61 | 0.3519 |
| hub | 0.5543 | | | | | | |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| streamline no. | pct. pass. | inlet streamline: inc. angle (deg) | ref. inc. (deg) | s.s.inc. angle (deg) | in.blade angle (deg) | streamline element: element slope (deg) | mach no. at shock location | sh.loc. as fract of s.s. | cov.chan. as fract of s.s. | min.chk. area margin | min.chk. pt.loc.in cov.chan. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.63 | 2.76 | -2.24 | 0.22 | 62.03 | -6.58 | 1.5030 | 0.6639 | 0.3361 | 0.0840 | 0.7696 |
| 2 | 8.62 | 2.70 | -2.08 | 0.20 | 61.14 | -4.64 | 1.4513 | 0.6387 | 0.3613 | 0.0657 | 0.5905 |
| 3 | 15.94 | 3.27 | -1.97 | 0.68 | 60.08 | -2.97 | 1.4149 | 0.6105 | 0.3895 | 0.0754 | 0.4202 |
| 4 | 23.65 | 3.82 | -1.90 | 0.99 | 58.82 | -1.31 | 1.3894 | 0.5793 | 0.4207 | 0.0793 | 0.3255 |
| 5 | 31.73 | 4.42 | -1.88 | 1.25 | 57.40 | 0.38 | 1.3673 | 0.5454 | 0.4546 | 0.0827 | 0.2105 |
| 6 | 40.17 | 4.92 | -1.88 | 1.30 | 55.87 | 2.08 | 1.3459 | 0.5095 | 0.4905 | 0.0801 | 0.1869 |
| 7 | 49.10 | 5.84 | -1.90 | 1.71 | 54.28 | 3.75 | 1.3268 | 0.4713 | 0.5287 | 0.0895 | 0.1336 |
| 8 | 58.75 | 6.86 | -1.94 | 2.19 | 52.65 | 5.52 | 1.3124 | 0.4306 | 0.5694 | 0.1048 | 0.0000 |
| 9 | 69.41 | 8.12 | -2.01 | 2.94 | 51.11 | 7.37 | 1.3034 | 0.3876 | 0.6124 | 0.1302 | 0.0000 |
| 10 | 81.67 | 9.29 | -2.22 | 3.76 | 50.25 | 9.33 | 1.2630 | 0.3428 | 0.6572 | 0.1791 | 0.0000 |
| 11 | 96.88 | 8.50 | -3.03 | 3.19 | 52.80 | 10.98 | 1.1967 | 0.2976 | 0.6977 | 0.2541 | 0.0000 |

1

** values of parameters on streamlines at station, 15, which is the outlet of rotor number, 2 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.374 | 9.729 | | | | | | | | | | | | |
| 1 | 9.311 | 9.733 | 555.27 | 557.43 | 334.22 | 649.94 | 0.5151 | 30.95 | -5.04 | 0.084 | 38.575 | 711.32 | 32.315 | 678.43 |
| 2 | 9.048 | 9.749 | 528.78 | 529.77 | 364.12 | 642.84 | 0.5116 | 34.50 | -3.51 | 0.054 | 38.479 | 704.70 | 32.308 | 672.48 |
| 3 | 8.767 | 9.772 | 511.48 | 511.89 | 401.07 | 650.30 | 0.5188 | 38.08 | -2.27 | 0.032 | 38.588 | 702.10 | 32.242 | 669.11 |
| 4 | 8.471 | 9.798 | 505.62 | 505.69 | 423.04 | 659.31 | 0.5273 | 39.91 | -0.98 | 0.015 | 38.700 | 699.54 | 32.148 | 665.61 |
| 5 | 8.164 | 9.827 | 505.35 | 505.36 | 439.97 | 670.05 | 0.5373 | 41.04 | 0.36 | -0.002 | 38.687 | 696.84 | 31.913 | 661.77 |
| 6 | 7.845 | 9.859 | 504.53 | 504.76 | 458.52 | 681.93 | 0.5476 | 42.25 | 1.72 | -0.018 | 38.716 | 696.23 | 31.705 | 659.89 |
| 7 | 7.509 | 9.897 | 499.11 | 499.83 | 486.50 | 697.51 | 0.5610 | 44.23 | 3.08 | -0.032 | 38.614 | 695.79 | 31.318 | 657.76 |
| 8 | 7.150 | 9.941 | 490.56 | 492.06 | 519.00 | 715.19 | 0.5758 | 46.53 | 4.48 | -0.046 | 38.526 | 696.20 | 30.907 | 656.22 |
| 9 | 6.758 | 9.993 | 471.70 | 474.25 | 559.12 | 733.16 | 0.5914 | 49.69 | 5.95 | -0.060 | 38.206 | 695.71 | 30.293 | 653.68 |
| 10 | 6.311 | 10.056 | 438.07 | 441.80 | 594.55 | 740.73 | 0.5986 | 53.38 | 7.45 | -0.074 | 37.411 | 693.96 | 29.497 | 651.03 |
| 11 | 5.747 | 10.143 | 351.69 | 356.34 | 608.52 | 705.18 | 0.5706 | 59.65 | 9.27 | -0.073 | 35.298 | 688.28 | 28.424 | 649.34 |
| hub | 5.647 | 10.158 | | | | | | | | | | | | |

| streamline no. | r/rtip | rel.flow angle (deg) | rel. tang.vel. (ft/sec) | rel. vel. (ft/sec) | rel.mach number | wheel speed (ft/sec) | flow coef. | head coef. | ideal head coef. | adiab. eff. | diffusion factor | loss coef. | shock loss coef. | element solidity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | | | | | | | | | |
| 1 | 0.9933 | 60.10 | 969.33 | 1118.18 | 0.8862 | 1303.54 | 0.4175 | 0.3012 | 0.3559 | 0.8463 | 0.4235 | 0.1113 | 0.0468 | 1.3075 |
| 2 | 0.9652 | 59.59 | 902.56 | 1046.55 | 0.8329 | 1266.68 | 0.3976 | 0.3039 | 0.3484 | 0.8722 | 0.4441 | 0.0954 | 0.0405 | 1.3486 |
| 3 | 0.9352 | 58.22 | 826.26 | 971.98 | 0.7754 | 1227.34 | 0.3846 | 0.3134 | 0.3513 | 0.8924 | 0.4724 | 0.0852 | 0.0363 | 1.3934 |
| 4 | 0.9037 | 56.46 | 762.90 | 915.28 | 0.7320 | 1185.94 | 0.3802 | 0.3173 | 0.3498 | 0.9073 | 0.4932 | 0.0763 | 0.0335 | 1.4441 |
| 5 | 0.8709 | 54.29 | 702.98 | 865.78 | 0.6943 | 1142.94 | 0.3800 | 0.3174 | 0.3455 | 0.9186 | 0.5098 | 0.0693 | 0.0310 | 1.5014 |
| 6 | 0.8368 | 51.73 | 639.73 | 814.89 | 0.6544 | 1098.26 | 0.3794 | 0.3158 | 0.3426 | 0.9219 | 0.5300 | 0.0688 | 0.0287 | 1.5668 |
| 7 | 0.8010 | 48.49 | 564.73 | 754.16 | 0.6065 | 1051.24 | 0.3753 | 0.3164 | 0.3429 | 0.9225 | 0.5570 | 0.0721 | 0.0269 | 1.6428 |
| 8 | 0.7627 | 44.41 | 481.98 | 688.79 | 0.5546 | 1000.98 | 0.3689 | 0.3177 | 0.3449 | 0.9211 | 0.5896 | 0.0785 | 0.0260 | 1.7342 |
| 9 | 0.7209 | 39.21 | 386.95 | 612.09 | 0.4937 | 946.07 | 0.3547 | 0.3184 | 0.3468 | 0.9179 | 0.6308 | 0.0892 | 0.0264 | 1.8484 |
| 10 | 0.6732 | 33.19 | 288.96 | 527.91 | 0.4266 | 883.50 | 0.3294 | 0.3145 | 0.3437 | 0.9150 | 0.6782 | 0.1019 | 0.0216 | 2.0005 |
| 11 | 0.6131 | 28.83 | 196.11 | 406.74 | 0.3291 | 804.63 | 0.2645 | 0.2951 | 0.3246 | 0.9091 | 0.7559 | 0.1216 | 0.0131 | 2.2239 |
| hub | 0.6024 | | | | | | | | | | | | | |

| streamline no. | pct. pass. | press. ratio | temp. ratio | local blade forces: radius (in.) | for.axial (lbs/in) | tang. (lbs/in) | -- out. stream. --: dev. angle (deg) | out.blade angle (deg) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1.69 | 1.6075 | 1.1612 | 9.3705 | 18.2027 | -10.3168 | 3.49 | 56.61 |
| 2 | 8.76 | 1.6194 | 1.1592 | 9.0909 | 17.2680 | -10.1276 | 3.87 | 55.71 |
| 3 | 16.30 | 1.6468 | 1.1615 | 8.7954 | 16.6731 | -9.9975 | 4.08 | 54.14 |
| 4 | 24.23 | 1.6593 | 1.1615 | 8.4843 | 15.9839 | -9.8382 | 4.22 | 52.24 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | 32.47 | 1.6613 | 1.1600 | 8.1598 | 15.0917 | -9.6774 | 4.34 | 49.94 |
| 6 | 41.04 | 1.6572 | 1.1586 | 7.8215 | 14.1027 | -9.5297 | 4.69 | 47.03 |
| 7 | 50.05 | 1.6593 | 1.1590 | 7.4645 | 13.0207 | -9.3687 | 5.17 | 43.31 |
| 8 | 59.68 | 1.6629 | 1.1599 | 7.0807 | 11.8973 | -9.1179 | 5.92 | 38.49 |
| 9 | 70.20 | 1.6658 | 1.1611 | 6.6589 | 10.5402 | -8.6684 | 7.16 | 32.05 |
| 10 | 82.19 | 1.6573 | 1.1599 | 6.1760 | 8.9938 | -7.7327 | 10.91 | 22.27 |
| 11 | 97.31 | 1.6100 | 1.1512 | 5.5723 | 6.8036 | -7.1519 | 29.70 | -0.87 |

1

:

** values of parameters on streamlines at station, 16, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.315 | 11.010 | | | | | | | | | | | | |
| 1 | 9.257 | 11.010 | 582.62 | 582.77 | 336.17 | 672.78 | 0.5344 | 29.98 | -1.31 | 0.010 | 38.565 | 710.52 | 31.883 | 675.26 |
| 2 | 9.005 | 11.010 | 560.55 | 560.68 | 365.85 | 669.48 | 0.5339 | 33.13 | -1.24 | 0.004 | 38.471 | 704.52 | 31.813 | 669.56 |
| 3 | 8.738 | 11.010 | 546.87 | 546.92 | 402.38 | 679.00 | 0.5429 | 36.34 | -0.81 | 0.006 | 38.579 | 702.03 | 31.702 | 666.05 |
| 4 | 8.459 | 11.010 | 544.80 | 544.81 | 423.62 | 690.12 | 0.5532 | 37.87 | -0.32 | 0.003 | 38.690 | 699.54 | 31.559 | 662.35 |
| 5 | 8.170 | 11.010 | 541.28 | 541.28 | 439.64 | 697.33 | 0.5604 | 39.08 | 0.22 | -0.001 | 38.677 | 696.92 | 31.384 | 658.91 |
| 6 | 7.869 | 11.010 | 542.21 | 542.27 | 457.14 | 709.24 | 0.5707 | 40.13 | 0.83 | -0.005 | 38.706 | 696.32 | 31.169 | 656.99 |
| 7 | 7.551 | 11.010 | 530.99 | 531.18 | 483.81 | 718.49 | 0.5788 | 42.33 | 1.52 | -0.011 | 38.604 | 695.87 | 30.901 | 655.51 |
| 8 | 7.209 | 11.010 | 520.93 | 521.35 | 514.75 | 732.65 | 0.5907 | 44.64 | 2.28 | -0.015 | 38.517 | 696.29 | 30.555 | 654.31 |
| 9 | 6.834 | 11.010 | 495.15 | 495.90 | 552.88 | 742.69 | 0.5995 | 48.11 | 3.16 | -0.021 | 38.201 | 695.80 | 30.100 | 652.66 |
| 10 | 6.403 | 11.010 | 454.59 | 455.80 | 586.03 | 742.42 | 0.6000 | 52.13 | 4.18 | -0.025 | 37.427 | 694.07 | 29.478 | 650.94 |
| 11 | 5.857 | 11.010 | 366.62 | 368.47 | 597.17 | 701.70 | 0.5675 | 58.32 | 5.74 | -0.047 | 35.412 | 688.54 | 28.581 | 649.99 |
| hub | 5.763 | 11.010 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 17, which is the inlet of stator number, 1, of stage number, 2 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.297 | 11.887 | | | | | | | | | | | | |
| 1 | 9.232 | 11.888 | 604.32 | 604.35 | 337.07 | 692.00 | 0.5507 | 29.15 | -0.62 | 0.025 | 38.556 | 710.02 | 31.511 | 672.71 |
| 2 | 8.986 | 11.892 | 580.59 | 580.64 | 366.61 | 686.69 | 0.5484 | 32.27 | -0.75 | 0.020 | 38.462 | 704.39 | 31.483 | 667.60 |
| 3 | 8.726 | 11.897 | 565.81 | 565.84 | 402.92 | 694.64 | 0.5561 | 35.45 | -0.55 | 0.008 | 38.569 | 701.97 | 31.397 | 664.31 |
| 4 | 8.455 | 11.900 | 563.50 | 563.50 | 423.85 | 705.11 | 0.5659 | 36.95 | -0.24 | 0.003 | 38.680 | 699.53 | 31.261 | 660.70 |
| 5 | 8.173 | 11.903 | 560.14 | 560.14 | 439.47 | 711.96 | 0.5728 | 38.12 | 0.15 | -0.001 | 38.667 | 696.96 | 31.092 | 657.34 |
| 6 | 7.880 | 11.907 | 561.13 | 561.16 | 456.46 | 723.36 | 0.5827 | 39.13 | 0.58 | -0.005 | 38.696 | 696.37 | 30.883 | 655.46 |
| 7 | 7.572 | 11.913 | 550.29 | 550.39 | 482.44 | 731.90 | 0.5902 | 41.24 | 1.10 | -0.008 | 38.594 | 695.93 | 30.628 | 654.04 |
| 8 | 7.242 | 11.919 | 540.15 | 540.40 | 512.41 | 744.71 | 0.6010 | 43.48 | 1.75 | -0.009 | 38.508 | 696.34 | 30.307 | 652.97 |
| 9 | 6.881 | 11.926 | 513.91 | 514.45 | 549.12 | 752.45 | 0.6079 | 46.87 | 2.61 | -0.006 | 38.195 | 695.86 | 29.901 | 651.57 |
| 10 | 6.467 | 11.937 | 472.37 | 473.38 | 580.14 | 748.77 | 0.6055 | 50.79 | 3.74 | -0.002 | 37.442 | 694.15 | 29.365 | 650.27 |
| 11 | 5.954 | 11.970 | 392.12 | 392.87 | 587.35 | 706.63 | 0.5716 | 56.22 | 3.55 | -0.035 | 35.529 | 688.78 | 28.588 | 649.69 |
| hub | 5.843 | 11.977 | | | | | | | | | | | | |

| streamline no. | r/rtip | flow coef. | rel.flow angle (deg) |
|---|---|---|---|
| tip | 1.0000 | | |
| 1 | 0.9930 | 0.4544 | 57.68 |
| 2 | 0.9666 | 0.4366 | 56.92 |
| 3 | 0.9386 | 0.4255 | 55.35 |
| 4 | 0.9094 | 0.4237 | 53.44 |
| 5 | 0.8791 | 0.4212 | 51.52 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | |
|---|---|---|---|
| 6 | 0.8476 | 0.4219 | 49.05 |
| 7 | 0.8145 | 0.4138 | 46.38 |
| 8 | 0.7790 | 0.4062 | 42.86 |
| 9 | 0.7401 | 0.3864 | 38.84 |
| 10 | 0.6957 | 0.3552 | 34.50 |
| 11 | 0.6405 | 0.2949 | 32.08 |
| hub | 0.6285 | | |

| | | ------ inlet streamline ------- | | | | ---------- streamline element ---------- | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| streamline no. | pct. pass. | inc. angle (deg) | ref. inc. (deg) | s.s.inc. angle (deg) | in.blade angle (deg) | element slope (deg) | mach no. at shock location | sh.loc. as fract of s.s. | cov.chan. as fract of s.s. | min.chk. area margin | min.chk. pt.loc.in cov.chan. |
| 1 | 1.87 | -10.89 | -2.24 | -16.67 | 40.04 | 0.53 | 0.6331 | 0.3726 | 0.5273 | 0.1513 | 0.0000 |
| 2 | 8.99 | -7.20 | -2.08 | -12.98 | 39.47 | 0.04 | 0.6513 | 0.3660 | 0.5598 | 0.1855 | 0.0000 |
| 3 | 16.52 | -4.05 | -1.97 | -9.81 | 39.50 | -0.10 | 0.6815 | 0.3614 | 0.5828 | 0.2056 | 0.0000 |
| 4 | 24.38 | -2.68 | -1.90 | -8.40 | 39.63 | 0.02 | 0.7003 | 0.3553 | 0.5994 | 0.2055 | 0.0000 |
| 5 | 32.54 | -1.87 | -1.88 | -7.55 | 39.99 | 0.25 | 0.7127 | 0.3492 | 0.6113 | 0.2063 | 0.0000 |
| 6 | 41.02 | -1.65 | -1.88 | -7.28 | 40.77 | 0.53 | 0.7267 | 0.3444 | 0.6193 | 0.1977 | 0.0000 |
| 7 | 49.95 | -0.64 | -1.90 | -6.21 | 41.87 | 0.91 | 0.7470 | 0.3402 | 0.6258 | 0.2086 | 0.0000 |
| 8 | 59.51 | 0.26 | -1.94 | -5.25 | 43.22 | 1.43 | 0.7720 | 0.3355 | 0.6310 | 0.2170 | 0.0000 |
| 9 | 69.97 | 2.08 | -2.01 | -3.35 | 44.78 | 2.22 | 0.8020 | 0.3296 | 0.6367 | 0.2567 | 0.0000 |
| 10 | 81.93 | 3.04 | -2.22 | -2.30 | 47.75 | 3.26 | 0.8203 | 0.3255 | 0.6357 | 0.3310 | 0.0000 |
| 11 | 96.79 | -0.22 | -3.03 | -5.40 | 56.45 | 1.71 | 0.7897 | 0.3333 | 0.5981 | 0.4087 | 0.0000 |

1

** values of parameters on streamlines at station, 18, which is the outlet of stator number, 1, of stage number, 2 **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.303 | 13.585 | | | | | | | | | | | | |
| 1 | 9.248 | 13.584 | 536.92 | 536.93 | 5.16 | 536.96 | 0.4235 | 0.55 | 0.31 | -0.008 | 37.853 | 707.83 | 33.554 | 685.39 |
| 2 | 8.988 | 13.580 | 536.40 | 536.41 | 23.33 | 536.92 | 0.4247 | 2.49 | 0.27 | 0.000 | 37.872 | 703.71 | 33.547 | 681.26 |
| 3 | 8.724 | 13.576 | 543.02 | 543.03 | 37.25 | 544.30 | 0.4314 | 3.92 | 0.23 | 0.007 | 38.025 | 701.64 | 33.556 | 678.55 |
| 4 | 8.455 | 13.574 | 547.51 | 547.51 | 44.35 | 549.31 | 0.4361 | 4.63 | 0.32 | 0.008 | 38.151 | 699.47 | 33.574 | 675.95 |
| 5 | 8.180 | 13.573 | 545.03 | 545.05 | 47.54 | 547.12 | 0.4350 | 4.99 | 0.47 | 0.008 | 38.150 | 697.18 | 33.594 | 673.82 |
| 6 | 7.896 | 13.573 | 544.86 | 544.90 | 49.17 | 547.11 | 0.4352 | 5.16 | 0.67 | 0.007 | 38.173 | 696.62 | 33.611 | 673.26 |
| 7 | 7.598 | 13.572 | 535.97 | 536.04 | 50.15 | 538.38 | 0.4282 | 5.35 | 0.91 | 0.004 | 38.032 | 696.18 | 33.622 | 673.57 |
| 8 | 7.283 | 13.572 | 527.77 | 527.89 | 49.66 | 530.22 | 0.4214 | 5.37 | 1.24 | -0.002 | 37.887 | 696.59 | 33.622 | 674.66 |
| 9 | 6.945 | 13.572 | 506.23 | 506.45 | 48.02 | 508.72 | 0.4039 | 5.42 | 1.68 | -0.013 | 37.504 | 696.13 | 33.602 | 675.95 |
| 10 | 6.561 | 13.573 | 451.91 | 452.24 | 41.39 | 454.13 | 0.3599 | 5.23 | 2.19 | -0.030 | 36.613 | 694.53 | 33.545 | 678.45 |
| 11 | 6.003 | 13.583 | 225.76 | 225.91 | 78.10 | 239.03 | 0.1885 | 19.07 | 2.11 | 0.003 | 34.308 | 689.84 | 33.488 | 685.38 |
| hub | 5.914 | 13.584 | | | | | | | | | | | | |

| streamline no. | r/rtip | flow coef. | head coef. | ideal head coef. | stator po.ratio | stage po.ratio | stage ad.eff. | diffusion factor | stator loss coef. | shock loss coef. | element solidity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 1.0000 | | | | | | | | | | |
| 1 | 0.9941 | 0.4037 | 0.2885 | 0.3559 | 0.9818 | 1.5774 | 0.8105 | 0.4126 | 0.0998 | 0.0000 | 1.2706 |
| 2 | 0.9661 | 0.4034 | 0.2932 | 0.3484 | 0.9847 | 1.5939 | 0.8416 | 0.4094 | 0.0846 | 0.0000 | 1.3065 |
| 3 | 0.9377 | 0.4083 | 0.3036 | 0.3513 | 0.9859 | 1.6228 | 0.8643 | 0.4120 | 0.0759 | 0.0000 | 1.3458 |
| 4 | 0.9089 | 0.4117 | 0.3078 | 0.3498 | 0.9863 | 1.6357 | 0.8800 | 0.4147 | 0.0713 | 0.0000 | 1.3887 |
| 5 | 0.8794 | 0.4098 | 0.3080 | 0.3455 | 0.9866 | 1.6382 | 0.8916 | 0.4231 | 0.0683 | 0.0000 | 1.4360 |
| 6 | 0.8488 | 0.4097 | 0.3064 | 0.3426 | 0.9865 | 1.6339 | 0.8943 | 0.4325 | 0.0670 | 0.0000 | 1.4886 |
| 7 | 0.8168 | 0.4030 | 0.3063 | 0.3429 | 0.9854 | 1.6344 | 0.8930 | 0.4548 | 0.0705 | 0.0000 | 1.5481 |
| 8 | 0.7829 | 0.3969 | 0.3066 | 0.3449 | 0.9839 | 1.6353 | 0.8888 | 0.4795 | 0.0756 | 0.0000 | 1.6171 |
| 9 | 0.7465 | 0.3807 | 0.3060 | 0.3468 | 0.9819 | 1.6352 | 0.8823 | 0.5187 | 0.0834 | 0.0000 | 1.6997 |
| 10 | 0.7052 | 0.3398 | 0.3001 | 0.3437 | 0.9779 | 1.6219 | 0.8733 | 0.5912 | 0.1026 | 0.0000 | 1.8051 |
| 11 | 0.6453 | 0.1698 | 0.2763 | 0.3246 | 0.9656 | 1.5648 | 0.8514 | 0.8441 | 0.1759 | 0.0000 | 1.9652 |
| hub | 0.6358 | | | | | | | | | | |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| streamline no. | pct. pass. | local blade forces radius (in.) | for.axial (lbs/in) | tang. (lbs/in) | -- out. stream. -- dev. angle (deg) | out.blade angle (deg) |
|---|---|---|---|---|---|---|
| 1 | 1.62 | 9.2400 | 1.3775 | 7.1196 | 11.14 | -10.59 |
| 2 | 9.30 | 8.9871 | 1.8445 | 7.2331 | 10.36 | -7.87 |
| 3 | 17.09 | 8.7249 | 2.3538 | 7.4581 | 9.92 | -6.00 |
| 4 | 25.00 | 8.4551 | 2.6091 | 7.5111 | 9.61 | -4.98 |
| 5 | 33.12 | 8.1767 | 2.7692 | 7.4998 | 9.43 | -4.45 |
| 6 | 41.52 | 7.8880 | 2.9129 | 7.4736 | 9.37 | -4.21 |
| 7 | 50.30 | 7.5851 | 3.1354 | 7.5066 | 9.43 | -4.09 |
| 8 | 59.60 | 7.2626 | 3.3780 | 7.4775 | 9.57 | -4.20 |
| 9 | 69.60 | 6.9126 | 3.6721 | 7.2928 | 9.83 | -4.42 |
| 10 | 80.93 | 6.5140 | 3.7622 | 6.3946 | 10.62 | -5.39 |
| 11 | 97.40 | 5.9785 | 2.6597 | 5.1590 | 30.05 | -10.97 |

1

** values of parameters on streamlines at station, 19, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.303 | 14.440 | | | | | | | | | | | | |
| 1 | 9.248 | 14.440 | 541.94 | 541.94 | 5.16 | 541.97 | 0.4277 | 0.55 | -0.10 | -0.004 | 37.842 | 707.57 | 33.466 | 684.71 |
| 2 | 8.991 | 14.440 | 541.12 | 541.13 | 23.32 | 541.63 | 0.4286 | 2.47 | 0.14 | -0.001 | 37.861 | 703.62 | 33.465 | 680.77 |
| 3 | 8.729 | 14.440 | 548.04 | 548.05 | 37.23 | 549.32 | 0.4355 | 3.89 | 0.39 | 0.002 | 38.014 | 701.58 | 33.467 | 678.07 |
| 4 | 8.463 | 14.440 | 553.08 | 553.11 | 44.31 | 554.88 | 0.4407 | 4.58 | 0.60 | 0.005 | 38.139 | 699.46 | 33.475 | 675.45 |
| 5 | 8.190 | 14.440 | 550.96 | 551.01 | 47.49 | 553.05 | 0.4399 | 4.93 | 0.80 | 0.007 | 38.138 | 697.20 | 33.489 | 673.34 |
| 6 | 7.909 | 14.440 | 550.78 | 550.86 | 49.09 | 553.05 | 0.4401 | 5.09 | 0.99 | 0.008 | 38.161 | 696.65 | 33.505 | 672.78 |
| 7 | 7.614 | 14.440 | 541.57 | 541.68 | 50.05 | 543.99 | 0.4328 | 5.28 | 1.17 | 0.008 | 38.021 | 696.22 | 33.523 | 673.13 |
| 8 | 7.302 | 14.440 | 532.49 | 532.63 | 49.53 | 534.93 | 0.4252 | 5.31 | 1.31 | 0.007 | 37.877 | 696.63 | 33.540 | 674.30 |
| 9 | 6.967 | 14.440 | 509.18 | 509.33 | 47.87 | 511.57 | 0.4062 | 5.37 | 1.38 | 0.006 | 37.499 | 696.17 | 33.555 | 675.75 |
| 10 | 6.585 | 14.440 | 452.01 | 452.14 | 41.24 | 454.01 | 0.3598 | 5.21 | 1.34 | 0.004 | 36.633 | 694.58 | 33.566 | 678.51 |
| 11 | 6.033 | 14.440 | 232.49 | 232.61 | 77.71 | 245.25 | 0.1935 | 18.47 | 1.85 | -0.012 | 34.439 | 689.99 | 33.573 | 685.30 |
| hub | 5.947 | 14.440 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 20, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.298 | 15.700 | | | | | | | | | | | | |
| 1 | 9.243 | 15.705 | 568.37 | 568.39 | 5.16 | 568.41 | 0.4494 | 0.52 | -0.40 | 0.006 | 37.826 | 707.21 | 33.033 | 682.06 |
| 2 | 8.995 | 15.728 | 566.43 | 566.45 | 23.31 | 566.92 | 0.4493 | 2.36 | 0.35 | 0.016 | 37.845 | 703.47 | 33.049 | 678.43 |
| 3 | 8.742 | 15.751 | 570.70 | 570.79 | 37.17 | 572.00 | 0.4541 | 3.73 | 1.01 | 0.023 | 37.996 | 701.50 | 33.086 | 675.99 |
| 4 | 8.485 | 15.774 | 572.42 | 572.63 | 44.20 | 574.34 | 0.4567 | 4.41 | 1.58 | 0.028 | 38.119 | 699.44 | 33.142 | 673.71 |
| 5 | 8.221 | 15.798 | 566.75 | 567.12 | 47.31 | 569.09 | 0.4531 | 4.77 | 2.06 | 0.032 | 38.118 | 697.24 | 33.212 | 671.97 |
| 6 | 7.946 | 15.823 | 562.50 | 563.02 | 48.86 | 565.14 | 0.4500 | 4.96 | 2.47 | 0.035 | 38.141 | 696.70 | 33.293 | 671.77 |
| 7 | 7.658 | 15.849 | 548.90 | 549.56 | 49.76 | 551.81 | 0.4392 | 5.17 | 2.81 | 0.038 | 38.002 | 696.27 | 33.383 | 672.50 |
| 8 | 7.351 | 15.877 | 534.79 | 535.56 | 49.20 | 537.81 | 0.4275 | 5.25 | 3.06 | 0.040 | 37.860 | 696.67 | 33.481 | 674.11 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 7.019 | 15.907 | 506.04 | 506.84 | 47.51 | 509.06 | 0.4042 | 5.36 | 3.22 | 0.042 | 37.491 | 696.22 | 33.586 | 676.01 |
| 10 | 6.638 | 15.942 | 443.98 | 444.70 | 40.91 | 446.58 | 0.3538 | 5.26 | 3.26 | 0.043 | 36.666 | 694.67 | 33.693 | 679.11 |
| 11 | 6.084 | 15.992 | 229.57 | 229.86 | 77.06 | 242.43 | 0.1912 | 18.53 | 2.88 | 0.045 | 34.648 | 690.23 | 33.796 | 685.65 |
| hub | 6.000 | 16.000 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 21, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.319 | 17.000 | | | | | | | | | | | | |
| 1 | 9.266 | 17.010 | 635.46 | 637.00 | 5.15 | 637.02 | 0.5060 | 0.46 | 3.99 | 0.109 | 37.811 | 706.84 | 31.866 | 675.22 |
| 2 | 9.040 | 17.053 | 619.42 | 621.68 | 23.19 | 622.11 | 0.4949 | 2.14 | 4.88 | 0.101 | 37.829 | 703.32 | 32.114 | 673.14 |
| 3 | 8.808 | 17.097 | 611.03 | 614.02 | 36.90 | 615.12 | 0.4898 | 3.44 | 5.65 | 0.094 | 37.979 | 701.41 | 32.347 | 671.90 |
| 4 | 8.568 | 17.143 | 601.96 | 605.63 | 43.77 | 607.21 | 0.4839 | 4.13 | 6.31 | 0.089 | 38.101 | 699.41 | 32.573 | 670.65 |
| 5 | 8.319 | 17.191 | 587.22 | 591.50 | 46.75 | 593.35 | 0.4731 | 4.52 | 6.90 | 0.085 | 38.100 | 697.28 | 32.793 | 669.80 |
| 6 | 8.059 | 17.240 | 574.74 | 579.60 | 48.17 | 581.60 | 0.4636 | 4.75 | 7.42 | 0.083 | 38.123 | 696.75 | 33.006 | 670.34 |
| 7 | 7.784 | 17.293 | 553.81 | 559.12 | 48.96 | 561.26 | 0.4469 | 5.00 | 7.91 | 0.081 | 37.985 | 696.32 | 33.217 | 671.73 |
| 8 | 7.490 | 17.349 | 532.69 | 538.41 | 48.29 | 540.57 | 0.4298 | 5.13 | 8.35 | 0.081 | 37.844 | 696.72 | 33.425 | 673.92 |
| 9 | 7.168 | 17.410 | 497.43 | 503.32 | 46.53 | 505.47 | 0.4012 | 5.28 | 8.77 | 0.082 | 37.486 | 696.28 | 33.634 | 676.35 |
| 10 | 6.796 | 17.481 | 430.08 | 435.67 | 39.96 | 437.50 | 0.3464 | 5.24 | 9.19 | 0.086 | 36.697 | 694.75 | 33.838 | 679.82 |
| 11 | 6.250 | 17.585 | 218.79 | 222.21 | 75.01 | 234.53 | 0.1849 | 18.65 | 10.06 | 0.102 | 34.833 | 690.47 | 34.032 | 686.18 |
| hub | 6.171 | 17.600 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 22, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.406 | 17.750 | | | | | | | | | | | | |
| 1 | 9.355 | 17.764 | 647.18 | 656.55 | 5.10 | 656.57 | 0.5224 | 0.45 | 9.69 | 0.135 | 37.802 | 706.63 | 31.511 | 673.03 |
| 2 | 9.141 | 17.825 | 626.99 | 636.94 | 22.93 | 637.36 | 0.5076 | 2.06 | 10.14 | 0.122 | 37.821 | 703.23 | 31.840 | 671.55 |
| 3 | 8.920 | 17.888 | 614.95 | 625.66 | 36.43 | 626.72 | 0.4994 | 3.33 | 10.62 | 0.113 | 37.969 | 701.36 | 32.137 | 670.72 |
| 4 | 8.691 | 17.953 | 602.71 | 614.18 | 43.15 | 615.70 | 0.4909 | 4.02 | 11.09 | 0.107 | 38.091 | 699.40 | 32.417 | 669.82 |
| 5 | 8.453 | 18.020 | 585.22 | 597.36 | 46.01 | 599.13 | 0.4779 | 4.40 | 11.57 | 0.102 | 38.090 | 697.30 | 32.686 | 669.28 |
| 6 | 8.204 | 18.091 | 570.20 | 583.06 | 47.32 | 584.98 | 0.4664 | 4.64 | 12.06 | 0.098 | 38.112 | 696.77 | 32.940 | 670.06 |
| 7 | 7.941 | 18.165 | 546.98 | 560.37 | 47.99 | 562.43 | 0.4479 | 4.90 | 12.55 | 0.096 | 37.975 | 696.35 | 33.190 | 671.66 |
| 8 | 7.658 | 18.245 | 523.80 | 537.74 | 47.23 | 539.81 | 0.4292 | 5.02 | 13.08 | 0.094 | 37.836 | 696.75 | 33.429 | 674.02 |
| 9 | 7.349 | 18.333 | 487.01 | 501.15 | 45.38 | 503.20 | 0.3993 | 5.17 | 13.64 | 0.094 | 37.482 | 696.31 | 33.664 | 676.56 |
| 10 | 6.993 | 18.434 | 419.97 | 433.44 | 38.83 | 435.17 | 0.3445 | 5.12 | 14.32 | 0.093 | 36.716 | 694.80 | 33.886 | 680.03 |
| 11 | 6.480 | 18.579 | 224.14 | 232.84 | 72.35 | 243.82 | 0.1922 | 17.26 | 15.70 | 0.088 | 34.940 | 690.62 | 34.072 | 685.98 |
| hub | 6.406 | 18.600 | | | | | | | | | | | | |

1

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

** values of parameters on streamlines at station, 23, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.572 | 18.500 | | | | | | | | | | | | |
| 1 | 9.523 | 18.519 | 627.35 | 649.60 | 5.01 | 649.62 | 0.5166 | 0.44 | 15.04 | 0.111 | 37.794 | 706.42 | 31.626 | 673.53 |
| 2 | 9.318 | 18.599 | 609.67 | 632.55 | 22.50 | 632.95 | 0.5040 | 2.04 | 15.45 | 0.113 | 37.812 | 703.14 | 31.909 | 671.90 |
| 3 | 9.106 | 18.681 | 598.53 | 622.21 | 35.69 | 623.23 | 0.4965 | 3.28 | 15.86 | 0.111 | 37.959 | 701.31 | 32.189 | 671.01 |
| 4 | 8.889 | 18.766 | 586.52 | 610.97 | 42.19 | 612.43 | 0.4882 | 3.95 | 16.27 | 0.108 | 38.080 | 699.38 | 32.465 | 670.12 |
| 5 | 8.663 | 18.854 | 569.02 | 594.06 | 44.90 | 595.75 | 0.4751 | 4.32 | 16.69 | 0.104 | 38.079 | 697.32 | 32.734 | 669.62 |
| 6 | 8.426 | 18.946 | 553.95 | 579.75 | 46.07 | 581.58 | 0.4635 | 4.54 | 17.16 | 0.101 | 38.102 | 696.80 | 32.988 | 670.40 |
| 7 | 8.177 | 19.043 | 530.66 | 556.95 | 46.61 | 558.90 | 0.4450 | 4.78 | 17.67 | 0.098 | 37.965 | 696.37 | 33.238 | 672.00 |
| 8 | 7.910 | 19.147 | 507.48 | 534.42 | 45.73 | 536.38 | 0.4263 | 4.89 | 18.27 | 0.097 | 37.827 | 696.78 | 33.475 | 674.33 |
| 9 | 7.619 | 19.260 | 471.02 | 498.09 | 43.77 | 500.01 | 0.3967 | 5.02 | 18.97 | 0.097 | 37.479 | 696.34 | 33.708 | 676.84 |
| 10 | 7.285 | 19.390 | 405.82 | 431.54 | 37.27 | 433.14 | 0.3429 | 4.94 | 19.88 | 0.099 | 36.736 | 694.85 | 33.929 | 680.22 |
| 11 | 6.813 | 19.574 | 223.52 | 240.57 | 68.81 | 250.22 | 0.1973 | 15.96 | 21.70 | 0.111 | 35.047 | 690.77 | 34.130 | 685.89 |
| hub | 6.745 | 19.600 | | | | | | | | | | | | |

** values of parameters on streamlines at station, 24, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 9.812 | 19.250 | | | | | | | | | | | | |
| 1 | 9.766 | 19.274 | 596.46 | 639.77 | 4.89 | 639.79 | 0.5085 | 0.44 | 21.20 | 0.151 | 37.785 | 706.21 | 31.791 | 674.31 |
| 2 | 9.573 | 19.374 | 576.61 | 618.77 | 21.90 | 619.16 | 0.4925 | 2.03 | 21.27 | 0.128 | 37.803 | 703.04 | 32.140 | 673.15 |
| 3 | 9.374 | 19.478 | 565.70 | 607.51 | 34.67 | 608.50 | 0.4843 | 3.27 | 21.38 | 0.111 | 37.949 | 701.25 | 32.434 | 672.38 |
| 4 | 9.169 | 19.585 | 555.25 | 597.03 | 40.90 | 598.43 | 0.4766 | 3.92 | 21.56 | 0.100 | 38.069 | 699.37 | 32.695 | 671.43 |
| 5 | 8.957 | 19.695 | 539.92 | 581.64 | 43.42 | 583.26 | 0.4648 | 4.27 | 21.83 | 0.092 | 38.068 | 697.35 | 32.935 | 670.80 |
| 6 | 8.735 | 19.810 | 527.44 | 569.71 | 44.44 | 571.44 | 0.4552 | 4.46 | 22.21 | 0.086 | 38.090 | 696.83 | 33.146 | 671.34 |
| 7 | 8.503 | 19.931 | 506.72 | 549.34 | 44.82 | 551.16 | 0.4386 | 4.66 | 22.72 | 0.083 | 37.955 | 696.40 | 33.353 | 672.70 |
| 8 | 8.257 | 20.060 | 486.27 | 529.79 | 43.80 | 531.60 | 0.4224 | 4.73 | 23.39 | 0.081 | 37.818 | 696.81 | 33.541 | 674.76 |
| 9 | 7.991 | 20.198 | 452.87 | 496.79 | 41.73 | 498.54 | 0.3955 | 4.80 | 24.27 | 0.081 | 37.476 | 696.37 | 33.727 | 676.99 |
| 10 | 7.689 | 20.355 | 392.72 | 435.26 | 35.31 | 436.69 | 0.3457 | 4.64 | 25.54 | 0.084 | 36.757 | 694.90 | 33.904 | 680.03 |
| 11 | 7.280 | 20.568 | 232.94 | 264.76 | 64.40 | 272.48 | 0.2150 | 13.67 | 28.38 | 0.094 | 35.158 | 690.94 | 34.070 | 685.15 |
| hub | 7.219 | 20.600 | | | | | | | | | | | | |

1

** values of parameters on streamlines at station, 25, which is an annulus **

| streamline no. | radius (in.) | axial coord. (in.) | axial vel. (ft/sec) | merd. vel. (ft/sec) | tang. vel. (ft/sec) | abs. vel. (ft/sec) | abs. mach no. | abs.flow angle (deg) | stream. slope (deg) | stream. curv. (1./in.) | total press. (psia) | total temp. (deg.r.) | static press. (psia) | static temp. (deg.r.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tip | 10.149 | 20.000 | | | | | | | | | | | | |
| 1 | 10.106 | 20.027 | 518.76 | 580.55 | 4.72 | 580.57 | 0.4597 | 0.47 | 26.68 | 0.067 | 37.776 | 706.01 | 32.785 | 679.76 |
| 2 | 9.916 | 20.146 | 512.37 | 570.00 | 21.14 | 570.39 | 0.4523 | 2.12 | 25.99 | 0.058 | 37.794 | 702.95 | 32.946 | 677.60 |
| 3 | 9.721 | 20.268 | 512.48 | 568.09 | 33.43 | 569.07 | 0.4518 | 3.37 | 25.56 | 0.051 | 37.939 | 701.20 | 33.082 | 675.95 |
| 4 | 9.523 | 20.393 | 511.23 | 565.84 | 39.38 | 567.21 | 0.4509 | 3.98 | 25.38 | 0.046 | 38.058 | 699.35 | 33.204 | 674.26 |
| 5 | 9.320 | 20.520 | 503.64 | 557.55 | 41.73 | 559.11 | 0.4448 | 4.28 | 25.41 | 0.042 | 38.057 | 697.37 | 33.321 | 672.98 |

**TABLE 3 - EXAMPLE OUTPUT DATA SET(with stator resets)**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 9.111 | 20.651 | 498.27 | 552.66 | 42.61 | 554.30 | 0.4410 | 4.41 | 25.63 | 0.040 | 38.079 | 696.85 | 33.415 | 672.88 |
| 7 | 8.894 | 20.788 | 483.95 | 538.76 | 42.85 | 540.46 | 0.4298 | 4.55 | 26.07 | 0.038 | 37.945 | 696.43 | 33.513 | 673.64 |
| 8 | 8.666 | 20.930 | 469.82 | 526.08 | 41.74 | 527.73 | 0.4192 | 4.54 | 26.74 | 0.037 | 37.809 | 696.83 | 33.592 | 675.11 |
| 9 | 8.424 | 21.082 | 443.13 | 500.55 | 39.59 | 502.11 | 0.3984 | 4.52 | 27.71 | 0.037 | 37.473 | 696.41 | 33.673 | 676.74 |
| 10 | 8.156 | 21.250 | 392.24 | 449.29 | 33.29 | 450.52 | 0.3569 | 4.24 | 29.19 | 0.038 | 36.778 | 694.96 | 33.746 | 679.13 |
| 11 | 7.813 | 21.465 | 260.22 | 308.57 | 60.00 | 314.35 | 0.2483 | 11.00 | 32.51 | 0.041 | 35.268 | 691.10 | 33.821 | 683.40 |
| hub | 7.758 | 21.500 | | | | | | | | | | | | |

1

# REPORT DOCUMENTATION PAGE

*Form Approved*
*OMB No. 0704-0188*

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

| 1. AGENCY USE ONLY (*Leave blank*) | 2. REPORT DATE | 3. REPORT TYPE AND DATES COVERED |
|---|---|---|
| | July 1995 | Final Contractor Report |

**4. TITLE AND SUBTITLE**

Off-Design Computer Code for Calculating the Aerodynamic Performance of Axial-Flow Fans and Compressors

User's Manual

**5. FUNDING NUMBERS**

WU–538–03–11
C–NAS3–27186

**6. AUTHOR(S)**

James F. Schmidt

**7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)**

NYMA, Inc.
2001 Aerospace Parkway
Brook Park, Ohio 44142

**8. PERFORMING ORGANIZATION REPORT NUMBER**

E–9764

**9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)**

National Aeronautics and Space Administration
Lewis Research Center
Cleveland, Ohio 44135–3191

**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**

NASA CR–198362

**11. SUPPLEMENTARY NOTES**

Project Manager, John Groeneweg, Propulsion Systems Division, NASA Lewis Research Center, organization code 2770, (216) 433–3945.

**12a. DISTRIBUTION/AVAILABILITY STATEMENT**

Unclassified - Unlimited
Subject Category 07

This publication is available from the NASA Center for Aerospace Information, (301) 621–0390.

**12b. DISTRIBUTION CODE**

**13. ABSTRACT** *(Maximum 200 words)*

An off-design axial-flow compressor code is presented and is available from COSMIC for predicting the aerodynamic performance maps of fans and compressors. Steady axisymmetric flow is assumed and the aerodynamic solution reduces to solving the two-dimensional flow field in the meridional plane. A streamline curvature method is used for calculating this flow-field outside the blade rows. This code allows for bleed flows and the first five stators can be reset for each rotational speed; capabilities which are necessary for large multi-stage compressors. The accuracy of the off-design performance predictions depend upon the validity of the flow loss and deviation correlation models. These empirical correlations for the flow loss and deviation are used to model the real flow effects and the off-design code will compute through small reverse flow regions. The input to this off-design code is fully described and a user's example case for a two-stage fan is included with complete input and output data sets. Also, a comparison of the off-design code predictions with experimental data is included which generally shows good agreement.

**14. SUBJECT TERMS**

Off-design aerodynamic performance; Axial-Flow fans; Multi-stage axial compressors

**15. NUMBER OF PAGES**

94

**16. PRICE CODE**

A05

| 17. SECURITY CLASSIFICATION OF REPORT | 18. SECURITY CLASSIFICATION OF THIS PAGE | 19. SECURITY CLASSIFICATION OF ABSTRACT | 20. LIMITATION OF ABSTRACT |
|---|---|---|---|
| Unclassified | Unclassified | Unclassified | |