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NASA CR-121101
UARL M931368-6

SYSTEMATIC TWO-DIMENSIONAL CASCADE TESTS

VOL. 4 - CASCADE TEST DATA

by

T. A. Murrin and W. E. Taylor

Prepared for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA Lewis Research Center

CONTRACT NAS3-4184

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
CR-121101		

4. Title and Subtitle	5. Report Date
Systematic Two-Dimensional Cascade Tests Vol. 4 - Cascade Test Data	March 15, 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
T. A. Murrin and W. E. Taylor	UARL M931368-6
9. Performing Organization Name and Address	10. Work Unit No.
United Aircraft Research Laboratories East Hartford, Connecticut 06108	11. Contract or Grant No. NAS3-4184
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
National Aeronautics and Space Administration Washington, D. C. 20546	Contractor Report
	14. Sponsoring Agency Code

15. Supplementary Notes

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NASA Lewis Research Center, Cleveland, Ohio

16. Abstract

A substantial amount of experimental test data were compiled under Contract NAS3-4184 during the systematic test programs with cascades of hydrofoils. The results from the various test programs are reported in three volumes which present performance characteristics for double circular-arc hydrofoils (Vol. 1 - CR72498), multiple circular-arc hydrofoils (Vol. 2 - CR72499) and slotted double circular-arc hydrofoils (Vol. 3 - CR72870). In Vol. 4 these experimental data were organized into a systematic presentation format, provided with scale factors and reference values for interpretation, catalogued with notation for identification and cross-referencing and recorded on microfilm for ease of data retrieval. The recorded data include local pressure distributions upstream and downstream of the cascade test section, continuous records from flow angle and total pressure surveys, hydrofoil local pressure distributions and cavitation data. Volume 4 is presented as a text in which data acquisition and reduction procedures for the experimental data are reviewed and a microfilm supplement on which the test data are recorded.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Cascade Data Circular-Arc Hydrofoils	Unclassified - unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	103	

* For sale by the National Technical Information Service, Springfield, Virginia 22151

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FOREWORD

The experimental investigation described herein was conducted by the Research Laboratories of the United Aircraft Corporation under Contract NAS3-4184 with the National Aeronautics and Space Administration. The work was performed under the management of the NASA Project Manager, Mr. Werner R. Britsch, Fluid Systems Components Division, NASA Lewis Research Center.

Report CR-121101

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ABSTRACT

A substantial amount of experimental test data were compiled under Contract NAS3-4184 during the systematic test programs with cascades of hydrofoils. The results from the various test programs are reported in three volumes which present performance characteristics for double circular-arc hydrofoils (Vol. 1 - CR72498), multiple circular-arc hydrofoils (Vol. 2 - CR72499) and slotted double circular-arc hydrofoils (Vol. 3 - CR72870). In Vol. 4, these experimental data were organized into a systematic presentation format, provided with scale factors and reference values for interpretation, catalogued with notation for identification and cross-referencing and recorded on microfilm for ease of data retrieval. The recorded data include local pressure distributions upstream and downstream of the cascade test section, continuous records from flow angle and total pressure surveys, hydrofoil local pressure distributions and cavitation data. Volume 4 is presented as a text in which data acquisition and reduction procedures for the experimental data are reviewed and a microfilm supplement on which the test data are recorded.

SUMMARY

The data compiled during the experimental tests with cascades of double circular-arc hydrofoils (NASA Contract NAS3-4184) were organized in a systematic manner, provided with identification, scale factors, and reference values to permit interpretation, and were recorded on microfilm to allow wide spread distribution within the technical community. The test procedures by which the data were acquired are described, and the data reduction procedures for obtaining the cascade performance parameters are defined. This presentation of experimental test data permits further detailed evaluation of the effects of cascade geometry and incidence on cascade characteristics such as wake shape and pressure and flow angle distributions.

INTRODUCTION

During the cascade programs conducted at the United Aircraft Research Laboratories under NASA Contract NAS3-4184, it was necessary to establish uniformity and periodicity within the upstream and downstream flows to insure a specified degree of flow two-dimensionality across the various cascade configurations. The achievement of these conditions was verified through static pressures measured at increments along the length of the cascade and from midspan total pressures and flow angles measured by means of continuous surveys along the length of the cascade. These data were then used in the determination of cascade performance parameters and correlations which were presented in NASA Contractor Reports CR-72498 (Vol. 1), CR-72499 (Vol. 2) and CR-72870 (Vol. 3), (Refs. 1, 2, and 3, respectively).

Although the data were acquired on tapes for computer processing, the data were also recorded manually from multi-tube manometers and on strip charts from continuous recorders. Therefore, this information is in a format enabling further analysis, evaluation and correlation of the cascade flow field characteristics; in particular, the distributions of pressures and flow angles for various cascades, the shapes of wake profiles as a function of incidence and the variations in the blade-to-blade losses and flow angles as functions of blade loading.

The data were organized with the necessary scale factors and reference information for interpretation and then filed in an orderly system which enabled the retrieval of the test data obtained for each valid test point. The experimental data recorded for each test point, including the scale factors, reference information and the computer printouts of reduced data, were then recorded on microfilm to make these data available for further analysis throughout the technical community.

PROCEDURES

Calibration

For every installation of hydrofoils in a cascade configuration, each hydrofoil was individually aligned with respect to an arbitrary reference angle. The alignment was made with a fixture which assured the setting of blade chord angles to within five minutes of the reference angle. These blade chord angle alignments were checked before a configuration was disassembled and also during the test phase if wake and flow angle surveys indicated a possible blade setting error. Permanent records of the blade setting angles were made on Blade Calibration Check Sheets for reference.

A combination pitot-directional probe was used to measure the total pressure and flow angle upstream of the cascade. The probe was installed 1.80 inches (45.72 mm), axially, upstream of the cascade and in a fixed direction to yield a null angle reading at an angle which was determined by the angle of the specific inlet flow nozzle used for the tests. Alignment of the probe was established using a clinometer which had an angle reading accuracy of one minute of arc. Prior to installation, the probe was tested to obtain a calibration of probe differential pressure as a function of relative flow angle.

A special combination pitot-directional probe was used to measure total pressures and flow angles downstream of the cascade. This probe had a conventional three-hole, prism-shaped measuring section with a tip extension which incorporated a miniature Kiel type total pressure probe. The probe could be installed at various axial stations as necessary to maintain the probe measuring section within a streamwise distance of one and two chord lengths from the hydrofoil trailing edge plane. The probe was installed in a fixed direction to yield a null differential pressure reading for an exit flow angle approximating that for the minimum loss incidence angle. The initial probe angle settings were estimated from flow angle measurements and correlations obtained from cascades which used air as the test medium. These estimated settings were corrected whenever necessary. Prior to installation, the probe was calibrated to obtain probe differential pressures as a function of relative flow angle.

Data Acquisition

Although the data were normally acquired automatically on paper tapes for subsequent machine computation, the static data were also recorded from multitube mercury manometers and the dynamic (traverse) data were recorded on continuous strip charts. The following discussions relate to the recorded test data although the same pressure sources were used for automatic data acquisition.

Static Pressure

Static pressures upstream of the cascade were determined from a row of 0.032 in. (0.81 mm) diameter orifices in the sidewall. The orifices were spaced one inch (25.4 mm) apart and were located 1.80 in. (45.72 mm), axially, upstream of the plane of hydrofoil leading edges. Static pressures downstream of the cascade were also determined from a row of 0.032 in. (0.81 mm) diameter orifices in the sidewall; the orifices were spaced two inches (50.8 mm) apart. A selection of the downstream measurement station was available from among several axially displaced rows of these static pressure orifices. The measurement station was established by the test specification to take measurements within one and two chord lengths (in the streamwise direction) of the trailing edge plane.

Individual static pressures were displayed on a 50-tube mercury manometer and therefore provided a simultaneous visual indication of static pressure distributions along the length of the cascade at both upstream and downstream measurement stations. For convenience in determining pressure coefficients and flow two-dimensionality, the manometer readings recorded were actually the difference between the upstream total pressure, indicated on the first manometer tube, and the local static pressure. The upstream recorded pressures, therefore, are actually dynamic pressures, indicated in inches of mercury.

Total Pressure

Inlet total pressures were determined from continuous midspan surveys with a combination pitot-directional probe at a station 1.80 in. (45.72 mm), axially, upstream of the cascade. The probe direction angle was fixed for a given inlet angle. Inlet total pressure was invariant along the survey distance and therefore was not continuously recorded on a strip chart. However, inlet total pressure was displayed for reference on the manometer.

Exit total pressures were determined from continuous midspan surveys using the special combination pitot-directional probe with a Kiel type total pressure measuring head. The survey plane was adjustable in the axial direction to maintain the probe within a streamwise distance between one and two chord lengths downstream of the trailing edge plane. Length of the probe traverse in the survey plane was adjustable and the traverse limits were generally adjusted to exclude measurements within the regions between the two cascade end walls and the wakes from the respective adjacent hydrofoils. Experience had shown that artificially high losses occurred within these regions, probably resulting from the end wall boundary layers and from end wall separation. The probe was installed at a predetermined angle and held constant throughout the incidence range of operation of a cascade configuration. Since the exit flow angle varied with incidence, the downstream total pressure was measured with the Keil head probe which was insensitive to relative flow angle effects between ± 40 deg (0.698 radians).

During the pressure surveys, exit total pressures were continuously recorded on strip charts; a distance of one inch (25.4 mm) along the cascade was represented by a length of 0.415 in. (10.54 mm) on the strip chart, and a total pressure decrement of one inch (25.4 mm) of mercury was represented by 40 strip chart units (scu). A reference between a location within the cascade and a corresponding point along the exit total pressure strip charts was provided by a numbered blade and the letters "S" and "N" on the strip charts. The blades were numbered in sequence with the numbers increasing toward "N". When the downstream flow from the cascade was surveyed in the direction from "S" toward "N", the probe approached each wake in the direction from pressure surface to suction surface.

Flow Angle

Flow angles upstream of the cascade were determined from continuous, midspan surveys along the cascade using the same combination pitot-directional probe that was used for upstream total pressure. The survey station was located 1.80 in. (45.72 mm), axially, upstream of the cascade, and the surveys excluded the regions within approximately two inches (50.80 mm) from the two end walls. The probe direction angle was fixed to yield a null reading from the angle sensing head when the probe was aligned with the nozzle angle which was also used as the reference flow angle; this reference angle was indicated by a displacement of 50 units on the strip charts. A displacement of 10 units from the reference was equivalent to a one degree difference in the local inlet flow angle. A strip chart displacement less than the reference value (50) indicated a flow angle greater than the reference angle. Angles were referenced to the axial direction.

Flow angles downstream from the cascade were also determined from continuous midspan surveys along the cascade using the special combination pitot-directional probe that was used for downstream total pressure measurements. Survey stations and survey distances were necessarily the same as those used for downstream total pressure surveys. As was previously discussed, this probe was installed at a predetermined reference angle which was constant for the incidence range of the cascade configuration. These reference angles corresponded to specific displacements on the strip charts; both the reference angle and the scu displacement were recorded. Interpretation of exit flow angle from the strip charts requires a scale factor which has been noted separately for each test point. The scale factor converts the difference between reference and measured strip chart units into a difference between reference and measured flow angles. If the scu difference (scu_{ref}-scu_{meas}) is positive, the measured angle is greater than the reference angle. The reference between the strip chart length and the cascade location for downstream flow angle measurements was the same as that for downstream total pressure measurements [(0.415 in. (10.54 mm) on the strip chart is represented by one inch (25.4 mm) along the cascade] because these downstream angle and pressure measurements were obtained simultaneously with the combination probe.

Profile Static Pressure

Static pressure distributions along the chord lengths of the hydrofoils were obtained from 0.022 in. (0.56 mm) diameter static pressure orifices in the hydrofoil surfaces. Twelve of these orifices were spaced along the pressure surface of one hydrofoil and twelve were spaced along the suction surface of a second hydrofoil. These two hydrofoils were installed in the central region of the cascade with the instrumented surfaces adjacent to each other. The arrangement of the pressure orifices is shown in Refs. 1, 2 and 3. Pressures were indicated on and recorded (in inches of Hg) from a multi-tube mercury manometer.

Cavitation Pressure

Pressures were recorded from a mercury manometer for the condition of cavitation desinence. The pressure source was a sidewall static pressure orifice located midway along the cascade and 1.80 in. (45.72 mm), axially, upstream of the hydrofoil leading edge plane. The cavitation index condition was determined visually by reducing the tunnel pressure until cavitation on the hydrofoils was well established and then increasing the pressure slowly until cavitation stopped. The desinent condition was defined as the cascade operating point of lowest inlet static pressure without visible cavitation on the suction surfaces of the hydrofoils. Water temperature in degrees Fahrenheit was also recorded at the desinent condition in order to determine the water vapor pressure which was required in the calculation of the cavitation index.

Data Reduction

The performance test data sheet is a computer printout from machine calculation of the automatically recorded data. Included in the standard format are run number, date, and cascade geometry information, and calculated test results as follows:

Blade Reynolds Number [Re_c] - based on average inlet velocity and blade chord length.

Average Inlet Flow Angle [β_1] - referenced to the axial direction.

Average Exit Flow Angle [β_2] - referenced to the axial direction.

Average Loss Coefficient [$\bar{\omega}$] - average of the blades comprising the two central passages.

Experimental $[(\Delta p/q_1)_E]$ and Two-Dimensional $[(\Delta p/q_1)_{2D}]$ Static Pressure Rise Coefficients.

Inlet Static (Norm) $[q_1/q_{ave}]$ - inlet dynamic pressure distribution along the cascade, normalized with respect to the inlet dynamic pressure at the central passage.

Exit Static (Norm) $[q_2/q_{ave}]$ - exit dynamic pressure distribution along the cascade, normalized with respect to the inlet dynamic pressure at the central passage.

Inlet Flow Angle $[\beta_1]$ - inlet flow angle distribution (1/2 in. increments) along the cascade.

Zeta (P) $[\bar{\omega}]$ - area-averaged total pressure loss coefficient, for each blade traversed.

Zeta (P,M) $[\bar{\omega}^*]$ - mass-averaged total pressure loss coefficient, for each blade traversed.

Delta */s $[\delta^*/s]$ - wake displacement thickness to gap ratio, for each blade traversed.

Delta **/s [k/s] - wake pseudoenergy thickness to gap ratio, for each blade traversed.

Theta */s $[\theta^*/s]$ - wake momentum thickness to gap ratio, for each blade traversed.

Beta (2) $[\beta_2]$ - average exit flow angle for each blade traversed, referenced to the axial direction.

H - wake form factor, for each blade traversed.

K - wake pseudoenergy factor, for each blade traversed.

Static Pressure Coefficient

The static pressure coefficient, $\Delta p/q_1$, is defined as the difference between the average exit and inlet static pressures nondimensionalized by the average inlet dynamic pressure. Since the pressures recorded on the Liquid Cascade Test Data forms were actually dynamic pressures (in inches of mercury), the static pressure coefficient may be calculated from the expression

$$\Delta p/q_1 = 1 - \bar{q}_2/\bar{q}_1 \qquad (1)$$

Efforts were made during the test program to obtain measured static pressure coefficients comparable to theoretical static pressure coefficients calculated from measured flow angles with a correction for wake blockage. The adjustments to obtain this approximation to a two-dimensional flow were made by means of side wall boundary layer control. A two-dimensional dynamic pressure ratio was defined by the expression

$$\left(\frac{q_2}{q_1}\right)_{2D} = \left[\frac{1}{2}\left(\frac{\cos\beta_1}{\cos\beta_2} + \sqrt{\frac{\cos\beta_1}{\cos\beta_2} + 2\bar{\omega}}\right)\right]^2 \qquad (2)$$

This expression is an approximation to the two-dimensional continuity equation in which the integrations are performed for a sine-squared variation of total pressure and a sine variation of angle across a blade wake. The approximation, which includes wake blockage effects on the exit flow area, is valid within experimental error if (1) the total pressure loss coefficient, $\bar{\omega}$, is less than 0.10, (2) the flow angle variations from the mean exit flow angle are less than 15 deg (0.262 radians) and (3) the widths of the wakes at the measuring station are less than the blade spacing. Methods given in Ref. 4 were used in the derivation. Effective two-dimensional flow was assumed when the average experimental dynamic pressure ratio was within ± 0.05 of $(q_2/q_1)_{2D}$ computed using the average measured exit flow angle.

Blade Wake Parameters

The total pressure loss coefficient, $\bar{\omega}$, is the nondimensionalized total pressure loss within a hydrofoil wake averaged across the space(s) between adjacent hydrofoils and is determined from the expression

$$\bar{\omega} = \frac{1}{s}\int_0^s \frac{P_1 - P_2}{q_1}\,dy \qquad (3)$$

The $\bar{\omega}$ values listed on the performance test data sheets were obtained by numerically integrating the total pressure losses recorded during the cascade traverses. Total pressure losses may also be determined from integrating the individual wakes on the strip charts and using the pressure conversion factor of 40 strip chart units per inch of mercury and the distance scale factor of 0.415 inches of strip chart per inch of cascade length. The losses may also be obtained from the integration trace which has the appearance of a sawtooth waveform at the bottom of the strip charts. Each sawtooth sweep represents 100 units; therefore, a waveform may be converted to a numerical value, N, by adding the numbers corresponding to full and partial sweeps within the integration distance. The loss coefficient is then determined from the expression

$$\bar{\omega} = \frac{N}{0.926\,q_1 Z} \qquad (4)$$

where Z is a scale factor equal to 808, 606 and 404 for solidities of 0.75, 1.00 and 1.50, respectively.

The other blade wake parameters, $\bar{\omega}^*$, δ^*/s, k/s, θ^*/s, H, and K, listed in the performance test data sheets, were obtained by numerical integration of the automatically recorded exit traverse total pressure data according to the following definitions (Ref. 5):

$$\delta^* = \int_{\delta_{\ell y}}^{\delta_{uy}} \left(1 - \frac{V}{V_o}\right) dy \tag{5}$$

$$k = \int_{\delta_{\ell y}}^{\delta_{uy}} \left(1 - \frac{V}{V_o}\right)\left(\frac{V}{V_o}\right)^2 dy \tag{6}$$

$$\theta^* = \int_{\delta_{\ell y}}^{\delta_{uy}} \left(1 - \frac{V}{V_o}\right)\left(\frac{V}{V_o}\right) dy \tag{7}$$

$$\bar{\omega}^* = \frac{\theta^*/s + k/s}{\left(1 - \delta^*/s\right)^3} \tag{8}$$

$$H = \delta^*/\theta^* \tag{9}$$

$$K = k/\theta^* \tag{10}$$

Profile Pressure Coefficient

Profile pressure distributions may be described by the distribution of local pressure coefficients along the hydrofoil surfaces. The local pressure coefficient (C_p) is defined by the difference between local and inlet (mean) static pressures, nondimensionalized by the mean inlet dynamic pressure.

$$C_p = \frac{p_\ell - \bar{p}_1}{q_1} \tag{11}$$

Local dynamic pressures (q_ℓ) in inches of mercury are actually recorded on the Liquid Cascade Test Data forms; therefore, the local pressure coefficients are calculated from the test data as

$$C_p = 1 - q_\ell / q_1 \tag{12}$$

Flow Angles

The flow angles may be determined by averaging the strip chart presentations from the flow angle surveys and making the appropriate scale factor corrections. It should be noted that the exit flow angles (β_2) are determined from measurements along the wake-free regions between adjacent hydrofoils. The flow angle measurements were used to determine turning angle (θ),

$$\theta = \beta_1 - \beta_2 \tag{13}$$

incidence angle (i),

$$i = \beta_1 - \left(\gamma^\circ + \frac{\phi}{2}\right) \tag{14}$$

deviation angle (δ°),

$$\delta^\circ = i + \phi - \theta \tag{15}$$

Diffusion Factor

Diffusion factors (D) may be calculated from the expression

$$D = \left(1 - \frac{\cos\beta_1}{\cos\beta_2}\right) + \frac{\cos\beta_1}{2\sigma}\left(\tan\beta_1 - \tan\beta_2\right) \tag{16}$$

using the inlet flow angle (β_1) and exit flow angle (β_2) determined from the respective strip charts.

Cavitation Index

Cavitation index, K, is defined as the difference between inlet static pressure for desinent cavitation and water vapor pressure nondimensionalized by inlet dynamic pressure. Therefore,

$$K = \frac{p_1 - p_v}{q_1} \tag{17}$$

Pressures for determining the cavitation index were measured in inches of mercury with a multi-tube manometer incorporating a pressure reference tube. Inlet static pressure was calculated from the recorded measurement from the expression

$$p_1 = R - M - \frac{(x-49)-M}{13.55} \tag{18}$$

which corrects the static pressure reading for the difference in head between the pressure orifice location and the manometer. "R" was the pressure indicated by the manometer reference, "M" was the pressure at the cascade inlet station and "X" was the distance in inches between the inlet station and the zero level on the manometer. The values for X were 43, 50, 68 and 78 for the 50, 60, 70 and 75 deg inlet tests, respectively. Vapor pressure of water (p_v) was obtained from standard tables using the water temperature recorded for each test point.

Inlet dynamic pressure was also determined from the reference pressure manometer through the expression

$$q_1 = \left[\left(R-L\right)-\left(R-M\right)\right]\left(0.926\right) \tag{19}$$

which is equivalent to

$$q_1 = \left(M-L\right)0.926 \tag{20}$$

where L was the pitot pressure measured at the nozzle entrance.
The value 0.926 is a proportioning factor between the densities of water and mercury at a temperature of 70 deg F (21.1 deg C),

$$0.926 = 1 - \rho_{H_2O}/\rho_{Hg} \tag{21}$$

which corrects the indicated mercury head reading by the equivalent head of water.

PRESENTATION OF RESULTS

Results from the experimental tests carried out under Contract NAS3-4184 are presented in a four-volume report; the first three volumes containing cascade performance results in parametric form and the fourth volume containing the valid experimental test data including manually recorded data, strip chart records and computer printouts of reduced data. Volume 1 (CR-72498) reported the results from systematic tests with double circular-arc hydrofoils, Volume 2 (CR-72499) reported the results from systematic tests with multiple-circular arc hydrofoils, Volume 3 (CR-72870) reported the results from systematic tests with slotted double circular-arc hydrofoils and Volume 4 (CR-121004) presents data recording and reduction procedures and also the experimental data recorded on a microfilm supplement.

The microfilmed data and information sheets are presented in the format shown in Figure 1; each microfilm generally includes the following data records:

1. Blade Calibration Check Sheet, which provides an indication of the hydrofoil installation accuracy.

2. Liquid Cascade Test Data, which is the record of upstream and downstream dynamic pressures across the cascade and the local dynamic pressures on the hydrofoil surfaces.

3. Scale and Reference Values, which provide the information necessary for interpretation of the strip chart records.

4. Performance Test Data, which is the computer printout of reduced data. The printout shows the inlet and exit static pressure distributions, the inlet flow angle distribution, and loss coefficients, exit flow angles, momentum thickness ratios, displacement thickness ratios, and shape factors for individual hydrofoils.

5. Blade Surface Local Static Pressure Coefficients, which is the computer printout of reduced hydrofoil pressure distributions.

6. Inlet Flow Angle Distribution, which is the strip chart obtained from a continuous survey of the inlet flow angle.

7. Downstream Flow Angle Distribution, which is the strip chart obtained from a continuous flow angle survey of the exit flow.

8. Downstream Total Pressure Distribution, which is the strip chart obtained from a continuous total pressure survey of the exit flow.

9. Static Pressure Distribution, which is the chart from the X-Y plotter used to record the static pressures upstream and downstream of the cascade. These plots were made solely to verify satisfactory operation of the automatic pressure recording equipment.

The data were organized in order of increasing inlet flow angle, camber angle, solidity and blade chord angle and then were numbered consecutively. The numbered test configurations are tabulated in Appendix I. The data were recorded on microfilm in the same sequence as listed in Appendix I. Each film has an identification consisting of the film number and a series of digits and letters which indicate, in sequence, the following: the inlet nozzle angle, the type of hydrofoil profile, the camber angle, the thickness ratio, the slot configuration (from slotted hydrofoil tests), the cascade solidity, availability of hydrofoil pressure distribution data, and the hydrofoil blade chord angle. For example, the identification 464 60 DCA 30 06 - 1.50 - 50 is microfilm number 464 which shows the data for the test configuration with the 60 degree inlet nozzle, the double circular-arc (DCA) hydrofoils with 30 degree camber and six percent thickness ratio, no slots, a solidity of 1.50, no pressure distribution data and a blade chord angle of 50 degrees.

The test data recorded on film numbers 1 through 1612 were obtained during the double circular-arc hydrofoil tests which were reported in Volume 1 (NASA CR-72498), the data recorded on film numbers 1612 through 2069 were obtained during the multiple circular-arc hydrofoil tests which were reported in Volume 2 (NASA CR-72499) and the data recorded on film numbers 2070 through 3367 were obtained during the slotted double circular-arc hydrofoil tests which were reported in Volume 3 (NASA CR-72870).

Cavitation test data were often obtained from blade chord angles other than those for the systematic performance tests and were therefore recorded separately. The data for the cavitation configurations, tabulated in Appendix II, were organized for microfilm recording with three solidities on each frame. Double circular-arc hydrofoil cavitation data are recorded on film numbers 3368 through 3399; multiple circular-arc cavitation data are recorded on film numbers 3400 through 3413.

Each of the microfilm frames was examined to insure a sharpness and clarity in the photograph as required for reproduction and data interpretation, and the film and cascade identifications were compared with the identifications listed in the appendices. Filming errors were noted by a punch mark proceeding

the frame and a symbol (√) adjacent to the corresponding film number in Appendix I. Film identification errors were not corrected since the error is evident from the film sequence and also from the correct identification shown in the appendix. Data for the frames which were poorly exposed or otherwise in error were recopied with the same film number. The recopied configurations are listed in Appendix III and appear on film in this same order.

APPENDIX I

Cascade Test Configurations

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
✓ 1	1457	50	DCA	00	06	-	0.75	-	42
2	1456								44
3	1455								46
4	1449								47
5	1454								48
6	1448								49
7	1453								50
8	1452								52
9	1450								54
10	1451								55
11	1370	50	DCA	00	06	-	1.00	-	40
12	1369								40
13	1368								42
14	1367								44
15	1366								46
16	1365								48
17	1375								48
18	1371								50
19	1372								52
20	1373								54
21	1374								55
22	1297	50	DCA	00	06	-	1.50	-	41
23	1296								42
24	1295								43.8
25	1294								44
26	1293								46
27	1292								48
28	1292								48
29	1291	50	DCA	00	06	-	1.50	-	50
30	1290								52
31	1298								54
32	1476	50	DCA	10	06	-	0.75	-	40
33	1475								42
34	1474								44
35	1473								44
36	1472								46
37	1471								48
38	1470								50
39	1468								51
40	1469								52
41	1478								52
42	1477								54
43	1391	50	DCA	10	06	-	1.00	-	39
44	1390								40
45	1389								42
46	1388								44
47	1393								46
48	1387								46
49	1392								48
50	1386								48
51	1384								50
52	1385								52
53	1315	50	DCA	10	06	-	1.50	-	38
54	1314								40
55	1313								42
56	1312								44

✓ See Appendix III

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
57	1311	50	DCA	10	06	-	1.50	-	44
58	1310								46
59	1308								50
60	1309								50
61	1316								51
62	1317								51
63	1318								51
64	1319								51
65	1564	50	DCA	20	06	-	0.75	-	36
66	1492								38
67	1491								38
68	1563								40
69	1490								40
70	1562								42
71	1489								42
72	1488								44
73	1487								46
74	1482								47
75	1483								47
76	1486								48
77	1480								49
78	1481								49
79	1484								50
80	1479								51
81	1485								51
82	1405	50	DCA	20	06	-	1.00	-	36
83	1404								36
84	1403								36
85	1402	50	DCA	20	06	-	1.00	-	36
86	1406								38
87	1401								38
88	1407								40
89	1400								40
90	1399								42
91	1398								44
92	1397								44
93	1396								46
94	1394								48
95	1395								50
96	1327	50	DCA	20	06	-	1.50	-	34
97	1326								36
98	1325								38
99	1324								40
100	1323								42
101	1322								44
102	1320								45
103	1321								46
104	1517	50	DCA	30	06	-	0.75	-	35
105	1516								36
106	1515								38
107	1514								40
108	1513								42
109	1512								44
110	1510								46
111	1511								47
112	1422	50	DCA	30	06	-	1.00	-	34

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
113	1421	50	DCA	30	06	-	1.00	-	36
114	1420								38
115	1419								40
116	1418								42
117	1417								44
118	1423								45
119	1343	50	DCA	30	06	-	1.50	-	32
120	1344								33
121	1342								34
122	1345								35
123	1341								36
124	1340								36
125	1339								38
126	1339								38
127	1338								40
128	1336								42
129	1337								43
130	1575	50	DCA	30	06	-	1.50	-	30
131	1574								31
132	1567								33
133	1568								35
134	1569								37
135	1570								39
136	1571								41
137	1572								43
138	1573								45
139	1524	50	DCA	40	06	-	0.75	-	34
140	1523								36
141	1522	50	DCA	40	06	-	0.75	-	38
142	1521								40
143	1520								40
144	1519								42
145	1518								44
146	1525								45
147	1560	50	DCA	40	06	-	0.75	-	33
148	1559								35
149	1558								37
150	1557								39
151	1556								41
152	1555								43
153	1554								43
154	1561								44
155	1553								45
156	1431	50	DCA	40	06	-	1.00	-	33
157	1430								34
158	1429								36
159	1428								36
160	1427								38
161	1426								40
162	1425								42
163	1424								44
164	1353	50	DCA	40	06	-	1.50	-	30
165	1352								32
166	1351								32
167	1350								34
168	1349								36

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
169	1346	50	DCA	40	06	-	1.50	-	36
170	1348								38
171	1585								38
172	1584								40
173	1347								40
174	1541	50	DCA	45	06	-	0.75	-	32
175	1540								32
176	1539								34
177	1538								36
178	1537								36
179	1537								36
180	1536								38
181	1535								40
182	1533								40
183	1534								42
184	1542								43
185	1446	50	DCA	45	06	-	1.00	-	32
186	1447								33
187	1445								34
188	1444								34
189	1443								36
190	1442								38
191	1441								38
192	1440								40
193	1439								42
194	1283	50	DCA	45	06	-	1.50	-	28
195	1282								30
196	1289								31
197	1288	50	DCA	45	06	-	1.50	-	31
198	1281								32
199	1287								33
200	1280								34
201	1286								35
202	1279								36
203	1285								37
204	1278								38
205	1284								39
206	707	60	DCA	00	06	-	0.75	-	50
207	706								50
208	705								52
209	704								54
210	722								54
211	703								54
212	713								56
213	721								56
214	702								56
215	723								57
216	720								58
217	712								58
218	701								58
219	719								59
220	718								59
221	708								59
222	710								60
223	711								60
224	724								61

APPENDIX I
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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
225	716	60	DCA	00	06	-	0.75	-	61
226	714								61
227	717								63
228	725								63
229	726								65
230	727								67
231	828	60	DCA	00	06	-	1.00	-	51
232	816								53
233	815								53
234	823								53
235	822								54
236	814								55
237	824								56
238	821								56
239	814								57
240	820								58
241	825								58
242	819								58
243	813								59
244	817								60
245	818								60
246	818								60
247	826								61
248	827								62.5
249	922	60	DCA	00	06	-	1.50	-	50
250	921								52
251	919								52
252	918								54
253	920	60	DCA	00	06	-	1.50	-	54
254	917								56
255	916								56
256	923								57
257	915								58
258	914								60
259	751	60	DCA	10	06	-	0.75	-	50
260	750								50
261	744								52
262	745								52
263	743								52
264	742								54
265	740								56
266	741								56
267	739								58
268	748								60
269	747								60
270	746								60
271	749								62
272	851	60	DCA	10	06	-	1.00	-	48
273	850								48
274	849								49
275	848								50
276	848								50
277	847								51
278	846								52
279	846								52
280	845								54

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
281	844	60	DCA	10	06	-	1.00	-	55
282	843								56
283	842								58
284	841								58
285	852								59
286	840								60
287	840								60
288	944	60	DCA	10	06	-	1.50	-	46
289	948								48
290	943								48
291	942								48
292	947								50
293	941								50
294	946								52
295	940								52
296	939								52
297	938								52
298	937								54
299	936								56
300	945								58
301	756	50	DCA	20	06	-	0.75	-	49
302	755								51
303	754								53
304	752								55
305	753								55
306	755								58
307	758								58
308	757								58
309	760	60	DCA	20	06	-	0.75	-	60
310	1605								66
311	1606								68
312	1604	60	DCA	20	06	-	0.75	-	68
313	1603								70
314	1602								72
315	2171	60	DCA	20	06	-	0.75	P	44
316	2174							P	45
317	2170							P	46
318	2169							P	48
319	2168							P	50
320	2167							P	52
321	2166							P	54
322	2165							P	56
323	2164							P	58
324	2172							P	59
325	2173							P	59
326	859	60	DCA	20	06	-	1.00	-	49
327	858								50
328	857								50
329	856								51
330	855								51
331	853								53
332	854								53
333	860								55
334	861								57
335	862								57
336	1276	60	DCA	20	06	-	1.00	-	48

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
337	1275	60	DCA	20	06	-	1.00	-	49
338	1275								50
339	1274								52
340	1273								55
341	1272								57
342	1277								60
343	2101	60	DCA	20	06	-	1.00	P	44
344	2100							P	46
345	2099							P	48
346	2098							P	50
347	2093							P	52
348	2094							P	54
349	2097							P	56
350	2095							P	57
351	2096							P	57
352	2102							P	58
353	955	60	DCA	20	06	-	1.50	-	46
354	954								47
355	953								48
356	952								50
357	958								51
358	959								51
359	960								51
360	951								52
361	957								53
362	950								54
363	956								55
364	949								56
365	2141	60	DCA	20	06	-	1.50	P	42
367	2140							P	44
367	2139							P	44
368	2138							P	44
369	2137							P	46
370	2136							P	48
371	2133							P	50
372	2135							P	50
373	2134							P	52
374	2132							P	52
375	2131							P	54
376	2142							P	54
377	774	60	DCA	30	06	-	0.75	-	48
378	773								50
379	772								52
380	771								54
381	775								56
382	776								56
383	2932	60	DCA	30	06	-	0.75	P	40
384	2931							P	42
385	2930							P	44
386	2929							P	46
387	2927							P	48
388	2928							P	49
389	2926							P	50
390	2925							P	52
391	2924							P	54
392	2923							P	56

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
393	2940	60	DCA	30	06	-	0.75	P	44
394	2939							P	44
395	2938							P	46
396	2937							P	48
397	2936							P	50
398	2935							P	52
399	2934							P	54
400	2933							P	56
401	2941							P	57
402	2950	60	DCA	30	06	-	0.75	P	44
403	2949							P	44
404	2948							P	46
405	2947							P	48
406	2946							P	50
407	2945							P	52
408	2944							P	54
409	2942							P	56
410	3943							P	56
411	2951							P	57
412	2960	60	DCA	30	06	-	0.75	P	42
413	2959							P	44
414	2958							P	46
415	2957							P	48
416	2956							P	50
417	2961							P	51
418	2955							P	52
419	2954							P	54
420	2953							P	56
421	2952	60	DCA	30	06	-	0.75	P	57
422	2163	60	DCA	30	06	-	0.75	P	44
423	2162							P	46
424	2161							P	48
425	2160							P	50
426	2159							P	52
427	2158							P	54
428	2156							P	57
429	2157							P	58
430	882	60	DCA	30	06	-	1.00	-	42
431	881								43
432	880								43
433	879								44
434	878								44
435	877								46
436	876								48
437	875								50
438	883								52
439	2121	60	DCA	30	06	-	1.00	P	40
440	2120							P	42
441	2119							P	42
442	2118							P	44
443	2117							P	44
444	2116							P	46
445	2111							P	46
446	2110							P	48
447	2115							P	48
448	2114							P	50

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
449	2109	60	DCA	30	06	-	1.00	P	50
450	2112							P	52
451	2113							P	52
452	2108							P	52
453	2107							P	52
454	2106							P	54
455	2105							P	54
456	2104							P	56
457	2103							P	56
458	984	60	DCA	30	06	-	1.50	-	42
459	983								42
460	982								44
461	981								46
462	980								48
463	978								48
464	979								50
465	977								50
466	975								52
467	976								52
468	2130	60	DCA	30	06	-	1.50	P	38
469	2129							P	40
470	2128							P	42
471	2127							P	44
472	2126							P	46
473	2125							P	48
474	2124							P	50
475	2123							P	52
476	2122							P	53
477	784	60	DCA	40	06	-	0.75	-	46
478	783								48
479	782								50
480	782								50
481	785								51
482	777								52
483	778								52
484	779								54
485	781								56
486	1225	60	DCA	40	06	-	0.75	-	50
487	1232								51
488	1227								52
489	1231								53
490	1226								54
491	1230								55
492	1229								56
493	1228								56
494	1256	60	DCA	40	06	-	0.75	-	45
495	1255								46
496	1254								46
497	1253								46
498	1252								48
499	1251								50
500	1250								52
501	1249								54
502	2015	60	DCA	40	06	-	0.75	P	39
503	2019							P	40
504	2013							P	40

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
505	2018	60	DCA	40	06	-	0.75	P	42
506	2014							P	42
507	2012							P	42
508	2017							P	44
509	2011							P	44
510	2010							P	46
511	2000							P	46
512	2001							P	46
513	2016							P	48
514	2008							P	48
515	1999							P	48
516	1998							P	48
517	2006							P	50
518	2007							P	50
519	1997							P	50
520	1994							P	50
521	1996							P	52
522	2005							P	52
523	1995							P	54
524	2004							P	54
525	2003							P	56
526	2002							P	56
527	890	60	DCA	40	06	-	1.00	-	44
528	892								45
529	893								45
530	889								46
531	888								46
532	891								47
533	887	60	DCA	40	06	-	1.00	-	48
534	886								48
535	884								50
536	885								52
537	1139	60	DCA	40	06	-	1.00	P	42
538	1138							P	44
539	1137							P	44
540	1136							P	44
541	1135							P	46
542	1134							P	48
543	1143							P	48
544	1133							P	50
545	1142							P	50
546	1141							P	52
547	1140							P	52
548	2032	60	DCA	40	06	-	1.00	P	38
549	2030							P	40
550	2029							P	42
551	2028							P	42
552	2027							P	44
553	2025							P	44
554	2026							P	46
555	2031							P	46
556	2024							P	46
557	2023							P	48
558	2022							P	50
559	2021							P	52
560	2020							P	54

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
561	993	60	DCA	40	06	-	1.50	-	40
562	992								40
563	989								42
564	990								43
565	991								44
566	988								44
567	987								46
568	986								48
569	985								48
570	986								48
571	994								49
572	997	60	DCA	40	06	-	1.50	P	42
573	998							P	43
574	1000							P	45
575	999							P	47
576	995							P	48
577	996							P	48
578	2036							P	38
579	2037							P	38
580	2035							P	40
581	2043							P	40
582	2034							P	42
583	2042							P	42
584	2033							P	44
585	2041							P	44
586	2040							P	46
587	2039							P	48
588	2038							P	49
589	2044	60	DCA	40	06	-	1.50	P	50
590	3103	60	DCA	45	06	-	0.50	-	41
591	3100								42
592	3102								43
593	3099								44
594	3098								46
595	3097								48
596	3096								50
597	3095								52
598	3094								54
599	3093								56
600	3092								58
601	3101								59
602	3110	60	DCA	45	06	-	0.50	-	42
603	3109								44
604	3108								48
605	3107								52
606	3106								54
607	3105								56
608	3104								58
609	3287	60	DCA	45	06	-	0.50	-	44
610	3286								46
611	3288								47
612	3285								48
613	3284								50
614	3283								52
615	3282								54
616	3281								56

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
617	3280	60	DCA	45	06	-	0.50	-	58
618	2063	60	DCA	45	06	-	0.75	P	46
619	2064							P	46
620	2072							P	47
621	2062							P	48
622	2071							P	49
623	2061							P	50
624	2070							P	51
625	2060							P	52
626	2069							P	53
627	2059							P	54
628	2074							P	55
629	2068	60	DCA	45	06	-	0.75	P	40
630	2067							P	42
631	2066							P	42
632	2065							P	44
633	2073							P	45
634	799	60	DCA	45	06	-	0.75	-	46
635	798								46
636	797								46
637	796								48
638	795								50
639	794								52
640	793								54
641	800								56
642	912	60	DCA	45	06	-	1.00	-	40
643	913								41
644	911								42
645	910	60	DCA	45	06	-	1.00	-	42
646	909								44
647	908								46
648	907								46
649	906								48
650	905								48
651	904								50
652	2092	60	DCA	45	06	-	1.00	P	40
653	2080							P	42
654	2091							P	42
655	2079							P	44
656	2089							P	44
657	2090							P	44
658	2084							P	45
659	2088							P	46
660	2077							P	46
661	2078							P	46
662	2083							P	47
663	2076							P	48
664	2087							P	48
665	2082							P	49
666	2075							P	50
667	2086							P	50
668	2081	60	DCA	45	06	-	1.00	P	52
669	2085							P	52
670	1023	60	DCA	45	06	-	1.50	-	36
671	1020								37
672	1022								38

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
673	1021	60	DCA	.45	06	-	1.50	-	38
674	1018								39
675	1019								39
676	1016								40
677	1015								41
678	1014								42
679	1013								43
680	1012								44
681	1945	60	DCA	45	06	-	1.50	-	32
682	1944								34
683	1943								36
684	1942								38
685	1941								40
686	1940								42
687	1946								44
788	1947								45
689	1948								45
690	2053	60	DCA	45	06	-	1.50	P	36
691	2052							P	38
692	2058							P	39
693	2051							P	40
694	2050							P	40
695	2049							P	40
696	2057							P	41
697	2056							P	41
698	2048							P	42
699	2055							P	43
700	2047							P	44
701	2054	60	DCA	.45	06	-	1.50	P	45
702	2046							P	46
703	2045							P	48
704	412	70	DCA	00	06	-	0.75	-	62.5
705	411								63.5
706	410								63.5
707	409								63.5
708	409								63.5
709	408								63.5
710	407								63.5
711	405								65.5
712	404								65.5
713	403								66.5
714	402								67.5
715	400								68.5
716	401								68.5
717	406								70
718	1837	70	DCA	00	06	-	0.75	-	64
719	1837								66
720	1842								66
721	1841								66
722	1840								68
723	1839								70
724	1838								72
725	503	70	DCA	00	06	-	1.0	-	61.5
726	502								63
727	501								65
728	500								65

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
729	499	70	DCA	.00	06	-	1.0	-	67
730	498								67
731	504								68
732	497								70
733	508								70
734	507								70
735	506								70
736	505								70
737	593	70	DCA	00	06	-	1.5	-	58
738	590								58
739	591								59
740	588								60
741	587								62
742	586								64
743	594								65
744	595								65
745	604								65
746	596								65
747	597								65
748	598								65
749	599								65
750	584								66
751	583								66
752	585								66
753	601								66
754	600								66
755	592								66
756	603								66
757	602	70	DCA	00	06	-	1.5	-	70
758	435	70	DCA	10	06	-	0.75	-	62
759	427								62
760	426								64
761	432								66
762	425								66
763	424								68
764	422								70
765	423								70
766	431								70
767	430								70
768	429								72
769	428								72
770	434								74
771	433								74
772	1828	70	DCA	10	06	-	0.75	-	64
773	1827								66
774	1829								65
775	1826								66
776	1825								70
777	1824								72
778	534	70	DCA	10	06	-	1.0	-	60
779	527								60
780	533								62
781	526								62
782	525								64
783	530								65
784	528								66

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
785	532	70	DCA	.10	06	-	1.0	-	66
786	531								68
787	529								68
788	524								68
789	530								69.5
790	635	70	DCA	10	06	-	1.5	-	55
791	634								56
792	631								57
793	630								57
794	627								57
795	626								57
796	633								58
797	625								59
798	624								61
799	632								62
800	621								63
801	623								63
802	629								64
803	628								65
804	1769	70	DCA	10	06	-	1.5	-	56
805	1768								58
806	1767								60
807	1766								62
808	1765								63
809	1764								64
810	1763								66
811	1762								68
812	2268	70	DCA	20	06	-	0.75	-	58
813	2267	70	DCA	.20	06	-	0.75	-	60
814	2266								62
815	2273								63
816	2265								64
817	2272								65
818	2269								66
819	2271								67
820	2270								68
821	446	70	DCA	20	06	-	0.75	-	58
822	445								58
823	444								60
824	443								62
825	443								62
826	437								62
827	442								64
828	436								64.3
829	448								66
830	441								66
831	438								66
832	439								68
833	440								68
834	447								68
835	447								68
836	540	70	DCA	20	06	-	1.0	-	58
837	539								60
838	538								62
839	537								64
840	536								66

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
841	542	70	DCA	20	06	-	1.0	-	67
842	541								68
843	2211	70	DCA	20	06	-	1.0	P	54
844	2211							P	56
845	2218							P	57
846	2210							P	58
847	2209							P	60
848	2217							P	61
849	2208							P	62
850	2213							P	64
851	2216							P	65
852	2215							P	66
853	2214							P	66
854	648	70	DCA	20	06	-	1.5	-	56
855	647								56
856	646								57
857	636								58
858	645								59
859	637								60
860	643								61
861	644	70	DCA	20	06	-	1.5	-	61
862	638								62
863	640								63
864	639								64
865	641								65
866	642								65
867	2228	70	DCA	20	06	-	1.5	P	54
868	2234	70	DCA	20	06	-	1.5	P	55
869	2226							P	56
870	2227							P	56
871	2233							P	57
872	2225							P	58
873	2232							P	59
874	2224							P	60
875	2223							P	60
876	2231							P	61
877	2222							P	62
878	2221							P	62
879	2230							P	63
880	2220							P	64
881	2229							P	65
882	2219							P	66
883	470	70	DCA	25	06	-	0.75	-	60
884	469								60
885	468								62
886	467								64
887	464								66
888	465								66
889	466								66
890	463								68
891	473	70	DCA	25	06	-	0.75	-	60.5
892	472								60.5
893	477								62.5
894	471								62.5
895	480								63.5

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
896	474	70	DCA	.25	06	-	0.75	-	64.5
897	475								66.5
898	476								68.5
899	479								68.5
900	478								71.5
901	564	70	DCA	25	06	-	1.0	-	58
902	563								60
903	562								62
904	565								63
905	561								64
906	560								66
907	668	70	DCA	25	06	-	1.5	-	53
908	667								54
909	666								56
910	665								56
911	664								56
912	663								58
913	659								60
914	660								62
915	662								63
916	661								64
917	2261	70	DCA	30	06	-	0.75	P	56
918	2256							P	56
919	2257							P	57
920	2255							P	58
921	2258							P	59
922	2260							P	59
923	2254							P	60
924	2259	70	DCA	30	06	-	0.75	P	61
925	2264							P	62
925	2253							P	62
926	2252							P	64
927	2263							P	64
928	2262							P	66
929	2251							P	66
930	2250							P	68
931	2249							P	68
932	487	70	DCA	30	06	-	0.75	-	60
933	488								60
934	485								61
935	484								63
936	486								63
937	489								64
938	483								65
939	483								67
940	482								67
941	481								69
942	572	70	DCA	30	06	-	1.0	-	57
943	570								58
944	569								60
945	571								61
946	568								62
947	567								64
948	566								66
949	2206	70	DCA	30	06	-	1.0	P	54
950	2207							P	55
951	2201							P	56

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
952	2200	70	DCA	30	06	-	1.0	P	56
953	2190							P	58
954	2199							P	58
955	2198							P	60
956	2189							P	60
957	2202							P	61
958	2191							P	62
959	2188							P	62
960	2193							P	62
961	2203							P	63
962	2194							P	64
963	2196							P	64
964	2195							P	64
965	2197							P	66
966	2205							P	67
967	2204							P	67
968	676	70	DCA	30	06	-	1.5	-	52
969	675								53
970	674								55
971	673								57
972	672								57
973	671								57
974	670								59
975	669								60
976	678								61
977	677								62
978	698								53
979	699								54
980	700	70	DCA	30	06	-	1.5	-	54
981	697								56
982	696								56
983	695								56
984	692								58
985	693								58
986	694	70	DCA	30	06	-	1.5	-	58
987	689								61
988	690								61
989	691								61
990	1782	70	DCA	30	06	-	1.5	-	55
991	1787								56
992	1786								57
993	1785								59
994	1784								60
995	1783								62
996	2246	70	DCA	30	06	-	1.5	P	52
997	2245							P	53
998	2244							P	54
999	2239							P	56
1000	2243							P	57
1001	2238							P	58
1002	2236							P	58
1003	2235							P	59
1004	2237							P	60
1005	2242							P	60
1006	2247							P	61
1007	2241							P	62

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1008	2248	70	DCA	30	06	-	1.5	P	63
1009	2240							P	64
1010	368	75	DCA	00	06	-	0.75	-	66
1011	366								66
1012	367								68
1013	365								68
1014	358								69.5
1015	358								71.5
1016	353								73
1017	354								73
1018	355								73
1019	356								73
1020	357								73
1021	371								75
1022	370								75
1023	369								75
1024	364								75
1025	359								75
1026	360								75
1027	361								76.5
1028	362								76.5
1029	363								76.5
1030	341	75	DCA	00	06	-	1.00	-	75
1031	342								75
1032	335	75	DCA	00	06	-	1.5	-	64
1033	334								66
1034	333								67.5
1035	332								67.5
1036	331	75	DCA	00	06	-	1.5	-	67.5
1037	330								68.5
1038	329								70
1039	328								71.5
1040	327								71.5
1041	323								73
1042	324								73
1043	325								73
1044	326								73
1045	339								75
1046	340								75
1047	338								75
1048	337								75
1049	336								75
1050	390	75	DCA	10	06	-	0.75	-	66
1051	389								68
1052	388								70
1053	387								72
1054	397								72
1055	396								73
1056	391								74
1057	392								76
1058	394								77
1059	395								77
1060	393								78
1061	1601	75	DCA	10	06	-	0.75	-	65
1062	1590								66
1063	1600								66

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1064	1589	75	DCA	.10	06	-	0.75	-	66
1065	1599								68
1066	1598								68
1067	1597								68
1068	1588								68
1069	1587								70
1070	1596								70
1071	1595								72
1072	1586								72
1073	1591								74
1074	1592								74
1075	1593								75
1076	1594								76
1077	350	75	DCA	10	06	-	1.00	-	65
1078	349								65
1079	348								69.5
1080	347								71
1081	352								72.5
1082	351								74
1083	282	75	DCA	10	06	-	1.5	-	63
1084	287								63
1085	285								67
1086	291								69
1087	284								70.5
1088	280								70.5
1089	281								72
1090	290								72
1091	289								72
1092	288	75	DCA	.10	06	-	1.5	-	80
1093	275								80
1094	286	75	DCA	10	06	-	1.5	-	64.3
1095	278								64.5
1096	276								66
1097	277								67
1098	279								69
1099	283								70.5
1100	205	75	DCA	20	06	-	0.75	-	66
1101	204								66
1102	192								66
1103	199	75	DCA	20	06	-	0.75	-	66.5
1104	200								66.5
1105	201								67.5
1106	202								67.5
1107	203								67.5
1108	191								69
1109	197								70
1110	196								70
1111	195								70
1112	195								70
1113	189								70
1114	190								70
1115	198								71.5
1116	194								71.5
1117	193								73
1118	258	75	DCA	20	06	-	1.00	-	65
1119	259								65

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1120	257	75	DCA	.20	06	-	1.00	-	69
1121	256								69
1122	254								73
1123	255								73
1124	309	75	DCA	20	06	-	1.5	-	61.5
1125	308								63.5
1126	307								63.5
1127	306								63.5
1128	298								63.5
1129	297								64.8
1130	296								65
1131	305								66
1132	304								66
1133	301								66.5
1134	295								67
1135	302								67
1136	292								67
1137	300								67.5
1138	294								68
1139	299	75	DCA	20	06	-	1.5	-	68.5
1140	293								69
1141	303								69
1142	174	75	DCA	25	06	-	0.75	-	62
1143	173								63
1144	172								63
1145	171								64
1146	170								64.8
1147	169								64.8
1148	168	75	DCA	25	06	-	0.75	-	65
1149	167								66
1150	166								67
1151	165								68
1152	185								68.4
1153	184								68.9
1154	163								69
1155	176								69
1156	177								69
1157	178								69
1158	179								69
1159	162								69.9
1160	180								70.5
1161	181								70.5
1162	181								73
1163	188								73
1164	253	75	DCA	25	06	-	1.00	-	61.5
1165	252								62.5
1166	251								64
1167	This film to be left blank								
1168	241								65.5
1169	242								65.5
1170	243								65.5
1171	250								67
1172	249								67
1173	248								67
1174	247								67
1175	236								67
1176	235								68.5

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1177	234	75	DCA	.25	06	-	1.00	-	68.5
1178	232								70
1179	240								70
1180	233								70
1181	239								71
1182	237								71.5
1183	238								71.5
1184	244								74.5
1185	322	75	DCA	25	06	-	1.5	-	66.8
1186	1725	75	DCA	25	06	-	1.5	-	60
1187	1724								61
1188	1722								62
1189	1723								62
1190	1721								64
1191	1720								66
1192	1719								68
1193	1718								70
1194	1463	50	DCA	00	10	-	0.75	-	41
1195	1462								42
1196	1461								42
1197	1460								44
1198	1459								46
1199	1458								48
1200	1467								50
1201	1466								52
1202	1465								54
1203	1465								55
1204	1379	50	DCA	00	10	-	1.0	-	40
1205	1378	50	DCA	00	10	-	1.0	-	42
1206	1377								44
1207	1376								46
1208	1381								48
1209	1382								50
1210	1383								52
1211	1380								53
1212	1306	50	DCA	00	10	-	1.5	-	40.5
1213	1305								42
1214	1304								44
1215	1303								46
1216	1307								46
1217	1302								48
1218	1301								50
1219	1300								52
1220	1299								54
1221	1502	50	DCA	20	10	-	0.75	-	37
1222	1566								38
1223	1501								39
1224	1500								41
1225	1498								41
1226	1499								41
1227	1509								41
1228	1565								42
1229	1497								43
1230	1508								43
1231	1496								45
1232	1507								45

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1233	1495	50	DCA	20	10	-	0.75	-	47
1234	1506								47
1235	1505								49
1236	1504								49
1237	1494								49
1238	1503								51
1239	1493								51
1240	1416	50	DCA	20	10	-	1.0	-	35
1241	1415								36
1242	1414								38
1243	1413								40
1244	1412								42
1245	1411								44
1246	1410								46
1247	1409								48
1248	1408								50
1249	1335	50	DCA	20	10	-	1.5	-	34
1250	1334								36
1251	1332								38
1251	1333								38
1252	1331								40
1253	1330								42
1254	1329								44
1255	1328								46
1256	1532	50	DCA	40	10	-	0.75	-	34
1257	1531								36
1258	1530								38
1259	1529								40
1260	1528								42
1261	1526	50	DCA	49	10	-	0.75	-	44
1262	1527								45
1263	1551	50	DCA	40	10	-	0.75	-	35
1264	1550								35
1265	1549								37
1266	1548								37
1267	1547								39
1268	1546								39
1269	1545								41
1270	1544								43
1271	1543								45
1272	1552								46
1273	1438	50	DCA	40	10	-	1.0	-	34
1274	1437								36
1275	1436								36
1276	1435								38
1277	1434								40
1278	1433								42
1279	1432								43
1280	1362	50	DCA	40	10	-	1.5	-	31
1281	1363								31
1282	1360								32
1283	1361								33
1284	1357								33
1285	1358								34
1286	1359								36
1287	1356								36
1288	1354								38

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1289	1355	50	DCA	40	10	-	1.5	-	39
1290	1364								40
1291	1583	50	DCA	40	10	-	1.5	-	29
1292	1582								31
1293	1580								33
1294	1581								33
1295	1579								35
1296	1578								37
1297	1577								39
1298	1576								41
1299	735	60	DCA	00	10	-	0.75	-	48
1300	734								50
1301	733								50
1302	732								52
1303	731								52
1304	730								52
1305	729								54
1306	728								56
1307	737								58
1308	736								58
1309	738								59
1310	837	60	DCA	00	10	-	1.0	-	50
1311	836								50
1312	836								52
1313	835								54
1314	834								54
1315	833								56
1316	839								56
1317	838	60	DCA	00	10	-	1.0	-	57
1318	832								58
1319	830								60
1320	829								61
1321	831								62
1322	934	60	DCA	00	10	-	1.5	-	48
1323	933								50
1324	932								50
1325	931								52
1326	930								52
1327	929								54
1328	928								56
1329	927								56
1330	926								56
1331	924								58
1332	925								58
1333	935								58
1334	765	60	DCA	20	10	-	0.75	-	49
1335	764								51
1336	763								53
1337	761								55
1338	762								55
1339	769								56
1340	768								56
1341	766								56
1342	767								58
1343	770								60
1344	871	60	DCA	20	10	-	1.0	-	46

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1345	869	60	DCA	20	10	-	1.0	-	47
1346	870								47
1347	868								49
1348	867								51
1349	872								53
1350	866								53
1351	865								53
1352	864								53
1353	863								55
1354	873								55
1355	874								57
1356	971	60	DCA	20	10	-	1.5	-	44
1357	974								46
1358	970								46
1359	969								48
1360	973								48
1361	967								50
1362	972								50
1363	968								50
1364	966								52
1365	965								52
1366	964								54
1367	963								54
1368	961								56
1369	962								56
1370	792	60	DCA	40	10	-	0.75	-	46
1371	786								48
1372	791								49
1373	785	60	DCA	40	10	-	0.75	-	50
1374	790								51
1375	787								52
1376	788								54
1377	789								56
1378	809	60	DCA	40	10	-	0.75	-	46
1379	810								47
1380	812								47.5
1381	807								48
1382	808								48
1383	811								49
1384	806								50
1385	805								50
1386	804								52
1387	803								54
1388	801								56
1389	802								56
1390	902	60	DCA	40	10	-	1.0	-	40
1391	901								42
✓ 1392	899								44
1393	897								46
1394	903								47
1395	896								48
1396	894								50
1397	895								50
1398	1008	60	DCA	40	10	-	1.5	-	39
1399	1007								41
1400	1006								41

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1401	1004	60	DCA	40	10	-	1.5	-	43
1402	1005								43
1403	1003								44
1404	1009								46
1405	1002								46
1406	1011								47
1407	1001								48
1408	1010								48.5
1409	420	70	DCA	00	10	-	0.75	-	62
1410	419								62
1411	418								64
1412	417								64
1413	417								64
1414	416								66
1415	415								67
1416	414								68
1417	413								70
1418	421								72
1419	1836	70	DCA	00	10	-	0.75	-	62
1420	1835								64
1421	1834								66
1422	1833								68
1423	1832								70
1424	1831								72
1425	1830								74
1426	521	70	DCA	00	10	-	1.0	-	58
1427	520								59
1428	515								61
1429	514	70	DCA	00	10	-	1.0	-	63
1430	513								63
1431	512								65
1432	511								65
1433	510								65
1434	522								66
1435	No tape								66
1436	509								67
1437	516								69
1438	517								69
1439	519								69
1440	523								71
1441	613	70	DCA	00	10	-	1.5	-	57
1442	612								58
1443	611								60
1444	610								60
1445	609								60
1446	608								62
1447	607								64
1448	606								66
1449	605								66
1450	620								68
1451	614								68
1452	615								68
1453	619								68
1454	618								70
1455	616								70
1456	617								70

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1457	459	70	DCA	20	10	-	0.75	-	62
1458	458								62
1459	457								62
1460	456								62
1461	455								62
1462	454								64
1463	453								64
1464	452								66
1465	451								66
1466	449								66
1467	450								68
1468	460								68
1469	461								68
1470	462								68
1471	556	70	DCA	20	10	-	1.0	-	58
1472	555								60
1473	551								62
1474	552								62
1475	553								62
1476	554								62
1477	558								63
1478	557								64
1479	550								64
1480	559								66
1481	543								66
1482	544								66
1483	545								66
1484	546								66
1485	547	70	DCA	20	10	-	1.0	-	66
1486	548								66
1487	549								66
1488	658	70	DCA	20	10	-	1.5	-	55
1489	653								56
1490	652								58
1491	651								58
1492	649								60
1493	650								60
1494	654								61
1495	655								61
1496	656								63
1497	657								64
1498	496	70	DCA	30	10	-	0.75	-	57.5
1499	495								59
1500	494								61
1501	493								63
1502	492								64.5
1503	491								66
1504	490								68
1505	577	70	DCA	30	10	-	1.0	-	56
1506	576								58
1507	575								58
1508	582								60
1509	574								60
1510	573								62
1511	573								62
1512	581								62

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1513	578	70	DCA	30	10	-	1.0	-	64
1514	579								64
1515	580								64
1516	687	70	DCA	30	10	-	1.5	-	52
1517	686								53
1518	685								54
1519	684								54
1520	683								56
1521	682								58
1522	681								58
1523	680								58
1524	679								60
1525	688								61
1526	386	75	DCA	00	10	-	0.75	-	66
1527	385								68
1528	384								70
1529	372								72
1530	373								72
1531	374								72
1532	382								73
1533	383								73
1534	375								74
1535	376								74
1536	377								74
1537	378								74
1538	381								75
1539	379								76
1540	380								77
1541	345	75	DCA	.00	10	-	1.00	-	70
1542	344								70
1543	343								74
1544	161	75	DCA	00	10	-	1.50	-	62
1545	159								63
1546	160								64
1547	154								64
1548	153								65
1549	152								66
1550	151								67
1551	157								68
1552	156								69
1553	155								70
1554	158								71
1555	212	75	DCA	20	10	-	0.75	-	64
1556	223								66
1557	211								66
1558	210								68
1559	221								68
1560	222								68
1561	230								69
1562	229								69
1563	228								69
1564	227								69
1565	226								69
1566	225								69
1567	206								69
1568	206A								69

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1569	207	75	DCA	20	10	-	0.75	-	69
1570	208								70
1571	209								70
1572	217								70
1573	220								70
1574	218								72
1575	214								72
1576	213								72
1577	224								74
1578	217								74
1579	216								74
1580	215								74
1581	231								75
1582	268	75	DCA	20	10	-	1.00	-	62
1583	267								64
1584	266								66
1585	263								66
1586	262								66
1587	260								67.5
1588	261								67.5
1589	264								68
1590	265								68
1591	269								69
1592	270								69
1593	271								70.5
1594	272								70.5
1595	273								70.5
1596	274								72
1597	114	75	DCA	20	10	-	1.50	-	61
1598	113								62.5
1599	115								64
1600	116								65.5
1601	321	75	DCA	20	10	-	1.50	-	62.5
1602	320								62.5
1603	319								63.8
1604	318								63.8
1605	317								64
1606	316								64
1607	315								64
1608	311								65.8
1609	310								65.8
1610	313								68
✓ 1611	312								68
✓ 1612	314								68
✓ 1612	1158	60	MCA	00	06	-	0.75	-	54
✓ 1613	1159								54
✓ 1614	1160								55
✓ 1615	1157								56
✓ 1616	1161								57
✓ 1617	1156								58
✓ 1618	1162								59
✓ 1619	1155								60
✓ 1620	1154								60
1621	1163								62
1622	1164								64
1623	1165								65
1624	1096	60	MCA	00	06	-	1.0	-	52

APPENDIX I
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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1625	1091	60	MCA	00	06	-	1.0	-	53
1626	1090								53
1627	1089								53
1628	1088								55
1629	1086								57
1630	1087								57
1631	1095								58
1632	1092								58
1633	1093								60
1634	1094								62
1635	1097								64
1636	1098								64
1637	1078	60	MCA	00	06	-	1.5	-	51
1638	1079								51
1637	1076								53
1640	1077								53
1641	1075								55
1642	1085								56
1643	1074								57
1644	1080								58
1645	1084								58
1646	1083								59
1647	1081								60
1648	1082								62
1649	1170	60	MCA	20	06	-	0.75	-	50
1650	1169								52
1651	1168								54
1652	1167								56
1653	1166	60	MCA	20	06	-	0.75	-	58
1654	1171								60
1655	1107	60	MCA	20	06	-	1.0	-	48
1656	1108								49
1657	1106								50
1658	1101								52
1659	1100								54
1660	1099								54
1661	1104								56
1662	1102								58
1663	1103								59
1664	1073	60	MCA	20	06	-	1.5	-	46
1665	1072								46
1666	1071								46
1667	1070								46
1668	1069								48
1669	1069								48
1670	1068								52
1671	1067								52
1672	1065								54
1673	1066								56
1674	1189	60	MCA	30	06	-	0.75	-	48
1675	1181								48
1676	1182								48
1677	1187								50
1678	1176								50
1679	1177								51
1680	1175								52

APPENDIX I
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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1681	1186	60	MCA	.30	06	-	0.75	-	52
1682	1183								52
1683	1178								53
1684	1185								54
1685	1174								54
1686	1184								54
1687	1179								55
1688	1194								55.5
1689	1190								56
1690	1173								56
1691	1193								56.5
1692	1179								57
1693	1191								58
1694	1172								58
1695	1180								59
1696	1192								60
1697	1188								60
1698	1263	60	MCA	30	06	-	0.75	-	47
1699	1262								49
1700	1270								50
1701	1261								51
1702	1269								52
1703	1268								54
1704	1271								56
1705	1267								56
1706	1264	60	MCA	30	06	-	0.75	-	58
1707	1265								60
1708	1266								60
1709	1116	60	MCA	.30	06	-	1.0	-	46
1710	1115								48
1711	1114								50
1712	1113								52
1713	1112								54
1714	1111								54
1715	1110								56
1716	1109								58
1717	1055	60	MCA	30	06	-	1.5	-	41
1718	1053								42
1719	1051								43
1720	1050								44
1721	1057								45
1722	1049								46
1723	1056								47
1724	1047								48
1725	1048								49
1726	1046								50
1727	1045								52
1728	1044								52
1729	1052								53
1730	1198	60	MCA	40	06	-	0.75	-	47
1731	1197								47
1732	1202								49
1733	1205								50
1734	1206								51
1735	1203								51
1736	1207								52

APPENDIX I
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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1737	1200	60	MCA	40	06	-	0.75	-	52
1738	1196								53
1739	1199								54
1740	1204								55
1741	1198								56
1742	1220	60	MCA	40	06	-	0.75	-	44
1743	1219								46
1744	1218								46
1745	1213								46
1746	1217								48
1747	1223								48
1748	1212								48
1749	1216								50
1750	1211								50
1751	1201								50
1752	1222								50
1753	1215								52
1754	1214								52
1755	1210								52
1756	1221								54
1757	1209								54
1758	1224								54
1759	1208								56
1760	1132	60	MCA	40	06	-	1.0	-	44
1761	1129								44
1762	1127								44
1763	1128								44
1764	1126								46
1765	1125	60	MCA	40	06	-	1.0	-	46
1766	1124								48
1767	1130								50
1768	1131								51
1769	1119	60	MCA	40	06	-	1.0	-	44
1770	1118								46
1771	1117								48
1772	1117								50
1773	1123								50
1774	1120								52
1775	1122								52
1776	1127								53
1777	1038	60	MCA	40	06	-	1.5	-	41
1778	1037								43
1779	1042								44
1780	1038								45
1781	1043								46
1782	1039								47
1783	1041								48
1784	1041								49
1785	1953	60	MCA	40	06	-	1.5	-	42
1786	1952								44
1787	1951								46
1788	1958								45
1789	1950								46
1790	1957								47
1791	1956								47
1792	1959	60	MCA	40	06	-	1.5	-	48

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1793	1949	60	MCA	40	06	-	1.5	-	48
1794	1955								49
1795	1954								50
1796	1064	60	MCA	40	06	-	1.5	P	42
1797	1063							P	42
1798	1062							P	44
1799	1060							P	46
1800	1061							P	46
1801	1058							P	48
1802	1059							P	50
1803	1248	60	MCA	45	06	-	0.75	-	48
1804	1247								49
1805	1346								50
1806	1245								50.5
1807	1244								50.5
1808	1243								50.5
1809	1242 + 1								51
1810	1242								51.5
1811	1241								52
1812	1240								52
1813	1239								54
1814	1238								56
1815	1147	60	MCA	45	06	-	1.0	-	45
1816	1148								45
1817	1146	60	MCA	45	06	-	1.0	-	47
1818	1149								48
1819	1150								48
1820	1145								49
1821	1153	60	MCA	45	06	-	1.0	-	50
1822	1152								50
1823	1144								51
1824	1151								52
1825	1036	60	MCA	45	06	-	1.5	-	37
1826	1026								39
1827	1025								41
1828	1024								43
1829	1027								44
1830	1031								44
1831	1028								46
1832	1030								46
1833	1032								47
1834	1029								48
1835	1033								48
1836	1035								49
1837	1034								50
1838	1964	60	MCA	45	06	-	1.5	-	40
1839	1963								42
1840	1962								44
1841	1961								46
1842	1960								48
1843	1819	70	MCA	00	06	-	0.75	-	63
1844	1818								65
1845	1817								66
1846	1823								68
1847	1822								70
1848	1820								72

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1849	1821	70	MCA	.00	06	-	0.75	-	74
1850	1793	70	MCA	00	06	-	1.0	-	63
1851	1792								64
1852	1791								66
1853	1790								68
1854	1816								68
1855	1815								70
1856	1789								70
1857	1788								72
1858	1733	70	MCA	00	06	-	1.50	-	61
1859	1732								63
1860	1731								63
1861	1728								64
1862	1730								65
1863	1727								64
1864	1726								66
1865	1729								67
1866	1734								67
1867	1735								69
1868	1736								71
1869	1737								71
1870	1849	70	MCA	20	06	-	0.75	-	61
1871	1850								62
1872	1848								63
1873	1851								64
1874	1847								65
1875	1852								66
1876	1846								67
1877	1853	70	MCA	20	06	-	0.75	-	68
1878	1845								69
1879	1854								70
1880	1843								71
1882	1800	70	MCA	20	06	-	1.0	-	60
1883	1799								62
1884	1798								62
1885	1796								64
1886	1797								65
1887	1795								66
1888	1794								68
1889	1747	70	MCA	20	06	-	1.5	-	56
1890	1744								57
1891	1743								58
1892	1745								60
1893	1742								60
1894	1746								61
1895	1741								61
1896	1740								63
1897	1739								65
1898	1738								65
1899	1858	70	MCA	25	06	-	0.75	-	61
1900	1857								63
1901	1855								65
1902	1856								65
1903	1862								66
1904	1859								67
1905	1861								68

APPENDIX I
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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1906	1860	70	MCA	.25	06	-	0.75	-	69
1907	1806	70	MCA	25	06	-	1.0	-	56
1908	1805								58
1909	1804								60
1910	1807								62
1911	1803								62
1912	1802								64
1913	1808								65
1914	1801								66
1915	1756	70	MCA	25	06	-	1.5	-	55
1916	1755								56
1917	1754								57
1918	1753								57
1919	1759								58
1920	1760								59
1921	1751								59
1922	1758								59.5
1923	1761								60
1924	1750								61
1925	1752								61
1926	1757								62
1927	1749								63
1928	1748								65
1929	1869	70	MCA	30	06	-	0.75	-	58
1930	1868								60
1931	1867								62
1932	1866								64
1933	1874								65
1934	1873	70	MCA	30	06	-	0.75	-	65
1935	1870								65
1936	1871								65
1937	1865								66
1938	1872								67
1939	1864								68
1940	1863								69
1941	1814	70	MCA	30	06	-	1.0	-	57
1942	1813								59
1943	1812								61
1944	1811								63
1945	1809								65
1946	1810								66
1947	1777	70	MCA	30	06	-	1.5	-	53
1948	1776								54
1949	1775								54
1950	1778								55
1951	1779								56
1952	1774								57
1953	1771								58
1954	1773								58
1955	1781								59
1956	1770								60
1957	1780								62
1958	1612	75	MCA	00	06	-	0.75	-	70
1959	1613								70
1960	1614								70
1961	1610								71

APPENDIX I
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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1962	1615	75	MCA	.00	06	-	0.75	-	72
1963	1609								73
1964	1608								73
1965	1616								74
1966	1607								75
1967	1617								76
1968	1611								77
1969	1618								78
1970	1655	75	MCA	00	06	-	1.0	-	65
1971	1654								66
1972	1653								68
1973	1649								69
1974	1650								70
1975	1652								72
1976	1651								72
1977	1648								75
1978	1693	75	MCA	00	06	-	1.5	-	69
1979	1691								69.5
1980	1692								69.5
1981	1685								70
1982	1685								72
1983	1686								72
1984	1688								73
1985	1689								74
1986	1690								75
1987	1624	75	MCA	10	06	-	0.75	-	67
1988	1620								68
1989	1619								70
1990	1620	75	MCA	10	06	-	0.75	-	72
1991	1621								74
1992	1622								76
1993	1623								77
1994	1662	75	MCA	10	06	-	1.0	-	66
1995	1661								67
1996	1660								69
1997	1659								70
1998	1658								72
1999	1656								74
2000	1657								74
2001	1700	75	MCA	10	06	-	1.5	-	62
2002	1699								64
2003	1698								66
2004	1697								67
2005	1696								68
2006	1694								70
2007	1695								70
2008	1701								72
2009	1702								74
2010	1638	75	MCA	20	06	-	0.75	-	68
2011	1637								69
2012	1635								69
2013	1629								70
2014	1632								70
2015	1633								70
2016	1634								70
2017	1631								71
2018	1630								72
2019	1628								72
2020	1627								72

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2021	1639	75	MCA	.20	06	-	0.75	-	72
2022	1636								73
2023	1626								74
2024	1641								75
2025	1640								75
2026	1625								76
2027	1674	75	MCA	20	06	-	1.0	-	63
2028	1673								63
2029	1672								63
2030	1671								63
2031	1670								64
2032	1669								64
2033	1667								65
2034	1666								67
2035	1668								68
2036	1665								69
2037	1664								70
2038	1663								71
2039	1706	75	MCA	20	06	-	1.5	-	61
2040	1705								63
2041	1704								65
2042	1703								67
2043	1707								69
2044	1708								70
2045	1642	75	MCA	25	06	-	0.75	-	67
2046	1643								68
2047	1644								68
2048	1645								70
2049	1646								70
2050	1647								72
2051	1684	75	MCA	25	06	-	1.0	-	64
2052	1683								66
2053	1683	75	MCA	.25	06	-	1.0	-	67
2054	1682								67
2055	1676								68
2056	1675								68
2057	1681								69
2058	1678								70
2059	1680								71
2060	1679								72
2061	1717	75	MCA	25	06	-	1.5	-	60
2062	1711								63
2063	1710								63
2064	1709								65
2065	1712								67
2066	1713								67
2067	1714								69
2068	1715								69
2069	1716								71
2070	3416	50	DCA	30	06	C-1*	0.75	P	29
2071	3415							P	30
2072	3414							P	32
2073	3413							P	34
2074	3412							P	36
2075	3411							P	38
2076	3410							P	39
2077	3408							P	40
2078	3409							P	41
2079	3407							P	42
2080	3406							P	44

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2081	3405	50	DCA	30	06	C-1*	0.75	P	46
2082	3467	50	DCA	30	06	C-1*	1.0	P	24
2083	3466							P	26
2084	3465							P	28
2085	3464							P	30
2086	3463							P	32
2087	3462							P	34
2088	3461							P	36
2089	3460							P	38
2090	3459							P	40
2091	3457							P	42
2092	3458							P	44
2093	3479	50	DCA	30	06	C-1*	1.5	P	23
2094	3478							P	24
2095	3477							P	26
2096	3476							P	28
2097	3475							P	30
2098	3474							P	32
2099	3473							P	34
2100	3472							P	35
2101	3471							P	36
2102	3470							P	38
2103	3469							P	40
2104	3468							P	42
2105	3426	50	DCA	40	06	C-1*	0.75	P	26
2106	3425							P	28
2107	3424							P	29
2108	3423							P	30
2109	3422	50	DCA	40	06	C-1*	0.75	P	32
2110	3421							P	34
2111	3420							P	36
2112	3419							P	38
2113	3419							P	40
2114	3418							P	42
2115	3456	50	DCA	40	06	C-1*	1.0	P	24
2116	3455							P	26
2117	3454							P	28
2118	3453							P	30
2119	3452							P	32
2120	3451							P	34
2121	3450							P	36
2122	3449							P	38
2123	3448							P	40
2124	3447							P	41
2125	3417							P	44
2126	3488	50	DCA	40	06	C-1*	1.5	P	22
2127	3487							P	24
2128	3486							P	26
2129	3485							P	28
2130	3484							P	30
2131	3483							P	32
2132	3482							P	34
2133	3481							P	36
2134	3480							P	38
2135	3437	50	DCA	45	06	C-1*	0.75	P	26
2136	3436							P	28

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle	
2137	3435	50	DCA	45	06	C-1*	0.75	P	30	
2138	3434							P	32	
2139	3433							P	34	
2140	3432							P	35	
2141	3431							P	36	
2142	3430							P	38	
2143	3429							P	40	
✓ 2144	3427							P	42	
2145	3428							P	43	
2146	3446	50	DCA	45	06	C-1*	1.0	P	24	
2147	3445							P	26	
2148	3444							P	28	
✓ 2149	3443							P	30	
2150	3442							P	32	
2151	3441							P	34	
2152	3440							P	36	
2153	3439							P	38	
2154	3438							P	40	
2155	3497	50	DCA	45	06	C-1*	1.5	P	22	
2156	3496							P	24	
2157	3495							P	26	
2158	3493							P	28	
2159	3494							P	29	
2160	3493							P	30	
2161	3498							P	31	
2162	3492							P	32	
2163	3491							P	34	
2164	3490							P	36	
2165	3489	50	DCA	45	06	C-1*	1.5	P	38	
2166	2445	60	DCA	30	06	A-1	0.75	P	44	
2167	2444							P	46	
2168	2443							P	48	
2169	2442							P	50	
2170	2441							P	52	
2171	2440							P	54	
2172	2438							P	56	
2173	2439							P	58	
2174	2455	60	DCA	30	06	A-1	0.75	-	40	C
2175	2454								42	
2176	2453								44	
2177	2452								46	
2178	3451								48	
2179	2450								50	
2180	2449								52	
2181	2448								54	
2182	2447								56	
2183	2446								58	
2184	2341	60	DCA	30	06	A-2	0.75	P	44	
2185	2340							P	46	
2186	2345							P	48	
2187	2339							P	48	
2188	2344							P	50	
2189	2338							P	50	
2190	2337							P	52	
2191	2343							P	52	
2192	2342							P	54	
2193	2346							P	56	

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2194	2347	60	DCA	30	06	A-2	0.75	P	58
2195	2498	60	DCA	30	06	A-3	0.75	P	40
2196	2497							P	42
2197	2496							P	44
2198	2495							P	46
2199	2494							P	48
2200	2500							P	49
2201	2499							P	49
2202	2493							P	50
2203	2492							P	52
2204	2491							P	54
2205	2501							P	56
2206	2490							P	56
2207	2489	60	DCA	30	06	A-3	0.75	-	42 C
2208	2488								44
2209	2487								46
2210	2486								48
2211	2485								50
2212	2484								52
2213	2482								54
2214	2483								54
2215	2509	60	DCA	30	06	A-3	0.75	-	40 C
2216	2508								42
2217	2507								44
2218	2506								46
2219	2505								48
2220	2504								50
2221	2503								52
2222	2502	60	DCA	30	06	A-3	0.75	-	54
2223	2510								55
2224	2742	60	DCA	30	06	C-1	0.75	P	42
2225	2741							P	44
2226	2740							P	46
2227	2739							P	48
2228	2738							P	50
2229	2744							P	50
2230	2743							P	52
2231	2737							P	52
2232	2736							P	54
2233	2735							P	56
✓2234	2745							P	57
2235	2722	60	DCA	30	06	C-1	0.75	-	42 C
2236	2723								44
2237	2721								44
2238	2720								46
2239	2719								48
2240	2724								50
2241	2718								50
2242	2717								52
2243	2716								54
2244	2715								56
2245	2713								56
2246	2714								57
2247	2904	60	DCA	30	06	C-1	0.75	-	40 R
2248	2903								42
2249	2902								44

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2250	2901	60	DCA	.30	06	C-1	0.75	-	46 R
2251	2900								48
2252	2899								50
2253	2898								52
2254	2897								54
2255	2896								56
2256	2895								57
2257	3050	60	DCA	30	06	C-1	0.75	-	40 R
2258	3049								42
2259	3048								44
2260	3047								46
2261	3046								48
2262	3045								50
2263	3044								52
2264	3043								54
2265	3042								56
2266	3041								58
2267	2691	60	DCA	30	06	C-2	0.75	P	40
2268	2690							P	42
2269	2689							P	44
2270	2688							P	46
2271	2687							P	48
2272	2686							P	50
2273	2685							P	52
2274	2684							P	54
2275	2683							P	56
2276	2692							P	58
2277	2894	60	DCA	30	06	C-3	0.75	P	40
2278	2893	60	DCA	.30	06	C-3	0.75	P	42
2279	2892							P	44
2280	2891							P	46
2281	2890							P	48
2282	2889							P	50
2283	2888							P	52
2284	2887							P	54
2285	2886							P	56
2286	2884							P	57
2287	2885							P	57
2288	3009	60	DCA	30	06	C-1*	0.75	P	40
2289	3008							P	42
2290	3007							P	44
2291	3006							P	46
2292	3005							P	48
2293	3004							P	50
2294	3003							P	52
2295	3002							P	54
2296	3000							P	56
2297	3001							P	56
2298	3010							P	58
2299	3240	60	DCA	30	06	C-2*	0.75	P	40
2300	3239							P	42
2301	3238							P	44
2302	3237							P	46
2303	3236							P	48
2304	3235							P	50
2305	3241							P	51

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2306	3234	60	DCA	.30	06	C-2*	0.75	P	52
2307	3233							P	54
2308	3232							P	56
2309	3212	60	DCA	30	06	C-3*	0.75	P	40
2310	3211							P	42
2311	3210							P	44
2312	3209							P	46
2313	3208							P	48
2314	3207							P	50
2315	3206							P	52
2316	3205							P	54
2317	3203							P	56
2318	3204							P	58
2319	2436	60	DCA	30	06	A-1	1.0	P	42
2320	2435							P	44
2321	2434							P	46
2322	2433							P	48
2323	2432							P	50
2324	2431							P	52
2325	2430							P	54
2326	2437							P	55
2327	2309	60	DCA	30	06	A-2	1.0	P	44
2328	2308							P	46
2329	2307							P	48
2330	2306							P	50
2331	2305							P	52
2332	2316							P	54
2333	2304							P	56
2334	2310	60	DCA	.30	06	A-2	1.0	P	56
2335	2311							P	56
2336	2312							P	58
2337	2313							P	58
2338	2314							P	59
2339	2315							P	59
2340	2576	60	DCA	30	06	A-3	1.0	P	38
2341	2575							P	40
2342	2574							P	42
2343	2573							P	44
2344	2570							P	46
2345	2572							P	46
2346	2571							P	48
2347	2569							P	48
2348	2568							P	50
2349	2577							P	50
2350	2567							P	52
2351	2565							P	53
2352	2578							P	54
2353	2566							P	55
2354	2800	60	DCA	30	06	C-1	1.0	P	39
2355	2799							P	40
2356	2798							P	40
2357	2797							P	42
2358	2796							P	44
2359	2795							P	46
2360	2794							P	48
2361	2801							P	49

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2362	2802	60	DCA	.30	06	C-1	1.0	P	49
2363	2793							P	50
2364	2792							P	52
2365	2791							P	54
2366	2803							P	56
2367	2980	60	DCA	30	06	C-1	1.0	-	38 R
2368	2979								40
2369	2978								42
2370	2977								44
2371	2976								46
2372	2975								48
2373	2974								50
2374	2981								50
2375	2973								52
2376	2972								54
2377	2971								56
2378	2612	60	DCA	30	06	C-2	1.0	P	38
2379	2611							P	40
2380	2610							P	42
2381	2609							P	44
2382	2608							P	46
2383	2613							P	48
2384	2602							P	48
2385	2601							P	50
2386	2607							P	50
2387	2606							P	52
2388	2605							P	54
2389	2603							P	54
2390	2604	60	DCA	.30	06	C-2	1.0	P	56
2391	2836	60	DCA	30	06	C-3	1.0	P	42
2392	2835							P	44
2393	2834							P	46
2394	2837							P	45
2395	2833							P	48
2396	2832							P	50
2396	2831							P	50
2397	2830							P	52
2398	2829							P	54
2399	3123	60	DCA	30	06	C-1*	1.00	P	38
2400	3121							P	40
2401	3120							P	42
2402	3119							P	44
2403	3118							P	46
2404	3117							P	48
2405	3116							P	50
2406	3115							P	52
2407	3113							P	52
2408	3112							P	54
2409	3114							P	54
2410	3111							P	56
2411	3122							P	56
2412	3357	60	DCA	30	06	C-2*	1.00	P	38
2413	3356							P	40
2414	3355							P	42
2415	3354							P	44
2416	3353							P	46
2417	3352							P	47

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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2418	3359	60	DCA	30	06	C-2*	1.00	P	48
2419	3351							P	48
2420	3358							P	49
2421	3350							P	50
2422	3349							P	52
2423	3348							P	54
2424	3347							P	56
2425	3152	60	DCA	30	06	C-3*	1.00	P	38
2426	3151							P	40
2427	3150							P	42
2428	3149							P	44
2429	3148							P	46
2430	3147							P	48
2431	3146							P	50
2432	3145							P	52
2433	3144							P	54
2434	3153							P	55
2435	2393	60	DCA	30	06	A-1	1.50	P	40
2436	2394							P	40
2437	2392							P	42
2438	2390							P	44
2439	2391							P	44
2440	2389							P	46
2441	2388							P	48
2442	2387							P	50
2443	2386							P	52
2444	2366	60	DCA	30	06	A-2	1.50	P	38
2445	2365							P	40
2446	2364	60	DCA	30	06	A-2	1.50	P	42
2447	2362							P	44
2448	2363							P	46
2449	2361							P	46
2450	2367							P	47
2451	2368							P	47
2452	2360							P	48
2453	2359							P	50
2454	2358							P	52
2455	2553	60	DCA	30	06	A-3	1.5	P	40
2456	2552							P	42
2457	2551							P	44
2458	2550							P	46
2459	2554							P	47
2460	2549							P	48
2461	2548							P	50
2462	2546							P	52
2463	2555							P	53
2464	2769	60	DCA	30	06	C-1	1.5	P	38
2465	2768							P	40
2466	2767							P	42
2467	2766							P	44
2468	2770							P	45
2469	2765							P	46
2470	2764							P	48
2471	2763							P	50
2472	2771							P	52
2473	2989	60	DCA	30	06	C-1	1.5	-	38 R

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2474	2988	60	DCA	.30	06	C-1	1.5	-	40 R
2475	2987								42
2476	2986								44
2477	2985								46
2478	2984								48
2479	2983								50
2480	2982								52
2481	2654	60	DCA	30	06	C-2	1.5	P	38
2482	2661							P	39
2483	2653							P	40
2484	2660							P	41
2485	2652							P	42
2486	2659							P	43
2487	2651							P	44
2488	2658							P	45
2489	2650							P	46
2490	2657							P	47
2491	2649							P	48
2492	2656							P	49
2493	2648							P	50
2494	2646							P	50
2495	2655							P	51
2496	2645							P	52
2497	2647							P	52
2498	2861	60	DCA	30	06	C-3	1.5	P	38
2499	2860							P	40
2500	2859							P	42
2501	2858							P	44
2502	2857	60	DCA	.30	06	C-3	1.5	P	46
2503	2856							P	48
2504	2855							P	50
2505	2862							P	51
2506	2854							P	52
2507	3080	60	DCA	30	06	C-1*	1.5	P	38
2508	3079							P	38
2509	3078							P	40
2510	3077							P	42
2511	3076							P	44
2512	3075							P	46
2513	3074							P	48
2514	3073							P	50
2515	3072							P	52
2516	3304	60	DCA	30	06	C-2*	1.50	P	40
2517	3305							P	40
2518	3303							P	42
2519	3302							P	44
2520	3306							P	45
2521	3301							P	46
2522	3300							P	48
2523	3299							P	50
2524	3298							P	52
2525	3182	60	DCA	30	06	C-3*	1.50	P	34
2526	3181							P	36
2527	3180							P	38
2528	3179							P	40
2529	3178							P	42

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2530	3183	60	DCA	30	06	C-3*	1.50	P	43
2531	3177							P	44
2532	3176							P	46
2533	3175							P	48
2534	3174							P	50
2535	3173							P	52
2536	1895	60	DCA	40	06	A	0.75	P	36
2537	1893							P	38
2538	1888							P	40
2539	1887							P	42
2540	1879							P	42
2541	1886							P	44
2542	1878							P	44
2543	1892							P	45
2544	1885							P	46
2545	1881							P	46
2546	1877							P	46
2547	1891							P	47
2548	1880							P	48
2549	1876							P	48
2550	1889							P	48
2551	1884							P	48
2552	1882							P	49
2553	1890							P	50
2554	1875							P	50
2555	1883							P	50
2556	1894							P	52
2557	1991	60	DCA	40	06	A	0.75	P	38
2558	1990	60	DCA	40	06	A	0.75	P	40
2559	1989							P	42
2560	1988							P	44
2561	1987							P	44
2562	1986							P	46
2563	1985							P	48
2564	1984							P	50
2565	1992							P	52
2566	1993							P	52
2567	2480	60	DCA	40	06	A-1	0.75	P	38
2568	2479							P	40
2569	2478							P	42
2570	2477							P	44
2571	2476							P	46
2572	2475							P	48
2573	2474							P	50
2574	2473							P	52
2575	2481							P	54
2576	2357	60	DCA	40	06	A-2	0.75	P	40
2577	2356							P	42
2578	2355							P	44
2579	2354							P	46
2580	2353							P	48
2581	2352							P	50
2582	2351							P	50
2583	2350							P	52
2584	2349							P	52
2585	2348							P	54
2586	2528	60	DCA	40	06	A-3	0.75	P	38

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2587	2527	60	DCA	40	06	A-3	0.75	P	40
2588	2526							P	42
2589	2525							P	44
2590	2524							P	46
2591	2523							P	48
2592	2522							P	50
2593	2521							P	52
2594	2520							P	54
2595	2733	60	DCA	40	06	C-1	0.75	P	39
2596	2731							P	40
2597	2732							P	41
2598	2730							P	42
2599	2729							P	44
2600	2728							P	46
2601	2727							P	48
2602	2726							P	50
2603	2725							P	52
2604	2734							P	54
2605	2681	60	DCA	40	06	C-2	0.75	P	38
2606	2680							P	40
2607	2679							P	40
2608	2678							P	42
2609	2682							P	43
2610	2677							P	44
2611	2676							P	46
2612	2675							P	48
2613	2674							P	50
2614	2673							P	52
2615	2672	60	DCA	40	06	C-2	0.75	P	54
2616	2881	60	DCA	40	06	C-3	0.75	P	40
2617	2880							P	42
2618	2883							P	43
2619	2879							P	44
2620	2878							P	46
2621	2882							P	47
2622	2877							P	48
2623	2874							P	50
2624	2875							P	52
2625	2876							P	54
2626	3040	60	DCA	40	06	C-1*	0.75	P	38
2627	3039							P	40
2628	3038							P	42
2629	3037							P	44
2630	3036							P	46
2631	3035							P	48
2632	3030							P	50
2633	3034							P	50
2634	3033							P	52
2635	3032							P	54
2636	3031							P	56
2637	3019	60	DCA	40	06	C-1*	0.75	P	36
2638	3018							P	38
2639	3017							P	40
2640	3016							P	42
✓ 2641	3015							P	44
2642	3014							P	44

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2643	3013	60	DCA	40	06	C-1*	0.75	P	46
2644	3012							P	48
2645	3011							P	50
2646	3250	60	DCA	40	06	C-2*	0.75	P	38
2647	3249							P	40
2648	3248							P	42
2649	3247							P	44
2650	3246							P	46
2651	3245							P	48
2652	3253							P	49
2653	3244							P	50
2654	3252							P	51
2655	3243							P	52
2656	3242							P	54
2657	3251							P	56
2658	3221	60	DCA	40	06	C-3*	0.75	P	40
2659	3220							P	42
2660	3219							P	44
2661	3218							P	46
2662	3217							P	48
2663	3216							P	50
2664	3215							P	52
2665	3214							P	54
2666	3213							P	56
2667	1917	60	DCA	40	06	A	1.0	P	34
2668	1916							P	36
2669	1915							P	38
2670	1914							P	40
2671	1911	60	DCA	40	06	A	1.0	P	40
2672	1913							P	42
2673	1910							P	42
2674	1912							P	44
2675	1909							P	44
2676	1908							P	46
2677	1907							P	48
2678	1906							P	50
2679	1905							P	52
2680	1981	60	DCA	40	06	A	1.0	P	36
2681	1980							P	38
2682	1979							P	40
2683	1978							P	42
2684	1977							P	44
2685	1976							P	46
2686	1975							P	48
✓2687	1982							P	50
✓2688	1983							P	52
✓2689	2152	60	DCA	40	06	A	1.0	P	36
✓2690	2151							P	38
✓2691	2150							P	40
✓2692	2149							P	40
✓2693	2148							P	40
✓2694	2147							P	42
✓2695	2143							P	42
2696	2153							P	42
2697	2154							P	44
2698	2146							P	44

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2699	2145	60	DCA	40	06	A	1.0	P	46
2700	2155							P	46
2701	2144							P	48
2702	2185	60	DCA	40	06	A	1.0	P	38
2703	2184							P	40
2704	2181							P	42
2705	2182							P	42
2706	2183							P	42
2707	2180							P	44
2708	2179							P	46
2709	2177							P	46
2710	2176							P	46
2711	2175							P	48
2712	2178							P	48
2713	2186							P	50
2714	2187							P	50
2715	2429	60	DCA	40	06	A-1	1.0	P	36
2716	2428							P	38
2717	2427							P	40
2718	2426							P	42
2719	2425							P	44
2720	2424							P	46
2721	2423							P	48
2722	2422							P	50
2723	2421							P	52
2724	2293	60	DCA	40	06	A-2	1.0	P	38
2725	2297							P	38
2726	2296							P	38
2727	2303	60	DCA	40	06	A-2	1.0	P	39
2728	2292							P	40
2729	2302							P	40
2730	2287							P	42
2731	2291							P	42
2732	2301							P	42
2733	2290							P	43
2734	2286							P	44
2735	2300							P	44
2736	2299							P	44
2737	2289							P	45
2738	2285							P	46
2739	2298							P	46
2740	2294							P	46
2741	2288							P	47
2742	2295							P	48
2743	2284							P	48
2744	2283							P	48
2745	2282							P	50
2746	2279	60	DCA	40	06	A-2	1.0	P	42
2747	2278							P	44
2748	2281							P	45
2749	2280							P	46
2750	2277							P	46
2751	2276							P	48
2752	2275							P	50
2753	2274							P	52
2754	2587	60	DCA	40	06	A-3	1.0	P	36

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2755	2586	60	DCA	40	06	A-3	1.0	P	38
2756	2584							P	38
2757	2583							P	40
2758	2582							P	42
2759	2581							P	44
2760	2580							P	46
2761	2579							P	48
2762	2585							P	50
2763	2789	60	DCA	40	06	C-1	1.0	P	38
2764	2788							P	40
2765	2787							P	42
2766	2790							P	44
2767	2786							P	44
2768	2785							P	46
2769	2784							P	48
2770	2783							P	50
2771	2782							P	52
2772	2621	60	DCA	40	06	C-2	1.0	P	36
2773	2624							P	36
2774	2623							P	36
2775	2622							P	38
2776	2620							P	40
2777	2619							P	42
2778	2618							P	44
2779	2617							P	46
2780	2616							P	48
2781	2615							P	50
2782	2614							P	52
2783	3379	60	DCA	40	06	C-2	1.0	P	36
2784	3378							P	38
2785	3377							P	40
2786	3376							P	42
2787	3375							P	44
2788	3374							P	45
2789	3373							P	46
2790	3380							P	47
2791	3372							P	48
2792	3371							P	50
2793	3370							P	52
2794	2822	60	DCA	40	06	C-3	1.0	P	36
2795	2821							P	38
2796	2820							P	40
2797	2828							P	40
2798	2825							P	42
2799	2819							P	42
2800	2827							P	44
2801	2818							P	44
2802	2817							P	44
2803	2826							P	46
2804	2816							P	46
2805	2815							P	48
2806	2823							P	50
2807	2824							P	52
2808	3132	60	DCA	40	06	C-1*	1.00	P	38
2809	3131								40
2810	3130							P	42

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2811	3129	60	DCA	40	06	C-1*	1.00	P	44
2812	3128							P	46
2813	3127							P	48
2814	3126							P	50
2815	3125							P	52
2816	3124							P	54
2817	3346	60	DCA	40	06	C-2*	1.00	P	36
2818	3345							P	38
2819	3344							P	40
2820	3343							P	42
2821	3342							P	43
2822	3341							P	44
2823	3340							P	45
2824	3339							P	46
2825	3338							P	48
2826	3337							P	50
2827	3336							P	52
√2828	3162	60	DCA	40	06	C-3*	1.00	P	36
√2829	3161							P	38
√2830	3160							P	40
√2831	3159							P	42
√2832	3163							P	43
√2833	3158							P	44
√2834	3157							P	46
√2835	3156							P	48
√2836	3154							P	50
√2837	3155							P	50.5
√2838	1936	60	DCA	40	06	A	1.5	P	34
√2839	1935	60	DCA	40	06	A	1.5	P	36
√2840	1934							P	38
√2841	1933							P	40
√2842	1932							P	42
√2843	1931							P	44
√2844	1930							P	46
√2845	1937							P	46
√2846	1938							P	48
√2847	1939							P	48
√2848	1971	60	DCA	40	06	A	1.5	P	34
√2849	1970							P	36
√2850	1969							P	38
√2851	1968							P	40
√2852	1965							P	42
√2853	1966							P	43
√2854	1967							P	45
√2855	1972							P	46
2856	1973							P	48
2857	1974							P	50
2858	2400	60	DCA	40	06	A-1	1.50	P	34
2859	2399							P	36
2860	2398							P	36
2861	2397							P	38
2862	2396							P	40
2863	2395							P	42
2864	2401							P	44
2865	2402							P	46
2866	2376	60	DCA	40	06	A-2	1.50	P	34

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2867	2375	60	DCA	40	06	A-2	1.50	P	36
2868	2371							P	38
2869	2370							P	40
2870	2369							P	42
2871	2374							P	44
2872	2372							P	46
2873	2373							P	46
2874	2535	60	DCA	40	06	A-3	1.5	P	34
2875	2534							P	36
2876	2533							P	38
2877	2537							P	39
2878	2532							P	40
2879	2530							P	41
2880	2531							P	42
2881	2536							P	43
2882	2529							P	45
2883	2761	60	DCA	40	06	C-1	1.5	P	34
2884	2760							P	36
2885	2759							P	38
2886	2758							P	40
2887	2757							P	42
2888	2756							P	44
2889	2755							P	46
2890	2754							P	48
2891	2762							P	50
2892	2644	60	DCA	40	06	C-2	1.5	P	34
2893	2643							P	36
2894	2642							P	38
2895	2641	60	DCA	40	06	C-2	1.5	P	38
2896	2640							P	40
2897	2639							P	42
2898	2638							P	44
2899	2636							P	46
2900	2637							P	48
2901	3389	60	DCA	40	06	C-2	1.5	P	34
2902	3388							P	36
2903	3386							P	38
2904	3387							P	40
2905	3394							P	41
2906	3385							P	42
2907	3384							P	43
2908	3393							P	43
2909	3383							P	44
2910	3392							P	44
2911	3391							P	46
2912	3381							P	46
2913	3382							P	48
2914	3390							P	48
2915	2853	60	DCA	40	06	C-3	1.5	P	36
2916	2852							P	38
2917	2851							P	40
2918	2850							P	42
2919	2849							P	44
2920	2848							P	46
2921	2847							P	48
2922	2846							P	50

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2923	3060	60	DCA	.40	06	C-1*	1.5	P	34
2924	3059							P	36
2925	3058							P	36
2926	3057							P	38
2927	3056							P	40
2928	3055							P	42
2929	3054							P	44
2930	3053							P	46
2931	3052							P	48
2932	3051							P	50
2933	3315	60	DCA	40	06	C-2*	1.50	P	34
2934	3314							P	36
2935	3313							P	38
2936	3312							P	40
2937	3311							P	42
2938	3316							P	43
2939	3310							P	44
2940	3309							P	46
2941	3308							P	48
2942	3307							P	50
2943	3190	60	DCA	40	06	C-3*	1.50	P	32
2944	3189							P	34
2945	3188							P	36
2946	3187							P	38
2947	3186							P	40
2948	3185							P	42
2949	3184							P	44
2950	3191							P	46
2951	3192							P	48
2952	3090	60	DCA	.45	06	C-1*	0.50	P	41
2953	3089							P	42
2954	3088							P	44
2955	3087							P	46
2956	3086							P	48
2957	3085							P	50
2958	3082							P	52
2959	3083							P	54
2960	3084							P	56
2961	3091							P	58
2962	1902	60	DCA	45	06	A	0.75	P	35
2963	1901							P	37
2964	1900							P	39
2965	1899							P	41
2966	1898							P	43
2967	1897							P	45
2968	1896							P	47
2969	1903							P	48
2970	1904							P	49
2971	2467	60	DCA	45	06	A-1	0.75	P	38
2972	2465							P	40
2973	2468							P	41
2974	2462							P	42
2975	2464							P	43
2976	2461							P	44
2977	2460							P	44
2978	2463							P	45
2979	2459							P	46

APPENDIX I
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Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2980	2458	60	DCA	45	06	A-1	0.75	P	48
2981	2457							P	50
2982	2469							P	51
2983	2470							P	51
2984	2471							P	52
2985	2456							P	52
2986	2472							P	52
2987	2336	60	DCA	45	06	A-2	0.75	P	40
2988	2335							P	42
2989	2328							P	44
2990	2327							P	46
2991	2326							P	48
2992	2333-A							P	49
2993	2333							P	49
2994	2329							P	50
2995	2332							P	51
2996	2331							P	52
2997	2334							P	52
2998	2330							P	54
2999	2519	60	DCA	45	06	A-3	0.75	P	41
3000	2518							P	42
3001	2517							P	44
3002	2516							P	46
3003	2515							P	46
3004	2514							P	48
3005	2513							P	50
3006	2512							P	52
3007	2511							P	54
3008	2702	60	DCA	45	06	C-1	0.75	P	38
3009	2703							P	39
3010	2701							P	40
3011	2700							P	42
3012	2699							P	44
3013	2698							P	46
3014	2697							P	48
3015	2696							P	50
3016	2695							P	52
3017	2693							P	54
3018	2694							P	55
3019	2996	60	DCA	45	06	C-1	0.75	-	38 R
3020	2995								40
3021	2994								42
3022	2993								44
3023	2992								46
3024	2991								48
3025	2990								50
3026	2999								52
3027	2997								54
3028	2998								56
3029	2669	60	DCA	45	06	C-2	0.75	P	38
3030	2668							P	40
3031	2667							P	42
3032	2663							P	44
3033	2662							P	46
3034	2666							P	48
3035	2665							P	50

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3036	2664	60	DCA	45	06	C-2	0.75	P	52
3037	2670							P	54
3038	2671							P	54
3039	2870	60	DCA	45	06	C-3	0.75	P	38
3040	2869							P	40
3041	2868							P	42
3042	2867							P	44
3043	2866							P	46
3044	2871							P	47
3045	2865							P	48
3046	2872							P	49
3047	2864							P	50
3048	2863							P	52
3049	2873							P	54
3050	3026	60	DCA	45	06	C-1*	1.5	P	38
3051	3025							P	40
3052	3024							P	42
3053	3023							P	44
3054	3022							P	46
3055	3021							P	48
3056	3020							P	50
3057	3027							P	52
3058	3028							P	54
3059	3029							P	56
3060	3273	60	DCA	45	06	C-2*	0.75	P	38
3061	3272							P	40
3062	3278							P	41
3063	3271							P	42
3064	3277	60	DCA	45	06	C-2*	0.75	P	43
3065	3270							P	44
3066	3279							P	45
3067	3276							P	46
3068	3269							P	46
3069	3268							P	48
3070	3275							P	49
3071	3267							P	50
3072	3274							P	51
3073	3266							P	52
3074	3265							P	54
3075	3230	60	DCA	45	06	C-3*	0.75	P	38
3076	3229							P	40
3077	3228							P	42
3078	3227							P	44
3079	3226							P	46
3080	3225							P	48
3081	3224							P	50
3082	3223							P	52
3083	3222							P	52
3084	3231							P	55
3085	1926	60	DCA	45	06	A	1.0	P	34
3086	1925							P	34
3087	1924							P	36
3088	1923							P	38
3089	1922							P	40
3090	1927							P	41
3091	1921							P	42

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3092	1928	60	DCA	45	06	A	1.0	P	43
3093	1920							P	44
3094	1919							P	46
3095	1918							P	46
3096	1929							P	47
3097	2420	60	DCA	45	06	A-1	1.0	P	36
3098	2419							P	38
3099	2418							P	40
3100	2417							P	42
3101	2416							P	44
3102	2415							P	46
3103	2414							P	48
3104	2413							P	50
3105	2325	60	DCA	45	06	A-2	1.0	P	37
3106	2324							P	38
3107	2323							P	40
3108	2322							P	42
3109	2321							P	43
3110	2318							P	44
3111	2320							P	45
3112	2317							P	46
3113	2319							P	47
3114	2564	60	DCA	45	06	A-3	1.0	P	38
3115	2561							P	40
3116	2560							P	42
3117	2559							P	44
3118	2558							P	46
3119	2557							P	48
3120	2562	60	DCA	45	06	A-3	1.0	P	50
3121	2563							P	50
3122	2556							P	50
3123	2781	60	DCA	45	06	C-1	1.0	P	34
3124	2780							P	36
3125	2779							P	38
3126	2778							P	40
3127	2777							P	42
3128	2776							P	44
3129	2775							P	46
3130	2774							P	48
3131	2773							P	50
3132	2772							P	52
3133	2597	60	DCA	45	06	C-2	1.0	P	34
3134	2596							P	36
3135	2595							P	38
3136	2594							P	40
3137	2593							P	42
3138	2592							P	44
3139	2600							P	44
3140	2599							P	46
3141	2591							P	46
3142	2590							P	48
✓3143	2588							P	48
✓3144	2589							P	50
✓3145	2598							P	50
3146	3369	60	DCA	45	06	C-2	1.0	P	36
3147	3368							P	36

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3148	3367	60	DCA	45	06	C-2	1.0	P	38
3149	3366							P	40
3150	3365							P	42
3151	3364							P	44
3152	3363							P	46
3153	3362							P	48
3154	3361							P	50
3155	3360							P	52
3156	2813	60	DCA	45	06	C-3	1.0	P	36
3157	2812							P	38
3158	2811							P	40
3159	2810							P	42
3160	2809							P	44
3161	2808							P	46
3162	2807							P	48
3163	2806							P	48
3164	2805							P	50
3165	2804							P	52
3166	2814							P	53
3167	3141	60	DCA	45	06	C-1*	1.00	P	36
3168	3140							P	38
3169	3139							P	40
3170	3138							P	42
3171	3143							P	43
3172	3137							P	44
3173	3142							P	45
3174	3136							P	46
3175	3135							P	48
3176	3134	60	DCA	45	06	C-1*	1.00	P	50
3177	3133							P	52
3178	3334	60	DCA	45	06	C-2*	1.00	P	34
3179	3333							P	36
3180	3332							P	38
3181	3331							P	40
3182	3330							P	42
3183	3335							P	43
3184	3329							P	44
3185	3328							P	46
3186	3327							P	48
3187	3326							P	50
3188	3171	60	DCA	45	06	C-3*	1.00	P	36
3189	3170							P	38
3190	3169							P	40
3191	3168							P	42
3192	3167							P	44
3193	3166							P	46
3194	3165							P	48
3195	3164							P	50
3196	3172							P	52
3197	2409	60	DCA	45	06	A-1	1.50	P	32
3198	2408							P	34
3199	2407							P	36
3200	2406							P	38
3201	2405							P	40
3202	2404							P	42
3203	2403							P	44

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3204	2410	60	DCA	45	06	A-1	1.50	P	45
3205	2411							P	45
3206	2412							P	45
3207	2382	60	DCA	45	06	A-2	1.50	P	34
3208	2381							P	36
3209	2380							P	38
3210	2384							P	39
3211	2379							P	40
3212	2383							P	41
3213	2378							P	42
3214	2377							P	44
3215	2385							P	45
3216	2545	60	DCA	45	06	A-3	1.5	P	34
3217	2544							P	36
3218	2543							P	38
3219	2542							P	40
3220	2541							P	42
3221	2540							P	44
3222	2539							P	44
3223	2538							P	46
3224	2547							P	54
3225	2753	60	DCA	45	06	C-1	1.5	P	34
3226	2752							P	36
3227	2751							P	38
3228	2750							P	40
3229	2749							P	42
3230	2748							P	44
3231	2746							P	46
3232	2747	60	DCA	45	06	C-1	1.5	P	48
3233	2632	60	DCA	45	06	C-2	1.5	P	34
3234	2631							P	36
3235	2630							P	38
3236	2629							P	40
3237	2635							P	42
3238	2628							P	42
3239	2627							P	44
3240	2625							P	46
3241	2626							P	46
3242	2633							P	47
3243	2634							P	47
3244	3404	60	DCA	45	06	C-2	1.5	P	34
3245	3403							P	36
3246	3402							P	38
3247	3401							P	40
3248	3400							P	41
3249	3399							P	42
3250	3398							P	43
3251	3397							P	44
3252	3396							P	46
3253	3395							P	48
3254	2844	60	DCA	45	06	C-3	1.5	P	34
3255	2843							P	36
3256	2842							P	38
3257	2841							P	40
3258	2840							P	42
3259	2839							P	44

APPENDIX I
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3260	2845	60	DCA	45	06	C-3	1.5	P	45
3261	2888							P	46
3262	3068	60	DCA	45	06	C-1*	1.5	P	34
3263	3067							P	36
3264	3066							P	38
3265	3065							P	40
3266	3064							P	42
3267	3069							P	43
3268	3063							P	44
3269	3070							P	45
3270	3061							P	46
3271	3070							P	47
3272	3062							P	48
3273	3325	60	DCA	45	06	C-2*	1.50	P	34
3274	3324							P	36
3275	3323							P	38
3276	3322							P	40
3277	3321							P	42
3278	3320							P	43
3279	3319							P	44
3280	3318							P	46
3281	3317							P	48
3282	3200	60	DCA	45	06	C-3*	1.50	P	34
3283	3201							P	35
3284	3198							P	36
3285	3197							P	38
3286	3202							P	39
3287	3196							P	40
3288	3195	60	DCA	45	06	C-3*	1.50	P	42
3289	3194							P	44
3290	3193							P	46
3291	3199							P	48
3292	3520	70	DCA	20	06	C-1*	0.75	P	58
3293	3519							P	60
3294	3518							P	62
3295	3517							P	64
3296	3516							P	66
3297	3515							P	68
3298	3544	70	DCA	20	06	C-1*	0.75	P	54
3299	3543							P	56
3300	3546							P	58
3301	3542							P	58
3302	3541							P	60
3303	3540							P	62
3304	3539							P	64
3305	3538							P	66
3306	3537							P	66
3307	3545							P	68
3308	3575	70	DCA	20	06	C-1*	1.0	P	50
3309	3574							P	52
3310	3573							P	54
3311	3572							P	56
3312	3571							P	58
3313	3570							P	59
3314	3569							P	60
3315	3568							P	62

APPENDIX I
(concluded)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3316	3567	70	DCA	20	06	C-1*	1.0	P	64
3317	3576							P	64
3318	3566							P	66
3319	3527	70	DCA	20	06	C-1*	1.5	P	52
3320	3528							P	52
3321	3526							P	54
3322	3525							P	56
3323	3524							P	58
3324	3522							P	60
3325	3523							P	60
3326	3529							P	61
3327	3520							P	62
3328	3513	70	DCA	30	06	C-1*	0.75	P	52
3329	3501							P	54
3330	3513							P	54
3331	3500							P	55
3332	3512							P	56
3333	3511							P	58
3334	3510							P	59
3335	3509							P	60
3336	3506							P	60
3337	3508							P	62
3338	3505							P	62
3339	3507							P	54
3340	3504							P	54
3341	3503							P	56
3342	3502							P	58
3343	3555	70	DCA	30	06	C-1*	0.75	P	52
3344	3554							P	54
3345	3553							P	56
3346	3552							P	58
3347	3551							P	60
3348	3550							P	62
3349	3549							P	64
3350	3548							P	66
3351	3547							P	68
3352	3561	70	DCA	30	06	C-1*	1.0	P	48
3353	3560							P	50
3354	3559							P	52
3355	3558							P	54
3356	3565							P	56
3357	3557							P	56
3358	3556							P	57
3359	3564							P	58
3360	3563							P	60
3361	3562							P	62
3362	3534	70	DCA	30	06	C-1*	1.5	P	50
3363	3533							P	52
3364	3536							P	53
3365	3532							P	54
3366	3535							P	55
3367	3531							P	56

APPENDIX II

Cavitation Test Configurations

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3368		50	DCA	00	06		0.75		40
									41
									42
		50	DCA	00	06		1.00		40
									41
									42
									43
									46
		50	DCA	00	06		1.50		No cavitation
3369		50	DCA	10	06		0.75		36
									38
									39
									41
									42
									43
		50	DCA	10	06		1.00		39
									40
									41
		50	DCA	10	06		1.50		35
									36
									38
									40
3370		50	DCA	20	06		0.75		38
									40
									42
									44
									48
		50	DCA	20	06		1.00		34
									35
									36
									38
		50	DCA	20	06		1.50		39
									41
3371		50	DCA	30	06		0.75		34
									35
									36
									37
									38
									38.5
		50	DCA	30	06		1.00		29
									31
									33
									34
		50	DCA	30	06		1.50		30
									31
									32
									33
									34
3372		50	DCA	40	06		0.75		29
									31
									32
									33
									36
									37
		50	DCA	40	06		1.00		32
									33
									34
									35
									36
									38
		50	DCA	40	06		1.50		38
3373		50	DCA	45	06		0.75		30

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3373		50	DCA	45	06		0.75		32
									34
									36
		50	DCA	45	06		1.00		30.5
									32
									33.5
		50	DCA	45	06		1.50		35
									29
									30
									31
									32.6
									34
									36
3374		60	DCA	00	06		0.75		No cavitation
		60	DCA	00	06		1.00		No cavitation
		60	DCA	00	06		1.50		52
									53
									54
									55
									56
3375		60	DCA	10	06		0.75		49
									50
									51
									51.9
		60	DCA	10	06		1.00		49
									50
									51
									51.5
		60	DCA	10	06		1.50		52
									46
									47
									48
		60	DCA	10	06		1.50		52
									54
3376		60	DCA	20	06		0.75		50
									52
									54
									56
									58
									60
		60	DCA	20	06		1.00		48
									48.5
									49
									50
		60	DCA	20	06		1.50		44
									45
									47
									48
3377		60	DCA	30	06		0.75		49
									50
									52
									54
									56
		60	DCA	30	06		1.00		47
									49
									51
									52
									54
									56
		60	DCA	30	06		1.50		44
									46
									47
									49
									51

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3378		60	DCA	40	06		0.75		44
									46
									48
									50
									52
		60	DCA	40	06		1.00		49
									50
									52
									54
		60	DCA	40	06		1.50		43
									44
									46
									48
									50
									51
3379		60	DCA	45	06		0.75		44
									46
									48
									50
									52
									54
									56
		60	DCA	45	06		1.00		40
									42
									44
									46
									48
									50
		60	DCA	45	06		1.50		39
									40
									41
									43
									45
									47
3380		70	DCA	00	06		0.75		62.5
									64.5
									67
									69
		70	DCA	00	06		1.00		60
									61
									62
									63
		70	DCA	00	06		1.50		58
									59
									60
									61
									62
3381		70	DCA	10	06		0.75		60
									62
									64
									66
		70	DCA	10	06		1.00		58
									59
									60
									61
		70	DCA	10	06		1.50		55.5
									57.5
3382		70	DCA	20	06		0.75		58
									60
									62
									64
									66
		70	DCA	20	06		1.00		58
									59
									60
									61
									64
									66

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3382		70	DCA	20	06		1.50		56
									57
									59
									61
									63
									65
3383		70	DCA	25	06		0.75		56.5
									58
									59.5
									61
		70	DCA	25	06		1.00		58
									59
									60
									61
									62
									63
									64
									66
									68
		70	DCA	25	06		1.50		56
									58
									60
									61
									62
									63
									64
3384		70	DCA	30	06		0.75		59
									60.5
									62
									63.5
									65
		70	DCA	30	06		1.00		58
									59
									60
									61
									62
									63
									64
									66
		70	DCA	30	06		1.50		50
									52
									53
									54
									56
									58
									60
									62
3385		75	DCA	00	06		0.75		62
									64
									66
									68
									70
									72
		75	DCA	00	06		1.00		66
									68
									70
									72
		75	DCA	00	06		1.50		63
									64
									65
									66
									67
									68

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3386		75	DCA	10	06		0.75		66
									68
									70
									72
		75	DCA	10	06		1.00		64
									66
									68
									70
									72
									74
		75	DCA	10	06		1.50		63
									65
									67
									69
3387		75	DCA	20	06		0.75		65
									66
									67
									68
									68.7
									70
		75	DCA	20	06		1.00		65
									67
									69
									71
									72
									72.5
									73
		75	DCA	20	06		1.50		62
									64
									66
									68
									70
3388		75	DCA	25	06		0.75		65
									65.5
									66
									67.5
									68.5
									69.5
									70.5
									71.5
		75	DCA	25	06		1.00		65.5
									67
									68
									70
									71.5
		75	DCA	25	06		1.50		62.8
									64.5
									67
									69
3389		50	DCA	00	10		0.75		39
									40
									41
									42
									46
		50	DCA	00	10		1.00		40
									41
									41.5
									42
		50	DCA	00	10		1.50		42
									44
									47
									52

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3390		50	DCA	20	10		0.75		32
									34
									36
		50	DCA	20	10		1.00		34
									35
									37
									38
		50	DCA	20	10		1.50		34
									36
									38
									40
									42
3391		50	DCA	40	10		0.75		28
									29
									30
									31
									33
									35
									36
		50	DCA	40	10		1.00		29
									31
									35
									37
									41
									43
		50	DCA	40	10		1.50		29
									30
									31
									32
									33
									34
3392		60	DCA	00	10		0.75		49
									49.1
									49.2
									49.3
									49.4
									49.5
		60	DCA	00	10		1.00		49
									51
									52
									53
									54
		60	DCA	00	10		1.50		47.5
									49
									50.5
									52
									53.5
									55
3393		60	DCA	20	10		0.75		48
									50
									52
									54
									56
		60	DCA	20	10		1.00		47
									48
									49
									51
									53
									55
		60	DCA	20	10		1.50		44
									46
									47
									48

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3394		60	DCA	40	10		0.75		44
									46
									48
									50
									52
									54
		60	DCA	40	10		1.00		41
									42.5
									44
									45.5
									47
									48.5
		60	DCA	40	10		1.50		38.5
									40
									41.5
									42.5
3395		70	DCA	00	10		0.75		60
									61
									62
									63
									64
		70	DCA	00	10		1.00		58.5
									59.5
		70	DCA	00	10		1.50		57
									58
									59
									60
									61
3396		70	DCA	20	10		0.75		57
									59
									61
									63
									65
									66
		70	DCA	20	10		1.00		58
									59.5
									61
									62.5
									64
		70	DCA	20	10		1.50		55
									57
									59
									61
									63
3397		70	DCA	30	10		0.75		59
									61
									63
									65
									67
		70	DCA	30	10		1.00		53.5
									55
									56.5
									58
									59.5
									61
		70	DCA	30	10		1.50		54
									56
									58
									60
									62
3398		75	DCA	00	10		0.75		66
									68
									70
									72
									74

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3398		75	DCA	.00	10		1.00		62
									64
									66
									68
									70
									72
		75	DCA	00	10		1.50		62
									63
									64
									65
									65.6
									65.8
3399		75	DCA	20	10		0.75		65
									66
									67
									68
									68.6
		75	DCA	20	10		1.00		62
									64
									66
									66.5
		75	DCA	20	10		1.50		62
									65
									66.5
3400		60	MCA	00	06		0.75		No cavitation
		60	MCA	00	06		1.00		No cavitation
		60	MCA	00	06		1.50		55
									57
									59
									60
									62
3401		60	MCA	20	06		0.75		52
									54
									56
									58
									59
									60
		60	MCA	20	06		1.00		48
									49
									50
									52
									53
									54
		60	MCA	20	06		1.50		44
									46
									48
									49
									50
									52
3402		60	MCA	30	06		0.75		52
									54
									56
									58
		60	MCA	30	06		1.00		47
									49
									51
									52
									54
									56
		60	MCA	30	06		1.50		44
									46
									47
									48

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3402		60	MCA	.30	06		1.50		49
									50
									51
3403		60	MCA	40	06		0.75		44
									46
									48
									50
									52
									54
		60	MCA	40	06		1.00		45
									47
									49
									50
									52
		60	MCA	40	06		1.50		43
									44
									46
									47
									48
									50
									51
3404		60	MCA	45	06		0.75		46
									48
									50
									52
									54
									56
		60	MCA	45	06		1.00		44
									46
									48
									50
		60	MCA	45	06		1.50		38
									40
									42
									43
									44
									46
									48
3405		70	MCA	00	06		0.75		59
									60
									61
									63
									65
									67
		70	MCA	00	06		1.00		59
									60
									61
									62
									63
									64
		70	MCA	00	06		1.50		55
									57
									59
									60
									61
									65
3406		70	MCA	20	06		0.75		55
									56
									58
									60
									62
									64
									65
									66

APPENDIX II
(continued)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3406		70	MCA	20	06		1.00		54
									55
									56
									57
									58
		70	MCA	20	06		1.50		54
									55
									56
									57
									59
3407		70	MCA	25	06		0.75		56
									57
									59
									61
									63
									65
		70	MCA	25	06		1.00		54
									55
									56
									57
		70	MCA	25	06		1.50		53.5
									54
									55
									56
									57
									58
3408		70	MCA	30	06		0.75		54
									56
									57
									59
									61
									63
									64
		70	MCA	30	06		1.00		54
									55
									57
									59
									61
									63
		70	MCA	30	06		1.50		49
									50
									51
									53
									55
3409		75	MCA	00	06		0.75		68
									69
									70
									71
									72
									73
									74
		75	MCA	00	06		1.00		64
									65
									66
									68
									70
		75	MCA	00	06		1.50		64
									65
									67
									69
3410		75	MCA	10	06		0.75		64
									66
									68
									70
									72

APPENDIX II
(concluded)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
3410		75	MCA	.10	06		1.00		64
									66
									68
									69
		75	MCA	10	06		1.50		61
									62
									63
									64
									68
3411		75	MCA	20	06		0.75		No cavitation
		75	MCA	20	06		1.00		61
									62
									64
									65
		75	MCA	20	06		1.50		59
									60
									61
									62
3412		75	MCA	25	06		0.75		62
									64
									65
									66
		75	MCA	25	06		1.00		61
									62
									64
									66
									68
		75	MCA	.25	06		1.50		58.5
									59.5
									60.5
									61.5
3413		75	MCA	30	06		0.75		50
									52
									54
									56
									58
		75	MCA	30	06		1.00		No cavitation
		75	MCA	30	06		1.50		No cavitation
		75	MCA	45	06		0.75		45
									46
									47
									48
									50
									52
		75	MCA	45	06		1.00		No cavitation
		75	MCA	45	06		1.50		No cavitation

APPENDIX III

Duplicated Films

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
1	1457	50	DCA	00	06	-	0.75	-	42
1392	899	60	DCA	40	10	-	1.00	-	44
1611	312	75	DCA	20	10	-	1.50	-	68
1612	314	75	DCA	20	10	-	1.50	-	68
1612	1158	60	MCA	00	06	-	0.75	-	54
1613	1159	60	MCA	00	06	-	0.75	-	54
1614	1160	60	MCA	00	06	-	0.75	-	55
1615	1157	60	MCA	00	06	-	0.75	-	56
1616	1161	60	MCA	00	06	-	0.75	-	57
1617	1156	60	MCA	00	06	-	0.75	-	58
1618	1162	60	MCA	00	06	-	0.75	-	59
1619	1155	60	MCA	00	06	-	0.75	-	60
1620	1154	60	MCA	00	06	-	0.75	-	60
2144	3427	50	DCA	45	06	C-1*	0.75	P	42
2149	3443	50	DCA	45	06	C-1*	1.00	P	30
2234	2745	60	DCA	30	06	C-1	0.75	P	57
2641	3015	60	DCA	40	06	C-1*	0.75	P	44
2687	1982	60	DCA	40	06	A	1.00	P	50
2688	1983	60	DCA	40	06	A	1.00	P	52
2689	2152	60	DCA	40	06	A	1.00	P	36
2690	2151	60	DCA	40	06	A	1.00	P	38
2691	2150	60	DCA	40	06	A	1.00	P	40
2692	2149	60	DCA	40	06	A	1.00	P	40
2693	2148	60	DCA	40	06	A	1.00	P	40
2694	2147	60	DCA	40	06	A	1.00	P	42
2695	2143	60	DCA	40	06	A	1.00	P	42
2828	3162	60	DCA	40	06	C-3*	1.00	P	36
2829	3161	60	DCA	40	06	C-3*	1.00	P	38
2830	3160	60	DCA	40	06	C-3*	1.00	P	40
2831	3159	60	DCA	40	06	C-3*	1.00	P	42
2832	3163	60	DCA	40	06	C-3*	1.00	P	43
2833	3158	60	DCA	40	06	C-3*	1.00	P	44
2834	3157	60	DCA	40	06	C-3*	1.00	P	46
2835	3156	60	DCA	40	06	C-3*	1.00	P	48
2836	3154	60	DCA	40	06	C-3*	1.00	P	50
2837	3155	60	DCA	40	06	C-3*	1.00	P	50.5
2838	1936	60	DCA	40	06	A	1.50	P	34
2839	1935	60	DCA	40	06	A	1.50	P	36
2840	1934	60	DCA	40	06	A	1.50	P	38
2841	1933	60	DCA	40	06	A	1.50	P	40
2842	1932	60	DCA	40	06	A	1.50	P	42
2843	1931	60	DCA	40	06	A	1.50	P	44
2844	1930	60	DCA	40	06	A	1.50	P	46
2845	1937	60	DCA	40	06	A	1.50	P	46
2846	1938	60	DCA	40	06	A	1.50	P	48
2847	1939	60	DCA	40	06	A	1.50	P	48
2848	1971	60	DCA	40	06	A	1.50	P	34
2849	1970	60	DCA	40	06	A	1.50	P	36
2850	1969	60	DCA	40	06	A	1.50	P	38
2851	1968	60	DCA	40	06	A	1.50	P	40
2852	1965	60	DCA	40	06	A	1.50	P	42
2853	1966	60	DCA	40	06	A	1.50	P	43
2854	1967	60	DCA	40	06	A	1.50	P	45
2855	1972	60	DCA	40	06	A	1.50	P	46
3143	2588	60	DCA	45	06	C-2	1.00	P	48
3144	2589	60	DCA	45	06	C-2	1.00	P	50
3145	2598	60	DCA	45	06	C-2	1.00	P	50

APPENDIX III
(concluded)

Film No.	Run No.	Inlet Flow Angle (β_1)	Profile	Camber Angle	Thickness Ratio	Slot Configuration	Solidity	Pressure Distribution	Blade Chord Angle
2994	2329	60	DCA	45	06	A-2	0.75	P	50
2999	2519	60	DCA	45	06	A-3	0.75	P	41
3146	3369	60	DCA	45	06	C-2	1.00	P	36
3147	3368	60	DCA	45	06	C-2	1.00	P	36
3148	3367	60	DCA	45	06	C-2	1.00	P	38
3149	3366	60	DCA	45	06	C-2	1.00	P	40
3150	3365	60	DCA	45	06	C-2	1.00	P	42
3151	3364	60	DCA	45	06	C-2	1.00	P	44
3152	3363	60	DCA	45	06	C-2	1.00	P	46
3153	3362	60	DCA	45	06	C-2	1.00	P	48
3154	3361	60	DCA	45	06	C-2	1.00	P	50
3155	3360	60	DCA	45	06	C-2	1.00	P	52
3156	2813	60	DCA	45	06	C-3	1.00	P	36
3157	2812	60	DCA	45	06	C-3	1.00	P	38
3158	2811	60	DCA	45	06	C-3	1.00	P	40
3159	2810	60	DCA	45	06	C-3	1.00	P	42
3160	2809	60	DCA	45	06	C-3	1.00	P	44
3161	2808	60	DCA	45	06	C-3	1.00	P	46
3162	2807	60	DCA	45	06	C-3	1.00	P	48
3163	2806	60	DCA	45	06	C-3	1.00	P	48
3164	2805	60	DCA	45	06	C-3	1.00	P	50
3165	2804	60	DCA	45	06	C-3	1.00	P	52
3166	2814	60	DCA	45	06	C-3	1.00	P	53
3167	3141	60	DCA	45	06	C-3	1.00	P	36
3168	3140	60	DCA	45	06	C-1*	1.00	P	38
3169	3139	60	DCA	45	06	C-1*	1.00	P	40
3170	3138	60	DCA	45	06	C-1*	1.00	P	42
3171	3143	60	DCA	45	06	C-1*	1.00	P	43
3172	3137	60	DCA	45	06	C-1*	1.00	P	44
3173	3142	60	DCA	45	06	C-1*	1.00	P	45
3174	3136	60	DCA	45	06	C-1*	1.00	P	46
3175	3135	60	DCA	45	06	C-1*	1.00	P	48
3176	3134	60	DCA	45	06	C-1*	1.00	P	50
3177	3133	60	DCA	45	06	C-1*	1.00	P	52
3178	3334	60	DCA	45	06	C-2*	1.00	P	34
3179	3333	60	DCA	45	06	C-2*	1.00	P	36
3180	3332	60	DCA	45	06	C-2*	1.00	P	38
3181	3331	60	DCA	45	06	C-2*	1.00	P	40
3182	3330	60	DCA	45	06	C-2*	1.00	P	42
3205	2411	60	DCA	45	06	A-1*	1.50	P	45
3301	3542	70	DCA	20	06	C-1*	0.75	P	58
3303	3540	70	DCA	20	06	C-1*	0.75	P	62

APPENDIX IV

List of Symbols

c	Hydrofoil chord length, in.
C_P	Pressure coefficient, $C_P = \frac{p_{local} - p_1}{P_1 - p_1}$
D	Diffusion factor, $D = \left(1 - \frac{\cos\beta_1}{\cos\beta_2}\right) + \frac{\cos\beta_1}{2\sigma}(\tan\beta_1 - \tan\beta_2)$
H	Boundary layer form factor, $H = \delta^*/\theta^*$
i	Incidence angle, angle between inlet-flow direction and tangent to meanline at leading edge, deg, $i = \beta_1 - \left(\gamma^\circ + \frac{\phi}{2}\right)$, $\therefore i = \alpha - \frac{\phi}{2}$
K	Wake pseudoenergy factor or cavitation index
k	Wake pseudoenergy thickness
L	Pitot pressure at nozzle entrance, in. Hg
M	Pressure at cascade inlet station, in. Hg
P	Total pressure
p	Static pressure
p_v	Vapor pressure of water, in. Hg
Δp	Static pressure difference, $p_2 - p_1$
q	Dynamic pressure
R	Manometer reference pressure, in. Hg
Re_c	Reynolds number based on chord length, $Re_c = \frac{Vc}{\nu}$
s	Blade spacing, in.
V	Velocity
Z	Scale factor
α	Angle-of-attack, angle between inlet-flow direction and blade-chord angle, $\alpha = \beta_1 - \gamma^\circ$ deg

β	Flow angle, angle between flow direction and axial direction, deg
γ°	Blade chord angle, angle between blade chord and axial direction, deg
δ°	Deviation angle, angle between exit-flow direction and tangent to blade mean camber line at trailing edge, $\delta^\circ = i + \phi - \theta$, deg
δ^*	Boundary layer displacement thickness, $\delta^* = \int_{\delta \ell y}^{\delta u y} \left(1 - \frac{V}{V_o}\right) dy$
θ	Turning angle, $\theta = \beta_1 - \beta_2$, deg
θ^*	Wake momentum-defect thickness, $\theta^* = \int_{\delta \ell y}^{\delta u y} \left(1 - \frac{V}{V_o}\right) \frac{V}{V_o} dy$
ν	Kinematic viscosity
ρ	Density
σ	Solidity, ratio of chord to spacing
ϕ	Camber angle, difference between tangent angles at leading and trailing edges, deg
$\bar{\omega}$	Total pressure loss coefficient
$\bar{\omega}^*$	Mass averaged total pressure loss coefficient
✓	Duplicated film - see Appendix III

Subscripts

AVE	Average
E	Experimental
H_2O	Water
Hg	Mercury
ℓ	Local

Subscripts

ly	Wake boundary from lower surface
o	Free stream
uy	Wake boundary layer from upper surface
1	Station at cascade inlet
2	Station at cascade exit
2D	Two-dimensional

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5. Lieblein, S. and W. H. Roudebush: Theoretical Loss Relations for Low-Speed, Two-Dimensional Cascade Flow. NACA Report TN3662, March, 1956.

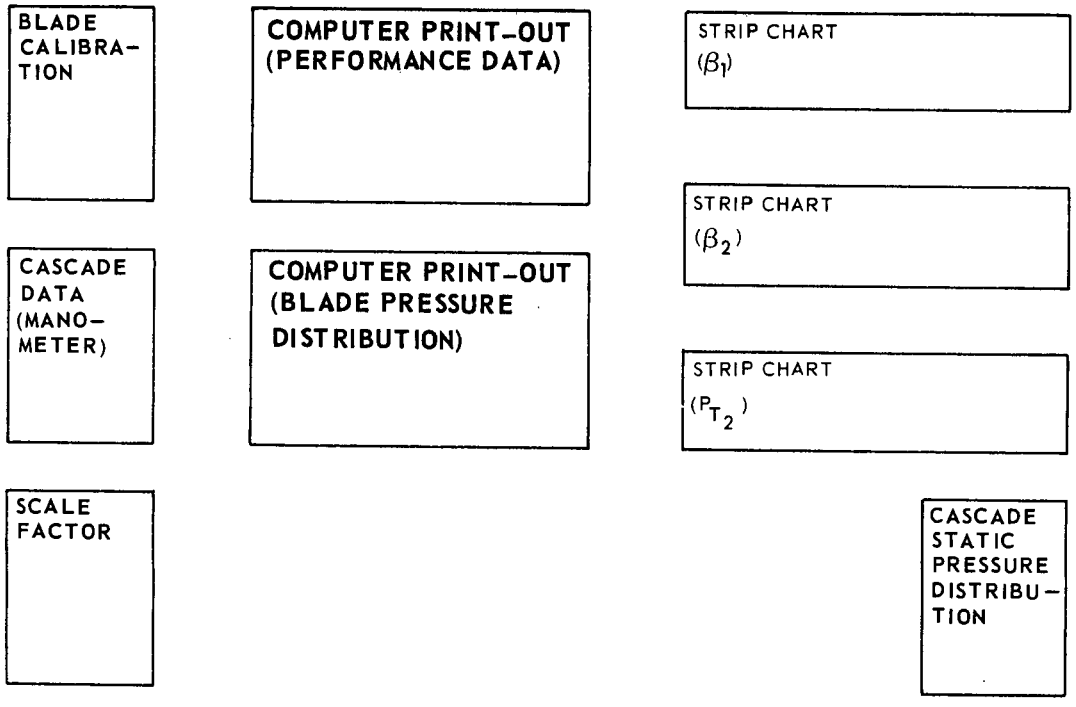

Figure 1. Organization of Data for Microfilming.