NASA Technical Memorandum 80166

AVRADCOM Technical Report 80-B-2

NASA-TM-80166 19800010756

A FLIGHT INVESTIGATION OF BLADE-SECTION AERODYNAMICS FOR A HELICOPTER MAIN ROTOR HAVING NLR-1T AIRFOIL SECTIONS

CHARLES E. K. MORRIS, JR., DARIENE D. STEVENS
AND ROBERT L. TOMAINE

JANUARY 1980

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665

U.S. ARMY AVRADCOM

aircraft (modified) airplane. The variable-wing sweep feature permitted
an evaluation of the supercritical wing in many configurations. The
primary emphasis was placed on the transonic Mach number region, which is
considered to be the principal air combat arena for fighter aircraft. An
agility study was undertaken to assess the maneuverability of the F-111A

ENTER:
35 1 1 RN/NASA-TM-80166

DISPLAY 35/2/1

80N19033*# ISSUE 10 PAGE 1230 CATEGORY 2 RPT#: NASA-TM-80166
AVRADCOM-TR-80-B-2 CNT#: DA PROJ. 1L2-62209-AH-76 80/01/00 194 PAGES
UNCLASSIFIED DOCUMENT

UTTL: A flight investigation of blade section aerodynamics for a helicopter main rotor having NLR-1T airfoil sections
AUTH: A/MORRIS, C. E. K., JR.; B/STEVENS, D. D.; C/TOMAINE, R. L.
CORP: National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. AVAIL.NTIS
SAP: HC A09/MF A01
COI: UNITED STATES Sponsored in part by AVRADCOM, St. Louis, Mo.
MAJS: /*AERODYNAMIC CHARACTERISTICS/*AH-1G HELICOPTER/*AIRFOILS/*ROTARY WINGS
MINS: / FLIGHT CHARACTERISTICS/ FLIGHT TESTS/ PRESSURE DISTRIBUTION/ ROTOR BLADES (TURBOMACHINERY)/ TEETERING
ABA: R.E.S.
ABS: A flight investigation was conducted using a teetering-rotor AH-1G helicopter to obtain data on the aerodynamic behavior of main-rotor blades with the NLR-1T blade section. The data system recorded blade-section aerodynamic pressures at 90 percent rotor radius as well as vehicle flight state, performance, and loads. The test envelope included hover, forward flight, and collective-fixed maneuvers. Data were obtained on apparent blade-vortex interactions, negative lift on the advancing blade in high-speed flight and wake interactions in hover. In many cases, good

ENTER:

no card

ck

A FLIGHT INVESTIGATION OF BLADE-SECTION AERODYNAMICS FOR A HELICOPTER MAIN ROTOR HAVING NLR-1T AIRFOIL SECTIONS

Charles E. K. Morris, Jr.
Dariene D. Stevens, and
Robert L. Tomaine

NASA Langley Research Center
Hampton, Virginia 23665

SUMMARY

A flight investigation has been conducted using a teetering-rotor helicopter to obtain data on the aerodynamic behavior of main-rotor blades with the NLR-1T blade section. The data system recorded blade-section aerodynamic pressures at 90-percent rotor radius, vehicle flight state, performance, and loads. The test envelope included hover, forward-flight speed sweeps from 35 to 85 m/sec (68 to 165 knots), and collective-fixed maneuvers at about 56 m/sec (109 knots).

Flight-test data were obtained on apparent blade-vortex interactions, negative lift on the advancing blade in high-speed level flight, wake interactions in hover, and other phenomena. In many cases, good agreement was achieved between chordwise pressure distributions measured in flight and those predicted by airfoil theory. Most comparisons were made for a high-speed, level-flight condition with no apparent indications of blade-vortex interactions.

INTRODUCTION

The continued development of airfoil technology offers the potential for improvements in the performance and loads characteristics of helicopter rotors (refs. 1 and 2). As indicated in references 3 to 11, methods of rotorcraft-airfoil design are still being improved. These methods are constrained by the assumption of two-dimensional, steady flow. In many parts of the typical helicopter operating envelope, blade sections are subjected to highly three-dimensional, unsteady flow (refs. 12 and 13). The degree of success with which rotorcraft-airfoil design technology can be applied depends on how well the airfoil design variables can be related to the complex flow environment of the rotor. Experimental studies on this topic are reported in references 8, 14, 15, and 16.

A flight investigation of rotor-airfoil characteristics has been conducted with a high-speed, teetering-rotor, AH-1G attack helicopter that used main-rotor blades with the NLR-1T airfoil. This airfoil was designed specifically to meet the rotorcraft-airfoil design criteria described in reference 4. The instrumented vehicle was flown in level flight up to 85 m/sec (165 knots) and in collective-fixed maneuvers at about .56 m/sec (109 knots). Data were obtained on performance, flight-state and control parameters, rotor loads and motions, and airfoil pressure distributions at 90-percent radius on one blade. Initial results of this investigation are presented in references 16 and 17. Detailed data on performance, loads, and blade motions for the NLR-1T blades are presented in reference 18. Baseline data for the same test vehicle with a standard, uninstrumented set of main-rotor blades are given in reference 19.

The NLR-1T flight-test program is complemented by other rotorcraft airfoil research. Wind-tunnel test data and analyses of the NLR-1 airfoil are given in references 6, 20, and 21. Flight-test data from other relevant rotorcraft research are presented in references 15 and 22 to 26. References 15 and 22 report on flight tests with new airfoil shapes gloved on blade tips; references 23, 24, and 25 contain results from AH-1G helicopter tests with instrumented standard blades. Relevant wind-tunnel tests of instrumented rotors are reported in references 27 and 28.

The purpose of this report is to present blade-section aerodynamic data for, and limited analysis of, significant flight-test conditions with the NLR-1T airfoil. That significance is determined in large part by the review of performance and loads data (ref. 18) obtained concurrently with the blade pressure data. The records of blade-section data in this report provide the basis for future analyses with other complementary data from references 18 and 24 or with results from computer programs for helicopter simulation. The data presented herein are intended to guide efforts to utilize the complete results.

SYMBOLS

Positive senses of some axes, angles and accelerations are presented in figure 1.

A_{0f} main-rotor collective pitch angle at 0.75R, commanded at swashplate, deg

A_{0s} main-rotor collective pitch angle at 0.75R, measured at blade grips, deg

$A_{0,tr}$ tail-rotor collective pitch angle, deg

A_{1f} main-rotor lateral pitch angle, commanded at swashplate, deg

A_{1s} first harmonic of main-rotor lateral pitch angle, measured at blade grip, deg

a speed of sound, m/sec

a_{1s} first harmonic of main-rotor longitudinal flapping with respect to the mast, deg

B_{1f} main-rotor longitudinal pitch angle, commanded at swashplate, deg

B_{1s} first harmonic of main-rotor longitudinal pitch angle, measured at blade grip, deg

b_{1s} first harmonic of main-rotor lateral flapping with respect to the mast, deg

C_L' vehicle load coefficient, $\frac{W n_z}{\rho \pi R^2 (\Omega R)^2}$

C_p airfoil pressure coefficient, $\frac{p - p_\infty}{q_\infty}$

C_p^* airfoil pressure coefficient corresponding to a local Mach number of 1.0

C_Q main-rotor mast torque coefficient, $\frac{Q}{\rho \pi R^3 (\Omega R)^2}$

c airfoil chord, m

c_c airfoil chord-force coefficient, pressure only,

$$\frac{1}{c}\int_{\text{thickness}} \left(C_{p,f} - C_{p,r}\right) dz$$

c_ℓ airfoil lift coefficient, section lift/(qc)

c_m airfoil pitching-moment coefficient about quarter chord, pressure

$$\frac{1}{c}\int_{\text{chord}} \left(C_{p,\ell} - C_{p,u}\right)\left(0.25 - \frac{x}{c}\right) dx + \frac{1}{c}\int_{\text{thickness}} \left(C_{p,f} - C_{p,r}\right)\frac{z}{c}\, dz$$

c_n airfoil normal-force coefficient $\frac{1}{c}\int_{\text{chord}} \left(C_{p,\ell} - C_{p,u}\right) dx$

F function (See eq. (C-2).)

F_c corrected function (See eq. (C-2).)

f frequency, Hz

f_{3db} frequency for 3 db amplitude attenuation, Hz

g acceleration due to gravity, 9.81 m/sec^2

$\dot{h}$ climb rate, m/sec

K	ratio of effective to actual cutoff frequency
K_n	constants for z-transform equation, $n = 1, 2, 3$ (See eq. (C-2).)
k_m	incremental angle for incremental airfoil pressure, deg/Pa (See eq. (B-2).)
M	local Mach number perpendicular to blade leading edge
M_h	reference blade-tip Mach number, $\frac{\Omega R}{a}$
m_1	data channel sensitivity, measured units/mV
m_2	slope representing PCM electronic response, mV/digital increment
n_x, n_y, n_z	orthogonal set of load factors for aircraft center of gravity, g units
p	local static pressure at a point on airfoil, P_a
p_f, q_f, r_f	orthogonal set of fuselage angular rate, rad/sec
p_∞	free-stream static pressure, P_a
Q	main-rotor mast torque, N-m
q_∞	free-stream dynamic pressure of blade section, P_a
R	blade radius, m (ft)
r	radial distance to blade element
s	Laplace operator
T	period between samples of same channel of multiplexed data system, sec
T_b	blade temperature on upper surface at $x/c = 0.6$ and $r/R = 0.9$, C
t	time, sec; also, airfoil thickness, m
t_d	delay time due to electronic-induced lag, sec
V	aircraft true airspeed or velocity, m/sec (knots)
W	aircraft gross weight, N
X,Y,Z	orthogonal set of aircraft body axes (See fig. 1.)
x	airfoil abscissa, positive rearward from leading edge, m

y	airfoil ordinate, positive upward, m
z	transformation variable (See eq. (C-2).)
α_c	rotor control-axis angle of attack, deg
α_e	effective airfoil angle of attack (See eq. (B-2).), deg
α_f	fuselage angle of attack, deg
β_f	fuselage angle of side-slip, deg
β_s	main-rotor, shaft-axis teeter angle, (where $\beta_s - a_0 - a_{1_s} \cos\psi - b_{1_s} \sin\psi$ ...) positive updard, deg
ΔD	digital increment above value for zero pressure, counts
Δh	hub height above ground
Δm_1	change in m_1 per change in pressure-sensor temperature, P_a/counts - C
Δp_o	change in indicated pressure per change in pressure-sensor temperature, P_a/C
Δp_t	change in p due to temperature effect, P_a
$\Delta\psi_d$	azimuthal lag due to electronic lag
θ_f	fuselage pitch attitude, deg
θ_s	main-rotor, shaft-axis blade pitch at 0.75R, (where $\theta_s = A_0 - A_{1_s} \cos\psi$ $B_{1_s} \sin\psi$ - ...), measured at blade grip, deg
μ	tip-speed ratio, $V/(\Omega R)$
ρ	mass density of air, kg/m^3
0_f	fuselage roll attitude, deg
ψ	main-rotor blade azimuth angle measured from downwind position in direction of rotor rotation. deg
Ω	main-rotor rotational speed, rad/sec
ω_c	cutoff frequency (See eq. (C-1).), Hz

Subscripts

a	above reference temperature
b	below reference temperature
c	mean line
f	forward surface
	lower surface
te	trailing edge
u	upper surface
5h	fifth harmonic value

EQUIPMENT AND PROCEDURES

Test Vehicle

The test vehicle was the instrumented AH-1G attack helicopter shown in figures 2 and 3. Physical characteristics of the vehicle are given in Table I. The teetering-hub main rotor was similar to the standard production configuration except for blade construction, airfoil section, and some structural-dynamic blade properties. Compared to standard blades, the NLR-1T blades did have identical planform, twist, and root-end fittings. However, the new blades were built with the NLR-1T airfoil contour from about 31-percent blade radius to the tip. One of these blades was instrumented to measure bending loads, internal temperatures, and aerodynamic pressures at one spanwise station. Details of blade design and other vehicle features may be found in reference 18.

Airfoil

The NLR-1 airfoil was developed to satisfy multiple design points derived for a helicopter rotor in hover, maneuvers, and high-speed flight. This work is described in references 4 and 6. Using hodograph-plane variables, a computer program produced a shock-free profile for the transonic design point (ref. 29). A program for analyzing airfoil aerodynamics in subcritical flow was then used to assess the effects of modifications to the initial contours. These modifications were aimed at satisfying the lower-speed design criteria of reference 4. The final shape was designated as the NLF7223-62 or, more simply, the NLR-1. The NLR-1T was obtained by truncating the NLR-1 at 99-percent chord to produce a finite-thickness trailing edge. NLR-1T coordinates are listed in Table II and presented graphically in figure 4. Noteworthy features are the far-forward location of the positive camber and the reflex camber at the trailing edge. Figure 5 presents a comparison of the nominal contour and the profile achieved at the spanwise location where pressure measurements were made.

Wind-tunnel data indicated that most of the aerodynamic objectives of the design were not met (refs. 6, 20, and 21). Maximum lift at a Mach number of 0.4 was limited to about c_l = 1.1 by trailing-edge separation. The drag-divergence Mach number at zero lift was determined to be approximately 0.84, about 0.01 below the design criterion. In contrast, the low-lift, low Mach number values of pitching-moment coefficient ranged from -0.01 to -0.02 which are within the design constraints.

Data System

Data from fuselage-mounted sensors were acquired with the Piloted Aircraft Data System (PADS) described in reference 19. These sensors measured flight-state parameters, control positions, and some rotor and engine parameters. Detail of the PADS sensor system are given in Table III. PADS electronics used a 10-bit data word, a sampling rate of 80 samples per second per channel, and pulse-code modulation (PCM) for digitization. PADS-PCM data channels were multiplexed and recorded on a single tape track.

Data from rotor-mounted sensors were processed by the digital Special Rotor Blade Instrumentation (SRBI) system of reference 30. This provided 30 channels with 8-bit data words (without parity) and a sampling rate of 1000 samples per second per channel. Data signals for rotor loads, teeter angle, blade pitch angle, blade azimuth angle, and canister temperature were processed in the mast-mounted canister shown in figure 6. This set of channels is described further in reference 18. Airfoil pressures were sensed by 13 pressure transducers located at 90 percent of rotor radius. Electronics mounted in the blade tip digitized and multiplexed signals for both the blade-section pressures and blade temperature. This data and the canister-processed data were merged and recorded on a single tape track. Photographs and a schematic of elements of the SRBI system are presented in figures 6 to 10. Some of the equipment used to perform a preflight blade-pressure calibration are shown in figure 11. Appendix A and Tables IV and V provide a more detailed description of the pressure data system.

Data Reduction

The pressure-transducer records were processed to produce local pressure and blade-section coefficients for every two degrees of azimuth within each selected rotor revolution. Corrected, dimensional values of local blade-section pressures were nondimensionalized with other data from the PADS and SRBI systems. These results were integrated (using the methods of ref. 31) to yield normal-force, chordwise-force, and pitching-moment coefficients. (Details of the data reduction are given in Appendices B and C). The standard data-reduction process also yielded loads data for the same rotor revolution (ref. 18).

Flight-Test Procedures

Flight tests were conducted to obtain data in straight and level flight and in maneuvers. Steady, level-flight speed sweeps were accomplished, usually in 5 m/s (10 knot) increments, from about 35 to 85 m/s (68 to 165 knots). This range of speeds corresponds to tip-speed ratios from about 0.15 to 0.37. Maneuvers were flown with a nominal tip-speed ratio of 0.25 and with the collective pitch set for trim at that speed. The corresponding airspeed is 56 m/sec (109 knots). The symmetrical pull-ups and constant-airspeed descending turns were flown with normal-load factors up to 2.3. The tests also include representative periods of hover and of linear climb and descent.

Emphasis was placed on achieving well-controlled, standardized test-point conditions to allow direct comparison between data sets for the different experimental rotors. Operating rotor speed and longitudinal center of gravity were maintained very close to nominal values and the external configuration of the aircraft was kept the same for the tests of all three experimental blade sets (ref. 16). Data were acquired only when air turbulence levels were acceptably low.

DISCUSSION OF RESULTS

Aerodynamic blade-section data are presented in figures 12 through 49 and in Appendices D and E. Table VI provides a guide to test-point conditions for the data in the appendices. Analysis of the data presented is limited to providing a suitable background for detailed analyses and comparative studies. The topics for the following discussion include: data interpretation; results for level flight, hover, and maneuvers; and a comparison of flight data with calculated results from airfoil theory.

The interpretation of the blade-section data should be guided by several considerations. First, test conditions were limited; the disk loading was low, and the maneuvers were flown at one target airspeed. Second, pressure coefficients are the most accurate form of blade-section data for any test point. Normal-force and pitching-moment coefficients required additional data reduction and are most useful on a comparative basis to guide detailed analysis of the pressure distributions. Third, the accuracy of each type of blade-section coefficient data is a complex function of azimuth position, tip-speed ratio and other test-condition parameters (Appendices B and C).

Another important consideration is the steadiness of a test-point condition and its effect on the data. Steadiness is significant because each set of data is unique for a single rotor revolution. There was no averaging of results for a series of revolutions. Figure 12 shows that pressure histories appear to be highly repetitive for level flight. Figure 13 confirms this with a comparison of airfoil coefficient data for several rotor revolutions. The data of figures 14 and 15 show that descending turns produce repetitive, periodic records, whereas the wave forms change as a function of time for symmetrical pull-ups.

The loads and performance data acquired concurrently in the same flight investigation (ref. 18) can be used to guide the study of the test results on blade-section aerodynamics. At each selected test point, all types of rotor data (rotor loads and aerodynamics included) were fully reduced, and listings were generated. Many of the data points of reference 18 have complementary sets of blade-section data listed in Appendices D and E.

Level Flight

Typical conditions. - Level flight data are reviewed first by concentrating on results for three values of tip-speed ratio achieved in one speed-sweep flight. Figure 16 presents a comparison of the behavior of both normal force and pitching moment through the full range of rotor azimuth. (The product of an airfoil coefficient and Mach number squared is directly proportional to the dimensional load acting on the blade section.) The significantly different patterns of loads at the three flight conditions are produced by different phenomena. The abrupt changes in C_nM^2 at $\psi = 70^o$ and 270^o for $\mu = 0.15$ indicate blade-vortex interactions similar to those of references 24 and 32. The major changes in both C_nM^2 and C_mM^2 near $\psi = 90^o$ or $\mu = 0.37$ indicate the significant effect of compressibility on the advancing blade.

More details of blade-section behavior are evident in the pressure-coefficient data of figure 17. Results for $\mu = 0.15$ show the strong influence of apparent blade-vortex interactions by the fluctuations of pressure coefficients near the leading edge (refs. 25, 33, and 34). The magnitude of these fluctuations in the first quadrant appear relatively small because the local pressure is nondimensionalized by a larger value of local dynamic pressure. Data for the intermediate-speed case also show that most of the variation in pressure coefficient occurs in the front of the blade section (fig. 17(b)). The high-speed data of figure 17(c) give clear examples of compressibility effects in the records for both upper and lower surfaces. The most prominent compressibility feature is the upper-surface pressure peak for 2-percent chord at an azimuth angle of about 230^o.

The relationship between the compressibility features and supercritical flow is illustrated in figure 18. This figure presents some details of data for the high-speed case of figure 17(c). Chordwise pressure distributions for two azimuth positions are given in figures 18(a) and (b); pressure-coefficient records for two transducers are given in figure 18(c). The points labeled A and B in figure 18(c) are cited as being effected by supercritical flow. The corresponding points in the pressure distributions substantiate this. (The local pressure coefficients are more negative than that for sonic flow.)

The relative significance of the local supercritical flow is suggested in the calculated supersonic-flow boundaries of figure 19. Figure 19(a) corresponds to the flow conditions of figure 18(a) and shows substantial regions of supercritical flow. Figure 19(b) corresponds to the flow conditions of figure 18(b); it indicates that the small supercritical-flow region for the high-lift coefficient case is probably insignificant, even though it produces a prominent peak in figure 18(c).

Speed-sweep results. - The change in character of blade-section aerodynamic characteristics during a speed sweep is illustrated by the data of figure 20. (As noted before, the nondimensionalizing factors for the coefficient data are themselves functions of azimuth, and variation of blade-section Mach number with blade azimuth also changes with tip-speed ratio.). The data show the following trends:

1. Typical results of apparent blade-vortex interaction are clearly observable at the lowest tip-speed ratios. These are apparent in the data for both normal-force and pressure coefficients.

2. Negative normal-force and, consequently, negative lift are generated in the second quadrant at 90-percent rotor radius for tip-speed ratios above approximately 0.3. This means that two significant vortices should trail from the outer part of the blade: the one from the downloaded tip could be ingested into the top of the first quadrant of the rotor disk.

3. Supercritical pressure peaks appear at high tip-speed ratios at the leading edge: in the third quadrant on the upper surface (fig. 20(c)) and the second quadrant on the lower surface (fig. 20(d)).

Variations of blade-section airfoil coefficients with local Mach number are presented for several tip-speed ratios in figures 21 and 22. The local Mach number due solely to blade rotation at 90-percent rotor radius is about 0.63 for this data. Apparent blade-vortex interactions are evident at about M = 0.5 for the lowest tip-speed ratios. At moderate-to-high values of tip-speed ratio, the traces of normal-force coefficient and Mach number form a characteristic, double-looped shape. The pitching-moment coefficients also produce a characteristic shape: retreating-blade flow produces a small loop or series of loops at about $c_m = 0.0$ at the lowest Mach numbers and a second large loop shows a wide range of moment-coefficient values at the highest Mach numbers. Figure 22 indicates the envelope of the measured operating conditions for the instrumented blade section during one speed sweep.

Rotor disk loading. - Representative data in figure 23 show the expected effect of variations in rotor disk loading. Decreased levels of vehicle load coefficient result in decreased levels of normal-force coefficient at 90-percent rotor radius. The largest decreases appear at the low-speed, retreating-blade side of the disk. The high-speed data show some significant changes in pitching-moment coefficient for the advancing-blade side of the disk.

Hover, Descents, Turns, and Pull-ups

Flight data for test conditions other than level flight are reviewed briefly. The data are intended to illustrate trends and identify regions of interest.

Hover. - Representative hover data are presented in figures 24 through 27. Figure 25 shows the typical fourth-quadrant disturbances that can be attributed to tail-rotor effects. Test-point steadiness can be considered with the data of figure 26; some effects of rotor thrust and trim are shown in figure 27. All of the figures demonstrate that very slight winds, typical trim variations, and tail-rotor effects can produce significant variations from the perfectly steady conditions assumed in most hovering-rotor analyses.

Descent. - Some data for descent conditions are shown in figure 28. These data indicate that the change from level flight to descent affects not only the level of blade-section normal-force required, but also the severity of blade-vortex interactions.

Maneuvers. - Most of the data on blade-section aerodynamics for maneuvering flight were obtained near μ = 0.25 and are presented with reference data for level flight. Figures 29 and 30 have typical level-flight data in the figure formats which will be used for subsequent data presentation. Those level flight conditions are chosen as reference conditions because the maneuver data were obtained at approximately the same tip-speed ratios and have the same variation of Mach number with blade azimuth position.

Data for descending turns are given in figures 14 and 31 to 34. Figure 32 shows that more normal force (at 90-percent radius and most azimuth angles) is required in the turn than level flight. The numerous inflection points in the first-quadrant left-turn data indicate apparent blade-vortex interactions. Another point of interest in figures 32 and 34 is the reduction in the second-quadrant amplitude of pitching moments at conditions for higher values of vehicle load coefficient. This agrees with observations (ref. 18) that vibration levels could actually decrease with increased load factor during some maneuvers.

Data on symmetrical pull-ups are presented in figures 15 and 35 through 39. The data of figure 39 show that achievement of the test point requires a significant increase in blade-section normal forces over those for level flight; the data also show that blade-section operating conditions have changed noticeably from the pull-up test point to a point occurring later in the maneuver.

Figure 40 presents maneuver data for test points that did not meet the standard criteria for test-point condition. These data illustrate the extent to which the coefficients for left and right turns can differ at lower tip-speed ratios. Substantial amounts of supercritical flow are indicated.

Comparison of Flight Data With Theory and Wind-Tunnel Data

The effect of the rotor environment on blade-section aerodynamics can be studied by comparing flight data with both wind-tunnel data and theory for airfoils in two-dimensional, steady flow. The wind-tunnel data used herein was obtained from reference 20. Additional unpublished data are also used. The Reynolds numbers for both wind-tunnel tests were close to those for flight. The theoretical results were obtained with the transonic airfoil-analysis program described in reference 35. Appendix F provides details of this application of the computer program. The comparisons are developed using both airfoil coefficients and pressure distributions.

Comparisons of airfoil pitching moment based on three level-flight conditions are presented in figures 41 and 42. Values of pitching-moment coefficient for flight, wind-tunnel test, or theory are based on common conditions of Mach number and normal-force coefficient. The scale of the moment data has sufficiently fine increments to show clearly the small, but potentially significant differences in the curves. These differences can be attributed to several causes: rotor-flow effects in the flight data; accuracy of the two-dimensional, steady-flow tunnel data; limitations of the airfoil theory; and the combined effects of accuracy and precision in the comparisons. These figures demonstrate that both force and moment characteristics for blade sections in a real rotor environment cannot be predicted to a high degree of accuracy using airfoil data obtained under simplified flow conditions.

Data for the high-speed case of figure 42 were selected for further consideration. Details of the data for that flight data are given in the listings for run 11 of flight 63 in Appendices D and E. This flight point was selected as having both a wide range of flow conditions and minimal indications of blade-vortex interactions.

Comparisons of chordwise pressure distributions for flight, wind-tunnel, and theory are given in figure 43. The wind-tunnel data for this figure consist of unpublished, absolute-pressure measurements (which allow a more meaningful comparison). The agreement between the flight and the wind-tunnel results appears good for the three cases considered. The agreement between flight data and theory is generally good except for figure 43(b); in that comparison, the most prominent difference is the strength and location of the upper-surface shock. In addition, figure 43 shows that small differences in the pressure distributions, primarily in the leading-edge and trailing-edge region, may contribute much to the differences in pitching-moment coefficient between flight data and theory.

The comparison of flight measured pressure distributions with theory may be extended over a wider range than with wind-tunnel data since theoretical methods allow a better matching of the flight Mach number and lift. Figure 44 presents comparisons between flight data and airfoil theory (ref. 35) at numerous blade azimuth angles for run 11 of flight 63. In most cases, the agreement is very good. Poorer agreement occurs between $\psi = 50^{\circ}$ and 80° and between $\psi = 130^{\circ}$ and 140°. At the lower azimuth angles, theory overpredicts the strength of lower surface suction peak and predicts a strong upper-surface shock evident in the flight data. At $\psi = 140^{\circ}$, the lower-surface agreement of theory with flight data is comparatively poor at 20-and 50-percent chord.

Figures 45 through 49 present the results of several brief studies of factors that could influence agreement between flight data and the theoretical predictions. Figure 45 indicates that prediction of the upper-surface shock location is not a problem at $\psi = 70^{\circ}$ until the aircraft reaches $\mu = 0.33$. Studies of the $\mu = 0.37$ case examined the effects of airfoil contour definition on the theoretical pressure distributions. Typical results (fig. 46) indicate only that the program is very sensitive to the smoothness of input airfoil coordinates. Even with evaluations at other test conditions, no further conclusions could be drawn about the effect of contour tolerences. Next, the computer program was modified to account for yawed flow by the appropriate thinning of the airfoil section and an increase of the free-stream Mach number. As indicated in figure 47, this simplified method produced a negligible change at $\psi = 70^{\circ}$. Results of similar computer-program studies for $\psi = 140^{\circ}$ are presented in figures 48 and 49. Other, unillustrated results showed no significant improvement in pressure-distribution agreement at $\psi = 70^{0}$ and 140^{0} when the computer-program inputs were altered to account for accuracy limitations in the Mach numbers, normal-force coefficients, and other relevant parameters of the flight data.

Pressure distributions may also be affected by phenomena that are beyond the scope of this report. Blade boundary-layer complexities, such as separation and rotor-wake effects could be important. Another relevant phenomenon is the unsteady Mach number effect cited in reference 36. The more complex treatment of three-dimensional transonic flow in reference 37 suggests another potentially significant effect.

In general, the present study indicates that viscous two-dimensional transonic airfoil theory for steady flow yields a good approximation of blade-section pressure distributions provided that the operating conditions (Mach number and either lift, normal force, or angle of attack) are well defined, and that local blade-vortex interactions are minimal.

CONCLUDING REMARKS

A flight investigation has been conducted with a teetering-rotor helicopter to obtain data on the aerodynamic behavior of main-rotor blades having the section contour of the NLR-1T airfoil. Chordwise pressure distributions at 90-percent rotor radius and the flight state of the rotor were measured.

Results show a wide variety of aerodynamic operating conditions for the instrumented blade section. Data are presented on apparent blade-vortex interactions, blade-section negative lift at high Mach numbers, and a variety of compressibility effects. Good agreement was achieved between most pressure distributions from flight and those from theory that assumes steady, two-dimensional, viscous, transonic flow. The primary comparisons were limited to a flight condition with no obvious effects of blade-vortex interaction or unsteady effects. Apparent blade-vortex interactions affected the measured chordwise pressure distributions by introducing disturbances that were significant over the forward portion of the blade section.

APPENDIX A. - SRBI PRESSURE DATA SYSTEM

Sensors and Installation

Each of the 13 pressure transducers was mounted to give accurate readings of aerodynamic pressure at a point on the surface of the instrumented blade. The sensing element of each absolute-pressure transducer consisted of a very short, strain-gauged, sealed can with a 0.64-cm diameter; the can was bonded to a plate. As indicated in figure 7, two posts that projected from the inner surface of the cover plate located and secured both the transducer plate and rubber mounting pad. Mounting pads and spacers for the posts were adjusted to hold the transducer assembly without transmitting structural loads. (This was verified in the blade loads calibration). The cover plates were secured and the cavities sealed so that the transducer responded only to external pressure applied through a 0.8-mm orifice in each cover plate. The surface at 90-percent rotor radius was then faired and smoothed before the contour was measured. Tests on sample blade segments indicated that local pressures, in the range measured in flight, produced no measurable local deformation. Typical transducer installations are shown in figures 8 and 9.

The frequency response of the typical installed transducer was flat within 0.6 percent of the excitation pressure level up to 200-Hz frequency. The uninstalled transducer had a resonant frequency of about 23,000 Hz. Each transducer was tested as installed because the shape and volume of the cavities were not identical. Results showed that the value of resonant frequency for the installed units ranged between 800 and 900 Hz.

Temperature and acceleration effects were also evaluated. Transducer installation, which oriented diaphragm approximately parallel to the rotor disk, reduced centrifugal and Coriolis effects to negligible levels. Laboratory tests showed that steady-state acceleration perpendicular to the diaphragm produced less than 10 Pa response per g unit. Flight tests with transducers in competely sealed cavities indicated that all acceleration and vibration components produced negligible effects on the pressure data. Laboratory calibrations determined values for temperature sensitivity and zero shifts for each transducer. Blade temperature was measured in the pressure-transducer cavity at 60-percent chord on the upper surface. An exploratory flight was made with a second thermistor temporarily located on the upper surface at 10-percent chord; the resulting data indicated that the standard, rearward sensor gave reasonable values. The temperature sensed at 60-percent chord was utilized subsequently in applying corrections for all blade sensors. Although sources of viscous heating, convective cooling, and structural heating could not be uniformly distributed, blade temperature gradients appeared to be mild; possibly this was due to the conductivity of the aluminum substructure and the insulating properties of the covering honeycomb and fiberglass.

Pressure-Data Electronics

SRBI signal conditioning for the pressure and blade temperature sensors was located on an electronics board mounted in a cavity on the lower surface at the blade tip (fig. 11.) Short leads carried the analog pressure-data signals from each sensor to the pressure-data electronics. The electronics produced multiplexed PCM signals that were sent to a terminal at the blade root and from there to the mast-mounted canister. The proper airfoil coordinates were maintained by fairing in the electronics-board cover plate and routing all leads beneath the honeycomb.

Preflight Calibration

Both pressure and temperature sensors were laboratory calibrated, and the entire pressure system was calibrated before each flight. The fixture shown in figure 11 was clamped over the 90-percent blade radius prior to each flight. Three levels of pressure were applied: ambient, 96.53 kPa (14.00 psi) and 62.05 kPa (9.00 psi). Pressure was measured by a gauge located in series with the vacuum pump; suction was applied simultaneously to all cavities through manifolds in each block of the fixture. Flexible sealing material on each block assured an adequately tight fit. Static check-calibrations gave highly linear, repeatable results. Each preflight calibration determined the sensitivites and zeros for the pressure system for that flight.

APPENDIX B. - PRESSURE DATA REDUCTION

The data-reduction process operated on all of the data obtained for each designated test-point time. A computer program processed all the flight data. First it reduced flight-state and other data from the PADS records for one point in time; it then reduced data for blade-section aerodynamics and blade loads for the rotor revolution containing that time. Many of the data sets of reference 18 provide results for test points listed in this report.

Values of corrected, dimensional pressure were computed for each pressure transducer for every two degrees of rotor azimuth. Temperature effects were corrected by the method of reference 30 and using the constants given in Table V. The time for each channel was incremented to account for multiplexing. Time was also adjusted for the lag introduced by the response dynamics of the pressure system (Appendix C and Table V). Simultaneous sets of pressure data for all 13 transducers were computed by using linear interpolation between the measured, corrected data points.

These data were converted to nondimensional pressure coefficients. Rotor azimuth and rotational speed were required from SRBI data; true airspeed, air density, and static pressure were obtained from PADS data. The nondimensionalizing values of blade-section dynamic pressure were calculated for the flow component normal to the blade leading edge; yawed flow was not considered. The accuracy of the resulting pressure coefficients varies with rotor azimuth and tip-speed ratio, both of which affect local dynamic pressure.

Airfoil force and moment coefficents were obtained using the integration methods of reference 31. The set of required inputs for those methods consists of the pressure-coefficient values, locations of the pressure orifices, Mach number, trailing-edge pressure coefficient, and leading-edge stagnation point. Empirical relationships for the latter two items were developed with wind-tunnel data, such as from reference 20, and with results from airfoil-analysis computer programs of references 35 and 38. The required value of trailing-edge pressure coefficient was computed from the following empirical equation:

$$C_{p,te} = 0.1 + 0.25M \qquad \text{(B-1)}$$

As in reference 31, stagnation point was determined as a function of effective angle of attack. That angle was calculated as a function of Mach number and differential-pressure coefficient for 10-percent chord as follows:

$$\alpha_e = -1.84^{\circ} + 1.26\,M + k_m\,(C_{p,\ell} - C_{p,u})\Big|_{\frac{x}{c} = 0.10} \qquad \text{(B-2)}$$

where k_m, a function of Mach number, is simply related to lift-curve slope. (This empirical expression reflects the utilization of available data.).

Tables were used to compute values of x/c and y/c associated with the effective angle of attack. Figure 50 presents plots of these tabulated values.

Some effects of the curve-fit and integration method of reference 31 can be observed in figure 51. The automated curve-fit method operated with values of $C_p \sqrt{x/c}$ given as function of $\sqrt{x/c}$. Figure 51 presents sample cases of flight data with the computer-generated curve fits for both the new and a conventional coordinate system. The area between the upper- and lower-surface curves for either plot is equivalent to normal-force coefficient. The method of reference 31 has the advantage of achieving a good fit for steep suction peaks at the airfoil leading-edge (fig. 51(d)). In some cases, such as shown in figure 51(a), the low number of pressure transducers may have degraded the potential for accurate pressure-field representation with the curve-fit routine.

APPENDIX C. - CORRECTIONS FOR THE DYNAMIC-RESPONSE CHARACTERISTICS OF THE PRESSURE-DATA SYSTEM

Dynamic-response characteristics of the SRBI pressure-data system produced some distortions in the data records. As in most systems, the primary criterion for judging these characteristics is the 3db or cutoff frequency (the frequency of a sinusoidal input signal which produces 3db attenuation). Although reference 30 indicated that the cutoff frequency was 200 Hz for pressure data, the actual values were determined to be less (Table V). Various correction techniques were evaluated, and the frequency content of the data records was reviewed. As a result, a simple time-lag correction was determined to be appropriate.

Initially, the z-transform method was evaluated because it was the most promising means of correcting both phase and amplitude effects on the digital records (ref. 39). A first-order interpolator, representing the digital sampling of a continuous system, was combined with a compensating network to yield the following Laplace equation:

$$\frac{\text{Output}}{\text{input}} = \frac{e^{sT}}{T}\left(\frac{1 - e^{sT}}{s}\right)^2 \left(\frac{s + \omega_c}{\omega_c}\right)\left(\frac{K\omega_c}{s + K\omega_c}\right) \qquad \text{(C-1)}$$

where T is the sampling increment in seconds, ω_c is the cutoff frequency, and K is the ratio of effective to actual cutoff frequency. When the substitution of $z = e^{sT}$ is made, the time-domain result is given as:

$$F_c(t) = \frac{K_1}{TK\omega_c}\,F(t) + \frac{K_2}{TK\omega_c}\,F(t - 1) + K_3\,F_c(t - 1) \qquad \text{(C-2)}$$

where t is time, F and F_c are uncorrected and corrected responses, respectively, and the other constants are:

$$K_1 = K (1 - K_3 + T\omega_c) - 1 + K_3$$

$$K_2 = K (K_3 - 1 - T\omega_c K_3) + 1 - K_3$$

$$K_3 = e^{-K\omega_c T}$$

This approach was evaluated with an input function of a unit-amplitude cosine wave with frequencies between 10 and 200 Hz. The output functions were harmonically analyzed, and the resulting coefficients are shown in figure 52. The solid line is the adjustment required if the system was purely analog. The zero-order hold method over-compensated, but the first-order hold version of the Markel method (ref. 39) appeared to give good results.

Processing of data for selected time segments led to the selection of a simple lag correction. Figure 53 presents fairly active data records with and without processing by a z-transform compensating network; that figure also permits a comparison between the compensated data and a 12-harmonic reconstitution of that curve. The results of this and other studies show that the frequency content of the data is not sufficiently high to warrant more than a lag correction. Such a correction is consistent with the constant-delay analog filters used in the SRBI pressure system.

The delay time for each channel was calculated with the following equation:

$$t_d = -(2\pi f)^{-1} \tan^{-1}(f/f_{3db}) \qquad \text{(C-3)}$$

where f is the input frequency, f_{3db} is the cutoff frequency and the arc tangent is expressed in radians. The resulting values are given Table V. The phase angle shift may also be expressed as a function of harmonic frequency for the test-vehicle rotor. Figure 54 presents a comparison between results for the constant-delay approximation used in data reduction and the delay of equation (C-2).

APPENDIX D. - AIRFOIL PRESSURE COEFFICIENT DATA

Computer-generated listings of airfoil pressure coefficient data are identified in terms of flight number, run number, and time. Also given are tip-speed ratio (MU), vehicle load coefficient (CLP), and blade temperature (TEMP(U60)). One column of pressure coefficient data is given for each pressure orifice location, as designated by a value of x/c (X/C). No value is given for the 35-percent-chord, upper-surface location due to instrumentation lead problems.

The data of Table VI serves as a guide for the contents of this appendix.

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/10/12.

FLT 61 RUN 268 TIME 55556.200 MU= 0.000 CLP= .00339 TEMP(U60)= 12.7 C = 54.82 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
0.	-.331	-.772	-.490		-.292	-.258	-.125	.060	.214	.018	-.056	-.079	-.038	-.036
2.	-.328	-.761	-.488		-.292	-.258	-.125	.065	.211	.018	-.063	-.086	-.038	-.040
4.	-.313	-.761	-.489		-.291	-.259	-.131	.067	.194	.016	-.072	-.089	-.038	-.048
6.	-.301	-.761	-.488		-.291	-.259	-.138	.062	.180	.002	-.077	-.096	-.045	-.048
8.	-.297	-.761	-.486		-.290	-.268	-.138	.062	.176	-.000	-.083	-.098	-.048	-.048
10.	-.282	-.761	-.488		-.290	-.273	-.138	.063	.163	-.013	-.085	-.098	-.049	-.049
12.	-.272	-.761	-.490		-.300	-.273	-.138	.063	.163	-.013	-.085	-.098	-.049	-.049
14.	-.266	-.762	-.490		-.304	-.272	-.138	.068	.162	-.014	-.088	-.099	-.048	-.048
16.	-.257	-.761	-.488		-.304	-.272	-.138	.070	.163	-.013	-.088	-.099	-.048	-.047
18.	-.257	-.769	-.490		-.302	-.273	-.138	.073	.156	-.013	-.085	-.108	-.048	-.048
20.	-.257	-.776	-.490		-.292	-.272	-.138	.071	.145	-.014	-.088	-.099	-.048	-.048
22.	-.257	-.776	-.491		-.304	-.272	-.138	.070	.145	-.014	-.088	-.099	-.048	-.047
24.	-.257	-.776	-.502		-.304	-.272	-.138	.070	.145	-.014	-.088	-.108	-.048	-.047
26.	-.249	-.776	-.502		-.304	-.272	-.138	.070	.145	-.014	-.088	-.108	-.048	-.047
28.	-.242	-.776	-.501		-.304	-.285	-.138	.070	.145	-.014	-.088	-.108	-.048	-.047
30.	-.251	-.786	-.500		-.304	-.272	-.138	.070	.146	-.013	-.088	-.108	-.048	-.047
32.	-.257	-.790	-.501		-.303	-.273	-.138	.073	.145	-.013	-.085	-.108	-.048	-.048
34.	-.257	-.789	-.499		-.304	-.272	-.138	.071	.146	-.013	-.087	-.108	-.048	-.048
36.	-.257	-.789	-.500		-.302	-.275	-.138	.074	.157	-.013	-.085	-.108	-.049	-.048
38.	-.257	-.790	-.501		-.303	-.286	-.138	.074	.151	-.013	-.086	-.108	-.048	-.049
40.	-.257	-.789	-.500		-.303	-.286	-.138	.070	.146	-.013	-.087	-.108	-.048	-.047
42.	-.257	-.803	-.506		-.303	-.286	-.138	.074	.145	-.013	-.086	-.108	-.048	-.049
44.	-.257	-.804	-.513		-.308	-.286	-.138	.070	.159	-.014	-.088	-.108	-.048	-.047
46.	-.257	-.804	-.513		-.312	-.286	-.138	.070	.162	-.014	-.088	-.108	-.048	-.047
48.	-.257	-.804	-.512		-.308	-.286	-.138	.070	.162	-.014	-.088	-.108	-.048	-.047
50.	-.271	-.818	-.512		-.311	-.286	-.138	.071	.178	-.013	-.087	-.108	-.048	-.047
52.	-.272	-.819	-.520		-.308	-.286	-.138	.073	.180	.000	-.081	-.108	-.048	-.048
54.	-.287	-.832	-.525		-.316	-.286	-.138	.070	.180	.002	-.077	-.108	-.048	-.047
56.	-.287	-.832	-.525		-.316	-.286	-.138	.070	.180	.002	-.077	-.108	-.048	-.050
58.	-.288	-.834	-.525		-.316	-.286	-.138	.070	.197	.002	-.077	-.108	-.048	-.059

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/10/12.

FLT 61 RUN 26B TIME 55556.200 MU= 0.000 CLF= .00339 TEMP(U60)= 12.7 C = 54.82 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
60.	-.301	-.846	-.525		-.316	-.286	-.138	.070	.197	.002	-.077	-.108	-.048	-.059
62.	-.301	-.846	-.525		-.316	-.286	-.138	.070	.197	.002	-.077	-.108	-.048	-.059
64.	-.304	-.846	-.525		-.316	-.286	-.138	.070	.197	.002	-.077	-.108	-.048	-.059
66.	-.316	-.850	-.534		-.316	-.286	-.138	.070	.199	.004	-.077	-.108	-.048	-.059
68.	-.316	-.860	-.536		-.316	-.286	-.138	.070	.214	.018	-.077	-.108	-.048	-.059
70.	-.320	-.860	-.536		-.316	-.286	-.138	.070	.214	.018	-.077	-.108	-.048	-.059
72.	-.331	-.865	-.536		-.316	-.286	-.138	.070	.218	.018	-.077	-.108	-.048	-.059
74.	-.336	-.874	-.536		-.316	-.286	-.138	.070	.231	.018	-.077	-.108	-.048	-.059
76.	-.346	-.880	-.547		-.316	-.286	-.138	.070	.236	.022	-.077	-.108	-.048	-.059
78.	-.351	-.888	-.548		-.316	-.286	-.145	.070	.248	.033	-.077	-.108	-.048	-.059
80.	-.361	-.888	-.548		-.316	-.286	-.142	.070	.248	.033	-.077	-.108	-.048	-.059
82.	-.367	-.888	-.548		-.316	-.286	-.138	.070	.255	.033	-.067	-.108	-.048	-.059
84.	-.382	-.883	-.548		-.328	-.286	-.138	.070	.272	.039	-.067	-.108	-.048	-.059
86.	-.397	-.888	-.548		-.317	-.286	-.138	.070	.282	.049	-.056	-.099	-.048	-.059
88.	-.412	-.888	-.546		-.316	-.286	-.138	.070	.291	.056	-.056	-.099	-.048	-.059
90.	-.428	-.907	-.548		-.327	-.286	-.138	.073	.308	.065	-.053	-.098	-.049	-.068
92.	-.443	-.916	-.548		-.328	-.286	-.138	.071	.335	.073	-.056	-.099	-.048	-.071
94.	-.467	-.926	-.560		-.327	-.286	-.138	.073	.351	.080	-.052	-.098	-.049	-.071
96.	-.498	-.930	-.560		-.327	-.286	-.138	.071	.361	.080	-.045	-.099	-.048	-.071
98.	-.518	-.942	-.560		-.316	-.286	-.138	.070	.379	.089	-.043	-.099	-.048	-.070
100.	-.534	-.944	-.563		-.316	-.286	-.138	.070	.397	.105	-.035	-.099	-.048	-.060
102.	-.560	-.956	-.571		-.316	-.286	-.138	.070	.414	.111	-.032	-.096	-.048	-.069
104.	-.579	-.971	-.571		-.319	-.286	-.138	.070	.432	.122	-.024	-.089	-.046	-.060
106.	-.606	-.985	-.570		-.329	-.286	-.138	.070	.450	.126	-.024	-.089	-.038	-.070
108.	-.636	-1.000	-.570		-.328	-.286	-.138	.071	.468	.139	-.019	-.089	-.038	-.059
110.	-.654	-1.001	-.577		-.327	-.286	-.138	.073	.471	.142	-.011	-.089	-.038	-.072
112.	-.683	-1.001	-.583		-.329	-.286	-.138	.070	.485	.155	-.009	-.089	-.038	-.070
114.	-.699	-1.015	-.583		-.329	-.286	-.138	.070	.488	.157	-.002	-.089	-.038	-.070
116.	-.700	-1.016	-.583		-.329	-.286	-.138	.070	.504	.157	-.002	-.089	-.038	-.070
118.	-.715	-1.029	-.583		-.329	-.286	-.138	.070	.505	.157	.003	-.089	-.038	-.070

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/10/12.

FLT 61 RUN 26B TIME 55556.200 MU= 0.000 CLP= .00339 TEMP(U60)= 12.7 C = 54.82 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
120.	-.730	-1.031	-.583		-.329	-.286	-.138	.070	.505	.172	.008	-.084	-.038	-.070
122.	-.745	-1.043	-.590		-.329	-.286	-.138	.070	.505	.173	.008	-.079	-.038	-.070
124.	-.746	-1.043	-.595		-.329	-.286	-.138	.070	.506	.173	.008	-.079	-.038	-.070
126.	-.761	-1.046	-.595		-.329	-.286	-.138	.070	.522	.173	.008	-.079	-.038	-.070
128.	-.774	-1.057	-.595		-.329	-.286	-.138	.070	.522	.173	.008	-.079	-.038	-.070
130.	-.774	-1.057	-.595		-.329	-.286	-.138	.070	.522	.173	.008	-.079	-.038	-.070
132.	-.774	-1.057	-.595		-.329	-.286	-.138	.070	.522	.175	.016	-.079	-.038	-.070
134.	-.778	-1.062	-.595		-.329	-.286	-.138	.070	.522	.189	.019	-.072	-.038	-.070
136.	-.793	-1.071	-.595		-.329	-.286	-.138	.070	.526	.189	.019	-.070	-.038	-.070
138.	-.804	-1.071	-.595		-.329	-.286	-.138	.070	.540	.189	.019	-.070	-.038	-.070
140.	-.804	-1.071	-.595		-.329	-.286	-.138	.070	.540	.189	.019	-.070	-.038	-.065
142.	-.809	-1.071	-.595		-.329	-.286	-.138	.070	.534	.189	.019	-.070	-.038	-.059
144.	-.818	-1.071	-.595		-.318	-.286	-.138	.070	.522	.189	.019	-.070	-.038	-.065
146.	-.818	-1.071	-.595		-.316	-.274	-.138	.070	.522	.189	.019	-.070	-.038	-.064
148.	-.818	-1.071	-.595		-.316	-.272	-.138	.070	.522	.189	.019	-.070	-.038	-.066
150.	-.818	-1.071	-.595		-.316	-.272	-.138	.070	.522	.189	.019	-.070	-.038	-.063
152.	-.818	-1.062	-.595		-.328	-.272	-.128	.070	.522	.189	.019	-.070	-.038	-.059
154.	-.818	-1.057	-.593		-.328	-.272	-.125	.070	.522	.189	.019	-.070	-.038	-.059
156.	-.818	-1.057	-.583		-.316	-.272	-.125	.070	.522	.189	.019	-.070	-.038	-.059
158.	-.818	-1.057	-.583		-.317	-.272	-.125	.070	.522	.189	.019	-.070	-.038	-.059
160.	-.818	-1.057	-.583		-.329	-.272	-.125	.070	.522	.189	.021	-.070	-.038	-.059
162.	-.818	-1.046	-.583		-.327	-.272	-.125	.070	.522	.189	.030	-.070	-.038	-.059
164.	-.818	-1.043	-.583		-.316	-.272	-.125	.070	.522	.189	.030	-.070	-.038	-.059
166.	-.829	-1.043	-.583		-.316	-.272	-.125	.070	.522	.189	.030	-.070	-.038	-.059
168.	-.833	-1.043	-.583		-.316	-.272	-.125	.070	.522	.189	.030	-.070	-.038	-.059
170.	-.833	-1.043	-.583		-.316	-.272	-.125	.070	.522	.189	.030	-.070	-.038	-.059
172.	-.846	-1.043	-.583		-.316	-.272	-.125	.070	.536	.189	.030	-.070	-.038	-.059
174.	-.848	-1.043	-.583		-.316	-.272	-.125	.070	.540	.201	.030	-.070	-.038	-.059
176.	-.848	-1.043	-.583		-.316	-.272	-.125	.070	.540	.204	.030	-.066	-.034	-.059
178.	-.848	-1.043	-.583		-.316	-.272	-.125	.070	.540	.204	.030	-.060	-.027	-.059

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/10/12.

FLT 61 RUN 26B TIME 55556.200 MU= 0.000 CLP= .00339 TEMP(U60)= 12.7 C = 54.82 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
180.	-.848	-1.043	-.583		-.316	-.272	-.125	.070	.540	.204	.035	-.060	-.027	-.059
182.	-.863	-1.043	-.588		-.316	-.266	-.125	.070	.540	.204	.040	-.060	-.027	-.059
184.	-.863	-1.043	-.594		-.315	-.265	-.125	.071	.540	.205	.042	-.055	-.028	-.059
186.	-.863	-1.045	-.595		-.315	-.272	-.125	.073	.540	.204	.042	-.050	-.028	-.060
188.	-.864	-1.057	-.595		-.316	-.272	-.125	.070	.540	.204	.040	-.050	-.027	-.059
190.	-.878	-1.057	-.593		-.316	-.272	-.125	.070	.540	.219	.047	-.050	-.027	-.059
192.	-.877	-1.057	-.594		-.315	-.272	-.125	.072	.540	.206	.047	-.050	-.028	-.059
194.	-.878	-1.057	-.595		-.316	-.272	-.125	.072	.540	.220	.049	-.050	-.028	-.060
196.	-.878	-1.057	-.595		-.316	-.272	-.125	.070	.542	.220	.051	-.050	-.027	-.059
198.	-.881	-1.057	-.593		-.316	-.272	-.125	.070	.557	.220	.051	-.050	-.027	-.059
200.	-.892	-1.062	-.592		-.324	-.272	-.125	.072	.557	.220	.054	-.035	-.021	-.059
202.	-.897	-1.071	-.592		-.327	-.273	-.125	.074	.557	.220	.055	-.031	-.018	-.060
204.	-.907	-1.065	-.594		-.317	-.273	-.125	.074	.557	.220	.064	-.031	-.018	-.060
206.	-.907	-1.057	-.595		-.316	-.272	-.125	.072	.557	.220	.053	-.031	-.018	-.060
208.	-.913	-1.057	-.592		-.316	-.272	-.125	.070	.557	.225	.051	-.031	-.017	-.059
210.	-.922	-1.057	-.595		-.315	-.273	-.125	.073	.557	.236	.064	-.031	-.018	-.060
212.	-.929	-1.057	-.592		-.316	-.272	-.125	.071	.557	.236	.062	-.031	-.018	-.059
214.	-.937	-1.057	-.594		-.315	-.273	-.125	.073	.565	.236	.065	-.031	-.018	-.060
216.	-.937	-1.057	-.593		-.316	-.259	-.125	.071	.574	.236	.062	-.031	-.017	-.059
218.	-.937	-1.057	-.594		-.303	-.259	-.125	.073	.574	.236	.065	-.031	-.018	-.060
220.	-.937	-1.047	-.590		-.316	-.258	-.125	.071	.574	.236	.062	-.031	-.017	-.059
222.	-.937	-1.043	-.581		-.302	-.259	-.125	.073	.565	.228	.064	-.031	-.018	-.060
224.	-.937	-1.043	-.581		-.302	-.259	-.125	.065	.557	.220	.055	-.031	-.018	-.060
226.	-.937	-1.043	-.581		-.302	-.259	-.125	.073	.557	.220	.055	-.031	-.019	-.060
228.	-.926	-1.031	-.581		-.302	-.259	-.125	.074	.557	.220	.055	-.031	-.028	-.060
230.	-.922	-1.029	-.581		-.302	-.259	-.125	.064	.557	.220	.055	-.031	-.028	-.060
232.	-.910	-1.029	-.577		-.302	-.259	-.125	.063	.557	.220	.055	-.031	-.028	-.060
234.	-.907	-1.016	-.569		-.302	-.259	-.125	.063	.557	.220	.055	-.031	-.028	-.060
236.	-.895	-1.015	-.569		-.302	-.259	-.125	.063	.544	.220	.055	-.031	-.028	-.060
238.	-.892	-1.001	-.569		-.302	-.259	-.125	.063	.540	.208	.051	-.031	-.028	-.060

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/10/12.

FLT 61 RUN 26B TIME 55556.200 MU= 0.000 CLP= .00339 TEMP(U60)= 12.7 C = 54.82 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
240.	-.879	-1.000	-.565		-.302	-.259	-.125	.063	.540	.205	.044	-.031	-.028	-.060
242.	-.864	-.986	-.559		-.303	-.259	-.125	.063	.525	.204	.042	-.039	-.028	-.059
244.	-.834	-.971	-.552		-.303	-.259	-.125	.061	.508	.191	.037	-.050	-.028	-.047
246.	-.819	-.957	-.548		-.303	-.259	-.125	.063	.505	.189	.032	-.050	-.024	-.048
248.	-.789	-.944	-.548		-.304	-.258	-.125	.060	.489	.189	.030	-.050	-.017	-.047
250.	-.774	-.942	-.548		-.304	-.258	-.125	.060	.488	.189	.030	-.050	-.017	-.047
252.	-.773	-.928	-.540		-.304	-.258	-.125	.060	.468	.173	.030	-.050	-.017	-.047
254.	-.756	-.910	-.536		-.304	-.258	-.125	.060	.487	.173	.030	-.050	-.017	-.047
256.	-.728	-.888	-.526		-.296	-.258	-.125	.060	.470	.172	.023	-.050	-.017	-.047
258.	-.710	-.888	-.522		-.291	-.259	-.125	.062	.452	.158	.021	-.050	-.018	-.048
260.	-.682	-.883	-.524		-.290	-.259	-.125	.063	.437	.156	.015	-.050	-.025	-.049
262.	-.671	-.874	-.525		-.291	-.259	-.125	.057	.437	.142	.009	-.050	-.028	-.048
264.	-.663	-.874	-.525		-.292	-.258	-.125	.050	.433	.142	.008	-.050	-.027	-.047
266.	-.637	-.868	-.525		-.292	-.258	-.125	.050	.420	.139	.008	-.050	-.027	-.047
268.	-.622	-.860	-.514		-.292	-.258	-.125	.050	.415	.126	-.000	-.050	-.027	-.047
270.	-.612	-.860	-.513		-.292	-.258	-.125	.056	.402	.126	-.002	-.059	-.027	-.047
272.	-.606	-.853	-.513		-.292	-.258	-.125	.054	.397	.126	-.002	-.060	-.027	-.047
274.	-.591	-.846	-.513		-.292	-.258	-.125	.057	.385	.121	-.002	-.060	-.027	-.047
276.	-.575	-.838	-.513		-.292	-.258	-.125	.060	.378	.111	-.002	-.060	-.027	-.047
278.	-.560	-.832	-.513		-.292	-.258	-.125	.060	.368	.111	-.013	-.060	-.027	-.047
280.	-.545	-.823	-.513		-.292	-.258	-.125	.060	.360	.111	-.013	-.060	-.027	-.047
282.	-.538	-.818	-.513		-.292	-.258	-.125	.052	.351	.111	-.013	-.060	-.027	-.047
284.	-.538	-.818	-.511		-.292	-.258	-.125	.050	.351	.111	-.012	-.060	-.027	-.047
286.	-.529	-.818	-.502		-.292	-.258	-.125	.050	.351	.103	-.004	-.060	-.027	-.047
288.	-.514	-.818	-.503		-.292	-.258	-.125	.050	.341	.095	-.013	-.060	-.027	-.047
290.	-.498	-.817	-.508		-.291	-.257	-.125	.050	.335	.096	-.012	-.062	-.028	-.047
292.	-.493	-.817	-.510		-.289	-.248	-.126	.066	.335	.097	-.006	-.069	-.029	-.049
294.	-.493	-.818	-.512		-.289	-.260	-.126	.057	.334	.096	-.008	-.069	-.029	-.050
296.	-.493	-.817	-.510		-.291	-.259	-.125	.060	.322	.086	-.011	-.067	-.028	-.048
298.	-.493	-.818	-.513		-.289	-.259	-.126	.066	.317	.080	-.008	-.060	-.029	-.050

FLT 61 RUN26B

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/10/12.

FLT 61 RUN 26B TIME 55556.200 MU= 0.000 CLP= .00339 TEMP(U60)= 12.7 C = 54.82 F

X/C=	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
AZIMUTH														
300.	-.493	-.818	-.513		-.292	-.258	-.125	.050	.317	.080	-.013	-.060	-.027	-.047
302.	-.493	-.818	-.506		-.292	-.258	-.125	.051	.317	.080	-.013	-.063	-.027	-.036
304.	-.480	-.818	-.499		-.292	-.258	-.125	.060	.317	.080	-.017	-.070	-.027	-.036
306.	-.478	-.817	-.499		-.290	-.259	-.125	.061	.318	.081	-.021	-.065	-.028	-.037
308.	-.479	-.818	-.502		-.290	-.259	-.128	.065	.317	.080	-.020	-.060	-.029	-.050
310.	-.479	-.818	-.502		-.292	-.258	-.138	.060	.317	.080	-.024	-.060	-.027	-.047
312.	-.479	-.818	-.508		-.292	-.258	-.134	.060	.317	.080	-.024	-.060	-.027	-.047
314.	-.478	-.818	-.504		-.292	-.258	-.125	.060	.300	.080	-.024	-.065	-.027	-.047
316.	-.462	-.818	-.501		-.291	-.259	-.125	.061	.300	.081	-.022	-.069	-.028	-.048
318.	-.449	-.815	-.502		-.291	-.259	-.125	.062	.299	.064	-.029	-.069	-.028	-.048
320.	-.447	-.804	-.502		-.292	-.258	-.125	.060	.282	.064	-.035	-.076	-.027	-.044
322.	-.434	-.804	-.502		-.292	-.258	-.125	.060	.282	.064	-.035	-.073	-.027	-.036
324.	-.431	-.799	-.492		-.292	-.258	-.125	.060	.282	.064	-.035	-.070	-.027	-.036
326.	-.420	-.790	-.490		-.292	-.258	-.125	.060	.282	.064	-.035	-.070	-.027	-.036
328.	-.420	-.790	-.490		-.292	-.258	-.125	.060	.279	.064	-.035	-.070	-.027	-.036
330.	-.415	-.790	-.490		-.292	-.258	-.125	.060	.265	.061	-.035	-.070	-.027	-.036
332.	-.405	-.790	-.490		-.292	-.258	-.125	.060	.265	.049	-.035	-.070	-.027	-.036
334.	-.405	-.790	-.488		-.292	-.258	-.125	.060	.260	.049	-.044	-.070	-.035	-.036
336.	-.399	-.789	-.490		-.290	-.259	-.133	.062	.248	.049	-.042	-.069	-.038	-.043
338.	-.390	-.790	-.490		-.291	-.258	-.138	.061	.248	.049	-.045	-.070	-.038	-.048
340.	-.390	-.790	-.490		-.292	-.258	-.138	.060	.248	.049	-.045	-.079	-.038	-.055
342.	-.390	-.790	-.490		-.292	-.258	-.128	.060	.248	.049	-.045	-.079	-.038	-.051
344.	-.390	-.790	-.490		-.292	-.258	-.125	.060	.248	.049	-.045	-.079	-.038	-.039
346.	-.382	-.790	-.490		-.292	-.258	-.125	.060	.240	.041	-.045	-.079	-.038	-.036
348.	-.375	-.780	-.488		-.291	-.258	-.125	.069	.231	.033	-.046	-.080	-.038	-.036
350.	-.366	-.775	-.487		-.290	-.259	-.125	.064	.232	.034	-.053	-.089	-.038	-.037
352.	-.350	-.764	-.483		-.290	-.259	-.125	.073	.222	.034	-.052	-.089	-.039	-.037
354.	-.335	-.761	-.473		-.287	-.260	-.138	.077	.215	.025	-.049	-.087	-.039	-.038
356.	-.330	-.761	-.473		-.276	-.260	-.127	.067	.204	.019	-.051	-.079	-.039	-.038
358.	-.319	-.749	-.473		-.276	-.260	-.139	.067	.186	.009	-.063	-.081	-.039	-.038

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 1 TIME 53718.300 MU= .151 CLP= .00423 TEMP(U60)= 9.2 C = 48.63 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
0.	-.284	-.809	-.505		-.390	-.323	-.178	.073	.197	-.067	-.069	-.096	-.055	-.055
2.	-.259	-.800	-.505		-.399	-.318	-.175	.069	.173	-.080	-.074	-.094	-.056	-.052
4.	-.238	-.791	-.508		-.394	-.315	-.173	.080	.150	-.097	-.082	-.108	-.064	-.052
6.	-.203	-.782	-.502		-.389	-.311	-.171	.079	.127	-.100	-.086	-.112	-.067	-.065
8.	-.181	-.773	-.496		-.390	-.313	-.169	.078	.104	-.113	-.097	-.122	-.075	-.064
10.	-.146	-.764	-.491		-.395	-.322	-.167	.077	.082	-.115	-.103	-.132	-.074	-.063
12.	-.126	-.755	-.485		-.391	-.319	-.165	.076	.079	-.128	-.108	-.137	-.073	-.063
14.	-.108	-.749	-.477		-.386	-.315	-.163	.076	.059	-.129	-.118	-.135	-.072	-.062
16.	-.089	-.753	-.472		-.387	-.320	-.162	.076	.039	-.142	-.127	-.134	-.072	-.062
18.	-.072	-.731	-.469		-.389	-.327	-.161	.083	.018	-.142	-.130	-.133	-.077	-.063
20.	-.039	-.726	-.473		-.387	-.323	-.163	.083	-.002	-.157	-.137	-.131	-.081	-.061
22.	-.023	-.731	-.472		-.384	-.328	-.171	.076	-.040	-.172	-.149	-.142	-.080	-.059
24.	-.006	-.724	-.466		-.388	-.333	-.164	.083	-.059	-.186	-.152	-.149	-.079	-.062
26.	.010	-.717	-.461		-.388	-.330	-.159	.083	-.077	-.185	-.156	-.148	-.079	-.071
28.	.025	-.710	-.458		-.384	-.327	-.167	.084	-.096	-.197	-.158	-.153	-.085	-.071
30.	.041	-.703	-.454		-.381	-.323	-.165	.087	-.113	-.198	-.165	-.162	-.088	-.070
32.	.056	-.697	-.450		-.387	-.330	-.163	.085	-.131	-.209	-.168	-.163	-.086	-.064
34.	.071	-.690	-.443		-.388	-.333	-.161	.084	-.148	-.210	-.174	-.162	-.086	-.061
36.	.085	-.684	-.442		-.381	-.331	-.161	.091	-.165	-.220	-.180	-.161	-.087	-.069
38.	.099	-.679	-.449		-.380	-.328	-.159	.090	-.182	-.222	-.192	-.167	-.092	-.063
40.	.109	-.673	-.446		-.388	-.336	-.165	.087	-.198	-.232	-.193	-.167	-.093	-.060
42.	.113	-.668	-.443		-.387	-.338	-.169	.086	-.215	-.234	-.200	-.174	-.093	-.060
44.	.127	-.663	-.439		-.384	-.335	-.168	.086	-.225	-.243	-.200	-.174	-.092	-.060
46.	.140	-.658	-.436		-.381	-.333	-.167	.085	-.229	-.246	-.199	-.173	-.091	-.065
48.	.154	-.653	-.433		-.389	-.343	-.165	.084	-.245	-.259	-.207	-.172	-.091	-.064
50.	.180	-.641	-.430		-.377	-.343	-.164	.084	-.274	-.272	-.216	-.179	-.090	-.064
52.	.222	-.623	-.427		-.374	-.341	-.163	.083	-.324	-.290	-.225	-.178	-.098	-.063
54.	.249	-.614	-.425		-.383	-.339	-.162	.083	-.358	-.305	-.233	-.168	-.098	-.056
56.	.232	-.619	-.433		-.381	-.337	-.161	.082	-.341	-.290	-.231	-.176	-.089	-.052
58.	.189	-.637	-.443		-.377	-.350	-.171	.084	-.280	-.253	-.198	-.174	-.080	-.052

FLT 63 RUN1

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 1 TIME 53718.300 MU= .151 CLP= .00423 TEMP(U60)= 9.2 C = 48.63 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
60.	.154	-.661	-.461		-.387	-.348	-.172	.092	-.220	-.224	-.179	-.158	-.079	-.061
62.	.134	-.684	-.459		-.387	-.346	-.161	.091	-.196	-.216	-.180	-.165	-.078	-.070
64.	.128	-.698	-.454		-.396	-.344	-.158	.098	-.196	-.222	-.180	-.164	-.087	-.072
66.	.136	-.708	-.446		-.394	-.343	-.157	.090	-.205	-.228	-.188	-.163	-.086	-.072
68.	.140	-.698	-.450		-.392	-.342	-.157	.089	-.220	-.235	-.186	-.163	-.085	-.062
70.	.149	-.682	-.454		-.388	-.342	-.157	.094	-.236	-.231	-.182	-.162	-.078	-.063
72.	.152	-.678	-.463		-.390	-.339	-.156	.079	-.230	-.216	-.174	-.159	-.076	-.061
74.	.132	-.676	-.469		-.389	-.335	-.167	.079	-.201	-.202	-.161	-.150	-.076	-.060
76.	.094	-.697	-.468		-.388	-.326	-.167	.079	-.145	-.178	-.144	-.143	-.076	-.060
78.	.064	-.721	-.467		-.390	-.336	-.166	.079	-.079	-.150	-.134	-.143	-.074	-.060
80.	.026	-.746	-.475		-.397	-.332	-.165	.079	-.027	-.143	-.128	-.142	-.066	-.060
82.	-.003	-.770	-.486		-.397	-.321	-.154	.079	.009	-.132	-.127	-.142	-.066	-.060
84.	-.019	-.795	-.476		-.392	-.321	-.152	.087	.015	-.129	-.127	-.142	-.069	-.060
86.	-.020	-.807	-.464		-.389	-.320	-.142	.087	.015	-.129	-.127	-.142	-.075	-.069
88.	-.032	-.820	-.464		-.391	-.320	-.142	.087	.015	-.129	-.127	-.142	-.075	-.060
90.	-.033	-.833	-.464		-.389	-.320	-.142	.087	.000	-.141	-.131	-.142	-.075	-.060
92.	-.033	-.844	-.464		-.396	-.320	-.142	.087	-.001	-.142	-.136	-.142	-.071	-.060
94.	-.007	-.845	-.464		-.390	-.320	-.142	.087	-.016	-.142	-.136	-.142	-.066	-.060
96.	-.006	-.845	-.465		-.385	-.321	-.142	.087	-.033	-.155	-.137	-.142	-.066	-.060
98.	.006	-.846	-.465		-.386	-.321	-.142	.088	-.049	-.156	-.142	-.142	-.066	-.057
100.	.008	-.845	-.459		-.386	-.322	-.142	.088	-.065	-.156	-.146	-.142	-.066	-.049
102.	.019	-.834	-.456		-.387	-.322	-.142	.088	-.082	-.170	-.147	-.143	-.067	-.050
104.	.022	-.826	-.455		-.381	-.323	-.143	.084	-.096	-.170	-.147	-.143	-.067	-.050
106.	.033	-.824	-.455		-.375	-.316	-.149	.081	-.099	-.171	-.145	-.144	-.063	-.047
108.	.036	-.805	-.451		-.375	-.321	-.151	.085	-.113	-.184	-.144	-.138	-.060	-.046
110.	.046	-.778	-.451		-.379	-.317	-.145	.087	-.116	-.185	-.147	-.136	-.059	-.052
112.	.047	-.763	-.450		-.381	-.322	-.145	.089	-.130	-.186	-.149	-.136	-.065	-.050
114.	.047	-.739	-.445		-.380	-.319	-.146	.092	-.134	-.186	-.146	-.130	-.069	-.052
116.	.047	-.721	-.436		-.384	-.316	-.146	.087	-.147	-.187	-.149	-.128	-.069	-.052
118.	.047	-.711	-.437		-.377	-.306	-.146	.081	-.148	-.188	-.151	-.129	-.068	-.051

FLT 63 RUN 1 TIME 53718.300 MU= .151 CLP= .00423 TEMP(U60)= 9.2 C = 48.63 F

X/C=	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
120.	.052	-.702	-.426		-.377	-.315	-.147	.081	-.153	-.193	-.152	-.129	-.062	-.051
122.	.062	-.685	-.418		-.366	-.309	-.149	.085	-.166	-.204	-.149	-.131	-.069	-.053
124.	.062	-.676	-.419		-.367	-.308	-.141	.086	-.167	-.205	-.151	-.131	-.063	-.054
126.	.062	-.665	-.424		-.368	-.310	-.146	.087	-.174	-.206	-.150	-.132	-.071	-.048
128.	.062	-.650	-.414		-.373	-.311	-.151	.078	-.185	-.208	-.155	-.132	-.062	-.042
130.	.063	-.648	-.419		-.374	-.314	-.152	.076	-.187	-.209	-.154	-.134	-.062	-.043
132.	.063	-.644	-.419		-.379	-.315	-.153	.075	-.196	-.210	-.157	-.134	-.062	-.042
134.	.064	-.635	-.410		-.379	-.318	-.144	.077	-.206	-.212	-.156	-.135	-.063	-.043
136.	.065	-.625	-.413		-.368	-.306	-.143	.081	-.208	-.213	-.155	-.127	-.065	-.045
138.	.065	-.616	-.417		-.359	-.308	-.144	.082	-.209	-.215	-.147	-.127	-.065	-.046
140.	.065	-.617	-.408		-.365	-.309	-.144	.077	-.211	-.209	-.151	-.119	-.064	-.044
142.	.066	-.611	-.410		-.365	-.313	-.146	.083	-.202	-.203	-.149	-.121	-.066	-.046
144.	.057	-.602	-.403		-.369	-.315	-.147	.081	-.197	-.205	-.150	-.121	-.065	-.046
146.	.052	-.604	-.407		-.369	-.317	-.149	.084	-.199	-.207	-.140	-.123	-.057	-.047
148.	.053	-.610	-.413		-.362	-.305	-.150	.075	-.188	-.199	-.142	-.124	-.058	-.048
150.	.041	-.603	-.413		-.367	-.307	-.151	.073	-.184	-.196	-.143	-.122	-.057	-.047
152.	.038	-.593	-.406		-.371	-.307	-.152	.070	-.186	-.197	-.137	-.119	-.057	-.046
154.	.039	-.598	-.406		-.369	-.298	-.154	.077	-.188	-.199	-.135	-.127	-.059	-.049
156.	.026	-.604	-.403		-.367	-.300	-.142	.078	-.175	-.189	-.133	-.129	-.060	-.049
158.	.024	-.595	-.408		-.377	-.303	-.143	.075	-.157	-.187	-.128	-.126	-.057	-.048
160.	.010	-.601	-.414		-.373	-.306	-.146	.076	-.155	-.190	-.131	-.120	-.049	-.049
162.	.008	-.592	-.412		-.373	-.303	-.160	.074	-.157	-.178	-.133	-.121	-.048	-.048
164.	-.007	-.597	-.410		-.368	-.294	-.159	.075	-.141	-.177	-.130	-.118	-.049	-.048
166.	-.009	-.589	-.413		-.366	-.297	-.149	.076	-.140	-.179	-.125	-.113	-.049	-.049
168.	-.008	-.595	-.409		-.368	-.301	-.150	.077	-.123	-.181	-.125	-.109	-.051	-.050
170.	-.025	-.600	-.408		-.372	-.305	-.152	.077	-.123	-.167	-.119	-.105	-.052	-.052
172.	-.026	-.592	-.411		-.368	-.308	-.154	.070	-.124	-.167	-.114	-.106	-.052	-.050
174.	-.043	-.599	-.415		-.371	-.312	-.156	.071	-.105	-.169	-.114	-.107	-.054	-.040
176.	-.044	-.603	-.404		-.366	-.317	-.158	.075	-.106	-.171	-.107	-.109	-.049	-.041
178.	-.046	-.596	-.398		-.367	-.309	-.160	.073	-.086	-.156	-.106	-.102	-.042	-.041

AIRFOIL PRESSURE DATA .9 BLADE RADIUS   NASA-LANGLEY AH-1G   78/11/14.

FLT 63 RUN 1   TIME 53718.300   MU= .151   CLP= .00423   TEMP(U60)= 9.2 C = 48.63 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
180.	-.065	-.603	-.405		-.370	-.304	-.155	.072	-.085	-.156	-.106	-.099	-.043	-.040
182.	-.082	-.611	-.407		-.376	-.307	-.147	.074	-.067	-.141	-.100	-.100	-.043	-.042
184.	-.086	-.618	-.411		-.379	-.311	-.149	.069	-.064	-.142	-.095	-.093	-.044	-.041
186.	-.106	-.625	-.420		-.382	-.316	-.151	.066	-.042	-.141	-.085	-.091	-.046	-.044
188.	-.126	-.626	-.421		-.378	-.318	-.160	.063	-.020	-.127	-.086	-.092	-.036	-.043
190.	-.142	-.622	-.430		-.376	-.309	-.163	.064	-.001	-.124	-.085	-.093	-.033	-.043
192.	-.150	-.630	-.431		-.395	-.305	-.156	.064	.004	-.111	-.078	-.084	-.032	-.044
194.	-.171	-.637	-.441		-.388	-.310	-.158	.066	.028	-.111	-.072	-.082	-.034	-.044
196.	-.194	-.645	-.444		-.392	-.312	-.160	.066	.046	-.108	-.065	-.072	-.033	-.045
198.	-.216	-.652	-.452		-.396	-.317	-.161	.066	.054	-.094	-.062	-.071	-.034	-.044
200.	-.231	-.660	-.454		-.402	-.320	-.163	.065	.079	-.089	-.065	-.072	-.033	-.045
202.	-.243	-.668	-.460		-.405	-.324	-.165	.058	.096	-.076	-.050	-.073	-.034	-.045
204.	-.267	-.676	-.468		-.393	-.328	-.167	.055	.107	-.077	-.049	-.060	-.035	-.047
206.	-.291	-.695	-.473		-.416	-.311	-.169	.053	.134	-.070	-.038	-.060	-.034	-.046
208.	-.316	-.711	-.473		-.404	-.312	-.171	.052	.150	-.048	-.039	-.061	-.021	-.046
210.	-.341	-.719	-.479		-.403	-.318	-.174	.059	.164	-.035	-.017	-.062	-.023	-.049
212.	-.367	-.727	-.489		-.408	-.321	-.176	.062	.192	-.026	-.017	-.063	-.024	-.051
214.	-.406	-.735	-.495		-.417	-.322	-.177	.056	.221	-.015	-.009	-.063	-.021	-.048
216.	-.442	-.743	-.499		-.422	-.326	-.178	.055	.251	-.004	-.009	-.064	-.020	-.048
218.	-.470	-.767	-.503		-.426	-.329	-.163	.055	.265	.008	-.008	-.065	-.006	-.048
220.	-.497	-.780	-.509		-.428	-.334	-.162	.060	.284	.021	-.001	-.065	-.007	-.051
222.	-.526	-.788	-.511		-.434	-.334	-.163	.057	.315	.031	.025	-.066	-.006	-.050
224.	-.570	-.796	-.531		-.434	-.317	-.166	.066	.329	.031	.033	-.064	-.011	-.054
226.	-.606	-.822	-.562		-.439	-.318	-.166	.058	.350	.046	.040	-.048	-.019	-.051
228.	-.636	-.833	-.567		-.427	-.321	-.168	.058	.382	.055	.041	-.033	-.006	-.051
230.	-.684	-.840	-.572		-.436	-.323	-.169	.059	.415	.072	.046	-.026	-.006	-.051
232.	-.719	-.869	-.577		-.449	-.326	-.171	.059	.426	.080	.059	-.038	-.006	-.052
234.	-.750	-.878	-.589		-.445	-.329	-.172	.060	.452	.099	.059	-.038	-.006	-.052
236.	-.801	-.907	-.604		-.461	-.332	-.174	.061	.462	.106	.067	-.032	-.007	-.053
238.	-.835	-.914	-.610		-.457	-.335	-.176	.065	.490	.107	.080	-.023	-.008	-.055

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 1 TIME 53718.300 MU= .151 CLP= .00423 TEMP(U60)= 9.2 C = 48.63 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
240.	-.866	-.944	-.615		-.456	-.336	-.176	.061	.498	.128	.085	-.023	-.006	-.053
242.	-.920	-.952	-.629		-.464	-.338	-.177	.061	.528	.133	.096	-.015	-.006	-.054
244.	-.953	-.982	-.642		-.463	-.341	-.178	.062	.534	.134	.097	-.006	-.006	-.054
246.	-1.009	-1.010	-.646		-.478	-.343	-.179	.062	.566	.158	.106	-.006	.001	-.054
248.	-1.066	-1.016	-.646		-.470	-.344	-.180	.062	.600	.161	.116	-.007	.011	-.055
250.	-1.123	-1.024	-.663		-.469	-.347	-.182	.066	.605	.188	.130	-.007	.009	-.056
252.	-1.180	-1.054	-.676		-.482	-.349	-.176	.075	.637	.188	.139	.003	.009	-.059
254.	-1.237	-1.083	-.688		-.475	-.349	-.160	.075	.670	.215	.146	.010	.011	-.055
256.	-1.294	-1.112	-.697		-.476	-.352	-.161	.067	.675	.218	.159	.010	.009	-.057
258.	-1.358	-1.141	-.703		-.486	-.354	-.162	.072	.709	.245	.172	.021	.018	-.060
260.	-1.458	-1.162	-.721		-.491	-.353	-.162	.074	.742	.271	.175	.027	.028	-.058
262.	-1.524	-1.173	-.728		-.493	-.353	-.162	.082	.771	.296	.187	.027	.029	-.056
264.	-1.621	-1.192	-.724		-.479	-.336	-.162	.082	.777	.300	.193	.027	.029	-.056
266.	-1.657	-1.184	-.712		-.468	-.329	-.163	.087	.805	.324	.213	.027	.026	-.058
268.	-1.603	-1.150	-.669		-.471	-.328	-.163	.087	.770	.318	.213	.027	.015	-.059
270.	-1.448	-1.079	-.647		-.451	-.329	-.163	.088	.620	.275	.189	.013	-.004	-.059
272.	-1.219	-.977	-.586		-.447	-.308	-.151	.089	.509	.174	.119	-.004	-.009	-.060
274.	-.981	-.898	-.583		-.445	-.302	-.140	.079	.445	.100	.077	-.022	-.024	-.060
276.	-.824	-.858	-.563		-.428	-.300	-.154	.071	.391	.054	.052	-.070	-.041	-.060
278.	-.738	-.831	-.541		-.424	-.322	-.163	.069	.369	.035	.033	-.075	-.044	-.058
280.	-.694	-.818	-.539		-.443	-.326	-.178	.057	.368	.026	.014	-.075	-.044	-.058
282.	-.678	-.816	-.538		-.424	-.326	-.185	.038	.367	.009	-.005	-.075	-.044	-.046
284.	-.676	-.813	-.536		-.421	-.325	-.184	.033	.366	.019	-.006	-.074	-.044	-.038
286.	-.673	-.810	-.536		-.440	-.349	-.184	.046	.379	.035	-.006	-.074	-.027	-.038
288.	-.684	-.822	-.552		-.439	-.324	-.183	.050	.394	.035	-.006	-.074	-.026	-.051
290.	-.693	-.827	-.549		-.437	-.321	-.182	.064	.392	.035	-.004	-.073	-.026	-.057
292.	-.689	-.840	-.547		-.435	-.346	-.181	.067	.406	.034	.030	-.073	-.026	-.072
294.	-.686	-.843	-.544		-.433	-.317	-.180	.067	.435	.034	.028	-.073	-.025	-.076
296.	-.682	-.838	-.541		-.430	-.317	-.179	.067	.445	.034	.012	-.072	-.025	-.076
298.	-.677	-.833	-.542		-.428	-.338	-.178	.066	.443	.034	.012	-.072	-.025	-.059

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 1 TIME 53718.300 MU= .151 CLP= .00423 TEMP(U60)= 9.2 C = 48.63 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
300.	-.673	-.846	-.553		-.425	-.311	-.177	.066	.440	.034	.012	-.071	-.025	-.072
302.	-.668	-.845	-.549		-.422	-.313	-.176	.065	.437	.033	.012	-.071	-.025	-.058
304.	-.663	-.839	-.545		-.419	-.333	-.174	.065	.433	.033	.012	-.070	-.025	-.072
306.	-.658	-.852	-.541		-.415	-.330	-.173	.064	.430	.033	.011	-.070	-.027	-.073
308.	-.653	-.848	-.537		-.412	-.328	-.172	.064	.426	.033	.011	-.069	-.041	-.073
310.	-.647	-.862	-.547		-.414	-.325	-.170	.080	.423	.032	.011	-.069	-.037	-.072
312.	-.661	-.856	-.564		-.425	-.322	-.169	.079	.419	.032	.011	-.068	-.024	-.072
314.	-.659	-.870	-.559		-.421	-.319	-.167	.078	.415	.032	.011	-.067	-.028	-.071
316.	-.653	-.862	-.563		-.424	-.316	-.166	.077	.411	.050	.011	-.067	-.039	-.070
318.	-.667	-.876	-.576		-.425	-.321	-.164	.077	.431	.054	.017	-.066	-.039	-.070
320.	-.662	-.889	-.579		-.417	-.334	-.162	.076	.430	.054	.027	-.066	-.038	-.067
322.	-.656	-.901	-.573		-.424	-.331	-.165	.075	.426	.053	.027	-.065	-.032	-.051
324.	-.671	-.893	-.567		-.419	-.327	-.179	.074	.422	.053	.026	-.064	-.022	-.050
326.	-.664	-.903	-.572		-.424	-.324	-.177	.074	.417	.052	.026	-.063	-.029	-.053
328.	-.657	-.896	-.572		-.429	-.331	-.175	.073	.413	.051	.017	-.063	-.037	-.066
330.	-.649	-.907	-.566		-.424	-.340	-.173	.072	.409	.051	.010	-.062	-.036	-.065
332.	-.642	-.914	-.571		-.419	-.336	-.171	.071	.429	.050	.010	-.061	-.036	-.065
334.	-.635	-.908	-.570		-.425	-.332	-.169	.076	.423	.050	.010	-.061	-.036	-.064
336.	-.628	-.913	-.575		-.427	-.328	-.167	.084	.395	.049	.000	-.060	-.035	-.063
338.	-.617	-.908	-.573		-.422	-.324	-.166	.083	.390	.049	-.005	-.059	-.043	-.062
340.	-.593	-.911	-.567		-.417	-.321	-.164	.082	.386	.048	-.005	-.059	-.048	-.062
342.	-.582	-.901	-.562		-.413	-.317	-.162	.081	.381	.045	.005	-.058	-.048	-.061
344.	-.550	-.890	-.554		-.409	-.313	-.160	.078	.372	.026	.007	-.057	-.046	-.059
346.	-.509	-.880	-.549		-.404	-.309	-.158	.077	.349	.023	-.002	-.067	-.046	-.058
348.	-.484	-.869	-.556		-.400	-.305	-.156	.076	.344	.006	-.018	-.068	-.054	-.058
350.	-.458	-.867	-.549		-.408	-.316	-.154	.074	.334	.002	-.021	-.078	-.047	-.056
352.	-.427	-.867	-.529		-.392	-.319	-.162	.075	.307	-.012	-.018	-.090	-.044	-.057
354.	-.384	-.848	-.519		-.397	-.315	-.167	.076	.281	-.018	-.029	-.091	-.044	-.057
356.	-.349	-.829	-.515		-.393	-.328	-.176	.077	.255	-.036	-.040	-.090	-.055	-.057
358.	-.319	-.819	-.509		-.404	-.327	-.169	.075	.222	-.055	-.055	-.100	-.056	-.056

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 6 TIME 54157.800 MU= .257 CLP= .00427 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
0.	-.523	-.867	-.524		-.378	-.307	-.157	.071	.352	.041	-.010	-.077	-.048	-.064
2.	-.488	-.864	-.519		-.386	-.302	-.154	.070	.331	.021	-.010	-.075	-.048	-.063
4.	-.461	-.850	-.519		-.393	-.312	-.151	.066	.303	.014	-.015	-.076	-.056	-.061
6.	-.422	-.848	-.518		-.386	-.309	-.163	.064	.290	.002	-.027	-.086	-.055	-.059
8.	-.379	-.849	-.526		-.378	-.319	-.160	.063	.270	-.004	-.039	-.096	-.054	-.071
10.	-.351	-.849	-.516		-.371	-.313	-.157	.062	.245	-.016	-.051	-.106	-.053	-.070
12.	-.315	-.835	-.512		-.369	-.311	-.154	.072	.235	-.020	-.058	-.111	-.055	-.069
14.	-.290	-.835	-.510		-.371	-.318	-.152	.071	.216	-.033	-.061	-.109	-.065	-.068
16.	-.255	-.850	-.507		-.369	-.313	-.151	.071	.193	-.048	-.067	-.107	-.072	-.066
18.	-.219	-.850	-.505		-.371	-.313	-.160	.079	.186	-.064	-.075	-.110	-.071	-.065
20.	-.184	-.851	-.502		-.370	-.318	-.157	.078	.167	-.065	-.091	-.118	-.073	-.064
22.	-.165	-.851	-.500		-.371	-.319	-.155	.076	.146	-.077	-.101	-.126	-.078	-.065
24.	-.118	-.853	-.491		-.371	-.323	-.155	.075	.125	-.091	-.110	-.134	-.077	-.074
26.	-.101	-.866	-.482		-.372	-.325	-.163	.077	.088	-.105	-.119	-.136	-.080	-.072
28.	-.070	-.864	-.474		-.371	-.329	-.160	.083	.069	-.118	-.126	-.140	-.085	-.072
30.	-.040	-.854	-.482		-.377	-.324	-.158	.084	.051	-.130	-.128	-.147	-.084	-.071
32.	-.012	-.851	-.487		-.377	-.327	-.160	.086	.033	-.129	-.132	-.154	-.088	-.070
34.	.014	-.839	-.484		-.378	-.338	-.166	.091	.016	-.141	-.140	-.155	-.091	-.069
36.	.030	-.827	-.481		-.378	-.339	-.163	.089	-.001	-.152	-.149	-.153	-.089	-.068
38.	.054	-.816	-.474		-.374	-.343	-.161	.086	-.017	-.152	-.158	-.151	-.093	-.066
40.	.067	-.806	-.476		-.377	-.343	-.159	.089	-.033	-.164	-.165	-.149	-.095	-.065
42.	.082	-.795	-.472		-.383	-.339	-.157	.093	-.048	-.172	-.165	-.147	-.094	-.065
44.	.104	-.786	-.466		-.390	-.345	-.161	.092	-.063	-.173	-.171	-.159	-.093	-.068
46.	.115	-.777	-.479		-.387	-.354	-.164	.091	-.078	-.181	-.178	-.167	-.098	-.073
48.	.127	-.762	-.512		-.392	-.354	-.163	.095	-.088	-.182	-.177	-.174	-.099	-.072
50.	.143	-.748	-.556		-.398	-.350	-.161	.097	-.092	-.190	-.183	-.173	-.105	-.066
52.	.161	-.740	-.610		-.396	-.357	-.159	.102	-.106	-.192	-.190	-.171	-.105	-.067
54.	.172	-.727	-.653		-.392	-.356	-.158	.104	-.120	-.202	-.197	-.185	-.104	-.064
56.	.183	-.715	-.685		-.398	-.364	-.156	.103	-.127	-.208	-.204	-.184	-.096	-.060
58.	.187	-.709	-.708		-.395	-.362	-.155	.108	-.133	-.206	-.203	-.182	-.102	-.066

FLT 63 RUN6

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 6 TIME 54157.800 MU= .257 CLP= .00427 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
60.	.192	-.703	-.730		-.392	-.359	-.154	.109	-.146	-.210	-.210	-.181	-.102	-.068
62.	.202	-.697	-.744		-.398	-.356	-.144	.108	-.159	-.221	-.208	-.187	-.101	-.068
64.	.213	-.685	-.756		-.396	-.366	-.141	.107	-.172	-.225	-.215	-.193	-.100	-.060
66.	.216	-.677	-.760		-.394	-.364	-.140	.114	-.178	-.224	-.213	-.192	-.100	-.058
68.	.222	-.673	-.765		-.401	-.361	-.139	.114	-.185	-.222	-.211	-.191	-.099	-.057
70.	.225	-.660	-.770		-.405	-.361	-.138	.113	-.189	-.221	-.203	-.189	-.098	-.057
72.	.223	-.655	-.772		-.386	-.368	-.138	.113	-.188	-.220	-.202	-.187	-.098	-.057
74.	.231	-.642	-.769		-.383	-.358	-.137	.112	-.187	-.219	-.203	-.182	-.097	-.056
76.	.241	-.648	-.762		-.376	-.364	-.136	.104	-.196	-.226	-.212	-.187	-.097	-.056
78.	.252	-.627	-.754		-.379	-.353	-.136	.104	-.219	-.245	-.225	-.186	-.097	-.056
80.	.263	-.624	-.748		-.371	-.352	-.136	.103	-.236	-.259	-.236	-.188	-.096	-.056
82.	.273	-.622	-.737		-.367	-.355	-.136	.103	-.260	-.278	-.251	-.198	-.096	-.047
84.	.284	-.610	-.727		-.360	-.366	-.145	.103	-.297	-.292	-.264	-.207	-.096	-.046
86.	.295	-.599	-.717		-.360	-.374	-.145	.103	-.326	-.312	-.275	-.206	-.096	-.038
88.	.306	-.598	-.707		-.359	-.373	-.145	.104	-.353	-.325	-.288	-.206	-.096	-.038
90.	.317	-.587	-.693		-.359	-.373	-.145	.108	-.381	-.347	-.296	-.206	-.096	-.038
92.	.329	-.576	-.680		-.359	-.373	-.145	.103	-.408	-.360	-.300	-.206	-.096	-.038
94.	.340	-.567	-.673		-.359	-.374	-.145	.103	-.449	-.382	-.304	-.207	-.096	-.038
96.	.341	-.568	-.665		-.366	-.374	-.145	.103	-.476	-.395	-.309	-.207	-.096	-.038
98.	.353	-.567	-.656		-.377	-.374	-.145	.100	-.505	-.407	-.324	-.207	-.095	-.037
100.	.364	-.557	-.649		-.380	-.376	-.146	.103	-.533	-.420	-.334	-.208	-.096	-.038
102.	.367	-.551	-.628		-.388	-.377	-.146	.104	-.549	-.432	-.335	-.208	-.097	-.038
104.	.377	-.546	-.569		-.392	-.378	-.142	.101	-.577	-.444	-.325	-.209	-.092	-.035
106.	.381	-.530	-.498		-.387	-.380	-.142	.100	-.596	-.448	-.327	-.210	-.090	-.030
108.	.392	-.517	-.434		-.386	-.374	-.148	.101	-.623	-.460	-.337	-.211	-.090	-.030
110.	.394	-.502	-.387		-.388	-.363	-.149	.098	-.641	-.462	-.341	-.206	-.091	-.030
112.	.396	-.494	-.374		-.390	-.361	-.144	.098	-.662	-.467	-.343	-.199	-.085	-.030
114.	.399	-.485	-.359		-.385	-.354	-.140	.099	-.694	-.476	-.345	-.199	-.084	-.030
116.	.401	-.477	-.360		-.386	-.364	-.141	.094	-.727	-.471	-.347	-.194	-.084	-.031
118.	.404	-.469	-.363		-.389	-.359	-.142	.092	-.761	-.474	-.327	-.194	-.085	-.031

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 6 TIME 54157.800 MU= .257 CLP= .00427 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
120.	.407	-.461	-.365		-.383	-.359	-.143	.093	-.796	-.478	-.319	-.196	-.079	-.031
122.	.411	-.454	-.367		-.375	-.351	-.144	.093	-.826	-.477	-.321	-.197	-.078	-.031
124.	.408	-.453	-.343		-.378	-.352	-.145	.094	-.842	-.474	-.324	-.199	-.079	-.032
126.	.406	-.450	-.345		-.382	-.356	-.147	.089	-.843	-.473	-.318	-.193	-.072	-.032
128.	.403	-.450	-.340		-.375	-.347	-.148	.088	-.822	-.471	-.312	-.187	-.072	-.032
130.	.402	-.446	-.344		-.378	-.350	-.150	.089	-.777	-.469	-.307	-.187	-.073	-.033
132.	.399	-.448	-.346		-.373	-.340	-.151	.089	-.724	-.461	-.301	-.175	-.074	-.033
134.	.390	-.444	-.346		-.376	-.344	-.143	.091	-.678	-.454	-.297	-.177	-.066	-.025
136.	.390	-.446	-.349		-.375	-.345	-.142	.076	-.658	-.446	-.301	-.175	-.064	-.029
138.	.386	-.441	-.351		-.377	-.337	-.144	.076	-.651	-.438	-.285	-.163	-.065	-.022
140.	.377	-.445	-.358		-.370	-.341	-.147	.085	-.643	-.430	-.271	-.164	-.068	-.024
142.	.369	-.451	-.359		-.378	-.329	-.148	.078	-.635	-.413	-.275	-.157	-.065	-.021
144.	.350	-.457	-.360		-.376	-.324	-.151	.078	-.616	-.400	-.265	-.153	-.061	-.035
146.	.338	-.463	-.358		-.369	-.328	-.152	.079	-.604	-.391	-.256	-.155	-.062	-.025
148.	.329	-.457	-.363		-.367	-.329	-.143	.080	-.595	-.383	-.246	-.157	-.063	-.037
150.	.320	-.464	-.364		-.372	-.323	-.145	.081	-.573	-.374	-.242	-.156	-.061	-.037
152.	.297	-.471	-.363		-.373	-.328	-.147	.081	-.562	-.353	-.229	-.153	-.055	-.038
154.	.286	-.478	-.369		-.367	-.328	-.150	.074	-.537	-.341	-.222	-.151	-.053	-.038
156.	.261	-.486	-.375		-.365	-.323	-.152	.075	-.510	-.331	-.215	-.143	-.047	-.039
158.	.250	-.494	-.381		-.371	-.329	-.155	.074	-.482	-.321	-.207	-.141	-.048	-.040
160.	.224	-.503	-.388		-.378	-.327	-.157	.067	-.452	-.311	-.200	-.132	-.049	-.040
162.	.211	-.511	-.395		-.377	-.324	-.156	.068	-.422	-.285	-.192	-.125	-.049	-.041
164.	.184	-.520	-.402		-.378	-.329	-.149	.069	-.391	-.273	-.177	-.121	-.045	-.038
166.	.169	-.530	-.409		-.377	-.326	-.152	.071	-.359	-.262	-.164	-.113	-.040	-.034
168.	.139	-.540	-.416		-.378	-.324	-.154	.067	-.323	-.249	-.155	-.111	-.035	-.039
170.	.110	-.550	-.424		-.385	-.330	-.157	.062	-.270	-.235	-.146	-.113	-.031	-.031
172.	.088	-.560	-.432		-.383	-.325	-.160	.063	-.234	-.207	-.136	-.107	-.031	-.032
174.	.041	-.571	-.441		-.386	-.325	-.156	.064	-.196	-.193	-.126	-.089	-.024	-.032
176.	.011	-.589	-.449		-.393	-.331	-.159	.065	-.156	-.178	-.115	-.085	-.020	-.033
178.	-.013	-.611	-.458		-.401	-.324	-.161	.060	-.115	-.163	-.094	-.087	-.021	-.033

FLT 63 RUN6

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 6 TIME 54157.800 MU= .257 CLP= .00427 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
180.	-.057	-.623	-.467		-.409	-.325	-.157	.055	-.073	-.142	-.080	-.078	-.012	-.034
182.	-.109	-.644	-.477		-.417	-.332	-.160	.057	-.021	-.112	-.068	-.067	-.009	-.035
184.	-.150	-.676	-.486		-.412	-.338	-.163	.058	.041	-.094	-.055	-.056	-.009	-.035
186.	-.201	-.699	-.497		-.418	-.327	-.167	.059	.081	-.076	-.042	-.044	-.009	-.036
188.	-.257	-.713	-.522		-.427	-.331	-.170	.060	.117	-.057	-.028	-.044	-.010	-.037
190.	-.304	-.740	-.533		-.419	-.338	-.174	.061	.169	-.037	-.014	-.031	.003	-.038
192.	-.364	-.763	-.545		-.427	-.345	-.177	.063	.212	-.016	.001	-.032	.004	-.038
194.	-.424	-.793	-.556		-.436	-.353	-.181	.064	.242	.005	.015	-.033	.004	-.039
196.	-.490	-.816	-.568		-.446	-.337	-.185	.065	.288	.028	.017	-.034	.004	-.040
198.	-.554	-.849	-.580		-.453	-.344	-.172	.067	.333	.039	.032	-.034	.005	-.041
200.	-.612	-.872	-.592		-.446	-.349	-.172	.068	.368	.053	.037	-.030	.020	-.042
202.	-.688	-.891	-.604		-.455	-.334	-.176	.070	.421	.078	.066	-.006	.020	-.043
204.	-.757	-.928	-.617		-.461	-.341	-.180	.055	.450	.089	.071	-.006	.021	-.044
206.	-.822	-.951	-.630		-.454	-.348	-.162	.056	.480	.107	.090	-.006	.021	-.045
208.	-.889	-.971	-.643		-.463	-.350	-.165	.057	.520	.117	.105	-.001	.022	-.045
210.	-.958	-.990	-.656		-.473	-.336	-.169	.058	.538	.138	.113	.010	.022	-.046
212.	-1.029	-1.034	-.669		-.476	-.343	-.172	.059	.573	.148	.127	.011	.022	-.047
214.	-1.103	-1.055	-.683		-.470	-.350	-.176	.061	.591	.172	.130	.011	.023	-.048
216.	-1.179	-1.076	-.696		-.479	-.357	-.176	.062	.603	.181	.140	.018	.023	-.049
218.	-1.257	-1.072	-.698		-.489	-.353	-.158	.063	.643	.208	.154	.029	.024	-.050
220.	-1.311	-1.092	-.701		-.488	-.342	-.161	.064	.659	.215	.157	.029	.024	-.051
222.	-1.391	-1.113	-.719		-.484	-.348	-.164	.065	.671	.219	.160	.030	.025	-.052
224.	-1.421	-1.133	-.730		-.496	-.353	-.167	.063	.683	.221	.169	.031	.027	-.052
226.	-1.557	-1.153	-.741		-.492	-.359	-.169	.060	.696	.227	.182	.031	.028	-.050
228.	-1.584	-1.173	-.735		-.485	-.367	-.173	.069	.742	.261	.190	.032	.026	-.055
230.	-1.615	-1.193	-.739		-.491	-.356	-.177	.072	.720	.266	.196	.032	.025	-.057
232.	-1.673	-1.204	-.751		-.498	-.348	-.180	.077	.732	.271	.201	.046	.025	-.060
234.	-1.725	-1.202	-.765		-.488	-.354	-.171	.078	.744	.275	.204	.053	.025	-.061
236.	-1.758	-1.220	-.758		-.490	-.358	-.157	.077	.754	.278	.204	.054	.027	-.060
238.	-1.807	-1.237	-.764		-.498	-.363	-.159	.075	.765	.282	.205	.055	.028	-.059

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 6 TIME 54157.800 MU= .257 CLP= .00427 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
240.	-1.832	-1.242	-.774		-.505	-.368	-.161	.076	.776	.286	.208	.056	.028	-.060
242.	-1.856	-1.240	-.784		-.511	-.347	-.163	.077	.786	.290	.211	.057	.029	-.048
244.	-1.879	-1.255	-.770		-.517	-.342	-.165	.077	.795	.293	.213	.057	.029	-.036
246.	-1.900	-1.269	-.777		-.523	-.345	-.167	.078	.805	.297	.216	.058	.030	-.036
248.	-1.921	-1.266	-.785		-.529	-.349	-.169	.079	.813	.300	.218	.038	.030	-.052
250.	-1.939	-1.263	-.766		-.508	-.353	-.170	.080	.821	.303	.220	.037	.030	-.064
252.	-1.957	-1.274	-.772		-.537	-.356	-.172	.081	.811	.305	.198	.037	.030	-.064
254.	-1.973	-1.284	-.779		-.515	-.359	-.173	.081	.794	.308	.199	.037	.031	-.065
256.	-1.968	-1.272	-.784		-.517	-.361	-.174	.082	.799	.310	.201	.038	.031	-.065
258.	-1.964	-1.245	-.785		-.492	-.363	-.176	.082	.804	.312	.202	.038	.031	-.066
260.	-1.975	-1.241	-.760		-.522	-.365	-.177	.062	.809	.314	.203	.038	.031	-.066
262.	-1.961	-1.246	-.740		-.499	-.367	-.177	.059	.812	.315	.204	.038	.031	-.066
264.	-1.955	-1.251	-.743		-.524	-.368	-.178	.059	.815	.316	.205	.038	.032	-.067
266.	-1.959	-1.254	-.745		-.504	-.369	-.178	.059	.817	.317	.205	.038	.032	-.067
268.	-1.936	-1.256	-.747		-.524	-.370	-.179	.059	.818	.317	.205	.038	.032	-.067
270.	-1.928	-1.257	-.751		-.501	-.370	-.179	.059	.818	.292	.204	.039	.032	-.067
272.	-1.870	-1.256	-.751		-.504	-.368	-.177	.052	.818	.280	.199	.039	.029	-.064
274.	-1.911	-1.254	-.750		-.503	-.367	-.177	.052	.816	.280	.199	.039	.010	-.063
276.	-1.858	-1.251	-.746		-.502	-.366	-.177	.052	.814	.279	.199	.030	.010	-.063
278.	-1.905	-1.213	-.745		-.499	-.366	-.176	.053	.812	.279	.200	.015	.016	-.063
280.	-1.872	-1.208	-.744		-.497	-.364	-.176	.056	.808	.276	.198	.015	.025	-.065
282.	-1.793	-1.202	-.738		-.498	-.360	-.173	.046	.804	.275	.193	.015	.011	-.060
284.	-1.778	-1.194	-.736		-.493	-.359	-.173	.051	.799	.274	.195	.015	.010	-.062
286.	-1.766	-1.186	-.733		-.491	-.356	-.172	.049	.793	.271	.191	.015	.001	-.061
288.	-1.750	-1.177	-.727		-.504	-.352	-.170	.043	.786	.268	.186	.015	-.011	-.058
290.	-1.702	-1.166	-.715		-.498	-.349	-.168	.043	.780	.266	.171	.015	-.011	-.057
292.	-1.686	-1.154	-.705		-.476	-.348	-.167	.047	.773	.266	.165	.014	-.014	-.059
294.	-1.663	-1.142	-.697		-.467	-.346	-.167	.055	.765	.263	.168	.014	-.016	-.062
296.	-1.611	-1.129	-.690		-.462	-.342	-.165	.055	.751	.257	.166	-.001	-.016	-.062
298.	-1.558	-1.106	-.691		-.456	-.338	-.163	.054	.708	.223	.164	-.008	-.016	-.061

FLT 63 RUN6

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 6 TIME 54157.800 MU= .257 CLP= .00427 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
300.	-1.496	-1.071	-.675		-.459	-.330	-.159	.055	.698	.218	.134	-.007	-.011	-.057
302.	-1.411	-1.056	-.642		-.447	-.327	-.157	.054	.681	.212	.133	-.007	-.013	-.054
304.	-1.327	-1.028	-.629		-.438	-.324	-.157	.064	.642	.183	.135	-.008	-.015	-.059
306.	-1.254	-.996	-.624		-.432	-.319	-.154	.072	.632	.172	.115	-.025	-.015	-.058
308.	-1.192	-.981	-.622		-.450	-.313	-.168	.055	.622	.145	.105	-.045	-.029	-.055
310.	-1.123	-.966	-.613		-.431	-.331	-.174	.050	.599	.141	.075	-.046	-.029	-.050
312.	-1.075	-.950	-.602		-.444	-.331	-.170	.038	.566	.129	.071	-.045	-.027	-.047
314.	-1.027	-.934	-.592		-.439	-.325	-.168	.031	.557	.107	.069	-.044	-.044	-.046
316.	-.994	-.917	-.583		-.431	-.320	-.165	.030	.547	.106	.048	-.043	-.046	-.045
318.	-.961	-.901	-.593		-.424	-.314	-.162	.030	.537	.104	.047	-.042	-.045	-.044
320.	-.931	-.902	-.582		-.439	-.308	-.159	.029	.527	.102	.045	-.042	-.044	-.044
322.	-.897	-.894	-.572		-.431	-.331	-.156	.045	.517	.100	.026	-.041	-.043	-.043
324.	-.870	-.895	-.561		-.423	-.325	-.153	.047	.507	.098	.026	-.040	-.043	-.042
326.	-.853	-.884	-.560		-.415	-.318	-.171	.046	.498	.096	.025	-.039	-.042	-.041
328.	-.836	-.886	-.579		-.410	-.312	-.170	.045	.488	.094	.025	-.042	-.041	-.040
330.	-.819	-.893	-.568		-.419	-.306	-.166	.044	.478	.092	.024	-.054	-.040	-.039
332.	-.803	-.879	-.560		-.416	-.304	-.163	.043	.489	.090	.024	-.053	-.039	-.039
334.	-.787	-.881	-.558		-.421	-.320	-.160	.043	.488	.090	.026	-.052	-.040	-.056
336.	-.790	-.887	-.560		-.408	-.316	-.160	.055	.478	.087	.030	-.052	-.042	-.062
338.	-.778	-.891	-.559		-.406	-.313	-.174	.056	.468	.085	.022	-.050	-.041	-.055
340.	-.762	-.895	-.556		-.404	-.324	-.170	.055	.458	.083	.022	-.049	-.047	-.071
342.	-.746	-.898	-.563		-.415	-.317	-.167	.054	.449	.082	.021	-.048	-.036	-.070
344.	-.731	-.901	-.569		-.418	-.311	-.163	.053	.463	.080	.021	-.047	-.035	-.068
346.	-.716	-.903	-.560		-.409	-.313	-.160	.052	.456	.078	.013	-.046	-.034	-.067
348.	-.701	-.905	-.555		-.397	-.322	-.157	.054	.447	.079	.010	-.053	-.035	-.066
350.	-.687	-.903	-.550		-.394	-.317	-.161	.061	.414	.077	.015	-.058	-.037	-.070
352.	-.671	-.888	-.549		-.394	-.321	-.170	.065	.406	.075	.014	-.057	-.037	-.068
354.	-.637	-.885	-.543		-.386	-.325	-.167	.072	.396	.073	.014	-.064	-.036	-.067
356.	-.605	-.872	-.530		-.388	-.318	-.163	.071	.366	.053	.005	-.067	-.035	-.065
358.	-.570	-.873	-.521		-.385	-.313	-.160	.071	.359	.051	.002	-.066	-.043	-.065

FLT 63 RUN6

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 9 TIME 54467.200 MU= .330 CLP= .00436 TEMP(U60)= 10.6 C = 50.99 F

X/C= AZIMUTH	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
0.	-.750	-.992	-.588		-.394	-.303	-.150	.058	.484	.114	.045	-.037	-.023	-.055
2.	-.681	-.984	-.573		-.389	-.308	-.146	.063	.450	.108	.021	-.048	-.031	-.053
4.	-.623	-.977	-.559		-.380	-.306	-.150	.061	.422	.087	.014	-.059	-.034	-.052
6.	-.556	-.963	-.545		-.370	-.299	-.154	.054	.407	.067	.014	-.060	-.033	-.051
8.	-.492	-.954	-.532		-.373	-.305	-.159	.059	.377	.052	.003	-.068	-.032	-.050
10.	-.436	-.956	-.543		-.378	-.302	-.162	.056	.348	.042	-.009	-.077	-.048	-.061
12.	-.388	-.950	-.533		-.371	-.295	-.158	.057	.314	.013	-.030	-.086	-.052	-.065
14.	-.338	-.943	-.533		-.374	-.302	-.154	.067	.275	-.003	-.042	-.094	-.051	-.058
16.	-.299	-.937	-.533		-.379	-.312	-.151	.069	.257	-.014	-.042	-.093	-.050	-.057
18.	-.262	-.931	-.522		-.384	-.321	-.157	.068	.245	-.013	-.051	-.101	-.058	-.063
20.	-.227	-.925	-.522		-.388	-.316	-.158	.074	.229	-.019	-.051	-.099	-.067	-.066
22.	-.193	-.920	-.522		-.381	-.324	-.154	.075	.216	-.027	-.070	-.115	-.066	-.072
24.	-.161	-.906	-.513		-.385	-.318	-.151	.073	.203	-.033	-.078	-.114	-.074	-.074
26.	-.130	-.897	-.514		-.388	-.326	-.158	.079	.191	-.047	-.078	-.129	-.082	-.081
28.	-.100	-.884	-.518		-.382	-.320	-.157	.080	.179	-.060	-.095	-.126	-.081	-.082
30.	-.071	-.867	-.547		-.386	-.329	-.154	.086	.167	-.065	-.102	-.125	-.080	-.080
32.	-.035	-.851	-.602		-.390	-.336	-.152	.086	.148	-.071	-.100	-.130	-.086	-.079
34.	-.005	-.827	-.661		-.394	-.331	-.159	.092	.130	-.075	-.102	-.128	-.086	-.078
36.	.021	-.810	-.711		-.398	-.339	-.157	.100	.122	-.082	-.116	-.131	-.092	-.076
38.	.045	-.787	-.752		-.400	-.345	-.155	.098	.100	-.093	-.124	-.150	-.090	-.075
40.	.069	-.772	-.780		-.398	-.342	-.152	.105	.079	-.104	-.128	-.153	-.092	-.074
42.	.092	-.750	-.803		-.407	-.350	-.150	.103	.063	-.106	-.131	-.156	-.104	-.073
44.	.115	-.738	-.819		-.404	-.354	-.148	.102	.048	-.114	-.146	-.169	-.104	-.071
46.	.137	-.717	-.832		-.408	-.356	-.146	.108	.033	-.124	-.158	-.177	-.109	-.070
48.	.158	-.696	-.835		-.413	-.368	-.144	.107	.019	-.134	-.164	-.174	-.109	-.070
50.	.169	-.687	-.833		-.413	-.368	-.142	.107	-.007	-.144	-.171	-.178	-.113	-.069
52.	.188	-.667	-.827		-.416	-.375	-.140	.112	-.011	-.154	-.180	-.188	-.115	-.068
54.	.208	-.649	-.817		-.426	-.378	-.138	.112	-.022	-.163	-.190	-.196	-.118	-.067
56.	.217	-.641	-.808		-.430	-.379	-.135	.119	-.035	-.163	-.196	-.205	-.117	-.066
58.	.226	-.625	-.800		-.435	-.381	-.126	.125	-.048	-.171	-.202	-.210	-.119	-.066

FLT 63 RUN9

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 9 TIME 54467.200 MU= .330 CLP= .00436 TEMP(U60)= 10.6 C = 50.99 F

X/C= AZIMUTH	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
60.	.245	-.617	-.792		-.445	-.378	-.122	.129	-.061	-.170	-.204	-.215	-.122	-.063
62.	.254	-.601	-.779		-.459	-.374	-.114	.130	-.073	-.179	-.210	-.212	-.117	-.056
64.	.262	-.586	-.763		-.478	-.365	-.110	.134	-.085	-.188	-.219	-.212	-.112	-.056
66.	.270	-.573	-.755		-.501	-.351	-.103	.136	-.097	-.197	-.220	-.213	-.111	-.055
68.	.281	-.566	-.737		-.523	-.337	-.098	.139	-.112	-.207	-.224	-.211	-.115	-.055
70.	.301	-.553	-.716		-.546	-.310	-.088	.141	-.147	-.217	-.234	-.209	-.117	-.054
72.	.328	-.539	-.701		-.575	-.289	-.083	.141	-.173	-.237	-.248	-.218	-.120	-.051
74.	.347	-.526	-.682		-.588	-.276	-.082	.136	-.209	-.256	-.256	-.230	-.127	-.046
76.	.366	-.510	-.656		-.601	-.257	-.082	.136	-.245	-.276	-.279	-.243	-.128	-.042
78.	.385	-.493	-.636		-.602	-.241	-.081	.135	-.281	-.298	-.301	-.255	-.128	-.034
80.	.403	-.481	-.617		-.600	-.230	-.081	.135	-.316	-.327	-.328	-.262	-.132	-.026
82.	.419	-.470	-.600		-.612	-.226	-.081	.134	-.352	-.354	-.350	-.274	-.123	-.018
84.	.428	-.459	-.582		-.614	-.217	-.081	.134	-.387	-.374	-.377	-.286	-.120	-.014
86.	.437	-.444	-.573		-.613	-.215	-.080	.129	-.419	-.394	-.399	-.293	-.114	-.014
88.	.451	-.429	-.556		-.612	-.215	-.086	.127	-.443	-.421	-.427	-.300	-.113	-.009
90.	.462	-.425	-.540		-.612	-.215	-.089	.132	-.472	-.462	-.449	-.306	-.107	-.006
92.	.472	-.419	-.533		-.596	-.224	-.089	.134	-.519	-.503	-.464	-.306	-.100	-.006
94.	.482	-.410	-.525		-.596	-.225	-.089	.128	-.574	-.545	-.478	-.300	-.100	-.006
96.	.488	-.401	-.518		-.597	-.236	-.097	.127	-.624	-.582	-.486	-.286	-.093	-.006
98.	.494	-.386	-.511		-.598	-.247	-.099	.128	-.667	-.609	-.494	-.260	-.087	-.000
100.	.501	-.374	-.506		-.599	-.259	-.106	.128	-.706	-.626	-.496	-.238	-.073	.002
102.	.507	-.359	-.506		-.594	-.272	-.108	.128	-.738	-.650	-.502	-.203	-.074	.002
104.	.509	-.348	-.500		-.595	-.294	-.117	.122	-.773	-.678	-.533	-.189	-.074	.002
106.	.512	-.340	-.494		-.588	-.307	-.118	.123	-.806	-.696	-.564	-.171	-.073	.002
108.	.514	-.332	-.489		-.570	-.331	-.119	.123	-.827	-.717	-.588	-.160	-.068	.002
110.	.518	-.333	-.484		-.538	-.354	-.120	.117	-.854	-.742	-.606	-.154	-.067	.002
112.	.521	-.335	-.476		-.507	-.370	-.120	.118	-.876	-.761	-.625	-.150	-.059	.002
114.	.525	-.328	-.466		-.477	-.392	-.121	.119	-.904	-.778	-.645	-.145	-.048	.002
116.	.521	-.330	-.454		-.451	-.410	-.113	.120	-.927	-.795	-.666	-.132	-.049	-.006
118.	.524	-.333	-.425		-.419	-.430	-.114	.121	-.959	-.813	-.681	-.131	-.049	.002

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 9 TIME 54467.200 MU= .330 CLP= .00436 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
120.	.519	-.336	-.386		-.389	-.430	-.115	.121	-.972	-.831	-.694	-.128	-.049	.001
122.	.513	-.340	-.350		-.373	-.419	-.116	.116	-.993	-.842	-.713	-.129	-.050	-.007
124.	.508	-.343	-.323		-.368	-.400	-.117	.115	-1.017	-.860	-.725	-.134	-.050	-.007
126.	.513	-.347	-.310		-.371	-.385	-.119	.111	-1.030	-.871	-.737	-.139	-.051	-.007
128.	.508	-.351	-.305		-.380	-.377	-.120	.110	-1.068	-.882	-.750	-.141	-.052	-.007
130.	.503	-.356	-.311		-.390	-.370	-.122	.105	-1.082	-.893	-.760	-.142	-.052	-.007
132.	.498	-.360	-.312		-.394	-.362	-.123	.104	-1.110	-.905	-.737	-.144	-.053	-.007
134.	.493	-.363	-.307		-.395	-.355	-.125	.100	-1.139	-.917	-.614	-.146	-.054	-.007
136.	.488	-.360	-.309		-.401	-.347	-.127	.102	-1.157	-.930	-.428	-.148	-.050	-.010
138.	.484	-.362	-.313		-.395	-.339	-.129	.100	-1.187	-.942	-.285	-.151	-.047	-.017
140.	.481	-.356	-.326		-.387	-.331	-.131	.093	-1.206	-.912	-.237	-.153	-.048	-.017
142.	.484	-.353	-.325		-.382	-.332	-.133	.090	-1.225	-.727	-.248	-.156	-.049	-.013
144.	.469	-.359	-.329		-.378	-.329	-.135	.087	-1.243	-.574	-.270	-.158	-.050	-.008
146.	.461	-.366	-.335		-.366	-.320	-.137	.084	-1.228	-.505	-.293	-.161	-.050	-.008
148.	.443	-.372	-.341		-.367	-.322	-.140	.081	-1.135	-.487	-.295	-.150	-.045	-.008
150.	.424	-.379	-.347		-.365	-.328	-.142	.078	-1.032	-.469	-.291	-.135	-.043	-.008
152.	.405	-.393	-.354		-.360	-.323	-.145	.080	-.936	-.450	-.279	-.135	-.037	-.008
154.	.380	-.407	-.350		-.365	-.326	-.148	.075	-.837	-.426	-.264	-.138	-.036	-.014
156.	.351	-.415	-.368		-.373	-.320	-.151	.073	-.747	-.396	-.240	-.132	-.029	-.020
158.	.329	-.432	-.376		-.380	-.325	-.145	.075	-.675	-.375	-.223	-.125	-.028	-.020
160.	.300	-.455	-.395		-.377	-.318	-.144	.076	-.600	-.347	-.207	-.108	-.028	-.020
162.	.268	-.479	-.404		-.384	-.323	-.148	.070	-.522	-.315	-.189	-.101	-.019	-.021
164.	.235	-.505	-.414		-.380	-.330	-.151	.069	-.450	-.290	-.172	-.102	-.019	-.030
166.	.193	-.522	-.434		-.389	-.338	-.154	.062	-.384	-.264	-.163	-.085	-.020	-.025
168.	.149	-.545	-.445		-.397	-.329	-.158	.061	-.315	-.238	-.144	-.087	-.009	-.022
170.	.102	-.573	-.458		-.395	-.336	-.162	.063	-.242	-.210	-.123	-.086	.002	-.033
172.	.054	-.604	-.479		-.415	-.326	-.152	.064	-.178	-.180	-.102	-.067	.003	-.026
174.	.003	-.635	-.491		-.413	-.317	-.154	.066	-.107	-.149	-.082	-.058	.013	-.024
176.	-.050	-.668	-.507		-.421	-.325	-.158	.068	-.037	-.116	-.068	-.047	.014	-.025
178.	-.120	-.703	-.530		-.419	-.333	-.162	.069	.043	-.082	-.047	-.036	.014	-.025

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 9 TIME 54467.200 MU= .330 CLP= .00436 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
180.	-.198	-.739	-.544		-.430	-.338	-.150	.071	.118	-.059	-.031	-.025	.017	-.026
182.	-.265	-.776	-.558		-.437	-.331	-.154	.060	.174	-.027	-.008	-.013	.028	-.026
184.	-.348	-.816	-.579		-.436	-.334	-.158	.061	.226	-.002	.011	-.004	.032	-.027
186.	-.421	-.857	-.604		-.443	-.327	-.162	.063	.281	.034	.035	-.005	.043	-.028
188.	-.513	-.900	-.620		-.443	-.336	-.164	.065	.339	.060	.051	.001	.044	-.029
190.	-.593	-.925	-.637		-.455	-.337	-.152	.066	.399	.084	.061	.015	.045	-.028
192.	-.696	-.971	-.654		-.467	-.332	-.156	.068	.440	.109	.077	.023	.046	-.013
194.	-.784	-1.018	-.672		-.472	-.341	-.161	.070	.479	.134	.104	.031	.053	-.014
196.	-.896	-1.046	-.691		-.474	-.350	-.165	.068	.520	.162	.124	.047	.064	-.014
198.	-1.017	-1.078	-.710		-.488	-.348	-.170	.058	.564	.191	.144	.056	.066	-.014
200.	-1.119	-1.128	-.730		-.501	-.357	-.174	.060	.609	.197	.156	.058	.068	-.015
202.	-1.226	-1.159	-.750		-.503	-.366	-.172	.061	.656	.227	.171	.069	.078	-.015
204.	-1.338	-1.191	-.771		-.508	-.349	-.170	.063	.703	.235	.194	.077	.089	-.016
206.	-1.455	-1.224	-.777		-.508	-.346	-.180	.065	.723	.266	.207	.080	.091	-.016
208.	-1.577	-1.258	-.793		-.514	-.356	-.160	.066	.747	.277	.213	.094	.094	-.017
210.	-1.705	-1.293	-.815		-.512	-.347	-.151	.068	.796	.309	.232	.102	.096	-.017
212.	-1.831	-1.328	-.837		-.519	-.345	-.155	.070	.818	.317	.245	.105	.099	-.017
214.	-1.932	-1.364	-.840		-.515	-.333	-.159	.072	.840	.332	.251	.108	.102	-.018
216.	-2.005	-1.389	-.859		-.522	-.332	-.149	.074	.853	.365	.275	.111	.104	-.018
218.	-2.048	-1.409	-.860		-.536	-.341	-.140	.076	.849	.375	.287	.114	.092	-.019
220.	-2.081	-1.446	-.880		-.550	-.350	-.144	.078	.871	.384	.294	.117	.089	-.019
222.	-2.135	-1.467	-.878		-.541	-.359	-.147	.080	.893	.394	.302	.120	.091	-.020
224.	-2.188	-1.472	-.903		-.551	-.368	-.151	.082	.901	.404	.309	.123	.093	-.020
226.	-2.242	-1.493	-.895		-.542	-.376	-.154	.079	.898	.413	.312	.126	.078	-.019
228.	-2.280	-1.509	-.916		-.549	-.353	-.158	.067	.920	.410	.324	.129	.075	-.020
230.	-2.297	-1.531	-.935		-.532	-.358	-.162	.082	.922	.398	.307	.131	.076	-.022
232.	-2.312	-1.543	-.927		-.544	-.366	-.166	.090	.919	.407	.314	.111	.078	-.022
234.	-2.325	-1.541	-.922		-.554	-.374	-.170	.092	.916	.416	.319	.113	.079	-.023
236.	-2.335	-1.536	-.936		-.536	-.342	-.145	.094	.914	.425	.300	.116	.081	-.023
238.	-2.368	-1.557	-.930		-.547	-.348	-.142	.096	.933	.434	.307	.118	.083	-.024

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 9 TIME 54467.200 MU= .330 CLP= .00436 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
240.	-2.414	-1.558	-.940		-.557	-.355	-.145	.073	.922	.419	.312	.120	.084	-.024
242.	-2.430	-1.547	-.933		-.562	-.362	-.147	.072	.920	.410	.318	.122	.083	-.025
244.	-2.460	-1.567	-.940		-.543	-.368	-.150	.073	.936	.417	.317	.125	.060	-.025
246.	-2.500	-1.558	-.932		-.552	-.374	-.152	.074	.917	.424	.299	.127	.061	-.026
248.	-2.538	-1.541	-.934		-.560	-.380	-.155	.076	.916	.430	.304	.129	.062	-.026
250.	-2.539	-1.558	-.926		-.558	-.385	-.157	.104	.929	.404	.308	.121	.062	-.026
252.	-2.564	-1.539	-.923		-.539	-.390	-.159	.077	.941	.398	.312	.104	.063	-.027
254.	-2.594	-1.555	-.914		-.545	-.395	-.161	.078	.952	.403	.316	.105	.064	-.027
256.	-2.581	-1.528	-.923		-.551	-.399	-.162	.074	.916	.407	.306	.106	.065	-.027
258.	-2.559	-1.500	-.932		-.556	-.385	-.164	.049	.917	.411	.290	.107	.065	-.027
260.	-2.575	-1.508	-.900		-.560	-.357	-.165	.056	.924	.414	.292	.108	.066	-.028
262.	-2.502	-1.478	-.873		-.546	-.360	-.166	.081	.930	.416	.294	.108	.066	-.028
264.	-2.514	-1.485	-.878		-.528	-.361	-.167	.073	.934	.418	.296	.093	.066	-.028
266.	-2.523	-1.490	-.881		-.530	-.363	-.168	.050	.938	.420	.297	.079	.067	-.028
268.	-2.525	-1.485	-.883		-.531	-.364	-.168	.050	.940	.375	.297	.080	.067	-.028
270.	-2.485	-1.451	-.883		-.531	-.364	-.168	.050	.940	.375	.298	.080	.050	-.028
272.	-2.477	-1.450	-.883		-.531	-.364	-.168	.050	.940	.375	.276	.080	.036	-.028
274.	-2.433	-1.447	-.881		-.530	-.363	-.168	.050	.938	.374	.264	.079	.036	-.028
276.	-2.424	-1.428	-.878		-.528	-.362	-.167	.050	.934	.373	.263	.079	.035	-.028
278.	-2.402	-1.392	-.844		-.526	-.360	-.166	.049	.930	.371	.262	.079	.035	-.028
280.	-2.353	-1.384	-.833		-.550	-.358	-.165	.049	.924	.368	.260	.055	.035	-.028
282.	-2.335	-1.373	-.826		-.527	-.355	-.164	.049	.917	.366	.258	.048	.035	-.027
284.	-2.300	-1.361	-.819		-.514	-.352	-.162	.066	.909	.362	.256	.048	.035	-.027
286.	-2.248	-1.347	-.811		-.539	-.348	-.161	.060	.900	.359	.253	.047	.034	-.027
288.	-2.222	-1.332	-.801		-.508	-.344	-.159	.047	.890	.355	.251	.047	.034	-.027
290.	-2.194	-1.315	-.797		-.528	-.340	-.157	.047	.878	.350	.247	.046	.033	-.026
292.	-2.145	-1.320	-.819		-.530	-.372	-.154	.040	.866	.344	.238	.046	.036	-.024
294.	-2.090	-1.317	-.807		-.522	-.372	-.151	.037	.853	.339	.234	.045	.036	-.043
296.	-2.057	-1.296	-.794		-.514	-.366	-.149	.037	.861	.333	.230	.045	.009	-.053
298.	-2.022	-1.274	-.775		-.505	-.360	-.146	.036	.873	.328	.226	.069	.033	-.053

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 9 TIME 54467.200 MU= .330 CLP= .00436 TEMP(U60)= 10.6 C = 50.99 F

X/C=	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
300.	-1.986	-1.251	-.762		-.491	-.356	-.173	.042	.858	.323	.228	.043	.031	-.054
302.	-1.948	-1.254	-.752		-.484	-.349	-.177	.042	.841	.316	.223	.042	.030	-.031
304.	-1.909	-1.239	-.737		-.509	-.340	-.172	.058	.824	.309	.213	.042	.032	-.021
306.	-1.869	-1.214	-.722		-.498	-.336	-.168	.036	.834	.303	.209	.045	.032	-.019
308.	-1.829	-1.215	-.722		-.488	-.364	-.165	.033	.833	.297	.205	.064	.031	-.019
310.	-1.789	-1.195	-.747		-.482	-.356	-.161	.056	.815	.290	.200	.057	.030	-.019
312.	-1.748	-1.196	-.728		-.495	-.348	-.188	.031	.796	.283	.195	.038	.030	-.018
314.	-1.707	-1.172	-.718		-.482	-.340	-.154	.031	.778	.277	.192	.030	.029	-.018
316.	-1.666	-1.173	-.717		-.468	-.334	-.152	.059	.759	.271	.192	.007	.026	-.020
318.	-1.625	-1.147	-.710		-.456	-.325	-.176	.058	.771	.264	.187	-.007	.025	-.020
320.	-1.584	-1.118	-.707		-.445	-.327	-.172	.056	.759	.258	.182	-.007	.025	-.044
322.	-1.544	-1.119	-.689		-.443	-.342	-.168	.055	.740	.251	.178	-.007	.024	-.043
324.	-1.504	-1.118	-.685		-.448	-.333	-.163	.053	.721	.245	.173	-.007	.023	-.042
326.	-1.465	-1.091	-.681		-.448	-.324	-.159	.051	.733	.237	.157	-.007	.024	-.040
328.	-1.426	-1.090	-.675		-.441	-.327	-.154	.045	.717	.231	.139	-.006	.024	-.037
330.	-1.388	-1.085	-.665		-.428	-.335	-.156	.044	.698	.225	.136	-.006	.024	-.036
332.	-1.351	-1.060	-.661		-.426	-.327	-.170	.044	.712	.220	.134	-.006	.013	-.036
334.	-1.314	-1.057	-.664		-.427	-.318	-.166	.051	.692	.213	.130	-.006	.004	-.036
336.	-1.279	-1.053	-.651		-.437	-.309	-.169	.053	.674	.208	.127	-.006	.003	-.040
338.	-1.244	-1.049	-.634		-.433	-.317	-.179	.051	.658	.203	.125	-.006	.002	-.054
340.	-1.211	-1.044	-.631		-.421	-.319	-.175	.060	.667	.197	.122	-.006	-.007	-.053
342.	-1.178	-1.039	-.633		-.410	-.311	-.170	.058	.649	.192	.119	-.005	-.014	-.051
344.	-1.146	-1.033	-.634		-.412	-.318	-.165	.056	.631	.187	.116	-.017	-.013	-.050
346.	-1.115	-1.035	-.635		-.406	-.318	-.161	.055	.620	.186	.112	-.020	-.013	-.056
348.	-1.092	-1.041	-.638		-.410	-.326	-.157	.053	.623	.198	.109	-.019	-.013	-.064
350.	-1.077	-1.034	-.636		-.419	-.322	-.152	.058	.607	.193	.104	-.018	-.011	-.061
352.	-1.042	-1.036	-.621		-.410	-.314	-.159	.063	.591	.188	.103	-.018	-.012	-.060
354.	-.994	-1.039	-.620		-.413	-.306	-.162	.063	.575	.183	.101	-.018	-.012	-.059
356.	-.940	-1.031	-.619		-.404	-.316	-.158	.061	.552	.172	.086	-.017	-.011	-.058
358.	-.869	-1.023	-.604		-.394	-.311	-.154	.069	.523	.148	.070	-.017	-.011	-.056

AIRFOIL PRESSURE DATA .9 BLADE RADIUS   NASA-LANGLEY AH-1G   78/11/14.

FLT 63 RUN 10   TIME 54541.600   MU= .356   CLP= .00421   TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
0.	-.875	-.988	-.593		-.391	-.291	-.142	.051	.523	.152	.071	-.024	-.019	-.049
2.	-.815	-.992	-.577		-.379	-.285	-.152	.052	.497	.129	.058	-.026	-.020	-.048
4.	-.746	-.987	-.561		-.371	-.295	-.150	.051	.475	.118	.044	-.037	-.020	-.047
6.	-.674	-.990	-.545		-.373	-.288	-.146	.061	.450	.105	.029	-.047	-.030	-.058
8.	-.595	-.984	-.540		-.365	-.283	-.143	.063	.418	.085	.010	-.057	-.032	-.059
10.	-.526	-.975	-.543		-.368	-.290	-.139	.058	.387	.066	.009	-.064	-.040	-.057
12.	-.477	-.966	-.534		-.360	-.287	-.150	.060	.372	.059	.007	-.066	-.040	-.056
14.	-.422	-.944	-.533		-.361	-.293	-.146	.069	.349	.047	-.004	-.074	-.039	-.055
16.	-.378	-.949	-.528		-.356	-.294	-.144	.067	.322	.041	-.015	-.083	-.040	-.054
18.	-.339	-.928	-.521		-.360	-.310	-.153	.064	.297	.029	-.022	-.087	-.053	-.076
20.	-.303	-.920	-.521		-.365	-.303	-.149	.056	.287	.025	-.029	-.093	-.068	-.084
22.	-.255	-.913	-.521		-.369	-.301	-.148	.064	.280	.012	-.046	-.109	-.073	-.071
24.	-.220	-.906	-.520		-.373	-.309	-.154	.071	.245	-.014	-.059	-.117	-.068	-.060
26.	-.188	-.888	-.514		-.371	-.318	-.152	.079	.222	-.029	-.072	-.115	-.061	-.071
28.	-.158	-.881	-.522		-.374	-.320	-.151	.077	.216	-.030	-.076	-.112	-.064	-.078
30.	-.128	-.863	-.563		-.384	-.319	-.157	.077	.197	-.030	-.075	-.114	-.071	-.078
32.	-.100	-.846	-.619		-.388	-.320	-.153	.083	.193	-.042	-.080	-.116	-.078	-.084
34.	-.072	-.828	-.678		-.391	-.321	-.151	.087	.189	-.041	-.082	-.124	-.081	-.082
36.	-.033	-.804	-.720		-.388	-.328	-.148	.089	.184	-.041	-.086	-.127	-.084	-.078
38.	.002	-.786	-.763		-.387	-.328	-.145	.093	.167	-.052	-.092	-.125	-.091	-.070
40.	.025	-.765	-.794		-.391	-.330	-.143	.096	.149	-.062	-.094	-.134	-.093	-.072
42.	.049	-.749	-.811		-.395	-.337	-.140	.097	.133	-.063	-.093	-.147	-.091	-.076
44.	.071	-.730	-.826		-.392	-.336	-.138	.100	.117	-.074	-.115	-.160	-.100	-.075
46.	.093	-.714	-.833		-.393	-.339	-.136	.102	.101	-.084	-.128	-.161	-.103	-.074
48.	.114	-.693	-.839		-.404	-.346	-.134	.105	.086	-.094	-.140	-.171	-.107	-.073
50.	.134	-.673	-.829		-.409	-.353	-.132	.111	.072	-.104	-.148	-.171	-.113	-.072
52.	.154	-.659	-.826		-.413	-.360	-.130	.113	.058	-.114	-.147	-.181	-.113	-.071
54.	.174	-.645	-.816		-.425	-.358	-.129	.111	.044	-.120	-.159	-.187	-.118	-.070
56.	.193	-.627	-.816		-.438	-.363	-.127	.115	.031	-.122	-.165	-.198	-.124	-.065
58.	.207	-.610	-.798		-.444	-.370	-.119	.119	.018	-.132	-.172	-.209	-.123	-.060

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 10 TIME 54541.600 MU= .356 CLP= .00421 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
60.	.220	-.594	-.789		-.456	-.368	-.115	.125	.005	-.141	-.178	-.214	-.128	-.059
62.	.233	-.578	-.774		-.478	-.364	-.107	.125	-.007	-.146	-.191	-.212	-.127	-.058
64.	.247	-.563	-.765		-.508	-.350	-.097	.130	-.020	-.149	-.196	-.211	-.126	-.052
66.	.260	-.555	-.749		-.528	-.337	-.087	.137	-.038	-.158	-.194	-.223	-.126	-.050
68.	.273	-.544	-.729		-.557	-.303	-.078	.144	-.062	-.172	-.207	-.233	-.125	-.050
70.	.297	-.530	-.712		-.577	-.289	-.068	.150	-.092	-.191	-.221	-.233	-.124	-.050
72.	.325	-.517	-.686		-.582	-.266	-.059	.149	-.127	-.210	-.240	-.246	-.129	-.043
74.	.346	-.505	-.664		-.569	-.244	-.049	.149	-.162	-.229	-.254	-.260	-.123	-.035
76.	.371	-.485	-.638		-.608	-.224	-.048	.148	-.204	-.254	-.274	-.260	-.135	-.034
78.	.392	-.472	-.618		-.611	-.224	-.040	.149	-.242	-.282	-.294	-.269	-.135	-.034
80.	.410	-.453	-.595		-.608	-.226	-.040	.148	-.277	-.311	-.321	-.285	-.134	-.034
82.	.428	-.441	-.575		-.606	-.247	-.039	.148	-.311	-.332	-.346	-.295	-.134	-.027
84.	.446	-.422	-.555		-.606	-.266	-.031	.147	-.353	-.359	-.369	-.305	-.133	-.019
86.	.464	-.412	-.535		-.607	-.291	-.030	.144	-.381	-.388	-.397	-.326	-.130	-.010
88.	.475	-.402	-.519		-.603	-.329	-.030	.143	-.413	-.424	-.419	-.351	-.125	-.003
90.	.484	-.384	-.507		-.598	-.357	-.030	.143	-.458	-.471	-.433	-.373	-.119	-.002
92.	.503	-.375	-.496		-.595	-.381	-.030	.143	-.514	-.512	-.447	-.393	-.104	.005
94.	.513	-.366	-.488		-.584	-.405	-.030	.144	-.573	-.543	-.458	-.409	-.097	.006
96.	.515	-.357	-.476		-.575	-.412	-.031	.144	-.622	-.574	-.462	-.426	-.086	.012
98.	.535	-.347	-.467		-.576	-.404	-.033	.146	-.659	-.596	-.474	-.443	-.072	.011
100.	.537	-.331	-.460		-.573	-.380	-.039	.144	-.696	-.627	-.504	-.461	-.066	.013
102.	.548	-.322	-.455		-.567	-.345	-.042	.140	-.722	-.649	-.533	-.478	-.059	.019
104.	.550	-.304	-.450		-.562	-.309	-.051	.140	-.760	-.672	-.557	-.493	-.049	.019
106.	.553	-.289	-.443		-.562	-.279	-.060	.137	-.787	-.686	-.577	-.509	-.039	.020
108.	.557	-.284	-.437		-.559	-.262	-.070	.136	-.815	-.710	-.594	-.530	-.033	.020
110.	.560	-.283	-.427		-.553	-.260	-.080	.139	-.834	-.734	-.612	-.539	-.027	.019
112.	.564	-.275	-.419		-.545	-.261	-.085	.135	-.864	-.751	-.631	-.528	-.024	.019
114.	.567	-.271	-.414		-.531	-.278	-.090	.132	-.893	-.774	-.645	-.487	-.020	.020
116.	.564	-.274	-.404		-.517	-.295	-.096	.135	-.913	-.785	-.663	-.406	-.014	.019
118.	.566	-.276	-.383		-.512	-.308	-.096	.135	-.934	-.808	-.685	-.325	-.011	.020

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 10 TIME 54541.600 MU= .356 CLP= .00421 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
120.	.561	-.279	-.354		-.501	-.323	-.097	.133	-.956	-.816	-.700	-.240	-.012	.016
122.	.557	-.282	-.326		-.488	-.338	-.098	.132	-.975	-.831	-.715	-.170	-.012	.007
124.	.552	-.291	-.304		-.492	-.343	-.099	.127	-.994	-.855	-.731	-.114	-.017	.009
126.	.548	-.299	-.282		-.490	-.347	-.107	.121	-1.027	-.869	-.748	-.098	-.019	.013
128.	.544	-.303	-.277		-.487	-.352	-.111	.120	-1.054	-.891	-.765	-.078	-.013	.013
130.	.540	-.313	-.281		-.484	-.356	-.113	.116	-1.075	-.910	-.783	-.064	-.005	.007
132.	.537	-.321	-.293		-.454	-.361	-.114	.116	-1.097	-.923	-.795	-.058	-.005	.005
134.	.527	-.326	-.306		-.440	-.367	-.116	.119	-1.127	-.936	-.806	-.059	-.013	.004
136.	.526	-.331	-.320		-.418	-.349	-.110	.115	-1.151	-.951	-.818	-.061	-.021	.004
138.	.520	-.328	-.333		-.415	-.342	-.119	.109	-1.169	-.966	-.830	-.070	-.021	-.003
140.	.512	-.331	-.336		-.413	-.335	-.122	.109	-1.197	-.982	-.834	-.087	-.022	-.013
142.	.509	-.337	-.333		-.417	-.341	-.124	.104	-1.224	-.999	-.804	-.103	-.030	-.015
144.	.497	-.343	-.331		-.404	-.344	-.126	.097	-1.246	-1.017	-.621	-.113	-.032	-.015
146.	.490	-.349	-.338		-.390	-.328	-.129	.098	-1.279	-1.020	-.404	-.124	-.040	-.015
148.	.496	-.345	-.344		-.378	-.331	-.131	.100	-1.308	-.918	-.266	-.133	-.040	-.016
150.	.476	-.362	-.351		-.372	-.327	-.134	.093	-1.323	-.717	-.233	-.135	-.041	-.016
152.	.467	-.370	-.354		-.363	-.330	-.137	.085	-1.298	-.575	-.253	-.138	-.040	-.016
154.	.441	-.390	-.351		-.367	-.326	-.140	.079	-1.209	-.514	-.278	-.141	-.034	-.017
156.	.420	-.399	-.354		-.368	-.329	-.143	.080	-1.060	-.469	-.277	-.140	-.032	-.017
158.	.389	-.421	-.362		-.377	-.325	-.145	.078	-.938	-.445	-.264	-.130	-.025	-.016
160.	.367	-.418	-.370		-.386	-.333	-.149	.071	-.834	-.413	-.245	-.118	-.022	-.016
162.	.346	-.442	-.391		-.395	-.335	-.152	.073	-.728	-.377	-.223	-.111	-.016	-.017
164.	.309	-.467	-.411		-.398	-.333	-.156	.075	-.634	-.340	-.201	-.098	-.012	-.019
166.	.254	-.496	-.428		-.401	-.334	-.160	.074	-.536	-.315	-.178	-.091	-.006	-.030
168.	.213	-.537	-.443		-.404	-.333	-.160	.068	-.434	-.275	-.159	-.087	-.002	-.028
170.	.168	-.566	-.463		-.407	-.333	-.153	.070	-.346	-.248	-.138	-.072	.004	-.019
172.	.106	-.597	-.489		-.418	-.333	-.158	.073	-.254	-.204	-.118	-.059	.010	-.024
174.	.055	-.633	-.507		-.421	-.331	-.161	.068	-.158	-.174	-.097	-.049	.016	-.033
176.	-.015	-.680	-.530		-.427	-.332	-.166	.063	-.077	-.142	-.074	-.038	.016	-.029
178.	-.085	-.716	-.549		-.439	-.341	-.163	.065	.006	-.109	-.059	-.027	.024	-.021

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 10 TIME 54541.600 MU= .356 CLP= .00421 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
180.	-.152	-.760	-.564		-.440	-.338	-.159	.066	.074	-.074	-.037	-.016	.030	-.021
182.	-.248	-.812	-.592		-.448	-.340	-.163	.068	.146	-.037	-.011	-.013	.039	-.022
184.	-.334	-.854	-.610		-.461	-.336	-.159	.070	.222	.003	.007	-.013	.045	-.022
186.	-.425	-.890	-.627		-.472	-.340	-.155	.067	.296	.040	.036	.008	.055	-.024
188.	-.522	-.934	-.645		-.471	-.333	-.160	.064	.362	.062	.055	.024	.060	-.026
190.	-.624	-.993	-.680		-.467	-.338	-.165	.066	.435	.093	.086	.039	.062	-.026
192.	-.732	-1.044	-.704		-.478	-.348	-.169	.068	.474	.133	.106	.042	.063	-.027
194.	-.845	-1.086	-.725		-.477	-.357	-.174	.067	.516	.160	.123	.058	.067	-.027
196.	-.965	-1.131	-.744		-.508	-.346	-.165	.068	.571	.189	.143	.075	.069	-.027
198.	-1.092	-1.175	-.772		-.503	-.355	-.164	.073	.622	.210	.152	.077	.069	-.029
200.	-1.213	-1.226	-.788		-.523	-.363	-.168	.069	.655	.227	.167	.096	.091	-.027
202.	-1.341	-1.272	-.794		-.512	-.351	-.174	.063	.706	.261	.216	.099	.091	-.030
204.	-1.474	-1.311	-.818		-.526	-.361	-.160	.063	.744	.283	.224	.103	.094	-.032
206.	-1.618	-1.351	-.843		-.521	-.343	-.161	.065	.766	.306	.249	.122	.096	-.033
208.	-1.780	-1.392	-.864		-.534	-.353	-.166	.067	.809	.328	.256	.126	.099	-.034
210.	-1.932	-1.434	-.873		-.529	-.362	-.171	.069	.848	.338	.264	.130	.102	-.036
212.	-2.101	-1.477	-.899		-.541	-.344	-.176	.071	.873	.367	.272	.134	.103	-.037
214.	-2.287	-1.497	-.919		-.536	-.354	-.155	.073	.899	.390	.285	.138	.091	-.038
216.	-2.483	-1.537	-.929		-.552	-.365	-.158	.075	.900	.401	.311	.142	.112	-.039
218.	-2.712	-1.555	-.947		-.568	-.369	-.163	.078	.915	.413	.320	.146	.111	-.040
220.	-2.933	-1.597	-.958		-.577	-.351	-.167	.080	.941	.425	.329	.150	.096	-.041
222.	-3.155	-1.611	-.974		-.564	-.361	-.142	.082	.936	.437	.338	.155	.099	-.042
224.	-3.387	-1.622	-.972		-.550	-.371	-.146	.084	.954	.449	.339	.159	.102	-.043
226.	-3.562	-1.666	-.983		-.545	-.369	-.150	.087	.980	.462	.332	.164	.104	-.045
228.	-3.665	-1.674	-.995		-.559	-.353	-.154	.089	.968	.474	.341	.168	.107	-.046
230.	-3.725	-1.681	-1.009		-.574	-.362	-.158	.091	.987	.453	.350	.172	.110	-.047
232.	-3.741	-1.686	-1.017		-.576	-.353	-.162	.092	.969	.459	.355	.164	.114	-.048
234.	-3.672	-1.689	-1.010		-.572	-.337	-.165	.083	.944	.471	.364	.141	.117	-.041
236.	-3.589	-1.695	-1.023		-.586	-.345	-.160	.068	.964	.481	.372	.132	.120	-.018
238.	-3.419	-1.726	-1.025		-.583	-.352	-.135	.073	.985	.492	.378	.135	.124	-.023

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 10 TIME 54541.600 MU= .356 CLP= .00421 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
240.	-3.280	-1.722	-1.036		-.579	-.359	-.138	.084	.957	.460	.368	.138	.112	-.040
242.	-3.177	-1.715	-1.033		-.569	-.367	-.141	.078	.977	.469	.363	.141	.100	-.016
244.	-3.103	-1.706	-1.017		-.565	-.374	-.144	.086	.990	.478	.349	.144	.084	-.016
246.	-3.031	-1.693	-1.026		-.576	-.381	-.147	.069	.960	.482	.345	.147	.092	-.017
248.	-3.000	-1.692	-1.015		-.586	-.387	-.149	.070	.977	.449	.351	.149	.105	-.017
250.	-3.000	-1.702	-1.024		-.595	-.360	-.151	.071	.981	.456	.356	.151	.086	-.017
252.	-3.008	-1.681	-1.006		-.574	-.384	-.154	.072	.950	.463	.361	.154	.077	-.017
254.	-3.033	-1.675	-1.014		-.571	-.367	-.156	.073	.963	.469	.366	.156	.078	-.018
256.	-3.019	-1.673	-.950		-.578	-.358	-.157	.054	.974	.462	.341	.157	.078	-.018
258.	-3.000	-1.665	-.953		-.579	-.363	-.160	.047	.984	.432	.346	.159	.076	-.020
260.	-2.976	-1.655	-.961		-.583	-.367	-.162	.051	.993	.435	.350	.160	.076	-.023
262.	-2.968	-1.618	-.968		-.550	-.370	-.163	.051	1.000	.439	.353	.130	.077	-.023
264.	-2.961	-1.633	-.972		-.548	-.372	-.164	.051	1.006	.441	.355	.129	.077	-.023
266.	-2.922	-1.631	-.938		-.551	-.373	-.165	.052	1.010	.443	.321	.130	.078	-.023
268.	-2.904	-1.586	-.940		-.594	-.374	-.165	.052	1.012	.444	.321	.130	.078	-.023
270.	-2.851	-1.569	-.941		-.552	-.374	-.165	.080	.983	.444	.321	.128	.078	-.023
272.	-2.804	-1.568	-.940		-.552	-.374	-.165	.058	.952	.444	.321	.097	.078	-.023
274.	-2.797	-1.564	-.930		-.551	-.373	-.165	.052	.950	.416	.320	.097	.078	-.023
276.	-2.786	-1.523	-.894		-.549	-.372	-.164	.051	.946	.391	.319	.096	.077	-.023
278.	-2.738	-1.502	-.889		-.546	-.370	-.163	.051	.941	.388	.317	.096	.077	-.023
280.	-2.703	-1.492	-.883		-.542	-.367	-.162	.051	.934	.386	.315	.095	.073	-.056
282.	-2.645	-1.479	-.878		-.537	-.364	-.161	.050	.926	.382	.312	.094	.042	-.061
284.	-2.604	-1.465	-.873		-.533	-.360	-.159	.050	.957	.377	.307	.094	.042	-.060
286.	-2.574	-1.448	-.863		-.541	-.354	-.156	.040	.963	.373	.288	.093	.045	-.055
288.	-2.503	-1.429	-.852		-.553	-.349	-.154	.040	.951	.368	.260	.082	.044	-.018
290.	-2.459	-1.409	-.840		-.517	-.344	-.152	.039	.937	.363	.257	.060	.036	-.054
292.	-2.421	-1.387	-.827		-.509	-.339	-.149	.039	.923	.357	.253	.059	.012	-.053
294.	-2.380	-1.364	-.813		-.514	-.333	-.147	.038	.907	.351	.248	.058	.012	-.052
296.	-2.296	-1.341	-.816		-.529	-.343	-.150	.037	.891	.345	.244	.057	.012	-.051
298.	-2.249	-1.355	-.818		-.519	-.367	-.180	.036	.874	.338	.239	.056	.011	-.050

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 10 TIME 54541.600 MU= .356 CLP= .00421 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
300.	-2.204	-1.328	-.801		-.508	-.360	-.177	.036	.856	.331	.234	.055	.011	-.049
302.	-2.157	-1.299	-.784		-.497	-.352	-.173	.035	.838	.324	.229	.068	.023	-.048
304.	-2.109	-1.271	-.767		-.486	-.344	-.169	.034	.868	.317	.224	.064	.038	-.040
306.	-2.060	-1.248	-.769		-.475	-.336	-.165	.033	.848	.310	.219	.051	.037	-.015
308.	-2.011	-1.248	-.762		-.482	-.328	-.161	.033	.828	.302	.214	.050	.037	-.014
310.	-1.961	-1.226	-.743		-.484	-.342	-.157	.032	.811	.295	.209	.049	.036	-.014
312.	-1.911	-1.222	-.724		-.472	-.351	-.153	.031	.831	.290	.203	.047	.035	-.014
314.	-1.861	-1.200	-.705		-.459	-.342	-.163	.030	.809	.312	.198	.030	.034	-.023
316.	-1.811	-1.202	-.686		-.467	-.333	-.177	.029	.787	.277	.193	.022	.033	-.040
318.	-1.762	-1.191	-.712		-.463	-.324	-.172	.029	.774	.293	.187	.021	.032	-.039
320.	-1.713	-1.158	-.701		-.471	-.339	-.167	.040	.784	.257	.182	.021	.031	-.038
322.	-1.665	-1.138	-.704		-.465	-.315	-.162	.049	.762	.258	.177	.020	.030	-.037
324.	-1.617	-1.123	-.709		-.452	-.322	-.158	.035	.740	.275	.172	.020	.029	-.036
326.	-1.571	-1.105	-.691		-.439	-.321	-.153	.038	.730	.267	.167	.037	.029	-.035
328.	-1.525	-1.101	-.667		-.426	-.311	-.149	.045	.733	.259	.162	.020	.028	-.034
330.	-1.492	-1.097	-.674		-.410	-.329	-.145	.047	.725	.252	.162	-.000	.025	-.035
332.	-1.464	-1.077	-.655		-.401	-.323	-.157	.044	.724	.244	.153	-.001	.009	-.033
334.	-1.421	-1.060	-.656		-.411	-.313	-.160	.041	.703	.237	.148	-.018	.007	-.031
336.	-1.379	-1.055	-.642		-.421	-.304	-.155	.040	.682	.229	.144	-.018	.007	-.030
338.	-1.338	-1.048	-.641		-.412	-.294	-.150	.049	.676	.222	.135	-.017	.008	-.028
340.	-1.298	-1.041	-.624		-.401	-.311	-.163	.050	.671	.215	.114	-.017	.008	-.040
342.	-1.246	-1.034	-.623		-.408	-.302	-.163	.049	.651	.210	.111	-.016	-.008	-.044
344.	-1.200	-1.026	-.623		-.395	-.296	-.158	.037	.632	.204	.111	-.016	-.010	-.044
346.	-1.165	-1.018	-.619		-.401	-.310	-.154	.049	.614	.198	.108	-.015	-.009	-.044
348.	-1.131	-1.010	-.603		-.392	-.301	-.149	.049	.613	.192	.105	-.015	-.009	-.042
350.	-1.098	-1.002	-.603		-.393	-.296	-.164	.051	.604	.187	.105	-.015	-.011	-.058
352.	-1.067	-1.010	-.603		-.386	-.307	-.160	.050	.604	.182	.102	-.014	-.010	-.058
354.	-1.037	-1.004	-.604		-.389	-.302	-.156	.062	.594	.190	.098	-.014	-.010	-.056
356.	-1.007	-1.011	-.602		-.388	-.309	-.150	.057	.577	.191	.093	-.013	-.008	-.053
358.	-.964	-1.003	-.601		-.400	-.301	-.146	.056	.562	.171	.087	-.013	-.008	-.052

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 11 TIME 54648.800 MU= .370 CLP= .00433 TEMP(U60)= 10.6 C = 50.99 F

X/C=	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
AZIMUTH														
0.	-.813	-1.027	-.582		-.391	-.313	-.154	.043	.510	.133	.050	-.043	-.026	-.045
2.	-.724	-1.028	-.590		-.392	-.306	-.153	.056	.486	.111	.038	-.042	-.026	-.045
4.	-.656	-1.021	-.576		-.383	-.298	-.149	.056	.460	.100	.024	-.043	-.026	-.055
6.	-.592	-1.010	-.572		-.385	-.307	-.159	.054	.426	.087	.011	-.053	-.025	-.056
8.	-.525	-.999	-.562		-.378	-.299	-.156	.053	.394	.067	.000	-.062	-.026	-.055
10.	-.474	-.989	-.556		-.381	-.293	-.151	.060	.377	.059	-.004	-.069	-.035	-.052
12.	-.418	-.978	-.544		-.374	-.302	-.147	.047	.354	.047	-.018	-.073	-.047	-.073
14.	-.373	-.969	-.541		-.377	-.312	-.157	.047	.327	.020	-.036	-.089	-.061	-.062
16.	-.321	-.959	-.539		-.378	-.322	-.155	.062	.287	.011	-.040	-.094	-.054	-.062
18.	-.281	-.937	-.538		-.377	-.326	-.164	.070	.272	-.001	-.039	-.095	-.052	-.061
20.	-.233	-.928	-.532		-.372	-.322	-.160	.069	.266	-.004	-.041	-.102	-.054	-.060
22.	-.210	-.920	-.532		-.380	-.325	-.156	.076	.245	-.004	-.051	-.105	-.062	-.070
24.	-.179	-.900	-.543		-.392	-.323	-.152	.075	.237	-.005	-.057	-.107	-.066	-.078
26.	-.148	-.892	-.574		-.396	-.329	-.151	.077	.232	-.016	-.061	-.113	-.067	-.074
28.	-.131	-.874	-.631		-.398	-.331	-.157	.080	.227	-.017	-.069	-.120	-.072	-.075
30.	-.102	-.867	-.690		-.395	-.330	-.154	.087	.222	-.017	-.077	-.121	-.074	-.084
32.	-.063	-.850	-.741		-.398	-.337	-.151	.092	.203	-.029	-.079	-.119	-.082	-.088
34.	-.037	-.833	-.779		-.406	-.338	-.148	.093	.199	-.029	-.083	-.117	-.084	-.079
36.	-.011	-.815	-.813		-.408	-.338	-.145	.097	.195	-.040	-.084	-.129	-.083	-.078
38.	.014	-.791	-.839		-.416	-.345	-.143	.100	.191	-.040	-.082	-.141	-.091	-.080
40.	.048	-.778	-.849		-.422	-.345	-.140	.107	.173	-.050	-.080	-.141	-.101	-.085
42.	.070	-.761	-.853		-.425	-.354	-.138	.109	.158	-.050	-.101	-.149	-.107	-.083
44.	.089	-.738	-.857		-.434	-.357	-.136	.111	.153	-.061	-.115	-.162	-.109	-.082
46.	.102	-.719	-.855		-.440	-.359	-.134	.114	.138	-.072	-.122	-.163	-.112	-.081
48.	.125	-.705	-.852		-.450	-.357	-.132	.115	.122	-.080	-.129	-.177	-.122	-.079
50.	.153	-.680	-.840		-.463	-.360	-.124	.120	.107	-.081	-.135	-.185	-.130	-.073
52.	.172	-.654	-.828		-.473	-.359	-.118	.123	.093	-.091	-.146	-.195	-.125	-.073
54.	.188	-.636	-.818		-.478	-.355	-.112	.126	.079	-.100	-.153	-.201	-.133	-.072
56.	.200	-.618	-.808		-.503	-.350	-.106	.132	.065	-.110	-.159	-.205	-.135	-.067
58.	.218	-.601	-.798		-.532	-.346	-.099	.133	.048	-.119	-.171	-.204	-.139	-.062

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 11 TIME 54648.800 MU= .370 CLP= .00433 TEMP(U60)= 10.6 C = 50.99 F

X/C=	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
AZIMUTH														
60.	.236	-.584	-.781		-.561	-.333	-.089	.136	.027	-.128	-.177	-.227	-.139	-.058
62.	.254	-.569	-.765		-.582	-.319	-.079	.142	.010	-.137	-.183	-.226	-.137	-.052
64.	.272	-.554	-.743		-.586	-.295	-.069	.148	-.020	-.151	-.195	-.243	-.136	-.049
66.	.294	-.533	-.721		-.616	-.280	-.052	.150	-.050	-.170	-.210	-.247	-.127	-.042
68.	.321	-.516	-.699		-.628	-.277	-.048	.150	-.085	-.188	-.223	-.251	-.125	-.039
70.	.348	-.503	-.677		-.631	-.276	-.040	.154	-.126	-.212	-.243	-.251	-.131	-.038
72.	.375	-.484	-.649		-.627	-.305	-.031	.149	-.166	-.235	-.269	-.268	-.137	-.038
74.	.396	-.462	-.619		-.623	-.336	-.030	.149	-.212	-.258	-.288	-.278	-.143	-.033
76.	.420	-.448	-.589		-.632	-.377	-.038	.144	-.250	-.292	-.312	-.286	-.144	-.032
78.	.440	-.430	-.570		-.622	-.425	-.046	.143	-.284	-.318	-.333	-.305	-.149	-.026
80.	.457	-.410	-.548		-.623	-.464	-.046	.134	-.317	-.342	-.360	-.327	-.146	-.017
82.	.475	-.398	-.527		-.624	-.501	-.054	.131	-.350	-.377	-.385	-.346	-.139	-.015
84.	.485	-.380	-.506		-.608	-.528	-.055	.127	-.392	-.414	-.402	-.369	-.133	-.009
86.	.502	-.369	-.490		-.596	-.550	-.063	.126	-.437	-.452	-.415	-.385	-.126	-.009
88.	.512	-.351	-.477		-.584	-.575	-.063	.121	-.491	-.490	-.428	-.400	-.116	-.002
90.	.522	-.342	-.466		-.581	-.585	-.062	.115	-.539	-.529	-.439	-.418	-.098	-.002
92.	.531	-.333	-.454		-.573	-.596	-.053	.128	-.585	-.552	-.445	-.432	-.088	-.002
94.	.541	-.324	-.447		-.562	-.603	-.045	.129	-.631	-.572	-.461	-.442	-.077	-.002
96.	.552	-.307	-.440		-.554	-.604	-.036	.136	-.668	-.600	-.489	-.455	-.063	.005
98.	.553	-.297	-.434		-.551	-.605	-.030	.142	-.693	-.622	-.515	-.472	-.056	.006
100.	.564	-.281	-.428		-.550	-.607	-.030	.142	-.729	-.644	-.534	-.486	-.047	.012
102.	.567	-.273	-.423		-.544	-.609	-.030	.141	-.744	-.656	-.550	-.501	-.037	.013
104.	.569	-.265	-.422		-.539	-.607	-.030	.142	-.770	-.669	-.570	-.526	-.027	.015
106.	.571	-.257	-.418		-.542	-.605	-.030	.142	-.787	-.692	-.586	-.539	-.017	.021
108.	.566	-.252	-.413		-.539	-.604	-.031	.145	-.815	-.716	-.601	-.550	-.011	.018
110.	.569	-.253	-.408		-.534	-.597	-.034	.146	-.843	-.731	-.614	-.563	-.005	.015
112.	.565	-.255	-.409		-.525	-.591	-.043	.144	-.861	-.745	-.631	-.569	-.002	.020
114.	.567	-.257	-.406		-.519	-.579	-.049	.141	-.880	-.753	-.645	-.578	-.006	.017
116.	.562	-.260	-.401		-.508	-.555	-.053	.143	-.898	-.770	-.658	-.570	-.004	.016
118.	.557	-.266	-.398		-.502	-.521	-.058	.144	-.909	-.785	-.672	-.535	-.002	.024

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 11 TIME 54648.800 MU= .370 CLP= .00433 TEMP(U60)= 10.6 C = 50.99 F

X/C=	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
AZIMUTH														
120.	.553	-.274	-.387		-.499	-.474	-.064	.140	-.930	-.793	-.686	-.471	.009	.026
122.	.548	-.282	-.375		-.503	-.423	-.068	.138	-.949	-.802	-.702	-.384	.013	.022
124.	.544	-.290	-.347		-.509	-.389	-.075	.135	-.961	-.817	-.717	-.291	.013	.022
126.	.536	-.294	-.318		-.493	-.369	-.079	.134	-.981	-.842	-.727	-.215	.007	.023
128.	.526	-.303	-.286		-.488	-.341	-.080	.131	-1.015	-.853	-.737	-.146	-.000	.023
130.	.523	-.312	-.283		-.484	-.321	-.082	.127	-1.037	-.865	-.746	-.103	.004	.018
132.	.519	-.323	-.288		-.483	-.312	-.090	.120	-1.058	-.882	-.765	-.082	-.001	.009
134.	.510	-.332	-.310		-.481	-.316	-.101	.113	-1.081	-.902	-.777	-.062	-.001	.007
136.	.495	-.337	-.324		-.469	-.332	-.105	.113	-1.098	-.911	-.781	-.062	-.009	.007
138.	.487	-.343	-.336		-.438	-.338	-.107	.109	-1.124	-.920	-.794	-.058	-.009	.000
140.	.484	-.348	-.349		-.414	-.333	-.110	.113	-1.150	-.936	-.794	-.074	-.019	-.004
142.	.481	-.355	-.353		-.410	-.326	-.112	.108	-1.171	-.953	-.745	-.091	-.019	-.004
144.	.470	-.370	-.351		-.400	-.319	-.114	.102	-1.201	-.956	-.544	-.100	-.020	-.004
146.	.453	-.371	-.352		-.404	-.313	-.116	.103	-1.229	-.919	-.338	-.110	-.028	-.004
148.	.446	-.376	-.357		-.393	-.316	-.128	.084	-1.244	-.763	-.228	-.119	-.027	-.002
150.	.442	-.383	-.364		-.377	-.312	-.132	.090	-1.233	-.593	-.225	-.122	-.029	-.004
152.	.428	-.402	-.373		-.365	-.316	-.135	.091	-1.155	-.498	-.237	-.124	-.028	-.005
154.	.399	-.413	-.383		-.365	-.311	-.138	.084	-1.025	-.446	-.243	-.121	-.021	-.005
156.	.367	-.434	-.383		-.376	-.317	-.140	.072	-.894	-.411	-.244	-.112	-.020	-.002
158.	.333	-.458	-.379		-.385	-.324	-.143	.073	-.762	-.377	-.230	-.111	-.018	-.003
160.	.297	-.469	-.393		-.394	-.327	-.147	.074	-.651	-.342	-.210	-.100	-.008	-.014
162.	.260	-.481	-.414		-.403	-.325	-.150	.067	-.557	-.305	-.183	-.083	-.002	-.015
164.	.235	-.508	-.437		-.408	-.327	-.151	.068	-.461	-.266	-.160	-.074	.002	-.026
166.	.180	-.551	-.458		-.411	-.325	-.144	.070	-.360	-.239	-.136	-.071	.009	-.027
168.	.121	-.594	-.474		-.413	-.327	-.148	.071	-.272	-.197	-.109	-.057	.008	-.028
170.	.058	-.628	-.494		-.415	-.327	-.153	.069	-.161	-.168	-.086	-.048	.012	-.028
172.	-.007	-.674	-.512		-.426	-.327	-.157	.071	-.084	-.121	-.063	-.037	.018	-.019
174.	-.077	-.709	-.526		-.430	-.327	-.156	.073	-.003	-.089	-.040	-.022	.024	-.023
176.	-.153	-.750	-.541		-.427	-.336	-.150	.075	.083	-.055	-.023	-.011	.031	-.029
178.	-.246	-.802	-.560		-.433	-.335	-.148	.077	.171	-.020	-.002	.001	.039	-.020

FLT 63 RUN11

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 11 TIME 54648.800 MU= .370 CLP= .00433 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
180.	-.329	-.849	-.596		-.449	-.335	-.142	.070	.241	.015	.021	.005	.047	-.020
182.	-.416	-.905	-.619		-.449	-.332	-.146	.064	.295	.039	.042	.005	.048	-.019
184.	-.513	-.951	-.638		-.456	-.335	-.151	.070	.357	.077	.070	.025	.057	-.022
186.	-.626	-.992	-.657		-.457	-.330	-.155	.072	.431	.105	.079	.032	.063	-.023
188.	-.730	-1.030	-.677		-.466	-.334	-.150	.075	.470	.146	.106	.044	.065	-.024
190.	-.839	-1.074	-.705		-.481	-.344	-.146	.077	.517	.172	.128	.060	.078	-.024
192.	-.964	-1.117	-.720		-.487	-.333	-.149	.062	.579	.200	.139	.077	.088	-.013
194.	-1.092	-1.163	-.742		-.477	-.341	-.154	.061	.626	.224	.168	.081	.088	-.015
196.	-1.209	-1.200	-.765		-.488	-.352	-.160	.068	.664	.239	.192	.083	.090	-.016
198.	-1.335	-1.238	-.788		-.484	-.341	-.165	.070	.697	.263	.200	.102	.092	-.009
200.	-1.466	-1.292	-.775		-.498	-.349	-.154	.072	.737	.281	.224	.105	.095	-.009
202.	-1.618	-1.327	-.800		-.514	-.334	-.153	.075	.760	.306	.231	.125	.098	-.009
204.	-1.779	-1.360	-.826		-.509	-.343	-.157	.077	.785	.328	.257	.113	.101	-.009
206.	-1.948	-1.404	-.852		-.546	-.354	-.163	.080	.810	.353	.267	.134	.105	-.010
208.	-2.143	-1.429	-.879		-.517	-.364	-.146	.065	.836	.365	.294	.138	.108	-.010
210.	-2.361	-1.446	-.902		-.531	-.346	-.147	.082	.862	.376	.304	.145	.111	-.010
212.	-2.590	-1.485	-.912		-.526	-.354	-.152	.068	.889	.406	.313	.163	.115	-.011
214.	-2.852	-1.532	-.934		-.538	-.335	-.156	.069	.917	.432	.323	.152	.119	-.011
216.	-3.115	-1.554	-.945		-.532	-.345	-.161	.071	.920	.445	.333	.156	.122	-.011
218.	-3.356	-1.597	-.965		-.549	-.356	-.137	.073	.936	.459	.344	.155	.126	-.012
220.	-3.597	-1.616	-.967		-.565	-.359	-.141	.075	.935	.473	.354	.144	.130	-.012
222.	-3.792	-1.631	-.978		-.574	-.341	-.145	.077	.952	.461	.365	.148	.128	-.012
224.	-3.979	-1.643	-.995		-.560	-.351	-.149	.080	.945	.465	.376	.152	.113	-.013
226.	-4.073	-1.690	-.994		-.555	-.361	-.154	.082	.964	.479	.377	.157	.117	-.013
228.	-4.150	-1.701	-1.005		-.558	-.371	-.153	.084	.952	.492	.370	.161	.112	-.014
230.	-4.151	-1.709	-1.017		-.553	-.367	-.127	.087	.930	.472	.380	.166	.096	-.014
232.	-4.139	-1.715	-1.029		-.553	-.349	-.131	.089	.949	.479	.377	.170	.099	-.014
234.	-4.079	-1.719	-1.037		-.548	-.358	-.134	.091	.974	.491	.371	.175	.102	-.015
236.	-4.008	-1.721	-1.029		-.562	-.367	-.137	.094	.949	.504	.381	.164	.104	-.015
238.	-3.927	-1.727	-1.047		-.575	-.376	-.141	.096	.971	.473	.390	.155	.107	-.015

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 11 TIME 54648.800 MU= .370 CLP= .00433 TEMP(U60)= 10.6 C = 50.99 F

X/C= AZIMUTH	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
240.	-3.830	-1.759	-1.052		-.595	-.382	-.143	.082	.939	.480	.390	.159	.113	-.014
242.	-3.687	-1.753	-1.063		-.590	-.388	-.144	.063	.959	.490	.373	.163	.118	-.008
244.	-3.574	-1.744	-1.032		-.586	-.396	-.147	.072	.979	.501	.368	.166	.121	-.008
246.	-3.450	-1.745	-1.031		-.598	-.404	-.150	.054	.998	.506	.375	.169	.123	-.008
248.	-3.336	-1.762	-1.050		-.609	-.379	-.153	.054	1.017	.471	.382	.173	.105	-.008
250.	-3.292	-1.744	-1.068		-.590	-.366	-.155	.055	1.012	.479	.362	.151	.094	-.008
252.	-3.254	-1.740	-1.057		-.587	-.371	-.157	.056	.931	.486	.358	.145	.096	-.008
254.	-3.248	-1.745	-1.066		-.600	-.375	-.159	.052	.943	.491	.357	.148	.100	-.006
256.	-3.236	-1.737	-1.031		-.608	-.378	-.160	.048	.955	.498	.360	.178	.102	-.004
258.	-3.238	-1.733	-1.037		-.605	-.387	-.164	.060	.967	.492	.378	.155	.097	-.009
260.	-3.248	-1.698	-1.046		-.608	-.392	-.167	.069	.976	.459	.384	.152	.096	-.014
262.	-3.241	-1.686	-.971		-.613	-.395	-.168	.069	.960	.462	.387	.153	.097	-.014
264.	-3.236	-1.696	-.977		-.576	-.397	-.169	.070	.926	.465	.353	.154	.098	-.014
266.	-3.196	-1.703	-.982		-.575	-.399	-.170	.070	.930	.467	.353	.154	.098	-.014
268.	-3.176	-1.676	-.997		-.576	-.400	-.170	.070	.932	.466	.354	.121	.098	-.014
270.	-3.151	-1.659	-.985		-.589	-.395	-.167	.054	.932	.466	.337	.154	.072	-.007
272.	-3.124	-1.657	-.986		-.576	-.400	-.169	.067	.932	.468	.354	.120	.062	-.011
274.	-3.084	-1.653	-.993		-.576	-.399	-.170	.070	.929	.465	.351	.120	.098	-.014
276.	-3.051	-1.646	-.977		-.584	-.392	-.166	.020	.926	.463	.336	.120	.069	-.006
278.	-3.033	-1.597	-.971		-.569	-.395	-.168	.031	.921	.462	.349	.118	.061	-.012
280.	-2.975	-1.574	-.964		-.565	-.392	-.167	.067	.914	.459	.347	.118	.061	-.014
282.	-2.932	-1.560	-.955		-.560	-.388	-.165	.068	.905	.455	.344	.125	.060	-.013
284.	-2.901	-1.543	-.945		-.554	-.384	-.164	.068	.939	.450	.340	.131	.060	-.013
286.	-2.826	-1.524	-.934		-.547	-.380	-.162	.067	.945	.444	.336	.081	.059	-.013
288.	-2.736	-1.548	-.921		-.539	-.374	-.159	.066	.932	.438	.331	.080	.058	-.013
290.	-2.686	-1.527	-.907		-.531	-.369	-.157	.065	.918	.432	.326	.078	.057	-.013
292.	-2.641	-1.502	-.892		-.522	-.363	-.154	.064	.903	.424	.321	.077	.056	-.013
294.	-2.594	-1.475	-.876		-.528	-.356	-.152	.063	.935	.417	.315	.076	.055	-.012
296.	-2.545	-1.449	-.859		-.542	-.367	-.149	.055	.974	.409	.309	.074	.054	-.012
298.	-2.493	-1.461	-.842		-.531	-.391	-.154	.035	.961	.401	.303	.073	.053	-.012

FLT 63 RUN11

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 11 TIME 54648.800 MU= .370 CLP= .00433 TEMP(U60)= 10.6 C = 50.99 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
300.	-2.439	-1.430	-.824		-.520	-.382	-.182	.059	.940	.392	.296	.071	.052	-.012
302.	-2.385	-1.404	-.805		-.508	-.374	-.178	.049	.919	.383	.290	.070	.051	-.011
304.	-2.328	-1.405	-.829		-.496	-.365	-.174	.027	.898	.374	.283	.068	.050	-.011
306.	-2.279	-1.379	-.833		-.503	-.356	-.170	.026	.877	.365	.276	.066	.048	-.011
308.	-2.294	-1.375	-.812		-.506	-.370	-.166	.036	.902	.397	.269	.065	.047	-.011
310.	-2.234	-1.348	-.813		-.513	-.380	-.161	.052	.878	.386	.262	.063	.046	-.010
312.	-2.174	-1.350	-.799		-.511	-.369	-.157	.051	.860	.376	.255	.061	.045	-.010
314.	-2.114	-1.338	-.804		-.497	-.359	-.153	.049	.875	.365	.248	.060	.044	-.010
316.	-2.063	-1.312	-.789		-.486	-.348	-.163	.044	.850	.354	.236	.058	.044	-.008
318.	-2.030	-1.309	-.790		-.474	-.337	-.174	.040	.835	.344	.228	.057	.044	-.006
320.	-1.970	-1.291	-.795		-.460	-.354	-.169	.039	.842	.334	.221	.037	.042	-.018
322.	-1.912	-1.267	-.774		-.469	-.353	-.164	.037	.829	.324	.215	.032	.041	-.019
324.	-1.855	-1.260	-.771		-.460	-.342	-.159	.050	.831	.314	.208	.012	.040	-.019
326.	-1.799	-1.237	-.749		-.443	-.333	-.155	.061	.819	.306	.207	.009	.037	-.031
328.	-1.757	-1.215	-.750		-.451	-.323	-.151	.061	.818	.296	.201	.009	.035	-.032
330.	-1.719	-1.207	-.728		-.440	-.314	-.146	.059	.793	.298	.195	.008	.034	-.031
332.	-1.666	-1.197	-.727		-.426	-.331	-.160	.057	.783	.307	.189	.008	.033	-.030
334.	-1.615	-1.187	-.706		-.436	-.324	-.162	.055	.778	.297	.183	.025	.032	-.029
336.	-1.565	-1.177	-.704		-.423	-.314	-.157	.054	.753	.288	.177	.008	.014	-.028
338.	-1.516	-1.165	-.685		-.431	-.304	-.152	.052	.746	.279	.170	.007	.013	-.042
340.	-1.469	-1.154	-.684		-.420	-.321	-.166	.050	.737	.271	.148	.007	.012	-.046
342.	-1.424	-1.142	-.679		-.426	-.313	-.164	.049	.715	.262	.144	.007	-.005	-.044
344.	-1.365	-1.130	-.663		-.415	-.327	-.159	.047	.693	.254	.139	.004	-.005	-.059
346.	-1.316	-1.118	-.661		-.419	-.320	-.155	.046	.672	.232	.132	-.008	-.004	-.060
348.	-1.259	-1.106	-.659		-.406	-.331	-.150	.060	.651	.217	.115	-.008	-.007	-.058
350.	-1.183	-1.093	-.651		-.403	-.321	-.145	.058	.632	.210	.112	-.008	-.019	-.056
352.	-1.138	-1.081	-.639		-.417	-.311	-.142	.056	.631	.204	.108	-.012	-.018	-.054
354.	-1.088	-1.087	-.633		-.406	-.307	-.155	.054	.599	.197	.099	-.021	-.017	-.053
356.	-1.036	-1.076	-.613		-.403	-.312	-.149	.047	.577	.191	.078	-.025	-.015	-.048
358.	-.953	-1.082	-.609		-.400	-.310	-.145	.061	.560	.170	.069	-.032	-.015	-.048

FLT 63 RUN11

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 15 TIME 54494.400 MU= .243 CLP= .00372 TEMP(U60)= 19.8 C = 67.56 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
0.	-.296	-.801	-.456		-.300	-.294	-.153	.083	.215	-.001	-.048	-.096	-.057	-.073
2.	-.263	-.786	-.448		-.294	-.294	-.150	.082	.195	-.017	-.056	-.103	-.063	-.071
4.	-.236	-.772	-.451		-.299	-.289	-.148	.080	.187	-.029	-.066	-.103	-.065	-.070
6.	-.208	-.758	-.444		-.296	-.296	-.152	.079	.165	-.032	-.076	-.101	-.072	-.075
8.	-.183	-.744	-.436		-.301	-.294	-.155	.077	.143	-.051	-.096	-.099	-.073	-.079
10.	-.150	-.731	-.439		-.298	-.289	-.152	.076	.122	-.070	-.097	-.098	-.071	-.071
12.	-.125	-.718	-.432		-.303	-.284	-.158	.061	.102	-.074	-.105	-.123	-.070	-.065
14.	-.102	-.729	-.436		-.299	-.279	-.160	.090	.083	-.081	-.114	-.122	-.077	-.071
16.	-.078	-.741	-.440		-.305	-.274	-.157	.091	.064	-.085	-.112	-.129	-.086	-.074
18.	-.063	-.734	-.443		-.312	-.310	-.154	.090	.046	-.098	-.121	-.127	-.085	-.073
20.	-.041	-.739	-.437		-.307	-.308	-.161	.088	.029	-.110	-.129	-.134	-.084	-.071
22.	-.021	-.745	-.439		-.303	-.303	-.161	.087	.003	-.115	-.137	-.141	-.082	-.070
24.	.008	-.746	-.434		-.308	-.312	-.158	.085	-.020	-.120	-.144	-.148	-.090	-.077
26.	.023	-.738	-.438		-.305	-.308	-.156	.084	-.036	-.131	-.152	-.152	-.089	-.078
28.	.039	-.736	-.442		-.311	-.316	-.154	.083	-.051	-.141	-.159	-.144	-.096	-.077
30.	.055	-.737	-.443		-.315	-.313	-.161	.082	-.066	-.152	-.166	-.148	-.094	-.076
32.	.067	-.739	-.440		-.313	-.322	-.160	.089	-.080	-.154	-.171	-.148	-.093	-.075
34.	.078	-.751	-.443		-.317	-.329	-.158	.088	-.094	-.160	-.171	-.156	-.093	-.074
36.	.099	-.754	-.447		-.313	-.325	-.156	.095	-.108	-.162	-.178	-.166	-.099	-.073
38.	.103	-.756	-.447		-.314	-.323	-.154	.094	-.121	-.168	-.182	-.164	-.097	-.072
40.	.120	-.757	-.446		-.324	-.329	-.162	.093	-.134	-.169	-.182	-.164	-.096	-.071
42.	.133	-.770	-.450		-.323	-.328	-.160	.092	-.147	-.176	-.189	-.167	-.097	-.070
44.	.143	-.773	-.454		-.329	-.333	-.158	.098	-.148	-.176	-.192	-.168	-.102	-.070
46.	.152	-.775	-.453		-.331	-.334	-.156	.097	-.158	-.184	-.193	-.171	-.100	-.077
48.	.162	-.767	-.453		-.332	-.338	-.155	.096	-.158	-.183	-.196	-.172	-.099	-.068
50.	.172	-.769	-.453		-.334	-.339	-.153	.097	-.169	-.191	-.198	-.178	-.098	-.067
52.	.170	-.763	-.453		-.335	-.343	-.152	.102	-.181	-.200	-.204	-.180	-.097	-.066
54.	.179	-.764	-.453		-.341	-.339	-.150	.101	-.180	-.199	-.206	-.178	-.097	-.074
56.	.179	-.760	-.454		-.342	-.342	-.149	.102	-.178	-.197	-.204	-.181	-.099	-.074
58.	.186	-.761	-.459		-.339	-.345	-.148	.107	-.177	-.196	-.203	-.182	-.102	-.073

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 15 TIME 54494.400 MU= .243 CLP= .00372 TEMP(U60)= 19.8 C = 67.58 F

X/C=	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
60.	.196	-.755	-.464		-.342	-.348	-.146	.106	-.188	-.204	-.206	-.181	-.101	-.072
62.	.196	-.750	-.487		-.343	-.351	-.145	.105	-.188	-.203	-.207	-.175	-.100	-.072
64.	.203	-.745	-.518		-.341	-.348	-.144	.107	-.198	-.201	-.206	-.172	-.100	-.071
66.	.202	-.743	-.554		-.338	-.346	-.143	.111	-.197	-.199	-.199	-.170	-.099	-.071
68.	.201	-.745	-.586		-.336	-.344	-.143	.110	-.193	-.189	-.196	-.169	-.099	-.070
70.	.197	-.741	-.616		-.341	-.342	-.142	.109	-.180	-.188	-.195	-.174	-.098	-.070
72.	.192	-.738	-.639		-.341	-.341	-.141	.109	-.169	-.187	-.194	-.174	-.098	-.070
74.	.204	-.735	-.654		-.340	-.339	-.141	.108	-.175	-.189	-.199	-.179	-.102	-.069
76.	.224	-.727	-.660		-.339	-.338	-.140	.104	-.199	-.204	-.212	-.180	-.104	-.065
78.	.240	-.720	-.659		-.330	-.337	-.139	.101	-.228	-.230	-.226	-.185	-.103	-.061
80.	.249	-.713	-.633		-.328	-.336	-.139	.100	-.260	-.246	-.234	-.185	-.103	-.061
82.	.263	-.701	-.591		-.327	-.344	-.139	.100	-.289	-.259	-.248	-.191	-.103	-.061
84.	.279	-.690	-.533		-.327	-.345	-.145	.100	-.326	-.275	-.256	-.197	-.103	-.056
86.	.288	-.674	-.468		-.326	-.345	-.147	.100	-.357	-.289	-.270	-.197	-.102	-.053
88.	.298	-.654	-.413		-.326	-.354	-.147	.100	-.388	-.304	-.277	-.197	-.102	-.053
90.	.308	-.647	-.383		-.334	-.344	-.147	.100	-.419	-.319	-.285	-.203	-.102	-.053
92.	.324	-.634	-.367		-.334	-.344	-.147	.100	-.450	-.334	-.292	-.203	-.102	-.053
94.	.333	-.622	-.354		-.335	-.345	-.147	.100	-.481	-.344	-.293	-.204	-.096	-.053
96.	.339	-.599	-.353		-.334	-.345	-.140	.100	-.513	-.360	-.301	-.204	-.096	-.047
98.	.350	-.571	-.347		-.327	-.346	-.139	.100	-.544	-.375	-.308	-.204	-.096	-.045
100.	.361	-.551	-.348		-.328	-.345	-.139	.100	-.570	-.385	-.308	-.205	-.096	-.045
102.	.365	-.533	-.347		-.327	-.337	-.139	.101	-.580	-.397	-.311	-.205	-.096	-.045
104.	.374	-.507	-.342		-.322	-.338	-.140	.101	-.582	-.401	-.318	-.206	-.096	-.046
106.	.378	-.505	-.341		-.323	-.339	-.140	.094	-.575	-.410	-.319	-.205	-.090	-.046
108.	.388	-.499	-.334		-.322	-.341	-.141	.095	-.565	-.415	-.320	-.201	-.091	-.046
110.	.391	-.482	-.327		-.318	-.339	-.142	.095	-.555	-.424	-.322	-.199	-.091	-.046
112.	.393	-.474	-.324		-.319	-.333	-.143	.096	-.535	-.429	-.323	-.196	-.092	-.039
114.	.396	-.467	-.322		-.318	-.335	-.143	.095	-.523	-.431	-.322	-.195	-.090	-.039
116.	.398	-.460	-.316		-.315	-.333	-.144	.090	-.514	-.434	-.320	-.192	-.086	-.039
118.	.401	-.453	-.314		-.317	-.329	-.145	.090	-.528	-.437	-.318	-.190	-.084	-.039

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 15 TIME 54494.400 MU= .243 CLP= .00372 TEMP(U60)= 19.8 C = 67.58 F

X/C= AZIMUTH	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
120.	.404	-.446	-.312		-.315	-.326	-.144	.091	-.533	-.431	-.313	-.188	-.080	-.040
122.	.407	-.440	-.306		-.313	-.322	-.136	.092	-.524	-.434	-.311	-.185	-.081	-.041
124.	.410	-.442	-.305		-.311	-.325	-.140	.093	-.515	-.427	-.310	-.184	-.081	-.047
126.	.404	-.438	-.307		-.309	-.322	-.141	.093	-.507	-.430	-.304	-.185	-.082	-.041
128.	.406	-.440	-.304		-.296	-.319	-.142	.091	-.527	-.424	-.304	-.187	-.079	-.041
130.	.400	-.436	-.305		-.288	-.316	-.143	.088	-.559	-.417	-.302	-.184	-.076	-.041
132.	.403	-.437	-.301		-.291	-.314	-.145	.088	-.593	-.421	-.296	-.184	-.077	-.042
134.	.396	-.435	-.302		-.294	-.317	-.142	.089	-.625	-.414	-.291	-.180	-.078	-.042
136.	.388	-.439	-.298		-.297	-.313	-.138	.087	-.646	-.407	-.286	-.175	-.074	-.043
138.	.384	-.440	-.300		-.294	-.313	-.140	.083	-.662	-.398	-.280	-.169	-.072	-.043
140.	.386	-.439	-.304		-.295	-.308	-.142	.085	-.659	-.382	-.275	-.169	-.073	-.044
142.	.378	-.445	-.306		-.291	-.308	-.143	.086	-.660	-.375	-.270	-.165	-.073	-.044
144.	.367	-.445	-.303		-.293	-.302	-.145	.087	-.643	-.368	-.264	-.166	-.068	-.045
146.	.352	-.445	-.306		-.288	-.303	-.141	.083	-.631	-.361	-.259	-.154	-.067	-.045
148.	.344	-.451	-.310		-.291	-.297	-.139	.081	-.610	-.354	-.253	-.154	-.068	-.046
150.	.337	-.458	-.305		-.285	-.299	-.141	.082	-.587	-.346	-.247	-.149	-.062	-.047
152.	.329	-.457	-.310		-.289	-.303	-.143	.083	-.564	-.343	-.241	-.151	-.062	-.047
154.	.320	-.459	-.314		-.293	-.295	-.145	.084	-.541	-.338	-.235	-.153	-.063	-.048
156.	.305	-.466	-.319		-.287	-.298	-.147	.085	-.517	-.317	-.229	-.146	-.055	-.049
158.	.291	-.474	-.323		-.291	-.289	-.140	.087	-.492	-.302	-.223	-.132	-.056	-.042
160.	.282	-.481	-.319		-.285	-.265	-.140	.088	-.466	-.280	-.216	-.141	-.057	-.040
162.	.264	-.489	-.324		-.288	-.270	-.142	.090	-.449	-.265	-.208	-.127	-.048	-.041
164.	.240	-.487	-.329		-.283	-.274	-.145	.074	-.430	-.269	-.192	-.128	-.048	-.041
166.	.225	-.493	-.335		-.288	-.279	-.147	.073	-.413	-.257	-.185	-.120	-.040	-.042
168.	.204	-.501	-.341		-.293	-.284	-.138	.074	-.390	-.242	-.177	-.111	-.041	-.043
170.	.178	-.510	-.347		-.295	-.289	-.140	.076	-.361	-.232	-.169	-.098	-.042	-.044
172.	.162	-.532	-.353		-.291	-.294	-.142	.077	-.330	-.221	-.161	-.099	-.041	-.044
174.	.138	-.543	-.360		-.296	-.296	-.145	.079	-.298	-.210	-.153	-.101	-.033	-.045
176.	.109	-.553	-.366		-.298	-.292	-.148	.079	-.265	-.187	-.140	-.103	-.034	-.046
178.	.079	-.563	-.373		-.294	-.311	-.150	.071	-.231	-.171	-.123	-.097	-.031	-.047

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 15 TIME 54494.400 MU= .243 CLP= .00372 TEMP(U60)= 19.8 C = 67.58 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
180.	.048	-.574	-.386		-.300	-.311	-.152	.072	-.196	-.158	-.113	-.086	-.024	-.048
182.	.030	-.600	-.400		-.305	-.305	-.142	.073	-.142	-.131	-.103	-.083	-.025	-.049
184.	-.017	-.613	-.408		-.311	-.305	-.145	.075	-.100	-.114	-.093	-.078	-.025	-.050
186.	-.053	-.640	-.416		-.311	-.299	-.147	.076	-.060	-.099	-.082	-.080	-.021	-.050
188.	-.089	-.654	-.424		-.309	-.305	-.150	.078	-.018	-.084	-.070	-.070	-.014	-.051
190.	-.127	-.682	-.432		-.315	-.311	-.153	.076	.026	-.051	-.052	-.060	-.015	-.052
192.	-.184	-.695	-.441		-.321	-.308	-.156	.068	.071	-.034	-.033	-.061	-.015	-.054
194.	-.225	-.712	-.459		-.328	-.304	-.159	.070	.119	-.016	-.020	-.048	-.009	-.055
196.	-.269	-.745	-.473		-.334	-.310	-.157	.071	.166	.003	-.006	-.039	-.003	-.056
198.	-.330	-.773	-.483		-.331	-.316	-.149	.072	.195	.020	-.001	-.040	-.003	-.057
200.	-.380	-.794	-.492		-.331	-.322	-.152	.074	.245	.023	.009	-.041	-.003	-.053
202.	-.443	-.823	-.502		-.327	-.315	-.155	.075	.278	.043	.024	-.041	.005	-.044
204.	-.493	-.845	-.512		-.340	-.313	-.158	.077	.329	.064	.040	-.032	.010	-.044
206.	-.545	-.882	-.522		-.339	-.319	-.152	.078	.367	.082	.045	-.029	.011	-.045
208.	-.598	-.911	-.546		-.341	-.310	-.146	.080	.414	.088	.058	-.030	.011	-.046
210.	-.653	-.929	-.559		-.347	-.309	-.149	.081	.429	.112	.075	-.019	.011	-.047
212.	-.710	-.946	-.569		-.339	-.315	-.152	.083	.464	.130	.079	-.017	.011	-.048
214.	-.768	-.964	-.580		-.342	-.321	-.154	.084	.491	.139	.109	-.004	.011	-.049
216.	-.829	-.982	-.591		-.348	-.307	-.144	.086	.510	.157	.115	-.003	.012	-.050
218.	-.890	-1.012	-.583		-.355	-.308	-.140	.087	.548	.168	.117	-.003	.012	-.051
220.	-.943	-1.039	-.593		-.361	-.314	-.143	.089	.575	.185	.119	-.003	.012	-.052
222.	-.996	-1.057	-.604		-.367	-.319	-.145	.091	.585	.188	.121	-.003	.012	-.052
224.	-1.049	-1.075	-.614		-.353	-.300	-.148	.092	.610	.202	.124	-.002	.012	-.053
226.	-1.092	-1.077	-.624		-.339	-.304	-.150	.094	.635	.219	.144	.013	.013	-.054
228.	-1.150	-1.087	-.631		-.344	-.309	-.134	.095	.645	.222	.146	.014	.013	-.055
230.	-1.203	-1.104	-.624		-.350	-.313	-.133	.097	.655	.226	.148	.014	.013	-.056
232.	-1.248	-1.121	-.633		-.355	-.316	-.155	.098	.684	.244	.151	.014	.013	-.057
234.	-1.293	-1.137	-.643		-.360	-.323	-.139	.100	.707	.258	.153	.014	.013	-.058
236.	-1.319	-1.153	-.652		-.361	-.327	-.139	.101	.717	.262	.155	.014	.014	-.058
238.	-1.357	-1.168	-.653		-.343	-.327	-.140	.102	.726	.265	.157	.019	.014	-.059

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 15 TIME 54494.400 MU= .243 CLP= .00372 TEMP(U60)= 19.8 C = 67.58 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
240.	-1.402	-1.183	-.647		-.335	-.307	-.142	.104	.735	.268	.159	.027	.014	-.060
242.	-1.425	-1.198	-.655		-.350	-.311	-.144	.105	.744	.272	.161	.015	.014	-.061
244.	-1.441	-1.211	-.662		-.337	-.314	-.146	.104	.753	.275	.163	.015	.014	-.061
246.	-1.456	-1.198	-.660		-.341	-.317	-.147	.088	.761	.278	.164	.015	.009	-.062
248.	-1.470	-1.209	-.654		-.344	-.321	-.149	.088	.739	.280	.166	.015	-.005	-.063
250.	-1.484	-1.193	-.659		-.338	-.323	-.150	.089	.740	.283	.167	.016	-.005	-.063
252.	-1.496	-1.203	-.665		-.336	-.326	-.151	.090	.746	.285	.169	.016	-.005	-.064
254.	-1.507	-1.212	-.657		-.342	-.329	-.152	.091	.752	.287	.170	.006	-.005	-.064
256.	-1.517	-1.216	-.651		-.331	-.317	-.153	.091	.757	.289	.171	.007	-.005	-.065
258.	-1.524	-1.199	-.655		-.333	-.301	-.154	.092	.761	.291	.172	.016	-.005	-.065
260.	-1.504	-1.205	-.658		-.334	-.303	-.155	.092	.765	.292	.173	.016	-.005	-.065
262.	-1.510	-1.210	-.661		-.336	-.304	-.156	.093	.766	.294	.174	.004	-.005	-.066
264.	-1.511	-1.206	-.646		-.337	-.305	-.156	.093	.771	.295	.174	-.003	-.005	-.066
266.	-1.489	-1.196	-.641		-.337	-.306	-.156	.093	.772	.295	.175	.010	-.005	-.066
268.	-1.491	-1.218	-.641		-.338	-.306	-.157	.093	.773	.292	.175	.002	-.005	-.066
270.	-1.491	-1.209	-.642		-.321	-.306	-.157	.093	.774	.266	.175	.011	-.005	-.066
272.	-1.463	-1.179	-.641		-.331	-.306	-.157	.093	.773	.266	.175	.016	-.005	-.066
274.	-1.459	-1.171	-.641		-.319	-.306	-.156	.093	.772	.266	.175	.000	-.005	-.066
276.	-1.446	-1.173	-.639		-.312	-.305	-.156	.093	.771	.265	.174	.013	-.005	-.066
278.	-1.422	-1.166	-.637		-.311	-.304	-.156	.093	.768	.265	.155	-.001	-.005	-.066
280.	-1.405	-1.177	-.635		-.310	-.303	-.155	.092	.765	.264	.151	-.003	-.005	-.065
282.	-1.380	-1.157	-.632		-.330	-.301	-.154	.092	.749	.262	.151	.014	-.005	-.065
284.	-1.372	-1.137	-.628		-.309	-.300	-.153	.091	.721	.261	.150	.016	-.005	-.065
286.	-1.350	-1.129	-.624		-.327	-.298	-.152	.091	.717	.259	.149	-.003	-.005	-.064
288.	-1.310	-1.121	-.619		-.303	-.296	-.151	.090	.711	.257	.148	-.004	-.005	-.064
290.	-1.270	-1.112	-.614		-.300	-.293	-.150	.089	.706	.242	.146	-.022	-.005	-.063
292.	-1.214	-1.102	-.606		-.297	-.320	-.149	.088	.682	.225	.145	-.022	-.005	-.063
294.	-1.161	-1.073	-.581		-.295	-.288	-.147	.088	.658	.223	.144	-.022	-.024	-.062
296.	-1.087	-1.053	-.574		-.312	-.313	-.146	.087	.632	.206	.138	-.024	-.024	-.061
298.	-1.025	-1.022	-.563		-.288	-.283	-.144	.086	.611	.176	.097	-.039	-.041	-.061

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 15 TIME 54494.400 MU= .243 CLP= .00372 TEMP(U60)= 19.8 C = 67.58 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
300.	-.967	-1.004	-.540		-.288	-.307	-.142	.085	.583	.162	.079	-.042	-.024	-.060
302.	-.900	-.970	-.533		-.299	-.300	-.141	.084	.563	.144	.074	-.056	-.041	-.078
304.	-.834	-.953	-.526		-.277	-.275	-.139	.083	.534	.132	.056	-.055	-.040	-.079
306.	-.809	-.940	-.519		-.278	-.300	-.137	.081	.517	.130	.057	-.055	-.040	-.078
308.	-.777	-.926	-.511		-.291	-.318	-.157	.080	.509	.110	.050	-.054	-.039	-.077
310.	-.740	-.913	-.504		-.286	-.307	-.155	.080	.502	.102	.036	-.053	-.038	-.076
312.	-.724	-.899	-.496		-.282	-.282	-.153	.095	.494	.100	.029	-.052	-.038	-.094
314.	-.713	-.908	-.497		-.278	-.266	-.150	.094	.486	.099	.017	-.051	-.037	-.093
316.	-.679	-.893	-.499		-.281	-.299	-.148	.092	.478	.077	.017	-.051	-.037	-.091
318.	-.666	-.879	-.491		-.288	-.294	-.145	.091	.470	.072	.017	-.050	-.036	-.090
320.	-.654	-.885	-.493		-.292	-.289	-.143	.089	.462	.071	.016	-.049	-.035	-.088
322.	-.643	-.872	-.492		-.288	-.264	-.140	.088	.454	.070	.016	-.056	-.041	-.087
324.	-.631	-.879	-.484		-.263	-.279	-.143	.086	.446	.068	.016	-.070	-.049	-.085
326.	-.620	-.881	-.486		-.297	-.285	-.155	.084	.438	.067	.016	-.076	-.049	-.084
328.	-.609	-.869	-.483		-.300	-.292	-.152	.083	.430	.087	.015	-.074	-.048	-.082
330.	-.597	-.874	-.486		-.294	-.287	-.149	.061	.422	.085	.015	-.073	-.047	-.080
332.	-.586	-.872	-.482		-.289	-.281	-.146	.080	.414	.063	.015	-.071	-.054	-.079
334.	-.575	-.862	-.486		-.295	-.289	-.151	.078	.406	.064	.014	-.070	-.059	-.077
336.	-.564	-.865	-.493		-.295	-.292	-.158	.077	.398	.081	.014	-.078	-.058	-.076
338.	-.553	-.868	-.487		-.301	-.301	-.155	.075	.391	.079	.014	-.080	-.057	-.075
340.	-.543	-.870	-.490		-.300	-.287	-.152	.081	.383	.078	.014	-.089	-.056	-.073
342.	-.532	-.872	-.496		-.294	-.305	-.149	.086	.376	.076	.002	-.090	-.055	-.079
344.	-.522	-.873	-.489		-.301	-.310	-.146	.084	.369	.070	-.001	-.088	-.054	-.085
346.	-.512	-.866	-.493		-.298	-.289	-.153	.082	.361	.055	-.001	-.086	-.053	-.083
348.	-.495	-.858	-.484		-.305	-.295	-.156	.081	.354	.054	-.001	-.074	-.051	-.082
350.	-.467	-.849	-.489		-.314	-.292	-.153	.079	.348	.053	-.013	-.082	-.050	-.080
352.	-.441	-.842	-.479		-.310	-.287	-.150	.078	.324	.046	-.013	-.081	-.050	-.076
354.	-.407	-.833	-.471		-.304	-.298	-.148	.076	.293	.035	-.025	-.091	-.059	-.077
356.	-.373	-.827	-.474		-.298	-.310	-.145	.084	.278	.027	-.025	-.090	-.059	-.076
358.	-.341	-.817	-.465		-.306	-.305	-.153	.085	.243	.010	-.038	-.099	-.058	-.074

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 18 TIME 54782.700 MU= .241 CLP= .00619 TEMP(U60)= 19.8 C = 67.58 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
0.	-.584	-1.021	-.558		-.328	-.309	-.163	.089	.444	.111	.027	-.055	-.026	-.059
2.	-.512	-1.002	-.554		-.328	-.313	-.171	.087	.400	.094	.015	-.059	-.029	-.058
4.	-.443	-.987	-.550		-.334	-.307	-.168	.086	.373	.078	.004	-.058	-.035	-.059
6.	-.405	-.996	-.545		-.346	-.301	-.162	.087	.348	.062	-.007	-.067	-.038	-.067
8.	-.341	-.992	-.535		-.347	-.296	-.153	.093	.325	.047	-.018	-.075	-.047	-.066
10.	-.292	-.986	-.533		-.335	-.305	-.159	.091	.301	.032	-.033	-.078	-.052	-.067
12.	-.232	-.973	-.528		-.335	-.315	-.160	.087	.262	.004	-.053	-.092	-.055	-.074
14.	-.189	-.983	-.526		-.341	-.317	-.169	.079	.258	-.010	-.067	-.102	-.064	-.073
15.	-.187	-.992	-.535		-.340	-.326	-.174	.080	.254	.003	-.065	-.101	-.063	-.072
18.	-.197	-1.003	-.540		-.341	-.335	-.171	.091	.265	.016	-.054	-.099	-.057	-.076
20.	-.206	-1.022	-.549		-.346	-.336	-.159	.105	.261	.016	-.049	-.097	-.061	-.092
22.	-.201	-1.027	-.547		-.345	-.338	-.162	.109	.256	.015	-.054	-.096	-.064	-.096
24.	-.182	-1.024	-.545		-.352	-.339	-.153	.104	.238	.003	-.063	-.100	-.068	-.087
26.	-.144	-1.020	-.540		-.343	-.334	-.154	.097	.231	-.010	-.071	-.112	-.075	-.083
28.	-.116	-1.013	-.539		-.330	-.329	-.159	.096	.198	-.022	-.085	-.121	-.078	-.075
30.	-.078	-.999	-.534		-.325	-.332	-.156	.098	.166	-.034	-.101	-.133	-.082	-.077
32.	-.043	-.982	-.519		-.333	-.340	-.158	.101	.134	-.056	-.112	-.136	-.084	-.079
34.	-.017	-.960	-.511		-.348	-.340	-.162	.100	.106	-.067	-.119	-.145	-.083	-.075
36.	.013	-.948	-.496		-.351	-.343	-.160	.101	.088	-.079	-.127	-.147	-.086	-.079
38.	.027	-.932	-.480		-.353	-.351	-.158	.104	.059	-.099	-.133	-.145	-.088	-.078
40.	.044	-.913	-.465		-.357	-.351	-.161	.108	.033	-.107	-.139	-.144	-.087	-.078
42.	.038	-.903	-.467		-.363	-.355	-.164	.107	.027	-.102	-.140	-.142	-.086	-.077
44.	.018	-.896	-.484		-.368	-.355	-.162	.096	.056	-.080	-.128	-.140	-.080	-.072
46.	.013	-.893	-.541		-.373	-.359	-.160	.092	.090	-.061	-.103	-.133	-.066	-.070
48.	.027	-.883	-.619		-.378	-.351	-.154	.096	.099	-.060	-.090	-.125	-.061	-.078
50.	.048	-.874	-.684		-.390	-.344	-.143	.106	.095	-.060	-.093	-.122	-.061	-.086
52.	.062	-.861	-.730		-.384	-.340	-.137	.115	.084	-.059	-.102	-.121	-.070	-.089
54.	.062	-.848	-.773		-.385	-.337	-.136	.117	.090	-.054	-.095	-.125	-.079	-.084
56.	.061	-.840	-.809		-.383	-.334	-.135	.117	.108	-.040	-.092	-.131	-.085	-.080
58.	.061	-.833	-.835		-.366	-.340	-.133	.116	.103	-.050	-.098	-.131	-.086	-.079

FLT 65 RUN18

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 18 TIME 54782.700 MU= .241 CLP= .00619 TEMP(U60)= 19.8 C = 67.58 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
60.	.119	-.827	-.854		-.360	-.340	-.132	.115	.098	-.054	-.098	-.130	-.080	-.078
62.	.152	-.826	-.872		-.343	-.337	-.131	.114	.109	-.044	-.104	-.129	-.078	-.078
64.	.036	-.825	-.883		-.338	-.335	-.131	.109	.125	-.034	-.098	-.134	-.078	-.073
66.	.025	-.824	-.901		-.336	-.333	-.130	.106	.144	-.027	-.096	-.134	-.077	-.069
68.	.015	-.829	-.912		-.334	-.331	-.129	.105	.156	-.023	-.089	-.127	-.077	-.073
70.	.009	-.834	-.924		-.332	-.329	-.128	.109	.172	-.017	-.088	-.126	-.076	-.076
72.	.014	-.839	-.934		-.332	-.327	-.127	.110	.185	-.017	-.089	-.132	-.081	-.075
74.	.024	-.845	-.937		-.329	-.326	-.127	.115	.185	-.020	-.094	-.137	-.082	-.075
76.	.033	-.846	-.934		-.313	-.325	-.127	.122	.174	-.030	-.101	-.143	-.088	-.075
78.	.046	-.838	-.936		-.295	-.315	-.120	.123	.155	-.039	-.108	-.143	-.088	-.070
80.	.067	-.831	-.928		-.286	-.313	-.117	.123	.137	-.049	-.115	-.149	-.082	-.067
82.	.081	-.818	-.925		-.261	-.312	-.117	.118	.113	-.062	-.122	-.149	-.087	-.062
84.	.091	-.804	-.916		-.261	-.311	-.123	.116	.089	-.077	-.129	-.155	-.088	-.059
86.	.100	-.794	-.907		-.252	-.311	-.125	.116	.065	-.091	-.143	-.161	-.081	-.059
88.	.110	-.790	-.898		-.244	-.311	-.125	.115	.042	-.105	-.150	-.161	-.081	-.059
90.	.119	-.784	-.890		-.236	-.321	-.125	.115	.018	-.119	-.157	-.161	-.081	-.059
92.	.129	-.775	-.883		-.236	-.321	-.125	.115	-.012	-.134	-.164	-.161	-.081	-.053
94.	.139	-.772	-.876		-.236	-.321	-.125	.116	-.041	-.143	-.171	-.161	-.081	-.052
96.	.143	-.767	-.869		-.237	-.322	-.125	.110	-.058	-.153	-.178	-.161	-.075	-.052
98.	.149	-.766	-.863		-.246	-.332	-.126	.115	-.077	-.158	-.178	-.161	-.075	-.052
100.	.153	-.760	-.859		-.254	-.333	-.126	.116	-.101	-.163	-.180	-.162	-.075	-.052
102.	.154	-.760	-.859		-.262	-.334	-.126	.111	-.118	-.174	-.186	-.162	-.075	-.052
104.	.160	-.763	-.855		-.263	-.336	-.127	.110	-.130	-.178	-.187	-.162	-.075	-.052
106.	.171	-.759	-.850		-.268	-.345	-.127	.104	-.143	-.185	-.188	-.157	-.075	-.046
108.	.175	-.760	-.847		-.291	-.338	-.136	.111	-.156	-.189	-.189	-.158	-.069	-.051
110.	.176	-.764	-.842		-.302	-.339	-.128	.110	-.168	-.190	-.191	-.157	-.069	-.052
112.	.176	-.768	-.842		-.311	-.341	-.129	.105	-.182	-.191	-.189	-.151	-.069	-.053
114.	.170	-.772	-.844		-.322	-.343	-.138	.104	-.187	-.192	-.186	-.147	-.063	-.053
116.	.161	-.769	-.841		-.330	-.346	-.131	.107	-.196	-.194	-.184	-.148	-.064	-.054
118.	.160	-.773	-.833		-.335	-.346	-.131	.105	-.201	-.195	-.181	-.145	-.063	-.053

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 18 TIME 54782.700 MU= .241 CLP= .00619 TEMP(U60)= 19.8 C = 67.58 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
120.	.161	-.779	-.603		-.343	-.340	-.132	.108	-.203	-.189	-.179	-.137	-.058	-.055
122.	.154	-.765	-.743		-.346	-.340	-.133	.109	-.204	-.188	-.174	-.136	-.059	-.055
124.	.153	-.791	-.663		-.349	-.334	-.135	.103	-.197	-.189	-.174	-.132	-.059	-.055
126.	.146	-.798	-.583		-.352	-.335	-.136	.104	-.195	-.184	-.170	-.133	-.060	-.056
128.	.137	-.806	-.520		-.352	-.329	-.137	.104	-.197	-.183	-.169	-.134	-.060	-.056
130.	.128	-.814	-.487		-.350	-.329	-.138	.098	-.189	-.177	-.166	-.136	-.059	-.057
132.	.118	-.822	-.479		-.351	-.324	-.138	.097	-.188	-.176	-.166	-.137	-.053	-.057
134.	.118	-.831	-.470		-.346	-.324	-.131	.098	-.190	-.178	-.162	-.136	-.054	-.057
136.	.110	-.840	-.462		-.339	-.320	-.133	.101	-.181	-.171	-.160	-.130	-.055	-.050
138.	.100	-.850	-.454		-.337	-.320	-.135	.102	-.181	-.171	-.156	-.127	-.054	-.051
140.	.090	-.849	-.455		-.341	-.316	-.135	.096	-.171	-.164	-.155	-.126	-.049	-.052
142.	.080	-.837	-.457		-.331	-.319	-.128	.097	-.172	-.164	-.148	-.120	-.050	-.052
144.	.069	-.816	-.453		-.312	-.319	-.130	.098	-.162	-.157	-.146	-.117	-.050	-.053
146.	.069	-.804	-.449		-.317	-.311	-.131	.098	-.162	-.157	-.145	-.118	-.050	-.053
148.	.059	-.792	-.446		-.320	-.307	-.133	.099	-.151	-.149	-.137	-.116	-.049	-.053
150.	.048	-.780	-.443		-.325	-.307	-.133	.094	-.138	-.150	-.134	-.110	-.044	-.046
152.	.036	-.768	-.439		-.325	-.303	-.127	.096	-.139	-.141	-.131	-.099	-.045	-.046
154.	.024	-.756	-.436		-.319	-.302	-.129	.095	-.127	-.142	-.129	-.093	-.046	-.047
156.	.012	-.745	-.438		-.319	-.299	-.131	.090	-.114	-.133	-.126	-.094	-.046	-.048
158.	.012	-.743	-.439		-.324	-.298	-.133	.091	-.115	-.134	-.118	-.096	-.043	-.049
160.	.011	-.732	-.436		-.324	-.295	-.135	.090	-.101	-.124	-.116	-.097	-.039	-.049
162.	-.014	-.729	-.432		-.318	-.300	-.137	.085	-.103	-.125	-.112	-.094	-.040	-.050
164.	-.028	-.716	-.436		-.318	-.291	-.139	.087	-.088	-.114	-.104	-.097	-.036	-.051
166.	-.042	-.715	-.436		-.317	-.281	-.138	.085	-.072	-.103	-.096	-.091	-.032	-.052
168.	-.057	-.706	-.432		-.311	-.286	-.132	.080	-.057	-.091	-.093	-.092	-.032	-.053
170.	-.072	-.715	-.436		-.311	-.291	-.134	.081	-.040	-.092	-.069	-.091	-.033	-.054
172.	-.088	-.714	-.436		-.310	-.296	-.137	.083	-.022	-.081	-.079	-.083	-.028	-.051
174.	-.104	-.713	-.441		-.310	-.293	-.139	.084	.012	-.081	-.077	-.081	-.024	-.044
176.	-.121	-.716	-.440		-.316	-.291	-.142	.086	.031	-.068	-.071	-.082	-.025	-.045
178.	-.141	-.725	-.445		-.314	-.296	-.139	.087	.050	-.054	-.061	-.077	-.019	-.046

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 18 TIME 54782.700 MU= .241 CLP= .00619 TEMP(U60)= 19.8 C = 67.58 F

X/C=	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
AZIMUTH														
180.	-.172	-.728	-.444		-.315	-.292	-.134	.089	.070	-.041	-.051	-.068	-.015	-.047
182.	-.191	-.737	-.450		-.321	-.291	-.136	.091	.090	-.040	-.046	-.066	-.015	-.046
184.	-.211	-.741	-.458		-.318	-.297	-.139	.092	.112	-.025	-.041	-.060	-.016	-.048
186.	-.231	-.755	-.457		-.320	-.302	-.142	.094	.134	-.012	-.029	-.050	-.009	-.049
188.	-.256	-.764	-.463		-.316	-.296	-.144	.096	.157	-.009	-.017	-.048	-.005	-.050
190.	-.296	-.769	-.472		-.318	-.296	-.147	.098	.181	.007	-.015	-.049	-.005	-.051
192.	-.331	-.784	-.481		-.314	-.302	-.142	.087	.206	.021	-.005	-.041	-.005	-.052
194.	-.356	-.799	-.479		-.316	-.294	-.138	.077	.232	.025	-.002	-.049	-.005	-.053
196.	-.386	-.808	-.486		-.323	-.295	-.140	.079	.259	.044	.008	-.043	-.005	-.048
198.	-.425	-.814	-.496		-.317	-.300	-.143	.080	.286	.058	.022	-.041	.004	-.041
200.	-.458	-.830	-.505		-.320	-.306	-.146	.082	.309	.064	.025	-.032	.007	-.042
202.	-.499	-.846	-.515		-.326	-.312	-.149	.084	.328	.079	.038	-.020	.007	-.043
204.	-.535	-.862	-.525		-.332	-.302	-.152	.085	.368	.086	.053	-.018	.007	-.044
206.	-.585	-.888	-.535		-.339	-.303	-.144	.087	.383	.102	.081	-.019	.007	-.044
208.	-.629	-.915	-.546		-.331	-.309	-.140	.080	.415	.110	.087	-.007	.019	-.045
210.	-.670	-.932	-.556		-.335	-.315	-.142	.076	.449	.132	.088	-.006	.022	-.046
212.	-.725	-.950	-.566		-.341	-.321	-.145	.077	.474	.149	.090	.007	.022	-.047
214.	-.782	-.978	-.577		-.331	-.308	-.148	.079	.492	.159	.106	.008	.022	-.048
216.	-.830	-1.006	-.587		-.336	-.310	-.151	.091	.528	.183	.124	.022	.023	-.049
218.	-.887	-1.024	-.598		-.342	-.315	-.140	.097	.554	.200	.128	.023	.023	-.039
220.	-.950	-1.042	-.609		-.348	-.299	-.136	.099	.575	.204	.130	.038	.024	-.033
222.	-1.000	-1.060	-.619		-.354	-.302	-.139	.089	.613	.226	.149	.039	.024	-.033
224.	-1.076	-1.091	-.629		-.341	-.307	-.141	.086	.640	.257	.151	.040	.025	-.034
226.	-1.141	-1.118	-.640		-.346	-.312	-.143	.087	.650	.261	.171	.041	.025	-.047
228.	-1.196	-1.136	-.650		-.351	-.317	-.146	.089	.675	.265	.174	.057	.025	-.054
230.	-1.264	-1.154	-.660		-.357	-.322	-.148	.090	.701	.269	.177	.058	.026	-.055
232.	-1.333	-1.171	-.670		-.362	-.327	-.150	.091	.726	.285	.180	.058	.042	-.056
234.	-1.388	-1.204	-.680		-.367	-.332	-.152	.093	.752	.302	.201	.059	.044	-.056
236.	-1.446	-1.228	-.689		-.373	-.309	-.154	.094	.762	.306	.203	.060	.044	-.057
238.	-1.519	-1.245	-.698		-.377	-.313	-.156	.111	.773	.323	.206	.061	.044	-.058

AIRFOIL PRESSURE DATA .9 BLADE RADIUS   NASA-LANGLEY AH-1G   78/11/15.

FLT 65 RUN 18   TIME 54782.700   MU= .241   CLP= .00619   TEMP(U60)= 19.8 C = 67.58 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
240.	-1.575	-1.260	-.707		-.380	-.317	-.139	.115	.800	.340	.211	.062	.028	-.059
242.	-1.637	-1.275	-.716		-.367	-.321	-.137	.116	.824	.344	.231	.062	.029	-.059
244.	-1.692	-1.309	-.719		-.386	-.324	-.159	.117	.833	.347	.233	.063	.045	-.060
246.	-1.720	-1.329	-.710		-.350	-.326	-.122	.119	.842	.351	.236	.064	.028	-.061
248.	-1.736	-1.342	-.718		-.354	-.302	-.118	.120	.850	.355	.238	.064	.029	-.061
250.	-1.771	-1.355	-.726		-.357	-.305	-.141	.121	.857	.373	.239	.065	.029	-.062
252.	-1.794	-1.365	-.729		-.362	-.306	-.120	.116	.864	.387	.237	.065	.031	-.060
254.	-1.807	-1.375	-.734		-.362	-.309	-.144	.104	.871	.391	.244	.066	.032	-.063
256.	-1.819	-1.384	-.739		-.365	-.311	-.146	.104	.877	.393	.250	.066	.049	-.063
258.	-1.830	-1.392	-.745		-.367	-.313	-.147	.105	.882	.396	.268	.067	.049	-.064
260.	-1.839	-1.400	-.752		-.369	-.315	-.123	.105	.910	.396	.267	.067	.050	-.064
262.	-1.846	-1.405	-.756		-.373	-.315	-.147	.099	.923	.398	.264	.067	.051	-.041
264.	-1.852	-1.435	-.770		-.375	-.315	-.147	.099	.925	.418	.263	.067	.052	-.051
266.	-1.902	-1.441	-.782		-.378	-.315	-.146	.094	.927	.426	.259	.067	.053	-.060
268.	-1.939	-1.442	-.778		-.377	-.316	-.146	.095	.930	.429	.263	.068	.053	-.060
270.	-1.969	-1.468	-.778		-.373	-.318	-.148	.106	.931	.430	.279	.068	.050	-.042
272.	-1.997	-1.469	-.790		-.373	-.318	-.124	.106	.959	.452	.293	.068	.050	-.065
274.	-2.023	-1.467	-.802		-.373	-.317	-.124	.105	.964	.456	.290	.068	.050	-.064
276.	-2.048	-1.464	-.800		-.373	-.316	-.122	.103	.962	.456	.288	.068	.051	-.062
278.	-2.096	-1.514	-.809		-.371	-.325	-.123	.124	.988	.454	.297	.067	.044	-.064
280.	-2.119	-1.535	-.815		-.369	-.344	-.125	.117	.990	.476	.307	.067	.031	-.062
282.	-2.138	-1.555	-.823		-.396	-.344	-.147	.108	1.016	.479	.318	.067	.030	-.064
284.	-2.180	-1.573	-.841		-.384	-.331	-.150	.124	1.045	.500	.337	.083	.030	-.063
286.	-2.356	-1.592	-.858		-.409	-.310	-.170	.123	1.073	.525	.347	.103	.029	-.063
288.	-2.615	-1.634	-.874		-.406	-.319	-.168	.122	1.099	.548	.354	.102	.037	-.065
290.	-2.952	-1.674	-.877		-.403	-.334	-.167	.121	1.155	.571	.362	.101	.048	-.083
292.	-3.066	-1.703	-.856		-.399	-.319	-.160	.120	1.150	.544	.359	.100	.047	-.083
294.	-2.844	-1.654	-.814		-.395	-.299	-.134	.129	1.075	.487	.325	.090	.039	-.082
296.	-2.518	-1.555	-.775		-.391	-.309	-.115	.155	.966	.404	.261	.071	.020	-.081
298.	-2.196	-1.436	-.732		-.387	-.334	-.121	.153	.889	.346	.210	.053	.002	-.080

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 18 TIME 54782.700 MU= .241 CLP= .00519 TEMP(U60)= 19.8 C = 67.58 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
300.	-1.885	-1.331	-.708		-.382	-.345	-.142	.151	.846	.315	.189	.035	-.008	-.070
302.	-1.661	-1.295	-.699		-.376	-.341	-.163	.138	.804	.310	.176	.017	.001	-.038
304.	-1.541	-1.278	-.690		-.373	-.336	-.177	.106	.794	.306	.166	.010	.010	-.037
306.	-1.472	-1.260	-.680		-.368	-.332	-.174	.093	.785	.302	.164	.020	.009	-.037
308.	-1.429	-1.248	-.671		-.362	-.327	-.164	.091	.802	.298	.161	.015	.009	-.042
310.	-1.406	-1.247	-.675		-.357	-.322	-.156	.090	.790	.293	.159	.009	.000	-.061
312.	-1.387	-1.228	-.670		-.352	-.317	-.167	.095	.778	.289	.156	.009	-.007	-.079
314.	-1.365	-1.221	-.673		-.359	-.312	-.164	.104	.769	.284	.154	.009	-.007	-.084
316.	-1.343	-1.240	-.667		-.347	-.307	-.161	.102	.782	.280	.152	.009	-.007	-.071
318.	-1.320	-1.235	-.656		-.346	-.317	-.159	.100	.769	.275	.149	.009	-.007	-.069
320.	-1.298	-1.221	-.659		-.348	-.321	-.156	.099	.760	.270	.146	.009	-.007	-.062
322.	-1.276	-1.221	-.665		-.355	-.316	-.153	.097	.770	.269	.144	-.002	-.007	-.050
324.	-1.253	-1.220	-.657		-.341	-.310	-.151	.095	.756	.282	.141	-.006	-.007	-.049
326.	-1.231	-1.219	-.659		-.343	-.304	-.157	.094	.743	.277	.139	-.006	-.006	-.048
328.	-1.208	-1.217	-.650		-.341	-.314	-.164	.092	.735	.272	.136	-.006	-.006	-.054
330.	-1.186	-1.214	-.652		-.348	-.315	-.161	.098	.741	.267	.134	.005	-.006	-.062
332.	-1.164	-1.211	-.656		-.346	-.309	-.158	.110	.727	.262	.131	-.014	-.006	-.061
334.	-1.142	-1.208	-.646		-.339	-.319	-.155	.114	.713	.257	.129	-.008	-.006	-.060
336.	-1.127	-1.212	-.648		-.346	-.319	-.152	.112	.700	.252	.126	-.016	-.016	-.059
338.	-1.124	-1.217	-.651		-.342	-.313	-.149	.110	.700	.253	.124	-.018	-.019	-.058
340.	-1.135	-1.220	-.653		-.349	-.322	-.156	.108	.740	.271	.145	-.018	-.018	-.064
342.	-1.155	-1.232	-.656		-.357	-.320	-.159	.106	.779	.297	.170	-.017	-.008	-.070
344.	-1.144	-1.226	-.644		-.353	-.314	-.156	.104	.772	.299	.158	-.006	-.005	-.069
346.	-1.129	-1.211	-.645		-.359	-.308	-.153	.102	.735	.281	.142	-.016	-.005	-.075
348.	-1.110	-1.204	-.633		-.354	-.302	-.140	.108	.707	.270	.150	-.006	-.005	-.079
350.	-1.057	-1.197	-.621		-.360	-.296	-.142	.110	.694	.248	.136	-.015	-.015	-.078
352.	-.979	-1.164	-.596		-.342	-.291	-.144	.100	.664	.226	.110	-.026	-.016	-.068
354.	-.879	-1.119	-.584		-.334	-.301	-.142	.094	.603	.200	.083	-.026	-.026	-.054
356.	-.766	-1.073	-.561		-.328	-.297	-.149	.093	.532	.164	.069	-.036	-.027	-.057
358.	-.649	-1.023	-.551		-.321	-.307	-.150	.091	.464	.130	.045	-.046	-.036	-.068

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 25 TIME 55583.000 MU= .241 CLP= .00512 TEMP(060)= 19.8 C = 67.61 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
0.	-.439	-.874	-.484		-.300	-.271	-.133	.094	.355	.068	.006	-.070	-.044	-.059
2.	-.375	-.858	-.476		-.300	-.270	-.136	.093	.313	.049	-.014	-.072	-.049	-.067
4.	-.337	-.843	-.467		-.294	-.278	-.147	.091	.285	.020	-.029	-.085	-.053	-.066
6.	-.301	-.828	-.459		-.297	-.283	-.152	.089	.246	.007	-.039	-.089	-.052	-.065
8.	-.266	-.813	-.460		-.305	-.294	-.149	.088	.224	.004	-.050	-.095	-.057	-.064
10.	-.232	-.804	-.464		-.303	-.294	-.153	.086	.206	-.010	-.060	-.095	-.060	-.063
12.	-.199	-.798	-.457		-.297	-.289	-.156	.085	.198	-.024	-.069	-.101	-.059	-.062
14.	-.172	-.790	-.459		-.301	-.284	-.154	.083	.177	-.034	-.070	-.101	-.065	-.066
16.	-.151	-.790	-.453		-.308	-.301	-.151	.082	.157	-.037	-.077	-.100	-.066	-.070
18.	-.126	-.784	-.455		-.305	-.303	-.149	.086	.138	-.050	-.086	-.098	-.072	-.069
20.	-.105	-.778	-.459		-.300	-.275	-.153	.088	.119	-.062	-.095	-.096	-.073	-.068
22.	-.082	-.778	-.452		-.305	-.300	-.155	.087	.096	-.074	-.112	-.119	-.072	-.067
24.	-.057	-.779	-.455		-.311	-.314	-.153	.086	.068	-.086	-.120	-.127	-.078	-.066
26.	-.029	-.786	-.458		-.307	-.311	-.151	.084	.052	-.097	-.128	-.133	-.078	-.071
28.	-.004	-.792	-.452		-.313	-.307	-.156	.089	.035	-.104	-.127	-.140	-.084	-.074
30.	.015	-.792	-.456		-.319	-.314	-.157	.091	.013	-.107	-.134	-.138	-.084	-.073
32.	.027	-.793	-.458		-.315	-.323	-.155	.089	-.010	-.118	-.141	-.152	-.083	-.072
34.	.044	-.801	-.453		-.320	-.332	-.153	.088	-.025	-.128	-.148	-.149	-.082	-.071
36.	.062	-.806	-.457		-.316	-.328	-.159	.094	-.039	-.133	-.155	-.141	-.081	-.076
38.	.076	-.807	-.460		-.312	-.324	-.159	.094	-.053	-.137	-.161	-.146	-.087	-.078
40.	.096	-.808	-.464		-.310	-.332	-.157	.093	-.067	-.146	-.160	-.145	-.087	-.077
42.	.125	-.809	-.466		-.334	-.329	-.155	.099	-.088	-.156	-.167	-.151	-.093	-.076
44.	.158	-.803	-.462		-.338	-.337	-.162	.098	-.123	-.172	-.174	-.157	-.092	-.075
46.	.175	-.794	-.468		-.336	-.344	-.152	.104	-.136	-.172	-.186	-.161	-.091	-.067
48.	.161	-.794	-.481		-.342	-.342	-.159	.104	-.110	-.160	-.180	-.158	-.088	-.065
50.	.145	-.796	-.497		-.347	-.350	-.158	.103	-.078	-.147	-.157	-.149	-.073	-.064
52.	.141	-.799	-.529		-.353	-.357	-.156	.109	-.059	-.135	-.149	-.140	-.068	-.071
54.	.139	-.802	-.565		-.357	-.354	-.146	.116	-.055	-.130	-.148	-.134	-.074	-.079
56.	.138	-.796	-.639		-.356	-.350	-.144	.115	-.054	-.129	-.149	-.137	-.081	-.079
58.	.137	-.799	-.687		-.357	-.348	-.134	.114	-.054	-.128	-.153	-.145	-.088	-.076

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 25 TIME 55583.000 MU= .241 CLP= .00512 TEMP(U60)= 19.8 C = 67.61 F

X/C= AZIMUTH	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
60.	.145	-.793	-.724		-.351	-.348	-.134	.119	-.053	-.135	-.152	-.147	-.092	-.078
62.	.154	-.787	-.757		-.354	-.353	-.141	.112	-.063	-.136	-.153	-.152	-.090	-.069
64.	.163	-.792	-.781		-.349	-.351	-.140	.111	-.076	-.143	-.160	-.156	-.084	-.069
66.	.164	-.787	-.797		-.341	-.349	-.139	.111	-.088	-.136	-.161	-.155	-.084	-.068
68.	.153	-.773	-.805		-.339	-.347	-.138	.110	-.067	-.134	-.152	-.154	-.083	-.068
70.	.133	-.778	-.813		-.341	-.349	-.138	.109	-.042	-.116	-.144	-.150	-.080	-.068
72.	.112	-.775	-.825		-.344	-.350	-.137	.109	-.017	-.104	-.135	-.146	-.075	-.067
74.	.101	-.781	-.838		-.346	-.342	-.136	.108	.019	-.094	-.127	-.142	-.075	-.068
76.	.081	-.788	-.851		-.349	-.340	-.134	.108	.045	-.083	-.127	-.141	-.078	-.074
78.	.091	-.794	-.864		-.348	-.339	-.127	.110	.057	-.082	-.130	-.144	-.081	-.074
80.	.101	-.791	-.873		-.347	-.338	-.126	.114	.045	-.092	-.134	-.147	-.084	-.072
82.	.110	-.769	-.873		-.337	-.332	-.126	.114	.032	-.101	-.141	-.150	-.088	-.066
84.	.120	-.786	-.872		-.329	-.332	-.126	.114	.008	-.111	-.148	-.153	-.087	-.066
86.	.130	-.778	-.871		-.324	-.336	-.126	.113	-.017	-.130	-.155	-.160	-.087	-.064
88.	.140	-.777	-.864		-.321	-.336	-.126	.113	-.041	-.140	-.162	-.166	-.087	-.058
90.	.150	-.774	-.856		-.321	-.336	-.126	.113	-.065	-.150	-.175	-.168	-.087	-.058
92.	.160	-.768	-.854		-.321	-.336	-.129	.113	-.090	-.160	-.184	-.166	-.083	-.058
94.	.170	-.765	-.849		-.321	-.336	-.134	.110	-.114	-.170	-.192	-.169	-.081	-.055
96.	.177	-.760	-.842		-.321	-.337	-.134	.107	-.139	-.180	-.194	-.169	-.081	-.051
98.	.180	-.758	-.829		-.322	-.337	-.135	.107	-.161	-.190	-.194	-.169	-.081	-.051
100.	.188	-.754	-.822		-.329	-.338	-.135	.107	-.177	-.198	-.201	-.169	-.081	-.051
102.	.192	-.752	-.816		-.332	-.339	-.135	.108	-.195	-.199	-.203	-.170	-.076	-.051
104.	.199	-.749	-.810		-.333	-.340	-.136	.108	-.203	-.204	-.203	-.165	-.075	-.051
106.	.200	-.747	-.798		-.334	-.342	-.136	.108	-.228	-.222	-.204	-.165	-.075	-.051
108.	.204	-.746	-.778		-.336	-.343	-.132	.109	-.250	-.230	-.205	-.165	-.075	-.052
110.	.212	-.744	-.710		-.337	-.345	-.129	.109	-.264	-.231	-.206	-.166	-.076	-.052
112.	.213	-.744	-.632		-.339	-.347	-.130	.105	-.276	-.236	-.207	-.161	-.076	-.052
114.	.214	-.743	-.545		-.341	-.339	-.130	.103	-.292	-.244	-.208	-.161	-.071	-.052
116.	.215	-.743	-.484		-.343	-.340	-.131	.104	-.302	-.246	-.210	-.162	-.070	-.053
118.	.217	-.742	-.455		-.346	-.342	-.132	.105	-.309	-.247	-.211	-.157	-.071	-.053

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 25 TIME 55583.000 MU= .241 CLP= .00512 TEMP(U60)= 19.8 C = 67.61 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
120.	.218	-.738	-.442		-.340	-.334	-.133	.106	-.319	-.249	-.213	-.151	-.071	-.048
122.	.220	-.733	-.437		-.342	-.336	-.134	.101	-.327	-.251	-.207	-.152	-.065	-.046
124.	.216	-.722	-.431		-.345	-.328	-.135	.100	-.337	-.248	-.208	-.153	-.072	-.046
126.	.213	-.708	-.420		-.347	-.319	-.136	.101	-.340	-.245	-.210	-.154	-.066	-.046
128.	.209	-.694	-.423		-.342	-.322	-.138	.102	-.343	-.247	-.204	-.148	-.066	-.047
130.	.207	-.687	-.418		-.337	-.314	-.139	.103	-.336	-.244	-.205	-.142	-.060	-.047
132.	.202	-.684	-.413		-.339	-.317	-.132	.097	-.336	-.229	-.199	-.138	-.060	-.048
134.	.200	-.680	-.409		-.334	-.319	-.132	.097	-.340	-.222	-.194	-.139	-.061	-.048
136.	.187	-.686	-.407		-.335	-.312	-.134	.098	-.335	-.225	-.195	-.141	-.061	-.049
138.	.182	-.675	-.409		-.320	-.314	-.135	.099	-.334	-.227	-.190	-.142	-.055	-.049
140.	.176	-.671	-.404		-.308	-.307	-.137	.093	-.338	-.230	-.191	-.142	-.055	-.050
142.	.175	-.668	-.400		-.312	-.311	-.138	.094	-.332	-.225	-.187	-.136	-.056	-.051
144.	.168	-.655	-.399		-.316	-.310	-.130	.095	-.311	-.225	-.186	-.132	-.057	-.051
146.	.158	-.651	-.401		-.317	-.294	-.132	.096	-.308	-.219	-.180	-.134	-.057	-.052
148.	.148	-.659	-.396		-.314	-.298	-.134	.097	-.300	-.219	-.173	-.133	-.056	-.043
150.	.148	-.623	-.396		-.315	-.299	-.136	.091	-.301	-.212	-.170	-.127	-.051	-.044
152.	.139	-.631	-.397		-.309	-.294	-.136	.092	-.280	-.203	-.169	-.123	-.052	-.045
154.	.129	-.640	-.393		-.307	-.284	-.129	.092	-.253	-.204	-.162	-.125	-.052	-.045
156.	.118	-.638	-.389		-.308	-.262	-.131	.086	-.253	-.196	-.159	-.123	-.050	-.046
158.	.106	-.635	-.390		-.306	-.266	-.133	.087	-.257	-.186	-.157	-.117	-.045	-.047
160.	.095	-.632	-.390		-.306	-.270	-.135	.088	-.246	-.188	-.149	-.105	-.042	-.047
162.	.096	-.630	-.392		-.300	-.274	-.137	.087	-.233	-.179	-.142	-.098	-.037	-.048
164.	.070	-.627	-.392		-.299	-.279	-.139	.062	-.220	-.168	-.134	-.100	-.038	-.049
166.	.057	-.624	-.394		-.304	-.284	-.142	.083	-.207	-.157	-.131	-.101	-.039	-.050
168.	.044	-.624	-.401		-.303	-.289	-.140	.085	-.192	-.145	-.128	-.103	-.035	-.051
170.	.030	-.635	-.400		-.309	-.294	-.134	.086	-.161	-.148	-.119	-.099	-.030	-.048
172.	.014	-.646	-.404		-.313	-.290	-.136	.088	-.144	-.136	-.110	-.097	-.031	-.041
174.	-.014	-.654	-.411		-.306	-.288	-.139	.089	-.111	-.123	-.101	-.086	-.031	-.042
176.	-.030	-.655	-.410		-.307	-.294	-.141	.091	-.092	-.110	-.091	-.088	-.026	-.047
178.	-.049	-.668	-.414		-.304	-.289	-.144	.093	-.058	-.097	-.081	-.085	-.022	-.055

FLT 65 RUN25

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 25 TIME 55583.000 MU= .241 CLP= .00512 TEMP(U60)= 19.8 C = 67.61 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
180.	-.082	-.675	-.422		-.305	-.288	-.140	.094	-.040	-.085	-.079	-.084	-.023	-.052
182.	-.112	-.678	-.430		-.311	-.293	-.135	.091	-.016	-.061	-.072	-.077	-.023	-.045
184.	-.135	-.691	-.438		-.307	-.299	-.138	.087	.020	-.056	-.061	-.068	-.016	-.046
186.	-.167	-.704	-.435		-.309	-.292	-.141	.082	.046	-.054	-.050	-.067	-.013	-.047
188.	-.193	-.718	-.442		-.315	-.292	-.143	.078	.083	-.038	-.038	-.068	-.013	-.048
190.	-.226	-.731	-.450		-.321	-.298	-.145	.080	.106	-.021	-.026	-.050	-.013	-.049
192.	-.255	-.746	-.459		-.315	-.289	-.140	.081	.137	-.009	-.024	-.047	-.013	-.049
194.	-.296	-.760	-.468		-.306	-.291	-.136	.083	.177	-.004	-.013	-.048	-.004	-.050
196.	-.339	-.775	-.477		-.310	-.296	-.139	.085	.204	.015	-.012	-.049	-.001	-.051
198.	-.376	-.790	-.486		-.316	-.302	-.142	.086	.231	.027	.001	-.039	-.001	-.052
200.	-.411	-.806	-.481		-.322	-.308	-.144	.088	.259	.035	.015	-.039	-.002	-.053
202.	-.449	-.821	-.490		-.313	-.295	-.147	.080	.288	.047	.030	-.027	-.002	-.045
204.	-.488	-.837	-.500		-.318	-.299	-.150	.077	.319	.057	.031	-.027	-.002	-.040
206.	-.539	-.866	-.509		-.324	-.305	-.153	.079	.362	.078	.047	-.027	.011	-.041
208.	-.579	-.889	-.519		-.330	-.311	-.142	.080	.395	.090	.063	-.015	.012	-.042
210.	-.624	-.906	-.529		-.337	-.294	-.141	.082	.416	.102	.066	-.015	.013	-.042
212.	-.679	-.923	-.542		-.343	-.300	-.143	.084	.436	.115	.097	-.014	.013	-.043
214.	-.722	-.955	-.562		-.347	-.305	-.146	.085	.459	.129	.098	-.001	.013	-.044
216.	-.772	-.978	-.559		-.337	-.311	-.149	.087	.495	.153	.100	-.001	.013	-.045
218.	-.832	-.996	-.573		-.343	-.314	-.151	.088	.515	.165	.105	-.001	.013	-.046
220.	-.893	-1.013	-.592		-.346	-.297	-.154	.090	.542	.182	.121	.002	.014	-.046
222.	-.956	-1.031	-.589		-.336	-.303	-.156	.091	.580	.194	.126	.014	.014	-.047
224.	-1.003	-1.048	-.598		-.341	-.308	-.139	.093	.599	.197	.142	.014	.014	-.065
226.	-1.062	-1.066	-.608		-.347	-.313	-.141	.094	.630	.217	.144	.019	.014	-.068
228.	-1.129	-1.105	-.618		-.353	-.318	-.143	.096	.649	.228	.152	.031	.015	-.032
230.	-1.197	-1.123	-.628		-.358	-.316	-.145	.097	.659	.249	.167	.031	.015	-.050
232.	-1.245	-1.139	-.637		-.363	-.300	-.147	.099	.693	.278	.170	.032	.015	-.051
234.	-1.311	-1.156	-.646		-.361	-.305	-.149	.100	.710	.288	.172	.039	.015	-.072
236.	-1.359	-1.172	-.655		-.360	-.309	-.149	.102	.719	.292	.175	.050	.016	-.073
238.	-1.428	-1.167	-.664		-.362	-.313	-.134	.103	.729	.296	.177	.051	.022	-.072

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 25 TIME 55583.000 MU= .241 CLP= .00512 TEMP(U60)= 19.8 C = 67.61 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
240.	-1.475	-1.204	-.672		-.339	-.317	-.155	.104	.738	.300	.188	.051	.028	-.054
242.	-1.520	-1.242	-.680		-.343	-.310	-.157	.105	.747	.303	.201	.052	.016	-.054
244.	-1.564	-1.256	-.688		-.347	-.295	-.159	.107	.786	.307	.203	.052	.016	-.055
246.	-1.609	-1.269	-.695		-.351	-.298	-.155	.108	.797	.310	.206	.053	.016	-.060
248.	-1.652	-1.281	-.702		-.342	-.301	-.138	.109	.804	.313	.208	.054	.017	-.074
250.	-1.668	-1.288	-.694		-.334	-.304	-.139	.110	.811	.316	.209	.054	.017	-.057
252.	-1.706	-1.277	-.691		-.336	-.306	-.140	.111	.816	.318	.211	.054	.017	-.063
254.	-1.721	-1.286	-.696		-.339	-.309	-.141	.112	.824	.321	.213	.055	.017	-.068
256.	-1.736	-1.294	-.701		-.341	-.311	-.142	.105	.830	.324	.214	.055	.017	-.036
258.	-1.766	-1.302	-.705		-.343	-.313	-.143	.093	.834	.353	.215	.043	.017	-.050
260.	-1.750	-1.308	-.708		-.345	-.314	-.144	.093	.838	.354	.216	.050	.017	-.065
262.	-1.757	-1.313	-.711		-.346	-.315	-.144	.094	.842	.356	.217	.056	.017	-.053
264.	-1.763	-1.317	-.713		-.347	-.316	-.145	.094	.844	.357	.218	.056	.017	-.082
266.	-1.767	-1.320	-.715		-.348	-.317	-.145	.094	.846	.358	.218	.056	.018	-.082
268.	-1.769	-1.322	-.716		-.330	-.317	-.145	.094	.847	.358	.219	.056	.018	-.082
270.	-1.770	-1.323	-.716		-.324	-.318	-.145	.094	.848	.358	.219	.056	.018	-.071
272.	-1.769	-1.322	-.716		-.324	-.317	-.145	.094	.847	.358	.219	.056	.018	-.071
274.	-1.767	-1.334	-.715		-.344	-.317	-.145	.094	.846	.358	.218	.056	.018	-.082
276.	-1.763	-1.345	-.713		-.327	-.316	-.145	.094	.856	.357	.218	.056	.017	-.082
278.	-1.770	-1.341	-.711		-.322	-.315	-.144	.094	.877	.356	.217	.038	.017	-.056
280.	-1.780	-1.336	-.709		-.342	-.314	-.144	.093	.874	.355	.236	.037	.017	-.049
282.	-1.784	-1.345	-.728		-.343	-.313	-.143	.093	.870	.364	.237	.037	.017	-.072
284.	-1.803	-1.349	-.724		-.341	-.311	-.142	.107	.865	.379	.235	.055	.017	-.066
286.	-1.806	-1.357	-.719		-.339	-.309	-.141	.097	.875	.377	.234	.055	-.001	-.058
288.	-1.808	-1.358	-.714		-.337	-.307	-.140	.091	.887	.386	.253	.054	-.002	-.073
290.	-1.838	-1.365	-.711		-.334	-.304	-.139	.090	.880	.398	.252	.054	-.002	-.079
292.	-1.878	-1.361	-.724		-.331	-.301	-.158	.106	.872	.408	.269	.054	-.002	-.078
294.	-1.883	-1.348	-.713		-.328	-.299	-.141	.108	.864	.404	.267	.055	-.002	-.077
296.	-1.812	-1.315	-.684		-.324	-.295	-.135	.107	.817	.372	.261	.070	.016	-.093
298.	-1.692	-1.235	-.649		-.321	-.292	-.134	.106	.760	.326	.232	.067	-.002	-.097

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 25 TIME 55583.000 MU= .241 CLP= .00512 TEMP(U60)= 19.8 C = 67.61 F

X/C=	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
300.	-1.528	-1.163	-.603		-.314	-.286	-.111	.104	.698	.284	.173	.044	-.004	-.096
302.	-1.330	-1.097	-.575		-.291	-.261	-.108	.103	.665	.238	.135	.008	-.022	-.094
304.	-1.146	-1.032	-.552		-.287	-.281	-.106	.102	.635	.199	.117	-.023	-.037	-.075
306.	-1.032	-1.011	-.545		-.284	-.278	-.127	.082	.595	.188	.116	-.035	-.034	-.072
308.	-.960	-.996	-.537		-.279	-.279	-.147	.081	.577	.185	.114	-.030	-.019	-.052
310.	-.915	-.962	-.537		-.281	-.296	-.145	.064	.568	.183	.113	-.016	-.019	-.050
312.	-.896	-.967	-.541		-.298	-.298	-.164	.079	.583	.180	.111	-.017	-.019	-.050
314.	-.902	-.974	-.540		-.301	-.313	-.162	.078	.580	.177	.109	-.023	-.023	-.049
316.	-.891	-.981	-.551		-.289	-.308	-.159	.078	.571	.174	.107	-.033	-.034	-.067
318.	-.898	-1.010	-.552		-.297	-.303	-.157	.091	.586	.171	.106	-.032	-.034	-.067
320.	-.885	-1.014	-.543		-.292	-.298	-.151	.090	.580	.168	.104	-.031	-.033	-.082
322.	-.869	-.997	-.543		-.287	-.293	-.135	.088	.570	.165	.087	-.038	-.032	-.081
324.	-.854	-.981	-.542		-.290	-.287	-.149	.087	.560	.163	.068	-.052	-.032	-.079
326.	-.860	-.985	-.542		-.304	-.282	-.146	.085	.550	.160	.066	-.059	-.031	-.076
328.	-.845	-.988	-.539		-.308	-.277	-.143	.084	.540	.157	.065	-.057	-.031	-.077
330.	-.829	-.990	-.540		-.302	-.283	-.141	.082	.556	.154	.064	-.056	-.030	-.075
332.	-.814	-.988	-.547		-.296	-.289	-.144	.081	.545	.151	.063	-.055	-.030	-.074
334.	-.799	-.973	-.542		-.300	-.284	-.153	.084	.535	.148	.053	-.054	-.036	-.072
336.	-.784	-.974	-.543		-.302	-.278	-.150	.091	.525	.145	.046	-.053	-.042	-.076
338.	-.769	-.975	-.537		-.306	-.285	-.147	.090	.517	.144	.045	-.052	-.041	-.085
340.	-.754	-.969	-.538		-.306	-.288	-.145	.088	.528	.159	.054	-.051	-.040	-.083
342.	-.743	-.962	-.543		-.311	-.295	-.142	.086	.518	.156	.057	-.050	-.040	-.082
344.	-.748	-.973	-.548		-.310	-.297	-.139	.085	.512	.153	.056	-.049	-.039	-.080
346.	-.752	-.972	-.540		-.304	-.291	-.144	.083	.525	.153	.055	-.048	-.038	-.079
348.	-.755	-.971	-.542		-.309	-.265	-.149	.088	.537	.164	.054	-.047	-.037	-.077
350.	-.753	-.969	-.533		-.307	-.293	-.146	.099	.543	.161	.073	-.047	-.037	-.076
352.	-.726	-.960	-.523		-.312	-.293	-.144	.102	.521	.154	.077	-.046	-.036	-.074
354.	-.668	-.934	-.513		-.309	-.287	-.141	.100	.470	.129	.054	-.045	-.035	-.073
356.	-.577	-.901	-.503		-.303	-.282	-.138	.098	.420	.099	.029	-.044	-.035	-.071
358.	-.481	-.876	-.481		-.298	-.277	-.136	.096	.372	.076	.004	-.063	-.043	-.070

AIRFOIL PRESSURE DATA .9 BLADE RADIUS   NASA-LANGLEY AH-1G   78/11/27.

FLT 66 RUN 22   TIME 55789.850   MU= .245 CLP= .00754 TEMP(U60)= 14.5 C = 58.13 F

X/C= AZIMUTH	UPPER SURFACE CP VALUES .02	.10	.20	.35	.50	.70	.80	.90	LOWER SURFACE CP VALUES .02	.10	.20	.50	.70	.90
0.	-.792	-1.535	-.605		-.399	-.321	-.138	.083	.569	.204	.066	-.021	-.016	-.046
2.	-.705	-1.409	-.594		-.403	-.327	-.149	.075	.529	.181	.054	-.029	-.014	-.040
4.	-.616	-1.288	-.594		-.398	-.324	-.151	.076	.473	.149	.033	-.021	-.013	-.039
6.	-.527	-1.205	-.583		-.390	-.318	-.140	.079	.437	.123	.021	-.036	-.021	-.038
8.	-.459	-1.157	-.583		-.393	-.313	-.141	.077	.412	.107	.011	-.054	-.030	-.044
10.	-.416	-1.130	-.584		-.388	-.318	-.143	.064	.389	.096	.001	-.054	-.039	-.048
12.	-.392	-1.116	-.584		-.381	-.316	-.147	.062	.376	.094	-.009	-.069	-.040	-.047
14.	-.390	-1.115	-.584		-.384	-.321	-.156	.070	.390	.100	-.002	-.062	-.032	-.046
16.	-.396	-1.120	-.585		-.398	-.319	-.151	.077	.410	.116	.008	-.053	-.023	-.051
18.	-.384	-1.126	-.585		-.395	-.324	-.144	.079	.413	.114	.017	-.051	-.027	-.054
20.	-.345	-1.131	-.585		-.397	-.322	-.136	.083	.406	.109	.010	-.057	-.029	-.059
22.	-.307	-1.131	-.594		-.392	-.316	-.129	.090	.396	.095	.001	-.064	-.035	-.062
24.	-.255	-1.119	-.648		-.386	-.311	-.127	.092	.371	.079	-.015	-.078	-.049	-.061
26.	-.208	-1.102	-.721		-.380	-.307	-.131	.091	.337	.057	-.032	-.079	-.058	-.060
28.	-.170	-1.076	-.785		-.375	-.311	-.133	.094	.304	.041	-.048	-.097	-.065	-.059
30.	-.141	-1.043	-.839		-.377	-.319	-.137	.096	.272	.021	-.064	-.106	-.066	-.059
32.	-.124	-1.017	-.890		-.374	-.327	-.140	.095	.245	.012	-.073	-.112	-.065	-.058
34.	-.111	-.993	-.923		-.384	-.334	-.143	.094	.232	.012	-.073	-.111	-.059	-.057
36.	-.124	-.974	-.955		-.390	-.333	-.146	.092	.235	.014	-.072	-.110	-.056	-.056
38.	-.141	-.961	-.978		-.394	-.337	-.139	.091	.255	.025	-.059	-.108	-.055	-.055
40.	-.146	-.953	-.992		-.391	-.327	-.132	.094	.268	.035	-.049	-.101	-.054	-.055
42.	-.145	-.952	-1.013		-.393	-.320	-.131	.092	.287	.045	-.040	-.099	-.054	-.054
44.	-.140	-.951	-1.020		-.391	-.317	-.129	.088	.293	.053	-.038	-.097	-.053	-.054
46.	-.125	-.950	-1.032		-.393	-.313	-.128	.087	.290	.050	-.038	-.096	-.052	-.060
48.	-.103	-.946	-1.024		-.385	-.310	-.126	.090	.284	.042	-.043	-.101	-.057	-.069
50.	-.082	-.932	-1.028		-.378	-.314	-.125	.092	.269	.039	-.056	-.106	-.063	-.068
52.	-.064	-.917	-1.020		-.368	-.322	-.128	.091	.257	.031	-.064	-.112	-.069	-.060
54.	-.056	-.909	-1.017		-.363	-.322	-.132	.090	.254	.030	-.065	-.112	-.071	-.051
56.	-.053	-.901	-1.016		-.360	-.319	-.130	.090	.252	.030	-.065	-.116	-.066	-.057
58.	-.043	-.889	-1.009		-.363	-.331	-.129	.092	.250	.030	-.064	-.117	-.063	-.065

FLT 66 RUN22

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/27.

FLT 66 RUN 22 TIME 55789.850 MU= .245 CLP= .00754 TEMP(U60)= 14.5 C = 58.13 F

	UPPER SURFACE CP VALUES										LOWER SURFACE CP VALUES			
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
60.	-.036	-.877	-1.007		-.362	-.335	-.128	.095	.248	.030	-.064	-.116	-.062	-.065
62.	-.035	-.870	-1.007		-.359	-.332	-.127	.098	.249	.031	-.063	-.115	-.062	-.064
64.	-.035	-.868	-1.002		-.363	-.330	-.127	.100	.258	.039	-.063	-.114	-.062	-.064
66.	-.035	-.868	-1.002		-.357	-.321	-.122	.103	.268	.040	-.057	-.113	-.065	-.067
68.	-.032	-.863	-.997		-.352	-.309	-.113	.109	.278	.048	-.055	-.113	-.067	-.071
70.	-.023	-.858	-.998		-.351	-.304	-.108	.112	.286	.048	-.055	-.117	-.071	-.070
72.	-.014	-.854	-.994		-.343	-.296	-.103	.114	.282	.046	-.059	-.122	-.073	-.070
74.	-.004	-.847	-.984		-.339	-.285	-.098	.117	.272	.036	-.066	-.123	-.073	-.067
76.	.007	-.838	-.979		-.343	-.274	-.094	.120	.267	.027	-.072	-.127	-.076	-.056
78.	.025	-.832	-.969		-.361	-.263	-.089	.123	.246	.018	-.079	-.133	-.079	-.047
80.	.043	-.821	-.954		-.378	-.253	-.086	.122	.234	.007	-.085	-.139	-.078	-.047
82.	.061	-.810	-.937		-.398	-.242	-.081	.122	.219	-.010	-.096	-.144	-.078	-.047
84.	.078	-.797	-.920		-.421	-.232	-.081	.122	.187	-.020	-.105	-.146	-.078	-.047
86.	.088	-.782	-.910		-.449	-.228	-.081	.122	.165	-.037	-.116	-.150	-.074	-.047
88.	.105	-.767	-.902		-.480	-.222	-.077	.121	.143	-.048	-.124	-.156	-.072	-.047
90.	.116	-.743	-.889		-.511	-.218	-.072	.121	.120	-.065	-.131	-.158	-.071	-.047
92.	.132	-.729	-.680		-.537	-.216	-.076	.121	.088	-.074	-.138	-.158	-.072	-.044
94.	.141	-.720	-.874		-.556	-.224	-.081	.122	.066	-.084	-.144	-.158	-.068	-.040
96.	.149	-.715	-.868		-.562	-.228	-.081	.119	.044	-.102	-.151	-.158	-.065	-.040
98.	.149	-.714	-.862		-.553	-.229	-.081	.116	.024	-.110	-.154	-.154	-.065	-.040
100.	.151	-.709	-.862		-.529	-.229	-.081	.116	.011	-.111	-.158	-.152	-.062	-.040
102.	.159	-.711	-.859		-.489	-.236	-.084	.114	-.010	-.121	-.161	-.149	-.059	-.038
104.	.160	-.714	-.855		-.444	-.241	-.090	.110	-.021	-.130	-.162	-.147	-.056	-.033
106.	.159	-.717	-.856		-.403	-.247	-.093	.111	-.032	-.130	-.162	-.148	-.054	-.033
108.	.152	-.720	-.860		-.360	-.258	-.099	.111	-.043	-.131	-.159	-.145	-.050	-.035
110.	.151	-.723	-.864		-.318	-.264	-.099	.112	-.054	-.132	-.157	-.139	-.048	-.041
112.	.143	-.727	-.869		-.289	-.271	-.100	.110	-.054	-.132	-.158	-.130	-.048	-.039
114.	.134	-.734	-.874		-.267	-.277	-.100	.106	-.054	-.133	-.150	-.126	-.045	-.034
116.	.126	-.745	-.879		-.244	-.279	-.101	.107	-.043	-.124	-.142	-.123	-.042	-.036
118.	.117	-.750	-.891		-.236	-.286	-.105	.105	-.031	-.116	-.136	-.117	-.039	-.042

FLT 66 RUN22

AIRFOIL PRESSURE DATA   .9 BLADE RADIUS   NASA-LANGLEY AH-1G   78/11/27.

FLT 66 RUN 22   TIME 55789.850   MU= .245   CLP= .00754   TEMP(U60)= 14.5 C = 58.13 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
120.	.108	-.758	-.900		-.237	-.293	-.111	.102	-.020	-.116	-.130	-.116	-.036	-.042
122.	.098	-.773	-.907		-.244	-.295	-.112	.102	-.008	-.098	-.124	-.117	-.036	-.042
124.	.081	-.787	-.920		-.259	-.303	-.113	.101	.003	-.098	-.118	-.114	-.036	-.043
126.	.071	-.796	-.931		-.274	-.311	-.114	.097	.015	-.089	-.111	-.104	-.033	-.043
128.	.061	-.811	-.945		-.285	-.314	-.115	.098	.028	-.080	-.110	-.100	-.030	-.043
130.	.042	-.821	-.957		-.301	-.312	-.116	.099	.040	-.071	-.106	-.101	-.030	-.044
132.	.022	-.840	-.967		-.317	-.310	-.117	.098	.065	-.061	-.100	-.098	-.031	-.044
134.	.002	-.859	-.983		-.324	-.313	-.119	.094	.078	-.052	-.094	-.092	-.031	-.045
136.	-.008	-.878	-.997		-.333	-.311	-.120	.095	.091	-.052	-.087	-.091	-.028	-.045
138.	-.019	-.897	-1.009		-.346	-.309	-.119	.096	.105	-.042	-.081	-.088	-.025	-.046
140.	-.041	-.910	-1.021		-.359	-.313	-.113	.095	.119	-.032	-.078	-.082	-.025	-.046
142.	-.073	-.931	-1.012		-.368	-.311	-.115	.091	.134	-.032	-.075	-.076	-.025	-.047
144.	-.085	-.954	-.968		-.368	-.309	-.116	.092	.149	-.022	-.068	-.073	-.026	-.048
146.	-.109	-.976	-.894		-.368	-.308	-.118	.094	.164	-.011	-.065	-.074	-.026	-.048
148.	-.132	-.991	-.808		-.374	-.306	-.120	.095	.180	-.011	-.062	-.075	-.023	-.049
150.	-.157	-1.015	-.725		-.379	-.304	-.121	.094	.196	-.000	-.054	-.077	-.019	-.048
152.	-.171	-1.031	-.654		-.380	-.302	-.120	.090	.200	.001	-.051	-.078	-.019	-.041
154.	-.197	-1.057	-.606		-.375	-.301	-.114	.091	.216	.012	-.047	-.075	-.019	-.042
156.	-.212	-1.073	-.579		-.376	-.299	-.116	.090	.220	.013	-.044	-.068	-.020	-.042
158.	-.227	-1.090	-.565		-.382	-.303	-.118	.085	.238	.013	-.040	-.065	-.016	-.043
160.	-.255	-1.108	-.560		-.383	-.303	-.120	.085	.242	.024	-.032	-.062	-.012	-.044
162.	-.272	-1.126	-.559		-.379	-.300	-.122	.079	.261	.037	-.028	-.055	-.012	-.043
164.	-.289	-1.144	-.559		-.379	-.299	-.124	.081	.266	.039	-.024	-.052	-.009	-.035
166.	-.320	-1.148	-.564		-.381	-.296	-.124	.080	.285	.052	-.019	-.048	-.003	-.036
168.	-.339	-1.116	-.568		-.376	-.302	-.117	.074	.291	.054	-.015	-.045	-.003	-.036
170.	-.358	-1.072	-.567		-.376	-.301	-.119	.076	.296	.067	-.006	-.041	.000	-.037
172.	-.392	-1.027	-.567		-.383	-.298	-.121	.077	.317	.070	.004	-.037	.006	-.038
174.	-.413	-.995	-.572		-.385	-.298	-.123	.077	.339	.083	.010	-.029	.006	-.038
176.	-.435	-.986	-.577		-.385	-.294	-.125	.070	.347	.087	.015	-.020	.010	-.039
178.	-.471	-.977	-.576		-.387	-.299	-.128	.071	.354	.101	.021	-.020	.016	-.040

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/27.

FLT 66 RUN 22 TIME 55789.850 MU= .245 CLP= .00754 TEMP(U60)= 14.5 C = 58.13 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
180.	-.496	-.969	-.581		-.377	-.299	-.128	.073	.377	.105	.026	-.021	.016	-.041
182.	-.534	-.973	-.586		-.369	-.295	-.119	.074	.386	.107	.032	-.021	.017	-.041
184.	-.561	-.977	-.585		-.376	-.300	-.122	.074	.409	.122	.038	-.022	.017	-.042
186.	-.602	-.981	-.591		-.384	-.301	-.124	.066	.420	.127	.045	-.017	.017	-.043
188.	-.630	-.985	-.596		-.391	-.295	-.126	.067	.445	.143	.051	-.012	.018	-.043
190.	-.689	-.990	-.601		-.394	-.295	-.127	.069	.456	.148	.059	-.007	.018	-.032
192.	-.722	-1.009	-.607		-.393	-.289	-.117	.070	.482	.151	.065	-.001	.019	-.032
194.	-.753	-1.013	-.612		-.395	-.295	-.119	.072	.495	.168	.073	-.001	.023	-.033
196.	-.800	-1.017	-.617		-.388	-.289	-.121	.073	.505	.174	.075	.003	.031	-.034
198.	-.835	-1.020	-.616		-.386	-.269	-.124	.074	.532	.178	.076	.010	.032	-.034
200.	-.870	-1.041	-.620		-.394	-.275	-.126	.074	.546	.181	.083	.006	.032	-.035
202.	-.905	-1.044	-.626		-.396	-.280	-.129	.065	.557	.200	.093	-.002	.033	-.036
204.	-.942	-1.047	-.630		-.394	-.286	-.131	.066	.568	.207	.094	.003	.034	-.036
206.	-.979	-1.049	-.636		-.401	-.291	-.132	.067	.579	.212	.101	.011	.034	-.037
208.	-1.017	-1.069	-.639		-.404	-.297	-.119	.069	.591	.216	.112	.011	.035	-.038
210.	-1.056	-1.071	-.645		-.400	-.297	-.122	.070	.602	.220	.114	.011	.036	-.039
212.	-1.097	-1.091	-.648		-.408	-.287	-.124	.071	.614	.240	.117	.016	.036	-.039
214.	-1.138	-1.093	-.653		-.410	-.292	-.126	.073	.625	.249	.119	.020	.037	-.024
216.	-1.162	-1.093	-.656		-.405	-.298	-.129	.074	.637	.253	.131	.012	.038	-.024
218.	-1.201	-1.112	-.668		-.413	-.303	-.131	.074	.669	.258	.154	.012	.038	-.025
220.	-1.244	-1.132	-.673		-.414	-.303	-.133	.061	.666	.263	.157	.017	.039	-.025
222.	-1.269	-1.132	-.674		-.408	-.290	-.135	.063	.692	.267	.160	.027	.040	-.026
224.	-1.310	-1.151	-.686		-.415	-.295	-.119	.064	.710	.272	.162	.033	.040	-.026
226.	-1.336	-1.150	-.697		-.422	-.300	-.139	.065	.722	.293	.165	.043	.045	-.027
228.	-1.376	-1.167	-.701		-.429	-.305	-.122	.066	.734	.304	.168	.044	.058	-.009
230.	-1.421	-1.185	-.701		-.431	-.310	-.124	.067	.745	.309	.171	.045	.059	-.027
232.	-1.447	-1.203	-.704		-.422	-.315	-.126	.068	.757	.314	.173	.045	.060	-.028
234.	-1.488	-1.200	-.703		-.434	-.314	-.128	.069	.768	.318	.176	.046	.060	-.010
236.	-1.533	-1.214	-.713		-.450	-.298	-.129	.070	.779	.323	.178	.047	.058	-.009
238.	-1.559	-1.231	-.722		-.435	-.302	-.131	.071	.789	.327	.181	.047	.045	-.009

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/27.

FLT 66 RUN 22 TIME 55789.850 MU= .245 CLP= .00754 TEMP(U60)= 14.5 C = 58.13 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C=	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
AZIMUTH														
240.	-1.599	-1.247	-.731		-.424	-.305	-.133	.072	.799	.349	.183	.053	.046	-.009
242.	-1.624	-1.262	-.740		-.429	-.309	-.135	.073	.809	.361	.190	.065	.049	-.028
244.	-1.662	-1.276	-.742		-.434	-.313	-.136	.073	.818	.365	.206	.066	.061	-.011
246.	-1.686	-1.290	-.736		-.439	-.316	-.137	.074	.827	.369	.208	.067	.047	-.010
248.	-1.703	-1.303	-.743		-.443	-.319	-.139	.075	.835	.373	.210	.067	.048	-.010
250.	-1.738	-1.315	-.750		-.447	-.322	-.140	.076	.843	.376	.212	.068	.048	-.010
252.	-1.760	-1.304	-.756		-.451	-.325	-.141	.076	.850	.380	.214	.069	.048	-.010
254.	-1.773	-1.331	-.762		-.455	-.327	-.142	.077	.856	.382	.216	.069	.049	-.029
256.	-1.785	-1.344	-.767		-.458	-.329	-.143	.077	.862	.385	.217	.070	.049	-.032
258.	-1.795	-1.352	-.772		-.460	-.331	-.144	.078	.889	.405	.218	.070	.052	-.032
260.	-1.804	-1.359	-.775		-.463	-.333	-.145	.078	.905	.417	.223	.070	.069	-.032
262.	-1.831	-1.365	-.785		-.464	-.334	-.145	.078	.908	.419	.240	.075	.069	-.032
264.	-1.864	-1.390	-.803		-.466	-.335	-.146	.060	.911	.420	.241	.089	.069	-.032
266.	-1.896	-1.399	-.805		-.467	-.336	-.146	.078	.913	.421	.242	.089	.069	-.032
268.	-1.926	-1.422	-.812		-.468	-.337	-.146	.079	.915	.438	.242	.089	.069	-.032
270.	-1.955	-1.428	-.829		-.468	-.337	-.147	.061	.936	.450	.242	.090	.069	-.032
272.	-1.981	-1.448	-.834		-.468	-.337	-.146	.060	.948	.449	.245	.089	.069	-.032
274.	-2.025	-1.473	-.850		-.467	-.336	-.146	.077	.967	.465	.262	.089	.069	-.032
276.	-2.057	-1.496	-.853		-.466	-.335	-.146	.079	.978	.476	.261	.089	.068	-.032
278.	-2.096	-1.497	-.867		-.467	-.334	-.145	.078	.995	.490	.263	.089	.050	-.032
280.	-2.124	-1.511	-.869		-.486	-.333	-.145	.078	1.005	.500	.279	.089	.050	-.032
282.	-2.141	-1.550	-.886		-.484	-.331	-.144	.078	1.019	.498	.278	.088	.049	-.032
284.	-2.156	-1.573	-.898		-.461	-.331	-.143	.077	1.027	.495	.276	.088	.049	-.032
286.	-2.152	-1.588	-.896		-.480	-.356	-.142	.077	1.039	.491	.277	.087	.049	-.048
288.	-2.152	-1.602	-.911		-.497	-.354	-.141	.092	1.045	.502	.292	.086	.049	-.053
290.	-2.161	-1.633	-.925		-.493	-.351	-.140	.094	1.054	.511	.290	.086	.066	-.052
292.	-2.151	-1.650	-.934		-.491	-.348	-.139	.093	1.059	.506	.287	.085	.066	-.052
294.	-2.146	-1.659	-.924		-.506	-.344	-.138	.092	1.048	.501	.284	.084	.065	-.051
296.	-2.134	-1.666	-.915		-.501	-.341	-.136	.091	1.037	.482	.280	.083	.064	-.051
298.	-2.110	-1.637	-.909		-.496	-.364	-.153	.090	1.025	.464	.259	.082	.064	-.050

FLT 66 RUN22

AIRFOIL PRESSURE DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/27.

FLT 66 RUN 22 TIME 55789.850 MU= .245 CLP= .00754 TEMP(U60)= 14.5 C = 58.13 F

	UPPER SURFACE CP VALUES								LOWER SURFACE CP VALUES					
X/C= AZIMUTH	.02	.10	.20	.35	.50	.70	.80	.90	.02	.10	.20	.50	.70	.90
300.	-2.070	-1.611	-.897		-.493	-.358	-.154	.099	1.012	.458	.250	.081	.065	-.048
302.	-2.033	-1.590	-.886		-.508	-.354	-.152	.100	.999	.452	.230	.080	.064	-.047
304.	-1.992	-1.569	-.874		-.501	-.349	-.168	.085	.986	.446	.227	.079	.063	-.046
306.	-1.954	-1.547	-.858		-.494	-.344	-.170	.081	.973	.440	.224	.077	.062	-.031
308.	-1.913	-1.525	-.846		-.484	-.365	-.168	.084	.950	.434	.225	.061	.044	-.041
310.	-1.874	-1.502	-.836		-.477	-.361	-.166	.083	.945	.428	.222	.059	.043	-.046
312.	-1.844	-1.493	-.842		-.489	-.355	-.163	.082	.930	.421	.218	.044	.042	-.045
314.	-1.815	-1.491	-.829		-.484	-.348	-.160	.077	.928	.413	.210	.044	.043	-.043
316.	-1.785	-1.474	-.817		-.476	-.342	-.157	.075	.927	.407	.207	.057	.042	-.017
318.	-1.766	-1.463	-.819		-.487	-.337	-.154	.073	.923	.400	.203	.056	.041	-.018
320.	-1.746	-1.458	-.807		-.479	-.331	-.152	.072	.921	.393	.200	.055	.054	-.023
322.	-1.716	-1.466	-.809		-.470	-.325	-.149	.071	.917	.395	.196	.054	.055	-.012
324.	-1.695	-1.467	-.812		-.462	-.319	-.146	.080	.926	.400	.208	.053	.054	-.006
326.	-1.675	-1.472	-.813		-.453	-.313	-.144	.072	.922	.393	.204	.052	.053	-.027
328.	-1.653	-1.471	-.814		-.461	-.327	-.154	.067	.916	.394	.229	.051	.052	-.038
330.	-1.633	-1.474	-.813		-.470	-.342	-.156	.076	.922	.398	.211	.050	.038	-.037
332.	-1.611	-1.472	-.796		-.462	-.338	-.153	.078	.919	.391	.221	.050	.036	-.046
334.	-1.581	-1.494	-.796		-.451	-.332	-.151	.079	.902	.384	.208	.049	.035	-.052
336.	-1.541	-1.546	-.796		-.457	-.343	-.148	.079	.894	.384	.203	.036	.034	-.051
338.	-1.511	-1.613	-.795		-.449	-.339	-.145	.078	.898	.388	.199	.035	.033	-.050
340.	-1.490	-1.685	-.794		-.441	-.333	-.142	.085	.902	.387	.208	.034	.022	-.049
342.	-1.478	-1.752	-.807		-.432	-.342	-.140	.087	.914	.404	.216	.033	.030	-.057
344.	-1.467	-1.808	-.833		-.450	-.338	-.137	.085	.938	.424	.225	.033	.031	-.061
346.	-1.455	-1.853	-.897		-.457	-.332	-.134	.083	.960	.439	.232	.043	.031	-.060
348.	-1.443	-1.887	-.999		-.463	-.325	-.141	.090	.981	.458	.251	.042	.030	-.066
350.	-1.418	-1.896	-1.031		-.455	-.333	-.134	.099	.973	.449	.248	.042	.029	-.070
352.	-1.348	-1.882	-1.012		-.446	-.330	-.127	.108	.902	.403	.222	.031	.020	-.069
354.	-1.239	-1.845	-.945		-.438	-.323	-.124	.124	.809	.348	.185	.011	.009	-.068
356.	-1.130	-1.802	-.841		-.420	-.317	-.121	.120	.733	.300	.136	-.000	-.001	-.066
358.	-1.045	-1.768	-.741		-.408	-.324	-.127	.102	.689	.274	.111	-.019	-.012	-.051

APPENDIX E. - AIRFOIL COEFFICIENT DATA

The listings of airfoil coefficent data are presented as reduced copies of two-page computer listings. The top of each page segment contains identification as to flight number, run number, and time. The ratio of Reynolds number per unit Mach number is identified as RN/M; blade azimuth is listed in degrees. CN, CC, and CM identify columns of normal-force, chordwise-force, and pitching-moment coefficients, respectively.

The data of Table VI serves as a guide to this set of listings.

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/10/12.

FLT 61 RUN 26B TIME 55556.200 RN/M= 16.37 MILLION ROTOR SPEED= 34.0205 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.251	-.003	-.003	.623	60.0	.251	-.003	-.000	.623	120.0	.355	-.012	.011	.623
2.0	.245	-.003	-.002	.623	62.0	.251	-.003	-.000	.623	122.0	.359	-.013	.011	.623
4.0	.239	-.002	-.001	.623	64.0	.252	-.003	-.000	.623	124.0	.360	-.013	.011	.623
6.0	.234	-.002	-.001	.623	66.0	.254	-.004	-.000	.623	126.0	.362	-.013	.012	.623
8.0	.231	-.002	-.002	.623	68.0	.258	-.004	.001	.623	128.0	.364	-.014	.012	.623
10.0	.228	-.002	-.002	.623	70.0	.258	-.004	.001	.623	130.0	.364	-.014	.012	.623
12.0	.232	-.002	-.003	.623	72.0	.259	-.004	.001	.623	132.0	.365	-.014	.012	.623
14.0	.232	-.002	-.003	.623	74.0	.261	-.004	.001	.623	134.0	.370	-.014	.012	.623
16.0	.231	-.001	-.003	.623	76.0	.264	-.004	.001	.623	136.0	.372	-.015	.012	.623
18.0	.228	-.002	-.002	.623	78.0	.268	-.004	.002	.623	138.0	.373	-.015	.012	.623
20.0	.227	-.002	-.002	.623	80.0	.268	-.005	.002	.623	140.0	.375	-.015	.012	.623
22.0	.231	-.002	-.003	.623	82.0	.270	-.005	.002	.623	142.0	.376	-.015	.011	.623
24.0	.230	-.002	-.002	.623	84.0	.276	-.005	.002	.623	144.0	.371	-.015	.012	.623
26.0	.230	-.002	-.002	.623	86.0	.280	-.005	.002	.623	146.0	.370	-.015	.013	.623
28.0	.231	-.001	-.003	.623	88.0	.281	-.005	.003	.623	148.0	.369	-.015	.013	.623
30.0	.231	-.002	-.002	.623	90.0	.287	-.006	.004	.623	150.0	.370	-.015	.013	.623
32.0	.231	-.002	-.002	.623	92.0	.290	-.006	.005	.623	152.0	.373	-.015	.012	.623
34.0	.231	-.002	-.002	.623	94.0	.296	-.006	.006	.623	154.0	.372	-.015	.012	.623
36.0	.232	-.002	-.002	.623	96.0	.299	-.007	.006	.623	156.0	.366	-.015	.013	.623
38.0	.232	-.002	-.003	.623	98.0	.300	-.007	.007	.623	158.0	.366	-.015	.013	.623
40.0	.232	-.002	-.003	.623	100.0	.307	-.008	.007	.623	160.0	.370	-.015	.012	.623
42.0	.234	-.002	-.002	.623	102.0	.312	-.008	.009	.623	162.0	.370	-.015	.012	.623
44.0	.238	-.002	-.003	.623	104.0	.323	-.009	.007	.623	164.0	.367	-.015	.013	.623
46.0	.240	-.002	-.003	.623	106.0	.328	-.009	.008	.623	166.0	.367	-.015	.013	.623
48.0	.238	-.002	-.003	.623	108.0	.336	-.010	.008	.623	168.0	.367	-.015	.013	.623
50.0	.242	-.002	-.002	.623	110.0	.337	-.011	.010	.623	170.0	.367	-.015	.013	.623
52.0	.244	-.002	-.002	.623	112.0	.343	-.011	.010	.623	172.0	.369	-.016	.013	.623
54.0	.251	-.003	-.002	.623	114.0	.346	-.012	.010	.623	174.0	.370	-.016	.013	.623
56.0	.251	-.003	-.002	.623	116.0	.347	-.012	.011	.623	176.0	.372	-.016	.013	.623
58.0	.250	-.003	-.001	.623	118.0	.350	-.012	.011	.623	178.0	.375	-.016	.012	.623

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/10/12.

FLT 61 RUN 26B TIME 55556.200 RN/M= 16.37 MILLION ROTOR SPEED= 34.0205 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
180.0	.376	-.016	.012	.623	240.0	.377	-.015	.011	.623	300.0	.292	-.006	.000	.623
182.0	.378	-.016	.012	.623	242.0	.370	-.015	.011	.623	302.0	.292	-.006	-.001	.623
184.0	.381	-.016	.012	.623	244.0	.363	-.014	.009	.623	304.0	.286	-.006	-.000	.623
186.0	.383	-.016	.012	.623	246.0	.359	-.014	.009	.623	306.0	.286	-.006	.000	.623
188.0	.384	-.016	.012	.623	248.0	.356	-.013	.007	.623	308.0	.286	-.005	.001	.623
190.0	.387	-.016	.012	.623	250.0	.355	-.012	.007	.623	310.0	.288	-.005	.000	.623
192.0	.385	-.017	.012	.623	252.0	.352	-.012	.006	.623	312.0	.289	-.005	.000	.623
194.0	.387	-.016	.012	.623	254.0	.349	-.011	.006	.623	314.0	.284	-.006	.001	.623
196.0	.388	-.016	.012	.623	256.0	.339	-.010	.006	.623	316.0	.281	-.005	.001	.623
198.0	.389	-.016	.012	.623	258.0	.333	-.010	.006	.623	318.0	.278	-.005	.001	.623
200.0	.398	-.017	.011	.623	260.0	.328	-.010	.006	.623	320.0	.274	-.005	.000	.623
202.0	.402	-.017	.011	.623	262.0	.325	-.009	.005	.623	322.0	.276	-.005	-.001	.623
204.0	.401	-.017	.011	.623	264.0	.325	-.009	.004	.623	324.0	.275	-.005	-.001	.623
206.0	.398	-.017	.011	.623	266.0	.323	-.008	.004	.623	326.0	.273	-.004	-.002	.623
208.0	.398	-.017	.011	.623	268.0	.316	-.008	.003	.623	328.0	.273	-.004	-.002	.623
210.0	.402	-.017	.011	.623	270.0	.311	-.008	.004	.623	330.0	.271	-.004	-.002	.623
212.0	.402	-.018	.011	.623	272.0	.310	-.008	.004	.623	332.0	.270	-.004	-.002	.623
214.0	.403	-.018	.012	.623	274.0	.307	-.008	.003	.623	334.0	.266	-.004	-.002	.623
216.0	.402	-.018	.012	.623	276.0	.304	-.007	.003	.623	336.0	.265	-.004	-.001	.623
218.0	.398	-.018	.013	.623	278.0	.301	-.007	.003	.623	338.0	.264	-.004	-.001	.623
220.0	.401	-.017	.012	.623	280.0	.299	-.006	.002	.623	340.0	.260	-.003	.000	.623
222.0	.393	-.018	.013	.623	282.0	.298	-.006	.002	.623	342.0	.259	-.004	.000	.623
224.0	.391	-.018	.012	.623	284.0	.298	-.006	.001	.623	344.0	.261	-.004	-.001	.623
226.0	.390	-.018	.013	.623	286.0	.297	-.006	.001	.623	346.0	.260	-.004	-.002	.623
228.0	.387	-.017	.013	.623	288.0	.294	-.006	.001	.623	348.0	.256	-.004	-.001	.623
230.0	.388	-.017	.013	.623	290.0	.293	-.005	.001	.623	350.0	.251	-.003	-.001	.623
232.0	.387	-.016	.012	.623	292.0	.288	-.006	.003	.623	352.0	.247	-.003	-.001	.623
234.0	.384	-.016	.012	.623	294.0	.290	-.005	.002	.623	354.0	.245	-.003	-.001	.623
236.0	.383	-.016	.012	.623	296.0	.289	-.006	.001	.623	356.0	.242	-.003	-.002	.623
238.0	.380	-.016	.011	.623	298.0	.291	-.006	.002	.623	358.0	.237	-.002	-.003	.623

FLT 61 RUN26B

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 1 TIME 53718.300 RN/M= 16.81 MILLION ROTOR SPEED= 34.1966 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.276	-.001	-.011	.633	60.0	.153	.004	-.018	.725	120.0	.171	.002	-.016	.725
2.0	.274	-.001	-.013	.637	62.0	.151	.004	-.015	.727	122.0	.161	.002	-.015	.724
4.0	.260	-.001	-.011	.641	64.0	.152	.003	-.014	.729	124.0	.159	.002	-.015	.722
6.0	.248	-.000	-.009	.644	66.0	.149	.003	-.014	.731	126.0	.160	.002	-.016	.719
8.0	.237	.000	-.009	.648	68.0	.149	.003	-.016	.732	128.0	.161	.002	-.019	.717
10.0	.230	.001	-.010	.652	70.0	.148	.003	-.016	.733	130.0	.162	.002	-.019	.715
12.0	.222	.001	-.010	.655	72.0	.155	.004	-.018	.735	132.0	.162	.002	-.020	.712
14.0	.215	.001	-.010	.659	74.0	.166	.004	-.018	.736	134.0	.158	.002	-.019	.710
16.0	.210	.001	-.011	.663	76.0	.179	.004	-.016	.737	136.0	.155	.002	-.018	.707
18.0	.205	.002	-.011	.666	78.0	.191	.004	-.015	.737	138.0	.153	.002	-.018	.705
20.0	.200	.002	-.012	.670	80.0	.204	.003	-.014	.738	140.0	.157	.003	-.019	.702
22.0	.193	.002	-.013	.673	82.0	.210	.002	-.012	.739	142.0	.157	.003	-.018	.699
24.0	.185	.002	-.013	.677	84.0	.208	.001	-.010	.739	144.0	.157	.003	-.019	.696
26.0	.179	.002	-.012	.680	86.0	.202	.001	-.007	.739	146.0	.160	.003	-.019	.693
28.0	.171	.003	-.012	.683	88.0	.206	.000	-.008	.740	148.0	.160	.003	-.019	.690
30.0	.162	.003	-.011	.686	90.0	.204	-.000	-.008	.740	150.0	.163	.003	-.019	.687
32.0	.161	.003	-.013	.690	92.0	.206	-.001	-.009	.740	152.0	.165	.003	-.020	.683
34.0	.158	.003	-.014	.693	94.0	.203	-.000	-.009	.739	154.0	.160	.003	-.018	.680
36.0	.149	.003	-.013	.696	96.0	.200	-.000	-.009	.739	156.0	.160	.003	-.017	.677
38.0	.144	.003	-.013	.699	98.0	.198	-.000	-.010	.739	158.0	.167	.003	-.018	.673
40.0	.145	.003	-.015	.702	100.0	.197	-.001	-.011	.738	160.0	.171	.003	-.019	.670
42.0	.140	.003	-.015	.704	102.0	.193	-.001	-.012	.737	162.0	.172	.003	-.020	.666
44.0	.136	.003	-.015	.707	104.0	.190	-.000	-.012	.737	164.0	.173	.003	-.018	.663
46.0	.132	.004	-.015	.710	106.0	.189	-.000	-.013	.736	166.0	.173	.003	-.018	.659
48.0	.131	.004	-.017	.712	108.0	.188	-.000	-.014	.735	168.0	.176	.003	-.018	.655
50.0	.118	.004	-.017	.715	110.0	.184	.000	-.014	.733	170.0	.181	.003	-.018	.652
52.0	.106	.004	-.017	.717	112.0	.181	.001	-.014	.732	172.0	.183	.003	-.019	.648
54.0	.107	.004	-.020	.719	114.0	.179	.001	-.014	.731	174.0	.188	.003	-.020	.644
56.0	.110	.004	-.020	.722	116.0	.177	.001	-.015	.729	176.0	.186	.003	-.020	.641
58.0	.131	.004	-.020	.724	118.0	.174	.001	-.015	.727	178.0	.190	.003	-.021	.637

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 1 TIME 53718.300 RN/M= 16.81 MILLION ROTOR SPEED= 34.1966 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
180.0	.194	.002	-.020	.633	240.0	.452	-.012	-.012	.541	300.0	.363	-.007	-.007	.541
182.0	.199	.002	-.019	.630	242.0	.467	-.014	-.012	.539	302.0	.364	-.007	-.009	.543
184.0	.206	.002	-.021	.626	244.0	.477	-.015	-.012	.538	304.0	.360	-.007	-.008	.545
186.0	.215	.002	-.021	.622	246.0	.494	-.016	-.012	.536	306.0	.358	-.007	-.008	.547
188.0	.220	.002	-.021	.618	248.0	.500	-.018	-.011	.535	308.0	.354	-.007	-.006	.549
190.0	.222	.002	-.021	.615	250.0	.511	-.019	-.010	.533	310.0	.356	-.007	-.005	.552
192.0	.234	.002	-.021	.611	252.0	.528	-.021	-.008	.532	312.0	.364	-.008	-.007	.554
194.0	.238	.002	-.020	.608	254.0	.539	-.023	-.007	.531	314.0	.362	-.008	-.006	.557
196.0	.248	.001	-.021	.604	256.0	.550	-.025	-.006	.530	316.0	.363	-.008	-.005	.559
198.0	.255	.001	-.021	.600	258.0	.570	-.026	-.006	.529	318.0	.371	-.008	-.005	.562
200.0	.261	.001	-.021	.597	260.0	.589	-.029	-.005	.528	320.0	.373	-.008	-.006	.565
202.0	.269	.001	-.021	.593	262.0	.600	-.031	-.003	.528	322.0	.379	-.008	-.008	.568
204.0	.274	.001	-.021	.590	264.0	.602	-.034	.000	.527	324.0	.379	-.009	-.009	.571
206.0	.289	.000	-.021	.587	266.0	.602	-.034	.003	.527	326.0	.380	-.009	-.009	.574
208.0	.292	-.001	-.020	.583	268.0	.586	-.032	.002	.527	328.0	.376	-.008	-.007	.577
210.0	.299	-.001	-.019	.580	270.0	.540	-.028	.001	.527	330.0	.373	-.008	-.008	.580
212.0	.306	-.001	-.018	.577	272.0	.470	-.022	-.001	.527	332.0	.373	-.008	-.007	.583
214.0	.319	-.002	-.019	.574	274.0	.426	-.016	-.004	.527	334.0	.373	-.008	-.007	.586
216.0	.326	-.002	-.019	.571	276.0	.379	-.012	-.004	.527	336.0	.371	-.008	-.007	.590
218.0	.333	-.003	-.019	.568	278.0	.362	-.009	-.007	.528	338.0	.365	-.008	-.006	.593
220.0	.340	-.004	-.017	.565	280.0	.363	-.007	-.011	.528	340.0	.360	-.008	-.005	.597
222.0	.352	-.004	-.017	.562	282.0	.356	-.007	-.013	.529	342.0	.358	-.007	-.005	.600
224.0	.359	-.005	-.014	.559	284.0	.357	-.007	-.014	.530	344.0	.352	-.007	-.006	.604
226.0	.380	-.006	-.015	.557	286.0	.368	-.007	-.017	.531	346.0	.339	-.006	-.006	.607
228.0	.389	-.007	-.015	.554	288.0	.368	-.007	-.013	.532	348.0	.331	-.005	-.005	.611
230.0	.402	-.008	-.015	.552	290.0	.365	-.008	-.011	.533	350.0	.328	-.005	-.007	.615
232.0	.411	-.009	-.014	.549	292.0	.370	-.007	-.010	.534	352.0	.313	-.004	-.007	.618
234.0	.417	-.009	-.013	.547	294.0	.367	-.007	-.007	.536	354.0	.305	-.003	-.008	.622
236.0	.435	-.011	-.013	.545	296.0	.362	-.007	-.007	.537	356.0	.296	-.002	-.010	.626
238.0	.443	-.011	-.013	.543	298.0	.366	-.007	-.011	.539	358.0	.286	-.002	-.011	.629

FLT 63 RUN1

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 6 TIME 54157.800 RN/M= 16.81 MILLION ROTOR SPEED= 34.0290 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.321	-.006	-.003	.630	60.0	.191	.005	-.012	.786	120.0	.020	.001	-.034	.786
2.0	.319	-.005	-.004	.636	62.0	.191	.005	-.012	.789	122.0	.014	.001	-.033	.783
4.0	.315	-.005	-.006	.643	64.0	.189	.005	-.013	.792	124.0	.009	.001	-.033	.780
6.0	.305	-.004	-.006	.649	66.0	.188	.005	-.013	.795	126.0	.016	.001	-.035	.776
8.0	.293	-.003	-.005	.655	68.0	.191	.005	-.014	.797	128.0	.016	.001	-.034	.772
10.0	.280	-.003	-.005	.661	70.0	.194	.006	-.014	.799	130.0	.022	.002	-.034	.768
12.0	.269	-.002	-.004	.668	72.0	.190	.006	-.014	.801	132.0	.028	.003	-.033	.764
14.0	.266	-.002	-.005	.674	74.0	.188	.006	-.014	.803	134.0	.034	.003	-.034	.760
16.0	.260	-.002	-.004	.680	76.0	.181	.006	-.014	.805	136.0	.037	.004	-.035	.755
18.0	.255	-.001	-.005	.686	78.0	.173	.006	-.015	.806	138.0	.047	.004	-.036	.751
20.0	.246	-.001	-.005	.692	80.0	.164	.006	-.015	.808	140.0	.049	.004	-.034	.746
22.0	.238	-.001	-.005	.698	82.0	.153	.006	-.016	.809	142.0	.057	.004	-.035	.741
24.0	.226	.000	-.005	.703	84.0	.141	.006	-.017	.809	144.0	.060	.004	-.033	.736
26.0	.220	-.000	-.005	.709	86.0	.134	.005	-.020	.810	146.0	.064	.004	-.033	.731
28.0	.211	.000	-.005	.715	88.0	.127	.005	-.020	.810	148.0	.062	.004	-.031	.726
30.0	.207	.000	-.005	.720	90.0	.118	.005	-.021	.810	150.0	.068	.004	-.030	.720
32.0	.201	.001	-.005	.726	92.0	.111	.005	-.022	.810	152.0	.077	.004	-.031	.715
34.0	.197	.002	-.007	.731	94.0	.104	.004	-.023	.810	154.0	.083	.004	-.031	.709
36.0	.192	.002	-.008	.736	96.0	.101	.004	-.024	.809	156.0	.092	.004	-.030	.703
38.0	.186	.002	-.008	.741	98.0	.098	.004	-.025	.809	158.0	.101	.004	-.031	.698
40.0	.183	.002	-.009	.746	100.0	.091	.004	-.026	.808	160.0	.114	.004	-.031	.692
42.0	.181	.003	-.010	.751	102.0	.087	.003	-.027	.806	162.0	.123	.004	-.030	.686
44.0	.175	.003	-.010	.755	104.0	.077	.003	-.028	.805	164.0	.134	.004	-.030	.680
46.0	.169	.004	-.010	.760	106.0	.059	.003	-.029	.803	166.0	.145	.004	-.030	.674
48.0	.172	.004	-.010	.764	108.0	.041	.003	-.030	.801	168.0	.155	.004	-.030	.668
50.0	.179	.004	-.011	.768	110.0	.030	.003	-.030	.799	170.0	.169	.004	-.031	.662
52.0	.185	.005	-.011	.772	112.0	.028	.002	-.031	.797	172.0	.180	.004	-.030	.655
54.0	.183	.005	-.011	.776	114.0	.019	.002	-.031	.795	174.0	.196	.004	-.030	.649
56.0	.191	.005	-.014	.779	116.0	.020	.002	-.032	.792	176.0	.211	.003	-.030	.643
58.0	.192	.005	-.012	.783	118.0	.022	.002	-.033	.789	178.0	.225	.003	-.029	.637

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 6 TIME 54157.800 RN/M= 16.81 MILLION ROTOR SPEED= 34.0290 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
180.0	.243	.003	-.030	.630	240.0	.648	-.039	-.003	.474	300.0	.534	-.028	-.000	.474
182.0	.264	.002	-.030	.624	242.0	.656	-.040	-.003	.471	302.0	.517	-.026	-.001	.477
184.0	.280	.002	-.029	.618	244.0	.661	-.041	-.004	.468	304.0	.499	-.024	-.001	.481
186.0	.297	.001	-.027	.611	246.0	.669	-.042	-.004	.466	306.0	.477	-.022	.000	.484
188.0	.315	.000	-.027	.605	248.0	.665	-.042	-.001	.463	308.0	.469	-.020	-.002	.488
190.0	.333	-.001	-.027	.599	250.0	.653	-.042	.001	.461	310.0	.453	-.018	-.004	.492
192.0	.350	-.002	-.026	.593	252.0	.662	-.043	-.000	.459	312.0	.450	-.017	-.007	.496
194.0	.367	-.003	-.025	.587	254.0	.657	-.044	.001	.457	314.0	.439	-.015	-.007	.500
196.0	.380	-.004	-.023	.581	256.0	.659	-.043	.001	.455	316.0	.426	-.014	-.007	.505
198.0	.396	-.006	-.021	.575	258.0	.649	-.042	.002	.454	318.0	.421	-.013	-.007	.509
200.0	.408	-.007	-.021	.569	260.0	.657	-.042	-.002	.453	320.0	.422	-.013	-.008	.514
202.0	.435	-.009	-.020	.563	262.0	.647	-.042	-.001	.452	322.0	.411	-.012	-.008	.519
204.0	.452	-.010	-.020	.557	264.0	.656	-.042	-.002	.451	324.0	.403	-.012	-.007	.524
206.0	.462	-.012	-.018	.551	266.0	.651	-.042	-.001	.450	326.0	.400	-.011	-.008	.529
208.0	.480	-.014	-.017	.546	268.0	.657	-.041	-.002	.450	328.0	.400	-.011	-.008	.534
210.0	.497	-.016	-.016	.540	270.0	.648	-.041	-.002	.450	330.0	.395	-.011	-.007	.540
212.0	.514	-.018	-.015	.535	272.0	.645	-.040	-.003	.450	332.0	.391	-.010	-.007	.545
214.0	.524	-.020	-.013	.529	274.0	.643	-.041	-.001	.450	334.0	.390	-.010	-.007	.551
216.0	.541	-.022	-.013	.524	276.0	.636	-.039	-.001	.451	336.0	.384	-.010	-.004	.557
218.0	.556	-.023	-.012	.519	278.0	.630	-.040	-.001	.452	338.0	.384	-.010	-.005	.562
220.0	.562	-.025	-.010	.514	280.0	.627	-.039	-.001	.453	340.0	.378	-.010	-.004	.568
222.0	.572	-.027	-.009	.510	282.0	.620	-.037	-.002	.454	342.0	.383	-.010	-.005	.574
224.0	.585	-.028	-.010	.505	284.0	.615	-.036	-.001	.455	344.0	.385	-.009	-.005	.580
226.0	.599	-.032	-.009	.501	286.0	.611	-.036	-.000	.457	346.0	.378	-.009	-.005	.586
228.0	.604	-.032	-.006	.496	288.0	.610	-.035	-.001	.459	348.0	.369	-.009	-.005	.592
230.0	.610	-.033	-.005	.492	290.0	.598	-.034	-.001	.461	350.0	.362	-.009	-.003	.599
232.0	.623	-.035	-.004	.488	292.0	.584	-.033	.001	.463	352.0	.361	-.008	-.005	.605
234.0	.628	-.036	-.003	.484	294.0	.576	-.033	.002	.465	354.0	.352	-.008	-.004	.611
236.0	.630	-.038	-.002	.481	296.0	.562	-.031	.002	.468	356.0	.341	-.007	-.005	.617
238.0	.640	-.039	-.003	.477	298.0	.549	-.030	.001	.471	358.0	.334	-.007	-.004	.624

FLT 63 RUN6

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 9 TIME 54467.200 RN/M= 16.81 MILLION ROTOR SPEED= 34.0810 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.401	-.012	-.003	.631	60.0	.202	.009	-.011	.831	120.0	-.067	-.004	-.056	.831
2.0	.381	-.011	-.002	.639	62.0	.202	.009	-.013	.835	122.0	-.086	-.005	-.054	.827
4.0	.364	-.010	-.003	.647	64.0	.200	.009	-.014	.839	124.0	-.101	-.006	-.052	.823
6.0	.352	-.008	-.004	.655	66.0	.201	.009	-.014	.842	126.0	-.108	-.007	-.052	.818
8.0	.340	-.007	-.005	.663	68.0	.200	.009	-.015	.845	128.0	-.112	-.007	-.052	.813
10.0	.330	-.006	-.003	.671	70.0	.193	.009	-.015	.848	130.0	-.111	-.008	-.053	.808
12.0	.309	-.005	-.002	.679	72.0	.187	.009	-.015	.851	132.0	-.107	-.009	-.053	.803
14.0	.300	-.005	-.004	.687	74.0	.177	.009	-.016	.853	134.0	-.086	-.008	-.054	.797
16.0	.298	-.004	-.005	.695	76.0	.161	.008	-.016	.855	136.0	-.051	-.008	-.054	.792
18.0	.289	-.003	-.005	.702	78.0	.144	.008	-.016	.857	138.0	-.028	-.007	-.054	.786
20.0	.285	-.002	-.005	.710	80.0	.127	.007	-.017	.859	140.0	-.019	-.007	-.053	.780
22.0	.269	-.001	-.003	.718	82.0	.116	.007	-.019	.860	142.0	-.009	-.005	-.050	.773
24.0	.261	-.001	-.003	.725	84.0	.100	.006	-.020	.861	144.0	-.001	-.004	-.048	.767
26.0	.252	.000	-.002	.732	86.0	.088	.006	-.021	.862	146.0	-.003	-.003	-.045	.760
28.0	.244	.001	-.002	.740	88.0	.074	.006	-.023	.862	148.0	.011	-.002	-.045	.754
30.0	.246	.001	-.004	.747	90.0	.060	.005	-.024	.862	150.0	.027	-.001	-.045	.747
32.0	.252	.002	-.005	.754	92.0	.045	.004	-.025	.862	152.0	.038	.000	-.043	.740
34.0	.261	.003	-.006	.760	94.0	.037	.003	-.028	.862	154.0	.050	.001	-.042	.732
36.0	.263	.004	-.006	.767	96.0	.035	.002	-.032	.861	156.0	.071	.002	-.041	.725
38.0	.260	.005	-.007	.773	98.0	.038	.002	-.037	.860	158.0	.088	.003	-.040	.718
40.0	.258	.005	-.007	.780	100.0	.044	.001	-.041	.859	160.0	.107	.003	-.038	.710
42.0	.259	.006	-.008	.786	102.0	.049	.001	-.045	.857	162.0	.130	.004	-.039	.703
44.0	.251	.006	-.008	.792	104.0	.045	.000	-.049	.855	164.0	.142	.004	-.036	.695
46.0	.245	.007	-.008	.797	106.0	.039	-.000	-.051	.853	166.0	.167	.005	-.038	.687
48.0	.243	.008	-.010	.803	108.0	.030	-.001	-.054	.851	168.0	.186	.004	-.037	.679
50.0	.236	.008	-.010	.808	110.0	.016	-.001	-.055	.848	170.0	.203	.004	-.035	.671
52.0	.228	.008	-.010	.813	112.0	.001	-.002	-.056	.845	172.0	.234	.004	-.035	.663
54.0	.220	.009	-.011	.818	114.0	-.013	-.002	-.057	.842	174.0	.254	.003	-.034	.655
56.0	.213	.009	-.011	.823	116.0	-.028	-.003	-.057	.839	176.0	.278	.002	-.033	.647
58.0	.206	.009	-.011	.827	118.0	-.046	-.004	-.057	.835	178.0	.303	.002	-.032	.639

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 9 TIME 54467.200 RN/M= 16.81 MILLION ROTOR SPEED= 34.0810 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
180.0	.328	.000	-.030	.631	240.0	.822	-.060	-.003	.431	300.0	.662	-.042	-.001	.431
182.0	.355	-.001	-.031	.623	242.0	.824	-.060	-.004	.427	302.0	.658	-.042	-.004	.435
184.0	.378	-.003	-.029	.615	244.0	.822	-.061	-.001	.424	304.0	.657	-.041	-.005	.439
186.0	.404	-.004	-.027	.607	246.0	.822	-.062	-.002	.420	306.0	.648	-.039	-.007	.444
188.0	.425	-.006	-.026	.599	248.0	.828	-.063	-.003	.417	308.0	.649	-.038	-.010	.449
190.0	.449	-.008	-.025	.591	250.0	.822	-.063	-.000	.414	310.0	.641	-.037	-.008	.454
192.0	.478	-.011	-.025	.583	252.0	.813	-.063	-.001	.411	312.0	.636	-.036	-.011	.459
194.0	.504	-.014	-.024	.575	254.0	.819	-.064	-.001	.409	314.0	.617	-.035	-.008	.465
196.0	.533	-.016	-.025	.568	256.0	.818	-.063	-.003	.407	316.0	.596	-.035	-.004	.470
198.0	.562	-.019	-.025	.560	258.0	.817	-.062	-.005	.405	318.0	.584	-.033	-.004	.476
200.0	.586	-.022	-.024	.552	260.0	.813	-.063	-.002	.404	320.0	.568	-.031	-.001	.482
202.0	.612	-.025	-.024	.545	262.0	.796	-.060	-.001	.402	322.0	.561	-.030	-.003	.489
204.0	.635	-.028	-.022	.537	264.0	.788	-.061	.001	.401	324.0	.556	-.030	-.003	.495
206.0	.652	-.031	-.020	.530	266.0	.789	-.061	-.000	.401	326.0	.547	-.028	-.004	.502
208.0	.672	-.035	-.019	.523	268.0	.766	-.061	-.001	.400	328.0	.538	-.028	-.005	.508
210.0	.694	-.038	-.015	.516	270.0	.760	-.059	-.001	.400	330.0	.529	-.027	-.005	.515
212.0	.715	-.042	-.014	.509	272.0	.773	-.058	.000	.400	332.0	.523	-.025	-.005	.522
214.0	.727	-.045	-.011	.502	274.0	.767	-.057	-.000	.401	334.0	.517	-.024	-.004	.530
216.0	.746	-.047	-.010	.495	276.0	.764	-.057	-.000	.401	336.0	.512	-.023	-.004	.537
218.0	.756	-.049	-.009	.489	278.0	.751	-.055	-.001	.402	338.0	.503	-.022	-.004	.544
220.0	.774	-.050	-.009	.483	280.0	.745	-.054	-.001	.404	340.0	.493	-.021	-.002	.552
222.0	.780	-.052	-.008	.477	282.0	.732	-.053	.000	.405	342.0	.484	-.021	-.001	.559
224.0	.796	-.053	-.009	.471	284.0	.719	-.053	.002	.407	344.0	.478	-.020	-.002	.567
226.0	.797	-.054	-.007	.465	286.0	.721	-.051	-.001	.409	346.0	.471	-.019	-.001	.575
228.0	.810	-.055	-.006	.460	288.0	.706	-.050	.000	.411	348.0	.472	-.019	-.000	.583
230.0	.807	-.057	-.004	.454	290.0	.707	-.049	-.002	.414	350.0	.470	-.019	-.001	.591
232.0	.806	-.057	-.003	.449	292.0	.710	-.048	-.005	.417	352.0	.461	-.018	-.001	.599
234.0	.813	-.057	-.005	.444	294.0	.697	-.046	-.004	.420	354.0	.459	-.017	-.001	.607
236.0	.802	-.058	-.000	.440	296.0	.681	-.045	.000	.423	356.0	.448	-.016	-.002	.615
238.0	.811	-.060	-.000	.435	298.0	.680	-.044	-.003	.427	358.0	.430	-.015	-.002	.623

FLT 63 RUN9

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 10 TIME 54541.600 RN/M= 16.78 MILLION ROTOR SPEED= 34.0841 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.422	-.015	-.002	.631	60.0	.215	.010	-.010	.847	120.0	-.082	-.004	-.053	.847
2.0	.407	-.014	-.002	.639	62.0	.213	.010	-.011	.851	122.0	-.074	-.005	-.057	.842
4.0	.390	-.012	-.003	.648	64.0	.217	.010	-.013	.855	124.0	-.063	-.006	-.061	.838
6.0	.370	-.011	.000	.657	66.0	.211	.010	-.012	.859	126.0	-.065	-.006	-.064	.833
8.0	.350	-.010	.001	.665	68.0	.203	.010	-.011	.862	128.0	-.064	-.007	-.066	.827
10.0	.342	-.008	-.001	.674	70.0	.196	.010	-.011	.865	130.0	-.064	-.008	-.068	.822
12.0	.333	-.007	-.001	.682	72.0	.177	.009	-.010	.868	132.0	-.073	-.009	-.067	.816
14.0	.321	-.006	-.002	.691	74.0	.162	.009	-.010	.870	134.0	-.081	-.009	-.066	.810
16.0	.310	-.005	-.002	.699	76.0	.150	.009	-.011	.873	136.0	-.093	-.010	-.063	.804
18.0	.298	-.004	-.001	.708	78.0	.133	.008	-.011	.875	138.0	-.099	-.011	-.062	.798
20.0	.289	-.002	.001	.716	80.0	.111	.008	-.012	.876	140.0	-.110	-.011	-.060	.791
22.0	.278	-.002	.000	.724	82.0	.096	.008	-.014	.878	142.0	-.111	-.011	-.060	.784
24.0	.272	-.002	-.003	.732	84.0	.080	.008	-.017	.879	144.0	-.083	-.011	-.060	.777
26.0	.261	-.001	-.003	.740	86.0	.064	.008	-.020	.880	146.0	-.051	-.010	-.057	.770
28.0	.260	-.000	-.003	.748	88.0	.046	.008	-.023	.880	148.0	-.023	-.009	-.055	.763
30.0	.266	.001	-.004	.755	90.0	.027	.007	-.026	.880	150.0	-.001	-.007	-.051	.755
32.0	.270	.002	-.003	.763	92.0	.013	.006	-.030	.880	152.0	.007	-.005	-.049	.748
34.0	.276	.003	-.003	.770	94.0	-.004	.006	-.032	.880	154.0	.016	-.004	-.047	.740
36.0	.278	.004	-.004	.777	96.0	-.017	.004	-.034	.879	156.0	.030	-.002	-.045	.732
38.0	.280	.005	-.005	.784	98.0	-.031	.004	-.034	.878	158.0	.053	-.000	-.044	.724
40.0	.278	.005	-.006	.791	100.0	-.050	.003	-.034	.876	160.0	.076	.001	-.045	.716
42.0	.275	.006	-.006	.798	102.0	-.068	.002	-.032	.875	162.0	.101	.003	-.045	.708
44.0	.263	.006	-.005	.804	104.0	-.086	.001	-.031	.873	164.0	.126	.003	-.043	.700
46.0	.257	.007	-.005	.810	106.0	-.099	-.000	-.031	.871	166.0	.149	.003	-.041	.691
48.0	.252	.008	-.006	.816	108.0	-.115	-.001	-.030	.868	168.0	.172	.004	-.040	.683
50.0	.245	.008	-.007	.822	110.0	-.127	-.002	-.030	.865	170.0	.199	.004	-.040	.674
52.0	.240	.009	-.007	.827	112.0	-.133	-.002	-.032	.862	172.0	.229	.003	-.038	.665
54.0	.234	.009	-.008	.832	114.0	-.129	-.003	-.036	.859	174.0	.253	.003	-.037	.657
56.0	.230	.010	-.009	.837	116.0	-.112	-.003	-.042	.855	176.0	.283	.003	-.036	.648
58.0	.220	.010	-.010	.842	118.0	-.096	-.004	-.048	.851	178.0	.313	.002	-.037	.639

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 10 TIME 54541.600 RN/M= 16.78 MILLION ROTOR SPEED= 34.0841 RAD/SEC

AZIMUTH	CN	CC	CM	M
180.0	.337	.000	-.035	.631
182.0	.368	-.002	-.033	.622
184.0	.393	-.003	-.031	.613
186.0	.428	-.005	-.031	.605
188.0	.455	-.007	-.029	.596
190.0	.487	-.010	-.027	.587
192.0	.516	-.013	-.026	.579
194.0	.543	-.016	-.025	.570
196.0	.580	-.019	-.024	.562
198.0	.599	-.022	-.021	.554
200.0	.636	-.026	-.024	.545
202.0	.658	-.029	-.020	.537
204.0	.683	-.033	-.019	.529
206.0	.709	-.037	-.016	.521
208.0	.737	-.042	-.015	.514
210.0	.754	-.046	-.013	.506
212.0	.780	-.051	-.010	.499
214.0	.796	-.056	-.005	.491
216.0	.827	-.062	-.006	.484
218.0	.854	-.068	-.005	.477
220.0	.875	-.074	.001	.470
222.0	.887	-.081	.004	.464
224.0	.899	-.087	.007	.457
226.0	.914	-.092	.010	.451
228.0	.930	-.095	.011	.445
230.0	.944	-.097	.009	.440
232.0	.946	-.098	.010	.434
234.0	.936	-.096	.010	.429
236.0	.947	-.094	.005	.424
238.0	.941	-.090	.006	.419

AZIMUTH	CN	CC	CM	M
240.0	.924	-.087	.006	.415
242.0	.921	-.084	.003	.410
244.0	.910	-.081	.004	.406
246.0	.913	-.079	-.000	.403
248.0	.915	-.078	-.003	.399
250.0	.919	-.078	-.000	.396
252.0	.909	-.078	-.000	.393
254.0	.912	-.079	.001	.391
256.0	.898	-.078	-.000	.389
258.0	.898	-.077	-.002	.387
260.0	.900	-.076	-.002	.385
262.0	.879	-.075	.001	.384
264.0	.881	-.075	.001	.382
266.0	.867	-.074	.001	.382
268.0	.878	-.072	-.003	.381
270.0	.856	-.071	.001	.381
272.0	.843	-.070	.000	.381
274.0	.839	-.070	-.001	.382
276.0	.824	-.068	-.002	.382
278.0	.817	-.067	-.002	.383
280.0	.803	-.065	.002	.385
282.0	.790	-.063	.005	.386
284.0	.784	-.062	.005	.388
286.0	.780	-.061	.003	.391
288.0	.773	-.059	-.002	.393
290.0	.737	-.057	.005	.396
292.0	.723	-.056	.007	.399
294.0	.715	-.054	.006	.403
296.0	.713	-.052	.003	.406
298.0	.712	-.050	.000	.410

AZIMUTH	CN	CC	CM	M
300.0	.698	-.049	.000	.414
302.0	.689	-.048	-.001	.419
304.0	.678	-.046	-.003	.424
306.0	.669	-.045	-.005	.429
308.0	.663	-.044	-.005	.434
310.0	.653	-.042	-.007	.439
312.0	.642	-.041	-.007	.445
314.0	.622	-.039	-.005	.451
316.0	.609	-.038	-.004	.457
318.0	.608	-.037	-.003	.463
320.0	.599	-.035	-.005	.470
322.0	.588	-.034	-.004	.477
324.0	.582	-.032	-.005	.484
326.0	.573	-.031	-.005	.491
328.0	.553	-.030	-.003	.498
330.0	.540	-.029	-.002	.506
332.0	.527	-.028	-.001	.513
334.0	.519	-.027	-.001	.521
336.0	.513	-.026	-.002	.529
338.0	.504	-.025	-.001	.537
340.0	.490	-.024	-.001	.545
342.0	.483	-.022	-.000	.553
344.0	.475	-.021	-.000	.562
346.0	.471	-.021	-.002	.570
348.0	.461	-.020	-.001	.578
350.0	.456	-.019	.000	.587
352.0	.452	-.018	-.000	.596
354.0	.449	-.018	.000	.604
356.0	.447	-.017	-.001	.613
358.0	.444	-.016	-.002	.622

FLT 63 RUN10

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 11 TIME 54648.800 RN/M= 16.81 MILLION ROTOR SPEED= 34.0717 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.412	-.014	-.003	.631	60.0	.236	.011	-.010	.856	120.0	-.134	-.003	-.050	.856
2.0	.402	-.012	-.004	.640	62.0	.234	.011	-.011	.860	122.0	-.113	-.004	-.053	.851
4.0	.384	-.011	-.002	.649	64.0	.216	.010	-.009	.864	124.0	-.092	-.005	-.057	.846
6.0	.373	-.009	-.004	.658	66.0	.211	.010	-.011	.868	126.0	-.084	-.006	-.059	.841
8.0	.356	-.008	-.004	.667	68.0	.201	.010	-.013	.871	128.0	-.075	-.007	-.061	.835
10.0	.345	-.007	-.003	.676	70.0	.186	.010	-.013	.875	130.0	-.068	-.008	-.062	.830
12.0	.327	-.006	-.002	.685	72.0	.162	.010	-.015	.878	132.0	-.066	-.009	-.062	.824
14.0	.314	-.005	-.003	.694	74.0	.144	.011	-.017	.880	134.0	-.058	-.009	-.064	.818
16.0	.306	-.004	-.004	.702	76.0	.132	.011	-.022	.883	136.0	-.060	-.010	-.065	.811
18.0	.301	-.003	-.006	.711	78.0	.114	.012	-.026	.885	138.0	-.071	-.010	-.063	.805
20.0	.290	-.002	-.005	.720	80.0	.097	.012	-.030	.886	140.0	-.086	-.011	-.059	.798
22.0	.283	-.001	-.004	.728	82.0	.082	.012	-.034	.888	142.0	-.084	-.011	-.059	.791
24.0	.281	-.000	-.004	.736	84.0	.060	.012	-.037	.889	144.0	-.051	-.011	-.058	.784
26.0	.283	.000	-.005	.745	86.0	.042	.012	-.039	.890	146.0	-.012	-.010	-.057	.776
28.0	.288	.001	-.005	.753	88.0	.026	.011	-.043	.890	148.0	.021	-.007	-.056	.769
30.0	.291	.002	-.003	.761	90.0	.011	.010	-.046	.890	150.0	.030	-.005	-.050	.761
32.0	.295	.003	-.004	.768	92.0	-.005	.009	-.046	.890	152.0	.038	-.004	-.047	.753
34.0	.303	.004	-.006	.776	94.0	-.020	.008	-.046	.890	154.0	.055	-.002	-.045	.745
36.0	.302	.004	-.006	.783	96.0	-.038	.007	-.048	.889	156.0	.076	-.000	-.046	.737
38.0	.302	.005	-.005	.791	98.0	-.055	.006	-.047	.888	158.0	.095	.001	-.044	.728
40.0	.298	.006	-.005	.798	100.0	-.067	.006	-.049	.886	160.0	.119	.002	-.043	.720
42.0	.289	.007	-.005	.804	102.0	-.079	.005	-.050	.885	162.0	.149	.003	-.044	.711
44.0	.282	.008	-.005	.811	104.0	-.094	.004	-.049	.883	164.0	.172	.004	-.041	.703
46.0	.278	.008	-.006	.818	106.0	-.102	.004	-.051	.880	166.0	.195	.004	-.039	.694
48.0	.269	.008	-.006	.824	108.0	-.115	.003	-.051	.878	168.0	.223	.004	-.037	.685
50.0	.262	.009	-.006	.830	110.0	-.126	.002	-.050	.875	170.0	.249	.003	-.036	.676
52.0	.253	.010	-.007	.835	112.0	-.134	.001	-.050	.872	172.0	.282	.002	-.036	.667
54.0	.243	.010	-.006	.841	114.0	-.145	.001	-.049	.868	174.0	.308	.002	-.034	.658
56.0	.243	.010	-.008	.846	116.0	-.152	-.000	-.047	.864	176.0	.330	.000	-.032	.649
58.0	.244	.010	-.010	.851	118.0	-.147	-.001	-.048	.860	178.0	.362	-.002	-.031	.640

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/14.

FLT 63 RUN 11 TIME 54648.800 RN/M= 16.81 MILLION ROTOR SPEED= 34.0717 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
180.0	.395	-.003	-.030	.631	240.0	.982	-.102	.006	.406	300.0	.765	-.057	-.003	.406
182.0	.419	-.005	-.028	.622	242.0	.980	-.098	.001	.402	302.0	.749	-.055	-.004	.411
184.0	.452	-.008	-.027	.613	244.0	.968	-.095	.000	.398	304.0	.744	-.054	-.005	.416
186.0	.475	-.010	-.025	.604	246.0	.973	-.091	-.004	.394	306.0	.738	-.052	-.005	.421
188.0	.504	-.013	-.024	.595	248.0	.972	-.088	-.003	.390	308.0	.736	-.052	-.005	.426
190.0	.538	-.016	-.024	.586	250.0	.954	-.087	.001	.387	310.0	.729	-.051	-.005	.432
192.0	.571	-.019	-.025	.577	252.0	.943	-.086	-.000	.384	312.0	.718	-.050	-.005	.438
194.0	.594	-.023	-.023	.568	254.0	.953	-.086	-.002	.382	314.0	.707	-.048	-.004	.444
196.0	.620	-.026	-.022	.560	256.0	.961	-.085	-.005	.379	316.0	.692	-.046	-.005	.451
198.0	.645	-.029	-.020	.551	258.0	.954	-.085	-.003	.377	318.0	.684	-.046	-.005	.457
200.0	.666	-.033	-.019	.542	260.0	.952	-.084	-.003	.375	320.0	.666	-.043	-.004	.464
202.0	.696	-.038	-.017	.534	262.0	.939	-.084	-.004	.374	322.0	.655	-.042	-.005	.471
204.0	.715	-.042	-.014	.526	264.0	.921	-.085	-.002	.373	324.0	.637	-.040	-.002	.478
206.0	.758	-.047	-.016	.517	266.0	.920	-.084	-.002	.372	326.0	.614	-.039	.001	.486
208.0	.775	-.052	-.013	.509	268.0	.910	-.082	-.001	.372	328.0	.610	-.037	.001	.493
210.0	.800	-.058	-.009	.501	270.0	.916	-.081	-.004	.371	330.0	.596	-.037	.002	.501
212.0	.829	-.064	-.009	.494	272.0	.900	-.080	.001	.372	332.0	.590	-.035	.000	.509
214.0	.855	-.072	-.004	.486	274.0	.902	-.079	-.002	.372	334.0	.589	-.034	-.002	.517
216.0	.876	-.079	-.002	.479	276.0	.898	-.078	-.005	.373	336.0	.569	-.032	.001	.525
218.0	.902	-.086	.001	.471	278.0	.886	-.076	-.003	.374	338.0	.558	-.031	.002	.533
220.0	.922	-.093	.003	.464	280.0	.873	-.074	-.001	.375	340.0	.547	-.030	.001	.542
222.0	.940	-.098	.006	.457	282.0	.866	-.073	-.001	.377	342.0	.540	-.028	.001	.550
224.0	.951	-.103	.009	.451	284.0	.862	-.072	-.001	.379	344.0	.523	-.027	.002	.559
226.0	.962	-.107	.010	.444	286.0	.834	-.069	.002	.381	346.0	.511	-.025	.002	.568
228.0	.971	-.109	.011	.438	288.0	.823	-.068	.002	.384	348.0	.496	-.024	.002	.577
230.0	.967	-.110	.013	.432	290.0	.811	-.066	.002	.387	350.0	.484	-.022	.002	.586
232.0	.971	-.110	.014	.427	292.0	.797	-.065	.002	.390	352.0	.481	-.021	.001	.595
234.0	.971	-.108	.014	.421	294.0	.790	-.063	.002	.394	354.0	.469	-.020	.001	.604
236.0	.970	-.106	.012	.416	296.0	.788	-.060	-.001	.398	356.0	.455	-.019	-.001	.613
238.0	.973	-.104	.010	.411	298.0	.781	-.059	-.004	.402	358.0	.441	-.018	.000	.622

FLT 63 RUN11

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 15 TIME 54494.400 RN/M= 16.14 MILLION ROTOR SPEED= 34.0711 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.236	-.002	.001	.621	60.0	.124	.003	-.006	.766	120.0	.003	.005	-.024	.766
2.0	.223	-.001	.002	.627	62.0	.130	.004	-.007	.769	122.0	-.000	.006	-.023	.763
4.0	.219	-.000	.001	.632	64.0	.136	.004	-.007	.771	124.0	.000	.006	-.022	.760
6.0	.211	.001	.000	.638	66.0	.143	.004	-.007	.774	126.0	.002	.006	-.023	.756
8.0	.202	.001	-.000	.644	68.0	.151	.004	-.007	.776	128.0	-.004	.006	-.022	.753
10.0	.198	.001	-.002	.650	70.0	.158	.004	-.007	.778	130.0	-.005	.005	-.022	.749
12.0	.186	.002	-.002	.656	72.0	.163	.004	-.007	.780	132.0	-.006	.005	-.023	.745
14.0	.179	.002	.000	.661	74.0	.161	.004	-.006	.782	134.0	-.004	.004	-.023	.741
16.0	.176	.002	.002	.667	76.0	.156	.004	-.007	.783	136.0	-.001	.004	-.024	.737
18.0	.177	.002	-.002	.672	78.0	.144	.004	-.008	.784	138.0	.002	.004	-.024	.733
20.0	.169	.002	-.002	.678	80.0	.133	.004	-.009	.786	140.0	.005	.004	-.023	.728
22.0	.162	.002	-.002	.683	82.0	.117	.004	-.010	.787	142.0	.008	.004	-.023	.724
24.0	.155	.003	-.002	.689	84.0	.099	.004	-.011	.787	144.0	.011	.004	-.023	.719
26.0	.148	.003	-.002	.694	86.0	.080	.003	-.012	.788	146.0	.017	.004	-.023	.714
28.0	.149	.003	-.003	.699	88.0	.064	.004	-.014	.788	148.0	.021	.004	-.022	.710
30.0	.147	.003	-.004	.704	90.0	.053	.003	-.014	.788	150.0	.025	.004	-.022	.705
32.0	.144	.003	-.004	.709	92.0	.044	.003	-.015	.788	152.0	.030	.004	-.022	.699
34.0	.143	.003	-.005	.714	94.0	.039	.003	-.016	.788	154.0	.034	.004	-.021	.694
36.0	.134	.003	-.003	.719	96.0	.032	.003	-.018	.787	156.0	.041	.005	-.021	.689
38.0	.134	.003	-.004	.724	98.0	.022	.003	-.018	.787	158.0	.053	.004	-.021	.684
40.0	.137	.003	-.005	.728	100.0	.018	.003	-.019	.786	160.0	.051	.004	-.018	.678
42.0	.134	.003	-.005	.733	102.0	.013	.003	-.019	.785	162.0	.064	.004	-.019	.673
44.0	.134	.003	-.005	.737	104.0	.006	.003	-.020	.783	164.0	.070	.004	-.020	.667
46.0	.131	.003	-.005	.741	106.0	.007	.004	-.021	.782	166.0	.081	.004	-.021	.661
48.0	.131	.003	-.006	.745	108.0	.006	.004	-.021	.780	168.0	.091	.004	-.021	.656
50.0	.128	.003	-.006	.749	110.0	.001	.004	-.021	.778	170.0	.104	.004	-.021	.650
52.0	.125	.003	-.007	.753	112.0	.003	.005	-.022	.776	172.0	.110	.004	-.020	.644
54.0	.125	.003	-.006	.756	114.0	.003	.005	-.022	.774	174.0	.119	.004	-.020	.638
56.0	.125	.003	-.006	.760	116.0	.003	.005	-.023	.771	176.0	.129	.004	-.019	.633
58.0	.124	.003	-.005	.763	118.0	.002	.005	-.024	.769	178.0	.142	.004	-.020	.627

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 15 TIME 54494.400 RN/M= 16.14 MILLION ROTOR SPEED= 34.0711 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
180.0	.158	.004	-.021	.621	240.0	.507	-.030	.012	.476	300.0	.378	-.017	.010	.476
182.0	.171	.004	-.019	.615	242.0	.513	-.030	.012	.473	302.0	.361	-.014	.013	.479
184.0	.185	.003	-.018	.609	244.0	.514	-.031	.013	.470	304.0	.340	-.013	.014	.482
186.0	.195	.003	-.016	.603	246.0	.517	-.031	.012	.468	306.0	.338	-.012	.012	.485
188.0	.209	.002	-.016	.598	248.0	.516	-.031	.013	.466	308.0	.339	-.011	.008	.489
190.0	.229	.002	-.016	.592	250.0	.515	-.031	.013	.463	310.0	.329	-.010	.008	.492
192.0	.244	.001	-.015	.586	252.0	.518	-.031	.013	.462	312.0	.315	-.010	.012	.496
194.0	.264	.001	-.015	.580	254.0	.517	-.032	.014	.460	314.0	.312	-.010	.012	.500
196.0	.284	-.000	-.015	.575	256.0	.513	-.032	.015	.458	316.0	.310	-.009	.010	.504
198.0	.293	-.002	-.013	.569	258.0	.516	-.032	.016	.457	318.0	.306	-.008	.009	.509
200.0	.305	-.003	-.012	.564	260.0	.517	-.032	.016	.456	320.0	.309	-.008	.009	.513
202.0	.319	-.004	-.011	.558	262.0	.515	-.032	.016	.455	322.0	.303	-.008	.009	.518
204.0	.341	-.005	-.011	.553	264.0	.511	-.032	.017	.454	324.0	.293	-.008	.011	.522
206.0	.352	-.007	-.009	.547	266.0	.513	-.031	.015	.454	326.0	.298	-.007	.009	.527
208.0	.366	-.008	-.007	.542	268.0	.512	-.032	.016	.453	328.0	.299	-.007	.008	.532
210.0	.384	-.009	-.007	.537	270.0	.507	-.032	.016	.453	330.0	.297	-.007	.008	.537
212.0	.393	-.011	-.005	.532	272.0	.509	-.031	.015	.453	332.0	.291	-.007	.009	.542
214.0	.413	-.012	-.005	.527	274.0	.498	-.030	.016	.454	334.0	.293	-.006	.008	.547
216.0	.423	-.014	-.003	.522	276.0	.498	-.030	.015	.454	336.0	.294	-.006	.007	.552
218.0	.431	-.016	-.001	.518	278.0	.488	-.029	.016	.455	338.0	.295	-.006	.006	.558
220.0	.443	-.017	-.000	.513	280.0	.485	-.029	.016	.456	340.0	.290	-.006	.008	.563
222.0	.453	-.018	.000	.509	282.0	.493	-.028	.013	.457	342.0	.285	-.006	.008	.569
224.0	.456	-.020	.004	.505	284.0	.482	-.028	.014	.458	344.0	.283	-.006	.007	.574
226.0	.467	-.021	.004	.500	286.0	.479	-.027	.014	.460	346.0	.281	-.006	.008	.580
228.0	.473	-.023	.005	.496	288.0	.466	-.026	.015	.461	348.0	.285	-.005	.005	.586
230.0	.479	-.024	.006	.493	290.0	.454	-.025	.015	.463	350.0	.282	-.004	.005	.591
232.0	.492	-.025	.006	.489	292.0	.447	-.024	.012	.465	352.0	.275	-.004	.004	.597
234.0	.500	-.026	.007	.485	294.0	.430	-.022	.015	.468	354.0	.261	-.003	.004	.603
236.0	.506	-.027	.008	.482	296.0	.427	-.020	.011	.470	356.0	.256	-.003	.003	.609
238.0	.506	-.028	.009	.479	298.0	.390	-.018	.015	.473	358.0	.247	-.002	.002	.615

FLT 65 RUN15

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 18 TIME 54782.700 RN/M= 16.15 MILLION ROTOR SPEED= 34.5916 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.354	-.010	.003	.630	60.0	.276	.005	-.003	.777	120.0	.221	.001	-.014	.777
2.0	.342	-.008	.001	.636	62.0	.273	.006	-.003	.780	122.0	.212	.001	-.013	.774
4.0	.333	-.006	-.000	.642	64.0	.282	.004	-.001	.782	124.0	.199	.001	-.013	.770
6.0	.324	-.006	.001	.648	66.0	.286	.004	-.001	.785	126.0	.187	.001	-.013	.767
8.0	.308	-.005	.002	.654	68.0	.294	.004	-.001	.787	128.0	.175	.001	-.012	.764
10.0	.295	-.004	.001	.660	70.0	.297	.003	.000	.789	130.0	.171	.001	-.012	.760
12.0	.277	-.003	.001	.665	72.0	.297	.004	.001	.791	132.0	.171	.000	-.012	.756
14.0	.271	-.002	-.000	.671	74.0	.293	.004	.002	.793	134.0	.168	-.000	-.011	.752
16.0	.277	-.002	-.001	.677	76.0	.280	.003	.005	.794	136.0	.170	-.001	-.011	.748
18.0	.282	-.002	.000	.683	78.0	.270	.003	.005	.796	138.0	.170	-.001	-.011	.743
20.0	.283	-.003	.003	.688	80.0	.260	.003	.005	.797	140.0	.175	-.001	-.011	.739
22.0	.280	-.003	.004	.694	82.0	.246	.003	.005	.798	142.0	.174	-.001	-.011	.734
24.0	.277	-.003	.003	.699	84.0	.238	.004	.004	.798	144.0	.168	-.001	-.010	.730
26.0	.264	-.002	.003	.704	86.0	.227	.004	.004	.799	146.0	.167	-.000	-.010	.725
28.0	.251	-.002	.003	.710	88.0	.218	.003	.004	.799	148.0	.171	-.000	-.010	.720
30.0	.234	-.001	.004	.715	90.0	.210	.003	.003	.799	150.0	.177	-.000	-.012	.715
32.0	.224	-.001	.002	.720	92.0	.204	.003	.001	.799	152.0	.179	-.000	-.012	.710
34.0	.220	.000	-.000	.725	94.0	.199	.003	.001	.799	154.0	.180	-.000	-.012	.704
36.0	.209	.001	-.000	.730	96.0	.196	.003	-.001	.798	156.0	.181	.000	-.012	.699
38.0	.201	.001	-.002	.734	98.0	.196	.003	-.002	.798	158.0	.184	.000	-.012	.694
40.0	.195	.001	-.003	.739	100.0	.196	.003	-.003	.797	160.0	.185	.001	-.012	.688
42.0	.198	.001	-.004	.743	102.0	.196	.003	-.004	.796	162.0	.186	.000	-.012	.683
44.0	.213	.002	-.006	.748	104.0	.194	.002	-.005	.794	164.0	.188	.001	-.012	.677
46.0	.239	.002	-.006	.752	106.0	.197	.003	-.006	.793	166.0	.193	.000	-.011	.671
48.0	.257	.003	-.007	.756	108.0	.202	.003	-.008	.791	168.0	.192	.001	-.011	.666
50.0	.267	.003	-.006	.760	110.0	.204	.002	-.009	.789	170.0	.197	.001	-.011	.660
52.0	.267	.003	-.004	.763	112.0	.209	.002	-.010	.787	172.0	.205	.001	-.012	.654
54.0	.274	.004	-.003	.767	114.0	.217	.002	-.012	.785	174.0	.212	.000	-.012	.648
56.0	.280	.004	-.002	.770	116.0	.218	.002	-.012	.782	176.0	.217	.000	-.012	.642
58.0	.278	.004	-.002	.774	118.0	.220	.002	-.013	.780	178.0	.225	.000	-.011	.636

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 18 TIME 54782.700 RN/M= 16.15 MILLION ROTOR SPEED= 34.5916 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
180.0	.233	-.000	-.011	.630	240.0	.580	-.035	.011	.484	300.0	.580	-.044	.022	.484
182.0	.240	-.001	-.011	.624	242.0	.587	-.036	.012	.481	302.0	.564	-.036	.014	.487
184.0	.248	-.001	-.010	.619	244.0	.605	-.038	.010	.478	304.0	.554	-.034	.009	.490
186.0	.259	-.001	-.011	.613	246.0	.589	-.040	.016	.476	306.0	.549	-.032	.007	.493
188.0	.266	-.001	-.010	.607	248.0	.593	-.041	.018	.474	308.0	.538	-.030	.008	.497
190.0	.273	-.002	-.009	.601	250.0	.603	-.041	.018	.472	310.0	.526	-.030	.012	.501
192.0	.284	-.003	-.009	.595	252.0	.607	-.042	.018	.470	312.0	.515	-.029	.015	.505
194.0	.286	-.003	-.008	.590	254.0	.616	-.042	.017	.468	314.0	.512	-.028	.016	.509
196.0	.300	-.003	-.008	.584	256.0	.623	-.043	.015	.466	316.0	.510	-.028	.015	.513
198.0	.311	-.004	-.009	.578	258.0	.630	-.043	.015	.465	318.0	.506	-.028	.014	.517
200.0	.323	-.005	-.009	.573	260.0	.632	-.043	.016	.464	320.0	.504	-.027	.012	.522
202.0	.340	-.006	-.010	.567	262.0	.644	-.043	.012	.463	322.0	.505	-.027	.011	.526
204.0	.352	-.006	-.008	.562	264.0	.647	-.044	.015	.462	324.0	.496	-.026	.012	.531
206.0	.367	-.008	-.007	.556	266.0	.654	-.045	.015	.462	326.0	.495	-.026	.012	.536
208.0	.380	-.009	-.007	.551	268.0	.656	-.046	.016	.461	328.0	.491	-.025	.011	.541
210.0	.392	-.010	-.007	.546	270.0	.664	-.048	.016	.461	330.0	.492	-.024	.011	.546
212.0	.408	-.011	-.007	.541	272.0	.666	-.048	.020	.461	332.0	.481	-.024	.013	.551
214.0	.416	-.013	-.005	.536	274.0	.670	-.049	.020	.462	334.0	.476	-.024	.013	.556
216.0	.435	-.014	-.003	.531	276.0	.570	-.049	.020	.462	336.0	.473	-.024	.013	.561
218.0	.447	-.016	-.003	.526	278.0	.677	-.052	.024	.463	338.0	.471	-.024	.014	.567
220.0	.462	-.018	-.002	.522	280.0	.692	-.052	.022	.464	340.0	.482	-.023	.014	.572
222.0	.479	-.019	-.002	.517	282.0	.705	-.052	.022	.465	342.0	.497	-.023	.014	.578
224.0	.488	-.021	-.000	.513	284.0	.718	-.054	.025	.466	344.0	.493	-.023	.014	.584
226.0	.500	-.023	.002	.509	286.0	.752	-.058	.025	.468	346.0	.482	-.023	.014	.589
228.0	.514	-.024	.002	.505	288.0	.776	-.065	.028	.470	348.0	.476	-.023	.015	.595
230.0	.526	-.026	.003	.501	290.0	.799	-.074	.033	.471	350.0	.463	-.022	.015	.601
232.0	.540	-.027	.002	.497	292.0	.797	-.078	.036	.474	352.0	.436	-.020	.013	.607
234.0	.556	-.029	.003	.494	294.0	.748	-.073	.036	.476	354.0	.415	-.017	.009	.612
236.0	.565	-.031	.005	.490	296.0	.679	-.064	.034	.478	356.0	.387	-.014	.007	.618
238.0	.574	-.033	.007	.487	298.0	.620	-.054	.028	.481	358.0	.357	-.011	.006	.624

FLT 65 RUN18

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS   NASA-LANGLEY AH-1G   78/11/15.

FLT 65 RUN 25 TIME 55583.000   RN/M= 16.14 MILLION   ROTOR SPEED= 34.2684 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.263	-.005	.007	.624	60.0	.214	.004	-.005	.769	120.0	.121	.001	-.015	.769
2.0	.269	-.004	.005	.630	62.0	.222	.004	-.007	.772	122.0	.123	.001	-.016	.766
4.0	.253	-.003	.004	.636	64.0	.222	.004	-.007	.774	124.0	.120	.001	-.015	.763
6.0	.245	-.002	.002	.642	66.0	.222	.004	-.007	.777	126.0	.117	.001	-.015	.759
8.0	.239	-.001	.001	.647	68.0	.225	.004	-.007	.779	128.0	.118	.002	-.016	.756
10.0	.233	-.001	-.000	.653	70.0	.235	.004	-.007	.781	130.0	.117	.002	-.016	.752
12.0	.224	-.000	-.000	.659	72.0	.245	.004	-.007	.783	132.0	.121	.002	-.016	.748
14.0	.219	.000	.000	.665	74.0	.254	.004	-.006	.785	134.0	.119	.002	-.016	.744
16.0	.217	.001	-.001	.670	76.0	.259	.004	-.005	.786	136.0	.119	.001	-.015	.740
18.0	.211	.001	-.001	.676	78.0	.259	.004	-.004	.787	138.0	.115	.001	-.015	.736
20.0	.203	.001	-.000	.681	80.0	.256	.004	-.003	.789	140.0	.110	.001	-.014	.732
22.0	.192	.001	-.002	.687	82.0	.249	.004	-.003	.789	142.0	.114	.002	-.015	.727
24.0	.188	.002	-.003	.692	84.0	.241	.004	-.003	.790	144.0	.115	.002	-.015	.722
26.0	.179	.002	-.002	.697	86.0	.232	.004	-.004	.791	146.0	.116	.002	-.013	.718
28.0	.174	.002	-.001	.703	88.0	.225	.004	-.004	.791	148.0	.120	.001	-.014	.713
30.0	.175	.002	-.003	.708	90.0	.218	.003	-.004	.791	150.0	.122	.002	-.016	.708
32.0	.166	.002	-.003	.713	92.0	.213	.003	-.006	.791	152.0	.124	.002	-.015	.703
34.0	.166	.002	-.004	.718	94.0	.210	.003	-.007	.791	154.0	.124	.002	-.013	.697
36.0	.164	.002	-.004	.722	96.0	.207	.003	-.009	.790	156.0	.124	.002	-.012	.692
38.0	.157	.002	-.003	.727	98.0	.202	.003	-.009	.789	158.0	.129	.002	-.013	.687
40.0	.156	.003	-.004	.731	100.0	.200	.003	-.010	.789	160.0	.135	.002	-.014	.681
42.0	.156	.003	-.004	.736	102.0	.198	.003	-.011	.787	162.0	.140	.002	-.015	.676
44.0	.150	.003	-.006	.740	104.0	.198	.003	-.011	.786	164.0	.144	.002	-.015	.670
46.0	.145	.003	-.007	.744	106.0	.193	.002	-.012	.785	166.0	.148	.002	-.015	.665
48.0	.156	.003	-.008	.748	108.0	.187	.002	-.012	.783	168.0	.152	.002	-.014	.659
50.0	.175	.004	-.010	.752	110.0	.172	.002	-.012	.781	170.0	.160	.002	-.015	.653
52.0	.189	.004	-.010	.756	112.0	.159	.002	-.013	.779	172.0	.169	.002	-.015	.648
54.0	.199	.004	-.008	.759	114.0	.141	.002	-.014	.777	174.0	.178	.002	-.014	.642
56.0	.207	.004	-.007	.763	116.0	.129	.001	-.014	.774	176.0	.183	.002	-.014	.636
58.0	.211	.004	-.005	.766	118.0	.125	.001	-.014	.772	178.0	.188	.002	-.012	.630

FLT 65 RUN25

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/15.

FLT 65 RUN 25 TIME 55583.000 RN/M= 16.14 MILLION ROTOR SPEED= 34.2684 RAD/SEC

AZIMUTH	CN	CC	CM	M
180.0	.195	.001	-.011	.624
182.0	.207	.001	-.013	.619
184.0	.220	.001	-.013	.613
186.0	.228	.000	-.013	.607
188.0	.239	.000	-.012	.601
190.0	.257	-.000	-.013	.595
192.0	.261	-.001	-.010	.590
194.0	.267	-.002	-.009	.584
196.0	.277	-.003	-.009	.578
198.0	.293	-.003	-.009	.573
200.0	.302	-.004	-.009	.567
202.0	.315	-.005	-.008	.562
204.0	.326	-.005	-.009	.556
206.0	.344	-.007	-.009	.551
208.0	.360	-.008	-.008	.546
210.0	.369	-.009	-.006	.541
212.0	.386	-.010	-.006	.536
214.0	.403	-.011	-.006	.531
216.0	.408	-.013	-.004	.526
218.0	.420	-.014	-.003	.522
220.0	.435	-.016	-.001	.517
222.0	.444	-.017	.000	.513
224.0	.450	-.018	.003	.508
226.0	.464	-.020	.005	.504
228.0	.488	-.022	.001	.500
230.0	.498	-.024	.004	.496
232.0	.509	-.025	.006	.493
234.0	.515	-.027	.009	.489
236.0	.524	-.028	.009	.486
238.0	.532	-.030	.010	.483

AZIMUTH	CN	CC	CM	M
240.0	.540	-.032	.009	.480
242.0	.550	-.033	.011	.477
244.0	.557	-.035	.013	.474
246.0	.563	-.036	.014	.472
248.0	.561	-.037	.017	.470
250.0	.563	-.038	.016	.467
252.0	.565	-.038	.017	.466
254.0	.568	-.039	.017	.464
256.0	.580	-.040	.013	.462
258.0	.580	-.040	.016	.461
260.0	.581	-.039	.017	.460
262.0	.588	-.040	.015	.459
264.0	.584	-.040	.018	.458
266.0	.585	-.040	.018	.458
268.0	.580	-.040	.019	.457
270.0	.580	-.040	.018	.457
272.0	.580	-.040	.018	.457
274.0	.585	-.040	.019	.458
276.0	.580	-.040	.020	.458
278.0	.578	-.040	.019	.459
280.0	.588	-.040	.017	.460
282.0	.589	-.041	.020	.461
284.0	.595	-.041	.020	.462
286.0	.594	-.041	.020	.464
288.0	.595	-.041	.022	.465
290.0	.594	-.042	.024	.467
292.0	.601	-.043	.025	.469
294.0	.594	-.043	.026	.472
296.0	.579	-.041	.023	.474
298.0	.542	-.037	.022	.477

AZIMUTH	CN	.CC	CM	M
300.0	.489	-.033	.021	.480
302.0	.432	-.028	.024	.483
304.0	.398	-.022	.020	.486
306.0	.386	-.018	.016	.489
308.0	.388	-.017	.010	.493
310.0	.391	-.015	.006	.496
312.0	.397	-.014	.005	.500
314.0	.396	-.014	.004	.504
316.0	.385	-.014	.009	.508
318.0	.388	-.015	.010	.512
320.0	.380	-.015	.013	.517
322.0	.368	-.014	.014	.521
324.0	.359	-.014	.013	.526
326.0	.361	-.014	.013	.531
328.0	.361	-.014	.012	.536
330.0	.360	-.013	.012	.541
332.0	.359	-.013	.011	.546
334.0	.355	-.012	.011	.551
336.0	.350	-.012	.013	.556
338.0	.348	-.012	.013	.562
340.0	.351	-.011	.012	.567
342.0	.354	-.011	.011	.572
344.0	.355	-.011	.011	.578
346.0	.353	-.011	.011	.584
348.0	.357	-.011	.011	.589
350.0	.358	-.011	.011	.595
352.0	.355	-.011	.010	.601
354.0	.338	-.010	.009	.607
356.0	.317	-.008	.007	.612
358.0	.288	-.006	.007	.618

FLT 65 RUN25

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/27.

FLT 66 RUN 22 TIME 55789.850 RN/M= 16.37 MILLION ROTOR SPEED= 35.2791 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
0.0	.471	-.024	.007	.646	60.0	.350	.003	-.003	.798	120.0	.236	.002	-.005	.798
2.0	.452	-.019	.002	.652	62.0	.349	.003	-.003	.801	122.0	.245	.002	-.005	.795
4.0	.430	-.016	-.002	.659	64.0	.350	.003	-.003	.804	124.0	.258	.002	-.006	.792
6.0	.400	-.012	-.003	.665	66.0	.347	.003	-.001	.807	126.0	.273	.002	-.008	.788
8.0	.381	-.010	-.002	.671	68.0	.342	.003	.002	.809	128.0	.285	.002	-.009	.785
10.0	.371	-.008	-.003	.677	70.0	.338	.003	.003	.811	130.0	.295	.001	-.009	.781
12.0	.360	-.008	-.003	.683	72.0	.330	.003	.005	.813	132.0	.309	.001	-.009	.777
14.0	.367	-.007	-.004	.689	74.0	.322	.003	.006	.815	134.0	.322	.001	-.010	.773
16.0	.378	-.007	-.004	.695	76.0	.317	.003	.005	.817	136.0	.333	.000	-.010	.768
18.0	.378	-.007	-.003	.701	78.0	.315	.003	.004	.818	138.0	.345	-.000	-.010	.764
20.0	.370	-.007	-.002	.706	80.0	.310	.003	.004	.819	140.0	.357	-.001	-.010	.759
22.0	.359	-.006	.000	.712	82.0	.304	.004	.003	.820	142.0	.366	-.002	-.011	.755
24.0	.352	-.005	.002	.718	84.0	.302	.004	.002	.821	144.0	.363	-.002	-.010	.750
26.0	.352	-.004	.001	.723	86.0	.302	.004	-.001	.821	146.0	.353	-.003	-.008	.745
28.0	.347	-.003	.002	.729	88.0	.302	.004	-.003	.822	148.0	.342	-.003	-.008	.739
30.0	.346	-.002	-.000	.734	90.0	.302	.004	-.005	.822	150.0	.334	-.004	-.007	.734
32.0	.347	-.002	-.002	.739	92.0	.305	.005	-.008	.822	152.0	.325	-.005	-.007	.729
34.0	.356	-.001	-.005	.745	94.0	.308	.005	-.011	.821	154.0	.320	-.006	-.006	.723
36.0	.365	-.001	-.006	.750	96.0	.305	.005	-.013	.821	156.0	.320	-.006	-.005	.718
38.0	.376	-.001	-.006	.754	98.0	.300	.004	-.013	.820	158.0	.325	-.007	-.006	.712
40.0	.381	-.001	-.005	.759	100.0	.291	.004	-.012	.819	160.0	.332	-.007	-.006	.706
42.0	.390	-.000	-.005	.764	102.0	.278	.004	-.012	.818	162.0	.338	-.008	-.006	.701
44.0	.392	-.000	-.005	.768	104.0	.264	.004	-.011	.817	164.0	.345	-.009	-.007	.695
46.0	.392	.000	-.004	.773	106.0	.251	.003	-.010	.815	166.0	.353	-.009	-.006	.689
48.0	.380	.001	-.002	.777	108.0	.241	.003	-.008	.813	168.0	.353	-.009	-.007	.683
50.0	.370	.001	-.002	.781	110.0	.230	.003	-.006	.811	170.0	.355	-.008	-.008	.677
52.0	.361	.002	-.002	.785	112.0	.226	.003	-.006	.809	172.0	.360	-.008	-.009	.671
54.0	.359	.002	-.003	.788	114.0	.225	.002	-.006	.807	174.0	.367	-.007	-.009	.665
56.0	.355	.002	-.003	.792	116.0	.224	.002	-.004	.804	176.0	.374	-.007	-.010	.659
58.0	.352	.003	-.003	.795	118.0	.229	.002	-.004	.801	178.0	.379	-.008	-.011	.653

AIRFOIL COEFFICIENT DATA .9 BLADE RADIUS NASA-LANGLEY AH-1G 78/11/27.

FLT 66 RUN 22 TIME 55789.850 RN/M= 16.37 MILLION ROTOR SPEED= 35.2791 RAD/SEC

AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M	AZIMUTH	CN	CC	CM	M
180.0	.379	-.008	-.010	.646	240.0	.607	-.035	-.001	.494	300.0	.753	-.052	.008	.494
182.0	.380	-.009	-.008	.640	242.0	.617	-.036	.001	.491	302.0	.746	-.051	.007	.497
184.0	.388	-.009	-.008	.634	244.0	.631	-.037	-.002	.489	304.0	.739	-.049	.005	.501
186.0	.398	-.010	-.009	.628	246.0	.634	-.038	-.001	.486	306.0	.731	-.048	.003	.504
188.0	.409	-.010	-.008	.622	248.0	.641	-.038	-.001	.484	308.0	.712	-.046	.005	.508
190.0	.420	-.012	-.009	.616	250.0	.647	-.039	-.001	.481	310.0	.700	-.044	.006	.512
192.0	.427	-.013	-.007	.610	252.0	.652	-.040	-.001	.479	312.0	.696	-.044	.005	.516
194.0	.435	-.013	-.007	.604	254.0	.654	-.040	.001	.478	314.0	.688	-.043	.005	.520
196.0	.440	-.015	-.007	.598	256.0	.658	-.041	.001	.476	316.0	.688	-.042	.002	.524
198.0	.444	-.016	-.005	.592	258.0	.665	-.041	.002	.475	318.0	.687	-.042	.001	.529
200.0	.452	-.016	-.005	.586	260.0	.673	-.041	.001	.473	320.0	.679	-.041	.001	.533
202.0	.459	-.017	-.005	.581	262.0	.682	-.042	.000	.473	322.0	.677	-.041	.001	.538
204.0	.465	-.018	-.005	.575	264.0	.697	-.043	-.001	.472	324.0	.675	-.041	.002	.543
206.0	.476	-.018	-.005	.570	266.0	.698	-.044	.001	.471	326.0	.666	-.040	.005	.548
208.0	.482	-.020	-.004	.564	268.0	.705	-.045	.002	.471	328.0	.672	-.039	.003	.553
210.0	.486	-.021	-.004	.559	270.0	.714	-.045	.001	.471	330.0	.670	-.038	.004	.558
212.0	.495	-.022	-.003	.553	272.0	.719	-.046	.001	.471	332.0	.660	-.038	.006	.564
214.0	.507	-.023	-.004	.548	274.0	.729	-.048	.004	.471	334.0	.650	-.038	.007	.569
216.0	.508	-.023	-.004	.543	276.0	.734	-.049	.006	.472	336.0	.650	-.038	.008	.575
218.0	.523	-.024	-.004	.538	278.0	.739	-.050	.008	.472	338.0	.650	-.039	.009	.580
220.0	.533	-.025	-.004	.534	280.0	.752	-.051	.008	.473	340.0	.650	-.040	.013	.586
222.0	.537	-.026	-.003	.529	282.0	.758	-.052	.009	.475	342.0	.657	-.041	.015	.592
224.0	.547	-.027	-.002	.524	284.0	.762	-.053	.010	.476	344.0	.675	-.041	.016	.598
226.0	.562	-.027	-.004	.520	286.0	.760	-.053	.010	.478	346.0	.699	-.041	.016	.604
228.0	.574	-.029	-.006	.516	288.0	.771	-.053	.011	.479	348.0	.727	-.041	.018	.610
230.0	.577	-.030	-.004	.512	290.0	.778	-.054	.011	.481	350.0	.726	-.041	.019	.616
232.0	.579	-.031	-.003	.508	292.0	.778	-.054	.012	.484	352.0	.696	-.040	.020	.622
234.0	.590	-.032	-.005	.504	294.0	.780	-.054	.011	.486	354.0	.646	-.038	.021	.628
236.0	.601	-.033	-.004	.501	296.0	.773	-.054	.011	.488	356.0	.589	-.036	.020	.634
238.0	.601	-.034	-.002	.498	298.0	.764	-.053	.008	.491	358.0	.548	-.033	.017	.640

FLT 66 RUN22

APPENDIX F. - THEORETICAL AIRFOIL PRESSURE DISTRIBUTIONS

Theoretical distributions of airfoil pressure coefficients were generated by utilizing the transonic-flow analysis of reference 35. This computer program uses a relaxation scheme around a conformally mapped representation of a "fluid" airfoil. That airfoil consists of a specified geometric shape and turbulent boundary layer that grows from a specified chordwise location on each airfoil surface. The program can predict transonic flow patterns and effects but cannot handle either separation or laminar flow. More details about the program are available in references 40 and 41.

Four primary input parameters were required for each flow condition. The Mach number was the value for the flow component normal to the blade leading edge. The normal-force coefficient of the flight data was input as a close approximation of lift coefficient. The two transition points (specifying the start of the boundary layer) were determined based on the estimates plotted in figure 55. Unless otherwise specified, the input airfoil coordinates were the set of reference 4 modified for the trailing-edge truncation.

REFERENCES

1. Dadone, Leo V.; and Fukushima, Toshiyuki: A Review of Design Objectives for Advanced Helicopter Rotor Airfoils. Paper presented at Am. Helicopter Soc. Symp. on Helicopter Aero. Efficiency (Hartford, CT), March 1975.

2. Paglino, Vincent M.; and Clark, David R.: A Study of the Potential Benefits of Advanced Airfoils for Helicopter Applications. Paper presented at Am. Helicopter Soc. Symp. on Helicopter Aero. Efficiency (Hartford, CT), March 1975.

3. Reichert, G; and Wagner, S. N.: Some Aspects of the Design of Rotor-Airfoil Shapes. Paper No. 14, AGARD CP-111, September 1972.

4. Kemp, Larry D.: An Analytical Study for the Design of Advanced Rotor Airfoils. NASA CR-112297, 1973.

5. Bingham, Gene J.: An Analytical Evaluation of Airfoil Sections for Helicopter Rotor Applications. NASA D-7796, 1975.

6. Sloof, J. W.; Wortmann, F. X. and Duhon, J. M.: The Development of Transonic Airfoils for Helicopters. Preprint 901, 31st Annual Nat. Forum of the Am. Helicopter Soc., May 1975.

7. Renand, J.; and Nibelle, F.: Effects of the Airfoil Choice on Rotor Aerodynamic Behavior in Forward Flight. Paper No. 23; Second European Rotorcraft and Powered Lift Aircraft Conference. (Buckeberg, F. R. G.), September 1976.

8. Thibert, J. J.; and Gallot, J.: A New Airfoil Family for Rotor Blades. Paper No. 41, Third European Rotorcraft and Powered Lift Aircraft Forum (Axi-en-Provence, France), September 1977.

9. Blackwell, James A., Jr.; and Hinson, Bobby L.: The Aerodynamic Design of an Advanced Rotor Airfoil. NASA CR-2961, 1978.

10. Dadone, L. V.: Design and Analytical Study of a Rotor Airfoil. NASA CR-2988, 1978.

11. Dadone, Leo: Rotor Airfoil Optimization: An Understanding of the Physical Limits. Preprint 78-04, 34th Annual Nat. Forum of the Am. Helicopter Soc., May 1978.

12. Ward, John F.; and Young, Warren H., Jr.: A Summary of Current Research in Rotor Unsteady Aerodynamics With Emphasis on Work at Langley Research Center. Paper No. 10, AGARD CP-111, September 1972.

13. Landgrebe, Anton J.; Moffitt, Robert C.; and Clark, David R.: Aerodynamic Technology for Advanced Rotorcraft - Part II. J. Am. Helicopter Soc., vol. 22, no. 3, July 1977, pp. 2-9

14. Pearcey, H. H.; Wilby, P. G.; Riley, M. J.; and Brotherhood, P.: The Derivation and Verification of a New Rotor Profile on the Basis of Flow Phenomena; Aerofoil Research and Flight Tests. Paper No. 16, AGARD CP-111, September 1972.

15. Riley, M. J.; and Brotherhood, P.: Comparative Performance Measurements of Two Helicopter Blade Profiles in Hovering Flight. R.&M. No. 3792, British A.R.C., 1977.

16. Morris, Charles E. K., Jr.: Rotor-Airfoil Flight Investigation: Preliminary Results. Preprint 78-05, 34th Annual Nat. Forum of the Am. Helicopter Society, May 1978.

17. Morris, Charles E. K., Jr.: A Flight Investigation of Rotor Airfoils. Paper No. 10, Advanced Technology Airfoil Research, Vol. II. NASA CP 2046, March 1978, pp. 141-154.

18. Morris, Charles E. K., Jr.; Tomaine, Robert L.; and Stevens, Dariene D.: A Flight Investigation of Performance and Loads for a Helicopter With NLR-1T Main-Rotor Blade Sections. NASA TM 80165, 1979.

19. Morris, Charles E. K., Jr.: A Flight Investigation of Basic Performance Characteristics of a Teetering-Rotor Attack Helicopter. NASA TM 80112, 1979.

20. Dadone, Leo: Two-Dimensional Wind-Tunnel Test of an Oscillating Rotor Airfoil, Vols. I and II. NASA CR-2914 and NASA CR-2915, 1977.

21. Noonan, Kevin W.; and Bingham, Gene J.: Two-Dimensional Aerodynamic Characteristics of Several Rotorcraft Airfoils at Mach Numbers From 0.35 to 0.90. NASA TM X-73990, 1977.

22. Brotherhood, P.; and Riley, M. J.: Flight Experiments on Aerodynamic Features Affecting Helicopter Blade Design. Paper No. 17, Third European Rotorcraft and Powered Lift Aircraft Forum (Aix-en-Provence, France), September 1977.

23. Shockey, Gerald A.; Williamson, Joe W.; and Cox, Charles R.: AH-1G Helicopter Aerodynamic and Structural Loads Survey. USAAMRDL TR-76-39, Feb. 1977.

24. Shockey, G. A.; Williamson, J. W. and Cox, C. R.: Helicopter Aerodynamics and Structural Loads Survey. Preprint 1060. 32nd Annual Nat. Forum of the Am. Helicopter Soc., May 1976.

25. Cox, C. R.: Helicopter Rotor Aerodynamic and Aeroacoustic Environments. Preprint 77-1338. 4th Aeroacoustic Conference of the AIAA. October 1977.

26. Scheiman, James; and Kelley, Henry L.: Comparison of Flight-Measured Helicopter Rotor-Blade Chordwise Pressure Distributions With Static Two-Dimensional Airfoil Distributions. NASA TN D-3936, 1967.

27. Bowden, T. H.; and Shockey, G. A.: A Wind Tunnel Investigation of the Aerodynamic Environment of a Full-Scale Helicopter Rotor in Forward Flight. USAAVLABS TR 70-35, July 1970.

28. Dadone, L. V.; and Fukushima, T.: Investigation of Rotor Blade Element Airloads for a Teetering Rotor in the Blade Stall Regime. NASA CR-137534, 1974.

29. Boerstoel, J. W.; and Huizing, G. H.: Transonic Shock-Free Airfoil Design by an Analytical Hodograph Method. AIAA Paper 74-539, 1974.

30. Knight, Vernie H., Jr.; Haywood, William S., Jr.; and Williams, Milton L.: A Rotor-Mounted Digital Instrumentation System for Helicopter Blade Flight Research Measurements. NASA TP 1146, 1978.

31. James, C. A.: A Suite of Computer Programs for the Automatic Analysis of Helicopter Rotor Blade Pressure Measurements. Tech. Memo. FS 47, British R.A.E., October 1975.

32. Scheiman, James; and Ludi, LeRoy, H.: Qualitative Evaluation of Effects of Helicopter Rotor-Blade Tip Vortex on Blade Airloads. NASA TN D-1637, 1963.

33. Ward, John F.: Helicopter Rotor Periodic Differential Pressures and Structural Response Measured in Transient and Steady-State Maneuvers. J. Am. Helicopter Soc., volume 16, number 1, January 1971. pp. 16-25.

34. Brotherhood, P.: Some Aerodynamic Measurements in Helicopter Flight Research. Aeronautical Journal, October 1975, pp. 450-465.

35. Bauer, Frances; Garabedian, Paul; and Korn, David: Supercritical Wing Sections III. Lecture Notes in Economics and Mathematical Systems, vol. 150, Springer-Verlag (New York), 1977.

36. Monnerie, Bernard; and Philippe, Jean-Jacques: Aerodynamic Problems of Helicopter Blade Tips. Paper No. 40, Third European Rotorcraft and Powered Lift Aircraft Forum (Aix-en-Provence, France), September 1977.

37. Arieli, Rimon; and Tauber, Michael E.: Computation of Subsonic and Transonic Flow About Lifting Rotor Blades. AIAA Paper No. 79-1667, August 1979.

38. Smetana, Frederick O.; Summey, Delbert C.; Smith, Neill S.; and Carden, Ronald K.: Light Aircraft Lift, Drag and Moment Prediction. A Review and Analysis. NASA CR-2523, 1975.

39. Markel, John D.: Z-Transform Applications Using Digital Computers. Electro-Technology, vol. 82, no. 6, December 1968, pp. 21-36.

40. Garabedian, P. R. Transonic Flow Theory of Airfoils and Wings. Advances in Engineering Science. Vol. 4. NASA CP-2001, 1976, pp. 1349-1358.

41. Bauer, Frances; Garabedian, Paul; Korn, David; and Jameson, Antony: Supercritical Wing Sections II. Lecture Notes in Economics and Mathematical Systems, Vol. 108, Springer-Verlag (New York), 1975.

TABLE I.- BASIC AIRCRAFT CHARACTERISTICS

Empty weight, N (lb.)	28,130 (6323)
Fuel capacity, N (lb.)	7,250 (1630)
Powerplant	Lycoming T53-L-13B
Nominal transmission limit at 100% rpm, kW (hp)	820 (1100)
Wing:	
Airfoil	
Root	NACA 0030
Tip	NACA 0024
Semispan (panel only), m (ft)	1.09 (3.56)
Area (panels only), m^2 (ft^2)	1.63 (17.6)
Chord:	
Root, m (ft)	0.88 (2.89)
Tip, m (ft)	0.62 (2.04)
Incidence angle (chord line), deg	14.0
Leading-edge sweep, deg	15.2
Dihedral angle, deg	0.0
Horizontal tail:	
Airfoil	inverted Clark Y
Semispan (panel only), m (ft)	0.78 (2.54)
Area (panels only), m^2 (ft^2)	0.95 (10.2)
Chord:	
Root, m (ft)	0.75 (2.45)
Tip, m (ft)	0.54 (1.78)
Leading-edge sweep, deg	19.9
Dihedral angle, deg	0.0
Vertical tail:	
Airfoil	
Root	cambered, 14% thick
Tip	cambered, 15% thick
Span (above tail boom), m (ft)	1.64 (5.38)
Area, m^2 (ft^2)	1.73 (18.6)
Chord:	
Root, m (ft)	1.42 (4.67)
Tip, m (ft)	.69 (2.25)
Leading-edge sweep, deg	50.0
Twist, deg	nonlinear

TABLE I.- Concluded

Main rotor:	
Number of blades	2
Airfoil	NLR-1T
Radius (R), m (ft)	6.706 (22.0)
Chord, m (ft)	0.686 (2.25)
Taper	1:1
Solidity	0.0651
Twist, deg	-10/R
Flapwise inertia, kg-m^2 (slug-ft^2)	2120 (1560)
Lock number	5.05
Nominal tip speed, m/sec (ft/sec)	227.5 (746.6)
Hub precone angle, deg	2.75
Pitch-flap coupling (δ_3), deg	0.0
Blade pitch range at .75 R, deg	-12.3, +39.6
Trim tab -	
Width, m (ft)	0.191 (0.75)
Overhang length, m (ft)	0.042 (0.138)
In-board edge	0.761 R
Tail rotor:	
Number of blades	2
Airfoil	
.25 tail-rotor radius	NACA 0018
tip	cambered, 8% thick
Radius	1.295 (4.25)
Chord, m (ft)	0.292 (0.96)
Taper	1:1
Solidity	0.144
Twist, deg	0.0
Equivalent root cut-out	35
Nominal tip speed, m/sec (ft/sec)	227.5 (746.4)
Blade pitch range, deg^3	-14.7, +15.3
Hub precone angle, deg	1^o
Pitch-flap coupling (δ_3), deg	30^o

TABLE II.- COORDINATES OF NLR-1T AIRFOIL

x/c	y_u/c	y_ℓ/c
0.00	0.00	0.00
.00259	.00704	-.00512
.00974	.01524	-.00867
.02185	.02296	-.01180
.03796	.02972	-.01465
.05675	.03588	-.01713
.07753	.04098	-.01929
.09845	.04469	-.02112
.12341	.04741	-.02299
.15412	.04986	-.02494
.18767	.05188	-.02671
.22313	.05345	-.02821
.26054	.05459	-.02944
.29979	.05531	-.03040
.34064	.05565	-.03104
.38269	.05560	-.03142
.42528	.05518	-.03150
.46849	.05438	-.03132
.51162	.05323	-.03080
.55383	.05175	-.02992
.59596	.04992	-.02867
.63728	.04774	-.02734
.67732	.04524	-.02580
.71079	.04291	-.02432
.73905	.04017	-.02305
.76946	.03644	-.02164
.80263	.03140	-.01996
.84055	.02533	-.01794
.87846	.01901	-.01571
.90845	.01421	-.01364
.93589	.01020	-.01087
.96199	.00651	-.00711
1.00000	.00104	-.00104

TABLE III.- PADS-PCM DATA SYSTEM CHARACTERISTICS

Parameter	System Accuracy (a)	Digital Channel Precision	Filter (b) Frequency
Aerodynamic Flight State:			
dynamic pressure - regular	70 Pa	14 Pa	1 Hz
- sensitive	14 Pa	3 Pa	—
static pressure - regular	500 Pa	200 Pa	—
- sensitive	70 Pa	40 Pa	
angle of attack	.1°	.18°	10 Hz
angle of sideslip	.1°	.18°	10 Hz
total temperature	.06°C	.1°C	—
Inertial Flight State:			
roll attitude	.5°	.36°	—
pitch attitude	.5°	.18°	—
heading	3.0°	.72°	—
angular rates	.01 rad/sec	.044 rad/sec	10 Hz
longitudinal acceleration	.001 g	.004 g	10 Hz
lateral acceleration	.001 g	.003 g	10 Hz
normal acceleration	.005 g	.009 g	10 Hz
Control Positions:			
lateral servo	.1°	.04°	10 Hz
longitudinal servo	.1°	.07°	10 Hz
collective servo	.1°	.05°	10 Hz
horizontal fin	.1°	.02°	10 Hz
pedal position	.16°	.07°	10 Hz
tail-rotor collective	.1°	.07°	10 Hz
Rotor/Engine Parameters:			
main-rotor speed - regular	.5%	.23%	—
-sensitive	.1%	.05%	—
main-rotor azimuth	1°	22.5°	—
engine torque pressure	3 kPa	1.3 kPa	—
fuel quantity	60	40	

Notes: a - accuracy of analog signal before digitization

b - frequency at 3 db roll-off for constant delay, 4-pole Bessel Filters

TABLE IV. CHARACTERISTICS OF SELECTED ROTOR-DATA PARAMETERS

Parameter	Analog System Accuracy	Digital Channel Precision	Maximum Final-Data Error
Q	122 N-m	158 N-m	.60 kN-m
T_b	-	.40^{o} C	1.0^{o} C
β_s	.1^{o}	.11^{o}	.3^{o}
θ_s	.1^{o}	.23^{o}	.8^{o}
ψ	-	1.41^{o}	.3^{o}

TABLE V. - CHARACTERISTICS OF BLADE PRESSURE-DATA SYSTEM

Surface	Orifice Location		Precision[a] kPa	Maximum Final-Data Error[b] kPa	f_{3db} Hz	Data reduction parameters[c]				
	$\frac{x}{c}$	$\frac{y}{c}$				$\Delta m_{1,a}$ $\frac{Pa}{counts\text{-}C}$	$\Delta m_{1,b}$ $\frac{Pa}{counts\text{-}C}$	$\Delta p_{o,a}$ Pa/C	$\Delta p_{o,b}$ Pa/C	$\Delta\psi_d$ deg
Upper	.02	.0215	.408	2.04	130	.21	.21	75	22	-2.35
	.10	.0449	.392	1.73	112	.43	.49	90	26	-2.71
	.20	.0525	.330	1.43	80	.32	.34	106	140	-3.73
	.50	.0536	.339	1.48	173	-.19	-.21	52	46	-1.77
	.70	.0438	.367	1.20	164	-.01	.05	-27	-26	-1.87
	.80	.0319	.360	1.07	188	-.21	-.19	61	-42	-1.63
	.90	.0157	.288	1.11	178	.23	.25	103	112	-1.73
Lower	.02	-.0114	.488	1.79	132	.32	.36	67	19	-2.31
	.10	-.0212	.396	1.59	128	.22	.55	85	31	-2.38
	.20	-.0272	.303	1.63	182	.05	.60	78	91	-1.69
	.50	-.0309	.272	1.17	160	.19	.18	35	3	-1.92
	.70	-.0247	.280	1.13	159	.10	.10	11	-34	-1.93
	.90	-.0142	.320	1.19	188	.03	.08	20	-44	-1.63

Notes: a - increment per unit digital input

b - highly conservative value for absolute value of single data point

c - $\Delta p_t = (\Delta m_1 \Delta D + \Delta p_o)(T_b - 23.9)$

TABLE VI.- CATALOG OF FLIGHT TEST-POINT CONDITIONS

Flight condition	Level flight -reference	Hover	Left turn	Right turn	Pull-up
Flight no. - Run no.	65-15	61-26B	65-18	65-25	66-22
μ	0.243	0.0	0.241	0.241	0.245
V, knots	107.9	0.0	108.9	107.5	112.5
M_h	0.69	0.69	0.70	0.69	0.71
C_L'	0.0037	0.0034	0.0062	0.0051	0.0075
n_z, g units	0.99	1.00	1.70	1.40	2.05
α_f, degrees	-2.8	---	3.9	-0.7	8.6
ϕ_f, degrees	-0.4	-0.8	-48.0	44.9	-0.5
θ_f, degrees	-3.8	0.0	-5.4	-4.0	-2.5
p_f, rad/sec	0.00	0.00	-0.03	0.03	0.02
q_f, rad/sec	0.00	0.00	0.18	0.12	0.28
r_f, rad/sec	0.00	-0.01	-0.14	0.13	0.00
$\dot{p}_f$, rad/sec^2	0.00	-0.01	0.02	0.02	-0.09
$\dot{q}_f$, rad/sec^2	-0.01	-0.01	-0.03	0.03	-0.10
$\dot{r}_f$, rad/sec^2	0.00	0.02	-0.04	-0.03	-0.04
C_Q	0.00022	0.00022	0.0014	0.00017	0.00009
A_{0s}, degrees	8.5	8.1	7.9	8.1	7.1
A_{1s}, degrees	-0.1	-1.5	-0.3	-0.2	-0.2
B_{1s}, degrees	5.0	-0.2	2.5	3.0	2.1
a_{1s}, degrees	-1.4	0.1	0.1	-0.1	-0.2
b_{1s}, degrees	0.1	-0.6	1.1	0.6	1.0
Ω, rad/sec	34.07	34.02	34.59	34.27	35.28
a, m/sec	331.7	329.9	331.7	331.8	329.9

TABLE VI.- Concluded

Flight condition	Level flight - speed sweep				
Flight no. - Run no.	63-1	63-6	63-9	63-10	63-11
μ	0.151	0.257	0.330	0.356	0.370
V, knots	67.5	114.2	146.4	158.3	164.5
M_h	0.70	0.70	0.70	0.70	0.70
C_L'	0.0042	0.0043	0.0044	0.0042	0.0043
n_z, g units	0.98	0.98	1.00	0.97	1.00
α_f, degrees	0.4	-2.9	-4.7	-6.1	-6.5
ϕ_f, degrees	0.0	-0.7	-0.4	-1.3	0.1
θ_f, degrees	-1.5	-3.1	-6.1	-7.4	7.6
p_f, rad/sec	0.00	0.00	0.00	-0.01	0.01
q_f rad/sec	0.00	0.00	0.01	0.00	0.00
r_f,rad/sec	0.00	0.00	0.00	0.00	0.00
$\dot{p}_f$, rad/sec^2	0.01	0.00	0.04	-0.05	-0.11
$\dot{q}_f$, rad/sec^2	0.00	-0.01	0.00	0.01	0.02
$\dot{r}_f$, rad/sec^2	0.02	0.01	-0.02	0.02	0.01
C_Q	0.00015	0.00024	0.00035	0.00042	0.00047
A_{0s}, degrees	7.5	10.1	13.0	14.7	15.4
A_{1s}, degrees	-1.0	-0.3	-0.3	-1.1	-0.7
B_{1s}, degrees	2.0	5.9	8.9	10.6	11.2
a_{1s}, degrees	0.0	-1.2	-1.8	-2.4	-2.4
b_{1s}, degrees	0.4	0.0	-0.6	-1.4	-1.3
Ω, rad/sec	34.20	34.03	34.08	34.08	34.07
a, m/sec	326.4	326.4	326.4	326.6	326.4

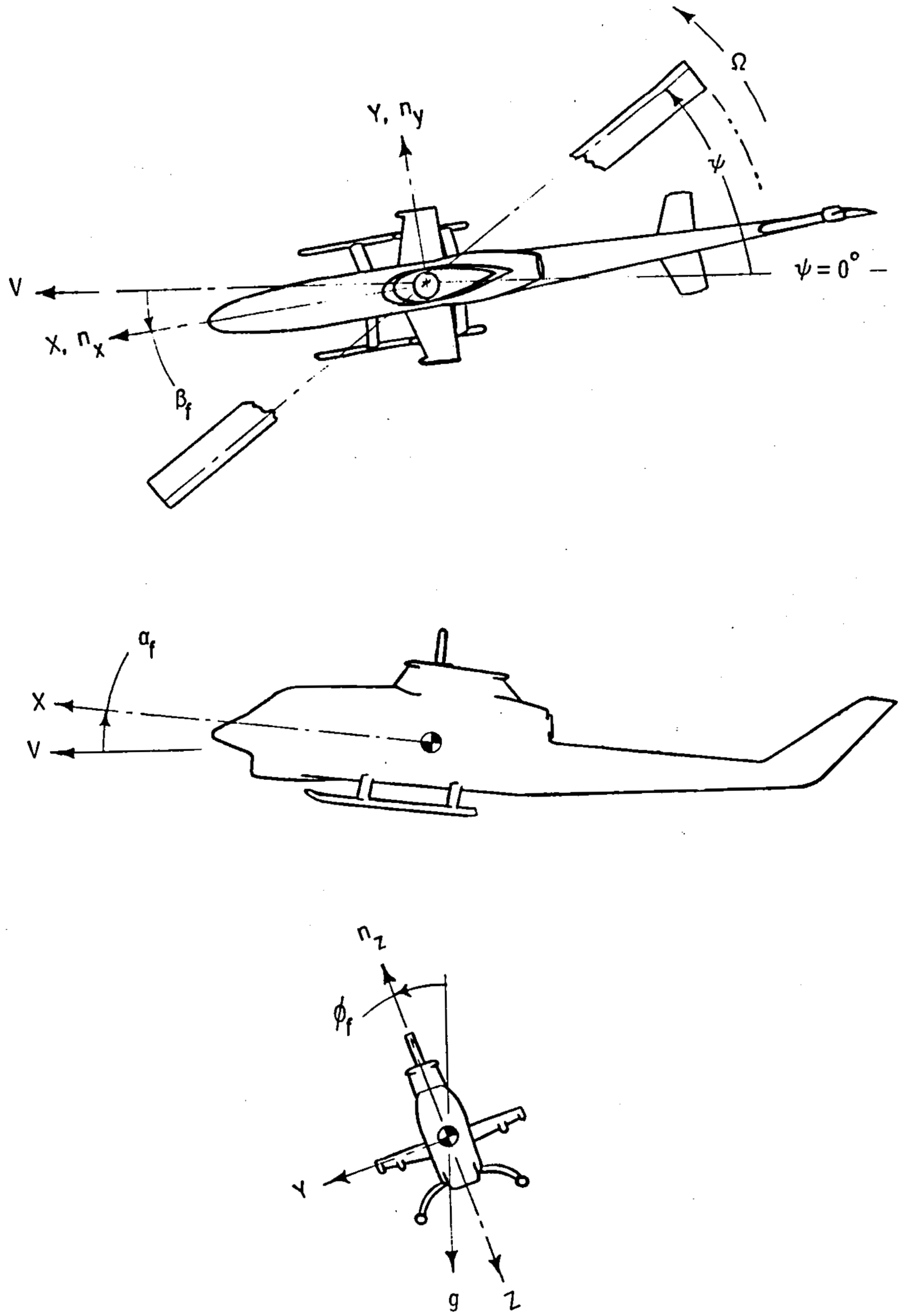


Figure 1.- Aircraft schematic and conventions used to define senses of axes, angles, and accelerations.

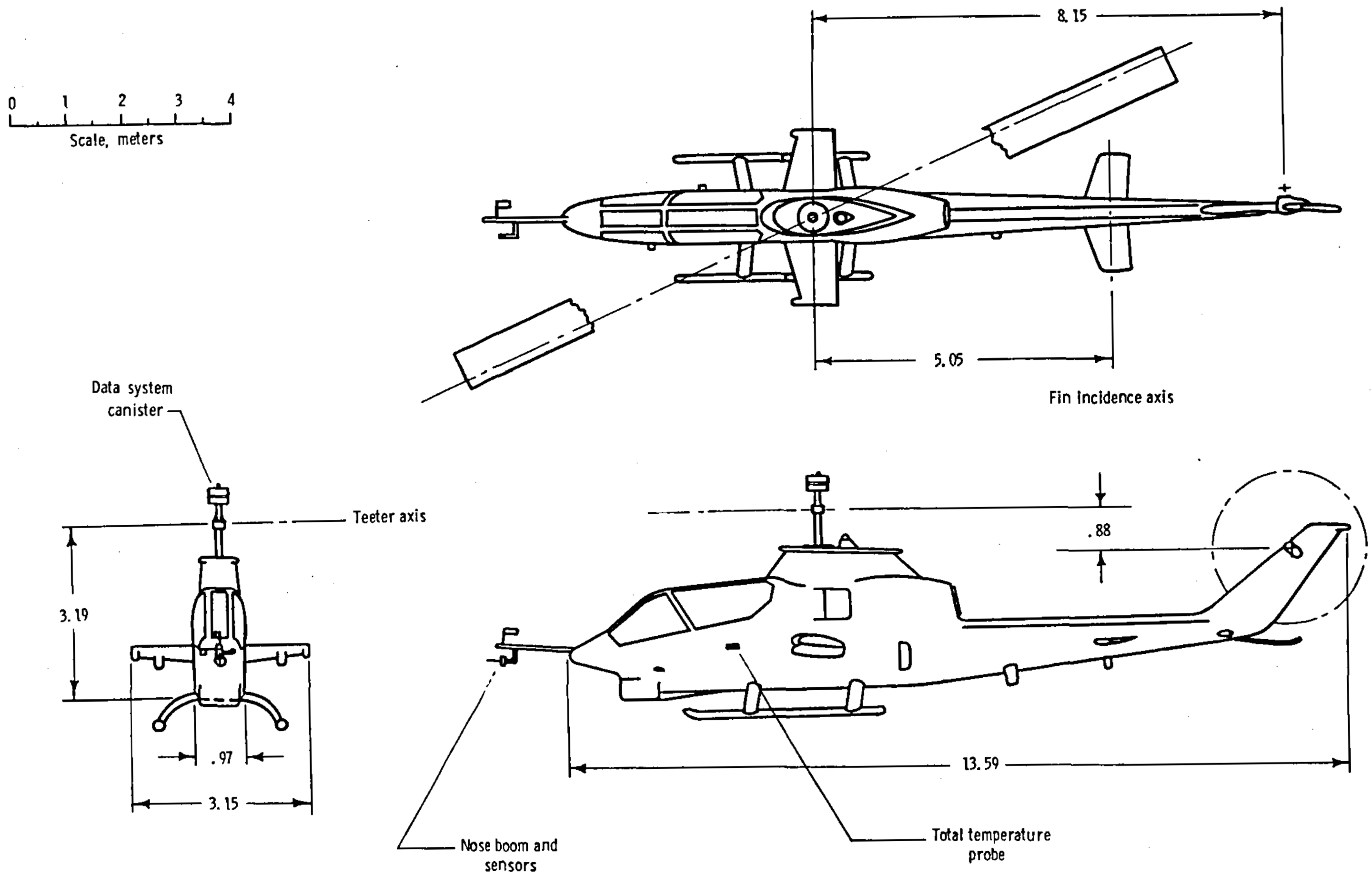


Figure 2.- Three-view scale drawing of aircraft. All dimensions are given in meters.

Figure 3.- Flight test vehicle.

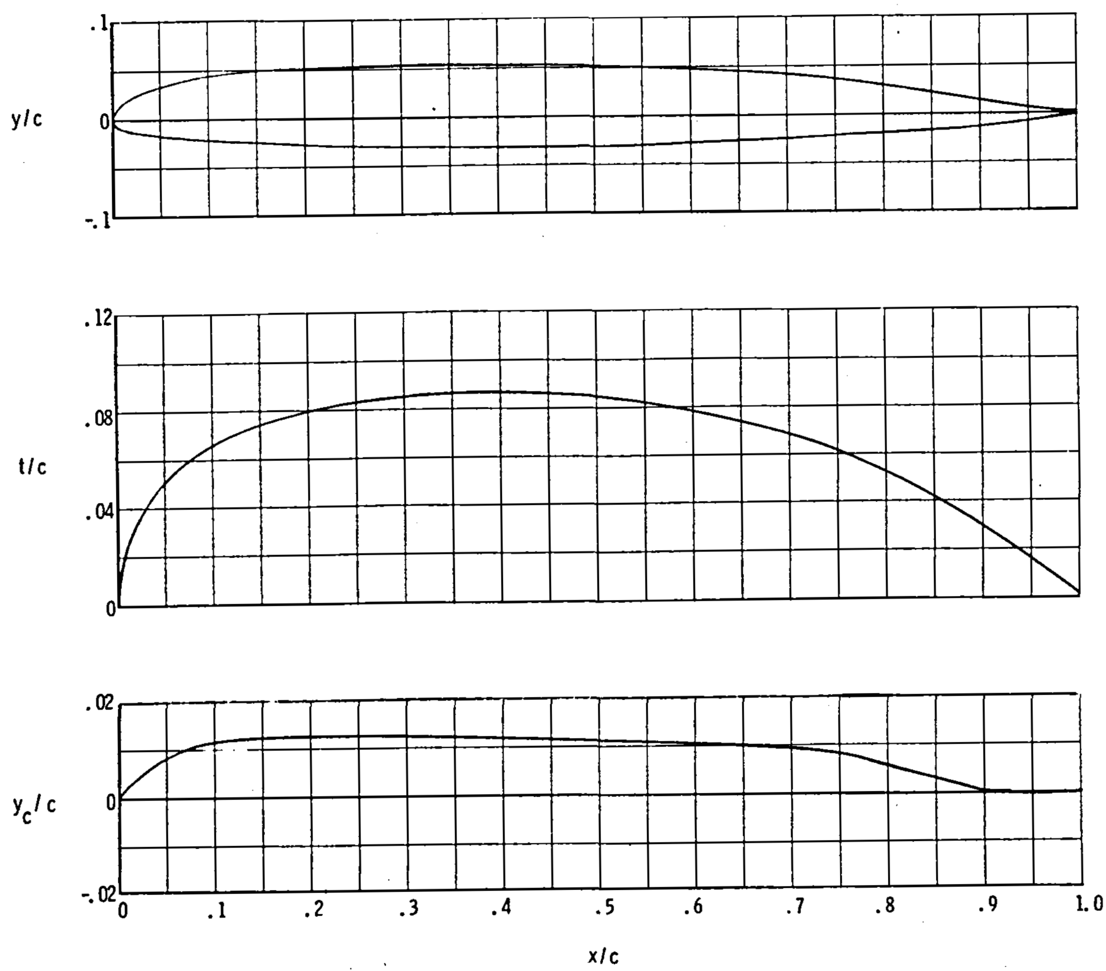


Figure 4.- Geometric characteristics of NLR-1T airfoil.

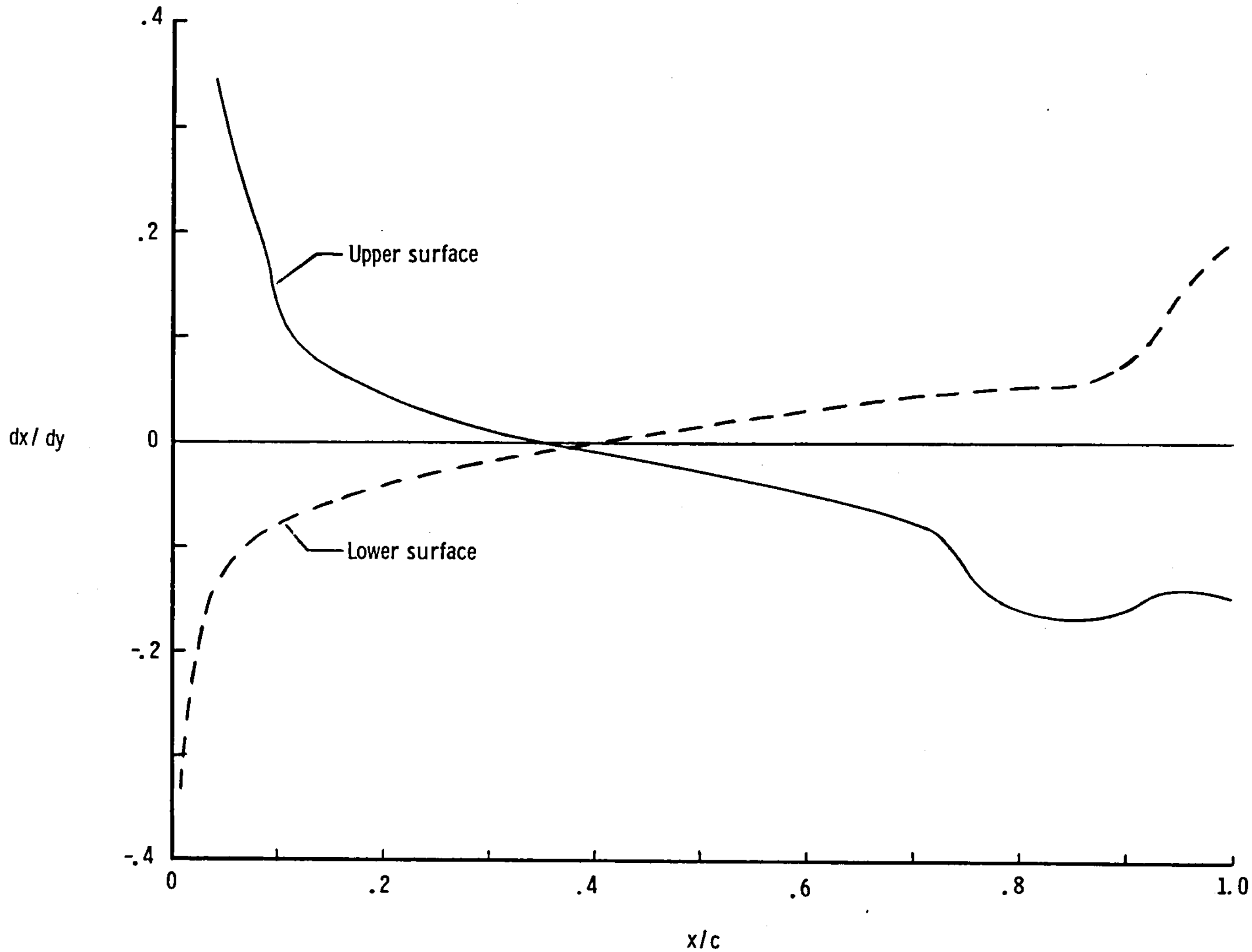


Figure 4.- Concluded.

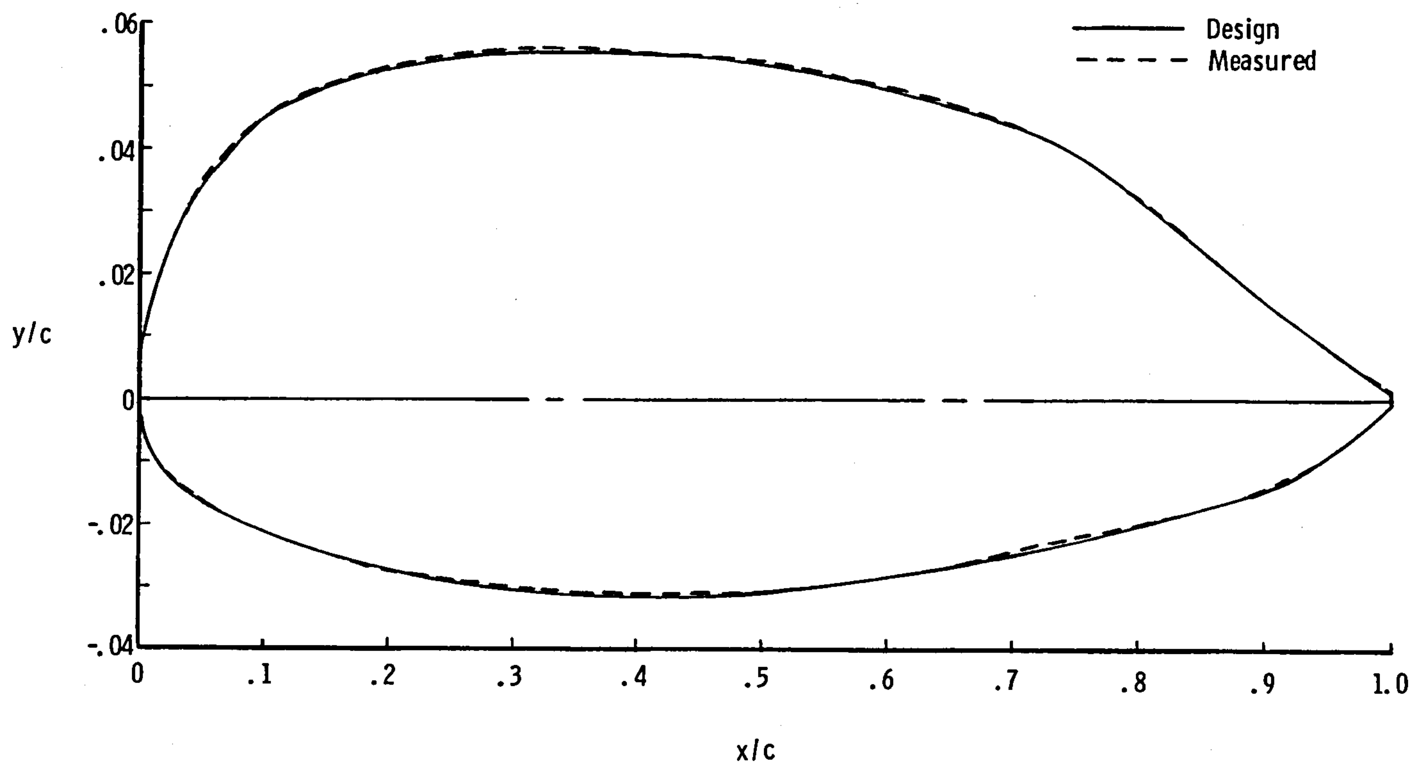


Figure 5.- Comparison of design and measured blade-section coordinates of 0.9R.

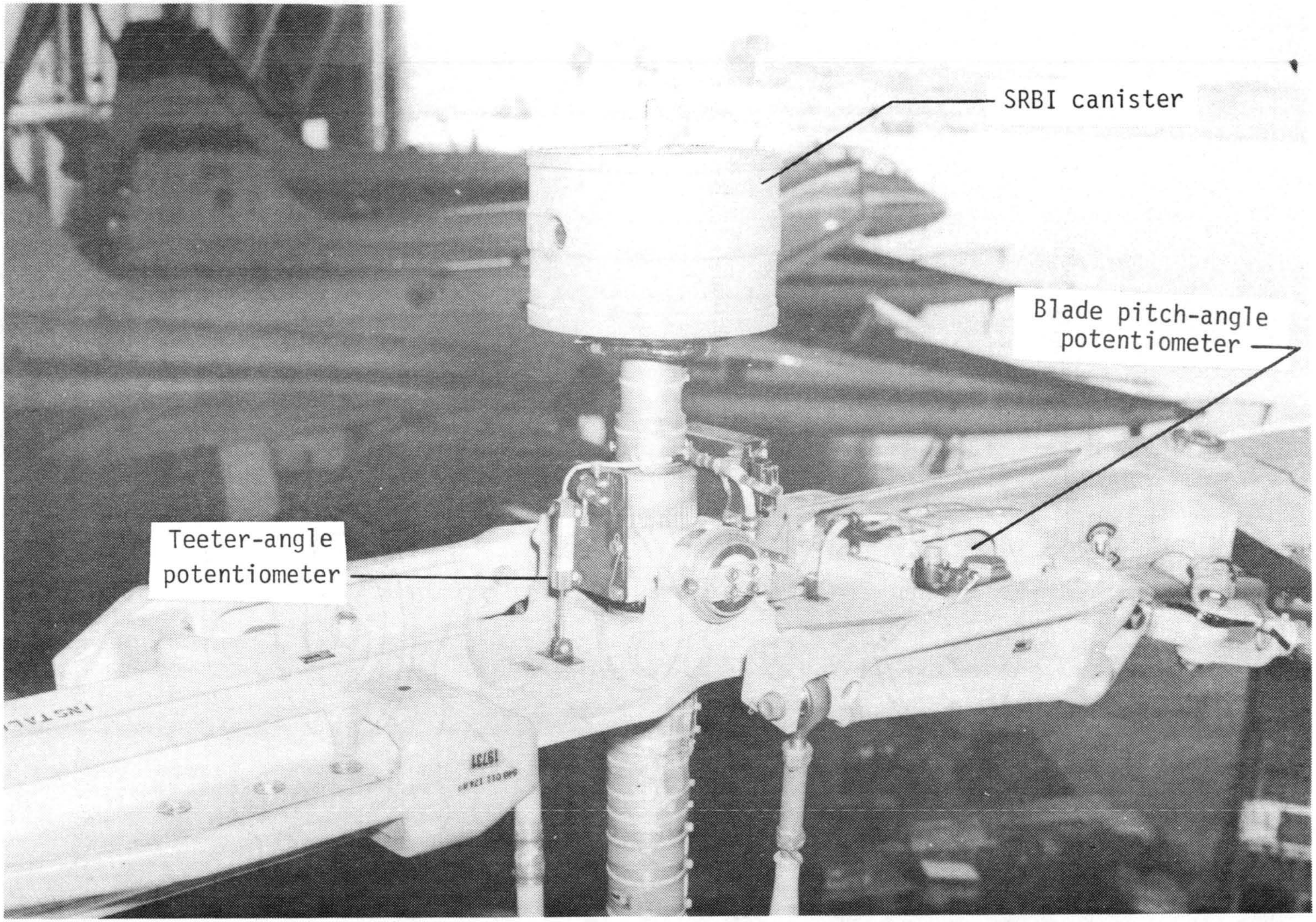


Figure 6.- Data canister and hub instrumentation.

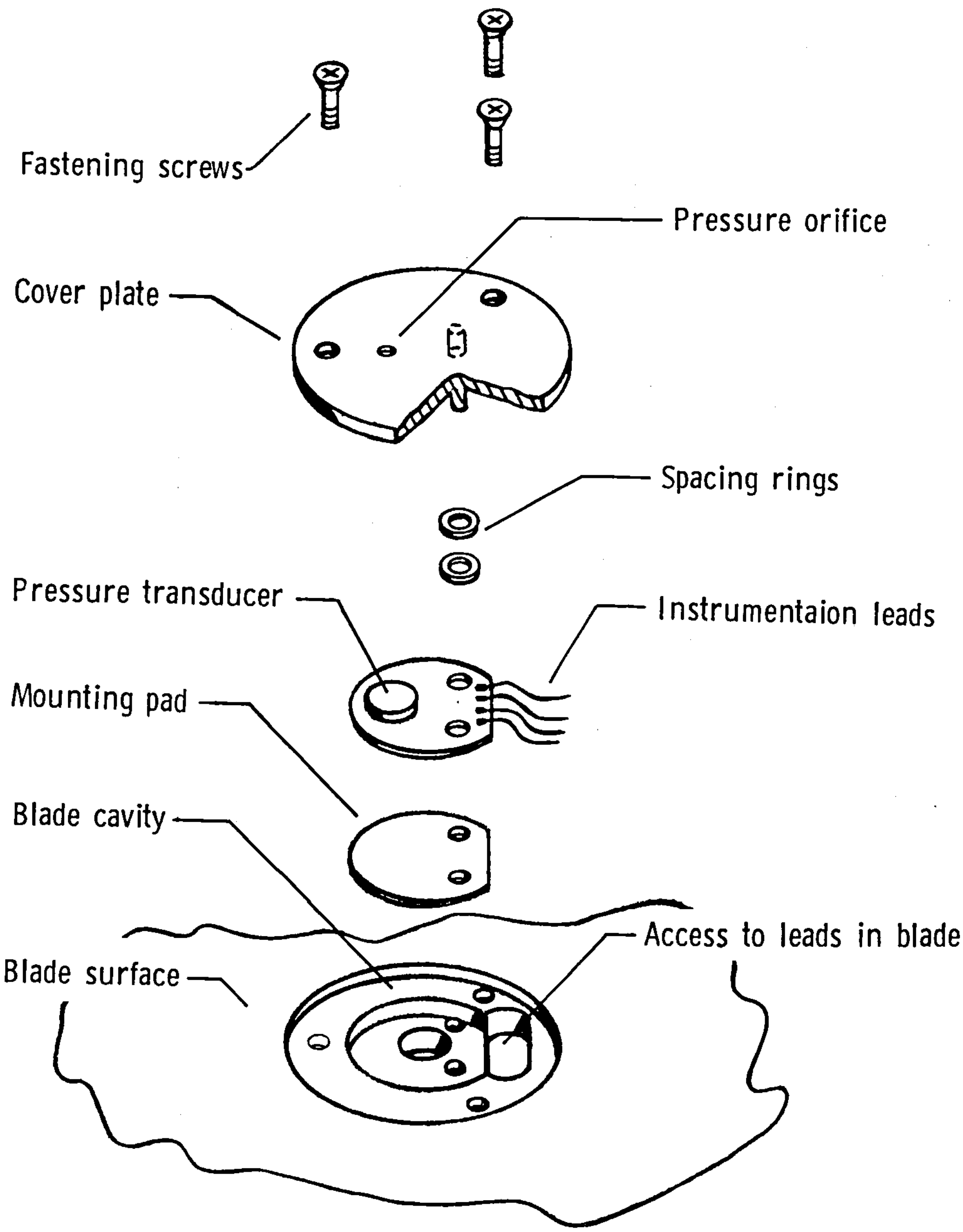


Figure 7.- Exploded-view drawing of typical pressure-transducer installation.

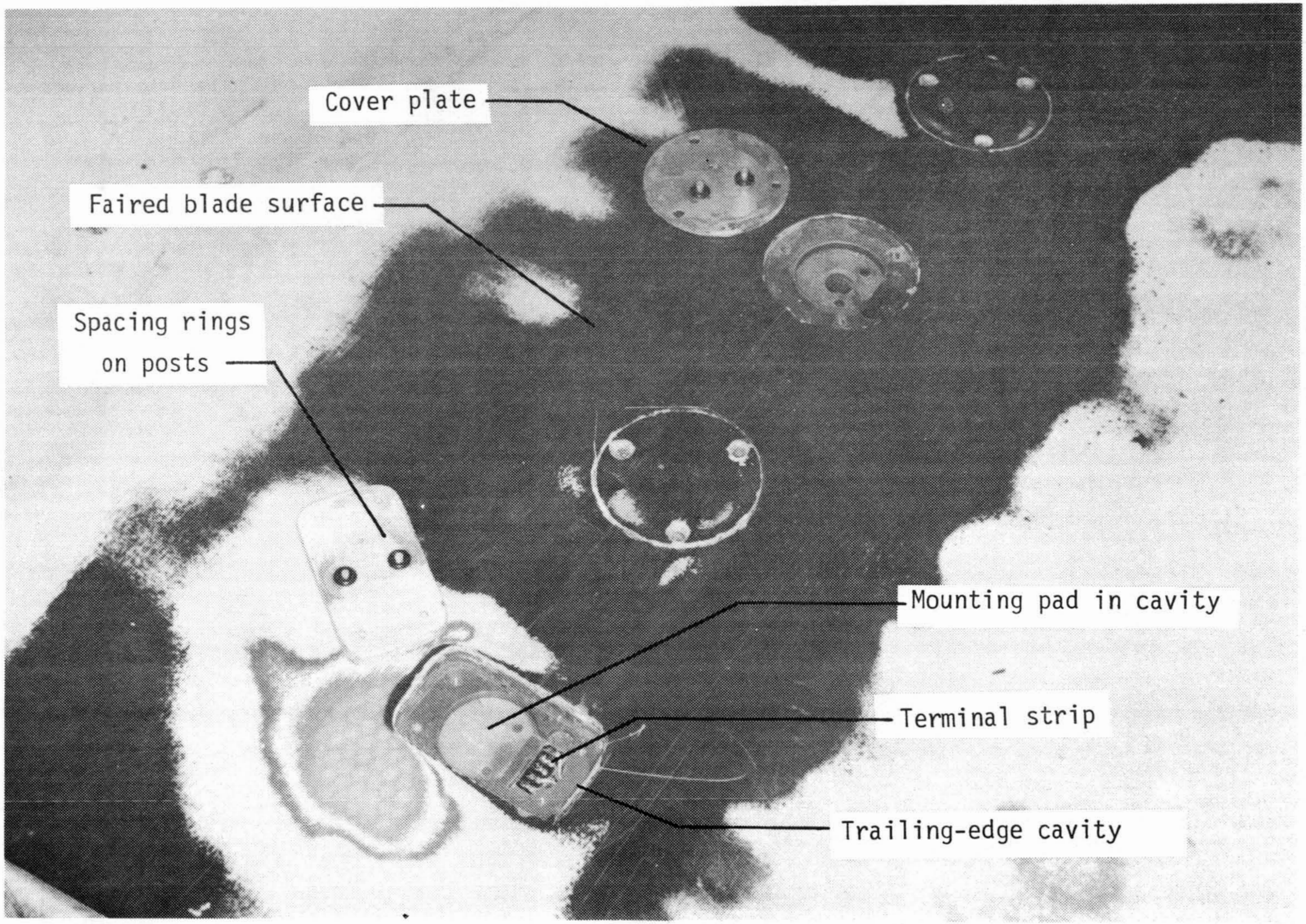
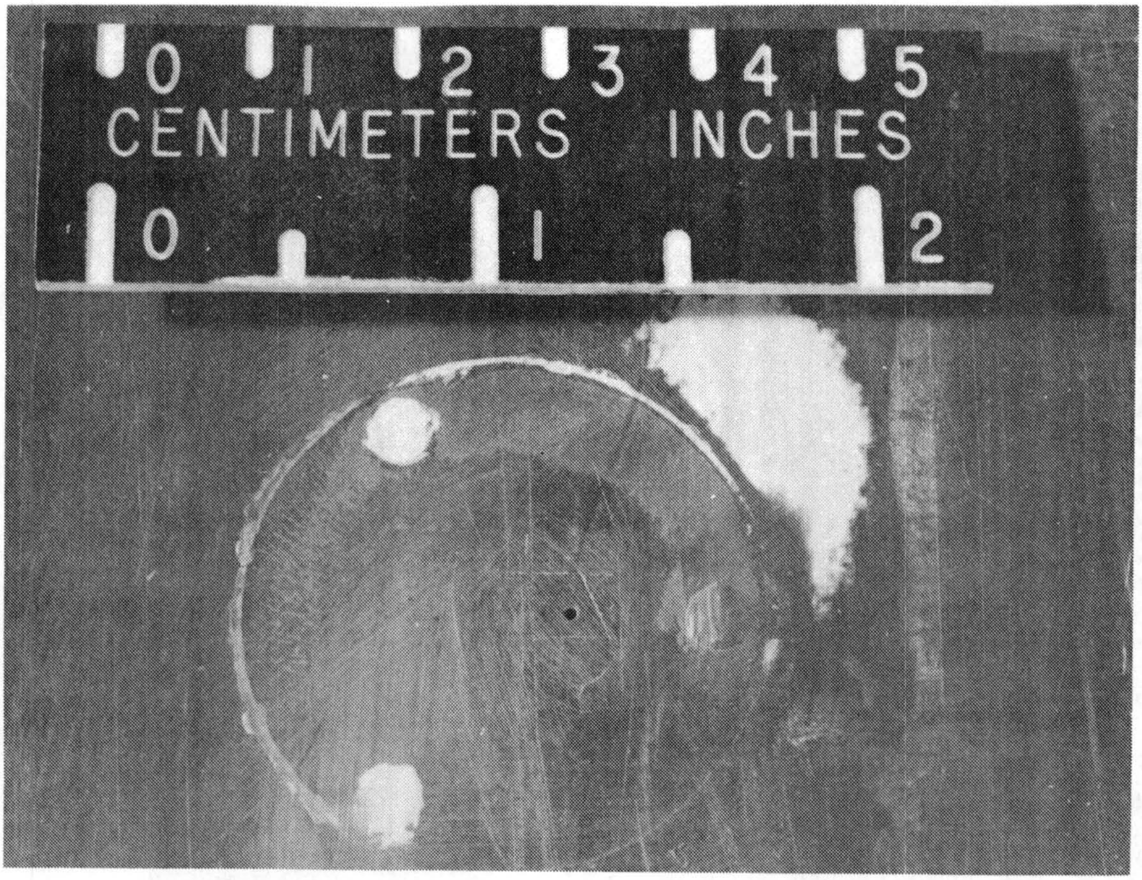
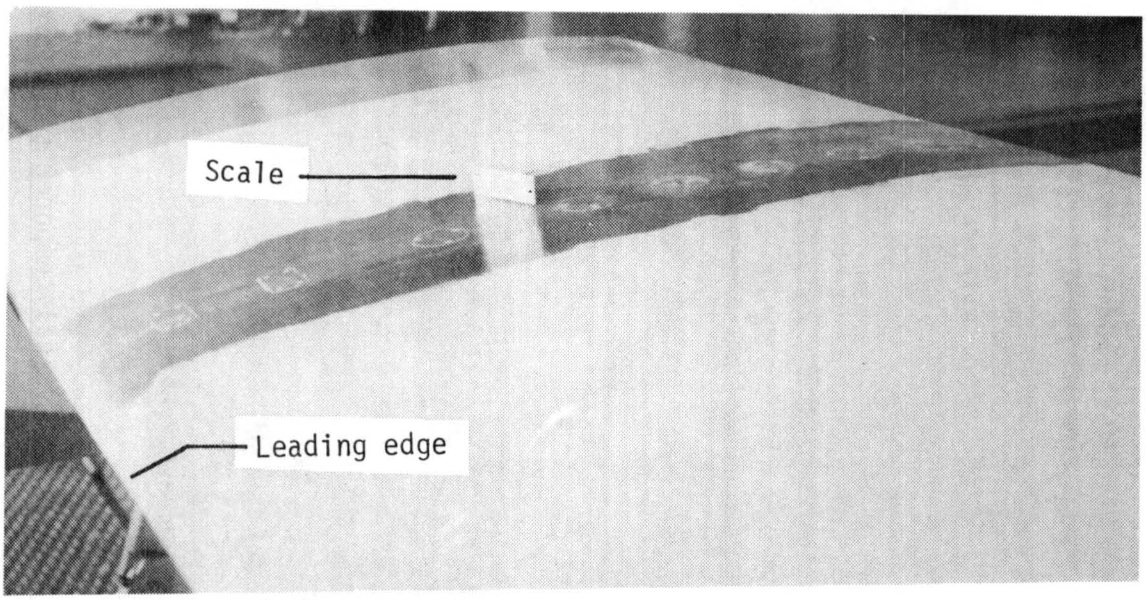


Figure 8.- Typical components for pressure-transducer assembly with transducers removed.



(a) Typical mid-chord cover plate.



(b) Blade upper surface.

Figure 9.- Blade surface with pressure transducers installed.

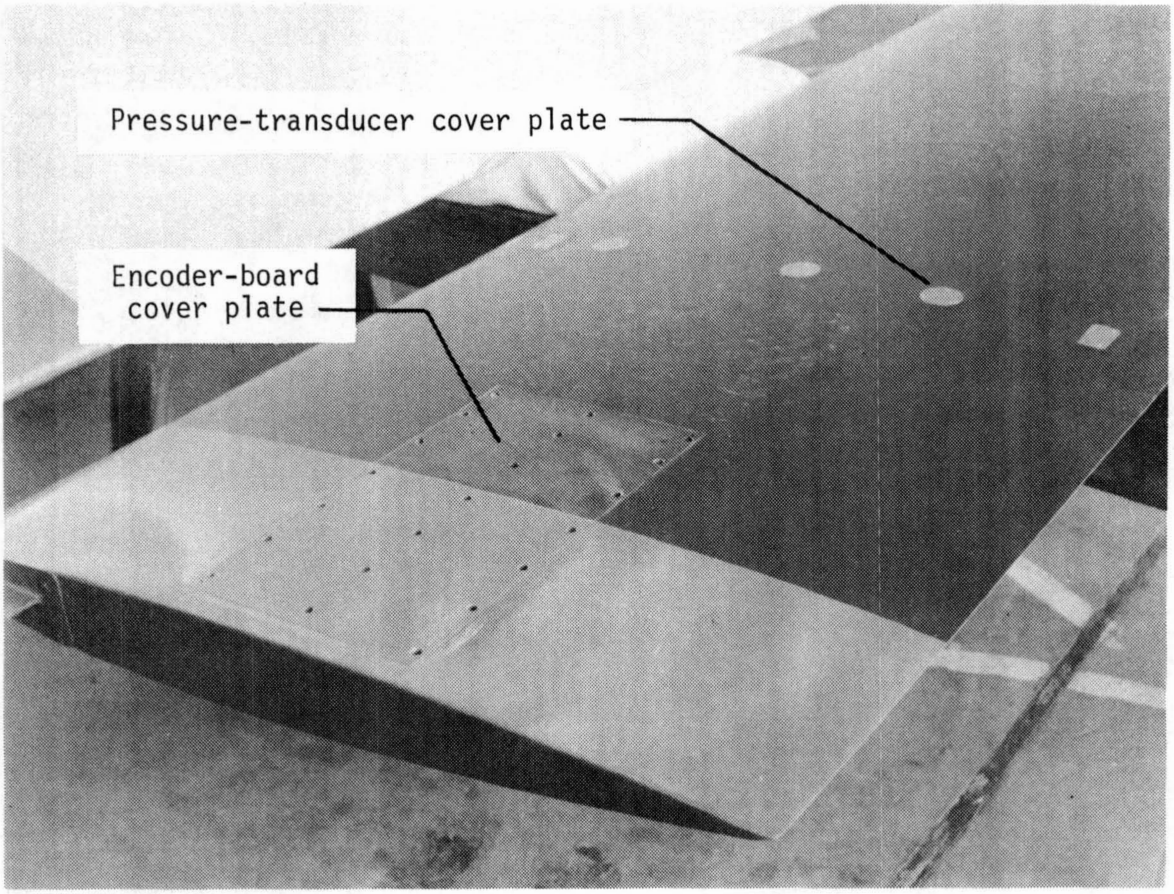
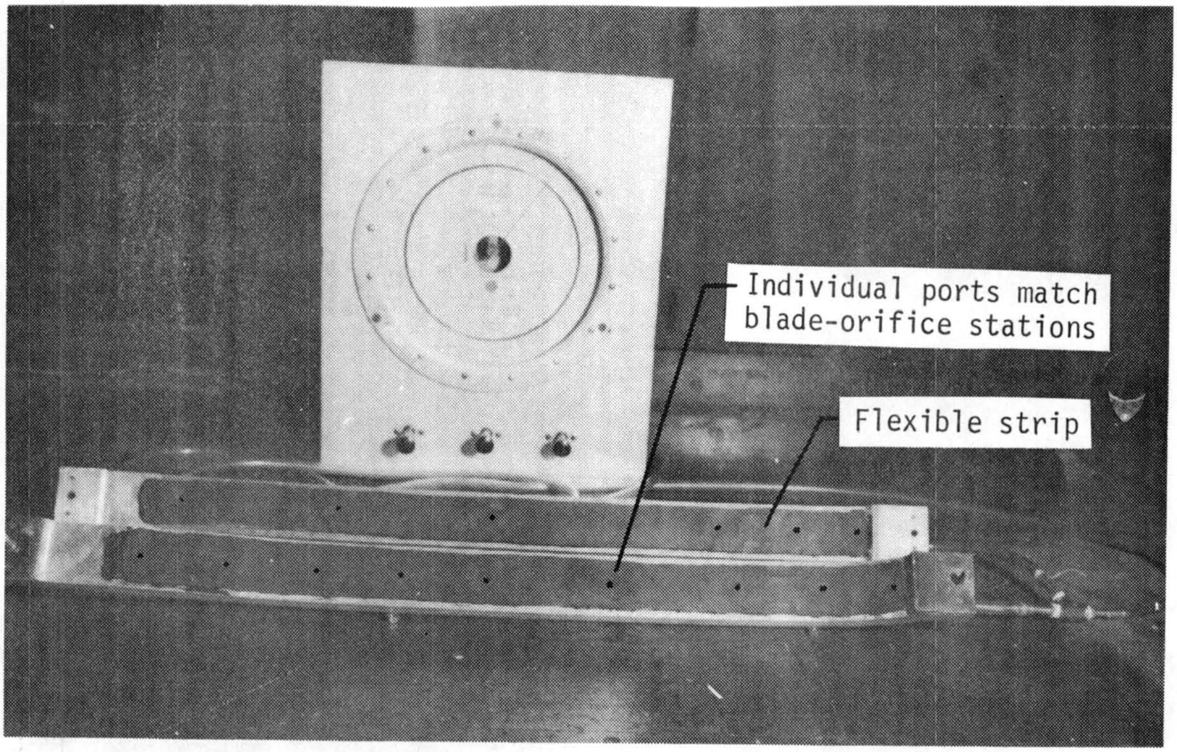
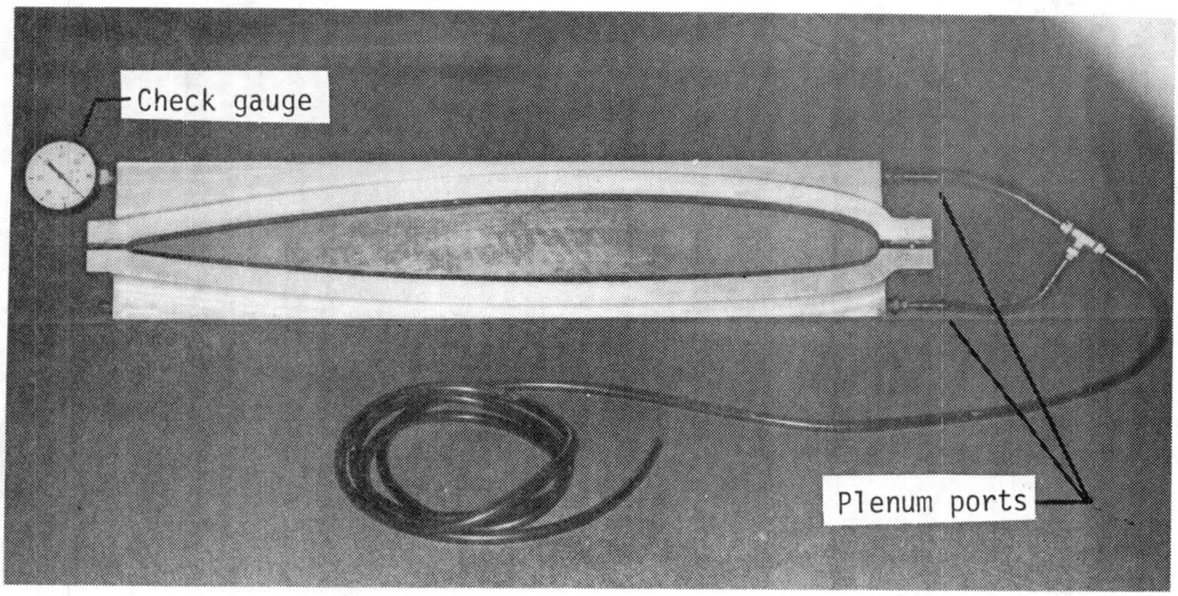


Figure 10.- Lower surface of blade tip prior to installation of pressure data system.

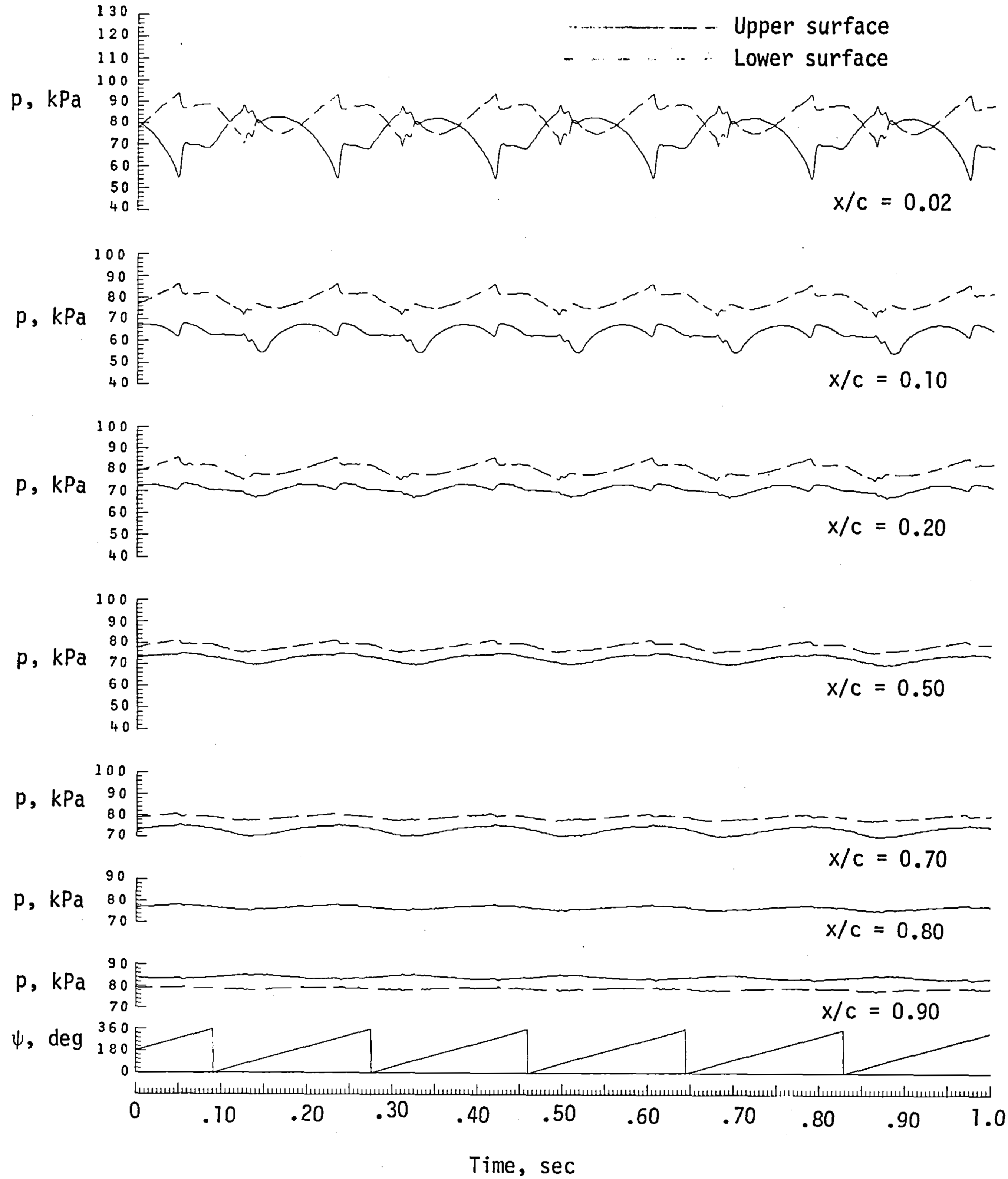


(a) Read-out gauge and fixture interior surfaces.



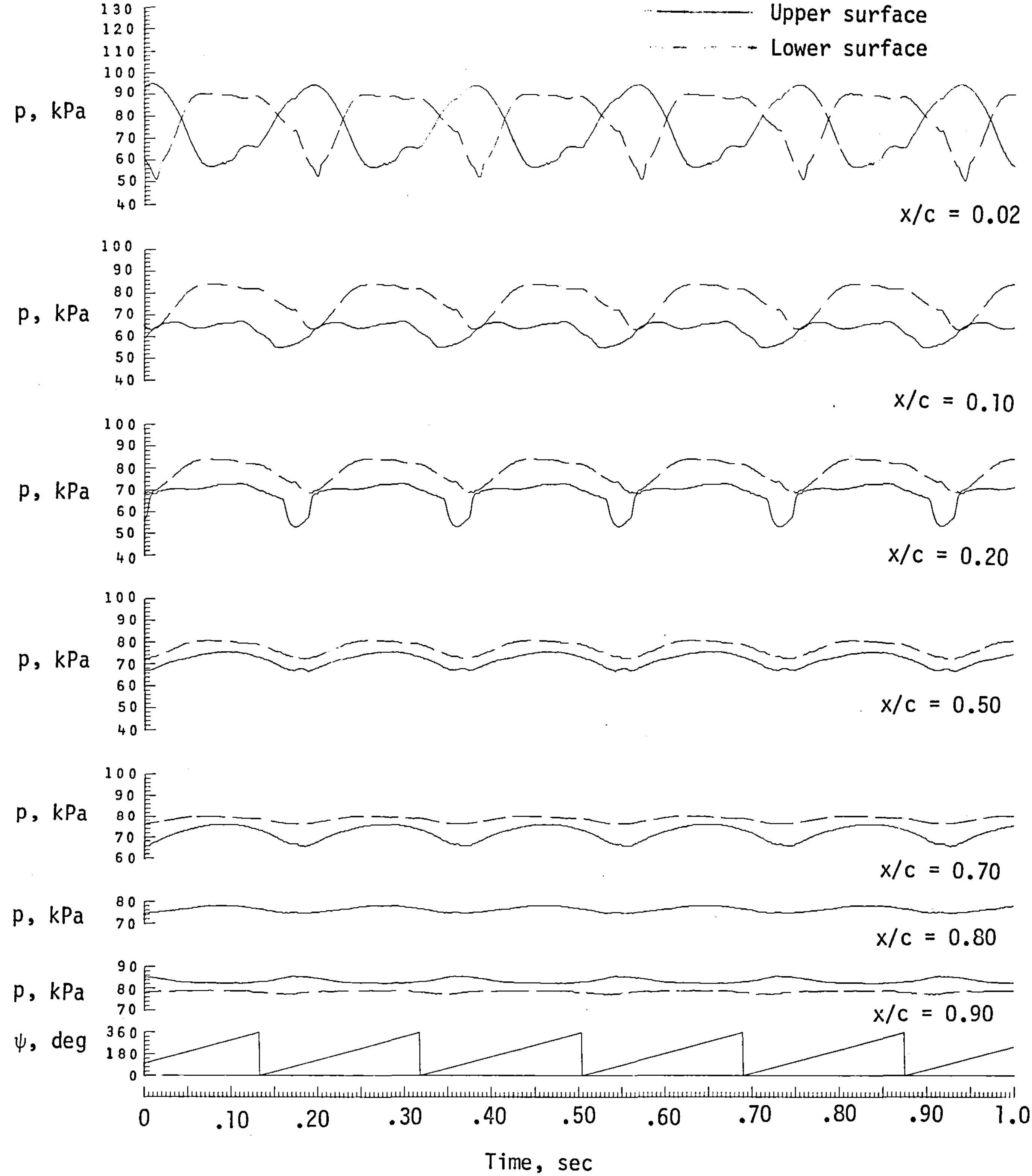
(b) Fixture installed on model blade section.

Figure 11.- Blade-section pressure fixture for preflight calibration.



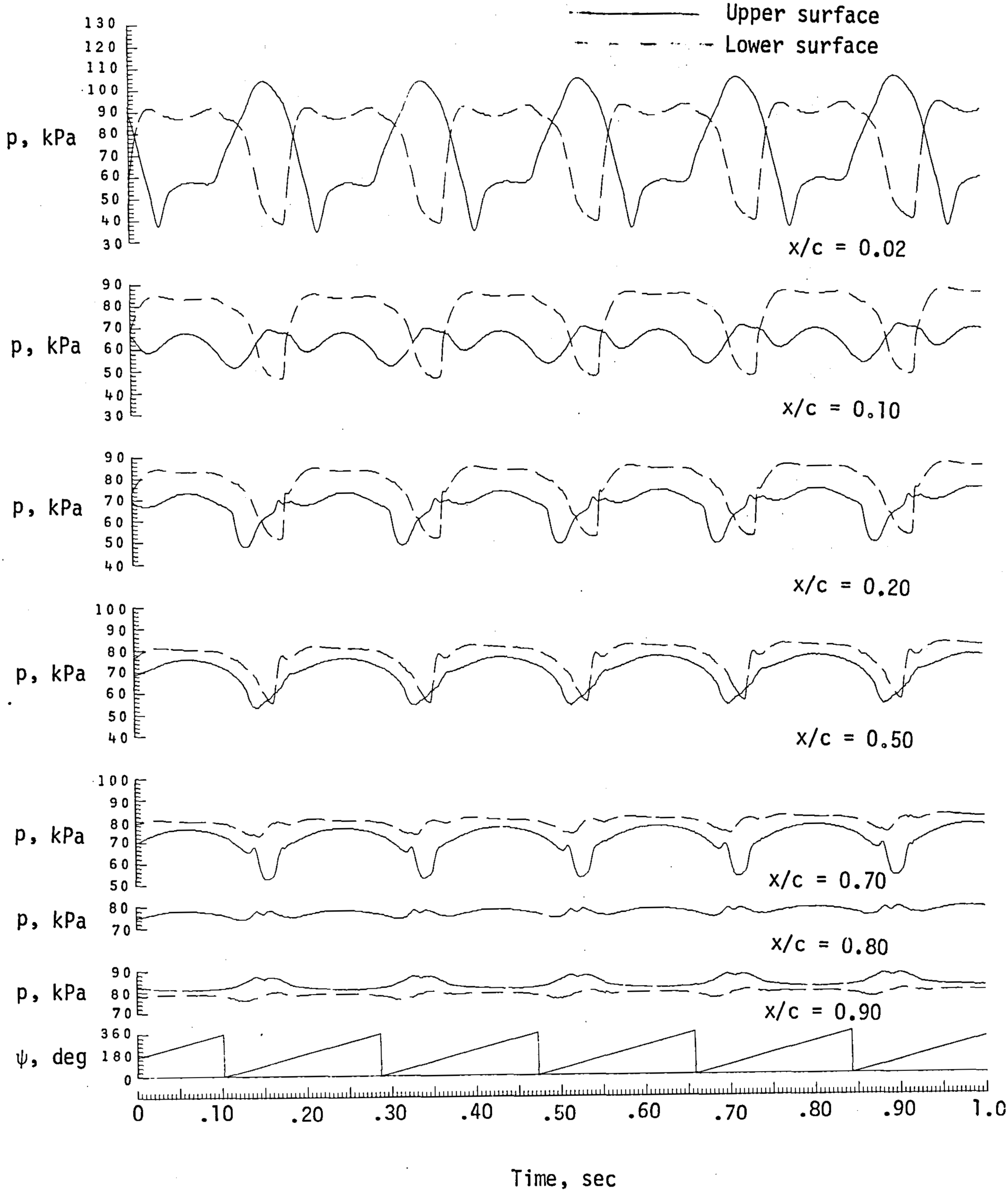
(a) $\mu = 0.151$

Figure 12.- Histories of uncorrected, local blade pressures and rotor azimuth for level flight (Flight 63 of Appendices D and E). r/R = 0.9



(b) $\mu = 0.257$

Figure 12.- Continued.



(c) $\mu = 0.370$

Figure 12.- Concluded.

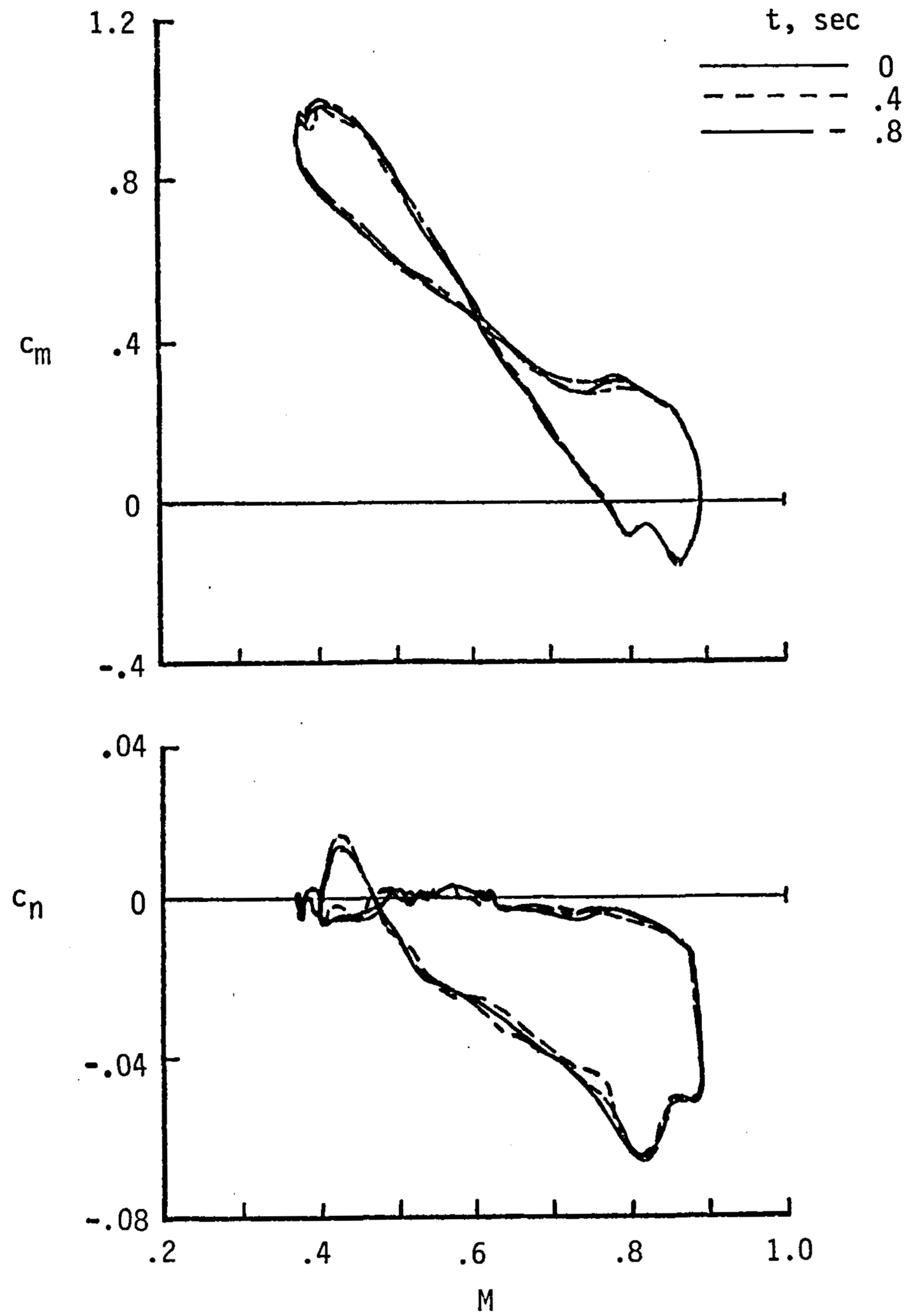


Figure 13.- Comparison of blade section data for several rotor revolutions at one test point. $C_L' = 0.0043$; $\mu = 0.37$; $r/R = 0.9$.

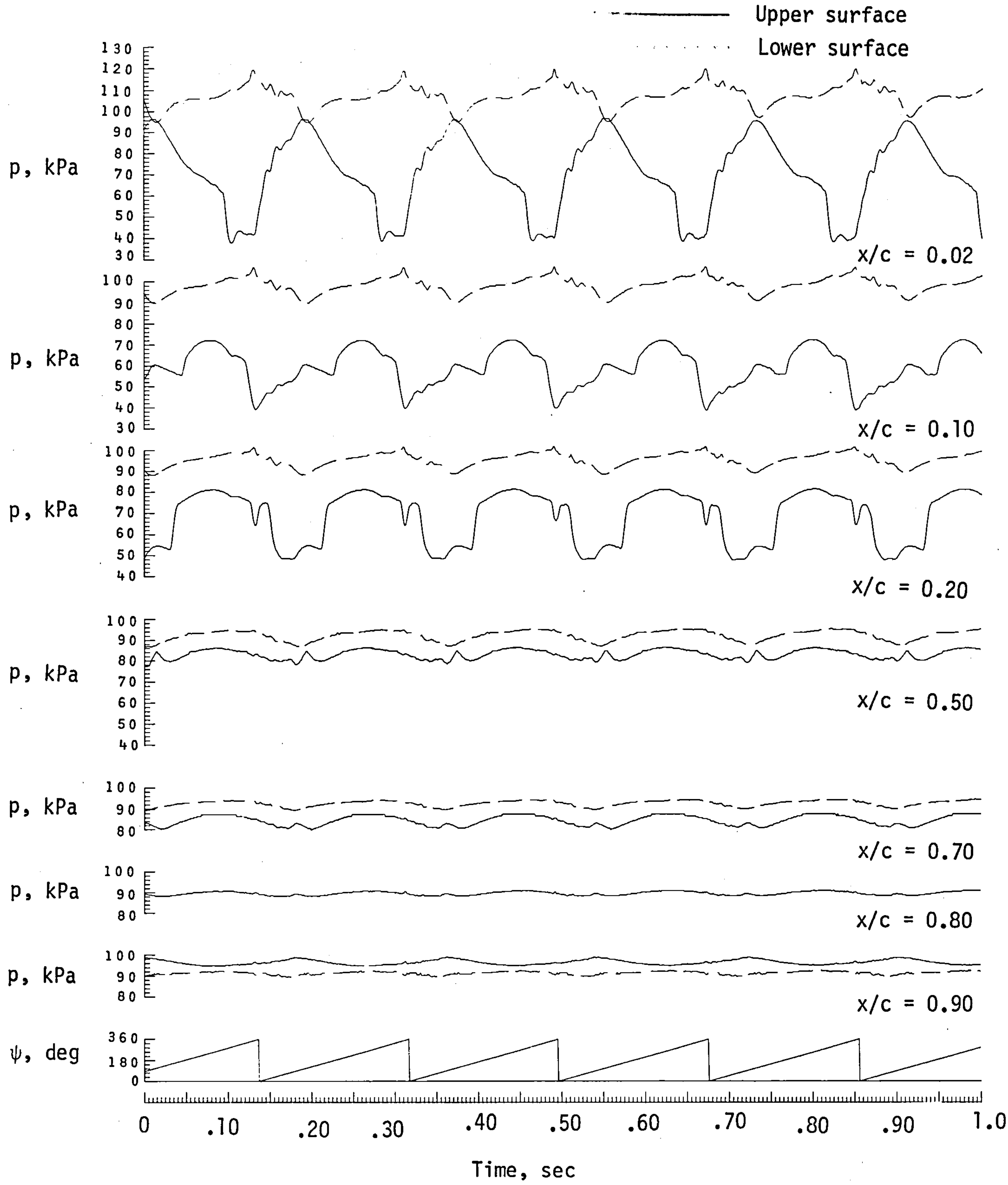


Figure 14.- Histories of uncorrected, local blade pressures and rotor azimuth for a descending left turn. $\mu = 0.224$; $C_L{}' = 0.0086$; $r/R = 0.9$.

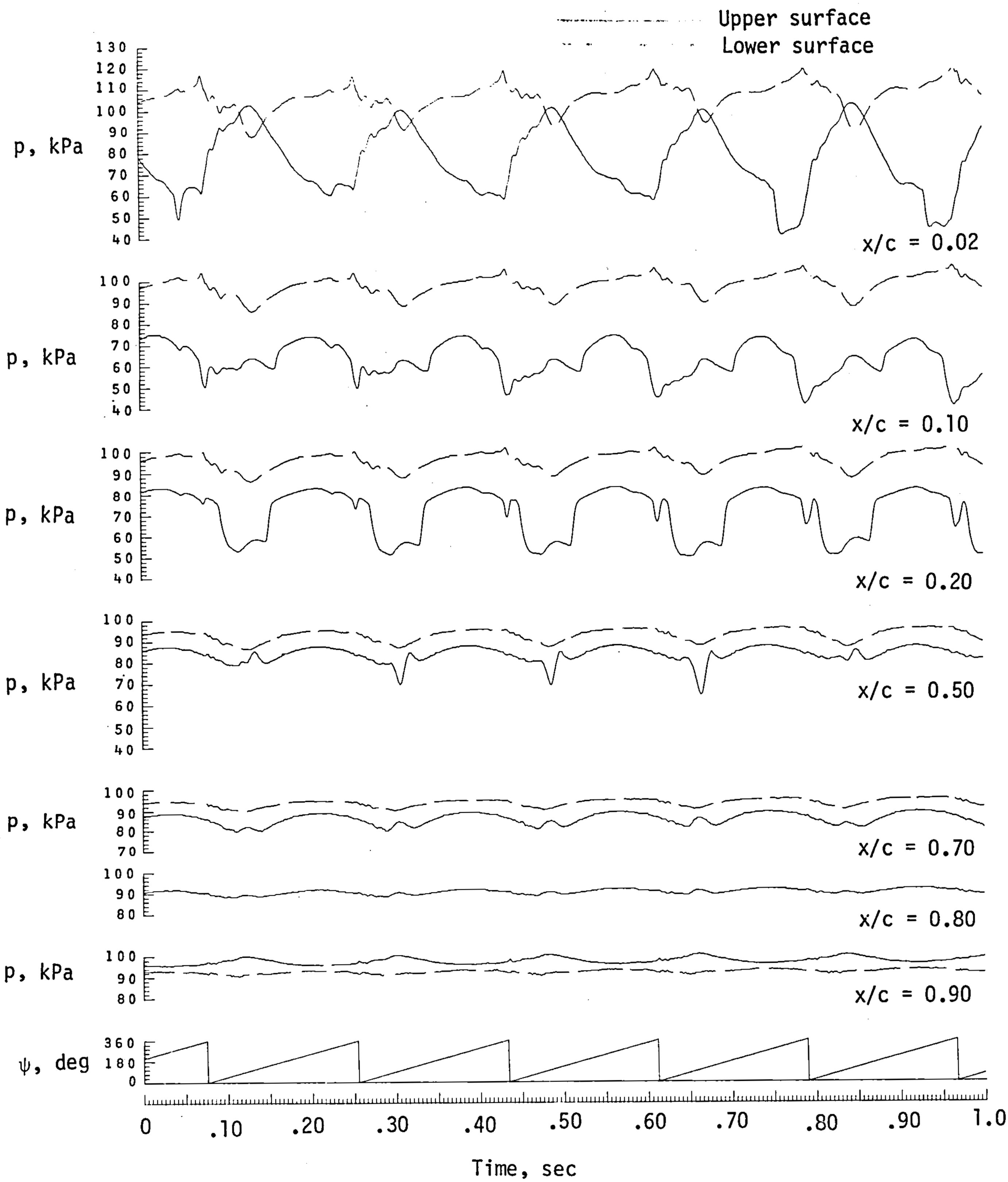


Figure 15.- Histories of uncorrected, local blade pressures and rotor azimuth for a symmetrical pull-up (Flight 66, run 22 of Appendices D and E). $\mu = 0.24$; $C_L' = 0.0075$; $r/R = 0.9$.

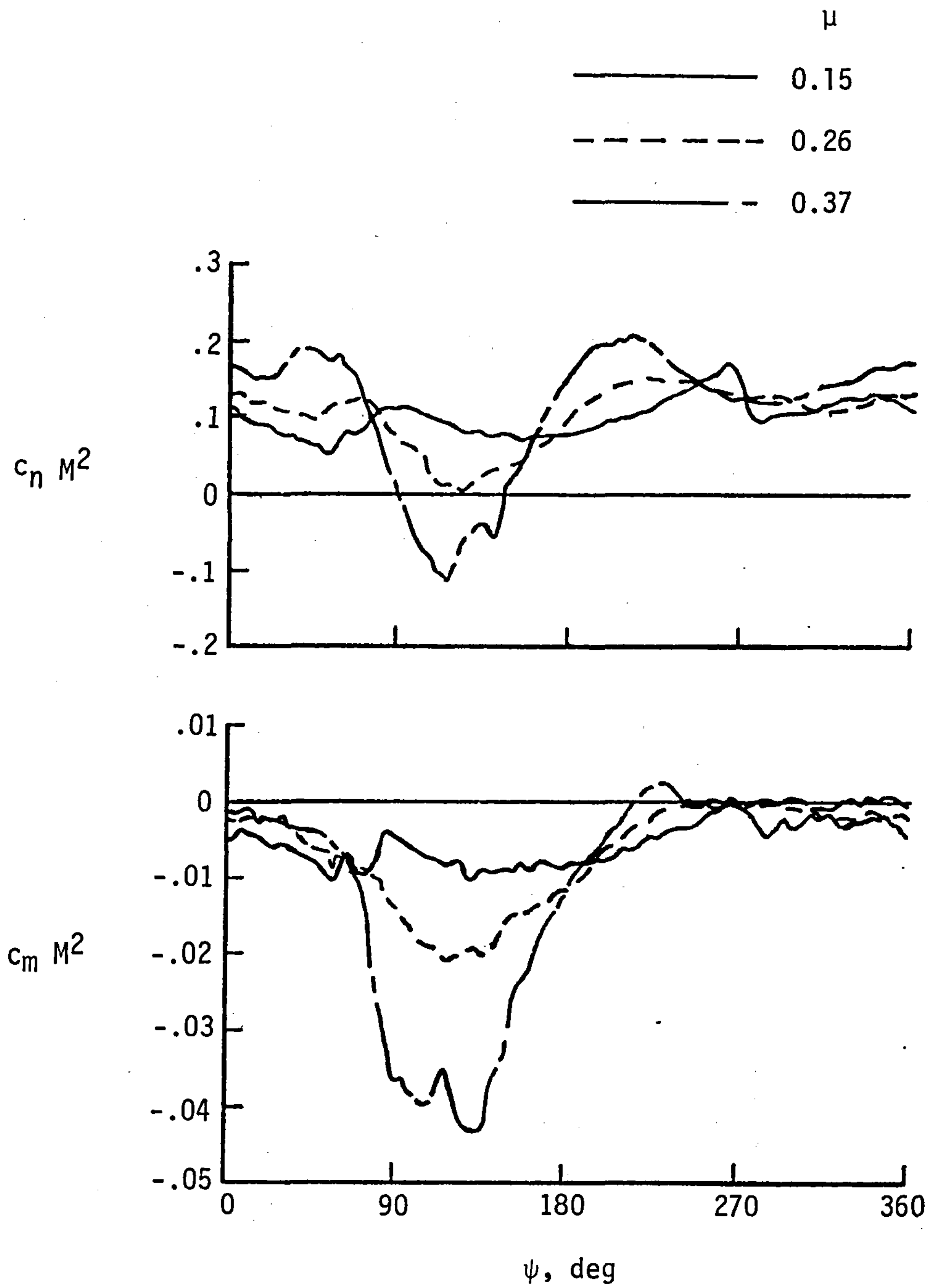
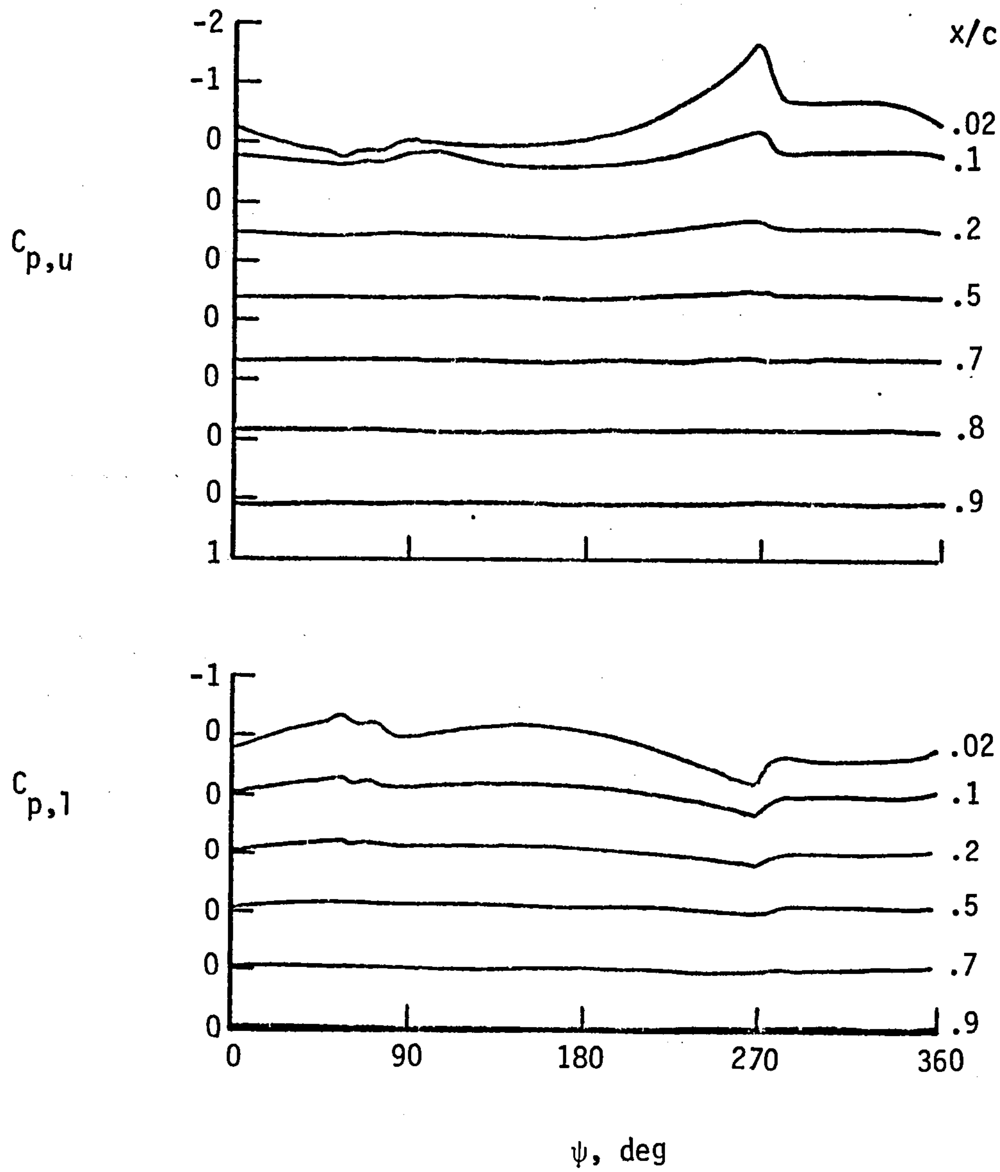
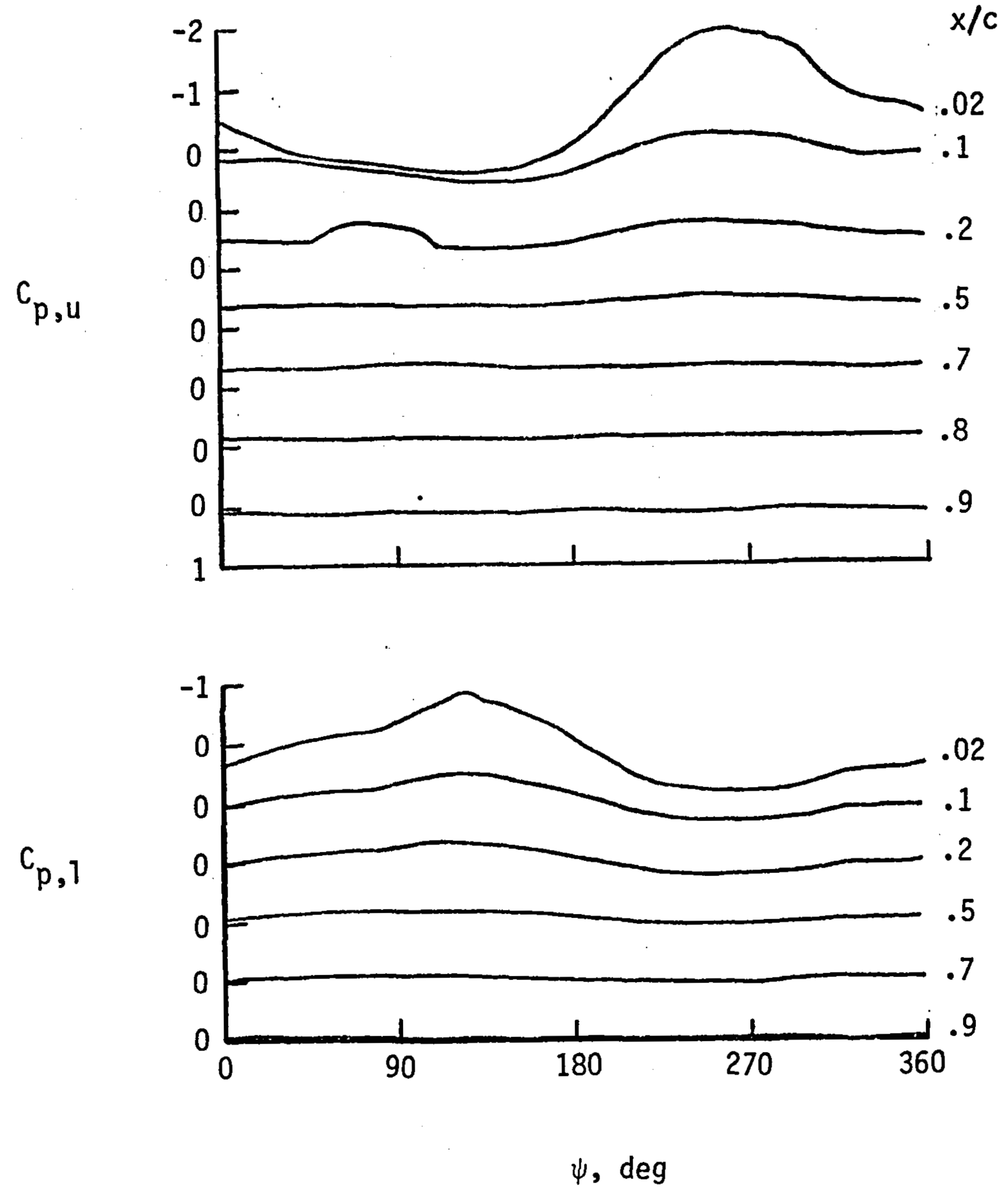


Figure 16.- Azimuthwise distribution of blade-section aerodynamic loads for three tip-speed ratios.



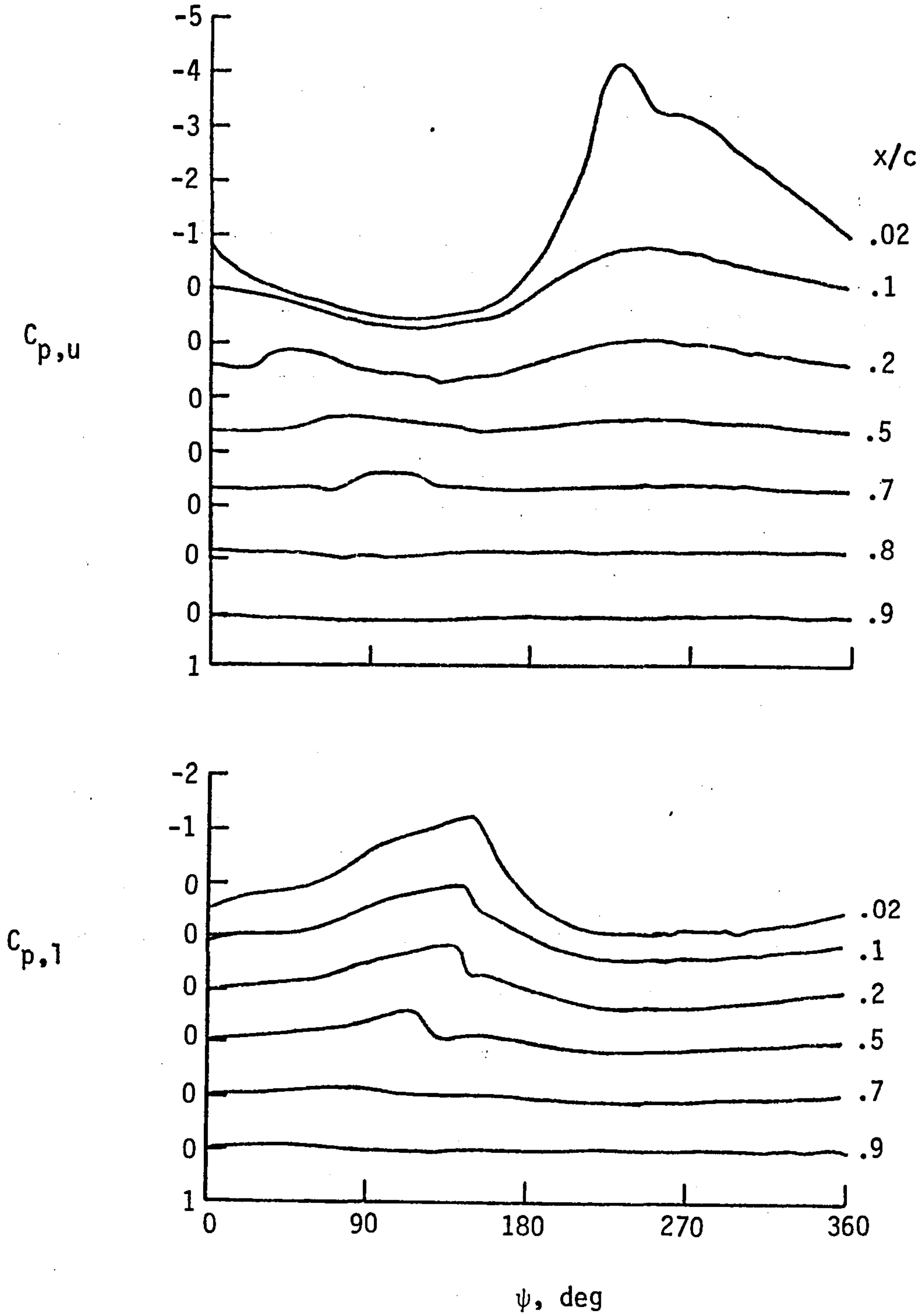
(a) μ = 0.15

Figure 17.- Pressure coefficient records for several values of tip-speed ratio in level flight. M_h = 0.70; C_L' = 0.0043; r/R = 0.9.



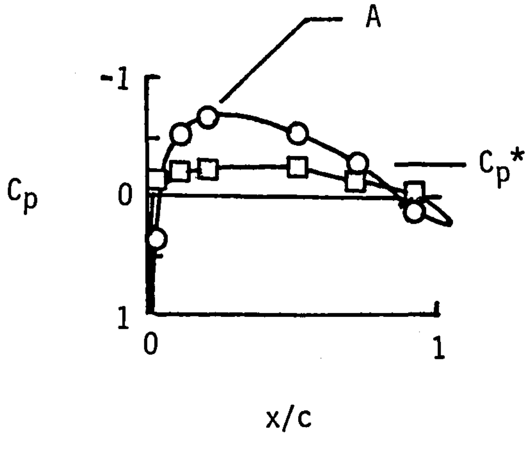
(b) μ = 0.26

Figure 17.- Continued.

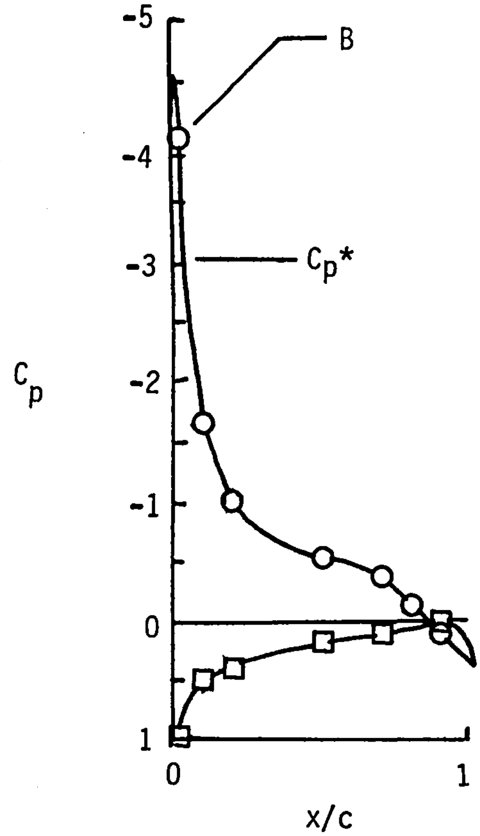


(c) $\mu = 0.37$

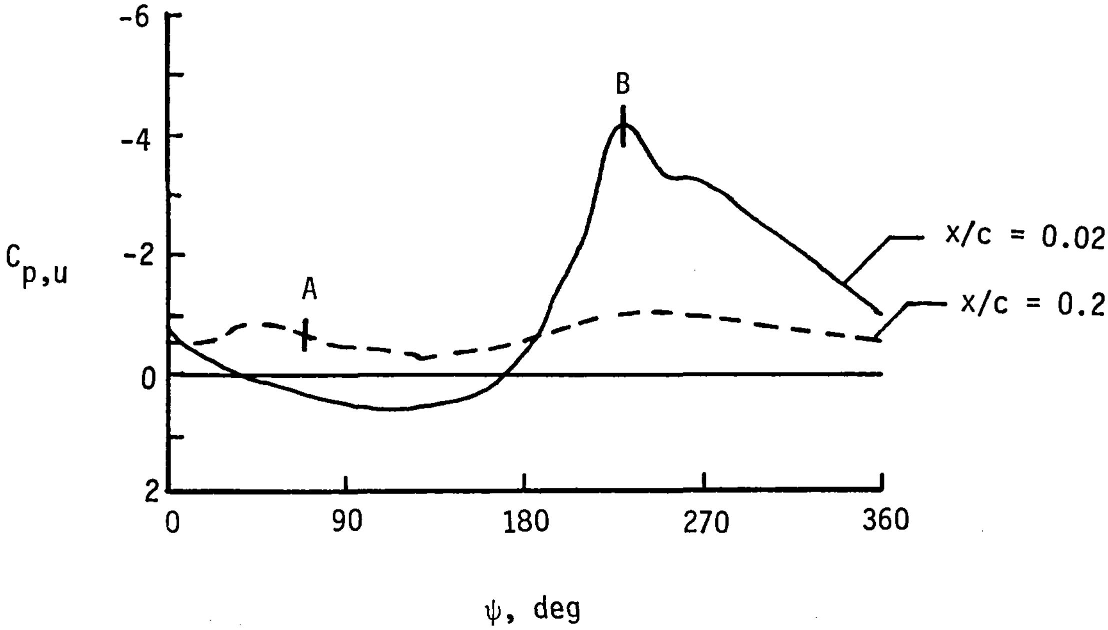
Figure 17.- Concluded.



(a) Pressure distribution, $\psi = 70^{\circ}$

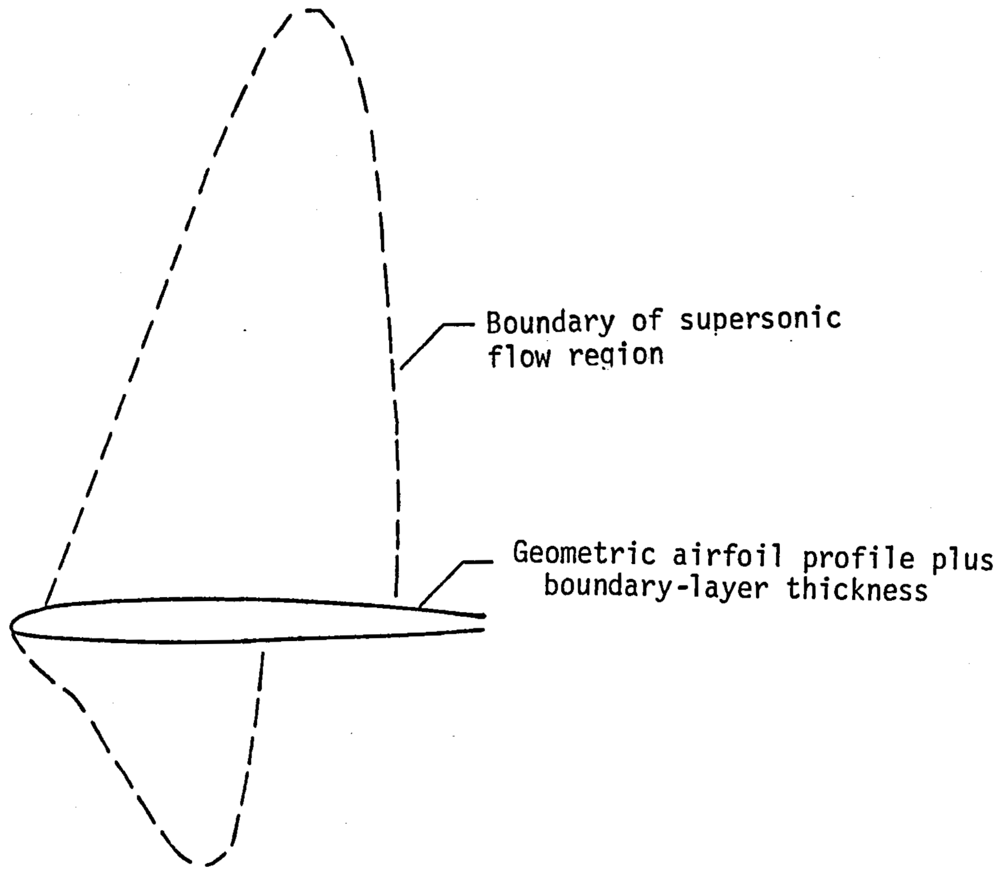


(b) Pressure distribution, $\psi = 230^{\circ}$

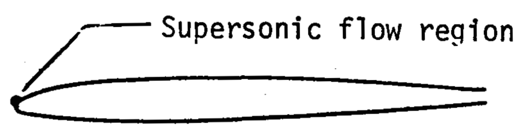


(c) Pressure as a function of azimuth

Figure 18.- Pressure-data characteristics for local supercritical flow. $\mu = 0.37$; $C_L' = 0.0043$; $r/R = 0.9$.

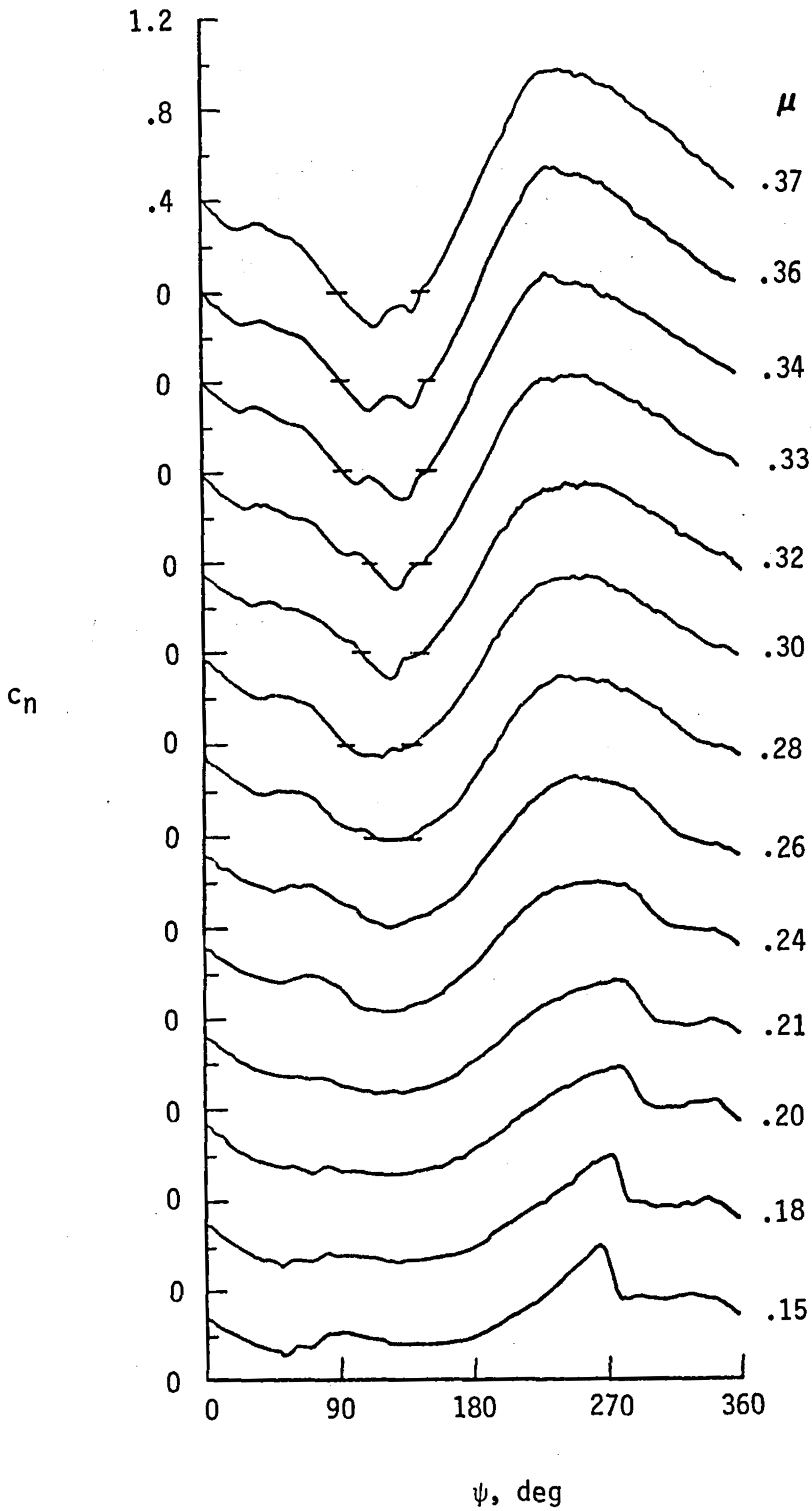


(a) $\psi = 70^{o}$



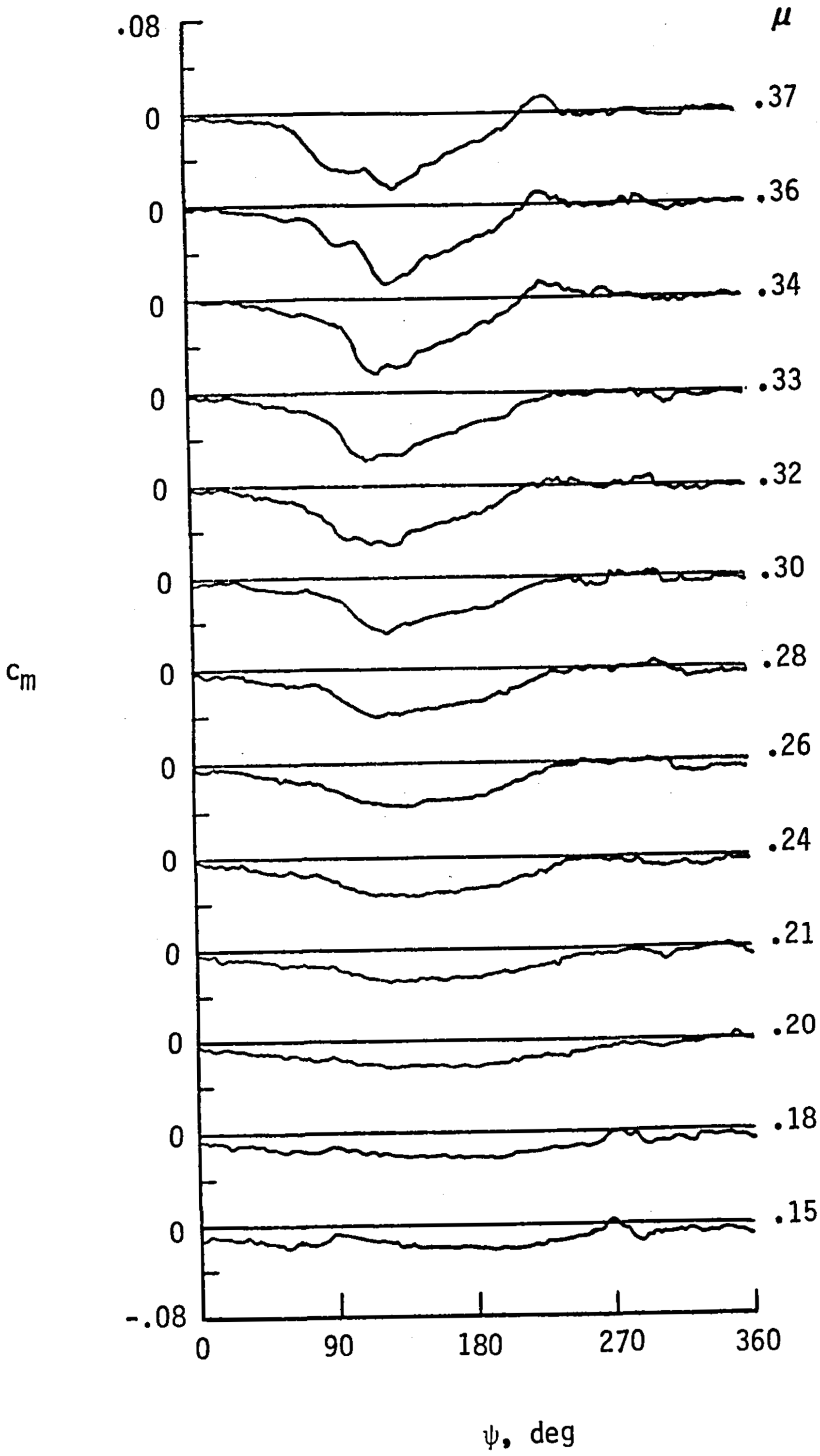
(b) $\psi = 230^{o}$

Figure 19.- Sample patterns of supersonic flow regions for blade section. $\mu = 0.37$; $C_L{}' = 0.0043$; $r/R = 0.9$.



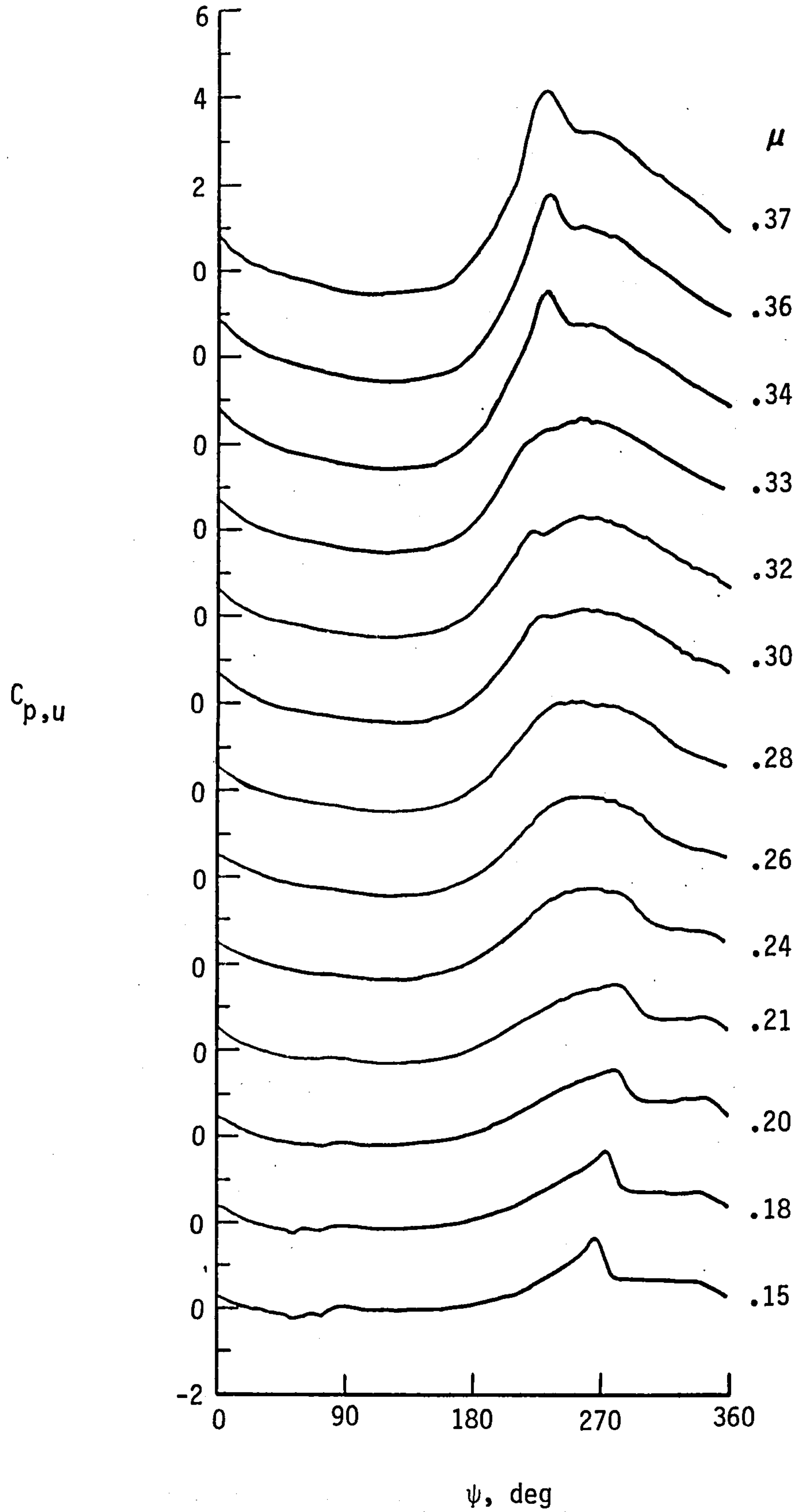
(a) Normal-force coefficient.

Figure 20.- Azimuthal distribution of blade-section aerodynamic characteristics at a series of tip-speed ratios (Flight 63 of Appendices D and E). $\overline{C}_L{}' = 0.0043$; $\overline{M}_h = 0.70$; $r/R = 0.9$.



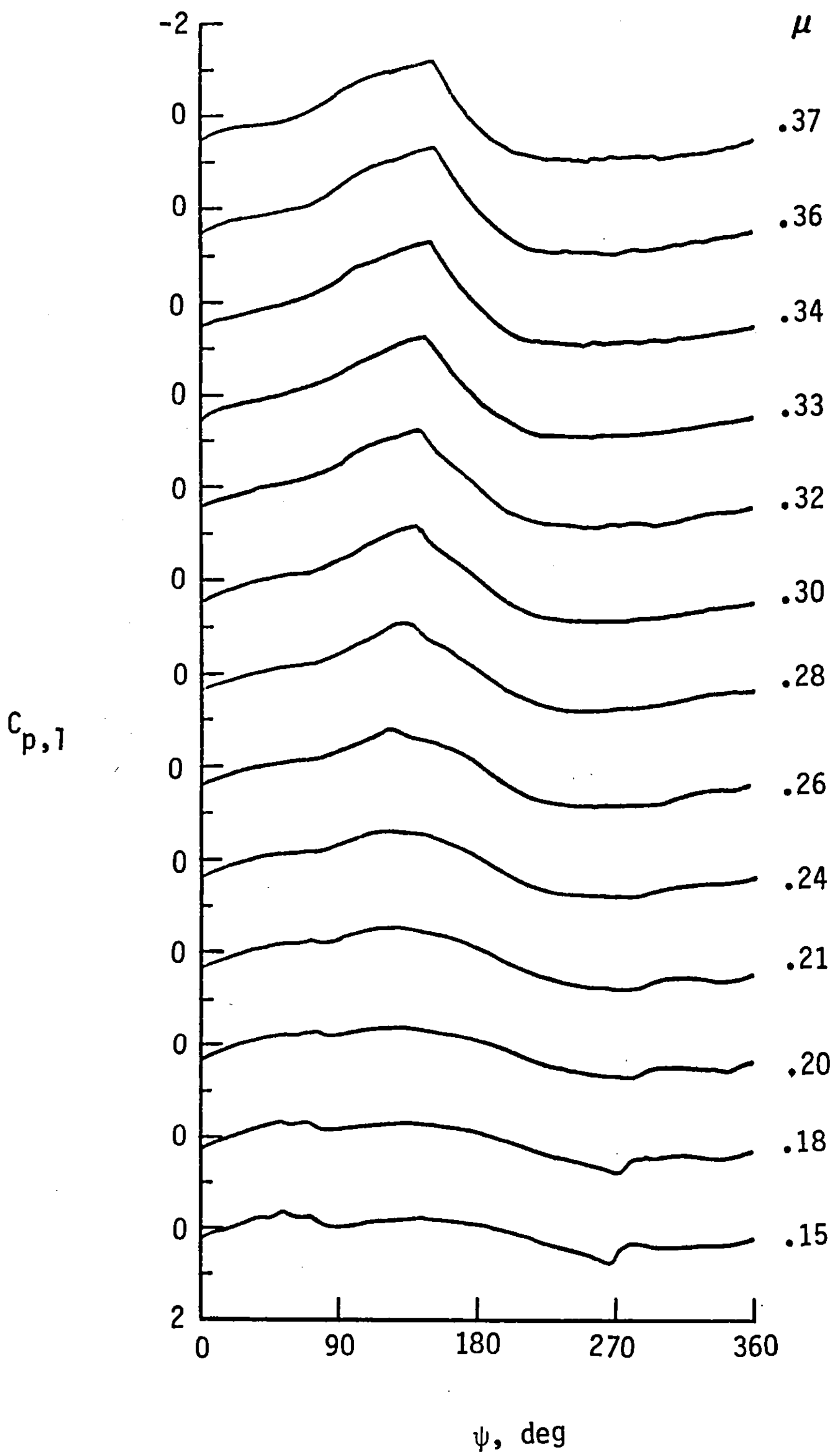
(b) Pitching-moment coefficient

Figure 20.- Continued.



(c) Upper-surface pressure coefficient; x/c = 0.02.

Figure 20.- Continued.



(d) Lower-surface pressure coefficient; x/c = 0.02.

Figure 20.- Concluded.

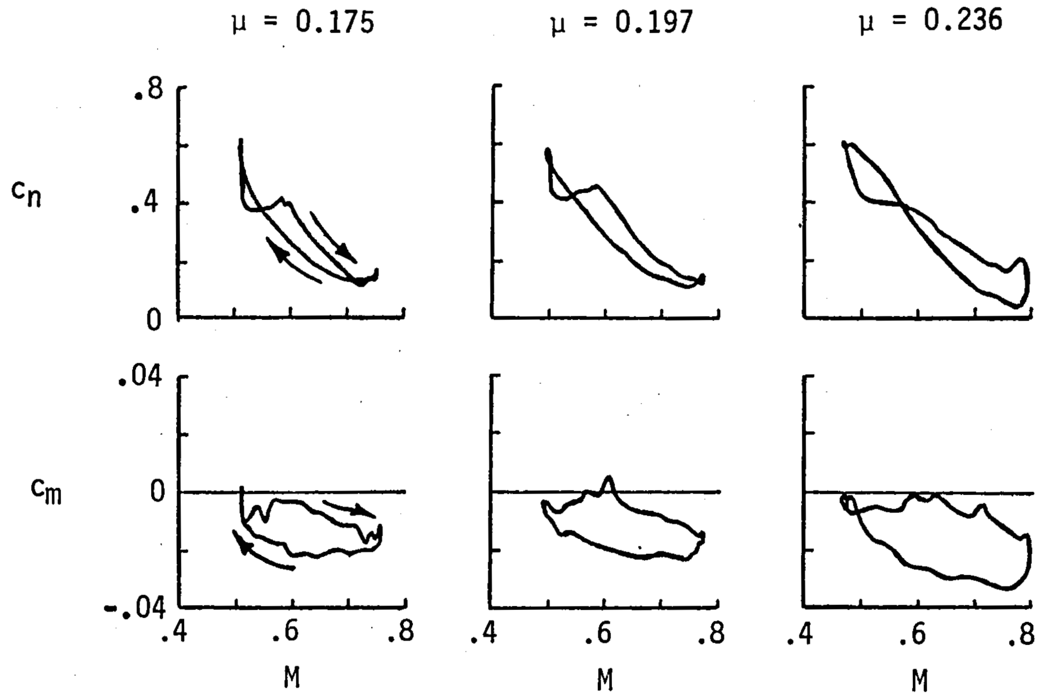


Figure 21.- Blade-section operating conditions at a series of tip-speed ratios. $\overline{C}_L{}' = 0.0043$; $\overline{M}_h = 0.70$; $r/R = 0.9$.

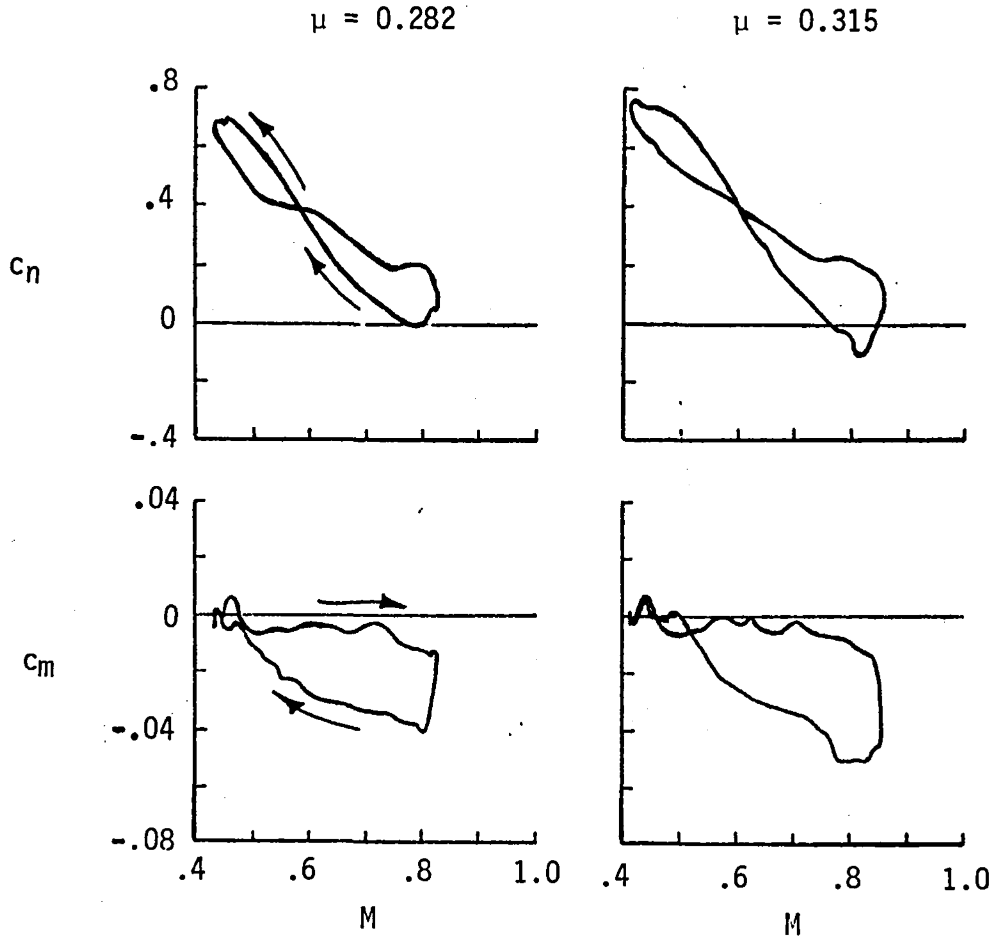


Figure 21.- Continued.

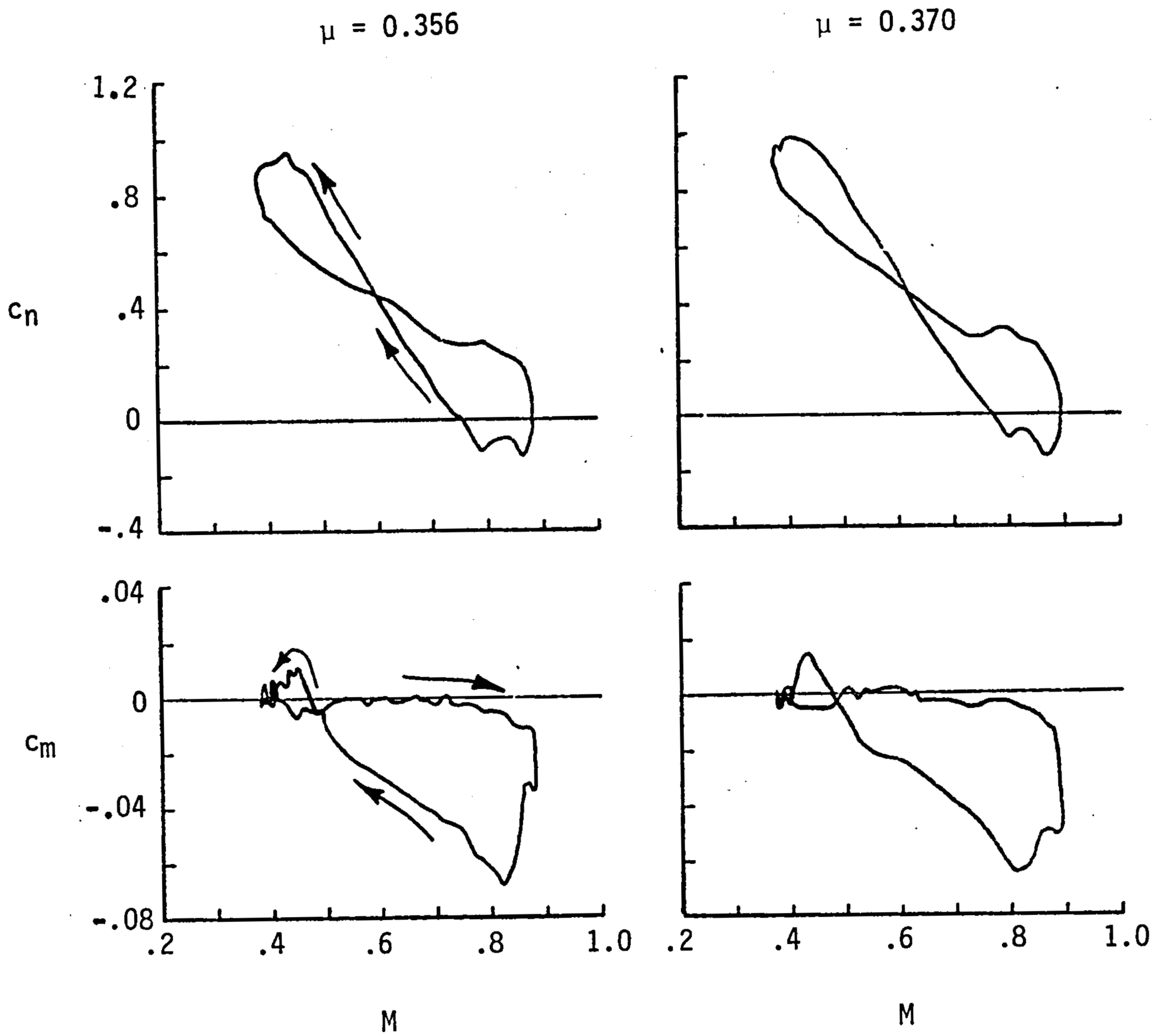


Figure 21.- Concluded.

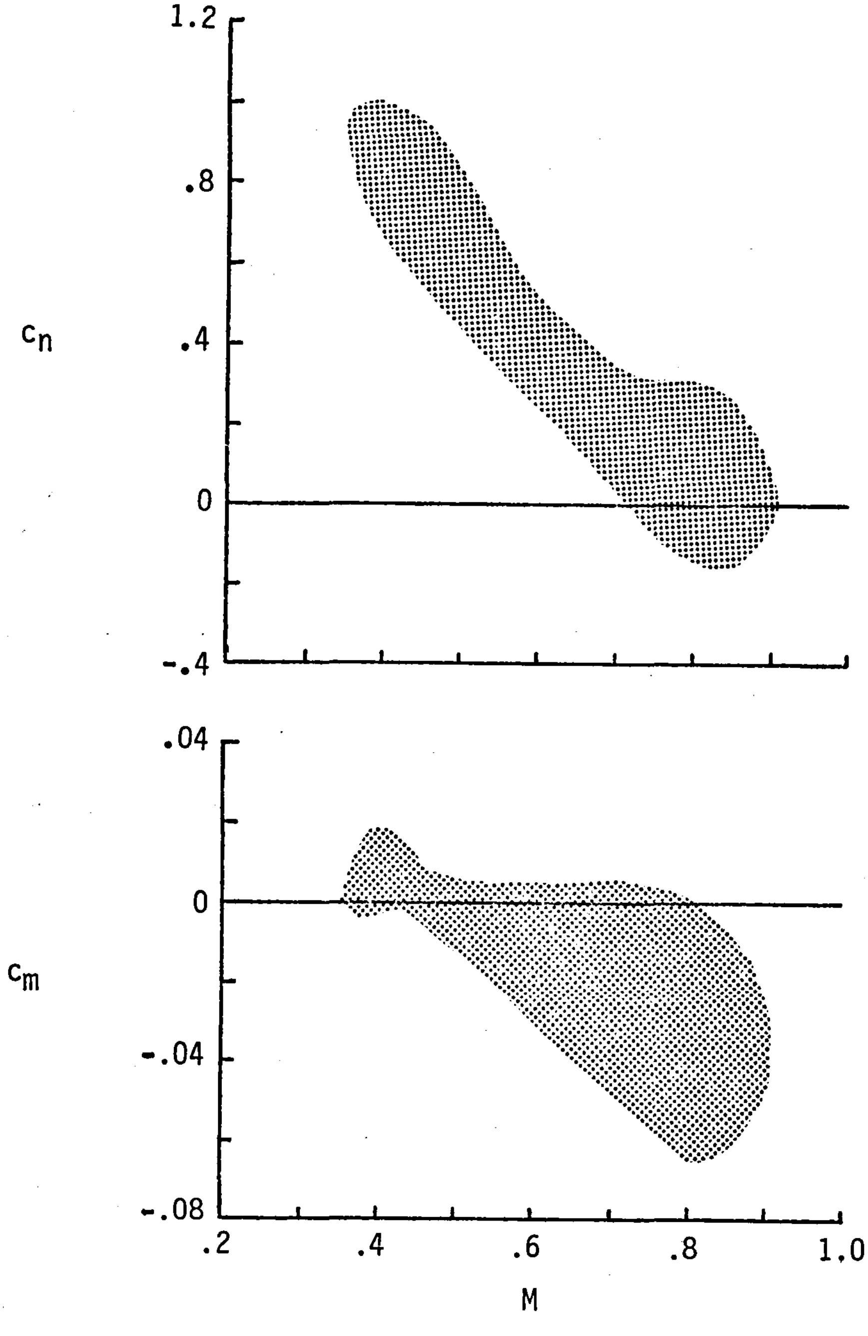
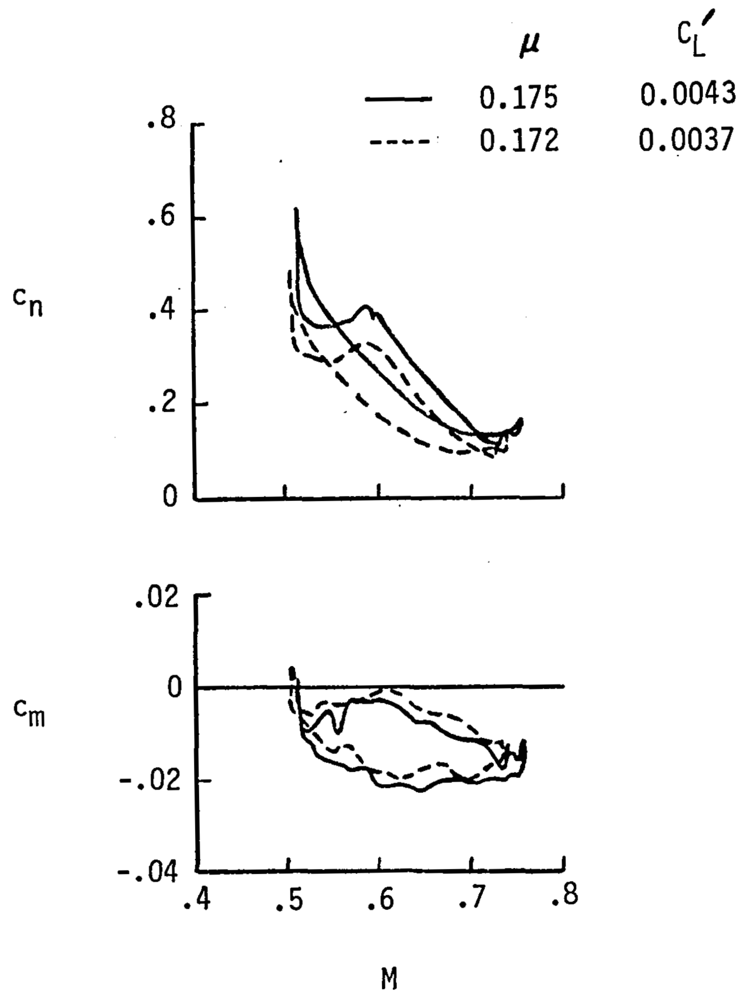
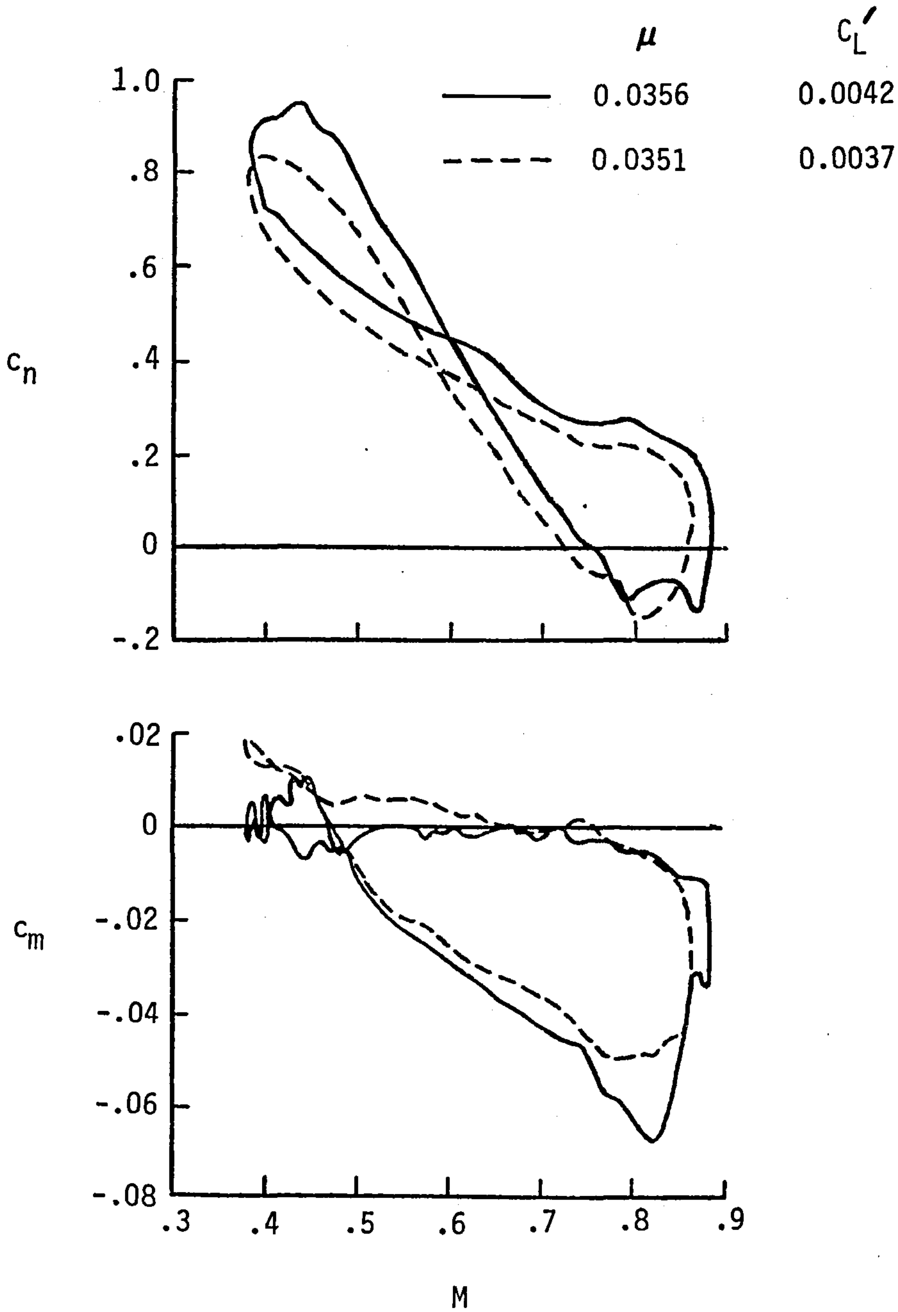


Figure 22.- Envelope of blade-section aerodynamic operating conditions (Flight 63, Appendix E). $\overline{C}_L' = 0.0043$; $\overline{M}_h = 0.70$; $r/R = 0.9$.



(a) Low-speed flight

Figure 23.- Comparison of blade-section operating conditions for two values of vehicle load coefficient. M_h = 0.69; r/R = 0.9.



(b) High-speed flight

Figure 23.- Concluded.

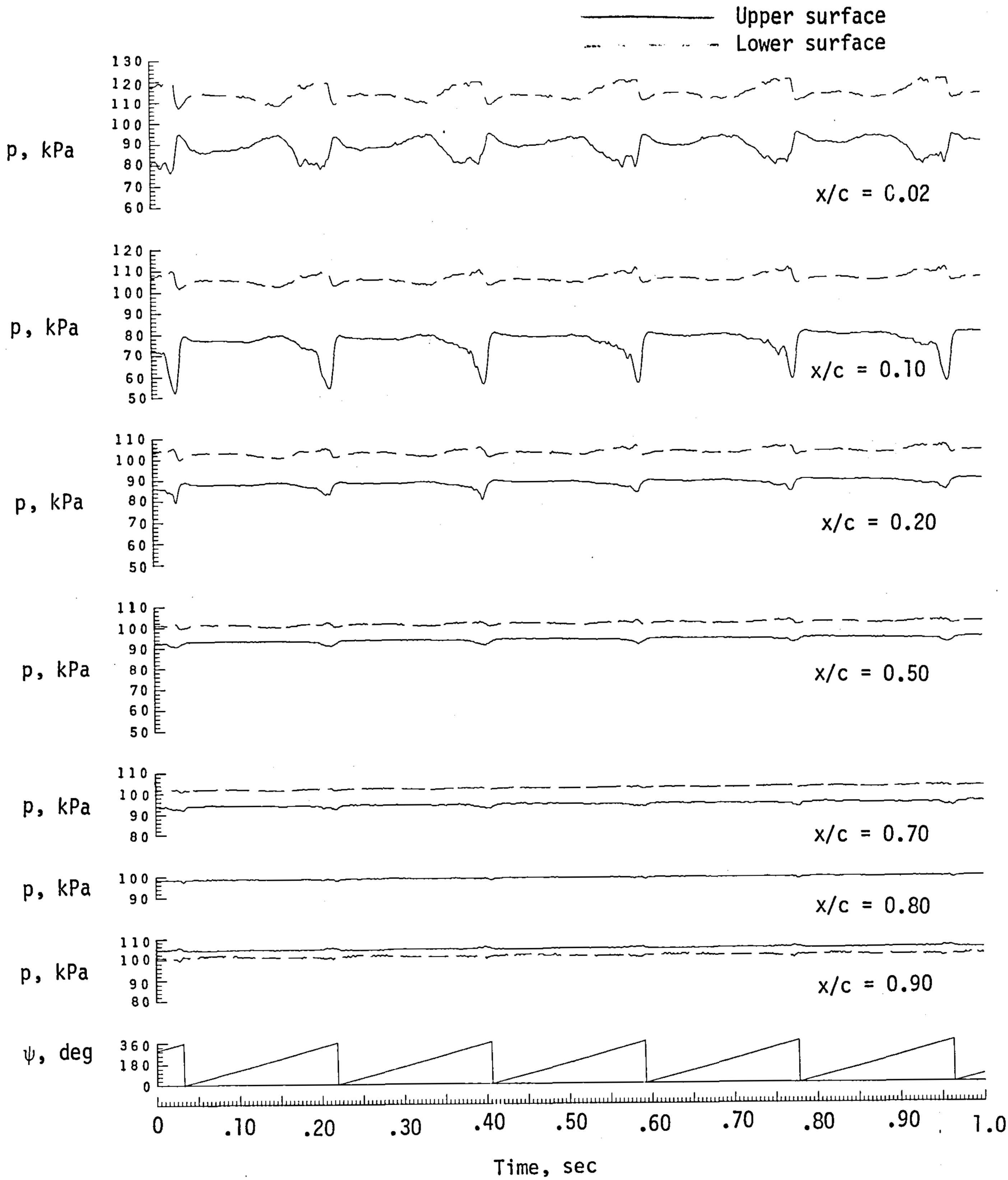


Figure 24.- History of uncorrected, local blade pressures and rotor azimuth for hover. $C_L{}'$ = 0.0039; $\Delta h/R$ = 1.9; r/R = 0.9.

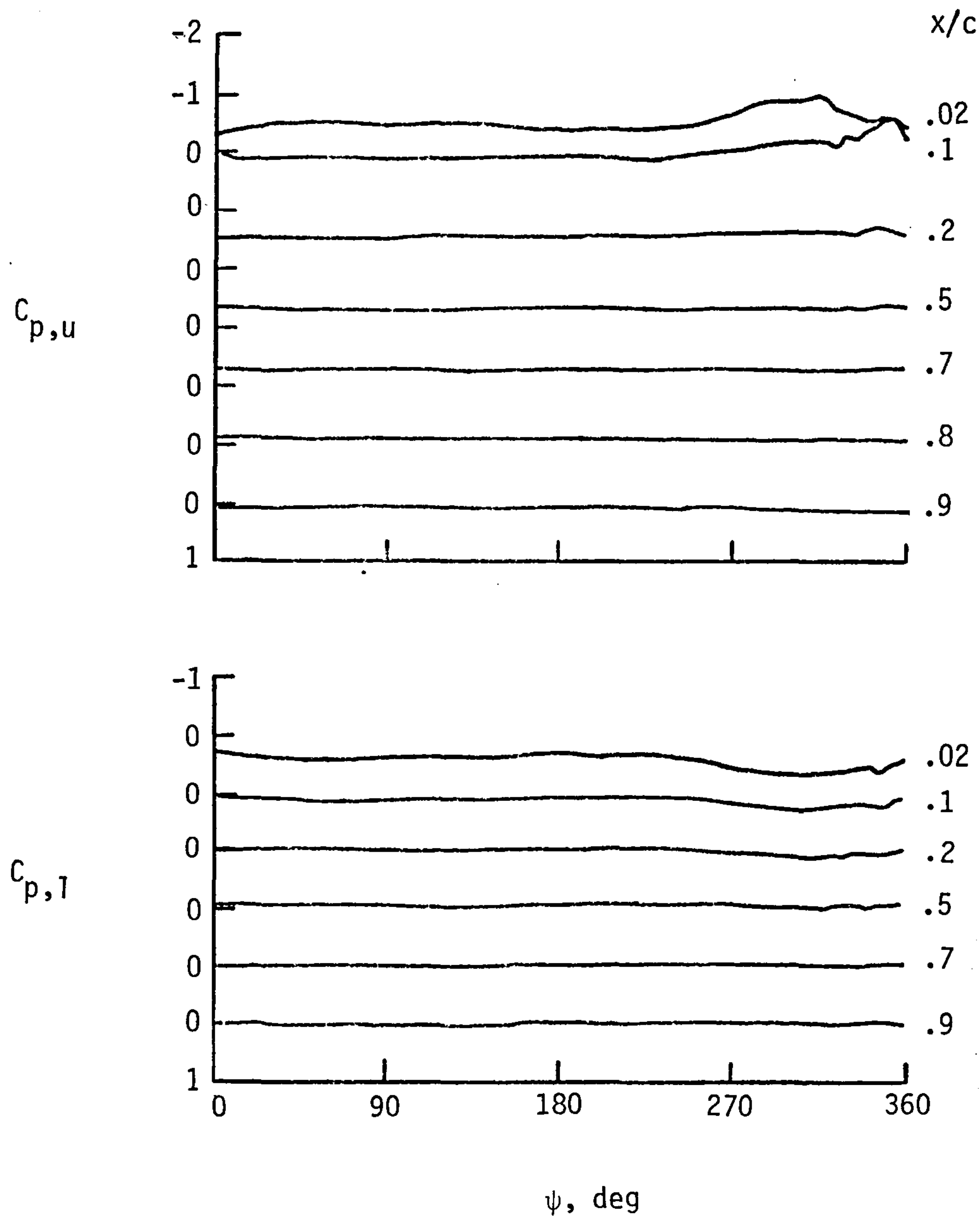


Figure 25.- Pressure coefficient records for one revolution in hover. $C_L' = 0.0039$; $M_h = 0.68$; $\Delta h/R \approx 1.9$; $r/R = 0.9$.

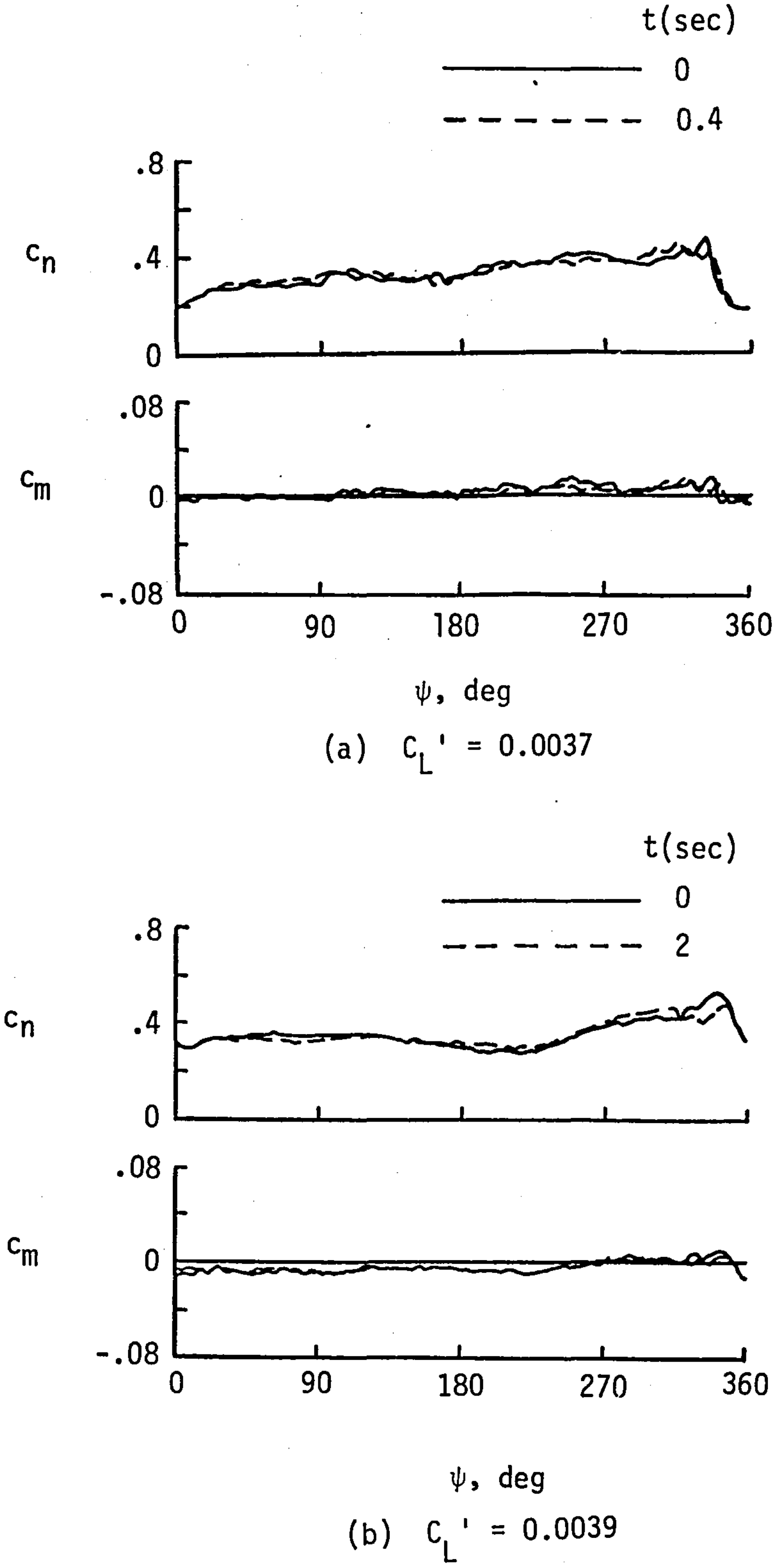


Figure 26.- Blade-section characteristics for two revolutions at the same hover test condition. M_h = 0.68; Δh/R = 1.9; r/R = 0.9.

	M_h	C_L'	A_{0f}	A_{1f}	B_{1f}	$\Delta h/R$
———	0.69	0.0034	9.2	-2.1	.4	3.2
----	0.68	0.0037	10.2	-2.9	.9	1.9
— -	0.68	0.0039	10.0	-2.8	-2.4	1.9

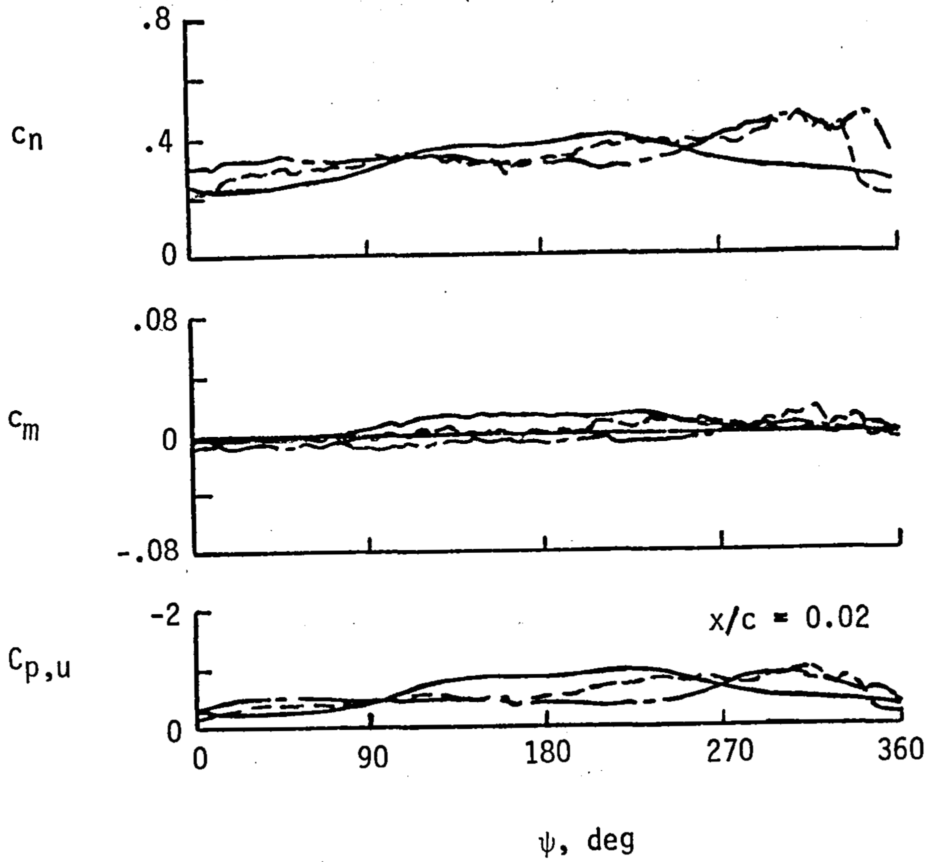
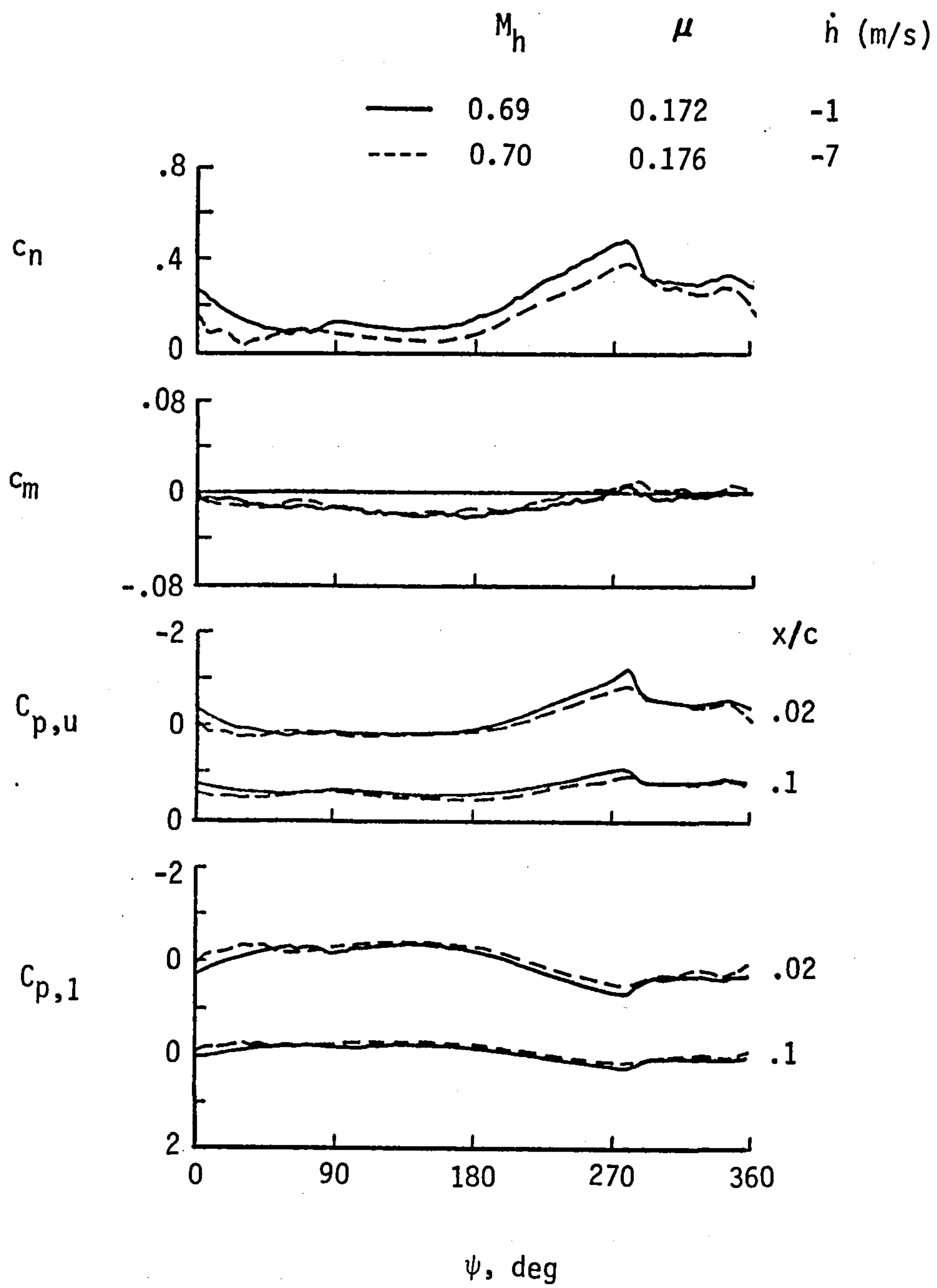
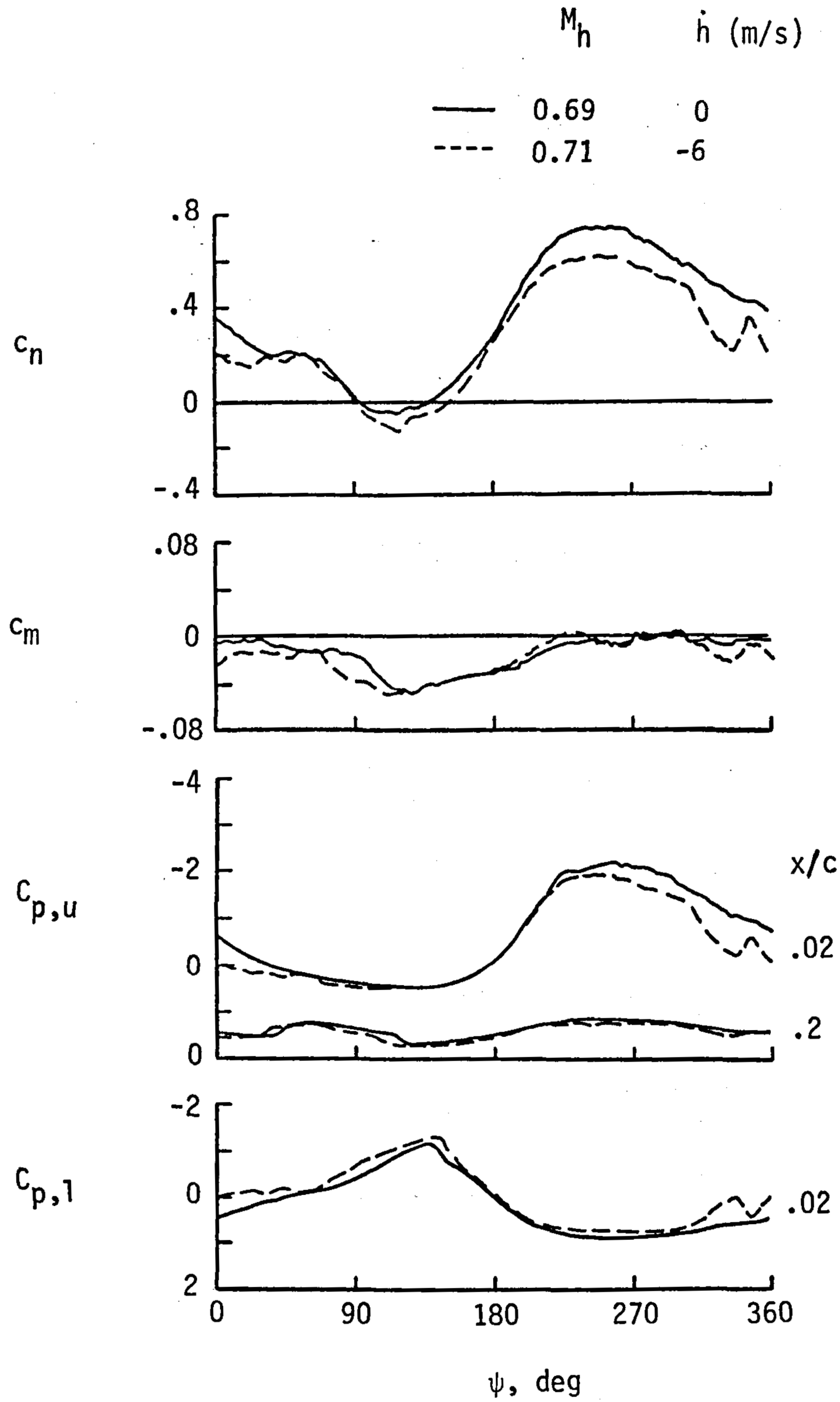


Figure 27.- Blade-section aerodynamics for one revolution at each of three hover test conditions.



(a) Moderate tip-speed ratio; $C_L' = 0.0037$

Figure 28.- Blade-section pressure data for one rotor revolution in descending flight.



(b) μ = 0.30; $C_L{}'$ = 0.0042

Figure 28.- Concluded.

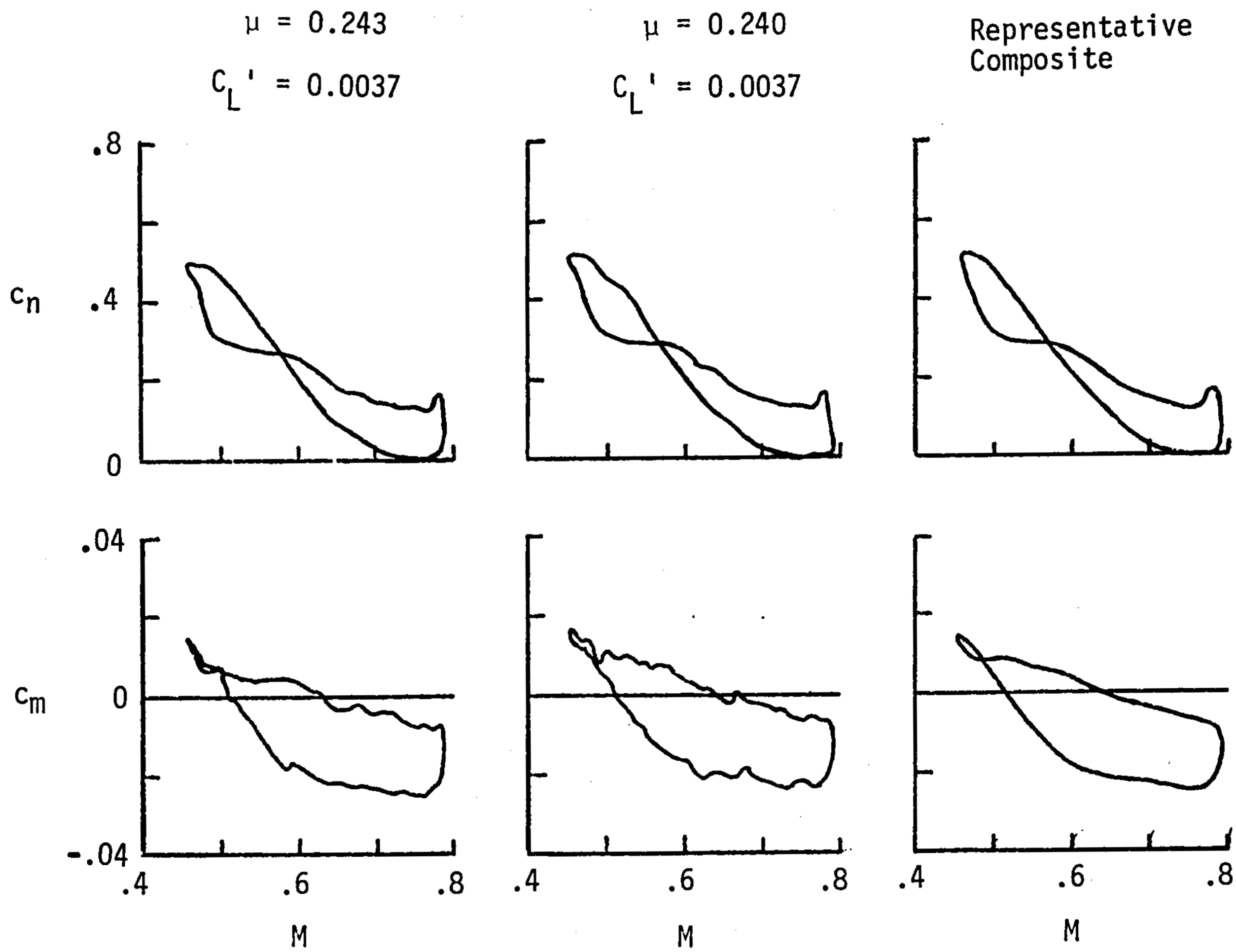


Figure 29.- Measured and representative blade-section operating conditions for level flight. $\mu \approx 0.24$; $r/R = 0.9$.

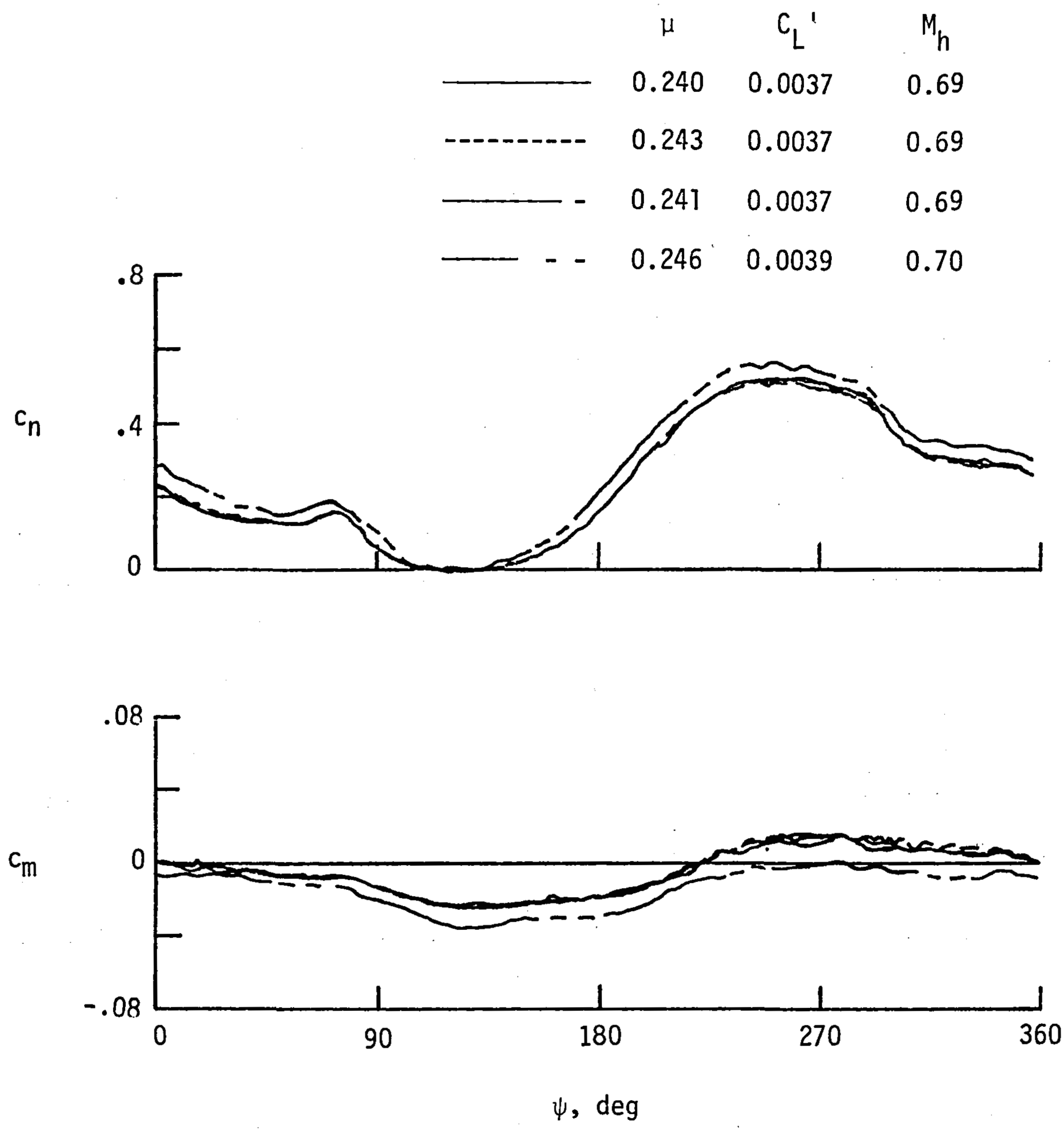


Figure 30.- Azimuthwise distribution of normal-force and pitching-moment coefficients for level flight. μ = 0.24; r/R = 0.9.

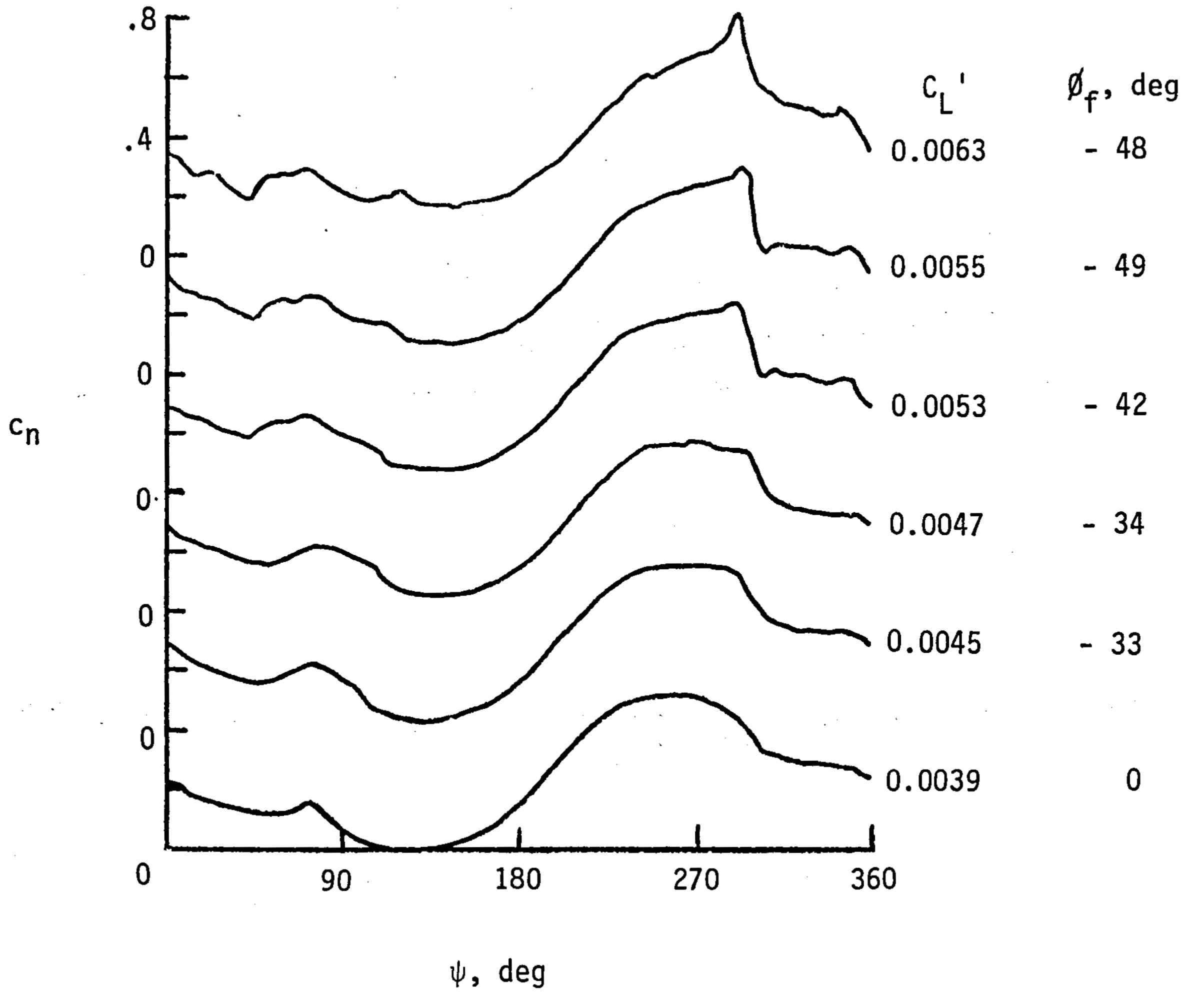


Figure 31.- Effect of rotor load on azimuthwise distribution of blade-section normal-force coefficient for descending left turn. $\overline{\mu} = 0.242$; $\overline{M}_h = 0.70$; $r/R = 0.9$.

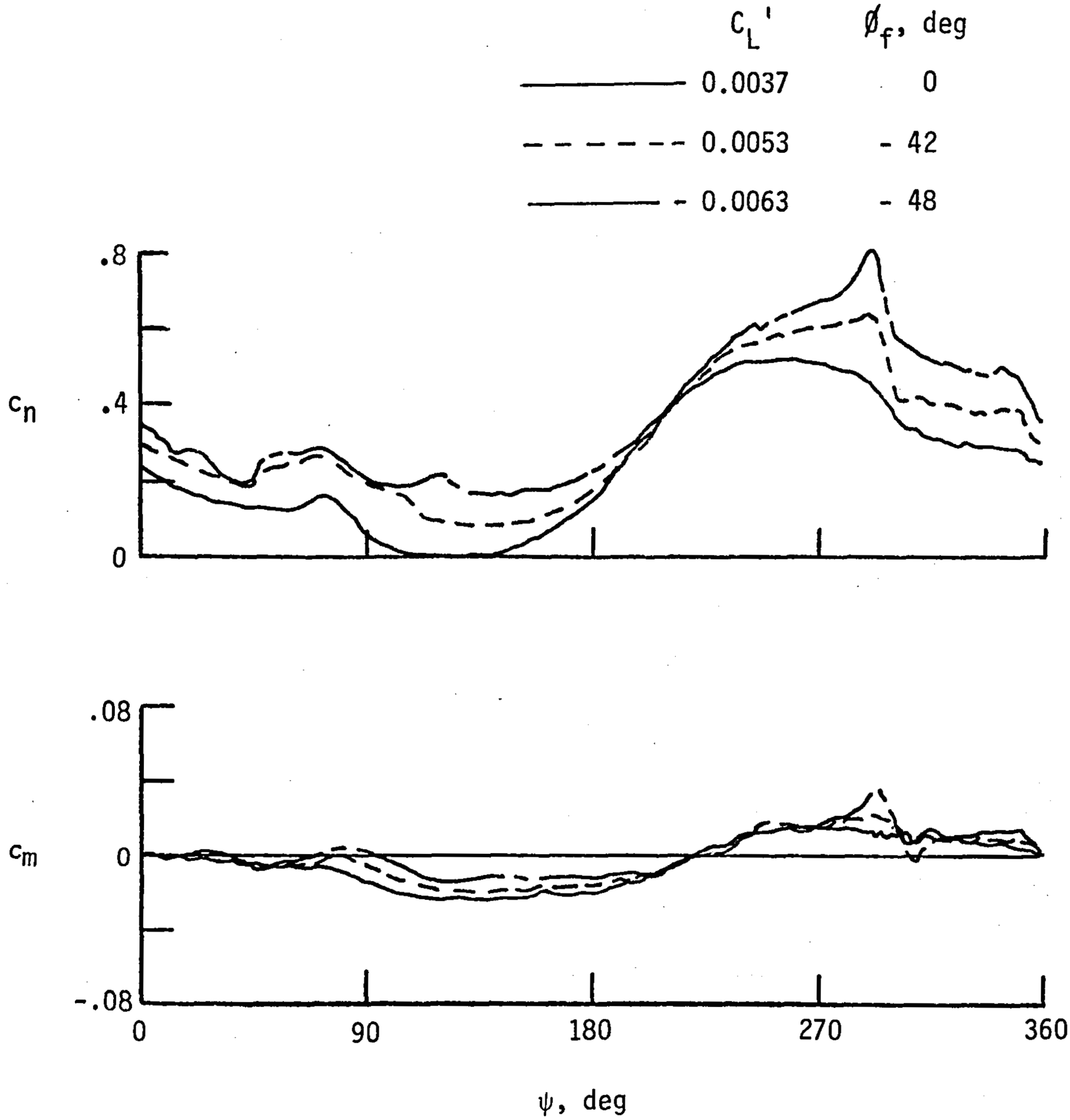


Figure 32.- Comparison of azimuthwise distributions of blade-section aerodynamic characteristics for descending left turns and level flight. $\overline{\mu}$ = 0.242; $\overline{M}_h$ = 0.70; r/R = 0.9.

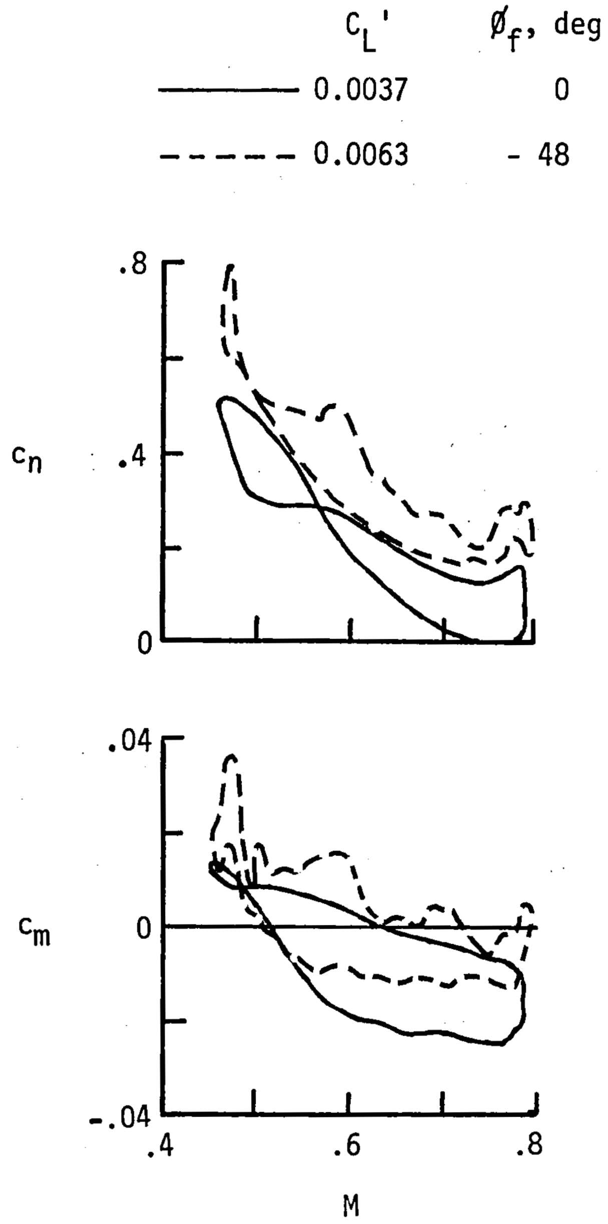


Figure 33.- Comparison of blade-section operating conditions for left turn and reference level-flight condition. $\mu = 0.24$; $M_h = 0.7$; $r/R = 0.9$.

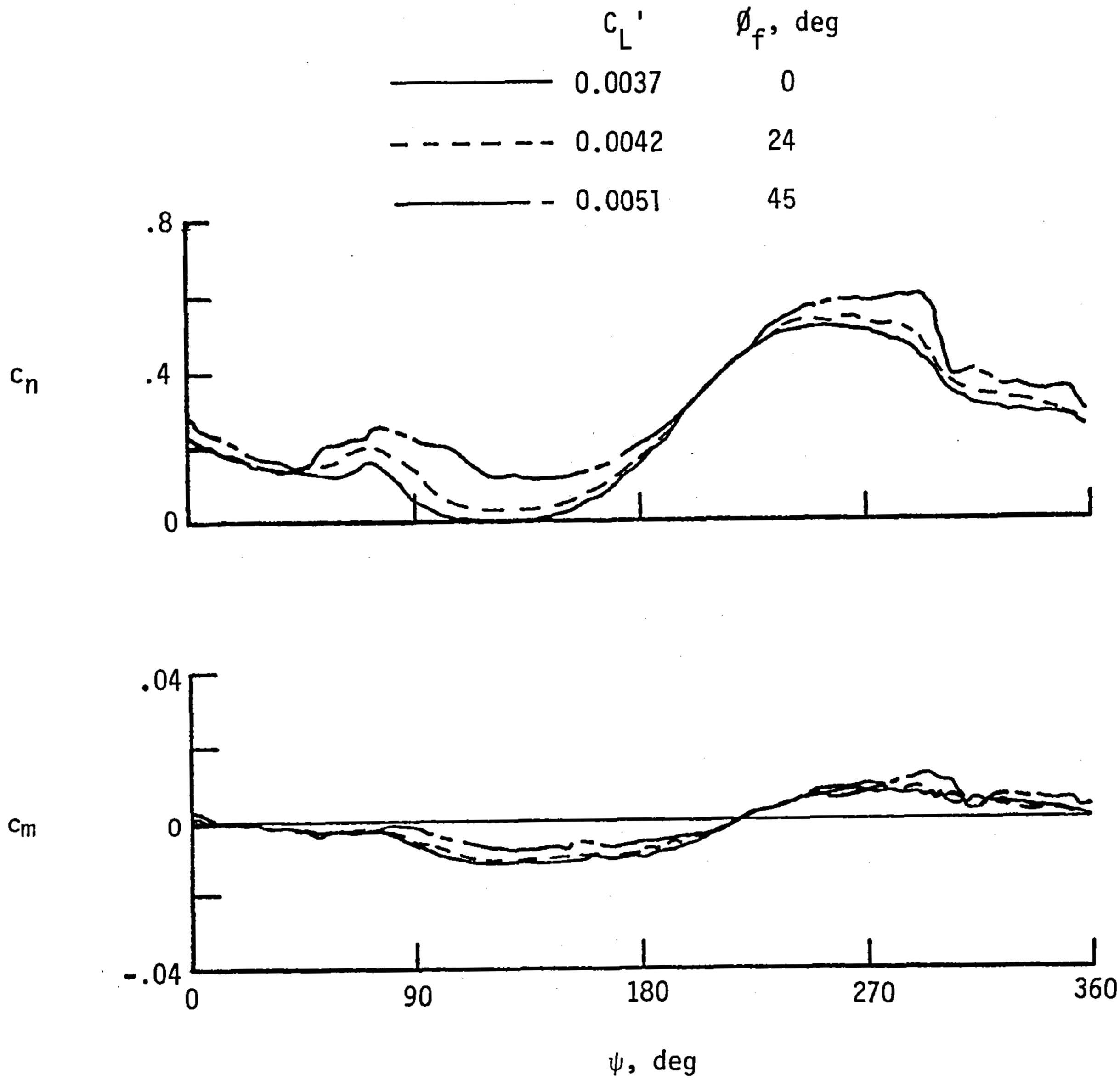


Figure 34.- Comparison of azimuthwise distributions of blade-section aerodynamic characteristics for descending right turns and level flight. $\bar{\mu}$ = 0.24; r/R = 0.9.

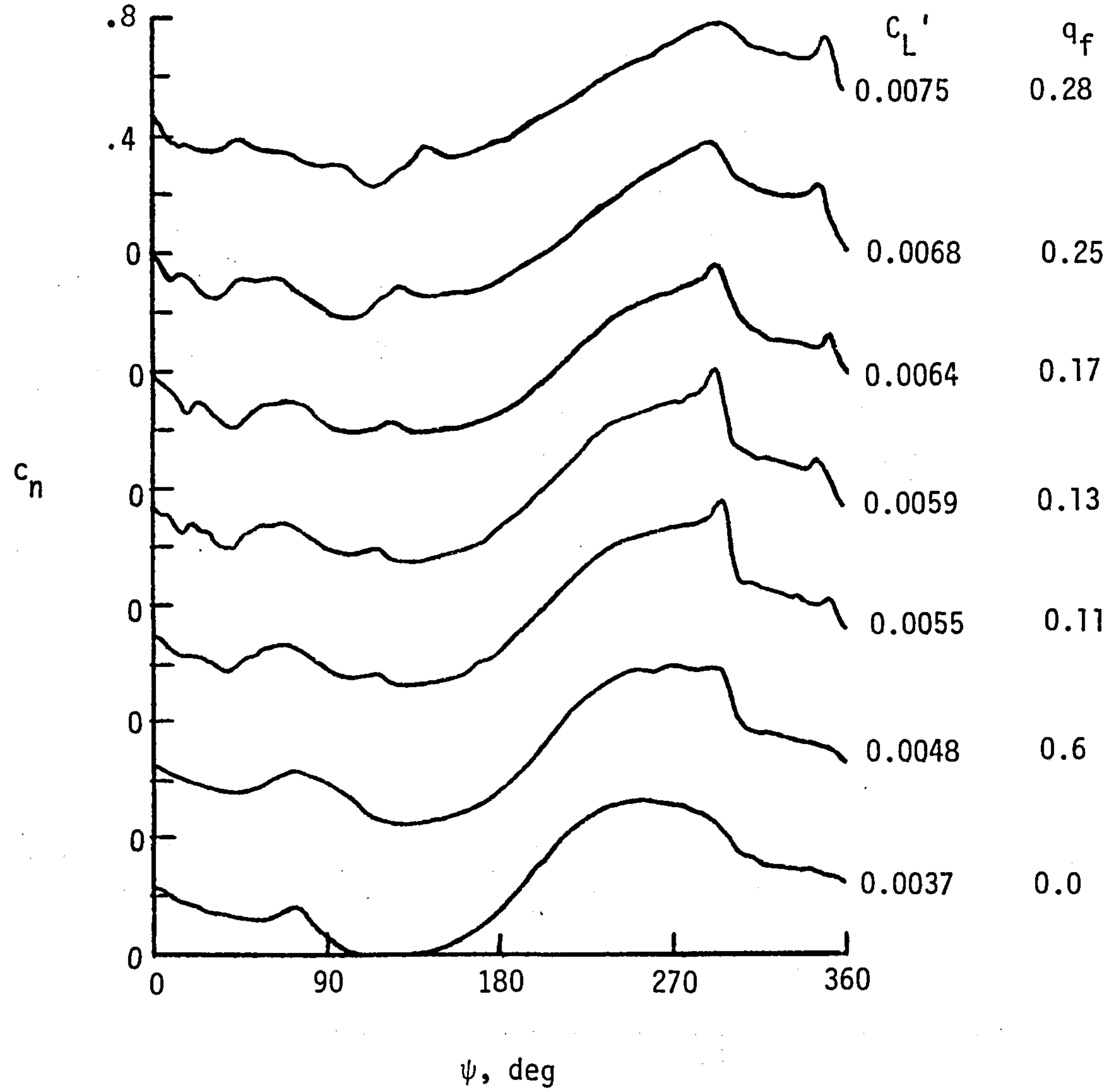


Figure 35.- Effect of rotor load on azimuthwise distribution of blade-section normal-force coefficient for symmetrical pull-ups. $\overline{\mu}$ = 0.242; $\overline{M}_h$ = 0.70; r/R = 0.9.

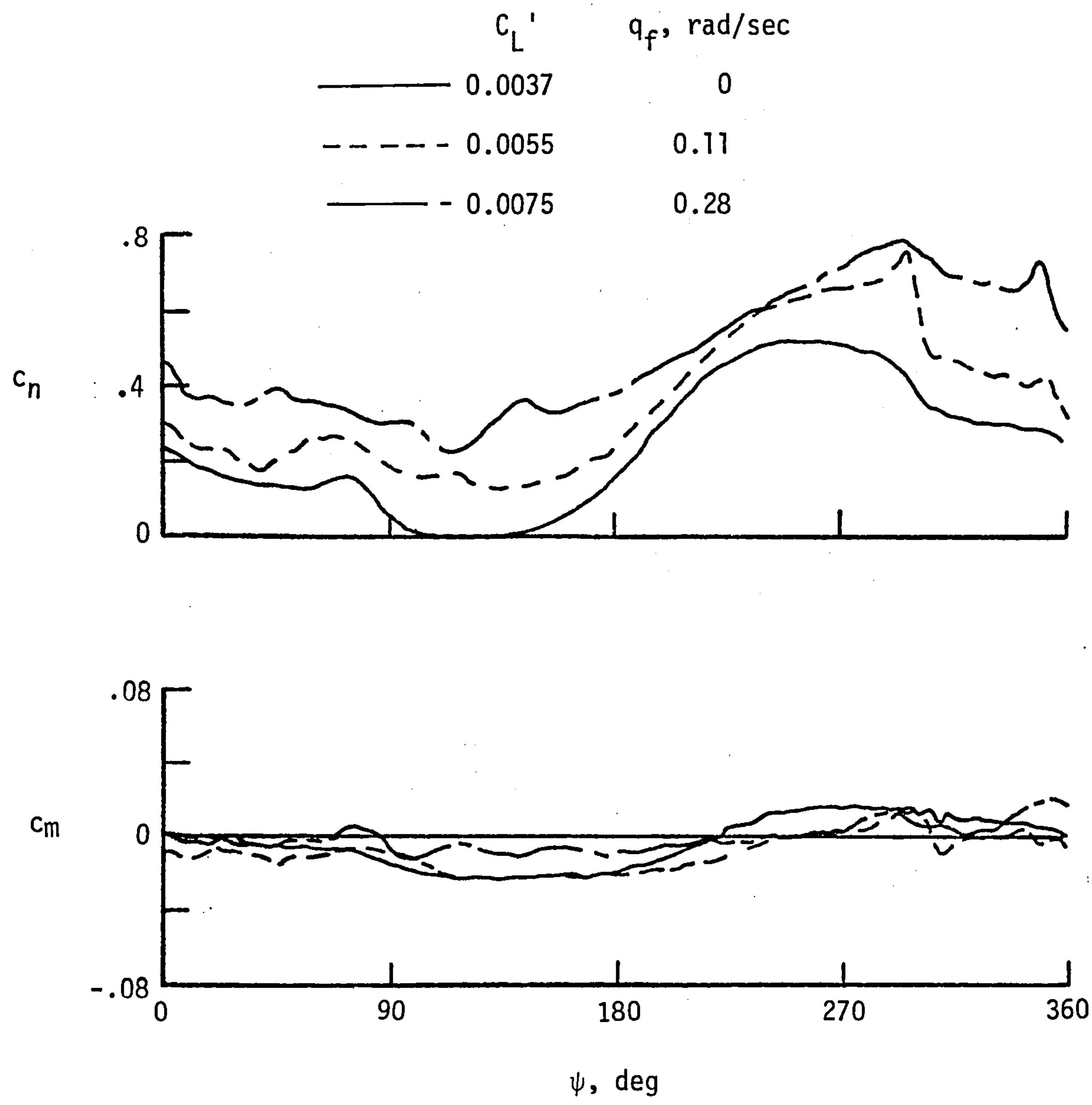


Figure 36.- Comparison of azimuthwise distributions of blade-section aerodynamic characteristics for symmetrical pull-ups and level flight. $\overline{\mu} = 0.245$; $\overline{M}_h = 0.70$; $r/R = 0.9$.

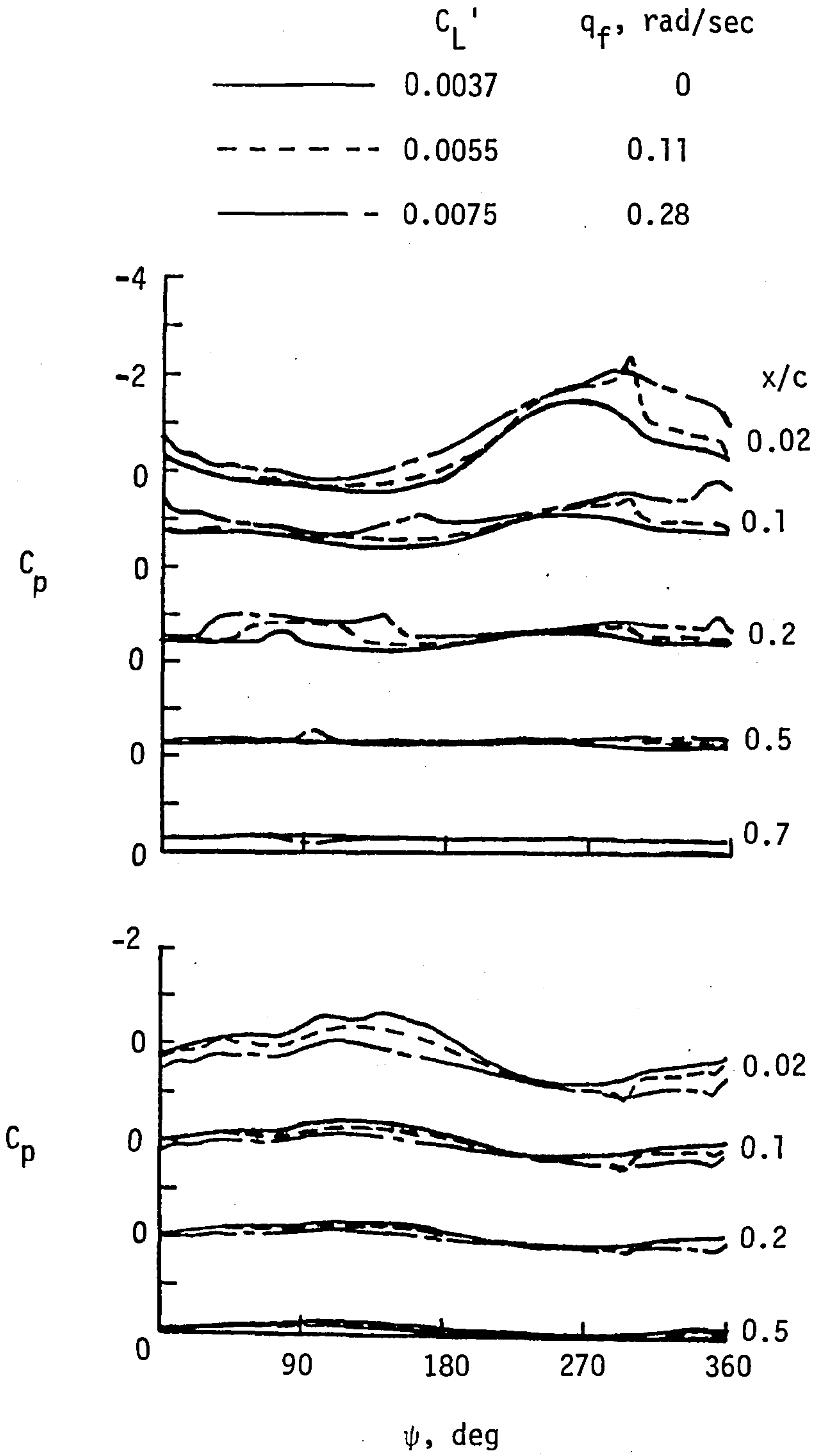


Figure 37.- Azimuthwise distributions of local pressure coefficient for two symmetrical pull-ups and level flight. $\bar{\mu}$ = 0.245; $\bar{M}_h$ = 0.70; r/R = 0.9.

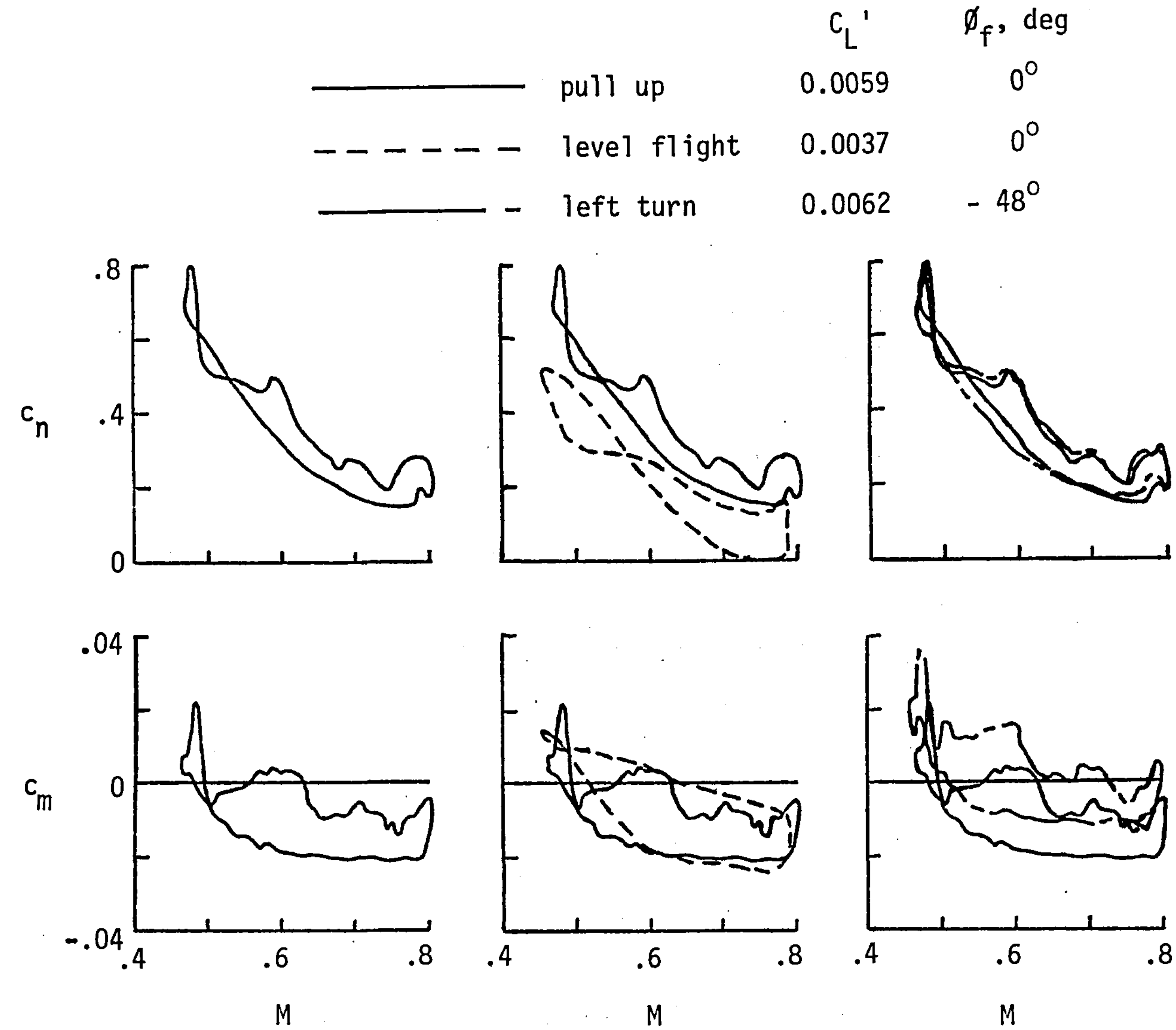


Figure 38.- Comparison of blade-section operating conditions for a symmetrical pull-up, a descending left turn, and level flight. $\bar{\mu}$ = 0.24; $\overline{M}_h$ = 0.70; r/R = 0.9.

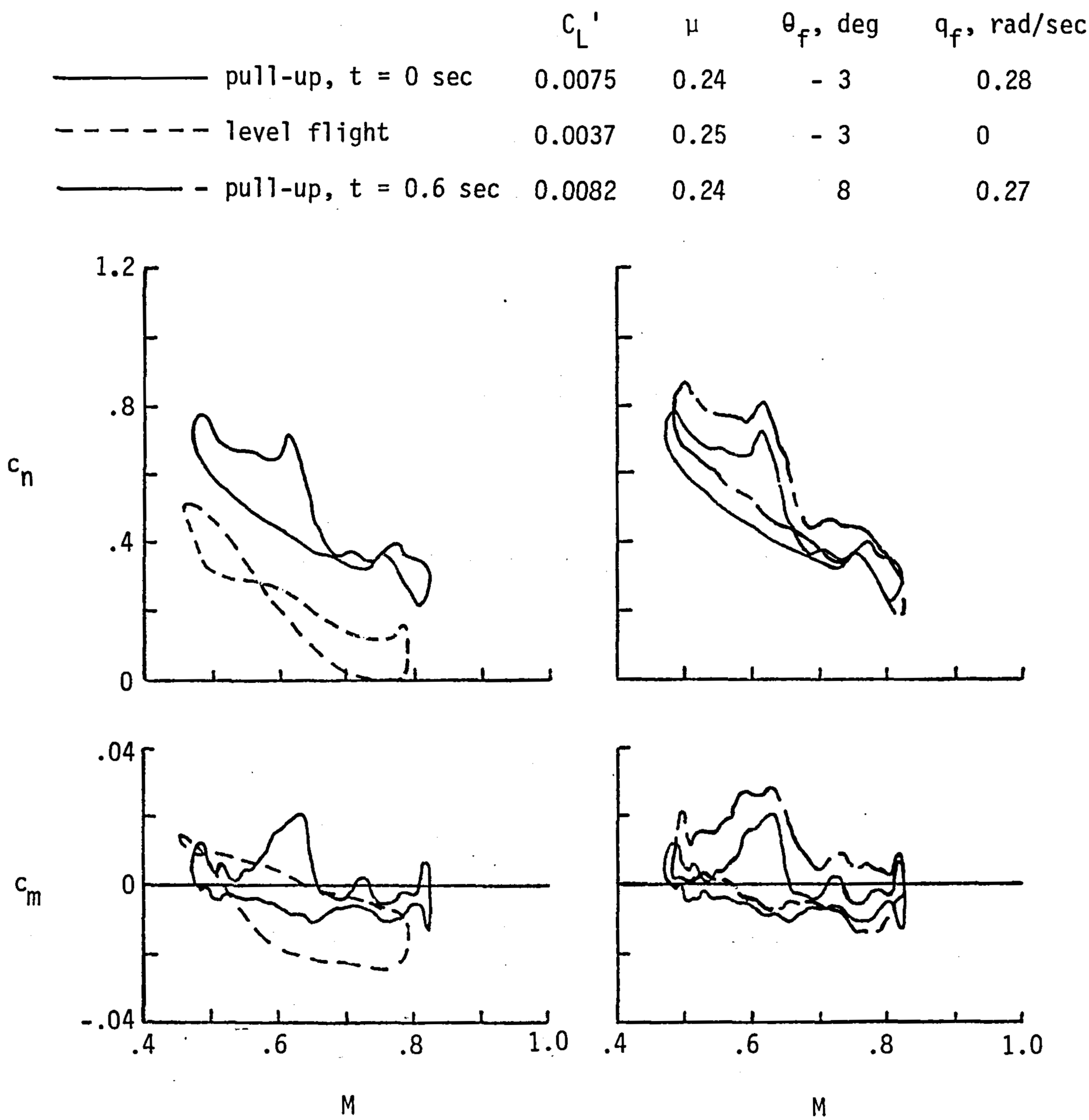


Figure 39.- Comparison of blade-section operating conditions for two rotor revolutions in the same pull-up maneuver and in level flight. r/R = 0.9.

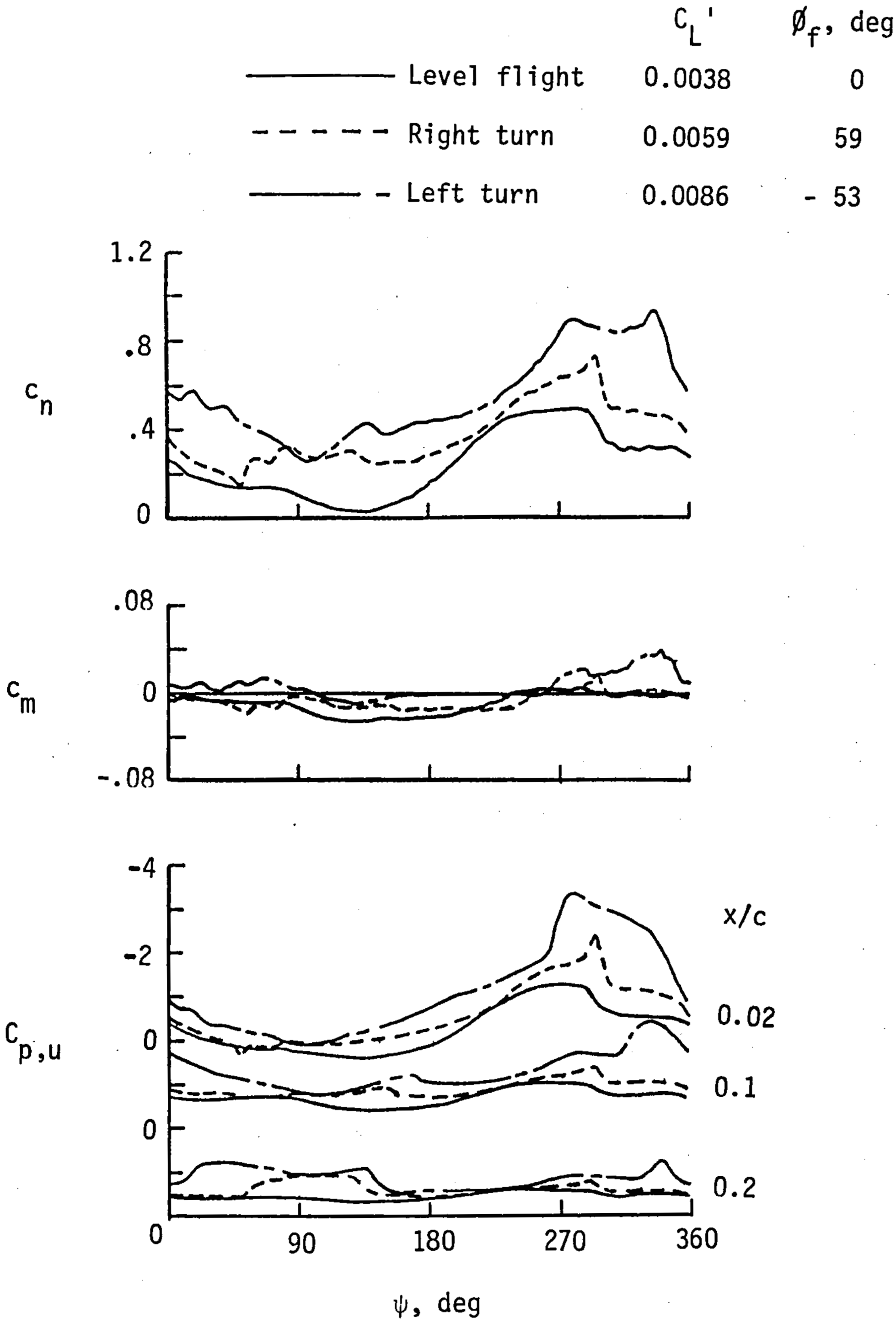


Figure 40.- Comparison of blade-section pressure data for level flight and two maneuvers. $\mu = 0.22$; $r/R = 0.9$.

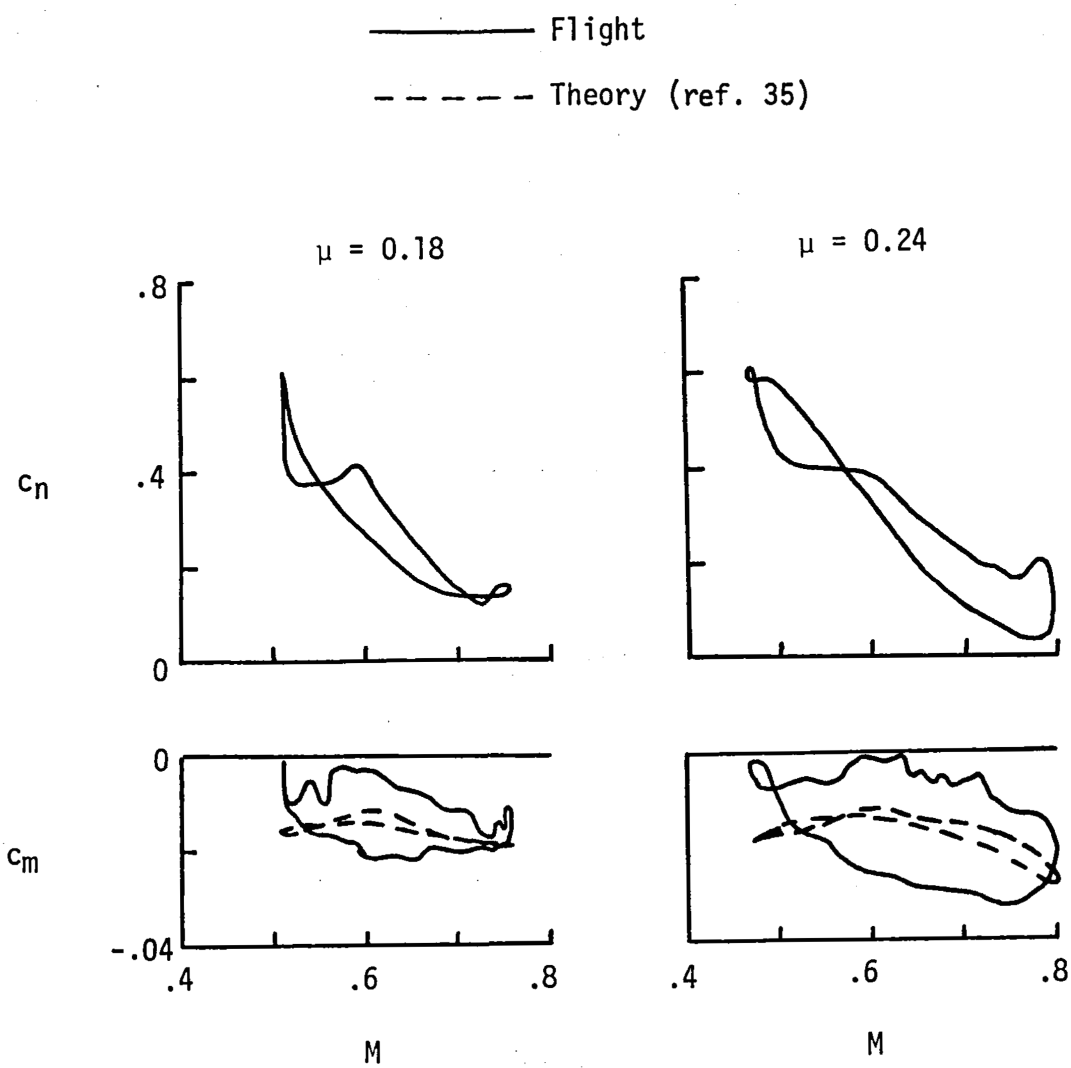


Figure 41.- Comparison of pitching-moment coefficients measured in flight with values computed with measured c_n and M as inputs to method of reference 35. r/R = 0.9.

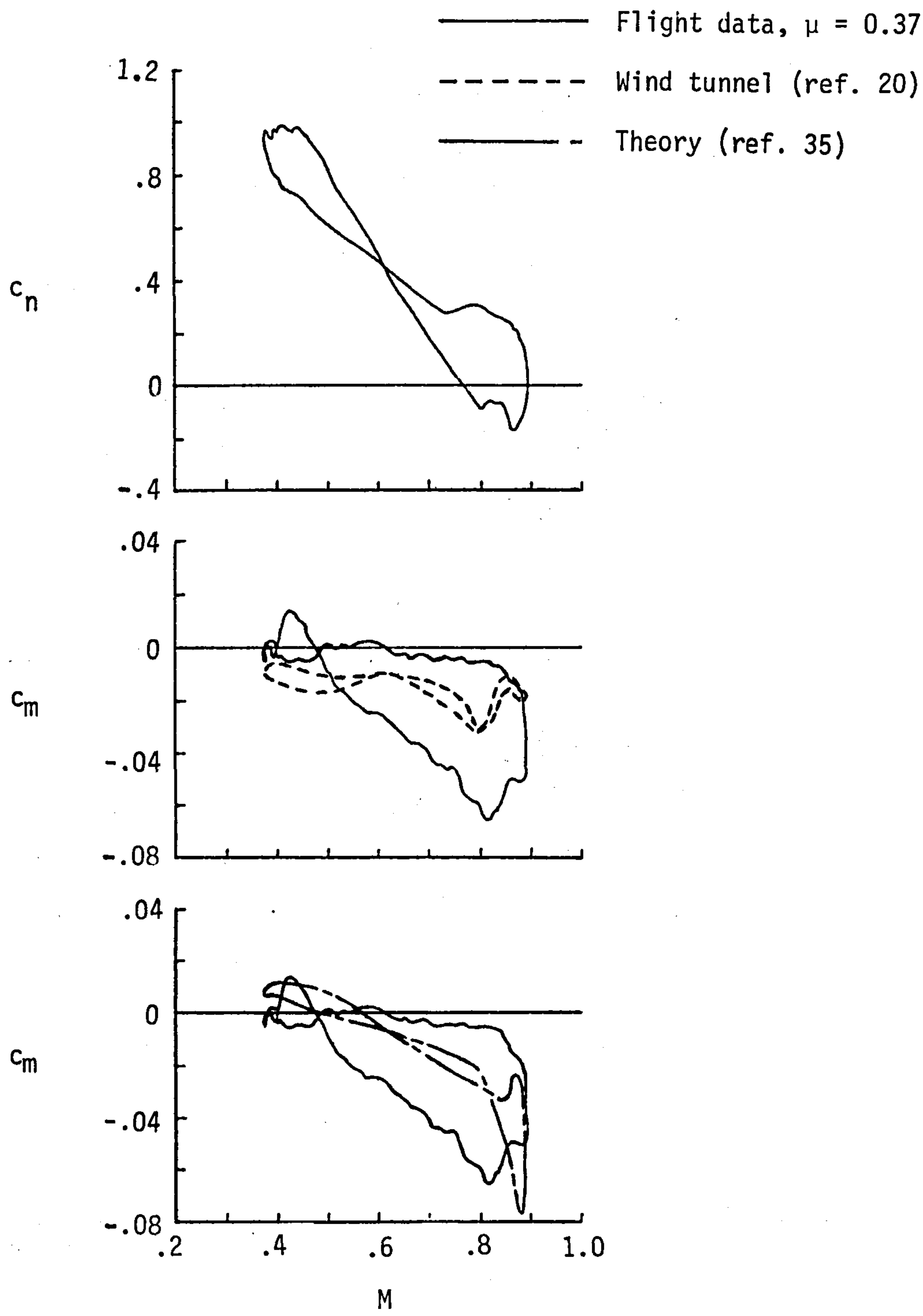
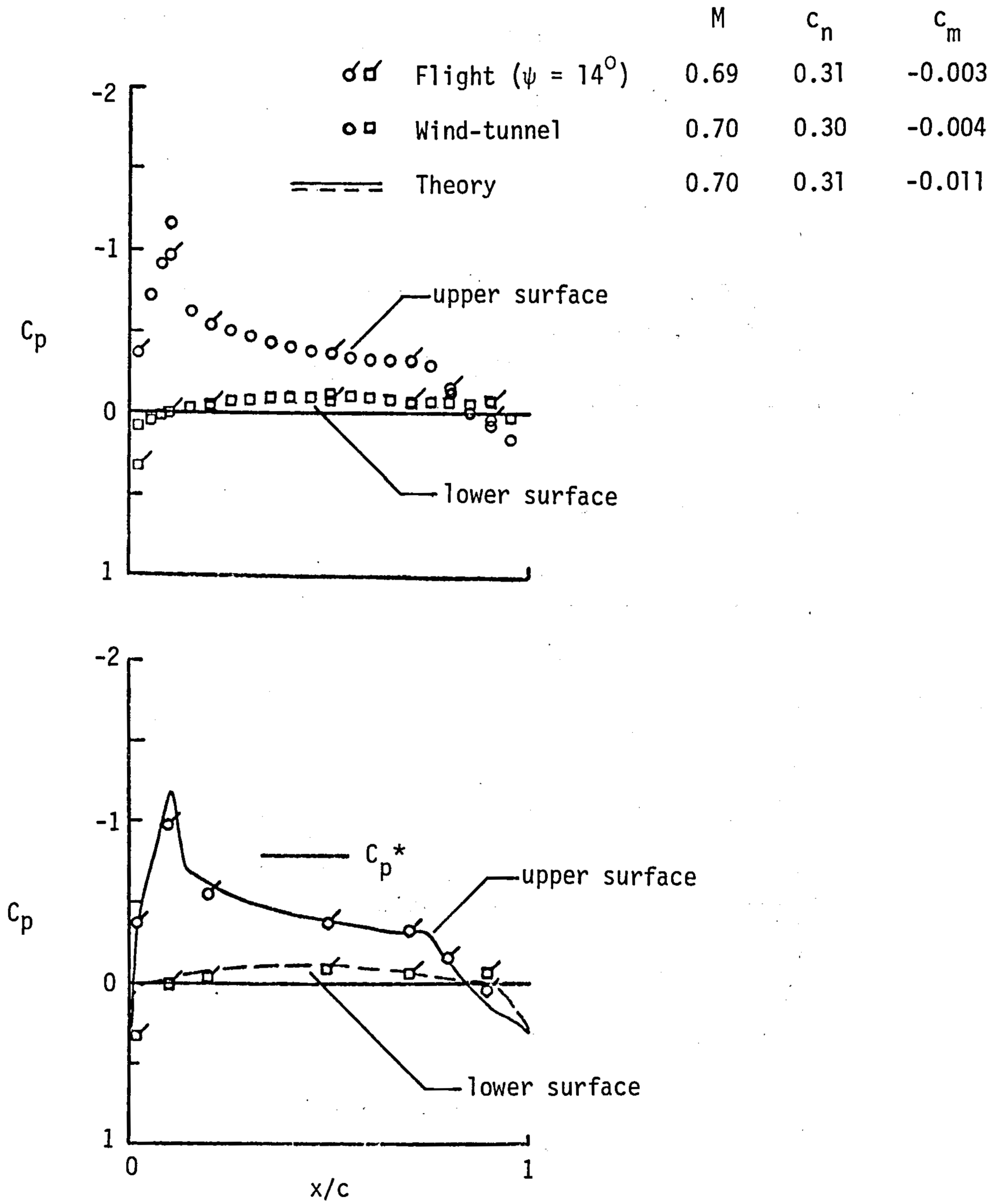


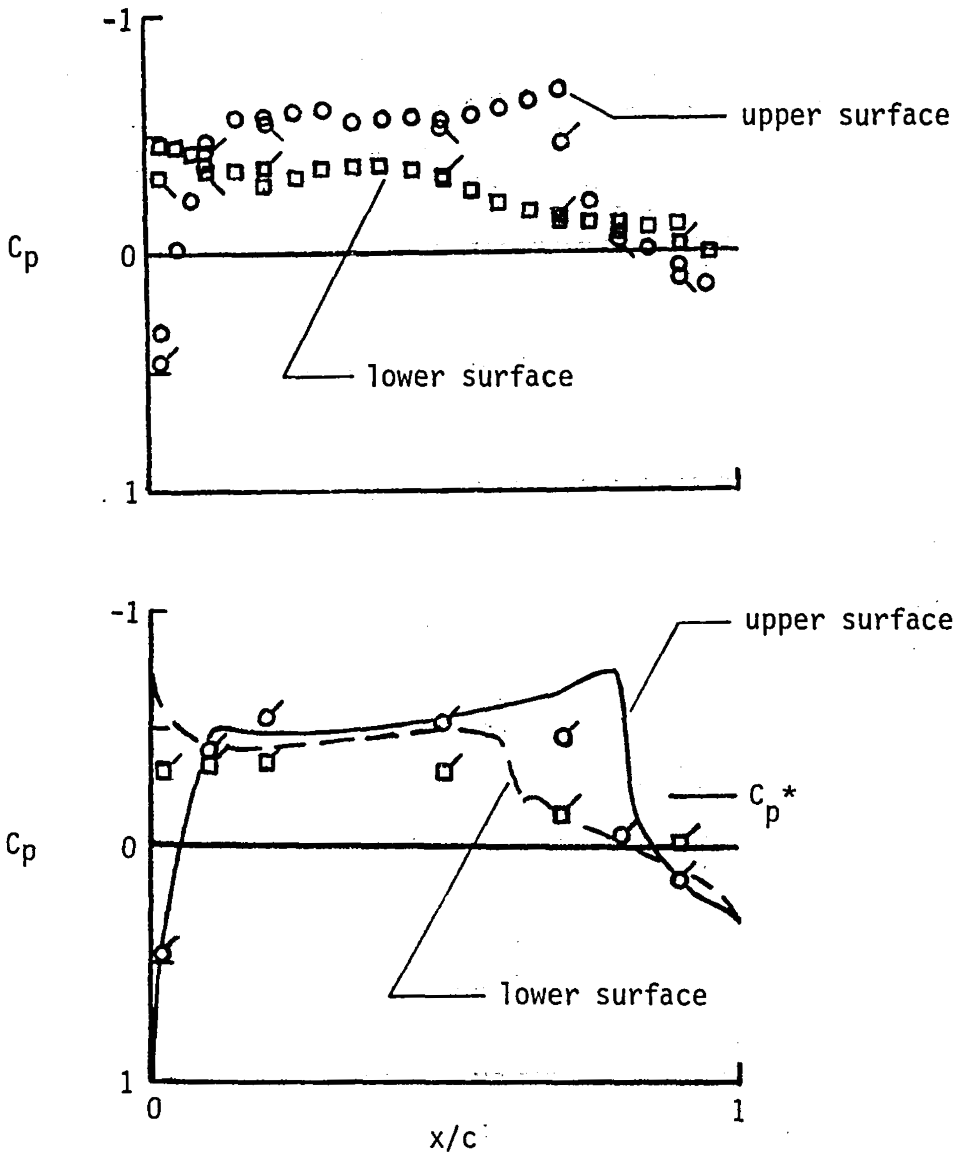
Figure 42.- Comparison of pitching-moment coefficient variation with Mach number for flight, wind-tunnel, and theoretical results for the same set of normal-force and Mach number values. r/R = 0.9.



(a) $M \approx 0.70$; $c_n \approx 0.3$.

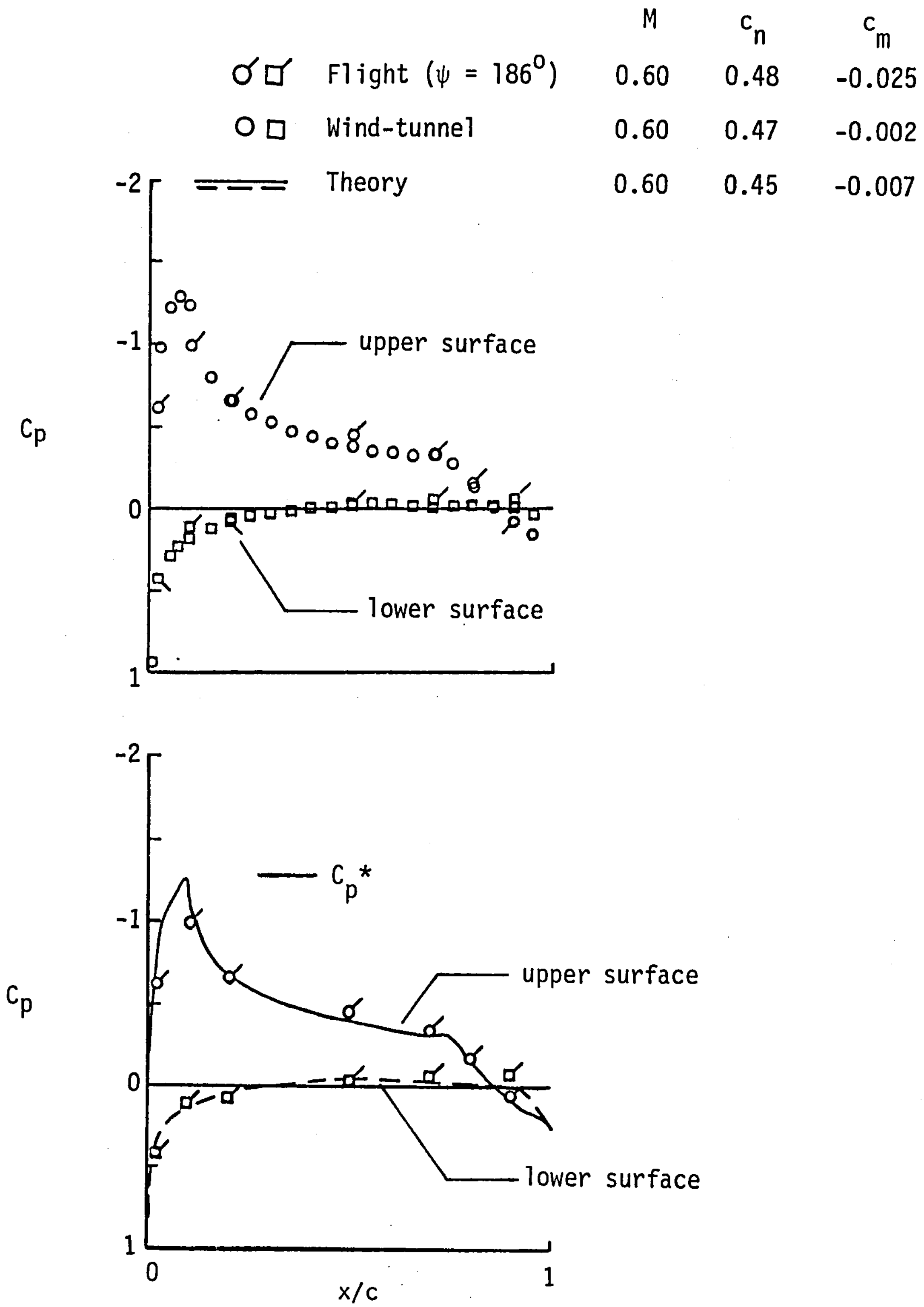
Figure 43.- Comparison of flight data, wind-tunnel data, and theoretical pressure distributions (ref. 35). (Flight 63, run 11 of Appendices D and E.)

		M	c_n	c_m
○✓ □✓	Flight (ψ = 80°)	0.89	0.09	-0.030
○ □	Wind-tunnel	0.89	0.12	-0.035
═══	Theory	0.89	0.09	-0.071



(b) M ≈ 0.89; C_n ≈ 0.1

Figure 43.- Continued.



(c) $M \approx 0.60$; $C_n \approx 0.48$

Figure 43.- Concluded.

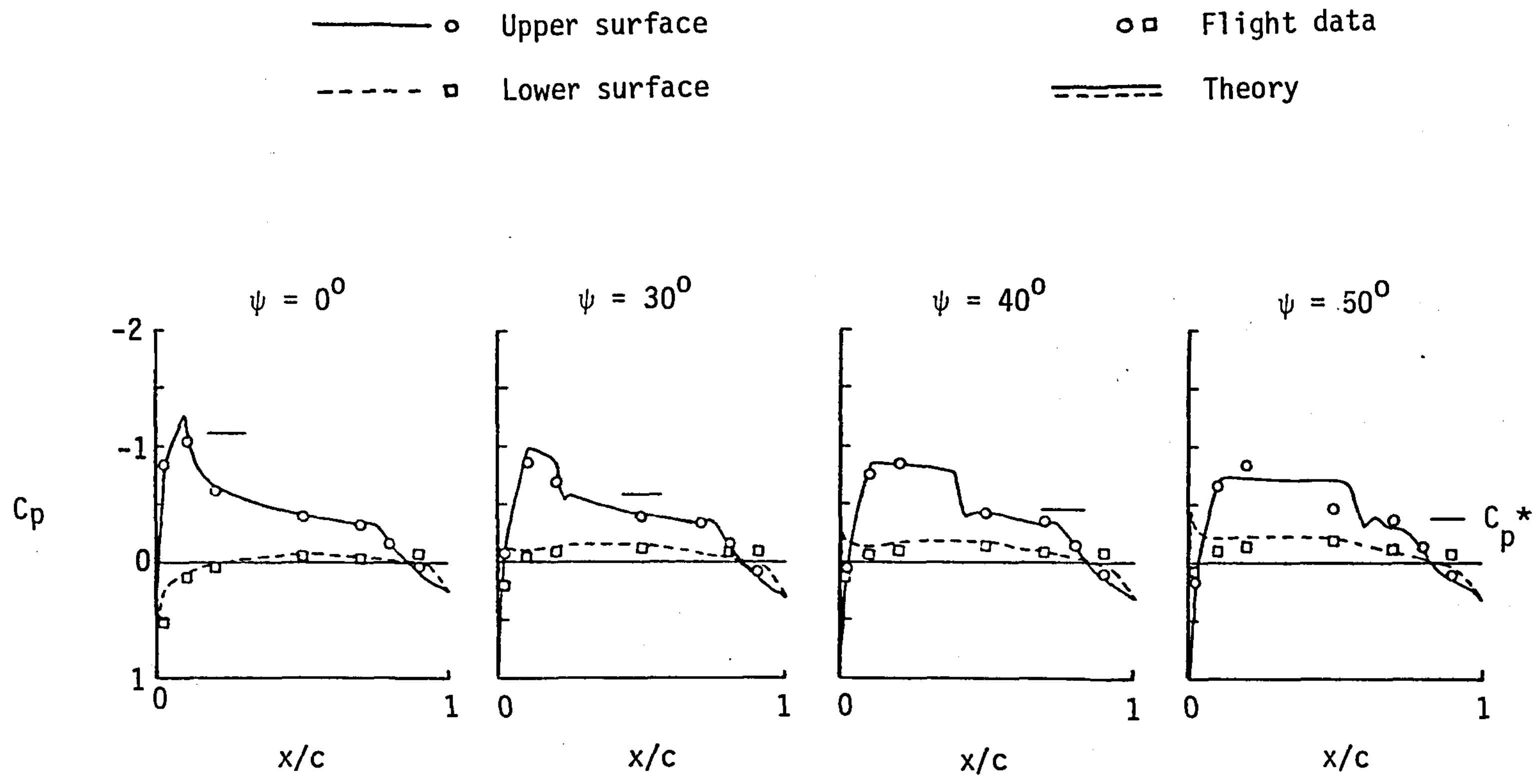


Figure 44.- Comparison of blade-section pressure distributions from theory and flight tests (Flight 63, run 11 of Appendices D and E); r/R = 0.9.

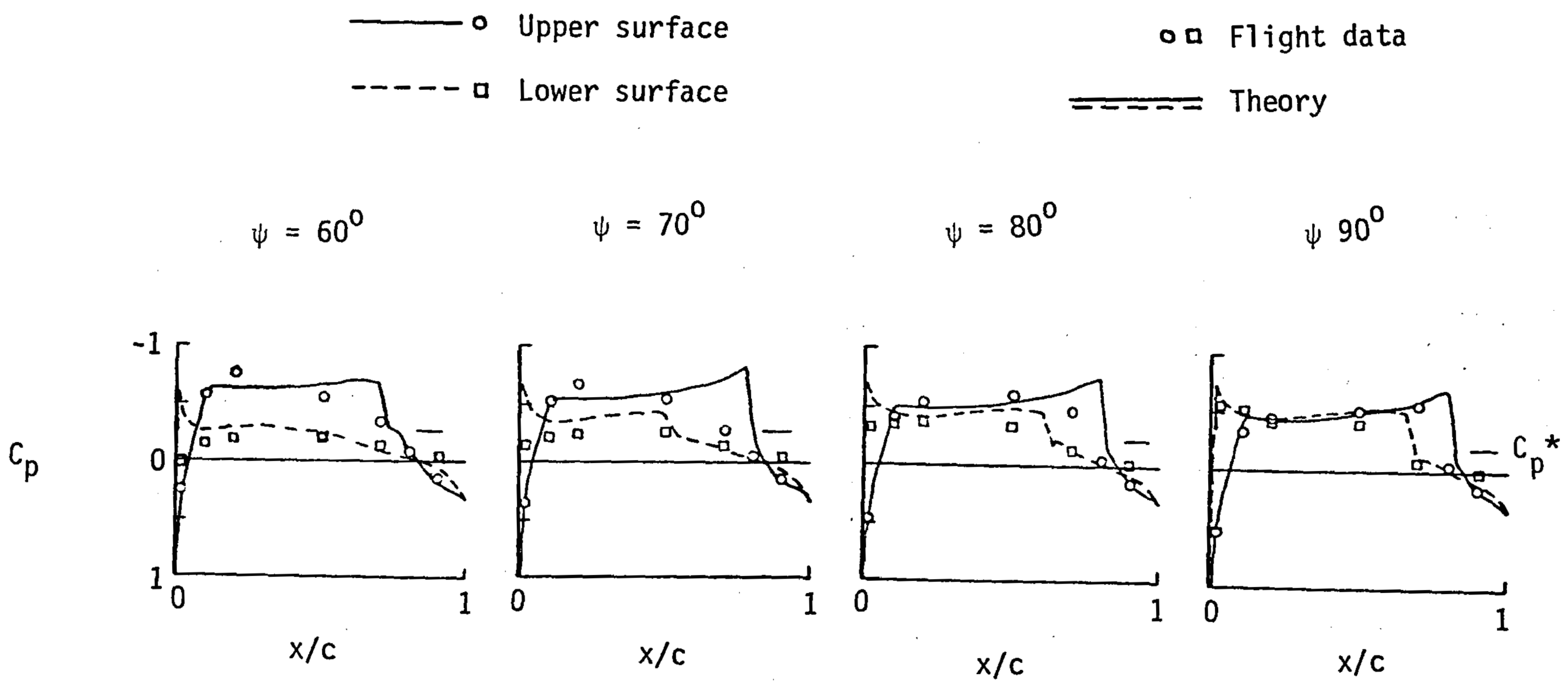


Figure 44.- Continued.

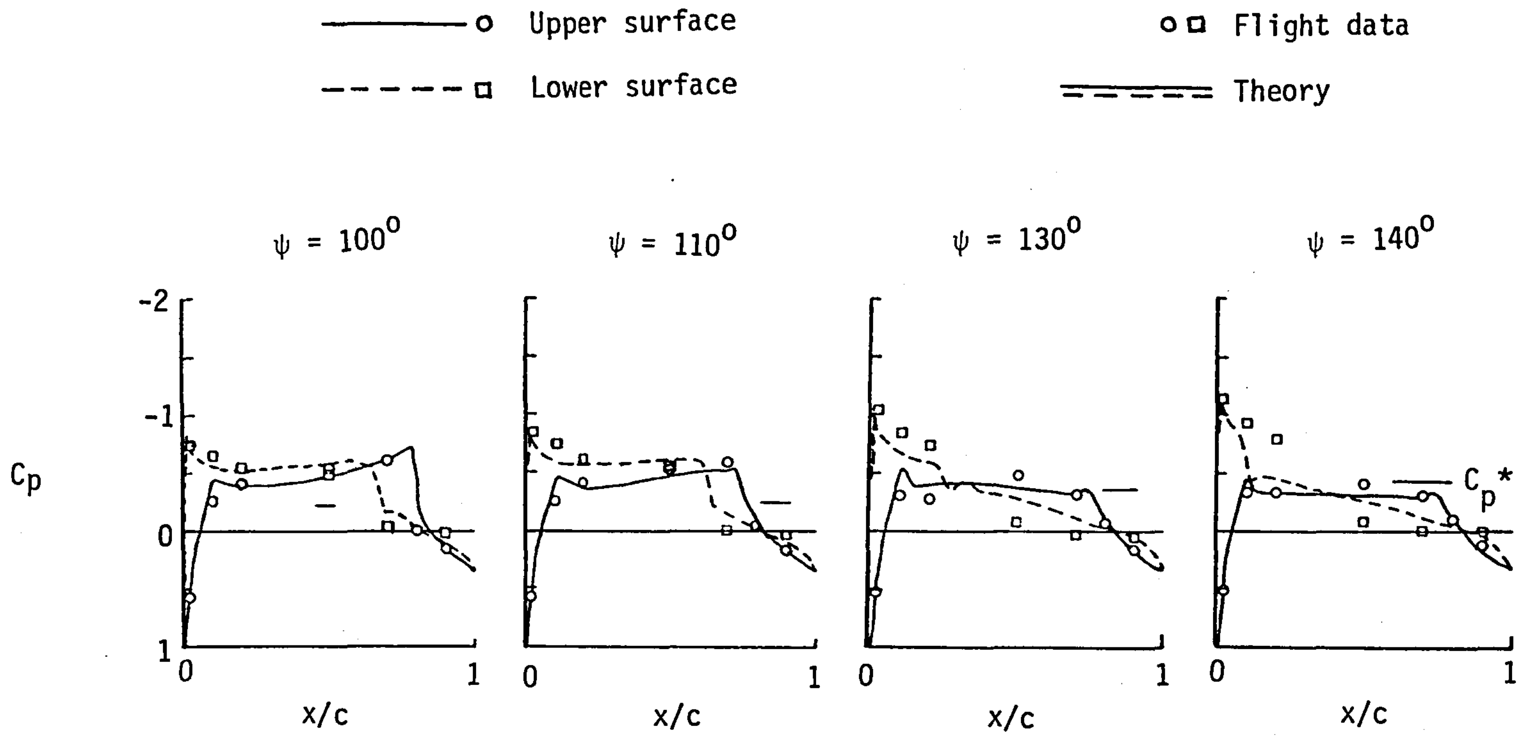


Figure 44.- Continued.

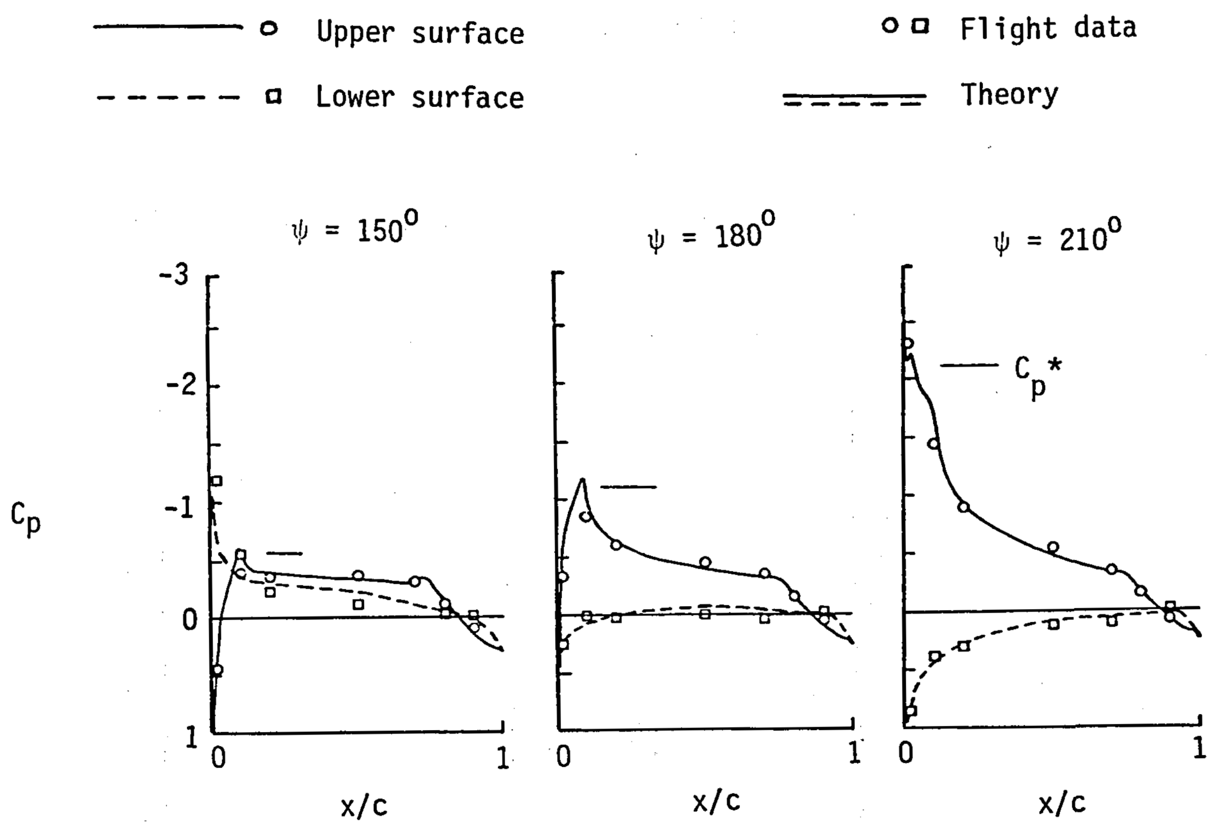


Figure 44.- Continued.

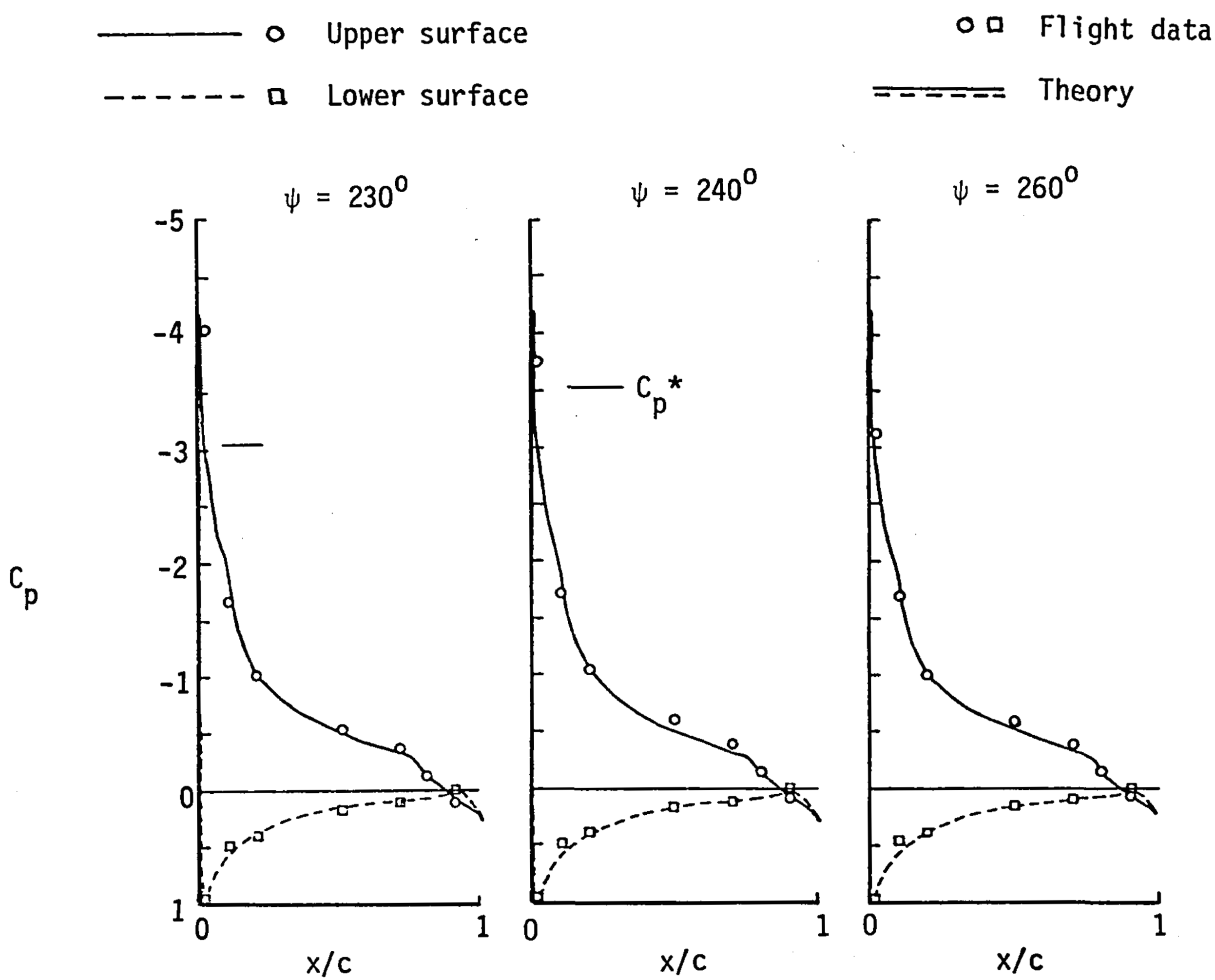


Figure 44.- Continued.

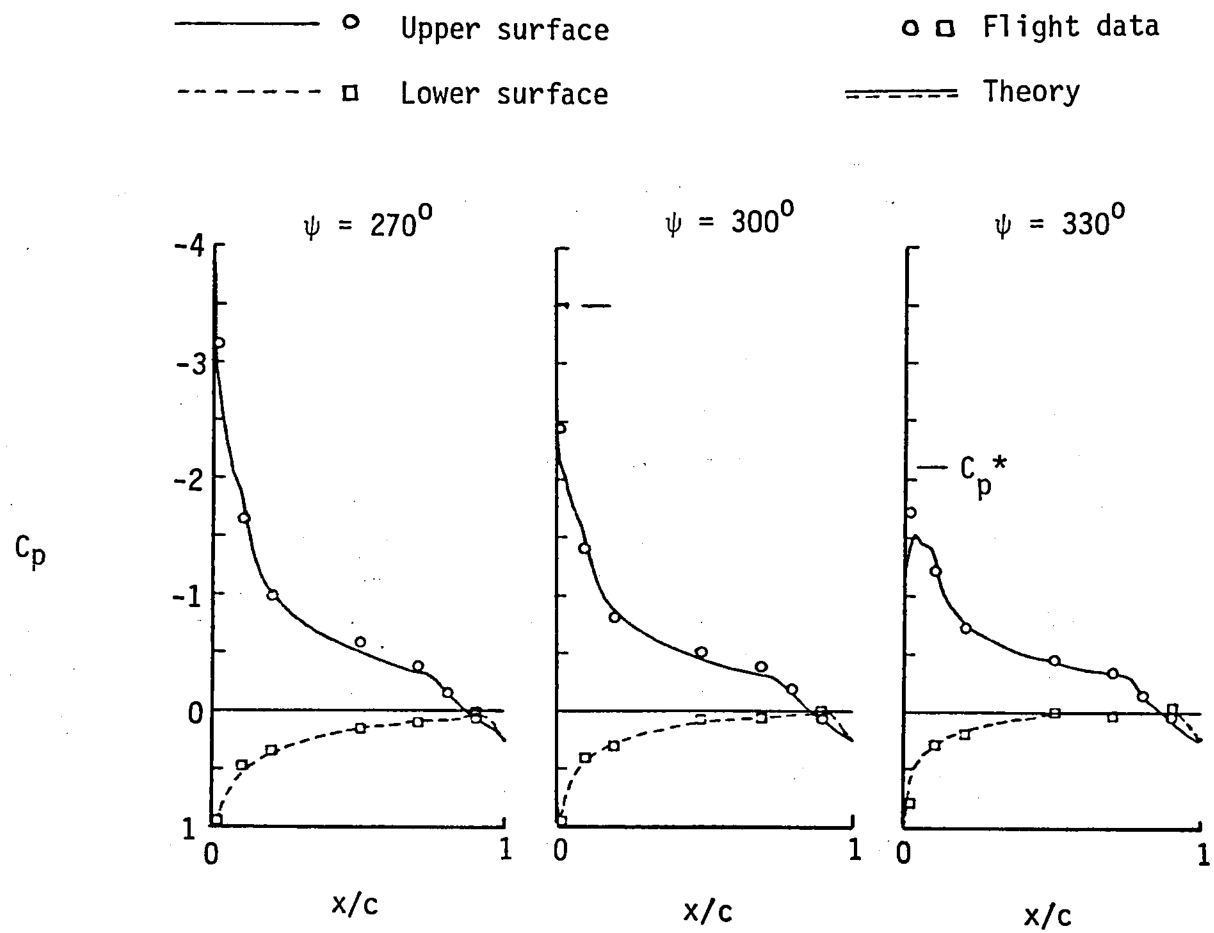


Figure 44.- Concluded.

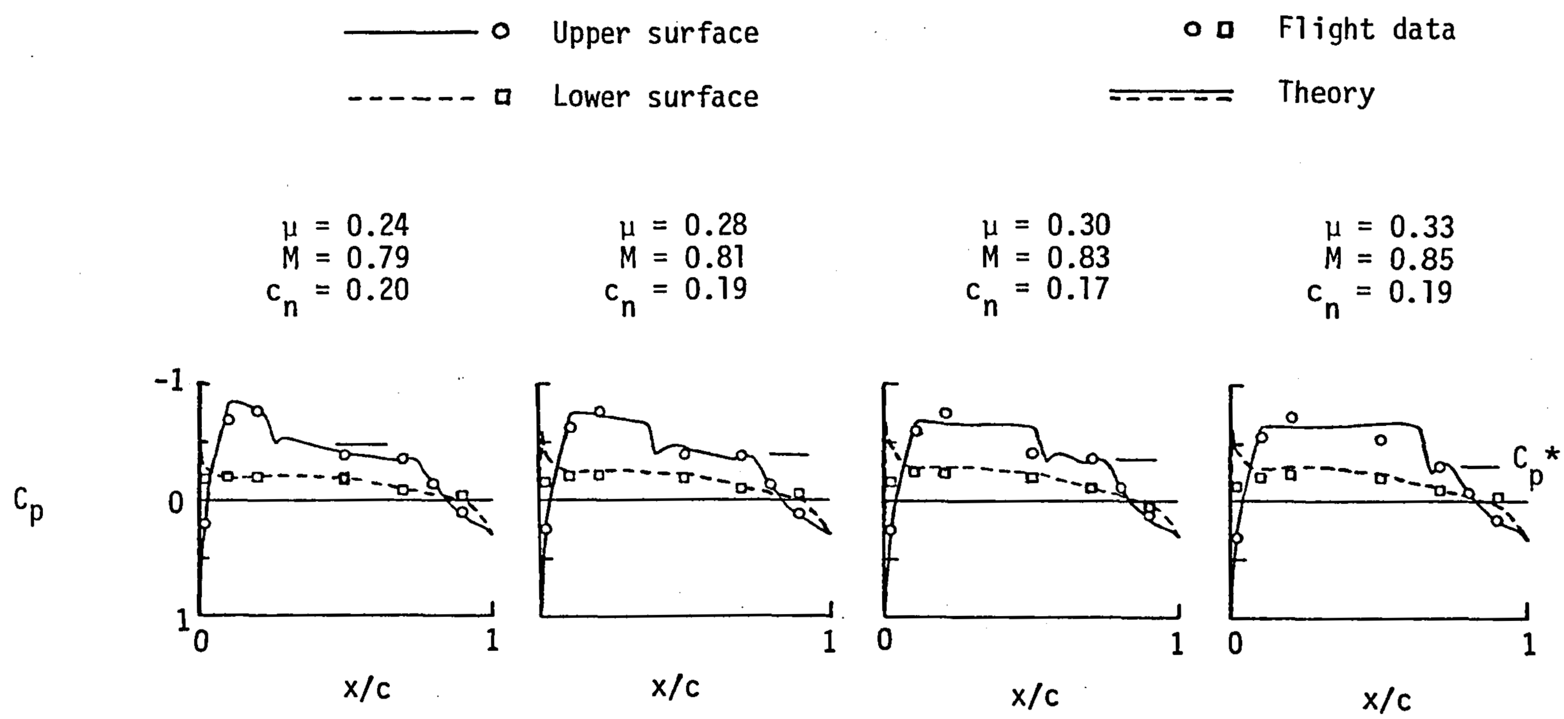


Figure 45.- Comparison of flight data and theoretical blade-section pressure distribution for $\psi = 70^{\circ}$; $r/R = 0.9$.

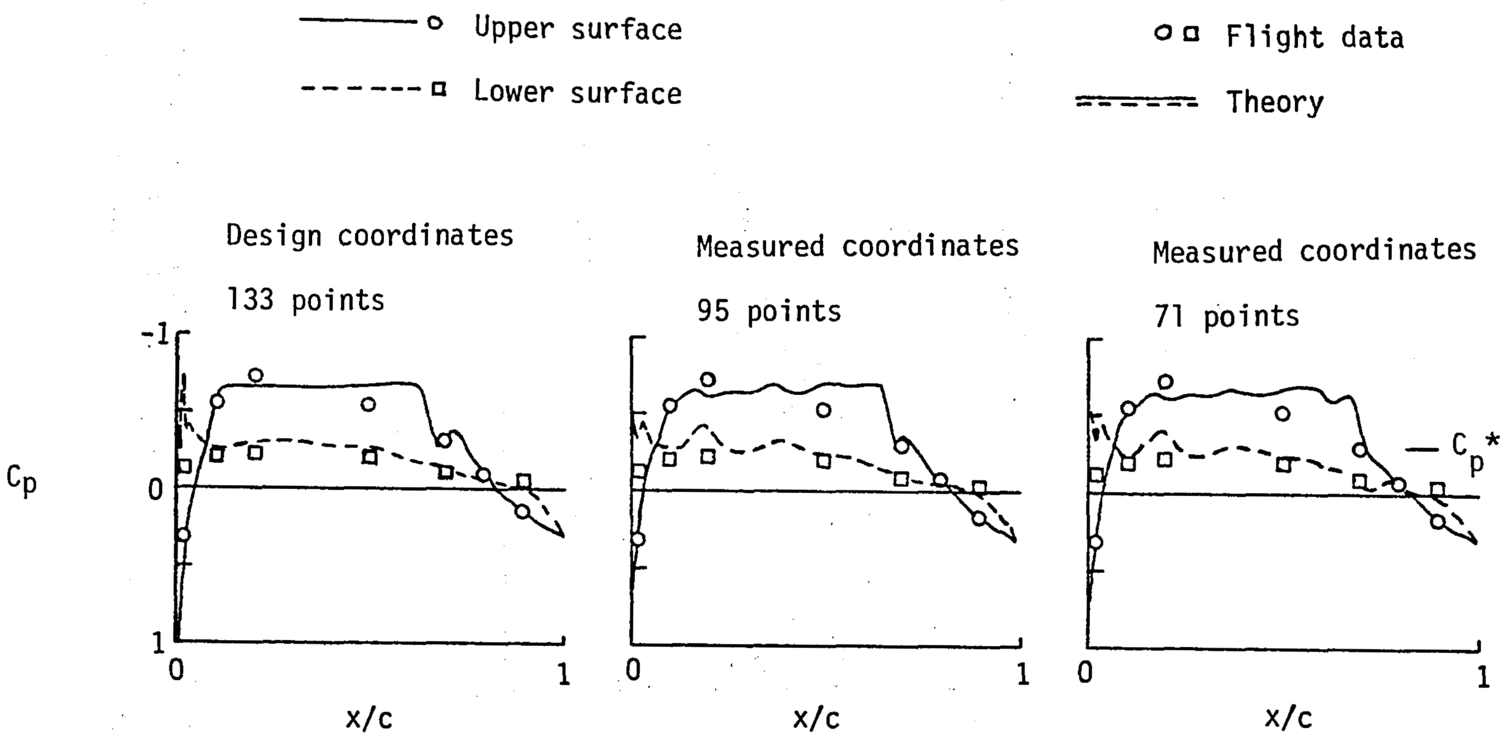


Figure 46.- Comparison of flight data and theoretical blade-section pressure distributions for several sets of airfoil coordinates. Flight 63, run 11 of Appendices D and E; $\psi = 70^{\circ}$, $M = 0.88$; $c_n = 0.19$; $r/R = 0.9$.

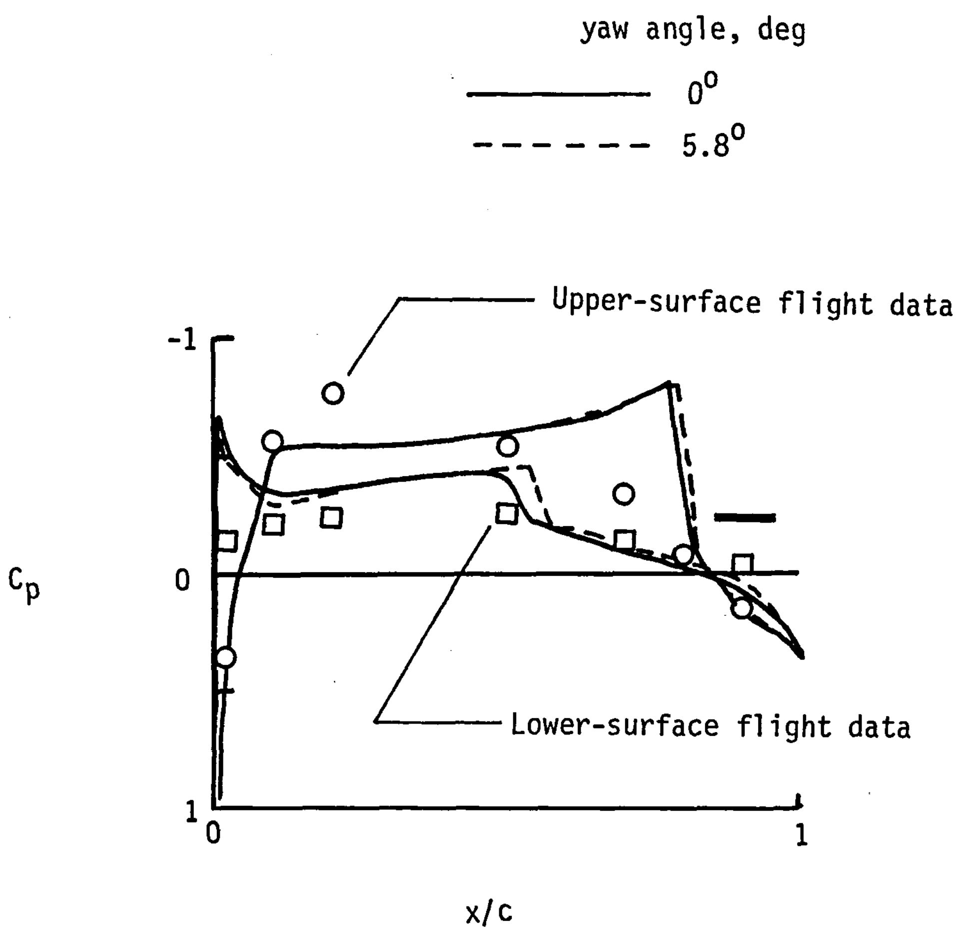


Figure 47.- Comparison of flight data and blade-section pressure distribution computed with and without Mach number and airfoil coordinate adjustment for yawed flow (ref. 35). ψ = 70°; μ = 0.37; r/R = 0.9.

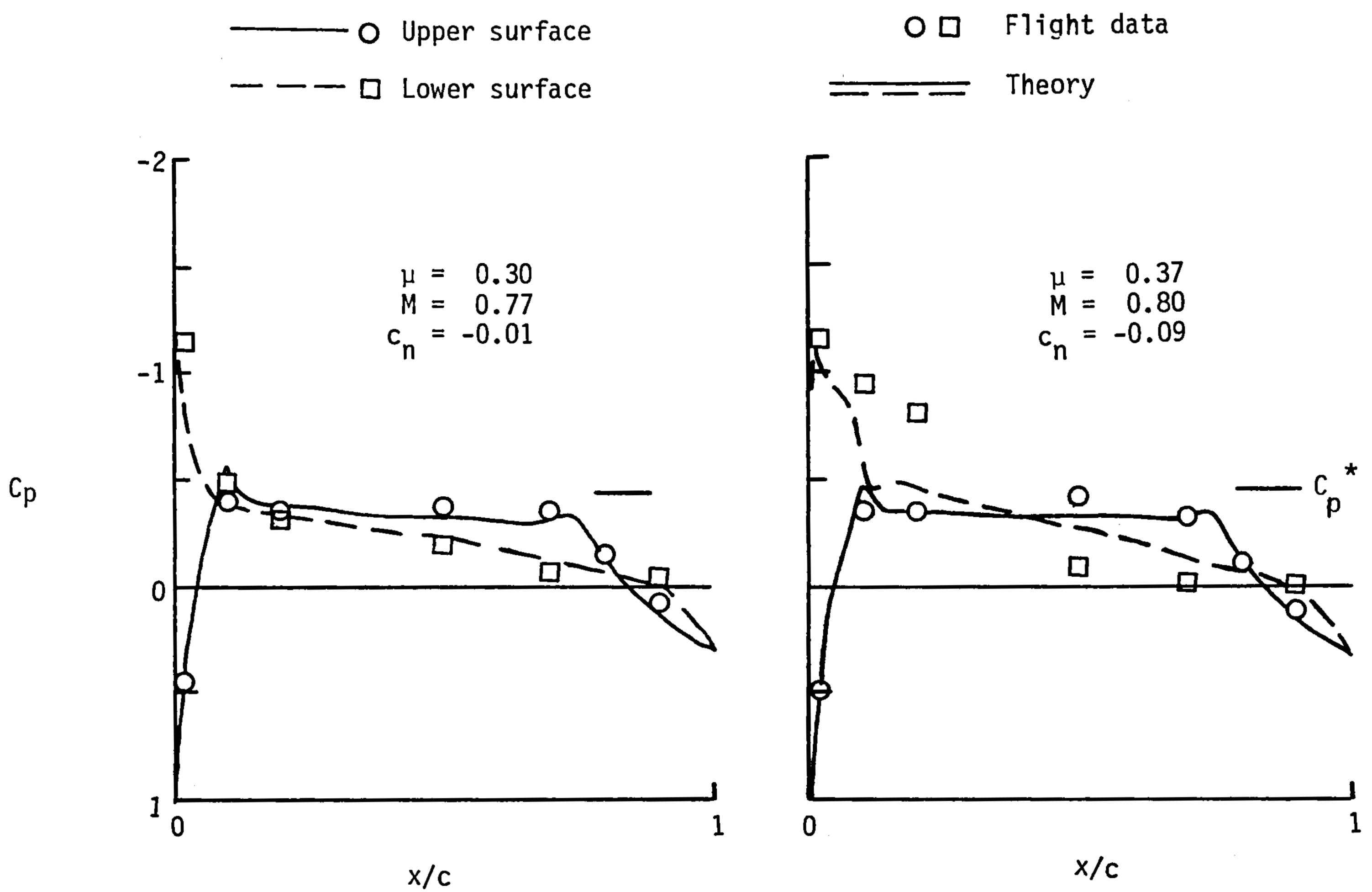


Figure 48.- Comparison of flight data and theoretical pressure distribution for $\psi = 140^{o}$; $r/R = 0.9$.

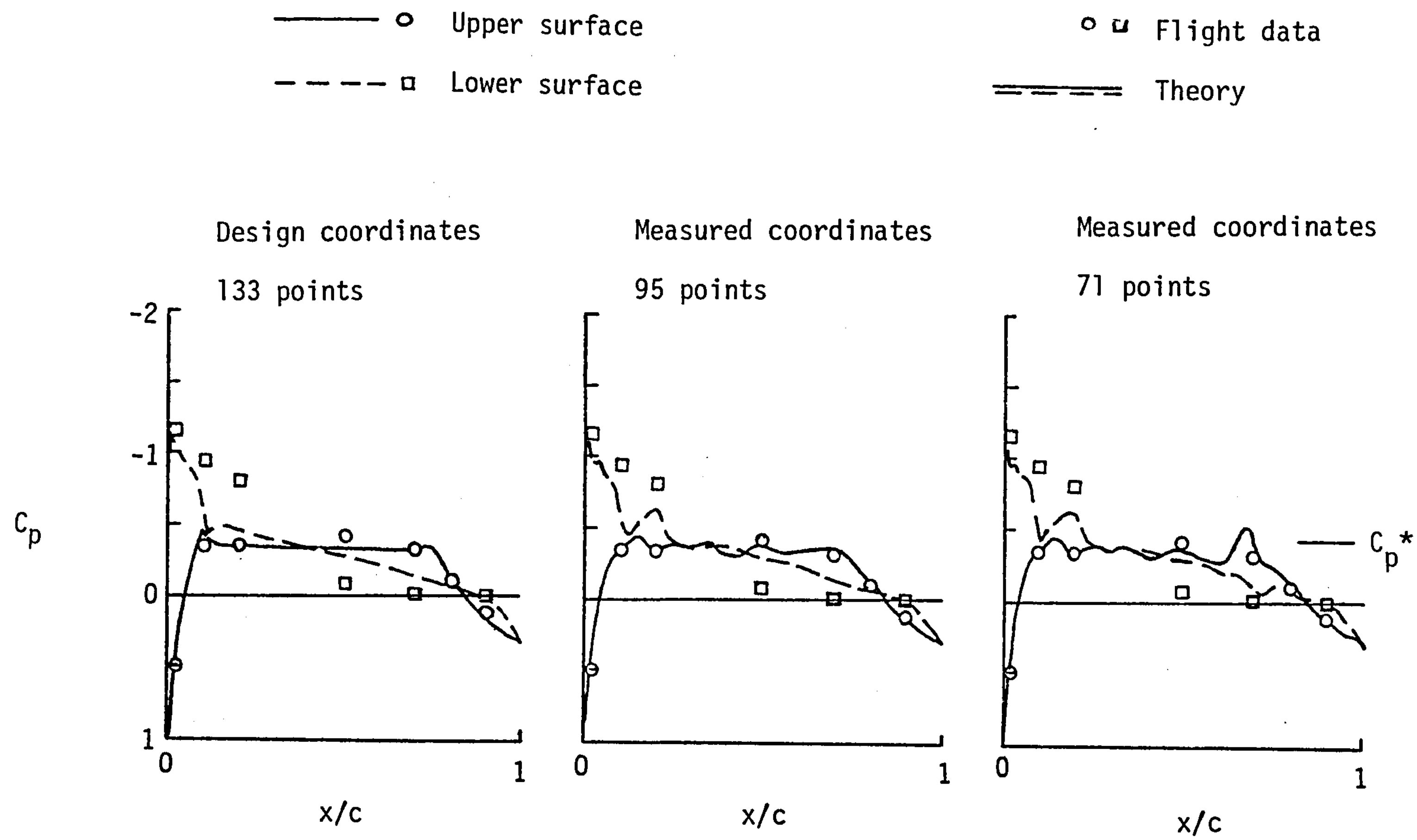


Figure 49.- Comparison of flight data and theoretical blade-section pressure distributions for several sets of airfoil coordinates. Flight 63, run 11 of Appendices D and E; $\psi = 140^{\circ}$; $M = 0.80$; $c_n = -0.09$; $r/R = 0.9$.

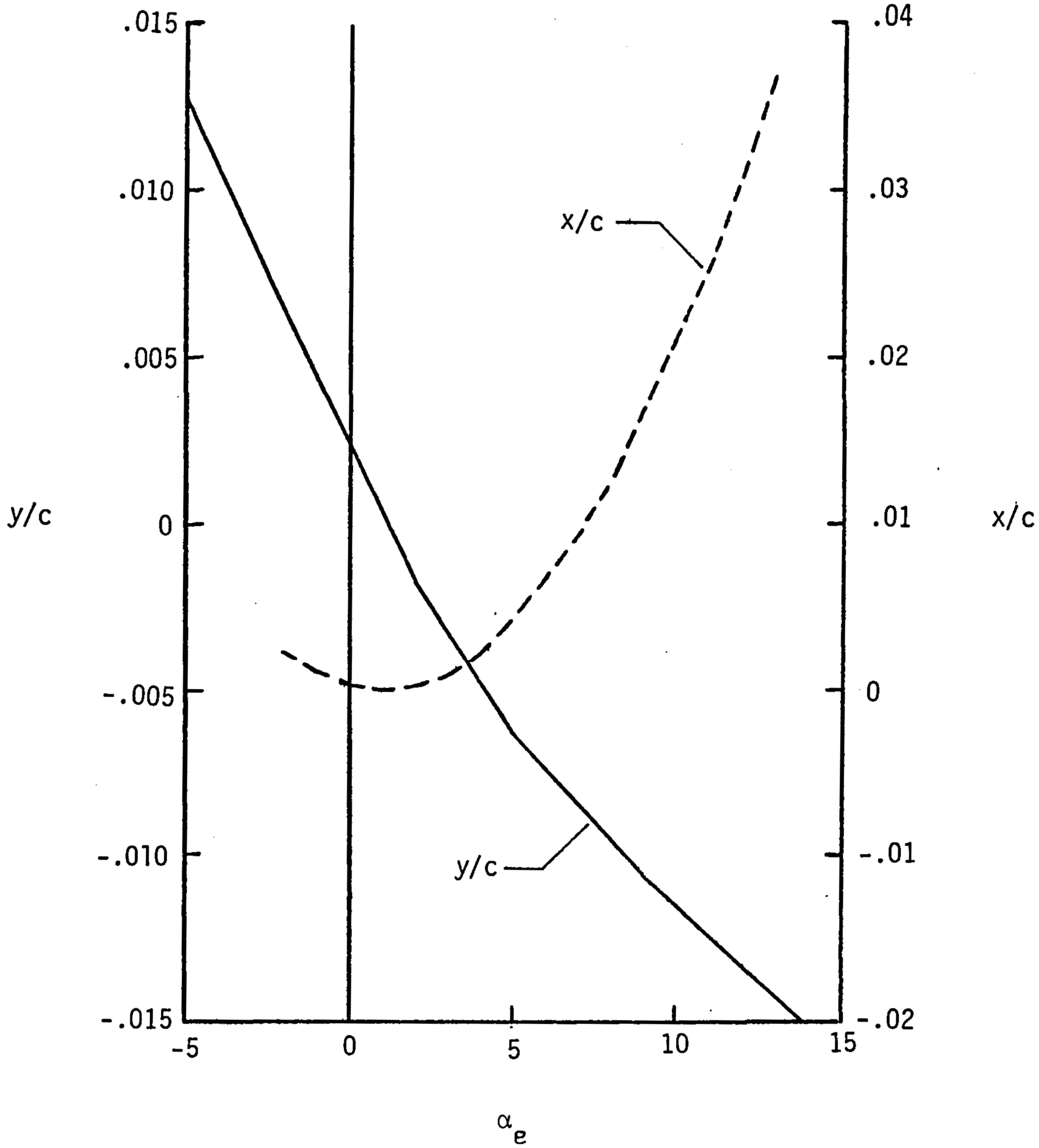
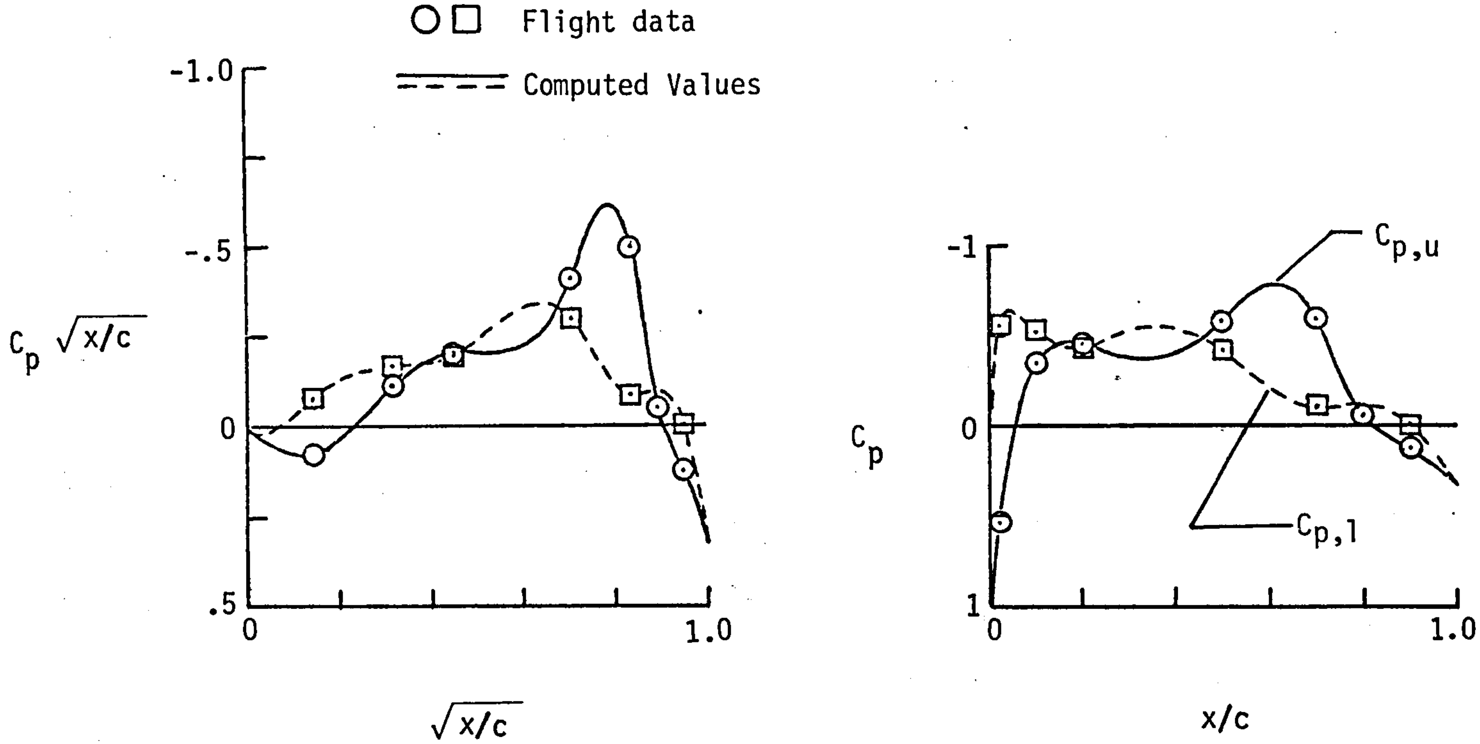
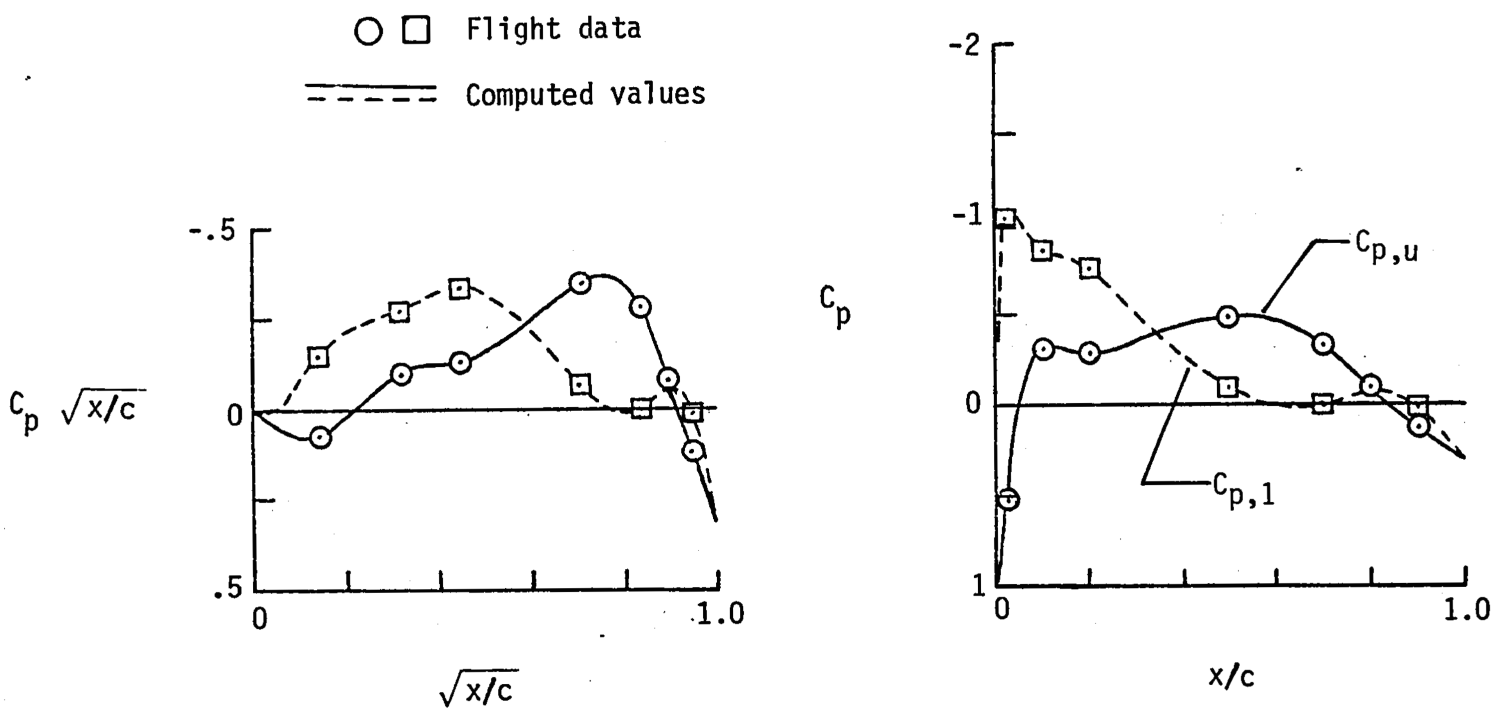


Figure 50.- Parameters for determination of stagnation-point locus as a function of effective angle of attack for the NLR-1T airfoil.



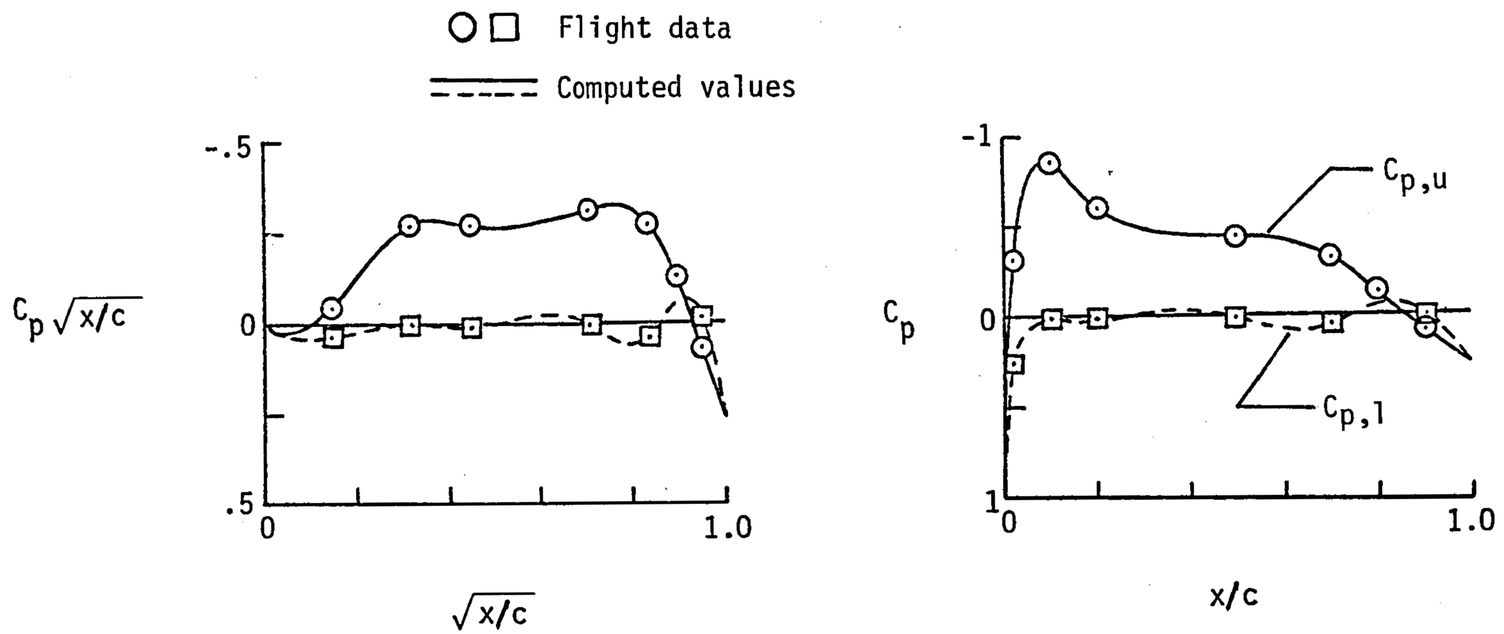
(a) $\psi = 90^0$; M = 0.89

Figure 51.- Results of curve-fit methods for flight pressure data. (Flight 63, run 11 of Appendices D and E.)



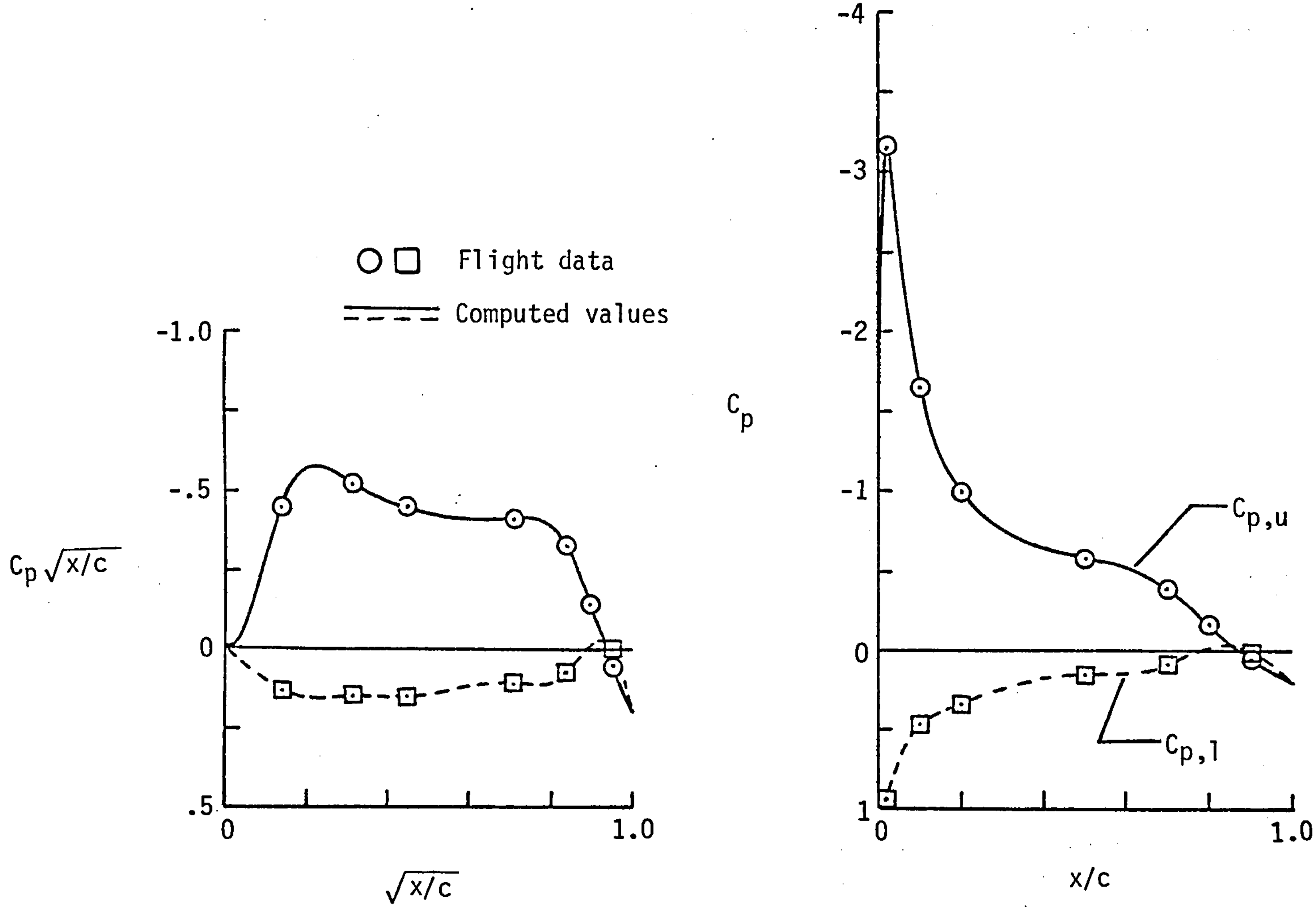
(b) ψ = 130°; M = 0.83

Figure 51.- Continued.



(c) ψ 180^{0}; M = 0.63

Figure 51.- Continued.



(d) $\psi = 270^{\circ}$; M = 0.37

Figure 51.- Concluded.

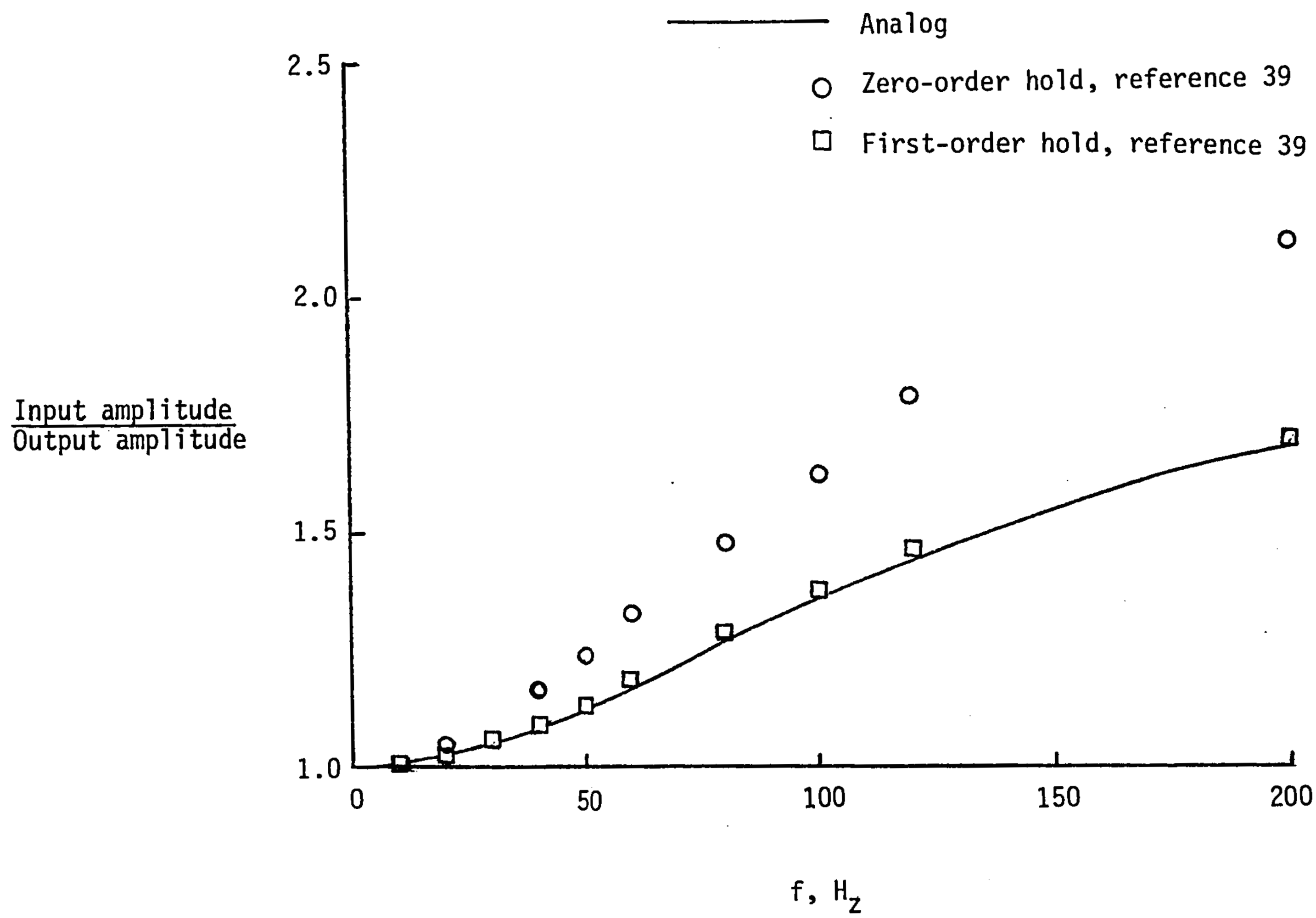


Figure 52.- Amplitude correction factors for electronics lag. Cutoff frequency, 80 H_z; gain factor, 2.0; 1000 sample/sec rate.

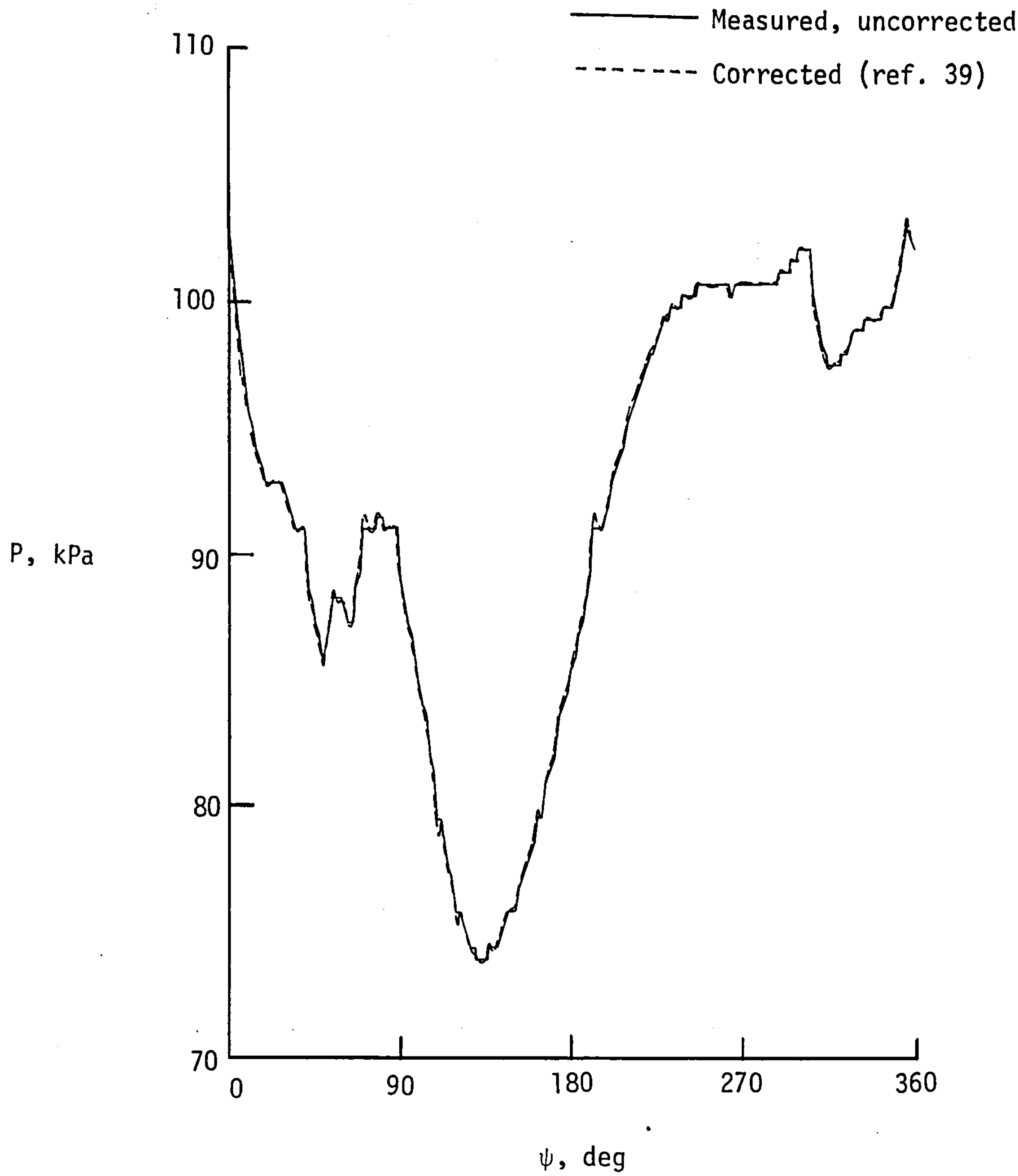


Figure 53.- Comparison of measured, corrected, and approximated pressure for a highly active pressure transducer.

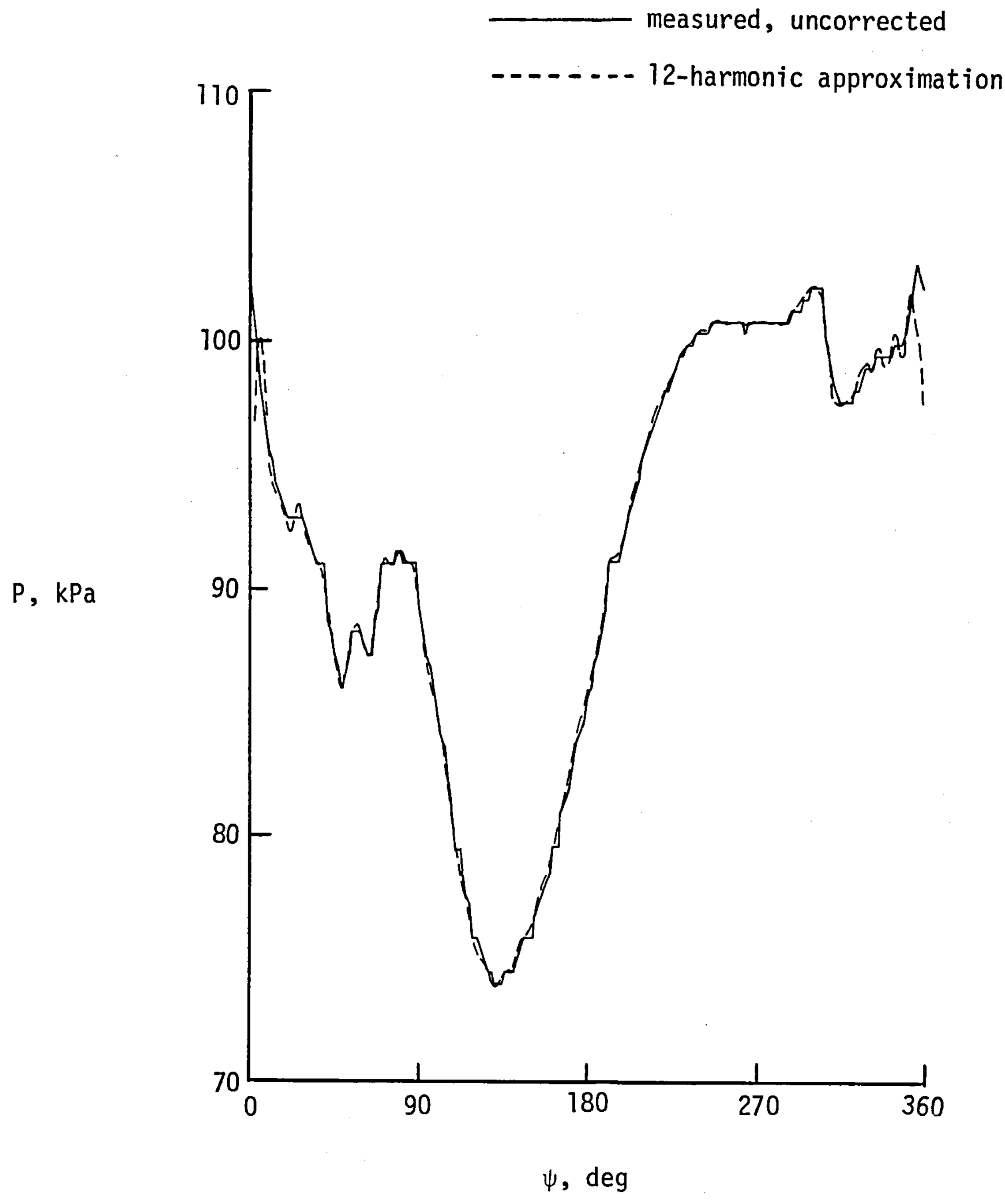


Figure 53.- Concluded.

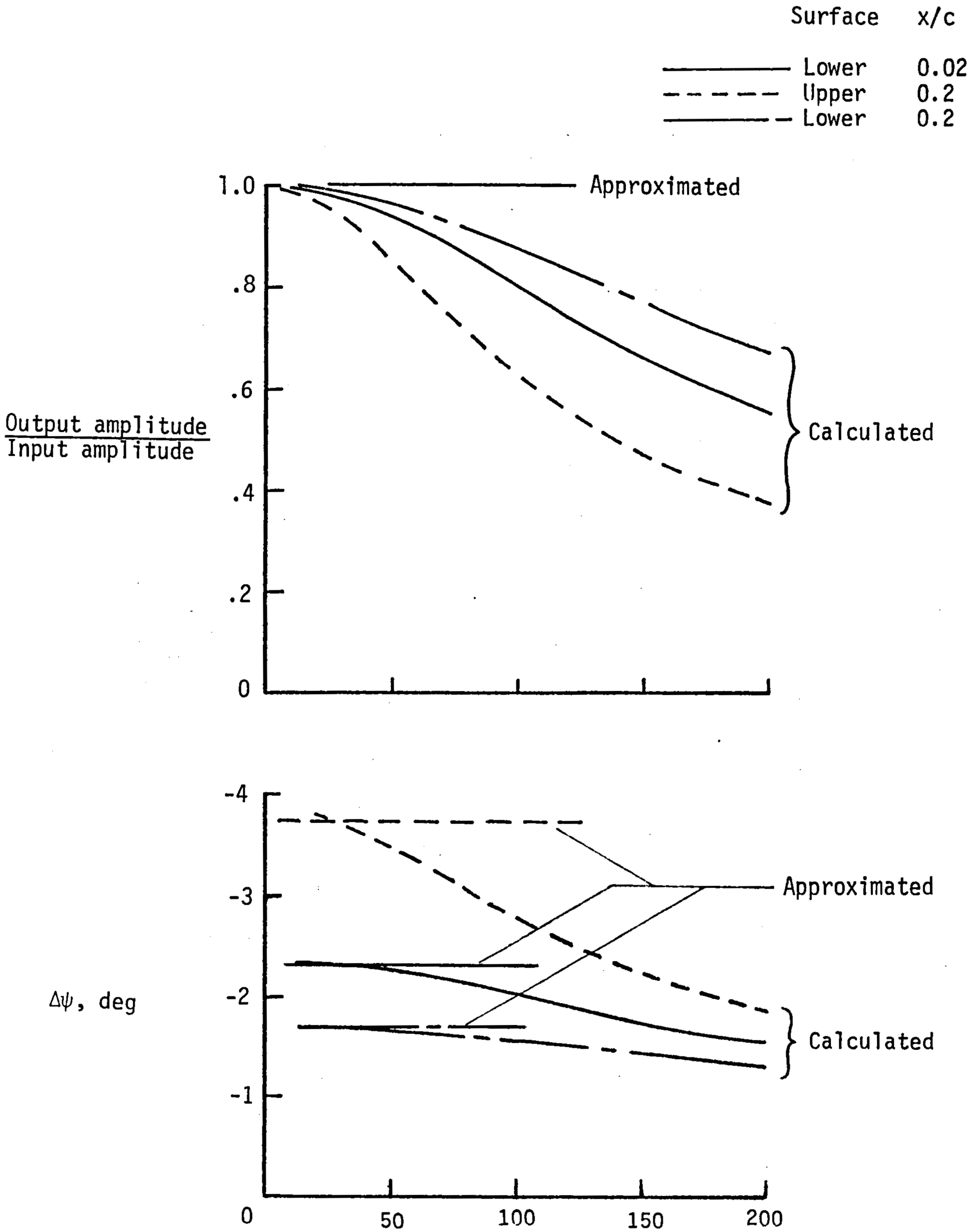


Figure 54.- Real and approximated dynamic-response characteristics for several pressure-transducer systems.

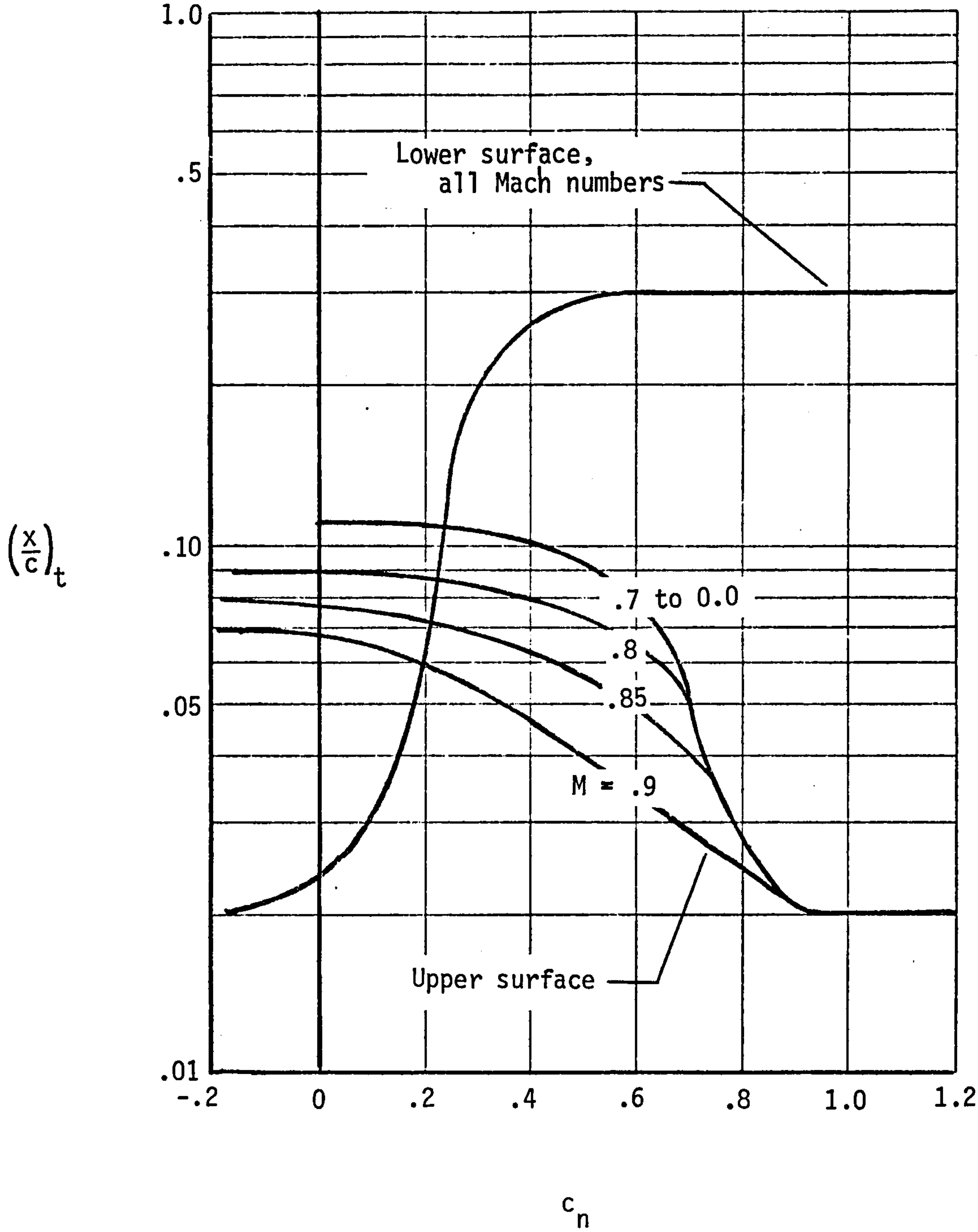


Figure 55.- Predicted blade-section boundary-layer transition for NLR-1T blades.

1. Report No. NASA TM-80166 AVRADCOM Technical Report 80-B-2	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle: A FLIGHT INVESTIGATION OF BLADE-SECTION AERODYNAMICS FOR A HELICOPTER MAIN ROTOR HAVING NLR-1T AIRFOIL SECTIONS		5. Report Date: January 1980
		6. Performing Organization Code
7. Author(s): Charles E. K. Morris, Jr., Dariene D. Stevens and Robert L. Tomaine		8. Performing Organization Report No.
		10. Work Unit No.
9. Performing Organization Name and Address: NASA Langley Research Center and Structures Laboratory, AVRADCOM Research and Technology Laboratories, Hampton, VA 23665		11. Contract or Grant No.
		13. Type of Report and Period Covered: Technical Memorandum
12. Sponsoring Agency Name and Address: National Aeronautics and Space Administration, Washington, DC 20546 and U.S. Army Aviation Research and Development Command, St. Louis, MO 63166		14. Army Project No. TL262209A76

15. Supplementary Notes

a. Charles E. K. Morris, Jr. and Dariene D. Stevens: Langley Research Center
Robert L. Tomaine: Structures Laboratory, AVRADCOM Research and Technology Laboratories

b. Major contributors to this research at LaRC, NASA, were Messrs. M. A. Basnett, M. T. Baxter, P. L. Deal, J. A. Fernandez, P. R. Pfeffer, and L. B. McHenry of FLTMD and Messrs. J. F. Bryant, J. O. Riggins, F. S. Vassey, and W. A. Walls of FED.

16. ABSTRACT

A flight investigation has been conducted using a teetering-rotor helicopter to obtain data on the aerodynamic behavior of main-rotor blades with the NLR-1T blade section. The data system recorded blade-section aerodynamic pressures at 90-percent rotor radius as well as vehicle flight state, performance, and loads. The test envelope included hover, forward flight, and collective-fixed maneuvers.

Data were obtained on apparent blade-vortex interactions, negative lift on the advancing blade in high-speed flight and wake interactions in hover. In many cases, good agreement was achieved between chordwise pressure distributions predicted by airfoil theory and flight data with no apparent indications of blade-vortex interactions.

This report presents detailed data for an advanced airfoil on an AH-1G helicopter; the data may be used for evaluating performance and airfoil analyses.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Airfoil Helicopter Teetering rotor	Unclassified - Unlimited STAR CATEGORY 02

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	192	$9.00

*For sale by the National Technical Information Service, Springfield, Virginia 22161