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# RESEARCH MEMORANDUM

## PROPELLER SECTION AERODYNAMIC CHARACTERISTICS AS DETERMINED BY MEASURING THE SECTION SURFACE PRESSURES ON AN NACA 10-(3)(08)-03 PROPELLER UNDER OPERATING CONDITIONS

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NATIONAL ADVISORY COMMITTEE
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## SUMMARY

A wind-tunnel investigation has been made by the National Advisory Committee for Aeronautics to determine propeller section aerodynamic characteristics by measuring the surface pressure distribution on the airfoil sections of a rotating propeller. The pressures were measured at nine radial stations on an NACA 10-(3)(08)-03 design two-blade propeller.

The results of the investigation are presented herein and airfoil aerodynamic characteristics are presented over a Mach number range from approximately 0.20 to approximately 1.15. A range of angle of attack is covered from about $-1^\circ$ to $12^\circ$ at relatively low values of section Mach number and from $0^\circ$ to $4^\circ$ in the transonic speed range.

The results are compared with two-dimensional-model data from wind-tunnel tests. An analysis of the comparisons shows that some refinement of present theory is needed to determine the induced flow at a propeller and that there are differences between data obtained on an operating propeller blade and that obtained on two-dimensional models in wind tunnels.

## INTRODUCTION

The problem of the application of airfoil data to the design of efficient propellers and of the procurement of airfoil data for propeller design and performance prediction, particularly at high speeds, is well know to the propeller designer. The problem of the application of two-dimensional airfoil data to propeller design was solved for the incompressible case of light propeller loading by the introduction of the Goldstein factor as developed by Lock. This method of design continues to yield satisfactory results when applied to the design of propellers which have sections operating at subcritical speeds.

For conditions of operation far from the ideally loaded condition, however, the Goldstein theory is inapplicable and is not intended for use in the estimation of the induced flow at the propeller.

As described in reference 1 there are three-dimensional relieving effects present near the propeller tips at supercritical speeds. Reference 1 points out that the shocks formed at or near the blade tips are not normal to the stream and therefore cause less flow separation and shock loss than the normal shock found in two-dimensional flow. This phenomenon involves a change in the relation between lift and angle of attack of the airfoil sections near the tip which is independent of the induced-flow field.

In addition to the tip-relieving effects at high speeds, there is also a radial boundary-layer flow caused by centrifugal action on the boundary layer, a Mach number gradient along the propeller blades, and the influence of high blade solidity on the lifting line concept, all of which tend to alter the two-dimensional aerodynamic characteristics of the propeller sections.

To obtain propeller section data, which include the aforementioned effects, tests have been conducted in the Langley 16-foot high-speed tunnel. Propeller airfoil section data have been obtained over the operating range of a propeller by the measurement of the surface pressure distribution on the sections of an operating propeller. The results of the investigation are presented over a Mach number range from approximately 0.20 to approximately 1.15. A range of angle of attack is covered from about $-1^\circ$ to $12^\circ$ at relatively low values of section Mach number and from $0^\circ$ to $4^\circ$ in the transonic speed range.

The airfoil-section data obtained give an insight into the nature of the differences between the characteristics of a section when working in two-dimensional and three-dimensional flow.

Some of the results presented herein have been presented in preliminary form in reference 2. The present results cover a wider range of section operation than those presented in reference 2 and have been more thoroughly analyzed. The data contained in the present paper include corrections to the section angles of attack caused by the twist of the propeller blade due to the operating loads and corrections to the nominal blade-angle settings. In addition, values of section-induced angles of attack calculated from Goldstein's theory and values of the section-chordwise-pressure forces are presented. Values of elemental thrust obtained from wake measurements which were made simultaneously with the surface pressure measurements are also included.

While the results of the present work provide some insight into the nature of the differences between propeller section data and

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two-dimensional data, a better understanding of the problem requires extensive theoretical treatment which is beyond the scope of this paper.

## SYMBOLS

The symbols used throughout this report, some of which are defined in figure 3, are as follows:

| | |
|---|---|
| $b$ | blade chord, feet |
| $c_c$ | section chordwise pressure force coefficient |
| $c_d$ | section pressure drag coefficient |
| $c_m$ | section moment coefficient |
| $(c_m)_{b/4}$ | section pitching-moment coefficient about quarter chord due to normal force |
| $c_n$ | section normal-force coefficient |
| $C_T'$ | section thrust coefficient |
| $C_{T_p}'$ | section thrust coefficient obtained by measuring section surface pressure |
| $C_{T_w}'$ | section thrust coefficient obtained by slipstream measurements of total pressure in wake |
| $c$ | distance from section leading edge to any point on chord, feet |
| $\bar{c}$ | distance from section leading edge to any point on chord about which moments are taken, feet |
| $c_{l_d}$ | design lift coefficient |
| c.p. | chordwise position of section center of pressure, percent chord |
| $D$ | propeller diameter, feet |
| $F_c$ | section chordwise pressure force (positive when directed toward the section trailing edge), pounds |
| $F_n$ | section normal force, pounds |

[redacted]

| | |
|---|---|
| G | Goldstein's induced-velocity correction factor for a finite number of blades |
| g | acceleration due to gravity $\left(32.2 \text{ ft/sec}^2\right)$ |
| h | blade section maximum thickness, feet |
| J | advance ratio (V/nD) |
| K | gas constant (53.3 ft-lb/lb/°F) |
| l/d | section lift-drag ratio |
| M | tunnel air-stream Mach number, corrected to equivalent free airspeed |
| $M_{LD}$ | value of Mach number at lift divergence |
| $M_{cr}$ | critical Mach number |
| $M_t$ | helical tip Mach number $\left(M\sqrt{1 + \left(\frac{\pi}{J}\right)^2}\right)$ |
| $M_x$ | helical section Mach number $\left(M\sqrt{1 + \left(\frac{\pi x}{J}\right)^2}\right)$ |
| m | section moment, pound-feet |
| N | propeller rotational speed, rpm |
| n | propeller rotational speed, rps |
| $P_{cr}$ | critical pressure coefficient |
| $P_x$ | pressure coefficient at a radial station x $\left(\frac{p - p_o}{q_x}\right)$ |
| p | pressure, pounds per square foot |
| $p_m$ | indicated pressure as read on manometer board (uncorrected for centrifugal pressure), pounds per square foot |
| $p_o$ | free-stream static pressure, pounds per square foot |
| $q_x$ | resultant dynamic pressure at a radial station x, pounds per square foot $\left(\frac{1}{2}\rho W_o^2\right)$ |
| R | propeller-tip radius, feet |

[redacted]

| | |
|---|---|
| $r$ | radius to a blade element, feet |
| $r_1$ | radius to orifice in rotating shaft of pressure-transfer device, feet |
| $\overline{T}$ | absolute mean temperature of air in propeller tubing, $^{\circ}F$ absolute |
| $V$ | tunnel air-stream velocity corrected to equivalent free airspeed, feet per second |
| $W$ | true resultant velocity, feet per second |
| $W_o$ | resultant velocity at a radial station $x$, feet per second $\left(V\sqrt{1 + \left(\frac{\pi x}{J}\right)^2}\right)$ |
| $w_1$ | induced velocity, feet per second |
| $x$ | fraction of propeller-tip radius, $(r/R)$ |
| $y$ | perpendicular distance from section chord line to any point on section surface, defined as being positive from chord to upper surface and negative to lower surface, feet |
| $\alpha_i$ | induced angle of attack computed by Lock's method, degrees |
| $\alpha_x$ | angle of attack of blade element at radial station $x$, corrected for induced flow and blade twist due to load, degrees, $(\beta + \Delta\beta - \phi)$ |
| $\alpha_x'$ | nominal angle of attack of blade element at radial station $x$, degrees $(\beta - \phi_o)$ |
| $\beta$ | blade angle, degrees (uncorrected for twist due to load) |
| $\Delta\beta$ | blade twisting angle due to operating loads, degrees |
| $\beta_x$ | blade angle, degrees $(\beta + \Delta\beta)$ |
| $\rho$ | mass density of air in free stream, slugs per cubic foot |
| $\sigma$ | propeller solidity $(Bb/2\pi r)$ |
| $\phi$ | helix angle |
| $\phi_o$ | nominal helix angle $\left(\tan^{-1}(J/\pi x)\right)$ |

[redacted]

$\omega$ propeller rotational speed, radians per second

Subscripts:

$l$ lower surface

$u$ upper surface

## APPARATUS

Basic equipment.- The tests were made with the NACA 2000-horsepower propeller dynamometer in the Langley 16-foot high-speed tunnel. A complete description of the dynamometer is contained in reference 3.

The pressure-transfer device used to transfer the pressures measured at the blade surface orifices from the rotating members of the test setup to the stationary manometers is shown schematically in figure 1 and is described in detail in reference 4.

Propeller blades.- The propeller blades are of solid duralumin construction and are designated the NACA 10-(3)(08)-03 propeller. The digits in the propeller designation describe the propeller diameter and the airfoil section at the design radius ($x = 0.70$) as follows: propeller diameter, 10 feet; section design lift coefficient, 0.3; section thickness chord ratio, 0.08; and solidity per blade, 0.03. The blades were made up of NACA 16-series airfoil sections throughout and were designed as a three-blade propeller to have the Betz loading for minimum induced-energy loss when operating at a blade angle of 45° at the design radius at an advance ratio of 2.1. The airfoil-section design characteristics are shown in table 1 for the blade stations where pressure measurements were made. It should be noted that throughout the present paper parentheses have been added to the airfoil designations to separate the airfoil-section design lift coefficient from the section thickness ratio. This addition of parentheses is contrary to the NACA method of designating the 16-series airfoils but the fractional values of design lift coefficient and thickness ratio involved in many instances in the present paper required the separation for clarity.

A description of the blades, together with the aerodynamic characteristics of the propeller, is contained in reference 3. The blades were tested as a two-blade propeller for the present tests, and blade-form characteristic curves are presented in figure 2.

Twenty-four pressure tubes were embedded in the surface of one of the blades; a resistance thermometer was embedded in the thrust face. Details of the blade construction, pressure tube and orifice installation,

and temperature measurements are described in reference 2. A schematic diagram of the test setup is shown in figure 1.

## TESTS

The tests were made at nominal values of blade angle of 30° and 45° at the 75-percent (45-inch) radius station. For most tests a constant rotational speed was used and a range of advance ratio was covered by changing the tunnel airspeed, which was varied from about 60 to 460 miles per hour. At a blade angle of 45°, however, the dynamometer could not deliver sufficient torque to cover the complete range of advance ratio at the higher rotational speeds and for this reason high-speed data were obtained by operating at constant high values of tunnel airspeed and variable dynamometer rotational speeds.

When the tests were run as described, the section Mach number and the section nominal angle of attack were varied simultaneously; the nominal angle of attack was varied over a fairly large range and the section Mach number was varied over a small range. Since the nominal angle of attack is a function of advance ratio at constant blade angle, a Mach number range was covered by running the tests over the same range of advance ratio a number of times with different combinations of tunnel airspeed and rotational speed. The Mach number range covered for the outboard stations was from about 0.6 to 1.1, and for the inboard stations from about 0.3 to 0.6. The nominal angle-of-attack range varied from about -1° to 12° for low values of Mach number and from about 0° to 4° for the higher values of Mach number.

## REDUCTION OF DATA

### Pressure Coefficient

The pressure coefficient for a pressure measured on the surface of the propeller blade is defined as the difference between the measured surface pressure and the free-stream static pressure, divided by the resultant section dynamic pressure, so that

$$P_x = \frac{p - p_o}{q_x}$$

The pressure $p$ at a point on the blade surface is the pressure recorded on the manometer corrected for the centrifugal force acting on

the air column in the pressure tube due to the rotation of the blade, so that

$$p = p_m e^{\frac{\omega^2}{2gKT}\left(r^2 - r_1^2\right)}$$

For the present installation $r_1$ was small compared with $r$ and was called zero with negligible effect on the resulting pressure coefficient.

The free-stream static pressure and the mass density of the air are determined by the free-stream conditions immediately ahead of the propeller but the resultant velocity and total pressure acting on a blade section are determined jointly by the speed of advance and the propeller rotational speed.

The coefficients defined herein are based on the resultant velocity $W_o$ (fig. 3). To be strictly analagous to two-dimensional flow the coefficients should be based on the resultant velocity $W$. The ratio $W/W_o$, however, is equal to $\cos \alpha_i$ and since $\alpha_i$ is less than $3.5^\circ$ for all conditions of the present tests the error involved by using the simplification amounted to less than 1 percent in normal-force coefficient.

## Normal-Force Coefficient

The normal-force coefficient of a section is defined as the normal force acting on a section of unit span divided by the chord of the section and the resultant section dynamic pressure:

$$c_n = \frac{F_n}{q_x b} = \int_0^{1.0} \left(P_{x_l} - P_{x_u}\right) d\frac{c}{b}$$

## Moment Coefficient

The moment coefficient of a section is defined as follows:

$$c_m = \frac{m}{q_x b^2} = \frac{\bar{c}}{b} \int_0^{1.0} \left(P_{x_l} - P_{x_u}\right) d\frac{c}{b} - \int_0^{1.0} \left(P_{x_l} - P_{x_u}\right) \frac{c}{b}\, d\frac{c}{b}$$

A positive value of moment coefficient is defined as a moment tending to increase the section angle of attack.

## Chordwise-Pressure-Force Coefficient

The chordwise-pressure-force coefficient is defined as

$$c_c = \frac{F_c}{q_x b}$$

and is found by an integration of the pressure-distribution curve determined by plotting the measured surface pressure coefficient against the section thickness so that

$$c_c = \frac{h}{b}\left(\int_{h_l/h}^{h_u/h} P_x \, d\frac{y}{n}\right)_{0<\frac{c}{b}<0.5} - \frac{h}{b}\left(\int_{h_l/h}^{h_u/h} P_x \, d\frac{y}{n}\right)_{0.5<\frac{c}{b}<1.0}$$

## Angle of Attack

The angle of attack of the propeller sections has been determined by the relation

$$\alpha_x = \alpha_x' + \Delta\beta - \alpha_i$$

where $\alpha_i$, the induced angle of attack, was computed by use of Goldstein's correction for a finite number of blades, as applied by Lock, reference 5.

In the equation

$$w_1 = \frac{\sigma c_l W}{4G \sin \phi}$$

$w_1$ is assumed to be perpendicular to the true resultant velocity $W$ as shown in figure 3. The induced angle $\alpha_i$ is obtained as

$$\alpha_i = \tan^{-1} \frac{\sigma c_l}{4G \sin \phi}$$

where $\phi = \phi_o + \alpha_i$.

This equation was solved for the induced angle $\alpha_i$ by successive approximations by letting $c_l = c_n$ and by assuming $\phi = \phi_o$ for the first trial. The factor $G$ was obtained from charts such as those reproduced in figure 2 of reference 6.

When a propeller is operating, the blades will twist due to the action of the centrifugal forces and the aerodynamic load. The subject blades are relatively stiff and the changes in angle of attack due to any twisting of the blades are small but in some cases constitute a fairly large percentage of the section angle of attack. The centrifugal loads acting on the blades can be calculated with good accuracy and when the aerodynamic load and physical characteristics of the blades are known the section angle of twist $\Delta\beta$ can be computed with good accuracy. The twist of the blade sections has been computed and is included in the calculation of the section angles of attack for all conditions of operation tested in the present program.

An accurate determination of the blade-angle setting is also of importance for the determination of the section angle of attack. For the present tests the blade angle was set at nominal values of $30^\circ$ and $45^\circ$ at the $\frac{r}{R} = 0.75$ station. It was necessary to complete the tests at a given radial station before proceeding with the tests at the succeeding station and because of this the blade angle was changed at least once for each station tested. Errors in blade-angle setting became evident when the thrust loading along the blade radius computed from the surface-pressure measurements was compared with that obtained from wake measurements. The loading curve from the nine radial surface-pressure stations was wavy and the loading curve from a single wake-survey run was characteristically smooth. However, when the wake measurement loading curve was determined from nine separate runs as was the surface-pressure curve, the wake-pressure curve had the same waviness as the surface-pressure curve. Since the wake-pressure measurements agreed with the surface-pressure measurements, the waviness of the curves was laid to errors in the blade-angle setting.

In order to determine the correct blade-angle setting of each test run, propeller thrust was plotted against advance ratio and compared with the curve of propeller thrust against advance ratio from tests where the blade angle was known to be set accurately. The blade angle was adjusted to produce the same thrust at the value of advance ratio for maximum efficiency as obtained in the tests where the blade angle was known. The values of blade angle determined as described are recorded in tables 2 to 10 and are the values used throughout this paper in the determination of the section angle of attack. The nominal values of blade-angle setting appear in many of the figures and are used for identification purposes only.

Small errors in the blade-angle setting will not affect the values of normal-force coefficient but small errors will affect values of drag coefficient since the determination of the drag coefficient from tests such as the present tests is dependent upon an accurate knowledge of the section angle of attack. Consistent error in the angle of attack would not, however, affect any of the analyses contained herein.

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### Tunnel-Wall Interference

The data presented herein have been corrected to equivalent free air by the application of the Glauert tunnel-wall-interference correction (reference 7).

## RESULTS AND DISCUSSION

### Pressure Distribution

The values of pressure coefficient obtained from the measurement of surface pressures on the propeller sections are presented in tabular form in tables 2 to 10. Typical pressure-distribution curves are shown in figure 4 plotted from the data presented in tables 7(f), 7(h), and 7(k) for a range of normal-force coefficient in the subsonic and transonic speed ranges.

The pressure distributions obtained on the propeller blade sections closely resemble data obtained on airfoils in tunnel tests, and, as shown in reference 2, the low-speed pressure distributions obtained on the propeller sections agree well with the distribution obtained from theoretical calculation.

At values of Mach number near the critical value for the propeller sections (between $M = 0.70$ and $M = 0.80$) the point of minimum pressure tends to move toward the section trailing edge with increasing Mach number. When the Mach number is increased to values above the critical value, a sharp pressure rise occurs on the section; this rise indicates that a shock wave has formed on the surface. (See fig. 4(b).) An inspection of figure 4 as a whole shows that the shock wave tends to move toward the leading edge of the section with increases in angle of attack and toward the trailing edge with increases in Mach number.

At speeds above the section critical speed, a region of supersonic flow forms on the airfoil surface. The supersonic region begins with a sonic boundary upstream and terminates in a shock at its downstream boundary. When the speed is increased above the critical speed, the sonic boundary moves rapidly toward the leading edge and begins to stabilize at the point where the airfoil curvature becomes relatively large; simultaneously, the shock location moves rearward and, at Mach numbers near unity and above, remains very close to the section trailing edge (figure 4(c)).

The foregoing discussion illustrates that, in general, the distributions of pressure over the propeller section qualitatively resemble those obtained in tests of two-dimensional models. On the outboard

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sections, however, there are differences that are not apparent from an over-all inspection of the pressure distributions. The differences are apparent, however, from an inspection of the values of normal-force coefficients and critical Mach numbers obtained, and are discussed subsequently.

## Section Critical Mach Number

The critical Mach number of most of the propeller sections tested has been determined by plotting the values of minimum pressure coefficient obtained at each test condition versus the section resultant Mach number at constant values of section angle of attack. The value of section Mach number at which the minimum pressure coefficient attained a value corresponding to a value of local Mach number equal to 1.0 was read from the plots and is defined as the section critical Mach number. The values of section critical Mach number are plotted against section normal-force coefficient in figure 5(a). The values of section normal-force coefficient are the values obtained for a given angle of attack at the section critical Mach number.

A comparison between the values of critical Mach number obtained in the propeller tests and values of theoretical critical Mach number from reference 8 is shown in figure 5(b) for two propeller stations at the two blade-angle settings tested. The values of lift coefficient against which the theoretical values of critical Mach number are plotted in reference 8 have been increased by the factor $\frac{1}{\sqrt{1 - M^2}}$ in figure 5(b) of the present paper.

For the inboard station ($x = 0.70$) shown in figure 5(b) the agreement between the experimentally determined curves and the theoretical curve is good except that for the experimental curves the range of normal-force coefficient over which relatively high values of critical Mach number are maintained is about 60 percent greater than the range for the theoretical curve. The extension of the flat portion of the curves is caused by the pressures on the lower surface of the propeller section and is probably caused by the lack of a pressure tube near the leading edge of the section. The tube nearest the leading edge over the lower surface was 3.75 percent of the chord length from the leading edge, while the closest tube on the upper surface was 2.5 percent chord from the leading edge. Because of the agreement with the theoretical curve for the portion of the curves determined by the upper surface pressures, the values of critical Mach number as determined from the propeller tests are believed to be accurate for positive values of angle of attack of the sections.

For the outboard station (x = 0.95) the percentage increase in the range of normal-force coefficient covered by the flat high-level portion of the experimental curves is approximately the same as for the x = 0.70 station. At the x = 0.95 station, however, the experimental curves are shifted to lower values of normal-force coefficient. The differences between the experimental and theoretical values for the outboard station indicate that the pressure distribution and, consequently, the aerodynamic characteristics of the outboard sections are different from two-dimensional data since two-dimensional data agree with theory as shown in reference 9. Further evidence of the differences between two-dimensional data and the propeller data will be shown in a discussion of the normal-force coefficients.

An interesting point illustrated by figure 5 is the tendency for the values of critical Mach number to level off and, in some cases, increase at high values of normal-force coefficient in the range above the main break in the curves. This phenomenon which is found in wing data when high narrow pressure peaks occur on the leading edge of the airfoil sections is caused by the breakdown of the pressure peaks when the angle of attack is increased. The breakdown of the leading-edge peaks occurs simultaneously with and may be associated with a separation of the flow at the trailing edge of the section as indicated in figure 6.

Figure 6 is a plot of the data which is typical of the subsonic pressure distributions obtained during the tests and shows the variation of the minimum peak pressure coefficient, trailing-edge pressure coefficient, normal-force coefficient, and the section Mach number with angle of attack. (Also, see fig. 4(a).) As the angle of attack is increased, the trailing-edge pressures indicate that a separation of the boundary layer has occurred at a value of angle of attack of about $7^\circ$ and that the separation becomes greater with further increases in angle. The trailing-edge separation in turn affects the flow over the entire section and reduces the leading-edge pressure peaks. The reduced suction peaks at the leading edge and the increased suction at the trailing edge (upper surface) tend to compensate each other so that the normal force continues to increase with increasing angle of attack.

## Aerodynamic Coefficients

The aerodynamic coefficients as obtained by integration of the pressure distribution on the propeller airfoil sections are presented in tabular form in tables 2 to 10. Values of normal-force coefficient are comparable to values of lift coefficient for angles of attack up to about $4^\circ$. For angles as high as $10^\circ$, the difference is believed to be within the experimental accuracy of the data. Values of chordwise-pressure-force coefficient, however, are not comparable to values of

pressure drag coefficient since the contribution of the relatively large normal-force vector to the drag vector constitutes a large percentage of the drag value. (See fig. 3.)

The data in tables 2 to 10 are presented for each test run, during which section angle of attack and section Mach number varied simultaneously. In order to determine the variation of the aerodynamic coefficients with Mach number and angle of attack it is necessary to plot the data against a parameter such as advance ratio. A typical plot of the aerodynamic coefficients as determined by the pressure distribution is shown in figure 7 where the data of table 7 have been plotted. From plots such as those shown in figure 7, cross plots can be made to obtain the variation of the aerodynamic coefficients with angle of attack or Mach number.

Normal force.- The variation of normal-force coefficient with angle of attack and section Mach number is shown in figure 8 in the form of normal-force carpets for each station at each blade angle tested. The values of critical Mach number shown in figure 5(a) have also been included in figure 8 as dashed lines.

A comparison of the propeller test data with two-dimensional wind-tunnel data for the same airfoil sections is shown in figure 9. The tunnel data were obtained by cross-plotting the data of reference 9 which, for these comparisons, have been corrected for tunnel-wall interference by the method described in reference 10. In figure 9(a) the data are compared as plots of normal-force coefficient against angle of attack for several values of Mach number for each radial station. Comparison with two-dimensional data shows the effect of the radial position of the sections on the lift-curve slope.

For the sections inboard of the $x = 0.70$ station the lift-curve slopes for the $\beta_{0.75R} = 45^\circ$ case agree well with the slopes of the two-dimensional data. For sections outboard of the $x = 0.70$ station, however, the slopes of the curves for the propeller data become less than the slopes of the two-dimensional data. This effect increases as the tip sections of the propeller are approached.

On the inboard sections, however, where the lift-curve slopes agree fairly well, there are differences between the two-dimensional data and the propeller data in the values of lift coefficient for given values of angle of attack. The differences in the data for the inboard sections appear to vary with Mach number and are evident as a shift in the angle of attack for zero lift. Lock's equation

$$\alpha_i = \tan^{-1} \frac{\sigma c_l}{4G \sin \phi}$$

shows that for zero lift coefficient the computed value of the induced angle is zero. It therefore appears that the differences between the propeller data and the two-dimensional data are partly due to changes in the propeller-section aerodynamic characteristics from those characteristics of two-dimensional data. For the furthermost inboard station (x = 0.30) much of the change may be traced to the effect of the blade spinner juncture on the section characteristics, but for the other stations the differences are probably caused by the effects of the Mach number gradient along the blade radius, the effects of the outboard flow of the boundary layer on the blade caused by centrifugal action, three-dimensional relieving effects near the blade tips as described in reference 1, and the influence of high blade solidity on the lifting-line concept.

Further evidence of the differences between propeller section data and two-dimensional data are shown in figure 9(b) where normal-force coefficient has been plotted against Mach number for several values of angle of attack for the two blade-angle settings investigated. Tunnel data have been plotted in figure 9(b) as was done in figure 9(a). In the case of the data obtained at $\beta_{0.75R} = 45^\circ$, the effects of the tip relief are clearly shown in the increase of the value of Mach number for lift divergence over that of the tunnel data for the tip sections. Outboard of the 0.7R station the difference becomes greater as the tip of the blade is approached and, in addition, the value of normal-force coefficient at lift divergence becomes considerably less for positive angles of attack and becomes greater for negative angles of attack. For the 0.6R station the value of Mach number for lift divergence is in close agreement with the values for the tunnel data although the value of normal-force coefficient at lift divergence is considerably lower than the values for the tunnel data.

In the $\beta_{0.75R} = 30^\circ$ case, the point of lift divergence is practically indefinable and in some cases the value of Mach number for the point which might be called the lift-divergence point is lower than the value of the critical Mach number. (See fig. 8(d).) Furthermore, in the lower Mach number range in many cases the value of normal-force coefficient increases with decreasing Mach number. The reason for the variances in the general shape of the curves with the familiar patterns of airfoil data is not definitely understood but contributing factors include a steeper Mach number gradient, greater radial boundary-layer flow, and a greater variation of section angle of attack along the span of the blade than for the $\beta_{0.75R} = 45^\circ$ case. These factors become evident with an inspection of figure 3 where in order to maintain a given section Mach number and angle of attack when the blade angle is reduced it is necessary to increase the rotational speed.

The change in the angle-of-attack variation along the span due to a blade-angle change can be seen in figure 10. Figure 10 presents the

variation of section nominal angle of attack along the blade radius together with the blade loading from the pressure measurements for two values of advance ratio. The values of advance ratio have been chosen so that the value of nominal angle of attack for both blade-angle cases is the same at the x = 0.70 station. Changes in the spanwise angle-of-attack variation will cause changes in the blade loading as indicated in figure 10 where it is shown that when compared to the ideal Betz loading the loading for the $\beta_{0.75R} = 30^\circ$ case is further from the ideal than the $\beta_{0.75R} = 45^\circ$ case. In general, the agreement between the experimentally determined propeller loading and the ideal loading is good for the outboard stations (outboard of the x = 0.60 station) for the low-speed conditions shown in figure 10, but for the inboard stations the data obtained at a blade angle of 30° show considerable deviation from the ideal loading. At the higher value of advance ratio the bumps in the loading curves are due to the small values involved in obtaining $\frac{bc_n}{(bc_n)_{0.7R}}$. Since the Lock-Goldstein calculation of the induced angle of attack is based on the assumption of an ideal Betz loading, the differences between the $\beta_{0.75R} = 30^\circ$ data and the $\beta_{0.75R} = 45^\circ$ data may be partly attributed to the absence of the ideal loading for the $\beta_{0.75R} = 30^\circ$ case. The calculated values of the induced angles of attack for the $\beta_{0.75R} = 45^\circ$ case, however, should be in close agreement with those actually obtained in the tests due to the nearly ideal loading. The difference between the $\beta_{0.75R} = 45^\circ$ data and the two-dimensional data may therefore be attributed partly to limitations of existing theory for the tip sections and partly to inherent differences between the aerodynamic characteristics of a propeller section and a two-dimensional airfoil section.

Differences in the section aerodynamic characteristics are especially evident at high section speeds. As an illustration, figures 11 and 12 have been prepared. In figure 11 the critical Mach number and the value of Mach number for lift divergence from the propeller pressure data have been compared with the theoretical critical Mach number and the lift-divergence Mach number from two-dimensional data for two propeller stations. As might be expected, the agreement between the curve of critical Mach number for the propeller and the two-dimensional theoretical data is good for moderate values of normal-force coefficient between approximately 0.30 and 0.55 for the x = 0.70 station, but the difference between the curves of critical Mach number and Mach number for lift divergence is a little greater for the two-dimensional data than for the propeller data. For the x = 0.95 station, where the effects of the propeller operation are more pronounced, the agreement between the critical Mach number curves is not so good as for the x = 0.70 station; the delay in Mach number for lift divergence above the critical Mach number is considerably increased over that for the x = 0.70 station and over that of the two-dimensional

data. It therefore appears from figure 11 that the aerodynamic characteristics of the tip section are less like the two-dimensional data than are those characteristic of the stations farther inboard. The effect caused by the radial position of the section in the blade is shown in figure 12 where the difference between the section critical Mach number and the Mach number for lift divergence is plotted against radial station. From figure 12 it is evident that, as the tip portion of the blade is approached, the spread between the values of helical Mach number where the local value of Mach number reaches unity and the value for lift divergence becomes greater. This phenomenon occurs in spite of the fact that, as the tip portions of the blade are approached, the sections become thinner and have lower design lift coefficients, (see fig. 2). The results shown in figures 11 and 12 indicate that either the induced flow at the propeller has not been accurately determined or that the aerodynamic characteristics of propeller sections are not the same as those of two-dimensional airfoils. It is highly probable that both conditions exist simultaneously for the propeller.

Figure 12 has been determined from the data presented in figure 8. If the data points were plotted in figure 12 it would be noted that the points are scattered. The scattering of the points is probably due to errors in the determination of the section critical Mach numbers; these errors were unavoidable because of the lack of pressure tubes near the leading edge of the sections. The curves of figure 12 have been faired conservatively, however, and if the trends shown are in error they show less divergence for the tip sections than actually occurs.

Section moment.- Section moment coefficients measured about the quarter-chord point are presented in figure 13 as plots of moment coefficient against normal-force coefficient for a range of section Mach number. The moment coefficients presented are a result of the action of the section normal force and do not include the effects of the section chordwise force which were found to be negligible.

Figure 13 shows that no abrupt changes in section pitching moment occur as the Mach number is increased through the transonic range. The values are negative (therefore, the blade angle tends to reduce) over the entire range of operation and tend to become more negative as the section Mach number is increased. Only on the inboard sections where the sections are relatively thick does the moment coefficient approach a value of zero and tend to become slightly positive. In general, given values of moment coefficient determined from the propeller tests occur at higher values of Mach number than shown by two-dimensional data. For example, in figure 13(b) for the $x = 0.75$ station the average value of moment coefficient for $M_x = 0.70$ is about the same as that given in reference 9 for $M = 0.30$ and the value for $M_x = 1.0$ in figure 13(b) is about the same as that for $M = 0.70$ in reference 9. This shift to higher Mach numbers for the moment coefficients is to be expected since it is in agreement with the results found for the normal-force data.

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Section pressure drag.- The pressure drag coefficients for the propeller sections are presented in figure 14 plotted against section Mach number at constant values of section angle of attack. From figure 3 the pressure drag coefficient is obtained as

$$c_d = c_n \sin \alpha_x + c_c \cos \alpha_x$$

From results of wing tests the values of pressure drag coefficient at zero angle of attack should be close to zero in the subcritical speed range and in no case should they be negative as shown. The reason for the negative values in the critical speed range is believed to be largely due to the lack of precision in the determination of the induced angle, since the values of drag obtained from the pressure distributions are dependent upon an accurate knowledge of the angle of attack.

The values of drag coefficient presented in figure 14, in some instances, appear to be too large at the higher angles of attack and to decrease too rapidly with increasing Mach number in the lower Mach number range (for example, see fig. 14(b) x = 0.70). The results may have been altered if more tubes had been installed near the leading edge of the blade sections. If the suction pressures on the blade sections at high angles of attack had been known and accounted for, the values of $c_c$ might have been more negative and the drag coefficients smaller.

At supercritical values of Mach number, the pressure peaks tend to be reduced or wiped out entirely with the result that the negative portion of the thicknesswise pressure distributions is reduced and the values of drag are larger. Therefore, the values of pressure drag coefficient are believed to be inherently more accurate in the supercritical range than at the lower speeds. The rate of increase of drag coefficient with increasing Mach number is believed to be reliable although the absolute values are admittedly not precise.

Part of the phenomenon may also be caused by the effects of a Mach number gradient along the blade, centrifugal boundary-layer flow, three-dimensional relieving effects, and the influence of the blade solidity on the lifting-line concept since the odd shape of the curves is much the same as that shown in the values of normal-force coefficient in the lower Mach number range of operation. As pointed out previously, no complete explanation of the phenomenon is evident at present.

When compared with values of drag coefficient from wind-tunnel tests, the values of Mach number for drag divergence for the inboard sections agree well with the values obtained from the tests of two-dimensional models, but for the outboard sections, the values obtained from the propeller tests are higher than the values obtained from wind-tunnel tests. The increase in the value of Mach number for drag divergence is in

[redacted]

agreement with the results obtained for lift-divergence Mach number from the analysis of the normal-force data.

In order to obtain realistic values of drag coefficient over the entire speed range the propeller data in the supercritical speed range may be combined with two-dimensional data. This combination can be accomplished by shifting the entire propeller drag curve in the positive direction until the minimum value of drag coefficient is equal to a reasonable value of friction drag. This friction-drag value can be assumed. The two-dimensional data can be connected to the propeller data by fairing a suitable curve. The value of minimum drag coefficient will occur in most cases at a value of Mach number which is very close to the value of Mach number for drag divergence.

Drag coefficients have been obtained as described above for the $x = 0.80$ station by assuming a value of friction drag coefficient of 0.004 and are presented in figure 15. Results of drop tests (references 11, 12, and 13) have been plotted on the curve for 0° angle of attack. The magnitude of the drag coefficients obtained from the propeller tests is in line with the results of the model tests at sonic velocities when it is considered that the propeller section is a cambered section and is carrying a lift load $\left(c_n = 0.09\right)$ and the three-dimensional models are of zero camber. The point of drag divergence for the propeller data occurs at a value of Mach number that is between the values for drag divergence for the three-dimensional drop-test models and the two-dimensional models.

Lift-drag ratio.- By the use of the drag data presented in figure 15, values of section lift-drag ratio have been computed and are presented in figure 16 as plots against section Mach number for several values of normal-force coefficient. At a section Mach number of 1.0, a maximum value of lift-drag ratio of about 6.0 was obtained at a value of normal-force coefficient of 0.4. Because of the power limitation of the dynamometer, higher values of normal-force coefficient could not be attained in this speed range. The trend of the curves, however, indicates that the maximum value of $l/d$ at Mach number 1.0 would probably be attained at a value of normal-force coefficient in excess of 0.40. In the subsonic range of Mach number the maximum value of lift-drag ratio occurs at a value of normal-force coefficient between 0.65 and 0.70; this value is in good agreement with values obtained for two-dimensional model data. The value of Mach number for maximum $l/d$, however, is higher than that value obtained in tunnel tests because values of Mach number for lift divergence and drag divergence are higher for the propeller data. At values of Mach number in the low-supersonic range the values of $l/d$ determined from the propeller test agree well with theoretical values as shown in reference 14.

Elemental thrust.- Values of elemental-thrust coefficient have been computed from the section aerodynamic characteristics obtained

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from the surface pressure measurements by the equation

$$C_{T_P}' = \frac{Bb}{D}\left(\frac{J^2 + \bar{\pi}\bar{x}^2}{4}\right)\left(c_n \cos \beta_x - c_c \sin \beta_x\right)$$

These results are compared in figure 17 with values of elemental-thrust coefficient $\left(C_{T_W}'\right)$ obtained from propeller slipstream pressure measurements. The agreement between the two methods of obtaining elemental thrust is good at low speeds where skin friction is relatively small except at the inboard station where the flow over the propeller spinner may have affected the wake-pressure measurements.

Values of elemental-thrust coefficient have been computed by conventional strip-theory methods as described in reference 2 by using the two-dimensional section data of reference 9 for three values of advance ratio. The computed points are plotted on the curves of figure 17(b) for a blade angle of 30° at 1350 rpm. These conditions of operation represent the highest speed range of section operation for which tunnel data are available at present. The agreement between the three methods of obtaining values of section thrust is excellent for all except the two most inboard sections where the thrust coefficient obtained from the wake measurements appears to be low. This discrepancy may be due to an outboard shift of the wake caused by the dynamometer body.

As a check on the feasibility of using the data obtained from the present tests as design data, or to predict the thrust grading curve of a propeller, the elemental thrust of the sections has been computed for operating conditions other than those at which the data were obtained. A rotational speed of 1600 rpm was chosen and the data presented in figure 8 were used in place of the usual two-dimensional airfoil data in the conventional strip-theory method. The normal-force coefficients obtained from the tests at a blade angle of 45° at the 0.75R station were used in the strip-theory method for computing the $\beta_{0.75R} = 30°$ case, and the $\beta_{0.75R} = 30°$ data were used to compute the thrust for the case of operation at $\beta_{0.75R} = 45°$. Although both blade-angle cases were computed for a rotational speed of 1600 rpm, the data used were not necessarily obtained at 1600 rpm. The values of thrust coefficient computed in this way are shown as squared points in figures 17(c) and 17(h) for a rotational speed of 1600 rpm for $\beta_{0.75R} = 30°$ and $\beta_{0.75R} = 45°$. The agreement of the computed points with the experimental data is excellent. These comparisons show that although there are differences between the airfoil data obtained on the operating propeller and two-dimensional airfoil data, the calculation of propeller thrust is relatively insensitive to the differences. The

preceding analysis, indicates however, that at higher speeds a more extensive theory is needed and also a different type of airfoil data than that which is conventionally used in propeller analysis.

## CONCLUSIONS

The results of the investigation to determine the aerodynamic characteristics of the airfoil sections of an operating propeller blade lead to the general conclusion that a further refinement of existing theory is needed to determine the induced-flow field at the propeller more accurately, especially for high section speeds or nonoptimum loadings.

Analysis also leads to the conclusion that there are differences between propeller section aerodynamic characteristics obtained from an operating propeller blade and those determined from wind-tunnel tests on two-dimensional models.

The results of the tests also led to the following specific conclusions:

1. The distribution of the pressures over the propeller sections qualitatively resembles those obtained in two-dimensional tests of wing sections in the same angle of attack and Mach number range.

2. The experimentally determined critical speeds of the propeller sections agree reasonably well with theoretically determined values for an inboard station but for sections near the blade tip the lack of agreement indicates that section characteristics are not like the characteristics of two-dimensional sections.

3. Comparison of the propeller data with two-dimensional data shows that the slope of the lift curves for the propeller sections decreases progressively toward the propeller tip. The variation of angle of attack for zero lift with Mach number for the propeller sections also differs from the variation for two-dimensional tests. This difference does not appear to be affected by the radial position of the blade sections.

4. The value of Mach number for lift divergence agrees with the values from two-dimensional data for the inboard sections. On the outboard sections the values from the propeller tests are higher with a maximum difference for the section nearest the tip. The values of lift coefficient at lift divergence for given angles of attack are lower than values from two-dimensional tests for positive angles of attack and greater for negative angles of attack. The point of lift divergence is indefinable for the $\beta_{0.75R} = 30^{\circ}$ case.

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5. In general the data obtained at $\beta_{0.75R} = 45^\circ$ agree better with two-dimensional data than that obtained at $\beta_{0.75R} = 30^\circ$. The differences between the propeller data may be attributed in part to the lack of the ideal loading for the $\beta_{0.75R} = 30^\circ$ case and in part to a greater Mach number gradient and radial boundary-layer flow for the $\beta_{0.75R} = 30^\circ$ case.

6. The differences in Mach number increment between the value of critical Mach number and the value of Mach number for lift divergence between the two-dimensional data and the propeller data obtained at $\beta_{0.75R} = 45^\circ$ suggest that the aerodynamic characteristics of the propeller sections are different from those of two-dimensional sections.

7. The pitching-moment coefficient of these particular propeller sections about the quarter-chord point is negative (therefore, the angle of attack tends to reduce) over the speed range covered and shows no abrupt changes with Mach number in the transonic speed range. In general, given values of moment coefficient determined from the propeller data occurred at higher values of Mach number than are shown by two-dimensional data.

8. The values of drag coefficient obtained are not precise but the shape of the curves of drag against Mach number is believed to be reliable in the critical and supercritical range of Mach number. The values of Mach number for drag divergence show the same shift to higher values for outboard sections when compared with two-dimensional model data as do the values of Mach number for lift divergence.

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TABLE I

SECTION DESIGN CHARACTERISTICS FOR THE

NACA 10-(3)(08)-03 PROPELLER BLADE

| Radial station, $x = \frac{r}{R}$ | Section chord, b (ft) | Design lift coefficient, $c_{l_d}$ | Thickness ratio, h/b | Section twist, $\beta - \beta_{0.75R}$ (deg) |
|---|---|---|---|---|
| [a]0.30 | 0.931 | 0.143 | 0.130 | 23.45 |
| .45 | .829 | .228 | .1085 | 13.93 |
| .60 | .727 | .282 | .0905 | 6.25 |
| .70 | .657 | .297 | .0800 | 1.98 |
| .75 | .623 | .300 | .0745 | 0 |
| .80 | .589 | .295 | .0695 | -1.82 |
| .85 | .555 | .282 | .0643 | -3.52 |
| .90 | .520 | .252 | .0577 | -5.12 |
| .95 | .473 | .203 | .0476 | -6.67 |

[a]Data for x = 0.30 station presented for $\beta_{0.75R} = 30^\circ$ only.



[redacted]

TABLE 2.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(1.43)(13.00) PROPELLER BLADE SECTION (x = 0.30)

(a) N = 1140 rpm; $\beta_{0.75R} = 29.32°$.

| | J | 0.696 | 0.754 | 0.847 | 0.944 | 1.041 | 1.160 | 1.251 | 1.353 | 1.472 | 1.417 | 1.303 | 1.207 | 1.112 | 1.000 | 0.898 | 0.795 | 0.740 | 0.617 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .192 | .195 | .212 | .225 | .239 | .253 | .270 | .284 | .305 | .294 | .278 | .262 | .251 | .236 | .215 | .202 | .197 | .181 |
| | $\alpha_x$° | 16.32 | 16.81 | 10.83 | 7.71 | 4.92 | 1.85 | -.25 | -3.34 | -4.61 | -3.61 | -1.36 | -.76 | 3.07 | 6.06 | 9.17 | 12.63 | 14.64 | 19.57 |
| | $\Delta\beta$ | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 |
| | $\alpha_l$ | 6.07 | 4.63 | 3.35 | 2.63 | 1.87 | 1.18 | .79 | .30 | -.06 | .06 | .46 | .87 | 1.38 | 2.00 | 2.88 | 3.85 | 4.88 | 6.44 |
| | $c_n$ | 1.3661 | 1.0512 | .8323 | .6366 | .4645 | .3033 | .2073 | .0789 | -.0177 | .0154 | .1201 | .2248 | .3482 | .4905 | .6839 | .8827 | 1.1045 | 1.3877 |
| | $c_m$ | -.0021 | -.0143 | -.0049 | .0002 | -.0003 | .0104 | -.0294 | -.0482 | -.0630 | -.0609 | -.0486 | -.0265 | -.0082 | -.0037 | -.0046 | -.0176 | -.0151 | .0040 |
| | $c_c$ | -.1305 | -.0771 | -.0494 | -.0344 | -.0186 | -.0183 | -.0116 | -.0002 | -.0010 | -.0079 | .0022 | -.0064 | -.0241 | -.0310 | -.0435 | -.0514 | -.0875 | -.1299 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.009 | 1.010 | 1.011 | 1.013 | 1.014 | 1.016 | 1.018 | 1.021 | 1.024 | 1.022 | 1.020 | 1.017 | 1.016 | 1.013 | 1.012 | 1.010 | 1.010 | 1.008 |
| | [a].025 | -4.230 | -3.044 | -2.070 | -1.500 | -.975 | -.665 | -.299 | .257 | .375 | .251 | .111 | -.252 | -.702 | -1.219 | -1.675 | -2.204 | -3.835 | -4.275 |
| | .050 | -4.054 | -2.916 | -1.906 | -1.404 | -.977 | -.602 | -.346 | -.094 | .128 | .070 | -.157 | -.391 | -.690 | -1.076 | -1.511 | -2.088 | -3.710 | -4.264 |
| | .100 | [a]-3.297 | [a]-2.111 | [a]-1.572 | [a]-1.203 | [a]-.907 | -.546 | -.375 | [a]-.287 | [a]-.125 | [a]-.149 | [a]-.321 | [a]-.496 | [a]-.661 | [a]-.914 | [a]-1.224 | -1.384 | -1.781 | -3.877 |
| | .200 | -1.781 | -1.257 | -1.063 | -.908 | -.744 | [a]-.501 | -.441 | -.323 | -.225 | -.270 | -.385 | -.483 | -.597 | -.757 | -.898 | -1.084 | -1.182 | -1.436 |
| | .300 | -1.014 | -.957 | -.812 | -.730 | -.609 | -.483 | -.419 | -.323 | -.248 | -.289 | -.378 | -.452 | -.539 | -.653 | -.763 | -.888 | -.938 | -1.009 |
| | .400 | -.822 | -.789 | -.692 | -.621 | -.538 | [a]-.465 | -.405 | -.336 | -.284 | -.320 | -.391 | -.437 | -.489 | -.579 | -.648 | -.738 | -.767 | -.844 |
| | [a].500 | -.694 | -.665 | -.612 | -.544 | -.505 | -.447 | -.412 | -.363 | -.320 | -.358 | -.408 | -.462 | -.462 | -.532 | -.572 | -.644 | -.650 | -.736 |
| | .600 | -.605 | -.572 | -.527 | -.492 | -.466 | -.427 | -.426 | -.395 | -.378 | -.401 | -.433 | -.445 | -.448 | -.494 | -.503 | -.554 | -.571 | [a]-.653 |
| | .700 | [a]-.542 | -.512 | -.418 | -.423 | -.403 | -.395 | -.412 | -.395 | -.396 | -.413 | -.426 | -.437 | -.414 | -.429 | -.420 | -.461 | -.523 | -.555 |
| | .800 | -.477 | -.416 | -.286 | -.254 | -.233 | -.252 | -.302 | -.317 | -.337 | -.351 | -.336 | -.301 | -.263 | -.249 | -.243 | -.346 | -.425 | -.472 |
| | .900 | -.401 | -.308 | [a]-.137 | -.055 | 0 | -.029 | -.099 | -.126 | -.178 | -.171 | -.157 | -.088 | -.030 | -.025 | -.076 | -.231 | -.328 | -.403 |
| | .950 | -.350 | -.224 | -.057 | .014 | .107 | .147 | .097 | .044 | -.019 | -.028 | .010 | .079 | .120 | .079 | .006 | -.138 | -.230 | -.348 |
| Lower surface | .0375 | .978 | .919 | .841 | .658 | .466 | .210 | -.048 | -.323 | -.625 | -.543 | -.267 | .003 | .279 | [a].351 | [a].547 | .876 | .955 | 1.018 |
| | .075 | .812 | .714 | .655 | [a].458 | [a].301 | [a].085 | [a]-.113 | [a]-.311 | [a]-.524 | -.475 | [a]-.269 | [a]-.087 | [a].120 | .210 | .422 | .600 | .723 | .866 |
| | .150 | .569 | .462 | .392 | .252 | .126 | -.012 | -.157 | -.284 | -.402 | -.383 | -.267 | -.148 | -.003 | .145 | .318 | .450 | .527 | .646 |
| | .250 | .403 | .305 | .249 | .143 | .036 | -.060 | -.164 | [a]-.263 | -.325 | -.320 | -.254 | -.164 | -.055 | .051 | .183 | .300 | .357 | .480 |
| | .350 | .264 | [a].193 | .140 | .044 | -.036 | -.108 | [a]-.176 | -.251 | [a]-.298 | -.301 | -.254 | -.194 | -.106 | -.016 | .089 | .174 | .234 | .328 |
| | .450 | .161 | .089 | .063 | -.016 | [a]-.081 | -.133 | -.194 | -.244 | -.284 | -.283 | -.254 | -.202 | -.130 | -.071 | .017 | .093 | .149 | .218 |
| | .550 | .059 | .004 | -.013 | -.075 | -.126 | -.156 | -.201 | -.231 | -.272 | -.270 | -.246 | -.209 | -.164 | -.118 | -.046 | 0 | .052 | .066 |
| | .650 | -.017 | -.079 | -.090 | -.134 | -.162 | -.188 | -.215 | -.224 | -.237 | -.252 | -.246 | -.225 | -.189 | -.166 | -.097 | -.069 | -.034 | -.002 |
| | .750 | [a]-.076 | -.128 | -.122 | -.155 | -.170 | -.172 | -.178 | -.179 | -.166 | -.178 | -.198 | -.194 | -.180 | -.175 | -.139 | -.127 | -.096 | -.100 |
| | .850 | -.120 | -.139 | [a]-.116 | -.115 | -.116 | -.100 | -.077 | -.047 | -.025 | -.041 | -.074 | -.104 | -.114 | -.137 | -.118 | -.115 | -.107 | -.154 |
| | .925 | -.145 | -.116 | -.090 | -.085 | -.072 | -.003 | .047 | .098 | .122 | .114 | .079 | .018 | -.030 | -.081 | -.076 | -.104 | -.096 | -.209 |
| | .975 | -.158 | -.079 | -.024 | -.016 | -.018 | .099 | .177 | .228 | .223 | .226 | .210 | .139 | .070 | -.005 | -.015 | -.046 | -.083 | -.265 |
| | [a]1.000 | -.152 | -.129 | -.042 | .052 | .186 | .393 | .365 | .302 | .275 | .286 | .278 | .259 | .202 | .186 | .105 | .032 | .064 | -.266 |

[a]Faired value.

TABLE 2.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(1.43)(13.00) PROPELLER BLADE SECTION ($x = 0.30$) - Continued

(b) $N = 1350$ rpm; $\beta_{0.75R} = 29.32°$.

| | J | 0.697 | 0.778 | 0.836 | 0.930 | 0.995 | 1.099 | 1.164 | 1.255 | 1.355 | 1.442 | 1.413 | 1.312 | 1.212 | 1.129 | 1.050 | 0.980 | 0.888 | 0.817 | 0.738 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .237 | .239 | .257 | .270 | .276 | .294 | .308 | .324 | .343 | .357 | .351 | .334 | .314 | .302 | .288 | .278 | .264 | .250 | .238 |
| | $\alpha_x'$ | 16.28 | 13.22 | 11.19 | 8.14 | 6.21 | 3.40 | 1.78 | -.32 | -2.39 | -4.05 | -3.53 | -1.55 | .65 | 2.63 | 4.69 | 6.66 | 9.47 | 11.86 | 14.71 |
| | $\Delta\beta$ | .03 | .03 | .03 | .03 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .03 | .03 | .03 |
| | $\alpha_1$ | 5.66 | 4.24 | 3.60 | 2.80 | 2.30 | 1.56 | 1.17 | .71 | .28 | .06 | .02 | .40 | .82 | 1.26 | 1.71 | 2.26 | 3.01 | 3.61 | 5.02 |
| | $c_n$ | 1.2653 | .9708 | .8398 | .6738 | .5639 | .3983 | .2985 | .1852 | .0759 | .0161 | .0064 | .1050 | .2115 | .3193 | .4243 | .5315 | .7142 | .8837 | 1.1386 |
| | $c_m$ | -.0120 | -.0191 | -.0110 | -.0059 | -.0017 | .0002 | -.0118 | -.0326 | -.0453 | -.0605 | -.0588 | -.0248 | -.0325 | -.0094 | -.0007 | -.0027 | -.0017 | -.0170 | -.0120 |
| | $c_o$ | -.0273 | -.0780 | -.0491 | -.0338 | -.0253 | -.0205 | -.0213 | -.0073 | -.0098 | -.0079 | -.0055 | -.0004 | .0097 | -.0155 | -.0202 | -.0247 | -.0365 | -.0464 | -.0936 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.014 | 1.014 | 1.017 | 1.018 | 1.019 | 1.022 | 1.024 | 1.027 | 1.030 | 1.032 | 1.031 | 1.028 | 1.025 | 1.023 | 1.021 | 1.020 | 1.018 | 1.016 | 1.014 |
| | [a].025 | -4.030 | -2.588 | -2.095 | -1.637 | -1.275 | -.875 | -.638 | -.187 | 0 | .245 | .215 | .050 | .102 | -.634 | -.969 | -1.224 | -1.662 | -2.024 | -3.884 |
| | .050 | -4.050 | -2.588 | -1.954 | -1.590 | -1.209 | -.829 | -.596 | -.301 | -.104 | .090 | .061 | -.144 | -.380 | -.629 | -.934 | -1.205 | -1.574 | -1.953 | -3.716 |
| | .100 | -2.486 | -1.259 | -1.416 | -1.226 | -.964 | -.706 | -.556 | -.359 | -.199 | -.060 | -.093 | -.244 | -.419 | -.587 | -.799 | -.964 | -1.210 | -1.470 | -1.909 |
| | .200 | [a]-1.536 | [a]-.813 | -1.078 | -.941 | -.759 | -.608 | -.533 | -.406 | -.295 | -.219 | -.242 | -.339 | -.440 | -.533 | -.651 | -.735 | -.875 | -1.151 | -1.316 |
| | .300 | -1.014 | -.580 | -.877 | -.818 | -.677 | -.553 | -.498 | -.417 | -.389 | -.268 | -.288 | -.374 | -.451 | -.528 | -.625 | -.679 | -.792 | -.872 | -.980 |
| | .400 | -.839 | -.410 | -.733 | -.708 | [a]-.643 | -.492 | -.476 | -.406 | -.338 | -.299 | -.319 | -.379 | -.440 | -.480 | -.560 | -.589 | -.663 | -.725 | -.776 |
| | .500 | [a]-.730 | [a]-.298 | [a]-.636 | [a]-.649 | -.616 | [a]-.461 | [a]-.464 | [a]-.415 | [a]-.368 | [a]-.343 | [a]-.356 | [a]-.396 | [a]-.434 | [a]-.470 | [a]-.526 | [a]-.589 | [a]-.609 | [a]-.628 | [a]-.667 |
| | .600 | -.685 | -.214 | -.564 | -.577 | -.487 | -.443 | -.458 | -.432 | -.391 | -.383 | -.398 | -.418 | -.446 | -.467 | -.489 | -.493 | -.549 | -.561 | -.616 |
| | .700 | -.588 | -.138 | -.468 | -.490 | -.418 | -.387 | -.417 | -.427 | -.391 | -.392 | -.401 | -.423 | -.435 | -.431 | -.430 | -.410 | -.435 | -.447 | -.546 |
| | .800 | -.477 | -.044 | -.323 | -.315 | -.234 | -.228 | -.273 | -.307 | -.295 | -.326 | -.333 | -.380 | -.305 | -.277 | -.263 | -.250 | -.261 | -.324 | -.497 |
| | .900 | -.385 | .058 | -.195 | -.162 | -.023 | .017 | -.037 | -.111 | -.113 | -.157 | -.156 | -.135 | -.088 | -.032 | -.016 | -.022 | -.109 | -.201 | -.333 |
| | .950 | -.329 | .159 | -.098 | -.074 | .045 | .140 | .142 | .078 | .069 | .011 | -.003 | .025 | .088 | .129 | .112 | .067 | -.010 | -.095 | -.245 |
| Lower surface | .0375 | .995 | [a]1.081 | .834 | .655 | .577 | .379 | .177 | -.085 | -.291 | -.568 | -.527 | -.264 | 0 | .213 | .416 | .608 | .763 | .879 | .951 |
| | .075 | .800 | 1.043 | .617 | .444 | .386 | .226 | .055 | -.154 | -.276 | -.458 | -.460 | -.294 | -.110 | .051 | .215 | .372 | .506 | .628 | .748 |
| | .150 | .559 | .822 | .393 | .232 | .195 | .078 | -.048 | -.175 | -.267 | -.388 | -.374 | -.264 | -.137 | -.032 | .080 | .213 | .323 | .437 | .526 |
| | .250 | .392 | .670 | .239 | .100 | .092 | .011 | -.089 | -.173 | -.228 | -.317 | -.310 | -.239 | -.148 | -.074 | .003 | .109 | .201 | .290 | .358 |
| | .350 | .263 | .551 | .127 | .014 | .011 | -.044 | -.130 | -.195 | -.237 | -.304 | -.301 | -.254 | -.182 | -.122 | -.068 | .026 | .095 | .175 | .234 |
| | .450 | .151 | .448 | .047 | -.052 | -.044 | -.087 | -.158 | -.206 | -.233 | -.282 | -.274 | -.244 | -.193 | -.151 | -.107 | -.029 | .020 | .094 | .136 |
| | .550 | .069 | .372 | -.025 | -.111 | -.099 | -.124 | -.181 | -.217 | -.233 | -.273 | -.265 | -.244 | -.198 | -.175 | -.146 | -.084 | -.041 | .012 | .039 |
| | .650 | -.042 | .278 | -.098 | -.177 | -.146 | -.160 | -.204 | -.222 | -.218 | -.245 | -.247 | -.244 | -.214 | -.206 | -.185 | -.133 | -.102 | -.063 | -.050 |
| | .750 | -.108 | .245 | -.139 | -.191 | -.160 | -.154 | -.181 | -.195 | -.180 | -.179 | -.179 | -.195 | -.193 | -.193 | -.198 | -.154 | -.147 | -.119 | -.111 |
| | .850 | -.126 | .228 | -.130 | -.184 | -.118 | -.106 | -.118 | -.080 | -.050 | -.034 | -.048 | -.075 | -.088 | -.122 | -.146 | -.118 | -.125 | -.103 | -.121 |
| | .925 | -.145 | .245 | -.114 | -.147 | -.078 | -.032 | -.014 | .062 | .098 | .121 | .115 | .085 | .039 | -.027 | -.081 | -.071 | -.094 | -.087 | -.121 |
| | .975 | -.145 | .278 | -.050 | -.089 | -.009 | .048 | .085 | .193 | .236 | .231 | .228 | .215 | .160 | .075 | .003 | -.008 | -.026 | -.030 | -.102 |
| | [a]1.000 | 0 | .364 | .095 | .084 | .187 | .323 | .427 | .476 | .402 | .316 | .315 | .318 | .346 | .368 | .329 | .218 | .166 | .096 | .016 |

[a]Faired value.

TABLE 2.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(1.43)(13.00) PROPELLER BLADE SECTION (x = 0.30) - Continued

(c) N = 1600 rpm; $\beta_{0.75R} = 29.32^\circ$.

| | J | 0.824 | 0.888 | 0.954 | 1.034 | 1.098 | 1.180 | 1.251 | 1.343 | 1.414 | 1.354 | 1.304 | 1.215 | 1.135 | 1.067 | 0.995 | 0.919 | 0.856 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .300 | .314 | .328 | .342 | .353 | .371 | .383 | .402 | .417 | .403 | .394 | .376 | .363 | .347 | .333 | .317 | .308 |
| | $\alpha_x'$ | 11.61 | 9.47 | 7.42 | 5.10 | 3.40 | 1.39 | -.25 | -2.16 | -3.53 | -2.39 | -1.36 | .58 | 2.36 | 4.21 | 6.21 | 8.51 | 10.61 |
| | $\Delta\beta$ | .04 | .04 | .04 | .04 | .04 | .04 | .04 | .03 | .03 | .03 | .03 | .04 | .04 | .04 | .04 | .04 | .04 |
| | $\alpha_1$ | 3.79 | 3.19 | 2.60 | 1.94 | 1.52 | 1.08 | .72 | .33 | 0 | .21 | .47 | .85 | 1.25 | 1.64 | 2.19 | 2.75 | 3.33 |
| | $c_n$ | .8815 | .7571 | .6316 | .4814 | .3823 | .2787 | .1879 | .0870 | -.0010 | .0561 | .1236 | .2208 | .3188 | .4083 | .5364 | .6585 | .7804 |
| | $c_m$ | -.0212 | -.0125 | -.0022 | .0015 | -.0025 | -.0187 | -.0338 | -.0477 | -.0625 | -.0547 | -.0425 | -.0337 | -.0106 | .0011 | -.0007 | -.0054 | -.0099 |
| | $c_c$ | -.0446 | -.0405 | -.0371 | -.0269 | -.0206 | -.0117 | -.0069 | -.0109 | -.0026 | -.0060 | -.0082 | -.0015 | -.0145 | -.0195 | -.0271 | -.0316 | -.0382 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.023 | 1.025 | 1.027 | 1.030 | 1.032 | 1.035 | 1.037 | 1.041 | 1.045 | 1.042 | 1.040 | 1.036 | 1.033 | 1.031 | 1.028 | 1.026 | 1.024 |
| | [a].025 | -2.119 | -1.874 | -1.533 | -1.173 | -.893 | -.470 | -.203 | -.035 | .276 | .091 | -.091 | -.234 | -.641 | -.936 | -1.238 | -1.503 | -1.830 |
| | .050 | -2.054 | -1.702 | -1.386 | -1.067 | -.818 | -.529 | -.337 | -.125 | .050 | -.048 | -.174 | -.382 | -.625 | -.873 | -1.135 | -1.453 | -1.742 |
| | .100 | -1.484 | -1.276 | -1.081 | [a]-.888 | [a]-.719 | [a]-.530 | -.390 | -.224 | -.099 | -.186 | -.277 | -.426 | -.595 | -.758 | -.941 | -1.143 | -1.331 |
| | .200 | [a]-1.094 | [a]-.967 | [a]-.856 | -.714 | [a]-.636 | [a]-.521 | [a]-.436 | [a]-.328 | [a]-.251 | [a]-.317 | [a]-.371 | [a]-.454 | [a]-.558 | [a]-.669 | [a]-.780 | [a]-.911 | [a]-1.016 |
| | .300 | -.895 | -.807 | -.730 | -.648 | -.581 | -.504 | -.441 | -.358 | -.306 | -.351 | -.391 | -.462 | -.539 | -.610 | -.683 | -.770 | -.847 |
| | .400 | -.741 | -.674 | -.626 | -.561 | -.518 | -.479 | -.429 | -.365 | -.336 | -.369 | -.398 | -.446 | -.500 | -.550 | -.599 | -.663 | -.715 |
| | [a].500 | -.647 | -.590 | -.559 | -.498 | -.493 | -.474 | -.438 | -.392 | -.371 | -.397 | -.421 | -.467 | -.491 | -.512 | -.549 | -.594 | -.624 |
| | .600 | -.558 | -.519 | -.502 | -.428 | -.465 | -.462 | -.444 | -.419 | -.412 | -.436 | -.446 | -.479 | -.500 | -.486 | -.499 | -.524 | -.550 |
| | .700 | -.458 | -.420 | -.420 | -.404 | -.412 | -.434 | -.437 | -.430 | -.442 | -.450 | -.442 | -.438 | -.435 | -.430 | -.424 | -.438 | -.454 |
| | .800 | -.346 | -.266 | -.244 | -.227 | -.246 | -.288 | -.305 | -.313 | -.346 | -.344 | -.324 | -.306 | -.283 | -.259 | -.245 | -.262 | -.299 |
| | .900 | -.233 | -.188 | -.048 | .011 | .004 | -.053 | -.092 | -.118 | -.162 | -.147 | -.121 | -.081 | -.025 | -.001 | -.011 | -.074 | -.158 |
| | .950 | -.129 | -.033 | .025 | .088 | .134 | .125 | .096 | .066 | .004 | .015 | .047 | .090 | .131 | .114 | .068 | .010 | -.049 |
| Lower surface | .0375 | .867 | .796 | .666 | .508 | .345 | .112 | -.073 | -.302 | -.538 | -.407 | -.251 | -.013 | .200 | .373 | .550 | .694 | .805 |
| | .075 | .637 | .608 | [a].427 | [a].279 | [a].144 | [a]-.033 | [a]-.135 | [a]-.300 | [a]-.476 | -.386 | -.280 | -.118 | .045 | .188 | .326 | .460 | .561 |
| | .150 | .420 | .365 | .253 | .150 | .045 | -.081 | -.177 | -.281 | -.389 | -.334 | -.266 | -.145 | -.037 | .059 | .167 | .283 | .361 |
| | .250 | .273 | .232 | .149 | .064 | -.013 | -.115 | -.177 | -.253 | -.326 | -.292 | -.243 | -.158 | -.085 | -.010 | .073 | .150 | .224 |
| | .350 | .160 | .121 | .055 | -.007 | -.072 | -.152 | -.205 | -.256 | -.316 | -.295 | -.255 | -.190 | -.137 | -.075 | -.002 | .064 | .139 |
| | .450 | .077 | .055 | -.006 | -.060 | -.116 | -.181 | -.220 | -.253 | -.296 | -.281 | -.255 | -.206 | -.163 | -.112 | -.061 | -.005 | .042 |
| | .550 | .001 | -.011 | -.063 | -.103 | -.152 | -.198 | -.224 | -.253 | -.286 | -.274 | -.258 | -.213 | -.188 | -.153 | -.106 | -.064 | -.026 |
| | .650 | -.081 | -.083 | -.125 | -.156 | -.188 | -.222 | -.239 | -.253 | -.269 | -.271 | -.258 | -.230 | -.215 | -.200 | -.161 | -.128 | -.112 |
| | .750 | -.129 | -.116 | -.146 | -.160 | -.179 | -.206 | -.201 | -.192 | -.195 | -.207 | -.210 | -.206 | -.201 | -.200 | -.170 | -.155 | -.140 |
| | .850 | -.117 | -.099 | -.110 | -.113 | -.121 | -.103 | -.089 | -.061 | -.046 | -.069 | -.078 | -.093 | -.124 | -.140 | -.131 | [a]-.148 | -.134 |
| | .925 | -.104 | -.077 | -.084 | -.074 | -.053 | .001 | .043 | .092 | .110 | .093 | .070 | .035 | -.033 | -.075 | -.062 | -.102 | -.112 |
| | .975 | -.029 | -.005 | -.006 | .011 | .036 | .129 | .182 | .222 | .223 | .222 | .210 | .170 | .071 | .017 | -.007 | -.016 | -.026 |
| | [a]1.000 | .075 | .158 | .157 | .207 | .359 | .397 | .335 | .317 | .326 | .342 | .303 | .269 | .297 | .309 | .187 | .147 | .148 |

[a]Paired value.

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TABLE 2.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(1.43)(13.00) PROPELLER BLADE SECTION (x = 0.30) - Continued

(d) N = 2000 rpm; $\beta_{0.75R}$ = 29.32°.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.026 | 1.091 | 1.157 | 1.210 | 1.262 | 1.324 | 1.394 | 1.351 | 1.302 | 1.244 | 1.178 | 1.110 | 1.055 |
| | $M_R$ | .428 | .443 | .457 | .472 | .485 | .499 | .516 | .506 | .493 | .476 | .460 | .445 | .435 |
| | $\alpha_r$' | 5.35 | 3.60 | 1.95 | .69' | -.47 | -1.78 | -3.17 | -2.32 | -1.33 | -.07 | 1.43 | 3.10 | 4.53 |
| | $\Delta\beta$ | .05 | .05 | .05 | .05 | .05 | .05 | .04 | .05 | .05 | .05 | .05 | .05 | .05 |
| | $\alpha_i$ | 2.12 | 1.64 | 1.28 | .95 | .68 | .35 | .02 | .17 | .41 | .71 | 1.08 | 1.52 | 1.87 |
| | $c_n$ | .5251 | .4118 | .3284 | .2451 | .1770 | .0926 | .0058 | .0453 | .1087 | .1845 | .2778 | .3847 | .4657 |
| | $c_m$ | -.0027 | -.0067 | -.0138 | -.0211 | -.0251 | -.0378 | -.0460 | -.0447 | -.0373 | -.0282 | -.0210 | -.0152 | -.0051 |
| | $c_o$ | -.0278 | -.0224 | -.0179 | -.0165 | -.0081 | -.0092 | -.0133 | -.0101 | -.0023 | -.0113 | -.0092 | -.0155 | -.0224 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.047 | 1.050 | 1.054 | 1.057 | 1.060 | 1.064 | 1.068 | 1.065 | 1.062 | 1.058 | 1.054 | 1.051 | 1.049 |
| | [a].025 | -.119 | -.972 | -.736 | -.546 | -.330 | -.148 | .042 | .050 | 0 | -.223 | -.474 | -.755 | -1.020 |
| | .050 | -1.069 | -.889 | -.687 | -.509 | -.363 | -.192 | -.033 | -.066 | -.158 | -.311 | -.505 | -.736 | -.952 |
| | .100 | -.903 | -.751 | -.599 | -.477 | -.371 | -.238 | -.120 | -.186 | -.277 | -.386 | -.528 | -.686 | -.828 |
| | [a].200 | -.800 | -.655 | -.577 | -.489 | -.405 | -.328 | -.266 | -.322 | -.381 | -.450 | -.552 | -.626 | -.745 |
| | .300 | -.689 | [a]-.598 | -.554 | -.501 | -.456 | -.391 | -.332 | -.372 | -.417 | -.462 | -.534 | -.597 | -.659 |
| | .400 | -.603 | -.562 | [a]-.534 | -.477 | -.446 | -.398 | -.359 | -.391 | -.422 | -.452 | -.505 | [a]-.590 | -.584 |
| | [a].500 | -.552 | -.535 | -.511 | -.473 | -.452 | -.424 | -.403 | -.421 | -.440 | -.462 | -.514 | -.587 | -.549 |
| | .600 | -.514 | -.504 | -.481 | -.468 | -.458 | -.448 | -.437 | -.458 | -.465 | -.471 | -.522 | -.559 | -.522 |
| | .700 | -.430 | -.438 | -.436 | -.445 | -.448 | -.448 | -.451 | -.468 | -.460 | -.449 | -.458 | -.443 | -.437 |
| | .800 | -.242 | -.258 | -.272 | -.291 | -.304 | -.316 | -.329 | -.339 | -.322 | -.303 | -.299 | -.265 | -.249 |
| | .900 | -.002 | .009 | -.009 | -.036 | -.061 | -.087 | -.107 | -.114 | -.088 | -.059 | -.046 | -.001 | .007 |
| | .950 | .083 | .121 | .140 | .140 | .126 | .103 | .092 | .076 | .097 | .119 | .118 | .127 | .097 |
| Lower surface | .0375 | .496 | .337 | .185 | .030 | -.118 | -.310 | -.515 | -.439 | -.270 | -.083 | .080 | .275 | .422 |
| | .075 | [a].322 | .163 | .044 | -.078 | -.185 | -.321 | -.460 | -.410 | -.295 | -.159 | -.043 | .109 | .223 |
| | .150 | .138 | .037 | -.044 | -.129 | -.205 | -.296 | -.384 | -.362 | -.282 | -.188 | -.110 | .002 | .094 |
| | .250 | .058 | -.018 | -.080 | -.146 | [a]-.217 | -.267 | -.329 | -.315 | [a]-.276 | [a]-.207 | [a]-.144 | -.056 | .017 |
| | .350 | -.016 | -.077 | -.128 | -.181 | -.226 | -.277 | -.327 | [a]-.307 | -.272 | -.216 | -.177 | -.105 | [a]-.039 |
| | .450 | -.060 | -.113 | -.153 | -.195 | -.232 | -.272 | -.311 | -.303 | -.270 | -.224 | -.199 | -.137 | -.093 |
| | .550 | -.114 | -.156 | -.187 | -.219 | -.249 | -.277 | -.304 | -.303 | -.277 | -.242 | -.224 | -.176 | -.140 |
| | .650 | -.165 | -.195 | -.216 | -.237 | -.260 | -.274 | -.291 | -.296 | -.280 | -.259 | -.249 | -.215 | -.190 |
| | .750 | -.168 | -.186 | -.193 | -.203 | -.210 | -.214 | -.214 | -.228 | -.222 | -.211 | -.221 | -.202 | -.190 |
| | .850 | -.121 | -.123 | -.111 | -.098 | -.095 | -.082 | -.070 | -.086 | -.092 | -.096 | -.123 | -.128 | -.130 |
| | .925 | -.057 | -.041 | -.007 | .023 | .043 | .074 | .083 | .072 | .058 | .035 | -.004 | -.036 | -.059 |
| | .975 | .017 | .048 | .103 | .145 | .165 | [a].215 | .186 | .187 | .177 | .161 | .121 | .062 | .017 |
| | [a]1.000 | .135 | .227 | .302 | .351 | .412 | .297 | .331 | .327 | .293 | .340 | .306 | .231 | .166 |

[a]Faired value.

TABLE 2.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(1.43)(13.00) PROPELLER BLADE SECTION (x = 0.30) - Concluded

(e) N = 2160 rpm; $\beta_{0.75R} = 29.32°$.

| | c/b | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.057 | 1.145 | 1.196 | 1.252 | 1.317 | 1.375 | 1.418 | 1.365 | 1.346 | 1.288 | 1.214 | 1.165 | 1.095 | 1.055 |
| | $M_x$ | .472 | .494 | .506 | .520 | .537 | .551 | .568 | .550 | .546 | .528 | .511 | .498 | .477 | .468 |
| | $\alpha_x'$ | 4.49 | 2.23 | 1.01 | -.26 | -1.64 | -2.80 | -3.62 | -2.61 | -2.23 | -1.04 | .59 | 1.74 | 3.49 | 4.54 |
| | $\Delta\beta$ | .07 | .07 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .07 | .07 |
| | $\alpha_1$ | 1.84 | 1.31 | 1.02 | .69 | .27 | .01 | -.16 | -.04 | .13 | .43 | .82 | 1.10 | 1.52 | 1.84 |
| | $c_n$ | .4593 | .3345 | .2627 | .1802 | .0702 | .0032 | -.0423 | -.0096 | .0334 | .1129 | .2121 | .2815 | .3833 | .4593 |
| | $c_m$ | -.0004 | -.0069 | -.0148 | -.0194 | -.0323 | -.0358 | -.0424 | -.0404 | -.0365 | -.0278 | -.0168 | -.0023 | .0003 | -.0022 |
| | $c_o$ | -.0214 | -.0215 | -.0178 | -.0140 | -.0135 | -.0120 | -.0114 | -.0089 | -.0079 | -.0028 | -.0022 | -.0057 | -.0119 | -.0168 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.057 | 1.062 | 1.065 | 1.069 | 1.074 | 1.078 | 1.083 | 1.078 | 1.076 | 1.071 | 1.067 | 1.063 | 1.058 | 1.056 |
| | .025 | -.918 | -.789 | -.601 | -.377 | -.165 | .011 | .113 | .076 | .068 | .031 | -.157 | -.370 | -.674 | -.908 |
| | .050 | -.918 | -.800 | -.581 | -.406 | -.226 | -.070 | .024 | -.016 | -.025 | -.172 | -.382 | -.560 | -.789 | -.971 |
| | .100 | -.864 | -.645 | -.517 | -.392 | -.257 | -.150 | -.078 | -.158 | -.198 | -.309 | -.467 | -.588 | -.752 | -.867 |
| | [a].200 | -.764 | -.620 | -.519 | -.437 | -.335 | -.291 | -.230 | -.306 | -.331 | -.406 | -.518 | -.563 | -.693 | -.766 |
| | .300 | -.685 | -.596 | -.544 | -.483 | -.412 | -.360 | -.322 | -.373 | -.387 | -.444 | -.518 | -.567 | -.647 | -.690 |
| | .400 | -.607 | -.546 | -.510 | -.472 | -.419 | -.384 | -.355 | -.395 | -.405 | -.442 | -.495 | -.526 | -.582 | -.612 |
| | [a].500 | -.551 | -.519 | -.507 | -.476 | -.437 | -.421 | -.390 | -.451 | -.429 | -.464 | -.498 | -.510 | -.556 | -.569 |
| | .600 | -.521 | -.501 | -.498 | -.487 | -.464 | -.458 | -.446 | -.482 | -.476 | -.477 | -.493 | -.501 | -.537 | -.535 |
| | .700 | -.446 | -.457 | -.465 | -.465 | -.456 | -.460 | -.458 | -.476 | -.468 | -.461 | -.462 | -.459 | -.459 | -.448 |
| | .800 | -.244 | -.275 | -.296 | -.308 | -.308 | -.323 | -.330 | -.340 | -.325 | -.309 | -.298 | -.282 | -.265 | -.253 |
| | .900 | .003 | -.007 | -.033 | -.052 | -.056 | -.083 | -.094 | -.094 | -.076 | -.056 | -.040 | -.012 | .002 | .001 |
| | .950 | .086 | .129 | .129 | .124 | .132 | .113 | .101 | .093 | .110 | .122 | .120 | .131 | .106 | .080 |
| Lower surface | .0375 | .424 | .193 | .044 | -.117 | -.293 | -.484 | -.611 | -.506 | -.410 | -.224 | -.011 | .148 | .311 | .423 |
| | .075 | .285 | [a].056 | [a]-.070 | [a]-.180 | -.283 | [a]-.441 | -.501 | -.484 | -.410 | -.276 | -.126 | -.002 | .104 | .216 |
| | .150 | .091 | -.047 | -.134 | -.216 | -.285 | -.380 | -.430 | -.393 | -.350 | -.265 | -.162 | -.074 | .017 | .088 |
| | .250 | .010 | -.094 | -.163 | -.222 | -.276 | -.340 | -.375 | -.352 | -.317 | -.256 | -.181 | -.113 | -.045 | .006 |
| | .350 | -.062 | -.146 | -.202 | -.247 | -.287 | -.340 | -.367 | -.352 | -.323 | -.274 | -.213 | -.163 | -.108 | -.061 |
| | .450 | -.102 | -.174 | -.216 | -.256 | -.285 | -.327 | -.346 | -.336 | -.312 | -.274 | -.228 | -.183 | -.140 | -.102 |
| | .550 | -.150 | -.206 | -.239 | -.269 | -.291 | -.321 | -.336 | -.334 | -.312 | -.283 | -.246 | -.214 | -.187 | -.154 |
| | .650 | -.220 | -.254 | -.277 | -.293 | -.304 | -.321 | -.328 | -.334 | -.319 | -.300 | -.279 | -.254 | -.239 | -.214 |
| | .750 | -.204 | -.219 | -.234 | -.243 | -.235 | -.241 | -.241 | -.256 | -.246 | -.241 | -.235 | -.222 | -.223 | -.208 |
| | .850 | -.145 | -.134 | -.130 | -.124 | -.105 | -.097 | -.086 | -.107 | -.105 | -.111 | -.124 | -.131 | -.147 | -.146 |
| | .925 | -.069 | -.035 | -.006 | .018 | .046 | .060 | .070 | .050 | .051 | .034 | .007 | -.012 | -.053 | -.072 |
| | .975 | .003 | .075 | .117 | .143 | .162 | .165 | [a].195 | .159 | .166 | .150 | .132 | .092 | .033 | -.004 |
| | [a]1.000 | .259 | .327 | .336 | .374 | .382 | .371 | .400 | .401 | .402 | .383 | .356 | .327 | .298 | .228 |

[a]Faired value.

NACA

TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45)

(a) N = 1140 rpm; $\beta_{0.75R} = 29.35^{\circ}$.

| | J | 0.702 | 0.788 | 0.854 | 0.949 | 1.050 | 1.158 | 1.259 | 1.359 | 1.472 | 1.409 | 1.318 | 1.203 | 1.108 | 1.004 | 0.901 | 0.813 | 0.743 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .258 | .266 | .275 | .286 | .297 | .311 | .324 | .337 | .356 | .347 | .336 | .318 | .304 | .278 | .276 | .273 | .262 |
| | $\alpha_x'$ | 16.87 | 14.15 | 12.14 | 9.41 | 6.68 | 3.96 | 1.59 | -.59 | -2.87 | -1.62 | .29 | 2.88 | 5.19 | 7.90 | 10.77 | 13.38 | 15.56 |
| | $\Delta\beta$ | .08 | .08 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .08 |
| | $\alpha_i$ | 4.95 | 3.99 | 3.45 | 2.79 | 2.26 | 1.66 | 1.20 | .65 | .07 | .22 | .69 | 1.08 | 1.50 | 2.32 | 2.90 | 3.65 | 4.49 |
| | $c_n$ | 1.3152 | 1.0841 | .9512 | .7873 | .6484 | .4852 | .3581 | .1970 | .0219 | .0683 | .2069 | .3160 | .4337 | .6610 | .8069 | .9976 | 1.2063 |
| | $c_m$ | -.0740 | -.0280 | -.0017 | -.0146 | -.0108 | -.0151 | -.0323 | -.0516 | -.0674 | -.0648 | -.0587 | -.0482 | -.0364 | -.0188 | -.0150 | -.0047 | -.0202 |
| | $c_c$ | -.0512 | -.0655 | -.0821 | -.0560 | -.0444 | -.0449 | -.0303 | -.0180 | .0061 | -.0041 | .0028 | .0053 | .0044 | -.0348 | -.0584 | -.0796 | -.1011 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.017 | 1.018 | 1.019 | 1.020 | 1.022 | 1.025 | 1.027 | 1.029 | 1.032 | 1.030 | 1.029 | 1.026 | 1.024 | 1.020 | 1.019 | 1.019 | 1.017 |
| | .025 | -1.752 | -2.064 | -2.656 | -2.171 | -2.008 | -1.821 | -1.245 | -.521 | [a].393 | [a].013 | [a]-.088 | -.159 | -.212 | -1.476 | -2.331 | -2.889 | -3.019 |
| | .050 | [a]-1.943 | -2.099 | -2.609 | -1.907 | -1.356 | -.972 | -.689 | -.344 | [a].010 | -.051 | [a]-.165 | [a]-.340 | [a]-.425 | [a]-1.315 | [a]-1.623 | [a]-2.699 | [a]-2.623 |
| | .100 | [a]-1.950 | -1.995 | -1.800 | -1.207 | -.922 | -.681 | -.483 | [a]-.257 | -.077 | -.099 | [a]-.254 | -.437 | -.627 | [a]-.973 | -1.174 | -2.016 | -2.142 |
| | .200 | [a]-1.897 | [a]-1.642 | [a]-1.019 | [a]-.878 | [a]-.782 | [a]-.587 | -.468 | [a]-.233 | -.170 | [a]-.202 | [a]-.331 | [a]-.482 | [a]-.642 | [a]-.783 | [a]-.934 | [a]-1.060 | [a]-1.624 |
| | .300 | -1.723 | -1.224 | -.830 | -.748 | -.655 | -.532 | -.441 | -.334 | -.246 | -.276 | -.372 | -.485 | -.576 | -.693 | -.805 | -.878 | -1.278 |
| | .400 | -1.395 | -.889 | -.717 | -.660 | -.601 | -.510 | -.441 | -.363 | -.295 | -.319 | -.392 | -.480 | -.536 | -.625 | -.709 | -.741 | -.967 |
| | .500 | -1.044 | -.674 | -.630 | -.597 | -.555 | -.494 | -.441 | -.382 | -.340 | -.355 | -.411 | -.480 | -.513 | -.571 | -.638 | -.639 | -.748 |
| | .600 | -.767 | .536 | -.543 | -.522 | -.501 | -.466 | -.431 | -.396 | -.367 | -.377 | -.416 | -.463 | -.473 | -.517 | -.553 | -.544 | -.599 |
| | .700 | -.570 | -.424 | -.443 | -.440 | -.435 | -.421 | -.406 | -.396 | -.385 | -.391 | -.416 | -.437 | -.422 | -.443 | -.463 | -.435 | -.478 |
| | .800 | -.381 | -.299 | -.269 | -.270 | -.275 | -.290 | -.302 | -.334 | -.336 | -.337 | -.357 | -.330 | -.292 | -.280 | -.282 | -.278 | -.337 |
| | .900 | -.176 | -.132 | -.047 | -.036 | -.038 | -.064 | -.090 | -.137 | -.202 | -.183 | -.155 | -.106 | -.053 | -.036 | -.055 | -.101 | -.174 |
| | .950 | -.082 | -.042 | .019 | .046 | .075 | .085 | .085 | .011 | -.041 | -.055 | -.044 | .039 | .066 | .061 | .009 | -.013 | -.082 |
| Lower surface | .0375 | .939 | .889 | [a].816 | .745 | .591 | [a].349 | .141 | -.190 | -.559 | -.430 | -.111 | .167 | .429 | [a].652 | [a].738 | [a].843 | [a].881 |
| | .075 | .772 | .709 | .634 | .536 | .395 | [a].197 | [a].031 | [a]-.181 | [a]-.400 | [a]-.354 | -.155 | [a].075 | [a].268 | [a].445 | .552 | .669 | .711 |
| | .150 | .582 | .514 | .440 | .348 | .229 | .085 | -.018 | -.171 | -.322 | -.276 | -.150 | -.014 | .128 | .280 | .378 | .486 | .534 |
| | .250 | .429 | .368 | .299 | .222 | .128 | .018 | -.055 | -.171 | -.278 | -.249 | -.155 | -.063 | .049 | .164 | .236 | .329 | .371 |
| | .350 | .319 | .272 | .205 | .158 | .063 | -.026 | -.075 | -.166 | -.246 | -.219 | -.155 | -.085 | -.002 | .091 | .158 | .233 | .272 |
| | .450 | .218 | .181 | .119 | .077 | .009 | -.064 | -.101 | -.166 | -.237 | -.214 | -.165 | -.106 | -.036 | .036 | .081 | .152 | .187 |
| | .550 | .144 | .111 | .065 | .032 | -.021 | -.086 | -.112 | [a]-.162 | -.211 | -.192 | [a]-.163 | -.122 | -.071 | -.006 | .028 | .083 | .108 |
| | .650 | .064 | .035 | -.001 | -.018 | -.079 | -.113 | -.127 | -.157 | -.202 | -.192 | -.165 | -.144 | -.105 | -.061 | -.043 | .015 | .024 |
| | .750 | -.016 | -.021 | -.048 | -.055 | -.097 | -.119 | -.117 | [a]-.117 | -.139 | -.144 | -.135 | -.137 | -.116 | -.085 | -.075 | -.033 | -.032 |
| | .850 | -.038 | -.038 | -.041 | -.036 | -.068 | -.069 | -.055 | -.017 | -.023 | -.038 | -.031 | -.073 | -.071 | -.055 | -.055 | -.047 | -.054 |
| | .925 | -.024 | -.014 | -.021 | -.005 | -.026 | .018 | .054 | [a].101 | .097 | .081 | .082 | .034 | -.002 | -.024 | -.043 | -.025 | -.046 |
| | .975 | -.009 | .008 | .032 | .058 | .069 | .091 | .244 | .218 | .209 | .196 | .201 | .129 | .088 | .067 | .008 | .001 | -.012 |
| | [a]1.000 | .108 | .160 | .179 | .229 | .268 | .321 | .385 | .312 | .285 | .299 | .280 | .190 | .231 | .259 | .199 | .170 | .097 |

[a]Paired value.

TABLE 3.– PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16–(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) – Continued

(b) N = 1350 rpm; $\beta_{0.75R} = 29.35°$.

| | J | 0.688 | 0.762 | 0.846 | 0.934 | 1.005 | 1.103 | 1.178 | 1.270 | 1.362 | 1.467 | 1.410 | 1.326 | 1.219 | 1.144 | 1.051 | 0.965 | 0.891 | 0.807 | 0.739 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .307 | .319 | .331 | .345 | .353 | .370 | .381 | .393 | .405 | .425 | .413 | .400 | .386 | .374 | .359 | .346 | .339 | .331 | .316 |
| | $\alpha_x'$ | 17.33 | 14.95 | 12.38 | 9.84 | 7.88 | 5.32 | 3.47 | 1.34 | −.65 | −2.77 | −1.63 | .11 | 2.52 | 4.31 | 6.65 | 8.96 | 11.07 | 13.56 | 15.68 |
| | $\Delta\beta$ | .10 | .10 | .10 | .10 | .10 | .09 | .09 | .09 | .09 | .08 | .09 | .09 | .09 | .09 | .10 | .10 | .10 | .10 | .10 |
| | $\alpha_i$ | 5.18 | 4.29 | 3.65 | 3.16 | 2.50 | 1.90 | 1.43 | .93 | .53 | .14 | .27 | .63 | 1.06 | 1.54 | 2.11 | 2.67 | 3.17 | 3.90 | 4.51 |
| | $c_n$ | 1.3697 | 1.1570 | 1.0065 | .8880 | .7114 | .5505 | .4201 | .2752 | .1587 | .0418 | .0830 | .1884 | .3129 | .4479 | .6043 | .7541 | .8818 | 1.0641 | 1.2079 |
| | $c_m$ | −.0743 | −.0252 | .0011 | −.0044 | −.0157 | −.0162 | −.0247 | −.0390 | −.0573 | −.0668 | −.0683 | −.0616 | −.0385 | −.0235 | −.0218 | −.0191 | −.0113 | −.0035 | −.0222 |
| | $c_c$ | −.0641 | −.0903 | −.0921 | −.0793 | −.0523 | −.0358 | −.0237 | −.0059 | −.0131 | −.0057 | −.0044 | .0058 | −.0077 | −.0233 | −.0367 | −.0517 | −.0737 | −.0974 | −.0982 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.024 | 1.026 | 1.028 | 1.030 | 1.032 | 1.035 | 1.037 | 1.039 | 1.042 | 1.046 | 1.044 | 1.041 | 1.037 | 1.036 | 1.033 | 1.030 | 1.029 | 1.028 | 1.025 |
| | .025 | −2.082 | −3.397 | −3.159 | −2.952 | −2.034 | −1.435 | −.979 | [a]−.304 | [a]−.183 | .081 | .086 | .050 | [a]−.424 | −.804 | −1.278 | −1.820 | −2.932 | −3.136 | −3.381 |
| | .050 | [a]−2.081 | −2.505 | −2.580 | −2.258 | −1.695 | −1.282 | −.947 | [a]−.372 | [a]−.198 | [a].030 | [a]−.015 | −.108 | [a]−.467 | [a]−.742 | [a]−1.108 | [a]−1.408 | −1.759 | [a]−2.752 | −2.808 |
| | .100 | [a]−2.048 | −1.735 | [a]−1.884 | −1.426 | −1.052 | −.801 | −.603 | −.419 | −.227 | −.070 | −.128 | −.276 | −.480 | −.659 | −.888 | −1.131 | −1.362 | −2.080 | −1.914 |
| | .200 | −1.885 | −1.429 | −1.172 | −.981 | −.839 | −.661 | −.550 | −.426 | −.294 | −.195 | −.239 | −.343 | −.484 | −.585 | −.722 | −.881 | −1.028 | −1.286 | −1.489 |
| | .300 | −1.661 | −1.165 | −.856 | −.775 | −.716 | −.601 | −.516 | −.437 | −.343 | −.260 | −.305 | −.377 | −.480 | −.554 | −.657 | −.755 | −.837 | −.929 | −1.191 |
| | .400 | −1.395 | −.945 | −.734 | −.677 | −.641 | −.556 | −.496 | −.441 | −.371 | −.306 | −.346 | −.399 | −.473 | −.526 | [a]−.610 | −.670 | −.719 | −.780 | −.963 |
| | .500 | −1.102 | −.755 | −.628 | −.603 | −.588 | −.524 | −.481 | −.448 | −.395 | −.345 | −.380 | −.420 | −.473 | −.502 | [a]−.567 | −.606 | −.624 | −.657 | −.772 |
| | .600 | −.847 | −.607 | −.534 | −.515 | −.522 | −.477 | −.457 | −.441 | −.405 | −.371 | −.404 | −.431 | −.468 | −.478 | −.524 | −.560 | −.572 | [a]−.547 | −.622 |
| | .700 | −.639 | −.473 | −.428 | −.423 | −.443 | −.419 | −.422 | −.423 | −.412 | −.394 | −.418 | −.424 | −.434 | −.421 | −.438 | −.443 | −.435 | −.428 | −.483 |
| | .800 | −.448 | −.339 | −.262 | −.242 | −.275 | −.270 | −.287 | −.315 | −.346 | −.342 | −.359 | −.356 | −.322 | −.284 | −.279 | −.267 | −.264 | −.275 | −.350 |
| | .900 | −.252 | −.206 | −.081 | −.029 | −.033 | −.026 | −.062 | −.102 | −.154 | −.175 | −.179 | −.158 | −.099 | −.046 | −.035 | −.035 | −.057 | −.116 | −.209 |
| | .950 | −.145 | −.129 | −.018 | .045 | .060 | .094 | .101 | .077 | .004 | −.037 | −.050 | −.018 | .056 | .083 | .068 | .051 | .034 | −.027 | −.127 |
| Lower surface | .0375 | .952 | .932 | .873 | .812 | .673 | .497 | .298 | .055 | −.237 | −.525 | −.424 | −.136 | .144 | .378 | .577 | .744 | .832 | .896 | .947 |
| | .075 | .776 | .753 | .707 | [a].647 | [a].455 | [a].336 | [a].158 | −.020 | −.234 | −.407 | −.356 | −.169 | .024 | .204 | .368 | .518 | .619 | .692 | .756 |
| | .150 | .580 | .538 | .473 | .409 | .285 | .173 | .053 | −.072 | −.206 | −.306 | −.278 | −.161 | −.034 | .099 | .226 | .341 | .426 | .494 | .560 |
| | .250 | .414 | .378 | .323 | .271 | .166 | .082 | −.010 | [a]−.096 | [a]−.194 | [a]−.262 | [a]−.248 | −.165 | [a]−.072 | [a].028 | .114 | .214 | .283 | .335 | .395 |
| | .350 | .303 | .271 | .230 | .188 | .095 | .029 | −.046 | −.117 | −.188 | −.240 | −.227 | −.165 | [a]−.107 | −.017 | .059 | .132 | .189 | .236 | .286 |
| | .450 | .202 | .184 | .142 | .114 | .038 | −.022 | −.077 | −.140 | −.188 | −.230 | −.223 | −.176 | [a]−.133 | [a]−.057 | .003 | .069 | .113 | .152 | .193 |
| | .550 | .121 | .106 | .079 | .063 | −.010 | −.050 | −.097 | [a]−.152 | [a]−.185 | [a]−.217 | −.206 | [a]−.174 | [a]−.150 | [a]−.092 | −.035 | .019 | .057 | .082 | .115 |
| | .650 | .025 | .019 | .001 | −.002 | −.059 | −.092 | −.125 | −.158 | −.178 | −.194 | −.200 | −.176 | −.157 | −.118 | −.078 | −.040 | −.009 | .007 | .028 |
| | .750 | −.044 | −.032 | −.038 | −.039 | −.081 | −.105 | −.125 | [a]−.137 | −.136 | −.142 | −.152 | −.147 | −.145 | −.127 | −.104 | −.072 | −.057 | −.047 | −.035 |
| | .850 | −.075 | −.057 | −.038 | −.020 | −.051 | −.062 | −.069 | −.065 | −.031 | [a]−.026 | −.033 | −.032 | −.079 | −.074 | −.065 | −.045 | −.038 | −.047 | −.055 |
| | .925 | −.075 | −.047 | −.029 | −.002 | −.010 | .003 | .021 | .039 | .081 | .108 | .093 | .079 | .028 | .014 | −.005 | −.013 | −.019 | −.037 | −.055 |
| | .975 | −.065 | −.032 | .031 | .063 | .096 | .078 | .112 | .137 | .214 | .222 | .213 | .198 | .140 | .115 | .076 | .032 | .005 | −.027 | −.065 |
| | [a]1.000 | 0 | .054 | .233 | .256 | .181 | .231 | .285 | .374 | .302 | .281 | .301 | .282 | .310 | .316 | .237 | .208 | .084 | .043 | .032 |

[a]Faired value.

TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) - Continued

(c) N = 1600 rpm; $\beta_{0.75R}$ = 29.35°.

| | J | 0.830 | 0.888 | 0.966 | 1.038 | 1.107 | 1.183 | 1.259 | 1.346 | 1.424 | 1.478 | 1.382 | 1.302 | 1.223 | 1.134 | 1.066 | 1.007 | 0.939 | 0.852 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | .399 | .404 | .420 | .434 | .440 | .456 | .466 | .480 | .496 | .502 | .487 | .475 | .464 | .446 | .431 | .423 | .414 | .401 |
| | $\alpha_r$' | 12.86 | 11.15 | 8.94 | 6.99 | 5.22 | 3.36 | 1.59 | -.31 | -1.93 | -2.99 | -1.11 | .63 | 2.42 | 4.55 | 6.26 | 7.82 | 9.69 | 12.20 |
| | $\Delta\beta$ | .14 | .14 | .14 | .14 | .14 | .14 | .13 | .13 | .13 | .13 | .13 | .13 | .13 | .14 | .14 | .14 | .14 | .14 |
| | $\alpha_i$ | 3.52 | 3.46 | 2.86 | 2.43 | 1.86 | 1.41 | .98 | .64 | .23 | .09 | .42 | .75 | 1.14 | 1.58 | 2.05 | 2.51 | 3.08 | 3.75 |
| | $c_\eta$ | .9651 | .9659 | .8085 | .6976 | .5379 | .4144 | .2983 | .1927 | .0710 | .0265 | .1257 | .2243 | .3366 | .4607 | .5890 | .7151 | .8695 | 1.0413 |
| | $c_x$ | -.0218 | .0045 | -.0164 | -.0208 | -.0210 | -.0243 | -.0381 | -.0580 | -.0669 | -.0729 | -.0685 | -.0551 | -.0322 | -.0223 | -.0234 | -.0335 | -.0161 | -.0014 |
| | $c_o$ | -.0758 | -.0867 | -.0672 | -.0549 | -.0330 | -.0318 | -.0177 | -.0116 | -.0052 | -.0049 | -.0008 | -.0043 | -.0108 | -.0229 | -.0339 | -.0465 | -.0811 | -.0943 |
| | r/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.041 | 1.042 | 1.45 | 1.049 | 1.050 | 1.053 | 1.056 | 1.059 | 1.063 | 1.064 | 1.061 | 1.058 | 1.055 | 1.051 | 1.048 | 1.046 | 1.044 | 1.041 |
| | .025 | -2.354 | -2.262 | -2.343 | -1.728 | -1.331 | -.941 | -.538 | -.245 | .013 | .147 | .109 | -.106 | -.450 | -.863 | -1.200 | -1.584 | -2.371 | -2.532 |
| | .050 | [a]-2.630 | [a]-2.308 | -1.847 | -1.342 | -1.023 | -.758 | -.478 | -.240 | -.059 | .056 | .017 | -.221 | -.476 | -.769 | -1.007 | -1.272 | -2.184 | [a]-2.709 |
| | .100 | -2.460 | -2.077 | -1.194 | -.999 | -.800 | -.622 | -.439 | -.270 | -.123 | -.040 | -.187 | -.341 | -.517 | -.710 | -.890 | -1.069 | -1.347 | -2.304 |
| | .200 | [a]-1.156 | [a]-1.391 | [a]-.927 | [a]-.806 | -.714 | [a]-.565 | [a]-.445 | [a]-.339 | [a]-.223 | [a]-.178 | [a]-.296 | [a]-.399 | [a]-.523 | [a]-.634 | [a]-.753 | [a]-.860 | [a]-.931 | [a]-1.175 |
| | .300 | -.852 | -.825 | -.797 | -.710 | -.631 | -.542 | -.467 | -.386 | [a]-.301 | -.264 | -.347 | -.422 | -.506 | -.590 | -.667 | -.735 | -.791 | -.840 |
| | .400 | -.724 | -.718 | -.698 | -.644 | -.585 | -.521 | -.473 | -.412 | -.352 | -.319 | -.386 | -.437 | -.501 | -.555 | -.611 | -.659 | -.698 | -.721 |
| | .500 | -.653 | -.639 | -.632 | -.594 | -.555 | -.510 | -.478 | -.439 | -.392 | -.365 | -.406 | -.454 | -.487 | -.531 | -.574 | -.601 | -.617 | -.643 |
| | .600 | -.572 | -.550 | -.553 | -.531 | -.508 | -.463 | -.444 | [a]-.446 | -.414 | -.396 | -.436 | -.460 | -.473 | -.507 | -.543 | -.562 | -.567 | -.559 |
| | .700 | -.459 | -.447 | -.455 | -.456 | -.450 | -.438 | [a]-.404 | -.444 | -.427 | -.418 | -.432 | -.452 | -.436 | -.442 | -.451 | -.446 | -.436 | -.460 |
| | .800 | -.271 | -.274 | -.271 | -.280 | -.291 | -.297 | -.330 | -.371 | -.367 | -.362 | -.381 | -.344 | -.309 | -.287 | -.284 | -.267 | -.255 | -.289 |
| | .900 | -.054 | -.075 | -.031 | -.028 | -.037 | -.050 | -.110 | -.162 | -.173 | -.180 | -.177 | -.140 | -.072 | -.039 | -.029 | -.022 | -.024 | -.077 |
| | .950 | -.014 | -.018 | .051 | .069 | .084 | .100 | .071 | .004 | -.037 | -.052 | -.039 | .023 | .097 | .092 | .079 | .068 | .053 | .014 |
| Lower surface | .0375 | .874 | .829 | .750 | .625 | .458 | .298 | .060 | -.191 | -.424 | -.548 | -.326 | -.090 | .175 | .389 | .547 | .692 | .790 | .858 |
| | .075 | .665 | .613 | .530 | .411 | .274 | [a].180 | [a]-.018 | [a].189 | [a]-.352 | -.456 | -.303 | -.148 | .049 | .211 | .339 | .473 | .572 | .643 |
| | .150 | .474 | .431 | .353 | .254 | .144 | .054 | -.077 | -.188 | -.321 | [a]-.345 | -.245 | -.148 | [a]-.015 | .104 | .200 | .306 | .388 | .454 |
| | .250 | .319 | .290 | .221 | .148 | .056 | -.012 | -.110 | [a]-.186 | -.303 | -.305 | -.232 | -.162 | -.061 | .024 | .101 | .184 | .254 | .306 |
| | .350 | .227 | .200 | .149 | .085 | .008 | -.044 | -.127 | -.186 | -.276 | -.266 | -.217 | -.170 | -.084 | -.020 | .045 | .119 | .177 | .215 |
| | .450 | .142 | .118 | .077 | .022 | -.040 | -.081 | -.143 | -.191 | -.271 | -.252 | [a]-.214 | -.181 | -.118 | -.075 | -.010 | .055 | .104 | .130 |
| | [a].550 | .074 | .053 | .031 | .023 | -.077 | -.112 | -.162 | -.190 | -.238 | -.238 | -.211 | -.187 | -.142 | -.105 | -.052 | .009 | .042 | .053 |
| | .650 | .001 | -.009 | -.039 | -.072 | -.112 | -.135 | -.168 | -.183 | -.195 | -.209 | -.197 | -.191 | -.151 | -.125 | -.091 | -.048 | -.014 | -.014 |
| | .750 | -.046 | -.051 | -.068 | -.091 | -.121 | -.135 | -.154 | -.152 | -.146 | -.151 | -.151 | -.165 | -.146 | -.134 | -.106 | -.074 | -.047 | -.046 |
| | .850 | -.046 | -.044 | -.048 | -.060 | -.076 | -.078 | -.080 | -.045 | -.034 | -.021 | -.039 | -.063 | -.084 | -.086 | -.066 | -.045 | -.030 | -.042 |
| | .925 | -.017 | -.006 | -.002 | -.003 | -.004 | .025 | .052 | .085 | .114 | .123 | .098 | .064 | .040 | .003 | .002 | .010 | .013 | -.003 |
| | .975 | -.003 | .028 | .038 | .048 | .060 | .092 | .137 | .197 | .223 | .224 | .211 | .168 | .108 | .069 | .052 | .049 | .043 | .024 |
| | [a]1.000 | .053 | .084 | .135 | .114 | .267 | .305 | .304 | .327 | .341 | .295 | .351 | .343 | .351 | .297 | .309 | .228 | .188 | .159 |

[a]Paired value.

TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) - Continued

(d) N = 2000 rpm; $\beta_{0.75R} = 29.35°$.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.032 | 1.087 | 1.147 | 1.206 | 1.275 | 1.337 | 1.399 | 1.362 | 1.291 | 1.236 | 1.168 | 1.116 | 1.052 |
| | $M_x$ | .538 | .552 | .561 | .573 | .587 | .599 | .613 | .607 | .587 | .577 | .564 | .553 | .544 |
| | $\alpha_x'$ | 7.15 | 5.73 | 4.24 | 2.81 | 1.24 | -.13 | -1.41 | -.65 | .88 | 2.12 | 3.71 | 5.00 | 6.63 |
| | $\Delta\beta$ | .21 | .21 | .20 | .20 | .19 | .19 | .19 | .19 | .19 | .20 | .20 | .21 | .21 |
| | $\alpha_l$ | 2.40 | 2.05 | 1.68 | 1.27 | .88 | .49 | .16 | .30 | .69 | 1.06 | 1.51 | 1.83 | 2.22 |
| | $c_n$ | .6876 | .5918 | .4899 | .3732 | .2605 | .1479 | .0480 | .0918 | .2057 | .3141 | .4417 | .5312 | .6364 |
| | $c_m$ | -.0166 | -.0205 | -.0233 | -.0280 | -.0340 | -.0415 | -.0480 | -.0480 | -.0375 | -.0350 | -.0297 | -.0240 | -.0222 |
| | $c_o$ | -.0466 | -.0386 | -.0326 | -.0203 | -.0106 | -.0069 | -.0073 | -.0064 | -.0065 | -.0086 | -.0197 | -.0297 | -.0369 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.074 | 1.078 | 1.081 | 1.084 | 1.089 | 1.092 | 1.097 | 1.095 | 1.089 | 1.085 | 1.082 | 1.078 | 1.076 |
| | .025 | -1.589 | -1.335 | -1.037 | -.680 | -.388 | -.132 | .073 | .063 | -.140 | -.375 | -.735 | -1.051 | -1.237 |
| | .050 | [a]-1.302 | -1.005 | -.863 | -.620 | -.382 | -.190 | -.042 | -.046 | -.233 | -.420 | -.668 | -.853 | -1.088 |
| | .100 | -1.046 | -.911 | -.731 | -.561 | -.397 | -.256 | -.133 | -.190 | -.354 | -.485 | -.664 | -.801 | -.972 |
| | [a].200 | -.867 | -.835 | -.668 | -.544 | -.444 | -.345 | -.253 | -.301 | -.433 | -.527 | -.618 | -.717 | -.827 |
| | .300 | -.757 | -.702 | -.630 | -.554 | -.472 | -.402 | -.337 | -.369 | -.455 | -.515 | -.595 | -.660 | -.732 |
| | .400 | -.682 | -.645 | -.599 | -.544 | -.485 | -.435 | -.386 | -.409 | -.473 | -.517 | -.572 | -.619 | -.668 |
| | .500 | -.619 | -.599 | -.571 | -.536 | -.496 | -.460 | -.426 | -.443 | -.490 | -.517 | -.556 | -.586 | -.616 |
| | .600 | -.549 | -.541 | -.529 | -.511 | -.485 | -.466 | -.447 | -.458 | -.488 | -.504 | -.536 | -.541 | -.552 |
| | .700 | -.454 | -.457 | -.464 | -.465 | -.454 | -.451 | -.447 | -.450 | -.460 | -.463 | -.464 | -.462 | -.464 |
| | .800 | -.258 | -.269 | -.288 | -.310 | -.312 | -.322 | -.335 | -.330 | -.319 | -.315 | -.295 | -.280 | -.868 |
| | .900 | -.004 | -.001 | -.018 | -.044 | -.053 | -.073 | -.095 | -.084 | -.062 | -.052 | -.028 | -.009 | -.008 |
| | .950 | .088 | .095 | .106 | .109 | .109 | .104 | .092 | .095 | .099 | .102 | .107 | .099 | .084 |
| Lower surface | .0375 | .628 | .522 | .365 | .185 | -.009 | -.220 | -.432 | -.319 | -.084 | .102 | .308 | .439 | .576 |
| | .075 | .415 | .321 | .191 | .052 | -.092 | -.240 | -.372 | -.306 | -.154 | -.019 | .139 | .245 | .358 |
| | .150 | .269 | .195 | .095 | -.008 | -.107 | -.206 | -.297 | -.247 | -.147 | -.056 | .062 | .140 | .228 |
| | .250 | .152 | .091 | .010 | -.069 | -.143 | -.218 | -.288 | -.251 | -.176 | -.101 | -.013 | .051 | .122 |
| | .350 | .092 | .040 | -.025 | -.091 | -.149 | -.208 | -.260 | -.229 | -.178 | -.116 | -.042 | .009 | .066 |
| | .450 | .028 | -.015 | -.071 | -.124 | -.171 | -.218 | -.260 | -.237 | -.198 | -.144 | -.086 | -.044 | .006 |
| | .550 | -.020 | -.056 | -.103 | -.146 | -.180 | -.217 | -.247 | -.229 | -.204 | -.157 | -.110 | -.077 | -.036 |
| | .650 | -.076 | -.104 | -.141 | -.173 | -.199 | -.224 | -.242 | -.231 | -.215 | -.185 | -.148 | -.121 | -.090 |
| | .750 | -.092 | -.112 | -.141 | -.161 | -.175 | -.188 | -.193 | -.188 | -.189 | -.165 | -.144 | -.127 | -.106 |
| | .850 | -.062 | -.068 | -.079 | -.082 | -.083 | -.080 | -.070 | -.077 | -.094 | -.084 | -.080 | -.077 | -.066 |
| | .925 | .002 | .005 | .006 | .018 | .028 | .039 | .056 | .049 | .022 | .023 | .012 | .003 | .002 |
| | .975 | .048 | .060 | .077 | .101 | .114 | .128 | .141 | .137 | .112 | .109 | .093 | .070 | .058 |
| | [a]1.000 | .145 | .165 | .205 | .280 | .218 | .231 | .381 | .351 | .263 | .254 | .245 | .185 | .166 |

[a]Faired value.

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TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) - Continued

(e) N = 2160 rpm; $\beta_{0.75R}$ = 29.35°.

| | J | 1.089 | 1.142 | 1.191 | 1.246 | 1.317 | 1.379 | 1.335 | 1.271 | 1.228 | 1.167 | 1.106 | 1.052 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .586 | .598 | .609 | .621 | .638 | .652 | .641 | .628 | .618 | .603 | .591 | .580 |
| | $\alpha_x'$ | 5.67 | 4.35 | 3.17 | 1.89 | .31 | -1.01 | -.08 | 1.32 | 2.30 | 3.74 | 5.24 | 6.62 |
| | $\Delta\beta$ | .25 | .25 | .25 | .24 | .24 | .23 | .24 | .24 | .24 | .25 | .25 | .25 |
| | $\alpha_1$ | 2.13 | 1.81 | 1.49 | 1.13 | .64 | .26 | .46 | .80 | 1.16 | 1.56 | 1.89 | 2.30 |
| | $c_n$ | .6173 | .5895 | .4381 | .3338 | .1904 | .0775 | .1371 | .2388 | .3436 | .4558 | .5490 | .6614 |
| | $c_m$ | -.0232 | -.0218 | -.0305 | -.0337 | -.0387 | -.0469 | -.0451 | -.0410 | -.0385 | -.0299 | -.0216 | -.0167 |
| | $c_o$ | -.0348 | -.0308 | -.0221 | -.0151 | -.0043 | -.0038 | -.0025 | -.0028 | -.0073 | -.0197 | -.0305 | -.0439 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | |
| Upper surface | 0.000 | 1.088 | 1.092 | 1.096 | 1.099 | 1.105 | 1.111 | 1.107 | 1.102 | 1.098 | 1.093 | 1.090 | 1.086 |
| | .025 | -1.231 | -1.211 | -.871 | -.561 | -.223 | -.018 | -.038 | -.116 | -.427 | -.741 | -1.106 | -1.592 |
| | .050 | [a]-1.082 | [a]-.955 | -.710 | -.531 | -.282 | -.114 | -.117 | -.206 | [a].472 | [a]-.708 | [a]-.969 | [a]-1.332 |
| | .100 | -.937 | -.793 | -.643 | -.481 | -.298 | -.170 | -.240 | -.369 | -.516 | -.678 | -.841 | -1.007 |
| | [a].200 | -.825 | -.717 | -.614 | -.519 | -.382 | -.290 | -.356 | -.460 | -.548 | -.649 | -.748 | -.859 |
| | .300 | -.746 | -.677 | -.614 | -.538 | -.447 | -.373 | -.415 | -.486 | -.557 | -.626 | -.706 | -.774 |
| | .400 | -.684 | -.639 | -.596 | -.545 | -.477 | -.423 | -.453 | -.505 | -.553 | -.602 | -.657 | -.703 |
| | .500 | -.635 | -.610 | -.581 | -.549 | -.504 | -.465 | -.487 | -.523 | -.553 | -.586 | -.621 | -.649 |
| | .600 | -.567 | -.554 | -.550 | -.529 | -.507 | -.482 | -.507 | -.544 | -.557 | -.564 | -.564 | -.574 |
| | .700 | -.472 | -.475 | -.487 | -.483 | -.480 | -.471 | -.475 | -.485 | -.483 | -.478 | -.477 | -.473 |
| | .800 | -.270 | -.285 | -.317 | -.327 | -.338 | -.341 | -.337 | -.334 | -.320 | -.300 | -.283 | -.269 |
| | .900 | -.002 | -.008 | -.035 | -.050 | -.070 | -.083 | -.077 | -.065 | -.046 | -.022 | -.009 | -.008 |
| | .950 | .098 | .103 | .112 | .114 | .109 | .104 | .101 | .103 | .109 | .110 | .092 | .072 |
| Lower surface | .0375 | .320 | .395 | .255 | .080 | -.170 | -.369 | -.250 | -.056 | .136 | .310 | .450 | .570 |
| | .075 | .318 | .214 | .103 | -.030 | -.210 | -.343 | [a]-.242 | -.132 | .010 | .148 | .254 | .360 |
| | .150 | .191 | .115 | .034 | -.065 | [a]-.221 | [a]-.302 | -.234 | -.139 | -.035 | .068 | .146 | .227 |
| | .250 | .095 | .033 | -.037 | -.111 | -.210 | -.274 | -.239 | -.171 | -.089 | -.013 | .048 | .117 |
| | .350 | .039 | -.013 | -.065 | -.128 | -.206 | -.258 | -.229 | -.176 | -.109 | -.047 | .002 | .057 |
| | .450 | -.021 | -.064 | -.106 | -.155 | -.223 | -.266 | -.240 | -.196 | -.140 | -.091 | -.050 | -.003 |
| | .550 | -.059 | -.094 | -.125 | -.167 | [a]-.237 | [a]-.271 | [a]-.253 | -.201 | -.156 | -.116 | -.086 | -.046 |
| | .650 | -.113 | -.140 | -.165 | -.194 | -.234 | -.258 | -.247 | [a]-.212 | -.189 | -.157 | -.137 | -.105 |
| | .750 | -.121 | -.140 | -.154 | -.170 | -.195 | -.205 | -.204 | -.191 | -.168 | -.152 | -.140 | -.120 |
| | .850 | -.073 | -.080 | -.079 | -.079 | -.084 | -.079 | -.085 | -.089 | -.082 | -.082 | -.084 | -.075 |
| | .925 | -.002 | .005 | .020 | .030 | .039 | .053 | .042 | .031 | .027 | .014 | -.004 | -.010 |
| | .975 | .061 | .078 | .105 | .119 | .130 | .144 | .138 | .123 | .116 | .094 | .066 | .010 |
| | [a]1.000 | .278 | .307 | .224 | .354 | .352 | .400 | .402 | .354 | .355 | .281 | .280 | .207 |

[a]Faired value.

TABLE 3.– PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) – Continued

(f) N = 1140 rpm; $\beta_{0.75R}$ = 45.30°.

| | J | 1.672 | 1.792 | 1.914 | 2.047 | 2.176 | 2.284 | 2.442 | 2.558 | 2.632 | 2.492 | 2.356 | 2.201 | 2.102 | 1.980 | 1.848 | 1.720 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_R$ | .383 | .401 | .417 | .437 | .458 | .473 | .499 | .514 | .528 | .502 | .486 | .460 | .447 | .428 | .410 | .393 |
| | $\alpha_R$' | 9.44 | 7.50 | 5.68 | 3.86 | 2.24 | .99 | -.70 | -1.84 | -2.53 | -1.20 | .20 | 1.94 | 3.15 | 4.76 | 6.65 | 8.65 |
| | $\Delta\beta$ | .08 | .08 | .08 | .07 | .07 | .07 | .07 | .07 | .06 | .07 | .07 | .07 | .07 | .07 | .08 | .08 |
| | $\alpha_i$ | 2.59 | 2.12 | 1.71 | 1.37 | 1.06 | .84 | .46 | .23 | .06 | .32 | .60 | .96 | 1.19 | 1.51 | 1.91 | 2.28 |
| | $c_n$ | .8395 | .6943 | .5643 | .4577 | .3552 | .2827 | .1568 | .0773 | .0204 | .1094 | .2022 | .3218 | .3977 | .5018 | .6276 | .7431 |
| | $c_m$ | -.0120 | -.0132 | -.0110 | -.0132 | -.0258 | -.0425 | -.0611 | -.0670 | -.0707 | -.0638 | -.0560 | -.0363 | -.0220 | -.0187 | -.0128 | -.0119 |
| | $c_c$ | -.0411 | -.0484 | -.0403 | -.0343 | -.0219 | -.0137 | -.0039 | -.0003 | .0011 | -.0020 | .0079 | -.0110 | -.0208 | -.0293 | -.0421 | -.0549 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | |
| Upper surface | [a]0.000 | 1.037 | 1.041 | 1.045 | 1.049 | 1.054 | 1.057 | 1.064 | 1.067 | 1.071 | 1.064 | 1.060 | 1.054 | 1.051 | 1.047 | 1.043 | 1.040 |
| | .025 | -1.877 | -1.715 | -1.535 | -1.350 | [a]-.699 | [a]-.316 | [a].015 | [a].270 | [a].450 | [a].130 | [a].351 | [a]-.341 | [a]-.636 | [a]-.919 | [a]-1.389 | -1.788 |
| | .050 | -2.212 | -1.409 | -1.033 | -.777 | [a]-.575 | -.368 | -.158 | -.007 | .082 | -.037 | -.210 | -.430 | -.622 | -.844 | -1.144 | -1.519 |
| | .100 | -1.295 | -1.117 | -.855 | -.670 | [a]-.523 | -.398 | -.236 | -.126 | -.064 | -.183 | -.316 | -.475 | -.605 | -.766 | -.962 | -1.155 |
| | .200 | [a]-.909 | [a]-.842 | [a]-.717 | -.607 | -.471 | -.401 | -.312 | [a]-.240 | -.166 | -.269 | [a]-.373 | -.467 | -.553 | [a]-.676 | [a]-.781 | [a]-.895 |
| | .300 | -.767 | -.717 | -.634 | -.551 | -.493 | -.440 | -.354 | -.303 | -.277 | -.338 | -.400 | -.478 | -.525 | -.600 | -.683 | -.768 |
| | .400 | -.687 | -.632 | -.580 | -.521 | -.479 | -.443 | -.376 | -.340 | -.322 | -.372 | -.421 | -.475 | -.502 | -.559 | -.614 | -.672 |
| | .500 | -.581 | -.569 | -.537 | -.491 | -.468 | -.448 | -.395 | -.372 | -.362 | -.400 | -.431 | -.467 | -.484 | -.521 | -.563 | -.605 |
| | .600 | -.497 | -.497 | -.485 | -.454 | -.445 | -.440 | -.403 | -.390 | -.386 | -.410 | -.431 | -.453 | -.452 | -.474 | -.497 | -.523 |
| | .700 | -.393 | -.404 | -.415 | -.399 | -.408 | -.422 | -.393 | -.390 | -.395 | -.410 | -.418 | -.422 | -.404 | -.410 | -.422 | -.426 |
| | .800 | -.220 | -.233 | -.250 | -.250 | -.279 | -.304 | -.322 | -.331 | -.337 | -.348 | -.334 | -.301 | -.269 | -.258 | -.246 | -.248 |
| | .900 | -.011 | .006 | -.002 | -.006 | -.046 | -.107 | -.119 | -.138 | -.155 | -.147 | -.128 | -.078 | -.026 | -.006 | .001 | -.017 |
| | .950 | .054 | .087 | .100 | .125 | .121 | .068 | .039 | .005 | -.020 | -.009 | .020 | .081 | .113 | .102 | .087 | .050 |
| Lower surface | .0375 | [a].789 | [a].700 | .536 | .387 | .208 | .031 | -.187 | -.388 | -.517 | -.317 | -.100 | .140 | .305 | .464 | [a].658 | [a].742 |
| | .075 | .590 | .487 | .342 | .223 | .090 | -.051 | -.185 | -.317 | -.410 | -.286 | -.141 | .025 | .151 | .280 | .411 | .518 |
| | .150 | .404 | .315 | .199 | .110 | .013 | -.077 | -.170 | -.253 | -.315 | -.233 | -.143 | -.025 | .062 | .153 | .252 | .343 |
| | .250 | .262 | .191 | .097 | .030 | .043 | -.112 | -.175 | -.237 | -.286 | -.221 | -.159 | -.072 | -.008 | .061 | .139 | .209 |
| | .350 | .177 | .120 | .045 | -.009 | .069 | -.120 | -.163 | -.211 | -.251 | -.204 | -.154 | -.095 | -.043 | -.013 | .074 | .132 |
| | .450 | .104 | .052 | -.008 | -.051 | .100 | -.140 | -.173 | -.209 | -.242 | -.209 | -.169 | -.120 | -.076 | -.038 | .018 | .061 |
| | .550 | .046 | .006 | -.045 | -.077 | .115 | -.145 | -.168 | -.198 | -.220 | -.194 | -.169 | -.129 | -.097 | -.064 | -.022 | .009 |
| | .650 | -.015 | -.048 | -.091 | -.113 | .137 | -.161 | -.168 | -.188 | -.206 | -.194 | -.177 | -.151 | -.133 | -.108 | -.074 | -.054 |
| | .750 | -.050 | -.069 | -.104 | -.113 | .131 | -.134 | -.129 | -.138 | -.146 | -.149 | -.143 | -.135 | -.133 | -.114 | -.091 | -.084 |
| | [a].850 | .029 | .032 | .071 | -.050 | .050 | -.045 | 0 | -.015 | 0 | -.030 | -.034 | -.044 | -.067 | -.051 | -.044 | -.048 |
| | .925 | .004 | .009 | .008 | .024 | .049 | .082 | .117 | .129 | .131 | .113 | .092 | .061 | .033 | .013 | .005 | -.010 |
| | .975 | .043 | .052 | .071 | .095 | .126 | .186 | .230 | .237 | .237 | .225 | .207 | .151 | .104 | .076 | .057 | .032 |
| | [a]1.000 | .204 | .254 | .294 | .353 | .402 | .402 | .381 | .370 | .380 | .351 | .331 | .351 | .342 | .273 | .253 | .203 |

[a]Faired value.

TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION ($x = 0.45$) - Continued

(g) $N = 1350$ rpm; $\beta_{0.75R} = 45.30°$.

| | J | 1.587 | 1.690 | 1.810 | 1.913 | 2.028 | 2.121 | 2.245 | 2.348 | 2.465 | 2.576 | 2.695 | 2.814 | 2.881 | 2.119 | 2.046 | 1.971 | 1.863 | 1.744 | 1.636 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .440 | .459 | .479 | .495 | .519 | .534 | .555 | .573 | .597 | .618 | .601 | .587 | .561 | .540 | .518 | .505 | .488 | .469 | .449 |
| | $\alpha_x'$ | 10.93 | 9.16 | 7.22 | 5.69 | 4.11 | 2.93 | 1.44 | .28 | -.91 | -2.00 | -1.22 | -.40 | 1.03 | 2.21 | 3.87 | 4.87 | 6.43 | 8.27 | 10.06 |
| | $\Delta\beta$ | .11 | .10 | .10 | .10 | .10 | .09 | .09 | .09 | .09 | .08 | .09 | .09 | .09 | .09 | .10 | .10 | .10 | .10 | .10 |
| | $c_l$ | 2.74 | 2.40 | 2.07 | 1.81 | 1.49 | 1.20 | .90 | .67 | .93 | .08 | .24 | .41 | .71 | .93 | 1.25 | 1.56 | 1.86 | 2.11 | 2.70 |
| | $c_n$ | .8823 | .7772 | .6794 | .5992 | .4950 | .4020 | .3023 | .2280 | .1129 | .0290 | .0819 | .1397 | .2407 | .3116 | .4159 | .5165 | .6127 | .6876 | .8719 |
| | $c_m$ | -.0013 | -.0105 | -.0135 | -.0131 | -.0147 | -.0181 | -.0302 | -.0391 | -.0482 | -.0491 | -.0531 | -.0533 | -.0454 | -.0362 | -.0308 | -.0234 | -.0145 | -.0221 | -.0045 |
| | $c_o$ | -.0559 | -.0394 | -.0294 | -.0411 | -.0347 | -.0309 | -.0166 | -.0090 | -.0061 | -.0059 | -.0027 | -.0052 | -.0087 | -.0056 | -.0031 | -.0205 | -.0278 | -.0236 | -.0488 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.050 | 1.054 | 1.058 | 1.063 | 1.069 | 1.073 | 1.079 | 1.084 | 1.091 | 1.097 | 1.093 | 1.089 | 1.081 | 1.075 | 1.068 | 1.065 | 1.061 | 1.056 | 1.052 |
| | .025 | [a]-1.605 | -1.610 | -1.481 | -1.337 | -1.194 | -1.073 | [a]-.510 | [a].271 | [a]-.042 | [a].125 | [a].115 | .251 | .079 | .036 | -.022 | [a]-.923 | [a]-1.144 | -1.177 | -1.778 |
| | .050 | -2.195 | -2.094 | -1.941 | -1.169 | -.901 | -.684 | -.497 | -.311 | -.116 | .026 | 0 | -.058 | -.274 | -.454 | -.732 | -.892 | -1.135 | -1.436 | -2.223 |
| | .100 | -2.033 | -1.314 | -1.100 | -.928 | -.751 | -.606 | -.464 | -.342 | [a]-.166 | [a]-.096 | [a]-.107 | -.255 | -.397 | -.526 | -.707 | -.820 | -.994 | -1.158 | [a]-1.816 |
| | .200 | [a]-1.125 | [a]-.980 | [a]-.880 | [a]-.769 | [a]-.667 | [a]-.558 | -.472 | [a]-.394 | -.270 | -.201 | -.265 | -.324 | -.439 | -.518 | -.645 | -.715 | [a]-.822 | [a]-.920 | [a]-1.083 |
| | .300 | -.826 | -.808 | -.744 | -.681 | -.606 | -.538 | -.477 | -.425 | -.365 | -.310 | -.352 | -.392 | -.465 | -.518 | -.597 | -.643 | -.719 | -.788 | -.818 |
| | .400 | -.696 | -.701 | -.657 | -.617 | -.565 | -.516 | -.470 | -.436 | -.394 | -.359 | [a]-.404 | -.418 | -.473 | -.509 | -.560 | -.591 | -.648 | -.697 | -.713 |
| | .500 | [a]-.599 | [a]-.609 | [a]-.583 | [a]-.562 | [a]-.524 | [a]-.492 | -.474 | -.444 | -.427 | -.400 | -.431 | -.443 | -.487 | -.503 | -.532 | -.563 | [a]-.590 | -.621 | -.623 |
| | .600 | -.507 | -.529 | -.511 | -.504 | -.482 | -.464 | -.444 | -.438 | -.423 | -.410 | -.431 | -.439 | -.467 | -.480 | -.489 | -.505 | -.528 | -.542 | -.528 |
| | .700 | -.399 | -.413 | -.412 | -.418 | -.410 | -.409 | -.405 | -.413 | -.410 | -.407 | -.424 | -.422 | -.437 | -.433 | -.425 | -.423 | -.434 | -.438 | -.410 |
| | .800 | -.239 | -.233 | -.220 | -.236 | -.243 | -.255 | -.266 | -.282 | -.301 | -.298 | -.319 | -.315 | -.308 | -.290 | -.263 | -.252 | -.251 | -.248 | -.236 |
| | .900 | -.061 | -.019 | .010 | .016 | .011 | .001 | -.037 | -.072 | -.072 | -.069 | -.085 | -.081 | -.082 | -.036 | -.004 | .007 | .002 | -.008 | -.040 |
| | .950 | .014 | .054 | .084 | .104 | .121 | .130 | .126 | .092 | .101 | .113 | .088 | .083 | .071 | .101 | .111 | .105 | .083 | .058 | .033 |
| Lower surface | .0375 | [a].798 | [a].733 | [a].680 | [a].552 | .427 | .285 | .121 | -.056 | -.262 | -.462 | -.348 | -.195 | -.006 | .164 | .379 | .487 | [a].568 | [a].666 | [a].778 |
| | .075 | .634 | .563 | .489 | .378 | .257 | .143 | .028 | -.101 | -.240 | -.362 | -.299 | -.197 | -.074 | .051 | .210 | .298 | .402 | .494 | .593 |
| | .150 | .436 | .372 | .306 | .233 | .142 | .058 | -.027 | -.120 | -.211 | -.291 | -.251 | -.188 | -.104 | -.015 | .108 | .177 | .252 | .327 | .406 |
| | .250 | .290 | .237 | .186 | .119 | .049 | -.016 | -.076 | -.143 | -.204 | -.274 | [a]-.240 | [a]-.188 | -.137 | -.070 | .021 | .074 | .175 | .189 | .263 |
| | .350 | .200 | .153 | .116 | .060 | .006 | -.046 | -.088 | [a]-.155 | -.202 | -.248 | [a]-.235 | [a]-.190 | [a]-.154 | [a]-.098 | -.017 | .026 | .073 | .118 | .179 |
| | .450 | .110 | .076 | .045 | .001 | -.042 | -.087 | -.119 | -.165 | -.206 | -.242 | -.231 | -.195 | -.167 | -.126 | -.066 | -.029 | .007 | .047 | .097 |
| | [a].550 | .037 | .009 | -.010 | -.051 | -.079 | -.119 | -.147 | -.175 | -.206 | -.236 | -.225 | -.199 | -.181 | -.149 | -.102 | -.077 | -.048 | -.020 | -.031 |
| | .650 | -.026 | -.050 | -.060 | -.088 | -.116 | -.141 | -.154 | -.182 | -.200 | -.220 | -.216 | -.197 | -.191 | -.168 | -.130 | -.108 | -.087 | -.068 | -.032 |
| | .750 | -.071 | -.081 | -.084 | -.100 | -.118 | -.132 | -.136 | -.151 | -.160 | -.168 | -.173 | -.164 | -.167 | -.156 | -.130 | -.117 | -.105 | -.098 | -.072 |
| | .850 | -.061 | -.064 | -.055 | -.061 | -.064 | -.066 | -.054 | -.053 | -.047 | -.040 | -.051 | -.049 | -.066 | -.074 | -.071 | -.068 | -.069 | -.070 | -.060 |
| | .925 | -.022 | -.019 | 0 | .008 | .017 | .027 | .058 | .077 | .081 | .088 | .081 | .081 | .095 | .038 | .017 | .011 | -.003 | -.013 | -.014 |
| | .975 | .008 | .020 | .045 | .065 | .088 | .104 | .153 | .189 | .180 | .177 | .175 | .182 | .164 | .117 | .086 | .074 | .048 | .030 | .021 |
| | [a]1.000 | .092 | .092 | .117 | .187 | .202 | .247 | .311 | .271 | .315 | .340 | .285 | .276 | .256 | .241 | .217 | .177 | .350 | .112 | .097 |

[a]Faired value.

TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) - Continued

(h) N = 1600 rpm; $\beta_{0.75R} = 45.30^\circ$.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.121 | 2.211 | 2.318 | 2.415 | 2.514 | 2.463 | 2.376 | 2.273 | 2.162 | 2.056 |
| | $M_R$ | .632 | .653 | .677 | .700 | .725 | .711 | .689 | .664 | .640 | .618 |
| | $\alpha_R$ | 2.93 | 1.81 | .61 | -.44 | -1.43 | -.92 | -.02 | 1.11 | 2.41 | 3.76 |
| | $\Delta\beta$ | .15 | .14 | .14 | .13 | .12 | .13 | .13 | .14 | .15 | .15 |
| | $\alpha_i$ | 1.21 | 1.00 | .68 | .35 | .16 | .24 | .50 | .78 | 1.09 | 1.40 |
| | $c_n$ | .4058 | .3372 | .2312 | .1192 | .0542 | .0825 | .1684 | .2646 | .3661 | .4670 |
| | $c_m$ | -.0289 | -.0332 | -.0305 | -.0343 | -.0402 | -.0403 | -.0367 | -.0361 | -.0322 | -.0238 |
| | $c_o$ | -.0051 | -.0052 | -.0139 | -.0132 | -.0127 | -.0122 | -.0089 | -.0072 | -.0044 | .0151 |
| | x/b | Pressure coefficient, P | | | | | | | | | |
| Upper surface | 0.000 | 1.103 | 1.111 | 1.120 | 1.129 | 1.139 | 1.133 | 1.125 | 1.115 | 1.106 | 1.098 |
| | .025 | -.335 | .273 | -.210 | -.154 | -.103 | .008 | -.030 | -.082 | -.134 | -.686 |
| | .050 | -.645 | -.506 | -.299 | -.107 | .033 | .018 | -.127 | -.318 | -.559 | -.790 |
| | .100 | -.675 | -.549 | -.379 | [a]-.185 | -.123 | -.167 | -.283 | -.432 | -.611 | -.775 |
| | [a].200 | -.655 | -.567 | -.457 | -.336 | -.297 | -.326 | -.411 | -.499 | -.604 | -.711 |
| | .300 | -.618 | -.567 | -.494 | -.427 | -.378 | -.402 | -.455 | -.524 | -.596 | -.658 |
| | .400 | -.588 | -.556 | -.506 | -.465 | -.433 | -.451 | -.481 | -.528 | -.574 | -.616 |
| | .500 | -.562 | -.545 | -.514 | -.491 | -.482 | -.492 | -.502 | -.532 | -.555 | -.582 |
| | .600 | -.521 | -.511 | -.494 | -.485 | -.490 | -.506 | -.514 | -.538 | -.520 | -.538 |
| | .700 | -.449 | -.449 | -.441 | -.444 | -.464 | -.465 | -.449 | -.454 | -.452 | -.445 |
| | .800 | -.270 | -.280 | -.273 | -.281 | -.300 | -.300 | -.285 | -.287 | -.279 | -.257 |
| | .900 | .012 | -.004 | .014 | .006 | -.007 | -.008 | .001 | -.005 | .002 | .022 |
| | .950 | .142 | .151 | .163 | .162 | .155 | .151 | .154 | .145 | .142 | .128 |
| Lower surface | .0375 | .288 | .159 | -.032 | -.239 | -.446 | -.370 | -.161 | .028 | .224 | .377 |
| | .075 | .142 | .046 | -.092 | -.244 | -.386 | -.336 | -.189 | -.054 | .093 | .212 |
| | .150 | .055 | -.016 | -.118 | -.222 | -.318 | -.284 | -.185 | -.089 | .017 | .107 |
| | .250 | -.015 | -.073 | -.149 | -.229 | -.307 | -.280 | -.201 | -.131 | -.048 | .020 |
| | .350 | -.053 | -.096 | -.157 | -.220 | -.285 | -.263 | -.198 | -.142 | -.078 | -.023 |
| | .450 | -.096 | -.131 | -.181 | -.235 | -.290 | -.272 | -.214 | -.169 | -.115 | -.070 |
| | .550 | -.119 | -.147 | -.187 | -.233 | -.275 | -.260 | -.216 | -.180 | -.136 | -.101 |
| | .650 | -.156 | -.175 | -.208 | -.244 | -.274 | -.265 | -.231 | -.204 | -.169 | -.143 |
| | .750 | -.149 | -.160 | -.181 | -.202 | -.214 | -.212 | -.195 | -.181 | -.157 | -.143 |
| | [a].850 | -.071 | .063 | -.070 | -.070 | -.061 | -.069 | -.074 | -.078 | -.071 | -.076 |
| | .925 | .028 | .048 | .046 | .052 | .066 | .060 | .050 | .045 | .037 | .015 |
| | .975 | .112 | .144 | .139 | .147 | .155 | .151 | .043 | .138 | .123 | .089 |
| | [a]1.000 | .327 | .372 | .389 | .386 | .384 | .384 | .366 | .344 | .341 | .290 |

[a]Faired value.

NACA

TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) - Continued

(i) M = 0.56; $\beta_{0.75R}$ = 45.30°.

| | J | 2.065 | 2.096 | 2.114 | 2.144 | 2.189 | 2.215 | 2.272 | 2.304 | 2.333 | 2.374 | 2.433 | 2.453 | 2.498 | 2.533 | 2.556 | 2.582 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .676 | .677 | .671 | .666 | .664 | .662 | .663 | .658 | .656 | .653 | .651 | .647 | .645 | .642 | .638 | .636 |
| | $\alpha_r$, | 3.64 | 3.21 | 3.01 | 2.61 | 2.09 | 1.77 | 1.11 | .78 | .44 | .02 | -.61 | -.83 | -1.26 | -1.61 | -1.83 | -2.05 |
| | $\Delta\beta$ | .19 | .18 | .18 | .17 | .17 | .16 | .15 | .15 | .14 | .14 | .13 | .13 | .12 | .11 | .11 | .10 |
| | $\alpha_i$ | 1.33 | 1.30 | 1.23 | 1.15 | 1.02 | .97 | .78 | .68 | .64 | .55 | .39 | .34 | .29 | .23 | .18 | .14 |
| | $\alpha_m$ | .4451 | .4336 | .4102 | .3848 | .3421 | .3258 | .2645 | .2291 | .2176 | .1873 | .1332 | .1152 | .0988 | .0777 | .0607 | .0494 |
| | $c_m$ | -.0311 | -.0297 | -.0311 | -.0311 | -.0329 | -.0329 | -.0346 | -.0353 | -.0370 | -.0364 | -.0404 | -.0481 | -.0511 | -.0557 | -.0606 | -.0601 |
| | $c_o$ | -.0913 | -.0007 | .0002 | .0004 | .0036 | -.0024 | -.0022 | -.0026 | .0021 | -.0071 | -.0067 | .0085 | .0060 | .0056 | -.0050 | -.0076 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.119 | 1.120 | 1.118 | 1.116 | 1.115 | 1.114 | 1.114 | 1.113 | 1.112 | 1.111 | 1.110 | 1.109 | 1.108 | 1.107 | 1.105 | 1.105 |
| | .025 | -.137 | -.139 | -.153 | -.165 | -.165 | -.171 | -.175 | -.183 | -.193 | [a]-.157 | [a].030 | [a].027 | [a].042 | [a].095 | [a].162 | .116 |
| | .050 | -.636 | -.657 | -.667 | -.637 | -.553 | -.513 | -.413 | -.346 | -.290 | -.228 | -.140 | -.086 | -.051 | -.003 | .023 | .039 |
| | .100 | -.731 | -.715 | -.689 | -.632 | -.564 | -.529 | -.443 | -.393 | -.354 | -.305 | -.235 | -.195 | -.168 | -.128 | -.110 | -.092 |
| | [a].200 | -.736 | -.699 | -.676 | -.625 | -.581 | -.554 | -.488 | -.447 | -.450 | -.400 | -.353 | -.320 | -.290 | -.260 | -.256 | -.227 |
| | .300 | -.686 | -.665 | -.653 | -.624 | -.586 | -.565 | -.523 | -.496 | -.472 | -.441 | -.403 | -.377 | -.365 | -.339 | -.328 | -.320 |
| | .400 | -.643 | -.626 | -.621 | -.599 | -.572 | -.555 | -.526 | -.503 | -.488 | -.462 | -.432 | -.414 | -.402 | -.383 | -.378 | -.369 |
| | .500 | -.607 | -.594 | -.592 | -.579 | -.560 | -.548 | -.526 | -.510 | -.497 | -.478 | -.456 | -.442 | -.435 | -.421 | -.418 | -.411 |
| | .600 | -.545 | -.534 | -.539 | -.533 | -.522 | -.513 | -.504 | -.502 | -.502 | -.491 | -.469 | -.471 | -.468 | -.455 | -.452 | -.446 |
| | .700 | -.454 | -.449 | -.459 | -.460 | -.455 | -.450 | -.446 | -.443 | -.445 | -.436 | -.430 | -.429 | -.432 | -.427 | -.432 | -.431 |
| | .800 | -.251 | -.253 | -.264 | -.272 | -.277 | -.276 | -.282 | -.282 | -.290 | -.292 | -.294 | -.307 | -.319 | -.325 | -.335 | -.336 |
| | .900 | .033 | .033 | .023 | .017 | .007 | .004 | .002 | -.002 | -.011 | -.018 | -.031 | -.052 | -.070 | -.084 | -.101 | -.107 |
| | .950 | .147 | .147 | .142 | .144 | .150 | .151 | .151 | .150 | .150 | .148 | .142 | .122 | .106 | .090 | .076 | .067 |
| Lower surface | .0375 | .338 | .313 | .277 | .226 | .168 | .139 | .039 | -.021 | .073 | -.130 | -.230 | -.299 | -.357 | -.421 | -.472 | -.512 |
| | .075 | .185 | .166 | .136 | .097 | .053 | .032 | -.039 | -.084 | -.118 | -.157 | -.211 | -.263 | -.304 | -.340 | -.373 | -.396 |
| | .150 | .092 | .077 | .053 | .023 | -.011 | -.024 | -.080 | -.110 | -.137 | -.162 | -.206 | -.234 | -.257 | -.279 | -.300 | -.313 |
| | .250 | .006 | -.003 | -.026 | -.045 | -.073 | -.081 | -.122 | -.145 | -.164 | -.180 | -.212 | -.231 | -.249 | -.265 | -.282 | -.295 |
| | .350 | -.034 | -.040 | -.060 | -.076 | -.096 | -.104 | -.138 | -.153 | -.166 | -.176 | -.203 | -.216 | -.226 | -.242 | -.254 | -.263 |
| | .450 | -.081 | -.085 | -.103 | -.117 | -.132 | -.137 | -.164 | -.177 | -.186 | -.194 | -.212 | -.223 | -.235 | -.242 | -.250 | -.260 |
| | .550 | -.108 | -.113 | -.127 | -.138 | -.149 | -.153 | -.175 | -.185 | -.190 | -.194 | -.209 | -.214 | -.224 | -.227 | -.234 | -.238 |
| | .650 | -.150 | -.154 | -.166 | -.171 | -.180 | -.181 | -.197 | -.205 | -.207 | -.209 | -.217 | -.219 | -.224 | -.224 | -.226 | -.228 |
| | .750 | -.147 | -.148 | -.158 | -.163 | -.165 | -.164 | -.175 | -.180 | -.177 | -.175 | -.179 | -.175 | -.177 | -.171 | -.169 | -.170 |
| | [a].850 | -.078 | -.064 | -.074 | -.076 | -.072 | -.070 | -.076 | -.080 | -.070 | -.061 | -.061 | -.050 | -.045 | -.026 | -.025 | -.030 |
| | .925 | .030 | .033 | .028 | .031 | .038 | .045 | .041 | .043 | .048 | .058 | .065 | .081 | .088 | .104 | .109 | .111 |
| | .975 | .110 | .117 | .113 | .119 | .131 | .137 | .135 | .136 | .140 | .151 | .161 | .180 | .188 | .201 | .205 | .205 |
| | [a]1.000 | .225 | .220 | .230 | .242 | .325 | .300 | .245 | .245 | .250 | .350 | .350 | .300 | .250 | .300 | .255 | .280 |

[a]Faired value.

TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) - Continued

(j) M = 0.60; $\beta_{0.75R} = 45.30°$.

| | J | 2.107 | 2.124 | 2.149 | 2.200 | 2.222 | 2.263 | 2.292 | 2.321 | 2.351 | 2.380 | 2.409 | 2.447 | 2.505 | 2.504 | 2.542 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | .724 | .722 | .716 | .719 | .714 | .711 | .706 | .704 | .701 | .699 | .694 | .694 | .695 | .690 | .690 |
| | $\alpha_i$ | 2.09 | 1.89 | 1.57 | .97 | .69 | .23 | -.10 | -.43 | -.76 | -1.06 | -1.36 | -1.74 | -2.35 | -2.30 | -2.70 |
| | $\Delta\alpha_i$ | .19 | .19 | .18 | .17 | .16 | .15 | .15 | .14 | .13 | .12 | .12 | .11 | .09 | .09 | .08 |
| | $\alpha_i$ | 1.30 | 1.27 | 1.16 | 1.02 | .93 | .83 | .76 | .68 | .59 | .50 | .42 | .35 | .23 | .20 | .15 |
| | $c_n$ | .4365 | .4265 | .3912 | .3452 | .3141 | .2795 | .2552 | .2316 | .2016 | .1697 | .1432 | .1181 | .0777 | .0668 | .0516 |
| | $c_m$ | -.0322 | -.0298 | -.0299 | -.0301 | -.0297 | -.0317 | -.0313 | -.0326 | -.0336 | -.0360 | -.0388 | -.0414 | -.0456 | -.0482 | -.0483 |
| | $c_c$ | -.0082 | -.0115 | -.0144 | -.0149 | -.0146 | -.0148 | -.0124 | -.0110 | -.0128 | -.0107 | -.0091 | -.0132 | -.0130 | -.0126 | -.0088 |
| | o/b | Pressure coefficient, P | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.138 | 1.138 | 1.135 | 1.137 | 1.135 | 1.133 | 1.132 | 1.131 | 1.130 | 1.129 | 1.127 | 1.127 | 1.128 | 1.125 | 1.125 |
| | .025 | -.411 | -.419 | -.436 | -.422 | -.436 | [a]-.280 | -.328 | -.287 | -.219 | -.162 | -.108 | -.056 | .040 | .026 | -.096 |
| | .050 | -.573 | -.572 | -.544 | -.464 | -.405 | -.352 | -.300 | -.265 | -.213 | -.163 | -.126 | -.082 | -.011 | .002 | -.037 |
| | .100 | -.676 | -.657 | -.606 | -.523 | -.477 | -.426 | -.386 | -.356 | -.316 | -.274 | [a]-.237 | -.208 | -.145 | -.138 | -.106 |
| | [a].200 | -.727 | -.702 | -.660 | -.598 | -.562 | -.510 | -.486 | -.462 | -.435 | -.393 | -.370 | -.344 | -.293 | -.293 | -.264 |
| | .300 | -.725 | -.713 | -.675 | -.627 | -.595 | -.558 | -.530 | -.510 | -.483 | -.455 | -.441 | -.414 | -.373 | -.372 | -.345 |
| | .400 | -.708 | -.699 | -.664 | -.626 | -.601 | -.570 | -.547 | -.531 | -.509 | -.487 | -.478 | -.453 | -.423 | -.423 | -.398 |
| | .500 | -.676 | -.671 | -.643 | -.617 | -.599 | -.574 | -.556 | -.544 | -.528 | -.511 | -.506 | -.486 | -.462 | -.465 | -.443 |
| | .600 | -.584 | -.591 | -.578 | -.562 | -.555 | -.538 | -.530 | -.524 | -.513 | -.505 | -.510 | -.502 | -.485 | -.497 | -.485 |
| | .700 | -.473 | -.479 | -.479 | -.473 | -.473 | -.468 | -.467 | -.468 | -.465 | -.461 | -.469 | -.462 | -.456 | -.463 | -.450 |
| | .800 | -.250 | -.258 | -.265 | -.262 | -.270 | -.273 | -.278 | -.284 | -.289 | -.292 | -.305 | -.303 | -.311 | -.323 | -.315 |
| | .900 | .038 | .031 | .031 | .033 | .030 | .026 | .021 | .016 | .010 | .005 | -.008 | -.013 | -.026 | -.040 | -.038 |
| | .950 | .149 | .146 | .143 | .155 | .156 | .158 | .158 | .158 | .159 | .158 | .150 | .153 | .150 | .139 | .142 |
| Lower surface | .0375 | .266 | .237 | .194 | .121 | .073 | .023 | -.026 | -.064 | -.120 | -.178 | -.242 | -.292 | -.394 | -.433 | -.470 |
| | .075 | .125 | .101 | .066 | .013 | -.024 | -.060 | -.095 | -.123 | -.162 | -.201 | -.249 | -.279 | -.344 | -.374 | -.388 |
| | .150 | .046 | .025 | 0 | -.037 | -.066 | -.091 | -.117 | -.136 | -.165 | -.192 | -.226 | -.244 | -.282 | -.302 | -.309 |
| | .250 | -.035 | -.053 | -.072 | -.099 | -.120 | -.136 | -.156 | -.171 | -.188 | -.210 | -.233 | -.247 | -.275 | -.293 | -.294 |
| | .350 | -.071 | -.084 | -.101 | -.123 | -.140 | -.150 | -.164 | -.174 | -.188 | -.204 | -.223 | -.232 | -.254 | -.269 | -.267 |
| | .450 | -.119 | -.132 | -.143 | -.161 | -.174 | -.180 | -.192 | -.200 | -.210 | -.220 | -.238 | -.244 | -.259 | -.272 | -.267 |
| | .550 | -.146 | -.157 | -.164 | -.181 | -.189 | -.192 | -.199 | -.206 | -.213 | -.220 | -.235 | -.236 | -.245 | -.254 | -.249 |
| | .650 | -.190 | -.198 | -.203 | -.210 | -.218 | -.217 | -.222 | -.226 | -.229 | -.233 | -.244 | -.242 | -.244 | -.253 | -.243 |
| | .750 | -.177 | -.185 | -.187 | -.189 | -.194 | -.190 | -.192 | -.193 | -.191 | -.192 | -.199 | -.195 | -.188 | -.195 | -.184 |
| | [a].850 | -.081 | -.092 | -.090 | -.075 | -.083 | -.075 | -.073 | -.070 | -.079 | -.069 | -.072 | -.060 | -.048 | -.050 | -.035 |
| | .925 | .033 | .029 | .031 | .036 | .039 | .043 | .044 | .048 | .051 | .056 | .054 | .064 | .080 | .075 | .087 |
| | .975 | .125 | .123 | .121 | .127 | .130 | .133 | .135 | .136 | .140 | .144 | .143 | .153 | .165 | .160 | .171 |
| | [a]1.000 | .210 | .243 | .235 | .260 | .260 | .265 | .270 | .289 | .305 | .325 | .315 | .330 | .335 | .335 | .355 |

[a]Paired value.

TABLE 3.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.28)(10.85) PROPELLER BLADE SECTION (x = 0.45) - Concluded

(k) M = 0.65; $\beta_{0.75R}$ = 45.30°.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | J | 2.118 | 2.158 | 2.170 | 2.205 | 2.245 | 2.267 | 2.317 | 2.343 |
| | $M_{rel}$ | .821 | .821 | .815 | .811 | .807 | .805 | .803 | .801 |
| | $\alpha_{rel}$ | 2.93 | 2.53 | 2.89 | 1.89 | 1.44 | 1.19 | .61 | .32 |
| | $\Delta\beta$ | .22 | .21 | .20 | .20 | .19 | .18 | .17 | .17 |
| | $\alpha_1$ | .96 | .84 | .75 | .67 | .59 | .50 | .38 | .26 |
| | $c_n$ | .3206 | .2800 | .2523 | .2232 | .2006 | .1697 | .1290 | .0890 |
| | $c_m$ | -.0370 | -.0345 | -.0299 | -.0265 | -.0165 | -.0177 | -.0201 | -.0244 |
| | $c_p$ | .0235 | .0249 | .0195 | .0178 | -.0015 | .0006 | .0006 | .0057 |
| | x/b | Pressure coefficient, P | | | | | | | |
| Upper surface | 0.000 | 1.180 | 1.180 | 1.177 | 1.175 | 1.173 | 1.173 | 1.172 | 1.171 |
| | .025 | [a]-.100 | .270 | .266 | .259 | [a]-.600 | [a]-.100 | 0 | .236 |
| | .050 | [a]-.205 | -.232 | -.235 | -.246 | -.251 | -.198 | -.130 | -.099 |
| | .100 | -.435 | -.399 | -.383 | -.362 | -.314 | -.282 | -.232 | -.211 |
| | [a].200 | -.532 | -.430 | -.482 | [a]-.485 | [a]-.430 | [a]-.412 | [a]-.390 | -.355 |
| | .300 | -.636 | -.606 | -.597 | -.581 | -.539 | -.522 | -.503 | -.496 |
| | .400 | -.744 | -.780 | -.708 | -.692 | -.645 | -.618 | -.585 | -.575 |
| | .500 | -.792 | -.767 | -.755 | -.738 | -.699 | -.680 | -.652 | -.643 |
| | [a].600 | -.835 | -.760 | -.749 | -.724 | -.675 | -.690 | -.705 | -.680 |
| | .700 | -.702 | [a]-.685 | -.646 | -.611 | -.553 | -.526 | -.539 | -.537 |
| | .800 | -.293 | -.252 | -.238 | -.215 | -.191 | -.187 | -.193 | -.204 |
| | .900 | -.122 | -.074 | -.047 | -.018 | .019 | .035 | .044 | .044 |
| | .950 | -.044 | -.003 | .019 | .039 | .071 | .085 | .100 | .105 |
| Lower surface | .0375 | .144 | .094 | [a].700 | [a].800 | -.033 | -.087 | -.168 | -.210 |
| | .075 | .039 | -.003 | -.021 | -.054 | -.099 | -.139 | -.195 | -.226 |
| | .150 | -.037 | -.066 | -.084 | -.108 | -.139 | -.168 | -.211 | -.233 |
| | .250 | -.113 | -.138 | -.151 | -.171 | -.198 | -.216 | -.247 | -.264 |
| | .350 | -.159 | -.178 | -.189 | -.205 | -.221 | -.238 | -.261 | -.278 |
| | .450 | -.222 | -.239 | -.248 | -.259 | -.270 | -.282 | -.303 | -.316 |
| | .550 | -.273 | -.284 | -.290 | -.298 | -.303 | -.311 | -.326 | -.335 |
| | .650 | -.379 | [a]-.375 | -.386 | -.384 | -.376 | -.378 | -.385 | -.392 |
| | .750 | -.488 | [a]-.400 | -.400 | -.384 | -.359 | -.349 | -.347 | -.346 |
| | .850 | -.273 | [a]-.247 | -.235 | -.220 | -.196 | -.189 | -.182 | -.178 |
| | .925 | -.117 | [a]-.099 | -.078 | -.061 | -.038 | -.034 | -.026 | -.032 |
| | .975 | -.032 | .001 | .012 | .030 | .050 | .054 | .063 | .069 |
| | [a]1.000 | .110 | .068 | .150 | .080 | .230 | .170 | .250 | .120 |

[a]Paired value.

TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION ($x = 0.60$)

(a) $N = 1140$ rpm; $\beta_{0.75R} = 29.38°$.

| | c/b | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.681 | 0.767 | 0.860 | 0.954 | 1.061 | 1.149 | 1.267 | 1.359 | 1.476 | 1.423 | 1.317 | 1.223 | 1.100 | 1.008 | 0.919 | 0.819 | 0.765 |
| | $M_x$ | .335 | .342 | .343 | .354 | .372 | .378 | .394 | .406 | .417 | .414 | .400 | .388 | .372 | .365 | .350 | .341 | .344 |
| | $\alpha_x'$ | 15.77 | 13.49 | 11.11 | 8.79 | 6.26 | 4.27 | 1.73 | -.16 | -2.43 | -1.41 | .68 | 2.65 | 5.37 | 7.49 | 9.64 | 12.15 | 13.54 |
| | $\Delta\beta$ | .13 | .13 | .13 | .13 | .13 | .12 | .12 | .11 | .11 | .11 | .11 | .12 | .12 | .13 | .13 | .13 | .13 |
| | $\alpha_i$ | 3.83 | 3.50 | 3.04 | 2.60 | 2.05 | 1.55 | 1.04 | .68 | .16 | .35 | .85 | 1.16 | 1.61 | 2.27 | 2.71 | 3.15 | 3.51 |
| | $c_n$ | 1.1168 | 1.0502 | .9339 | .8143 | .6520 | .4981 | .3394 | .2256 | .0517 | .1168 | .2786 | .3749 | .5166 | .7163 | .8413 | .9577 | 1.0523 |
| | $c_m$ | -.0714 | -.0510 | -.0313 | -.0290 | -.0320 | -.0361 | -.0519 | -.0656 | -.0700 | -.0784 | -.0682 | -.0471 | -.0428 | -.0371 | -.0232 | -.0246 | -.0405 |
| | $c_d$ | -.0306 | -.0400 | -.0442 | -.0584 | -.0410 | -.0235 | -.0087 | .0031 | .0070 | .0087 | .0023 | -.0078 | -.0100 | -.0459 | -.0586 | -.0510 | -.0452 |
| | | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.028 | 1.030 | 1.030 | 1.032 | 1.035 | 1.036 | 1.040 | 1.042 | 1.045 | 1.044 | 1.041 | 1.038 | 1.035 | 1.034 | 1.031 | 1.030 | 1.030 |
| | .025 | -1.493 | -1.425 | -1.436 | -2.147 | [a]-1.555 | [a]-1.002 | [a]-.506 | [a]-.163 | [a].190 | [a].296 | -.165 | [a]-.528 | [a]-.916 | -1.903 | -2.192 | [a]-1.686 | [a]-1.641 |
| | .050 | -1.664 | -1.558 | -1.596 | -1.821 | -1.265 | -.865 | -.434 | -.201 | .074 | .070 | -.225 | -.487 | -.831 | -1.373 | -1.821 | -1.713 | -1.641 |
| | .100 | -1.619 | -1.554 | -1.623 | -1.198 | -.874 | -.649 | -.405 | -.232 | -.028 | -.096 | -.290 | -.464 | -.697 | -.900 | -1.491 | -1.678 | -1.635 |
| | [a].200 | -1.449 | -1.465 | -1.433 | -.896 | -.700 | -.555 | -.403 | -.292 | -.180 | -.251 | -.347 | -.454 | -.599 | -.744 | -.970 | -1.442 | -1.556 |
| | .300 | -1.244 | -1.317 | -1.116 | -.746 | -.627 | -.538 | -.423 | -.338 | -.233 | -.273 | -.372 | -.453 | -.568 | -.668 | -.701 | -1.109 | -1.292 |
| | .400 | -1.045 | -1.034 | -.786 | -.629 | -.563 | -.496 | -.413 | -.355 | -.270 | -.303 | -.376 | -.438 | -.525 | -.598 | -.608 | -.786 | -.963 |
| | .500 | -.842 | -.749 | -.565 | -.550 | -.515 | -.472 | -.413 | -.372 | -.306 | -.334 | [a]-.404 | -.431 | -.493 | -.545 | -.536 | -.576 | -.677 |
| | .600 | -.675 | -.538 | -.439 | -.486 | -.475 | -.450 | -.420 | -.390 | -.348 | -.364 | [a]-.422 | -.431 | -.469 | -.500 | -.485 | -.462 | -.498 |
| | .700 | -.536 | -.403 | -.349 | -.403 | -.412 | -.403 | -.402 | -.390 | -.359 | -.374 | [a]-.421 | -.404 | -.422 | -.427 | -.405 | -.362 | -.378 |
| | .800 | -.416 | -.292 | -.249 | -.282 | -.287 | -.291 | -.325 | -.341 | -.322 | -.334 | -.346 | -.315 | [a]-.298 | -.300 | -.282 | -.262 | -.284 |
| | .900 | -.324 | -.194 | -.186 | -.115 | -.087 | -.084 | -.150 | -.159 | -.204 | -.185 | -.165 | -.121 | [a]-.113 | [a]-.116 | -.113 | -.139 | -.196 |
| | .950 | -.231 | -.153 | -.076 | -.023 | .020 | .043 | -.026 | -.058 | -.075 | -.086 | -.072 | -.013 | [a]-.003 | -.002 | -.020 | -.065 | -.120 |
| Lower surface | .0375 | .902 | .859 | .804 | .739 | .607 | .424 | .123 | -.118 | -.422 | -.351 | -.036 | .213 | .461 | .658 | .749 | .805 | .852 |
| | .075 | .731 | .671 | .613 | .533 | .412 | .259 | .024 | -.132 | [a]-.360 | -.263 | -.090 | .076 | .268 | .446 | .533 | .600 | .661 |
| | .150 | .546 | .496 | .440 | .371 | .267 | .147 | -.008 | -.114 | -.263 | -.209 | -.079 | .039 | .175 | .307 | .381 | .442 | .501 |
| | .250 | .402 | .361 | .319 | .257 | .180 | .086 | -.033 | -.107 | -.207 | -.168 | -.083 | -.002 | .100 | .210 | .263 | .316 | .363 |
| | .350 | .296 | .259 | .228 | .174 | .108 | .032 | -.063 | -.118 | -.197 | -.168 | -.097 | -.040 | .045 | .128 | .178 | .220 | .260 |
| | .450 | .204 | .187 | .159 | .116 | .060 | .001 | -.077 | -.118 | -.174 | -.151 | -.104 | -.058 | .005 | .079 | .115 | .150 | .184 |
| | [a].550 | .120 | .107 | .095 | .063 | .010 | -.033 | -.091 | -.126 | -.164 | -.151 | -.113 | -.086 | -.034 | .031 | .062 | .078 | .107 |
| | .650 | .046 | .044 | .037 | .015 | -.016 | -.053 | -.095 | -.111 | -.144 | -.131 | -.104 | -.091 | -.057 | -.002 | .018 | .022 | .041 |
| | .750 | -.009 | .003 | .012 | .006 | -.016 | -.038 | -.049 | -.061 | -.078 | -.062 | -.062 | -.065 | -.045 | -.002 | .001 | -.003 | .001 |
| | .850 | -.070 | -.032 | -.011 | .006 | -.004 | -.011 | -.019 | .008 | [a]-.009 | -.008 | .010 | -.017 | -.026 | .002 | .001 | -.017 | -.026 |
| | .925 | -.101 | -.041 | .002 | .027 | .024 | .028 | .047 | .078 | .057 | .080 | .064 | .032 | .002 | .022 | .022 | [a]-.011 | [a]-.030 |
| | .975 | [a]-.076 | [a]-.013 | [a].053 | [a].086 | [a].087 | [a].072 | [a].114 | [a].161 | [a].128 | .213 | [a].210 | [a].102 | [a].075 | [a].054 | .070 | [a].031 | [a].005 |
| | [a]1.000 | .022 | .086 | .137 | .188 | .216 | .256 | .202 | .252 | .230 | .351 | .354 | .203 | .185 | .207 | .167 | .127 | .096 |

[a]Faired value.

NACA

TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(b) N = 1350 rpm; $\beta_{0.75R}$ = 29.38°.

| | J | 0.704 | 0.775 | 0.842 | 0.906 | 1.005 | 1.095 | 1.183 | 1.269 | 1.372 | 1.463 | 1.397 | 1.312 | 1.225 | 1.149 | 1.051 | 0.968 | 0.884 | 0.813 | 0.735 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .400 | .414 | .417 | .430 | .434 | .452 | .459 | .470 | .485 | .499 | .489 | .479 | .463 | .452 | .439 | .428 | .425 | .414 | .403 |
| | $\alpha_{x'}$ | 15.15 | 13.28 | 11.56 | 9.47 | 7.57 | 5.47 | 3.51 | 1.67 | -.42 | -2.20 | -.92 | .80 | 2.62 | 4.27 | 6.48 | 8.44 | 10.50 | 12.30 | 14.33 |
| | $\Delta\beta$ | .18 | .18 | .18 | .18 | .17 | .17 | .17 | .16 | .15 | .15 | .15 | .16 | .16 | .17 | .17 | .18 | .18 | .18 | .18 |
| | $\alpha_i$ | 3.82 | 3.62 | 3.33 | 2.75 | 2.39 | 1.93 | 1.37 | 1.03 | .56 | .18 | .39 | .84 | 1.12 | 1.49 | 2.01 | 2.56 | 3.00 | 3.39 | 3.72 |
| | $c_n$ | 1.1235 | 1.0917 | 1.0194 | .8585 | .7557 | .6162 | .4437 | .3380 | .1859 | .0588 | .1281 | .2742 | .3647 | .4810 | .6373 | .8050 | .9285 | 1.0319 | 1.1085 |
| | $c_m$ | -.0836 | -.0477 | -.0185 | -.0234 | -.0272 | -.0275 | -.0387 | -.0514 | -.0654 | -.0727 | -.0717 | -.0689 | -.0501 | -.0416 | -.0361 | -.0289 | -.0176 | -.0311 | -.0649 |
| | $c_c$ | -.0374 | -.0562 | -.0762 | -.0652 | -.0570 | -.0434 | -.0157 | -.0044 | .0051 | .0130 | .0097 | .0054 | .0086 | -.0166 | -.0336 | -.0590 | -.0734 | -.0663 | -.0508 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.041 | 1.044 | 1.045 | 1.047 | 1.049 | 1.053 | 1.054 | 1.057 | 1.060 | 1.064 | 1.061 | 1.059 | 1.055 | 1.053 | 1.050 | 1.047 | 1.046 | 1.044 | 1.041 |
| | .025 | [a]-2.054 | [a]-2.103 | [a]-2.146 | -2.379 | -2.303 | -1.871 | [a]-.732 | [a]-.399 | [a]-.033 | [a].330 | [a].090 | [a]-.182 | -.431 | -.792 | -1.387 | -2.089 | -2.441 | -2.100 | [a]-2.108 |
| | .050 | [a]-1.735 | [a]-1.946 | [a]-2.169 | -1.867 | -1.665 | -1.062 | [a]-.683 | -.413 | -.143 | .077 | -.033 | -.253 | -.505 | -.763 | [a]-1.113 | -1.890 | [a]-2.156 | [a]-1.955 | [a]-1.866 |
| | .100 | -1.400 | -1.579 | -1.663 | -1.455 | -.999 | -.807 | -.573 | -.421 | -.220 | -.056 | -.151 | -.316 | -.484 | -.648 | -.879 | -1.163 | -1.641 | -1.609 | -1.502 |
| | [a].200 | -1.280 | -1.450 | -1.435 | -.999 | -.797 | -.688 | -.558 | -.430 | -.329 | -.227 | -.275 | -.390 | -.479 | -.596 | -.747 | -.873 | -1.260 | -1.424 | -1.402 |
| | .300 | -1.203 | -1.320 | -1.196 | -.787 | -.710 | -.627 | -.523 | -.445 | -.343 | -.269 | -.321 | -.401 | -.478 | -.577 | -.664 | -.740 | -.987 | -1.260 | -1.279 |
| | .400 | -1.065 | -1.071 | -.869 | -.668 | -.633 | -.569 | -.496 | -.437 | -.367 | -.303 | -.344 | -.406 | -.465 | -.520 | -.599 | -.652 | -.724 | -.966 | -1.074 |
| | .500 | -.915 | -.819 | -.668 | -.578 | -.576 | -.531 | -.476 | -.440 | -.387 | -.343 | -.380 | -.422 | -.458 | -.495 | -.552 | -.584 | -.559 | -.714 | -.862 |
| | .600 | -.776 | -.609 | -.487 | -.504 | -.519 | -.497 | -.464 | -.443 | -.408 | -.377 | -.403 | -.432 | -.456 | -.476 | -.513 | -.523 | -.477 | -.533 | -.686 |
| | .700 | -.651 | -.461 | -.384 | -.417 | -.444 | -.435 | -.423 | -.421 | -.408 | -.392 | -.411 | -.429 | -.429 | -.431 | -.445 | -.441 | -.392 | -.411 | -.563 |
| | .800 | -.537 | -.343 | -.281 | -.288 | -.308 | -.308 | -.312 | -.339 | -.354 | -.353 | -.362 | -.369 | -.333 | -.312 | -.315 | -.307 | -.289 | -.301 | -.457 |
| | .900 | -.430 | -.241 | -.169 | -.136 | -.114 | -.084 | -.097 | -.152 | -.171 | -.197 | -.186 | -.179 | -.130 | -.094 | -.103 | -.124 | -.144 | -.188 | -.365 |
| | .950 | -.312 | -.198 | -.115 | -.059 | -.014 | .029 | .048 | -.014 | -.060 | -.088 | -.099 | -.084 | -.019 | .030 | .015 | -.020 | -.068 | -.120 | -.275 |
| Lower surface | .0375 | .859 | .834 | .789 | .744 | .656 | .525 | .313 | .101 | -.187 | -.422 | -.331 | -.052 | .192 | .392 | .573 | .700 | .759 | .800 | .843 |
| | .075 | [a].681 | [a].643 | [a].608 | [a].528 | [a].461 | [a].337 | [a].170 | [a].018 | -.182 | -.377 | -.283 | -.102 | .065 | .294 | .372 | .490 | .548 | .604 | .649 |
| | .150 | .501 | .467 | .428 | .376 | .300 | .214 | .085 | -.028 | -.161 | -.281 | -.219 | -.102 | .018 | .126 | .242 | .340 | .394 | .442 | .481 |
| | .250 | .360 | .339 | .303 | .260 | .198 | .130 | .034 | -.055 | -.141 | -.227 | -.184 | -.107 | -.025 | .064 | .148 | .223 | .274 | .312 | .345 |
| | .350 | .253 | .234 | .210 | .171 | .120 | .064 | -.010 | -.079 | -.151 | -.219 | -.189 | -.123 | -.056 | .013 | .080 | .144 | .183 | .216 | .235 |
| | .450 | .169 | .159 | .138 | .109 | .069 | .020 | -.042 | -.093 | -.143 | -.200 | -.176 | -.128 | -.077 | -.018 | .033 | .086 | .117 | .138 | .152 |
| | [a].550 | .089 | .079 | .069 | .050 | .012 | -.030 | -.069 | -.109 | -.161 | -.208 | -.186 | -.136 | -.101 | -.054 | -.010 | .033 | .059 | .068 | .077 |
| | .650 | .009 | .011 | .007 | .001 | -.024 | -.058 | -.084 | -.114 | -.141 | -.167 | -.161 | -.133 | -.111 | -.078 | -.049 | -.011 | .004 | .005 | 0 |
| | .750 | -.048 | -.028 | -.022 | -.015 | -.027 | -.044 | -.063 | -.079 | -.078 | -.076 | -.079 | -.084 | -.077 | -.057 | -.043 | -.020 | -.018 | -.027 | -.050 |
| | .850 | -.118 | -.064 | -.044 | -.024 | -.018 | -.030 | -.042 | -.030 | -.012 | -.019 | -.025 | [a]-.010 | -.030 | -.038 | -.032 | -.020 | -.027 | -.055 | -.102 |
| | [a].925 | -.136 | -.068 | -.032 | -.008 | .009 | .008 | .020 | .043 | .050 | .050 | .043 | .027 | .016 | .021 | -.008 | .004 | -.015 | -.052 | [a]-.123 |
| | [a].975 | -.077 | -.028 | .016 | .061 | .075 | .075 | .100 | .122 | .106 | .112 | .103 | .107 | .066 | .102 | .052 | .064 | .016 | .010 | -.097 |
| | [a]1.000 | .033 | .054 | .106 | .167 | .166 | .236 | .265 | .202 | .166 | .160 | .161 | .167 | .127 | .219 | .206 | .166 | .105 | .096 | 0 |

[a]Paired value.

TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(c) N = 1600 rpm; $\beta_{0.75R} = 29.38^{\circ}$.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.840 | 0.896 | 0.969 | 1.035 | 1.119 | 1.184 | 1.266 | 1.338 | 1.430 | 1.464 | 1.375 | 1.309 | 1.221 | 1.141 | 1.059 | 1.003 | 0.940 | 0.867 |
| | $M_x$ | .520 | .513 | .518 | .525 | .540 | .550 | .562 | .572 | .581 | .589 | .573 | .564 | .552 | .539 | .531 | .522 | .512 | .505 |
| | $\alpha_x'$ | 11.61 | 10.21 | 8.42 | 6.86 | 4.94 | 3.90 | 1.75 | .27 | -1.56 | -2.20 | -.48 | .85 | 2.70 | 4.44 | 6.30 | 7.61 | 9.12 | 10.93 |
| | $\Delta\beta$ | .25 | .25 | .25 | .24 | .24 | .24 | .23 | .23 | .23 | .22 | .23 | .23 | .24 | .24 | .24 | .25 | .25 | .25 |
| | $\alpha_i$ | 3.06 | 2.99 | 2.67 | 2.32 | 1.81 | 1.46 | 1.08 | .66 | .25 | .15 | .44 | .76 | 1.19 | 1.62 | 2.07 | 2.46 | 2.79 | 3.13 |
| | $\rho_n$ | .9335 | .9249 | .8405 | .7358 | .5816 | .4737 | .3530 | .2186 | .0845 | .0495 | .1454 | .2478 | .3865 | .5284 | .6574 | .7763 | .8724 | .9628 |
| | $\rho_m$ | -.0339 | -.0189 | -.0243 | -.0295 | -.0297 | -.0371 | -.0451 | -.0547 | -.0641 | -.0587 | -.0596 | -.0565 | -.0487 | -.0396 | -.0333 | -.0310 | -.0217 | -.0281 |
| | $\alpha_0$ | -.0526 | -.0707 | -.0638 | -.0574 | -.0370 | -.0281 | -.0222 | -.0050 | -.0012 | .0025 | .0005 | .0013 | -.0066 | -.0193 | -.0402 | -.0575 | -.0656 | -.0661 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.069 | 1.067 | 1.068 | 1.071 | 1.074 | 1.077 | 1.081 | 1.084 | 1.087 | 1.089 | 1.084 | 1.082 | 1.078 | 1.074 | 1.072 | 1.070 | 1.067 | 1.065 |
| | .025 | -1.919 | -2.572 | -2.533 | -2.439 | -1.636 | -1.268 | -.863 | [a]-.204 | [a].078 | [a].150 | .023 | -.083 | -.449 | -.843 | -1.601 | -2.166 | -2.482 | -2.658 |
| | .050 | -1.556 | [a]-2.008 | -2.063 | -1.580 | -1.003 | -.737 | -.465 | -.213 | .014 | .084 | -.066 | -.235 | -.520 | -.833 | -1.138 | -1.755 | -1.927 | -1.660 |
| | .100 | -1.383 | -1.556 | -1.336 | -.992 | -.777 | -.602 | -.432 | -.239 | -.068 | -.018 | -.158 | -.281 | -.500 | -.696 | -.901 | -1.062 | -1.446 | -1.497 |
| | [a].200 | -1.207 | -1.180 | -.934 | -.806 | -.689 | -.560 | -.442 | -.328 | -.215 | -.178 | -.279 | -.361 | -.496 | -.626 | -.763 | -.840 | -.978 | -1.223 |
| | .300 | -1.021 | -.889 | -.772 | -.712 | -.626 | -.552 | -.465 | -.379 | -.290 | -.258 | -.337 | -.399 | -.502 | -.593 | -.684 | -.727 | -.783 | -.986 |
| | .400 | -.799 | -.705 | -.666 | -.631 | -.570 | -.518 | -.456 | -.395 | -.326 | -.303 | -.362 | -.407 | -.483 | -.546 | -.614 | -.648 | -.667 | -.776 |
| | .500 | -.616 | -.573 | -.583 | -.569 | -.531 | -.497 | -.456 | -.411 | -.357 | -.339 | -.387 | -.417 | -.475 | -.518 | -.566 | -.582 | -.580 | -.609 |
| | .600 | -.480 | -.470 | -.509 | -.515 | -.496 | -.480 | -.456 | -.429 | -.395 | -.378 | -.416 | -.433 | -.475 | -.499 | -.526 | -.535 | -.540 | -.537 |
| | .700 | -.365 | -.373 | -.416 | -.435 | -.433 | -.434 | -.428 | -.419 | -.397 | -.388 | -.398 | -.415 | -.435 | -.435 | -.441 | -.438 | -.407 | -.384 |
| | .800 | -.262 | [a]-.263 | -.275 | [a]-.289 | -.293 | -.308 | -.330 | -.332 | -.328 | -.326 | -.335 | -.328 | -.322 | -.302 | -.292 | -.288 | -.270 | -.270 |
| | .900 | -.166 | -.128 | -.101 | -.077 | -.057 | -.071 | -.122 | -.126 | -.139 | -.138 | -.136 | -.119 | -.099 | -.065 | -.065 | -.088 | -.110 | -.161 |
| | .950 | [a]-.100 | -.037 | -.004 | .028 | .068 | .085 | .040 | .022 | .004 | .003 | 0 | .018 | .039 | .091 | .059 | .080 | -.009 | -.075 |
| Lower surface | .0375 | [a].789 | .795 | .742 | .652 | .489 | .331 | .110 | -.118 | -.410 | -.412 | -.246 | -.032 | .224 | .424 | .595 | .688 | .764 | .816 |
| | .075 | [a].642 | .671 | .533 | .448 | .311 | .193 | .026 | -.146 | -.326 | -.386 | -.234 | -.095 | .097 | .265 | .390 | .464 | .539 | .604 |
| | .150 | .478 | .437 | .381 | .312 | .195 | .103 | -.028 | -.136 | -.245 | -.286 | -.186 | -.091 | .033 | .161 | .264 | .346 | .413 | .455 |
| | .250 | .349 | .311 | .267 | .207 | .117 | .051 | -.034 | -.122 | -.203 | -.232 | -.160 | -.095 | .003 | .102 | .164 | .217 | .274 | .320 |
| | .350 | .248 | .217 | .179 | .135 | .064 | 0 | -.077 | -.142 | -.207 | -.228 | -.170 | -.115 | -.041 | .034 | .110 | .151 | .204 | .226 |
| | .450 | .176 | .151 | .122 | .080 | .015 | -.030 | -.089 | -.138 | -.188 | -.204 | -.160 | -.119 | -.060 | -.001 | .053 | .100 | .134 | .165 |
| | [a].550 | .095 | .084 | .054 | .023 | -.051 | -.061 | -.111 | -.149 | -.200 | -.213 | -.171 | -.131 | -.086 | -.039 | -.013 | .031 | .063 | .095 |
| | .650 | .037 | .024 | .015 | -.014 | -.053 | -.079 | -.116 | -.146 | -.173 | -.179 | -.158 | -.129 | -.095 | -.056 | -.039 | -.007 | .021 | .052 |
| | .750 | .014 | -.004 | .007 | -.010 | -.026 | -.042 | -.071 | -.097 | -.112 | -.115 | -.101 | -.071 | -.058 | -.031 | -.021 | -.007 | .002 | -.005 |
| | .850 | -.039 | -.016 | .005 | -.005 | -.008 | 0 | .006 | -.041 | -.040 | -.040 | -.027 | -.014 | -.007 | -.003 | -.001 | .002 | .002 | -.024 |
| | .925 | -.001 | -.008 | .015 | .012 | -.006 | 0 | .012 | .050 | .059 | .063 | .039 | .025 | .009 | .007 | .014 | .020 | [a].016 | -.020 |
| | .975 | [a].045 | [a].042 | [a].070 | [a].077 | [a].053 | [a].079 | [a].071 | .242 | .240 | .242 | [a].156 | [a].101 | [a].064 | [a].082 | [a].069 | [a].067 | [a].068 | [a].063 |
| | [a]1.000 | .159 | .137 | .198 | .269 | .307 | .407 | .405 | .444 | .401 | .450 | .602 | .363 | .325 | .389 | .309 | .207 | .262 | .317 |

[a]Faired value.

TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(d) N = 2000 rpm; $\beta_{0.75R} = 29.38°$.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | | 1.028 | 1.097 | 1.154 | 1.210 | 1.274 | 1.343 | 1.404 | 1.364 | 1.295 | 1.245 | 1.187 | 1.123 | 1.061 |
| $M_x$ | | .663 | .674 | .683 | .692 | .703 | .717 | .724 | .719 | .704 | .695 | .686 | .675 | .666 |
| $\alpha_x'$ | | 7.02 | 5.43 | 4.16 | 2.93 | 1.58 | .16 | -1.05 | -.26 | 1.14 | 2.18 | 3.43 | 4.84 | 6.25 |
| $\Delta\beta$ | | .38 | .37 | .37 | .36 | .35 | .34 | .33 | .34 | .35 | .35 | .36 | .37 | .38 |
| $\alpha_i$ | | 2.56 | 2.11 | 1.75 | 1.43 | 1.06 | .61 | .25 | .39 | .72 | 1.11 | 1.41 | 1.83 | 2.34 |
| $c_n$ | | .8132 | .6771 | .5647 | .4652 | .3465 | .2015 | .0815 | .1289 | .2372 | .3625 | .4565 | .5882 | .7458 |
| $c_m$ | | -.0191 | -.0287 | -.0360 | -.0384 | -.0433 | -.0498 | -.0551 | -.0560 | -.0561 | -.0503 | -.0462 | -.0403 | -.0273 |
| $c_a$ | | -.0599 | -.0534 | -.0350 | -.0261 | -.0166 | -.0066 | -.0048 | -.0020 | .0092 | -.0022 | -.0109 | -.0251 | -.0501 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.114 | 1.119 | 1.122 | 1.126 | 1.130 | 1.136 | 1.138 | 1.139 | 1.131 | 1.127 | 1.124 | 1.119 | 1.116 |
| | .025 | -1.806 | -1.769 | -1.681 | -.836 | -.514 | -.196 | [a]-.007 | .013 | -.006 | [a]-.269 | -.488 | -.975 | -1.551 |
| | .050 | -1.780 | -1.209 | -.862 | [a]-.773 | [a]-.511 | [a]-.253 | [a]-.078 | [a]-.053 | -.198 | -.389 | [a]-.489 | -.861 | -1.502 |
| | .100 | -1.545 | -1.002 | -.806 | -.693 | -.508 | -.324 | -.173 | -.166 | -.184 | [a]-.484 | -.501 | -.742 | [a]-1.278 |
| | [a].200 | -1.066 | -.854 | -.736 | -.641 | -.508 | -.381 | -.270 | -.303 | -.323 | -.514 | -.580 | -.739 | -.970 |
| | .300 | -.818 | -.760 | -.683 | -.610 | -.514 | -.412 | -.335 | -.374 | -.464 | -.541 | -.630 | -.719 | -.783 |
| | .400 | -.718 | -.683 | -.633 | -.587 | -.518 | -.443 | -.384 | -.414 | -.480 | -.537 | -.599 | -.656 | -.695 |
| | .500 | -.641 | -.624 | -.596 | -.569 | -.527 | -.472 | -.434 | -.456 | -.500 | -.540 | -.580 | -.610 | -.629 |
| | .600 | -.566 | -.565 | -.557 | -.548 | -.525 | -.498 | -.478 | -.491 | -.513 | -.535 | -.561 | -.579 | -.591 |
| | .700 | -.447 | -.460 | -.466 | -.471 | -.471 | -.464 | -.464 | -.466 | -.468 | -.472 | -.476 | -.468 | -.455 |
| | .800 | -.250 | -.272 | -.290 | -.309 | -.326 | -.337 | -.352 | -.347 | -.333 | -.322 | -.308 | -.286 | -.261 |
| | .900 | -.015 | -.022 | -.031 | -.044 | -.068 | -.085 | -.106 | -.098 | -.077 | -.057 | -.042 | -.028 | -.022 |
| | .950 | .055 | .059 | .067 | .078 | .077 | .070 | .056 | .056 | .068 | .074 | .070 | .062 | .051 |
| Lower surface | .0375 | .630 | .519 | .363 | .265 | .067 | -.181 | -.483 | -.314 | -.028 | .137 | .311 | .462 | .576 |
| | .075 | .436 | .333 | .229 | .126 | -.021 | -.198 | -.361 | -.281 | -.092 | .026 | .156 | .280 | .379 |
| | .150 | .298 | .216 | .135 | .056 | -.051 | -.171 | -.293 | -.229 | -.097 | -.016 | .080 | .174 | .252 |
| | .250 | .203 | .137 | .073 | .010 | -.071 | -.158 | [a]-.254 | -.201 | -.106 | -.046 | .029 | .103 | .169 |
| | .350 | .124 | .065 | .009 | -.042 | -.109 | -.187 | [a]-.252 | -.224 | [a]-.126 | -.088 | -.026 | .037 | .092 |
| | .450 | .071 | .020 | -.027 | -.068 | -.126 | -.188 | -.254 | -.218 | -.147 | -.109 | -.056 | -.003 | .046 |
| | .550 | .024 | -.025 | -.065 | -.102 | -.148 | -.201 | -.254 | -.225 | -.165 | -.132 | -.089 | -.044 | -.003 |
| | .650 | -.030 | -.066 | -.097 | -.123 | -.159 | -.198 | -.238 | -.217 | -.173 | -.150 | -.117 | -.080 | -.043 |
| | .750 | -.027 | -.052 | -.075 | -.091 | -.114 | -.136 | -.160 | -.150 | -.120 | -.110 | -.087 | -.065 | -.037 |
| | .850 | -.024 | -.037 | -.049 | -.052 | -.059 | -.062 | -.066 | -.066 | -.070 | -.060 | -.054 | -.043 | -.030 |
| | .925 | .018 | .015 | .016 | .022 | .028 | .039 | .045 | .042 | .038 | .022 | .016 | .015 | .018 |
| | .975 | .022 | .046 | .054 | .080 | .103 | .125 | .144 | .136 | .119 | .108 | .092 | .074 | .064 |
| | [a]1.000 | .135 | .103 | .174 | .163 | .202 | .191 | .225 | .221 | .202 | .183 | .163 | .133 | .207 |

[a]Paired value.

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TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(e) N = 2160 rpm; $\beta_{0.75R} = 29.38°$.

| | J | 1.105 | 1.165 | 1.230 | 1.290 | 1.345 | 1.359 | 1.320 | 1.256 | 1.190 | 1.126 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | .726 | .737 | .749 | .762 | .769 | .774 | .762 | .749 | .739 | .725 |
| | $\alpha_r'$ | 5.25 | 3.91 | 2.50 | 1.24 | .11 | -.16 | .63 | 1.96 | 3.37 | 4.78 |
| | $\Delta\beta$ | .44 | .43 | .42 | .41 | .40 | .40 | .41 | .42 | .42 | .43 |
| | $\alpha_1$ | 1.94 | 1.67 | 1.29 | .89 | .53 | .30 | .61 | .94 | 1.42 | 1.86 |
| | $c_n$ | .6214 | .5412 | .4203 | .2939 | .1744 | .0980 | .2000 | .3048 | .4607 | .5966 |
| | $c_m$ | -.0443 | -.0438 | -.0477 | -.0529 | -.0591 | -.0600 | -.0528 | -.0535 | -.0482 | -.0410 |
| | $c_o$ | -.0314 | -.0273 | -.0142 | -.0045 | .0027 | .0037 | .0070 | .0059 | -.0143 | -.0237 |
| | x/b | Pressure coefficient, P | | | | | | | | | |
| Upper surface | 0.000 | 1.140 | 1.144 | 1.149 | 1.154 | 1.157 | 1.159 | 1.154 | 1.149 | 1.145 | 1.139 |
| | .025 | -.952 | [a]-.827 | [a]-.548 | [a]-.230 | [a]-.030 | [a]-.140 | .082 | -.075 | [a]-.698 | [a]-.895 |
| | .050 | -.878 | -.753 | -.514 | -.274 | -.105 | -.028 | -.089 | -.267 | [a]-.586 | [a]-.824 |
| | .100 | -.739 | -.660 | -.481 | -.301 | -.167 | -.096 | -.197 | -.340 | -.539 | -.741 |
| | [a].200 | -.771 | -.679 | -.548 | -.427 | -.335 | -.287 | -.378 | -.454 | -.601 | -.779 |
| | .300 | -.792 | -.784 | -.627 | -.518 | -.428 | -.381 | -.449 | -.540 | -.654 | -.785 |
| | .400 | -.783 | -.709 | -.633 | -.550 | -.478 | -.438 | -.494 | -.568 | -.654 | -.759 |
| | .500 | -.750 | -.695 | -.649 | -.592 | -.537 | -.508 | -.552 | -.606 | -.667 | -.735 |
| | .600 | -.675 | -.659 | -.653 | -.635 | -.606 | -.601 | -.623 | -.642 | -.663 | -.671 |
| | .700 | -.508 | -.504 | -.520 | -.548 | -.575 | -.592 | -.569 | -.540 | -.527 | -.509 |
| | .800 | -.281 | -.284 | -.304 | -.328 | -.337 | -.349 | -.341 | -.326 | -.313 | -.282 |
| | .900 | -.024 | -.014 | -.021 | -.039 | -.050 | -.066 | -.061 | -.041 | -.029 | -.025 |
| | .950 | .143 | .140 | .133 | .082 | .067 | .073 | .076 | .073 | .074 | .144 |
| Lower surface | .0375 | .422 | .312 | .170 | .015 | -.164 | -.349 | -.156 | .041 | .226 | .378 |
| | .075 | .294 | .205 | .059 | -.070 | -.185 | -.306 | -.192 | -.037 | .075 | .234 |
| | .150 | .169 | .117 | .021 | -.086 | -.187 | -.251 | -.171 | -.067 | .046 | .184 |
| | .250 | .122 | .067 | -.016 | -.104 | -.171 | -.222 | -.167 | -.091 | -.002 | .090 |
| | .350 | .033 | -.007 | -.076 | -.147 | -.208 | -.259 | -.206 | -.142 | -.064 | .022 |
| | .450 | .003 | -.037 | -.093 | -.164 | -.213 | -.255 | -.209 | -.145 | -.084 | -.018 |
| | [a].550 | -.082 | -.092 | -.125 | -.171 | -.231 | -.262 | -.232 | -.162 | -.122 | -.061 |
| | .650 | -.094 | -.116 | -.155 | -.195 | -.228 | -.274 | -.244 | -.198 | -.153 | -.109 |
| | .750 | -.057 | -.076 | -.118 | -.147 | -.170 | -.195 | -.177 | -.151 | -.120 | -.092 |
| | .850 | -.060 | -.060 | -.075 | -.081 | -.082 | -.099 | -.097 | -.087 | -.076 | -.068 |
| | .925 | -.039 | -.014 | .006 | .020 | .031 | .021 | .017 | .009 | .005 | -.005 |
| | .975 | .194 | .201 | .141 | .145 | .122 | .110 | .105 | .091 | .086 | .059 |
| | [a]1.000 | .648 | .510 | .406 | .282 | .251 | .281 | .302 | .273 | .285 | .411 |

[a]Faired value.

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TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(f) N = 1140 rpm; $\beta_{0.75R}$ = 44.55°.

| | J | 1.494 | 1.664 | 1.781 | 1.917 | 2.029 | 2.166 | 2.276 | 2.413 | 2.548 | 2.446 | 2.349 | 2.228 | 2.057 | 1.987 | 1.858 | 1.719 | 1.603 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_R$ | .415 | .437 | .456 | .467 | .483 | .502 | .516 | .534 | .555 | .539 | .527 | .511 | .488 | .476 | .463 | .444 | .431 |
| | $\alpha_R'$ | 11.41 | 9.37 | 7.41 | 5.31 | 3.69 | 1.82 | .42 | -1.21 | -2.70 | -1.57 | -.47 | 1.03 | 3.29 | 4.30 | .623 | .845 | 10.42 |
| | $\Delta\beta$ | .14 | .14 | .14 | .13 | .13 | .12 | .12 | .11 | .11 | .11 | .12 | .12 | .13 | .13 | .13 | .14 | .14 |
| | $\alpha_i$ | 3.04 | 2.52 | 2.16 | 1.68 | 1.27 | .96 | .70 | .38 | .07 | .27 | .46 | .79 | 1.22 | 1.44 | 1.85 | 2.43 | 2.76 |
| | $c_n$ | 1.0554 | .8832 | .7626 | .5934 | .4543 | .3426 | .2529 | .1372 | .0245 | .0975 | .1662 | .2820 | .4340 | .5118 | .6546 | .8521 | .9652 |
| | $c_m$ | -.0254 | -.0097 | -.0297 | -.0321 | -.0415 | -.0448 | -.0573 | -.0686 | -.0722 | -.0683 | -.0715 | -.0537 | -.0425 | -.0365 | -.0317 | -.0152 | -.0008 |
| | $c_o$ | -.0693 | -.0593 | -.0424 | -.0259 | -.0074 | -.0036 | .0006 | .0045 | .0066 | .0087 | .0091 | .0007 | -.0145 | -.0237 | -.0446 | -.0791 | -.0904 |
| | o/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.044 | 1.049 | 1.053 | 1.056 | 1.060 | 1.064 | 1.068 | 1.073 | 1.079 | 1.074 | 1.071 | 1.067 | 1.061 | 1.058 | 1.055 | 1.051 | 1.048 |
| | .025 | -3.097 | -2.785 | [a]-2.079 | [a]-1.437 | [a]-.701 | [a]-.470 | [a]-.198 | .017 | .259 | .233 | .208 | -.153 | [a]-.748 | [a]-.904 | [a]-1.488 | [a]-2.729 | [a]-2.988 |
| | .050 | -3.077 | -2.776 | [a]-2.039 | [a]-1.422 | -.682 | -.460 | -.237 | -.035 | .145 | .060 | -.064 | -.296 | [a]-.635 | -.788 | [a]-1.149 | [a]-2.439 | [a]-2.874 |
| | .100 | -1.632 | -1.823 | [a]-1.100 | -.793 | -.598 | -.432 | [a]-.274 | -.119 | .020 | -.083 | -.179 | [a]-.346 | -.557 | -.667 | -.861 | -1.532 | -2.095 |
| | [a].200 | -1.363 | -.978 | -.805 | -.668 | -.556 | -.445 | -.339 | -.240 | -.122 | -.206 | -.284 | -.392 | -.532 | -.604 | -.711 | -.874 | -1.069 |
| | .300 | -1.170 | -.747 | -.688 | -.606 | -.528 | -.446 | -.378 | -.300 | -.225 | -.283 | -.332 | -.410 | -.514 | -.562 | -.644 | -.696 | -.766 |
| | .400 | -.879 | -.616 | -.606 | -.549 | -.495 | -.436 | -.387 | -.326 | -.270 | -.313 | -.352 | -.410 | -.488 | -.519 | -.577 | -.625 | -.632 |
| | .500 | -.654 | -.531 | -.546 | -.508 | -.472 | -.434 | -.398 | -.354 | -.313 | -.347 | -.377 | -.415 | -.468 | -.488 | -.529 | -.556 | -.540 |
| | .600 | -.502 | -.459 | -.488 | -.473 | -.454 | -.434 | -.410 | -.384 | -.354 | -.377 | -.399 | -.422 | -.453 | -.467 | -.485 | -.497 | -.458 |
| | .700 | -.386 | -.365 | -.405 | -.405 | -.402 | -.399 | -.398 | -.384 | -.368 | -.381 | -.397 | -.398 | -.406 | -.409 | -.415 | -.408 | -.360 |
| | .800 | -.284 | -.239 | -.269 | -.269 | -.284 | -.301 | -.333 | -.332 | -.327 | -.334 | -.341 | -.317 | -.294 | -.286 | -.276 | -.270 | -.238 |
| | .900 | -.187 | -.096 | -.072 | -.050 | -.060 | -.088 | -.138 | [a]-.156 | -.164 | -.152 | -.151 | -.119 | -.070 | -.060 | -.062 | [a]-.104 | -.118 |
| | .950 | -.134 | -.032 | .017 | .059 | .062 | .047 | -.020 | -.039 | -.057 | -.056 | -.048 | .008 | .050 | .057 | .033 | -.005 | -.064 |
| Lower surface | .0375 | [a].902 | .784 | .705 | .558 | .387 | .164 | -.068 | -.282 | -.480 | -.328 | -.213 | .039 | .339 | .446 | .619 | .735 | .821 |
| | .075 | .665 | .659 | [a].492 | [a].312 | .228 | .057 | -.101 | -.247 | -.425 | -.296 | -.193 | -.027 | .185 | .275 | .418 | .526 | .624 |
| | .150 | .482 | .414 | .341 | .183 | .132 | .011 | -.096 | -.188 | -.305 | -.220 | -.153 | -.046 | .104 | .165 | .276 | .371 | .449 |
| | .250 | .358 | .298 | .237 | .156 | .076 | -.017 | -.091 | -.149 | -.231 | -.173 | -.128 | -.058 | .052 | .099 | .184 | .266 | .322 |
| | .350 | .252 | .201 | .153 | .083 | .024 | -.049 | -.112 | -.160 | -.221 | -.177 | -.142 | -.084 | .002 | .043 | .111 | .172 | .221 |
| | .450 | .139 | .112 | .095 | .043 | -.009 | -.068 | -.112 | -.152 | -.196 | -.165 | -.137 | -.093 | -.024 | .007 | .062 | .079 | .156 |
| | .550 | .126 | .078 | .038 | .002 | -.042 | -.093 | -.136 | -.167 | -.196 | -.173 | -.153 | -.117 | -.059 | -.030 | .014 | .041 | .077 |
| | .650 | .041 | .048 | .029 | -.028 | -.057 | -.093 | -.117 | -.136 | -.155 | -.141 | -.130 | -.109 | -.070 | -.052 | -.019 | .013 | .046 |
| | .750 | -.006 | .014 | .006 | -.017 | -.037 | -.058 | -.050 | -.071 | -.078 | -.069 | -.068 | -.069 | -.049 | -.035 | -.016 | .007 | .008 |
| | .850 | -.042 | -.001 | .020 | .007 | -.019 | -.034 | -.041 | -.013 | -.006 | 0 | -.006 | -.022 | -.024 | -.017 | -.003 | .004 | -.014 |
| | .925 | -.049 | .017 | [a].028 | .015 | .032 | .038 | .069 | .089 | .096 | .072 | .070 | .058 | .032 | .033 | .025 | .022 | -.011 |
| | .975 | .014 | .057 | .094 | .078 | .092 | .111 | .164 | .177 | .190 | .188 | .175 | .136 | .084 | .078 | .084 | .079 | .033 |
| | [a]1.000 | .143 | .204 | .183 | .253 | .207 | .241 | .251 | .276 | .275 | .276 | .276 | .221 | .202 | .192 | .202 | .173 | .102 |

[a]Faired value.

TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(g) N = 1350 rpm; $\beta_{0.75R} = 44.55°$

| | J | 1.509 | 1.621 | 1.765 | 1.873 | 1.970 | 2.062 | 2.193 | 2.289 | 2.412 | 2.516 | 2.630 | 2.744 | 2.184 | 2.134 | 2.013 | 1.891 | 1.812 | 1.698 | 1.577 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .500 | .513 | .536 | .552 | .567 | .578 | .598 | .614 | .636 | .653 | .637 | .624 | .596 | .589 | .568 | .552 | .540 | .521 | .508 |
| | $\alpha_x'$ | 12.12 | 10.11 | 7.68 | 5.98 | 4.53 | 3.23 | 1.48 | .27 | -1.19 | -2.36 | -1.40 | -.40 | 1.60 | 2.25 | 3.92 | 5.71 | 6.93 | 8.79 | 10.88 |
| | $\Delta\beta_{0.75R}$ | .19 | .19 | .18 | .18 | .18 | .17 | .16 | .16 | .15 | .14 | .15 | .16 | .17 | .17 | .17 | .18 | .18 | .19 | .19 |
| | $\alpha_i$ | 2.85 | 2.54 | 2.21 | 1.91 | 1.63 | 1.32 | .95 | .72 | .32 | .06 | .17 | .41 | .86 | 1.04 | 1.41 | 1.79 | 2.06 | 2.39 | 2.72 |
| | $c_n$ | .9895 | .8869 | .7770 | .6743 | .5808 | .4708 | .3420 | .2607 | .1165 | .0226 | .0615 | .1486 | .3097 | .3714 | .5047 | .6329 | .7286 | .8375 | .9505 |
| | $c_{m_{c/4}}$ | -.0640 | -.0329 | -.0351 | -.0328 | -.0372 | -.0354 | -.0426 | -.0512 | -.0600 | -.0611 | -.0640 | -.0569 | -.0511 | -.0458 | -.0399 | -.0318 | -.0330 | -.0251 | -.0191 |
| | $c_a$ | -.0241 | -.0324 | -.0315 | -.0266 | -.0224 | -.0247 | -.0155 | -.0089 | .0065 | .0109 | .0160 | .0049 | .0099 | -.0029 | -.0082 | -.0327 | -.0495 | -.0491 | -.0659 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.064 | 1.067 | 1.073 | 1.078 | 1.082 | 1.086 | 1.092 | 1.097 | 1.105 | 1.111 | 1.105 | 1.101 | 1.091 | 1.089 | 1.083 | 1.078 | 1.075 | 1.069 | 1.066 |
| | .025 | [a]-1.242 | -1.317 | -1.568 | -1.493 | -1.395 | -1.177 | -.639 | -.405 | [a].062 | [a].230 | [a].441 | .102 | .047 | -.395 | -.783 | -1.338 | -1.682 | -1.864 | 2.019 |
| | .050 | -1.502 | -1.739 | -1.803 | -1.678 | -1.569 | -.745 | [a]-.460 | -.254 | [a].062 | .117 | .091 | -.086 | -.358 | -.498 | -.779 | -1.079 | -1.497 | -1.891 | 2.052 |
| | .100 | -1.458 | -1.736 | -1.293 | -.944 | -.776 | -.598 | -.420 | -.263 | -.108 | .013 | -.067 | -.187 | -.414 | -.494 | -.684 | -.890 | -1.013 | -1.589 | 1.923 |
| | [a].200 | -1.339 | -1.295 | -.985 | -.789 | -.691 | -.588 | -.453 | -.348 | -.247 | -.157 | -.241 | -.315 | -.462 | -.503 | -.626 | -.770 | -.840 | -.962 | 1.209 |
| | .300 | -1.201 | -.966 | -.764 | -.697 | -.632 | -.568 | -.470 | -.404 | -.329 | -.260 | -.309 | -.367 | -.475 | -.507 | -.599 | -.682 | -.733 | -.769 | .919 |
| | .400 | -1.013 | -.719 | -.662 | -.620 | -.577 | -.535 | -.465 | -.415 | -.361 | -.309 | -.348 | -.389 | -.473 | -.491 | -.554 | -.614 | -.649 | -.667 | .722 |
| | .500 | -.794 | -.575 | -.585 | -.565 | -.538 | -.516 | -.465 | -.427 | -.392 | -.356 | -.386 | -.411 | -.473 | -.485 | -.526 | -.562 | -.589 | -.588 | .596 |
| | .600 | -.618 | -.476 | -.517 | -.512 | -.503 | -.497 | -.465 | -.440 | -.422 | -.399 | -.424 | -.435 | -.490 | -.481 | -.507 | [a]-.496 | -.529 | -.515 | .496 |
| | .700 | -.476 | -.379 | -.418 | -.425 | -.431 | -.442 | -.427 | -.415 | -.414 | -.405 | -.421 | -.418 | -.443 | -.431 | -.437 | [a]-.414 | -.439 | -.419 | .393 |
| | .800 | -.354 | -.263 | -.273 | -.275 | -.287 | -.311 | -.314 | -.313 | -.334 | -.337 | -.345 | -.329 | -.381 | -.315 | -.302 | [a]-.287 | -.288 | -.274 | .276 |
| | .900 | -.255 | -.139 | -.082 | -.051 | -.046 | -.070 | -.078 | -.088 | -.118 | -.128 | -.132 | -.108 | -.098 | -.078 | -.060 | -.056 | -.069 | -.098 | .159 |
| | .950 | -.200 | -.086 | .003 | .040 | .057 | .054 | .059 | .056 | .032 | .023 | .018 | .039 | .038 | .053 | .055 | .041 | .021 | -.020 | .098 |
| Lower surface | .0375 | .730 | .733 | .689 | .613 | .484 | .308 | .103 | -.066 | -.304 | -.446 | -.361 | -.200 | .086 | .199 | .405 | .569 | .658 | [a].733 | [a].768 |
| | .075 | .619 | .585 | .506 | .406 | .308 | .182 | [a].023 | -.093 | -.276 | -.443 | -.351 | -.192 | [a].020 | .079 | .238 | [a].328 | .447 | .531 | .602 |
| | .150 | .488 | .422 | .350 | .287 | .189 | .087 | -.012 | -.092 | -.214 | -.324 | -.266 | -.156 | -.029 | .027 | .137 | .251 | .305 | .370 | .432 |
| | .250 | .389 | .297 | .241 | .177 | .115 | .044 | [a]-.055 | -.087 | -.179 | -.260 | -.217 | -.134 | -.044 | .003 | .077 | .164 | .200 | .257 | .305 |
| | .350 | .222 | .193 | .149 | .100 | .049 | -.022 | -.080 | [a]-.112 | -.189 | -.251 | -.219 | -.156 | -.087 | [a]-.049 | .017 | .081 | .123 | .167 | .205 |
| | .450 | .149 | .129 | .088 | .057 | -.001 | -.052 | -.097 | [a]-.133 | [a]-.196 | [a]-.245 | [a]-.223 | [a]-.182 | [a]-.134 | [a]-.084 | -.022 | .016 | .067 | .090 | .119 |
| | .550 | .048 | .033 | .027 | -.014 | -.038 | -.082 | -.113 | [a]-.142 | -.193 | [a]-.225 | [a]-.212 | -.176 | -.141 | -.107 | -.054 | [a]-.029 | [a].028 | .043 | [a].062 |
| | .650 | .048 | .049 | [a].003 | [a]-.026 | -.036 | [a]-.085 | -.113 | [a]-.137 | -.151 | [a]-.171 | [a]-.167 | -.149 | -.130 | -.101 | -.072 | -.039 | 0.017 | .017 | .011 |
| | .750 | -.028 | .016 | [a]-.011 | [a]-.029 | -.011 | [a]-.080 | [a]-.077 | [a]-.085 | -.080 | [a]-.113 | [a]-.119 | [a]-.103 | [a]-.089 | [a]-.074 | [a]-.071 | -.031 | -.013 | -.007 | -.029 |
| | .850 | -.076 | -.032 | -.016 | -.018 | -.015 | -.032 | -.026 | [a]0 | -.024 | -.044 | -.061 | -.047 | -.042 | -.041 | -.030 | -.014 | -.008 | -.014 | -.041 |
| | .925 | -.086 | -.020 | .018 | .017 | .007 | .003 | .015 | [a].072 | .016 | .023 | .025 | .008 | -.009 | -.006 | [a].027 | -.006 | -.004 | -.009 | -.039 |
| | .975 | [a]-.065 | .067 | .136 | .144 | .097 | .068 | .092 | .126 | .128 | .137 | .133 | .127 | .106 | .099 | .092 | .079 | .094 | .099 | .065 |
| | [a]1.000 | .051 | .184 | .305 | .324 | .273 | .242 | .236 | .226 | .401 | .250 | .276 | .411 | .402 | .375 | .227 | .455 | .558 | .560 | .574 |

[a]Paired value.

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TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(h) N = 1600 rpm; $\beta_{0.75R} = 44.55°$.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.965 | 2.056 | 2.139 | 2.236 | 2.340 | 2.435 | 2.399 | 2.305 | 2.180 | 2.101 | 2.006 |
| | $M_t$ | .668 | .685 | .701 | .720 | .740 | .759 | .750 | .729 | .705 | .686 | .669 |
| | $\beta_i$ | 4.60 | 3.32 | 2.18 | .93 | -.33 | -1.46 | -1.03 | .08 | 1.66 | 2.69 | 4.03 |
| | $\Delta\beta$ | .27 | .26 | .25 | .24 | .22 | .21 | .22 | .23 | .24 | .25 | .26 |
| | $\alpha_i$ | 1.79 | 1.47 | 1.18 | .78 | .42 | .07 | .18 | .46 | .96 | 1.24 | 1.56 |
| | $c_n$ | .6362 | .5246 | .4220 | .2801 | .1505 | .0259 | .0662 | .1667 | .3432 | .4428 | .5577 |
| | $c_m$ | -.0384 | -.0353 | -.0365 | -.0436 | -.0501 | -.0566 | -.0589 | -.0488 | -.0405 | -.0365 | -.0317 |
| | $c_c$ | -.0361 | -.0259 | -.0192 | -.0093 | -.0052 | -.0052 | -.0001 | -.0009 | -.0059 | -.0143 | -.0241 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.116 | 1.123 | 1.130 | 1.137 | 1.145 | 1.153 | 1.149 | 1.141 | 1.131 | 1.124 | 1.117 |
| | .025 | -1.348 | -.912 | -.602 | -.254 | .005 | .201 | .195 | .106 | -.272 | -.537 | -.861 |
| | .050 | -.974 | -.762 | -.528 | -.262 | -.057 | .122 | .090 | -.071 | -.372 | -.587 | -.892 |
| | .100 | -.920 | -.740 | -.560 | -.358 | -.193 | -.045 | -.087 | -.223 | -.461 | -.618 | -.815 |
| | [a].200 | -.825 | -.706 | -.592 | -.462 | -.356 | -.243 | -.265 | -.374 | -.531 | -.627 | -.754 |
| | .300 | -.729 | -.664 | -.590 | -.501 | -.415 | -.328 | -.353 | -.431 | -.548 | -.615 | -.687 |
| | .400 | -.653 | -.611 | -.567 | -.510 | -.450 | -.388 | -.405 | -.458 | -.536 | -.583 | -.626 |
| | .500 | -.593 | -.570 | -.545 | -.515 | -.481 | -.443 | -.452 | -.486 | -.528 | -.555 | -.579 |
| | .600 | -.542 | -.531 | -.525 | -.515 | -.502 | -.494 | -.495 | -.505 | -.518 | -.531 | -.554 |
| | .700 | -.441 | -.444 | -.453 | -.455 | -.455 | -.462 | -.458 | -.455 | -.451 | -.454 | -.448 |
| | .800 | -.260 | -.272 | -.288 | -.299 | -.309 | -.316 | -.311 | -.307 | -.293 | -.289 | -.271 |
| | .900 | -.003 | -.009 | -.021 | -.030 | -.045 | -.056 | -.050 | -.041 | -.026 | -.023 | -.012 |
| | .950 | .078 | .128 | .121 | .088 | .092 | .081 | .084 | .084 | .087 | .085 | .080 |
| Lower surface | .0375 | .517 | .326 | .180 | -.018 | -.259 | -.758 | -.540 | -.215 | .113 | .255 | .397 |
| | .075 | .325 | .211 | .089 | -.073 | -.231 | -.396 | -.359 | -.207 | .026 | .137 | .281 |
| | .150 | .207 | .134 | .044 | -.078 | -.193 | -.334 | -.287 | -.168 | -.006 | .073 | .164 |
| | .250 | .131 | .071 | .001 | -.095 | -.180 | -.286 | -.248 | -.163 | -.037 | .022 | .095 |
| | .350 | .062 | .011 | -.051 | -.130 | -.199 | -.284 | -.252 | -.183 | -.081 | -.030 | .034 |
| | .450 | .018 | -.025 | -.081 | -.144 | -.197 | -.267 | -.242 | -.185 | -.102 | -.058 | -.006 |
| | .550 | -.025 | -.060 | -.100 | -.158 | -.207 | -.263 | -.239 | -.196 | -.125 | -.092 | -.045 |
| | .650 | -.055 | -.083 | -.116 | -.160 | -.196 | -.239 | -.223 | -.193 | -.137 | -.110 | -.074 |
| | .750 | -.041 | -.058 | -.084 | -.114 | -.134 | -.158 | -.150 | -.132 | -.098 | -.080 | -.051 |
| | .850 | .015 | .005 | -.014 | -.028 | -.035 | -.043 | -.047 | -.068 | -.098 | -.098 | -.083 |
| | .925 | .021 | .020 | .024 | .026 | .035 | .041 | .035 | .023 | .017 | .015 | .016 |
| | .975 | .035 | .054 | .066 | .084 | .098 | .115 | .109 | .094 | .069 | .055 | .039 |
| | [a]1.000 | .232 | .333 | .383 | .261 | .309 | .276 | .302 | .276 | .255 | .227 | .228 |

[a]Faired value.

TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(i) M = 0.56; $\beta_{0.75R}$ = 44.55°

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.034 | 2.071 | 2.099 | 2.155 | 2.187 | 2.254 | 2.272 | 2.330 | 2.387 | 2.438 | 2.523 |
| | $M_x$ | .774 | .764 | .759 | .755 | .746 | .740 | .738 | .727 | .720 | .712 | .709 |
| | $\alpha_x'$ | 3.62 | 3.11 | 2.72 | 1.98 | 1.56 | .71 | .48 | -.23 | -.90 | -1.49 | -2.44 |
| | $\Delta\beta$ | .32 | .31 | .30 | .28 | .27 | .25 | .25 | .23 | .21 | .20 | .17 |
| | $\alpha_i$ | 1.41 | 1.40 | 1.31 | 1.15 | 1.02 | .82 | .73 | .57 | .41 | .27 | .07 |
| | $c_n$ | .5019 | .5010 | .4698 | .4118 | .3668 | .2940 | .2699 | .2073 | .1499 | .0992 | .0237 |
| | $c_m$ | -.0480 | -.0472 | -.0457 | -.0465 | -.0459 | -.0498 | -.0519 | -.0573 | -.0643 | -.0667 | -.0730 |
| | $c_c$ | -.0111 | -.0132 | -.0175 | -.0128 | -.0093 | -.0066 | -.0067 | -.0011 | .0026 | -.0005 | .0002 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.159 | 1.155 | 1.153 | 1.151 | 1.148 | 1.145 | 1.144 | 1.140 | 1.137 | 1.134 | 1.133 |
| | .025 | -.503 | -.535 | -.551 | -.463 | -.388 | -.222 | -.187 | -.076 | .048 | .130 | .250 |
| | .050 | -.559 | -.575 | -.527 | -.432 | -.371 | -.248 | -.209 | -.132 | -.030 | .050 | .155 |
| | .100 | -.584 | -.596 | -.556 | -.475 | -.430 | -.325 | -.298 | -.229 | -.145 | -.083 | .005 |
| | [a].200 | -.660 | -.630 | -.625 | -.566 | -.525 | -.444 | -.420 | -.355 | -.303 | -.269 | -.197 |
| | .300 | -.731 | -.712 | -.674 | -.637 | -.602 | -.523 | -.502 | -.450 | -.389 | -.345 | -.282 |
| | .400 | -.764 | -.762 | -.707 | -.642 | -.603 | -.538 | -.519 | -.478 | -.427 | -.389 | -.339 |
| | .500 | -.746 | -.741 | -.694 | -.640 | -.607 | -.558 | -.540 | -.508 | -.467 | -.436 | -.396 |
| | .600 | -.711 | -.708 | -.661 | -.613 | -.594 | -.564 | -.552 | -.533 | -.504 | -.480 | -.451 |
| | .700 | -.458 | -.474 | -.480 | -.483 | -.490 | -.489 | -.487 | -.486 | -.478 | -.469 | -.455 |
| | .800 | -.232 | -.254 | -.267 | -.279 | -.298 | -.314 | -.318 | -.335 | -.350 | -.358 | -.366 |
| | .900 | .015 | .009 | .007 | .003 | -.012 | -.028 | -.032 | -.053 | -.071 | -.088 | -.111 |
| | .950 | .094 | .089 | .093 | .100 | .094 | .098 | .097 | .087 | .080 | .072 | .054 |
| Lower surface | .0375 | .318 | .282 | .237 | .158 | .094 | -.031 | -.066 | -.179 | -.323 | -.458 | -.685 |
| | .075 | .186 | .156 | .123 | .061 | .005 | -.085 | -.109 | -.187 | -.270 | -.339 | -.446 |
| | .150 | .109 | .085 | .058 | .015 | -.025 | -.091 | -.104 | -.158 | -.211 | -.263 | -.340 |
| | .250 | .037 | .016 | -.001 | -.033 | -.064 | -.112 | -.122 | -.162 | -.200 | -.234 | -.285 |
| | .350 | -.018 | -.036 | -.049 | -.074 | -.100 | -.138 | -.144 | -.173 | -.200 | -.226 | -.264 |
| | .450 | -.054 | -.068 | -.078 | -.098 | -.120 | -.146 | -.151 | -.175 | -.193 | -.210 | -.236 |
| | .550 | -.096 | -.108 | -.113 | -.127 | -.147 | -.167 | -.167 | -.183 | -.193 | -.204 | -.222 |
| | .650 | -.123 | -.134 | -.133 | -.140 | -.154 | -.167 | -.167 | -.176 | -.177 | -.183 | -.192 |
| | .750 | -.094 | -.102 | -.099 | -.100 | -.110 | -.114 | -.113 | -.117 | -.109 | -.109 | -.110 |
| | .850 | -.057 | -.060 | -.054 | -.049 | -.056 | -.051 | -.047 | -.043 | -.030 | -.025 | -.019 |
| | .925 | .005 | .003 | .011 | .020 | .016 | .030 | .036 | .041 | .057 | .066 | .077 |
| | .975 | .042 | .045 | .056 | .068 | .067 | .085 | .091 | .101 | .113 | .119 | .136 |
| | [a]1.000 | .120 | .120 | .120 | .142 | .150 | .175 | .185 | .160 | .200 | .195 | .175 |

[a]Paired value.

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TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Continued

(j) M = 0.60; $\beta_{0.75R}$ = 44.55°.

| | J | 2.036 | 2.070 | 2.112 | 2.152 | 2.183 | 2.223 | 2.245 | 2.308 | 2.358 | 2.393 | 2.440 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .833 | .822 | .815 | .808 | .799 | .793 | .787 | .779 | .778 | .770 | .768 |
| | $\alpha_x'$ | 3.59 | 3.12 | 2.55 | 2.02 | 1.61 | 1.10 | .82 | .04 | -.56 | -.97 | -1.51 |
| | $\Delta\beta$ | .34 | .33 | .32 | .30 | .29 | .28 | .27 | .25 | .23 | .22 | .21 |
| | $\alpha_1$ | 1.18 | 1.22 | 1.15 | 1.05 | .92 | .80 | .70 | .57 | .42 | .28 | .13 |
| | $\alpha_n$ | .4212 | .4341 | .4096 | .3753 | .3295 | .2875 | .2500 | .2067 | .1505 | .1014 | .0481 |
| | $\alpha_m$ | -.0535 | -.0562 | -.0575 | -.0570 | -.0506 | -.0499 | -.0501 | -.0637 | -.0595 | -.0632 | -.0655 |
| | $\alpha_0$ | .0112 | .0078 | .0043 | .0031 | .0010 | -.0033 | -.0025 | .0017 | -.0035 | -.0025 | -.0027 |
| | o/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.185 | 1.180 | 1.177 | 1.174 | 1.170 | 1.167 | 1.164 | 1.161 | 1.161 | 1.158 | 1.156 |
| | .025 | -.229 | -.260 | -.276 | -.288 | -.254 | -.181 | -.122 | -.012 | .059 | .126 | .194 |
| | .050 | -.347 | -.373 | -.339 | -.300 | -.246 | -.184 | -.141 | -.057 | -.002 | .055 | .124 |
| | .100 | -.407 | -.427 | -.406 | -.377 | -.338 | -.287 | -.252 | -.181 | -.135 | -.088 | -.029 |
| | [a].200 | -.539 | -.551 | -.518 | -.477 | -.440 | -.431 | -.419 | -.352 | -.323 | -.282 | [a]-.230 |
| | .300 | -.645 | -.657 | -.613 | -.573 | -.543 | -.530 | -.518 | -.457 | -.422 | -.384 | -.336 |
| | .400 | -.699 | -.716 | -.691 | -.675 | -.646 | -.588 | -.564 | -.504 | -.473 | -.441 | -.398 |
| | .500 | -.744 | -.763 | -.746 | -.716 | -.676 | -.633 | -.605 | -.560 | -.536 | -.504 | -.468 |
| | .600 | -.824 | -.853 | -.831 | -.803 | -.769 | -.721 | -.685 | -.625 | -.604 | -.575 | -.538 |
| | .700 | -.609 | -.638 | -.717 | -.736 | -.663 | -.594 | -.568 | -.530 | -.529 | -.525 | -.509 |
| | .800 | -.293 | -.271 | -.238 | -.221 | -.227 | -.243 | -.265 | -.473 | -.312 | -.337 | -.347 |
| | .900 | -.205 | -.157 | -.087 | -.037 | -.008 | .017 | .010 | -.008 | -.019 | -.040 | -.055 |
| | .950 | -.112 | -.103 | -.050 | -.002 | .040 | .080 | .092 | .097 | .102 | .095 | .090 |
| Lower surface | .0375 | .229 | .212 | .158 | .114 | .041 | -.022 | -.086 | -.206 | -.307 | -.472 | -.746 |
| | .075 | .128 | .112 | .062 | .024 | -.029 | -.080 | -.127 | -.211 | -.269 | -.338 | -.398 |
| | .150 | .058 | .045 | .010 | -.017 | -.058 | -.089 | -.122 | -.180 | -.218 | -.272 | -.328 |
| | .250 | -.004 | .015 | -.038 | -.056 | -.089 | -.110 | -.135 | -.175 | -.204 | -.242 | -.282 |
| | .350 | [a]-.060 | -.079 | -.098 | -.112 | -.138 | -.152 | -.172 | -.199 | [a]-.209 | [a]-.230 | [a]-.265 |
| | .450 | -.114 | -.120 | -.134 | -.144 | -.165 | -.172 | -.185 | -.204 | -.220 | -.240 | -.259 |
| | .550 | -.172 | -.174 | -.184 | -.187 | -.202 | -.201 | -.209 | -.216 | -.229 | -.241 | -.254 |
| | .650 | -.224 | -.224 | -.221 | -.216 | -.220 | -.211 | -.214 | -.211 | -.216 | -.222 | -.226 |
| | .750 | -.207 | -.201 | -.190 | -.178 | -.171 | -.154 | -.150 | -.140 | -.140 | -.141 | -.140 |
| | .850 | -.187 | -.174 | -.149 | -.127 | -.111 | -.085 | -.079 | -.062 | -.053 | -.049 | -.042 |
| | .925 | -.146 | -.122 | -.084 | -.054 | -.033 | 0 | .010 | .033 | .046 | .052 | .059 |
| | .975 | -.153 | -.116 | -.061 | -.020 | .010 | .048 | .064 | .091 | .105 | .111 | .121 |
| | [a]1.000 | .012 | .030 | .070 | .060 | .300 | .200 | .240 | .250 | .275 | .290 | .275 |

[a]Faired value.

TABLE 4.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(09.05) PROPELLER BLADE SECTION (x = 0.60) - Concluded

(k) M = 0.65; $\beta_{0.75R} = 44.55^{\circ}$.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.035 | 2.067 | 2.101 | 2.135 | 2.171 | 2.200 | 2.239 | 2.285 | 2.311 | 2.350 | 2.385 |
| | $M_x$ | .919 | .912 | .903 | .897 | .886 | .878 | .868 | .861 | .849 | .849 | .844 |
| | $\alpha_x$' | 3.61 | 3.16 | 2.70 | 2.24 | 1.77 | 1.39 | .89 | .33 | 0 | -.47 | -.88 |
| | $\Delta\beta$ | .41 | .40 | .38 | .37 | .35 | .34 | .33 | .31 | .30 | .28 | .27 |
| | $\alpha_i$ | .86 | .86 | .72 | .64 | .55 | .49 | .40 | .29 | .19 | .07 | -.02 |
| | $c_n$ | .3049 | .3088 | .2552 | .2300 | .1982 | .1776 | .1448 | .1056 | .0667 | .0266 | -.0065 |
| | $c_m$ | -.0403 | -.0390 | -.0350 | -.0292 | -.0302 | -.0364 | -.0390 | -.0433 | -.0461 | -.0476 | -.0548 |
| | $c_c$ | .0367 | .0371 | .0362 | .0300 | .0281 | .0278 | .0253 | .0267 | .0206 | .0168 | .0117 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.229 | 1.225 | 1.222 | 1.218 | 1.212 | 1.207 | 1.202 | 1.199 | 1.193 | 1.193 | 1.191 |
| | .025 | -.031 | -.022 | -.026 | -.026 | .029 | .076 | .134 | .180 | .222 | .271 | .320 |
| | .050 | -.092 | -.094 | -.101 | -.079 | -.034 | .001 | .048 | .086 | .119 | .158 | .202 |
| | .100 | -.209 | -.198 | -.185 | -.152 | -.121 | -.095 | -.061 | -.030 | -.001 | [a].029 | .070 |
| | [a].200 | -.361 | -.360 | -.321 | -.290 | -.265 | -.235 | -.218 | -.185 | -.170 | -.179 | -.125 |
| | .300 | -.474 | -.466 | -.446 | -.404 | -.373 | -.352 | -.326 | -.316 | -.309 | -.306 | -.278 |
| | .400 | -.543 | -.543 | -.530 | -.488 | -.465 | -.456 | -.452 | -.437 | -.410 | -.389 | -.355 |
| | .500 | -.596 | -.603 | -.588 | -.551 | -.535 | -.533 | -.513 | -.492 | -.474 | -.463 | -.426 |
| | .600 | -.682 | -.686 | -.679 | -.662 | -.658 | -.656 | -.657 | -.622 | -.597 | -.584 | -.547 |
| | .700 | -.784 | -.795 | -.795 | -.765 | -.762 | -.757 | -.749 | -.740 | -.722 | -.716 | -.682 |
| | .800 | -.470 | -.435 | -.373 | -.356 | -.295 | -.273 | -.280 | -.244 | -.197 | -.158 | -.162 |
| | .900 | -.376 | -.358 | -.313 | -.257 | -.212 | -.186 | -.178 | -.169 | -.143 | -.090 | -.014 |
| | .950 | -.282 | -.302 | -.291 | -.225 | -.186 | -.160 | -.133 | -.118 | -.099 | -.061 | .014 |
| Lower surface | .0375 | .194 | .184 | .140 | .082 | .033 | -.018 | -.096 | -.180 | -.261 | -.388 | -.543 |
| | .075 | .092 | .088 | .053 | .002 | -.032 | -.070 | -.126 | -.176 | -.219 | -.265 | -.334 |
| | .150 | .046 | .056 | .018 | -.020 | -.045 | -.072 | -.133 | -.153 | -.183 | -.225 | -.263 |
| | .250 | -.015 | -.012 | -.036 | -.062 | -.076 | -.097 | -.127 | -.160 | -.182 | -.214 | -.242 |
| | .350 | -.078 | -.076 | -.097 | -.115 | -.129 | -.145 | -.171 | -.199 | -.215 | -.242 | -.258 |
| | .450 | -.122 | -.133 | -.139 | -.150 | -.160 | -.173 | -.197 | -.217 | -.227 | -.246 | -.253 |
| | .550 | -.179 | -.159 | -.190 | -.204 | -.213 | -.226 | -.244 | -.261 | -.268 | -.281 | -.281 |
| | .650 | -.291 | -.288 | -.303 | -.314 | -.322 | -.332 | -.349 | -.362 | -.363 | -.360 | -.324 |
| | .750 | -.348 | -.347 | -.361 | -.363 | -.365 | -.361 | -.364 | -.339 | -.301 | -.253 | -.189 |
| | .850 | -.413 | -.414 | -.424 | -.390 | -.365 | -.315 | -.266 | -.212 | -.166 | -.125 | -.068 |
| | .925 | -.427 | -.427 | -.421 | -.315 | -.256 | -.195 | -.148 | -.104 | -.067 | -.028 | .031 |
| | .975 | -.396 | -.428 | -.407 | -.257 | -.203 | -.154 | -.104 | -.064 | -.037 | .001 | .071 |
| | [a]1.000 | -.110 | -.200 | -.215 | -.130 | -.100 | -.060 | -.025 | .015 | .030 | .050 | .130 |

[a]Faired value.

TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70)

(a) N = 1140 rpm; $\beta_{0.75R} = 29.38^{\circ}$.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.691 | 0.776 | 0.866 | 0.957 | 1.053 | 1.150 | 1.249 | 1.349 | 1.475 | 1.413 | 1.301 | 1.205 | 1.094 | 1.001 | 0.901 | 0.815 | 0.749 |
| | $M_x$ | .381 | .390 | .399 | .401 | .422 | .424 | .436 | .453 | .461 | .454 | .442 | .430 | .421 | .415 | .404 | .391 | .377 |
| | $\alpha_x'$ | 13.92 | 11.92 | 9.86 | 7.84 | 5.77 | 3.75 | 1.77 | -.17 | -2.49 | -1.37 | .75 | 2.64 | 4.91 | 6.89 | 9.08 | 11.02 | 12.55 |
| | $\Delta\beta$ | .17 | .17 | .17 | .17 | .16 | .16 | .15 | .15 | .14 | .14 | .15 | .15 | .16 | .17 | .17 | .17 | .17 |
| | $\alpha_i$ | 3.09 | 2.94 | 2.70 | 2.41 | 2.07 | 1.47 | 1.01 | .51 | 0 | .22 | .67 | 1.23 | 1.67 | 2.14 | 2.58 | 2.85 | 3.04 |
| | $c_n$ | .9259 | .9057 | .8503 | .7739 | .6715 | .4843 | .3346 | .1709 | .0006 | .0757 | .2242 | .4087 | .5437 | .6908 | .8194 | .8884 | .9317 |
| | $c_m$ | -.0598 | -.0495 | -.0272 | -.0277 | -.0333 | -.0485 | -.0532 | -.0568 | -.0602 | -.0656 | -.0563 | -.0491 | -.0480 | -.0419 | -.0874 | -.0221 | -.0439 |
| | $c_c$ | -.0399 | -.0477 | -.0562 | -.0551 | -.0476 | -.0226 | -.0086 | .0032 | .0070 | .0070 | -.0011 | -.0077 | -.0145 | -.0376 | -.0547 | -.0612 | -.0520 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.037 | 1.039 | 1.041 | 1.041 | 1.046 | 1.046 | 1.049 | 1.053 | 1.054 | 1.053 | 1.050 | 1.047 | 1.045 | 1.044 | 1.042 | 1.039 | 1.036 |
| | .025 | -1.847 | -1.969 | -2.050 | -1.996 | -1.909 | [a]-.910 | [a]-.426 | [a].101 | [a].440 | [a].452 | -.127 | [a]-.661 | -.895 | -1.565 | -1.995 | -2.112 | -2.189 |
| | .050 | -1.660 | -1.662 | -1.881 | -1.842 | -1.763 | -.811 | -.444 | -.187 | .090 | .077 | [a]-.263 | [a]-.711 | [a]-1.088 | -1.396 | -1.877 | -1.962 | -2.023 |
| | .100 | -1.066 | -1.168 | -1.298 | -1.211 | -.873 | -.641 | -.439 | -.257 | -.039 | -.116 | -.295 | -.478 | -.728 | -.898 | -1.324 | -1.432 | -1.198 |
| | [a].200 | -.924 | -.950 | -.983 | -.771 | -.649 | -.514 | -.414 | -.284 | -.122 | -.191 | -.315 | -.407 | -.557 | -.659 | -.916 | -1.018 | -.986 |
| | .300 | -.854 | -.815 | -.788 | -.636 | -.573 | -.481 | -.388 | -.305 | -.187 | -.237 | -.324 | -.393 | -.524 | -.612 | -.713 | -.789 | -.853 |
| | .400 | -.705 | -.684 | -.601 | -.554 | -.520 | -.456 | -.388 | -.332 | -.239 | -.271 | -.341 | -.381 | -.486 | -.548 | -.576 | -.608 | -.704 |
| | .500 | -.617 | -.587 | -.501 | -.505 | -.491 | -.453 | -.403 | -.363 | -.286 | -.315 | -.365 | -.387 | -.473 | -.514 | -.513 | -.503 | -.589 |
| | .600 | -.515 | -.488 | -.406 | -.429 | -.442 | -.419 | -.388 | -.363 | -.308 | -.329 | -.371 | -.372 | -.441 | -.466 | -.440 | -.414 | -.474 |
| | .700 | -.416 | -.394 | -.322 | -.351 | -.369 | -.369 | -.352 | -.343 | -.302 | -.315 | -.338 | -.326 | -.376 | -.382 | -.350 | -.314 | -.383 |
| | .800 | -.335 | -.311 | -.224 | -.239 | -.264 | -.283 | -.290 | -.291 | -.267 | -.273 | -.280 | -.251 | -.284 | -.271 | -.243 | -.222 | -.300 |
| | .900 | -.258 | -.238 | -.119 | -.078 | -.073 | -.089 | -.104 | -.118 | -.119 | -.116 | -.113 | -.069 | -.085 | -.084 | -.103 | -.133 | -.230 |
| | .950 | -.193 | -.211 | -.102 | -.009 | .023 | .026 | .014 | -.003 | -.001 | -.001 | .004 | .046 | .022 | .010 | -.032 | -.085 | -.189 |
| Lower surface | .0375 | .870 | .832 | .779 | .700 | .577 | .359 | .103 | -.191 | -.533 | -.384 | -.090 | .248 | .459 | .629 | .738 | .818 | .849 |
| | .075 | .700 | .653 | .600 | .530 | .414 | .242 | .053 | -.156 | -.374 | -.273 | -.084 | .164 | .314 | .458 | .555 | .633 | .675 |
| | .150 | .527 | .480 | .434 | .372 | .285 | .152 | .023 | -.107 | -.250 | -.175 | -.058 | .112 | .214 | .315 | .395 | .461 | .497 |
| | .250 | .372 | .328 | .292 | .247 | .172 | .065 | -.051 | -.150 | -.239 | -.192 | -.107 | .037 | .116 | .205 | .262 | .321 | .347 |
| | .350 | .298 | .266 | .236 | .198 | .134 | .056 | -.021 | -.101 | -.171 | -.131 | -.067 | .043 | .090 | .159 | .208 | .253 | .278 |
| | .450 | .248 | .221 | .195 | .172 | .119 | .036 | -.006 | -.076 | -.130 | -.096 | -.045 | .052 | .081 | .140 | .172 | .212 | .232 |
| | .550 | .128 | .107 | .094 | .076 | .032 | -.024 | -.075 | -.130 | -.165 | -.142 | -.104 | -.021 | -.001 | .042 | .074 | .100 | .111 |
| | .650 | .072 | .051 | .049 | .044 | .010 | -.033 | -.069 | -.118 | -.141 | -.121 | -.096 | -.024 | -.020 | .017 | .035 | .052 | .055 |
| | [a].750 | .033 | .019 | .034 | .036 | .021 | -.010 | .041 | -.080 | -.087 | -.068 | -.051 | .005 | 0 | .023 | .029 | .032 | .021 |
| | .850 | .004 | -.003 | .033 | .050 | .042 | .026 | .008 | -.020 | -.009 | -.004 | .004 | .049 | .028 | .046 | .035 | .024 | -.001 |
| | [a].925 | .005 | -.005 | .046 | .074 | .082 | .082 | .083 | .059 | .070 | .085 | .074 | .112 | .082 | .078 | .058 | .035 | 0 |
| | [a].975 | .043 | .035 | .088 | .183 | .144 | .165 | .163 | .141 | .150 | .191 | .147 | .183 | .147 | .138 | .110 | .080 | .040 |
| | [a]1.000 | .136 | .117 | .179 | .302 | .237 | .276 | .264 | .232 | .250 | .301 | .242 | .285 | .226 | .228 | .209 | .170 | .140 |

[a]Faired value.

TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(b) N = 1350 rpm; $\beta_{0.75R} = 29.38°$.

| | J | 0.701 | 0.772 | 0.855 | 0.932 | 1.002 | 1.098 | 1.180 | 1.271 | 1.356 | 1.459 | 1.404 | 1.307 | 1.221 | 1.133 | 1.047 | 0.964 | 0.882 | 0.809 | 0.741 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_R$ | .461 | .458 | .484 | .486 | .493 | .508 | .515 | .525 | .535 | .553 | .542 | .529 | .519 | .514 | .497 | .487 | .485 | .474 | .458 |
| | $\alpha_R$, | 13.68 | 12.02 | 10.11 | 8.40 | 6.87 | 4.83 | 3.15 | 1.33 | -.29 | -2.21 | -1.20 | .64 | 2.32 | 4.10 | 5.90 | 7.69 | 9.50 | 11.16 | 12.74 |
| | $\Delta\beta$ | .24 | .24 | .24 | .23 | .23 | .22 | .21 | .21 | .20 | .19 | .20 | .20 | .21 | .22 | .23 | .23 | .24 | .24 | .24 |
| | $c_{d_1}$ | 3.33 | 3.11 | 2.76 | 2.56 | 2.24 | 1.91 | 1.48 | 1.00 | .54 | .16 | .31 | .73 | 1.13 | 1.57 | 1.96 | 2.34 | 2.64 | 2.90 | 3.27 |
| | $c_n$ | 1.0110 | .9636 | .8713 | .8165 | .7253 | .6263 | .4894 | .3339 | .1796 | .0527 | .1045 | .2437 | .3741 | .5126 | .6351 | .7518 | .8365 | .9005 | 1.0027 |
| | $c_m$ | -.0674 | -.0558 | -.0338 | -.0325 | -.0494 | -.0393 | -.0450 | -.0554 | -.0592 | -.0641 | -.0588 | -.0569 | -.0549 | -.0505 | -.0481 | -.0390 | -.0298 | -.0333 | -.0485 |
| | $c_c$ | -.0268 | -.0310 | -.0397 | -.0392 | -.0314 | -.0322 | -.0261 | -.0053 | .0071 | .0070 | .0062 | .0018 | -.0015 | -.0110 | -.0214 | -.0318 | -.0389 | -.0401 | -.0395 |
| | c/b | Preasure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.055 | 1.054 | 1.060 | 1.059 | 1.062 | 1.066 | 1.068 | 1.071 | 1.073 | 1.078 | 1.075 | 1.072 | 1.069 | 1.068 | 1.063 | 1.061 | 1.060 | 1.058 | 1.054 |
| | .025 | -1.509 | -1.507 | -1.902 | -1.900 | -1.837 | -1.759 | [a]-1.186 | [a]-.389 | [a].302 | [a].450 | [a].306 | -.156 | -.417 | -.807 | -1.316 | -1.702 | -1.810 | -1.888 | -1.937 |
| | .050 | -1.704 | -1.745 | -2.005 | -1.984 | -1.922 | -1.105 | -.775 | -.432 | -.181 | .051 | .030 | [a]-.322 | [a]-.605 | [a]-.850 | [a]-1.366 | -1.748 | -1.968 | -2.060 | -2.125 |
| | .100 | -1.543 | -1.584 | -1.809 | -1.406 | -1.023 | -.846 | -.661 | -.454 | -.273 | -.091 | -.179 | -.349 | -.528 | -.719 | -.894 | -1.189 | -1.535 | -1.487 | -1.615 |
| | [a].200 | -1.282 | -1.297 | -1.080 | -.948 | -.769 | -.662 | -.555 | -.429 | -.301 | -.185 | -.248 | -.353 | -.470 | -.591 | -.684 | -.769 | -.980 | -1.080 | -1.257 |
| | .300 | -1.048 | -1.053 | -.867 | -.725 | -.656 | -.581 | -.502 | -.410 | -.318 | -.227 | -.277 | -.361 | -.446 | -.528 | -.612 | -.666 | -.776 | -.860 | -.984 |
| | .400 | -.802 | -.794 | -.659 | -.598 | -.584 | -.532 | -.480 | -.412 | -.341 | -.271 | -.309 | -.376 | -.435 | -.490 | -.553 | -.588 | -.620 | -.665 | -.741 |
| | .500 | -.668 | -.630 | -.527 | -.531 | -.542 | -.508 | -.477 | -.430 | -.378 | -.325 | -.357 | -.406 | -.451 | -.486 | -.528 | -.540 | -.527 | -.547 | -.616 |
| | .600 | -.541 | -.488 | -.421 | -.442 | -.477 | -.461 | -.461 | -.419 | -.382 | -.342 | -.366 | -.406 | -.435 | -.448 | -.476 | -.471 | -.431 | -.437 | -.498 |
| | .700 | -.454 | -.389 | -.327 | -.356 | -.392 | -.390 | -.390 | -.382 | -.354 | -.329 | -.349 | -.376 | -.387 | -.388 | -.397 | -.377 | -.339 | -.345 | -.415 |
| | .800 | -.380 | -.307 | -.237 | -.242 | -.275 | -.282 | -.300 | -.310 | -.298 | -.289 | -.300 | -.310 | -.308 | -.289 | -.287 | -.259 | -.232 | -.258 | -.345 |
| | .900 | -.302 | -.236 | -.140 | -.099 | [a]-.134 | -.072 | -.094 | -.113 | -.115 | -.118 | -.123 | -.123 | -.111 | -.083 | -.084 | -.087 | -.111 | -.173 | -.272 |
| | .950 | -.257 | -.205 | -.095 | -.030 | [a]-.039 | .030 | .085 | .011 | .009 | .003 | -.002 | 0 | .010 | .037 | .016 | -.002 | -.059 | -.133 | -.246 |
| Lower surface | .0375 | .859 | .824 | .796 | .727 | .644 | .520 | .328 | .084 | -.173 | -.502 | -.355 | -.079 | .178 | .412 | .566 | .688 | .763 | .817 | .846 |
| | .075 | .692 | .656 | .622 | .550 | .469 | .359 | .211 | .031 | -.145 | -.339 | -.264 | -.086 | .097 | .281 | .399 | .511 | .585 | .635 | .676 |
| | .150 | .521 | .490 | .452 | .402 | .343 | .254 | .135 | .009 | -.100 | -.235 | -.177 | -.062 | .055 | .181 | .272 | .362 | .422 | .487 | .499 |
| | .250 | .354 | .326 | .298 | .243 | .182 | .114 | .018 | -.074 | -.151 | -.241 | -.207 | -.123 | -.038 | .066 | .138 | .225 | .278 | .316 | .343 |
| | .350 | .284 | .264 | .245 | .210 | .164 | .110 | .035 | -.035 | -.100 | -.171 | -.143 | -.081 | -.010 | .070 | .124 | .187 | .225 | .252 | .273 |
| | .450 | .228 | .214 | .202 | .168 | .142 | .095 | .035 | -.024 | -.073 | -.131 | -.110 | -.062 | -.001 | .054 | .109 | .160 | .190 | .210 | .225 |
| | .550 | .130 | .117 | .110 | .094 | .059 | .015 | -.037 | -.083 | -.123 | -.166 | -.153 | -.116 | -.072 | -.017 | .016 | .059 | .082 | .092 | .104 |
| | .650 | .051 | .049 | .050 | .042 | .025 | .001 | -.046 | -.083 | -.115 | -.141 | -.136 | -.112 | -.074 | -.031 | -.005 | .030 | .039 | .041 | .043 |
| | [a].750 | -.018 | 0 | .021 | .031 | .028 | .012 | -.021 | .071 | -.089 | -.084 | -.088 | -.079 | -.053 | -.026 | .003 | .027 | .026 | .018 | .003 |
| | .850 | -.022 | -.009 | .026 | .049 | .047 | .039 | .016 | .002 | -.006 | [a].010 | -.019 | -.011 | .001 | .022 | .026 | .040 | .024 | .005 | -.022 |
| | [a].925 | -.013 | 0 | .038 | .067 | .070 | .067 | .060 | .094 | .085 | .109 | .052 | .067 | .072 | .102 | .073 | .067 | .041 | .018 | -.013 |
| | [a].975 | .027 | .043 | .082 | .105 | .117 | .116 | .122 | .169 | .156 | .187 | .126 | .146 | .144 | .184 | .164 | .128 | .084 | .057 | .027 |
| | [a]1.000 | .109 | .129 | .158 | .188 | .197 | .205 | .285 | .283 | .262 | .250 | .201 | .227 | .229 | .271 | .278 | .208 | .158 | .159 | .108 |

[a]Paired value.

TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(c) N = 1600 rpm; $\beta_{0.75R}$ = 29.38°.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.733 | 0.806 | 0.866 | 0.963 | 1.070 | 1.183 | 1.296 | 1.414 | 1.518 | 1.432 | 1.331 | 1.225 | 1.125 | 1.016 | 0.904 | 0.834 | 0.758 |
| | $M_x$ | .547 | .560 | .565 | .581 | .595 | .610 | .621 | .641 | .655 | .641 | .628 | .616 | .597 | .586 | .567 | .558 | .547 |
| | $\alpha_x'$ | 12.93 | 11.23 | 9.86 | 7.71 | 5.41 | 3.08 | .85 | -1.39 | -3.25 | -1.71 | .17 | 2.24 | 4.27 | 6.56 | 9.02 | 10.59 | 12.34 |
| | $\Delta\beta$ | .32 | .32 | .32 | .31 | .31 | .30 | .29 | .28 | .28 | .28 | .29 | .30 | .30 | .31 | .32 | .32 | .32 |
| | $\alpha_l$ | 3.09 | 3.10 | 2.89 | 2.55 | 2.12 | 1.55 | .98 | .36 | -.08 | .23 | .70 | 1.27 | 1.70 | 2.32 | 2.85 | 3.09 | 3.42 |
| | $c_n$ | .9422 | .9669 | .9156 | .8196 | .6909 | .5137 | .3248 | .1212 | -.0277 | .0770 | .2325 | .4190 | .5565 | .7494 | .9055 | .9729 | 1.0578 |
| | $c_m$ | -.1305 | -.0670 | -.0413 | -.0358 | -.0422 | -.0547 | -.0589 | -.0624 | -.0663 | -.0660 | -.0604 | -.0511 | -.0464 | -.0326 | -.0184 | -.0288 | -.0552 |
| | $c_c$ | .0290 | -.0095 | -.0214 | -.0261 | -.0408 | -.0189 | -.0114 | -.0029 | .0058 | .0018 | -.0023 | -.0151 | -.0184 | -.0500 | -.0656 | -.0613 | -.0531 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.077 | 1.080 | 1.082 | 1.087 | 1.091 | 1.096 | 1.099 | 1.107 | 1.112 | 1.107 | 1.102 | 1.098 | 1.092 | 1.088 | 1.082 | 1.080 | 1.077 |
| | .025 | -.015 | -.482 | -.738 | -1.398 | -1.499 | [a]-.830 | [a]-.377 | [a].057 | [a].330 | [a].240 | [a]-.015 | [a]-.488 | -.724 | -1.901 | -2.019 | -2.061 | -2.107 |
| | .050 | -.994 | -1.465 | -1.681 | -2.079 | -1.230 | -.793 | -.399 | -.065 | .159 | .092 | -.170 | -.530 | -.808 | -1.651 | -1.930 | -1.940 | -1.634 |
| | .100 | -.987 | -1.493 | -1.656 | -1.550 | -.968 | -.693 | -.411 | -.150 | .031 | -.095 | -.306 | -.566 | -.792 | -1.036 | -1.663 | -1.550 | -1.482 |
| | [a].200 | -.971 | -1.387 | -1.419 | -.980 | -.778 | -.601 | -.410 | -.228 | -.096 | -.197 | -.352 | -.516 | -.661 | -.797 | -1.174 | -1.272 | -1.311 |
| | .300 | -.989 | -1.144 | -1.044 | -.736 | -.658 | -.540 | -.418 | -.283 | -.184 | -.253 | -.369 | -.480 | -.581 | -.682 | -.853 | -1.070 | -1.157 |
| | .400 | -.884 | -.904 | -.779 | -.641 | -.600 | -.518 | -.434 | -.331 | -.253 | -.302 | -.391 | -.472 | -.543 | -.611 | -.656 | -.811 | -.943 |
| | .500 | -.841 | -.717 | -.593 | -.569 | -.558 | -.504 | -.444 | -.369 | -.309 | -.350 | -.413 | -.475 | -.525 | -.562 | -.604 | -.624 | -.778 |
| | .600 | -.788 | -.560 | -.457 | -.493 | -.506 | -.478 | -.439 | -.389 | -.347 | -.378 | -.420 | -.461 | -.495 | -.509 | -.441 | -.474 | -.625 |
| | .700 | -.731 | -.447 | -.356 | -.396 | -.425 | -.419 | -.409 | -.379 | -.350 | -.371 | -.398 | -.418 | -.428 | -.419 | -.348 | -.366 | -.506 |
| | .800 | [a]-.671 | [a]-.342 | [a]-.267 | [a]-.240 | [a]-.269 | [a]-.287 | [a]-.315 | [a]-.301 | [a]-.285 | [a]-.299 | [a]-.312 | [a]-.302 | [a]-.286 | -.227 | -.257 | -.267 | -.327 |
| | .900 | -.585 | -.258 | -.165 | -.093 | -.083 | -.086 | -.126 | -.128 | -.137 | -.133 | -.136 | -.105 | -.093 | -.090 | -.114 | -.172 | -.296 |
| | .950 | -.549 | -.233 | -.128 | -.021 | .010 | .034 | .011 | .002 | -.014 | -.002 | 0 | .029 | .020 | .008 | -.055 | -.125 | -.247 |
| Lower surface | .0375 | .823 | .825 | .788 | .704 | .532 | .337 | .019 | -.407 | -.674 | -.503 | -.189 | .224 | .440 | .619 | .718 | .778 | .830 |
| | .075 | .652 | .647 | .610 | .546 | .443 | .221 | -.020 | -.898 | -.514 | -.360 | -.127 | .126 | .290 | .488 | .607 | .630 | .668 |
| | .150 | .483 | .474 | .440 | .382 | .281 | .141 | [a]-.029 | -.189 | -.342 | -.225 | -.089 | .077 | .192 | .328 | .416 | .452 | .489 |
| | .250 | .363 | .361 | .329 | .271 | .189 | .078 | -.039 | -.161 | -.267 | -.186 | -.087 | .035 | .121 | .231 | .301 | .332 | .360 |
| | .350 | .266 | .266 | .243 | .204 | .134 | .045 | -.046 | -.145 | -.224 | -.165 | -.087 | .008 | .079 | .171 | .227 | .251 | .270 |
| | .450 | .186 | .194 | .178 | .150 | .090 | .014 | -.056 | -.122 | -.184 | -.137 | -.080 | -.011 | .043 | .120 | .168 | .182 | .195 |
| | .550 | .088 | .105 | .100 | .081 | .034 | -.019 | -.073 | -.141 | -.187 | -.151 | -.100 | -.042 | -.003 | .064 | .097 | .103 | .107 |
| | .650 | .009 | .043 | .044 | .040 | .005 | -.038 | -.082 | -.132 | -.161 | -.140 | -.107 | -.056 | -.030 | .028 | .046 | .044 | .039 |
| | .750 | -.056 | [a]-.004 | .011 | [a].023 | [a].004 | [a]-.019 | [a]-.041 | [a]-.077 | [a]-.096 | -.051 | -.082 | [a]-.044 | [a]-.020 | [a].012 | [a].015 | [a].011 | [a]-.010 |
| | .850 | -.117 | -.029 | -.003 | .032 | .024 | .014 | .009 | -.009 | -.011 | -.011 | -.003 | .010 | .008 | .038 | .018 | -.010 | -.040 |
| | .925 | -.215 | -.072 | -.032 | .028 | .033 | .032 | .051 | .047 | .056 | .046 | .043 | .037 | .025 | .049 | 0 | -.040 | -.090 |
| | .975 | -.356 | -.112 | -.038 | .072 | .106 | [a].148 | .123 | .136 | .156 | .130 | .094 | .068 | .030 | .009 | -.018 | -.047 | -.120 |
| | [a]1.000 | -.108 | -.021 | .032 | .146 | .247 | .255 | .244 | .251 | .300 | .245 | .252 | .259 | .215 | .228 | .367 | .053 | 0 |

[a]Paired value.

TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(d) N = 2000 rpm; $\beta_{0.75R} = 29.38°$.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.035 | 1.096 | 1.155 | 1.211 | 1.283 | 1.345 | 1.403 | 1.377 | 1.303 | 1.247 | 1.177 | 1.121 | 1.058 |
| | $M_x$ | .749 | .760 | .767 | .776 | .786 | .797 | .804 | .803 | .787 | .781 | .770 | .761 | .753 |
| | $\alpha_x$ | 6.37 | 4.86 | 3.65 | 2.52 | 1.10 | -.09 | -1.19 | -.69 | .72 | 1.81 | 3.20 | 4.35 | 6.07 |
| | $\Delta\beta$ | .49 | .48 | .47 | .46 | .44 | .43 | .42 | .42 | .44 | .45 | .47 | .48 | .49 |
| | $\alpha_1$ | 2.65 | 2.31 | 1.85 | 1.42 | .99 | .62 | .15 | .28 | .76 | 1.20 | 1.63 | 1.98 | 2.41 |
| | $c_n$ | .8631 | .7544 | .6076 | .4696 | .3301 | .2065 | .0496 | .0929 | .2535 | .3970 | .5391 | .6485 | .7823 |
| | $c_m$ | -.0523 | -.0502 | -.0562 | -.0582 | -.0596 | -.0635 | -.0616 | -.0605 | -.0599 | -.0541 | -.0505 | -.0498 | -.0484 |
| | $c_c$ | -.0371 | -.0313 | -.0202 | -.0058 | .0085 | .0074 | .0086 | .0092 | -.0025 | -.0041 | -.0160 | -.0218 | -.0300 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.149 | 1.153 | 1.156 | 1.160 | 1.164 | 1.169 | 1.172 | 1.171 | 1.164 | 1.162 | 1.157 | 1.154 | 1.150 |
| | .025 | -1.147 | -1.139 | [a]-.857 | [a]-.335 | [a].202 | [a].252 | [a].541 | [a].371 | -.145 | -.178 | -.545 | -.711 | [a]-1.056 |
| | .050 | -1.313 | -1.178 | [a]-.838 | -.508 | -.280 | -.113 | .044 | .045 | [a]-.227 | -.271 | [a]-.617 | -.857 | -1.184 |
| | .100 | -1.257 | -1.092 | -.742 | -.625 | -.446 | -.275 | -.120 | -.143 | -.300 | -.496 | -.658 | -.860 | -1.126 |
| | [a].200 | -1.239 | -1.042 | -.746 | -.598 | -.461 | -.351 | -.225 | -.247 | -.361 | -.527 | -.684 | -.865 | -1.080 |
| | .300 | -1.211 | -1.009 | -.758 | -.612 | -.493 | -.393 | -.296 | -.325 | -.431 | -.537 | -.695 | -.854 | -1.006 |
| | .400 | -.978 | -.835 | -.742 | -.657 | -.567 | -.481 | -.393 | -.416 | -.505 | -.602 | -.689 | -.772 | -.807 |
| | .500 | -.655 | -.763 | -.733 | -.675 | -.608 | -.550 | -.490 | -.508 | -.573 | -.635 | -.699 | -.739 | -.737 |
| | .600 | -.548 | -.657 | -.701 | -.710 | -.683 | -.648 | -.588 | -.603 | -.654 | -.691 | -.701 | -.671 | -.598 |
| | .700 | -.428 | -.447 | -.449 | -.470 | -.483 | -.527 | -.565 | -.551 | -.516 | -.478 | -.460 | -.443 | -.439 |
| | .800 | -.278 | -.279 | -.275 | -.292 | -.299 | -.310 | -.322 | -.318 | -.314 | -.295 | -.282 | -.272 | -.273 |
| | .900 | -.031 | -.032 | -.028 | -.035 | -.036 | -.043 | -.050 | -.044 | -.043 | -.034 | -.031 | -.024 | -.026 |
| | .950 | .080 | .055 | .058 | .062 | .069 | .071 | .069 | .070 | .064 | .066 | .060 | .063 | .069 |
| Lower surface | .0375 | .578 | .466 | .353 | .197 | .002 | -.226 | -.582 | -.441 | -.154 | .103 | .296 | .419 | .525 |
| | .075 | .438 | .336 | .246 | .124 | -.022 | -.194 | -.411 | -.338 | -.137 | .056 | .203 | .302 | .389 |
| | .150 | .325 | .245 | .174 | .083 | -.023 | -.138 | -.268 | -.218 | -.099 | .031 | .138 | .213 | .283 |
| | .250 | .193 | .116 | .054 | -.026 | -.113 | -.210 | -.322 | -.285 | -.185 | -.077 | .006 | .069 | .131 |
| | .350 | .158 | .095 | .048 | -.014 | -.082 | -.156 | -.242 | -.209 | -.132 | -.046 | .023 | .076 | .129 |
| | .450 | .133 | .076 | .038 | -.018 | -.073 | -.138 | -.211 | -.181 | -.115 | -.041 | .018 | .065 | .111 |
| | .550 | .050 | -.004 | -.039 | -.089 | -.136 | -.191 | -.261 | -.231 | -.174 | -.109 | -.058 | -.016 | .025 |
| | .650 | .005 | -.042 | -.074 | -.113 | -.149 | -.194 | -.247 | -.225 | -.181 | -.128 | -.086 | -.052 | -.014 |
| | .750 | [a].031 | [a]-.033 | [a]-.051 | [a]-.096 | [a]-.120 | [a]-.148 | [a]-.188 | [a]-.176 | [a]-.142 | [a]-.089 | [a]-.068 | [a]-.051 | .014 |
| | .850 | .038 | .003 | -.008 | -.023 | -.034 | -.047 | -.061 | -.053 | -.043 | -.043 | -.051 | -.034 | .028 |
| | .925 | .045 | .016 | .019 | -.003 | -.003 | -.003 | -.003 | -.002 | -.009 | -.016 | -.038 | -.015 | -.004 |
| | [a].975 | .096 | .073 | .066 | .053 | .059 | .073 | .071 | .065 | .058 | .049 | .006 | .024 | .031 |
| | [a]1.000 | .249 | .206 | .184 | .203 | .187 | .226 | .215 | .201 | .192 | .172 | .168 | .175 | .228 |

[a]Paired value.

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TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(e) N = 2160 rpm; $\beta_{0.75R}$ = 29.38°.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.109 | 1.177 | 1.230 | 1.295 | 1.349 | 1.409 | 1.356 | 1.320 | 1.256 | 1.190 | 1.135 |
| | $M_x$ | .821 | .831 | .840 | .850 | .859 | .871 | .862 | .854 | .838 | .822 | .819 |
| | $\alpha_x'$ | 4.60 | 3.20 | 2.14 | .86 | -.17 | -1.28 | -.29 | .39 | 1.63 | 2.94 | 4.07 |
| | $\Delta\beta$ | .55 | .54 | .54 | .53 | .52 | .51 | .51 | .52 | .53 | .54 | .55 |
| | $\alpha_i$ | 2.08 | 1.68 | 1.24 | .83 | .46 | -.02 | .13 | .40 | .86 | 1.30 | 1.80 |
| | $c_n$ | .6810 | .5556 | .4123 | .2757 | .1541 | -.0074 | .0436 | .1318 | .2853 | .4296 | .5903 |
| | $c_m$ | -.0963 | -.0844 | -.0700 | -.0570 | -.0445 | -.0376 | -.0428 | -.0487 | -.0632 | -.0745 | -.0825 |
| | $c_c$ | -.0471 | .0089 | .0071 | .0086 | .0082 | .0129 | .0159 | .0152 | .0214 | .0140 | .0074 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.180 | 1.184 | 1.189 | 1.194 | 1.198 | 1.204 | 1.199 | 1.195 | 1.187 | 1.180 | 1.179 |
| | .025 | -.242 | -.213 | -.193 | -.171 | -.149 | [a]-.017 | [a].030 | [a].111 | [a].161 | [a].275 | -.215 |
| | .050 | -.495 | -.466 | -.440 | -.290 | -.164 | -.037 | -.014 | -.045 | -.056 | -.068 | -.350 |
| | .100 | -.703 | -.538 | -.422 | -.302 | -.185 | -.050 | -.070 | -.158 | -.322 | -.439 | -.572 |
| | [a].200 | -.810 | -.612 | -.492 | -.376 | -.246 | -.120 | -.174 | -.264 | -.421 | -.567 | -.686 |
| | .300 | -.831 | -.691 | -.561 | -.448 | -.333 | -.238 | -.274 | -.343 | -.486 | -.603 | -.719 |
| | .400 | -.790 | -.732 | -.608 | -.504 | -.437 | -.347 | -.383 | -.441 | -.536 | -.631 | -.765 |
| | .500 | -.860 | -.786 | -.678 | -.597 | -.519 | -.432 | -.461 | -.520 | -.614 | -.692 | -.807 |
| | .600 | -.892 | -.815 | -.745 | -.685 | -.628 | -.534 | -.554 | -.600 | -.688 | -.754 | -.835 |
| | .700 | -.837 | -.869 | -.833 | -.765 | -.715 | -.655 | -.676 | -.718 | -.783 | -.842 | -.899 |
| | .800 | -.318 | -.299 | -.294 | -.320 | -.369 | -.538 | -.467 | -.373 | -.299 | -.275 | -.307 |
| | .900 | -.177 | -.160 | -.153 | -.151 | -.147 | -.149 | -.147 | -.143 | -.132 | -.116 | -.162 |
| | .950 | -.112 | -.099 | -.096 | -.100 | -.100 | -.108 | -.110 | -.100 | -.079 | -.062 | -.097 |
| Lower surface | .0375 | .418 | .298 | .125 | -.059 | -.237 | -.536 | -.465 | -.255 | .019 | .204 | .343 |
| | [a].075 | .311 | .189 | .093 | -.050 | -.188 | -.420 | -.323 | -.201 | .005 | .144 | .247 |
| | .150 | .219 | .142 | .046 | -.053 | -.137 | -.290 | -.237 | -.150 | -.017 | .081 | .171 |
| | .250 | .143 | .079 | -.003 | -.084 | -.149 | -.241 | -.214 | -.151 | [a]-.052 | .047 | .119 |
| | .350 | .071 | .012 | -.058 | -.130 | -.183 | -.256 | -.234 | -.184 | -.094 | -.019 | .041 |
| | .450 | .058 | .008 | -.055 | [a]-.190 | [a]-.229 | [a]-.294 | [a]-.278 | [a]-.227 | [a]-.137 | [a]-.076 | [a]-.020 |
| | [a].550 | -.023 | -.080 | -.122 | -.233 | -.275 | -.344 | -.336 | -.280 | -.179 | -.122 | -.071 |
| | .650 | -.094 | -.130 | -.187 | -.253 | -.316 | -.401 | -.378 | -.317 | -.217 | -.151 | -.112 |
| | .750 | [a]-.115 | [a]-.138 | [a]-.191 | [a]-.224 | [a]-.330 | [a]-.405 | [a]-.359 | [a]-.308 | [a]-.221 | [a]-.142 | [a]-.121 |
| | [a].850 | -.103 | -.113 | -.144 | -.176 | -.252 | -.297 | -.273 | -.235 | -.170 | -.122 | -.107 |
| | .925 | -.081 | -.083 | -.095 | -.114 | -.121 | -.145 | -.143 | -.127 | -.097 | -.082 | -.088 |
| | .975 | .023 | .006 | .003 | 0 | 0 | -.009 | -.019 | -.025 | -.034 | -.034 | -.050 |
| | [a]1.000 | .206 | .133 | .152 | .252 | .126 | .075 | .060 | .030 | 0 | -.010 | -.020 |

[a]Paired value.

TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(f) N = 1140 rpm; $\beta_{0.75R} = 44.46°$.

| | J | 1.481 | 1.599 | 1.728 | 1.843 | 1.969 | 2.119 | 2.229 | 2.355 | 2.491 | 2.542 | 2.376 | 2.292 | 2.157 | 2.024 | 1.904 | 1.798 | 1.656 | 1.540 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_K$ | .461 | .469 | .485 | .497 | .513 | .530 | .544 | .557 | .577 | .583 | .560 | .551 | .533 | .518 | .504 | .495 | .476 | .462 |
| | $\alpha_K$° | 12.48 | 10.42 | 8.28 | 6.47 | 4.60 | 2.50 | 1.05 | -.52 | -2.12 | -2.69 | -.77 | .26 | 1.99 | 3.81 | 5.55 | 7.17 | 9.46 | 11.44 |
| | $\Delta\beta$ | .18 | .18 | .17 | .17 | .16 | .15 | .15 | .14 | .13 | .13 | .14 | .14 | .15 | .16 | .17 | .17 | .18 | .18 |
| | $\alpha_1$ | 3.13 | 2.97 | 2.58 | 2.06 | 1.67 | 1.28 | 1.01 | .62 | .17 | .09 | .33 | .63 | .99 | 1.30 | 1.63 | 2.05 | 2.44 | 2.73 |
| | $c_n$ | 1.0989 | 1.0546 | .9225 | .7374 | .6034 | .4660 | .3676 | .2266 | .0627 | .0348 | .1221 | .2312 | .3593 | .4690 | .5857 | .7342 | .8646 | .9631 |
| | $c_m$ | -.0386 | -.0129 | -.0163 | -.0385 | -.0430 | -.0527 | -.0522 | -.0602 | -.0664 | -.0656 | -.0701 | -.0610 | -.0550 | -.0564 | -.0575 | -.0475 | -.0330 | -.0366 |
| | $c_o$ | -.0400 | -.0576 | -.0506 | -.0287 | -.0257 | -.0109 | -.0061 | .0002 | .0075 | .0094 | .0083 | -.0005 | -.0023 | -.0001 | -.0041 | -.0184 | -.0365 | -.0434 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.055 | 1.056 | 1.060 | 1.063 | 1.067 | 1.072 | 1.076 | 1.080 | 1.086 | 1.087 | 1.081 | 1.078 | 1.073 | 1.069 | 1.065 | 1.063 | 1.058 | 1.055 |
| | .025 | -.725 | [a]-2.622 | [a]-2.134 | [a]-1.471 | [a]-1.152 | [a]-.553 | -.350 | [a].020 | .466 | [a].570 | [a].361 | [a]-.090 | -.371 | -.432 | -.490 | [a]-1.136 | [a]-1.828 | [a]-1.979 |
| | .050 | -2.805 | -2.672 | -2.492 | -2.351 | -1.091 | -.709 | -.454 | -.197 | .087 | .149 | -.028 | -.170 | -.402 | -.653 | -.948 | -1.506 | -1.775 | -1.918 |
| | .100 | -2.369 | -2.229 | -2.055 | -1.228 | -.864 | -.676 | -.519 | -.342 | -.136 | -.100 | -.160 | -.234 | -.384 | -.568 | -.767 | -1.129 | -1.565 | -1.728 |
| | [a].200 | -1.586 | -1.291 | -1.250 | -.789 | -.655 | -.548 | -.462 | -.321 | -.180 | -.150 | -.235 | -.323 | -.403 | -.529 | -.663 | -.801 | -1.074 | -1.283 |
| | .300 | -1.044 | -.900 | -.705 | -.638 | -.563 | -.466 | -.391 | -.311 | -.228 | -.202 | -.286 | -.348 | -.420 | -.510 | -.603 | -.654 | -.784 | -.952 |
| | .400 | -.829 | -.710 | -.579 | -.569 | -.523 | -.449 | -.393 | -.331 | -.271 | -.252 | -.320 | -.364 | -.420 | -.487 | -.553 | -.583 | -.647 | -.747 |
| | .500 | -.661 | -.567 | -.500 | -.529 | -.500 | -.444 | -.405 | -.356 | -.314 | -.297 | -.358 | -.392 | -.429 | -.478 | -.526 | -.533 | -.551 | -.612 |
| | .600 | [a]-.534 | -.448 | -.425 | -.476 | -.465 | -.425 | -.397 | -.364 | -.341 | -.327 | -.378 | -.402 | -.425 | -.455 | -.485 | -.471 | -.461 | -.488 |
| | .700 | -.412 | -.351 | -.340 | -.397 | -.399 | -.371 | -.358 | -.344 | -.333 | -.323 | -.366 | -.380 | -.384 | -.400 | -.418 | -.390 | -.369 | -.385 |
| | .800 | -.316 | -.253 | -.235 | -.288 | -.300 | -.290 | -.291 | -.293 | -.302 | -.293 | -.326 | -.327 | -.315 | -.312 | -.314 | -.279 | -.260 | [a]-.288 |
| | .900 | -.232 | -.161 | -.093 | -.089 | -.085 | -.079 | -.089 | -.107 | -.124 | -.121 | -.140 | -.136 | -.107 | -.099 | -.097 | -.098 | -.124 | -.191 |
| | .950 | -.188 | -.112 | -.026 | .009 | .028 | .046 | .043 | .026 | .002 | .004 | -.014 | -.003 | .022 | .023 | .011 | -.008 | -.063 | -.134 |
| Lower surface | .0375 | .846 | .823 | .745 | .637 | .495 | .323 | .133 | -.129 | -.487 | -.545 | -.382 | -.123 | .142 | .368 | .537 | .693 | .776 | .840 |
| | .075 | .671 | .648 | .567 | .459 | .333 | .212 | .069 | -.105 | -.333 | -.378 | -.272 | -.115 | .074 | .285 | .373 | .509 | .594 | .644 |
| | .150 | .498 | .474 | .408 | .317 | .223 | .135 | .037 | -.073 | -.226 | -.252 | -.178 | -.077 | .041 | .154 | .253 | .361 | .419 | .473 |
| | .250 | [a].370 | .355 | .302 | .223 | .153 | .084 | .018 | -.060 | -.171 | -.185 | -.134 | -.067 | .017 | .101 | .171 | .261 | .308 | .347 |
| | .350 | .280 | .266 | .228 | .159 | .103 | .053 | .001 | -.060 | -.149 | -.159 | -.128 | -.075 | -.004 | .059 | .117 | .193 | .228 | .258 |
| | .450 | .207 | .204 | .171 | .118 | .066 | .026 | -.013 | [a]-.065 | [a]-.145 | [a]-.147 | [a]-.125 | -.085 | -.016 | .034 | .079 | .150 | .169 | .189 |
| | .550 | .126 | .126 | .107 | .061 | .023 | -.004 | -.032 | -.075 | -.132 | -.136 | -.120 | -.092 | -.043 | -.005 | .030 | .082 | .101 | .111 |
| | .650 | .062 | .071 | .068 | .029 | .005 | -.015 | -.039 | -.075 | -.109 | -.115 | -.114 | -.094 | -.052 | -.021 | .004 | .043 | .053 | .053 |
| | .750 | .016 | .039 | .048 | .026 | .005 | -.004 | -.020 | -.036 | -.063 | -.068 | -.076 | -.069 | -.039 | -.021 | .002 | .032 | .026 | .009 |
| | .850 | -.011 | .020 | .046 | .044 | .033 | .035 | .031 | .024 | .004 | .008 | -.004 | -.001 | .013 | .023 | .030 | .043 | .021 | -.007 |
| | .925 | -.056 | -.010 | .038 | .051 | .046 | .057 | .064 | .071 | .064 | .068 | .052 | .043 | .043 | .043 | .038 | .048 | .005 | -.040 |
| | .975 | -.109 | -.045 | .038 | .061 | .057 | .091 | .107 | .131 | .127 | .140 | .114 | .092 | .084 | .067 | .047 | .067 | -.003 | -.067 |
| | [a]1.000 | -.133 | -.071 | .050 | .086 | .192 | .101 | .151 | .245 | .170 | .210 | .150 | .131 | .141 | .176 | .192 | .183 | .071 | -.077 |

[a]Faired value.

TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(g) N = 1350 rpm; $\beta_{0.75R}$ = 44.46°.

| | J | 1.563 | 1.642 | 1.769 | 1.873 | 1.956 | 2.073 | 2.185 | 2.282 | 2.399 | 2.502 | 2.472 | 2.352 | 2.222 | 2.123 | 2.099 | 1.858 | 1.813 | 1.707 | 1.593 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_{tr}$ | .551 | .559 | .574 | .590 | .603 | .621 | .643 | .652 | .671 | .688 | .681 | .660 | .638 | .626 | .609 | .588 | .585 | .569 | .557 |
| | $\alpha_r$' | 11.04 | 9.69 | 7.63 | 6.02 | 4.79 | 3.13 | 1.82 | .38 | -1.05 | -2.24 | -1.90 | -.48 | 1.14 | 2.45 | 4.03 | 6.32 | 6.94 | 8.62 | 10.52 |
| | $\Delta\beta$ | .24 | .24 | .23 | .23 | .22 | .21 | .20 | .20 | .19 | .18 | .18 | .19 | .20 | .21 | .22 | .23 | .23 | .24 | .24 |
| | $\alpha_i$ | 2.73 | 2.66 | 2.40 | 2.14 | 1.87 | 1.52 | 1.20 | .90 | .55 | .13 | .19 | .41 | .84 | 1.15 | 1.49 | 1.98 | 2.19 | 2.39 | 2.66 |
| | $c_n$ | .9644 | .9428 | .8609 | .7875 | .6738 | .5509 | .4378 | .3297 | .2014 | .0490 | .0703 | .1516 | .3063 | .4160 | .5389 | .7105 | .7839 | .8521 | .9420 |
| | $c_m$ | -.0381 | -.0303 | -.0289 | -.0360 | -.0399 | -.0434 | -.0517 | -.0547 | -.0686 | -.0718 | -.0915 | -.0729 | -.0638 | -.0589 | -.0544 | -.0448 | -.0377 | -.0314 | -.0270 |
| | $c_c$ | -.0565 | -.0503 | -.0559 | -.0504 | -.0396 | -.0258 | -.0196 | -.0110 | -.0039 | .0056 | .0044 | .0088 | -.0042 | -.0069 | -.0184 | -.0350 | -.0458 | -.0523 | -.0558 |
| | x/h | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.078 | 1.080 | 1.085 | 1.089 | 1.093 | 1.099 | 1.104 | 1.111 | 1.118 | 1.124 | 1.122 | 1.113 | 1.105 | 1.101 | 1.096 | 1.089 | 1.088 | 1.083 | 1.080 |
| | .025 | [a]-1.860 | [a]-1.693 | [a]-1.385 | [a]-1.618 | [a]-1.361 | [a]-.806 | [a]-.518 | [a]-.243 | .077 | [a].575 | [a].610 | [a].551 | [a]-.005 | [a]-.224 | [a].974 | [a]-1.272 | [a]-1.575 | [a]-1.619 | [a]-1.676 |
| | .050 | -1.721 | -1.671 | -1.614 | -1.529 | -1.204 | -.781 | -.527 | -.297 | -.068 | .170 | .258 | .158 | -.196 | -.381 | .604 | -1.133 | -1.476 | -1.605 | -1.718 |
| | .100 | -1.488 | -1.634 | -1.533 | -1.076 | -.887 | -.697 | -.519 | -.351 | -.183 | -.009 | 0 | -.105 | -.286 | -.443 | .621 | -.885 | -1.120 | -1.413 | -1.682 |
| | [a].200 | -1.149 | -1.168 | -.984 | -.752 | -.684 | -.564 | -.439 | -.351 | -.222 | -.097 | -.122 | -.189 | -.369 | -.443 | .590 | -.710 | -.783 | -.952 | -1.201 |
| | .300 | -.897 | -.837 | -.691 | -.611 | -.561 | -.472 | -.385 | -.313 | -.228 | -.147 | -.200 | -.238 | -.332 | -.406 | .499 | -.616 | -.644 | -.711 | -.849 |
| | .400 | -.695 | -.643 | -.564 | -.532 | -.503 | -.439 | -.381 | -.326 | -.266 | -.207 | -.278 | -.278 | -.352 | -.401 | .473 | -.550 | -.561 | -.596 | -.658 |
| | .500 | -.574 | -.513 | -.477 | -.485 | -.469 | -.425 | -.383 | -.346 | -.301 | -.260 | -.349 | -.319 | -.375 | -.408 | .462 | -.507 | -.504 | -.518 | -.540 |
| | .600 | -.457 | -.400 | -.393 | -.421 | -.418 | -.390 | -.367 | -.346 | -.315 | -.292 | -.392 | -.338 | -.375 | -.394 | .430 | -.450 | -.435 | -.438 | -.428 |
| | .700 | -.352 | -.299 | -.295 | -.329 | -.335 | -.322 | -.313 | -.303 | -.288 | -.280 | -.376 | -.313 | -.332 | -.340 | .363 | -.360 | -.339 | -.340 | -.329 |
| | .800 | -.256 | -.202 | -.178 | -.198 | -.213 | -.218 | -.223 | -.300 | -.229 | -.238 | -.313 | -.256 | -.257 | -.252 | .256 | -.229 | -.209 | -.214 | -.223 |
| | .900 | -.155 | -.103 | -.028 | .010 | .016 | .015 | .010 | -.003 | -.006 | -.021 | -.037 | -.036 | -.085 | -.014 | .016 | -.004 | -.013 | -.046 | -.107 |
| | .950 | -.102 | -.054 | .047 | .104 | .122 | .138 | .143 | .137 | .136 | .122 | .147 | .107 | .112 | .119 | .107 | .092 | .076 | .030 | -.051 |
| Lower surface | .0375 | .866 | [a].890 | .799 | .707 | .605 | .472 | .293 | .088 | -.145 | -.482 | -.646 | -.221 | .074 | .283 | .452 | .689 | .749 | .799 | .897 |
| | .075 | .680 | .688 | .685 | .538 | .451 | .344 | .209 | .062 | -.083 | -.289 | -.380 | -.136 | .046 | .195 | .318 | .514 | .568 | .612 | .674 |
| | .150 | .515 | .519 | .471 | .399 | .331 | .252 | .160 | .066 | -.031 | -.170 | -.219 | -.061 | .056 | .151 | .232 | .379 | .420 | .453 | .502 |
| | .250 | .392 | .404 | .367 | .307 | .253 | .197 | .130 | .062 | -.006 | -.106 | -.141 | -.033 | .051 | .121 | .178 | .291 | .326 | .346 | .383 |
| | .350 | .304 | .315 | .282 | .244 | .202 | .155 | .107 | [a].090 | -.003 | -.080 | -.110 | -.030 | .034 | .091 | .135 | .225 | .253 | .271 | .297 |
| | .450 | .240 | .251 | .224 | .193 | .157 | .124 | .084 | .050 | .009 | -.058 | -.070 | -.009 | .038 | .177 | .110 | .184 | .204 | .214 | .231 |
| | .550 | .161 | .171 | .174 | .140 | .108 | .083 | .056 | .018 | -.015 | -.062 | -.086 | -.034 | .007 | .041 | .066 | .126 | .143 | .149 | .154 |
| | .650 | .094 | .115 | .120 | .106 | .083 | .070 | .045 | .014 | -.006 | -.042 | -.065 | -.031 | .003 | .025 | .046 | .090 | .104 | .101 | .097 |
| | .750 | .054 | .081 | .101 | .099 | .083 | .076 | .063 | .143 | .034 | .012 | .002 | .008 | .018 | .037 | .046 | .079 | .091 | .079 | .061 |
| | .850 | .036 | .064 | .105 | .118 | .106 | .112 | .112 | .102 | .105 | .094 | .114 | .085 | .082 | .091 | .089 | .103 | .109 | .086 | .047 |
| | .925 | .002 | .037 | .098 | .118 | .112 | .131 | .140 | .147 | .157 | .158 | .196 | .139 | .125 | .123 | .112 | .105 | .104 | .079 | .025 |
| | .975 | .085 | .113 | .146 | .159 | .159 | .160 | .186 | .198 | .223 | .229 | .288 | .202 | .171 | .157 | .135 | .105 | .095 | .065 | 0 |
| | [a]1.000 | .225 | .224 | .305 | .213 | .242 | .222 | .231 | .311 | .299 | .283 | .340 | .256 | .231 | .231 | .192 | .264 | .193 | .153 | .061 |

[a]Paired value.

TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(h) N = 1600 rpm; $\beta_{0.75R} = 44.46°$.

| | J | 1.970 | 2.056 | 2.156 | 2.248 | 2.361 | 2.450 | 2.419 | 2.320 | 2.181 | 2.119 | 2.020 | 1.899 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | .715 | .731 | .751 | .770 | .789 | .809 | .800 | .781 | .755 | .742 | .724 | .703 |
| | $\alpha_r'$ | 4.58 | 3.38 | 2.01 | .80 | -.61 | -1.64 | -1.29 | -.99 | 1.67 | 2.51 | 3.88 | 5.63 |
| | $\Delta\beta$ | .34 | .32 | .30 | .29 | .26 | .24 | .25 | .27 | .30 | .31 | .33 | .35 |
| | $\alpha_i$ | 2.19 | 1.89 | 1.39 | 1.00 | .55 | .15 | .20 | .53 | 1.10 | 1.39 | 1.79 | 2.16 |
| | $c_n$ | .7904 | .6647 | .5053 | .3638 | .2018 | .0536 | .0733 | .1931 | .4018 | .5030 | .6465 | .7761 |
| | $c_m$ | -.0427 | -.0437 | -.0328 | -.0613 | -.0707 | -.0752 | -.0763 | -.0743 | -.0663 | -.0595 | -.0488 | -.0441 |
| | $c_o$ | -.0303 | -.0406 | -.0210 | -.0100 | .0022 | -.0031 | -.0023 | -.0012 | -.0057 | -.0148 | -.0344 | -.0507 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | |
| Upper surface | 0.000 | 1.135 | 1.141 | 1.150 | 1.158 | 1.165 | 1.175 | 1.170 | 1.162 | 1.151 | 1.146 | 1.138 | 1.130 |
| | .025 | -.567 | -1.221 | [a]-.539 | [a]-.181 | .194 | .217 | .207 | .183 | [a]-.179 | [a]-.431 | [a]-1.111 | [a]-1.550 |
| | .050 | -1.364 | -1.161 | -.623 | [a]-.322 | [a]-.070 | .067 | [a].065 | [a]-.025 | -.335 | -.540 | -1.016 | -1.460 |
| | .100 | -1.917 | -.974 | -.698 | -.466 | [a]-.249 | -.074 | -.066 | -.187 | [a]-.447 | -.622 | -.831 | -1.259 |
| | [a].200 | -2.296 | -.823 | -.671 | -.487 | -.324 | [a]-.194 | [a]-.204 | -.312 | -.513 | -.645 | -.784 | -.918 |
| | .300 | -.767 | -.726 | -.619 | -.507 | -.389 | -.279 | [a]-.313 | -.401 | -.556 | [a]-.638 | -.748 | -.743 |
| | .400 | -.696 | -.663 | -.628 | -.565 | -.471 | -.379 | [a]-.409 | -.477 | -.600 | [a]-.643 | -.686 | -.681 |
| | .500 | -.636 | -.609 | -.615 | -.594 | -.530 | -.467 | [a]-.496 | [a]-.542 | [a]-.620 | -.629 | -.630 | -.632 |
| | .600 | -.564 | -.536 | -.551 | -.572 | -.592 | -.566 | [a]-.574 | [a]-.611 | -.590 | -.570 | -.560 | -.570 |
| | .700 | -.450 | -.427 | -.440 | -.448 | -.456 | [a]-.515 | [a]-.520 | -.489 | [a]-.488 | -.460 | -.445 | -.457 |
| | .800 | -.300 | -.279 | [a]-.267 | [a]-.265 | -.321 | -.326 | -.342 | -.346 | -.331 | [a]-.298 | -.297 | -.310 |
| | .900 | -.039 | -.023 | -.032 | -.038 | -.045 | -.049 | -.058 | -.063 | -.054 | -.043 | -.035 | -.051 |
| | .950 | .065 | .079 | .078 | .082 | .084 | .082 | .073 | .067 | .064 | .066 | .067 | .062 |
| Lower surface | .0375 | .493 | .418 | .218 | .014 | -.277 | -.740 | -.728 | -.322 | .086 | .243 | .428 | .563 |
| | .075 | .363 | .305 | [a].149 | -.021 | -.215 | [a]-.593 | -.509 | -.250 | .023 | .147 | .294 | .410 |
| | .150 | .248 | .204 | .086 | -.020 | -.148 | [a]-.286 | -.279 | [a]-.166 | .014 | .095 | .202 | .290 |
| | .250 | .174 | .141 | .048 | -.030 | -.126 | [a]-.231 | -.230 | [a]-.140 | -.004 | .054 | .138 | .210 |
| | .350 | .120 | .098 | .019 | -.043 | -.126 | [a]-.213 | [a]-.203 | [a]-.131 | -.032 | .021 | [a].089 | [a].151 |
| | .450 | [a].066 | .063 | .001 | -.047 | [a]-.136 | [a]-.207 | [a]-.192 | [a]-.138 | -.033 | .002 | [a].040 | [a].094 |
| | .550 | .025 | .013 | -.042 | -.089 | -.148 | [a]-.207 | [a]-.202 | -.158 | -.080 | -.038 | .006 | .052 |
| | .650 | .001 | -.008 | -.058 | -.098 | -.141 | -.189 | -.191 | -.156 | -.098 | -.064 | -.022 | .018 |
| | .750 | 0 | -.003 | -.037 | -.062 | -.089 | -.120 | -.128 | -.108 | -.073 | -.048 | -.016 | .013 |
| | .850 | .018 | [a].012 | [a].004 | .004 | -.006 | -.020 | -.029 | -.023 | -.010 | -.006 | [a]0 | .045 |
| | .925 | .045 | .053 | .045 | .046 | .050 | .049 | .039 | .036 | .030 | .037 | .041 | .058 |
| | .975 | .091 | .095 | .116 | .106 | .120 | .155 | .143 | .112 | .126 | .125 | .094 | .105 |
| | [a]1.000 | .152 | .162 | .181 | .176 | .281 | .240 | .210 | .191 | .211 | .186 | .162 | .183 |

[a]Faired value.

TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(i) M = 0.56; $\beta_{0.75R}$ = 44.46°.

| | J | 2.008 | 2.039 | 2.059 | 2.090 | 2.120 | 2.143 | 2.180 | 2.212 | 2.240 | 2.259 | 2.287 | 2.312 | 2.352 | 2.390 | 2.424 | 2.463 | 2.495 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | .835 | .828 | .821 | .817 | .811 | .804 | .800 | .797 | .792 | .785 | .778 | .774 | .768 | .765 | .763 | .759 | .748 |
| | $\beta_{r_{0.7}}$ | 4.04 | 3.62 | 3.32 | 2.89 | 2.48 | 2.18 | 1.70 | 1.27 | .92 | .66 | .33 | 0 | -.48 | -.95 | -1.35 | -1.80 | -2.18 |
| | $\Delta\beta$ | .40 | .39 | .38 | .37 | .36 | .35 | .34 | .32 | .31 | .30 | .29 | .28 | .27 | .25 | .24 | .23 | .21 |
| | $c_l$ | 1.57 | 1.58 | 1.50 | 1.42 | 1.34 | 1.23 | 1.13 | .99 | .90 | .86 | .79 | .69 | .57 | .42 | .33 | .20 | .05 |
| | $c_n$ | .5685 | .5730 | .5465 | .5149 | .4858 | .4470 | .4125 | .3618 | .3275 | .3123 | .2888 | .2542 | .2106 | .1525 | .1208 | .0746 | .0187 |
| | $c_m$ | -.0724 | -.0755 | -.0716 | -.0680 | -.0642 | -.0615 | -.0602 | -.0505 | -.0525 | -.0588 | -.0616 | -.0627 | -.0645 | -.0663 | -.0695 | -.0727 | -.0784 |
| | $c_c$ | -.0086 | -.0091 | -.0113 | -.0107 | -.0130 | -.0129 | -.0118 | -.0149 | -.0112 | -.0103 | -.0111 | -.0109 | -.0086 | -.0060 | -.0056 | -.0057 | -.0009 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.186 | 1.183 | 1.180 | 1.178 | 1.175 | 1.172 | 1.170 | 1.169 | 1.166 | 1.164 | 1.161 | 1.159 | 1.156 | 1.155 | 1.154 | 1.151 | 1.148 |
| | [a].025 | -.485 | -.489 | -.385 | -.383 | -.275 | -.207 | -.212 | -.175 | -.124 | -.142 | -.175 | -.147 | -.068 | .045 | .082 | .192 | .370 |
| | .050 | -.527 | -.527 | -.467 | -.426 | -.389 | -.350 | -.311 | -.268 | -.221 | -.183 | [a]-.242 | [a]-.208 | [a]-.137 | [a].040 | [a].002 | [a].050 | .192 |
| | .100 | -.515 | -.523 | -.522 | -.521 | -.511 | -.497 | -.462 | -.423 | -.383 | -.352 | -.314 | -.273 | -.219 | -.146 | -.105 | -.056 | -.014 |
| | [a].200 | -.603 | -.622 | -.612 | -.610 | -.600 | -.597 | -.540 | -.496 | -.435 | -.407 | -.381 | -.350 | -.308 | -.261 | -.224 | -.181 | -.150 |
| | .300 | -.678 | -.724 | -.695 | -.679 | -.666 | -.644 | -.595 | -.544 | -.502 | -.480 | -.457 | -.424 | -.385 | -.336 | -.308 | -.274 | -.244 |
| | .400 | -.743 | -.782 | -.771 | -.742 | -.704 | -.676 | -.636 | -.610 | -.587 | -.564 | -.535 | -.495 | -.453 | -.406 | -.379 | -.348 | -.318 |
| | .500 | -.771 | -.809 | -.783 | -.764 | -.738 | -.710 | -.674 | -.640 | -.606 | -.594 | -.582 | -.554 | -.513 | -.473 | -.444 | -.416 | -.389 |
| | .600 | -.855 | -.879 | -.850 | -.840 | -.817 | -.780 | -.739 | -.714 | -.684 | -.657 | -.616 | -.572 | -.533 | -.501 | -.479 | -.461 | -.439 |
| | .700 | -.465 | -.547 | -.351 | -.526 | -.491 | -.459 | -.444 | -.445 | -.444 | -.455 | -.466 | -.463 | -.457 | -.447 | -.437 | -.430 | -.419 |
| | .800 | [a]-.309 | [a]-.281 | [a]-.242 | [a]-.235 | [a]-.210 | [a]-.207 | [a]-.224 | -.063 | -.112 | -.206 | -.252 | -.279 | -.299 | -.297 | -.304 | -.328 | -.345 |
| | .900 | -.188 | -.128 | -.065 | -.044 | -.031 | -.028 | -.023 | -.027 | -.032 | -.043 | -.054 | -.060 | -.073 | -.079 | -.086 | -.103 | -.113 |
| | .950 | -.112 | -.074 | -.010 | .020 | .044 | .056 | .070 | .074 | .076 | .074 | .069 | .068 | .064 | .062 | .052 | .040 | .029 |
| Lower surface | .0375 | .326 | .293 | .263 | .225 | .179 | .134 | .098 | .047 | -.007 | -.063 | -.128 | -.194 | -.284 | -.413 | -.509 | -.700 | -.906 |
| | .075 | .252 | .212 | .180 | .151 | .132 | .075 | .042 | 0 | -.038 | -.079 | -.127 | -.167 | -.221 | -.293 | -.335 | -.385 | -.413 |
| | .150 | .168 | .141 | .121 | .099 | .079 | .046 | .026 | -.001 | -.025 | -.052 | -.083 | -.107 | -.142 | -.187 | -.217 | -.266 | -.302 |
| | .250 | .108 | .086 | .071 | .052 | .039 | .011 | -.002 | -.022 | -.042 | -.063 | -.087 | -.104 | -.128 | -.163 | -.183 | -.216 | -.241 |
| | .350 | .082 | .043 | .031 | .015 | .004 | -.019 | -.029 | -.045 | -.060 | -.075 | -.095 | -.107 | -.126 | -.149 | -.163 | -.187 | -.205 |
| | .450 | .033 | .014 | .003 | -.011 | -.031 | -.043 | -.043 | -.050 | -.061 | -.073 | -.088 | -.097 | -.110 | -.128 | -.139 | -.157 | -.170 |
| | .550 | -.045 | -.053 | -.056 | -.064 | -.057 | -.075 | -.065 | -.099 | -.107 | -.116 | -.127 | -.132 | -.139 | -.153 | -.157 | -.171 | -.178 |
| | .650 | -.101 | -.109 | -.107 | -.113 | -.112 | -.117 | -.116 | -.123 | -.126 | -.129 | -.137 | -.136 | -.139 | -.146 | -.148 | -.157 | -.161 |
| | .750 | -.100 | -.102 | -.095 | -.094 | -.090 | -.091 | -.085 | -.087 | -.087 | -.088 | -.093 | -.091 | -.090 | -.091 | -.089 | -.095 | -.097 |
| | .850 | -.079 | -.069 | -.051 | -.046 | -.038 | -.032 | -.024 | -.023 | -.021 | -.020 | -.022 | -.019 | -.013 | -.008 | -.005 | -.008 | -.006 |
| | [a].925 | -.086 | -.055 | -.026 | -.014 | 0 | .011 | .020 | .024 | .029 | .032 | .035 | .040 | .054 | .063 | .067 | .066 | .069 |
| | [a]975 | -.011 | .021 | .067 | .082 | .116 | .130 | .133 | .212 | .125 | .113 | .125 | .140 | .120 | .130 | .177 | .175 | .205 |
| | [a]1.000 | .350 | .230 | .300 | .300 | .350 | .400 | .275 | .475 | .300 | .300 | .300 | .325 | .325 | .325 | .325 | .350 | .500 |

[a]Faired value.

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TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Continued

(j) M = 0.60; $\beta_{0.75R}$ = 44.46°.

| | J | 2.022 | 2.048 | 2.061 | 2.090 | 2.103 | 2.123 | 2.144 | 2.207 | 2.228 | 2.251 | 2.286 | 2.316 | 2.348 | 2.378 | 2.409 | 2.435 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | .894 | .888 | .882 | .876 | .870 | .865 | .861 | .862 | .850 | .846 | .839 | .832 | .826 | .821 | .816 | .813 |
| | $\alpha_r$' | 3.85 | 3.48 | 3.30 | 2.89 | 2.73 | 2.45 | 2.18 | 1.32 | 1.07 | .77 | .33 | -.03 | -.42 | -.79 | -1.16 | -1.70 |
| | $\Delta\beta$ | .42 | .41 | .41 | .39 | .39 | .38 | .37 | .34 | .33 | .33 | .31 | .30 | .28 | .27 | .26 | .24 |
| | $\rho_l$ | 1.20 | 1.29 | 1.27 | 1.18 | 1.16 | 1.07 | 1.07 | .85 | .79 | .71 | .63 | .51 | .40 | .32 | .18 | .07 |
| | $\rho_m$ | .4345 | .4665 | .4610 | .4261 | .4197 | .3873 | .3882 | .3104 | .2888 | .2590 | .2316 | .1886 | .1470 | .1163 | .0662 | .0245 |
| | $\rho_s$ | -.0657 | -.0729 | -.0745 | -.0751 | -.0729 | -.0648 | -.0714 | -.0702 | -.0700 | -.0714 | -.0723 | -.0722 | -.0718 | -.0754 | -.0777 | -.0807 |
| | $\alpha_s$ | .0171 | .0175 | .0173 | .0210 | .0201 | .0182 | .0196 | .0162 | .0155 | .0117 | .0055 | .0029 | .0072 | .0061 | .0042 | .0036 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.216 | 1.212 | 1.209 | 1.206 | 1.203 | 1.201 | 1.199 | 1.199 | 1.194 | 1.191 | 1.188 | 1.185 | 1.182 | 1.180 | 1.178 | 1.176 |
| | .025 | [a]-.105 | [a]-.225 | [a]-.160 | [a].050 | [a]-.082 | [a].095 | [a].125 | .171 | .158 | .147 | .117 | .131 | [a].340 | [a].375 | [a].440 | [a].465 |
| | .050 | -.269 | -.283 | -.266 | -.238 | -.217 | -.201 | -.178 | -.081 | -.047 | -.022 | .011 | .052 | .082 | .117 | .164 | .203 |
| | .100 | -.330 | -.357 | -.365 | -.366 | -.366 | -.365 | -.358 | -.287 | -.258 | -.232 | -.206 | -.168 | -.141 | -.106 | -.064 | -.025 |
| | [a].200 | -.463 | -.488 | -.482 | -.464 | -.466 | -.472 | -.477 | -.394 | -.380 | -.359 | -.315 | -.281 | -.245 | -.219 | -.184 | -.150 |
| | .300 | -.546 | -.586 | -.576 | -.559 | -.556 | -.555 | -.548 | -.487 | -.464 | -.443 | -.408 | -.371 | -.354 | -.329 | -.298 | -.269 |
| | .400 | -.564 | -.624 | -.648 | -.651 | -.637 | -.624 | -.609 | -.554 | -.527 | -.512 | -.498 | -.479 | -.460 | -.435 | -.400 | -.372 |
| | .500 | -.622 | -.671 | -.682 | -.682 | -.681 | -.674 | -.655 | -.599 | -.588 | -.578 | -.553 | -.520 | -.503 | -.487 | -.469 | -.459 |
| | .600 | -.707 | -.763 | -.777 | -.776 | -.763 | -.756 | -.743 | -.706 | -.701 | -.692 | -.676 | -.652 | -.641 | -.628 | -.605 | -.585 |
| | .700 | -.676 | -.768 | -.808 | -.831 | -.843 | -.818 | -.835 | -.818 | -.809 | -.799 | -.786 | -.766 | -.747 | -.682 | -.605 | -.542 |
| | .800 | -.315 | -.333 | -.323 | -.314 | -.305 | -.292 | -.281 | -.268 | -.272 | -.270 | -.257 | -.254 | -.267 | -.289 | -.314 | -.335 |
| | .900 | -.285 | -.303 | -.293 | -.279 | -.865 | -.246 | -.218 | -.159 | -.128 | -.094 | -.054 | -.032 | -.036 | -.042 | -.051 | -.065 |
| | .950 | -.198 | -.262 | -.263 | -.256 | -.248 | -.226 | -.196 | -.127 | -.076 | -.040 | .008 | .053 | .069 | .077 | .078 | .070 |
| Lower surface | .0375 | .275 | .249 | .213 | .178 | .149 | .131 | .100 | -.023 | -.089 | -.148 | -.206 | -.293 | -.379 | -.486 | -.656 | -.808 |
| | .075 | .195 | .169 | .144 | .116 | .088 | .073 | .045 | -.052 | -.102 | -.147 | -.186 | -.242 | -.296 | -.355 | -.474 | -.652 |
| | .150 | .164 | .139 | .119 | .097 | .073 | .060 | .040 | -.024 | -.059 | -.088 | -.113 | -.146 | -.176 | -.208 | -.252 | -.275 |
| | .250 | .098 | .075 | .058 | .039 | .020 | .010 | -.007 | -.059 | -.085 | -.108 | -.123 | -.148 | -.175 | -.196 | -.229 | -.255 |
| | .350 | .041 | .021 | .009 | -.007 | -.025 | -.031 | -.044 | -.086 | -.107 | -.125 | -.136 | -.154 | -.173 | -.188 | -.210 | -.229 |
| | .450 | .011 | -.010 | -.018 | -.033 | -.047 | -.054 | -.064 | -.100 | -.115 | -.130 | -.137 | -.148 | -.162 | -.170 | -.186 | -.199 |
| | .550 | -.079 | -.100 | -.106 | -.120 | -.133 | -.136 | -.144 | -.173 | -.183 | -.194 | -.194 | -.196 | -.203 | -.204 | -.211 | -.218 |
| | .650 | -.161 | -.180 | -.183 | -.193 | -.202 | -.200 | -.202 | -.221 | -.223 | -.224 | -.216 | -.205 | -.207 | -.200 | -.199 | -.199 |
| | .750 | [a]-.207 | [a]-.216 | [a]-.216 | [a]-.224 | [a]-.228 | [a]-.219 | [a]-.220 | [a]-.215 | [a]-.201 | [a]-.194 | [a]-.184 | -.163 | -.166 | -.156 | -.150 | -.140 |
| | [a].850 | -.215 | -.222 | -.220 | -.223 | -.223 | -.208 | -.194 | -.171 | -.140 | -.127 | -.107 | -.080 | -.079 | -.070 | -.061 | -.043 |
| | .925 | -.181 | -.204 | -.203 | -.201 | -.192 | -.171 | -.146 | -.109 | -.076 | -.054 | -.025 | .006 | .018 | .034 | .049 | .060 |
| | [a].975 | -.101 | -.176 | -.179 | -.175 | -.149 | -.120 | -.093 | -.053 | -.011 | .006 | .044 | .081 | .122 | .140 | .156 | .150 |
| | [a]1.000 | .025 | -.120 | -.145 | -.135 | -.100 | -.050 | -.040 | .010 | .065 | .050 | .115 | .175 | .215 | .240 | .275 | .245 |

[a]Paired value.

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TABLE 5.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.97)(08.00) PROPELLER BLADE SECTION (x = 0.70) - Concluded

(k) M = 0.65; $\beta_{0.75R}$ = 44.46°.

| | J | 2.036 | 2.053 | 2.074 | 2.095 | 2.112 | 2.134 | 2.151 | 2.175 | 2.203 | 2.226 | 2.253 | 2.280 | 2.309 | 2.337 | 2.367 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .998 | .992 | .987 | .982 | .973 | .968 | .961 | .956 | .946 | .940 | .935 | .927 | .921 | .912 | .906 |
| | $\alpha_x$° | 3.65 | 3.41 | 3.12 | 2.83 | 2.60 | 2.30 | 2.07 | 1.76 | 1.43 | 1.09 | .75 | .40 | .04 | -.30 | -.67 |
| | $\Delta\beta$ | .49 | .48 | .47 | .46 | .45 | .44 | .43 | .42 | .41 | .40 | .38 | .37 | .35 | .34 | .32 |
| | $\alpha_i$ | .94 | 1.02 | .94 | .90 | .81 | .75 | .68 | .63 | .50 | .44 | .34 | .26 | .16 | .05 | -.08 |
| | $c_n$ | .3412 | .3693 | .3422 | .3241 | .2956 | .2717 | .2464 | .2290 | .1798 | .1598 | .1235 | .0944 | .0576 | .0168 | -.0303 |
| | $c_m$ | -.0999 | -.1103 | -.1048 | -.1004 | -.0886 | -.0824 | -.0771 | -.0727 | -.0650 | -.0604 | -.0551 | -.0486 | -.0468 | -.0400 | -.0397 |
| | $c_d$ | .0491 | .0564 | .0524 | .0504 | .0487 | .0486 | .0460 | .0457 | .0428 | .0423 | .0416 | .0408 | .0379 | .0340 | .0260 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.273 | 1.270 | 1.267 | 1.264 | 1.259 | 1.256 | 1.252 | 1.249 | 1.244 | 1.241 | 1.238 | 1.233 | 1.230 | 1.225 | 1.222 |
| | .025 | .452 | .443 | .435 | .433 | .424 | .420 | .413 | .406 | .396 | .389 | .382 | .372 | .361 | .351 | .345 |
| | .050 | .033 | .003 | .005 | .004 | .017 | .037 | .052 | .061 | .090 | .107 | .120 | .132 | .152 | .173 | .200 |
| | .100 | -.088 | -.130 | -.139 | -.139 | -.145 | -.151 | -.145 | -.138 | -.114 | -.100 | -.085 | -.080 | -.064 | -.044 | -.019 |
| | [a].200 | -.264 | -.268 | -.271 | -.270 | -.270 | -.272 | -.275 | -.265 | -.243 | -.230 | -.221 | -.220 | -.202 | -.190 | -.147 |
| | .300 | -.354 | -.373 | -.361 | -.351 | -.348 | -.341 | -.336 | -.331 | -.315 | -.305 | -.297 | -.295 | -.283 | -.264 | -.231 |
| | .400 | -.396 | -.430 | -.437 | [a]-.420 | [a]-.405 | [a]-.400 | [a]-.390 | [a]-.387 | -.389 | -.386 | -.382 | -.372 | -.356 | -.348 | -.338 |
| | .500 | -.453 | -.484 | -.484 | -.480 | -.476 | -.466 | -.458 | -.455 | -.437 | -.429 | -.425 | -.429 | -.427 | -.423 | -.404 |
| | .600 | -.538 | -.573 | -.579 | -.578 | -.574 | -.567 | -.557 | -.554 | -.548 | -.547 | -.548 | -.553 | -.555 | -.544 | -.527 |
| | .700 | -.608 | -.653 | -.663 | -.663 | -.663 | -.655 | -.651 | -.646 | -.648 | -.652 | -.656 | -.656 | -.655 | -.653 | -.647 |
| | .800 | -.673 | -.740 | -.756 | -.761 | -.763 | -.762 | -.761 | -.764 | -.757 | -.760 | -.764 | -.765 | -.763 | -.733 | -.645 |
| | .900 | -.714 | -.823 | -.794 | -.683 | -.547 | -.466 | -.424 | -.406 | -.359 | -.347 | -.326 | -.309 | -.279 | -.242 | -.197 |
| | .950 | -.401 | -.491 | -.492 | -.470 | -.439 | -.408 | -.386 | -.376 | -.343 | -.331 | -.313 | -.298 | -.271 | -.235 | -.188 |
| Lower surface | .0375 | .209 | .187 | .148 | .120 | .084 | .041 | .004 | -.029 | -.094 | -.149 | -.205 | -.265 | -.336 | -.411 | -.484 |
| | .075 | .134 | .114 | .081 | .064 | .036 | .002 | -.032 | -.061 | -.117 | -.161 | -.210 | -.257 | -.317 | -.390 | -.467 |
| | .150 | .118 | .098 | .072 | .056 | .036 | .013 | -.007 | -.025 | -.056 | -.085 | -.129 | -.185 | -.257 | -.331 | -.409 |
| | .250 | .076 | .060 | .037 | .024 | .008 | -.009 | -.023 | -.037 | -.061 | -.084 | -.106 | -.128 | -.158 | -.202 | -.253 |
| | .350 | .042 | .023 | .003 | -.007 | -.021 | -.035 | -.047 | -.062 | -.083 | -.103 | -.129 | -.151 | -.172 | -.194 | -.218 |
| | .450 | .028 | .009 | -.009 | -.019 | -.030 | -.043 | -.053 | -.067 | -.088 | -.107 | -.131 | -.152 | -.172 | -.194 | -.217 |
| | .550 | -.057 | -.078 | -.094 | -.103 | -.113 | -.125 | -.134 | -.147 | -.164 | -.183 | -.204 | -.225 | -.244 | -.262 | -.276 |
| | .650 | -.167 | -.188 | -.204 | -.210 | -.222 | -.232 | -.244 | -.257 | -.273 | -.289 | -.308 | -.327 | -.345 | -.366 | -.381 |
| | .750 | -.227 | -.254 | -.268 | -.277 | -.286 | -.295 | -.306 | -.319 | -.337 | -.354 | -.374 | -.393 | -.413 | -.433 | -.448 |
| | .850 | -.237 | -.265 | -.282 | -.289 | -.297 | -.307 | -.315 | -.329 | -.347 | -.364 | -.386 | -.407 | -.424 | -.464 | -.445 |
| | .925 | -.266 | -.299 | -.315 | -.321 | -.329 | -.340 | -.349 | -.361 | -.376 | -.395 | -.412 | -.431 | -.445 | -.464 | -.342 |
| | .975 | -.313 | -.351 | -.367 | -.373 | -.381 | -.388 | -.396 | -.408 | -.418 | -.433 | -.447 | -.447 | -.402 | -.272 | -.178 |
| | [a]1.000 | -.305 | -.324 | -.325 | -.320 | -.300 | -.345 | -.269 | -.312 | -.310 | -.236 | -.220 | -.130 | -.248 | 0 | .150 |

[a]Paired value.

TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75)

(a) N = 1140 rpm; $\beta_{0.75R} = 29.94°$.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.740 | 0.854 | 1.012 | 1.177 | 1.331 | 1.492 | 1.402 | 1.243 | 1.088 | 0.942 | 0.804 |
| | $M_x$ | .406 | .418 | .435 | .453 | .466 | .488 | .480 | .462 | .447 | .430 | .421 |
| | $\alpha_x$ | 12.50 | 10.02 | 6.69 | 3.40 | .47 | -2.41 | -.81 | 2.13 | 5.16 | 8.15 | 11.10 |
| | $\Delta\beta$ | .19 | .19 | .18 | .17 | .16 | .15 | .16 | .17 | .18 | .19 | .19 |
| | $\alpha_i$ | 3.37 | 3.03 | 2.37 | 1.82 | 1.10 | .11 | .38 | 1.06 | 1.57 | 2.11 | 2.76 |
| | $c_n$ | 1.0263 | .9502 | .7593 | .5954 | .3664 | .0378 | .1271 | .3485 | .5061 | .6685 | .8528 |
| | $c_m$ | -.0604 | -.0464 | -.0235 | -.0086 | -.0361 | -.0587 | -.0591 | -.0473 | -.0315 | -.0140 | -.0588 |
| | $c_o$ | -.0563 | -.0538 | -.0527 | -.0455 | -.0334 | .0068 | .0083 | -.0096 | .0027 | -.0070 | -.0075 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.042 | 1.045 | 1.049 | 1.053 | 1.056 | 1.061 | 1.059 | 1.055 | 1.051 | 1.047 | 1.045 |
| | [a].025 | -2.438 | -2.234 | -2.065 | -1.935 | -1.527 | .320 | .321 | -.463 | -.128 | -.182 | -.213 |
| | .050 | -2.049 | -1.954 | -1.840 | -1.709 | -1.286 | [a].125 | 0 | -.430 | -.744 | -1.056 | -1.157 |
| | .100 | -1.136 | -1.158 | -1.311 | -.709 | -.331 | -.027 | -.140 | -.398 | -.693 | [a]-1.271 | -1.467 |
| | .200 | [a]-1.066 | [a]-1.054 | [a]-.772 | [a]-.601 | [a]-.353 | [a]-.147 | [a]-.232 | [a]-.395 | -.589 | [a]-.844 | [a]-1.131 |
| | .300 | -1.035 | -.973 | -.692 | -.520 | -.390 | -.231 | -.289 | -.419 | -.554 | -.639 | -.922 |
| | .400 | -.921 | -.832 | -.567 | -.470 | -.374 | -.252 | -.297 | -.395 | -.500 | -.555 | -.790 |
| | .500 | -.782 | -.680 | -.503 | -.443 | -.382 | -.284 | -.317 | -.395 | -.472 | -.502 | -.660 |
| | .600 | -.617 | -.540 | -.441 | -.414 | -.385 | -.310 | -.338 | -.392 | -.444 | -.449 | -.527 |
| | .700 | -.477 | -.417 | -.371 | -.376 | -.374 | -.325 | -.338 | -.376 | -.401 | -.381 | -.419 |
| | .800 | -.350 | -.308 | -.257 | -.273 | -.298 | -.274 | -.288 | -.295 | -.297 | -.267 | -.310 |
| | .900 | -.230 | -.213 | -.101 | -.093 | -.128 | -.130 | -.127 | -.120 | -.107 | -.107 | -.211 |
| | .950 | -.142 | -.156 | -.014 | .035 | .023 | .014 | .010 | .013 | .015 | -.013 | -.140 |
| Lower surface | .0375 | .818 | .783 | .659 | .412 | -.004 | -.532 | -.292 | .102 | .437 | .648 | .765 |
| | .075 | .644 | .607 | .483 | .282 | -.012 | -.338 | -.194 | .062 | .302 | .476 | .592 |
| | .150 | .487 | .448 | .343 | .197 | -.012 | -.226 | -.127 | .038 | .202 | .332 | .431 |
| | .250 | .365 | .335 | .246 | .135 | -.014 | -.138 | -.075 | .031 | .151 | .252 | .333 |
| | .350 | .328 | .301 | .232 | .141 | .020 | -.092 | -.042 | .051 | .146 | .223 | .289 |
| | .450 | .220 | .198 | .150 | .074 | -.028 | -.125 | -.078 | -.003 | .075 | .138 | .187 |
| | .550 | .112 | .095 | .062 | -.004 | -.088 | -.151 | -.119 | -.063 | -.002 | .052 | .088 |
| | [a].650 | .079 | .042 | .041 | -.002 | -.085 | -.127 | -.116 | -.082 | -.031 | .010 | .035 |
| | .750 | .068 | .021 | .030 | .010 | -.041 | -.072 | -.070 | -.057 | -.025 | -.004 | .002 |
| | [a].850 | .019 | -.003 | .005 | .020 | .007 | -.015 | -.006 | -.008 | -.001 | 0 | -.027 |
| | .925 | -.033 | [a]-.026 | .027 | .041 | .042 | .046 | .046 | .038 | .032 | .017 | -.051 |
| | .975 | -.066 | -.092 | .027 | .063 | .086 | .105 | .097 | .078 | .052 | .017 | -.094 |
| | [a]1.000 | .054 | -.032 | .176 | .255 | .302 | .235 | .216 | .203 | .257 | .156 | 0 |

[a]Paired value.

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TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Continued

(b) M = 1350 rpm; $\beta_{0.75R}$ = 89.94°.

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.688 | 0.759 | 0.858 | 0.945 | 0.994 | 1.094 | 1.110 | 1.209 | 1.287 | 1.387 | 1.377 | 1.466 | 1.469 | 1.486 | 1.334 | 1.202 | 1.154 | 1.068 | 0.976 | 0.896 | 0.822 |
| | $M_{Tr}$ | .499 | .494 | .518 | .510 | .519 | .525 | .542 | .559 | .556 | .569 | .566 | .583 | .582 | .568 | .556 | .560 | .545 | .528 | .510 | .508 | .516 |
| | $\alpha_{R}$, deg | 13.66 | 12.08 | 9.93 | 8.08 | 8.53 | 6.45 | 4.72 | 2.91 | 1.30 | -.54 | -.36 | -1.95 | -2.00 | -1.88 | .48 | 2.91 | 3.85 | 5.55 | 7.44 | 9.18 | 10.70 |
| | $\Delta\beta$, deg | .86 | .87 | .97 | .86 | .87 | .86 | .85 | .84 | .83 | .81 | .81 | .80 | .80 | .81 | .82 | .84 | .84 | .85 | .86 | .87 | .87 |
| | $\alpha_{i}$, deg | 3.34 | 3.08 | 2.79 | 2.48 | 2.53 | 2.25 | 1.98 | 1.55 | 1.18 | .58 | .63 | .15 | .17 | .33 | .82 | 1.27 | 1.63 | 2.06 | 2.47 | 2.80 | 2.93 |
| | $p_{n}$ | 1.0081 | .9819 | .8766 | .7846 | .8017 | .7206 | .6844 | .5087 | .3910 | .1934 | .2084 | .0514 | -.0572 | .1107 | .2711 | .4137 | .5384 | .6671 | .7849 | .8448 | .9119 |
| | $p_{M}$ | -.1182 | -.0953 | -.0332 | -.0865 | -.0858 | -.0358 | -.0307 | -.0394 | -.0420 | -.0658 | -.0827 | -.0691 | -.0674 | -.0877 | -.0604 | -.0423 | -.0448 | -.0433 | -.0368 | -.0869 | -.0403 |
| | $p_{o}$ | .0019 | .0172 | .0267 | .0395 | .0313 | .0300 | .0240 | .0210 | .0218 | .0104 | .0140 | .0131 | .0144 | .0184 | .0087 | -.0088 | -.0191 | -.0285 | -.0294 | -.0286 | -.0387 |
| | o/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.064 | 1.062 | 1.067 | 1.066 | 1.069 | 1.070 | 1.075 | 1.079 | 1.079 | 1.083 | 1.082 | 1.087 | 1.087 | 1.083 | 1.079 | 1.080 | 1.078 | 1.071 | 1.066 | 1.066 | 1.068 |
| | .025 | -.617 | -.852 | -1.125 | -1.215 | -1.859 | -1.313 | -1.291 | -1.228 | -1.178 | -.794 | -.714 | [a].760 | [a].735 | [a].616 | -.004 | -.484 | -.760 | -1.062 | -1.165 | -1.191 | -1.188 |
| | .050 | -.847 | -1.019 | -1.859 | -1.395 | -1.459 | -1.436 | -1.377 | -1.309 | -.083 | -.594 | -.574 | [a].649 | [a].410 | [a].170 | -.156 | [a]-.494 | [a]-.730 | [a]-1.008 | [a]-1.165 | [a]-1.448 | -1.414 |
| | .100 | -1.182 | -1.092 | -1.531 | -1.680 | -1.659 | -1.137 | -.791 | -.779 | -.387 | -.821 | -.897 | -.058 | -.051 | [a].085 | -.306 | -.508 | -.676 | -.879 | [a]-1.378 | [a]-1.639 | [a]-1.644 |
| | .200 | [a]-1.135 | [a]-1.076 | [a]-1.270 | [a]-1.003 | [a]-1.056 | [a].810 | [a].668 | -.430 | -.411 | -.358 | -.357 | -.883 | -.873 | -.265 | [a]-.391 | [a]-.488 | [a]-.596 | -.956 | [a]-1.118 | [a]-1.873 | |
| | .300 | -1.068 | -1.015 | -.936 | -.703 | -.704 | -.662 | -.600 | -.513 | -.427 | -.358 | -.357 | -.858 | -.859 | -.307 | -.394 | -.470 | -.558 | -.646 | -.678 | -.799 | -.924 |
| | .400 | -.997 | -.913 | -.706 | -.588 | -.580 | -.579 | -.538 | -.467 | -.405 | -.346 | -.394 | -.877 | -.277 | -.315 | -.300 | -.433 | -.497 | -.567 | -.589 | -.619 | -.736 |
| | .500 | -.906 | -.787 | -.547 | -.503 | -.500 | -.586 | -.502 | -.455 | -.411 | -.368 | -.376 | -.315 | -.313 | -.346 | -.392 | -.489 | -.476 | -.524 | -.525 | -.514 | -.587 |
| | .600 | -.786 | -.64 | -.432 | -.424 | -.419 | -.467 | -.461 | -.434 | -.407 | -.385 | -.388 | -.340 | -.338 | -.366 | -.398 | -.413 | -.448 | -.475 | -.456 | -.496 | -.454 |
| | .700 | -.600 | -.517 | -.339 | -.337 | -.336 | -.393 | -.398 | -.391 | -.381 | -.370 | -.373 | -.342 | -.342 | -.362 | -.378 | -.373 | -.395 | -.402 | -.370 | -.337 | -.365 |
| | [a].800 | -.489 | -.398 | -.253 | -.257 | -.285 | -.270 | -.283 | -.285 | -.296 | -.304 | -.308 | -.892 | -.891 | -.899 | -.303 | -.288 | -.896 | -.860 | -.860 | -.836 | [a]-.895 |
| | .900 | -.401 | -.287 | -.168 | -.095 | -.097 | -.092 | -.081 | -.091 | -.118 | -.187 | -.131 | -.132 | -.130 | -.134 | -.188 | -.098 | -.088 | -.090 | -.087 | -.119 | [a]-.175 |
| | [a].950 | -.317 | -.206 | -.095 | .010 | -.031 | .058 | .081 | .095 | .035 | .007 | .008 | .010 | -.028 | -.009 | .005 | .091 | .074 | .091 | -.036 | -.042 | -.085 |
| Lower surface | .0375 | .847 | .787 | .788 | .784 | .731 | .637 | .507 | .317 | .079 | -.191 | -.191 | -.310 | -.313 | -.368 | -.044 | .244 | .414 | .593 | .710 | .759 | .792 |
| | .075 | .677 | .617 | .607 | .543 | .551 | .487 | .356 | .213 | .048 | -.135 | -.139 | -.393 | -.386 | -.235 | -.038 | .160 | .288 | .428 | .588 | .775 | .614 |
| | .150 | .580 | .472 | .455 | .403 | .407 | .338 | .255 | .151 | .035 | -.084 | -.089 | -.207 | -.208 | -.158 | -.084 | .109 | .201 | .303 | .389 | .484 | .461 |
| | .250 | .390 | .350 | .335 | .294 | .298 | .241 | .176 | .104 | .044 | -.045 | -.049 | -.132 | -.132 | -.095 | .009 | .086 | .150 | .229 | .295 | .385 | .356 |
| | .350 | .330 | .301 | .288 | .255 | .259 | .213 | .908 | .102 | .035 | -.087 | -.033 | -.090 | -.090 | -.068 | .011 | .085 | .139 | .203 | .255 | .281 | .309 |
| | .450 | .288 | .205 | .194 | .170 | .176 | .138 | .092 | .043 | -.013 | -.071 | -.077 | -.125 | -.124 | -.105 | -.042 | .084 | .069 | .121 | .163 | .180 | .806 |
| | .550 | .108 | .091 | .086 | .073 | .075 | .043 | .009 | -.038 | -.077 | -.120 | -.187 | -.163 | -.160 | -.148 | -.099 | -.047 | -.011 | .032 | .065 | .077 | .097 |
| | .650 | .045 | .041 | .039 | .038 | .042 | .080 | -.008 | -.040 | -.073 | -.106 | -.111 | -.134 | -.133 | -.127 | -.089 | -.049 | -.022 | .012 | .035 | .038 | .046 |
| | .750 | -.002 | .004 | .018 | .082 | .024 | .015 | -.008 | -.019 | -.042 | -.063 | -.071 | -.085 | -.082 | -.079 | -.054 | -.026 | -.009 | .012 | .022 | .019 | .019 |
| | .850 | -.035 | -.037 | -.027 | -.002 | 0 | .011 | .005 | .004 | -.007 | -.015 | -.061 | -.086 | -.023 | -.024 | -.010 | 0 | .010 | .021 | .018 | -.004 | -.018 |
| | .925 | -.097 | -.063 | -.041 | -.002 | .002 | .024 | .035 | .043 | .046 | .047 | .037 | .043 | .044 | .041 | .043 | .039 | .038 | .036 | .018 | -.013 | -.046 |
| | [a].975 | -.071 | -.059 | -.011 | .031 | .029 | .072 | .108 | .108 | .101 | .136 | .117 | .115 | .110 | .125 | .113 | .105 | .094 | .093 | .073 | .016 | -.011 |
| | [a]1.000 | .080 | .032 | .093 | .830 | .105 | .889 | .307 | .284 | .273 | .226 | .301 | .265 | .180 | .256 | .288 | .492 | .332 | .857 | .208 | .105 | .138 |

[a]Paired value.

TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Continued

(c) N = 1600 rps; $\beta_{0.75R}$ = 29.94°.

| J | 0.760 | 0.839 | 0.899 | 0.968 | 1.036 | 1.106 | 1.193 | 1.255 | 1.339 | 1.418 | 1.493 | 1.455 | 1.379 | 1.302 | 1.225 | 1.144 | 1.071 | 1.002 | 0.932 | 0.858 | 0.802 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $M_x$ | .596 | .602 | .605 | .624 | .628 | .639 | .640 | .660 | .670 | .672 | .685 | .676 | .668 | .653 | .650 | .639 | .629 | .618 | .611 | .599 | .582 |
| $\alpha_x'$ | 12.06 | 10.34 | 9.06 | 7.61 | 6.21 | 4.79 | 3.09 | 1.90 | .33 | -1.10 | -2.46 | -1.76 | -.40 | 1.02 | 2.47 | 4.03 | 5.50 | 6.90 | 8.36 | 9.72 | 11.14 |
| $\Delta\alpha_x'$ | .36 | .36 | .35 | .35 | .34 | .34 | .33 | .33 | .32 | .31 | .30 | .31 | .31 | .32 | .33 | .34 | .34 | .35 | .35 | .35 | .36 |
| $\alpha_i$ | 3.15 | 2.95 | 2.89 | 2.71 | 2.36 | 1.96 | 1.62 | 1.22 | .75 | .47 | .10 | .18 | .54 | .97 | 1.30 | 1.71 | 2.10 | 2.58 | 2.82 | 3.08 | 3.31 |
| $\rho_a/\rho$ | .9675 | .9170 | .9180 | .8631 | .7601 | .6363 | .5280 | .4404 | .2496 | .1556 | .0389 | .0586 | .1805 | .3209 | .4274 | .5370 | .6808 | .8281 | .8997 | .9709 | 1.0281 |
| $\rho_w/\rho$ | -.0699 | -.0385 | -.0199 | -.0253 | -.0333 | -.0371 | -.0461 | -.0448 | -.0349 | -.0598 | -.0578 | -.0612 | -.0641 | -.0545 | -.0512 | -.0497 | -.0395 | -.0318 | -.0201 | -.0208 | -.0545 |
| $\rho_o/\rho$ | -.0411 | -.0585 | -.0551 | -.0603 | -.0493 | -.0358 | -.0233 | -.0168 | -.0052 | -.0080 | .0019 | .0089 | .0036 | -.0032 | -.0071 | -.0189 | -.0426 | -.0559 | -.0623 | -.0650 | -.0556 |

| c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper surface 0.000 | 1.091 | 1.093 | a1.094 | a1.101 | a1.102 | 1.106 | 1.106 | a1.114 | a1.117 | a1.118 | a1.123 | a1.120 | 1.116 | 1.111 | 1.110 | a1.106 | 1.102 | 1.098 | a1.096 | a1.092 | a1.087 |
| .025 | -.991 | -.963 | a-1.993 | a-2.286 | a2.270 | -1.521 | -.976 | a-.754 | a-.270 | a-.084 | a.125 | a.175 | a.100 | a-.176 | a-.415 | a-.700 | a-1.695 | a-2.298 | a-2.382 | a-2.386 | a-2.460 |
| .050 | -2.035 | -1.987 | -1.987 | -2.129 | -2.115 | -1.343 | -.964 | -.582 | -.310 | -.139 | .055 | .074 | -.017 | -.254 | -.509 | -.764 | -1.502 | -2.148 | -2.175 | -2.243 | -2.304 |
| .100 | -1.392 | -1.561 | -1.814 | -1.501 | -.944 | -.824 | -.687 | -.506 | -.319 | -.189 | -.043 | -.039 | -.180 | -.367 | -.542 | -.759 | -.824 | -1.883 | -1.699 | -1.674 | -1.459 |
| a.200 | -1.132 | -1.262 | -1.304 | -.984 | -.795 | -.688 | -.616 | -.493 | -.375 | -.285 | -.200 | -.219 | -.320 | -.485 | -.489 | -.665 | -.723 | -.855 | -1.030 | -1.282 | -1.166 |
| .300 | -.991 | -1.014 | -.914 | -.733 | -.715 | -.642 | -.578 | -.489 | -.394 | -.336 | -.255 | -.280 | -.363 | -.461 | -.582 | -.618 | -.679 | -.725 | -.752 | -1.002 | -1.007 |
| .400 | -.860 | -.766 | -.699 | -.625 | -.619 | -.570 | -.523 | -.454 | -.390 | -.349 | -.286 | -.304 | -.369 | -.444 | -.484 | -.556 | -.598 | -.636 | -.636 | -.737 | -.837 |
| .500 | -.724 | -.577 | -.557 | -.547 | -.538 | -.529 | -.500 | -.455 | -.402 | -.376 | -.328 | -.341 | -.394 | -.447 | -.471 | -.520 | -.545 | -.569 | -.545 | -.548 | -.687 |
| .600 | -.597 | -.444 | -.453 | -.475 | -.500 | -.485 | -.474 | -.446 | -.411 | -.400 | -.365 | -.373 | -.411 | -.447 | -.451 | -.484 | -.493 | -.504 | -.462 | -.419 | -.527 |
| .700 | -.490 | -.348 | -.356 | -.378 | -.412 | -.408 | -.412 | -.400 | -.384 | -.384 | -.365 | -.368 | -.392 | -.410 | -.400 | -.413 | -.408 | -.411 | -.361 | -.321 | -.451 |
| .800 | -.389 | -.261 | -.258 | -.234 | -.265 | -.267 | -.285 | -.289 | -.291 | -.299 | -.295 | -.295 | -.331 | -.305 | -.283 | -.279 | -.269 | -.263 | -.223 | -.229 | -.355 |
| .900 | -.316 | -.195 | -.166 | -.065 | -.068 | -.062 | -.074 | -.085 | -.097 | -.113 | -.120 | -.114 | -.130 | -.100 | -.074 | -.063 | -.065 | -.064 | -.087 | -.154 | -.277 |
| .950 | -.251 | -.143 | -.105 | .026 | .053 | .061 | .074 | .063 | a.013 | .042 | .034 | .039 | .042 | .051 | .060 | .067 | .053 | .059 | -.007 | -.100 | -.218 |
| Lower surface .0375 | .825 | .792 | .723 | .707 | .614 | .490 | .323 | .156 | -.102 | -.350 | -.697 | -.582 | -.251 | .034 | .244 | .431 | .560 | .669 | .737 | .785 | .815 |
| .075 | .685 | .678 | a.562 | a.531 | .466 | .362 | a.236 | .104 | -.076 | -.234 | -.420 | -.341 | -.169 | .015 | .174 | .298 | .404 | a.493 | a.551 | a.583 | a.652 |
| .150 | .501 | .473 | .407 | .399 | .332 | .295 | .163 | .063 | -.053 | -.158 | -.280 | -.228 | -.116 | .005 | .117 | .220 | .296 | .379 | .425 | .463 | .490 |
| .250 | .381 | .358 | .300 | .306 | .249 | .188 | .117 | .043 | -.030 | -.100 | -.183 | -.147 | -.068 | -.003 | .082 | .162 | .222 | .285 | .325 | .354 | .376 |
| .350 | .271 | .257 | .201 | .209 | .166 | .115 | .054 | .004 | -.087 | -.152 | -.210 | -.189 | -.128 | -.049 | .027 | .090 | .141 | .196 | .228 | .250 | .263 |
| .450 | .204 | .190 | .141 | .160 | .122 | a.058 | $a_0$ | a-.059 | a-.111 | a-.160 | a-.216 | a-.202 | -.152 | -.091 | a-.030 | a.020 | .099 | .143 | .178 | .189 | .197 |
| .550 | .108 | .104 | .064 | .095 | .063 | .009 | -.037 | -.077 | -.117 | -.155 | -.191 | -.176 | -.143 | -.103 | -.054 | -.012 | .045 | .084 | .103 | .103 | .101 |
| .650 | .038 | .032 | .014 | .054 | .032 | -.007 | -.048 | -.071 | -.104 | -.135 | -.159 | -.146 | -.123 | -.095 | -.054 | -.021 | .014 | .045 | .058 | .053 | .037 |
| .750 | .009 | .004 | -.008 | .044 | .029 | .014 | -.008 | -.027 | -.047 | -.070 | -.085 | -.077 | -.067 | -.046 | -.014 | .006 | .014 | .036 | .044 | .031 | .012 |
| .850 | -.051 | -.019 | -.033 | .036 | .032 | .014 | .001 | -.009 | -.012 | -.024 | -.027 | -.022 | -.025 | -.017 | .002 | .009 | .025 | .036 | .031 | -.010 | -.036 |
| .925 | -.097 | -.041 | -.049 | .059 | .055 | a.047 | .041 | .037 | .044 | a.041 | a.046 | a.046 | a.044 | .041 | .047 | a.043 | .045 | .054 | .032 | .007 | -.001 |
| .975 | a-.067 | $a_0$ | a-.005 | a.119 | a.103 | a.115 | .122 | a.101 | a.116 | a.110 | a.149 | a.152 | a.147 | a.158 | a.142 | a.060 | .095 | a.128 | a.100 | a.074 | a.064 |
| a1.000 | .043 | .085 | .095 | .229 | .869 | .257 | .356 | .283 | .211 | .190 | .270 | .320 | .261 | .893 | .864 | .307 | .837 | .280 | .188 | .158 | .150 |

[a]Paired value.

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TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Continued

(d) N = 2000 rpm; $\beta_{0.75R}$ = 29.94°.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.055 | 1.121 | 1.218 | 1.315 | 1.406 | 1.425 | 1.369 | 1.279 | 1.192 | 1.098 |
| | $M_x$ | .798 | .804 | .820 | .832 | .850 | .863 | .842 | .826 | .817 | .803 |
| | $\alpha_x$ | 5.82 | 4.49 | 2.61 | .77 | -.88 | -1.23 | -.22 | 1.45 | 3.10 | 4.95 |
| | $\Delta\beta$ | .55 | .53 | .50 | .47 | .45 | .44 | .46 | .48 | .51 | .54 |
| | $\alpha_i$ | 2.47 | 2.19 | 1.59 | .97 | .26 | .08 | .43 | 1.11 | 1.65 | 2.15 |
| | $c_n$ | .8049 | .7149 | .5831 | .3191 | .0862 | .0262 | .1438 | .3694 | .5404 | .6956 |
| | $c_m$ | -.0607 | -.0651 | -.0655 | -.0647 | -.0497 | -.0472 | -.0537 | -.0686 | -.0635 | -.0651 |
| | $c_o$ | -.0331 | -.0079 | .0010 | -.0017 | -.0074 | -.0035 | -.0020 | .0027 | -.0011 | -.0050 |
| | c/b | Pressure coefficient, P | | | | | | | | | |
| Upper surface | 0.000 | 1.169 | 1.172 | 1.179 | 1.185 | 1.194 | 1.200 | 1.189 | 1.182 | 1.178 | 1.171 |
| | .025 | -.370 | -.359 | -.325 | -.291 | -.262 | -.245 | -.258 | -.291 | -.303 | -.327 |
| | .050 | -1.083 | -1.029 | -.582 | -.263 | -.033 | .016 | .016 | -.013 | -.188 | -.643 |
| | .100 | -1.035 | -.881 | -.549 | -.305 | -.092 | -.052 | -.089 | -.313 | -.526 | -.824 |
| | [a].200 | -1.046 | -.938 | -.620 | -.437 | -.246 | -.200 | -.266 | -.571 | -.732 | -.921 |
| | .300 | -1.102 | -.965 | -.722 | -.520 | -.338 | -.293 | -.391 | -.587 | -.767 | -.949 |
| | .400 | [a]-1.128 | -.934 | -.699 | -.502 | -.368 | -.335 | -.401 | -.569 | -.726 | -.931 |
| | .500 | -1.105 | -.934 | -.713 | -.570 | -.456 | -.413 | -.488 | -.614 | -.746 | -.923 |
| | .600 | -.536 | -.808 | -.763 | -.643 | -.539 | -.512 | -.571 | -.684 | -.783 | -.787 |
| | .700 | -.399 | -.421 | -.706 | -.774 | -.677 | -.638 | -.704 | -.794 | -.561 | -.420 |
| | [a].800 | -.182 | -.195 | -.299 | -.353 | -.301 | -.300 | -.287 | -.284 | -.249 | -.217 |
| | .900 | -.050 | -.062 | -.042 | -.031 | -.026 | -.026 | -.036 | -.046 | -.049 | -.059 |
| | .950 | -.011 | .020 | .019 | .033 | .040 | .043 | .039 | .026 | .024 | .020 |
| Lower surface | .0375 | .552 | .443 | .223 | -.078 | -.624 | -.704 | -.438 | .012 | .289 | .460 |
| | .075 | .427 | .361 | .167 | -.047 | -.371 | -.554 | -.264 | .010 | .211 | .343 |
| | .150 | .308 | .234 | .102 | -.054 | -.226 | [a]-.311 | -.185 | -.018 | .134 | .238 |
| | .250 | .236 | .171 | .064 | -.055 | -.197 | -.215 | -.158 | -.026 | .096 | .179 |
| | .350 | .184 | .107 | .011 | -.092 | -.214 | -.232 | -.181 | -.068 | .041 | .113 |
| | .450 | .105 | .051 | -.035 | -.124 | -.235 | -.250 | -.213 | -.104 | -.009 | .056 |
| | .550 | .018 | -.029 | -.105 | -.184 | -.293 | -.307 | -.255 | -.168 | -.081 | -.024 |
| | .650 | -.019 | -.055 | -.125 | -.187 | -.276 | -.293 | -.248 | -.177 | -.103 | -.056 |
| | .750 | -.028 | -.053 | -.106 | -.149 | -.195 | -.200 | -.184 | -.145 | -.091 | -.056 |
| | .850 | -.022 | -.034 | -.068 | -.087 | -.104 | -.103 | -.100 | -.089 | -.056 | -.034 |
| | [a].925 | -.016 | -.022 | -.032 | -.033 | -.035 | -.030 | -.038 | -.038 | -.027 | -.012 |
| | .975 | -.008 | .005 | -.006 | .010 | .023 | .029 | .018 | -.002 | 0 | .003 |
| | [a]1.000 | .104 | .184 | .152 | .171 | .150 | .200 | .181 | .152 | .143 | .165 |

[a]Paired value.

TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Continued

(e) N = 2160 rpm; $\beta_{0.75R} = 29.94°$.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.103 | 1.179 | 1.229 | 1.288 | 1.349 | 1.407 | 1.371 | 1.317 | 1.250 | 1.200 | 1.133 | 1.075 |
| | $M_x$ | .858 | .869 | .876 | .886 | .896 | .907 | .900 | .891 | .876 | .870 | .860 | .849 |
| | $\alpha_r$' | 4.86 | 3.36 | 2.39 | 1.28 | .15 | -.90 | -.26 | .74 | 1.99 | 2.95 | 4.26 | 5.42 |
| | $\Delta\beta$ | .61 | .59 | .58 | .57 | .55 | .54 | .55 | .56 | .58 | .59 | .61 | .62 |
| | $\alpha_i$ | 2.18 | 1.80 | 1.37 | .85 | .41 | .05 | .17 | .55 | 1.11 | 1.48 | 1.98 | 2.41 |
| | $c_n$ | .7115 | .5899 | .4511 | .2813 | .1344 | .0161 | .0572 | .1817 | .3626 | .4837 | .6444 | .7794 |
| | $c_m$ | -.0979 | -.0867 | -.0692 | -.0614 | -.0532 | -.0497 | -.0524 | -.0535 | -.0794 | -.0778 | -.0885 | -.0982 |
| | $c_c$ | .0033 | .0067 | .0088 | .0185 | .0219 | .0251 | .0210 | .0224 | .0230 | .0188 | .0047 | -.0030 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | |
| Upper surface | 0.000 | 1.197 | 1.203 | 1.206 | 1.212 | 1.217 | 1.223 | 1.219 | 1.214 | 1.206 | 1.203 | 1.198 | 1.193 |
| | [a].025 | -.617 | -.486 | -.307 | .086 | .301 | .425 | .251 | .332 | .132 | -.102 | -.584 | -.764 |
| | .050 | -.626 | -.487 | -.349 | -.174 | -.028 | .080 | .093 | .034 | -.130 | -.264 | -.554 | -.737 |
| | .100 | -.642 | -.494 | -.378 | -.245 | -.139 | -.054 | -.046 | -.119 | -.248 | -.360 | -.545 | -.729 |
| | [a].200 | -.738 | -.592 | -.491 | -.376 | -.297 | -.228 | -.230 | -.316 | -.433 | -.517 | -.667 | -.792 |
| | .300 | -.821 | -.688 | -.587 | -.471 | -.378 | -.306 | -.329 | -.424 | -.527 | -.634 | -.749 | -.860 |
| | .400 | -.829 | -.701 | -.589 | -.501 | -.401 | -.304 | -.337 | -.451 | -.542 | -.637 | -.764 | -.887 |
| | .500 | -.871 | -.750 | -.649 | -.542 | -.461 | -.385 | -.410 | -.492 | -.593 | -.684 | -.807 | -.924 |
| | .600 | -.935 | -.813 | -.714 | -.631 | -.556 | -.494 | -.511 | -.595 | -.664 | -.754 | -.868 | -.981 |
| | .700 | -.646 | -.844 | -.798 | -.728 | -.663 | -.574 | -.604 | -.685 | -.766 | -.828 | -.758 | -.577 |
| | .800 | -.424 | -.359 | -.300 | -.311 | -.486 | -.667 | -.667 | -.345 | -.288 | -.331 | -.375 | -.471 |
| | .900 | -.374 | -.309 | -.240 | -.209 | -.191 | -.180 | -.181 | -.186 | -.213 | -.272 | -.321 | -.404 |
| | .950 | -.337 | -.286 | -.237 | -.185 | -.170 | -.155 | -.160 | -.165 | -.187 | -.248 | -.286 | -.311 |
| Lower surface | .0375 | .396 | .277 | .154 | -.046 | -.302 | -.530 | -.501 | -.153 | .088 | .218 | .357 | .429 |
| | .075 | .313 | .272 | .122 | -.028 | -.203 | -.438 | -.371 | -.110 | .059 | .108 | .286 | .366 |
| | .150 | .239 | .163 | .096 | -.011 | -.118 | -.296 | -.179 | -.065 | .053 | .126 | .209 | .273 |
| | .250 | .178 | .114 | .060 | -.015 | -.095 | -.129 | -.121 | -.047 | .040 | .098 | .176 | .226 |
| | [a].350 | .100 | .069 | .019 | -.037 | -.105 | -.158 | -.143 | -.068 | .013 | .050 | .100 | .165 |
| | .450 | .047 | .006 | -.031 | -.101 | -.168 | -.226 | -.205 | -.132 | -.052 | -.012 | .041 | .083 |
| | .550 | -.068 | -.109 | -.208 | -.211 | -.278 | -.307 | -.289 | -.237 | -.166 | -.133 | -.076 | -.038 |
| | .650 | -.111 | -.152 | -.178 | -.256 | -.347 | -.378 | -.371 | -.292 | -.199 | -.170 | -.117 | -.083 |
| | .750 | -.108 | -.141 | -.154 | -.214 | -.314 | -.391 | -.384 | -.282 | -.169 | -.153 | -.109 | -.083 |
| | .850 | -.062 | -.100 | -.104 | -.132 | -.185 | -.264 | -.299 | -.225 | -.180 | -.178 | -.149 | -.136 |
| | .925 | -.157 | -.169 | -.151 | -.164 | -.194 | -.200 | -.195 | -.164 | -.147 | -.168 | -.147 | -.145 |
| | .975 | -.214 | -.238 | -.202 | -.200 | -.196 | -.179 | -.186 | -.189 | -.192 | -.244 | -.238 | -.255 |
| | [a]1.000 | -.154 | -.153 | -.203 | -.101 | -.090 | -.075 | -.110 | -.101 | -.101 | -.102 | -.051 | -.052 |

[a]Paired value.

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TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Continued

(f) N = 1140 rpm; $\beta_{0.75R} = 44.24°$.

| | J | 1.456 | 1.584 | 1.713 | 1.858 | 1.981 | 2.129 | 2.246 | 2.422 | 2.620 | 2.477 | 2.347 | 2.165 | 1.964 | 1.795 | 1.500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_R$ | .483 | .501 | .509 | .530 | .541 | .560 | .573 | .595 | .619 | .601 | .584 | .560 | .539 | .519 | .486 |
| | $\alpha_R'$ | 12.52 | 10.34 | 8.21 | 5.98 | 4.17 | 2.15 | .61 | -1.54 | -3.80 | -2.20 | -.67 | 1.65 | 4.43 | 6.95 | 11.76 |
| | $\Delta\beta$ | .20 | .20 | .19 | .19 | .18 | .17 | .16 | .14 | .13 | .14 | .15 | .16 | .18 | .19 | .20 |
| | $\alpha_i$ | 2.88 | 2.60 | 2.33 | 1.95 | 1.71 | 1.28 | .95 | .47 | -.03 | .10 | .45 | .94 | 1.54 | 2.02 | 2.69 |
| | $c_n$ | .9935 | .9019 | .8104 | .6850 | .6034 | .4543 | .3404 | .1700 | -.0116 | .0349 | .1606 | .3346 | .5444 | .7047 | .9294 |
| | $c_m$ | -.0720 | -.0420 | -.0275 | -.0359 | -.0365 | -.0426 | -.0458 | -.0567 | -.0624 | -.0696 | -.0637 | -.0568 | -.0449 | -.0454 | -.0509 |
| | $c_c$ | -.0268 | -.0337 | -.0380 | -.0328 | -.0298 | -.0191 | -.0201 | -.0092 | -.0012 | .0005 | -.0030 | -.0046 | -.0220 | -.0261 | -.0329 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.060 | 1.064 | 1.066 | 1.072 | 1.075 | 1.081 | 1.084 | 1.091 | 1.098 | 1.093 | 1.088 | 1.080 | 1.075 | 1.069 | 1.061 |
| | .025 | -1.151 | -1.059 | [a]-1.159 | [a]-1.199 | [a]-1.121 | -.759 | -.691 | [a]-.214 | [a].120 | [a].146 | [a].120 | [a]-.131 | -.852 | -.955 | -1.215 |
| | .050 | [a]-1.221 | -1.228 | -1.366 | -1.307 | -1.232 | -.956 | -.564 | -.219 | .079 | .074 | .053 | -.233 | [a]-.778 | -1.132 | -1.338 |
| | .100 | -1.275 | -1.446 | -1.556 | -1.064 | -.878 | -.624 | -.437 | -.197 | .023 | -.006 | -.027 | -.346 | -.681 | -1.069 | -1.405 |
| | .200 | -1.210 | -1.243 | -1.033 | -.771 | -.685 | -.539 | -.411 | -.248 | -.080 | -.127 | -.184 | -.411 | -.619 | -.811 | -1.198 |
| | .300 | -1.083 | -.974 | -.742 | -.632 | -.577 | -.476 | -.393 | -.286 | -.170 | -.229 | -.313 | -.430 | -.572 | -.666 | -.986 |
| | .400 | -.896 | -.754 | -.596 | -.555 | -.520 | -.444 | -.386 | -.303 | -.214 | -.266 | -.323 | -.413 | -.519 | -.587 | -.801 |
| | .500 | -.737 | -.586 | -.493 | -.505 | -.488 | -.437 | -.393 | -.331 | -.266 | -.312 | -.350 | -.420 | -.497 | -.534 | -.651 |
| | .600 | -.603 | -.467 | -.411 | -.446 | -.436 | -.410 | -.384 | -.340 | -.304 | -.350 | -.363 | -.418 | -.471 | -.479 | -.531 |
| | .700 | -.506 | -.370 | -.325 | -.374 | -.382 | -.371 | -.357 | -.340 | -.314 | -.350 | -.348 | -.378 | -.405 | -.392 | -.428 |
| | .800 | -.402 | -.273 | -.215 | -.248 | -.263 | -.269 | -.271 | -.274 | -.274 | -.306 | -.281 | -.287 | -.292 | -.268 | -.332 |
| | .900 | -.332 | -.207 | -.109 | -.079 | -.079 | -.085 | -.089 | -.117 | -.175 | -.183 | .120 | -.101 | -.093 | -.099 | -.245 |
| | .950 | -.277 | -.167 | -.045 | .029 | .042 | .056 | .052 | -.002 | .004 | -.013 | .031 | .043 | .023 | -.004 | -.191 |
| Lower surface | .0375 | .860 | .827 | .771 | .646 | .509 | .287 | .068 | -.307 | -.727 | -.653 | .232 | .144 | .461 | .682 | .834 |
| | .075 | .726 | .691 | .588 | .469 | .359 | .190 | .036 | -.195 | -.473 | -.423 | .149 | .085 | .307 | .489 | .639 |
| | .150 | .521 | .485 | .437 | .335 | .249 | .127 | .024 | -.121 | -.306 | -.273 | .089 | .054 | .209 | .348 | .475 |
| | .250 | .378 | .356 | .316 | .236 | .164 | .073 | .005 | -.104 | -.231 | -.210 | .059 | .029 | .141 | .253 | .353 |
| | .350 | .290 | .271 | .240 | .171 | .116 | .042 | -.011 | -.098 | -.194 | -.181 | .072 | -.001 | .089 | .178 | .258 |
| | .450 | .206 | .197 | .174 | .119 | .069 | .016 | -.023 | -.098 | -.177 | -.170 | .080 | -.017 | .045 | .119 | .177 |
| | .550 | .123 | .122 | .112 | .067 | .029 | -.015 | -.050 | -.109 | -.167 | -.163 | .093 | -.042 | .010 | .072 | .106 |
| | .650 | .055 | .066 | .057 | .040 | .008 | -.023 | -.050 | -.091 | -.134 | -.136 | .084 | -.048 | -.012 | .033 | .044 |
| | .750 | .008 | .029 | .043 | .035 | .012 | -.001 | -.019 | -.045 | -.067 | -.075 | .044 | -.021 | -.007 | .023 | .003 |
| | .850 | -.046 | -.016 | .026 | .040 | .025 | .018 | .013 | .004 | .004 | -.002 | .008 | .007 | .010 | .026 | -.035 |
| | .925 | -.095 | -.038 | .019 | .058 | .051 | .056 | .066 | .074 | .089 | .085 | .073 | .056 | .036 | .040 | -.066 |
| | .975 | -.158 | -.120 | -.045 | .037 | .077 | .098 | .121 | .154 | .200 | .193 | .164 | .121 | .069 | .071 | -.105 |
| | [a]1.000 | -.031 | -.010 | .203 | .263 | .303 | .332 | .336 | .240 | .360 | .301 | .271 | .292 | .253 | .203 | -.031 |

[a]Faired value.

TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Continued

(g) N = 1350 rpm; $\beta_{0.75R}$ = 44.24°.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.555 | 1.656 | 1.729 | 1.866 | 1.950 | 2.043 | 2.172 | 2.289 | 2.401 | 2.440 | 2.455 | 2.389 | 2.223 | 2.127 | 1.949 | 1.906 | 1.792 | 1.690 | 1.596 |
| | $M_x$ | .579 | .598 | .608 | .629 | .637 | .650 | .666 | .685 | .702 | .708 | .711 | .691 | .674 | .659 | .653 | .629 | .615 | .599 | .590 |
| | $\alpha_x'$ | 10.81 | 9.14 | 7.97 | 5.87 | 4.62 | 3.30 | 1.57 | .06 | -1.31 | -1.76 | -1.93 | .42 | .91 | 2.17 | 4.64 | 5.27 | 6.99 | 8.59 | 10.12 |
| | $\Delta\beta$ | .27 | .26 | .26 | .25 | .25 | .23 | .23 | .21 | .20 | .19 | .19 | .21 | .22 | .23 | .25 | .25 | .26 | .26 | .27 |
| | $\alpha_l$ | 2.83 | 2.57 | 2.40 | 2.03 | 1.83 | 1.65 | 1.18 | .68 | .35 | -.02 | .13 | .52 | .81 | 1.16 | 1.46 | 1.91 | 2.24 | 2.52 | 2.81 |
| | $c_n$ | .9796 | .8947 | .8364 | .7165 | .6459 | .5866 | .4199 | .2442 | .1261 | -.0077 | -.0465 | .1869 | .2889 | .4128 | .5096 | .6733 | .7855 | .8771 | .9763 |
| | $c_m$ | -.0549 | -.0271 | -.0321 | -.0496 | -.0418 | -.0566 | -.0349 | -.0414 | -.0450 | -.0515 | -.0474 | -.0389 | -.0361 | -.0316 | -.0271 | -.0300 | -.0244 | -.0163 | -.0476 |
| | $c_c$ | -.0318 | -.0427 | -.0430 | -.0364 | -.0300 | -.0340 | -.0272 | -.0114 | -.0054 | -.0047 | -.0008 | -.0024 | -.0051 | -.0147 | -.0216 | -.0367 | -.0488 | -.0575 | -.0557 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.086 | 1.092 | 1.095 | 1.102 | 1.104 | 1.110 | 1.116 | 1.123 | 1.130 | 1.132 | 1.133 | 1.126 | 1.119 | 1.113 | 1.111 | 1.102 | 1.097 | 1.092 | 1.089 |
| | .025 | -1.209 | -1.330 | -1.321 | -1.209 | -1.166 | -1.083 | -1.000 | -.891 | [a]-.055 | [a].119 | [a].165 | [a]0 | [a]-.230 | [a]-.502 | [a]-.761 | [a]-1.412 | [a]-1.702 | [a]-1.785 | [a]-1.871 |
| | .050 | -1.435 | -1.502 | -1.482 | -1.389 | -1.330 | -1.243 | -1.150 | -.306 | -.103 | .056 | .068 | -.109 | -.309 | -.545 | -.762 | -1.506 | -1.804 | -1.892 | -1.981 |
| | .100 | -1.602 | -1.623 | -1.586 | -.921 | -.840 | -.775 | -.503 | -.289 | -.188 | -.013 | -.052 | -.222 | -.379 | -.556 | -.718 | -.804 | -1.240 | -1.776 | -1.542 |
| | .200 | [a]-1.311 | -1.278 | -1.019 | -.784 | -.848 | -.667 | -.515 | -.364 | -.261 | -.179 | -.208 | -.344 | -.443 | -.553 | -.649 | -.749 | -.875 | -1.174 | -1.239 |
| | .300 | -1.060 | -.924 | -.767 | -.708 | -.749 | -.603 | -.508 | -.413 | -.335 | -.290 | -.298 | -.387 | -.460 | -.535 | -.592 | -.686 | -.726 | -.898 | -1.028 |
| | .400 | -.841 | -.722 | -.638 | -.618 | -.663 | -.546 | -.479 | -.412 | -.354 | -.327 | -.326 | -.392 | -.446 | -.497 | -.533 | -.604 | -.630 | -.653 | -.801 |
| | .500 | -.674 | -.567 | -.546 | -.559 | -.587 | -.517 | -.474 | -.424 | -.386 | -.376 | -.367 | -.413 | -.454 | -.486 | -.502 | -.550 | -.563 | -.531 | -.622 |
| | .600 | -.554 | -.450 | -.458 | -.499 | -.542 | -.485 | -.463 | -.434 | -.412 | -.419 | -.403 | -.428 | -.454 | -.469 | -.469 | -.497 | -.496 | -.434 | -.485 |
| | .700 | -.457 | -.351 | -.357 | -.409 | -.494 | -.418 | -.418 | -.403 | -.396 | -.416 | -.395 | -.401 | -.414 | -.416 | -.400 | -.410 | -.400 | -.337 | -.382 |
| | .800 | -.364 | -.253 | -.284 | -.259 | -.412 | -.285 | -.298 | -.299 | -.304 | -.333 | -.309 | -.303 | -.306 | -.296 | -.271 | -.265 | -.252 | -.222 | -.285 |
| | .900 | -.891 | -.178 | -.092 | -.058 | -.266 | -.069 | -.085 | -.091 | -.100 | -.134 | -.109 | -.097 | -.097 | -.080 | -.063 | -.061 | -.060 | -.122 | -.214 |
| | .950 | -.239 | -.109 | -.018 | .046 | -.056 | .062 | .065 | .064 | .059 | .026 | .049 | .057 | .054 | .063 | .060 | .054 | .045 | -.049 | -.140 |
| Lower surface | .0375 | .833 | .760 | [a].748 | .623 | .019 | .381 | .155 | -.097 | -.393 | -1.080 | -.680 | -.195 | .084 | .244 | .408 | .585 | [a].650 | [a].670 | [a].728 |
| | .075 | .658 | .634 | [a].591 | [a].479 | .523 | .266 | .098 | -.073 | -.248 | -.433 | -.350 | -.137 | -.045 | .105 | .266 | .419 | .518 | .533 | [a].585 |
| | .150 | .492 | .448 | .416 | .336 | .384 | .186 | .069 | -.047 | -.167 | -.316 | [a]-.231 | [a]-.091 | .001 | .110 | .200 | .307 | .387 | .424 | .463 |
| | .250 | .365 | .330 | .305 | .241 | .271 | .120 | .031 | -.041 | -.116 | -.229 | [a]-.175 | [a]-.072 | [a]-.020 | .066 | .138 | .222 | .287 | .316 | .350 |
| | .350 | .263 | .238 | .220 | .166 | .189 | .069 | -.008 | [a]-.060 | [a]-.124 | [a]-.215 | [a]-.170 | [a]-.080 | [a]-.041 | .027 | .083 | .152 | [a].214 | .226 | .253 |
| | .450 | .193 | .176 | .164 | [a].092 | .122 | [a].020 | [a]-.040 | [a]-.085 | [a]-.131 | [a]-.214 | [a]-.168 | [a]-.092 | [a]-.062 | [a]-.007 | [a].039 | [a].095 | [a].144 | [a].153 | [a].164 |
| | .550 | .084 | .077 | .076 | .041 | .087 | [a]-.013 | [a]-.060 | [a]-.103 | [a]-.138 | [a]-.211 | [a]-.160 | [a]-.107 | [a]-.082 | [a]-.040 | [a].002 | [a].039 | [a].083 | [a].090 | [a].088 |
| | .650 | .031 | .036 | .045 | .022 | -.011 | -.025 | -.070 | [a]-.112 | [a]-.140 | [a]-.201 | [a]-.153 | [a]-.120 | [a]-.100 | [a]-.078 | [a]-.029 | [a]-.003 | [a].033 | [a].035 | .037 |
| | [a].750 | -.026 | .001 | .033 | .020 | 0 | -.020 | -.071 | -.111 | -.135 | -.187 | -.140 | -.130 | -.110 | -.090 | -.059 | -.030 | -.007 | -.013 | .010 |
| | [a].850 | -.061 | .046 | .025 | .039 | .006 | .028 | .068 | -.085 | -.121 | -.161 | -.120 | -.130 | -.111 | -.099 | -.082 | -.032 | -.022 | -.031 | .020 |
| | [a].925 | -.079 | .056 | .054 | .025 | .044 | .161 | -.023 | -.032 | -.050 | -.060 | -.069 | -.118 | -.085 | -.087 | -.091 | -.010 | -.015 | 0 | .073 |
| | [a].975 | -.064 | .023 | .112 | .294 | .116 | .370 | .121 | .068 | -.024 | .135 | .081 | -.020 | -.020 | .010 | -.025 | .099 | .075 | .064 | .049 |
| | [a]1.000 | -.005 | .097 | .204 | .456 | .232 | .605 | .382 | .402 | .361 | .400 | .372 | .341 | -.387 | .392 | .354 | .304 | .254 | .153 | .153 |

[a]Faired value.

TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x' = 0.75) - Continued

(h) N = 1600 rpm; $\beta_{0.75R}$ = 44.24°.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.990 | 2.104 | 2.199 | 2.319 | 2.417 | 2.468 | 2.377 | 2.268 | 2.147 | 2.052 |
| | $M_x$ | .758 | .779 | .795 | .818 | .838 | .847 | .828 | .807 | .784 | .768 |
| | $\alpha_{R'}$ | 4.06 | 2.48 | 1.20 | -.31 | -1.48 | -2.08 | -1.02 | .34 | 1.89 | 3.18 |
| | $\Delta\beta$ | .37 | .34 | .32 | .29 | .27 | .26 | .28 | .30 | .33 | .35 |
| | $\alpha_i$ | 2.03 | 1.63 | 1.24 | .75 | .20 | -.05 | .26 | .75 | 1.30 | 1.72 |
| | $c_n$ | .7202 | .5768 | .4424 | .2684 | .0719 | -.0167 | .0919 | .2684 | .4627 | .6100 |
| | $c_m$ | -.0476 | -.0497 | -.0557 | -.0690 | -.0778 | .0825 | .0877 | -.0721 | -.0622 | -.0525 |
| | $c_Q$ | -.0382 | -.0286 | -.0180 | -.0117 | .0039 | .0039 | .0027 | .0006 | -.0108 | -.0262 |
| | x/b | Pressure coefficient, P | | | | | | | | | |
| Upper surface | 0.000 | 1.152 | 1.161 | 1.168 | 1.178 | 1.187 | 1.192 | 1.183 | 1.174 | 1.163 | 1.157 |
| | .025 | -1.081 | -.828 | -.433 | -.081 | [a].436 | .450 | .335 | .095 | -.267 | -.730 |
| | .050 | -.992 | -.582 | -.321 | -.060 | .136 | .214 | .158 | -.038 | -.340 | -.681 |
| | .100 | -.912 | -.660 | -.465 | -.248 | -.067 | .014 | -.018 | -.187 | -.414 | [a]-.646 |
| | [a].200 | -.918 | -.769 | -.638 | -.392 | -.228 | -.197 | -.236 | -.379 | -.614 | -.763 |
| | .300 | -.961 | -.778 | -.636 | -.468 | -.325 | -.264 | -.350 | -.502 | -.674 | -.851 |
| | .400 | -.873 | [a]-.736 | -.611 | -.471 | -.369 | -.321 | -.390 | -.489 | -.634 | -.771 |
| | .500 | -.678 | -.705 | -.645 | -.452 | -.453 | -.410 | -.475 | -.574 | -.662 | -.692 |
| | .600 | -.526 | -.602 | -.685 | -.632 | -.574 | -.540 | -.592 | -.659 | -.670 | -.592 |
| | .700 | -.416 | [a]-.435 | -.414 | -.596 | -.642 | -.628 | -.668 | -.640 | -.469 | -.456 |
| | .800 | -.246 | -.249 | -.249 | -.248 | -.264 | -.331 | -.281 | -.271 | -.263 | -.252 |
| | .900 | [a].032 | -.019 | -.018 | -.024 | -.026 | -.024 | -.038 | -.036 | -.025 | -.021 |
| | .950 | .084 | .091 | .098 | .099 | .098 | .100 | .088 | .090 | .085 | .080 |
| Lower surface | .0375 | .471 | .278 | .087 | -.231 | -.699 | -.846 | -.698 | -.177 | .157 | .365 |
| | .075 | .338 | .191 | .055 | -.144 | -.564 | -.751 | -.413 | -.115 | .102 | .255 |
| | .150 | .244 | .134 | .041 | -.083 | -.194 | -.352 | -.229 | -.069 | .070 | .178 |
| | .250 | .165 | .075 | .006 | -.085 | -.188 | -.216 | -.182 | -.068 | .029 | .109 |
| | .350 | .114 | .038 | -.018 | -.103 | -.194 | -.218 | -.183 | -.086 | .006 | .070 |
| | .450 | .067 | .006 | -.040 | -.118 | -.198 | -.232 | -.189 | -.107 | -.026 | .028 |
| | .550 | .025 | -.035 | -.081 | -.147 | -.218 | -.243 | -.203 | -.134 | -.066 | -.011 |
| | .650 | -.001 | -.048 | -.087 | -.136 | -.184 | -.205 | -.183 | -.132 | -.077 | -.031 |
| | .750 | .013 | -.023 | -.048 | -.078 | -.109 | -.119 | -.114 | -.084 | -.046 | -.012 |
| | .850 | .030 | .007 | .005 | -.014 | -.026 | -.027 | -.030 | -.020 | -.006 | .012 |
| | .925 | .057 | .050 | .050 | .059 | .060 | .065 | .053 | .047 | .041 | .048 |
| | .975 | .070 | .067 | .086 | .114 | .125 | .139 | .118 | .099 | .072 | .062 |
| | [a]1.000 | .304 | .353 | .337 | .316 | .301 | .301 | .331 | .281 | .323 | .313 |

[a]Paired value.

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TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Continued

(i) M = 0.56; $\beta_{0.75R} = 44.24°$.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | r | 2.043 | 2.061 | 2.101 | 2.145 | 2.178 | 2.227 | 2.299 | 2.334 | 2.392 | 2.441 | 2.509 |
| | $M_r$ | .856 | .847 | .843 | .833 | .822 | .812 | .803 | .793 | .787 | .780 | .766 |
| | $\alpha_r$, | 3.30 | 3.06 | 2.51 | 1.91 | 1.49 | .85 | -.05 | -.48 | -1.19 | -1.78 | -2.56 |
| | $\Delta\beta$ | .41 | .41 | .39 | .37 | .36 | .34 | .31 | .29 | .27 | .25 | .22 |
| | $\alpha_i$ | 1.58 | 1.58 | 1.51 | 1.37 | 1.30 | 1.08 | .92 | .78 | .55 | .37 | .11 |
| | $\rho_n$ | .5626 | .5613 | .5342 | .4884 | .4645 | .3871 | .3290 | .2774 | .1961 | .1310 | .0387 |
| | $\rho_m$ | -.0785 | -.0788 | -.0765 | -.0749 | -.0700 | -.0682 | -.0670 | -.0734 | -.0703 | -.0745 | -.0804 |
| | $c_o$ | .0099 | .0065 | .0046 | .0010 | -.0020 | -.0189 | -.0041 | .0020 | .0026 | .0018 | .0054 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.196 | 1.192 | 1.190 | 1.185 | 1.180 | 1.176 | 1.172 | 1.168 | 1.165 | 1.162 | 1.156 |
| | .025 | -.151 | -.174 | -.183 | -.206 | -.232 | -.256 | -.276 | [a]-.094 | [a].020 | [a].090 | .410 |
| | .050 | -.323 | -.343 | -.355 | -.384 | -.410 | -.438 | -.350 | -.187 | -.073 | -.001 | .084 |
| | .100 | -.451 | -.471 | -.497 | -.439 | -.423 | -.377 | -.311 | -.245 | -.168 | -.114 | -.048 |
| | [a].200 | -.656 | -.674 | -.620 | -.549 | -.545 | -.448 | -.395 | -.375 | -.312 | -.253 | -.190 |
| | .300 | -.742 | -.749 | -.712 | -.671 | -.650 | [a]-.534 | [a]-.488 | -.460 | -.384 | -.339 | -.283 |
| | .400 | -.706 | -.725 | -.705 | -.686 | -.665 | -.608 | -.532 | -.478 | -.419 | -.382 | -.333 |
| | .500 | -.778 | -.794 | -.775 | -.743 | -.712 | -.666 | -.599 | -.550 | -.491 | -.451 | -.401 |
| | .600 | -.847 | -.863 | -.845 | -.814 | -.794 | -.744 | -.683 | -.623 | -.551 | -.507 | -.459 |
| | .700 | -.462 | -.494 | -.574 | -.699 | -.692 | -.635 | -.519 | -.486 | -.465 | -.455 | -.436 |
| | .800 | -.316 | -.306 | -.271 | -.230 | -.230 | -.250 | -.279 | -.301 | -.308 | -.322 | -.344 |
| | .900 | -.232 | -.222 | -.166 | -.079 | -.045 | -.038 | -.047 | -.065 | -.075 | -.092 | -.107 |
| | .950 | -.189 | -.155 | -.103 | -.010 | .049 | .062 | .039 | -.022 | [a].038 | -.015 | .013 |
| Lower surface | .0375 | .320 | .289 | .242 | .163 | .091 | .012 | -.079 | -.157 | -.283 | -.601 | -.932 |
| | .075 | .224 | .212 | .172 | .115 | .067 | -.005 | -.084 | -.157 | -.232 | -.273 | -.466 |
| | .150 | .175 | .160 | .129 | .085 | .046 | -.005 | -.092 | -.096 | -.149 | -.204 | -.286 |
| | .250 | .119 | .101 | .075 | .042 | .013 | -.025 | .057 | -.095 | -.138 | -.176 | -.215 |
| | .350 | .063 | .051 | .033 | .004 | -.019 | -.050 | -.077 | -.105 | -.134 | -.160 | -.193 |
| | .450 | .007 | -.002 | -.017 | -.041 | -.059 | -.082 | -.099 | -.119 | -.139 | -.158 | -.182 |
| | .550 | -.064 | -.070 | -.080 | -.095 | -.108 | -.123 | -.130 | -.141 | -.152 | -.166 | -.181 |
| | .650 | -.104 | -.107 | -.113 | -.119 | -.123 | -.129 | -.145 | -.140 | -.145 | -.165 | -.195 |
| | .750 | -.101 | -.117 | -.127 | -.103 | -.095 | -.090 | -.079 | -.085 | -.099 | -.117 | -.091 |
| | .850 | -.106 | -.096 | -.084 | -.067 | -.053 | -.041 | -.023 | -.017 | -.010 | -.010 | -.004 |
| | .925 | -.103 | -.084 | -.059 | -.022 | .005 | .026 | .049 | .059 | .071 | .076 | .092 |
| | .975 | [a]-.080 | [a]-.045 | [a]-.002 | [a].060 | [a].068 | .063 | .097 | .115 | .134 | .142 | .175 |
| | [a]1.000 | .070 | .060 | .080 | .170 | .210 | .232 | .239 | .210 | .250 | .230 | .290 |

[a]Paired value.

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TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Continued

(j) M = 0.60; $\beta_{0.75R}$ = 44.24°.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.053 | 2.080 | 2.120 | 2.139 | 2.185 | 2.213 | 2.251 | 2.298 | 2.350 | 2.398 | 2.466 |
| | $M_x$ | .915 | .911 | .894 | .890 | .884 | .888 | .876 | .871 | .857 | .848 | .834 |
| | $\alpha_x'$ | 3.27 | 2.80 | 2.26 | 2.01 | 1.40 | 1.04 | .55 | -.04 | -.68 | -1.26 | -2.07 |
| | $\Delta\beta$ | .44 | .43 | .41 | .40 | .38 | .36 | .35 | .32 | .30 | .27 | .24 |
| | $\alpha_1$ | 1.20 | 1.84 | 1.14 | 1.07 | .95 | .78 | .73 | .59 | .46 | .33 | .19 |
| | $c_n$ | .4863 | .4389 | .4030 | .3797 | .3399 | .2801 | .2600 | .2119 | .1636 | .1177 | .0676 |
| | $c_m$ | -.0829 | -.0825 | -.0752 | -.0721 | -.0660 | -.0502 | -.0603 | -.0594 | -.0608 | -.0660 | -.0720 |
| | $c_o$ | .0253 | .0229 | .0225 | .0211 | .0175 | .0171 | .0109 | .0051 | .0011 | -.0044 | -.0065 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.227 | 1.225 | 1.216 | 1.214 | 1.211 | 1.213 | 1.207 | 1.204 | 1.197 | 1.192 | 1.185 |
| | .025 | .081 | .070 | .043 | .037 | .022 | .029 | .011 | -.004 | -.028 | -.048 | -.110 |
| | .050 | -.087 | -.100 | -.130 | -.138 | -.154 | -.146 | -.119 | -.018 | .020 | .078 | .089 |
| | .100 | -.228 | -.252 | -.281 | -.286 | -.287 | -.239 | -.224 | -.176 | -.154 | -.108 | -.107 |
| | [a].200 | -.405 | -.472 | -.470 | -.442 | -.443 | -.364 | -.373 | -.379 | -.374 | -.290 | -.284 |
| | .300 | -.550 | -.554 | -.557 | -.542 | -.513 | -.469 | -.457 | -.423 | -.410 | -.359 | -.349 |
| | .400 | -.562 | -.570 | -.579 | -.563 | -.547 | -.507 | -.494 | -.446 | -.425 | -.391 | -.398 |
| | .500 | -.633 | -.642 | -.656 | -.645 | -.621 | -.573 | -.556 | -.525 | -.518 | -.484 | -.491 |
| | .600 | -.701 | -.711 | -.732 | -.723 | -.699 | -.657 | -.656 | -.631 | -.630 | -.610 | -.618 |
| | .700 | -.786 | -.808 | -.822 | -.812 | -.800 | -.761 | -.758 | -.737 | -.729 | -.709 | -.710 |
| | .800 | -.354 | -.361 | -.350 | -.309 | -.267 | -.241 | -.235 | -.222 | -.246 | -.265 | -.312 |
| | .900 | -.312 | -.319 | -.307 | -.265 | -.222 | -.191 | -.171 | -.198 | -.086 | -.037 | -.088 |
| | .950 | -.288 | -.307 | -.301 | -.262 | -.216 | -.181 | -.155 | -.100 | -.047 | .035 | .029 |
| Lower surface | .0375 | .247 | .232 | .153 | .113 | .028 | -.049 | -.137 | -.298 | -.461 | -.653 | -.841 |
| | .075 | .185 | .174 | .111 | .081 | .018 | -.033 | -.092 | -.178 | -.377 | -.491 | -.717 |
| | .150 | .151 | .142 | .090 | .068 | .024 | -.007 | -.044 | -.098 | -.149 | -.180 | -.366 |
| | .250 | [a].101 | [a].092 | [a].047 | [a].031 | -.009 | -.032 | -.065 | -.113 | -.158 | -.191 | -.247 |
| | .350 | .044 | .038 | -.005 | -.019 | -.049 | -.069 | -.098 | -.137 | -.173 | -.200 | -.254 |
| | .450 | -.015 | -.021 | -.062 | -.074 | -.098 | -.114 | -.138 | -.168 | -.196 | -.212 | -.259 |
| | .550 | -.096 | -.102 | -.142 | -.150 | -.170 | -.184 | -.201 | -.221 | -.238 | -.238 | -.271 |
| | .650 | -.164 | -.170 | -.207 | -.211 | -.222 | -.234 | -.240 | -.243 | -.240 | -.222 | -.244 |
| | .750 | -.171 | -.178 | -.210 | -.208 | -.205 | -.210 | -.202 | -.187 | -.177 | -.151 | -.185 |
| | .850 | -.184 | -.191 | -.215 | -.202 | -.185 | -.173 | -.157 | -.145 | -.131 | -.084 | -.089 |
| | .925 | -.170 | -.178 | -.200 | -.188 | -.159 | -.139 | -.114 | -.074 | -.042 | .008 | .003 |
| | .975 | -.258 | -.268 | -.295 | -.274 | -.221 | -.188 | -.146 | -.082 | -.027 | .053 | .061 |
| | [a]1.000 | -.230 | -.254 | -.245 | -.200 | -.175 | -.135 | -.090 | -.050 | .025 | .150 | .105 |

[a]Paired value.

TABLE 6.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(3.00)(07.45) PROPELLER BLADE SECTION (x = 0.75) - Concluded

(k) M = 0.65; $\beta_{0.75R}$ = 44.24°.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.031 | 2.056 | 2.081 | 2.109 | 2.153 | 2.185 | 2.211 | 2.245 | 2.284 | 2.316 | 2.354 |
| | $M_r$ | 1.043 | 1.036 | 1.029 | 1.021 | 1.010 | .997 | .989 | .981 | .965 | .959 | .951 |
| | $\alpha_r$' | 3.48 | 3.13 | 2.79 | 2.41 | 1.82 | 1.40 | 1.06 | .62 | .13 | -.27 | -.73 |
| | $\Delta\beta$ | .53 | .52 | .50 | .49 | .46 | .45 | .43 | .41 | .39 | .37 | .35 |
| | $\alpha_1$ | .97 | 1.02 | 1.00 | .94 | .87 | .75 | .62 | .50 | .31 | .13 | -.07 |
| | $c_n$ | .3422 | .3609 | .3551 | .3325 | .3089 | .2646 | .2193 | .1798 | .1106 | .0479 | -.0243 |
| | $c_m$ | -.1030 | -.1096 | -.1126 | -.1112 | -.1110 | -.0987 | -.0902 | -.0835 | -.0735 | -.0619 | -.0428 |
| | $c_c$ | .0400 | +.0441 | +.0453 | +.0458 | +.0445 | +.0423 | +.0383 | +.0358 | +.0354 | .0318 | .0270 |
| | x/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.301 | 1.297 | 1.293 | 1.287 | 1.280 | 1.273 | 1.268 | 1.263 | 1.254 | 1.251 | 1.247 |
| | .025 | .323 | .315 | .307 | .300 | .285 | .270 | .257 | .247 | .228 | .216 | .206 |
| | .050 | .221 | .197 | .186 | .179 | .163 | .146 | .133 | .121 | .102 | .088 | .076 |
| | .100 | -.018 | -.044 | -.051 | -.050 | -.050 | -.035 | -.023 | -.010 | .006 | .025 | .044 |
| | [a].200 | -.233 | -.245 | -.259 | -.244 | -.250 | -.210 | -.212 | -.190 | -.160 | -.135 | -.113 |
| | .300 | -.303 | -.326 | -.331 | -.328 | -.324 | -.304 | -.289 | -.282 | -.270 | -.255 | -.245 |
| | .400 | -.334 | -.359 | -.368 | -.365 | -.359 | -.344 | -.336 | -.326 | -.319 | -.303 | -.285 |
| | .500 | -.399 | -.422 | -.430 | -.430 | -.432 | -.421 | -.412 | -.401 | -.386 | -.369 | -.359 |
| | .600 | -.467 | -.492 | -.502 | -.503 | -.504 | -.495 | -.489 | -.480 | -.476 | -.472 | -.483 |
| | .700 | -.536 | -.566 | -.580 | -.588 | -.594 | -.587 | -.582 | -.579 | -.577 | -.578 | -.570 |
| | .800 | -.611 | -.647 | -.666 | -.674 | -.684 | [a]-.687 | -.683 | -.682 | -.690 | -.688 | -.683 |
| | .900 | -.657 | -.709 | -.741 | -.763 | -.785 | -.800 | -.808 | -.809 | -.779 | -.605 | -.402 |
| | .950 | -.546 | -.638 | -.691 | -.729 | -.724 | [a]-.681 | -.578 | -.518 | -.448 | -.378 | -.312 |
| Lower surface | .0375 | .217 | .218 | .183 | .125 | .050 | -.040 | -.122 | -.196 | -.311 | -.394 | -.465 |
| | .075 | .173 | .174 | .143 | .103 | .042 | -.027 | -.088 | -.145 | -.249 | -.336 | -.417 |
| | .150 | .160 | .155 | .130 | .099 | .061 | .049 | -.006 | -.063 | -.185 | -.273 | -.346 |
| | .250 | .135 | [a].120 | .106 | [a].074 | .050 | .022 | -.002 | [a]-.030 | -.108 | -.193 | -.279 |
| | .350 | .077 | [a].073 | .046 | [a].030 | -.013 | [a]-.020 | [a]-.055 | [a]-.090 | -.116 | -.170 | -.242 |
| | .450 | -.026 | -.017 | -.004 | -.026 | -.054 | -.079 | -.106 | -.126 | -.162 | -.177 | -.209 |
| | .550 | -.035 | -.047 | -.064 | [a]-.090 | -.108 | -.128 | [a]-.165 | -.175 | -.218 | -.239 | [a]-.268 |
| | .650 | -.116 | -.127 | -.147 | [a]-.153 | -.187 | -.208 | [a]-.220 | -.251 | -.289 | -.314 | -.330 |
| | .750 | -.163 | [a]-.184 | [a]-.207 | -.211 | -.233 | -.306 | -.276 | -.296 | -.336 | -.352 | -.372 |
| | .850 | -.214 | -.226 | [a]-.242 | -.263 | [a]-.279 | -.302 | -.324 | -.338 | -.367 | -.385 | -.403 |
| | .925 | -.221 | -.247 | -.255 | [a]-.277 | [a]-.300 | -.309 | -.332 | -.350 | -.389 | -.410 | -.432 |
| | .975 | -.243 | -.260 | -.280 | -.291 | -.313 | -.335 | -.354 | -.368 | -.405 | -.425 | -.442 |
| | [a]1.000 | -.200 | -.225 | -.250 | -.255 | -.285 | -.160 | .010 | .130 | -.130 | -.205 | -.130 |

[a]Paired value.

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TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80)

(a) N = 1140 rpm; $\beta_{0.75R}$ = 29.92°.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.690 | 0.785 | 0.862 | 0.964 | 1.067 | 1.163 | 1.262 | 1.384 | 1.435 | 1.315 | 1.224 | 1.118 | 1.011 | 0.931 | 0.833 | 0.750 |
| | $M_T$ | .432 | .435 | .457 | .463 | .466 | .481 | .489 | .500 | .511 | .494 | .492 | .471 | .461 | .459 | .451 | .426 |
| | $\alpha_T'$ | 12.75 | 10.76 | 9.17 | 7.11 | 5.10 | 3.27 | 1.44 | -.74 | -1.63 | .48 | 2.13 | 4.12 | 6.19 | 7.77 | 9.76 | 11.48 |
| | $\Delta\beta$ | .22 | .22 | .22 | .21 | .20 | .19 | .18 | .17 | .17 | .18 | .19 | .20 | .21 | .21 | .22 | .22 |
| | $\alpha_i$ | 2.84 | 2.89 | 2.53 | 2.31 | 1.98 | 1.55 | 1.13 | .69 | .41 | .92 | 1.28 | 1.72 | 2.09 | 2.41 | 2.73 | 2.99 |
| | $c_n$ | .8299 | .8704 | .7693 | .7149 | .6186 | .4887 | .3601 | .2210 | .1389 | .2989 | .4067 | .5395 | .6498 | .7401 | .8268 | .8905 |
| | $c_m$ | -.0522 | -.0400 | -.0303 | -.0414 | -.0516 | -.0505 | -.0549 | -.0530 | -.0620 | -.0539 | -.0529 | -.0529 | -.0510 | -.0430 | -.0340 | -.0598 |
| | $c_o$ | -.0071 | -.0194 | -.0184 | -.0154 | -.0135 | -.0037 | .0024 | .0032 | .0143 | .0021 | .0010 | -.0016 | -.0073 | -.0135 | -.0186 | -.0119 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.048 | 1.049 | 1.054 | 1.055 | 1.056 | 1.059 | 1.061 | 1.064 | 1.067 | 1.062 | 1.062 | 1.057 | 1.053 | 1.054 | 1.052 | 1.047 |
| | .025 | -.472 | -.459 | -.430 | -.413 | -.396 | -.360 | -.333 | [a]-.262 | [a].501 | [a]-.239 | -.338 | -.366 | -.396 | -.431 | -.449 | -.464 |
| | .050 | -1.664 | -1.652 | -1.569 | -1.545 | -1.475 | -1.388 | [a]-.516 | [a]-.287 | -.009 | [a]-.319 | -.493 | -.811 | -1.310 | -1.375 | -1.415 | -1.437 |
| | .100 | -1.766 | -1.749 | -1.656 | -1.629 | -.925 | -.710 | -.501 | [a]-.307 | -.226 | [a]-.340 | [a]-.621 | [a]-.835 | -.942 | -1.549 | -1.702 | -1.370 |
| | [a].200 | -.880 | -1.267 | -1.059 | -.842 | -.689 | -.558 | -.442 | -.307 | -.256 | -.354 | -.499 | -.645 | -.699 | -.877 | -1.228 | -1.200 |
| | .300 | -.635 | -.902 | -.718 | -.617 | -.590 | -.488 | -.405 | -.305 | -.267 | -.357 | -.433 | -.531 | -.610 | -.640 | -.859 | -1.064 |
| | .400 | -.607 | -.642 | -.540 | -.544 | -.517 | -.442 | -.383 | -.307 | -.279 | -.347 | -.403 | -.474 | -.537 | -.546 | -.612 | -.866 |
| | .500 | -.533 | -.507 | -.451 | -.492 | -.480 | -.421 | -.378 | -.326 | [a]-.301 | -.355 | -.398 | -.446 | -.488 | -.483 | -.474 | -.668 |
| | .600 | -.464 | -.419 | -.380 | -.435 | -.438 | -.403 | -.374 | -.341 | -.322 | -.360 | -.388 | -.418 | -.437 | -.420 | -.382 | -.498 |
| | .700 | -.380 | -.333 | -.307 | -.361 | -.381 | -.363 | -.347 | -.326 | -.319 | -.337 | -.356 | -.369 | -.373 | -.342 | -.297 | -.365 |
| | .800 | -.347 | -.299 | -.216 | -.298 | -.280 | -.280 | -.280 | -.281 | -.281 | -.281 | -.283 | -.279 | -.266 | -.279 | -.219 | -.274 |
| | .900 | -.310 | -.170 | -.112 | -.110 | -.105 | -.106 | -.117 | -.136 | -.139 | -.127 | -.118 | -.101 | -.107 | -.109 | -.132 | -.196 |
| | .950 | -.273 | -.121 | -.052 | -.026 | .011 | .018 | .004 | -.024 | -.042 | -.009 | .001 | .015 | -.003 | -.031 | -.085 | -.150 |
| Lower surface | .0375 | .830 | .814 | .746 | .686 | .561 | .384 | .172 | -.153 | -.307 | .030 | .251 | .478 | .630 | .723 | .778 | .797 |
| | .075 | .672 | .654 | .584 | .528 | .463 | .393 | [a].138 | -.095 | -.169 | .020 | .171 | .347 | .474 | .557 | .606 | .632 |
| | .150 | .509 | .491 | .433 | .378 | .296 | .191 | .086 | -.051 | -.113 | .017 | .121 | .242 | .339 | .401 | .455 | .480 |
| | .250 | .358 | .345 | .299 | .256 | .188 | .111 | .038 | -.072 | -.118 | .003 | .071 | .167 | .234 | .291 | .331 | .353 |
| | .350 | .261 | .259 | .228 | .184 | .128 | .063 | .001 | -.085 | -.118 | -.041 | .021 | .100 | .159 | .206 | .238 | .257 |
| | .450 | .180 | .184 | .157 | .125 | .080 | .033 | -.021 | -.088 | -.110 | -.059 | -.003 | .061 | .107 | .145 | .171 | .183 |
| | .550 | .112 | .125 | .107 | .086 | .050 | .012 | -.025 | -.080 | -.099 | -.056 | -.013 | .038 | .075 | .098 | .115 | .124 |
| | .650 | .047 | .067 | .058 | .046 | .025 | -.007 | -.032 | -.073 | -.089 | -.054 | -.025 | .012 | .042 | .056 | .061 | .068 |
| | .750 | .010 | .039 | .039 | .037 | .032 | .012 | [a]-.010 | -.039 | [a]-.050 | -.016 | -.003 | .023 | .048 | .043 | .039 | .028 |
| | .850 | -.048 | .002 | .017 | .029 | .032 | .022 | .016 | -.003 | -.002 | .010 | .019 | .031 | .037 | .032 | .014 | -.006 |
| | .925 | -.099 | -.018 | .012 | .037 | .050 | .058 | .059 | .055 | .062 | .060 | .059 | .056 | .051 | .034 | -.003 | -.032 |
| | [a].975 | -.076 | .021 | .047 | .073 | .129 | .122 | .121 | .126 | .130 | .106 | .112 | .097 | .104 | .084 | .032 | -.011 |
| | [a]1.000 | 0 | .106 | .137 | .156 | .206 | .204 | .202 | .191 | .200 | .162 | .163 | .154 | .197 | .157 | .095 | .064 |

[a]Paired value.

TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (r = 0.80) - Continued

(b) N = 1350 rpm; $\beta_{0.75R} = 29.92^{\circ}$.

| | J | 0.709 | 0.779 | 0.859 | 0.938 | 1.018 | 1.109 | 1.192 | 1.284 | 1.384 | 1.471 | 1.419 | 1.329 | 1.236 | 1.146 | 1.066 | 0.982 | 0.892 | 0.819 | 0.754 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .516 | .533 | .543 | .557 | .558 | .573 | .578 | .586 | .598 | .610 | .599 | .595 | .587 | .568 | .570 | .550 | .540 | .513 | .510 |
| | $\alpha_x'$ | 12.35 | 10.88 | 9.23 | 7.63 | 6.05 | 4.29 | 2.72 | 1.03 | -.74 | -2.23 | -1.35 | .23 | 1.91 | 3.59 | 5.09 | 6.76 | 8.56 | 10.05 | 11.40 |
| | $\Delta\beta$ | .30 | .30 | .30 | .29 | .29 | .27 | .26 | .25 | .23 | .22 | .23 | .24 | .26 | .27 | .28 | .29 | .30 | .30 | .30 |
| | $\alpha_i$ | 3.22 | 3.07 | 2.81 | 2.54 | 2.38 | 1.91 | 1.56 | 1.11 | .57 | .24 | .43 | .84 | 1.32 | 1.76 | 2.16 | 2.46 | 2.70 | 2.90 | 3.18 |
| | $c_n$ | .9518 | .9248 | .8575 | .7842 | .7402 | .6007 | .4934 | .3532 | .1840 | .0764 | .1383 | .2690 | .4198 | .5536 | .6748 | .7633 | .8282 | .8799 | .9530 |
| | $c_m$ | -.0475 | -.0380 | -.0257 | -.0293 | -.0343 | -.0441 | -.0534 | -.0516 | -.0622 | -.0648 | -.0647 | -.0565 | -.0602 | -.0498 | -.0329 | -.0393 | -.0234 | -.0285 | -.0406 |
| | $c_a$ | -.0285 | -.0357 | -.0370 | -.0337 | -.0457 | -.0264 | -.0149 | -.0062 | .0057 | .0056 | .0045 | -.0057 | -.0076 | -.0219 | -.0303 | -.0311 | -.0425 | -.0390 | -.0358 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.068 | 1.072 | 1.075 | 1.079 | 1.080 | 1.084 | 1.086 | 1.088 | 1.092 | 1.096 | 1.092 | 1.091 | 1.089 | 1.083 | 1.084 | 1.078 | 1.075 | 1.067 | 1.066 |
| | [a].025 | -1.334 | -1.316 | -1.286 | -1.263 | -1.799 | -1.066 | -1.690 | -.374 | .120 | .250 | .165 | -.151 | -.514 | -.899 | -1.337 | -1.276 | -1.445 | -1.318 | -1.344 |
| | .050 | -1.597 | -1.560 | -1.538 | -1.507 | -1.531 | [a]-.948 | -1.411 | -.378 | -.091 | .104 | .011 | -.214 | -.473 | -.777 | -1.145 | -1.589 | -1.614 | -1.648 | -1.728 |
| | .100 | -1.640 | -1.578 | -1.678 | -1.577 | -1.026 | [a]-.764 | -.586 | -.379 | -.193 | -.034 | -.115 | -.282 | [a]-.461 | [a]-.674 | -.866 | -1.339 | -1.685 | -1.693 | -1.711 |
| | .200 | [a]-1.189 | [a]-1.209 | [a]-1.160 | [a]-.951 | [a]-.694 | [a]-.643 | [a]-.529 | [a]-.395 | -.275 | [a]-.189 | -.245 | [a]-.341 | [a]-.456 | [a]-.602 | [a]-.709 | [a]-.874 | [a]-1.047 | [a]-1.217 | [a]-1.284 |
| | .300 | -.881 | -.942 | -.830 | -.657 | -.650 | -.574 | -.499 | -.407 | -.312 | -.237 | -.281 | -.356 | -.448 | -.544 | -.633 | -.665 | -.731 | -.874 | -.946 |
| | .400 | -.709 | -.718 | -.620 | -.551 | -.565 | -.510 | -.546 | -.392 | -.321 | -.263 | -.295 | -.355 | -.423 | -.492 | -.562 | -.557 | -.581 | -.646 | -.707 |
| | .500 | -.594 | -.466 | -.489 | -.479 | -.509 | -.473 | -.437 | -.392 | -.339 | -.297 | -.320 | -.364 | -.416 | -.462 | -.515 | -.517 | -.486 | -.505 | -.576 |
| | .600 | -.498 | -.460 | -.396 | -.410 | -.455 | -.437 | -.418 | -.392 | -.354 | -.322 | -.338 | -.369 | -.408 | -.441 | -.474 | -.454 | -.406 | -.405 | -.483 |
| | .700 | -.406 | -.356 | -.310 | -.326 | -.377 | -.377 | -.372 | -.363 | -.336 | -.320 | -.326 | -.347 | -.370 | -.388 | -.406 | -.369 | -.323 | -.317 | -.382 |
| | .800 | -.337 | -.290 | -.226 | -.224 | -.267 | -.275 | -.286 | -.291 | -.281 | -.279 | -.282 | -.284 | -.294 | -.291 | -.298 | -.255 | -.222 | -.242 | -.303 |
| | .900 | -.304 | -.225 | -.137 | -.093 | -.093 | -.086 | -.093 | -.113 | -.113 | -.128 | -.124 | -.113 | [a]-.166 | -.095 | [a]-.212 | -.095 | -.110 | -.167 | -.217 |
| | .950 | -.258 | -.175 | -.086 | -.020 | .012 | .032 | .035 | .013 | .009 | -.016 | -.009 | .007 | [a]-.086 | .023 | [a]-.107 | -.002 | -.048 | -.122 | -.172 |
| Lower surface | .0375 | .841 | .813 | .767 | .707 | .630 | .510 | .368 | .122 | -.157 | -.363 | -.295 | -.009 | .232 | .449 | .556 | .690 | .746 | .787 | .843 |
| | .075 | [a].694 | [a].674 | [a].606 | [a].575 | [a].476 | .375 | .245 | .083 | -.086 | -.270 | -.168 | 0 | .160 | .320 | .406 | .520 | .577 | .612 | .672 |
| | .150 | .515 | .591 | .449 | .408 | .349 | .275 | .201 | .055 | -.060 | -.176 | -.110 | .004 | .109 | .217 | .279 | .378 | .425 | .462 | .505 |
| | .250 | .379 | .360 | .325 | .289 | .239 | .182 | .124 | .024 | -.062 | -.149 | -.103 | -.015 | .065 | .152 | .195 | .272 | .315 | .340 | .374 |
| | .350 | .269 | .255 | .232 | .206 | .163 | .116 | .066 | -.011 | -.082 | -.146 | -.110 | -.046 | .019 | .089 | .119 | .189 | .218 | .244 | .267 |
| | .450 | .185 | .180 | .162 | .147 | .115 | .073 | .035 | -.032 | -.084 | -.135 | -.108 | -.059 | -.006 | .049 | .074 | .129 | .154 | .171 | .187 |
| | .550 | .119 | .117 | .110 | .103 | .079 | .045 | .015 | -.037 | -.077 | -.119 | -.096 | -.059 | -.013 | .028 | .042 | .089 | .102 | .114 | .126 |
| | .650 | .051 | .057 | .059 | .063 | .042 | .019 | -.002 | -.045 | -.073 | -.104 | -.085 | -.059 | -.026 | .004 | .012 | .054 | .059 | .060 | .063 |
| | .750 | .007 | .018 | .040 | .054 | .042 | .030 | .017 | -.013 | -.035 | -.050 | -.040 | -.027 | -.004 | .019 | .017 | .048 | .042 | .030 | .029 |
| | .850 | -.044 | -.021 | .011 | .034 | .036 | .034 | .031 | .013 | .004 | .008 | .005 | .007 | .017 | .028 | .017 | .037 | .019 | -.002 | -.013 |
| | .925 | -.088 | -.057 | -.006 | .030 | .040 | .057 | .066 | .059 | .062 | .068 | .067 | .057 | .057 | .057 | .036 | .044 | .015 | -.026 | -.042 |
| | [a].975 | .116 | -.005 | .034 | .093 | .130 | .154 | .173 | .151 | .161 | .153 | .172 | .136 | .134 | .156 | .074 | .099 | .064 | .010 | -.047 |
| | [a]1.000 | .076 | .032 | .105 | .209 | .279 | .318 | .305 | .232 | .271 | .280 | .291 | .252 | .304 | .276 | .134 | .207 | .189 | .149 | 0 |

[a]Faired value.

TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) - Continued

(c) N = 1600 rpm; $\beta_{0.75R}$ = 29.92°.

| | J | 0.823 | 0.896 | 0.973 | 1.039 | 1.123 | 1.192 | 1.271 | 1.348 | 1.438 | 1.473 | 1.397 | 1.319 | 1.215 | 1.141 | 1.078 | 1.010 | 0.940 | 0.866 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_T$ | .648 | .656 | .667 | .672 | .683 | .692 | .698 | .713 | .721 | .726 | .719 | .707 | .697 | .684 | .670 | .669 | .664 | .648 |
| | $\alpha_T'$ | 9.97 | 8.48 | 6.94 | 5.64 | 4.02 | 2.72 | 1.27 | -.11 | -1.67 | -2.28 | -.97 | .40 | 2.30 | 3.69 | 4.88 | 6.20 | 7.60 | 9.09 |
| | $\Delta\beta$ | .39 | .39 | .39 | .38 | .37 | .37 | .36 | .35 | .33 | .33 | .34 | .35 | .36 | .37 | .38 | .38 | .39 | .39 |
| | $\alpha_1$ | 3.00 | 2.82 | 2.80 | 2.61 | 2.10 | 1.83 | 1.30 | .84 | .38 | .23 | .52 | .95 | 1.52 | 1.93 | 2.21 | 2.47 | 2.71 | 2.88 |
| | $c_n$ | .9097 | .8662 | .8723 | .8175 | .6614 | .5794 | .4163 | .2683 | .1242 | .0757 | .1682 | .3043 | .4826 | .6071 | .6946 | .7693 | .8380 | .8793 |
| | $c_m$ | -.0420 | -.0353 | -.0306 | -.0314 | -.0395 | -.0426 | -.0568 | -.0630 | -.0660 | -.0689 | -.0674 | -.0611 | -.0562 | -.0481 | -.0462 | -.0425 | -.0357 | -.0216 |
| | $c_o$ | -.0432 | -.0448 | -.0456 | -.0397 | -.0287 | -.0340 | -.0142 | .0010 | .0059 | .0067 | .0058 | .0024 | -.0162 | -.0290 | -.0243 | -.0280 | -.0337 | -.0344 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.109 | 1.112 | 1.116 | 1.118 | 1.122 | 1.126 | 1.128 | 1.134 | 1.137 | 1.139 | 1.136 | 1.132 | 1.128 | 1.123 | 1.117 | 1.117 | 1.115 | 1.109 |
| | .025 | -1.264 | -1.645 | -1.645 | -1.610 | -1.577 | -1.589 | -1.071 | -.110 | .199 | .279 | .137 | -.140 | -.621 | -1.174 | -1.309 | -1.314 | -1.338 | -1.479 |
| | .050 | -1.539 | -1.799 | -1.788 | -1.743 | -1.709 | -1.062 | -.466 | -.211 | .029 | .101 | .016 | -.209 | -.561 | -.747 | -1.597 | -1.695 | -1.859 | -2.113 |
| | .100 | -1.505 | -2.038 | -2.011 | -1.961 | -.820 | -.673 | -.484 | -.308 | -.130 | -.071 | -.131 | -.303 | -.549 | -.744 | -1.028 | -1.767 | -1.985 | -2.312 |
| | [a].200 | -1.213 | -.925 | -1.188 | -.992 | -.717 | -.580 | -.505 | -.382 | -.240 | -.213 | -.279 | -.409 | -.549 | -.706 | -.797 | -.851 | -.837 | -1.014 |
| | .300 | -.940 | -.613 | -.628 | -.657 | -.642 | -.575 | -.499 | -.403 | -.300 | -.267 | -.331 | -.429 | -.546 | -.625 | -.686 | -.663 | -.608 | -.742 |
| | .400 | -.726 | -.549 | -.572 | -.573 | -.558 | -.516 | -.466 | -.396 | -.323 | -.300 | -.342 | -.413 | -.496 | -.546 | -.593 | -.587 | -.559 | -.646 |
| | .500 | -.561 | -.497 | -.526 | -.527 | -.528 | -.495 | -.463 | -.412 | -.363 | -.345 | -.376 | -.425 | -.483 | -.513 | -.546 | -.538 | -.514 | -.564 |
| | .600 | -.436 | -.435 | -.474 | -.475 | -.480 | -.467 | -.454 | -.422 | -.391 | -.379 | -.396 | -.429 | -.464 | -.476 | -.497 | -.489 | -.461 | -.477 |
| | .700 | -.331 | -.349 | -.389 | -.393 | -.405 | -.407 | -.407 | -.389 | -.376 | -.373 | -.374 | -.391 | -.408 | -.406 | -.415 | -.404 | -.377 | -.378 |
| | [a].800 | -.261 | -.231 | -.250 | -.258 | -.267 | -.285 | -.302 | -.297 | -.290 | -.300 | -.291 | -.292 | -.290 | -.276 | -.278 | -.259 | -.254 | -.287 |
| | .900 | -.196 | -.073 | -.071 | -.059 | -.071 | -.084 | -.098 | -.105 | -.127 | -.136 | -.119 | -.105 | -.093 | -.074 | -.070 | -.074 | -.073 | -.191 |
| | .950 | -.160 | .022 | .040 | .045 | .042 | .044 | .038 | .033 | .009 | -.004 | .020 | .035 | .039 | .043 | .039 | .036 | .035 | -.150 |
| Lower surface | .0375 | .793 | [a].736 | [a].677 | [a].651 | [a].605 | [a].499 | [a].202 | [a]-.065 | [a]-.315 | [a]-.398 | [a]-.214 | [a].010 | .339 | .491 | [a].566 | [a].622 | [a].722 | [a].707 |
| | .075 | .647 | .596 | .535 | .481 | .423 | .394 | .107 | -.055 | -.257 | -.328 | -.165 | 0 | .195 | .329 | .425 | .484 | .563 | .543 |
| | .150 | .477 | .443 | .390 | .338 | .251 | .173 | .074 | -.038 | -.178 | -.225 | -.117 | 0 | .132 | .230 | .302 | .351 | .416 | .388 |
| | .250 | .351 | .327 | .288 | .245 | .170 | .109 | .032 | -.049 | -.150 | -.184 | -.104 | -.022 | .079 | .155 | .217 | .256 | .313 | .271 |
| | .350 | .270 | .247 | .213 | .178 | .113 | .062 | -.001 | -.065 | -.140 | -.167 | -.106 | -.042 | .041 | .103 | .152 | .190 | .238 | .190 |
| | .450 | .185 | .177 | .148 | .119 | .064 | .021 | -.032 | -.084 | -.140 | -.161 | -.116 | -.067 | 0 | .052 | .092 | .124 | .167 | .110 |
| | .550 | .128 | .130 | .108 | .083 | .034 | .002 | -.044 | -.084 | -.127 | -.144 | -.104 | -.070 | -.015 | .028 | .060 | .089 | .128 | .060 |
| | .650 | .067 | .084 | .071 | .049 | .008 | .018 | -.052 | -.080 | -.114 | -.123 | -.096 | -.070 | -.032 | .003 | .028 | .053 | .086 | .005 |
| | .750 | .039 | .076 | .071 | .055 | .022 | .005 | -.019 | -.036 | -.057 | -.062 | -.044 | -.031 | -.005 | .018 | .036 | .057 | .083 | -.013 |
| | .850 | -.007 | .060 | .063 | .051 | .028 | .021 | .008 | .001 | -.003 | -.004 | .004 | .004 | .016 | .030 | .036 | .052 | .071 | -.044 |
| | [a].925 | -.011 | .074 | .089 | .086 | .072 | .081 | .081 | .073 | .075 | .070 | .078 | .081 | .081 | .077 | .071 | .092 | .084 | -.063 |
| | .975 | [a].021 | [a].121 | [a].146 | [a].139 | .142 | [a].153 | [a].162 | [a].171 | [a].155 | [a].155 | [a].181 | [a].164 | [a].193 | [a].164 | .141 | [a].156 | [a].134 | [a]-.031 |
| | [a]1.000 | .149 | .210 | .250 | .227 | .246 | .234 | .253 | .262 | .240 | .240 | .276 | .247 | .351 | .286 | .278 | .239 | .241 | .042 |

[a]Paired value.

TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) - Continued

(d) N = 2000 rpm; $\beta_{0.75R} = 29.92^\circ$.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.008 | 1.116 | 1.188 | 1.275 | 1.369 | 1.447 | 1.421 | 1.351 | 1.238 | 1.134 |
| | $M_x$ | .834 | .844 | .855 | .864 | .880 | .894 | .886 | .878 | .858 | .846 |
| | $\alpha_x'$ | 6.24 | 4.16 | 2.80 | 1.20 | -.48 | -1.83 | -1.38 | -.16 | 1.87 | 3.81 |
| | $\Delta\beta$ | .61 | .59 | .56 | .53 | .50 | .47 | .48 | .50 | .54 | .58 |
| | $\alpha_1$ | 2.98 | 2.37 | 1.91 | 1.23 | .49 | -.21 | -.03 | .62 | 1.43 | 2.18 |
| | $c_n$ | .9348 | .7470 | .6064 | .3941 | .1583 | -.0692 | -.0096 | .2006 | .4558 | .6870 |
| | $c_m$ | -.0123 | -.0979 | -.1081 | -.0916 | -.0677 | -.0596 | -.0622 | -.0736 | -.0974 | -.0920 |
| | $c_c$ | -.0131 | -.0122 | .0003 | .0064 | .0124 | .0104 | .0104 | .0049 | .0076 | -.0094 |
| | c/b | Pressure coefficient, P | | | | | | | | | |
| Upper surface | 0.000 | 1.186 | 1.191 | 1.196 | 1.200 | 1.208 | 1.216 | 1.212 | 1.207 | 1.197 | 1.192 |
| | .025 | [a]-.885 | [a]-.760 | [a]-.434 | -.081 | [a].151 | [a].322 | [a].350 | -.041 | -.061 | [a]-.658 |
| | .050 | -1.042 | -.896 | -.495 | -.158 | .065 | .214 | .210 | [a]-.055 | -.218 | -.655 |
| | .100 | -.963 | -.688 | -.401 | -.230 | -.041 | .087 | .054 | -.078 | -.298 | -.599 |
| | .200 | [a]-.989 | [a]-.735 | [a]-.554 | [a]-.396 | -.132 | -.111 | -.114 | -.142 | [a]-.416 | [a]-.674 |
| | .300 | -1.057 | -.819 | -.671 | -.512 | -.342 | -.237 | -.269 | -.376 | -.566 | -.790 |
| | .400 | -1.058 | -.879 | -.714 | -.550 | -.382 | -.292 | -.311 | -.425 | -.612 | -.823 |
| | .500 | -1.076 | -.894 | -.775 | -.581 | -.445 | -.364 | -.393 | -.477 | -.635 | -.836 |
| | .600 | -.679 | -.932 | -.792 | -.682 | -.549 | -.453 | -.473 | -.570 | -.727 | -.915 |
| | .700 | -.515 | -.468 | -.790 | -.741 | -.627 | -.560 | -.582 | -.651 | -.779 | -.492 |
| | [a].800 | -.446 | -.339 | -.530 | -.466 | -.377 | -.380 | -.325 | -.362 | -.436 | -.318 |
| | .900 | -.358 | -.240 | -.184 | -.138 | -.117 | -.106 | -.111 | -.115 | -.140 | -.200 |
| | .950 | -.285 | -.171 | -.134 | -.095 | -.077 | -.067 | -.069 | -.070 | -.092 | -.134 |
| Lower surface | .0375 | .605 | .457 | .312 | .066 | [a]-.071 | -.735 | -.703 | -.241 | .168 | .420 |
| | .075 | .480 | .357 | [a].255 | .066 | -.117 | -.634 | -.591 | -.110 | .137 | .325 |
| | .150 | .371 | .269 | .180 | .050 | -.133 | -.497 | -.217 | -.092 | .093 | .235 |
| | .250 | .272 | .182 | .109 | .003 | -.145 | -.195 | -.210 | -.106 | .045 | .163 |
| | .350 | .199 | .120 | .057 | -.033 | -.161 | -.264 | -.230 | -.126 | .002 | .102 |
| | .450 | .123 | .051 | -.005 | -.084 | -.196 | -.283 | -.266 | -.164 | -.054 | .036 |
| | .550 | .071 | .007 | -.046 | -.114 | -.213 | -.308 | -.297 | -.180 | -.086 | -.007 |
| | .650 | .016 | -.039 | -.085 | -.144 | -.228 | -.376 | -.313 | -.200 | -.120 | -.050 |
| | .750 | 0 | -.041 | -.075 | -.116 | -.166 | -.251 | -.209 | -.150 | -.098 | -.046 |
| | .850 | -.036 | -.052 | -.073 | -.093 | -.114 | -.124 | -.119 | -.103 | -.079 | -.051 |
| | [a].925 | .001 | -.017 | -.020 | -.012 | -.014 | -.015 | -.014 | -.005 | -.002 | -.006 |
| | .975 | .155 | .126 | .112 | .117 | .122 | .127 | .130 | .128 | .119 | .128 |
| | [a]1.000 | .385 | .359 | .346 | .309 | .311 | .315 | .340 | .302 | .254 | .338 |

[a]Paired value.

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TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) -- Continued

(e) N = 2160 rpm; $\beta_{0.75R} = 29.92^{\circ}$.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.122 | 1.181 | 1.244 | 1.298 | 1.363 | 1.402 | 1.391 | 1.331 | 1.265 | 1.203 | 1.150 |
| | $M_x$ | .932 | .939 | .950 | .957 | .970 | .975 | .971 | .959 | .947 | .937 | .930 |
| | $\alpha_x$, | 4.04 | 2.93 | 1.76 | .78 | -.37 | -1.05 | -.86 | .19 | 1.39 | 2.52 | 3.51 |
| | $\Delta\beta$ | .66 | .65 | .63 | .61 | .59 | .58 | .58 | .60 | .62 | .64 | .66 |
| | $\alpha_l$ | 1.92 | 1.62 | 1.21 | .80 | .29 | -.04 | .09 | .49 | .90 | 1.36 | 1.71 |
| | $c_n$ | .6046 | .5135 | .3853 | .2570 | .0936 | -.0148 | .0296 | .1559 | .2864 | .4315 | .5382 |
| | $c_m$ | -.1070 | -.0985 | -.0922 | -.0789 | -.0725 | -.0667 | -.0700 | -.0730 | -.0923 | -.1048 | -.1077 |
| | $c_a$ | .0207 | .0227 | .0317 | .0300 | .0330 | .0391 | .0385 | .0387 | .0397 | .0312 | .0255 |
| | x/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.235 | 1.240 | 1.246 | 1.250 | 1.257 | 1.260 | 1.258 | 1.251 | 1.244 | 1.239 | 1.235 |
| | [a].025 | -.185 | -.194 | -.071 | .181 | .341 | .380 | .380 | .392 | .394 | .152 | -.102 |
| | .050 | -.297 | -.295 | -.177 | -.015 | .158 | .236 | .235 | .219 | .214 | .036 | -.156 |
| | .100 | [a]-.399 | [a]-.367 | -.190 | -.134 | -.001 | .089 | .090 | .050 | -.017 | -.116 | -.236 |
| | [a].200 | -.522 | -.459 | -.304 | -.261 | -.135 | -.085 | -.083 | -.221 | -.295 | -.371 | -.440 |
| | .300 | -.602 | -.521 | -.431 | -.350 | -.222 | -.176 | -.187 | -.304 | -.378 | -.463 | -.550 |
| | .400 | -.663 | -.581 | -.490 | -.408 | -.295 | -.242 | -.255 | -.349 | -.428 | -.532 | -.622 |
| | .500 | -.707 | -.635 | -.559 | -.463 | -.357 | -.311 | -.327 | -.403 | -.491 | -.592 | -.661 |
| | .600 | -.762 | -.708 | -.599 | -.534 | -.461 | -.395 | -.417 | -.502 | -.554 | -.638 | -.735 |
| | .700 | -.845 | -.759 | -.699 | -.638 | -.525 | -.490 | -.501 | -.571 | -.653 | -.788 | -.806 |
| | .800 | -.409 | -.570 | -.783 | -.744 | -.663 | -.614 | -.629 | -.704 | -.761 | -.695 | -.418 |
| | .900 | -.376 | -.369 | -.372 | -.375 | -.617 | -.713 | -.688 | -.399 | -.352 | -.355 | -.352 |
| | .950 | -.371 | -.360 | -.352 | -.333 | -.319 | -.325 | -.302 | -.312 | -.320 | -.337 | -.346 |
| Lower surface | .0375 | .419 | .290 | .144 | -.006 | -.359 | -.474 | -.443 | -.230 | .054 | .227 | .358 |
| | .075 | .339 | [a].245 | .134 | .028 | -.262 | -.390 | -.353 | -.046 | .066 | .116 | .287 |
| | .150 | .273 | .191 | .105 | .032 | -.025 | -.276 | -.227 | -.041 | .054 | .145 | .223 |
| | .250 | .182 | .109 | .036 | -.023 | -.106 | -.223 | -.100 | -.082 | .004 | .079 | .147 |
| | .350 | .119 | .056 | -.008 | -.059 | -.154 | -.196 | -.161 | -.094 | -.032 | .034 | .094 |
| | .450 | .045 | -.013 | -.073 | -.125 | -.171 | -.232 | -.202 | -.166 | -.098 | -.039 | .017 |
| | .550 | -.008 | -.062 | -.112 | -.146 | -.210 | -.241 | -.229 | -.206 | -.136 | -.082 | -.034 |
| | .650 | -.074 | -.133 | -.189 | -.221 | -.276 | -.312 | -.298 | -.257 | -.209 | -.199 | -.099 |
| | .750 | -.084 | -.128 | -.205 | -.254 | -.288 | -.347 | -.317 | -.288 | -.236 | -.199 | -.104 |
| | .850 | -.125 | -.180 | -.242 | -.297 | -.349 | -.376 | -.354 | -.341 | -.272 | -.158 | -.144 |
| | [a].925 | -.147 | -.184 | -.218 | -.272 | -.313 | -.320 | -.305 | -.171 | -.242 | -.142 | -.153 |
| | .975 | -.157 | -.165 | -.177 | -.175 | -.179 | -.214 | -.171 | -.181 | -.164 | -.162 | -.156 |
| | [a]1.000 | -.103 | -.102 | -.101 | -.091 | -.060 | -.100 | -.015 | -.070 | -.051 | -.051 | -.010 |

[a]Paired value.

TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) - Continued

(f) N = 1140 rpm; $\beta_{0.75R} = 44.39°$.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.458 | 1.682 | 1.861 | 1.982 | 2.083 | 2.232 | 2.356 | 2.526 | 2.417 | 2.265 | 2.172 | 2.040 | 1.895 | 1.772 | 1.577 |
| | $M_x$ | .492 | .515 | .540 | .548 | .558 | .574 | .594 | .610 | .594 | .583 | .567 | .557 | .540 | .527 | .512 |
| | $\alpha_x'$ | 12.45 | 8.77 | 6.04 | 4.31 | 2.93 | .96 | -.57 | -2.58 | -1.31 | .55 | 1.73 | 3.50 | 5.55 | 7.38 | 10.47 |
| | $\Delta\beta$ | .22 | .21 | .20 | .19 | .19 | .17 | .16 | .14 | .15 | .17 | .18 | .19 | .20 | .21 | .22 |
| | $\alpha_l$ | 3.01 | 2.44 | 1.99 | 1.70 | 1.45 | 1.02 | .63 | .18 | .48 | .90 | 1.20 | 1.51 | 1.93 | 2.25 | 2.67 |
| | $c_n$ | 1.0075 | .8247 | .6775 | .5799 | .4956 | .3477 | .2169 | .0631 | .1646 | .3098 | .4107 | .5167 | .6528 | .7603 | .8960 |
| | $c_m$ | -.0855 | -.0298 | -.0432 | -.0457 | -.0502 | -.0574 | -.0606 | -.0587 | -.0548 | -.0635 | -.0655 | -.0588 | -.0464 | -.0355 | -.0410 |
| | $c_c$ | -.0166 | -.0287 | -.0179 | -.0143 | -.0130 | -.0042 | -.0129 | .0121 | .0114 | .0092 | .0039 | -.0035 | -.0245 | -.0331 | -.0342 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.062 | 1.067 | 1.075 | 1.077 | 1.080 | 1.085 | 1.091 | 1.096 | 1.091 | 1.087 | 1.082 | 1.079 | 1.075 | 1.071 | 1.067 |
| | .025 | -1.262 | -1.315 | -1.180 | -1.113 | -1.028 | [a]-.362 | [a]-.133 | .259 | .123 | -.046 | -.382 | -.566 | -1.168 | -1.353 | -1.416 |
| | .050 | -1.424 | -1.460 | -1.324 | -1.249 | -1.158 | -.365 | -.115 | .149 | -.006 | -.271 | -.482 | -.721 | -1.064 | -1.417 | -1.528 |
| | .100 | [a]-1.478 | -1.560 | -1.012 | -.744 | -.568 | -.376 | -.202 | -.001 | -.132 | -.320 | -.470 | -.636 | -.861 | -1.465 | -1.569 |
| | [a].200 | -1.257 | -1.159 | -.768 | -.607 | -.474 | -.370 | -.293 | -.181 | -.246 | -.371 | -.461 | -.569 | -.699 | -.920 | -1.194 |
| | .300 | -.986 | -.780 | -.632 | [a]-.443 | [a]-.453 | -.359 | -.320 | -.223 | -.288 | -.373 | -.452 | -.523 | -.614 | -.701 | -.875 |
| | .400 | -.863 | -.575 | -.525 | -.500 | -.443 | -.387 | -.324 | -.250 | -.301 | -.365 | -.428 | -.474 | -.539 | -.612 | -.699 |
| | .500 | -.772 | -.492 | -.488 | -.471 | -.428 | -.385 | -.343 | -.287 | -.325 | -.371 | -.420 | -.453 | -.495 | -.548 | -.561 |
| | .600 | -.653 | -.405 | -.439 | -.438 | -.409 | -.383 | -.358 | -.317 | -.349 | -.380 | -.413 | -.431 | -.453 | -.489 | -.448 |
| | [a].700 | -.544 | -.302 | -.349 | -.275 | -.374 | -.371 | -.347 | -.289 | -.342 | -.373 | -.400 | -.397 | -.363 | -.402 | -.348 |
| | .800 | [a]-.452 | [a]-.225 | [a]-.222 | [a]-.262 | [a]-.281 | -.343 | -.290 | -.225 | -.275 | -.336 | -.376 | [a]-.328 | [a]-.248 | [a]-.292 | [a]-.265 |
| | .900 | -.370 | -.129 | -.090 | -.090 | -.093 | -.113 | -.126 | -.144 | -.132 | -.112 | -.114 | -.101 | -.098 | -.160 | -.189 |
| | .950 | -.321 | -.069 | .007 | .024 | .032 | .015 | .003 | -.025 | .024 | .012 | .015 | -.020 | .010 | -.073 | -.143 |
| Lower surface | .0375 | .831 | .773 | .650 | .533 | .404 | .197 | -.035 | -.262 | -.144 | .148 | .294 | .458 | .614 | .640 | .791 |
| | .075 | .584 | .613 | .571 | .467 | .337 | .118 | [a]-.037 | -.244 | -.196 | -.114 | .159 | .290 | .440 | .476 | .627 |
| | .150 | .506 | .439 | .336 | .246 | .174 | .049 | -.062 | -.209 | -.119 | .020 | .099 | [a].210 | .310 | .325 | .463 |
| | .250 | .374 | .322 | .239 | .168 | .109 | .017 | -.062 | -.164 | -.101 | .003 | .053 | .129 | .216 | .215 | .343 |
| | .350 | .285 | .243 | .179 | .116 | .074 | .005 | -.062 | -.141 | -.095 | -.013 | .027 | .088 | .160 | .149 | .259 |
| | .450 | .201 | .172 | .127 | .073 | .040 | -.022 | -.077 | -.134 | -.099 | -.032 | 0 | .049 | .109 | .089 | .183 |
| | .550 | .132 | .122 | .089 | .043 | .020 | -.030 | -.073 | -.116 | -.095 | -.036 | -.016 | .029 | .074 | .046 | .127 |
| | .650 | .062 | .069 | .054 | .019 | 0 | -.038 | -.067 | -.098 | -.084 | -.042 | -.030 | .008 | .041 | .003 | .077 |
| | .750 | .018 | .033 | .036 | .030 | .022 | -.007 | -.024 | [a]-.058 | [a]-.059 | -.009 | -.004 | .018 | .048 | -.004 | .050 |
| | .850 | -.049 | .026 | .049 | .034 | .036 | .021 | .018 | .016 | -.013 | [a]-.023 | [a]-.020 | [a].035 | [a].040 | [a]-.020 | [a]-.008 |
| | .925 | -.106 | .009 | .038 | .057 | .068 | .066 | .073 | .084 | .073 | .069 | .061 | .058 | .061 | -.018 | -.026 |
| | .975 | -.073 | .074 | .144 | .139 | .160 | .170 | [a].130 | [a].139 | [a].146 | [a].139 | [a].146 | [a].120 | [a].142 | [a].043 | [a].010 |
| | [a]1.000 | .021 | .127 | .123 | .273 | .302 | .221 | .205 | .215 | .235 | .226 | .236 | .252 | .263 | .132 | .133 |

[a]Faired value.

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TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) - Continued

(g) N = 1350 rpm; $\beta_{0.75R}$ = 44.39°.

| | J | 1.524 | 1.648 | 1.777 | 1.859 | 1.952 | 2.060 | 2.172 | 2.280 | 2.399 | 2.500 | 2.452 | 2.350 | 2.231 | 2.130 | 2.017 | 1.876 | 1.814 | 1.696 | 1.572 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_{R'}$ | .603 | .616 | .628 | .642 | .654 | .666 | .683 | .698 | .716 | .733 | .722 | .706 | .689 | .675 | .657 | .640 | .637 | .620 | .602 |
| | $\alpha_{R'}$ | 11.34 | 9.32 | 7.60 | 6.08 | 4.74 | 3.23 | 1.73 | .35 | -1.09 | -2.29 | -1.72 | -.52 | .99 | 2.29 | 3.82 | 5.84 | 6.74 | 8.56 | 10.55 |
| | $\Delta\beta$ | .30 | .30 | .29 | .28 | .27 | .26 | .25 | .23 | .21 | .19 | .20 | .22 | .24 | .25 | .27 | .27 | .28 | .29 | .30 |
| | $\alpha_i$ | 2.76 | 2.48 | 2.32 | 2.15 | 1.95 | 1.68 | 1.31 | .89 | .49 | .22 | .33 | .60 | .98 | 1.39 | 1.76 | 2.13 | 2.24 | 2.42 | 2.84 |
| | $c_a$ | .9232 | .8312 | .7846 | .7270 | .6647 | .5724 | .4459 | .3050 | .1680 | .0763 | .1137 | .2060 | .3348 | .4745 | .6030 | .7210 | .7590 | .8193 | .9588 |
| | $c_m$ | -.0400 | -.0546 | -.0484 | -.0525 | -.0446 | -.0492 | -.0350 | -.0686 | -.0711 | -.0687 | -.0700 | -.0688 | -.0645 | -.0550 | -.0477 | -.0459 | -.0482 | -.0372 | -.0590 |
| | $c_n$ | .0008 | -.0085 | -.0139 | -.0128 | -.0348 | -.0181 | -.0061 | .0047 | .0111 | .0164 | .0139 | .0135 | -.0006 | -.0072 | -.0162 | -.0354 | -.0198 | -.0217 | -.0204 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.093 | 1.098 | 1.102 | 1.107 | 1.112 | 1.116 | 1.122 | 1.128 | 1.135 | 1.142 | 1.138 | 1.132 | 7.125 | 1.120 | 1.112 | 1.106 | 1.105 | 1.099 | 1.093 |
| | [a].025 | -.090 | -.128 | -.457 | -.395 | -1.449 | -1.240 | -.749 | -.136 | .230 | .370 | .405 | .476 | -.110 | -.790 | -1.221 | -1.406 | -.913 | -1.018 | -1.153 |
| | .050 | -1.105 | -1.205 | -1.332 | -1.270 | -1.211 | -1.141 | [a]-.684 | [a]-.222 | .012 | [a].169 | [a].095 | [a].005 | [a]-.261 | [a]-.755 | [a]-1.157 | -1.273 | -1.302 | -1.395 | -1.485 |
| | .100 | -1.286 | -1.423 | -1.487 | -1.496 | -.788 | -.686 | -.496 | -.311 | -.134 | .002 | -.070 | -.208 | -.367 | -.549 | -.743 | -.934 | -1.374 | -1.503 | -1.594 |
| | [a].200 | -1.191 | -1.193 | -.964 | -.839 | -.699 | -.605 | -.500 | -.393 | -.282 | -.172 | -.221 | -.320 | -.427 | -.522 | -.655 | -.769 | -.867 | -1.201 | -1.288 |
| | .300 | -1.031 | -.935 | -.746 | -.668 | -.640 | -.577 | -.496 | -.412 | -.323 | -.253 | -.290 | -.360 | -.443 | -.524 | -.604 | -.668 | -.687 | -.843 | -1.010 |
| | .400 | -.867 | -.788 | -.612 | -.585 | -.562 | -.519 | -.462 | -.406 | -.338 | -.286 | -.313 | -.369 | -.428 | -.484 | -.536 | -.586 | -.585 | -.643 | -.828 |
| | .500 | -.710 | -.558 | -.514 | -.527 | -.516 | -.489 | -.452 | -.412 | -.368 | -.332 | -.350 | -.386 | -.431 | -.469 | -.501 | -.532 | -.524 | -.509 | -.663 |
| | .600 | -.580 | -.437 | -.431 | -.474 | -.474 | -.462 | -.441 | -.421 | -.395 | -.376 | -.385 | -.410 | -.436 | -.458 | -.468 | -.484 | -.470 | -.406 | -.525 |
| | .700 | -.469 | -.333 | -.334 | -.388 | -.397 | -.398 | -.391 | -.386 | -.375 | -.367 | -.371 | -.382 | -.395 | -.403 | -.398 | -.401 | -.381 | -.309 | -.410 |
| | .800 | -.387 | -.257 | -.222 | -.269 | -.274 | -.287 | -.292 | -.299 | -.303 | -.309 | -.305 | -.305 | -.307 | -.301 | -.282 | -.275 | -.256 | -.218 | -.389 |
| | .900 | -.316 | -.189 | -.080 | -.065 | -.065 | -.071 | -.081 | -.093 | -.108 | -.113 | -.108 | -.103 | -.098 | -.089 | -.071 | -.074 | -.061 | -.131 | -.260 |
| | .950 | -.275 | -.153 | -.016 | .037 | .040 | .047 | .047 | .040 | .033 | .024 | .028 | .034 | .034 | .037 | .040 | .030 | .038 | -.089 | -.223 | |
| Lower surface | .0375 | .826 | .792 | .753 | .660 | .558 | .422 | .240 | .025 | -.295 | -.834 | -.486 | -.143 | .078 | .291 | .485 | .633 | .701 | .768 | .809 |
| | .075 | .665 | .624 | .592 | .506 | .415 | .307 | .173 | .016 | -.148 | -.307 | -.228 | -.082 | .055 | .207 | .355 | .478 | .541 | .601 | .641 |
| | .150 | .500 | .463 | .436 | .362 | .287 | .206 | .110 | .004 | -.115 | -.227 | -.166 | -.062 | .028 | .131 | .241 | .338 | .390 | .439 | .476 |
| | .250 | .366 | .335 | .318 | .257 | .194 | .130 | .056 | -.022 | -.109 | -.191 | -.147 | -.071 | -.006 | .070 | .158 | .236 | .281 | .318 | .347 |
| | .350 | .276 | .256 | .248 | .201 | .141 | .089 | .028 | -.034 | -.105 | -.166 | -.135 | -.075 | -.023 | .039 | .110 | .174 | .215 | .240 | .262 |
| | .450 | .195 | .181 | .179 | .137 | .091 | .048 | .001 | -.050 | -.105 | -.152 | -.128 | -.082 | -.041 | .008 | .068 | .119 | .155 | .173 | .184 |
| | .550 | .128 | .121 | .130 | .096 | .059 | .024 | -.014 | -.055 | -.098 | -.132 | -.116 | -.079 | -.047 | -.008 | .040 | .083 | .113 | .119 | .122 |
| | .650 | .060 | .064 | .084 | .062 | .027 | .004 | -.027 | -.056 | -.088 | -.113 | -.099 | -.075 | -.054 | -.023 | .015 | .048 | .075 | .066 | .059 |
| | .750 | .022 | .039 | .074 | .063 | .038 | .021 | .004 | -.016 | -.037 | -.051 | -.044 | -.030 | -.018 | .001 | .027 | .051 | .074 | .050 | .028 |
| | .850 | -.039 | -.006 | .054 | .057 | .040 | .034 | .025 | .019 | .013 | .009 | .010 | .014 | .015 | .022 | .034 | .048 | .063 | .014 | -.028 |
| | .925 | -.091 | -.039 | .050 | .067 | .060 | .066 | .068 | .072 | .078 | .080 | .078 | .075 | .064 | .060 | .060 | .061 | .072 | -.005 | -.070 |
| | .975 | -.078 | .005 | .088 | .125 | .128 | .149 | .160 | .174 | .186 | .199 | .189 | .179 | .165 | .151 | .137 | .124 | .125 | .050 | -.041 |
| | [a]1.000 | .010 | .180 | .132 | .223 | .212 | .255 | .277 | .271 | .281 | .330 | .290 | .301 | .261 | .263 | .253 | .243 | .233 | .199 | .046 |

[a]Paired value.

TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) - Continued

(h) N = 1600 rpm; $\beta_{0.75R} = 44.39^\circ$.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.969 | 2.067 | 2.148 | 2.242 | 2.350 | 2.441 | 2.414 | 2.311 | 2.186 | 2.096 | 1.992 |
| | $M_R$ | .784 | .797 | .810 | .830 | .846 | .872 | .855 | .838 | .813 | .796 | .784 |
| | $\alpha_R$, | 4.48 | 3.14 | 2.05 | .84 | -.52 | -1.58 | -1.28 | -.02 | 1.56 | 2.74 | 4.18 |
| | $\Delta\beta$ | .41 | .38 | .36 | .33 | .31 | .27 | .28 | .31 | .35 | .37 | .40 |
| | $\alpha_i$ | 2.33 | 1.90 | 1.55 | 1.06 | .59 | -.02 | .24 | .77 | 1.39 | 1.78 | 2.20 |
| | $c_p$ | .7953 | .6517 | .5294 | .3644 | .2034 | -.0055 | .0828 | .2656 | .4744 | .6075 | .7535 |
| | $c_m$ | -.0607 | -.0586 | -.0673 | -.0764 | -.0778 | -.0848 | -.0847 | -.0789 | -.0695 | -.0615 | -.0587 |
| | $c_c$ | -.0359 | -.0284 | -.0142 | -.0017 | .0025 | .0075 | .0075 | .0042 | -.0073 | -.0198 | -.0283 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.163 | 1.169 | 1.175 | 1.184 | 1.191 | 1.204 | 1.196 | 1.187 | 1.176 | 1.169 | 1.163 |
| | .025 | -.961 | -.880 | -.437 | -.091 | .167 | .367 | .362 | .082 | -.270 | -.631 | -.880 |
| | .050 | -1.043 | -.758 | -.443 | -.164 | .050 | .231 | .163 | -.029 | -.313 | -.646 | -.962 |
| | .100 | -.967 | -.645 | -.469 | -.276 | -.104 | .054 | -.010 | -.173 | -.391 | -.564 | -.901 |
| | [a].200 | -.991 | -.721 | -.602 | -.443 | -.305 | -.168 | -.235 | -.366 | -.536 | -.678 | -.901 |
| | .300 | -1.034 | -.847 | -.715 | -.537 | -.410 | -.271 | -.330 | -.458 | -.638 | -.792 | -.950 |
| | .400 | -1.028 | -.876 | -.734 | -.576 | -.445 | -.322 | -.369 | -.492 | -.670 | -.818 | -.961 |
| | .500 | -.943 | -.871 | -.764 | -.614 | -.503 | -.411 | -.450 | -.542 | -.684 | -.828 | -.882 |
| | .600 | -.416 | -.521 | -.775 | -.684 | -.601 | -.505 | -.552 | -.630 | -.754 | -.538 | -.424 |
| | .700 | -.347 | -.348 | -.364 | -.665 | -.679 | -.611 | -.649 | -.708 | -.399 | -.370 | -.359 |
| | .800 | -.228 | -.227 | -.233 | -.219 | -.264 | -.366 | -.340 | -.230 | -.236 | -.241 | -.243 |
| | .900 | -.029 | -.018 | -.022 | -.015 | -.014 | .045 | -.032 | -.018 | -.021 | -.023 | -.028 |
| | .950 | .081 | .081 | .075 | .080 | .074 | .018 | .042 | .079 | .078 | .079 | .081 |
| Lower surface | .0375 | .507 | .386 | .242 | .011 | -.341 | -.805 | -.716 | -.159 | .158 | .345 | .480 |
| | .075 | .389 | .290 | .178 | .020 | -.135 | -.699 | -.485 | -.084 | .119 | .256 | .364 |
| | .150 | .278 | .200 | .117 | .005 | -.121 | -.480 | -.174 | -.069 | .073 | .174 | .257 |
| | .250 | .188 | .125 | .056 | -.030 | -.133 | -.225 | -.198 | -.078 | .031 | .111 | .179 |
| | .350 | .138 | .082 | .022 | -.053 | -.138 | -.225 | -.196 | -.103 | .004 | .065 | .124 |
| | .450 | .090 | .040 | -.013 | -.076 | -.148 | -.227 | -.193 | -.117 | -.034 | .025 | .080 |
| | .550 | .055 | .013 | -.034 | -.090 | -.152 | -.210 | -.188 | -.122 | -.048 | 0 | .049 |
| | .650 | .024 | .012 | -.053 | -.098 | -.147 | -.191 | -.175 | -.123 | -.067 | .022 | .019 |
| | .750 | .043 | .013 | -.019 | -.050 | -.083 | -.111 | -.103 | -.069 | -.028 | .005 | .037 |
| | [a].850 | .061 | .042 | .020 | .004 | .006 | -.039 | -.020 | -.005 | .020 | .040 | .059 |
| | .925 | .091 | .074 | .057 | .052 | .045 | .020 | .033 | .051 | .060 | .071 | .088 |
| | [a].975 | .192 | .155 | .122 | .121 | -.108 | .080 | .096 | .114 | .173 | .151 | .188 |
| | [a]1.000 | .475 | .379 | .272 | .302 | .221 | .170 | .200 | .226 | .352 | .302 | .374 |

[a]Faired value.

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TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) - Continued

(i) $M = 0.56$; $\beta_{0.75R} = 44.39^\circ$.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.026 | 2.060 | 2.093 | 2.155 | 2.182 | 2.239 | 2.286 | 2.357 | 2.382 | 2.432 | 2.507 |
| | $M_x$ | .897 | .885 | .877 | .857 | .851 | .839 | .823 | .820 | .808 | .800 | .784 |
| | $\alpha_{x'}$ | 3.70 | 3.23 | 2.78 | 1.96 | 1.61 | .87 | .28 | -.59 | -.89 | -1.49 | -2.36 |
| | $\Delta\beta$ | .45 | .44 | .42 | .40 | .38 | .36 | .33 | .30 | .29 | .26 | .22 |
| | $\alpha_i$ | 1.58 | 1.56 | 1.49 | 1.39 | 1.28 | 1.13 | .95 | .65 | .53 | .35 | .08 |
| | $c_n$ | .5414 | .5317 | .5109 | .4730 | .4386 | .3875 | .3254 | .2245 | .1824 | .1190 | .0285 |
| | $c_m$ | -.0748 | -.0772 | -.0765 | -.0762 | -.0753 | -.0818 | -.0771 | -.0776 | -.0799 | -.0828 | -.0840 |
| | $c_c$ | .0126 | .0124 | .0120 | .0084 | .0083 | .0026 | .0033 | .0014 | .0033 | .0018 | .0015 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.217 | 1.211 | 1.208 | 1.197 | 1.194 | 1.189 | 1.180 | 1.179 | 1.174 | 1.170 | 1.164 |
| | .025 | -.352 | -.360 | -.330 | -.277 | -.203 | -.122 | -.043 | .107 | .179 | .244 | .328 |
| | .050 | -.421 | -.407 | -.365 | -.301 | -.242 | -.179 | -.115 | .009 | .065 | .119 | .200 |
| | .100 | -.399 | -.387 | -.360 | -.346 | -.320 | -.286 | -.247 | -.145 | -.098 | -.055 | .015 |
| | [a].200 | -.510 | -.500 | -.500 | -.485 | -.471 | -.450 | -.425 | -.332 | -.298 | -.250 | -.189 |
| | .300 | -.631 | -.646 | -.642 | -.627 | -.597 | -.559 | -.524 | -.429 | -.386 | -.345 | -.286 |
| | .400 | -.678 | -.695 | -.689 | -.677 | -.643 | -.605 | -.550 | -.458 | -.424 | -.387 | -.334 |
| | .500 | -.722 | -.740 | -.747 | -.730 | -.682 | -.635 | -.598 | -.523 | -.490 | -.454 | -.397 |
| | .600 | -.794 | -.821 | -.815 | -.793 | -.772 | -.741 | -.678 | -.597 | -.562 | -.516 | -.452 |
| | .700 | -.444 | -.470 | -.529 | -.659 | -.730 | -.759 | -.631 | -.506 | -.454 | -.447 | -.430 |
| | .800 | -.296 | -.296 | -.281 | -.253 | -.217 | -.208 | -.249 | -.285 | -.296 | -.317 | -.329 |
| | .900 | -.271 | -.270 | -.245 | -.174 | -.104 | -.038 | -.037 | -.054 | -.057 | -.082 | -.107 |
| | .950 | -.228 | -.256 | -.234 | -.169 | -.084 | -.005 | .039 | .062 | .068 | .047 | .023 |
| Lower surface | .0375 | .363 | .326 | .282 | .196 | .138 | .037 | -.063 | -.267 | -.405 | -.657 | -.988 |
| | .075 | .293 | .263 | .227 | .159 | .117 | .045 | -.025 | -.131 | -.170 | -.211 | -.515 |
| | .150 | .208 | .181 | .151 | .099 | .066 | .012 | -.038 | -.108 | -.133 | -.184 | -.232 |
| | .250 | .139 | .114 | .089 | .047 | .021 | -.018 | -.056 | -.103 | -.122 | -.163 | -.206 |
| | .350 | .071 | .048 | .026 | -.008 | -.027 | -.057 | -.084 | -.115 | -.127 | -.158 | -.196 |
| | .450 | .017 | -.005 | -.024 | -.050 | -.063 | -.083 | -.101 | -.122 | -.127 | -.150 | -.177 |
| | .550 | -.033 | -.051 | -.069 | -.084 | -.090 | -.099 | -.108 | -.119 | -.121 | -.137 | -.156 |
| | .650 | -.087 | -.105 | -.116 | -.118 | -.114 | -.111 | -.111 | -.110 | -.108 | -.120 | -.136 |
| | .750 | -.072 | -.104 | -.117 | -.118 | -.103 | -.094 | -.083 | -.063 | -.057 | -.066 | -.083 |
| | .850 | -.113 | -.129 | -.128 | -.101 | -.074 | -.049 | -.034 | -.015 | -.008 | -.020 | -.029 |
| | .925 | -.130 | -.135 | -.122 | -.062 | -.023 | .022 | .047 | .071 | .086 | .078 | .078 |
| | .975 | [a]-.097 | [a]-.095 | [a]-.071 | [a]-.025 | [a].051 | [a].120 | [a].158 | [a].191 | .219 | .210 | .212 |
| | [a]1.000 | .020 | .005 | .017 | .060 | .150 | .290 | .290 | .405 | .335 | .340 | .380 |

[a]Faired value.

TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) - Continued

(j) M = 0.60; $\beta_{0.75R}$ = 44.39°.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.033 | 2.066 | 2.092 | 2.130 | 2.155 | 2.180 | 2.226 | 2.285 | 2.313 | 2.354 | 2.386 | 2.429 |
| | $M_x$ | .955 | .946 | .938 | .936 | .926 | .920 | .909 | .893 | .883 | .882 | .876 | .868 |
| | $a_x$ | 3.60 | 3.15 | 2.80 | 2.29 | 1.97 | 1.63 | 1.04 | .29 | -.05 | -.55 | -.94 | -1.56 |
| | $\Delta\beta$ | .48 | .47 | .45 | .43 | .42 | .41 | .38 | .35 | .34 | .32 | .30 | .28 |
| | $\alpha_i$ | 1.53 | 1.44 | 1.35 | 1.19 | 1.13 | 1.07 | .91 | .76 | .70 | .55 | .49 | .38 |
| | $c_n$ | .5238 | .4919 | .4620 | .4041 | .3853 | .3645 | .3114 | .2607 | .2423 | .1895 | .1683 | .1302 |
| | $c_m$ | -.1142 | -.1078 | -.1006 | -.0853 | -.0871 | -.0820 | -.0745 | -.0733 | -.0758 | -.0702 | -.0789 | -.0744 |
| | $c_c$ | .0312 | .0326 | .0334 | .0382 | .0323 | .0292 | .0364 | .0310 | .0332 | .0349 | .0292 | .0219 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | |
| Upper surface | 0.000 | 1.249 | 1.244 | 1.239 | 1.238 | 1.232 | 1.230 | 1.223 | 1.215 | 1.210 | 1.210 | 1.207 | 1.203 |
| | [a].025 | -.110 | -.015 | -.048 | .310 | .085 | .148 | .550 | .579 | .663 | .600 | .700 | .675 |
| | .050 | -.203 | -.160 | -.147 | -.084 | -.061 | -.040 | .030 | .088 | .107 | .156 | .184 | .221 |
| | .100 | [a]-.298 | -.284 | -.185 | -.280 | -.205 | -.213 | -.232 | -.257 | -.246 | -.169 | -.144 | -.110 |
| | [a].200 | -.414 | [a]-.420 | -.292 | [a]-.381 | -.373 | -.357 | -.342 | -.323 | -.315 | -.277 | -.258 | -.230 |
| | .300 | -.490 | -.479 | -.479 | -.451 | -.443 | -.438 | -.403 | -.371 | -.364 | -.337 | -.317 | -.284 |
| | .400 | -.539 | -.521 | -.537 | -.514 | -.502 | -.496 | -.461 | -.429 | -.422 | -.382 | -.364 | -.336 |
| | .500 | -.589 | -.590 | -.599 | -.585 | -.571 | -.554 | -.516 | -.492 | -.479 | -.448 | -.442 | -.427 |
| | .600 | -.668 | -.670 | -.673 | -.629 | -.622 | -.624 | -.621 | -.588 | -.572 | -.549 | -.526 | -.510 |
| | .700 | -.741 | -.724 | -.729 | -.729 | -.734 | -.735 | -.687 | -.677 | -.664 | -.638 | -.632 | -.626 |
| | [a].800 | -.763 | -.738 | -.729 | -.758 | -.778 | -.720 | -.658 | -.709 | -.720 | -.713 | -.686 | -.655 |
| | .900 | -.381 | -.378 | -.362 | -.329 | -.280 | -.288 | -.184 | -.133 | -.109 | -.088 | -.059 | -.024 |
| | .950 | [a]-.356 | -.359 | -.348 | -.315 | -.270 | -.238 | -.171 | -.110 | -.075 | -.038 | -.002 | .049 |
| Lower surface | .0375 | .313 | .274 | .233 | .155 | .095 | [a].313 | [a].520 | [a].365 | [a].368 | [a].083 | -.008 | [a]-.093 |
| | .075 | .263 | .233 | .198 | .154 | .109 | .087 | .054 | .009 | -.020 | [a]-.118 | -.158 | [a].125 |
| | .150 | .197 | .171 | .141 | .095 | .058 | .036 | -.029 | -.096 | -.131 | -.158 | -.185 | [a].165 |
| | .250 | .131 | .113 | .086 | .047 | .016 | 0 | -.046 | -.108 | -.139 | -.177 | -.190 | -.200 |
| | .350 | .066 | .050 | .024 | -.011 | -.037 | -.051 | -.088 | -.138 | -.161 | -.193 | -.204 | -.217 |
| | .450 | .008 | -.009 | -.031 | -.063 | -.086 | -.098 | -.131 | -.165 | -.181 | -.203 | -.208 | -.213 |
| | .550 | -.041 | -.057 | -.078 | -.106 | -.128 | -.137 | -.163 | -.190 | -.200 | -.211 | -.205 | -.199 |
| | .650 | [a]-.088 | -.101 | -.143 | -.185 | [a]-.172 | [a]-.174 | [a]-.187 | [a]-.225 | [a]-.196 | -.218 | -.198 | [a]-.142 |
| | .750 | -.126 | -.146 | -.165 | -.198 | -.204 | -.201 | -.193 | -.179 | -.162 | -.149 | -.126 | -.106 |
| | .850 | -.171 | -.186 | -.204 | -.224 | -.222 | -.211 | -.175 | -.132 | -.112 | -.088 | -.065 | -.041 |
| | .925 | -.154 | -.171 | -.185 | -.198 | -.188 | -.175 | -.135 | -.085 | -.059 | -.030 | -.001 | .031 |
| | [a].975 | -.126 | -.118 | -.144 | -.093 | -.151 | -.132 | -.080 | -.021 | .006 | -.046 | .106 | .132 |
| | a1.000 | -.085 | -.068 | -.100 | .010 | -.103 | -.040 | 0 | .048 | .075 | .085 | .223 | .260 |

[a]Faired value

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TABLE 7.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.95)(06.95) PROPELLER BLADE SECTION (x = 0.80) - Concluded

(k) M = 0.65; $\beta_{0.75R}$ = 44.39°.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.037 | 2.052 | 2.095 | 2.129 | 2.167 | 2.194 | 2.226 | 2.245 | 2.305 | 2.337 | 2.362 |
| | $M_R$ | 1.093 | 1.088 | 1.067 | 1.056 | 1.046 | 1.036 | 1.023 | 1.018 | 1.001 | .994 | .984 |
| | $\alpha_R'$ | 3.55 | 3.34 | 2.76 | 2.29 | 1.81 | 1.46 | 1.04 | .81 | .04 | -.36 | -.65 |
| | $\Delta\beta$ | .56 | .55 | .53 | .51 | .48 | .47 | .45 | .43 | .40 | .38 | .36 |
| | $\alpha_i$ | 1.11 | 1.11 | 1.05 | 1.00 | .84 | .76 | .64 | .55 | .33 | .20 | .05 |
| | $c_n$ | .3800 | .3787 | .3582 | .3428 | .2848 | .2590 | .2171 | .1894 | .1153 | .0670 | .0161 |
| | $c_m$ | -.1036 | -.1138 | -.1192 | -.1188 | -.1170 | -.1147 | -.1108 | -.1084 | -.1030 | -.0964 | -.0874 |
| | $c_c$ | .0437 | .0442 | .0457 | .0476 | .0432 | .0432 | .0435 | .0433 | .0444 | .0449 | .0425 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.334 | 1.331 | 1.318 | 1.310 | 1.304 | 1.298 | 1.288 | 1.284 | 1.275 | 1.272 | 1.265 |
| | .025 | .229 | .167 | .152 | .179 | .232 | .252 | .289 | .314 | .343 | .371 | .386 |
| | .050 | .056 | .057 | .070 | .099 | .144 | .159 | .189 | .209 | .231 | .254 | .265 |
| | .100 | .003 | .003 | .001 | .011 | .035 | .041 | .058 | .070 | .081 | .099 | .106 |
| | [a].200 | -.169 | -.145 | -.160 | -.149 | -.138 | -.131 | -.129 | -.141 | -.121 | -.108 | -.125 |
| | .300 | -.268 | -.274 | -.284 | -.276 | -.251 | -.247 | -.235 | -.229 | -.223 | -.208 | -.209 |
| | .400 | -.318 | -.328 | -.341 | -.340 | -.313 | -.307 | -.294 | -.285 | -.284 | -.270 | -.270 |
| | .500 | -.371 | -.383 | -.397 | -.393 | -.376 | -.376 | -.358 | -.346 | -.343 | -.333 | -.335 |
| | .600 | -.434 | -.449 | -.476 | -.475 | -.440 | -.431 | -.422 | -.421 | -.439 | -.438 | -.443 |
| | .700 | -.503 | -.519 | -.545 | -.537 | -.519 | -.527 | -.529 | -.529 | -.527 | -.513 | -.516 |
| | .800 | -.599 | -.618 | -.635 | -.644 | -.642 | -.650 | -.642 | -.637 | -.652 | -.650 | -.655 |
| | .900 | -.667 | -.695 | -.731 | -.741 | -.732 | -.741 | -.744 | -.741 | -.756 | -.754 | -.764 |
| | .950 | -.439 | -.585 | -.715 | -.751 | -.770 | -.789 | -.797 | -.800 | -.824 | -.819 | -.773 |
| Lower surface | .0375 | .301 | .284 | .217 | .154 | .069 | .013 | -.110 | -.184 | -.313 | -.372 | -.434 |
| | .075 | .272 | .264 | .207 | .161 | .105 | .074 | .004 | -.063 | -.217 | -.288 | -.353 |
| | .150 | .219 | .206 | .157 | .121 | .081 | .055 | .019 | -.007 | -.132 | -.200 | -.266 |
| | .250 | .155 | .145 | .098 | .067 | .033 | .011 | -.025 | -.045 | -.130 | -.171 | -.231 |
| | .350 | .094 | .086 | .041 | .013 | -.017 | -.038 | -.074 | -.096 | -.183 | -.231 | -.287 |
| | .450 | .048 | .038 | -.004 | -.028 | -.051 | -.071 | -.103 | -.123 | -.181 | -.225 | -.287 |
| | .550 | .003 | -.003 | -.043 | -.065 | -.084 | -.105 | -.136 | -.159 | -.203 | -.225 | -.276 |
| | .650 | -.064 | -.070 | -.107 | -.128 | -.143 | -.164 | -.192 | -.211 | -.267 | -.284 | -.313 |
| | .750 | -.071 | -.089 | -.133 | -.145 | -.173 | -.192 | -.215 | -.223 | -.278 | -.299 | -.327 |
| | .850 | -.156 | -.161 | -.198 | -.216 | -.226 | -.245 | -.270 | -.284 | -.331 | -.348 | -.373 |
| | .925 | -.164 | -.171 | -.207 | -.221 | -.231 | -.252 | -.275 | -.290 | -.337 | -.355 | -.379 |
| | [a].975 | -.158 | -.162 | -.183 | -.200 | -.203 | -.230 | -.245 | -.259 | -.303 | -.335 | -.355 |
| | [a]1.000 | 0 | -.050 | -.135 | -.145 | -.135 | -.170 | -.180 | -.180 | -.235 | -.270 | -.285 |

[a]Faired value.

TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85)

(a) N = 1140 rpm; $\beta_{0.75R} = 29.66°$.

| | J | 0.652 | 0.810 | 0.845 | 0.980 | 1.070 | 1.151 | 1.280 | 1.369 | 1.486 | 1.432 | 1.333 | 1.218 | 1.119 | 1.029 | 0.933 | 0.840 | 0.760 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .479 | .470 | .471 | .482 | .490 | .509 | .508 | .528 | .528 | .520 | .513 | .509 | .496 | .493 | .484 | .454 | .474 |
| | $\alpha_x'$ | 12.42 | 9.27 | 8.58 | 5.99 | 4.31 | 2.82 | .53 | -1.00 | -2.96 | -2.06 | -.39 | 1.62 | 3.40 | 5.07 | 6.88 | 8.68 | 10.25 |
| | $\Delta\beta$ | .24 | .24 | .24 | .23 | .22 | .21 | .19 | .18 | .17 | .18 | .19 | .20 | .21 | .22 | .23 | .24 | .24 |
| | $\alpha_1$ | 2.68 | 2.78 | 2.43 | 2.12 | 1.88 | 1.52 | 1.06 | .61 | .05 | .25 | .66 | 1.16 | 1.60 | 1.96 | 2.30 | 2.79 | 2.93 |
| | $c_n$ | .7364 | .8001 | .7003 | .6244 | .5596 | .4535 | .3210 | .1860 | .0155 | .0772 | .2006 | .3468 | .4773 | .5799 | .6721 | .8083 | .8336 |
| | $c_m$ | -.0689 | -.0376 | -.0287 | -.0424 | -.0502 | -.0439 | -.0449 | -.0510 | -.0624 | -.0642 | -.0625 | -.0593 | -.0606 | -.0549 | -.0404 | -.0379 | -.0441 |
| | $c_c$ | -.0070 | -.0250 | -.0250 | -.0215 | -.0200 | -.0147 | -.0133 | -.0139 | .0075 | .0078 | .0027 | -.0037 | -.0101 | -.0175 | -.0251 | -.0304 | -.0287 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.059 | 1.057 | 1.057 | 1.060 | 1.061 | 1.066 | 1.066 | 1.071 | 1.071 | 1.069 | 1.067 | 1.066 | 1.063 | 1.062 | 1.060 | 1.053 | 1.058 |
| | .025 | -.660 | -.878 | -.818 | -1.039 | -1.024 | -.961 | -.937 | -.876 | .343 | .331 | .110 | -.152 | -.439 | -.858 | -.969 | -1.097 | -1.022 |
| | .050 | -.995 | -1.376 | -1.296 | -1.272 | -1.267 | -1.196 | -.774 | -.245 | .002 | -.004 | -.020 | -.049 | -.375 | -.908 | -1.220 | -1.394 | -1.306 |
| | .100 | -.877 | -1.363 | -1.316 | -.919 | -.710 | -.526 | -.332 | -.152 | .011 | -.066 | -.226 | -.409 | -.599 | -.731 | -1.256 | -1.467 | -1.366 |
| | [a].200 | -.770 | -1.018 | -.855 | -.643 | -.551 | -.414 | -.276 | -.151 | -.072 | -.130 | -.292 | -.411 | -.543 | -.579 | -.711 | -1.024 | -1.077 |
| | .300 | -.718 | -.790 | -.633 | -.527 | -.496 | -.406 | -.318 | -.228 | -.158 | -.194 | -.272 | -.352 | -.456 | -.510 | -.540 | -.798 | -.884 |
| | .400 | -.652 | -.645 | -.516 | -.488 | -.467 | -.402 | -.341 | -.273 | -.226 | -.253 | -.304 | -.366 | -.446 | -.486 | -.490 | -.600 | -.706 |
| | .500 | -.569 | -.507 | -.420 | -.434 | -.423 | -.373 | -.332 | -.278 | -.249 | -.269 | -.304 | -.348 | -.414 | -.432 | -.429 | -.489 | -.543 |
| | .600 | -.484 | -.401 | -.345 | -.387 | -.391 | -.358 | -.332 | -.296 | -.280 | -.294 | -.319 | -.342 | -.389 | -.393 | -.378 | -.388 | -.405 |
| | .700 | -.416 | -.313 | -.271 | -.318 | -.330 | -.309 | -.295 | -.269 | -.267 | -.275 | -.286 | -.302 | -.341 | -.332 | -.308 | -.308 | -.316 |
| | .800 | -.344 | -.239 | -.203 | -.248 | -.273 | -.264 | -.271 | -.260 | -.269 | -.275 | -.272 | -.271 | -.292 | -.268 | -.237 | -.232 | -.240 |
| | .900 | -.285 | -.168 | -.113 | -.106 | -.116 | -.116 | -.132 | -.134 | -.152 | -.151 | -.139 | -.124 | -.136 | -.113 | -.105 | -.143 | -.174 |
| | .950 | -.247 | -.130 | -.063 | -.015 | -.004 | -.001 | -.010 | -.017 | -.041 | -.036 | -.020 | -.006 | -.016 | -.012 | -.018 | -.083 | -.127 |
| Lower surface | .0375 | .707 | .758 | .686 | .595 | .487 | .325 | .074 | -.179 | -.520 | -.362 | -.086 | .193 | .386 | .545 | .641 | .776 | .741 |
| | .075 | .556 | .585 | .523 | .439 | .341 | .227 | .046 | -.125 | -.348 | -.253 | -.059 | .132 | .267 | .396 | .479 | .602 | .584 |
| | .150 | .427 | .448 | .392 | .322 | .246 | .163 | .038 | -.080 | -.224 | -.165 | -.067 | .093 | .186 | .285 | .356 | .450 | .443 |
| | .250 | .306 | .315 | .276 | .214 | .158 | .097 | .004 | -.082 | -.188 | -.142 | -.050 | .047 | .113 | .191 | .247 | .320 | .312 |
| | .350 | .232 | .235 | .208 | .160 | .112 | .062 | -.010 | -.071 | -.152 | -.116 | -.050 | .027 | .079 | .143 | .185 | .235 | .242 |
| | .450 | .155 | .161 | .136 | .101 | .066 | .032 | -.024 | -.090 | -.145 | -.119 | -.050 | .008 | .050 | .096 | .124 | .165 | .173 |
| | .550 | .113 | .124 | .110 | .083 | .049 | .017 | -.026 | -.062 | -.113 | -.087 | -.043 | -.001 | .030 | .071 | .101 | .122 | .126 |
| | .650 | .047 | .060 | .055 | .036 | .017 | -.001 | -.046 | -.073 | -.113 | -.094 | [a]-.049 | -.013 | .006 | .037 | .053 | .067 | .063 |
| | .750 | .008 | .034 | .035 | .036 | .025 | .013 | -.019 | -.031 | -.059 | -.050 | -.032 | .004 | .010 | .039 | .041 | .038 | .032 |
| | .850 | -.041 | -.003 | .011 | .032 | .025 | .017 | -.001 | .001 | -.009 | -.004 | -.002 | .013 | .020 | .037 | .030 | .010 | -.002 |
| | .925 | [a]-.064 | [a]-.037 | [a].010 | [a].075 | [a].109 | [a].061 | [a].061 | [a].060 | [a].060 | [a].073 | [a].050 | [a].113 | .093 | .108 | .095 | [a].019 | [a].016 |
| | .975 | [a]-.055 | [a]-.005 | [a].039 | [a].176 | [a].242 | [a].138 | [a].207 | [a].159 | [a].188 | [a].198 | [a].210 | [a].242 | .255 | [a].227 | [a].209 | [a].118 | [a].094 |
| | [a]1.000 | -.015 | .082 | .253 | .270 | .340 | .266 | .445 | .332 | .330 | .310 | .494 | .356 | .326 | .312 | .303 | .216 | .198 |

[a]Paired value.

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TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85) - Continued

(b) M = 1350 rpm; $\beta_{0.75R}$ = 29.66°.

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.704 | 0.777 | 0.899 | 0.938 | 1.005 | 1.096 | 1.174 | 1.271 | 1.371 | 1.465 | 1.404 | 1.329 | 1.243 | 1.144 | 1.077 | 0.973 | 0.910 | 0.836 | 0.738 |
| | $M_x$ | .536 | .584 | .572 | .573 | .581 | .598 | .606 | .610 | .624 | .636 | .620 | .615 | .605 | .590 | .583 | .565 | .561 | .550 | .567 |
| | $\alpha_x'$ | 11.37 | 9.92 | 8.31 | 6.79 | 5.52 | 3.82 | 2.41 | .69 | -1.03 | -2.61 | -1.59 | -.34 | 1.18 | 2.95 | 4.17 | 6.12 | 7.32 | 8.76 | 10.69 |
| | $\Delta\beta$ | .33 | .34 | .33 | .33 | .32 | .30 | .29 | .27 | .25 | .23 | .25 | .26 | .28 | .29 | .30 | .32 | .33 | .34 | .34 |
| | $\alpha_1$ | 2.67 | 2.83 | 2.53 | 2.35 | 2.07 | 1.79 | 1.44 | 1.14 | .56 | .13 | .35 | .65 | 1.02 | 1.64 | 1.90 | 2.23 | 2.46 | 2.74 | 2.82 |
| | $c_n$ | .7480 | .8073 | .7320 | .6896 | .6111 | .5339 | .4289 | .3450 | .1692 | .0408 | .1058 | .1957 | .3063 | .4895 | .5633 | .6560 | .7195 | .7929 | .7980 |
| | $c_m$ | -.0688 | -.0471 | -.0225 | -.0314 | -.0451 | -.0478 | -.0478 | -.0603 | -.0586 | -.0672 | -.0631 | -.0677 | -.0612 | -.0449 | -.0550 | -.0474 | -.0375 | -.0411 | -.0472 |
| | $c_c$ | -.0021 | -.0213 | -.0276 | -.0244 | -.0180 | -.0177 | -.0160 | -.0130 | -.0028 | .0002 | .0032 | .0048 | .0083 | .0199 | .0114 | -.0219 | -.0291 | -.0305 | -.0268 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.073 | 1.082 | 1.084 | 1.084 | 1.087 | 1.092 | 1.095 | 1.096 | 1.101 | 1.105 | 1.099 | 1.098 | 1.094 | 1.090 | 1.087 | 1.088 | 1.081 | 1.077 | 1.082 |
| | .025 | -.795 | -.902 | -1.032 | -1.032 | -.980 | -.948 | -1.053 | [a]-.622 | -.211 | [a].066 | [a].108 | [a].232 | [a].289 | -.934 | [a]-.597 | -.975 | -1.018 | -1.063 | -1.016 |
| | .050 | -.913 | -1.412 | -1.573 | -1.590 | -1.534 | [a]-1.099 | -.868 | -.476 | -.215 | .003 | -.011 | -.019 | -.035 | [a]-.806 | -.738 | -1.232 | -1.320 | -1.383 | -1.224 |
| | .100 | -.961 | [a]-1.474 | -1.493 | -1.328 | -.846 | -.680 | -.641 | -.345 | -.162 | -.004 | -.108 | -.227 | -.382 | -.603 | -.746 | -1.051 | -1.328 | -1.524 | -1.181 |
| | [a].200 | -.834 | -.982 | -.921 | -.793 | -.624 | -.542 | -.551 | -.334 | -.189 | -.070 | -.191 | -.275 | -.370 | -.479 | -.639 | -.696 | -.844 | -.963 | -.973 |
| | .300 | -.740 | -.807 | -.686 | -.597 | -.551 | -.496 | -.552 | -.339 | -.251 | -.171 | -.234 | -.285 | -.364 | -.468 | -.539 | -.565 | -.627 | -.751 | -.820 |
| | .400 | -.665 | -.678 | -.553 | -.527 | -.511 | -.473 | -.559 | -.366 | -.303 | -.242 | -.294 | -.330 | -.390 | -.458 | -.512 | -.520 | -.540 | -.590 | -.683 |
| | .500 | -.576 | -.544 | -.449 | -.454 | -.458 | -.429 | -.531 | -.392 | -.304 | -.259 | -.306 | -.330 | -.375 | -.425 | -.462 | -.459 | -.462 | -.474 | -.547 |
| | .600 | -.480 | -.421 | -.362 | -.387 | -.405 | -.394 | -.514 | -.350 | -.320 | -.288 | -.326 | -.341 | -.371 | -.403 | -.427 | -.407 | -.394 | -.424 | -.419 |
| | .700 | -.402 | -.338 | -.286 | -.315 | -.340 | -.339 | -.488 | -.313 | -.294 | -.273 | -.306 | -.308 | -.334 | -.347 | -.360 | -.338 | -.311 | -.298 | -.343 |
| | .800 | -.354 | -.262 | -.211 | -.231 | -.263 | -.274 | -.424 | -.280 | -.277 | -.271 | -.297 | -.290 | -.298 | -.294 | -.292 | -.254 | -.230 | -.228 | -.273 |
| | .900 | -.297 | -.195 | -.116 | -.096 | -.102 | -.105 | -.257 | -.124 | -.132 | -.140 | -.156 | -.141 | -.140 | -.120 | -.119 | -.102 | -.101 | -.146 | -.214 |
| | .950 | -.247 | -.060 | .096 | .090 | .016 | .018 | -.129 | .006 | -.007 | -.013 | -.026 | -.012 | -.010 | .004 | .001 | .004 | -.023 | -.092 | -.056 |
| Lower surface | .0375 | .711 | [a].702 | [a].660 | .599 | .555 | .449 | .134 | .086 | -.194 | -.462 | -.326 | -.109 | .111 | .373 | .507 | .617 | .695 | .735 | .666 |
| | .075 | .575 | .584 | .536 | .496 | .413 | .317 | .043 | .053 | -.136 | -.314 | -.230 | -.077 | .069 | .254 | .365 | .462 | .528 | .590 | .578 |
| | .150 | .432 | .435 | .401 | .370 | .296 | .225 | -.018 | .032 | -.089 | -.208 | -.158 | -.055 | .038 | .175 | .244 | .317 | .365 | .432 | .438 |
| | .250 | .309 | .307 | .278 | .249 | .193 | .133 | -.080 | -.003 | -.091 | -.171 | -.146 | -.066 | .001 | .097 | .154 | .222 | .271 | .307 | .316 |
| | .350 | .234 | .235 | .212 | .195 | .150 | .104 | -.097 | -.005 | -.074 | -.135 | -.116 | -.058 | -.006 | .073 | .120 | .173 | .206 | .232 | .243 |
| | .450 | .140 | [a].149 | .125 | .115 | .077 | .044 | -.142 | -.037 | -.087 | -.130 | -.115 | -.068 | -.033 | .026 | .062 | .104 | .129 | .144 | .157 |
| | .550 | .108 | .117 | .110 | .103 | .076 | .043 | -.134 | -.022 | -.064 | -.100 | -.092 | -.055 | -.026 | .024 | .057 | .090 | .107 | .120 | .122 |
| | .650 | .026 | .041 | .045 | .042 | .027 | .002 | -.167 | .025 | -.072 | -.094 | -.099 | -.077 | -.054 | -.016 | .006 | .037 | .048 | .047 | .043 |
| | .750 | -.009 | .015 | [a].008 | .035 | .027 | .013 | -.148 | -.019 | -.034 | -.047 | -.056 | -.041 | -.028 | 0 | .012 | .033 | .035 | .020 | .012 |
| | .850 | -.066 | -.028 | -.001 | .018 | .025 | .021 | -.125 | .008 | .005 | .004 | -.011 | 0 | .003 | .013 | .017 | .028 | .022 | -.008 | -.035 |
| | .925 | [a]-.067 | .062 | .057 | .061 | .071 | .083 | -.048 | .109 | [a].072 | [a].100 | [a].058 | [a].089 | [a].071 | [a].051 | [a].067 | .121 | .107 | -.078 | -.035 |
| | .975 | [a]-.013 | [a].201 | .183 | [a].196 | [a].195 | [a].210 | [a].034 | [a].224 | [a].226 | [a].238 | [a].151 | [a].242 | [a].173 | [a].127 | [a].201 | [a].247 | [a].209 | [a].243 | [a].183 |
| | [a]1.000 | .076 | .374 | .454 | .365 | .414 | .411 | .173 | .374 | .453 | .450 | .271 | .504 | .456 | .254 | .412 | .416 | .377 | .423 | .329 |

[a]Faired value.

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TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85) - Continued

(c) N = 1600 rpm; $\beta_{0.75R} = 29.66°$.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.828 | 0.904 | 0.975 | 1.039 | 1.103 | 1.194 | 1.259 | 1.354 | 1.418 | 1.386 | 1.300 | 1.220 | 1.157 | 1.071 | 1.013 | 0.941 | 0.873 |
| | $M_x$ | .681 | .700 | .692 | .698 | .711 | .716 | .728 | .739 | .745 | .746 | .734 | .714 | .702 | .710 | .681 | .689 | .680 |
| | $\alpha_i$' | 8.91 | 7.44 | 6.08 | 4.88 | 3.70 | 2.04 | .90 | -.75 | -1.83 | -1.29 | .18 | 1.59 | 2.71 | 4.28 | 5.37 | 6.73 | 8.04 |
| | $\Delta\beta$ | .43 | .43 | .42 | .42 | .41 | .40 | .39 | .37 | .36 | .37 | .38 | .39 | .40 | .41 | .42 | .43 | .43 |
| | $\alpha_i$ | 2.65 | 2.50 | 2.37 | 2.24 | 1.85 | 1.52 | 1.16 | .69 | .24 | .39 | .80 | 1.32 | 1.66 | 1.96 | 2.36 | 2.47 | 2.56 |
| | $c_n$ | .7628 | .7289 | .6986 | .6665 | .5496 | .4555 | .3499 | .2108 | .0719 | .1178 | .2418 | .3961 | .4938 | .5825 | .7013 | .7253 | .7431 |
| | $c_m$ | -.0210 | -.0244 | -.0328 | -.0377 | -.0474 | -.0489 | -.0515 | -.0598 | -.0696 | -.0685 | -.0629 | -.0585 | -.0520 | -.0467 | -.0419 | -.0346 | -.0238 |
| | $c_c$ | -.0416 | -.0393 | -.0352 | -.0240 | -.0201 | -.0107 | -.0163 | -.0100 | .0077 | .0070 | .0039 | -.0027 | -.0114 | -.0178 | -.0253 | -.0289 | -.0359 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.122 | 1.129 | 1.126 | 1.128 | 1.133 | 1.135 | 1.140 | 1.145 | 1.147 | 1.148 | 1.143 | 1.135 | 1.130 | 1.133 | 1.122 | 1.125 | 1.121 |
| | .025 | -1.061 | -1.018 | -1.050 | -1.012 | -.971 | -.966 | -.917 | [a]-.423 | .392 | .333 | .128 | -.157 | -.485 | -.826 | -.993 | -1.040 | -1.083 |
| | .050 | -1.775 | -1.711 | -1.770 | -1.721 | -1.657 | -1.260 | -.565 | -.269 | [a].107 | [a].070 | -.113 | [a]-.516 | [a]-.689 | -1.240 | -1.580 | -1.649 | -1.696 |
| | .100 | -1.892 | -1.807 | -1.769 | -1.518 | -.715 | -.546 | -.372 | -.187 | -.049 | -.108 | -.279 | -.496 | -.647 | [a]-.815 | -1.628 | -1.755 | -1.829 |
| | [a].200 | -.861 | -.805 | -.557 | -.700 | -.577 | -.467 | -.338 | -.244 | -.159 | -.235 | -.349 | -.447 | -.560 | -.617 | -.719 | -.679 | -.702 |
| | .300 | -.590 | -.472 | -.491 | -.549 | -.537 | -.477 | -.398 | -.309 | -.233 | -.263 | -.352 | -.455 | -.527 | -.563 | -.545 | -.481 | -.512 |
| | .400 | -.540 | -.462 | -.511 | -.536 | -.515 | -.484 | -.428 | -.365 | -.307 | -.328 | -.393 | -.465 | -.514 | -.538 | -.551 | -.499 | -.498 |
| | .500 | -.457 | -.431 | -.477 | -.487 | -.469 | -.449 | -.413 | -.369 | -.328 | -.345 | -.390 | -.440 | -.474 | -.487 | -.504 | -.472 | -.452 |
| | .600 | -.375 | -.396 | -.443 | -.445 | -.433 | -.433 | -.414 | -.387 | -.362 | -.372 | -.398 | -.431 | -.454 | -.452 | -.469 | -.445 | -.407 |
| | .700 | -.291 | -.321 | -.361 | -.368 | -.362 | -.370 | -.358 | -.346 | -.331 | -.337 | -.352 | -.369 | -.381 | -.374 | -.381 | -.358 | -.315 |
| | .800 | -.216 | -.249 | -.281 | -.281 | -.281 | -.301 | -.309 | -.307 | -.307 | -.308 | -.307 | -.309 | -.307 | -.292 | -.295 | -.282 | -.242 |
| | .900 | -.126 | -.093 | -.099 | -.086 | -.086 | -.102 | -.115 | -.120 | -.127 | -.124 | -.118 | -.111 | -.101 | -.096 | -.096 | -.101 | -.093 |
| | .950 | .122 | .169 | .125 | .068 | .042 | .031 | .019 | .017 | .012 | .013 | .017 | .024 | .029 | .025 | .044 | .049 | .058 |
| Lower surface | .0375 | .586 | .561 | .561 | .520 | .414 | .264 | .077 | -.187 | -.378 | -.300 | -.039 | .216 | .349 | .474 | .595 | .635 | .691 |
| | .075 | .540 | .493 | .466 | .396 | .300 | .178 | .049 | -.137 | -.283 | -.219 | -.032 | .145 | .243 | .345 | .447 | .495 | .548 |
| | .150 | .418 | .380 | .351 | .287 | .204 | .119 | .028 | -.096 | -.194 | -.155 | -.035 | .087 | .160 | .241 | .329 | .371 | .414 |
| | .250 | .289 | .262 | .239 | .189 | .122 | .053 | -.012 | -.101 | -.166 | -.137 | -.053 | .036 | .090 | .149 | .217 | .253 | .287 |
| | .350 | .223 | .210 | .186 | .147 | .093 | .036 | -.019 | -.086 | -.134 | -.113 | -.049 | .021 | .063 | .114 | .171 | .201 | .228 |
| | .450 | .141 | .134 | .115 | .081 | .038 | -.008 | -.048 | -.096 | -.127 | -.111 | -.065 | -.014 | .016 | .061 | .105 | .130 | .151 |
| | [a].550 | .085 | .084 | .061 | .034 | .002 | -.031 | -.074 | -.101 | -.123 | -.113 | -.075 | -.041 | -.013 | .019 | .062 | .084 | .103 |
| | .650 | .047 | .061 | .043 | .021 | -.009 | -.037 | -.064 | -.090 | -.123 | -.100 | -.074 | -.045 | -.028 | .003 | .037 | .052 | .060 |
| | .750 | .027 | .054 | .043 | .028 | .002 | -.017 | -.033 | -.048 | -.055 | -.054 | -.041 | -.020 | -.010 | .010 | .034 | .049 | .044 |
| | .850 | .002 | .048 | .043 | .032 | .013 | .006 | -.003 | -.007 | -.002 | -.005 | -.005 | .007 | .008 | .017 | .038 | .047 | .033 |
| | .925 | .100 | .095 | .093 | .091 | .078 | .077 | .070 | .078 | .084 | -.068 | .056 | .056 | .052 | .045 | .048 | .049 | .046 |
| | [a].975 | .289 | .247 | .219 | .189 | .216 | .183 | .162 | .209 | .173 | .152 | .139 | .127 | .139 | .147 | .129 | .136 | .143 |
| | [a]1.000 | .521 | .598 | .510 | .372 | .431 | .285 | .253 | .352 | .235 | .211 | .222 | .234 | .240 | .309 | .280 | .272 | .296 |

[a]Paired value.

TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85) - Continued

(d) N = 2000 rpm; $\beta_{0.75R} = 29.66°$.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.995 | 1.088 | 1.168 | 1.224 | 1.285 | 1.363 | 1.441 | 1.393 | 1.324 | 1.243 | 1.130 |
| | $M_x$ | .875 | .890 | .884 | .905 | .913 | .926 | .929 | .924 | .909 | .906 | .887 |
| | $\alpha_x'$ | 5.70 | 3.97 | 2.52 | 1.52 | .44 | -.90 | -2.21 | -1.41 | .08 | 1.18 | 3.20 |
| | $\Delta\beta$ | .67 | .65 | .61 | .59 | .56 | .53 | .49 | .51 | .54 | .58 | .63 |
| | $\alpha_1$ | 2.70 | 2.06 | 1.61 | 1.14 | .65 | .13 | -.43 | -.12 | .50 | .94 | 1.71 |
| | $c_n$ | .7998 | .6124 | .4806 | .3402 | .1961 | .0408 | -.1320 | -.0363 | .1509 | .2829 | .5125 |
| | $c_m$ | -.1068 | -.0832 | -.0858 | -.0713 | -.0691 | -.0734 | -.0506 | -.0646 | -.0726 | -.0667 | -.0778 |
| | $c_o$ | .0032 | .0084 | .0177 | .0191 | .0187 | .0195 | .0180 | .0190 | .0184 | .0191 | .0118 |
| | c/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.206 | 1.214 | 1.211 | 1.222 | 1.225 | 1.233 | 1.234 | 1.232 | 1.224 | 1.222 | 1.212 |
| | .025 | -.297 | -.112 | -.077 | -.213 | .347 | .472 | .551 | .497 | .367 | .232 | -.062 |
| | .050 | [a]-.684 | [a]-.362 | -.188 | -.169 | [a].080 | [a].232 | [a].240 | [a].294 | [a].136 | [a]-.007 | [a]-.273 |
| | .100 | -.810 | -.594 | -.401 | -.251 | -.114 | .018 | [a]-.001 | .060 | -.084 | -.198 | -.489 |
| | [a].200 | -.846 | -.670 | -.505 | -.361 | -.253 | -.132 | -.123 | -.423 | -.234 | -.325 | -.583 |
| | .300 | -.831 | -.690 | -.558 | -.437 | -.331 | -.233 | -.167 | -.202 | -.312 | -.387 | -.625 |
| | .400 | -.905 | -.767 | -.632 | -.518 | -.435 | -.315 | -.240 | -.281 | -.414 | -.488 | -.678 |
| | .500 | -.944 | -.794 | -.702 | -.601 | -.472 | -.385 | -.318 | -.351 | -.462 | -.533 | -.728 |
| | .600 | -.948 | -.851 | -.739 | -.668 | -.560 | -.486 | -.440 | -.467 | -.560 | -.626 | -.802 |
| | .700 | -.499 | -.482 | -.799 | -.676 | -.603 | -.538 | -.459 | -.513 | -.600 | -.638 | -.727 |
| | .800 | -.500 | -.312 | -.276 | -.293 | -.428 | -.632 | -.622 | -.645 | -.532 | -.336 | -.316 |
| | .900 | -.318 | -.266 | -.232 | -.190 | -.160 | -.133 | -.122 | -.128 | -.158 | -.175 | -.256 |
| | .950 | -.228 | -.238 | -.213 | -.166 | -.133 | -.106 | -.088 | -.096 | -.123 | -.128 | -.224 |
| Lower surface | .0375 | .550 | .408 | .274 | .114 | -.094 | -.512 | -.649 | -.610 | -.218 | .044 | .285 |
| | .075 | .426 | .303 | .194 | .073 | -.067 | -.415 | -.563 | -.519 | -.139 | .024 | .195 |
| | .150 | .328 | .232 | .145 | .051 | -.064 | -.201 | -.486 | [a]-.330 | -.114 | .003 | .130 |
| | .250 | .228 | .145 | .070 | .002 | -.081 | -.176 | -.446 | -.219 | -.126 | -.028 | .062 |
| | .350 | .171 | .098 | .034 | -.023 | -.095 | [a]-.179 | -.380 | -.252 | -.133 | -.052 | .020 |
| | .450 | .098 | .037 | -.019 | -.067 | -.120 | -.199 | -.275 | -.263 | -.148 | -.085 | -.031 |
| | .550 | .058 | .002 | -.054 | -.096 | -.140 | -.205 | -.296 | -.248 | -.167 | -.112 | -.065 |
| | .650 | [a].002 | -.041 | -.091 | -.122 | [a]-.166 | [a]-.206 | -.335 | -.306 | -.225 | -.170 | [a]-.102 |
| | .750 | -.045 | -.085 | -.131 | -.157 | -.183 | -.199 | -.353 | -.281 | -.205 | -.169 | -.142 |
| | .850 | -.088 | -.111 | -.145 | -.160 | -.171 | -.157 | -.191 | -.142 | -.183 | -.158 | -.153 |
| | .925 | [a]-.115 | -.124 | -.118 | -.121 | -.123 | -.110 | -.088 | -.093 | -.131 | -.141 | -.180 |
| | [a].975 | -.091 | -.084 | -.085 | -.050 | -.061 | -.020 | -.020 | -.048 | -.045 | -.070 | -.156 |
| | [a]1.000 | 0 | 0 | -.020 | .020 | .051 | .100 | .070 | .020 | .071 | .051 | -.051 |

[a]Faired value.

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TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85) - Continued

(e) N = 2160 rpm; $\beta_{0.75R} = 29.66°$.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.060 | 1.108 | 1.158 | 1.218 | 1.286 | 1.349 | 1.359 | 1.379 | 1.309 | 1.242 | 1.197 | 1.137 | 1.080 |
| | $M_x$ | .954 | .964 | .972 | .975 | .991 | .992 | 1.024 | 1.002 | .988 | .973 | .971 | .963 | .953 |
| | $\alpha_x'$ | 4.49 | 3.60 | 2.70 | 1.62 | .42 | -.66 | -.83 | -1.18 | .03 | 1.20 | 2.00 | 3.08 | 4.12 |
| | $\Delta\beta$ | .74 | .72 | .70 | .68 | .66 | .63 | .63 | .62 | .65 | .67 | .69 | .71 | .73 |
| | $\alpha_i$ | 1.97 | 1.77 | 1.35 | 1.01 | .53 | .07 | -.28 | -.19 | .30 | .81 | 1.12 | 1.51 | 1.84 |
| | $c_n$ | .5843 | .5280 | .4029 | .3022 | .1592 | .0210 | -.0849 | -.0580 | .0906 | .2432 | .3333 | .4486 | .5473 |
| | $c_m$ | -.1112 | -.1131 | -.1014 | -.0890 | -.0735 | -.0683 | -.0572 | -.0644 | -.0749 | -.0844 | -.0949 | -.1103 | -.1053 |
| | $c_c$ | .0204 | .0284 | .0332 | .0336 | .0353 | .0361 | .0414 | .0429 | .0356 | .0347 | .0351 | .0321 | .0220 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.249 | 1.254 | 1.258 | 1.260 | 1.272 | 1.270 | 1.290 | 1.276 | 1.267 | 1.259 | 1.258 | 1.253 | 1.248 |
| | .025 | .165 | .246 | .329 | .412 | .497 | .562 | .577 | .589 | .525 | .443 | .371 | .286 | .087 |
| | .050 | [a]-.207 | [a]-.165 | [a]-.015 | .084 | .107 | [a].226 | [a].271 | [a].270 | .174 | [a].127 | [a].051 | [a]-.077 | [a]-.299 |
| | .100 | -.431 | -.351 | -.198 | -.121 | -.010 | .071 | .132 | .122 | .033 | -.074 | -.140 | -.256 | -.501 |
| | [a].200 | -.440 | -.403 | -.291 | -.221 | -.116 | -.038 | .030 | .016 | -.067 | -.181 | -.233 | -.353 | -.541 |
| | .300 | -.503 | -.463 | -.355 | -.295 | -.203 | -.147 | -.083 | -.097 | -.175 | -.255 | -.317 | -.422 | -.599 |
| | .400 | -.619 | -.571 | -.470 | -.405 | -.324 | -.268 | -.201 | -.220 | -.292 | -.360 | -.420 | -.492 | -.702 |
| | .500 | -.661 | -.615 | -.531 | -.475 | -.402 | -.323 | -.259 | -.278 | -.357 | -.440 | -.488 | -.556 | -.732 |
| | .600 | -.645 | -.613 | -.531 | -.482 | -.414 | -.364 | -.302 | -.324 | -.389 | -.460 | -.503 | -.581 | -.744 |
| | .700 | -.684 | -.667 | -.599 | -.556 | -.471 | -.418 | -.355 | -.379 | -.430 | -.520 | -.568 | -.627 | -.784 |
| | .800 | -.497 | -.790 | -.755 | -.700 | -.640 | -.605 | -.534 | -.562 | -.613 | -.667 | -.706 | -.785 | -.651 |
| | .900 | -.364 | -.405 | -.363 | -.364 | -.680 | -.726 | -.648 | -.684 | -.720 | -.398 | -.365 | -.384 | -.462 |
| | .950 | -.351 | -.382 | -.331 | -.302 | -.314 | -.442 | -.628 | -.681 | -.373 | -.289 | -.308 | -.356 | -.447 |
| Lower surface | .0375 | .459 | .365 | .252 | .127 | -.128 | -.337 | -.410 | -.420 | -.281 | .046 | .175 | .294 | .308 |
| | .075 | .380 | .300 | .211 | .113 | -.046 | -.265 | -.343 | -.346 | -.148 | .049 | .144 | .233 | .226 |
| | .150 | .290 | .224 | .166 | .090 | -.024 | -.171 | -.278 | -.275 | -.080 | .020 | .101 | .158 | .149 |
| | .250 | .203 | .145 | .099 | .036 | -.062 | -.124 | -.271 | -.271 | -.104 | .008 | .073 | .130 | .066 |
| | .350 | .153 | .099 | .060 | .004 | -.109 | -.165 | -.297 | -.272 | -.153 | -.039 | .024 | .061 | .019 |
| | .450 | .102 | .050 | .025 | -.017 | -.103 | -.169 | -.242 | -.193 | -.132 | -.033 | .007 | .034 | -.019 |
| | .550 | .042 | -.007 | -.030 | -.068 | -.135 | -.204 | -.239 | -.243 | -.159 | -.097 | -.053 | -.030 | -.084 |
| | .650 | -.038 | -.091 | -.117 | -.155 | -.216 | [a]-.262 | -.279 | -.284 | -.240 | -.179 | -.145 | -.121 | -.169 |
| | .750 | -.058 | [a]-.146 | [a]-.162 | [a]-.198 | -.237 | [a]-.301 | [a]-.311 | [a]-.321 | -.271 | [a]-.226 | [a]-.174 | [a]-.161 | -.190 |
| | .850 | -.109 | -.164 | -.172 | -.204 | -.267 | -.323 | -.339 | -.348 | -.292 | -.231 | -.189 | -.177 | -.234 |
| | .925 | -.104 | -.155 | -.171 | -.196 | -.272 | -.323 | -.344 | -.350 | -.294 | -.223 | -.193 | -.178 | -.230 |
| | [a].975 | -.026 | -.113 | -.156 | -.152 | -.245 | -.296 | -.310 | -.300 | -.163 | -.142 | -.169 | -.160 | -.209 |
| | [a]1.000 | .207 | 0 | -.128 | -.051 | .151 | .100 | -.100 | .050 | .252 | .162 | -.102 | -.102 | -.170 |

[a]Paired value.

TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85) - Continued

(f) M = 1140 rpm; $\beta_{0.75R}$ = 44.53°.

| | J | 1.479 | 1.394 | 1.725 | 1.857 | 1.952 | 2.090 | 2.198 | 2.353 | 2.500 | 2.409 | 2.282 | 2.132 | 2.022 | 1.918 | 1.800 | 1.667 | 1.538 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | .532 | .545 | .559 | .574 | .580 | .594 | .609 | .624 | .641 | .629 | .616 | .599 | .586 | .571 | .563 | .546 | .539 |
| | $\alpha_r$[1] | 12.04 | 10.17 | 8.15 | 6.19 | 4.84 | 2.97 | 1.55 | -.37 | -2.11 | -1.06 | .49 | 2.42 | 3.88 | 5.32 | 7.04 | 9.04 | 11.07 |
| | $\Delta\beta$ | .24 | .23 | .23 | .22 | .21 | .20 | .19 | .17 | .15 | .16 | .17 | .19 | .20 | .21 | .22 | .23 | .23 |
| | $\alpha_i$ | 2.66 | 2.47 | 2.12 | 1.96 | 1.72 | 1.44 | 1.13 | .62 | .19 | .42 | .76 | 1.27 | 1.59 | 1.81 | 1.97 | 2.23 | 2.60 |
| | $c_n$ | .8986 | .7828 | .6727 | .6248 | .5505 | .4638 | .3641 | .1996 | .0617 | .1371 | .2475 | .4096 | .5093 | .5793 | .6290 | .7091 | .8211 |
| | $c_m$ | -.0768 | -.0508 | -.0320 | -.0389 | -.0463 | -.0470 | -.0471 | -.0590 | -.0608 | -.0680 | -.0597 | -.0504 | -.0483 | -.0483 | -.0347 | -.0321 | -.0582 |
| | $c_o$ | -.0028 | -.0135 | -.0160 | -.0164 | -.0048 | -.0054 | -.0125 | .0051 | .0066 | .0069 | .0057 | -.0095 | -.0168 | -.0084 | -.0233 | -.0197 | -.0148 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.072 | 1.076 | 1.079 | 1.085 | 1.086 | 1.091 | 1.096 | 1.101 | 1.107 | 1.102 | 1.098 | 1.092 | 1.088 | 1.084 | 1.081 | 1.076 | 1.074 |
| | .025 | -.581 | -.660 | -.847 | -.880 | -.832 | -.774 | -.693 | .106 | .333 | .322 | .300 | [a]-.441 | [a]-.716 | -.784 | -.845 | -.908 | -.967 |
| | .050 | -1.069 | -1.140 | -1.255 | -1.190 | -1.136 | -1.012 | -.483 | -.173 | .061 | .040 | .013 | -.476 | -.713 | -1.017 | -1.110 | -1.186 | -1.260 |
| | .100 | -1.038 | -1.242 | -1.290 | -1.205 | -.760 | -.599 | -.426 | -.212 | -.038 | -.142 | -.308 | -.508 | -.667 | -.800 | -1.166 | -1.259 | -1.333 |
| | .200 | -.900 | -.941 | -.741 | -.603 | -.568 | -.506 | -.428 | -.332 | -.243 | -.297 | -.376 | -.465 | -.533 | -.586 | -.583 | -.832 | -.942 |
| | [a].300 | -.868 | -.827 | -.620 | -.568 | -.540 | -.497 | -.424 | -.371 | -.270 | -.316 | -.390 | -.443 | -.475 | -.519 | -.520 | -.687 | -.874 |
| | .400 | -.801 | -.749 | -.555 | -.524 | -.502 | -.465 | -.405 | -.337 | -.269 | -.309 | -.368 | -.433 | -.484 | -.519 | -.508 | -.613 | -.798 |
| | .500 | -.684 | -.580 | -.447 | -.456 | -.444 | -.422 | -.375 | -.327 | -.276 | -.306 | -.350 | -.396 | -.434 | -.456 | -.445 | -.461 | -.650 |
| | .600 | [a]-.575 | -.435 | -.380 | -.358 | -.376 | -.378 | -.339 | -.318 | -.274 | -.299 | -.333 | -.387 | -.441 | -.436 | -.404 | -.377 | -.493 |
| | .700 | -.477 | -.341 | -.292 | -.326 | -.335 | -.339 | -.318 | -.303 | -.277 | -.292 | -.313 | -.328 | -.343 | -.337 | -.308 | -.276 | -.410 |
| | .800 | -.395 | -.258 | -.216 | -.248 | -.274 | -.290 | -.293 | -.291 | -.282 | -.287 | -.296 | -.294 | -.289 | -.276 | [a]-.228 | -.204 | -.315 |
| | .900 | -.315 | -.199 | -.124 | -.100 | -.107 | .117 | -.131 | -.138 | -.142 | -.142 | -.143 | -.132 | -.120 | -.114 | -.106 | -.124 | -.234 |
| | .950 | -.273 | -.154 | -.053 | -.009 | .004 | .006 | -.001 | -.006 | -.012 | -.008 | -.007 | .001 | .002 | -.002 | -.020 | -.073 | -.197 |
| Lower surface | .0375 | .781 | .743 | .686 | .609 | .511 | .332 | .147 | -.140 | -.446 | -.258 | -.019 | .245 | .417 | .554 | .646 | .726 | .756 |
| | .075 | .622 | .586 | .528 | .450 | .362 | .215 | .081 | -.109 | -.311 | -.184 | -.033 | .152 | .286 | .398 | .489 | .565 | .603 |
| | .150 | .473 | .445 | .390 | .332 | .260 | .151 | .060 | -.075 | -.209 | -.123 | -.017 | .100 | .202 | .287 | .360 | .425 | .460 |
| | .250 | .343 | .317 | .272 | .227 | .170 | .092 | .020 | -.075 | -.164 | -.106 | -.029 | .057 | .126 | .190 | .246 | .302 | .329 |
| | [a].350 | .263 | .245 | .208 | .171 | .123 | .061 | .008 | -.065 | -.136 | -.088 | -.029 | .039 | .094 | .145 | .190 | .234 | .258 |
| | [a].450 | .187 | .176 | .150 | .122 | .089 | .035 | 0 | -.060 | -.120 | -.077 | -.032 | .020 | .060 | .109 | .131 | .168 | .189 |
| | .550 | .125 | .122 | [a].101 | .086 | .059 | .010 | -.017 | -.063 | -.102 | -.079 | -.043 | -.003 | .032 | .066 | .093 | .118 | .125 |
| | .650 | .032 | .042 | .034 | .030 | .008 | -.029 | -.048 | -.078 | -.106 | -.093 | -.070 | -.041 | -.013 | .016 | .037 | .053 | .047 |
| | .750 | -.010 | .014 | .021 | .030 | .016 | -.009 | -.023 | -.042 | -.056 | -.047 | -.036 | -.017 | 0 | .018 | .026 | .030 | .007 |
| | .850 | -.083 | -.044 | -.016 | .011 | .008 | -.003 | -.006 | -.015 | -.017 | -.011 | -.012 | -.007 | 0 | .008 | .004 | -.014 | -.053 |
| | [a].925 | -.118 | -.060 | -.007 | .034 | .039 | .039 | .047 | .049 | .053 | .053 | .048 | .043 | .038 | .038 | .022 | -.016 | -.080 |
| | [a].975 | -.091 | .005 | .059 | .122 | .139 | .124 | .149 | .149 | .150 | .181 | .139 | .151 | .159 | .103 | .097 | .062 | -.082 |
| | [a]1.000 | .041 | .133 | .163 | .213 | .303 | .232 | .241 | .271 | .220 | .291 | .251 | .312 | .272 | .182 | .203 | .214 | -.020 |

[a]Paired value.

TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85) - Continued

(g) N = 1350 rpm; $\beta_{0.75R} = 44.53°$.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.647 | 1.758 | 1.866 | 1.962 | 2.059 | 2.165 | 2.278 | 2.399 | 2.512 | 2.442 | 2.352 | 2.221 | 2.108 | 2.011 | 1.906 | 1.805 | 1.685 |
| | $M_x$ | .648 | .662 | .678 | .686 | .698 | .712 | .728 | .746 | .763 | .751 | .736 | .715 | .701 | .690 | .678 | .664 | .653 |
| | $\alpha_x'$ | 9.34 | 7.65 | 6.06 | 4.70 | 3.38 | 1.96 | .54 | -.93 | -2.24 | -1.42 | -.37 | 1.25 | 2.73 | 4.03 | 5.49 | 6.95 | 8.76 |
| | $\Delta\beta$ | .32 | .32 | .31 | .30 | .28 | .27 | .25 | .22 | .20 | .21 | .23 | .26 | .28 | .29 | .30 | .31 | .32 |
| | $\alpha_1$ | 2.38 | 2.27 | 2.11 | 1.90 | 1.66 | 1.30 | .89 | .51 | .21 | .38 | .61 | 1.09 | 1.46 | 1.76 | 2.02 | 2.24 | 2.42 |
| | $c_n$ | .7578 | .7247 | .6764 | .6088 | .5313 | .4200 | .2888 | .1646 | .0688 | .1235 | .1994 | .3526 | .4684 | .5661 | .6451 | .7144 | .7702 |
| | $c_m$ | -.0380 | -.0383 | -.0397 | -.0436 | -.0425 | -.0518 | -.0603 | -.0646 | -.0662 | -.0681 | -.0685 | -.0600 | -.0525 | -.0487 | -.0430 | -.0432 | -.0298 |
| | $c_o$ | -.0122 | -.0279 | -.0279 | -.0256 | -.0190 | -.0114 | -.0021 | .0014 | .0077 | .0052 | .0060 | -.0019 | -.0093 | -.0157 | -.0221 | -.0251 | -.0294 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.109 | 1.114 | 1.120 | 1.124 | 1.128 | 1.134 | 1.140 | 1.148 | 1.154 | 1.150 | 1.143 | 1.135 | 1.130 | 1.125 | 1.120 | 1.115 | 1.111 |
| | .025 | -.441 | -1.084 | -1.026 | -.977 | -.926 | [a]-.504 | [a]0 | .218 | -.390 | -.372 | -.358 | -.086 | [a]-.424 | [a]-.735 | -.867 | -1.012 | -1.085 |
| | .050 | -1.233 | -1.379 | -1.293 | -1.239 | -1.190 | [a]-.513 | [a]-.152 | [a].057 | [a].249 | [a].102 | [a].049 | [a]-.257 | [a]-.767 | [a]-1.109 | -1.266 | -1.349 | -1.398 |
| | .100 | -1.364 | -1.564 | -1.496 | -.808 | -.683 | -.512 | -.320 | -.158 | .001 | [a]-.140 | -.207 | -.409 | -.616 | -.693 | -1.226 | -1.476 | -1.559 |
| | .200 | -.941 | -.586 | -.613 | -.626 | -.584 | -.509 | -.431 | -.354 | -.267 | -.313 | -.375 | -.468 | -.550 | -.605 | -.619 | -.599 | -.881 |
| | [a].300 | -.821 | -.580 | -.588 | -.575 | -.554 | -.506 | -.442 | -.383 | -.289 | -.330 | -.391 | -.463 | -.519 | -.574 | -.595 | -.577 | -.750 |
| | .400 | -.717 | -.563 | -.558 | -.554 | -.529 | -.478 | -.427 | -.374 | -.309 | -.344 | -.386 | -.451 | -.506 | -.539 | -.552 | -.555 | -.651 |
| | .500 | -.543 | -.492 | -.491 | -.487 | -.476 | -.436 | -.403 | -.369 | -.322 | -.348 | -.376 | -.423 | -.458 | -.482 | -.484 | -.495 | -.490 |
| | .600 | -.388 | -.405 | -.418 | -.421 | -.423 | -.401 | -.381 | -.367 | -.336 | -.350 | -.372 | -.416 | [a]-.440 | -.443 | -.440 | -.444 | -.380 |
| | .700 | -.319 | -.341 | -.355 | -.363 | -.372 | -.358 | -.355 | -.346 | -.335 | -.342 | -.345 | -.360 | [a]-.385 | -.369 | -.354 | -.352 | -.287 |
| | .800 | -.247 | -.265 | -.280 | -.283 | -.299 | -.303 | -.315 | -.316 | -.319 | -.319 | -.315 | -.318 | -.305 | -.292 | -.273 | -.276 | -.216 |
| | .900 | -.181 | -.110 | -.090 | -.087 | -.099 | -.102 | -.117 | -.119 | -.127 | -.131 | -.125 | -.126 | -.108 | -.094 | -.085 | -.099 | -.139 |
| | .950 | -.079 | .004 | .027 | .028 | .024 | .029 | .024 | .022 | .018 | .016 | .020 | .019 | .025 | .027 | .032 | .016 | -.089 |
| Lower surface | .0375 | .689 | .700 | .608 | .507 | .369 | .206 | -.018 | -.266 | [a]-.360 | -.401 | -.170 | .086 | .306 | .446 | .566 | .669 | .695 |
| | .075 | .580 | .542 | .458 | .363 | .248 | .129 | -.036 | -.187 | -.303 | -.271 | -.135 | .038 | .203 | .314 | .419 | .509 | .587 |
| | .150 | .438 | .405 | .335 | .260 | .175 | .089 | -.025 | -.133 | -.242 | -.191 | -.097 | -.024 | .141 | .217 | .285 | .359 | .404 |
| | .250 | .310 | .288 | .236 | .174 | .107 | .042 | -.036 | -.116 | -.196 | -.154 | -.088 | -.001 | .081 | .145 | .211 | .268 | .305 |
| | .350 | .238 | .222 | .183 | .133 | .075 | .023 | -.037 | -.100 | -.160 | -.133 | -.077 | .012 | .055 | .108 | .163 | .211 | .237 |
| | [a].450 | .162 | .157 | .122 | .072 | .038 | .010 | -.050 | -.110 | -.140 | -.120 | -.079 | .031 | .027 | .065 | .105 | .144 | .170 |
| | .550 | .102 | .113 | .082 | .039 | .007 | -.011 | -.054 | [a]-.110 | -.121 | -.105 | -.077 | .041 | .001 | .033 | .072 | .108 | .111 |
| | .650 | .038 | [a].072 | .040 | .023 | -.023 | -.047 | -.076 | -.100 | -.121 | -.114 | -.094 | [a].041 | -.033 | .011 | .032 | .053 | [a].056 |
| | .750 | 0 | .043 | .037 | .013 | -.012 | -.022 | -.040 | -.053 | -.063 | -.064 | -.053 | -.038 | [a]-.032 | .002 | .026 | .045 | .020 |
| | .850 | -.054 | .020 | .021 | .005 | -.005 | -.006 | -.012 | -.014 | -.012 | -.016 | -.015 | -.015 | -.007 | .002 | .018 | .028 | -.021 |
| | .925 | -.067 | .043 | .050 | .042 | .036 | .049 | .053 | .054 | .059 | .055 | .050 | .044 | .042 | .042 | .049 | .054 | -.028 |
| | [a].975 | .004 | .122 | .109 | .181 | .133 | .176 | .157 | .152 | .162 | .162 | .179 | .162 | .146 | .127 | .130 | .137 | .042 |
| | [a]1.000 | .306 | .305 | .203 | .354 | .252 | .392 | .291 | .341 | .280 | .320 | .331 | .341 | .302 | .253 | .273 | .254 | .204 |

[a]Faired value.

TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85) - Continued

(h) N = 1600 rpm; $\beta_{0.75R} = 44.53°$.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.030 | 2.101 | 2.192 | 2.303 | 2.409 | 2.374 | 2.264 | 2.128 | 2.060 |
| | $M_x$ | .829 | .839 | .859 | .876 | .896 | .888 | .864 | .841 | .829 |
| | $\alpha_x'$ | 3.76 | 2.81 | 1.62 | .25 | -1.06 | -.62 | .71 | 2.46 | 3.36 |
| | $\Delta\beta$ | .43 | .40 | .37 | .33 | .29 | .30 | .34 | .39 | .43 |
| | $\alpha_i$ | 2.15 | 1.82 | 1.39 | .82 | .14 | .35 | .93 | 1.61 | 1.96 |
| | $c_n$ | .6900 | .5862 | .4492 | .2665 | .0451 | .1127 | .2987 | .5182 | .6303 |
| | $c_m$ | -.0695 | -.0665 | -.0711 | -.0802 | -.0746 | -.0754 | -.0766 | -.0713 | -.0717 |
| | $c_o$ | -.0174 | -.0151 | -.0096 | -.0086 | .0015 | .0041 | .0029 | -.0079 | -.0132 |
| | c/b | Pressure coefficient, P | | | | | | | | |
| Upper surface | 0.000 | 1.184 | 1.188 | 1.198 | 1.206 | 1.217 | 1.212 | 1.201 | 1.189 | 1.184 |
| | .025 | -.417 | -.393 | -.352 | [a]-.075 | [a].150 | [a].267 | .228 | -.049 | -.219 |
| | .050 | [a]-.564 | [a]-.429 | -.397 | -.096 | .090 | .084 | .052 | -.184 | -.417 |
| | .100 | -.702 | -.505 | -.300 | -.098 | .062 | .019 | -.159 | -.416 | -.604 |
| | .200 | [a]-.795 | [a]-.641 | -.616 | [a]-.214 | -.083 | .197 | -.398 | -.619 | -.748 |
| | .300 | -.821 | -.718 | -.532 | -.389 | -.279 | -.306 | -.435 | -.643 | -.774 |
| | .400 | -.840 | -.716 | -.569 | -.421 | -.296 | -.327 | -.475 | -.650 | -.770 |
| | .500 | -.856 | -.763 | -.636 | -.482 | -.362 | -.392 | -.516 | -.721 | -.802 |
| | .600 | -.844 | -.801 | -.683 | -.558 | -.464 | -.484 | -.590 | -.768 | -.832 |
| | .700 | -.276 | -.333 | -.662 | -.585 | -.507 | -.524 | -.627 | -.370 | -.260 |
| | .800 | -.113 | -.109 | -.126 | -.403 | -.303 | -.295 | -.167 | -.115 | -.109 |
| | .900 | .035 | .038 | .029 | -.011 | -.038 | -.028 | .024 | .044 | .044 |
| | .950 | .111 | .108 | .092 | .042 | .002 | .016 | .080 | .123 | .128 |
| Lower surface | .0375 | .483 | .370 | .176 | -.123 | -.612 | -.536 | -.022 | .307 | .429 |
| | .075 | .361 | .270 | .125 | -.064 | -.504 | -.348 | -.015 | .224 | .316 |
| | .150 | .272 | .202 | .087 | -.066 | -.333 | -.192 | -.027 | .160 | .233 |
| | .250 | .207 | .149 | .065 | -.048 | -.133 | -.128 | -.015 | .122 | .180 |
| | .350 | .168 | .119 | .046 | -.050 | -.135 | -.109 | -.020 | .094 | [a].128 |
| | .450 | [a].122 | .046 | [a].019 | [a]-.060 | -.151 | [a]-.100 | [a]-.039 | [a].043 | [a].096 |
| | .550 | .084 | .038 | [a]-.010 | [a]-.068 | [a]-.162 | -.106 | [a]-.061 | [a].008 | .079 |
| | .650 | .052 | .028 | -.037 | [a]-.068 | -.141 | -.128 | -.076 | -.002 | [a].056 |
| | .750 | .052 | .027 | -.011 | -.052 | -.086 | -.077 | -.039 | .018 | .043 |
| | .850 | .067 | .047 | .024 | -.006 | -.032 | -.022 | .006 | .046 | .065 |
| | .925 | .100 | .089 | .070 | .042 | .018 | .027 | .057 | .094 | .106 |
| | [a].975 | .166 | .163 | .189 | .197 | .160 | .105 | .171 | .220 | .247 |
| | [a]1.000 | .283 | .292 | .303 | .472 | .451 | .251 | .402 | .403 | .505 |

[a]Faired value.

TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION ($x = 0.85$) - Continued

(i) $M = 0.56$; $\beta_{0.75R} = 44.53^\circ$.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.057 | 2.138 | 2.138 | 2.173 | 2.213 | 2.252 | 2.277 | 2.316 | 2.364 | 2.414 | 2.435 | 2.487 |
| | $M_r$ | .923 | .842 | .834 | .884 | .871 | .862 | .854 | .843 | .836 | .826 | .815 | .805 |
| | $\alpha_r$[a] | 3.40 | 2.33 | 2.33 | 1.88 | 1.37 | .87 | .56 | .07 | -.50 | -1.11 | -1.34 | -1.95 |
| | $\Delta\beta$ | .46 | .42 | .42 | .41 | .39 | .37 | .36 | .34 | .31 | .28 | .27 | .24 |
| | $c_l$ | 1.46 | 1.40 | 1.32 | 1.23 | 1.15 | 1.04 | .93 | .82 | .66 | .51 | .33 | .13 |
| | $c_n$ | .4667 | .4496 | .4256 | .3969 | .3719 | .3357 | .3017 | .2677 | .2136 | .1675 | .1082 | .0422 |
| | $c_m$ | -.0799 | -.0756 | -.0743 | -.0636 | -.0665 | -.0657 | -.0696 | -.0701 | -.0712 | -.0754 | -.0756 | -.0788 |
| | $c_o$ | .0153 | .0143 | .0133 | .0087 | .0022 | -.0013 | -.0005 | -.0036 | -.0056 | -.0053 | -.0026 | -.0006 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | |
| Upper surface | 0.000 | 1.231 | 1.189 | 1.186 | 1.210 | 1.204 | 1.199 | 1.195 | 1.191 | 1.187 | 1.182 | 1.177 | 1.172 |
| | .025 | -.043 | -.091 | -.028 | -.004 | [a]-.204 | [a]-.245 | [a]-.175 | [a]-.225 | [a]-.159 | [a]-.055 | [a].095 | [a].210 |
| | .050 | -.141 | -.205 | -.207 | -.224 | -.249 | -.269 | -.293 | -.317 | -.146 | -.077 | -.005 | .046 |
| | .100 | -.352 | -.371 | -.345 | -.330 | -.305 | -.271 | -.232 | -.201 | -.134 | -.100 | -.050 | -.008 |
| | .200 | [a]-.470 | [a]-.495 | [a]-.454 | [a]-.435 | [a]-.402 | [a]-.375 | [a]-.335 | [a]-.318 | [a]-.286 | -.230 | -.167 | -.098 |
| | .300 | -.528 | -.560 | -.533 | -.516 | -.489 | -.468 | -.434 | -.420 | -.369 | -.338 | -.285 | -.250 |
| | .400 | -.573 | -.622 | -.603 | -.587 | -.572 | -.554 | -.508 | -.472 | -.408 | -.416 | -.371 | -.339 |
| | .500 | -.636 | -.695 | -.682 | -.674 | -.660 | [a]-.624 | [a]-.582 | -.536 | -.474 | -.459 | -.414 | -.382 |
| | .600 | -.704 | -.770 | -.753 | -.744 | -.724 | -.681 | -.649 | -.629 | -.533 | -.517 | -.471 | -.437 |
| | .700 | -.730 | -.779 | -.738 | -.721 | -.722 | -.709 | -.688 | -.606 | -.495 | -.453 | -.408 | -.392 |
| | .800 | -.282 | -.289 | -.255 | -.229 | -.207 | -.195 | -.209 | -.247 | -.287 | -.313 | -.324 | -.331 |
| | .900 | -.239 | -.251 | -.211 | -.172 | -.125 | -.048 | -.022 | -.038 | -.053 | -.074 | -.087 | -.102 |
| | .950 | -.220 | -.246 | -.202 | -.154 | -.094 | -.002 | .057 | .068 | .074 | .062 | .053 | .042 |
| Lower surface | .0375 | .301 | .235 | .216 | .169 | -.094 | .022 | -.061 | -.144 | -.304 | -.496 | -.726 | -.903 |
| | .075 | .222 | .162 | .146 | .108 | [a]-.073 | .003 | -.053 | -.104 | -.164 | -.197 | -.224 | -.480 |
| | .150 | .162 | .112 | .103 | .072 | -.030 | -.011 | -.051 | -.087 | -.124 | -.163 | -.196 | -.207 |
| | .250 | .094 | .048 | .043 | .022 | -.013 | -.040 | -.070 | -.096 | -.115 | -.144 | -.167 | -.190 |
| | .350 | [a].034 | [a]-.009 | [a]-.013 | [a]-.029 | [a]-.060 | [a]-.077 | [a]-.097 | [a]-.113 | [a]-.114 | -.122 | -.139 | -.158 |
| | .450 | -.022 | -.064 | -.062 | -.076 | -.095 | -.105 | -.112 | -.120 | -.118 | -.133 | -.143 | -.158 |
| | [a].550 | -.072 | -.113 | -.110 | -.120 | -.125 | -.121 | -.120 | -.125 | -.117 | -.136 | -.135 | -.147 |
| | .650 | -.114 | -.153 | -.140 | -.141 | -.140 | -.124 | -.114 | -.112 | -.099 | -.108 | -.109 | -.116 |
| | .750 | [a]-.142 | -.167 | -.149 | -.138 | -.123 | -.097 | -.078 | -.069 | -.053 | -.056 | -.056 | -.062 |
| | .850 | -.152 | -.176 | -.149 | -.127 | -.098 | -.056 | -.027 | -.016 | .006 | .002 | .006 | .001 |
| | .925 | -.144 | -.181 | -.152 | -.122 | -.077 | -.020 | .022 | .040 | .064 | .060 | .065 | .062 |
| | [a].975 | -.115 | -.175 | -.133 | -.103 | -.027 | .042 | .096 | .132 | .120 | .181 | .136 | .158 |
| | [a]1.000 | -.075 | -.140 | -.095 | -.025 | .025 | .110 | .200 | .250 | .185 | .360 | .275 | .325 |

[a]Faired value.

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TABLE 8.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (r = 0.85) - Continued

(j) M = 0.60; $\beta_{0.75R}$ = 44.53°.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.057 | 2.085 | 2.124 | 2.163 | 2.209 | 2.255 | 2.301 | 2.318 | 2.373 | 2.418 | 2.458 | 2.490 |
| | $M_r$ | .988 | .980 | .968 | .950 | .938 | .924 | .908 | .904 | .889 | .881 | .869 | .863 |
| | $\alpha_r$, | 3.40 | 3.03 | 2.51 | 2.01 | 1.41 | .83 | .27 | .05 | -.62 | -1.16 | -1.63 | -2.00 |
| | $\Delta\beta$ | .49 | .47 | .45 | .43 | .41 | .38 | .35 | .34 | .31 | .28 | .27 | .25 |
| | $\alpha_i$ | 1.30 | 1.30 | 1.22 | 1.13 | .91 | .73 | .58 | .49 | .38 | .25 | .19 | .08 |
| | $c_n$ | .4157 | .4173 | .3919 | .3640 | .2935 | .2374 | .1886 | .1588 | .1218 | .0828 | .0635 | .0267 |
| | $c_m$ | -.1061 | -.1064 | -.1010 | -.0974 | -.0778 | -.0676 | -.0599 | -.0635 | -.0664 | -.0737 | -.0801 | -.0878 |
| | $c_o$ | .0306 | .0325 | .0307 | .0283 | .0253 | .0214 | .0184 | .0162 | .0149 | .0096 | .0096 | .0075 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | |
| Upper surface | 0.000 | 1.267 | 1.263 | 1.256 | 1.246 | 1.239 | 1.231 | 1.223 | 1.221 | 1.213 | 1.209 | 1.202 | 1.200 |
| | .025 | .111 | .099 | [a].113 | .134 | .180 | .217 | .234 | .264 | .307 | .338 | .363 | .398 |
| | .050 | [a]-.033 | [a]-.050 | [a]-.038 | .015 | -.005 | -.026 | -.045 | [a].063 | [a].110 | [a].130 | [a].145 | [a].200 |
| | [a].100 | -.175 | -.194 | -.189 | -.189 | -.160 | -.132 | -.121 | -.100 | -.061 | -.039 | -.018 | .020 |
| | [a].200 | -.312 | -.319 | -.310 | -.309 | -.275 | -.247 | -.238 | -.225 | -.217 | -.241 | -.201 | -.150 |
| | .300 | -.368 | -.392 | -.389 | -.390 | -.359 | -.342 | -.344 | -.328 | -.313 | -.306 | -.296 | -.263 |
| | .400 | -.420 | -.447 | -.459 | -.465 | -.438 | -.434 | -.439 | -.422 | -.398 | -.375 | -.367 | -.351 |
| | .500 | -.492 | -.520 | -.533 | -.545 | -.535 | -.517 | [a]-.520 | [a]-.510 | [a]-.484 | -.458 | -.452 | -.422 |
| | .600 | -.564 | -.597 | -.610 | -.623 | -.606 | -.591 | [a]-.583 | -.580 | [a]-.564 | -.567 | -.551 | -.518 |
| | .700 | [a]-.642 | [a]-.678 | [a]-.690 | [a]-.713 | [a]-.654 | -.614 | -.628 | -.624 | -.622 | -.600 | -.588 | -.561 |
| | .800 | -.707 | -.746 | -.772 | -.782 | -.686 | -.520 | -.399 | -.316 | -.323 | -.375 | -.431 | -.460 |
| | .900 | -.559 | -.556 | -.441 | -.370 | -.249 | -.203 | -.183 | -.156 | -.107 | -.076 | -.054 | -.029 |
| | .950 | -.377 | -.397 | -.370 | -.333 | -.253 | -.186 | -.164 | -.133 | -.077 | -.036 | 0 | .048 |
| Lower surface | .0375 | .266 | .248 | .190 | .140 | .054 | -.038 | -.118 | -.260 | -.477 | -.608 | -.706 | -.800 |
| | .075 | .205 | .186 | .136 | .094 | .033 | -.030 | -.078 | -.139 | -.315 | -.464 | -.578 | -.686 |
| | .150 | .157 | .143 | .101 | .068 | .016 | -.034 | -.071 | -.123 | -.168 | -.250 | -.358 | -.502 |
| | .250 | .098 | .082 | .046 | .017 | -.022 | [a]-.050 | -.095 | [a]-.119 | [a]-.151 | -.198 | -.204 | -.222 |
| | .350 | [a].043 | [a].030 | [a].004 | -.012 | -.045 | -.077 | [a]-.125 | -.133 | -.165 | -.181 | -.186 | -.172 |
| | .450 | [a]-.009 | [a]-.023 | [a]-.053 | [a]-.063 | [a]-.078 | [a]-.108 | [a]-.157 | [a]-.179 | [a]-.196 | [a]-.202 | [a]-.203 | [a]-.186 |
| | .550 | [a]-.059 | [a]-.074 | [a]-.148 | [a]-.112 | [a]-.116 | [a]-.141 | [a]-.198 | [a]-.215 | [a]-.217 | [a]-.211 | [a]-.201 | [a]-.186 |
| | .650 | [a]-.106 | [a]-.124 | -.169 | [a]-.164 | [a]-.167 | [a]-.184 | -.230 | -.230 | -.215 | -.198 | -.182 | -.155 |
| | .750 | -.153 | -.170 | -.196 | -.217 | -.221 | -.222 | -.221 | -.208 | -.172 | -.148 | -.129 | -.100 |
| | .850 | -.193 | -.211 | -.236 | -.250 | -.242 | -.231 | -.205 | -.167 | -.117 | -.090 | -.068 | -.036 |
| | .925 | -.199 | -.219 | -.240 | -.251 | -.224 | -.189 | -.161 | -.128 | -.078 | -.043 | -.019 | .014 |
| | [a].975 | -.176 | -.211 | -.215 | -.220 | -.168 | -.126 | -.100 | -.073 | -.025 | .007 | .045 | .070 |
| | [a]1.000 | -.125 | -.175 | -.150 | -.125 | -.075 | -.050 | -.025 | -.010 | .050 | .075 | .150 | .175 |

[a]Faired value.

TABLE 8.– PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.82)(06.43) PROPELLER BLADE SECTION (x = 0.85) – Concluded

(k) M = 0.65; $\beta_{0.75R}$ = 44.53°.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| J | 2.083 | 2.117 | 2.139 | 2.161 | 2.189 | 2.221 | 2.243 | 2.286 | 2.326 | 2.381 |
| $M_{r_0}$ | 1.102 | 1.089 | 1.083 | 1.072 | 1.060 | 1.051 | 1.040 | 1.026 | 1.015 | .998 |
| $\alpha_M$ | 3.05 | 2.59 | 2.31 | 2.04 | 1.67 | 1.25 | .99 | .44 | –.05 | –.70 |
| $\Delta\beta$ | .56 | .53 | .52 | .50 | .48 | .46 | .45 | .42 | .39 | .35 |
| $\alpha_i$ | 1.06 | 1.03 | .98 | .94 | .83 | .69 | .56 | .43 | .32 | .12 |
| $c_n$ | .3389 | .3292 | .3163 | .3043 | .2688 | .2241 | .1851 | .1400 | .1026 | .0389 |
| $c_m$ | –.1087 | –.1105 | –.1106 | –.1097 | –.1052 | –.1016 | –.0971 | –.0963 | –.0944 | –.0880 |
| $c_0$ | .0364 | .0381 | .0382 | .0399 | .0422 | .0422 | .0415 | .0419 | .0410 | .0422 |

| | x/b | Pressure coefficient, P | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper surface | 0.000 | 1.341 | 1.332 | 1.328 | 1.321 | 1.313 | 1.307 | 1.300 | 1.291 | 1.284 | 1.273 |
| | .025 | .274 | .285 | .289 | .304 | .324 | .343 | .160 | .377 | .390 | .408 |
| | .050 | .221 | .209 | .195 | .184 | .168 | .156 | –.063 | .126 | [a].170 | [a].210 |
| | .100 | –.009 | –.001 | .005 | .012 | .018 | .032 | –.168 | .052 | .059 | .069 |
| | [a].200 | –.136 | –.134 | –.127 | –.107 | –.105 | –.085 | –.275 | –.069 | –.057 | –.063 |
| | .300 | –.213 | –.217 | –.207 | –.195 | –.187 | –.174 | –.372 | –.168 | –.168 | –.169 |
| | .400 | –.279 | –.282 | –.275 | –.269 | –.264 | –.255 | –.456 | –.255 | –.258 | –.269 |
| | .500 | –.339 | –.348 | –.346 | –.342 | –.341 | –.338 | –.546 | –.348 | –.349 | –.344 |
| | .600 | –.408 | –.423 | –.427 | –.426 | –.425 | –.417 | –.623 | –.421 | –.424 | –.429 |
| | [a].700 | –.480 | –.497 | –.505 | –.506 | –.507 | –.504 | –.703 | –.497 | –.508 | –.519 |
| | .800 | –.553 | –.575 | [a]–.581 | –.584 | –.589 | –.587 | –.786 | –.588 | –.599 | –.621 |
| | .900 | –.632 | –.663 | –.672 | –.680 | –.683 | –.686 | –.899 | –.713 | –.730 | –.758 |
| | .950 | –.617 | –.660 | –.676 | –.685 | –.699 | –.711 | –.928 | –.742 | –.759 | –.780 |
| Lower surface | .0375 | .295 | .257 | .219 | .183 | .117 | .048 | –.255 | –.146 | –.227 | –.331 |
| | .075 | .239 | .206 | .176 | .146 | .095 | .048 | –.221 | –.093 | –.171 | –.274 |
| | .150 | .198 | .172 | .148 | .129 | .089 | .053 | –.187 | –.047 | –.121 | –.222 |
| | .250 | .141 | .120 | .102 | .088 | .055 | .028 | –.211 | –.061 | –.125 | –.213 |
| | .350 | .091 | .070 | .052 | .038 | –.001 | –.033 | –.271 | –.100 | –.144 | –.225 |
| | .450 | [a].035 | [a].017 | [a]0 | [a]–.015 | –.052 | –.079 | –.320 | –.157 | [a]–.173 | [a]–.244 |
| | [a].550 | –.015 | –.032 | –.050 | –.062 | –.093 | –.115 | –.355 | –.183 | –.203 | –.273 |
| | .650 | –.064 | –.080 | –.092 | –.101 | –.129 | –.152 | –.384 | –.210 | –.236 | –.297 |
| | .750 | –.108 | –.122 | –.132 | –.139 | –.167 | –.187 | –.418 | –.245 | –.270 | –.319 |
| | .850 | –.144 | –.157 | –.168 | –.175 | –.204 | –.223 | –.452 | –.277 | –.304 | –.342 |
| | .925 | –.167 | –.182 | –.192 | –.200 | –.226 | –.245 | –.471 | –.294 | [a]–.319 | [a]–.352 |
| | .975 | –.138 | –.154 | [a]–.192 | [a]–.190 | [a]–.216 | [a]–.226 | –.441 | –.262 | –.307 | –.337 |
| | [a]1.000 | –.053 | –.050 | –.160 | –.118 | –.170 | –.133 | –.352 | –.180 | –.260 | –.307 |

[a]Faired value.

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TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90)

(a) N = 1140 rpm; $\beta_{0.75R} = 29.57^{\circ}$.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.740 | 0.852 | 0.969 | 1.055 | 1.163 | 1.245 | 1.377 | 1.308 | 1.196 | 1.107 | 1.011 | 0.902 | 0.808 |
| | $M_x$ | .481 | .493 | .511 | .521 | .518 | .534 | .551 | .535 | .529 | .515 | .510 | .505 | .494 |
| | $\rho_x'$ | 9.78 | 7.68 | 5.53 | 3.99 | 2.09 | .68 | -1.52 | -.37 | 1.52 | 3.08 | 4.78 | 6.76 | 8.50 |
| | $\Delta\beta$ | .26 | .26 | .25 | .24 | .22 | .21 | .19 | .20 | .22 | .23 | .24 | .25 | .26 |
| | $\rho_y'$ | 2.70 | 2.57 | 1.96 | 1.90 | 1.38 | .91 | .35 | .67 | 1.13 | 1.60 | 1.98 | 2.36 | 2.64 |
| | $\rho_n$ | .6824 | .6620 | .5071 | .4956 | .3655 | .2418 | .0940 | .1783 | .2999 | .4192 | .5156 | .6099 | .6778 |
| | $\rho_m$ | -.0338 | -.0263 | -.0323 | -.0418 | -.0432 | -.0508 | -.0510 | -.0543 | -.0525 | -.0529 | -.0487 | -.0378 | -.0376 |
| | $c_o$ | -.0177 | -.0250 | -.0173 | -.0164 | -.0107 | .0016 | .0076 | .0032 | -.0010 | -.0047 | -.0105 | -.0177 | -.0209 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.059 | 1.062 | 1.067 | 1.069 | 1.068 | 1.073 | 1.078 | 1.073 | 1.072 | 1.068 | 1.067 | 1.065 | 1.062 |
| | .025 | -.760 | -.974 | -.933 | -.925 | -.808 | -.027 | .243 | .045 | -.157 | -.443 | -.730 | -.949 | -1.045 |
| | .050 | -1.118 | -1.214 | -1.179 | -1.165 | -.524 | -.266 | -.023 | -.186 | -.387 | -.634 | -.963 | -1.216 | -1.291 |
| | .100 | -1.150 | -1.237 | -.823 | -.612 | -.415 | -.262 | -.086 | -.220 | -.347 | -.506 | -.666 | -1.106 | -1.220 |
| | .200 | [a]-.881 | [a]-.857 | -.494 | -.494 | [a]-.372 | [a]-.264 | [a]-.143 | [a]-.263 | -.308 | -.405 | -.518 | -.668 | -.822 |
| | .300 | -.695 | -.579 | -.463 | -.433 | -.354 | -.281 | [a]-.181 | -.286 | -.325 | -.397 | -.459 | -.489 | [a]-.594 |
| | .400 | -.546 | -.466 | -.416 | -.399 | -.337 | -.281 | -.215 | -.294 | -.316 | -.374 | -.419 | -.426 | -.471 |
| | .500 | -.429 | -.397 | -.381 | -.376 | -.332 | -.290 | -.236 | -.309 | -.316 | -.361 | -.391 | -.384 | -.386 |
| | .600 | -.335 | -.336 | -.341 | -.349 | -.318 | -.288 | -.252 | -.316 | -.310 | -.342 | -.363 | -.339 | -.320 |
| | .700 | -.264 | -.277 | -.289 | -.297 | -.283 | -.262 | -.232 | -.290 | -.274 | -.299 | -.307 | [a]-.298 | -.260 |
| | .800 | -.184 | -.195 | -.194 | -.215 | -.221 | -.212 | -.194 | -.266 | -.249 | [a]-.259 | [a]-.259 | -.252 | -.241 |
| | .900 | -.137 | -.113 | -.111 | -.123 | -.120 | -.119 | -.117 | -.160 | -.121 | -.130 | -.186 | -.107 | [a]-.191 |
| | .950 | [a]-.088 | [a]-.036 | -.017 | -.034 | -.034 | -.037 | -.039 | -.077 | -.035 | -.043 | -.042 | -.034 | [a]-.138 |
| Lower surface | .0375 | [a].610 | .530 | .499 | .416 | .220 | .031 | -.209 | -.124 | .145 | .333 | .464 | .560 | [a].564 |
| | .075 | .504 | .471 | .375 | .303 | .166 | .022 | -.151 | -.094 | .105 | .240 | .341 | .423 | [a].479 |
| | .150 | .380 | .351 | .277 | .222 | .119 | .022 | -.086 | -.064 | .073 | .171 | .247 | .313 | .366 |
| | .250 | .261 | .240 | .182 | .140 | .063 | -.006 | -.090 | -.081 | .034 | .105 | .161 | .214 | .256 |
| | .350 | .203 | .184 | .138 | .104 | .045 | -.001 | -.060 | -.064 | .018 | .075 | .120 | .163 | .197 |
| | .450 | .142 | .128 | .094 | .067 | .022 | -.018 | -.060 | -.073 | .003 | .050 | .083 | .117 | .143 |
| | .550 | .091 | .095 | .067 | .047 | .009 | -.023 | -.056 | -.077 | -.004 | .030 | .055 | .086 | .101 |
| | .650 | .059 | .099 | .044 | .029 | 0 | -.023 | -.043 | -.069 | -.010 | .016 | .034 | .058 | .066 |
| | .750 | .027 | .031 | .030 | .023 | 0 | -.018 | -.027 | -.060 | -.010 | .009 | .025 | .040 | .040 |
| | [a].850 | .002 | .019 | .036 | .040 | .020 | .018 | [a].006 | -.023 | .010 | .023 | .031 | .031 | .016 |
| | .925 | -.005 | .022 | .051 | .065 | .059 | .077 | [a].040 | [a].036 | [a].061 | .069 | .050 | .044 | .021 |
| | [a].975 | .043 | .061 | .125 | .124 | .122 | .152 | .091 | .116 | .148 | .128 | .093 | .082 | .064 |
| | [a]1.000 | .140 | .158 | .291 | .227 | .276 | .228 | .191 | .212 | .244 | .195 | .145 | .157 | .138 |

[a]Paired value.

TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Continued

(b) N = 1350 rpm; $\beta_{0.75R} = 29.57°$.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.026 | 1.095 | 1.185 | 1.285 | 1.378 | 1.298 | 1.233 | 1.142 | 1.058 | 0.967 | 0.928 | 0.874 |
| | $M_x$ | .615 | .618 | .630 | .635 | .643 | .639 | .635 | .618 | .610 | .603 | .596 | .595 |
| | $\alpha_x'$ | 4.51 | 3.28 | 1.71 | .01 | -1.53 | -.21 | .89 | 2.46 | 3.93 | 5.57 | 6.28 | 7.27 |
| | $\Delta\beta$ | .34 | .33 | .31 | .29 | .26 | .28 | .30 | .32 | .33 | .35 | .35 | .36 |
| | $\alpha_i$ | 2.06 | 1.76 | 1.42 | .79 | .39 | .72 | 1.01 | 1.45 | 1.88 | 2.23 | 2.39 | 2.57 |
| | $c_{p_l}$ | .5357 | .4599 | .3742 | .2175 | .1041 | .1908 | .2688 | .3816 | .4905 | .5798 | .6191 | .6629 |
| | $c_{p_m}$ | -.0436 | -.0422 | -.0404 | -.0517 | -.0618 | -.0582 | -.0585 | -.0488 | -.0487 | -.0427 | -.0390 | -.0305 |
| | $c_{p_o}$ | -.0125 | -.0146 | -.0122 | .0042 | .0051 | .0034 | .0018 | -.0063 | -.0101 | -.0129 | -.0149 | -.0196 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | |
| Upper surface | 0.000 | 1.097 | 1.098 | 1.103 | 1.105 | 1.107 | 1.106 | 1.105 | 1.098 | 1.096 | 1.093 | 1.091 | 1.091 |
| | .025 | -.873 | -.855 | -.779 | 0 | [a].216 | .101 | -.094 | -.283 | -.782 | [a]-1.040 | -.980 | -1.000 |
| | .050 | -1.212 | -.734 | -.504 | -.216 | [a].015 | -.138 | -.309 | -.499 | -.951 | -1.324 | -1.395 | -1.415 |
| | .100 | [a]-.690 | -.546 | -.416 | -.231 | -.080 | [a]-.190 | -.302 | -.413 | -.600 | -.875 | -1.103 | -1.304 |
| | .200 | [a]-.537 | [a]-.452 | [a]-.372 | [a]-.262 | [a]-.156 | [a]-.234 | -.289 | [a]-.358 | [a]-.494 | [a]-.593 | [a]-.659 | [a]-.820 |
| | .300 | -.468 | -.422 | -.362 | -.285 | [a]-.204 | -.257 | [a]-.307 | -.346 | -.453 | -.491 | -.514 | -.565 |
| | .400 | -.426 | -.392 | -.344 | -.291 | [a]-.241 | -.267 | -.318 | -.325 | -.418 | -.441 | -.453 | -.466 |
| | .500 | -.398 | -.375 | -.338 | -.302 | [a]-.266 | -.283 | -.327 | -.317 | -.393 | -.405 | -.410 | -.405 |
| | .600 | -.364 | -.352 | [a]-.320 | -.306 | -.282 | [a]-.285 | -.324 | -.304 | -.365 | -.365 | -.361 | -.344 |
| | .700 | -.308 | -.302 | -.283 | -.274 | -.258 | [a]-.273 | -.286 | -.258 | -.311 | -.305 | -.298 | -.280 |
| | .800 | [a]-.225 | -.232 | -.223 | -.233 | -.235 | [a]-.231 | -.255 | -.219 | -.261 | -.243 | -.232 | -.213 |
| | .900 | -.108 | -.110 | -.100 | -.118 | -.124 | [a]-.133 | -.123 | [a]-.092 | -.119 | [a]-.128 | [a]-.126 | -.097 |
| | .950 | -.014 | -.015 | -.008 | -.026 | -.039 | -.030 | -.027 | .012 | -.029 | -.021 | -.031 | [a]-.014 |
| Lower surface | .0375 | .465 | .350 | .220 | -.026 | -.248 | -.096 | .067 | .287 | .412 | .516 | .562 | [a].535 |
| | .075 | [a].367 | .263 | .165 | -.018 | -.179 | -.062 | .048 | .215 | .307 | .396 | .435 | [a].451 |
| | .150 | .255 | .181 | [a].112 | -.001 | -.107 | -.030 | .037 | .163 | .175 | .285 | .315 | .344 |
| | .250 | .174 | .124 | [a].073 | -.028 | -.110 | [a]-.042 | .002 | .106 | .140 | .192 | .219 | [a].250 |
| | .350 | .131 | .084 | .056 | -.015 | -.071 | -.030 | .009 | .086 | .103 | .146 | .165 | [a].189 |
| | .450 | .091 | .056 | .032 | -.026 | -.072 | -.031 | -.003 | .067 | .076 | .110 | .122 | .138 |
| | .550 | .064 | .035 | .014 | -.035 | -.066 | -.040 | -.018 | .046 | .048 | .073 | .085 | [a].103 |
| | .650 | .041 | .017 | .008 | -.030 | -.054 | -.036 | -.020 | .034 | .026 | .045 | .054 | .060 |
| | .750 | .034 | .014 | .004 | -.021 | -.033 | -.025 | -.017 | .032 | .021 | .032 | .037 | .036 |
| | [a].850 | .033 | .026 | .020 | .006 | .017 | .016 | .020 | .054 | .021 | .029 | .021 | .019 |
| | .925 | .063 | .056 | .066 | .060 | .091 | .072 | .075 | .093 | .056 | .050 | .044 | .032 |
| | [a].975 | .122 | .126 | .143 | .131 | .161 | .195 | .172 | .169 | .123 | .104 | .123 | .116 |
| | [a]1.000 | .207 | .252 | .255 | .242 | .271 | .424 | .385 | .297 | .221 | .239 | .282 | .263 |

[a]Paired value.

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TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Continued

(c) N = 1600 rpm; $\beta_{0.75R}$ = 29.57°.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.960 | 1.030 | 1.119 | 1.181 | 1.267 | 1.354 | 1.423 | 1.376 | 1.307 | 1.220 | 1.141 | 1.069 | 0.996 |
| | $M_x$ | .713 | .710 | .738 | .743 | .748 | .762 | .771 | .770 | .761 | .749 | .738 | .734 | .726 |
| | $\alpha_x'$ | 5.69 | 4.37 | 2.86 | 1.78 | .32 | -1.14 | -2.26 | -1.50 | -.36 | 1.11 | 1.47 | 3.74 | 5.05 |
| | $\Delta\beta$ | .46 | .45 | .44 | .43 | .41 | .40 | .38 | .39 | .41 | .42 | .43 | .44 | .45 |
| | $\alpha_i$ | 2.66 | 2.49 | 1.85 | 1.47 | .98 | .57 | .25 | .46 | .75 | 1.27 | 1.73 | 2.28 | 2.44 |
| | $c_n$ | .6930 | .6495 | .4879 | .3878 | .2598 | .1535 | .0682 | .1252 | .2009 | .3354 | .4567 | .5964 | .6373 |
| | $c_m$ | -.0208 | -.0288 | -.0451 | -.0506 | -.0588 | -.0650 | -.0705 | -.0651 | -.0607 | -.0556 | -.0452 | -.0373 | -.0350 |
| | $c_o$ | -.0436 | -.0386 | -.0109 | -.0107 | -.0009 | .0053 | .0053 | .0057 | -.0005 | -.0099 | -.0181 | -.0271 | -.0257 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.134 | 1.133 | 1.144 | 1.146 | 1.148 | 1.154 | 1.158 | 1.158 | 1.154 | 1.149 | 1.144 | 1.142 | 1.139 |
| | .025 | [a]-1.611 | [a]-1.625 | -.952 | -.519 | -.080 | .158 | .290 | .182 | -.016 | -.419 | -1.143 | -1.273 | -1.362 |
| | .050 | -1.661 | -1.655 | -1.212 | -.543 | -.258 | -.032 | .112 | .042 | -.104 | -.370 | -.608 | -1.368 | -1.511 |
| | .100 | -1.468 | -1.354 | -.532 | -.458 | -.269 | -.114 | -.005 | -.061 | -.167 | -.366 | -.495 | -1.027 | -1.336 |
| | .200 | [a]-.838 | [a]-.545 | [a]-.471 | [a]-.431 | [a]-.304 | [a]-.196 | [a]-.132 | [a]-.160 | -.240 | [a]-.378 | [a]-.463 | [a]-.612 | -.484 |
| | .300 | -.432 | -.442 | -.458 | -.420 | -.335 | -.260 | -.202 | -.231 | -.291 | -.384 | -.445 | -.471 | [a]-.418 |
| | .400 | -.375 | -.438 | -.428 | -.400 | -.338 | -.288 | -.246 | -.268 | -.307 | -.377 | -.418 | -.449 | -.426 |
| | .500 | -.403 | -.433 | -.414 | -.395 | -.349 | -.319 | -.290 | -.304 | -.331 | -.382 | -.408 | -.433 | -.424 |
| | .600 | -.386 | -.407 | -.391 | -.384 | -.353 | -.343 | -.328 | -.334 | -.348 | -.378 | -.390 | -.405 | -.401 |
| | .700 | -.327 | -.340 | -.327 | -.324 | -.305 | -.306 | -.299 | -.303 | -.309 | -.327 | -.328 | -.338 | -.337 |
| | .800 | -.253 | -.267 | -.257 | -.261 | -.253 | -.272 | -.278 | -.279 | -.275 | -.274 | -.264 | -.267 | -.267 |
| | .900 | -.093 | -.098 | -.092 | -.097 | -.098 | -.119 | -.128 | -.154 | -.121 | -.114 | -.100 | -.105 | -.108 |
| | .950 | .111 | .031 | .017 | .007 | .004 | -.013 | -.024 | -.025 | -.016 | -.007 | .004 | .001 | -.004 |
| Lower surface | .0375 | .466 | .431 | .320 | .209 | .019 | -.187 | -.736 | -.261 | -.140 | .116 | .285 | .407 | .495 |
| | .075 | .416 | .354 | .252 | .151 | [a].016 | -.148 | -.301 | -.212 | -.089 | .083 | [a].212 | .304 | .380 |
| | .150 | .320 | .261 | [a].167 | [a].096 | [a].012 | [a]-.105 | -.175 | [a]-.155 | -.055 | .054 | .136 | .222 | .278 |
| | .250 | .219 | .172 | .112 | .055 | [a].005 | [a]-.074 | [a]-.138 | [a]-.111 | [a]-.051 | [a].024 | .088 | .143 | .190 |
| | .350 | .170 | .130 | .090 | .047 | -.002 | -.066 | -.107 | -.091 | -.048 | [a].010 | .073 | .116 | .147 |
| | .450 | .130 | .097 | .062 | .025 | [a]-.016 | -.053 | [a]-.098 | [a]-.080 | [a]-.051 | 0 | .054 | .092 | .121 |
| | .550 | .089 | .058 | .030 | -.001 | -.027 | -.058 | -.088 | -.078 | -.057 | -.019 | .017 | .047 | .074 |
| | .650 | .059 | .038 | .016 | -.009 | -.026 | -.053 | -.070 | -.064 | -.048 | -.022 | .005 | .030 | .047 |
| | .750 | .047 | .023 | .008 | -.012 | [a]-.014 | -.034 | -.041 | -.041 | -.035 | -.022 | -.001 | .015 | .031 |
| | .850 | .051 | .033 | .027 | .017 | .020 | .013 | .011 | .005 | .010 | .011 | .020 | .030 | .041 |
| | .925 | .069 | .060 | .062 | .037 | .069 | .068 | .073 | .067 | .063 | .058 | .058 | .062 | .065 |
| | [a].975 | .185 | .151 | .171 | .129 | .155 | .161 | .179 | .186 | .149 | .158 | .169 | .133 | .164 |
| | [a]1.000 | .731 | .313 | .359 | .244 | .273 | .282 | .351 | .377 | .253 | .407 | .358 | .259 | .364 |

[a]Paired value.

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TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Continued

(d) N = 2000 rpm; $\beta_{0.75R} = 29.57^{\circ}$.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | | 1.058 | 1.137 | 1.180 | 1.266 | 1.302 | 1.387 | 1.404 | 1.327 | 1.284 | 1.217 | 1.139 | 1.107 | 1.037 |
| $M_x$ | | .926 | .919 | .943 | .936 | .954 | .947 | .971 | .945 | .945 | .933 | .931 | .922 | .916 |
| $\alpha_x$ | | 3.93 | 2.55 | 1.80 | .33 | -.27 | -1.68 | -1.96 | -.69 | .03 | 1.16 | 2.51 | 3.07 | 4.31 |
| $\Delta\beta$ | | .71 | .67 | .64 | .60 | .58 | .55 | .54 | .57 | .59 | .62 | .67 | .69 | .72 |
| $\alpha_i$ | | 2.14 | 1.83 | 1.44 | .97 | .56 | -.07 | -.34 | .24 | .65 | 1.17 | 1.60 | 1.91 | 2.25 |
| $c_n$ | | .5592 | .4838 | .3815 | .2602 | .1492 | -.0195 | -.0915 | .0657 | .1727 | .3084 | .4220 | .5010 | .5876 |
| $c_m$ | | -.0767 | -.0755 | -.0834 | -.0861 | -.0737 | -.0708 | -.0663 | -.0716 | -.0706 | -.0824 | -.0724 | -.0846 | -.0858 |
| $c_o$ | | .0020 | .0052 | .0107 | .0156 | .0138 | .0139 | .0130 | .0143 | .0131 | .0113 | .0061 | .0091 | .0133 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.233 | 1.229 | 1.242 | 1.238 | 1.248 | 1.244 | 1.258 | 1.243 | 1.243 | 1.236 | 1.235 | 1.230 | 1.228 |
| | .025 | -.238 | -.165 | -.023 | .137 | .217 | .329 | .365 | .231 | .129 | .055 | [a]-.157 | [a]-.031 | [a].140 |
| | .050 | [a]-.377 | [a]-.256 | [a]-.080 | [a]-.040 | [a].104 | [a].230 | [a].278 | [a].155 | [a].075 | [a]-.060 | -.201 | -.210 | -.223 |
| | .100 | -.514 | -.347 | -.172 | -.070 | .001 | .092 | .132 | .042 | -.017 | -.090 | -.260 | -.387 | -.571 |
| | [a].200 | -.569 | -.456 | -.332 | -.224 | -.157 | -.062 | -.025 | -.116 | -.167 | -.228 | -.387 | -.474 | -.622 |
| | .300 | -.597 | -.525 | -.416 | -.325 | -.249 | -.154 | -.118 | -.207 | -.268 | -.358 | -.462 | -.529 | -.643 |
| | .400 | -.622 | -.577 | -.480 | -.386 | -.297 | -.221 | -.183 | -.255 | -.319 | -.419 | -.515 | -.583 | -.687 |
| | .500 | -.667 | -.621 | -.521 | -.434 | -.362 | -.295 | -.253 | -.332 | -.380 | -.462 | -.554 | -.624 | -.727 |
| | .600 | -.707 | -.680 | -.593 | -.519 | -.453 | -.391 | -.347 | -.422 | -.467 | -.539 | -.619 | -.681 | -.773 |
| | .700 | -.438 | -.656 | -.636 | -.577 | -.516 | -.462 | -.423 | -.491 | -.529 | -.596 | -.666 | -.723 | -.408 |
| | .800 | -.242 | -.257 | -.504 | -.618 | -.607 | -.571 | -.534 | -.590 | -.621 | -.672 | -.296 | -.239 | -.278 |
| | .900 | -.231 | -.201 | -.179 | -.181 | -.180 | -.324 | -.398 | -.244 | -.186 | -.179 | -.178 | -.194 | -.257 |
| | .950 | -.212 | -.186 | -.155 | -.137 | -.120 | -.109 | -.099 | -.117 | -.120 | -.135 | -.148 | -.176 | -.245 |
| Lower surface | .0375 | .400 | .289 | .166 | -.047 | -.343 | -.521 | -.564 | -.482 | -.274 | .041 | .242 | .313 | .422 |
| | .075 | .319 | .226 | .132 | .008 | -.158 | -.427 | -.480 | -.361 | -.076 | .053 | .197 | .251 | .341 |
| | .150 | .255 | .180 | .109 | .011 | -.064 | -.348 | -.416 | -.166 | -.054 | .043 | .150 | .192 | .267 |
| | .250 | .166 | .105 | .045 | [a]-.011 | [a]-.056 | -.318 | -.395 | -.165 | [a]-.058 | -.009 | .082 | .118 | .175 |
| | .350 | .134 | .081 | .031 | -.028 | -.084 | -.198 | -.331 | -.152 | -.068 | -.010 | .064 | .093 | .141 |
| | .450 | .092 | .046 | .008 | -.037 | -.064 | -.165 | -.230 | -.091 | -.051 | -.011 | .049 | .072 | .114 |
| | .550 | .026 | -.016 | -.049 | [a]-.089 | [a]-.096 | [a]-.161 | -.217 | -.125 | -.108 | -.078 | -.024 | -.005 | .033 |
| | .650 | -.015 | -.055 | -.082 | -.122 | -.145 | -.183 | -.213 | -.157 | -.143 | -.112 | [a]-.078 | -.045 | -.015 |
| | .750 | -.069 | -.110 | -.136 | -.171 | -.193 | -.206 | -.223 | -.207 | -.193 | -.169 | -.119 | -.102 | -.074 |
| | .850 | -.092 | -.131 | -.162 | -.198 | -.218 | -.210 | -.217 | -.228 | -.216 | -.193 | -.134 | -.118 | -.098 |
| | .925 | -.087 | -.108 | -.124 | -.156 | -.178 | -.152 | -.120 | -.183 | -.172 | -.148 | -.112 | -.107 | -.100 |
| | [a].975 | -.051 | -.043 | .046 | .022 | -.061 | -.014 | .127 | -.054 | -.059 | 0 | -.031 | -.036 | -.024 |
| | [a]1.000 | .086 | .067 | .306 | .213 | .086 | .226 | .401 | .151 | .086 | .152 | .128 | .103 | .182 |

[a]Faired value.

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TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Continued

(e) N = 2160 rpm; $\beta_{0.75R} = 29.57°$.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | J | 1.048 | 1.109 | 1.170 | 1.263 | 1.350 | 1.405 | 1.373 | 1.259 |
| | $M_x$ | 1.004 | 1.013 | 1.018 | 1.019 | 1.038 | 1.045 | 1.040 | 1.022 |
| | $c_x'$ | 4.11 | 3.04 | 1.97 | .38 | -1.08 | -1.98 | -1.45 | .45 |
| | $\Phi$ | .79 | .76 | .74 | .70 | .66 | .64 | .65 | .70 |
| | $c_l$ | 2.05 | 1.73 | 1.32 | .61 | -.21 | -.65 | -.44 | .54 |
| | $c_n$ | .5334 | .4533 | .3488 | .1619 | -.0564 | -.1742 | -.1184 | .1424 |
| | $c_m$ | -.1333 | -.1887 | -.1212 | -.0901 | -.0615 | -.0334 | -.0508 | -.0904 |
| | $c_o$ | .0235 | .0300 | .0307 | .0246 | .0284 | .0316 | .0316 | .0274 |
| | x/b | Pressure coefficient, P | | | | | | | |
| Upper surface | 0.000 | 1.277 | 1.282 | 1.285 | 1.286 | 1.298 | 1.303 | 1.300 | 1.288 |
| | .025 | [a]-.041 | [a].116 | [a].219 | .220 | .379 | .451 | .411 | .231 |
| | [a].050 | -.140 | -.012 | .110 | .172 | .296 | .370 | .319 | .190 |
| | .100 | [a]-.219 | -.140 | -.010 | .080 | .180 | .233 | .218 | .111 |
| | .200 | -.313 | [a]-.251 | [a]-.147 | [a]-.064 | [a].038 | [a].070 | .089 | -.030 |
| | [a].300 | -.388 | -.330 | -.243 | -.165 | -.056 | -.016 | -.014 | -.134 |
| | .400 | -.458 | -.398 | -.323 | -.232 | -.136 | [a]-.087 | -.101 | -.219 |
| | .500 | -.519 | -.470 | -.394 | -.302 | -.213 | [a]-.161 | -.192 | -.289 |
| | .600 | -.579 | -.534 | -.466 | -.387 | -.301 | [a]-.243 | -.281 | -.370 |
| | .700 | -.627 | -.588 | -.523 | -.450 | -.366 | -.326 | -.345 | -.445 |
| | .800 | -.690 | -.659 | -.605 | -.542 | -.464 | -.427 | -.441 | -.523 |
| | .900 | -.668 | [a]-.701 | [a]-.668 | -.621 | -.552 | -.517 | -.530 | -.601 |
| | .950 | [a]-.502 | [a]-.690 | [a]-.635 | -.478 | -.511 | -.506 | -.527 | -.586 |
| Lower surface | .0375 | .352 | .259 | .162 | -.198 | -.360 | -.415 | -.400 | -.247 |
| | .075 | .293 | .216 | .146 | -.071 | -.288 | -.345 | -.384 | -.096 |
| | .150 | .241 | .177 | .126 | -.020 | -.244 | -.302 | -.284 | -.040 |
| | [a].250 | .176 | .127 | .095 | -.033 | [a]-.243 | [a]-.298 | [a]-.275 | -.051 |
| | .350 | [a].123 | [a].080 | .061 | [a]-.060 | [a]-.243 | [a]-.298 | [a]-.277 | [a]-.079 |
| | .450 | .072 | .032 | [a].024 | -.088 | -.241 | [a]-.300 | -.283 | -.099 |
| | .550 | .038 | .002 | -.015 | -.087 | -.207 | -.306 | -.278 | -.093 |
| | .650 | -.005 | -.043 | -.058 | -.110 | -.195 | -.314 | -.273 | -.122 |
| | .750 | -.075 | -.110 | -.122 | -.161 | -.232 | -.334 | -.265 | -.170 |
| | .850 | -.118 | -.152 | -.167 | -.198 | -.250 | -.339 | -.268 | -.206 |
| | [a].925 | -.094 | -.113 | -.161 | [a]-.192 | -.243 | -.314 | -.261 | -.207 |
| | [a].975 | -.033 | -.067 | -.104 | -.144 | -.196 | -.276 | -.236 | -.183 |
| | [a]1.000 | .104 | 0 | 0 | -.076 | -.100 | -.225 | -.175 | -.127 |

[a]Faired value.

TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Continued

(f) N = 1140 rpm; $\beta_{0.75R} = 44.71°$.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 1.595 | 1.737 | 1.858 | 1.985 | 2.107 | 2.237 | 2.372 | 2.499 | 2.582 | 2.407 | 2.286 | 2.142 | 2.047 | 1.935 | 1.794 | 1.684 |
| | $M_x$ | .548 | .579 | .597 | .601 | .616 | .624 | .640 | .654 | .664 | .644 | .632 | .619 | .603 | .596 | .584 | .566 |
| | $\alpha_x'$ | 10.17 | 8.03 | 6.28 | 4.51 | 2.90 | 1.24 | -.40 | -1.89 | -2.81 | -.81 | .64 | 2.44 | 3.68 | 5.20 | 7.19 | 8.81 |
| | $\Delta\beta$ | .25 | .25 | .24 | .22 | .21 | .19 | .17 | .15 | .14 | .16 | .18 | .20 | .21 | .23 | .24 | .25 |
| | $\alpha_i$ | 2.79 | 2.61 | 2.29 | 2.00 | 1.44 | 1.04 | .54 | .22 | -.02 | .39 | .80 | 1.24 | 1.60 | 1.97 | 2.32 | 2.52 |
| | $c_n$ | .7845 | .7335 | .6449 | .5659 | .4076 | .2971 | .1534 | .0638 | -.0051 | .1108 | .2291 | .3515 | .4510 | .5575 | .6521 | .7087 |
| | $c_m$ | -.0344 | -.0128 | -.0294 | -.0358 | -.0497 | -.0471 | -.0558 | -.0629 | -.0662 | -.0507 | -.0417 | -.0346 | -.0224 | -.0140 | .0079 | .0152 |
| | $c_c$ | -.0372 | -.0445 | -.0378 | -.0335 | -.0143 | -.0093 | -.0009 | .0044 | .0056 | .0004 | -.0068 | -.0124 | -.0201 | -.0312 | -.0397 | -.0464 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.083 | 1.086 | 1.092 | 1.093 | 1.098 | 1.101 | 1.106 | 1.111 | 1.115 | 1.108 | 1.103 | 1.099 | 1.093 | 1.091 | 1.088 | 1.082 |
| | .025 | -1.463 | -1.817 | -1.715 | -1.658 | -.709 | -.407 | -.048 | .203 | .341 | .023 | -.254 | -.588 | -1.112 | -1.600 | -1.721 | -1.802 |
| | .050 | -1.295 | -1.613 | -1.602 | -1.560 | -.622 | -.365 | -.114 | .075 | .186 | -.056 | -.254 | -.523 | -.730 | -1.266 | -1.581 | -1.663 |
| | .100 | -1.219 | -1.402 | -1.016 | -.654 | -.479 | -.321 | -.160 | -.027 | .057 | -.119 | -.254 | -.430 | -.558 | -.759 | -1.323 | -1.439 |
| | .200 | -1.110 | -.981 | -.617 | -.540 | -.444 | -.342 | -.235 | -.144 | -.090 | -.206 | -.293 | -.404 | -.490 | -.563 | -.775 | -1.064 |
| | .300 | -.888 | -.660 | -.512 | -.482 | -.414 | -.343 | -.272 | -.205 | -.160 | -.251 | -.310 | -.385 | -.446 | -.495 | -.554 | -.717 |
| | .400 | -.676 | -.497 | -.448 | -.431 | [a]-.392 | [a]-.332 | [a]-.276 | -.227 | [a]-.202 | [a]-.276 | [a]-.320 | [a]-.362 | [a]-.423 | [a]-.457 | -.461 | -.535 |
| | .500 | -.509 | -.413 | -.416 | -.413 | [a]-.372 | [a]-.326 | [a]-.290 | [a]-.256 | [a]-.239 | [a]-.288 | [a]-.319 | [a]-.358 | -.395 | -.415 | -.415 | -.430 |
| | .600 | -.382 | -.341 | -.360 | -.368 | -.347 | -.321 | -.302 | -.276 | -.259 | -.294 | -.311 | -.339 | -.361 | -.368 | -.357 | -.344 |
| | .700 | -.293 | -.278 | -.311 | -.329 | [a]-.297 | -.307 | -.297 | -.284 | -.273 | -.293 | -.301 | -.311 | -.323 | -.323 | -.299 | -.275 |
| | [a].800 | -.217 | -.196 | -.220 | -.262 | -.226 | -.245 | -.248 | -.248 | -.243 | -.240 | -.243 | -.249 | -.270 | -.283 | -.258 | -.244 |
| | .900 | -.158 | -.106 | -.101 | -.111 | -.116 | -.118 | -.130 | -.141 | -.143 | -.128 | -.122 | -.123 | -.148 | -.175 | -.213 | -.241 |
| | .950 | -.136 | -.061 | -.031 | -.027 | -.027 | -.027 | -.044 | -.055 | -.060 | -.046 | -.035 | -.025 | -.022 | -.027 | -.044 | -.080 |
| Lower surface | .0375 | .520 | .530 | .528 | [a].370 | [a].181 | .075 | -.176 | -.413 | -.709 | -.235 | -.022 | .205 | .339 | .475 | .594 | [a].642 |
| | .075 | [a].439 | [a].467 | [a].426 | .288 | .151 | .022 | -.160 | -.311 | -.386 | -.202 | [a]-.011 | [a].178 | [a].266 | .362 | [a].467 | .511 |
| | .150 | .350 | .363 | .307 | .233 | .144 | [a]-.009 | [a]-.134 | -.170 | -.234 | [a]-.156 | 0 | .117 | .187 | .265 | .343 | .378 |
| | .250 | .272 | .237 | .183 | .124 | .052 | -.012 | -.099 | [a]-.111 | [a]-.159 | -.115 | [a]0 | [a].029 | [a].125 | [a].190 | [a].243 | [a].261 |
| | .350 | .224 | .217 | .183 | .125 | .066 | [a].001 | [a]-.065 | -.097 | -.129 | -.085 | -.007 | -.002 | .088 | .142 | .175 | .158 |
| | .450 | .165 | .141 | .113 | .071 | .025 | -.010 | -.064 | -.097 | -.122 | -.072 | -.025 | [a]-.010 | .050 | .087 | .058 | .037 |
| | .550 | .096 | .086 | .069 | .031 | -.006 | -.033 | [a]-.072 | -.097 | -.112 | -.079 | -.045 | -.010 | .014 | .046 | [a].016 | -.007 |
| | .650 | [a].022 | .041 | [a].030 | [a].006 | -.015 | [a]-.035 | [a]-.070 | [a]-.085 | [a]-.097 | [a]-.110 | [a]-.098 | [a]-.023 | [a]-.039 | [a]-.016 | [a]-.071 | -.103 |
| | .750 | -.027 | -.003 | [a].010 | .006 | [a].001 | -.027 | -.048 | -.051 | -.062 | -.110 | -.144 | -.080 | -.108 | -.134 | -.174 | -.204 |
| | .850 | -.047 | -.024 | .004 | .025 | .047 | [a].001 | [a]0 | .005 | 0 | -.046 | -.075 | -.112 | -.137 | -.166 | -.206 | -.235 |
| | .925 | [a].015 | [a].006 | .071 | .075 | [a].112 | .058 | .048 | .059 | .062 | .049 | .047 | .034 | [a]-.051 | [a]-.063 | -.046 | -.072 |
| | [a].975 | .163 | .120 | .255 | .187 | .206 | .148 | .125 | .135 | .140 | .138 | .204 | .193 | .080 | .139 | .165 | .228 |
| | [a]1.000 | .398 | .305 | .557 | .414 | .322 | .306 | .245 | .260 | .270 | .220 | .361 | .322 | .242 | .429 | .383 | .647 |

[a]Paired value.

TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Continued

(g) N = 1350 rpm; $\beta_{0.75R} = 44.71°$.

| | J | 1.335 | 1.658 | 1.759 | 1.882 | 1.988 | 2.076 | 2.197 | 2.285 | 2.419 | 2.564 | 2.456 | 2.343 | 2.238 | 2.117 | 2.003 | 1.904 | 1.815 | 1.744 | 1.703 | 1.590 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .665 | .679 | .692 | .702 | .714 | .727 | .740 | .754 | .771 | .794 | .776 | .756 | .740 | .729 | .718 | .705 | .693 | .677 | .676 | .670 |
| | $\alpha_x'$ | 11.09 | 9.20 | 7.70 | 5.94 | 4.47 | 3.30 | 1.74 | .64 | -.95 | -2.61 | -1.39 | -.05 | 1.22 | 2.78 | 4.28 | 5.63 | 6.90 | 7.92 | 8.52 | 10.24 |
| | $\Delta\beta$ | .36 | .35 | .34 | .32 | .31 | .30 | .27 | .25 | .22 | .18 | .21 | .23 | .26 | .29 | .31 | .32 | .33 | .34 | .34 | .35 |
| | $\alpha_l$ | 2.85 | 2.98 | 2.81 | 2.63 | 2.29 | 1.89 | 1.38 | 1.03 | .40 | -.13 | .29 | .68 | 1.13 | 1.37 | 1.70 | 2.11 | 2.40 | 2.65 | 2.65 | 2.79 |
| | $c_n$ | .7991 | .8388 | .7920 | .7436 | .6481 | .5355 | .3933 | .2933 | .1148 | -.0372 | .0818 | .1983 | .3206 | .3878 | .4831 | .5953 | .6763 | .7433 | .7467 | .7864 |
| | $c_a$ | -.0609 | -.0373 | -.0316 | -.0305 | -.0259 | -.0887 | -.0331 | -.0361 | -.0588 | -.0714 | -.0674 | -.0638 | -.0593 | -.0462 | -.0435 | -.0474 | -.0421 | -.0354 | -.0329 | -.0360 |
| | $c_o$ | -.0192 | -.0898 | -.0328 | -.0347 | -.0338 | -.0401 | -.0216 | -.0196 | .0076 | .0003 | .0056 | .0008 | -.0031 | -.0093 | -.0166 | -.0159 | -.0216 | -.0201 | -.0188 | -.0218 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.115 | 1.121 | 1.126 | 1.130 | 1.135 | 1.140 | 1.145 | 1.151 | 1.158 | 1.168 | 1.160 | 1.152 | 1.145 | 1.140 | 1.136 | 1.131 | 1.126 | 1.120 | 1.120 | 1.117 |
| | [a].025 | -1.194 | -1.408 | -1.362 | -1.338 | -1.283 | -1.211 | -1.208 | -1.103 | .266 | .385 | .210 | -.020 | -.336 | -.552 | -1.126 | -.835 | -.933 | -.833 | -.703 | -.970 |
| | .050 | -1.135 | -1.563 | -1.490 | -1.446 | -1.371 | -1.310 | -1.250 | -1.189 | .011 | .203 | .068 | -.106 | -.336 | -.543 | -1.049 | -1.215 | -1.272 | -1.342 | -1.347 | -1.377 |
| | .100 | -.991 | -1.398 | -1.389 | -1.289 | -1.220 | -.916 | -.464 | -.259 | -.081 | .057 | -.042 | -.178 | -.333 | -.489 | -.608 | -1.261 | -1.353 | -1.429 | -1.436 | -1.464 |
| | [a].200 | -.840 | -1.162 | -1.091 | -1.044 | -.949 | -.706 | -.425 | -.281 | -.160 | -.070 | -.140 | -.228 | -.331 | -.391 | -.364 | -.528 | -.786 | -.968 | -1.018 | -1.025 |
| | .300 | -.728 | -.951 | -.898 | [a]-.809 | [a]-.705 | [a]-.754 | [a]-.392 | [a]-.303 | [a]-.220 | [a]-.150 | [a]-.200 | [a]-.284 | [a]-.336 | [a]-.327 | [a]-.323 | [a]-.363 | [a]-.314 | [a]-.655 | [a]-.733 | [a]-.732 |
| | .400 | -.634 | -.770 | -.663 | -.591 | -.505 | -.425 | -.369 | -.327 | -.270 | -.215 | -.258 | -.302 | -.349 | -.319 | -.370 | -.391 | -.371 | -.558 | -.558 | -.540 |
| | .500 | -.570 | -.555 | -.421 | -.422 | -.386 | -.368 | -.339 | -.315 | -.305 | -.259 | -.295 | -.335 | -.368 | -.367 | -.409 | -.447 | [a]-.363 | [a]-.463 | [a]-.492 | [a]-.450 |
| | .600 | [a]-.477 | [a]-.436 | [a]-.385 | [a]-.355 | [a]-.344 | [a]-.335 | [a]-.318 | [a]-.311 | [a]-.301 | [a]-.283 | [a]-.315 | [a]-.346 | [a]-.370 | [a]-.376 | [a]-.394 | [a]-.430 | [a]-.355 | -.362 | -.363 | -.385 |
| | .700 | -.400 | -.353 | -.271 | -.309 | -.312 | -.302 | -.297 | -.301 | -.290 | -.288 | -.318 | -.330 | -.333 | -.333 | -.349 | -.353 | -.345 | -.384 | -.377 | -.381 |
| | .800 | -.342 | -.270 | -.216 | [a]-.212 | [a]-.193 | [a]-.231 | -.264 | -.266 | -.283 | [a]-.230 | -.298 | -.279 | -.266 | -.260 | -.264 | -.266 | -.254 | -.801 | -.198 | -.264 |
| | .900 | -.280 | -.216 | -.098 | -.085 | -.056 | -.043 | -.046 | -.054 | -.071 | -.084 | -.110 | -.140 | -.167 | -.077 | -.113 | -.142 | -.162 | [a]-.132 | [a]-.141 | -.215 |
| | .950 | -.244 | -.195 | -.026 | -.010 | .004 | .027 | .033 | .024 | .011 | -.003 | -.025 | -.047 | -.045 | .012 | -.017 | -.036 | -.050 | -.071 | -.068 | -.188 |
| Lower surface | .0375 | .737 | .666 | .639 | .568 | .440 | .329 | .151 | -.021 | -.225 | -1.147 | -.507 | -.164 | .080 | .269 | .406 | .520 | .604 | .665 | .682 | .713 |
| | .075 | .603 | .583 | .516 | [a].455 | .332 | .244 | .112 | -.008 | -.189 | -.822 | -.238 | -.090 | .060 | .200 | .305 | .397 | .470 | .521 | .536 | .566 |
| | .150 | .466 | .389 | .395 | .331 | .246 | .181 | .086 | .003 | -.121 | -.154 | -.156 | -.056 | .048 | .149 | .226 | .297 | .356 | .394 | .407 | .433 |
| | [a].250 | .348 | .278 | .289 | .251 | .170 | .123 | .049 | -.001 | -.088 | -.126 | -.122 | -.049 | .026 | .109 | .163 | .213 | .263 | .288 | .303 | .319 |
| | .350 | .266 | .209 | .229 | .185 | .129 | .087 | .030 | -.017 | -.080 | -.131 | -.102 | -.031 | .007 | .068 | .114 | .159 | .201 | .224 | .231 | .244 |
| | .450 | .185 | .135 | .167 | .128 | .083 | .045 | 0 | -.037 | -.084 | -.123 | -.099 | -.063 | -.018 | .031 | .070 | .106 | .142 | .159 | .164 | .171 |
| | .550 | .125 | .089 | .125 | .093 | .055 | .023 | -.013 | -.043 | -.076 | -.106 | -.089 | -.061 | -.027 | .012 | .043 | .075 | .105 | .114 | .115 | .117 |
| | .650 | .077 | .042 | .097 | .071 | .041 | .016 | -.012 | -.034 | -.057 | -.076 | -.067 | -.050 | -.026 | .007 | .031 | .055 | .078 | .081 | .079 | .078 |
| | .750 | .010 | -.018 | .061 | .046 | .021 | .004 | -.016 | -.030 | -.041 | -.050 | -.047 | -.040 | -.025 | -.007 | .008 | .025 | .044 | .039 | .037 | .013 |
| | .850 | -.033 | [a]-.060 | .061 | .055 | .041 | .028 | .019 | .013 | .015 | .016 | .015 | .018 | .017 | .027 | .034 | .045 | .054 | .036 | .023 | -.011 |
| | .925 | -.075 | -.063 | .066 | .071 | .066 | .059 | .061 | .061 | .071 | .079 | .078 | .062 | .060 | .060 | .061 | .063 | .070 | .036 | .014 | -.042 |
| | [a].975 | -.073 | -.051 | .093 | .101 | .102 | .111 | .132 | .113 | .111 | .141 | .135 | .121 | .116 | .120 | .101 | .096 | .119 | .061 | .042 | -.040 |
| | [a]1.000 | -.020 | 0 | .152 | .172 | .162 | .181 | .201 | .191 | .160 | .220 | .225 | .251 | .226 | .226 | .152 | .152 | .183 | .122 | .092 | .020 |

[a]Paired value.

TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Continued

(h) N = 1600 rpm; $\beta_{0.75R} = 44.71°$.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| J | 1.985 | 2.065 | 2.175 | 2.256 | 2.374 | 2.499 | 2.430 | 2.333 | 2.199 | 2.125 | 2.022 |
| $M_r$ | .848 | .859 | .874 | .874 | .885 | .907 | .929 | .916 | .893 | .872 | .864 |
| $\alpha_r'$ | 4.52 | 3.45 | 2.02 | 1.00 | -.43 | -1.88 | -1.09 | .06 | 1.72 | 2.66 | 4.02 |
| $\Delta\beta$ | .49 | .43 | .38 | .35 | .30 | .25 | .28 | .32 | .38 | .40 | .45 |
| $\alpha_1$ | 2.55 | 2.20 | 1.53 | 1.06 | .49 | -.38 | .10 | .57 | 1.37 | 1.70 | 2.27 |
| $c_n$ | .7223 | .6233 | .4366 | .3022 | .1399 | -.1092 | .0296 | .1621 | .3900 | .4818 | .6423 |
| $c_m$ | -.0615 | -.0637 | -.0667 | -.0736 | -.0785 | -.0697 | -.0849 | -.0721 | -.0682 | -.0614 | -.0566 |
| $c_c$ | -.0285 | -.0215 | -.0088 | .0005 | .0073 | .0101 | .0082 | .0068 | -.0041 | -.0131 | -.0114 |

| | c/b | Pressure coefficient, P | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper surface | 0.000 | 1.192 | 1.198 | 1.205 | 1.205 | 1.211 | 1.223 | 1.234 | 1.227 | 1.215 | 1.204 | 1.200 |
| | .025 | -.982 | -.814 | -.373 | -.086 | .175 | .365 | .286 | .104 | -.284 | -.578 | -.942 |
| | .050 | -.881 | -.735 | -.320 | -.149 | .052 | .221 | .158 | .012 | -.265 | -.526 | -.851 |
| | .100 | -.801 | -.617 | -.282 | -.180 | -.035 | .105 | .045 | -.080 | -.253 | -.413 | -.748 |
| | .200 | -.785 | -.644 | -.469 | -.340 | -.208 | -.077 | -.136 | -.242 | -.438 | -.531 | -.755 |
| | .300 | -.838 | -.716 | -.560 | -.447 | -.299 | -.194 | -.241 | -.336 | -.526 | -.617 | -.804 |
| | .400 | -.819 | -.773 | -.634 | -.517 | -.403 | -.291 | -.309 | [a]-.364 | -.524 | -.639 | -.792 |
| | .500 | -.851 | -.765 | -.613 | -.522 | -.421 | -.319 | -.364 | -.447 | -.584 | -.680 | -.842 |
| | .600 | -.852 | -.789 | -.653 | -.571 | -.481 | -.396 | -.433 | -.509 | -.631 | -.699 | [a]-.854 |
| | .700 | -.346 | -.482 | -.684 | -.618 | -.539 | -.467 | -.500 | -.564 | -.671 | -.670 | [a]-.673 |
| | .800 | -.161 | -.149 | -.192 | -.349 | -.596 | -.568 | -.613 | -.645 | -.326 | -.276 | -.260 |
| | .900 | -.006 | -.011 | -.024 | -.035 | -.094 | -.119 | -.111 | [a]-.071 | -.021 | -.014 | -.028 |
| | .950 | .077 | .062 | .040 | .023 | -.019 | -.037 | -.046 | [a]-.007 | .026 | .056 | .048 |
| Lower surface | .0375 | .402 | [a].294 | [a].120 | -.031 | [a]-.511 | [a]-.690 | -.664 | [a]-.365 | [a].087 | .135 | .243 |
| | .075 | .328 | [a].249 | [a].110 | [a]-.014 | [a]-.284 | [a]-.607 | -.560 | [a]-.227 | [a].050 | .124 | .227 |
| | .150 | .260 | .191 | .084 | 0 | -.133 | -.501 | [a]-.391 | -.108 | .009 | .098 | .184 |
| | [a].250 | .198 | .136 | .054 | -.001 | -.098 | -.445 | -.240 | -.075 | -.014 | .077 | .153 |
| | .350 | .153 | .099 | .023 | -.027 | -.102 | -.426 | -.163 | -.092 | -.024 | .057 | .121 |
| | .450 | .089 | .046 | -.023 | -.069 | -.134 | [a]-.379 | [a]-.150 | -.120 | -.036 | -.013 | .022 |
| | .550 | .041 | 0 | -.059 | -.101 | -.162 | -.292 | -.164 | -.193 | [a]-.068 | [a]-.111 | [a]-.105 |
| | .650 | .020 | [a]-.020 | [a]-.069 | -.104 | [a]-.173 | [a]-.197 | [a]-.165 | [a]-.194 | -.153 | -.166 | -.191 |
| | .750 | .017 | -.017 | -.061 | -.089 | -.141 | -.119 | -.136 | -.165 | -.142 | -.156 | -.182 |
| | .850 | .046 | .016 | -.021 | -.040 | -.066 | -.062 | -.077 | -.103 | -.061 | -.074 | -.098 |
| | .925 | .089 | [a].072 | [a].030 | .025 | .001 | -.001 | -.002 | [a]-.020 | .042 | .033 | [a].020 |
| | [a].975 | .156 | .141 | .101 | .096 | .067 | .062 | .105 | .068 | .141 | .141 | .122 |
| | [a]1.000 | .233 | .222 | .171 | .176 | .125 | .150 | .210 | .151 | .201 | .272 | .202 |

[a]Paired value.

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TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Continued

(1) $M = 0.60$, $\beta_{0.75R} = 44.71°$.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.039 | 2.075 | 2.104 | 2.135 | 2.177 | 2.208 | 2.254 | 2.293 | 2.336 | 2.377 | 2.421 | 2.466 | 2.513 | 2.541 |
| | $M_x$ | 1.028 | 1.016 | 1.002 | .992 | .980 | .969 | .959 | .954 | .936 | .926 | .919 | .910 | .900 | .899 |
| | $\alpha_x'$ | 3.80 | 3.32 | 2.94 | 2.53 | 2.00 | 1.61 | 1.02 | .55 | .02 | -.48 | -.98 | -1.49 | -2.04 | -2.35 |
| | $\Delta\beta$ | .51 | .49 | .48 | .46 | .43 | .41 | .39 | .36 | .33 | .31 | .28 | .25 | .22 | .20 |
| | $\alpha_i$ | 1.75 | 1.71 | 1.67 | 1.53 | 1.31 | 1.22 | .86 | .72 | .56 | .38 | .18 | .02 | -.10 | -.20 |
| | $c_n$ | .4942 | .4872 | .4731 | .4335 | .3731 | .3469 | .2433 | .2065 | .1586 | .1074 | .0496 | .0054 | -.0281 | -.0563 |
| | $c_m$ | -.1235 | -.1275 | -.1260 | -.1215 | -.1061 | -.0963 | -.0938 | -.0974 | -.0975 | -.1014 | -.1044 | -.1099 | -.1139 | -.1205 |
| | $c_c$ | .0237 | .0249 | .0261 | .0243 | .0202 | .0214 | .0181 | .0182 | .0173 | .0159 | .0162 | .0151 | .0134 | .0119 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.292 | 1.285 | 1.276 | 1.270 | 1.263 | 1.257 | 1.251 | 1.248 | 1.238 | 1.233 | 1.229 | 1.224 | 1.219 | 1.219 |
| | .025 | [a]-.109 | [a]-.175 | [a]-.128 | -.100 | [a]-.076 | [a]-.062 | [a].274 | [a].300 | [a].380 | [a].490 | .634 | .620 | .610 | .600 |
| | .050 | -.136 | -.146 | -.151 | -.119 | -.092 | -.083 | [a].096 | [a].137 | [a].163 | [a].230 | [a].310 | [a].314 | [a].340 | [a].360 |
| | .100 | -.128 | -.122 | -.115 | -.076 | -.050 | -.049 | -.027 | -.013 | -.001 | .017 | .051 | .067 | .100 | .118 |
| | .200 | -.244 | -.257 | -.271 | -.271 | -.255 | -.246 | -.204 | -.180 | -.175 | -.166 | -.142 | -.126 | -.093 | -.075 |
| | .300 | -.342 | -.345 | -.354 | -.349 | -.338 | -.333 | -.305 | -.284 | -.275 | -.250 | -.223 | -.216 | -.190 | -.170 |
| | .400 | -.366 | -.373 | -.384 | -.381 | -.358 | -.353 | -.321 | -.309 | -.296 | -.282 | -.258 | -.255 | -.250 | -.246 |
| | .500 | -.426 | -.438 | -.453 | -.445 | -.444 | -.447 | -.417 | -.400 | -.398 | -.389 | -.370 | -.366 | -.351 | -.334 |
| | .600 | -.485 | -.501 | -.516 | -.507 | -.490 | -.490 | -.472 | -.460 | -.463 | -.458 | -.435 | -.419 | -.404 | -.404 |
| | .700 | -.535 | -.550 | -.562 | -.565 | -.551 | -.550 | -.533 | -.518 | -.526 | -.522 | -.504 | -.505 | -.481 | -.477 |
| | .800 | -.595 | -.615 | -.635 | -.635 | -.627 | -.632 | -.620 | -.611 | -.623 | -.625 | -.616 | -.635 | -.655 | -.673 |
| | .900 | -.624 | -.659 | -.687 | -.700 | -.719 | -.659 | -.443 | -.280 | -.243 | -.208 | -.178 | -.170 | -.155 | -.146 |
| | .950 | -.622 | -.673 | -.703 | -.667 | -.395 | -.268 | -.183 | -.129 | -.110 | -.078 | -.043 | -.024 | .017 | .053 |
| Lower surface | .0375 | .337 | .306 | .260 | .191 | .110 | .252 | -.103 | -.267 | -.403 | -.516 | -.612 | -.688 | -.774 | -.846 |
| | .075 | .293 | .265 | .225 | .168 | .104 | .060 | .002 | -.086 | -.247 | -.402 | -.505 | -.590 | -.674 | -.739 |
| | .150 | .247 | .228 | .204 | .172 | .137 | .066 | .009 | -.028 | -.098 | -.239 | -.424 | -.509 | -.595 | -.657 |
| | .250 | .171 | .149 | .117 | .076 | .033 | .004 | -.040 | -.077 | -.102 | -.145 | -.297 | -.432 | -.554 | -.628 |
| | .350 | .152 | .133 | .102 | .070 | .033 | .006 | -.027 | -.056 | -.081 | -.095 | -.146 | -.226 | -.333 | -.404 |
| | .450 | .086 | .071 | .044 | .016 | -.015 | -.038 | -.065 | -.088 | -.110 | -.123 | -.108 | -.097 | -.087 | -.077 |
| | .550 | .054 | .035 | .010 | -.018 | -.045 | -.066 | -.088 | -.108 | -.130 | -.145 | -.124 | -.105 | -.060 | -.037 |
| | .650 | .007 | -.012 | -.038 | -.063 | -.089 | -.108 | -.127 | -.141 | -.165 | -.172 | -.139 | -.123 | -.078 | -.050 |
| | .750 | -.067 | -.087 | -.112 | -.132 | -.158 | -.176 | -.193 | -.205 | -.225 | -.215 | -.158 | -.120 | -.067 | -.037 |
| | .850 | -.107 | -.130 | -.154 | -.173 | -.191 | -.209 | -.219 | -.180 | -.181 | -.162 | -.090 | -.065 | -.039 | -.016 |
| | .925 | -.100 | -.117 | -.139 | -.137 | -.135 | -.139 | -.038 | .089 | .084 | .078 | .063 | .054 | .023 | .030 |
| | [a].975 | -.070 | -.072 | -.087 | .017 | -.010 | -.038 | .205 | .250 | .263 | .320 | .228 | .225 | .086 | .155 |
| | [a]1.000 | -.010 | -.010 | -.015 | .250 | .175 | .250 | .430 | .400 | .450 | .525 | .450 | .390 | .350 | .285 |

[a]Paired value.

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TABLE 9.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.52)(05.77) PROPELLER BLADE SECTION (x = 0.90) - Concluded

(j) M = 0.65; $\beta_{0.75R}$ = 44.71°.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.071 | 2.099 | 2.111 | 2.131 | 2.175 | 2.201 | 2.230 | 2.278 | 2.312 | 2.342 | 2.389 |
| | $M_R$ | 1.147 | 1.135 | 1.132 | 1.124 | 1.105 | 1.094 | 1.080 | 1.066 | 1.054 | 1.045 | 1.026 |
| | $\alpha_R'$ | 3.37 | 3.00 | 2.84 | 2.59 | 2.02 | 1.69 | 1.33 | .73 | .32 | -.05 | -.61 |
| | $\Delta\beta$ | .58 | .56 | .55 | .53 | .50 | .48 | .46 | .43 | .40 | .38 | .35 |
| | $\alpha_1$ | 1.25 | 1.21 | 1.13 | 1.08 | 1.01 | .85 | .70 | .49 | .34 | .18 | -.03 |
| | $c_n$ | .3545 | .3429 | .3210 | .3061 | .2868 | .2423 | .1994 | .1387 | .0955 | .0509 | -.0074 |
| | $c_m$ | -.1037 | -.1008 | -.1006 | -.0952 | -.0960 | -.0945 | -.0904 | -.0850 | -.0827 | -.0787 | -.0754 |
| | $c_o$ | .0291 | .0263 | .0279 | .0284 | .0295 | .0291 | .0296 | .0301 | .0310 | .0291 | .0302 |
| | x/b | Pressure coefficient, P | | | | | | | | | | |
| Upper surface | 0.000 | 1.372 | 1.364 | 1.361 | 1.355 | 1.342 | 1.335 | 1.326 | 1.317 | 1.309 | 1.303 | 1.291 |
| | .025 | .148 | .079 | .104 | .111 | .136 | .169 | .211 | .237 | .263 | .286 | .319 |
| | .050 | .092 | .066 | .074 | .089 | .090 | .099 | .123 | .138 | .154 | .172 | .197 |
| | .100 | .060 | .042 | .052 | .064 | .072 | .086 | .100 | .101 | .101 | .104 | .113 |
| | .200 | -.080 | -.084 | -.073 | -.068 | -.074 | -.069 | -.057 | -.052 | -.041 | -.034 | -.029 |
| | .300 | -.175 | -.184 | -.171 | -.168 | -.167 | -.164 | -.156 | -.157 | -.151 | -.144 | -.136 |
| | .400 | -.211 | -.222 | -.208 | -.205 | -.208 | -.203 | -.193 | -.195 | -.189 | -.181 | -.169 |
| | .500 | -.267 | -.271 | -.262 | -.254 | -.257 | -.253 | -.244 | -.249 | -.246 | -.204 | -.240 |
| | [a].600 | -.325 | -.328 | -.320 | -.310 | -.322 | -.320 | -.315 | -.325 | -.318 | -.286 | -.310 |
| | .700 | -.387 | -.399 | -.390 | -.390 | -.402 | -.395 | -.390 | -.408 | -.401 | -.397 | -.394 |
| | .800 | -.460 | -.473 | -.466 | -.465 | -.476 | -.475 | -.473 | -.485 | -.488 | -.489 | -.493 |
| | .900 | -.515 | -.528 | [a]-.529 | -.519 | -.532 | -.535 | -.536 | -.549 | -.556 | -.561 | [a]-.580 |
| | .950 | -.534 | -.562 | -.561 | -.563 | -.580 | -.584 | -.585 | -.600 | -.619 | -.636 | -.669 |
| Lower surface | .0375 | .334 | .297 | .259 | .232 | .184 | .102 | -.035 | -.151 | -.225 | -.285 | -.369 |
| | .075 | .267 | .238 | .213 | .194 | .157 | .128 | .059 | -.065 | -.153 | -.222 | -.308 |
| | .150 | .278 | .251 | .235 | .188 | .153 | [a].120 | .084 | .005 | -.066 | -.123 | -.211 |
| | .250 | .195 | .169 | .152 | .168 | .142 | .093 | [a].058 | -.033 | -.089 | -.154 | -.239 |
| | .350 | .159 | .140 | .131 | .115 | .091 | .056 | .018 | -.038 | -.085 | -.136 | -.203 |
| | .450 | .111 | .094 | .085 | .071 | .047 | .015 | -.017 | -.063 | -.105 | -.154 | -.223 |
| | .550 | .071 | .057 | .047 | .037 | .013 | -.018 | -.049 | -.097 | -.130 | -.178 | -.251 |
| | .650 | .026 | .012 | .007 | -.001 | -.024 | [a]-.055 | [a]-.080 | [a]-.129 | [a]-.154 | [a]-.195 | [a]-.254 |
| | .750 | -.026 | -.038 | -.043 | -.049 | -.073 | -.095 | -.121 | -.159 | -.184 | -.211 | -.247 |
| | [a].850 | -.067 | -.090 | -.085 | -.100 | -.114 | -.130 | -.156 | -.195 | -.216 | -.214 | -.235 |
| | [a].925 | -.086 | -.117 | -.104 | -.128 | -.133 | -.145 | -.172 | -.210 | -.224 | -.210 | -.217 |
| | [a].975 | -.084 | -.120 | -.103 | -.130 | -.133 | -.142 | -.168 | -.203 | -.224 | -.198 | -.194 |
| | [a]1.000 | -.050 | -.095 | -.078 | -.100 | -.107 | -.120 | -.142 | -.175 | -.200 | -.167 | -.160 |

[a]Faired value.

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TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95)

(a) N = 1140 rpm; $\beta_{0.75R} = 29.59°$.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.685 | 0.782 | 0.858 | 0.978 | 1.063 | 1.169 | 1.266 | 1.403 | 1.528 | 1.484 | 1.327 | 1.223 | 1.109 | 1.021 | 0.925 | 0.817 | 0.727 |
| | $M_x$ | .476 | .512 | .514 | .533 | .529 | .541 | .553 | .558 | .573 | .570 | .554 | .544 | .538 | .532 | .519 | .515 | .512 |
| | $\alpha_x'$ | 9.99 | 8.24 | 6.88 | 4.78 | 3.32 | 1.53 | -.07 | -2.26 | -4.19 | -3.52 | -1.05 | .63 | 2.53 | 4.03 | 5.70 | 7.61 | 9.23 |
| | $\Delta\beta$ | .28 | .28 | .27 | .26 | .25 | .23 | .22 | .20 | .18 | .18 | .21 | .23 | .24 | .25 | .27 | .28 | .28 |
| | $\alpha_i$ | 3.49 | 3.31 | 2.94 | 2.30 | 1.98 | 1.47 | .91 | .35 | -.21 | -.16 | .18 | .47 | 1.12 | 1.51 | 2.13 | 2.73 | 3.06 |
| | $c_n$ | .7017 | .6739 | .6036 | .4785 | .4143 | .3103 | .1943 | .0750 | -.0467 | -.0341 | .0396 | .0995 | .2383 | .3149 | .4419 | .5572 | .6270 |
| | $c_m$ | -.0300 | -.0232 | -.0237 | -.0300 | -.0335 | -.0354 | -.0341 | -.0391 | -.0408 | -.0374 | -.0308 | -.0213 | -.0212 | -.0145 | -.0038 | .0090 | .0097 |
| | $c_o$ | -.0154 | -.0175 | -.0173 | -.0182 | -.0158 | -.0104 | -.0075 | -.0032 | .0009 | .0007 | .0020 | .0019 | -.0032 | -.0095 | -.0190 | -.0246 | -.0272 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.058 | 1.067 | 1.068 | 1.073 | 1.072 | 1.075 | 1.078 | 1.080 | 1.084 | 1.083 | 1.079 | 1.077 | 1.074 | 1.072 | 1.069 | 1.068 | 1.067 |
| | .025 | -.879 | -1.010 | -1.136 | -1.221 | -1.128 | -.731 | -.408 | -.099 | .141 | .144 | .118 | .036 | -.326 | -.827 | 1.282 | -1.355 | -1.369 |
| | .050 | -1.029 | -1.160 | -1.249 | -1.120 | -.842 | -.542 | -.341 | -.124 | .061 | .046 | .018 | -.103 | -.312 | -.510 | 1.137 | -1.290 | -1.305 |
| | .100 | -1.059 | -1.197 | -1.219 | -.623 | -.508 | -.386 | -.237 | -.082 | .055 | .013 | -.097 | -.235 | -.388 | -.477 | .829 | -1.221 | -1.241 |
| | .200 | -1.011 | -.979 | -.733 | [a]-.398 | [a]-.357 | [a]-.278 | [a]-.177 | [a]-.076 | [a].010 | [a].019 | [a]-.053 | [a]-.109 | [a]-.216 | [a]-.296 | [a].351 | -.737 | -1.010 |
| | .300 | -.827 | [a]-.721 | [a]-.511 | [a]-.349 | [a]-.310 | [a]-.261 | [a]-.169 | [a]-.100 | [a]-.037 | [a]-.007 | [a]-.054 | [a]-.078 | [a]-.143 | [a]-.211 | [a]-.306 | -.476 | [a]-.715 |
| | .400 | -.554 | -.497 | [a]-.383 | [a]-.322 | [a]-.286 | [a]-.251 | [a]-.177 | [a]-.129 | [a]-.081 | [a]-.078 | [a]-.113 | [a]-.138 | [a]-.227 | [a]-.218 | [a]-.303 | -.362 | [a]-.408 |
| | .500 | -.410 | -.313 | -.297 | -.286 | -.266 | -.243 | -.196 | -.158 | -.121 | [a]-.132 | -.171 | [a]-.206 | -.291 | -.273 | -.301 | -.298 | -.289 |
| | [a].600 | -.287 | -.245 | -.244 | -.246 | -.245 | -.235 | -.201 | -.173 | -.141 | -.161 | -.195 | -.202 | -.242 | -.250 | -.251 | -.280 | [a]-.252 |
| | .700 | -.207 | -.196 | -.202 | -.196 | [a]-.219 | [a]-.211 | [a]-.189 | [a]-.172 | [a]-.149 | [a]-.159 | [a]-.187 | -.169 | -.187 | -.210 | -.221 | -.244 | -.225 |
| | .800 | -.177 | -.165 | -.171 | -.184 | -.176 | -.171 | -.153 | -.143 | -.138 | [a]-.135 | -.159 | -.179 | -.181 | -.188 | -.195 | -.187 | -.175 |
| | .900 | -.129 | -.115 | -.113 | -.108 | -.102 | -.098 | -.086 | -.084 | -.090 | -.093 | -.099 | -.107 | -.115 | -.114 | -.122 | -.117 | -.113 |
| | .950 | -.096 | -.068 | -.058 | -.045 | .037 | -.029 | -.020 | -.022 | -.028 | -.013 | -.035 | -.039 | -.056 | -.066 | -.080 | -.093 | -.104 |
| Lower surface | .0375 | .664 | .619 | .597 | .446 | .372 | .210 | .021 | -.241 | -.508 | -.433 | -.215 | -.006 | .217 | .343 | .432 | .575 | .626 |
| | .075 | .508 | .471 | .426 | .322 | .269 | .143 | .013 | -.150 | -.337 | -.288 | -.130 | .004 | .162 | .253 | .348 | .434 | .477 |
| | .150 | .387 | .336 | .248 | .213 | .174 | .091 | .013 | -.091 | -.209 | -.180 | -.081 | -.004 | .096 | .164 | .232 | .293 | .289 |
| | [a].250 | .284 | .242 | .190 | .154 | .122 | .051 | .016 | -.069 | -.137 | -.122 | -.053 | -.012 | .058 | .105 | .163 | .201 | .207 |
| | .350 | .199 | .180 | .159 | .114 | .092 | .043 | .005 | -.047 | -.106 | -.093 | -.043 | -.004 | .045 | .082 | .122 | .163 | .187 |
| | .450 | .146 | .133 | .120 | .081 | .066 | .033 | [a]-.002 | -.039 | -.084 | -.075 | -.043 | -.013 | .028 | .054 | .087 | .120 | .139 |
| | .550 | .098 | .090 | .078 | [a].030 | .038 | .006 | -.014 | -.041 | -.074 | -.083 | -.114 | -.136 | .002 | .032 | .051 | .075 | .066 |
| | .650 | .052 | .054 | .051 | .032 | .023 | -.004 | -.020 | -.037 | -.062 | -.059 | -.089 | -.119 | -.072 | -.084 | -.096 | -.111 | [a]-.032 |
| | .750 | [a].027 | [a].027 | [a].032 | .054 | [a].016 | [a]0 | [a]-.007 | [a]-.018 | [a]-.035 | [a]-.034 | -.041 | -.059 | -.062 | -.072 | -.090 | -.145 | -.113 |
| | .850 | .003 | .022 | .035 | .050 | .038 | .039 | .027 | [a].023 | .012 | .001 | -.025 | -.048 | -.062 | -.077 | -.090 | [a]-.145 | -.113 |
| | [a].925 | .035 | .055 | .082 | .104 | .106 | .092 | .078 | .077 | .066 | .052 | -.003 | -.014 | -.030 | -.042 | -.040 | -.059 | -.088 |
| | [a].975 | .108 | .130 | .220 | .210 | .223 | .158 | .136 | .137 | .126 | .116 | .053 | .052 | .030 | .060 | .038 | .015 | -.015 |
| | [a]1.000 | .207 | .235 | .399 | .394 | .399 | .276 | .202 | .211 | .197 | .188 | .116 | .142 | .102 | .222 | .157 | .127 | .096 |

[a]Faired value.

TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Continued

(b) N = 1350 rpm; $\beta_{0.75R} = 29.59°$.

| | J | 0.684 | 0.759 | 0.861 | 0.928 | 1.015 | 1.099 | 1.193 | 1.267 | 1.373 | 1.464 | 1.419 | 1.327 | 1.187 | 1.143 | 1.055 | 0.972 | 0.882 | 0.808 | 0.738 | 0.677 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | .600 | .595 | .615 | .639 | .635 | .645 | .657 | .664 | .666 | .686 | .679 | .666 | .649 | .647 | .641 | .631 | .619 | .628 | .610 | .605 |
| | $\alpha_r'$ | 10.01 | 8.65 | 6.83 | 5.65 | 4.13 | 2.71 | 1.13 | -.08 | -1.78 | -3.21 | -2.51 | -1.05 | 1.23 | 1.96 | 3.45 | 4.88 | 6.46 | 7.77 | 9.03 | 10.14 |
| | $\Delta\beta$ | .38 | .40 | .39 | .38 | .36 | .34 | .32 | .30 | .28 | .25 | .26 | .29 | .32 | .33 | .35 | .37 | .39 | .40 | .40 | .38 |
| | $\alpha_1$ | 3.68 | 3.49 | 3.19 | 2.89 | 2.57 | 1.78 | 1.39 | .93 | .41 | -.04 | .13 | .45 | .95 | 1.46 | 1.88 | 2.30 | 2.64 | 3.10 | 3.12 | 3.30 |
| | $c_n$ | .7386 | .7110 | .6567 | .5999 | .5356 | .3738 | .2951 | .1985 | .0870 | -.0094 | .0275 | .0973 | .2004 | .3071 | .3918 | .4796 | .5423 | .6326 | .6311 | .6613 |
| | $c_m$ | -.0352 | -.0212 | -.0247 | -.0359 | -.0312 | -.0351 | -.0403 | -.0454 | -.0467 | -.0498 | -.0537 | -.0438 | -.0239 | -.0409 | -.0324 | -.0205 | -.0098 | -.0057 | -.0086 | -.0167 |
| | $c_o$ | -.0246 | -.0293 | -.0305 | -.0286 | -.0245 | -.0114 | -.0052 | -.0041 | -.0004 | .0033 | .0025 | 0 | -.0041 | -.0081 | -.0163 | -.0252 | -.0293 | -.0333 | -.0249 | -.0244 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.092 | 1.091 | 1.097 | 1.106 | 1.104 | 1.108 | 1.112 | 1.115 | 1.116 | 1.124 | 1.121 | 1.116 | 1.110 | 1.109 | 1.107 | 1.103 | 1.099 | 1.102 | 1.096 | 1.095 |
| | .025 | -1.118 | -1.402 | -1.573 | -1.544 | -1.543 | -.776 | -.451 | -.202 | .079 | .291 | .242 | .051 | -.303 | -.458 | -1.042 | [a]-1.762 | -1.692 | [a]-1.615 | -1.279 | 1.186 |
| | .050 | [a]-1.114 | -1.356 | -1.511 | -1.483 | -1.242 | -.640 | -.532 | [a]-.202 | [a].005 | [a].150 | [a].110 | -.051 | [a]-.298 | [a]-.407 | [a]-.721 | [a]-1.180 | [a]-1.493 | [a]-1.525 | -1.288 | [a]-1.225 |
| | .100 | [a]-1.106 | -1.217 | -1.235 | -.979 | -.655 | -.449 | -.322 | -.206 | -.068 | .051 | .009 | -.098 | -.279 | [a]-.356 | [a]-.493 | [a]-.488 | -1.082 | [a]-1.259 | [a]-1.187 | [a]-1.125 |
| | .200 | [a]-1.048 | -.972 | -.700 | -.589 | -.433 | -.355 | -.274 | -.204 | -.117 | -.039 | -.062 | -.130 | -.236 | [a]-.300 | -.367 | [a]-.519 | [a]-.589 | [a]-.776 | [a]-.944 | [a]-.996 |
| | .300 | -.885 | -.693 | -.469 | -.408 | -.376 | -.333 | -.275 | -.222 | -.161 | -.071 | -.122 | -.164 | -.251 | [a]-.281 | [a]-.312 | [a]-.419 | [a]-.389 | -.571 | -.709 | -.863 |
| | .400 | -.616 | -.476 | -.372 | -.346 | -.327 | -.299 | [a]-.274 | -.216 | -.169 | -.126 | -.137 | -.171 | -.236 | [a]-.264 | -.304 | [a]-.386 | [a]-.366 | [a]-.393 | -.497 | -.624 |
| | .500 | -.386 | -.361 | -.331 | -.310 | -.297 | -.291 | -.267 | -.245 | -.196 | -.172 | -.180 | -.199 | -.231 | [a]-.258 | -.267 | [a]-.385 | -.333 | -.316 | [a]-.345 | [a]-.407 |
| | .600 | -.279 | -.289 | -.296 | -.294 | -.289 | -.282 | -.255 | -.240 | -.215 | -.194 | -.199 | -.216 | [a]-.221 | [a]-.259 | -.286 | [a]-.385 | -.333 | [a]-.266 | [a]-.278 | -.300 |
| | .700 | -.218 | -.247 | -.263 | -.263 | -.263 | -.258 | -.235 | -.222 | -.203 | -.197 | -.205 | -.218 | [a]-.204 | -.245 | -.264 | [a]-.345 | [a]-.282 | [a]-.215 | -.234 | -.229 |
| | .800 | -.164 | -.183 | -.189 | -.185 | -.184 | -.190 | -.172 | -.167 | -.163 | -.160 | -.159 | -.162 | -.175 | [a]-.197 | [a]-.205 | [a]-.260 | -.208 | [a]-.154 | -.177 | -.182 |
| | .900 | -.111 | -.112 | -.106 | -.103 | -.097 | -.103 | -.092 | -.090 | -.091 | -.095 | -.092 | -.093 | -.121 | -.094 | [a]-.093 | [a]-.176 | [a]-.131 | -.075 | -.114 | -.117 |
| | .950 | -.063 | -.058 | -.037 | -.025 | -.017 | -.015 | .001 | .002 | -.004 | -.006 | -.005 | -.007 | [a]-.051 | -.004 | [a]-.002 | [a]-.094 | -.064 | [a].003 | -.066 | -.070 |
| Lower surface | .0375 | .668 | .651 | .584 | .521 | .450 | .302 | .166 | -.001 | -.242 | -.406 | -.323 | -.178 | .111 | .225 | .336 | .387 | .493 | .634 | .598 | .604 |
| | .075 | .516 | .498 | .443 | .389 | .328 | .213 | .114 | .005 | -.142 | -.302 | -.238 | -.107 | .078 | [a].166 | .258 | .289 | .348 | [a].420 | .369 | .371 |
| | .150 | .370 | .354 | .315 | .269 | .229 | .132 | .070 | .005 | -.093 | -.191 | -.153 | -.066 | .044 | .098 | [a].160 | .138 | [a].172 | [a].234 | .203 | [a].200 |
| | .250 | .234 | .244 | .250 | .227 | .160 | .091 | .048 | -.006 | -.071 | -.137 | -.143 | [a]-.045 | .010 | [a].064 | [a].077 | [a]0 | .157 | .222 | .181 | [a].200 |
| | .350 | .204 | .208 | .174 | .149 | .124 | .071 | .037 | -.004 | -.052 | -.098 | -.076 | -.037 | .019 | .051 | .065 | -.012 | [a].087 | [a].202 | .192 | [a].200 |
| | .450 | .152 | .160 | .137 | .121 | .097 | .046 | .020 | -.009 | -.045 | -.079 | -.066 | [a]-.045 | [a]-.002 | .034 | .062 | [a].012 | .054 | [a].120 | [a].119 | [a].088 |
| | .550 | .099 | .097 | .083 | .072 | .054 | .016 | .001 | -.026 | -.050 | -.074 | -.081 | [a]-.093 | [a]-.066 | .007 | .028 | -.022 | .019 | [a].070 | [a].022 | [a].011 |
| | .650 | .056 | .056 | .051 | .053 | .034 | -.002 | -.007 | -.026 | -.045 | -.057 | -.064 | -.080 | -.105 | [a]-.004 | .018 | -.102 | [a]-.047 | [a]0 | [a].052 | [a]-.046 |
| | .750 | [a].044 | [a].021 | [a].042 | [a].063 | .038 | [a].002 | [a]0 | [a]-.005 | [a]-.022 | [a]-.030 | [a]-.019 | -.035 | -.094 | [a]-.003 | [a]-.042 | [a]-.110 | [a]-.074 | [a]-.014 | [a]-.056 | [a]-.074 |
| | .850 | [a].058 | [a].018 | [a].076 | [a].107 | .072 | .033 | .043 | .054 | [a].025 | [a].021 | .051 | .037 | [a]-.051 | [a].034 | .009 | -.072 | -.040 | .015 | [a]-.035 | -.034 |
| | [a].925 | .109 | .052 | .129 | .178 | .145 | .082 | .107 | .122 | .094 | .090 | .130 | .107 | .020 | .104 | .098 | .016 | -.034 | .083 | .011 | .002 |
| | [a].975 | .197 | .129 | .190 | .282 | .242 | .161 | .174 | .207 | .176 | .175 | .218 | .195 | .112 | .191 | .227 | .109 | .131 | .181 | .102 | .131 |
| | [a]1.000 | .295 | .247 | .285 | .418 | .383 | .267 | .265 | .309 | .282 | .300 | .340 | .297 | .234 | .307 | .412 | .208 | .263 | .338 | .216 | .235 |

[a]Paired value.

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TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Continued

(a) N = 1600 rpm; $\beta_{0.75R} = 29.59°$.

| | J | 0.742 | 0.860 | 0.926 | 1.002 | 1.072 | 1.144 | 1.226 | 1.306 | 1.387 | 1.473 | 1.421 | 1.351 | 1.265 | 1.175 | 1.067 | 0.950 | 0.842 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_x$ | .718 | .730 | .745 | .746 | .761 | .771 | .781 | .782 | .801 | .809 | .792 | .791 | .784 | .773 | .763 | .735 | .729 |
| | $\alpha_x'$ | 8.96 | 6.84 | 5.68 | 4.36 | 3.16 | 1.95 | .58 | -.72 | -1.97 | -3.35 | -2.54 | -1.44 | -.05 | 1.43 | 3.25 | 5.27 | 7.17 |
| | $\Delta\beta$ | .50 | .50 | .49 | .48 | .47 | .46 | .44 | .42 | .41 | .39 | .40 | .41 | .43 | .45 | .47 | .49 | .50 |
| | $\alpha_1$ | 3.75 | 3.86 | 3.76 | 2.59 | 2.12 | 1.70 | 1.16 | .68 | .39 | -.19 | -.02 | .38 | .64 | 1.39 | 2.16 | 2.67 | 3.37 |
| | $c_n$ | .7615 | .7999 | .7861 | .5416 | .4458 | .3594 | .2476 | .1477 | .0834 | -.0399 | -.0052 | .0810 | .1358 | .2944 | .4540 | .5566 | .6941 |
| | $c_m$ | -.0090 | -.0138 | -.0179 | -.0121 | -.0177 | .0027 | -.0341 | -.0397 | -.0456 | -.0645 | -.0594 | -.0469 | -.0381 | -.0310 | -.0143 | -.0071 | -.0048 |
| | $c_o$ | -.0381 | -.0411 | -.0405 | -.0318 | -.0253 | -.0168 | -.0072 | -.0037 | -.0003 | -.0005 | .0002 | .0004 | -.0003 | -.0053 | -.0201 | -.0265 | -.0383 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.132 | 1.141 | 1.147 | 1.147 | 1.154 | 1.158 | 1.162 | 1.162 | 1.171 | 1.174 | 1.167 | 1.166 | 1.164 | 1.158 | 1.154 | 1.151 | 1.141 |
| | .025 | -1.880 | -1.838 | -1.780 | -1.748 | -1.525 | -.967 | -.421 | -.102 | .081 | .273 | .317 | .183 | -.027 | -.481 | -1.135 | -1.495 | -1.761 |
| | [a].050 | -1.836 | -1.719 | -1.581 | -1.592 | -1.209 | -.745 | -.371 | -.131 | .020 | .170 | .180 | .017 | -.127 | -.434 | -1.090 | -1.420 | -1.654 |
| | .100 | -1.624 | -1.507 | -1.381 | -1.201 | -.744 | -.451 | -.299 | -.160 | [a]-.038 | .077 | .025 | -.056 | -.172 | -.357 | -.636 | -1.197 | -1.460 |
| | .200 | [a]-.757 | -1.115 | -1.117 | -.386 | -.334 | -.331 | -.259 | -.176 | -.104 | -.024 | -.031 | -.087 | -.157 | -.278 | -.574 | -.579 | -1.230 |
| | .300 | [a]-.571 | [a]-.788 | [a]-.890 | -.230 | -.214 | -.202 | -.185 | -.172 | -.148 | -.134 | [a]-.080 | -.121 | [a]-.177 | [a]-.267 | [a]-.543 | [a]-.452 | [a]-.848 |
| | [a].400 | -.465 | -.566 | -.652 | -.257 | -.214 | -.238 | -.207 | -.193 | -.191 | -.213 | -.159 | -.170 | -.226 | -.287 | -.464 | -.399 | -.376 |
| | [a].500 | -.384 | -.419 | -.449 | -.308 | -.288 | -.298 | -.254 | -.239 | -.243 | -.250 | -.206 | -.224 | -.258 | -.296 | -.370 | -.362 | -.339 |
| | .600 | [a]-.306 | -.313 | -.320 | -.326 | -.314 | -.301 | -.280 | -.267 | -.240 | -.222 | -.237 | -.251 | -.268 | -.287 | -.308 | -.325 | -.323 |
| | .700 | -.228 | -.229 | -.232 | -.233 | -.222 | -.211 | -.191 | -.180 | -.175 | -.178 | -.224 | .233 | -.242 | -.251 | -.271 | -.287 | -.288 |
| | .800 | -.155 | -.161 | -.159 | -.161 | -.148 | -.144 | -.136 | -.136 | -.130 | -.139 | -.140 | -.150 | -.163 | -.169 | -.180 | -.189 | -.203 |
| | .900 | -.118 | -.112 | -.109 | -.101 | -.088 | -.085 | -.081 | -.085 | -.083 | -.094 | -.089 | -.093 | -.092 | -.088 | -.098 | -.111 | -.128 |
| | .950 | -.052 | -.031 | -.023 | -.013 | .002 | .004 | .008 | .002 | .004 | -.007 | .003 | -.006 | -.021 | -.032 | -.047 | -.062 | -.078 |
| Lower surface | .0375 | .677 | .602 | .533 | .460 | .370 | .252 | .095 | -.110 | -.324 | -.980 | -.832 | [a]-.121 | -.070 | .186 | .325 | .457 | [a].475 |
| | .075 | .529 | .460 | .412 | .345 | .274 | .181 | .077 | -.061 | -.145 | -.822 | -.196 | -.154 | -.032 | .135 | .248 | .368 | .423 |
| | .150 | .381 | .332 | .293 | .244 | .191 | .117 | .055 | -.035 | -.108 | -.131 | -.154 | -.105 | -.022 | .087 | .147 | .241 | .236 |
| | .250 | .278 | .242 | .213 | .173 | .135 | .083 | .028 | -.035 | -.076 | -.123 | -.112 | -.079 | -.023 | .059 | [a].074 | [a].137 | [a].187 |
| | .350 | .214 | .188 | .161 | .132 | .105 | .066 | .026 | -.022 | -.054 | -.097 | -.080 | [a]-.072 | -.049 | .042 | .026 | .133 | .178 |
| | .450 | .159 | .143 | .121 | .095 | .077 | .043 | .012 | -.024 | -.045 | -.080 | -.066 | -.076 | -.094 | .022 | [a]0 | .099 | .092 |
| | .550 | .106 | .095 | .083 | .060 | .043 | .015 | -.007 | -.030 | -.049 | -.073 | -.058 | -.071 | -.086 | 0 | -.012 | -.025 | -.040 |
| | .650 | .065 | .065 | .052 | .038 | .022 | 0 | [a]-.011 | -.034 | -.042 | -.058 | -.053 | -.059 | -.070 | [a]-.023 | -.099 | -.114 | -.133 |
| | .750 | [a].041 | [a].051 | [a].041 | [a].029 | [a].021 | [a]-.002 | [a]0 | [a]-.018 | .002 | -.013 | [a]-.024 | [a].031 | [a].048 | [a]-.032 | [a]-.089 | [a]-.125 | [a]-.138 |
| | .850 | .028 | .044 | .046 | [a].046 | .041 | .032 | .029 | .025 | .032 | .026 | .027 | .014 | 0 | -.012 | -.026 | -.040 | -.057 |
| | .925 | .039 | .061 | .070 | .076 | .073 | .070 | .074 | .076 | [a].070 | .081 | .093 | [a].091 | .065 | [a].023 | .066 | .056 | .045 |
| | [a].975 | .142 | [a].148 | .155 | .174 | .165 | .276 | .158 | .172 | .139 | .175 | .195 | .211 | .129 | .061 | .181 | .160 | .162 |
| | [a]1.000 | .357 | .339 | .366 | .363 | .319 | .521 | .290 | .303 | .256 | .350 | .351 | .367 | .197 | .112 | .340 | .303 | .286 |

[a]Faired value.

TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Continued

(d) N = 2000 rpm; $\beta_{0.75R} = 29.59°$.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 0.994 | 1.154 | 1.240 | 1.346 | 1.426 | 1.341 | 1.265 | 1.203 | 1.121 | 1.037 |
| | $M_x$ | .949 | .959 | .979 | .983 | 1.004 | .978 | .980 | .973 | .957 | .949 |
| | $\alpha_x'$ | 4.50 | 1.78 | .36 | -1.36 | -2.62 | -1.27 | -.05 | .97 | 2.33 | 3.76 |
| | $\Delta\beta$ | .76 | .69 | .63 | .58 | .55 | .59 | .62 | .65 | .71 | .75 |
| | $\alpha_l$ | 3.03 | 1.85 | 1.06 | .28 | -.63 | -.03 | .55 | .99 | 1.83 | 2.23 |
| | $c_n$ | .6325 | .3909 | .2259 | .0593 | -.1336 | -.0061 | .1169 | .2106 | .3853 | .4650 |
| | $c_m$ | -.0957 | -.0818 | -.0745 | -.0831 | -.0523 | -.0690 | -.0645 | -.0576 | -.0512 | -.0553 |
| | $c_c$ | -.0025 | .0077 | .0116 | .0154 | .0229 | .0165 | .0122 | .0129 | .0067 | .0016 |
| | c/b | Pressure coefficient, P | | | | | | | | | |
| Upper surface | 0.000 | 1.245 | 1.251 | 1.262 | 1.264 | 1.277 | 1.292 | 1.263 | 1.259 | 1.250 | 1.245 |
| | .025 | -.663 | -.212 | .078 | .272 | .402 | .299 | .153 | .003 | -.330 | -.508 |
| | .050 | -.599 | -.229 | -.016 | .151 | .268 | .181 | .057 | -.079 | -.316 | -.470 |
| | .100 | -.533 | -.249 | -.075 | .039 | [a].186 | .067 | -.037 | -.100 | -.306 | -.428 |
| | .200 | -.572 | -.313 | -.166 | -.040 | .047 | -.011 | -.104 | -.193 | -.356 | -.468 |
| | [a].300 | -.580 | -.357 | -.235 | -.116 | .048 | -.091 | -.174 | -.256 | -.398 | -.503 |
| | .400 | -.580 | -.389 | -.281 | -.196 | -.116 | -.161 | -.232 | -.294 | -.405 | -.506 |
| | .500 | -.570 | -.404 | -.306 | -.229 | -.163 | -.204 | -.269 | -.323 | -.421 | -.501 |
| | .600 | -.592 | -.461 | -.380 | -.319 | -.258 | -.299 | -.351 | -.395 | -.478 | -.539 |
| | .700 | -.591 | -.488 | -.420 | -.372 | -.314 | -.353 | -.393 | -.432 | -.500 | -.556 |
| | .800 | -.620 | -.537 | -.479 | -.447 | -.410 | -.427 | -.455 | -.487 | -.545 | -.599 |
| | .900 | -.276 | -.534 | -.543 | -.527 | -.482 | -.512 | -.533 | -.552 | -.486 | -.345 |
| | .950 | -.188 | -.169 | -.224 | -.405 | -.442 | -.412 | -.259 | -.180 | -.180 | -.194 |
| Lower surface | .0375 | .458 | .219 | .006 | -.283 | -.408 | -.344 | -.306 | .067 | .269 | .360 |
| | .075 | .368 | .194 | .024 | -.240 | -.386 | -.297 | -.061 | .071 | .215 | .298 |
| | .150 | .271 | .135 | .007 | -.246 | -.367 | -.298 | -.068 | .042 | .156 | .211 |
| | .250 | .206 | .094 | .010 | -.229 | -.364 | -.286 | -.049 | .008 | .108 | .101 |
| | .350 | .164 | .070 | .009 | -.111 | -.321 | -.138 | -.032 | .004 | .075 | .115 |
| | .450 | .111 | .033 | -.018 | -.049 | -.287 | -.084 | -.055 | -.063 | .033 | .039 |
| | .550 | .047 | -.023 | -.066 | -.077 | -.283 | -.091 | -.093 | -.103 | -.035 | -.046 |
| | .650 | -.010 | -.066 | -.101 | -.102 | -.281 | -.161 | -.173 | -.183 | -.195 | -.212 |
| | .750 | [a]-.061 | [a]-.124 | [a]-.149 | [a]-.138 | [a]-.327 | -.230 | -.244 | -.256 | -.268 | [a]-.289 |
| | .850 | -.090 | -.150 | -.178 | -.183 | -.231 | -.239 | -.252 | -.264 | -.278 | -.296 |
| | .925 | -.080 | -.129 | -.156 | -.164 | -.149 | -.165 | -.177 | -.189 | -.201 | -.202 |
| | [a].975 | -.037 | -.038 | -.052 | -.064 | .040 | -.019 | -.046 | -.064 | -.071 | -.031 |
| | [a]1.000 | .092 | .181 | .179 | .177 | .075 | .200 | .202 | .153 | .076 | .207 |

[a]Paired value.

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TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Continued

(e) N = 2160 rpm; $\beta_{0.75R}$ = 29.59°.

| | J | 1.094 | 1.141 | 1.207 | 1.279 | 1.320 | 1.381 | 1.410 | 1.357 | 1.284 | 1.247 | 1.183 | 1.114 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_r$ | 1.025 | 1.051 | 1.053 | 1.044 | 1.065 | 1.071 | 1.072 | 1.064 | 1.051 | 1.050 | 1.044 | 1.025 |
| | $\alpha_x'$ | 2.79 | 2.00 | .90 | -.28 | -.94 | -1.91 | -2.37 | -1.53 | -.36 | .24 | 1.30 | 2.45 |
| | $\Delta\beta$ | .80 | .78 | .75 | .71 | .70 | .67 | .65 | .68 | .71 | .73 | .76 | .79 |
| | $\alpha_i$ | 1.93 | 1.57 | 1.11 | .65 | .29 | -.25 | -.51 | -.28 | .22 | .44 | .79 | 1.40 |
| | $c_n$ | .4058 | .3332 | .2374 | .1396 | .0629 | -.0548 | -.1081 | -.0597 | .0469 | .0950 | .1646 | .2933 |
| | $c_m$ | -.0896 | -.0884 | -.0863 | -.0859 | -.0806 | -.0601 | -.0493 | -.0559 | -.0666 | -.0669 | -.0539 | -.0735 |
| | $c_c$ | .0144 | .0167 | .0189 | .0187 | .0181 | .0205 | .0211 | .0218 | .0196 | .0194 | .0228 | .0220 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | |
| Upper surface | 0.000 | 1.290 | 1.307 | 1.308 | 1.303 | 1.315 | 1.320 | 1.321 | 1.315 | 1.307 | 1.307 | 1.303 | 1.290 |
| | .025 | -.141 | -.007 | .120 | .245 | .320 | .401 | .436 | .377 | .288 | .230 | [a].250 | [a].133 |
| | .050 | [a]-.144 | [a]-.020 | [a].088 | [a].177 | [a].224 | [a].281 | .330 | [a].256 | .193 | .184 | +.123 | -.008 |
| | .100 | -.154 | -.066 | .010 | .086 | .130 | .187 | .225 | .179 | .114 | [a].106 | .002 | -.109 |
| | .200 | -.215 | -.155 | -.107 | -.035 | .026 | .086 | .108 | .081 | .014 | -.034 | -.097 | -.187 |
| | .300 | -.290 | -.222 | -.195 | -.135 | -.081 | -.032 | -.013 | -.043 | -.097 | -.137 | -.189 | -.264 |
| | .400 | -.299 | -.243 | -.225 | -.169 | -.117 | -.070 | -.049 | -.080 | -.130 | -.167 | -.218 | -.287 |
| | .500 | -.315 | -.267 | -.259 | -.217 | -.166 | -.144 | -.128 | -.137 | -.169 | -.197 | -.240 | -.302 |
| | .600 | [a]-.358 | -.329 | [a].300 | -.287 | -.224 | -.198 | -.187 | -.210 | -.256 | [a]-.260 | -.319 | -.348 |
| | .700 | -.399 | -.357 | -.357 | -.344 | -.291 | -.254 | -.243 | -.264 | -.303 | -.329 | -.358 | [a]-.408 |
| | .800 | -.436 | -.399 | -.405 | [a]-.405 | -.360 | -.338 | -.328 | -.348 | -.361 | -.394 | -.408 | -.451 |
| | .900 | -.476 | -.464 | -.476 | -.467 | -.441 | -.422 | -.417 | -.421 | -.440 | -.459 | -.481 | -.518 |
| | .950 | -.463 | -.472 | -.490 | -.491 | -.469 | -.453 | -.450 | -.462 | -.477 | -.485 | -.498 | -.535 |
| Lower surface | .0375 | .325 | .259 | .114 | -.044 | -.126 | -.206 | -.249 | -.207 | -.113 | -.030 | .116 | .253 |
| | .075 | .282 | .235 | .118 | -.023 | -.095 | -.185 | -.231 | -.186 | -.097 | -.025 | .105 | .207 |
| | .150 | .220 | .181 | .070 | -.043 | -.115 | -.184 | -.226 | -.187 | -.111 | -.035 | .065 | .149 |
| | .250 | .166 | .142 | .053 | -.015 | -.114 | -.195 | -.238 | -.231 | -.087 | -.087 | .024 | .092 |
| | .350 | .149 | .135 | .061 | .008 | -.075 | -.167 | -.216 | -.172 | -.055 | -.020 | .044 | .074 |
| | .450 | .108 | .101 | .041 | -.008 | -.029 | -.145 | -.197 | -.150 | -.049 | -.038 | .010 | [a]-.053 |
| | .550 | .045 | .045 | -.007 | -.049 | -.046 | -.156 | -.203 | -.153 | -.080 | -.065 | -.029 | -.028 |
| | .650 | .001 | .006 | -.044 | -.083 | -.077 | -.169 | -.216 | -.145 | -.135 | -.141 | -.152 | -.165 |
| | .750 | [a]-.048 | [a].047 | [a]-.095 | [a]-.141 | [a].116 | [a]-.182 | [a]-.229 | -.191 | -.203 | -.210 | -.220 | -.235 |
| | .850 | -.084 | -.080 | -.124 | -.155 | -.136 | -.190 | -.237 | -.198 | -.210 | -.218 | -.228 | -.243 |
| | .925 | -.091 | -.085 | -.124 | -.125 | -.113 | -.106 | -.158 | -.168 | -.148 | -.155 | -.166 | -.180 |
| | [a].975 | -.077 | -.077 | -.100 | -.005 | .032 | 0 | .017 | -.125 | -.042 | -.088 | -.041 | -.041 |
| | [a]1.000 | -.041 | -.041 | -.051 | .202 | .252 | .250 | .225 | -.060 | .151 | 0 | .204 | .205 |

[a]Paired value.

TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Continued

(f) N = 1140 rpm; $\beta_{0.75R}$ = 44.96°.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | 1.618 | 1.850 | 1.977 | 2.113 | 2.240 | 2.375 | 2.505 | 2.632 | 2.564 | 2.424 | 2.302 | 2.172 | 2.034 | 1.917 | 1.795 | 1.700 |
| $M_R$ | .586 | .605 | .820 | .633 | .645 | .661 | .673 | .688 | .677 | .662 | .647 | .635 | .619 | .610 | .602 | .587 |
| $\alpha_R'$ | 9.83 | 6.49 | 4.78 | 2.98 | 1.40 | -.21 | -1.73 | -3.12 | -2.38 | -.79 | .65 | 2.24 | 4.01 | 5.58 | 7.27 | 8.62 |
| $\Delta\beta$ | .26 | .25 | .23 | .21 | .19 | .17 | .15 | .13 | .14 | .17 | .18 | .20 | .22 | .24 | .25 | .26 |
| $c_l$ | 2.91 | 2.44 | 2.12 | 1.71 | 1.07 | .49 | .15 | -.23 | -.01 | .29 | .71 | 1.24 | 1.92 | 2.32 | 2.57 | 2.87 |
| $c_n$ | .6532 | .5442 | .4732 | .3860 | .2410 | .1115 | .0338 | -.0523 | -.0026 | .0653 | .1587 | .2798 | .4311 | .5197 | .5758 | .6403 |
| $c_m$ | -.0282 | -.0267 | -.0351 | -.0248 | -.0251 | -.0345 | -.0401 | -.0447 | -.0497 | -.0372 | -.0259 | -.0215 | -.0461 | -.0223 | -.0050 | -.0282 |
| $c_o$ | -.0173 | -.0109 | -.0094 | -.0151 | -.0049 | .0012 | .0029 | .0028 | .0034 | .0017 | -.0039 | -.0065 | -.0205 | -.0195 | -.0229 | -.0161 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.088 | 1.094 | 1.099 | 1.104 | 1.108 | 1.114 | 1.118 | 1.124 | 1.120 | 1.114 | 1.109 | 1.103 | 1.099 | 1.096 | 1.093 | 1.089 |
| | .025 | -.926 | -.929 | -.962 | -.899 | [a]-.324 | [a].015 | [a].215 | [a].300 | .274 | .068 | -.184 | -.477 | -1.027 | -1.284 | -1.318 | [a]-.835 |
| | .050 | -1.034 | -1.051 | -.992 | -.744 | [a]-.330 | -.122 | .033 | .181 | .131 | -.028 | -.203 | -.412 | -.620 | -1.290 | -1.382 | [a]-1.100 |
| | .100 | -1.008 | -1.047 | -.748 | -.573 | -.330 | -.175 | -.061 | .053 | .012 | -.107 | [a]-.210 | [a]-.354 | -.490 | -.866 | -1.157 | -1.134 |
| | .200 | [a]-.867 | -.711 | -.539 | [a]-.436 | [a]-.310 | [a]-.200 | [a]-.140 | [a]-.077 | [a]-.082 | -.138 | -.208 | -.310 | -.360 | -.467 | -.710 | -.896 |
| | .300 | -.691 | [a]-.496 | [a]-.414 | -.350 | -.279 | -.211 | -.166 | -.107 | -.124 | -.164 | -.226 | -.296 | -.324 | -.406 | -.453 | -.610 |
| | .400 | [a]-.510 | -.350 | -.327 | -.284 | -.248 | -.197 | -.164 | -.122 | -.142 | -.180 | -.224 | -.282 | -.288 | -.359 | -.365 | -.426 |
| | .500 | -.367 | -.318 | -.301 | -.269 | -.245 | -.203 | -.183 | -.151 | -.169 | -.194 | -.227 | -.273 | -.270 | -.330 | -.325 | -.338 |
| | .600 | -.278 | -.303 | -.293 | -.273 | -.255 | -.230 | -.219 | -.195 | -.211 | -.226 | -.247 | -.284 | -.266 | -.319 | -.307 | -.294 |
| | .700 | -.222 | -.259 | -.254 | -.240 | -.232 | -.212 | -.209 | -.194 | -.205 | -.212 | -.226 | -.254 | -.227 | -.272 | -.263 | -.246 |
| | .800 | -.168 | -.197 | -.191 | -.183 | -.180 | -.169 | -.170 | -.164 | -.172 | -.173 | -.177 | -.197 | -.168 | -.209 | -.200 | -.183 |
| | .900 | -.111 | -.115 | -.106 | -.101 | -.102 | -.099 | -.107 | -.107 | -.112 | -.105 | -.104 | -.113 | -.075 | -.117 | -.118 | -.108 |
| | .950 | -.071 | -.043 | -.032 | -.022 | -.024 | -.022 | -.029 | -.032 | -.036 | -.029 | -.026 | -.029 | .005 | -.041 | -.051 | -.053 |
| Lower surface | .0375 | .644 | .532 | .424 | .281 | .106 | -.120 | -.296 | -.519 | -.392 | -.218 | -.008 | .198 | .391 | .508 | .586 | .645 |
| | .075 | .497 | .396 | .306 | .196 | .068 | -.083 | -.209 | -.350 | -.292 | -.139 | -.010 | .131 | .281 | .369 | .437 | .493 |
| | .150 | .354 | .272 | .204 | .126 | .039 | -.055 | -.134 | -.220 | -.187 | -.088 | -.008 | .078 | .187 | .251 | .303 | .344 |
| | .250 | .256 | .190 | .137 | .078 | .016 | -.048 | -.107 | -.166 | -.143 | -.076 | -.021 | .043 | .128 | .172 | .214 | .247 |
| | .350 | .195 | .143 | .103 | .057 | .010 | -.036 | -.078 | -.120 | -.106 | -.055 | -.019 | .029 | .099 | .128 | .159 | .188 |
| | .450 | .146 | .108 | .073 | .035 | -.005 | -.039 | -.072 | -.101 | -.092 | -.055 | -.026 | [a].019 | .072 | .070 | .048 | .142 |
| | .550 | .093 | .063 | .035 | .008 | -.024 | -.050 | -.072 | -.092 | -.086 | -.105 | -.042 | -.020 | .032 | .001 | -.021 | .085 |
| | .650 | .066 | .044 | .026 | .006 | -.018 | -.034 | -.052 | -.065 | -.086 | -.119 | -.078 | -.063 | .028 | -.002 | -.026 | .061 |
| | .750 | [a].043 | [a].023 | [a].030 | -.005 | -.023 | -.030 | -.042 | -.046 | -.056 | -.101 | -.058 | [a]-.094 | .019 | -.019 | -.042 | .030 |
| | .850 | [a].024 | [a].010 | [a].051 | [a].005 | [a]-.027 | [a]-.029 | [a]-.024 | [a]-.020 | .016 | -.018 | -.052 | -.085 | .039 | [a].002 | [a]-.041 | [a].031 |
| | .925 | [a].031 | [a].010 | [a].079 | [a].042 | [a]-.020 | [a].019 | [a].009 | [a].020 | [a].087 | [a].075 | [a]-.025 | [a]-.019 | .204 | [a].066 | [a].004 | [a].060 |
| | [a].975 | .087 | .033 | .122 | .103 | .007 | .010 | .054 | .070 | .157 | .161 | .044 | .107 | .577 | .216 | .084 | .103 |
| | [a]1.000 | .235 | .101 | .202 | .201 | .351 | .301 | .300 | .325 | .315 | .276 | .336 | .302 | 1.008 | .648 | .223 | .173 |

[a]Paired value.

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TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Continued

(g) M = 1350 rpm; $\beta_{0.75R} = 44.96^\circ$.

| | J | 1.545 | 1.652 | 1.762 | 1.866 | 1.978 | 2.071 | 2.170 | 2.290 | 2.403 | 2.528 | 2.475 | 2.360 | 2.248 | 2.141 | 2.029 | 1.926 | 1.806 | 1.720 | 1.611 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $M_R$ | .690 | .697 | .708 | .721 | .733 | .746 | .756 | .770 | .789 | .802 | .794 | .781 | .760 | .746 | .732 | .727 | .714 | .705 | .691 |
| | $\alpha_R$° | 10.92 | 9.33 | 7.74 | 6.27 | 4.76 | 3.53 | 2.26 | .79 | -.55 | -1.97 | -1.38 | -.04 | 1.31 | 2.64 | 4.08 | 5.46 | 7.12 | 8.33 | 9.94 |
| | $\Delta\beta$ | .38 | .37 | .35 | .34 | .32 | .31 | .28 | .25 | .22 | .19 | .20 | .23 | .27 | .29 | .32 | .33 | .35 | .36 | .37 |
| | $\alpha_i$ | 3.71 | 3.40 | 3.01 | 2.65 | 2.37 | 1.96 | 1.54 | 1.06 | .68 | .22 | .32 | .69 | 1.18 | 1.54 | 2.04 | 2.42 | 2.89 | 3.09 | 3.59 |
| | $c_n$ | .8272 | .7574 | .6784 | .5951 | .5323 | .4409 | .3488 | .2381 | .1556 | .0498 | .0736 | .1556 | .2675 | .3465 | .4579 | .5448 | .6466 | .6918 | .8003 |
| | $c_m$ | -.0461 | -.0292 | -.0275 | -.0375 | -.0339 | -.0386 | -.0410 | -.0483 | -.0559 | -.0721 | -.0723 | -.0659 | -.0506 | -.0434 | -.0310 | -.0250 | -.0204 | -.0093 | -.0137 |
| | $c_o$ | -.0260 | -.0306 | -.0232 | -.0168 | -.0189 | -.0135 | -.0126 | -.0073 | -.0086 | -.0072 | .0021 | -.0006 | -.0071 | -.0066 | -.0195 | -.0260 | -.0279 | -.0315 | -.0335 |
| | x/b | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.125 | 1.128 | 1.132 | 1.137 | 1.142 | 1.148 | 1.152 | 1.157 | 1.166 | 1.171 | 1.167 | 1.162 | 1.153 | 1.148 | 1.142 | 1.140 | 1.135 | 1.131 | 1.126 |
| | [a].025 | -1.191 | -1.344 | -1.169 | -.933 | -1.025 | -1.130 | -.686 | -.404 | -.875 | -.069 | .368 | .175 | -.233 | -.407 | -1.233 | -1.406 | -1.482 | -1.526 | -1.616 |
| | .050 | -1.189 | -1.334 | -1.438 | -1.420 | -1.367 | -1.316 | -.646 | -.418 | -.240 | -.072 | .061 | -.098 | -.299 | -.444 | -1.088 | -1.322 | -1.499 | -1.564 | -1.649 |
| | .100 | -1.160 | -1.252 | -1.434 | -1.415 | -1.325 | -.522 | -.434 | -.286 | -.158 | -.037 | -.045 | -.164 | -.312 | -.438 | -.473 | -1.189 | -1.394 | -1.496 | -1.578 |
| | .200 | -1.102 | -1.039 | -.880 | -.491 | -.374 | -.388 | -.325 | -.239 | -.155 | -.084 | -.111 | -.181 | -.277 | -.352 | -.398 | -.371 | -.658 | -.859 | [a]-1.167 |
| | .300 | -.929 | [a]-.764 | -.504 | -.423 | -.390 | -.370 | -.320 | -.263 | -.208 | -.153 | -.171 | -.223 | -.287 | -.339 | -.386 | -.383 | -.387 | -.544 | -.840 |
| | .400 | -.746 | -.597 | -.378 | -.360 | -.353 | -.334 | -.296 | -.257 | -.219 | -.180 | -.192 | -.229 | -.276 | -.313 | -.350 | -.355 | -.356 | -.407 | -.683 |
| | .500 | -.553 | -.415 | -.346 | -.342 | -.330 | -.315 | -.287 | -.259 | -.232 | -.210 | -.215 | -.240 | -.272 | -.300 | -.331 | -.336 | -.340 | -.347 | -.460 |
| | .600 | -.403 | -.327 | -.331 | -.337 | -.325 | -.317 | -.298 | -.278 | -.268 | -.261 | -.262 | -.272 | -.291 | -.309 | -.331 | -.331 | -.332 | -.320 | -.351 |
| | .700 | -.304 | -.264 | -.292 | -.310 | -.287 | -.280 | -.271 | -.259 | -.253 | -.258 | -.255 | -.257 | -.268 | -.279 | -.295 | -.293 | -.294 | -.280 | -.279 |
| | .800 | -.224 | -.192 | -.214 | -.214 | -.205 | -.201 | -.194 | -.188 | -.187 | -.196 | -.188 | -.189 | -.196 | -.201 | -.213 | -.211 | -.214 | -.203 | -.208 |
| | .900 | -.164 | -.128 | -.122 | -.119 | -.107 | -.105 | -.102 | -.097 | -.100 | -.109 | -.105 | -.101 | -.104 | -.109 | -.116 | -.116 | -.119 | -.117 | -.149 |
| | .950 | -.124 | -.084 | -.046 | -.037 | -.023 | -.019 | -.020 | -.013 | -.012 | -.021 | -.018 | -.013 | -.016 | -.021 | -.030 | -.031 | -.038 | -.049 | -.110 |
| Lower surface | .0375 | .707 | .674 | .618 | .538 | .440 | .344 | .193 | .008 | -.185 | -.807 | -.343 | -.118 | .091 | .245 | .383 | .483 | .588 | .612 | .669 |
| | .075 | .554 | .521 | [a].468 | .404 | .324 | .247 | .136 | .012 | -.125 | -.242 | -.219 | -.073 | .036 | .142 | .265 | .356 | .427 | .490 | .537 |
| | .150 | .406 | .379 | .339 | .289 | .232 | .173 | .094 | .005 | -.081 | -.167 | -.142 | -.048 | [a].015 | -.110 | .190 | .252 | .319 | .350 | .389 |
| | .250 | .298 | .276 | .246 | .203 | .157 | .111 | .048 | -.014 | -.074 | -.138 | -.113 | -.053 | .010 | .065 | [a].131 | .164 | [a].225 | .232 | [a].278 |
| | .350 | .228 | .211 | .190 | .156 | .118 | .082 | .032 | -.014 | -.057 | -.106 | -.088 | -.042 | .003 | .042 | .090 | .133 | .181 | .197 | .216 |
| | .450 | .168 | .160 | .146 | .117 | .091 | .058 | .016 | -.021 | -.054 | -.090 | -.078 | -.045 | -.018 | .019 | .057 | .095 | .136 | .151 | .132 |
| | .550 | .103 | .103 | .096 | .070 | .044 | .023 | -.011 | -.039 | -.062 | -.089 | -.073 | -.055 | [a]-.037 | -.009 | .018 | .054 | .078 | .063 | .040 |
| | .650 | .066 | .071 | .068 | .051 | .029 | .010 | -.011 | -.034 | -.050 | -.069 | -.078 | -.049 | [a]-.052 | [a]-.019 | [a]-.020 | [a].027 | [a].025 | [a].001 | [a]-.024 |
| | .750 | .022 | .036 | .041 | .032 | .017 | .007 | -.013 | -.026 | -.032 | -.046 | -.041 | -.033 | -.061 | -.015 | -.027 | -.015 | -.005 | -.021 | -.048 |
| | .850 | -.006 | .018 | .036 | .034 | .028 | .020 | .012 | .008 | .005 | .003 | -.004 | -.030 | -.059 | [a].030 | [a].010 | [a].028 | [a].001 | [a]-.013 | [a]-.038 |
| | .925 | .045 | .068 | .081 | .103 | .115 | .116 | .116 | .136 | .157 | .179 | .173 | .152 | .130 | .107 | .085 | .068 | .046 | .031 | .007 |
| | [a].975 | .174 | .192 | .186 | .252 | .294 | .293 | .293 | .321 | .361 | .470 | .530 | .522 | .506 | .211 | .222 | .170 | .132 | .136 | .115 |
| | [a]1.000 | .410 | .378 | .356 | .477 | .657 | .605 | .478 | .482 | .676 | .850 | 1.100 | 1.002 | 1.004 | .382 | .454 | .354 | .609 | .326 | .307 |

[a]Faired value.

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TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Continued

(h) N = 1600 rpm; $\beta_{0.75R} = 44.96°$.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.210 | 2.323 | 2.417 | 2.521 | 2.468 | 2.375 | 2.268 | 2.114 | 2.191 | 2.092 | 2.050 | 2.001 | 1.967 |
| | $M_x$ | .899 | .916 | .929 | .942 | .934 | .921 | .904 | .882 | .893 | .879 | .874 | .866 | .860 |
| | $\alpha_x'$ | 1.77 | .39 | -.71 | -1.90 | -1.30 | -.22 | 1.06 | 2.98 | 2.01 | 3.26 | 3.81 | 4.45 | 4.90 |
| | $\Delta\beta$ | .38 | .33 | .29 | .24 | .26 | .30 | .35 | .43 | .39 | .44 | .46 | .48 | .50 |
| | $\alpha_l$ | 1.50 | .98 | .28 | -.48 | -.19 | .50 | 1.22 | 2.01 | 1.71 | 2.03 | 2.36 | 2.59 | 2.87 |
| | $c_n$ | .3391 | .2213 | .0632 | -.1092 | -.0435 | .1126 | .2743 | .4527 | .3865 | .4563 | .5301 | .5831 | .6462 |
| | $c_m$ | -.0722 | -.0713 | -.0785 | -.0728 | -.0841 | -.0727 | -.0666 | -.0492 | -.0538 | -.0444 | -.0397 | -.0397 | -.0424 |
| | $c_c$ | .0021 | .0040 | .0087 | .0097 | .0097 | .0043 | -.0012 | -.0087 | -.0066 | -.0099 | -.0146 | -.0166 | -.0205 |
| | c/b | Pressure coefficient, P | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.218 | 1.227 | 1.234 | 1.242 | 1.237 | 1.230 | 1.221 | 1.209 | 1.215 | 1.208 | 1.205 | 1.201 | 1.198 |
| | [a].025 | -.188 | -.050 | .240 | .325 | .435 | .115 | -.160 | -.465 | -.346 | -.504 | -.631 | -.710 | -.789 |
| | [a].050 | -.236 | -.111 | .070 | .173 | .233 | -.006 | -.189 | -.488 | -.363 | -.517 | -.644 | -.722 | -.810 |
| | .100 | -.289 | -.165 | -.029 | .081 | .039 | -.074 | -.225 | -.516 | -.379 | -.538 | -.661 | -.735 | -.825 |
| | .200 | -.355 | -.213 | -.114 | -.020 | -.084 | -.142 | -.272 | -.531 | -.413 | -.556 | -.674 | -.743 | -.826 |
| | .300 | -.408 | -.299 | -.204 | -.129 | -.156 | -.230 | -.334 | -.522 | -.505 | -.555 | -.665 | -.732 | -.812 |
| | .400 | -.399 | -.312 | -.238 | -.166 | -.196 | -.254 | -.349 | -.474 | -.446 | -.497 | -.619 | -.692 | -.773 |
| | .500 | -.407 | -.329 | -.273 | -.217 | -.239 | -.286 | -.368 | -.448 | -.439 | -.456 | -.532 | -.618 | -.700 |
| | .600 | -.470 | -.411 | -.365 | -.324 | -.342 | -.378 | -.431 | -.505 | -.495 | -.513 | -.540 | -.577 | -.664 |
| | .700 | -.508 | -.462 | -.418 | -.388 | -.404 | -.436 | -.476 | -.503 | -.527 | -.505 | -.270 | -.228 | -.232 |
| | .800 | -.485 | -.508 | -.479 | -.458 | -.473 | -.499 | -.516 | -.173 | -.216 | -.156 | -.170 | -.159 | -.151 |
| | .900 | -.026 | -.069 | -.200 | -.424 | -.301 | -.136 | -.036 | -.050 | -.031 | -.053 | -.067 | -.064 | -.063 |
| | .950 | .050 | .039 | .006 | -.047 | -.025 | .024 | .051 | .036 | .046 | .034 | .025 | .022 | .016 |
| Lower surface | .0375 | .111 | -.100 | -.437 | -.543 | -.522 | -.364 | .003 | .273 | .182 | .282 | .352 | .401 | .449 |
| | .075 | [a].106 | -.060 | -.388 | -.498 | -.475 | -.283 | .006 | .203 | .139 | .210 | .264 | .286 | .343 |
| | .150 | .068 | -.025 | -.328 | -.465 | -.448 | -.137 | .006 | .131 | .088 | .137 | .176 | .207 | .238 |
| | .250 | .015 | -.051 | -.177 | -.446 | -.458 | -.146 | -.028 | .080 | .045 | .085 | .116 | [a].141 | [a].163 |
| | .350 | -.005 | -.054 | [a]-.076 | -.403 | -.333 | -.136 | -.040 | .045 | .017 | .048 | .077 | .099 | .119 |
| | .450 | -.017 | -.059 | -.067 | -.345 | -.180 | -.103 | -.048 | .027 | 0 | -.008 | .052 | .072 | .088 |
| | .550 | -.057 | -.091 | -.121 | -.318 | -.080 | -.120 | -.088 | -.011 | -.039 | [a]-.030 | [a].014 | .023 | .038 |
| | .650 | -.079 | -.115 | -.145 | -.217 | -.113 | -.137 | -.099 | -.037 | -.059 | -.037 | [a]-.030 | -.019 | -.022 |
| | .750 | -.070 | -.100 | -.139 | -.077 | -.107 | -.115 | -.082 | -.046 | -.051 | -.051 | [a]-.035 | -.024 | -.034 |
| | .850 | [a]-.020 | [a]-.041 | [a]-.084 | .047 | .031 | .007 | -.017 | -.050 | -.030 | [a].047 | -.059 | -.068 | -.077 |
| | .925 | .039 | .028 | .016 | .011 | .001 | [a].006 | .005 | .011 | .031 | [a].015 | .004 | -.004 | -.015 |
| | [a].975 | .111 | .161 | .110 | .045 | .037 | .059 | .085 | .176 | .204 | .194 | .187 | .177 | .164 |
| | [a]1.000 | .226 | .351 | .381 | .550 | .375 | .326 | .326 | .378 | .423 | .378 | .354 | .354 | .329 |

[a]Faired value.

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TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Continued

(i) $M = 0.56$; $\beta_{0.75R} = 44.96^\circ$.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | | 2.058 | 2.072 | 2.107 | 2.135 | 2.160 | 2.183 | 2.211 | 2.242 | 2.267 | 2.298 | 2.328 | 2.362 | 2.388 | 2.419 | 2.453 | 2.485 | 2.517 | 2.553 | 2.588 |
| $M_x$ | | .983 | .978 | .967 | .959 | .952 | .942 | .934 | .929 | .923 | .915 | .907 | .896 | .890 | .883 | .876 | .872 | .862 | .856 | .852 |
| $\alpha_x$' | | 3.70 | 3.51 | 3.06 | 2.71 | 2.40 | 2.10 | 1.76 | 1.37 | 1.08 | .70 | .33 | -.06 | -.37 | -.73 | -1.12 | -1.49 | -1.85 | -2.25 | -2.65 |
| $\Delta\beta$ | | .49 | .48 | .47 | .45 | .44 | .43 | .41 | .40 | .38 | .36 | .34 | .32 | .30 | .28 | .26 | .24 | .22 | .19 | .16 |
| $\alpha_l$ | | 2.12 | 2.08 | 1.97 | 1.85 | 1.65 | 1.54 | 1.34 | 1.28 | 1.13 | 1.03 | .92 | .81 | .70 | .50 | .38 | .23 | .01 | -.22 | -.47 |
| $c_n$ | | .4769 | .4679 | .4441 | .4170 | .3735 | .3477 | .3026 | .2891 | .2543 | .2314 | .2085 | .1843 | .1595 | .1136 | .0855 | .0535 | .0013 | -.0496 | -.1070 |
| $c_m$ | | -.0970 | -.0953 | -.0889 | -.0850 | -.0689 | -.0638 | -.0572 | -.0558 | -.0557 | -.0568 | -.0593 | -.0604 | -.0588 | -.0628 | -.0571 | -.0505 | -.0563 | -.0556 | -.0530 |
| $c_o$ | | .0091 | .0090 | .0073 | .0071 | .0051 | .0041 | .0022 | .0020 | .0024 | .0025 | .0035 | .0038 | .0028 | .0025 | .0020 | .0011 | .0035 | .0051 | .0051 |
| x/b | | Pressure coefficient, P | | | | | | | | | | | | | | | | | | |
| Upper surface | 0.000 | 1.264 | 1.262 | 1.256 | 1.251 | 1.247 | 1.241 | 1.237 | 1.234 | 1.231 | 1.227 | 1.223 | 1.217 | 1.214 | 1.210 | 1.207 | 1.204 | 1.199 | 1.197 | 1.194 |
| | [a].025 | -.325 | -.338 | -.336 | -.294 | -.248 | -.249 | -.202 | -.187 | -.125 | -.073 | -.035 | .015 | .055 | .100 | .154 | .168 | .255 | -.575 | .670 |
| | .050 | -.331 | -.341 | -.324 | -.292 | -.257 | -.248 | -.204 | -.192 | -.146 | -.122 | -.092 | -.058 | -.032 | .014 | .048 | .079 | .116 | .152 | .184 |
| | .100 | -.331 | -.335 | -.313 | -.290 | -.275 | -.262 | -.218 | -.205 | -.192 | -.183 | -.171 | -.148 | -.135 | -.096 | -.071 | -.047 | -.017 | .011 | .037 |
| | .200 | -.303 | -.300 | -.307 | -.313 | -.322 | -.331 | -.336 | -.342 | -.317 | -.300 | -.280 | -.260 | -.253 | -.230 | -.217 | -.198 | -.152 | -.111 | -.087 |
| | [a].300 | -.341 | -.339 | -.348 | -.349 | -.352 | -.359 | -.349 | -.350 | -.329 | -.318 | -.298 | -.275 | -.276 | -.251 | -.231 | -.215 | -.172 | -.169 | -.149 |
| | .400 | -.397 | -.402 | -.394 | -.384 | -.380 | -.381 | -.361 | -.355 | -.338 | -.332 | -.316 | -.297 | -.286 | -.262 | -.252 | -.234 | -.218 | -.198 | -.182 |
| | [a].500 | -.428 | -.434 | -.430 | -.420 | -.421 | -.417 | -.399 | -.392 | -.380 | -.367 | -.361 | -.343 | -.322 | -.303 | -.300 | -.294 | -.280 | -.269 | -.246 |
| | .600 | -.452 | -.454 | -.454 | -.453 | -.449 | -.451 | -.442 | -.440 | -.430 | -.421 | -.412 | -.401 | -.399 | -.383 | -.382 | -.371 | -.358 | -.334 | -.307 |
| | .700 | -.474 | -.478 | -.480 | -.481 | -.482 | -.485 | -.478 | -.479 | -.469 | -.466 | -.462 | -.451 | -.449 | -.431 | -.421 | -.392 | -.356 | -.324 | -.303 |
| | .800 | -.515 | -.520 | -.526 | -.531 | -.533 | -.536 | -.531 | -.534 | -.528 | -.528 | -.523 | -.483 | -.406 | -.267 | -.239 | -.236 | -.240 | -.237 | -.231 |
| | .900 | -.573 | -.589 | -.598 | -.590 | -.455 | -.340 | -.235 | -.144 | -.108 | -.074 | -.056 | -.047 | -.057 | -.067 | -.084 | -.096 | -.110 | -.118 | -.123 |
| | .950 | -.514 | -.471 | -.356 | -.229 | -.137 | -.101 | -.063 | -.022 | .006 | .030 | .029 | .018 | .002 | -.011 | -.024 | -.013 | [a]-.042 | -.007 | -.013 |
| Lower surface | .0375 | .333 | .309 | .280 | .242 | .202 | .170 | .104 | .081 | .012 | -.038 | -.095 | -.163 | -.247 | -.383 | -.496 | -.596 | -.694 | -.777 | -.864 |
| | .075 | .265 | .247 | .224 | .191 | .160 | .135 | .087 | .067 | .016 | -.020 | -.059 | -.094 | -.135 | -.242 | -.360 | -.473 | -.580 | -.673 | -.766 |
| | .150 | .196 | .180 | .164 | .138 | .113 | .093 | .056 | .042 | .005 | -.019 | -.046 | -.065 | -.079 | -.090 | -.103 | -.134 | -.246 | -.383 | -.537 |
| | .250 | .136 | .130 | .117 | .096 | .077 | .059 | .028 | .017 | -.007 | -.025 | -.043 | -.055 | -.070 | -.082 | -.091 | -.093 | -.109 | -.124 | -.137 |
| | .350 | .109 | .099 | .087 | .069 | .053 | .039 | .012 | 0 | -.015 | -.027 | -.040 | -.049 | -.061 | -.067 | -.077 | -.081 | -.096 | -.108 | -.123 |
| | .450 | .066 | .055 | .044 | .029 | .012 | 0 | -.019 | -.028 | -.043 | -.052 | -.063 | -.065 | -.073 | -.073 | -.081 | -.083 | -.084 | -.094 | -.107 |
| | .550 | .011 | .002 | -.009 | -.023 | -.037 | -.049 | -.065 | -.071 | -.082 | -.100 | -.115 | -.125 | -.143 | -.157 | -.123 | -.088 | -.084 | -.092 | -.105 |
| | .650 | -.038 | -.048 | -.060 | -.073 | -.086 | -.100 | -.112 | -.112 | -.128 | -.144 | -.160 | -.116 | -.102 | -.098 | -.111 | -.100 | -.087 | -.087 | -.101 |
| | .750 | -.085 | -.097 | -.110 | -.122 | -.137 | -.151 | -.166 | -.179 | -.139 | -.118 | -.132 | -.083 | -.064 | -.058 | -.067 | -.081 | -.094 | [a]-.089 | [a]-.102 |
| | .850 | -.135 | -.146 | -.157 | -.172 | -.186 | -.201 | -.175 | [a]-.156 | [a]-.126 | [a]-.089 | [a]-.079 | -.066 | [a]-.058 | [a]-.048 | [a]-.057 | [a]-.074 | [a]-.101 | [a]-.098 | [a]-.111 |
| | .925 | -.084 | -.095 | -.107 | -.119 | -.134 | -.148 | -.147 | -.125 | -.117 | -.080 | -.067 | -.060 | -.049 | -.050 | -.063 | -.076 | -.093 | -.106 | -.120 |
| | [a].975 | .086 | .076 | .070 | .057 | .045 | .030 | -.057 | -.048 | -.057 | -.039 | -.030 | -.030 | -.025 | -.010 | -.025 | -.060 | -.029 | -.018 | -.015 |
| | [a]1.000 | .255 | .265 | .250 | .245 | .315 | .190 | .250 | .275 | .235 | .170 | .160 | .125 | .125 | .100 | .275 | .300 | .140 | .400 | .450 |

[a]Faired value.

TABLE 10.- PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS OF AN NACA 16-(2.03)(04.76) PROPELLER BLADE SECTION (x = 0.95) - Concluded

(j) $M = 0.65$; $\beta_{0.75R} = 45^\circ$.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | J | 2.041 | 2.112 | 2.147 | 2.216 | 2.250 | 2.285 | 2.324 | 2.359 | 2.430 |
| | $M_x$ | 1.165 | 1.136 | 1.123 | 1.100 | 1.084 | 1.079 | 1.063 | 1.045 | 1.026 |
| | $\alpha_x$, | 3.92 | 3.00 | 2.56 | 1.70 | 1.27 | .85 | .38 | -.03 | -.86 |
| | $\Delta\beta$ | .61 | .56 | .53 | .48 | .45 | .43 | .40 | .37 | .32 |
| | $\alpha_i$ | 1.81 | 1.38 | 1.25 | .91 | .70 | .49 | .32 | .10 | -.09 |
| | $c_n$ | .4079 | .3106 | .2831 | .2037 | .1579 | .1109 | .0785 | .0222 | -.0215 |
| | $c_m$ | -.1027 | -.0732 | -.0722 | -.0762 | -.0660 | -.0649 | -.0681 | -.0581 | -.0475 |
| | $c_c$ | .0179 | .0167 | .0168 | .0199 | .0211 | .0207 | .0201 | .0218 | .0205 |
| | c/b | Pressure coefficient, P | | | | | | | | |
| Upper surface | 0.000 | 1.385 | 1.364 | 1.354 | 1.339 | 1.329 | 1.325 | 1.315 | 1.303 | 1.291 |
| | [a].025 | .220 | .085 | .097 | .172 | .240 | .320 | .310 | .525 | .320 |
| | [a].050 | .056 | .043 | .060 | .120 | .140 | .133 | .122 | .185 | .110 |
| | .100 | -.003 | -.004 | .019 | .062 | .076 | .076 | .072 | .128 | .075 |
| | .200 | -.062 | -.094 | -.074 | -.050 | -.038 | -.030 | -.018 | .054 | .003 |
| | .300 | -.116 | -.176 | -.183 | -.185 | -.169 | -.135 | -.133 | -.067 | -.129 |
| | .400 | -.147 | -.180 | -.169 | -.163 | -.153 | -.147 | -.143 | -.079 | -.141 |
| | .500 | -.167 | -.200 | -.194 | -.182 | -.186 | -.184 | -.182 | -.123 | -.185 |
| | .600 | -.210 | -.255 | -.253 | -.256 | [a]-.255 | -.259 | -.258 | -.201 | -.269 |
| | .700 | -.250 | -.294 | -.294 | -.304 | [a]-.310 | -.311 | -.315 | -.260 | -.333 |
| | .800 | -.279 | -.327 | -.331 | -.348 | -.355 | -.360 | -.366 | -.317 | -.393 |
| | .900 | -.330 | -.388 | -.398 | -.418 | -.426 | -.434 | -.444 | -.399 | -.479 |
| | .950 | -.283 | -.345 | -.353 | -.373 | -.382 | -.391 | -.402 | -.357 | -.437 |
| Lower surface | .0375 | .424 | .351 | .286 | .157 | .087 | .009 | -.063 | -.077 | -.223 |
| | .075 | .378 | .313 | .261 | [a].140 | .074 | .007 | -.054 | -.059 | -.199 |
| | .150 | .256 | .217 | .200 | .104 | .046 | -.015 | -.071 | -.069 | -.203 |
| | .250 | .248 | .197 | .167 | .083 | .039 | -.020 | -.073 | -.071 | -.201 |
| | .350 | .222 | .172 | .147 | .077 | .041 | -.007 | -.054 | -.046 | -.173 |
| | .450 | .180 | .125 | .105 | .045 | .019 | -.018 | -.057 | -.045 | -.168 |
| | .550 | .136 | .082 | .065 | .018 | -.009 | -.038 | -.071 | -.055 | -.175 |
| | .650 | .080 | .027 | .011 | -.035 | -.063 | -.084 | -.113 | -.092 | -.211 |
| | .750 | .047 | -.006 | -.024 | -.065 | -.093 | -.111 | -.132 | -.108 | -.222 |
| | .850 | .020 | -.034 | -.057 | -.105 | -.130 | -.150 | -.169 | -.138 | -.245 |
| | .925 | .006 | -.049 | -.070 | -.119 | -.143 | -.160 | -.172 | -.138 | -.243 |
| | [a].975 | .117 | -.022 | -.045 | -.087 | -.112 | -.124 | -.132 | -.100 | -.202 |
| | [a]1.000 | .170 | -.125 | .025 | -.030 | -.035 | -.055 | -.040 | -.010 | -.100 |

[a]Faired value.

NACA

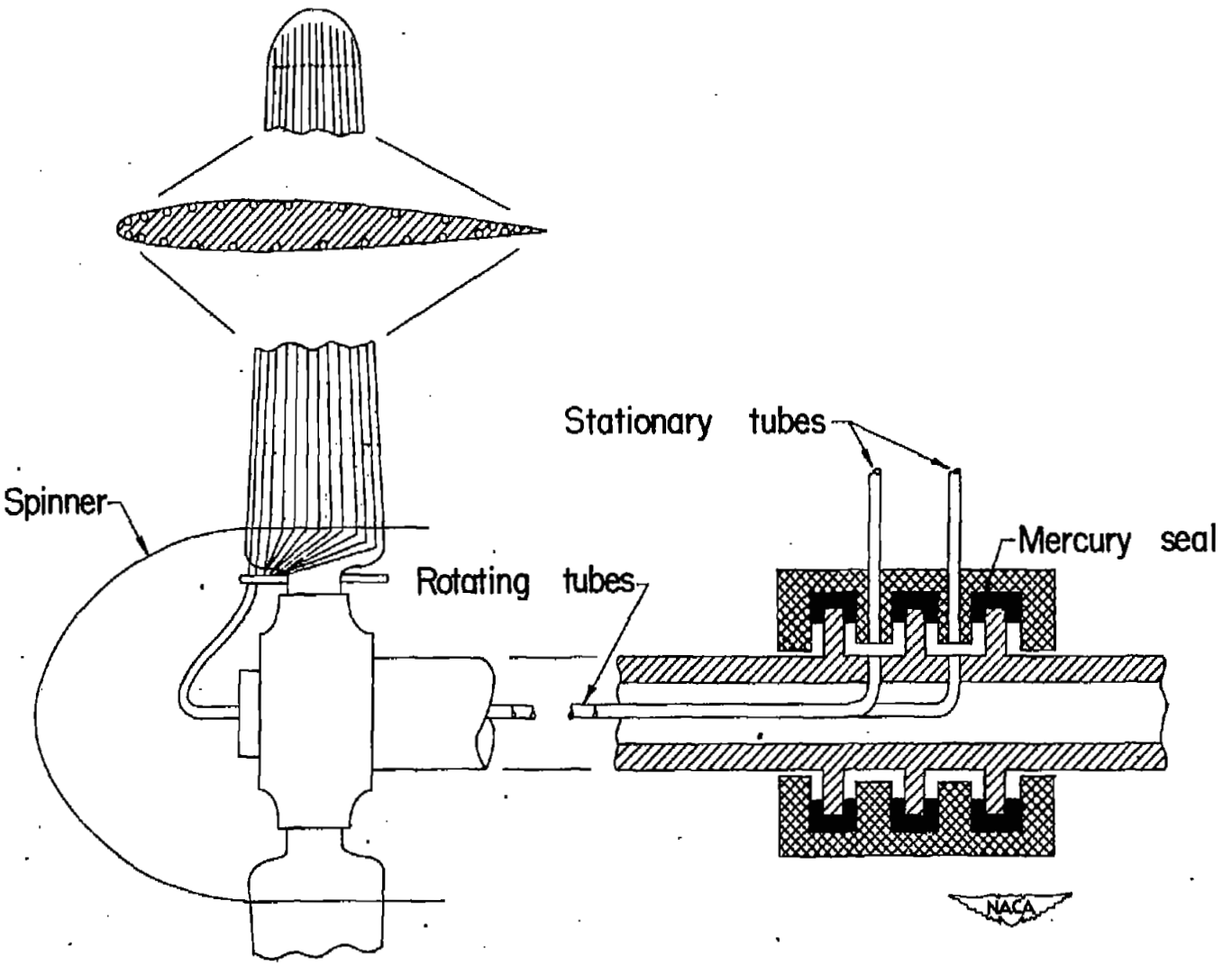



Figure 1.- Schematic diagram showing method of measuring pressures.

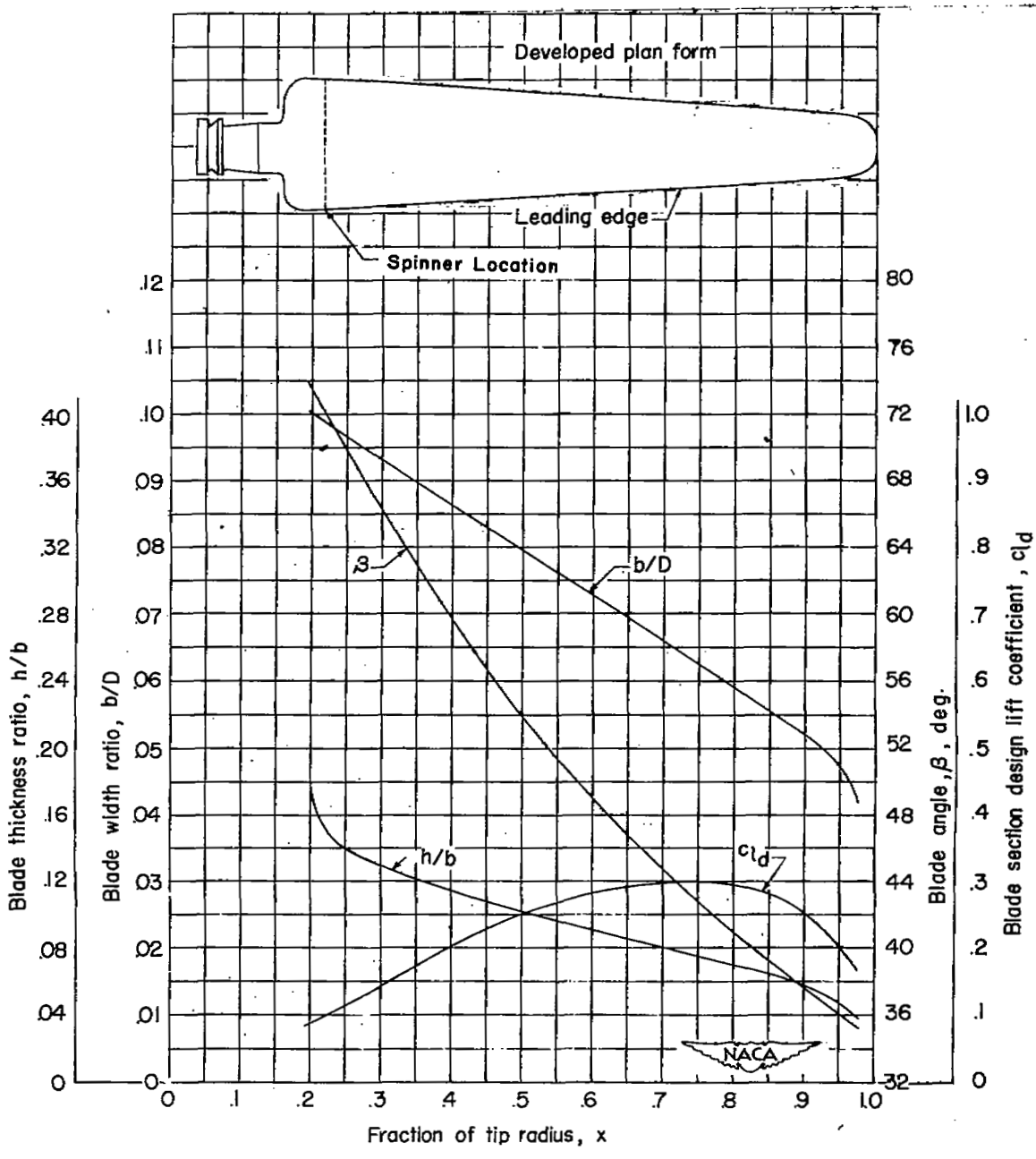



Figure 2.- Blade-form curves for NACA 10-(3)(08)-03 propeller.

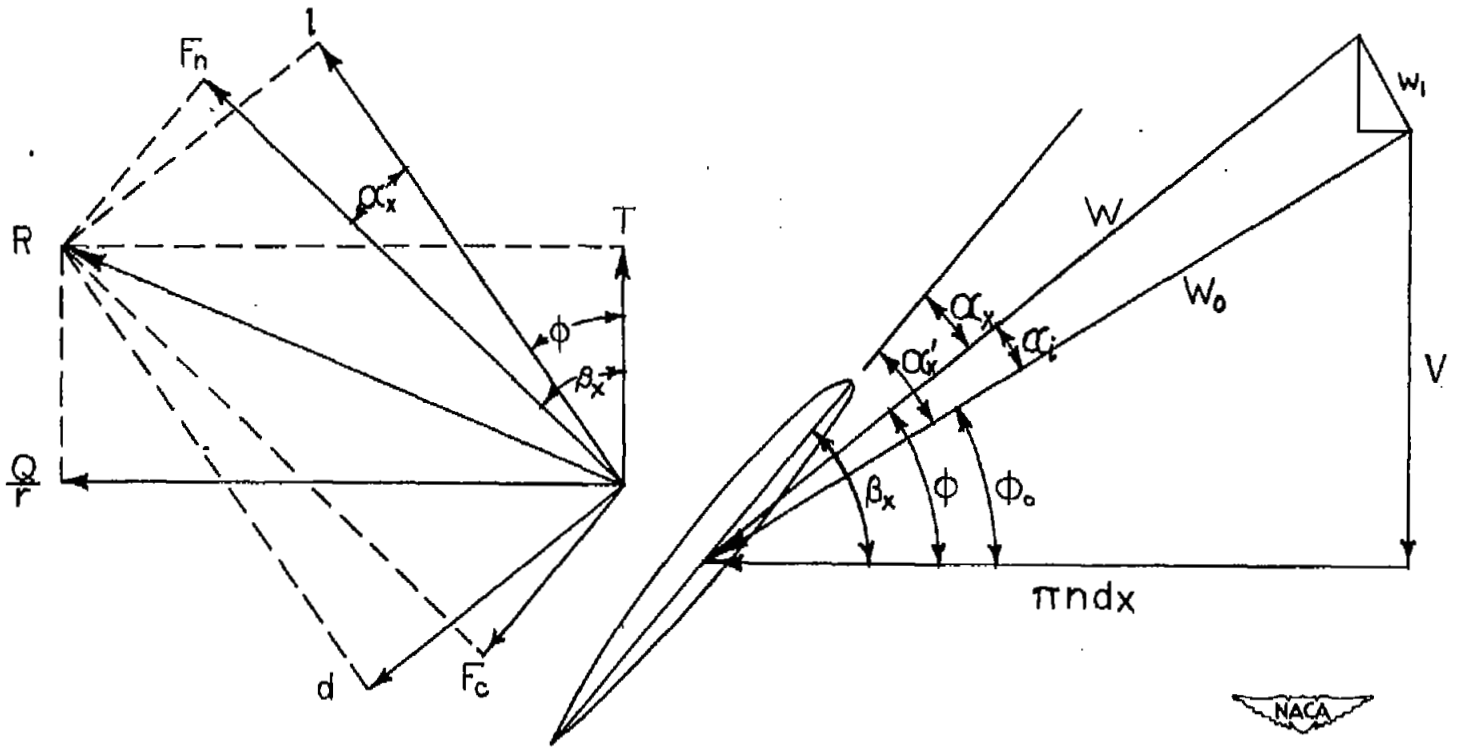
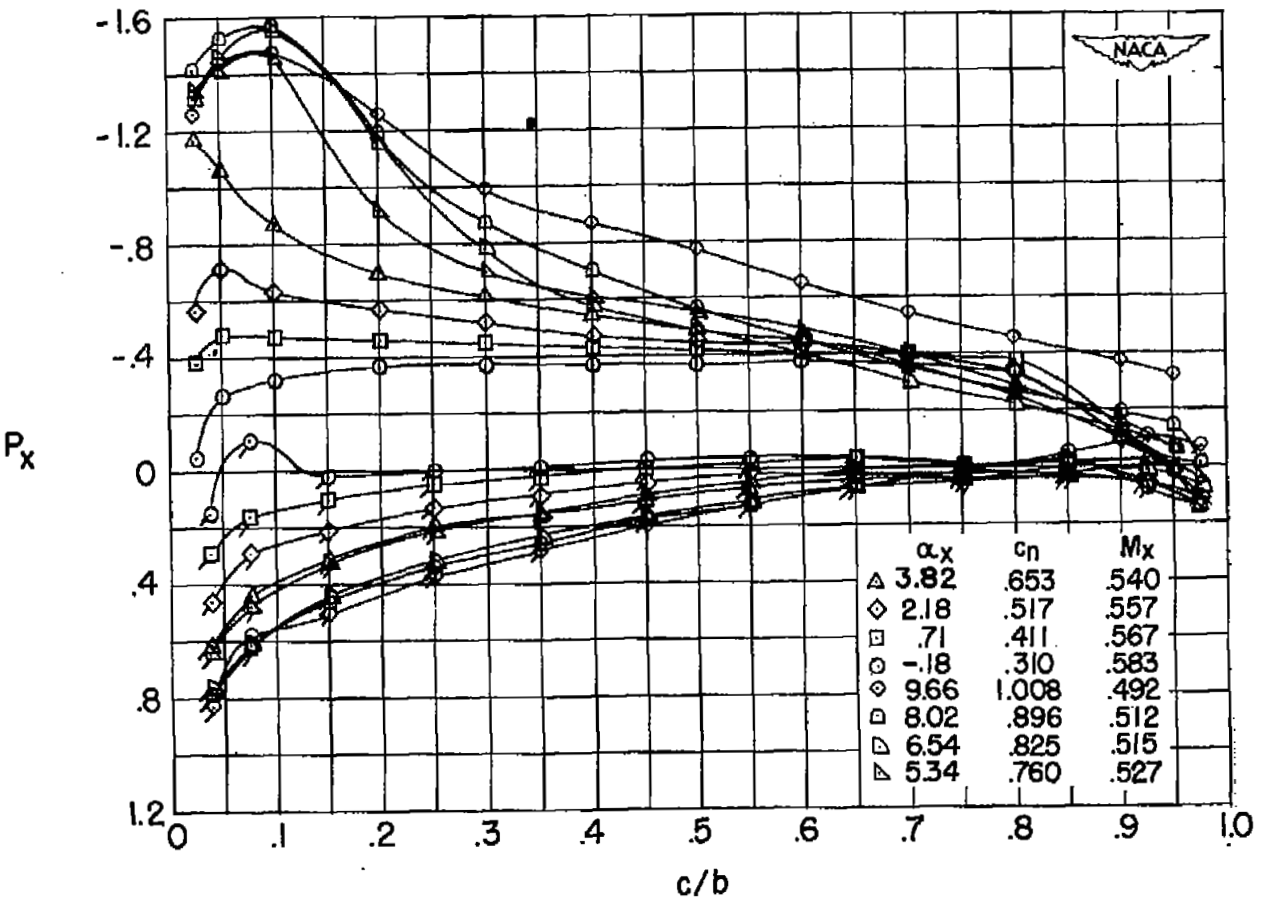
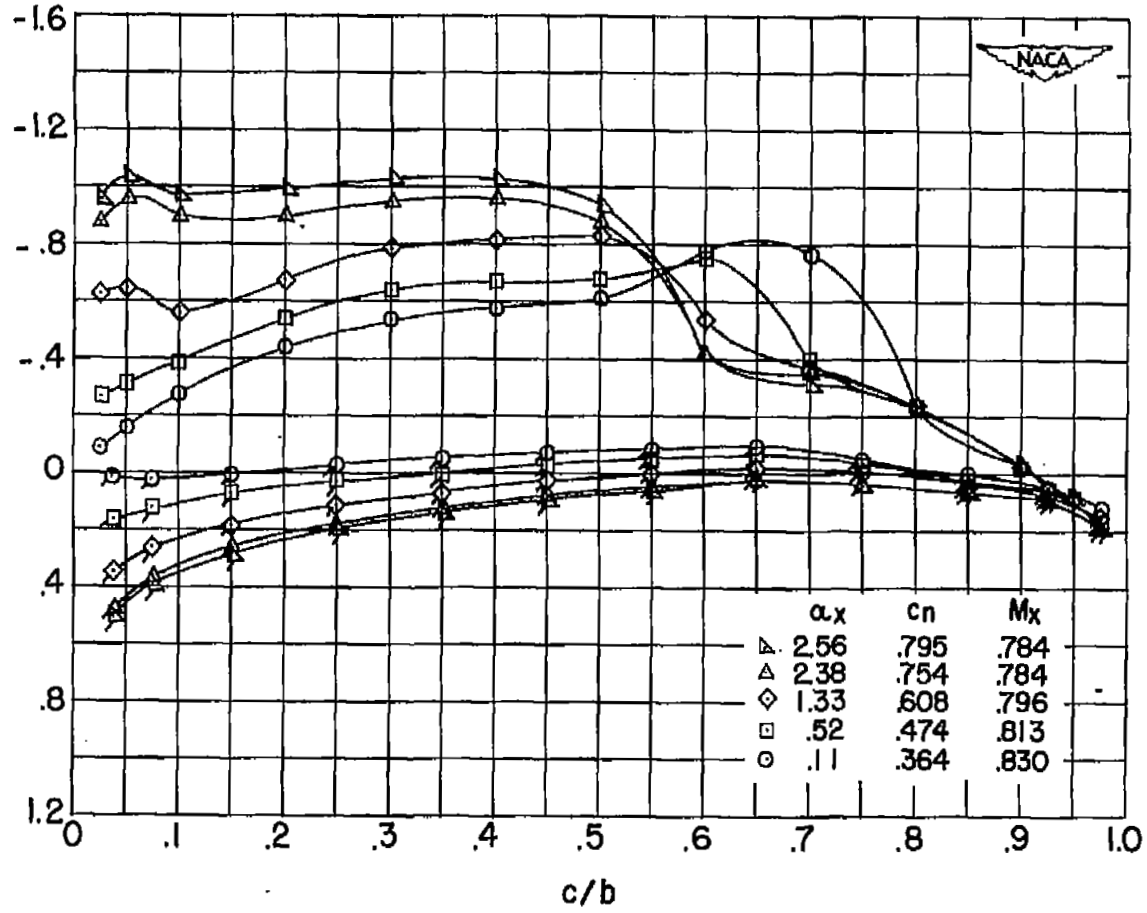



Figure 3.- Vector diagram of velocity and forces acting at a typical propeller blade section.



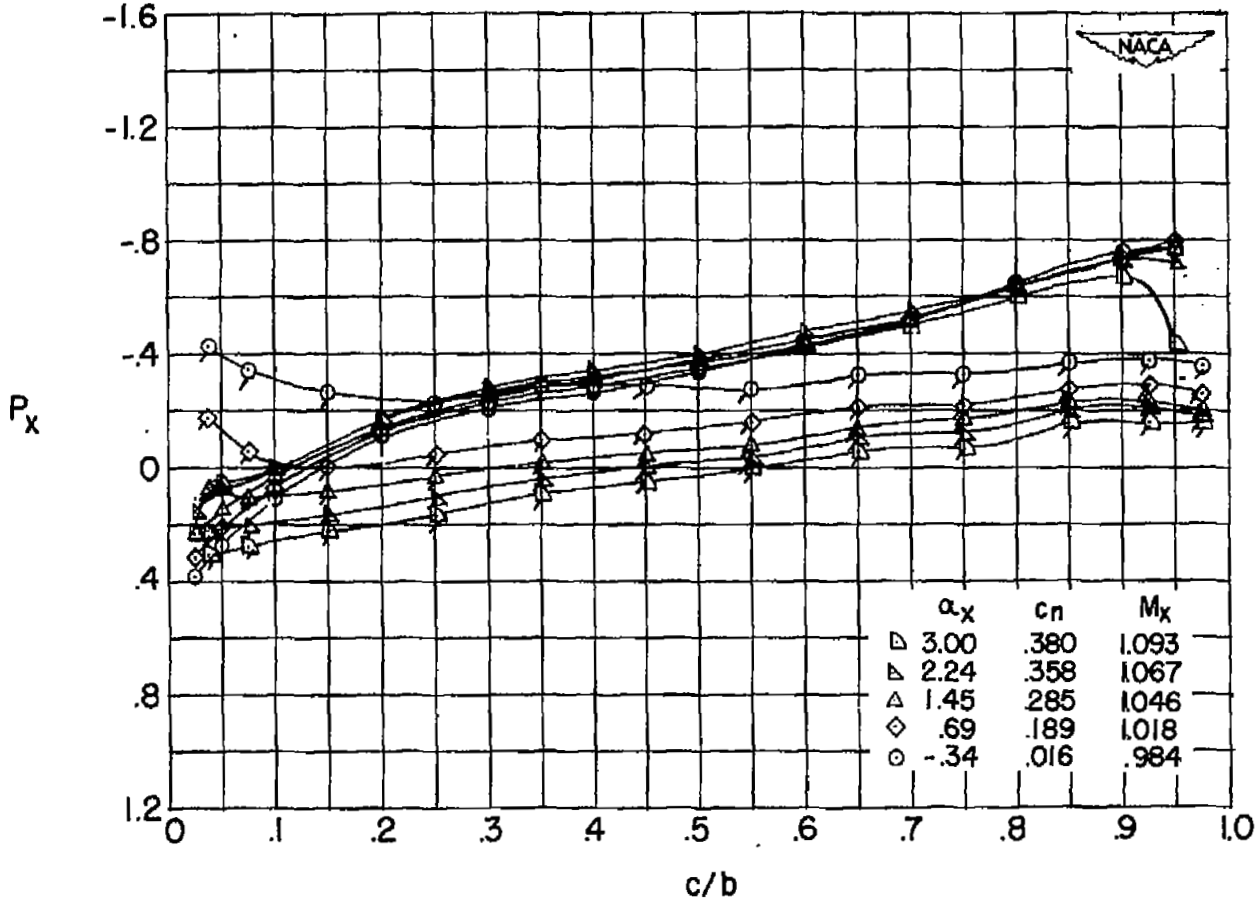

(a) N = 1140 rpm.

Figure 4.- Pressure distribution diagrams obtained at the $\frac{r}{R} = 0.80$ radial station at $\beta_{0.75R} = 45^\circ$.



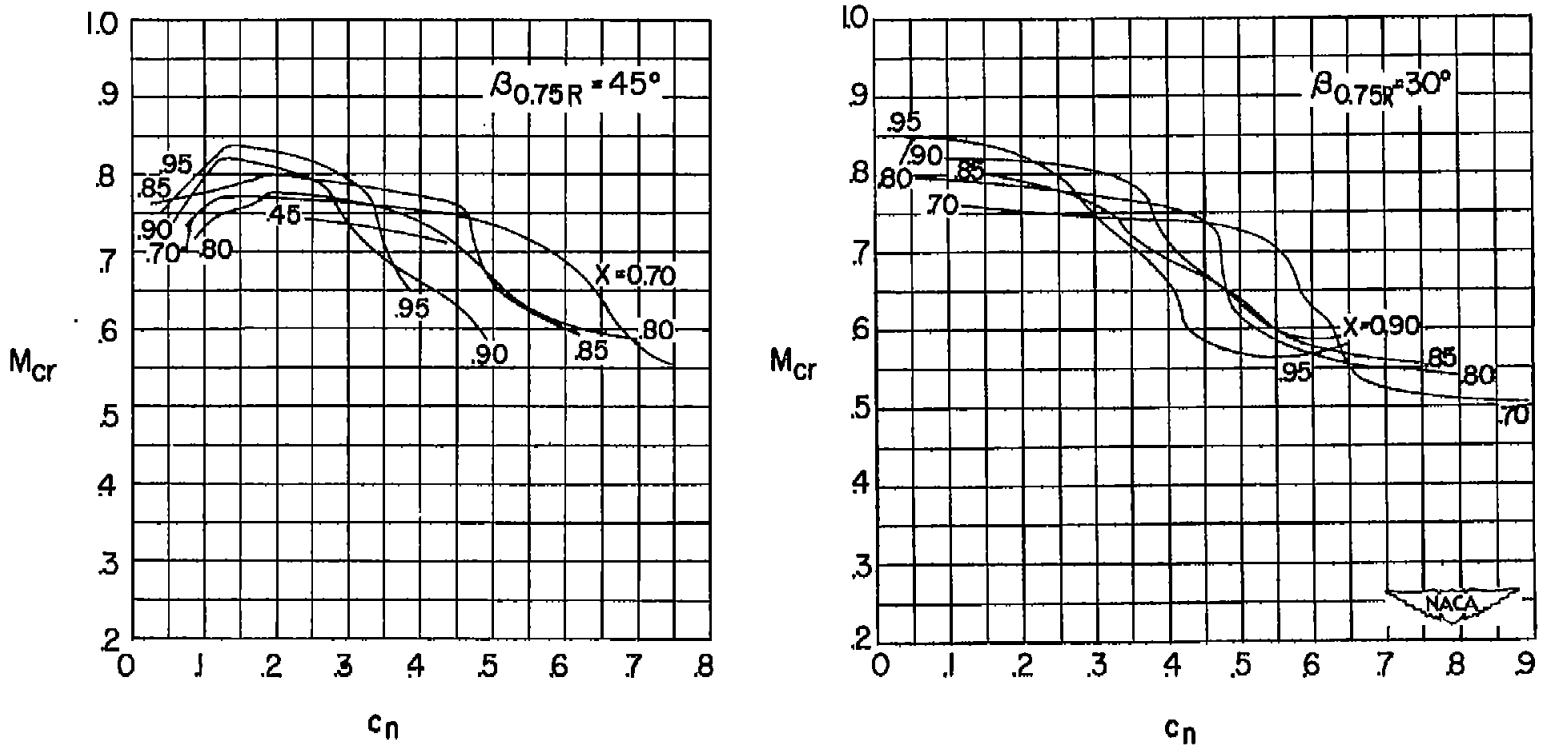

(b) N = 1600 rpm.

Figure 4.- Continued.



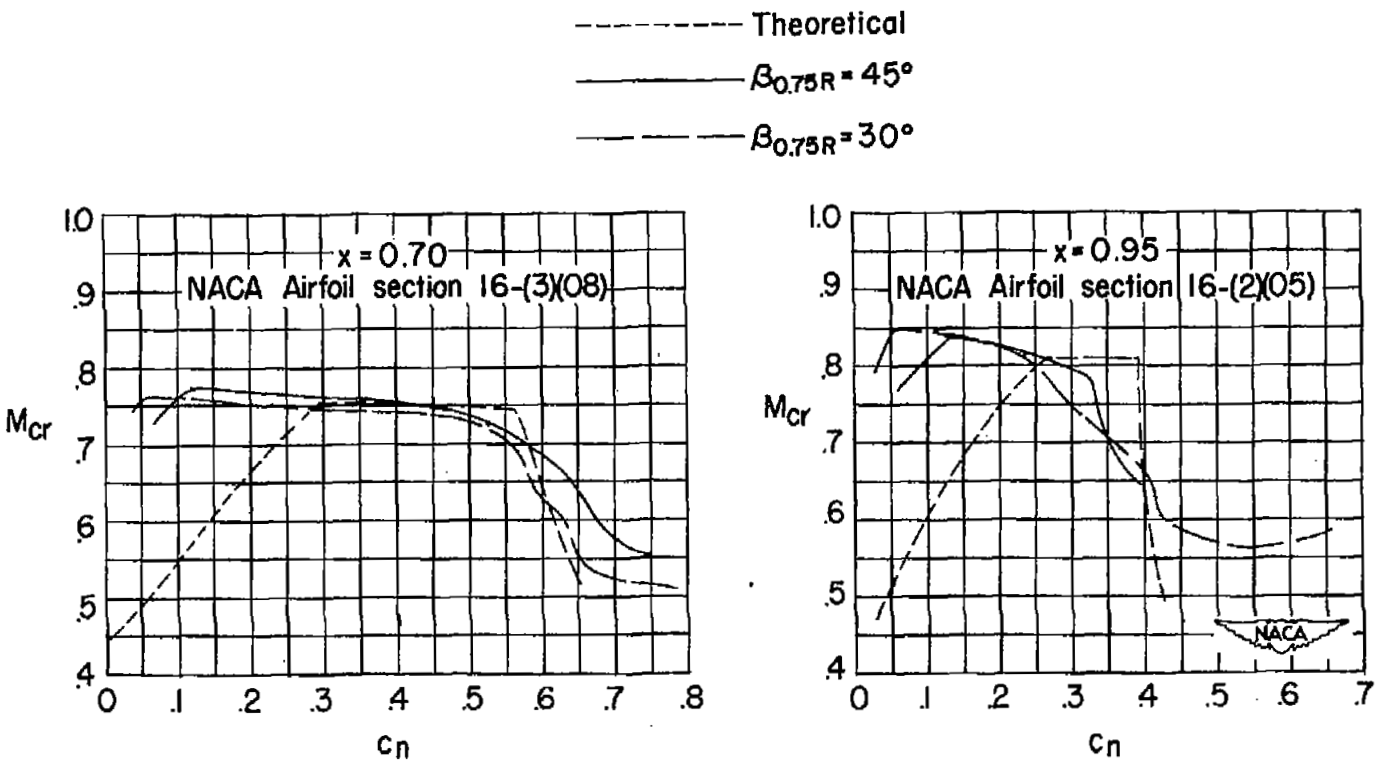

(c) Variable revolutions per minute; M = 0.65.

Figure 4.- Concluded.




(a) Experimental values determined from pressure measurements.

Figure 5.- Variation of section critical Mach number with section normal-force coefficient.




(b) Comparison of experimental values with theoretical calculated values.

Figure 5.- Concluded.

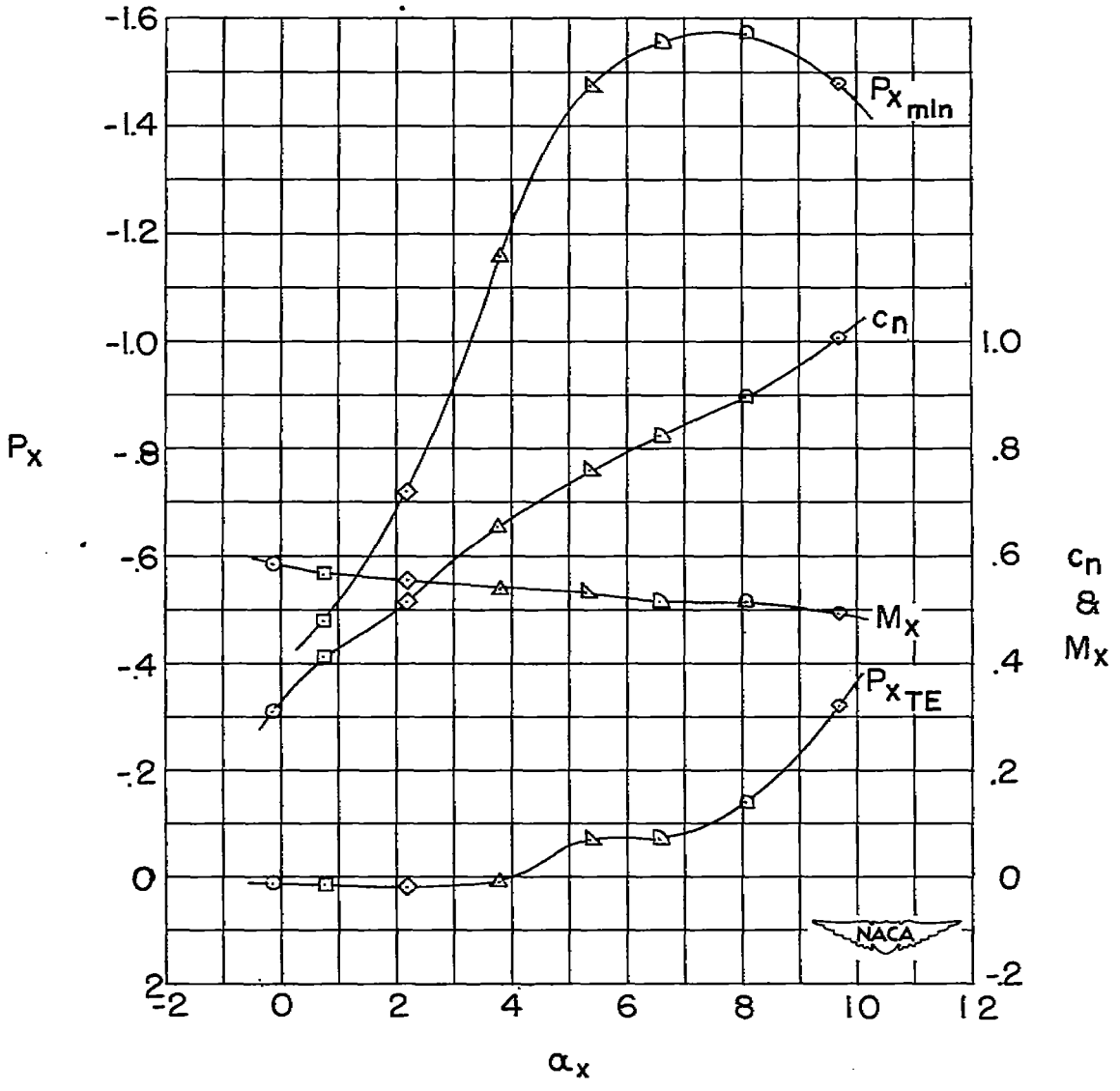



Figure 6.- Effect of angle of attack on a typical subsonic pressure distribution. $\frac{r}{R} = 0.80$; $\beta_{0.75R} = 45°$; N = 1140 rpm.

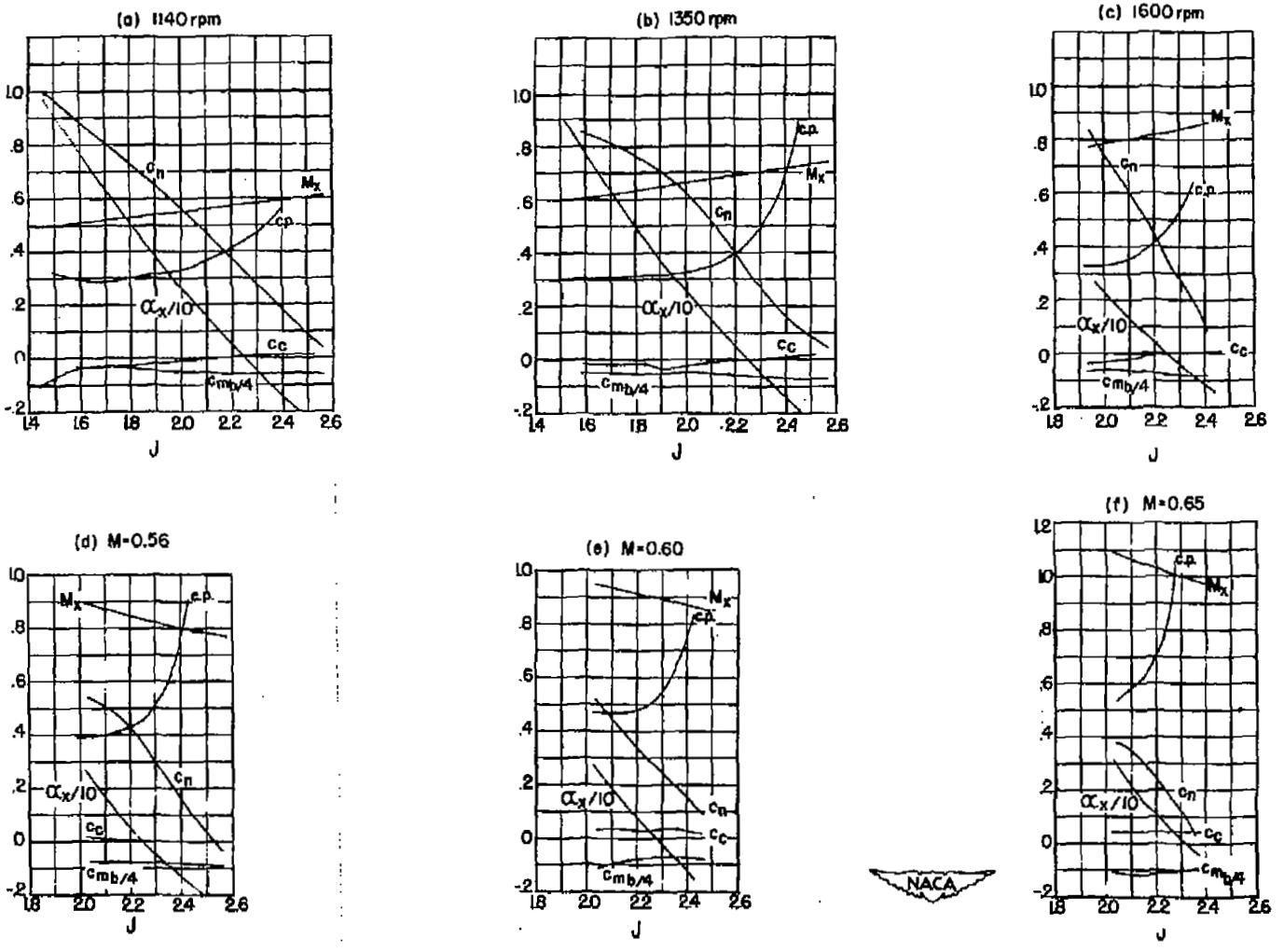
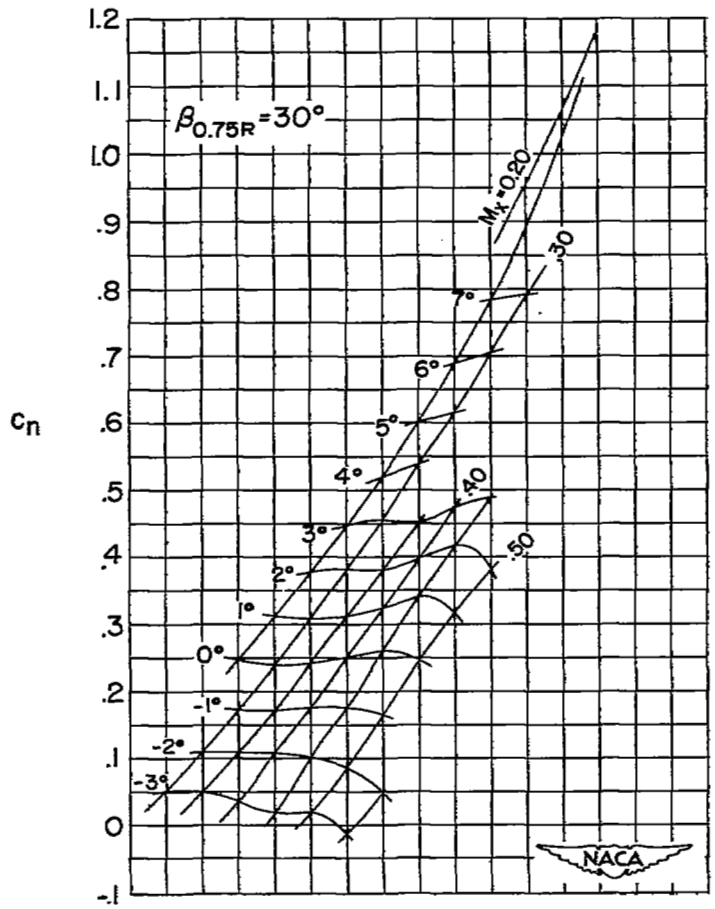
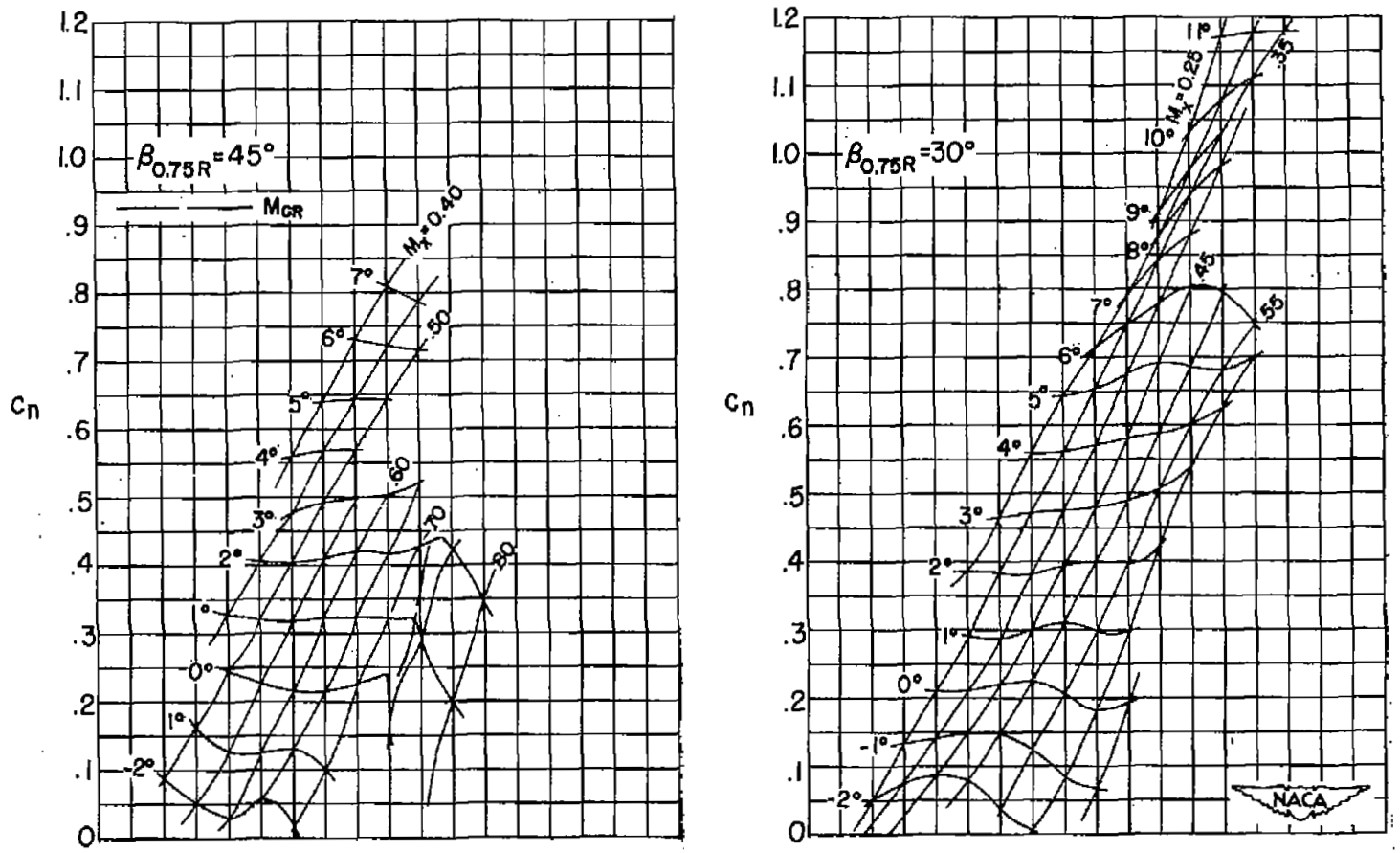



Figure 7.- Variation of section aerodynamic characteristics with propeller advance ratio. $\frac{r}{R} = 0.80$; $\beta_{0.75R} = 45°$.



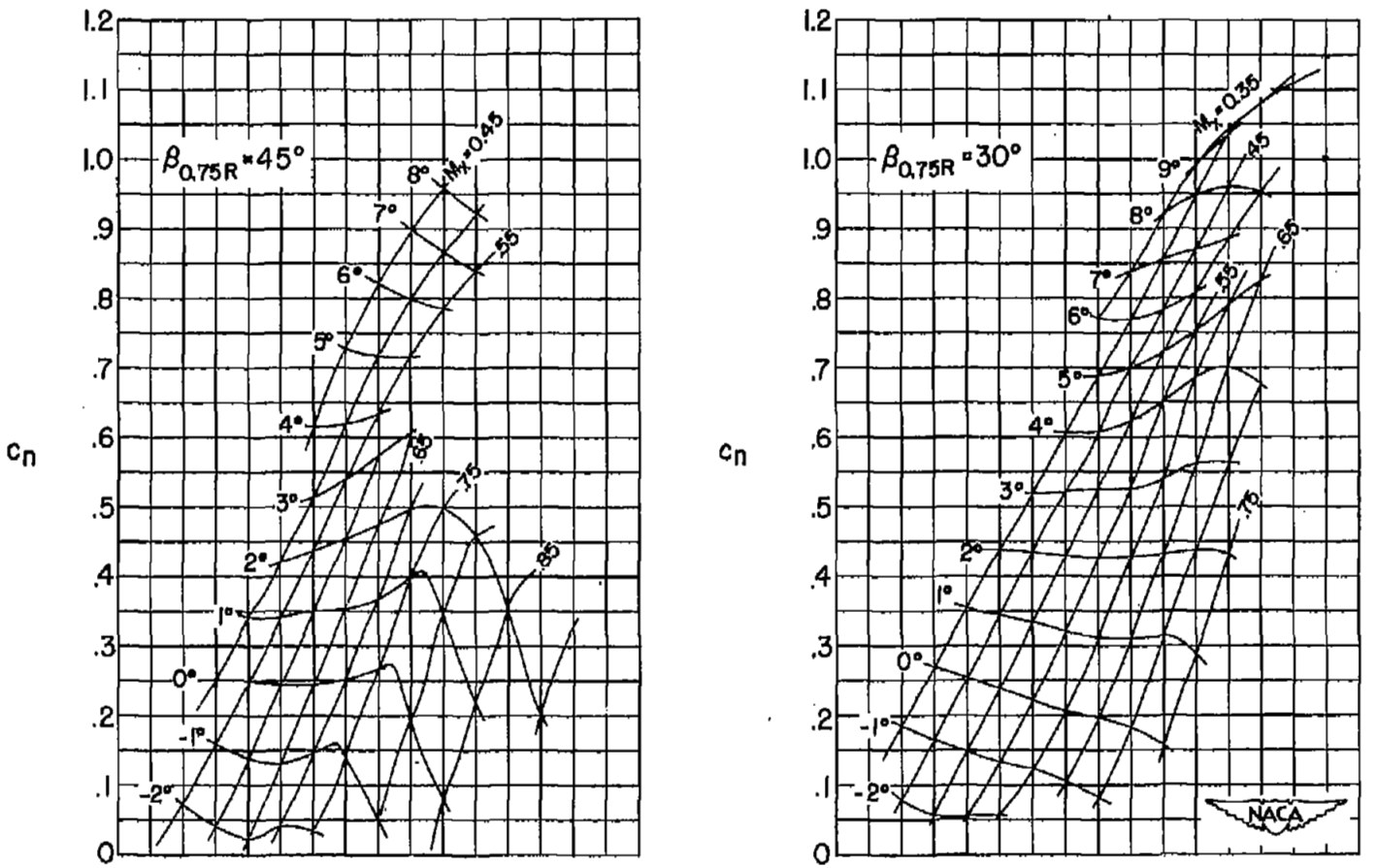

(a) $\frac{r}{R}$ = 0.30; NACA 16-(14)(13) airfoil section.

Figure 8.- Variation of section normal-force coefficient with angle of attack and Mach number for two propeller blade-angle settings.



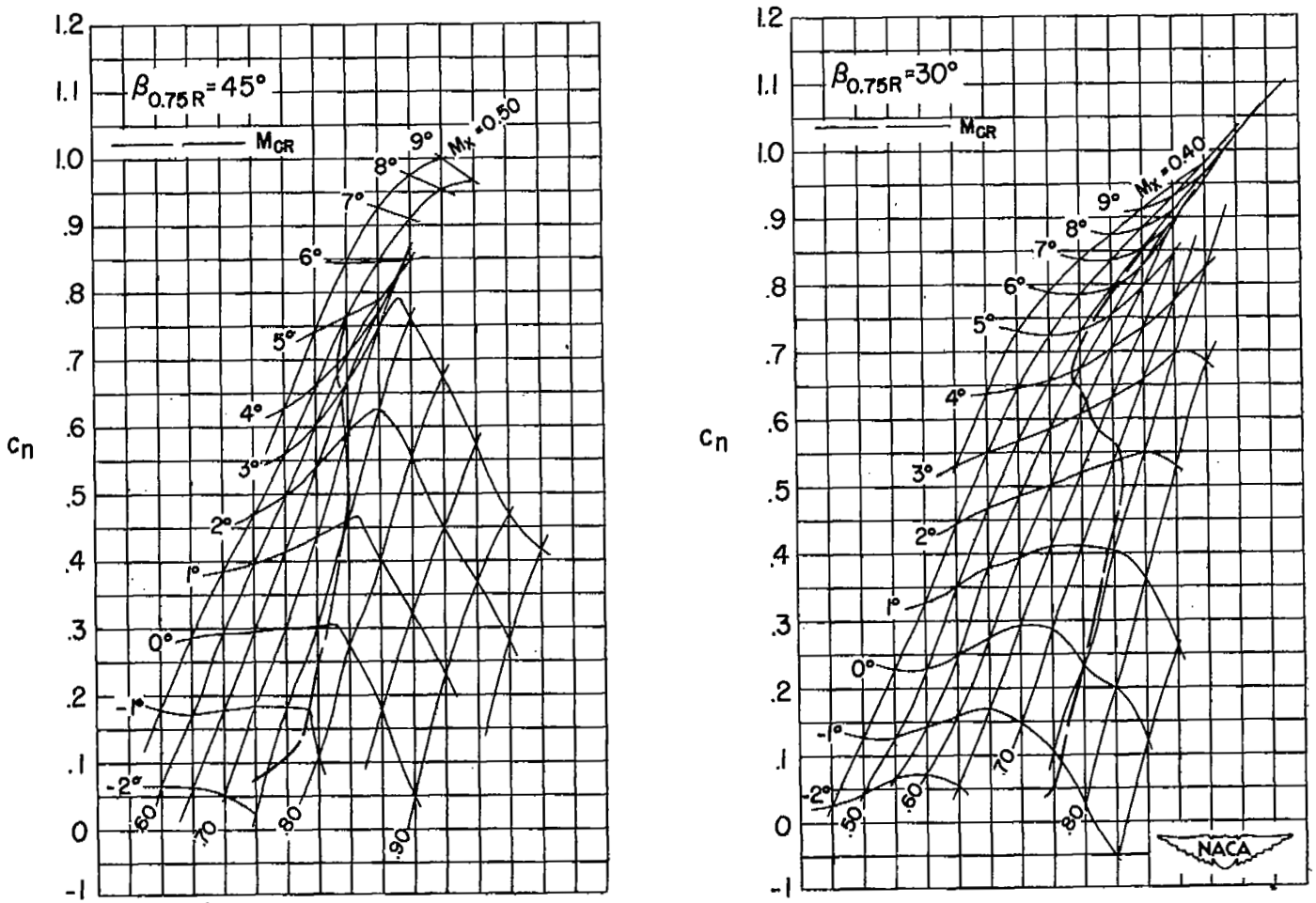

(b) $\frac{r_H}{R}$ = 0.45; NACA 16-(23)(11) airfoil section.

Figure 8.- Continued.



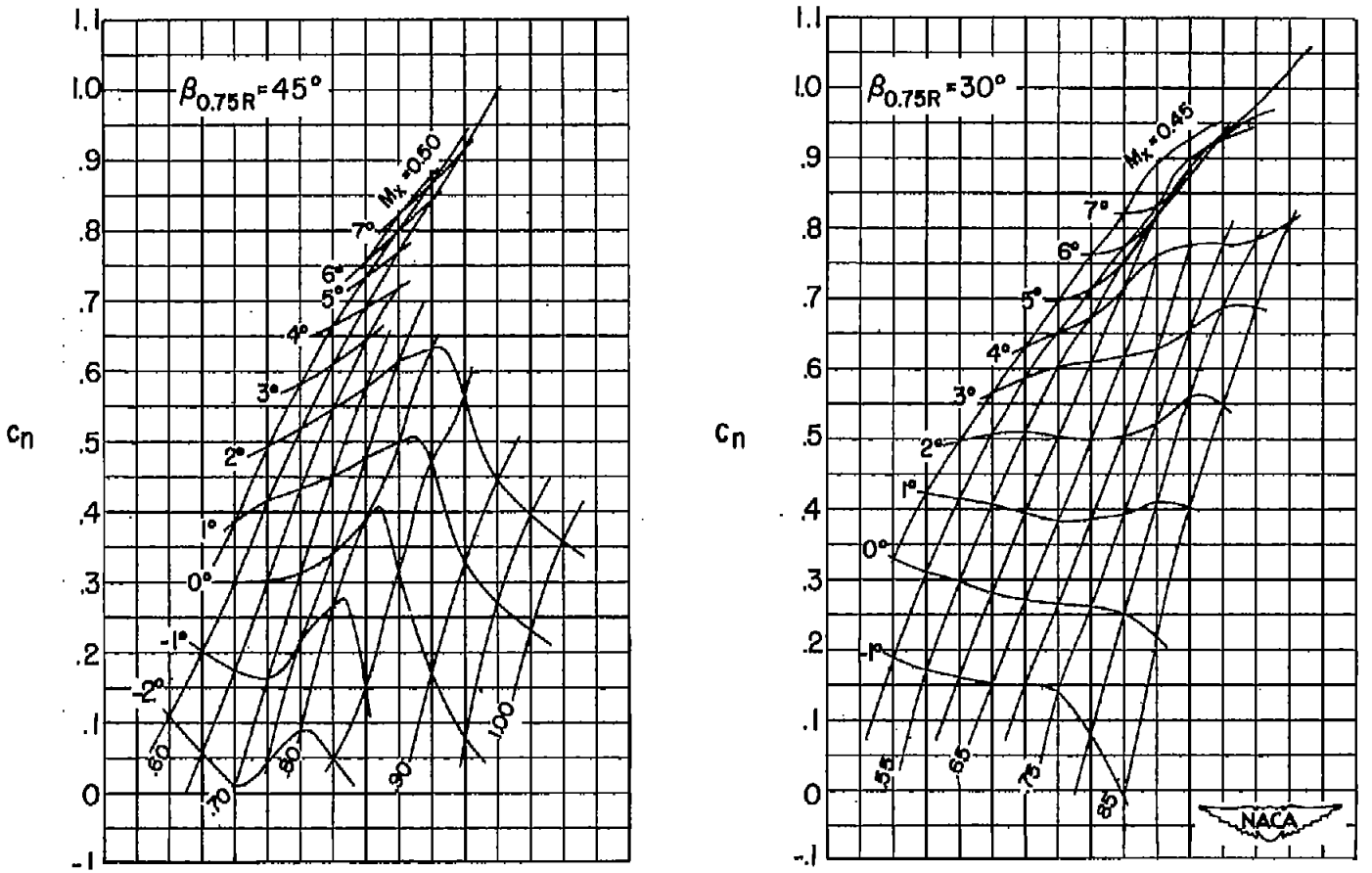

(c) $\frac{r}{R}$ = 0.60; NACA 16-(28)(09) airfoil section.

Figure 8.- Continued.



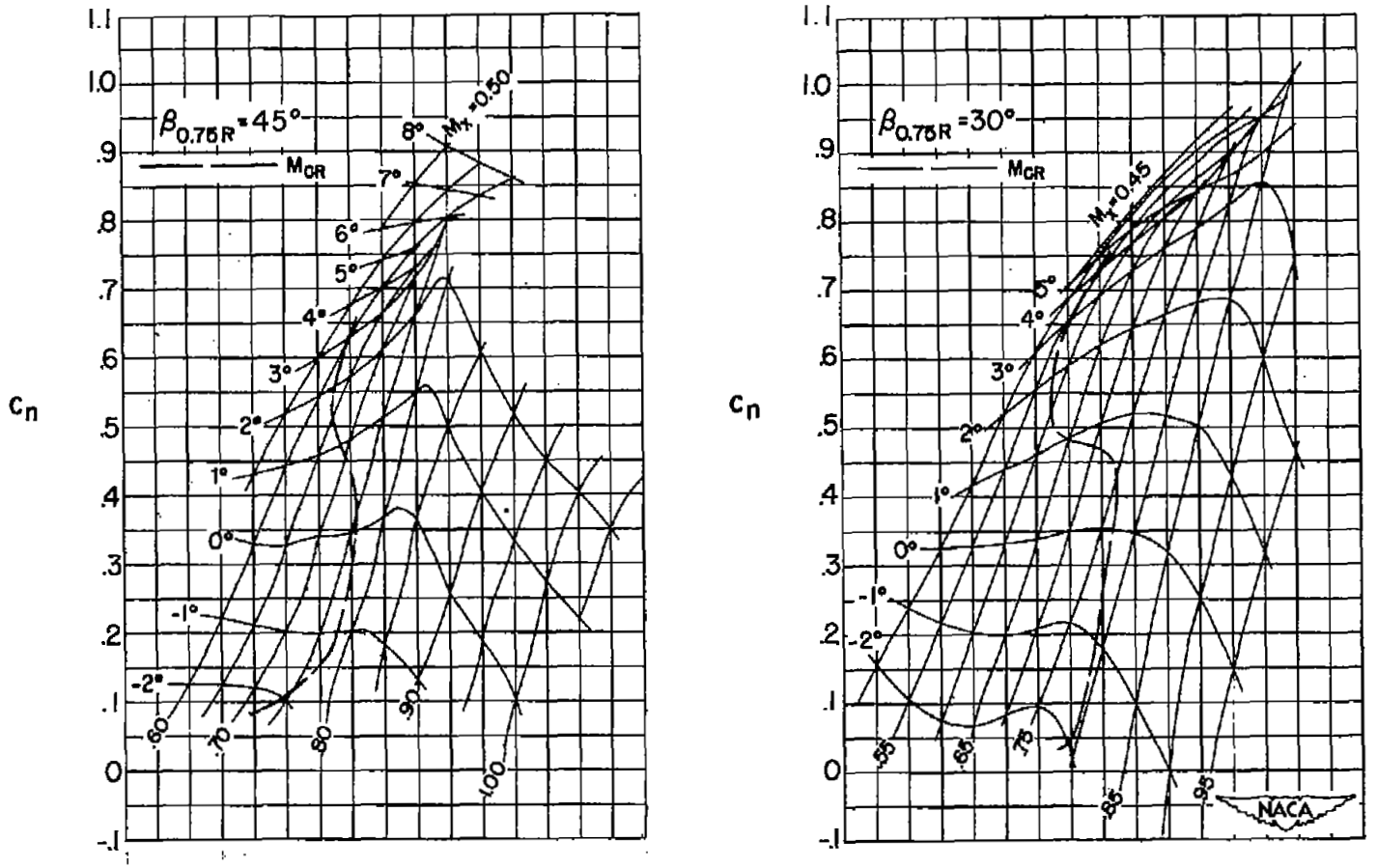

(d) $\frac{r}{R}$ = 0.70; NACA 16-(3)(08) airfoil section.

Figure 8.- Continued.



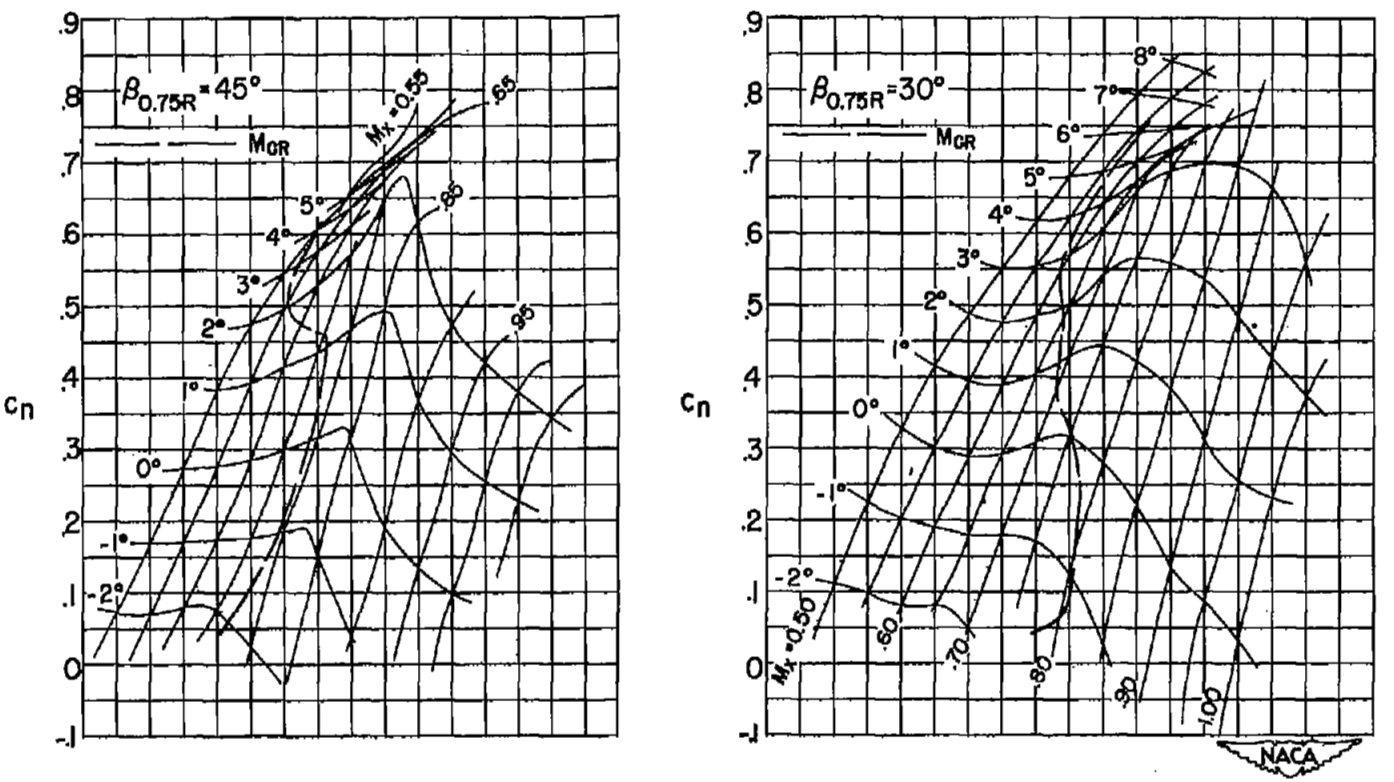

(e) $\frac{r}{R}$ = 0.75; NACA 16-(3)(07) airfoil section.

Figure 8.- Continued.



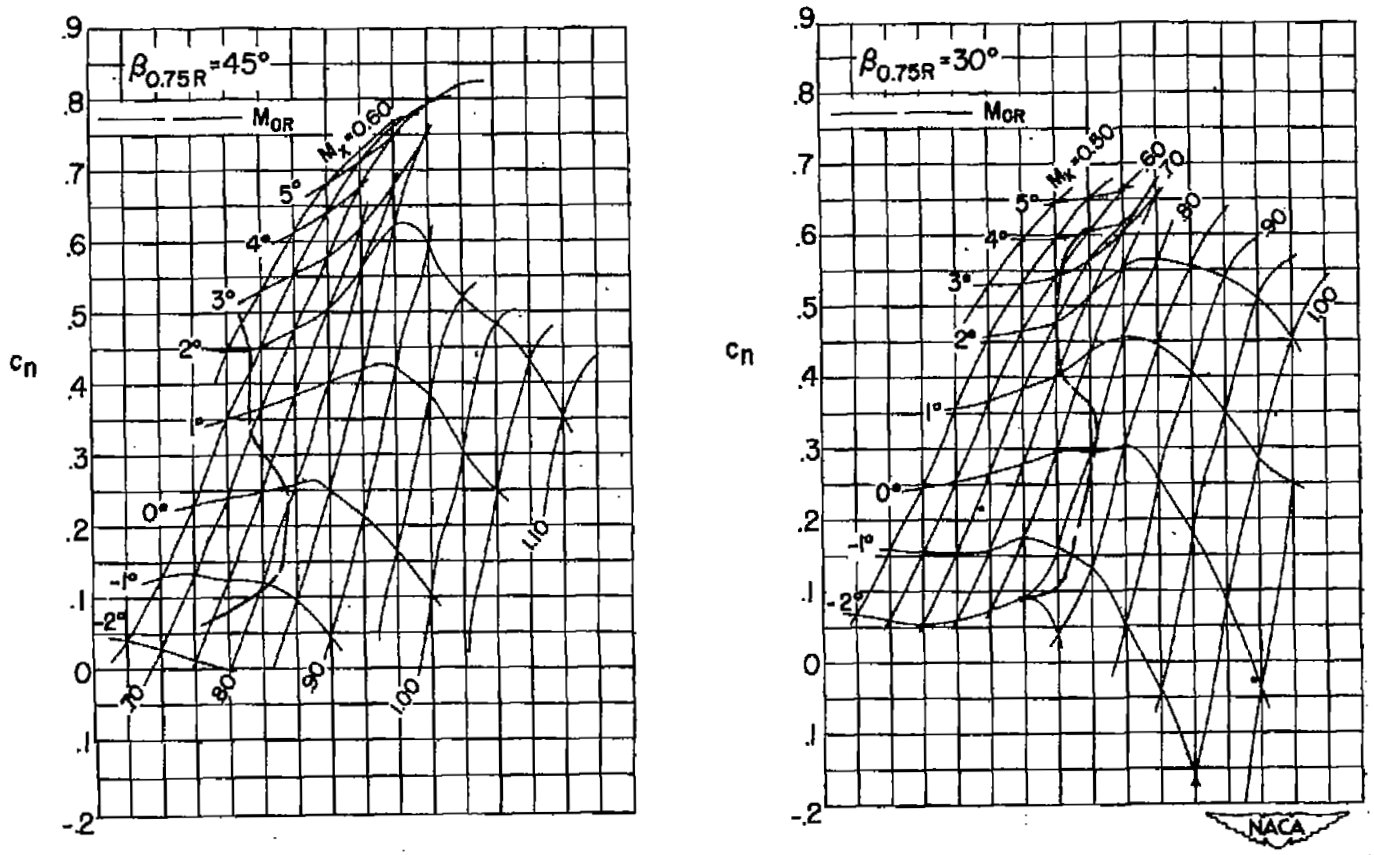

(f) $\frac{r}{R}$ = 0.80; NACA 16-(3)(07) airfoil section.

Figure 8.- Continued.



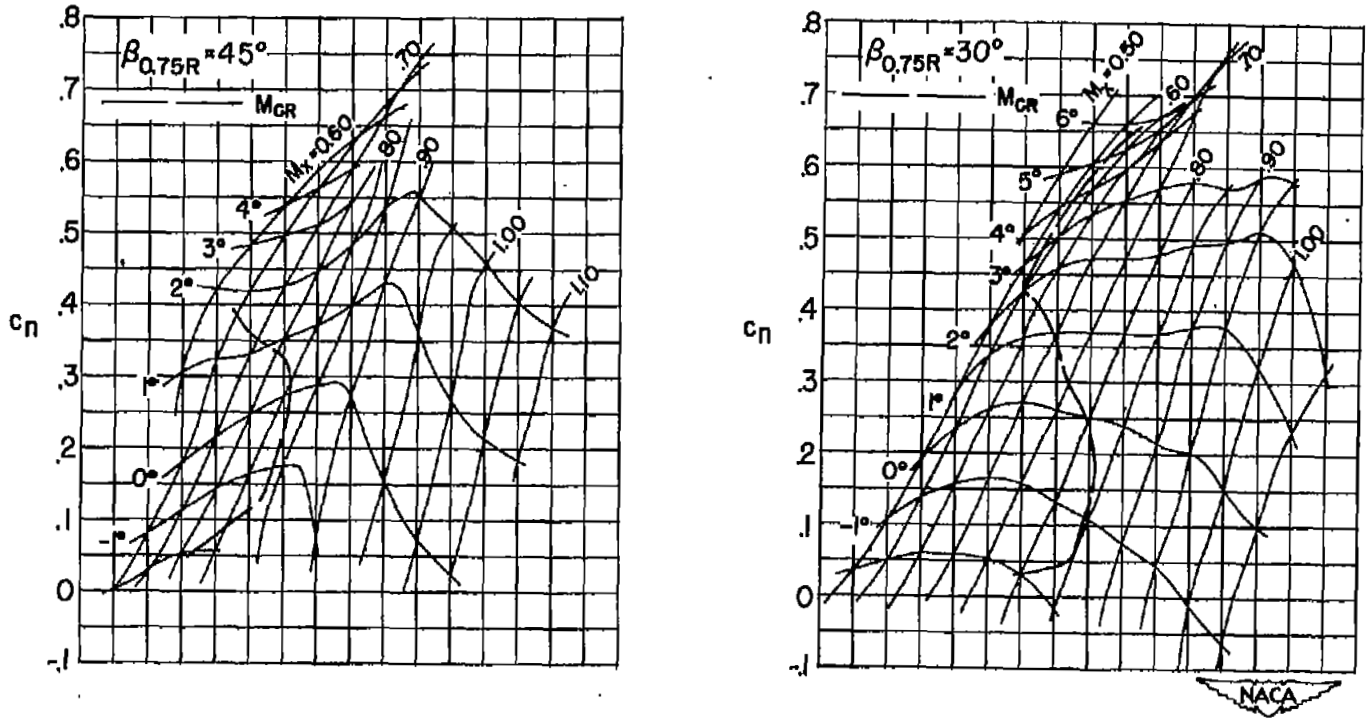

(g) $\frac{r}{R}$ = 0.85; NACA 16-(28)(06) airfoil section.

Figure 8.- Continued.



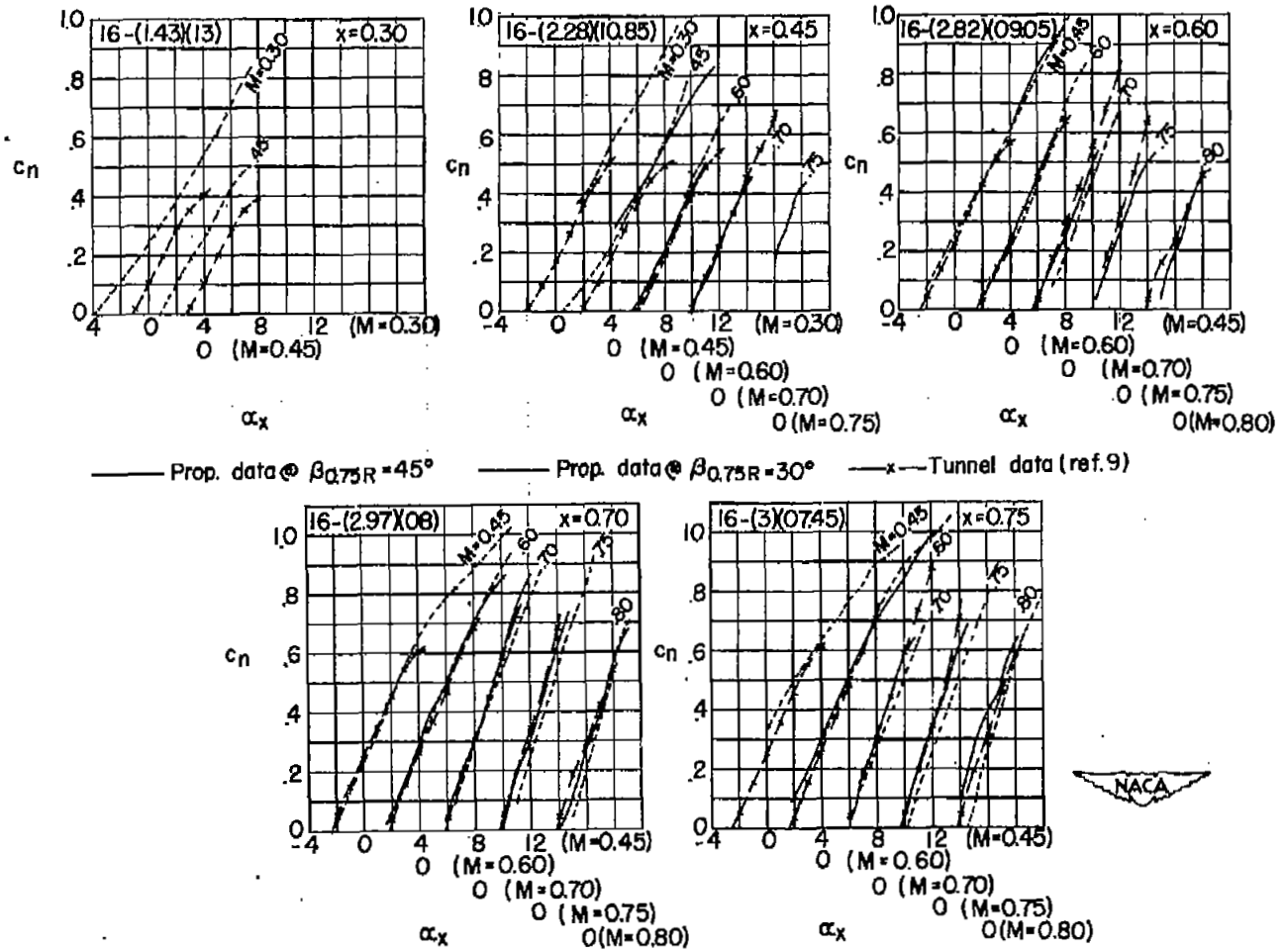

(h) $\frac{r}{R}$ = 0.90; NACA 16-(25)(06) airfoil section.

Figure 8.- Continued.



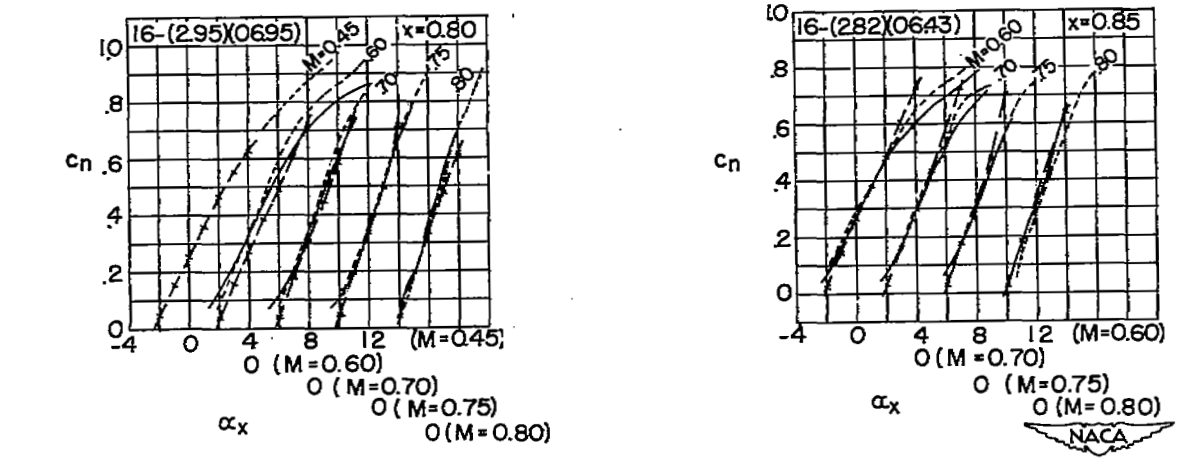

(1) $\frac{r}{R}$ = 0.95; NACA 16-(2)(05) airfoil section.

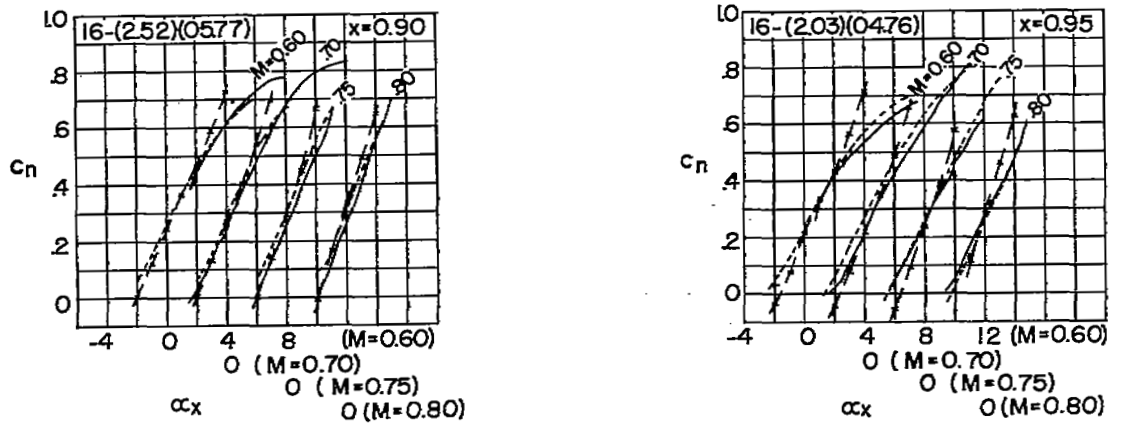
Figure 8.- Concluded.




(a) Normal-force coefficient against angle of attack.

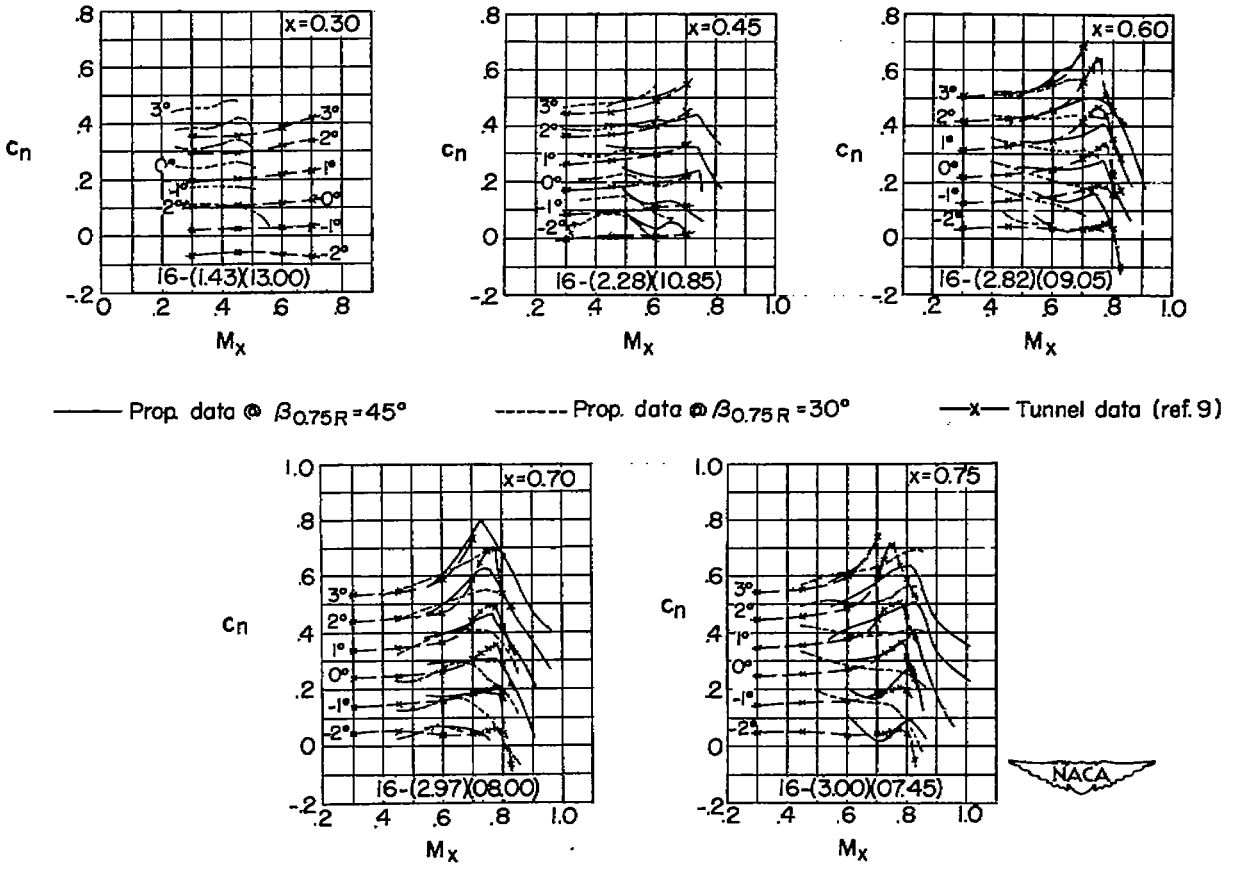
Figure 9.- Comparison of propeller section data with two-dimensional data.



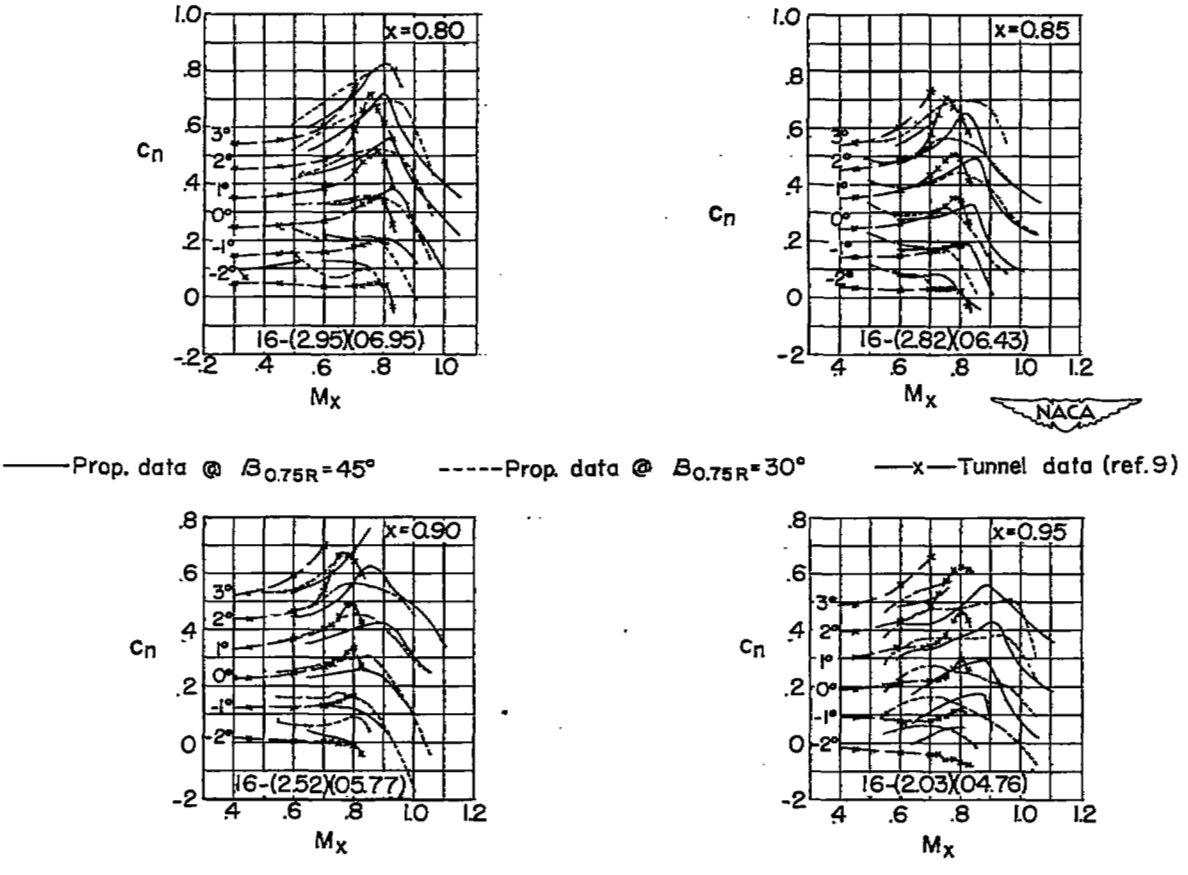

(a) Concluded.

Figure 9.- Continued.




(b) Normal-force coefficient against Mach number.

Figure 9.- Continued.

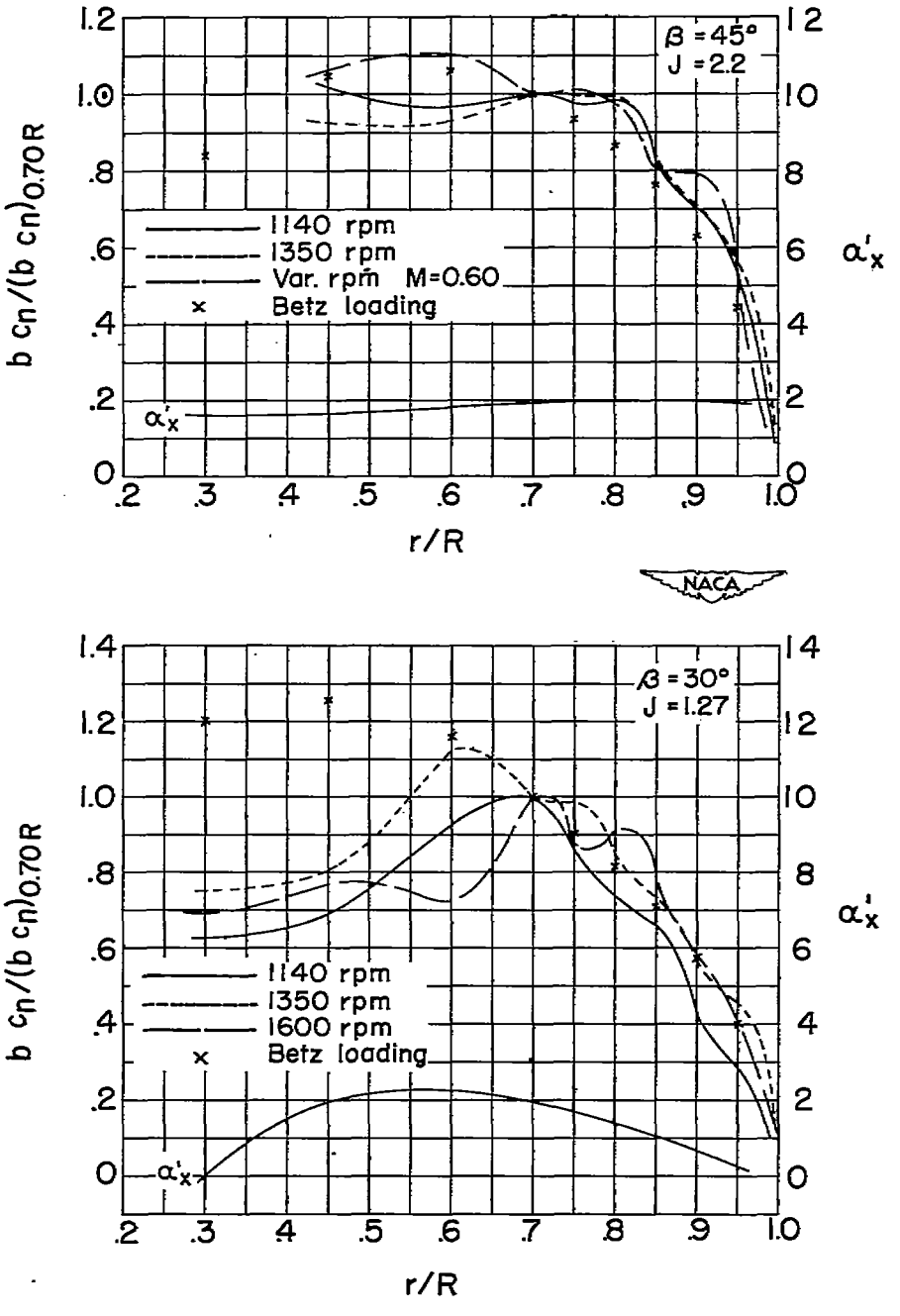



(b) Concluded.

Figure 9.- Concluded.

# Error

An error occurred while processing this page. See the system log for more details.




(b) $\alpha'_{0.70R} = 1.97$.

Figure 10.- Concluded.

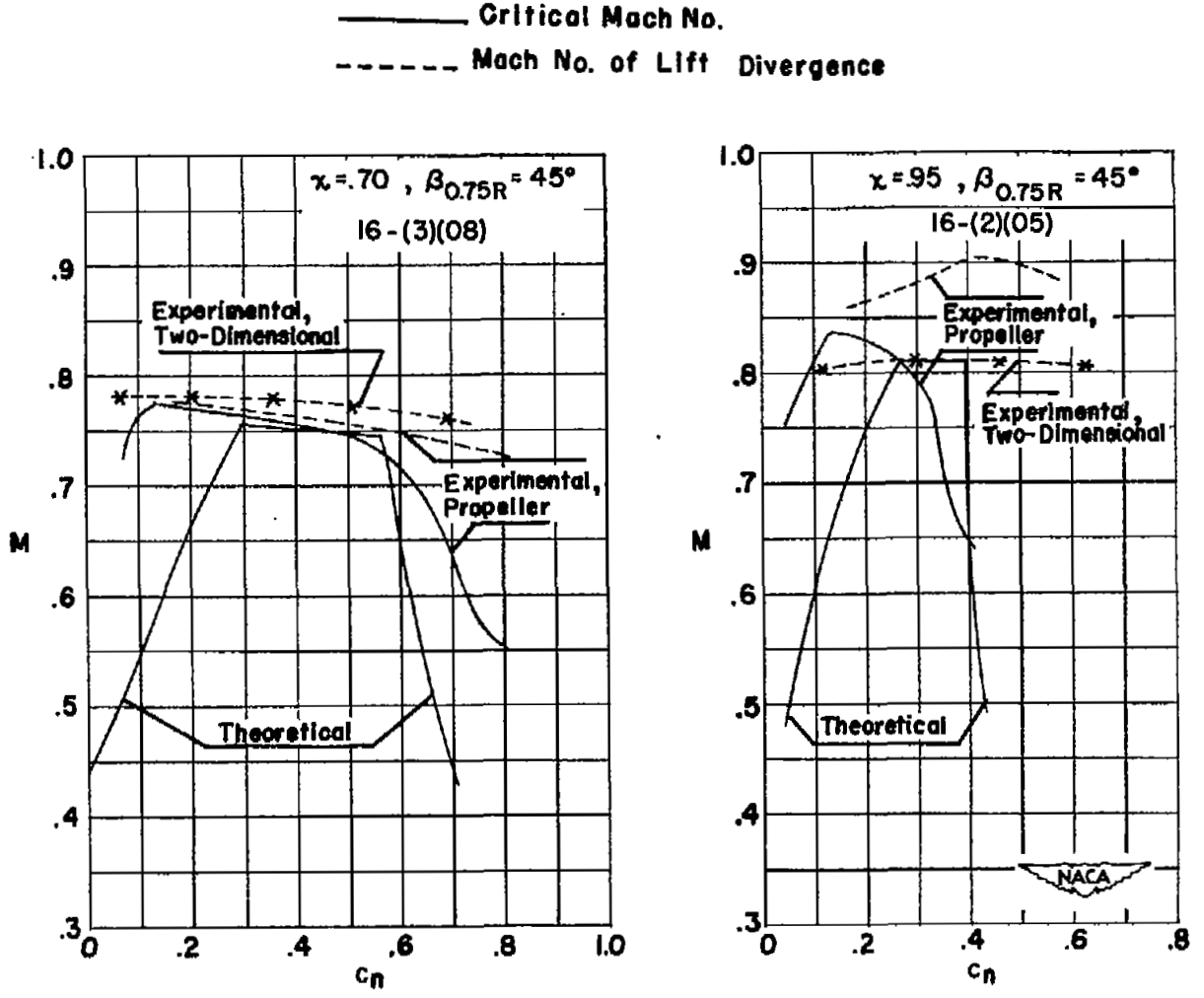



Figure 11.- Comparison of critical Mach number and Mach number for lift divergence from propeller tests with theoretical critical Mach number and two-dimensional lift-divergence Mach number.

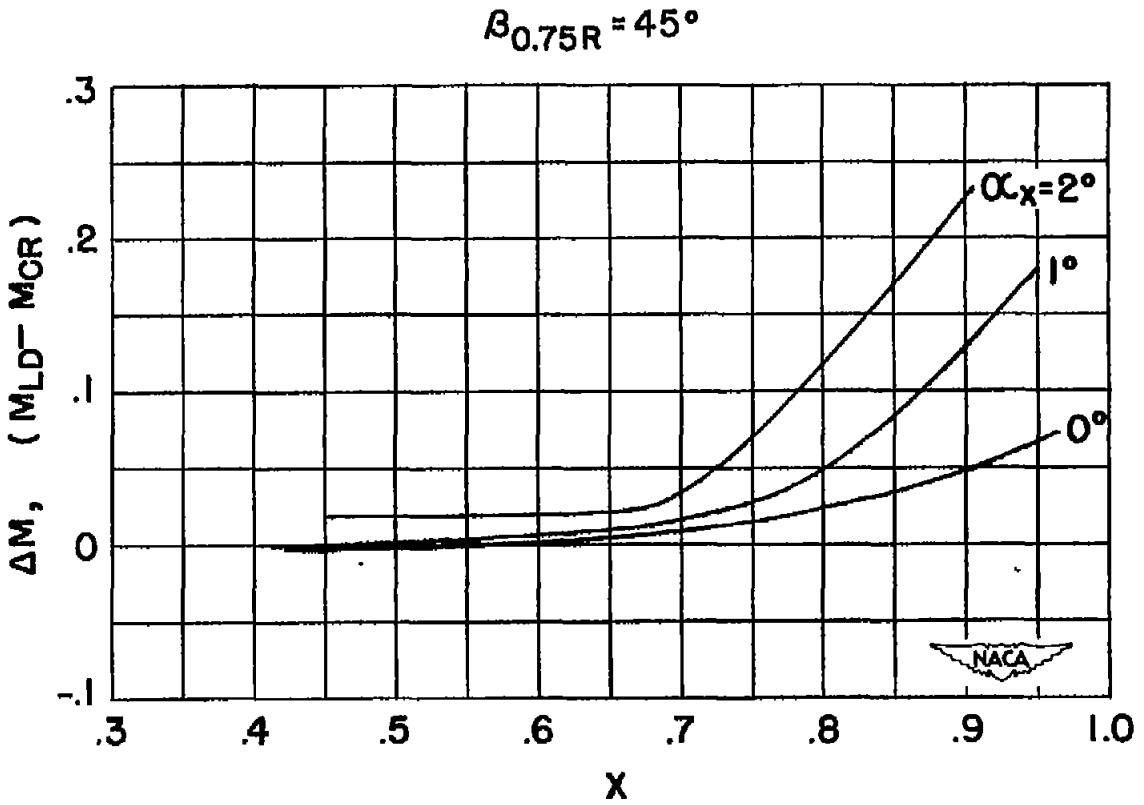
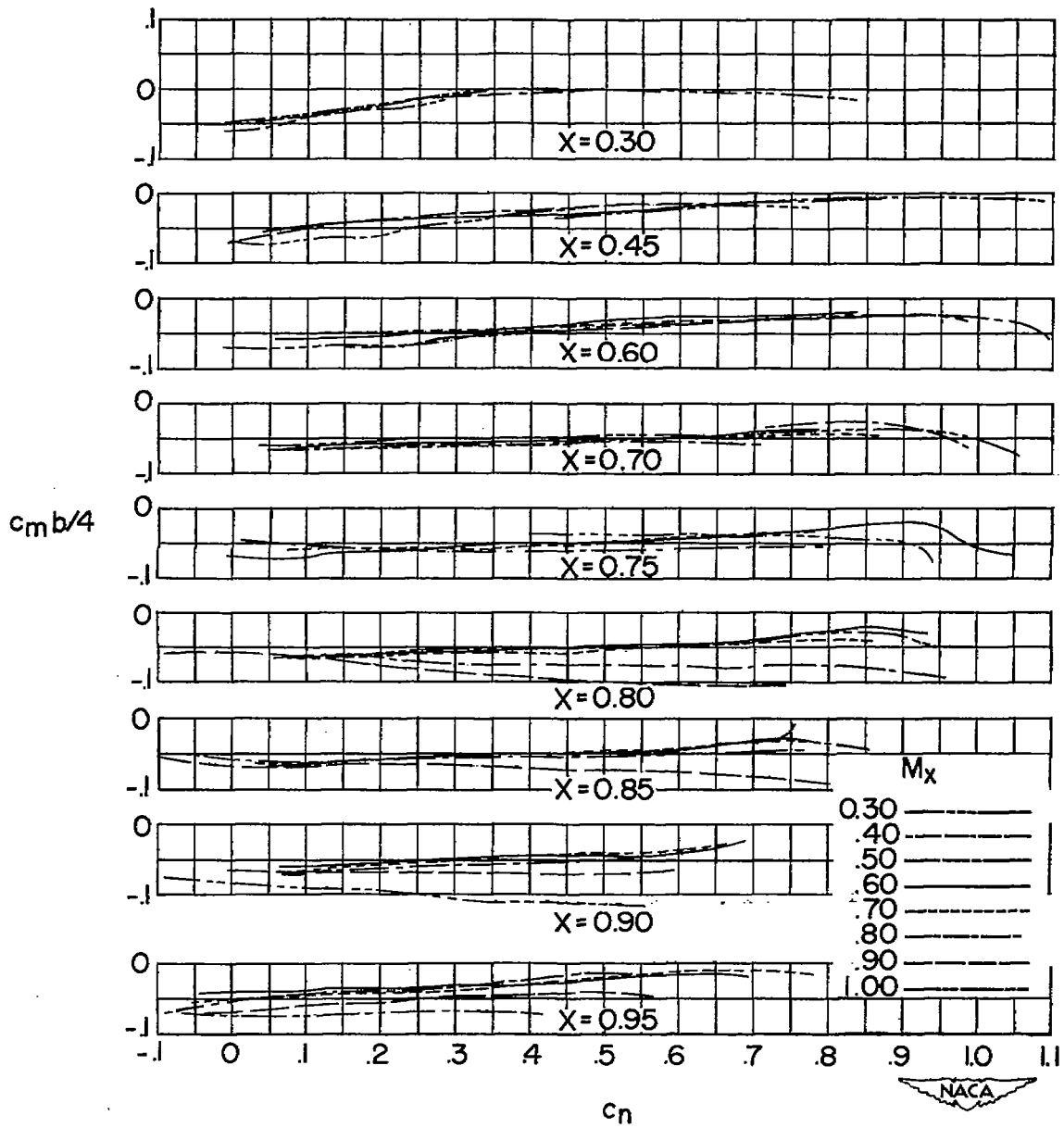
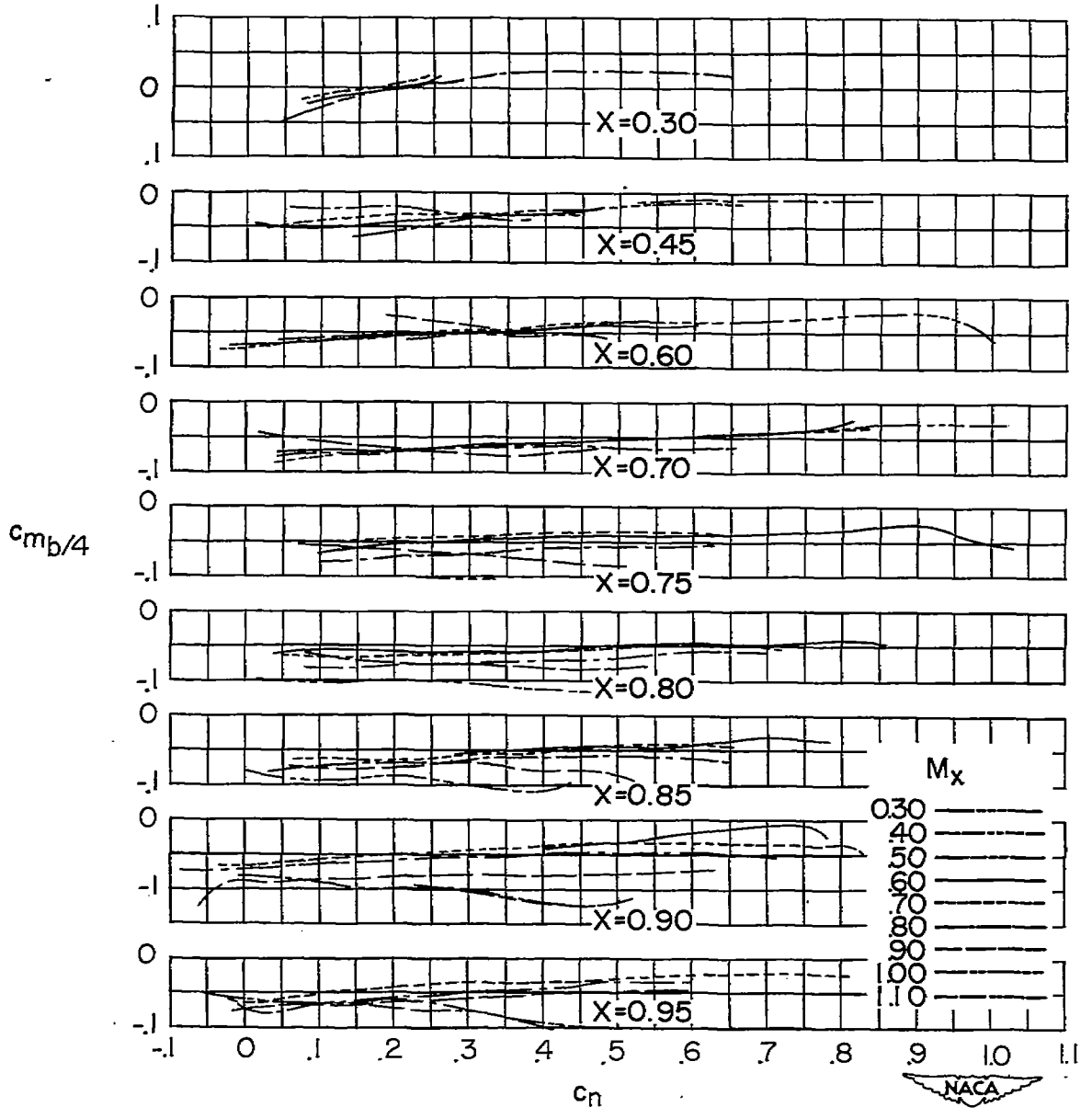



Figure 12.- Variation of the difference between critical Mach number and Mach number for lift divergence with radial station.



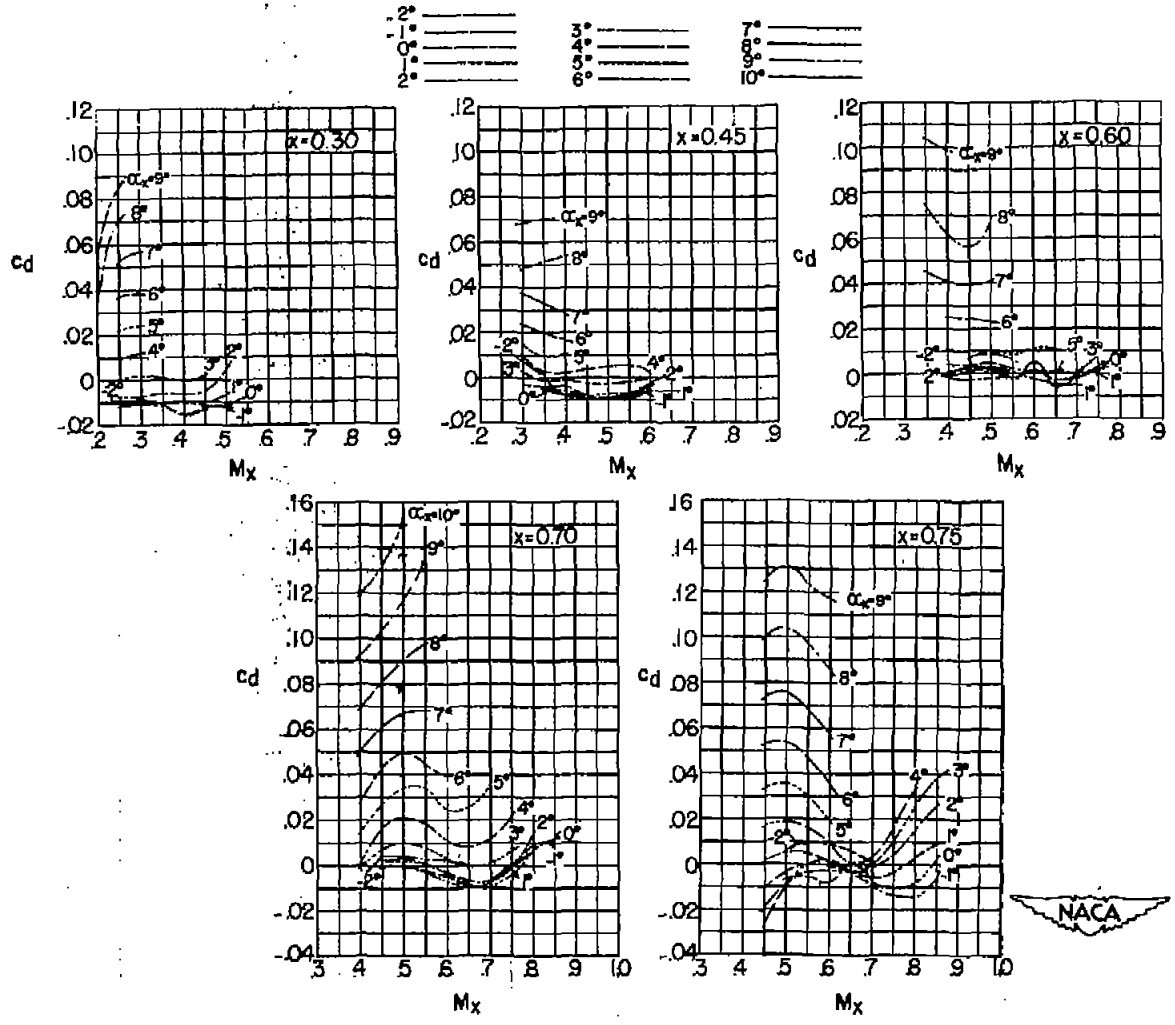

(a) $\beta_{0.75R} = 30°$.

Figure 13.- Variation of section moment coefficient about the quarter-chord point with section normal-force coefficient.



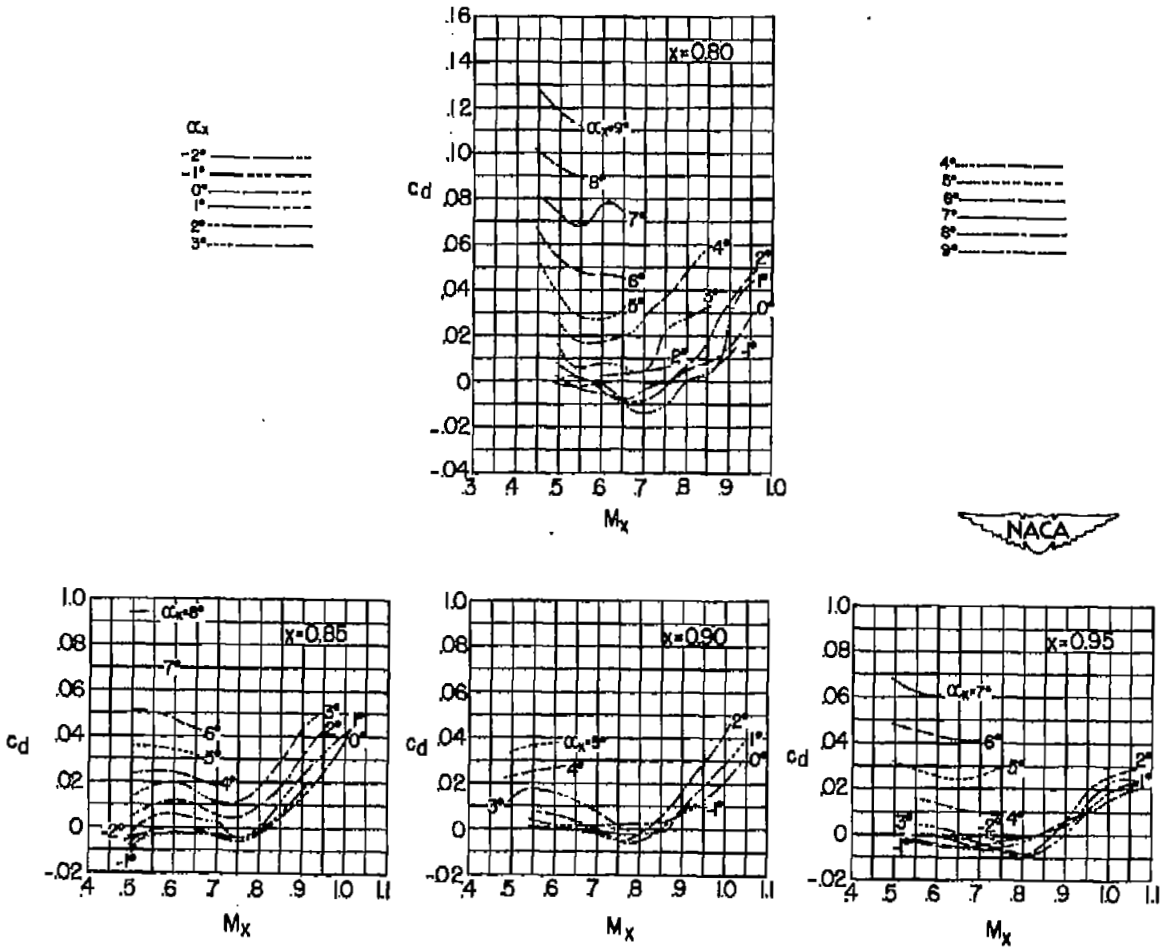

(b) $\beta_{0.75R} = 45°$.

Figure 13.- Concluded.



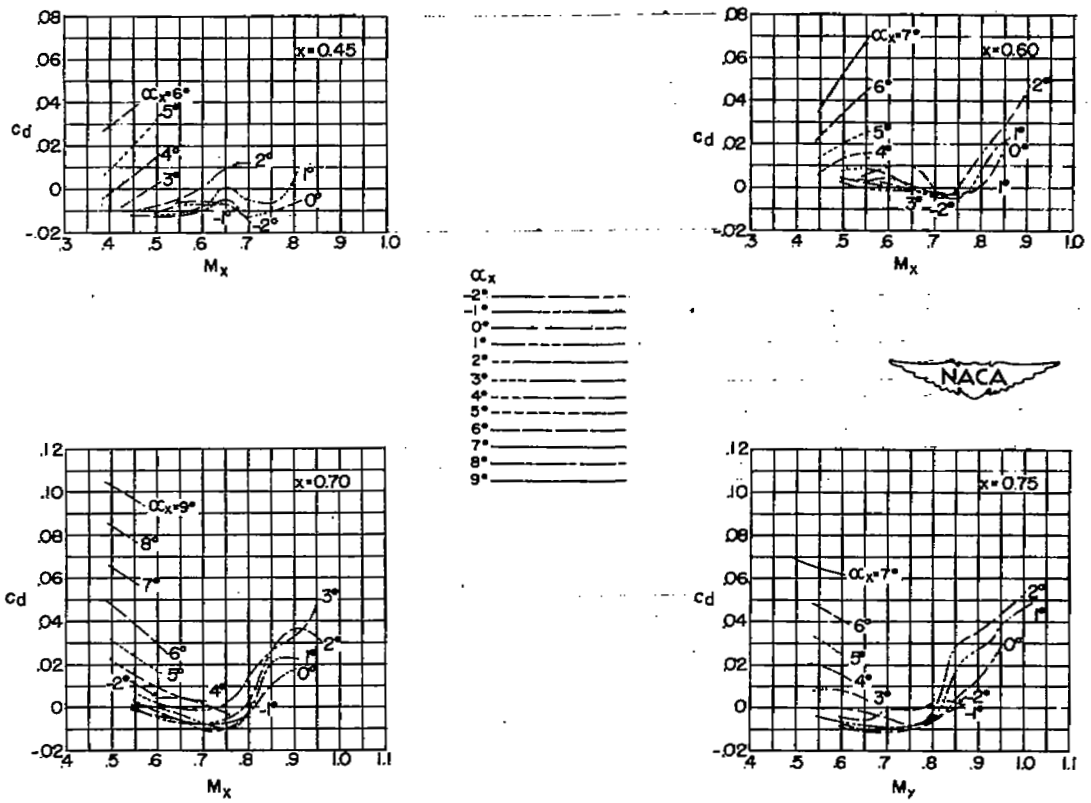

(a) $\beta_{0.75R} = .30°$.

Figure 14.- Variation of section pressure drag coefficient with section Mach number.



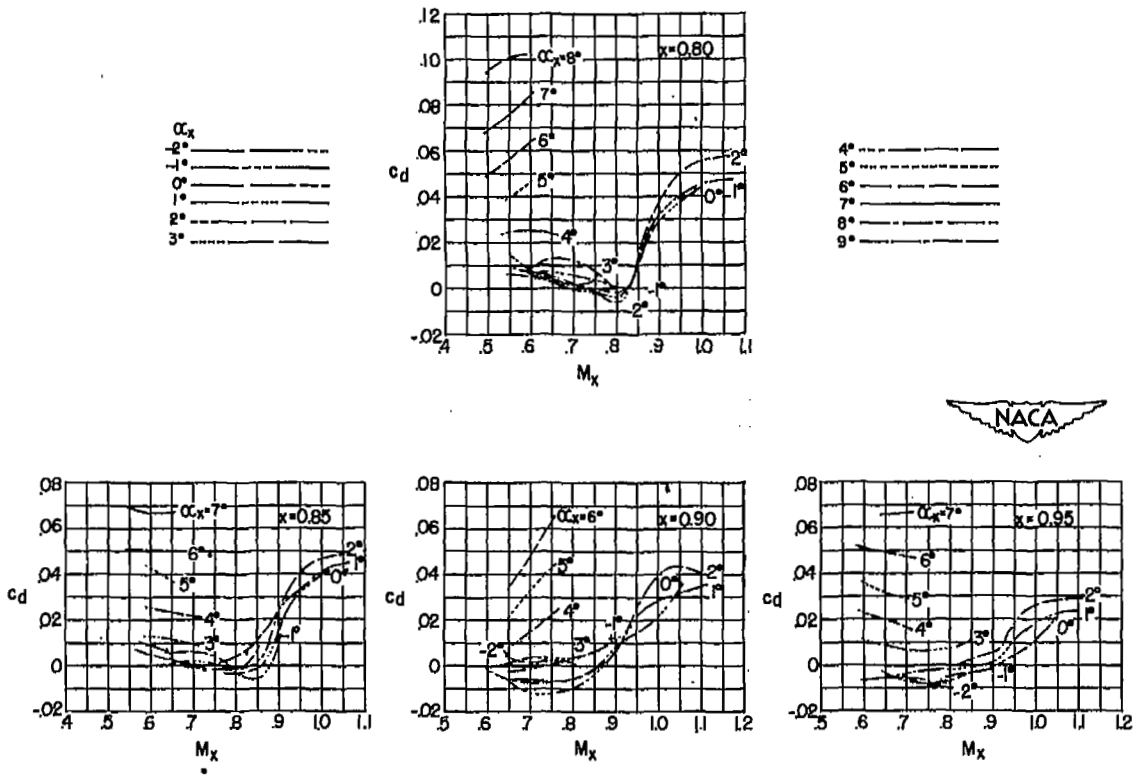

(a) Concluded.

Figure 14.- Continued.




(b) $\beta_{0.75R} = 45°$.

Figure 14.- Continued.




(b) Concluded.

Figure 14.- Concluded.

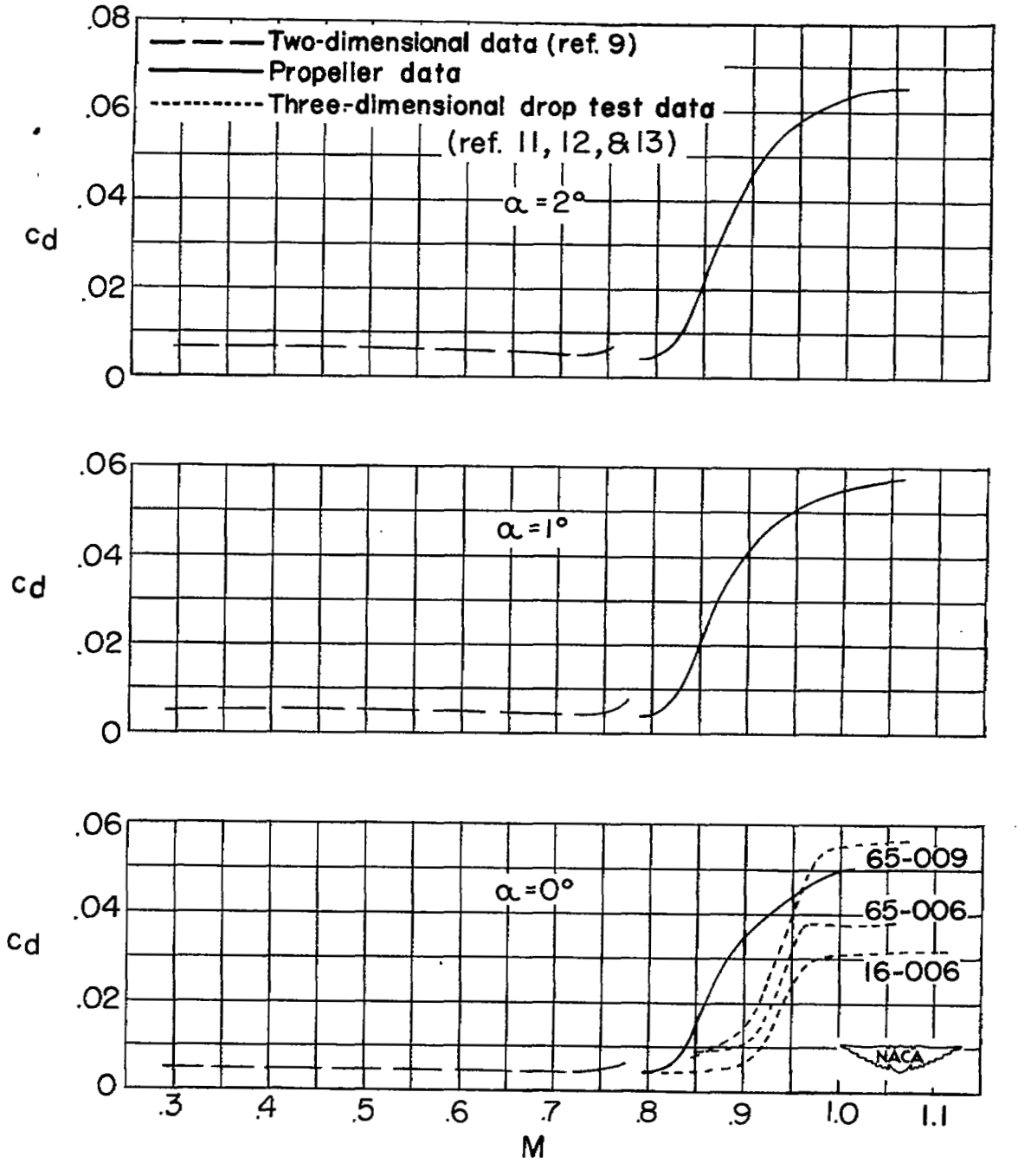



Figure 15.- Section total drag coefficient as determined by comparison with two-dimensional model data. $\frac{r}{R} = 0.80$; $\beta_{0.75R} = 45°$; NACA 16-(3)(07) airfoil section.

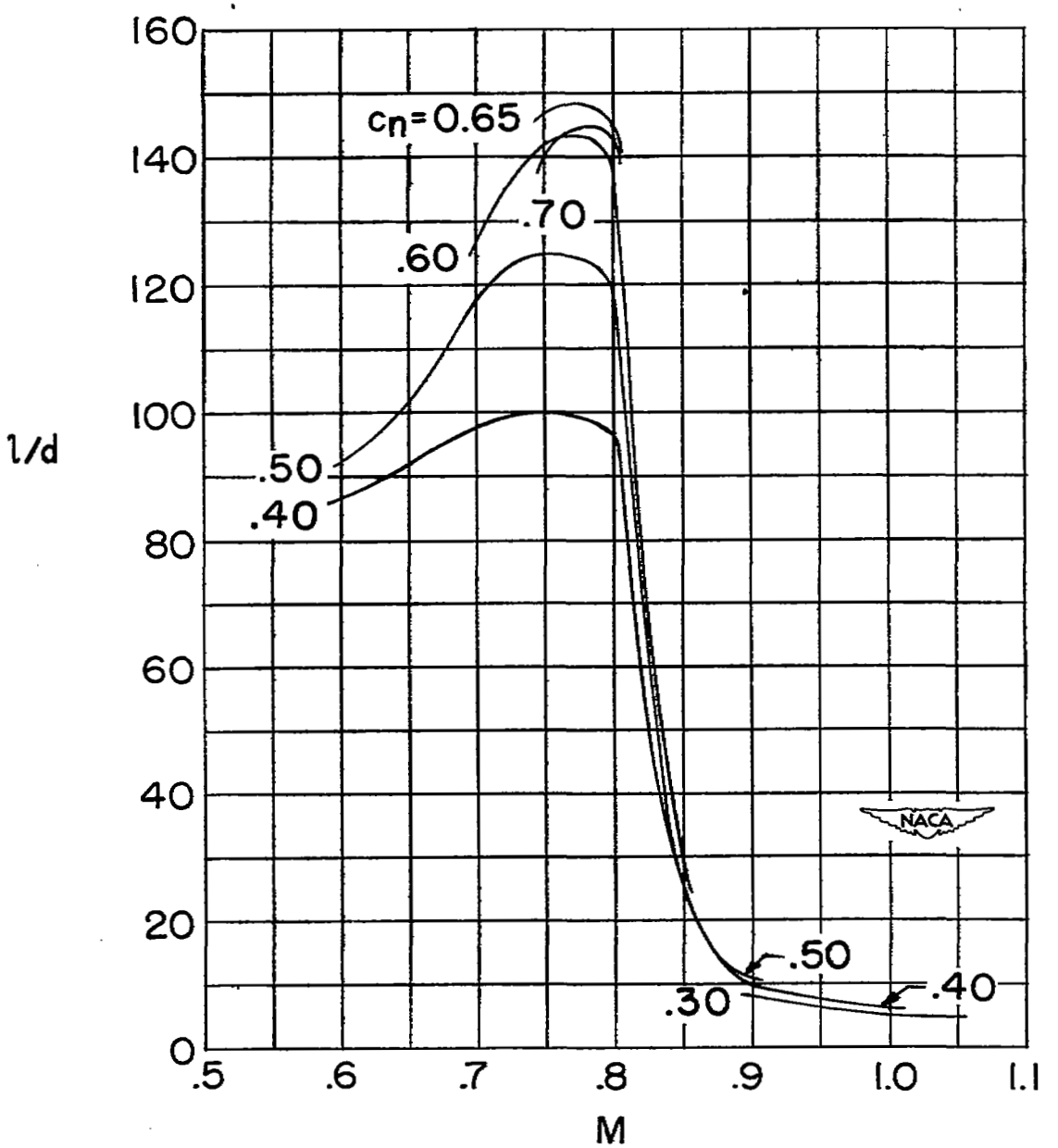
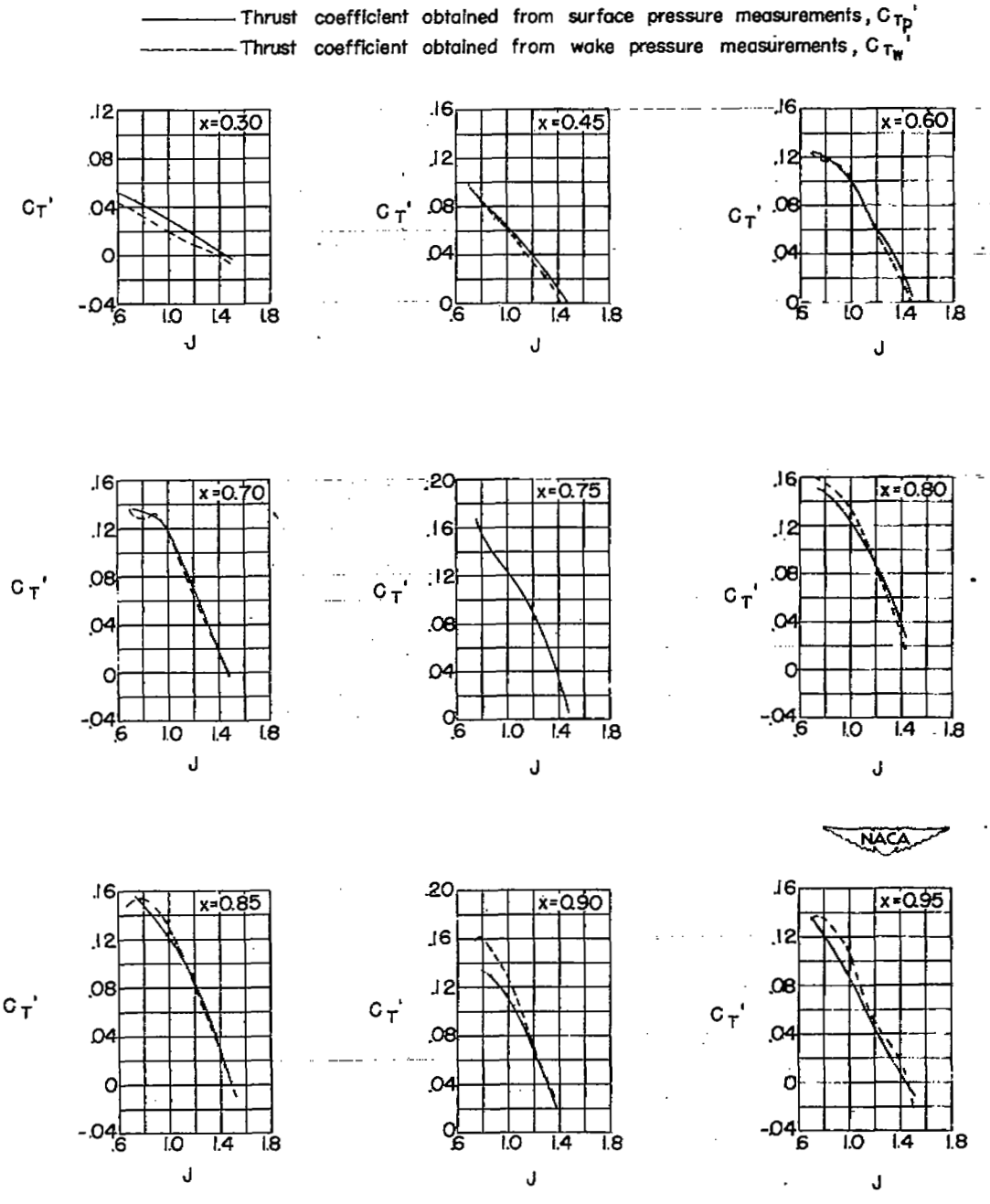



Figure 16 - Variation of section lift-drag ratio with section Mach number as determined from the drag curves of figure 15. $\frac{r}{R} = 0.80$; $\beta_{0.75R} = 45°$; NACA 16-(3)(07) airfoil section.

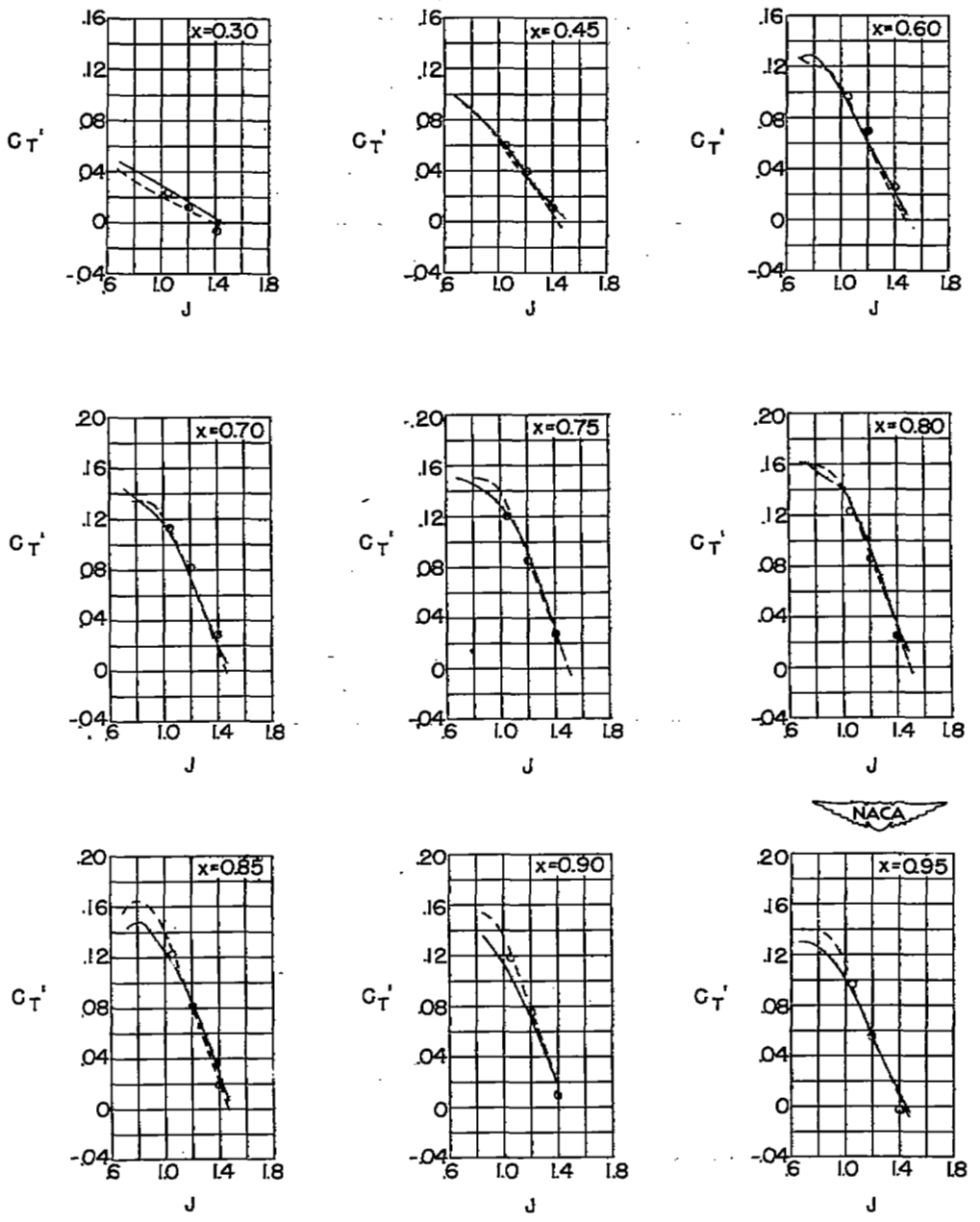
[redacted]




(a) N = 1140 rpm; $\beta_{0.75R} = 30^\circ$.

Figure 17.- Comparison of section thrust coefficient as determined by the surface-pressure measurements and wake-pressure measurements.

———Thrust coefficient obtained from surface pressure measurements, $C_{T_p}'$
- - - - - - -Thrust coefficient obtained from wake pressure measurements, $C_{T_w}'$
o Computed from tunnel data of ref. 8



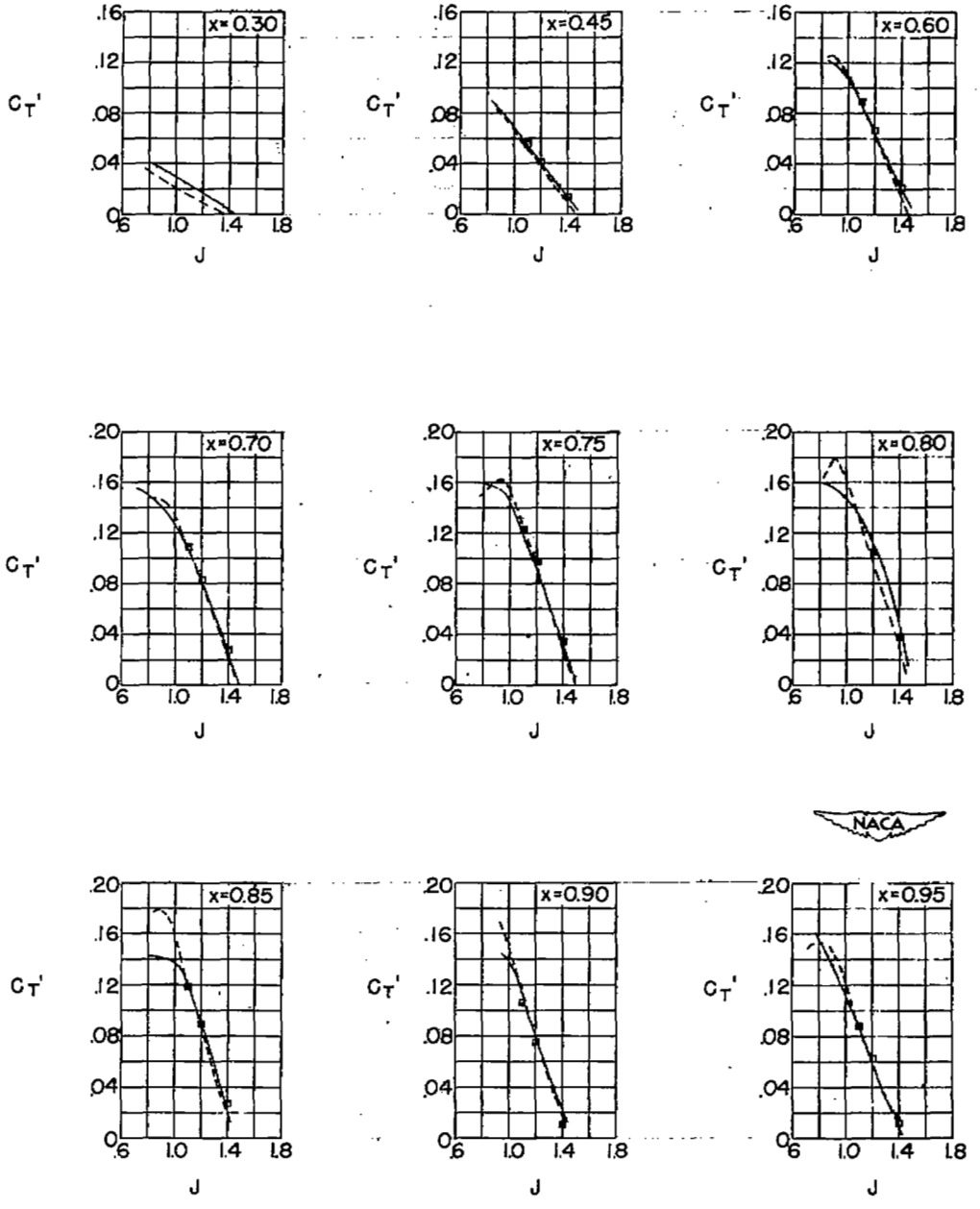

(b) N = 1350 rpm; $\beta_{0.75R} = 30^\circ$.

Figure 17.- Continued.

———Thrust coefficient obtained from surface pressure measurements, $C_{T_p}'$

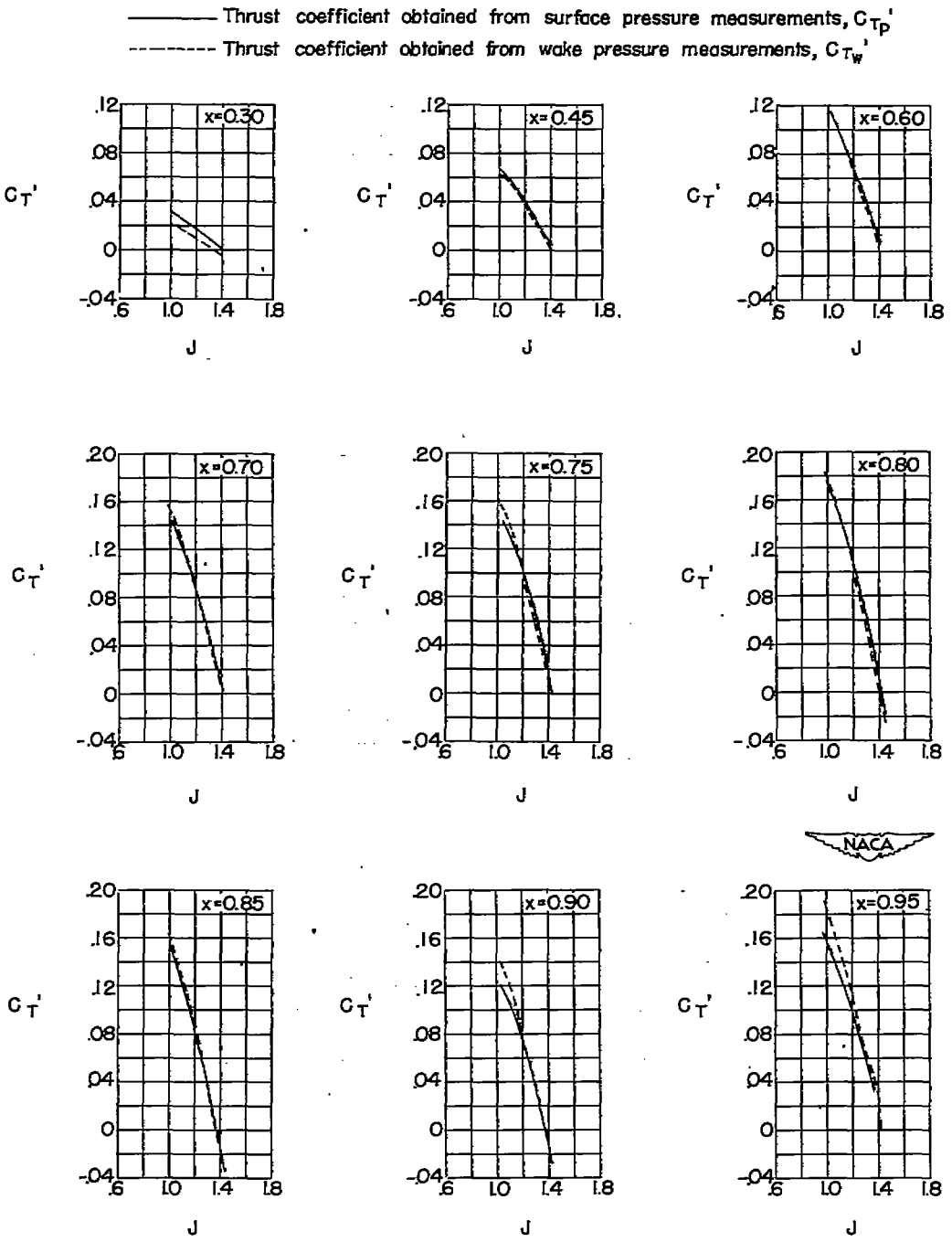
- - - - - - -Thrust coefficient obtained from wake pressure measurements, $C_{T_w}'$

▫ $C_{T_p}'$ computed from data obtained at $\beta_{0.75} = 45°$



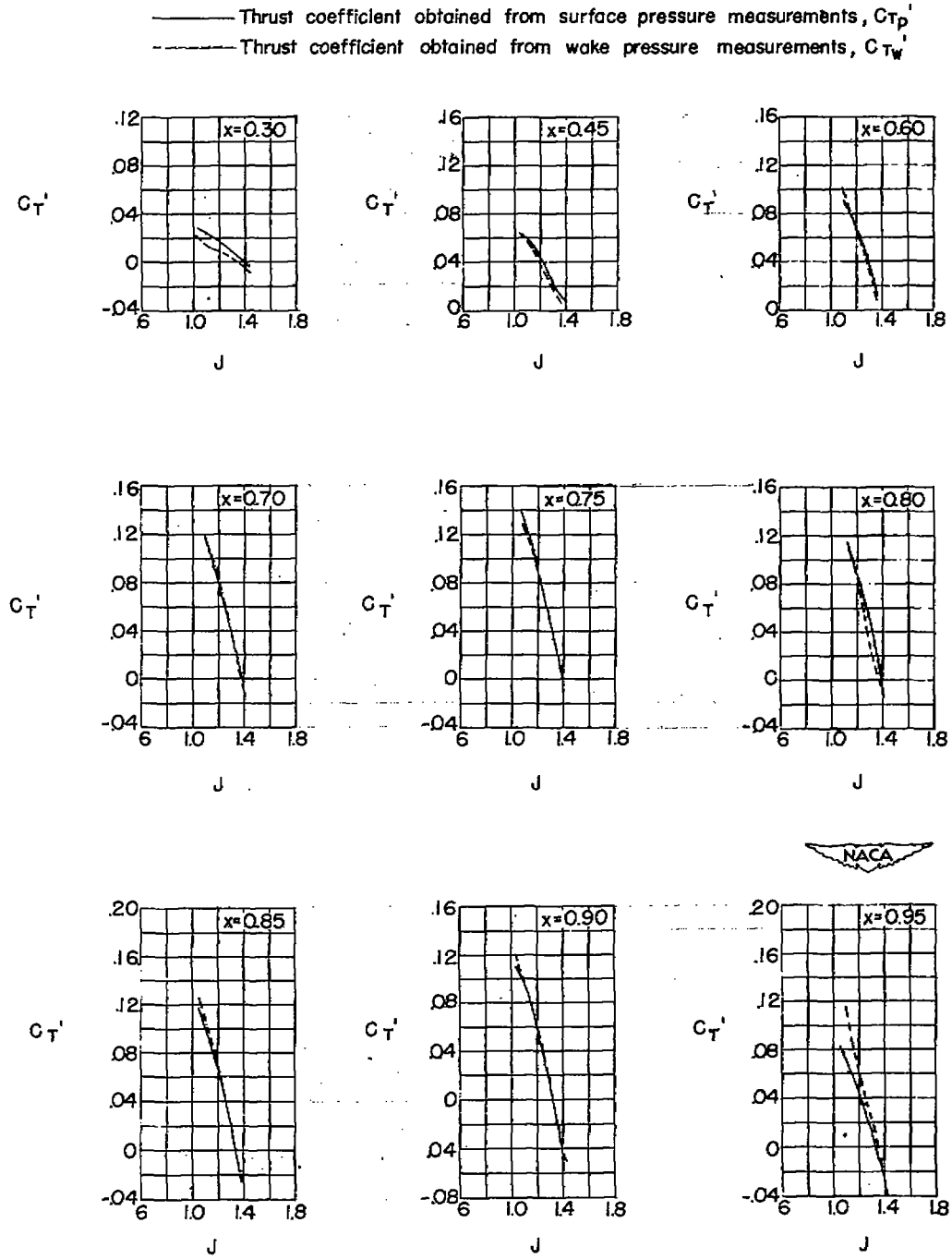

(c) N = 1600 rpm; $\beta_{0.75R} = 30°$.

Figure 17.- Continued.



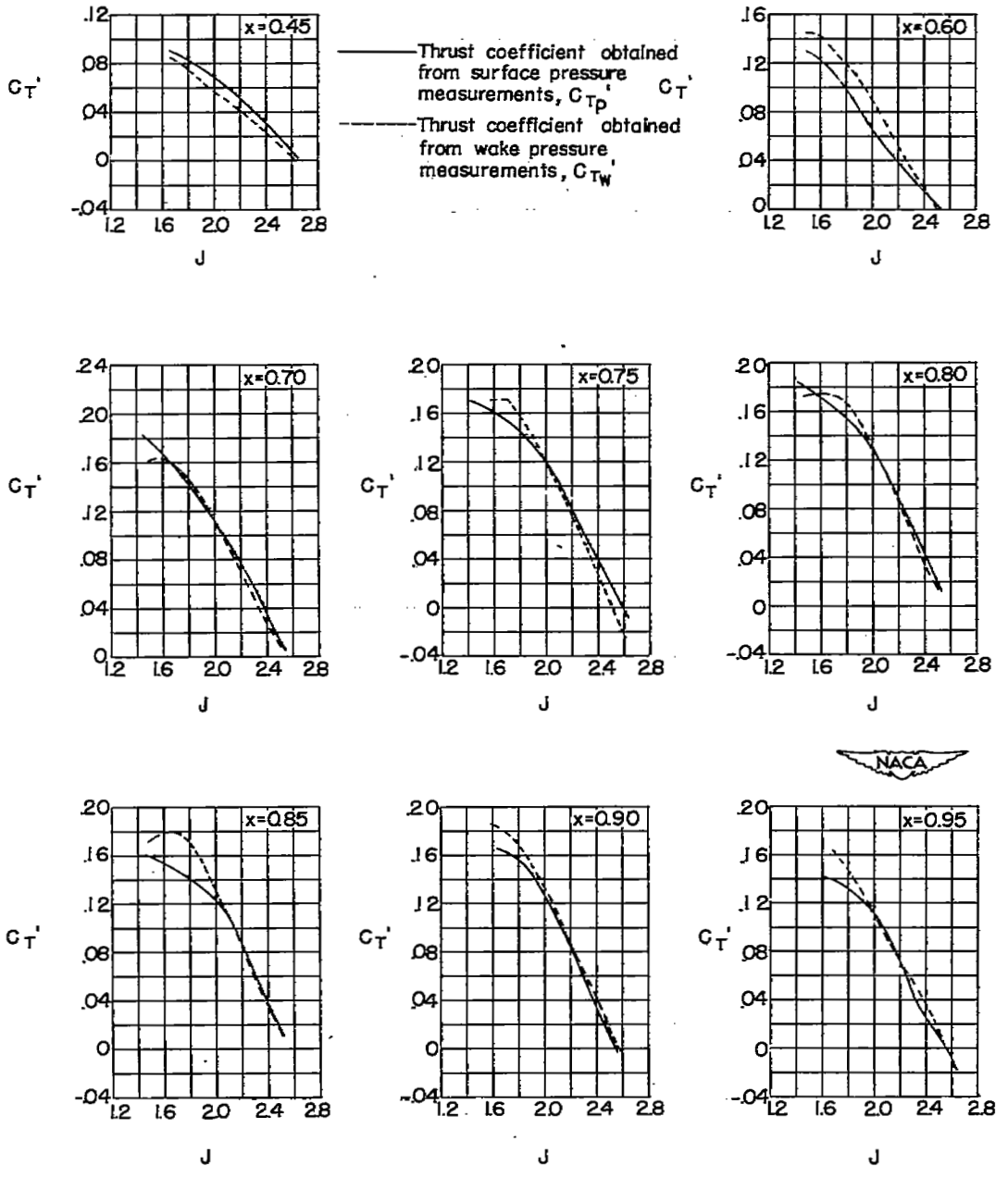

(d) N = 2000 rpm; $\beta_{0.75R} = 30°$.

Figure 17.- Continued.



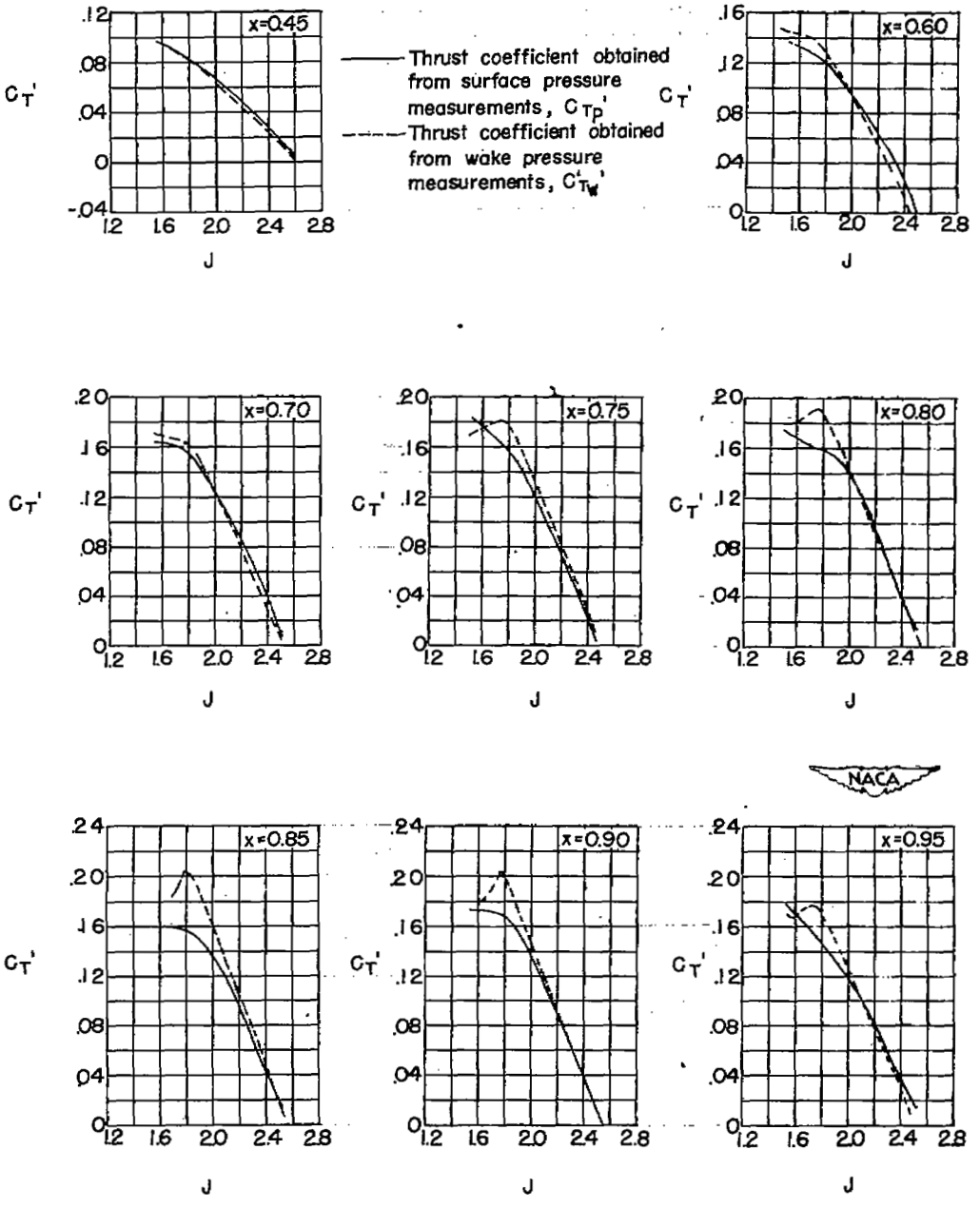

(e) N = 2160 rpm; $\beta_{0.75R} = 30^\circ$.

Figure 17.- Continued.




(f) N = 1140 rpm; $\beta_{0.75R} = 45°$.

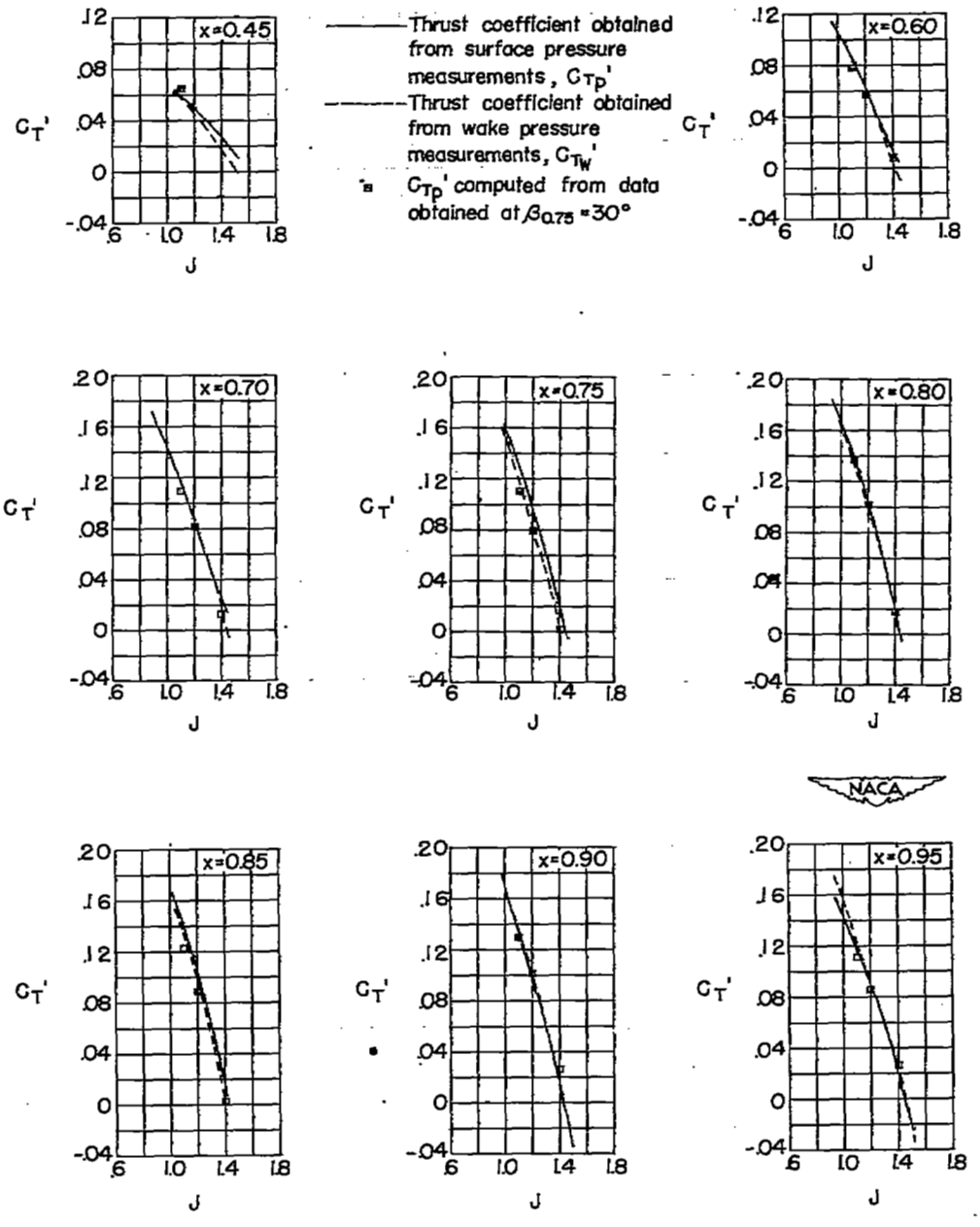
Figure 17.- Continued.




(g) N = 1350 rpm; $\beta_{0.75R} = 45°$.

Figure 17.- Continued.

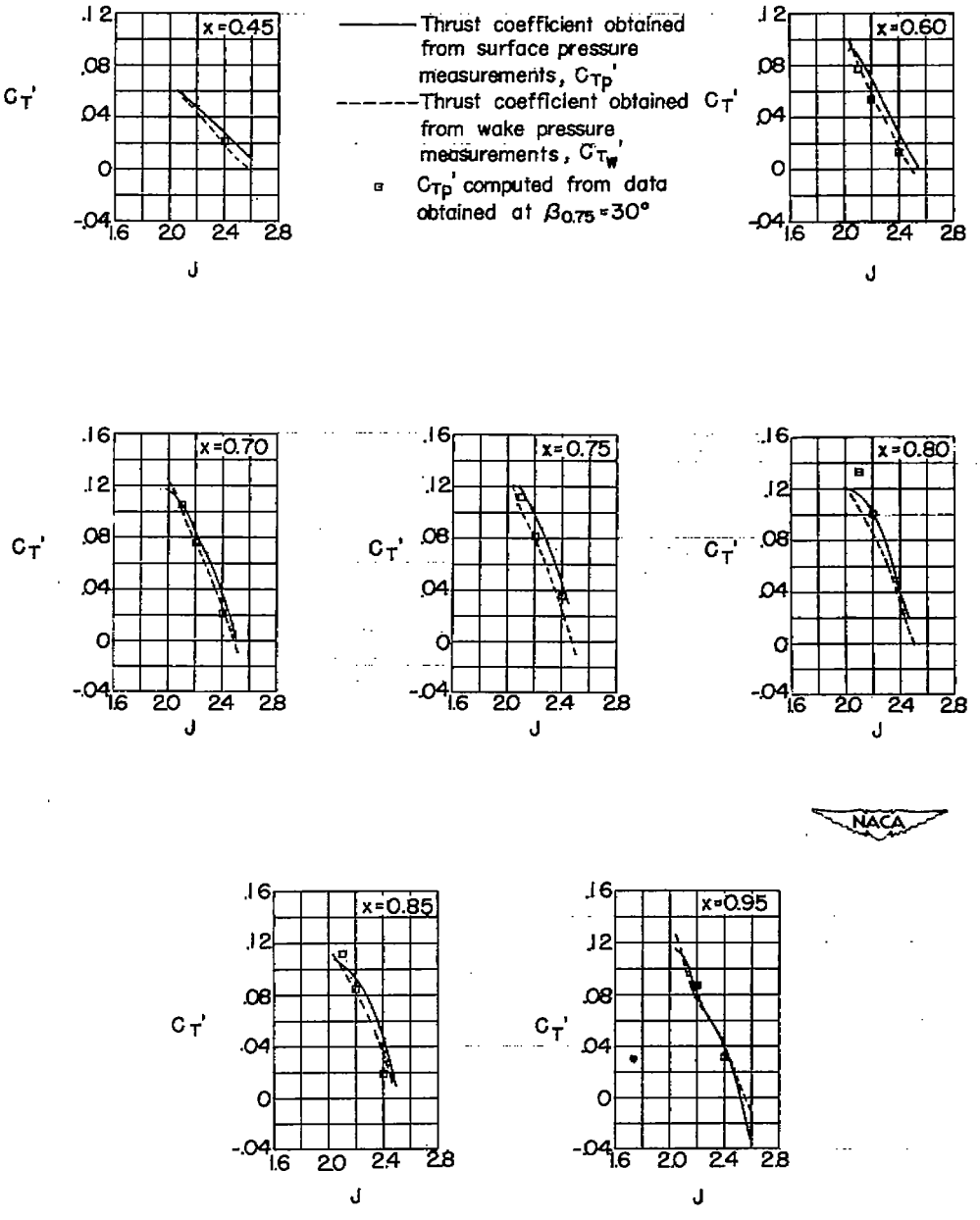
[redacted]




(h) N = 1600 rpm; $\beta_{0.75R} = 45°$.

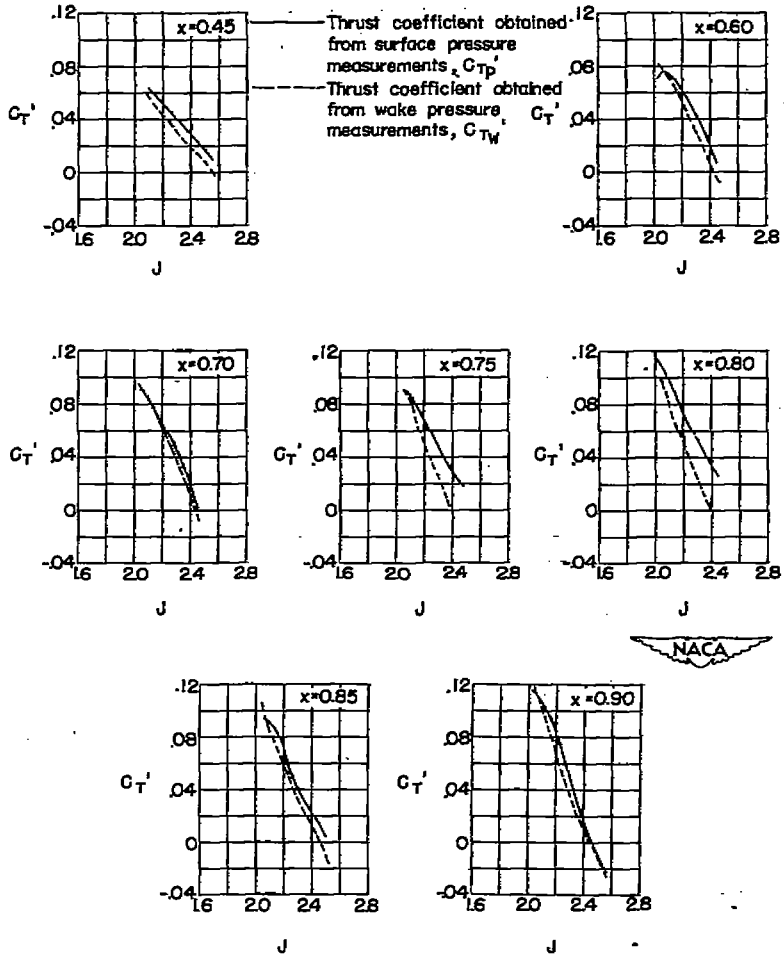
Figure 17.- Continued.

[redacted]



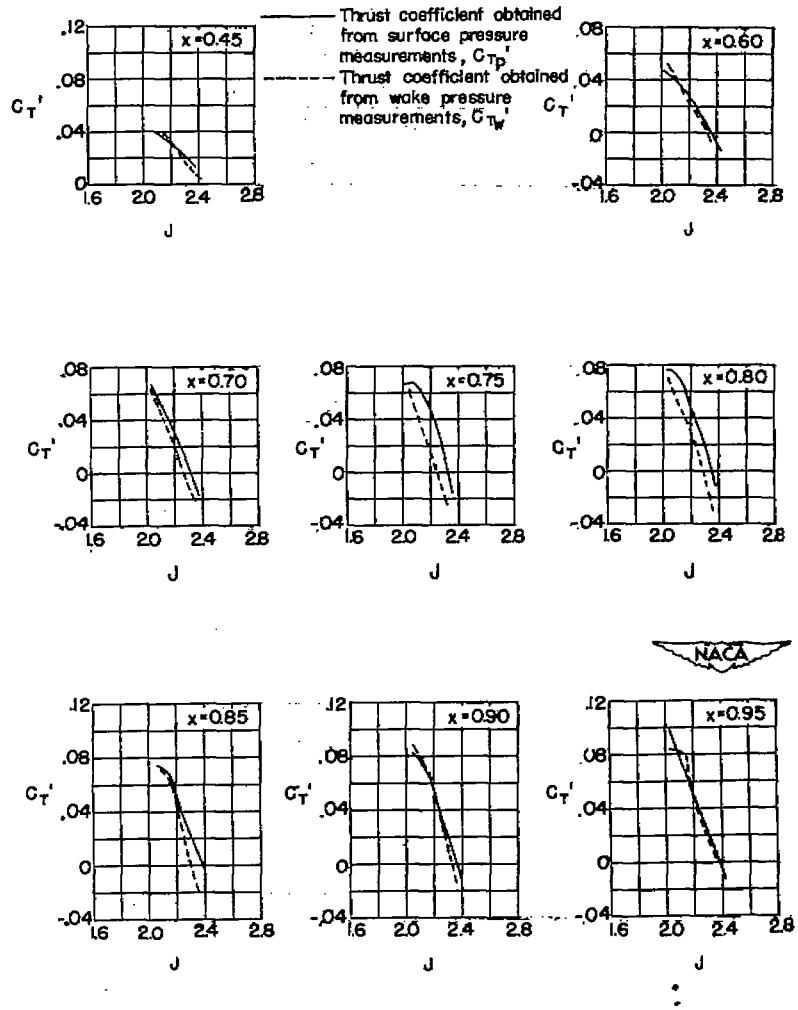

(i) M = 0.56; $\beta_{0.75R} = 45°$.

Figure 17.- Continued.




(j) M = 0.60; $\beta_{0.75R} = 45°$.

Figure 17.- Continued.




(k) M = 0.65; $\beta_{0.75R} = 45^\circ$.

Figure 17.- Concluded.