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# RESEARCH MEMORANDUM

## STATIC STABILITY AND CONTROL CHARACTERISTICS OF A TRIANGULAR WING AND CANARD CONFIGURATION AT MACH NUMBERS FROM 2.58 TO 3.53

By C. Ernest Hedstrom, James R. Blackaby, and Victor L. Peterson

Ames Aeronautical Laboratory
Moffett Field, Calif.

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RESEARCH MEMORANDUM

# STATIC STABILITY AND CONTROL CHARACTERISTICS OF A TRIANGULAR WING AND CANARD CONFIGURATION AT MACH NUMBERS FROM 2.58 TO 3.53

By C. Ernest Hedstrom, James R. Blackaby,
and Victor L. Peterson

## SUMMARY

Results of an investigation of the static longitudinal stability and control characteristics of a canard airplane configuration are presented without analysis for the Mach number range of 2.58 to 3.53. The configuration consisted of a triangular wing and a triangular canard, both of aspect ratio 2.0, a low-aspect-ratio vertical tail, and a fineness ratio 12.5 Sears-Haack body. The hinge line of the canard was in the extended wing chord plane, 1.21 wing mean aerodynamic chords ahead of the reference center of moments. The ratio of the area of the exposed canard panels to the total area of the wing was 6.9 percent. Data are presented for various combinations of the body, canard, wing, and vertical tail at 0° and 5° sideslip for an angle-of-attack range of -10° to +15°. The canard deflection angles ranged from 0° to +20°.

## INTRODUCTION

The possible gains to be realized at supersonic speeds in the form of reduced trim drag and increased maneuverability by the use of canards rather than conventional tail-aft controls have resulted in increased interest in these arrangements. Therefore, an extensive research program aimed at determining the static longitudinal and directional characteristics of a number of canard configurations has been undertaken by the NACA.

As a part of the program, tests were conducted on a canard configuration to determine its static stability and control characteristics in the Mach number range of 2.58 to 3.53. The configuration consisted of a triangular wing and triangular canard, both of aspect ratio 2.0, a Sears-Haack body of fineness ratio 12.5, and a low-aspect-ratio vertical tail.

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This report presents without analysis the aerodynamic characteristics of the complete configuration and its component parts. The static stability and control characteristics of this and similar configurations in the Mach number range of 0.70 to 2.22 are given in references 1, 2, 3, and 4.

## NOTATION

a.c. aerodynamic center determined at $C_L = 0$, percent $\bar{c}$

$b$ wing span, ft

$\bar{c}$ mean aerodynamic chord of wing, ft

$\bar{c}_c$ mean aerodynamic chord of canard, ft

$c_c$ canard root chord, ft

$C_D$ drag coefficient, $\frac{\text{drag}}{qS}$

$C_{D_o}$ drag coefficient at zero lift

$C_L$ lift coefficient, $\frac{\text{lift}}{qS}$

$C_{L_\alpha}$ lift-curve slope taken through zero angle of attack, per deg

$C_l$ rolling-moment coefficient, $\frac{\text{rolling moment}}{qSb}$

$C_{l_s}$ rolling-moment coefficient about stability axis, $C_l \cos \alpha + C_n \sin \alpha$

$C_m$ pitching-moment coefficient, $\frac{\text{pitching moment}}{qS\bar{c}}$, referred to the projection of the 0.21 $\bar{c}$ point on the fuselage reference line

$C_n$ yawing-moment coefficient, $\frac{\text{yawing moment}}{qSb}$, referred to the projection of the 0.21 $\bar{c}$ point on the fuselage reference line

$C_{n_s}$ yawing-moment coefficient about stability axis, $C_n \cos \alpha - C_l \sin \alpha$

$C_Y$ side-force coefficient, $\frac{\text{side force}}{qS}$

$\frac{\Delta C_{l_s}}{\beta}$ difference between rolling-moment coefficients about stability axis at $5^\circ$ and $0^\circ$ sideslip divided by $5^\circ$, per deg

$\frac{\Delta C_{n_s}}{\beta}$ difference between yawing-moment coefficients about stability axis at $5^\circ$ and $0^\circ$ sideslip divided by $5^\circ$, per deg

$\frac{\Delta C_Y}{\beta}$ difference between side-force coefficients at $5^\circ$ and $0^\circ$ sideslip divided by $5^\circ$, per deg

$C_{h_c}$ canard hinge-moment coefficient, $\frac{\text{canard hinge moment}}{qS_c(c_c/2)}$, referred to the projection of the 0.35 $\bar{c}_c$ point on the fuselage reference line

$C_{Z_c}$ force coefficient normal to the canard, $\frac{\text{canard normal force}}{qS}$

$\left(\frac{L}{D}\right)_{max}$ maximum lift-drag ratio

M free-stream Mach number

q free-stream dynamic pressure, lb/sq ft

S wing area, formed by extending the leading and trailing edges to the plane of symmetry, sq ft

$S_c$ exposed canard area, sq ft

$\alpha$ angle of attack of wing root chord, deg

$\beta$ sideslip angle measured between the relative wind and vertical plane of symmetry, deg

$\delta$ angle of deflection of the canard with respect to the extended wing chord plane, positive when trailing edge is down, deg

Configurations are denoted by the following letters used in combination:

B body

C canard

V vertical tail

W wing

## APPARATUS AND MODEL

### Test Facility

The experimental data were obtained in the 8- by 7-foot supersonic test section of the Ames Unitary Plan Wind Tunnel. This wind tunnel is capable of continuous variation of nominal Mach number from 2.5 to 3.5 and of stagnation pressure from 2 to 28 pounds per square inch absolute. A more detailed description of the wind tunnel may be found in reference 5.

### Description of Model and Balances

The sting-mounted model (figs. 1(a) and (b)) consisted of an aspect ratio 2.0 triangular wing, an aspect ratio 2.0 all-movable triangular canard, and a low-aspect-ratio vertical tail all mounted on a fineness ratio 12.5 Sears-Haack body. A dimensional sketch of the configuration is shown in figure 1(c). The wing and vertical tail had NACA 0003-63 sections streamwise and the constant thickness canard, detailed in figure 1(d), had beveled leading and trailing edges. The canard, which was pivoted about the 0.35 canard mean aerodynamic chord, was mounted in the extended wing chord plane 1.21 wing mean aerodynamic chords ahead of the reference center of moments (0.21 $\bar{c}$). The exposed area of the canard panels was 6.9 percent of the total area of the wing, while the total area was 12.9 percent of the total area of the wing. The wing, canard, and vertical tail were of solid steel construction to minimize aeroelastic effects. The surfaces were polished to give a smooth surface and were further treated to prevent corrosion.

The fuselage was cut off as shown in figure 1(c) to accommodate the sting and the six-component strain-gage balance which measured forces and moments on the entire configuration. Canard normal forces and hinge moments were obtained from a two-component strain-gage balance mounted in the nose of the fuselage. The canard, wing, and vertical tail were removable, enabling data to be taken which would permit an evaluation of the effect of each of these components on the stability of the model.

## TEST AND PROCEDURES

### Range of Test Variables

The tests were conducted at Mach numbers of 2.58, 3.06, and 3.53 with a constant Reynolds number of 2.5 million per foot. Data were obtained for the body alone and for various combinations of the body and

the wing, canard, and vertical tail. The majority of the tests were made with the model at a constant angle of sideslip of $0^{\circ}$ or $5^{\circ}$ and with canard deflections from $0^{\circ}$ to $20^{\circ}$ while angle of attack was varied from $-10^{\circ}$ to $+15^{\circ}$. In addition, tests of the complete model with a canard deflection of $0^{\circ}$ were made at each of the test Mach numbers with angle of attack constant at approximately $0^{\circ}$ and $10^{\circ}$ while sideslip angle was varied from $-2^{\circ}$ to $+10^{\circ}$. Table I is a summary of the configurations investigated.

## Reduction of Data

The data presented herein have been reduced to standard NACA coefficient form. The pitching-moment coefficients were referred to the 0.21 point of the wing mean aerodynamic chord. This location was the same as that chosen in reference 1. The canard hinge moments were computed about a hinge line located at the 0.35 point of the canard mean aerodynamic chord. Transition was not fixed in the present tests because the large wire size required at the highest Mach number would have had excessive drag. Factors which affect the accuracy of the results are discussed in the following paragraphs.

Stream angle variations.- Surveys of the stream characteristics for the 8- by 7-foot supersonic test section of the Ames Unitary Plan Wind Tunnel showed that some stream curvature existed in both the pitch and sideslip planes. For the pitch plane a stream angle, which was less than $0.21^{\circ}$ throughout the Mach number range, was found to exist in the vicinity of the model. In the sideslip plane the stream angle was less than $0.07^{\circ}$. The data presented herein have been corrected for these stream angles.

Buoyancy corrections.- The static-pressure variations in the test section of the wind tunnel were also determined during the stream survey. The longitudinal-buoyancy corrections to the drag of this model due to the static-pressure variations have been included in all the drag data presented. For the complete model, these corrections amounted to less than 1.3 percent of the total drag.

Support interference.- The effects of model support interference on the aerodynamic characteristics were considered to consist primarily of a change in the pressure at the base of the model. However, the drag data presented herein contain no base drag component since the base pressure was measured and the drag was adjusted to correspond to a base pressure equal to the free-stream static pressure.

## RESULTS

The results are presented in this report without analysis in order to expedite publication. Table I, which includes model configurations and test variables, serves as an index to tables II through VI in which all of the experimental data are tabulated. Selected portions of the data are presented in figures 2 through 7.

Figure 2 shows the lift, drag, and pitching-moment characteristics with the canard on and deflected, and with the canard off, for the three test Mach numbers. Variation of canard normal-force and hinge-moment coefficients as a function of angle of attack at constant canard deflection angles are presented in figure 3. Summarized in figure 4 are the maximum lift-drag ratios, lift-curve slopes, minimum drag coefficients, and aerodynamic centers as a function of Mach number with the canard at zero deflection and with the canard off. In figure 4 the curves shown in the Mach number range of 0.70 through 2.22 were obtained from reference 1.

Figure 5 shows the effect of configuration changes on the lateral and directional characteristics (rolling-moment, side-force, and yawing-moment coefficients) as a function of angle of attack at constant sideslip angles. The effects of canard deflection on the lateral and directional characteristics are presented in figure 6 as a function of angle of attack at constant angles of sideslip. Summarized in figure 7 are $\Delta C_{l_s}/\beta$, $\Delta C_Y/\beta$, and $\Delta C_{n_s}/\beta$ as functions of Mach number at constant angles of attack of $0^\circ$ and $10^\circ$ with the canard on at zero deflection and with the canard off.

Ames Aeronautical Laboratory,
National Advisory Committee for Aeronautics
Moffett Field, Calif., Mar. 5, 1958

## REFERENCES

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4. Peterson, Victor L., and Menees, Gene P.: Static Stability and Control of Canard Configurations at Mach Numbers From 0.70 to 2.22 - Lateral-Directional Characteristics of a Triangular Wing and Canard. NACA RM A57L18, 1958.

5. Huntsberger, Ralph F., and Parsons, John F.: The Design of Large High Speed Wind Tunnels. NACA paper presented at the Fourth General Assembly of the AGARD wind tunnel panel, Schevenigen, Netherlands, AG15/P6, May 3-7, 1954.

TABLE I.- CONFIGURATIONS INVESTIGATED AND INDEX TO TABULATED DATA

| Configuration | $\delta$, deg | $\beta$, deg | Tabulated data, table no. |
|---|---|---|---|
| BVWC | 0 | 0 and 5 | II(a), III(a) |
| BVWC | 2.6 | 0 | II(b) |
| BVWC | 4.6 | 0 | II(c) |
| BVWC | 10.0 | 0 and 5 | II(d), III(b) |
| BVWC | 19.4 | 0 and 5 | II(e), III(c) |
| BVWC | 0 | variable | IV(a), IV(b) |
| BVW | 0 | 0 and 5 | II(f), III(d) |
| BWC | 0 | 0 and 5 | II(g), III(e) |
| BWC | 10.0 | 5 | III(f) |
| BWC | 19.9 | 0 | III(g) |
| BW | 0 | 0 and 5 | II(h), III(h) |
| BVC | 0 | 0 and 5 | V(a), VI(a) |
| BVC | 2.5 | 0 | V(b) |
| BVC | 4.8 | 0 | V(c) |
| BVC | 10.2 | 0 and 5 | V(d), VI(b) |
| BVC | 20.0 | 0 and 5 | V(e), VI(c) |
| BV | 0 | 0 and 5 | V(f), VI(d) |
| BC | 0 | 0 and 5 | V(g), VI(e) |
| BC | 10.0 | 0 and 5 | V(h), VI(f) |
| BC | 20.0 | 0 and 5 | V(i), VI(g) |
| B | 0 | 0 | V(j) |

TABLE II.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta = 0^{\circ}$

(a) BVWC, $\delta = 0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 00.0 | -.297 | .0674 | .0344 | -4.40 | -.002 | .0001 | .0001 | -.0235 | .0895 |
| | -6.6 | 00.0 | -.188 | .0333 | .0233 | -5.63 | -.002 | .0001 | .0000 | -.0148 | .0555 |
| | -4.6 | 00.0 | -.132 | .0222 | .0172 | -5.93 | -.002 | .0001 | -.0001 | -.0101 | .0393 |
| | -2.6 | 00.0 | -.075 | .0150 | .0105 | -4.97 | -.002 | .0001 | -.0001 | -.0054 | .0208 |
| | -0.5 | 00.0 | -.017 | .0119 | .0029 | -1.40 | -.001 | .0002 | -.0002 | -.0007 | .0021 |
| | 1.4 | 00.0 | .040 | .0125 | -.0049 | 3.21 | -.001 | .0002 | -.0003 | .0038 | -.0158 |
| | 3.5 | 00.0 | .098 | .0173 | -.0117 | 5.70 | -.001 | .0002 | -.0003 | .0088 | -.0350 |
| | 7.6 | 00.0 | .214 | .0394 | -.0240 | 5.43 | -.002 | .0002 | -.0002 | .0183 | -.0707 |
| | 11.7 | 00.0 | .324 | .0776 | -.0350 | 4.18 | -.003 | .0002 | -.0003 | .0269 | -.1036 |
| | 14.4 | 00.0 | .395 | .1118 | -.0415 | 3.54 | -.003 | .0002 | -.0001 | .0323 | -.1257 |
| 3.05 | -10.7 | 00.0 | -.258 | .0609 | .0249 | -4.23 | -.003 | .0000 | .0005 | -.0206 | .0781 |
| | -6.6 | 00.0 | -.162 | .0306 | .0170 | -5.30 | -.002 | .0000 | .0002 | -.0131 | .0490 |
| | -4.6 | 00.0 | -.114 | .0210 | .0124 | -5.44 | -.002 | .0000 | .0002 | -.0089 | .0332 |
| | -2.6 | 00.0 | -.064 | .0145 | .0077 | -4.42 | -.003 | .0000 | .0001 | -.0048 | .0183 |
| | -0.5 | 00.0 | -.014 | .0117 | .0023 | -1.19 | -.002 | .0000 | .0000 | -.0007 | .0025 |
| | 1.4 | 00.0 | .034 | .0121 | -.0029 | 2.82 | -.002 | .0001 | .0000 | .0035 | -.0140 |
| | 3.4 | 00.0 | .083 | .0164 | -.0077 | 5.06 | -.001 | .0001 | -.0001 | .0080 | -.0312 |
| | 7.6 | 00.0 | .182 | .0355 | -.0166 | 5.14 | -.002 | .0001 | -.0001 | .0163 | -.0640 |
| | 11.6 | 00.0 | .281 | .0688 | -.0250 | 4.08 | -.003 | .0000 | -.0001 | .0236 | -.0898 |
| | 14.3 | 00.0 | .345 | .0994 | -.0298 | 3.47 | -.003 | .0000 | -.0002 | .0286 | -.1100 |
| 3.53 | -10.7 | 00.0 | -.223 | .0566 | .0175 | -3.94 | -.001 | .0000 | .0002 | -.0186 | .0690 |
| | -6.6 | 00.0 | -.139 | .0298 | .0118 | -4.68 | -.001 | .0000 | .0001 | -.0115 | .0420 |
| | -4.6 | 00.0 | -.096 | .0211 | .0086 | -4.52 | -.001 | .0001 | .0001 | -.0080 | .0290 |
| | -2.6 | 00.0 | -.052 | .0156 | .0055 | -3.35 | -.001 | .0001 | .0000 | -.0043 | .0156 |
| | -0.6 | 00.0 | -.010 | .0131 | .0019 | -0.77 | -.001 | .0001 | .0000 | -.0006 | .0022 |
| | 1.4 | 00.0 | .032 | .0135 | -.0020 | 2.40 | -.001 | .0001 | .0000 | .0032 | -.0131 |
| | 3.4 | 00.0 | .075 | .0172 | -.0053 | 4.38 | .000 | .0001 | -.0001 | .0070 | -.0272 |
| | 7.5 | 00.0 | .162 | .0336 | -.0114 | 4.82 | -.001 | .0001 | .0000 | .0145 | -.0543 |
| | 11.5 | 00.0 | .251 | .0637 | -.0175 | 3.95 | -.001 | .0001 | -.0001 | .0216 | -.0813 |
| | 14.2 | 00.0 | .311 | .0916 | -.0213 | 3.40 | -.001 | .0001 | -.0001 | .0257 | -.0980 |

TABLE II.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(b) BVWC, $\delta = 2.6^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 00.0 | -.289 | .0656 | .0411 | -4.41 | -.001 | .0002 | -.0001 | -.0189 | .0745 |
| | -6.6 | 00.0 | -.180 | .0321 | .0304 | -5.60 | .000 | .0001 | -.0002 | -.0100 | .0393 |
| | -4.6 | 00.0 | -.123 | .0214 | .0241 | -5.74 | .000 | .0002 | -.0003 | -.0051 | .0203 |
| | -2.5 | 00.0 | -.066 | .0146 | .0172 | -4.52 | .000 | .0001 | -.0002 | -.0004 | .0017 |
| | -0.5 | 00.0 | -.010 | .0123 | .0096 | -0.79 | .000 | .0002 | -.0003 | .0039 | -.0165 |
| | 1.4 | 00.0 | .047 | .0132 | .0024 | 3.59 | .000 | .0002 | -.0004 | | |
| | 3.5 | 00.0 | .105 | .0185 | -.0044 | 5.67 | .001 | .0003 | -.0005 | | |
| | 7.6 | 00.0 | .221 | .0417 | -.0172 | 5.31 | .000 | .0002 | -.0004 | | |
| | 11.6 | 00.0 | .332 | .0812 | -.0287 | 4.09 | -.001 | .0003 | -.0004 | | |
| | 14.4 | 00.0 | .402 | .1157 | -.0349 | 3.48 | -.001 | .0002 | -.0003 | | |
| 3.05 | -10.7 | 00.0 | -.248 | .0591 | .0312 | -4.19 | -.002 | .0000 | .0004 | -.0162 | .0627 |
| | -6.6 | 00.0 | -.153 | .0296 | .0234 | -5.17 | -.001 | .0000 | .0001 | -.0082 | .0320 |
| | -4.6 | 00.0 | -.105 | .0206 | .0190 | -5.09 | -.001 | .0000 | .0001 | -.0041 | .0156 |
| | -2.5 | 00.0 | -.055 | .0147 | .0140 | -3.74 | -.002 | .0000 | .0000 | -.0001 | .0006 |
| | -0.5 | 00.0 | -.006 | .0126 | .0085 | -0.50 | .000 | .0000 | -.0001 | .0038 | -.0152 |
| | 1.5 | 00.0 | .042 | .0136 | .0034 | 3.10 | .000 | .0001 | -.0002 | | |
| | 7.6 | 00.0 | .191 | .0377 | -.0106 | 5.07 | -.001 | .0001 | -.0002 | | |
| | 11.6 | 00.0 | .288 | .0721 | -.0190 | 4.00 | -.001 | .0001 | -.0002 | | |
| | 14.3 | 00.0 | .352 | .1029 | -.0233 | 3.43 | -.001 | .0001 | -.0003 | | |
| 3.53 | -10.7 | 00.0 | -.218 | .0558 | .0239 | -3.91 | -.001 | .0000 | .0001 | -.0141 | .0551 |
| | -6.6 | 00.0 | -.135 | .0294 | .0181 | -4.58 | -.001 | .0001 | .0000 | -.0073 | .0282 |
| | -4.6 | 00.0 | -.090 | .0208 | .0152 | -4.32 | .000 | .0001 | -.0002 | -.0034 | .0133 |
| | -2.6 | 00.0 | -.047 | .0159 | .0118 | -2.94 | .000 | .0001 | -.0001 | .0000 | -.0009 |
| | -0.6 | 00.0 | -.005 | .0139 | .0080 | -0.34 | .000 | .0001 | -.0002 | .0037 | -.0151 |
| | 1.4 | 00.0 | .038 | .0145 | .0042 | 2.63 | .000 | .0002 | -.0003 | | |
| | 3.4 | 00.0 | .080 | .0182 | .0009 | 4.40 | .001 | .0002 | -.0003 | | |
| | 7.5 | 00.0 | .168 | .0358 | -.0054 | 4.70 | .001 | .0002 | -.0003 | | |
| | 11.6 | 00.0 | .256 | .0665 | -.0110 | 3.85 | .000 | .0001 | -.0003 | | |
| | 14.2 | 00.0 | .316 | .0948 | -.0148 | 3.33 | .000 | .0001 | -.0003 | | |

TABLE II.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(c) BVWC, $\delta = 4.6^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 00.0 | -.286 | .0643 | .0466 | -4.45 | -.002 | .0002 | .0000 | -.0150 | .0627 |
| | -6.6 | 00.0 | -.176 | .0311 | .0361 | -5.67 | -.001 | .0002 | -.0001 | -.0057 | .0249 |
| | -4.6 | 00.0 | -.121 | .0211 | .0298 | -5.74 | -.002 | .0002 | -.0001 | -.0011 | .0058 |
| | -2.6 | 00.0 | -.064 | .0150 | .0223 | -4.27 | -.001 | .0002 | -.0002 | .0031 | -.0096 |
| | -0.5 | 00.0 | -.008 | .0123 | .0149 | -0.62 | .000 | .0002 | -.0002 | .0080 | -.0292 |
| | 1.5 | 00.0 | .050 | .0139 | .0072 | 3.59 | -.001 | .0003 | -.0003 | .0130 | -.0487 |
| | 3.5 | 00.0 | .108 | .0193 | -.0004 | 5.59 | .000 | .0003 | -.0004 | .0176 | -.0653 |
| | 7.6 | 00.0 | .223 | .0427 | -.0128 | 5.22 | -.001 | .0003 | -.0005 | .0265 | -.0993 |
| | 11.7 | 00.0 | .333 | .0825 | -.0242 | 4.04 | -.002 | .0003 | -.0004 | .0348 | -.1324 |
| | 14.4 | 00.0 | .402 | .1164 | -.0307 | 3.45 | -.003 | .0003 | -.0004 | .0400 | -.1532 |
| 3.05 | -10.6 | 00.0 | -.244 | .0584 | .0365 | -4.18 | -.002 | .0001 | .0003 | -.0124 | .0521 |
| | -6.6 | 00.0 | -.149 | .0300 | .0285 | -4.96 | -.001 | .0001 | .0001 | -.0043 | .0192 |
| | -4.6 | 00.0 | -.101 | .0211 | .0240 | -4.78 | -.001 | .0001 | .0001 | -.0003 | .0033 |
| | -2.5 | 00.0 | -.052 | .0153 | .0188 | -3.42 | -.001 | .0000 | .0000 | .0034 | -.0110 |
| | -0.5 | 00.0 | -.005 | .0135 | .0136 | -0.37 | -.001 | .0001 | .0000 | .0075 | -.0268 |
| | 1.5 | 00.0 | .045 | .0148 | .0079 | 3.08 | .000 | .0001 | -.0002 | .0118 | -.0430 |
| | 3.5 | 00.0 | .094 | .0193 | .0028 | 4.86 | -.001 | .0002 | -.0001 | .0159 | -.0578 |
| | 7.5 | 00.0 | .193 | .0395 | -.0069 | 4.90 | .000 | .0001 | -.0003 | .0236 | -.0866 |
| | 11.6 | 00.0 | .290 | .0739 | -.0149 | 3.93 | -.001 | .0001 | -.0003 | .0314 | -.1167 |
| | 14.3 | 00.0 | .352 | .1041 | -.0191 | 3.38 | -.002 | .0001 | -.0004 | .0362 | -.1361 |
| 3.53 | -10.7 | 00.0 | -.219 | .0549 | .0288 | -4.00 | .000 | .0000 | .0000 | -.0109 | .0443 |
| | -6.6 | 00.0 | -.131 | .0282 | .0228 | -4.64 | -.001 | .0000 | .0000 | -.0033 | .0137 |
| | -4.6 | 00.0 | -.090 | .0203 | .0198 | -4.45 | -.001 | .0000 | .0000 | -.0001 | .0019 |
| | -2.5 | 00.0 | -.048 | .0155 | .0162 | -3.10 | .000 | .0000 | -.0002 | .0036 | -.0133 |
| | -0.6 | 00.0 | -.005 | .0134 | .0119 | -0.35 | .000 | .0000 | -.0002 | .0073 | -.0265 |
| | 1.4 | 00.0 | .037 | .0146 | .0084 | 2.52 | .000 | .0002 | -.0002 | .0109 | -.0397 |
| | 3.4 | 00.0 | .079 | .0183 | .0050 | 4.34 | .000 | .0002 | -.0002 | .0145 | -.0529 |
| | 7.5 | 00.0 | .168 | .0360 | -.0021 | 4.68 | -.001 | .0001 | -.0002 | .0214 | -.0778 |
| | 11.5 | 00.0 | .254 | .0657 | -.0077 | 3.87 | .000 | .0001 | -.0003 | .0288 | -.1060 |
| | 14.2 | 00.0 | .315 | .0949 | -.0108 | 3.32 | -.001 | .0001 | -.0003 | .0338 | -.1256 |

TABLE II.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(d) BVWC, $\delta = 10.0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 00.0 | -.280 | .0630 | .0619 | -4.45 | .000 | .0001 | -.0001 | -.0046 | .0254 |
| | -6.6 | 00.0 | -.172 | .0323 | .0506 | -5.30 | .000 | .0001 | -.0002 | .0042 | -.0107 |
| | -4.6 | 00.0 | -.115 | .0222 | .0435 | -5.19 | .000 | .0001 | -.0003 | .0086 | -.0278 |
| | -2.5 | 00.0 | -.061 | .0165 | .0363 | -3.67 | .000 | .0001 | -.0003 | .0132 | -.0452 |
| | -0.5 | 00.0 | -.006 | .0151 | .0280 | -0.39 | .000 | .0002 | -.0003 | .0176 | -.0623 |
| | 1.5 | 00.0 | .051 | .0168 | .0189 | 3.07 | .000 | .0002 | -.0004 | .0221 | -.0791 |
| | 3.5 | 00.0 | .105 | .0225 | .0104 | 4.68 | .001 | .0002 | -.0005 | .0263 | -.0949 |
| | 7.6 | 00.0 | .223 | .0470 | -.0022 | 4.75 | .000 | .0003 | -.0005 | .0347 | -.1290 |
| | 11.7 | 00.0 | .333 | .0871 | -.0139 | 3.82 | -.001 | .0001 | -.0005 | .0430 | -.1619 |
| | 14.4 | 00.0 | .400 | .1213 | -.0211 | 3.30 | -.002 | .0002 | -.0006 | .0481 | -.1830 |
| 3.05 | -10.7 | 00.0 | -.240 | .0566 | .0506 | -4.25 | -.001 | .0000 | .0002 | -.0027 | .0195 |
| | -6.6 | 00.0 | -.145 | .0294 | .0419 | -4.92 | -.001 | .0000 | .0001 | .0050 | -.0124 |
| | -4.5 | 00.0 | -.096 | .0209 | .0372 | -4.61 | -.001 | -.0001 | .0001 | .0086 | -.0261 |
| | -2.5 | 00.0 | -.049 | .0166 | .0317 | -2.96 | .000 | .0000 | .0000 | .0125 | -.0411 |
| | -0.5 | 00.0 | -.003 | .0151 | .0258 | -0.20 | .000 | .0000 | -.0001 | .0166 | -.0567 |
| | 1.4 | 00.0 | .046 | .0166 | .0194 | 2.75 | .000 | .0001 | -.0001 | .0191 | -.0657 |
| | 3.5 | 00.0 | .095 | .0212 | .0128 | 4.49 | .000 | .0001 | -.0003 | .0241 | -.0845 |
| | 7.5 | 00.0 | .196 | .0428 | .0039 | 4.57 | .000 | .0001 | -.0003 | .0320 | -.1163 |
| | 11.6 | 00.0 | .290 | .0776 | -.0043 | 3.74 | .000 | .0000 | -.0004 | .0396 | -.1478 |
| | 14.4 | 00.0 | .351 | .1084 | -.0081 | 3.24 | -.002 | .0000 | -.0003 | .0448 | -.1684 |
| 3.53 | -10.7 | 00.0 | -.209 | .0544 | .0425 | -3.84 | -.001 | .0000 | .0000 | -.0014 | .0148 |
| | -6.6 | 00.0 | -.123 | .0292 | .0359 | -4.23 | -.001 | .0000 | .0000 | .0054 | -.0129 |
| | -4.6 | 00.0 | -.081 | .0216 | .0320 | -3.73 | .000 | .0000 | -.0001 | .0086 | -.0248 |
| | -2.5 | 00.0 | -.041 | .0176 | .0280 | -2.36 | .000 | .0000 | .0000 | .0121 | -.0381 |
| | -0.5 | 00.0 | .001 | .0162 | .0238 | 0.09 | .001 | .0001 | -.0001 | .0152 | -.0500 |
| | 1.4 | 00.0 | .043 | .0173 | .0195 | 2.49 | .001 | .0002 | -.0003 | .0192 | -.0654 |
| | 3.4 | 00.0 | .085 | .0216 | .0150 | 3.95 | .000 | .0001 | -.0001 | .0228 | -.0787 |
| | 7.5 | 00.0 | .173 | .0400 | .0090 | 4.31 | .001 | .0001 | -.0002 | .0301 | -.1065 |
| | 11.5 | 00.0 | .261 | .0715 | .0037 | 3.64 | .000 | .0000 | -.0004 | .0376 | -.1366 |
| | 14.3 | 00.0 | .317 | .0998 | .0005 | 3.18 | .000 | .0001 | -.0004 | .0427 | -.1595 |

TABLE II.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(e) BVWC, $\delta = 19.4^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 00.0 | -.266 | .0656 | .0840 | -4.05 | -.001 | .0001 | -.0001 | .0124 | -.0314 |
| | -6.6 | 00.0 | -.158 | .0366 | .0707 | -4.32 | -.001 | .0001 | -.0002 | .0202 | -.0659 |
| | -4.6 | 00.0 | -.103 | .0282 | .0628 | -3.66 | .000 | .0001 | -.0004 | .0238 | -.0809 |
| | -2.5 | 00.0 | -.050 | .0238 | .0548 | -2.10 | -.001 | .0001 | -.0003 | .0278 | -.0981 |
| | -0.5 | 00.0 | .004 | .0228 | .0456 | 0.16 | -.001 | .0002 | -.0003 | .0319 | -.1157 |
| | 1.5 | 00.0 | .056 | .0256 | .0354 | 2.19 | -.001 | .0003 | -.0004 | .0361 | -.1341 |
| | 3.5 | 00.0 | .109 | .0313 | .0252 | 3.47 | -.001 | .0003 | -.0005 | .0402 | -.1525 |
| | 7.6 | 00.0 | .225 | .0571 | .0126 | 3.93 | -.001 | .0003 | -.0006 | .0485 | -.1878 |
| | 11.7 | 00.0 | .329 | .0974 | .0010 | 3.38 | -.002 | .0002 | -.0009 | .0569 | -.2253 |
| | 14.4 | 00.0 | .394 | .1323 | -.0051 | 2.98 | -.002 | .0001 | -.0007 | .0629 | -.2559 |
| 3.05 | -10.6 | 00.0 | -.226 | .0591 | .0702 | -3.83 | -.002 | .0000 | .0002 | .0131 | -.0296 |
| | -6.5 | 00.0 | -.132 | .0336 | .0603 | -3.92 | -.001 | .0000 | .0001 | .0194 | -.0576 |
| | -4.5 | 00.0 | -.084 | .0266 | .0545 | -3.14 | -.002 | .0000 | .0001 | .0230 | -.0741 |
| | -2.5 | 00.0 | -.038 | .0229 | .0485 | -1.64 | -.002 | .0000 | .0001 | .0264 | -.0890 |
| | -0.4 | 00.0 | .011 | .0223 | .0418 | 0.47 | -.002 | .0001 | -.0001 | .0301 | -.1057 |
| | 1.5 | 00.0 | .053 | .0248 | .0349 | 2.13 | -.002 | .0001 | .0000 | .0341 | -.1233 |
| | 3.5 | 00.0 | .100 | .0301 | .0281 | 3.33 | -.001 | .0001 | -.0002 | .0382 | -.1409 |
| | 7.6 | 00.0 | .199 | .0526 | .0192 | 3.78 | -.001 | .0001 | -.0004 | .0462 | -.1757 |
| | 11.6 | 00.0 | .288 | .0878 | .0133 | 3.28 | -.001 | .0000 | -.0005 | .0547 | -.2153 |
| | 14.4 | 00.0 | .347 | .1197 | .0093 | 2.90 | -.002 | .0000 | -.0006 | .0608 | -.2461 |
| 3.53 | -10.6 | 00.0 | -.194 | .0542 | .0603 | -3.59 | -.002 | -.0001 | .0001 | .0135 | -.0282 |
| | -6.6 | 00.0 | -.112 | .0323 | .0528 | -3.48 | -.002 | .0001 | -.0001 | .0193 | -.0544 |
| | -4.5 | 00.0 | -.070 | .0254 | .0487 | -2.75 | -.001 | .0001 | -.0002 | .0224 | -.0673 |
| | -2.5 | 00.0 | -.028 | .0228 | .0441 | -1.23 | -.002 | .0001 | .0000 | .0257 | -.0825 |
| | -0.5 | 00.0 | .013 | .0222 | .0394 | 0.60 | .000 | .0002 | -.0002 | .0292 | -.0974 |
| | 1.4 | 00.0 | .052 | .0243 | .0343 | 2.16 | -.001 | .0002 | .0000 | .0330 | -.1140 |
| | 3.4 | 00.0 | .092 | .0290 | .0301 | 3.18 | -.001 | .0002 | -.0001 | .0368 | -.1309 |
| | 7.5 | 00.0 | .179 | .0501 | .0247 | 3.58 | -.001 | .0002 | -.0002 | .0449 | -.1667 |
| | 11.6 | 00.0 | .260 | .0824 | .0216 | 3.16 | -.002 | .0001 | -.0001 | .0531 | -.2065 |
| | 14.3 | 00.0 | .315 | .1111 | .0194 | 2.83 | -.002 | .0002 | -.0004 | .0594 | -.2383 |

TABLE II.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(f) BVW

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 00.0 | -.278 | .0621 | .0691 | -4.48 | -.001 | .0003 | -.0002 | | |
| | - 6.4 | 00.0 | -.176 | .0302 | .0451 | -5.82 | -.000 | .0003 | -.0003 | | |
| | - 4.4 | 00.0 | -.123 | .0199 | .0320 | -6.19 | .000 | .0002 | -.0003 | | |
| | - 2.4 | 00.0 | -.070 | .0138 | .0180 | -5.09 | .001 | .0003 | -.0004 | | |
| | - 0.4 | 00.0 | -.015 | .0109 | .0039 | -1.38 | .001 | .0003 | -.0005 | | |
| | 1.6 | 00.0 | .041 | .0118 | -.0102 | 3.44 | .001 | .0003 | -.0006 | | |
| | 3.6 | 00.0 | .095 | .0166 | -.0243 | 5.68 | .000 | .0004 | -.0004 | | |
| | 7.7 | 00.0 | .202 | .0374 | -.0505 | 5.40 | .000 | .0004 | -.0003 | | |
| | 11.7 | 00.0 | .306 | .0728 | -.0739 | 4.20 | .000 | .0003 | -.0002 | | |
| | 14.5 | 00.0 | .374 | .1052 | -.0873 | 3.55 | -.001 | .0004 | -.0001 | | |
| 3.05 | -10.5 | 00.0 | -.239 | .0552 | .0549 | -4.33 | -.001 | .0001 | .0001 | | |
| | - 6.4 | 00.0 | -.150 | .0277 | .0359 | -5.41 | -.001 | .0001 | -.0001 | | |
| | - 4.4 | 00.0 | -.104 | .0191 | .0252 | -5.44 | .000 | .0002 | -.0001 | | |
| | - 2.4 | 00.0 | -.059 | .0137 | .0144 | -4.30 | .000 | .0001 | -.0001 | | |
| | - 0.4 | 00.0 | -.012 | .0112 | .0031 | -1.04 | .000 | .0002 | -.0002 | | |
| | 1.6 | 00.0 | .034 | .0120 | -.0083 | 2.81 | .000 | .0001 | -.0003 | | |
| | 3.6 | 00.0 | .080 | .0160 | -.0192 | 5.03 | .000 | .0002 | -.0002 | | |
| | 7.7 | 00.0 | .172 | .0334 | -.0400 | 5.13 | .001 | .0002 | -.0003 | | |
| | 11.7 | 00.0 | .264 | .0647 | -.0592 | 4.08 | .000 | .0001 | -.0002 | | |
| | 14.4 | 00.0 | .326 | .0937 | -.0713 | 3.48 | -.001 | .0002 | .0000 | | |
| 3.53 | -10.5 | 00.0 | -.208 | .0507 | .0450 | -4.11 | -.001 | .0002 | -.0001 | | |
| | - 6.4 | 00.0 | -.127 | .0263 | .0289 | -4.84 | .001 | .0001 | -.0002 | | |
| | - 4.4 | 00.0 | -.087 | .0182 | .0203 | -4.79 | .000 | .0002 | -.0002 | | |
| | - 2.4 | 00.0 | -.048 | .0139 | .0117 | -3.41 | .000 | .0002 | -.0002 | | |
| | - 0.4 | 00.0 | -.007 | .0117 | .0024 | -0.63 | .001 | .0002 | -.0003 | | |
| | 1.5 | 00.0 | .032 | .0124 | -.0064 | 2.62 | .000 | .0003 | -.0002 | | |
| | 3.5 | 00.0 | .072 | .0160 | -.0156 | 4.48 | .001 | .0003 | -.0002 | | |
| | 7.6 | 00.0 | .153 | .0315 | -.0324 | 4.86 | .000 | .0004 | -.0001 | | |
| | 11.6 | 00.0 | .235 | .0599 | -.0485 | 3.92 | .001 | .0003 | -.0002 | | |
| | 14.4 | 00.0 | .294 | .0863 | -.0598 | 3.40 | .000 | .0002 | -.0001 | | |

TABLE II.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(g) BWC, $\delta = 0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_\beta}$ | $C_{n_\beta}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 00.0 | -.294 | .0650 | .0331 | -4.52 | -.002 | -.0001 | .0005 | -.0235 | .0908 |
| | -6.6 | 00.0 | -.183 | .0311 | .0217 | -5.89 | -.002 | .0000 | .0005 | -.0148 | .0567 |
| | -4.5 | 00.0 | -.127 | .0200 | .0156 | -6.36 | -.002 | .0000 | .0005 | -.0100 | .0383 |
| | -2.5 | 00.0 | -.070 | .0131 | .0093 | -5.31 | -.001 | .0000 | .0002 | -.0053 | .0199 |
| | -0.5 | 00.0 | -.011 | .0103 | .0013 | -1.03 | -.002 | .0000 | .0003 | -.0005 | .0008 |
| | 1.5 | 00.0 | .046 | .0113 | -.0062 | 4.06 | -.001 | .0001 | .0001 | .0040 | -.0171 |
| | 3.5 | 00.0 | .104 | .0164 | -.0126 | 6.33 | -.002 | .0001 | .0003 | .0091 | -.0367 |
| | 7.6 | 00.0 | .219 | .0389 | -.0251 | 5.62 | -.001 | .0002 | .0002 | .0185 | -.0732 |
| | 11.7 | 00.0 | .328 | .0774 | -.0358 | 4.23 | -.002 | .0002 | .0000 | .0273 | -.1073 |
| | 14.4 | 00.0 | .399 | .1121 | -.0425 | 3.56 | -.003 | .0002 | .0000 | .0327 | -.1289 |
| 3.05 | -10.6 | 00.0 | -.254 | .0601 | .0239 | -4.22 | -.003 | -.0001 | .0005 | -.0207 | .0779 |
| | -6.5 | 00.0 | -.156 | .0301 | .0154 | -5.20 | -.001 | .0000 | .0003 | -.0129 | .0478 |
| | -4.5 | 00.0 | -.107 | .0208 | .0107 | -5.17 | -.001 | -.0001 | .0002 | -.0088 | .0323 |
| | -2.5 | 00.0 | -.058 | .0145 | .0062 | -4.00 | -.001 | .0000 | .0003 | -.0047 | .0165 |
| | -0.4 | 00.0 | -.009 | .0118 | .0010 | -0.77 | -.001 | .0000 | .0002 | -.0006 | .0018 |
| | 1.5 | 00.0 | .040 | .0125 | -.0047 | 3.24 | -.001 | .0000 | .0001 | .0036 | -.0154 |
| | 3.5 | 00.0 | .089 | .0170 | -.0092 | 5.25 | -.001 | .0000 | .0000 | .0077 | -.0300 |
| | 7.6 | 00.0 | .187 | .0364 | -.0178 | 5.15 | -.001 | .0001 | .0001 | .0157 | -.0613 |
| | 11.6 | 00.0 | .282 | .0691 | -.0259 | 4.08 | -.002 | .0001 | .0001 | .0239 | -.0930 |
| | 14.4 | 00.0 | .348 | .1003 | -.0305 | 3.47 | -.003 | .0001 | .0001 | .0290 | -.1134 |
| 3.53 | -10.6 | 00.0 | -.220 | .0543 | .0169 | -4.06 | -.001 | -.0001 | .0003 | -.0186 | .0692 |
| | -6.6 | 00.0 | -.133 | .0282 | .0111 | -4.72 | -.001 | .0000 | .0003 | -.0117 | .0434 |
| | -4.6 | 00.0 | -.089 | .0199 | .0078 | -4.50 | .000 | .0000 | .0001 | -.0081 | .0294 |
| | -2.5 | 00.0 | -.047 | .0145 | .0045 | -3.24 | .000 | .0000 | .0001 | -.0040 | .0140 |
| | -0.5 | 00.0 | -.003 | .0122 | .0009 | -0.27 | -.001 | .0000 | .0002 | -.0003 | .0005 |
| | 1.5 | 00.0 | .039 | .0130 | -.0027 | 2.96 | -.001 | .0001 | .0001 | .0034 | -.0140 |
| | 3.5 | 00.0 | .081 | .0173 | -.0061 | 4.68 | -.001 | .0002 | .0001 | .0071 | -.0275 |
| | 7.5 | 00.0 | .167 | .0341 | -.0121 | 4.89 | .000 | .0002 | .0001 | .0146 | -.0555 |
| | 11.6 | 00.0 | .253 | .0637 | -.0174 | 3.97 | -.001 | .0002 | .0001 | .0219 | -.0841 |
| | 14.3 | 00.0 | .310 | .0913 | -.0214 | 3.40 | -.001 | .0002 | -.0001 | .0266 | -.1035 |

TABLE II.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta = 0^{\circ}$ - Concluded

(h) BW

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 00.0 | -.278 | .0607 | .0672 | -4.58 | -.002 | .0000 | .0003 | | |
| | -6.4 | 00.0 | -.173 | .0290 | .0436 | -5.95 | -.001 | .0000 | .0003 | | |
| | -4.4 | 00.0 | -.120 | .0188 | .0305 | -6.39 | -.001 | .0000 | .0003 | | |
| | -2.4 | 00.0 | -.065 | .0127 | .0167 | -5.13 | -.001 | .0000 | .0003 | | |
| | -0.4 | 00.0 | -.010 | .0095 | .0022 | -1.04 | -.001 | .0000 | .0002 | | |
| | 1.6 | 00.0 | .044 | .0109 | -.0118 | 4.07 | .000 | .0001 | .0002 | | |
| | 3.6 | 00.0 | .099 | .0156 | -.0259 | 6.35 | -.001 | .0001 | .0002 | | |
| | 7.7 | 00.0 | .203 | .0359 | -.0514 | 5.67 | -.001 | .0002 | .0003 | | |
| | 11.7 | 00.0 | .307 | .0714 | -.0751 | 4.31 | -.002 | .0003 | .0004 | | |
| | 14.5 | 00.0 | .374 | .1039 | -.0882 | 3.60 | -.002 | .0002 | .0005 | | |
| 3.05 | -10.5 | 00.0 | -.238 | .0545 | .0541 | -4.37 | -.002 | .0001 | .0002 | | |
| | -6.4 | 00.0 | -.147 | .0266 | .0347 | -5.54 | -.001 | .0000 | .0002 | | |
| | -4.4 | 00.0 | -.100 | .0178 | .0236 | -5.65 | -.002 | .0000 | .0003 | | |
| | -2.4 | 00.0 | -.055 | .0122 | .0132 | -4.55 | -.002 | .0000 | .0002 | | |
| | -0.3 | 00.0 | -.008 | .0100 | .0017 | -0.82 | -.001 | .0000 | .0002 | | |
| | 1.6 | 00.0 | .038 | .0109 | -.0094 | 3.47 | -.001 | .0000 | .0002 | | |
| | 3.6 | 00.0 | .083 | .0149 | -.0206 | 5.61 | -.001 | .0000 | .0001 | | |
| | 7.7 | 00.0 | .174 | .0325 | -.0409 | 5.37 | -.001 | .0001 | .0002 | | |
| | 14.4 | 00.0 | .327 | .0922 | -.0723 | 3.54 | -.002 | .0001 | .0003 | | |
| 3.53 | -10.5 | 00.0 | -.209 | .0516 | .0438 | -4.04 | -.002 | .0000 | .0002 | | |
| | -6.4 | 00.0 | -.129 | .0270 | .0282 | -4.78 | -.002 | .0000 | .0003 | | |
| | -4.4 | 00.0 | -.088 | .0186 | .0196 | -4.73 | -.001 | .0000 | .0002 | | |
| | -2.4 | 00.0 | -.048 | .0135 | .0107 | -3.53 | -.003 | .0000 | .0005 | | |
| | -0.4 | 00.0 | -.008 | .0113 | .0017 | -0.68 | .000 | .0001 | .0001 | | |
| | 1.6 | 00.0 | .033 | .0122 | -.0075 | 2.67 | -.001 | .0001 | .0002 | | |
| | 3.6 | 00.0 | .073 | .0159 | -.0165 | 4.61 | -.001 | .0002 | .0002 | | |
| | 7.6 | 00.0 | .152 | .0310 | -.0331 | 4.90 | -.001 | .0002 | .0003 | | |
| | 11.6 | 00.0 | .233 | .0584 | -.0489 | 4.00 | -.001 | .0002 | .0003 | | |
| | 14.4 | 00.0 | .290 | .0847 | -.0599 | 3.42 | -.001 | .0002 | .0004 | | |

TABLE III.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta \approx 5^{\circ}$

(a) BVWC, $\delta = 0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 4.9 | -.296 | .0684 | .0345 | -4.33 | -.055 | -.0041 | .0143 | -.0230 | .0884 |
| | -6.6 | 4.9 | -.185 | .0338 | .0231 | -5.48 | -.047 | -.0039 | .0115 | -.0144 | .0552 |
| | -4.6 | 4.9 | -.129 | .0229 | .0171 | -5.64 | -.044 | -.0042 | .0102 | -.0098 | .0382 |
| | -2.6 | 4.9 | -.072 | .0158 | .0107 | -4.56 | -.041 | -.0044 | .0091 | -.0049 | .0191 |
| | -0.5 | 4.9 | -.014 | .0130 | .0035 | -1.06 | -.038 | -.0045 | .0078 | -.0002 | .0004 |
| | 1.4 | 4.9 | .039 | .0135 | -.0038 | 2.92 | -.036 | -.0047 | .0068 | .0041 | -.0172 |
| | 3.5 | 4.9 | .097 | .0183 | -.0101 | 5.28 | -.035 | -.0052 | .0061 | .0089 | -.0359 |
| | 7.6 | 4.9 | .214 | .0406 | -.0226 | 5.26 | -.034 | -.0067 | .0047 | .0186 | -.0731 |
| | 11.6 | 5.0 | .323 | .0784 | -.0333 | 4.12 | -.034 | -.0078 | .0032 | .0269 | -.1049 |
| | 13.5 | 5.0 | .371 | .1007 | -.0382 | 3.69 | -.035 | -.0085 | .0026 | .0306 | -.1195 |
| 3.05 | -10.6 | 4.9 | -.256 | .0606 | .0259 | -4.22 | -.051 | -.0034 | .0116 | -.0202 | .0765 |
| | -6.6 | 4.9 | -.159 | .0307 | .0175 | -5.18 | -.045 | -.0037 | .0092 | -.0125 | .0469 |
| | -4.6 | 4.9 | -.112 | .0211 | .0129 | -5.29 | -.042 | -.0040 | .0080 | -.0086 | .0327 |
| | -2.5 | 4.9 | -.061 | .0151 | .0082 | -4.04 | -.039 | -.0040 | .0070 | -.0044 | .0161 |
| | -0.5 | 4.9 | -.012 | .0127 | .0030 | -.98 | -.037 | -.0041 | .0058 | -.0003 | .0004 |
| | 1.4 | 4.9 | .032 | .0128 | -.0024 | 2.48 | -.035 | -.0042 | .0049 | .0036 | -.0147 |
| | 3.5 | 4.9 | .083 | .0168 | -.0067 | 4.91 | -.034 | -.0044 | .0042 | .0080 | -.0311 |
| | 7.5 | 4.9 | .184 | .0364 | -.0157 | 5.06 | -.033 | -.0057 | .0029 | .0162 | -.0621 |
| | 11.6 | 4.9 | .281 | .0692 | -.0239 | 4.05 | -.032 | -.0071 | .0012 | .0239 | -.0920 |
| | 13.4 | 5.0 | .324 | .0890 | -.0275 | 3.64 | -.033 | -.0078 | .0007 | .0271 | -.1056 |
| 3.53 | -10.7 | 5.0 | -.224 | .0555 | .0184 | -4.04 | -.049 | -.0019 | .0099 | -.0184 | .0690 |
| | -6.6 | 5.0 | -.137 | .0292 | .0123 | -4.69 | -.043 | -.0026 | .0076 | -.0116 | .0430 |
| | -4.6 | 5.0 | -.096 | .0208 | .0096 | -4.62 | -.040 | -.0030 | .0067 | -.0078 | .0283 |
| | -2.6 | 5.0 | -.054 | .0155 | .0063 | -3.45 | -.038 | -.0034 | .0058 | -.0039 | .0135 |
| | -0.5 | 5.0 | -.011 | .0127 | .0025 | -0.84 | -.037 | -.0036 | .0050 | -.0003 | .0005 |
| | 1.4 | 5.0 | .031 | .0134 | -.0009 | 2.31 | -.035 | -.0038 | .0041 | .0032 | -.0126 |
| | 3.4 | 5.0 | .075 | .0169 | -.0044 | 4.43 | -.034 | -.0042 | .0035 | .0073 | -.0272 |
| | 7.5 | 5.0 | .163 | .0337 | -.0103 | 4.82 | -.033 | -.0055 | .0023 | .0148 | -.0561 |
| | 11.5 | 5.0 | .249 | .0636 | -.0160 | 3.92 | -.031 | -.0071 | .0006 | .0218 | -.0829 |
| | 13.4 | 5.1 | .293 | .0822 | -.0194 | 3.56 | -.032 | -.0079 | .0000 | .0249 | -.0948 |

TABLE III.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(b) BVWC, $\delta = 10.0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 4.9 | -.282 | .0646 | .0633 | -4.37 | -.056 | -.0053 | .0131 | -.0038 | .0227 |
| | -6.6 | 4.9 | -.171 | .0329 | .0512 | -5.18 | -.047 | -.0054 | .0110 | .0049 | -.0129 |
| | -4.6 | 4.9 | -.116 | .0233 | .0449 | -4.99 | -.043 | -.0055 | .0096 | .0093 | -.0300 |
| | -2.5 | 4.9 | -.061 | .0181 | .0377 | -3.37 | -.041 | -.0057 | .0083 | .0138 | -.0472 |
| | -0.5 | 4.9 | -.007 | .0164 | .0298 | -0.40 | -.037 | -.0058 | .0067 | .0182 | -.0643 |
| | 1.4 | 4.9 | .048 | .0180 | .0216 | 2.65 | -.036 | -.0061 | .0056 | .0223 | -.0800 |
| | 3.5 | 4.9 | .105 | .0237 | .0135 | 4.45 | -.034 | -.0068 | .0047 | .0267 | -.0972 |
| | 7.6 | 4.9 | .224 | .0483 | -.0000 | 4.63 | -.032 | -.0084 | .0044 | .0354 | -.1308 |
| | 11.6 | 5.0 | .331 | .0878 | -.0113 | 3.77 | -.032 | -.0094 | .0032 | .0434 | -.1630 |
| | 13.5 | 5.0 | .379 | .1110 | -.0165 | 3.41 | -.031 | -.0098 | .0029 | .0471 | -.1785 |
| 3.05 | -10.6 | 4.9 | -.240 | .0567 | .0516 | -4.23 | -.054 | -.0045 | .0112 | -.0020 | .0169 |
| | -6.6 | 4.9 | -.144 | .0297 | .0426 | -4.84 | -.046 | -.0048 | .0093 | .0056 | -.0133 |
| | -4.6 | 4.9 | -.096 | .0216 | .0376 | -4.42 | -.042 | -.0050 | .0082 | .0092 | -.0279 |
| | -2.5 | 4.9 | -.048 | .0170 | .0321 | -2.84 | -.040 | -.0051 | .0070 | .0130 | -.0422 |
| | -0.5 | 4.9 | -.002 | .0155 | .0263 | -0.11 | -.036 | -.0051 | .0055 | .0168 | -.0574 |
| | 1.4 | 4.9 | .046 | .0167 | .0201 | 2.73 | -.034 | -.0052 | .0045 | .0206 | -.0718 |
| | 3.5 | 4.9 | .094 | .0218 | .0147 | 4.29 | -.032 | -.0056 | .0035 | .0245 | -.0859 |
| | 7.6 | 4.9 | .196 | .0433 | .0050 | 4.54 | -.030 | -.0069 | .0028 | .0320 | -.1157 |
| | 11.6 | 4.9 | .289 | .0779 | -.0026 | 3.71 | -.030 | -.0082 | .0016 | .0396 | -.1460 |
| | 13.4 | 5.0 | .333 | .0987 | -.0064 | 3.37 | -.030 | -.0090 | .0017 | .0431 | -.1610 |
| 3.53 | -10.6 | 5.0 | -.209 | .0524 | .0423 | -3.99 | -.052 | -.0028 | .0096 | -.0008 | .0141 |
| | -6.6 | 5.0 | -.124 | .0284 | .0359 | -4.35 | -.045 | -.0037 | .0079 | .0059 | -.0136 |
| | -4.6 | 5.0 | -.081 | .0213 | .0321 | -3.81 | -.042 | -.0041 | .0071 | .0091 | -.0261 |
| | -2.5 | 5.0 | -.041 | .0171 | .0283 | -2.38 | -.040 | -.0045 | .0061 | .0122 | -.0379 |
| | -0.5 | 5.0 | .001 | .0156 | .0238 | 0.09 | -.037 | -.0047 | .0051 | .0161 | -.0527 |
| | 1.4 | 5.0 | .042 | .0169 | .0200 | 2.51 | -.035 | -.0049 | .0041 | .0196 | -.0654 |
| | 3.4 | 5.0 | .085 | .0211 | .0160 | 4.01 | -.032 | -.0051 | .0034 | .0232 | -.0794 |
| | 7.5 | 5.0 | .174 | .0401 | .0100 | 4.34 | -.031 | -.0063 | .0024 | .0304 | -.1075 |
| | 11.6 | 5.0 | .258 | .0713 | .0049 | 3.62 | -.030 | -.0079 | .0013 | .0377 | -.1363 |
| | 13.4 | 5.1 | .297 | .0899 | .0026 | 3.31 | -.030 | -.0088 | .0013 | .0412 | -.1510 |

TABLE III.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(c) BVWC, $\delta = 19.4^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 4.9 | -.265 | .0669 | .0837 | -3.96 | -.057 | -.0055 | .0134 | .0133 | -.0351 |
| | -6.6 | 4.9 | -.155 | .0380 | .0704 | -4.09 | -.050 | -.0058 | .0106 | .0209 | -.0686 |
| | -4.5 | 4.9 | -.102 | .0299 | .0635 | -3.42 | -.047 | -.0062 | .0091 | .0248 | -.0857 |
| | -2.5 | 4.9 | -.047 | .0252 | .0556 | -1.86 | -.043 | -.0065 | .0073 | .0287 | -.1021 |
| | -0.5 | 4.9 | .006 | .0248 | .0472 | 0.23 | -.039 | -.0070 | .0060 | .0329 | -.1200 |
| | 1.5 | 4.9 | .057 | .0272 | .0390 | 2.09 | -.036 | -.0074 | .0049 | .0370 | -.1378 |
| | 3.5 | 4.9 | .109 | .0330 | .0300 | 3.31 | -.035 | -.0076 | .0045 | .0409 | -.1539 |
| | 7.6 | 4.9 | .226 | .0587 | .0149 | 3.84 | -.033 | -.0092 | .0035 | .0493 | -.1902 |
| | 11.7 | 5.0 | .331 | .0993 | .0030 | 3.33 | -.034 | -.0101 | .0037 | .0575 | -.2275 |
| | 13.5 | 5.0 | .376 | .1222 | -.0020 | 3.08 | -.033 | -.0106 | .0034 | .0612 | -.2457 |
| 3.05 | -10.6 | 4.9 | -.224 | .0598 | .0694 | -3.74 | -.056 | -.0047 | .0113 | .0135 | -.0317 |
| | -6.5 | 4.9 | -.129 | .0343 | .0595 | -3.75 | -.048 | -.0050 | .0093 | .0203 | -.0617 |
| | -4.5 | 4.9 | -.082 | .0268 | .0540 | -3.06 | -.046 | -.0055 | .0083 | .0238 | -.0767 |
| | -2.5 | 4.9 | -.035 | .0236 | .0485 | -1.47 | -.042 | -.0056 | .0066 | .0272 | -.0916 |
| | -0.4 | 4.9 | .012 | .0234 | .0426 | 0.51 | -.039 | -.0058 | .0051 | .0308 | -.1082 |
| | 1.5 | 4.9 | .056 | .0250 | .0365 | 2.22 | -.036 | -.0061 | .0041 | .0344 | -.1238 |
| | 3.5 | 4.9 | .100 | .0309 | .0304 | 3.22 | -.034 | -.0063 | .0035 | .0383 | -.1390 |
| | 7.6 | 4.9 | .199 | .0540 | .0203 | 3.69 | -.031 | -.0076 | .0021 | .0465 | -.1746 |
| | 11.6 | 4.9 | .290 | .0896 | .0136 | 3.24 | -.031 | -.0092 | .0023 | .0544 | -.2119 |
| | 13.5 | 5.0 | .329 | .1102 | .0104 | 2.99 | -.032 | -.0100 | .0026 | .0581 | -.2293 |
| 3.53 | -10.6 | 5.0 | -.193 | .0549 | .0584 | -3.51 | -.054 | -.0032 | .0097 | .0136 | -.0315 |
| | -6.6 | 5.0 | -.109 | .0322 | .0512 | -3.39 | -.047 | -.0041 | .0079 | .0197 | -.0571 |
| | -4.6 | 5.0 | -.068 | .0262 | .0475 | -2.57 | -.047 | -.0045 | .0077 | .0230 | -.0714 |
| | -2.5 | 5.0 | -.026 | .0230 | .0435 | -1.13 | -.043 | -.0048 | .0063 | .0264 | -.0858 |
| | -0.5 | 5.0 | .016 | .0228 | .0394 | 0.68 | -.039 | -.0051 | .0051 | .0297 | -.1000 |
| | 1.4 | 5.0 | .052 | .0249 | .0358 | 2.10 | -.037 | -.0054 | .0041 | .0335 | -.1160 |
| | 3.4 | 5.0 | .091 | .0294 | .0318 | 3.09 | -.035 | -.0056 | .0035 | .0371 | -.1306 |
| | 7.5 | 5.0 | .177 | .0502 | .0260 | 3.53 | -.031 | -.0069 | .0023 | .0449 | -.1646 |
| | 11.5 | 5.0 | .259 | .0828 | .0227 | 3.13 | -.031 | -.0088 | .0024 | .0527 | -.2001 |
| | 13.4 | 5.1 | .295 | .1010 | .0208 | 2.92 | -.030 | -.0099 | .0022 | .0567 | -.2195 |

TABLE III.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(d) BVW

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 4.9 | -.277 | .0632 | .0692 | -4.39 | -.056 | -.0054 | .0125 | | |
| | - 6.5 | 4.9 | -.174 | .0315 | .0450 | -5.52 | -.046 | -.0050 | .0106 | | |
| | - 4.4 | 4.9 | -.122 | .0216 | .0320 | -5.65 | -.043 | -.0049 | .0097 | | |
| | - 2.4 | 4.9 | -.068 | .0149 | .0182 | -4.53 | -.039 | -.0047 | .0087 | | |
| | - 0.4 | 4.9 | -.012 | .0125 | .0039 | -1.00 | -.037 | -.0044 | .0077 | | |
| | 1.6 | 4.9 | .041 | .0132 | -.0099 | 3.10 | -.034 | -.0042 | .0068 | | |
| | 3.6 | 4.9 | .094 | .0177 | -.0237 | 5.30 | -.034 | -.0042 | .0061 | | |
| | 7.6 | 4.9 | .201 | .0384 | -.0501 | 5.24 | -.035 | -.0050 | .0042 | | |
| | 11.7 | 5.0 | .305 | .0740 | -.0729 | 4.13 | -.037 | -.0064 | .0015 | | |
| | 13.5 | 5.0 | .349 | .0940 | -.0817 | 3.71 | -.039 | -.0073 | .0001 | | |
| 3.05 | -10.4 | 4.9 | -.238 | .0557 | .0551 | -4.28 | -.055 | -.0045 | .0105 | | |
| | - 6.4 | 4.9 | -.147 | .0283 | .0357 | -5.19 | -.045 | -.0046 | .0088 | | |
| | - 4.4 | 4.9 | -.102 | .0198 | .0253 | -5.17 | -.041 | -.0045 | .0078 | | |
| | - 2.4 | 4.9 | -.055 | .0141 | .0143 | -3.92 | -.037 | -.0043 | .0066 | | |
| | - 0.3 | 4.8 | -.009 | .0122 | .0033 | -0.77 | -.035 | -.0040 | .0056 | | |
| | 1.6 | 4.9 | .035 | .0127 | -.0075 | 2.76 | -.033 | -.0039 | .0047 | | |
| | 3.6 | 4.9 | .081 | .0167 | -.0181 | 4.85 | -.032 | -.0039 | .0038 | | |
| | 7.6 | 4.9 | .173 | .0345 | -.0391 | 5.03 | -.033 | -.0049 | .0020 | | |
| | 11.7 | 4.9 | .265 | .0662 | -.0576 | 4.00 | -.035 | -.0065 | -.0004 | | |
| | 13.5 | 4.9 | .304 | .0834 | -.0649 | 3.64 | -.038 | -.0074 | -.0009 | | |
| 3.53 | -10.5 | 5.0 | -.207 | .0507 | .0439 | -4.07 | -.054 | -.0028 | .0092 | | |
| | - 6.4 | 4.9 | -.126 | .0264 | .0264 | -4.77 | -.044 | -.0034 | .0073 | | |
| | - 4.4 | 4.9 | -.086 | .0191 | .0201 | -4.49 | -.040 | -.0036 | .0065 | | |
| | - 2.4 | 4.9 | -.047 | .0145 | .0116 | -3.25 | -.037 | -.0036 | .0056 | | |
| | - 0.4 | 4.9 | -.006 | .0123 | .0029 | -0.52 | -.034 | -.0035 | .0044 | | |
| | 1.5 | 4.9 | .031 | .0130 | -.0057 | 2.42 | -.033 | -.0035 | .0035 | | |
| | 3.6 | 4.9 | .070 | .0165 | -.0141 | 4.22 | -.033 | -.0037 | .0029 | | |
| | 7.6 | 5.0 | .152 | .0322 | -.0308 | 4.71 | -.033 | -.0049 | .0012 | | |
| | 11.6 | 5.0 | .234 | .0600 | -.0460 | 3.89 | -.036 | -.0068 | -.0005 | | |
| | 13.4 | 5.0 | .269 | .0760 | -.0526 | 3.54 | -.038 | -.0078 | -.0006 | | |

TABLE III.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(e) BWC, $\delta = 0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.7 | 4.9 | -.293 | .0656 | .0318 | -4.47 | -.022 | .0062 | -.0045 | -.0234 | .0897 |
| | -6.6 | 4.9 | -.180 | .0312 | .0204 | -5.77 | -.018 | .0039 | -.0056 | -.0144 | .0554 |
| | -4.6 | 4.9 | -.125 | .0206 | .0142 | -6.08 | -.016 | .0025 | -.0059 | -.0098 | .0369 |
| | -2.5 | 4.9 | -.067 | .0135 | .0083 | -4.96 | -.016 | .0014 | -.0063 | -.0049 | .0180 |
| | -0.5 | 4.9 | -.010 | .0109 | .0013 | -0.96 | -.015 | .0003 | -.0064 | -.0002 | .0004 |
| | 1.5 | 4.9 | .044 | .0118 | -.0058 | 3.72 | -.015 | -.0007 | -.0063 | .0041 | -.0168 |
| | 3.5 | 4.9 | .103 | .0169 | -.0121 | 6.09 | -.015 | -.0020 | -.0062 | .0091 | -.0367 |
| | 7.6 | 4.9 | .217 | .0394 | -.0240 | 5.50 | -.018 | -.0045 | -.0054 | .0188 | -.0743 |
| | 11.7 | 5.0 | .328 | .0786 | -.0348 | 4.17 | -.022 | -.0066 | -.0044 | .0274 | -.1071 |
| | 13.6 | 5.0 | .376 | .1013 | -.0395 | 3.71 | -.024 | -.0074 | -.0039 | .0310 | -.1222 |
| 3.05 | -10.6 | 4.9 | -.250 | .0572 | .0231 | -4.36 | -.022 | .0054 | -.0046 | -.0203 | .0765 |
| | -6.5 | 4.9 | -.152 | .0277 | .0148 | -5.47 | -.019 | .0031 | -.0057 | -.0125 | .0470 |
| | -4.5 | 4.9 | -.102 | .0182 | .0107 | -5.64 | -.018 | .0020 | -.0060 | -.0085 | .0310 |
| | -2.5 | 4.8 | -.054 | .0129 | .0058 | -4.15 | -.016 | .0011 | -.0066 | -.0044 | .0153 |
| | -0.4 | 4.8 | -.006 | .0106 | .0012 | -0.54 | -.016 | .0002 | -.0066 | -.0002 | -.0004 |
| | 1.5 | 4.8 | .041 | .0114 | -.0037 | 3.59 | -.016 | -.0007 | -.0065 | .0037 | -.0155 |
| | 3.5 | 4.9 | .090 | .0159 | -.0081 | 5.66 | -.016 | -.0016 | -.0063 | .0080 | -.0312 |
| | 7.6 | 4.9 | .186 | .0353 | -.0167 | 5.28 | -.019 | -.0038 | -.0055 | .0162 | -.0622 |
| | 11.7 | 4.9 | .284 | .0689 | -.0244 | 4.12 | -.023 | -.0060 | -.0047 | .0239 | -.0913 |
| | 13.5 | 4.9 | .328 | .0895 | -.0278 | 3.66 | -.025 | -.0069 | -.0042 | .0272 | -.1055 |
| 3.53 | -10.6 | 5.0 | -.217 | .0531 | .0156 | -4.10 | -.025 | .0056 | -.0043 | -.0182 | .0677 |
| | -6.5 | 4.9 | -.132 | .0269 | .0102 | -4.90 | -.021 | .0032 | -.0053 | -.0114 | .0414 |
| | -4.5 | 4.9 | -.089 | .0184 | .0075 | -4.86 | -.020 | .0021 | -.0057 | -.0077 | .0281 |
| | -2.5 | 4.9 | -.047 | .0131 | .0043 | -3.56 | -.019 | .0011 | -.0061 | -.0040 | .0146 |
| | -0.5 | 4.9 | -.005 | .0115 | .0011 | -0.42 | -.019 | .0002 | -.0061 | -.0003 | .0005 |
| | 1.4 | 4.9 | .037 | .0120 | -.0023 | 3.10 | -.018 | -.0006 | -.0061 | .0035 | -.0135 |
| | 3.5 | 4.9 | .080 | .0158 | -.0052 | 5.04 | -.019 | -.0016 | -.0059 | .0075 | -.0282 |
| | 7.5 | 5.0 | .168 | .0338 | -.0107 | 4.96 | -.020 | -.0038 | -.0051 | .0150 | -.0567 |
| | 11.6 | 5.0 | .252 | .0632 | -.0162 | 3.99 | -.025 | -.0062 | -.0043 | .0219 | -.0818 |
| | 13.4 | 5.0 | .292 | .0815 | -.0190 | 3.58 | -.026 | -.0072 | -.0040 | .0251 | -.0948 |

TABLE III.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(f) BWC, $\delta = 10.0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 4.9 | -.278 | .0600 | .0599 | -4.64 | -.023 | .0051 | -.0060 | -.0042 | .0241 |
| | - 6.4 | 4.9 | -.167 | .0293 | .0486 | -5.71 | -.019 | .0026 | -.0062 | .0047 | -.0126 |
| | - 4.4 | 4.9 | -.111 | .0202 | .0422 | -5.52 | -.017 | .0013 | -.0065 | .0090 | -.0294 |
| | - 2.4 | 4.9 | -.056 | .0149 | .0352 | -3.78 | -.016 | .0000 | -.0069 | .0135 | -.0467 |
| | - 0.3 | 4.9 | -.003 | .0138 | .0277 | -0.19 | -.015 | -.0011 | -.0070 | .0179 | -.0632 |
| | 3.6 | 4.9 | .109 | .0219 | .0120 | 4.99 | -.016 | -.0036 | -.0066 | .0265 | -.0957 |
| | 7.7 | 4.9 | .226 | .0473 | -.0011 | 4.78 | -.017 | -.0062 | -.0059 | .0351 | -.1300 |
| | 11.8 | 5.0 | .334 | .0879 | -.0124 | 3.80 | -.021 | -.0080 | -.0041 | .0431 | -.1619 |
| | 13.7 | 5.0 | .381 | .1111 | -.0175 | 3.42 | -.023 | -.0087 | -.0032 | .0466 | -.1765 |
| 3.06 | -10.5 | 4.9 | -.236 | .0535 | .0486 | -4.42 | -.024 | .0047 | -.0059 | -.0023 | .0176 |
| | - 6.4 | 4.9 | -.140 | .0271 | .0398 | -5.18 | -.020 | .0023 | -.0063 | .0054 | -.0131 |
| | - 4.4 | 4.9 | -.093 | .0193 | .0351 | -4.83 | -.019 | .0012 | -.0066 | .0090 | -.0270 |
| | - 2.3 | 4.9 | -.045 | .0150 | .0299 | -2.97 | -.019 | .0002 | -.0068 | .0128 | -.0415 |
| | - 0.3 | 4.9 | .002 | .0142 | .0243 | 0.15 | -.017 | -.0008 | -.0071 | .0161 | -.0542 |
| | 1.6 | 4.9 | .049 | .0155 | .0186 | 3.14 | -.016 | -.0017 | -.0067 | .0202 | -.0702 |
| | 3.7 | 4.9 | .097 | .0211 | .0131 | 4.59 | -.017 | -.0027 | -.0065 | .0239 | -.0838 |
| | 7.7 | 4.9 | .198 | .0430 | .0041 | 4.60 | -.019 | -.0050 | -.0057 | .0318 | -.1144 |
| | 11.8 | 4.9 | .290 | .0779 | -.0036 | 3.72 | -.022 | -.0070 | -.0041 | .0393 | -.1448 |
| | 13.6 | 5.0 | .333 | .0989 | -.0068 | 3.36 | -.025 | -.0080 | -.0032 | .0429 | -.1606 |
| 3.53 | -10.5 | 5.0 | -.208 | .0504 | .0394 | -4.13 | -.027 | .0051 | -.0053 | -.0014 | .0148 |
| | - 6.4 | 5.0 | -.120 | .0265 | .0329 | -4.54 | -.023 | .0025 | -.0058 | .0055 | -.0118 |
| | - 4.4 | 5.0 | -.079 | .0202 | .0297 | -3.91 | -.021 | .0014 | -.0061 | .0089 | -.0257 |
| | - 2.4 | 5.0 | -.036 | .0157 | .0259 | -2.28 | -.020 | .0003 | -.0064 | .0123 | -.0390 |
| | - 0.4 | 5.0 | .004 | .0147 | .0221 | 0.27 | -.020 | -.0006 | -.0064 | .0157 | -.0514 |
| | 1.6 | 5.0 | .045 | .0164 | .0182 | 2.75 | -.019 | -.0015 | -.0061 | .0192 | -.0639 |
| | 3.6 | 5.0 | .086 | .0210 | .0147 | 4.08 | -.018 | -.0024 | -.0059 | .0227 | -.0774 |
| | 7.6 | 5.0 | .173 | .0402 | .0092 | 4.31 | -.020 | -.0046 | -.0050 | .0301 | -.1059 |
| | 11.7 | 5.0 | .258 | .0722 | .0042 | 3.58 | -.024 | -.0070 | -.0034 | .0375 | -.1354 |
| | 13.5 | 5.1 | .296 | .0909 | .0024 | 3.26 | -.025 | -.0081 | -.0026 | .0408 | -.1480 |

TABLE III.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(g) BWC, $\delta = 19.9^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 4.9 | -.262 | .0633 | .0813 | -4.14 | -.023 | .0050 | -.0059 | .0137 | -.0365 |
| | -6.4 | 4.9 | -.151 | .0350 | .0681 | -4.32 | -.020 | .0020 | -.0067 | .0215 | -.0711 |
| | -4.4 | 4.9 | -.098 | .0268 | .0616 | -3.66 | -.018 | .0004 | -.0073 | .0252 | -.0870 |
| | -2.4 | 4.9 | -.043 | .0230 | .0540 | -1.85 | -.017 | -.0010 | -.0077 | .0292 | -.1043 |
| | -0.3 | 4.9 | .009 | .0224 | .0461 | 0.40 | -.016 | -.0025 | -.0077 | .0333 | -.1222 |
| | 1.7 | 4.9 | .060 | .0255 | .0378 | 2.36 | -.016 | -.0038 | -.0073 | .0373 | -.1394 |
| | 3.7 | 4.9 | .112 | .0319 | .0291 | 3.53 | -.017 | -.0048 | -.0064 | .0414 | -.1573 |
| | 7.7 | 4.9 | .228 | .0583 | .0143 | 3.90 | -.016 | -.0073 | -.0065 | .0496 | -.1920 |
| | 11.8 | 4.9 | .332 | .0995 | .0024 | 3.34 | -.021 | -.0089 | -.0043 | .0579 | -.2302 |
| | 13.7 | 5.0 | .376 | .1226 | -.0026 | 3.07 | -.022 | -.0098 | -.0029 | .0614 | -.2475 |
| 3.05 | -6.4 | 4.9 | -.127 | .0322 | .0573 | -3.94 | -.022 | .0021 | -.0063 | .0205 | -.0622 |
| | -4.3 | 4.8 | -.079 | .0253 | .0521 | -3.11 | -.021 | .0008 | -.0069 | .0238 | -.0776 |
| | -2.3 | 4.8 | -.031 | .0218 | .0469 | -1.44 | -.020 | -.0004 | -.0071 | .0273 | -.0927 |
| | -0.3 | 4.8 | .014 | .0218 | .0414 | 0.62 | -.019 | -.0015 | -.0072 | .0310 | -.1094 |
| | 1.7 | 4.8 | .058 | .0246 | .0356 | 2.33 | -.018 | -.0027 | -.0069 | .0346 | -.1251 |
| | 3.7 | 4.9 | .101 | .0298 | .0297 | 3.39 | -.018 | -.0036 | -.0063 | .0387 | -.1419 |
| | 7.7 | 4.9 | .200 | .0533 | .0202 | 3.74 | -.019 | -.0060 | -.0059 | .0467 | -.1761 |
| | 11.8 | 4.9 | .290 | .0895 | .0131 | 3.24 | -.023 | -.0082 | -.0035 | .0547 | -.2122 |
| | 13.6 | 4.9 | .329 | .1101 | .0103 | 2.99 | -.024 | -.0093 | -.0023 | .0585 | -.2313 |
| 3.53 | -10.5 | 5.0 | -.190 | .0538 | .0559 | -3.53 | -.027 | .0047 | -.0051 | .0138 | -.0329 |
| | -6.4 | 4.9 | -.107 | .0322 | .0487 | -3.32 | -.024 | .0022 | -.0056 | .0199 | -.0596 |
| | -4.4 | 4.9 | -.066 | .0264 | .0456 | -2.51 | -.021 | .0009 | -.0061 | .0230 | -.0725 |
| | -2.4 | 4.9 | -.024 | .0231 | .0420 | -1.03 | -.021 | -.0001 | -.0064 | .0264 | -.0864 |
| | -0.3 | 4.9 | .017 | .0231 | .0383 | 0.74 | -.020 | -.0011 | -.0064 | .0302 | -.1029 |
| | 1.6 | 4.9 | .054 | .0253 | .0348 | 2.13 | -.019 | -.0022 | -.0063 | .0335 | -.1167 |
| | 3.6 | 4.9 | .092 | .0303 | .0313 | 3.04 | -.020 | -.0032 | -.0057 | .0373 | -.1325 |
| | 7.6 | 5.0 | .177 | .0512 | .0258 | 3.47 | -.021 | -.0054 | -.0045 | .0453 | -.1667 |
| | 13.5 | 5.0 | .293 | .1026 | .0207 | 2.86 | -.025 | -.0093 | -.0015 | .0569 | -.2208 |

TABLE III.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Concluded

(h) BW

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 4.9 | -.274 | .0613 | .0664 | -4.47 | -.024 | .0048 | -.0066 | | |
| | -6.5 | 4.9 | -.170 | .0297 | .0425 | -5.73 | -.018 | .0026 | -.0064 | | |
| | -4.4 | 4.9 | -.117 | .0198 | .0290 | -5.91 | -.017 | .0016 | -.0063 | | |
| | -2.4 | 4.9 | -.063 | .0133 | .0157 | -4.71 | -.015 | .0009 | -.0065 | | |
| | -0.4 | 4.9 | -.009 | .0108 | .0014 | -0.79 | -.015 | .0002 | -.0065 | | |
| | 1.6 | 4.9 | .044 | .0116 | -.0122 | 3.82 | -.014 | -.0004 | -.0064 | | |
| | 3.6 | 4.9 | .099 | .0166 | -.0257 | 5.94 | -.015 | -.0011 | -.0064 | | |
| | 7.7 | 4.9 | .205 | .0372 | -.0514 | 5.51 | -.020 | -.0031 | -.0062 | | |
| | 11.7 | 4.9 | .306 | .0722 | -.0740 | 4.24 | -.026 | -.0052 | -.0066 | | |
| | 13.6 | 4.9 | .350 | .0928 | -.0825 | 3.77 | -.030 | -.0063 | -.0065 | | |
| 3.05 | -10.4 | 4.9 | -.236 | .0544 | .0522 | -4.34 | -.027 | .0046 | -.0064 | | |
| | -4.4 | 4.9 | -.098 | .0183 | .0227 | -5.37 | -.018 | .0015 | -.0065 | | |
| | -2.3 | 4.9 | -.052 | .0128 | .0121 | -4.09 | -.017 | .0007 | -.0065 | | |
| | -0.4 | 4.9 | -.007 | .0106 | .0012 | -0.62 | -.016 | .0001 | -.0066 | | |
| | 1.6 | 4.9 | .039 | .0115 | -.0097 | 3.37 | -.016 | -.0004 | -.0065 | | |
| | 3.6 | 4.9 | .083 | .0154 | -.0199 | 5.43 | -.017 | -.0011 | -.0064 | | |
| | 7.7 | 4.9 | .176 | .0332 | -.0405 | 5.29 | -.021 | -.0030 | -.0064 | | |
| | 11.7 | 4.9 | .265 | .0642 | -.0583 | 4.13 | -.029 | -.0053 | -.0063 | | |
| | 13.5 | 5.0 | .303 | .0818 | -.0657 | 3.70 | -.033 | -.0064 | -.0060 | | |
| 3.53 | -10.5 | 5.0 | -.205 | .0501 | .0411 | -4.10 | -.029 | .0051 | -.0057 | | |
| | -6.4 | 5.0 | -.126 | .0259 | .0262 | -4.87 | -.023 | .0027 | -.0060 | | |
| | -4.4 | 5.0 | -.086 | .0180 | .0179 | -4.79 | -.021 | .0017 | -.0062 | | |
| | -2.4 | 5.0 | -.045 | .0134 | .0097 | -3.38 | -.019 | .0009 | -.0063 | | |
| | -0.4 | 5.0 | -.006 | .0116 | .0011 | -0.48 | -.018 | .0001 | -.0063 | | |
| | 1.6 | 5.0 | .033 | .0121 | -.0075 | 2.77 | -.019 | -.0005 | -.0061 | | |
| | 3.6 | 5.0 | .073 | .0156 | -.0155 | 4.68 | -.020 | -.0013 | -.0062 | | |
| | 7.6 | 5.0 | .151 | .0308 | -.0319 | 4.91 | -.024 | -.0033 | -.0059 | | |
| | 11.7 | 5.0 | .231 | .0583 | -.0463 | 3.96 | -.031 | -.0058 | -.0053 | | |
| | 13.4 | 5.0 | .266 | .0739 | -.0525 | 3.59 | -.034 | -.0069 | -.0050 | | |

TABLE IV.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATION AT VARIABLE $\beta$

(a) BVWC, $\alpha \approx 0^{\circ}$, $\delta = 0^{\circ}$

| M | $\alpha$, deg | $\beta$, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -0.5 | -2.0 | -.015 | .0124 | .0027 | -1.23 | .013 | .0020 | -.0034 | -.0004 | .0009 |
| | -0.5 | 0.0 | -.014 | .0122 | .0025 | -1.15 | -.002 | .0002 | -.0002 | -.0004 | .0009 |
| | -0.5 | 1.9 | -.014 | .0125 | .0029 | -1.12 | -.016 | -.0018 | .0033 | -.0004 | .0009 |
| | -0.5 | 3.9 | -.015 | .0128 | .0031 | -1.14 | -.031 | -.0037 | .0065 | -.0003 | .0002 |
| | -0.5 | 6.9 | -.015 | .0134 | .0040 | -1.14 | -.055 | -.0061 | .0105 | -.0004 | .0009 |
| 3.05 | -0.5 | -2.0 | -.012 | .0119 | .0021 | -0.98 | .013 | .0017 | -.0025 | -.0003 | .0012 |
| | -0.5 | 0.0 | -.011 | .0115 | .0021 | -0.95 | -.001 | .0000 | .0000 | -.0003 | .0012 |
| | -0.5 | 1.9 | -.011 | .0120 | .0021 | -0.92 | -.015 | -.0017 | .0024 | -.0003 | .0012 |
| | -0.5 | 3.9 | -.012 | .0123 | .0028 | -0.95 | -.029 | -.0033 | .0046 | -.0003 | .0004 |
| | -0.5 | 6.9 | -.012 | .0128 | .0034 | -0.91 | -.052 | -.0055 | .0081 | -.0003 | .0004 |
| | -0.5 | 9.8 | -.013 | .0132 | .0043 | -0.99 | -.081 | -.0075 | .0112 | -.0003 | .0004 |
| 3.53 | -0.6 | -2.0 | -.011 | .0122 | .0021 | -0.94 | .012 | .0016 | -.0020 | -.0005 | .0021 |
| | -0.6 | 0.0 | -.010 | .0118 | .0018 | -0.83 | -.001 | .0001 | .0000 | -.0003 | .0014 |
| | -0.6 | 2.0 | -.011 | .0122 | .0022 | -0.87 | -.014 | -.0014 | .0020 | -.0003 | .0014 |
| | -0.6 | 3.9 | -.011 | .0126 | .0025 | -0.90 | -.028 | -.0029 | .0040 | -.0003 | .0014 |
| | -0.5 | 7.0 | -.011 | .0128 | .0032 | -0.89 | -.053 | -.0049 | .0066 | -.0001 | -.0002 |
| | -0.5 | 9.9 | -.011 | .0131 | .0036 | -0.86 | -.080 | -.0066 | .0082 | -.0001 | -.0002 |

TABLE IV.- AERODYNAMIC CHARACTERISTICS OF WING-ON CONFIGURATION AT VARIABLE $\beta$ - Concluded

(b) BVWC, $\alpha \approx 10^{\circ}$, $\delta = 0^{\circ}$

| M | $\alpha$, deg | $\beta$, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | 9.6 | - 2.0 | .267 | .0564 | -.0291 | 4.74 | .010 | .0033 | -.0021 | .0227 | -.0878 |
| | 9.6 | 0.0 | .269 | .0566 | -.0292 | 4.75 | -.002 | .0003 | -.0002 | .0229 | -.0884 |
| | 9.6 | 1.9 | .268 | .0567 | -.0289 | 4.73 | -.015 | -.0029 | .0018 | .0229 | -.0891 |
| | 9.6 | 3.9 | .269 | .0574 | -.0285 | 4.69 | -.029 | -.0059 | .0036 | .0229 | -.0892 |
| | 9.6 | 6.9 | .268 | .0579 | -.0270 | 4.63 | -.049 | -.0099 | .0049 | .0231 | -.0905 |
| | 9.5 | 10.0 | .265 | .0580 | -.0242 | 4.58 | -.076 | -.0137 | .0077 | .0232 | -.0920 |
| 3.05 | 9.6 | - 2.1 | .235 | .0507 | -.0209 | 4.63 | .010 | .0027 | -.0011 | .0200 | -.0759 |
| | 9.6 | 0.0 | .235 | .0506 | -.0212 | 4.66 | -.002 | .0001 | -.0001 | .0201 | -.0765 |
| | 9.6 | 1.9 | .235 | .0508 | -.0209 | 4.62 | -.014 | -.0026 | .0010 | .0200 | -.0767 |
| | 9.6 | 3.9 | .234 | .0510 | -.0203 | 4.58 | -.026 | -.0051 | .0018 | .0200 | -.0767 |
| | 9.6 | 6.9 | .234 | .0513 | -.0192 | 4.57 | -.046 | -.0089 | .0028 | .0203 | -.0782 |
| | 9.5 | 9.9 | .233 | .0517 | -.0176 | 4.51 | -.074 | -.0127 | .0048 | .0203 | -.0782 |
| 3.53 | 9.5 | - 1.9 | .206 | .0460 | -.0143 | 4.47 | .011 | .0027 | -.0010 | .0179 | -.0673 |
| | 9.5 | 0.0 | .207 | .0460 | -.0143 | 4.50 | -.001 | .0002 | -.0001 | .0181 | -.0680 |
| | 9.5 | 2.0 | .206 | .0464 | -.0139 | 4.45 | -.012 | -.0024 | .0007 | .0181 | -.0680 |
| | 9.5 | 4.0 | .207 | .0467 | -.0134 | 4.44 | -.025 | -.0051 | .0013 | .0181 | -.0680 |
| | 9.5 | 7.0 | .205 | .0469 | -.0125 | 4.36 | -.046 | -.0088 | .0014 | .0182 | -.0690 |
| | 9.5 | 10.0 | .202 | .0465 | -.0123 | 4.35 | -.073 | -.0122 | .0022 | .0180 | -.0682 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$

(a) BVC, $\delta = 0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 00.0 | -.065 | .0201 | -.0519 | -3.23 | -.001 | .0000 | .0003 | -.0230 | .0883 |
| | -6.5 | 00.0 | -.036 | .0111 | -.0333 | -3.26 | -.001 | .0001 | .0001 | -.0145 | .0561 |
| | -4.5 | 00.0 | -.026 | .0085 | -.0222 | -3.05 | -.001 | .0001 | .0000 | -.0099 | .0383 |
| | -2.4 | 00.0 | -.015 | .0066 | -.0111 | -2.32 | -.001 | .0001 | -.0001 | -.0050 | .0202 |
| | -0.4 | 00.0 | -.005 | .0061 | -.0001 | -0.86 | -.001 | .0001 | -.0002 | -.0004 | .0017 |
| | 1.5 | 00.0 | .003 | .0061 | .0106 | 0.54 | .000 | .0001 | -.0003 | .0041 | -.0169 |
| | 3.5 | 00.0 | .013 | .0069 | .0217 | 1.89 | -.001 | .0001 | -.0003 | .0089 | -.0353 |
| | 7.6 | 00.0 | .037 | .0116 | .0430 | 3.22 | -.001 | .0001 | -.0003 | .0183 | -.0712 |
| | 11.6 | 00.0 | .069 | .0218 | .0607 | 3.18 | -.002 | .0000 | -.0002 | .0268 | -.1033 |
| | 14.3 | 00.0 | .097 | .0325 | .0725 | 2.98 | -.002 | .0000 | -.0003 | .0321 | -.1250 |
| 3.05 | -10.5 | 00.0 | -.064 | .0202 | -.0465 | -3.16 | -.001 | .0000 | .0003 | -.0204 | .0774 |
| | -6.4 | 00.0 | -.036 | .0112 | -.0298 | -3.21 | -.002 | .0000 | .0002 | -.0126 | .0478 |
| | -4.4 | 00.0 | -.024 | .0086 | -.0201 | -2.83 | -.001 | .0000 | .0002 | -.0086 | .0327 |
| | -2.4 | 00.0 | -.015 | .0069 | -.0100 | -2.23 | -.001 | .0000 | .0001 | -.0044 | .0161 |
| | -0.4 | 00.0 | -.006 | .0061 | -.0001 | -0.97 | -.001 | .0000 | .0000 | -.0003 | .0012 |
| | 1.5 | 00.0 | .004 | .0061 | .0101 | 0.60 | -.001 | .0000 | -.0001 | .0038 | -.0145 |
| | 3.5 | 00.0 | .013 | .0070 | .0201 | 1.87 | -.001 | .0001 | -.0001 | .0080 | -.0304 |
| | 7.6 | 00.0 | .037 | .0111 | .0376 | 3.30 | -.002 | .0000 | -.0001 | .0155 | -.0590 |
| | 11.6 | 00.0 | .071 | .0215 | .0550 | 3.28 | -.002 | .0000 | -.0001 | .0239 | -.0914 |
| | 14.3 | 00.0 | .099 | .0328 | .0651 | 3.02 | -.002 | -.0001 | -.0001 | .0286 | -.1097 |
| 3.53 | -10.5 | 00.0 | -.062 | .0213 | -.0427 | -2.90 | -.001 | .0001 | .0000 | -.0185 | .0694 |
| | -6.5 | 00.0 | -.034 | .0123 | -.0270 | -2.77 | -.001 | .0001 | .0001 | -.0115 | .0425 |
| | -4.4 | 00.0 | -.023 | .0098 | -.0184 | -2.37 | .000 | .0001 | .0000 | -.0078 | .0291 |
| | -2.4 | 00.0 | -.012 | .0079 | -.0094 | -1.55 | -.001 | .0000 | .0000 | -.0040 | .0146 |
| | -0.4 | 00.0 | -.004 | .0070 | .0000 | -0.60 | .000 | .0001 | -.0001 | -.0003 | .0005 |
| | 1.5 | 00.0 | .006 | .0074 | .0093 | 0.79 | -.001 | .0001 | -.0001 | .0033 | -.0128 |
| | 3.5 | 00.0 | .015 | .0081 | .0181 | 1.81 | -.001 | .0001 | -.0001 | .0069 | -.0261 |
| | 7.5 | 00.0 | .037 | .0121 | .0357 | 3.05 | -.001 | .0001 | -.0002 | .0143 | -.0536 |
| | 11.6 | 00.0 | .072 | .0223 | .0503 | 3.23 | -.001 | .0001 | -.0001 | .0214 | -.0809 |
| | 14.3 | 00.0 | .096 | .0325 | .0609 | 2.96 | -.002 | .0001 | -.0002 | .0254 | -.0959 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(b) BVC, $\delta = 2.5^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 00.0 | -.060 | .0190 | -.0458 | -3.18 | .000 | .0001 | .0002 | -.0192 | .0762 |
| | -6.4 | 00.0 | -.031 | .0105 | -.0266 | -2.94 | .000 | .0001 | -.0001 | -.0103 | .0415 |
| | -4.4 | 00.0 | -.019 | .0082 | -.0156 | -2.38 | .000 | .0002 | -.0002 | -.0054 | .0227 |
| | -2.4 | 00.0 | -.009 | .0069 | -.0049 | -1.27 | .000 | .0002 | -.0002 | -.0008 | .0043 |
| | -0.4 | 00.0 | .000 | .0069 | .0060 | 0.03 | .000 | .0002 | -.0002 | .0036 | -.0133 |
| | 1.5 | 00.0 | .009 | .0072 | .0173 | 1.30 | .000 | .0002 | -.0003 | .0085 | -.0322 |
| | 3.5 | 00.0 | .020 | .0084 | .0285 | 2.40 | .000 | .0002 | -.0004 | .0134 | -.0504 |
| | 7.6 | 00.0 | .042 | .0137 | .0493 | 3.06 | -.001 | .0002 | -.0004 | .0222 | -.0838 |
| | 11.7 | 00.0 | .073 | .0241 | .0669 | 3.01 | -.001 | .0001 | -.0005 | .0306 | -.1163 |
| | 14.3 | 00.0 | .100 | .0356 | .0786 | 2.82 | -.001 | .0000 | -.0002 | .0362 | -.1389 |
| 3.05 | -10.5 | 00.0 | -.059 | .0218 | -.0404 | -2.71 | .000 | .0000 | .0001 | -.0164 | .0641 |
| | -6.4 | 00.0 | -.028 | .0128 | -.0236 | -2.20 | .000 | .0000 | .0000 | -.0087 | .0349 |
| | -4.4 | 00.0 | -.018 | .0106 | -.0139 | -1.68 | .000 | .0000 | .0000 | -.0044 | .0181 |
| | -2.4 | 00.0 | -.007 | .0093 | -.0043 | -0.73 | .000 | .0001 | -.0002 | -.0004 | .0029 |
| | -0.4 | 00.0 | .001 | .0088 | .0059 | 0.10 | .000 | .0001 | -.0001 | .0035 | -.0122 |
| | 1.6 | 00.0 | .010 | .0091 | .0161 | 1.14 | .000 | .0001 | -.0001 | .0077 | -.0281 |
| | 3.6 | 00.0 | .019 | .0102 | .0264 | 1.86 | .000 | .0001 | -.0001 | .0120 | -.0438 |
| | 7.6 | 00.0 | .042 | .0153 | .0447 | 2.75 | .000 | .0001 | -.0003 | .0199 | -.0738 |
| | 11.6 | 00.0 | .074 | .0256 | .0606 | 2.88 | -.001 | .0000 | -.0002 | .0272 | -.1015 |
| | 14.3 | 00.0 | .100 | .0365 | .0718 | 2.75 | -.001 | .0000 | -.0000 | .0324 | -.1235 |
| 3.53 | -10.5 | 00.0 | -.062 | .0213 | -.0363 | -2.90 | -.001 | .0001 | -.0001 | -.0144 | .0561 |
| | -6.5 | 00.0 | -.031 | .0126 | -.0208 | -2.49 | .000 | .0001 | -.0001 | -.0074 | .0292 |
| | -4.4 | 00.0 | -.020 | .0103 | -.0123 | -1.94 | -.001 | .0001 | -.0001 | -.0038 | .0160 |
| | -2.4 | 00.0 | -.009 | .0089 | -.0034 | -1.04 | .000 | .0001 | -.0002 | -.0001 | .0019 |
| | -0.4 | 00.0 | .000 | .0084 | .0057 | 0.02 | .000 | .0001 | -.0002 | .0035 | -.0122 |
| | 1.5 | 00.0 | .008 | .0084 | .0151 | 0.89 | -.001 | .0001 | -.0002 | .0072 | -.0255 |
| | 3.5 | 00.0 | .017 | .0094 | .0243 | 1.82 | .000 | .0001 | -.0002 | .0110 | -.0393 |
| | 7.6 | 00.0 | .040 | .0140 | .0414 | 2.83 | -.001 | .0001 | -.0002 | .0183 | -.0657 |
| | 11.6 | 00.0 | .072 | .0243 | .0562 | 2.97 | -.001 | .0001 | -.0003 | .0254 | -.0930 |
| | 14.2 | 00.0 | .096 | .0344 | .0667 | 2.80 | -.002 | .0001 | -.0001 | .0299 | -.1110 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(c) BVC, $\delta = 4.8^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 00.0 | -.053 | .0165 | -.0381 | -3.20 | -.001 | .0001 | .0001 | -.0141 | .0595 |
| | -6.4 | 00.0 | -.023 | .0089 | -.0188 | -2.61 | -.001 | .0001 | .0000 | -.0049 | .0214 |
| | -4.4 | 00.0 | -.012 | .0073 | -.0085 | -1.63 | .000 | .0001 | -.0001 | -.0006 | .0040 |
| | -2.4 | 00.0 | -.002 | .0064 | .0020 | -0.27 | .000 | .0001 | -.0002 | .0037 | -.0126 |
| | -0.4 | 00.0 | .008 | .0065 | .0132 | 1.17 | .000 | .0001 | -.0002 | .0086 | -.0320 |
| | 3.5 | 00.0 | .027 | .0094 | .0346 | 2.89 | .000 | .0001 | -.0004 | .0179 | -.0662 |
| | 7.6 | 00.0 | .049 | .0151 | .0548 | 3.21 | -.001 | .0001 | -.0004 | .0265 | -.0991 |
| | 11.6 | 00.0 | .077 | .0260 | .0725 | 2.96 | -.001 | .0001 | -.0004 | .0348 | -.1324 |
| | 14.3 | 00.0 | .105 | .0375 | .0841 | 2.79 | -.001 | .0000 | -.0002 | .0401 | -.1546 |
| 3.05 | -10.5 | 00.0 | -.052 | .0171 | -.0332 | -3.05 | -.001 | .0000 | .0002 | -.0118 | .0494 |
| | -6.4 | 00.0 | -.023 | .0092 | -.0164 | -2.54 | -.001 | .0000 | .0001 | -.0038 | .0172 |
| | -4.4 | 00.0 | -.012 | .0075 | -.0070 | -1.54 | -.001 | .0000 | .0001 | .0001 | .0012 |
| | -2.4 | 00.0 | -.002 | .0065 | .0025 | -0.30 | -.001 | .0000 | .0000 | .0040 | -.0133 |
| | -0.4 | 00.0 | .007 | .0069 | .0124 | 1.01 | -.001 | .0000 | .0000 | .0082 | -.0292 |
| | 1.5 | 00.0 | .017 | .0077 | .0228 | 2.15 | -.001 | .0000 | -.0001 | .0122 | -.0445 |
| | 3.6 | 00.0 | .026 | .0092 | .0321 | 2.82 | -.001 | -.0001 | .0000 | .0164 | -.0596 |
| | 7.6 | 00.0 | .048 | .0151 | .0503 | 3.18 | -.001 | .0000 | -.0001 | .0240 | -.0879 |
| | 11.6 | 00.0 | .078 | .0259 | .0665 | 3.03 | -.002 | .0000 | -.0002 | .0316 | -.1182 |
| 3.53 | -10.5 | 00.0 | -.053 | .0197 | -.0298 | -2.72 | -.001 | .0000 | .0001 | -.0099 | .0414 |
| | -6.4 | 00.0 | -.023 | .0118 | -.0144 | -1.96 | .000 | .0001 | -.0001 | -.0030 | .0146 |
| | -4.4 | 00.0 | -.010 | .0093 | -.0059 | -1.12 | .000 | .0001 | -.0001 | .0007 | -.0010 |
| | -2.4 | 00.0 | -.001 | .0089 | .0026 | -0.15 | .000 | .0001 | -.0001 | .0042 | -.0139 |
| | -0.4 | 00.0 | .007 | .0087 | .0119 | 0.82 | .000 | .0001 | -.0002 | .0077 | -.0266 |
| | 1.5 | 00.0 | .018 | .0092 | .0209 | 1.94 | .001 | .0001 | -.0003 | .0114 | -.0400 |
| | 3.5 | 00.0 | .026 | .0106 | .0298 | 2.45 | .000 | .0001 | -.0001 | .0150 | -.0537 |
| | 7.6 | 00.0 | .046 | .0158 | .0468 | 2.93 | -.001 | .0001 | -.0002 | .0221 | -.0795 |
| | 11.6 | 00.0 | .078 | .0266 | .0615 | 2.94 | -.001 | .0001 | -.0003 | .0294 | -.1074 |
| | 14.3 | 00.0 | .103 | .0374 | .0725 | 2.74 | -.001 | .0000 | -.0003 | .0342 | -.1274 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(d) BVC, $\delta = 10.2^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 00.0 | -.049 | .0160 | -.0236 | -3.07 | -.003 | .0002 | -.0002 | -.0044 | .0257 |
| | -6.4 | 00.0 | -.019 | .0095 | -.0051 | -2.01 | -.003 | .0002 | -.0003 | .0044 | -.0111 |
| | -4.4 | 00.0 | -.007 | .0082 | .0048 | -0.82 | -.003 | .0002 | -.0004 | .0087 | -.0276 |
| | -2.4 | 00.0 | .003 | .0081 | .0148 | 0.31 | -.003 | .0002 | -.0005 | .0130 | -.0439 |
| | -0.4 | 00.0 | .012 | .0091 | .0251 | 1.35 | -.002 | .0002 | -.0006 | .0174 | -.0606 |
| | 1.6 | 00.0 | .021 | .0105 | .0355 | 1.96 | -.002 | .0002 | -.0007 | .0220 | -.0776 |
| | 3.6 | 00.0 | .029 | .0125 | .0451 | 2.34 | -.003 | .0002 | -.0007 | .0262 | -.0940 |
| | 7.6 | 00.0 | .050 | .0192 | .0642 | 2.60 | -.003 | .0001 | -.0007 | .0344 | -.1262 |
| | 11.7 | 00.0 | .077 | .0303 | .0813 | 2.53 | -.004 | .0000 | -.0008 | .0425 | -.1591 |
| | 14.3 | 00.0 | .099 | .0410 | .0931 | 2.42 | -.004 | .0000 | -.0009 | .0478 | -.1811 |
| 3.05 | -10.4 | 00.0 | -.048 | .0173 | -.0204 | -2.76 | -.003 | .0001 | -.0003 | -.0028 | .0205 |
| | -6.4 | 00.0 | -.016 | .0108 | -.0041 | -1.50 | -.004 | .0001 | -.0002 | .0048 | -.0111 |
| | -4.4 | 00.0 | -.006 | .0096 | .0049 | -0.63 | -.004 | .0000 | -.0003 | .0086 | -.0256 |
| | -2.4 | 00.0 | .004 | .0093 | .0141 | 0.38 | -.003 | .0000 | -.0003 | .0126 | -.0399 |
| | -0.4 | 00.0 | .012 | .0099 | .0238 | 1.24 | -.003 | .0001 | -.0003 | .0163 | -.0541 |
| | 1.6 | 00.0 | .021 | .0111 | .0330 | 1.88 | -.003 | .0000 | -.0004 | .0202 | -.0683 |
| | 3.6 | 00.0 | .029 | .0130 | .0421 | 2.24 | -.003 | .0000 | -.0004 | .0241 | -.0837 |
| | 7.6 | 00.0 | .049 | .0195 | .0600 | 2.54 | -.003 | .0001 | -.0005 | .0320 | -.1157 |
| | 11.6 | 00.0 | .077 | .0302 | .0762 | 2.54 | -.004 | .0000 | -.0006 | .0394 | -.1450 |
| | 14.4 | 00.0 | .103 | .0420 | .0871 | 2.46 | -.004 | .0000 | -.0006 | .0444 | -.1663 |
| 3.53 | -10.5 | 00.0 | -.046 | .0195 | -.0180 | -2.34 | -.001 | .0000 | .0000 | -.0015 | .0145 |
| | -6.4 | 00.0 | -.014 | .0121 | -.0035 | -1.17 | .000 | .0000 | -.0001 | .0052 | -.0131 |
| | -4.4 | 00.0 | -.003 | .0107 | .0043 | -0.26 | .000 | .0000 | -.0002 | .0083 | -.0242 |
| | -2.4 | 00.0 | .006 | .0103 | .0131 | 0.55 | .000 | .0000 | -.0002 | .0115 | -.0369 |
| | -0.4 | 00.0 | .015 | .0109 | .0215 | 1.35 | .001 | .0000 | -.0003 | .0151 | -.0504 |
| | 1.5 | 00.0 | .022 | .0120 | .0306 | 1.83 | .000 | .0001 | -.0001 | .0187 | -.0637 |
| | 3.5 | 00.0 | .031 | .0138 | .0390 | 2.26 | .000 | .0001 | -.0002 | .0222 | -.0771 |
| | 7.5 | 00.0 | .051 | .0199 | .0557 | 2.55 | .000 | .0000 | -.0003 | .0297 | -.1057 |
| | 11.6 | 00.0 | .080 | .0311 | .0712 | 2.57 | -.001 | .0000 | -.0005 | .0370 | -.1351 |
| | 14.3 | 00.0 | .104 | .0424 | .0824 | 2.44 | -.001 | .0000 | -.0005 | .0421 | -.1574 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(e) BVC, $\delta = 20.0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.4 | 00.0 | -.028 | .0193 | -.0022 | -1.45 | -.002 | .0001 | .0000 | .0130 | -.0339 |
| | -6.4 | 00.0 | .000 | .0155 | .0156 | -0.03 | -.002 | .0001 | .0000 | .0202 | -.0671 |
| | -4.4 | 00.0 | .010 | .0157 | .0249 | 0.64 | -.001 | .0001 | .0000 | .0242 | -.0839 |
| | -2.4 | 00.0 | .019 | .0166 | .0339 | 1.15 | -.001 | .0001 | .0000 | .0279 | -.1001 |
| | -0.3 | 00.0 | .029 | .0185 | .0436 | 1.55 | -.001 | .0002 | -.0003 | .0319 | -.1181 |
| | 1.6 | 00.0 | .037 | .0210 | .0525 | 1.74 | -.001 | .0002 | -.0005 | .0358 | -.1359 |
| | 3.6 | 00.0 | .045 | .0241 | .0612 | 1.87 | -.001 | .0002 | -.0004 | .0395 | -.1530 |
| | 7.6 | 00.0 | .059 | .0318 | .0784 | 1.85 | -.002 | .0002 | -.0003 | .0470 | -.1894 |
| | 11.7 | 00.0 | .081 | .0438 | .0949 | 1.86 | -.003 | .0001 | -.0007 | .0546 | -.2255 |
| | 14.4 | 00.0 | .104 | .0560 | .1077 | 1.86 | -.002 | .0001 | -.0001 | .0601 | -.2553 |
| 3.05 | -10.4 | 00.0 | -.030 | .0211 | -.0006 | -1.42 | -.002 | .0000 | .0000 | .0133 | -.0308 |
| | -6.4 | 00.0 | -.001 | .0169 | .0151 | -0.08 | -.002 | .0000 | .0001 | .0196 | -.0603 |
| | -4.4 | 00.0 | .010 | .0165 | .0235 | 0.59 | -.002 | .0000 | .0001 | .0231 | -.0767 |
| | -2.3 | 00.0 | .021 | .0172 | .0322 | 1.20 | -.002 | .0000 | .0001 | .0265 | -.0924 |
| | -0.3 | 00.0 | .028 | .0190 | .0410 | 1.49 | -.001 | .0000 | -.0001 | .0302 | -.1079 |
| | 1.6 | 00.0 | .037 | .0212 | .0498 | 1.73 | -.001 | .0001 | -.0001 | .0339 | -.1253 |
| | 3.6 | 00.0 | .045 | .0242 | .0584 | 1.85 | -.001 | .0001 | -.0002 | .0377 | -.1421 |
| | 7.6 | 00.0 | .061 | .0321 | .0748 | 1.90 | -.002 | .0001 | -.0002 | .0451 | -.1770 |
| | 11.7 | 00.0 | .084 | .0443 | .0916 | 1.90 | -.003 | .0001 | -.0001 | .0531 | -.2177 |
| | 14.4 | 00.0 | .108 | .0572 | .1044 | 1.89 | -.002 | .0000 | -.0002 | .0589 | -.2484 |
| 3.53 | -10.4 | 00.0 | -.029 | .0209 | .0002 | -1.37 | .000 | .0000 | -.0001 | .0139 | -.0298 |
| | -6.4 | 00.0 | .000 | .0163 | .0138 | -0.02 | .000 | .0000 | -.0002 | .0197 | -.0552 |
| | -4.4 | 00.0 | .011 | .0157 | .0219 | 0.68 | .000 | .0000 | -.0002 | .0229 | -.0692 |
| | -2.4 | 00.0 | .020 | .0163 | .0300 | 1.20 | .000 | .0000 | -.0003 | .0264 | -.0849 |
| | -0.4 | 00.0 | .027 | .0178 | .0383 | 1.54 | .000 | .0000 | -.0002 | .0299 | -.1007 |
| | 1.5 | 00.0 | .036 | .0201 | .0470 | 1.79 | .000 | .0001 | -.0002 | .0336 | -.1169 |
| | 3.6 | 00.0 | .044 | .0230 | .0550 | 1.91 | -.001 | .0001 | -.0002 | .0374 | -.1330 |
| | 7.6 | 00.0 | .059 | .0309 | .0717 | 1.92 | -.001 | .0001 | -.0003 | .0455 | -.1696 |
| | 11.6 | 00.0 | .086 | .0436 | .0887 | 1.98 | -.002 | .0000 | -.0002 | .0538 | -.2099 |
| | 14.3 | 00.0 | .108 | .0559 | .1006 | 1.93 | -.002 | .0000 | -.0004 | .0599 | -.2392 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(f) BV

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.4 | 00.0 | -.039 | .0142 | -.0171 | -2.72 | .000 | .0000 | .0000 | | |
| | -6.4 | 00.0 | -.018 | .0083 | -.0112 | -2.21 | .000 | .0001 | -.0002 | | |
| | -4.4 | 00.0 | -.013 | .0068 | -.0075 | -1.85 | .000 | .0001 | -.0002 | | |
| | -2.4 | 00.0 | -.007 | .0059 | -.0036 | -1.23 | .000 | .0001 | -.0002 | | |
| | -0.4 | 00.0 | -.005 | .0054 | .0008 | -0.85 | .000 | .0001 | -.0003 | | |
| | 1.6 | 00.0 | .000 | .0056 | .0048 | -0.01 | .000 | .0001 | -.0003 | | |
| | 3.6 | 00.0 | .003 | .0060 | .0090 | 0.52 | .001 | .0001 | -.0004 | | |
| | 7.6 | 00.0 | .018 | .0083 | .0163 | 2.16 | .000 | .0001 | -.0004 | | |
| | 11.6 | 00.0 | .046 | .0157 | .0221 | 2.95 | .000 | .0001 | -.0002 | | |
| | 14.3 | 00.0 | .069 | .0237 | .0282 | 2.90 | .000 | .0001 | -.0001 | | |
| 3.05 | -10.4 | 00.0 | -.042 | .0153 | -.0160 | -2.77 | -.001 | -.0001 | .0001 | | |
| | -6.3 | 00.0 | -.020 | .0091 | -.0103 | -2.26 | .000 | .0000 | .0000 | | |
| | -4.4 | 00.0 | -.014 | .0075 | -.0071 | -1.85 | -.001 | .0000 | .0001 | | |
| | -2.3 | 00.0 | -.009 | .0065 | -.0030 | -1.35 | -.001 | .0000 | .0000 | | |
| | -0.3 | 00.0 | -.005 | .0056 | .0009 | -0.90 | .000 | .0000 | -.0001 | | |
| | 1.6 | 00.0 | -.001 | .0058 | .0050 | -0.14 | .000 | .0000 | -.0001 | | |
| | 3.6 | 00.0 | .004 | .0064 | .0087 | 0.65 | .000 | -.0000 | -.0001 | | |
| | 7.6 | 00.0 | .020 | .0088 | .0154 | 2.32 | .000 | .0001 | -.0002 | | |
| | 11.7 | 00.0 | .049 | .0162 | .0212 | 3.05 | .000 | .0000 | -.0001 | | |
| | 14.3 | 00.0 | .068 | .0237 | .0273 | 2.89 | .000 | .0000 | -.0001 | | |
| 3.53 | -10.4 | 00.0 | -.041 | .0162 | -.0158 | -2.51 | .000 | -.0001 | .0000 | | |
| | -6.4 | 00.0 | -.020 | .0102 | -.0099 | -1.94 | .000 | .0001 | .0000 | | |
| | -4.4 | 00.0 | -.012 | .0083 | -.0067 | -1.50 | .000 | .0000 | .0000 | | |
| | -2.4 | 00.0 | -.007 | .0075 | -.0032 | -0.99 | .000 | .0001 | -.0001 | | |
| | -0.4 | 00.0 | -.003 | .0065 | .0005 | -0.50 | .000 | .0001 | -.0001 | | |
| | 1.5 | 00.0 | .000 | .0067 | .0045 | -0.01 | .000 | .0001 | -.0001 | | |
| | 3.5 | 00.0 | .005 | .0070 | .0084 | 0.79 | .000 | .0001 | -.0001 | | |
| | 7.6 | 00.0 | .023 | .0096 | .0143 | 2.39 | .000 | .0001 | -.0001 | | |
| | 11.6 | 00.0 | .050 | .0168 | .0207 | 2.96 | .000 | .0001 | -.0001 | | |
| | 14.3 | 00.0 | .067 | .0241 | .0264 | 2.78 | .000 | .0001 | .0000 | | |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(g) BC, $\delta = 0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 00.0 | -.063 | .0177 | -.0531 | -3.55 | -.002 | .0000 | .0006 | -.0231 | .0897 |
| | -6.5 | 00.0 | -.036 | .0093 | -.0340 | -3.86 | -.001 | .0000 | .0004 | -.0144 | .0564 |
| | -4.4 | 00.0 | -.024 | .0068 | -.0231 | -3.62 | -.002 | .0000 | .0003 | -.0097 | .0387 |
| | -2.4 | 00.0 | -.013 | .0051 | -.0121 | -2.58 | -.002 | .0000 | .0003 | -.0048 | .0186 |
| | -0.4 | 00.0 | -.003 | .0048 | -.0012 | -0.70 | -.001 | .0000 | .0002 | -.0003 | .0011 |
| | 1.6 | 00.0 | .005 | .0050 | .0097 | 1.05 | -.002 | .0000 | .0003 | .0042 | -.0164 |
| | 3.5 | 00.0 | .016 | .0064 | .0210 | 2.45 | -.001 | .0000 | .0003 | .0090 | -.0352 |
| | 7.6 | 00.0 | .040 | .0114 | .0423 | 3.48 | -.002 | .0000 | .0002 | .0184 | -.0709 |
| | 11.7 | 00.0 | .072 | .0219 | .0598 | 3.28 | -.002 | .0000 | .0001 | .0270 | -.1038 |
| | 14.4 | 00.0 | .100 | .0331 | .0713 | 3.03 | -.002 | .0000 | -.0002 | .0324 | -.1258 |
| 3.05 | -10.4 | 00.0 | -.063 | .0180 | -.0476 | -3.50 | -.002 | .0000 | .0004 | -.0202 | .0773 |
| | -6.4 | 00.0 | -.034 | .0093 | -.0305 | -3.65 | -.002 | .0000 | .0002 | -.0124 | .0469 |
| | -4.4 | 00.0 | -.024 | .0071 | -.0207 | -3.37 | -.002 | .0000 | .0002 | -.0085 | .0329 |
| | -2.4 | 00.0 | -.013 | .0055 | -.0109 | -2.38 | -.002 | .0000 | .0001 | -.0044 | .0175 |
| | -0.4 | 00.0 | -.004 | .0051 | -.0006 | -0.72 | -.001 | .0000 | .0002 | -.0002 | .0014 |
| | 1.6 | 00.0 | .005 | .0053 | .0094 | 0.97 | -.002 | .0000 | .0002 | .0039 | -.0149 |
| | 3.6 | 00.0 | .016 | .0062 | .0192 | 2.54 | -.001 | .0000 | .0002 | .0080 | -.0305 |
| | 7.6 | 00.0 | .038 | .0111 | .0382 | 3.44 | -.002 | .0000 | .0002 | .0162 | -.0616 |
| | 11.6 | 00.0 | .073 | .0217 | .0539 | 3.34 | -.002 | .0000 | .0000 | .0239 | -.0908 |
| | 14.3 | 00.0 | .101 | .0331 | .0641 | 3.06 | -.003 | .0000 | .0000 | .0286 | -.1092 |
| 3.53 | -10.5 | 00.0 | -.061 | .0208 | -.0436 | -2.93 | -.001 | .0000 | .0002 | -.0184 | .0692 |
| | -6.5 | 00.0 | -.033 | .0122 | -.0280 | -2.69 | -.001 | .0000 | .0002 | -.0112 | .0424 |
| | -4.4 | 00.0 | -.021 | .0097 | -.0194 | -2.20 | -.001 | .0000 | .0002 | -.0075 | .0282 |
| | -2.4 | 00.0 | -.011 | .0080 | -.0101 | -1.43 | -.001 | .0000 | .0002 | -.0039 | .0148 |
| | -0.4 | 00.0 | -.002 | .0072 | -.0006 | -0.35 | .000 | .0000 | .0002 | -.0002 | .0007 |
| | 1.5 | 00.0 | .006 | .0074 | .0088 | 0.77 | -.001 | .0000 | .0002 | .0034 | -.0133 |
| | 3.5 | 00.0 | .016 | .0084 | .0176 | 1.93 | -.001 | .0000 | .0003 | .0072 | -.0271 |
| | 7.5 | 00.0 | .038 | .0129 | .0348 | 2.99 | -.001 | .0000 | .0002 | .0145 | -.0544 |
| | 11.6 | 00.0 | .072 | .0230 | .0497 | 3.11 | -.002 | .0000 | .0001 | .0216 | -.0816 |
| | 14.3 | 00.0 | .099 | .0337 | .0593 | 2.93 | -.002 | .0000 | .0001 | .0263 | -.1001 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(h) BC, $\delta = 10.0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.4 | 00.0 | -.042 | .0133 | -.0254 | -3.18 | -.001 | -.0001 | .0002 | -.0044 | .0248 |
| | -6.4 | 00.0 | -.012 | .0076 | -.0067 | -1.55 | -.001 | .0000 | .0001 | .0044 | -.0120 |
| | -4.4 | 00.0 | -.002 | .0066 | .0034 | -0.23 | -.001 | -.0001 | .0001 | .0085 | -.0277 |
| | -2.4 | 00.0 | .008 | .0069 | .0138 | 1.21 | -.001 | -.0001 | .0001 | .0129 | -.0447 |
| | -0.4 | 00.0 | .017 | .0078 | .0241 | 2.23 | -.001 | -.0001 | .0001 | .0174 | -.0616 |
| | 1.6 | 00.0 | .027 | .0097 | .0341 | 2.80 | -.001 | -.0001 | .0002 | .0219 | -.0784 |
| | 3.6 | 00.0 | .035 | .0120 | .0441 | 2.92 | -.001 | .0000 | .0002 | .0261 | -.0949 |
| | 7.6 | 00.0 | .056 | .0192 | .0629 | 2.91 | -.002 | .0000 | .0001 | .0345 | -.1283 |
| | 11.7 | 00.0 | .084 | .0310 | .0795 | 2.70 | -.002 | .0000 | .0000 | .0424 | -.1598 |
| | 14.4 | 00.0 | .107 | .0422 | .0913 | 2.54 | -.002 | -.0002 | -.0004 | .0477 | -.1813 |
| 3.06 | -10.4 | 00.0 | -.043 | .0163 | -.0220 | -2.66 | -.001 | .0000 | .0001 | -.0025 | .0185 |
| | -6.4 | 00.0 | -.012 | .0097 | -.0056 | -1.20 | -.001 | .0000 | .0000 | .0050 | -.0129 |
| | -4.4 | 00.0 | .000 | .0087 | .0033 | -0.02 | -.001 | -.0001 | .0000 | .0085 | -.0262 |
| | -2.3 | 00.0 | .009 | .0087 | .0130 | 1.00 | -.001 | -.0001 | .0001 | .0123 | -.0409 |
| | -0.3 | 00.0 | .017 | .0095 | .0225 | 1.77 | -.001 | -.0001 | .0000 | .0163 | -.0562 |
| | 1.6 | 00.0 | .026 | .0109 | .0317 | 2.40 | -.002 | .0000 | .0001 | .0202 | -.0703 |
| | 3.6 | 00.0 | .034 | .0131 | .0408 | 2.59 | -.001 | .0000 | .0001 | .0241 | -.0849 |
| | 7.6 | 00.0 | .056 | .0202 | .0585 | 2.74 | -.001 | .0000 | .0001 | .0319 | -.1159 |
| | 11.6 | 00.0 | .083 | .0315 | .0745 | 2.63 | -.002 | -.0001 | -.0001 | .0393 | -.1462 |
| | 14.4 | 00.0 | .109 | .0433 | .0850 | 2.51 | -.002 | -.0001 | .0000 | .0444 | -.1671 |
| 3.53 | -10.5 | 00.0 | -.045 | .0169 | -.0191 | -2.67 | -.001 | -.0001 | .0001 | -.0018 | .0161 |
| | -6.5 | 00.0 | -.014 | .0103 | -.0044 | -1.36 | .000 | -.0001 | .0001 | .0049 | -.0114 |
| | -4.4 | 00.0 | -.004 | .0089 | .0041 | -0.40 | .000 | -.0001 | .0001 | .0083 | -.0236 |
| | -2.4 | 00.0 | .006 | .0087 | .0126 | 0.73 | .000 | -.0001 | .0001 | .0119 | -.0398 |
| | -0.4 | 00.0 | .016 | .0092 | .0210 | 1.76 | -.001 | .0000 | .0002 | .0154 | -.0510 |
| | 1.5 | 00.0 | .023 | .0105 | .0298 | 2.14 | .000 | .0000 | .0002 | .0191 | -.0650 |
| | 3.5 | 00.0 | .031 | .0125 | .0387 | 2.49 | -.001 | .0000 | .0002 | .0228 | -.0784 |
| | 7.5 | 00.0 | .051 | .0190 | .0552 | 2.68 | -.001 | .0000 | .0002 | .0299 | -.1057 |
| | 11.6 | 00.0 | .082 | .0306 | .0702 | 2.69 | -.002 | .0000 | .0001 | .0373 | -.1348 |
| | 14.3 | 00.0 | .107 | .0423 | .0809 | 2.54 | -.002 | .0000 | .0001 | .0425 | -.1580 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Continued

(i) BC, $\delta = 20.0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.4 | 00.0 | -.026 | .0161 | -.0038 | -1.60 | -.001 | -.0001 | .0002 | .0134 | -.0348 |
| | -6.4 | 00.0 | .003 | .0125 | .0142 | 0.27 | -.001 | -.0001 | .0002 | .0207 | -.0672 |
| | -4.4 | 00.0 | .013 | .0131 | .0235 | 1.01 | -.002 | .0000 | .0003 | .0246 | -.0843 |
| | -2.3 | 00.0 | .023 | .0145 | .0328 | 1.58 | -.001 | .0000 | .0002 | .0287 | -.1020 |
| | -0.3 | 00.0 | .032 | .0164 | .0420 | 1.93 | -.001 | .0000 | .0001 | .0326 | -.1191 |
| | 1.6 | 00.0 | .040 | .0192 | .0514 | 2.07 | -.001 | .0000 | .0002 | .0369 | -.1381 |
| | 3.6 | 00.0 | .047 | .0224 | .0602 | 2.09 | -.002 | .0000 | .0003 | .0408 | -.1544 |
| | 7.7 | 00.0 | .064 | .0309 | .0769 | 2.06 | -.003 | .0000 | .0001 | .0490 | -.1888 |
| | 11.7 | 00.0 | .086 | .0434 | .0935 | 1.99 | -.003 | .0000 | .0000 | .0572 | -.2265 |
| | 14.4 | 00.0 | .109 | .0560 | .1063 | 1.95 | -.003 | .0000 | .0000 | .0634 | -.2593 |
| 3.05 | -10.4 | 00.0 | -.028 | .0180 | -.0025 | -1.54 | -.001 | .0000 | .0000 | .0138 | -.0324 |
| | -6.4 | 00.0 | .000 | .0142 | .0131 | 0.04 | -.002 | .0000 | .0002 | .0202 | -.0609 |
| | -4.4 | 00.0 | .012 | .0140 | .0221 | 0.89 | -.001 | .0000 | .0001 | .0237 | -.0771 |
| | -2.3 | 00.0 | .022 | .0150 | .0307 | 1.46 | -.001 | .0000 | .0002 | .0272 | -.0930 |
| | -0.3 | 00.0 | .031 | .0170 | .0397 | 1.80 | -.001 | .0000 | .0001 | .0310 | -.1095 |
| | 1.6 | 00.0 | .037 | .0194 | .0484 | 1.94 | -.001 | .0000 | .0001 | .0348 | -.1266 |
| | 3.6 | 00.0 | .046 | .0226 | .0569 | 2.05 | -.002 | .0000 | .0002 | .0386 | -.1422 |
| | 7.6 | 00.0 | .063 | .0308 | .0733 | 2.04 | -.002 | .0000 | .0001 | .0468 | -.1784 |
| | 11.7 | 00.0 | .087 | .0436 | .0896 | 2.00 | -.003 | .0000 | .0000 | .0552 | -.2168 |
| | 14.4 | 00.0 | .110 | .0563 | .1024 | 1.95 | -.002 | .0000 | -.0001 | .0612 | -.2486 |
| 3.53 | -10.4 | 00.0 | -.025 | .0180 | -.0011 | -1.41 | -.001 | -.0001 | -.0001 | .0142 | -.0310 |
| | -6.4 | 00.0 | .002 | .0142 | .0130 | 0.17 | -.001 | -.0001 | .0000 | .0200 | -.0565 |
| | -4.4 | 00.0 | .012 | .0142 | .0211 | 0.86 | -.002 | -.0001 | .0001 | .0232 | -.0703 |
| | -2.4 | 00.0 | .023 | .0150 | .0292 | 1.52 | -.001 | -.0001 | .0002 | .0265 | -.0856 |
| | -0.3 | 00.0 | .031 | .0167 | .0377 | 1.83 | -.001 | .0000 | .0002 | .0300 | -.1011 |
| | 1.6 | 00.0 | .039 | .0191 | .0462 | 2.05 | -.001 | .0000 | .0002 | .0338 | -.1178 |
| | 3.6 | 00.0 | .047 | .0222 | .0545 | 2.10 | -.001 | .0000 | .0002 | .0377 | -.1347 |
| | 7.6 | 00.0 | .064 | .0306 | .0707 | 2.09 | -.002 | .0000 | .0000 | .0458 | -.1701 |
| | 11.6 | 00.0 | .090 | .0441 | .0877 | 2.05 | -.002 | .0000 | .0000 | .0540 | -.2106 |
| | 14.3 | 00.0 | .112 | .0565 | .0993 | 1.98 | -.003 | .0000 | .0000 | .0595 | -.2384 |

TABLE V.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta = 0^{\circ}$ - Concluded

(j) B

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.4 | 00.0 | -.035 | .0124 | -.0182 | -2.84 | .000 | .0001 | .0002 | | |
| | -6.4 | 00.0 | -.014 | .0068 | -.0121 | -2.08 | -.001 | .0001 | .0002 | | |
| | -4.3 | 00.0 | -.008 | .0053 | -.0084 | -1.46 | -.001 | .0001 | .0002 | | |
| | -2.4 | 00.0 | -.004 | .0048 | -.0045 | -0.73 | .000 | .0001 | .0002 | | |
| | -0.4 | 00.0 | .001 | .0045 | -.0002 | 0.15 | -.001 | .0001 | .0002 | | |
| | 1.6 | 00.0 | .004 | .0050 | .0040 | 0.77 | .000 | .0001 | .0002 | | |
| | 3.6 | 00.0 | .008 | .0058 | .0080 | 1.41 | .000 | .0001 | .0002 | | |
| | 7.6 | 00.0 | .022 | .0083 | .0153 | 2.60 | -.001 | .0001 | .0003 | | |
| | 11.6 | 00.0 | .049 | .0162 | .0212 | 3.03 | -.001 | .0001 | .0001 | | |
| | 14.3 | 00.0 | .071 | .0242 | .0278 | 2.92 | .000 | .0001 | .0002 | | |
| 3.06 | -10.4 | 00.0 | -.039 | .0152 | -.0170 | -2.57 | -.001 | .0000 | .0001 | | |
| | -6.4 | 00.0 | -.015 | .0090 | -.0114 | -1.68 | .000 | .0000 | .0000 | | |
| | -4.4 | 00.0 | -.009 | .0079 | -.0079 | -1.19 | -.001 | .0000 | .0001 | | |
| | -2.3 | 00.0 | -.004 | .0070 | -.0041 | -0.56 | .000 | .0000 | .0000 | | |
| | -0.3 | 00.0 | .000 | .0063 | .0000 | 0.01 | .000 | .0000 | -.0001 | | |
| | 1.6 | 00.0 | .004 | .0066 | .0041 | 0.55 | .000 | .0000 | .0002 | | |
| | 3.6 | 00.0 | .009 | .0074 | .0080 | 1.24 | .000 | .0001 | .0001 | | |
| | 7.6 | 00.0 | .025 | .0101 | .0147 | 2.50 | .000 | .0001 | .0001 | | |
| | 11.6 | 00.0 | .052 | .0181 | .0206 | 2.90 | -.001 | .0001 | .0001 | | |
| | 14.3 | 00.0 | .070 | .0252 | .0269 | 2.79 | .000 | .0001 | .0001 | | |
| 3.53 | -10.4 | 00.0 | -.042 | .0167 | -.0165 | -2.48 | .000 | .0000 | .0001 | | |
| | -6.4 | 00.0 | -.019 | .0103 | -.0110 | -1.87 | .000 | .0000 | .0001 | | |
| | -4.4 | 00.0 | -.011 | .0090 | -.0078 | -1.26 | .000 | .0000 | .0001 | | |
| | -2.4 | 00.0 | -.007 | .0081 | -.0040 | -0.84 | .000 | .0000 | .0001 | | |
| | -0.4 | 00.0 | -.002 | .0070 | -.0005 | -0.24 | .000 | .0000 | .0001 | | |
| | 1.5 | 00.0 | .002 | .0073 | .0037 | 0.32 | .000 | .0000 | .0001 | | |
| | 3.5 | 00.0 | .007 | .0077 | .0072 | 0.91 | .000 | .0000 | .0002 | | |
| | 7.6 | 00.0 | .022 | .0101 | .0137 | 2.15 | .000 | .0001 | .0003 | | |
| | 11.6 | 00.0 | .048 | .0175 | .0200 | 2.77 | .000 | .0001 | .0002 | | |
| | 14.3 | 00.0 | .064 | .0243 | .0263 | 2.64 | .000 | .0001 | .0002 | | |

TABLE VI.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta \approx 5^{\circ}$

(a) BVC, $\delta = 0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 4.9 | -.071 | .0222 | -.0489 | -3.20 | -.043 | -.0062 | .0086 | -.0228 | .0882 |
| | -6.4 | 4.9 | -.041 | .0125 | -.0303 | -3.26 | -.040 | -.0057 | .0079 | -.0139 | .0543 |
| | -4.4 | 4.9 | -.029 | .0096 | -.0199 | -3.01 | -.039 | -.0054 | .0078 | -.0095 | .0369 |
| | -2.4 | 4.9 | -.017 | .0079 | -.0090 | -2.19 | -.038 | -.0051 | .0079 | -.0046 | .0186 |
| | -0.4 | 4.9 | -.007 | .0072 | .0016 | -0.93 | -.038 | -.0048 | .0078 | -.0001 | -.0001 |
| | 1.5 | 4.9 | .003 | .0069 | .0116 | 0.47 | -.037 | -.0045 | .0076 | .0042 | -.0170 |
| | 3.5 | 4.9 | .015 | .0078 | .0221 | 1.94 | -.037 | -.0043 | .0075 | .0090 | -.0356 |
| | 7.6 | 4.9 | .041 | .0129 | .0426 | 3.19 | -.035 | -.0038 | .0058 | .0184 | -.0716 |
| | 11.6 | 4.9 | .075 | .0232 | .0596 | 3.25 | -.031 | -.0029 | .0032 | .0269 | -.1047 |
| | 13.4 | 5.0 | .093 | .0298 | .0666 | 3.12 | -.031 | -.0028 | .0021 | .0303 | -.1185 |
| 3.05 | -10.5 | 4.9 | -.070 | .0213 | -.0433 | -3.30 | -.041 | -.0050 | .0065 | -.0201 | .0768 |
| | -6.4 | 4.9 | -.040 | .0120 | -.0267 | -3.35 | -.038 | -.0046 | .0059 | -.0122 | .0465 |
| | -4.4 | 4.9 | -.027 | .0091 | -.0176 | -2.96 | -.036 | -.0044 | .0057 | -.0084 | .0320 |
| | -2.4 | 4.9 | -.017 | .0074 | -.0080 | -2.28 | -.036 | -.0044 | .0058 | -.0043 | .0163 |
| | -0.4 | 4.9 | -.006 | .0068 | .0012 | -0.86 | -.035 | -.0041 | .0056 | -.0001 | .0006 |
| | 1.5 | 4.9 | .004 | .0067 | .0105 | 0.54 | -.035 | -.0039 | .0054 | .0036 | -.0147 |
| | 3.6 | 4.9 | .015 | .0076 | .0199 | 1.99 | -.036 | -.0037 | .0053 | .0078 | -.0305 |
| | 7.6 | 4.9 | .041 | .0123 | .0376 | 3.35 | -.035 | -.0032 | .0044 | .0160 | -.0606 |
| | 11.6 | 5.0 | .075 | .0225 | .0530 | 3.35 | -.031 | -.0027 | .0017 | .0236 | -.0905 |
| | 13.4 | 5.0 | .092 | .0291 | .0599 | 3.17 | -.029 | -.0026 | .0005 | .0270 | -.1040 |
| 3.53 | -10.5 | 5.0 | -.067 | .0217 | -.0402 | -3.06 | -.040 | -.0043 | .0051 | -.0184 | .0690 |
| | -6.5 | 5.0 | -.038 | .0128 | -.0242 | -2.98 | -.037 | -.0039 | .0046 | -.0113 | .0426 |
| | -4.5 | 5.0 | -.026 | .0099 | -.0160 | -2.62 | -.037 | -.0038 | .0045 | -.0074 | .0269 |
| | -2.5 | 5.0 | -.015 | .0083 | -.0073 | -1.84 | -.036 | -.0038 | .0045 | -.0039 | .0145 |
| | -0.5 | 5.0 | -.006 | .0076 | .0014 | -0.76 | -.036 | -.0036 | .0045 | -.0001 | .0007 |
| | 1.5 | 5.0 | .004 | .0070 | .0095 | 0.58 | -.035 | -.0034 | .0044 | .0032 | -.0126 |
| | 3.5 | 5.0 | .014 | .0080 | .0186 | 1.71 | -.035 | -.0033 | .0045 | .0069 | -.0258 |
| | 11.6 | 5.0 | .072 | .0217 | .0493 | 3.33 | -.031 | -.0025 | .0008 | .0215 | -.0811 |
| | 13.4 | 5.1 | .089 | .0283 | .0565 | 3.13 | -.029 | -.0025 | -.0001 | .0247 | -.0941 |

TABLE VI.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(b) BVC, $\delta = 10.2^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 4.9 | -.055 | .0178 | -.0208 | -3.10 | -.048 | -.0065 | .0079 | -.0035 | .0221 |
| | -6.4 | 4.9 | -.024 | .0112 | -.0020 | -2.15 | -.042 | -.0060 | .0074 | .0052 | -.0132 |
| | -4.4 | 4.9 | -.012 | .0097 | .0079 | -1.28 | -.042 | -.0057 | .0075 | .0094 | -.0296 |
| | -2.4 | 4.9 | -.001 | .0095 | .0178 | -.14 | -.042 | -.0054 | .0077 | .0138 | -.0466 |
| | -0.4 | 4.9 | .010 | .0100 | .0276 | 0.96 | -.041 | -.0052 | .0078 | .0183 | -.0642 |
| | 1.6 | 4.9 | .021 | .0114 | .0364 | 1.86 | -.041 | -.0048 | .0076 | .0225 | -.0799 |
| | 3.6 | 4.9 | .032 | .0136 | .0454 | 2.38 | -.040 | -.0046 | .0073 | .0265 | -.0951 |
| | 7.6 | 4.9 | .055 | .0209 | .0640 | 2.65 | -.034 | -.0041 | .0049 | .0349 | -.1278 |
| | 11.6 | 5.0 | .086 | .0325 | .0796 | 2.64 | -.029 | -.0034 | .0026 | .0429 | -.1606 |
| | 13.5 | 5.0 | .103 | .0402 | .0862 | 2.55 | -.028 | -.0033 | .0022 | .0465 | -.1759 |
| 3.05 | -10.4 | 4.9 | -.054 | .0178 | -.0180 | -3.04 | -.046 | -.0054 | .0058 | -.0019 | .0178 |
| | -6.4 | 4.9 | -.025 | .0115 | -.0010 | -2.13 | -.041 | -.0050 | .0054 | .0055 | -.0124 |
| | -4.4 | 4.9 | -.013 | .0101 | .0075 | -1.31 | -.040 | -.0049 | .0056 | .0093 | -.0275 |
| | -2.4 | 4.8 | -.002 | .0093 | .0161 | -.17 | -.039 | -.0047 | .0056 | .0128 | -.0404 |
| | -0.3 | 4.8 | .009 | .0098 | .0246 | 0.94 | -.039 | -.0044 | .0054 | .0167 | -.0558 |
| | 1.5 | 4.8 | .020 | .0109 | .0330 | 1.80 | -.039 | -.0042 | .0054 | .0206 | -.0706 |
| | 3.6 | 4.9 | .032 | .0131 | .0413 | 2.41 | -.038 | -.0040 | .0051 | .0242 | -.0834 |
| | 7.6 | 4.9 | .054 | .0201 | .0582 | 2.70 | -.034 | -.0036 | .0036 | .0319 | -.1141 |
| | 11.6 | 4.9 | .086 | .0317 | .0721 | 2.72 | -.030 | -.0030 | .0018 | .0393 | -.1434 |
| | 13.5 | 4.9 | .101 | .0387 | .0794 | 2.62 | -.029 | -.0029 | .0014 | .0428 | -.1589 |
| 3.53 | -10.5 | 5.0 | -.051 | .0182 | -.0165 | -2.80 | -.042 | -.0050 | .0049 | -.0011 | .0135 |
| | -6.5 | 5.0 | -.024 | .0122 | -.0005 | -1.92 | -.037 | -.0044 | .0045 | .0055 | -.0130 |
| | -4.4 | 5.0 | -.011 | .0103 | .0069 | -1.06 | -.036 | -.0043 | .0045 | .0088 | -.0255 |
| | -2.4 | 5.0 | .001 | .0099 | .0146 | 0.06 | -.036 | -.0042 | .0047 | .0122 | -.0386 |
| | -0.4 | 5.0 | .010 | .0102 | .0228 | 1.00 | -.036 | -.0041 | .0047 | .0155 | -.0507 |
| | 1.5 | 5.0 | .021 | .0114 | .0304 | 1.81 | -.035 | -.0039 | .0047 | .0190 | -.0640 |
| | 3.5 | 5.0 | .031 | .0131 | .0384 | 2.41 | -.035 | -.0036 | .0047 | .0225 | -.0768 |
| | 7.6 | 5.0 | .055 | .0200 | .0543 | 2.74 | -.033 | -.0032 | .0035 | .0298 | -.1047 |
| | 11.6 | 5.0 | .085 | .0313 | .0681 | 2.73 | -.027 | -.0026 | .0013 | .0370 | -.1344 |
| | 13.4 | 5.1 | .100 | .0383 | .0757 | 2.62 | -.026 | -.0026 | .0010 | .0404 | -.1474 |

TABLE VI.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta \approx 0^{\circ}$ - Continued

(c) BVC, $\delta = 20.0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.4 | 4.9 | -.040 | .0216 | .0017 | -1.84 | -.042 | -.0067 | .0069 | .0141 | -.0388 |
| | -6.4 | 4.9 | -.007 | .0168 | .0181 | -0.41 | -.043 | -.0063 | .0080 | .0215 | -.0718 |
| | -4.4 | 4.9 | .007 | .0161 | .0262 | 0.46 | -.045 | -.0061 | .0086 | .0250 | -.0869 |
| | -2.4 | 4.9 | .019 | .0170 | .0350 | 1.11 | -.046 | -.0058 | .0089 | .0289 | -.1049 |
| | -0.3 | 4.9 | .030 | .0187 | .0443 | 1.59 | -.044 | -.0054 | .0088 | .0329 | -.1217 |
| | 1.6 | 4.9 | .038 | .0213 | .0534 | 1.77 | -.043 | -.0050 | .0087 | .0368 | -.1396 |
| | 3.6 | 4.9 | .048 | .0244 | .0615 | 1.99 | -.041 | -.0048 | .0087 | .0403 | -.1556 |
| | 7.6 | 4.9 | .069 | .0336 | .0787 | 2.06 | -.033 | -.0042 | .0050 | .0479 | -.1907 |
| | 11.7 | 5.0 | .095 | .0469 | .0928 | 2.03 | -.027 | -.0037 | .0039 | .0551 | -.2273 |
| | 13.5 | 5.0 | .111 | .0553 | .1000 | 2.02 | -.024 | -.0035 | .0038 | .0587 | -.2449 |
| 3.05 | -10.4 | 4.9 | -.038 | .0218 | .0020 | -1.75 | -.043 | -.0056 | .0054 | .0140 | -.0336 |
| | -6.4 | 4.9 | -.010 | .0170 | .0174 | -0.60 | -.041 | -.0053 | .0058 | .0204 | -.0621 |
| | -4.3 | 4.9 | .004 | .0162 | .0247 | 0.27 | -.042 | -.0052 | .0066 | .0240 | -.0789 |
| | -2.3 | 4.8 | .016 | .0166 | .0331 | 0.95 | -.043 | -.0050 | .0068 | .0272 | -.0932 |
| | -0.3 | 4.8 | .026 | .0182 | .0416 | 1.41 | -.040 | -.0047 | .0062 | .0309 | -.1104 |
| | 1.6 | 4.8 | .036 | .0205 | .0497 | 1.75 | -.039 | -.0043 | .0061 | .0346 | -.1262 |
| | 3.6 | 4.9 | .047 | .0236 | .0574 | 1.98 | -.038 | -.0041 | .0060 | .0380 | -.1414 |
| | 7.6 | 4.9 | .068 | .0326 | .0733 | 2.08 | -.033 | -.0037 | .0038 | .0455 | -.1763 |
| | 11.7 | 4.9 | .096 | .0461 | .0876 | 2.09 | -.026 | -.0031 | .0030 | .0529 | -.2108 |
| | 13.5 | 4.9 | .111 | .0541 | .0950 | 2.05 | -.025 | -.0029 | .0027 | .0562 | -.2287 |
| 3.53 | -10.4 | 5.0 | -.037 | .0206 | .0013 | -1.78 | -.042 | -.0052 | .0045 | .0142 | -.0336 |
| | -6.4 | 5.0 | -.010 | .0161 | .0162 | -0.62 | -.040 | -.0047 | .0047 | .0202 | -.0591 |
| | -4.4 | 5.0 | .002 | .0155 | .0236 | 0.14 | -.039 | -.0046 | .0049 | .0232 | -.0716 |
| | -2.4 | 5.0 | .014 | .0160 | .0310 | 0.89 | -.039 | -.0045 | .0052 | .0267 | -.0869 |
| | -0.4 | 5.0 | .024 | .0172 | .0396 | 1.37 | -.038 | -.0042 | .0049 | .0302 | -.1019 |
| | 1.5 | 5.0 | .035 | .0191 | .0469 | 1.84 | -.038 | -.0040 | .0048 | .0337 | -.1169 |
| | 3.5 | 5.0 | .046 | .0224 | .0545 | 2.05 | -.036 | -.0038 | .0047 | .0374 | -.1316 |
| | 7.6 | 5.0 | .068 | .0315 | .0700 | 2.17 | -.033 | -.0034 | .0035 | .0455 | -.1666 |
| | 11.6 | 5.0 | .096 | .0450 | .0850 | 2.14 | -.026 | -.0028 | .0023 | .0534 | -.2026 |
| | 13.4 | 5.1 | .110 | .0528 | .0924 | 2.07 | -.025 | -.0025 | .0018 | .0573 | -.2218 |

TABLE VI.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(d) BV

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.4 | 4.9 | -.045 | .0163 | -.0155 | -2.74 | -.048 | -.0066 | .0080 | | |
| | -6.4 | 4.9 | -.023 | .0100 | -.0091 | -2.32 | -.041 | -.0060 | .0081 | | |
| | -4.4 | 4.9 | -.017 | .0082 | -.0056 | -2.03 | -.039 | -.0056 | .0081 | | |
| | -2.4 | 4.9 | -.012 | .0070 | -.0019 | -1.72 | -.038 | -.0052 | .0081 | | |
| | -0.4 | 4.9 | -.007 | .0064 | .0022 | -1.14 | -.037 | -.0048 | .0078 | | |
| | 1.6 | 4.9 | -.001 | .0063 | .0057 | -0.23 | -.036 | -.0044 | .0075 | | |
| | 3.6 | 4.9 | .004 | .0066 | .0091 | 0.56 | -.037 | -.0041 | .0072 | | |
| | 7.6 | 4.9 | .021 | .0092 | .0161 | 2.30 | -.037 | -.0035 | .0059 | | |
| | 11.6 | 5.0 | .050 | .0168 | .0219 | 3.01 | -.037 | -.0033 | .0031 | | |
| | 13.4 | 5.0 | .065 | .0221 | .0256 | 2.95 | -.038 | -.0033 | .0018 | | |
| 3.05 | -10.4 | 4.9 | -.047 | .0164 | -.0151 | -2.85 | -.046 | -.0055 | .0059 | | |
| | -6.4 | 4.9 | -.025 | .0099 | -.0087 | -2.56 | -.040 | -.0049 | .0059 | | |
| | -4.3 | 4.9 | -.017 | .0080 | -.0050 | -2.17 | -.037 | -.0047 | .0058 | | |
| | -2.3 | 4.9 | -.012 | .0069 | -.0016 | -1.69 | -.036 | -.0045 | .0059 | | |
| | -0.3 | 4.9 | -.006 | .0062 | .0022 | -0.93 | -.034 | -.0042 | .0056 | | |
| | 1.6 | 4.9 | .000 | .0061 | .0053 | -0.02 | -.034 | -.0038 | .0052 | | |
| | 3.6 | 4.9 | .006 | .0063 | .0089 | 0.99 | -.035 | -.0036 | .0050 | | |
| | 7.6 | 4.9 | .025 | .0092 | .0151 | 2.67 | -.036 | -.0031 | .0041 | | |
| | 11.6 | 4.9 | .053 | .0166 | .0214 | 3.15 | -.038 | -.0029 | .0017 | | |
| | 13.4 | 5.0 | .065 | .0217 | .0248 | 2.98 | -.038 | -.0029 | .0009 | | |
| 3.53 | -10.4 | 5.0 | -.047 | .0168 | -.0146 | -2.77 | -.045 | -.0048 | .0045 | | |
| | -6.4 | 5.0 | -.025 | .0105 | -.0080 | -2.39 | -.039 | -.0042 | .0045 | | |
| | -4.4 | 5.0 | -.016 | .0089 | -.0050 | -1.83 | -.036 | -.0039 | .0043 | | |
| | -2.4 | 5.0 | -.012 | .0076 | -.0014 | -1.60 | -.035 | -.0038 | .0044 | | |
| | -0.4 | 5.0 | -.005 | .0067 | .0018 | -0.71 | -.035 | -.0036 | .0044 | | |
| | 1.5 | 5.0 | .001 | .0066 | .0049 | 0.11 | -.033 | -.0033 | .0040 | | |
| | 3.5 | 5.0 | .007 | .0070 | .0084 | 1.01 | -.034 | -.0032 | .0040 | | |
| | 7.5 | 5.0 | .025 | .0099 | .0144 | 2.55 | -.036 | -.0028 | .0033 | | |
| | 11.6 | 5.0 | .051 | .0170 | .0211 | 3.00 | -.037 | -.0027 | .0013 | | |
| | 13.4 | 5.0 | .064 | .0219 | .0241 | 2.91 | -.038 | -.0026 | .0006 | | |

TABLE VI.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

(e) BC, $\delta = 0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_\beta}$ | $C_{n_\beta}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 4.9 | -.069 | .0194 | -.0509 | -3.59 | -.021 | .0012 | -.0047 | -.0229 | .0889 |
| | -6.4 | 4.9 | -.039 | .0101 | -.0325 | -3.86 | -.017 | .0009 | -.0063 | -.0140 | .0546 |
| | -4.4 | 4.9 | -.026 | .0075 | -.0222 | -3.52 | -.015 | .0007 | -.0068 | -.0092 | .0365 |
| | -2.4 | 4.9 | -.015 | .0059 | -.0111 | -2.55 | -.015 | .0004 | -.0070 | -.0047 | .0189 |
| | -0.4 | 4.9 | -.005 | .0055 | -.0004 | -0.83 | -.014 | .0001 | -.0071 | .0000 | .0000 |
| | 1.6 | 4.9 | .005 | .0055 | .0101 | 0.98 | -.015 | -.0002 | -.0069 | .0044 | -.0179 |
| | 3.6 | 4.9 | .016 | .0065 | .0205 | 2.51 | -.015 | -.0005 | -.0067 | .0090 | -.0355 |
| | 7.6 | 4.9 | .043 | .0120 | .0418 | 3.53 | -.018 | -.0009 | -.0059 | .0185 | -.0720 |
| | 11.6 | 5.0 | .079 | .0232 | .0579 | 3.38 | -.022 | -.0011 | -.0043 | .0270 | -.1045 |
| | 13.4 | 5.0 | .096 | .0301 | .0652 | 3.18 | -.023 | -.0013 | -.0041 | .0306 | -.1192 |
| 3.05 | -10.4 | 4.9 | -.067 | .0186 | -.0453 | -3.60 | -.022 | .0012 | -.0046 | -.0199 | .0768 |
| | -6.4 | 4.9 | -.037 | .0099 | -.0291 | -3.71 | -.019 | .0009 | -.0059 | -.0121 | .0465 |
| | -4.4 | 4.9 | -.025 | .0074 | -.0199 | -3.40 | -.017 | .0007 | -.0066 | -.0082 | .0317 |
| | -2.4 | 4.8 | -.014 | .0057 | -.0103 | -2.38 | -.016 | .0003 | -.0069 | -.0041 | .0162 |
| | -0.4 | 4.8 | -.003 | .0052 | -.0009 | -0.54 | -.016 | .0001 | -.0070 | .0000 | .0000 |
| | 1.5 | 4.8 | .006 | .0054 | .0091 | 1.11 | -.016 | -.0002 | -.0068 | .0039 | -.0149 |
| | 3.5 | 4.9 | .017 | .0065 | .0186 | 2.67 | -.016 | -.0005 | -.0066 | .0082 | -.0319 |
| | 7.6 | 4.9 | .044 | .0121 | .0364 | 3.65 | -.020 | -.0009 | -.0053 | .0162 | -.0616 |
| | 11.6 | 4.9 | .079 | .0228 | .0517 | 3.46 | -.022 | -.0012 | -.0047 | .0238 | -.0910 |
| | 13.4 | 4.9 | .095 | .0295 | .0589 | 3.22 | -.022 | -.0015 | -.0051 | .0271 | -.1042 |
| 3.53 | -10.5 | 5.0 | -.066 | .0193 | -.0418 | -3.40 | -.023 | .0012 | -.0048 | -.0181 | .0679 |
| | -6.4 | 4.9 | -.036 | .0108 | -.0261 | -3.33 | -.020 | .0008 | -.0054 | -.0109 | .0412 |
| | -4.4 | 4.9 | -.023 | .0083 | -.0179 | -2.78 | -.019 | .0006 | -.0059 | -.0073 | .0274 |
| | -2.4 | 4.9 | -.014 | .0069 | -.0093 | -1.97 | -.018 | .0003 | -.0063 | -.0035 | .0129 |
| | -0.4 | 4.9 | -.003 | .0062 | -.0006 | -0.51 | -.018 | .0001 | -.0064 | .0000 | .0000 |
| | 1.5 | 4.9 | .007 | .0065 | .0081 | 1.14 | -.018 | -.0002 | -.0063 | .0035 | -.0129 |
| | 3.5 | 4.9 | .017 | .0074 | .0170 | 2.30 | -.018 | -.0004 | -.0059 | .0073 | -.0265 |
| | 13.4 | 5.0 | .090 | .0289 | .0554 | 3.13 | -.022 | -.0016 | -.0054 | .0248 | -.0946 |

TABLE VI.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Continued

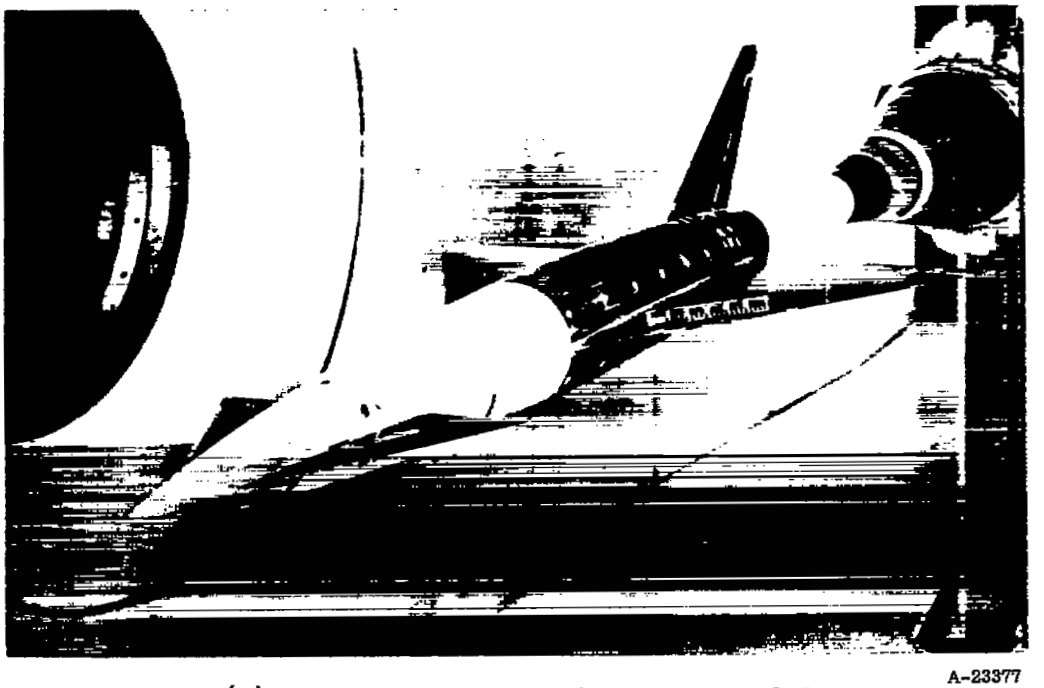
(f) BC, $\delta = 10.0^{\circ}$

| M | $\alpha$, deg | $\beta$, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.5 | 4.9 | -.048 | .0138 | -.0239 | -3.50 | -.022 | .0010 | -.0057 | -.0038 | .0219 |
| | -6.4 | 4.9 | -.016 | .0080 | -.0050 | -2.04 | -.015 | .0006 | -.0072 | .0049 | -.0128 |
| | -4.4 | 4.9 | -.005 | .0071 | .0046 | -0.65 | -.014 | .0003 | -.0075 | .0092 | -.0293 |
| | -2.4 | 4.9 | .008 | .0070 | .0144 | 1.12 | -.014 | .0001 | -.0075 | .0135 | -.0464 |
| | -0.4 | 4.9 | .018 | .0080 | .0241 | 2.29 | -.014 | -.0001 | -.0077 | .0179 | -.0640 |
| | 1.6 | 4.9 | .030 | .0098 | .0335 | 3.04 | -.013 | -.0005 | -.0078 | .0222 | -.0796 |
| | 3.6 | 4.9 | .040 | .0123 | .0433 | 3.23 | -.014 | -.0008 | -.0078 | .0264 | -.0954 |
| | 7.6 | 4.9 | .062 | .0201 | .0626 | 3.10 | -.012 | -.0013 | -.0075 | .0349 | -.1285 |
| | 11.7 | 5.0 | .094 | .0331 | .0780 | 2.83 | -.015 | -.0016 | -.0061 | .0427 | -.1603 |
| | 13.5 | 5.0 | .111 | .0411 | .0848 | 2.71 | -.016 | -.0017 | -.0057 | .0465 | -.1765 |
| 3.06 | -10.4 | 4.9 | -.049 | .0150 | -.0207 | -3.23 | -.023 | .0010 | -.0057 | -.0019 | .0162 |
| | -6.4 | 4.9 | -.017 | .0094 | -.0036 | -1.84 | -.018 | .0006 | -.0068 | .0055 | -.0144 |
| | -4.4 | 4.9 | -.007 | .0083 | .0047 | -0.80 | -.016 | .0003 | -.0072 | .0091 | -.0273 |
| | -2.3 | 4.9 | .005 | .0082 | .0131 | 0.62 | -.016 | .0001 | -.0074 | .0127 | -.0419 |
| | -0.4 | 4.9 | .015 | .0088 | .0220 | 1.73 | -.016 | -.0002 | -.0074 | .0164 | -.0557 |
| | 1.6 | 4.9 | .027 | .0100 | .0307 | 2.66 | -.016 | -.0005 | -.0073 | .0203 | -.0708 |
| | 3.6 | 4.9 | .038 | .0126 | .0392 | 3.01 | -.015 | -.0007 | -.0072 | .0242 | -.0840 |
| | 7.6 | 4.9 | .061 | .0204 | .0562 | 3.01 | -.017 | -.0012 | -.0066 | .0321 | -.1159 |
| | 11.7 | 4.9 | .094 | .0329 | .0705 | 2.85 | -.018 | -.0016 | -.0058 | .0395 | -.1460 |
| | 13.5 | 5.0 | .107 | .0397 | .0779 | 2.70 | -.018 | -.0016 | -.0053 | .0427 | -.1595 |
| 3.53 | -10.4 | 5.0 | -.049 | .0151 | -.0188 | -3.22 | -.025 | .0009 | -.0056 | -.0008 | .0129 |
| | -6.5 | 4.9 | -.021 | .0098 | -.0026 | -2.12 | -.020 | .0005 | -.0062 | .0060 | -.0141 |
| | -4.4 | 4.9 | -.009 | .0086 | .0051 | -1.05 | -.019 | .0002 | -.0065 | .0092 | -.0265 |
| | -2.4 | 4.9 | .002 | .0083 | .0132 | 0.28 | -.018 | .0000 | -.0067 | .0125 | -.0389 |
| | -0.4 | 4.9 | .014 | .0087 | .0208 | 1.56 | -.017 | -.0003 | -.0067 | .0161 | -.0527 |
| | 1.5 | 4.9 | .023 | .0100 | .0290 | 2.31 | -.017 | -.0005 | -.0065 | .0194 | -.0650 |
| | 3.5 | 4.9 | .034 | .0123 | .0373 | 2.78 | -.018 | -.0007 | -.0062 | .0232 | -.0794 |
| | 7.5 | 5.0 | .058 | .0193 | .0530 | 3.00 | -.019 | -.0011 | -.0056 | .0301 | -.1058 |
| | 11.6 | 5.0 | .087 | .0309 | .0675 | 2.80 | -.018 | -.0014 | -.0051 | .0374 | -.1353 |
| | 13.4 | 5.0 | .103 | .0384 | .0747 | 2.67 | -.017 | -.0016 | -.0051 | .0408 | -.1496 |

TABLE VI.- AERODYNAMIC CHARACTERISTICS OF WING-OFF CONFIGURATIONS AT $\beta \approx 5^{\circ}$ - Concluded

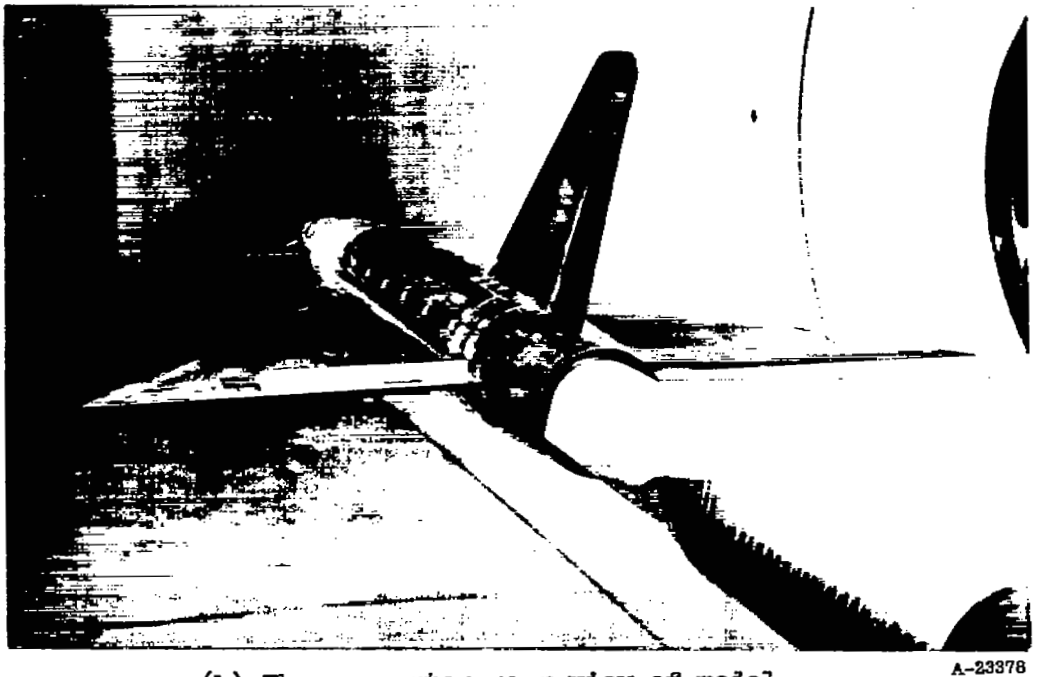
(g) BC, $\delta = 20.0^{\circ}$

| M | α, deg | β, deg | $C_L$ | $C_D$ | $C_m$ | L/D | $C_Y$ | $C_{l_s}$ | $C_{n_s}$ | $C_{Z_c}$ | $C_{h_c}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.58 | -10.4 | 4.9 | -.036 | .0181 | -.0016 | -1.98 | -.017 | .0011 | -.0074 | .0140 | -.0378 |
| | -6.4 | 4.9 | -.002 | .0139 | .0149 | -0.16 | -.017 | .0006 | -.0075 | .0215 | -.0708 |
| | -4.3 | 4.9 | .013 | .0136 | .0226 | 0.98 | -.018 | .0003 | -.0071 | .0254 | -.0872 |
| | -2.3 | 4.9 | .025 | .0147 | .0314 | 1.70 | -.018 | .0001 | -.0073 | .0294 | -.1050 |
| | -0.3 | 4.9 | .035 | .0167 | .0408 | 2.10 | -.016 | -.0002 | -.0076 | .0332 | -.1213 |
| | 1.6 | 4.9 | .043 | .0196 | .0505 | 2.20 | -.015 | -.0005 | -.0078 | .0374 | -.1388 |
| | 3.6 | 4.9 | .054 | .0231 | .0592 | 2.33 | -.014 | -.0007 | -.0078 | .0415 | -.1565 |
| | 7.7 | 4.9 | .076 | .0330 | .0767 | 2.29 | -.011 | -.0015 | -.0088 | .0496 | -.1912 |
| | 11.7 | 5.0 | .099 | .0465 | .0916 | 2.14 | -.010 | -.0018 | -.0075 | .0576 | -.2278 |
| | 13.5 | 5.0 | .116 | .0555 | .0988 | 2.10 | -.009 | -.0018 | -.0066 | .0616 | -.2474 |
| 3.05 | -10.4 | 4.9 | -.035 | .0186 | -.0010 | -1.89 | -.022 | .0009 | -.0065 | .0143 | -.0353 |
| | -6.4 | 4.9 | -.006 | .0143 | .0144 | -0.45 | -.019 | .0005 | -.0070 | .0207 | -.0632 |
| | -4.3 | 4.9 | .009 | .0139 | .0215 | 0.63 | -.019 | .0002 | -.0068 | .0243 | -.0800 |
| | -2.3 | 4.9 | .020 | .0145 | .0299 | 1.40 | -.018 | .0000 | -.0070 | .0276 | -.0933 |
| | -0.3 | 4.9 | .030 | .0163 | .0388 | 1.81 | -.017 | -.0003 | -.0074 | .0312 | -.1090 |
| | 1.6 | 4.9 | .037 | .0187 | .0472 | 1.99 | -.017 | -.0005 | -.0073 | .0351 | -.1262 |
| | 3.6 | 4.9 | .050 | .0219 | .0554 | 2.26 | -.016 | -.0008 | -.0073 | .0388 | -.1410 |
| | 7.7 | 4.9 | .069 | .0312 | .0715 | 2.22 | -.015 | -.0013 | -.0077 | .0466 | -.1750 |
| | 11.7 | 5.0 | .100 | .0458 | .0861 | 2.18 | -.014 | -.0016 | -.0065 | .0547 | -.2124 |
| | 13.5 | 5.0 | .113 | .0539 | .0936 | 2.11 | -.013 | -.0015 | -.0055 | .0583 | -.2300 |
| 3.53 | -10.4 | 5.0 | -.032 | .0178 | -.0009 | -1.80 | -.024 | .0007 | -.0060 | .0143 | -.0334 |
| | -6.4 | 4.9 | -.005 | .0141 | .0139 | -0.35 | -.021 | .0004 | -.0062 | .0202 | -.0591 |
| | -4.4 | 4.9 | .008 | .0137 | .0210 | 0.58 | -.021 | .0002 | -.0064 | .0235 | -.0725 |
| | -2.4 | 4.9 | .020 | .0143 | .0284 | 1.40 | -.020 | -.0001 | -.0065 | .0268 | -.0866 |
| | -0.4 | 4.9 | .029 | .0160 | .0373 | 1.78 | -.019 | -.0003 | -.0067 | .0304 | -.1021 |
| | 1.6 | 4.9 | .039 | .0185 | .0452 | 2.09 | -.019 | -.0005 | -.0066 | .0342 | -.1186 |
| | 3.6 | 4.9 | .049 | .0219 | .0532 | 2.25 | -.018 | -.0007 | -.0065 | .0379 | -.1335 |
| | 7.6 | 5.0 | .073 | .0314 | .0686 | 2.31 | -.017 | -.0011 | -.0065 | .0456 | -.1677 |
| | 11.6 | 5.0 | .100 | .0456 | .0835 | 2.20 | -.016 | -.0014 | -.0054 | .0536 | -.2046 |
| | 13.4 | 5.0 | .114 | .0540 | .0916 | 2.11 | -.016 | -.0014 | -.0049 | .0575 | -.2240 |



A-23377

(a) Three-quarter front view of model.

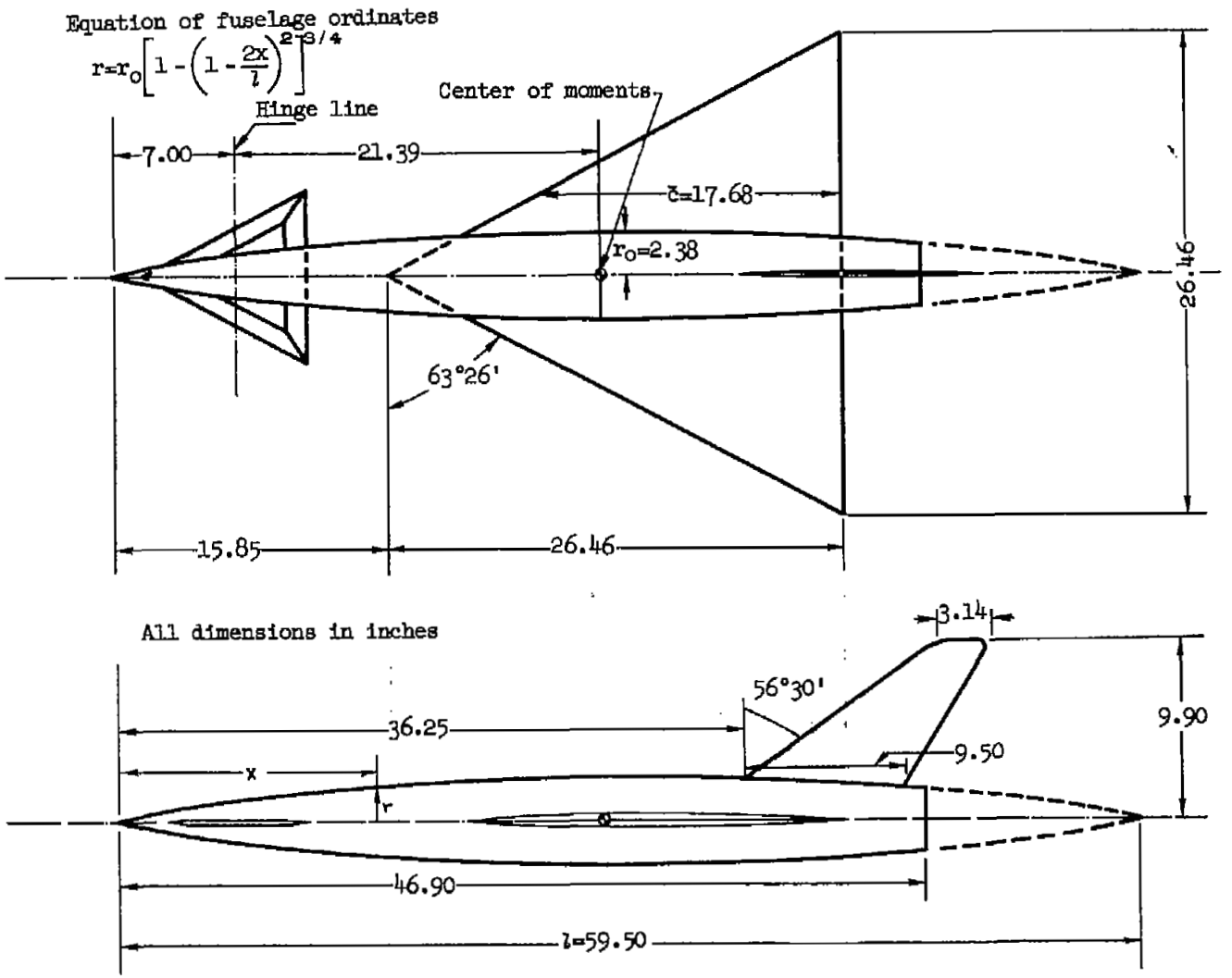


A-23378

(b) Three-quarter rear view of model.

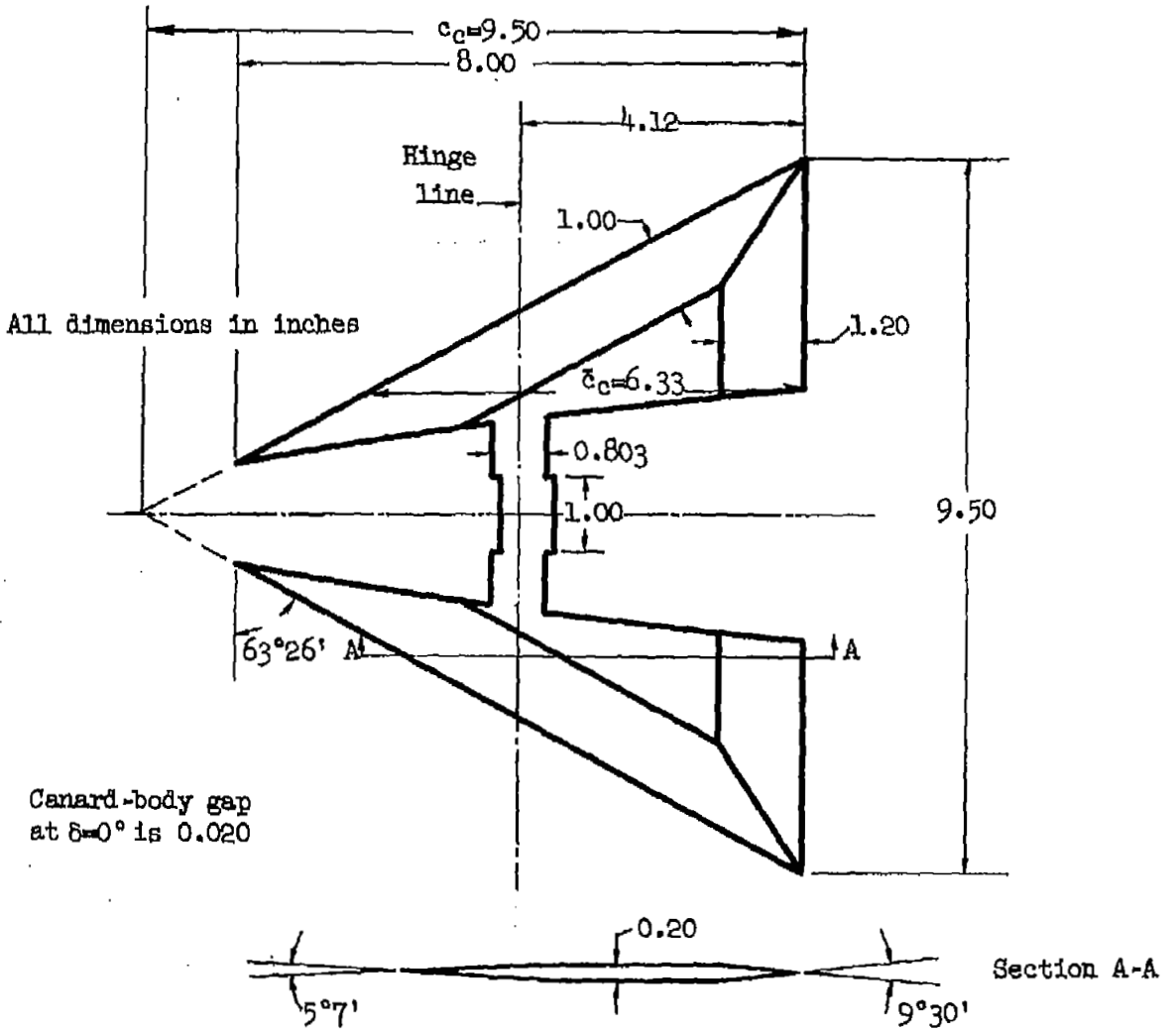
Figure 1.- Model details and dimensions.

[redacted]



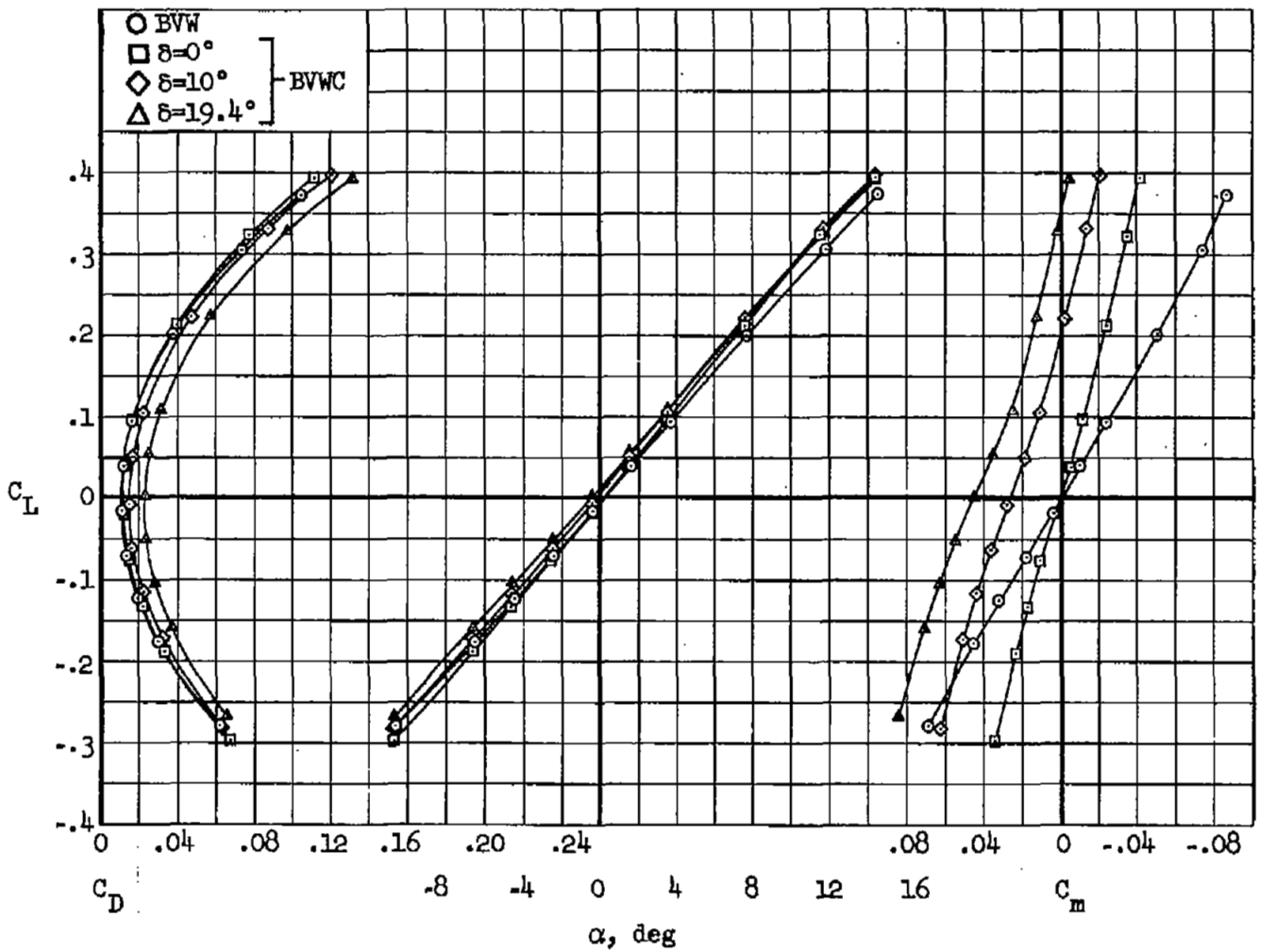

(c) Dimensional sketch of complete model.

Figure 1.- Continued.



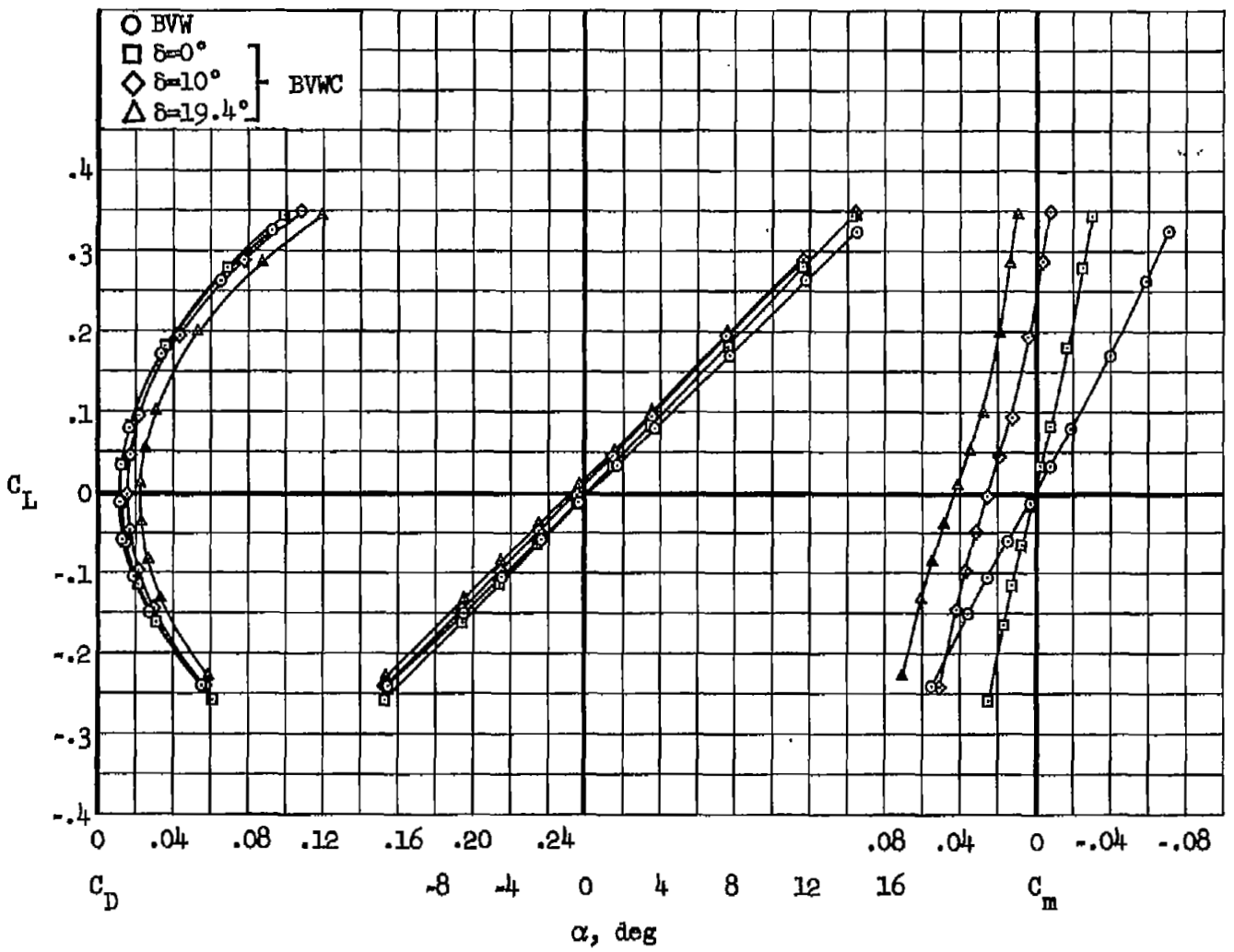

(d) Details of canard surface.

Figure 1.- Concluded.



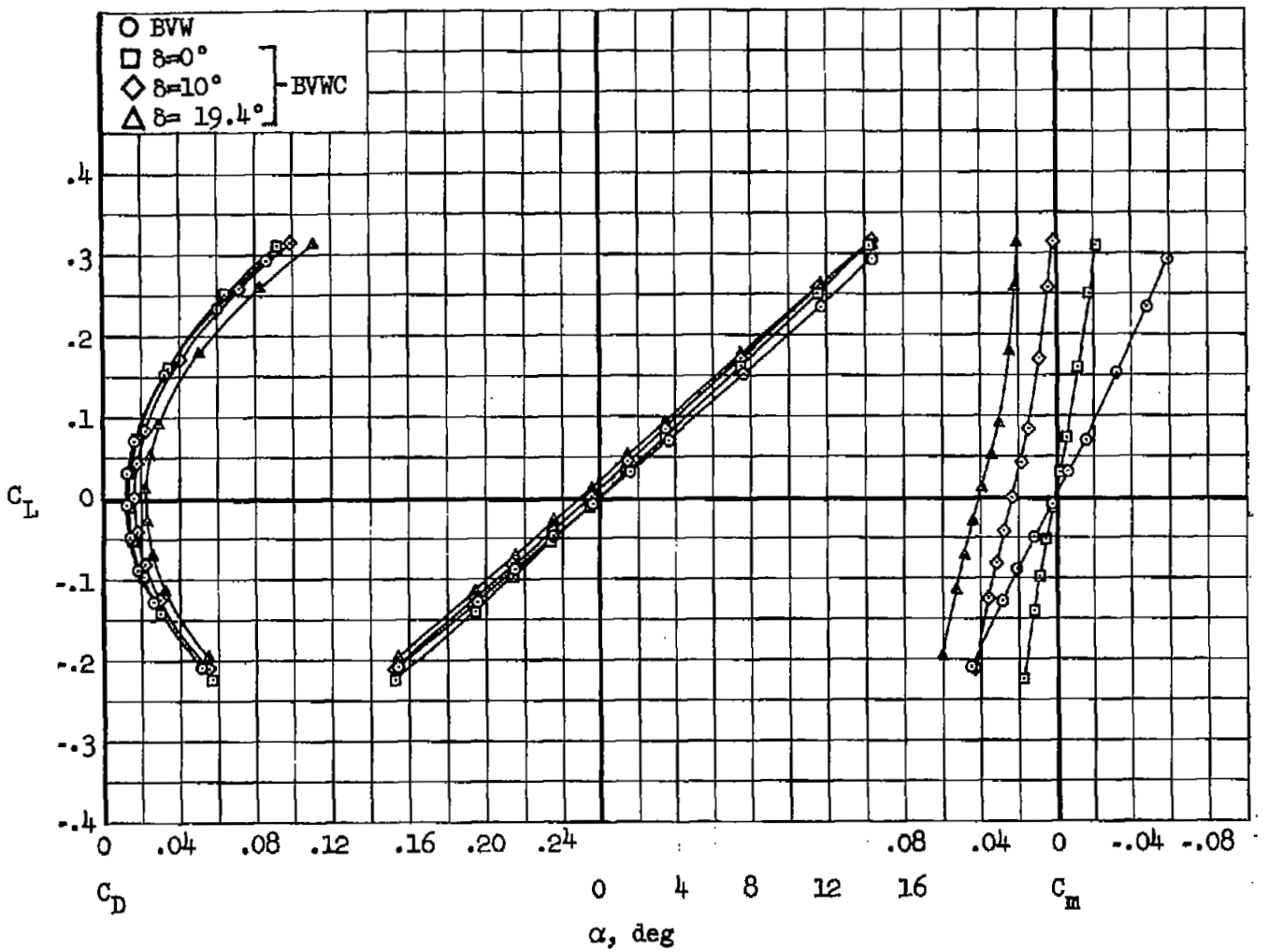

(a) M = 2.58

Figure 2.- Lift, drag, and pitching-moment characteristics with the canard on at constant deflection angles and with the canard off.



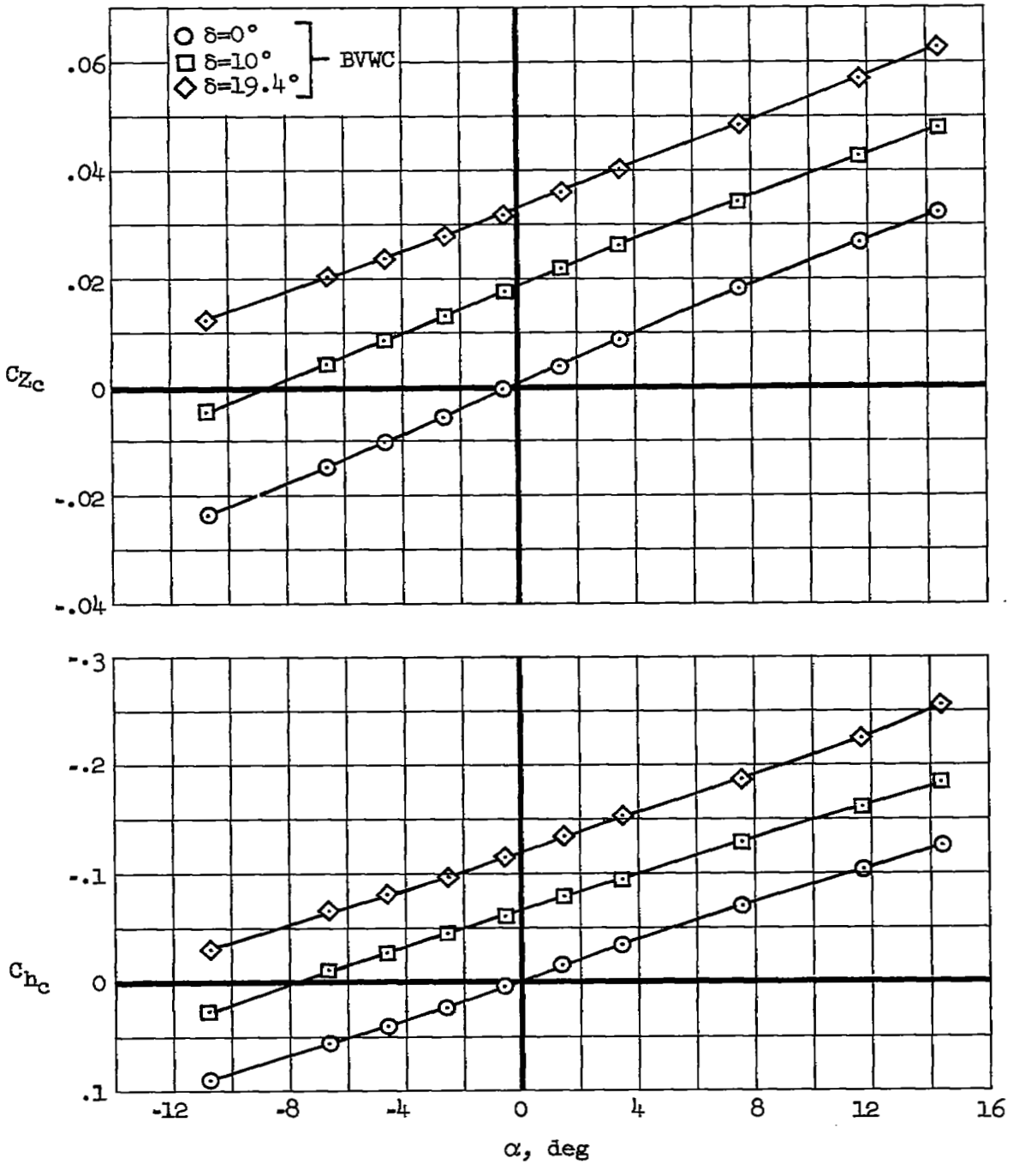

(b) M = 3.06

Figure 2.- Continued.



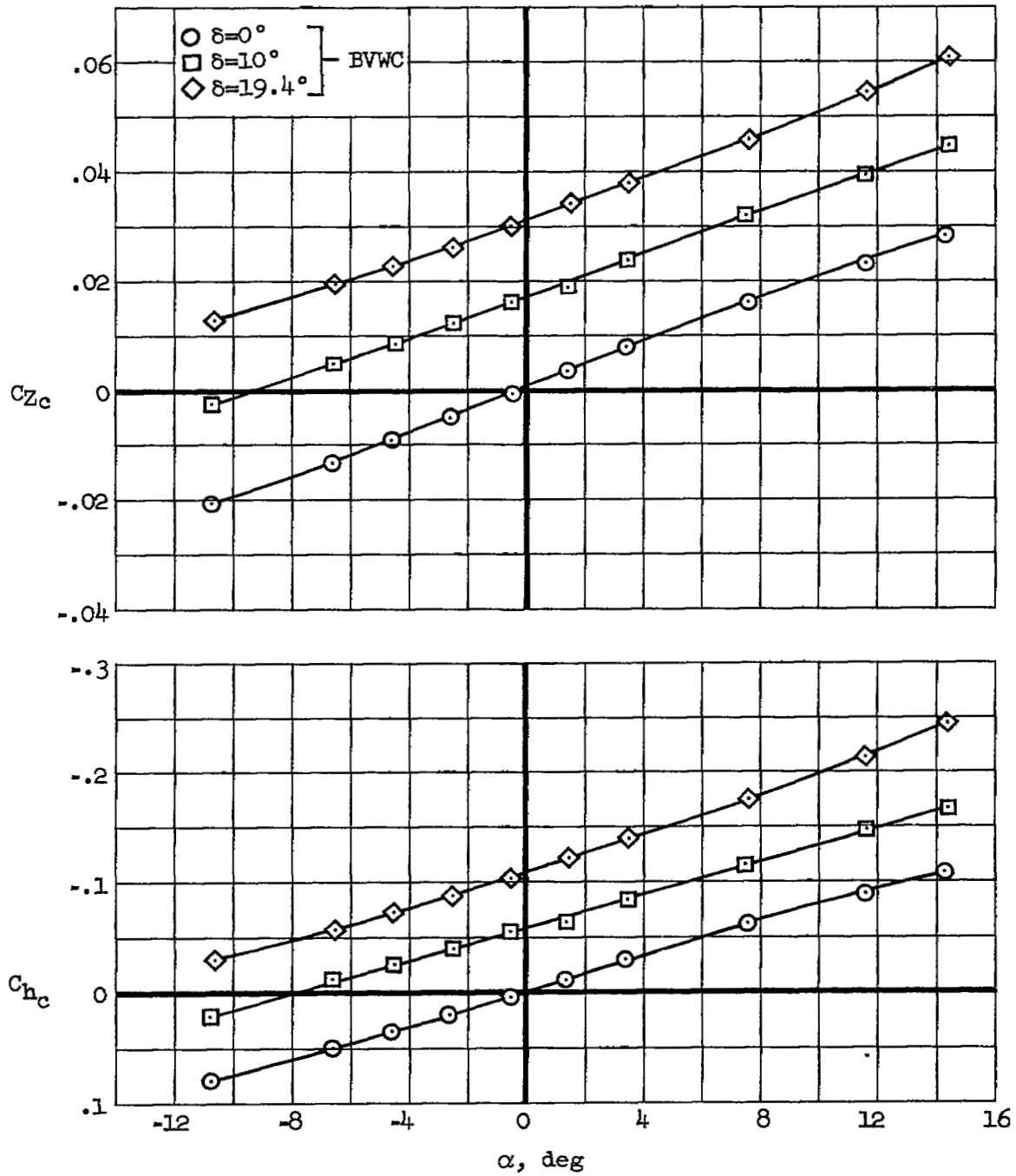

(c) M = 3.53

Figure 2.- Concluded.



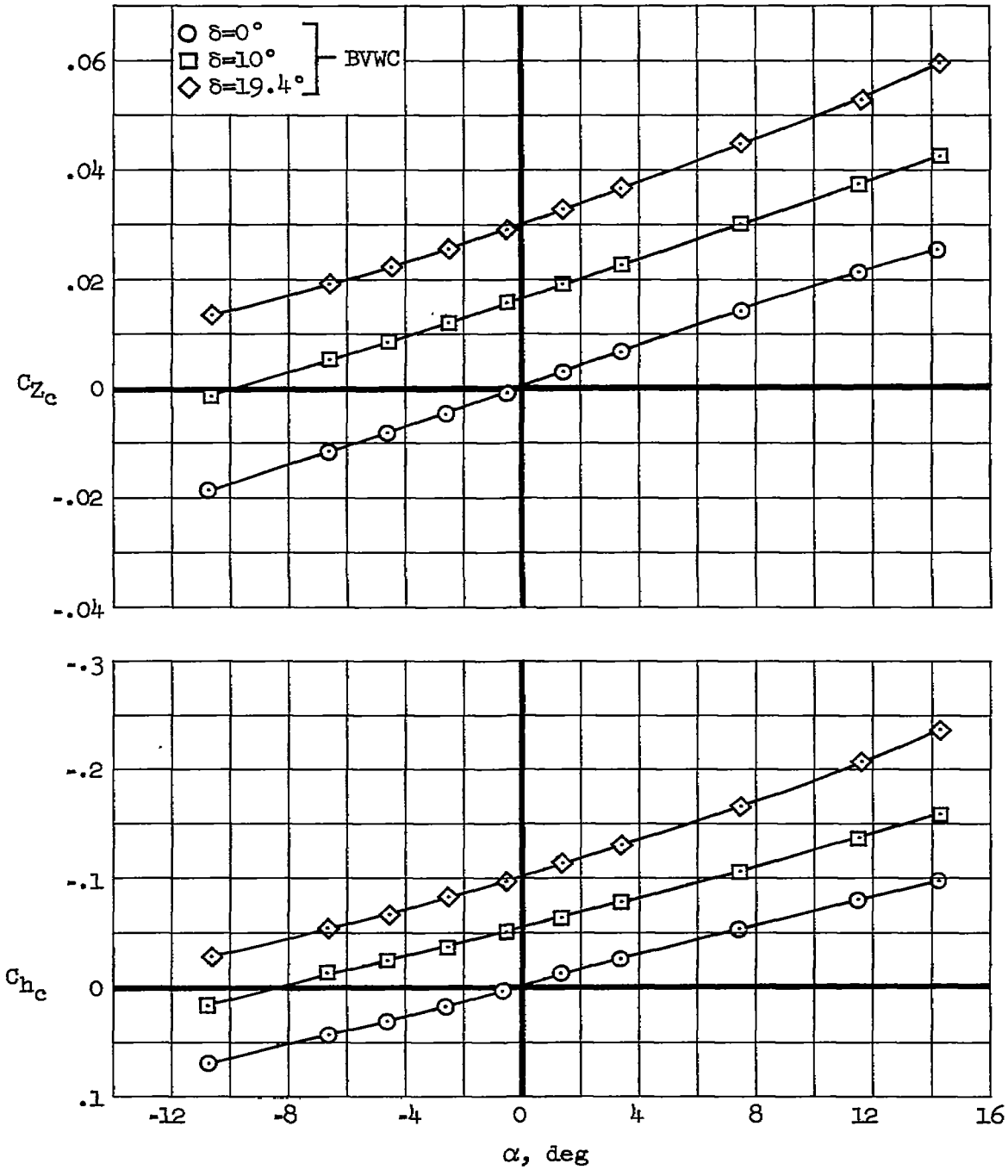

(a) M = 2.58

Figure 3.- Variation of canard normal-force and hinge-moment coefficients as a function of angle of attack at constant deflection angles.




(b) M = 3.06

Figure 3.- Continued.




(c) M = 3.53

Figure 3.- Concluded.

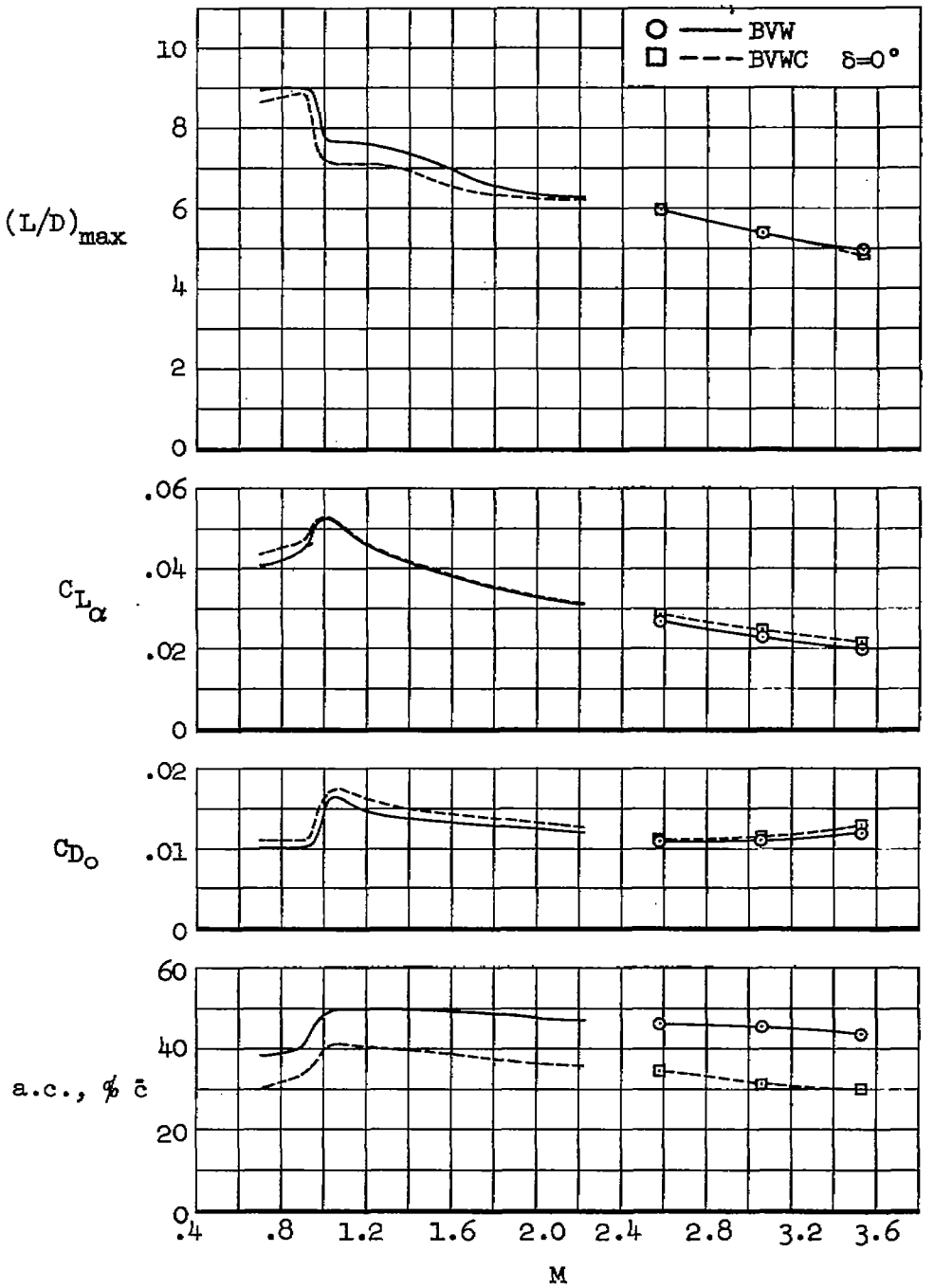
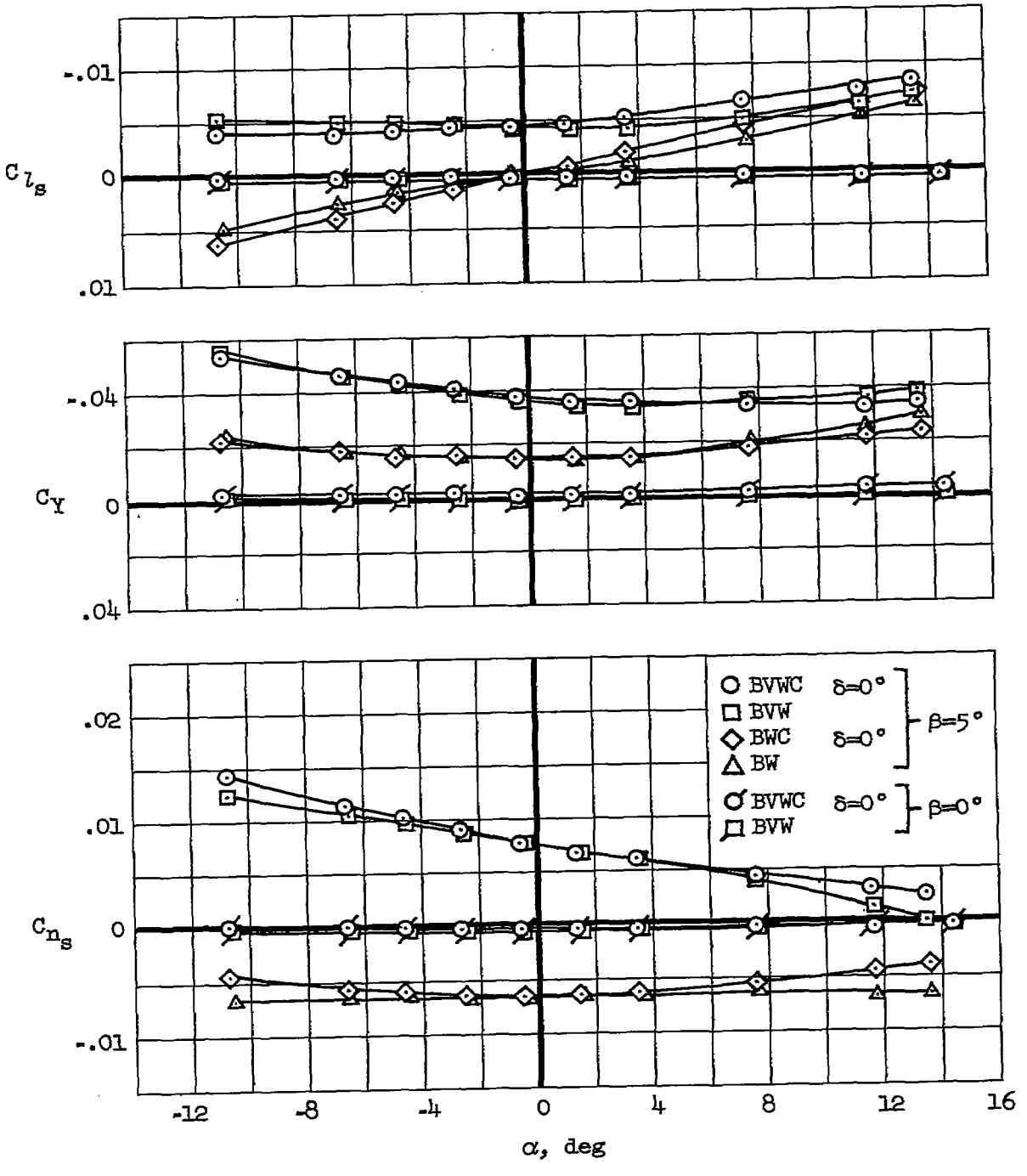
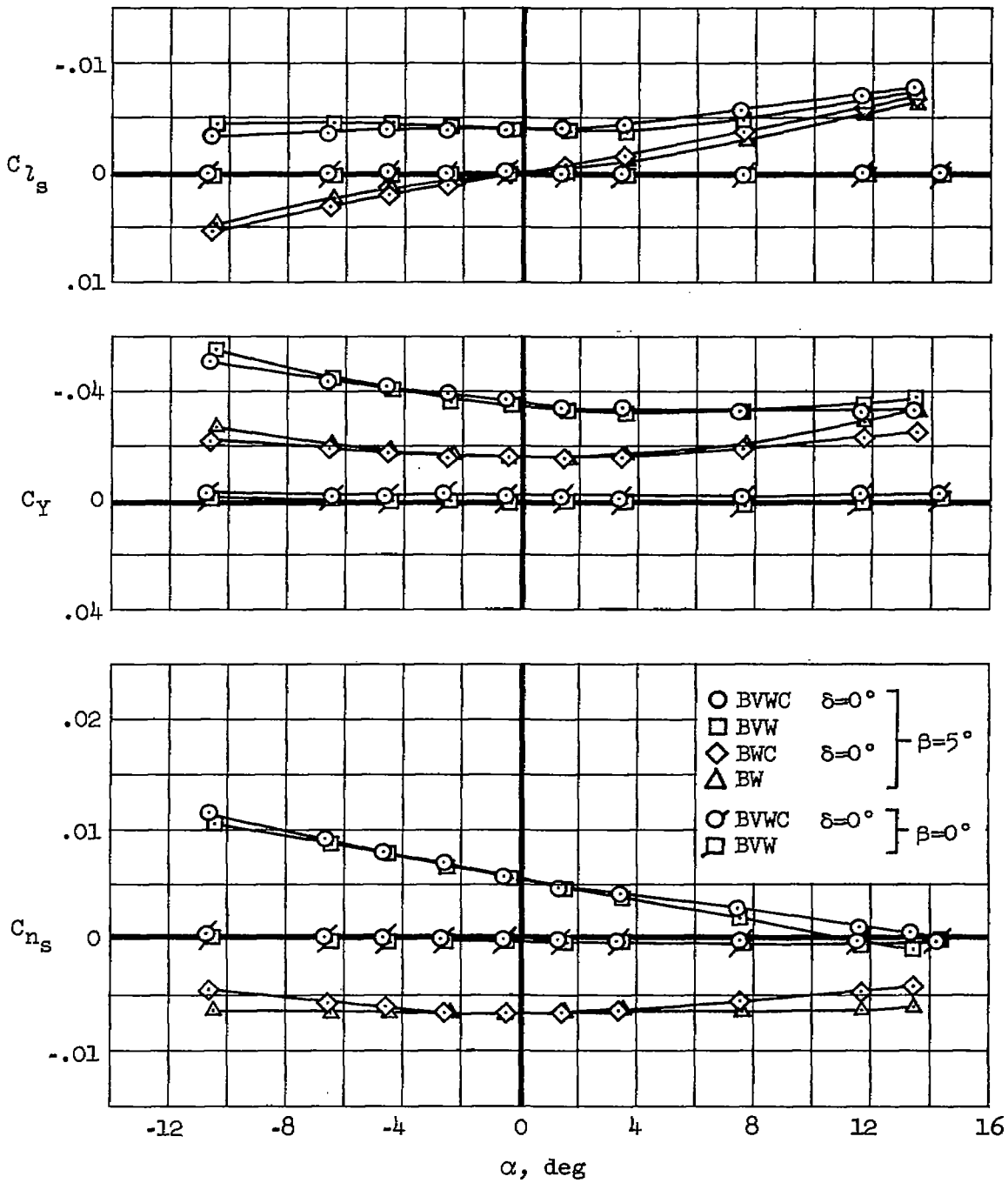



Figure 4.- Variation of maximum lift-drag ratios, lift-curve slope, minimum drag coefficients, and aerodynamic centers as a function of Mach number with the canard on and off. (Mach number 0.70 to 2.22 data obtained from ref. 1.)



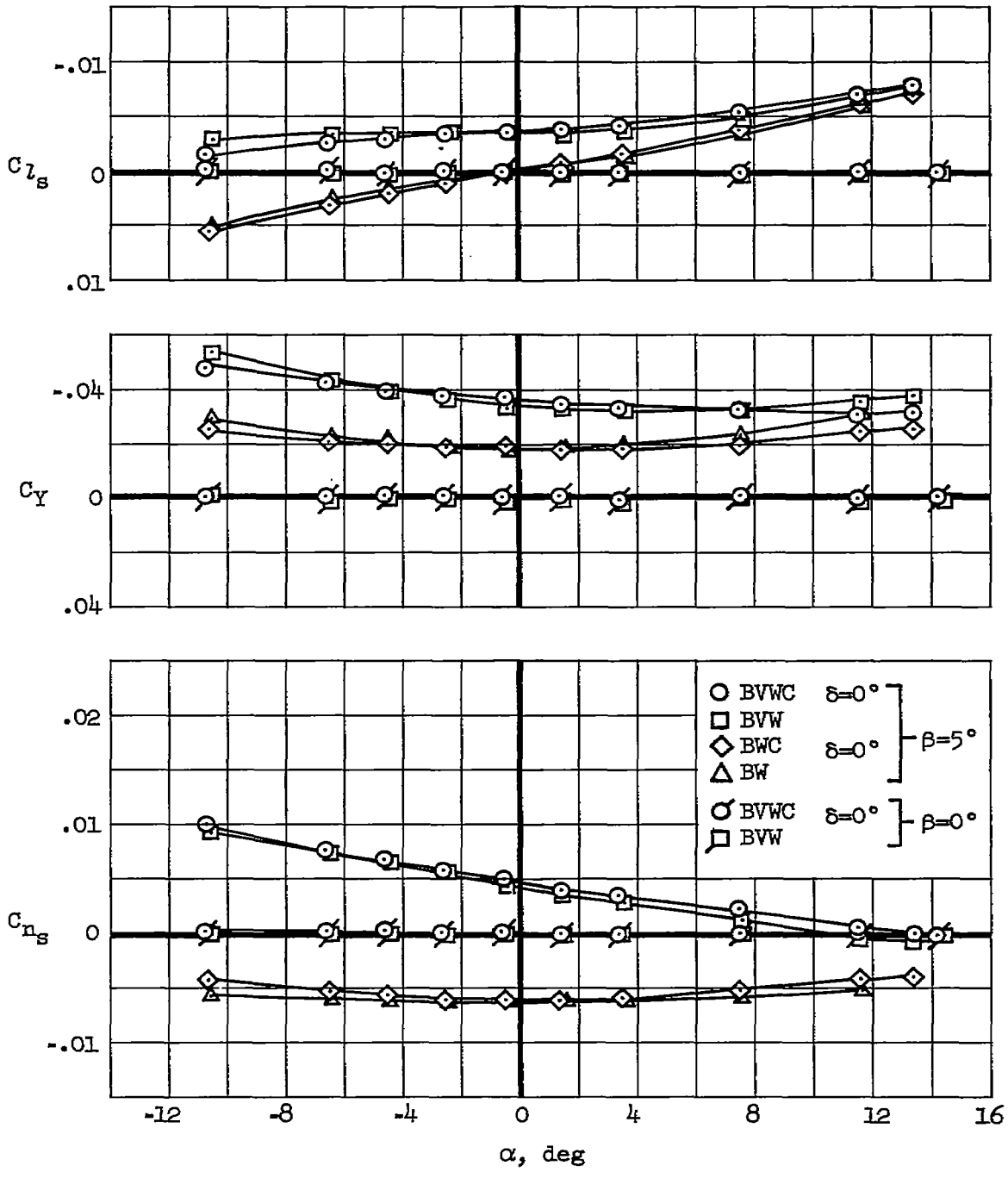

(a) M = 2.58

Figure 5.- The effect of configuration change on the lateral-directional stability characteristics as a function of angle of attack at constant sideslip angles.



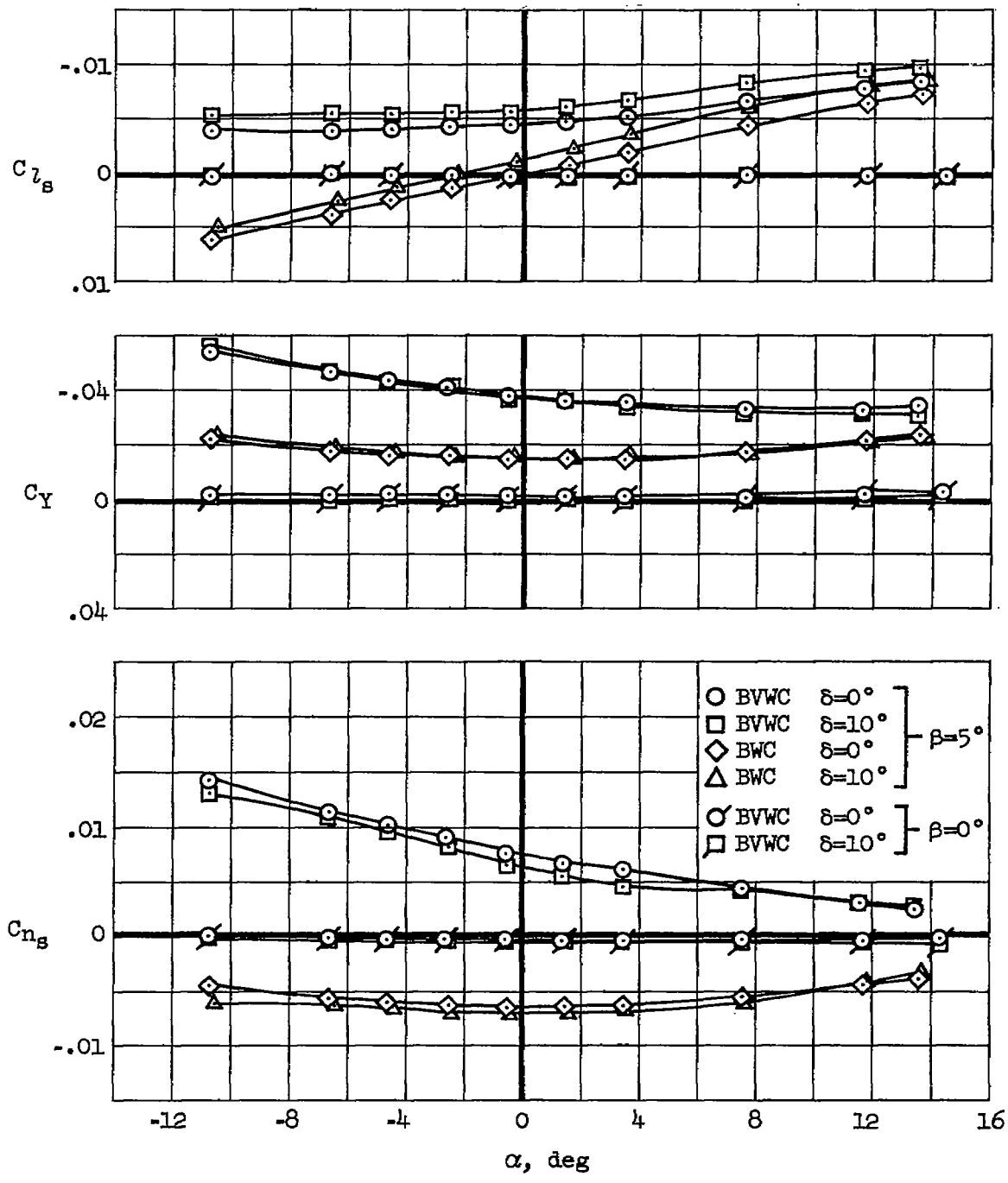

(b) M = 3.06

Figure 5.- Continued.



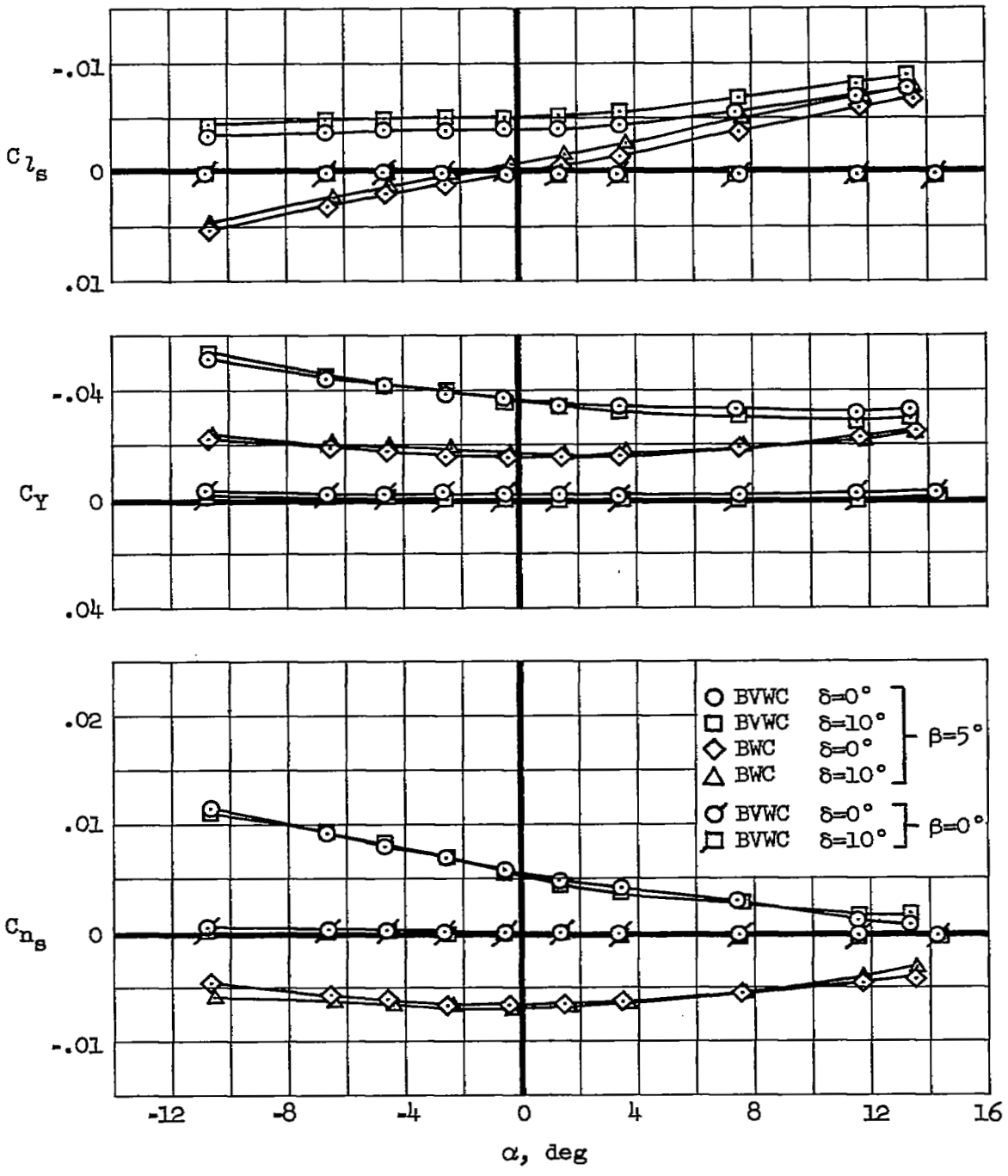

(c) M = 3.53

Figure 5.- Concluded.



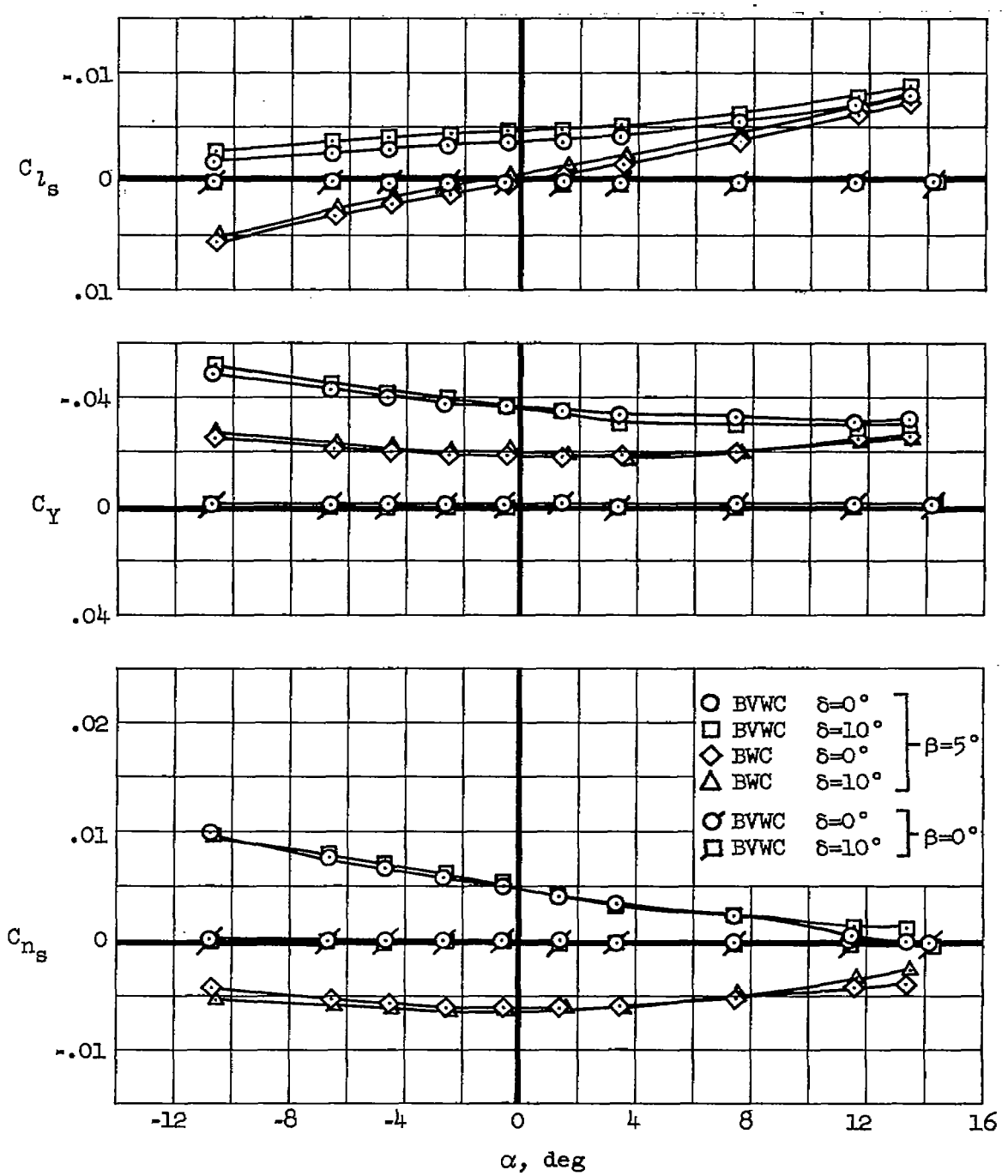

(a) M = 2.58

Figure 6.- The effect of canard deflection on the lateral-directional characteristics with the vertical tail on and off as a function of angle of attack at constant sideslip angles.



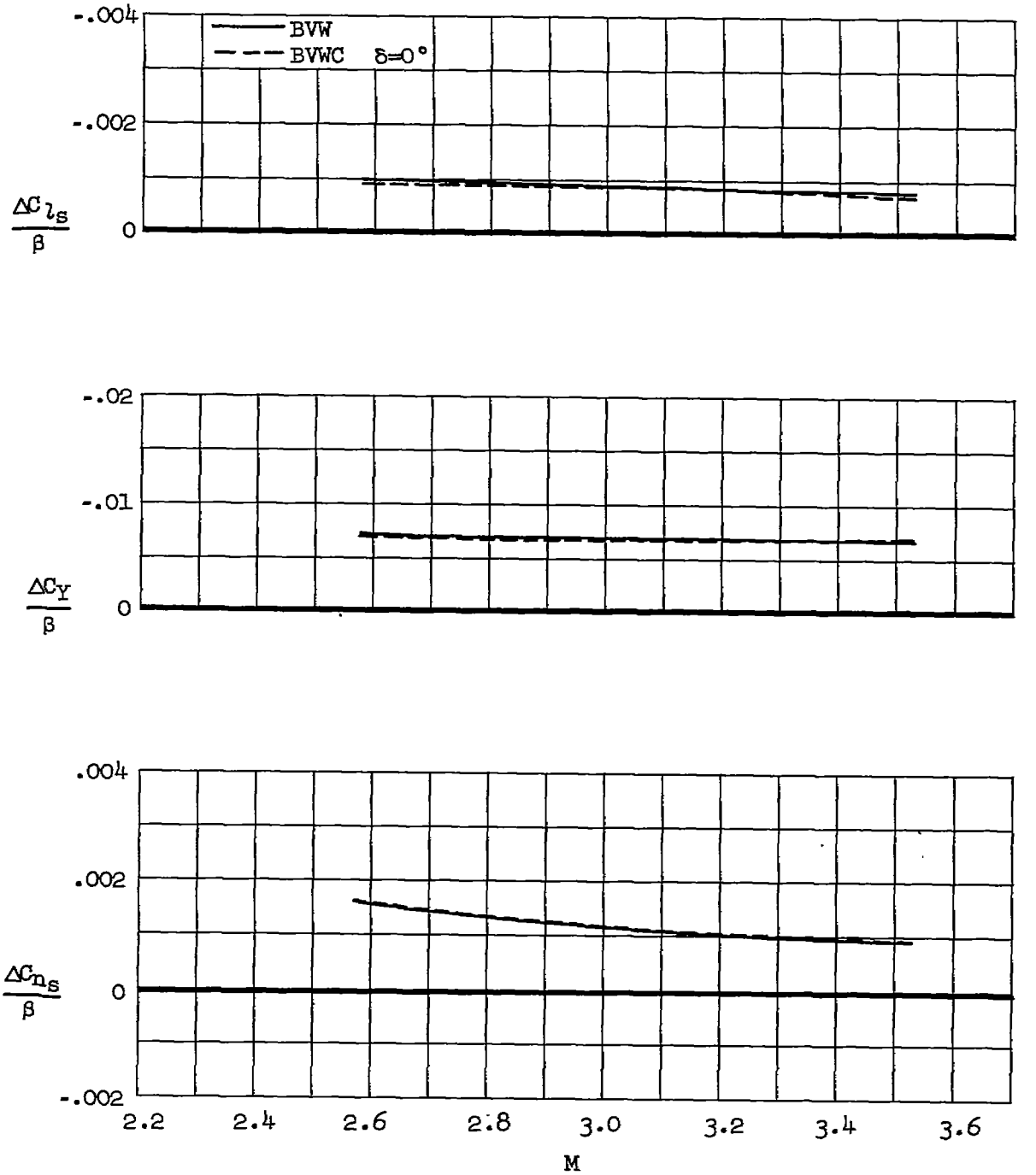

(b) M = 3.06

Figure 6.- Continued.



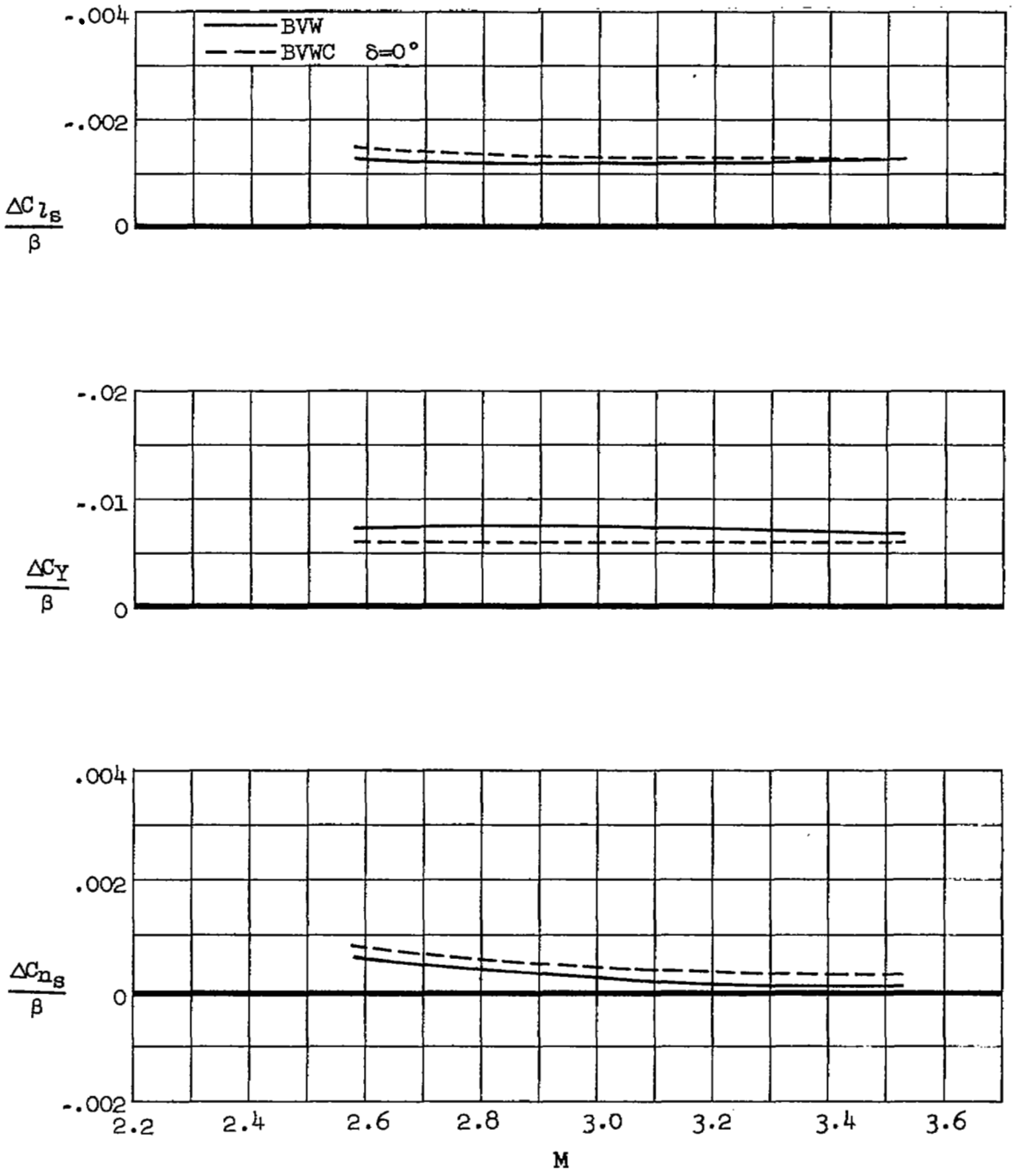

(c) M = 3.53

Figure 6.- Concluded.




(a) $\alpha = 0^{\circ}$

Figure 7.- Variation of $\Delta C_{l_s}/\beta$, $\Delta C_Y/\beta$, $\Delta C_{n_s}/\beta$ as a function of Mach number at constant angle of attack with the canard on and off, and with the vertical tail on.




(b) $\alpha = 10^{\circ}$

Figure 7.- Concluded.

[redacted]

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