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RESEARCH MEMORANDUM

TWO-DIMENSIONAL WIND-TUNNEL INVESTIGATION OF A SYMMETRICAL AIRFOIL SECTION WITH A SEALED INTERNALLY BALANCED CONTROL SURFACE AND A LEADING TAB

By

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TWO-DIMENSIONAL WIND-TUNNEL INVESTIGATION OF A SYMMETRICAL AIRFOIL SECTION WITH A SEALED INTERNALLY BALANCED CONTROL SURFACE AND A LEADING TAB

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SUMMARY

An investigation was made in the Langley two-dimensional low-turbulence tunnel of a symmetrical airfoil section equipped with a 0.30-airfoil-chord sealed internally balanced flap having a 0.70-flap-chord overhang and a 0.33-flap-chord leading tab. Airfoil lift, surface pressure, flap hinge-moment, and flap-balance-chamber pressure characteristics were determined at various flap deflections for a range of tab-flap deflection ratios from 0.5 to 2.0.

The results indicate that the values of $c_{l_{\delta_f}}$ (rate of change of airfoil-section lift coefficient with flap deflection at 0° angle of attack) obtained for tab-flap deflection ratios of 0.65 and 1.5 are about 34 percent and 71 percent higher, respectively, than the calculated value of $c_{l_{\delta_f}}$ corresponding to a tab-flap deflection ratio of 0. The internally balanced overhang required for zero $c_{h_{f_{\delta_f}}}$ (rate of change of flap-section hinge-moment coefficient with flap deflection at 0° angle of attack) ranged from 0.70 flap chord for a tab-flap deflection ratio of 0.65 to 0.81 flap chord for a tab-flap deflection ratio of 1.5. Good agreement was found to exist between the predicted and experimental lift and hinge-moment parameters. It was also found that, when the balance-chamber cover plates were deflected outward, the flap effectiveness, in general, decreased and the effective aerodynamic balance increased.

INTRODUCTION

The use of large high-speed airplanes has imposed upon the designer the problem of obtaining improved lift effectiveness in combination with satisfactory control forces. A method of improving the lift effectiveness of a control surface consists of the use of a leading tab. Large increments in hinge moments, however, are produced by a leading tab which necessitate a control-surface design to counterbalance these effects. One of the most promising types is the sealed internally balanced control surface (flap) inasmuch as the amount of balance can be adjusted without affecting the lift, drag, pitching-moment, or chordwise surface pressure characteristics. The amount of balance will depend upon the tab-flap deflection ratio required to give the desired lift effectiveness.

Tests have been made in the Langley two-dimensional low-turbulence tunnel to investigate the characteristics of a symmetrical NACA 6-series-type airfoil with a sealed internally balanced control surface and a leading tab. Airfoil lift, surface pressures, flap hinge moments, and flap-balance-chamber pressures were measured for several tab-flap deflection ratios.

Misalinement of the balance-chamber cover plates with the airfoil contour due to air loads or manufacturing imperfections, if large, may have serious effects on the resultant hinge moment of a control surface with a sealed internal balance. The investigation was extended, therefore, to include the determination of the effects of balance-chamber cover-plate misalinement on the lift and hinge-moment characteristics. With the model placed tail-to-wind, the hinge-moment characteristics also were obtained in order to provide a means for estimating the required size of a locking pin for mooring the control surface in a strong ground tail wind.

The tests were made at a Reynolds number, for the most part, of about 2.0×10^6 with transition fixed.

COEFFICIENTS AND SYMBOLS

c_l airfoil-section lift coefficient $\left(\frac{\text{Lift}}{qc}\right)$

c_{h_f} flap-section hinge-moment coefficient; positive when trailing edge tends to deflect downward $\left(\frac{\text{Hinge moment}}{q{c_f}^2}\right)$

$\frac{\Delta p}{q}$	seal-pressure difference coefficient (ratio of pressure difference across control-surface seal to free-stream dynamic pressure); positive when pressure below seal is greater than pressure above seal
S	airfoil pressure coefficient $\left(\frac{H_o - p}{q}\right)$
q	free-stream dynamic pressure
c	chord of airfoil with both control surfaces neutral
c_f	chord of flap behind hinge axis
H_o	free-stream total pressure
p	local static pressure
α_o	airfoil-section angle of attack
δ_f	flap deflection with respect to airfoil; positive when trailing edge is deflected downward
δ_t	tab deflection with respect to flap; positive when trailing edge is deflected downward
c_b	chord of overhang balance; distance from flap hinge axis to center of rubber-seal gap
c_t	chord of tab behind hinge axis
R	Reynolds number; based on airfoil chord with both control surfaces neutral

$$c_{l_\alpha} = \left(\frac{\partial c_l}{\partial \alpha_o}\right)_{\delta_f, \delta_t}$$

$$c_{l_{\delta_f}} = \left(\frac{\partial c_l}{\partial \delta_f}\right)_{\alpha_o}$$

$$c_{h_{f_\alpha}} = \left(\frac{\partial c_{h_f}}{\partial \alpha_o}\right)_{\delta_f, \delta_t}$$

$$c_{h_{f_{\delta_f}}} = \left(\frac{\partial c_{h_f}}{\partial \delta_f}\right)_{\alpha_o}$$

$$P_{\alpha} = \left(\frac{\partial \frac{\Delta p}{q}}{\partial \alpha_o}\right)_{\delta_f,\delta_t}$$

$$P_{\delta_f} = \left(\frac{\partial \frac{\Delta p}{q}}{\partial \delta_f}\right)_{\alpha_o}$$

α_{δ_f} flap-section effectiveness parameter

Δc_l increment of airfoil-section lift coefficient

The subscripts following the partial derivatives denote the variables held constant when the partial derivatives are taken. The derivatives were measured at $\alpha_o = 0^{\circ}$ and $\delta_f = 0^{\circ}$.

The airfoil-section lift coefficients are based on the chord of the airfoil with the flaps neutral and are corrected to free-air conditions by the methods of reference 1. The flap-section hinge-moment coefficients are based on the total flap chord measured from the hinge axis to the airfoil trailing edge.

MODEL

The model was a 24-inch-chord two-dimensional airfoil section built to the contour of the NACA 66,2-015 profile. The laminated mahogany airfoil had a 0.30c flap, with a sealed internal balance of approximately $0.70c_f$, and a $0.33c_f$ leading tab (fig. 1) which were constructed of brass. A rubber seal was used along the complete span and at both ends of the flap to prevent the flow of air across the balance. Transition was fixed at 0.20c on both surfaces by a $\frac{1}{2}$-inch-wide roughness strip consisting of 0.011-inch carborundum grains applied to a layer of shellac. Ordinates and sketches of the model showing the various configurations tested are presented in table I and figure 2, respectively.

Configuration 1, built to the true airfoil contour, had a flap-gap size of 0.002c. In order to determine the effects of imperfections in the alinement of the balance-chamber cover plates, the true airfoil contour was modified behind the 0.42c station by deflecting the cover plates outward. This modification, referred to herein as configuration 2, had a flap-gap opening of 0.006c. Configuration 3 was tested tail-to-wind in order to provide the information necessary for determining the elevator-mooring requirements. This configuration, shown in figure 2, had a flap-gap opening of 0.006c and the true airfoil contour behind the 0.10c station was refaired. The shape of the flap and tab and the amount of internal-balance chord were the same for all configurations.

Pressure orifices were located on the airfoil, flap, and tab surfaces, and in the balance chamber (fig. 3) at the midspan in a single chordwise row. The chordwise positions of the orifices are given in the table in figure 3.

APPARATUS AND TESTS

The investigation was conducted in the Langley two-dimensional low-turbulence tunnel. The manometer arrangement which integrated the pressures along the floor and ceiling of the tunnel test section was used to measure lift. (See reference 1.) Flap hinge moment and the balance-chamber and surface pressure characteristics were determined by the use of a torque-tube balance and orifices, respectively.

Tests of the model were made, for the most part, at a Reynolds number of 2.0×10^6 with transition fixed at 0.20c and consisted of measurements of lift, surface pressures, flap hinge moments, and flap balance-chamber pressures. These characteristics were determined for configuration 1 with the flap deflected through a range of angles from 0° to 18° and for tab-flap deflection ratios of 0.5, 1.0, and 2.0. By bending the balance-chamber cover plates outward to give a flap-gap opening of 0.006c on both surfaces (configuration 2), the effects of changes in airfoil contour on the lift, hinge-moment, and balance-chamber pressure characteristics were determined for a tab-flap deflection ratio of 2.0. In addition, with the model placed tail-to-wind the flap hinge-moment and balance-chamber pressure characteristics of configuration 3 were measured for a tab-flap deflection ratio of 2.0 and flap deflections of 0°, 3°, and 6° at a Reynolds number of 0.75×10^6.

The local pressure coefficients of configuration 1 which were determined from the orifice pressure measurements are presented in tables II to IV. Included in the tables are the number and chordwise positions of the orifices corresponding to those shown in figure 3. A $\frac{1}{2}$-inch-wide section of the transition strip in the region of the orifices was removed for these tests.

RESULTS AND DISCUSSION

Lift Characteristics

The lift characteristics of configurations 1 and 2 are presented in figure 4. The apparent failure of the airfoil to realize zero lift at zero incidence with the flap neutral is attributed to small errors in setting the adjustment linkage. A summary of the lift parameters c_{l_α}, $c_{l_{\delta_f}}$, and α_{δ_f} for configurations 1 and 2 is presented in table V.

As shown in table V, an increase in the tab-flap deflection ratio between 0.5 and 2.0 (configuration 1) had no appreciable effect on c_{l_α} but increased $c_{l_{\delta_f}}$ from 0.072 to 0.114 with a corresponding increase in α_{δ_f} from -0.76 to -1.19. Deflecting the balance-chamber cover plates outward decreased the values of c_{l_α} and $c_{l_{\delta_f}}$ from 0.096 to 0.093 and 0.114 to 0.113, respectively. The flap-effectiveness parameter α_{δ_f}, however, remained unchanged.

The variation of the increment of section lift coefficient Δc_l with flap deflection is presented in figure 5 for section angles of attack of 0°, ±2°, ±6°, and ±10°. In general, the flap effectiveness decreases with increasing flap deflection and with increasing angle of attack. At negative section angles of attack, Δc_l varies inconsistently with flap deflection, the magnitude of the irregularities in Δc_l becoming larger with increasing tab-flap deflection ratio.

A comparison of figures 5(a), 5(b), and 5(c) shows that the flap effectiveness increases with increasing tab-flap deflection ratio. As the cover plates were bent outward (fig. 5(d)), the values of Δc_l generally decreased.

Hinge-Moment Characteristics

The control-surface hinge-moment coefficients of configurations 1 and 2 are presented in figure 6. A summary of the important hinge-moment parameters is presented in table V.

As shown in table V, an increase in the tab-flap deflection ratio between 0.5 and 2.0 (configuration 1) increased $c_{h_{f_\alpha}}$ from 0.0010 to 0.0018 and caused a negative increase in $c_{h_{f_{\delta_f}}}$ from 0.001 to -0.014.

The values of $c_{h_{f_\alpha}}$ and $c_{h_{f_{\delta_f}}}$ became less positive and less negative, respectively, when the cover plates were deflected outward. Deflecting the cover plates outward, therefore, increased the effective aerodynamic balance and might result in overbalance for an originally closely balanced flap.

An overbalanced condition exists in the range of angles of attack below about 2° and flap deflections below 6° for a tab-flap deflection ratio of 0.5. (See fig. 6(a).) As the tab-flap deflection ratio is increased to 1.0, the loss of balance is evident for all the flap deflections investigated. The loss of balance continues to increase with increasing tab-flap deflection ratio between 1.0 and 2.0 for corresponding flap deflections.

Because the hinge-moment parameters shown in table V are representative of the curves at $\delta_f = 0^\circ$ and $\alpha_o = 0^\circ$, they should be used mainly as an indication of the relative merits of the different configurations. Large deflections of the flap produce different balance characteristics; therefore, in order to calculate the characteristics of the control surface, the hinge-moment curves should be used.

The variation of the pressure difference across the flap balance seal with α_o is presented in figure 7. Although transition was fixed at 0.20c for these tests, movements in transition on a smooth airfoil will probably have little effect on the variation of $\Delta p/q$ with α_o. (See reference 2.) Approximate estimation of the hinge-moment characteristics of a flap of similar contour and chord with any amount of internal balance may be made by means of the methods described in reference 3 using the present hinge-moment and seal-pressure data.

Comparison of Experimental and Calculated Parameters

The lift and hinge-moment parameters $\left(c_{l_{\delta_f}}, c_{h_{f_\alpha}}, \text{and } c_{h_{f_{\delta_f}}}\right)$ presented in table V are shown in figure 8 plotted against tab-flap deflection ratio (configuration 1). Included in the figure are the corresponding parameters as predicted using the values of P_α and P_δ extrapolated to zero tab-flap deflection ratio, c_{l_α} of 0.095, and equations (26) and (35) of reference 4. The results show that good agreement exists between the experimental and predicted values of these parameters.

An illustration of the increase in lift effectiveness that can be obtained with the leading tab also is shown in figure 8. The values of $c_{l_{\delta_f}}$ obtained for tab-flap deflection ratios of 0.65 and 1.5 are about 34 percent and 71 percent higher, respectively, than the calculated value of $c_{l_{\delta_f}}$ (0.056) corresponding to a tab-flap deflection ratio of 0. For a tab-flap deflection ratio of 0.65 and the 70-percent-chord nose balance, $c_{h_{f_{\delta_f}}}$ is zero. In order to closely balance the system for a tab-flap deflection ratio of 1.5 an increase in the balance overhang to about 81 percent would be required.

Mooring Characteristics

With the trailing edge of the model directed into the wind, the section-hinge-moment and seal-pressure difference characteristics of configuration 3 were obtained at a Reynolds number of 0.75×10^6 (40-mph gust) for a tab-flap deflection ratio of 2.0 and flap deflections of 0°, 3°, and 6°. These data, presented in figures 9 and 10, may be of interest to the designer in that they can be used in determining the flap mooring requirements.

CONCLUSIONS

The results of a two-dimensional wind-tunnel investigation of an NACA 66,2-015 airfoil equipped with a 0.30-airfoil-chord sealed internally balanced control surface having a 0.70-flap-chord overhang and a 0.33-flap-chord leading tab indicate the following conclusions:

1. The flap effectiveness, in general, decreased with increasing flap deflection and with increasing angle of attack and increased with increasing tab-flap deflection ratio.

2. The values of $c_{l_{\delta_f}}$ (rate of change of airfoil-section lift coefficient with flap deflection at 0° angle of attack) obtained for tab-flap deflection ratios of 0.65 and 1.5 are about 34 percent and 71 percent higher, respectively, than the calculated value of $c_{l_{\delta_f}}$ corresponding to a tab-flap deflection ratio of 0. The internal balance overhang required for zero $c_{h_{f_{\delta_f}}}$ (rate of change of flap-section hinge-moment coefficient with flap deflection at 0° angle of attack) ranged from 0.70-flap chord for a tab-flap deflection ratio of 0.65 to 0.81-flap chord for a tab-flap deflection ratio of 1.5.

3. Good agreement was obtained between the predicted and experimental lift and hinge-moment parameters for the tab-flap deflection ratios investigated.

4. Deflecting the balance-chamber cover plates outward, in general, decreased the flap effectiveness and caused an increase in the effective aerodynamic balance.

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TABLE I

ORDINATES FOR THE NACA 66,2-015 AIRFOIL (CONFIGURATION 1) AND MODIFICATIONS THEREOF

[Stations and ordinates given in
percent of airfoil chord]

Upper surface				Lower surface			
Station	Ordinate			Station	Ordinate		
	Configuration 1	Configuration 2	Configuration 3		Configuration 1	Configuration 2	Configuration 3
0	0	0	0	0	0	0	0
.5	1.110	1.110	1.110	.5	-1.110	-1.110	-1.110
.75	1.329	1.329	1.329	.75	-1.329	-1.329	-1.329
1.25	1.645	1.645	1.645	1.25	-1.645	-1.645	-1.645
2.5	2.229	2.229	2.229	2.5	-2.229	-2.229	-2.229
5	3.086	3.086	3.086	5	-3.086	-3.086	-3.086
7.5	3.757	3.757	3.757	7.5	-3.757	-3.757	-3.757
10	4.337	4.337	4.337	10	-4.337	-4.337	-4.337
15	5.255	5.255	5.305	15	-5.255	-5.255	-5.305
20	5.964	5.964	6.014	20	-5.964	-5.964	-6.014
25	6.516	6.516	6.576	25	-6.516	-6.516	-6.576
30	6.933	6.933	7.023	30	-6.933	-6.933	-7.023
35	7.230	7.230	7.350	35	-7.230	-7.230	-7.350
40	7.415	7.415	7.565	40	-7.415	-7.415	-7.565
45	7.495	7.535	7.655	45	-7.495	-7.535	-7.655
50	7.460	7.610	7.670	50	-7.460	-7.610	-7.670
55	7.294	7.464	7.524	55	-7.294	-7.464	-7.524
60	6.961	7.291	7.271	60	-6.961	-7.291	-7.271
65	6.405	6.775	6.805	65	-6.405	-6.775	-6.805
70	5.597	6.017	6.017	70	-5.597	-6.017	-6.017
75	4.652	4.652	4.652	75	-4.652	-4.652	-4.652
80	3.616	3.616	3.616	80	-3.616	-3.616	-3.616
85	2.545	2.545	2.545	85	-2.545	-2.545	-2.545
90	1.488	1.488	1.488	90	-1.488	-1.488	-1.488
95	.560	.560	.560	95	-.560	-.560	-.560
100	0	0	0	100	0	0	0
L.E. Radius: 1.384							

TABLE II.- PRESSURE COEFFICIENTS S FOR THE NACA 66,2-015 AIRFOIL AT DIFFERENT ANGLES OF ATTACK WITH A 0.30c INTERNALLY BALANCED CONTROL SURFACE AND A 0.33c_f CONTROL SURFACE TAB

$$\left[\frac{\delta_t}{\delta_f} = 0.5;\ \text{CONFIGURATION 1};\ R \cong 2.0 \times 10^6\right]$$

(a) $\delta_f = 0^\circ$

Orifice number	x/c	Section angle of attack, α_0, deg											
		−16.8	−15.2	−12.2	−8.1	−4.1	−0.4	0	4.1	8.1	12.2	15.2	16.8
1	0	1.53	8.28	5.89	2.75	0.63	0	0	0.89	3.27	6.54	8.76	1.49
2	.5	.17	2.36	1.35	.28	.01	.65	.72	2.56	5.35	8.38	10.36	1.72
3	.75	.04	1.35	.70	.07	.09	.84	.92	2.65	4.98	7.82	9.80	1.72
4	1.25	0	.55	.22	0	.23	.98	1.05	2.46	4.69	5.87	6.87	1.73
5	2.5	.06	.07	0	.07	.43	1.07	1.12	2.16	3.31	4.53	5.20	1.73
6	5	.23	.02	.08	.27	.66	1.18	1.21	1.92	2.77	3.52	3.91	1.72
7	7.5	.37	.09	.19	.42	.78	1.22	1.25	1.84	2.49	3.05	3.32	1.72
8	10	.48	.19	.30	.53	.87	1.27	1.29	1.80	2.35	2.79	3.00	1.73
9	15	.64	.34	.46	.68	.98	1.31	1.34	1.74	2.16	2.48	2.59	1.75
10	20	.76	.47	.58	.78	1.05	1.34	1.36	1.68	2.02	2.27	2.33	1.75
11	30	.97	.68	.77	.94	1.16	1.39	1.40	1.65	1.89	2.02	1.97	1.77
12	40	1.13	.82	.90	1.04	1.22	1.40	1.41	1.60	1.78	1.83	1.66	1.77
13	50	1.28	.96	1.02	1.14	1.28	1.43	1.43	1.58	1.69	1.65	1.41	1.77
14	60	1.42	1.08	1.11	1.20	1.31	1.42	1.42	1.52	1.57	1.44	1.30	1.77
15	65	1.44	1.09	1.11	1.17	1.26	1.35	1.35	1.43	1.45	1.30	1.28	1.77
[a]16	57.5	1.41	1.07	1.07	1.11	1.16	1.25	1.24	1.31	1.31	1.21	1.28	1.71
[a]17	66.5	1.41	1.07	1.07	1.11	1.18	1.25	1.24	1.31	1.32	1.21	1.28	1.71
[a]18	68	1.41	1.07	1.07	1.11	1.18	1.25	1.24	1.31	1.32	1.22	1.29	1.71
[a]19	69	1.41	1.07	1.07	1.11	1.18	1.25	1.24	1.31	1.32	1.21	1.29	1.74
20	70	1.22	.93	.95	.99	1.06	1.14	1.14	1.22	1.26	1.19	1.27	1.76
21	75	1.43	1.08	1.08	1.10	1.15	1.20	1.20	1.23	1.20	1.15	1.27	1.77
22	80	1.37	1.04	1.02	1.02	1.05	1.09	1.09	1.10	1.08	1.13	1.27	1.76
23	85	1.34	1.01	.97	.96	.96	.99	.98	1.00	1.01	1.12	1.27	1.73
24	90	1.15	.86	.82	.81	.83	.86	.86	.90	.99	1.12	1.27	1.68
25	95	1.28	.97	.90	.84	.81	.82	.82	.86	.96	1.12	1.28	1.67
26	98	1.37	1.03	.94	.85	.80	.80	.79	.83	.94	1.12	1.27	1.64
27	.5	1.72	9.26	7.41	4.65	2.16	.63	.56	0	.36	1.41	2.29	.14
28	.75	1.72	8.98	7.00	4.45	2.23	.78	.71	.03	.15	.85	1.47	.11
29	1.25	1.72	7.11	6.84	4.01	2.16	.95	.88	.16	0	.29	.58	0
30	2.5	1.72	5.08	4.34	3.01	1.97	1.06	1.00	.36	.05	.01	.09	.07
31	5	1.71	3.79	3.36	2.57	1.79	1.14	1.10	.57	.23	.06	.01	.24
32	7.5	1.72	3.28	2.96	2.36	1.74	1.20	1.16	.70	.37	.16	.08	.38
33	10	1.72	2.99	2.76	2.28	1.75	1.25	1.22	.80	.49	.26	.17	.49
34	15	1.73	2.60	2.44	2.08	1.67	1.29	1.27	.92	.64	.42	.33	.65
35	20	1.74	2.36	2.27	2.00	1.67	1.34	1.31	1.00	.75	.55	.45	.78
36	30	1.76	2.00	1.99	1.82	1.58	1.34	1.32	1.09	.88	.71	.64	.95
37	40	1.77	1.78	1.86	1.78	1.61	1.42	1.41	1.18	1.04	.89	.83	1.16
38	50	1.76	1.52	1.70	1.68	1.56	1.42	1.40	1.25	1.11	.99	.95	1.29
39	60	1.77	1.30	1.50	1.57	1.51	1.40	1.40	1.28	1.17	1.08	1.07	1.43
40	65	1.77	1.25	1.36	1.46	1.44	1.36	1.35	1.25	1.16	1.09	1.09	1.46
[a]41	57.5	1.70	1.23	1.24	1.32	1.29	1.23	1.23	1.16	1.09	1.05	1.06	1.42
[a]42	66.5	1.70	1.23	1.24	1.32	1.29	1.23	1.23	1.16	1.10	1.05	1.06	1.42
[a]43	68	1.71	1.24	1.24	1.32	1.29	1.23	1.23	1.16	1.10	1.05	1.06	1.42
[a]44	69	1.73	1.24	1.24	1.33	1.31	1.24	1.24	1.16	1.10	1.05	1.06	1.42
45	70	1.75	1.23	1.21	1.28	1.25	1.17	1.17	.108	1.00	.95	.95	1.26
46	75	1.76	1.22	1.15	1.20	1.23	1.18	1.18	1.13	1.08	1.06	1.08	1.43
47	80	1.74	1.22	1.11	1.09	1.11	1.08	1.04	1.05	1.02	1.02	1.05	1.39
48	85	1.72	1.21	1.10	1.00	1.00	.99	.99	.97	.96	.97	1.03	1.36
49	90	1.67	1.21	1.09	.96	.91	.88	.88	.86	.85	.87	.92	1.22
50	95	1.63	1.22	1.08	.93	.85	.82	.83	.82	.85	.91	1.00	1.31
51	98	1.71	1.21	1.09	.92	.82	.80	.79	.81	.86	.96	1.08	1.39

[a] Balance chamber pressures.

TABLE II.– PRESSURE COEFFICIENTS – Continued

(b) $\delta_f = 5^\circ$

Orifice number	x/c	Section angle of attack, α_o, deg											
		–17.8	–16.8	–12.2	–8.1	–4.1	0	4.1	8.1	12.2	13.7	14.7	15.8
1	0	1.49	8.12	4.79	1.78	0.19	0.16	1.55	4.18	7.53	8.80	9.22	1.58
2	.5	.16	2.30	.93	.09	.17	1.33	3.42	6.28	9.41	10.38	10.58	1.77
3	.75	.04	1.31	.43	0	.32	1.52	3.41	5.77	8.73	9.88	10.20	1.77
4	1.25	0	.53	.11	.02	.49	1.56	3.07	5.52	6.37	6.99	7.17	1.77
5	2.5	.07	.06	0	.18	.68	1.51	2.52	3.72	4.90	5.28	5.35	1.77
6	5	.24	.03	.12	.40	.87	1.51	2.23	3.04	3.75	3.99	4.02	1.77
7	7.5	.39	.10	.26	.55	.98	1.51	2.09	2.70	3.24	3.41	3.41	1.77
8	10	.50	.20	.37	.66	1.05	1.52	2.02	2.53	2.96	3.10	3.08	1.77
9	15	.67	.37	.54	.81	1.15	1.54	1.92	2.31	2.62	2.69	2.66	1.80
10	20	.80	.49	.66	.91	1.20	1.54	1.85	2.16	2.39	2.44	2.38	1.81
11	30	1.02	.71	.85	1.07	1.31	1.57	1.81	2.01	2.12	2.11	2.02	1.82
12	40	1.19	.88	.99	1.17	1.37	1.58	1.75	1.88	1.90	1.85	1.71	1.82
13	50	1.38	1.05	1.13	1.28	1.45	1.61	1.73	1.79	1.72	1.59	1.46	1.82
14	60	1.57	1.21	1.26	1.37	1.50	1.63	1.69	1.67	1.48	1.36	1.35	1.82
15	65	1.64	1.26	1.28	1.37	1.48	1.58	1.61	1.54	1.34	1.31	1.34	1.82
[a]16	57.5	1.68	1.29	1.29	1.35	1.43	1.51	1.50	1.40	1.27	1.30	1.34	1.78
[a]17	66.5	1.68	1.29	1.29	1.35	1.43	1.51	1.50	1.40	1.27	1.30	1.34	1.78
[a]18	68	1.68	1.29	1.29	1.35	1.43	1.51	1.50	1.40	1.27	1.30	1.34	1.78
19	69	1.66	1.27	1.26	1.34	1.43	1.51	1.51	1.40	1.26	1.29	1.33	1.80
20	70	1.84	1.43	1.43	1.49	1.56	1.63	1.58	1.40	1.25	1.29	1.34	1.86
21	75	1.67	1.29	1.25	1.29	1.35	1.39	1.33	1.21	1.22	1.28	1.32	1.82
22	80	1.55	1.19	1.13	1.15	1.18	1.20	1.15	1.16	1.22	1.28	1.32	1.80
23	85	1.49	1.15	1.04	1.04	1.05	1.06	1.06	1.15	1.22	1.28	1.32	1.78
24	90	1.38	1.05	.95	.94	.94	.96	1.02	1.13	1.21	1.28	1.32	1.73
25	95	1.37	1.05	.89	.85	.86	.90	1.01	1.14	1.22	1.28	1.32	1.71
26	98	1.41	1.08	.87	.81	.82	.87	1.00	1.14	1.22	1.28	1.32	1.68
27	.5	1.68	9.02	6.49	3.60	1.38	.21	.03	.61	1.77	2.29	2.48	.16
28	.75	1.68	8.82	6.09	3.53	1.50	.33	0	.31	1.11	1.48	1.61	.05
29	1.25	1.68	6.93	5.88	3.16	1.57	.52	.05	.05	.39	.59	.66	.01
30	2.5	1.69	4.95	3.90	2.83	1.52	.70	.21	.01	.04	.09	.11	.05
31	5	1.67	3.68	3.08	2.23	1.46	.86	.43	.16	.03	.02	0	.21
32	7.5	1.67	3.17	2.73	2.07	1.46	.95	.56	.29	.11	.08	.06	.34
33	10	1.68	2.88	2.56	2.03	1.46	1.02	.67	.40	.21	.17	.14	.45
34	15	1.69	2.47	2.28	1.88	1.46	1.09	.80	.55	.36	.32	.29	.60
35	20	1.70	2.23	2.14	1.82	1.46	1.15	.89	.66	.48	.44	.42	.73
36	30	1.72	1.85	1.87	1.66	1.40	1.17	.97	.80	.64	.61	.59	.87
37	40	1.73	1.57	1.75	1.62	1.44	1.25	1.09	.94	.80	.78	.76	1.08
38	50	1.73	1.35	1.59	1.51	1.38	1.24	1.11	1.00	.89	.88	.86	1.18
39	60	1.73	1.27	1.41	1.39	1.31	1.21	1.12	1.03	.96	.95	.95	1.27
40	65	1.73	1.27	1.27	1.28	1.22	1.13	1.07	1.01	.95	.95	.94	1.26
[a]41	57.5	1.65	1.25	1.16	1.14	1.07	1.01	.96	.92	.87	.88	.88	1.16
[a]42	66.5	1.65	1.25	1.16	1.14	1.07	1.01	.96	.92	.87	.88	.88	1.16
[a]43	68	1.66	1.25	1.16	1.14	1.07	1.01	.96	.92	.87	.88	.88	1.16
[a]44	69	1.68	1.27	1.16	1.14	1.07	1.01	.96	.92	.87	.88	.88	1.16
[a]45	70	1.68	1.25	1.16	1.14	1.07	1.01	.96	.92	.87	.87	.88	1.16
46	75	1.71	1.25	1.08	1.08	1.04	1.00	.96	.93	.90	.90	.91	1.20
47	80	1.70	1.25	1.02	1.01	.99	.96	.94	.93	.91	.92	.93	1.22
48	85	1.69	1.25	.98	.94	.91	.90	.90	.90	.90	.92	.93	1.22
49	90	1.63	1.25	.95	.85	.78	.75	.74	.74	.73	.73	.75	1.00
50	95	1.61	1.25	.92	.82	.79	.79	.83	.87	.90	.92	.95	1.23
51	98	1.58	1.24	.91	.81	.78	.80	.87	.94	.98	1.03	1.05	1.36

NACA

[a] Balance chamber pressures.

TABLE II.– PRESSURE COEFFICIENTS – Continued

(c) $\delta_f = 9^{\circ}$

Orifice number	x/c	Section angle of attack, α_o, deg											
		–17.8	–16.8	–13.9	–12.2	–8.1	–4.1	0	4.1	8.1	12.2	13.7	14.2
1	0	1.39	7.30	5.34	3.80	1.12	0.03	0.41	2.02	5.01	8.52	9.56	1.72
2	.5	.12	1.95	1.14	.60	0	.38	1.82	3.99	7.13	10.16	11.22	1.89
3	.75	.01	1.08	.55	.24	0	.56	1.99	3.90	6.51	9.65	10.56	1.90
4	1.25	0	.41	.15	.03	.10	.73	1.94	3.49	5.81	6.88	7.43	1.91
5	2.5	.08	.04	0	.02	.29	.88	1.79	2.66	4.07	5.25	5.53	1.90
6	5	.27	.03	.09	.19	.53	1.04	1.71	2.42	3.27	4.00	4.15	1.89
7	7.5	.40	.13	.22	.33	.68	1.13	1.68	2.25	2.89	3.42	3.54	1.90
8	10	.53	.23	.34	.45	.78	1.20	1.68	2.16	2.68	3.12	3.19	1.92
9	15	.70	.40	.51	.62	.92	1.28	1.67	2.04	2.43	2.74	2.77	1.94
10	20	.82	.54	.64	.74	1.01	1.33	1.66	1.95	2.27	2.50	2.51	1.95
11	30	1.05	.76	.85	.94	1.17	1.43	1.68	1.89	2.10	2.20	2.16	1.95
12	40	1.24	.94	1.01	1.03	1.28	1.50	1.69	1.83	1.96	1.97	1.88	1.93
13	50	1.45	1.12	1.18	1.24	1.41	1.58	1.73	1.80	1.85	1.76	1.61	1.88
14	60	1.68	1.31	1.35	1.39	1.53	1.66	1.76	1.75	1.71	1.51	1.40	1.83
15	65	1.78	1.39	1.41	1.43	1.55	1.66	1.74	1.66	1.57	1.38	1.35	1.82
[a]16	57.5	1.89	1.48	1.47	1.49	1.58	1.65	1.67	1.54	1.43	1.32	1.34	1.75
[a]17	66.5	1.89	1.48	1.47	1.47	1.58	1.65	1.67	1.54	1.43	1.32	1.34	1.75
[a]18	68	1.87	1.45	1.45	1.46	1.56	1.64	1.67	1.54	1.43	1.32	1.34	1.78
[a]19	69	1.58	1.23	1.24	1.26	1.36	1.46	1.52	1.46	1.37	1.32	1.34	1.80
20	70	2.37	1.85	1.85	1.86	1.95	2.03	2.02	1.69	1.43	1.30	1.34	1.84
21	75	1.83	1.42	1.40	1.39	1.45	1.49	1.46	1.27	1.26	1.29	1.33	1.80
22	80	1.65	1.27	1.23	1.21	1.22	1.25	1.22	1.20	1.24	1.29	1.33	1.78
23	85	1.56	1.19	1.12	1.09	1.09	1.10	1.10	1.19	1.24	1.29	1.33	1.76
24	90	1.53	1.15	1.06	1.02	.99	.99	1.05	1.17	1.23	1.39	1.33	1.71
25	95	1.38	1.04	.92	.88	.89	.94	1.04	1.19	1.24	1.29	1.34	1.68
26	98	1.37	1.02	.88	.83	.85	.92	1.04	1.19	1.24	1.29	1.34	1.65
27	.5	1.64	8.37	6.91	5.60	2.81	.95	.07	.09	.87	2.16	2.61	.21
28	.75	1.64	8.10	6.49	5.25	2.81	1.09	.15	0	.47	1.38	1.71	.09
29	1.25	1.64	6.97	6.34	4.94	2.61	1.22	.33	0	.11	.53	.70	0
30	2.5	1.64	4.67	4.07	3.46	2.29	1.25	.52	.15	0	.07	.13	.04
31	5	1.63	3.51	3.16	2.79	1.93	1.27	.71	.35	.11	0	0	.20
32	7.5	1.64	3.03	2.78	2.50	1.84	1.29	.82	.49	.23	.08	.04	.32
33	10	1.66	2.76	2.59	2.36	1.81	1.31	.90	.59	.34	.17	.13	.43
34	15	1.68	2.37	2.28	2.10	1.70	1.33	.98	.72	.48	.32	.27	.57
35	20	1.68	2.16	2.12	1.99	1.67	1.34	1.04	.82	.60	.43	.39	.69
36	30	1.68	1.78	1.83	1.74	1.52	1.30	1.07	.91	.73	.58	.56	.82
37	40	1.69	1.53	1.67	1.63	1.48	1.32	1.15	1.02	.87	.74	.71	.99
38	50	1.68	1.29	1.48	1.48	1.38	1.26	1.13	1.03	.91	.82	.80	1.07
39	60	1.67	1.19	1.26	1.28	1.24	1.17	1.08	1.02	.93	.94	.85	1.12
40	65	1.66	1.18	1.15	1.15	1.11	1.06	.99	.95	.89	.98	.83	1.07
[a]41	57.5	1.57	1.17	1.08	1.04	.97	.91	.85	.82	.77	.72	.72	.94
[a]42	66.5	1.57	1.17	1.08	1.04	.97	.91	.85	.82	.77	.72	.72	.94
[a]43	68	1.57	1.17	1.08	1.04	.97	.91	.85	.82	.77	.72	.72	.94
[a]44	69	1.59	1.17	1.08	1.04	.97	.91	.85	.82	.77	.72	.72	.94
45	70	1.61	1.18	1.08	1.04	.97	.91	.85	.81	.77	.72	.72	.93
46	75	1.64	1.17	1.02	.99	.94	.90	.86	.85	.81	.77	.78	.99
47	80	1.62	1.17	.99	.95	.92	.90	.87	.87	.84	.82	.82	1.05
48	85	1.60	1.19	.96	.90	.87	.85	.84	.85	.84	.83	.84	1.06
49	90	1.54	1.14	.93	.85	.75	.69	.65	.65	.63	.61	.61	.79
50	95	1.51	1.12	.90	.83	.78	.78	.79	.85	.85	.86	.89	1.11
51	98	1.48	1.10	.88	.81	.80	.81	.85	.94	.96	.98	1.02	1.27

[a]Balance chamber pressures.

TABLE II.- PRESSURE COEFFICIENTS - Continued

(d) $\delta_f = 14^\circ$

Orifice number	x/c	Section angle of attack, α_0, deg										
		-18.8	-17.8	-12.2	-8.1	-4.1	0	4.1	8.1	12.2	12.7	13.2
1	0	1.40	7.06	2.87	0.66	0	0.67	2.55	5.69	9.38	5.96	1.67
2	.5	.14	1.87	.32	0	.60	2.23	4.59	7.70	10.90	11.14	1.89
3	.75	.03	1.02	.09	.07	.79	2.36	4.38	7.12	10.41	10.66	1.89
4	1.25	0	.38	0	.22	.94	2.24	4.00	5.91	7.36	7.48	1.91
5	2.5	.07	.02	.07	.42	1.05	2.10	2.99	4.33	5.51	5.58	1.91
6	5	.25	.04	.27	.66	1.17	1.87	2.60	3.44	4.16	4.20	1.89
7	7.5	.40	.14	.42	.80	1.24	1.81	2.39	3.03	3.56	3.58	1.89
8	10	.52	.24	.55	.90	1.21	1.80	2.29	2.81	3.23	3.13	1.90
9	15	.68	.42	.71	1.03	1.37	1.76	2.14	2.53	2.88	2.83	1.92
10	20	.82	.55	.83	1.12	1.41	1.73	2.04	2.36	2.57	2.57	1.93
11	30	1.06	.80	1.04	1.28	1.51	1.75	1.97	2.17	2.25	2.24	1.94
12	40	1.25	.99	1.19	1.39	1.56	1.74	1.89	2.02	2.01	1.98	1.94
13	50	1.48	1.18	1.35	1.53	1.65	1.77	1.85	1.91	1.79	1.75	1.92
14	60	1.75	1.43	1.55	1.68	1.74	1.78	1.78	1.76	1.53	1.49	1.91
15	65	1.90	1.55	1.62	1.73	1.74	1.72	1.68	1.61	1.41	1.39	1.91
[a]16	57.5	2.05	1.69	1.68	1.74	1.67	1.64	1.55	1.46	1.37	1.36	1.86
[a]17	66.5	2.05	1.69	1.68	1.73	1.67	1.64	1.55	1.46	1.37	1.36	1.86
[a]18	68	2.05	1.67	1.70	1.79	1.72	1.62	1.54	1.45	1.36	1.36	1.88
19	69	2.16	1.76	1.79	1.87	1.77	1.63	1.52	1.42	1.35	1.36	1.94
20	70	2.92	2.39	2.38	2.45	2.21	1.89	1.63	1.43	1.35	1.36	1.97
21	75	1.96	1.59	1.53	1.54	1.35	1.30	1.31	1.32	1.35	1.34	1.90
22	80	1.71	1.37	1.27	1.26	1.26	1.29	1.30	1.32	1.35	1.34	1.88
23	85	1.59	1.26	1.10	1.11	1.24	1.28	1.30	1.32	1.34	1.34	1.86
24	90	1.59	1.23	1.00	1.04	1.24	1.27	1.29	1.32	1.34	1.34	1.82
25	95	1.38	1.05	.92	1.02	1.22	1.29	1.31	1.32	1.35	1.34	1.79
26	98	1.36	1.01	.90	1.02	1.22	1.28	1.30	1.32	1.35	1.34	1.77
27	.5	1.60	8.15	4.42	2.18	.67	0	.19	1.09	2.52	2.64	0.17
28	.75	1.60	7.88	4.43	2.24	.81	.07	.05	.63	1.64	1.74	.05
29	1.25	1.60	6.71	4.03	2.15	.97	.22	0	.17	.68	.73	0
30	2.5	1.61	4.54	2.97	1.93	1.05	.41	.08	0	.13	.13	.04
31	5	1.70	3.40	2.49	1.73	1.12	.61	.28	.07	0	0	.20
32	7.5	1.70	2.93	2.25	1.65	1.16	.72	.41	.19	.06	.05	.32
33	10	1.61	2.67	2.15	1.65	1.19	.81	.51	.29	.13	.12	.43
34	15	1.63	2.29	1.94	1.55	1.21	.90	.65	.43	.27	.25	.57
35	20	1.64	2.06	1.84	1.53	1.23	.96	.74	.54	.39	.37	.70
36	30	1.67	1.69	1.61	1.39	1.20	1.00	.83	.66	.53	.52	.82
37	40	1.70	1.43	1.50	1.36	1.22	1.07	.93	.79	.66	.62	.97
38	50	1.70	1.23	1.34	1.25	1.15	1.04	.94	.82	.74	.73	1.03
39	60	1.69	1.17	1.14	1.09	1.04	.96	.89	.82	.76	.74	1.03
40	65	1.67	1.16	1.01	1.44	.92	.86	.81	.74	.69	.69	.95
[a]41	57.5	1.50	1.15	.92	.82	.76	.70	.65	.60	.56	.56	.77
[a]42	66.5	1.50	1.15	.92	.82	.76	.70	.65	.60	.56	.55	.77
[a]43	68	1.50	1.15	.92	.82	.76	.70	.65	.60	.56	.55	.77
[a]44	69	1.50	1.15	.92	.82	.76	.70	.65	.60	.56	.55	.77
[a]45	70	1.56	1.16	.92	.82	.76	.70	.65	.60	.56	.56	.77
46	75	1.63	1.16	.87	.81	.78	.74	.71	.66	.63	.63	.85
47	80	1.61	1.15	.89	.83	.82	.80	.77	.74	.71	.71	.96
48	85	1.57	1.13	.84	.81	.81	.80	.79	.76	.74	.74	.99
49	90	1.49	1.11	.75	.66	.62	.58	.56	.53	.51	.50	.66
50	95	1.46	1.08	.79	.78	.81	.83	.83	.82	.82	.82	1.09
51	98	1.43	1.05	.82	.85	.93	.95	.97	.97	.98	.98	1.29

[a] Balance chamber pressures.

TABLE II.– PRESSURE COEFFICIENTS – Concluded

(e) $\delta_f = 13$

Orifice number	x/c	Section angle of attack, α_o, deg									
		–19.3	–17.8	–12.2	–8.1	–4.1	0	4.1	8.1	11.2	14.2
1	0	1.40	6.58	2.26	0.45	0.01	0.89	3.17	6.65	10.12	3.92
2	.5	.14	1.67	.15	.04	.81	2.55	5.30	8.73	11.86	4.55
3	.75	.03	.89	.02	.14	1.01	2.65	5.04	8.07	11.19	4.35
4	1.25	0	.31	0	.30	1.12	2.47	4.61	6.12	7.69	4.04
5	2.5	.07	.01	.11	.51	1.20	1.18	3.35	4.69	5.81	3.38
6	5	.26	.05	.34	.75	1.29	1.98	2.82	3.66	4.37	2.52
7	7.5	.40	.15	.50	.87	1.34	1.91	2.57	3.20	3.73	2.14
8	10	.52	.27	.62	.96	1.38	1.88	2.44	2.95	3.38	2.05
9	15	.70	.45	.79	1.10	1.44	1.83	2.26	2.65	2.95	1.99
10	20	.83	.59	.91	1.18	1.47	1.80	2.15	2.45	2.69	1.93
11	30	1.08	.83	1.12	1.34	1.56	1.81	2.06	2.24	2.37	1.89
12	40	1.29	1.02	1.27	1.44	1.61	1.80	1.98	2.09	2.13	1.90
13	50	1.55	1.24	1.44	1.57	1.69	1.82	1.93	1.97	1.94	1.92
14	60	1.88	1.49	1.64	1.69	1.75	1.81	1.86	1.81	1.68	1.95
15	65	2.08	1.64	1.73	1.70	1.71	1.74	1.74	1.66	1.52	1.96
[a]16	57.5	2.20	1.80	1.73	1.70	1.67	1.64	1.60	1.49	1.42	1.96
[a]17	66.5	2.20	1.80	1.73	1.70	1.67	1.64	1.60	1.49	1.42	1.96
[a]18	68	2.30	1.78	1.77	1.64	1.60	1.59	1.56	1.49	1.42	1.98
19	69	2.82	2.18	2.14	1.89	1.78	1.70	1.61	1.47	1.41	2.00
20	70	3.52	2.70	2.56	2.10	1.90	1.74	1.60	1.44	1.40	2.02
21	75	2.17	1.63	1.46	1.35	1.34	1.36	1.38	1.37	1.38	1.99
22	80	1.87	1.35	1.33	1.34	1.34	1.36	1.38	1.37	1.38	1.99
23	85	1.73	1.19	1.29	1.34	1.34	1.37	1.38	1.37	1.39	1.98
24	90	1.87	1.09	1.20	1.34	1.34	1.36	1.37	1.36	1.38	1.95
25	95	1.49	.96	1.18	1.35	1.35	1.38	1.39	1.37	1.39	1.94
26	98	1.42	.94	1.19	1.33	1.34	1.37	1.38	1.37	1.39	1.93
27	.5	1.58	7.74	4.06	1.85	.47	0	.33	1.43	2.79	.76
28	.75	1.58	7.44	3.92	1.94	.53	.03	.13	.86	1.83	.45
29	1.25	1.58	6.92	3.50	1.91	.78	.15	0	.28	.76	.09
30	2.5	1.58	4.37	2.60	1.76	.91	.34	.05	.01	.13	0
31	5	1.58	3.28	2.31	1.60	1.00	.54	.22	.04	0	.05
32	7.5	1.58	2.84	2.10	1.55	1.05	.66	.35	.14	.04	.16
33	10	1.58	2.59	2.01	1.52	1.10	.74	.45	.23	.10	.27
34	15	1.60	2.23	1.83	1.48	1.13	.83	.59	.37	.23	.42
35	20	1.61	2.02	1.74	1.46	1.15	.90	.67	.48	.36	.55
36	30	1.64	1.66	1.52	1.32	1.12	.93	.76	.60	.50	.69
37	40	1.68	1.41	1.42	1.29	1.14	1.00	.86	.71	.61	.84
38	50	1.70	1.19	1.25	1.17	1.07	.96	.85	.73	.67	.89
39	60	1.70	1.12	1.03	1.00	1.01	.87	.80	.71	.66	.87
40	65	1.67	1.10	.90	.84	.80	.74	.69	.63	.58	.78
[a]41	57.5	1.51	1.09	.85	.72	.66	.60	.55	.49	.45	.60
[a]42	66.5	1.51	1.09	.85	.72	.66	.60	.55	.49	.45	.60
[a]43	68	1.51	1.09	.85	.72	.66	.60	.55	.49	.45	.60
[a]44	69	1.51	1.09	.85	.72	.66	.60	.55	.49	.46	.60
[a]45	70	1.52	1.09	.85	.72	.66	.60	.55	.49	.46	.60
46	75	1.63	1.09	.81	.72	.67	.63	.59	.54	.51	.68
47	80	1.62	1.08	.80	.77	.74	.71	.68	.63	.61	.81
48	85	1.57	1.05	.80	.78	.76	.73	.71	.66	.64	.87
49	90	1.49	1.01	.68	.56	.51	.47	.44	.39	.37	.48
50	95	1.46	.97	.80	.81	.81	.81	.79	.76	.74	1.02
51	98	1.44	.93	.89	.96	.97	.97	.96	.94	.94	1.28

[a]Balance chamber pressures.

TABLE III.- PRESSURE COEFFICIENTS S FOR THE NACA 66,2-015 AIRFOIL AT DIFFERENT ANGLES OF ATTACK WITH A 0.30c INTERNALLY BALANCED CONTROL SURFACE AND A 0.33c_f CONTROL SURFACE TAB

$$\left[\frac{\delta_t}{\delta_f} = 1.0;\ \text{CONFIGURATION 1};\ R = 2.0 \times 10^6\right]$$

(a) $\delta_f = 0^{\circ}$.

Orifice number	x/c	Section angle of attack, α_o, deg											
		−17.3	−16.2	−15.2	−12.2	−8.1	−4.1	0	4.1	8.1	12.2	15.2	16.2
1	0	1.40	8.82	8.14	5.80	0.15	0.65	0.01	0.86	3.17	6.39	8.60	1.44
2	.5	.18	2.62	2.32	1.32	.29	.01	.70	2.52	5.21	8.02	10.10	1.70
3	.75	.06	1.52	1.26	.67	.08	.09	.89	2.61	4.86	7.69	9.67	1.70
4	1.25	0	.64	.54	.20	0	.23	1.02	2.43	4.60	5.87	6.81	1.70
5	2.5	.06	.10	.07	0	.07	.43	1.10	2.13	3.25	4.49	5.15	1.70
6	5	.23	0	.01	.07	.27	.65	1.20	1.92	2.71	3.48	3.88	1.70
7	7.5	.37	.07	.09	.19	.42	.77	1.24	1.83	2.45	3.03	3.29	1.70
8	10	.48	.17	.20	.30	.53	.87	1.28	1.79	2.31	2.78	2.98	1.70
9	15	.65	.33	.34	.46	.68	.98	1.33	1.73	2.13	2.46	2.51	1.70
10	20	.77	.45	.46	.57	.78	1.04	1.35	1.67	2.00	2.26	2.31	1.71
11	30	.97	.66	.67	.76	.94	1.15	1.39	1.65	1.87	2.01	1.97	1.73
12	40	1.13	.81	.82	.90	1.04	1.22	1.40	1.60	1.76	1.83	1.68	1.73
13	50	1.30	.96	.97	1.02	1.13	1.28	1.43	1.58	1.67	1.66	1.43	1.73
14	60	1.45	1.09	1.07	1.11	1.20	1.30	1.42	1.52	1.56	1.45	1.29	1.73
15	65	1.45	1.10	1.09	1.11	1.18	1.26	1.35	1.43	1.44	1.31	1.27	1.73
[a]16	57.5	1.44	1.09	1.07	1.08	1.12	1.18	1.26	1.32	1.32	1.22	1.27	1.68
[a]17	66.5	1.44	1.09	1.07	1.08	1.12	1.18	1.26	1.32	1.32	1.22	1.27	1.68
[a]18	68	1.44	1.09	1.07	1.08	1.12	1.18	1.26	1.32	1.32	1.22	1.27	1.69
[a]19	69	1.44	1.09	1.07	1.08	1.12	1.18	1.26	1.32	1.32	1.22	1.27	1.72
20	70	1.19	.91	.90	.91	.97	1.04	1.12	1.22	1.24	1.20	1.27	1.72
21	75	1.49	1.00	1.08	1.07	1.10	1.14	1.19	1.23	1.19	1.14	1.27	1.72
22	80	1.39	1.06	1.04	1.01	1.02	1.04	1.08	1.10	1.07	1.13	1.27	1.72
23	85	1.36	1.03	1.01	.97	.95	.96	.98	.99	1.01	1.12	1.27	1.70
24	90	1.16	.87	.84	.81	.81	.82	.85	.90	.97	1.11	1.27	1.65
25	95	1.31	1.00	.97	.89	.84	.82	.81	.85	.95	1.08	1.27	1.63
26	98	1.39	1.07	1.03	.93	.85	.80	.79	.83	.94	1.11	1.27	1.61
27	.5	1.70	9.63	9.26	7.32	4.63	2.18	.58	.01	.34	1.35	2.22	.12
28	.75	1.70	9.63	8.86	6.93	4.43	2.24	.72	.04	.14	.79	1.42	.03
29	1.25	1.70	7.04	7.11	6.78	4.00	2.17	.89	.17	0	.35	.56	.01
30	2.5	1.70	5.20	5.01	4.29	2.98	1.98	1.02	.37	.05	0	.08	.06
31	5.	1.69	3.85	3.74	3.33	2.56	1.79	1.10	.58	.24	.05	.01	.24
32	7.5	1.69	3.31	3.24	2.93	2.35	1.74	1.17	.71	.37	.16	.06	.37
33	10	1.69	3.00	2.96	2.73	2.26	1.74	1.22	.81	.48	.26	.18	.48
34	15	1.70	2.58	2.55	2.41	2.07	1.67	1.27	.93	.64	.43	.33	.65
35	20	1.72	2.34	2.34	2.26	2.00	1.67	1.32	1.02	.75	.55	.46	.77
36	30	1.73	1.95	1.99	1.98	1.81	1.58	1.33	1.10	.89	.72	.64	.94
37	40	1.73	1.67	1.77	1.84	1.75	1.58	1.39	1.20	1.02	.88	.81	1.13
38	50	1.74	1.43	1.54	1.69	1.67	1.56	1.40	1.25	1.11	1.00	.95	1.28
39	60	1.75	1.31	1.31	1.50	1.56	1.51	1.39	1.28	1.17	1.09	1.08	1.42
40	65.	1.75	1.30	1.25	1.36	1.46	1.44	1.35	1.25	1.16	1.10	1.10	1.45
[a]41	57.5	1.71	1.30	1.24	1.24	1.31	1.28	1.21	1.15	1.09	1.05	1.06	1.39
[a]42	66.5	1.71	1.30	1.24	1.24	1.31	1.28	1.21	1.15	1.09	1.05	1.06	1.39
[a]43	68	1.71	1.30	1.24	1.24	1.31	1.28	1.21	1.15	1.09	1.05	1.06	1.39
[a]44	69	1.72	1.30	1.24	1.24	1.31	1.30	1.24	1.16	1.09	1.05	1.06	1.39
45	70	1.74	1.30	1.24	1.22	1.27	1.25	1.16	1.08	1.01	.96	.96	1.26
46	75	1.75	1.30	1.24	1.15	1.20	1.24	1.18	1.13	1.06	1.07	1.09	1.42
47	80	1.75	1.29	1.21	1.10	1.09	1.12	1.08	1.05	1.02	1.03	1.06	1.39
48	85	1.73	1.28	1.21	1.09	1.01	1.01	.99	.98	.96	.99	1.05	1.36
49	90	1.69	1.28	1.21	1.08	.97	.91	.89	.87	.86	.88	.94	1.24
50	95	1.67	1.28	1.21	1.08	.93	.85	.83	.83	.85	.92	1.00	1.30
51	98	1.65	1.28	1.21	1.08	.92	.83	.79	.81	.86	.96	1.08	1.38

[a] Balance chamber pressures.

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TABLE III.– PRESSURE COEFFICIENT – Continued

(b) $\delta_f = 5^\circ$.

Orifice number	x/c	Section angle of attack, α_o, deg										
		–17.8	–16.8	–12.2	–8.1	–4.1	0	4.1	8.1	12.2	14.2	15.2
1	0	1.42	7.80	4.51	1.69	0.15	0.30	1.65	4.29	7.75	9.27	1.58
2	.5	.14	2.18	.85	.05	.20	1.43	3.54	6.33	9.62	10.91	1.80
3	.75	.03	1.23	.38	0	.36	1.62	3.51	5.87	8.95	10.31	1.80
4	1.25	0	.50	.08	.03	.53	1.64	3.15	5.52	6.44	7.17	1.80
5	2.5	.08	.05	0	.18	.71	1.57	2.47	3.76	4.97	5.40	1.80
6	5	.27	.03	.14	.41	.90	1.55	2.26	3.05	3.81	4.06	1.79
7	7.5	.41	.11	.27	.56	1.00	1.54	2.11	2.71	3.28	3.43	1.79
8	10	.52	.22	.39	.68	1.07	1.55	2.04	2.54	2.99	3.12	1.80
9	15	.69	.38	.55	.83	1.17	1.57	1.94	2.31	2.64	2.71	1.81
10	20	.81	.51	.67	.92	1.22	1.57	1.86	2.16	2.41	2.44	1.82
11	30	1.03	.73	.87	1.08	1.33	1.59	1.82	2.01	2.13	2.10	1.84
12	40	1.21	.90	1.01	1.19	1.40	1.61	1.76	1.90	1.93	1.81	1.84
13	50	1.41	1.07	1.15	1.30	1.47	1.64	1.75	1.79	1.73	1.53	1.84
14	60	1.62	1.24	1.28	1.40	1.54	1.66	1.71	1.68	1.49	1.35	1.83
15	65	1.68	1.29	1.31	1.41	1.51	1.53	1.64	1.56	1.35	1.32	1.83
[a]16	57.5	1.73	1.33	1.31	1.38	1.47	1.54	1.53	1.42	1.29	1.32	1.78
[a]17	66.5	1.73	1.33	1.31	1.38	1.47	1.54	1.53	1.42	1.29	1.32	1.78
[a]18	68	1.73	1.33	1.31	1.38	1.47	1.54	1.53	1.42	1.30	1.32	1.80
[a]19	69	1.73	1.33	1.31	1.38	1.47	1.55	1.53	1.42	1.28	1.31	1.80
20	70	1.83	1.42	1.41	1.51	1.58	1.64	1.60	1.42	1.26	1.31	1.84
21	75	1.71	1.32	1.27	1.33	1.38	1.42	1.31	1.24	1.23	1.31	1.82
22	80	1.59	1.22	1.15	1.18	1.20	1.22	1.17	1.17	1.23	1.31	1.80
23	85	1.55	1.19	1.08	1.08	1.08	1.09	1.08	1.15	1.23	1.31	1.78
24	90	1.58	1.20	1.05	1.01	1.00	.99	1.04	1.14	1.22	1.31	1.74
25	95	1.42	1.08	.90	.87	.88	.93	1.02	1.15	1.23	1.30	1.71
26	98	1.42	1.08	.87	.82	.85	.90	1.02	1.15	1.22	1.30	1.69
27	.5	1.64	8.99	6.24	3.49	1.29	.18	.04	.65	1.86	2.48	.17
28	.75	1.64	8.54	5.83	3.42	1.42	.29	0	.33	1.17	1.61	.06
29	1.25	1.64	6.81	5.61	3.08	1.49	.44	.04	.06	.43	.66	0
30	2.5	1.65	4.84	3.76	2.77	1.47	.66	.19	.01	.04	.11	.06
31	5	1.64	3.48	2.97	2.18	1.42	.82	.40	.14	.03	0	.23
32	7.5	1.64	3.11	2.65	2.03	1.42	.92	.53	.27	.11	.06	.35
33	10	1.64	2.84	2.49	1.99	1.43	.99	.64	.39	.20	.14	.46
34	15	1.65	2.44	2.21	1.84	1.42	1.06	.77	.52	.35	.29	.61
35	20	1.66	2.21	2.08	1.78	1.43	1.12	.86	.64	.47	.42	.73
36	30	1.67	1.85	1.84	1.64	1.38	1.16	.96	.78	.64	.59	.90
37	40	1.68	1.59	1.70	1.57	1.39	1.21	1.05	.90	.78	.74	1.07
38	50	1.68	1.34	1.56	1.49	1.36	1.21	1.09	.97	.88	.84	1.18
39	60	1.68	1.22	1.38	1.37	1.28	1.18	1.09	1.02	.94	.93	1.26
40	65	1.68	1.21	1.25	1.25	1.19	1.11	1.04	.98	.93	.92	1.24
[a]41	57.5	1.63	1.21	1.14	1.11	1.05	.98	.93	.88	.84	.84	1.14
[a]42	66.5	1.63	1.21	1.14	1.11	1.05	.98	.93	.88	.84	.84	1.13
[a]43	68	1.63	1.21	1.14	1.11	1.05	.98	.93	.88	.84	.84	1.13
[a]44	69	1.65	1.21	1.15	1.11	1.05	.98	.93	.88	.93	.84	1.14
[a]45	70	1.64	1.20	1.14	1.11	1.05	.98	.93	.88	.84	.84	1.14
46	75	1.68	1.20	1.06	1.05	1.01	.96	.93	.90	.88	.88	1.18
47	80	1.67	1.19	1.00	.99	.96	.92	.91	.89	.88	.89	1.19
48	85	1.65	1.19	.95	.91	.80	.86	.86	.85	.87	.88	1.17
49	90	1.59	1.19	.92	.82	.73	.69	.66	.64	.64	.65	.86
50	95	1.59	1.19	.89	.81	.77	.78	.80	.83	.87	.89	1.18
51	98	1.55	1.19	.88	.80	.78	.81	.86	.92	.98	1.01	1.33

[a] Balance chamber pressures.

TABLE III.– PRESSURE COEFFICIENT – Continued

(c) $\delta_f = 9^{\circ}$.

Orifice number	x/c	Section angle of attack, a_0, deg											
		–18.3	–17.8	–12.2	–8.1	–4.1	0	4.1	8.1	12.2	13.2	14.2	15.2
1	0	1.31	7.12	3.54	1.01	0	0.53	2.20	5.22	8.95	10.44	10.22	1.77
2	.5	.10	1.90	.51	0	.48	2.02	4.23	7.36	10.62	11.32	11.64	1.87
3	.75	.02	.99	.19	.02	.67	2.17	4.05	7.24	10.09	10.59	11.18	1.90
4	1.25	0	.40	.02	.16	.83	2.09	3.65	5.70	7.08	7.36	7.64	1.92
5	2.5	.09	.04	.02	.32	.96	1.90	2.77	4.16	5.41	5.54	5.70	1.90
6	5	.28	.04	.21	.56	1.11	1.80	2.47	3.31	4.09	4.18	4.26	1.88
7	7.5	.41	.15	.35	.70	1.18	1.74	2.28	2.93	3.51	3.56	3.61	1.89
8	10	.54	.25	.47	.81	1.25	1.74	2.19	2.72	3.19	3.22	3.25	1.90
9	15	.71	.42	.64	.95	1.33	1.71	2.06	2.47	2.80	2.81	2.82	1.92
10	20	.84	.54	.76	1.04	1.37	1.69	1.96	2.29	2.55	2.54	2.54	1.93
11	30	1.08	.78	.97	1.20	1.47	1.73	1.91	2.12	2.25	2.21	2.17	1.95
12	40	1.27	.96	1.11	1.31	1.54	1.74	1.86	1.99	2.02	1.95	1.86	1.94
13	50	1.49	1.15	1.27	1.44	1.63	1.78	1.83	1.88	1.81	1.71	1.60	1.92
14	60	1.74	1.36	1.43	1.57	1.72	1.82	1.78	1.75	1.56	1.45	1.43	1.91
15	65	1.85	1.45	1.47	1.59	1.72	1.80	1.78	1.71	1.41	1.38	1.39	1.90
[a]16	57.5	1.99	1.54	1.54	1.62	1.71	1.74	1.59	1.46	1.34	1.35	1.38	1.85
[a]17	66.5	1.99	1.54	1.54	1.62	1.71	1.74	1.59	1.46	1.34	1.35	1.38	1.85
[a]18	68	1.98	1.54	1.52	1.61	1.71	1.74	1.59	1.46	1.34	1.35	1.38	1.88
[a]19	69	1.67	1.29	1.29	1.40	1.52	1.59	1.50	1.40	1.34	1.35	1.38	1.90
20	70	2.43	1.90	1.92	2.00	2.09	2.09	1.74	1.46	1.34	1.35	1.38	1.94
21	75	1.91	1.48	1.44	1.50	1.55	1.53	1.30	1.29	1.32	1.34	1.38	1.90
22	80	1.75	1.35	1.26	1.29	1.31	1.28	1.23	1.27	1.31	1.33	1.37	1.88
23	85	1.68	1.29	1.14	1.15	1.15	1.15	1.21	1.27	1.31	1.33	1.37	1.67
24	90	1.92	1.44	1.13	1.08	1.06	1.08	1.19	1.25	1.30	1.32	1.36	1.83
25	95	1.50	1.12	.91	.93	.98	1.06	1.20	1.25	1.31	1.32	1.37	1.79
26	98	1.45	1.08	.86	.91	.97	1.06	1.20	1.25	1.31	1.32	1.37	1.76
27	.5	1.57	8.32	5.38	2.65	.81	.08	.13	.93	2.32	2.60	2.88	.23
28	.75	1.57	7.91	5.07	2.67	.92	.12	.03	.52	1.49	1.70	1.90	.09
29	1.25	1.57	6.75	4.73	2.49	1.09	.28	0	.13	.58	.71	.81	0
30	2.5	1.57	4.55	3.36	1.96	1.16	.47	.12	.01	.08	.12	.17	.03
31	5	1.56	3.42	2.72	1.86	1.20	.66	.32	.09	0	0	0	.16
32	7.5	1.56	2.95	2.44	1.78	1.23	.77	.45	.21	.07	.04	.03	.29
33	10	1.57	2.69	2.31	1.77	1.26	.85	.56	.32	.15	.12	.12	.40
34	15	1.58	2.31	2.07	1.66	1.28	.94	.69	.46	.31	.27	.25	.54
35	20	1.59	2.10	1.96	1.62	1.29	1.00	.78	.58	.41	.39	.37	.66
36	30	1.61	1.74	1.73	1.49	1.26	1.05	.87	.70	.57	.54	.54	.82
37	40	1.62	1.48	1.60	1.44	1.27	1.09	.96	.82	.71	.69	.68	.97
38	50	1.62	1.25	1.45	1.35	1.22	1.09	.99	.88	.79	.78	.77	1.07
39	60	1.62	1.16	1.27	1.21	1.13	1.04	.98	.90	.84	.82	.83	1.11
40	65	1.62	1.15	1.13	1.08	1.02	.96	.91	.85	.80	.79	.79	1.06
[a]41	57.5	1.56	1.16	1.02	.95	.87	.82	.77	.73	.69	.69	.69	.92
[a]42	66.5	1.56	1.15	1.02	.95	.87	.82	.77	.73	.69	.69	.69	.92
[a]43	68	1.56	1.15	1.02	.95	.87	.82	.77	.73	.69	.69	.69	.92
[a]44	69	1.57	1.16	1.02	.95	.87	.82	.77	.73	.69	.69	.69	.92
[a]45	70	1.57	1.15	1.02	.95	.87	.82	.77	.73	.69	.69	.69	.92
46	75	1.61	1.15	.97	.91	.86	.82	.80	.77	.73	.74	.74	.98
47	80	1.60	1.15	.93	.88	.85	.82	.81	.80	.77	.77	.79	1.03
48	85	1.58	1.15	.88	.83	.80	.78	.78	.77	.76	.76	.79	1.01
49	90	1.52	1.14	.82	.70	61	.49	.54	.51	.49	.49	.49	.65
50	95	1.51	1.13	.81	.76	.74	.74	.79	.80	.80	.82	.83	1.08
51	98	1.49	1.13	.81	.80	.81	.84	.91	.93	.95	.95	.99	1.28

[a] Balance chamber pressures.

TABLE III.— PRESSURE COEFFICIENT — Continued

(d) $\delta_f = 14^{\circ}$.

Orifice number	x/c	Section angle of attack, a_o, deg										
		−18.8	−17.8	−12.2	−8.1	−4.1	0	4.1	8 1	12.2	12.7	13.7
1	0	1.12	6.80	2.93	0.44	0.01	0.89	2.98	6 30	10.12	10.28	1.85
2	.5	.08	1.76	.22	.06	.85	2.54	5.05	8.33	11.64	11.75	2.01
3	.75	.01	.96	.05	.16	1.05	2.64	4.76	7.66	11.14	11.23	2.04
4	1.25	0	.35	0	.32	1.17	2.46	4.43	5.94	7.69	7.72	2.05
5	2.5	.10	.02	.10	.53	1.23	2.17	3.22	4.36	5.77	5.76	2.05
6	5	.30	.03	.32	.76	1.32	1.98	2.73	3.57	4.35	4.33	2.00
7	7.5	.41	.15	.48	.89	1.36	1.89	2.50	3.12	3.70	3.67	2.03
8	10	.57	.26	.60	.99	1.41	1.86	2.37	2.89	3.35	3.32	2.05
9	15	.73	.43	.76	1.11	1.47	1.82	2.21	2.60	2.93	2.90	2.07
10	20	.87	.56	.88	1.19	1.51	1.76	2.18	2.41	2.66	2.62	2.08
11	30	1.12	.81	1.09	1.35	1.59	1.80	2.02	2.21	2.32	2.28	2.07
12	40	1.33	1.00	1.25	1.48	1.66	1.80	1.95	2.06	2.08	2.03	2.04
13	50	1.58	1.21	1.43	1.62	1.75	1.82	1.91	1.94	1.86	1.80	1.98
14	60	1.89	1.45	1.63	1.79	1.85	1.83	1.84	1.78	1.59	1.54	1.94
15	65	2.05	1.57	1.71	1.85	1.85	1.77	1.73	1.63	1.47	1.45	1.93
[a]16	57.5	2.33	1.77	1.79	1.86	1.78	1.68	1.59	1.48	1.42	1.40	1.83
[a]17	66.5	2.33	1.77	1.79	1.86	1.78	1.67	1.59	1.48	1.42	1.40	1.83
[a]18	68	2.29	1.74	1.81	1.93	1.86	1.69	1.60	1.48	1.42	1.40	1.88
19	69	2.33	1.76	1.91	2.01	1.89	1.67	1.56	1.44	1.42	1.40	1.93
20	70	3.20	2.41	2.55	2.65	2.37	1.89	1.67	1.45	1.41	1.40	1.96
21	75	2.17	1.62	1.64	1.69	1.45	1.35	1.36	1.35	1.39	1.39	1.88
22	80	1.93	1.40	1.37	1.40	1.39	1.34	1.35	1.35	1.39	1.39	1.87
23	85	1.83	1.29	1.20	1.22	1.38	1.34	1.35	1.35	1.39	1.39	1.85
24	90	2.41	1.37	1.10	1.12	1.32	1.32	1.34	1.34	1.39	1.38	1.82
25	95	1.56	1.03	1.02	1.09	1.30	1.33	1.35	1.34	1.39	1.39	1.78
26	98	1.46	1101	1.02	1.09	1.33	1.33	1.35	1.34	1.39	1.38	1.75
27	.5	1.53	8.00	4.26	1.81	.45	0	.28	1.32	2.82	2.93	.26
28	.75	1.53	7.65	4.08	1.89	.59	.04	.11	.78	1.86	1.93	.11
29	1.25	1.53	6.69	3.67	1.88	.76	.16	0	.25	.79	.84	.01
30	2.5	1.53	4.43	2.73	1.73	.89	.34	.09	.01	.15	.17	.04
31	5	1.53	3.33	2.36	1.58	.99	.54	.23	.05	0	0	.18
32	7.5	1.53	2.87	2.15	1.54	1.05	.66	.35	.16	.04	.03	.29
33	10	1.53	2.61	2.06	1.51	1.09	.74	.46	.25	.12	.10	.39
34	15	1.54	2.24	1.86	1.46	1.13	.84	.59	.39	.25	.23	.53
35	20	1.55	2.02	1.77	1.44	1.15	.90	.68	.49	.35	.35	.64
36	30	1.57	1.66	1.56	1.32	1.14	.95	.78	.62	.51	.49	.77
37	40	1.58	1.38	1.44	1.28	1.13	.99	.86	.72	.62	.61	.89
38	50	1.58	1.20	1.29	1.18	1.09	.97	.87	.77	.69	.68	.95
39	60	1.58	1.16	1.08	1.03	.97	.91	.83	.76	.70	.70	.94
40	65	1.57	1.14	.95	.89	.85	.80	.74	.69	.64	.64	.86
[a]41	57.5	1.50	1.14	.88	.75	.71	.65	.60	.56	.53	.51	.70
[a]42	66.5	1.50	1.14	.88	.75	.71	.65	.60	.56	.52	.51	.70
[a]43	68	1.50	1.14	.88	.75	.71	.65	.60	.56	.52	.51	.70
[a]44	69	1.50	1.14	.88	.75	.71	.65	.60	.56	.52	.51	.70
[a]45	70	1.53	1.15	.88	.75	.71	.65	.61	.56	.52	.51	.70
46	75	1.55	1.15	.84	.74	.71	.68	.64	.60	.57	.57	.76
47	80	1.55	1.14	.81	.75	.73	.71	.69	.66	.63	.62	.83
48	85	1.52	1.12	.78	.71	.71	.69	.67	.65	.63	.61	.82
49	90	1.45	1.09	.71	.57	.52	.49	.45	.42	.41	.40	.53
50	95	1.45	1.05	.75	.70	.72	.73	.69	.71	.71	.71	.92
51	98	1.44	1.01	.82	.82	.89	.91	.91	.90	.92	.90	1.16

[a] Balance chamber pressures.

TABLE III.- PRESSURE COEFFICIENT - Concluded

(e) $\delta_f = 18^\circ$

Orifice number	x/c	Section angle of attack, a_o, deg										
		-19.3	-18.3	-17.8	-12.2	-8.1	-4.1	0	4.1	8.1	11.7	12.7
1	0	1.35	6.87	6.52	1.82	0.29	0.07	1.24	3.55	7.16	10.41	1.83
2	.5	.12	1.80	1.65	.08	.09	1.05	3.04	5.66	9.06	11.87	1.96
3	.75	.03	.97	1.00	0	.22	1.25	3.08	5.26	8.46	11.39	1.98
4	1.25	0	.36	.32	.02	.39	1.34	3.29	4.99	6.31	7.86	1.98
5	2.5	.08	.02	.02	.16	.68	1.36	2.45	3.50	4.88	5.87	1.98
6	5	.28	.04	.05	.40	.82	1.41	2.13	2.92	3.79	4.43	1.96
7	7.5	.42	.15	.16	.55	.94	1.44	2.04	2.65	3.31	3.78	1.95
8	10	.54	.26	.28	.68	1.04	1.47	1.99	2.51	3.05	3.41	1.98
9	15	.73	.43	.44	.85	1.16	1.52	1.93	2.33	2.73	2.99	2.01
10	20	.85	.56	.59	.96	1.24	1.55	1.88	2.21	2.53	2.72	2.02
11	30	1.11	.82	.83	1.17	1.39	1.63	1.89	2.11	2.31	2.40	2.03
12	40	1.32	1.02	1.02	1.34	1.50	1.68	1.87	2.03	2.15	2.15	2.02
13	50	1.59	1.24	1.24	1.52	1.63	1.76	1.89	1.99	2.02	1.93	2.01
14	60	1.93	1.50	1.50	1.76	1.76	1.82	1.88	1.91	1.85	1.68	1.99
15	65	2.12	1.65	1.64	1.88	1.78	1.79	1.80	1.79	1.70	1.55	1.99
[a]16	57.5	2.43	1.87	1.86	1.81	1.78	1.74	1.70	1.64	1.53	1.45	1.91
[a]17	66.5	2.43	1.87	1.86	1.81	1.78	1.74	1.70	1.64	1.53	1.45	1.91
[a]18	68	2.41	1.85	1.83	2.02	1.76	1.70	1.67	1.62	1.53	1.46	1.98
19	69	2.82	2.16	2.14	2.41	1.98	1.87	1.76	1.64	1.52	1.46	2.03
20	70	3.54	2.70	2.67	2.97	2.24	2.02	1.81	1.63	1.48	1.45	2.06
21	75	2.20	1.65	1.62	1.77	1.41	1.40	1.42	1.42	1.42	1.45	1.97
22	80	1.87	1.37	1.34	1.46	1.40	1.40	1.42	1.42	1.42	1.43	1.95
23	85	1.71	1.21	1.17	1.29	1.40	1.40	1.42	1.42	1.42	1.45	1.94
24	90	1.77	1.09	1.04	1.18	1.39	1.40	1.41	1.42	1.42	1.43	1.93
25	95	1.47	1.01	.99	1.15	1.39	1.40	1.42	1.42	1.42	1.43	1.86
26	98	1.48	1.01	.99	1.16	1.38	1.40	1.41	1.42	1.42	1.43	1.83
27	.5	1.57	8.04	7.84	3.57	1.56	.32	0	.44	1.62	2.93	.23
28	.75	1.57	7.68	7.39	3.48	1.66	.44	0	.19	.99	1.94	.08
29	1.25	1.57	6.66	6.73	3.10	1.68	.62	.08	.02	.34	.83	0
30	2.5	1.58	4.43	4.32	2.52	1.58	.77	.26	.03	.02	.34	0
31	5	1.57	3.31	3.25	2.12	1.48	.89	.45	.19	.02	0	.15
32	7.5	1.57	2.85	2.81	1.96	1.44	.96	.57	.31	.11	.03	.26
33	10	1.57	2.59	2.56	1.88	1.42	1.01	.66	.41	.20	.09	.36
34	15	1.59	2.21	2.21	1.71	1.38	1.05	.76	.54	.34	.22	.51
35	20	1.60	1.99	1.99	1.64	1.37	1.08	.83	.63	.45	.33	.61
36	30	1.62	1.61	1.65	1.44	1.26	1.06	.87	.72	.58	.46	.74
37	40	1.63	1.35	1.39	1.32	1.21	1.06	.91	.79	.66	.58	.85
38	50	1.64	1.21	1.17	1.17	1.11	1.00	.89	.79	.71	.63	.89
39	60	1.64	1.18	1.10	.95	.93	.87	.80	.73	.66	.61	.83
40	65	1.63	1.17	1.09	.83	.78	.74	.69	.64	.58	.55	.73
[a]41	57.5	1.55	1.14	1.08	.79	.67	.62	.56	.51	.46	.42	.58
[a]42	66.5	1.55	1.14	1.08	.79	.67	.62	.56	.51	.46	.42	.58
[a]43	68	1.55	1,14	1.08	.79	.67	.62	.56	.51	.46	.42	.58
[a]44	69	1.56	1.14	1.08	.79	.67	.62	.56	.51	.46	.42	.58
[a]45	70	1.57	1.14	1.08	.79	.67	.62	.56	.51	.46	.42	.58
46	75	1.61	1.15	1.08	.75	.66	.62	.57	.54	.50	.45	.62
47	80	1.62	1.14	1.07	.73	.68	.66	.63	.60	.56	.54	.71
48	85	1.59	1.11	1.06	.70	.66	.64	.61	.58	.56	.54	.71
49	90	1.50	1.08	1.00	.72	.66	.63	.61	.58	.56	.52	.70
50	95	1.53	1.03	.98	.69	.70	.69	.67	.66	.63	.62	.81
51	98	1.53	1.00	.95	.61	.89	.89	.89	.88	.86	.86	1.10

[a] Balance chamber pressures.

TABLE IV.- PRESSURE COEFFICIENTS S FOR THE NACA 66,2-015 AIRFOIL AT DIFFERENT ANGLES OF ATTACK WITH A 0.30c INTERNALLY BALANCED CONTROL SURFACE AND A 0.33c_f CONTROL SURFACE TAB

$\left[\frac{\delta_t}{\delta_f} = 2.0\text{; CONFIGURATION 1; } R = 2.0 \times 10^6\right]$

(a) $\delta_f = 0^\circ$

Orifice number	x/c	Section angle of attack, α_o, degrees											
		-17.3	-16.2	-12.2	-8.1	-4.1	0	0.3	4.1	8.1	12.2	15.2	16.2
1	0	1.51	8.89	5.92	2.71	0.65	0	0	0.87	3.17	6.35	8.69	1.54
2	.5	.17	2.65	1.36	.29	.01	.69	.62	2.52	5.17	8.24	10.29	1.75
3	.75	.04	1.54	.69	.08	.08	.88	.81	2.62	4.89	7.68	9.77	1.74
4	1.25	0	.66	.22	0	.22	1.02	.95	2.44	4.62	5.95	7.00	1.75
5	2.5	.06	.10	0	.08	.43	1.10	1.05	2.14	3.26	4.48	5.18	1.75
6	5	.24	.01	.07	.28	.65	1.19	1.15	1.87	2.70	3.48	3.89	1.72
7	7.5	.37	.07	.19	.42	.77	1.24	1.20	1.81	2.44	3.02	3.30	1.73
8	10	.49	.16	.29	.53	.86	1.28	1.24	1.78	2.31	2.77	2.99	1.75
9	15	.64	.32	.46	.68	.97	1.33	1.29	1.72	2.11	2.46	2.58	1.76
10	20	.77	.45	.57	.77	1.04	1.35	1.31	1.66	1.98	2.25	2.32	1.78
11	30	.99	.65	.77	.93	1.15	1.39	1.36	1.64	1.87	2.02	1.97	1.82
12	40	1.14	.81	.90	1.04	1.22	1.42	1.39	1.61	1.76	1.84	1.68	1.82
13	50	1.30	.96	1.02	1.13	1.27	1.43	1.40	1.57	1.68	1.67	1.41	1.82
14	60	1.45	1.08	1.12	1.19	1.31	1.42	1.40	1.52	1.56	1.46	1.28	1.80
15	65	1.47	1.10	1.12	1.18	1.26	1.36	1.35	1.43	1.44	1.32	1.27	1.80
[a]16	57.5	1.45	1.08	1.08	1.11	1.18	1.26	1.25	1.31	1.31	1.22	1.27	1.70
[a]17	66.5	1.45	1.08	1.08	1.11	1.18	1.26	1.25	1.31	1.31	1.22	1.27	1.70
[a]18	68	1.45	1.08	1.08	1.11	1.18	1.26	1.25	1.31	1.31	1.22	1.27	1.72
[a]19	69	1.45	1.08	1.08	1.11	1.18	1.26	1.25	1.31	1.31	1.22	1.27	1.76
20	70	1.24	.93	.94	.99	1.07	1.17	1.15	1.24	1.26	1.20	1.27	1.76
21	75	1.45	1.09	1.08	1.09	1.14	1.19	1.18	1.22	1.18	1.15	1.25	1.77
22	80	1.40	1.06	1.02	1.02	1.04	1.08	1.07	1.10	1.07	1.13	1.25	1.75
23	85	1.37	1.04	.98	.96	.96	.99	.98	.99	1.01	1.12	1.25	1.72
24	90	1.19	.89	.84	.82	.83	.86	.86	.90	.98	1.11	1.24	1.66
25	95	1.31	1.00	.91	.84	.82	.83	.82	.86	.96	1.12	1.25	1.65
26	98	1.39	1.06	.95	.85	.80	.80	.79	.83	.94	1.12	1.24	1.62
27	.5	1.68	9.77	7.49	4.59	2.18	.60	.64	0	.34	1.34	2.25	.16
28	.75	1.68	9.52	7.05	4.40	2.24	.74	.78	.03	.14	.79	1.44	.06
29	1.25	1.69	6.75	6.46	3.97	2.17	.91	.95	.16	0	.25	.57	0
30	2.5	1.70	5.22	4.34	2.96	1.97	1.03	1.05	.36	.05	.01	.09	.06
31	5	1.69	3.86	3.35	2.53	1.79	1.12	1.13	.57	.23	.05	.02	.23
32	7.5	1.69	3.32	2.95	2.33	1.74	1.18	1.19	.70	.40	.16	.07	.36
33	10	1.68	3.01	2.75	2.24	1.72	1.23	1.23	.80	.48	.27	.16	.47
34	15	1.70	2.58	2.43	2.04	1.65	1.28	1.28	.91	.63	.43	.32	.63
35	20	1.71	2.33	2.26	1.96	1.64	1.32	1.32	1.00	.74	.55	.45	.75
36	30	1.73	1.96	2.00	1.81	1.59	1.35	1.34	1.10	.89	.73	.64	.94
37	40	1.74	1.68	1.84	1.72	1.57	1.38	1.38	1.18	1.00	.87	.80	1.11
38	50	1.75	1.43	1.69	1.66	1.56	1.42	1.40	1.25	1.11	1.00	.95	1.27
39	60	1.76	1.30	1.50	1.55	1.50	1.40	1.39	1.28	1.17	1.10	1.06	1.41
40	65	1.76	1.27	1.35	1.45	1.43	1.36	1.34	1.25	1.16	1.11	1.09	1.44
[a]41	57.5	1.70	1.25	1.23	1.30	1.27	1.22	1.20	1.14	1.09	1.05	1.06	1.38
[a]42	66.5	1.70	1.25	1.23	1.30	1.28	1.22	1.20	1.14	1.09	1.06	1.06	1.38
[a]43	68	1.70	1.25	1.23	1.30	1.28	1.22	1.20	1.14	1.09	1.06	1.06	1.38
[a]44	69	1.71	1.25	1.23	1.31	1.30	1.24	1.22	1.16	1.09	1.05	1.06	1.38
45	70	1.75	1.26	1.21	1.26	1.24	1.18	1.16	1.08	1.01	.97	.95	1.25
46	75	1.76	1.26	1.14	1.20	-1.23	1.19	1.18	1.13	1.09	1.07	1.08	1.42
47	80	1.75	1.26	1.11	1.08	1.11	1.09	1.07	1.05	1.02	1.02	1.06	1.38
48	85	1.73	1.26	1.10	1.00	1.00	1.00	.98	.97	.96	.99	1.03	1.35
49	90	1.68	1.25	1.09	.95	.90	.89	.87	.85	.85	.87	.92	1.22
50	95	1.66	1.25	1.09	.93	.84	.83	.82	.82	.85	.92	.99	1.30
51	98	1.63	1.25	1.09	.91	.82	.80	.79	.81	.86	.96	1.06	1.38

[a] Balance chamber pressures.

TABLE IV.- PRESSURE COEFFICIENTS – Continued

(b) $\delta_f = 5^\circ$

Orifice number	x/c	Section angle of attack, α_o, deg										
		−18.3	−17.3	−12.2	−8.1	−4.1	0	4.1	8.1	12.2	14.2	15.2
1	0	1.41	7.83	4.19	1.48	0.10	0.28	1.92	4.68	8.31	9.64	1.87
2	.5	.14	2.19	.74	.03	.27	1.58	3.86	6.76	10.00	11 27	2.28
3	.75	..07	1.23	.32	0	.43	1.75	3.79	6.22	9.50	10.65	1.76
4	1.25	0	.49	.06	.05	.60	1.75	3.41	5 61	6.93	7.51	1.77
5	2.5	.07	.06	.01	.22	.77	1.65	2.62	3.92	5.18	5.52	1.75
6	5	.26	.02	.16	.45	.95	1.61	2.37	3.16	3.95	4.13	1.75
7	7.5	.40	.10	.30	.60	1.05	1.58	2.22	2.80	3.40	3.50	1.75
8	10	.53	.21	.42	.71	1.11	1.59	2.12	2.62	3.08	3.17	1.75
9	15	.68	.38	.58	.85	1.20	1.60	2.01	2.38	2.71	2.75	1.76
10	20	.81	.50	.70	.94	1.25	1.60	1.92	2.21	2.47	2.49	1.77
11	30	1.04	.73	.90	1.11	1.36	1.62	1.88	2.06	2.19	2.16	1.79
12	40	1.23	.91	1.05	1.22	1.43	1.63	1.83	1.95	1.98	1.91	1.81
13	50	1.43	1.09	1.17	1.33	1.50	1.67	1.81	1.85	1.79	1.68	1.83
14	60	1.65	1.27	1.32	1.44	1.57	1.69	1.78	1.73	1.55	1.47	1.86
15	65	1.73	1.33	1.35	1.44	1.55	1.65	1.70	1.60	1.40	1.38	1.87
[a]16	57.5	1.78	1.37	1.36	1.43	1.51	1.57	1.59	1.47	1.33	1.34	1.82
[a]17	66.5	1.78	1.37	1.36	1.43	1.51	1.57	1.59	1.47	1.33	1.34	1.82
[a]18	68	1.79	1.37	1.36	1.43	1.51	1.58	1.60	1.47	1.34	1.35	1.84
[a]19	69	1.79	1.37	1.36	1.43	1.51	1.58	1.60	1.47	1.33	1.35	1.85
20	70	1.85	1.43	1.43	1.49	1.57	1.65	1.64	1.46	1.30	1.34	1.89
21	75	1.78	1.37	1.32	1.36	1.41	1.47	1.43	1.27	1.26	1.32	1.87
22	80	1.69	1.29	1.21	1.22	1.26	1.28	1.23	1.20	1.26	1.32	1.86
23	85	1.68	1.28	1.15	1.13	1.14	1.14	1.14	1.18	1.26	1.32	1.85
24	90	2.08	1.56	1.27	1.16	1.11	1.07	1.08	1.16	1.26	1.31	1.79
25	95	1.54	1.17	.94	.91	.93	.97	1.06	1.16	1.26	1.32	1.75
26	98	1.48	1.12	.87	.86	.90	.95	1.06	1.17	1.26	1.32	1.73
27	.5	1.63	9.69	6.01	3.24	1.15	.12	.07	.77	2.09	2.65	.27
28	.75	1.63	8.59	5.60	3.20	1.27	.22	.01	.41	1.32	1.74	.14
29	1.25	1.64	6.21	5.34	2.91	1.37	.40	.03	.08	.51	.73	.01
30	2.5	1.63	4.84	3.64	2.58	1.37	.60	.17	.01	.08	.15	.02
31	.5	1.62	3.58	2.89	2.08	1.35	.77	.38	.12	.01	0	.15
32	7.5	1.62	3.34	2.59	1.96	1.36	.87	.51	24	.09	.05	.27
33	10	1.62	2.80	2.43	1.92	1.38	.94	.61	.35	.17	.13	.38
34	15	1.64	2.40	2.17	1.78	1.38	1.02	.74	.50	.33	.27	.53
35	20	1.65	2.16	2.03	1.75	1.39	1.08	.83	.61	.46	.40	.65
36	30	1.66	1.79	1.80	1.60	1.35	1.12	.94	.76	.61	.56	.82
37	40	1.67	1.51	1.66	1.52	1.34	1.16	1.01	.86	.75	.70	.97
38	50	1.67	1.29	1.53	1.45	1.32	1.18	1.06	.95	.86	.82	1.10
39	60	1.67	1.22	1.34	1.34	1.24	1.14	1.06	.98	.91	.89	1.18
40	65	1.67	1.20	1.21	1.21	1.15	1.07	1.01	.95	.90	.87	1.17
[a]41	57.5	1.61	1.20	1.09	1.08	1.01	.95	.91	.86	.84	.83	1.07
[a]42	66.5	1.61	1.20	1.09	1.08	1.01	.95	.91	.86	.84	.83	1.07
[a]43	68	1.61	1.20	1.10	1.08	1.01	.95	.91	.86	.84	.83	1.07
[a]44	69	1.62	1.20	1.10	1.08	1.01	.95	.91	.86	.84	.83	1.07
[a]45	70	1.62	1.20	1.09	1.08	1.01	.95	.91	.86	.83	.81	1.07
46	75	1.66	1.20	1.02	1.01	.97	.91	.89	.86	.84	.84	1.10
47	80	1.65	1.20	.96	.93	.90	.87	.86	.84	.84	.84	1.10
48	85	1.62	1.20	.92	.86	.82	.79	.80	.79	.79	.80	1.05
49	90	1.57	1.20	.90	.78	.68	.61	.59	.54	.52	.52	.69
50	95	1.57	1.20	.87	.78	.73	.73	.75	.77	.80	.82	1.08
51	98	1.55	1.20	.85	.79	.78	.79	.84	.89	.94	.97	1.28

[a] Balance chamber pressures.

TABLE IV.– PRESSURE COEFFICIENTS – Continued

(c) $\delta_f = 9^{\circ}$.

Orifice number	x/c	Section angle of attack, α_o, deg										
		–18.3	–17.8	–12.2	–8.1	–4.1	0	4.1	8.1	12.2	12.7	13.2
1	0	1.35	7.13	3.22	0.77	0	0.82	2.77	5.93	9.49	9.93	1.64
2	.5	.12	1.89	.43	0	.87	2.47	4.84	7.94	11.08	11.47	1.87
3	.75	.03	1.05	.15	.06	.87	2.57	4.60	7.35	10.55	10.94	1.87
4	1.25	.01	.40	.01	.19	1.01	2.42	4.24	5.93	7.38	7.63	1.87
5	2.5	.10	.04	.04	.39	1.10	2.15	3.12	4.42	5.56	5.69	1.87
6	5	.29	.03	.24	.63	1.22	1.97	2.67	3.50	4.19	4.28	1.87
7	7.5	.43	.13	.39	.77	1.27	1.87	2.44	3.06	3.58	3.64	1.87
8	10	.54	.24	.51	.87	1.33	1.85	2.33	2.84	3.25	3.30	1.87
9	15	.72	.42	.68	1.01	1.39	1.81	2.17	2.55	2.83	2.87	1.89
10	20	.84	.55	.79	1.09	1.44	1.78	2.07	2.38	2.59	2.61	1.91
11	30	1.08	.79	1.00	1.26	1.53	1.82	2.01	2.20	2.28	2.28	1.92
12	40	1.29	.98	1.16	1.38	1.61	1.83	1.95	2.06	2.05	2.04	1.91
13	50	1.51	1.18	1.31	1.51	1.70	1.87	1.92	1.95	1.83	1.81	1.90
14	60	1.77	1.40	1.48	1.64	1.80	1.92	1.88	1.81	1.56	1.54	1.89
15	65	1.89	1.49	1.53	1.68	1.81	1.90	1.80	1.66	1.44	1.43	1.89
[a]16	57.5	2.05	1.60	1.60	1.71	1.82	1.85	1.68	1.51	1.39	1.40	1.83
[a]17	66.5	2.06	1.60	1.60	1.71	1.82	1.85	1.68	1.52	1.39	1.40	1.83
[a]18	68	2.05	1.60	1.59	1.71	1.81	1.86	1.69	1.52	1.39	1.40	1.87
[a]19	69	1.79	1.48	1.35	1.48	1.62	1.74	1.61	1.47	1.38	1.39	1.88
20	70	2.48	1.95	1.97	2.09	2.21	2.21	1.83	1.51	1.37	1.39	1.91
21	75	1.98	1.57	1.49	1.58	1.66	1.66	1.39	1.34	1.35	1.37	1.87
22	80	1.83	1.44	1.31	1.37	1.42	1.39	1.30	1.32	1.35	1.36	1.86
23	85	1.79	1.41	1.19	1.24	1.26	1.25	1.28	1.32	1.35	1.37	1.85
24	90	2.42	1.98	1.18	1.17	1.17	1.17	1.26	1.31	1.35	1.36	1.85
25	95	1.57	1.25	1.02	1.06	1.09	1.15	1.26	1.32	1.35	1.37	1.76
26	98	1.51	1.20	1.03	1.06	1.10	1.15	1.27	1.32	1.35	1.37	1.73
27	.5	1.61	8.18	5.05	2.31	.60	0	.24	1.19	2.58	2.82	.18
28	.75	1.61	7.95	4.80	2.35	.74	.04	.09	.69	1.68	1.81	.07
29	1.25	1.61	6.49	4.41	2.24	.90	.18	0	.20	.70	.77	0
30	2.5	1.62	4.51	3.17	2.01	1.01	.36	.07	.01	.14	.15	.05
31	5	1.60	3.35	2.60	1.78	1.08	.56	.26	.07	0	0	.20
32	7.5	1.61	2.88	2.35	1.67	1.12	.68	.38	.18	.06	.04	.33
33	10	1.61	2.60	2.23	1.66	1.16	.76	.49	.28	.13	.12	.43
34	15	1.62	2.20	1.99	1.57	1.19	.86	.62	.42	.27	.26	.57
35	20	1.64	1.95	1.87	1.53	1.21	.93	.71	.53	.38	.37	.69
36	30	1.65	1.57	1.68	1.43	1.19	.98	.82	.66	.54	.52	.83
37	40	1.65	1.38	1.54	1.36	1.18	1.01	.89	.76	.66	.65	.95
38	50	1.65	1.33	1.40	1.28	1.15	1.02	.93	.83	.75	.73	1.03
39	60	1.65	1.31	1.20	1.14	1.05	.97	.91	.84	.77	.77	1.06
40	65	1.64	1.31	1.07	1.02	.95	.89	.84	.78	.74	.73	.99
[a]41	57.5	1.54	1.27	.97	.89	.81	.75	.72	.68	.64	.64	.86
[a]42	66.5	1.54	1.27	.97	.89	.81	.75	.72	.68	.64	.64	.86
[a]43	68	1.55	1.27	.97	.89	.81	.75	.72	.68	.64	.64	.86
[a]44	69	1.56	1.27	.97	.89	.81	.75	.72	.68	.64	.64	.86
[a]45	70	1.58	1.29	.97	.89	.81	.75	.72	.68	.64	.64	.86
46	75	1.61	1.25	.92	.84	.78	.74	.72	.68	.66	.66	.89
47	80	1.60	1.29	.88	.80	.75	.72	.71	.68	.67	.66	.89
48	85	1.56	1.27	.84	.73	.68	.65	.65	.64	.62	.63	.83
49	90	1.50	1.25	.84	.72	.64	.62	.61	.60	.59	.59	.77
50	95	1.49	1.23	.79	.70	.66	.64	.67	.67	.67	.66	.88
51	98	1.49	1.21	.83	.80	.79	.80	.85	.87	.95	.88	1.13

[a] Balance chamber pressures.

TABLE IV.— PRESSURE COEFFICIENTS — Continued

(d) $\delta_f = 14^\circ$

Orifice number	x/c	Section angle of attack, α_o, deg									
		−19.3	−18.3	−12.2	−8.1	−4.1	0	4.1	8.1	11.2	12.2
1	0	1.41	7.18	1.83	0.20	0.14	1.34	3.72	7.25	10.20	2.11
2	.5	.15	1.94	.09	.15	1.26	3.18	5.82	9.11	11.76	2.45
3	.75	.03	1.08	.01	.30	1.45	3.21	5.40	8.52	11.19	1.98
4	1.25	.01	.41	.02	.47	1.50	2.92	5.15	7.78	7.90	2.00
5	2.5	.07	.04	.16	.67	1.48	2.55	3.57	4.88	5.82	1.98
6	5	.26	.03	.40	.88	1.51	2.18	2.96	3.79	4.38	1.97
7	7.5	.40	.13	.55	.99	1.52	2.07	2.67	3.30	3.74	1.96
8	10	.52	.24	.68	1.08	1.55	2.03	2.52	3.03	3.39	1.99
9	15	.69	.41	.84	1.21	1.59	1.96	2.34	2.72	2.97	2.00
10	20	.82	.54	.95	1.28	1.61	1.90	2.21	2.51	2.70	2.01
11	30	1.07	.78	1.16	1.44	1.69	1.91	2.12	2.30	2.40	2.02
12	40	1.28	.98	1.32	1.57	1.76	1.91	2.04	2.15	2.17	2.01
13	50	1.52	1.19	1.50	1.72	1.86	1.93	2.00	2.02	1.96	2.00
14	60	1.81	1.42	1.72	1.91	1.98	1.94	1.92	1.85	1.72	2.00
15	65	1.97	1.54	1.81	1.98	2.01	1.87	1.81	1.70	1.56	2.00
[a]16	57.5	2.24	1.74	1.87	1.97	1.86	1.77	1.67	1.54	1.47	1.95
[a]17	66.5	2.24	1.74	1.87	1.97	1.86	1.77	1.67	1.54	1.47	1.95
[a]18	68	2.21	1.71	1.91	2.08	2.05	1.79	1.67	1.54	1.47	1.96
19	69	2.13	1.68	2.00	2.15	2.10	1.78	1.63	1.50	1.45	2.02
20	70	2.98	2.32	2.69	2.87	2.71	2.06	1.76	1.52	1.44	2.05
21	75	2.02	1.56	1.77	1.87	1.70	1.45	1.42	1.40	1.42	1.98
22	80	1.75	1.34	1.49	1.57	1.46	1.42	1.41	1.40	1.42	1.96
23	85	1.61	1.22	1.34	1.39	1.42	1.42	1.41	1.40	1.42	1.96
24	90	1.52	1.11	1.21	1.24	1.39	1.40	1.40	1.40	1.42	1.96
25	95	1.49	1.08	1.19	1.23	1.38	1.40	1.40	1.40	1.42	1.83
26	98	1.51	1.08	1.20	1.23	1.38	1.40	1.40	1.40	1.42	1.81
27	.5	1.60	8.26	3.57	1.38	.22	.01	.49	1.68	2.87	.34
28	.75	1.59	7.96	3.47	1.48	.34	0	.23	1.04	1.89	.19
29	1.25	1.60	5.08	3.11	1.53	.52	.07	.03	.37	.81	.01
30	2.5	1.61	4.52	2.48	1.47	.68	.23	.02	.03	.17	
31	5	1.59	3.36	2.11	1.39	.82	.43	.17	.03		.12
32	7.5	1.59	2.89	1.95	1.37	.90	.56	.24	.11	.04	.23
33	10	1.60	2.62	1.87	1.36	.95	.65	.39	.20	.10	.32
34	15	1.61	2.23	1.70	1.33	1.00	.75	.52	.34	.23	.46
35	20	1.63	1.99	1.61	1.31	1.03	.82	.61	.44	.33	.57
36	30	1.65	1.61	1.44	1.22	1.03	.87	.71	.56	.48	.70
37	40	1.67	1.36	1.31	1.16	1.02	.90	.77	.65	.58	.80
38	50	1.69	1.28	1.17	1.07	.98	.89	.79	.70	.63	.86
39	60	1.68	1.25	.96	.91	.86	.81	.74	.67	.63	.83
40	65	1.67	1.23	.84	.78	.74	.71	.66	.60	.56	.75
[a]41	57.5	1.59	1.19	.79	.66	.62	.58	.54	.49	.46	.60
[a]42	66.5	1.59	1.19	.79	.66	.62	.58	.54	.49	.46	.60
[a]43	68	1.59	1.19	.79	.66	.62	.58	.54	.49	.46	.61
[a]44	69	1.60	1.19	.79	.66	.62	.58	.54	.50	.46	.61
[a]45	70	1.63	1.20	.79	.66	.62	.58	.54	.49	.47	.60
46	75	1.65	1.22	.76	.63	.60	.58	.54	.50	.48	.62
47	80	1.65	1.19	.72	.61	.59	.58	.55	.52	.50	.65
48	85	1.61	1.17	.70	.55	.53	.51	.49	.47	.45	.59
49	90	1.54	1.12	.76	.64	.63	.61	.57	.55	.52	.69
50	95	1.61	1.10	.65	.54	.54	.54	.52	.50	.50	.63
51	98	1.65	1.06	.75	.72	.75	.78	.76	.75	.75	.95

[a] Balance chamber pressures.

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TABLE IV.— PRESSURE COEFFICIENTS — Concluded

(e) $\delta_r = 17.04^\circ$.

Orifice number	x/c	Section angle of attack, a_o, deg									
		−19.3	−18.3	−12.2	−8.1	−4.1	0	4.1	8.1	10.7	11.2
1	0	1.41	6.71	1.26	0.09	0.20	1.66	4.29	8.27	10.41	1.89
2	.5	.15	1.75	.01	.25	1.41	3.57	6.40	10.11	11.93	2.04
3	.75	.03	.95	0	.42	1.59	3.54	5.91	9.52	11.38	2.04
4	1.25	0	.36	.08	.60	1.62	3.20	5.64	6.87	7.89	2.04
5	2.5	.08	.03	.26	.77	1.57	2.58	3.81	5.30	5.88	2.04
6	5	.26	.05	.50	.97	1.57	2.31	3.03	4.08	4.44	2.04
7	7.5	.40	.16	.66	1.02	1.57	2.17	2.80	3.53	3.78	2.04
8	10	.51	.27	.78	1.16	1.59	2.11	2.63	3.25	3.43	2.05
9	15	.69	.44	.94	1.27	1.62	2.03	2.43	2.90	3.01	2.08
10	20	.82	.58	1.05	1.34	1.64	1.96	2.29	2.67	2.74	2.10
11	30	1.07	.83	1.26	1.49	1.71	1.97	2.19	2.44	2.42	2.10
12	40	1.29	1.04	1.43	1.62	1.76	1.96	2.11	2.26	2.20	2.07
13	50	1.53	1.26	1.63	1.76	1.84	1.97	2.05	2.73	2.01	2.03
14	60	1.85	1.53	1.88	1.94	1.91	1.96	2.00	1.94	1.75	2.00
15	65	2.02	1.67	2.01	2.00	1.88	1.88	1.85	1.78	1.60	1.99
[a]16	57.5	2.35	1.91	2.03	1.88	1.82	1.78	1.70	1.62	1.49	1.91
[a]17	66.5	2.35	1.91	2.03	1.88	1.82	1.78	1.71	1.62	1.49	1.92
[a]18	68	2.32	1.90	2.21	2.10	1.86	1.79	1.71	1.62	1.50	1.97
19	69	2.57	2.12	2.50	2.32	1.96	1.83	1.70	1.59	1.49	2.01
20	70	3.30	2.70	3.17	2.81	2.20	1.94	1.72	1.57	1.47	2.04
21	75	2.06	1.68	1.95	1.62	1.47	1.48	1.48	1.50	1.46	1.95
22	80	1.75	1.42	1.62	1.52	1.47	1.48	1.48	1.50	1.46	1.94
23	85	1.58	1.27	1.44	1.51	1.47	1.48	1.48	1.50	1.46	1.94
24	90	1.41	1.12	1.29	1.47	1.46	1.47	1.48	1.50	1.46	1.94
25	95	1.42	1.11	1.29	1.45	1.44	1.47	1.46	1.48	1.46	1.83
26	98	1.44	1.11	1.29	1.44	1.43	1.46	1.46	1.48	1.45	1.80
27	.5	1.61	7.85	2.90	1.12	.17	.04	.65	2.03	2.98	.26
28	.75	1.60	7.54	2.87	1.24	.27	0	.33	1.28	1.97	.11
29	1.25	1.61	5.68	2.63	1.33	.45	.04	.06	.34	.86	0
30	2.5	1.61	4.33	2.32	1.32	.62	.18	0	.07	.19	.02
31	5	1.60	3.22	1.87	1.28	.77	.29	.12	.02	0	.16
32	7.5	1.60	2.77	1.76	1.28	.85	.50	.24	.09	.03	.26
33	10	1.60	2.50	1.70	1.28	.90	.58	.34	.18	.09	.37
34	15	1.62	2.11	1.56	1.26	.95	.69	.47	.38	.21	.49
35	20	1.63	1.86	1.48	1.24	.98	.76	.55	.52	.31	.58
36	30	1.64	1.49	1.33	1.16	.98	.81	.66	.61	.44	.70
37	40	1.66	1.33	1.20	1.10	.97	.83	.71	.64	.53	.79
38	50	1.66	1.30	1.05	1.00	.91	.81	.72	.59	.57	.81
39	60	1.66	1.26	.83	.82	.77	.72	.65	.52	.55	.75
40	65	1.65	1.24	.73	.68	.64	.60	.55	.41	.48	.65
[a]41	57.5	1.57	1.19	.71	.60	.55	.50	.44	.55	.37	.52
[a]42	66.5	1.57	1.19	.71	.60	.55	.50	.45	.41	.37	.52
[a]43	68	1.57	1.19	.71	.60	.55	.50	.45	.41	.37	.52
[a]44	69	1.58	1.19	.71	.60	.55	.50	.45	.41	.37	.52
[a]45	70	1.59	1.20	.71	.60	.55	.50	.45	.41	.37	.52
46	75	1.63	1.23	.69	.56	.52	.48	.44	.41	.39	.52
47	80	1.62	1.20	.66	.54	.51	.48	.46	.30	.39	.54
48	85	1.59	1.18	.64	.50	.46	.43	.40	.55	.35	.47
49	90	1.53	1.12	.77	.68	.64	.69	.58	.41	.53	.72
50	95	1.63	1.10	.57	.48	.47	.44	.42	.40	.39	.51
51	98	1.69	1.07	.68	.71	.71	.70	.69	.66	.66	.84

[a] Balance chamber pressures.

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TABLE V

SECTION PARAMETERS MEASURED AT $\alpha_0 = 0^\circ$, $\delta_f = 0^\circ$

$[R = 2.0 \times 10^6]$

Configuration	δ_t/δ_f	c_{l_α}	$c_{l_{\delta_f}}$	α_{δ_f}	$c_{h_{f_\alpha}}$	$c_{h_{f_{\delta_f}}}$	P_α	P_{δ_f}
1	0.5	0.095	0.072	-0.76	0.0010	0.001	0.033	0.104
1	1.0	.096	.082	-.84	.0016	-.003	.032	.124
1	2.0	.096	.114	-1.19	.0018	-.014	.031	.144
2	2.0	.093	.113	-1.19	0	-.006	.025	.161

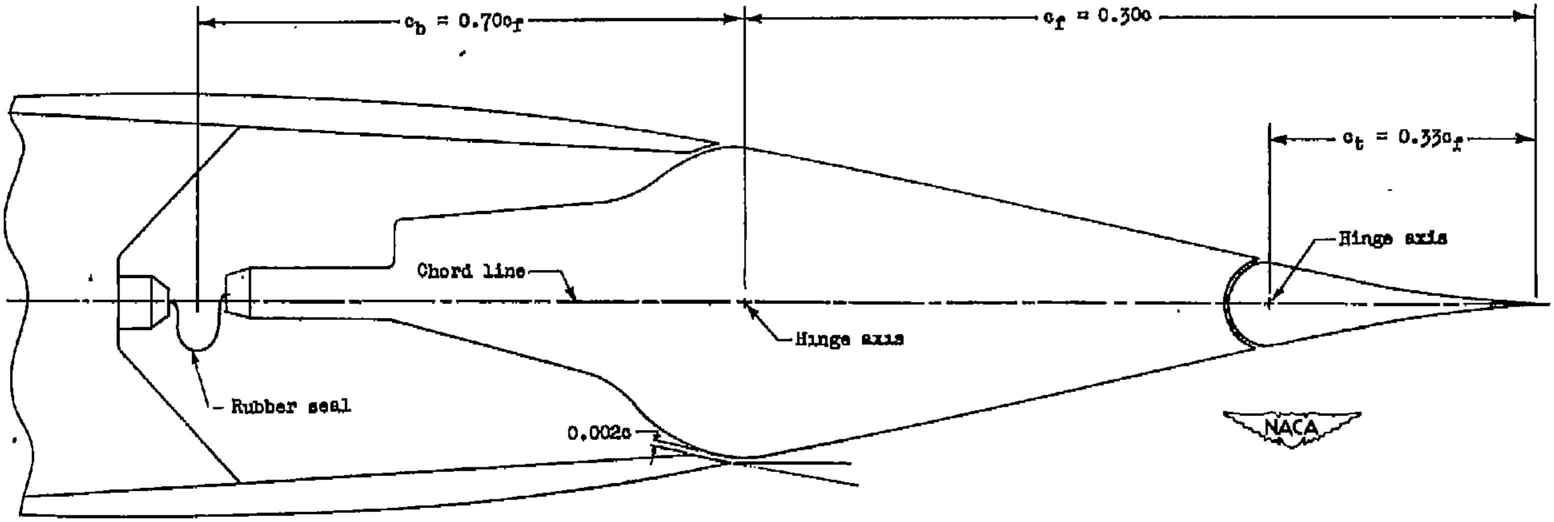
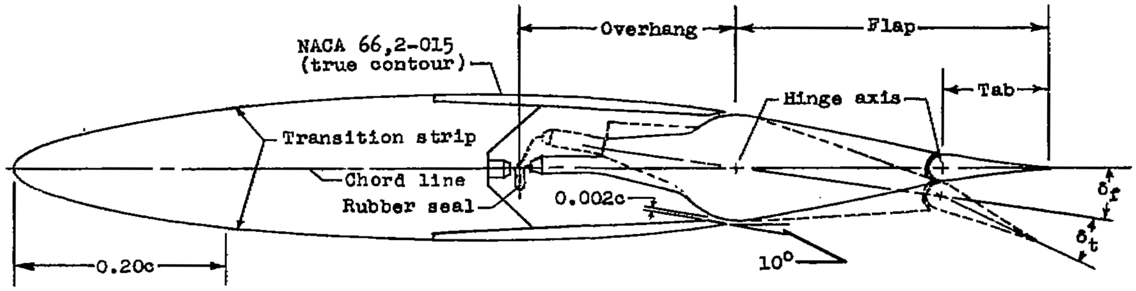
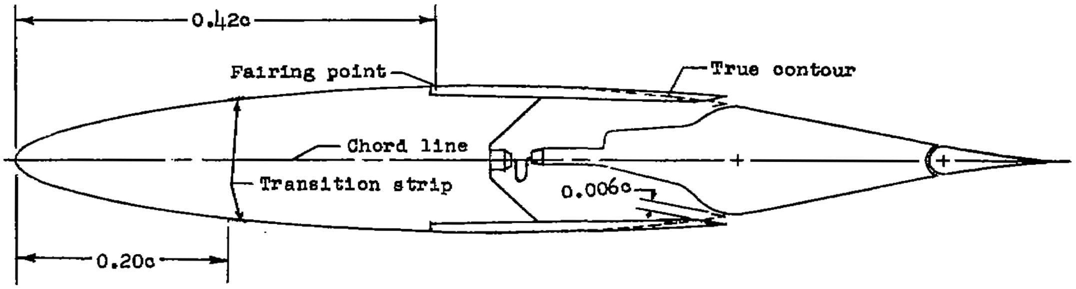


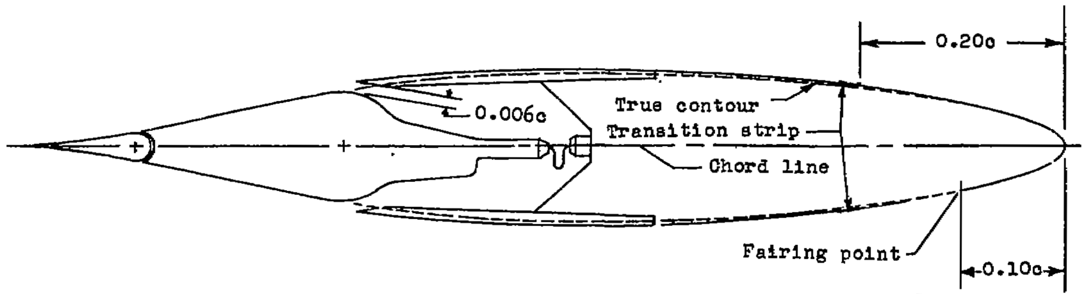
Figure 1.- Sketch of control surfaces for 24-inch-chord symmetrical airfoil section.



Configuration 1

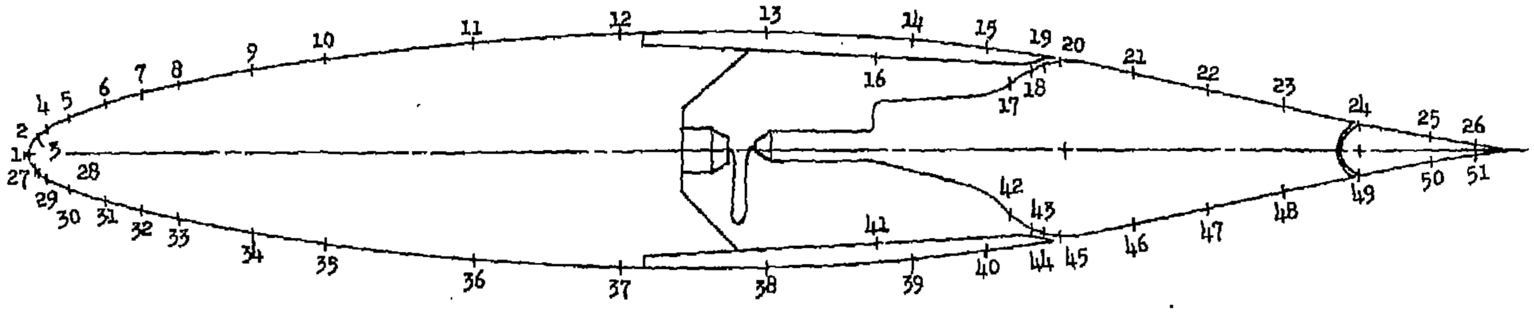


Configuration 2



Configuration 3

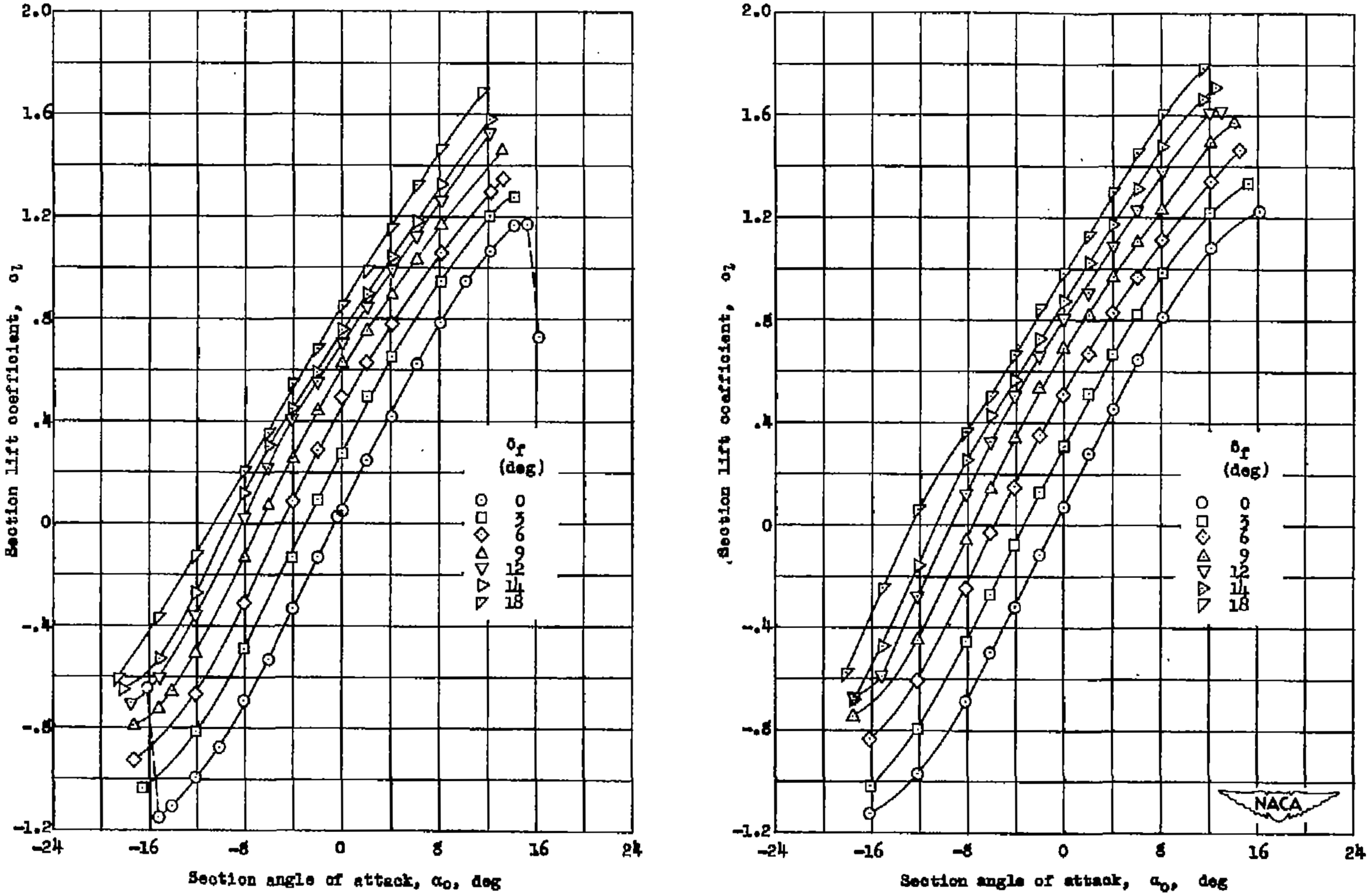
Figure 2.- Profile of model configurations with a 0.30c flap having a $0.70c_f$ overhang and a $0.33c_f$ leading tab.



Orifice number	Station (a)	Ordinate (a)	Orifice number	Station (a)	Ordinate (a)
1	0	0			
2	.5	1.110	27	0.5	-1.110
3	.75	1.329	28	.75	-1.329
4	1.25	1.645	29	1.25	-1.645
5	2.5	2.229	30	2.5	-2.229
6	5	3.086	31	5	-3.086
7	7.5	3.757	32	7.5	-3.757
8	10	4.337	33	10	-4.337
9	15	5.255	34	15	-5.255
10	20	5.964	35	20	-5.964
11	30	6.933	36	30	-6.933
12	40	7.415	37	40	-7.415
13	50	7.460	38	50	-7.460
14	60	6.961	39	60	-6.961
15	65	6.405	40	65	-6.405
16	57.5	5.750	41	57.5	-5.750
17	66.5	4.260	42	66.5	-4.260
18	68	5.126	43	68	-5.126
19	69	5.409	44	69	-5.409
20	70	5.506	45	70	-5.506
21	75	4.652	46	75	-4.652
22	80	3.615	47	80	-3.615
23	85	2.545	48	85	-2.545
24	90	1.488	49	90	-1.488
25	95	.560	50	95	-.560
26	98	.133	51	98	-.133

[a] Percent of airfoil chord

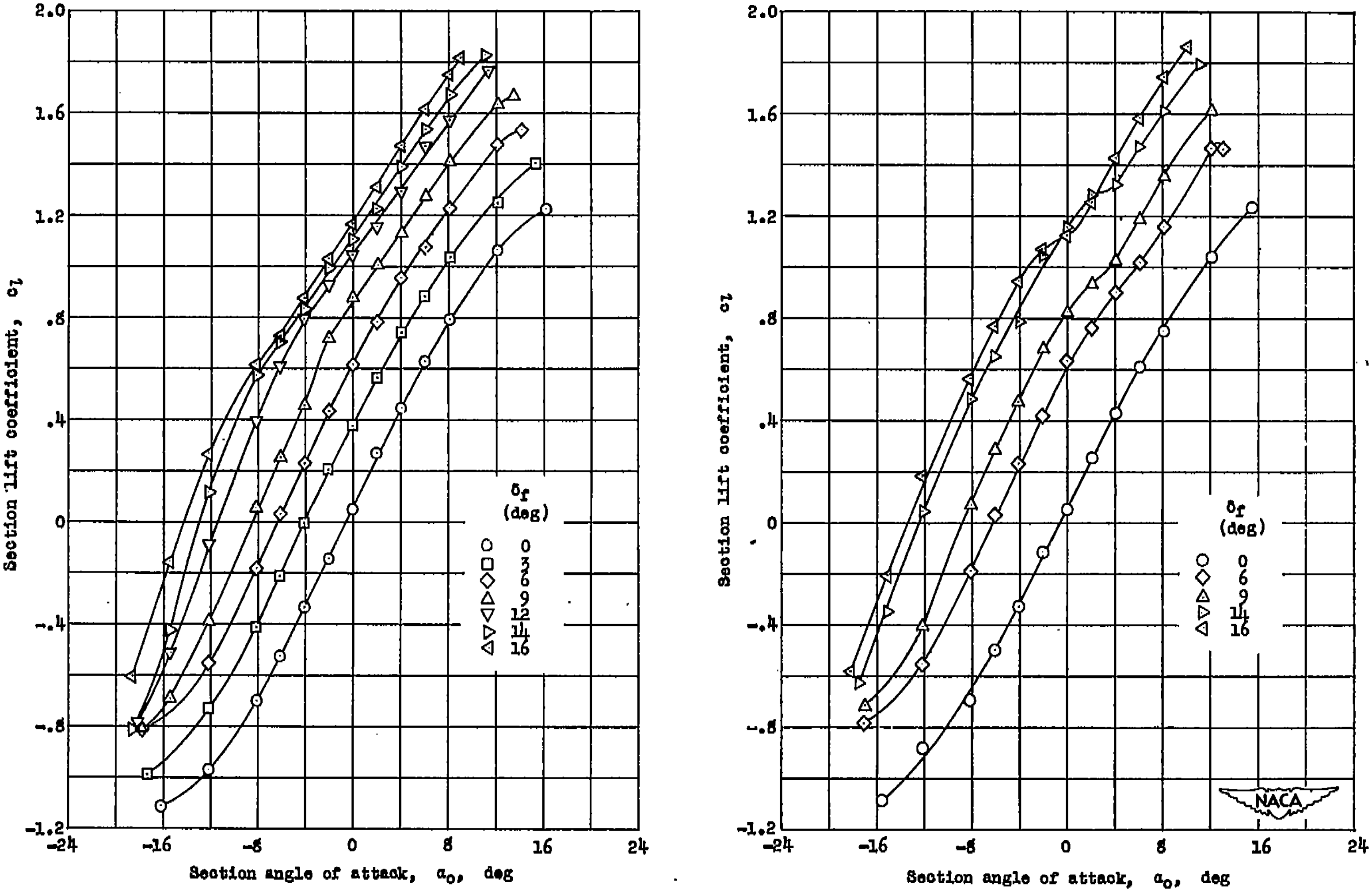
Figure 3.- Location of pressure orifices on the symmetrical airfoil section with a 0.30c flap having a $0.70c_f$ overhang and a $0.33c_f$ leading tab; configuration 1.



(a) $\frac{\delta_t}{\delta_f} = 0.5$; configuration 1.

(b) $\frac{\delta_t}{\delta_f} = 1.0$; configuration 1.

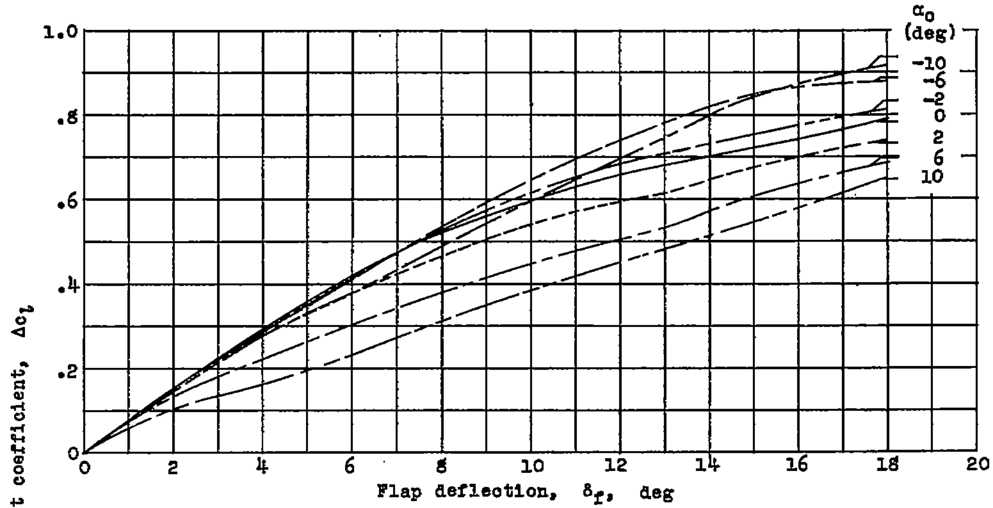
Figure 4.- Lift characteristics of the symmetrical airfoil section with a 0.30c flap having a $0.70c_f$ overhang and a $0.33c_f$ leading tab. Transition fixed; $R = 2 \times 10^6$.



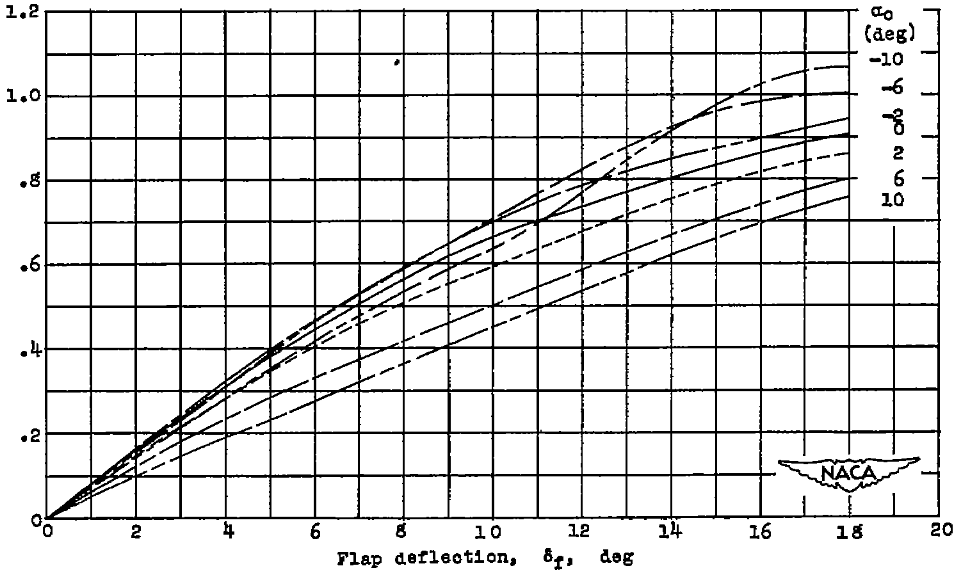
(c) $\frac{\delta_t}{\delta_f} = 2.0$; configuration 1.

(d) $\frac{\delta_t}{\delta_f} = 2.0$; configuration 2.

Figure 4.- Concluded.

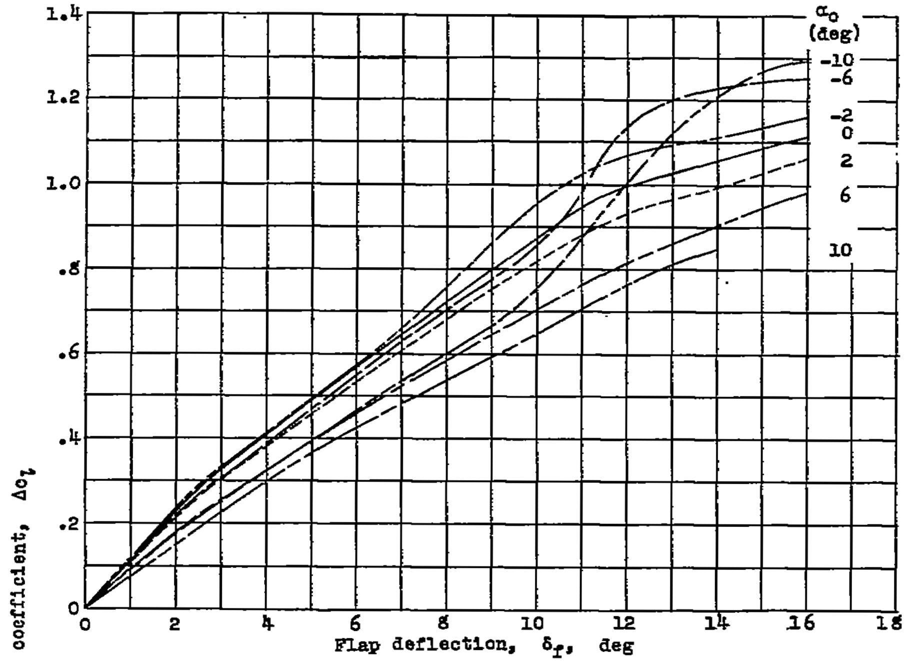


(a) $\frac{\delta_t}{\delta_f} = 0.5$; configuration 1.

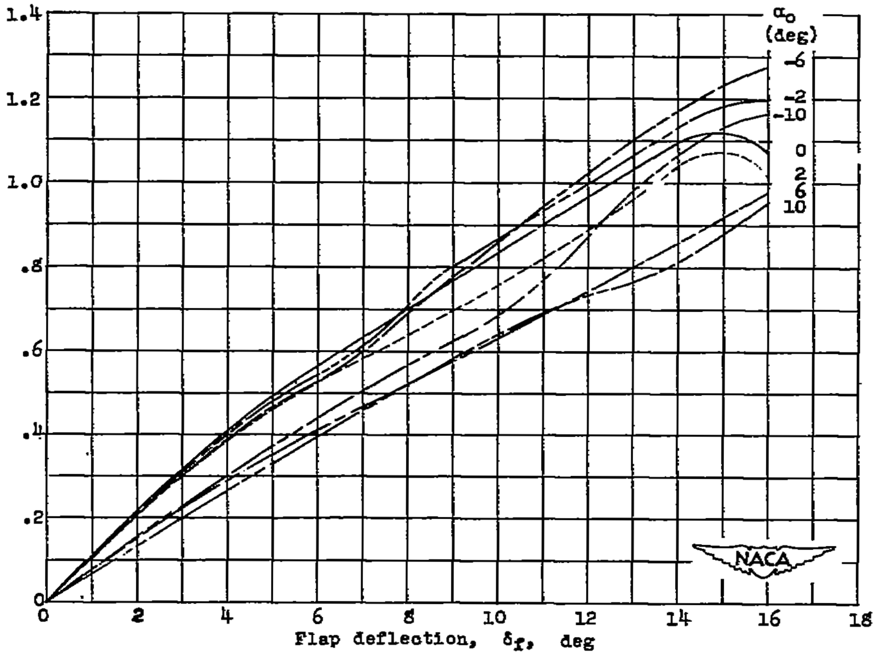


(b) $\frac{\delta_t}{\delta_f} = 1.0$; configuration 1

Figure 5.- Variation of Δc_l with δ_f at constant α_o for the symmetrical airfoil section with a 0.30c flap having a $0.70c_f$ overhang and a $0.33c_f$ leading tab. Transition fixed; $R = 2 \times 10^6$.

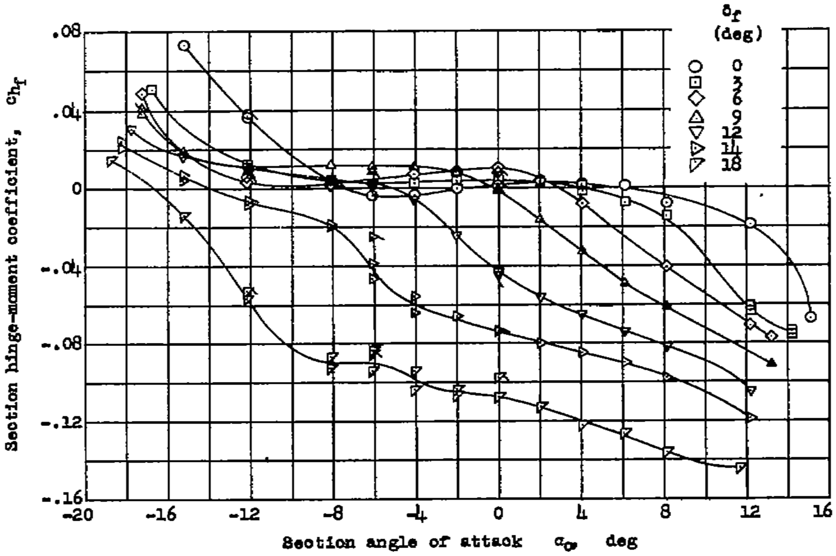


(c) $\frac{\delta_t}{\delta_f} = 2.0$; configuration 1.

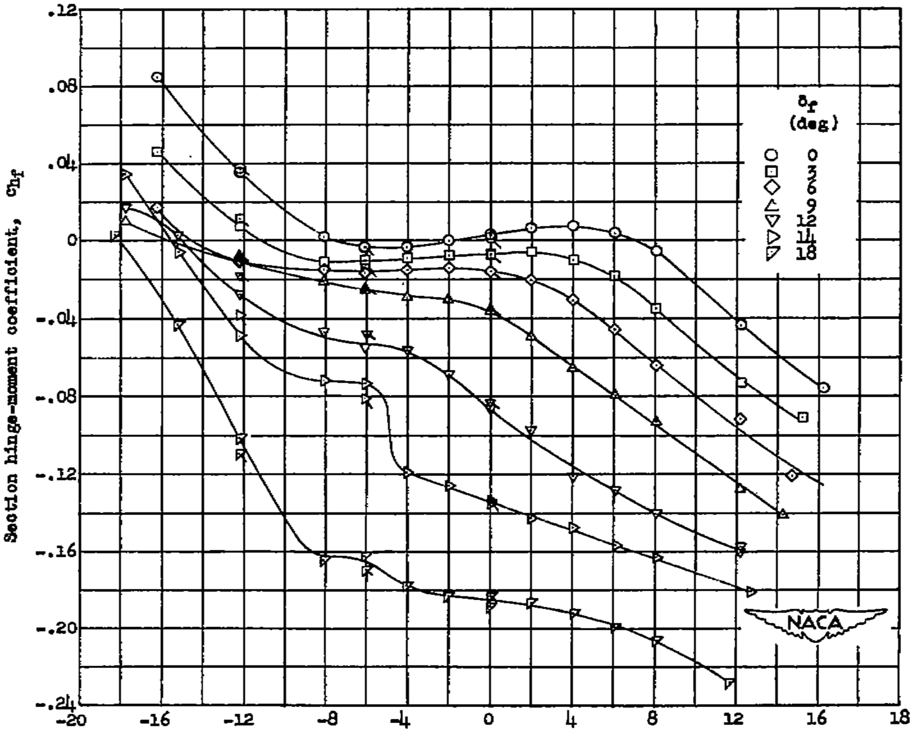


(d) $\frac{\delta_t}{\delta_f} = 2.0$; configuration 2.

Figure 5.- Concluded.

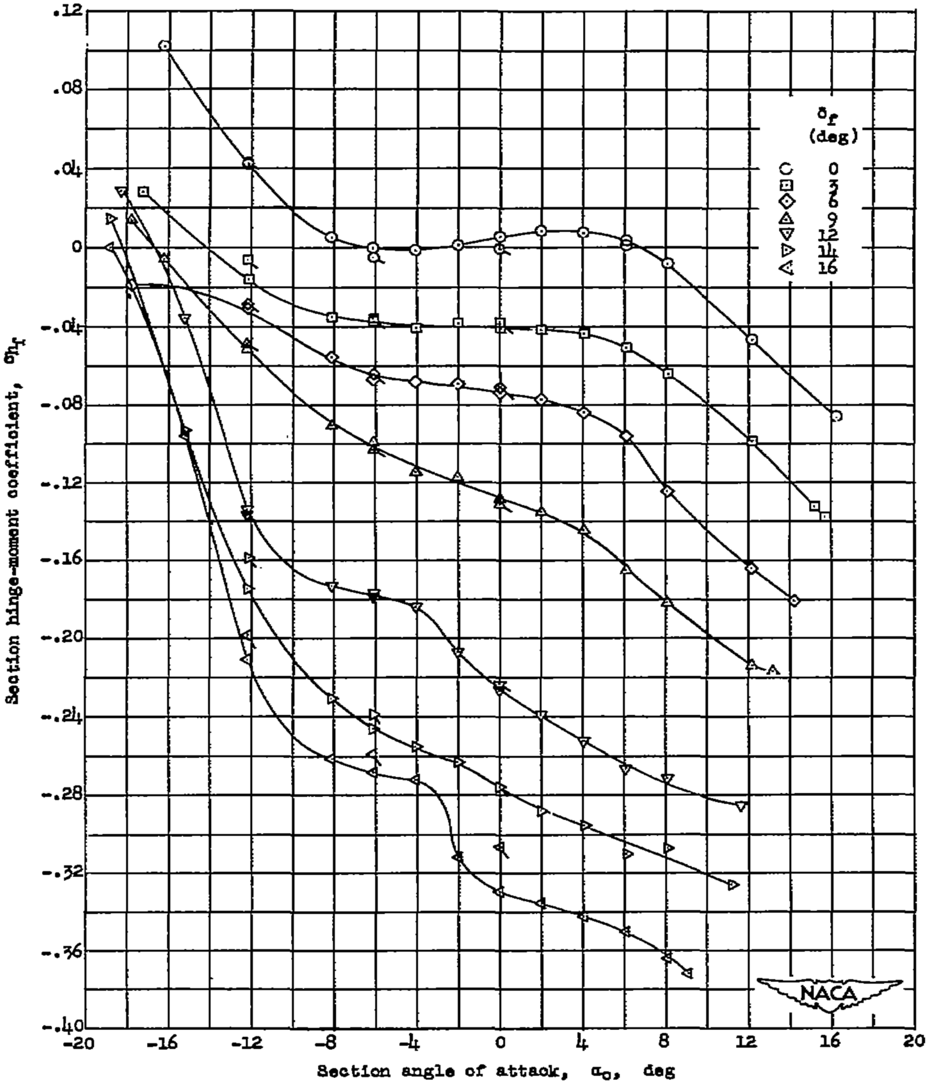


(a) $\frac{\delta_t}{\delta_f} = 0.5$; configuration 1.



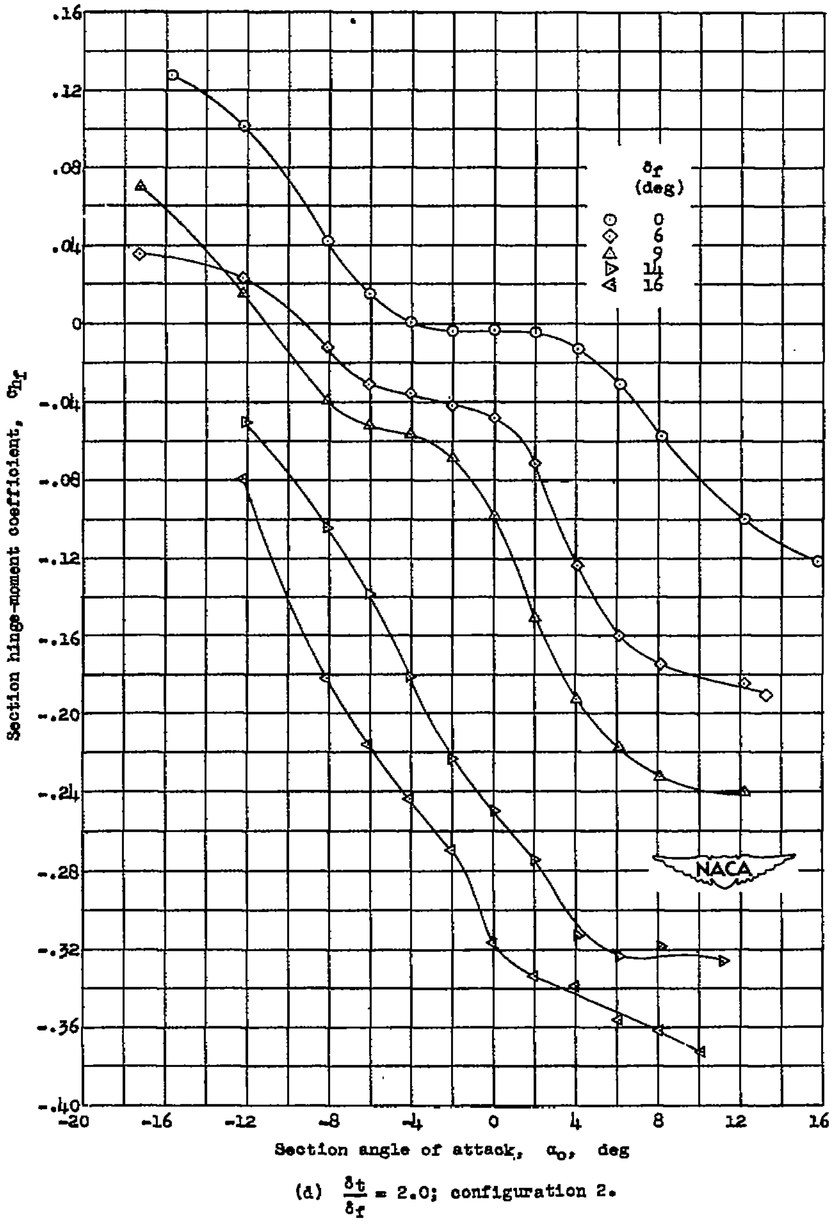
(b) $\frac{\delta_t}{\delta_f} = 1.0$; configuration 1.

Figure 6.- Hinge-moment characteristics of the symmetrical airfoil section with a 0.30c flap having a $0.70c_f$ overhang and a $0.33c_f$ leading tab. Transition fixed; $R = 2 \times 10^6$.



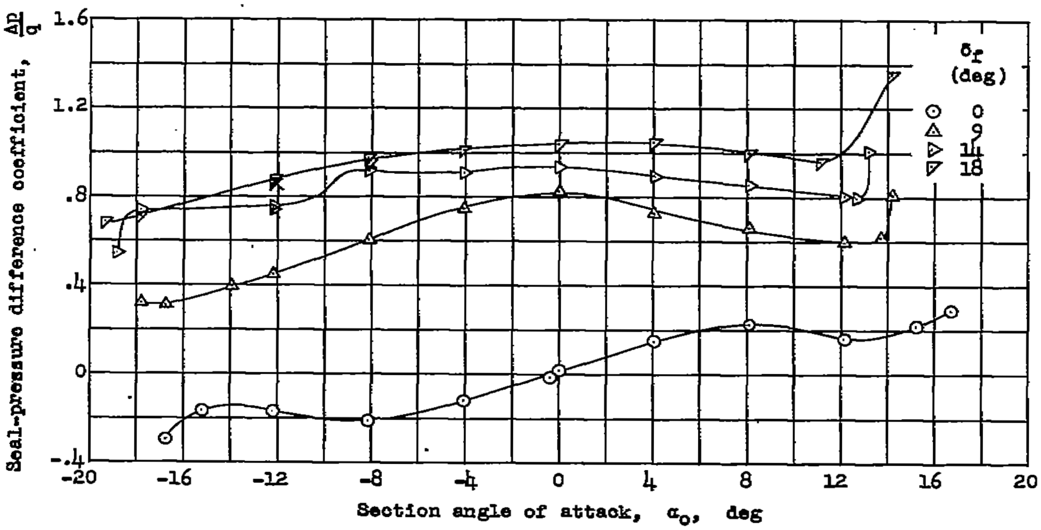
(c) $\frac{\delta_t}{\delta_f} = 2.0$; configuration 1.

Figure 6.- Continued.

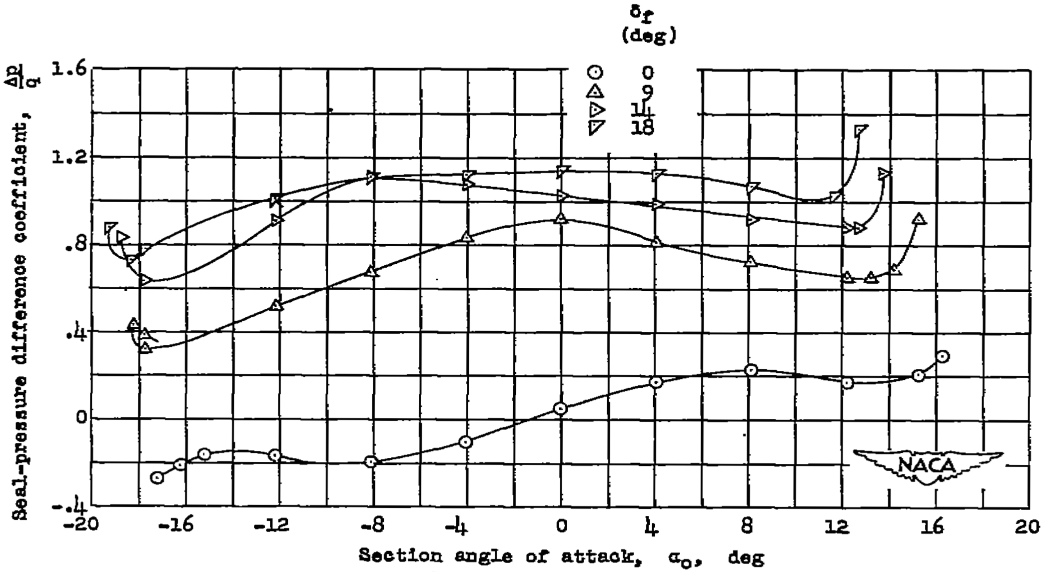


(d) $\frac{\delta_t}{\delta_f} = 2.0$; configuration 2.

Figure 6.- Concluded.

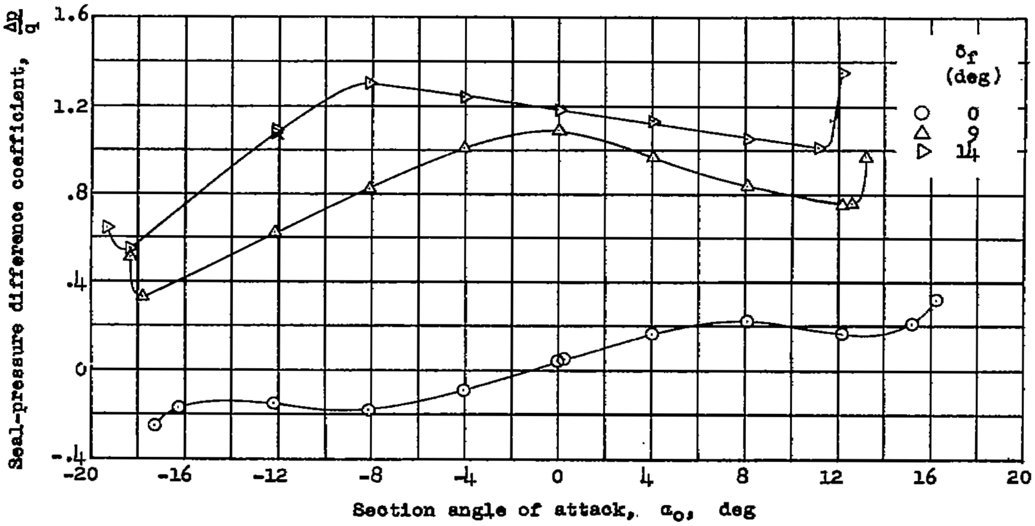


(a) $\frac{\delta_t}{\delta_f} = 0.5$; configuration 1.

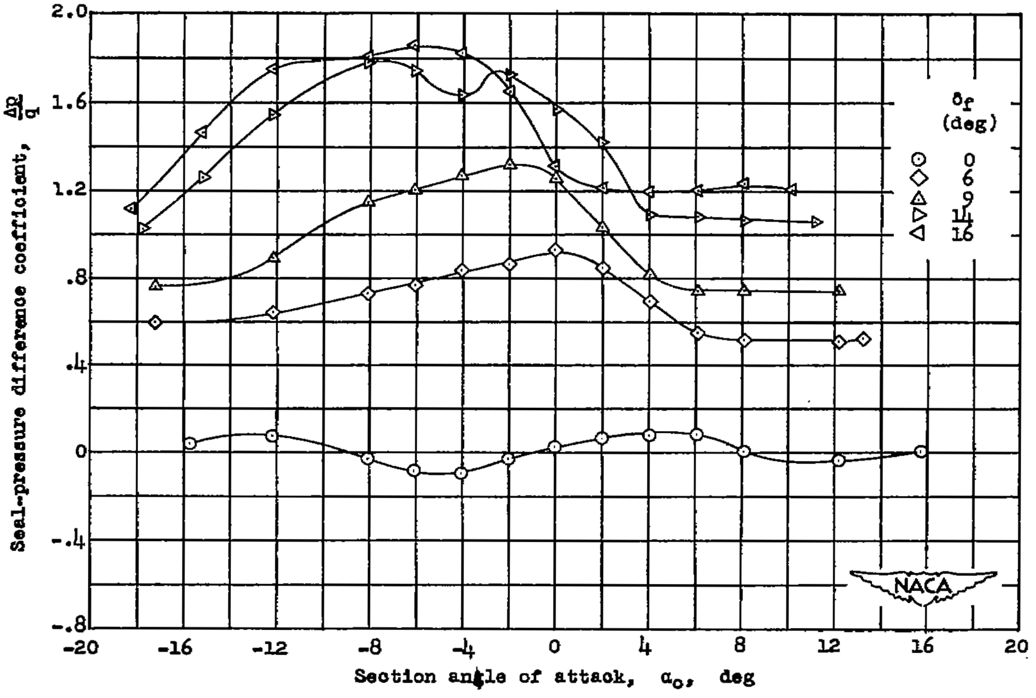


(b) $\frac{\delta_t}{\delta_f} = 1.0$; configuration 1.

Figure 7.- Variation of $\frac{\Delta p}{q}$ with α_o for the symmetrical airfoil section with a 0.30c flap having a 0.70c_f overhang and a 0.33c_f leading tab. Transition fixed; R = 2×10^6.



(c) $\frac{\delta_t}{\delta_f}$ = 2.0; configuration 1.



(d) $\frac{\delta_t}{\delta_f}$ = 2.0; configuration 2.

Figure 7.- Concluded.

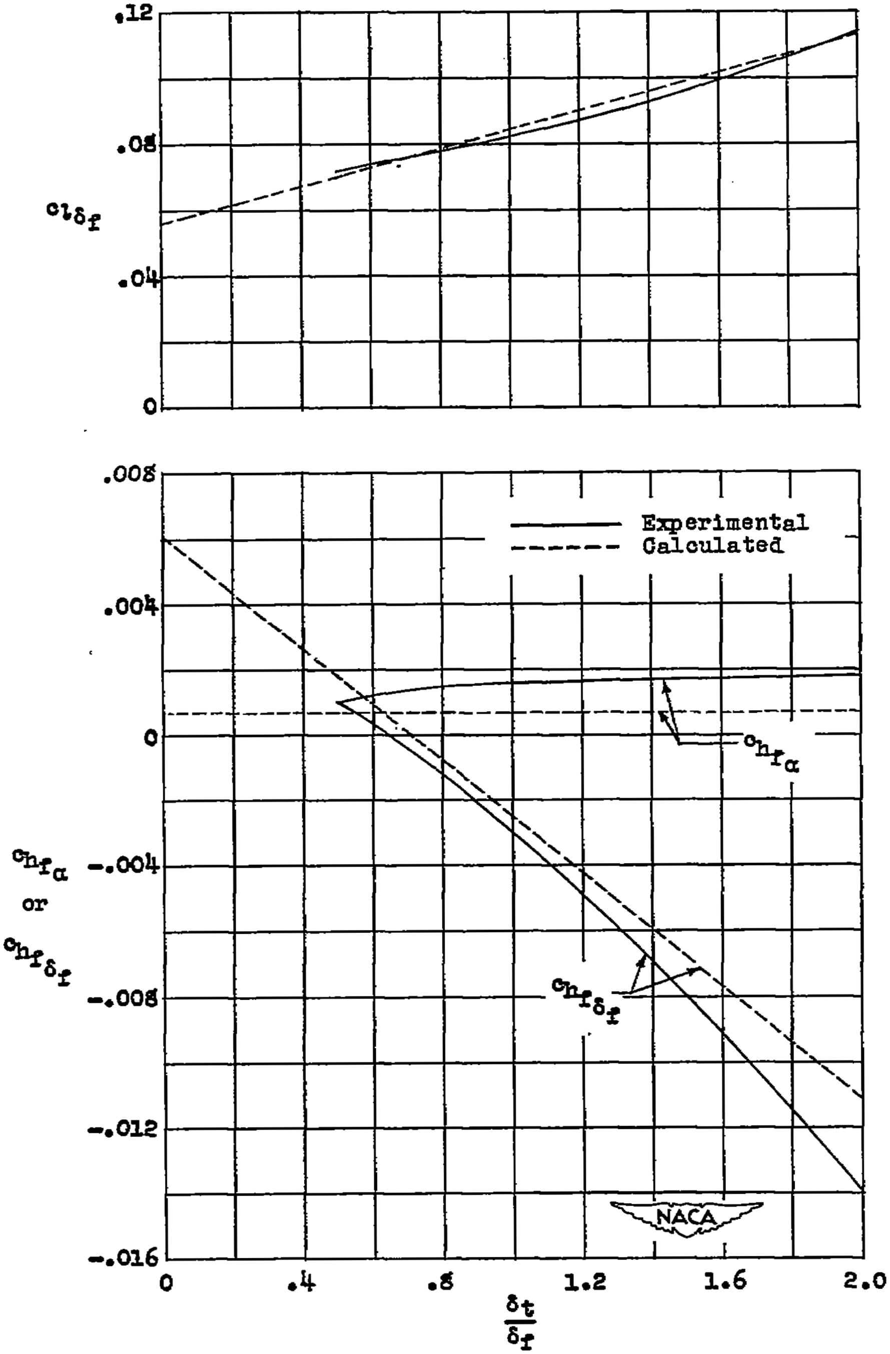


Figure 8.- Variation of the lift and hinge-moment parameters with tab-flap deflection ratio for the symmetrical airfoil section with a 0.30c flap having a 0.70c_f overhang and a 0.33c_f leading tab.

Transition fixed; $R = 2 \times 10^6$; configuration 1. Parameters measured at $\alpha_o = 0^\circ$, $\delta_f = 0^\circ$.

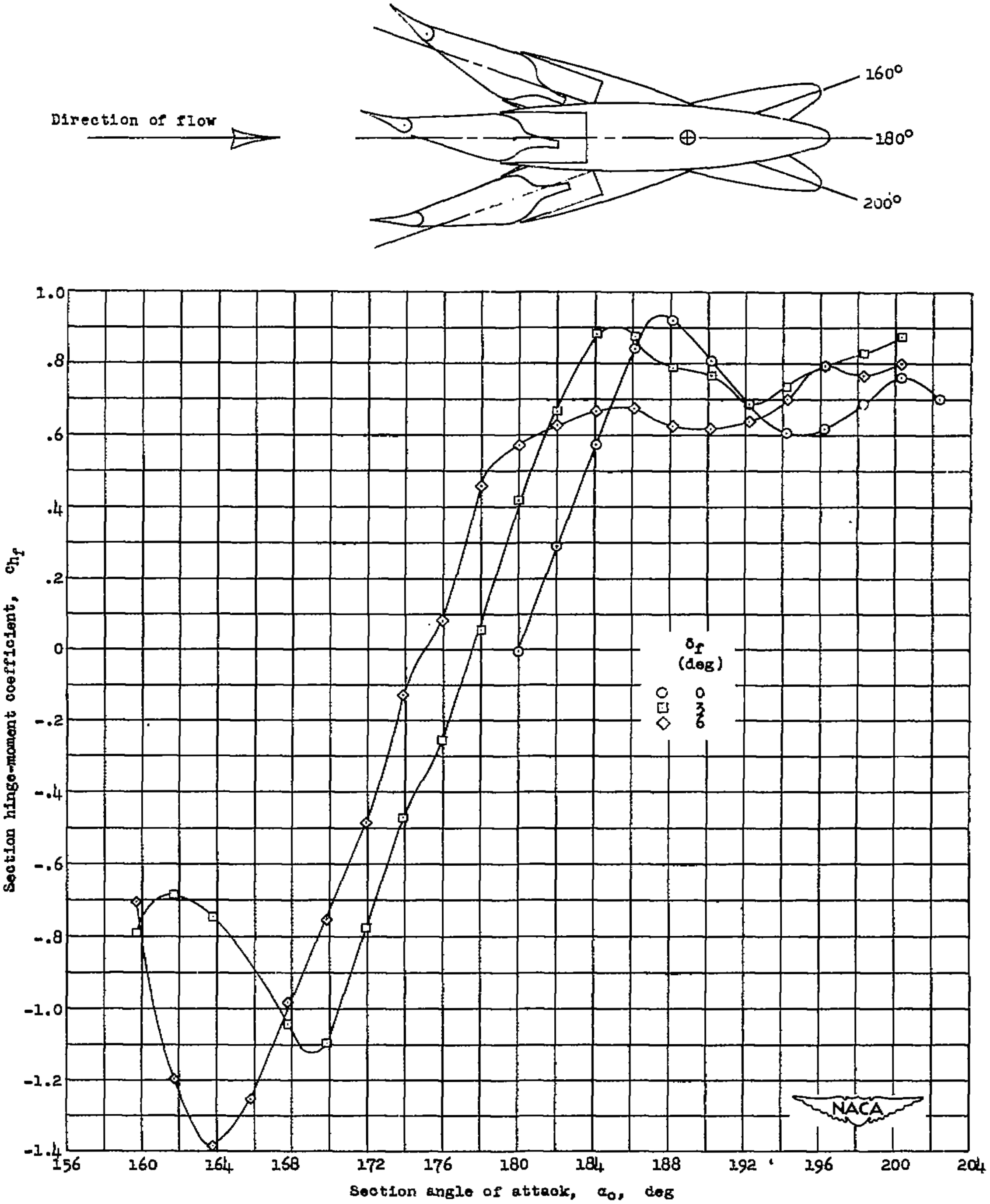


Figure 9.- Hinge-moment characteristics of the symmetrical airfoil section with a 0.30c flap having a $0.70c_f$ overhang and a $0.33c_f$ leading tab. Tail-to-wind; $R = 0.75 \times 10^6$; $\frac{\delta_t}{\delta_f} = 2.0$; configuration 3.

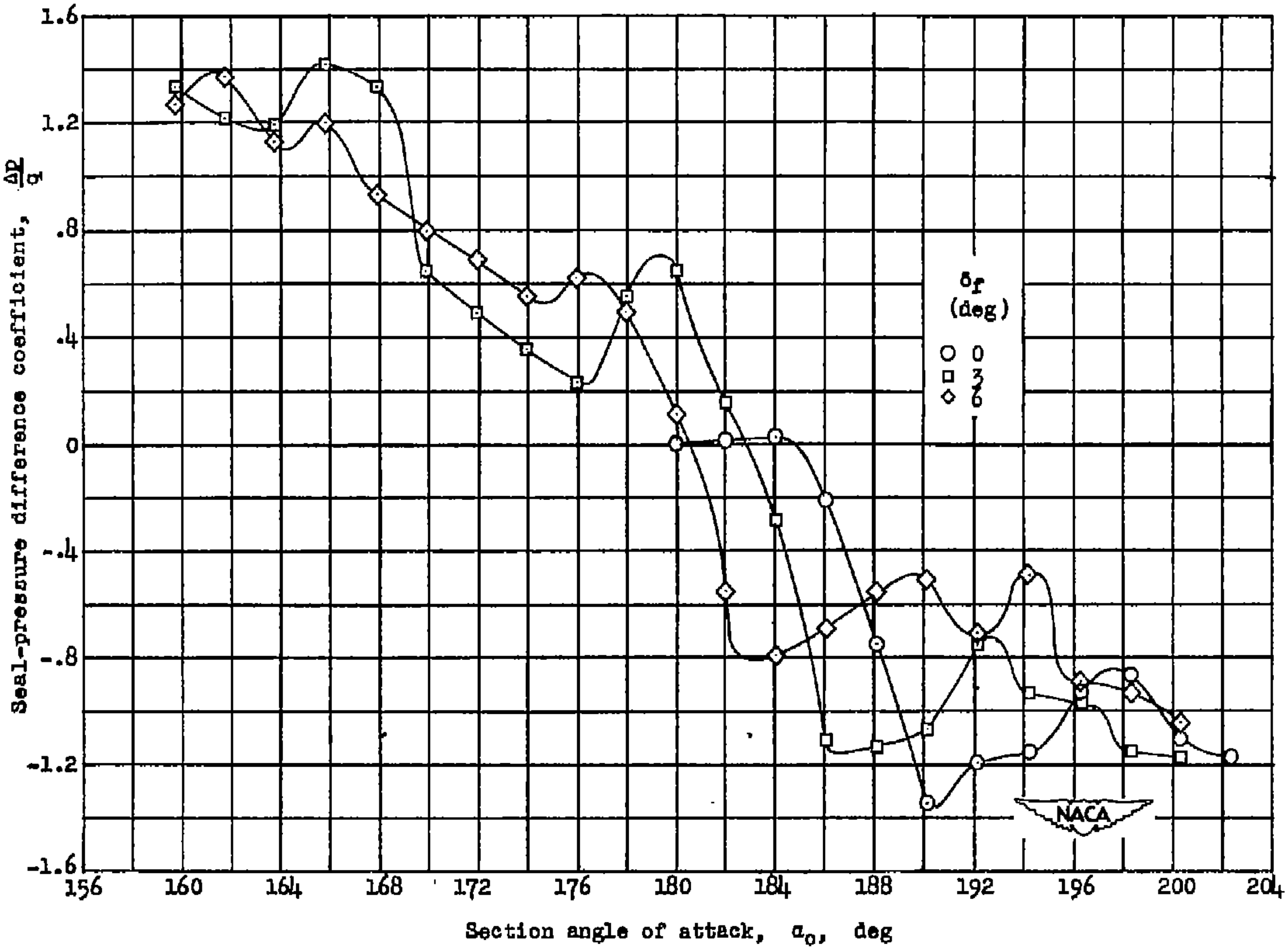


Figure 10.- Variation of $\frac{\Delta p}{q}$ with α_o for the symmetrical airfoil section with a 0.30c flap having a 0.70c_f overhang and a 0.33c_f leading tab. Tail-to-wind; $R = 0.75 \times 10^6$; $\frac{\delta_t}{\delta_f} = 2.0$; configuration 3.