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FULL-SCALE TUNNEL MEASUREMENTS OF THE PRESSURES ON THE ELEVATOR AND FUSELAGE OF THE CURTISS XP-55 AIRPLANE

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NACA

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MEMORANDUM REPORT

for the

Army Air Forces, Materiel Command

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INTRODUCTION

At the request of the Army Air Forces, Materiel Command, force tests and measurements of the pressure distribution over the elevator and forward part of the fuselage were made on a flying model of the Curtiss XP-55 airplane in the NACA full-scale tunnel. The results of the force tests, which include lift, drag, pitching-moment, and elevator hinge-moment measurements, have been reported in reference 1. The results of the elevator pressure measurements are given in the present paper.

The XP-55 is a low-wing airplane with the engine and propeller located at the rear of the fuselage. Longitudinal and directional control are obtained by means of an elevator located at the nose of the fuselage and by fins and rudders attached near the wing tips.

The pressures were measured over a wide range of elevator and elevator tab deflections for several angles of attack of the fuselage axis with the landing flaps retracted and deflected 45°. A few tests were made to determine the pressure distribution over the forward part of the fuselage with the elevator removed.

An analysis has been made to show the distribution of normal-force coefficient across the span of the elevator and a comparison is given of the elevator normal-force coefficients determined from the pressure measurements and those determined from the force tests. Some calculations have been made of the fuselage normal-force coefficients by means of existing theoretical knowledge and these results are compared with the experimental data. Owing to the general applicability of the data to canard-type airplanes, the analysis has been extended to include a discussion of the mutual effects of the elevator and fuselage loadings on the normal-force distributions.

SYMBOLS

Δp difference between free-stream static pressure and local static pressure

q_o free-stream dynamic pressure

N normal force

n section normal force

S surface area

c elevator chord

α_F angle of attack of the fuselage axis relative to free-stream direction, degrees

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δ	control-surface deflection, degrees; positive with trailing edge down
c_n	section normal-force coefficient, n/qc
C_N	normal-force coefficient, N/qS
C_L	lift coefficient, L/qS
$\frac{dC_{N_e}}{d\delta_e}$	elevator effectiveness
$\frac{dC_{N_e}}{d\delta_T}$	elevator tab effectiveness

Subscripts:

e	elevator
f	wing flap
T	elevator tab
F	fuselage

APPARATUS AND TESTS

The flying model of the Curtiss XP-55 airplane, which is designated the Curtiss model 24B, is shown mounted in the NACA full-scale tunnel in figure 1. A three-view drawing giving the important dimensions of the airplane is shown in figure 2. The elevator which is hinged at 13.42 percent of the chord, has a symmetrical low-drag airfoil section that was developed by the manufacturer. The elevator is equipped with trim tabs having a span of 50 percent of the elevator span and a chord of 25 percent of the elevator chord. The elevator was directly connected to the stick, but the tab angle was adjusted by means of a separate control in the cockpit.

Flush-type static-pressure orifices were installed in the left elevator and tab and in the left side of the fuselage. The inside diameter of the orifice tubes was 0.090 inch. The location and identification of the orifices are given in tables I to III and in figures 3 to 5.

All the tests were made at a tunnel airspeed of approximately 63 miles per hour and with the airplane propeller removed. Pressure measurements were taken for various elevator deflections with the elevator tab neutral at angles of attack of the fuselage axis of 0.9°, 4.6°, 12.0°, and 15.8°. The effects of deflecting the elevator tab on the pressure distributions over the horizontal tail surfaces were determined at angles of attack of 0.9° and 12.0°. Most of the tests were made with the landing flaps retracted; however, a few tests were made with the flaps deflected 45°. The complete test program is listed in table IV.

RESULTS AND DISCUSSION

The test results (tables V and VI) have been corrected for jet-boundary effects (reference 2), the longitudinal static-pressure gradient in the jet, and stream angle and blocking effects at the elevator (reference 3), and therefore differ slightly from the data presented in the preliminary reports. Chordwise pressure distributions over the elevator and forward part of the fuselage were plotted from these data. Integration of the chordwise pressure distributions gave the distribution of normal-force coefficient across the horizontal tail span which was then integrated to obtain average values of elevator and fuselage normal-force coefficients. In the determination of the spanwise normal-force distribution, the chord of the fuselage has been taken as 29.8 inches, which corresponds to the chord at the elevator-fuselage juncture. The elevator normal-force coefficients are given in table IV.

Chordwise pressure distributions. - Isometric charts of typical chordwise pressure distributions over the elevator and forward part of the fuselage are presented in figures 6 to 19. The effects of the elevator and fuselage loadings on the resultant pressure distributions are clearly shown in these figures. The normal force on the fuselage increases for positive deflections of the elevator and decreases for negative deflections of the elevator. A greater percentage of the normal force on the horizontal tail surface is carried across the fuselage when the tab is deflected with the elevator neutral than when the elevator is deflected with the tab neutral inasmuch as the gap between the elevator and the fuselage is smaller for tab deflections than for elevator deflections. The load on the fuselage directly affects the load on the elevator such that, at high angles of attack of the fuselage, the pressure differences between the upper and lower surfaces of the inboard section of the elevator are increased, whereas the outboard sections are not appreciably affected. (See figs. 7 and 16.) It should also be noted that at positive angles of attack of the fuselage the pressures near the trailing edge of the elevator are more negative for the inboard sections than for the outboard sections.

At $\alpha_F = 12.0^\circ$ and $\delta_e = 10^\circ$ (fig. 13), stall occurred over the center section of the elevator, but the fuselage remained unstalled. At an angle of attack of 12.0° (fig. 16), an elevator deflection of -10° would be expected to result in a smaller elevator loading than is shown inasmuch as the angle of the elevator with respect to the free-stream direction is only 2.0°. The high elevator loading for this condition is due to the effects of the upwash ahead of the wing and the fuselage-pressure distribution. The upwash due to the wing increases the effective angle of attack and the normal-force coefficient of the elevator. The pressure differences between the upper and lower surfaces of the fuselage extend across a part of the elevator and tend to increase the negative pressures on the upper surface at the rear of the elevator. These effects increase with angle of attack and cause the elevator to float nose down with respect to the free-stream direction.

The static-pressure differences between top and bottom longitudinal sections of the fuselage are plotted in figures 20 to 22 for various angles of attack with the elevator and tab neutral. The longitudinal location of the elevator with respect to the fuselage is drawn to scale in each figure. The elevator floating angles determined from the force tests are shown in figure 23. At $\alpha_F = 12.0^\circ$, the elevator floats at -7.0° with respect to the free-stream direction. The floating angles for any particular angle of attack shown in figure 23 are 1.5° less than those given in reference 1. This discrepancy represents a correction for the difference in the average stream angle across the elevator and wing span which has been applied to the data.

Span-load distribution. - The distribution of normal-force coefficient across the span of the elevator for the various test conditions is shown in figures 24 to 29. The loading across the fuselage shown in these figures represents the increment of normal-force coefficient due only to the presence of the elevator and was determined from the difference in the pressures on the fuselage with the elevator attached to the airplane and with the elevator removed.

The spanwise distributions of normal-force coefficient for various elevator deflections with the tab neutral and for various tab deflections with the elevator neutral at $\alpha = 0.9^{\circ}$ are shown in figures 24 and 25. A comparison of these figures shows that a tab deflection equal to twice that of the elevator produces very nearly the same load on the horizontal tail; that is, the total load on the horizontal tail surface produced by a -10° tab deflection with the elevator neutral is very nearly equal to that produced by a -5° elevator deflection with the tab neutral. (See fig. 26.) In addition, these figures show that for a given tab deflection, the fuselage and the inboard section of the elevator are more highly loaded than for an elevator deflection producing the same normal-force coefficient. Figures 27 to 29 show the spanwise distribution of normal-force coefficient at angles of attack of 4.6°, 12.0°, and 15.8° for various elevator deflections with the tab neutral.

The effect on the elevator span loadings of deflecting the wing flaps 45° at fuselage angles of attack of 0.9°, 4.6°, and 12.0° (figs. 30 to 34) is small. Reference to the force tests (reference 1) showed that the average increment of lift coefficient due to this flap deflection was only about 0.23; hence, the upwash at the elevator due to deflecting the wing flaps is small.

<u>Normal-force coefficients</u>. - A summary of the average elevator normal-force coefficients obtained from the span-load

distributions of figures 24 to 34 is given in table IV. A comparison is made in figure 35 of the elevator effectiveness, $\frac{dC_{N_e}}{d\delta_e}$, determined from the pressure distributions and from the force tests at four angles of attack from 0.9° to 15.8°. The elevator effectiveness obtained from the force tests was determined by comparing the pitching moments of the airplane with the elevator removed and attached. The elevator effectiveness obtained from the pressure measurements was 0.042 at all angles of attack as compared with an average value of 0.040 determined from the force tests. The small difference between these values of $\frac{dC_{N_e}}{d\delta_e}$ probably results from the change in pitching moment of the inboard section of the wing due to the elevator trailing vortices. At $\alpha_F = 15.8°$ the value of normal-force coefficient determined from the force tests at any elevator deflection was about 0.14 greater than that determined from the pressure measurements although the slopes, $\frac{dC_{N_e}}{d\delta_e}$, were approximately equal. This discrepancy probably results from the fact that part of the wing was stalled at this angle of attack.

Values of the normal-force coefficient of the elevator for various tab deflections with elevator neutral at an angle of attack of 0.9° are presented in figure 36. The tab effectiveness, $\frac{dC_{N_e}}{d\delta_T}$, determined from these results is 0.024. This value is about one-half as large as the elevator effectiveness.

The fuselage normal-force coefficients determined from the pressure data with the elevator removed are given in figure 37. A comparison has been made of these values and normal-force coefficients calculated by the methods presented in reference 4. Although the slopes, $\frac{dC_{N_F}}{d\alpha_T}$, are in fairly good agreement, the results based on the pressure data indicate that there is a small upload on the fuselage at zero angle of attack of the fuselage axis.

SUMMARY OF RESULTS

1. The elevator effectiveness, $\frac{dC_{N_e}}{d\delta_e}$, obtained from the pressure measurements was 0.042. This value was in good agreement with that determined from force tests.

2. The effectiveness of the elevator tab was about half as great as the elevator effectiveness; a value of $\frac{dC_{N_e}}{d\delta_T}$ of 0.024 was measured.

3. The change in the elevator normal-force coefficient resulting from deflecting the wing flaps 45° was small.

4. The normal-force coefficients of the inboard sections of the elevator increased as the loading on the forward part of the fuselage increased.

5. A greater percentage of the normal force on the elevator surface was carried across the fuselage when the tab was

deflected with the elevator neutral than when the elevator was deflected with the tab neutral inasmuch as the gap between the elevator and the fuselage was smaller for tab deflections than for elevator deflections.

6. The pressure measurements indicated that the elevator will tend to float nose down with respect to the free-stream direction due to the effects of fuselage interference and wing upwash.

Langley Memorial Aeronautical Laboratory,
National Advisory Committee for Aeronautics,
Langley Field, Va., June 14, 1943.

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3. Theodorsen, Theodore, and Silverstein, Abe: Experimental Verification of the Theory of Wind-Tunnel Boundary Interference. Rep. No. 478, NACA, 1934.

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Table I. Location of Elevator Orifices
(Distances are measured chordwise)

Row 1		Row 2		Row 3		Row 4		Row 5		Row 6	
% C	Inches	% C	Inches	% C	Inches	% C	Inches	% C	Inches	% C	Inches
0	0	0	0	0	0	0	0	0	0	0	0
2.5	0.47	2.5	0.53	2.5	0.60	2.5	0.66	2.5	0.72	2.5	1.0
5	.93	5	1.16	5	1.19	5	1.32	5	1.45	5	2.0
10	1.86	10	2.12	10	2.38	10	2.64	10	2.90	10	3.6
15	2.80	15	3.18	15	3.57	15	3.96	15	4.34	15	5.4
25	4.66	25	5.30	25	5.95	25	6.60	25	7.24	25	8.6
35	6.53	35	7.41	35	8.33	35	9.24	35	10.12	40	13.3
50	9.32	50	10.60	50	11.90	50	13.20	50	14.48	—	—
60	11.18	60	12.71	60	14.28	60	15.82	60	17.37	—	—
70	13.05	70	14.82	70	16.66	70	18.46	70	20.25	—	—
90	16.78	—	—	—	—	—	—	—	—	—	—

Table II. Location of Tab Orifices
(Distances measured from leading edge of tab along the chord)

Row 2	Row 3	Row 4	Row 5
Inches	Inches	Inches	Inches
0.750	0.750	0.750	0.750
1.250	1.250	1.375	1.500
2.000	2.125	2.375	2.500
3.250	3.500	3.750	4.000
4.375	4.750	5.125	5.500

Table III. Location of Fuselage Orifices
(Distances measured along the surface from the fuselage nose tip in inches)

Row 16	Row 7	Row 8	Row 9	Row 10	Row 11	Row 12	Row 13
—	0	—	—	—	—	—	—
—	6	—	6	6	6	6	6
—	12	12	12	—	—	12	12
—	20	20	20	—	—	20	20
32	32	32	32	32	32	32	32
42	42	42	42	42	42	42	42
52	52	52	52	52	52	52	52
62	62	62	62	62	62	62	62

Table IV. - Test Conditions and Corresponding Elevator Normal-Force Coefficients Based on Free-Stream Dynamic Pressure

Run	α_F, deg	δ_e, deg	δ_T, deg	δ_f, deg	C_{N_e}
1	0.9	-10	0	0	-0.446
2	.9	-5	0	0	-.244
3	.9	-5	-20	0	-.570
4	.9	0	-30	0	-.553
5	.9	0	-20	0	-.444
6	.9	0	-10	0	-.239
7	.9	0	0	0	-.027
8	.9	0	10	0	.240
9	.9	0	19.3	0	.400
10	.9	5	0	0	.212
11	.9	5	-20	0	-.195
12	.9	10	0	0	.421
13	.9	10	-20	0	.017
14	.9	17	0	0	.648
15	.9	17	-20	0	.352
16	4.6	-10	0	0	-.183
17	4.6	-5	0	0	.003
18	4.6	0	0	0	.256
19	4.6	5	0	0	.430
20	4.6	10	0	0	.621
21	12.0	-20	0	0	-.205
22	12.0	-10	0	0	.264
23	12.0	-5	0	0	.479
24	12.0	-5	-20	0	.100
25	12.0	0	0	0	.687
26	12.0	0	-20	0	.298
27	12.0	5	0	0	.791
28	12.0	5	-20	0	.521
29	12.0	10	0	0	.769
30	12.0	10	-20	0	.506
31	15.8	-30	0	0	-.399
32	15.8	-20	0	0	.027
33	15.8	-10	0	0	.470
34	15.8	0	0	0	.859
35	12.0	-10	0	45	.272
36	12.0	10	0	45	.739
37	12.0	0	0	45	.674
38	8.3	0	0	45	.464
39	4.6	0	0	45	.267
40	.9	0	0	45	.021
41	.9	Elevator removed			
42	4.6				
43	8.3				
44	12.0				
45	15.8				

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Table V. - Elevator Pressure Coefficients, $\Delta p/q_0$

Orifice \ Run	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1-0	-0.53	0.60	0.36	1.00	1.00	1.00	1.00	1.00	1.00	0.81	0.96	-0.25	0.20	-2.84	-2.30	0.67	1.00	0.81	-0.10	-2.02
1-1	.84	.54	.65	.29	.23	.16	.04	-.04	-.15	-.54	-.36	-1.35	-1.05	-2.57	-2.61	.48	.04	-.54	-1.17	-2.52
1-2	.65	.36	.45	.10	.09	.01	-.07	-.13	-.21	-.47	-.34	-1.04	-.81	-1.77	-1.57	.29	-.06	-.47	-1.00	-1.55
1-3	.35	.09	.18	-.07	-.09	-.17	-.20	-.26	-.33	-.52	-.36	-.83	-.71	-1.30	-1.15	.09	-.21	-.48	-.85	-1.20
1-4	.18	-.02	.03	-.14	-.16	-.25	-.27	-.36	-.39	-.52	-.38	-.79	-.64	-.93	-.96	-.04	-.28	-.50	-.77	-1.03
1-5	-.02	-.15	-.10	-.24	-.24	-.31	-.35	-.41	-.45	-.50	-.38	-.68	-.55	-.88	-.76	-.17	-.35	-.48	-.67	-.83
1-6	-.19	-.28	-.23	-.29	-.33	-.36	-.40	-.47	-.50	-.50	-.40	-.63	-.51	-.75	-.63	-.28	-.43	-.48	-.64	-.74
1-7	-.30	-.35	-.28	-.29	-.33	-.34	-.40	-.46	-.50	-.45	-.34	-.51	-.37	-.59	-.63	-.32	-.43	-.43	-.50	-.76
1-8	-.25	-.27	-.23	-.33	-.22	-.25	-.29	-.38	-.41	-.31	-.25	-.36	-.24	-.46	-.27	-.27	-.31	-.32	-.35	-.43
1-9	-.13	-.04	-.12	-.06	.02	.01	-.21	-.10	-.17	-.08	.01	-.17	-.03	-.76	-.09	-.06	-.06	-.07	-.15	-.23
1-10	.14	.18	.11	.10	.16	.20	.21	.13	.07	.16	.18	.11	.15	.01	.07	.18	.16	.16	.09	.03
1-11	-1.66	-.76	-1.07	-.37	-.24	-.21	-.05	.01	.11	.48	.28	.82	.68	.05	1.00	-.67	-.11	.46	.75	1.00
1-12	-1.18	-.68	-.89	-.45	-.33	-.31	-.20	-.12	-.08	.05	.11	.56	.46	.87	.81	-.62	-.21	.23	.50	.81
1-13	-.98	-.63	-.79	-.48	-.42	-.36	-.29	-.26	-.18	.03	—	.26	.17	.63	.59	-.60	-.35	.01	.22	.51
1-14	-.80	-.58	-.71	-.50	-.46	-.38	-.33	-.30	-.23	-.08	-.21	.11	.07	.42	.38	-.55	-.36	-.10	.09	.33
1-15	-.67	-.53	-.64	-.52	-.50	-.39	-.37	-.34	-.26	-.21	-.28	-.07	-.14	.16	.10	-.50	-.38	-.20	-.10	.14
1-16	-.60	-.49	-.61	-.53	-.52	-.41	-.38	-.36	-.30	-.28	-.38	-.20	-.25	-.02	-.09	-.47	-.41	-.28	-.19	-.04
1-17	-.47	-.43	-.56	-.53	-.50	-.39	-.37	-.34	-.31	-.34	-.44	-.28	-.35	-.20	-.34	-.42	-.38	-.32	-.30	-.21
1-18	-.30	-.25	-.40	-.46	-.40	-.34	-.29	-.25	-.21	-.25	-.34	-.23	-.27	-.13	-.20	-.22	-.31	-.20	-.20	-.14
1-19	-.13	-.10	-.25	-.25	-.18	-.10	-.05	-.04	0	-.07	-.13	-.12	-.18	-.04	-.11	-.07	-.06	-.04	-.15	-.09
1-20	.08	.16	0	.02	.09	.16	.22	-.35	.18	.18	.13	.18	.14	.18	.15	.18	.18	.20	-.18	.16
2-0	-.75	.58	.13	.63	1.00	1.00	1.00	1.00	1.00	.77	.99	-.40	.10	-.38	-2.48	.68	1.00	.76	-.39	-2.40
2-1	.97	.65	.80	.42	.38	.24	.12	-.07	-.12	-.54	-.26	-1.63	-1.16	-2.83	-2.58	.58	.03	-.67	-1.57	-2.67
2-2	.68	.36	.49	.14	.10	.01	-.09	-.21	-.30	-.52	-.34	-1.12	-.87	-2.00	-1.65	.26	-.13	-.55	-1.10	-1.77
2-3	.39	.15	.28	.01	-.07	-.12	-.20	-.33	-.38	-.56	-.36	-1.02	-.76	-1.51	-1.28	.11	-.21	-.55	-.95	-1.40
2-4	.16	-.07	.05	-.14	-.20	-.25	-.33	-.47	-.50	-.60	-.41	-1.02	-.77	-1.36	-1.15	-.10	-.35	-.58	-1.00	-1.28
2-5	.01	-.15	-.07	-.16	-.22	-.25	-.35	-.47	-.51	-.57	-.38	-.73	-.58	-.97	-.78	-.17	-.41	-.55	-.77	-.93
2-6	-.12	-.25	-.13	-.18	-.24	-.32	-.38	-.53	-.57	-.54	-.36	-.68	-.48	-.78	-.58	-.27	-.43	-.54	-.67	-.78
2-7	-.26	-.35	-.12	-.11	-.20	-.33	-.46	-.58	-.68	-.51	-.29	-.57	-.30	-.61	-.27	-.32	-.43	-.52	-.58	-.61
2-8	-.18	-.25	-.03	.20	-.04	-.21	-.36	-.49	-.62	-.38	-.01	-.36	-.04	-.36	-.04	-.25	-.34	-.37	-.35	-.38
2-9	-.07	0	.37	.51	.36	.16	-.07	-.28	-.54	-.10	.32	-.12	.22	-.13	.01	0	-.06	-.10	-.13	-.16
2-10	.10	.05	.53	.75	.54	.29	.01	-.34	-.90	0	.49	-.02	.39	-.08	.08	.05	.02	0	-.02	-.09
2-11	.14	.11	.46	.64	.45	.29	.08	-.20	-.75	.08	.43	—	.41	-.08	.13	.11	.09	.05	0	-.06
2-12	.20	.18	.43	.59	.42	.29	.13	-.08	-.52	.13	.40	-.05	.39	-.07	.21	.16	.15	.11	.03	-.04
2-13	.20	.18	.33	.43	.36	.27	.16	.03	-.24	.16	.33	.09	.35	-.04	.26	.18	.16	.15	.07	-.03
2-14	.20	.18	.24	.33	.29	.24	.18	.09	-.05	.18	.27	.11	.29	-.02	.28	.18	.18	.16	.11	-.01
2-15	-2.09	-.84	-1.27	-.51	-.36	-.21	-.13	.03	.16	.45	.27	.87	.76	.05	1.00	-.82	-.12	.46	.85	1.00
2-16	-1.20	-.69	-1.01	-.48	-.38	-.28	-.21	-.10	.04	.26	.09	.60	.50	.96	.90	-.67	-.17	.26	.58	.81
2-17	-1.04	-.66	-.91	-.53	-.49	-.38	-.30	-.25	-.11	.05	-.14	.36	.24	.70	.64	-.65	-.28	.05	.33	.59
2-18	-.91	-.65	-.80	-.55	-.51	-.41	-.36	-.28	-.16	-.07	-.24	.18	.11	.52	.47	-.60	-.34	-.06	.20	.41
2-19	-.76	-.58	-.76	-.58	-.53	-.46	-.39	-.30	-.20	-.20	-.35	0	-.11	.26	.21	-.52	-.37	-.19	.01	.21
2-20	-.67	-.55	-.70	-.63	-.58	-.51	-.43	-.30	-.22	-.26	-.40	-.13	-.26	.11	0	-.50	-.39	-.27	-.12	.06
2-21	-.50	-.46	-.67	-.68	-.64	-.52	-.43	-.28	-.18	-.32	-.53	-.23	-.40	-.08	-.23	-.45	-.37	-.32	-.39	-.14
2-22	-.29	-.28	-.53	-.63	-.58	-.46	-.32	-.20	.07	-.23	-.48	-.15	-.38	-.07	-.25	-.27	-.30	-.22	-.15	-.11
2-23	-.12	-.12	-.47	-.58	-.53	-.30	-.13	-.17	.27	-.07	-.43	-.07	-.34	0	-.28	-.12	-.10	-.06	-.06	-.04
2-24	.03	.05	-.48	-.70	-.57	-.23	.08	.40	.71	.11	-.61	.16	-.51	.21	-.48	.05	.09	.11	.15	.16
2-25	.04	.10	-.47	-.76	-.46	-.13	.11	.35	.60	.14	-.57	.16	-.51	.18	-.43	.09	.15	.13	.15	.16
2-26	.07	.15	-.47	-.76	-.33	-.10	.16	.33	.50	.20	-.48	.21	-.46	.22	-.33	.15	.18	.18	.20	.19
2-27	.10	.18	-.47	-.74	-.15	.08	.20	.32	.42	.24	-.25	.24	-.23	.26	-.08	.20	.22	.23	.23	.23
2-28	.14	.21	-.35	-.50	0	.16	.24	.32	.36	.26	-.05	.26	0	.24	.15	.23	.26	.26	.26	.23

Table V. - continued

Orifice \ Run	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1-0	0.36	0.91	0.21	0.34	-1.38	0.84	-3.53	-2.84	-2.01	-2.01	1.00	0.90	0.16	-3.64	0.86	-1.62	-1.61	-0.15	0.64	1.00
1-1	.58	-.42	-1.10	-.85	-2.05	-1.79	-2.85	-2.72	-1.42	-1.48	.91	.23	-1.00	-2.89	-.46	-1.36	-2.28	-1.22	-.56	0
1-2	.34	-.42	-.92	-.69	-1.38	-1.12	-1.98	-1.70	-1.46	-1.56	.66	.08	-.83	-2.03	-.46	-1.47	-1.39	-.97	-.53	-.12
1-3	.10	-.50	-.80	-.59	-1.16	-.94	-1.31	-1.30	-1.56	-1.66	.39	-.12	-.78	-1.52	-.49	-1.57	-1.12	-.82	-.57	-.27
1-4	.03	-.50	-.74	-.55	-1.00	-.87	-1.25	-1.10	-1.54	-1.56	.25	-.24	-.76	-1.28	-.51	-1.58	-1.01	-.77	-.54	-.33
1-5	-.19	-.50	-.65	-.51	-.80	—	-.97	-.83	-1.22	-1.12	.02	-.31	-.69	-1.01	-.51	-1.19	-.80	-.72	-.51	-.38
1-6	-.31	-.50	-.62	-.49	-.75	-.60	-.84	-.69	-.87	-.77	-.14	-.40	-.62	-.89	-.53	-.79	-.72	-.60	-.51	-.43
1-7	-.36	-.44	-.53	-.39	-.61	-.43	-.72	-.51	-.60	-.51	-.28	-.42	-.53	-.74	-.48	-.56	-.56	-.48	-.46	-.43
1-8	-.29	-.37	-.37	-.23	-.46	-.27	-.56	-.36	-.53	-.43	-.26	-.33	-.40	-.58	-.37	-.52	-.44	-.34	-.23	-.33
1-9	-.15	-.11	-.16	-.04	-.23	-.07	-.36	-.14	-.43	-.34	-.16	-.06	-.17	-.37	-.11	-.45	-.22	-.15	-.10	.13
1-10	.13	.15	.10	.16	.04	.10	-.04	0	-.34	-.18	.13	.14	.08	-.10	.13	-.29	.03	.10	-.23	.16
1-11	-.88	.37	.73	.53	.96	.94	1.00	1.00	—	.99	-2.04	-.35	.67	.92	.38	.95	.95	.78	.49	-.04
1-12	-.77	.20	.49	.34	.73	.61	.90	.91	.88	.87	-1.33	-.39	.41	.85	.13	.85	.75	.48	.27	-.20
1-13	-.68	-.03	.28	.16	.43	.39	.62	.66	.69	.63	-1.10	-.45	.19	.60	-.09	.64	.49	.22	-.02	-.31
1-14	-.62	-.10	.08	0	.30	.16	.42	.43	.52	.48	-.87	-.42	.04	.43	-.15	.46	.34	.13	-.08	-.35
1-15	-.55	-.22	-.10	-.16	.08	-.04	.23	.16	.23	.22	-.73	-.42	-.14	.15	-.22	.24	.06	-.02	-.19	-.36
1-16	-.50	-.28	-.21	-.30	-.07	-.16	-.03	-.06	.04	-.02	-.65	-.43	-.24	-.02	-.30	.05	-.09	-.15	-.29	-.38
1-17	-.43	-.33	-.32	-.39	-.21	-.30	-.17	-.23	-.16	-.21	-.53	-.40	-.33	-.17	-.32	-.16	-.20	-.24	-.32	-.36
1-18	-.46	-.23	-.24	-.32	-.16	-.23	-.17	-.18	-.16	-.21	-.09	-.31	-.24	-.16	-.24	-.16	-.14	-.19	-.23	-.28
1-19	.26	-.04	-.14	-.21	-.07	-.14	-.03	-.12	-.10	-.16	-.20	-.08	-.14	-.10	-.04	-.10	-.09	-.10	-.08	-.25
1-20	.12	.18	.16	.14	.16	.16	.15	.14	.04	.04	-.04	.18	.14	.10	.19	.02	.16	.19	.19	.19
2-0	.46	.82	-.06	.16	-2.05	-1.38	-4.25	-3.63	-2.43	-2.40	-1.15	.97	.02	-4.30	.76	-2.57	-2.39	-.46	.61	1.00
2-1	.65	-.44	-1.34	-1.12	-2.45	-2.35	-3.25	-2.92	-2.20	-2.26	1.00	-.28	-1.45	-5.40	-.53	-2.17	-2.69	-1.58	-.71	.07
2-2	.34	-.51	-1.02	-.87	-1.73	-1.46	-2.34	-1.97	-2.19	-2.24	.73	.04	-1.02	-2.32	-.59	-2.21	-1.62	-1.06	-.61	-.15
2-3	.15	-.52	-.94	-.73	-1.38	-1.17	-1.77	-1.90	-1.77	-1.50	.45	-.18	-.92	-1.78	-.59	-1.80	-1.33	-.91	-.61	-.27
2-4	-.06	-.58	-1.02	-.75	-1.30	-1.10	-1.57	-1.32	-1.98	-1.14	.23	-.33	-1.02	-1.57	-.65	-1.35	-1.26	-.99	-.64	-.38
2-5	-.17	-.56	-.76	-.60	-.96	-.78	-1.13	-.91	-.82	-.77	.06	-.40	-.78	-1.14	-.58	-.85	-.93	-.74	-.59	-.41
2-6	-.27	-.56	-.71	-.49	-.83	-.61	-.95	-.89	-.75	-.73	-.10	-.43	-.71	-.94	-.57	-.75	-.80	-.65	-.57	-.44
2-7	-.37	-.54	-.59	-.34	-.64	-.34	-.64	-.30	-.74	-.68	-.27	-.48	-.62	-.68	-.56	-.77	-.62	-.58	-.51	-.47
2-8	-.27	-.45	-.40	-.04	-.37	-.06	-.40	-.14	-.75	-.65	-.23	-.37	-.43	-.40	-.47	-.76	-.24	-.35	-.38	-.38
2-9	-.04	-.13	-.15	.22	-.16	.08	-.22	-.10	-.75	-.66	-.13	-.09	-.19	-.27	-.14	-.77	-.16	-.14	-.12	-.08
2-10	.04	-.03	-.03	.43	-.07	.20	-.20	-.06	-.72	-.62	.05	-.01	-.08	-.20	-.04	-.77	-.07	-.04	0	0
2-11	.10	.05	.01	.41	-.06	.28	-.18	-.02	-.70	-.60	.12	.05	-.04	-.20	.02	-.74	-.06	-.01	.05	08
2-12	.15	.08	.05	.37	-.02	.30	-.17	.06	-.70	-.58	.16	.11	0	-.18	.07	-.72	-.04	.03	.11	.13
2-13	.17	.13	.10	.34	0	.34	-.15	.14	-.68	-.50	.16	.13	.05	-.16	.12	-.69	-.02	.06	.15	.14
2-14	.17	.15	.11	.25	.02	.28	-.11	.22	-.66	-.42	.16	.15	.08	-.13	.14	-.67	.02	.09	.19	.16
2-15	-.97	.39	.73	.66	1.00	.99	1.00	1.00	1.00	1.00	-2.22	-.23	.82	1.00	.43	1.00	1.00	.86	.40	-.04
2-16	-.75	.22	.50	.43	.87	.80	.99	.93	.96	.96	-1.29	-.30	.56	—	.19	.94	.82	.62	.28	-.12
2-17	-.71	.01	.29	.16	.60	.51	.74	.69	.78	.76	-1.16	-.37	.26	.74	0	.75	.60	.37	10	-.26
2-18	-.63	-.08	.17	.02	.46	.32	.60	.48	.58	.59	-1.00	-.40	.10	.56	-.10	.61	.40	.20	-.02	-.31
2-19	-.57	-.18	-.01	-.14	.22	.08	.35	.18	.35	.29	-.80	-.40	-.06	.32	-.19	.34	.17	.01	-.17	-.36
2-20	-.52	-.25	-.13	-.25	.08	-.07	.15	.06	.15	.07	-.70	-.42	-.16	-.03	-.27	.19	.04	-.09	-.22	-.41
2-21	-.44	-.30	-.22	-.37	-.10	-.28	-.03	-.18	-.06	-.20	-.54	-.42	-.26	-.06	-.31	-.04	-.07	-.18	-.27	-.41
2-22	-.48	-.23	-.17	-.37	-.07	-.32	-.03	-.21	-.08	-.31	-.38	-.37	-.20	-.03	-.23	-.07	-.07	-.14	-.21	-.33
2-23	-.52	-.06	-.06	-.35	0	-.32	-.01	-.30	-.11	-.47	-.19	-.15	-.11	-.01	-.07	-.12	-.02	-.04	-.04	-.13
2-24	.05	.11	.13	-.55	.20	-.49	.19	-.48	.07	-.60	.04	.03	-.08	.18	10	.07	.17	.16	.13	.08
2-25	.07	.13	.15	-.53	.18	-.46	.19	-.37	.05	-.42	.01	.08	.12	.18	.12	.05	.17	.16	.15	.09
2-26	.14	.18	.21	-.43	.22	-.39	.23	-.21	.07	-.23	.01	.11	.15	.20	.17	.07	.21	.22	.18	.14
2-27	.17	.24	.24	-.20	.23	-.16	.25	-.02	.05	-.13	.05	.17	.22	.20	.21	.05	.24	.26	.14	.16
2-28	.19	.25	.26	.02	.25	06	.23	.14	-.01	-.11	.07	.20	.24	.20	.23	-.02	.24	.26	.26	-.16

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Table V. - continued

Orifice \ Run	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3-0	-0.93	0.51	0.12	0.98	1.00	1.00	1.00	1.00	1.00	0.78	0.96	-0.12	0.22	3.04	-2.18	0.61	1.00	0.71	-0.37	-2.29
3-1	.89	.59	.71	.33	.22	.17	0	-.12	-.34	-.70	-.42	-1.55	-1.13	-2.97	-2.57	.50	-.04	-.83	-1.68	-2.59
3-2	.65	.30	.48	.13	.01	-.04	-.15	-.26	-.42	-.65	-.48	-1.28	-1.01	-2.25	-1.88	.26	-.17	-.76	-1.35	-2.03
3-3	.42	.11	.27	.07	-.02	-.10	-.17	-.30	-.40	-.54	-.37	-.92	-.72	-1.50	-1.24	.09	-.22	-.62	-.98	-1.40
3-4	.26	-.02	.12	.01	-.08	-.17	-.28	-.36	-.45	-.52	-.37	-.79	-.60	-1.21	-.97	0	-.28	-.58	-.85	-1.13
3-5	.03	-.15	.01	-.07	-.17	-.26	-.38	-.47	-.52	-.58	-.37	-.74	-.53	-.98	-.72	-.17	-.35	-.57	-.76	-.95
3-6	-.17	-.26	-.07	-.10	-.20	-.30	-.43	-.51	-.60	-.53	-.34	-.67	-.43	-.80	-.53	-.30	-.41	-.56	-.67	-.77
3-7	-.23	-.34	-.07	-.02	-.13	-.28	-.43	-.59	-.65	-.50	-.21	-.57	-.23	-.55	-.77	-.35	-.43	-.51	-.57	-.55
3-8	-.17	-.25	.03	.26	.11	-.17	-.35	-.49	-.59	-.32	.05	-.36	.03	-.29	.01	-.27	-.35	-.34	-.54	-.31
3-9	-.04	-.02	.42	.58	.39	.21	-.07	-.30	-.41	-.09	.34	-.12	.24	-.12	.01	-.04	-.09	-.29	-.12	.05
3-10	.09	.05	.58	.73	.55	.35	.02	-.38	-.51	.03	.52	-.02	.34	-.13	.03	.05	.03	-.01	-.03	-.04
3-11	.11	.09	.50	.65	.50	.34	.04	-.25	-.49	.07	.47	.01	.35	-.13	.03	.07	.06	.02	-.01	-.04
3-12	.16	.13	.40	.52	.42	.29	.10	-.08	-.46	.12	.39	.08	.37	-.13	.08	.13	.12	.09	.04	-.04
3-13	.21	.18	.32	.39	.34	.28	.15	.05	-.38	.16	.29	.09	.32	-.05	.11	.16	.16	.14	.09	-.03
3-14	.21	.21	.18	.24	.24	.26	.17	.13	-.30	.20	.22	.13	.22	-.05	.15	.18	.18	.16	.12	-.03
3-15	-1.80	-1.00	-1.34	-.68	-.51	-.40	-.24	-.04	.09	.38	.22	.88	.75	1.00	1.00	-.78	-.21	.50	.80	1.00
3-16	-1.09	-.64	-.86	-.46	-.36	-.17	—	.05	.13	.35	.14	.71	.55	.94	.90	-.63	-.04	.37	.64	.90
3-17	-.98	-.60	-.83	-.53	-.46	-.33	-.27	-.13	-.04	.09	-.10	.39	.24	.68	.59	-.60	-.21	.14	.37	.61
3-18	-.90	-.62	-.83	-.61	-.53	-.41	-.37	-.25	-.13	-.04	-.23	.21	.09	.48	.39	-.60	-.31	.14	.21	.41
3-19	-.72	-.53	-.73	-.58	-.54	-.41	-.37	-.25	-.17	-.16	-.33	.01	-.12	.25	.16	-.52	-.33	-.18	.04	.23
3-20	-.64	-.54	-.73	-.66	-.60	-.49	-.40	-.27	-.17	-.22	-.43	-.12	-.23	.09	-.04	-.50	-.36	-.23	-.11	.09
3-21	-.66	-.47	-.70	-.72	-.67	-.53	-.42	-.23	-.12	-.32	-.59	-.23	-.40	-.09	-.28	-.45	-.41	-.29	-.21	.09
3-23	-1.60	-.12	-.39	-.53	-.46	-.49	-.11	.15	.13	-.05	-.41	-.04	-.33	-.01	-.30	-.12	-.09	-.05	-.03	.01
3-24	.03	.05	-.26	-.77	-.30	-.20	-.12	.45	.71	.10	-.30	.14	-.28	.16	-.35	.05	.06	.12	.16	.17
3-25	.07	.09	-.26	-.77	-.30	-.12	.10	.41	.66	.14	-.30	.18	-.26	.17	-.30	.09	.12	.14	.17	.19
3-26	.11	.13	-.28	-.43	-.28	-.04	.14	.36	.40	.20	-.30	.21	-.26	.21	-.28	.13	.18	.19	.21	.23
3-27	.13	.18	-.28	-.46	-.28	.03	.20	.36	.40	.24	-.30	.28	-.25	.23	-.21	.20	.23	.22	.25	.25
3-28	.16	.21	-.32	-.48	-.26	.09	.22	.32	.27	.25	-.12	.24	-.21	.18	-.10	.20	.23	.22	.23	.21
4-0	-.64	.55	.29	.93	.94	1.00	1.00	1.00	1.00	.87	.97	0	.41	-2.33	-1.72	.61	1.00	.76	-.14	-1.10
4-1	.90	.60	.71	.37	.35	.29	.09	-.17	-.21	-.53	-.21	-1.60	-1.03	-2.41	-2.13	.53	-.01	-.57	-1.52	-2.34
4-2	.69	.32	.52	.21	.13	.13	-.07	-.21	-.33	-.50	-.30	-1.11	-.79	-1.89	-1.61	.30	-.09	-.57	-1.12	-1.62
4-3	.37	.05	.26	.03	-.04	-.13	-.25	-.34	-.41	-.53	-.36	-.92	-.67	-1.42	-1.20	.07	-.23	-.57	-.95	-1.29
4-4	.29	0	.13	0	-.07	-.17	-.29	-.33	-.39	-.50	-.34	-.77	-.54	-1.12	-.91	-.02	-.23	-.56	-.80	-1.04
4-5	.01	-.15	-.01	-.12	-.17	-.25	-.35	-.45	-.49	-.54	-.30	-.71	-.50	-.88	-.67	-.22	-.39	-.55	-.74	-.85
4-6	-.13	-.27	-.07	-.12	-.20	-.28	-.40	-.50	-.60	-.53	-.28	-.65	-.42	-.73	-.69	-.32	-.44	-.55	-.69	-.72
4-7	-.25	-.33	-.07	-.04	-.14	-.28	-.43	-.58	-.65	-.51	-.21	-.58	-.25	-.54	-.23	-.37	-.45	-.52	-.57	-.57
4-8	-.20	-.23	.07	.24	.11	-.17	-.33	-.50	-.58	-.38	.08	-.38	.02	-.34	0	-.32	-.34	-.34	-.14	-.32
4-9	-.08	-.02	.40	.55	.39	.18	-.46	-.39	-.47	-.13	.36	-.17	.25	-.15	.05	-.07	-.10	-.31	-.14	-.12
4-10	.09	.08	.58	.73	.59	.37	.01	-.39	-.51	0	.55	-.08	.35	-.10	.09	.03	.02	-.01	-.06	-.06
4-11	.11	.09	.49	.63	.51	.29	.03	-.24	-.51	.03	.47	-.02	.35	-.10	.13	.05	.03	.03	-.02	-.04
4-12	.14	.15	.40	.52	.43	.28	.10	-.07	-.43	.08	.41	.01	.36	-.08	.14	.11	.11	.09	.02	-.04
4-13	.16	.16	.30	.37	.34	.26	.13	.02	-.34	.13	.32	.05	.33	-.07	.24	.15	.13	.12	.05	-.02
4-14	.18	.21	.20	.22	.26	.26	.16	.09	-.23	.15	.26	.05	.25	-.07	.22	.17	.15	.14	.10	0
4-15	-1.63	-.85	-1.13	-.39	-.43	-.30	-.14	.10	.11	.42	.21	.78	.72	1.00	1.00	-.60	-.04	.48	.82	1.00
4-16	-1.27	-.68	-.94	-.41	-.46	-.36	-.24	.12	.05	.26	.05	.55	.43	.89	.83	-.56	-.14	.33	.58	.85
4-17	-.96	-.54	-.72	-.41	-.43	-.36	-.22	-.11	-.04	.09	-.07	.32	.27	.67	.61	-.49	-.19	.16	.37	.66
4-18	-.80	-.53	-.72	-.49	-.48	-.40	-.30	-.22	-.13	-.07	-.20	.18	.09	.48	.39	-.50	-.22	.04	.22	.46
4-19	-.67	-.49	-.66	-.52	-.53	-.40	-.35	-.24	-.15	-.17	-.33	.01	-.09	.26	.13	-.45	-.29	-.09	.03	.23
4-20	-.60	-.48	-.64	-.54	-.59	-.46	-.38	-.25	-.17	-.27	-.41	-.13	-.24	.08	-.04	-.45	-.34	-.19	-.07	.07
4-21	-.49	-.43	-.64	-.67	-.65	-.51	-.38	-.22	-.43	-.33	-.53	-.25	-.40	-.12	-.26	-.43	-.36	-.28	-.19	-.10

Table V. - continued

Orifice \ Run	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
3-0	0.56	0.68	-0.29	0.32	-2.01	-1.32	-4.35	-3.54	-0.75	-0.62	-0.95	1.00	-0.10	-4.36	0.71	-0.70	-2.30	-0.39	0.77	1.00
3-1	.52	-.80	-1.61	-1.14	-2.57	-2.25	-3.55	-3.10	-.64	-.54	.91	.01	-1.66	-3.58	-.75	-.60	-2.66	-1.65	-.77	-.13
3-2	.24	-.77	-1.38	-1.04	-2.02	-1.72	-2.75	-2.31	-.64	-.54	.65	-.15	-1.46	-2.75	-.78	-.60	-1.90	-1.38	-.74	-.25
3-3	.10	-.66	-1.03	-.75	-1.44	-1.15	-1.80	-1.52	-.64	-.56	.40	-.20	-.94	-1.83	-.61	-.60	-1.44	-.98	-.59	-.26
3-4	-.04	-.62	-.87	-.65	-1.17	-.96	-1.43	-1.21	-.66	-.56	.24	-.30	-.88	-1.44	-.59	-.61	-1.13	-.81	-.55	-.34
3-5	-.19	-.62	-.80	-.60	-.96	-.75	-1.13	-.89	-.68	-.60	.03	-.39	-.82	-1.14	-.62	-.61	-.94	-.75	-.57	-.42
3-6	-.30	-.62	-.74	-.48	-.83	-.57	-.87	-.59	-.71	-.61	-.12	-.45	-.74	-.90	-.62	-.65	-.82	-.69	-.59	-.46
3-7	-.35	-.57	-.63	-.29	-.61	-.28	-.52	-.22	-.75	-.65	-.27	-.49	-.62	-.59	-.55	-.72	-.61	-.57	-.51	-.46
3-8	-.28	-.43	-.43	-.01	-.37	0	-.32	-.13	-.75	-.65	-.20	-.38	-.43	-.37	-.41	-.75	-.36	-.36	-.36	-.34
3-9	-.04	-.16	-.16	.21	-.14	.06	-.22	-.11	-.73	-.61	-.12	-.12	-.17	-.24	-.16	-.71	-.14	-.12	-.12	-.10
3-10	.03	-.06	-.06	.33	-.07	10	-.20	-.11	-.67	-.60	.06	0	-.07	-.22	-.06	-.65	-.07	-.04	.02	.03
3-11	.05	-.02	-.02	.35	-.06	.12	-.20	-.08	-.65	-.57	.04	.02	-.06	-.22	0	-.65	-.07	-.02	.02	.05
3-12	.11	.05	.02	.35	-.04	.18	-.20	-.06	-.64	-.55	.11	.05	0	-.22	.05	-.65	-.06	.04	.07	.11
3-13	.13	.10	.06	.29	-.02	.22	-.20	.01	-.60	-.54	.15	.12	.05	-.22	.10	-.62	-.04	.07	.15	.16
3-14	.16	.19	.07	.21	0	.22	-.18	.07	-.57	-.50	.15	.14	.07	-.22	.14	-.55	-.04	.10	.15	.16
3-15	-.94	.40	.83	.72	1.00	.96	1.00	1.00	1.00	1.00	-2.02	-.31	.74	1.00	.40	.97	.97	.84	.54	-.07
3-16	-.61	.36	.67	.53	.92	.90	.99	.99	.96	.93	-1.10	-.22	.60	.99	.31	.94	.87	69	.40	-.04
3-17	-.59	.12	.35	.25	.63	.53	.82	.70	.77	.70	-1.04	-.33	.33	.81	.10	.75	.59	.38	.15	-.23
3-18	-.61	-.02	.21	.10	.42	.39	.60	.54	.61	.54	-.95	-.40	.19	.61	.02	.60	.42	.21	-.04	-.34
3-19	-.51	-.02	.04	-.11	.21	.14	.36	.26	.38	.29	-.73	-.40	.04	.40	-.12	.38	.22	.05	-.12	-.34
3-20	-.51	-.24	-.07	-.24	.06	-.06	.18	.07	.18	.07	-.70	-.41	-.10	.22	-.21	.19	.07	-.07	-.19	-.38
3-21	-.47	-.29	-.21	-.40	-.10	-.28	-.06	-.17	-.06	-.24	-.59	-.43	-.24	0	-.29	-.04	-.10	-.19	-.28	-.41
3-23	-.14	-.07	-.06	-.36	0	-.30	0	-.29	-.10	-.52	-.22	-.14	-.10	.02	-.10	-.12	-.04	-.06	-.04	-.10
3-24	.03	.07	.12	-.38	.16	-.37	.16	-.42	.06	-.80	-.06	-.14	.10	.16	.10	.04	.32	.15	.12	.09
3-25	.06	.12	.16	-.38	.20	-.37	.18	-.36	.06	.57	-.02	.05	.12	.18	.12	.05	.17	.17	.15	.13
3-26	.11	.15	.20	-.38	.21	-.35	.20	-.31	.06	-.34	.02	.12	.16	.19	.17	.05	.21	.21	.19	.16
3-27	.15	.21	.23	-.33	.23	-.23	20	-.13	.06	-.24	.06	.17	.19	.24	.23	.05	.22	.24	.25	.22
3-28	.16	.21	.21	-.26	.20	-.14	.14	-.01	-.02	-.26	.09	.17	.19	.18	.23	-.07	.19	.22	.25	.22
4-0	.63	.76	-.10	.29	-1.75	-1.20	-3.84	-3.08	-.46	-.34	-.52	1.00	-.19	-3.91	.67	-.43	-2.00	-.33	.66	1.00
4-1	.54	-.72	-1.66	-1.23	-2.41	-2.43	-3.19	-2.74	-.61	-.54	.86	.07	-1.46	-3.18	-.77	-.58	-2.31	-1.60	-.61	.03
4-2	.32	-.70	-1.15	-.95	-1.80	-1.51	-2.46	-2.05	-.61	-.54	1.00	-.12	-1.19	-2.04	-.70	-.58	-1.80	-1.20	-.61	-.20
4-3	.05	-.69	-1.04	-.82	-1.45	-1.19	-1.76	-1.46	-.64	-.55	.31	-.29	-1.13	-1.75	-.67	-.58	-1.40	-1.07	-.65	-.27
4-4	-.06	-.63	-.90	-.66	-1.16	-.95	-1.39	-1.14	-.64	-.57	.15	-.31	-.94	-1.39	-.60	-.62	-1.11	-.86	-.54	-.28
4-5	-.23	-.63	-.77	-.58	-.95	-.73	-1.02	-.82	-.66	-.62	-.09	-.43	-.82	-1.09	-.63	-.63	-.97	-.75	.55	-.37
4-6	-.37	-.63	-.73	-.50	-.82	-.57	-.79	-.56	-.72	-.67	-.25	-.54	-.76	-.85	-.63	-.70	-.83	-.70	-.57	-.40
4-7	-.47	-.60	-.61	-.31	-.64	-.28	-.47	-.18	-.74	-.67	-.40	-.57	-.67	-.53	.59	-.72	-.62	-.58	-.53	-.43
4-8	-.35	-.43	-.40	-.01	-.38	-.02	-.26	-.11	-.70	-.62	-.33	-.45	-.45	-.33	-.45	-.70	-.37	-.38	-.34	-.32
4-9	-.13	-.16	-.17	.19	-.15	.04	-.24	-.15	-.66	-.57	-.17	-.18	-.21	-.29	-.18	-.66	-.14	0	-.14	-.09
4-10	-.03	-.04	-.07	.29	-.08	.06	-.20	-.13	-.58	-.51	-.01	-.06	-.10	-.26	-.04	-.59	-.07	-.06	-.02	.04
4-11	-.01	-.03	-.04	.31	-.08	.10	-.20	-.11	-.58	-.51	-.01	.04	-.07	-.26	-.03	-.59	-.07	-.04	.02	.07
4-12	.05	.03	.02	.31	-.06	.12	-.20	-.06	-.56	-.49	.03	.02	.04	-.26	.03	-.55	-.06	0	.07	.12
4-13	.08	.05	.04	.24	-.06	.16	-.20	-.05	-.50	-.43	.05	.04	0	-.26	.09	-.51	-.06	.03	.11	.16
4-14	.11	.08	.05	.19	-.06	.18	-.18	.01	-.47	-.41	1.29	.07	.04	-.26	.11	-.47	-.04	.07	.15	.23
4-15	-.78	.51	.85	.76	1.00	.99	1.00	1.00	1.00	1.00	-1.52	-.04	.84	1.00	.51	1.00	1.00	.85	.50	.01
4-16	-.64	32	.01	.49	.88	.78	.96	.94	.96	.88	-1.19	-.18	.60	—	.30	.94	.88	.64	.33	-.09
4-17	-.50	.15	-.01	.26	.65	.53	.81	.72	.78	.69	-.89	-.19	.65	.77	.16	.77	.62	.41	.18	-.16
4-18	-.50	.01	.02	.17	—	.36	.63	.53	.62	.53	-.79	-.24	.29	.62	.06	.53	.46	.27	.05	-.22
4-19	-.44	-.08	.07	-.04	.24	.14	.39	29	.39	.28	-.69	-.30	.10	.39	-.09	.36	.26	.07	-.07	-.30
4-20	-.47	-.18	-.06	-.20	.11	-.02	.21	.05	.21	.06	-.64	-.36	-.06	.24	-.18	.18	.12	-.02	-.12	-.35
4-21	-.47	-.28	-.16	-.36	-.06	-.25	.01	-.17	-.01	-.25	-.60	-.42	-.19	.02	-.26	-.01	-.06	-.14	-.25	-.35

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Table V. - continued

Orifice \ Run	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
4-22	—	-0.30	-0.55	-0.60	-0.58	-0.43	-0.30	-0.09	0.11	-0.23	-0.49	-0.17	-0.40	-0.10	-0.30	-0.32	-0.27	-0.29	-0.14	-0.06
4-23	-.12	-.10	-.37	-.52	-.48	-.30	-.11	.16	.35	-.07	-.40	-.08	-.32	-.04	-.30	-.14	-.07	-.05	-.06	0
4-24	.01	.08	-.29	-.43	-.46	-.33	-.14	.46	.72	.05	-.48	.09	-.25	.11	-.38	-.02	.05	09	.11	13
4-25	.03	.05	-.29	-.41	-.36	-.17	-.16	.33	.55	.03	-.41	.05	-.35	.08	-.36	.02	.03	.06	.07	.09
4-26	.09	.15	-.29	-.41	-.30	-.02	.13	.36	.50	.16	-.33	.18	-.29	.18	-.30	.11	.17	.19	.20	.20
4-27	.14	.21	-.31	-.43	-.25	.08	.20	.36	.42	.22	-.25	.24	-.24	.22	-.17	.18	.22	.26	.26	23
4-28	.14	.22	-.33	-.47	-.22	.13	.22	.33	.33	.24	-.17	24	-.16	.21	-.07	.20	.25	.26	.26	.23
5-0	-.36	.65	.30	.92	.95	.99	24	1.08	1.00	.83	1.00	.27	.43	-1.64	-1.14	.75	1.09	.79	-.35	-1.15
5-1	.82	.58	.72	.45	.34	.21	.09	-.14	-.10	-.53	-.20	-1.12	-.92	-1.84	-1.67	.45	0	-.55	-1.27	-1.83
5-2	.61	.37	.49	.26	.21	.11	-.04	-.12	-.15	-.46	-.23	-.86	-.66	-1.48	-1.33	.10	-.14	-.53	-.92	-1.35
5-3	.34	.08	.23	01	02	-.12	-.20	-.24	-.34	-.46	-.28	-.86	-.61	-1.22	-1.02	-.02	-.25	-.55	-.94	-1.13
5-4	.18	-.04	.14	-.04	-.08	-.16	-.22	-.28	-.30	-.39	-.27	-.70	-.49	-.92	-.74	-.06	-.09	-.48	-.75	-.95
5-6	-.17	-.26	-.09	-.13	-.12	-.30	-.44	-.46	-.53	-.49	-.32	-.62	-.43	-.70	-.42	-.32	-.42	-.52	-.66	-.71
5-7	-.25	-.33	-.09	-.07	-.13	-.27	-.40	-.49	-.59	-.43	—	-.49	-.28	-.61	-.27	-.31	-.39	-.47	-.71	-.58
5-8	-.17	-.23	.07	18	.05	-.16	-.29	-.41	-.54	-.30	-.16	-.41	-.10	-.48	-.14	-.25	-.29	-.32	-.44	-.45
5-9	-.07	-.10	.33	.46	.29	.09	-.18	-.46	-.66	-.23	.27	-.33	.08	-.43	-.08	-.11	-.19	-.28	-.29	-.28
5-10	-.07	-.08	.51	70	52	.22	-.09	-.51	-.83	-.20	.51	-.23	.24	-.30	.02	-.11	-.12	-.19	-.19	-.22
5-11	.03	.01	.38	.55	.39	.20	-.05	-.40	-.61	-.13	.41	-.17	.22	-.27	.04	-.01	-.07	-.13	-.16	-.17
5-12	.08	.08	.29	43	.34	20	-.01	-.27	-.46	-.07	.38	-.10	.20	-.22	.04	.02	-.06	-.06	-.06	-.14
5-13	.05	.05	.09	.16	16	.12	.01	-.15	-.30	0	.20	-.07	.05	-.22	.04	02	0	0	-.01	-.07
5-14	.05	.08	-.05	0	.05	.12	.02	-.10	-.25	.01	.12	-.08	0	-.20	.03	-.04	.02	-.01	-.01	-.07
5-15	-1.34	-.67	-.87	-.41	-.23	-.14	-.01	.09	.15	.46	.28	.79	.63	1.00	.98	-.49	.07	.50	.80	.96
5-16	-1.10	-.59	-.74	-.42	-.33	-.22	-.11	-.02	.01	.26	.10	.60	40	—	.79	-.47	-.07	.31	.54	.81
5-17	-.70	-.43	-.58	-.36	-.28	-.22	-.11	-.07	0	.18	-.05	.40	.24	.62	.57	-.31	-.07	.18	.39	.58
5-18	-.66	-.46	-.55	-.42	-.38	-.29	-.22	-.13	-.08	-.02	-.14	.18	.11	40	.38	-.36	-.21	.05	.25	.43
5-19	-.63	-.46	-.58	-.49	-.43	-.27	-.32	-.20	-.15	-.17	-.27	0	-.10	.15	.12	-.36	-.27	-.10	.03	.16
5-20	-.51	-.41	-.53	-.50	-.47	-.40	-.33	-.23	-.13	-.23	-.33	-.12	-.23	.01	-.05	-.36	-.27	-.17	-.06	.05
5-21	-.46	-.40	-.53	-.54	-.53	-.43	-.35	-.21	-.10	-.26	-.45	-.23	-.36	-.14	-.25	-.36	-.32	-.25	-.18	-.10
5-22	-.36	-.26	-.34	-.42	-.41	-.35	-.24	-.07	.09	-.20	-.37	-.13	-.30	-.12	-.24	-.23	-.22	-.13	-.11	-.04
5-23	-.25	-.17	-.30	-.45	-.41	-.30	-.12	-.21	.26	-.08	-.33	-.07	-.26	-.09	-.24	-.18	-.14	-.04	-.03	0
5-25	-.13	-.08	-.34	-.63	-.72	-.35	.02	.33	.41	.08	-.59	.09	-.45	.04	-.31	-.11	.03	.11	.10	.10
5-26	-.08	-.04	-.21	-.50	-.49	-.33	.07	.33	.41	11	-.68	.09	-.64	.04	-.24	-.05	.05	.13	12	.10
5-27	.01	.01	-.20	-.45	-.26	-.14	.10	.29	.24	.11	-.25	.09	-.71	-.01	-.12	.01	.07	.15	.12	09
5-28	.03	.05	-.17	-.42	-.23	-.03	.12	.22	.21	.13	-.16	.11	-.43	.04	-.05	.04	.13	.16	.12	.11
6-0	.01	.65	.42	.85	.89	.90	.97	.98	.96	.84	.96	.34	.52	-.90	-.66	.75	.97	.79	.12	-.97
6-1	.79	.52	.66	.40	.37	.27	.20	.11	0	-.22	.01	-.65	-.52	-1.22	-1.02	.37	.11	01	-.82	-1.27
6-2	.54	.32	46	20	.21	.10	.07	0	-.08	-.26	-.09	-.64	-.45	-.98	-.87	.21	02	-.35	-.71	-1.08
6-3	.38	.12	.24	.07	03	-.05	-.12	-.18	-.22	-.33	-.17	-.51	-.47	-.73	-.64	.05	-.17	-.44	-.63	-.75
6-4	.16	.01	.09	-.05	-.11	-.14	-.22	-.25	-.27	-.37	-.23	-.49	-.43	-.65	-.54	-.12	-.28	-.45	-.63	-.68
6-5	-.07	-.15	-.08	-.13	-.18	-.24	-.27	-.35	-.35	-.38	-.28	-.51	-.39	-.67	-.53	-.27	-.34	-.45	-.60	-.68
6-6	-.15	-.27	-.10	-.13	-.18	-.29	-.35	-.45	-.48	-.42	-.30	-.51	-.34	-.67	-.46	-.34	-.37	-.47	-.53	-.97
6-7	-1.04	-.48	-.64	-.28	-.18	-.12	-.03	.10	.16	.35	.28	.68	.58	.93	.89	-.25	.11	-.55	.64	.89
6-8	-.78	-.43	-.57	-.30	-.22	-.12	-.09	.04	.09	.23	.14	.50	.40	.74	.71	-.25	.02	.35	.55	.73
6-9	-.79	-.46	-.59	-.39	-.39	-.29	-.27	-.18	-.12	-.01	-.15	.16	.08	.45	.37	-.32	-.17	.13	.25	.44
6-10	-.50	-.40	-.51	-.38	-.35	-.25	-.24	-.12	-.11	-.05	-.15	.11	.03	.30	.24	-.30	-.12	.07	.20	.33
6-11	-.55	-.41	-.61	-.43	-.41	-.35	-.29	-.22	-.18	-.20	-.30	-.10	-.20	.01	-.04	-.32	-.22	-.12	-.04	.09
6-12	-.48	-.38	-.54	-.49	-.45	-.37	-.33	-.25	-.16	-.27	-.38	-.20	-.28	-.11	-.17	-.35	-.30	-.21	-.13	-.02
7-0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.99	.97
7-1	.47	.43	.47	.46	.45	.46	.37	.35	.37	.37	.39	.31	.35	27	.32	.30	.22	.17	.11	09

Table V. - continued

Orifice \ Run	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
4-22	-0.37	-0.20	-0.12	-0.36	-0.04	-0.30	-0.07	-0.24	-0.04	-0.35	-0.49	-0.33	-0.16	0.19	-0.20	-0.04	-0.06	-0.12	-0.17	-0.27
4-23	-.18	-.11	-.04	-.33	-.01	-.28	.03	-.29	-.04	-.49	-.29	-.16	-.12	.02	-.11	-.06	0	-.04	-.04	-.07
4-24	-.06	.06	.10	-.40	-.11	-.37	-.13	-.47	.05	-.83	-.15	-.06	.05	.12	.09	.03	.12	.13	.11	.07
4-25	-.06	.03	.07	-.38	.11	-.37	.10	-.42	.03	-.59	-.13	-.07	.04	.12	.05	.01	.12	.12	.08	.07
4-26	.05	.16	.19	-.38	.19	-.34	.19	-.31	.12	-.37	.04	.06	.16	.19	.18	.09	.21	.20	.20	.18
4-27	.13	.22	.25	-.36	.24	-.23	.23	-.15	.13	-.21	.01	.14	.21	.21	.24	.11	.26	.27	.26	.23
4-28	.13	.22	.25	-.26	.23	-.12	.17	-.01	.07	-.16	.03	.16	.19	.17	.24	.06	.23	.27	.26	.23
5-0	.73	.66	-.10	.29	-1.56	-1.14	3.10	-2.67	-1.38	-.92	-.01	1.00	-.12	3.55	.63	-1.26	-1.43	-.10	.75	1.00
5-1	.35	-.80	-1.52	-1.04	-1.99	-2.00	-2.79	-2.36	-1.55	-1.25	.77	-.02	-1.58	-2.84	-.79	-1.63	-1.98	-1.42	-.61	.07
5-2	.16	-.65	-1.10	-.88	-1.63	-1.38	-2.10	-1.84	-1.39	-1.18	.46	-.12	-1.10	-2.19	-.61	-1.40	-1.62	-1.14	-.49	-.01
5-3	-.06	-.65	1.06	-.88	-1.38	-1.19	-1.62	-1.39	-1.13	-1.00	.18	-.33	-1.07	-1.70	-.61	-1.04	-1.35	-.97	-.54	-.20
5-4	-.14	-.58	-.88	-.70	-1.08	-.95	-1.10	-1.01	-.88	.71	-.01	-.39	-.92	-1.32	-.65	-.73	-1.11	-.84	-.51	-.25
5-6	-.42	-.63	-.72	-.52	-.76	-.59	-.76	-.46	-.72	-.64	-.40	-.56	-.76	-.78	-.62	-.68	-.79	-.68	-.54	-.36
5-7	-.44	-.55	-.55	-.31	-.60	-.35	-.49	-.22	-.69	-.57	-.49	-.56	-.61	-.45	-.52	-.68	-.61	-.53	-.47	-.36
5-8	-.35	-.36	-.41	-.11	-.47	-.12	-.35	-.11	-.58	-.54	-.42	-.44	-.47	-.35	-.33	-.56	-.44	-.44	-.34	-.28
5-9	-.22	-.31	-.33	.05	-.21	-.02	-.23	-.08	-.51	-.48	-.27	-.32	-.38	-.30	-.27	-.53	-.23	-.27	-.25	-.17
5-10	-.22	-.24	-.21	.10	-.14	0	-.21	-.06	-.46	-.46	-.31	-.28	-.31	-.24	-.26	-.44	-.15	-.19	-.17	-.13
5-11	-.18	-.19	-.14	.07	-.12	0	-.20	-.06	-.47	-.43	-.25	-.25	-.21	-.24	-.19	-.44	-.11	-.12	-.14	-.06
5-12	-.13	-.14	-.10	.05	-.01	0	-.18	-.04	-.46	-.43	-.22	-.20	-.14	-.21	-.12	-.44	-.06	-.06	-.04	-.02
5-13	-.14	-.11	-.04	-.04	-.04	-.02	-.18	-.10	-.47	-.52	-.25	-.16	-.10	-.20	-.06	-.44	-.03	0	.02	.03
5-14	-.14	-.12	-.02	-.15	-.04	-.06	-.18	.01	-.53	-.50	-.33	-.16	-.12	-.18	-.12	-.53	-.03	0	.02	.03
5-15	-.39	.73	.88	.78	1.00	.91	.98	1.00	1.00	1.00	-1.06	.13	.84	.97	.55	1.00	1.00	.82	.47	.01
5-16	-.39	.36	.65	.55	.90	.77	.96	.95	.98	.93	-.83	-.01	.64	.99	.35	.95	.84	.58	.30	-.12
5-17	-.40	.22	.47	.39	.71	.36	.80	.76	.80	.74	-.54	-.01	.45	.85	.23	.80	.67	.46	.17	.07
5-18	-.33	.11	.32	.19	.51	.34	.62	.58	.65	.54	-.54	-.11	.29	.66	.12	.61	.48	.27	.05	-.20
5-19	-.35	-.04	.07	-.03	.25	.12	.39	.29	.37	.26	-.62	-.23	.12	.42	.04	.35	.24	.07	.07	-.28
5-20	-.39	-.12	-.02	-.11	.12	-.02	.20	.10	.21	.10	-.62	-.30	0	.28	-.12	.20	.15	-.02	-.12	-.31
5-21	-.47	-.24	-.16	-.31	-.02	-.21	.04	-.08	.02	-.15	-.65	-.46	-.16	.06	-.23	.01	-.01	-.12	-.19	-.31
5-22	-.35	-.21	-.12	-.33	0	-.25	.04	-.15	0	-.22	-.52	-.42	-.16	.04	-.21	.01	.01	-.07	-.12	-.21
5-23	-.32	-.15	-.07	-.34	.02	-.30	.04	-.22	-.04	-.34	-.44	-.32	-.12	.04	-.16	-.04	.01	-.04	-.06	-.10
5-25	-.28	-.02	.10	-.56	.18	-.55	.12	-.61	.07	-.71	-.42	-.18	0	.12	.02	.05	.17	.13	.13	.05
5-26	-.25	.02	.12	-.48	.16	-.43	.12	-.34	.04	-.42	-.38	-.15	.02	.06	.04	.03	.17	.15	.15	.09
5-27	-.20	.05	.14	-.38	.16	-.39	.08	-.31	.07	-.38	-.35	-.13	.04	.10	.04	-.09	.15	.15	.15	.11
5-28	-.14	.11	.16	-.33	.16	-.23	.04	-.24	.07	-.32	-.29	-.09	.10	.10	.12	-.06	.17	.17	.19	.13
6-0	.79	.59	-.16	.10	-1.33	-.96	-2.82	-2.30	-.26	-1.55	.77	.93	-.07	-3.49	.64	-2.07	-1.52	-.04	.81	.96
6-1	.35	-.55	-1.07	-.80	-1.73	-1.35	-2.16	-1.91	-1.57	-1.28	.62	-.09	-1.21	-2.36	-.62	1.49	-1.58	-.92	-.33	.11
6-2	.16	-.55	-.90	-.76	-1.43	-1.22	-1.73	-1.51	-1.33	-1.15	.42	-.20	-1.00	-1.89	-.60	-1.30	-1.42	-.75	-.40	.03
6-3	-.08	-.55	-.80	-.64	-1.09	-.92	-1.24	-1.04	-1.04	-.82	.11	-.35	-.95	-1.42	-.54	-1.07	-1.06	-.76	-.39	-.12
6-4	-.20	-.63	-.77	-.61	-1.02	-.80	-1.04	-.89	-.80	-.61	-.10	-.43	-.87	-1.16	-.62	-.78	-.97	-.67	-.47	-.23
6-5	-.35	-.55	-.61	-.48	-.72	-.55	-.78	-.61	-.51	-.52	-.32	-.40	-.55	-.75	-.58	-.51	-.71	-.60	-.54	-.43
6-6	-.47	.55	-.64	-.42	-.70	-.46	-.68	-.46	-.62	-.54	-.54	-.54	-.65	-.71	-.56	-.58	-.68	-.55	-.47	-.35
6-7	-.16	.55	.80	.70	.95	.91	.98	.98	.98	1.00	-.55	.16	.78	.96	.56	1.00	.93	.76	.53	-.02
6-8	-.25	.40	.65	.53	.82	.75	.92	.89	.94	.96	-.47	.12	.64	.94	.37	.96	.78	.63	.35	-.08
6-9	-.28	.16	.37	.27	.54	.48	.69	.61	.73	.69	-.50	-.06	.35	.72	.18	.72	.64	.31	.13	-.22
6-10	-.25	.13	.29	.21	.44	.33	.58	.50	.57	.55	-.41	-.08	.29	.58	.13	.57	.47	.24	.02	-.22
6-11	-.43	-.06	.07	-.01	.21	.10	.31	.22	.28	.23	-.70	-.24	.10	.34	-.04	.27	.16	.04	-.14	-.31
6-12	-.49	-.20	-.09	-.18	.05	-.08	.15	.04	.10	.01	-.74	-.43	-.07	.17	-.16	.13	.03	-.07	-.17	-.31
7-0	.91	.85	.84	.86	.82	.84	.85	.80	.80	.86	.87	.77	.69	.62	.84	.81	.80	.93	1.00	1.00
7-1	-.04	-.16	-.22	-.13	-.31	-.22	-.33	-.25	-.25	-.20	-.16	-.28	-.40	-.49	-.13	-.20	-.26	-.02	.17	.40

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Table V. - continued

Orifice \ Run	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
7-2	0.21	0.16	0.22	0.20	0.20	0.15	0.14	0.14	0.10	0.13	0.13	0.08	0.13	0.01	0.01	0.03	0.02	-0.04	-0.10	-0.20
7-3	-.02	-.04	0	0	-.01	-.07	-.08	-.11	-.11	-.09	-.08	-.15	-.12	-.20	-.15	-.15	-.19	-.22	-.27	-.26
7-4	-.04	-.07	-.02	-.02	-.03	-.07	-.11	-.11	-.11	-.09	-.07	-.12	-.10	-.16	-.12	-.15	-.17	-.19	-.22	-.20
7-5	.03	0	.03	.03	.03	.01	-.01	-.01	-.01	.01	.01	-.67	.01	-.05	-.02	-.06	-.06	-.06	-.10	-.10
7-6	.02	01	.01	.03	.03	.01	-.01	-.01	.01	.02	.01	0	.01	-.01	-.01	-.04	-.04	-.06	-.07	-.04
7-7	-.04	-.04	-.04	-.04	-.03	-.05	-.05	-.05	-.03	-.03	-.04	-.04	-.04	-.07	0	-.07	-.07	-.07	-.10	-.07
8-2	.22	.18	.22	.20	.20	.15	.14	.09	.07	.07	.13	.01	.05	-.07	0	.05	0	-.06	-.12	-.17
8-3	.02	0	.05	.03	.03	.03	-.09	-.12	-.12	-.09	-.04	.15	-.10	-.25	-.17	-.15	-.17	-.22	-.27	-.30
8-5	.08	.05	.09	.13	.11	.09	.04	.01	-.01	.04	.09	.01	.05	-.01	.01	.01	.02	0	-.04	-.04
8-6	-.20	0	0	0	.01	.01	-.03	-.03	-.03	.01	0	0	0	-.03	-.02	-.04	-.02	-.04	-.07	-.06
8-7	-.08	-.08	-.08	-.08	-.07	.10	-.09	-.02	-.09	-.07	-.07	-.08	-.08	-.11	-.10	-.12	-.12	-.12	-.12	-.06
9-1	.54	.51	.50	.50	.52	.46	.46	.46	.46	.46	.47	.39	.42	.33	.39	.38	.35	.32	.26	.21
9-3	.03	-.08	.03	.01	-.04	-.07	-.15	-.17	-.26	-.23	-.10	-.33	-.18	-.48	-.36	-.06	-.20	-.30	-.43	-.48
9-4	-.04	-.08	.11	.15	.09	-.01	-.13	-.20	-.26	-.15	.03	-.17	-.03	-.22	-.10	-.06	-.14	-.17	-.19	-.19
9-5	.05	.01	.01	.04	.08	.02	-.02	-.07	-.13	-.07	.05	-.08	.02	-.11	-.04	.03	-.01	-.04	-.07	-.07
9-6	-.04	-.04	-.04	-.01	-.02	.10	-.04	-.04	-.10	-.07	-.02	-.08	-.03	-.09	-.07	-.06	-.06	-.07	-.07	-.07
9-7	-.04	-.04	-.04	-.01	-.01	.10	-.04	-.02	-.07	-.04	-.02	-.08	-.03	-.07	-.07	-.06	-.06	-.07	-.07	-.07
10-1	.54	.53	.52	.54	.52	.49	.50	.52	.52	.50	.50	.48	.51	.48	.49	.48	.46	.44	.43	.42
10-4	-.33	-.15	-.28	-.14	-.15	-.22	-.23	-.30	-.36	.09	0	-.25	-.05	-.24	-.10	-.21	-.18	-.22	-.45	-.39
10-5	-.07	-.05	-.30	-.34	-.15	.07	.03	-.12	-.28	-.07	.05	-.08	.10	-.11	-.02	-.03	.08	.03	-.07	-.13
10-6	-.17	-.08	-.20	-.14	-.10	-.09	-.08	-.08	-.20	-.15	-.08	-.13	-.05	-.12	-.10	-.12	-.09	-.06	-.10	-.17
10-7	-.12	-.07	-.13	-.10	-.10	-.07	-.08	-.07	-.13	-.10	-.07	-.10	-.05	-.11	-.10	-.12	-.09	-.06	-.06	-.13
11-1	.47	.50	.47	.51	.49	.49	.52	.54	.54	.52	.50	.54	.53	.57	.57	.51	.53	.55	.55	.56
11-4	-.14	-.12	-.23	-.22	-.25	-.17	-.08	.09	.18	0	-.20	.03	-.11	-.09	-.14	-.09	-.06	.01	.05	.09
11-5	-.12	-.08	-.23	-.25	-.20	-.11	.02	.08	.04	-.01	-.13	.08	-.05	-.16	0	-.09	-.06	0	.03	.09
11-6	-.08	-.07	-.12	-.12	-.10	-.09	-.04	0	-.02	-.04	-.10	-.02	-.09	-.12	-.04	-.09	-.06	-.02	-.02	.01
11-7	-.10	-.08	-.12	-.11	-.10	-.11	-.08	-.04	-.07	-.07	-.10	-.07	-.09	-.12	-.08	-.09	-.09	-.06	-.06	.02
12-1	.43	.47	.39	.46	.56	.43	.48	.52	.52	.50	.50	.55	.51	.59	.56	.53	.58	.61	.61	.64
12-2	0	.11	.01	.12	.11	-.26	.19	.22	.24	.26	.16	.32	.27	.37	.34	.23	.28	35	.58	.48
12-3	-.28	-.20	-.26	-.22	-.21	-.16	-.12	.16	-.02	-.07	-.13	.01	-.07	.07	0	-.09	.02	.05	.08	.16
12-4	-.15	-.12	-.20	-.20	-.20	-.16	-.08	-.02	.03	-.04	-.13	0	-.11	.01	-.10	-.06	.02	.01	.03	.07
12-5	-.10	-.07	-.15	-.19	-.13	-.09	-.04	.01	.03	-.02	-.10	.01	-.07	.02	-.04	-.03	.01	.01	.03	.05
12-6	-.12	-.10	-.15	-.19	-.19	-.12	-.08	03	-.07	-.07	-.10	-.07	-.11	-.07	-.08	-.09	-.06	-.04	-.06	-.02
12-7	-.12	-.10	-.13	-.12	-.12	-.12	-.12	-.04	-.10	-.10	-.10	-.10	-.11	-.01	-.10	-.09	-.06	-.06	-.07	-.06
13-1	.41	.43	.39	.44	.57	.44	.48	—	.55	.50	.47	.55	.51	.59	.56	59	.59	.63	.68	.71
13-2	.11	.13	.05	.09	.11	.12	.16	.52	.22	.20	.16	.26	.22	.29	.35	.26	.31	.33	.36	.42
13-3	-.15	-.12	-.20	-.18	-.15	-.12	-.10	.22	-.02	-.04	-.10	.01	-.05	.02	.04	-.01	.04	.07	.09	.13
13-4	0	.01	-.02	-.03	-.02	.01	-.15	-.08	.08	.05	0	.08	.04	.07	.02	.11	.12	.13	.11	.14
13-5	-.04	-.04	-.07	-.05	-.07	-.05	-.02	-.08	-.01	0	-.04	0	-.01	-.01	-.04	.11	.04	.05	.05	.07
13-6	-.08	-.08	-.10	-.11	-.10	-.11	-.10	-.04	-.04	-.07	-.08	-.07	-.07	-.07	-.08	-.01	-.01	-.02	-.02	0
13-7	-.07	-.04	-.04	-.05	-.07	-.07	-.04	-.04	-.04	-.09	-.07	-.04	-.04	-.04	-.07	0	0	0	0	0
14-4	-.04	-.07	0	0	-.02	-.04	-.08	-.10	-.12	-.12	-.07	-.12	-.04	-.13	-.12	-.12	-.03	-.11	-.19	-.19
14-5	-.13	-.04	0	0	-.02	-.12	-.04	-.07	-.10	-.11	-.04	-.10	-.04	-.10	-.08	-.10	0	-.12	-.13	-.13
14-6	-.04	-.12	-.10	-.10	0	0	-.12	-.13	-.15	-.15	-.13	-.16	-.10	-.13	-.13	-.15	-.03	-.17	-.19	-.17
14-7	-.12	-.12	.01	0	0	-.12	0	0	-.02	-.07	-.02	-.02	0	-.02	-.02	-.04	-.04	-.06	-.06	-.06

Table V. - concluded

Orifice \ Run	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
7-2	-0.20	-0.30	-0.34	-0.24	-0.42	-0.29	-0.40	-0.37	-0.37	-0.33	-0.23	-0.35	-0.43	-0.56	-0.25	-0.37	-0.37	0.21	-0.02	0.15
7-3	-.34	-.40	-.43	-.36	-.50	-.40	-.49	-.46	-.51	-.47	-.39	-.43	-.52	-.59	-.39	-.49	-.45	-.35	-.21	-.08
7-4	-.25	-.30	-.32	-.24	-.36	-.29	-.36	-.34	-.41	-.36	-.29	-.31	-.35	-.42	-.30	-.37	-.32	-.27	-.17	-.08
7-5	-.13	-.16	-.17	-.13	-.17	-.13	-.19	-.16	-.23	-.18	-.14	-.16	-.19	-.25	-.16	-.22	-.16	-.12	-.07	0
7-6	-.11	-.11	-.13	-.11	-.13	-.11	-.13	-.12	-.16	-.13	-.12	-.10	-.14	-.16	-.13	.01	-.16	-.07	-.06	.02
7-7	-.13	-.13	-.15	-.13	-.15	-.15	-.12	-.14	-.16	-.13	-.14	-.14	-.16	-.18	-.14	.01	-.16	-.12	-.10	.04
8-2	-.22	-.33	-.42	-.29	-.48	-.41	-.52	-.49	-.46	-.40	-.23	-.38	-.55	-.68	-.33	-.44	-.45	-.27	-.07	.13
8-3	-.32	-.40	-.46	-.34	-.52	-.42	-.52	-.46	-.55	-.48	-.37	-.43	-.55	-.61	-.39	-.51	-.47	-.35	-.21	-.07
8-5	-.04	-.06	-.08	-.06	-.11	-.06	-.13	-.10	-.23	-.17	-.04	-.14	-.12	-.16	-.06	-.22	-.08	-.06	0	.05
8-6	-.13	-.13	-.13	-.13	-.13	-.13	-.15	-.14	-.16	-.13	-.18	-.14	-.18	-.18	-.13	-.16	-.13	-.07	-.06	0
8-7	-.20	-.18	-.18	-.20	-.18	-.18	-.19	-.21	-.18	-.15	-.34	-.19	-.24	-.25	-.20	-.18	-.18	-.16	-.12	-.07
9-1	-.30	.04	-.01	.03	-.04	-.10	-.13	-.10	-.02	-.15	.13	0	-.18	-.28	.06	.01	-.04	-.19	.30	.46
9-3	-.18	-.38	-.51	-.37	-.64	-.49	-.68	-.55	-.59	-.52	-.47	-.60	-.66	-.80	-.41	-.52	-.62	—	-.29	-.18
9-4	-.28	-.21	-.23	-.07	-.24	-.06	-.24	-.14	-.50	-.42	-.38	-.46	-.28	-.30	-.21	-.47	-.26	-.22	-.15	-.17
9-5	-.28	-.10	-.10	-.04	-.13	-.06	-.17	-.10	-.37	-.28	-.27	-.13	-.16	-.27	-.10	-.37	-.14	-.08	-.06	-.04
9-6	.18	-.10	-.12	-.07	-.18	-.06	-.15	-.12	-.20	-.13	-.27	-.20	-.10	-.16	-.10	-.16	-.16	-.13	-.07	-.08
9-7	.18	-.10	-.06	-.12	-.08	-.04	-.11	-.16	-.12	-.08	-.27	-.20	-.12	-.15	-.12	-.10	-.07	-.13	-.07	-.08
10-1	.40	.50	.23	.30	.23	.25	.14	.22	.30	.29	.39	.25	.10	-.01	.29	.29	.21	.31	.43	.46
10-4	-.30	-.25	-.23	-.21	-.22	-.04	-.29	-.07	-.53	-.48	-.49	.03	-.36	-.18	-.27	-.56	-.26	-.31	-.27	.16
10-5	-.18	0	.12	-.16	-.03	-.05	-.13	0	-.55	-.34	-.35	.19	-.02	-.18	-.14	-.50	-.02	.01	.03	0
10-6	-.22	-.16	-.10	-.18	-.08	.01	-.06	-.14	-.23	-.17	-.40	-.28	-.18	-.11	-.16	-.17	-.11	-.11	-.07	-.15
10-7	-.22	-.14	-.12	-.18	-.08	.03	-.08	-.10	-.10	-.15	-.35	-.27	-.18	-.11	-.16	-.10	-.11	-.11	-.06	-.10
11-1	.56	.54	.53	.55	.51	.55	.49	.50	.55	.58	.57	.53	.44	.39	.52	.56	.46	.54	.54	.49
11-4	-.13	-.02	.04	-.12	.13	-.06	.13	-.02	.06	-.17	-.27	-.13	.02	.15	-.02	.45	.12	.05	.02	-.08
11-5	-.18	-.06	0	-.18	.03	-.13	-.01	-.10	-.18	-.22	-.29	-.16	-.06	.01	-.06	-.16	.02	.01	0	-.07
11-6	-.14	-.06	.04	-.10	-.01	-.06	-.01	-.04	-.14	-.08	-.23	-.15	-.07	.03	.06	-.14	-.02	-.03	-.02	-.08
11-7	-.14	-.10	-.07	-.12	-.04	-.08	-.06	-.07	-.07	-.08	-.25	-.18	-.14	-.08	-.12	-.07	-.07	-.08	-.02	-.14
12-1	.65	.69	.71	.71	.74	.73	.72	.74	.75	.76	.71	.72	.72	.72	.67	.76	.71	.65	.60	.46
12-2	.35	.46	.53	.50	.62	.57	.62	.61	.63	.62	.39	.48	.60	.65	.46	.64	.60	.47	.35	.15
12-3	.01	.15	.25	.16	.31	.22	.33	.30	.32	.23	-.04	.13	.28	.41	.15	.31	.31	.16	.03	-.16
12-4	-.03	.05	.12	.02	.15	.05	.15	.06	.10	-.01	-.04	.05	.12	.20	.05	.12	.15	.05	0	-.10
12-5	-.03	.04	.08	0	.10	.03	.07	.04	0	-.04	-.04	.03	.08	.13	.04	.02	.10	.03	0	-.07
12-6	-.06	-.04	0	-.06	.01	-.03	-.01	-.04	-.06	-.06	-.09	-.03	-.02	.03	-.02	-.04	.02	-.03	-.04	-.12
12-7	-.06	-.06	-.04	-.06	-.03	-.04	-.04	-.06	-.06	-.06	-.11	-.05	-.06	.01	-.06	-.06	-.04	-.06	-.07	-.15
13-1	.81	.85	.91	.85	.91	.69	.90	.92	.91	.86	.87	.89	.96	.97	.83	.88	.90	.73	.61	.49
13-2	.47	.57	.59	.57	.62	.58	.62	.64	.61	.56	.57	.64	.70	.74	.55	.62	.62	.47	.30	.18
13-3	.22	.26	.29	.27	.35	.29	.33	.32	.32	.26	.28	.39	.39	.44	.27	.31	.50	.20	.07	-.13
13-4	.23	.25	.27	.25	.31	.28	.26	.26	.25	.23	.30	.34	.37	.39	.27	.27	.29	.20	.13	0
13-5	.18	.17	.20	.18	.24	.17	.17	.18	.16	.15	.24	.27	.26	.27	.17	.16	.19	.13	.05	.04
13-6	.08	.10	.12	.12	.17	.10	.10	.08	.08	.07	.18	.20	.20	.19	.10	.07	.12	.03	0	-.08
13-7	.10	.12	.10	.11	.12	.13	.10	.11	.10	.10	.18	.17	.21	.17	.13	.10	.10	-.17	0	-.07
14-4	-.24	-.26	-.32	-.23	-.32	-.22	-.37	-.20	-.39	-.37	-.26	-.29	-.29	-.38	-.26	-.38	-.31	-.24	-.14	-.08
14-5	-.19	-.19	-.23	-.18	-.21	-.17	-.25	-.22	-.30	-.25	-.20	-.19	-.21	-.26	-.18	-.29	-.23	-.17	-.10	-.07
14-6	-.23	-.23	-.25	-.22	-.23	-.22	-.28	-.25	-.25	-.23	-.26	-.24	-.21	-.26	-.22	-.28	-.25	-.23	-.17	-.16
14-7	-.14	-.12	-.12	-.12	-.12	-.08	-.14	-.14	-.10	-.14	-.14	-.14	-.12	-.14	-.11	-.12	-.12	-.10	-.06	-.04

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Table VI. - Fuselage Pressure Coefficients, $\Delta p/q_0$

Orifice \ Run	41	42	43	44	45
7-0	1.00	1.00	1.00	0.90	0.80
7-1	.38	.20	.11	-.06	-.24
7-2	.16	.03	-.06	-.19	-.29
7-3	-.03	-.12	-.21	-.33	-.38
7-4	-.09	-.13	-.20	-.25	-.29
7-5	-.04	-.06	-.11	-.16	-.17
7-6	-.01	-.04	-.06	-.12	-.14
7-7	-.07	-.10	-.13	-.14	-.16
8-2	.12	.03	-.06	-.19	-.29
8-3	.02	-.04	-.11	-.19	-.27
8-4	----	----	----	----	----
8-5	.02	0	-.04	-.12	-.17
8-6	.02	-.02	-.06	-.12	-.17
8-7	-.09	-.12	-.14	-.19	-.26
9-1	.42	.33	.23	.12	-.02
9-3	-.18	.56	-.18	-.16	-.15
9-4	.04	.01	-.03	-.08	-.15
9-5	-.05	-.07	-.13	-.18	-.26
9-6	-.07	-.10	-.14	-.20	-.26
9-7	-.05	-.07	-.13	-.18	-.25
10-1	.46	.44	.38	-.34	.23
10-4	-.03	-.04	-.06	-.13	-.18
10-5	-.09	-.10	-.14	-.18	-.26
10-6	-.14	-.13	-.20	-.25	-.34
10-7	-.09	-.10	-.16	-.22	-.30
11-1	.48	.50	.48	.49	.48
11-4	.02	.03	.03	-.01	-.04
11-5	-.11	-.10	-.11	-.13	-.16
11-6	-.09	-.06	-.08	-.11	-.15
11-7	-.11	-.10	-.13	-.16	-.20
12-1	.48	.55	.60	.63	-.09
12-2	-.18	-.17	-.18	-.14	-.15
12-3	-.18	-.17	-.18	-.16	-.15
12-4	.01	.05	.06	.11	.11
12-5	-.05	0	.01	.03	.03
12-6	-.12	-.10	-.08	-.08	-.06
12-7	-.12	-.10	-.08	-.08	-.06
13-1	.48	.64	.72	.81	.90
13-2	.20	.35	.42	.49	.63
13-3	-.01	.11	.20	.25	.40
13-4	.04	.13	.20	.25	.37
13-5	.01	.05	.12	.20	.28
13-6	-.20	-.19	-.18	.06	-.15
13-7	-.03	.01	.05	.13	.18
14-4	-.05	-.12	-.19	-.23	-.28
14-5	-.07	-.12	-.17	-.22	-.25
14-6	-.12	-.16	-.19	-.22	-.25
14-7	-.11	-.14	-.17	-.18	-.20

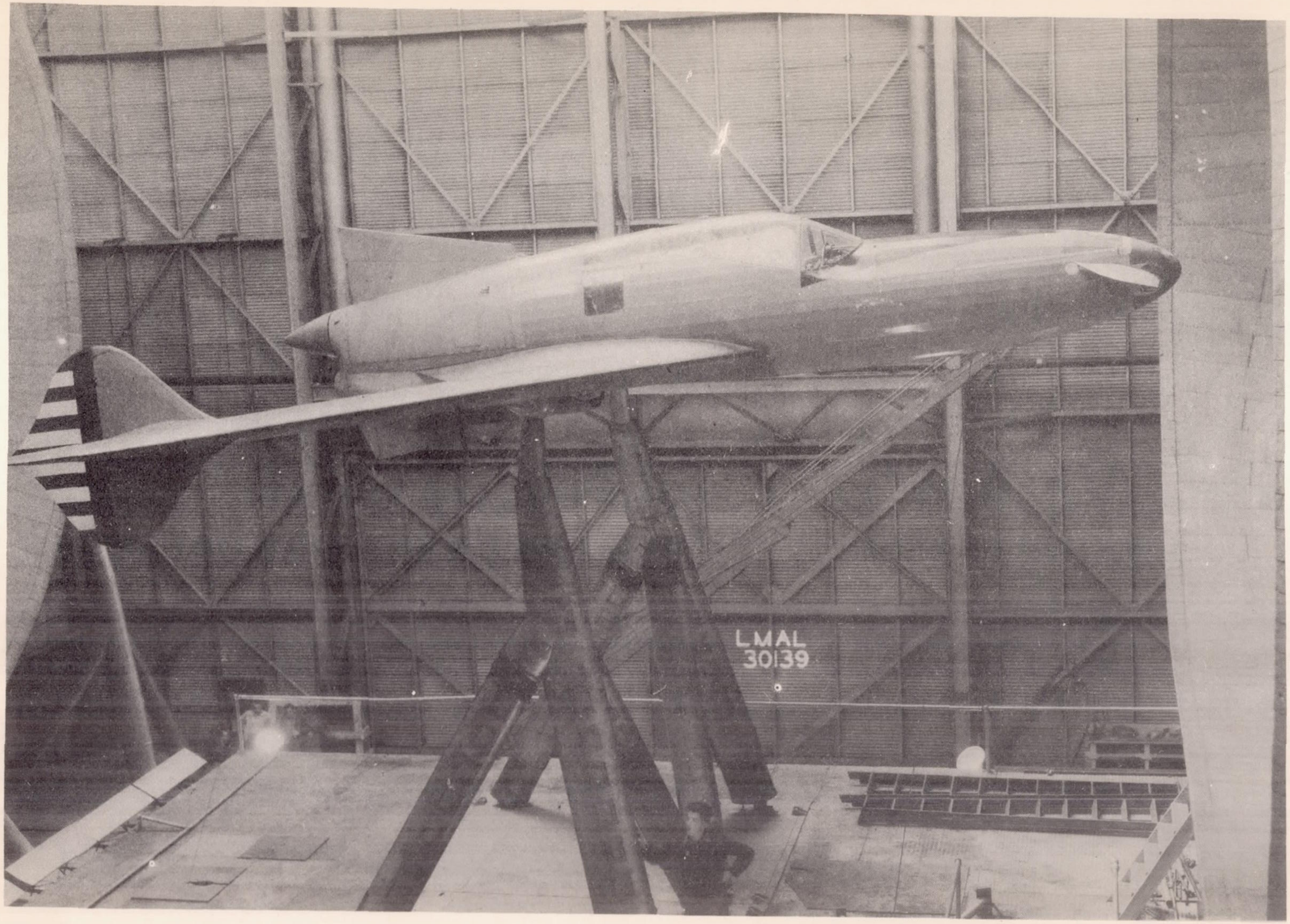
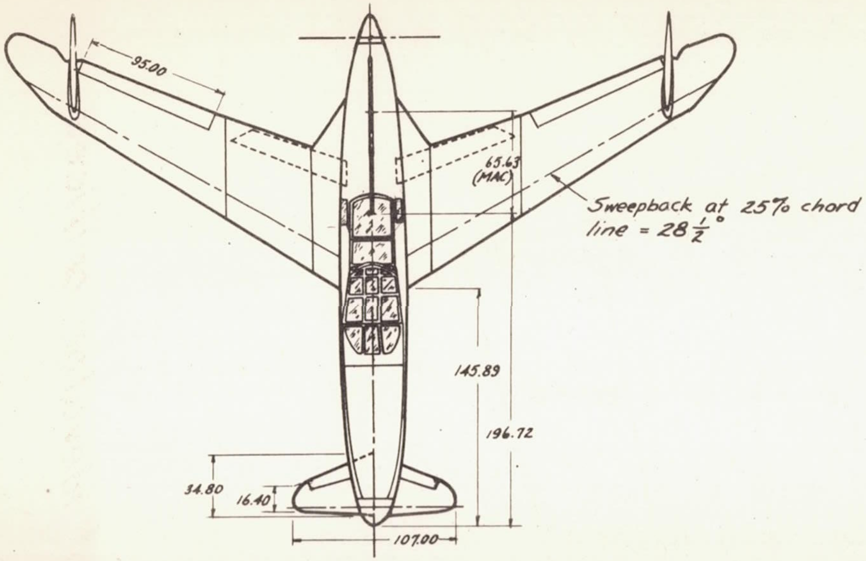


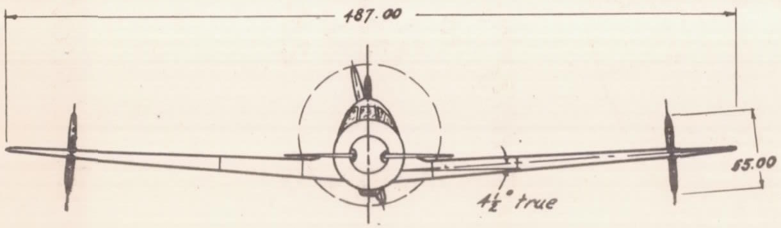
Figure 1.- The XP-55 airplane mounted in the full-scale tunnel.



Areas, sq. ft.

Wing (including flaps)	203.4
Aileron (total)	13.10
Flaps (total)	14.85
Rudder (each)	6.61
Wing fin (each)	8.80
Upper cowl fin	7.88
Lower cowl fin	4.26
Elevator (including fuselage)	18.00
Elevator (excluding fuselage)	12.78
Elevator tabs (total)	2.25

Gross weight 4000 pounds



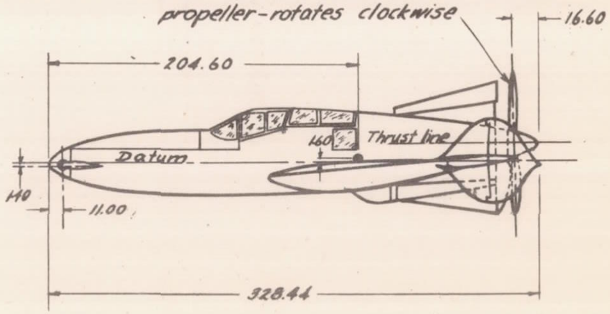


Figure 2.- Three-view drawing of the Curtiss XP-55 airplane

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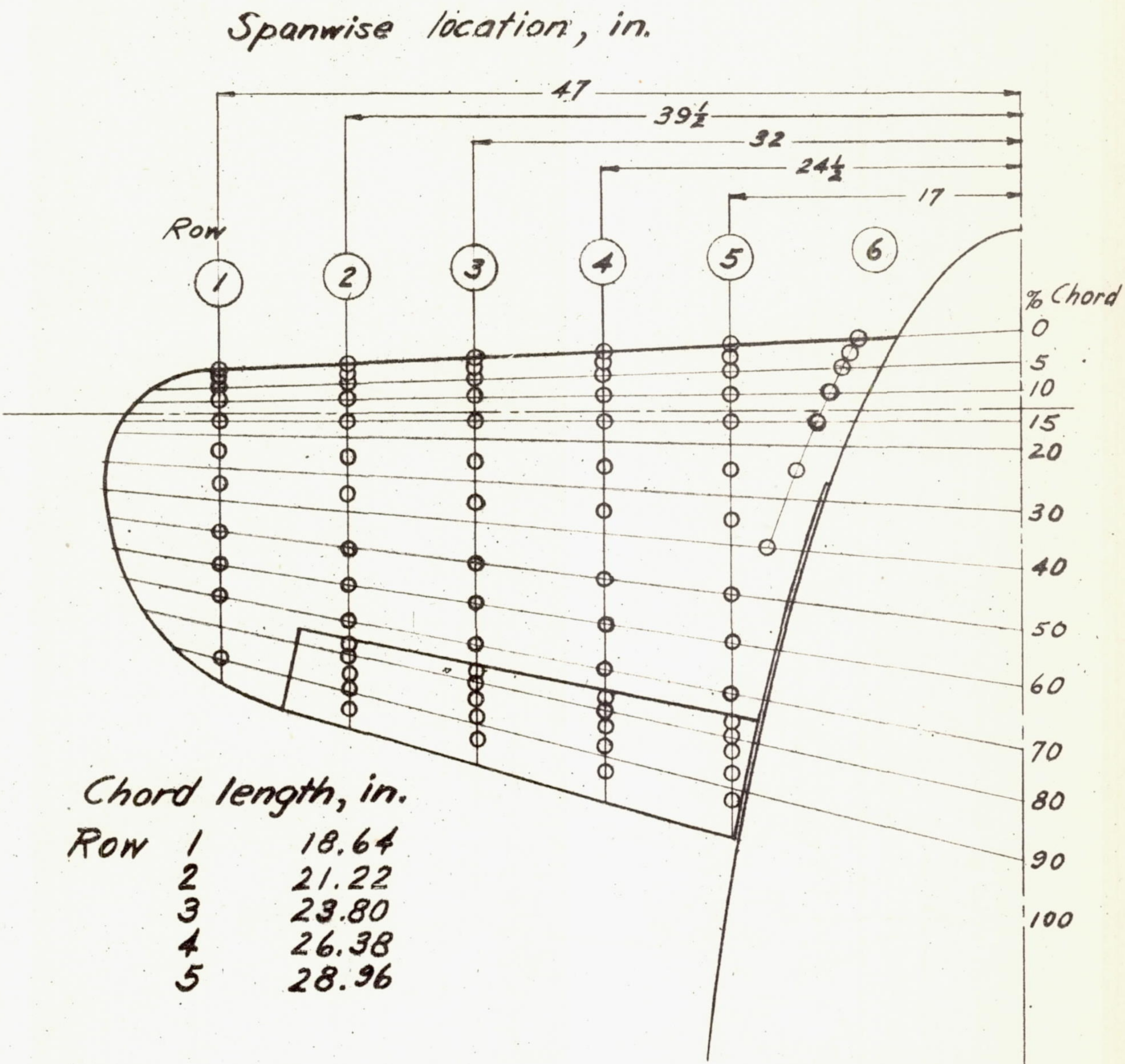

Chord length, in.

Row	1	18.64
	2	21.22
	3	23.80
	4	26.38
	5	28.96

Figure 3.-Location of elevator orifices.

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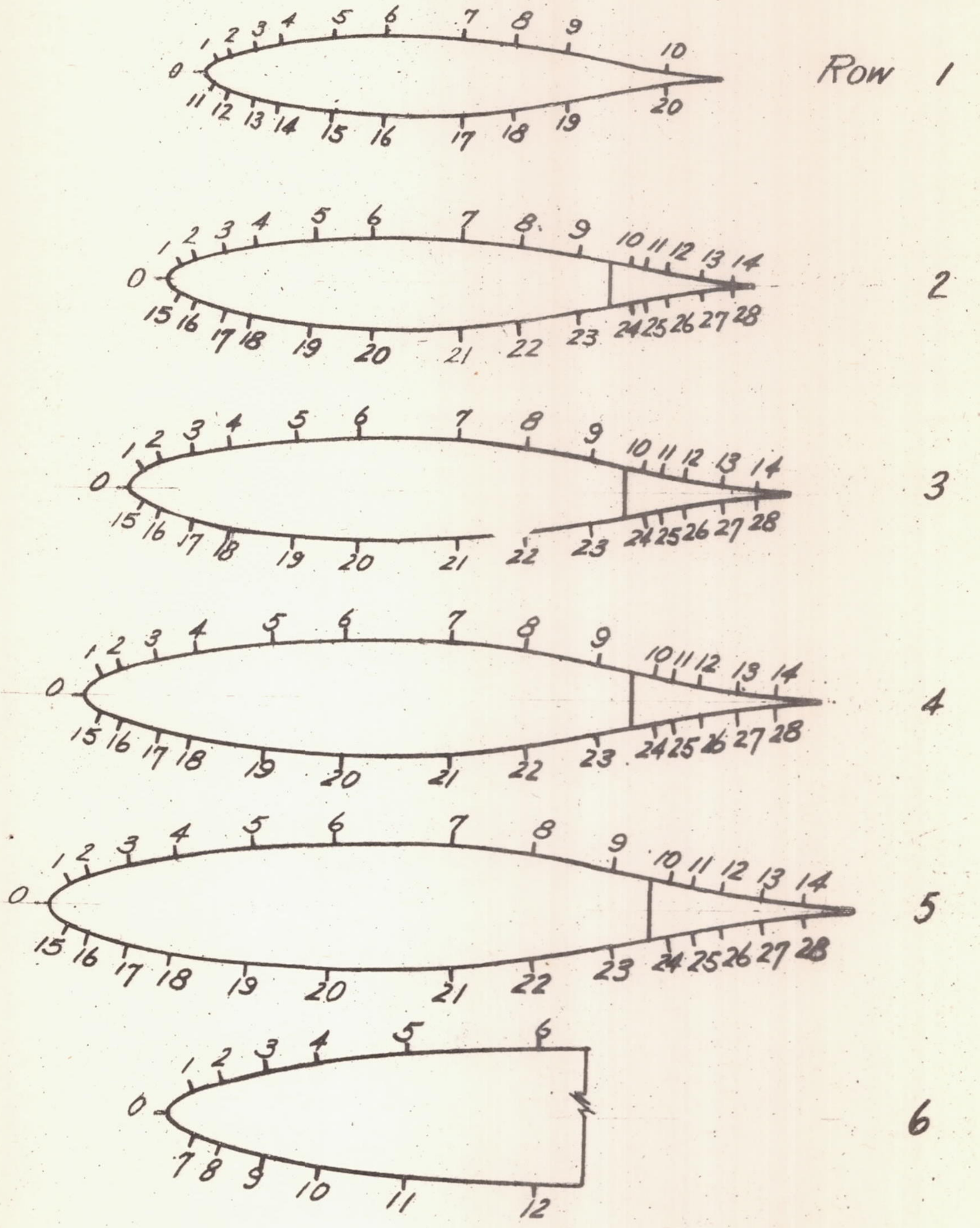

Figure 4.-Identification of elevator orifices

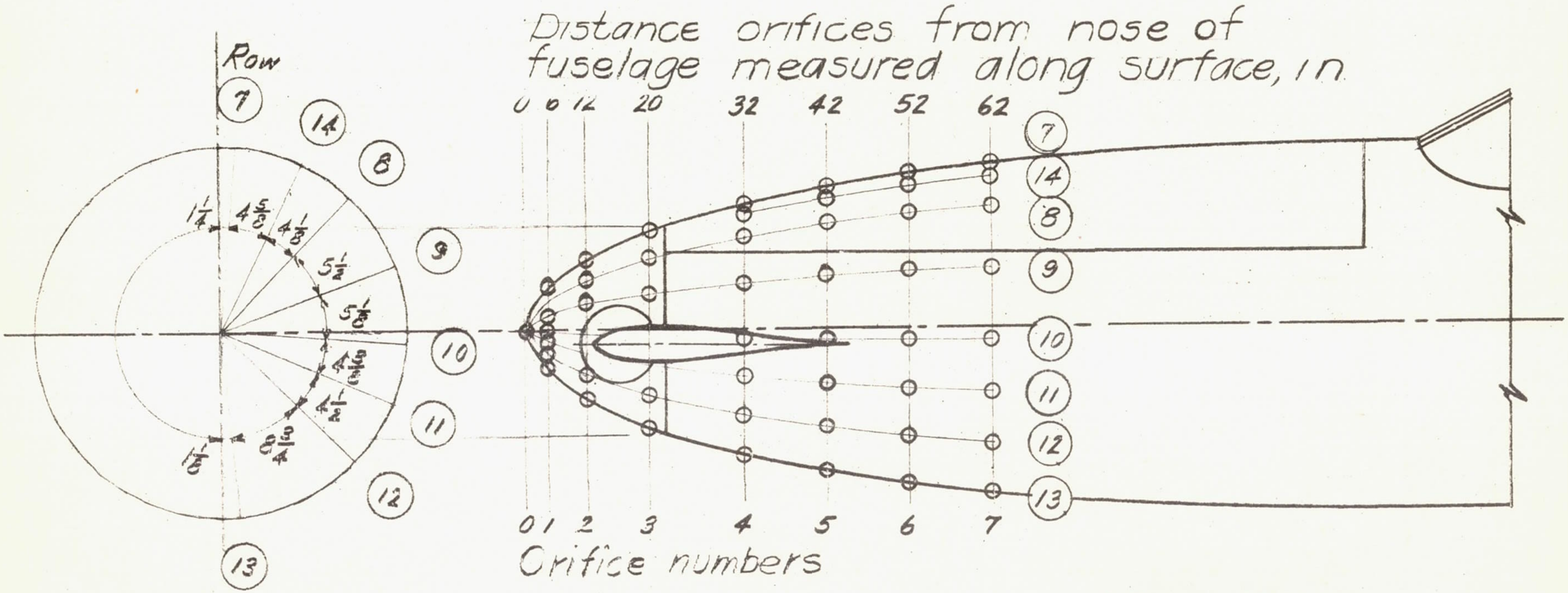

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Figure 5.- Identification and location of fuselage orifices

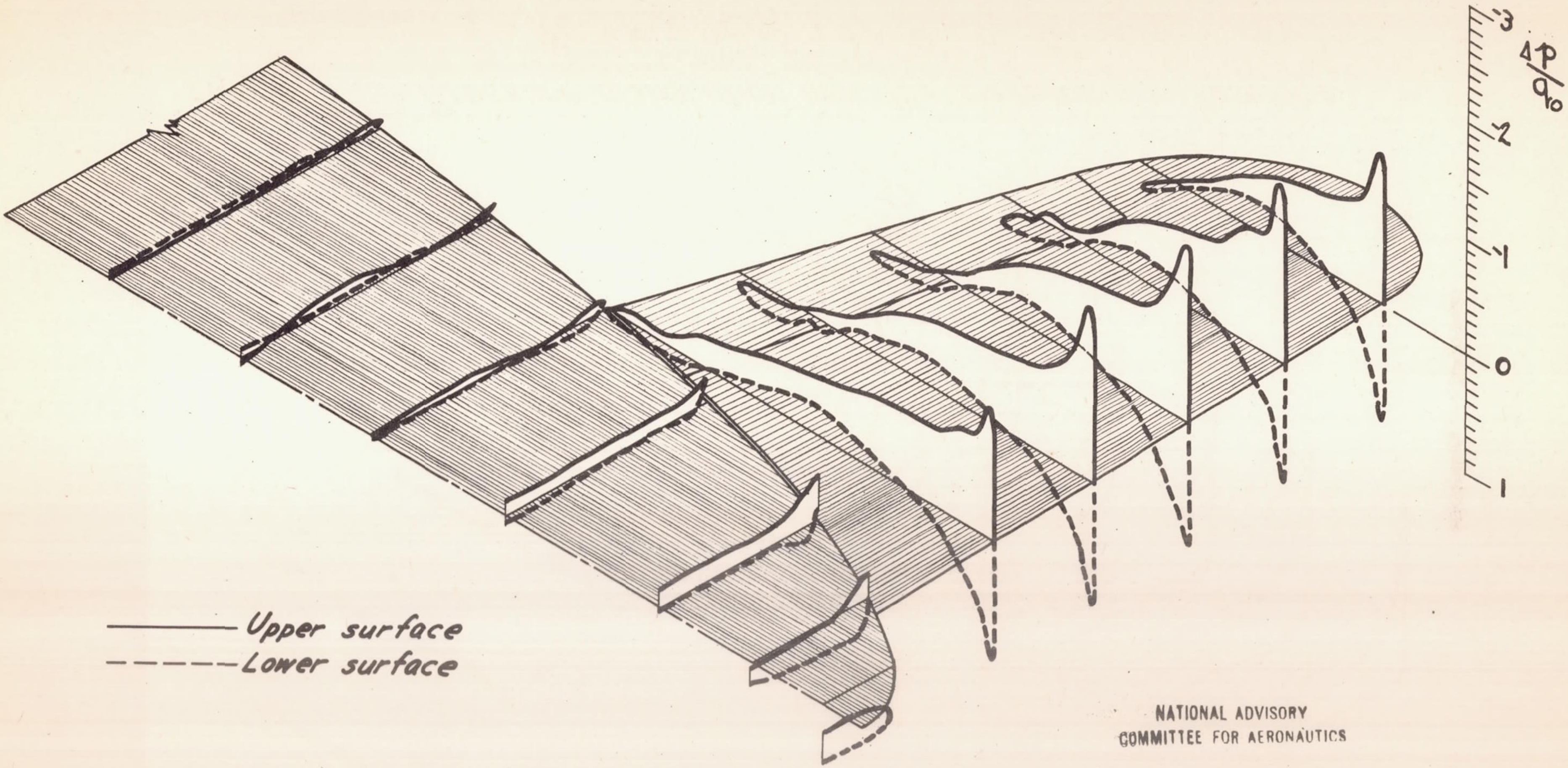

Figure 6.- Pressure distribution over the elevator and fuselage
α_f, 0.9°; δ_e, 10°; δ_T, 0°; δ_f, 0°.

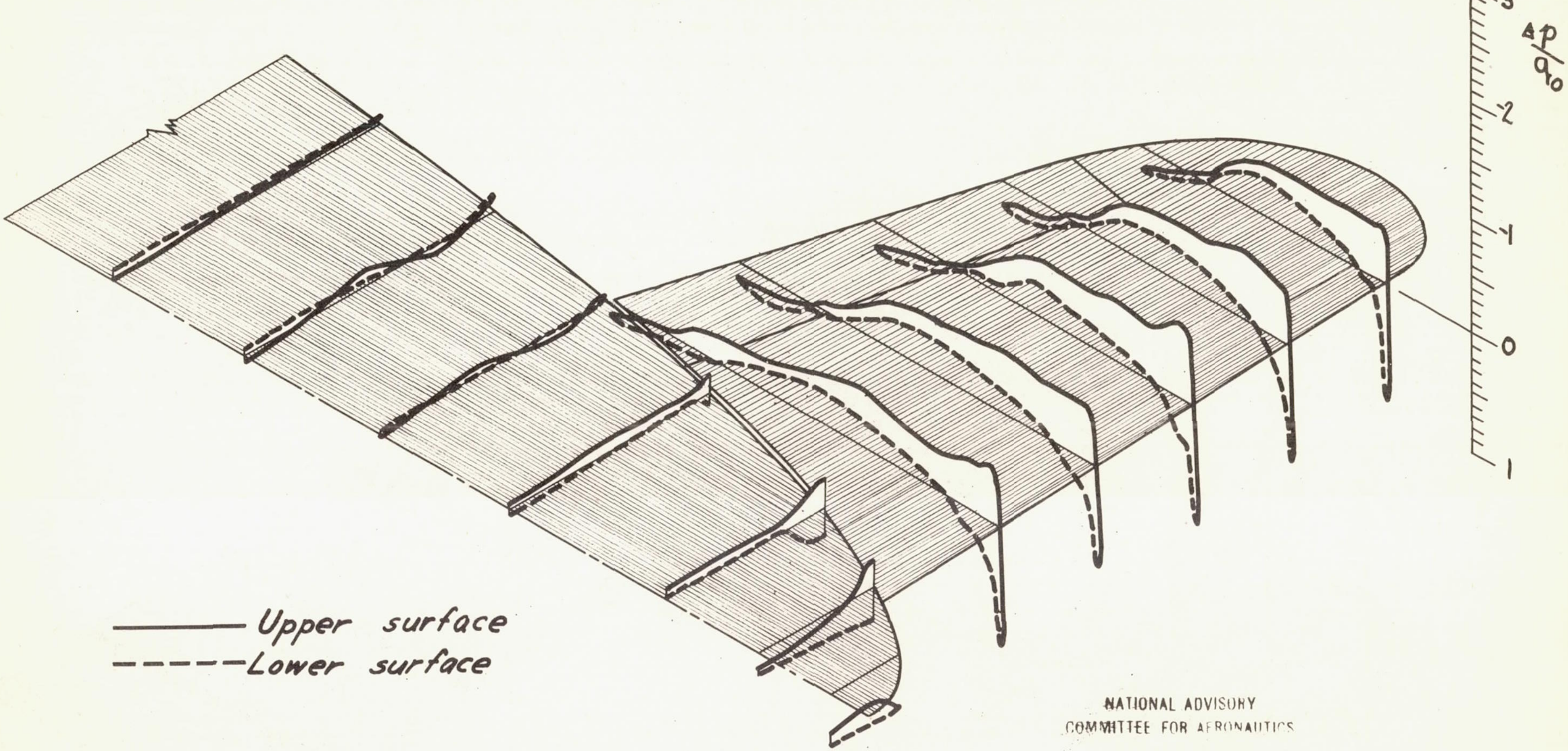

Figure 7 .- Pressure distribution over the elevator and fuselage
α_t, 0.0°; δ_e, 5°; δ_T, 0°; δ_f, 0°.

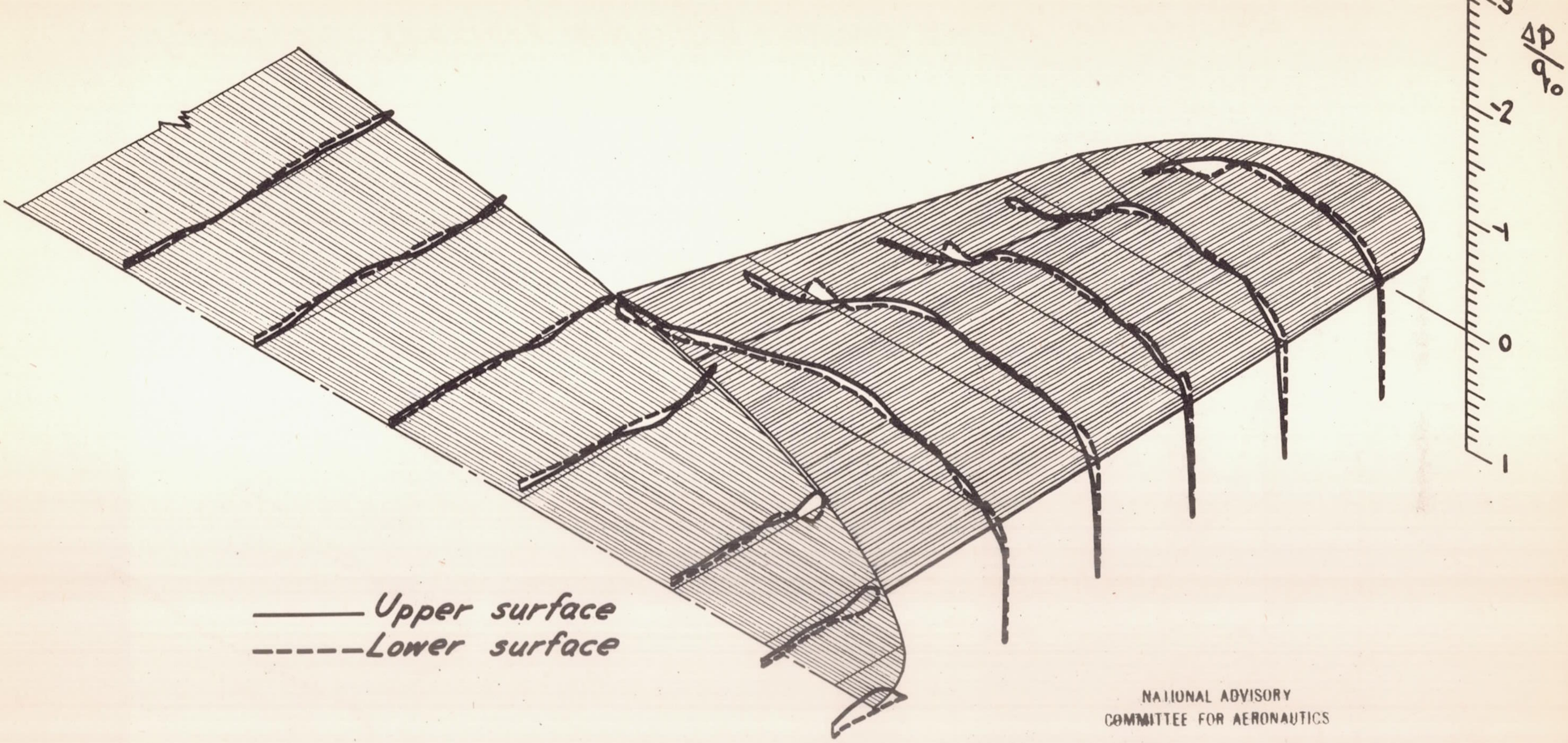

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Figure 8.- Pressure distribution over the elevator and fuselage α_r, 0.9°; δ_e, 0°; δ_r, 0°; δ_f, 0°.

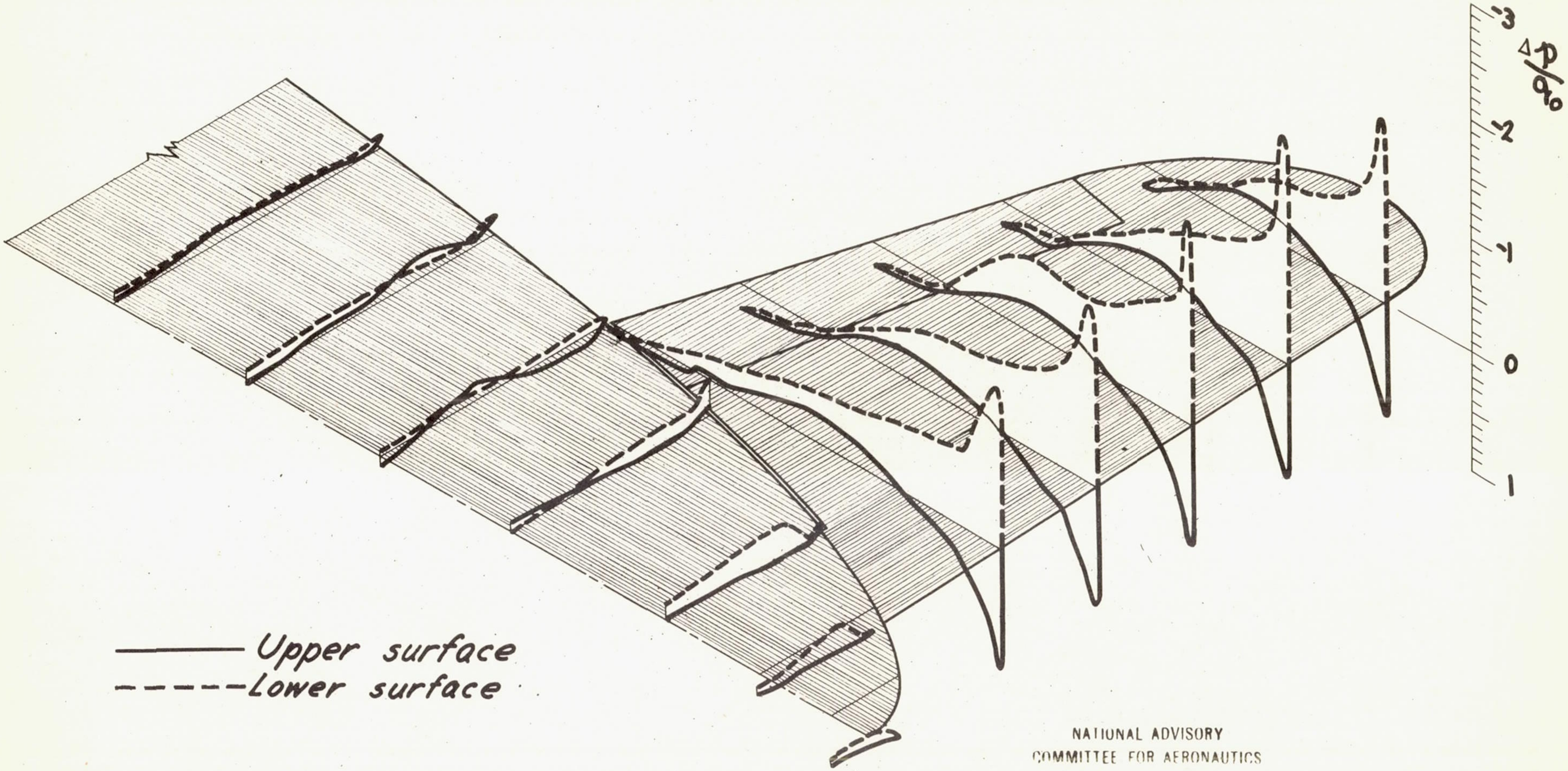

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Figure 9. — Pressure distribution over the elevator and fuselage
α_F, 0.9°; δ_e, -10°; δ_T, 0°; δ_f, 0°.

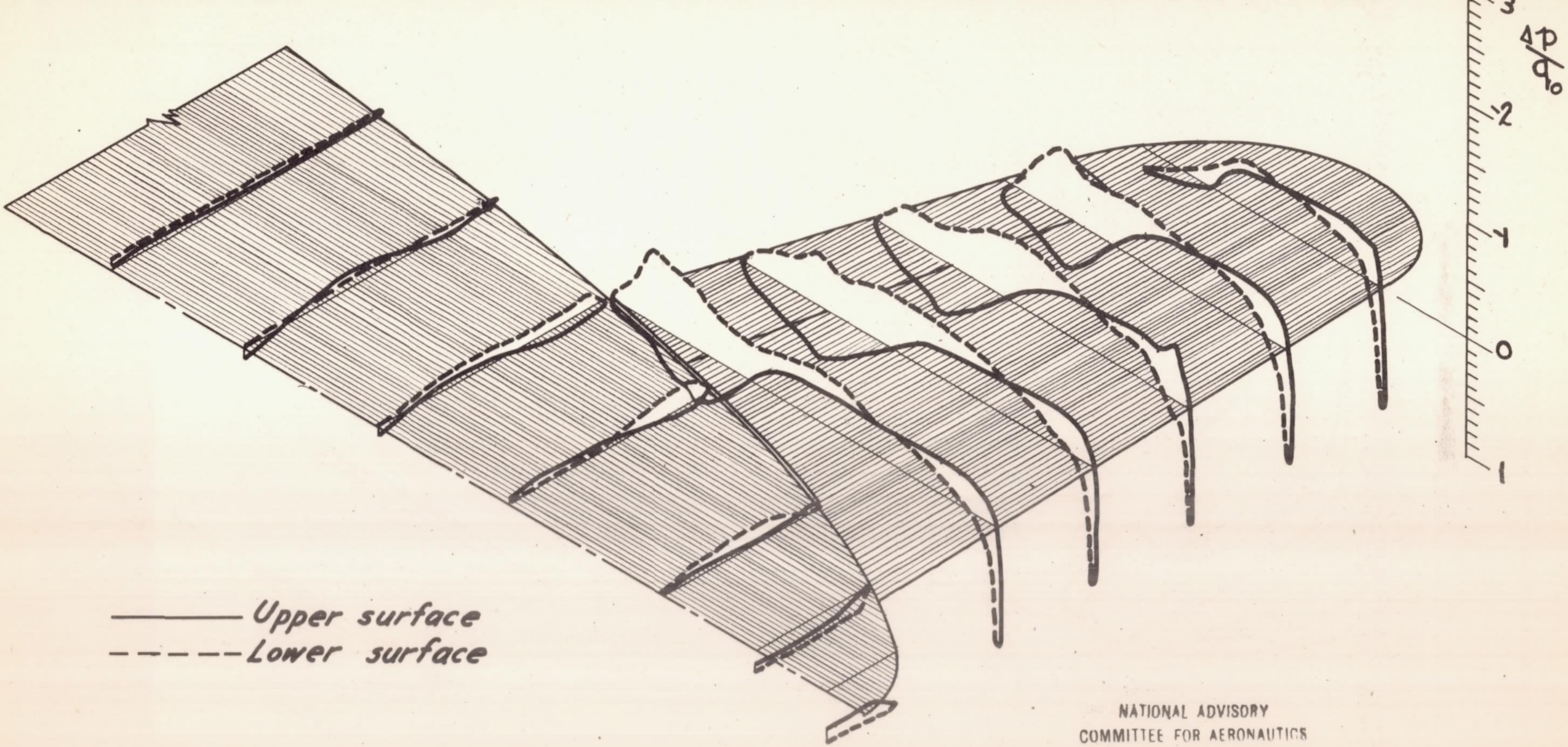

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Figure 10.- Pressure distribution over the elevator and fuselage
α_F, -0.9°; δ_e, 5°; δ_T, -20°; δ_f, 0°.

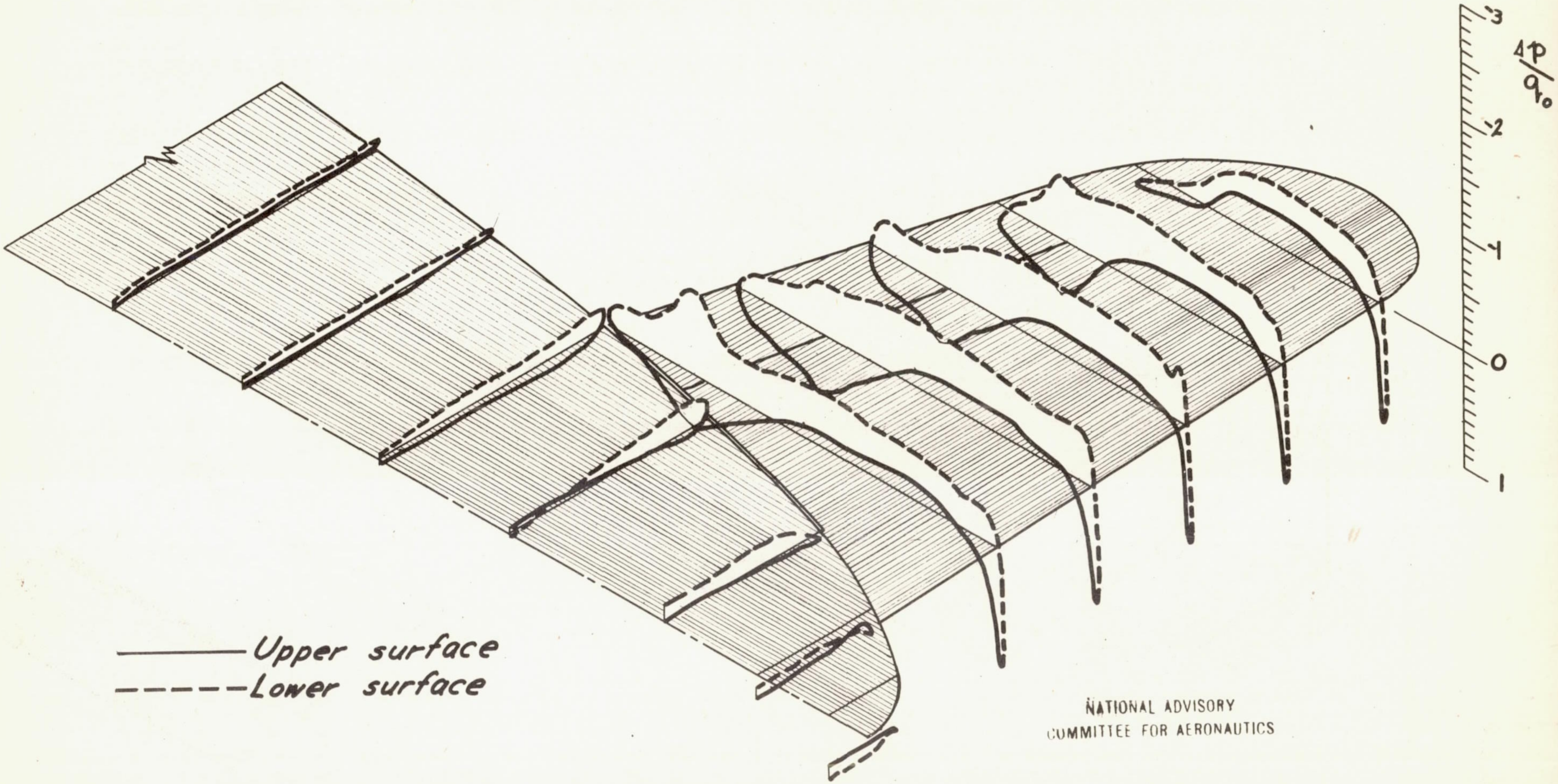

Figure 11.- Pressure distribution over the elevator and fuselage
α_r, 0.9°; δ_e, 0°; δ_T, -20°; δ_f, 0°.

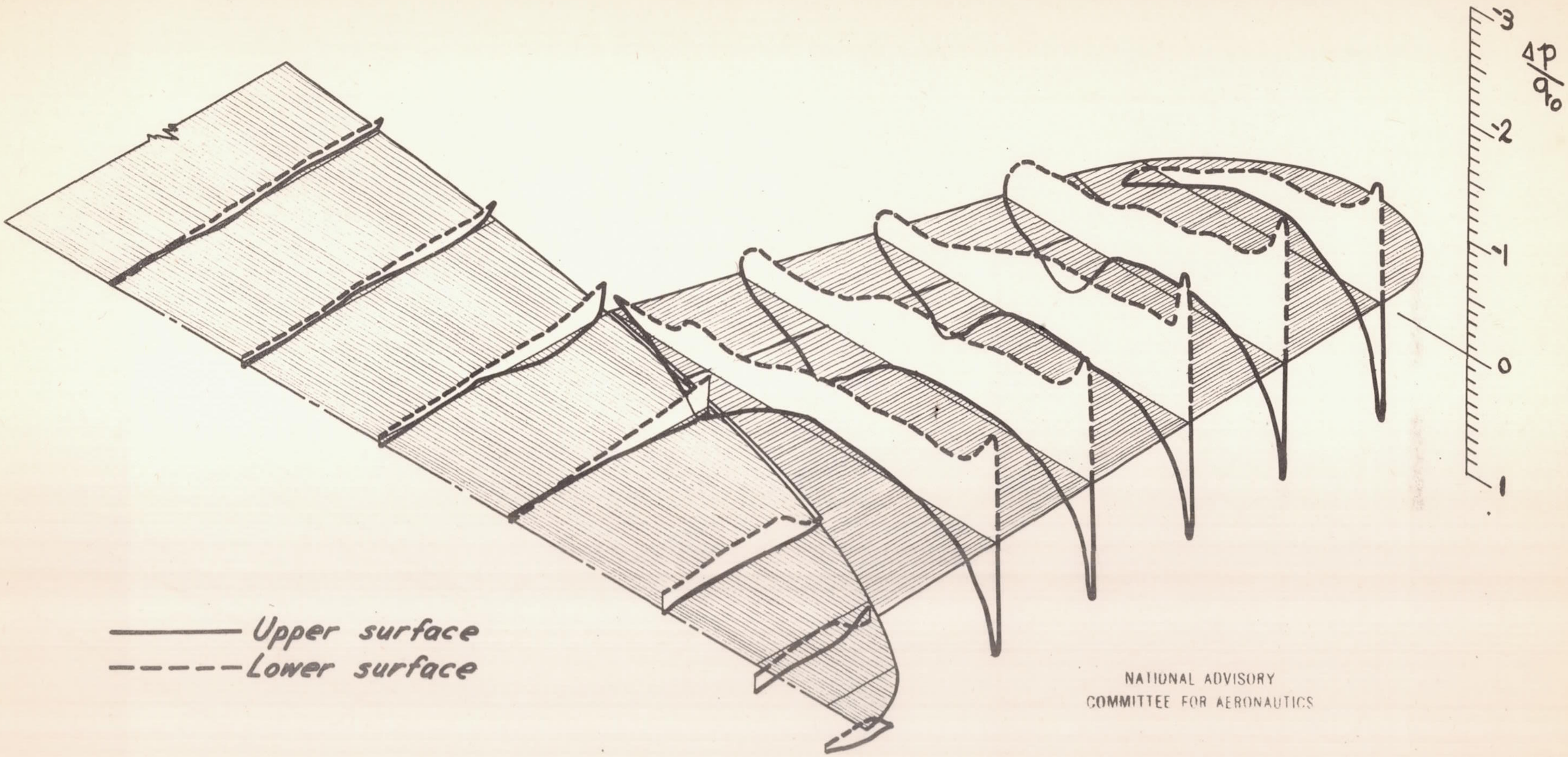

Figure 12.- Pressure distribution over the elevator and fuselage α_F, 0.9°; δ_e, -5°; δ_T, -20°; δ_f, 0°.

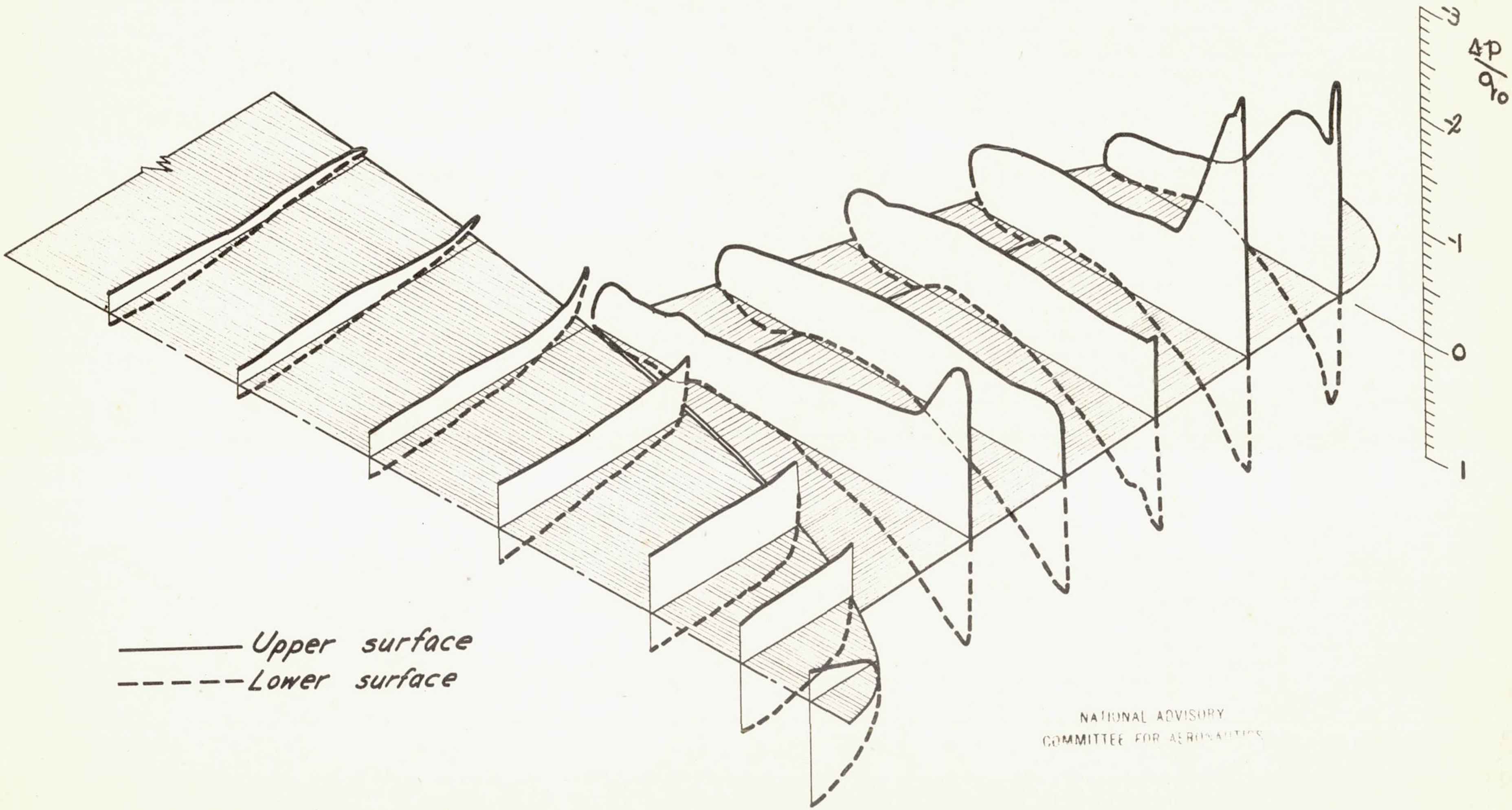

Figure 13. – Pressure distribution over the elevator and fuselage α_F, 12.0°; δ_e, 10°; δ_T, 0°; δ_f, 0°.

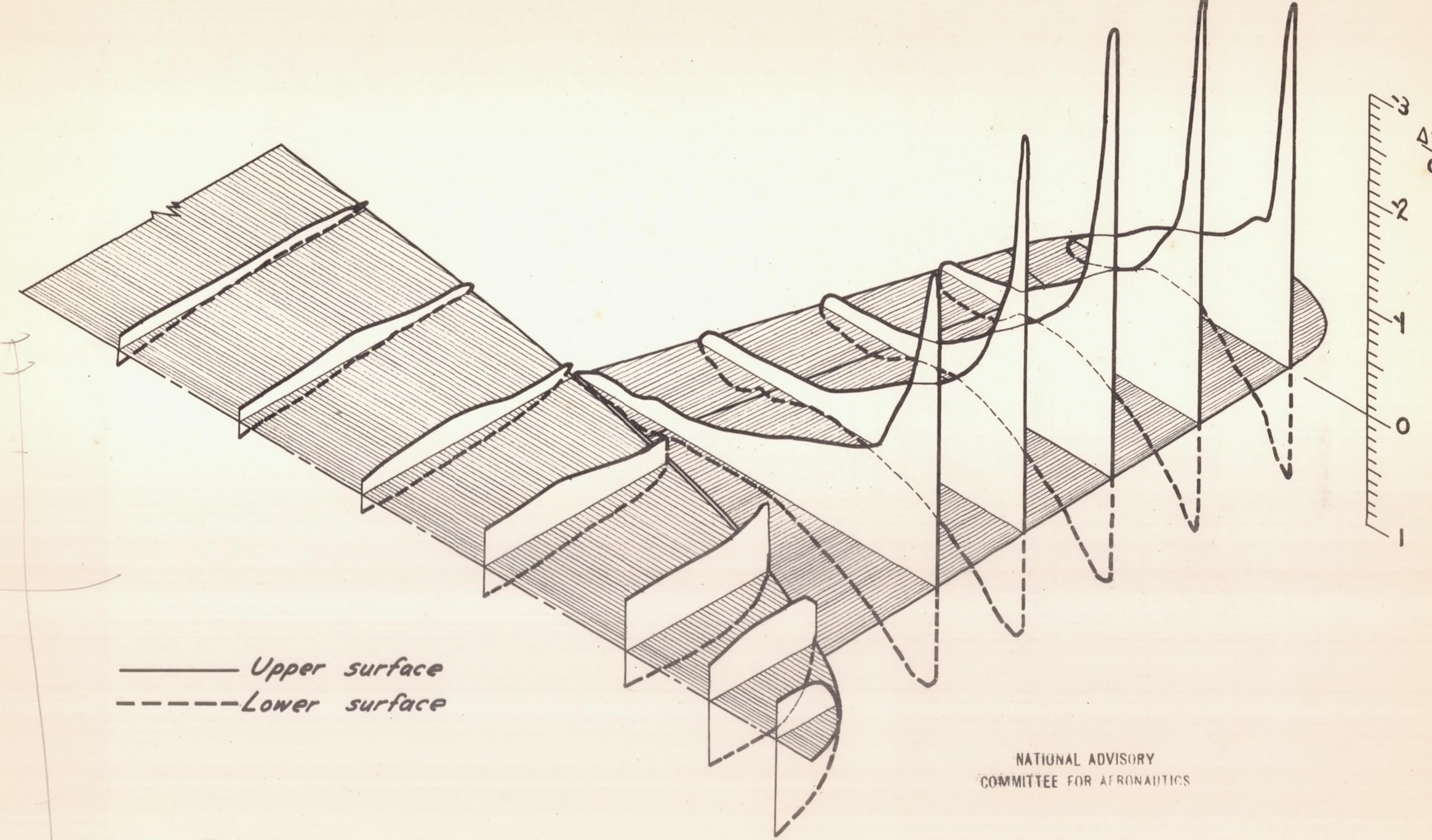

Figure 14.– Pressure distribution over the elevator and fuselage α_f, 12.0°; δ_e, 5°; δ_T, 0°; δ_f, 0°.

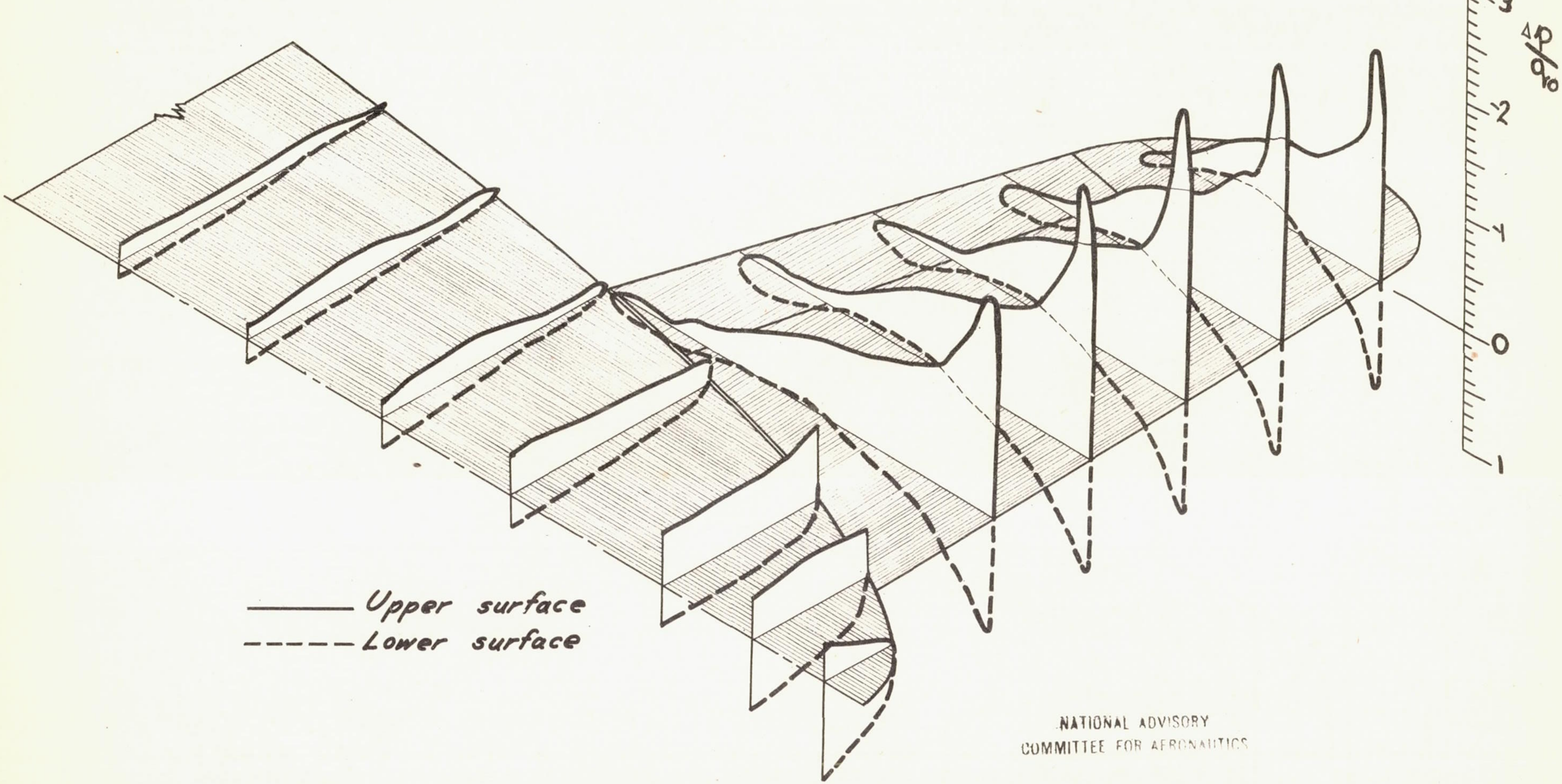

Figure 15.- Pressure distribution over the elevator and fuselage
α_F, 12.0°; δ_e, 0°; δ_T, 0°; δ_f, 0°.

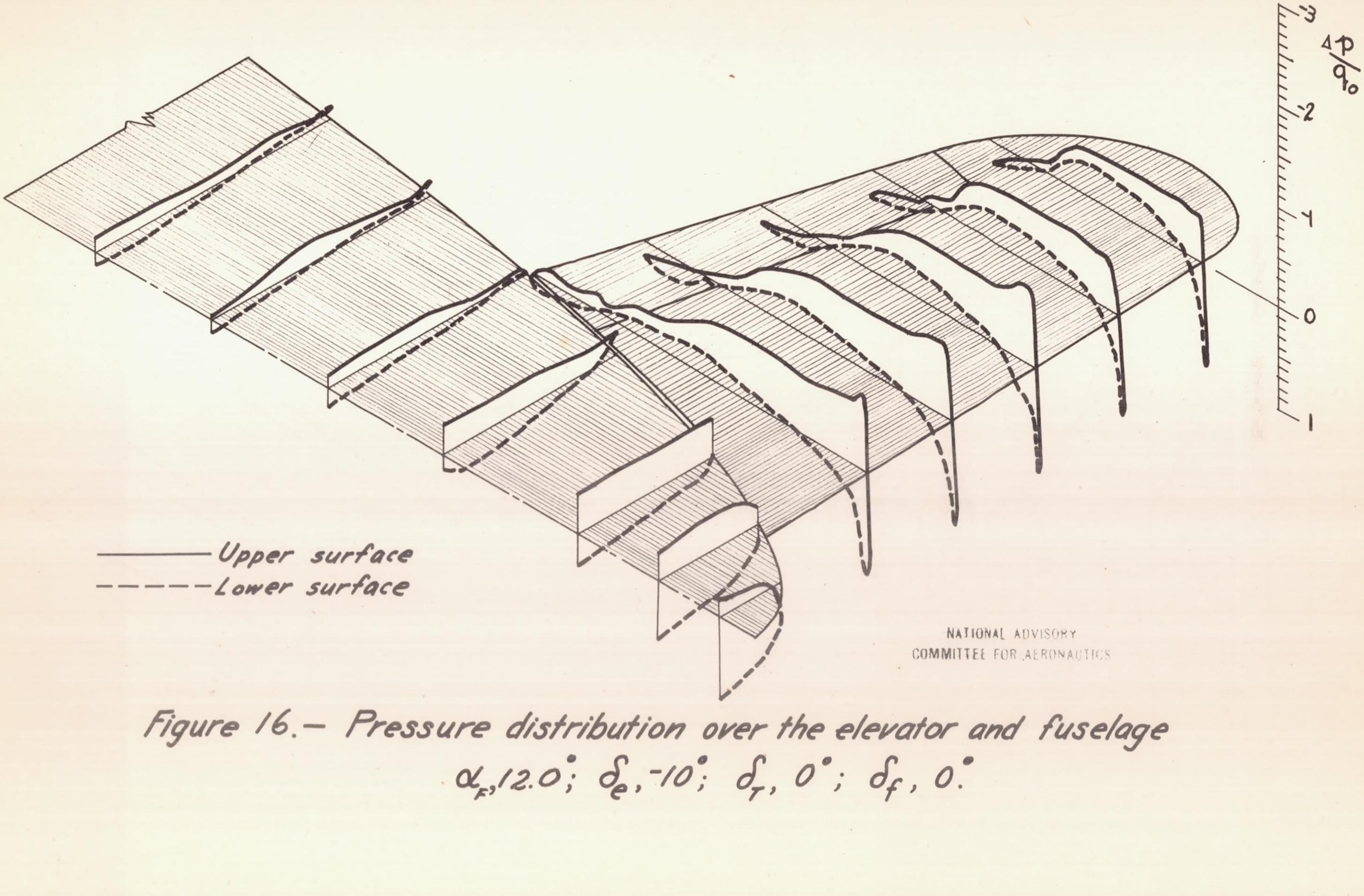

Figure 16.– Pressure distribution over the elevator and fuselage
α_F, 12.0°; δ_e, -10°; δ_T, 0°; δ_f, 0°.

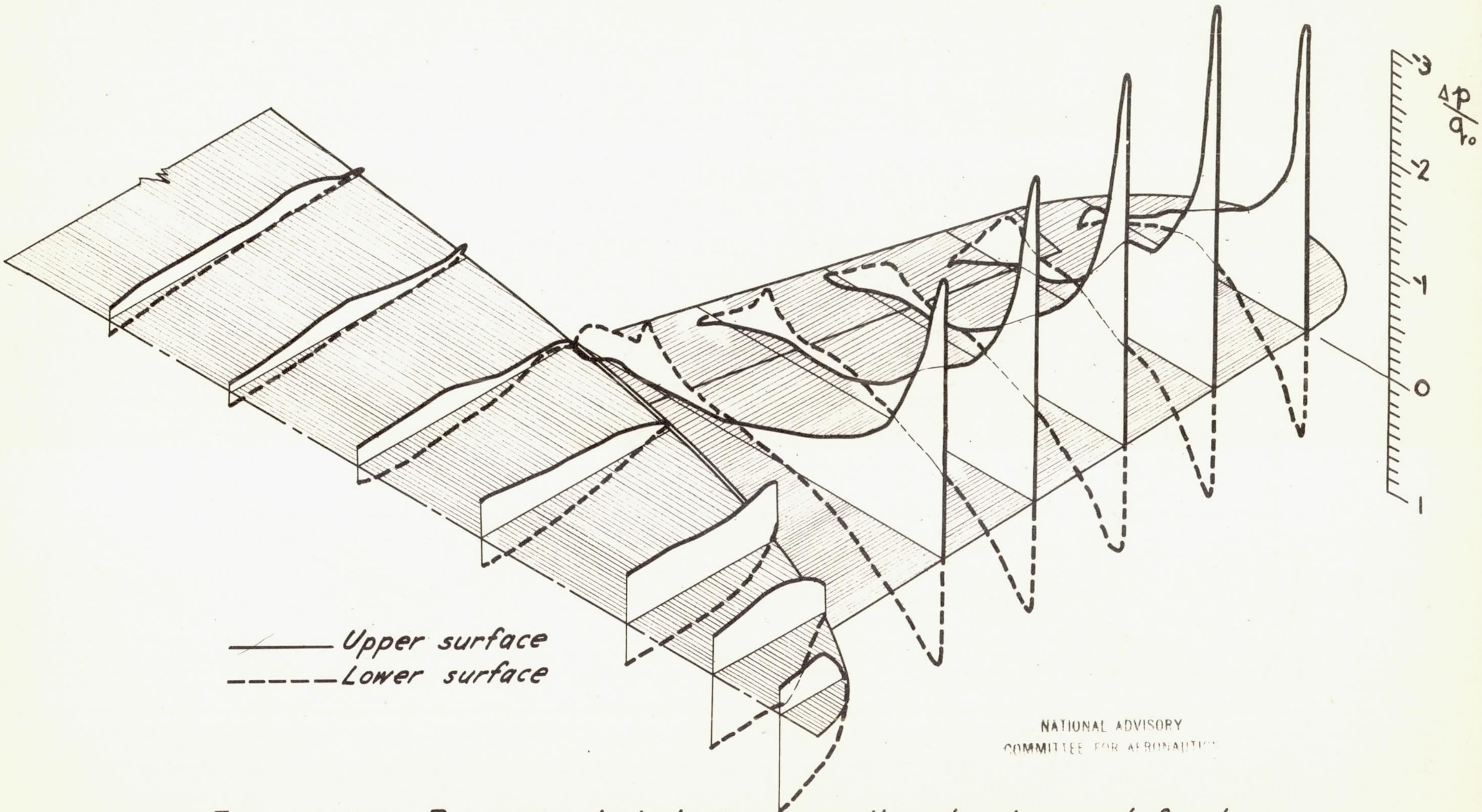

Figure 17.– Pressure distribution over the elevator and fuselage
α_f, 12.0°; δ_e, 5°; δ_T, -20°; δ_f, 0°.

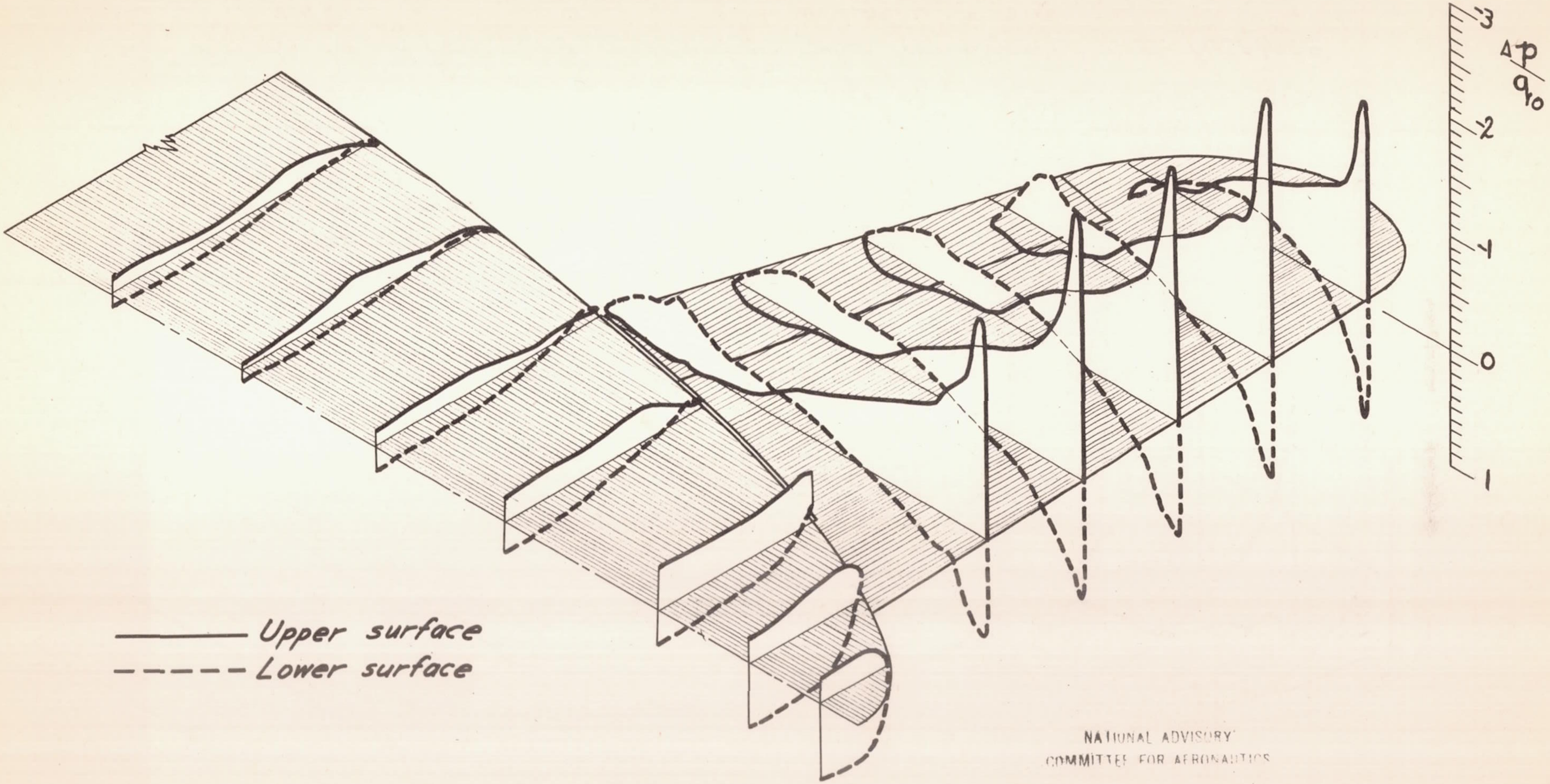

Figure 18.- Pressure distribution over the elevator and fuselage
α_F, 12.0°; δ_e, 0°; δ_T, -20°; δ_f, 0°.

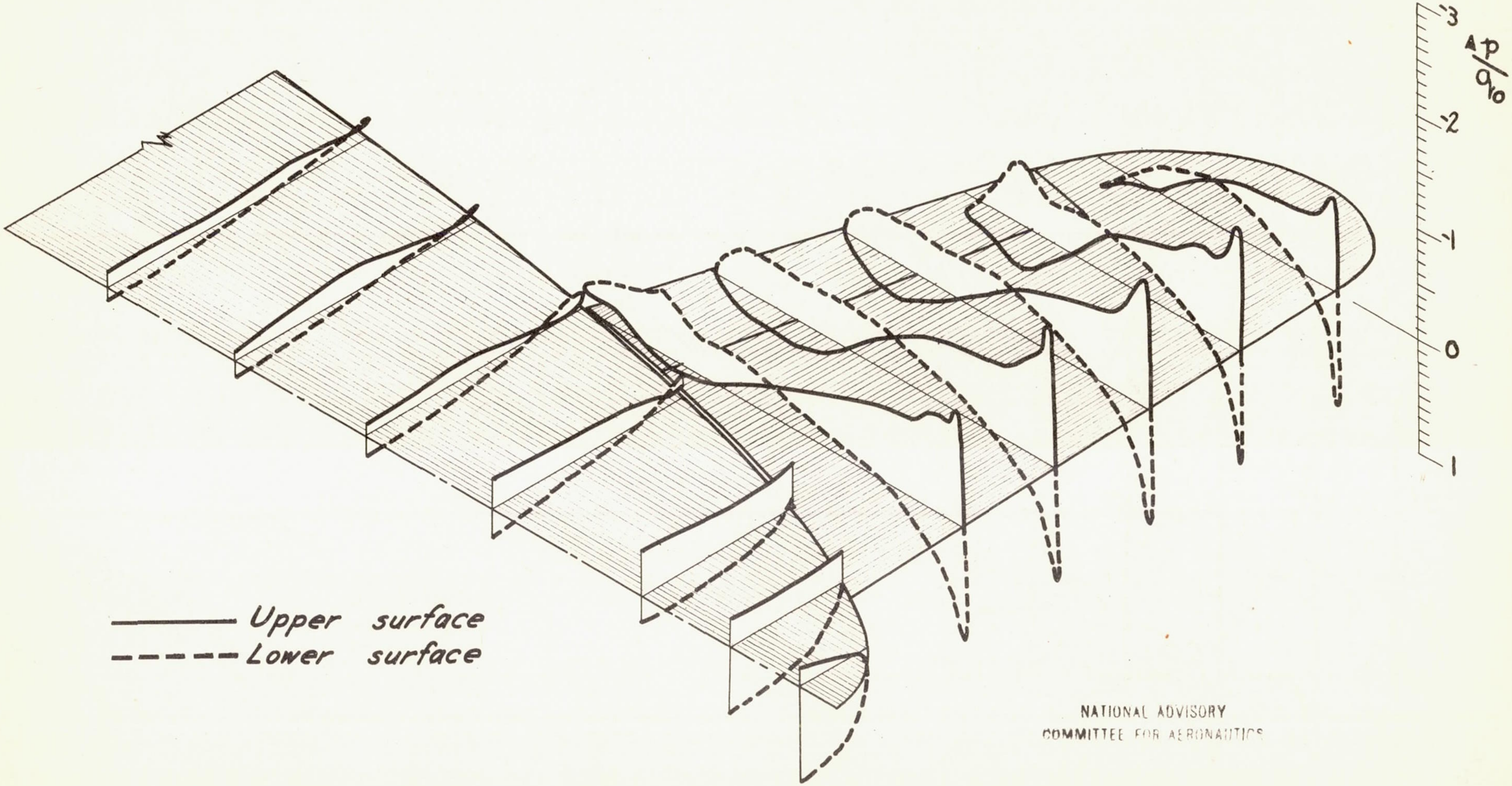

Figure 19.– Pressure distribution over the elevator and fuselage
α_F 12.0°; δ_e, -5°; δ_T, -20°; δ_f, 0°.

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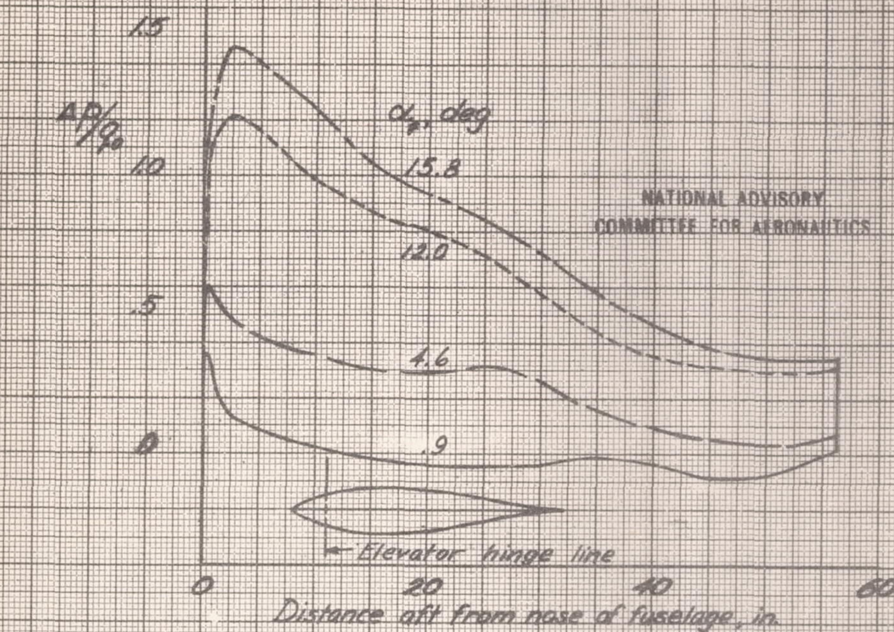

Figure 20. - Pressure difference along fuselage between upper row 7 and lower row 13. δ_e, 0°; δ_r, 0°; δ_f, 0°.

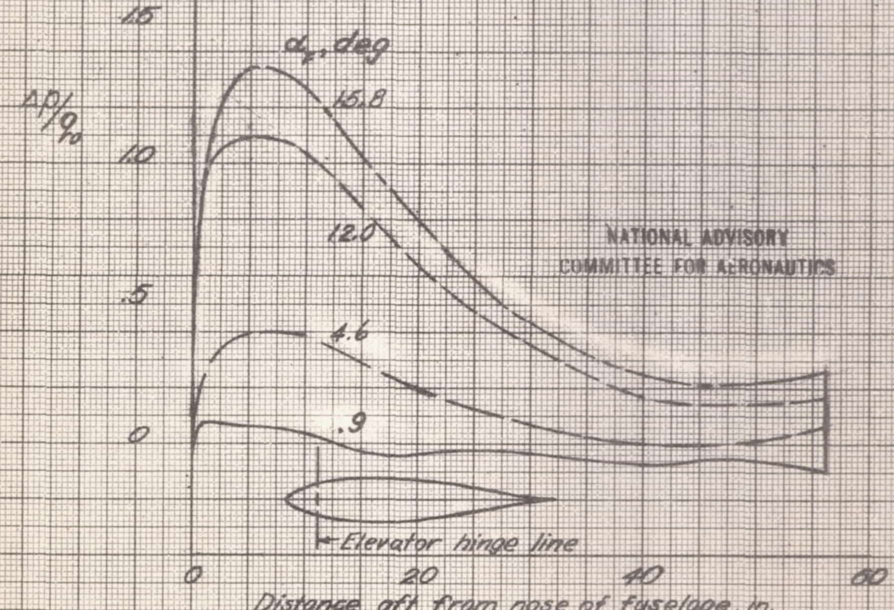

Figure 21. - Pressure difference along fuselage between upper row 8 and lower row 12. δ_e, 0°; δ_r, 0°; δ_f, 0°.

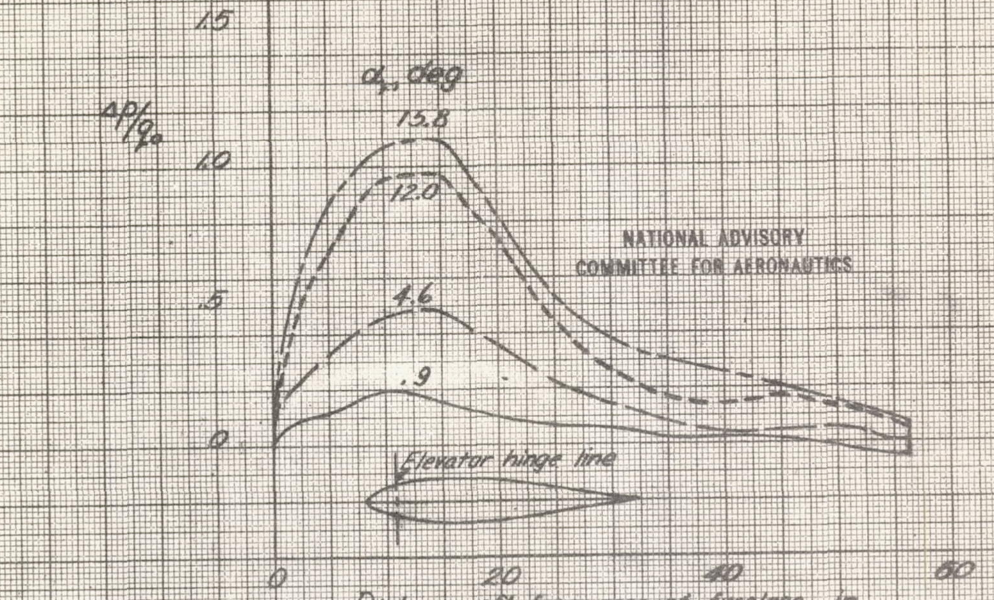

Figure 22.- Pressure difference along fuselage between upper row 9 and lower row 11. δ_e, 0°; δ_r, 0°; δ_f, 0°.

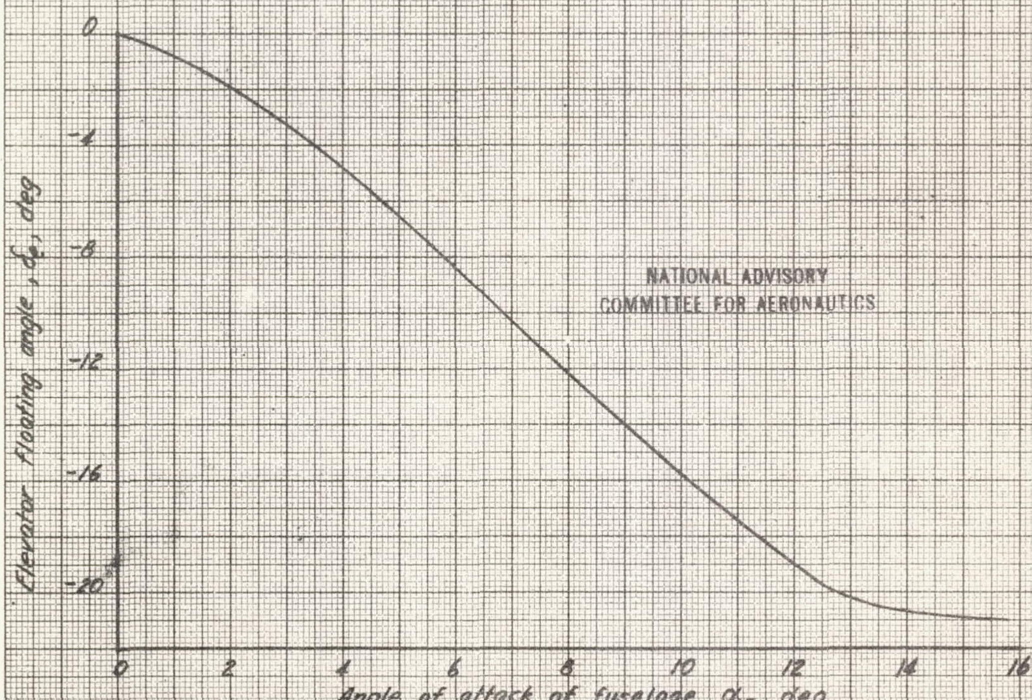

Figure 23.—Variation of elevator floating angle with angle of attack. δ_r, 0°; δ_f, 0°.

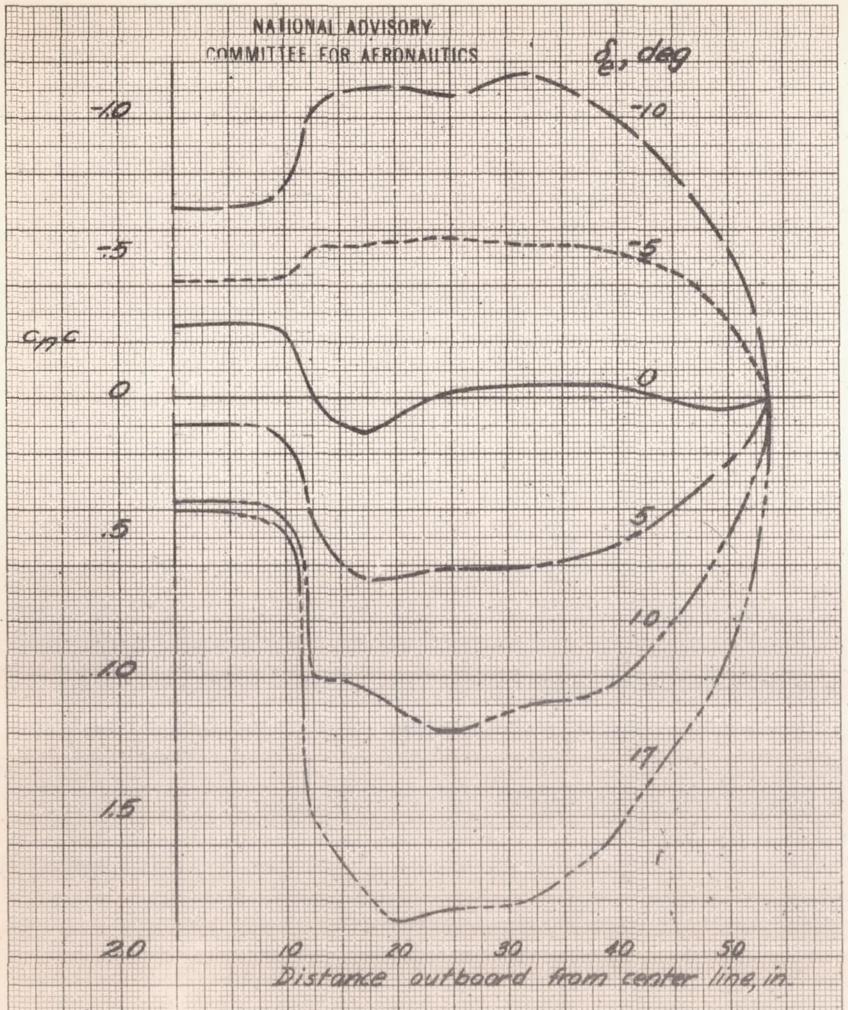

Figure 24.-Elevator span loadings for various elevator deflections. α_r, 0.9°; δ_t, 0°; δ_f, 0°.

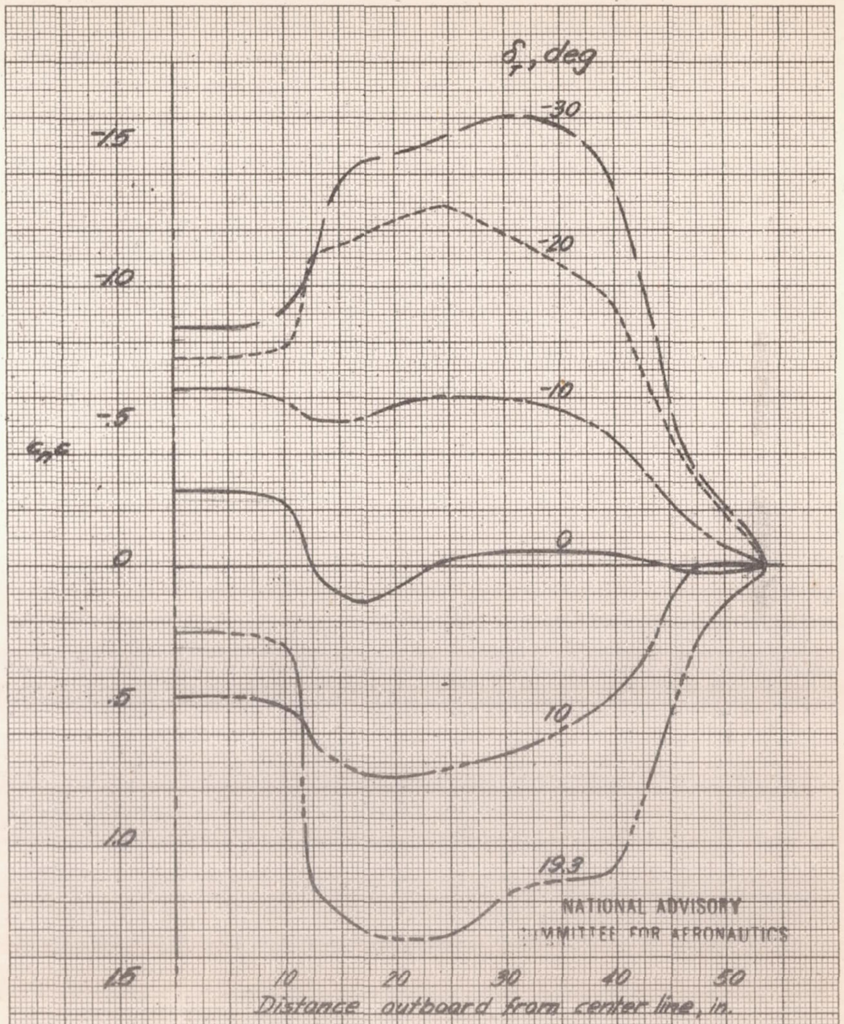

Figure 25.-Elevator span loadings for various tab deflections. α_r, 0.9°; δ_e, 0°; δ_f, 0°.

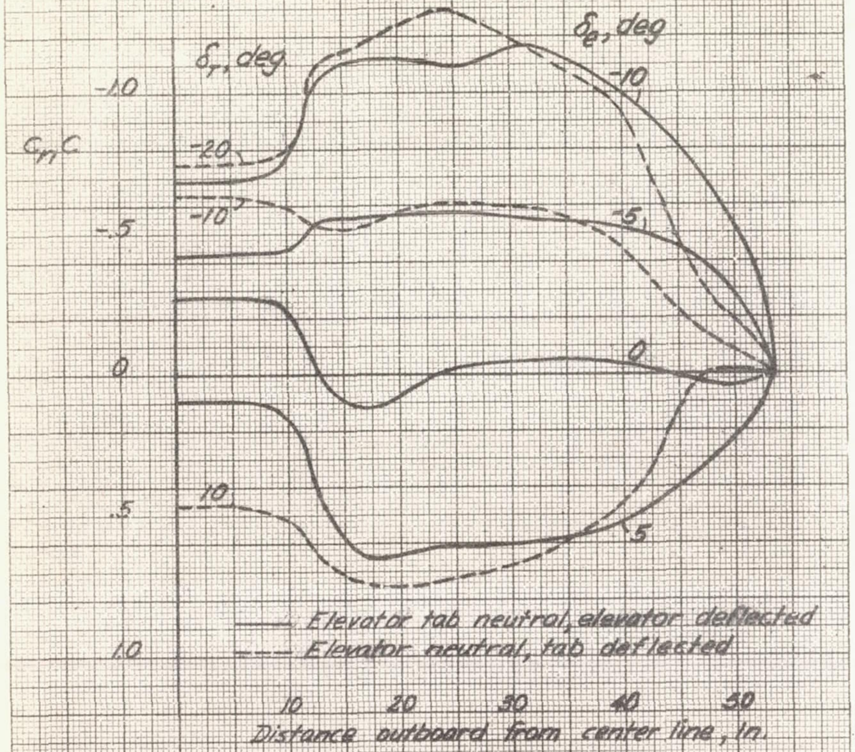

Figure 26.–Comparison of span loadings obtained for various elevator deflections, tab neutral and for various tab deflections, elevator neutral. α_t, 0.9°; δ_f, 0°.

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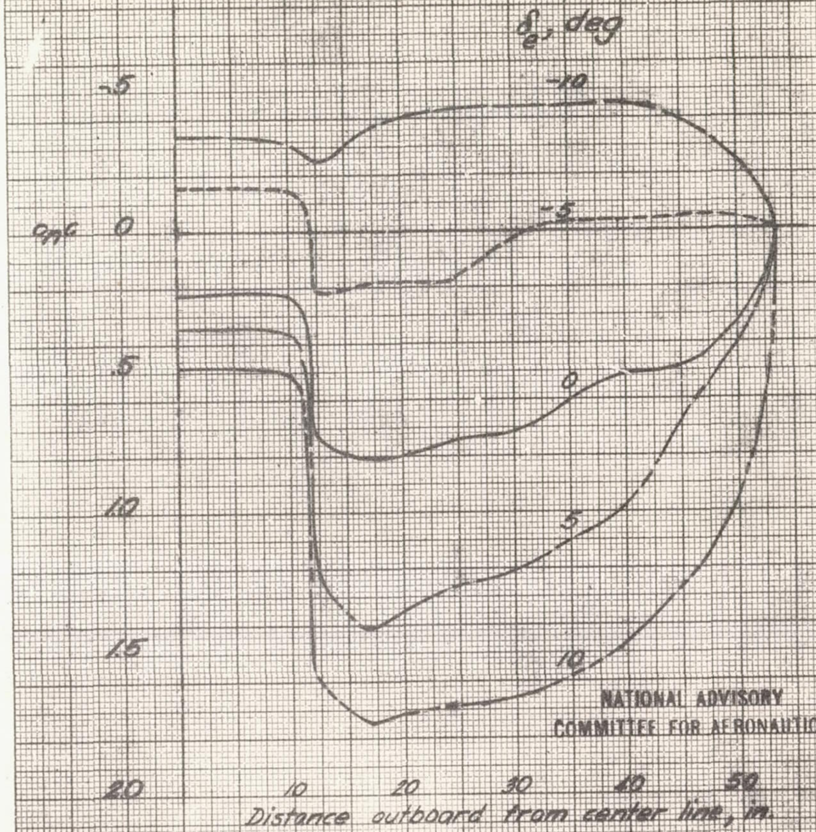

Figure 27.–Elevator span loadings for various elevator deflections. α_t, 4.6°; δ_t, 0°; δ_f, 0°.

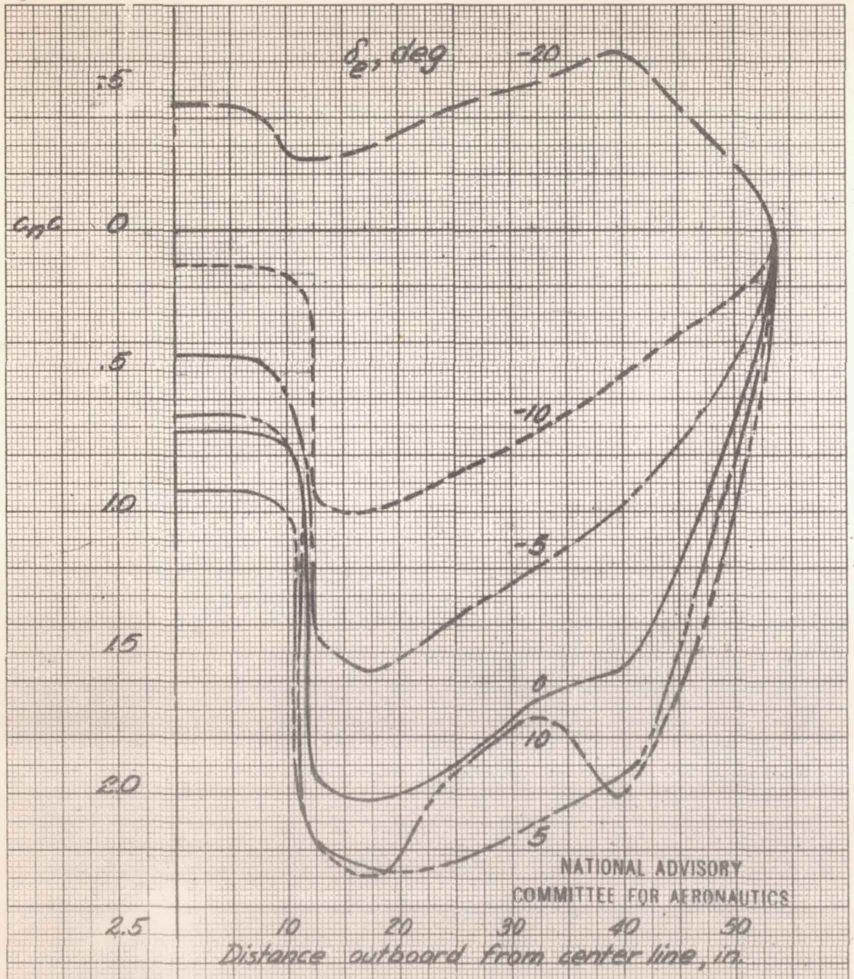

Figure 28.- Elevator span loadings for various elevator deflections. α_r, 12.0°; δ_t, 0°; δ_f, 0°.

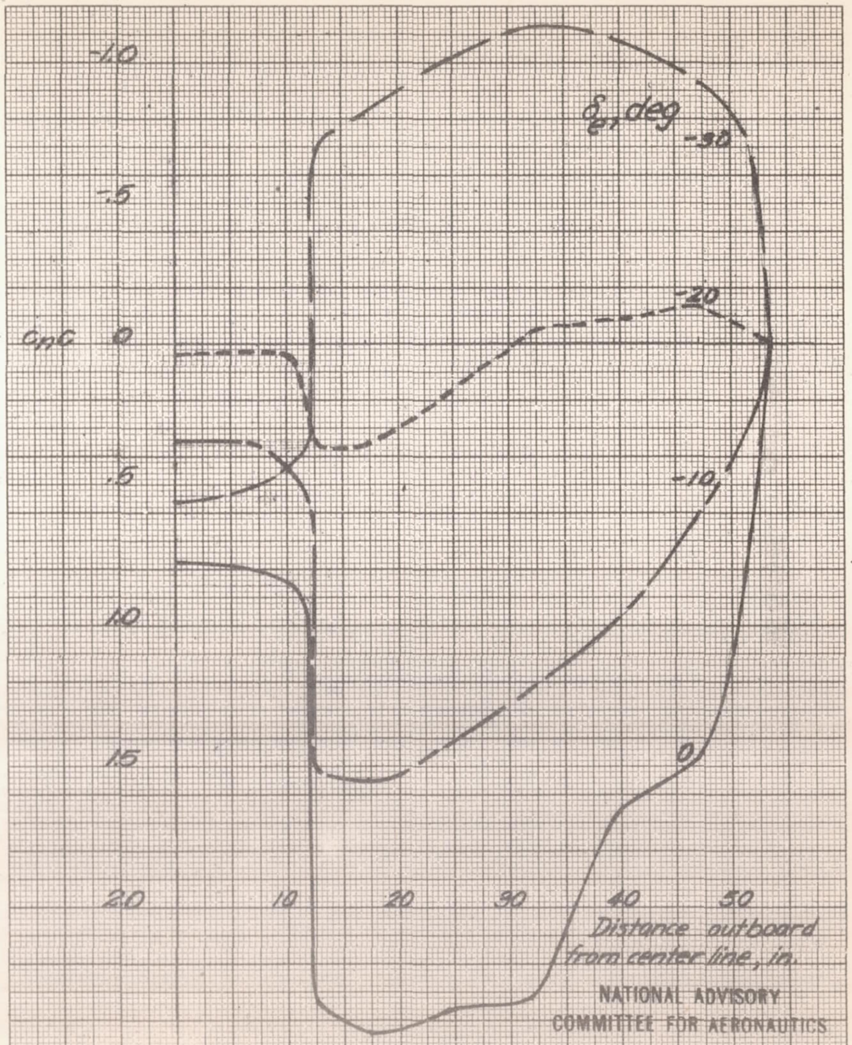

Figure 29.- Elevator span loadings for various elevator deflections. α_r, 15.8°; δ_t, 0°; δ_f, 0°.

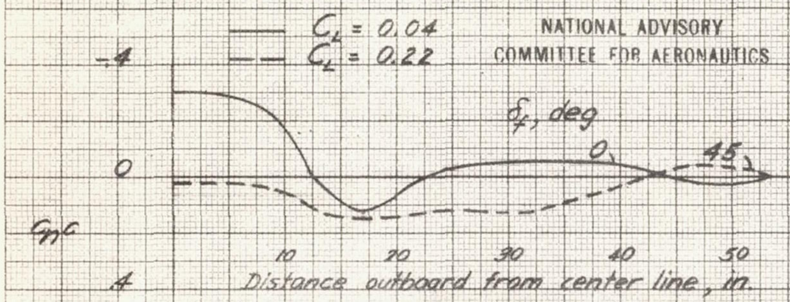

Figure 30.-Effect of flap deflection on the elevator span loading. α_F, 0.9°; δ_e, 0°; δ_T, 0°.

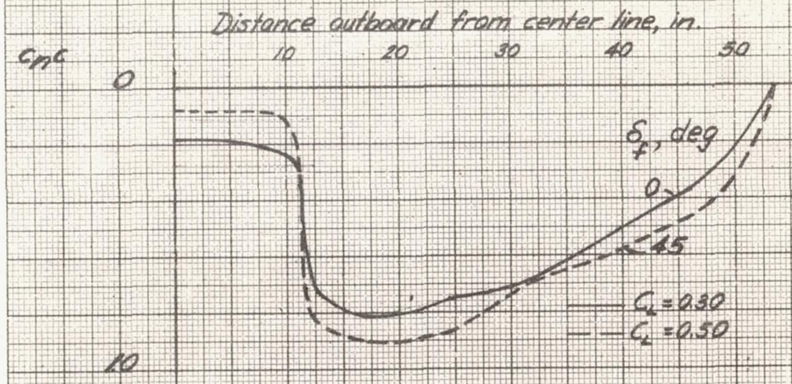

Figure 31.-Effect of flap deflection on the elevator span loading. α_F, 4.6°; δ_e, 0°; δ_T, 0°.

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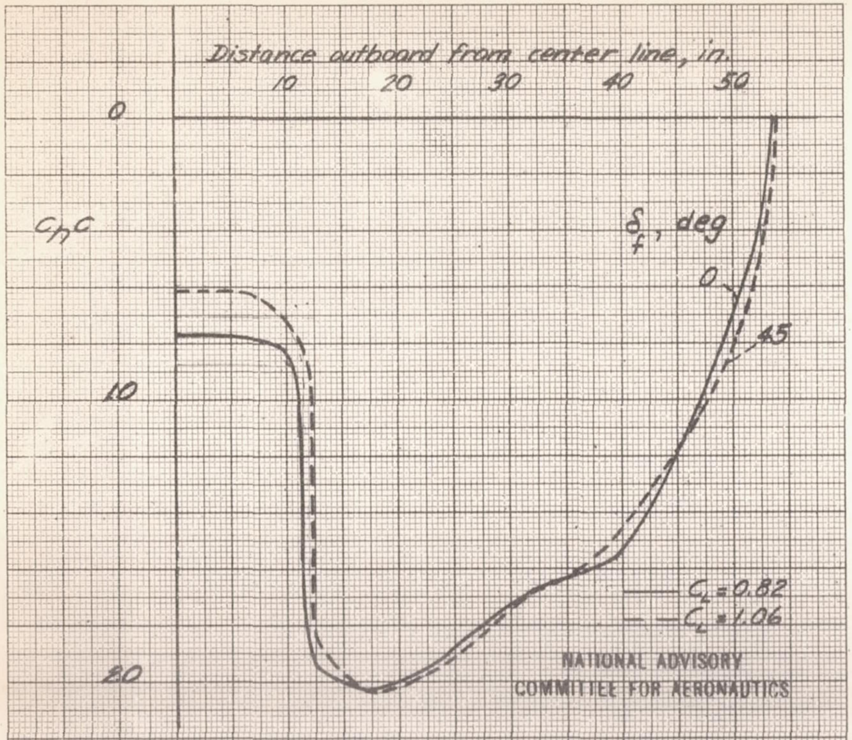

Figure 32.- Effect of flap deflection on the elevator span loading. α_F, 12.0°; δ_e, 0°; δ_T, 0°.

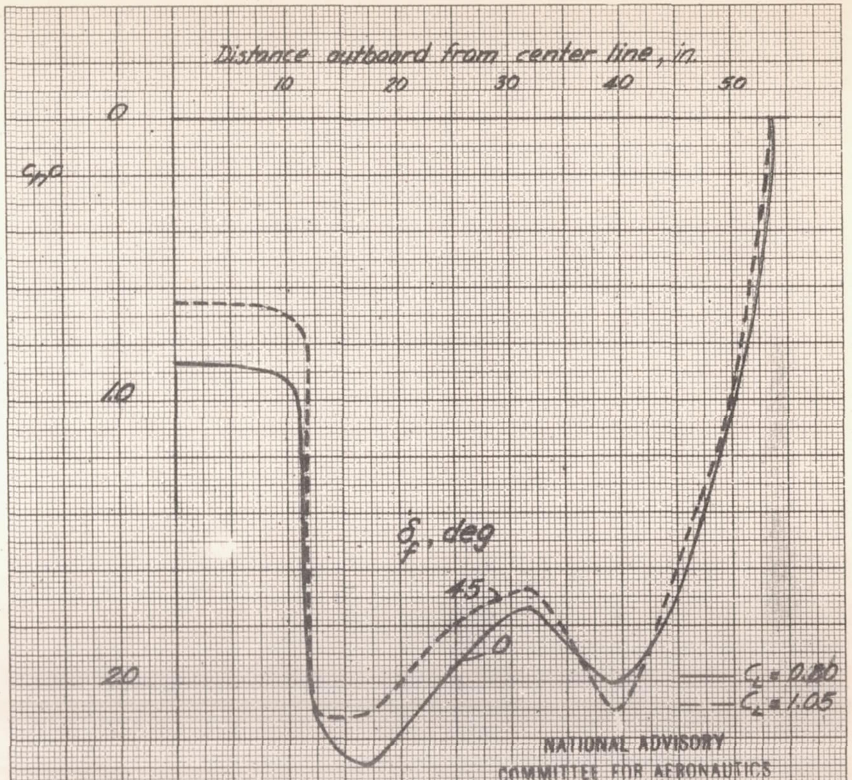

Figure 33.- Effect of flap deflection on the elevator span loading. α_F, 12.0°; δ_e, 10°; δ_T, 0°.

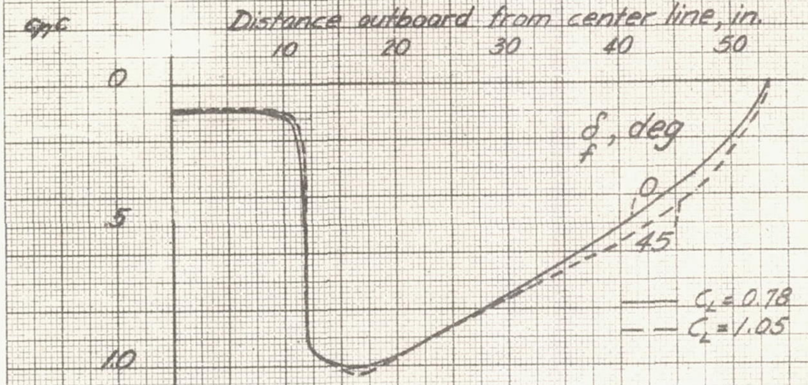

Figure 34.- Effect of flap deflection on the elevator span loading.
α_F, 12.0°; δ_e, -10°; δ_T, 0°

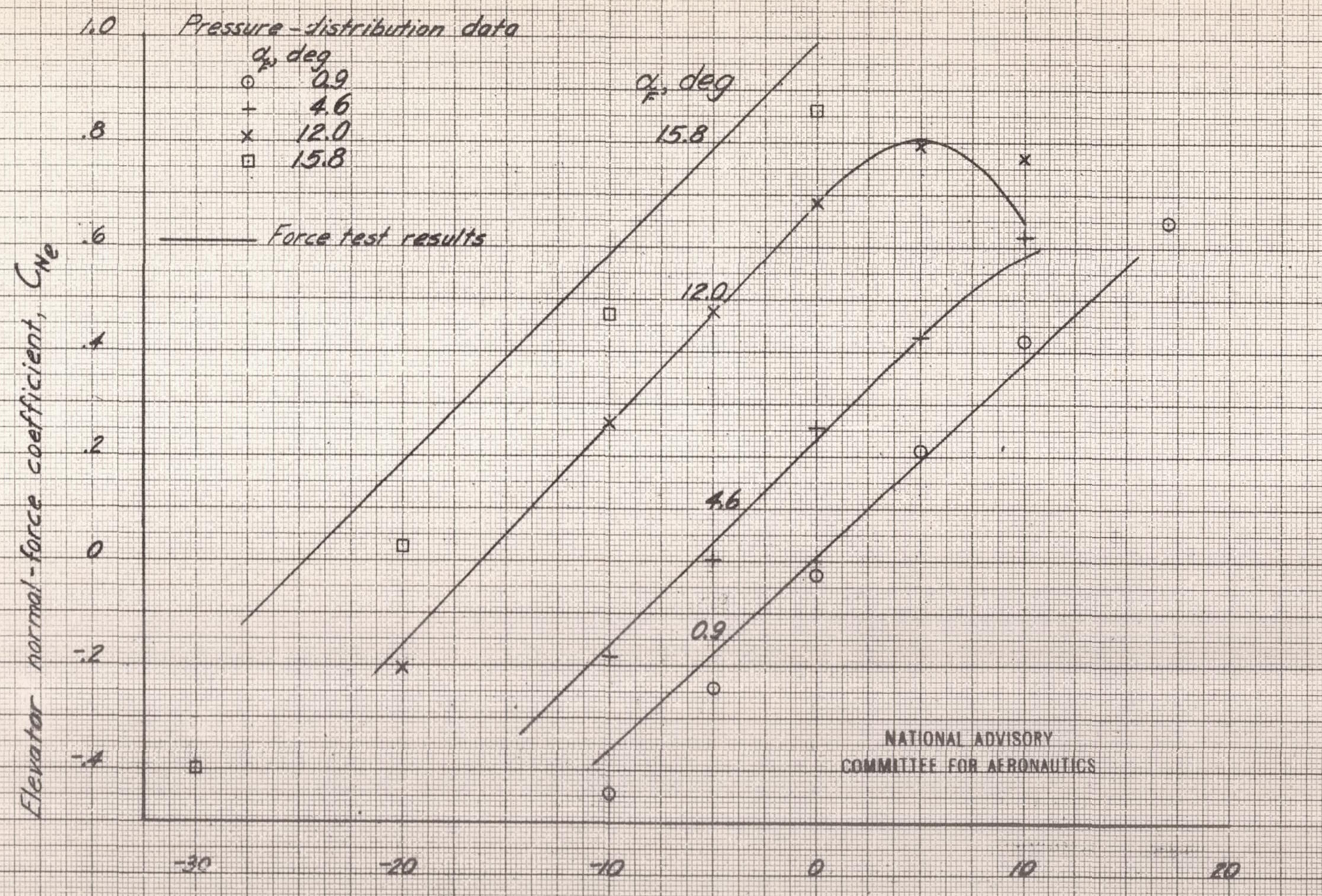

Figure 35.–Variation of normal-force coefficient on the XP-55 elevator with elevator deflection. δ_r, 0°; δ_f, 0°.

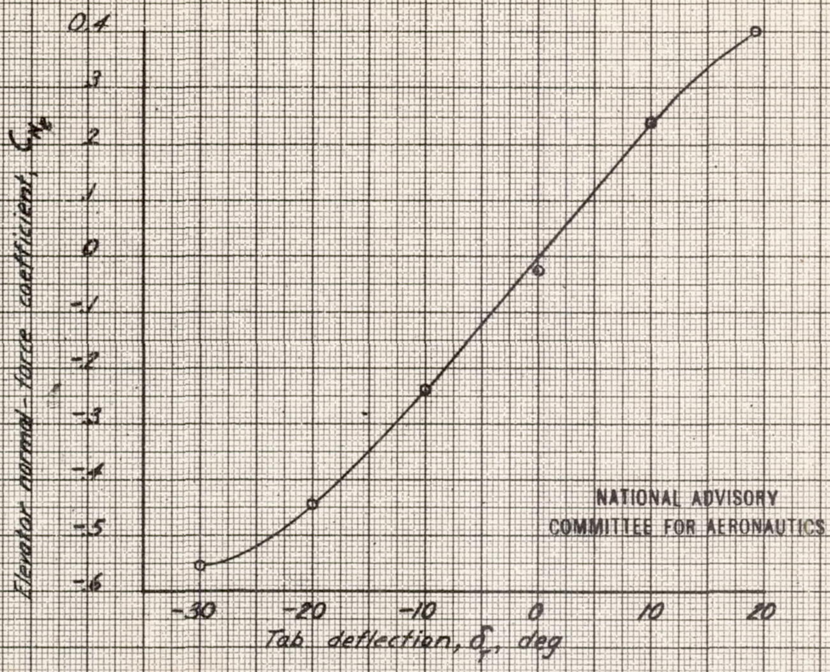

Figure 36.-Variation of normal-force coefficient on the XP-55 horizontal tail surface with elevator tab deflection. α_f, 0.9°; δ_e, 0°; δ_f, 0°.

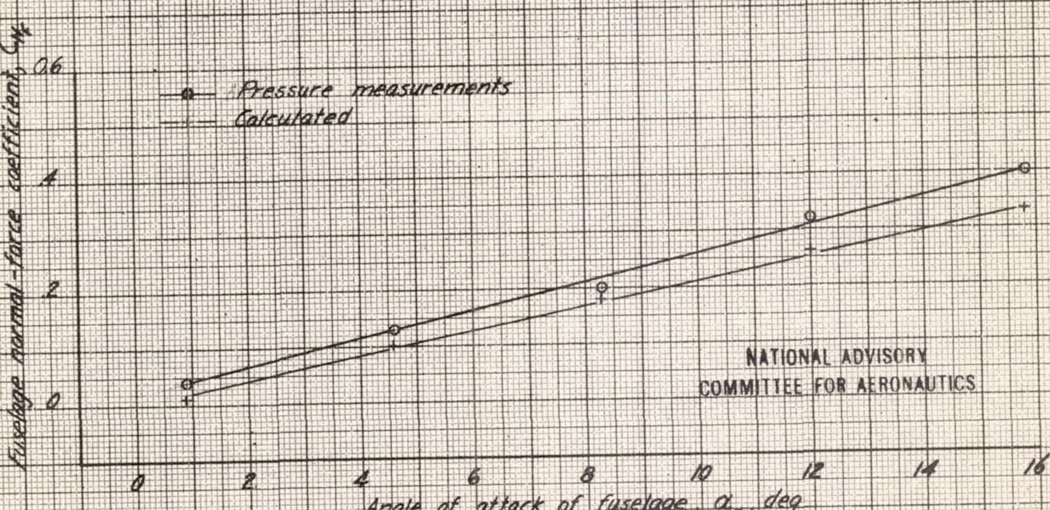

Figure 37.-Variation of the normal-force coefficient on the forward part of the fuselage with angle of attack, elevator removed. δ_f, 0°.