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EFFECT OF CANARD POSITION AND WING LEADING-EDGE FLAP DEFLECTION ON WING BUFFET AT TRANSONIC SPEEDS

By Blair B. Gloss, William P. Henderson, and Jarrett K. Huffman

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SUMMARY

A generalized wind-tunnel model, with canard and wing planform typical of highly maneuverable aircraft, was tested in the Langley 8-foot transonic pressure tunnel at Mach numbers from 0.70 to 1.20 to determine the effects of canard location and wing leading-edge flap deflection on the wing buffet characteristics. The major results of this investigations may be summarized as follows. The addition of a canard above the wing chord plane, for the configuration with leading-edge flaps undeflected, allowed this configuration to obtain substantially higher total configuration lift coefficients before buffet onset occurs than the configuration with the canard off and leading-edge flaps undeflected. However, the addition of the canard did not substantially affect the lift of the wing at which buffet onset occurs, for the configurations with the leading-edge flaps undeflected, but the wing buffet intensity was substantially lower for the canard wing configuration than the wing alone configuration. The low canard configuration generally displayed the poorest buffet characteristics. Deflecting the wing leading-edge flaps substantially improved the wing buffet characteristics for canard-off configurations. The addition of the high canard did not appear to substantially improve the wing buffet characteristics of the wing with leading-edge flaps deflected.

INTRODUCTION

The National Aeronautics and Space Administration is currently conducting wind-tunnel investigations to provide a data base for the use of determining the desirability of employing close-coupled canard surfaces on highly maneuverable aircraft. The use of canards offers several attractive features, such as increased trimmed lift capability and the potential for reduced trimmed drag. (Refs. 1-6) In addition, the geometric characteristics of close-coupled canard configurations offer a potential for improved longitudinal progression of cross-sectional area; this improvement could result in reduced wave drag at low supersonic speeds. References 7-11 present the results of several additional investigations of close-coupled canard wing configurations at subsonic and transonic speeds. Since the maneuver and performance capability of aircraft engaged in air-to-air combat is often limited by flow separation manifesting itself as wing buffeting (reference 12), the present study was conducted to determine the effect of close-coupled canard surfaces on wing buffet onset characteristics at transonic speeds. A generalized wind-tunnel model which had a wing buffet strain gage installed in one wing was tested in the Langley 8-foot transonic pressure tunnel at Mach numbers from 0.70 to 1.20 at angles of attack from -4° to 20° at 0° side slip.

SYMBOLS

The International System of Units with the U. S. Customary Units presented in parenthesis, is used for the physical quantities in this paper. Measurements and calculations were made in U.S. Customary Units. The data presented in this report are referred to the stability axis system with the exception of axial force and normal force which are referred to the body-axis system.

A aspect ratio (2.5), b^2/S_w

b wing spang 50.8 cm (20 in)

$\bar{c}$ wing mean geometric chord, 23.32 cm (9.18 in)

C_A axial force coefficient, $\frac{\text{Axial force}}{qS_w}$

C_D drag coefficient, $\frac{\text{Drag}}{qS_w}$

C_L lift coefficient, $\frac{\text{Lift}}{qS_w}$

$C_{L,DIF}$ wing lift (main balance lift - canard balance lift)

$C_{M,WSG}$ $\frac{\text{root-mean-square moment of wing bending gage}}{q\,S_w\,\bar{c}}$

M free-stream Mach number

q free-stream dynamic pressure lb/ft^2

S_c canard area (exposed), 288.71 cm^2 (44.75 in^2)

S_w reference area of wing with leading and trailing edges extended to plane of symmetry, 1032.26 cm^2 (160.00 in^2)

z vertical distance between the chord planes of the canard and wing, positive up.

α angle of attack, deg.

Λ_w leading-edge sweep angle of wing, deg.

Λ_c leading-edge sweep angle of canard, deg.

δ leading edge flap deflection (positive direction leading edge down), deg.

DESCRIPTION OF MODEL

A sketch of the general research model showing the wing leading edge flap locations and wing buffet strain gage location is presented in figure 1. Table I contains the pertinent geometric parameters associated with this model.

The untwisted wing planform used on this model had a leading edge sweep angle, Λ_w, of 44°, and a 64A006 airfoil section at the wing root (the root of the wing is taken at the intersection of the fuselage and wing) which varied linearly to a 64A004 airfoil section at the tip. When the wing leading edge flaps were deflected for the present investigation, the deflection angles were as presented in the schedule shown below. The wing buffet gage was aligned

Flap	δ, deg.
I	4
II	8
III	12
IV	16
V	20

along the fifty percent chord line as indicated in figure 1.

The canard had a leading-edge sweep angle of 51.7° and an exposed area (S_c) of 28.0 percent of the wing reference area (S_w). The canard was tested in a position of 18.5 percent of the wing mean geometric chord above and below the wing chord plane ($z/\bar{c}$ = 0.185 and -0.185 respectively). Fuselage fairings were required to fair the canard mounting brackets into the body. Thus, there were two fuselage configurations: body fairings on the top for $z/\bar{c}$ = 0.185 and body fairings on the bottom for $z/\bar{c}$ = -0.185 (see figure 1.)

The canard was untwisted and had uncambered circular arc airfoil sections.

The thickness varied linearily from 6 percent of the chord at the root to 4 percent at the tip.

The moment reference point was taken to be at fuselage station 59.14 cm (23.29 in).

APPARATUS, TESTS AND CORRECTIONS

This investigation was conducted in the Langley 8-foot transonic pressure tunnel which is a continuous-flow facility (ref. 13). Forces and moments were measured by two internally mounted, six-component strain-gage balances; the relative locations of these balances are shown in figure 1. One balance measured the loads on the forward part of the body (shaded area in figure 1) and is called the canard balance. The second balance, which was housed in the aft section of the model measured the total loads and is referred to as the main balance. There was a small unsealed gap between segments of the fuselage in order to prevent fouling.

Tests were made at Mach numbers of 0.70, 0.90, 0.95, 1.03 and 1.20. The angle-of-attack range was from approximately -4° to 20° at 0° sideslip. Angles of attack have been corrected for the effects of sting deflection due to aerodynamic load. All axial-force measurements obtained on the main balance were corrected to a condition of free stream static pressure acting on the base of the model. All tests were made with boundary-layer transition fixed on the model by means of a narrow strip of carborundum grit placed on the body, wings and canards, using the methods outlined in reference 14.

The wing-root bending-gage technique used in this paper to obtain wing buffet information is described in reference 15.

RESULTS AND DISCUSSION

The flap deflections that were employed in this study were chosen so that the data obtained in this investigation would be compatible with the data presented in reference 12. As reference 12 points out these flap deflections do not necessarily represent an optimum.

The use of the canard balance and main balance made it possible to separate the wing lift ($C_{L,DIF}$) from the total lift (C_L) of the configuration. Since the total lift of each configuration was a strong function of the lift on the forebody (shaded area of figure 1), the buffet gage data ($C_{M,WSG}$) is presented versus wing lift coefficient ($C_{L,DIF}$). Presenting the data in this manner permits the study of the effect of canard location on wing buffet onset in terms of wing lift only. Of course the total lift coefficient of the configuration, at which buffet onset occurs is a very important consideration, and thus, the buffet gage data is also presented versus total lift coefficient.

Table II defines the configuration code that is used for the tabulated results presented in Table III. The data in figures 2 to 16 show the effect of canard height and wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet characteristics for Mach numbers from 0.70 to 1.20.

The aerodynamic parameters presented in these figures are some of those which are usually utilized to predict buffet onset (reference 15). Among these parameters is a presentation of axial force coefficient (C_A) versus $\sin^2\alpha$. Reference 16 points out that for subsonic attached potential flow, the axial force coefficient should vary linearly with $\sin^2\alpha$. The implication from this and reference 15 is that buffet onset should occur when C_A is no longer a linear function of $\sin^2\alpha$. It should be noted that the axial force coefficients are obtained from the main balance and thus include the contribution of the fuselage and canard as well as the wing. However, the canards have a symmetrical airfoil section, are geometrically smaller than the wings and have sharp leading edges; thus, the canard production of axial force should be small compared to that of the wing. In addition, since leading edge suction is a function of potential lift and since the fuselage doesn't produce significant levels of lift (reference 4), it is assumed that the fuselage would not contribute significant amounts of thrust as compared to that of the wing. Therefore, the trends of the C_A curves are primarily influenced by the leading edge thrust of the wing.

When examining the buffet gage data ($C_{M,WSG}$), buffet onset is assumed to occur when the value of $C_{M,WSG}$ increases above a previous relatively constant level. It should be noted, however, that for the Mach number 0.70 data for all configurations, the value of $C_{M,WSG}$ changes with angle of attack throughout the complete angle-of-attack range. This may be due to inadequate stiffness in the model support system, canard buffet exciting fuselage bending or some other cause. This inadequate stiffness may also be a dominant factor causing a fairly significant level of output from the buffet gage even at low angles of attack at other Mach numbers. It is felt, therefore, that the $C_{M,WSG}$ data at a Mach number of 0.70 for all configurations should only be used in a qualitative manner.

The discussion presented herein will be limited to the buffet characteristics since the longitudinal aerodynamic characteristics for models of these configurations are rather fully documented in references 1-6.

Effect of Canard Height

Figures 2 through 6 present longitudinal aerodynamic and wing buffet characteristics for the high canard ($z/\bar{c}$ = 0.185), low canard ($z/\bar{c}$ = -0.185) and canard off configurations for Mach numbers from 0.70 to 1.20.

Shown below are the approximate wing lift coefficients ($C_{L,DIF}$) and total configuration lift coefficient (C_L) at which buffet onset appears to occur as determined from the wing buffet gage data, $C_{M,WSG}$ (figures 2-6).

Lift Coefficients At Buffet Onset

Leading-Edge Flaps Undeflected

M	High Candard		Low Canard		Canard Off	
	$C_{L,DIF}$	C_L	$C_{L,DIF}$	C_L	$C_{L,DIF}$	C_L
1.20	0.74	1.03	0.39	0.61	0.80	0.84
1.03	0.67	0.93	0.34	0.51	0.77	0.80
0.95	0.37	0.55	0.36	0.52	0.31	0.32
0.90	0.34	0.52	--	--	0.28	0.29
0.70	--	--	--	--	--	--

The supersonic data (M = 1.20 and 1.03) in the above table shows that the wing lift ($C_{L,DIF}$) at which buffet onset appears to occur is significantly higher for the high canard and canard off configurations than the low canard configuration. At the Mach numbers 0.95 and 0.90 (figures 4 and 5) buffet onset occurs at slightly higher values of wing lift for the canard high and low than for the canard off configuration. For those configurations and Mach numbers where the lift coefficient at which buffet onset occurred could not be determined with some confidence no data are presented in the above table. The high canard configuration produces significantly higher total lift coefficients (C_L) at buffet onset than the other configurations. Since canard buffet onset could be a limiting factor to the total lift, some caution should be exercised in directly using the total lift coefficients (C_L) at which buffet onset occurs. As can be seen from the data in figures 2-5 the wing buffet intensity for the high canard configuration is significantly lower than that of the other configurations. In addition, generally the wing buffet intensity for the high canard configuration increases at a lower rate after buffet onset occurs than that of the other configurations. Since there is apparently a leading edge vortex on the wing in the presence of the high canard (references 4, 5 and 6), a gradual increase of wing buffet intensity after buffet onset occurs should be anticipated (see reference 12).

Effect of Wing Leading-Edge Flap Deflection - Canard Off

The data in figures 7-11 present the effect of wing leading edge flap deflection on wing buffet onset. Shown below in Table II are the approximate wing lift coefficients ($C_{L,DIF}$) and total configuration lift coefficients (C_L) at which buffet onset appears to occur as determined from the wing buffet gage data, $C_{M,WSG}$ (Figures 7-11)

Lift Coefficient At Buffet Onset

M	Flaps Undeflected		Flaps Deflected	
	$C_{L,DIF}$	C_L	$C_{L,DIF}$	C_L
1.20	0.80	0.84	Greater than 1.0	Greater than 1.1
1.03	0.77	0.80	Greater than 1.1	Greater than 1.2
0.95	0.31	0.32	0.90	0.94
0.90	0.28	0.29	0.59	0.62
0.70	--	--	--	--

As is indicated in the above table, there is no indication of buffet onset for the configuration with the leading edge flaps deflected at Mach numbers of 1.20 and 1.03 in the angle of attack range tested. There are significant gains in the lift coefficient at which buffet onset occurs for the flaps deflected configuration over the flaps undeflected configuration at Mach numbers of 1.20, 1.03, 0.95 and 0.90. Comparing the buffet onset data for the high canard, flaps undeflected, configuration with that for the canard off, flaps deflected configuration (data in figures 2-5 with that in figures 7-10), it is noted that deflection of the leading edge flaps, canard off, allows higher attainable lift coefficients without buffet onset than was indicated by adding the high canard to the wing with leading edge flaps undeflected. This is not surprising since the close-coupled canard configuration creates a favorable flow field which allows the formation of wing leading edge vortices and the leading edge flaps function to maintain attached flow. Leading edge vortices have been shown previously to result in an early indication of buffet onset which after onset occurs does not increase in intensity as rapidly as the configuration with the leading edge flaps deflected. And in fact, the buffet intensity increases much faster after buffet onset occurs for the flaps deflected, canard off, configuration than for the high canard, flaps undeflected configuration.

It is interesting to note that for the Mach numbers of 0.95, 0.90 and 0.70 there are regions where C_A is a linear function of $\sin^2 \alpha$ for the flaps deflected configuration (fig. 9c-11c). As mentioned earlier this linear region is that region over which buffet free operation might be anticipated. Lower surface separation on the leading edge flap is the probable cause for the apparent lose of leading edge suction at the lower angles of attack (The angle of attack at which C_A ceases to be linear with $\sin^2 \alpha$ is the point at which the wing is assumed to start losing leading edge suction). The apparent buffet free regions as indicated by the axial force data in figures 7c-11c are presented, for the configuration with leading edge flap deflected, in the table below. By comparing

Regions of Buffet Free Operation As Determined

By Axial Force Data

M	Leading Edge Flaps Deflected	
	$C_{L,DIF}$	C_L
1.20	---	---
1.03	---	---
0.95	0.20 → 0.77	0.21 → 0.81
0.90	0.20 → 0.73	0.21 → 0.76
0.70	0.31 → 0.65	0.32 → 0.69

the lift coefficients at which buffet onset occurs for the flaps deflected configuration as determined by the wing buffet gage data and axial force data, it is seen that the axial force data predicts a smaller buffet free region than the wing buffet gage data. (The wing buffet gage data, figures 9c and 10c, for Mach numbers of 0.95 and 0.90 indicate a lower lift coefficient limit of less than 0.0 for the buffet free region for the flaps deflected configuration.)

Effect Of Wing Leading-Edge Flap Deflection - Canard On

The data in figures 12-16 present the effect of wing leading edge flap deflection on wing buffet onset for the configuration with the high canard on. For the Mach number of 1.20 (figure 12) there is no indication of buffet onset from the buffet gage data for the flaps deflected configuration. For a Mach number of 1.03 (figure 13) the buffet gage indicates buffet onset occuring at approximately the same lift for both configurations (high canard; flap deflected and flap undeflected).

The buffet gage data as well as the axial force versus $\sin^2 \alpha$ data show no region of buffet free operation for Mach numbers of 0.95 and 0.90 (figures 14 and 15) for the leading edge flaps deflected configuration. Both $C_{M,WSG}$ and C_A data seem to indicate mild buffet over a rather large lift range for the flaps deflected case. The mild buffet is indicated by a slow rate of change of buffet intensity ($C_{M,WSG}$ data) and a slightly nonlinear region for the C_A versus $\sin^2 \alpha$ data. The buffet gage data shows a sharp increase in buffet intensity for the flaps deflected configuration at wing lift coefficients approximately the same as those for the off-wing leading edge flaps deflected configuration for Mach numbers of 0.95 and 0.90. (Compare the data in figures 9 and 10 with that in figures 14 and 15) Thus adding the canard to the flaps deflected wing did not substantially alter the wing lift coefficient at which there is strong indication of buffet onset.

CONCLUDING REMARKS

A generalized wind-tunnel model, with canard and wing planform typical of highly maneuverable aircraft, was tested in the Langley 8-foot transonic pressure tunnel at Mach numbers from 0.70 to 1.20 to determine the effects of canard location and wing leading edge flap deflection on the wing buffet characteristics. The major results of this investigations may be summarized as follows:

1. The addition of a canard above the wing chord plane, for the configuration with leading edge flaps undeflected, allowed this configuration to obtain substantially higher total configuration lift coefficients before buffet onset occurs than the configuration with the canard off and leading edge flaps undeflected. However, the addition of the canard did not substantially affect the lift of the wing at which buffet onset occurs, for the configurations with the leading edge flaps undeflected, but the wing buffet intensity was substantially lower for the canard wing configuration than the wing alone configuration.

2. The low canard configuration generally displayed the poorest buffet characteristics.

3. Deflecting the wing leading edge flaps substantially improved the wing buffet characteristics for canard off configurations.

4. The addition of the high canard did not appear to substantially improve the wing buffet characteristics of the wing with leading edge flaps deflected.

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TABLE I

GEOMETRIC CHARACTERISTICS OF MODEL

Body length, cm(in)	96.52(38.00)
Wing	
A	2.5
b/2, cm(in)	25.40(10.00)
Leading edge sweep angle, deg.	44
$\bar{c}$, cm(in)	23.32(9.18)
Airfoil Section	NACA 64A Series
S_w, cm(in)	1032.3(160.0)
Root Chord, cm(in)	29.79
Tip Chord, cm(in)	6.78(2.67)
Maximum thickness, percent chord at -	
Root	6.0
Tip	4.0
Canard	
b/2, cm(in)	17.25(6.79)
Leading edge sweep angle, deg	51.7
S_c, cm^2 (in^2)	288.73(44.75)
Airfoil Section	Circular arc
Root chord, cm (in)	17.92(7.05)
Tip chord, cm (in)	3.59(1.41)
Maximum thickness, percent chord at -	
Root	6.0
Tip	4.0

TABLE II

TEST CONFIGURATIONS

Configuration Number	Canard	$z/\bar{c}$	Wing flaps
1	On	0.185	deflected
2	Off	0.185	deflected
3	Off	0.185	undeflected
4	On	-0.185	undeflected
5	On	0.185	undeflected

TABLE III

TEST DATA

Symbols used in the tabulated data are defined as follows.

CONFIG.	configuration number (see table II)
MACH NO	Mach number
Q	free-stream dynamic pressure, lb/ft^2 ($1\ lb/ft^2 = 97.88\ N/m^2$)
BETA	angle of sideslip, deg
ALPHA	angle of attack, deg
CN	normal-force coefficient
CA	axial-force coefficient
CM	pitching-moment coefficient
R/FT	Reynolds number per foot $x10^{-6}$
TEMP	air temp in wind tunnel, ^{o}F
CMWSG	wing mean bending moment coefficient
CL	lift coefficient
CD	drag coefficient
L/D	lift-drag ratio

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MACH NO 1.200 CONFIG. 1

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
660.23	0.00	-4.72	-.4131	.07159	.0137	3.19	116.6	.00190	-.4058	.10536	-3.85
660.42	0.00	-2.41	-.2655	.07025	.0235	3.19	117.4	.00170	-.2623	.08137	-3.22
660.52	0.00	-.14	-.1080	.06564	.0211	3.18	118.0	.00160	-.1078	.06591	-1.64
660.43	0.00	2.17	.0659	.05813	.0116	3.18	118.5	.00149	.0637	.06059	1.05
660.26	0.00	4.49	.2475	.04726	.0054	3.18	119.0	.00147	.2430	.06650	3.65
660.40	0.00	6.81	.4316	.03496	.0007	3.17	119.9	.00146	.4244	.08588	4.94
660.52	0.00	9.11	.6054	.02207	-.0057	3.17	120.6	.00145	.5943	.11767	5.05
660.37	0.00	11.43	.7889	.00796	-.0135	3.16	121.4	.00154	.7717	.16412	4.70
660.30	0.00	13.72	.9682	-.00632	-.0232	3.16	121.6	.00175	.9421	.22352	4.21
660.40	0.00	18.30	1.3295	-.02856	-.0568	3.16	121.0	.00123	1.2713	.39041	3.26
660.56	0.00	18.30	1.3285	-.02856	-.0567	3.16	120.9	.00143	1.2703	.39007	3.26
660.44	0.00	20.53	1.4772	-.03661	-.0758	3.16	120.7	.00161	1.3962	.48379	2.89
660.42	0.00	21.55	1.5448	-.03969	-.0805	3.16	120.7	.00164	1.4514	.53057	2.74
660.27	0.00	-.14	-.1046	.06555	.0188	3.16	120.6	.00159	-.1045	.06580	-1.59

MACH NO 1.030 CONFIG. 1

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
601.60	0.00	-4.72	-.4218	.06387	-.0008	3.10	121.2	.00285	-.4151	.09838	-4.22
601.34	0.00	-2.42	-.2705	.06389	.0094	3.10	121.5	.00244	-.2676	.07525	-3.56
601.21	0.00	-.13	-.1085	.06102	.0133	3.10	121.1	.00227	-.1084	.06127	-1.77
601.38	0.00	2.15	.0711	.05409	.0110	3.10	120.7	.00194	.0690	.05671	1.22
601.37	0.00	4.50	.2720	.04186	.0072	3.10	120.7	.00212	.2679	.06305	4.25
601.33	0.00	6.83	.4837	.02792	-.0045	3.10	121.0	.00215	.4769	.08526	5.59
601.82	0.00	9.13	.6828	.01417	-.0125	3.10	121.6	.00197	.6719	.12229	5.49
601.51	0.00	11.45	.8744	-.00154	-.0135	3.10	121.9	.00201	.8573	.17201	4.98
601.78	0.00	13.74	1.0740	-.02463	-.0288	3.10	121.7	.00221	1.0492	.23122	4.54
600.57	0.00	16.03	1.2748	-.03906	-.0482	3.10	121.0	.00205	1.2360	.31437	3.93
601.84	0.00	18.33	1.4630	-.04856	-.0568	3.10	120.7	.00231	1.4040	.41410	3.39
601.26	0.00	20.60	1.6341	-.05550	-.0656	3.11	120.4	.00293	1.5492	.52292	2.96
601.76	0.00	21.62	1.7006	-.05813	-.0639	3.11	120.4	.00301	1.6023	.57269	2.80
601.61	0.00	-.17	-.1121	.06138	.0079	3.12	118.4	.00231	-.1119	.06171	-1.81

MACH NO .950 CONFIG. 1

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
561.87	0.00	-4.66	-.3905	.05206	-.0203	3.04	119.9	.00371	-.3850	.08364	-4.60
561.04	0.00	-2.39	-.2430	.05002	-.0102	3.04	120.0	.00323	-.2407	.06009	-4.01
560.95	0.00	-.13	-.0905	.04541	-.0009	3.04	120.1	.00325	-.0903	.04562	-1.98
561.80	0.00	2.13	.0648	.03857	.0118	3.04	120.2	.00295	.0633	.04095	1.55
562.06	0.00	4.45	.2703	.02823	.0095	3.04	120.2	.00289	.2673	.04911	5.44
561.47	0.00	6.76	.4706	.01757	.0093	3.04	120.6	.00272	.4652	.07285	6.39
561.57	0.00	9.07	.6507	.00697	.0097	3.04	120.6	.00252	.6415	.10940	5.86
561.65	0.00	11.33	.8306	-.00756	.0105	3.03	121.0	.00245	.8159	.15577	5.24
552.42	0.00	13.64	1.0259	-.03118	.0118	3.03	121.9	.00260	1.0043	.21165	4.74
562.06	0.00	15.96	1.2316	-.04866	.0094	3.03	122.1	.00292	1.1975	.29183	4.10
561.86	0.00	18.28	1.4177	-.05836	.0141	3.03	121.7	.00330	1.3645	.38932	3.50
561.69	0.00	20.50	1.5429	-.06002	.0323	3.03	121.0	.00474	1.4662	.48418	3.03
561.88	0.00	21.53	1.6117	-.05833	.0256	3.04	120.7	.00474	1.5206	.53735	2.83
561.65	0.00	-.15	-.0935	.04582	-.0043	3.06	117.2	.00328	-.0934	.04606	-2.03

MACH NO .900 CONFIG. 1

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
532.22	0.00	-4.61	-.3684	.04566	-.0364	3.00	117.9	.00388	-.3635	.07513	-4.84
532.47	0.00	-2.38	-.2408	.04371	-.0131	2.99	118.9	.00379	-.2388	.05367	-4.45
532.78	0.00	-.12	-.0870	.03892	.0004	2.99	119.6	.00353	-.0869	.03910	-2.22
531.70	0.00	2.17	.0871	.03010	.0103	2.98	120.0	.00382	.0859	.03339	2.57
532.80	0.00	4.46	.2728	.01930	.0232	2.98	120.2	.00371	.2705	.04046	6.69
532.30	0.00	6.77	.4535	.00887	.0368	2.98	120.2	.00328	.4493	.06227	7.22
532.47	0.00	9.03	.6192	-.00091	.0413	2.98	120.2	.00272	.6117	.09626	6.35
532.24	0.00	11.28	.7905	-.01418	.0422	2.98	120.2	.00249	.7780	.14077	5.53
532.65	0.00	13.57	.9869	-.03504	.0404	2.98	120.2	.00250	.9676	.19757	4.90
532.79	0.00	15.87	1.1597	-.05155	.0542	2.98	120.2	.00376	1.1296	.26761	4.22
532.30	0.00	18.15	1.3267	-.06029	.0695	2.98	120.2	.00478	1.2795	.35596	3.60
532.93	0.00	20.37	1.4682	-.05852	.0755	2.98	120.9	.00570	1.3968	.45625	3.06
532.21	0.00	21.42	1.5438	-.05963	.0742	2.97	121.1	.00586	1.4590	.50825	2.87
532.65	0.00	-.14	-.0871	.03885	-.0043	2.98	120.1	.00365	-.0870	.03906	-2.23

MACH NO .700 CONFIG. 1

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
524.73	0.00	-4.60	-.3537	.03998	-.0425	3.53	117.1	.00452	-.3493	.06819	-5.12
523.57	0.00	-2.36	-.2309	.03896	-.0135	3.53	117.1	.00399	-.2291	.04843	-4.73
524.27	0.00	-.11	-.0800	.03274	.0029	3.53	117.1	.00287	-.0799	.03290	-2.43
524.19	0.00	2.17	.0845	.02305	.0121	3.53	117.0	.00228	.0836	.02623	3.19
524.11	0.00	4.44	.2505	.01113	.0318	3.53	117.0	.00251	.2489	.03049	8.16
523.72	0.00	6.74	.4152	-.00084	.0550	3.53	116.9	.00294	.4124	.04791	8.61
525.20	0.00	9.02	.5733	-.01404	.0708	3.54	116.9	.00364	.5684	.07604	7.47
524.73	0.00	11.29	.7344	-.02964	.0896	3.53	117.0	.00417	.7260	.11473	6.33
524.81	0.00	13.57	.9038	-.04933	.1090	3.53	117.0	.00496	.8902	.16418	5.42
524.03	0.00	15.87	1.0722	-.06718	.1281	3.53	117.0	.00552	1.0497	.22860	4.59
523.65	0.00	18.15	1.2443	-.07950	.1400	3.53	117.0	.00627	1.2072	.31206	3.87
524.80	0.00	20.42	1.4033	-.08181	.1547	3.53	117.0	.00712	1.3437	.41298	3.25
524.42	0.00	21.49	1.4742	-.08215	.1668	3.53	117.0	.00796	1.4018	.46363	3.02
524.66	0.00	-.13	-.0875	.03309	-.0023	3.53	117.0	.00281	-.0874	.03330	-2.63

MACH NO 1.200 CONFIG. 2

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
660.83	0.00	-4.32	-.3676	.06646	.1205	3.16	121.4	.00157	-.3615	.09398	-3.85
661.22	0.00	-2.24	-.2395	.06386	.0753	3.17	121.0	.00157	-.2368	.07316	-3.24
660.96	0.00	-.10	-.1014	.05924	.0250	3.16	121.0	.00143	-.1013	.05941	-1.71
661.12	0.00	2.01	.0415	.05278	-.0267	3.17	120.7	.00130	.0397	.05421	.73
660.97	0.00	4.13	.1849	.04443	-.0772	3.17	120.9	.00129	.1812	.05763	3.14
660.78	0.00	6.27	.3251	.03440	-.1241	3.17	120.7	.00127	.3194	.06968	4.58
661.18	0.00	8.38	.4629	.02326	-.1681	3.17	120.9	.00125	.4546	.09050	5.02
661.07	0.00	10.52	.6009	.01146	-.2078	3.17	120.7	.00124	.5887	.12094	4.87
661.19	0.00	12.66	.7326	-.00004	-.2436	3.17	120.7	.00139	.7148	.16046	4.45
660.89	0.00	14.81	.8571	-.01150	-.2752	3.17	120.6	.00152	.8316	.20792	4.00
661.09	0.00	16.94	.9820	-.02121	-.3102	3.17	120.6	.00129	.9456	.26577	3.56
660.97	0.03	19.06	1.0970	-.02961	-.3425	3.17	120.6	.00143	1.0465	.33018	3.17
661.24	0.00	20.04	1.1482	-.03297	-.3569	3.17	120.6	.00130	1.0900	.36250	3.01
661.13	0.00	-.10	-.1000	.05894	.0248	3.17	120.7	.00138	-.0999	.05912	-1.69

MACH NO 1.030 CONFIG. 2

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
601.86	0.00	-4.35	-.3862	.06152	.1108	3.09	122.2	.00240	-.3805	.09064	-4.20
601.91	0.00	-2.25	-.2532	.05889	.0688	3.11	120.5	.00209	-.2507	.06877	-3.65
602.70	0.00	-.10	-.1033	.05464	.0209	3.11	120.6	.00214	-.1032	.05482	-1.88
602.07	0.00	2.01	.0506	.04774	-.0307	3.11	120.6	.00194	.0489	.04949	.99
602.35	0.00	4.15	.2126	.03771	-.0849	3.11	120.6	.00210	.2093	.05298	3.95
602.07	0.00	6.28	.3753	.02516	-.1408	3.11	120.5	.00214	.3703	.06609	5.60
601.94	0.00	8.41	.5250	.01166	-.1837	3.11	120.4	.00214	.5176	.08836	5.86
602.11	0.00	10.56	.6693	-.00288	-.2213	3.11	120.4	.00225	.6585	.11983	5.50
602.73	0.00	12.70	.8168	-.01746	-.2631	3.11	120.4	.00214	.8007	.16253	4.93
602.37	0.00	14.83	.9627	-.02933	-.3105	3.11	120.6	.00205	.9381	.21808	4.30
602.24	0.00	16.94	1.1010	-.03959	-.3539	3.11	120.6	.00175	1.0647	.28293	3.76
602.59	0.00	19.05	1.2215	-.04817	-.3897	3.11	120.5	.00185	1.1703	.35316	3.31
602.09	0.00	20.03	1.2716	-.05195	-.4018	3.11	120.9	.00191	1.2124	.38678	3.13
602.04	0.00	-.12	-.1039	.05438	.0206	3.11	120.1	.00207	-.1038	.05460	-1.90

MACH NO .950 CONFIG. 2

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
561.26	0.00	-4.36	-.3432	.05175	.0751	3.04	120.4	.00359	-.3382	.07766	-4.36
561.56	0.00	-2.23	-.2120	.04814	.0358	3.04	120.9	.00314	-.2100	.05634	-3.73
561.45	0.00	-.10	-.0812	.04318	.0035	3.03	121.0	.00326	-.0812	.04332	-1.87
561.48	0.00	2.04	.0461	.03639	-.0234	3.03	121.0	.00305	.0448	.03801	1.18
561.67	0.00	4.17	.2165	.02672	-.0783	3.03	121.0	.00305	.2139	.04238	5.05
561.89	0.00	6.30	.3766	.01585	-.1292	3.04	120.9	.00298	.3726	.05706	6.53
561.67	0.00	8.43	.5244	.00419	-.1716	3.04	120.5	.00314	.5181	.08099	6.40
561.72	0.00	10.56	.6644	-.01138	-.2029	3.04	120.4	.00305	.6552	.11057	5.93
561.79	0.00	12.73	.8202	-.02855	-.2430	3.04	120.5	.00315	.8063	.15284	5.28
562.25	0.00	14.84	.9629	-.04038	-.2819	3.04	121.0	.00294	.9411	.20753	4.53
561.75	0.00	16.95	1.0945	-.05052	-.3182	3.03	121.4	.00339	1.0617	.27085	3.92
562.01	0.00	19.05	1.1732	-.05688	-.3260	3.03	121.6	.00439	1.1276	.32917	3.43
562.35	0.00	20.04	1.2040	-.05790	-.3304	3.04	121.0	.00499	1.1510	.35817	3.21
562.26	0.00	-.10	-.0819	.04373	.0035	3.06	117.9	.00322	-.0819	.04387	-1.87

MACH NO .900 CONFIG. 2

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
533.29	0.00	-4.32	-.3273	.04571	.0634	2.99	119.4	.00406	-.3229	.07024	-4.60
533.43	0.00	-2.22	-.2113	.04224	.0352	2.99	120.0	.00367	-.2095	.05041	-4.16
533.44	0.00	-.08	-.0757	.03631	.0052	2.98	120.4	.00338	-.0756	.03642	-2.08
533.14	0.00	2.02	.0642	.02874	-.0273	2.98	120.6	.00364	.0631	.03099	2.04
533.92	0.00	4.18	.2148	.01898	-.0652	2.98	120.5	.00367	.2128	.03458	6.15
533.15	0.00	5.32	.3576	.00805	-.1014	2.98	120.5	.00349	.3545	.04736	7.49
533.36	0.00	8.43	.4889	-.00347	-.1328	2.98	120.5	.00336	.4841	.06826	7.09
532.96	0.00	10.57	.6257	-.01931	-.1610	2.98	120.5	.00326	.6186	.09580	6.46
533.34	0.00	12.72	.7734	-.03922	-.1935	2.98	120.5	.00374	.7631	.13199	5.78
532.76	0.00	14.84	.9062	-.05080	-.2233	2.98	120.5	.00380	.8890	.18306	4.86
533.21	0.00	16.92	.9778	-.05172	-.2375	2.98	120.5	.00614	.9506	.23509	4.04
532.85	0.00	18.97	1.0387	-.04716	-.2611	2.98	120.5	.00651	.9977	.29297	3.41
533.14	0.00	19.91	1.0635	-.04491	-.2726	2.98	120.5	.00624	1.0152	.31986	3.17
533.16	0.00	-.08	-.0778	.03644	.0056	2.98	120.6	.00356	-.0778	.03655	-2.13

MACH NO .700 CONFIG. 2

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
522.23	0.00	-4.33	-.3147	.04011	.0540	3.58	110.1	.00451	-.3108	.06374	-4.88
524.04	0.00	-2.19	-.2037	.03731	.0342	3.59	110.1	.00380	-.2022	.04507	-4.49
523.57	0.00	-.07	-.0793	.03092	.0094	3.58	110.4	.00291	-.0792	.03103	-2.55
523.26	0.00	2.06	.0574	.02146	-.0216	3.56	110.4	.00248	.0566	.02351	2.41
523.89	0.00	4.18	.1942	.00939	-.0507	3.58	110.5	.00253	.1930	.02352	8.20
523.88	0.00	6.33	.3233	-.00422	-.0763	3.58	110.7	.00297	.3218	.03145	10.23
523.65	0.00	8.44	.4479	-.01912	-.0990	3.58	111.0	.00365	.4458	.04684	9.52
523.50	0.00	10.58	.5691	-.03607	-.1194	3.58	111.1	.00455	.5661	.06906	8.20
523.34	0.00	12.71	.6946	-.05571	-.1383	3.58	111.2	.00498	.6898	.09852	7.00
523.42	0.00	14.87	.8177	-.07021	-.1558	3.57	111.4	.00611	.8084	.14204	5.69
524.51	0.00	16.98	.9310	-.07308	-.1776	3.58	111.6	.00707	.9118	.20203	4.51
523.34	0.00	19.07	1.0101	-.06774	-.1943	3.57	111.7	.00854	.9768	.26595	3.67
523.26	0.00	-.06	-.0741	.03039	.0080	3.57	112.2	.00283	-.0740	.03047	-2.43

MACH NO 1.200 CONFIG. 3

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
661.14	0.00	-4.26	-.2867	.02995	.0993	3.18	118.8	.00150	-.2837	.05114	-5.55
661.17	0.00	-2.11	-.1402	.03182	.0479	3.17	120.1	.00150	-.1389	.03696	-3.76
661.21	0.00	.01	.0013	.03256	.0002	3.17	120.7	.00136	.0013	.03256	.04
661.19	0.00	2.13	.1404	.03160	-.0451	3.16	121.4	.00145	.1391	.03680	3.78
660.92	0.00	4.28	.2911	.02960	-.0959	3.16	121.2	.00151	.2881	.05126	5.62
661.18	0.00	6.41	.4407	.02757	-.1473	3.16	121.4	.00147	.4349	.07662	5.68
661.04	0.00	8.52	.5846	.02567	-.1968	3.16	121.6	.00146	.5743	.11197	5.13
660.95	0.00	10.68	.7287	.02356	-.2439	3.16	121.0	.00137	.7117	.15817	4.50
661.07	0.00	12.77	.8640	.02145	-.2893	3.17	120.9	.00134	.8379	.21187	3.95
661.03	0.00	14.88	.9825	.01954	-.3232	3.17	120.9	.00150	.9445	.27119	3.48
660.92	0.00	17.01	1.0657	.01852	-.3379	3.16	121.0	.00202	1.0136	.32950	3.08
660.91	0.00	19.11	1.1666	.01704	-.3642	3.16	121.0	.00234	1.0967	.39809	2.75
660.97	0.00	20.08	1.2155	.01641	-.3782	3.17	120.9	.00209	1.1360	.43281	2.62
661.08	0.00	-.01	-.0003	.03225	.0007	3.17	120.6	.00137	-.0003	.03225	-.01

MACH NO 1.030 CONFIG. 3

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
601.42	0.00	-4.27	-.3160	.02361	.1019	3.11	120.4	.00192	-.3134	.04706	-6.66
602.32	0.00	-2.11	-.1508	.02844	.0481	3.11	120.7	.00187	-.1496	.03397	-4.40
601.97	0.00	.01	-.0032	.03005	.0011	3.10	121.1	.00173	-.0032	.03005	-.11
601.94	0.00	2.15	.1556	.02871	-.0486	3.10	121.5	.00183	.1544	.03451	4.47
601.56	0.00	4.30	.3236	.02463	-.1033	3.10	121.6	.00204	.3208	.04880	6.57
601.88	0.00	6.41	.4932	.02067	-.1586	3.10	121.4	.00194	.4878	.07558	6.45
601.88	0.00	8.53	.6535	.01786	-.2137	3.10	121.1	.00186	.6436	.11462	5.62
601.77	0.00	10.67	.8166	.01585	-.2715	3.10	121.6	.00176	.7996	.16671	4.80
601.90	0.00	12.78	.9602	.01367	-.3204	3.10	121.1	.00168	.9334	.22575	4.13
602.14	0.00	14.90	1.0233	.01213	-.3173	3.10	121.4	.00278	.9858	.27476	3.59
602.25	0.00	16.98	1.1319	.01052	-.3497	3.10	121.0	.00296	1.0795	.34070	3.17
602.15	0.00	19.08	1.2317	.00947	-.3849	3.11	120.7	.00233	1.1610	.41158	2.82
601.97	0.00	20.02	1.2839	.00949	-.4058	3.11	120.5	.00219	1.2030	.44850	2.68
602.16	0.00	-.00	-.0005	.03005	.0003	3.11	119.7	.00164	-.0005	.03005	-.02

MACH NO .950 CONFIG. 3

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
562.53	0.00	-4.31	-.3303	.01295	.0985	3.05	118.9	.00254	-.3284	.03773	-8.70
562.34	0.00	-2.16	-.1607	.01518	.0462	3.04	119.9	.00257	-.1601	.02123	-7.54
562.33	0.00	.01	-.0010	.01664	.0009	3.04	120.2	.00255	-.0010	.01664	-.06
562.61	0.00	2.14	.1529	.01609	-.0419	3.04	120.4	.00275	.1522	.02178	6.99
562.46	0.00	4.31	.3233	.01374	-.0915	3.04	120.4	.00277	.3214	.03798	8.46
562.40	0.00	6.40	.4787	.01152	-.1370	3.04	120.4	.00294	.4744	.06480	7.32
562.51	0.00	8.55	.6234	.01041	-.1766	3.04	120.4	.00322	.6149	.10298	5.97
562.46	0.00	10.65	.7437	.01068	-.2113	3.04	120.7	.00384	.7289	.14801	4.93
560.74	0.00	12.74	.8327	.01023	-.2256	3.03	121.6	.00394	.8095	.19345	4.18
561.73	0.00	14.85	.9392	.01025	-.2585	3.02	122.9	.00427	.9052	.25055	3.61
562.05	0.00	16.90	1.0407	.01039	-.2936	3.03	122.2	.00469	.9927	.31249	3.18
562.28	0.00	18.99	1.1365	.00978	-.3252	3.03	121.5	.00510	1.0714	.37914	2.83
562.46	0.00	19.96	1.1735	.00965	-.3394	3.04	121.0	.00511	1.0998	.40965	2.68
562.00	0.00	-.01	-.0039	.01668	.0015	3.06	117.5	.00259	-.0039	.01668	-.23

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OF POOR QUALITY

MACH NO .900 CONFIG. 3

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
533.43	0.00	-4.29	-.2951	.00638	.0645	3.00	117.4	.00263	-.2938	.02844	-10.33
533.65	0.00	-2.15	-.1414	.01087	.0282	3.00	118.8	.00301	-.1409	.01616	-8.72
533.75	0.00	-.00	-.0032	.01344	.0010	2.99	119.5	.00289	-.0032	.01344	-.24
532.56	0.00	2.15	.1374	.01147	-.0257	2.98	119.9	.00307	.1369	.01661	8.24
533.16	0.00	4.28	.2910	.00697	-.0604	2.98	120.2	.00306	.2896	.02869	10.10
533.71	0.00	6.44	.4398	.00575	-.0995	2.98	120.4	.00370	.4364	.05501	7.93
533.36	0.00	8.53	.5613	.00675	-.1314	2.98	120.4	.00456	.5541	.08996	6.16
533.30	0.00	10.61	.6661	.00790	-.1576	2.98	120.4	.00496	.6533	.13040	5.01
533.15	0.00	12.69	.7525	.01001	-.1824	2.98	120.4	.00484	.7319	.17509	4.18
532.80	0.00	14.80	.8444	.01088	-.2102	2.98	120.4	.00457	.8136	.22625	3.60
533.04	0.00	16.83	.9276	.01153	-.2382	2.98	120.5	.00481	.8846	.27966	3.16
532.91	0.00	18.83	.9654	.01304	-.2589	2.98	120.5	.00560	.9095	.32395	2.81
533.43	0.00	19.79	.9800	.01359	-.2652	2.98	120.5	.00584	.9175	.34456	2.66
533.17	0.00	-.01	-.0023	.01343	.0008	2.98	120.6	.00308	-.0023	.01343	-.17

MACH NO .700 CONFIG. 3

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
524.68	0.00	-4.30	-.2501	.00493	.0479	3.52	118.9	.00394	-.2491	.02366	-10.53
524.98	0.00	-2.10	-.1222	.01040	.0223	3.52	118.9	.00346	-.1217	.01487	-8.19
525.07	0.00	.01	-.0036	.01295	.0012	3.52	119.0	.00278	-.0036	.01295	-.27
525.29	0.00	2.12	.1165	.01099	-.0195	3.52	119.0	.00248	.1160	.01528	7.59
524.60	0.00	4.26	.2430	.00576	-.0432	3.52	119.0	.00294	.2419	.02379	10.17
524.98	0.00	6.41	.3807	.00070	-.0704	3.52	119.0	.00338	.3783	.04319	8.76
525.37	0.00	8.52	.5071	-.00080	-.0963	3.52	119.0	.00481	.5017	.07431	6.75
524.52	0.00	10.63	.6130	-.00119	-.1139	3.52	118.9	.00486	.6027	.11191	5.39
524.60	0.00	12.72	.7062	.00050	-.1329	3.52	118.9	.00569	.6887	.15602	4.41
525.13	0.00	14.81	.7933	.00525	-.1612	3.52	118.9	.00645	.7656	.20784	3.68
525.21	0.00	16.86	.8607	.00722	-.1813	3.52	118.9	.00663	.8216	.25656	3.20
524.51	0.00	17.89	.8844	.00880	-.1921	3.52	119.0	.00675	.8389	.28005	3.00
525.06	0.00	-.00	-.0044	.01299	.0013	3.52	119.0	.00272	-.0044	.01299	-.34

MACH NO .900 CONFIG. 4

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
534.09	0.00	-4.68	-.3680	.00920	-.0337	3.01	116.9	.00290	-.3660	.03917	-9.34
533.77	0.00	-2.34	-.1762	.01323	-.0195	3.00	118.2	.00328	-.1755	.02041	-8.60
534.00	0.00	-.06	-.0130	.01592	-.0015	2.99	119.1	.00350	-.0129	.01594	-.81
534.60	0.00	2.20	.1448	.01459	.0121	2.99	119.6	.00399	.1441	.02015	7.15
533.45	0.00	4.51	.3273	.01159	.0237	2.99	119.9	.00390	.3254	.03731	8.72
533.87	0.00	6.75	.4793	.01256	.0274	2.99	120.0	.00393	.4745	.06880	6.90
533.47	0.00	8.91	.6083	.01348	.0182	2.99	120.0	.00381	.5989	.10753	5.57
533.84	0.00	11.10	.7410	.01384	.0109	2.99	120.0	.00434	.7245	.15626	4.64
533.28	0.00	13.27	.8795	.01256	.0011	2.99	120.0	.00593	.8531	.21416	3.98
533.39	0.00	15.44	1.0080	.01133	-.0116	2.98	120.4	.00800	.9686	.27922	3.47
533.55	0.00	17.57	1.1186	.01081	-.0245	2.98	120.6	.00758	1.0632	.34803	3.05
532.90	0.00	19.77	1.2332	.01025	-.0185	2.98	120.6	.00695	1.1571	.42668	2.71
532.84	0.00	21.01	1.3067	.00917	-.0192	2.98	120.6	.00719	1.2165	.47712	2.55
533.52	0.00	-.05	-.0132	.01591	-.0022	2.99	119.1	.00366	-.0132	.01592	-.83

MACH NO .700 CONFIG. 4

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
524.52	0.00	-4.60	-.3203	.00725	-.0462	3.53	117.4	.00383	-.3187	.03294	-9.67
524.90	0.00	-2.31	-.1588	.01259	-.0234	3.53	117.2	.00338	-.1582	.01897	-8.34
525.44	0.00	-.05	-.0140	.01545	-.0031	3.54	117.2	.00284	-.0140	.01546	-.90
524.35	0.00	2.19	.1298	.01377	.0151	3.53	117.2	.00236	.1291	.01873	6.89
524.35	0.00	4.47	.2786	.00952	.0368	3.53	117.2	.00277	.2770	.03121	8.87
524.97	0.00	6.73	.4287	.00577	.0568	3.53	117.2	.00358	.4250	.05596	7.60
525.13	0.00	8.92	.5576	.00463	.0596	3.53	117.2	.00480	.5501	.09107	6.04
524.51	0.00	11.13	.6974	.00326	.0669	3.53	117.2	.00553	.6836	.13787	4.96
524.75	0.00	13.31	.8218	.00272	.0648	3.53	117.2	.00723	.7991	.19188	4.16
523.81	0.00	15.49	.9460	.00260	.0600	3.53	117.2	.00856	.9110	.25519	3.57
524.43	0.00	17.58	1.0513	.00428	.0400	3.53	117.2	.00965	1.0009	.32164	3.11
523.89	0.00	19.74	1.1521	.00569	.0383	3.53	117.1	.01040	1.0825	.39458	2.74
525.05	0.00	20.89	1.2133	.00525	.0377	3.54	117.1	.00987	1.1317	.43749	2.59
523.81	0.00	-.08	-.0183	.01537	-.0037	3.53	117.0	.00293	-.0183	.01539	-1.19

MACH NO 1.200 CONFIG. 4

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
661.10	0.00	-4.66	-.3622	.03325	.0133	3.16	121.1	.00159	-.3583	.06258	-5.73
660.84	0.00	-2.36	-.1822	.03682	.0047	3.16	121.6	.00154	-.1805	.04430	-4.07
661.08	0.00	-.06	-.0139	.03899	-.0010	3.16	121.2	.00148	-.0138	.03901	-.35
661.01	0.00	2.22	.1496	.03864	-.0050	3.17	120.9	.00151	.1479	.04441	3.33
660.88	0.00	4.56	.3203	.03646	-.0034	3.17	120.9	.00156	.3164	.06183	5.12
660.69	0.00	6.84	.4720	.03359	-.0012	3.17	120.7	.00155	.4646	.08955	5.19
660.74	0.00	9.11	.6227	.03051	-.0041	3.16	121.0	.00153	.6100	.12871	4.74
660.76	0.00	11.34	.7689	.02640	-.0153	3.16	120.9	.00158	.7487	.17704	4.23
660.76	0.00	13.54	.9135	.02283	-.0422	3.17	120.7	.00191	.8828	.23602	3.74
660.85	0.00	15.77	1.0586	.02027	-.0506	3.17	120.9	.00222	1.0133	.30724	3.30
660.73	0.00	17.99	1.1911	.01807	-.0624	3.16	120.9	.00227	1.1273	.38511	2.93
660.98	0.00	20.20	1.3331	.01705	-.0766	3.17	120.7	.00243	1.2452	.47641	2.61
660.91	0.00	21.51	1.4251	.01666	-.0852	3.16	120.9	.00246	1.3198	.53805	2.45
660.91	0.00	-.06	-.0127	.03881	-.0024	3.17	120.7	.00147	-.0126	.03882	-.33

MACH NO 1.030 CONFIG. 4

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
601.94	0.00	-4.67	-.3841	.02985	.0043	3.11	120.0	.00220	-.3804	.06100	-6.24
601.90	0.00	-2.34	-.1935	.03529	.0038	3.11	119.9	.00199	-.1919	.04315	-4.45
602.16	0.00	-.05	-.0159	.03766	.0011	3.11	119.9	.00193	-.0159	.03767	-.42
601.92	0.00	2.22	.1617	.03653	-.0033	3.11	119.9	.00202	.1601	.04277	3.74
601.60	0.00	4.53	.3399	.03290	-.0034	3.11	120.4	.00209	.3362	.05966	5.64
601.98	0.00	6.82	.5195	.02822	-.0087	3.10	121.1	.00214	.5124	.08972	5.71
601.88	0.00	9.08	.6788	.02460	-.0134	3.10	122.0	.00230	.6664	.13139	5.07
601.90	0.00	11.25	.8194	.02054	-.0349	3.10	121.5	.00296	.7997	.17998	4.44
602.03	0.00	13.41	.9703	.01921	-.0693	3.11	120.7	.00384	.9394	.24376	3.85
601.93	0.00	15.76	1.1464	.01687	-.0885	3.10	120.9	.00374	1.0987	.32758	3.35
602.19	0.00	17.86	1.2865	.01466	-.1041	3.11	120.4	.00406	1.2200	.40863	2.99
601.89	0.00	20.04	1.4209	.01340	-.1211	3.11	120.4	.00412	1.3303	.49941	2.66
601.88	0.00	21.34	1.5059	.01125	-.1253	3.11	120.1	.00459	1.3986	.55843	2.50
601.81	0.00	-.07	-.0165	.03734	.0008	3.12	118.8	.00191	-.0164	.03735	-.44

MACH NO .950 CONFIG. 4

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
562.18	0.00	-4.64	-.3876	.01643	-.0017	3.05	119.6	.00249	-.3850	.04775	-8.06
562.30	0.00	-2.32	-.1876	.01809	-.0011	3.04	120.2	.00266	-.1867	.02566	-7.27
562.53	0.00	-.05	-.0103	.01949	-.0008	3.04	120.2	.00273	-.0103	.01950	-.53
562.66	0.00	2.23	.1677	.01933	-.0036	3.04	120.4	.00292	.1669	.02583	6.46
562.26	0.00	4.51	.3551	.01876	-.0086	3.04	120.4	.00275	.3525	.04660	7.56
562.19	0.00	6.74	.5302	.01858	-.0205	3.04	120.4	.00268	.5244	.08071	6.50
562.57	0.00	8.95	.6526	.01851	-.0223	3.04	120.4	.00334	.6418	.11984	5.36
562.48	0.00	11.12	.7861	.01799	-.0371	3.04	120.6	.00408	.7679	.16922	4.54
562.83	0.00	13.33	.9391	.01588	-.0497	3.03	121.6	.00598	.9102	.23193	3.92
562.38	0.00	15.52	1.0860	.01334	-.0618	3.02	122.7	.00681	1.0428	.30339	3.44
562.72	0.00	17.71	1.2018	.01183	-.0658	3.03	121.7	.00686	1.1412	.37686	3.03
561.38	0.00	19.90	1.3086	.01039	-.0527	3.03	121.1	.00684	1.2270	.45515	2.70
562.01	0.00	21.17	1.3789	.00905	-.0508	3.04	120.7	.00682	1.2825	.50648	2.53
562.26	0.00	-.06	-.0131	.01942	-.0021	3.06	117.2	.00266	-.0131	.01944	-.68

MACH NO 1.200 CONFIG. 5

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
660.99	0.00	-4.58	-.3370	.03640	.0064	3.16	121.4	.00157	-.3330	.06322	-5.27
660.94	0.00	-2.26	-.1731	.03861	.0058	3.16	121.0	.00154	-.1714	.04542	-3.77
660.91	0.00	.03	-.0116	.03945	.0029	3.17	120.6	.00137	-.0116	.03945	-.29
661.13	0.00	2.33	.1565	.03777	-.0031	3.17	120.5	.00149	.1548	.04410	3.51
661.04	0.00	4.62	.3392	.03441	-.0126	3.17	120.6	.00155	.3354	.06163	5.44
660.93	0.00	6.92	.5212	.03013	-.0271	3.17	120.5	.00151	.5138	.09267	5.54
660.70	0.00	9.22	.7090	.02614	-.0413	3.17	120.6	.00142	.6956	.13943	4.99
661.18	0.00	11.51	.8892	.02249	-.0548	3.17	120.5	.00132	.8668	.19941	4.35
661.15	0.00	13.82	1.0690	.01870	-.0700	3.17	120.4	.00146	1.0336	.27345	3.78
661.05	0.00	16.08	1.2026	.01558	-.0615	3.17	120.4	.00192	1.1513	.34801	3.31
660.84	0.00	18.34	1.3567	.01304	-.0698	3.17	120.5	.00175	1.2837	.43921	2.92
661.11	0.00	20.54	1.5002	.01068	-.0920	3.16	121.1	.00188	1.4011	.53636	2.61
660.92	0.00	21.85	1.5846	.00956	-.1007	3.17	120.9	.00208	1.4672	.59865	2.45
660.91	0.00	.03	-.0085	.03936	.0026	3.17	120.5	.00135	-.0085	.03936	-.22

MACH NO 1.030 CONFIG. 5

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
602.16	0.00	-4.56	-.3535	.03220	.0002	3.10	121.1	.00204	-.3498	.06022	-5.81
601.84	0.00	-2.28	-.1829	.03579	.0004	3.11	120.9	.00189	-.1813	.04302	-4.21
602.10	0.00	.02	-.0150	.03807	.0007	3.11	120.6	.00172	-.0150	.03807	-.39
602.21	0.00	2.32	.1648	.03650	-.0033	3.11	120.5	.00176	.1632	.04314	3.78
602.09	0.00	4.63	.3649	.03160	-.0109	3.11	120.6	.00178	.3612	.06093	5.93
602.25	0.00	6.95	.5726	.02569	-.0247	3.10	121.1	.00180	.5653	.09478	5.96
602.40	0.00	9.26	.7692	.02056	-.0278	3.10	121.4	.00202	.7559	.14411	5.24
601.74	0.00	11.51	.9505	.01601	-.0455	3.10	120.9	.00196	.9281	.20536	4.52
602.26	0.00	13.82	1.1282	.01207	-.0455	3.11	120.6	.00222	1.0926	.28123	3.89
602.11	0.00	16.09	1.2941	.00959	-.0492	3.11	120.1	.00196	1.2407	.36788	3.37
602.00	0.00	18.33	1.4570	.00783	-.0574	3.11	119.9	.00205	1.3806	.46571	2.96
602.21	0.00	20.58	1.6198	.00577	-.0708	3.11	119.9	.00216	1.5144	.57487	2.63
602.32	0.00	21.88	1.7138	.00519	-.0820	3.11	119.7	.00224	1.5884	.64357	2.47
601.64	0.00	.03	-.0082	.03758	-.0001	3.12	118.5	.00173	-.0082	.03758	-.22

MACH NO .950 CONFIG. 5

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
562.19	0.00	-4.52	-.3718	.01838	.0103	3.04	119.7	.00271	-.3692	.04762	-7.75
561.95	0.00	-2.24	-.1896	.01907	.0052	3.04	119.9	.00267	-.1888	.02645	-7.14
562.00	0.00	.02	-.0170	.02009	.0046	3.04	119.9	.00248	-.0170	.02008	-.85
562.03	0.00	2.28	.1620	.01933	.0041	3.04	120.0	.00265	.1611	.02577	6.25
562.04	0.00	4.61	.3604	.01766	.0039	3.04	120.0	.00255	.3578	.04655	7.69
561.90	0.00	6.90	.5524	.01671	.0013	3.04	120.1	.00251	.5464	.08297	6.59
561.90	0.00	9.20	.7273	.01532	.0057	3.04	120.7	.00284	.7155	.13137	5.45
562.48	0.00	11.47	.8920	.01348	.0118	3.03	121.2	.00275	.8715	.19062	4.57
562.64	0.00	13.70	1.0542	.01137	-.0004	3.05	119.2	.00321	1.0216	.26069	3.92
562.63	0.00	15.96	1.2311	.00948	-.0066	3.03	121.6	.00397	1.1811	.34766	3.40
562.50	0.00	18.20	1.3971	.00806	-.0121	3.04	120.9	.00434	1.3247	.44398	2.98
562.51	0.00	20.43	1.5438	.00631	-.0116	3.04	120.1	.00564	1.4445	.54480	2.65
562.54	0.00	21.75	1.6263	.00556	-.0110	3.04	120.0	.00553	1.5085	.60786	2.48
562.60	0.00	.03	-.0146	.02013	.0050	3.06	118.1	.00245	-.0147	.02012	-.73

MACH NO .900 CONFIG. 5

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
533.87	0.00	-4.54	-.3446	.01099	-.0221	2.99	118.9	.00260	-.3427	.03821	-8.97
533.46	0.00	-2.24	-.1694	.01413	-.0148	2.99	119.7	.00280	-.1687	.02074	-8.14
534.11	0.00	.03	-.0110	.01663	.0027	2.99	120.1	.00290	-.0110	.01662	-.66
534.15	0.00	2.31	.1510	.01467	.0193	2.99	120.1	.00327	.1503	.02075	7.25
533.31	0.00	4.63	.3414	.01063	.0353	2.98	120.2	.00296	.3394	.03816	8.90
533.34	0.00	6.90	.5220	.01025	.0399	2.98	120.2	.00289	.5170	.07289	7.09
533.32	0.00	9.16	.6855	.01033	.0442	2.98	120.2	.00310	.6751	.11937	5.66
533.55	0.00	11.39	.8261	.01167	.0493	2.98	120.2	.00332	.8075	.17453	4.63
533.60	0.00	13.60	.9830	.01014	.0451	2.98	120.4	.00338	.9531	.24102	3.95
533.75	0.00	15.86	1.1455	.00866	.0455	2.98	120.4	.00414	1.0996	.32129	3.42
533.81	0.00	18.07	1.2976	.00758	.0463	2.98	120.5	.00473	1.2312	.40979	3.00
533.47	0.00	20.30	1.4414	.00579	.0493	2.98	121.1	.00528	1.3498	.50560	2.67
533.49	0.00	21.59	1.5017	.00608	.0492	2.98	120.5	.00539	1.3941	.55832	2.50
533.86	0.00	.03	-.0113	.01646	.0025	2.99	119.1	.00291	-.0113	.01645	-.69

MACH NO .700 CONFIG. 5

Q	BETA	ALPHA	CN	CA	CM	R/FT	TEMP	CMWSG	CL	CD	L/D
523.96	0.00	-4.49	-.2972	.00851	-.0388	3.51	120.5	.00346	-.2956	.03177	-9.31
523.96	0.00	-2.24	-.1539	.01307	-.0179	3.50	120.6	.00302	-.1532	.01907	-8.04
523.26	0.00	.02	-.0117	.01587	.0025	3.50	120.7	.00255	-.0117	.01587	-.74
523.86	0.00	2.28	.1337	.01397	.0213	3.50	120.7	.00214	.1330	.01928	6.90
523.96	0.00	4.57	.2969	.00909	.0438	3.51	120.5	.00261	.2953	.03274	9.02
523.80	0.00	6.89	.4726	.00454	.0636	3.51	120.1	.00325	.4686	.06117	7.66
524.04	0.00	9.13	.6328	.00169	.0733	3.51	120.0	.00384	.6246	.10213	6.12
523.88	0.00	11.39	.7898	.00084	.0905	3.51	120.0	.00446	.7741	.15683	4.94
522.49	0.00	13.67	.9559	.00029	.1011	3.50	120.0	.00469	.9288	.22613	4.11
523.74	0.00	15.89	1.0913	-.00123	.1120	3.51	120.0	.00541	1.0499	.29764	3.53
523.80	0.00	18.13	1.2439	-.00219	.1215	3.51	120.0	.00577	1.1828	.38494	3.07
523.73	0.00	20.36	1.3743	-.00253	.1363	3.51	120.0	.00603	1.2893	.47579	2.71
523.96	0.00	21.65	1.4361	-.00157	.1388	3.51	120.2	.00621	1.3354	.52837	2.53
523.65	0.00	.03	-.0093	.01586	.0021	3.51	120.2	.00246	-.0093	.01586	-.59

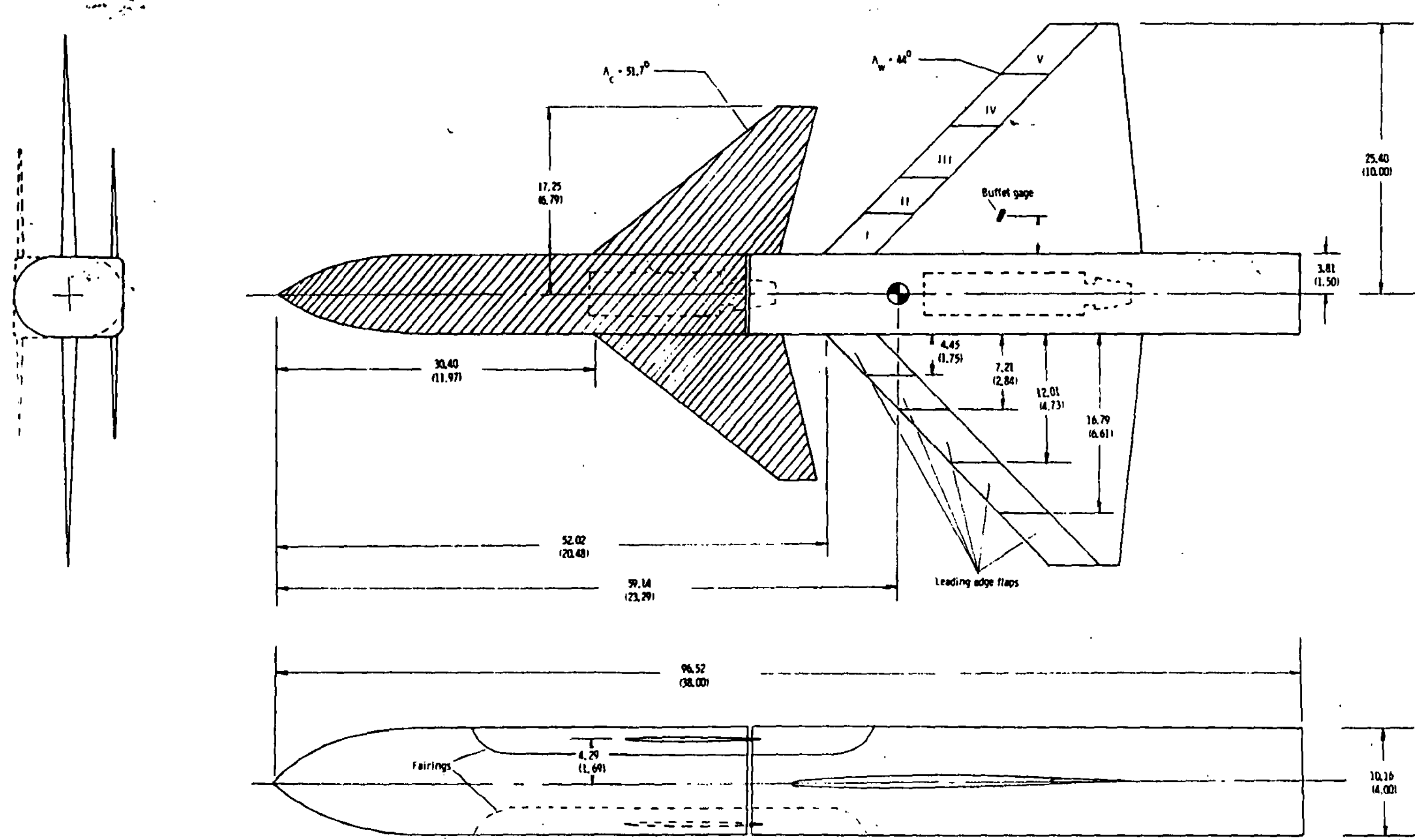


Figure 1.- Three view sketch of model; dimensions in centimeters (inches).

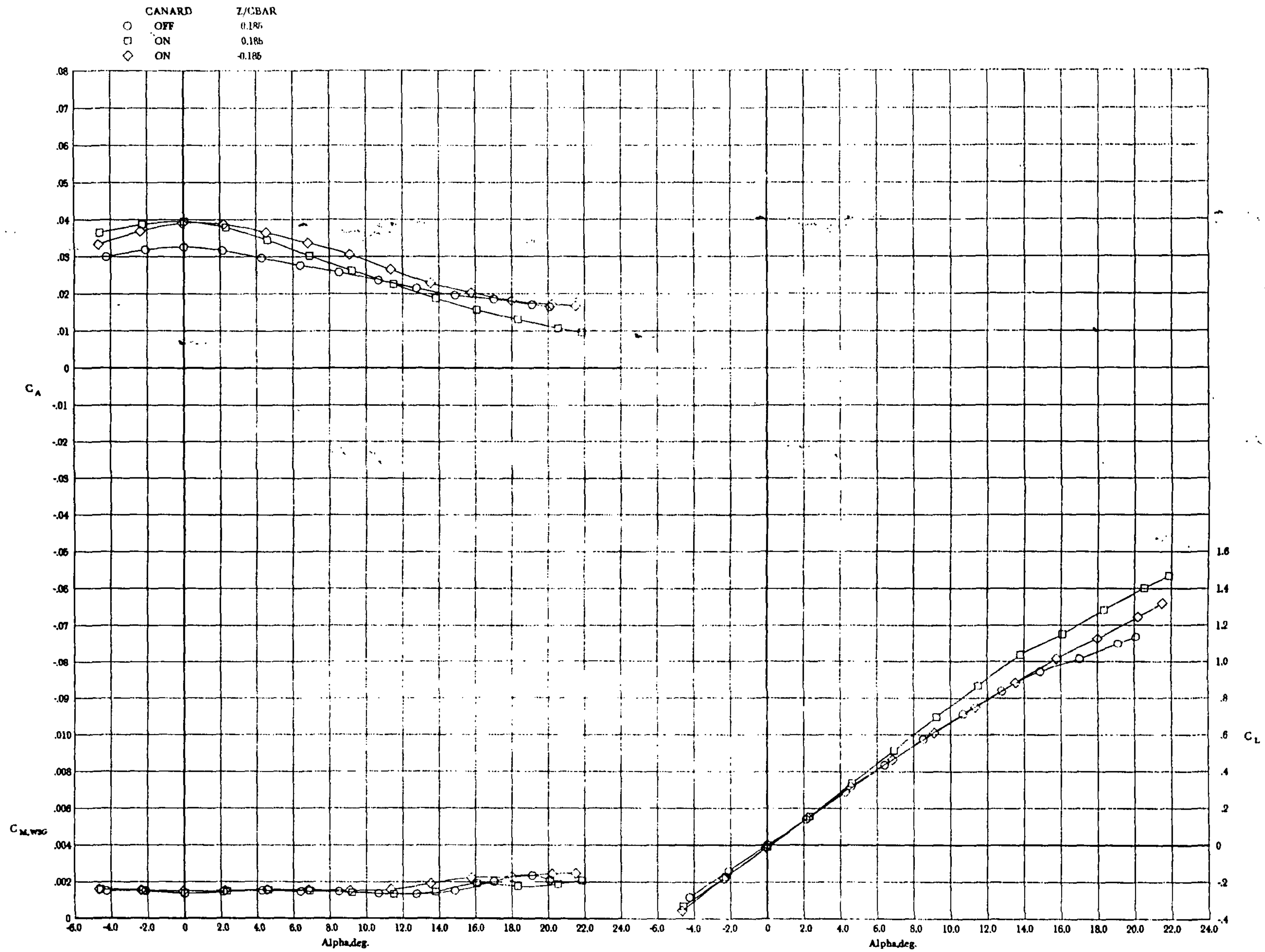


Figure 2.- Effect of canard position on the longitudinal aerodynamic characteristics and wing buffet for the model with the leading edge flaps undeflected at a Mach number of 1.20.

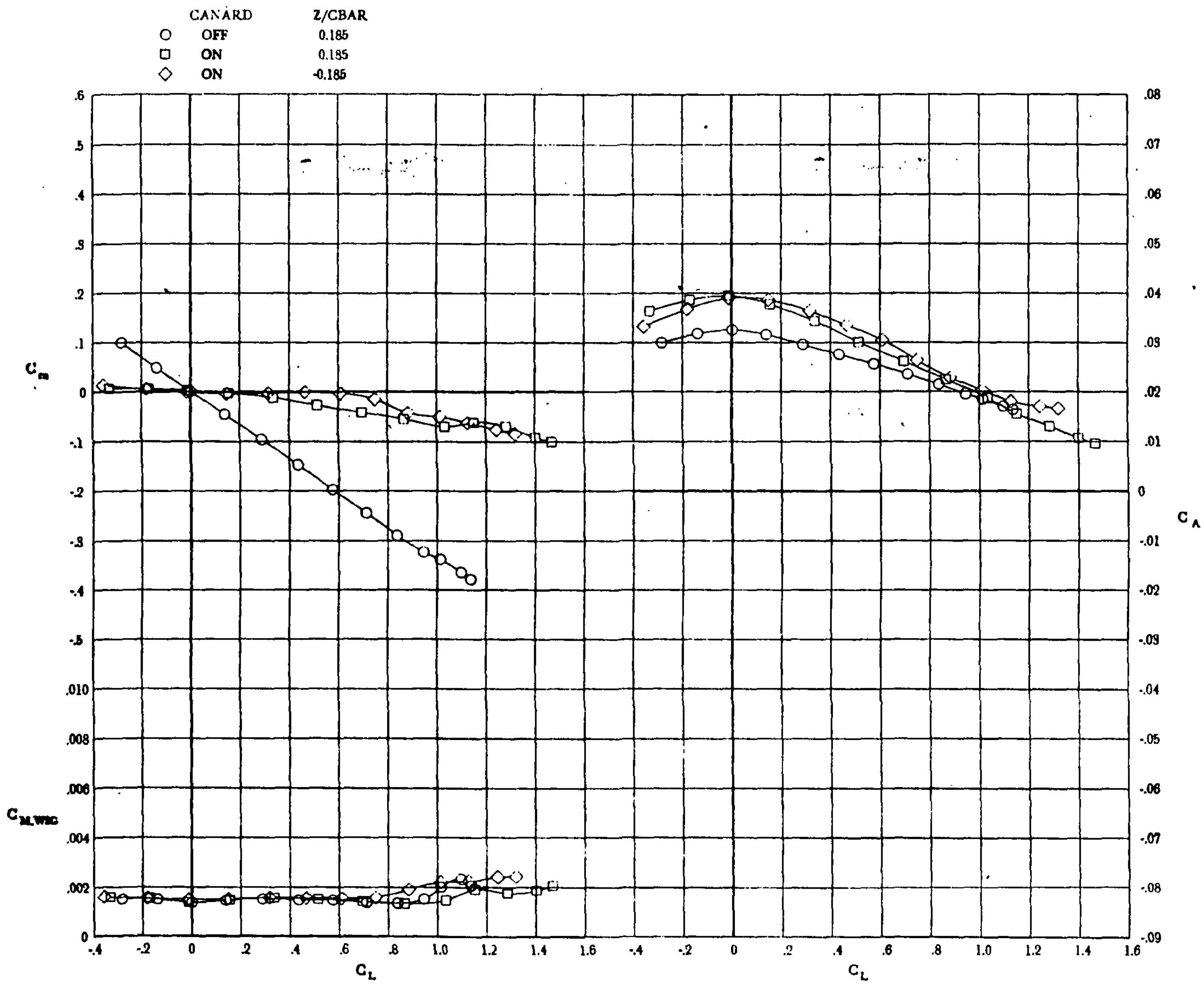


Figure 2.- Continued.

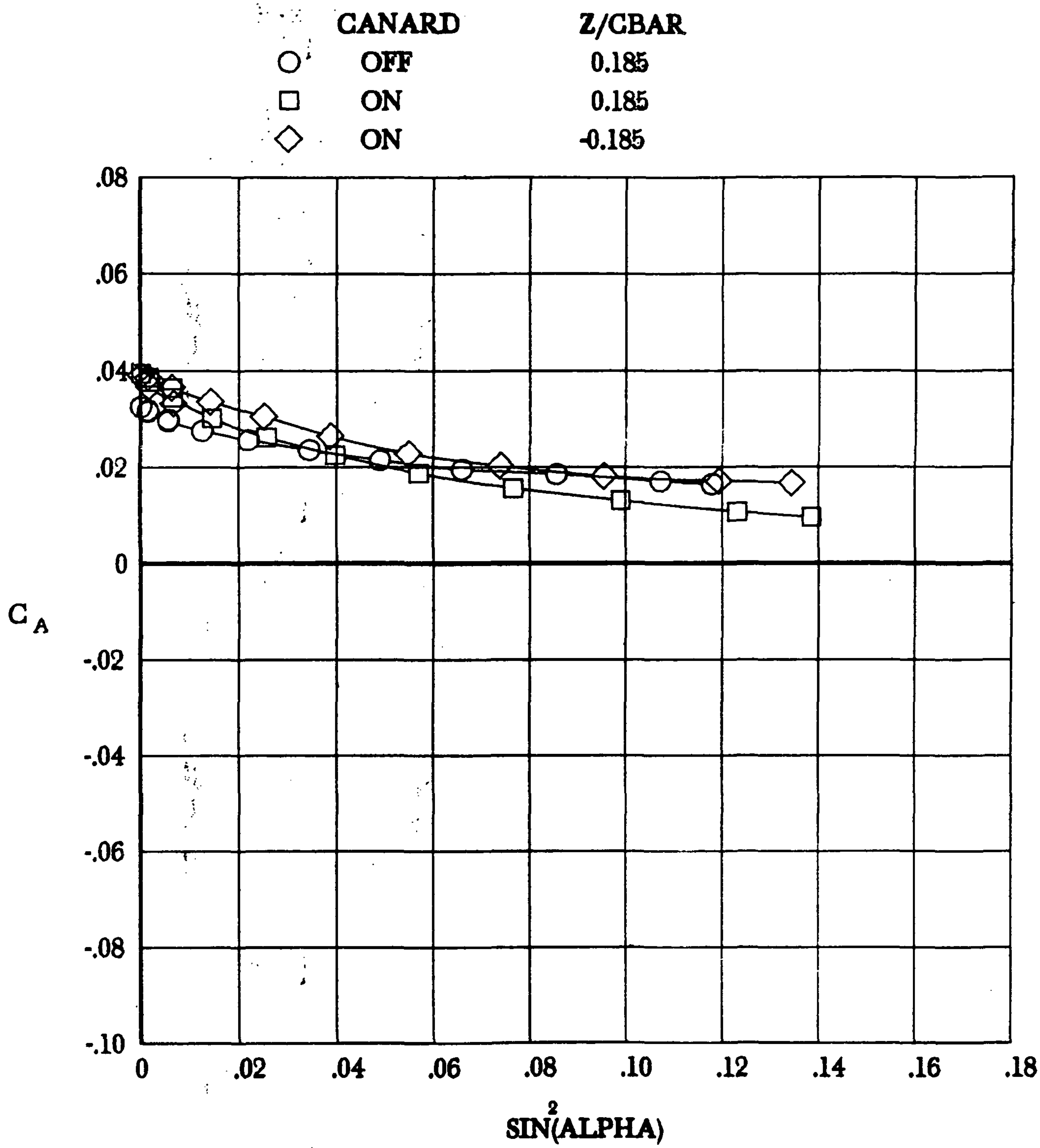
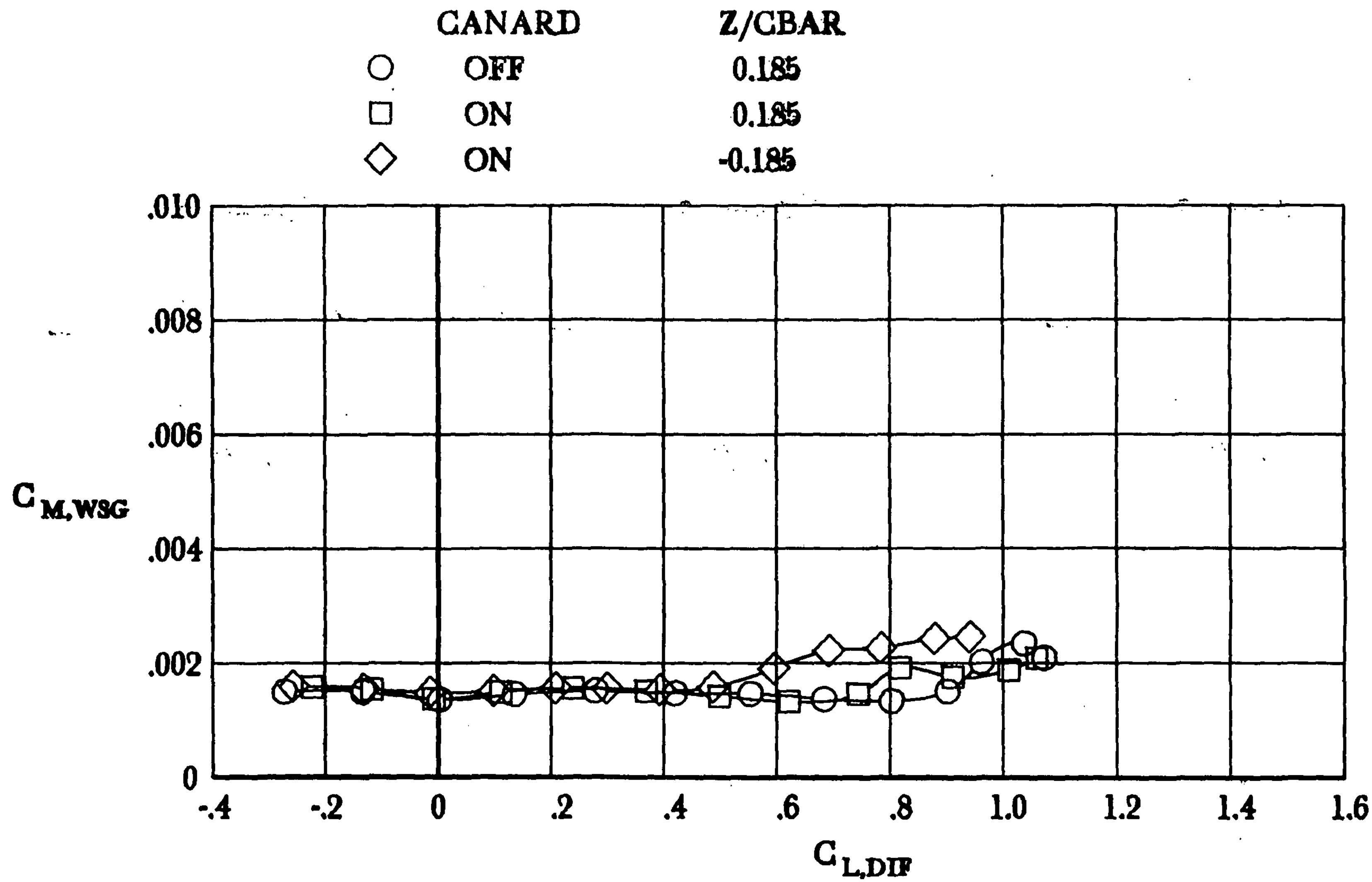


Figure 2.- Continued.

SHEET 101 TYPE 1 TEST 670
RUNS 18 1 22 0 0 0 0 0 0 0



D
Figure 2.- Concluded.

SHEET 101 TYPE 1 TEST 670
RUNS 16 1 22 0 0 0 0 0 0 0

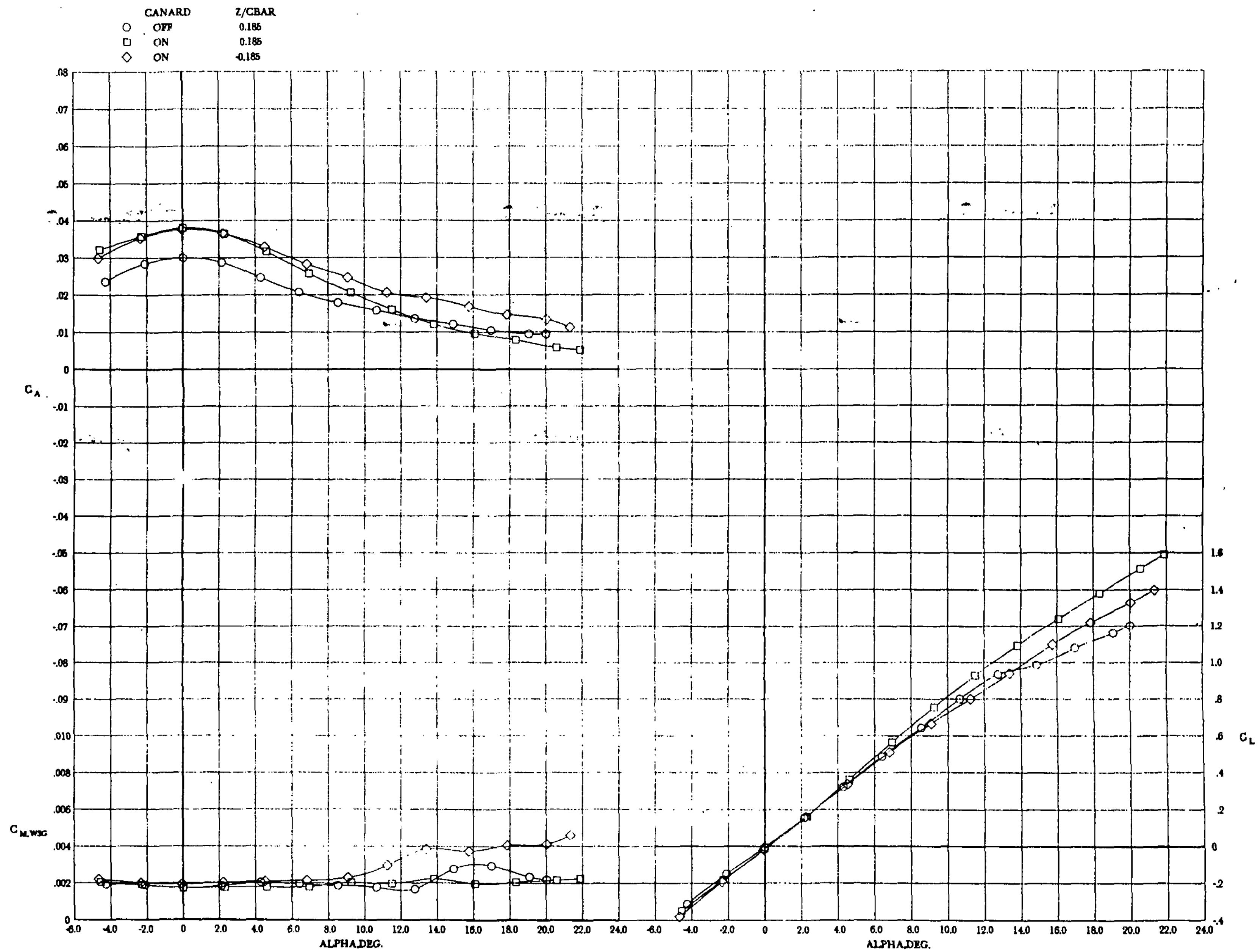


Figure 3.- Effect of canard position on the longitudinal aerodynamic characteristics and wing buffet for the model with the leading edge flaps undeflected at a Mach number of 1.03.

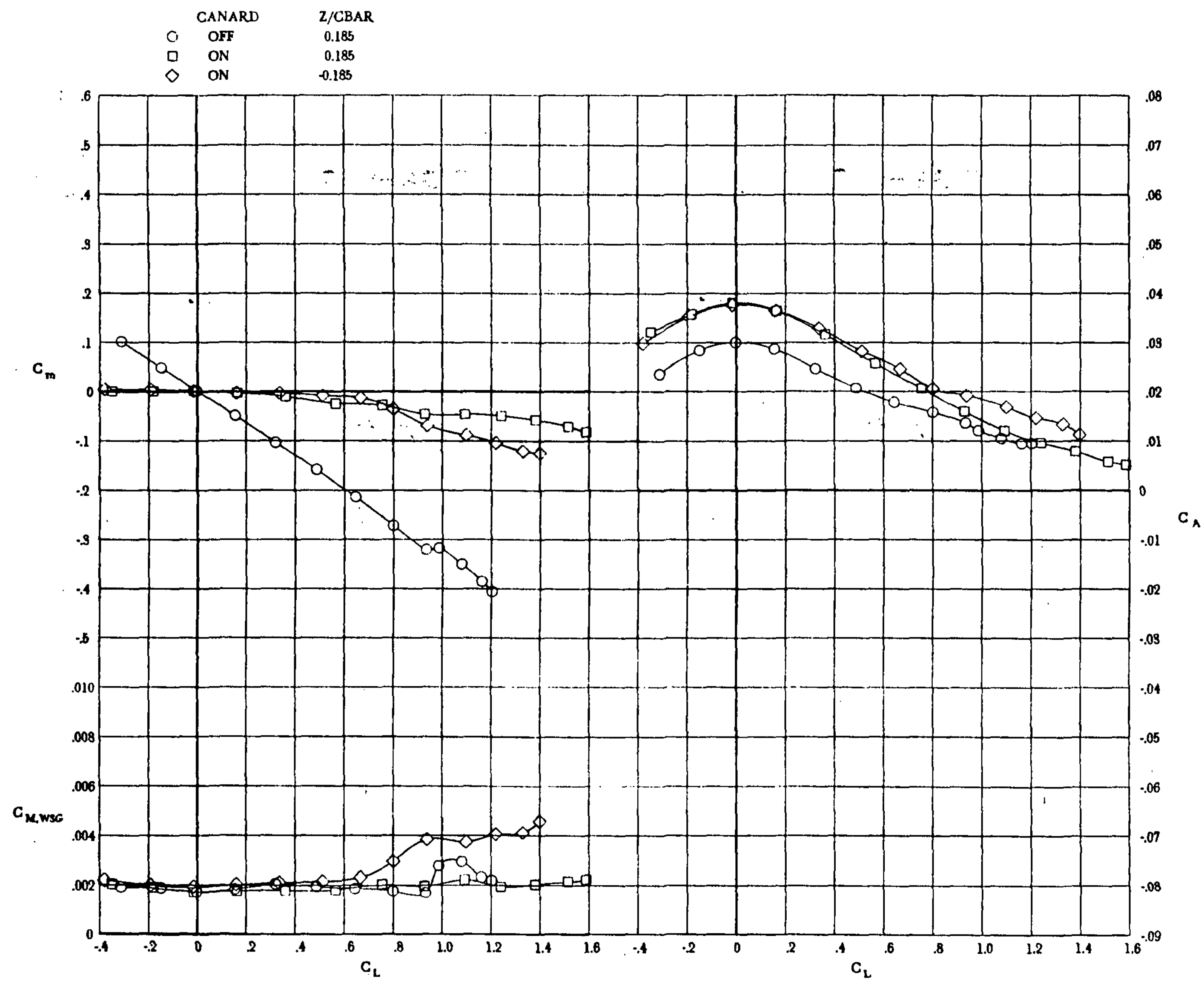
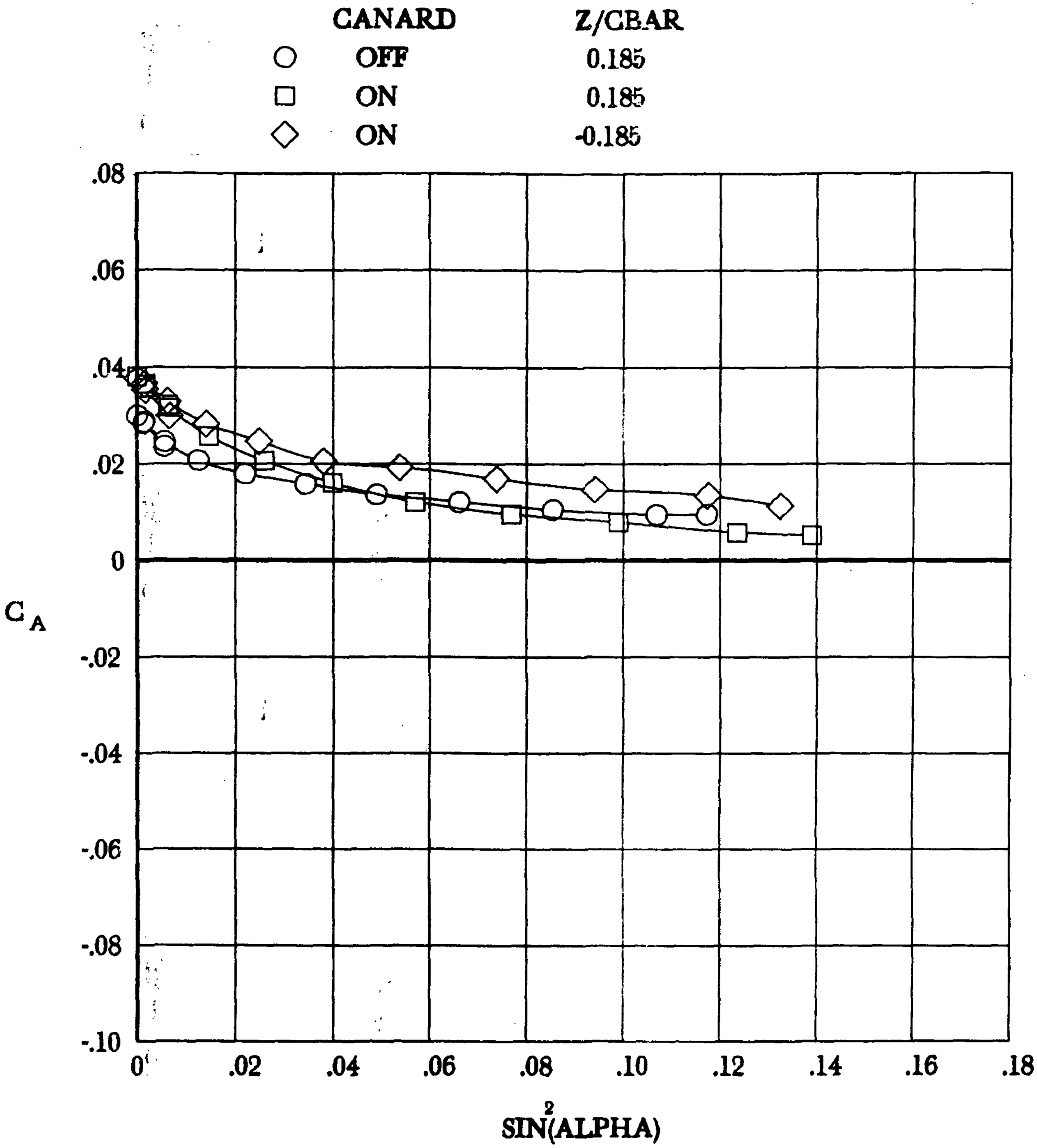
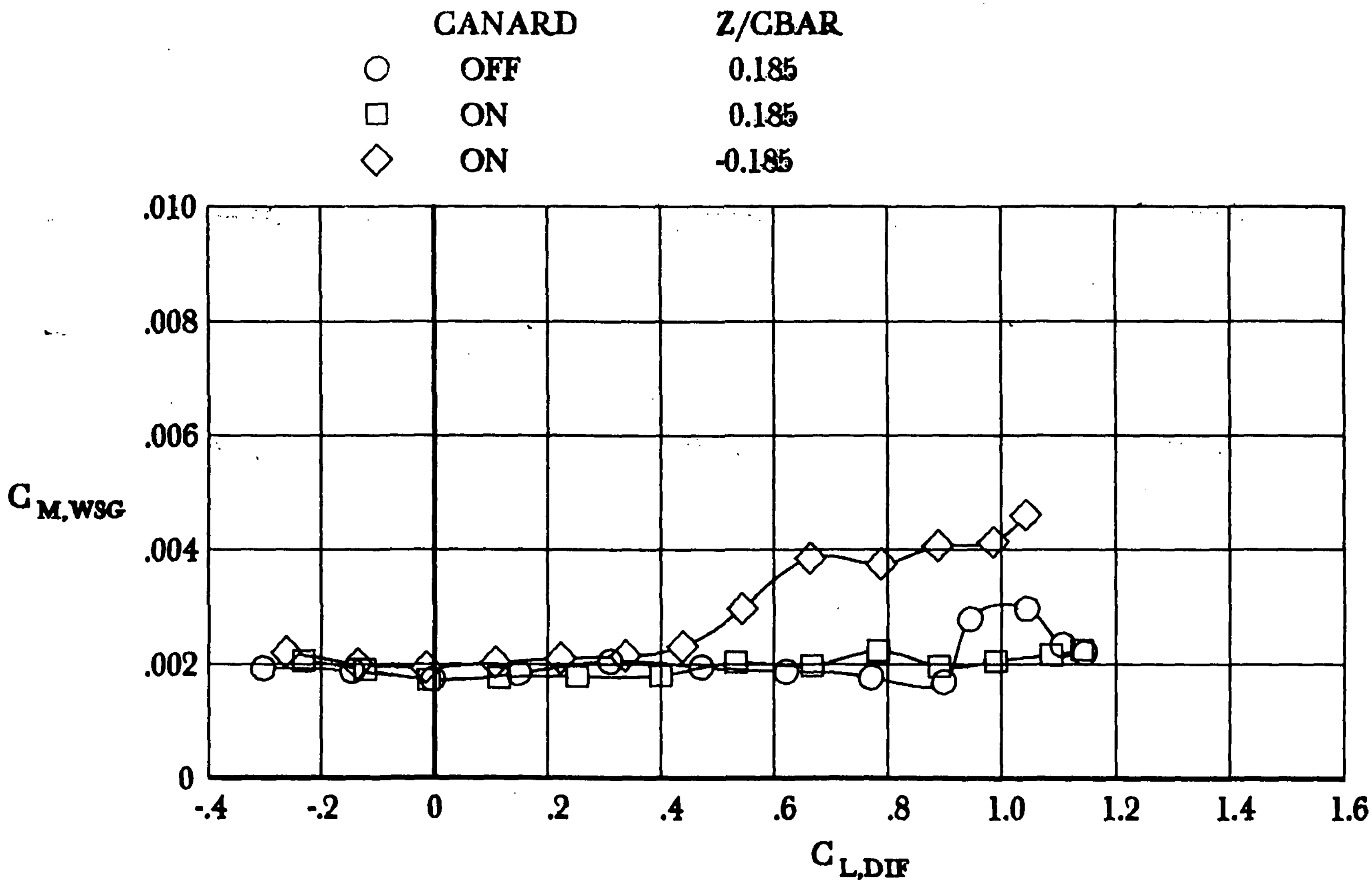


Figure 3.- Continued.



C
Figure 3.- Continued.

SHEET 103 TYPE 1 TEST 670
RUNS 17 2 23 0 0 0 0 0 0 0



D
Figure 3. - Concluded.

SHEET 102 TYPE 1 TEST 670
RUNS 17 2 23 0 0 0 0 0 0 0

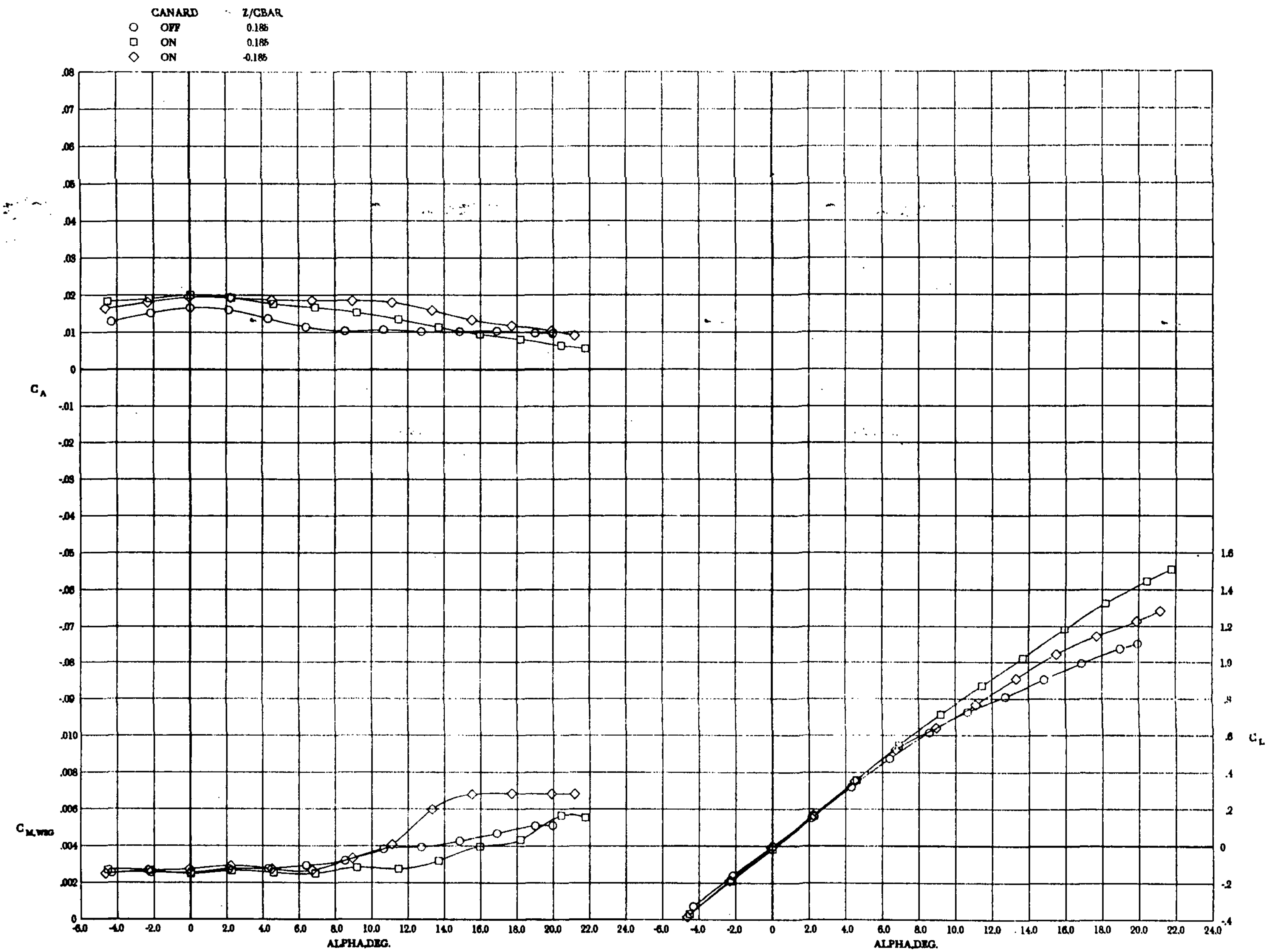


Figure 4.- Effect of canard position on the longitudinal aerodynamic characteristics and wing buffet for the model with the leading edge flaps undeflected at a Mach number of 0.95.

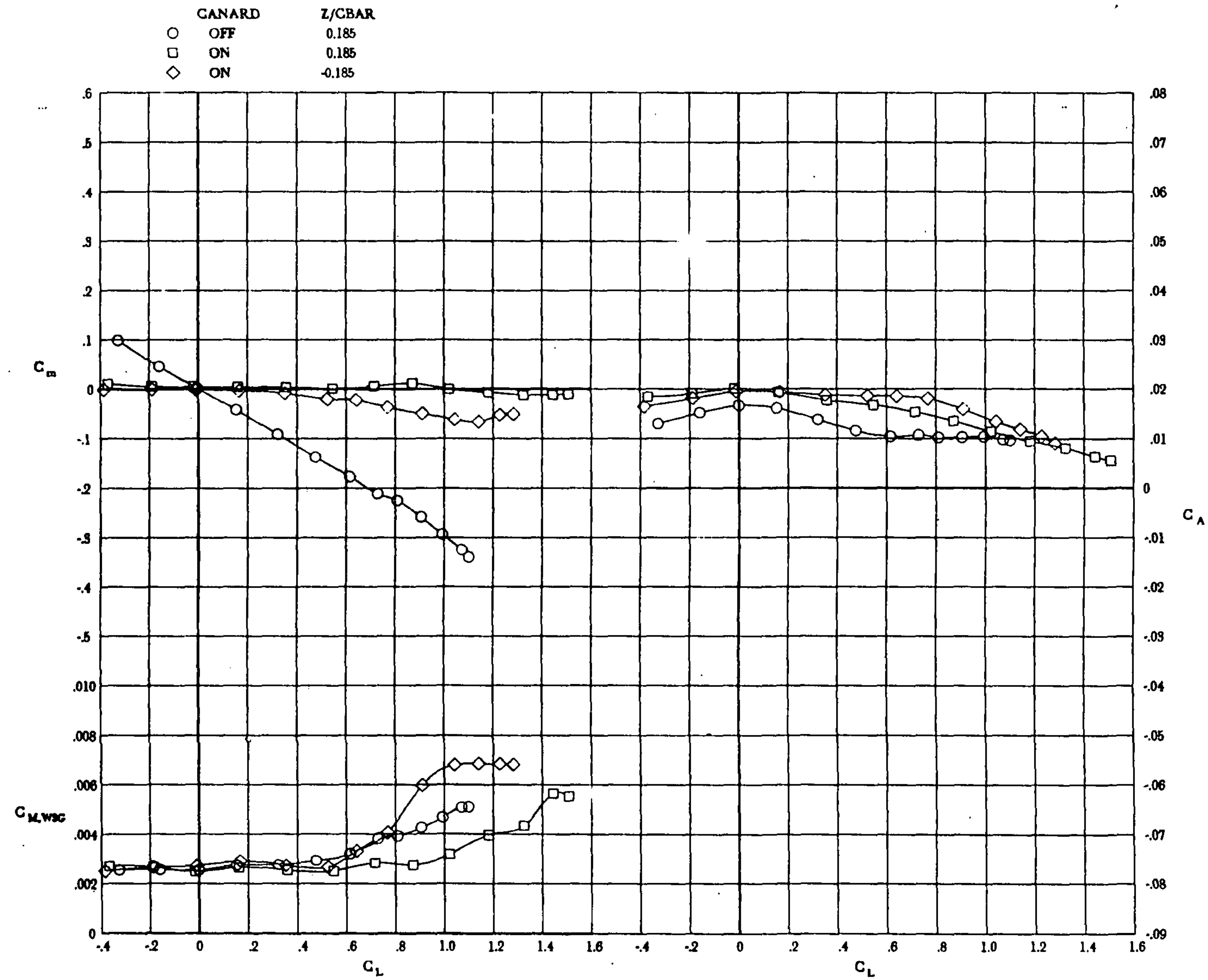
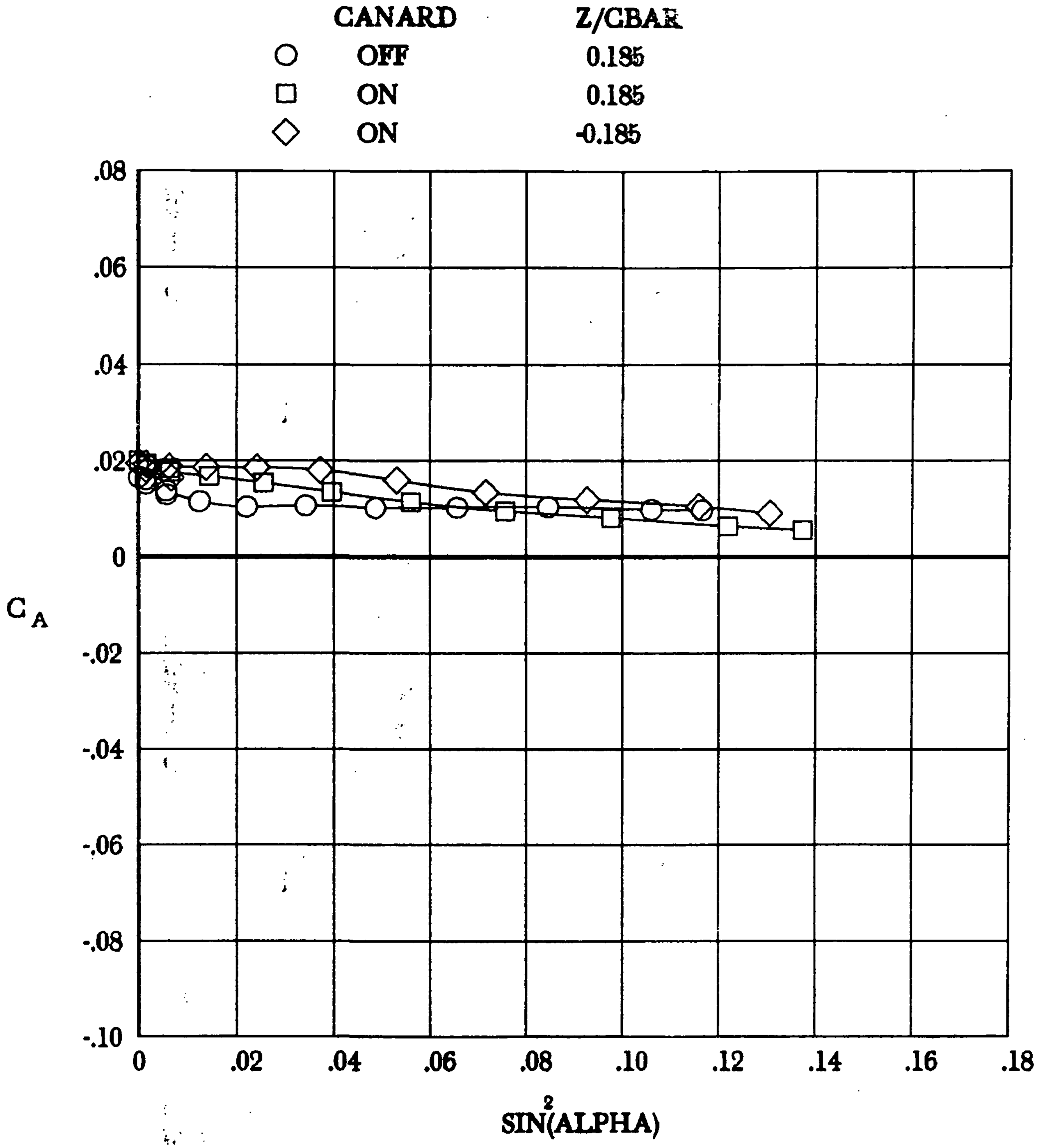
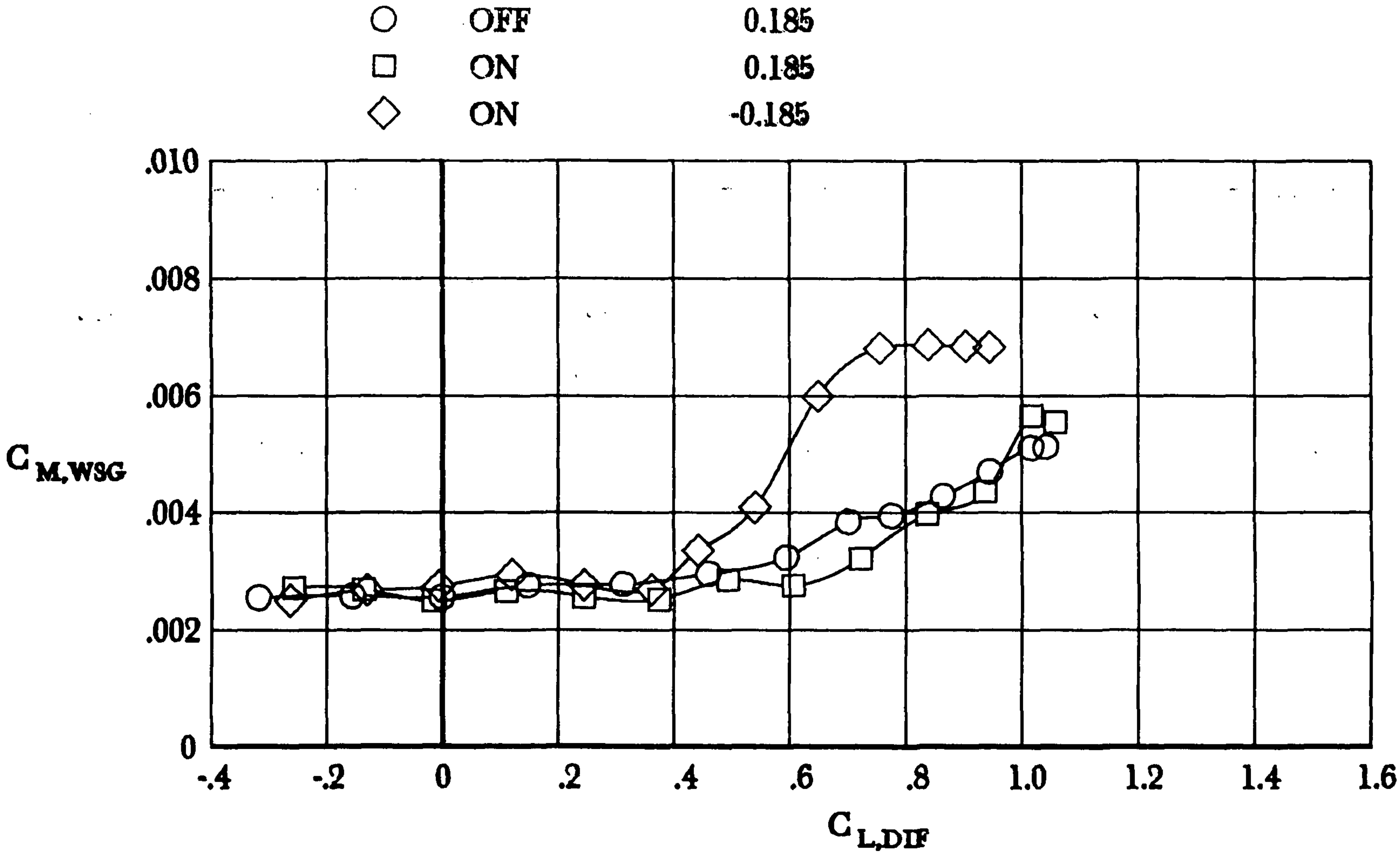


Figure 4.- Continued.



(c) Figure 4. - Continued.

SHEET 103 TYPE 1 TEST 670
RUNS 18 3 24 0 0 0 0 0 0 0



D
Figure 4. - Concluded.

SHEET 103 TYPE 1 TEST 670
RUNS 18 9 24 0 0 0 0 0 0 0

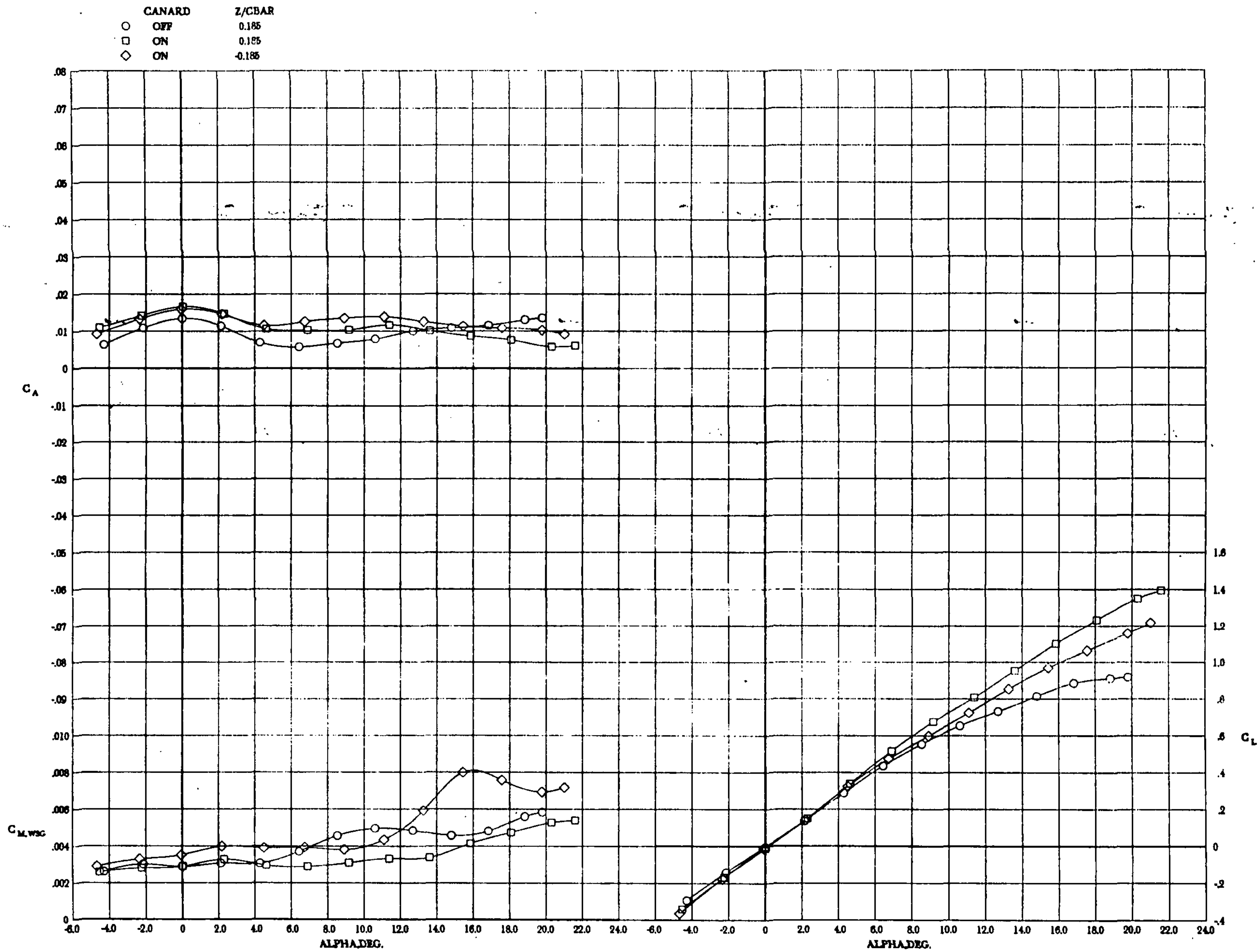


Figure 5.- Effect of canard position on the longitudinal aerodynamic characteristics and wing buffet for the model with the leading edge flaps undeflected at a Mach number of 0.90.

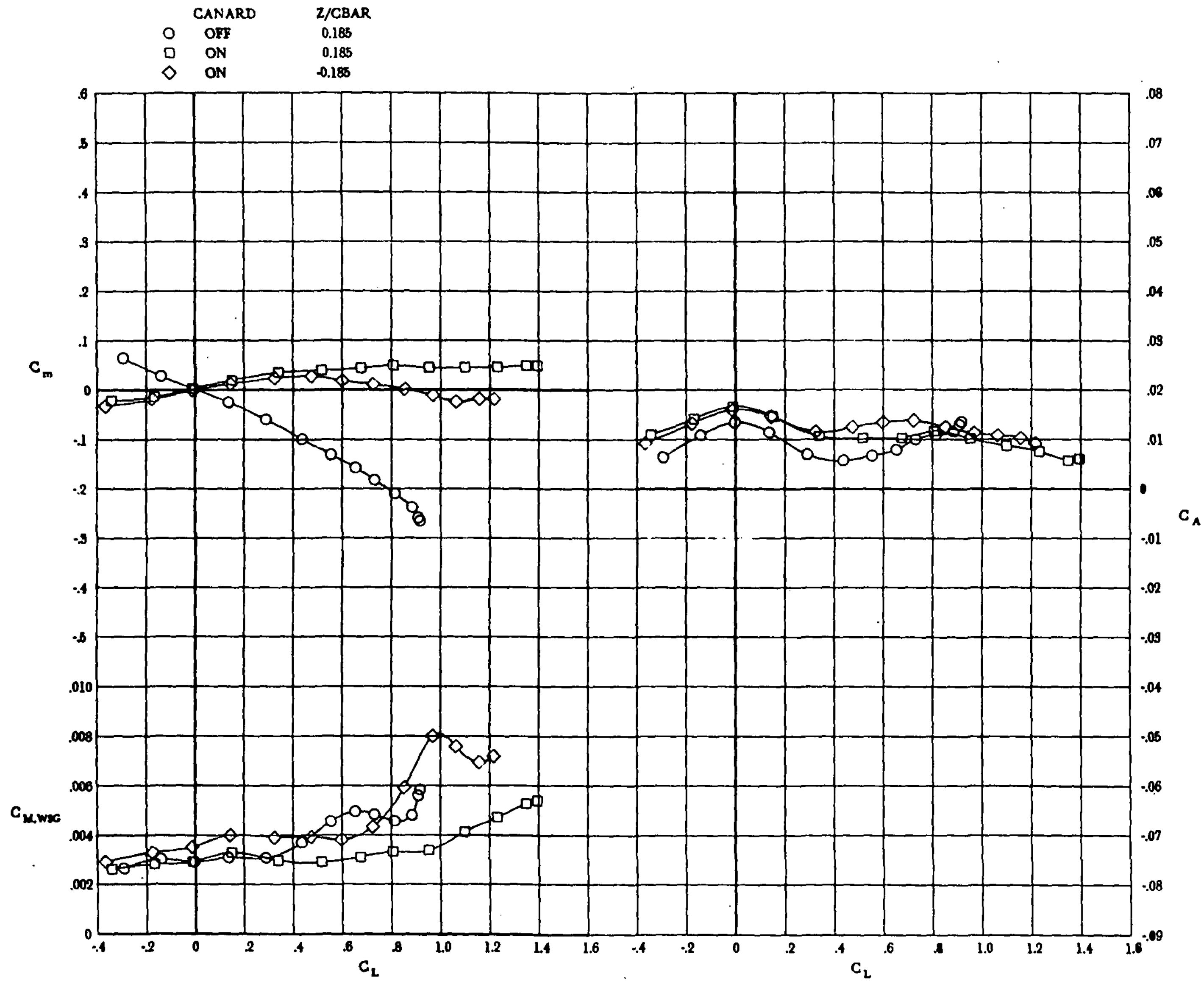
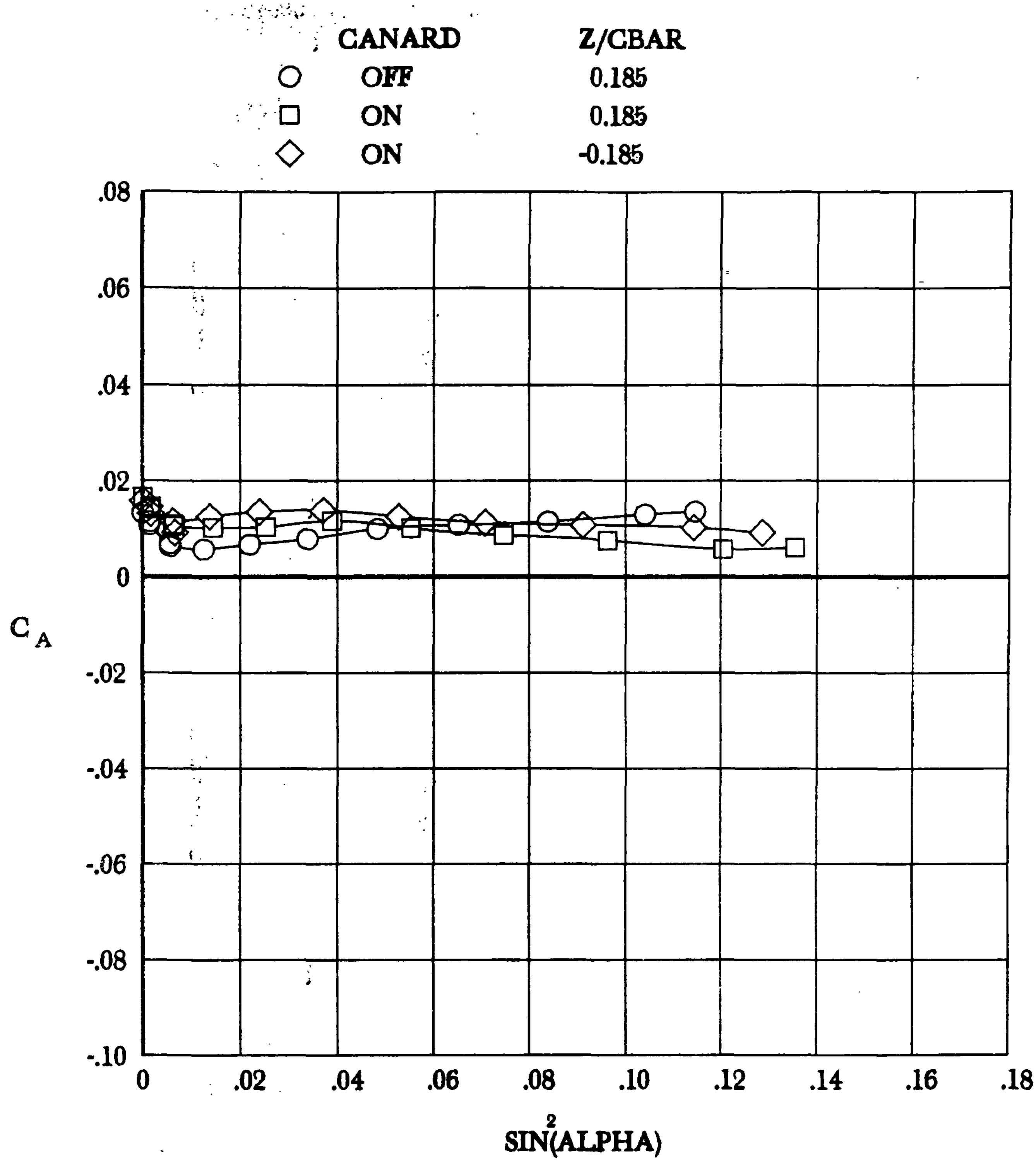
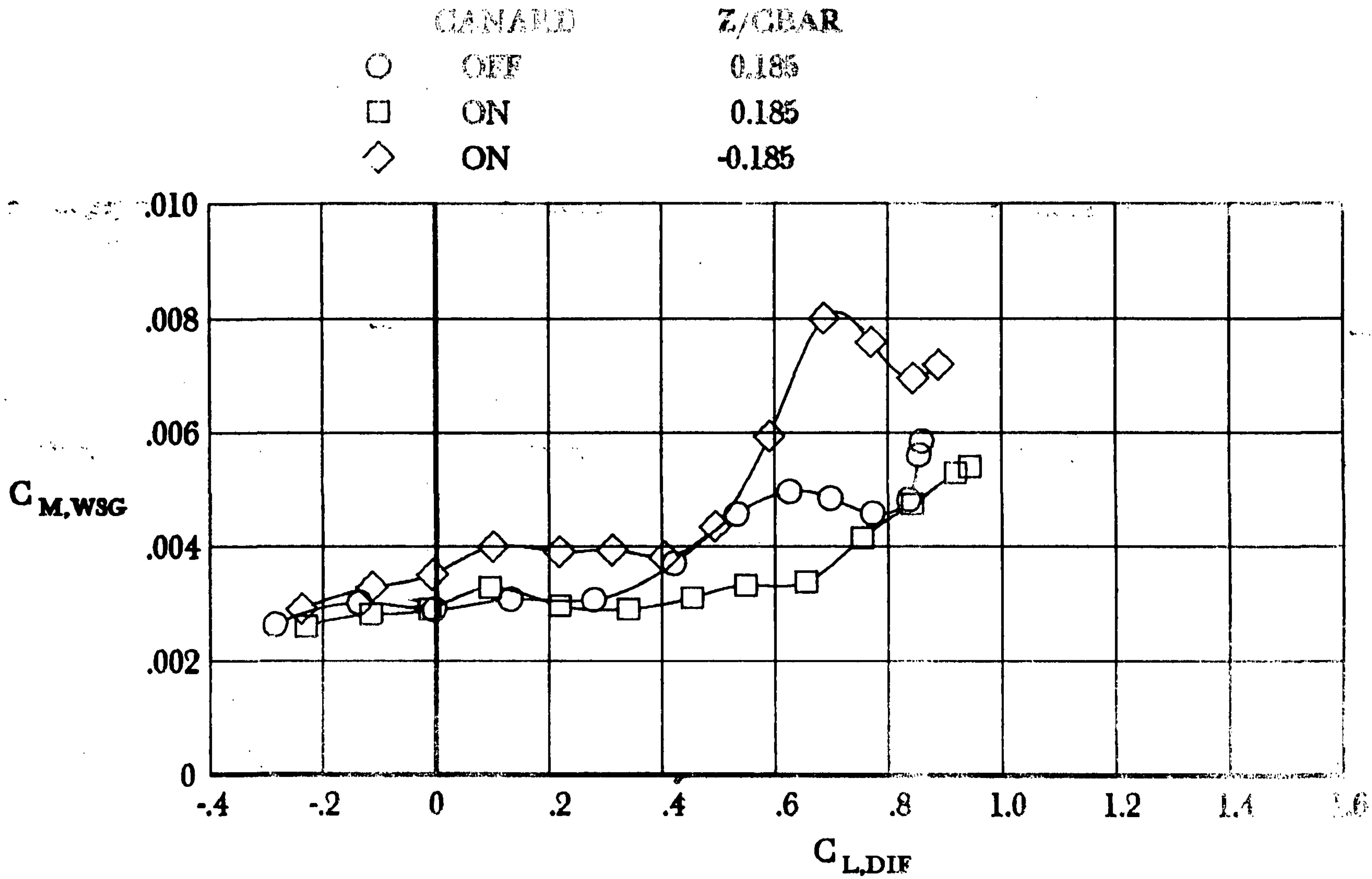


Figure 5.- Continued.



C
Figure 5.- Continued.

SHEET 104 TYPE 1 TEST 670
RUNS 19 4 25 0 0 0 0 0 0 0



D
Figure 5. - Concluded.

SHEET 104 TYPE 1 TEST 670
RUNS 19 4 25 0 0 0 0 0 0 0

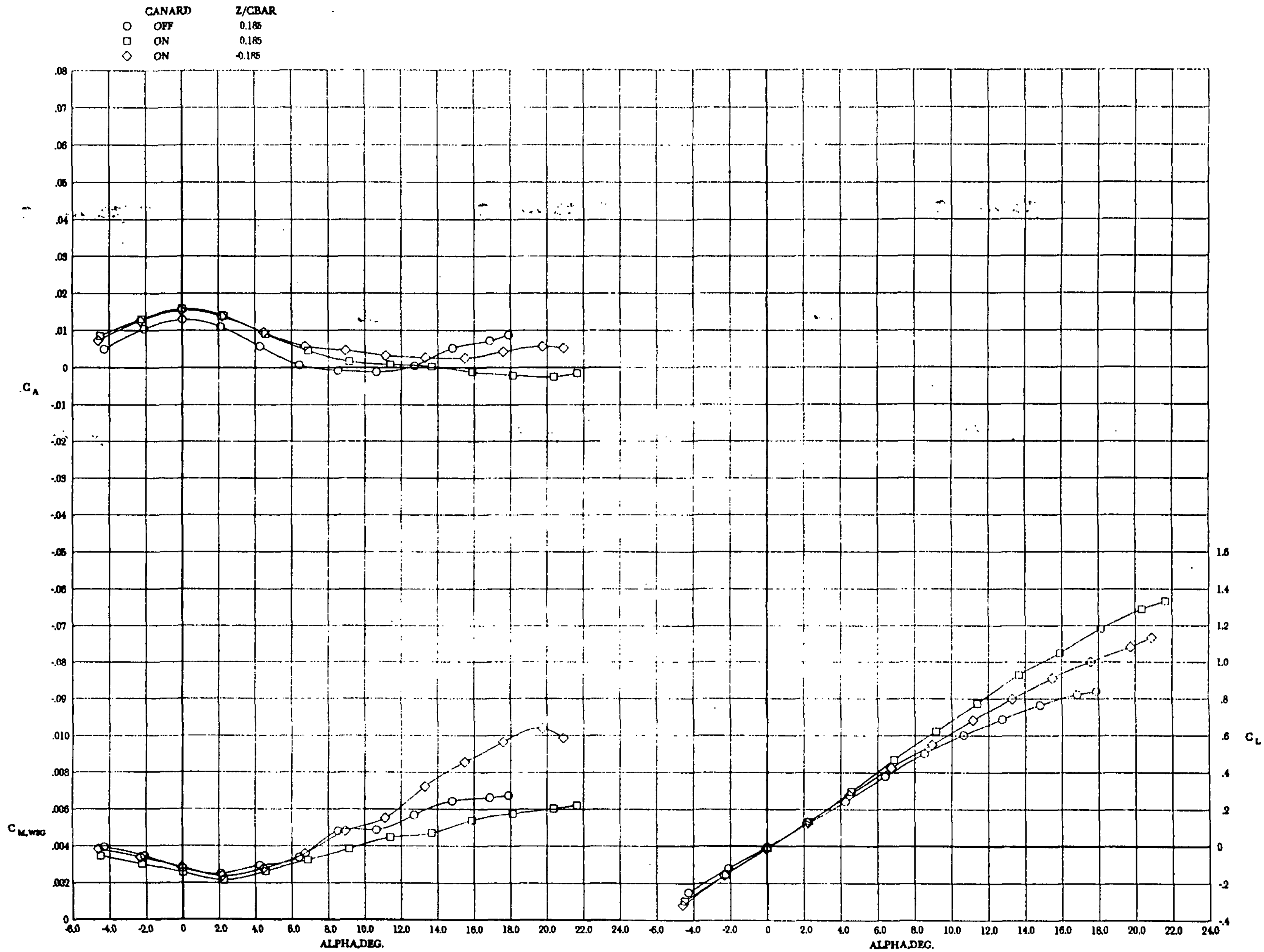


Figure 6.- Effect of canard position on the longitudinal aerodynamic characteristics and wing buffet for the model with the leading edge flaps undeflected at a Mach number of 0.70.

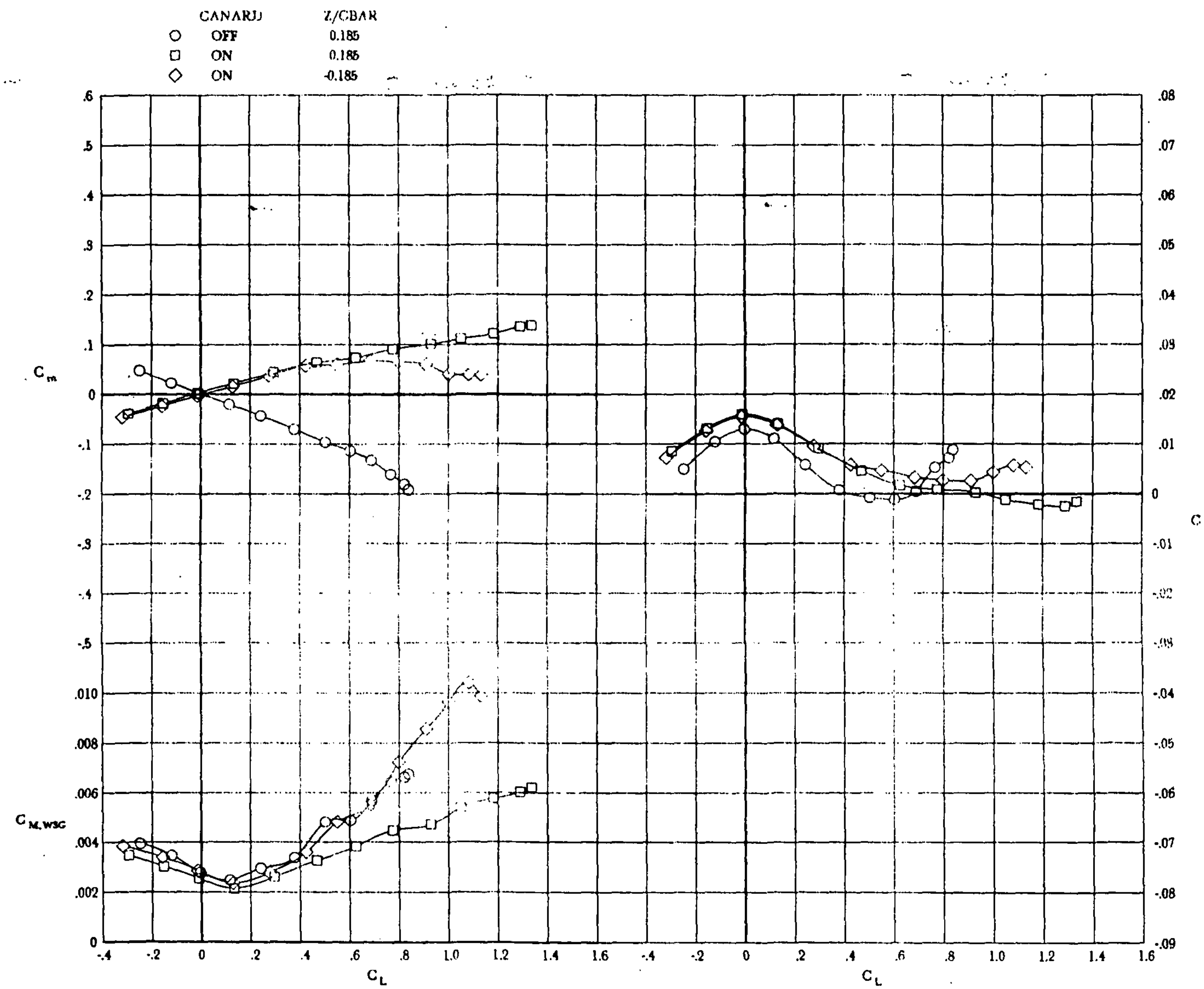
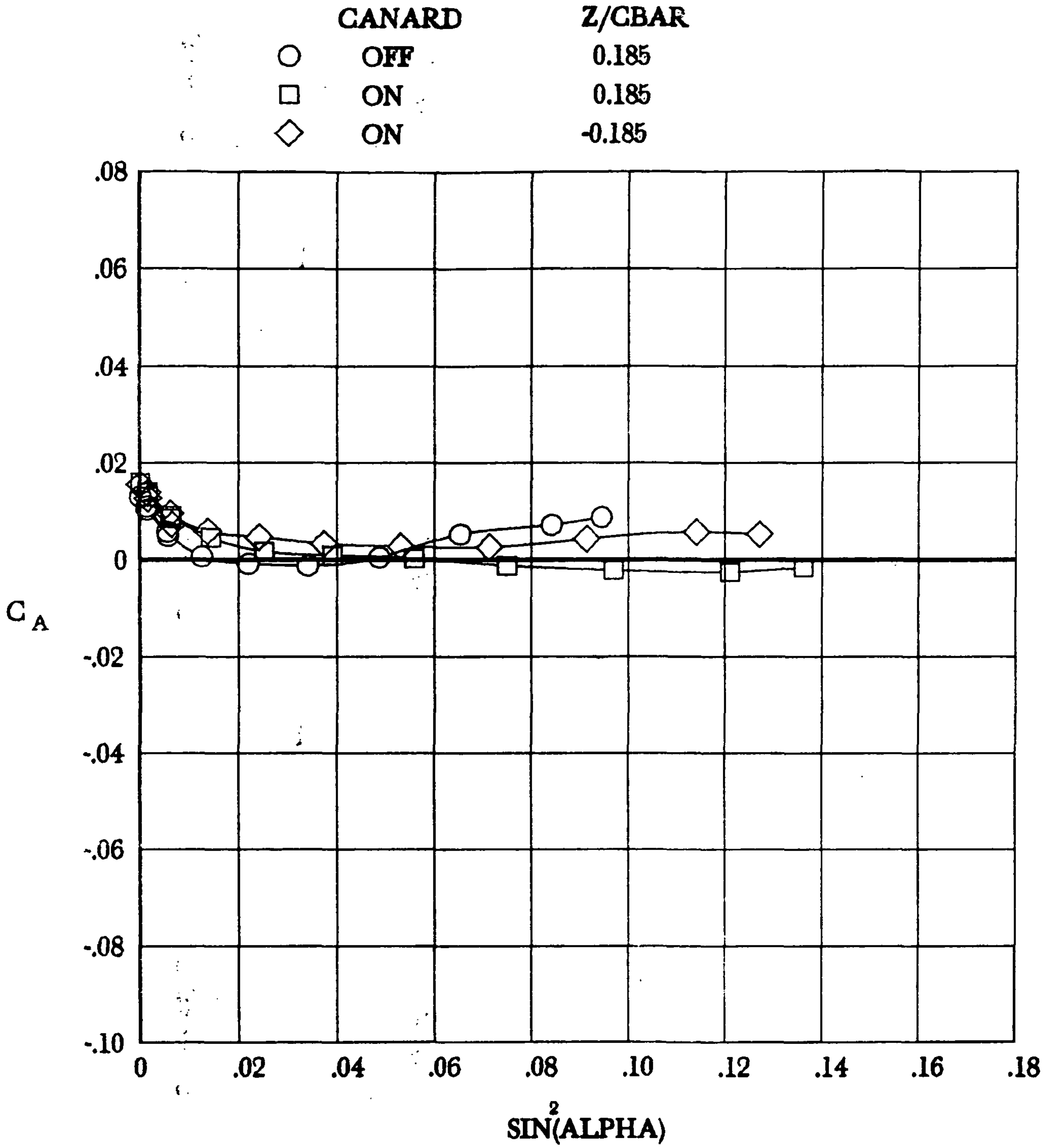
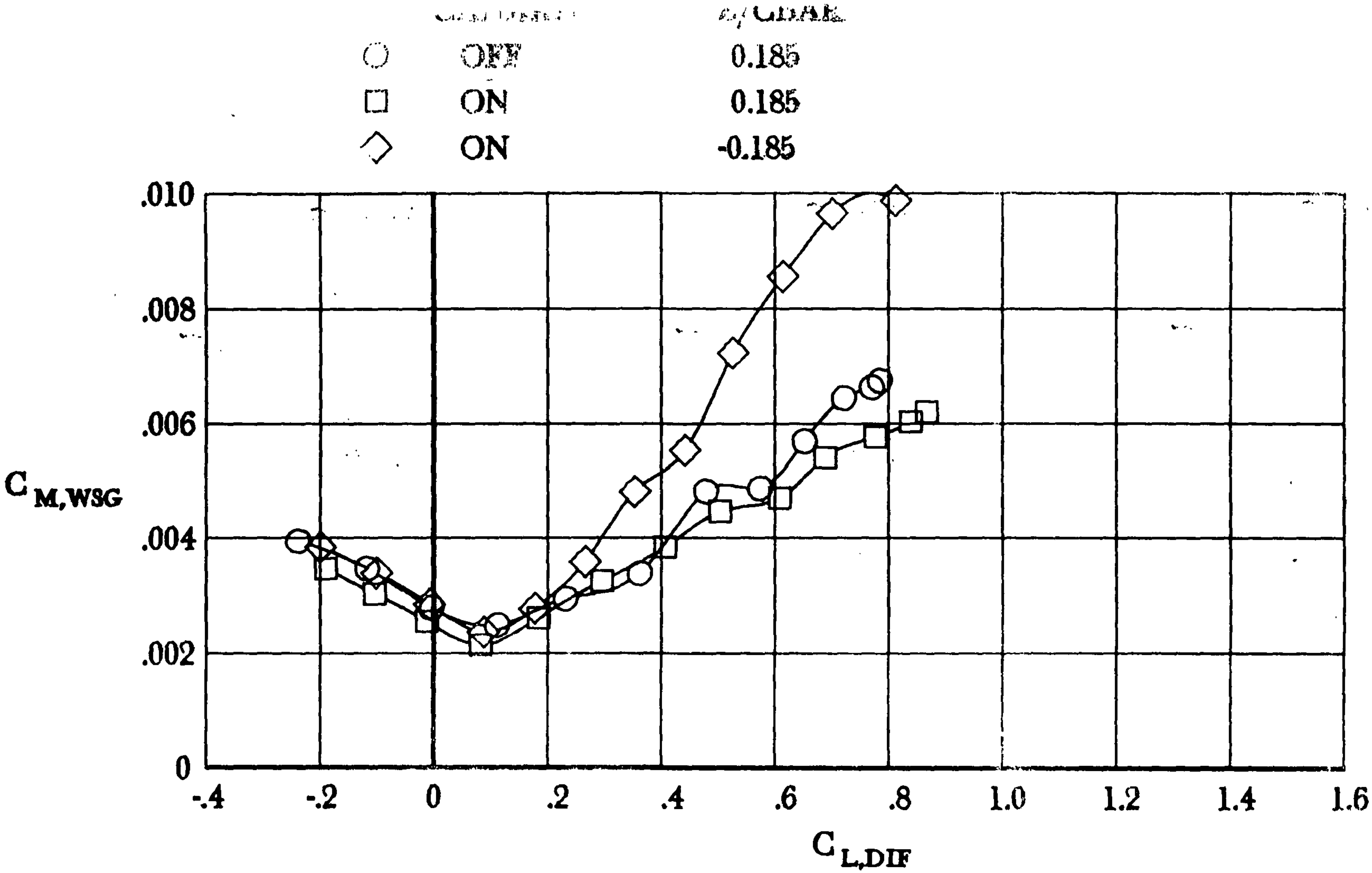


Figure 6.- Continued.



c
Figure 6.- Continued.

SHEET 105 TYPE 1 TEST 670
RUNS 20 5 26 0 0 0 0 0 0 0



D
Figure 6.- Concluded.

SHEET 105 TYPE 1 TEST 670
RUNS 20 5 26 0 0 0 0 0 0 0

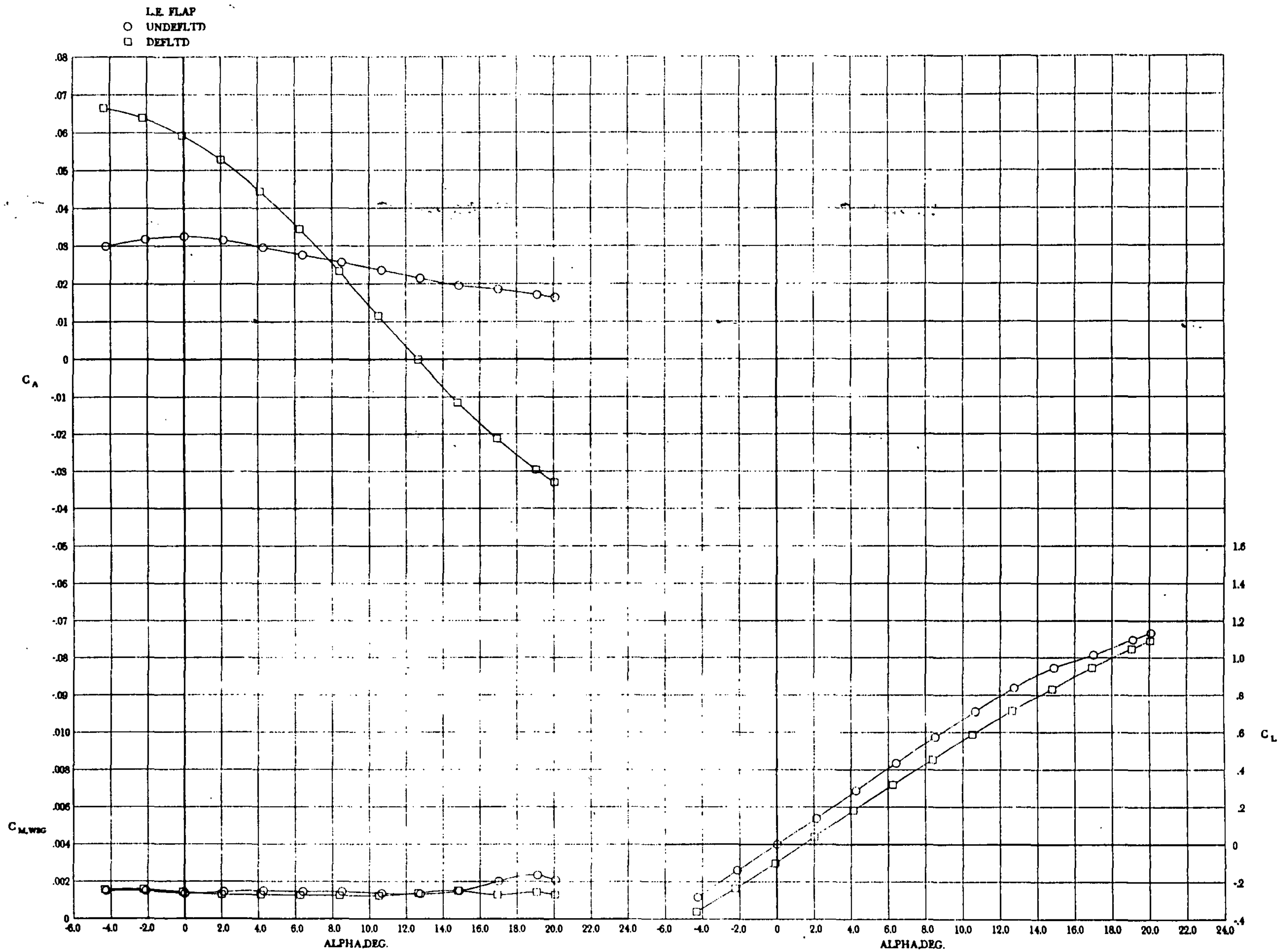


Figure 7.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard off at a Mach number of 1.20.

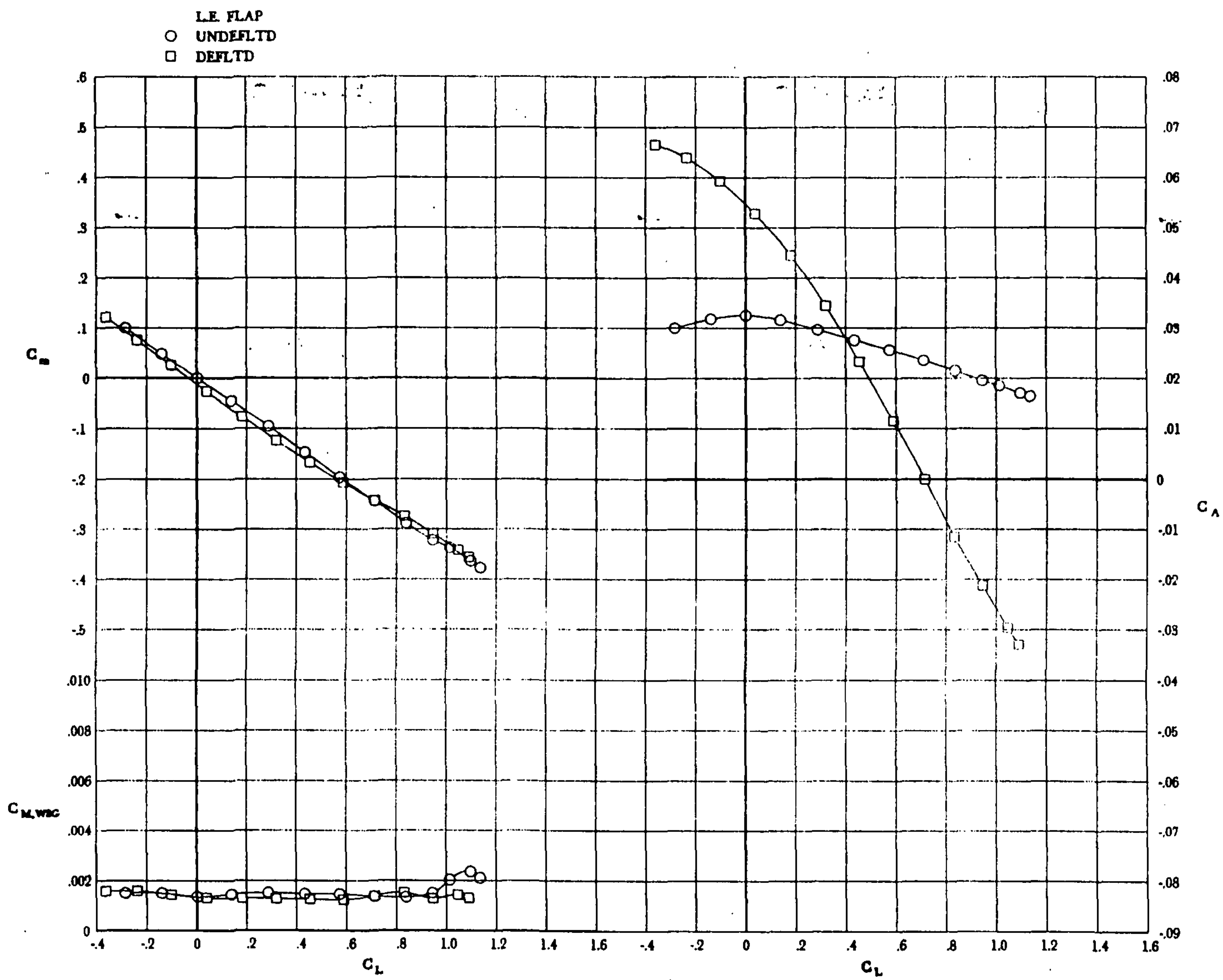
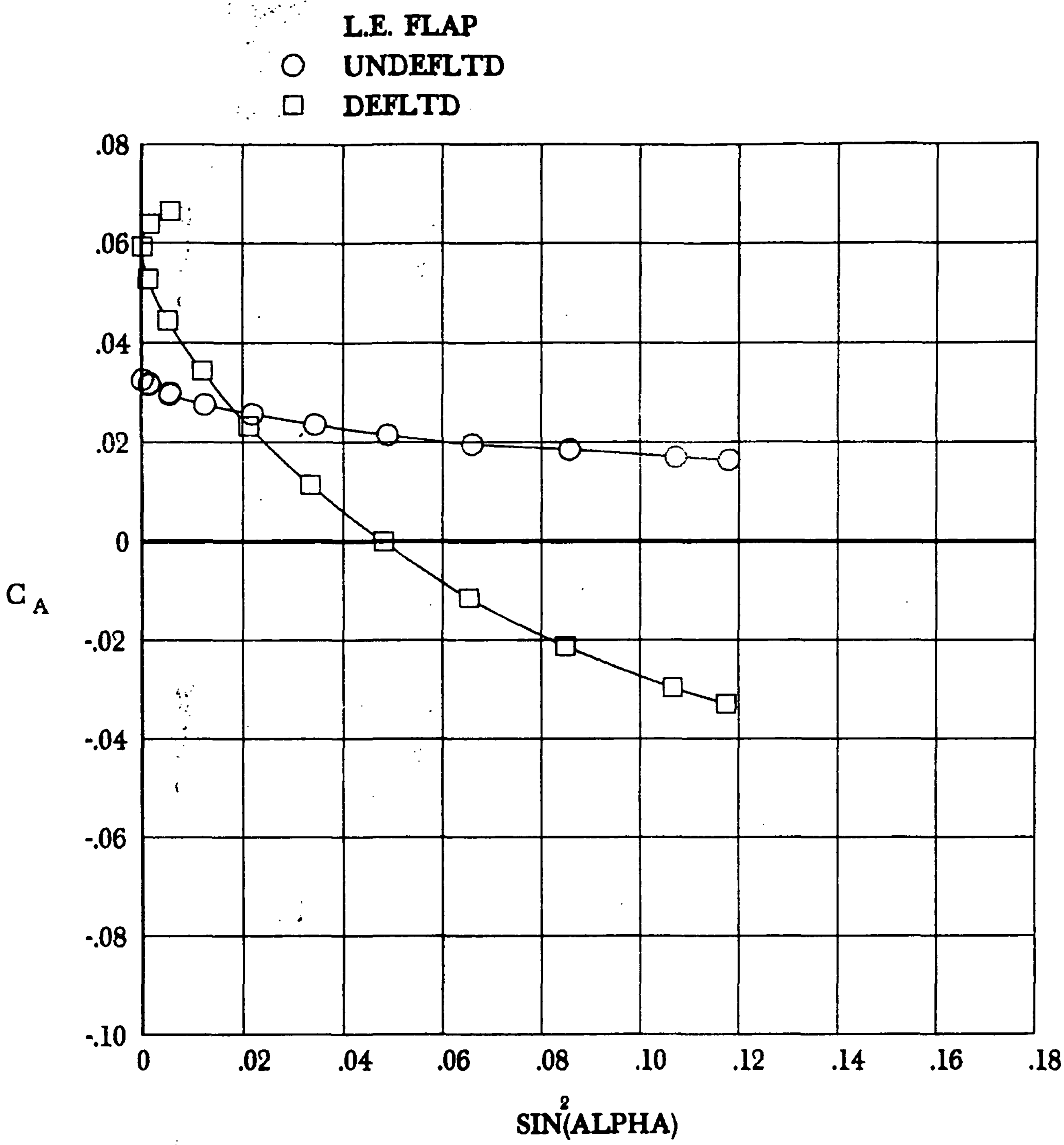
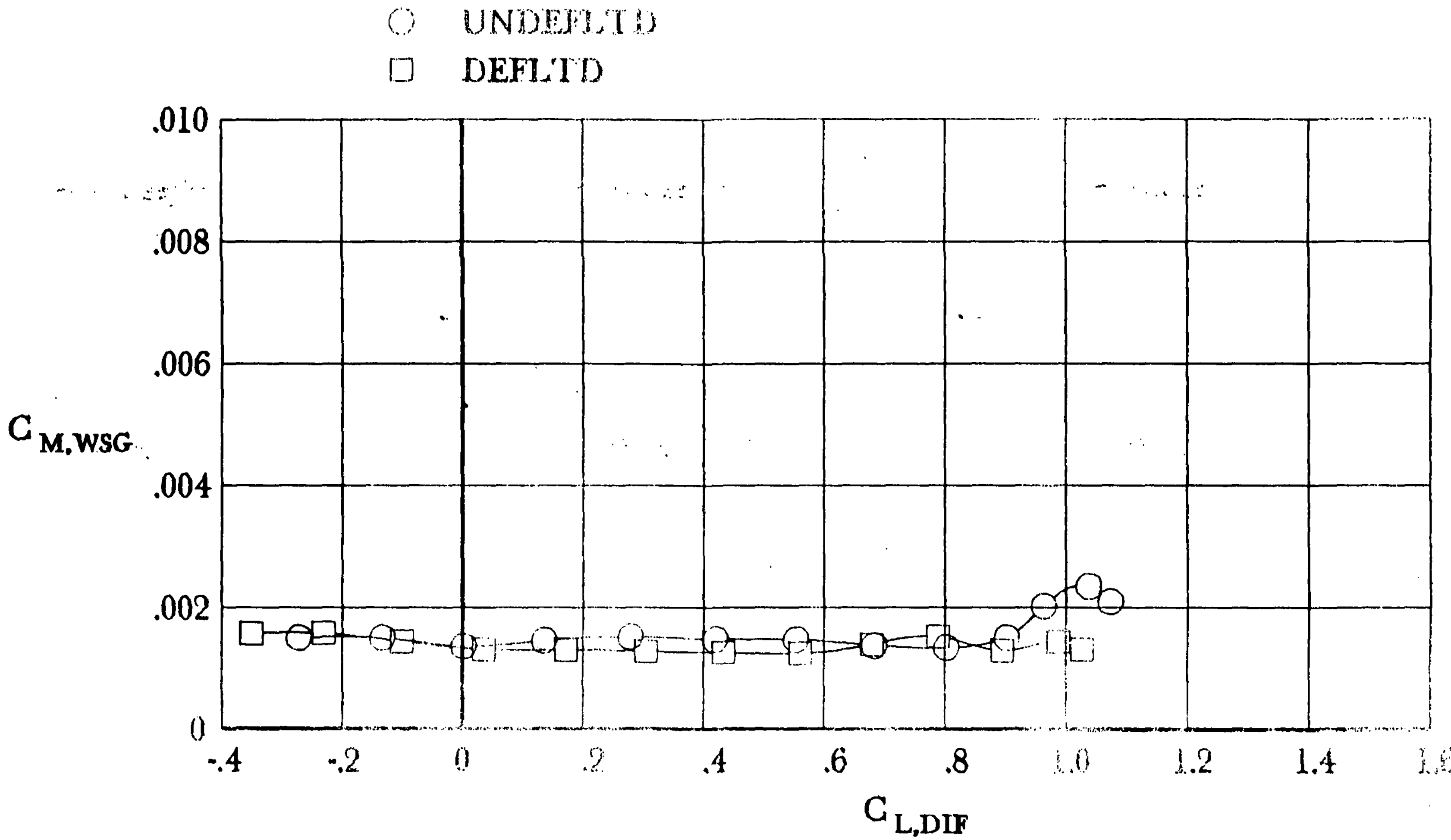


Figure 7.- Continued.



c
Figure 7.- Continued.

SHEET 109 TYPE 1 TEST 670
RUNS 16 11 0 0 0 0 0 0 0 0



D

Figure 7.- Concluded.

SHEET 109 TYPE 1 TEST 670
RUNS 16 11 0 0 0 0 0 0 0 0

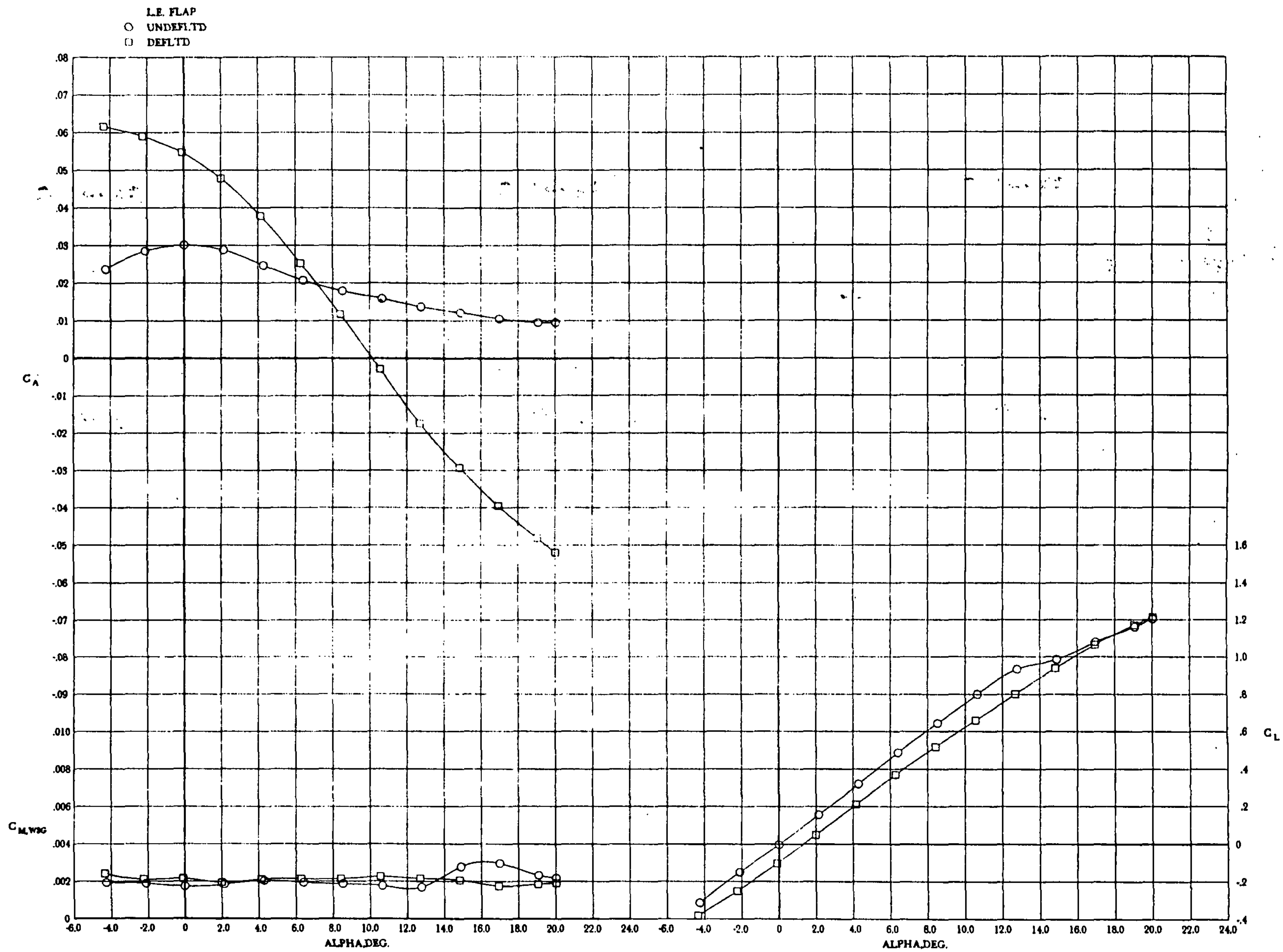


Figure 8.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard off at a Mach number of 1.03.

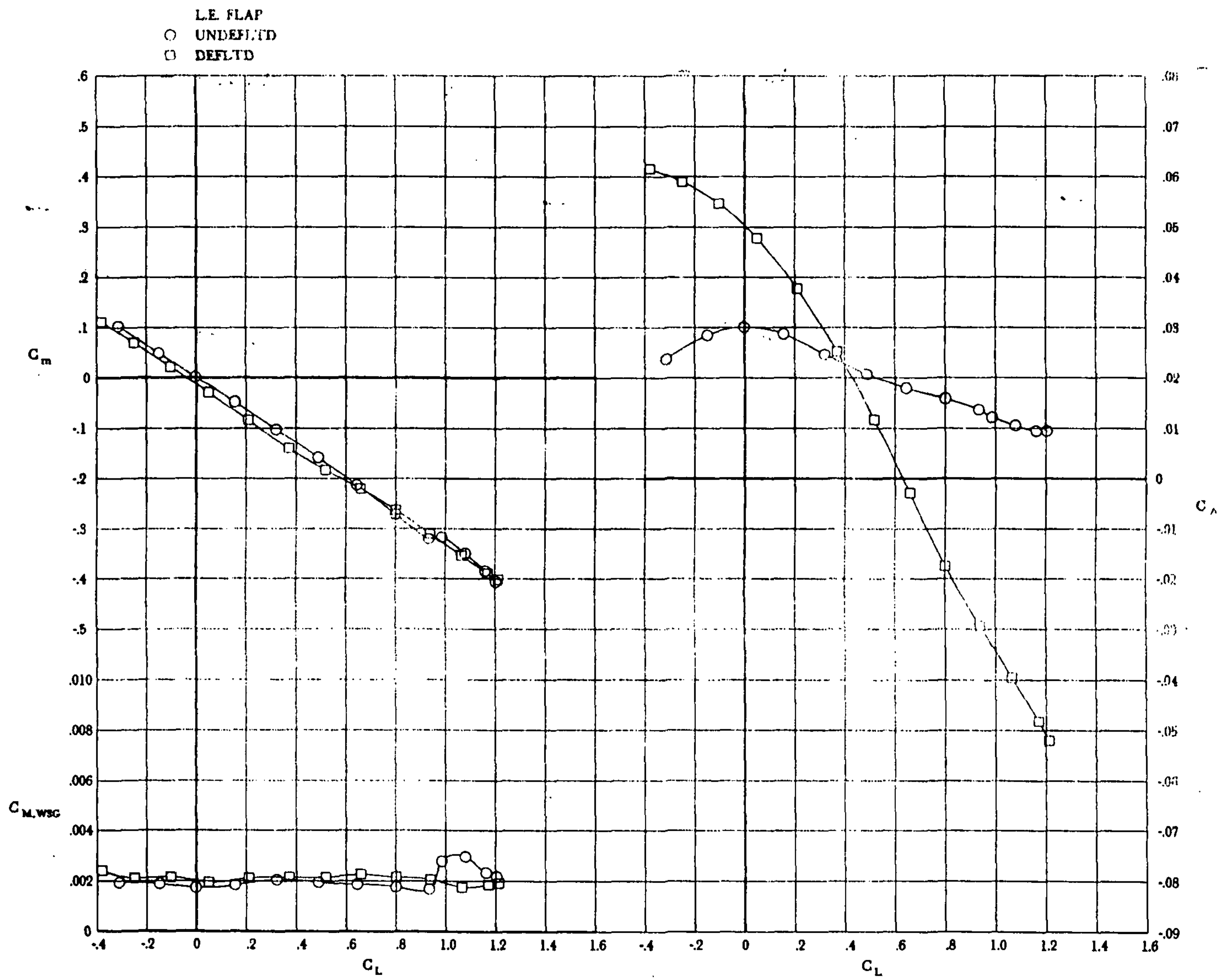
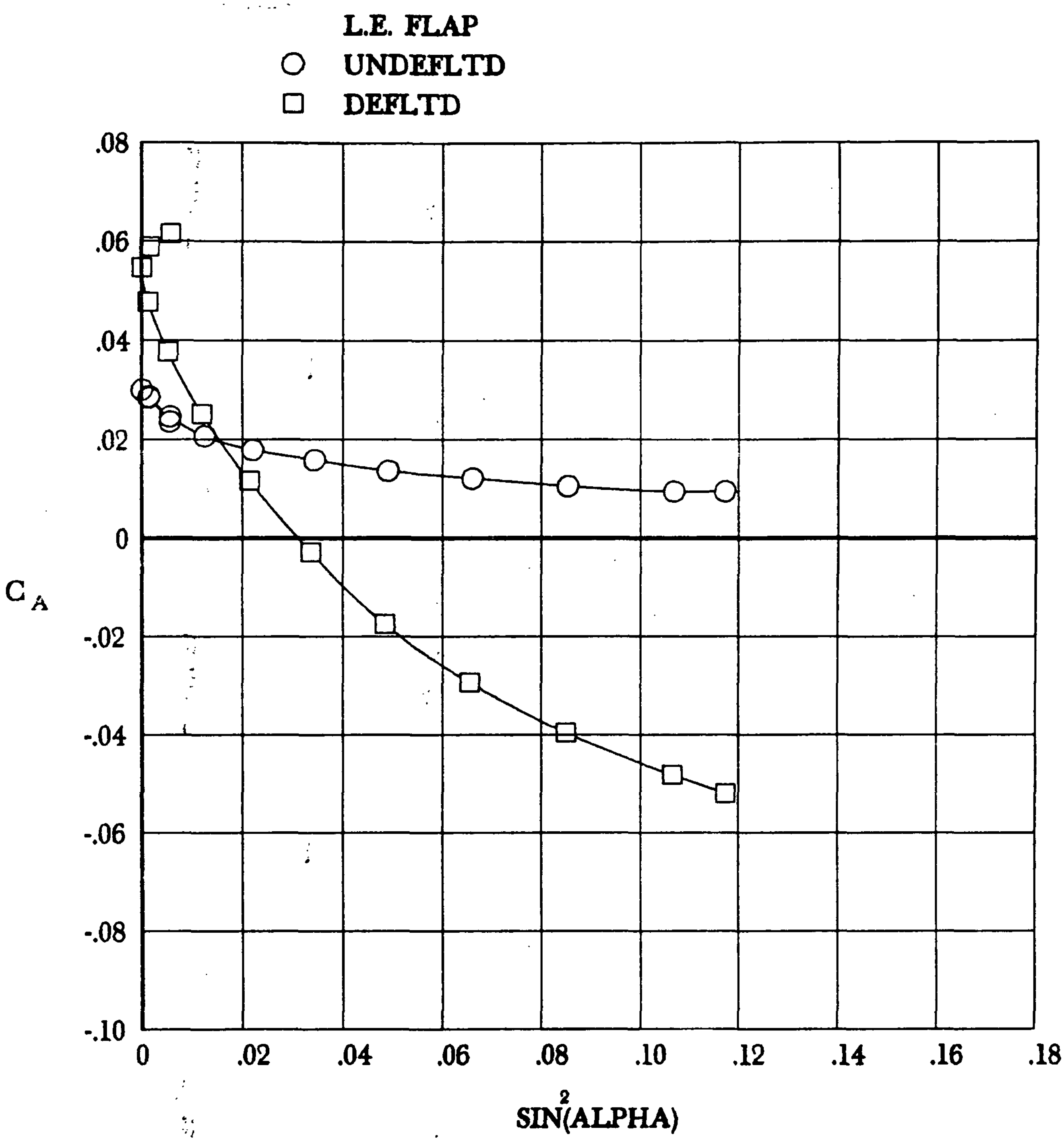
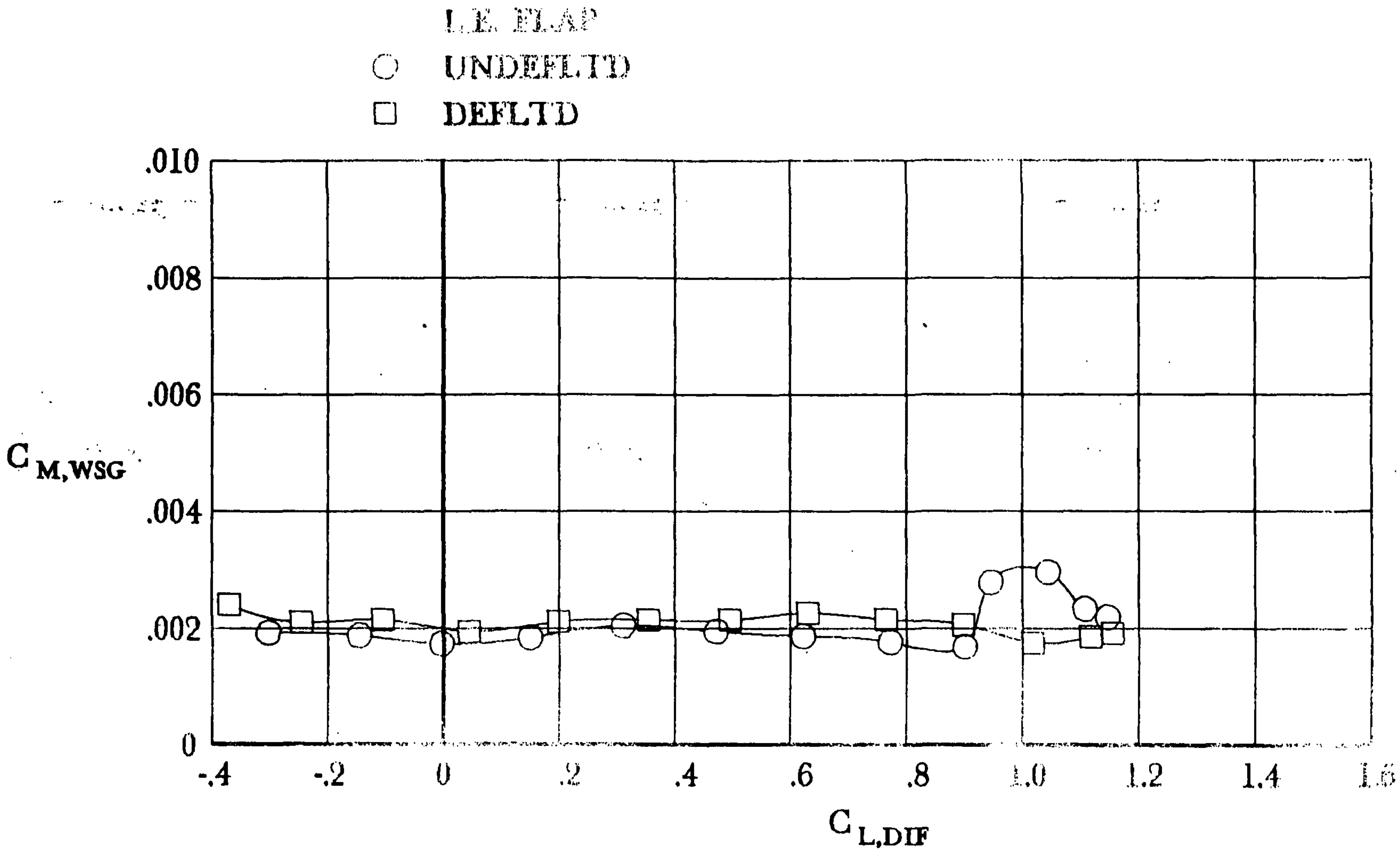


Figure 8.- Continued.



C
Figure 8.- Continued.

SHEET 110 TYPE 1 TEST 670
RUNS 17 12 0 0 0 0 0 0 0 0



D

Figure 8. - Concluded.

SHEET 110 TYPE 1 TEST 670
RUNS 17 12 0 0 0 0 0 0 0 0

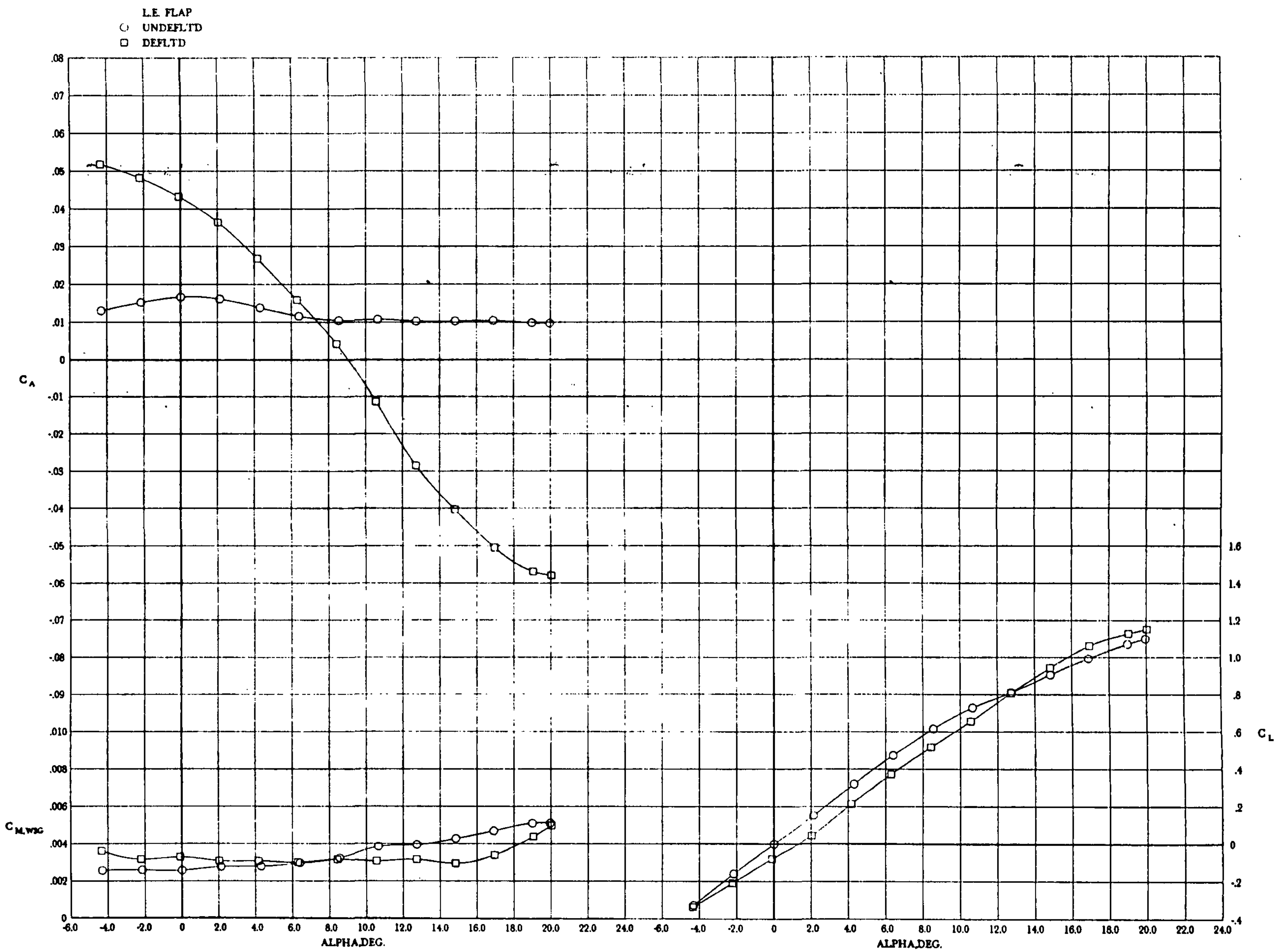


Figure 9.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard off at a Mach number of 0.95.

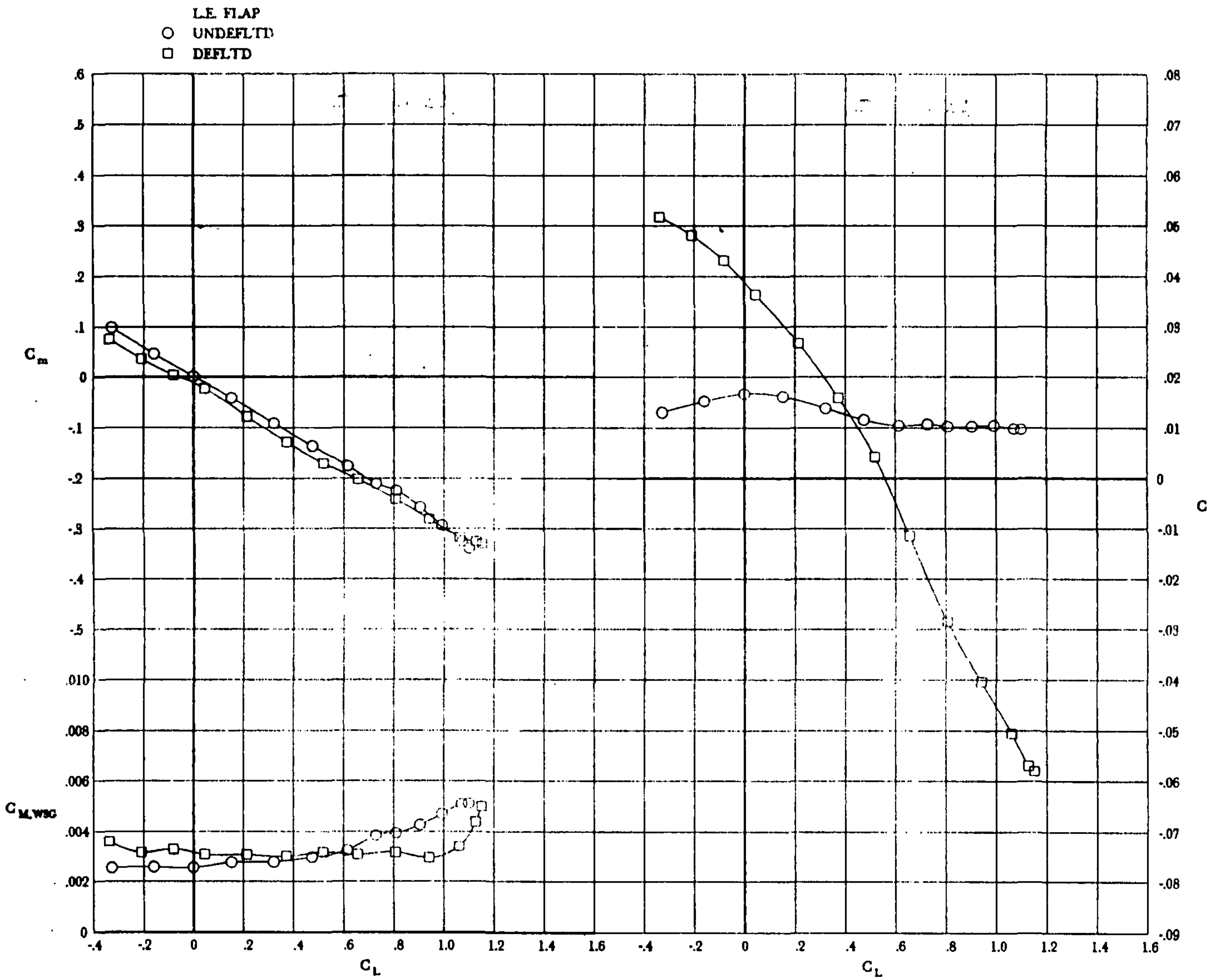
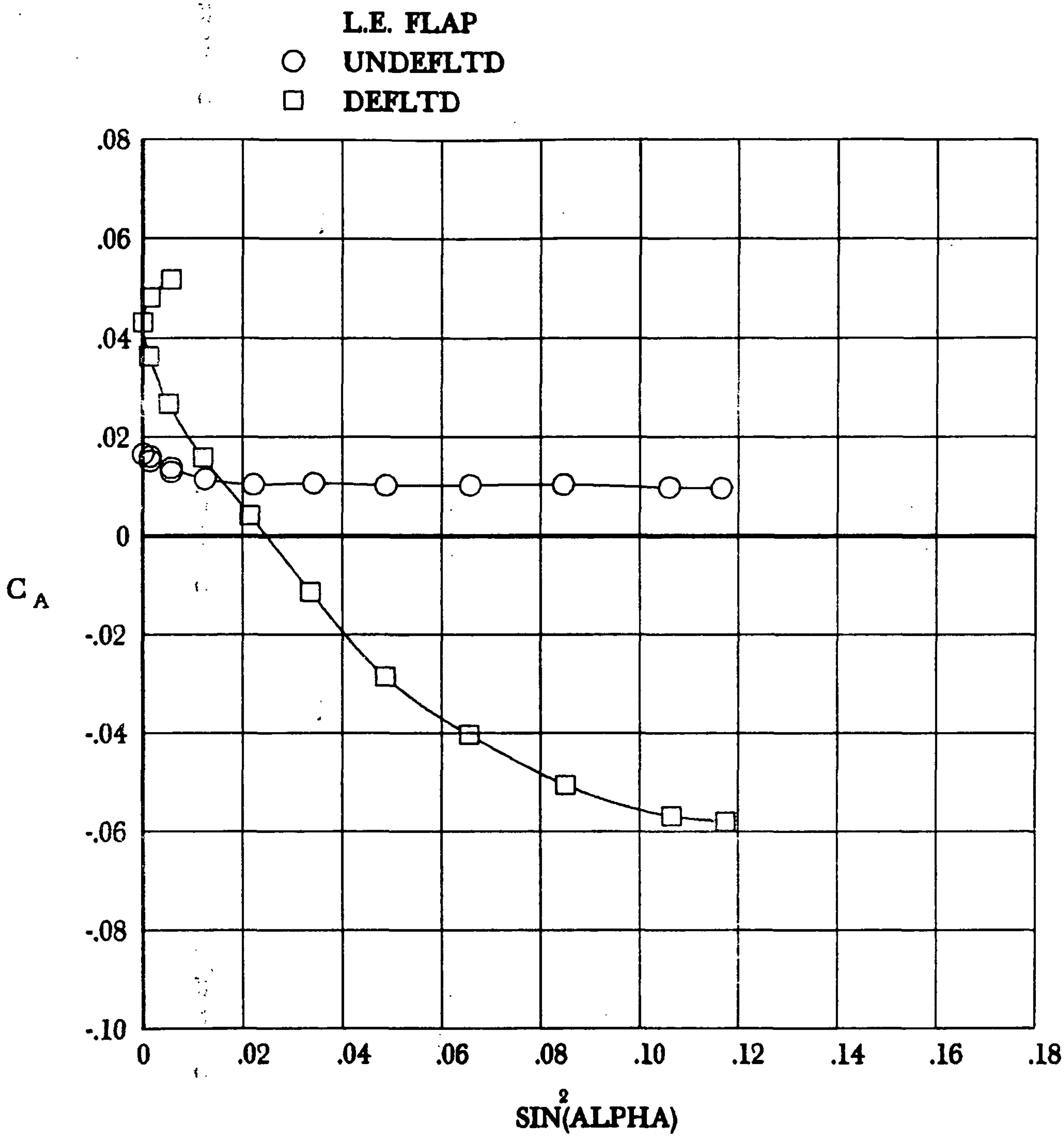


Figure 9.- Continued.

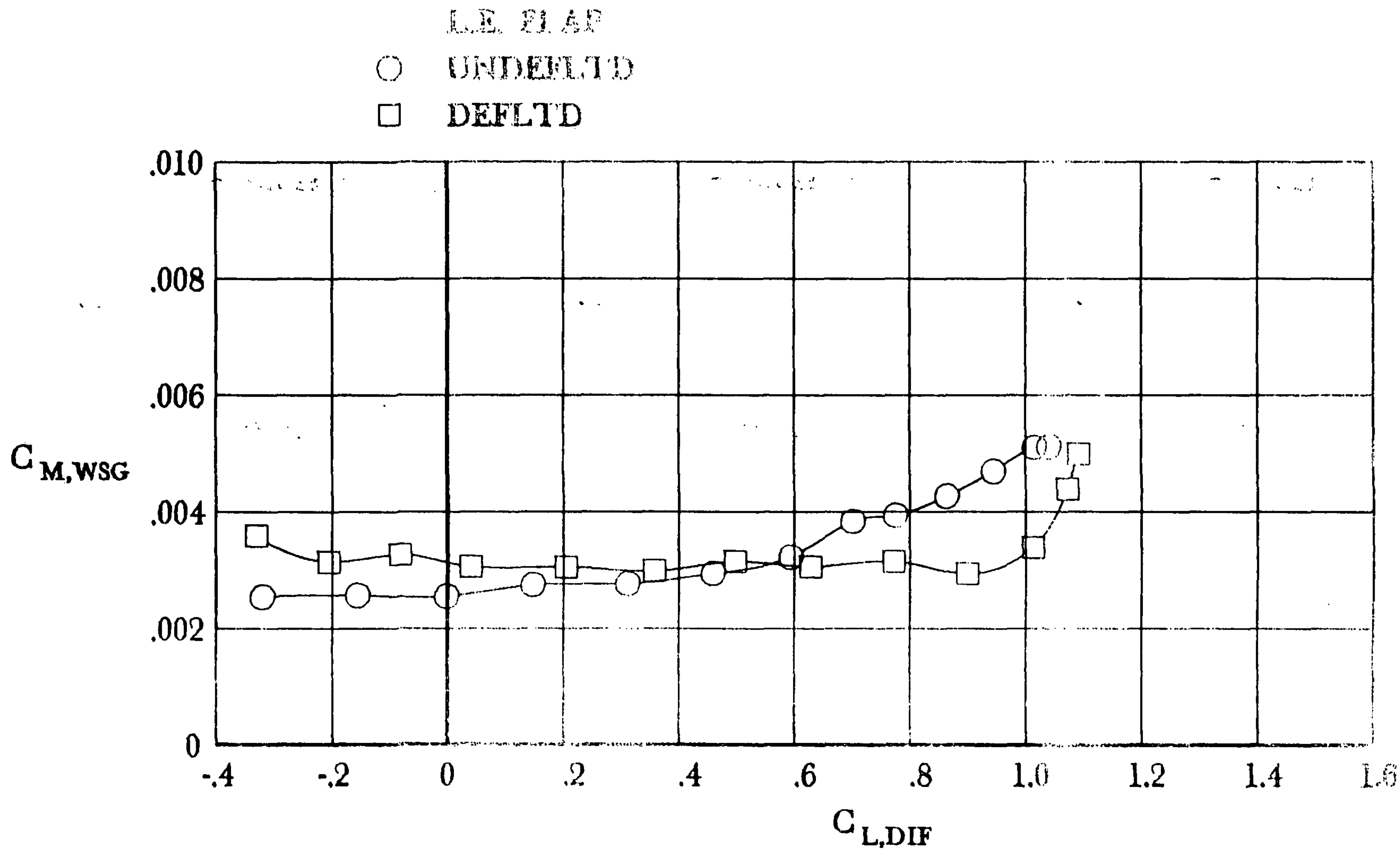


C

Figure 9.- Continued.

SHEET 111 TYPE 1 TEST 670

RUNS 18 13 0 0 0 0 0 0 0 0



D
Figure 9.- Concluded.

SHEET 111 TYPE 1 TEST 670
RUNS 18 13 0 0 0 0 0 0 0 0

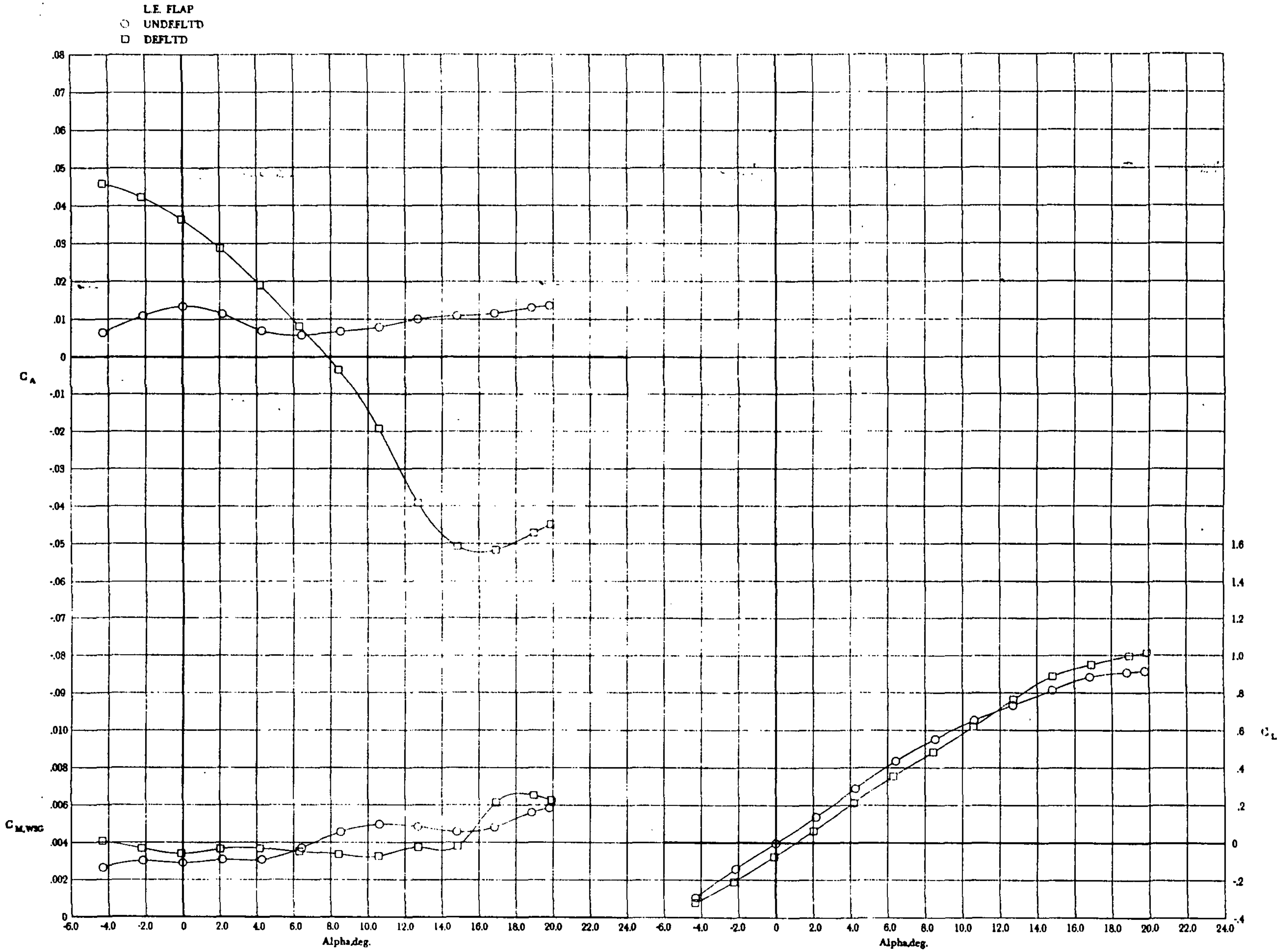


Figure 10.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard off at a Mach number of 0.90.

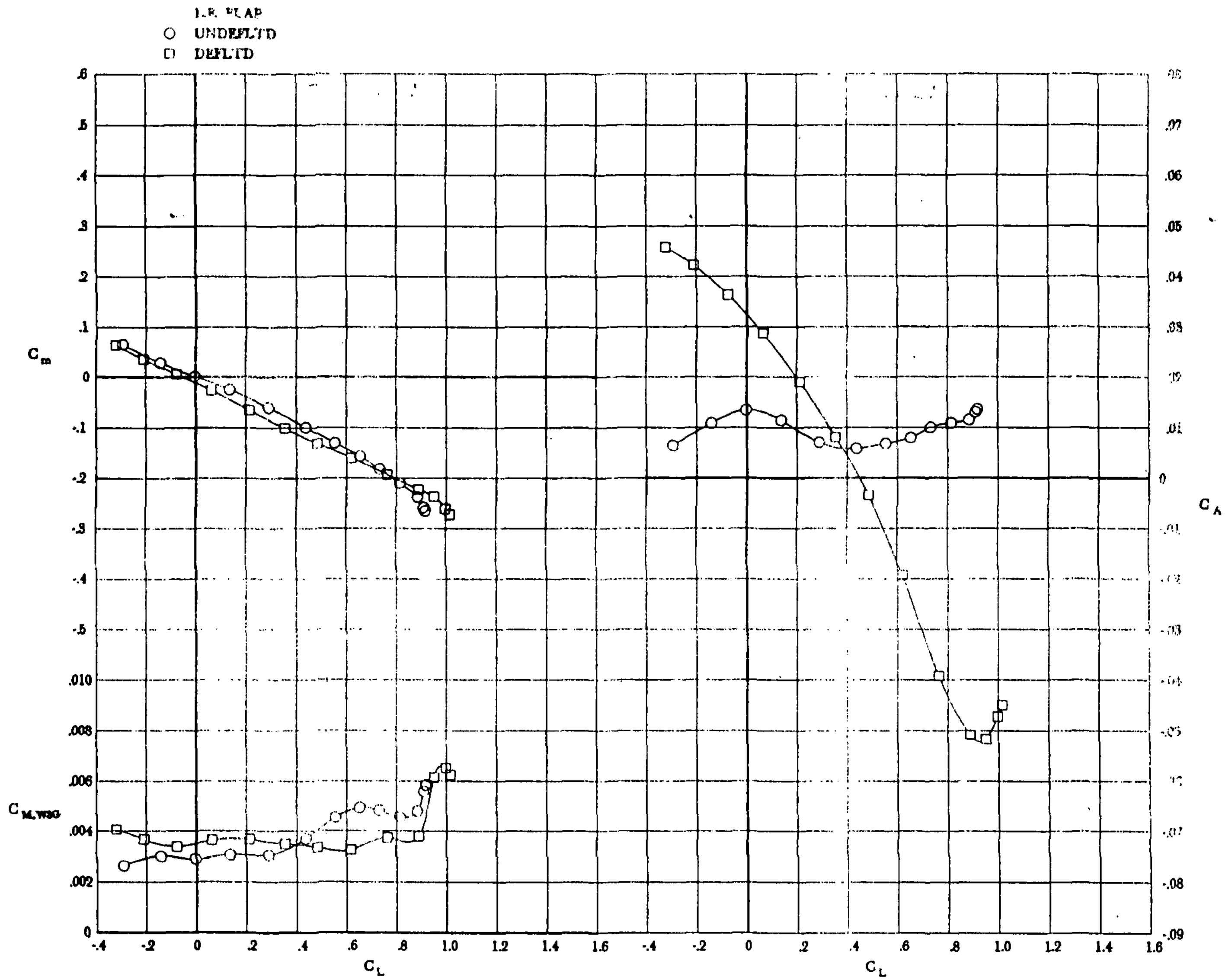
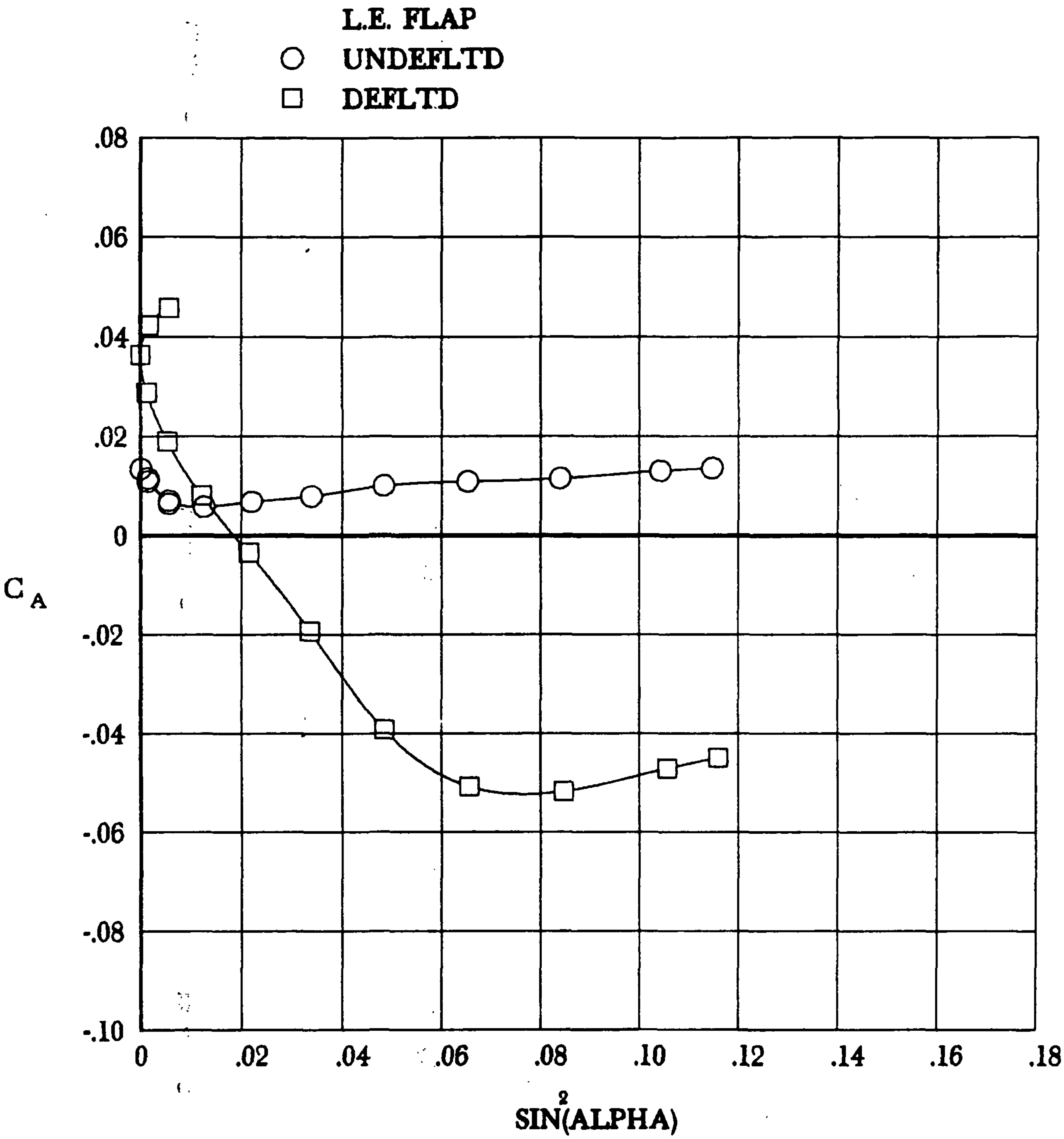


Figure 10.- Continued.



C
Figure 10. - Continued.

SHEET 112 TYPE 1 TEST 670
RUNS 19 14 0 0 0 0 0 0 0 0

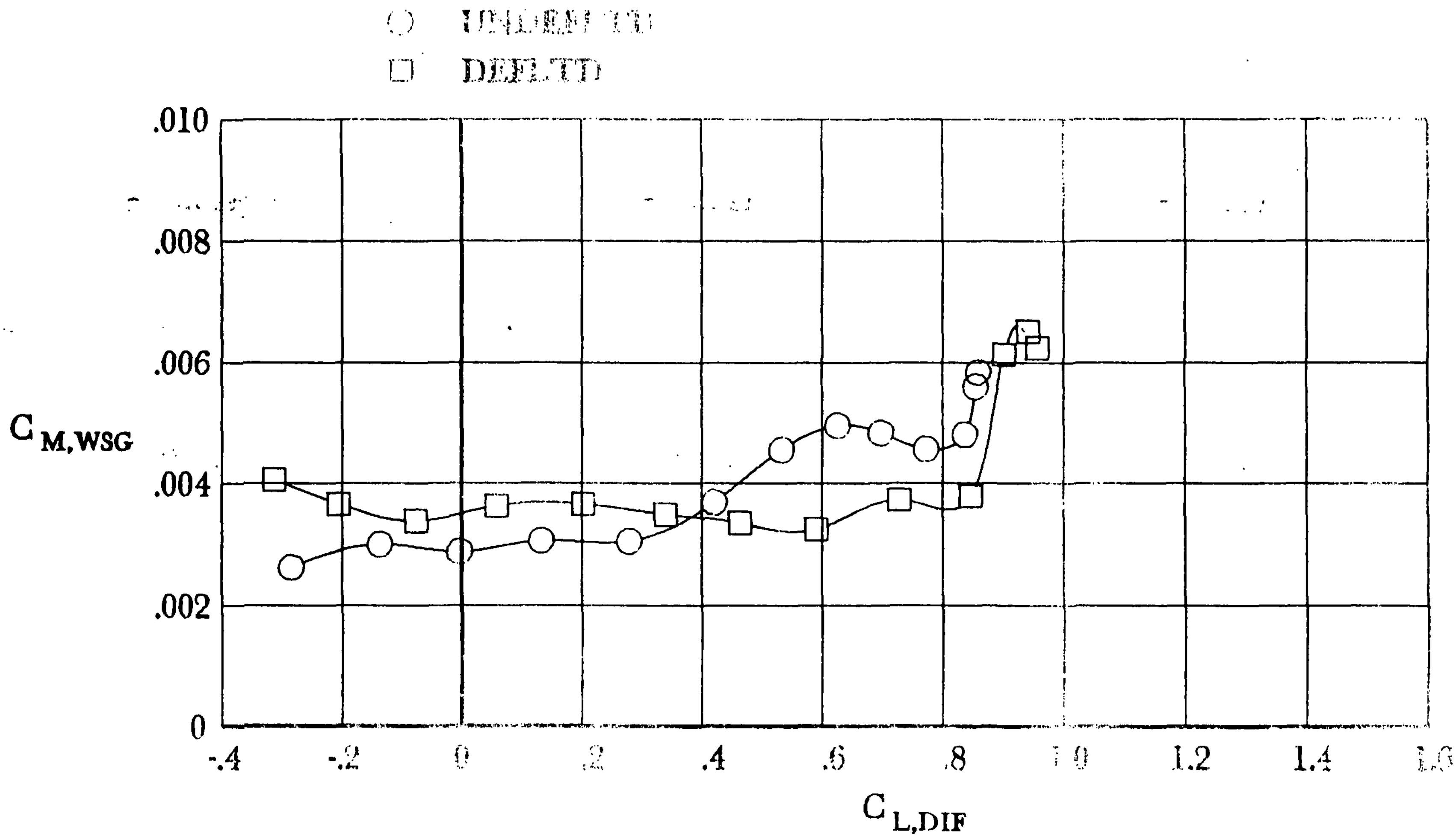


Figure 10.- Concluded.

SHEET 112 TYPE 1 TEST 670
RUNS 19 14 0 0 0 0 0 0 0 0

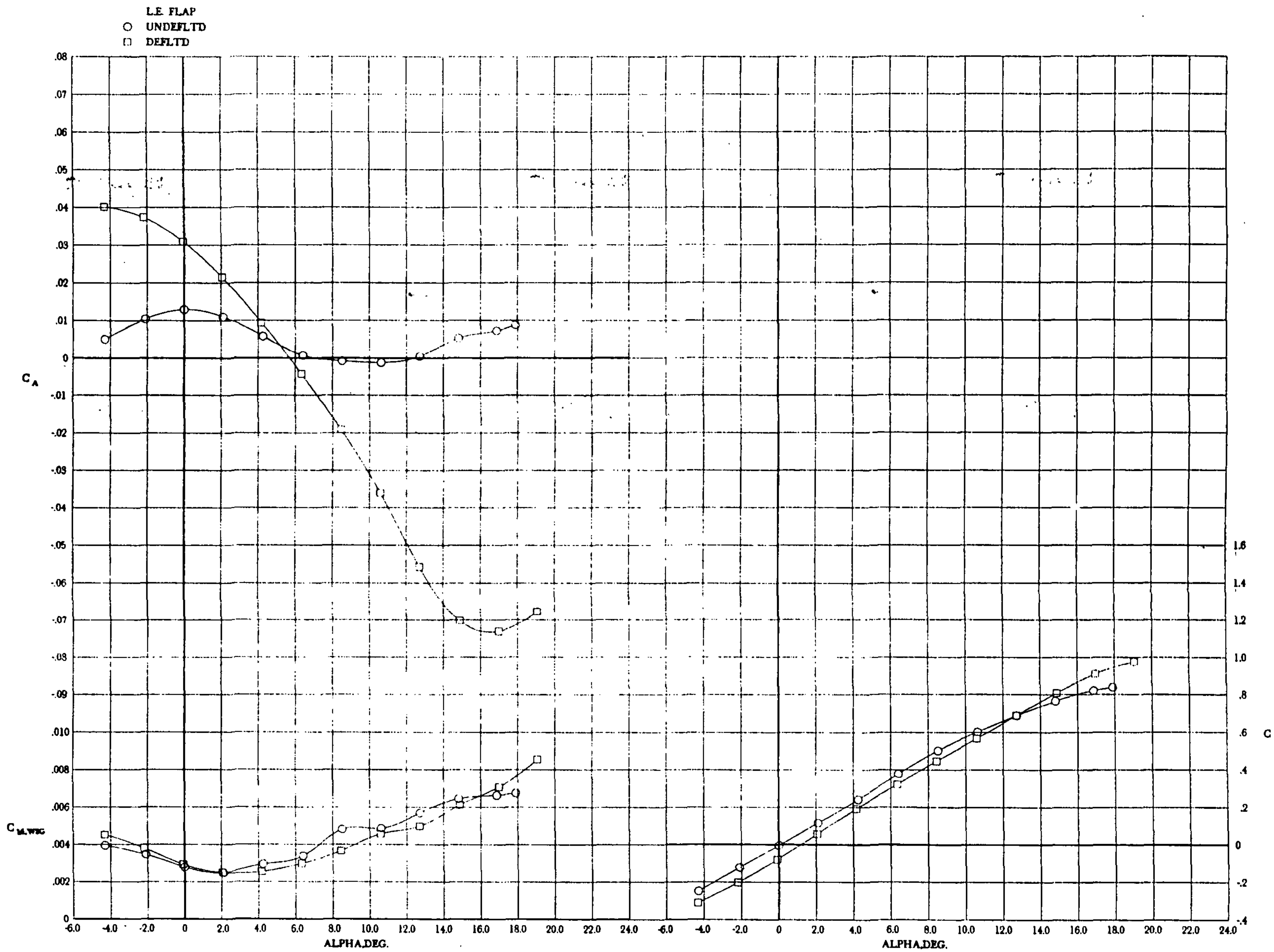


Figure 11.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard off at a Mach number of 0.70.

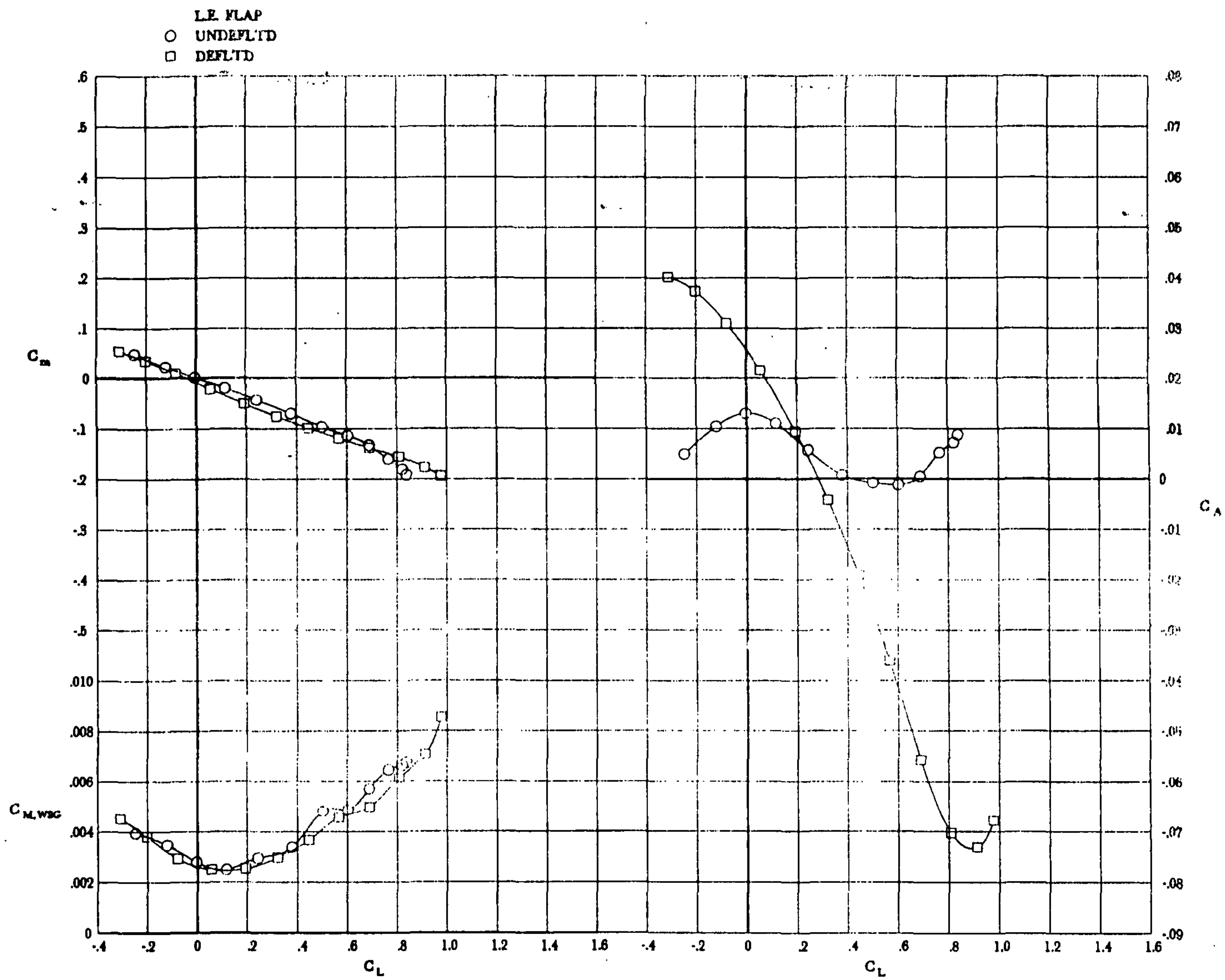
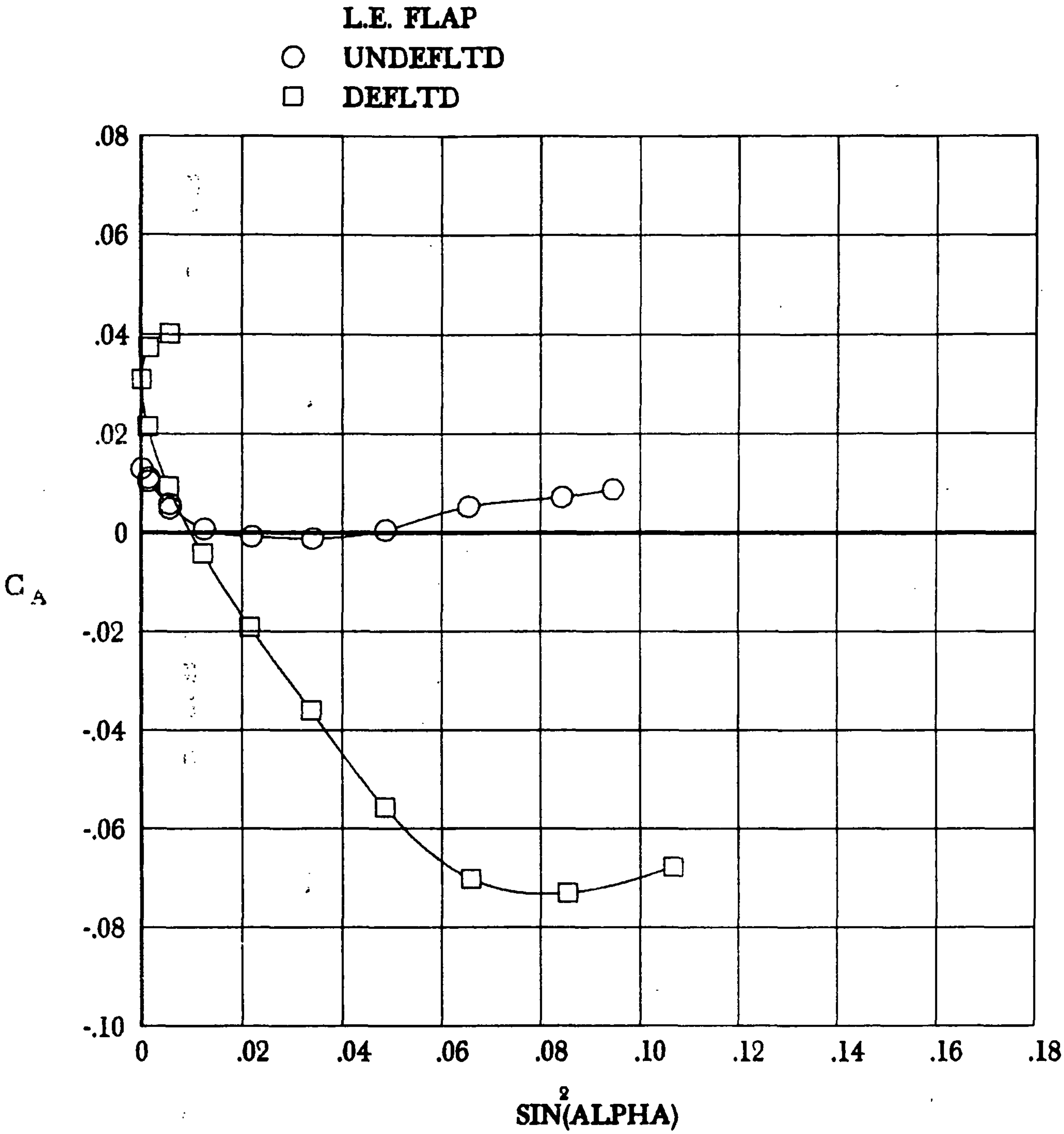
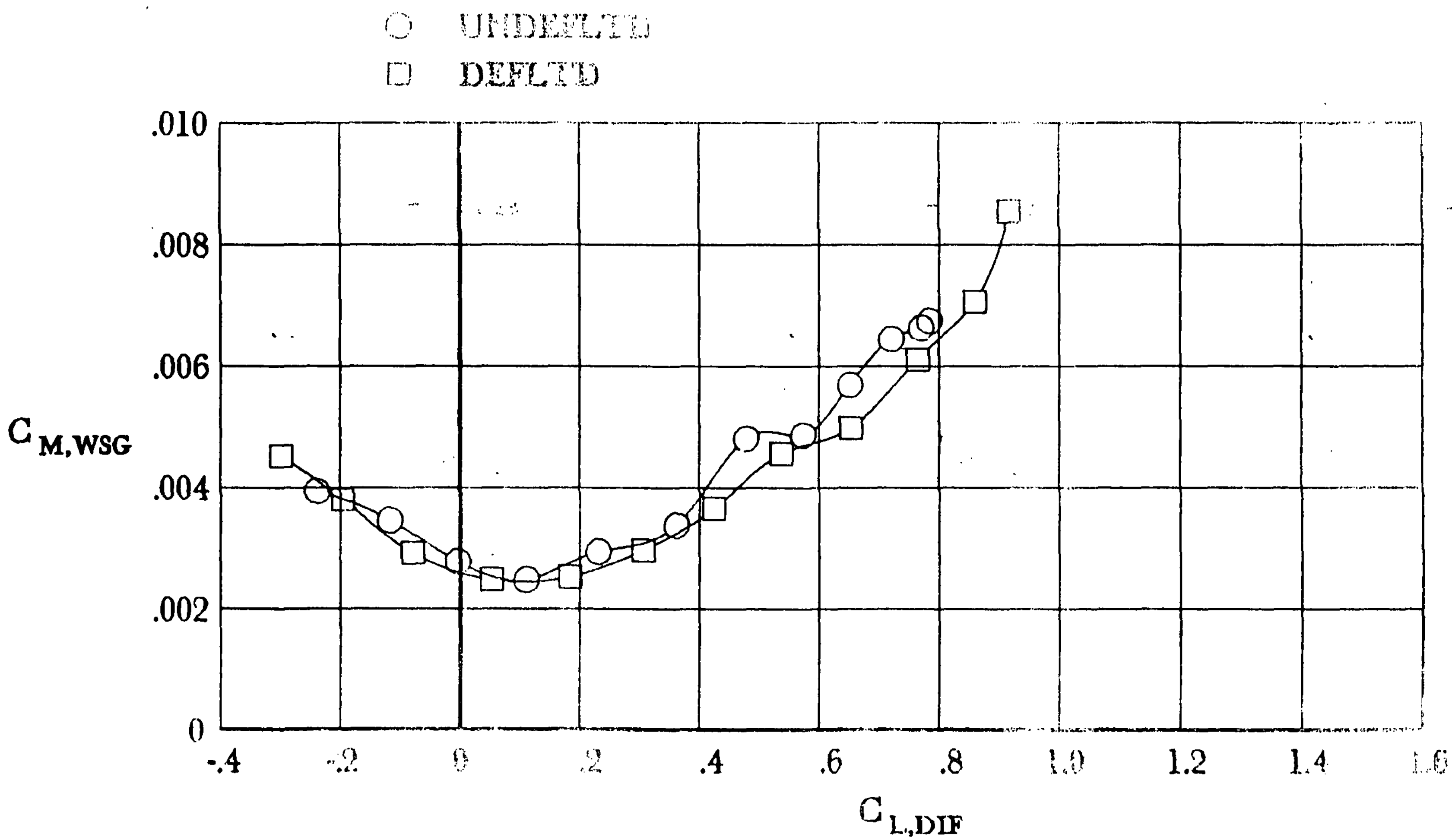


Figure 11.- Continued.



C
Figure 11. - Continued.

SHEET 113 TYPE 1 TEST 670
RUNS 20 15 0 0 0 0 0 0 0 0



D
Figure 11. - Concluded.

SHEET 113 TYPE 1 TEST 670
RUNS 20 15 0 0 0 0 0 0 0 0

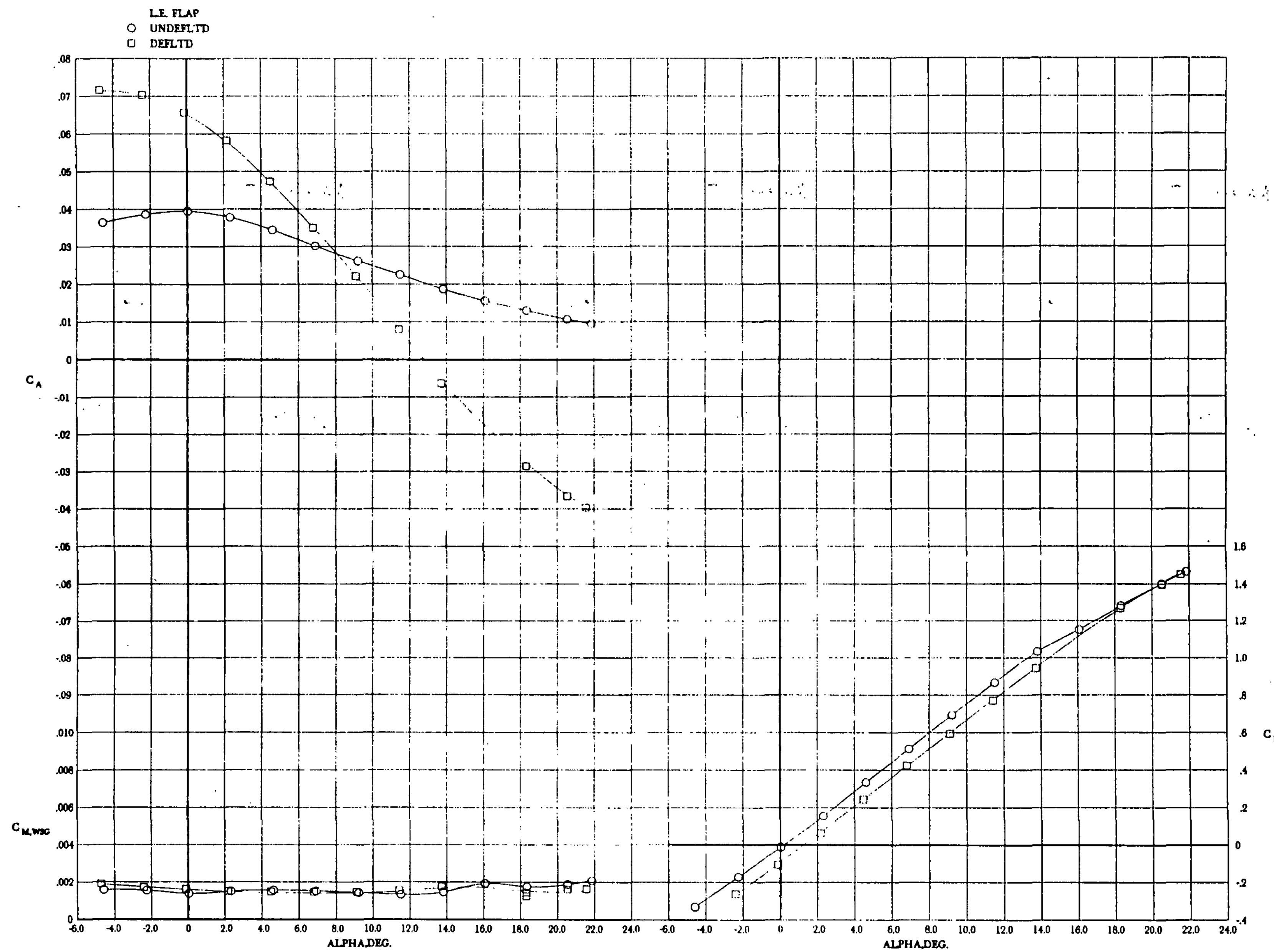


Figure 12.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard on at a Mach number of 1.20.

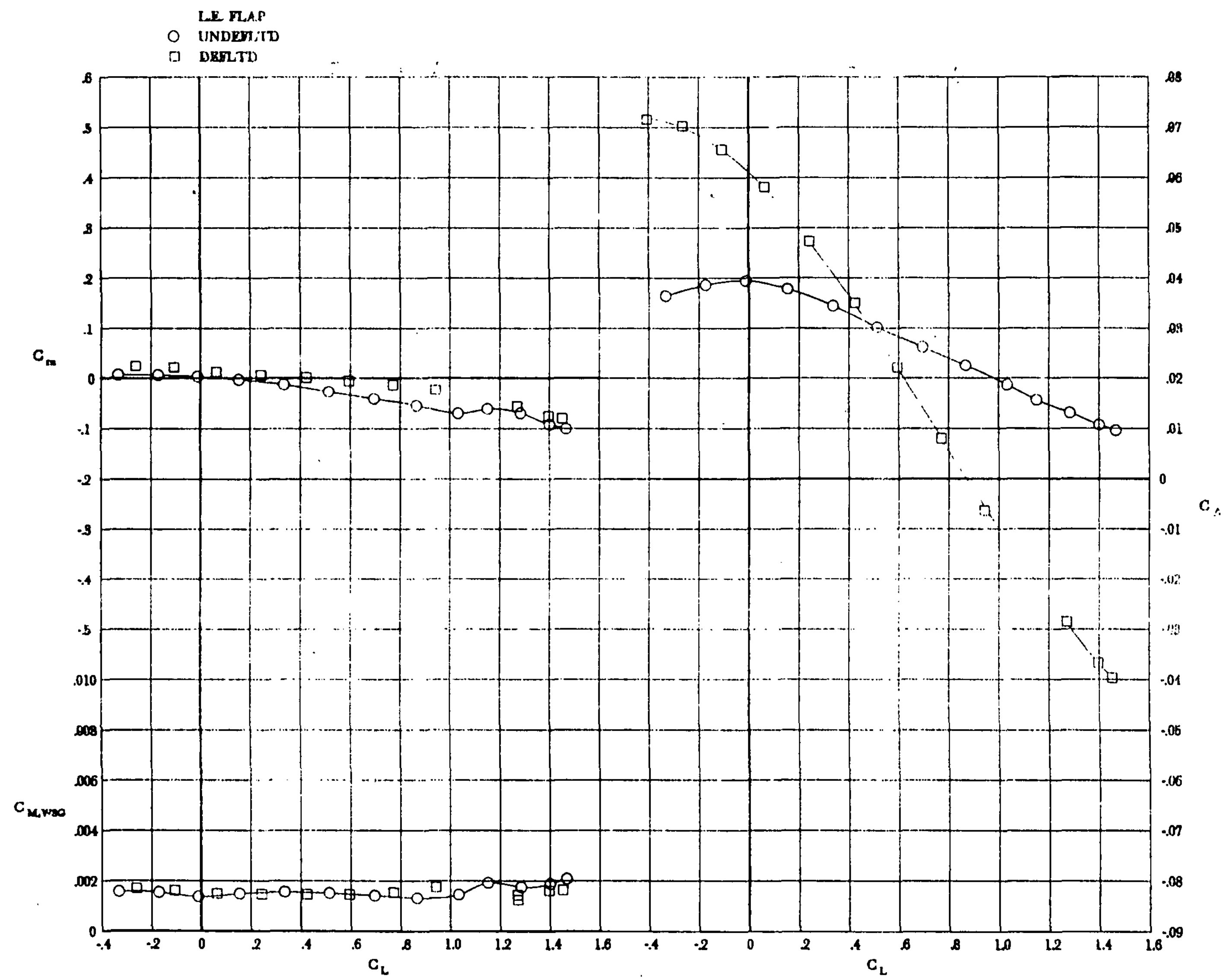


Figure 12.- Continued.

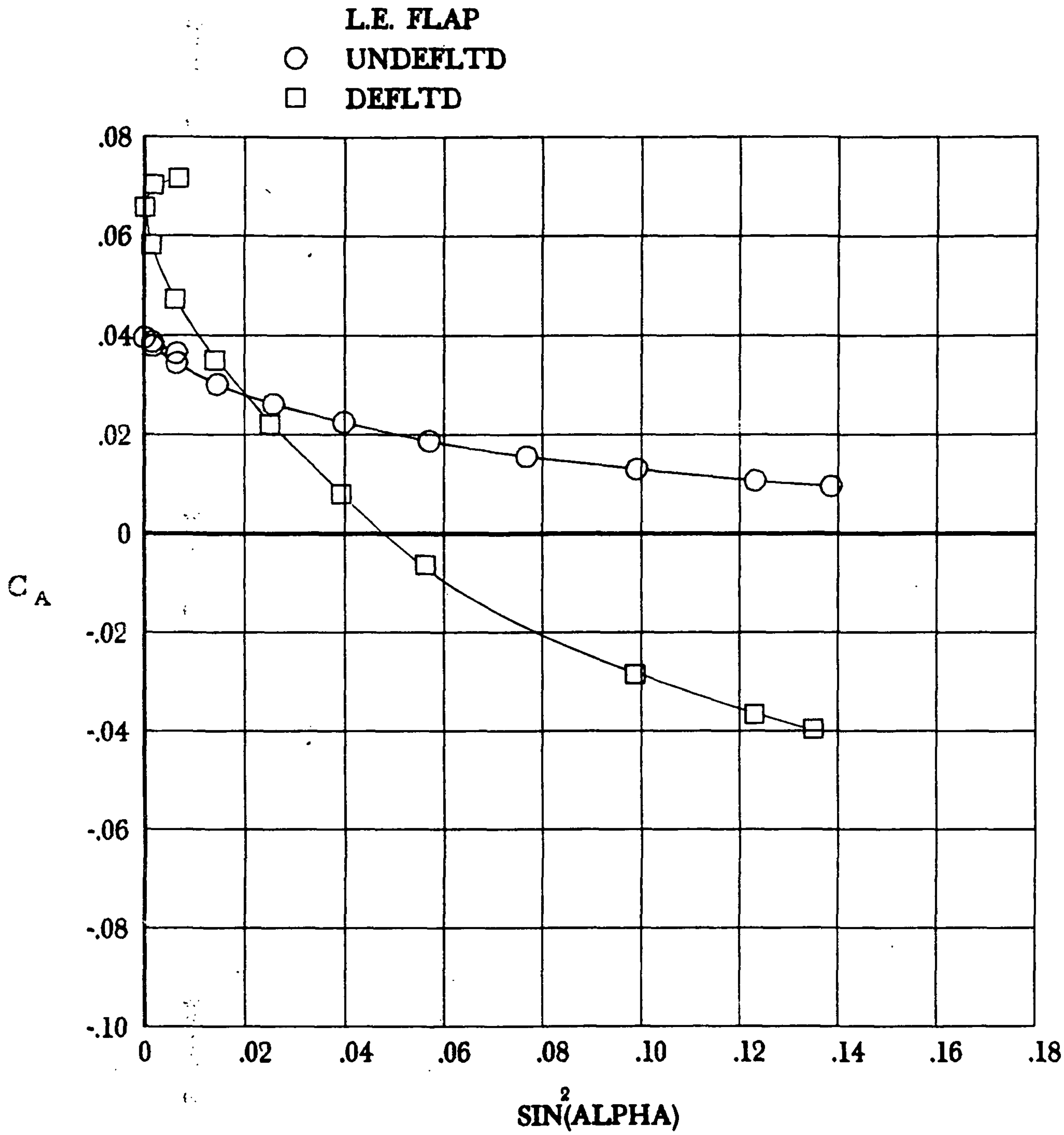


Figure 12c - Continued.

SHEET 116 TYPE 1 TEST 670
RUNS 1 6 0 0 0 0 0 0 0 0

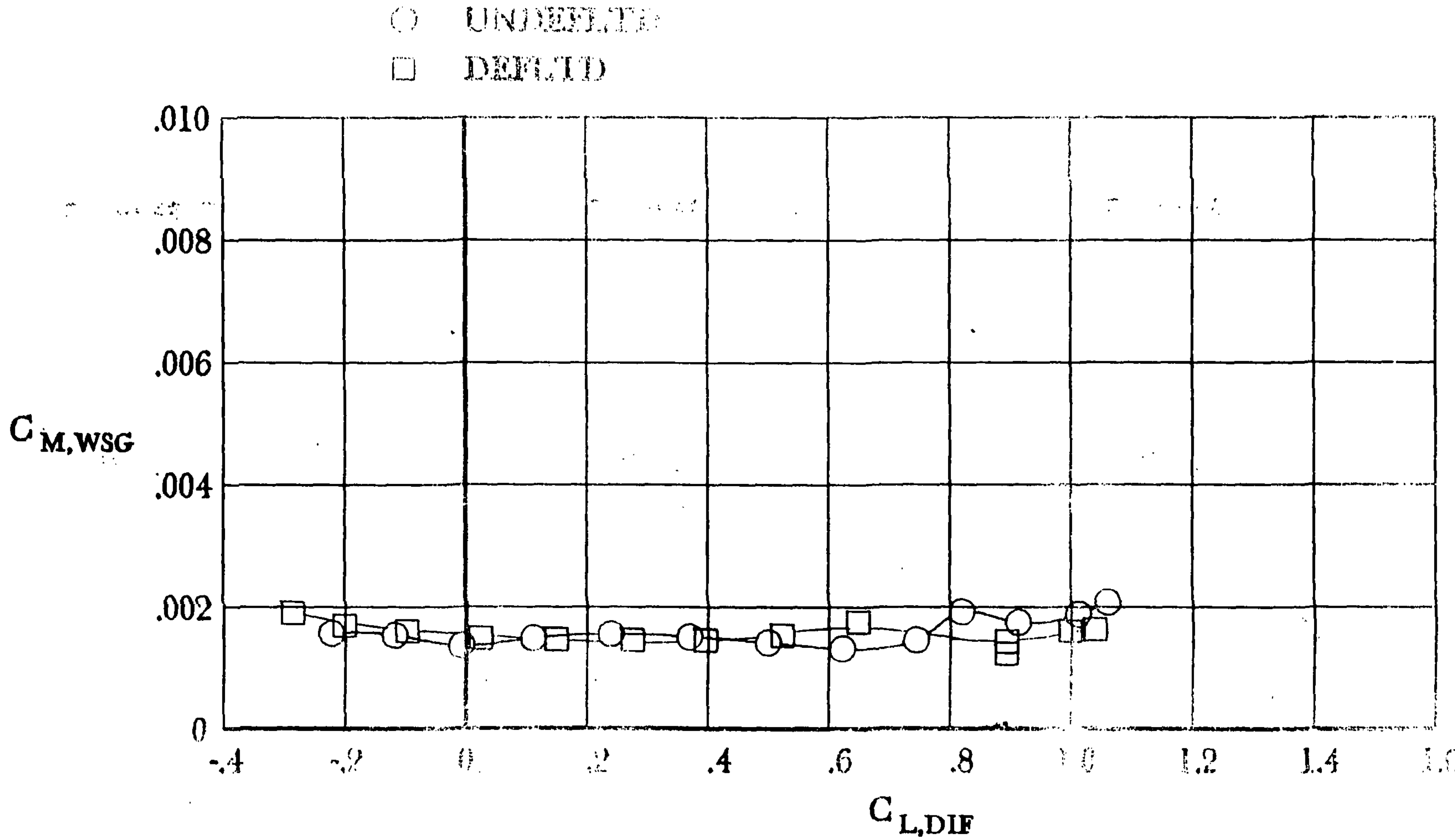


Figure 12. - Concluded.

SHEET 116 TYPE 1 TEST 670
RUNS 1 6 0 0 0 0 0 0 0 0

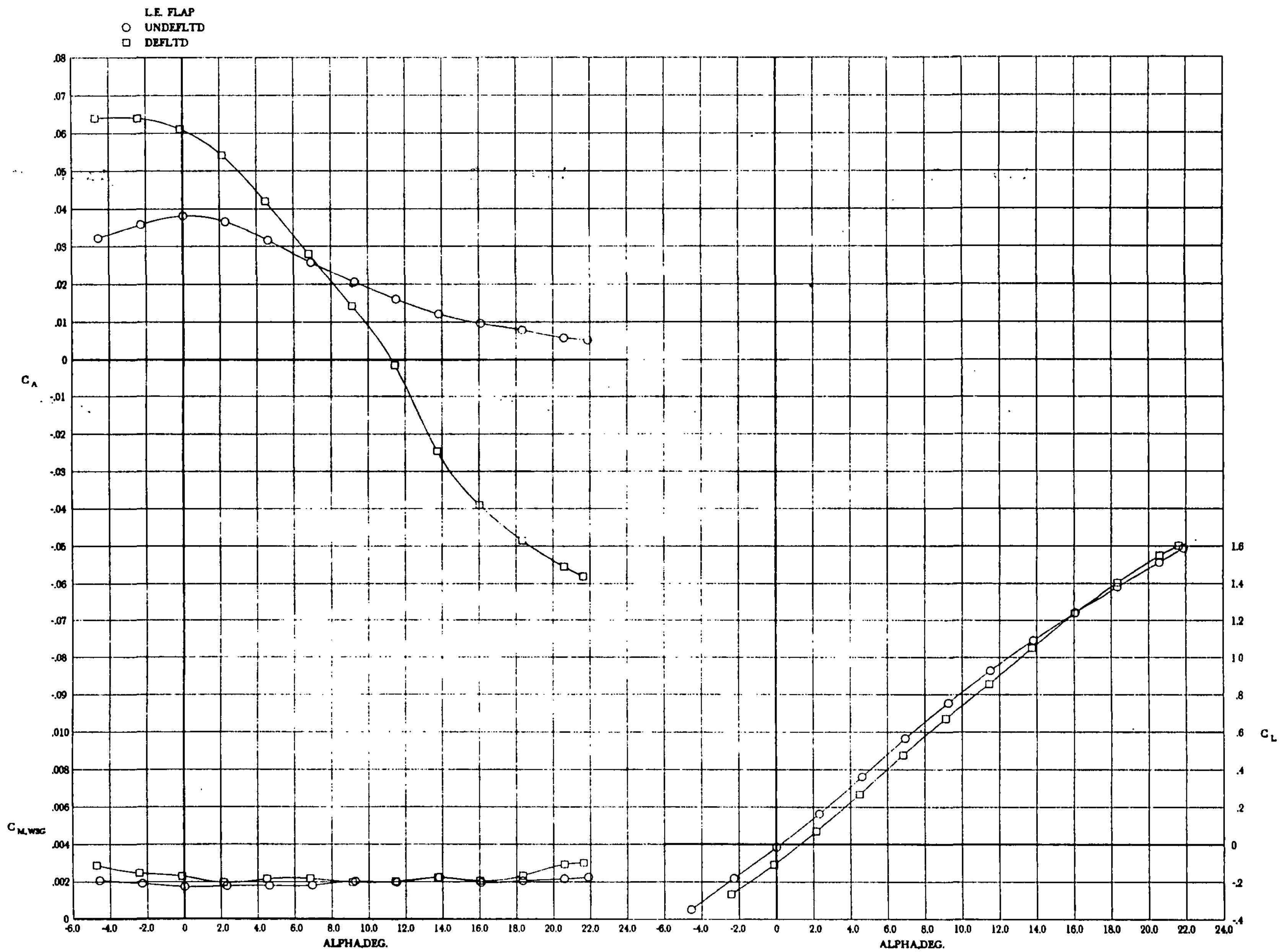


Figure 13.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard on at a Mach number of 1.03.

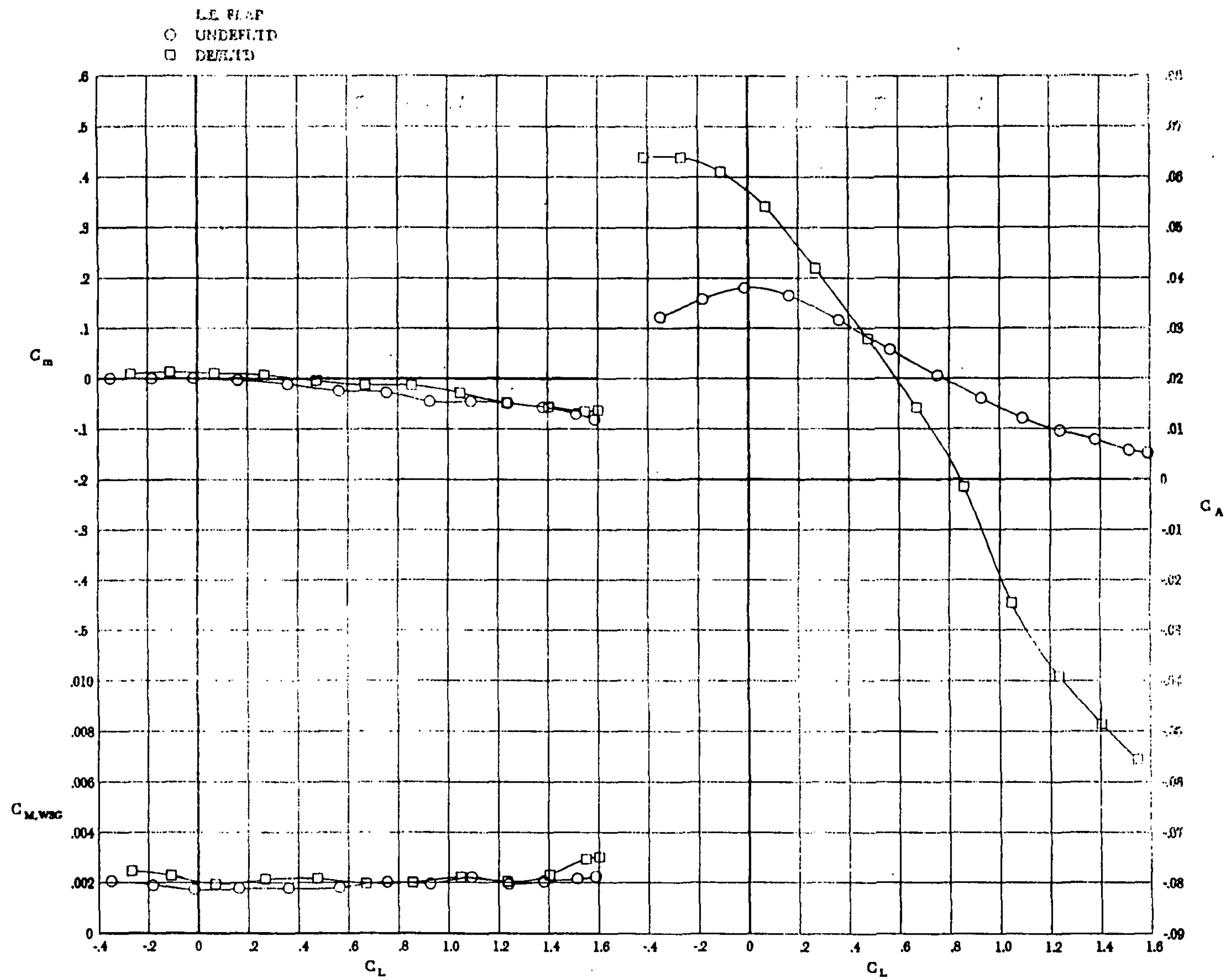
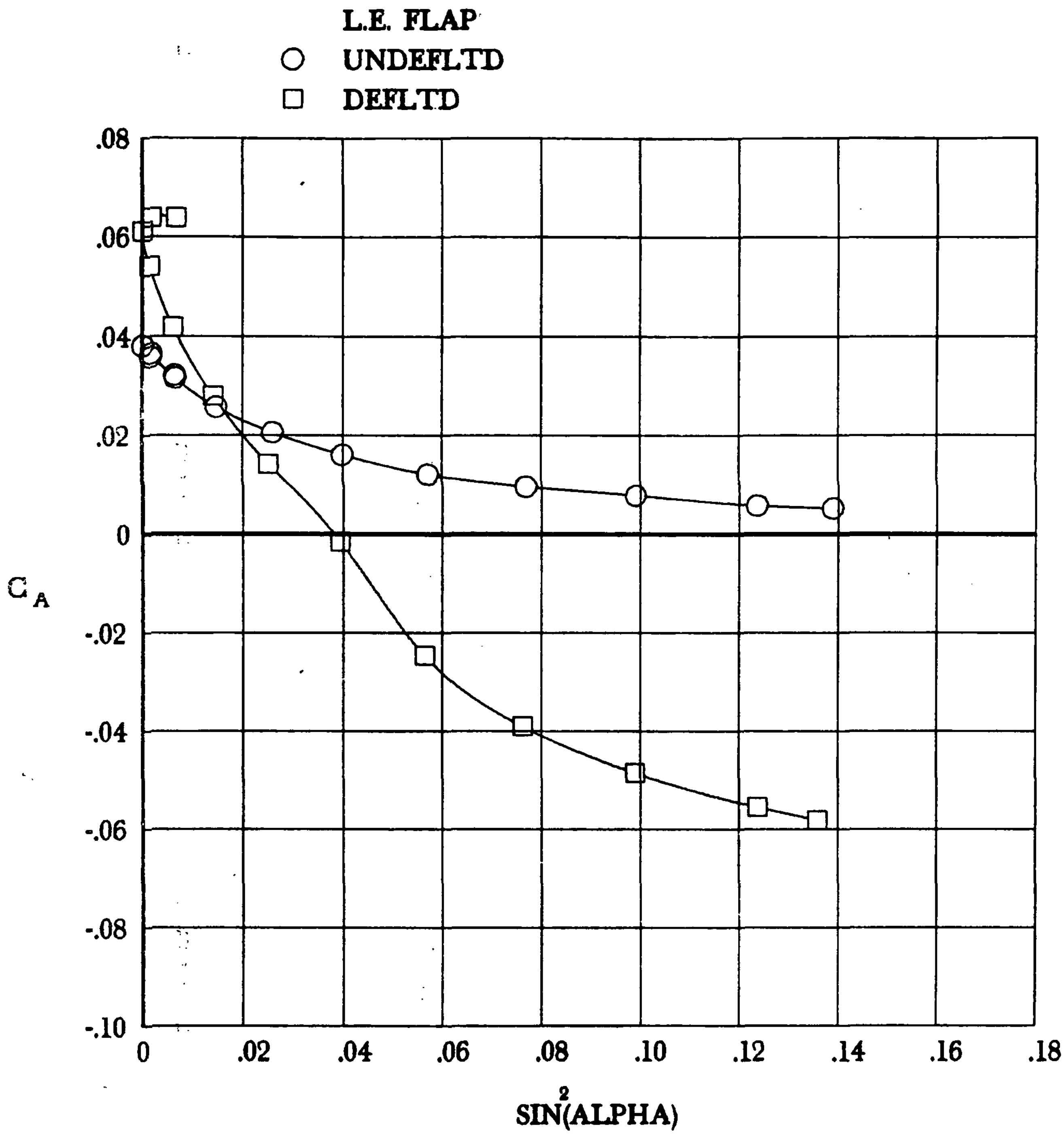
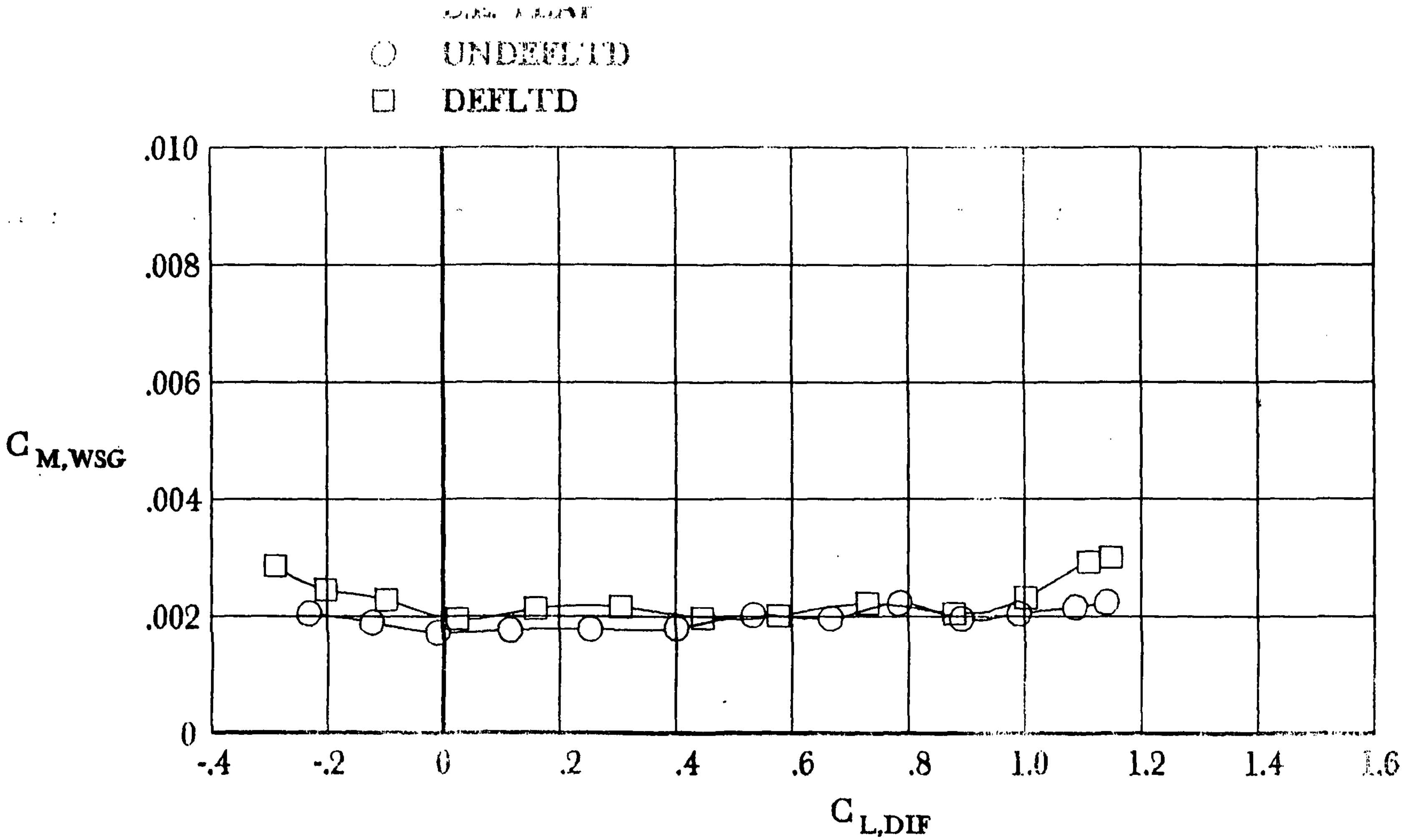


Figure 13.- Continued.



C
Figure 13. - Continued.

SHEET 117 TYPE 1 TEST 670
RUNS 2 7 0 0 0 0 0 0 0 0



D
Figure 13. - Concluded.

SHEET 117 TYPE 1 TEST 670
PUNS 2 7 0 0 0 0 0 0 0 0

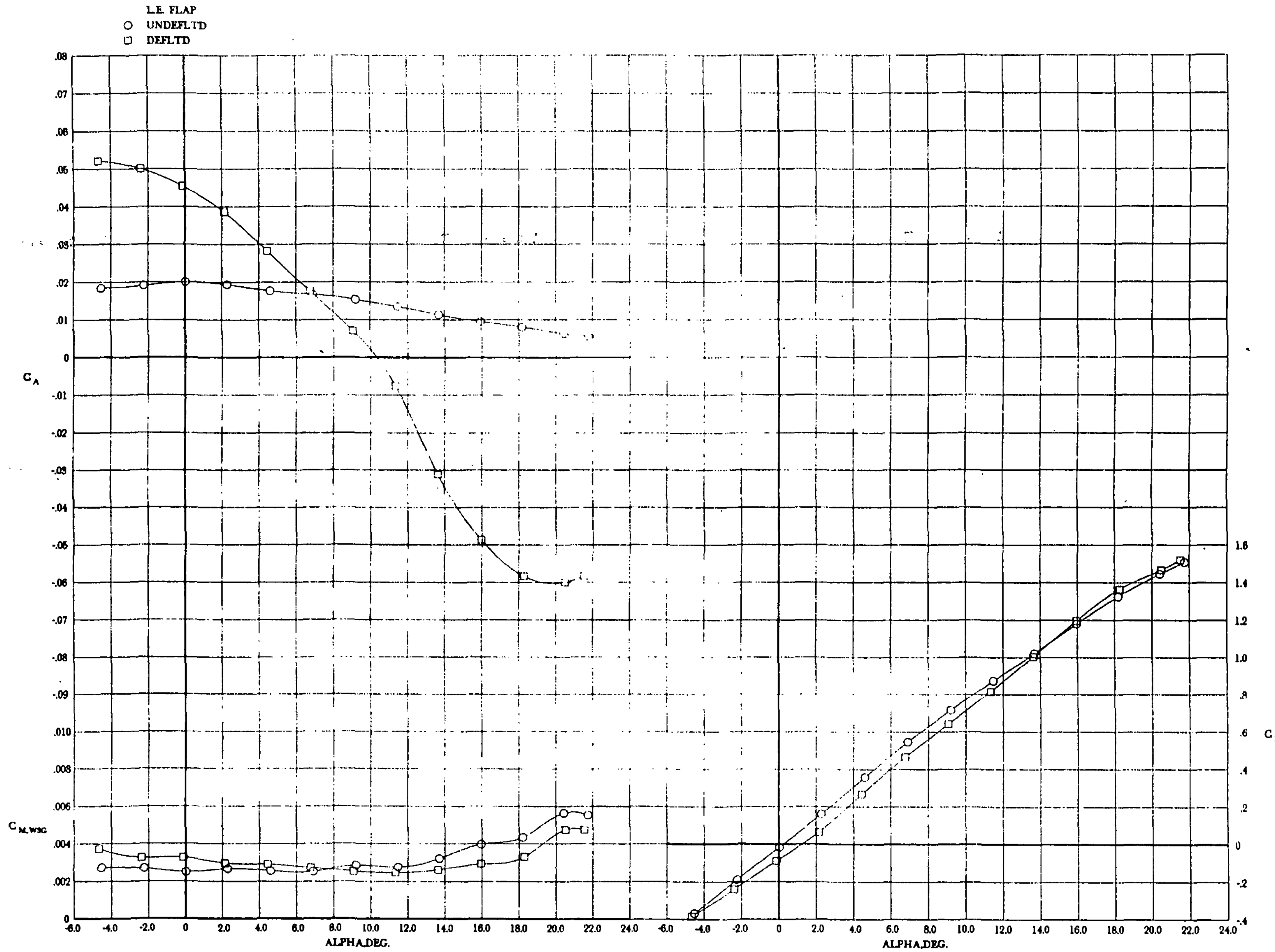


Figure 14.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard on at a Mach number of 0.95.

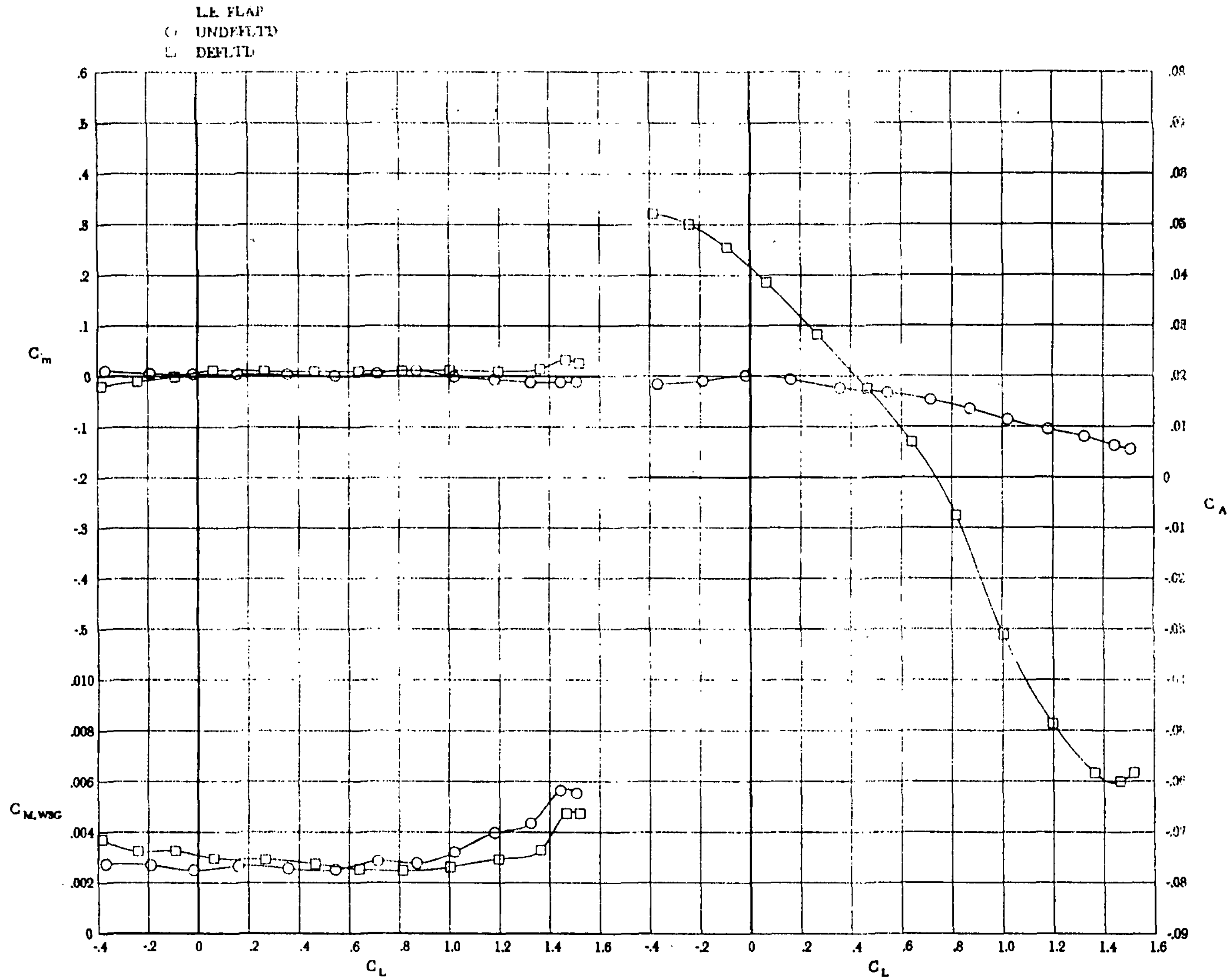
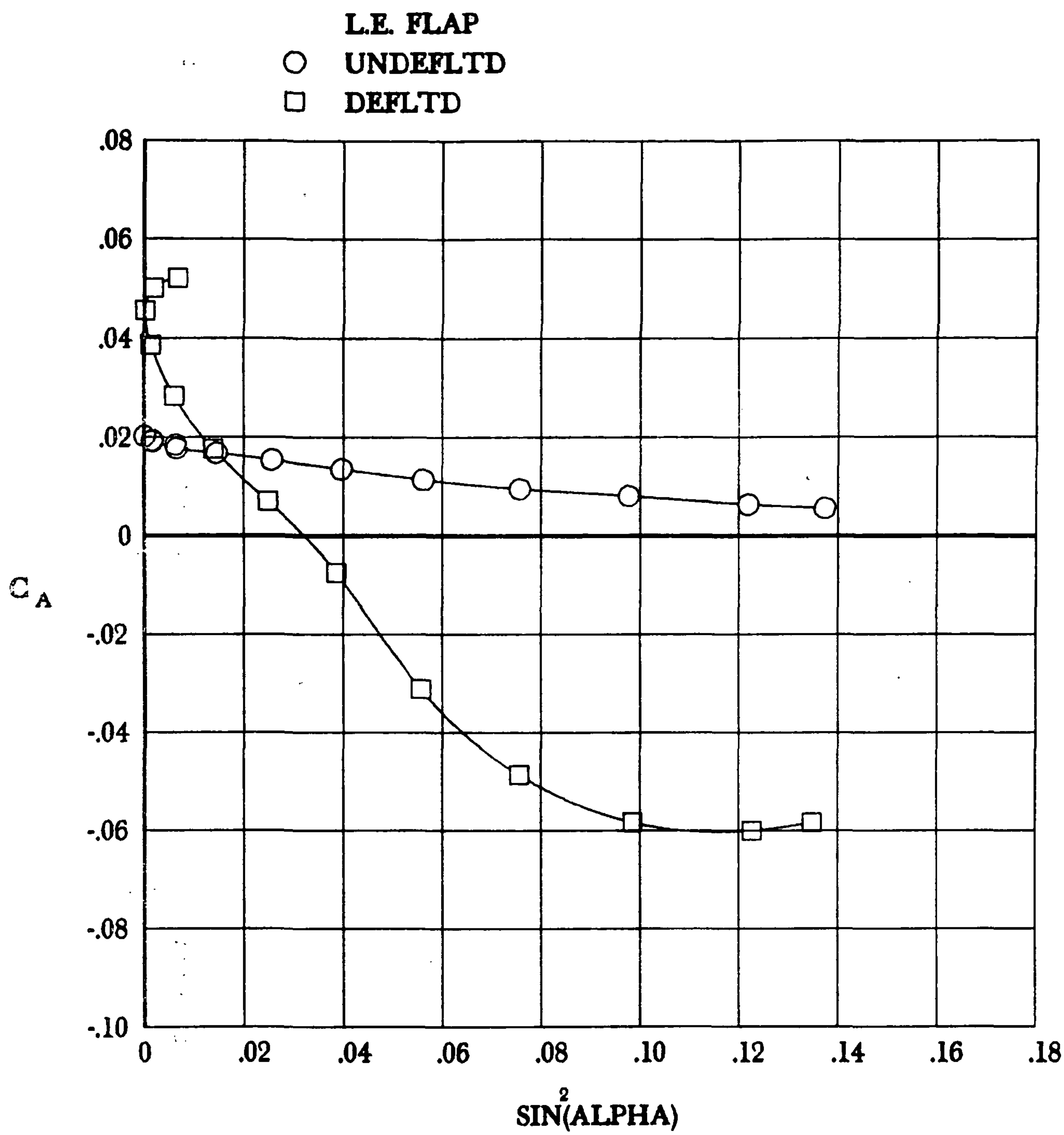
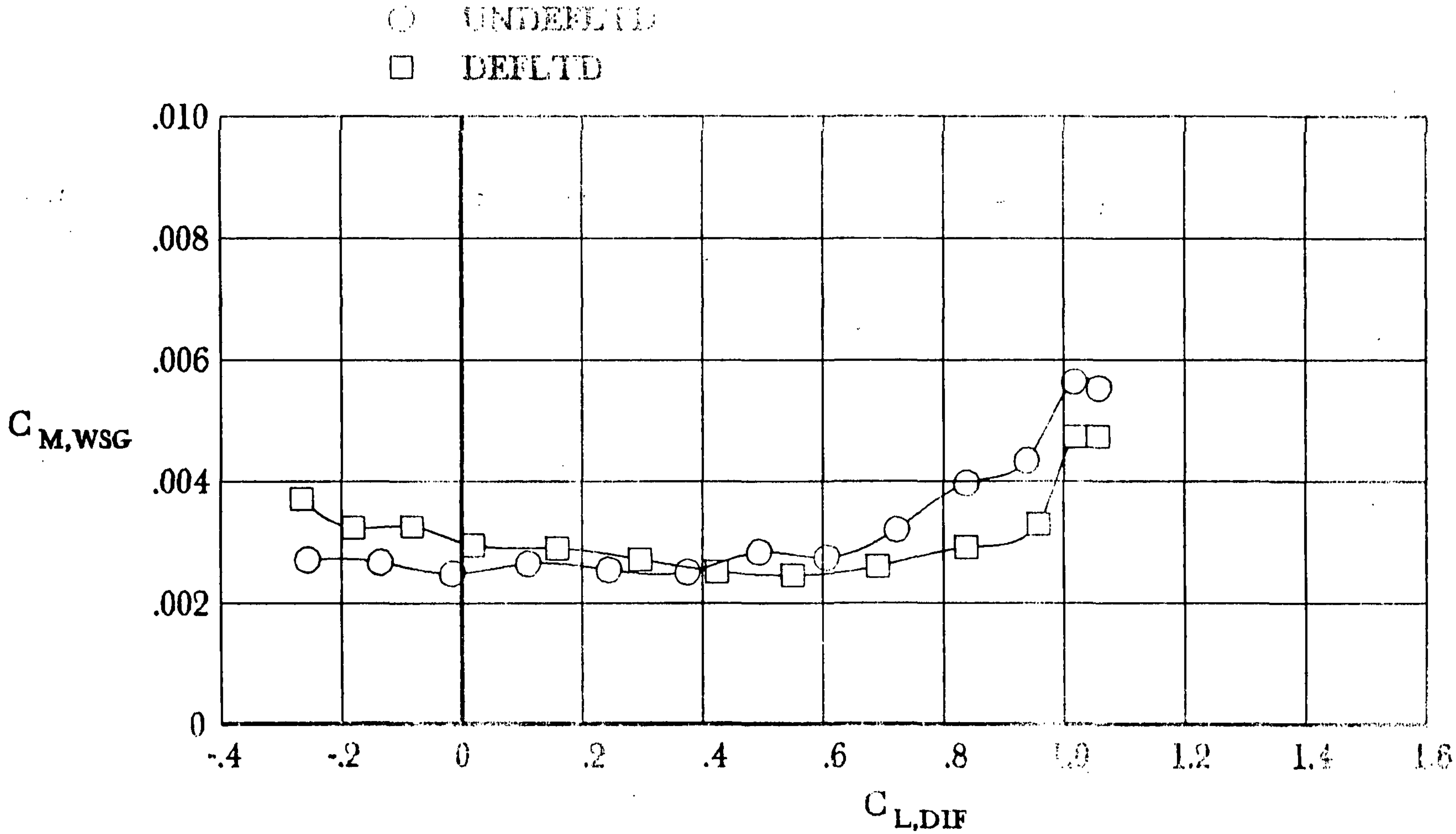


Figure 14.- Continued.



C
Figure 14.- Continued.

SHEET 118 TYPE 1 TEST 670
RUNS 3 8 0 0 0 0 0 0 0 0



D
Figure 14. - Concluded.

SHEET 118 TYPE 1 TEST 670
RUNS 3 8 0 0 0 0 0 0 0 0

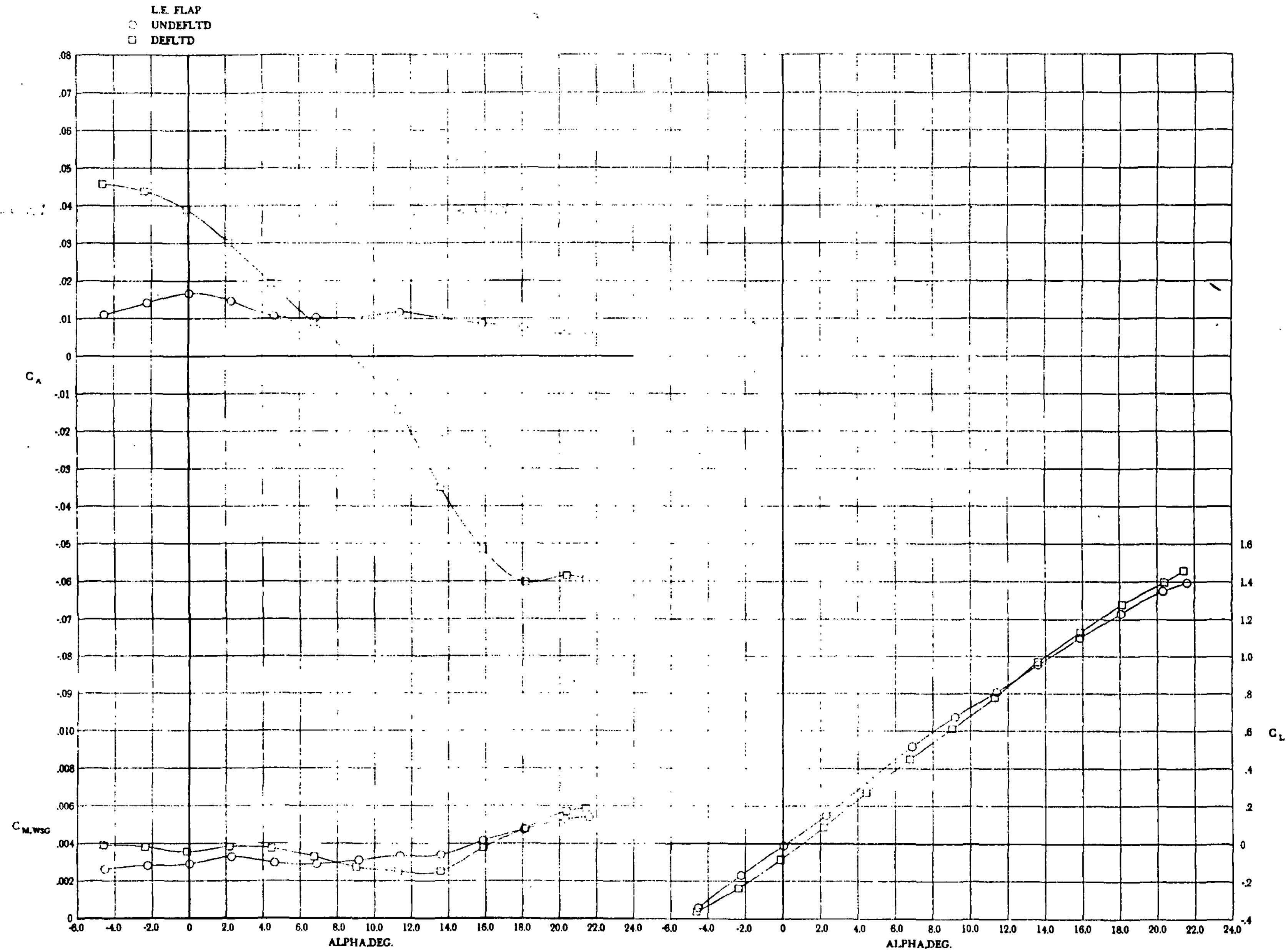


Figure 15.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard on at a Mach number of 0.90.

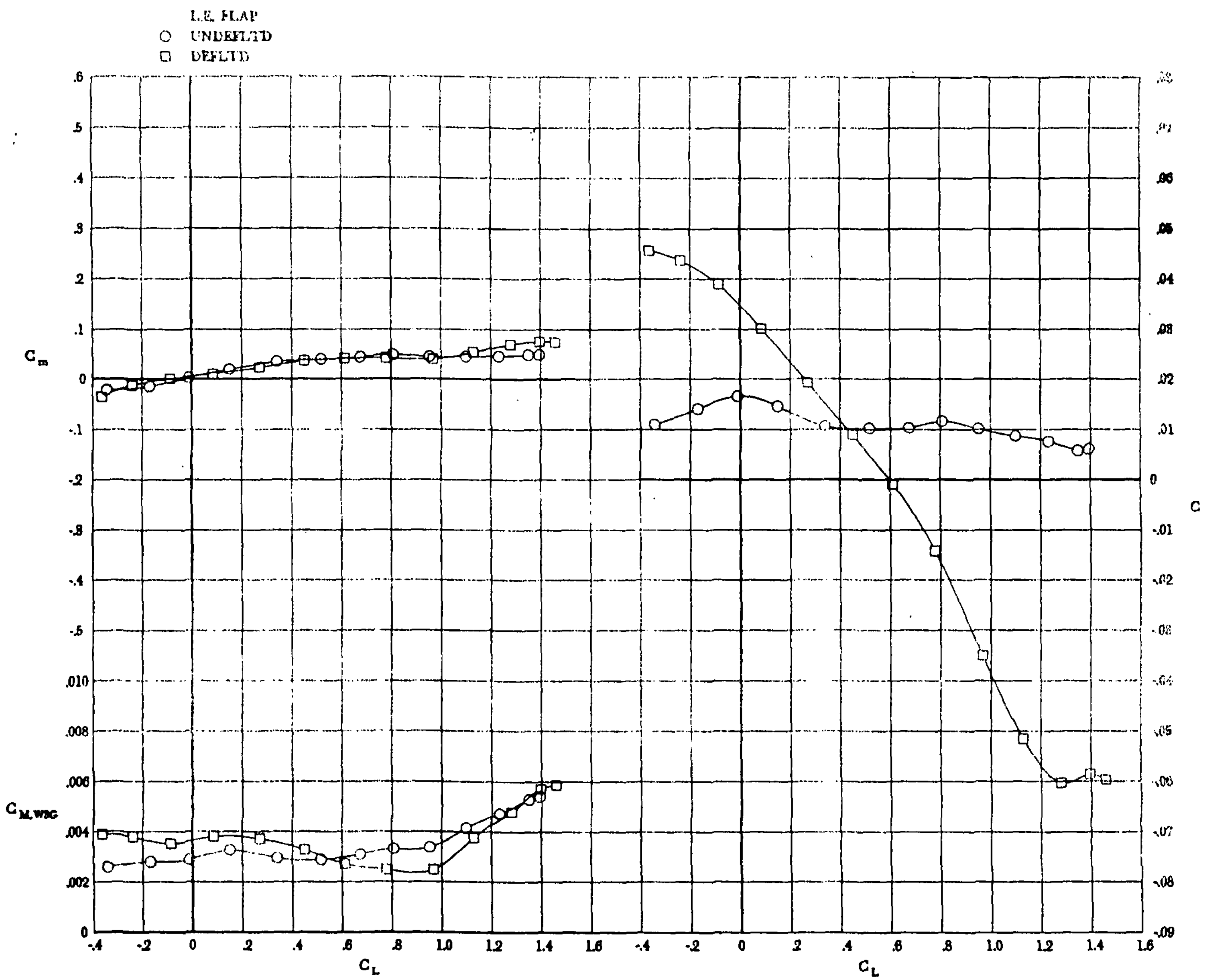
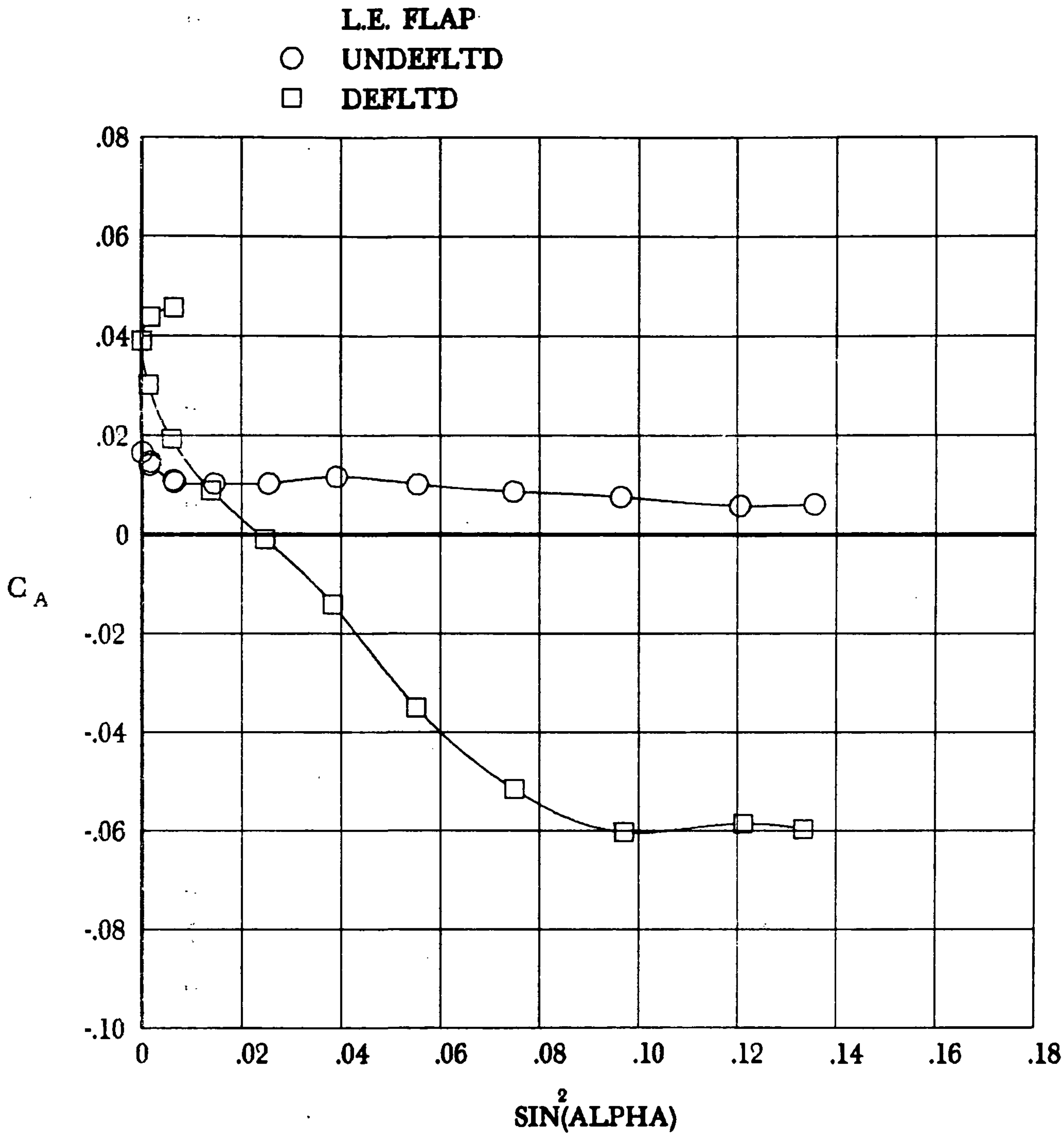
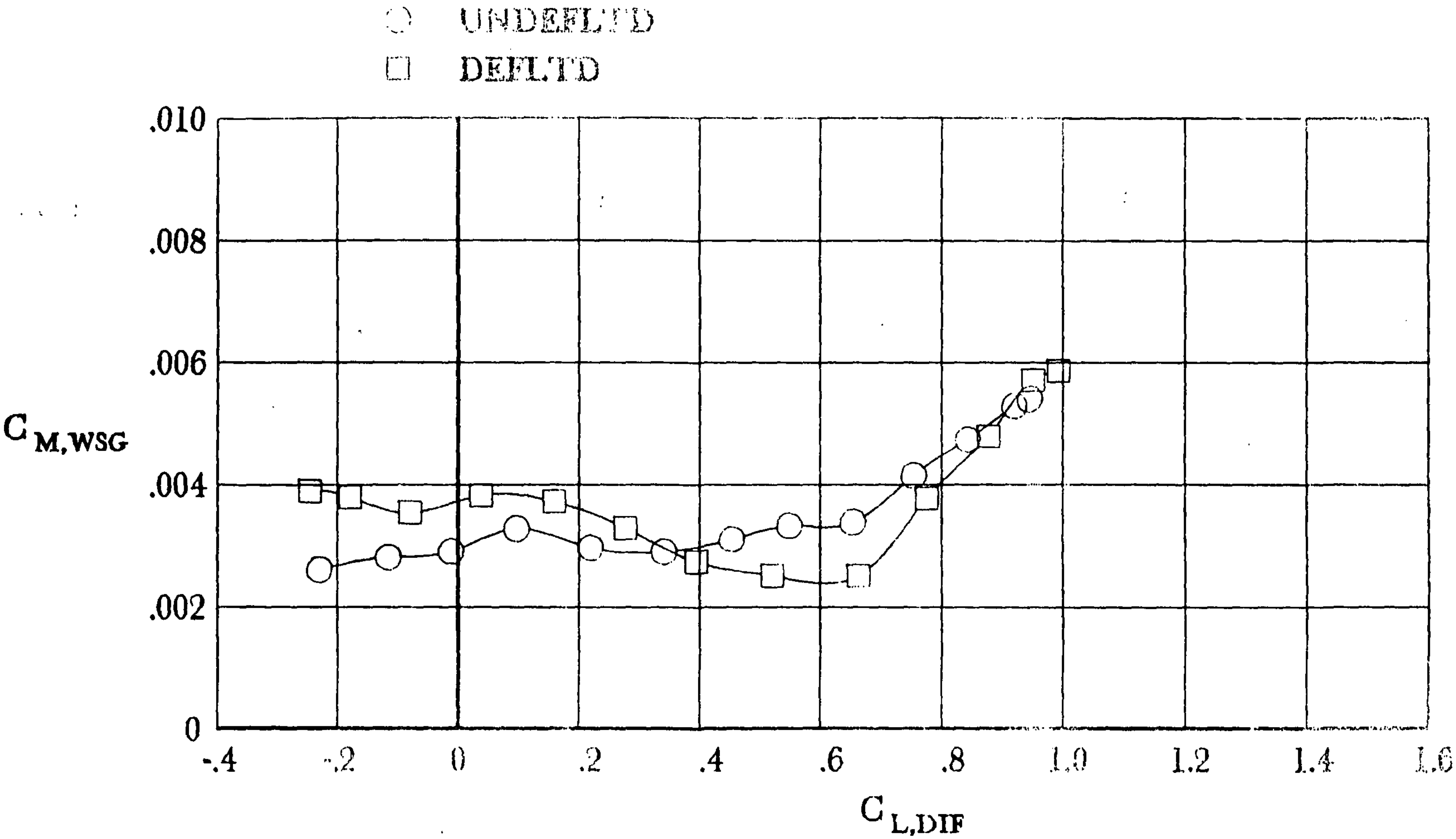


Figure 15.- Continued.



C
Figure 15.- Continued.

SHEET 119 TYPE 1 TEST 670
RUNS 4 9 0 0 0 0 0 0 0 0



D

Figure 15. - Concluded.

SHEET 119 TYPE 1 TEST 670

RUNS 4 9 0 0 0 0 0 0 0 0

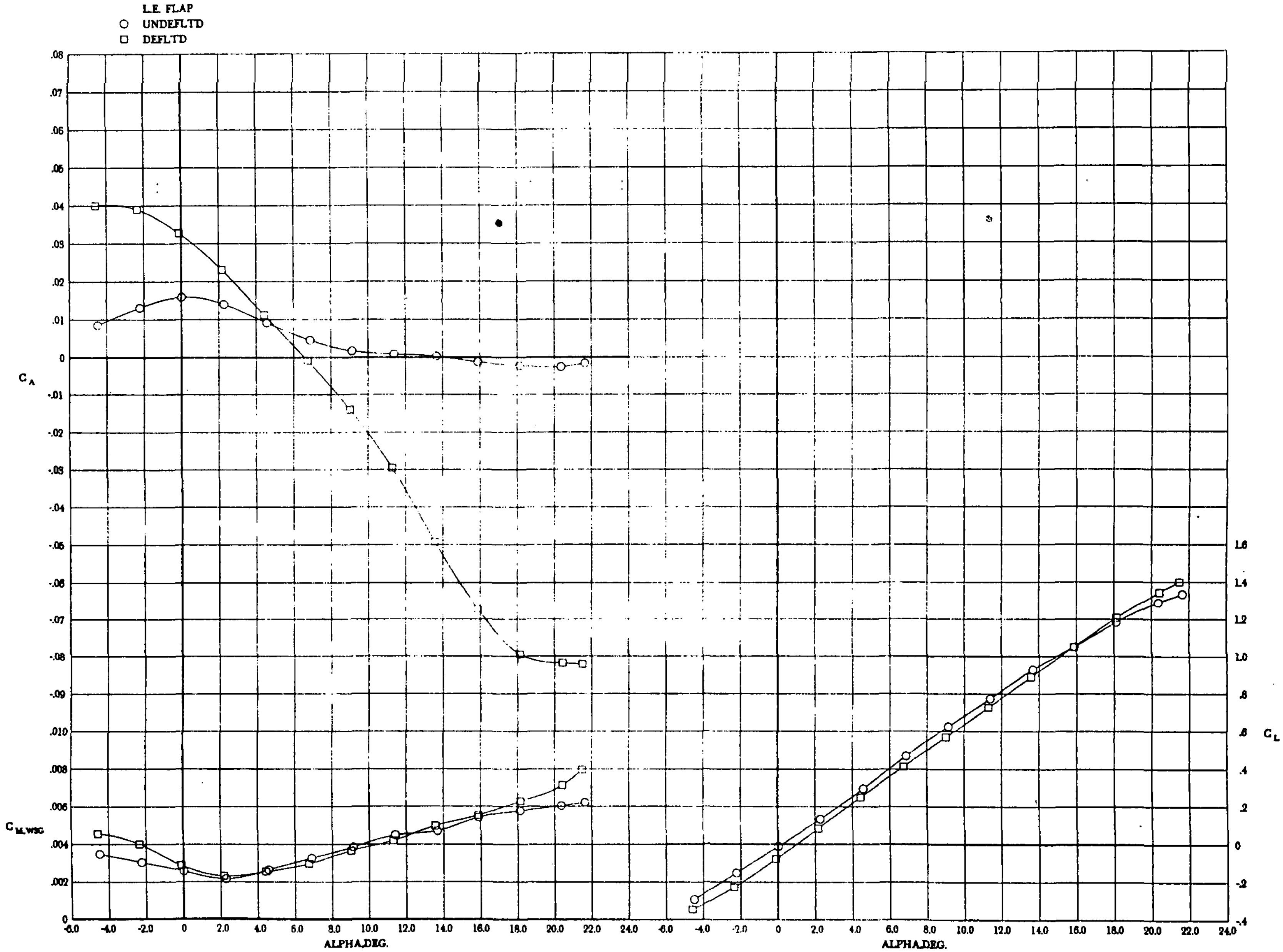


Figure 16.- Effect of wing leading edge flap deflection on the longitudinal aerodynamic characteristics and wing buffet for canard on at a Mach number of 0.70.

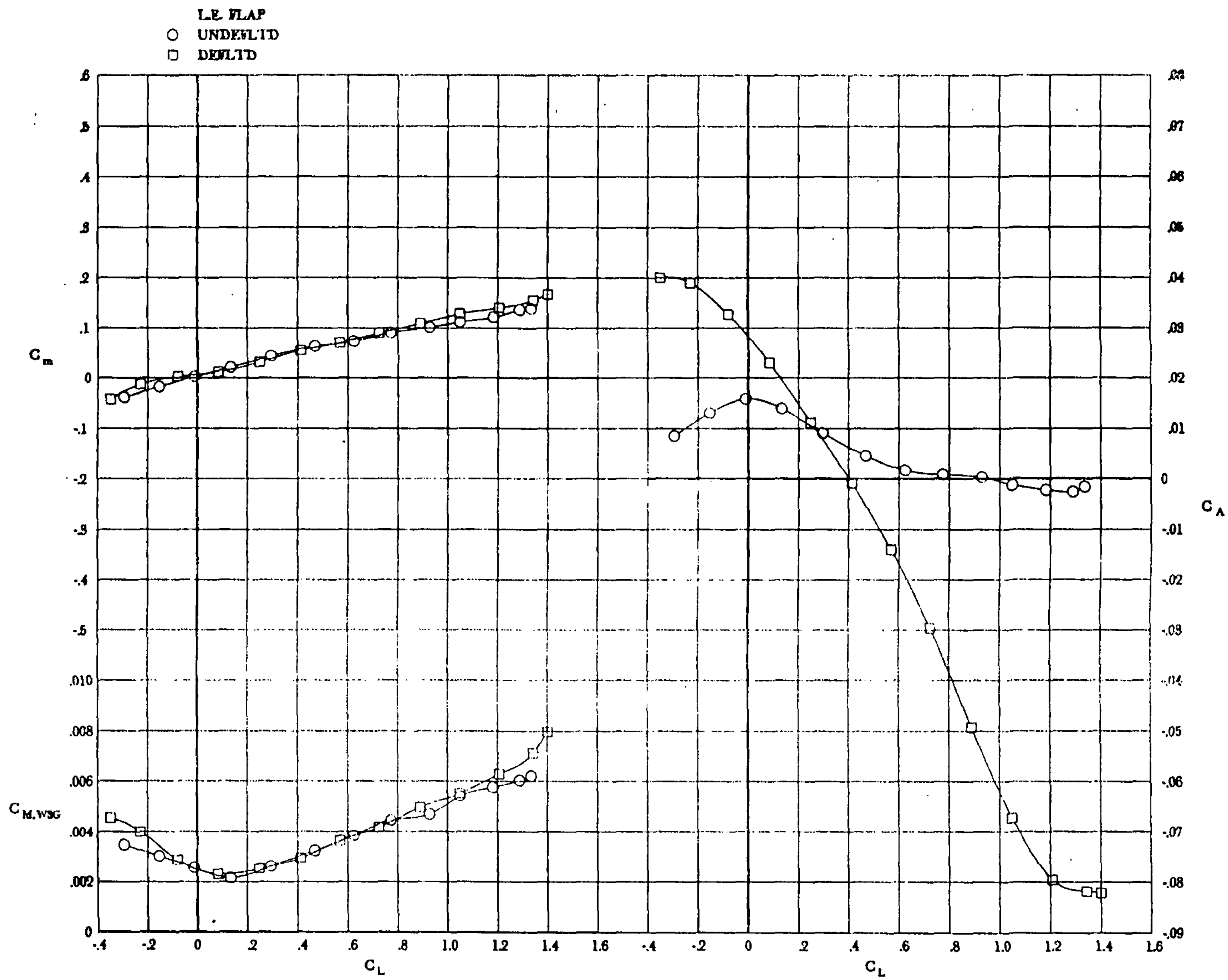
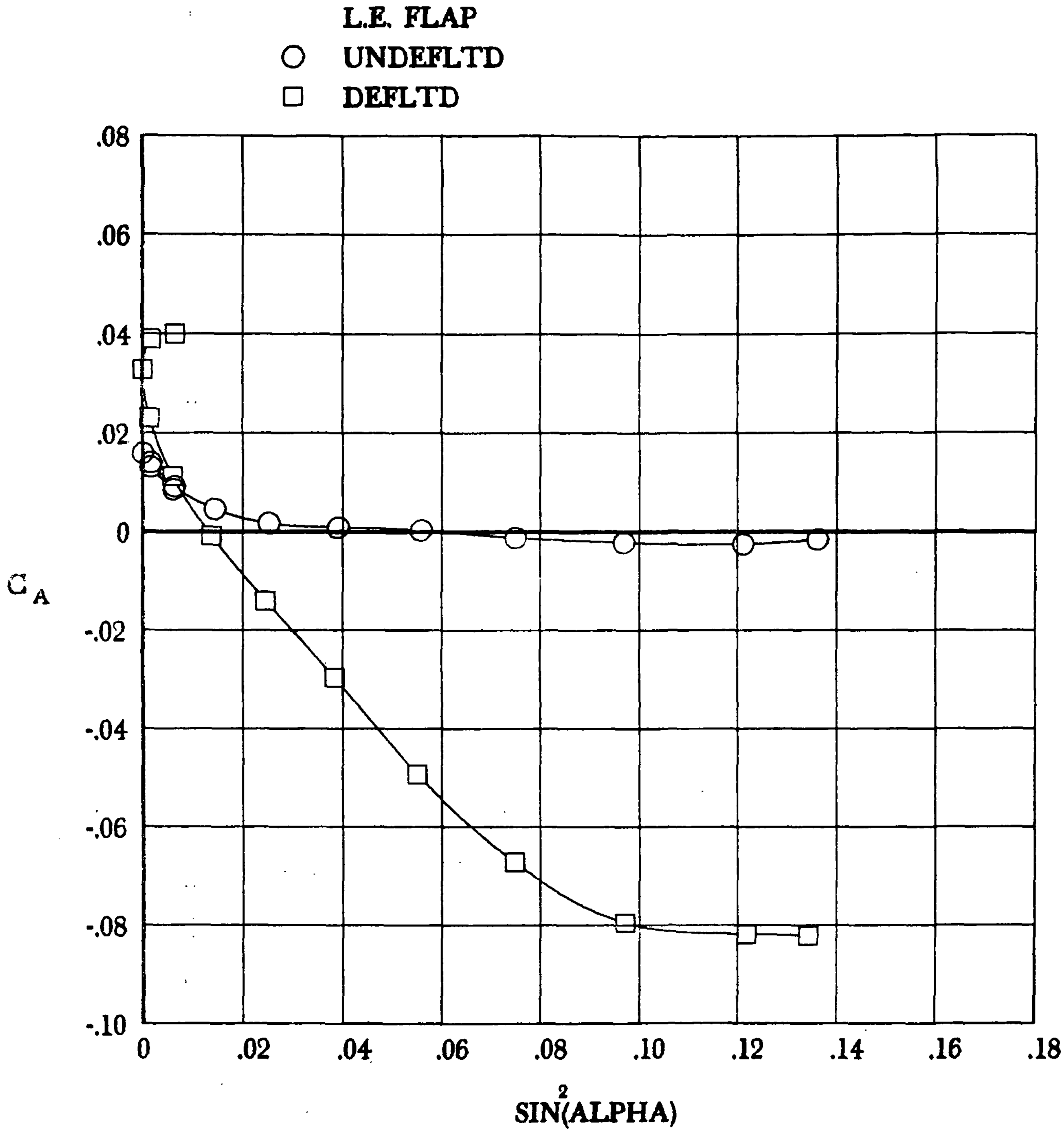
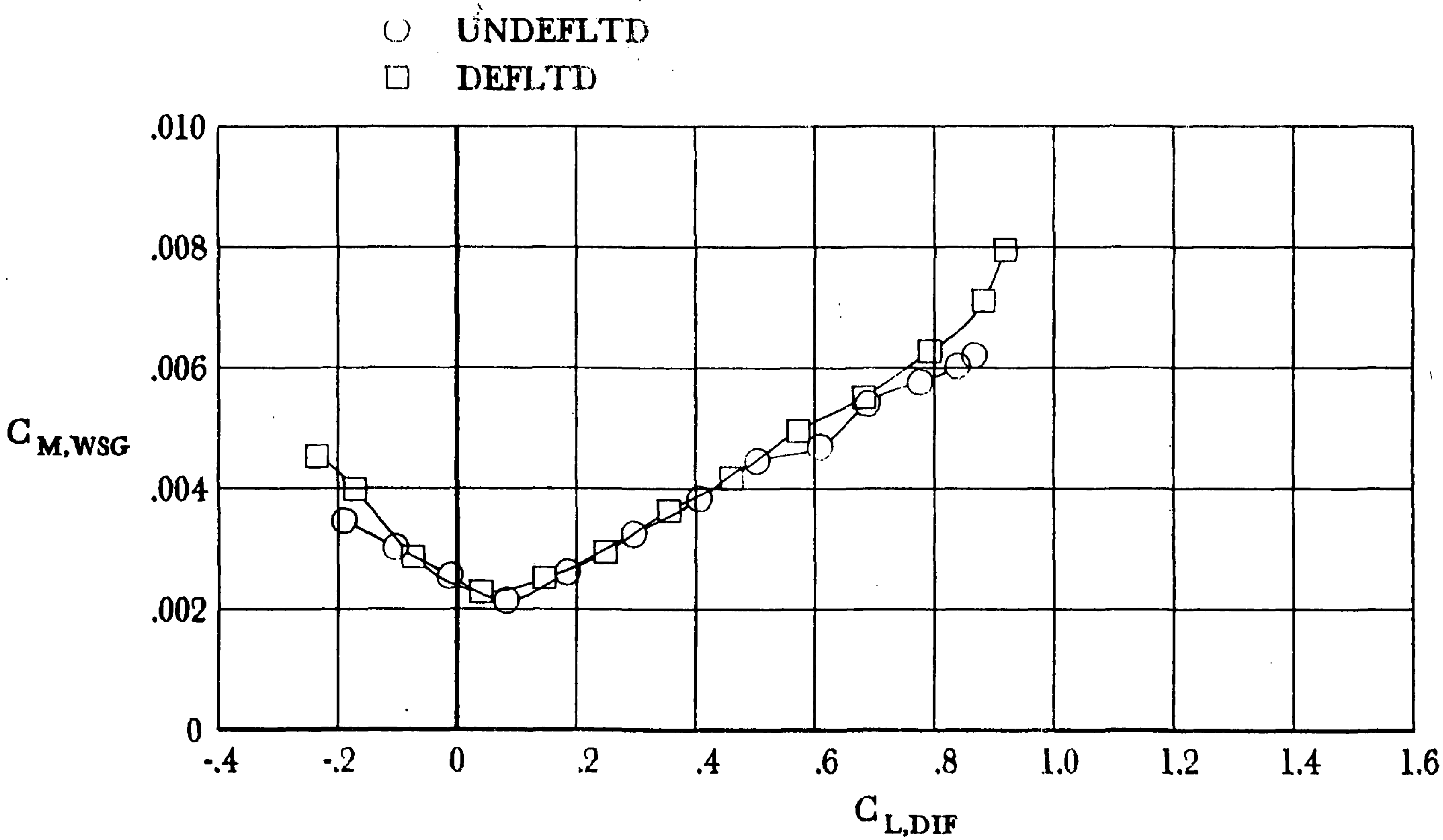


Figure 16.- Continued.



C
Figure 16. - Continued.

SHEET 120 TYPE 1 TEST 670
RUNS 5 10 0 0 0 0 0 0 0 0



D
Figure 16.- Concluded.

SHEET 120 TYPE 1 TEST 670
RUNS 5 10 0 0 0 0 0 0 0 0