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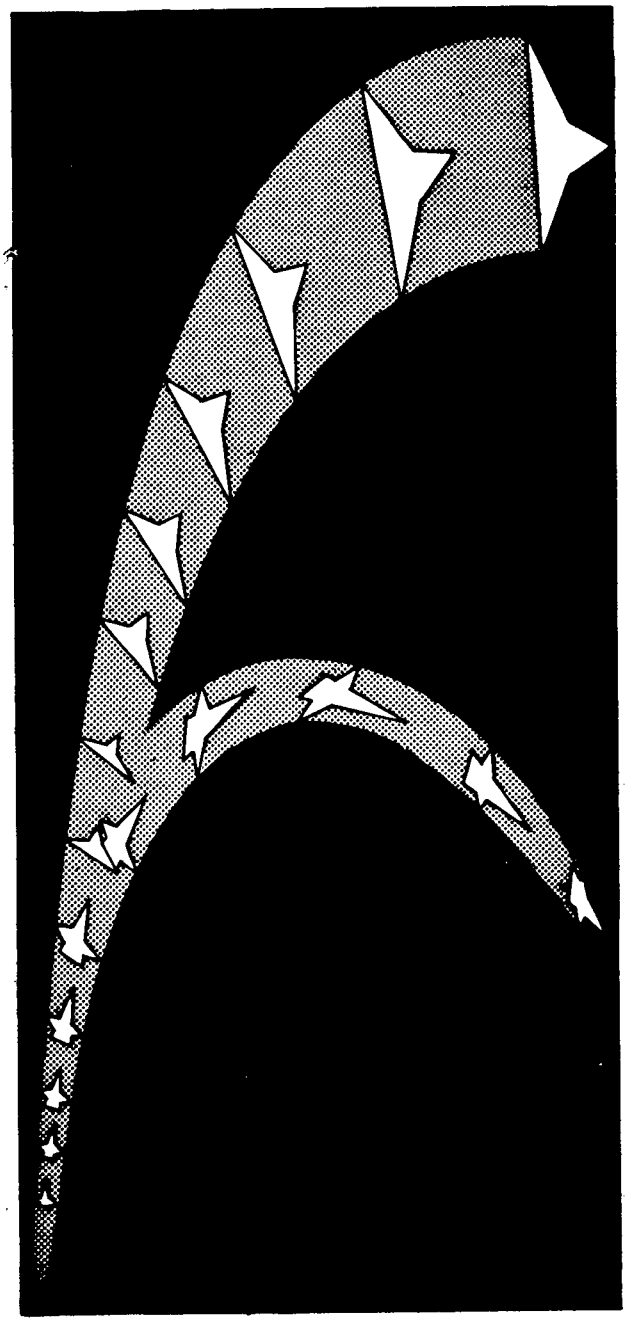

SADSAC SPACE SHUTTLE
AEROTHERMODYNAMIC
DATA MANAGEMENT SYSTEM

CONTRACT NAS8-4016
MARSHALL SPACE FLIGHT CENTER

SPACE DIVISION CHRYSLER CORPORATION

—SPACE SHUTTLE—

STATIC AERODYNAMIC CHARACTERISTICS AND CONTROL EFFECTIVENESS OF THE GAC H-33 ORBITER AT MACH NUMBERS FROM 0.6 TO 4.96

by

R. Krepski, GAC
M. Quan, GAC
A. Francario, GAC
K. Blackwell, MSFC

RECEIVED NASA STI FACILITY INPUT BRANCH JUL 7 2

MSFC 14-INCH
TRISONIC WIND TUNNEL

Marshall Space
Flight Center

NASA

This document should be referenced as NASA CR-120,013

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SADSAC/SPACE SHUTTLE

WIND TUNNEL TEST DATA REPORT

CONFIGURATION: GRUMAN H-33 SPACE SHUTTLE ORBITER

TEST PURPOSE: AERODYNAMIC CHARACTERISTICS IN THE SUPERSONIC FLIGHT REGIME

TEST FACILITY: MSFC 14" X 14" TRISONIC WIND TUNNEL

TESTING AGENCY: GRUMMAN AEROSPACE CORPORATION

TEST NO. & DATE: MSFC 507, OCTOBER 13 - 18, 1971 AND JANUARY 13 -19,1972(100 hrs.)

FACILITY COORDINATOR: J. Weaver - NASA/MSFC

PROJECT ENGINEER(S): R. Krepski - GAC; A. Francario - GAC; M. Quan - GAC
K. Blackwell - MSFC

DATA MANAGEMENT SERVICES

LIAISON: J. T. Glyn FOR John E. Vaughn

DATA OPERATIONS: H C Zimmerle H. C. Zimmerle

RELEASE APPROVAL: J. T. Glyn FOR N. D. Kemp, Supervisor
Aero Thermo Data Group

CONTRACT NAS 8-4016 AMENDMENT 158 DRL 297 - 84a

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FACILITY COORDINATOR:

Mr. Jim Weaver
Marshall Space Flight Center
Mail Stop S&E-AERO-AAE
Huntsville, Alabama 35801

Phone: (205) 453-2521

PROJECT ENGINEERS:

Mr. R. Krepski
Dept. 401, Plant No. 5
Grumman Aerospace Corporation
Bethpage, Long Island, New York 11714

Phone: (516) 575-1341

Mr. M. Quan
Dept. 401, Plant No. 5
Grumman Aerospace Corporation
Bethpage, Long Island, New York 11714

Phone: (516) 575-7044

Mr. A. Francario
Dept. 401, Plant No. 5
Grumman Aerospace Corporation
Bethpage, Long Island, New York 11714

Phone: (516) 575-7044

Mr. K. Blackwell
Marshall Space Flight Center
Mail Stop S&E-AERO-AAE
Huntsville, Alabama 35801

Phone: (205) 453-2517

SADSAC LIAISON:

Mr. J. Vaughn
Dept. 4820
Chrysler Corporation Huntsville Division
102 Wynn Drive
Huntsville, Alabama 35805

Phone: (205) 895-1387

SADSAC OPERATIONS:

Mr. H. C. Zimmerle
Dept. 2780
Chrysler Corporation Space Division
P. O. Box 29200
New Orleans, Louisiana 70129

Phone: (504) 255-2304

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STATIC AERODYNAMIC CHARACTERISTICS AND CONTROL EFFECTIVENESS OF THE GAC H-33 ORBITER AT MACH NUMBERS FROM 0.6 TO 4.96

By: R. Krepski, M. Quan, A. Francario,
and K. Blackwell

SUMMARY

A .003366 scale model of the Grumman H-33 orbiter was tested in the MSFC 14 inch Trisonic Wind Tunnel. Six-component aerodynamic force and moment data was recorded over a Mach number range of 0.6 to 4.96. Both pitch runs and yaw runs at various constant angles of attack were completed.

The basic model configuration was investigated. The effects of a component build-up and of various control deflections were obtained. The elevons were deflected symmetrically and asymmetrically to determine elevator and aileron effectiveness. The rudder was tested both flared and unflared and the effects of deflections were determined in the flared case.

The model was tested in pitch in two intervals. The first interval was from 0° to 20°. Then an adaptor was set to give the sting an offset angle and 20° to 40° angle of attack was obtained. Characteristics in sideslip were determined by varying sideslip angle from -4° to 10° with angle of attack set at 0°, 10°, 15°, and 30°.

An anomalous shift in the rolling moment data for the angle of attack range of 20° to 40° is observable in the plotted data (data figures 5, 6, and 8 of this report). This data is presented only to show the increments due to aileron and rudder deflection.

NOMENCLATURE
General

SYMBOL	SADSAC SYMBOL	DEFINITION
a		speed of sound; m/sec, ft/sec
C_p	CP	pressure coefficient; $(p_l - p_\infty)/q$
M	MACH	Mach number; V/a
p		pressure; N/m^2, psf
q	Q(NSM) Q(PSF)	dynamic pressure; $1/2\rho V^2$, N/m^2, psf
RN/L	RN/L	unit Reynolds number; per m, per ft
V		velocity; m/sec, ft/sec
α	ALPHA	angle of attack, degrees
β	BETA	angle of sideslip, degrees
ψ	PSI	angle of yaw, degrees
ϕ	PHI	angle of roll, degrees
ρ		mass density; kg/m^3, $slugs/ft^3$
		Reference & C.G. Definitions
A_b		base area; m^2, ft^2
b	BREF	wing span or reference span; m, ft
c.g.		center of gravity
ℓ_{REF} $\bar{c}$	LREF	reference length or wing mean aerodynamic chord; m, ft
S	SREF	wing area or reference area; m^2, ft^2
	MRP	moment reference point
	XMRP	moment reference point on X axis
	YMRP	moment reference point on Y axis
	ZMRP	moment reference point on Z axis

SUBSCRIPTS

b	base
l	local
s	static conditions
t	total conditions
∞	free stream

NOMENCLATURE (Continued)

Body-Axis System

SYMBOL	SADSAC SYMBOL	DEFINITION
C_N	CN	normal-force coefficient; $\frac{\text{normal force}}{qS}$
C_A	CA	axial-force coefficient; $\frac{\text{axial force}}{qS}$
C_Y	CY	side-force coefficient; $\frac{\text{side force}}{qS}$
C_{A_b}	CAB	base-force coefficient; $\frac{\text{base force}}{qS}$ $-A_b(p_b - p_\infty)/qS$
C_{A_f}	CAF	forebody axial force coefficient, $C_A - C_{A_b}$
C_m	CLM	pitching-moment coefficient; $\frac{\text{pitching moment}}{qS\ell_{REF}}$
C_n	CYN	yawing-moment coefficient; $\frac{\text{yawing moment}}{qSb}$
C_ℓ	CBL	rolling-moment coefficient; $\frac{\text{rolling moment}}{qSb}$
		Stability-Axis System
C_L	CL	lift coefficient; $\frac{\text{lift}}{qS}$
C_D	CD	drag coefficient; $\frac{\text{drag}}{qS}$
C_{D_b}	CDB	base-drag coefficient; $\frac{\text{base drag}}{qS}$
C_{D_f}	CDF	forebody drag coefficient; $C_D - C_{D_b}$
C_Y	CY	side-force coefficient; $\frac{\text{side force}}{qS}$
C_m	CLM	pitching-moment coefficient; $\frac{\text{pitching moment}}{qS\ell_{REF}}$
C_n	CLN	yawing-moment coefficient; $\frac{\text{yawing moment}}{qSb}$
C_ℓ	CSL	rolling-moment coefficient; $\frac{\text{rolling moment}}{qSb}$
L/D	L/D	lift-to-drag ratio; C_L/C_D

ADDITIONS TO SADSAC NOMENCLATURE
FOR
MSFC TWT TEST NO. 507

SYMBOL	SADSAC SYMBOL	DEFINITION
δ_{e_L}	ELVN-L	left elevon, surface deflection angle, positive deflection, trailing edge down; degrees
δ_{e_R}	ELVN-R	right elevon, surface deflection angle, positive deflection, trailing edge down; degrees
δ_a	AILERN	total aileron deflection angle in degrees, $(\delta_{e_L} - \delta_{e_R})/2$
δ_e	ELEVTR	elevator deflection angle in degrees, $(\delta_{e_L} + \delta_{e_R})/2$
δ_{r_L}	LRUDDR	left split rudder surface deflection angle, degrees; positive deflection, trailing edge to the left
δ_{r_R}	RRUDDR	right split rudder surface deflection angle, degrees; positive deflection, trailing edge to the left.
δ_r	RUDDER	assymetrical split rudder deflection for directional control, $(\delta_{r_L} + \delta_{r_R})/2$; degrees
C_{m_α}	CLMALF	derivative of pitching moment coefficient with respect to alpha, (alpha = 0 to 5°); per degree
C_{L_α}	CLALFA	derivative of lift coefficient with respect to alpha, (alpha = 0 to 5°); per degree
C_{y_β}	CYBETA	derivative of side-force coefficient with respect to beta (beta = $\pm 5^\circ$); per degree
C_{n_β}	DCLNDB	derivative of yawing moment coefficient with respect to beta (beta = $\pm 5^\circ$); per degree, stability axis system
C_{ℓ_β}	DCSLDB	derivative of rolling moment coefficient with respect to beta (beta = $\pm 5^\circ$); per degree, stability axis system
$\alpha_{(C_L = 0)}$	ALFCLØ	angle of attack at zero lift coefficient (CL = 0); degrees

ADDITIONS TO SADSAC NOMENCLATURE
(Continued)

SYMBOL	SADSAC SYMBOL	DEFINITION
C_{D_o}	CDØ	drag coefficient at zero lift coefficient (CL = 0)
$C_{m_{\alpha = 0}}$	CLMAFØ	pitching moment coefficient at zero angle of attack (ALPHA = 0)

CONFIGURATIONS INVESTIGATED

This test was conducted on a .003366 scale model of the Grumman H-33 Space Shuttle Orbiter. The model was built by the Boeing Company for the Marshall Space Flight Center with controls and deflections being put in by Grumman. The following components were utilized:

B_5	Basic H-33 Orbiter Body
W_4	Basic H-33 Orbiter Wing
V_5	Basic H-33 Orbiter Vertical Tail

There was no transition grit on the model. Component part combinations which were investigated are shown in Table II entitled Dataset Collation Sheets.

TEST FACILITY DESCRIPTION

The MSFC 14 x 14 Inch Trisonic Wind Tunnel is an intermittent blowdown tunnel which operates by high pressure air flowing from storage to either vacuum or atmospheric conditions. A Mach number range from 0.2 to 5.85 is covered by utilizing two interchangeable test sections. The transonic section permits testing at Mach 2.75 to 5.85. Mach numbers between 0.2 and 0.9 are obtained by using a controllable diffuser. The range from 0.95 to 1.3 is achieved through the use of plenum suction and perforated walls. Mach numbers of 1.46, 1.96 and 2.48 are produced by interchangeable sets of fixed contour nozzle blocks. Above Mach 2.48 a set of fixed contour nozzle blocks are tilted and translated automatically to produce any desired Mach number in 0.25 increments.

Air is supplied to a 6000 cubic foot storage tank at approximately -40°F dew point and 500 psi. The compressor is a three-stage reciprocating unit driven by a 1500 hp motor.

The tunnel flow is established and controlled with a servo actuated gate valve. The controlled air flows through the valve diffuser into the stilling chamber and heat exchanger where the air temperature can be controlled from ambient to approximately 180°F. The air then passes through the test section which contains the nozzle blocks and test region.

Downstream of the test section is a hydraulically controlled pitch sector that provides a total angle of attack range of 20° (±10°). Sting offsets and extensions are available for obtaining various maximum angles of attack up to 90°.

DATA REDUCTION

The MSFC # 201 0.5 inch six component balance was used to measure the orbiter forces and moments. The data were reduced along and about a system of stability axes centered at F.S. 1274.4, W.L. 391.3 and B.L. 0 (full scale coordinates). Pertinent parameters (model scale) used in the data reduction are given below:

$$S_{ref} = 7.897 \text{ in.}^2$$

$$\ell_{ref} = 5.453 \text{ in.}$$

$$b_{ref} = 3.817 \text{ in.}$$

There were three base pressure taps on this model. Using them, a base axial force coefficient was computed as follows:

$$C_{A_b} = - \left[C_{p_1} (A/_3) + C_{p_2} (A/_3) + C_{p_3} (A/_3) \right] / S_{ref}$$

where $C_{p_{1,2,3}}$ is the pressure coefficient corresponding to Taps 1, 2, 3 respectively. A is the model base area which is equal to .7521 square inches.

TABLE I.

TEST CONDITIONS

TEST 507

MACH NUMBER	REYNOLDS NUMBER per unit length	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)
0.60	5.0×10^6	4.340	98
0.90	6.3×10^6	7.389	96
1.20	6.7×10^6	9.143	97
1.46	7.5×10^6	10.769	95
1.96	7.4×10^6	10.982	112
2.74	4.7×10^6	6.380	138
2.99	5.3×10^6	6.066	103
3.48	7.0×10^6	6.856	104
4.00	8.2×10^6	6.635	104
4.96	5.4×10^6	3.068	103

BALANCE UTILIZED: MSFC No. 201

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF	60 #	.15 #	Varies with Dynamic Pressure
SF	20 #	.05 #	
AF	30 #	.08 #	
PM	60 in-#	.15 in-#	
YM	20 in-#	.05 in-#	
RM	25 in-#	.06 in-#	

COMMENTS:

TABLE II.

TEST MSFC 507 DATA SET COLLATION SHEET

.003366 SCALE MODEL OF THE GRUMMAN H-33 ORBITER IN THE M.S.F.C. 14" TRISONIC WIND TUNNEL

☐ PRETEST
☒ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES δ_e	δ_A	δ_R		NO. of RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE) 1.46	1.96	2.99	3.48	4.00	4.96						
R49001	$B_5W_4V_5^{\pm30}$	A	O	0	0	±30		4			4	3	2/1	1/1						
R49002	$B_5W_4^{-10,-10}V_5^{\pm30}$	A	O	-10	0	±30		4			5	6	7	8						
R49003	$B_5W_4^{-20,-20}V_5^{\pm30}$	A	O	-20	0	±30		4			12	11	10	9						
R49004	$B_5W_4^{-10,-30}V_5^{\pm30}$	A	O	-20	10	±30		4			16	15	14	13						
R49005	$B_5W_4^{-40,-40}V_5^{\pm30}$	A	O	-40	0	±30		4			17	18	19	20						
R49006	$B_5W_4^{+10,+10}V_5^{\pm30}$	A	O	+10	0	±30		4			24	23	22	21						
R49007	$B_5W_4V_5^{+35,-25}$	A	O	0	0	+35/-25		4			25	26	27	28						
R49008	$B_5W_4V_5$	A	O	0	0	0		4			32	31	30	29						
R49009	$B_5W_4V_5^{\pm30}$	10	C	0	0	±30		4			33	34	35	36						
R49010	$B_5W_4V_5^{\pm30}$	15	C	0	0	±30		4			40	39	38	37						
R49011	$B_5W_4V_5$	15	C	0	0	0		4			41	42	43	44						
R49012	B_5W_4	15	C	0	0	–		4			48	47	46	45						
R49013	B_5W_4	10	C	0	0	–		4			49	50	51	52						
R49014	B_5W_4	0	C	0	0	–		4			56*	55*	54*	53*						
R49015	$B_5W_4V_5$	0	C	0	0	0		4			57*	58*	59*	60*						
R49016	$B_5W_4V_5^{\pm30}$	0	C	0	0	±30		4			64*	63*	62*	61*						

1	7	13	19	25	31	37	43	49	55	61	67	75 76
CLM	CL	CY	CBL	CLN	CD	CAF	CAB	CPB1	CPB2			10

COEFFICIENTS: → IDPVAR(1) | IDPVAR(2) | NDV

α or β SCHEDULES

αA = 0° → 20° by 2°
αB = 20° → 40° by 2°
βC = -4, -3, -2, -1, 0, 1, 2, 3, 4, 6, 8, 10

* AXIAL FORCE GAGE INOPERATIVE DURING THESE RUNS

NASA-MSFC-MAF

TABLE II. (Continued)

TEST MSFC 507 DATA SET COLLATION SHEET

.003366 SCALE MODEL OF THE GRUMMAN H-53 ORBITER IN THE M.S.F.C. 14" TRISONIC WIND TUNNEL

☐ PRETEST
☒ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES δ_e	δ_A	δ_R		NO. of RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE) 1.46	1.96	2.74	2.99	3.48	4.00	4.96	0.6	0.9	1.2		
R49017	$W_4^0 B_5 V_5^{\pm 30}$	B	0	0	0	±30		4				65/1	66/1	67/1	68/1					
R49018	$W_4^{-10} B_5 V_5^{\pm 30}$	B	0	-10	0	±30		4				72/1	71/1	70/1	69/1					
R49019	$W_4^{-10,-30} B_5 V_5^{\pm 30}$	B	0	-20	+10	±30		4				73/1	74	75	76					
R49020	$W_4^{-20} B_5 V_5^{\pm 30}$	B	0	-20	0	±30		4				80	79	78	77					
R49021	$W_4^{-40} B_5 V_5^{\pm 30}$	B	0	-40	0	±30		4				81	82	83	84					
R49022	$W_4^0 B_5 V_5^{+35,-25}$	B	0	0	0	+35/-25		4				88	87	86	85					
R49023	$W_4^{0,-20} B_5 V_5^0$	B	0	-10	+10	0		4				89	90	91	92					
R49024	$W_4^0 B_5 V_5^0$	B	0	0	0	0		4				96	95	94	93					
R49025	$W_4^0 B_5 V_5^0$	30	C	0	0	0		4				97	98	99	100					
R49026	$W_4^0 B_5 V_5^{\pm 30}$	30	C	0	0	±30		4				104	103	102	101					
R49027	$W_4^0 B_5$	30	C	0	0	–		4				105	106	107	108					
R49028	$W_4^0 B_5$	0	C	0	0	–		3	139	137*	109									
R49029	$W_4^0 B_5 V_5^0$	10	C	0	0	0		10	141	135	110	111	112	113	114	152	153	154		
R49030	$W_4^{-20} B_5 V_5^{\pm 30}$	10	C	-20	0	±30		7	144	134	119	118	117	116	115					
R49031	$W_4^0 B_5$	10	C	0	0	–		3	138	136	120									
R49032	$W_4^0 B_5 V_5^{\pm 30}$	10	C	0	0	±30		3	142	133	121									
R49033	$W_4^0 B_5 V_5^{\pm 30}$	0	C	0	0	±30		3	143	131	122									
R49034	$W_4^0 B_5 V_5^0$	0	C	0	0	0		5	140		123					157	156	155		
R49035	$W_4^0 B_5 V_5^{\pm 30}$	A	0	0	0	±30		3	145	130	124									
R49036	$W_4^{-10,+10} B_5 V_5^0$	A	0	0	-10	0		1				125								

1 7 13 19 25 31 37 43 49 55 61 67 75 76

COEFFICIENTS: → IDPVAR(1) | IDPVAR(2) | NDV

α or β SCHEDULES

$\alpha A = 0° \rightarrow 20°$ by 2°

$\alpha B = 20° \rightarrow 40°$ by 2°

$\beta C = \pm 4°, \pm 3°, \pm 2°, \pm 1°, 0°, 6°, 8°, 10°$

*ROLLING MOMENT COEFFICIENT, CSL, NOT PRESENTED FOR DATASET R49028, M=1.96

NASA-MSFC-MAF

TABLE II. (Continued)

TEST MSFC 507 DATA SET COLLATION SHEET

.003366 SCALE MODEL OF THE GRUMMAN H-33 ORBITER IN THE MSFC. 14" TRISONIC WIND TUNNEL

☐ PRETEST

☒ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES δ_e	δ_A	δ_R		NO. of RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE) 1.46	1.96	2.74	2.99	3.48	4.00	4.96	0.6	0.9	1.2		
R49037	$W_4^{-10} B_5 V_5^{+35,-25}$	A	0	-10	0	+35/-25		4				126	127	128	129		•			
R49038	$W_4^{0} B_5 V_5^{0}$	A	0	0	0	0		3								146	147	148		
R49039	$W_4^{-10} B_4 V_5^{0}$	A	0	-10	0	0		3								151	150	149		

1 7 13 19 25 31 37 43 49 55 61 67 75 76

COEFFICIENTS: IDPVAR(1) | IDPVAR(2) | NDV

α or β SCHEDULES

αA = 0° → 20° by 2°

αB = 20° → 40° by 2°

βC = -4°, -3°, -2°, -1°, 0°, 1°, 2°, 3°, 4°, 6°, 8°, 10°

NASA-MSFC-MAF

TABLE III.
DIMENSIONAL DATA

MODEL COMPONENT: BODY - B_5

GENERAL DESCRIPTION: BASIC H-33 ORBITER BODY

DRAWING NUMBER: _____

DIMENSIONS:

	FULL-SCALE (ft. or ft.^{2})	.003366 MODEL SCALE (in. or in.^{2})
Length	135	5.453
Max. Width	25	1.010
Max. Depth	27.5	1.111
Fineness Ratio	4.92	4.92
Area		
Max. Cross-Sectional	530	.865
Planform	3120	5.090
Wetted	10,345	16.878
Base	461	.752

TABLE III. (Continued)

MODEL COMPONENT: WING - W_4

GENERAL DESCRIPTION: BASIC H-33 ORBITER WING

DRAWING NUMBER:

DIMENSIONS:

TOTAL DATA	FULL-SCALE (ft.orft.^{2})	.003366 MODEL SCALE (in.orin.^{2})
Area		
Planform	4840	7.897
Wetted	5940	9.691
Span (equivalent)	94.5	3.817
Aspect Ratio	1.845	1.845
Rate of Taper		
Taper Ratio	.178	.178
Diehedral Angle, degrees	5°	5°
Incidence Angle, degrees	2°@body-3°@tip	2°@body-3°@ tip
Aerodynamic Twist, degrees		
Toe-In Angle		
Cant Angle		
Sweep Back Angles, degrees		
Leading Edge	55°	55°
Trailing Edge	-5°	-5°
0.25 Element Line	46.32°	46.32°
Chords:		
Root (Wing Sta. 0.0)	86.96	3.512
Tip, (equivalent)	15.48	.625
MAC,	59.5	2.403
Fus. Sta. of .25 MAC		
W.P. of .25 MAC		
Airfoil Section		
Root	t/c=9.5%cambered sect.	t/c=9.5%cambered sect.
Tip	" " "	" " "

EXPOSED DATA		
Area	2900	4.731
Span, (equivalent)	69.5	2.807
Aspect Ratio	1.666	1.666
Taper Ratio	.228	.228
Chords		
Root	67.98	2.746
Tip	15.48	.625
MAC	47.2	1.907
Fus. Sta. of .25 MAC		
W.P. of .25 MAC		

TABLE III. (Continued)

MODEL COMPONENT: ELEVON (FOR W_4 WING)

GENERAL DESCRIPTION: INDIVIDUAL MOVABLE CONTROL SURFACE ASSOCIATED WITH THE W_4 WING

DRAWING NUMBER: _____

DIMENSIONS:	FULL-SCALE (ft.orft.^{2})	.003366 MODEL SCALE (in.or in.^{2})
Area	410	.669
Span (equivalent)	34.75	1.404
Inb'd equivalent chord	13.6	.549
Outb'd equivalent chord	10.0	.404
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord		
At Outb'd equiv. chord		
Sweep Back Angles, degrees		
Leading Edge	0°	0°
Tailing Edge	-5°	-5°
Hingeline	0°	0°
Area Moment (Normal to hinge line)		

TABLE III. (Continued)

MODEL COMPONENT: ℄ VERTICAL TAIL - V5

GENERAL DESCRIPTION: BASIC H-33 ORBITER VERTICAL TAIL

DRAWING NUMBER:

DIMENSIONS:	FULL-SCALE (ft. or ft.^{2})	.003366 MODEL SCALE (in. or in.^{2})
Area	855	1.395
Span (equivalent)	33.75	1.363
Inb'd equivalent chord	36.66	1.481
Outb'd equivalent chord	14.0	.565
Ratio Elevator chord/horizontal tail chord		
At Inb'd equiv. chord	.348	.348
At Outb'd equiv. chord	.351	.351
Sweep Back Angles, degrees		
Leading Edge	47	47°
Tailing Edge	21.85°	21.85°
Hingeline	32	32°
Area Moment (Normal to hinge line)		
ASPECT RATIO	1.33	1.33
TAPER RATIO	.38	.38
MAC	27	1.091
AIRFOIL SECTION	NACA 64A010	NACA 64A010

MODEL COMPONENT: RUDDER (FOR V_5 VERTICAL TAIL)

GENERAL DESCRIPTION: MOVABLE CONTROL SURFACE ASSOCIATED WITH THE V_5 VERTICAL TAI

DRAWING NUMBER: _____

DIMENSIONS:

	FULL-SCALE (ft. or ft.^{2})	.003366 MODEL SCALE (in. or in.^{2})
Area	292	.476
Span (equivalent)	34.75	1.404
Inb'd equivalent chord	12.76	.515
Outb'd equivalent chord	4.92	.199
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord		
At Outb'd equiv. chord		
Sweep Back Angles, degrees		
Leading Edge	32	32°
Tailing Edge	21.85°	21.85°
Hingeline	32	32°
Area Moment (Normal to hinge line)		

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TABLE IV.
INDEX OF MODEL FIGURES

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3	Photograph of Tunnel Installation of Configuration $B_5W_4V_5$	22

TABLE V. INDEX OF DATA FIGURES

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
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Figure 2, Basic Longitudinal Characteristics - ELEVTR=0, LRUDDR=30, RRUDDR=-30 Degrees	A	MACH	11-20
Figure 3, Elevon Effectiveness - LRUDDR=0, RRUDDR=0 Degrees	A	ELEVTR, MACH	21-35
Figure 4, Elevon Effectiveness - LRUDDR=30, RRUDDR=-30 Degrees	A	ELEVTR, MACH	36-55
Figure 5, Aileron Effectiveness - ELEVTR=-20, LRUDDR=30, RRUDDR=-30 Degrees	C	AILERN, MACH	56-67
Figure 6, Aileron Effectiveness - ELEVTR=-10, LRUDDR=30, RUDDR=-30 Degrees	C	AILERN, MACH	68-79
Figure 7, Aileron Effectiveness - ELEVTR=0, LRUDDR=0, RRUDDR=0	C	AILERN	80-82
Figure 8, Rudder Effectiveness, Flared Rudder, ELEVTR=0	C	LRUDDR, RRUDDR, MACH	83-94
Figure 9, Effect of Rudder Flare on Longitudinal Characteristics, ELEVTR=0	B	Rudder Flare, MACH	95-106
Figure 10, Longitudinal Characteristics Summary - Effect of Rudder Flare, ELEVTR=0	E	Rudder Flare	107-111
Figure 11, Lateral-Directional Characteristics, ALPHA=0	D	MACH	112-115

TABLE V. INDEX OF DATA FIGURES
(CONTINUED)

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
Figure 12, Lateral-Directional Characteristics, Component Buildup, ALPHA=0	D	Configuration, MACH	116-143
Figure 13, Lateral-Directional Characteristics, ALPHA=10 Degrees	D	MACH	144-147
Figure 14, Lateral-Directional Characteristics, Component Buildup, ALPHA=10 Degrees	D	Configuration, MACH	148-175
Figure 15, Lateral-Directional Characteristics, Component Buildup, ALPHA=15 Degrees	D	Configuration, MACH	176-191
Figure 16, Lateral-Directional Characteristics, Component Buildup, ALPHA=30 Degrees	D	Configuration, MACH	192-207
Figure 17, Lateral Derivatives, Component Buildup, ALPHA=0	F	Configuration	208-210
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Figure 19, Lateral Derivatives, Component Buildup, ALPHA=15 Degrees	F	Configuration	214-216
Figure 20, Lateral Derivatives, Component Buildup, ALPHA=30 Degrees	F	Configuration	217-219

PLOTTED COEFFICIENTS SCHEDULE:

(A) CL, CLM, CAB vs. ALPHA
CL vs. CLM, CD

(B) CL, CLM vs. ALPHA
CL vs. CD

(C) CY, CLN, CSL vs. ALPHA

(D) CY, CLN, CSL, CAB vs. BETA

(E) CLALFA, ALFCLØ, CLMALF, CLMAFØ, CDØ vs. MACH

(F) CYBETA, DCLNDB, DCSLDB vs. MACH

Notes:

1. Positive directions of force coefficients moment coefficients, and angles are indicated by arrows.

2. For clarity, origins of wind and stability axes have been displaced from the center of gravity.

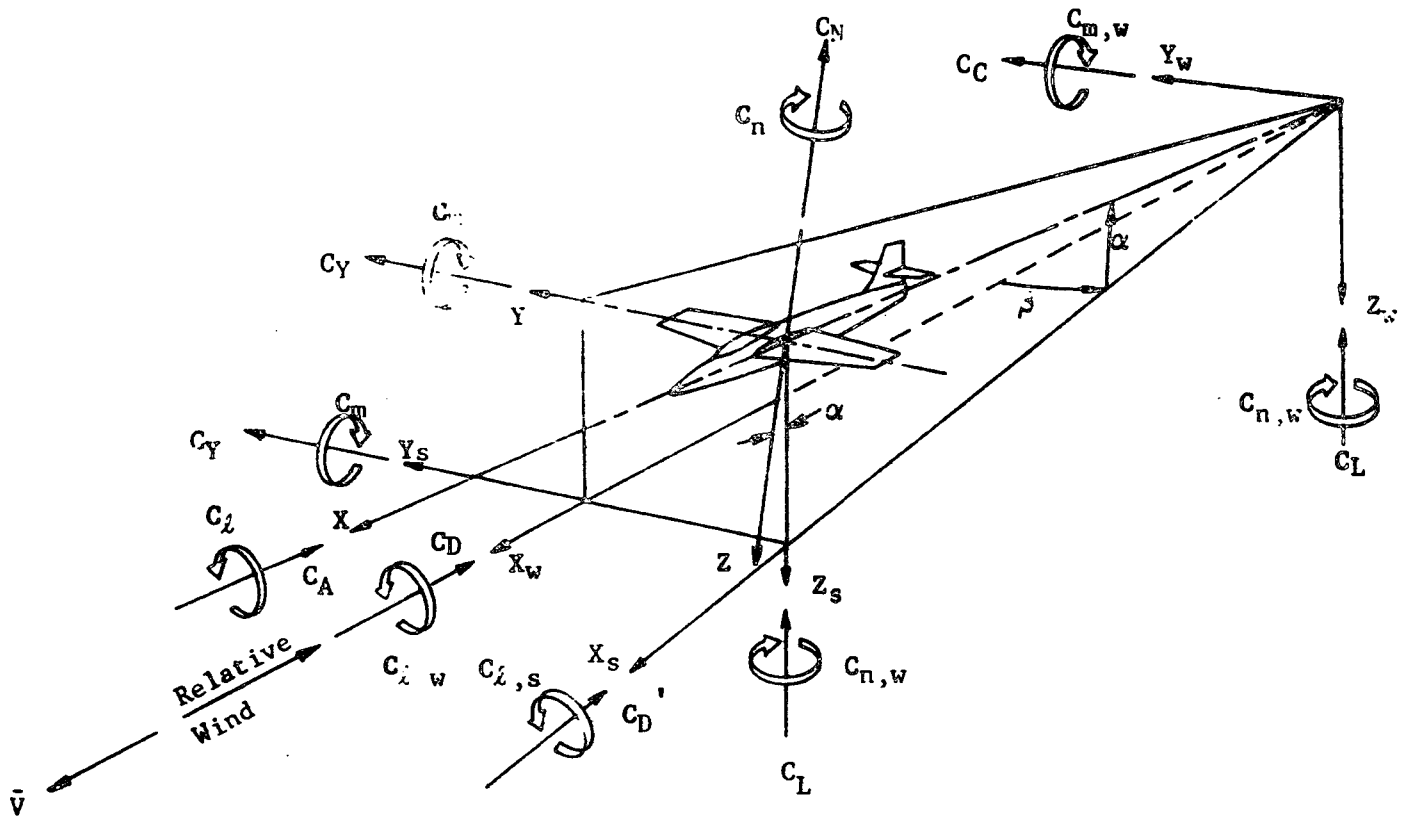

Figure 1. Axis systems, showing direction and sense of force and moment coefficients, angle of attack, and sideslip angle

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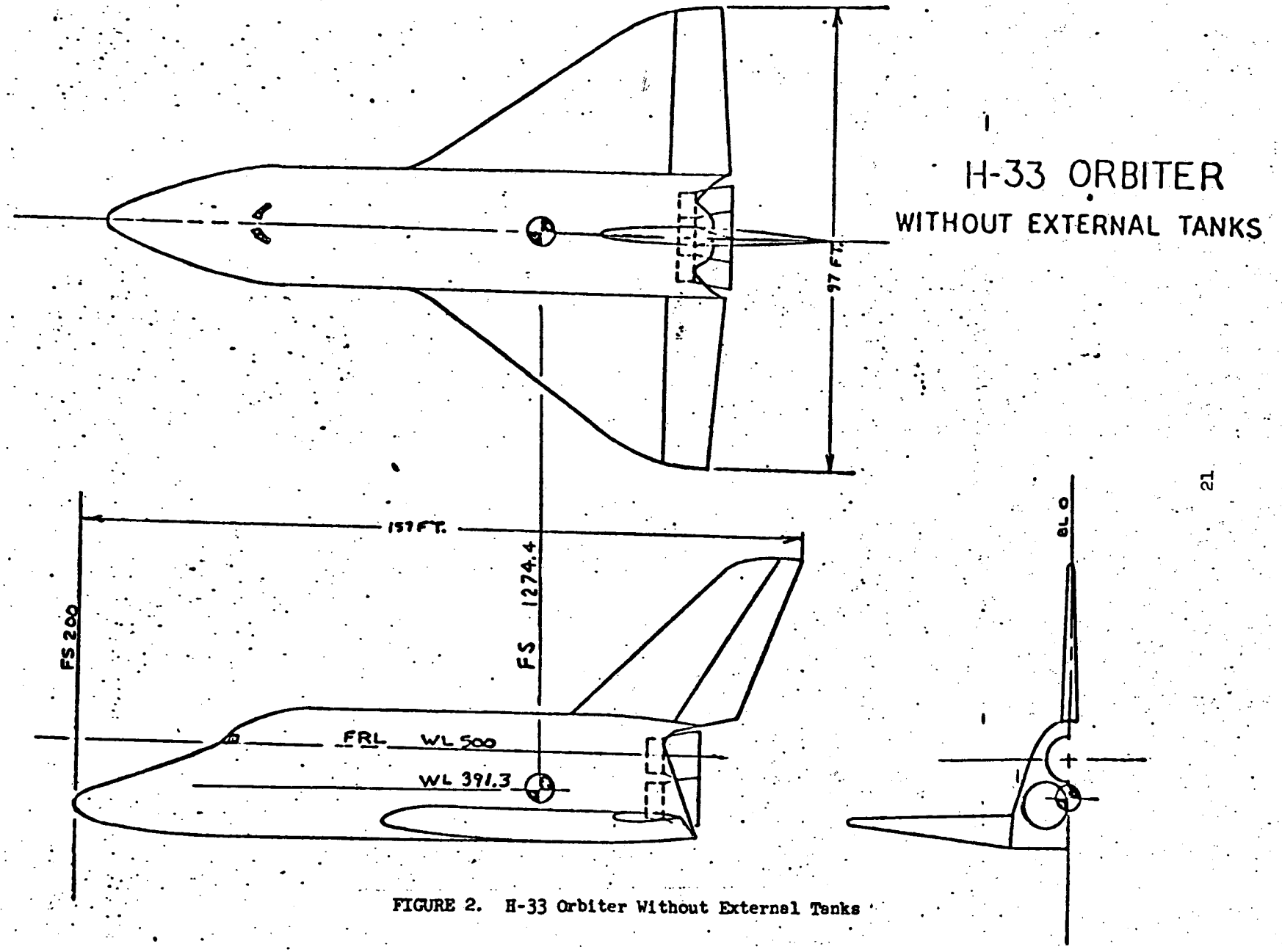
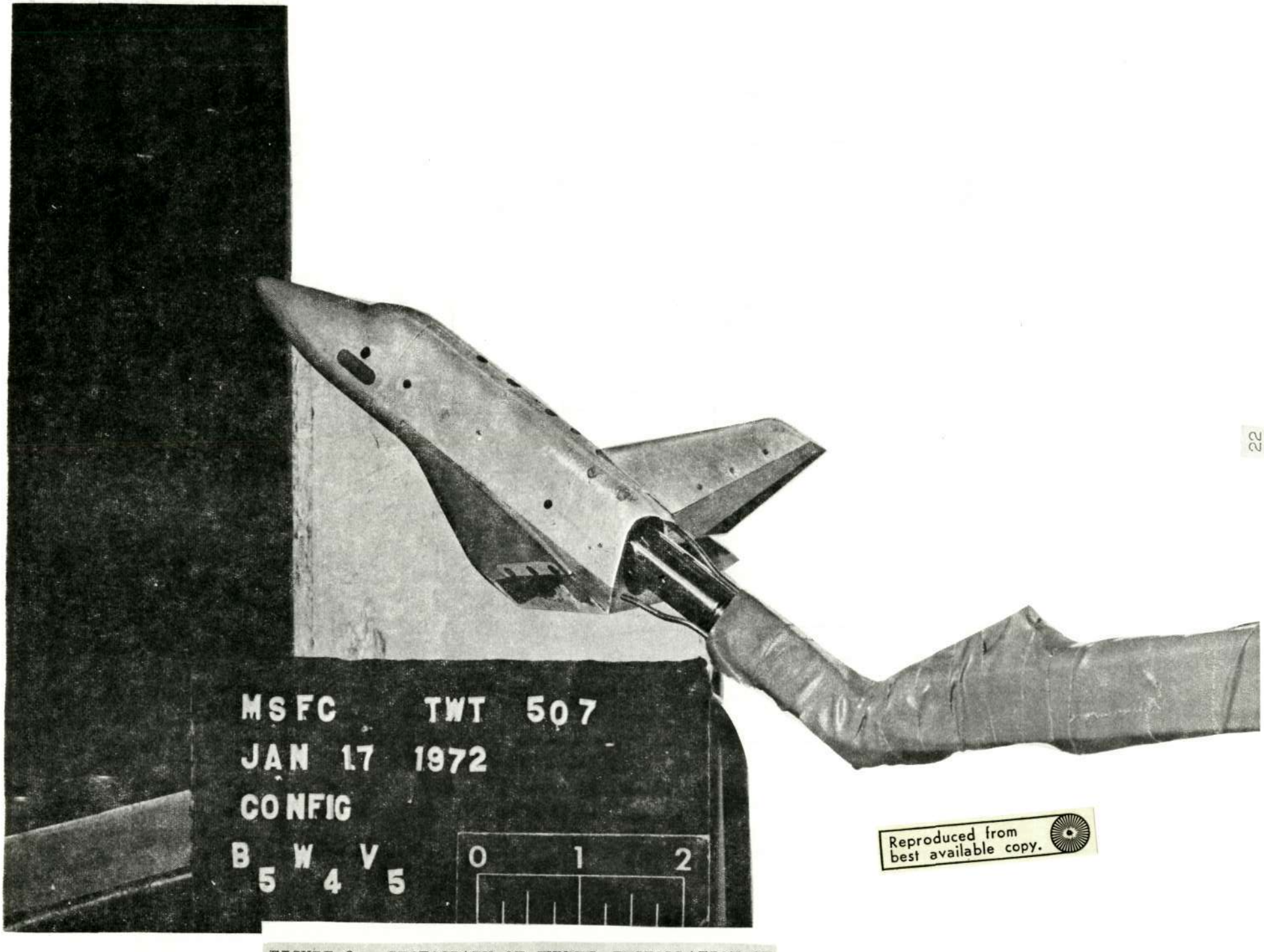


FIGURE 2. H-33 Orbiter Without External Tanks



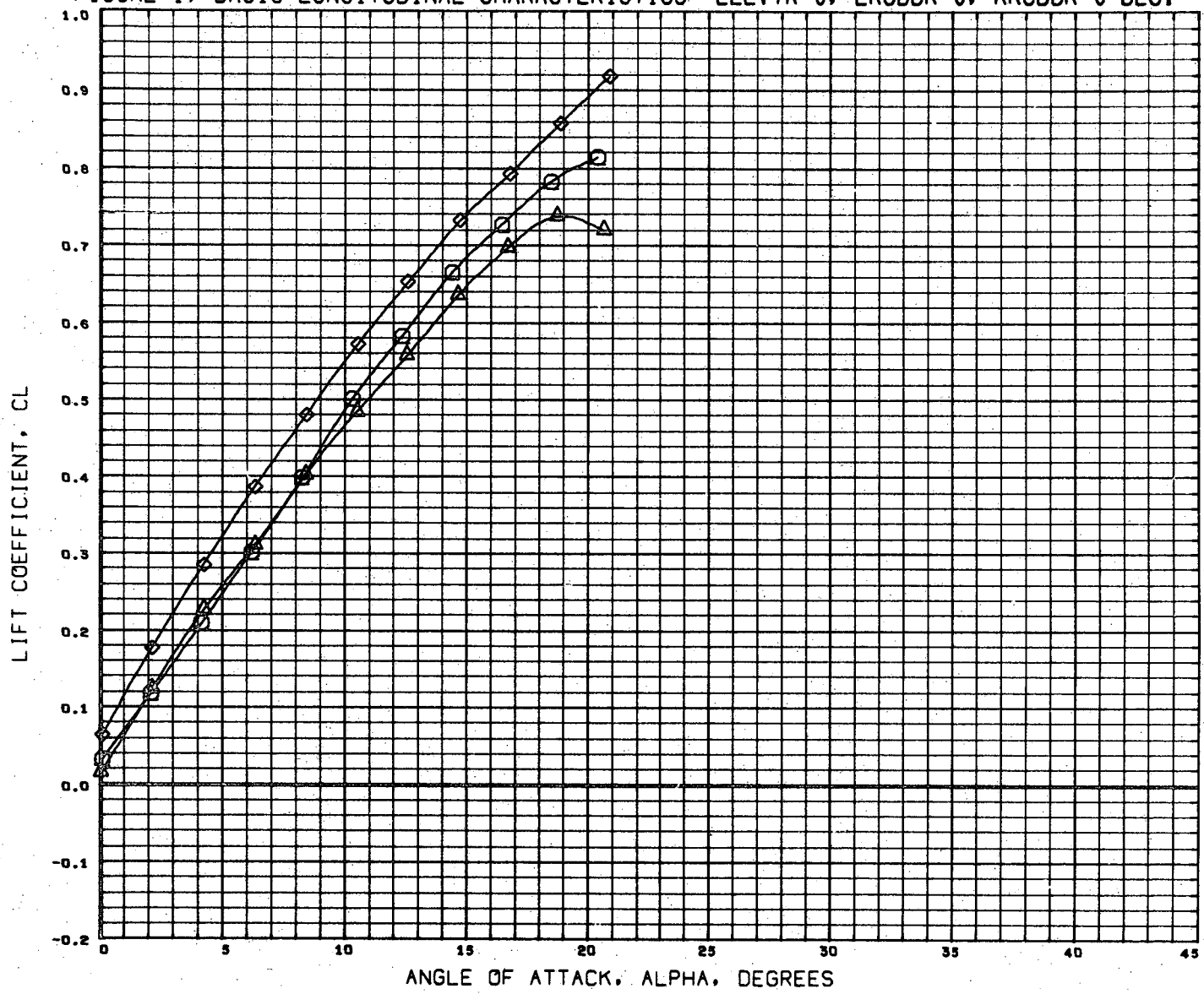
Reproduced from best available copy.

FIGURE 3. PHOTOGRAPH OF TUNNEL INSTALLATION OF CONFIGURATION $B_5W_4V_5$

D A T A F I G U R E S

Tabulations of the plotted data and corresponding source data are available from SADSAC Operations.

FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



SYMBOL	MACH		PARAMETRIC VALUES		
○	0.600	BETA	0.000	ELEVTR	0.000
△	0.899	AILERN	0.000	LRUDDR	0.000
◇	1.199	RRUDDR	0.000		

REFERENCE FILE AER/T-PT-140

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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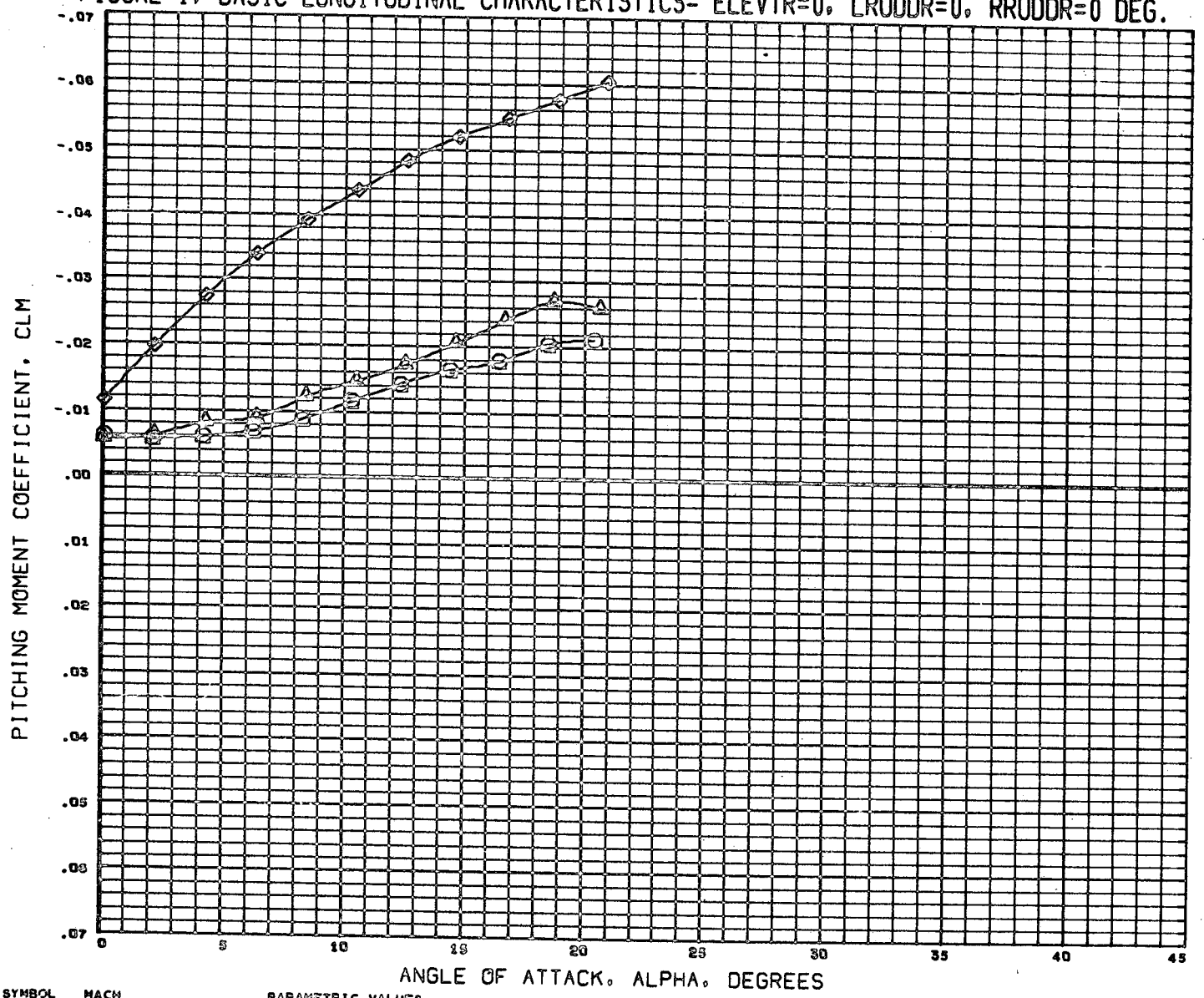
FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0. LRUDDR=0. RRUDDR=0 DEG.



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.600	BETA	0.000	ELEVTR	0.000
△	0.899	AILERN	0.000	LRUDDR	0.000
◇	1.199	RRUDDR	0.000		

REFERENCE FILE AER/T-PT-140

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SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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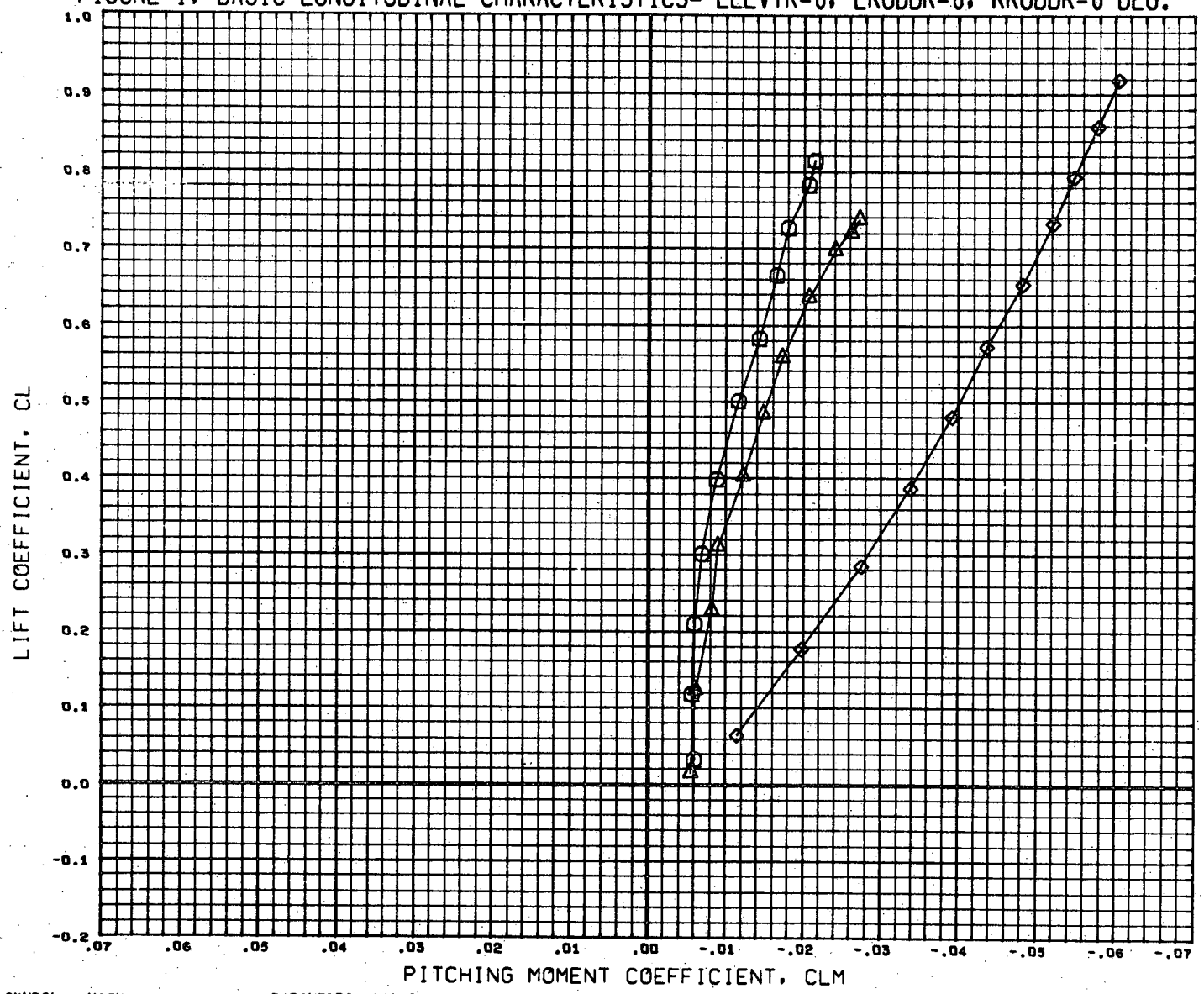
FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



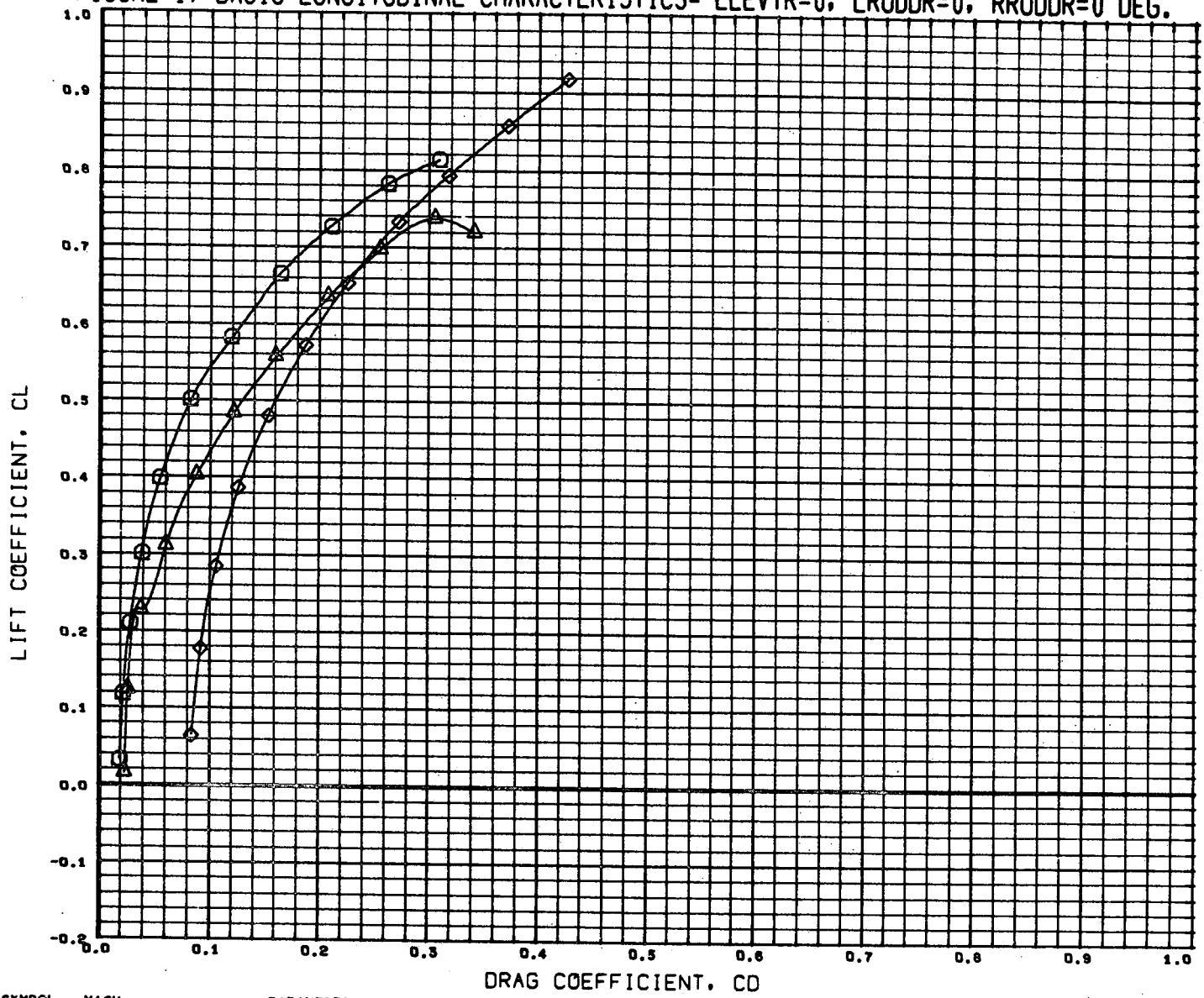
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.600	BETA	0.000	ELEVTR	0.000
△	0.899	AILERN	0.000	LRUDDR	0.000
◇	1.199	RRUDDR	0.000		

REFERENCE FILE AER/T-PT-140

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5 (A49038) 03 MAR 72 PAGE 3

FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



SYMBOL	MACH		PARAMETRIC VALUES		
○	0.600	BETA	0.000	ELEVTR	0.000
△	0.899	AILERN	0.000	LRUDDR	0.000
◇	1.199	RRUDDR	0.000		

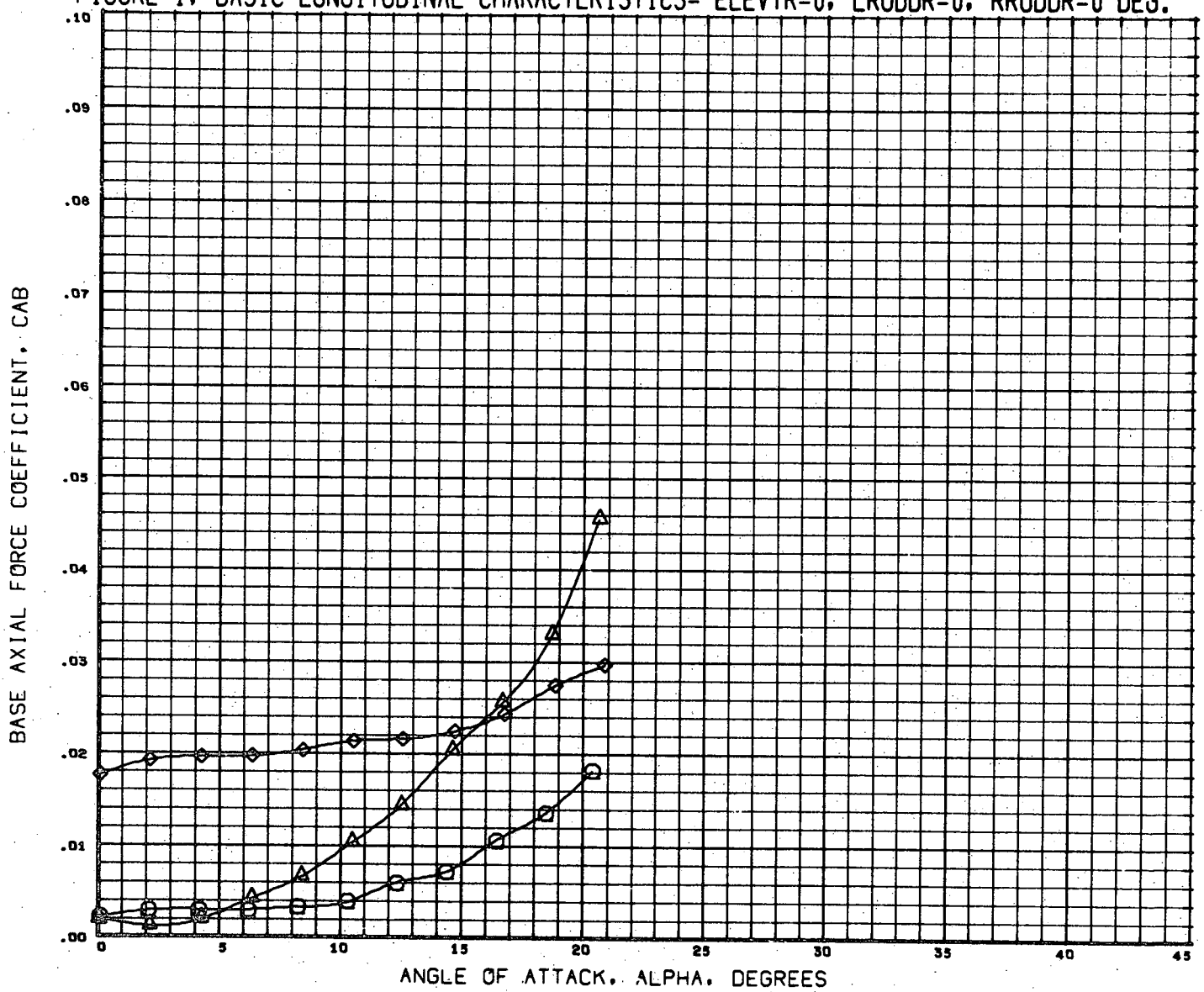
REFERENCE FILE AER/T-PT-140

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5 (A49038) 03 MAR 72 PAGE 4

FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.600	BETA	0.000	ELEVTR	0.000
△	0.899	AILERN	0.000	LRUDDR	0.000
◇	1.199	RRUDDR	0.000		

REFERENCE FILE AER/T-PT-140

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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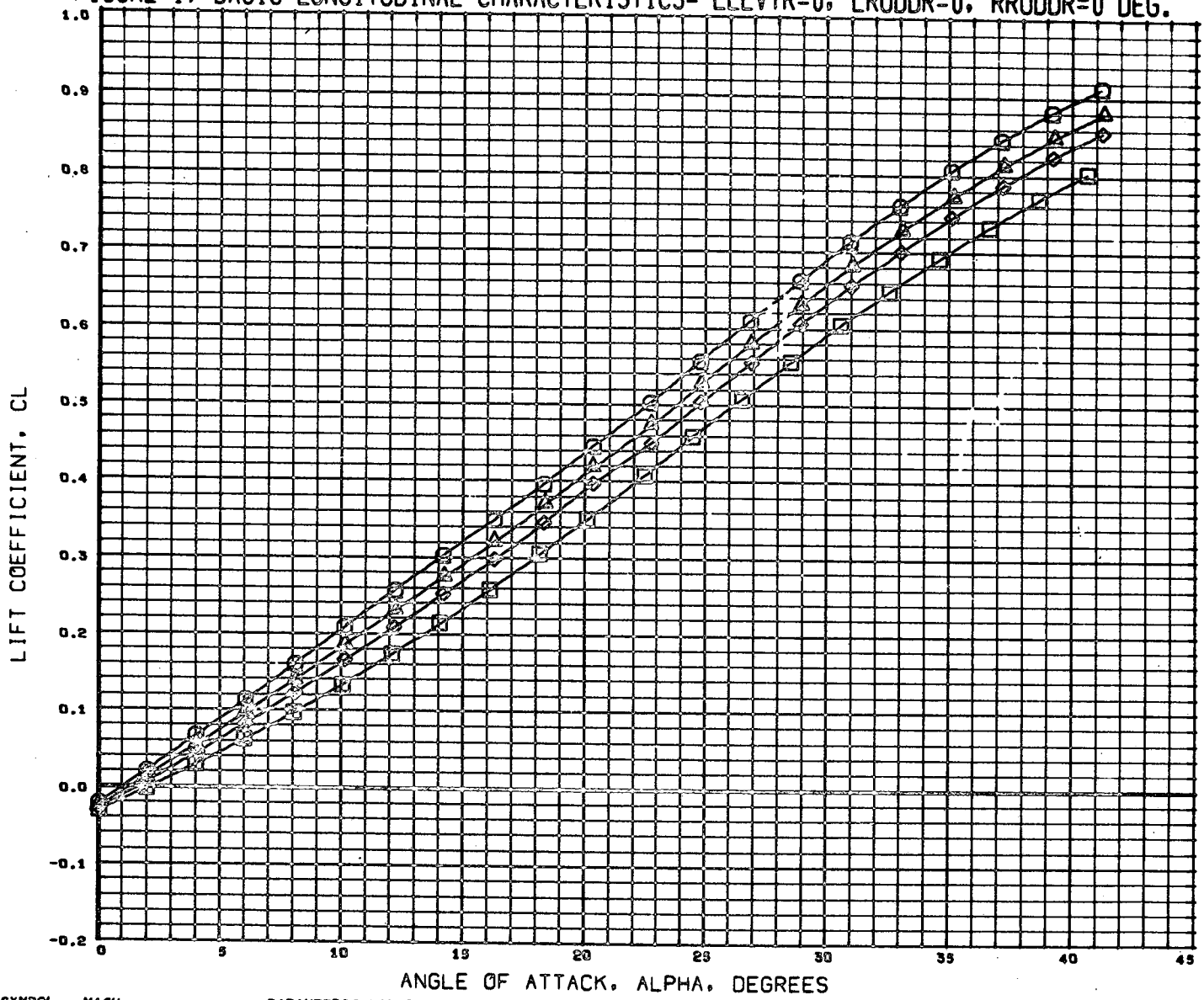
FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



SYMBOL	MACH
○	2.990
△	3.480
◇	4.000
□	4.999

PARAMETRIC VALUES

BETA	0.000	ELEVTR	0.000
AILERN	0.000	LRUDDR	0.000
RRUDDR	0.000		

DATA HIST. CODE #6

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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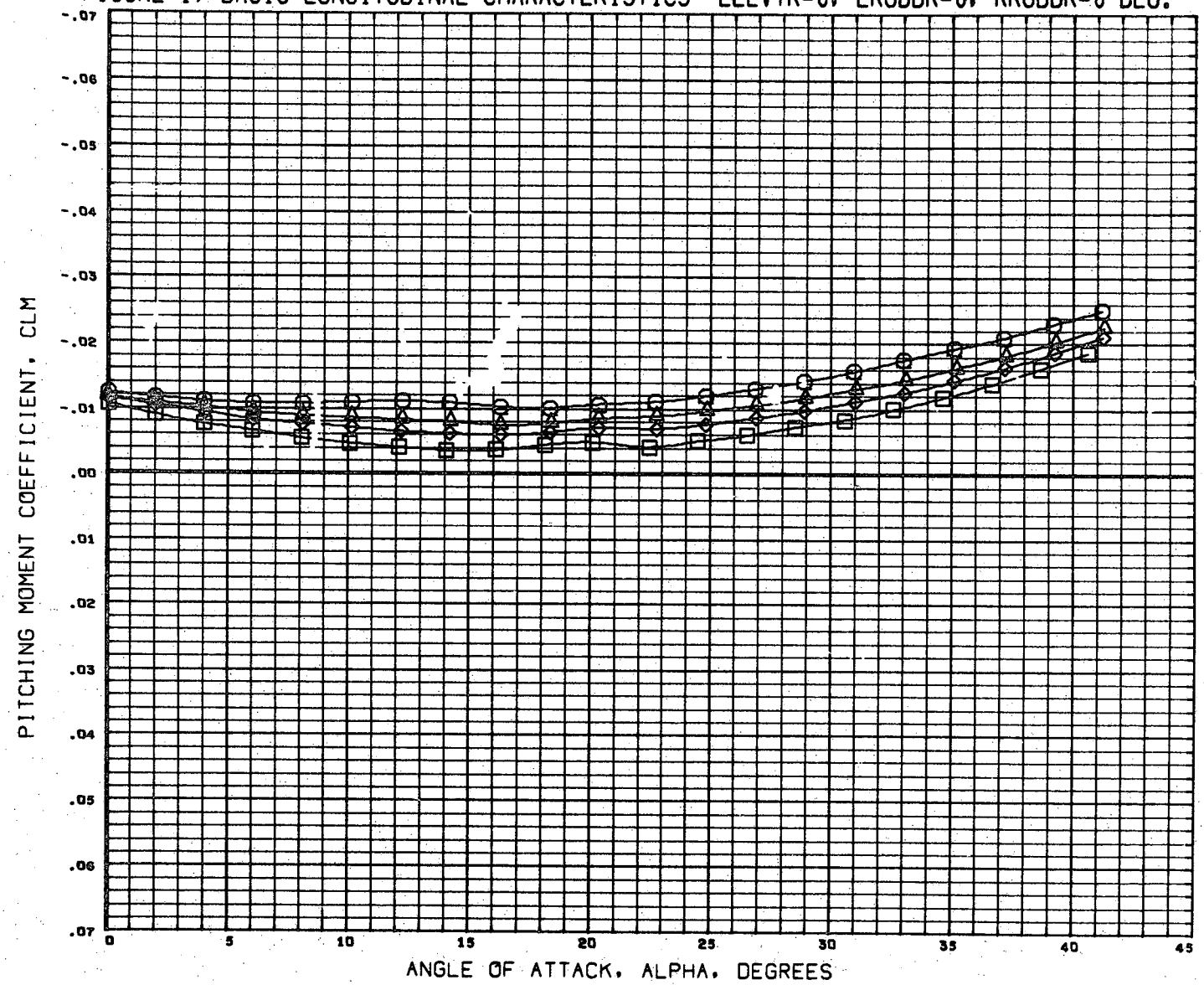
FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



SYMBOL	MACH		PARAMETRIC VALUES		
○	2.990	BETA	0.000	ELEVTR	0.000
△	3.480	AILERN	0.000	LRUDDR	0.000
◇	4.000	RRUDDR	0.000		
□	4.959				

DATA HIST. CODE *G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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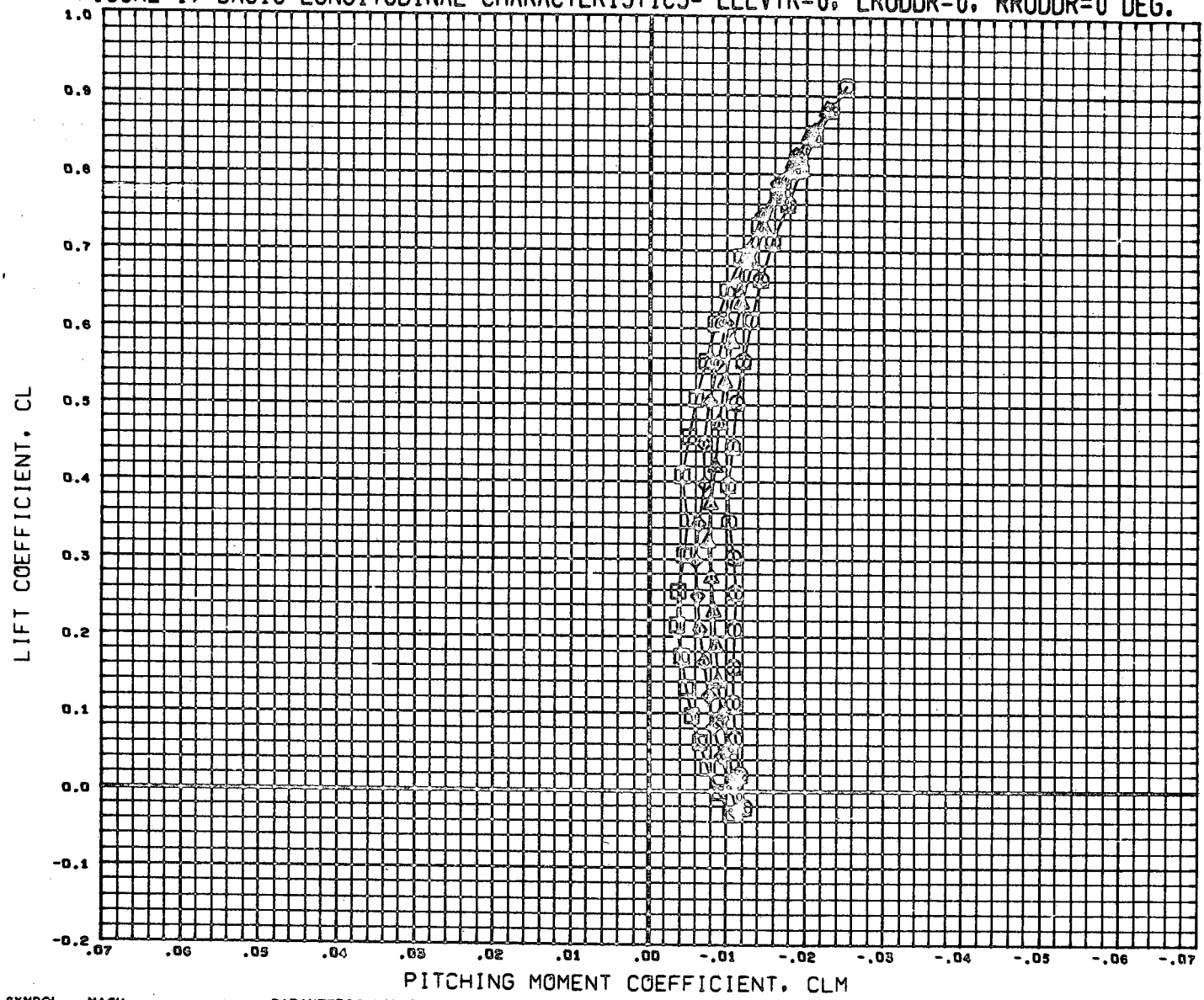
FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0. LRUDDR=0. RRUDDR=0 DEG.



SYMBOL	MACH		PARAMETRIC VALUES		
○	2.990	BETA	0.000	ELEVTR	0.000
△	3.480	AILERN	0.000	LRUDDR	0.000
◇	4.000	RRUDDR	0.000		
□	4.959				

DATA HIST. CODE *G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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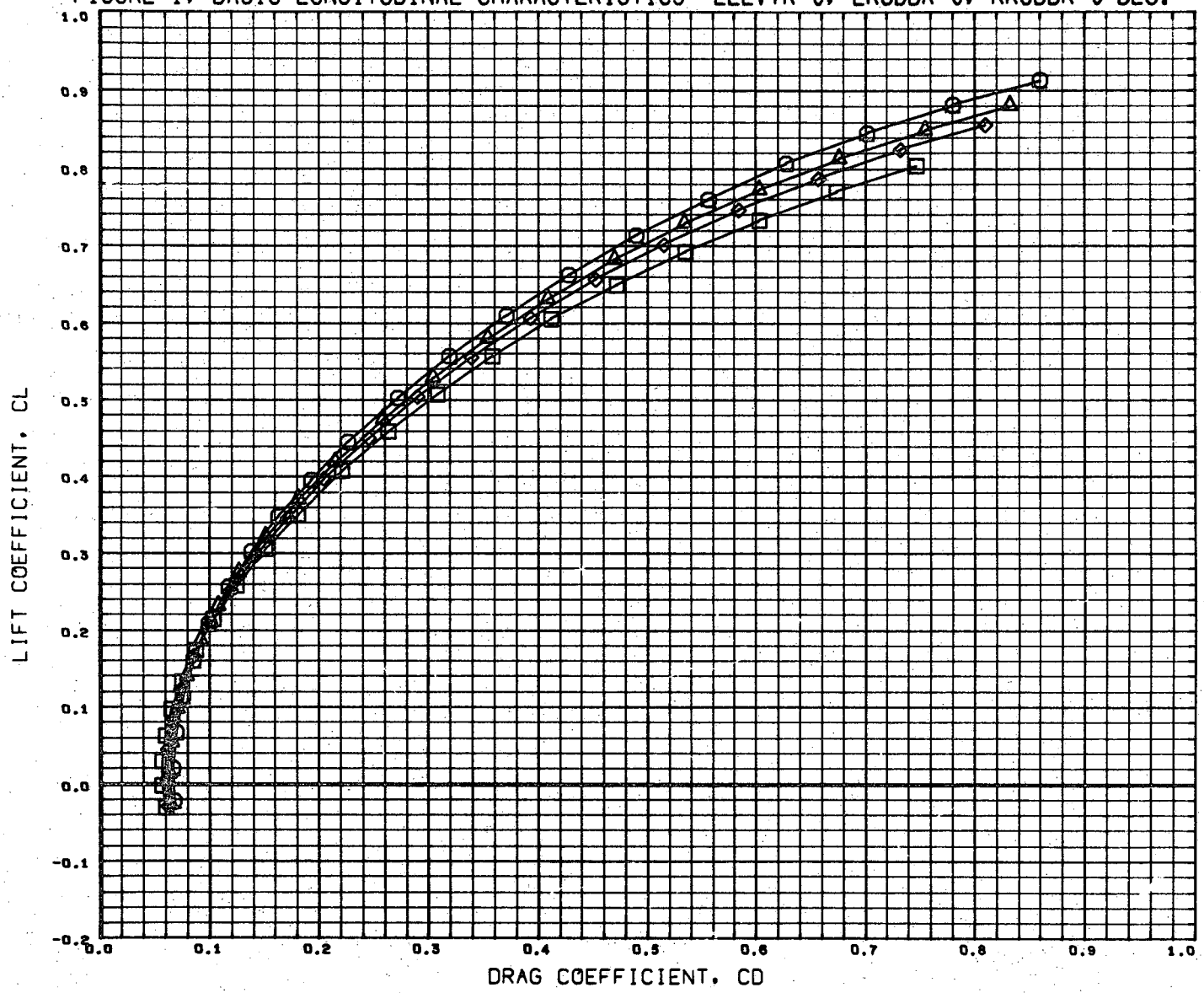
FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



SYMBOL	MACH		PARAMETRIC VALUES		
○	2.990	BETA	0.000	ELEVTR	0.000
△	3.480	AILERN	0.000	LRUDDR	0.000
◇	4.000	RRUDDR	0.000		
□	4.959				

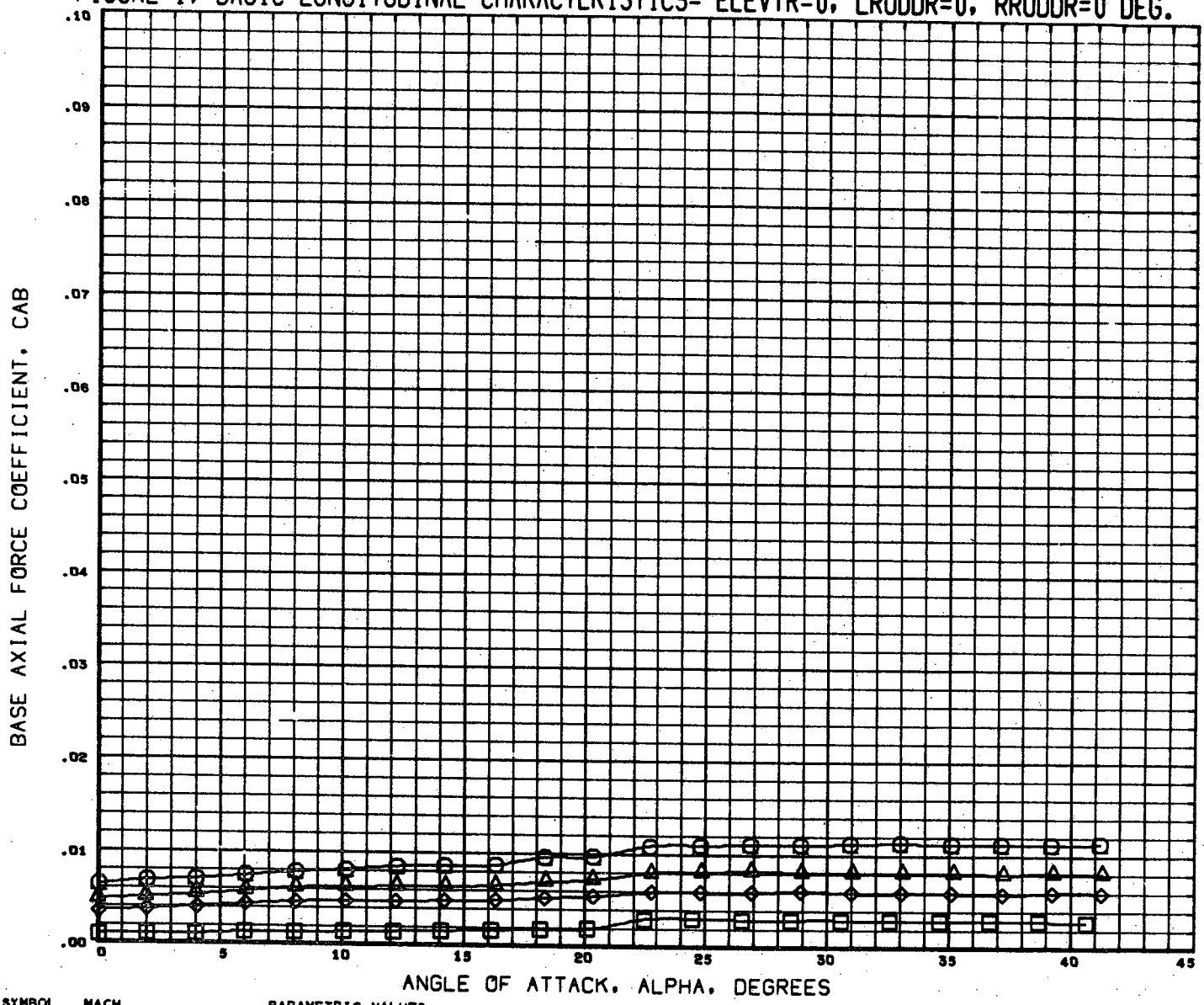
DATA HIST. CODE #G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5 (A49S08) 31 MAY 72 PAGE 9

FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



SYMBOL	MACH		PARAMETRIC VALUES		
○	2.990	BETA	0.000	ELEVTR	0.000
△	3.480	AILERN	0.000	LRUDDR	0.000
◇	4.000	RRUDDR	0.000		
□	4.959				

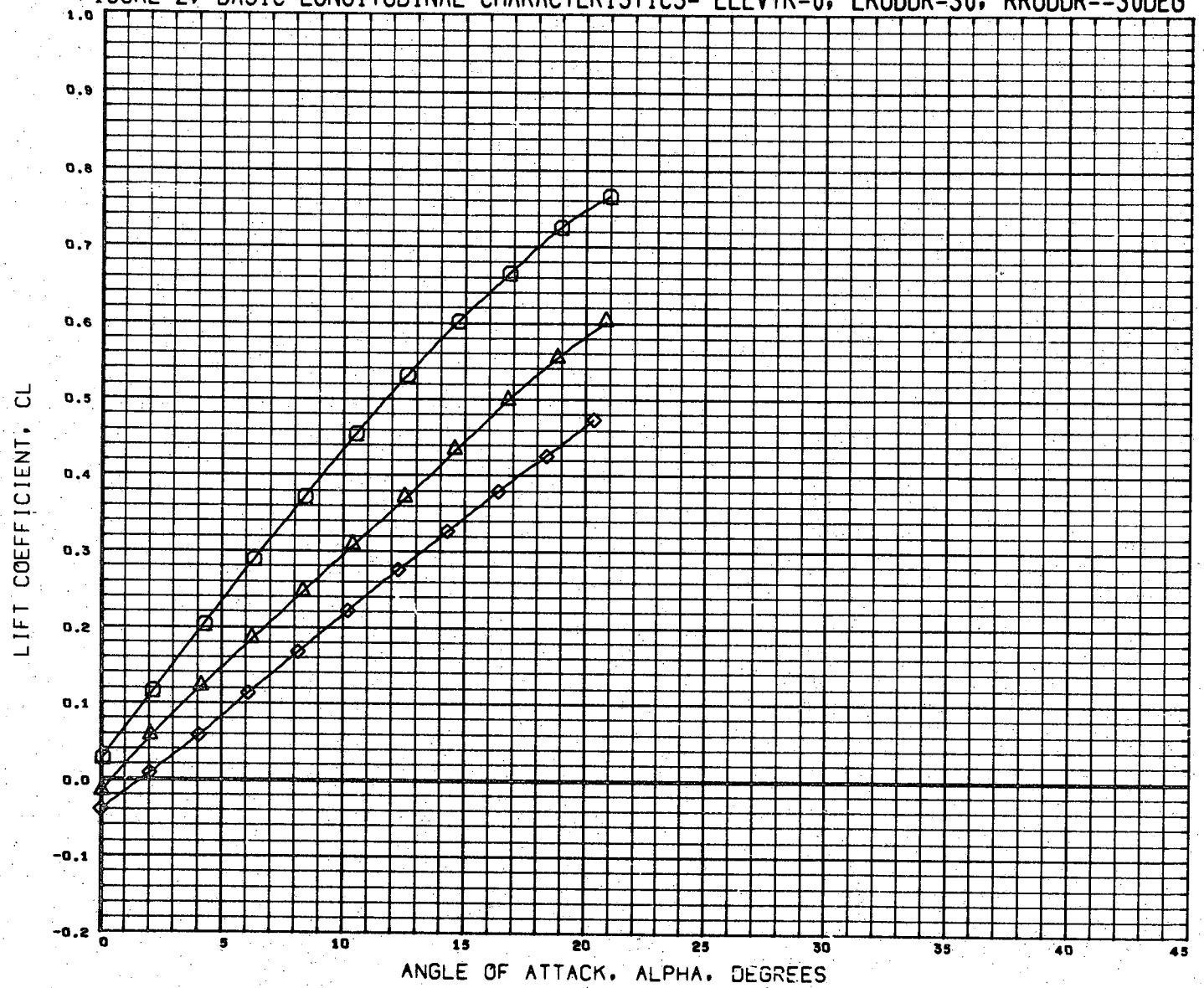
DATA HIST. CODE *G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5 (A49S08) 31 MAY 72 PAGE 10

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	1.466	BETA	0.000	ELEVTR	0.000
△	1.953	AILERN	0.000	LRUDDR	30.000
◇	2.740	RRUDDR	- 30.000		

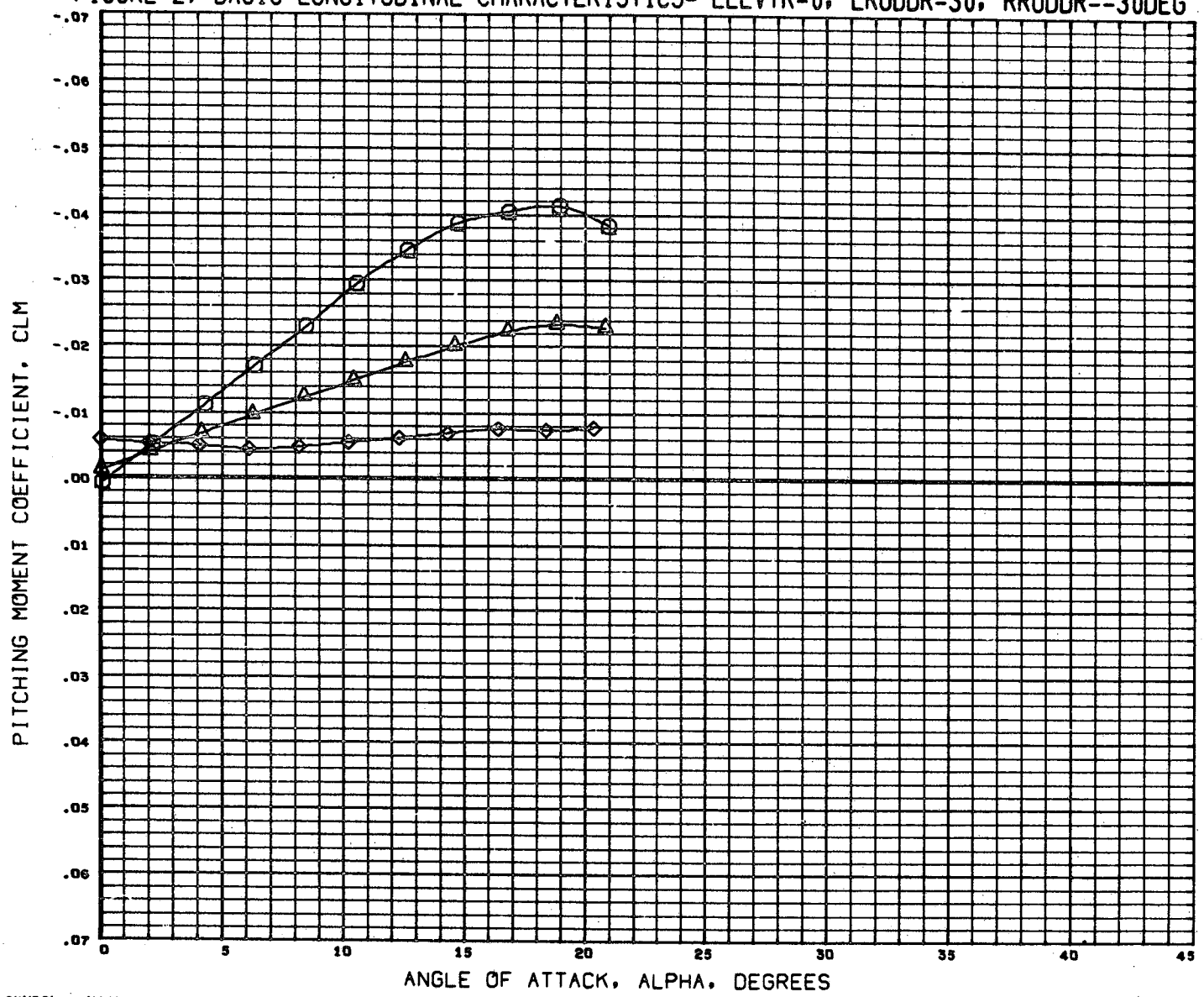
REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30) (A49035) 03 MAR 72 PAGE 11

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	1.466	BETA	0.000	ELEVTR	0.000
△	1.953	AILERN	0.000	LRUDDR	30.000
◇	2.740	RRUDDR	- 30.000		

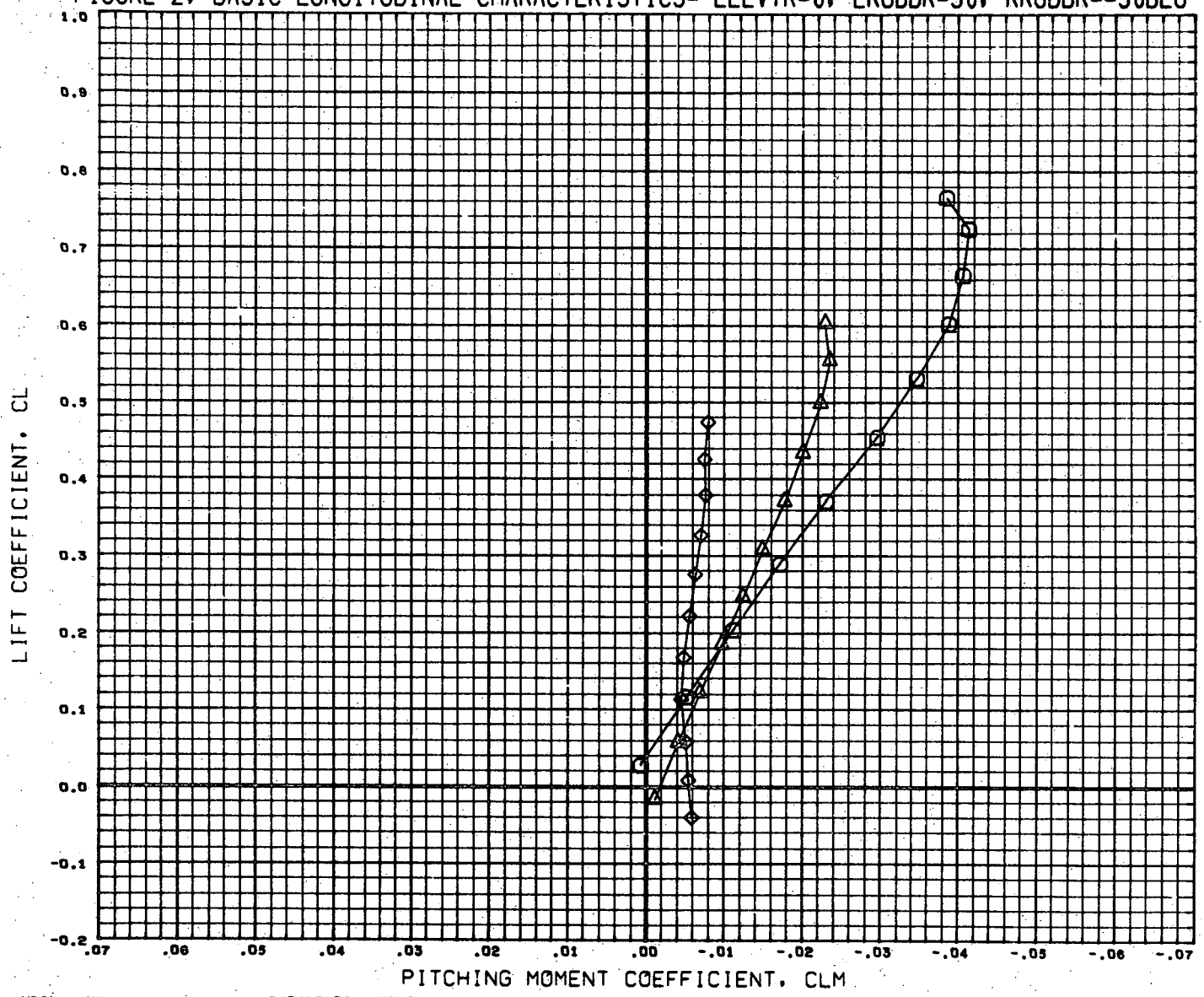
REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30) (A49035) 03 MAR 72 PAGE 12

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	1.466	BETA	0.000	ELEVTR	0.000
△	1.953	AILERN	0.000	LRUDDR	30.000
◇	2.740	RRUDDR	- 30.000		

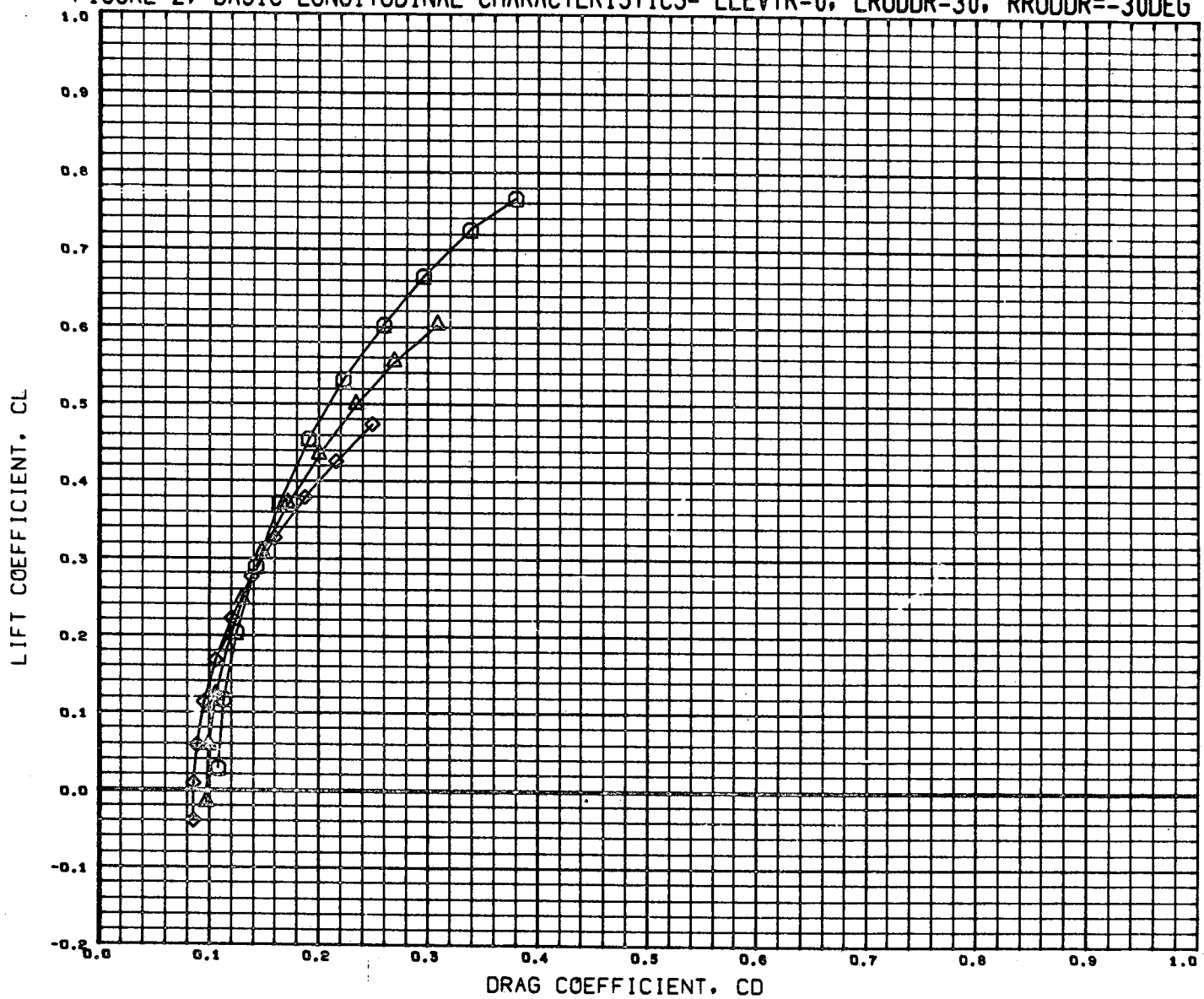
REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30) (A49035) 03 MAR 72 PAGE 13

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	1.466	BETA	0.000	ELEVTR	0.000
△	1.953	AILERN	0.000	LRUDDR	30.000
◇	2.740	RRUDDR	- 30.000		

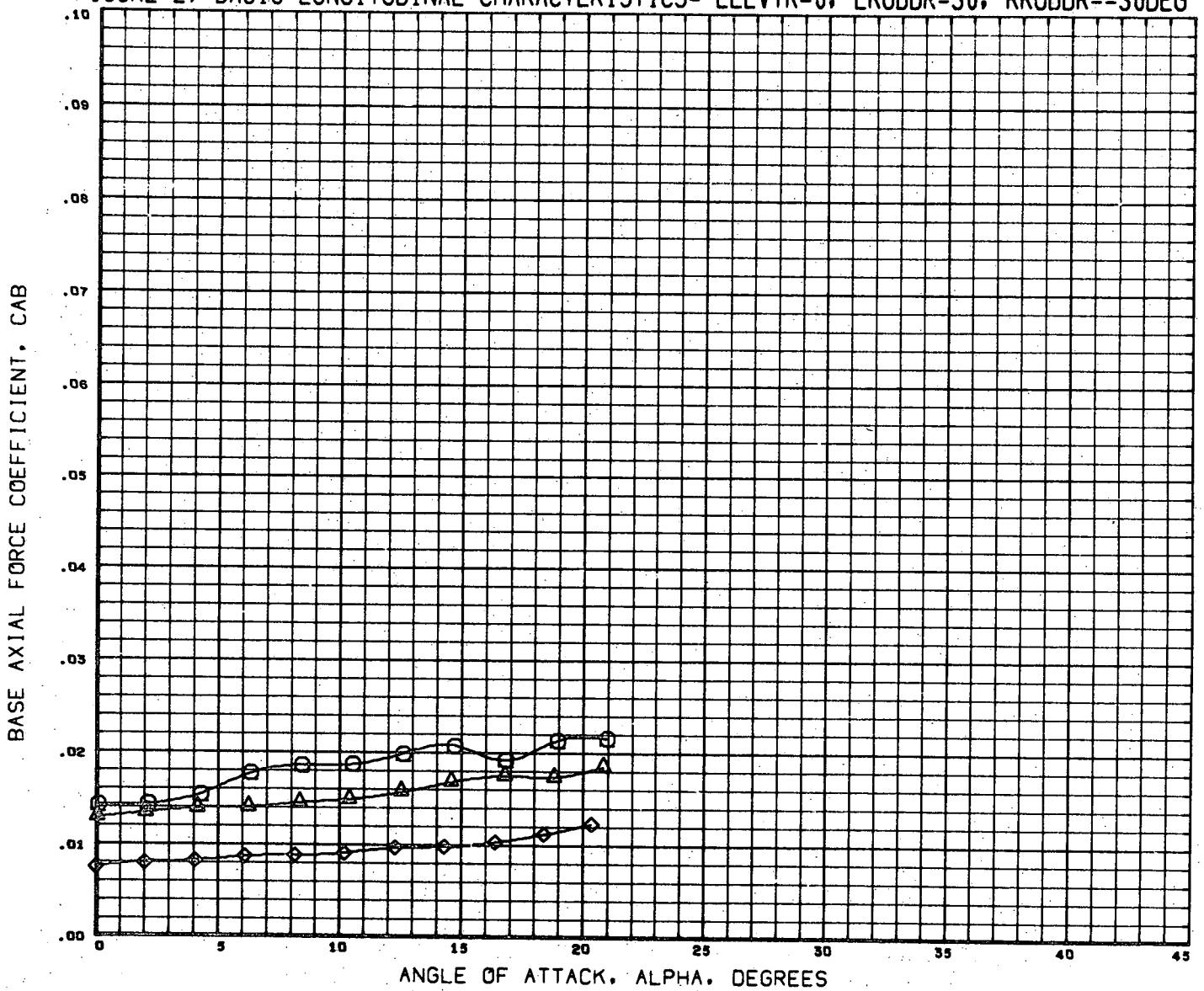
REFERENCE FILE AER/T-PT-140

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30) (A49035) 03 MAR 72 PAGE 14

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	1.466	BETA	0.000	ELEVTR	0.000
△	1.953	AILERN	0.000	LRUDDR	30.000
◇	2.740	RRUDDR	- 30.000		

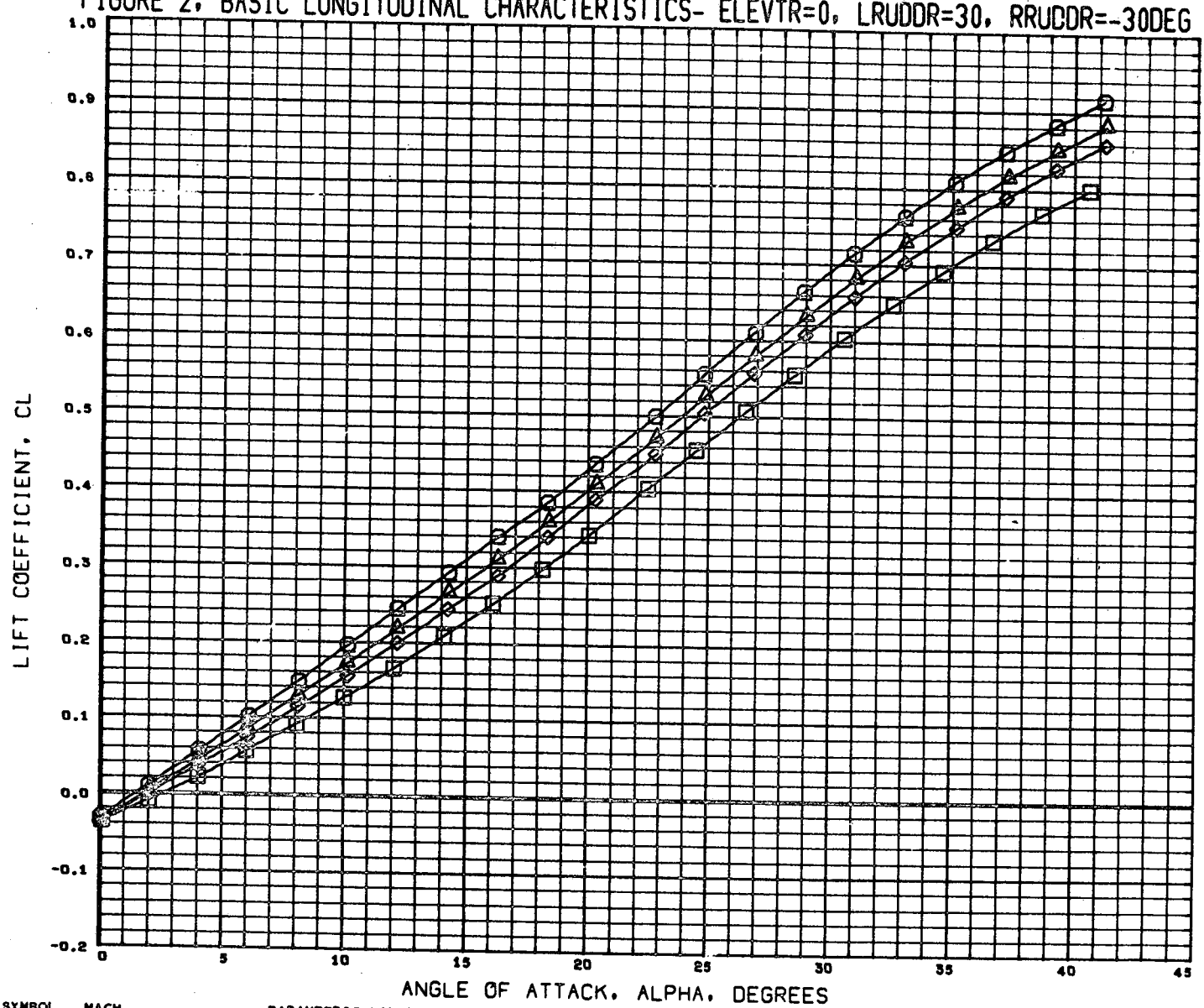
REFERENCE FILE AER/T-PT-140

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	3.4530	IN
BREF	3.3170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30) (A49035) 03 MAR 72 PAGE 15

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH
○	2.990
△	3.480
◇	4.000
□	4.959

PARAMETRIC VALUES

BETA	0.000	ELEVTR	0.000
AILERN	0.000	LRUDDR	30.000
RRUDDR	- 30.000		

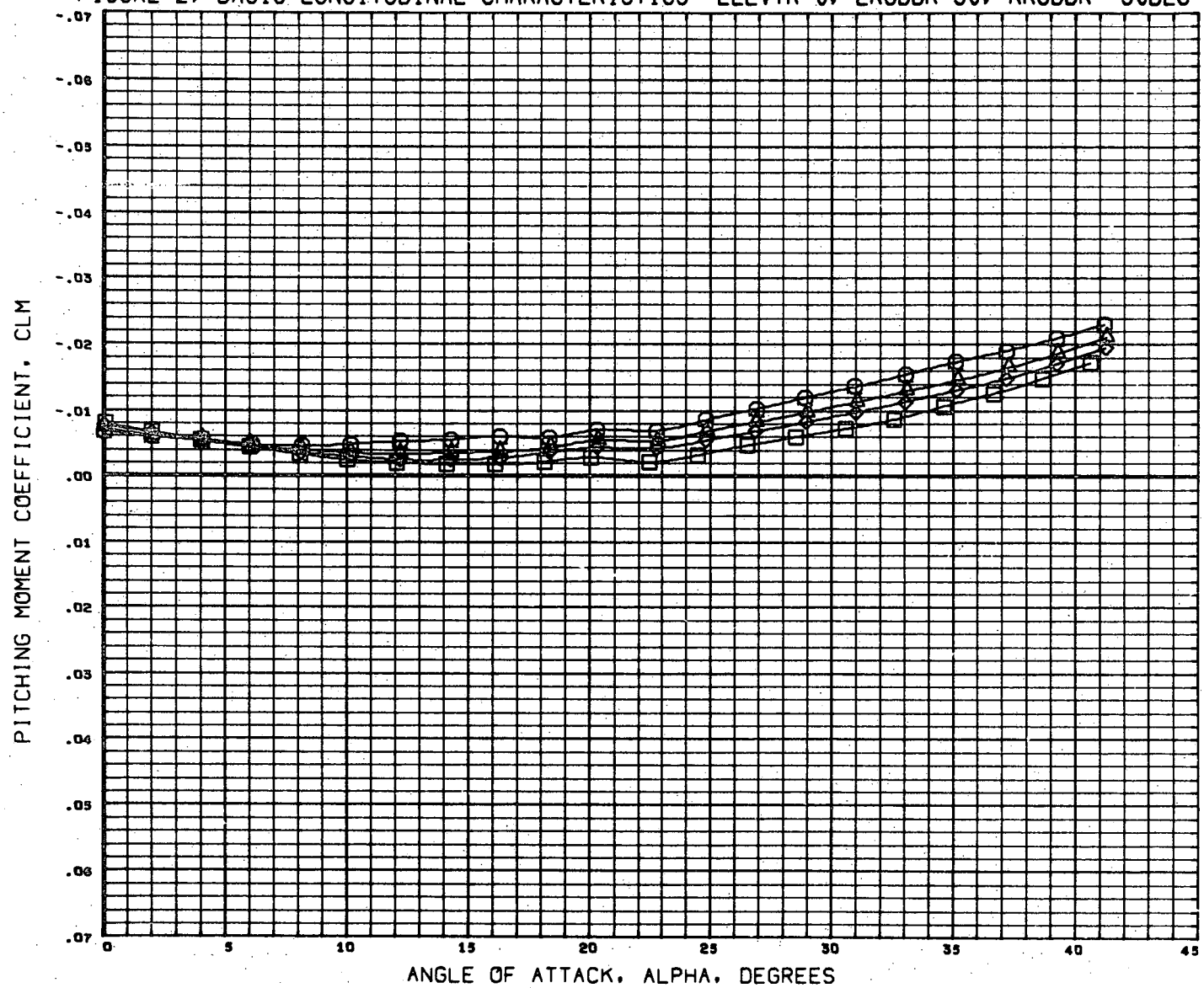
DATA HIST. CODE *G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30) (A49S01) 31 MAY 72 PAGE 16

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	2.990	BETA	0.000	ELEVTR	0.000
△	3.480	AILERN	0.000	LRUDDR	30.000
◇	4.000	RRUDDR	- 30.000		
□	4.959				

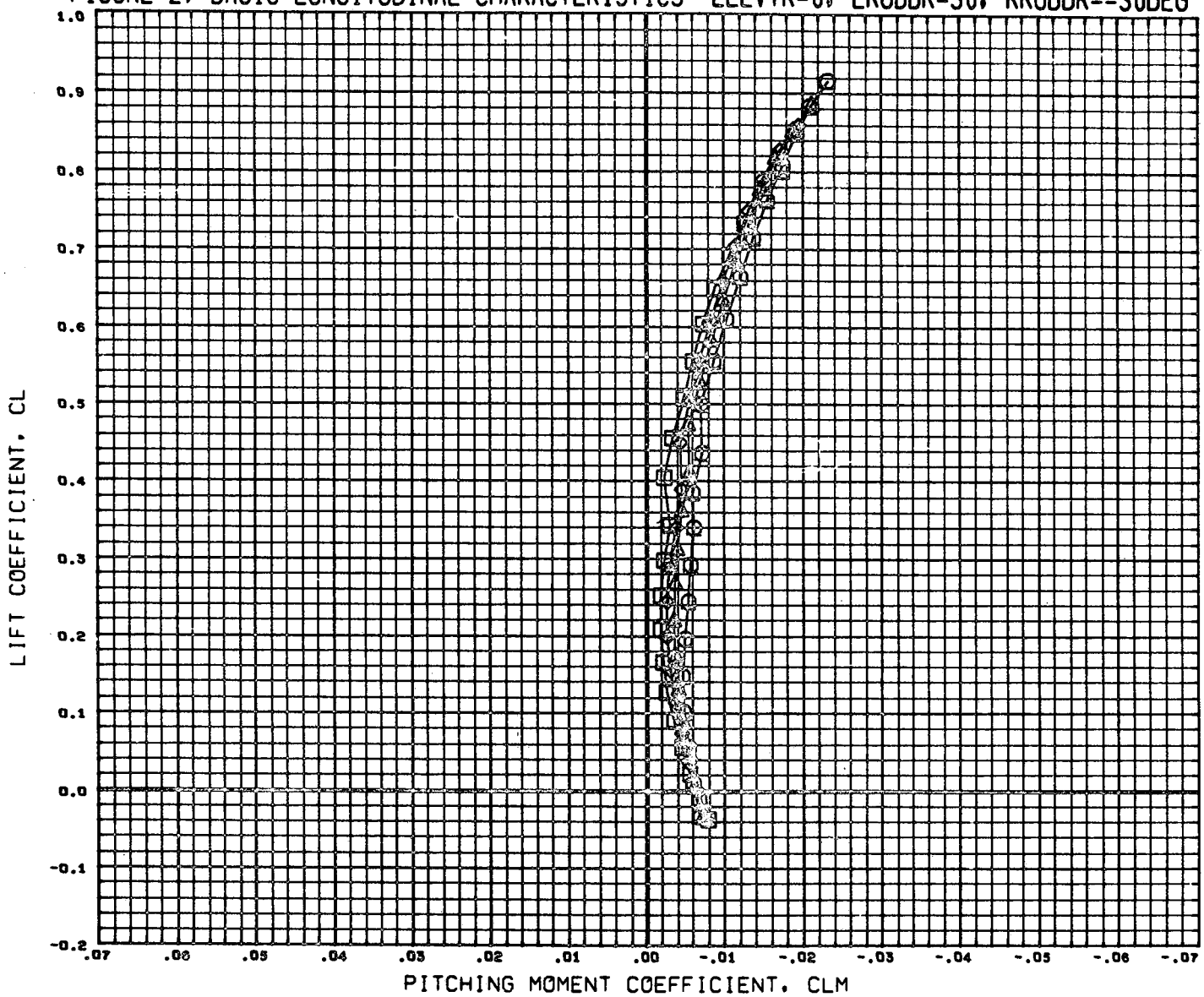
DATA HIST. CODE #G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30) (A49S01) 31 MAY 72 PAGE 17

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	2.990	BETA	0.000	ELEVTR	0.000
△	3.480	AILERN	0.000	LRUDDR	30.000
◇	4.000	RRUDDR	- 30.000		
□	4.959				

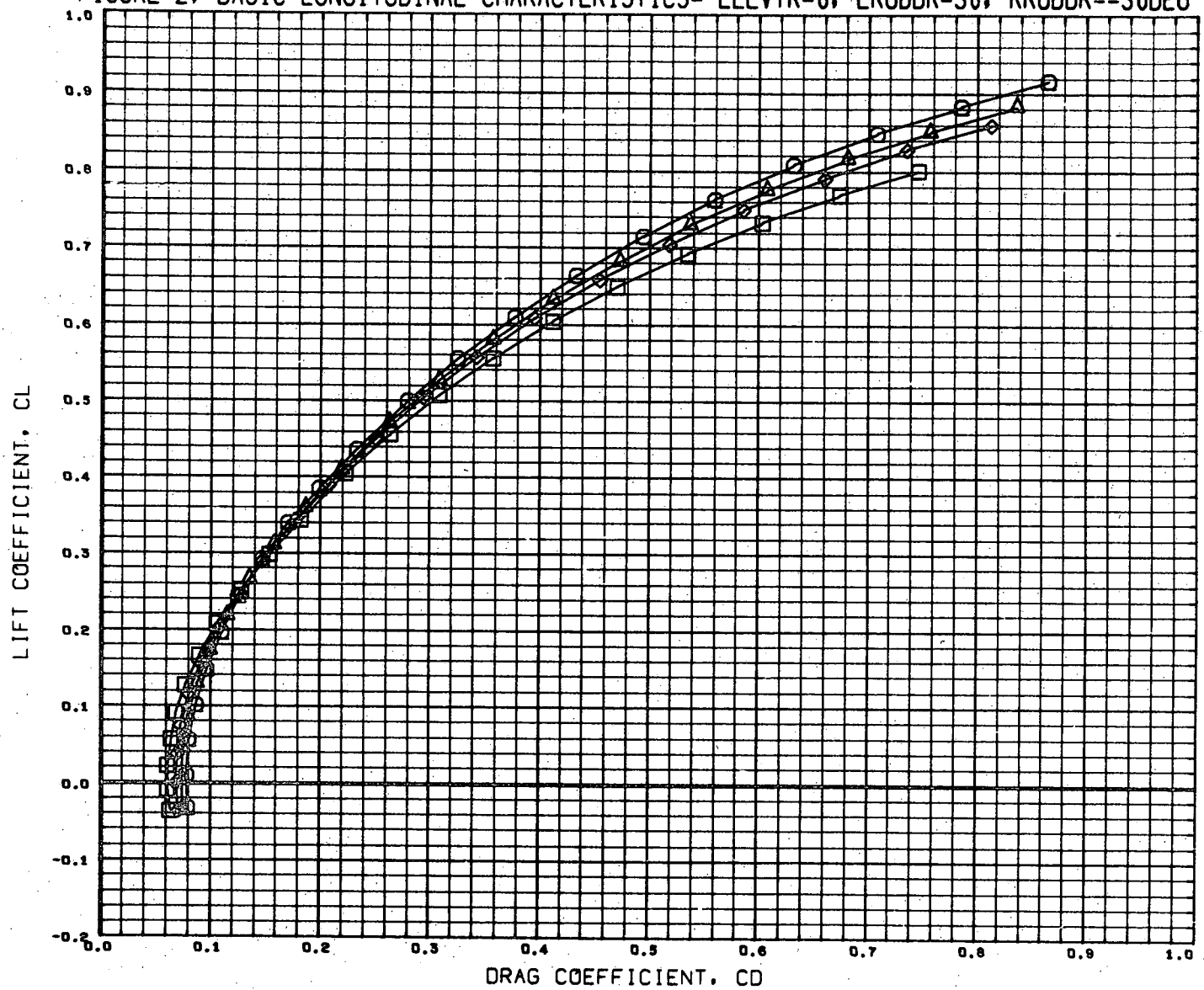
DATA HIST. CODE *G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5(+30.-30) (A49S01) 31 MAY 72 PAGE 18

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	2.990	BETA	0.000	ELEVTR	0.000
△	3.480	AILERN	0.000	LRUDDR	30.000
◇	4.000	RRUDDR	- 30.000		
□	4.959				

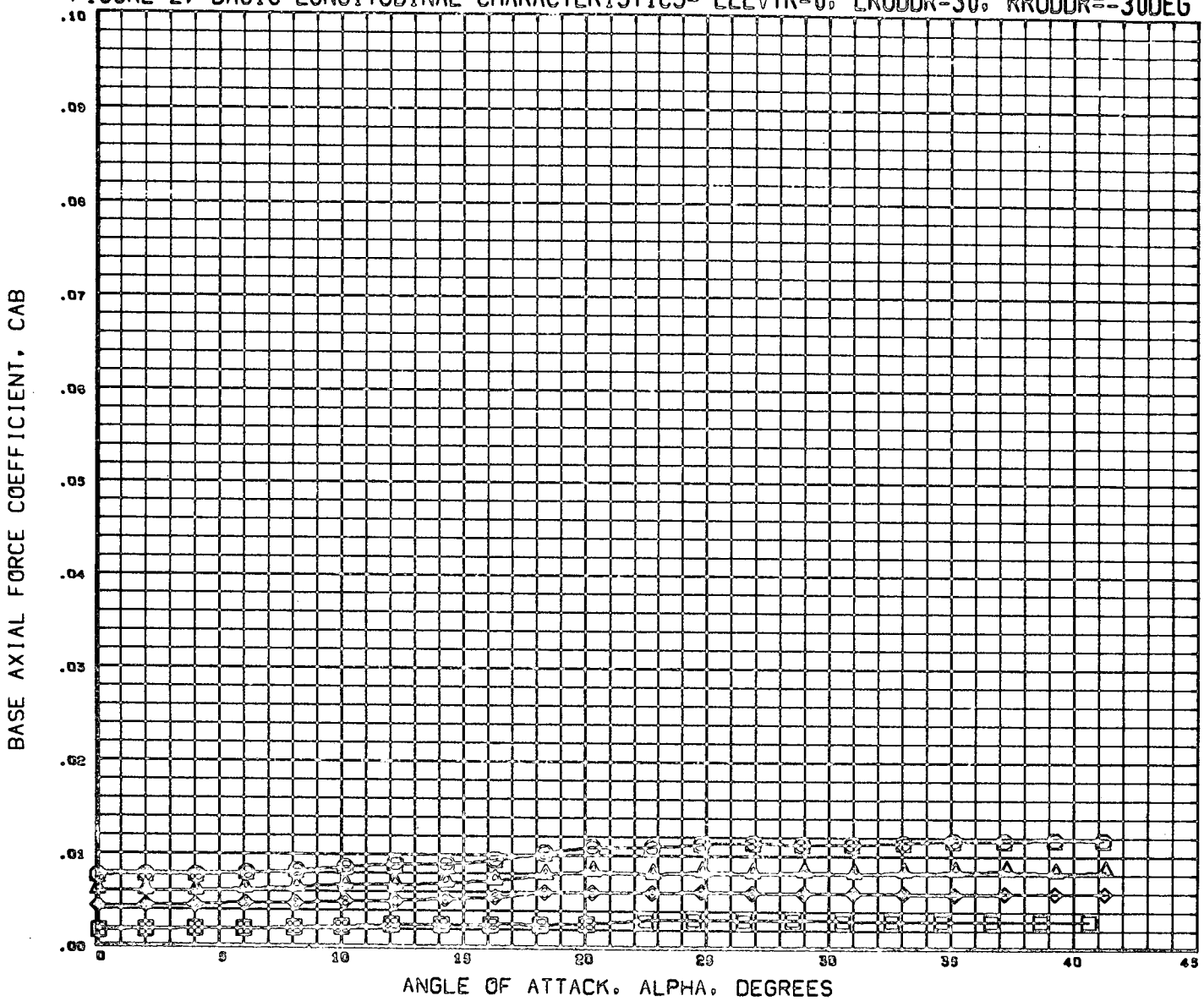
DATA HIST. CODE *G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30) (A49S01) 31 MAY 72 PAGE 19

FIGURE 2. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0. LRUDDR=30. RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES			
○	2.990	BETA	0.000	ELEVTR	0.000
△	3.480	AILERN	0.000	LRUDDR	30.000
◇	4.000	RRUDDR	- 30.000		
□	4.990				

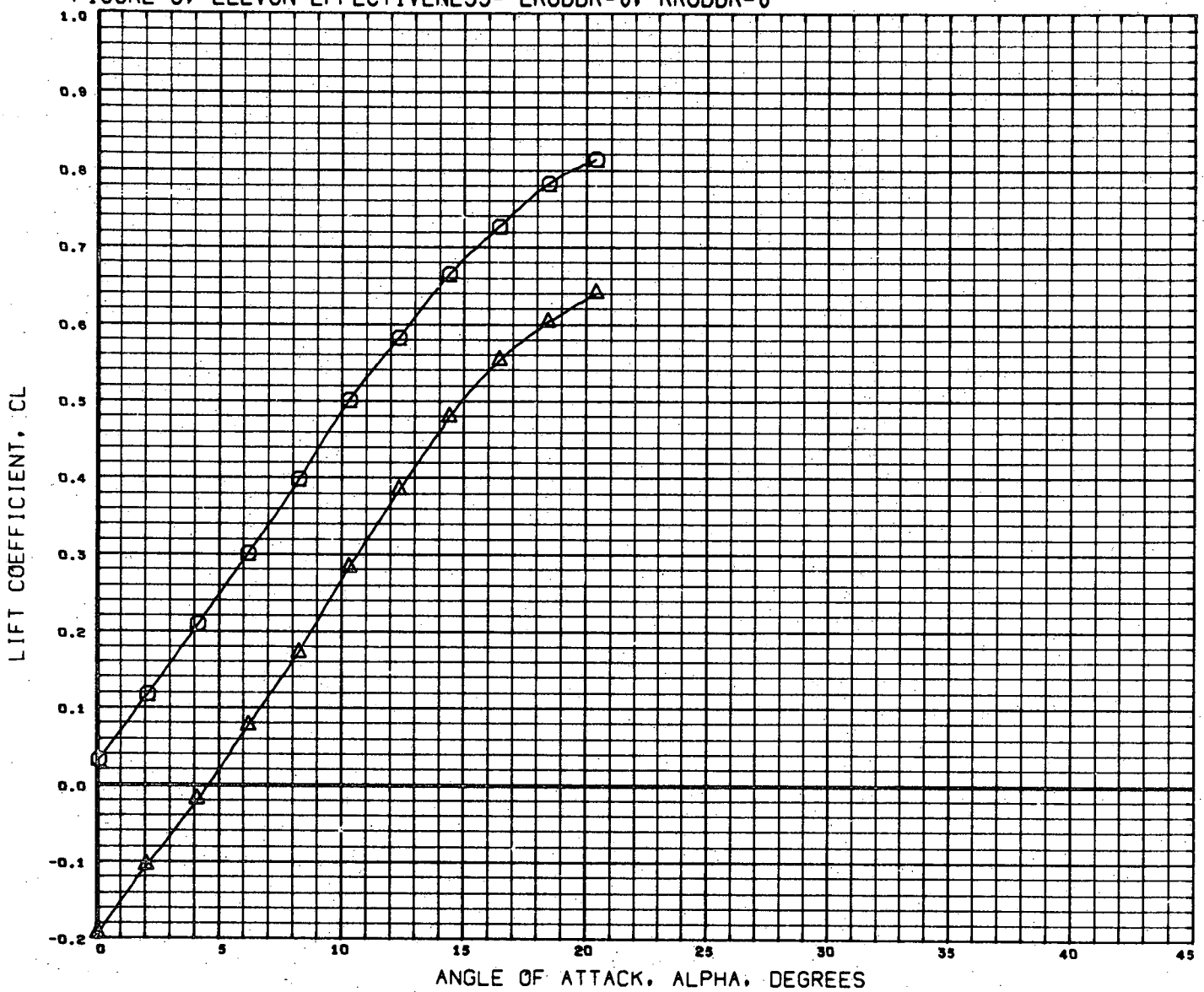
DATA HIST. CODE *G

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5(+30.-30) (A49S01) 31 MAY 72 PAGE 20

FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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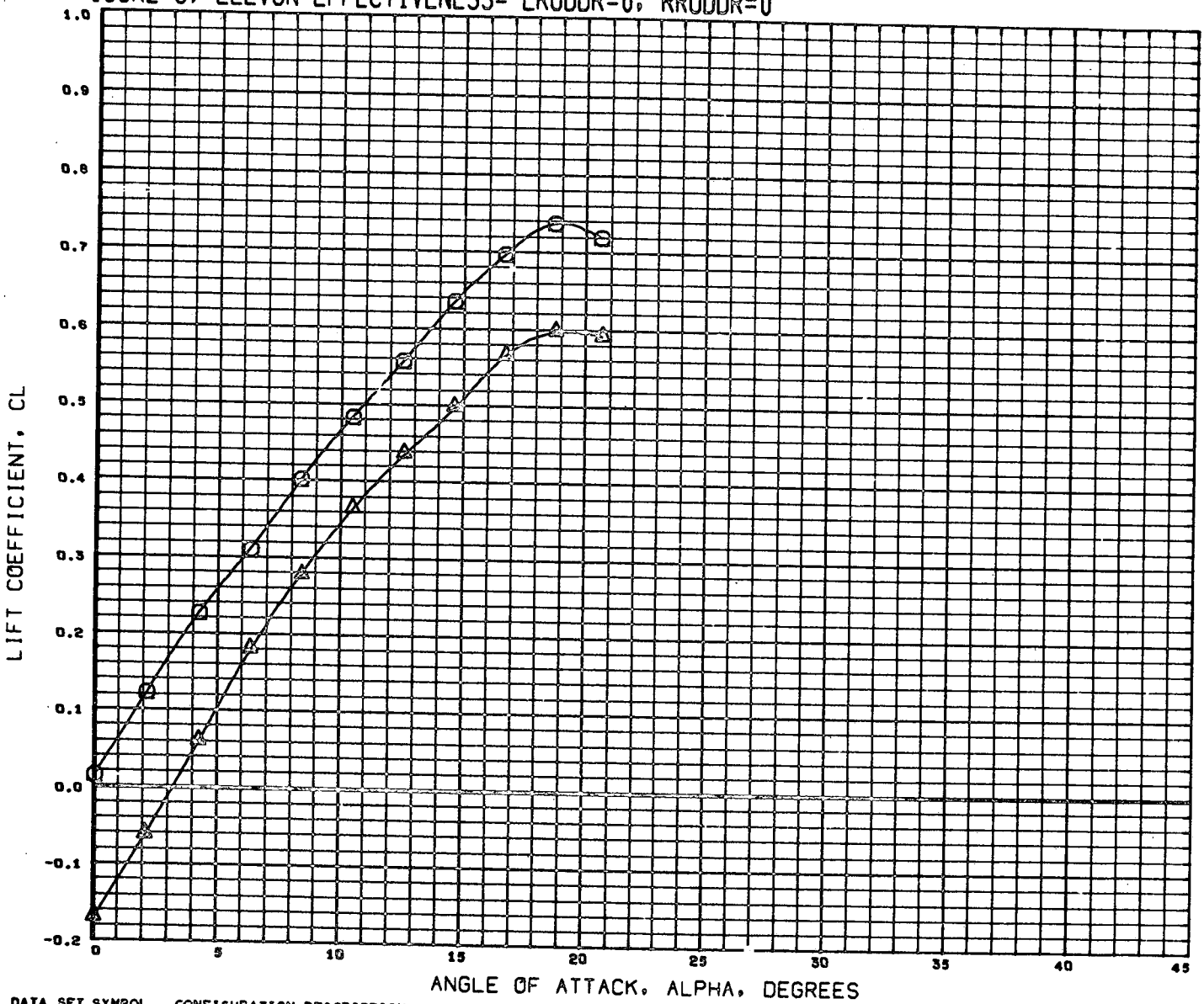
FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49038)	○	MSFC 507 GAC M-33 ORB. B5W4V5
(A49039)	△	MSFC 507 GAC M-33 ORB. B5W4(-10)V5

BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH .90

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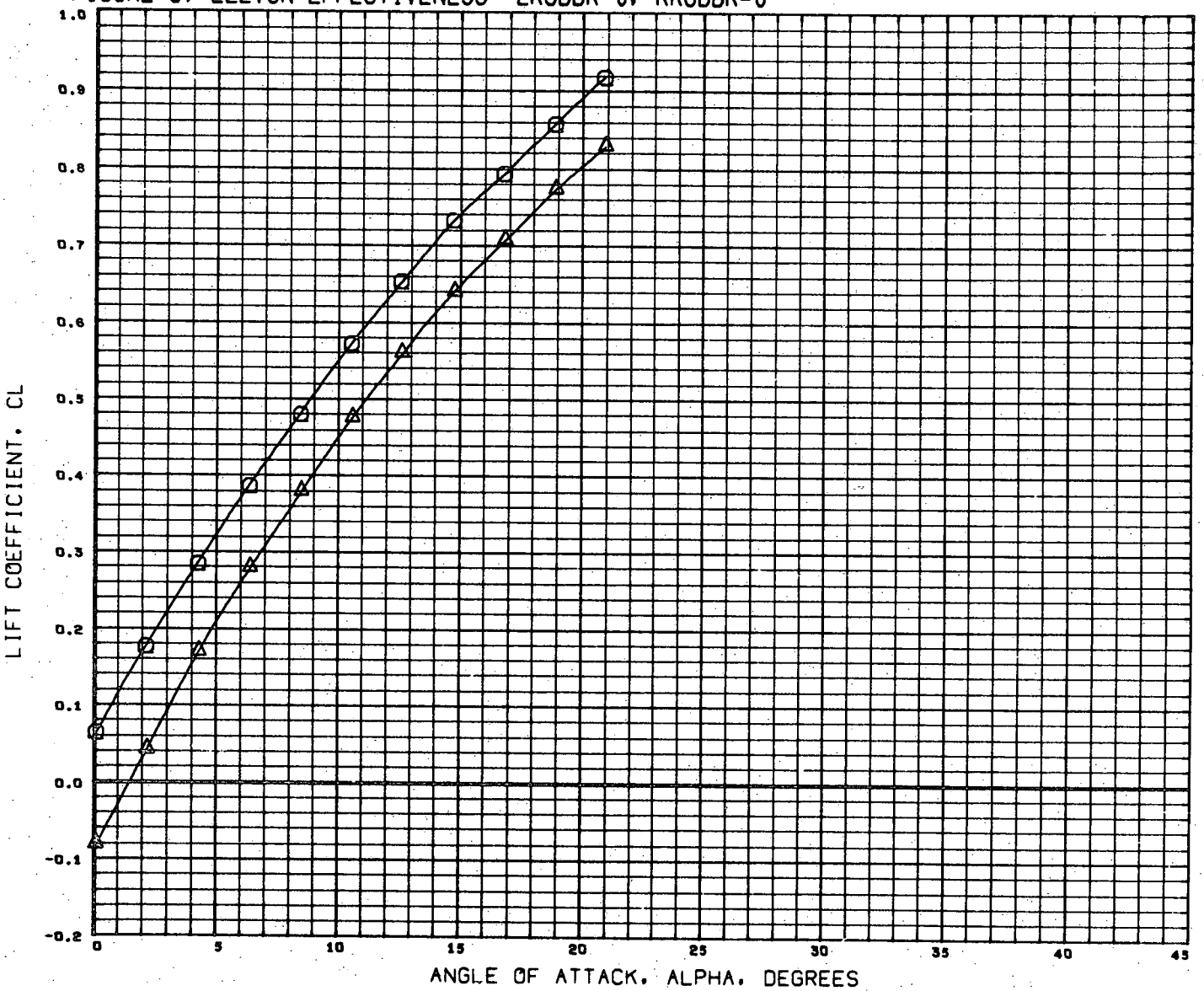
FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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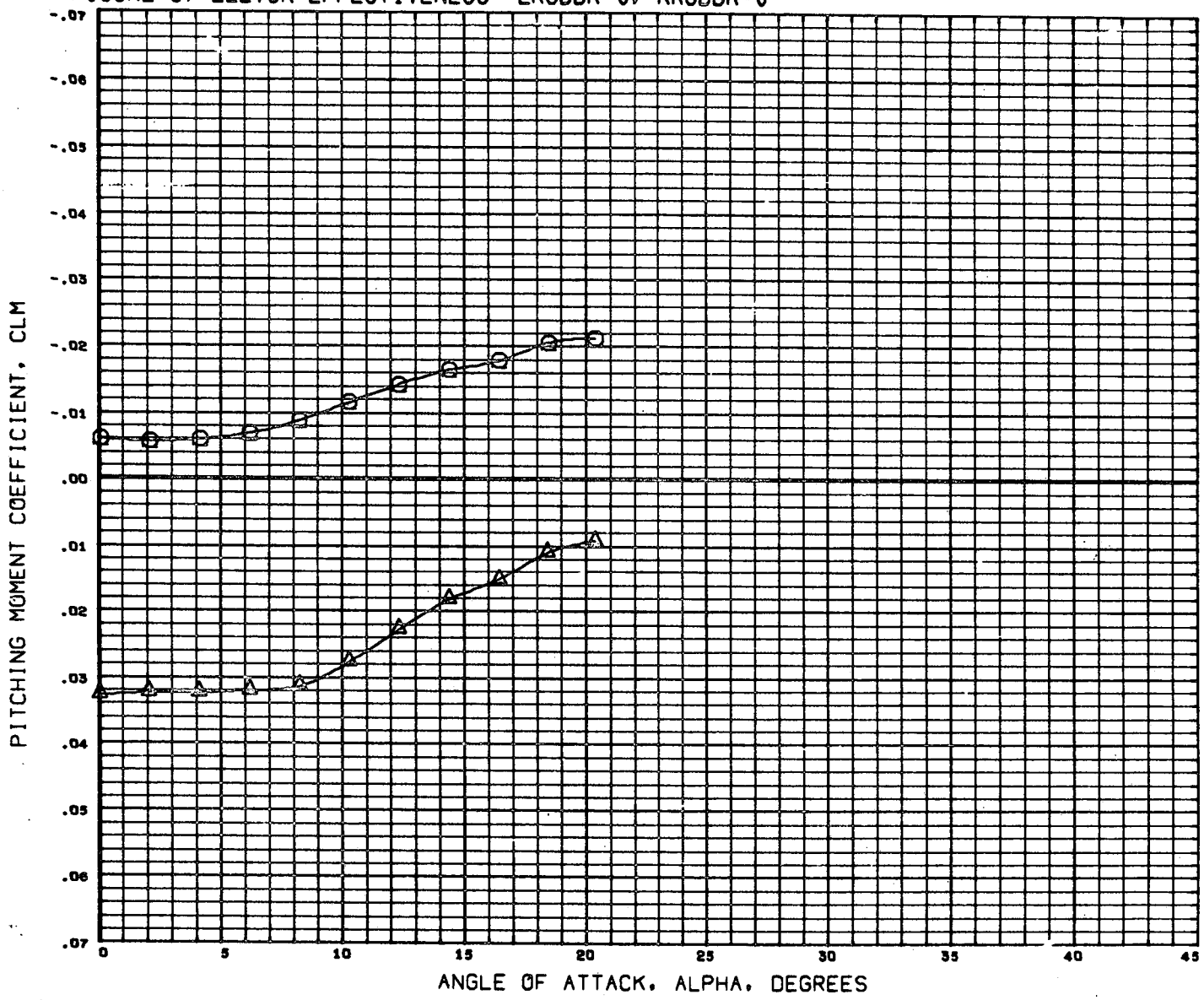
FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



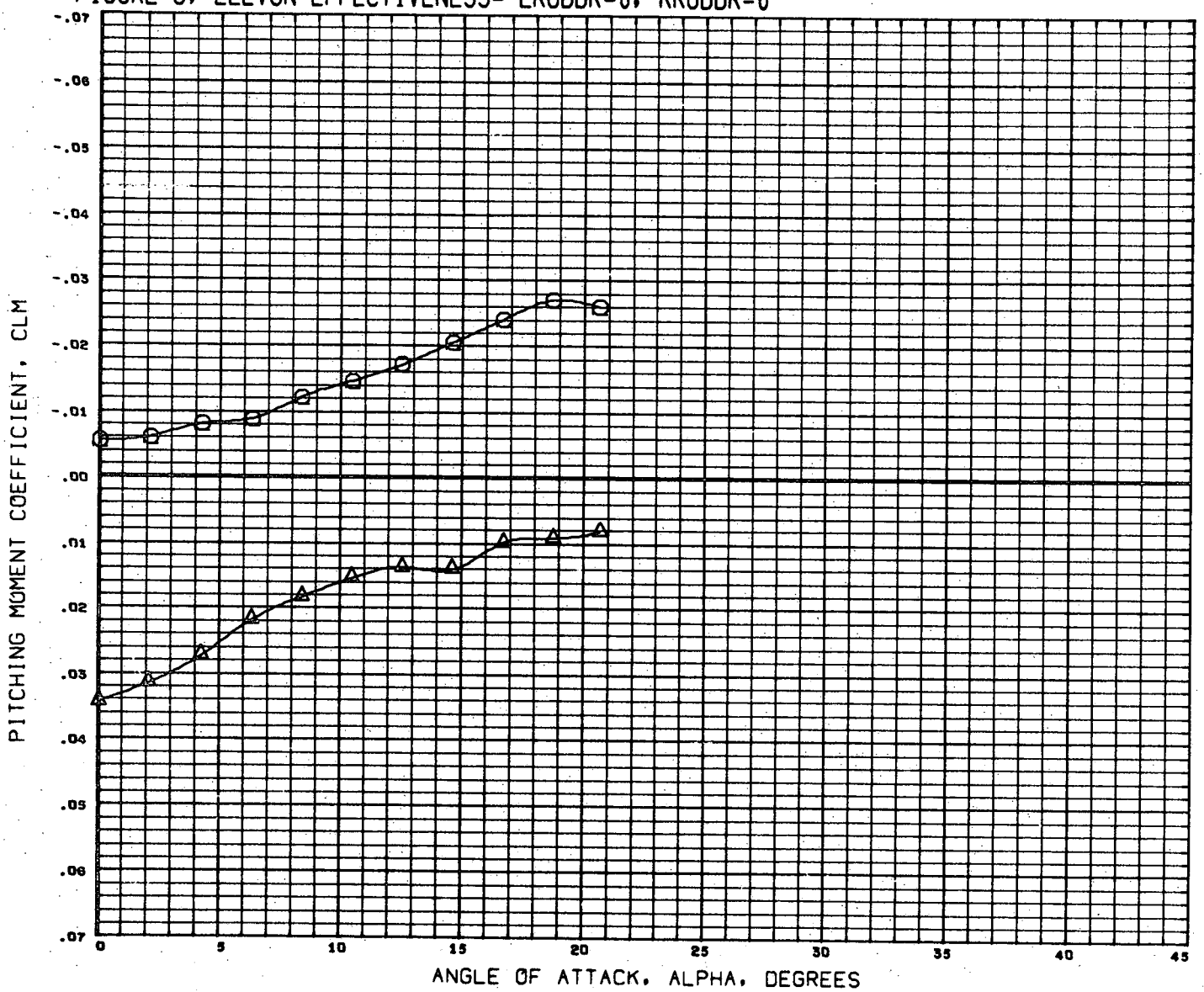
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH .60

FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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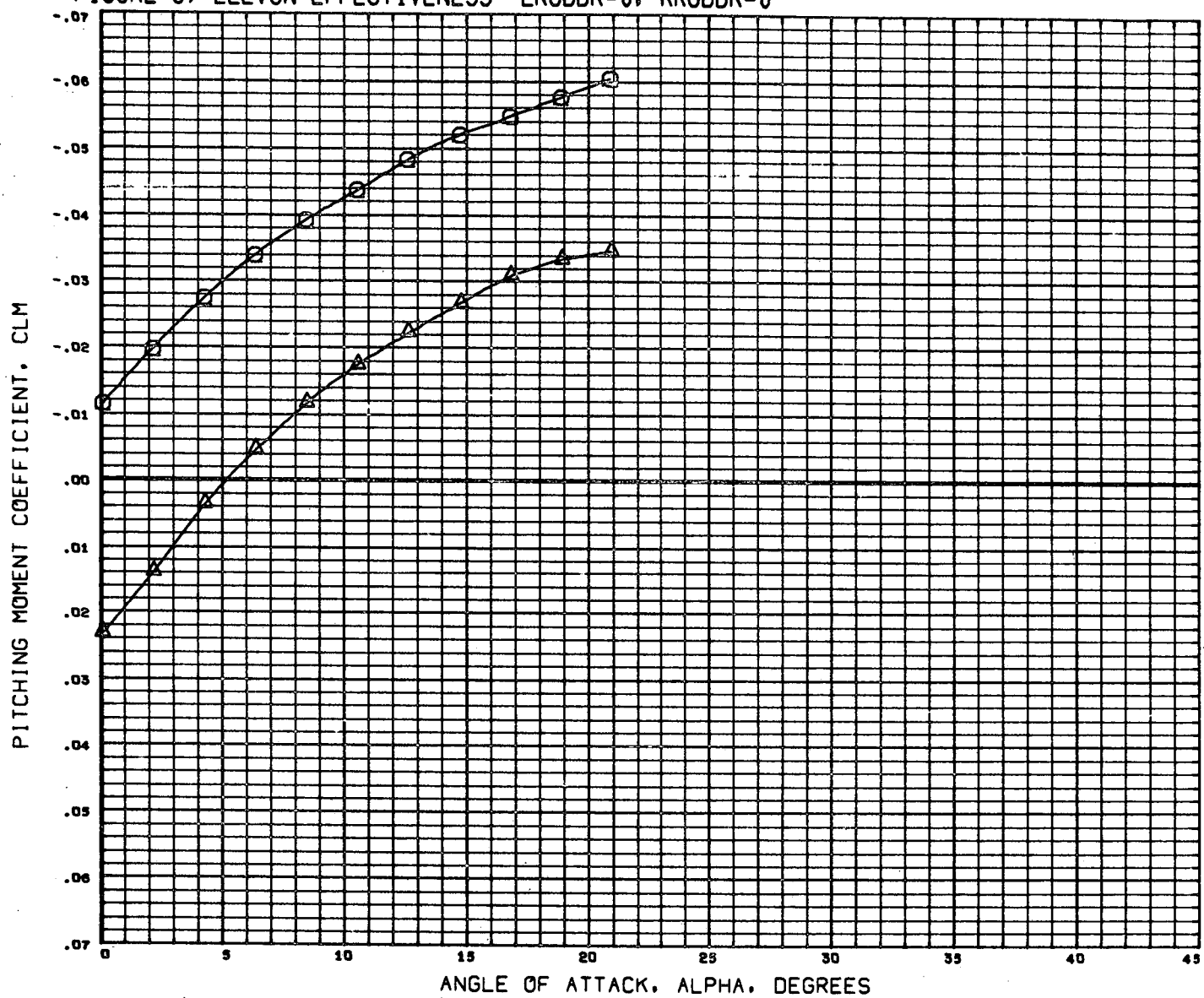
FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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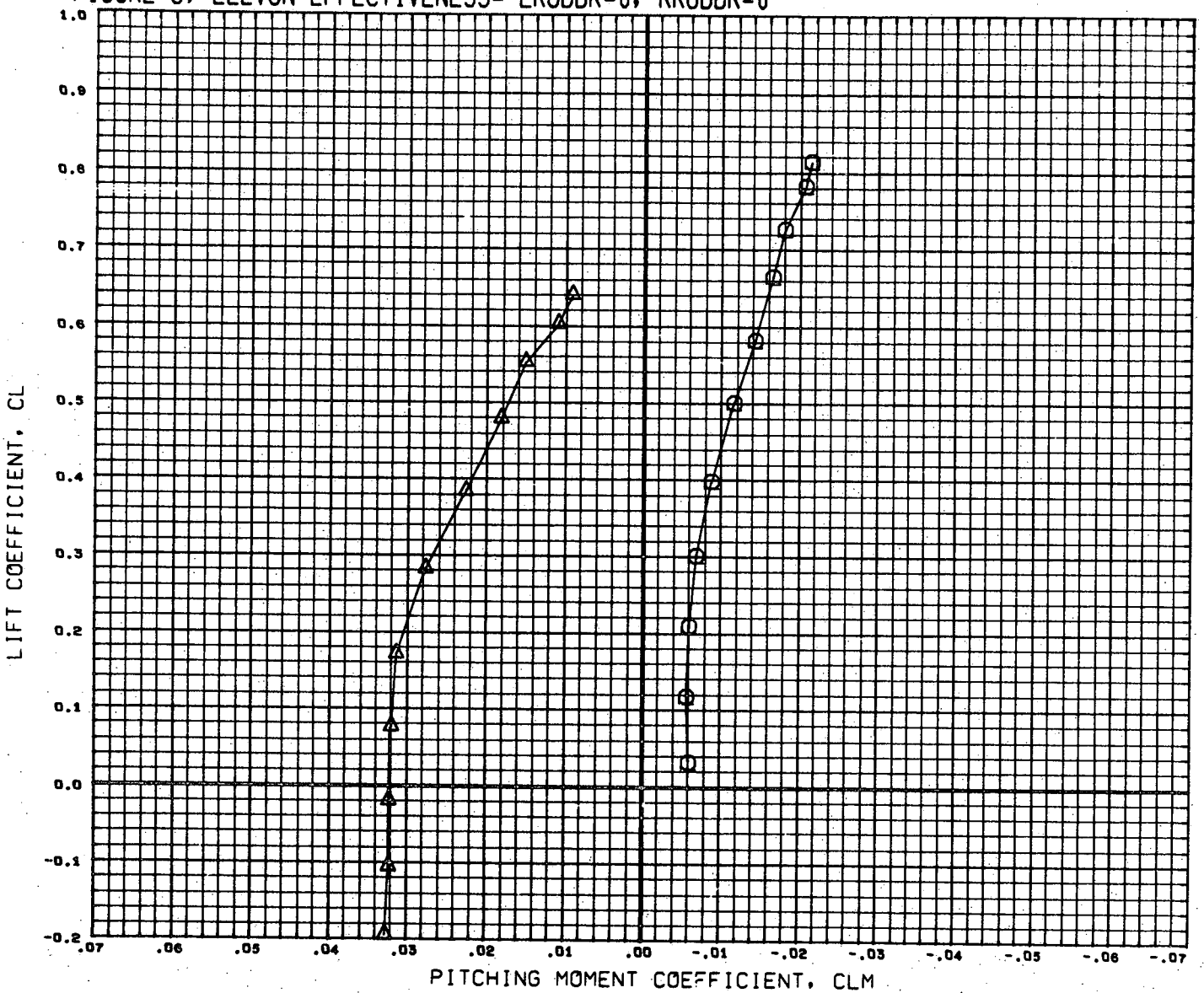
FIGURE 3, ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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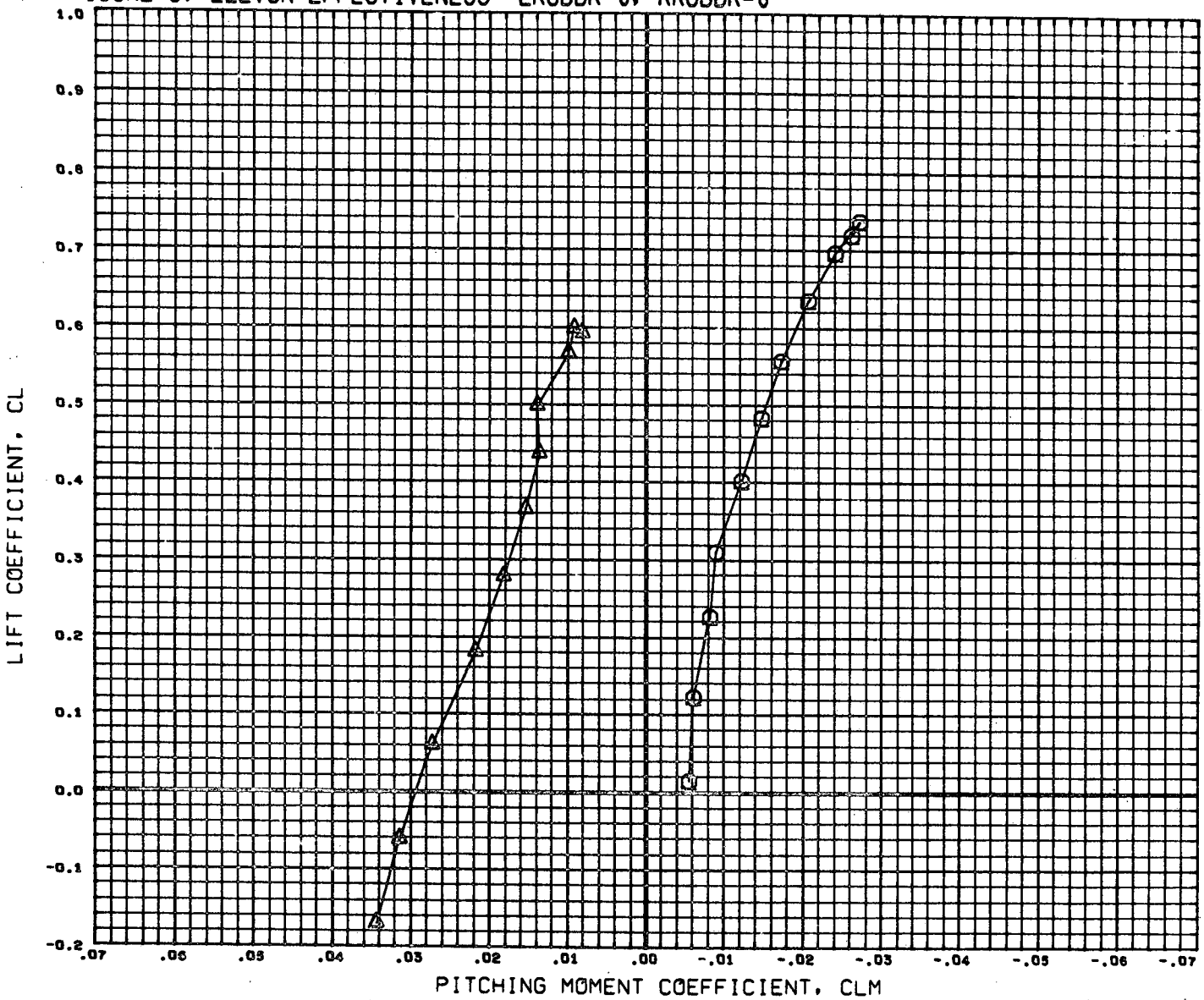
FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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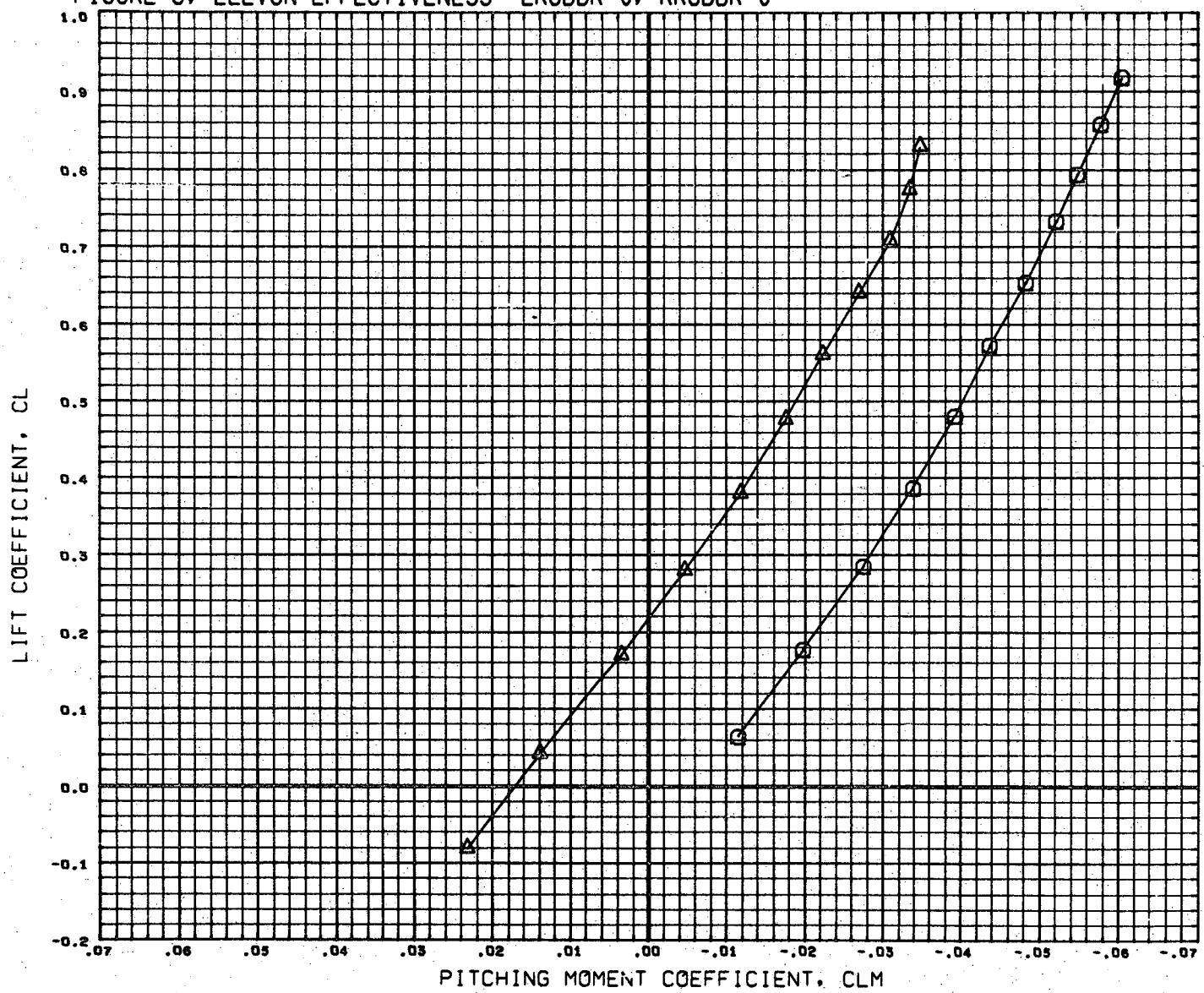
FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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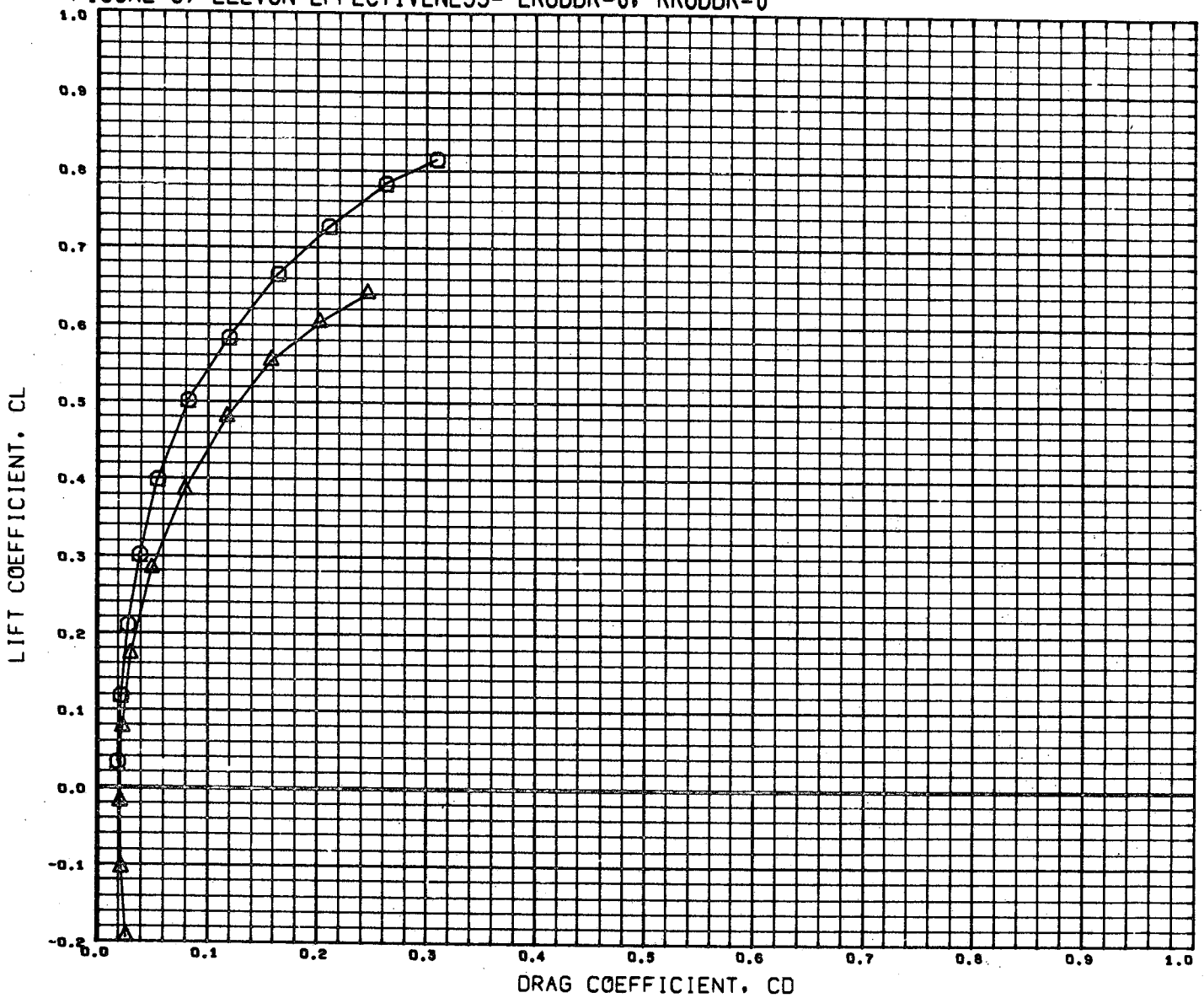
FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5

BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH .60

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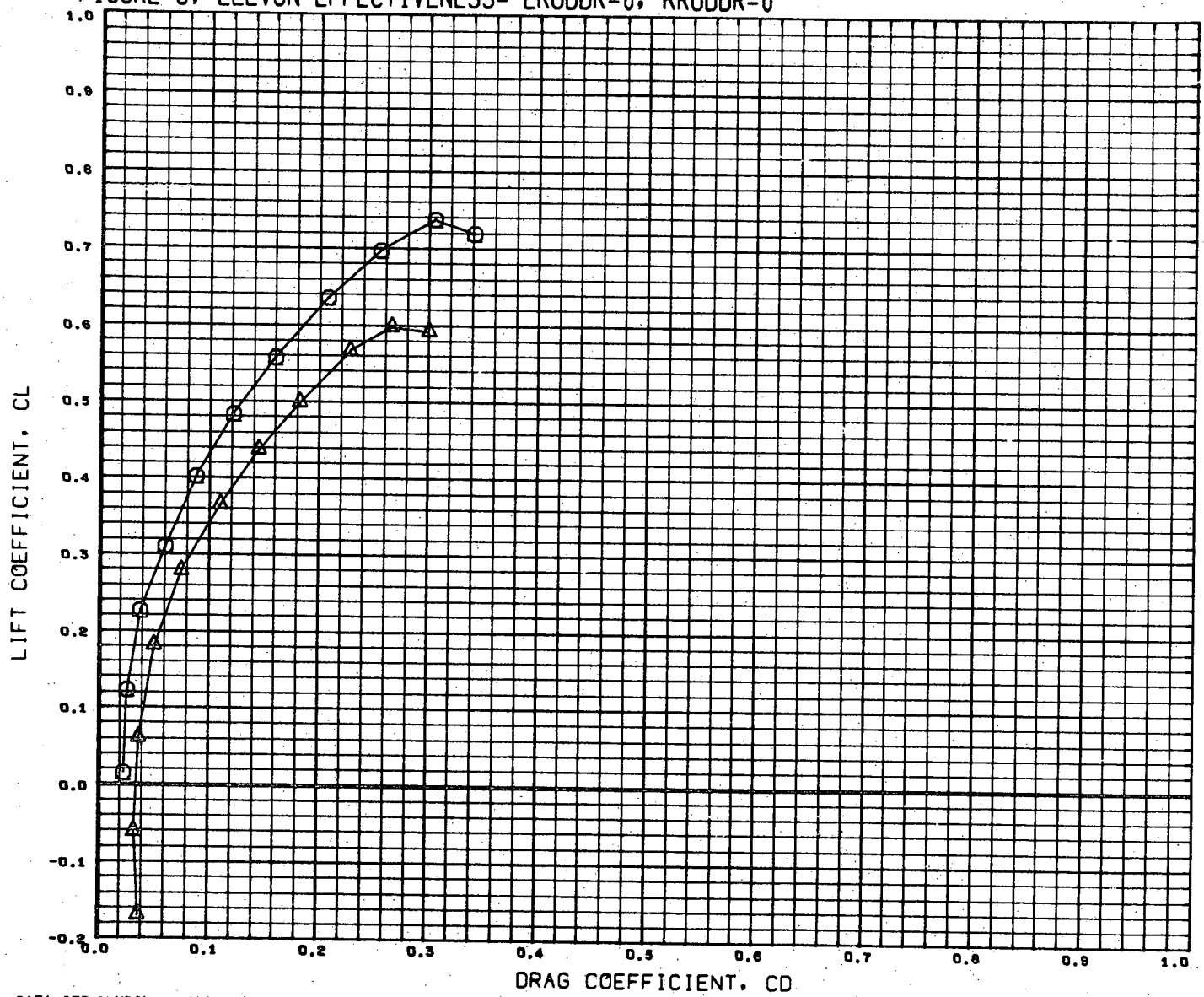
FIGURE 3, ELEVØN EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5

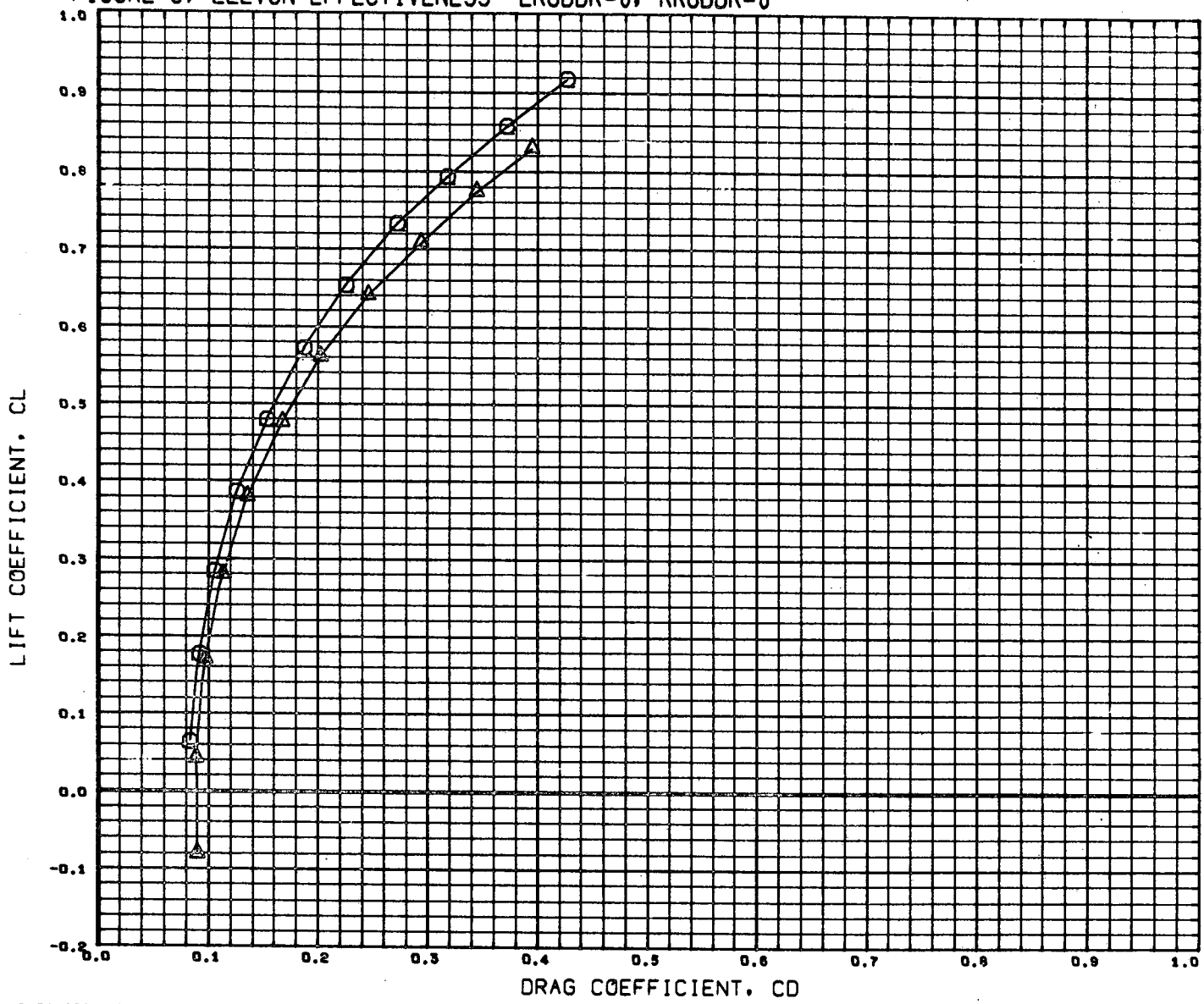
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH .90

FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



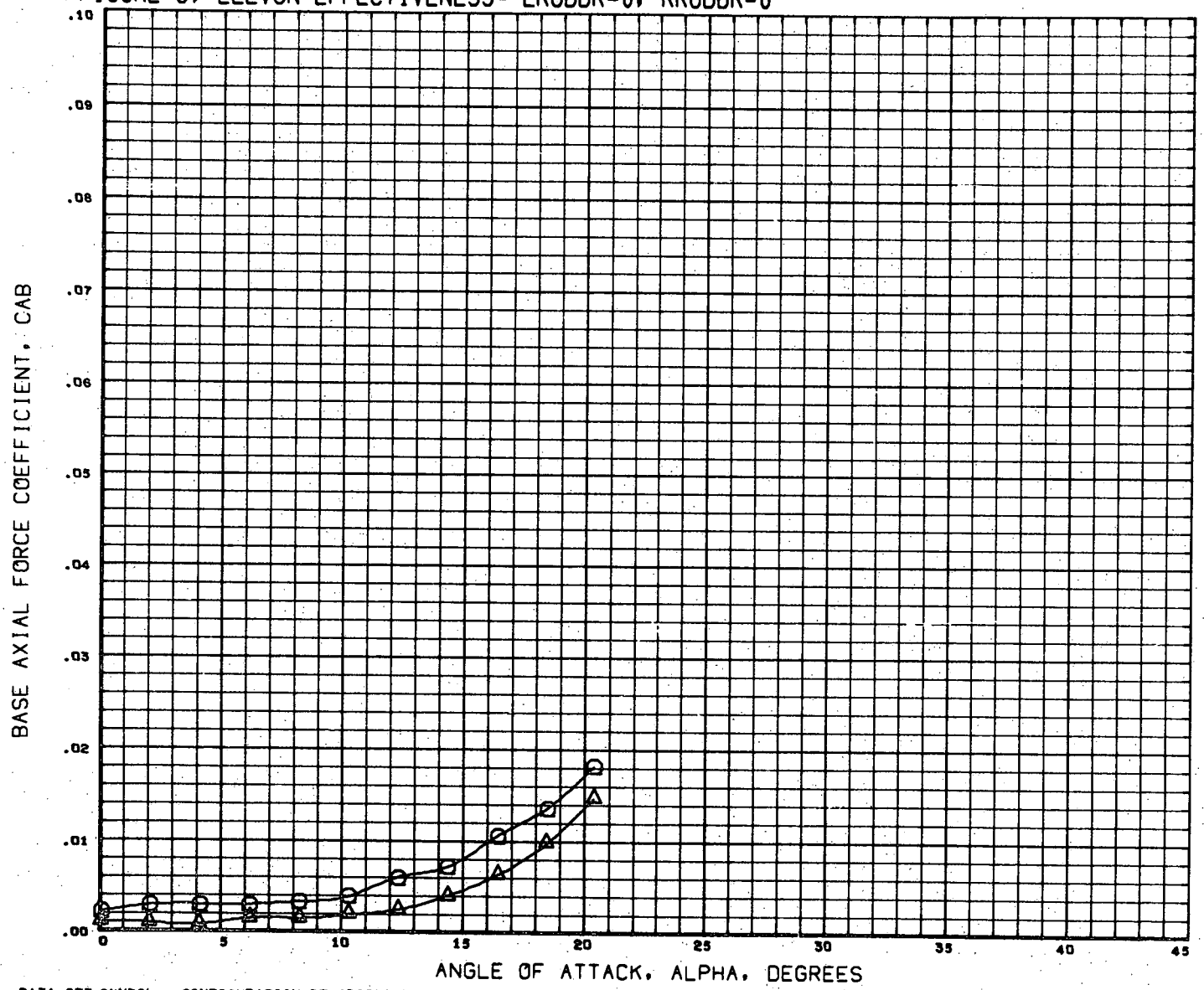
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.20

FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH .60

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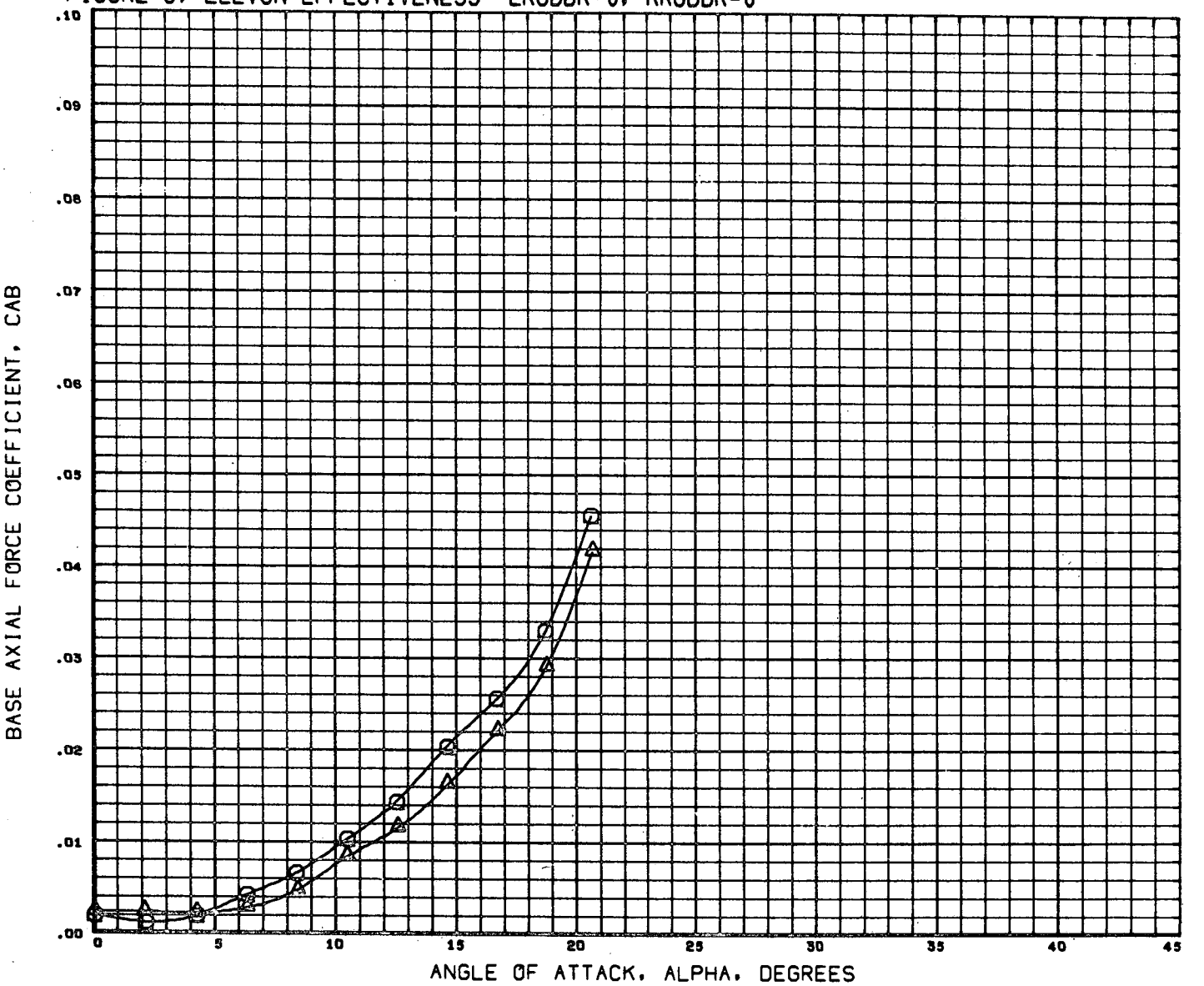
FIGURE 3. ELEVON EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH .90

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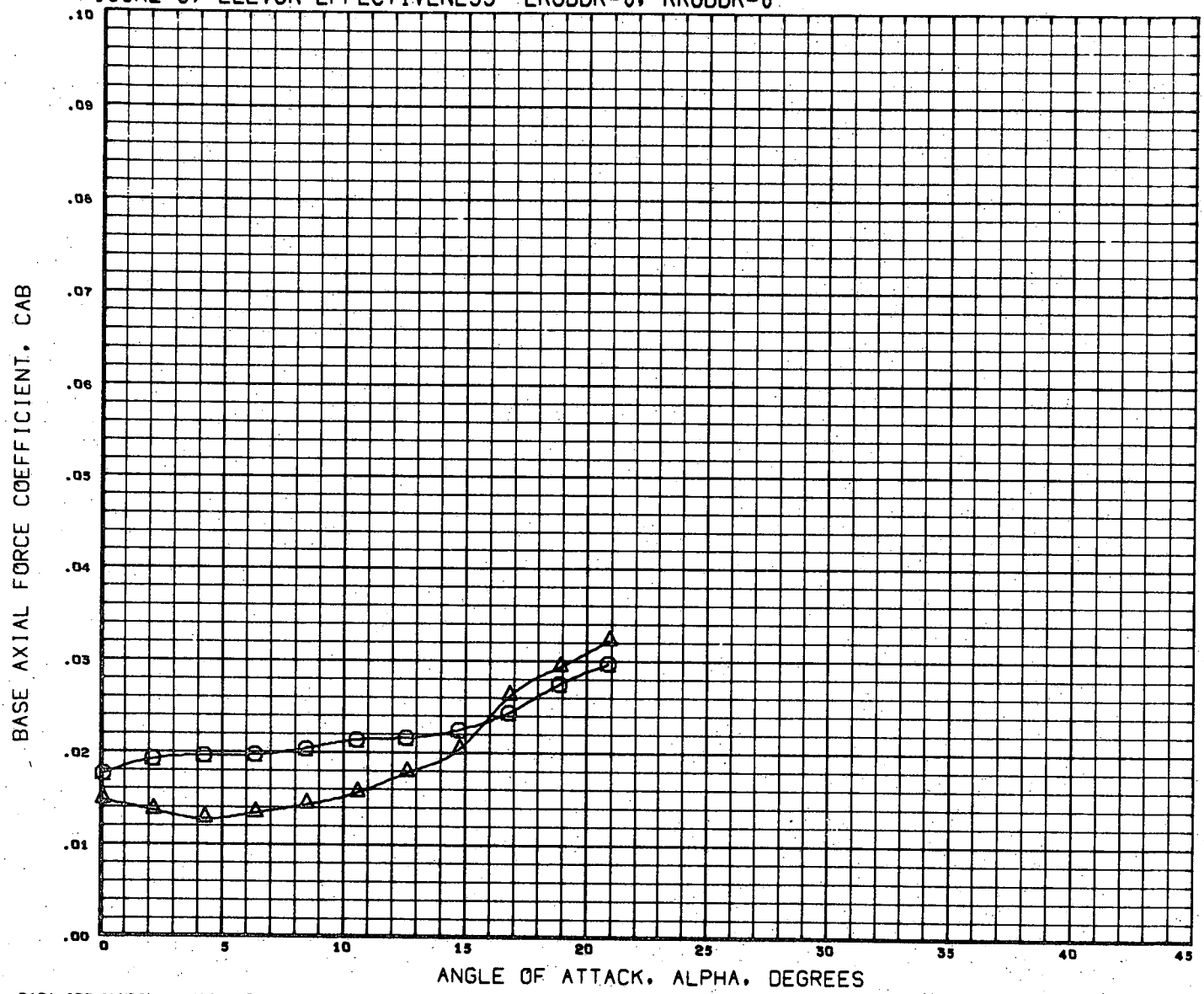
FIGURE 3. ELEVØN EFFECTIVENESS- LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49038)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49039)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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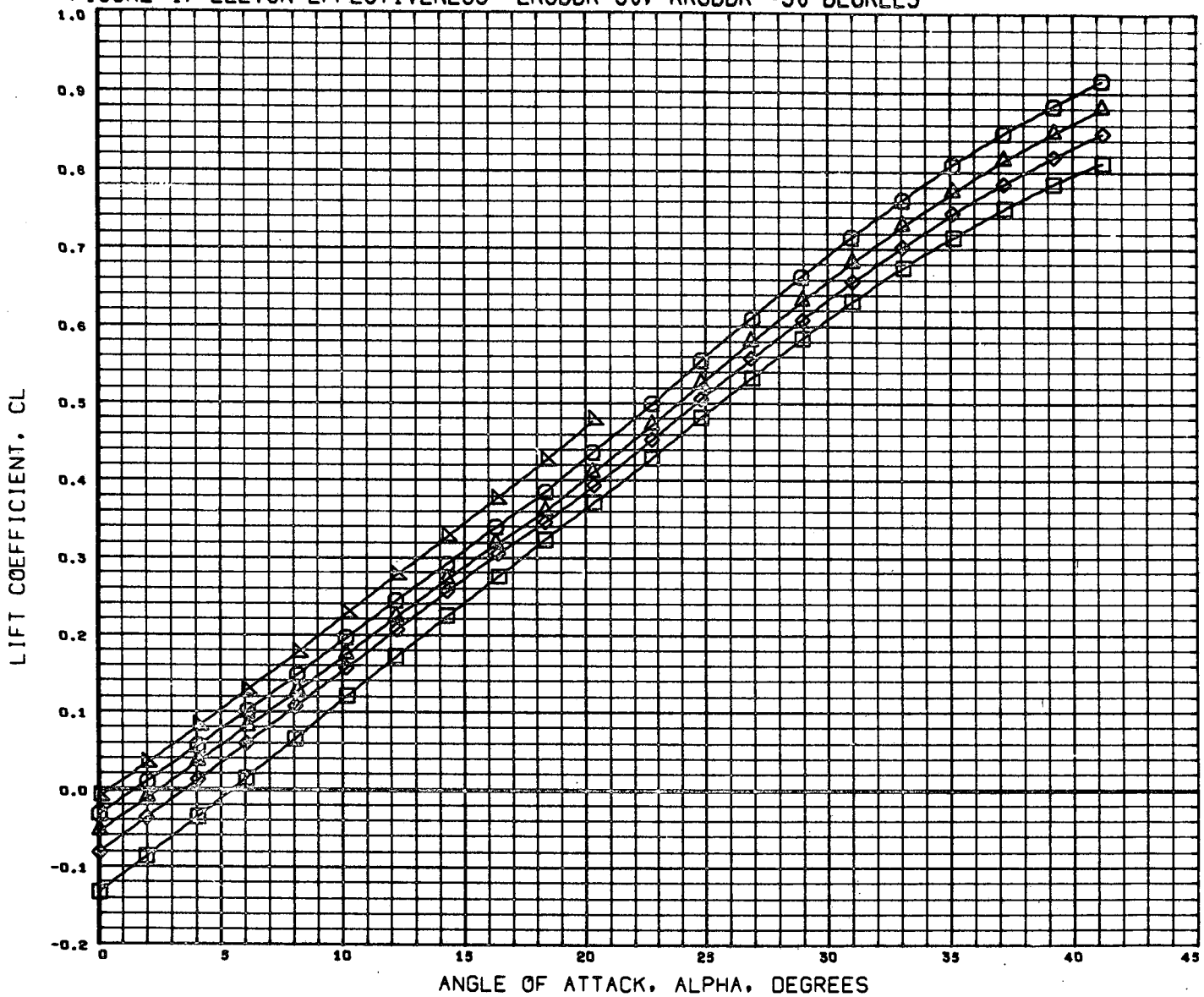
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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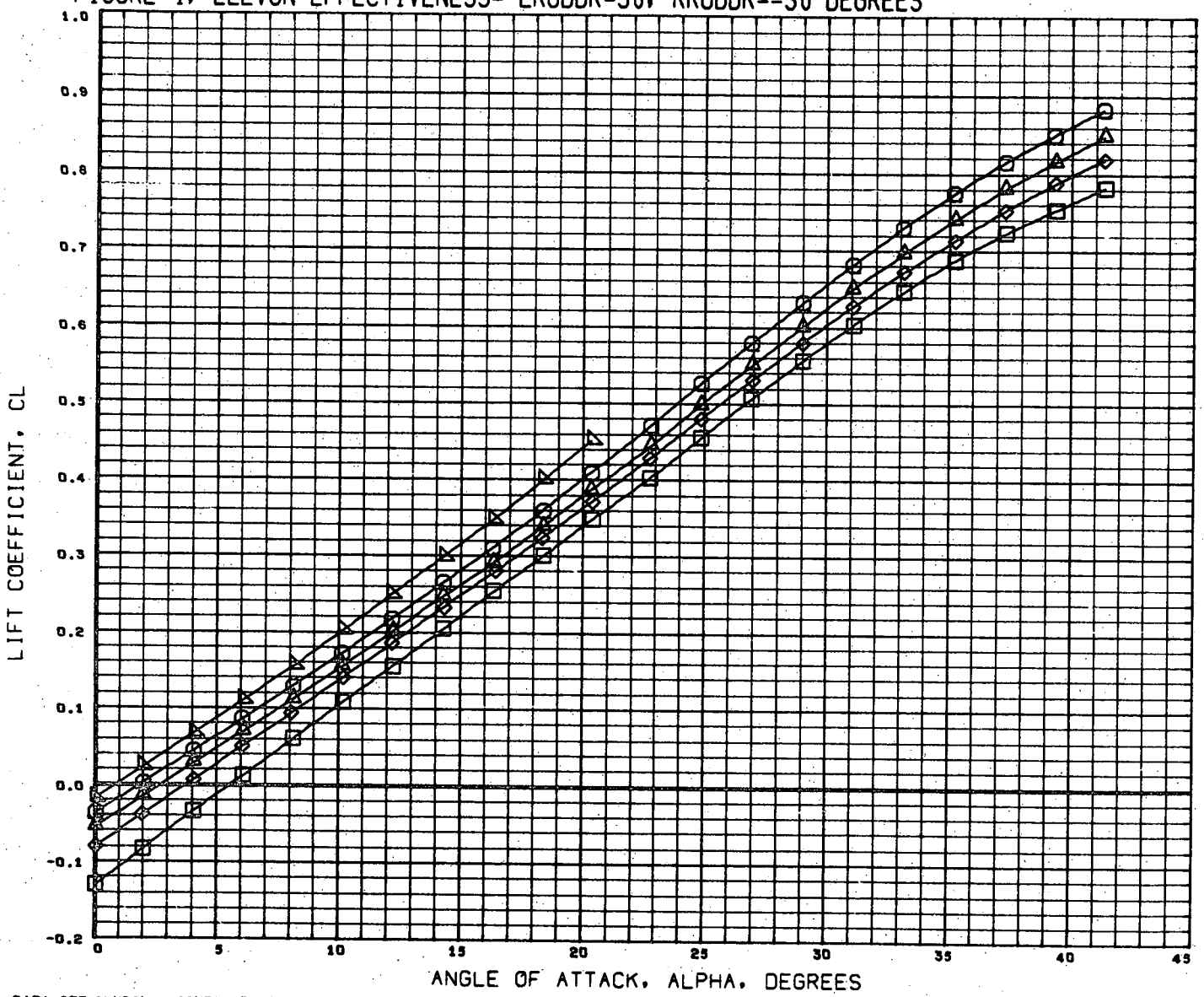
FIGURE 4. ELEVØN EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



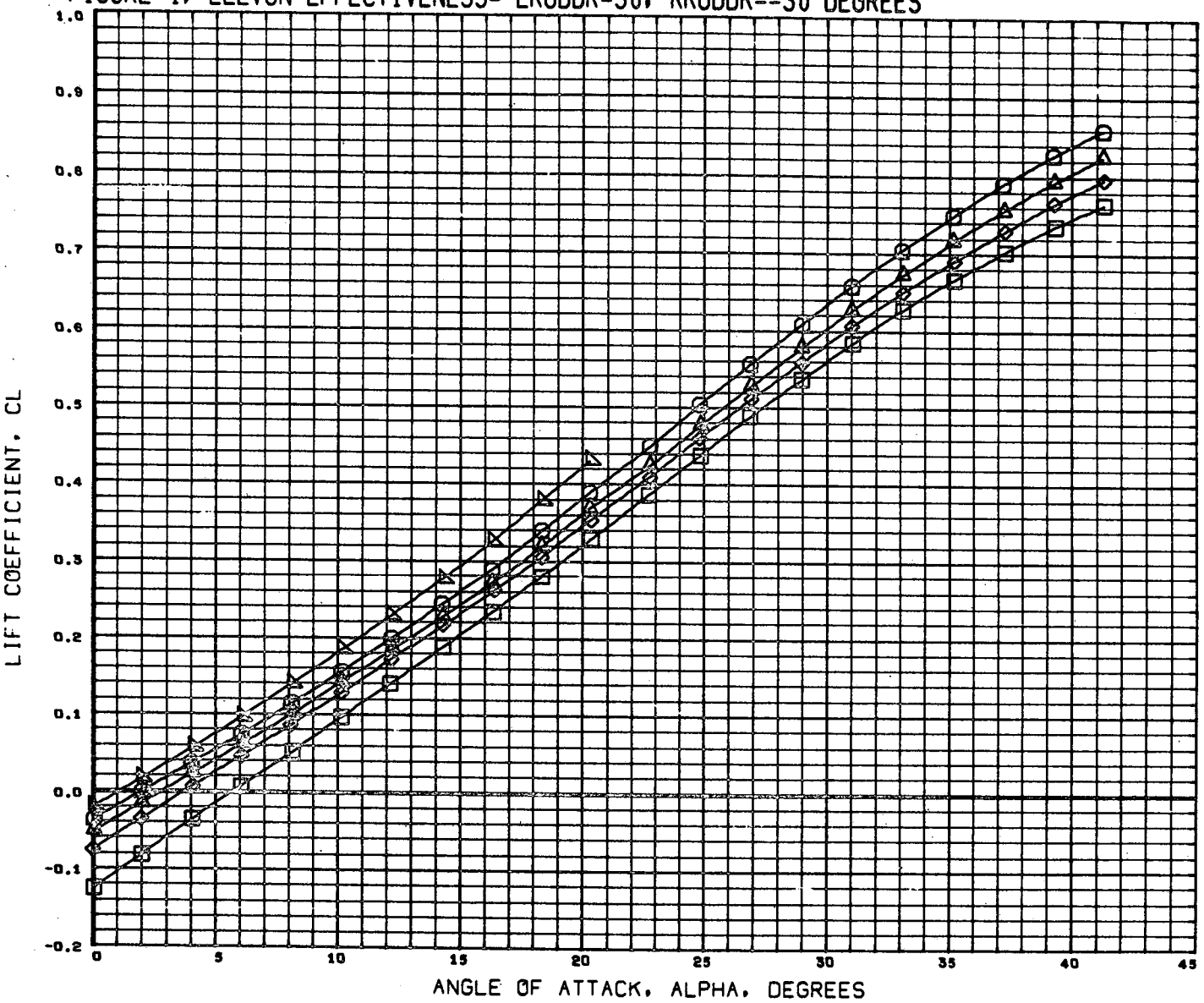
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 3.48

FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49S06)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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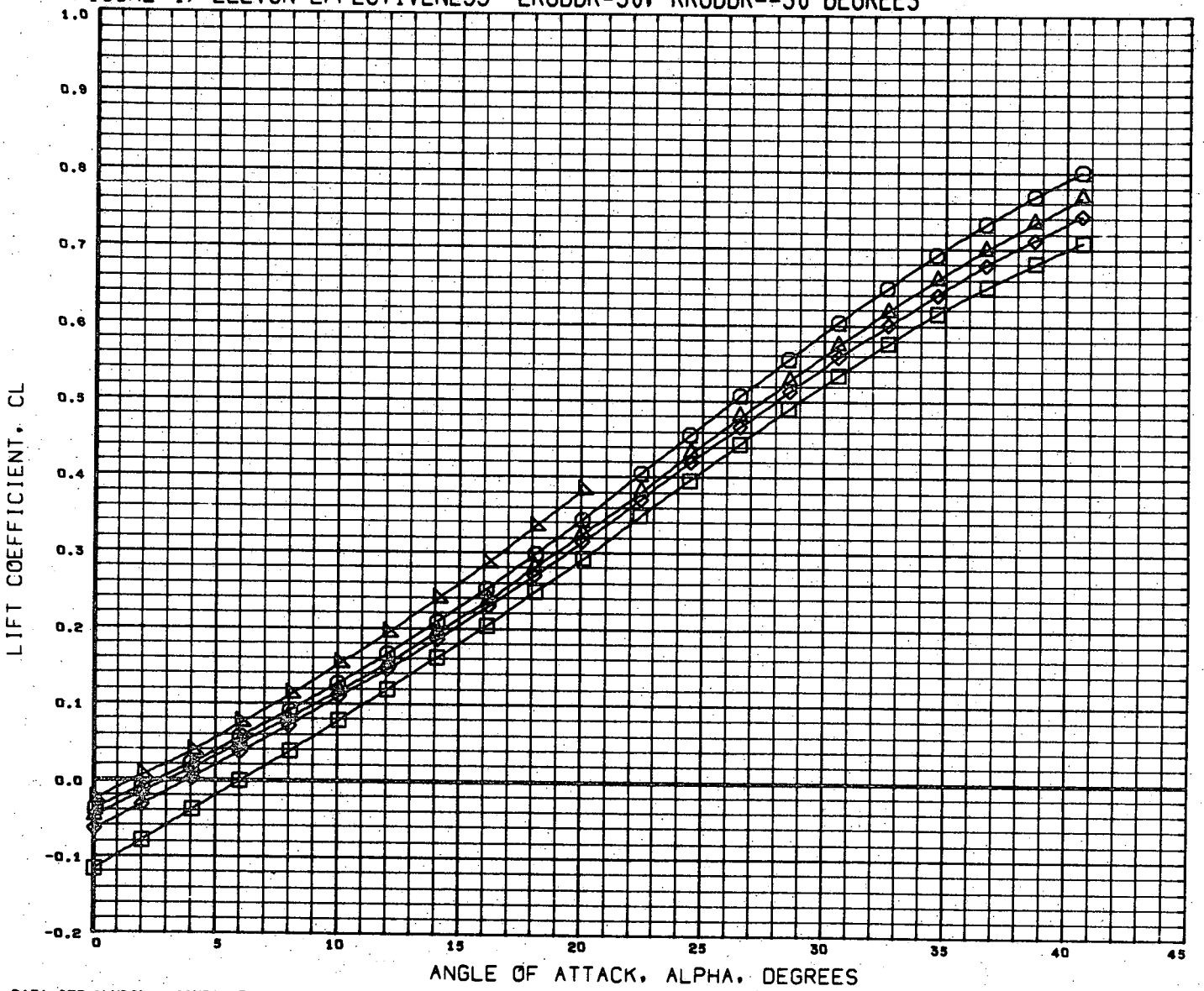
FIGURE 4, ELEVØN EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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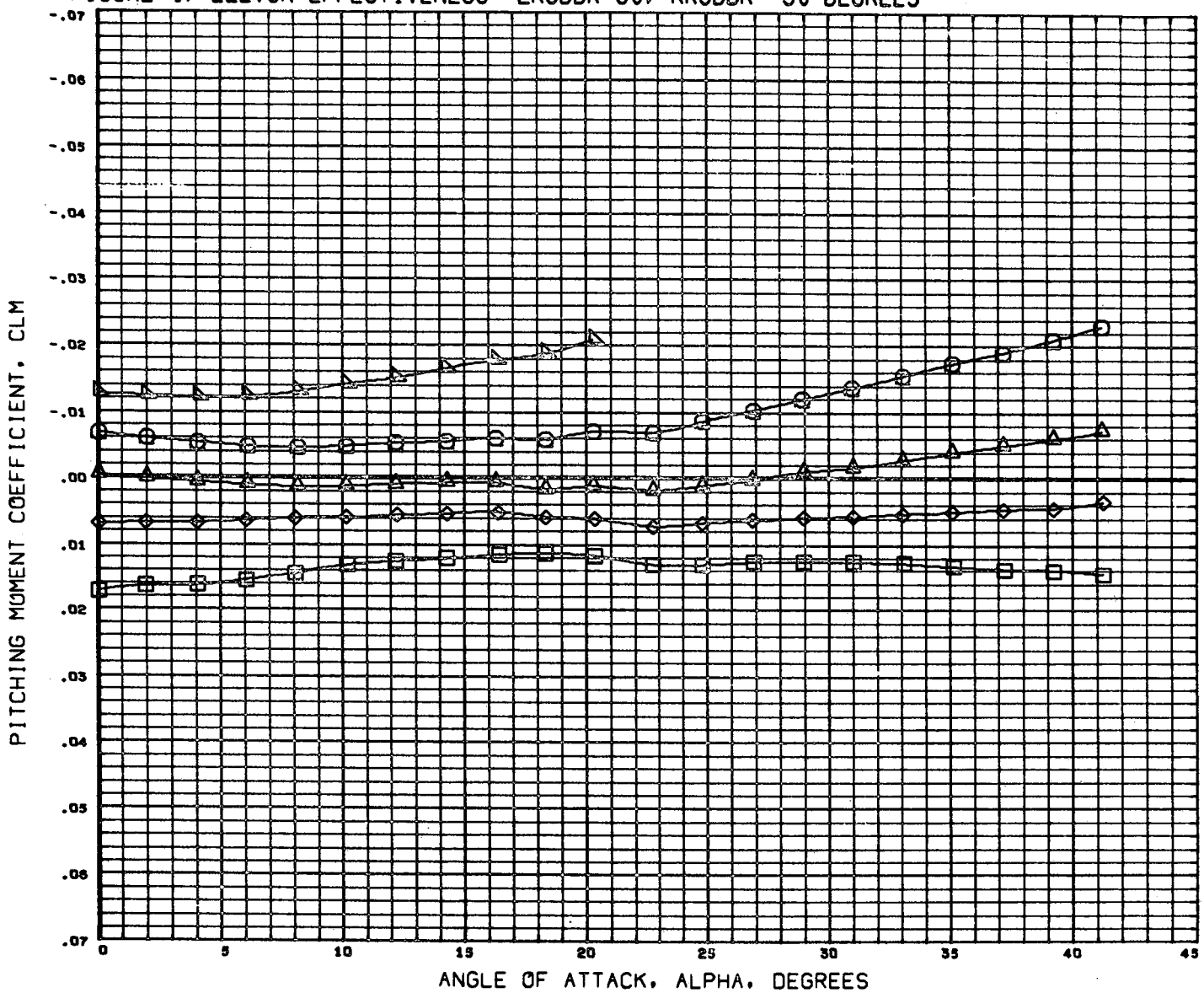
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



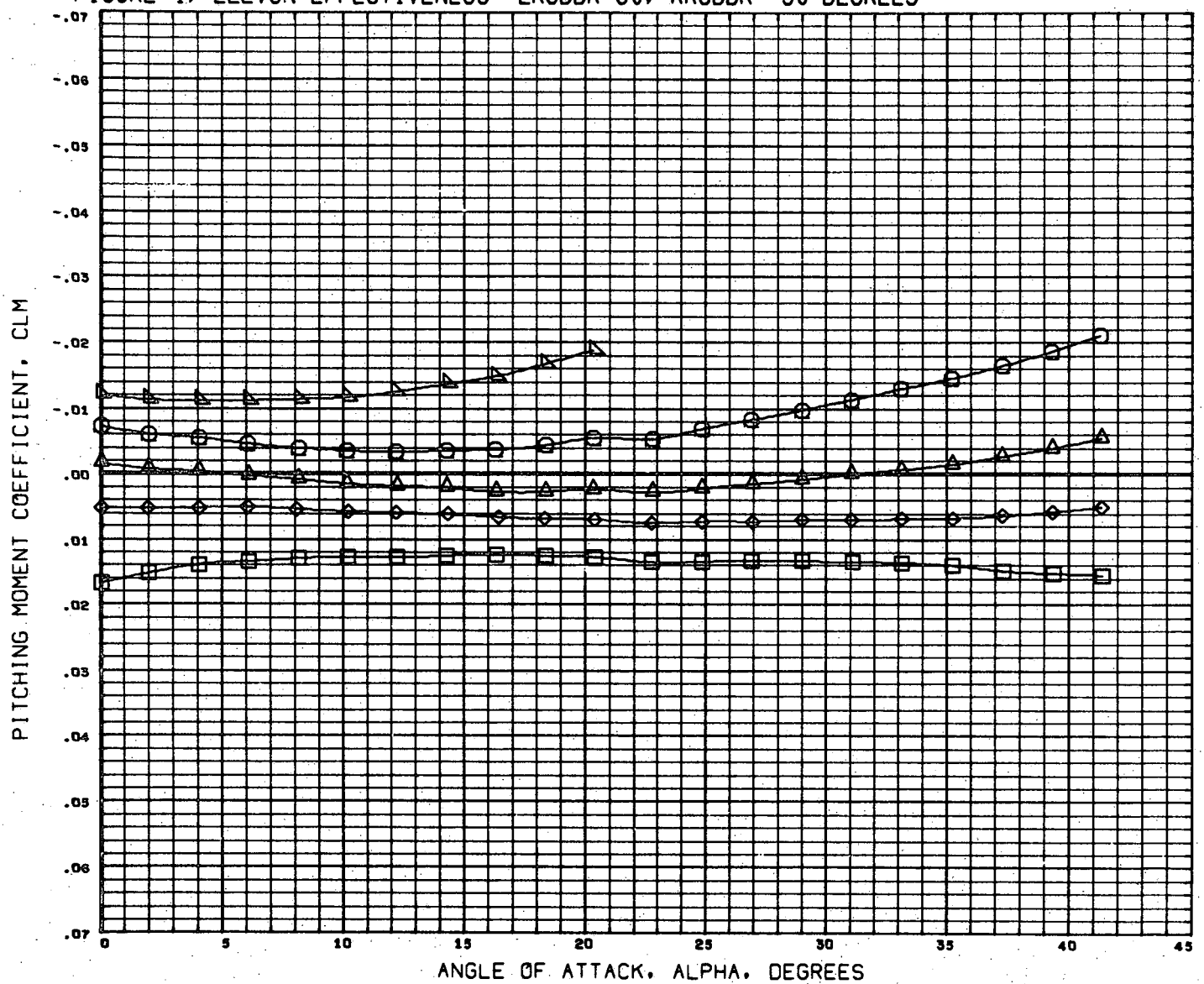
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49D06)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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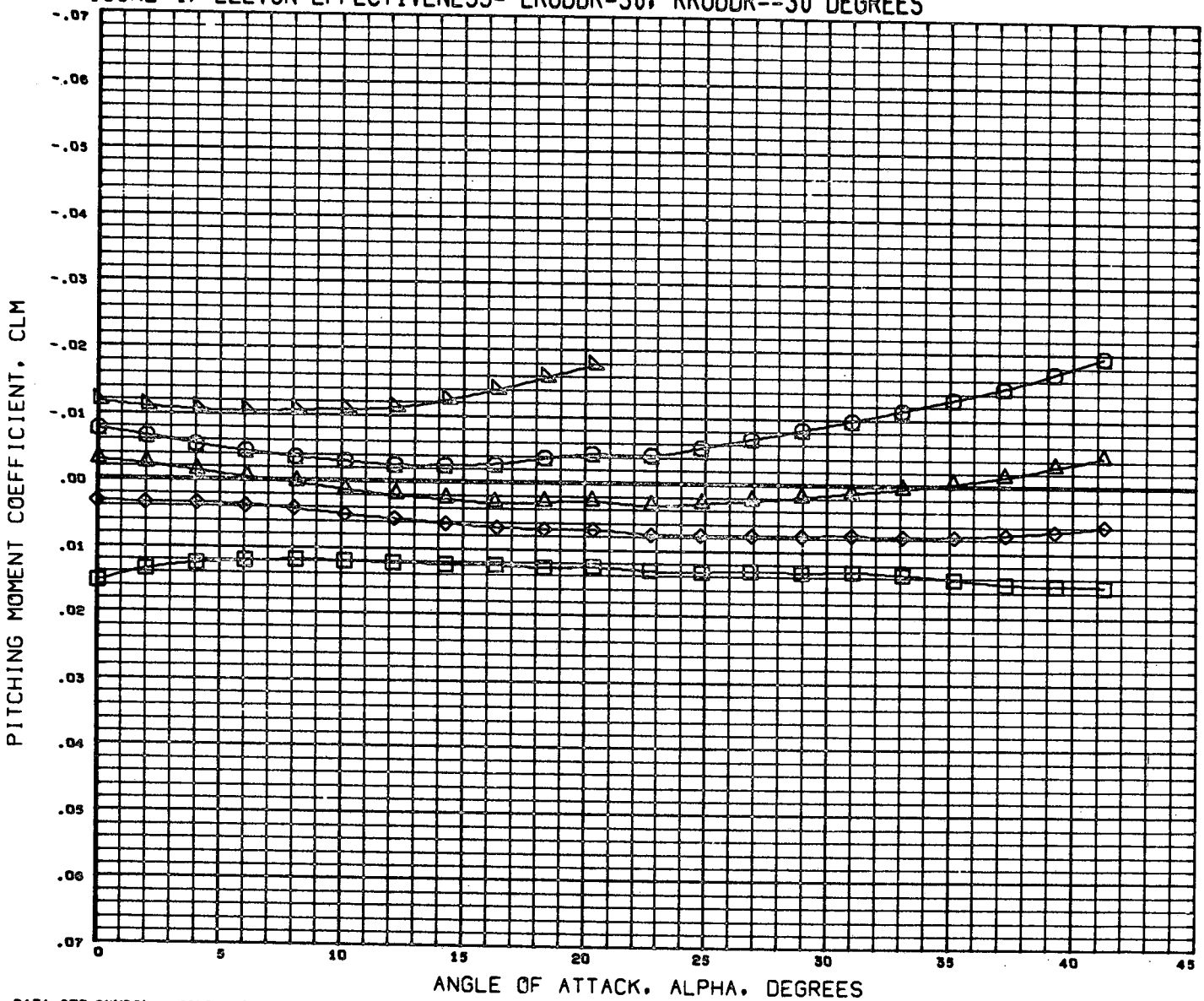
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	⊿	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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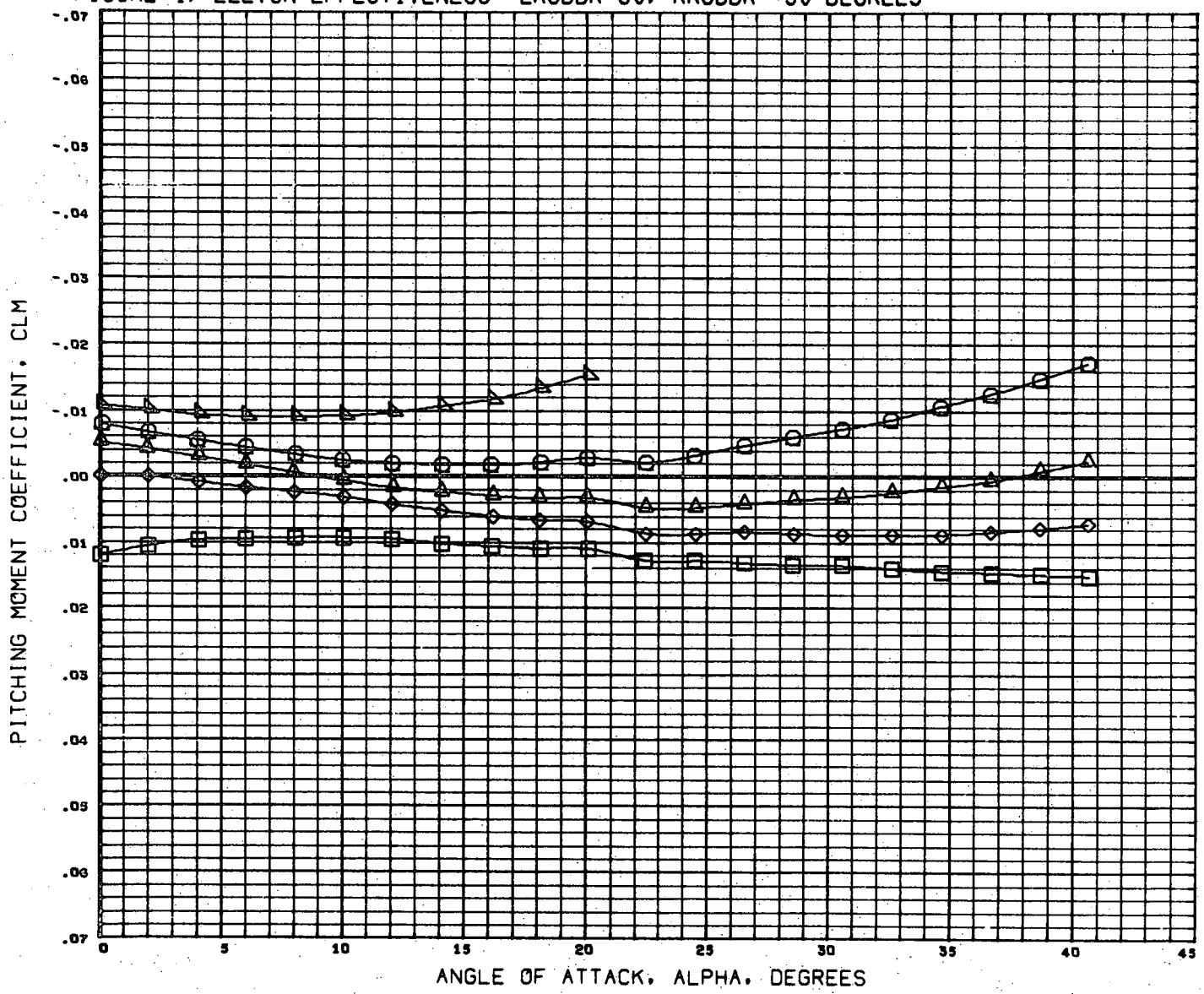
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	⌂	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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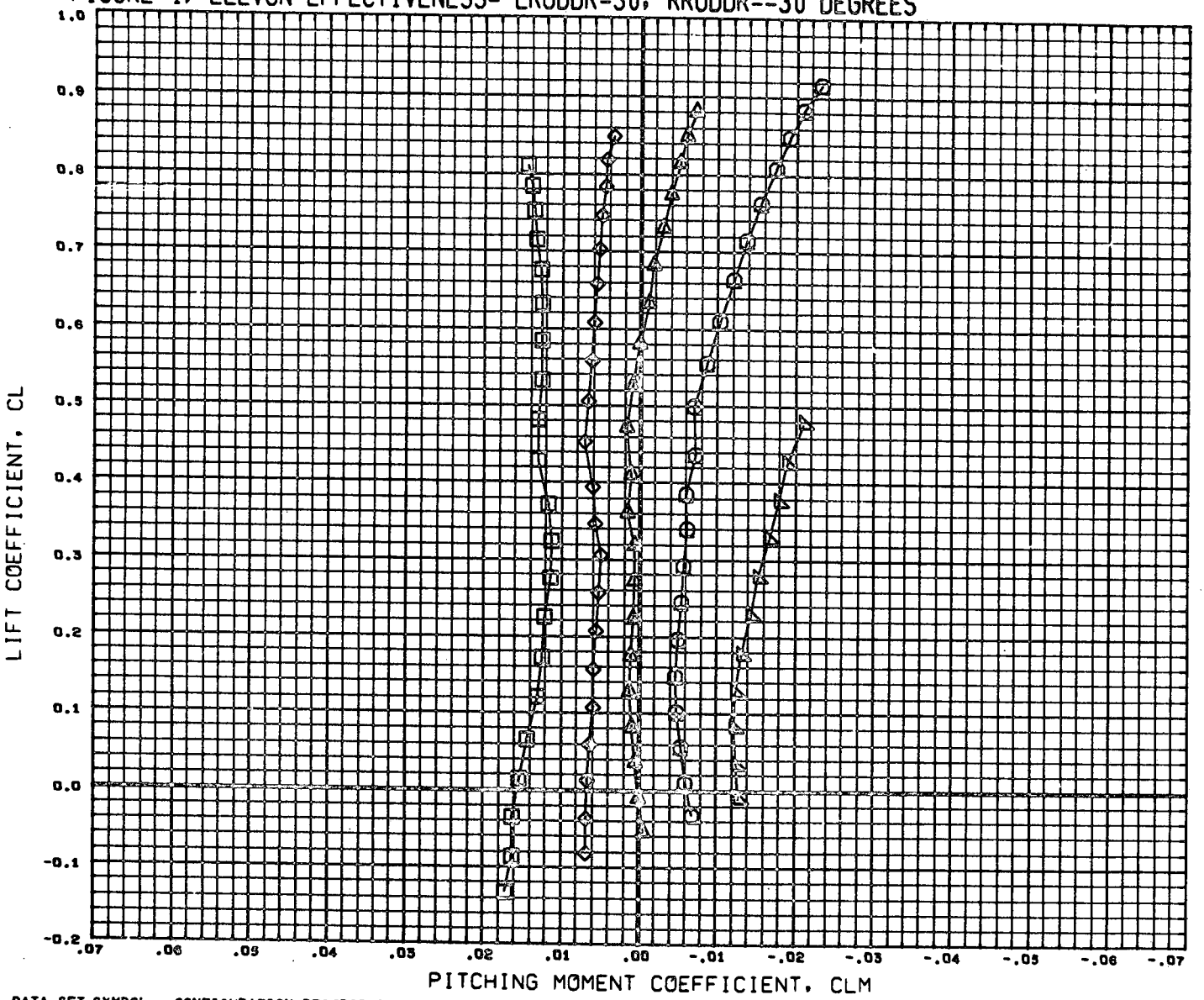
FIGURE 4, ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◪	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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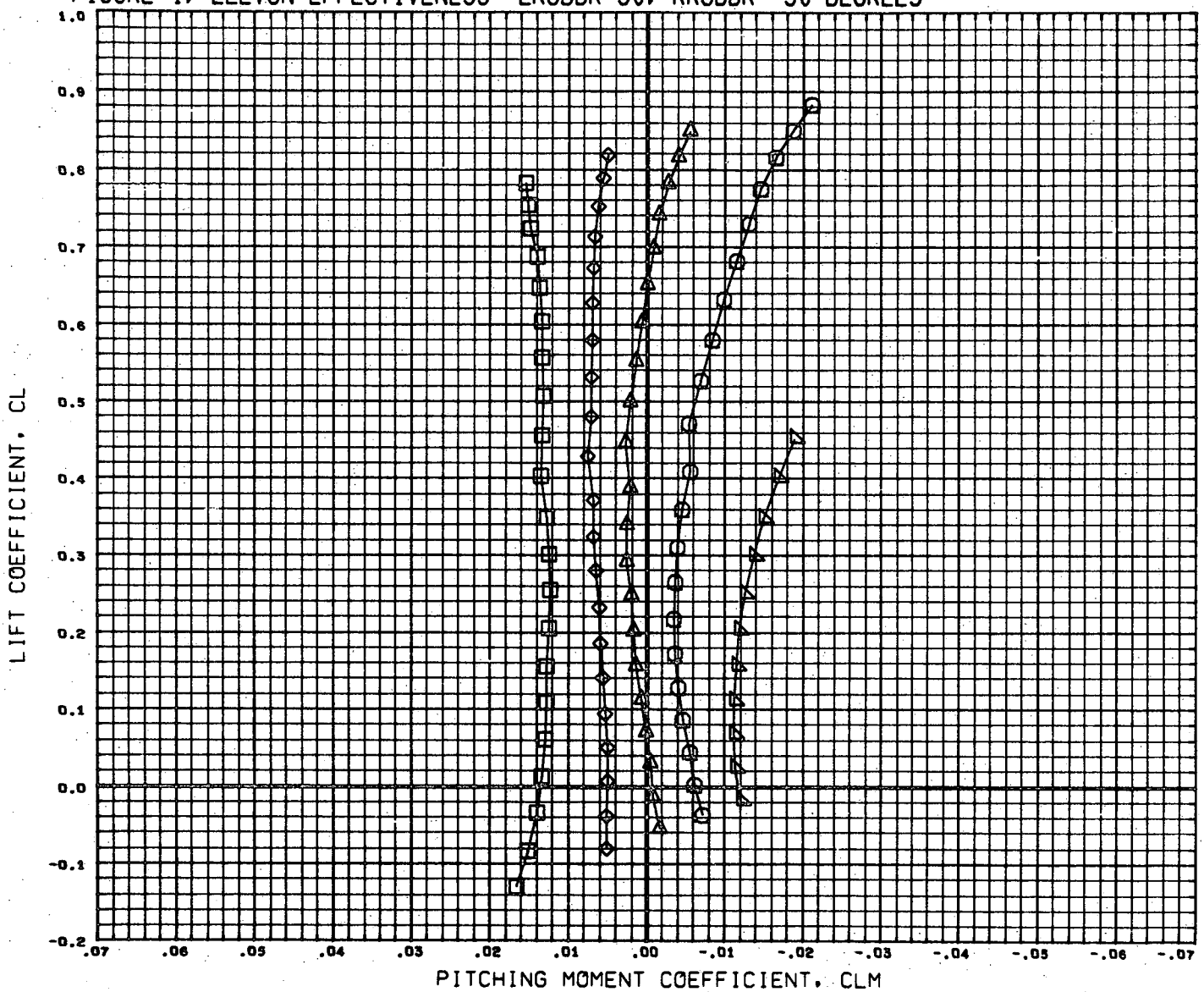
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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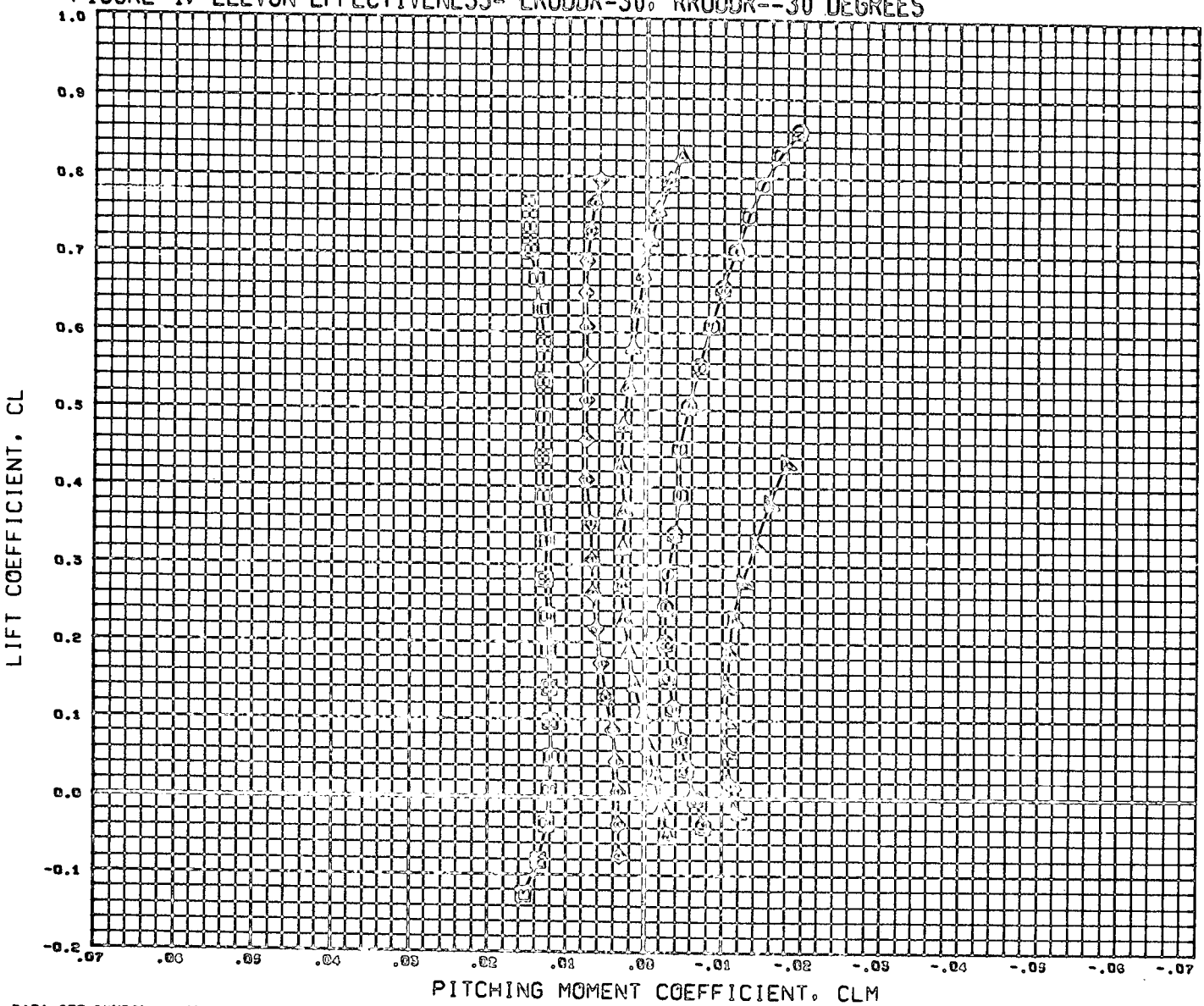
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30. RRUDDR=-30 DEGREES



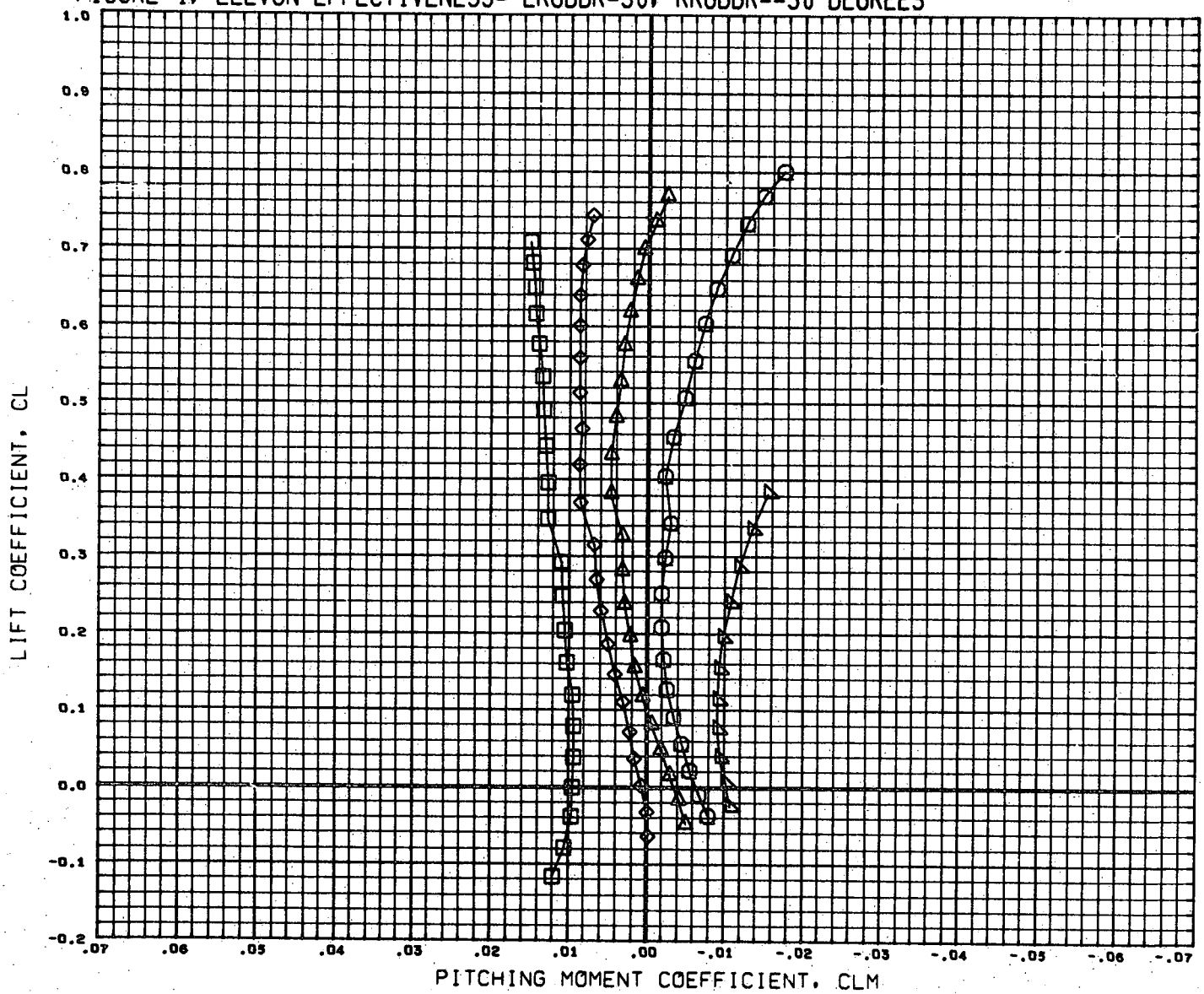
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC M-33 ORB. BSW4VS(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC M-33 ORB. BSW4(-10)VS(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC M-33 ORB. BSW4(-20)VS(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC M-33 ORB. BSW4(-40)VS(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC M-33 ORB. BSW4(+10)VS(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



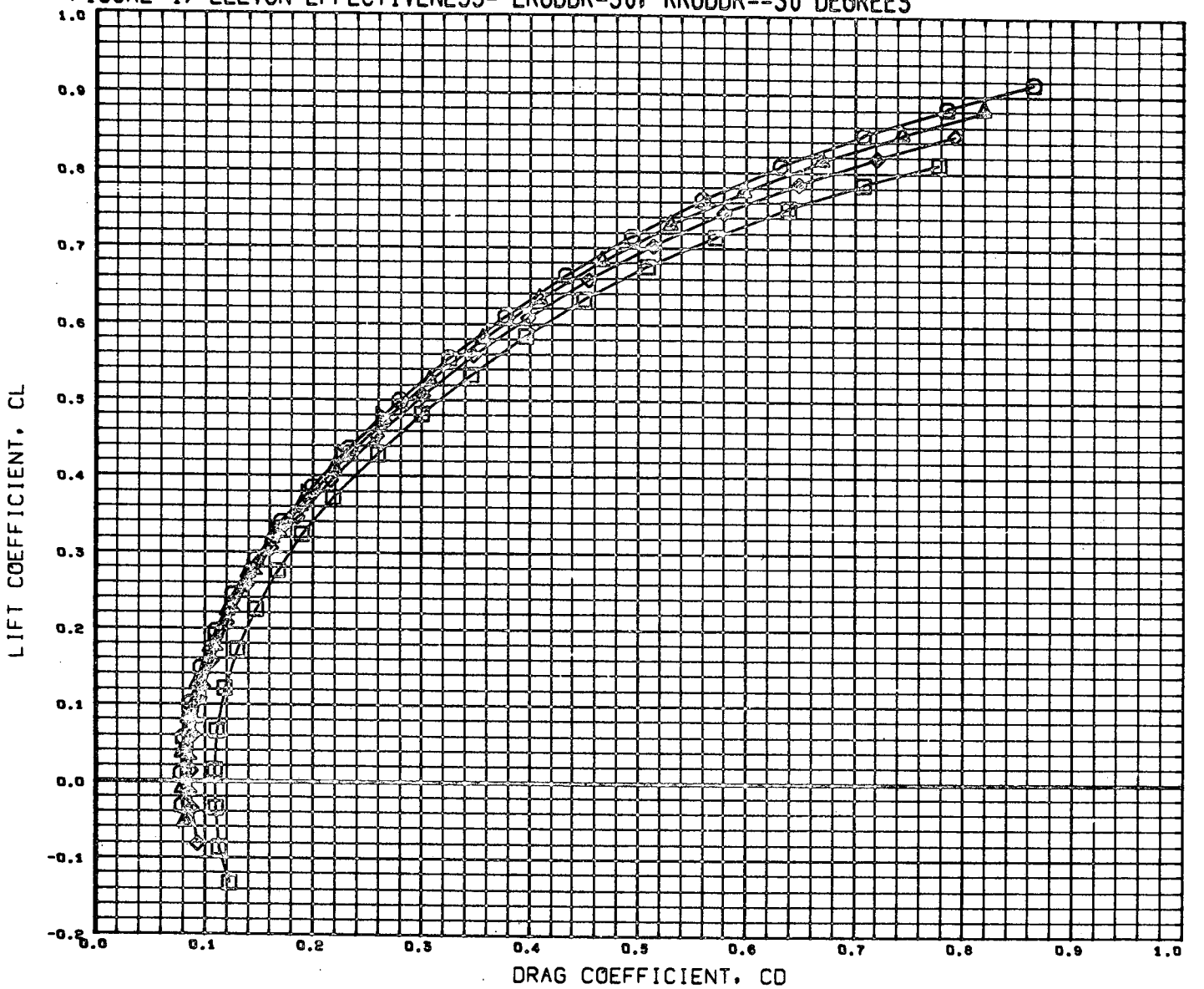
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.96

FIGURE 4, ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



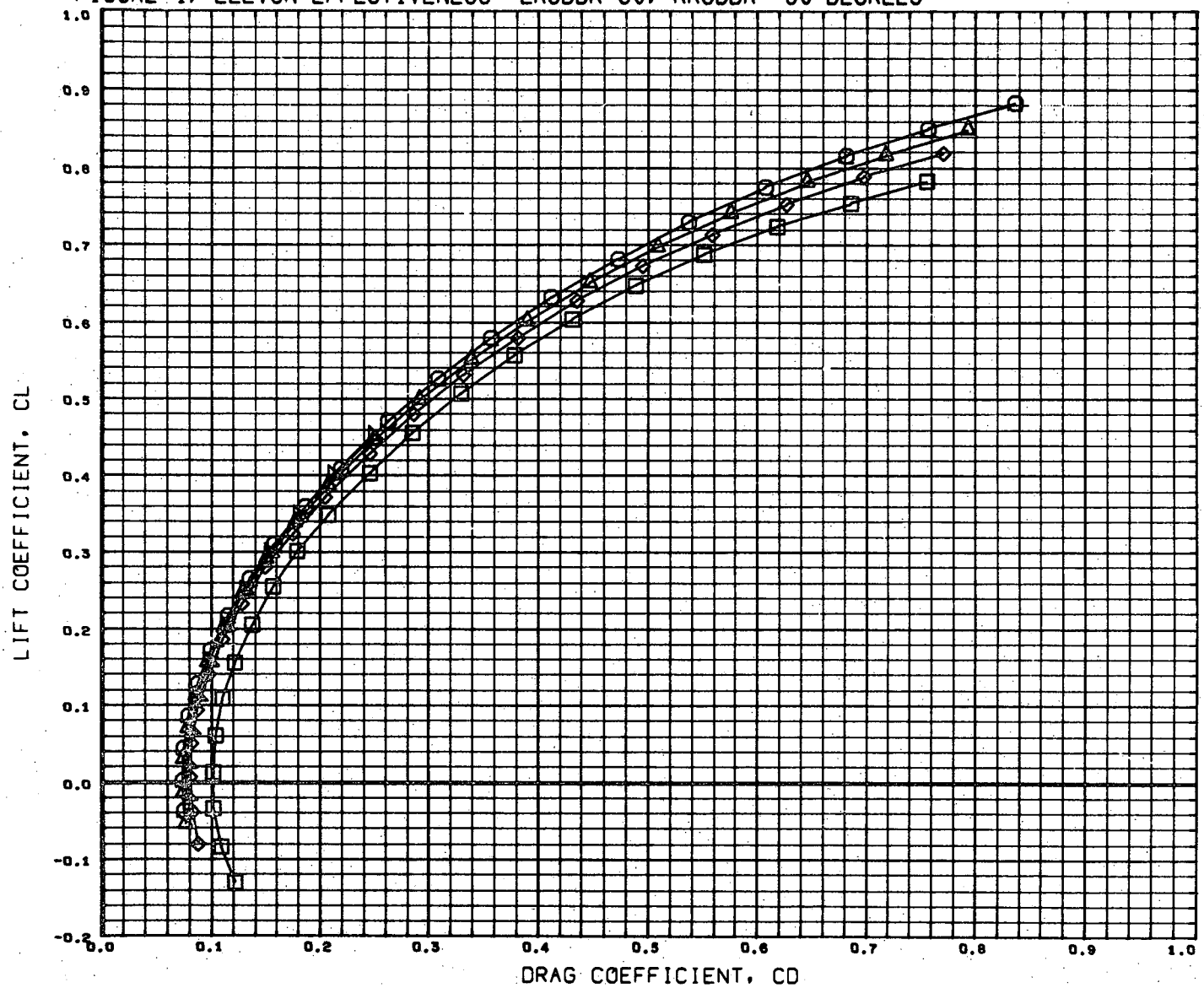
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◪	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

FIGURE 4, ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	⊠	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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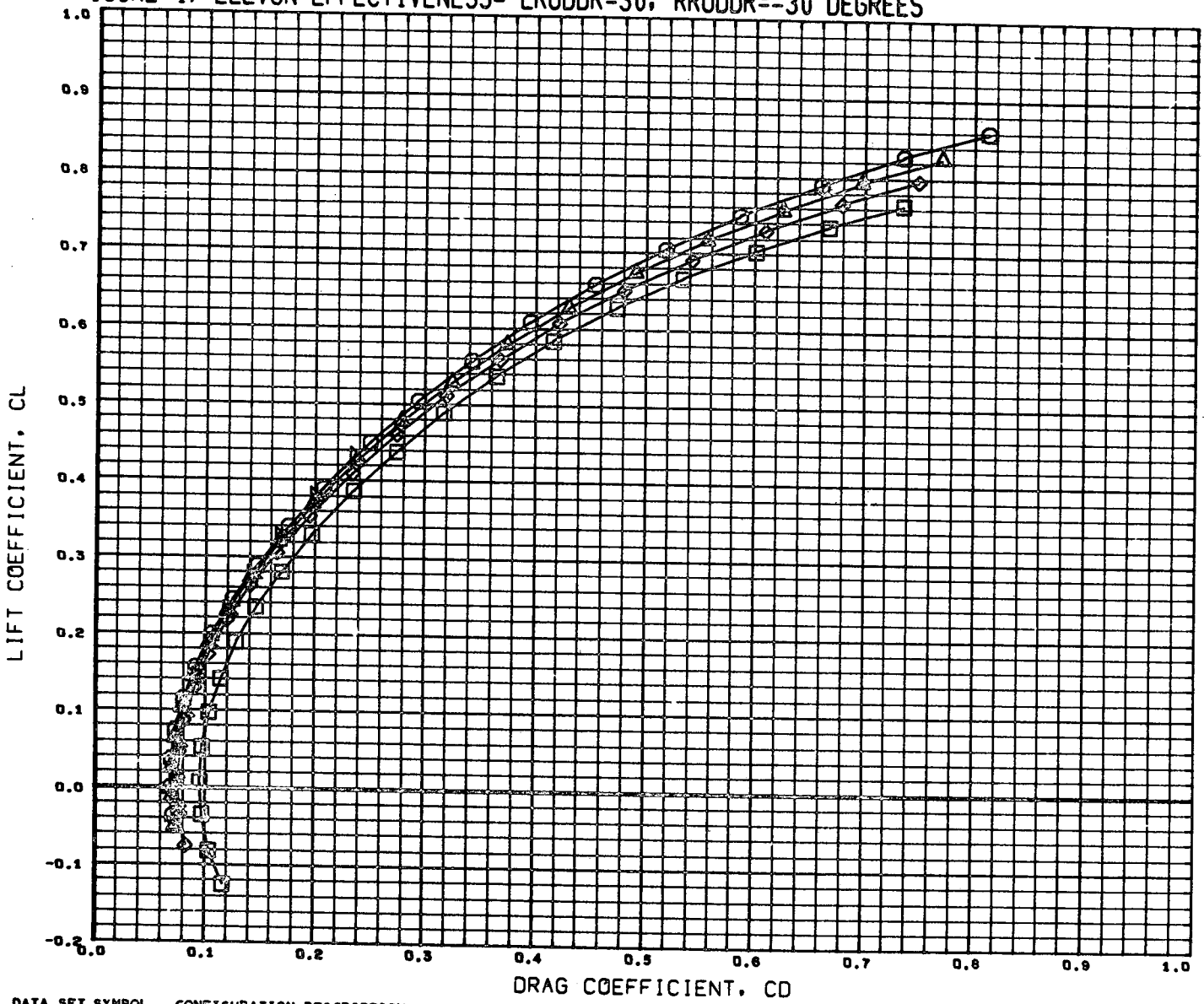
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)
(A49006)	⊠	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)

BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000
0.000	-20.000	0.000
0.000	-40.000	0.000
0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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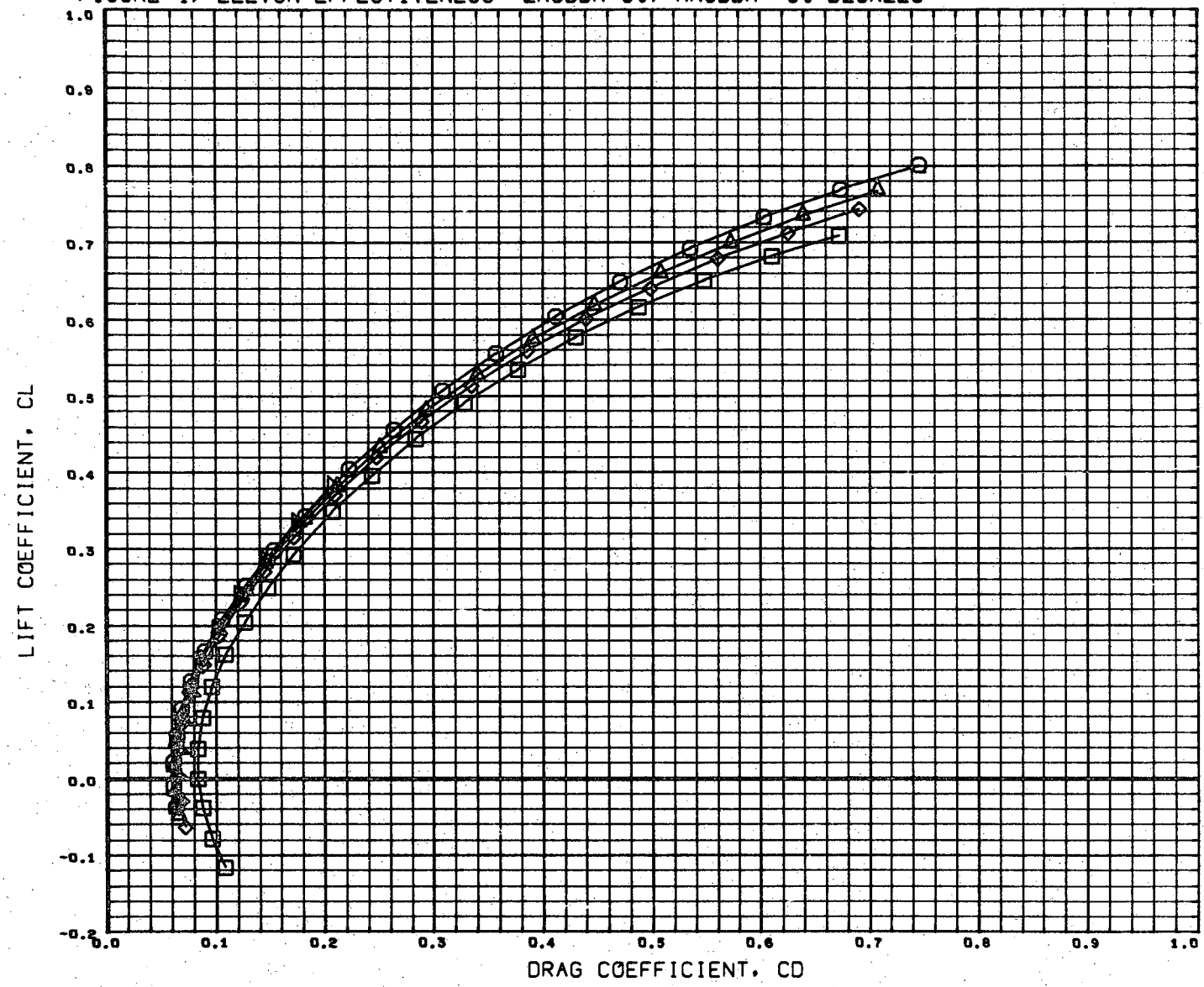
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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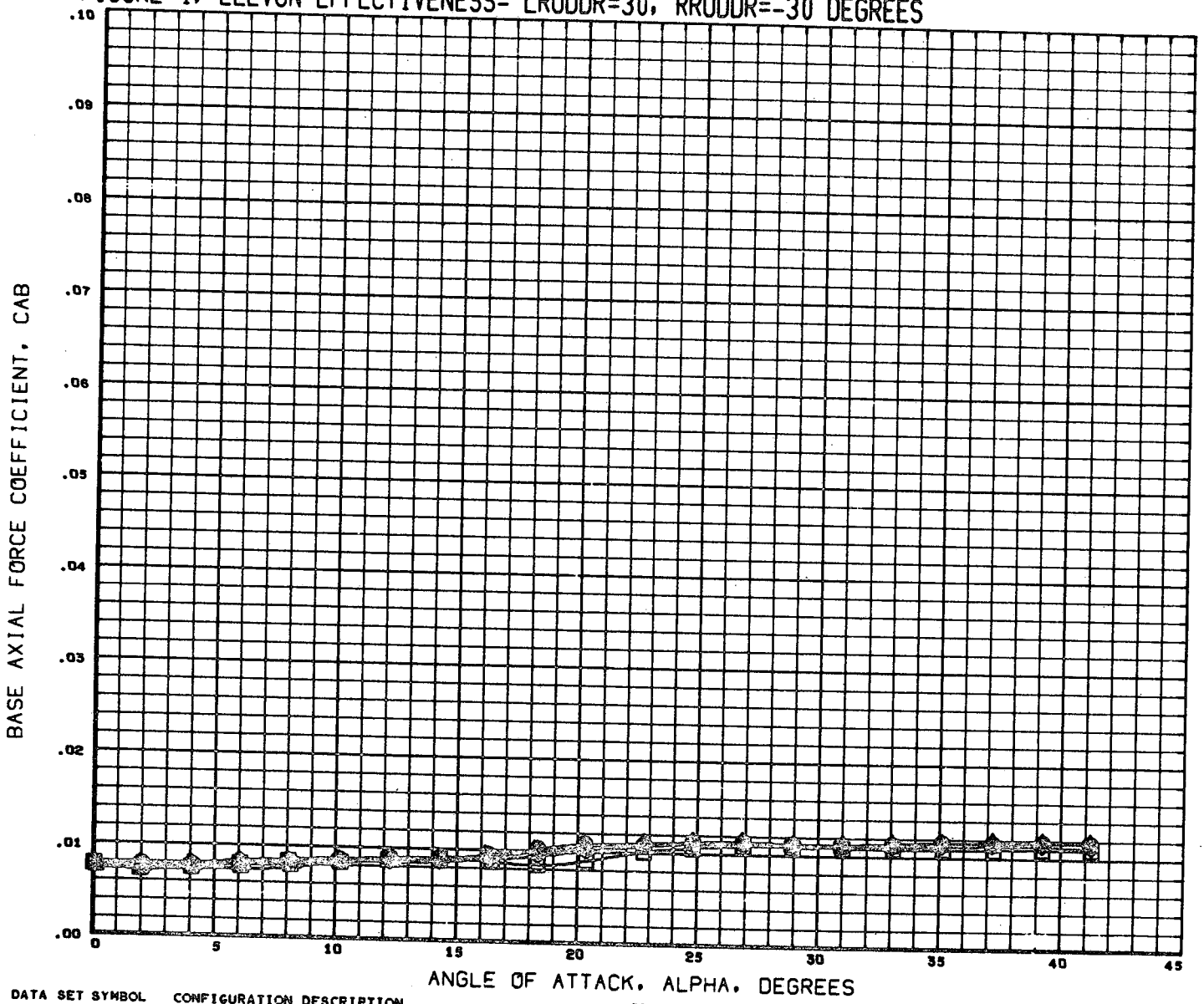
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◺	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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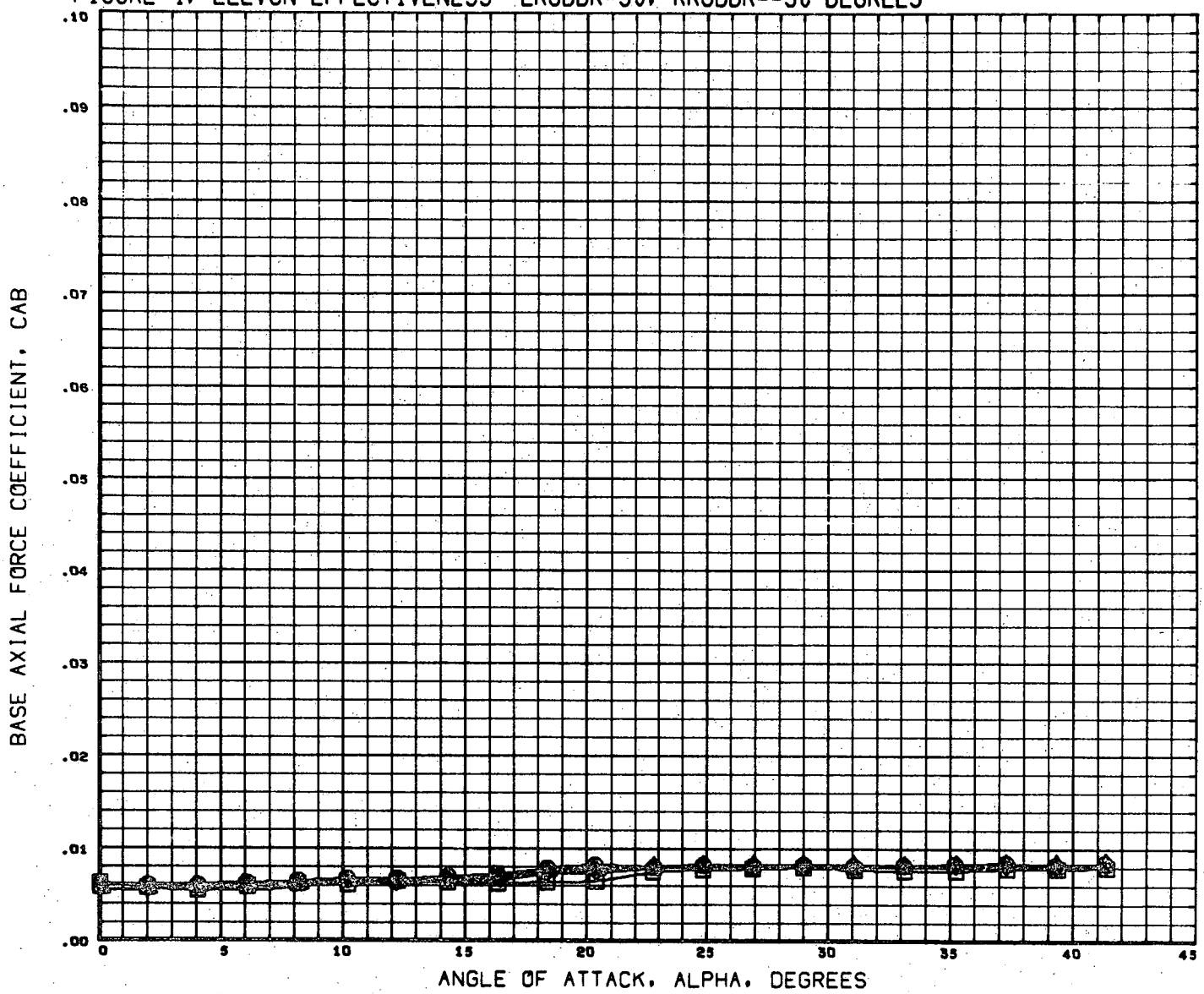
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	⊠	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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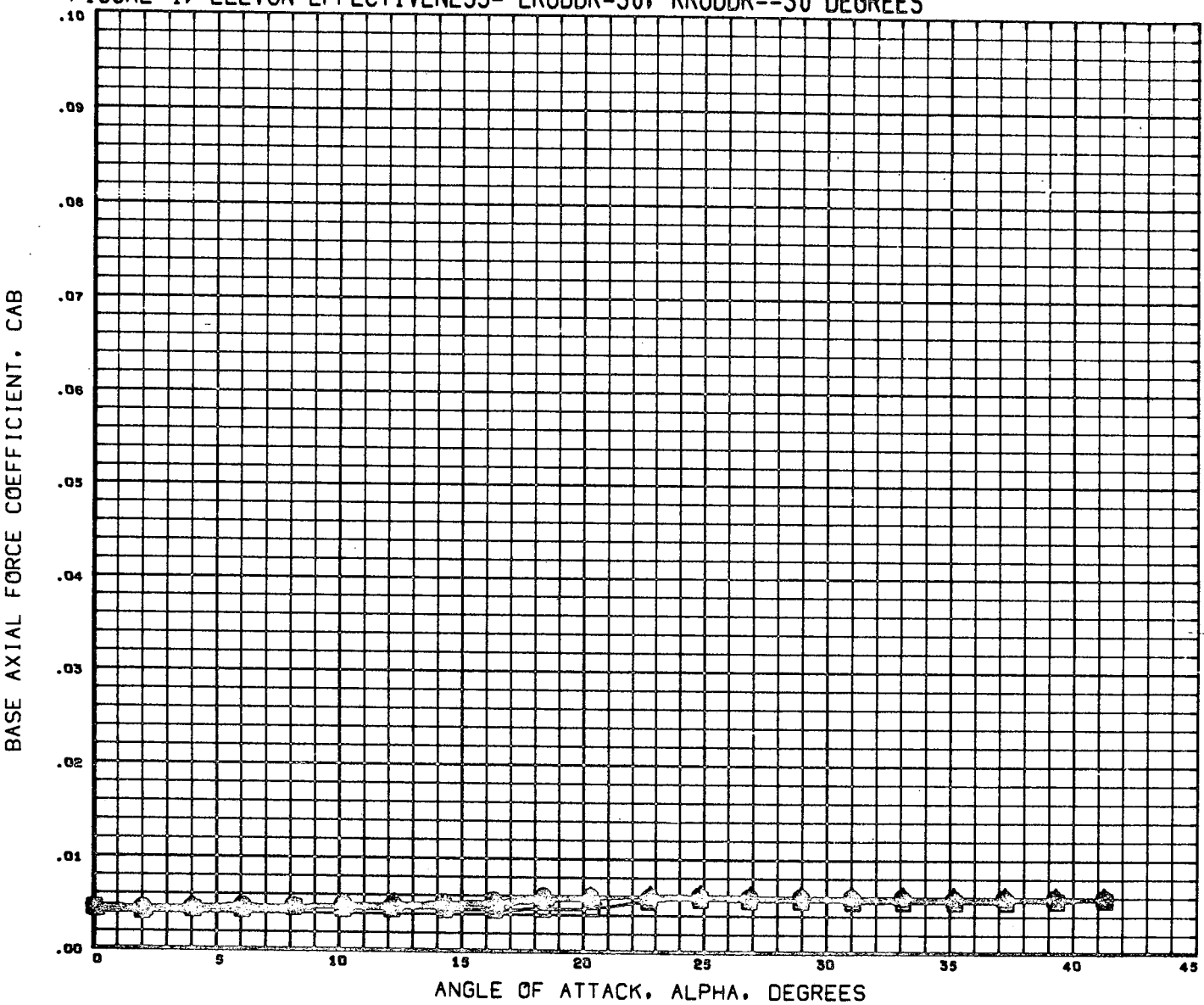
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	◪	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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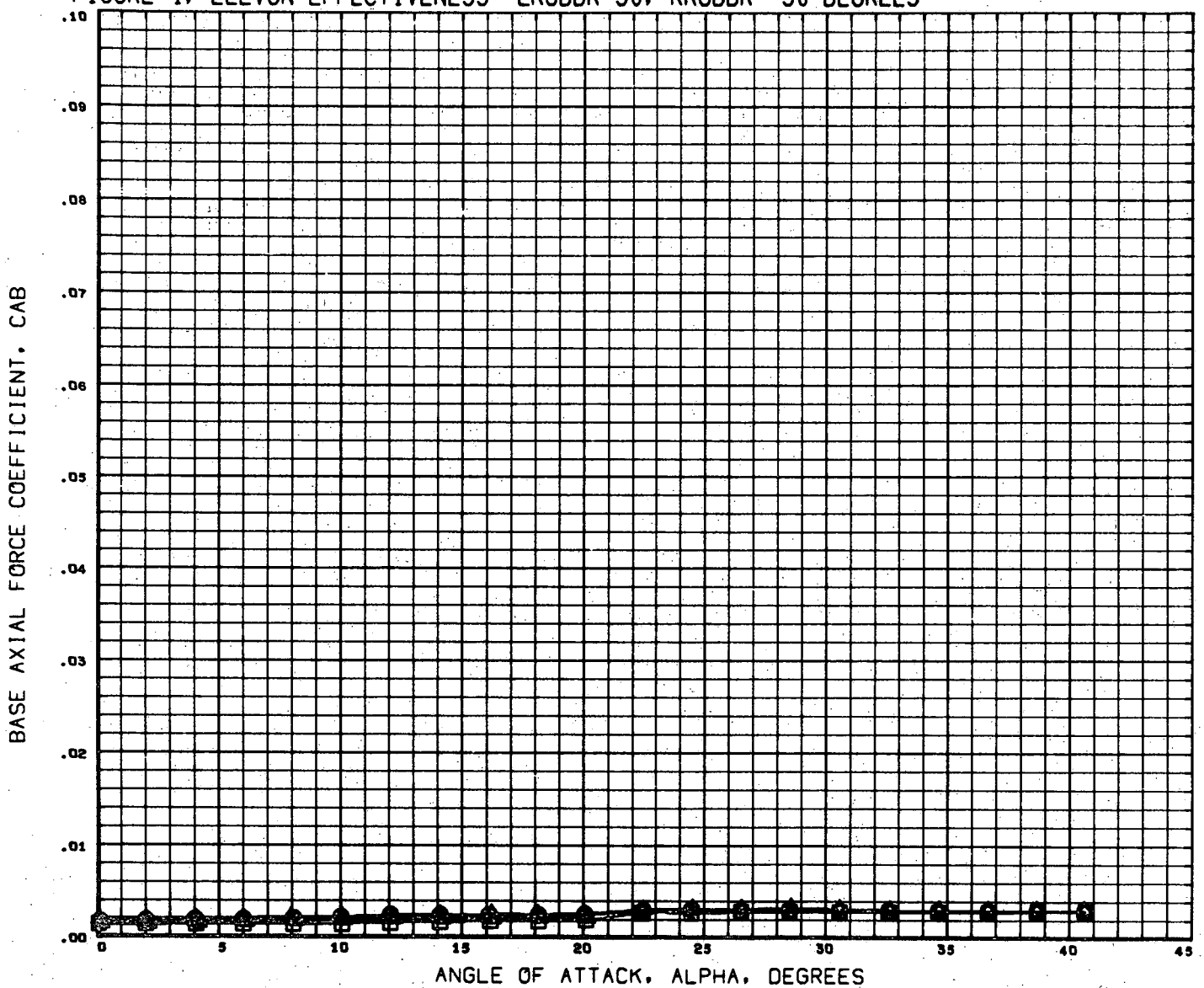
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000
(A49S02)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49S03)	◇	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49S05)	□	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000
(A49006)	⬠	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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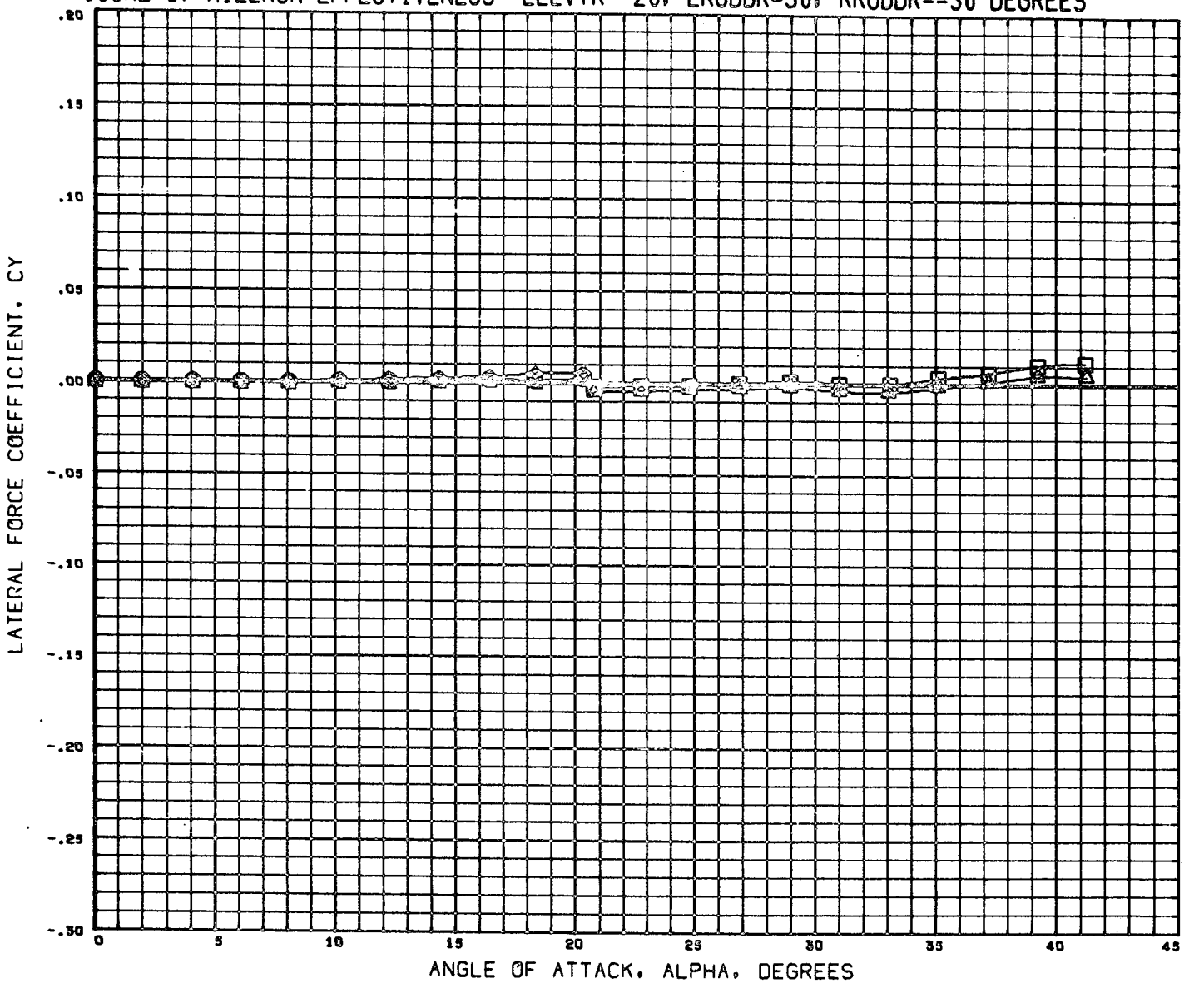
FIGURE 5. AILERØN EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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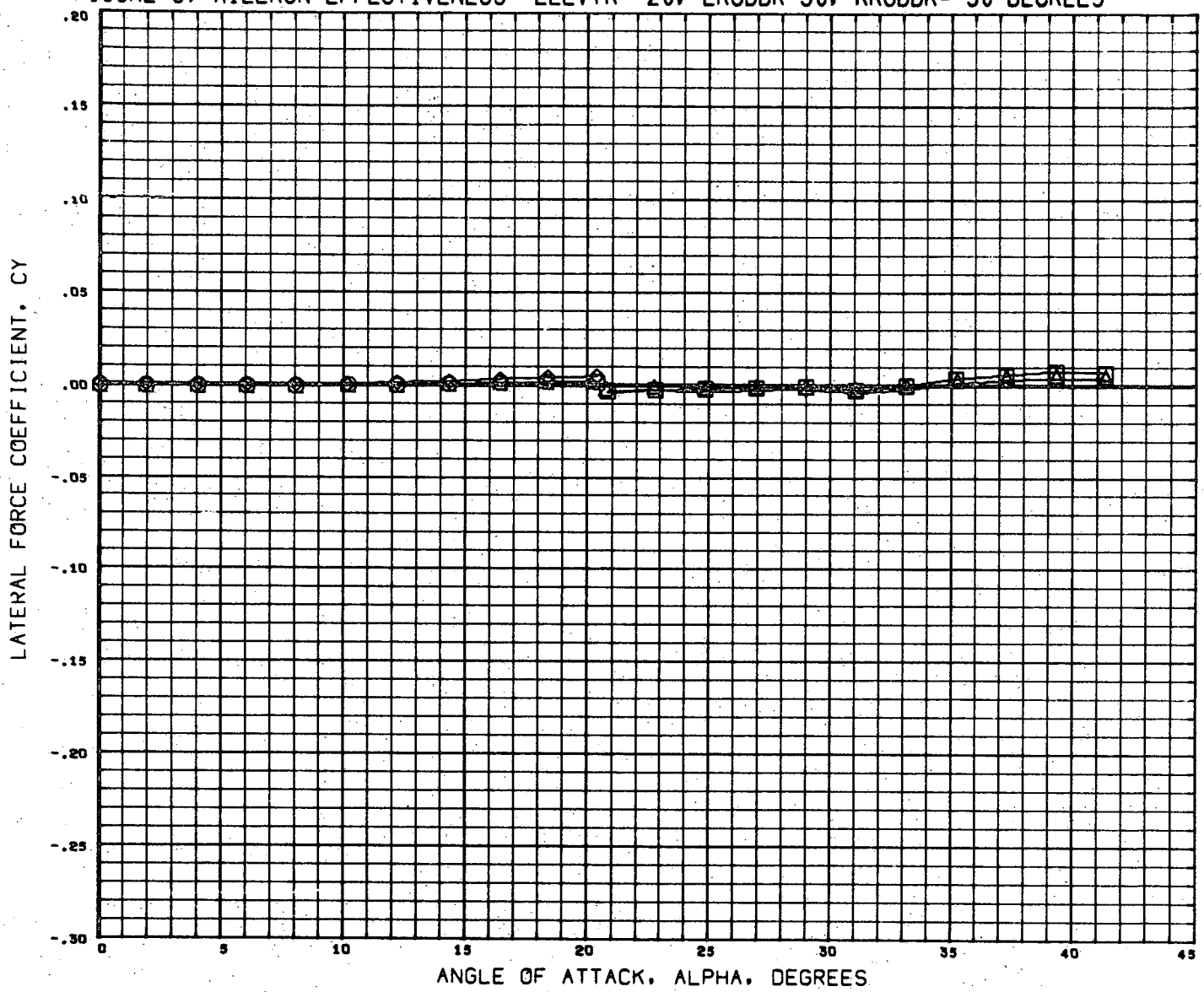
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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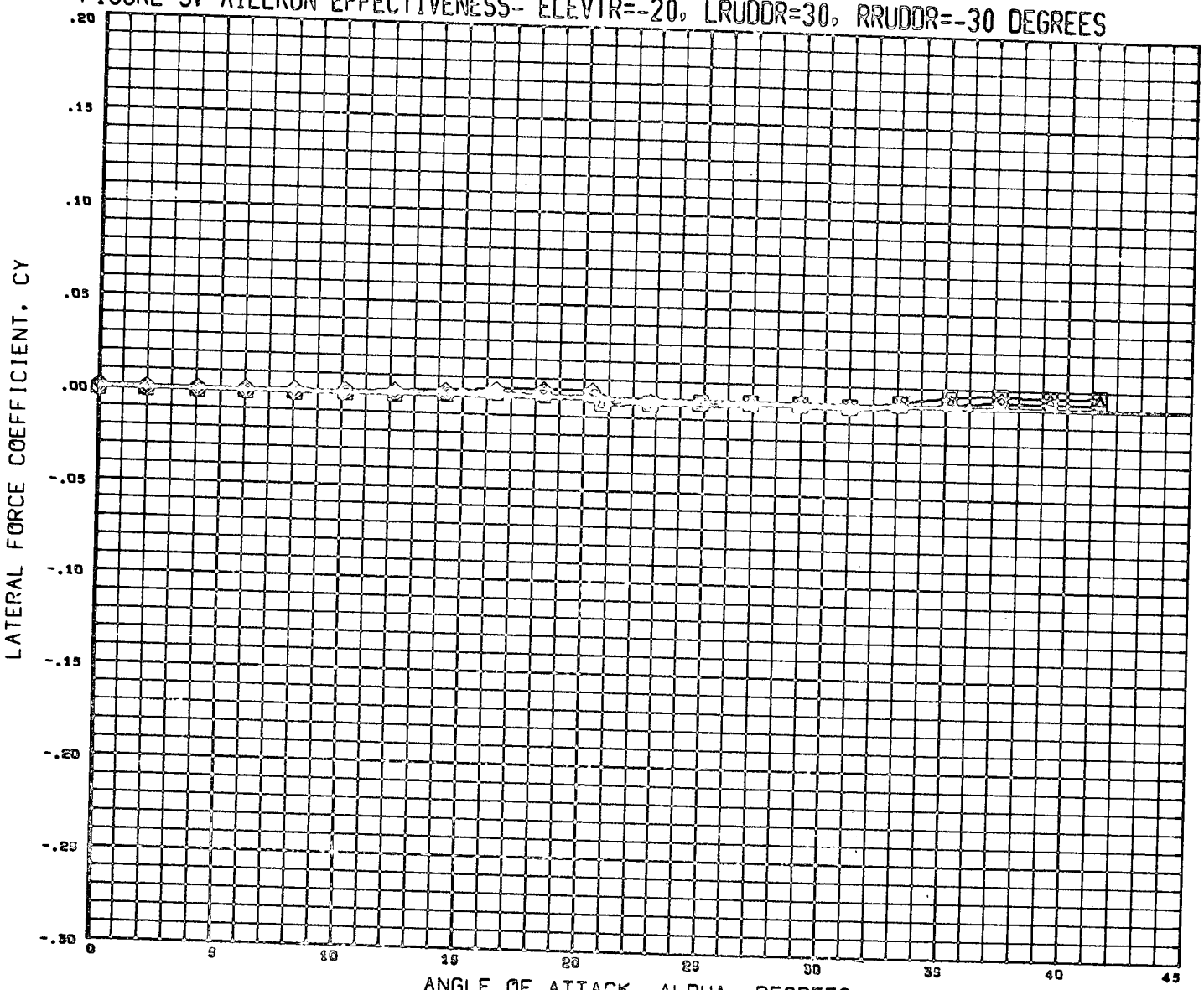
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 907 6AC H-33 ORB. B9W4(-20)V9(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 907 6AC H-33 ORB. B9W4(-20)V9(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 907 6AC H-33 ORB. B9W4(-10,-30)V9(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 907 6AC H-33 ORB. B9W4(-10,-30)V9(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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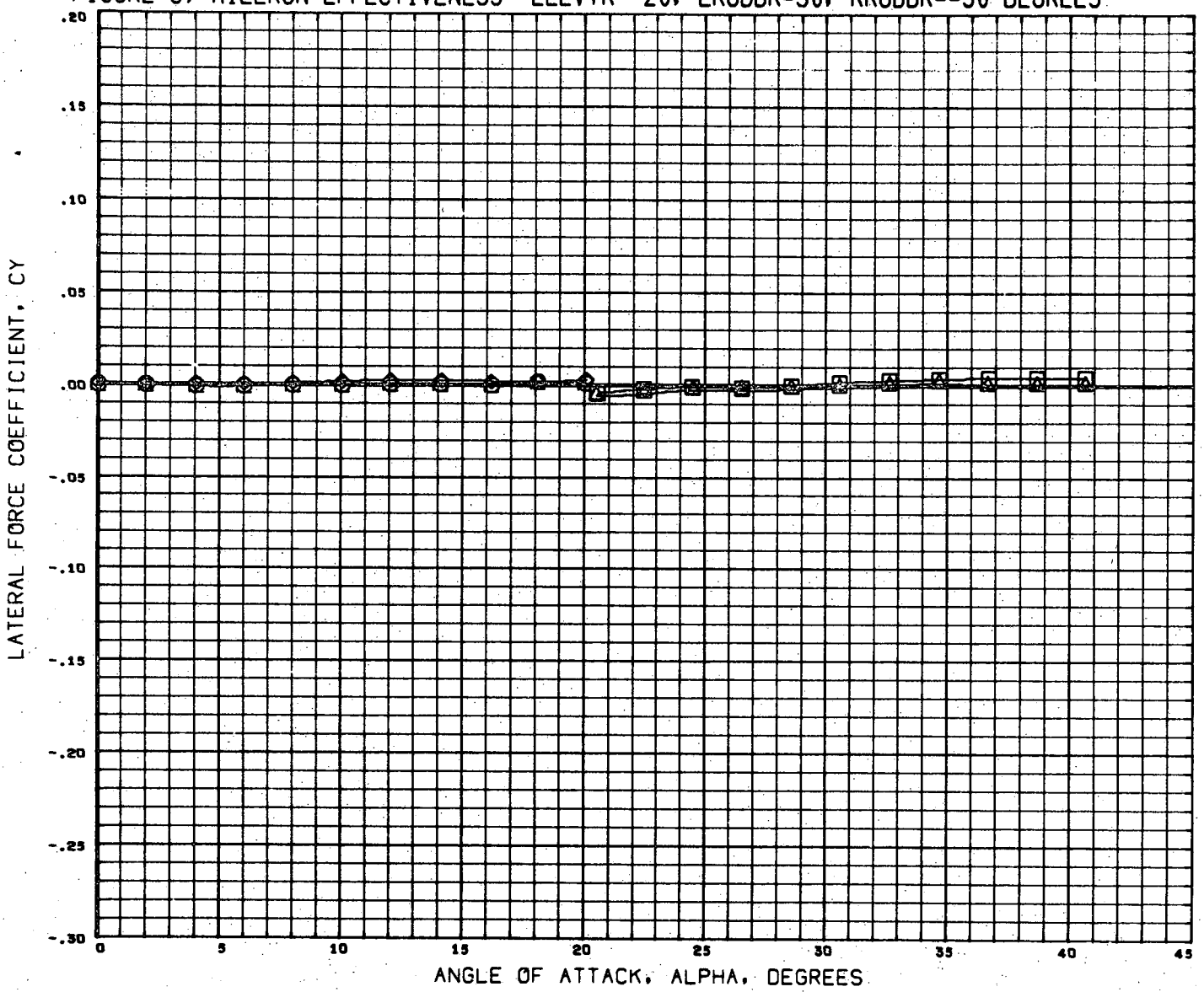
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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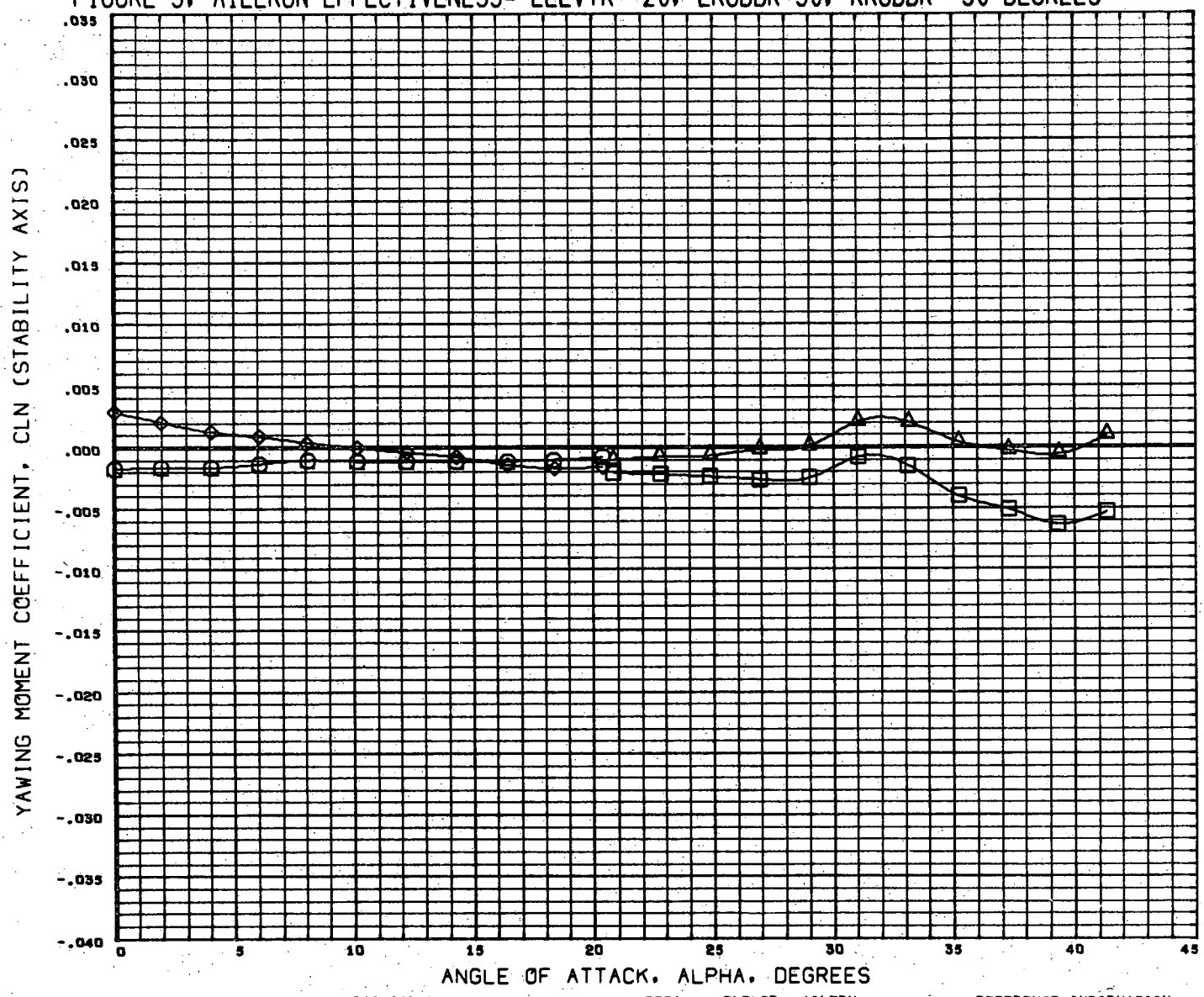
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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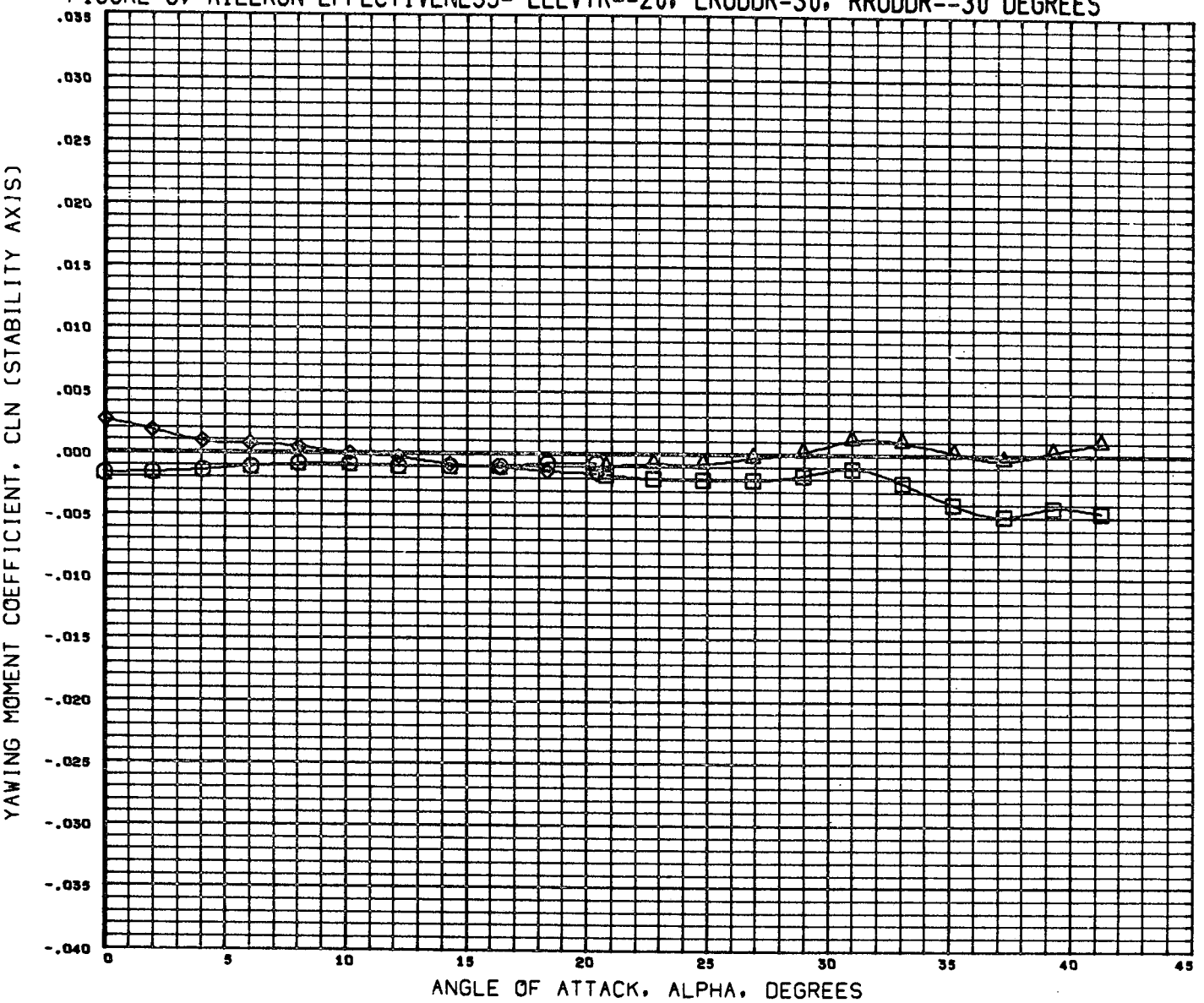
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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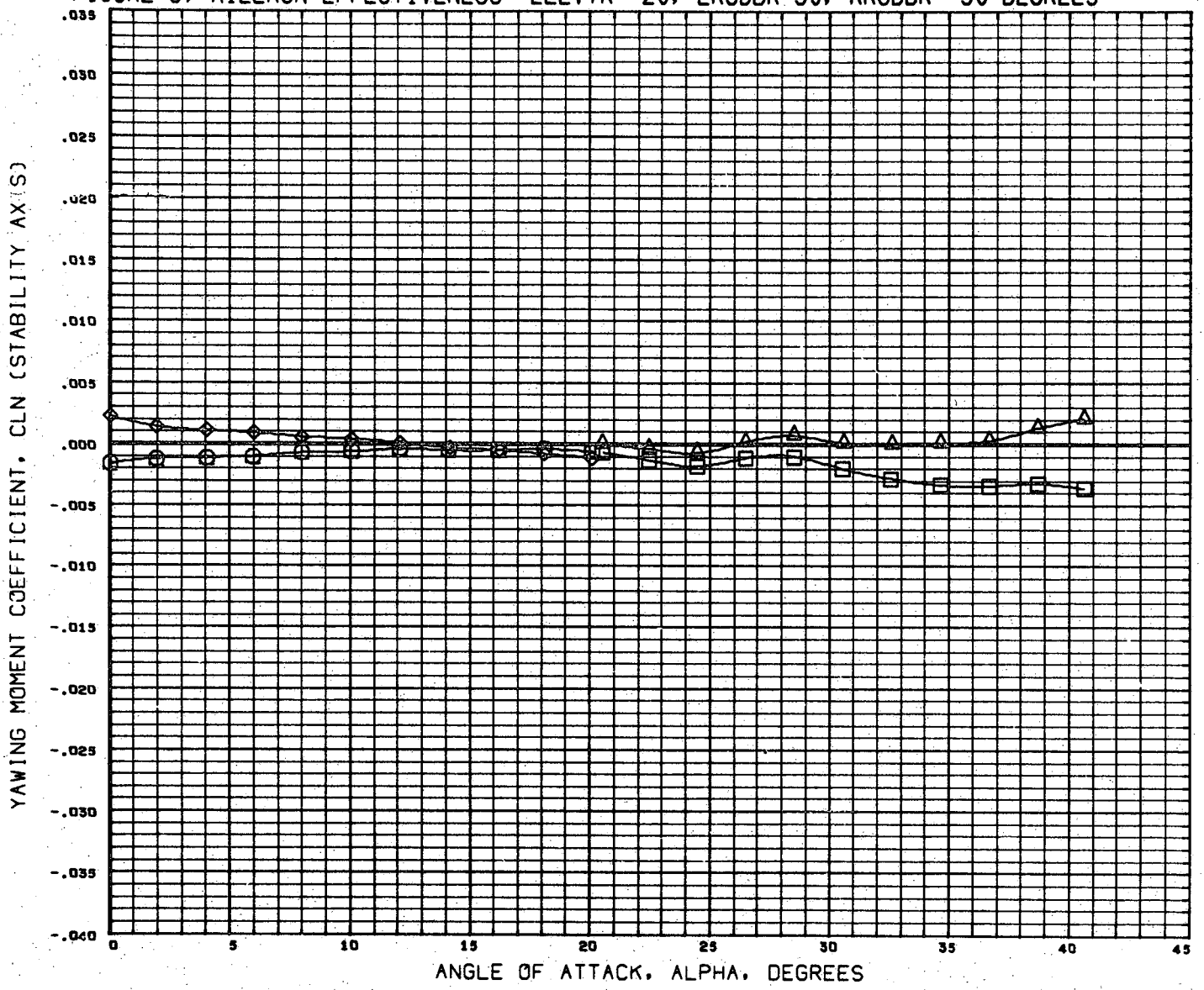
FIGURE 5. AILERØN EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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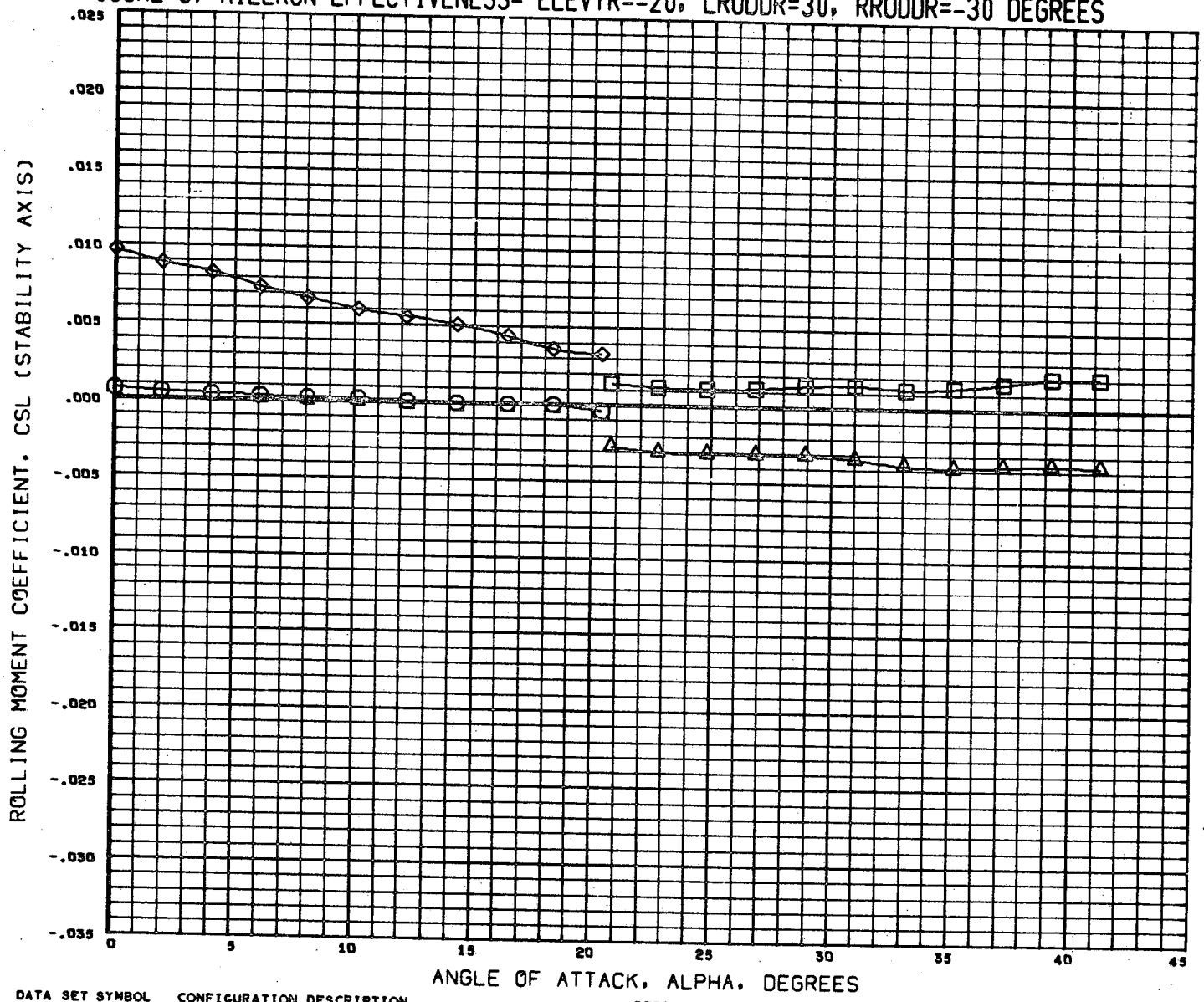
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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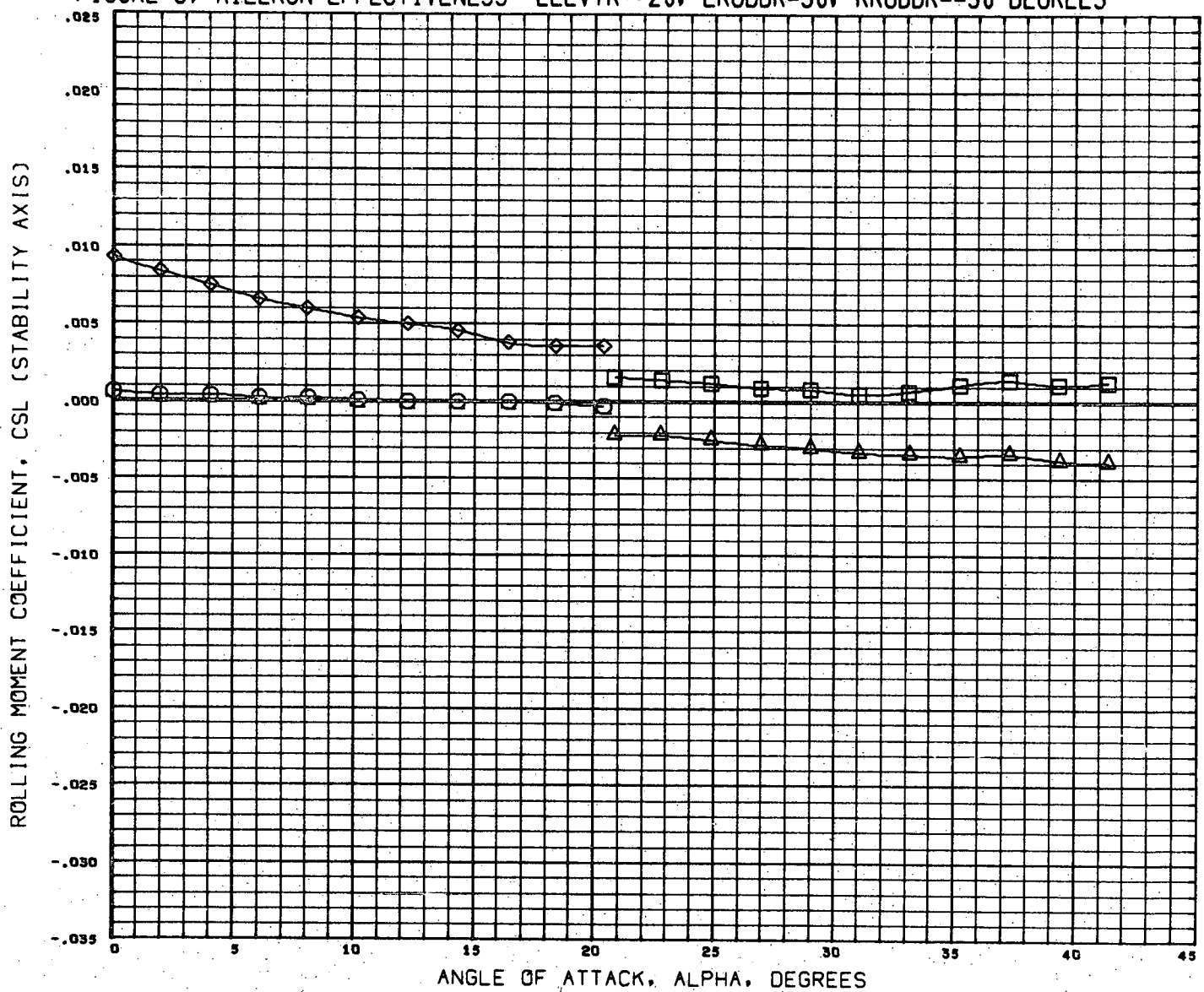
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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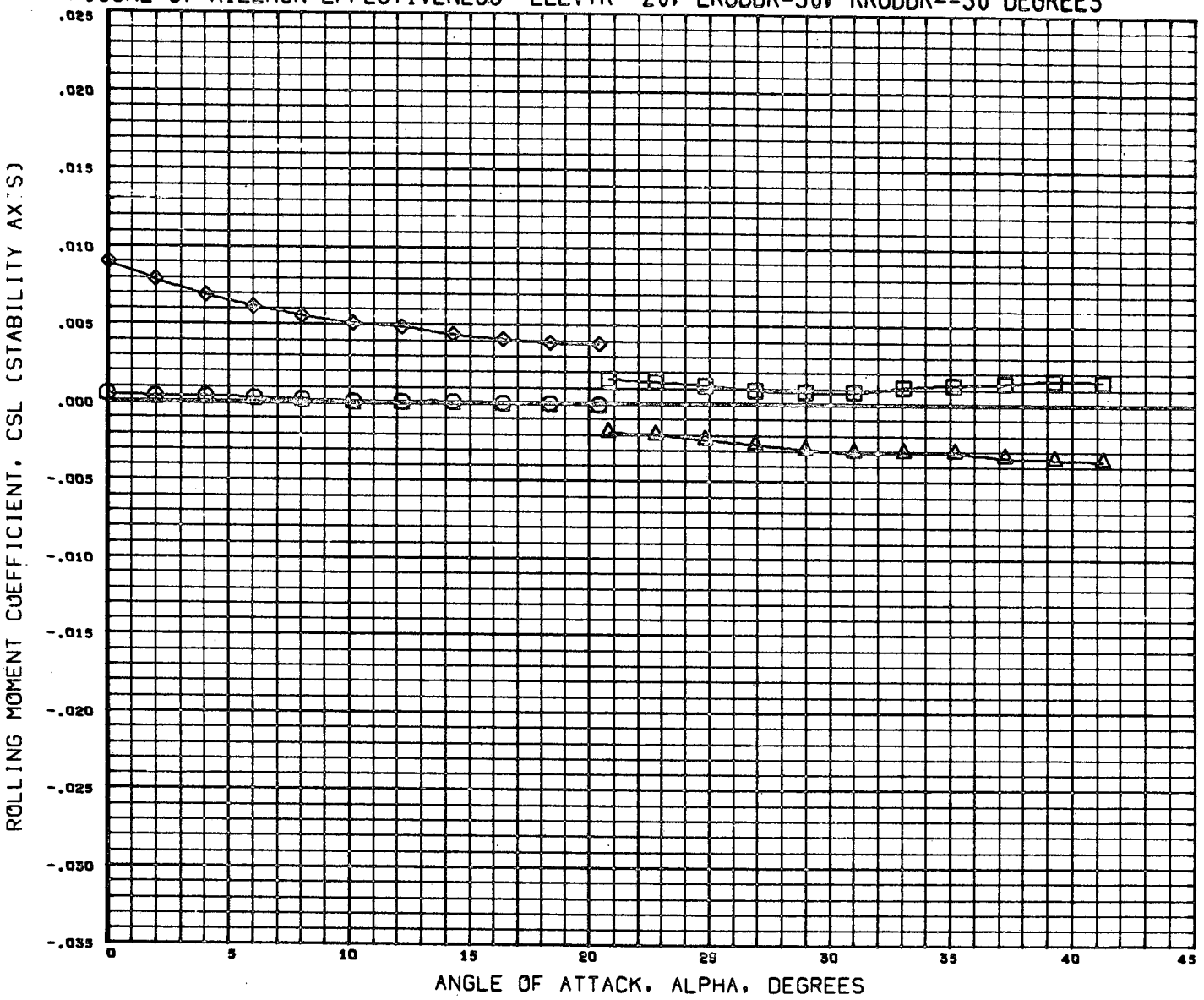
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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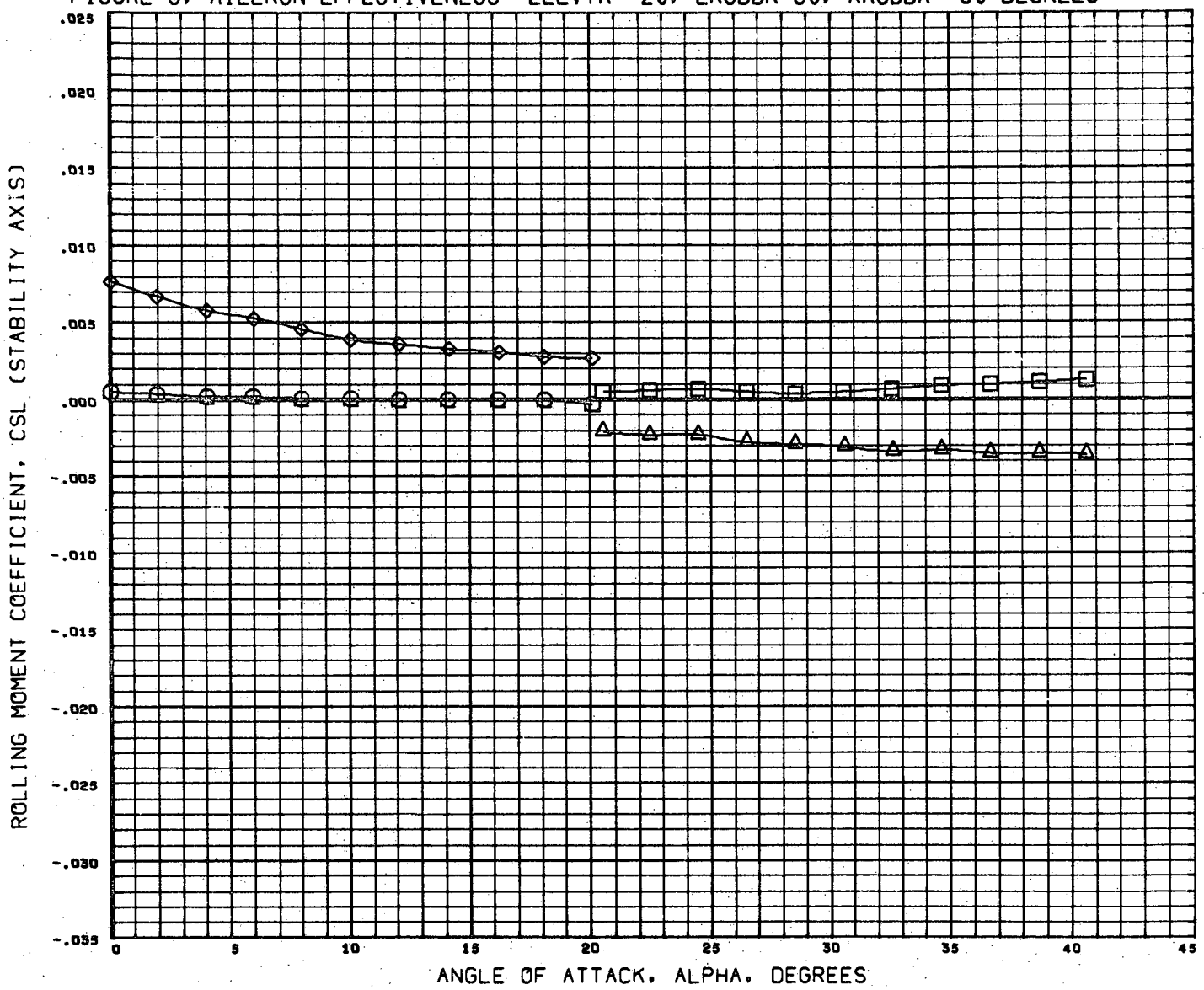
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49003)	○	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49020)	△	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000
(A49004)	◇	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000
(A49019)	□	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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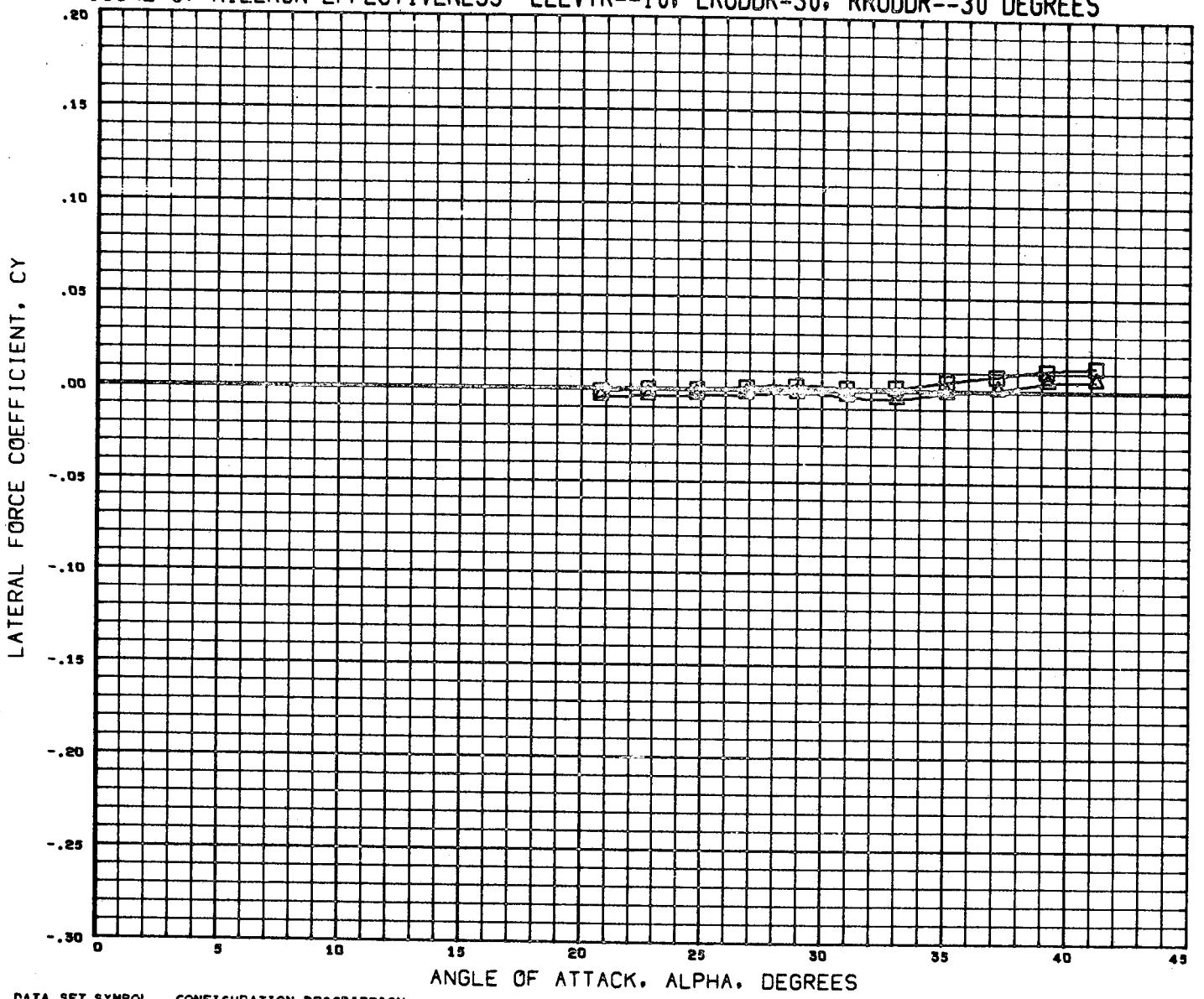
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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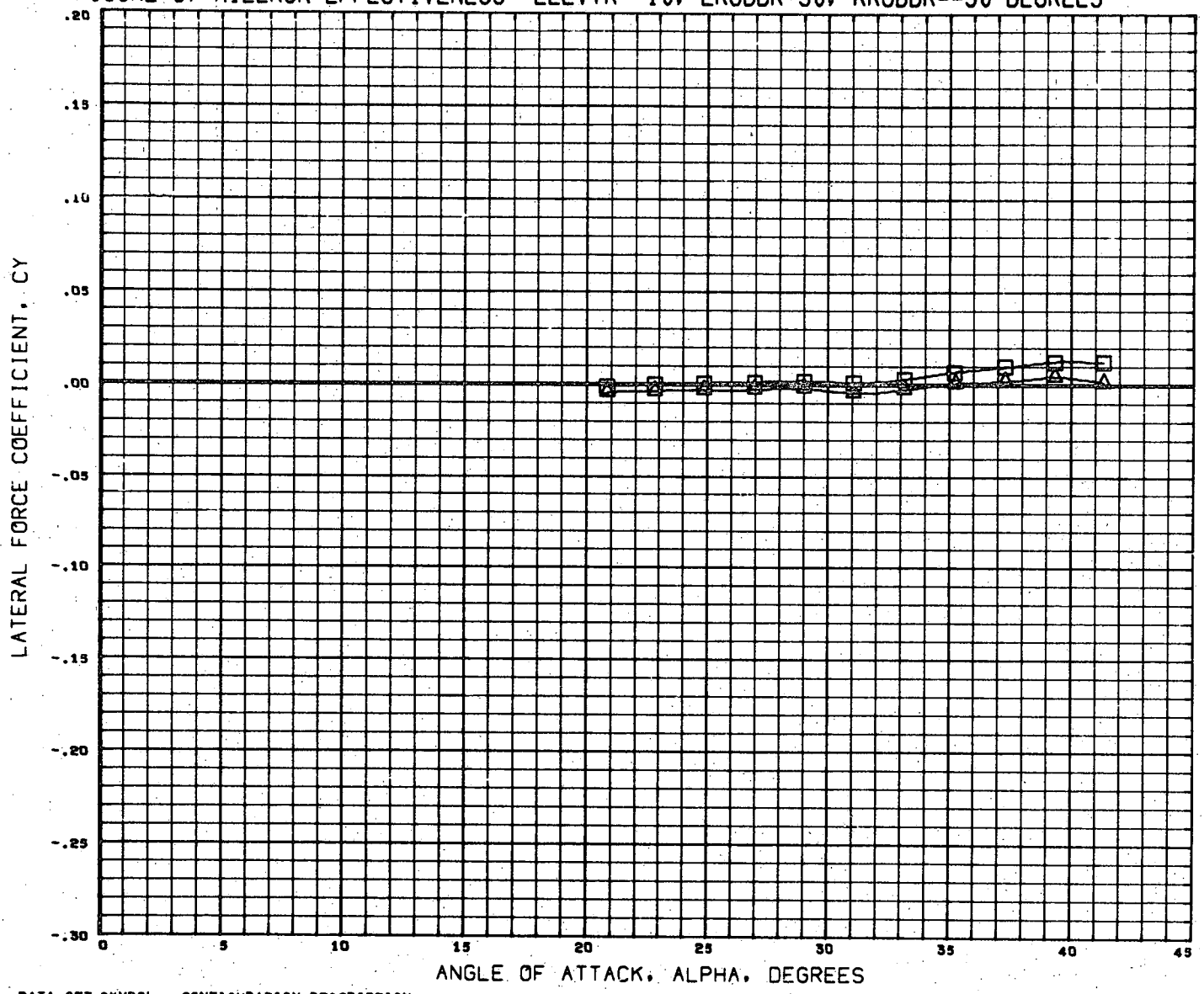
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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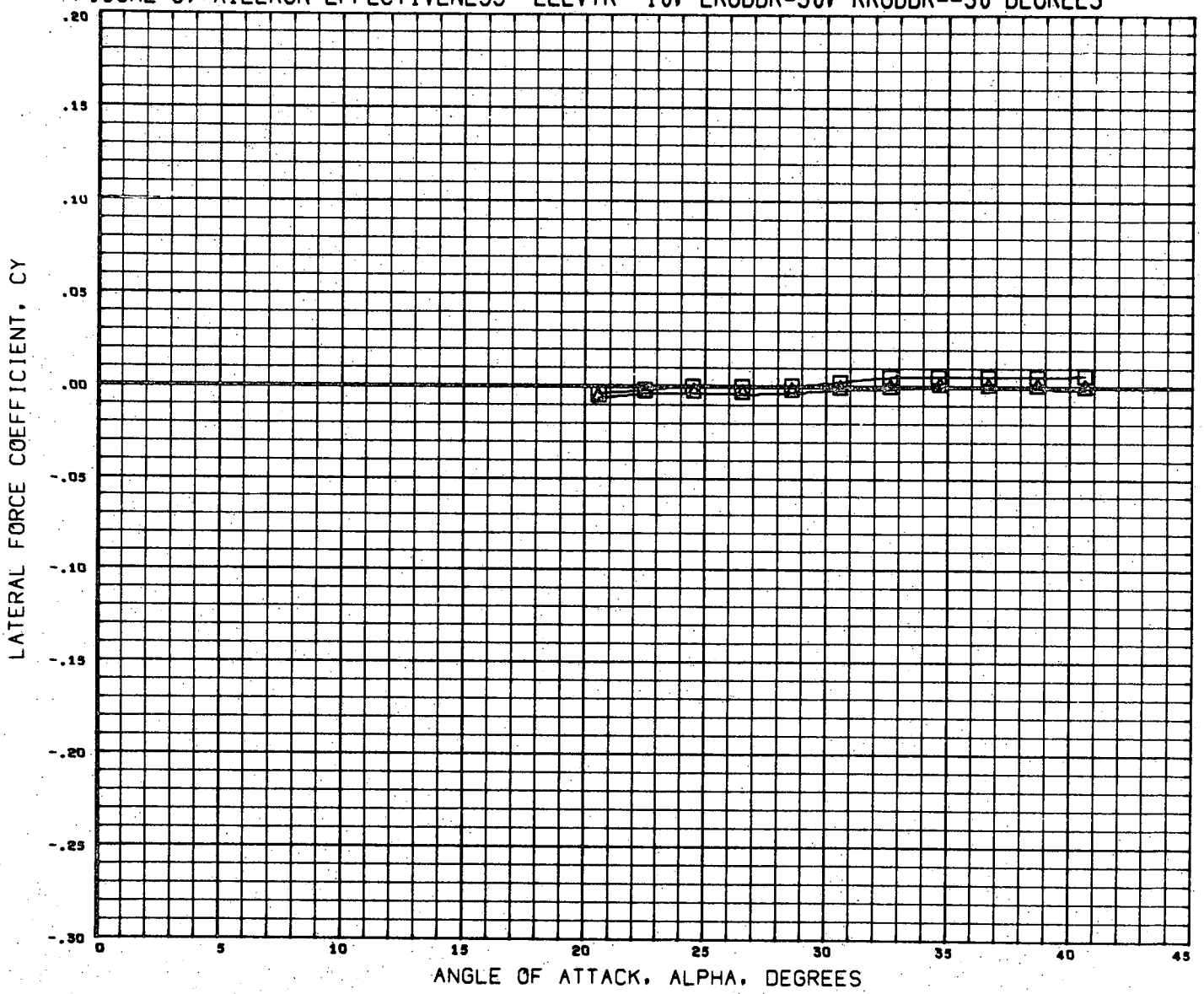
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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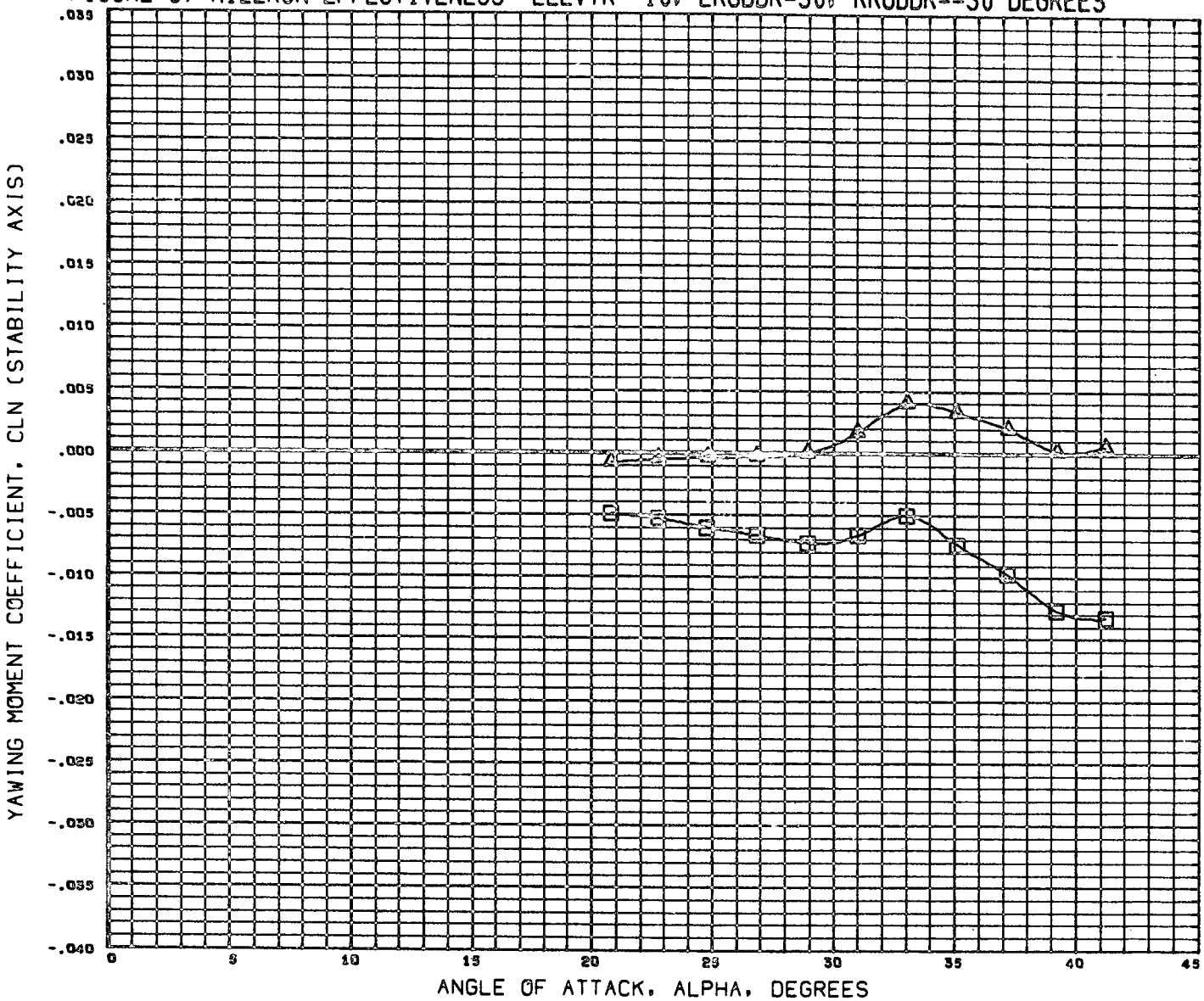
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10. LRUDDR=30. RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B9W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B9W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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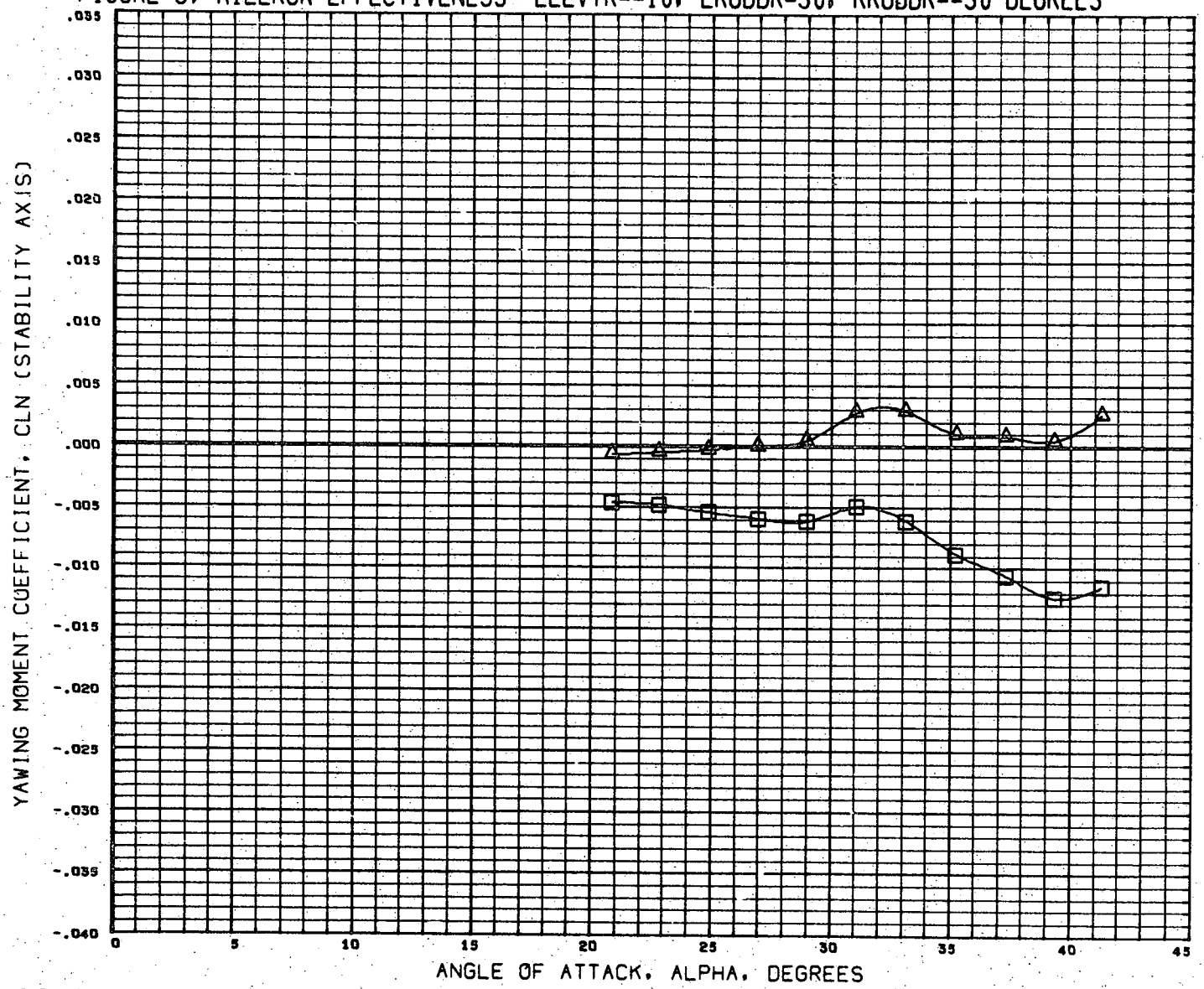
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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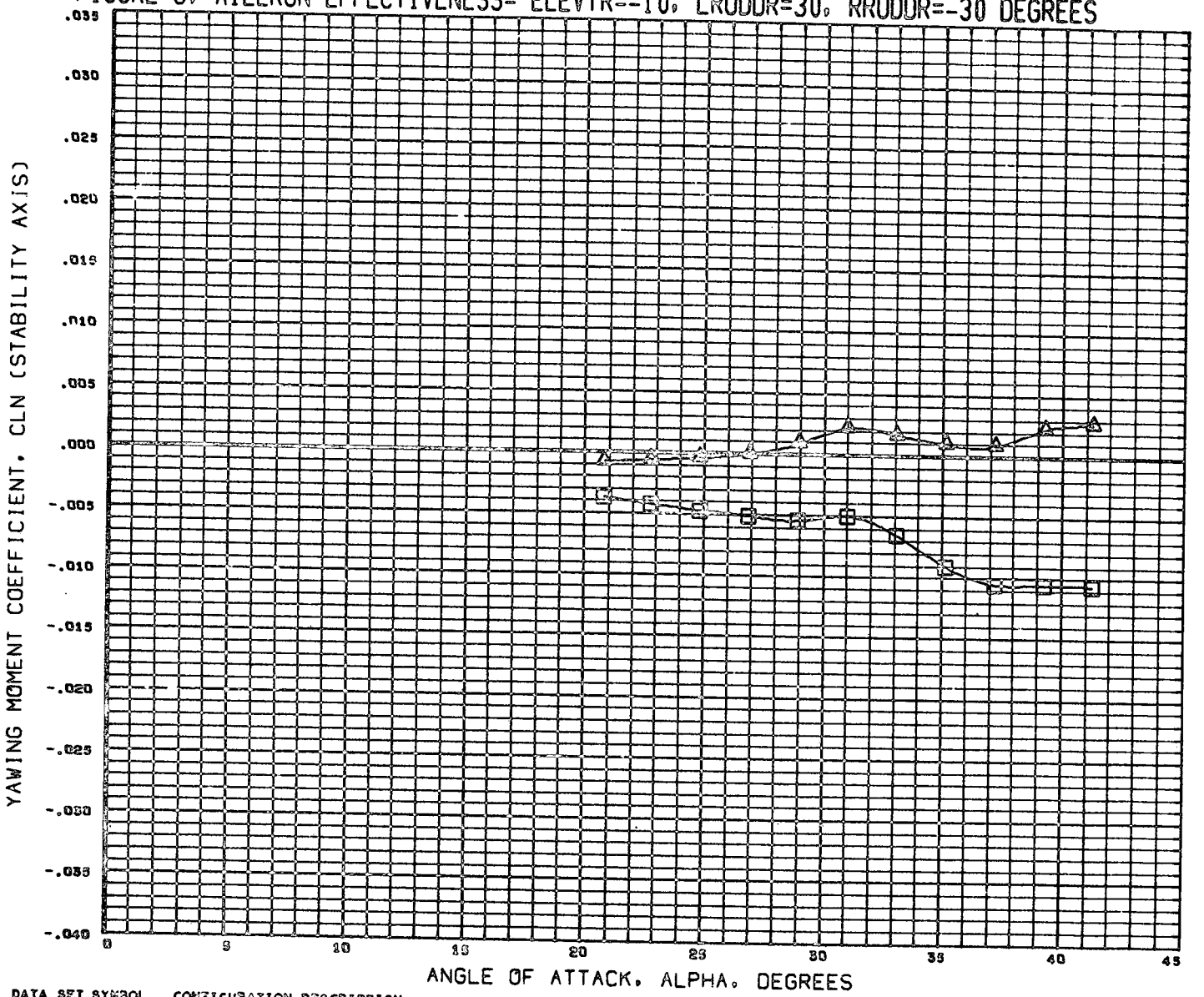
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 907 GAC M-33 ORB. BSW4(-10)VS(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 907 GAC M-33 ORB. BSW4(0,-20)VS	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.6970	SQ.IN
LREF	5.4330	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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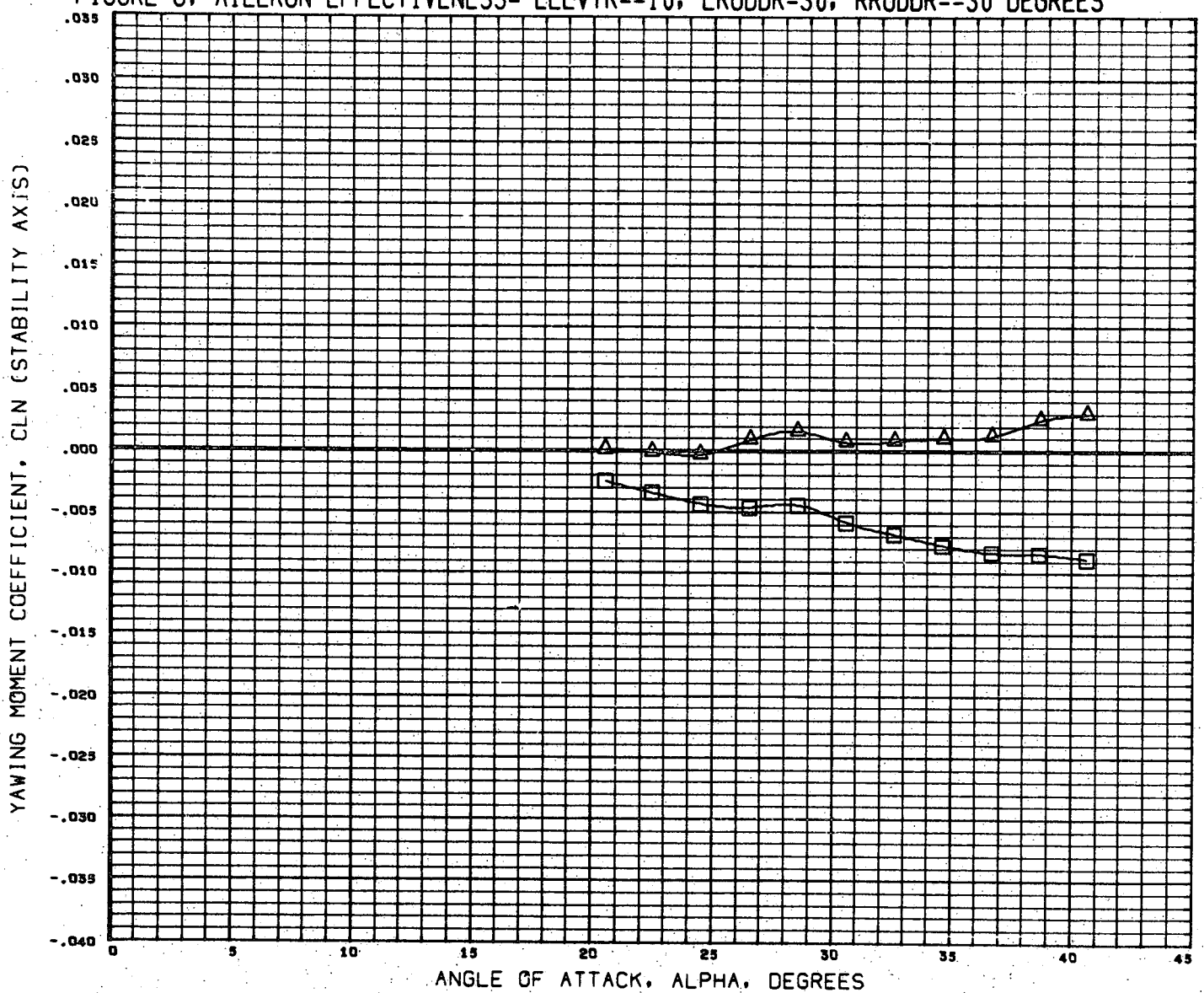
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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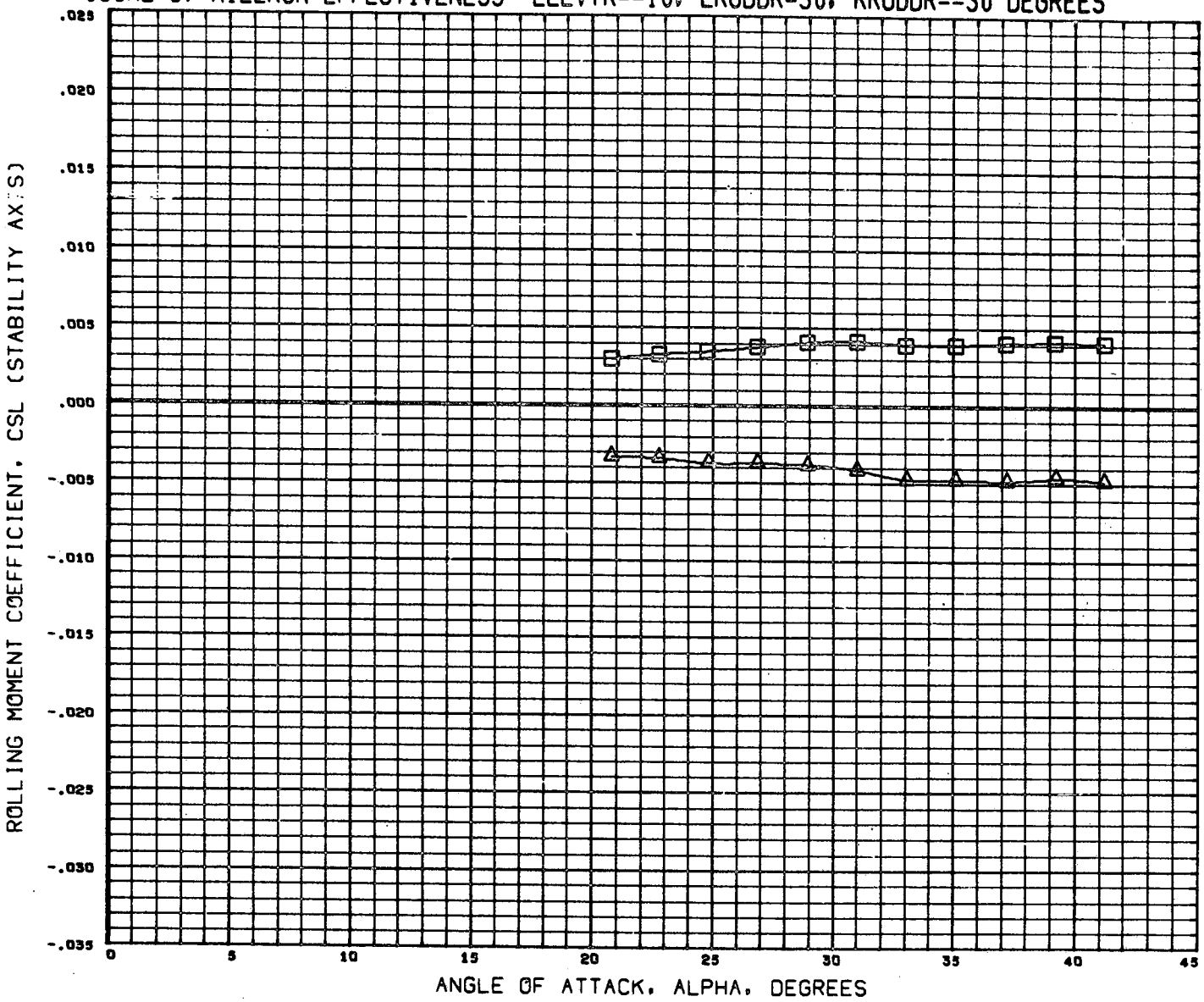
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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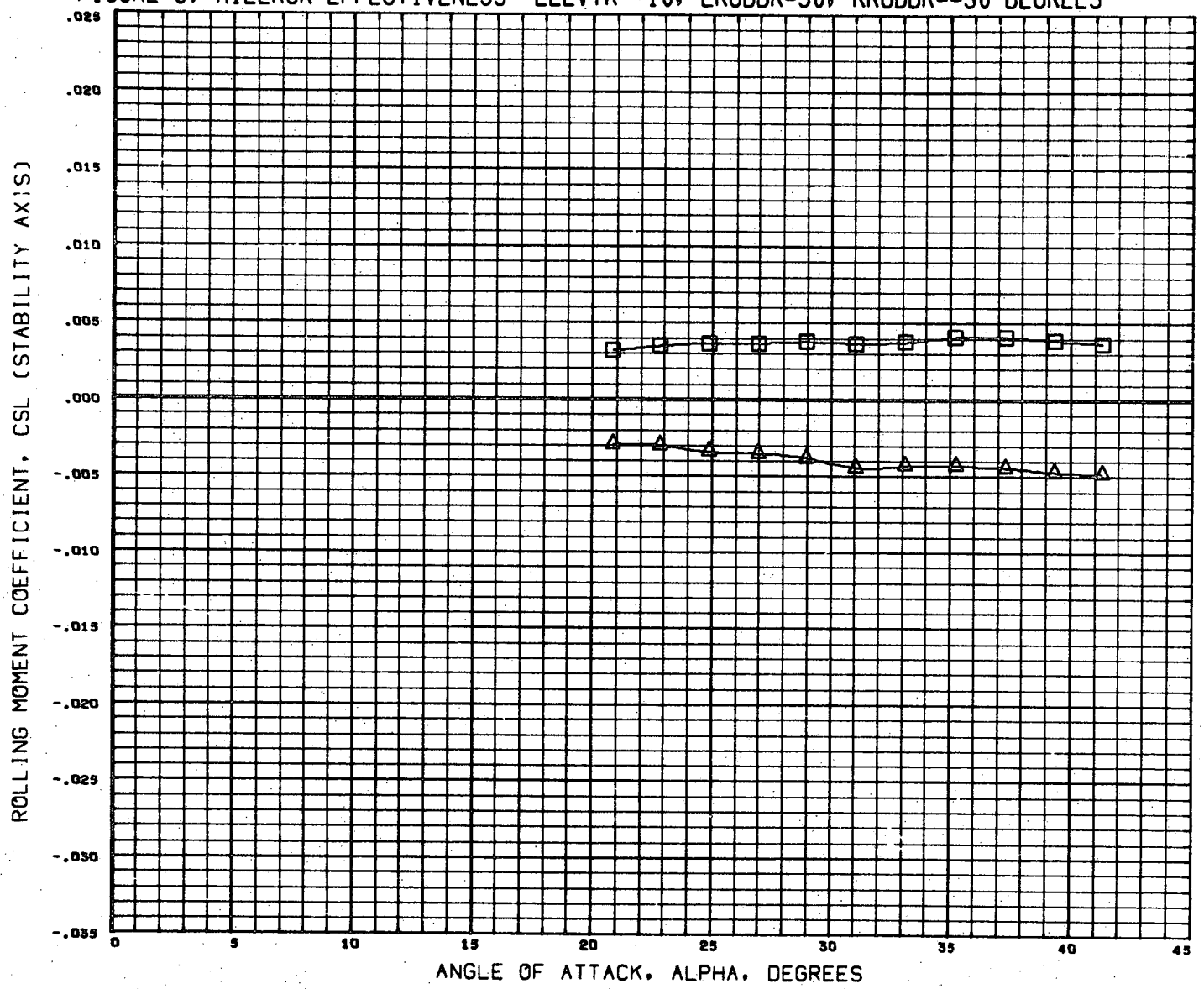
FIGURE 6. AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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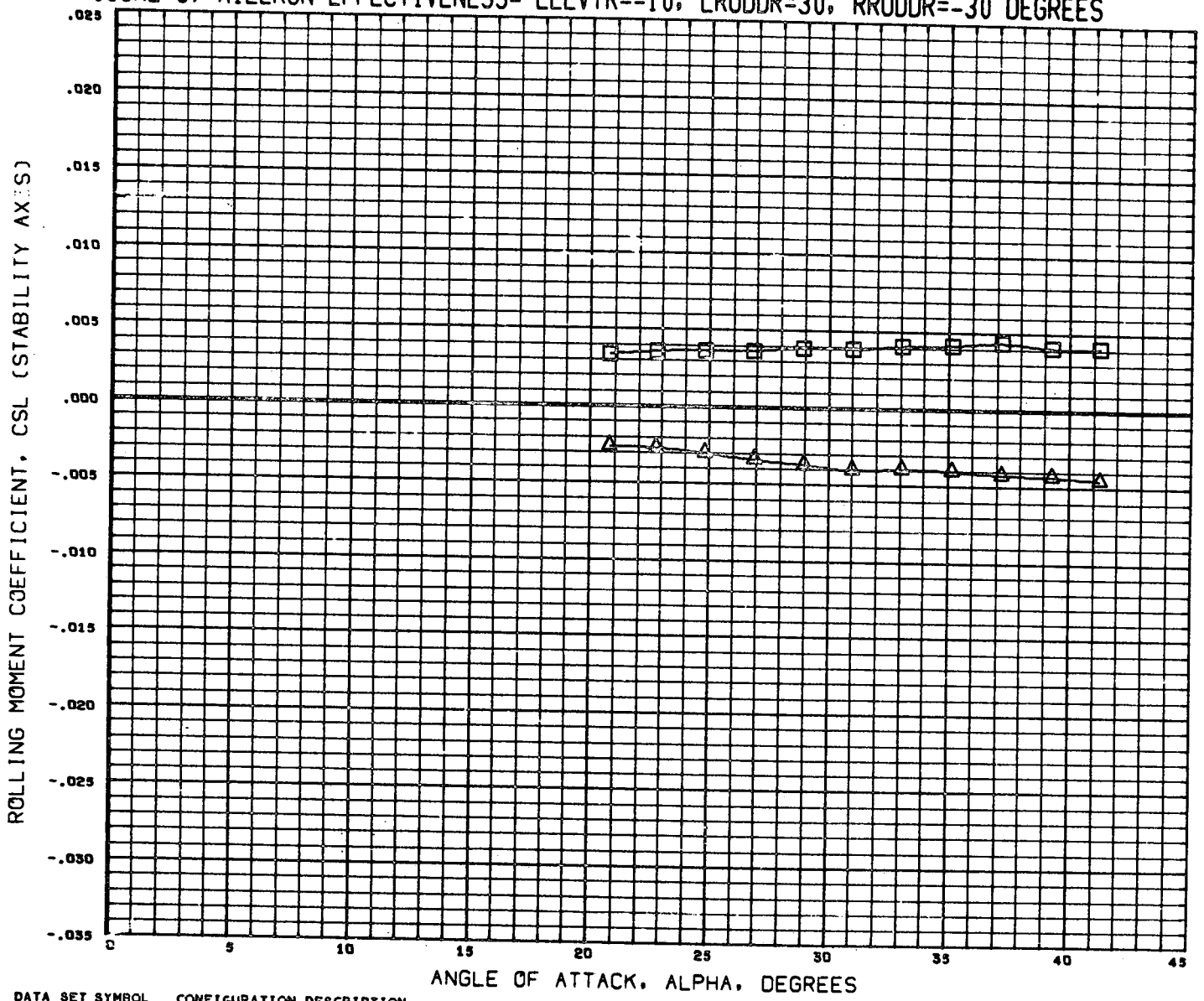
FIGURE 6, AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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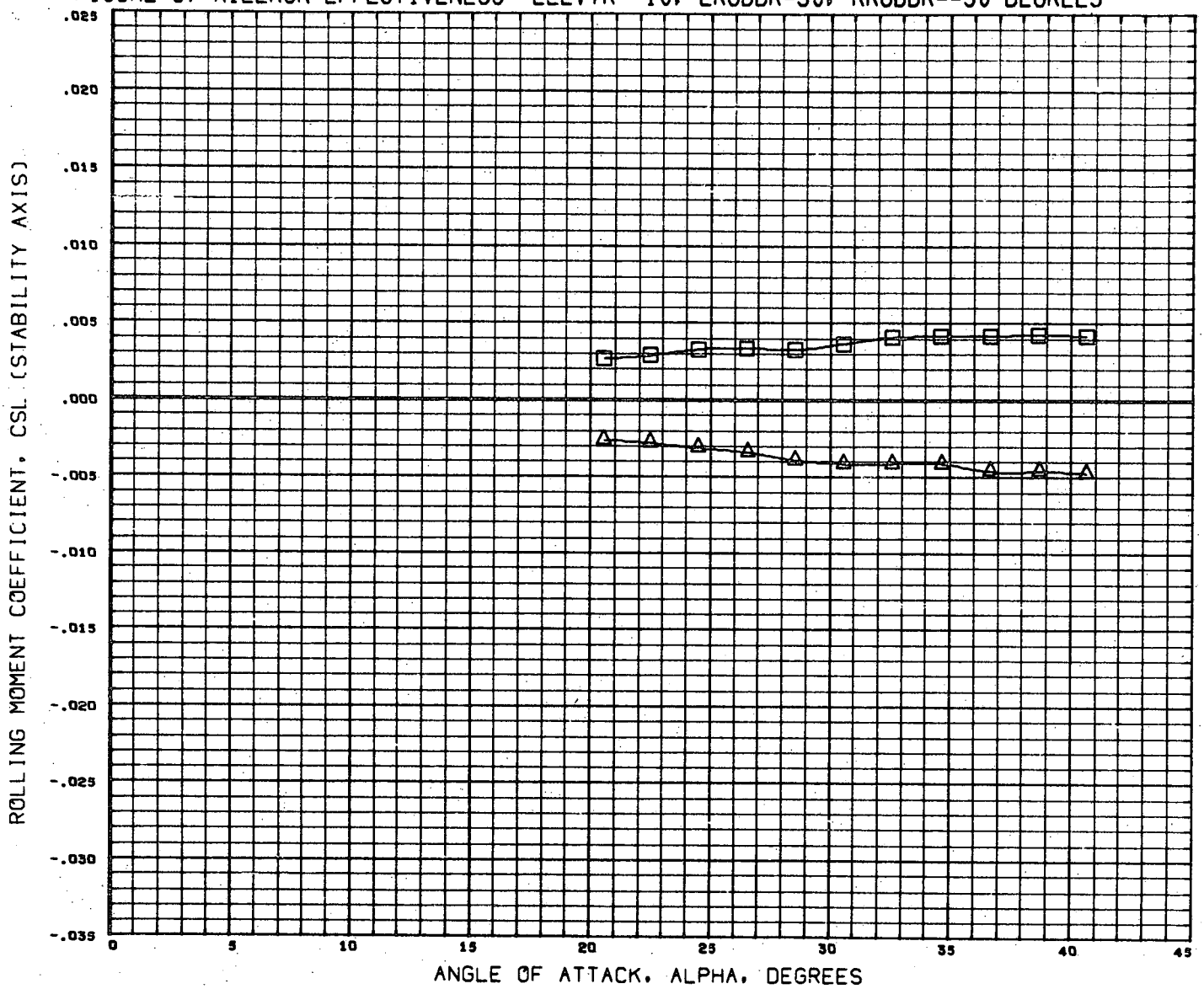
FIGURE 6, AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49018)	△	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000
(A49023)	□	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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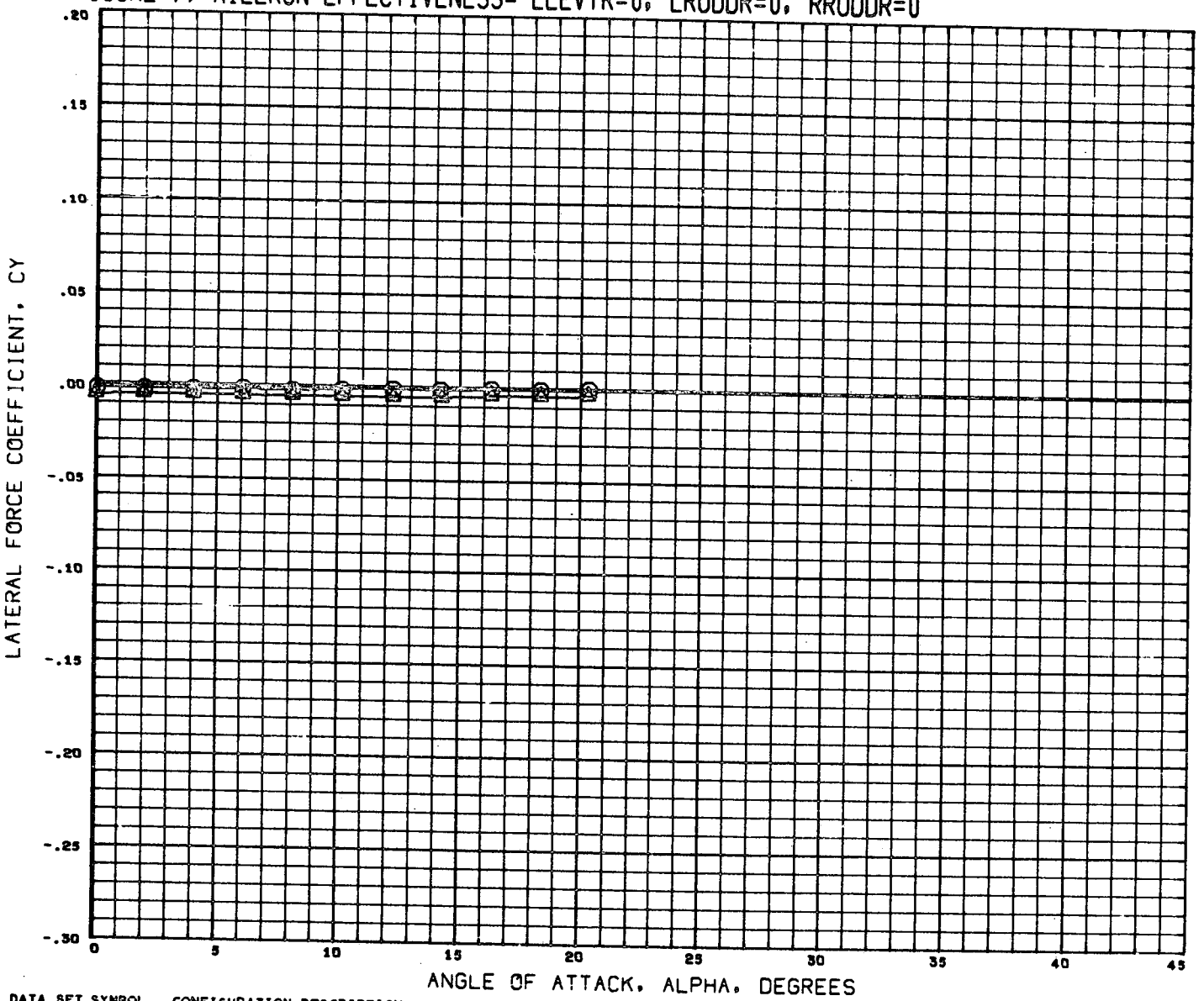
FIGURE 7, AILERØN EFFECTIVENESS- ELEVTR=0, LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49X08)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49036)	△	MSFC 507 GAC H-33 ORB. B5W4(-10,+10)V5	0.000	0.000	-10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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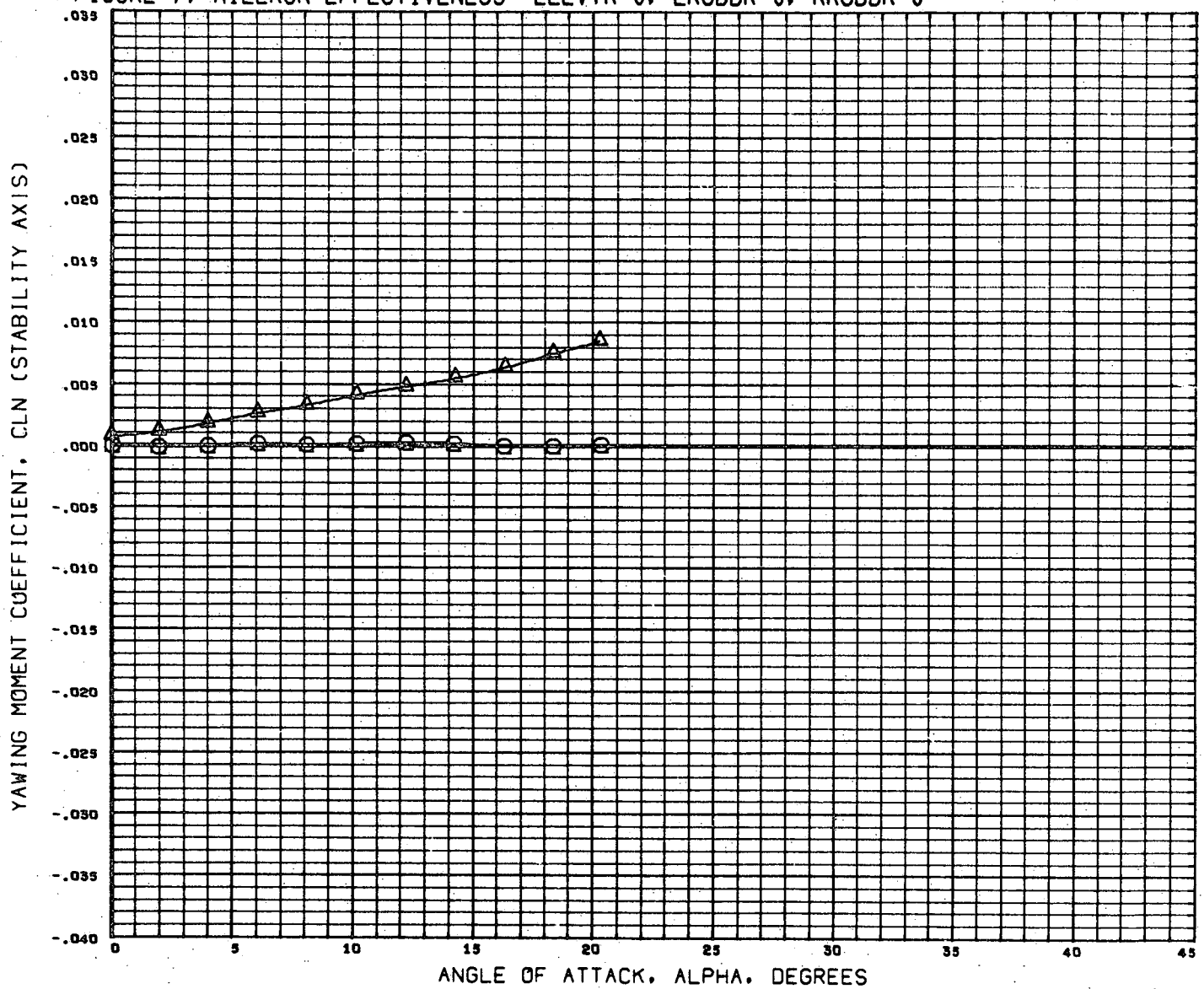
FIGURE 7. AILERON EFFECTIVENESS- ELEVTR=0, LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49X08)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49036)	△	MSFC 507 GAC H-33 ORB. B5W4(-10,+10)V5	0.000	0.000	-10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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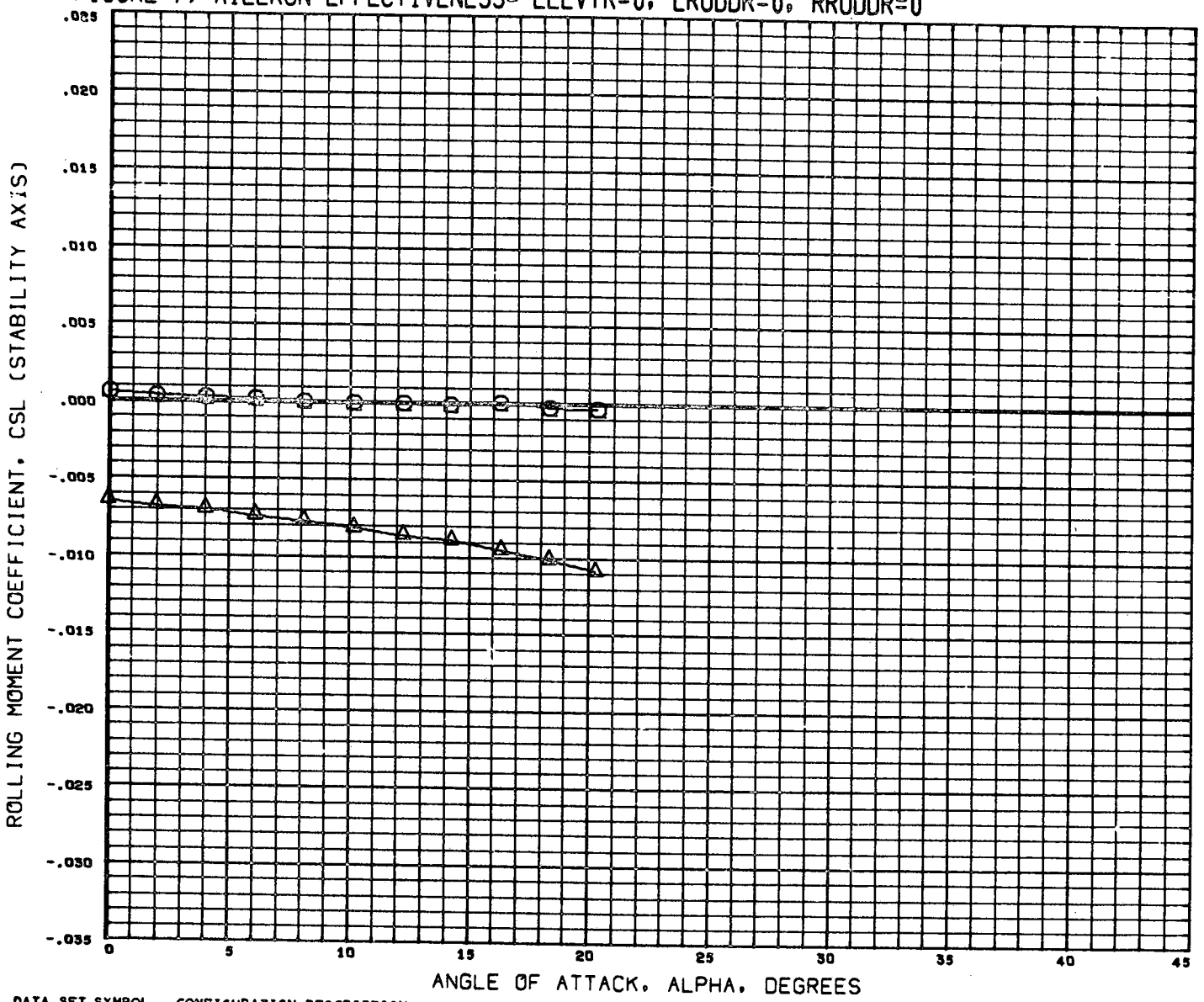
FIGURE 7, AILERON EFFECTIVENESS- ELEVTR=0, LRUDDR=0, RRUDDR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN
(A49X08)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000
(A49036)	△	MSFC 507 GAC H-33 ORB. B5W4(-10,+10)V5	0.000	0.000	-10.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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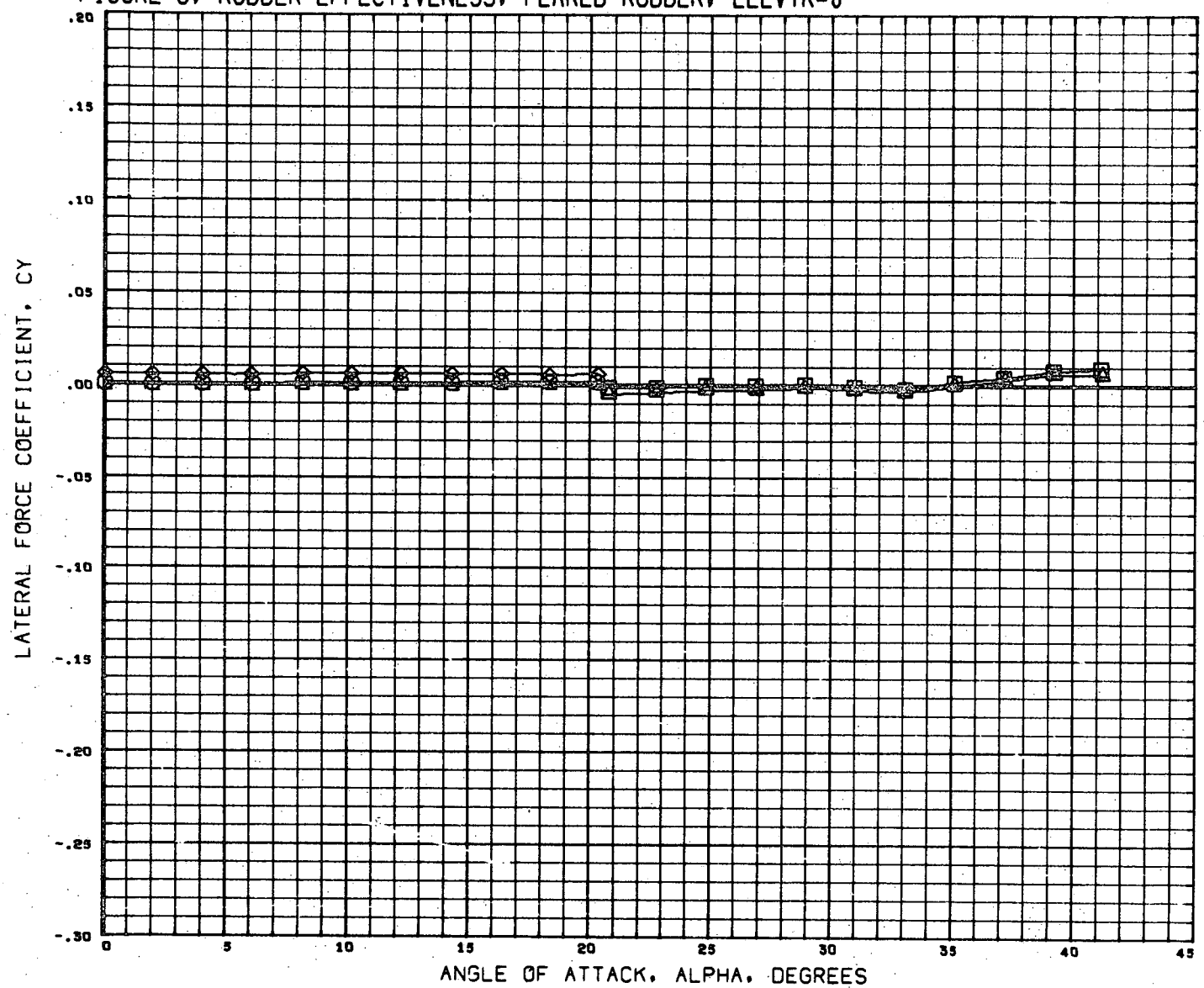
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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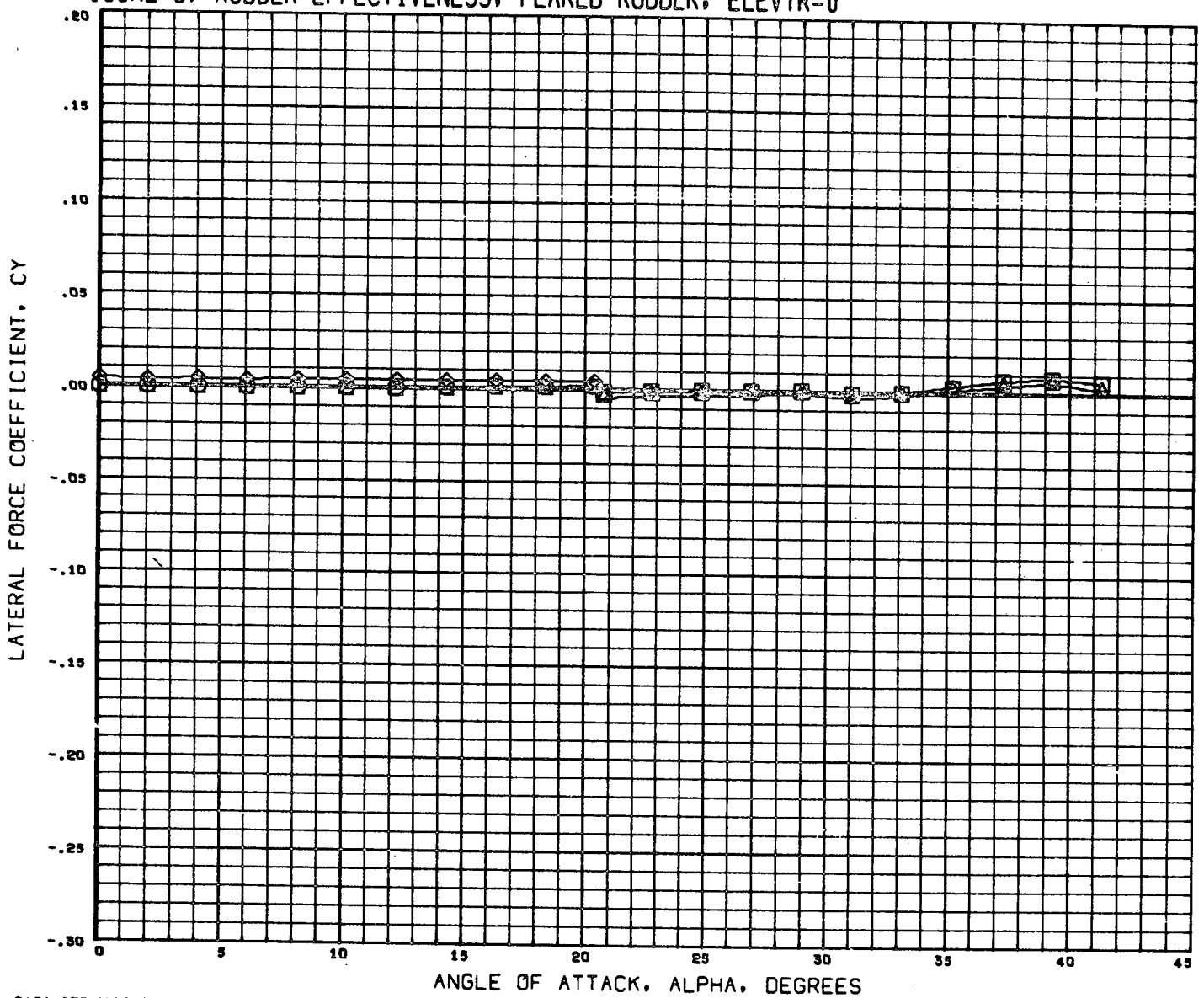
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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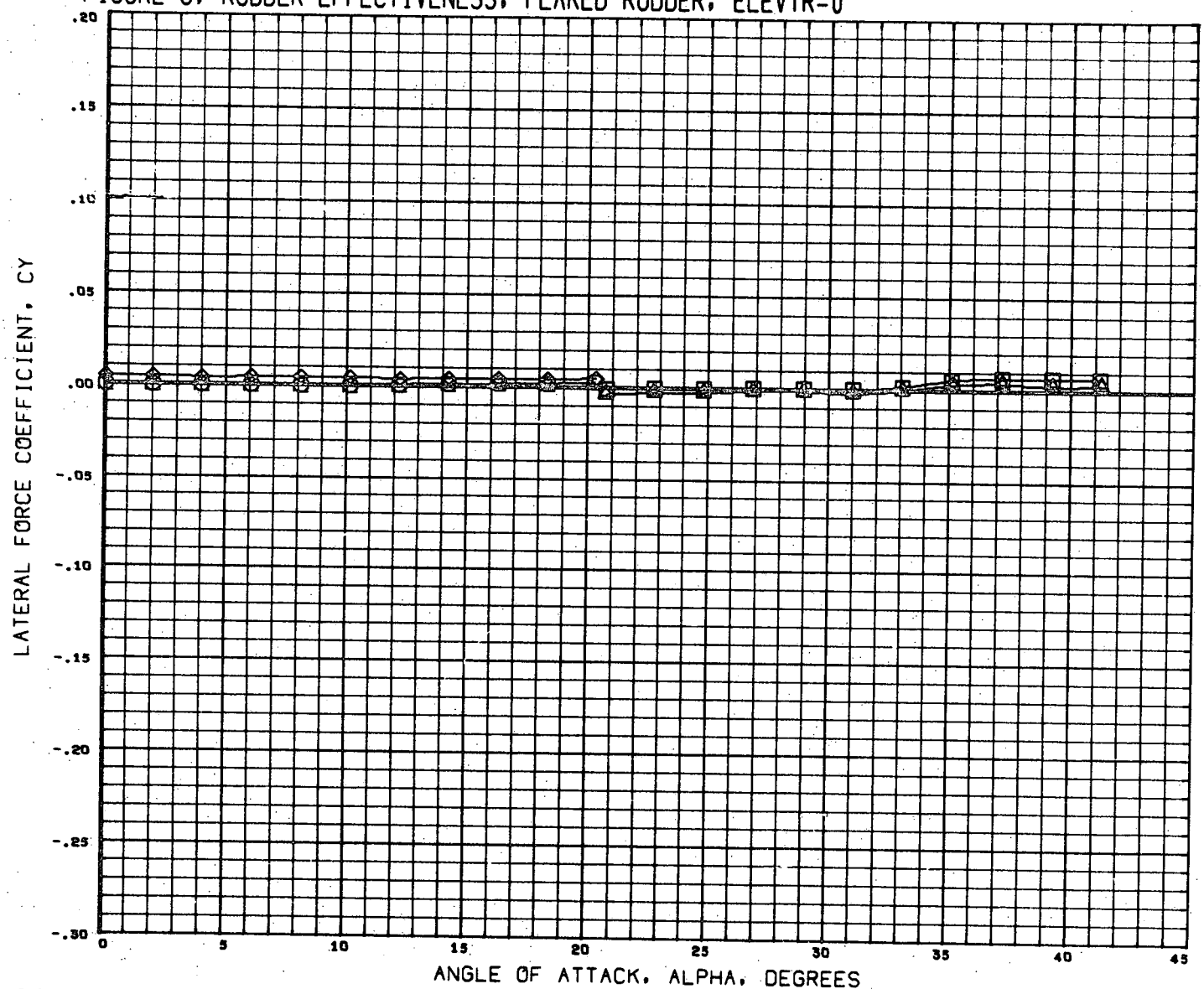
FIGURE 8, RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)

BETA	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	30.000	-30.000
0.000	0.000	35.000	-25.000
0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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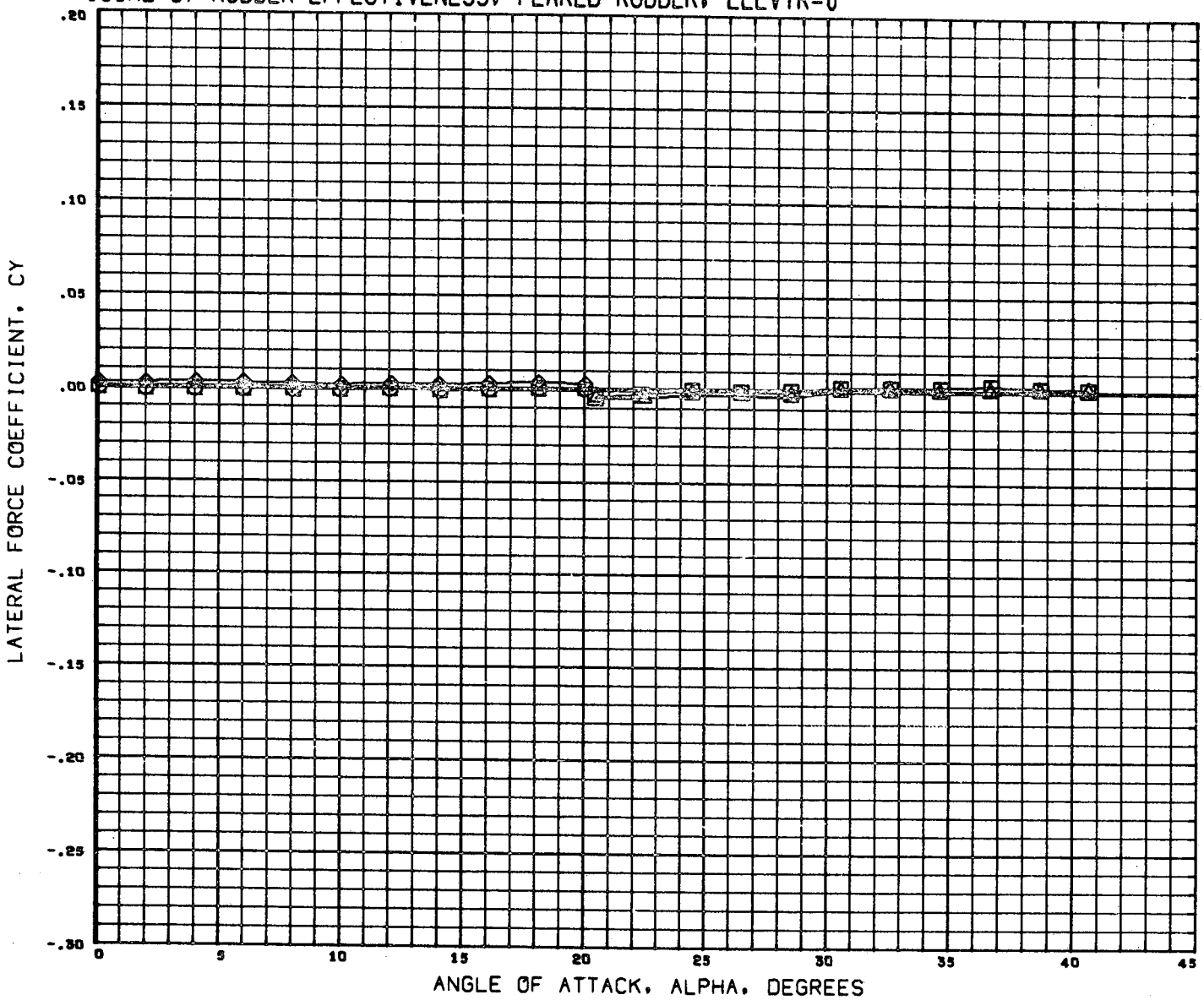
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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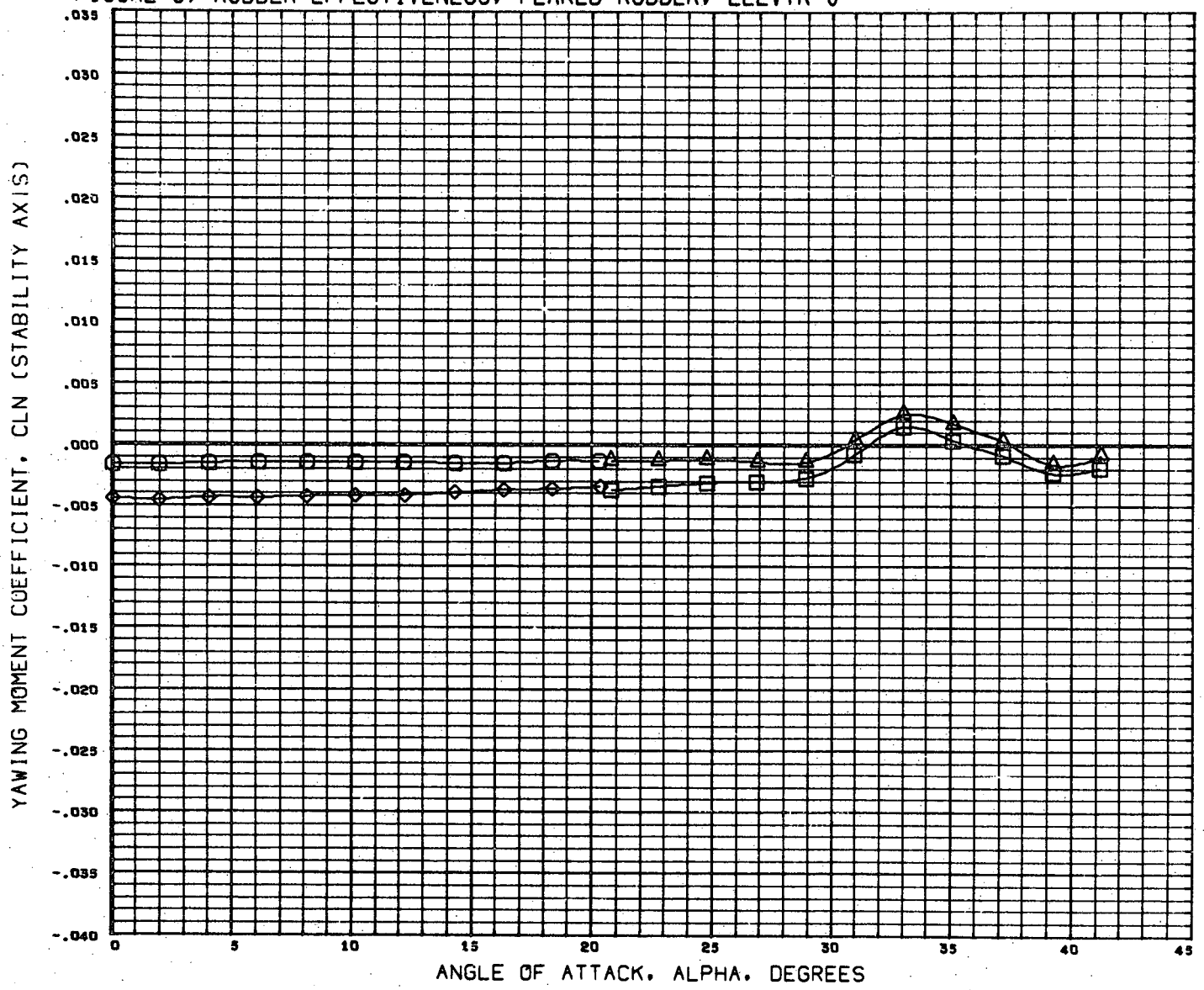
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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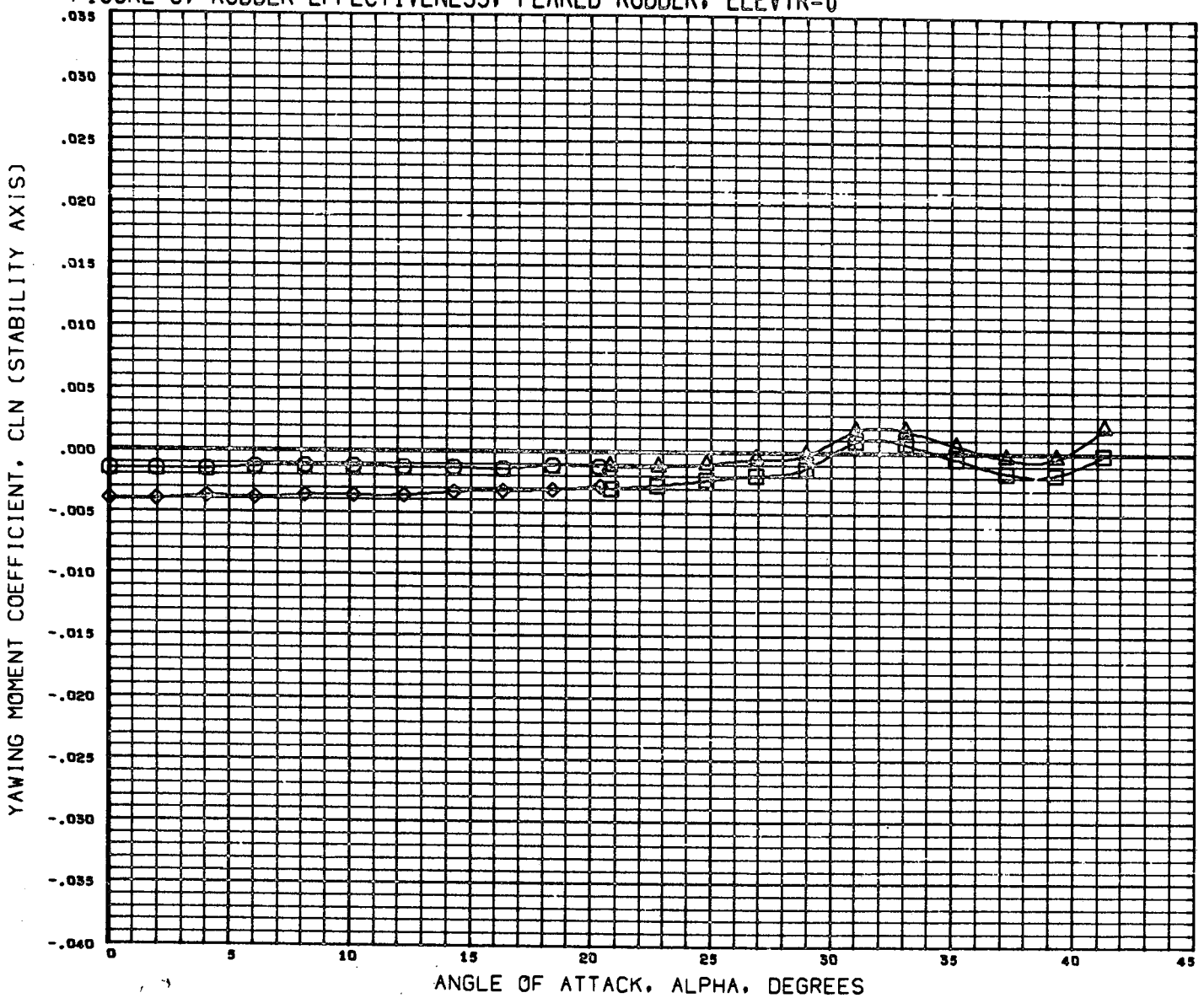
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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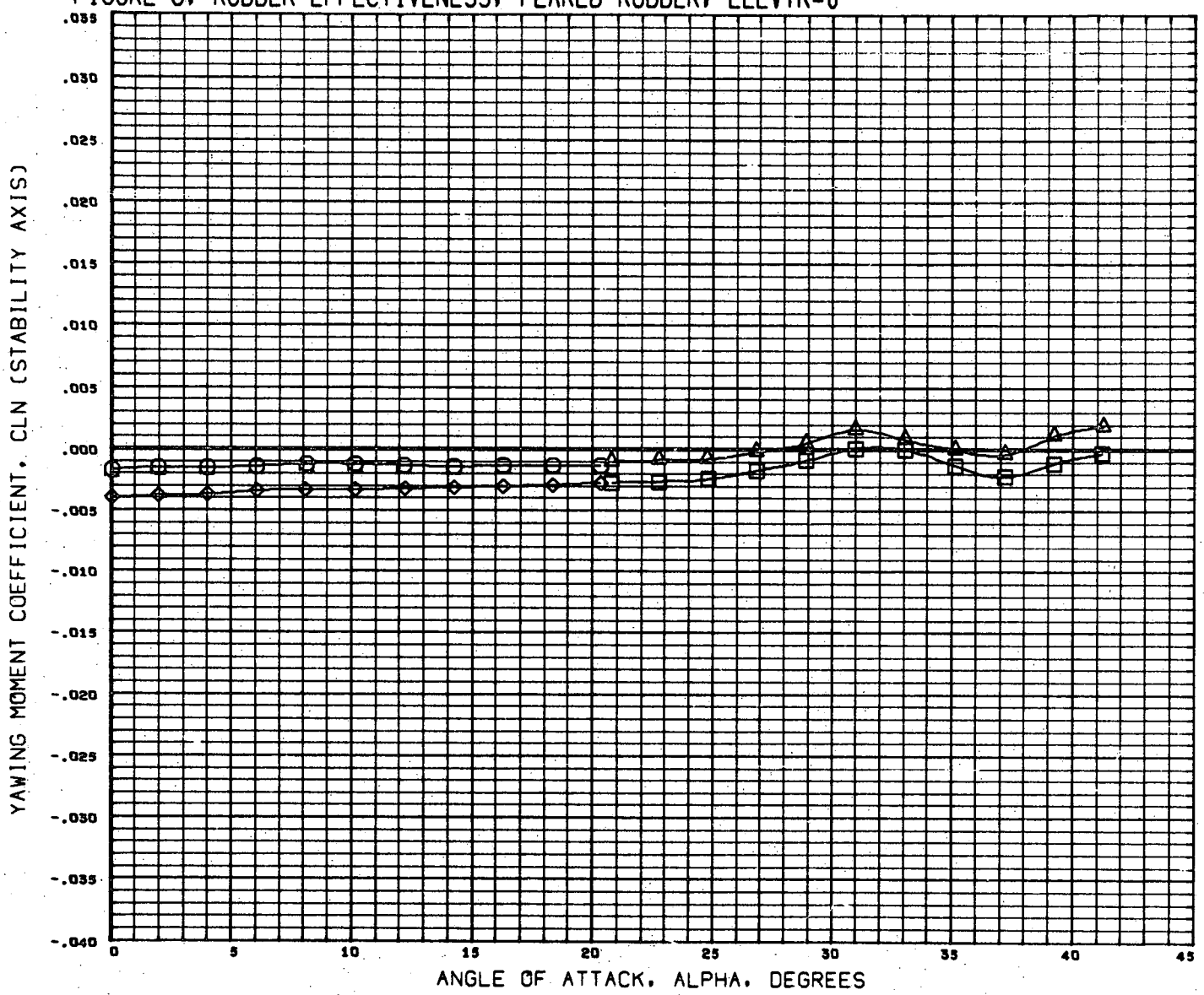
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0

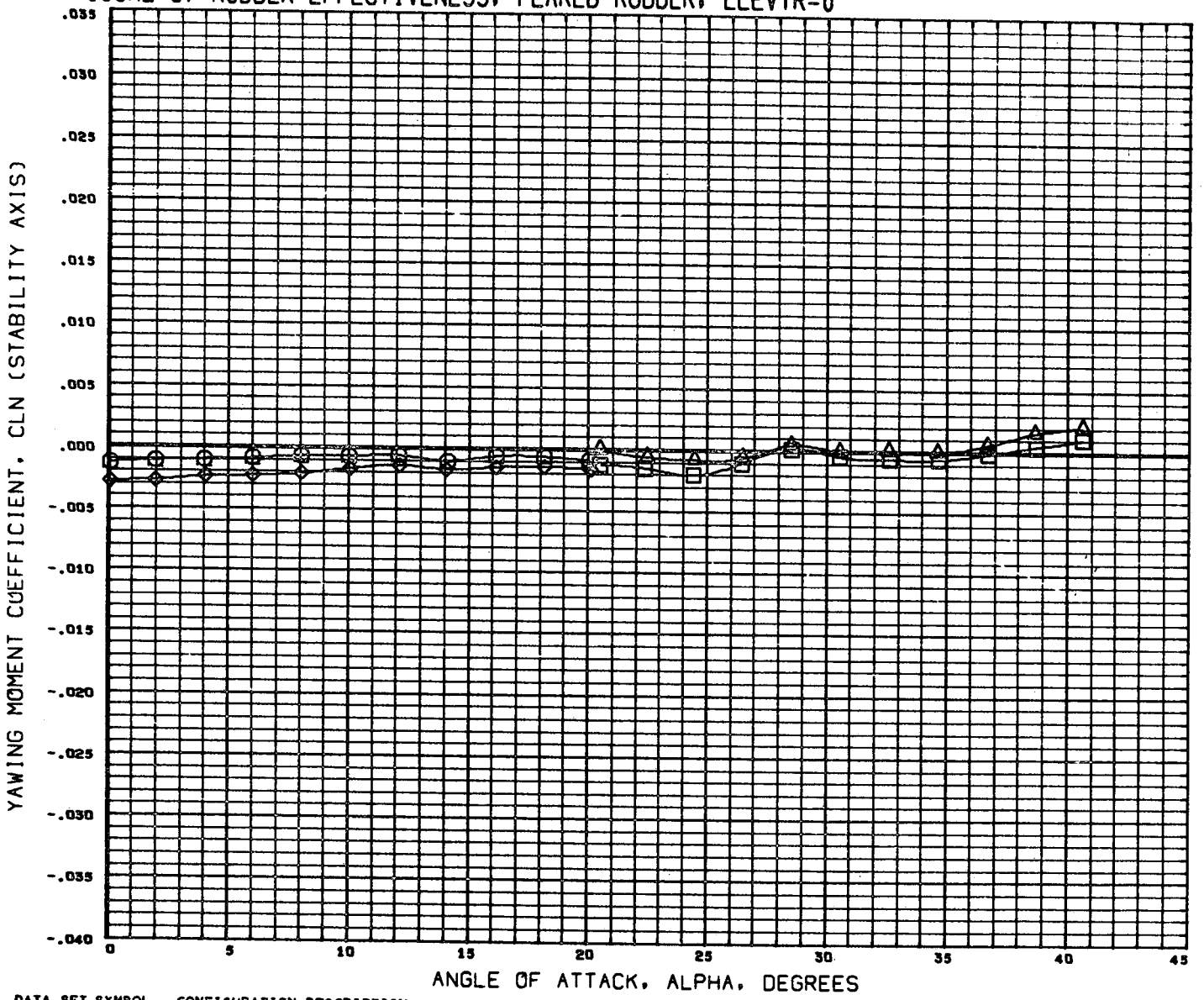


DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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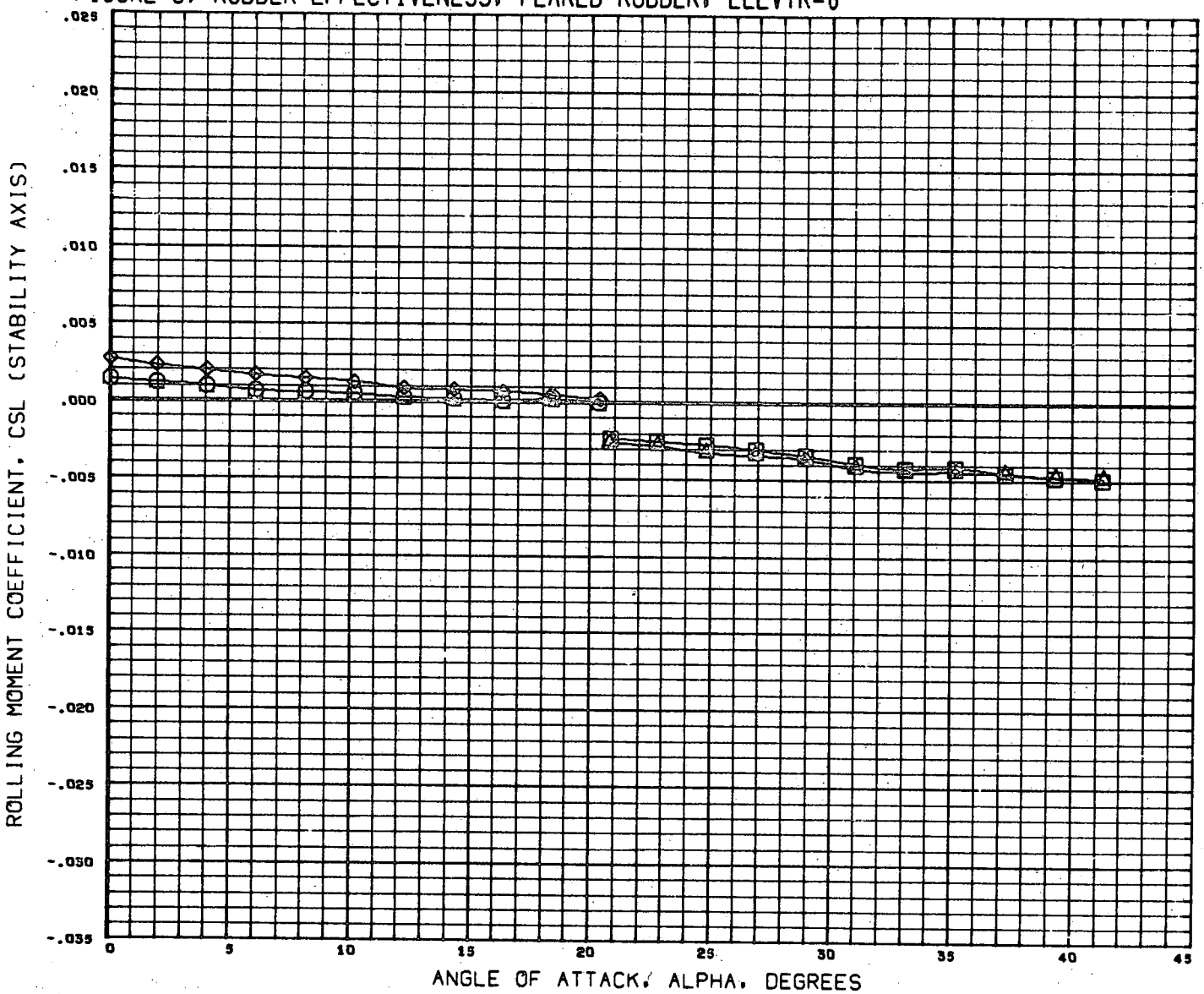
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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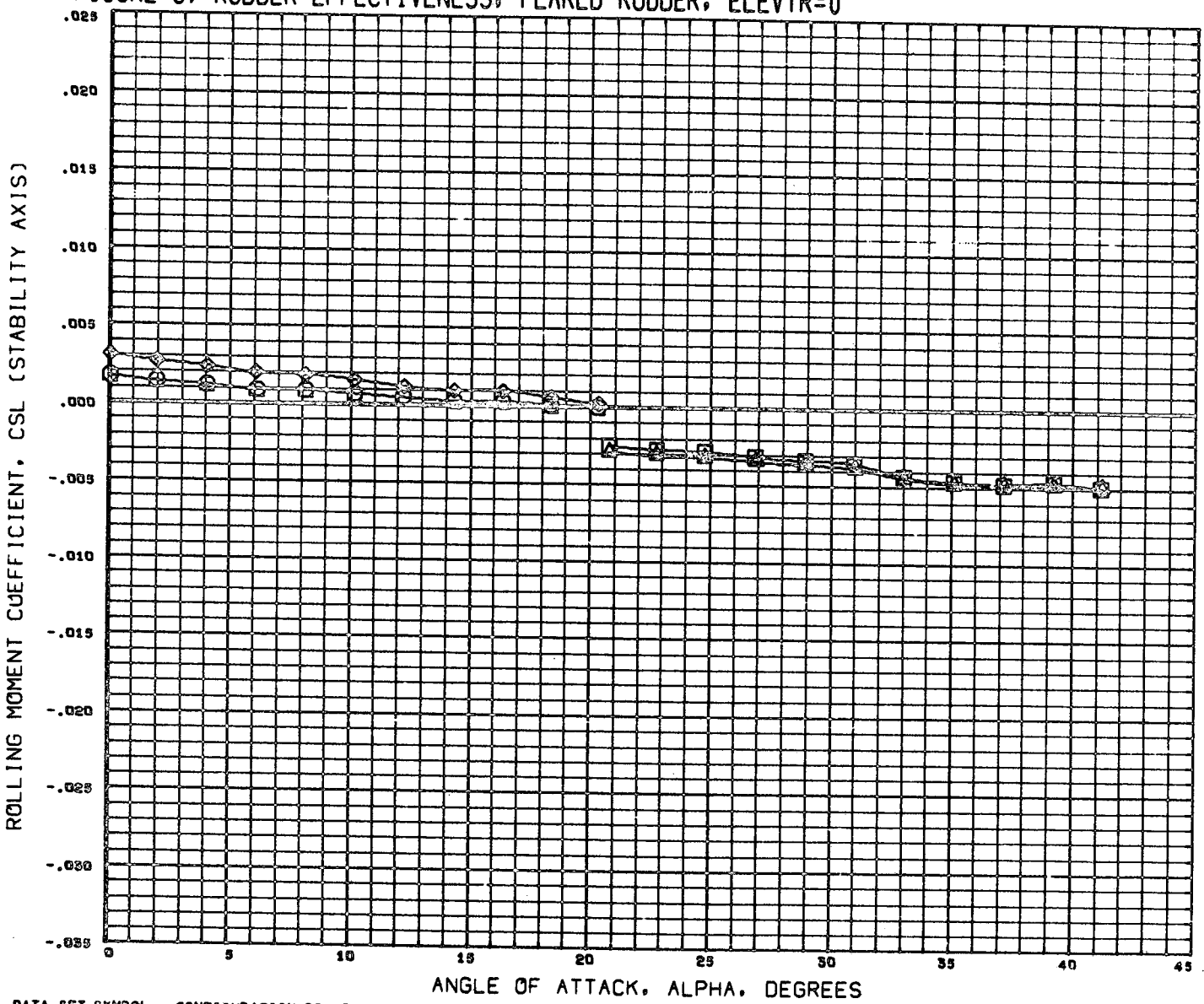
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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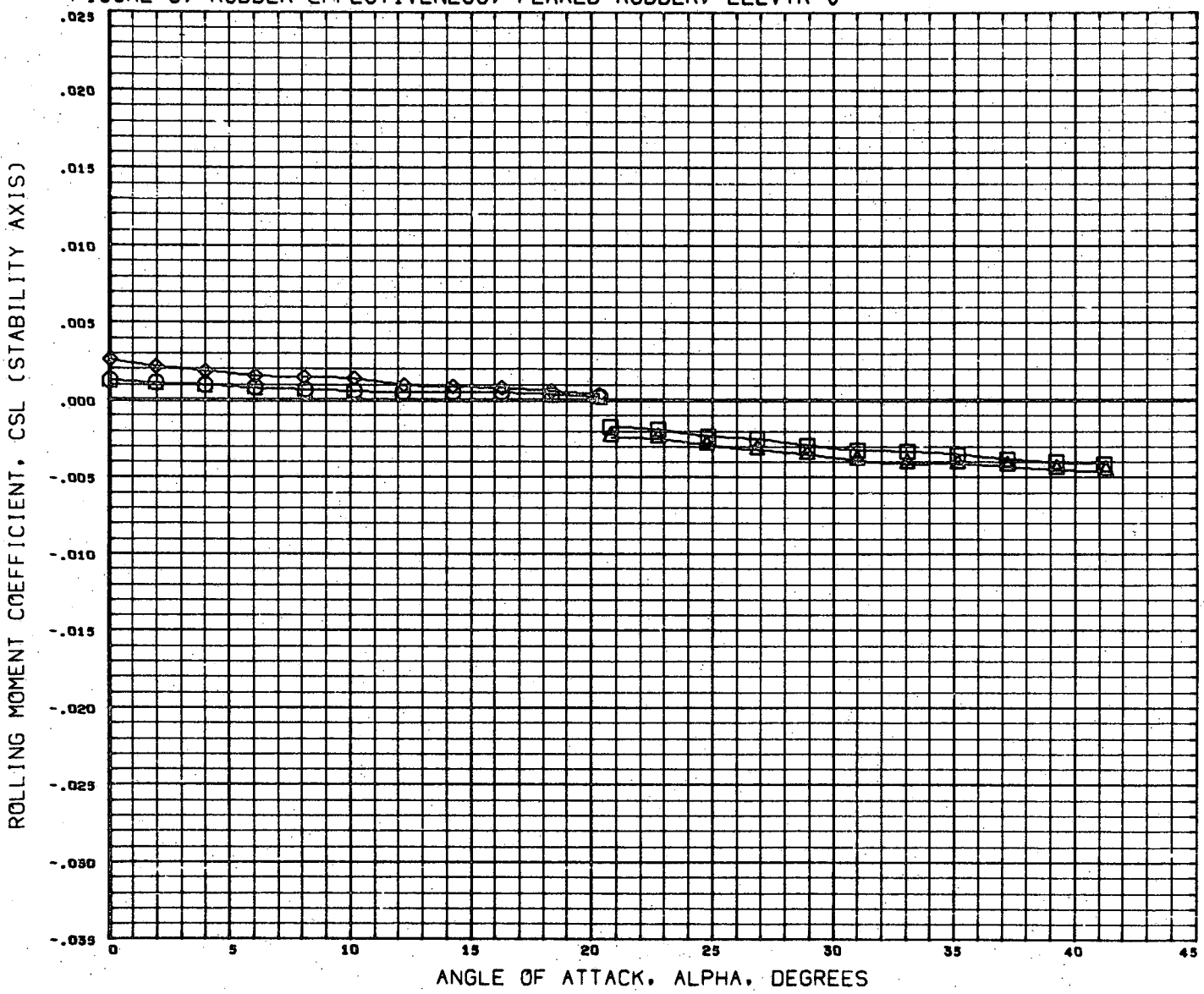
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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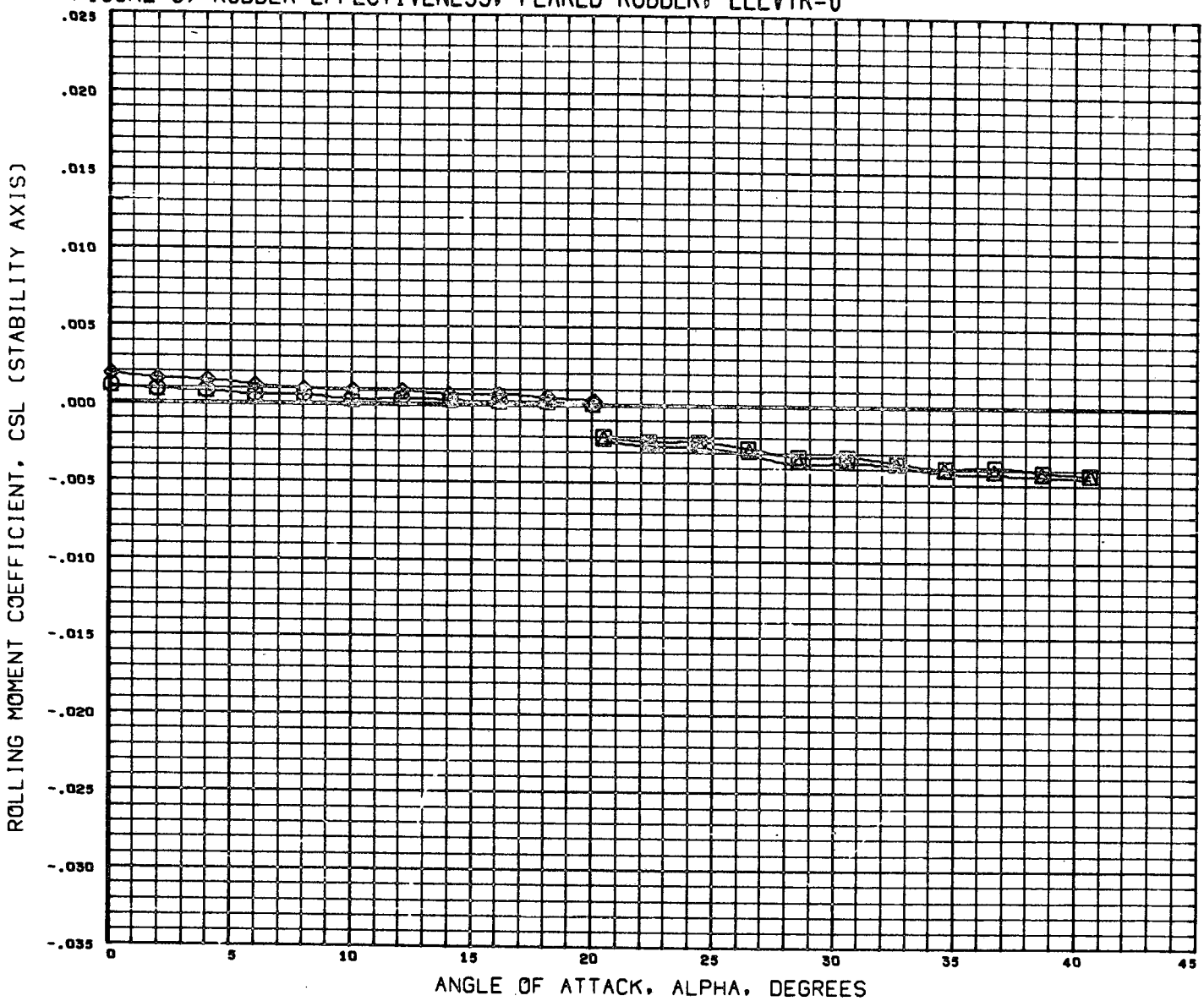
FIGURE 8. RUDDER EFFECTIVENESS, FLARED RUDDER, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49001)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49017)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49007)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000
(A49022)	□	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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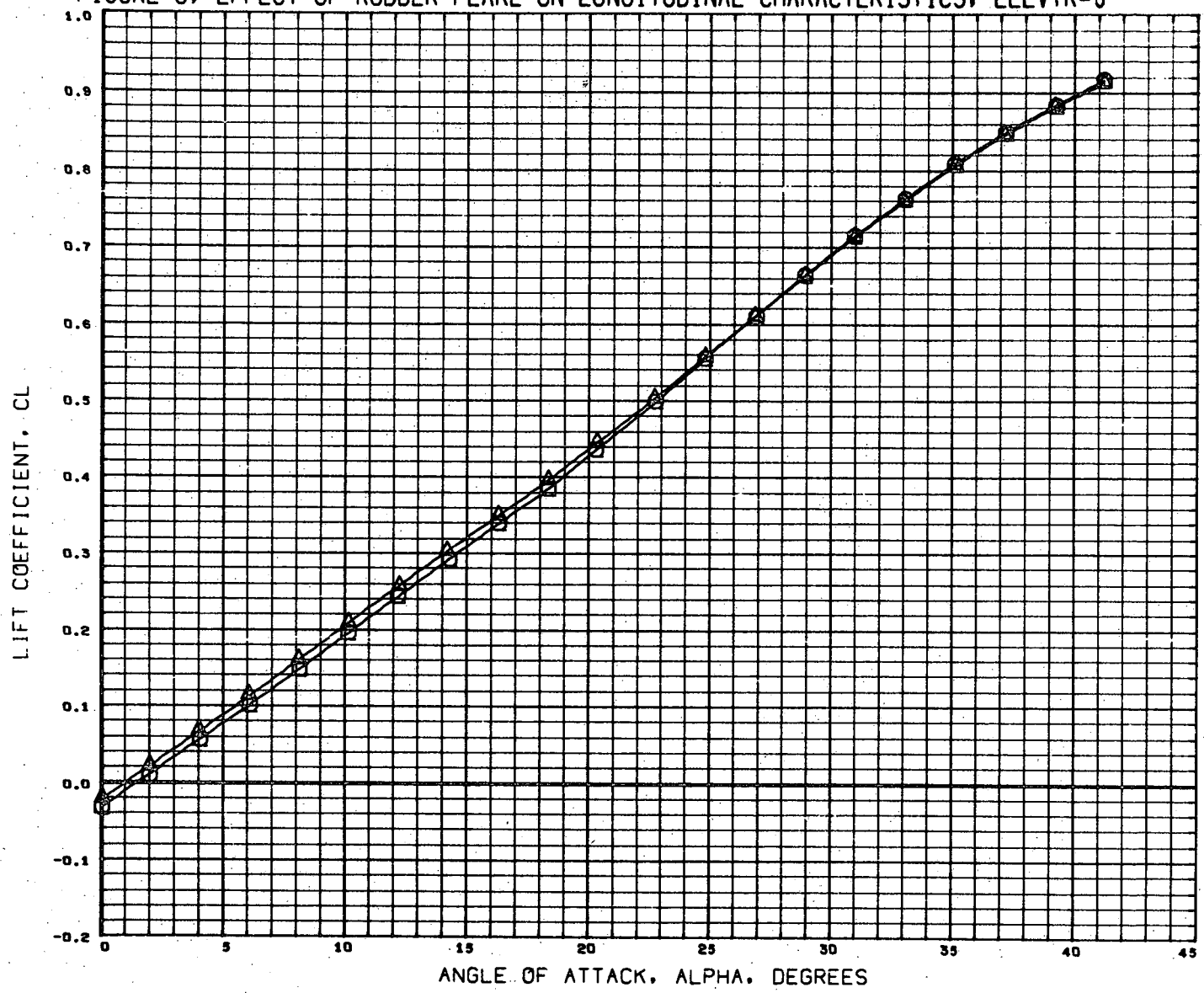
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS. ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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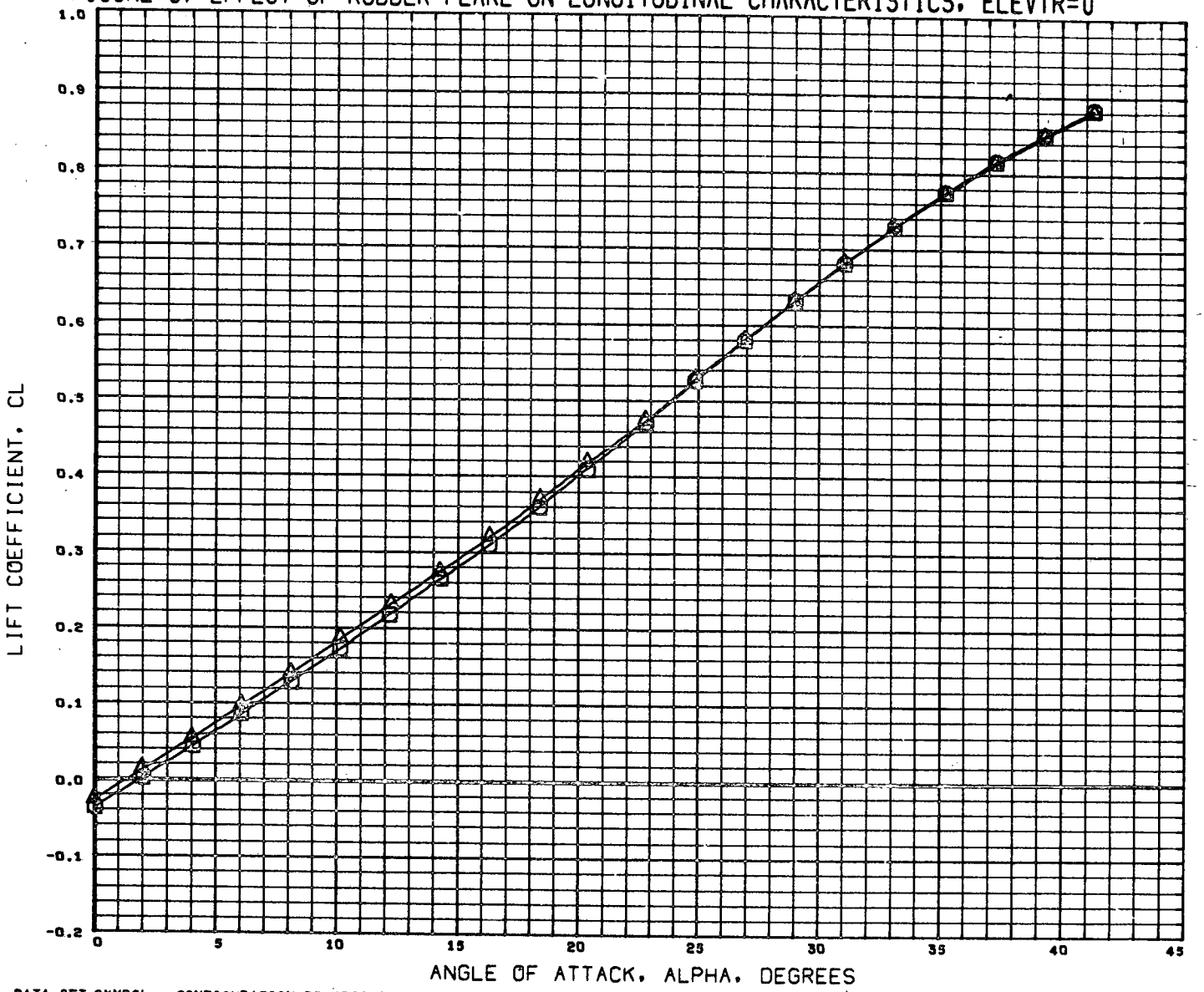
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS. ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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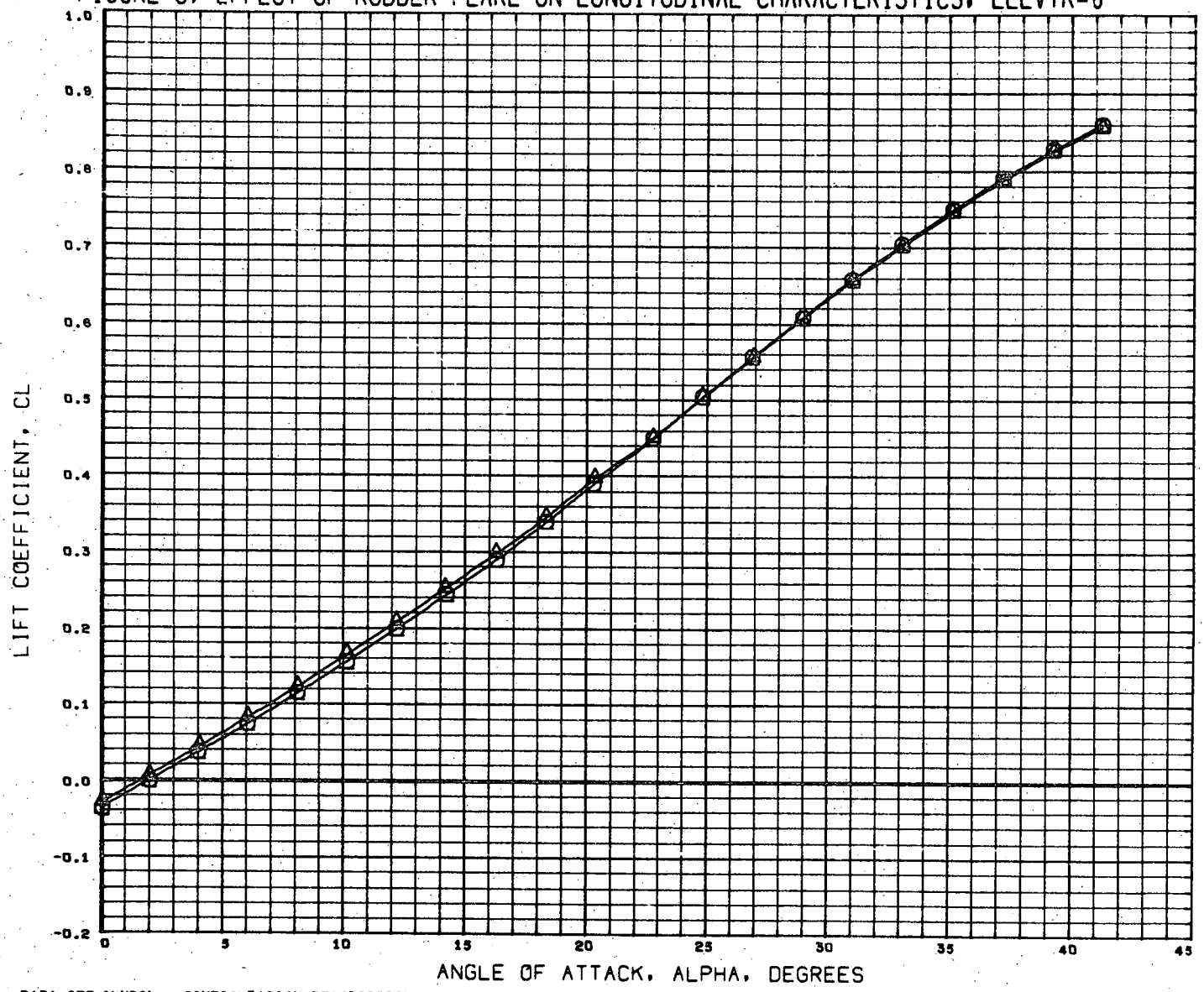
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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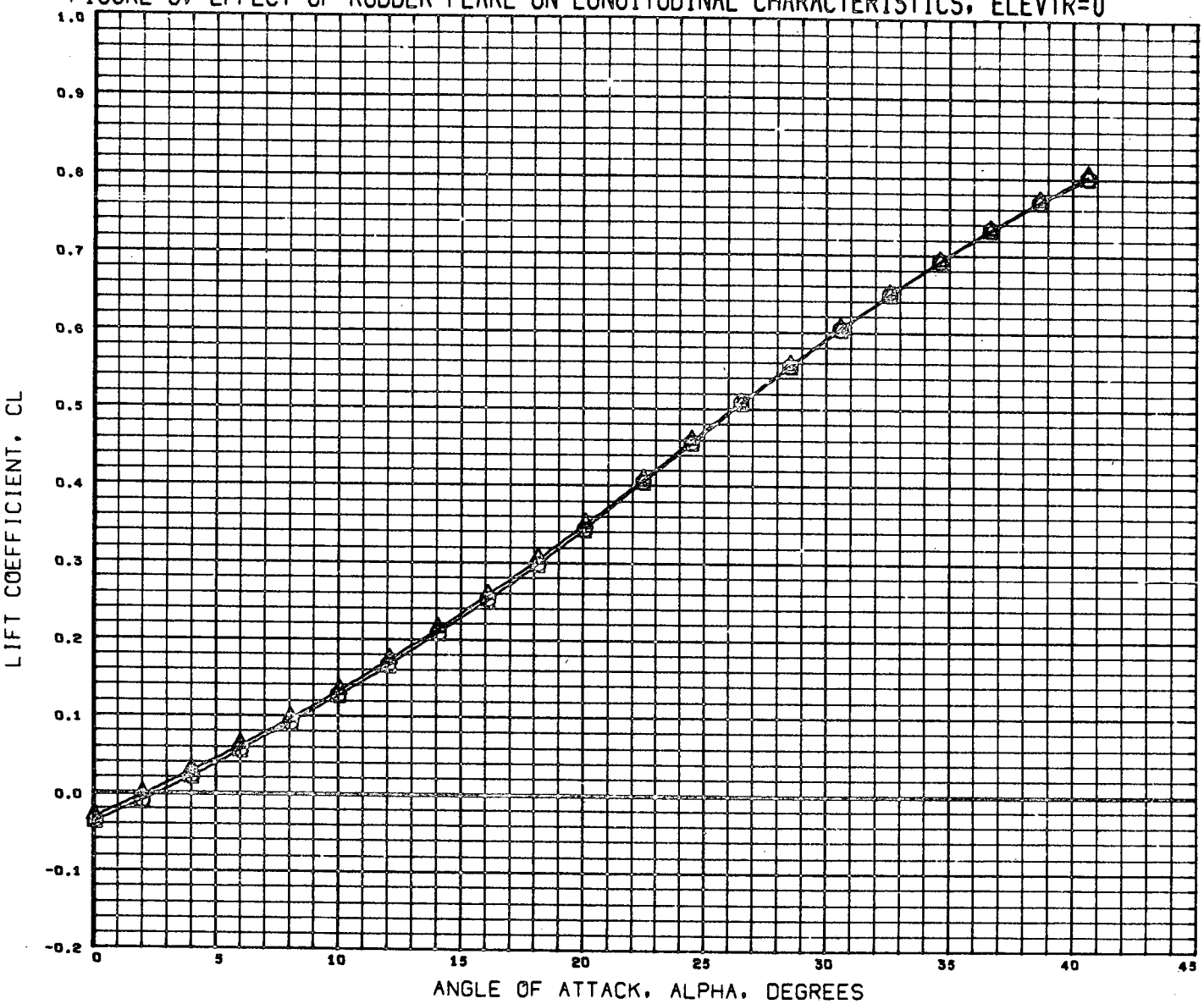
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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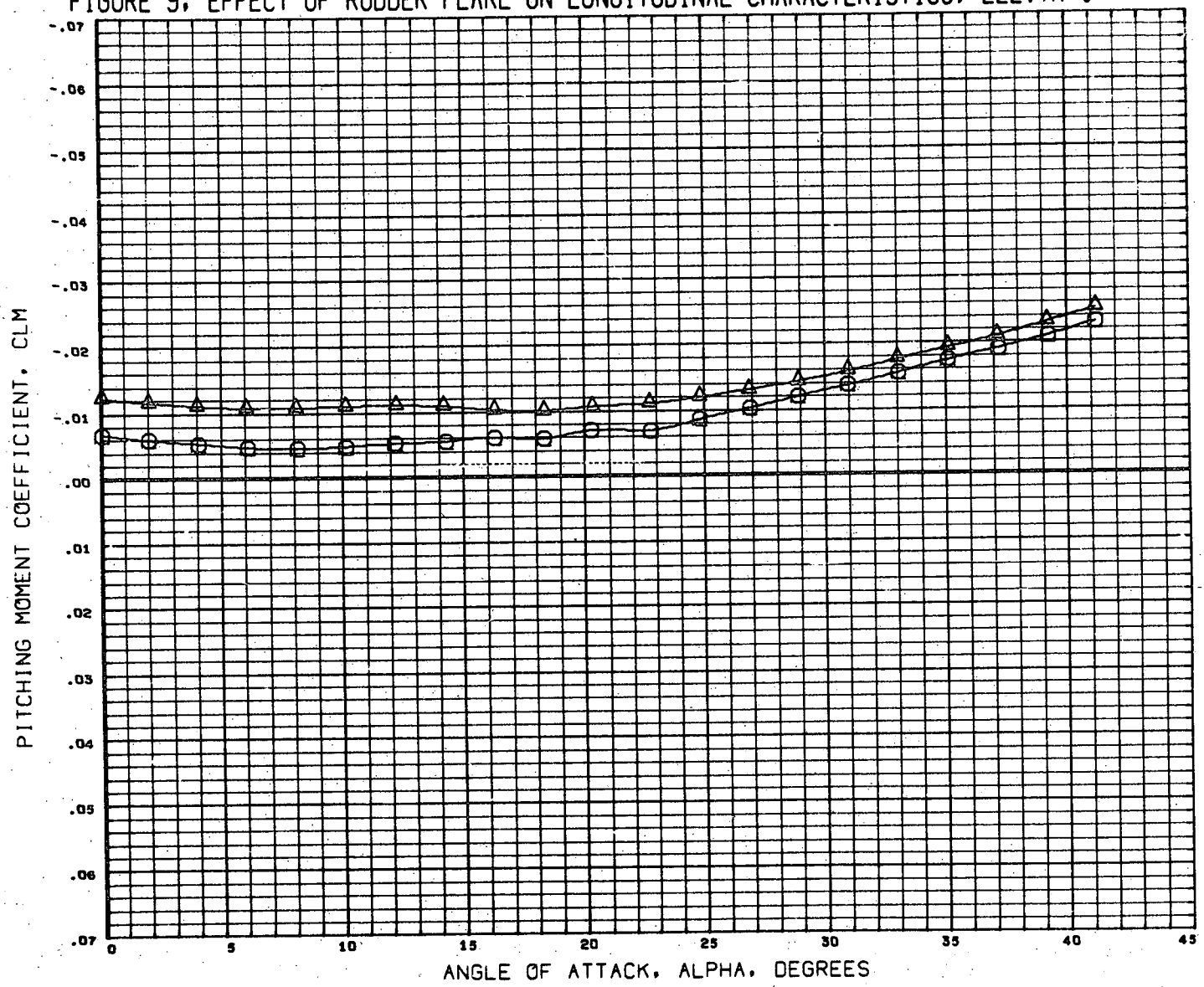
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS. ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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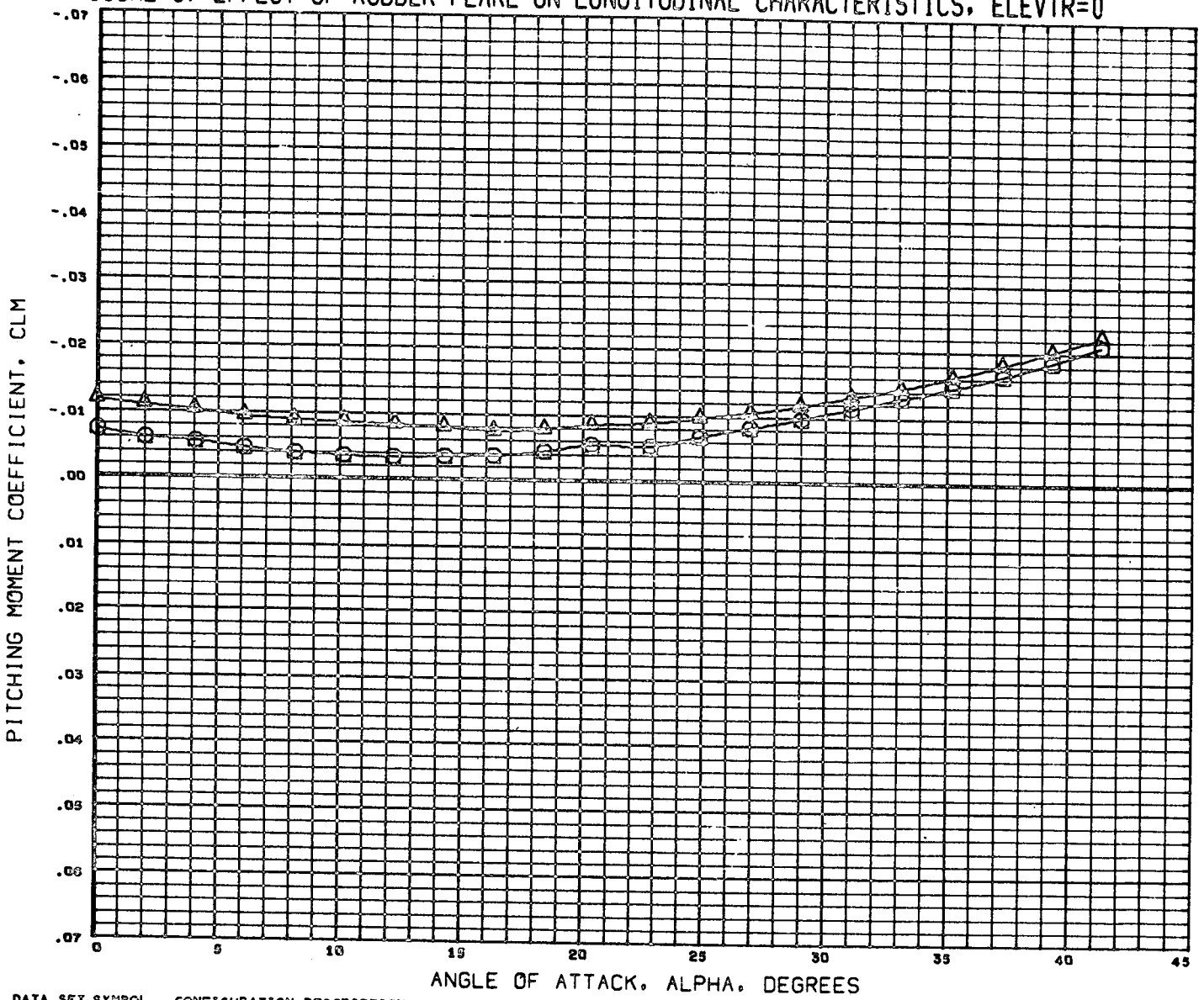
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	○	HSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(A49S06)	△	HSFC 507 GAC H-33 ORB. B5W4V5

BETA	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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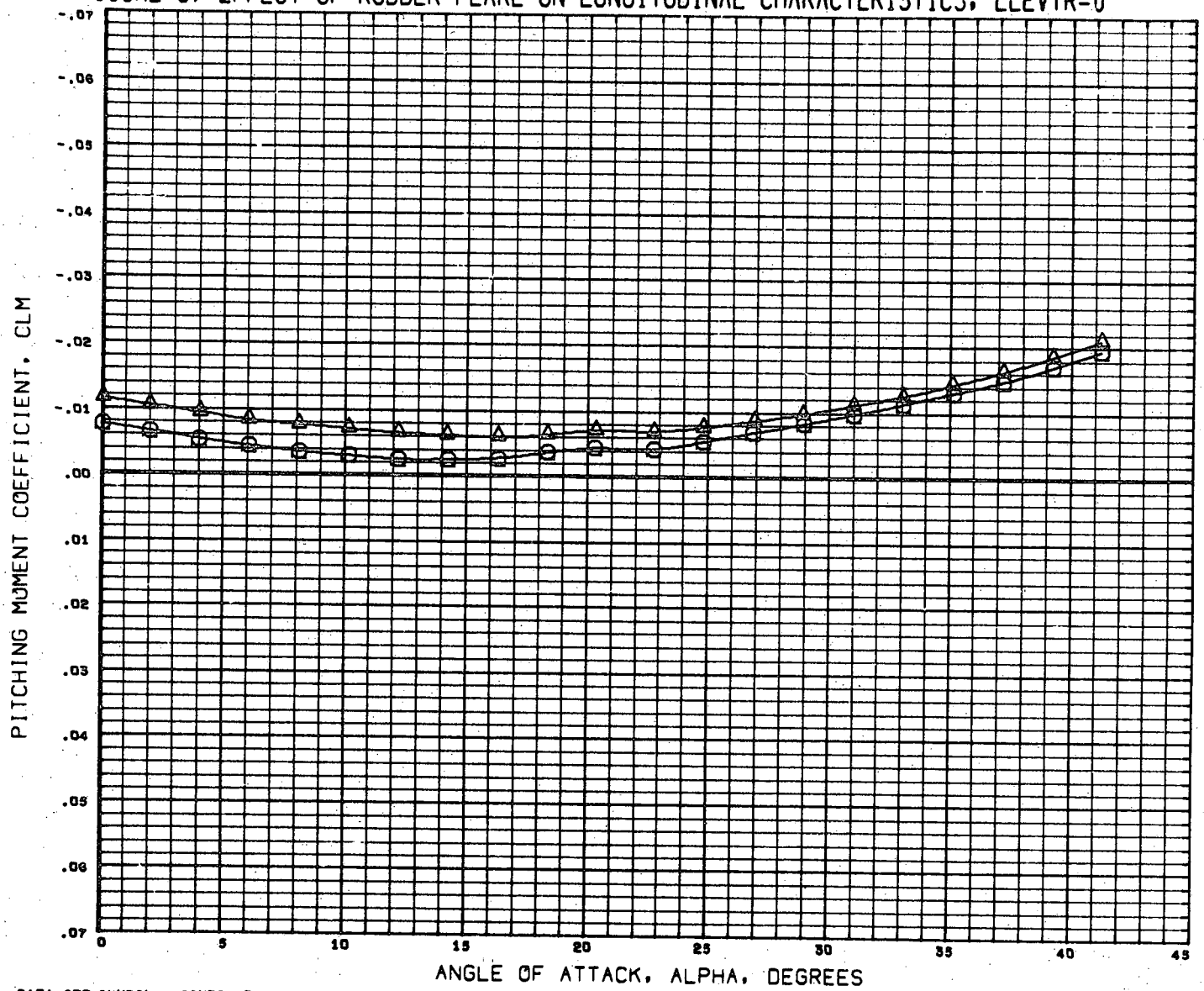
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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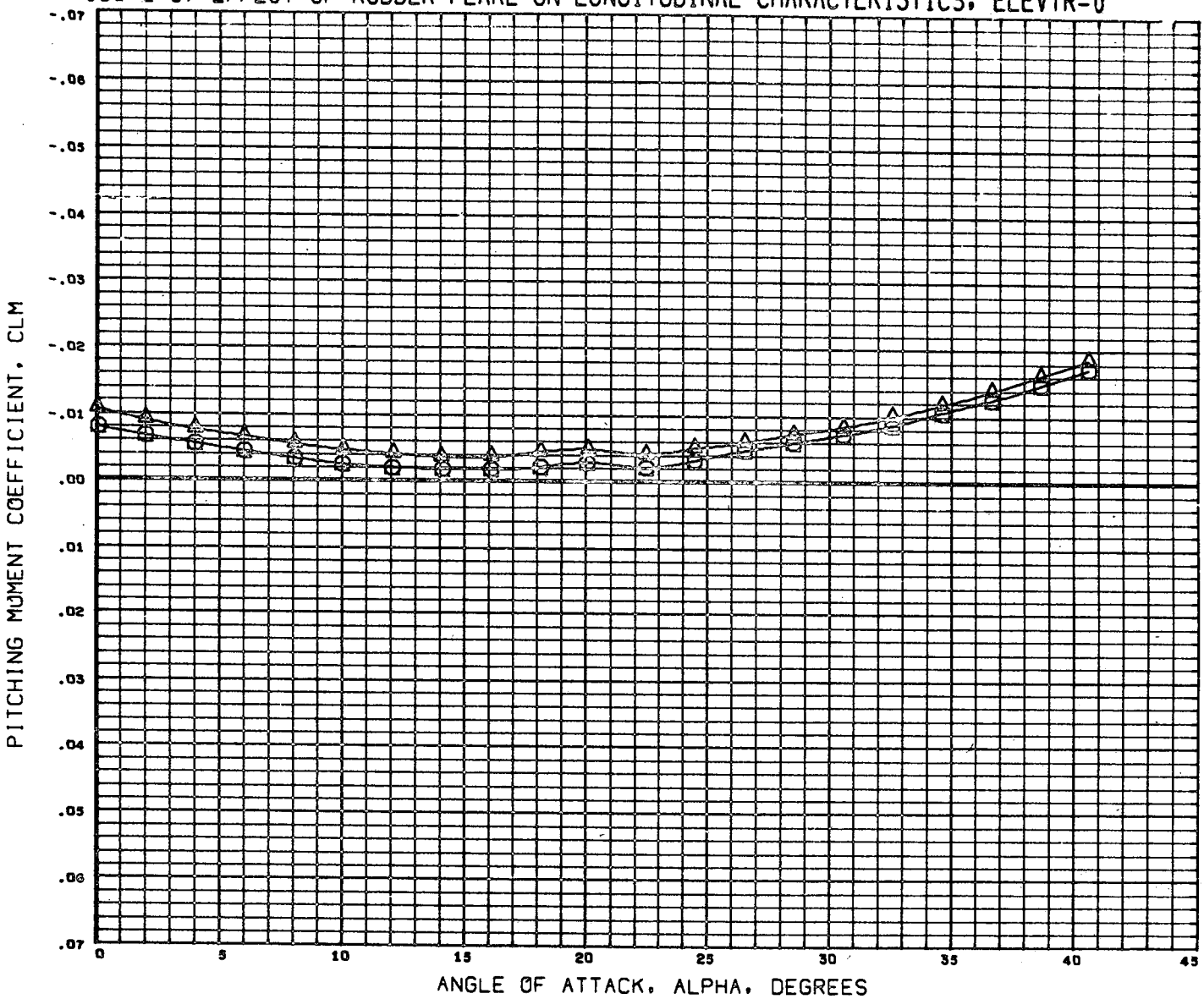
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS. ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S06)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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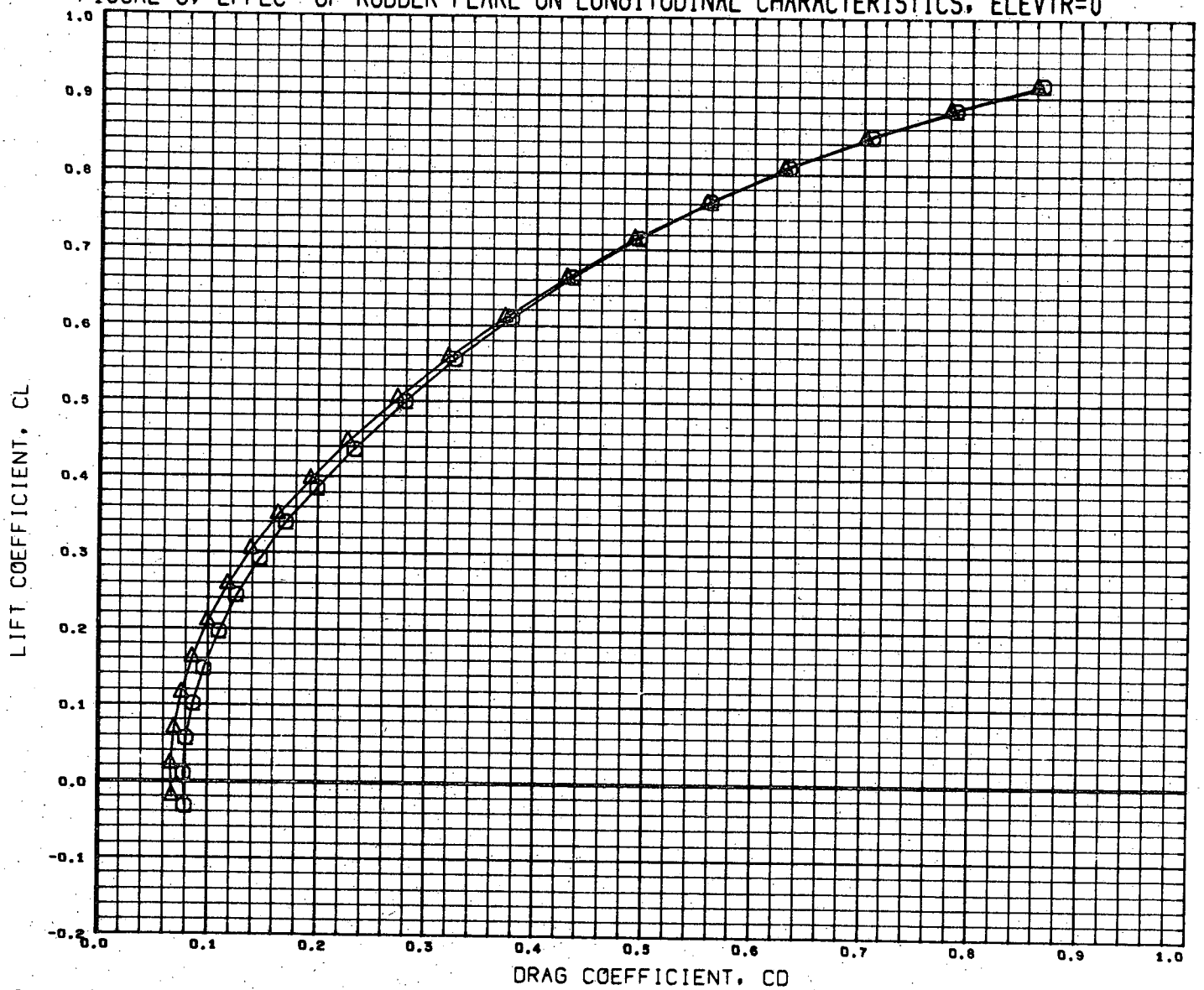
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS, ELEVTR=0



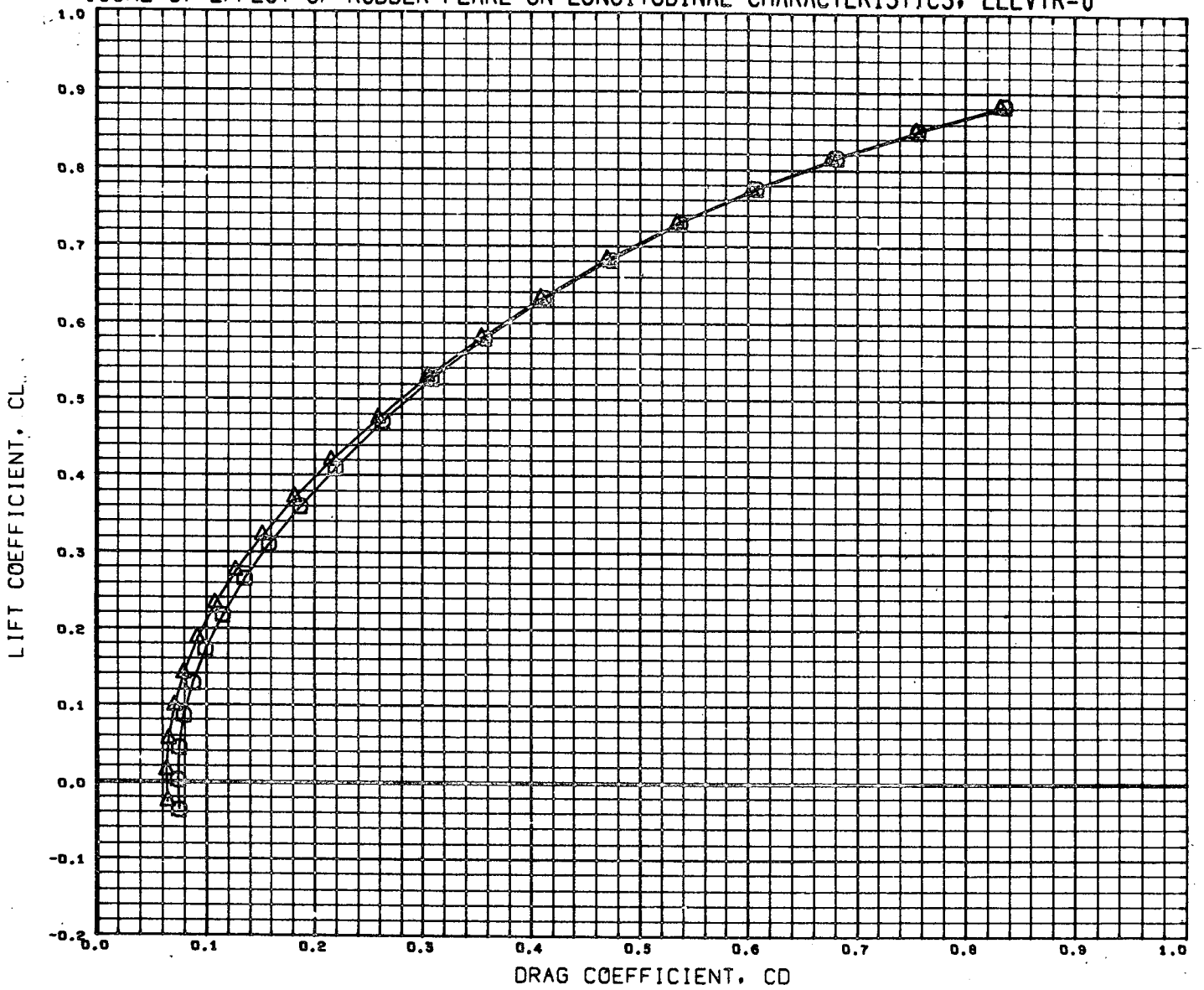
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	○	MSFC S07 GAC H-33 ORB. B5W4V5(+30,-30)
(A49S08)	△	MSFC S07 GAC H-33 ORB. B5W4V5

BETA	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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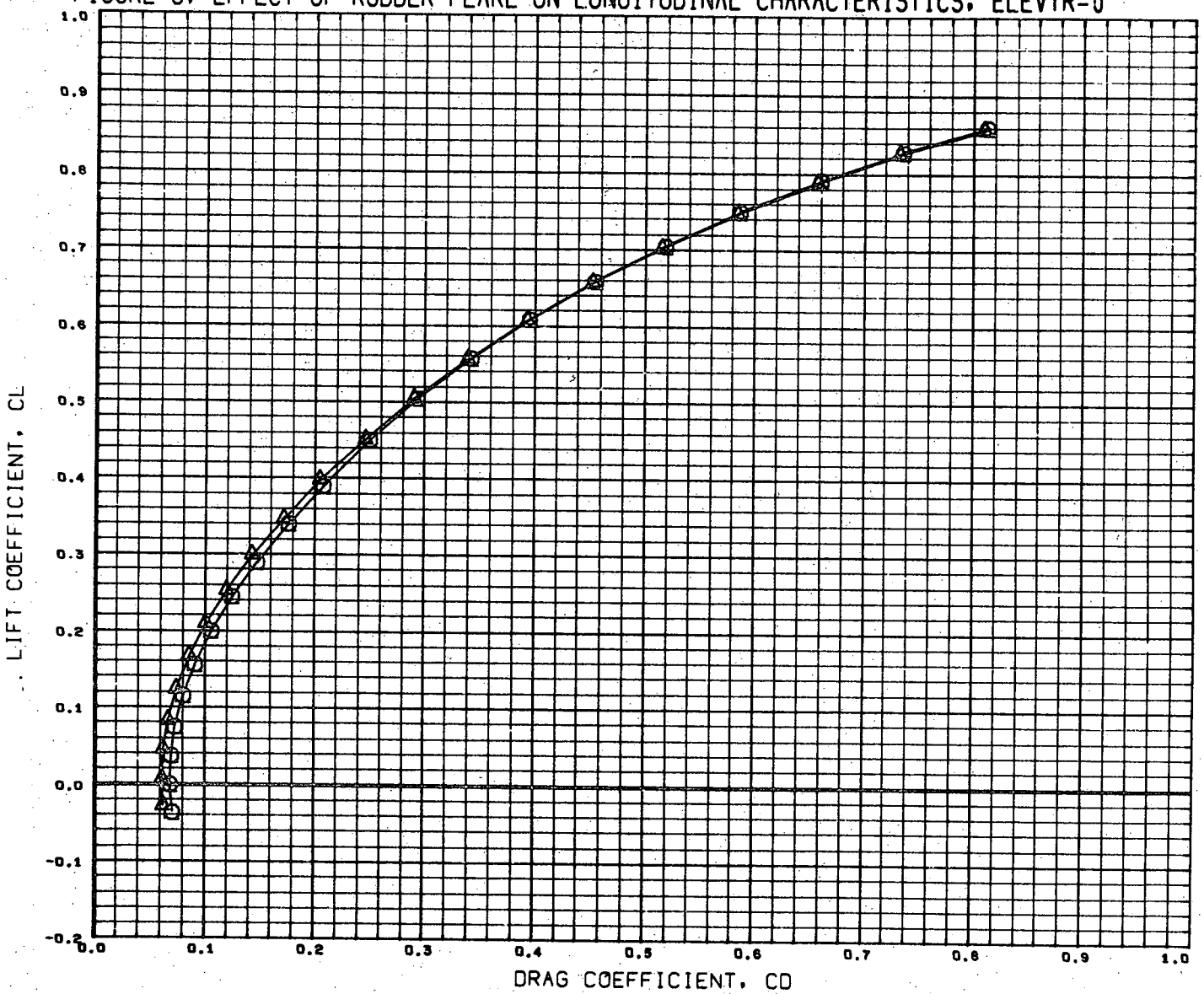
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS. ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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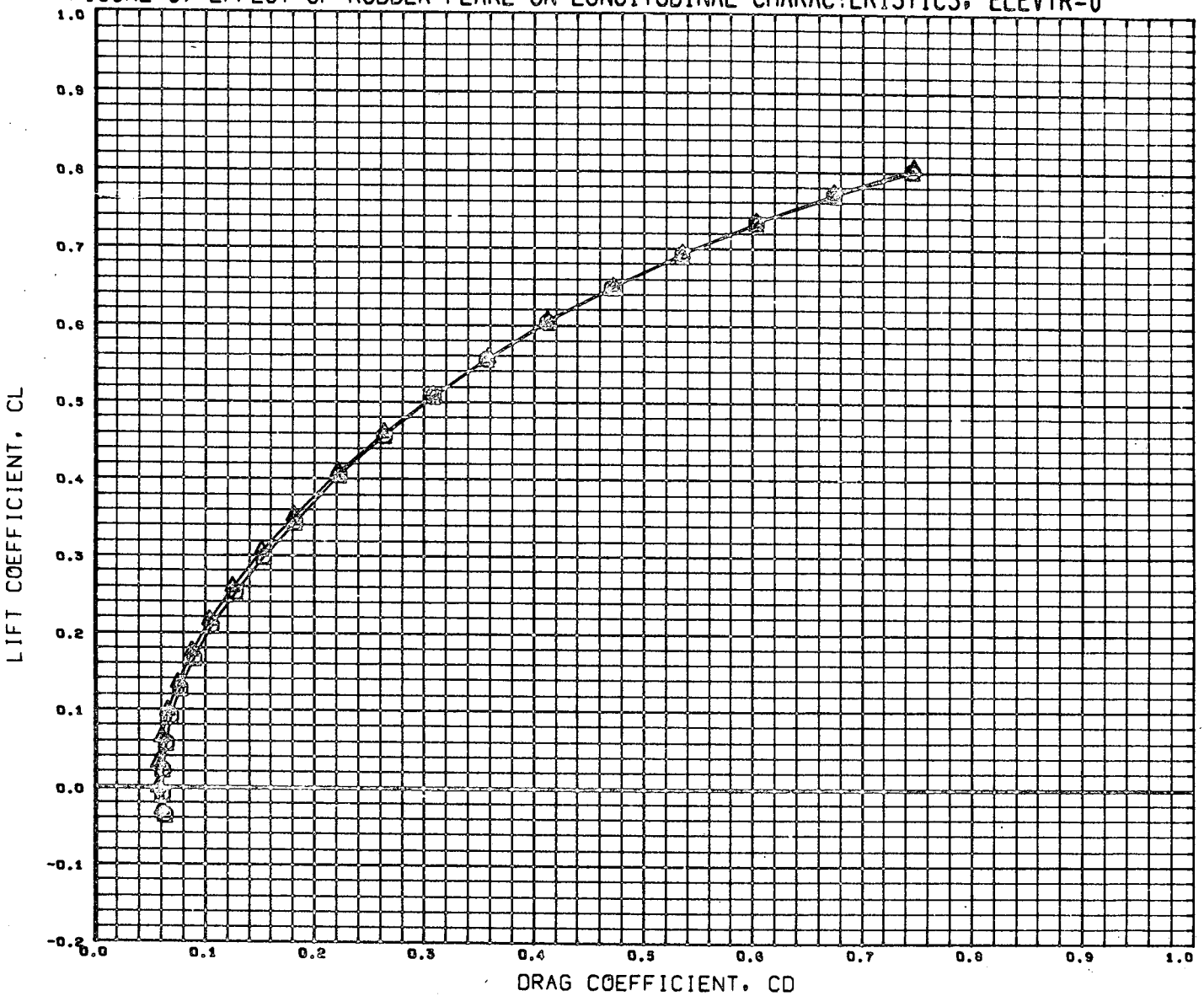
FIGURE 9. EFFECT OF RUDDER FLARE ON LONGITUDINAL CHARACTERISTICS. ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR
(A49S01)	○	MSFC 507 GAC H-33 ORB. B9W4V9(+30,-30)	0.000	0.000	30.000	-30.000
(A49S08)	△	MSFC 507 GAC H-33 ORB. B9W4V9	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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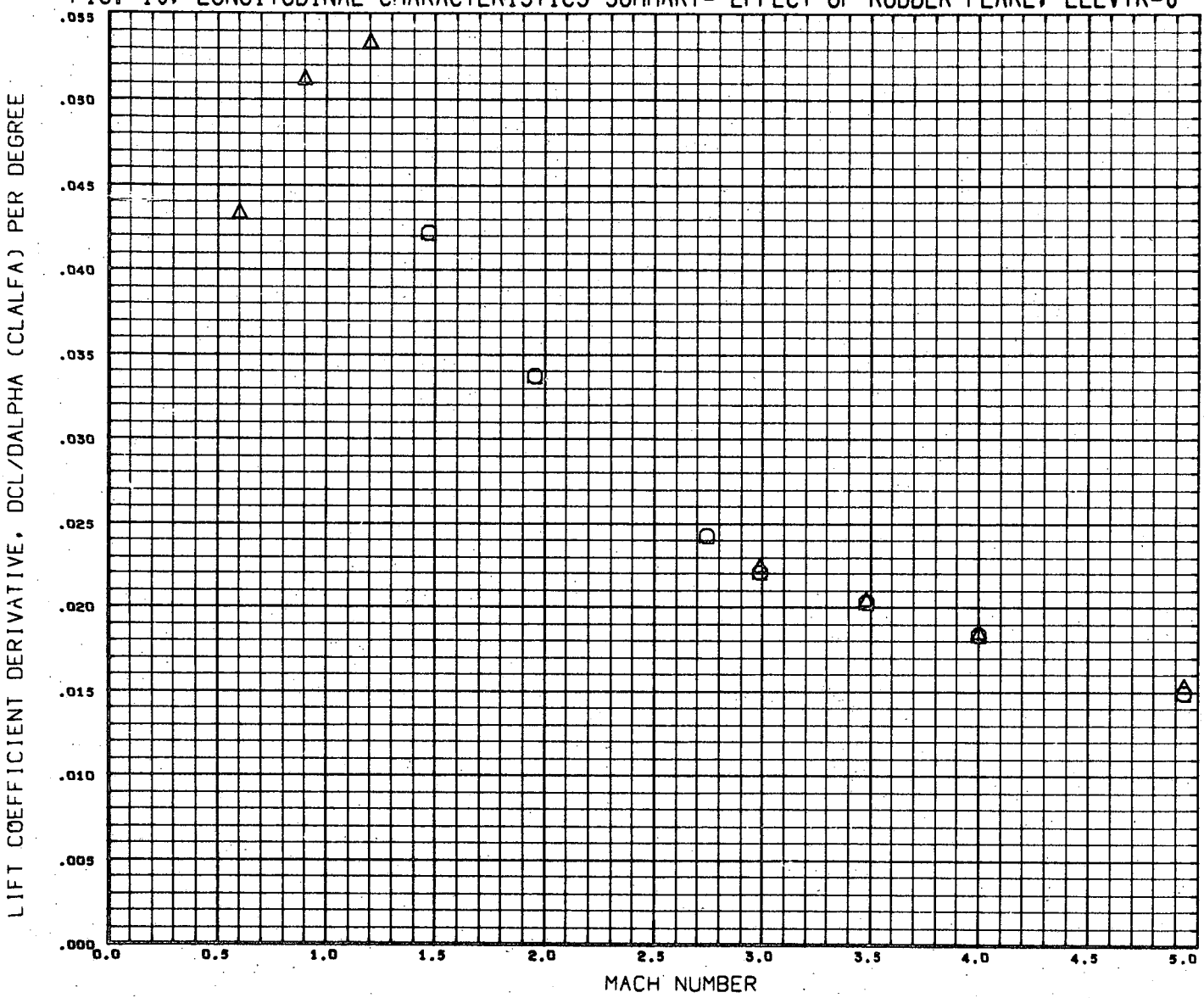
FIG. 10, LONGITUDINAL CHARACTERISTICS SUMMARY- EFFECT OF RUDDER FLARE, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(B49M01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(B49M08)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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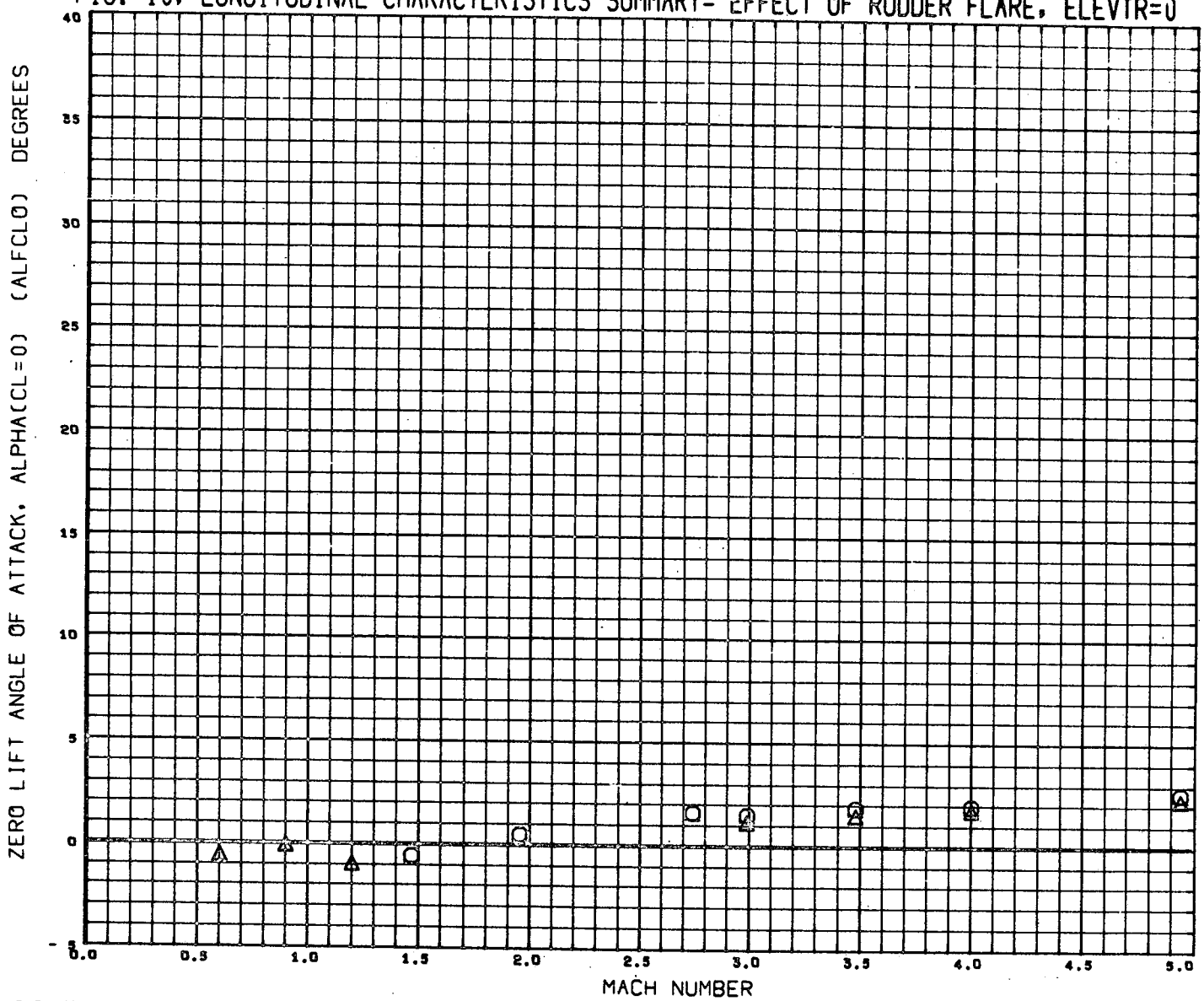
FIG. 10, LONGITUDINAL CHARACTERISTICS SUMMARY- EFFECT OF RUDDER FLARE, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(B49M01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(B49M08)	△	MSFC 507 GAC H-33 ORB. B5W4V5

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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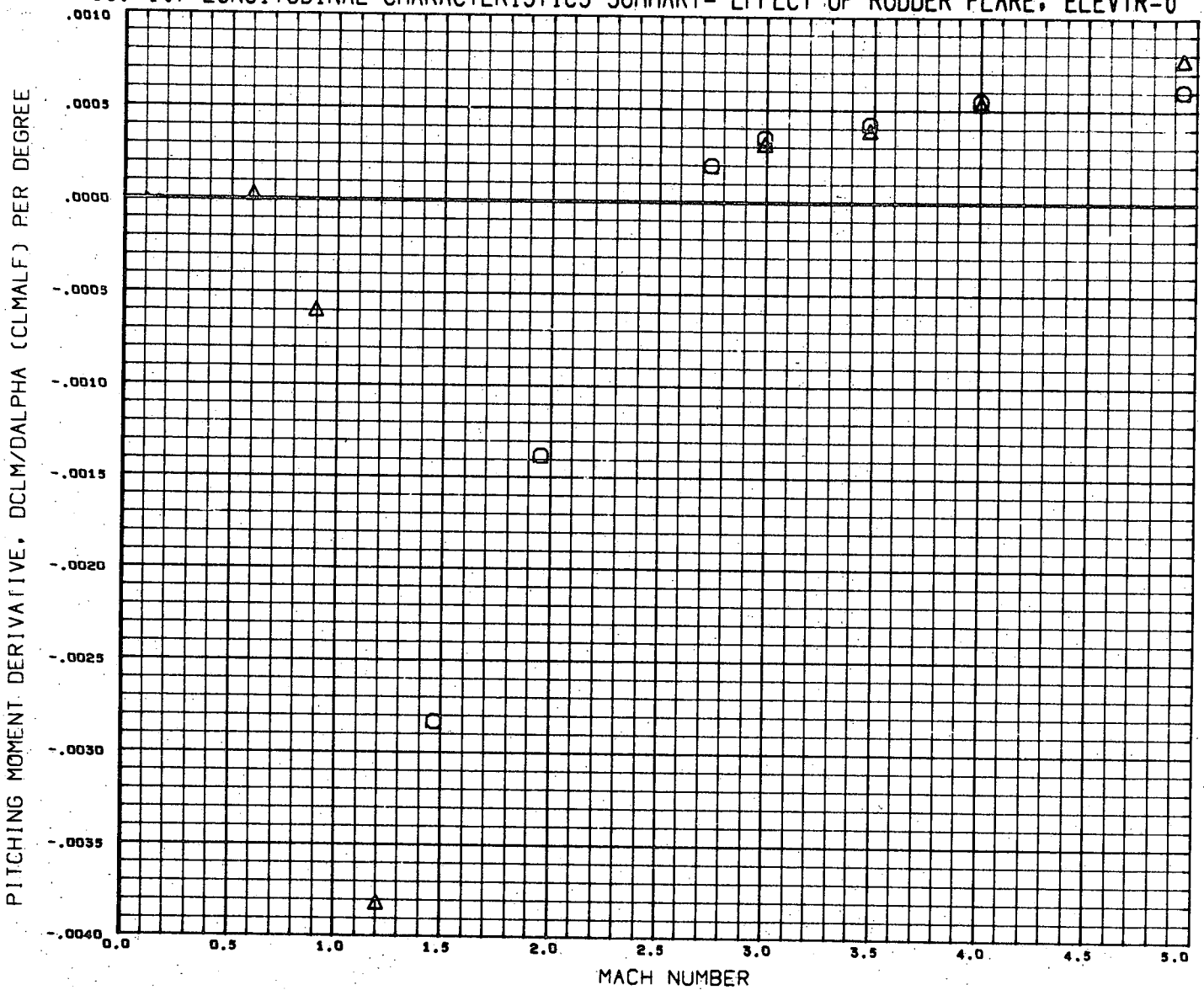
FIG. 10, LONGITUDINAL CHARACTERISTICS SUMMARY- EFFECT OF RUDDER FLARE, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(B49M01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(B49M08)	△	MSFC 507 GAC H-33 ORB. B5W4V5

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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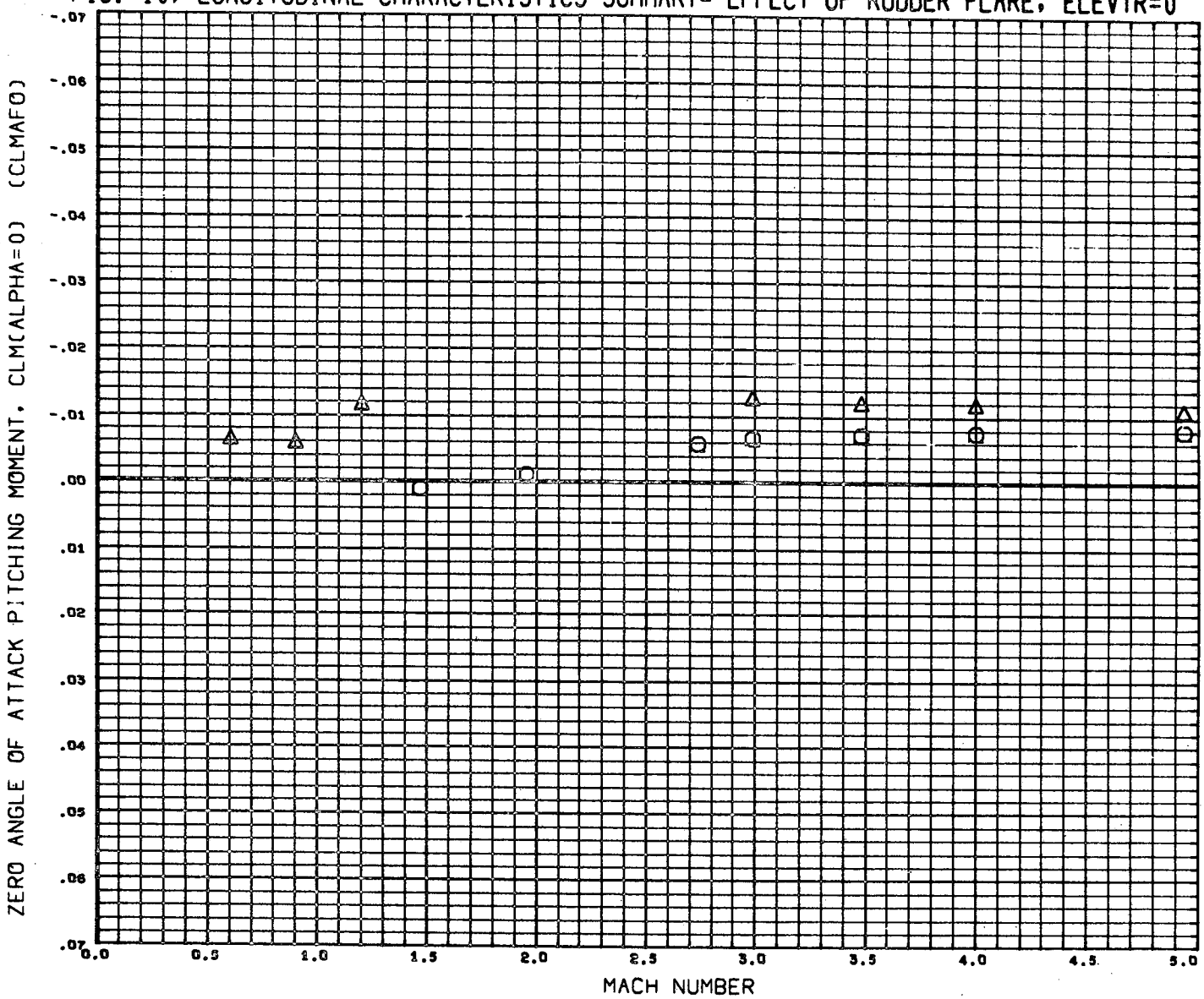
FIG. 10, LONGITUDINAL CHARACTERISTICS SUMMARY- EFFECT OF RUDDER FLARE, ELEVTR=0

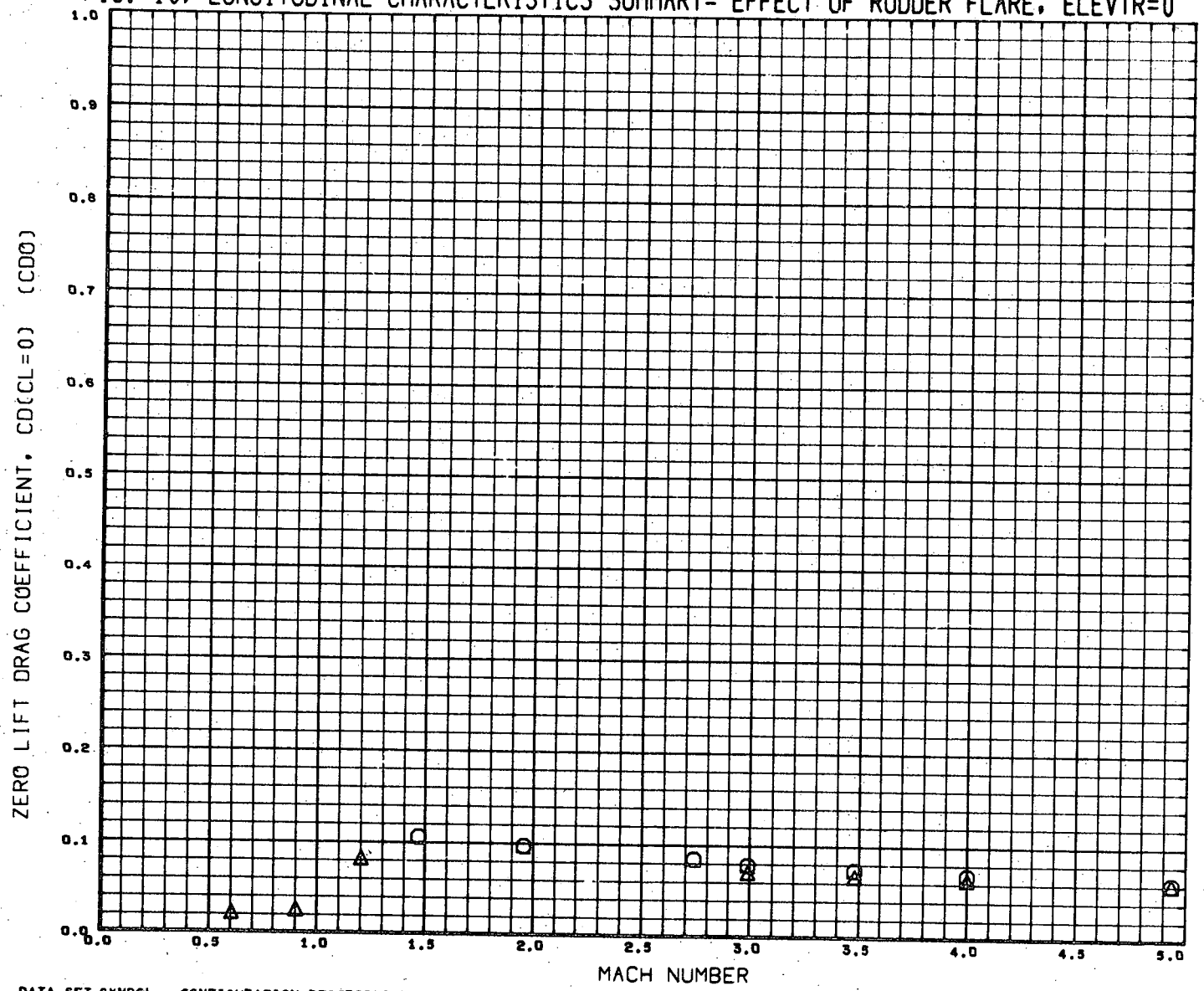


DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(B49M01)	○	MSFC 507 GAC M-33 ORB. B5W4V5(+30,-30)
(B49M08)	△	MSFC 507 GAC M-33 ORB. B5W4V5

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

FIG. 10, LONGITUDINAL CHARACTERISTICS SUMMARY- EFFECT OF RUDDER FLARE, ELEVTR=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(B49M01)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(B49M08)	△	MSFC 507 GAC H-33 ORB. B5W4V5

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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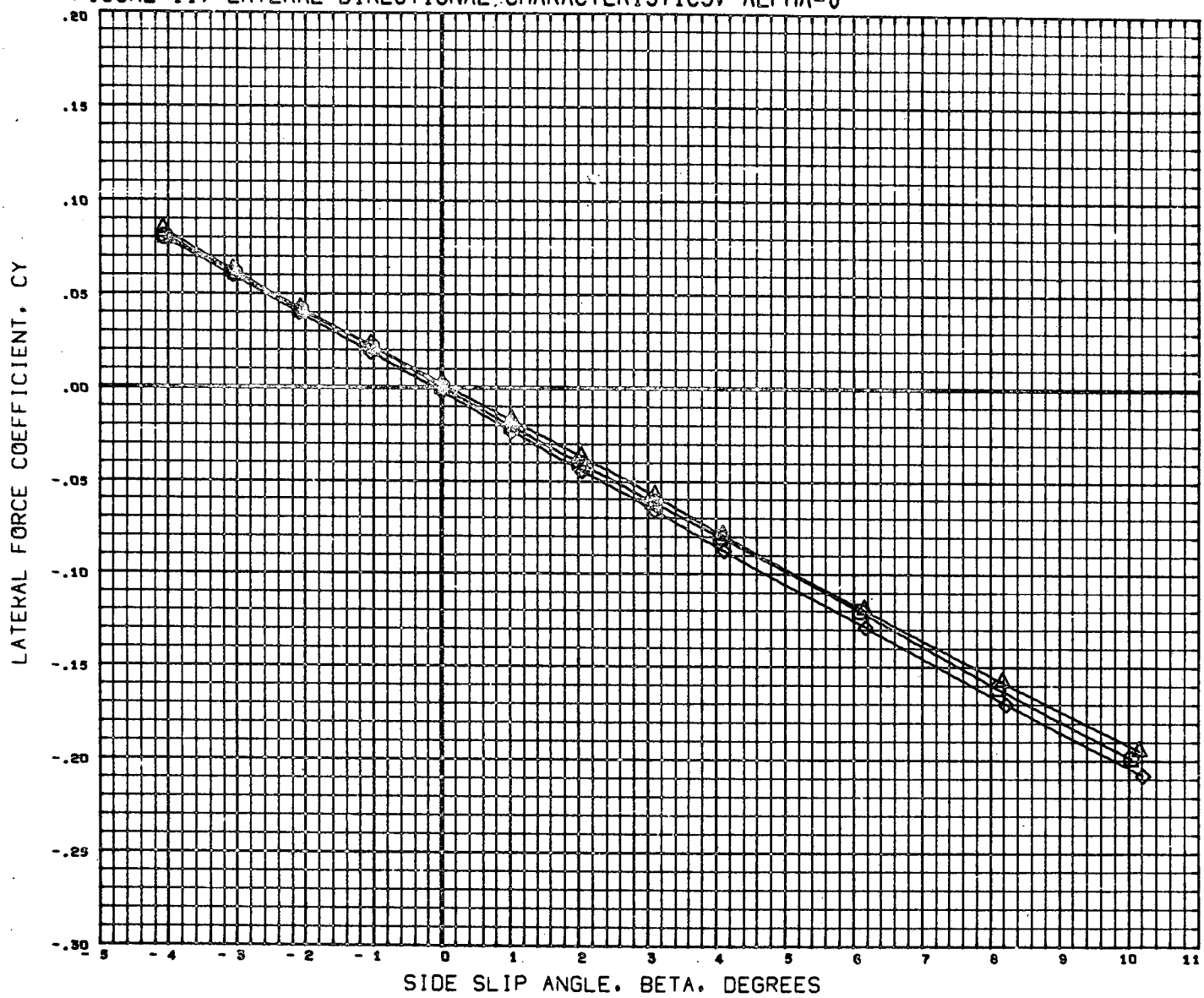
FIGURE 11. LATERAL-DIRECTIONAL CHARACTERISTICS, ALPHA=0



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.599	ALPHA	0.000	ELEVTR	0.000
△	0.900	AILERN	0.000	LRUDDR	0.000
◇	1.198	RRUDDR	0.000		

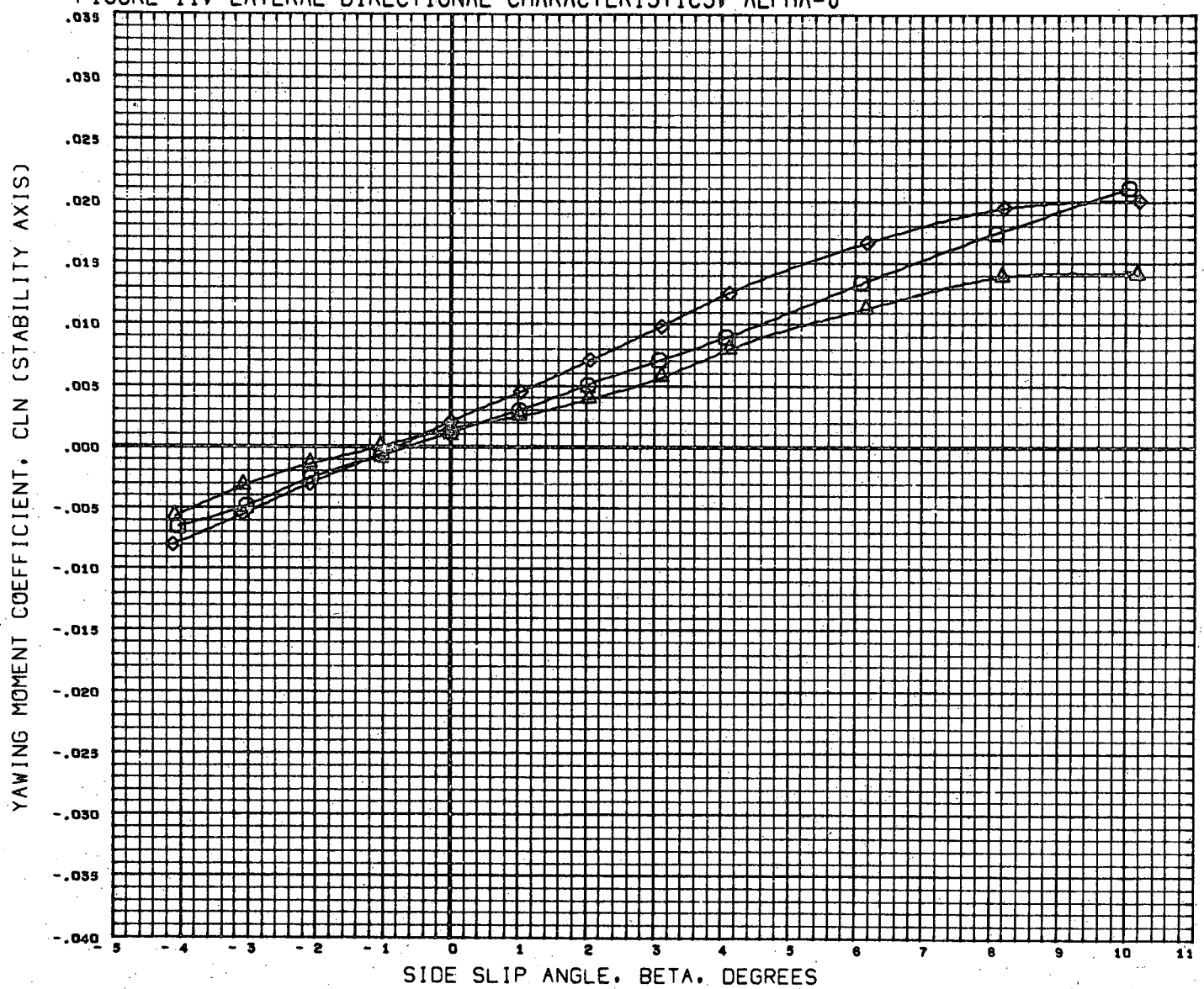
DATA HIST. CODE *A

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5 (A49X34) 31 MAY 72 PAGE 112

FIGURE 11. LATERAL-DIRECTIONAL CHARACTERISTICS, ALPHA=0



SYMBOL	MACH		PARAMETRIC VALUES		
○	0.599	ALPHA	0.000	ELEVTR	0.000
△	0.900	AILERN	0.000	LRUDDR	0.000
◇	1.198	RRUDDR	0.000		

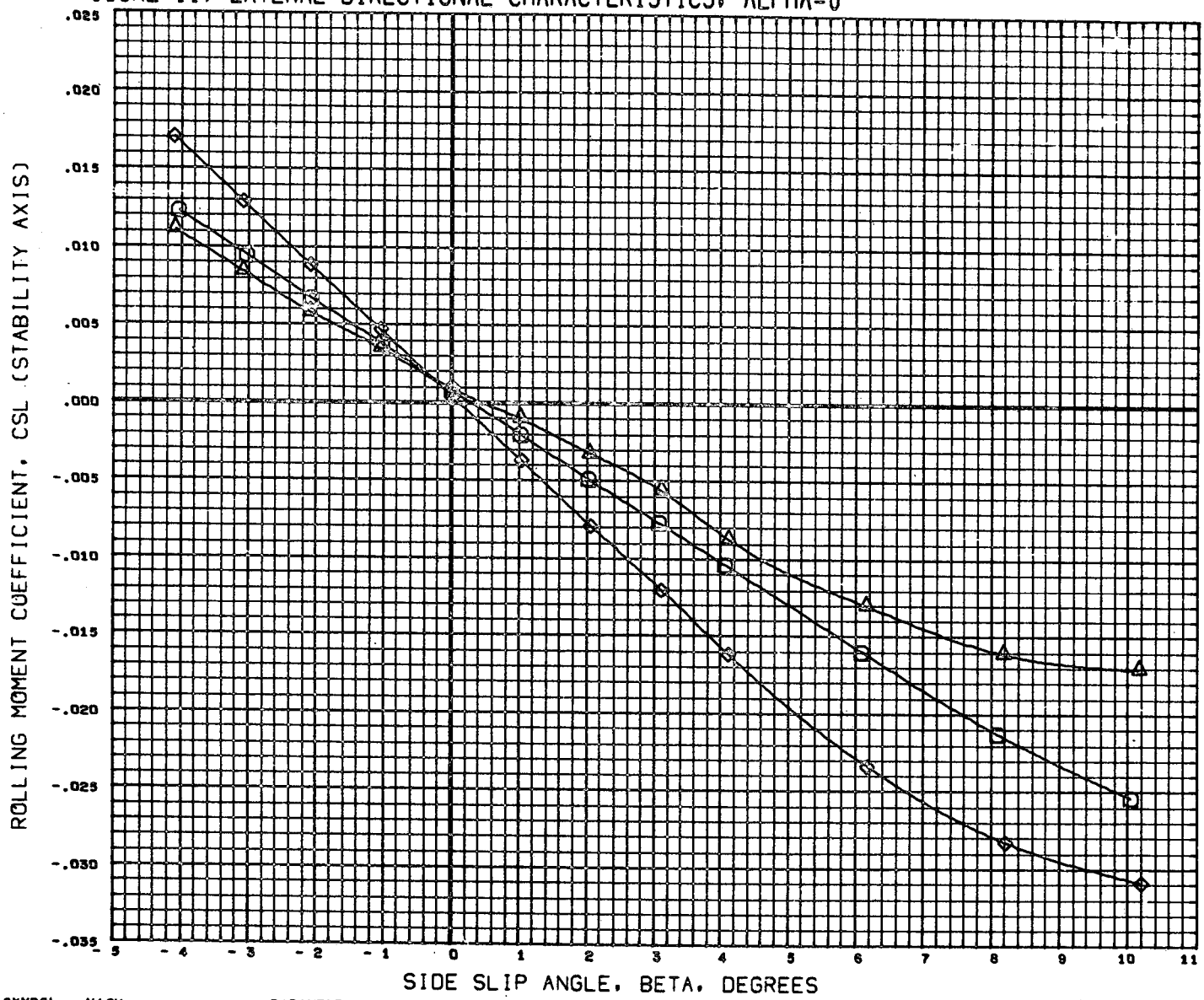
DATA HIST. CODE *A

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5 (A49X34) 31 MAY 72 PAGE 113

FIGURE 11. LATERAL-DIRECTIONAL CHARACTERISTICS. ALPHA=0



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.599	ALPHA	0.000	ELEVTR	0.000
△	0.900	AILERN	0.000	LRUDDR	0.000
◇	1.198	RRUDDR	0.000		

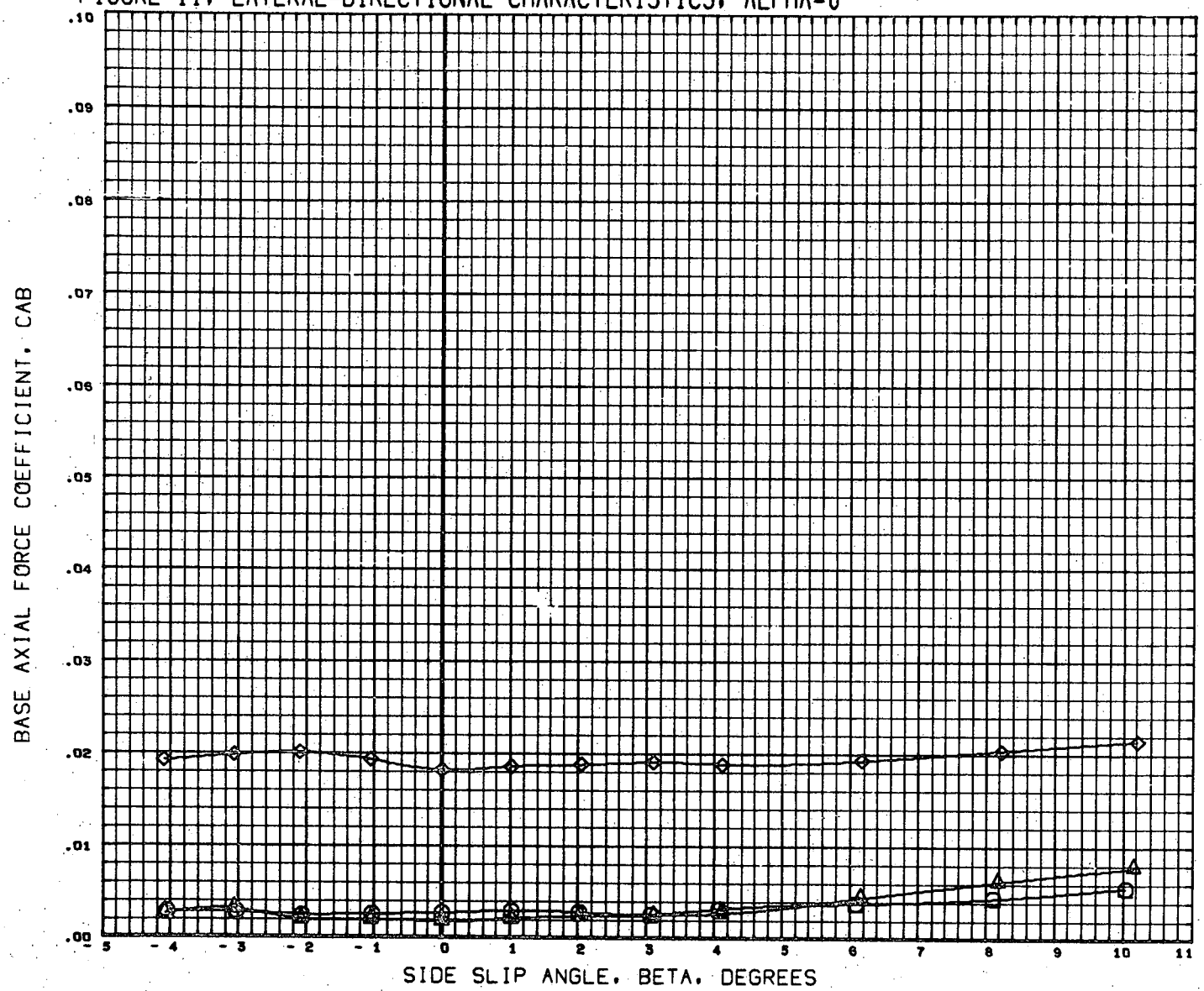
DATA HIST. CODE *A

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5 (A49X34) 31 MAY 72 PAGE 114

FIGURE 11. LATERAL-DIRECTIONAL CHARACTERISTICS, ALPHA=0



SYMBOL	MACH		PARAMETRIC VALUES		
○	0.599	ALPHA	0.000	ELEVTR	0.000
△	0.900	AILERN	0.000	LRUDDR	0.000
◇	1.196	RRUDDR	0.000		

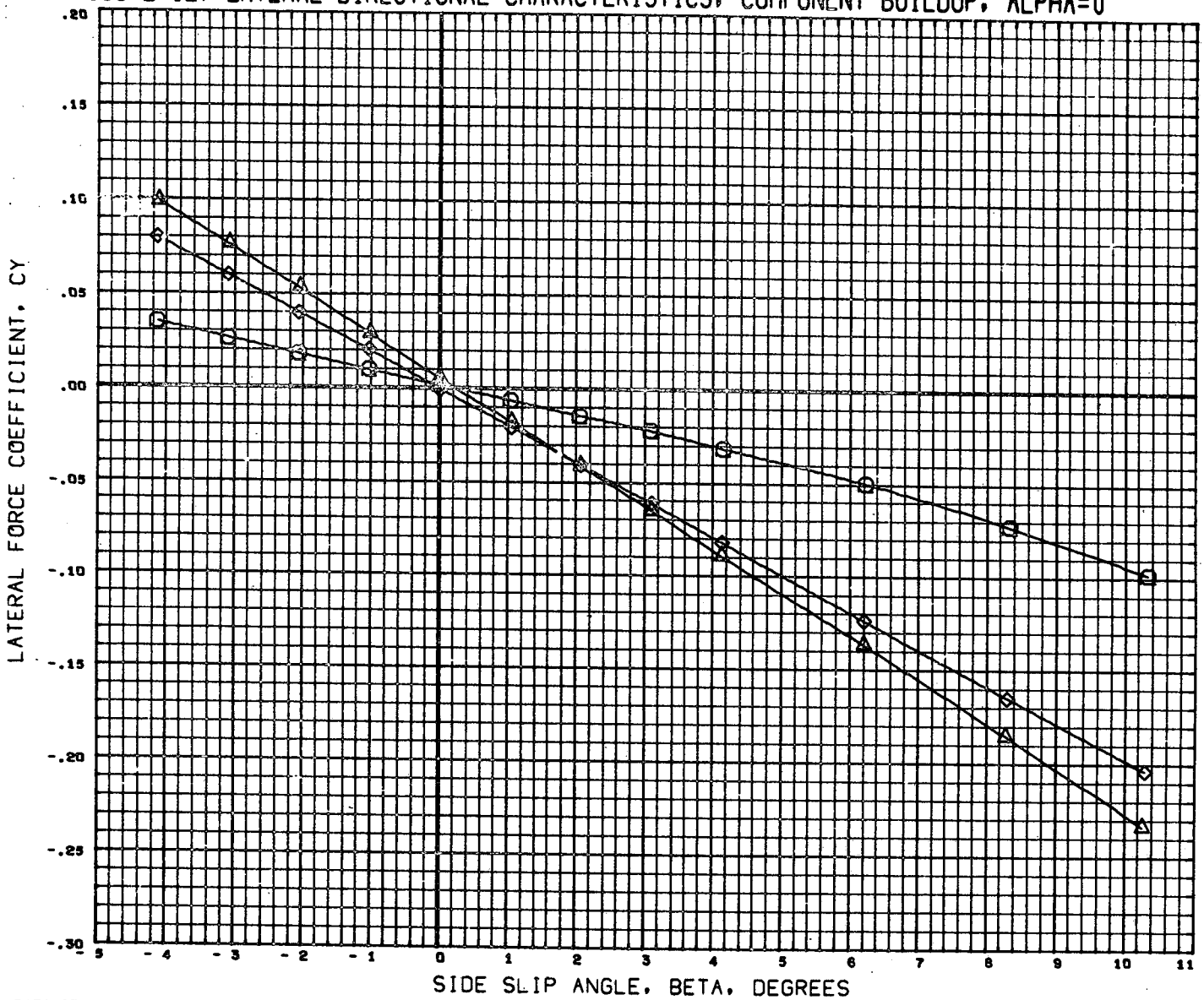
DATA HIST. CODE *A

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MSFC 507 GAC H-33 ORB. B5W4V5 (A49X34) 31 MAY 72 PAGE 115

FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49028)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49033)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.46

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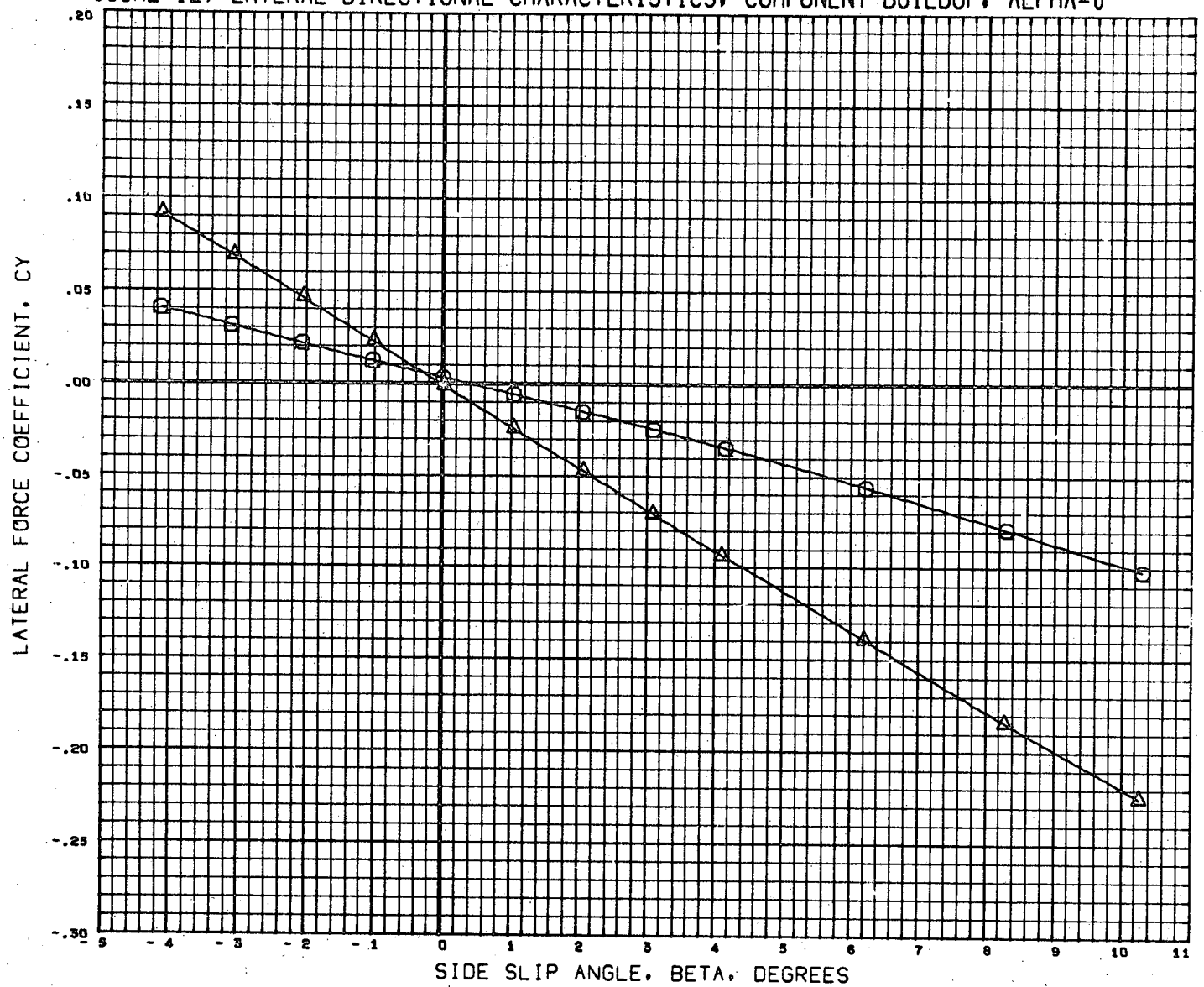
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49028)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49033)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	DATA NOT AVAILABLE FOR ALL CONDITIONS	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.96

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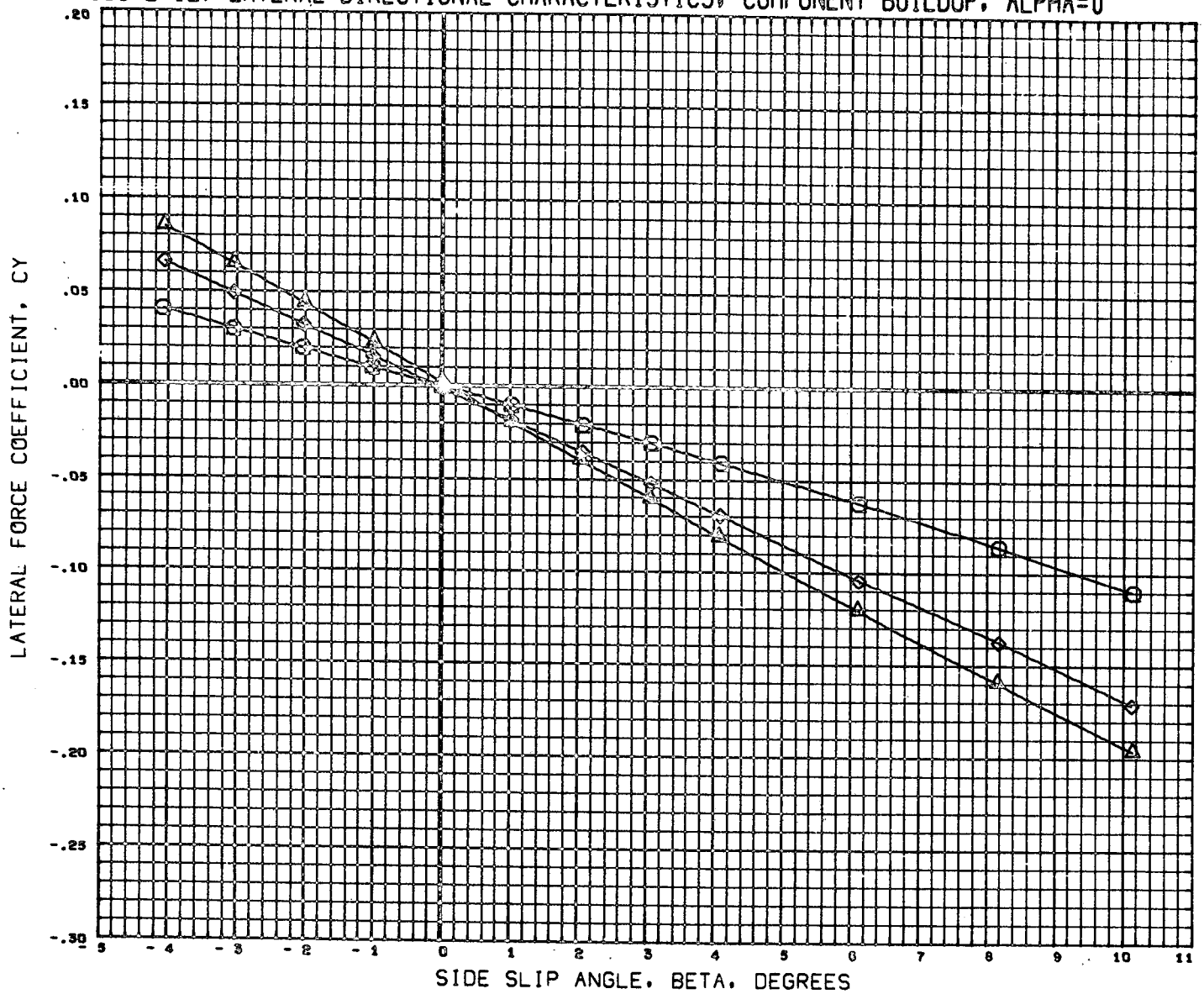
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



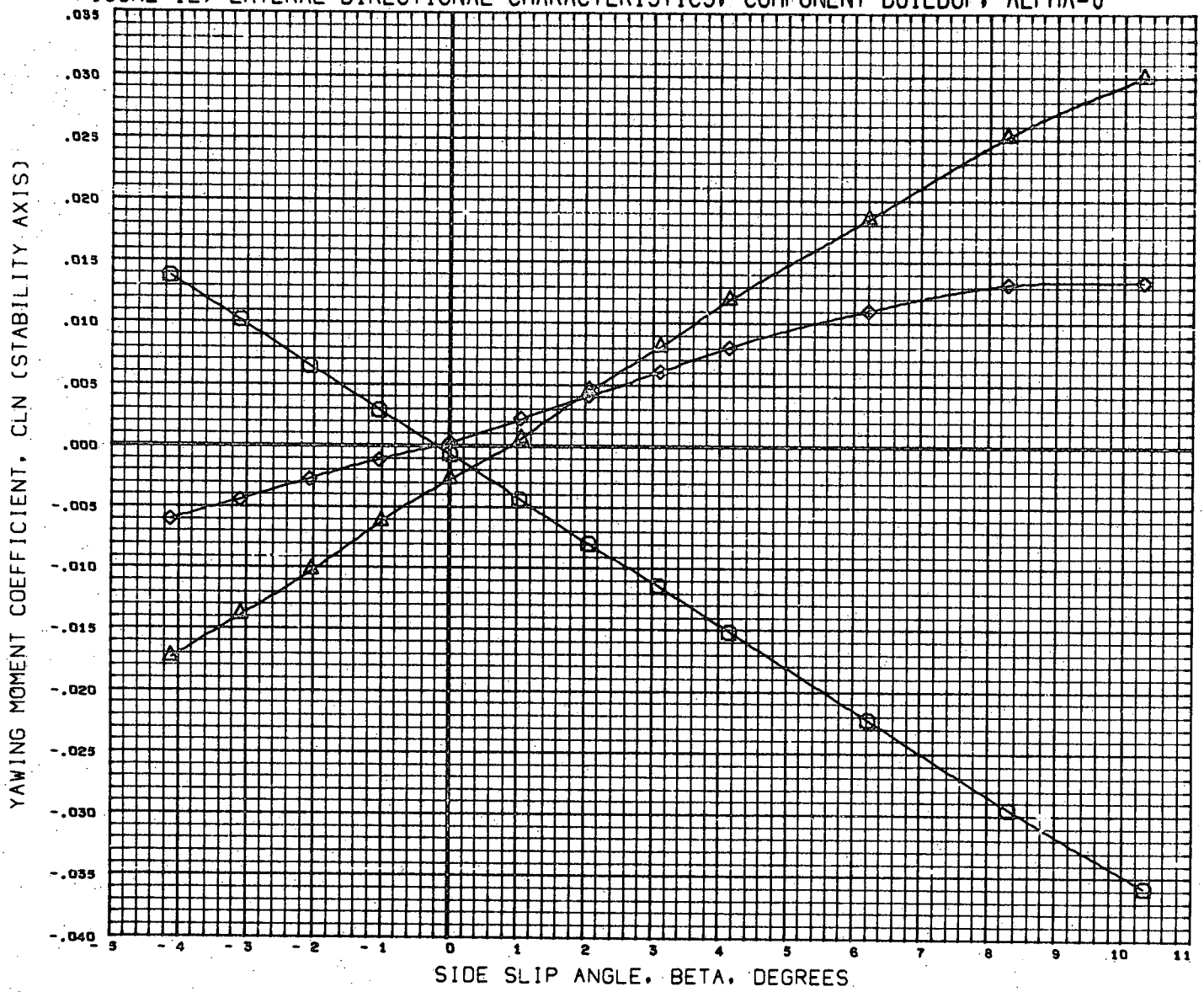
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49026)	○	MSFC 507 GAC M-33 ORB. B3W4	0.000	0.000		
(A49033)	△	MSFC 507 GAC M-33 ORB. B3W4VS(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	MSFC 507 GAC M-33 ORB. B3W4VS	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.74

FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49028)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49033)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.46

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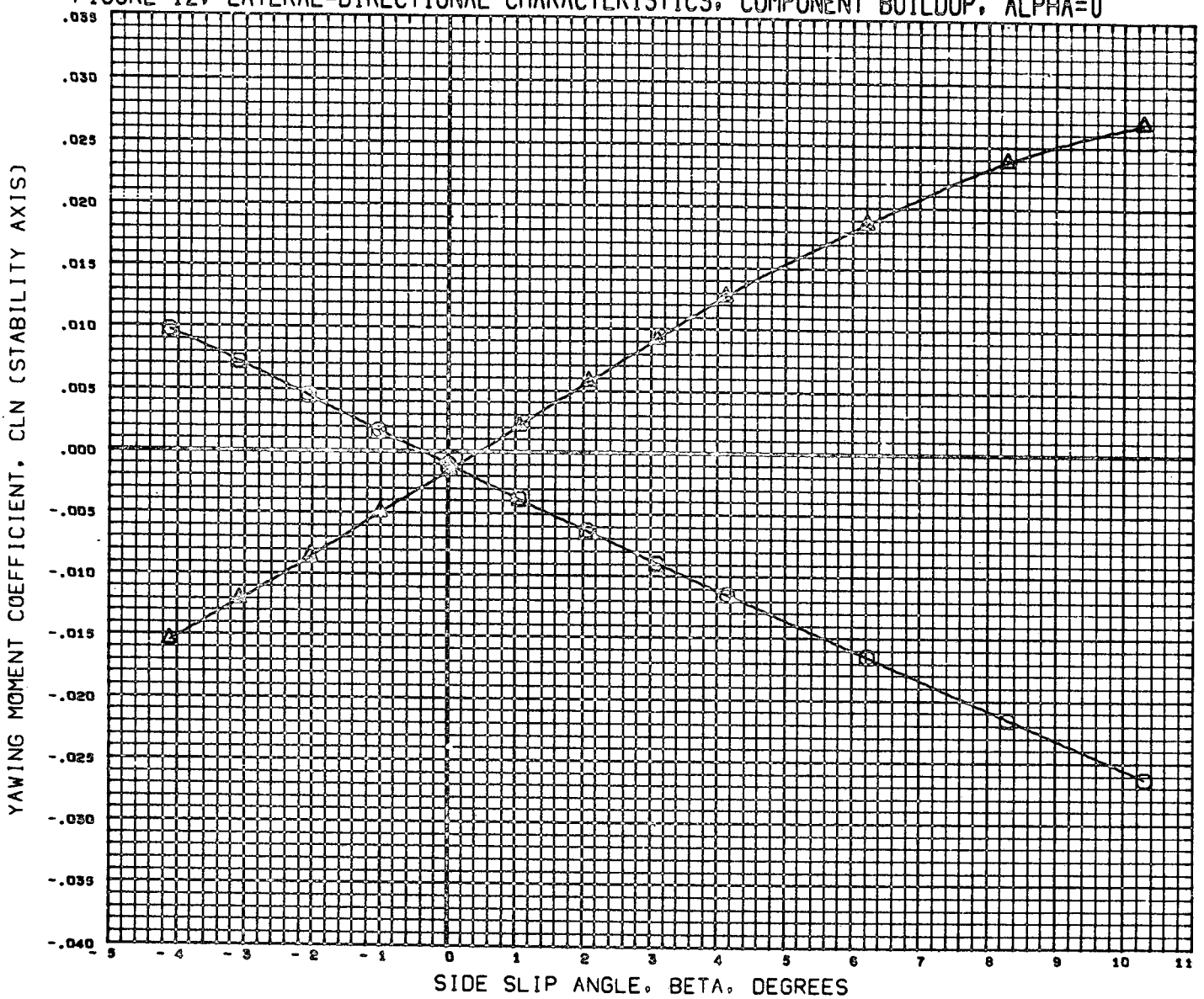
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49028)	○	MSFC 907 GAC M-33 ORB. BSW4	0.000	0.000		
(A49033)	△	MSFC 907 GAC M-33 ORB. BSW4VS(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	DATA NOT AVAILABLE FOR ALL CONDITIONS	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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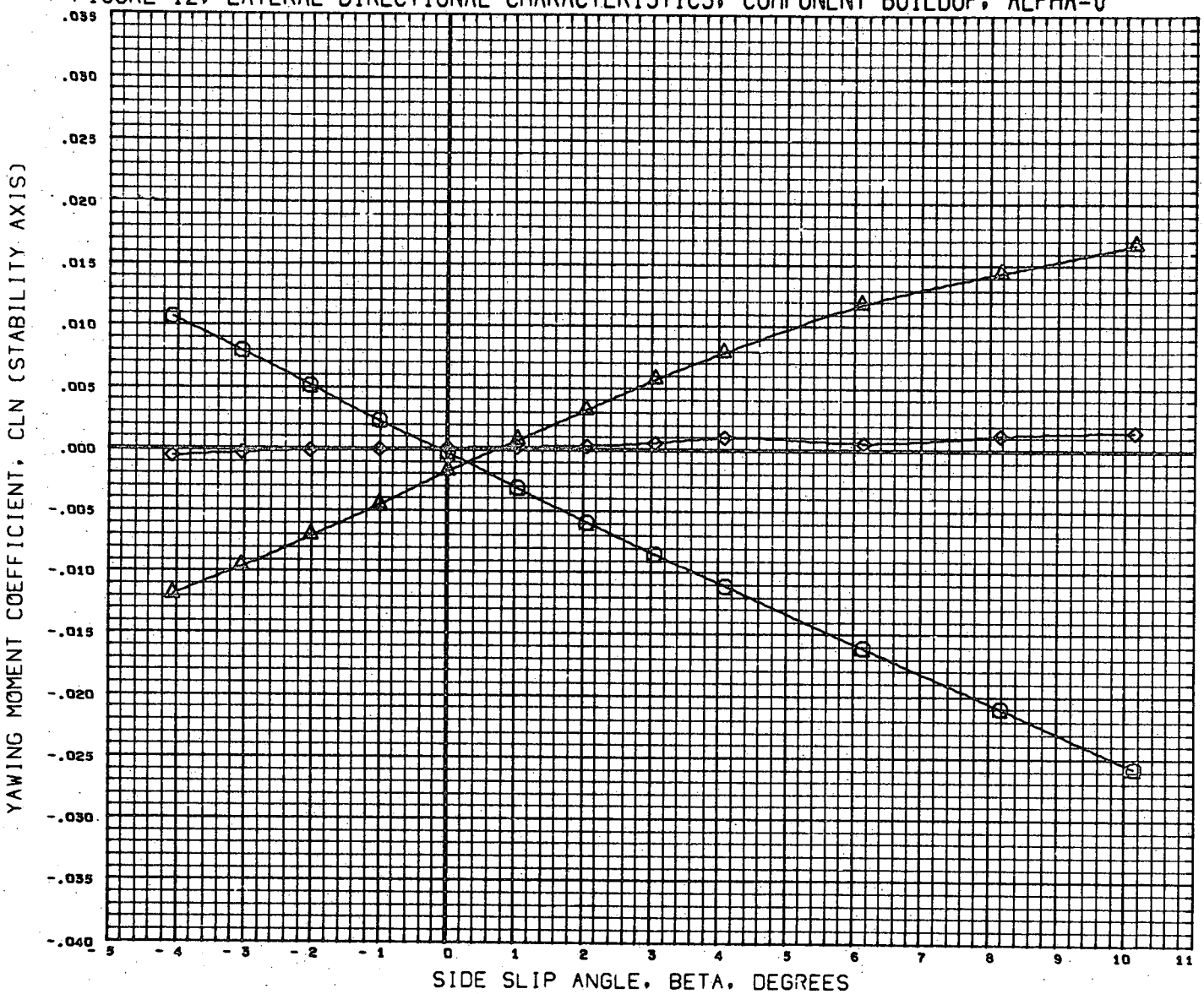
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49026)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49033)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.74

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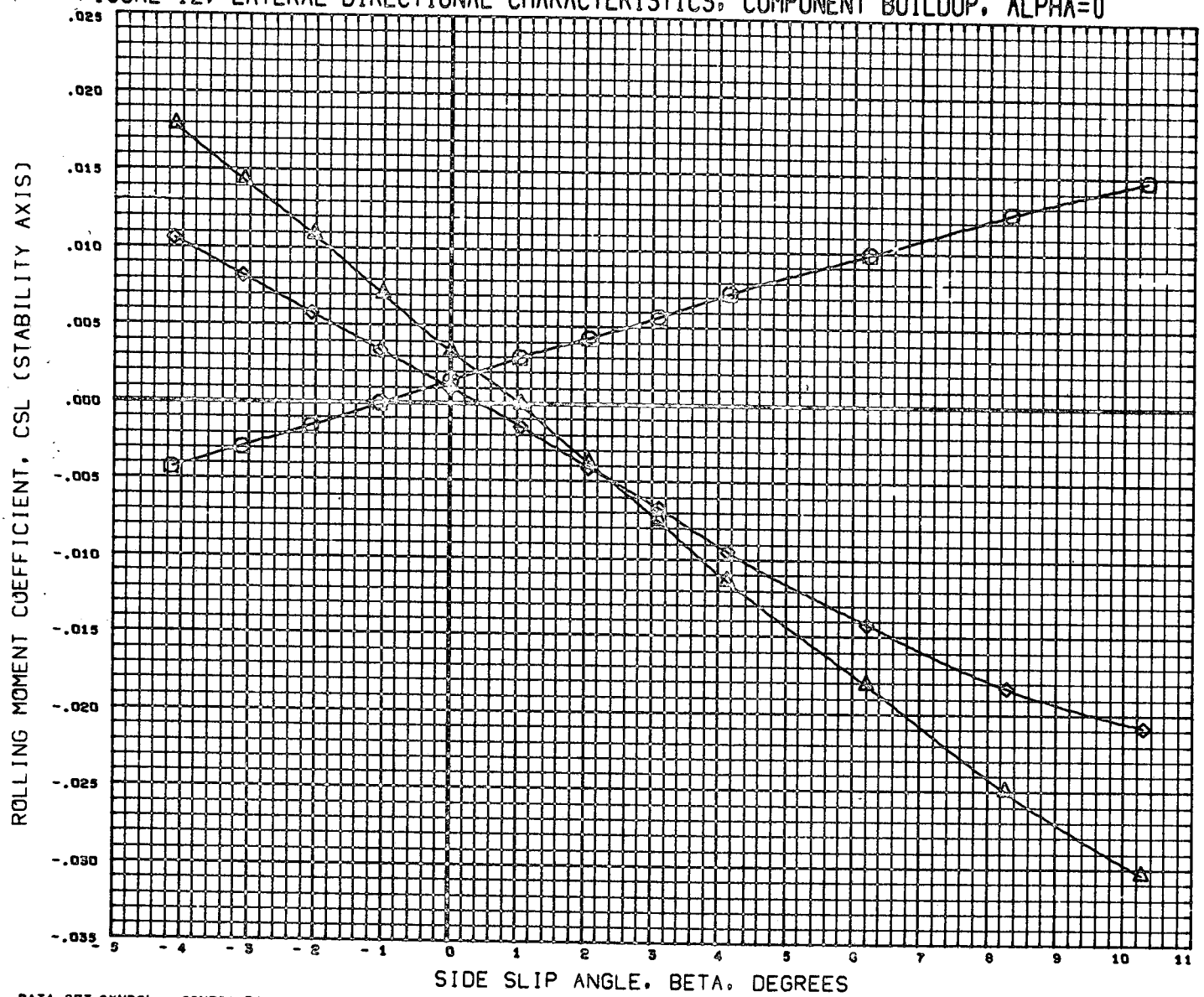
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



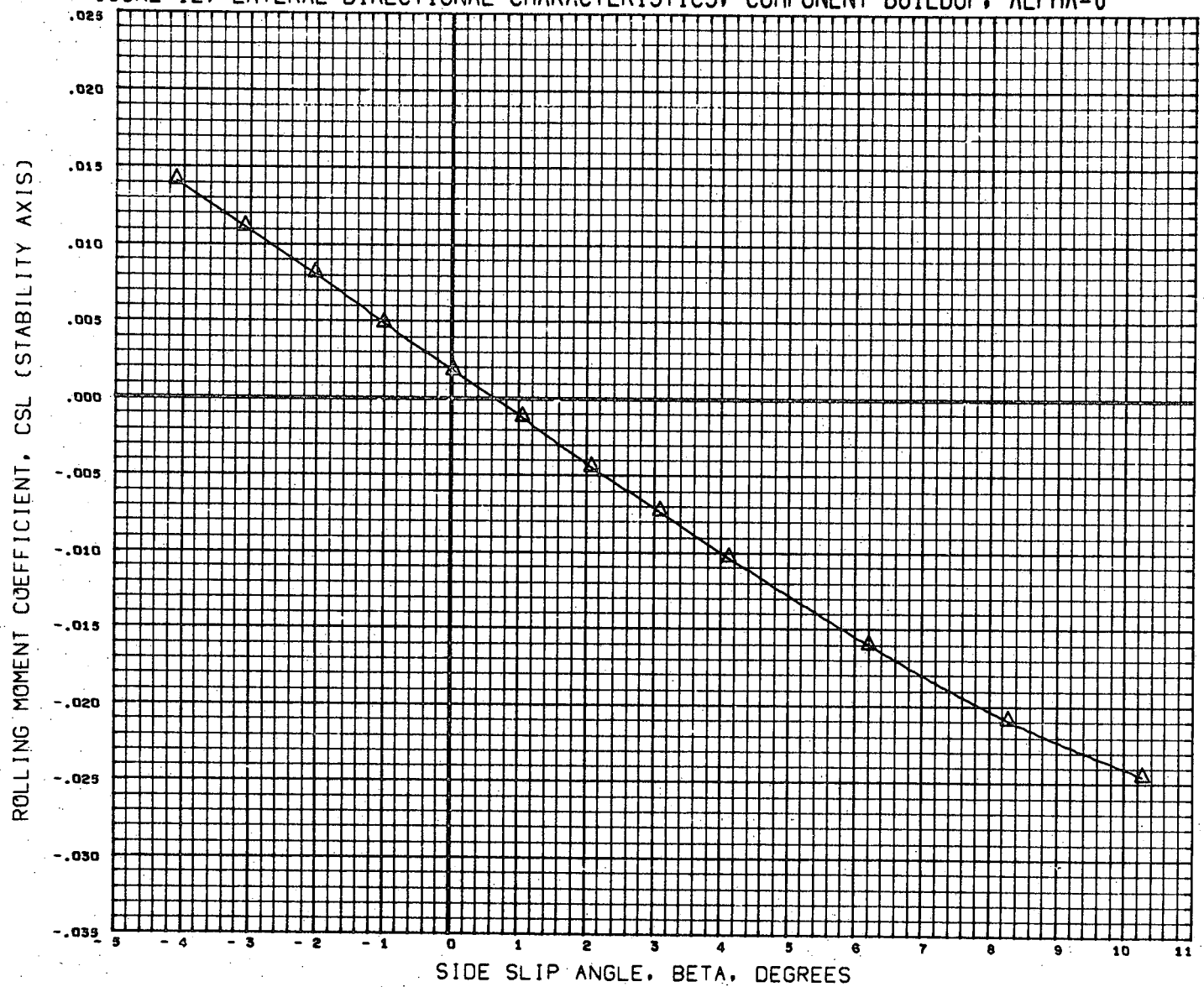
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49028)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49033)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.46

FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49033) △	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.96

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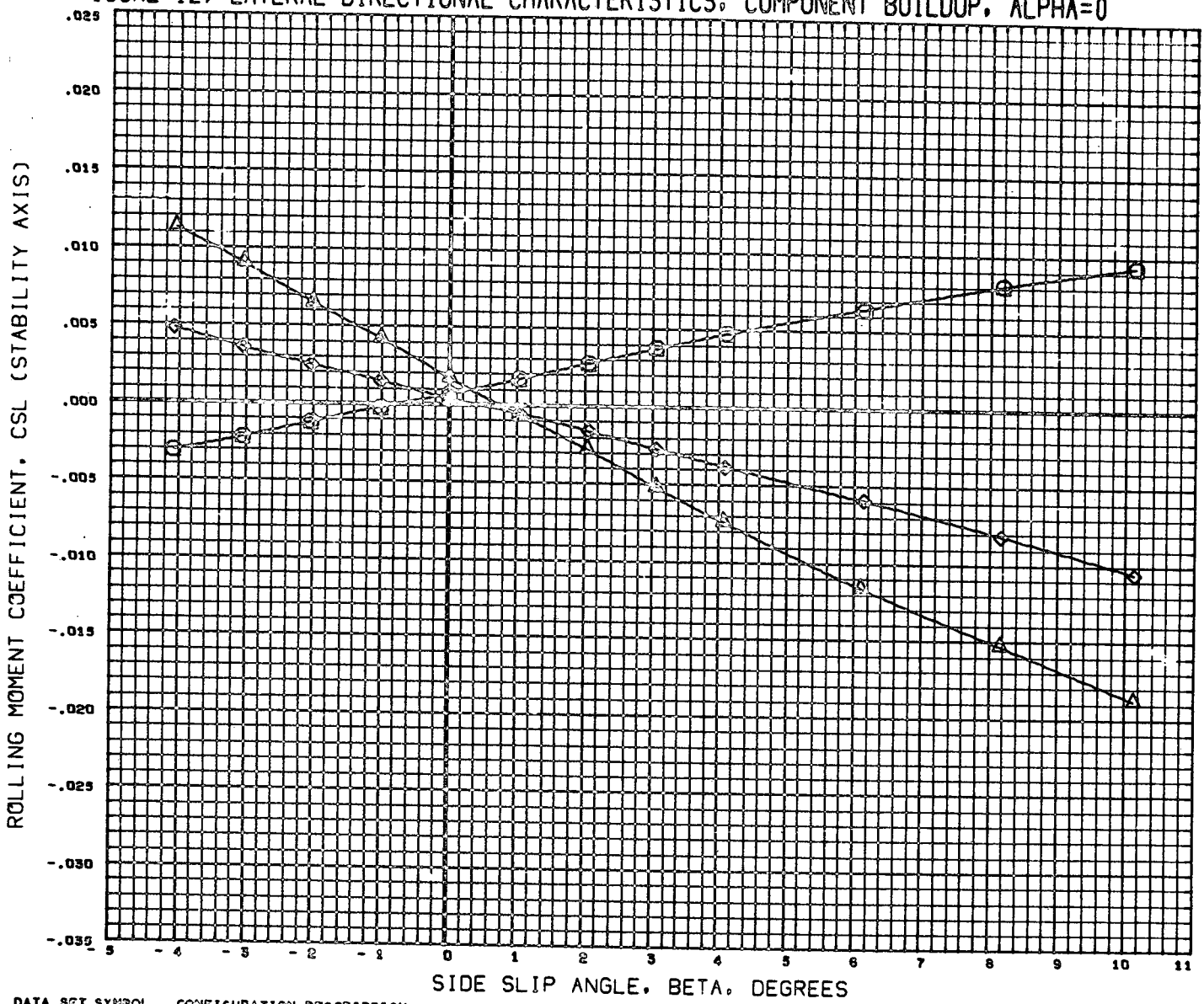
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



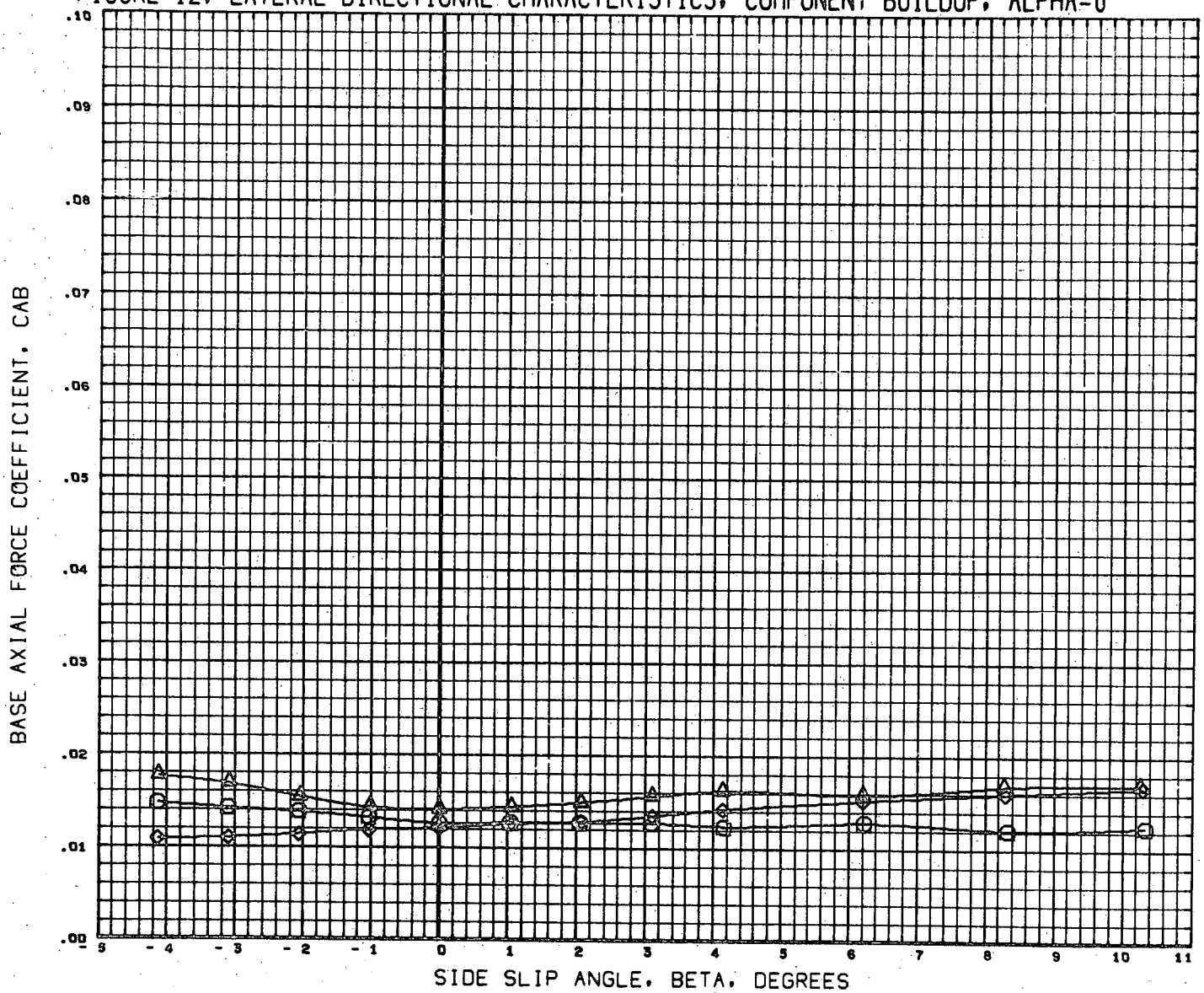
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49028)	○	MSFC 507 GAC H-33 ORB. BSW4
(A49033)	△	MSFC 507 GAC H-33 ORB. BSW4V3(+30,-30)
(A49Y34)	◇	MSFC 507 GAC H-33 ORB. BSW4V3

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.74

FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49028)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49033)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.46

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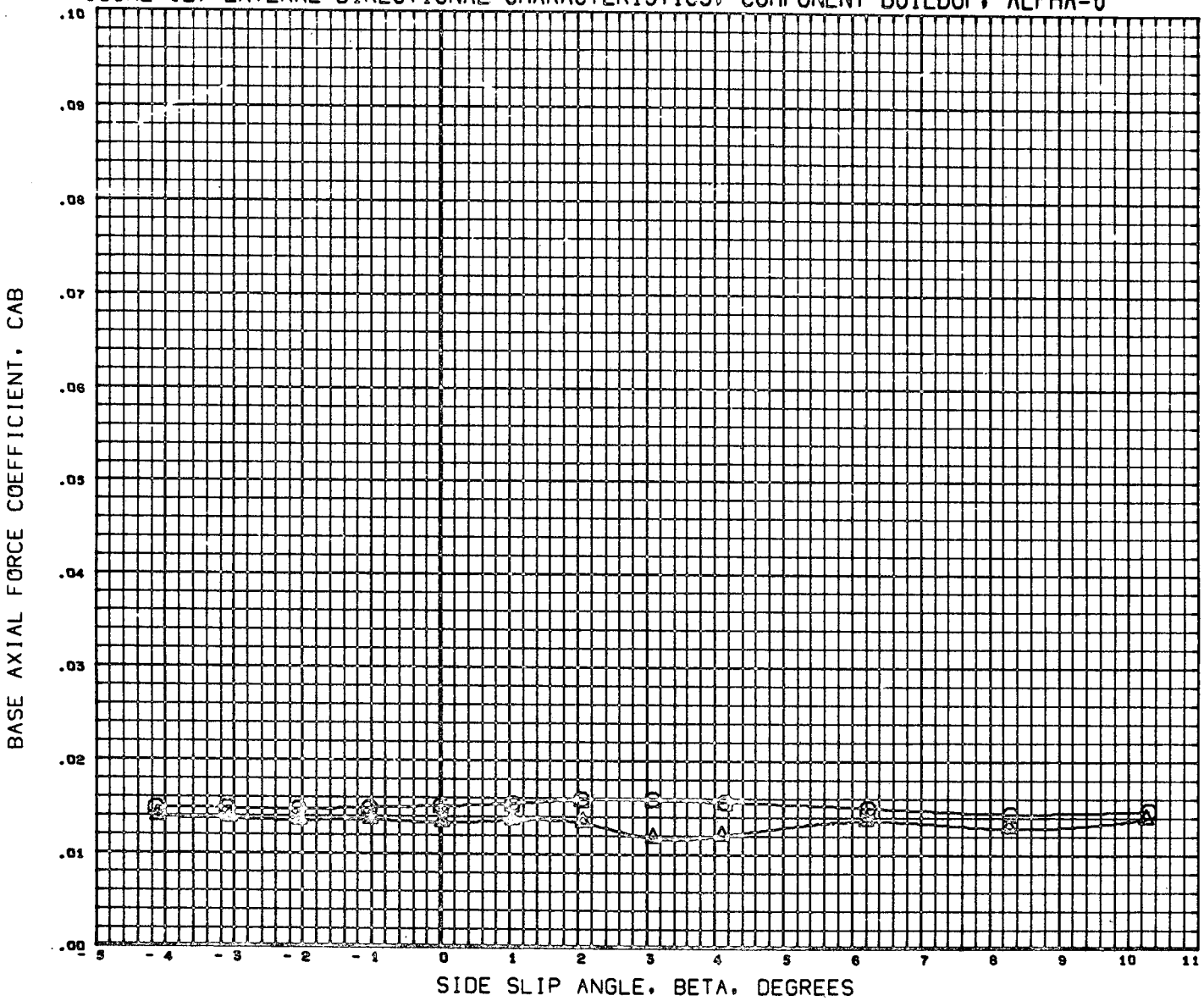
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



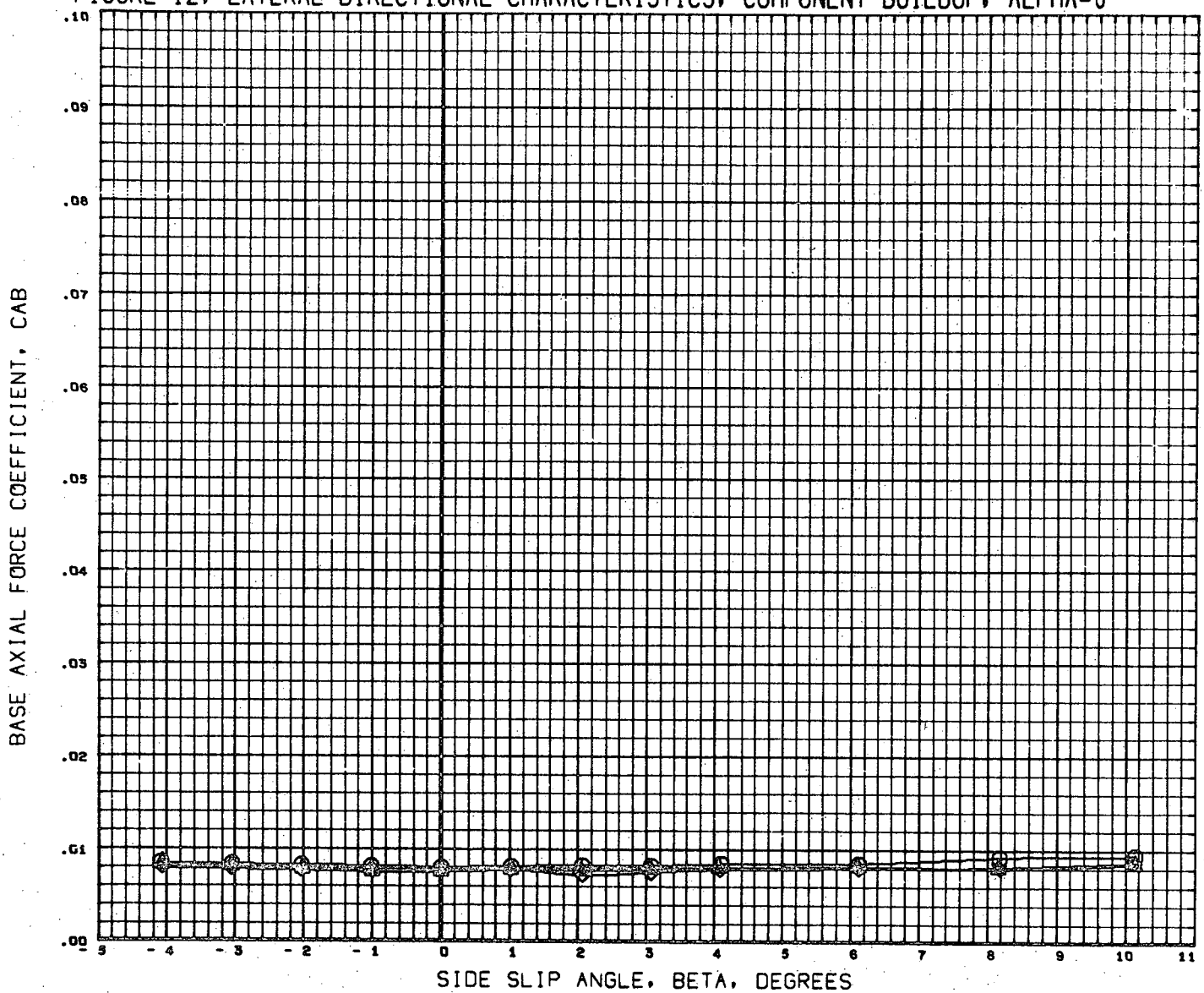
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49028)	○	MSFC 507 GAC H-33 ORB. BSW4	0.000	0.000		
(A49033)	△	MSFC 507 GAC H-33 ORB. BSW4VS(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	DATA NOT AVAILABLE FOR ALL CONDITIONS	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.96

FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49028)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49033)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y34)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.74

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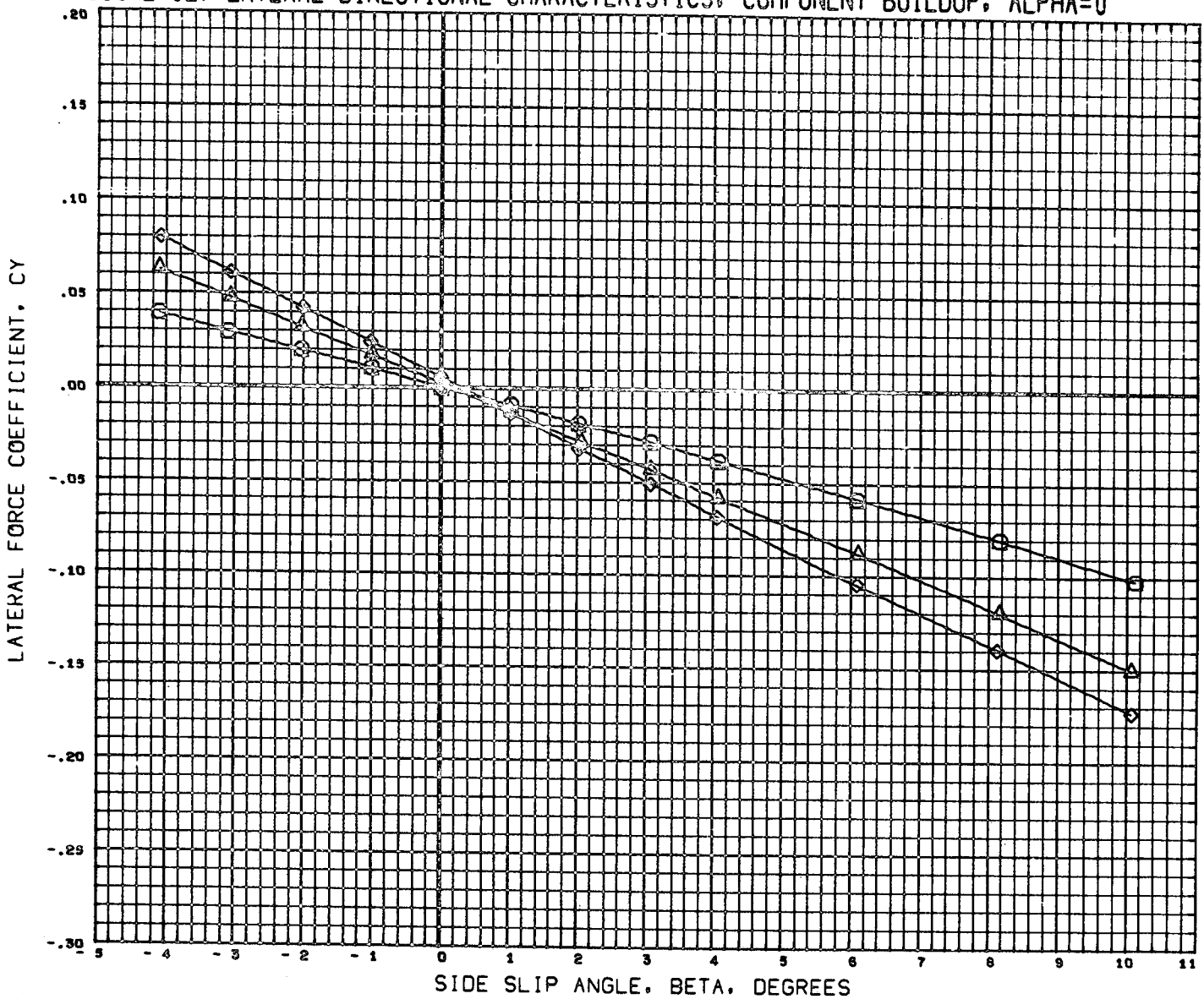
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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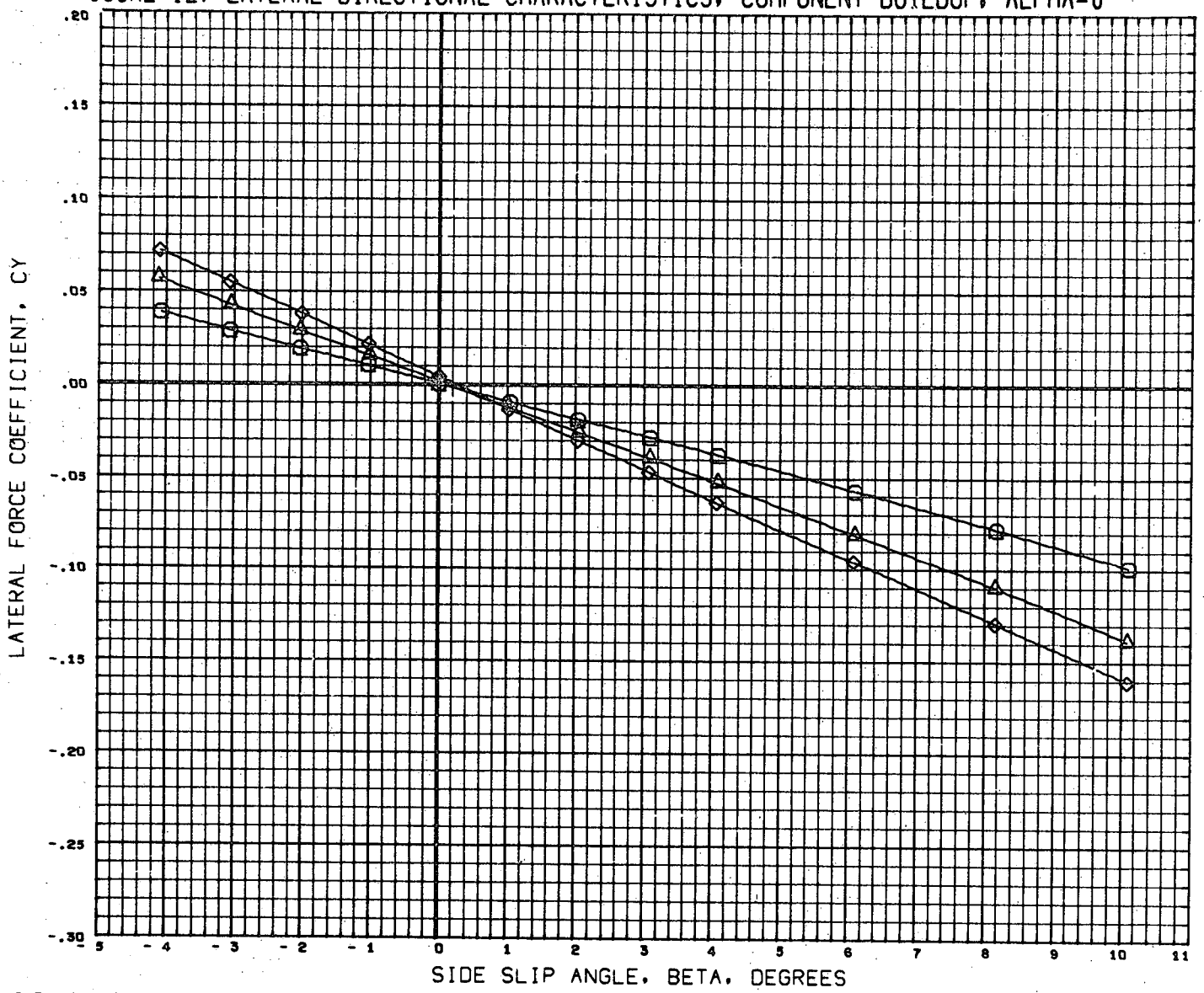
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 3.48

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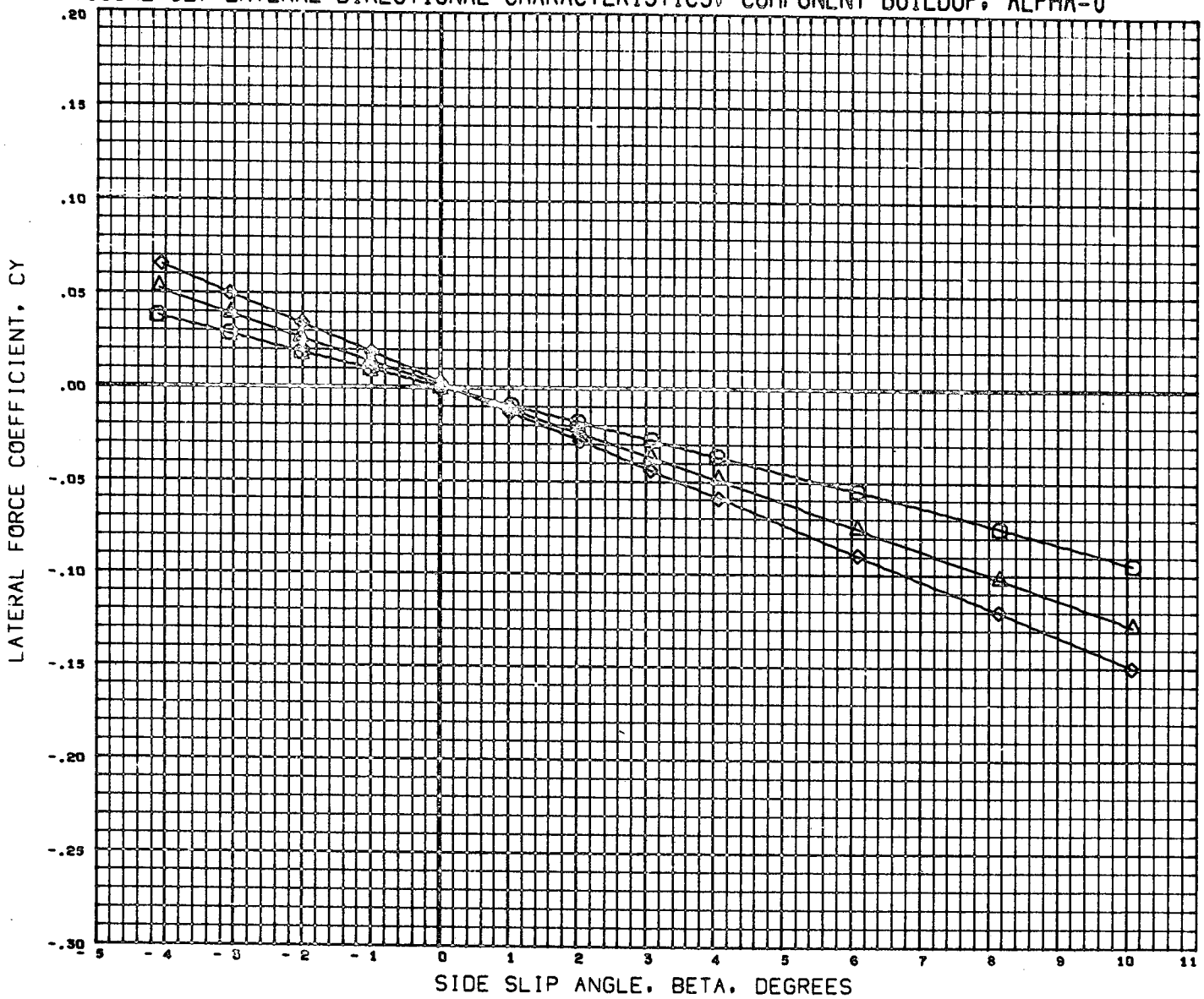
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 907 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 907 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 907 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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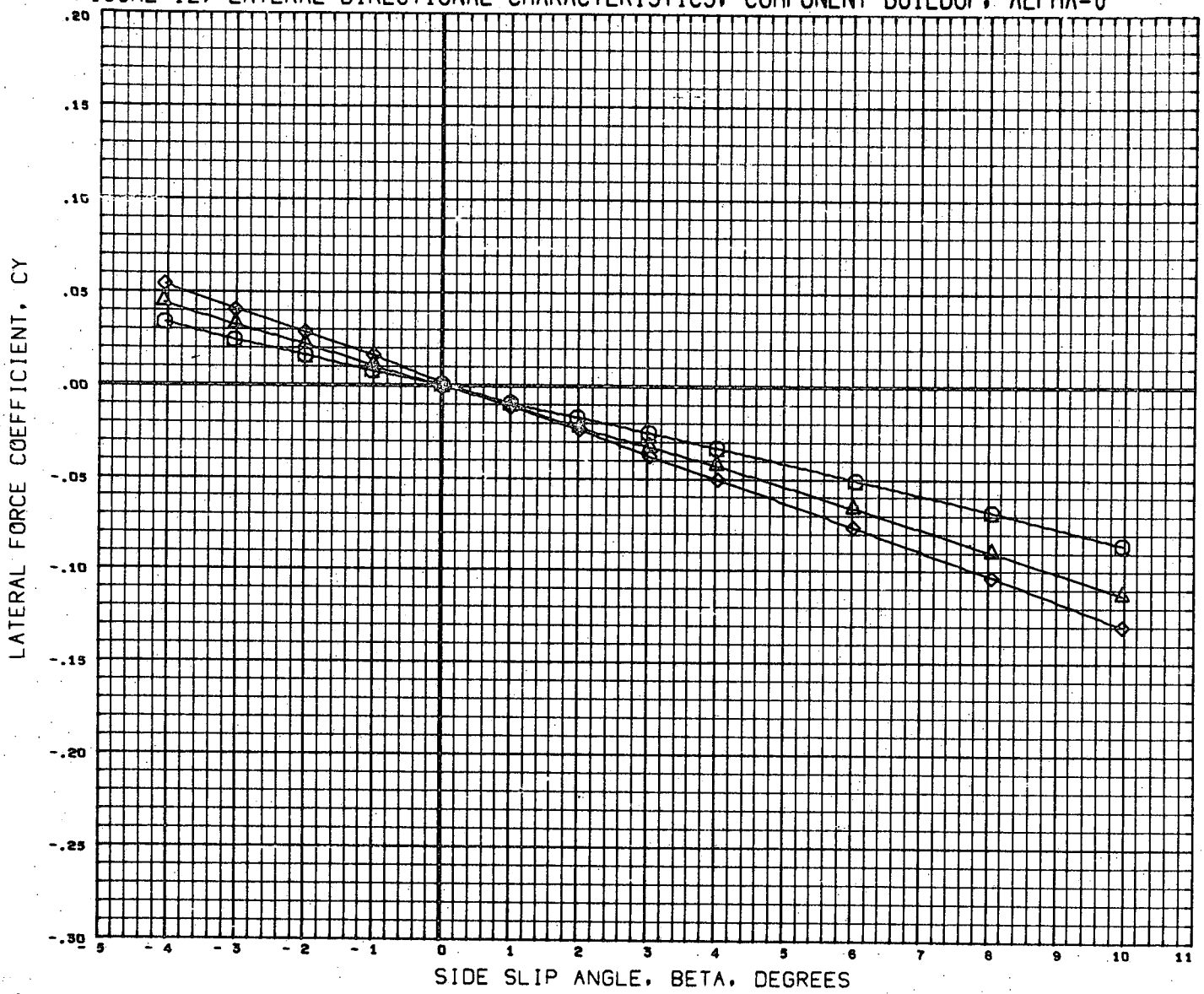
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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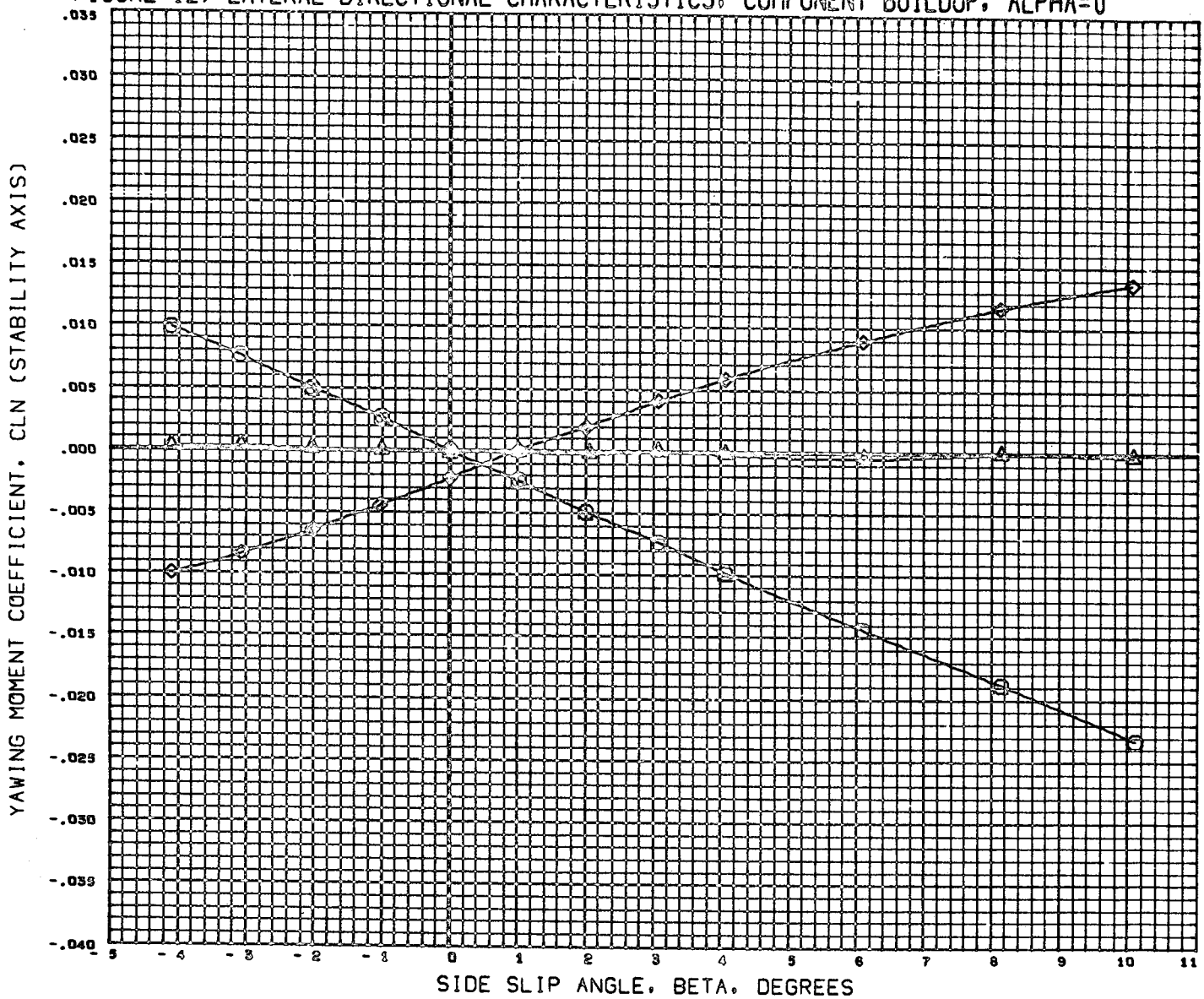
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 907 GAC M-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 907 GAC M-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 907 GAC M-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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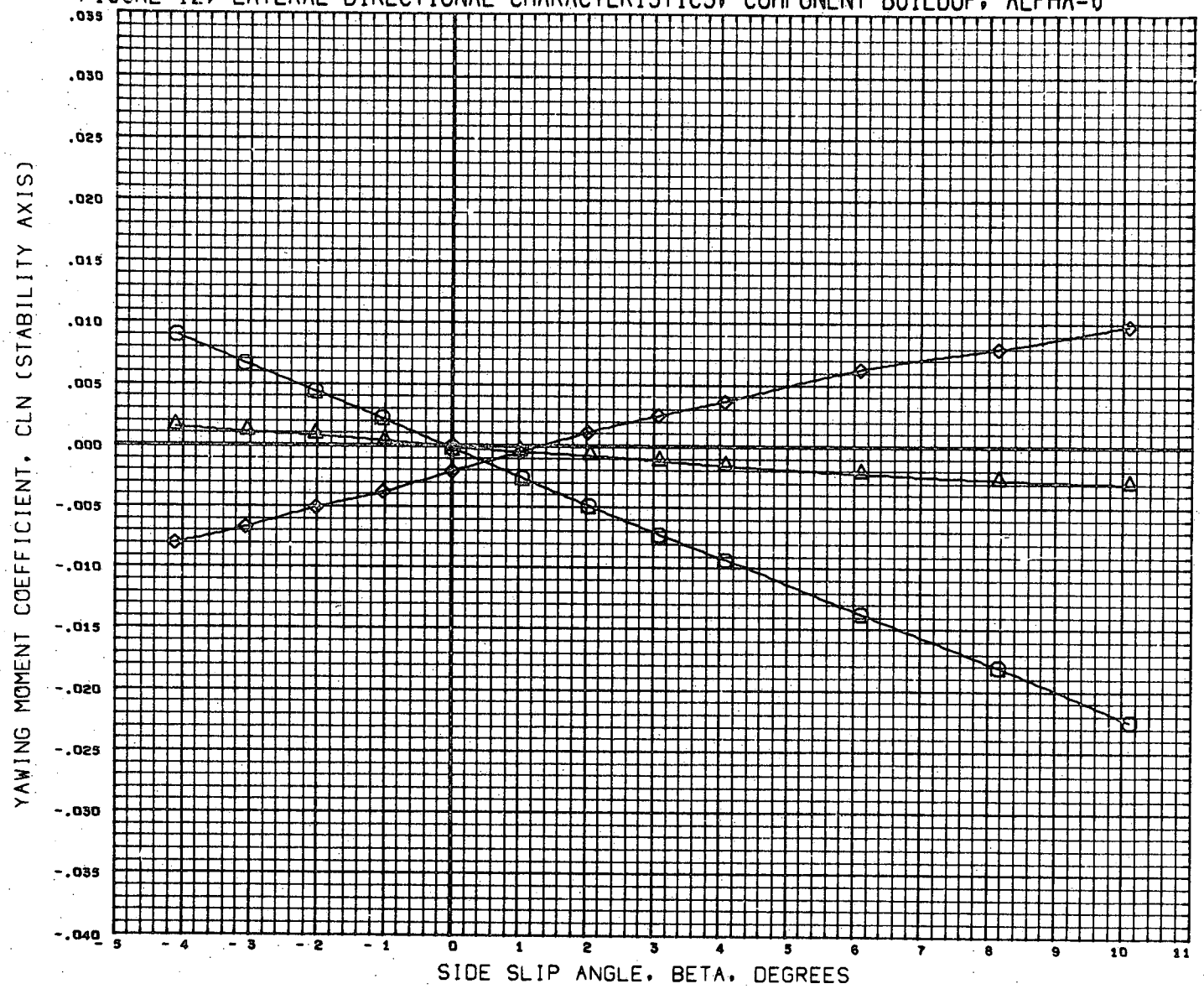
FIGURE 12, LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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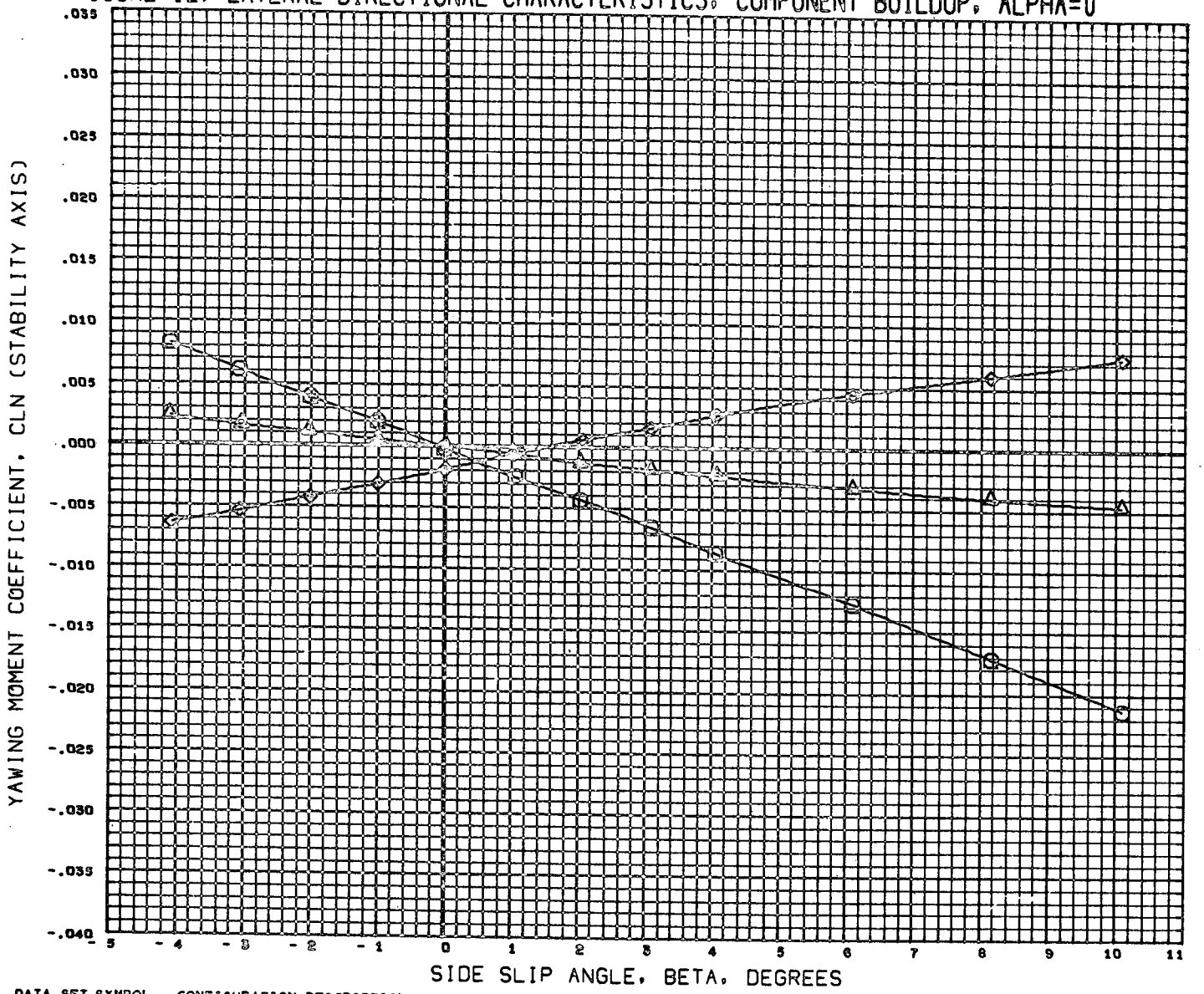
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 907 GAC H-33 ORB. B9W4	0.000	0.000		
(A49015)	△	MSFC 907 GAC H-33 ORB. B9W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 907 GAC H-33 ORB. B9W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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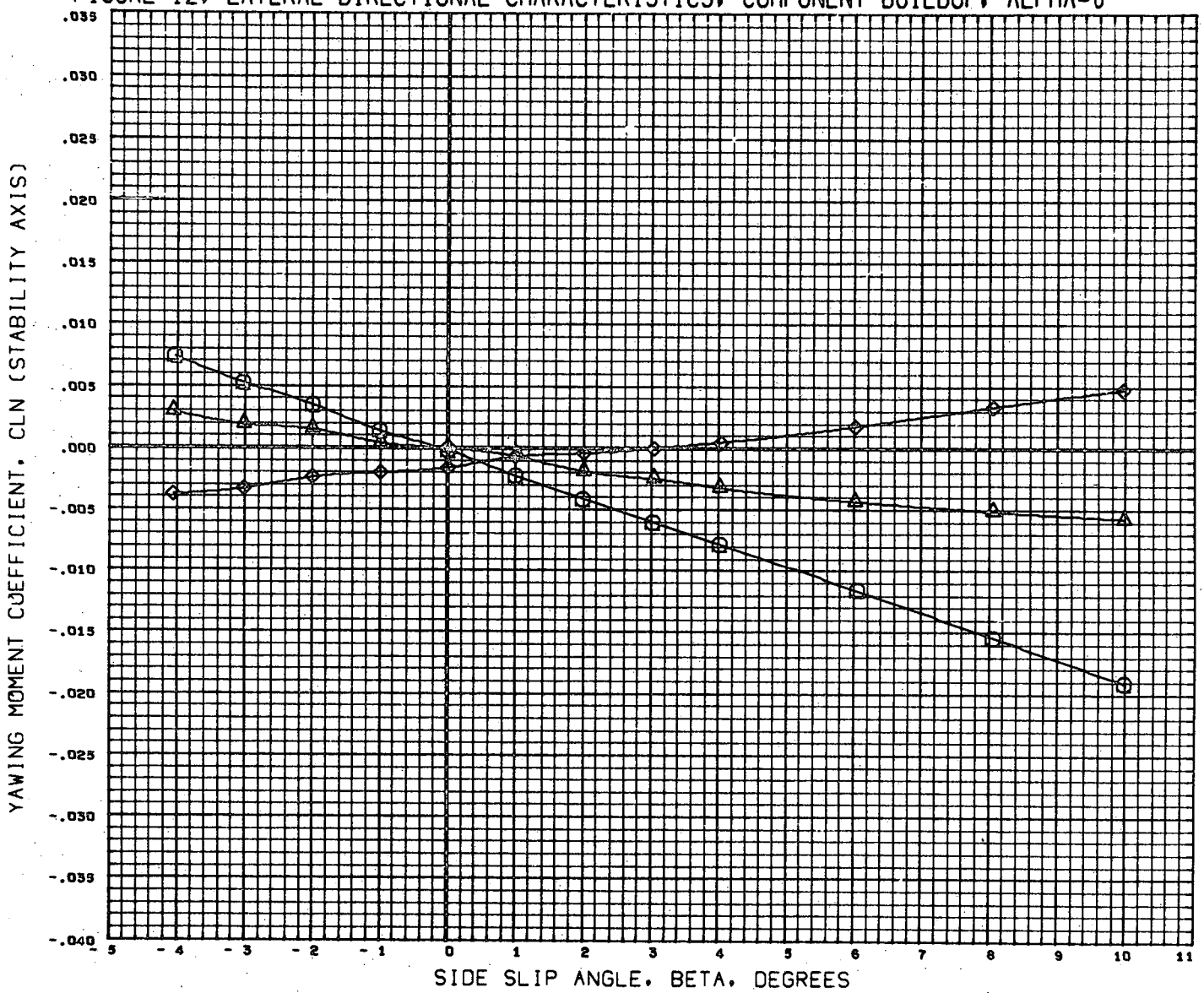
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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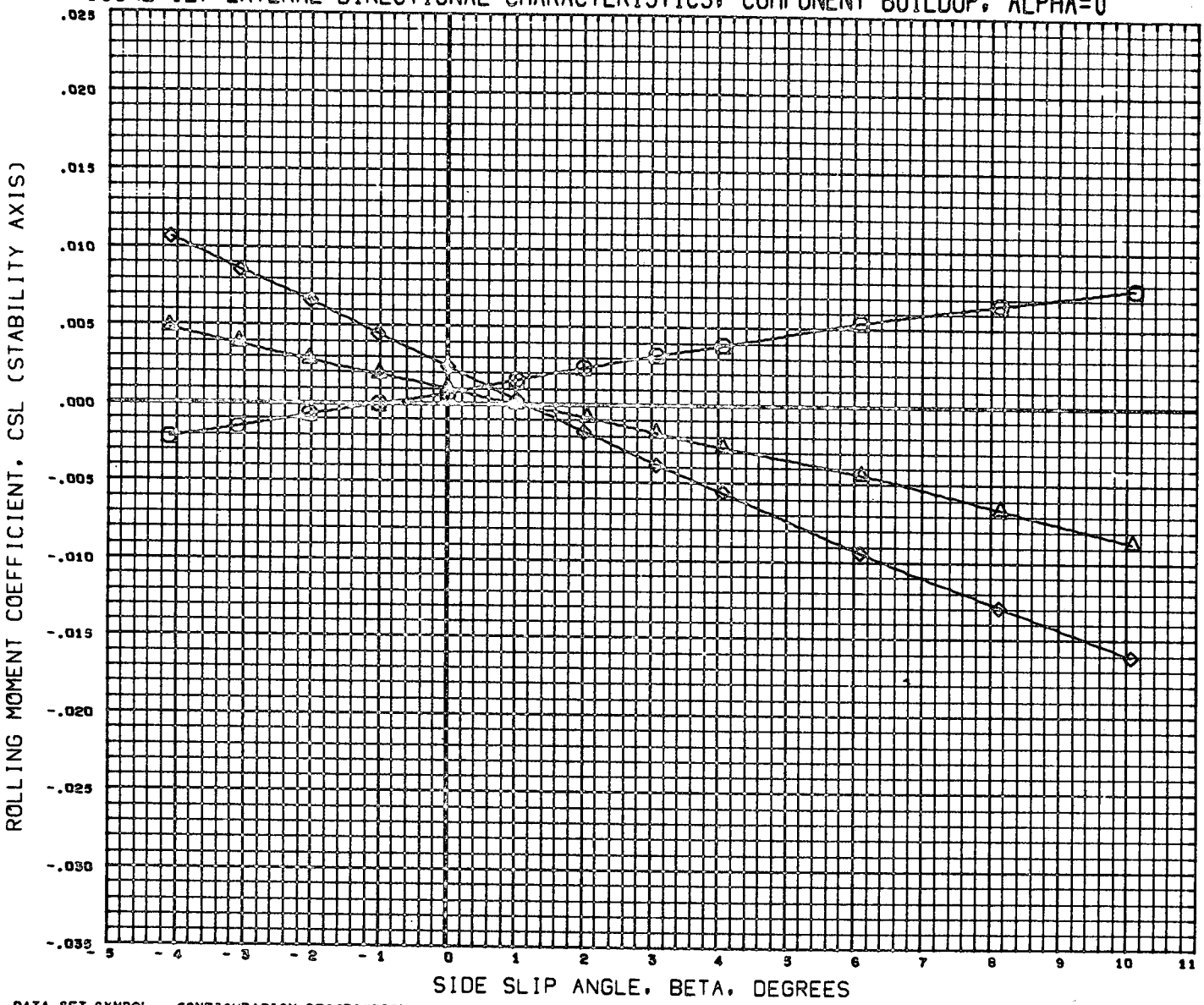
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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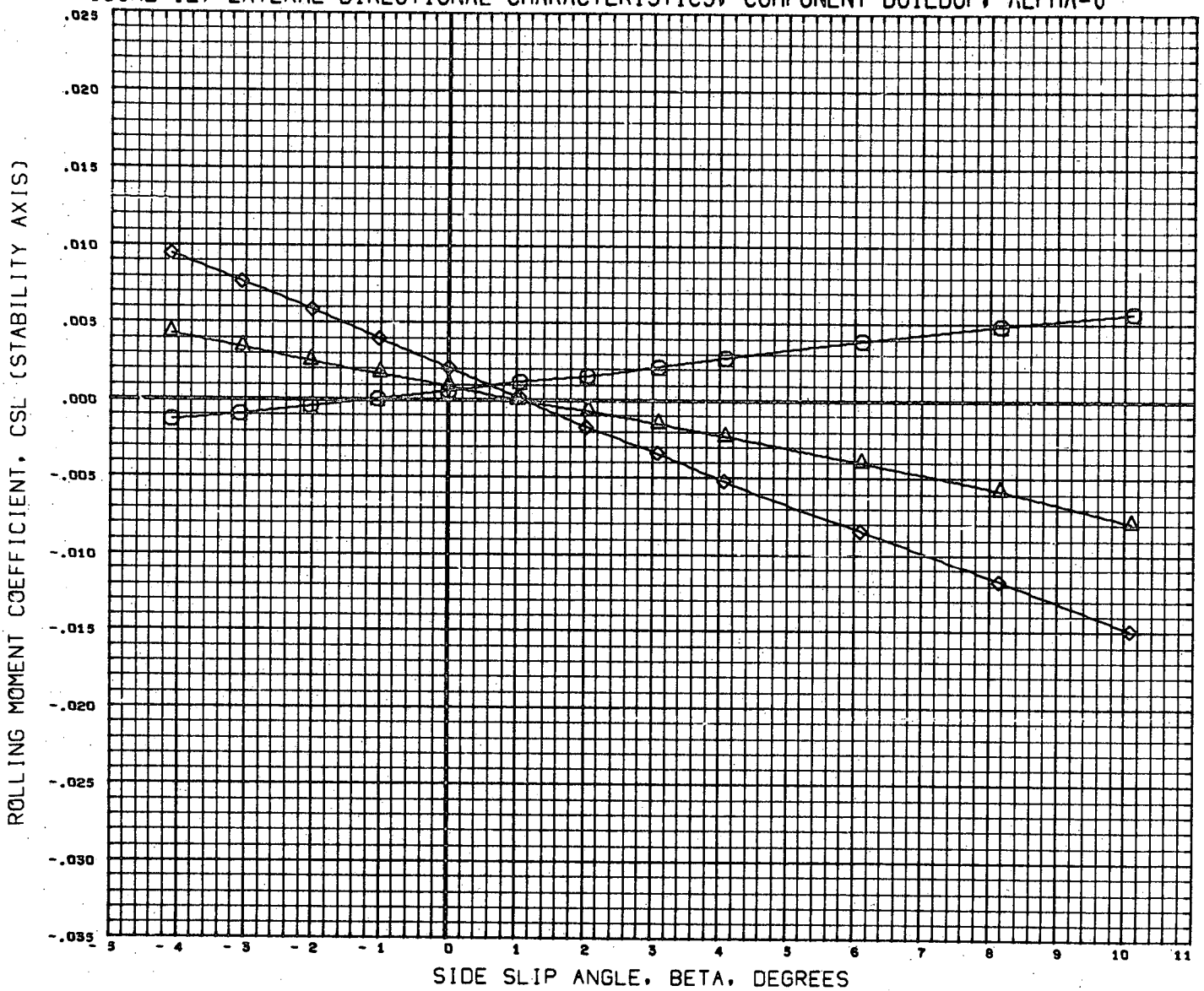
FIGURE 12, LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 3.48

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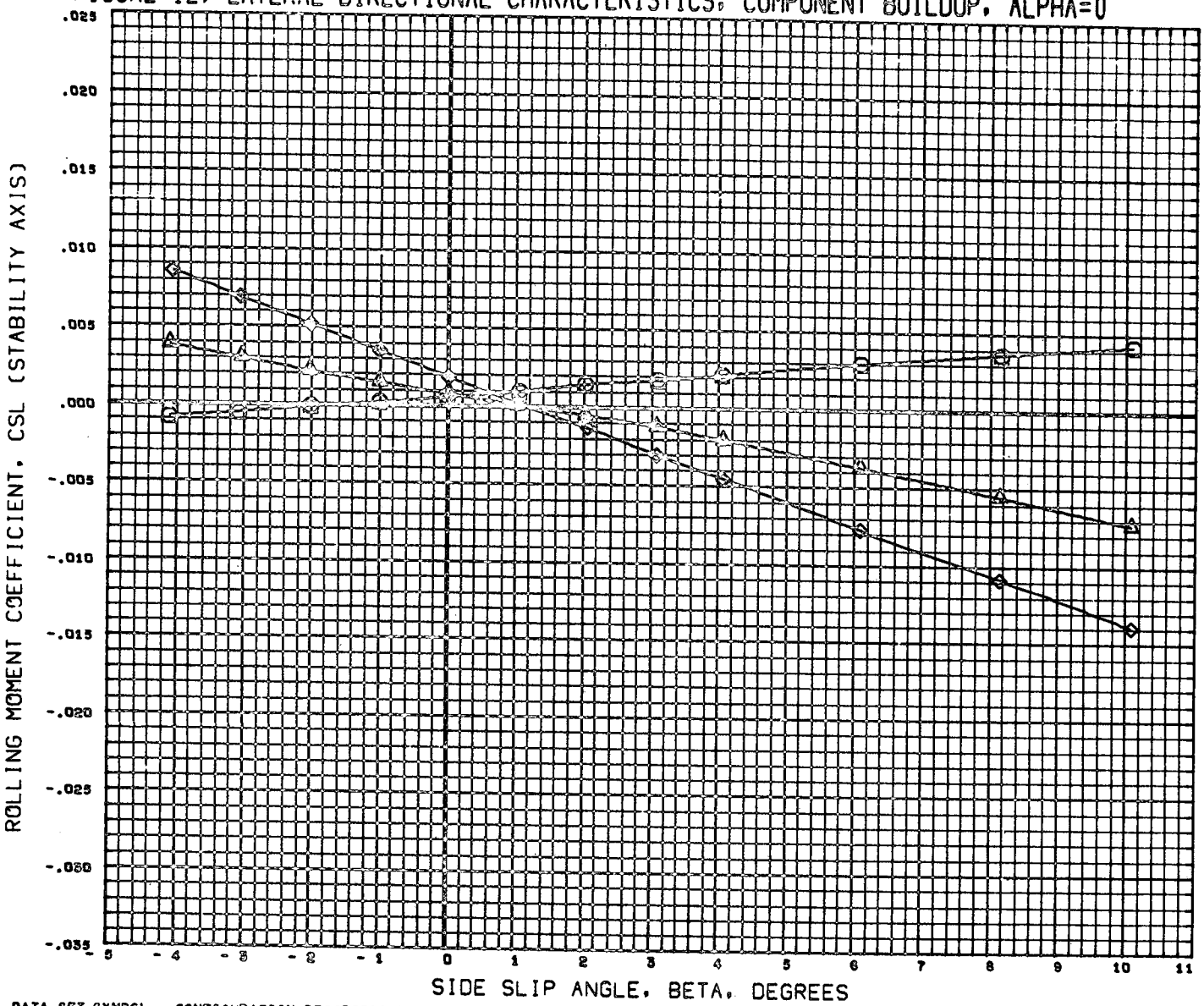
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



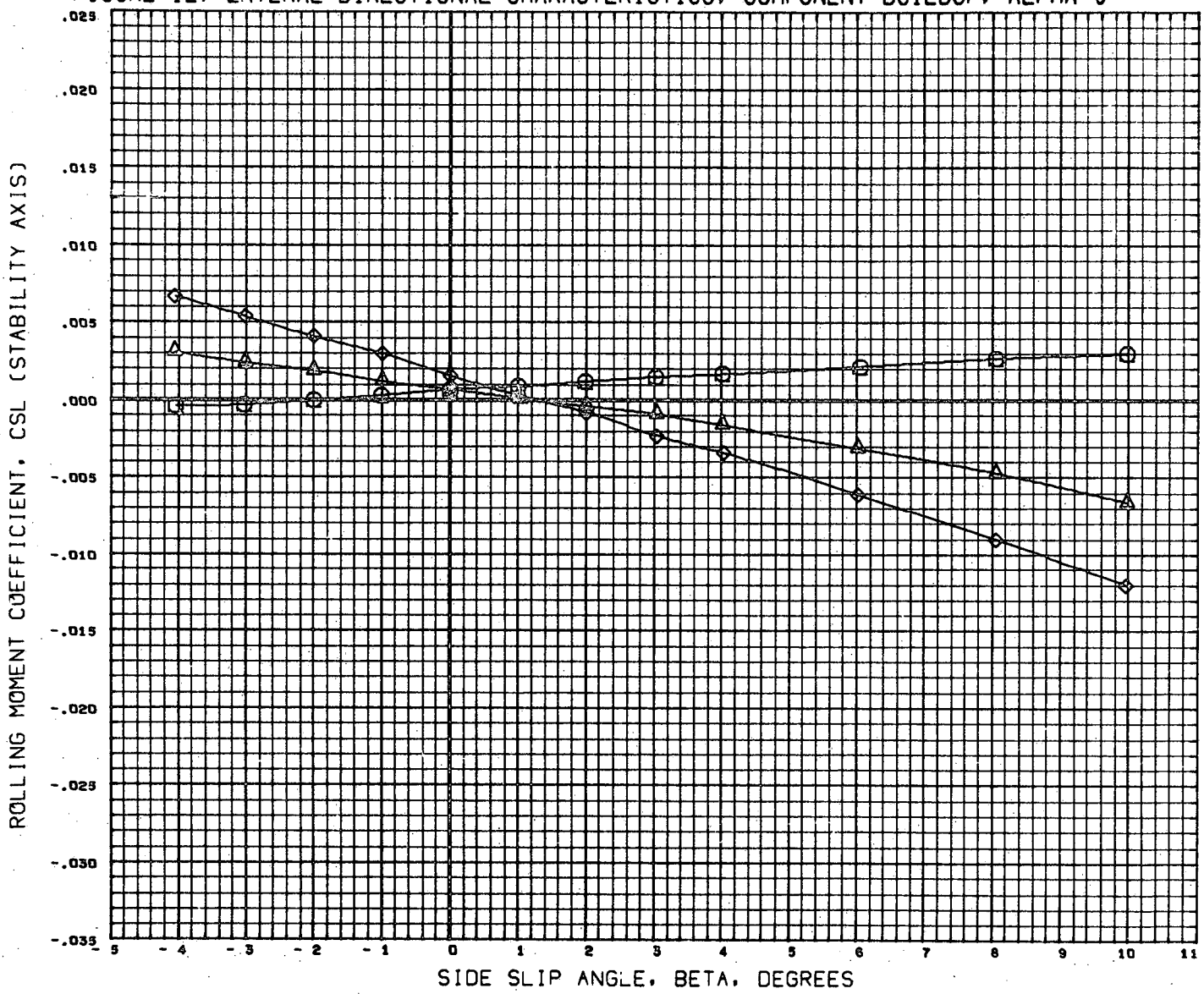
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 907 GAC M-99 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 907 GAC M-99 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 907 GAC M-99 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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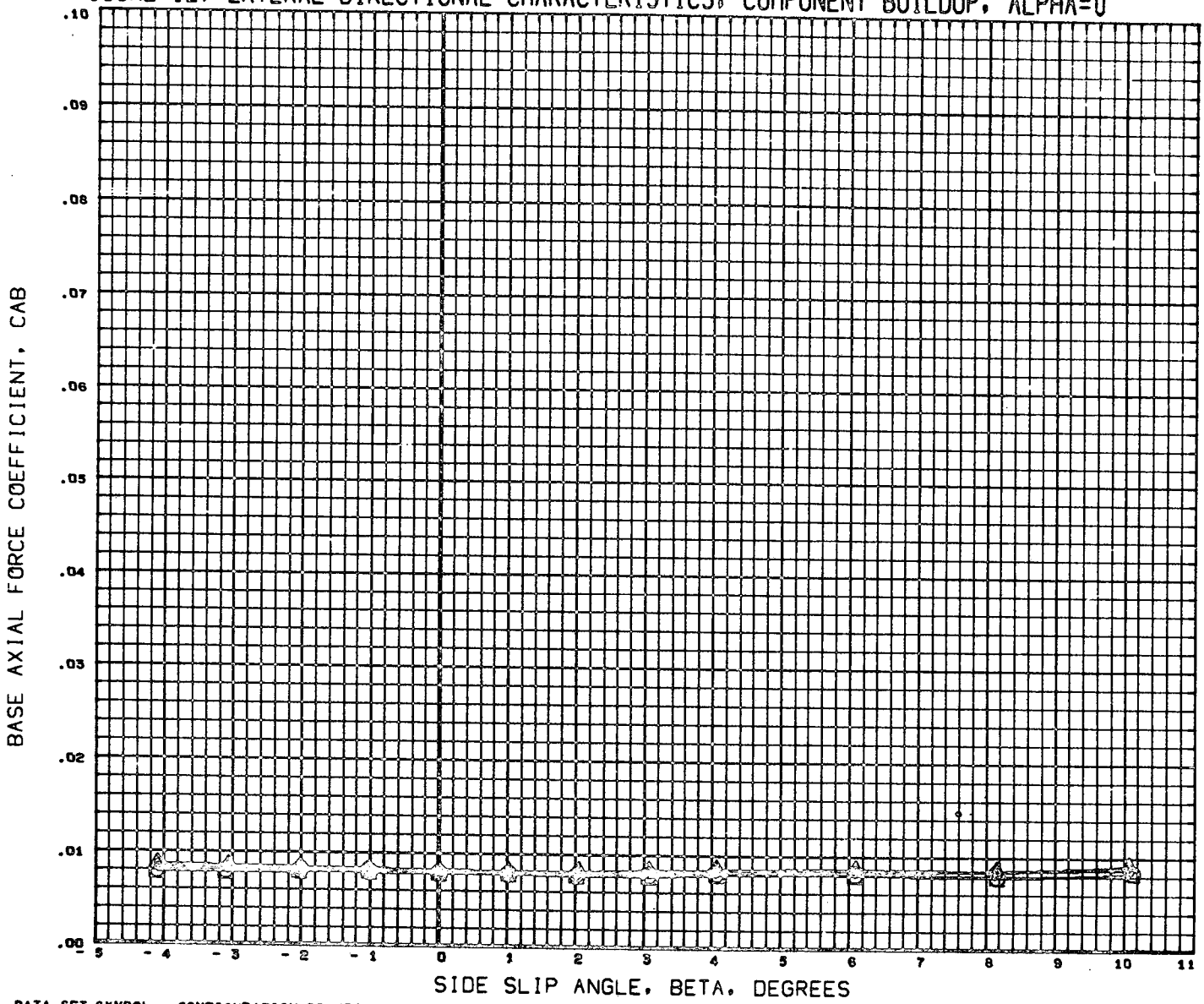
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



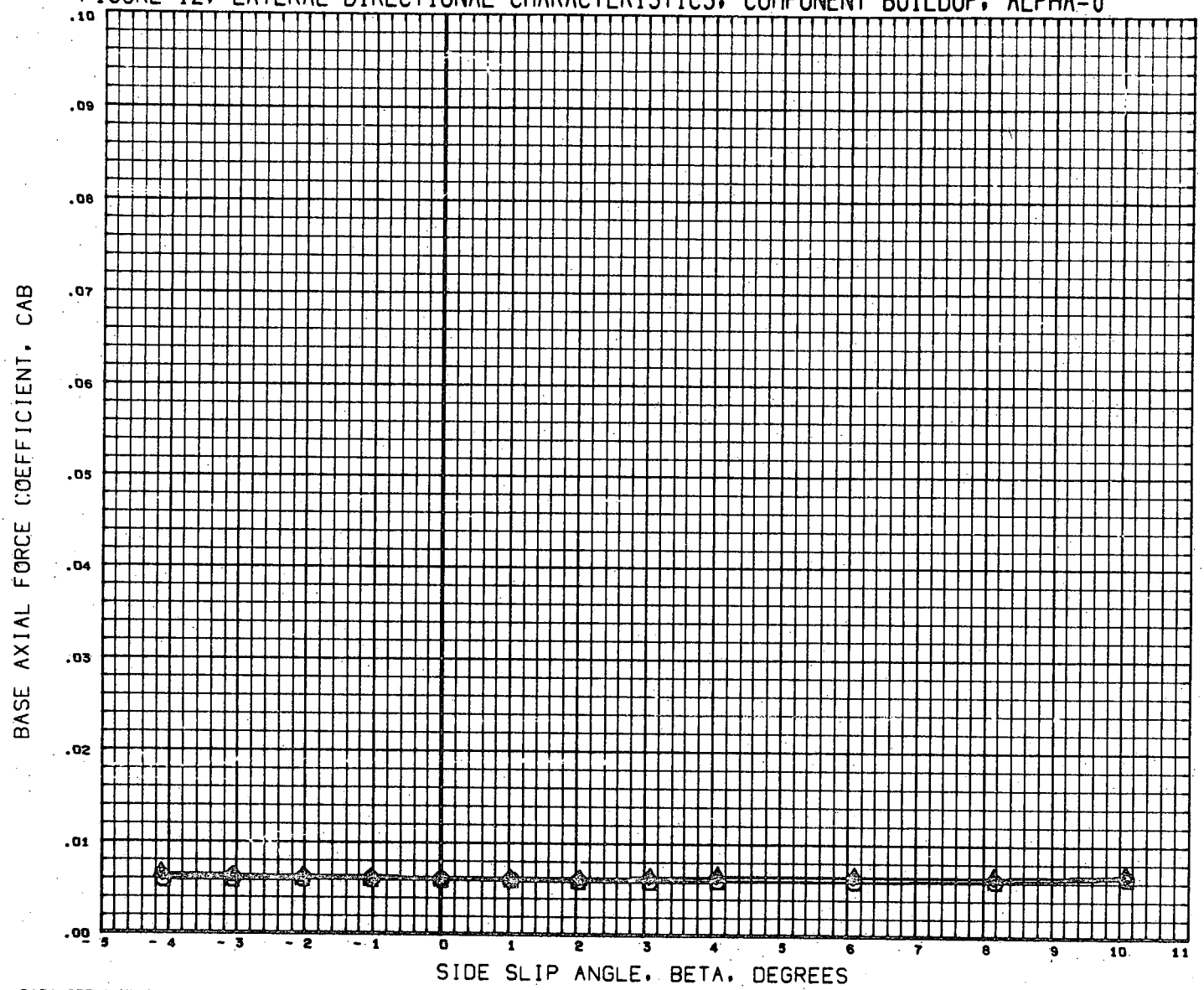
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



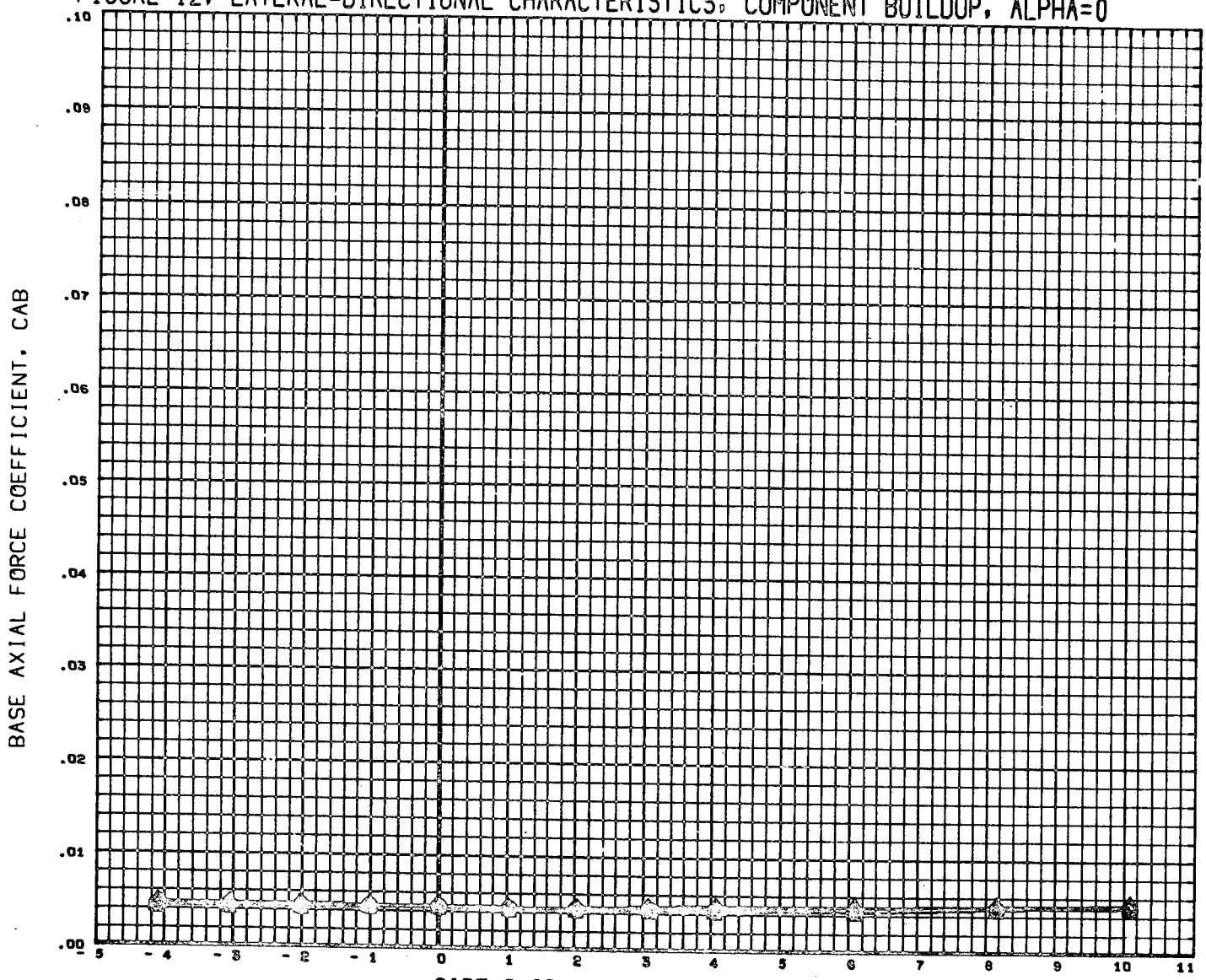
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 3.48

FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B9W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B9W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B9W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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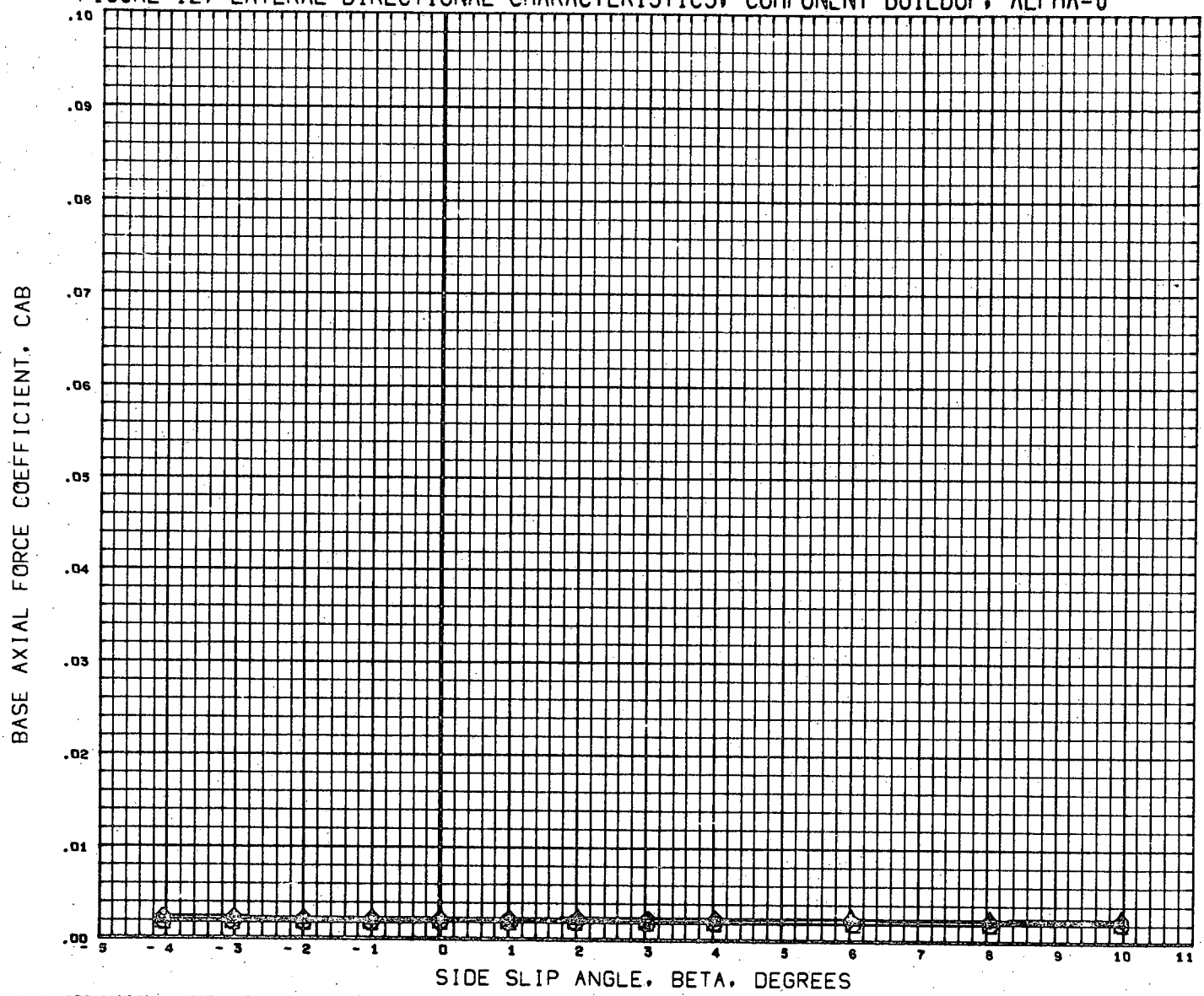
FIGURE 12. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.96

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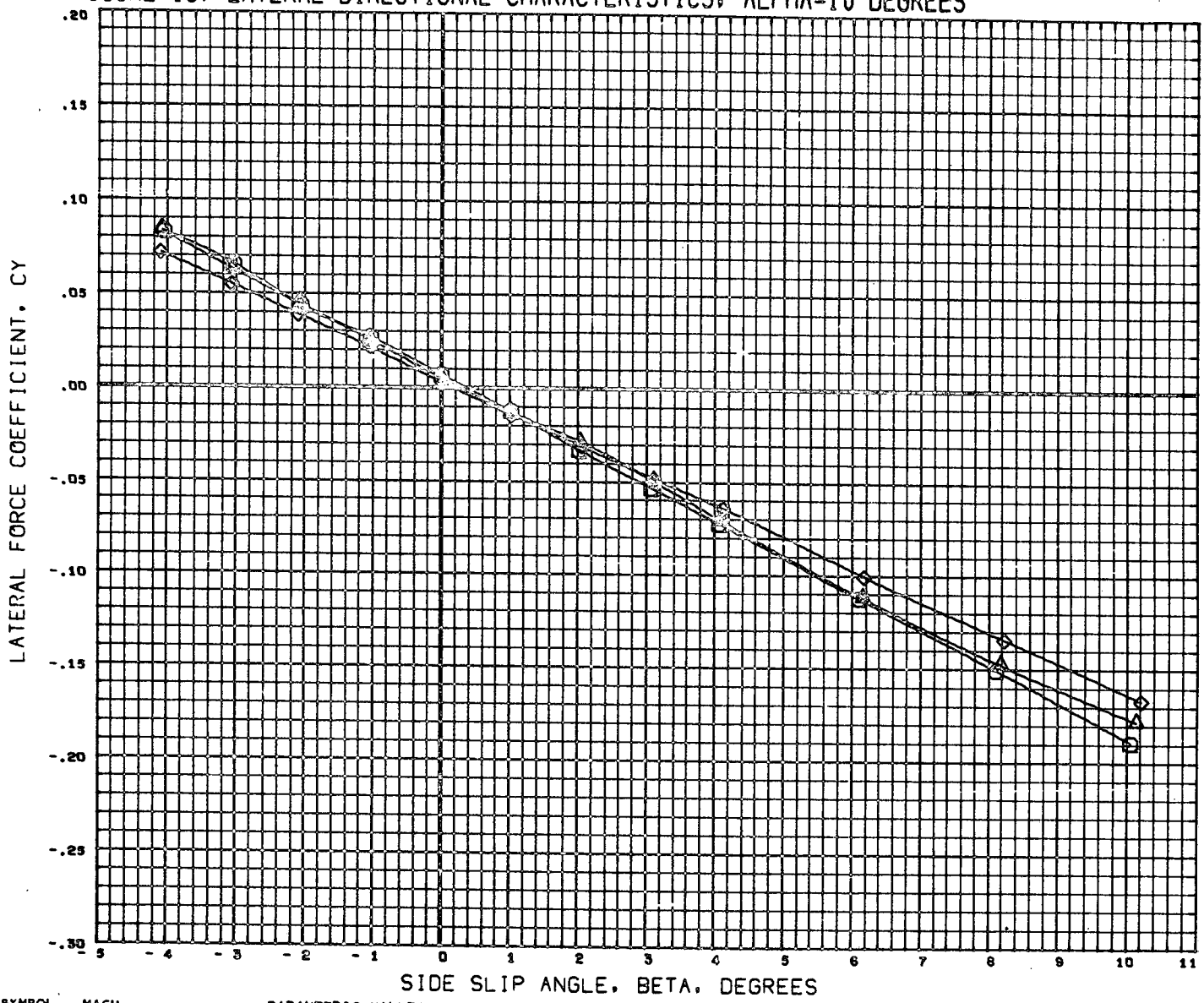
FIGURE 13. LATERAL-DIRECTIONAL CHARACTERISTICS, ALPHA=10 DEGREES



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.595	ALPHA	10.000	ELEVTR	0.000
△	0.898	AILERN	0.000	LRUDDR	0.000
◇	1.204	RRUDDR	0.000		

DATA HIST. CODE *A

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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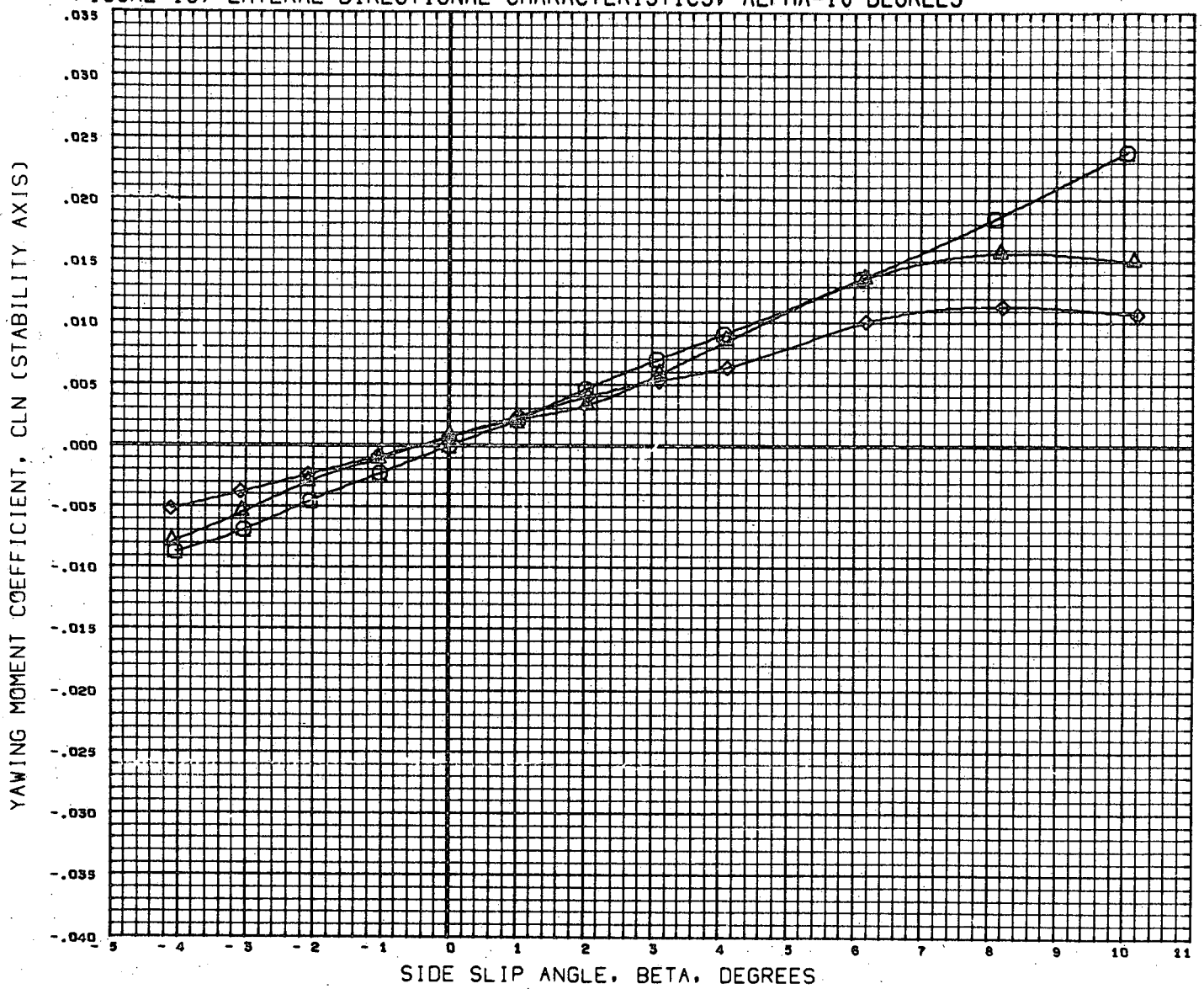
FIGURE 13, LATERAL-DIRECTIONAL CHARACTERISTICS, ALPHA=10 DEGREES



SYMBOL	MACH		PARAMETRIC VALUES		
○	0.595	ALPHA	10.000	ELEVTR	0.000
△	0.898	AILERN	0.000	LRUDDR	0.000
◇	1.204	RRUDDR	0.000		

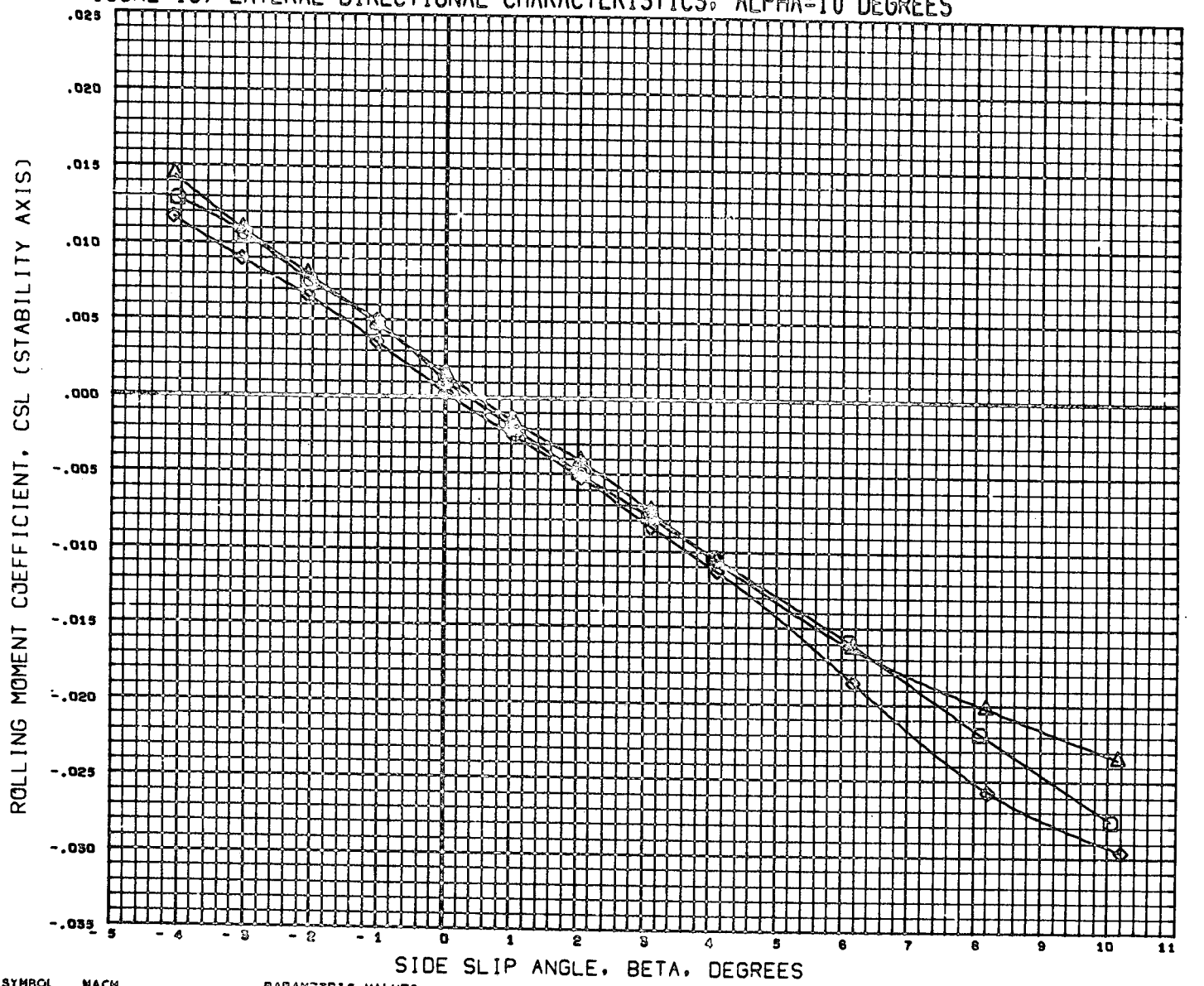
REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE *A

MSFC 507 GAC H-33 ORB. B5W4V5 (A49X29) 31 MAY 72 PAGE 145

FIGURE 13. LATERAL-DIRECTIONAL CHARACTERISTICS. ALPHA=10 DEGREES



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.595	ALPHA	10.000	ELEVTR	0.000
△	0.898	AILERN	0.000	LRUDDR	0.000
◇	1.204	RRUDDR	0.000		

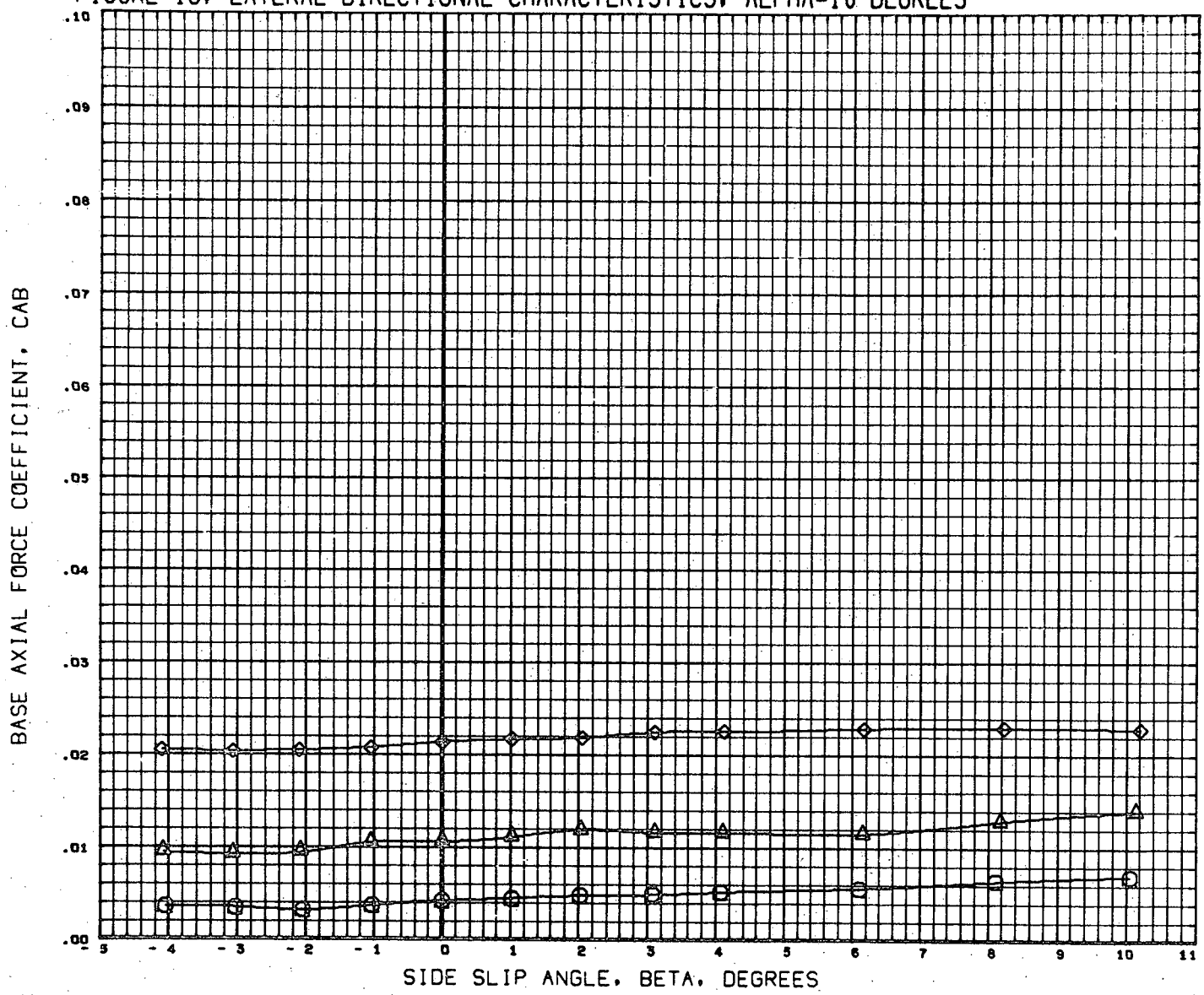
REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA MIST. CODE *A

MSFC 507 GAC H-33 ORB. B5W4V5 (A49X29) 31 MAY 72 PAGE 146

FIGURE 13. LATERAL-DIRECTIONAL CHARACTERISTICS. ALPHA=10 DEGREES



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.595	ALPHA	10.000	ELEVTR	0.000
△	0.898	AILERN	0.000	LRUDDR	0.000
◇	1.204	RRUDDR	0.000		

DATA HIST. CODE *A

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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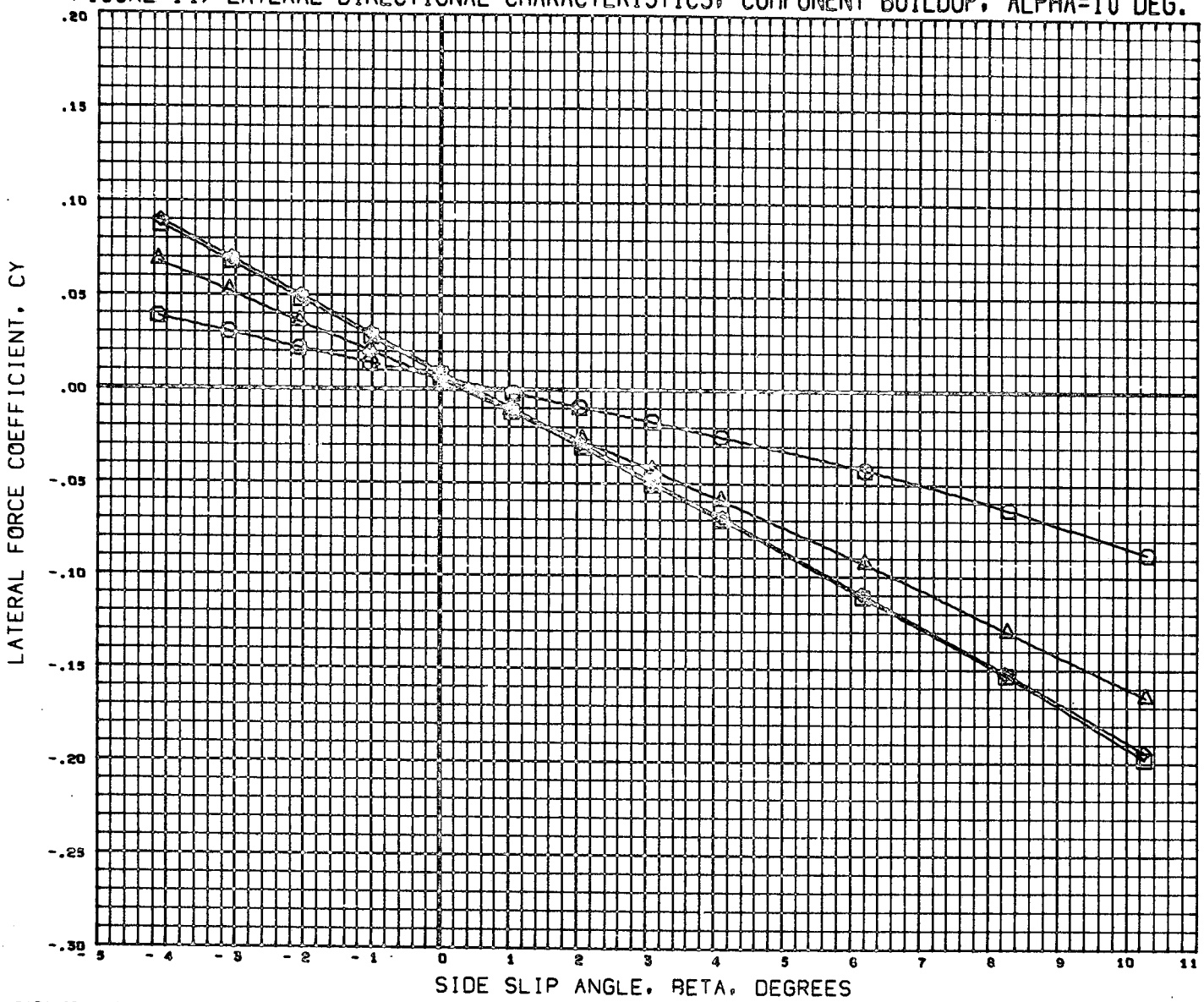
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



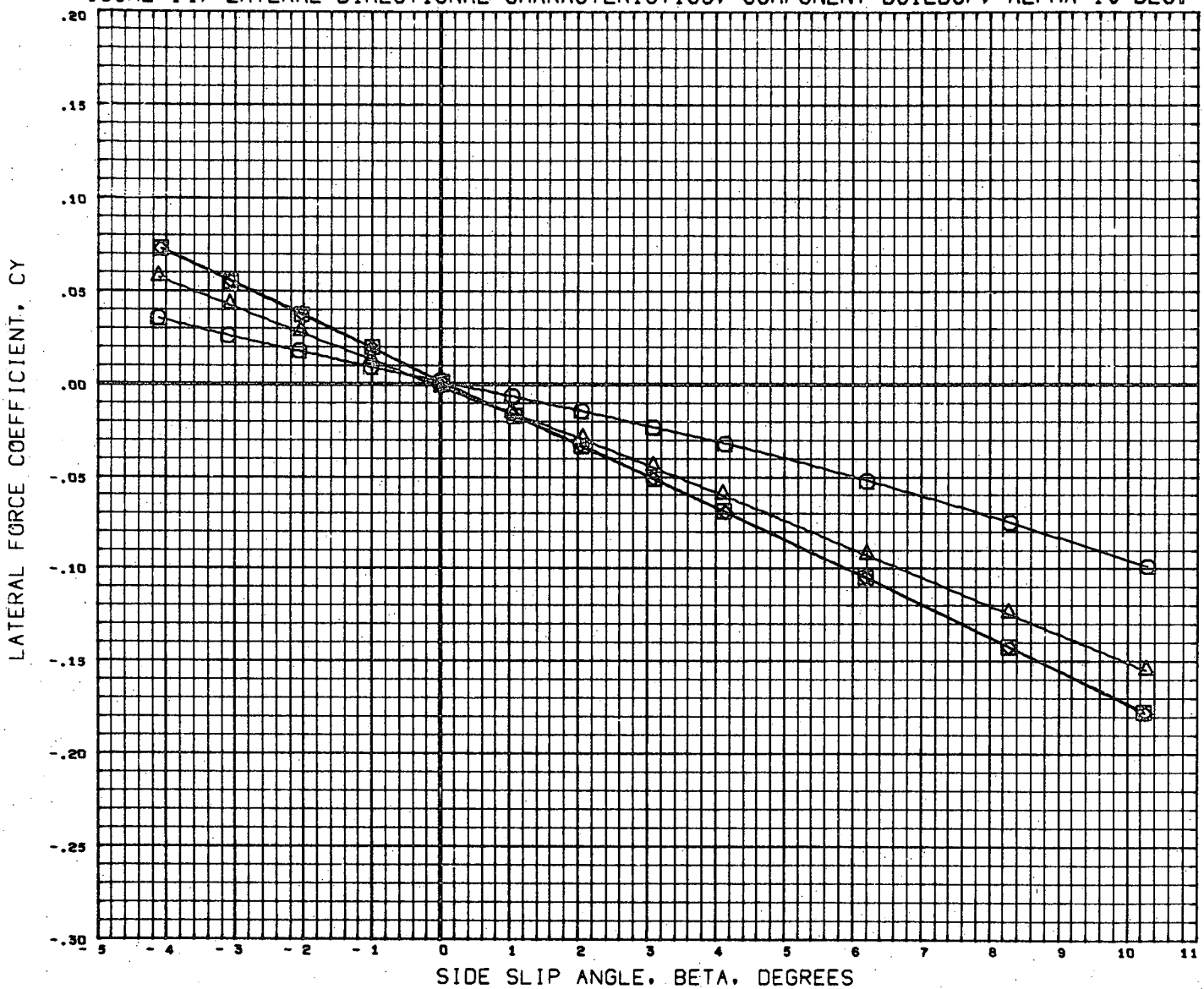
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.46

FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



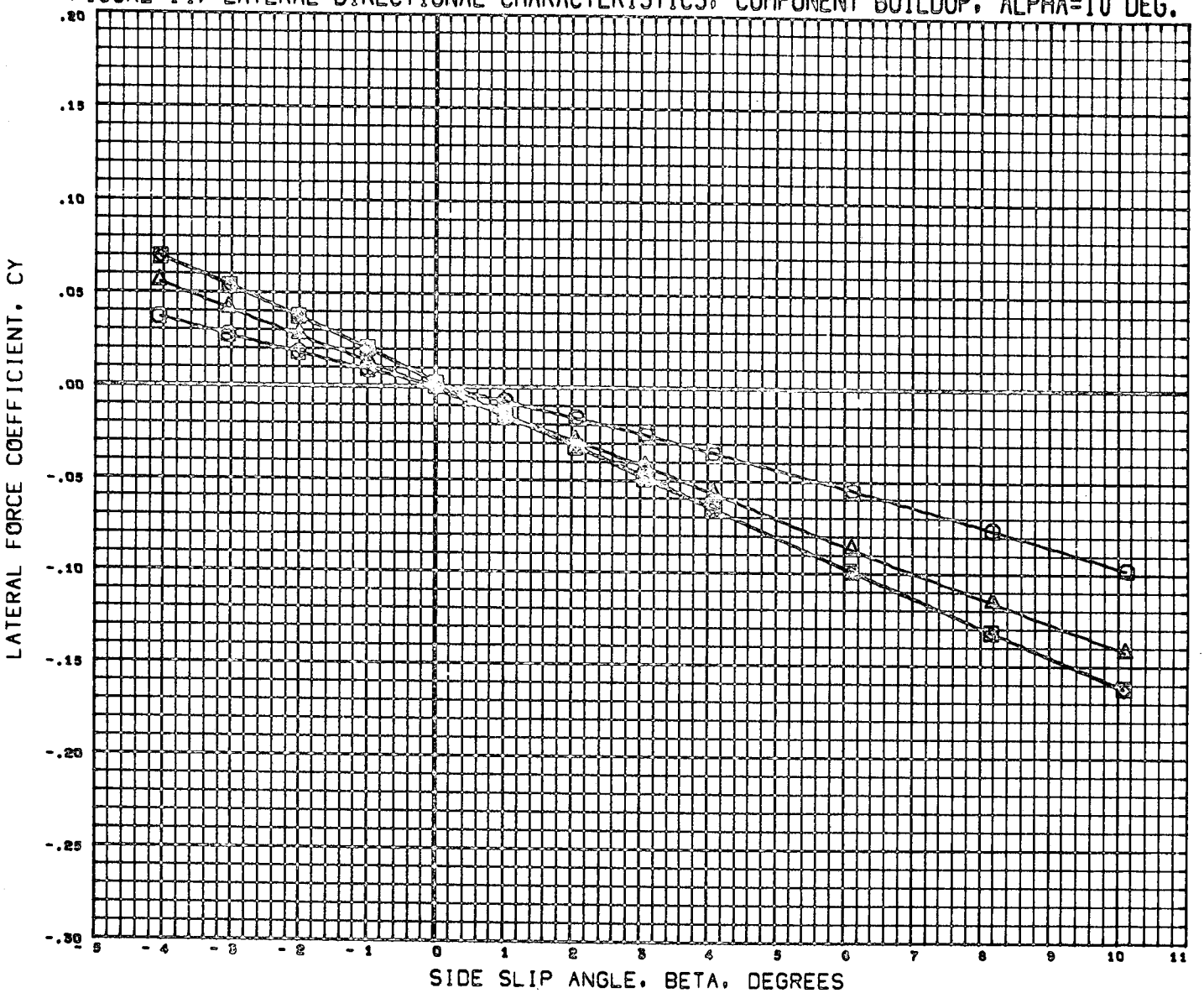
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.96

FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 907 GAC M-33 ORB. B9W4	0.000	0.000		
(A49Y29)	△	MSFC 907 GAC M-33 ORB. B9W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 907 GAC M-33 ORB. B9W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 907 GAC M-33 ORB. B9W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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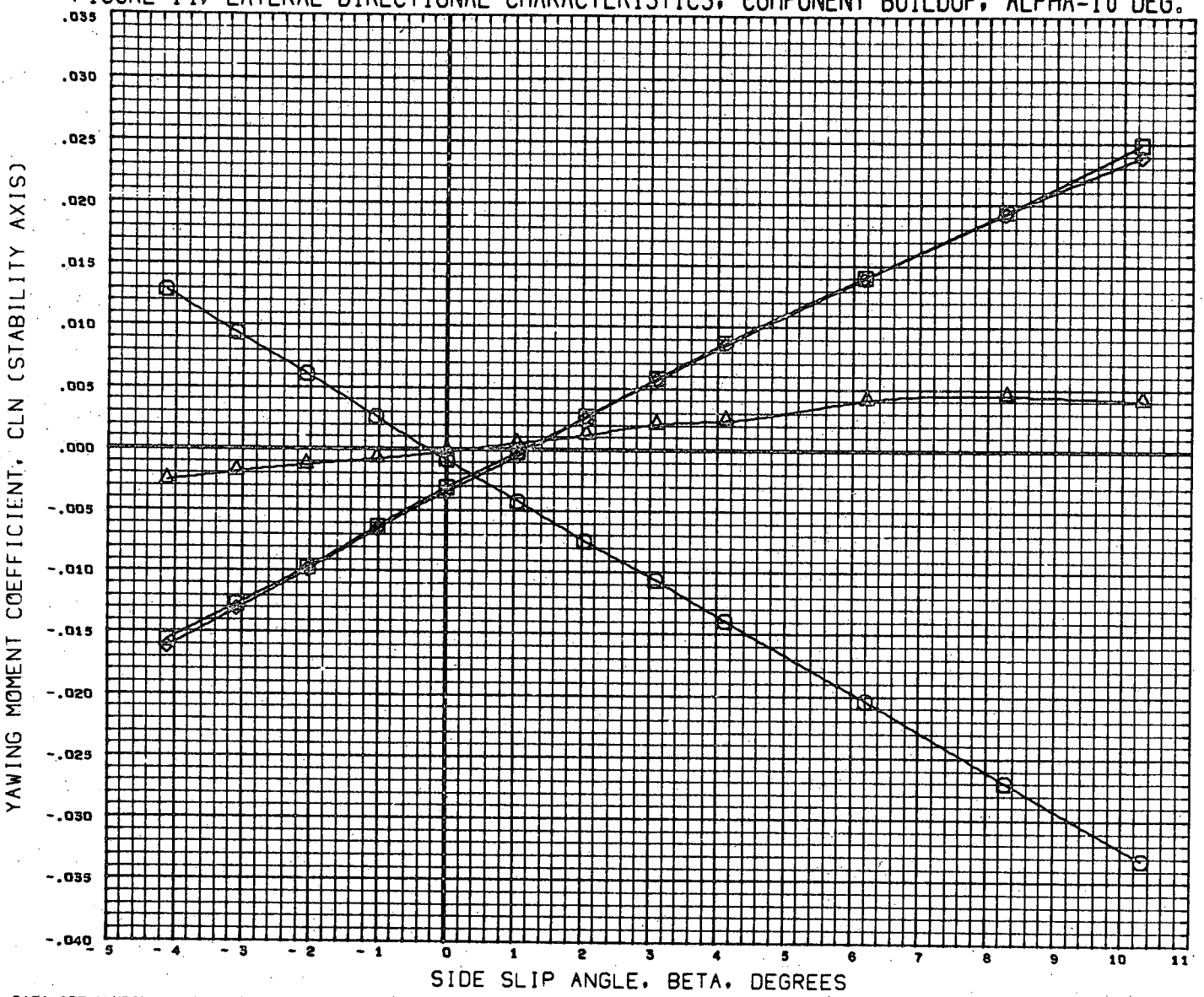
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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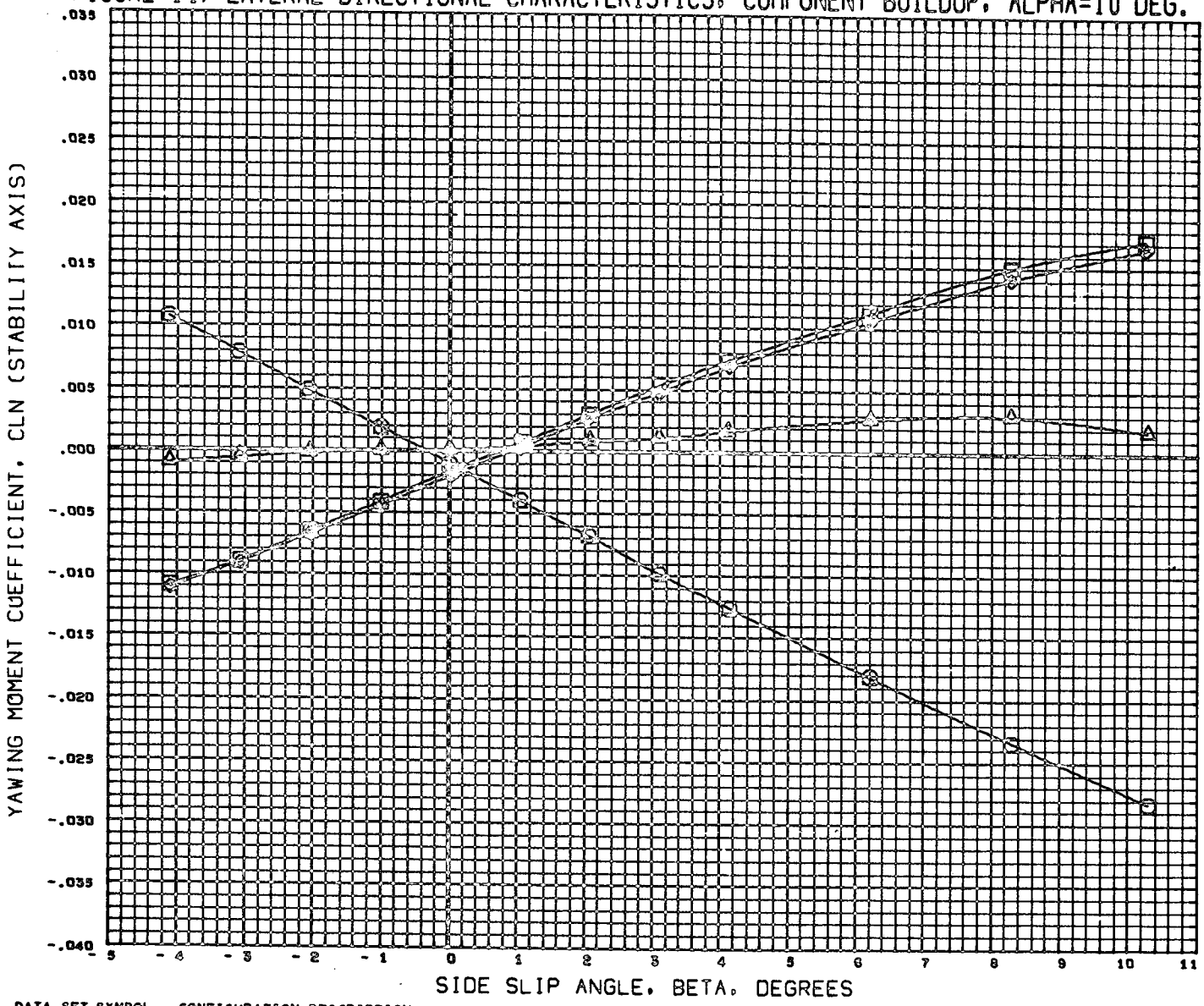
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 907 GAC M-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 907 GAC M-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 907 GAC M-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 907 GAC M-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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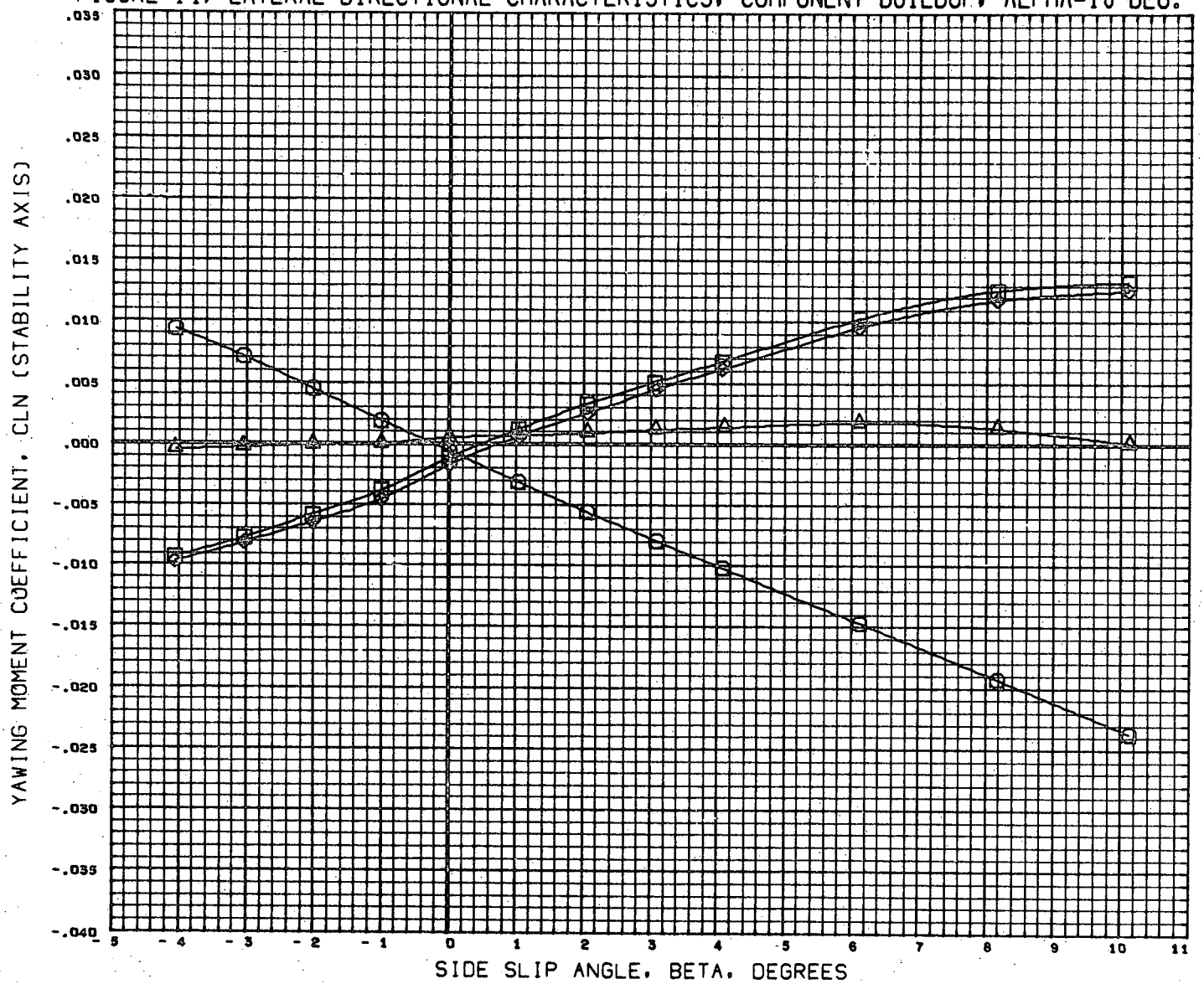
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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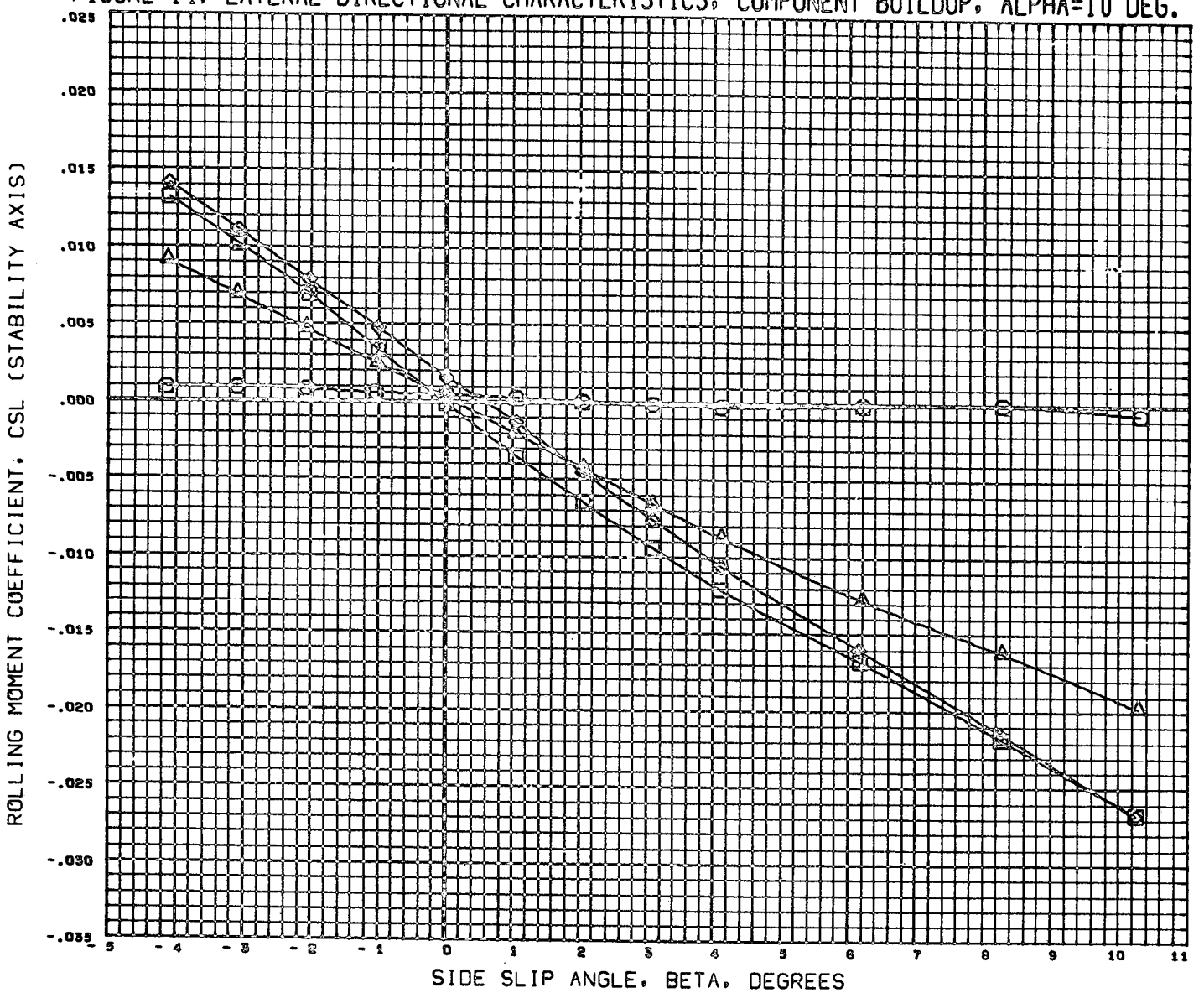
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC M-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC M-33 ORB. B5W4VS	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC M-33 ORB. B5W4VS(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC M-33 ORB. B5W4(-20)VS(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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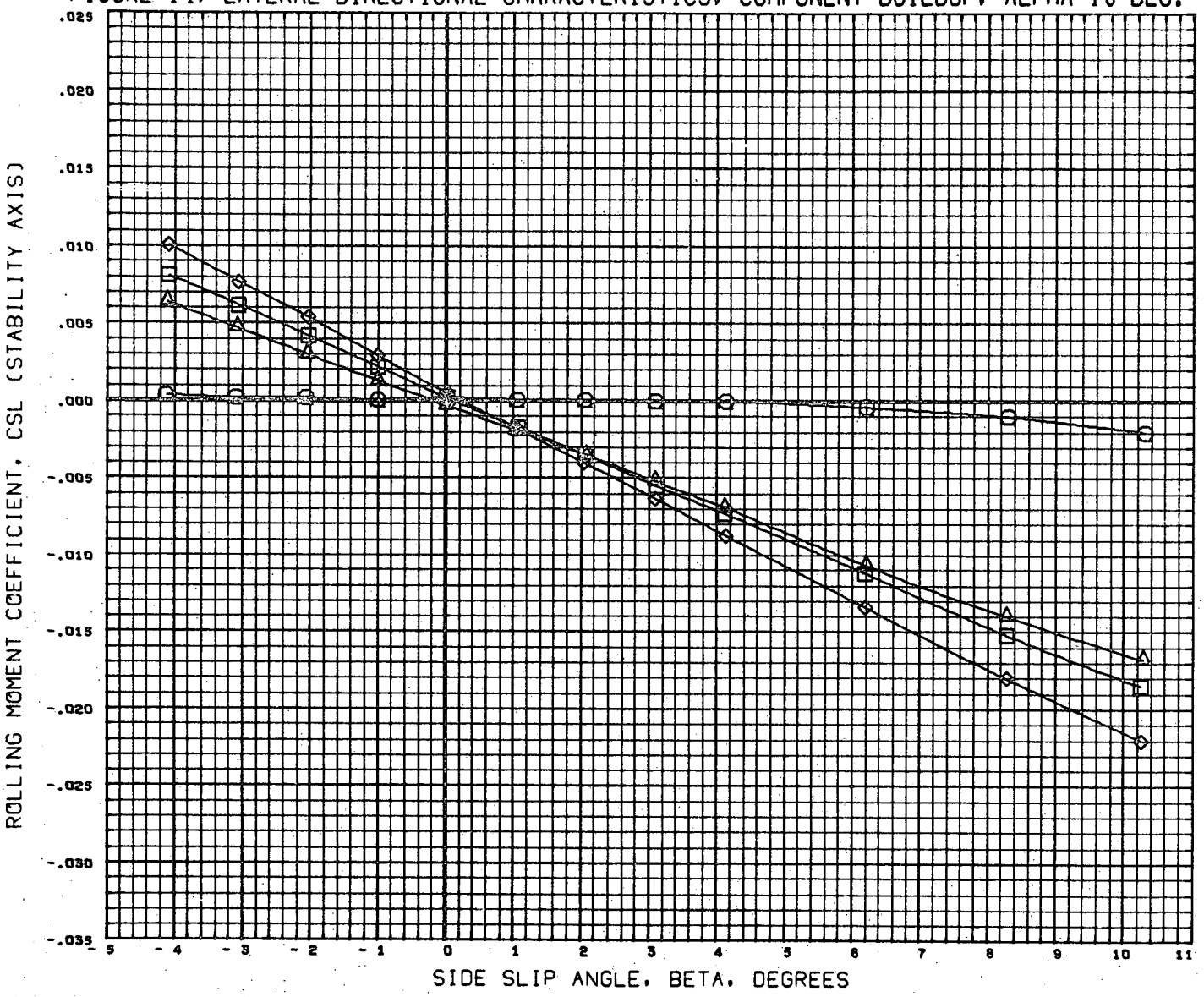
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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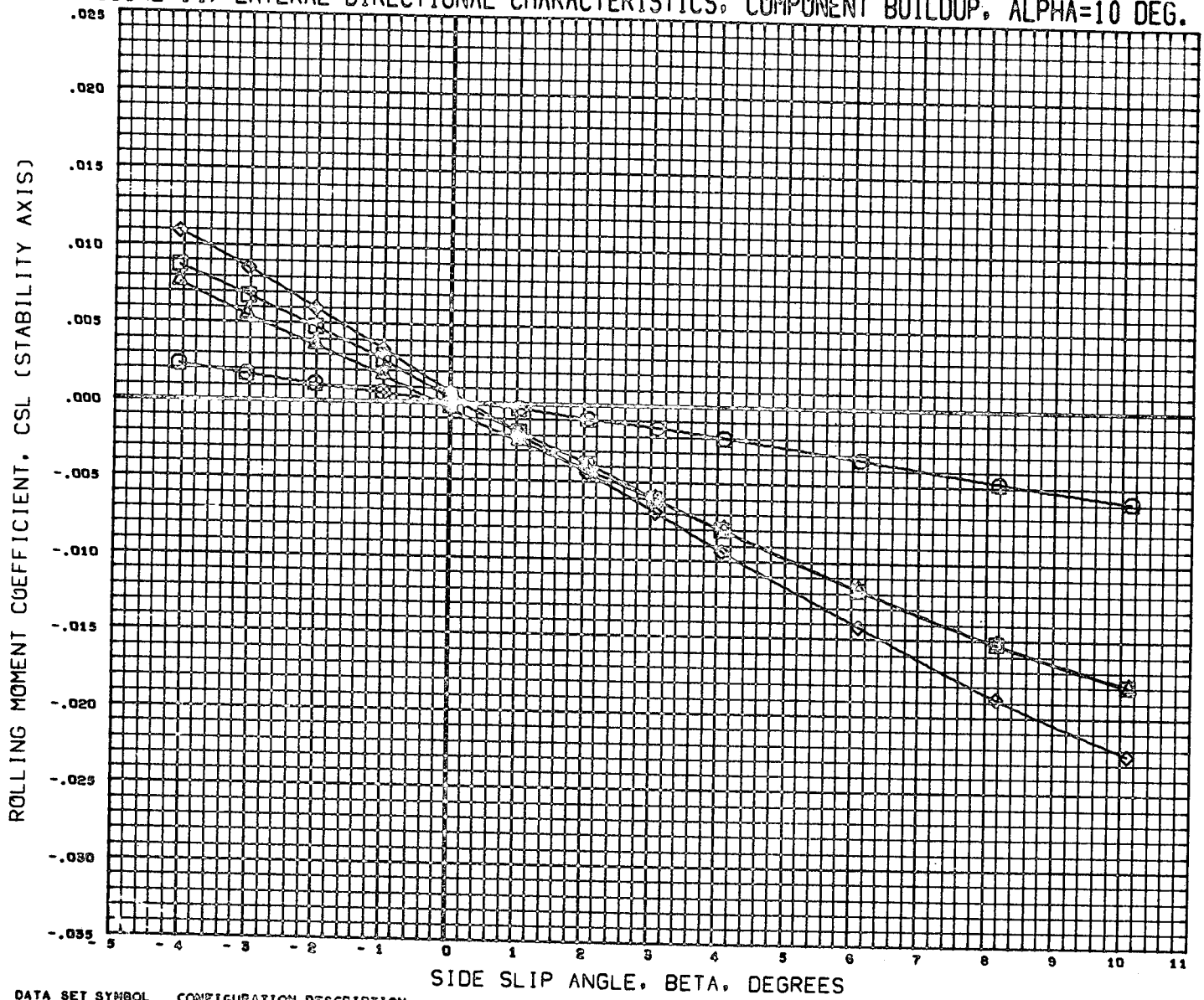
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B9W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B9W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B9W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B9W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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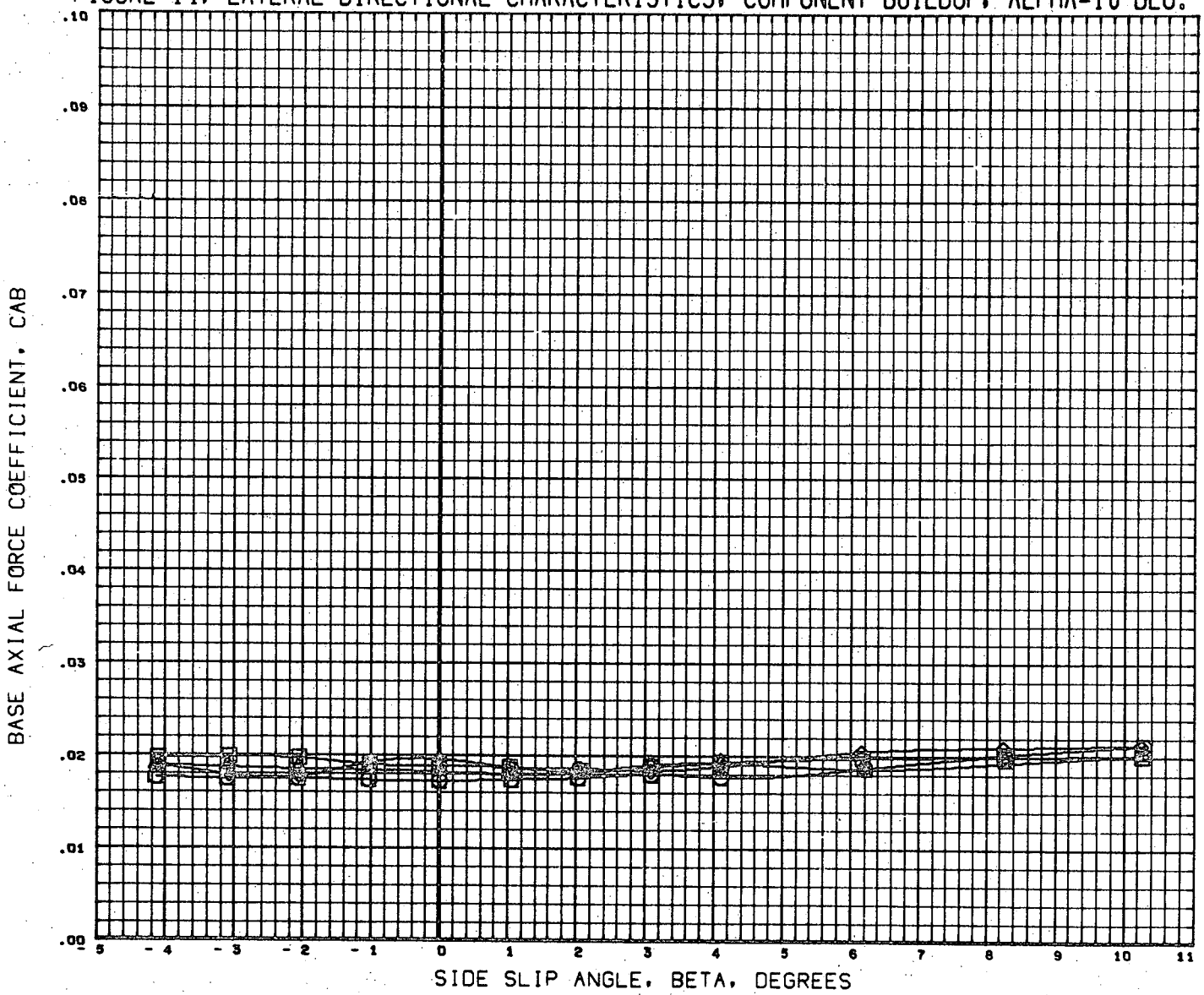
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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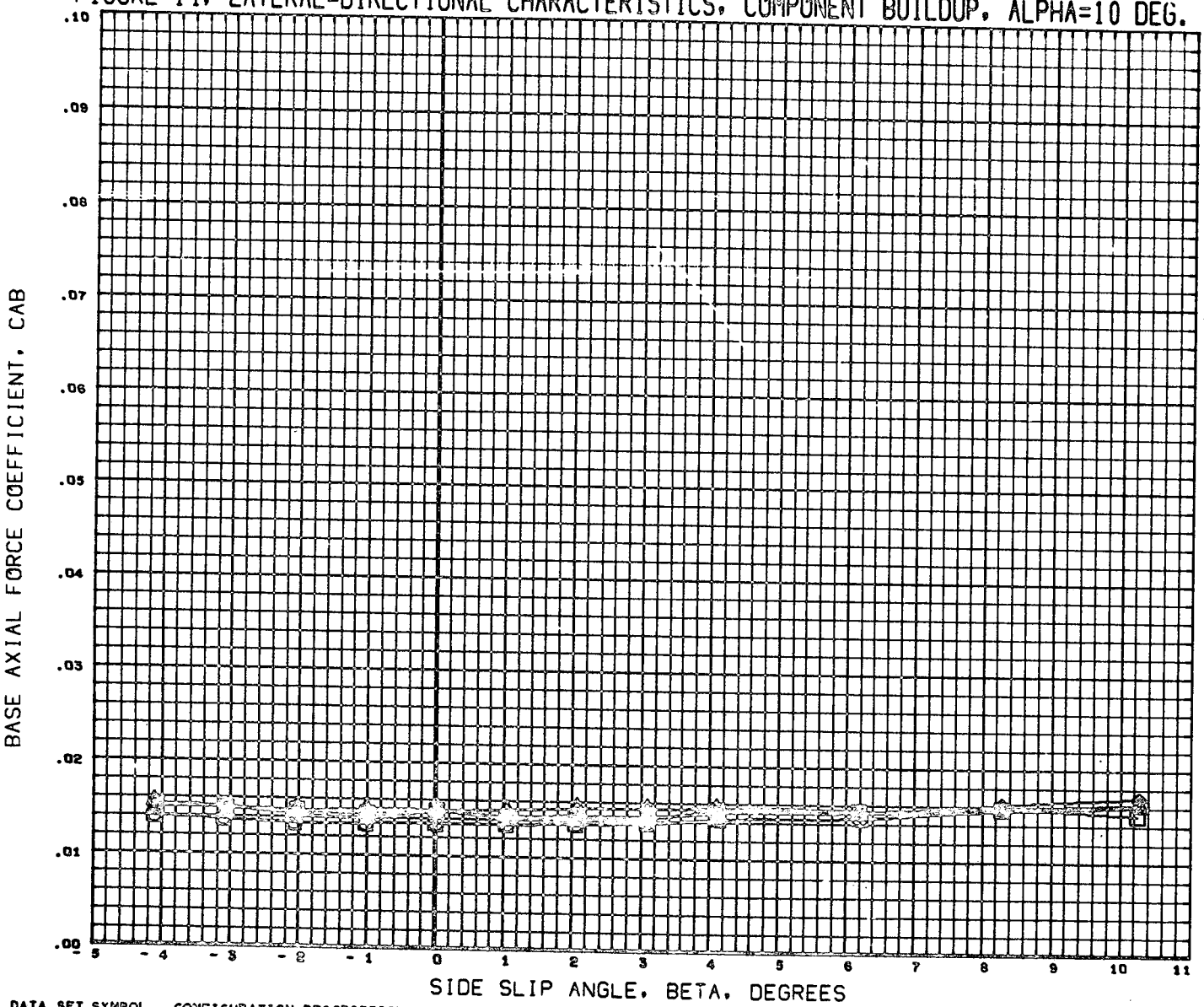
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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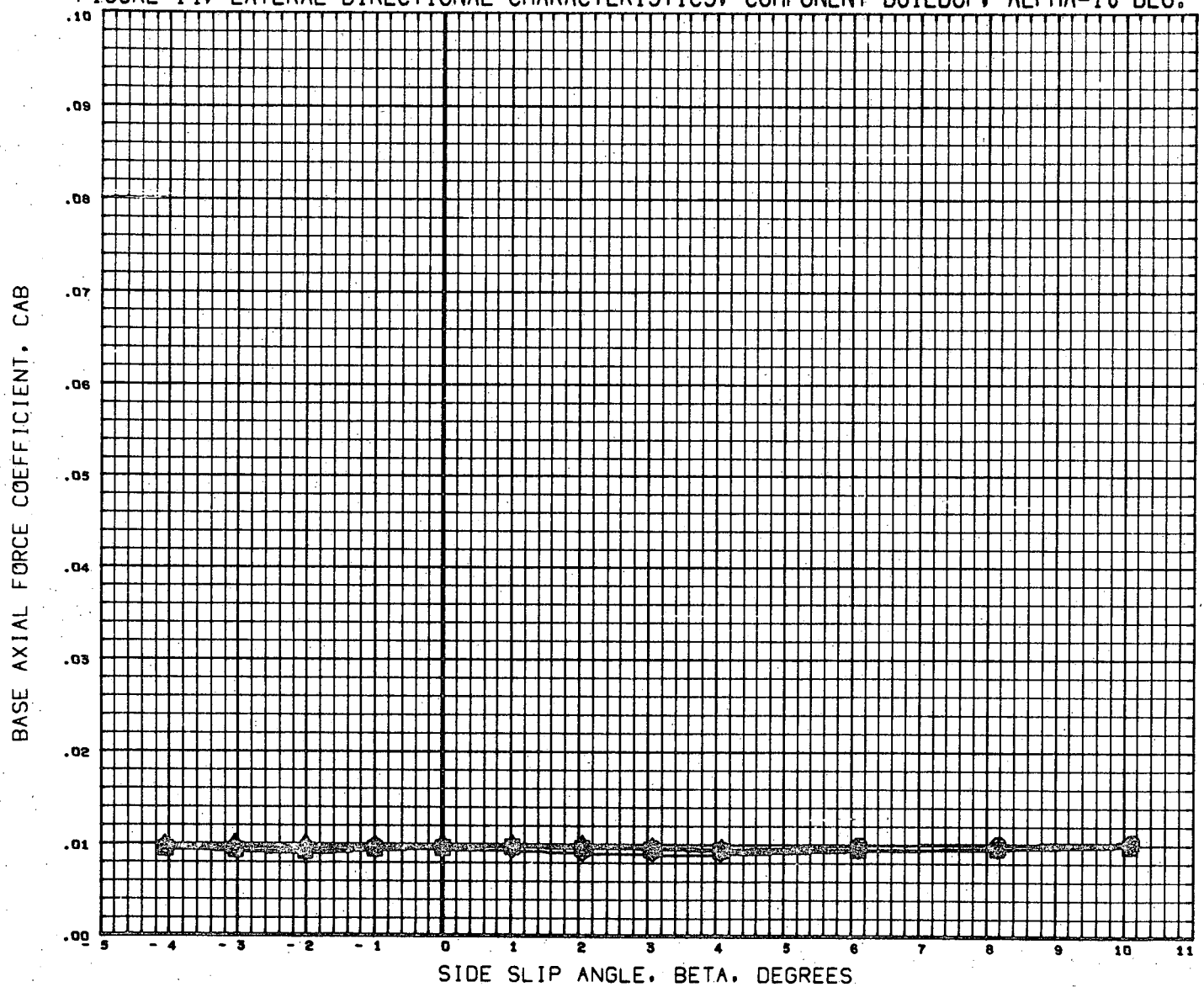
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49031)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Y29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49032)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49X30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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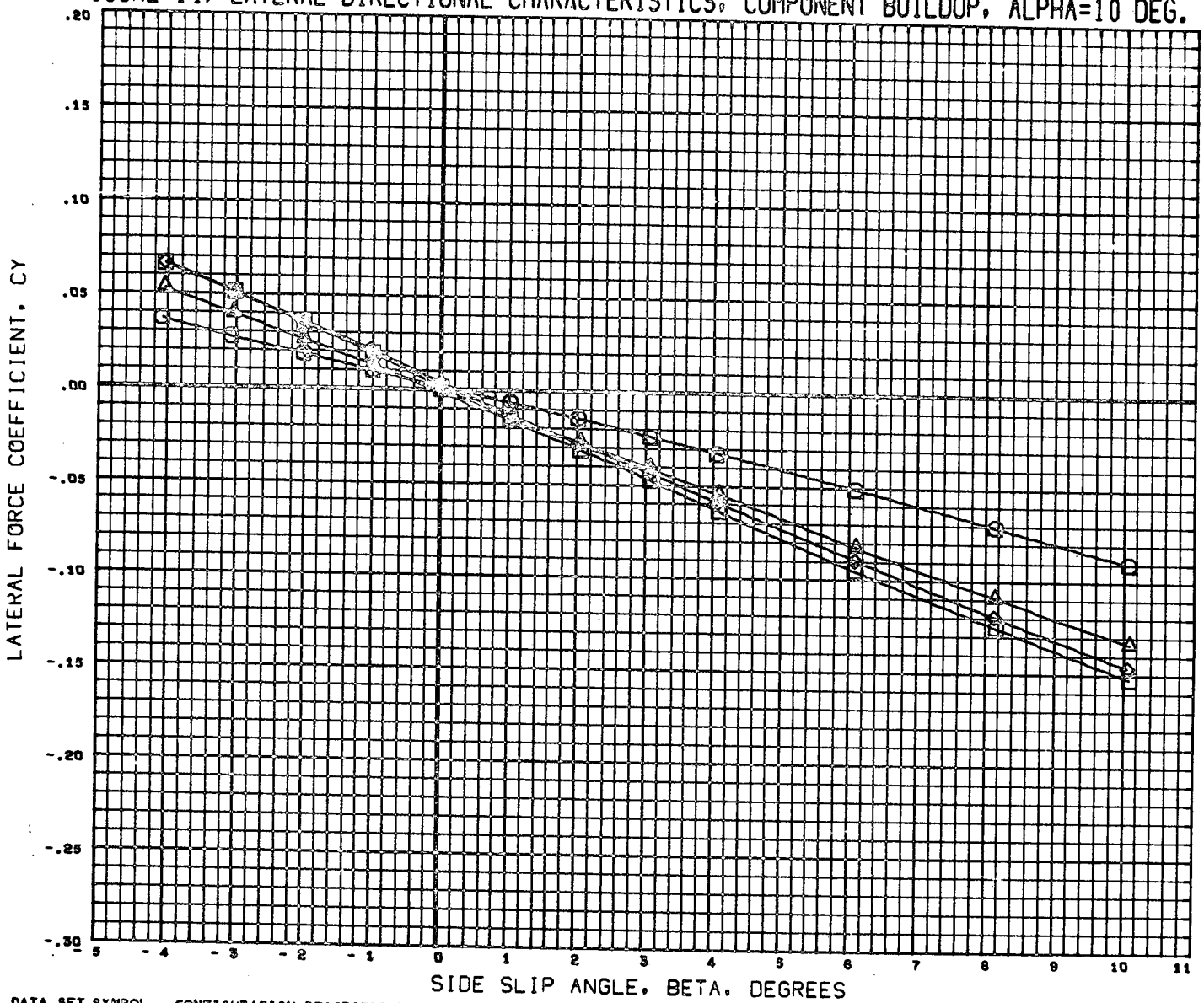
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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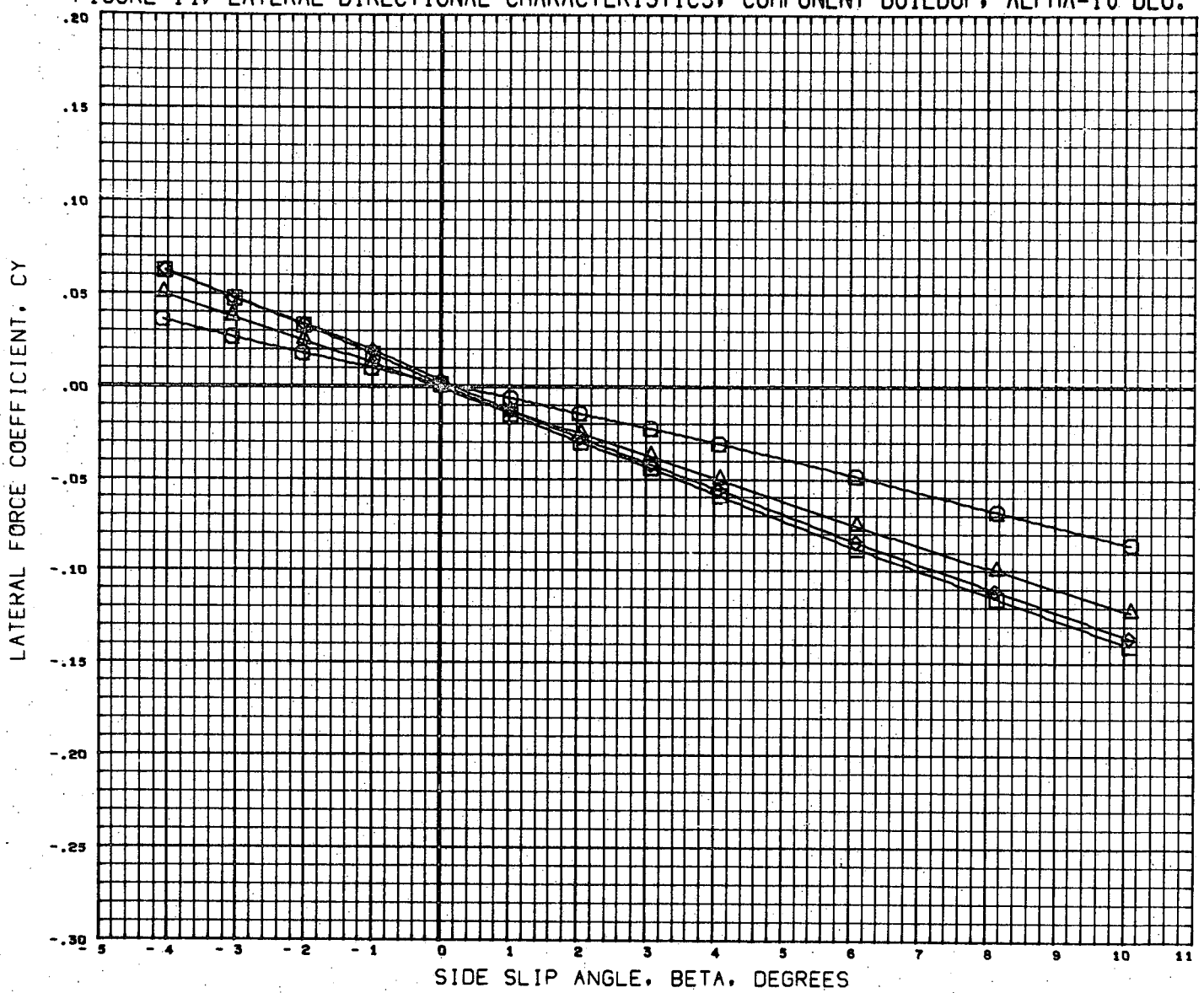
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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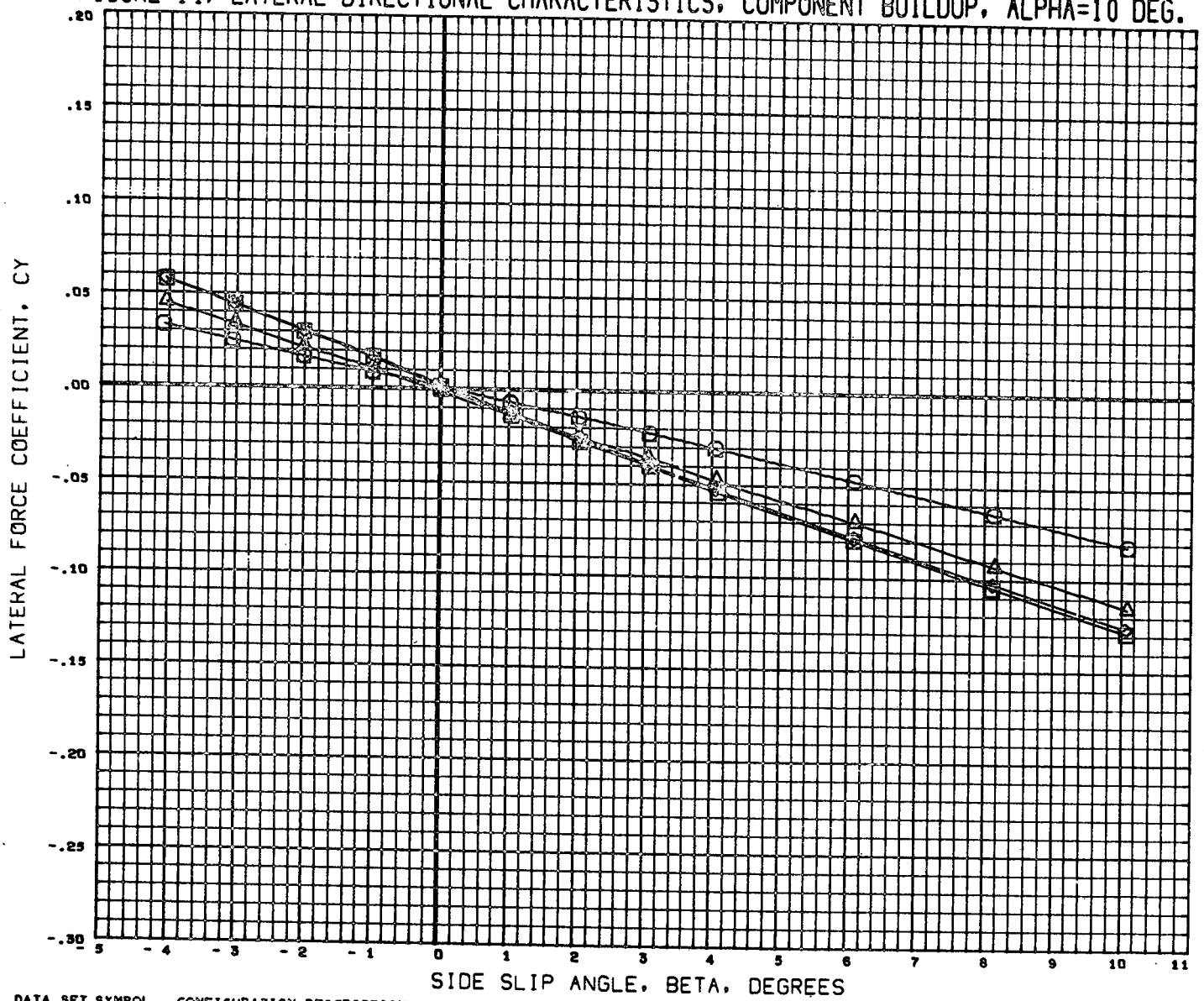
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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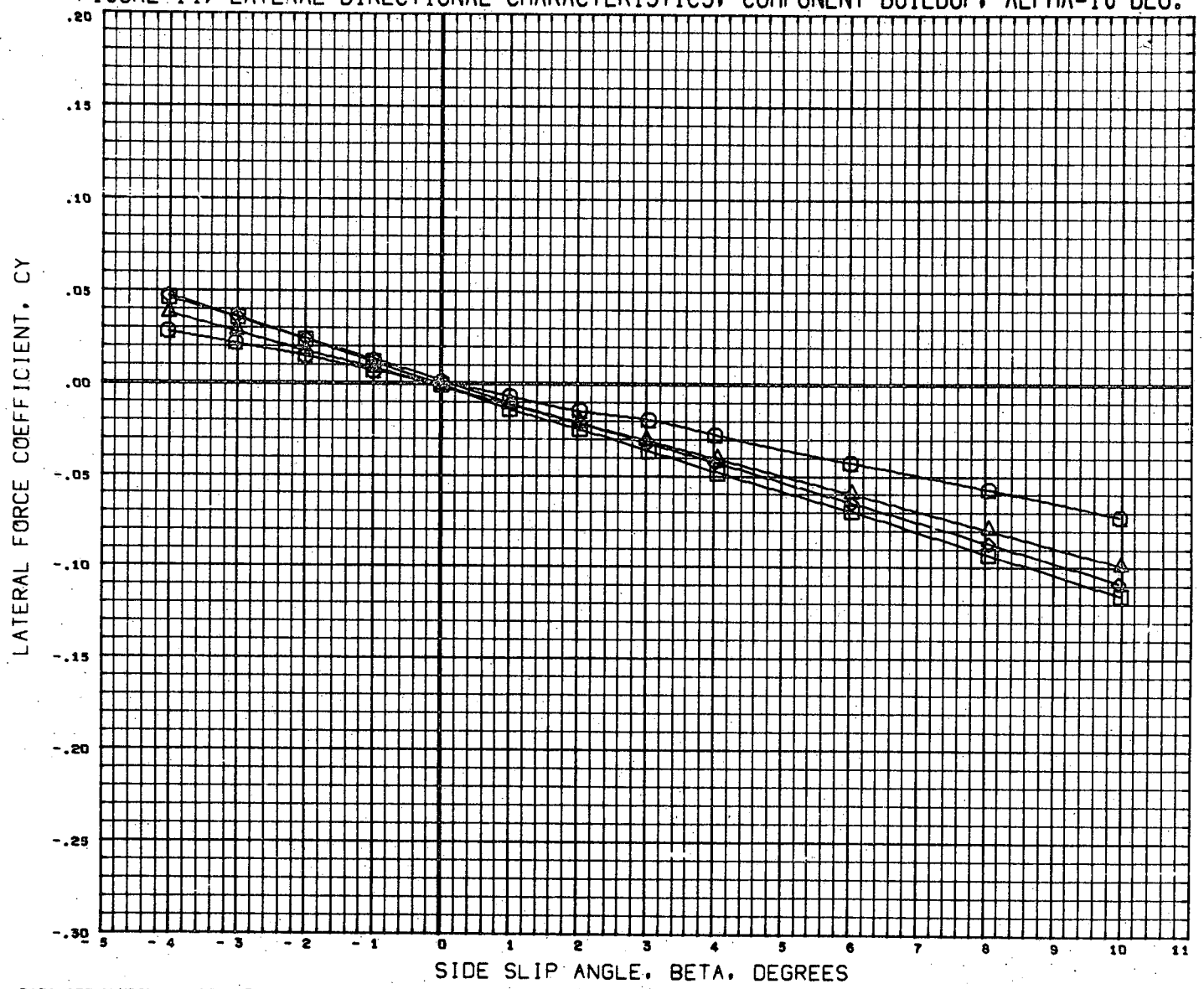
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.96

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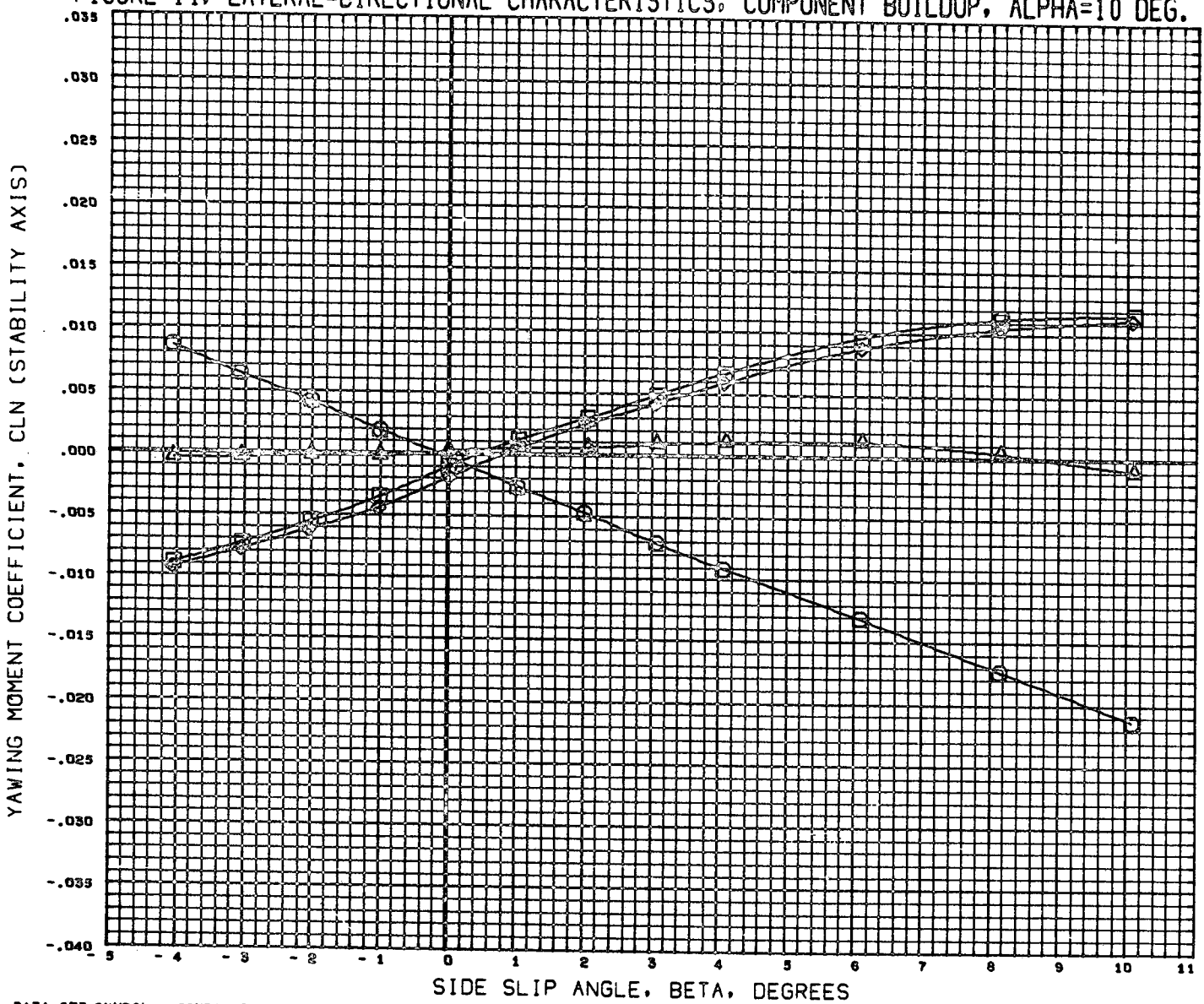
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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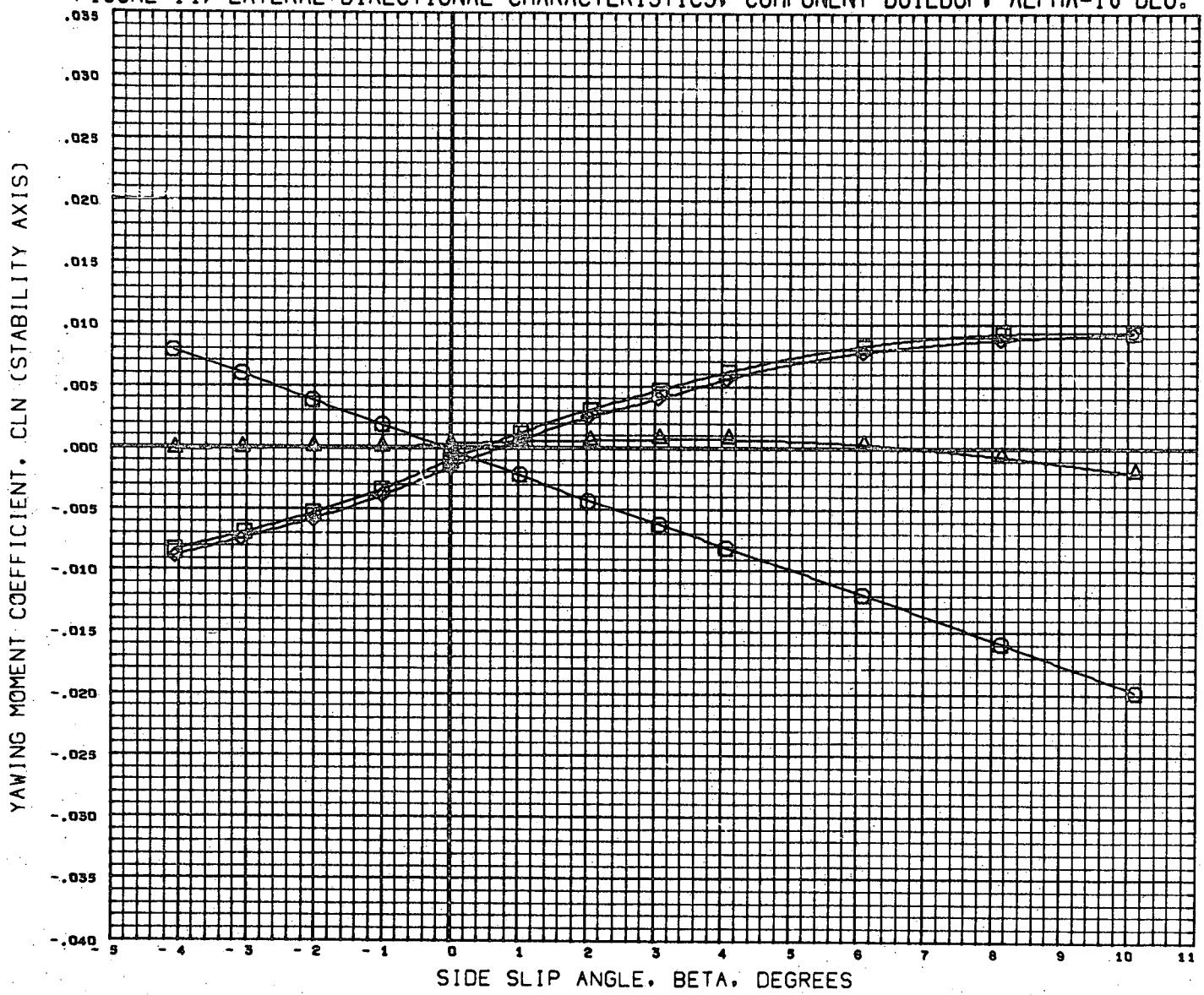
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 3.48

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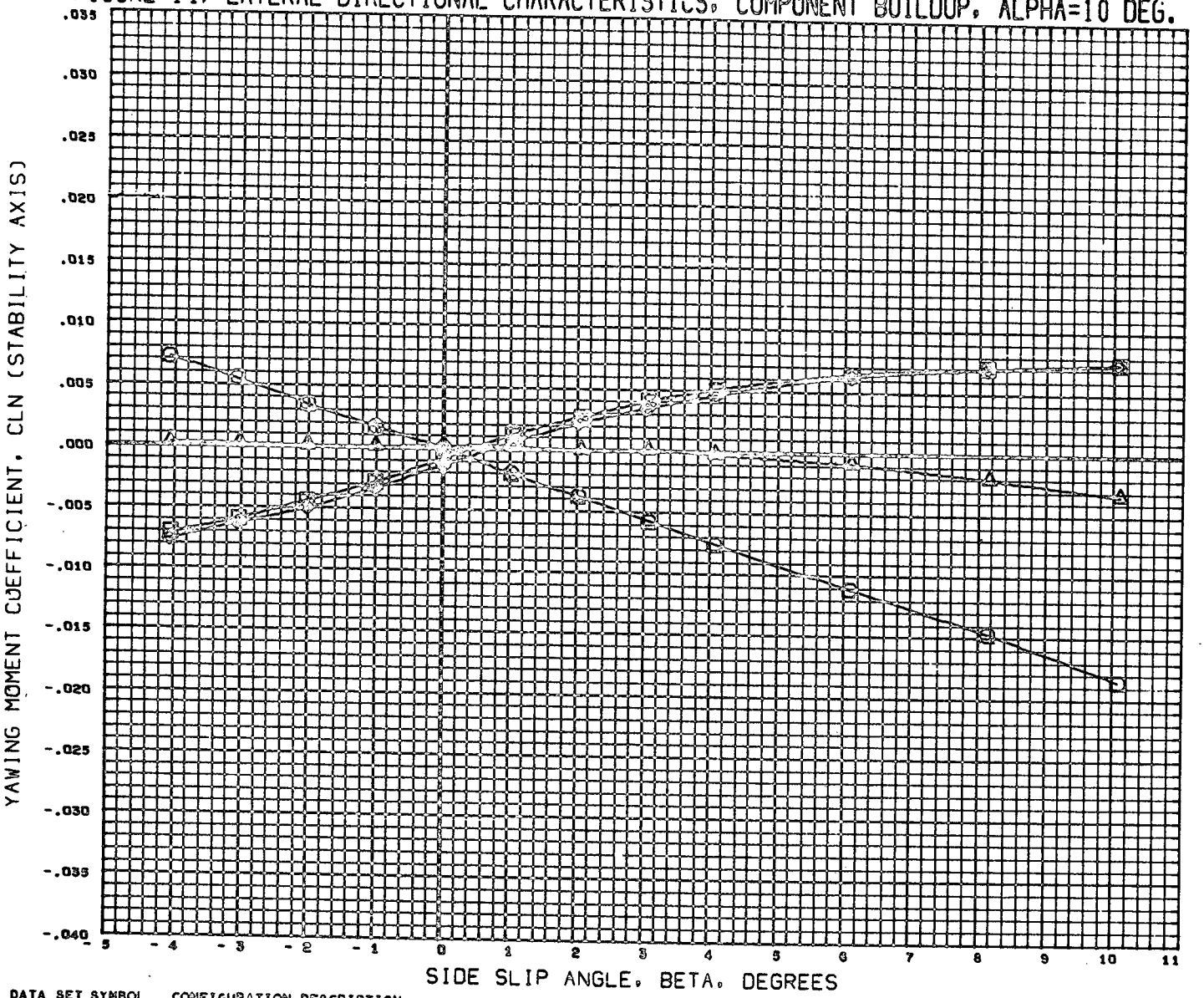
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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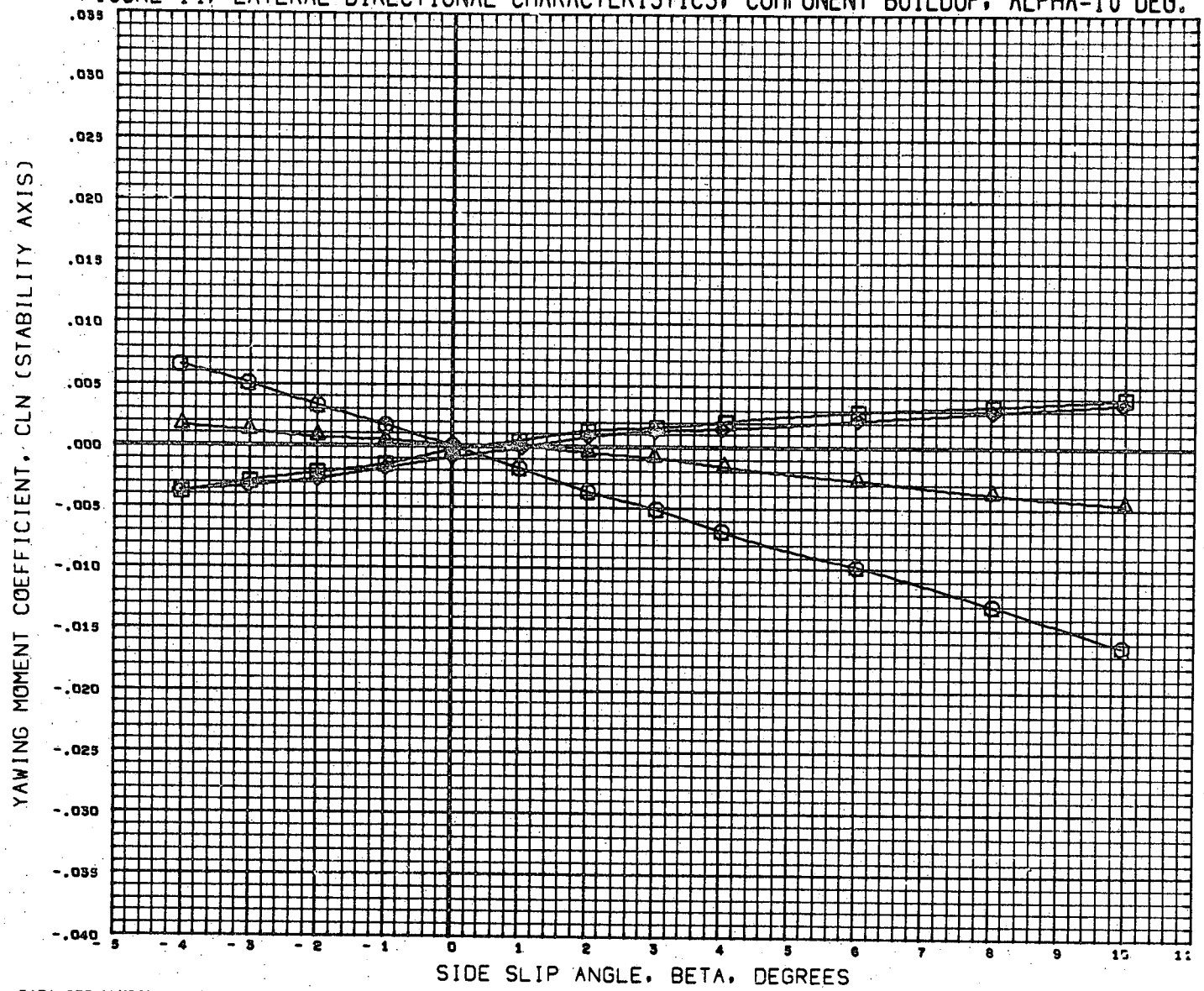
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49D13)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	⊠	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49D09)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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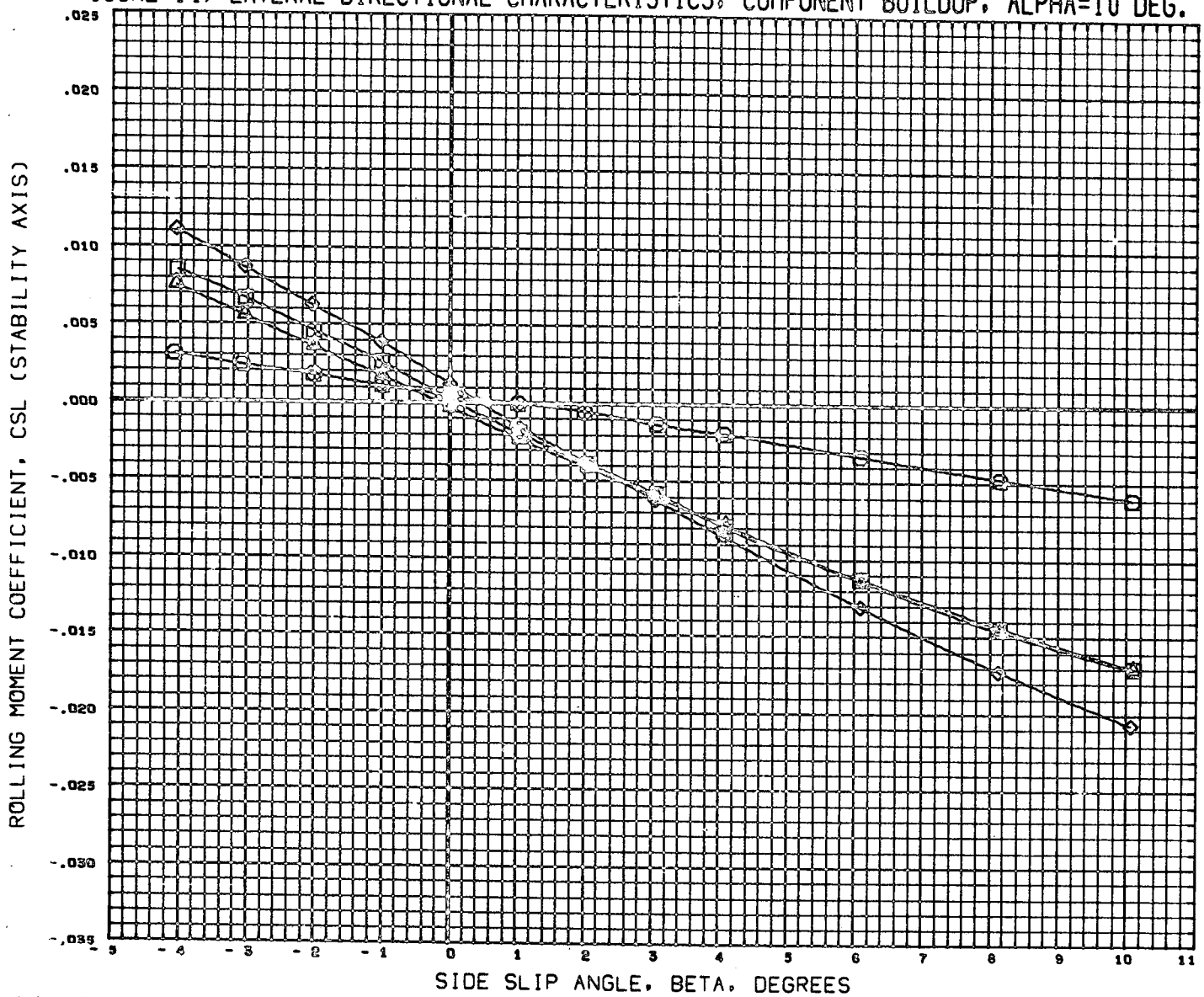
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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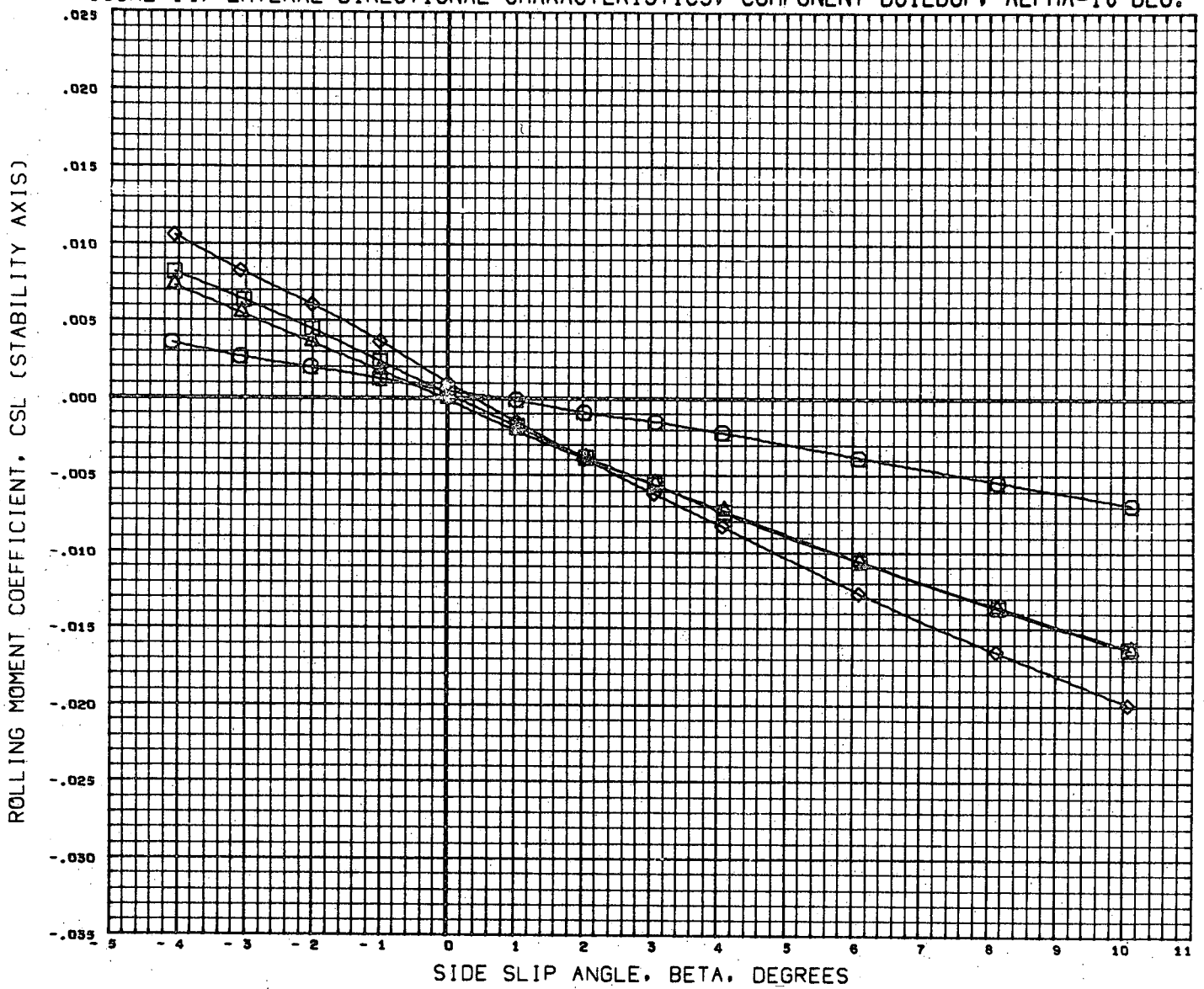
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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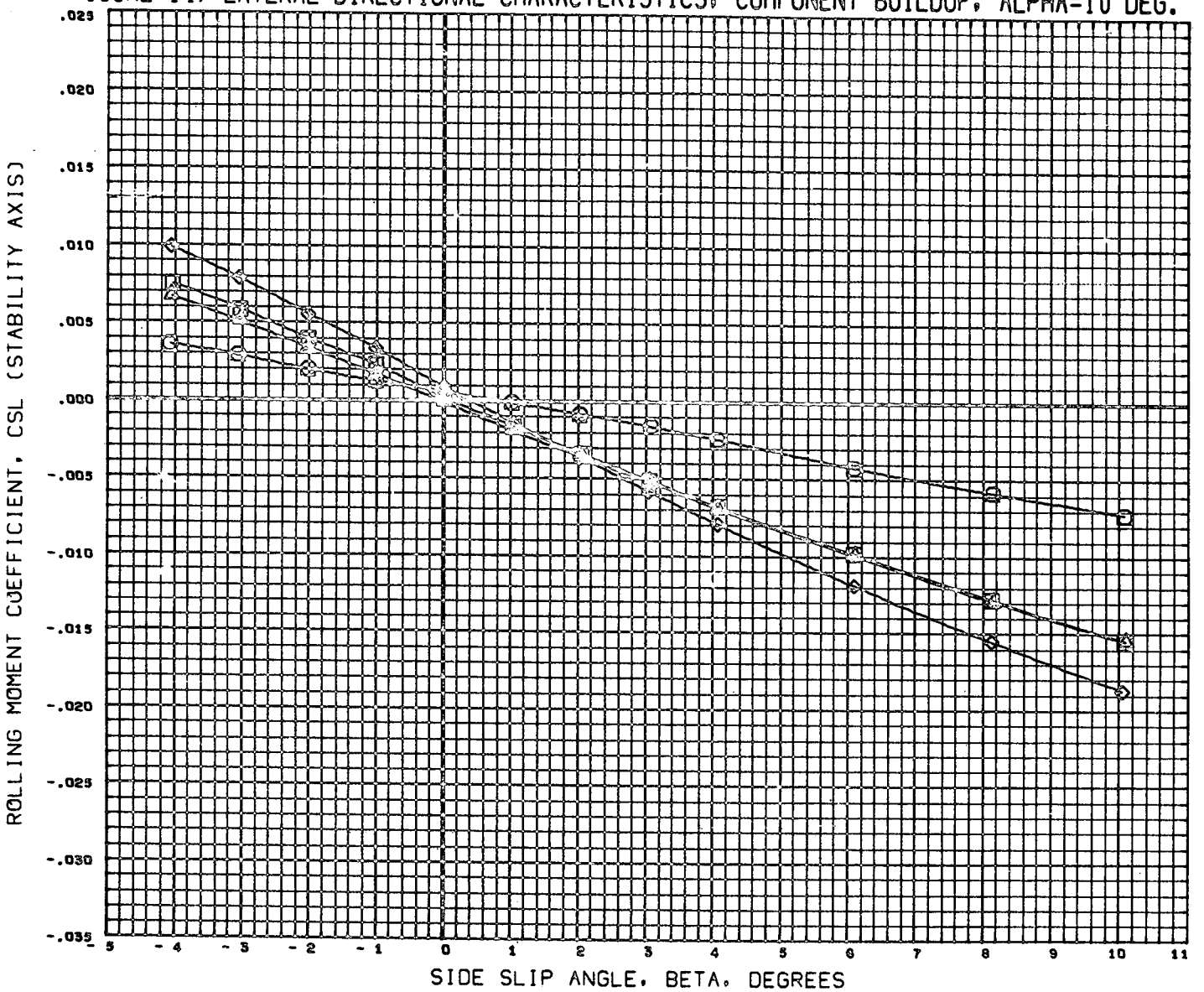
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B9W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B9W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B9W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B9W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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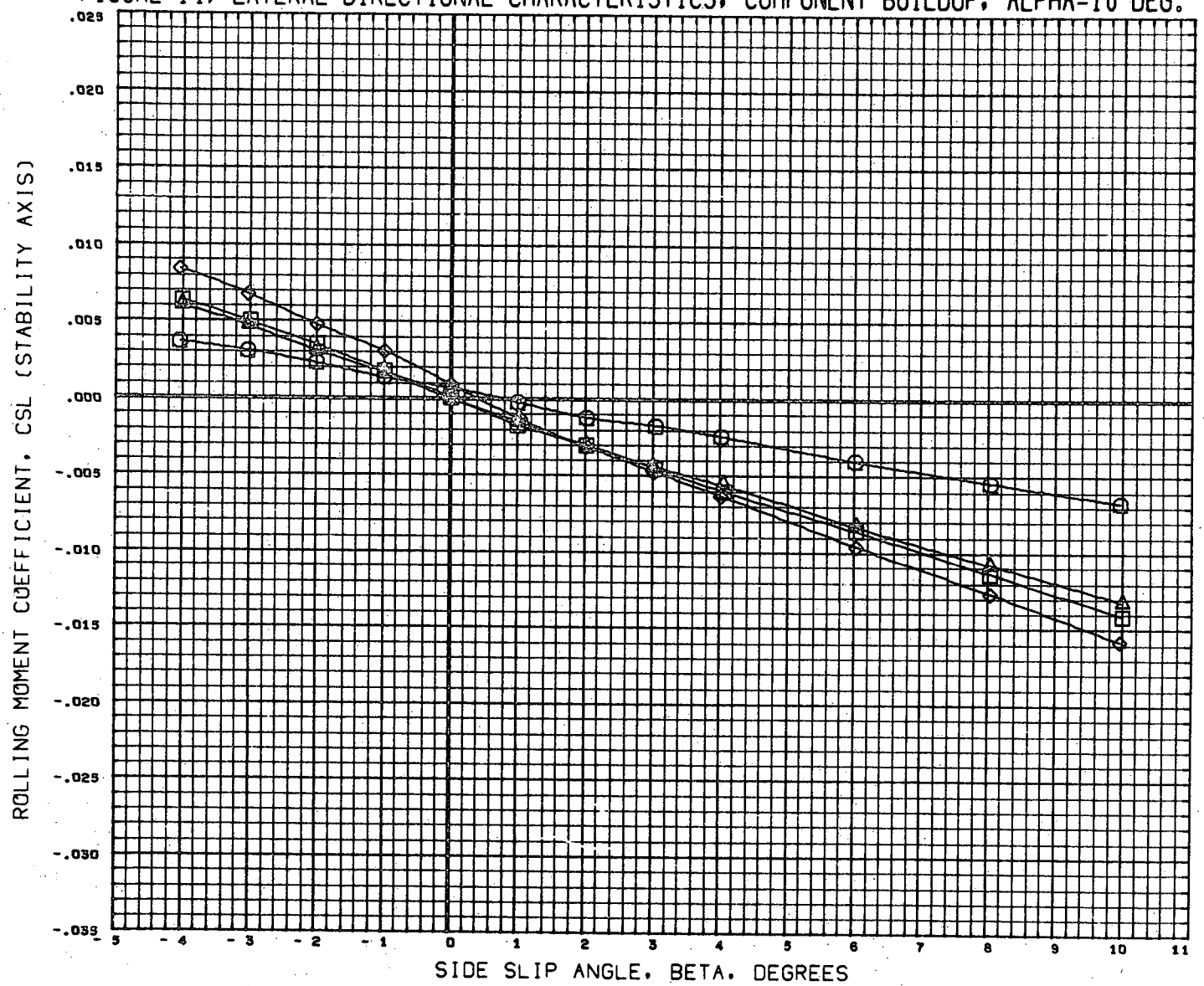
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49D13)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49D09)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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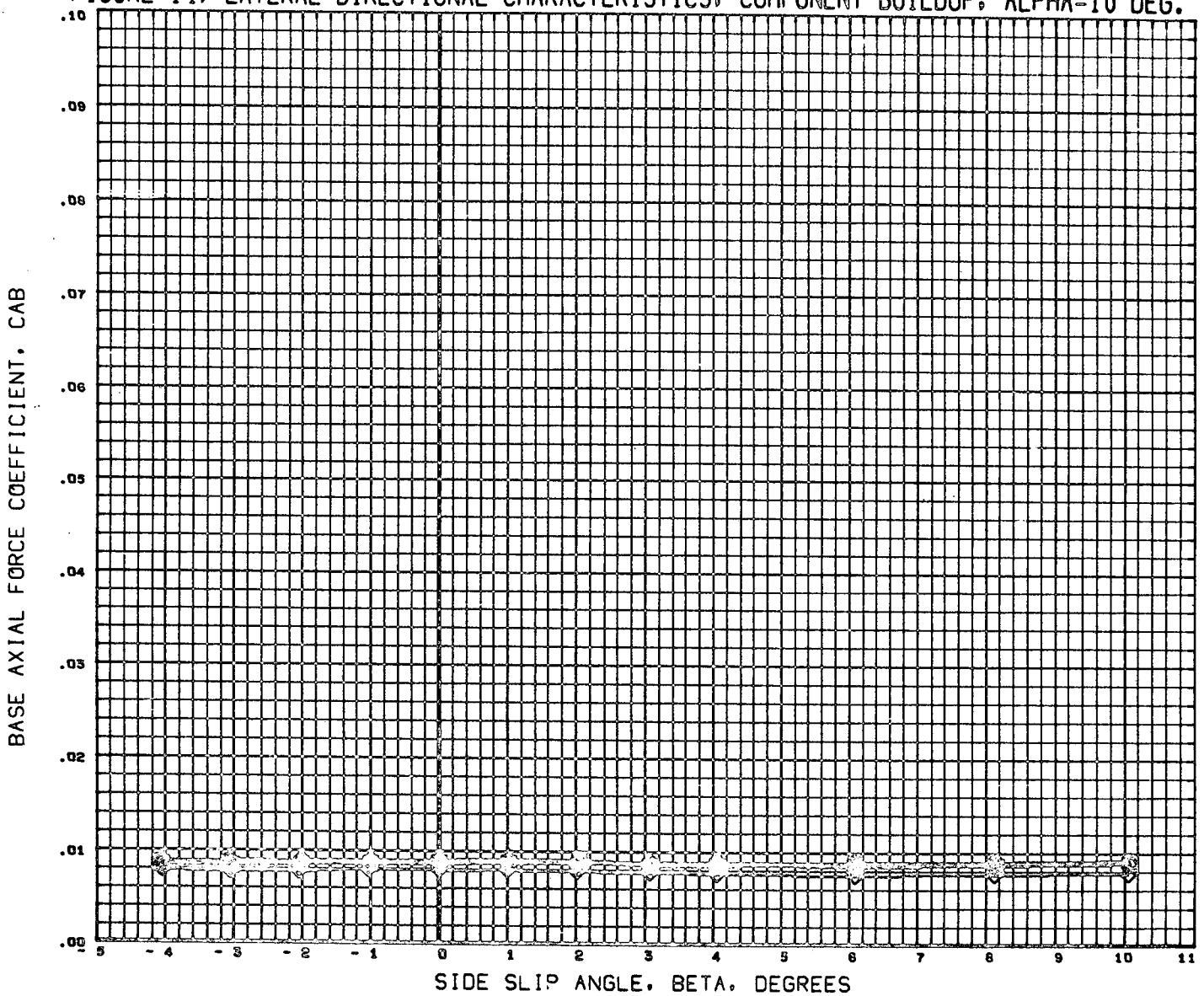
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	⧖	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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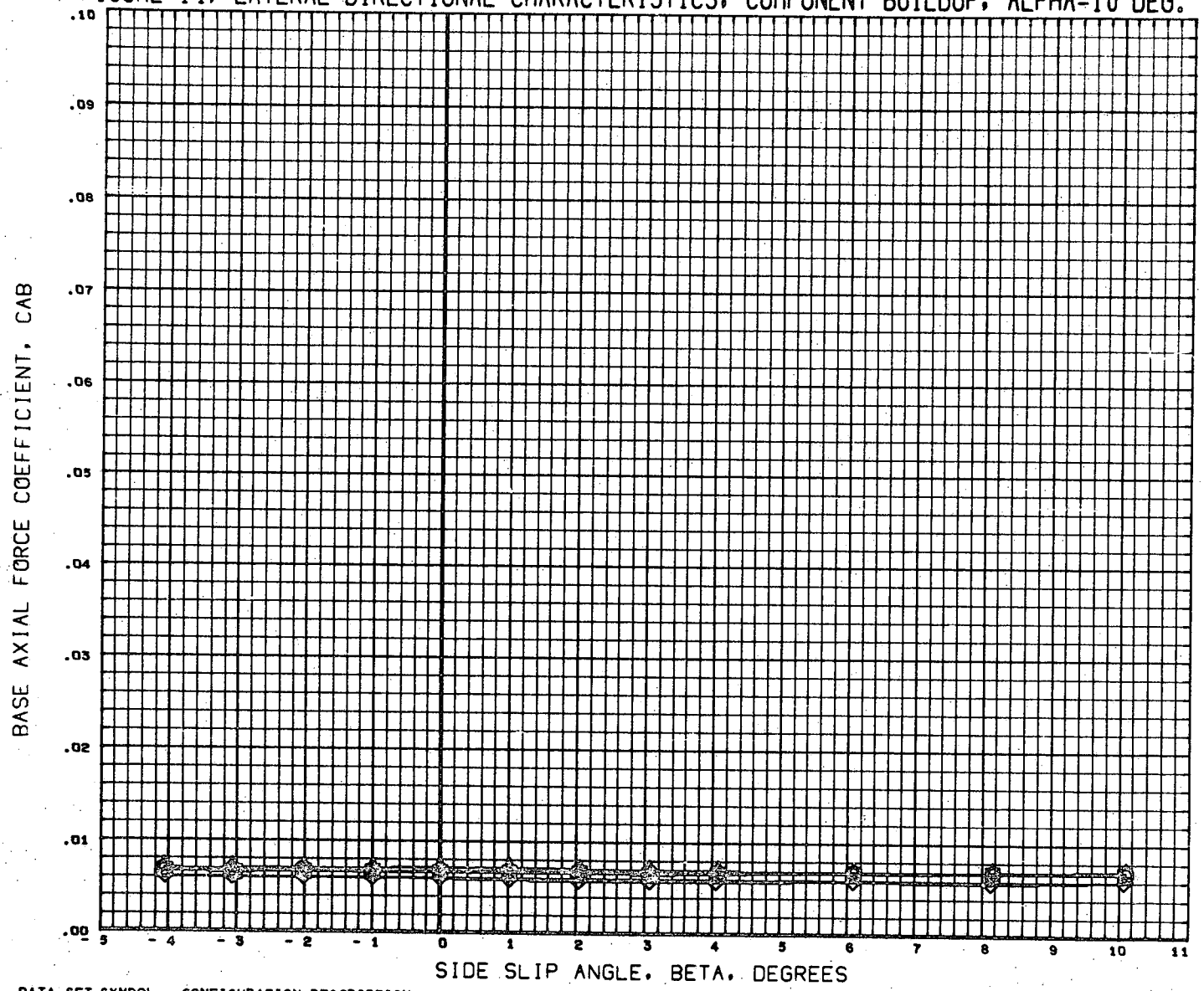
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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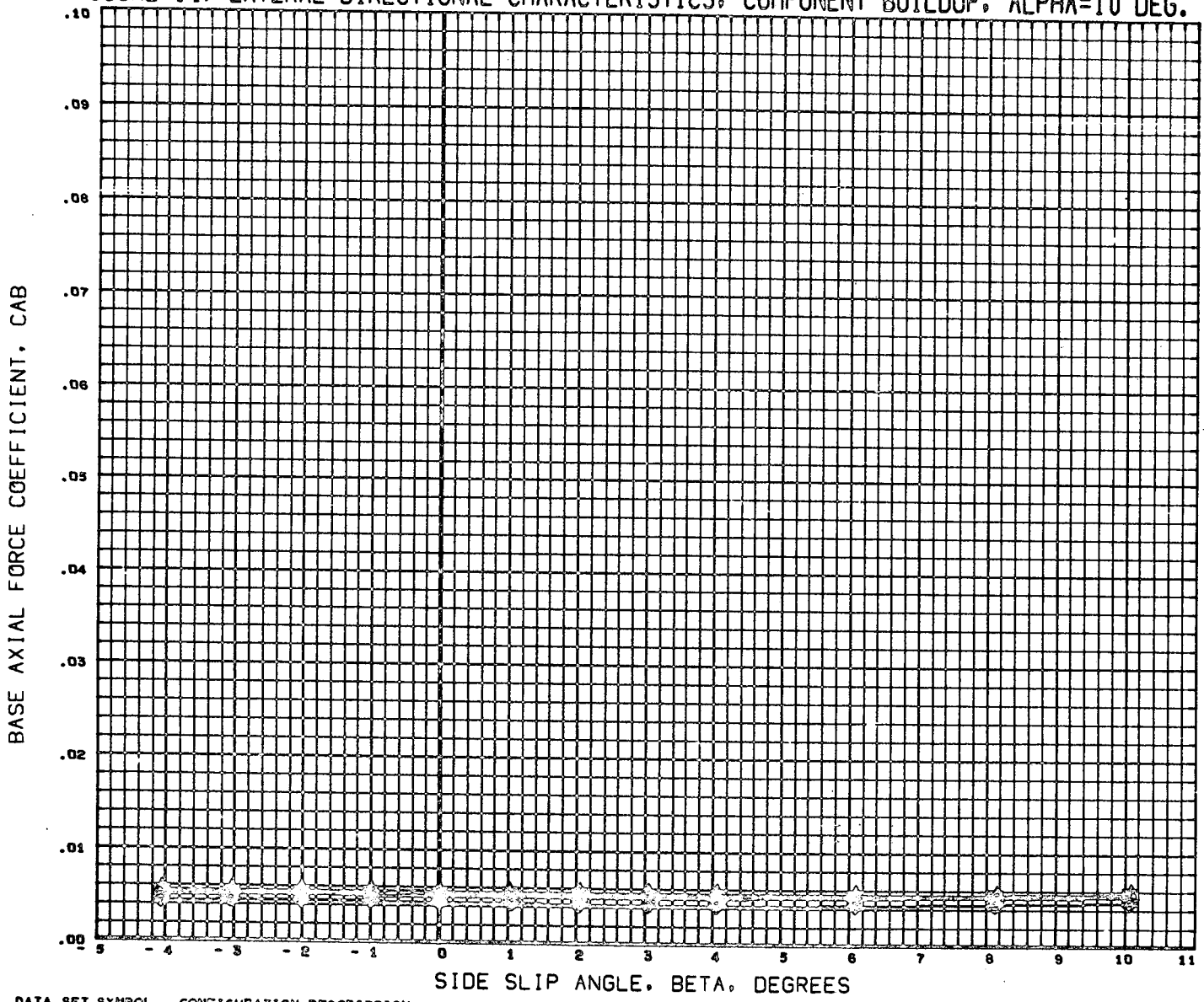
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 907 GAC M-33 ORB. BSW4	0.000	0.000		
(A49Z29)	△	MSFC 907 GAC M-33 ORB. BSW4VS	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 907 GAC M-33 ORB. BSW4VS(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 907 GAC M-33 ORB. BSW4(-20)VS(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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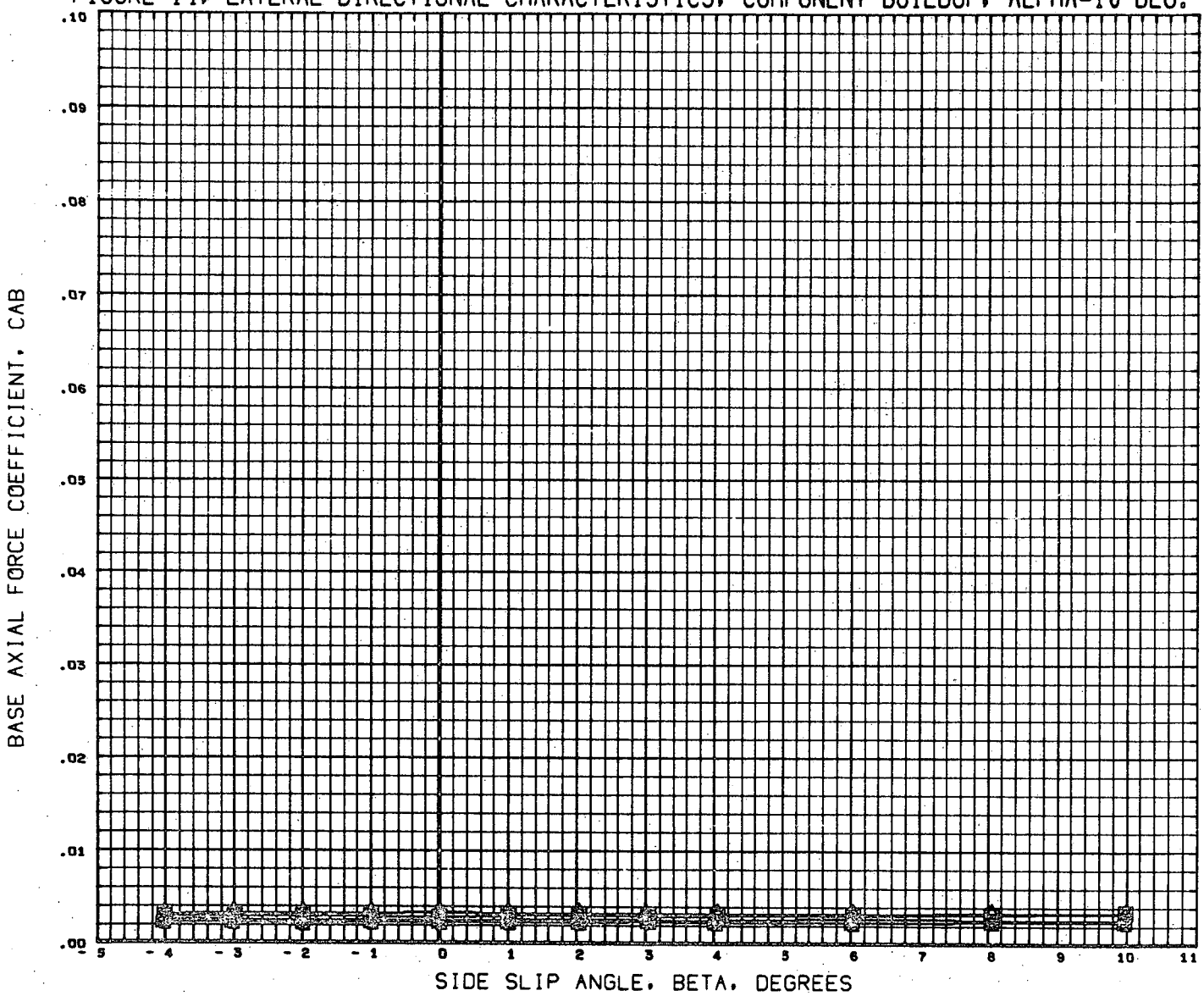
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49013)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49Z29)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49009)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49Y30)	□	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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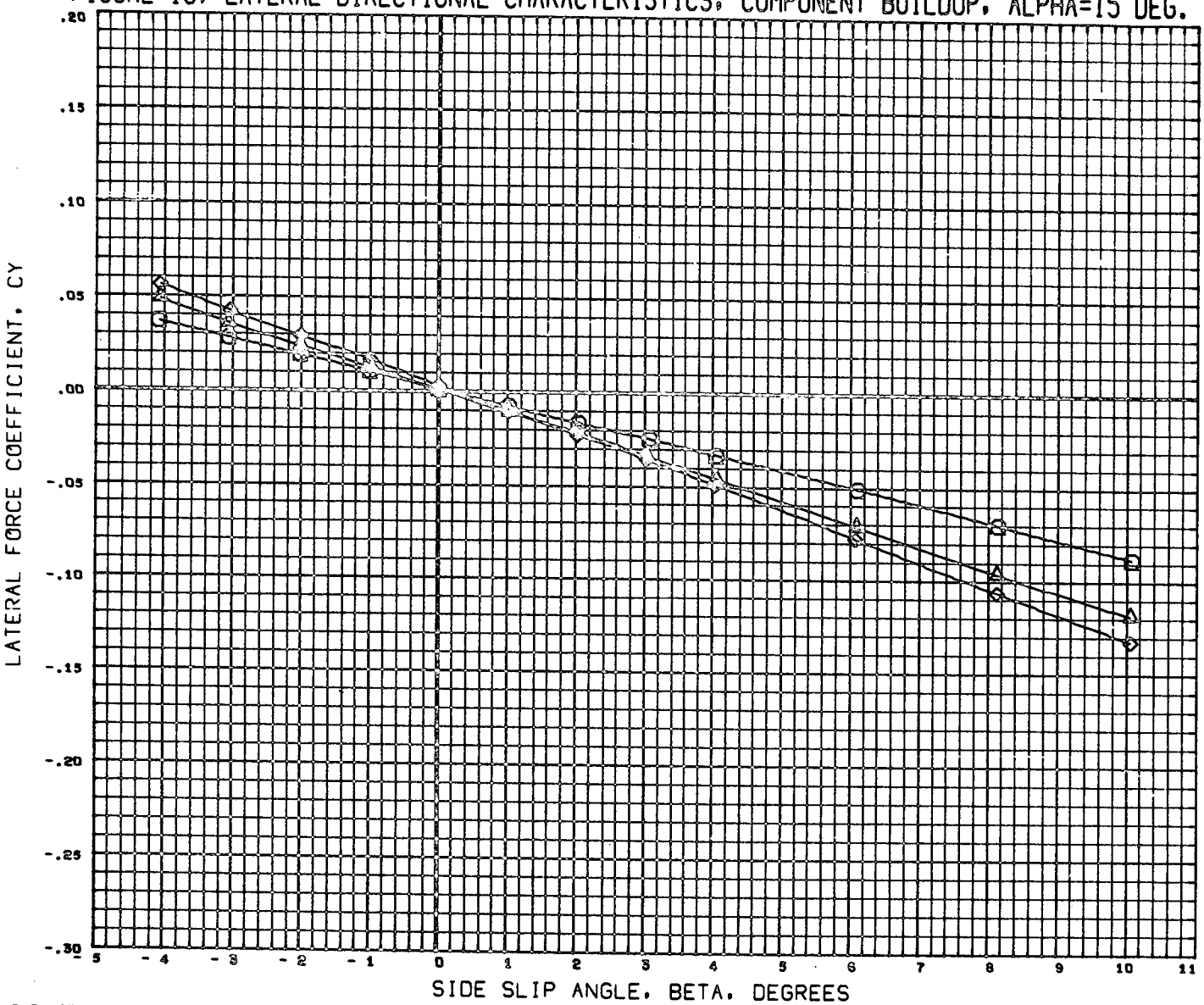
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 307 GAC M-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 307 GAC M-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	M3FC 307 GAC M-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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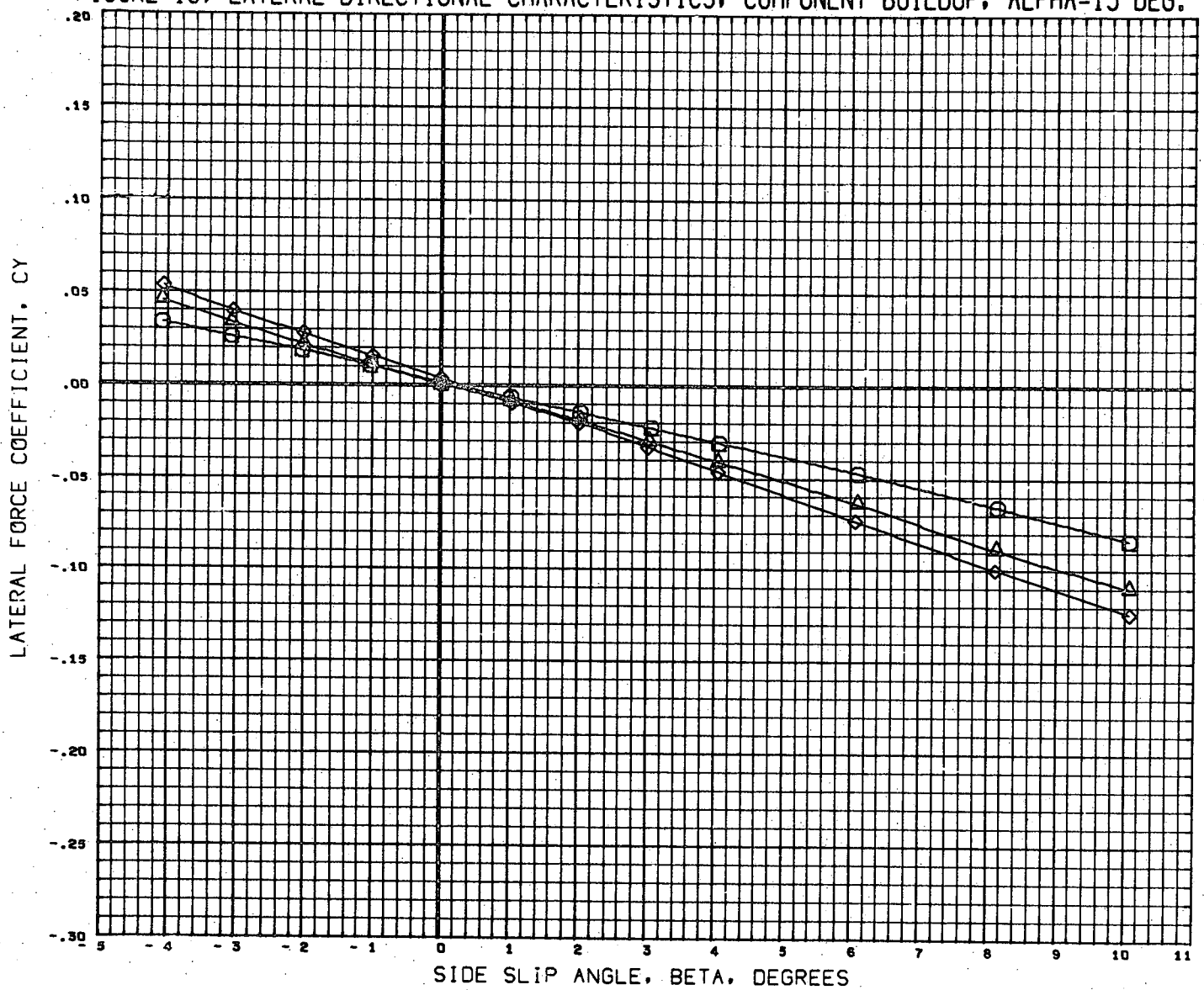
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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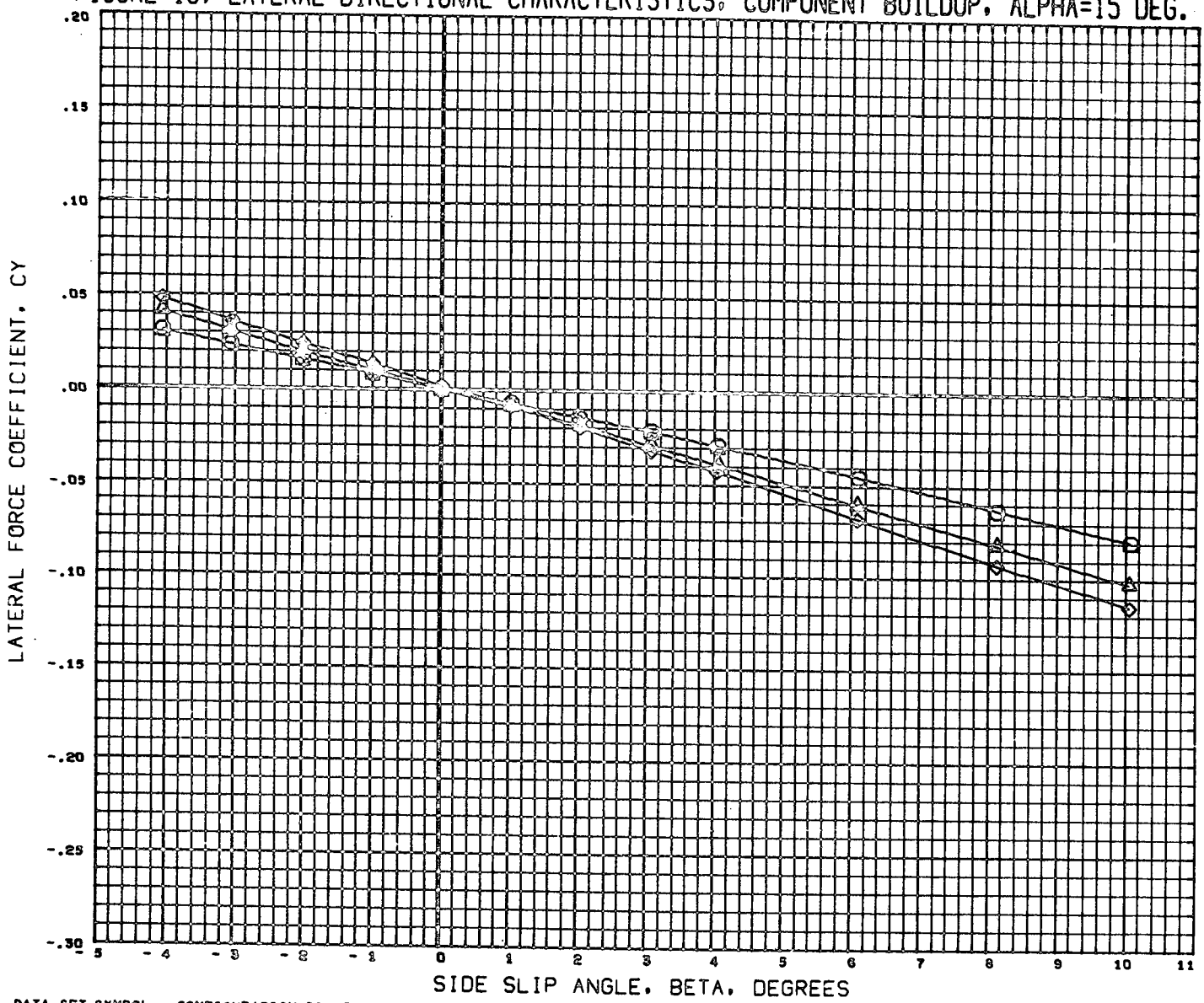
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49012)	○	MSFC 907 GAC H-33 ORB. B5W4
(A49011)	△	MSFC 907 GAC H-33 ORB. B5W4V5
(A49010)	◇	MSFC 907 GAC H-33 ORB. B5W4V5(+30,-30)

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	0.000	0.000
0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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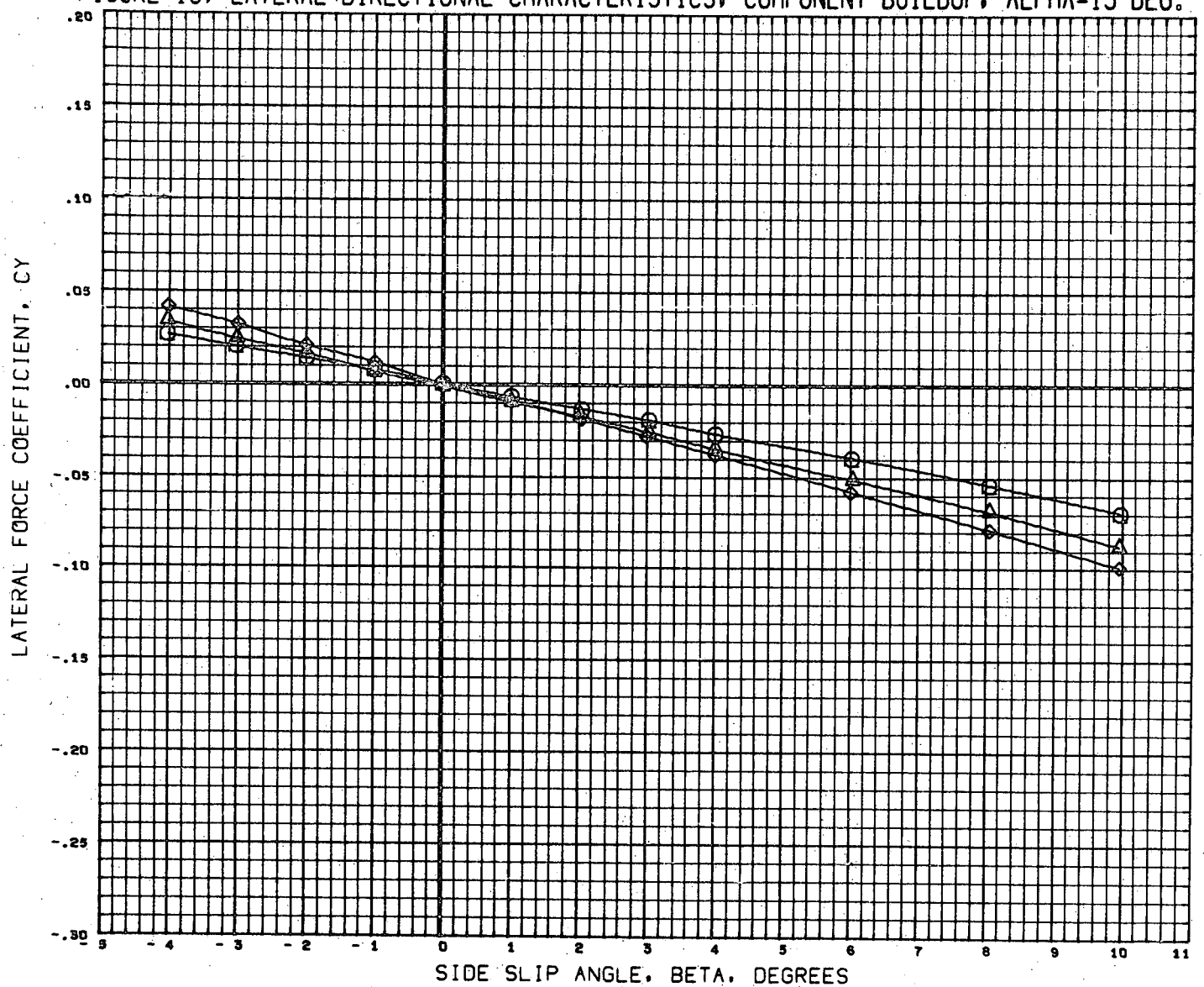
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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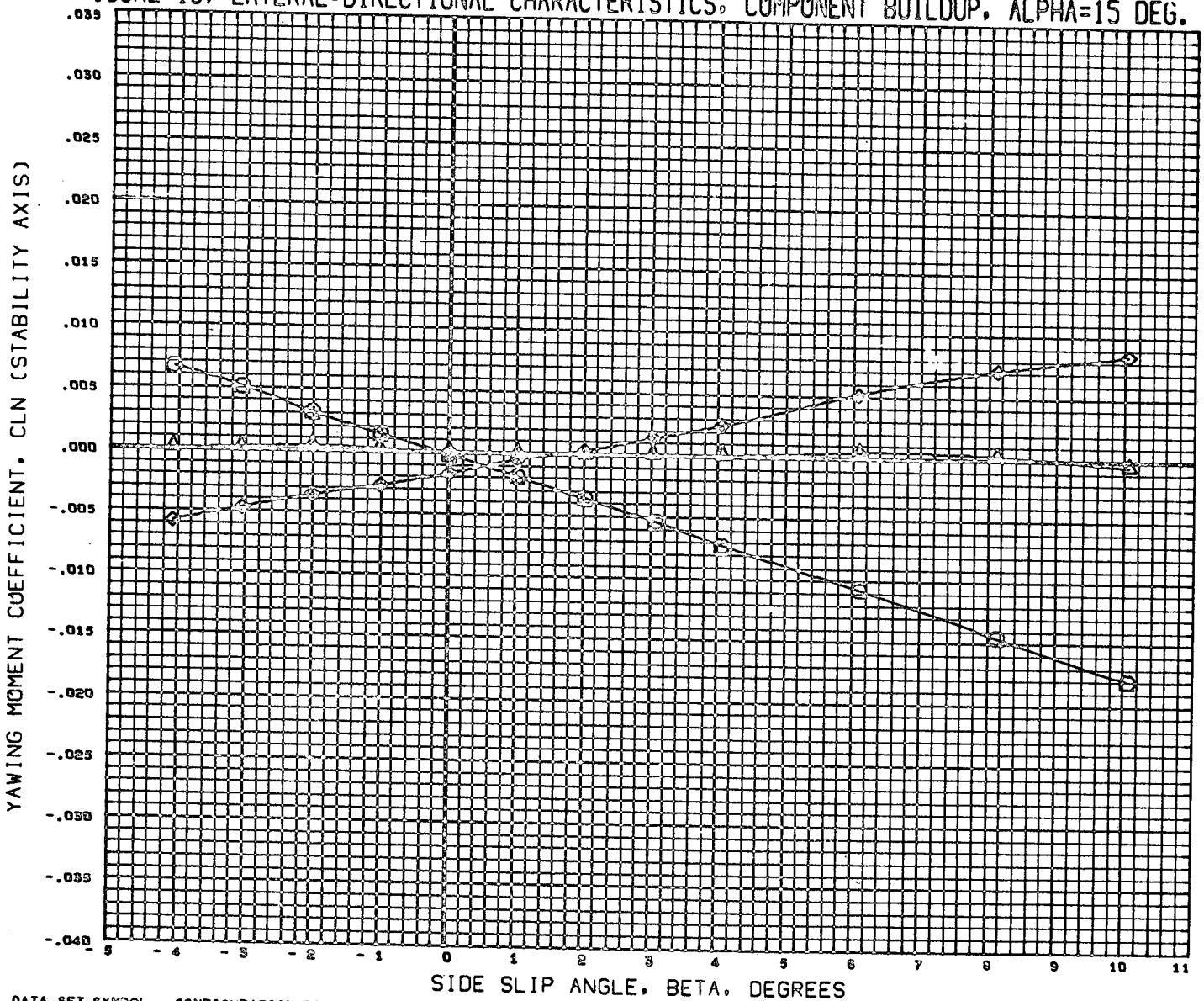
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC M-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC M-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC M-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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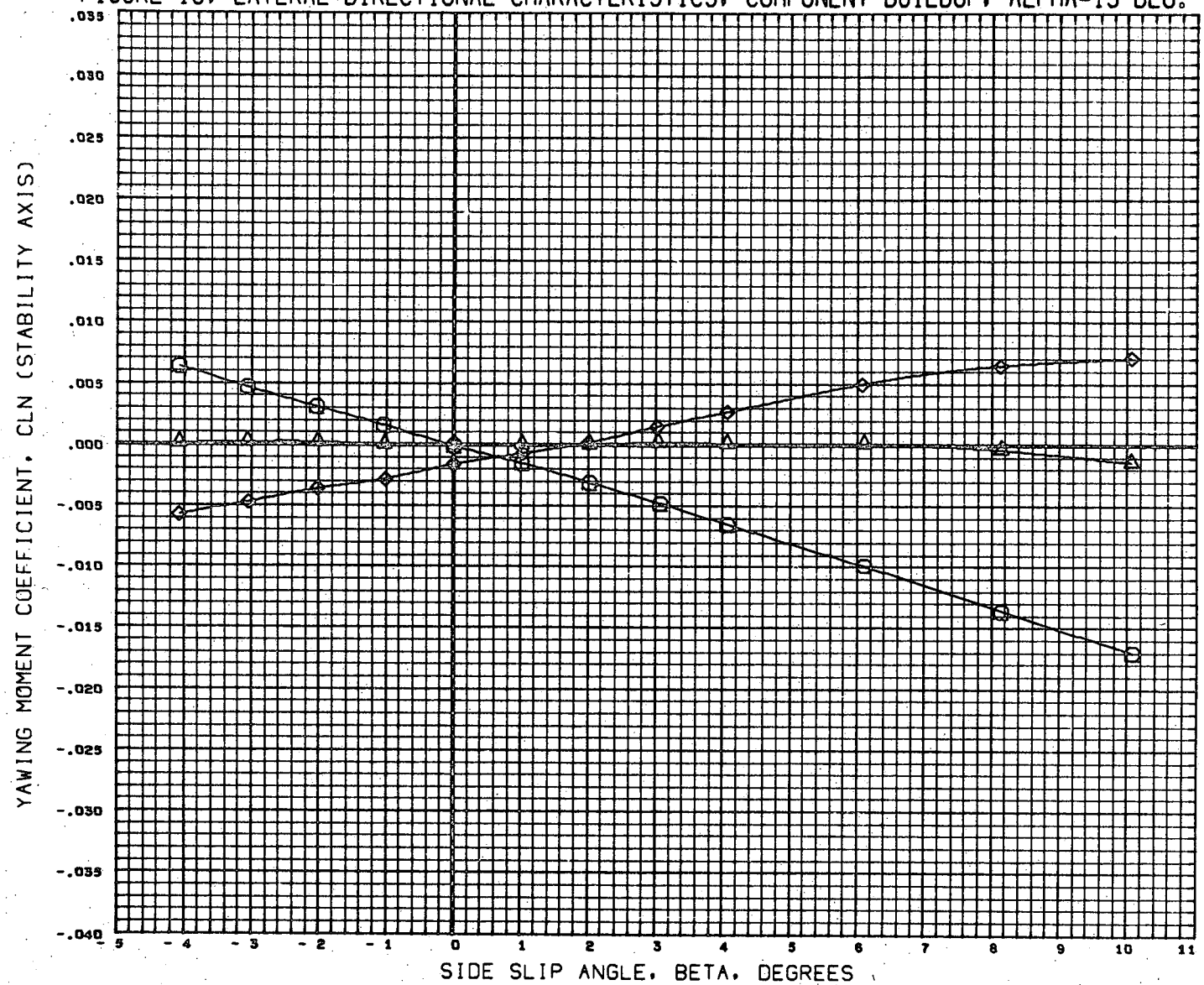
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 3.48

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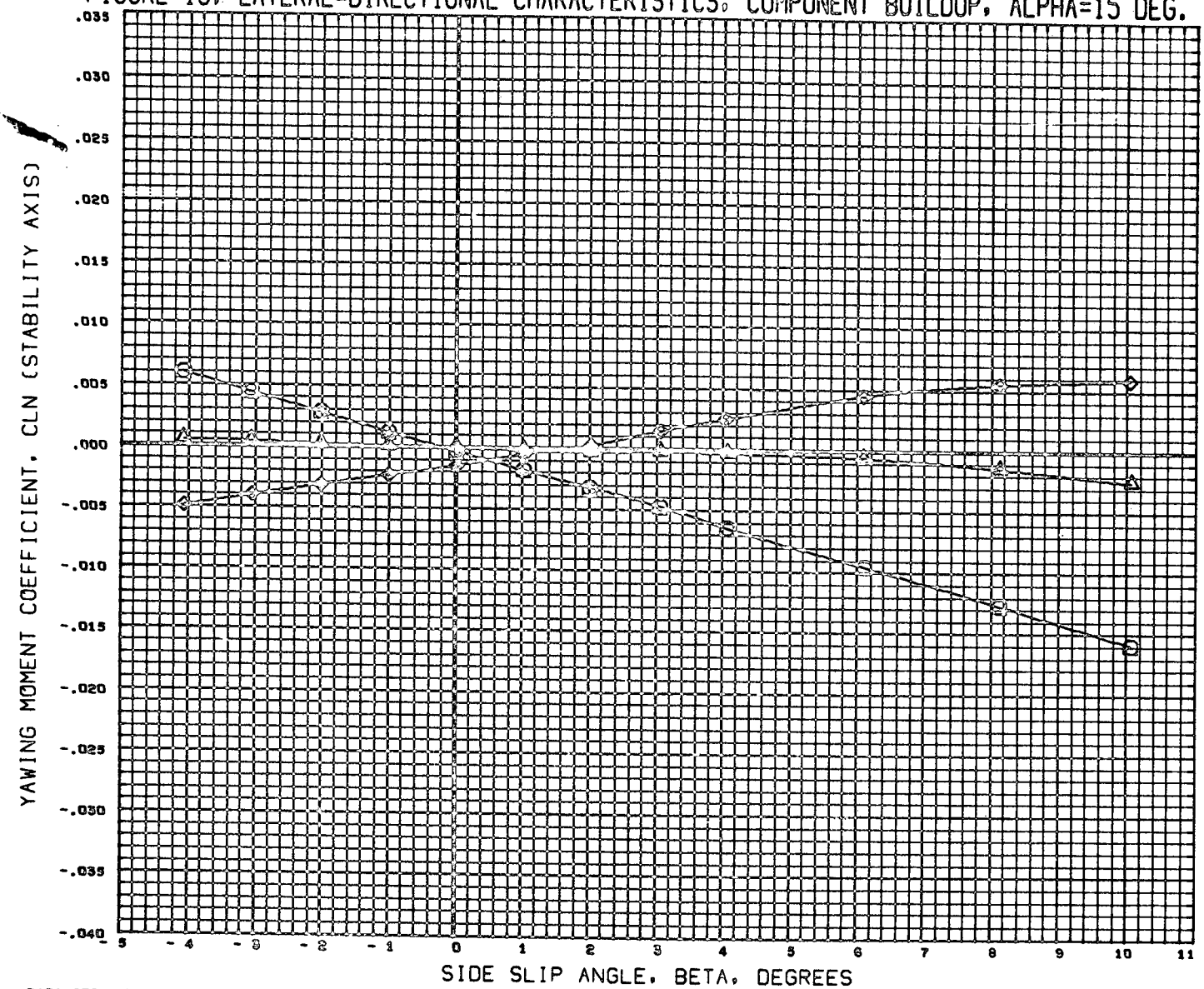
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. BSW4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. BSW4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. BSW4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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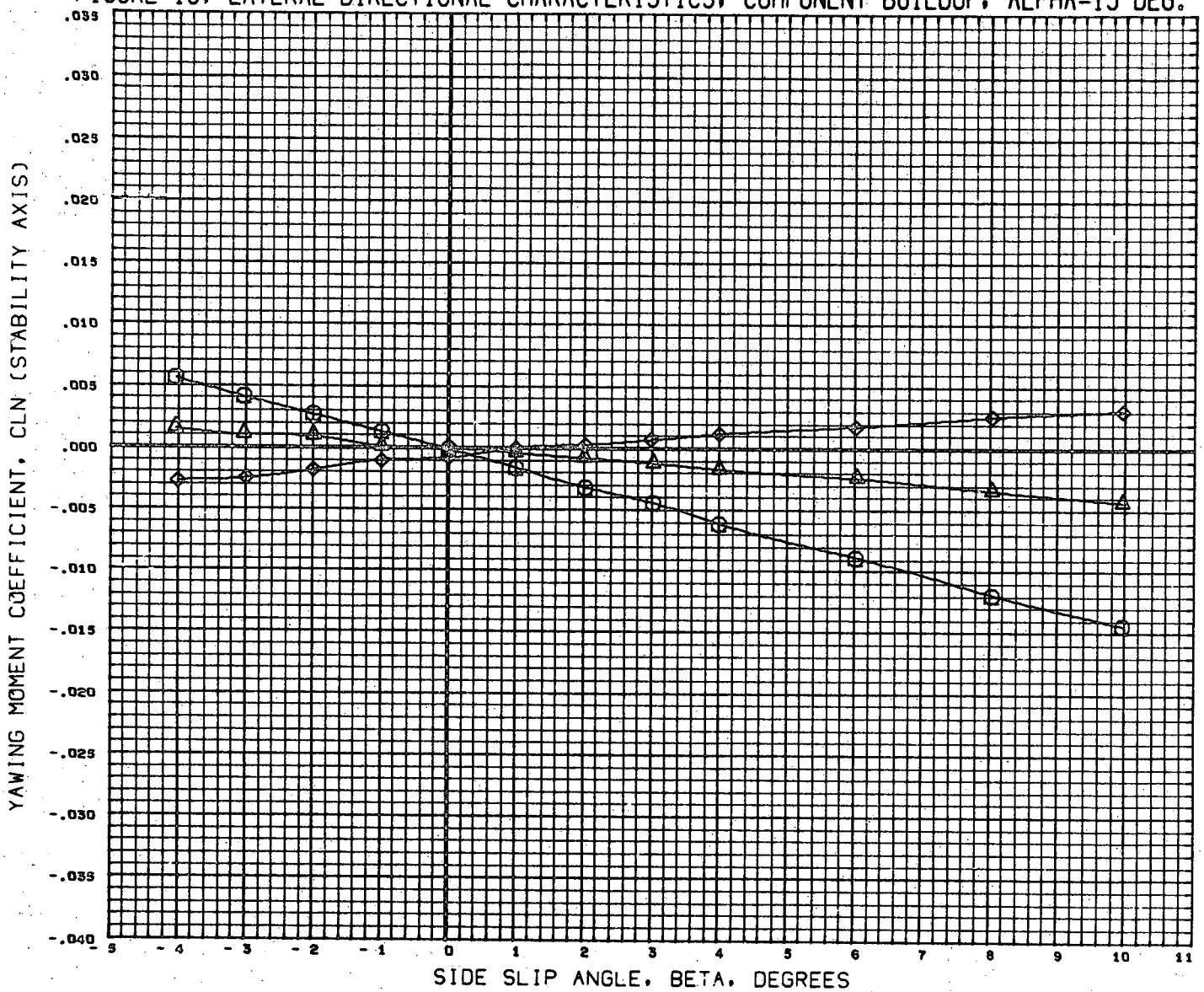
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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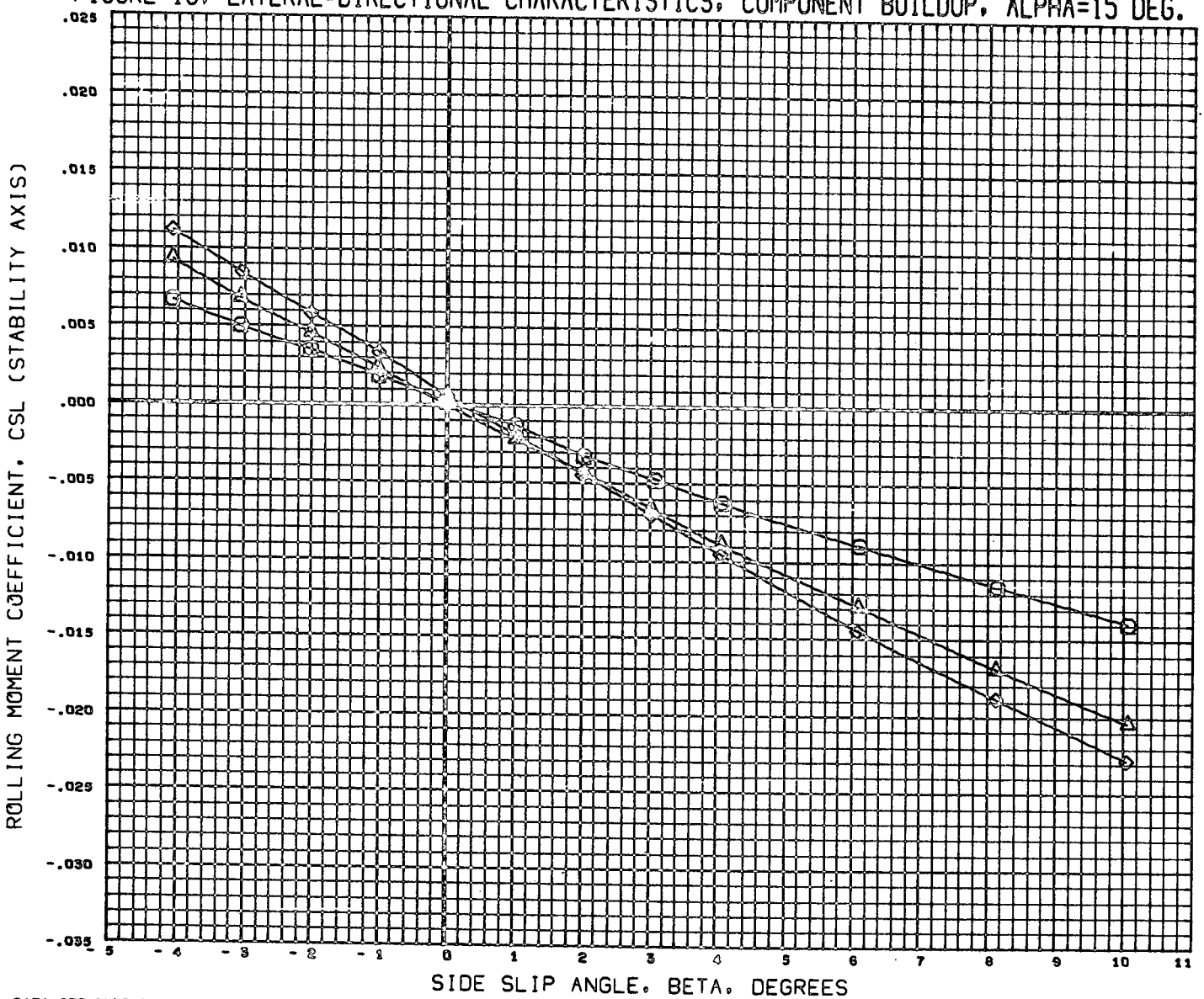
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC M-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC M-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC M-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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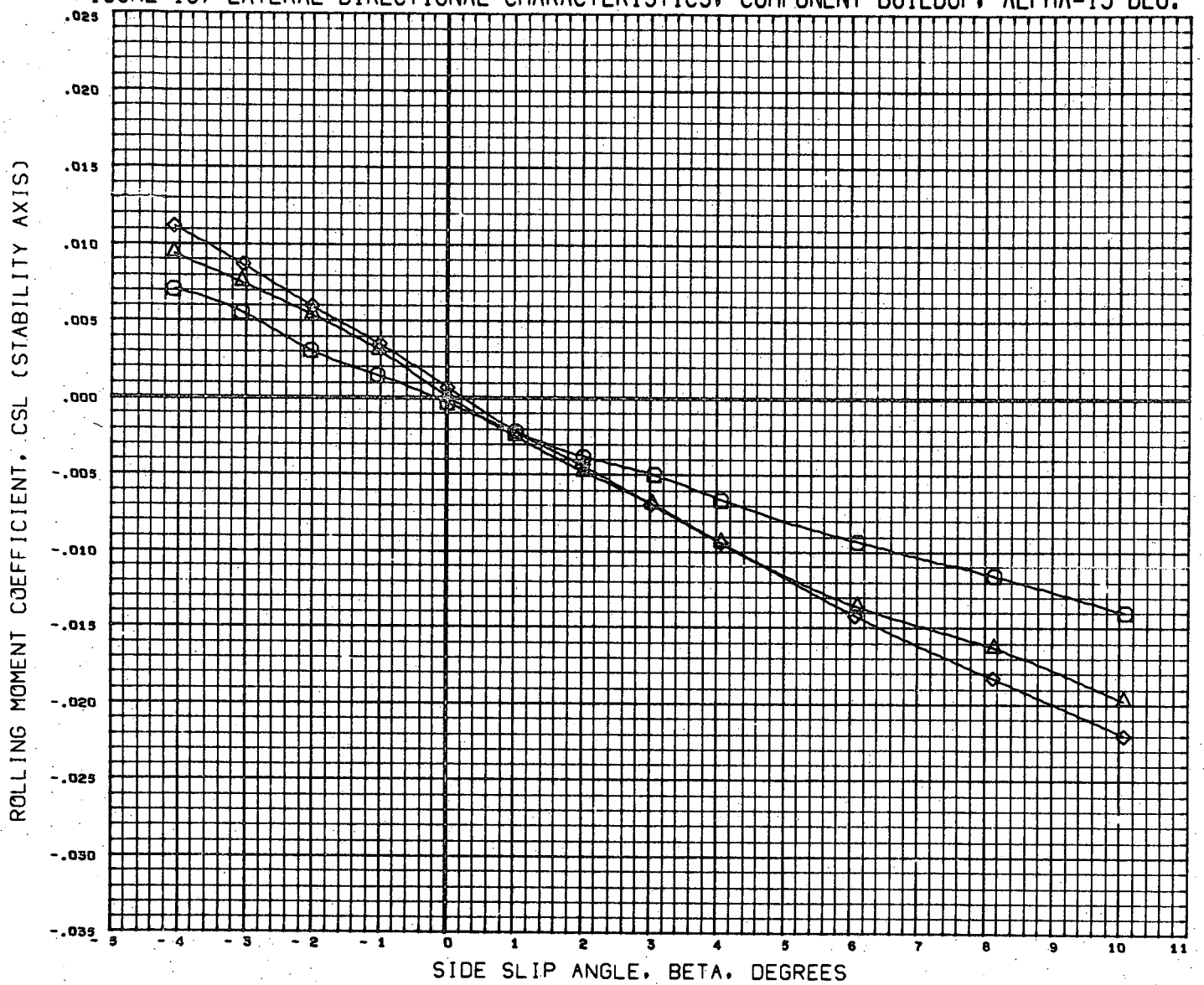
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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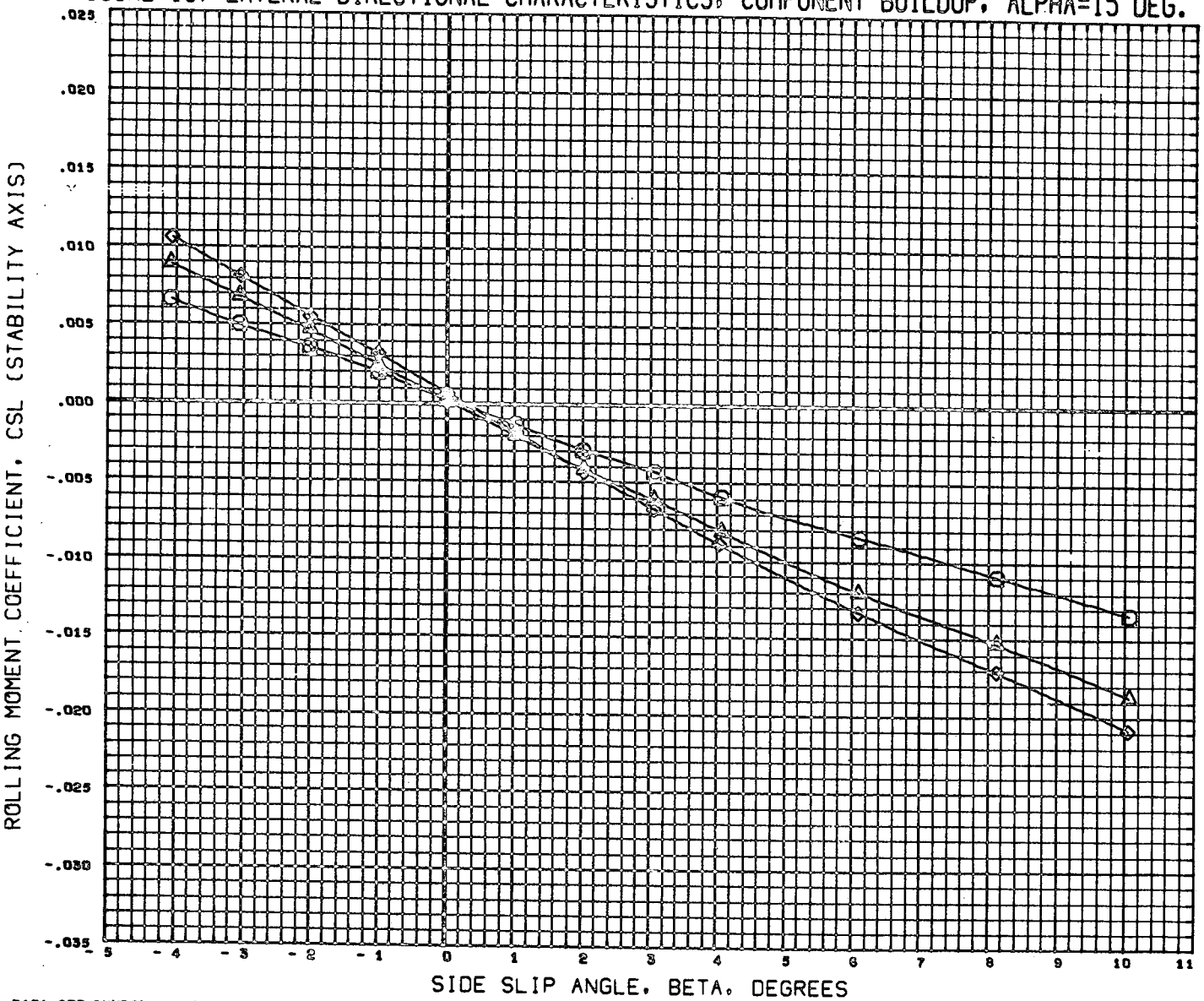
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49012)	○	MSFC 507 GAC M-33 ORB. B5W4
(A49011)	△	MSFC 507 GAC M-33 ORB. B5W4V5
(A49010)	◇	MSFC 507 GAC M-33 ORB. B5W4V5(+30,-30)

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	0.000	0.000
0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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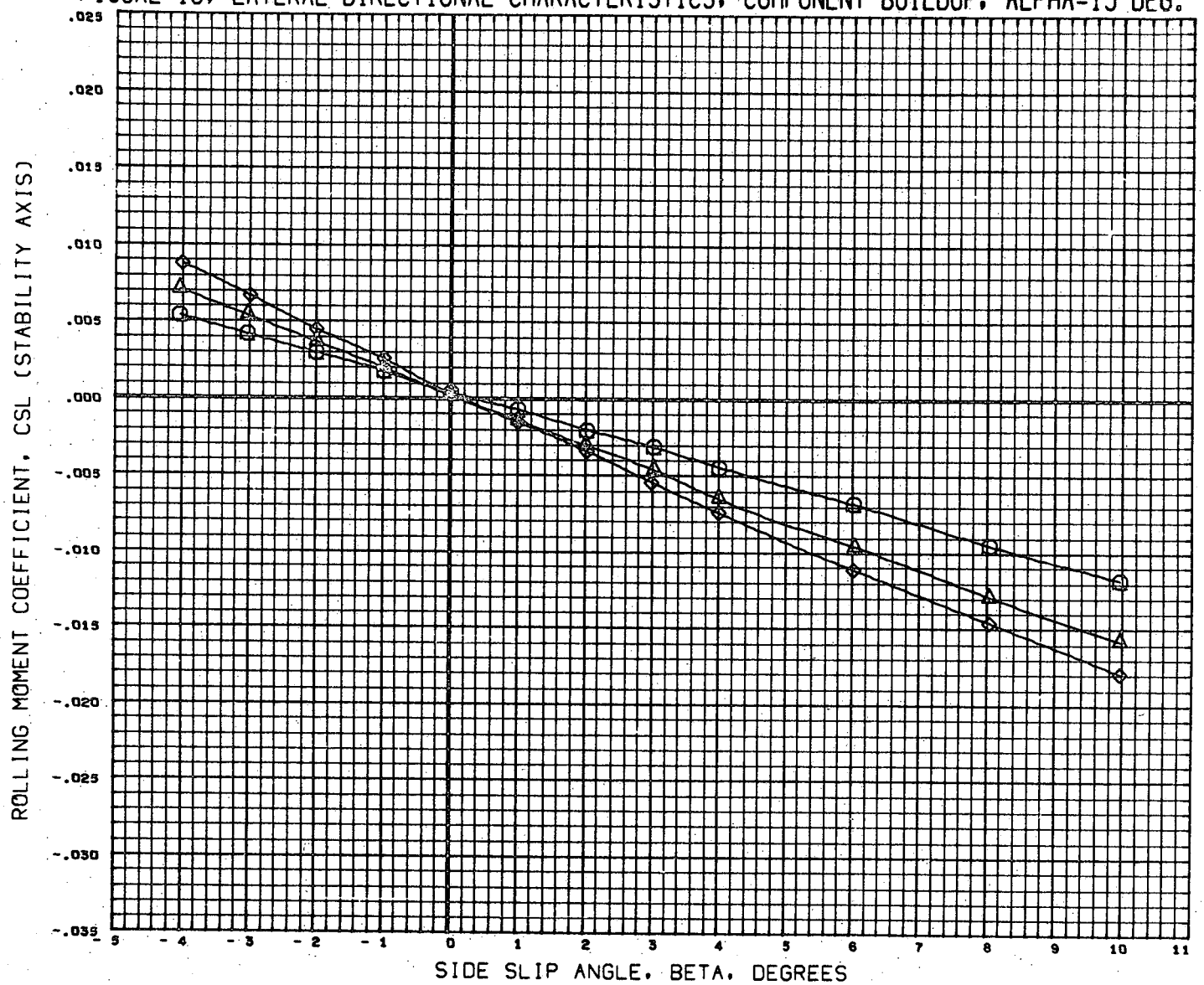
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 907 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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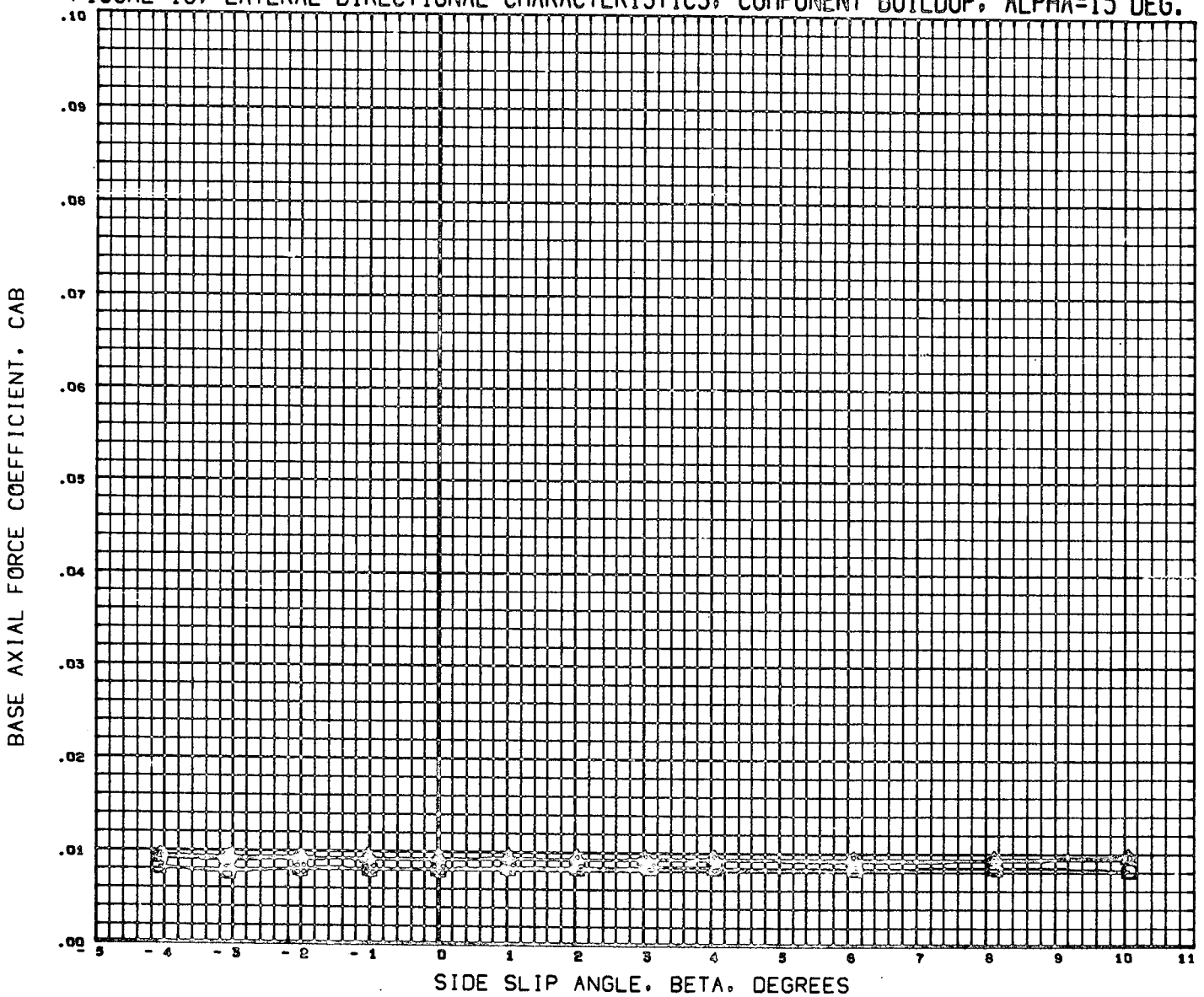
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. BSW4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. BSW4VS	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. BSW4VS(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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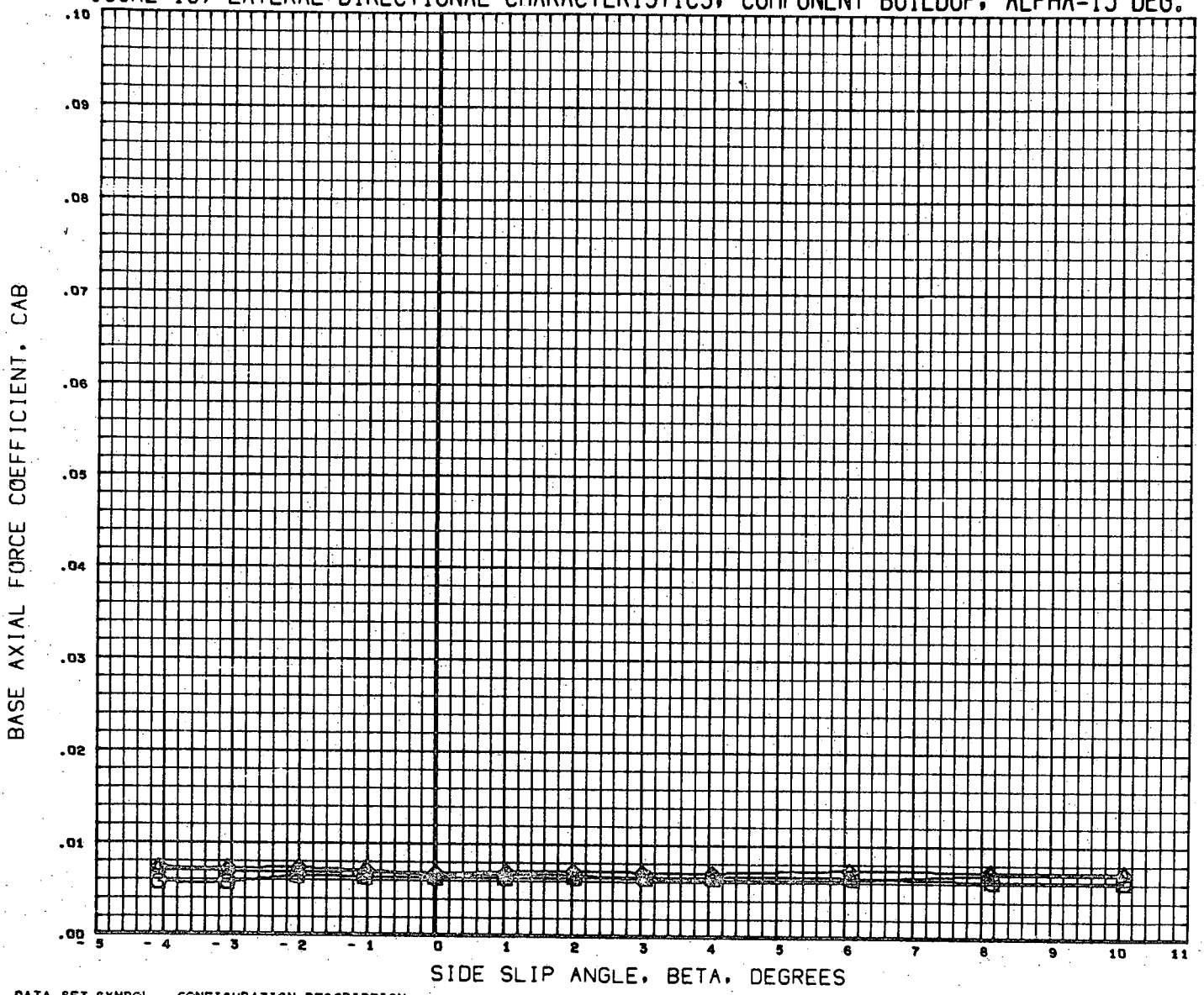
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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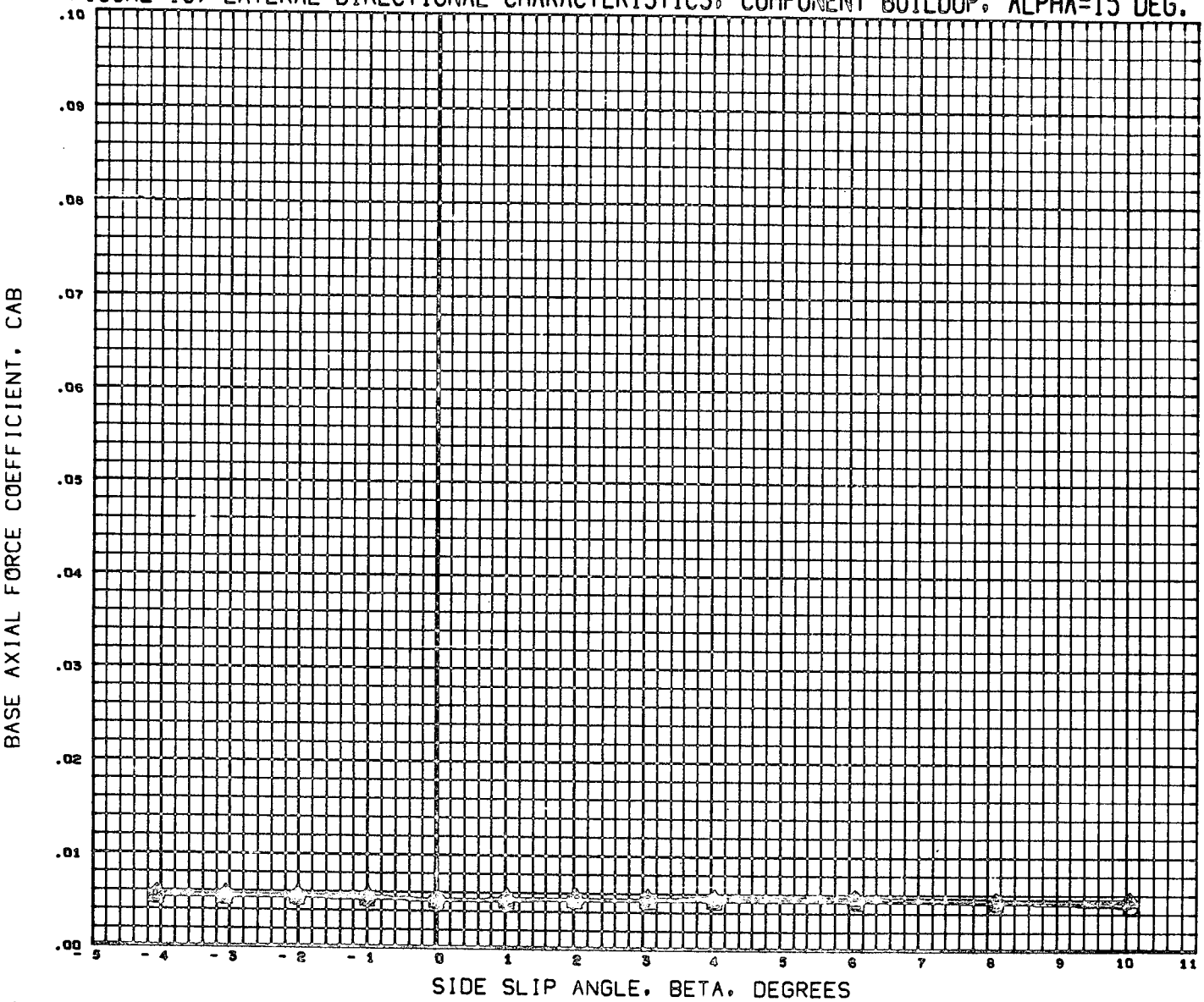
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 907 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 907 GAC H-33 ORB. B9W4VS	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 907 GAC H-33 ORB. B9W4VS(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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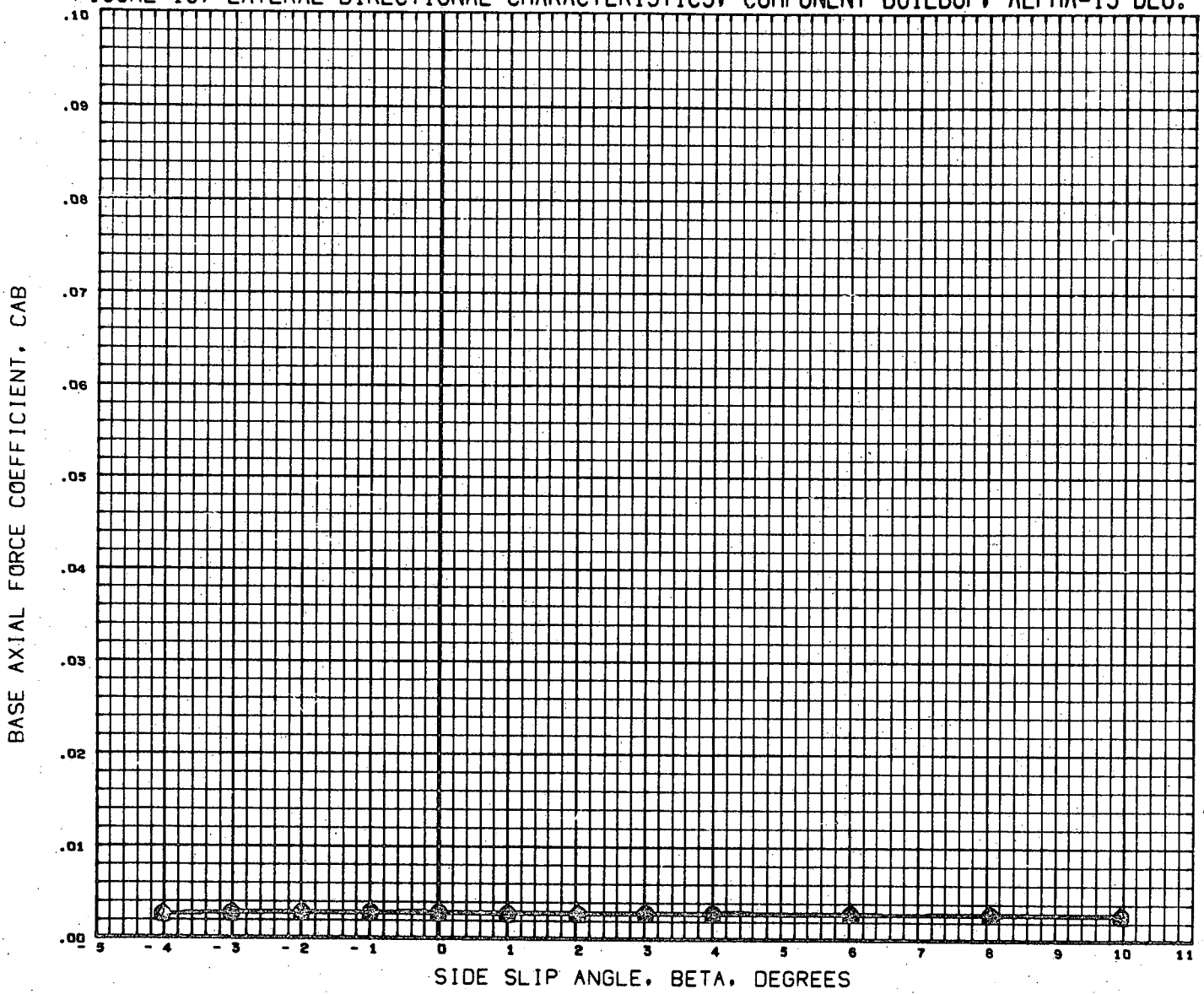
FIGURE 15. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=15 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49012)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49010)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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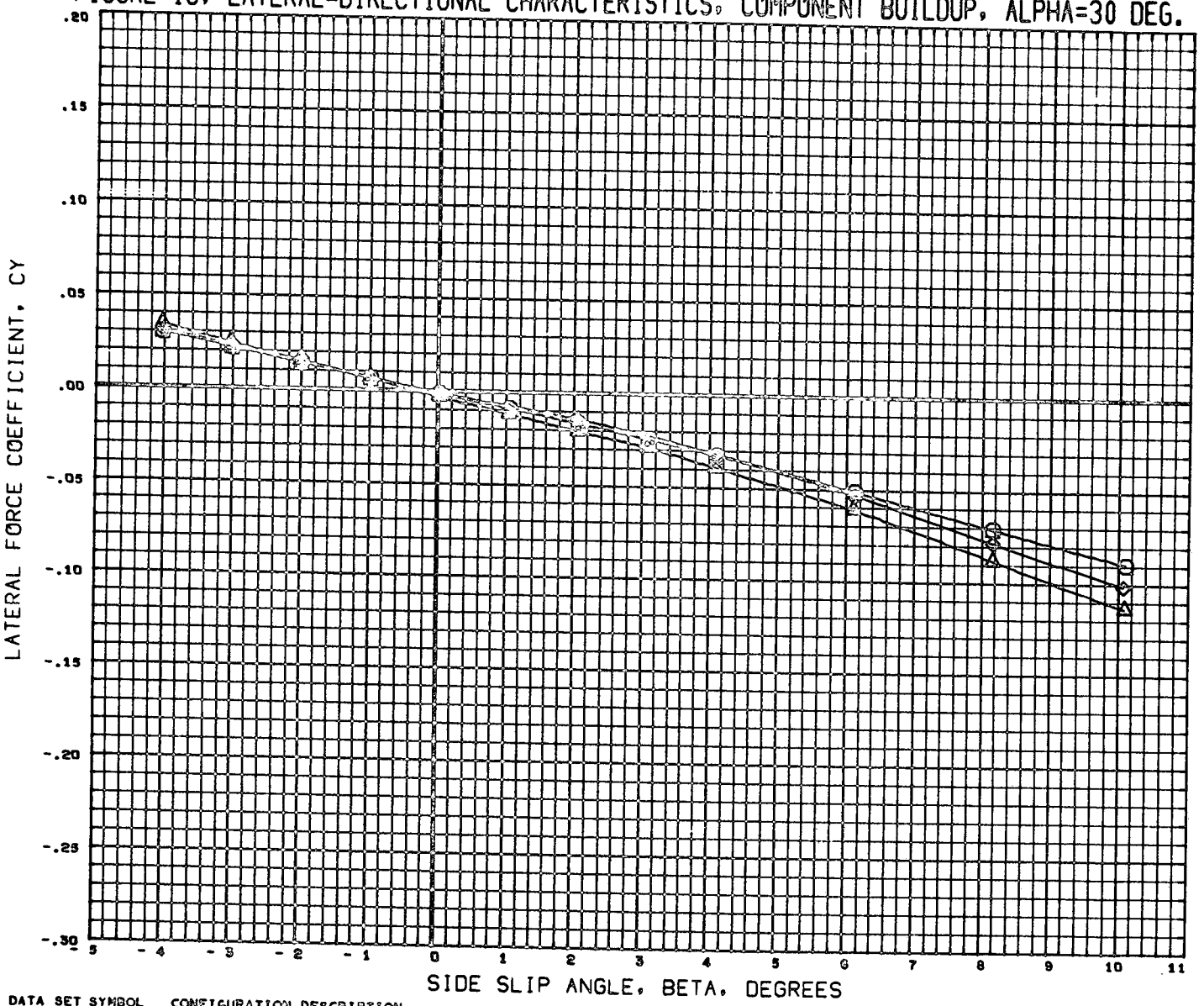
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(A49325)	◇	MSFC 507 GAC H-33 ORB. B5W4V5

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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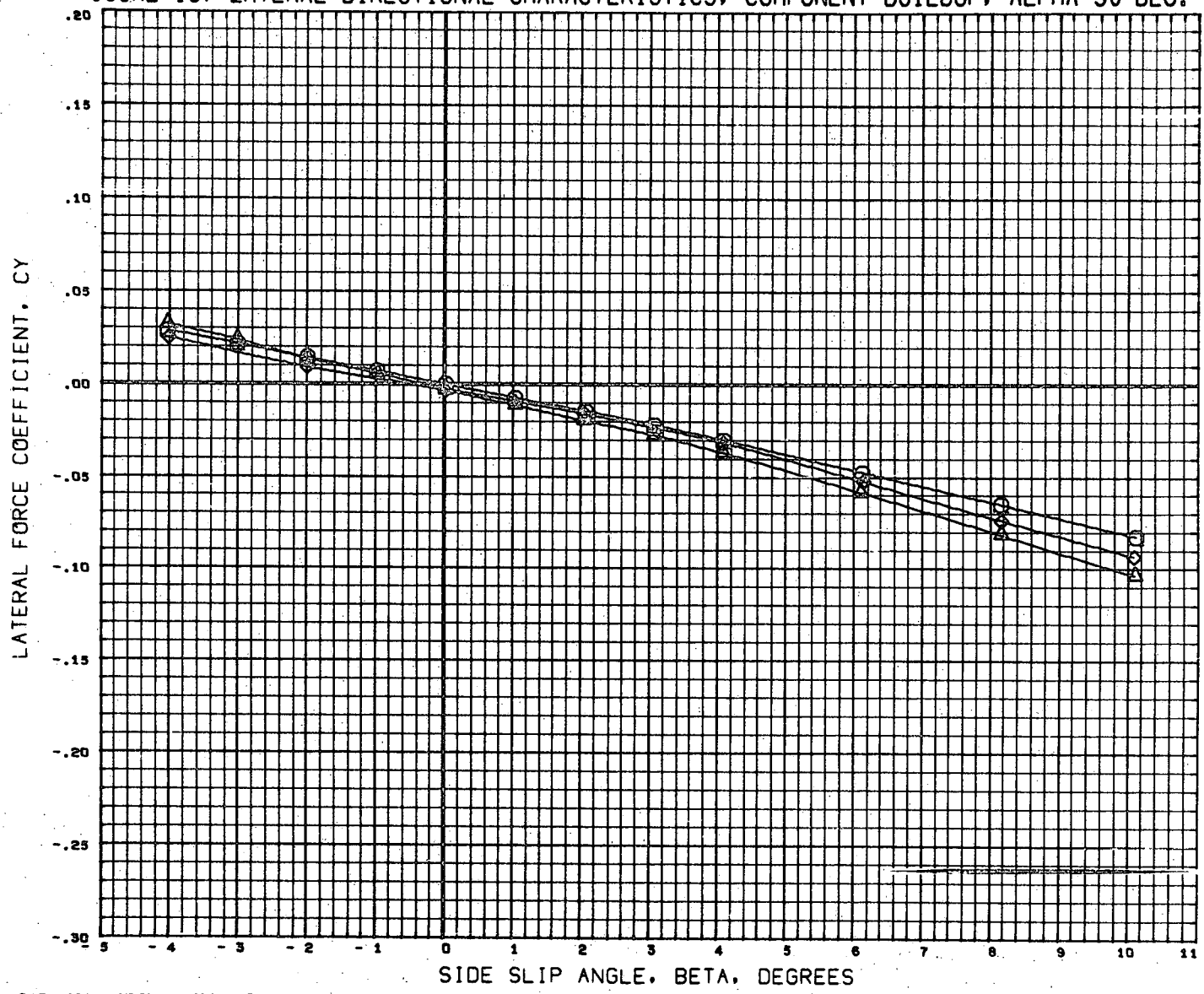
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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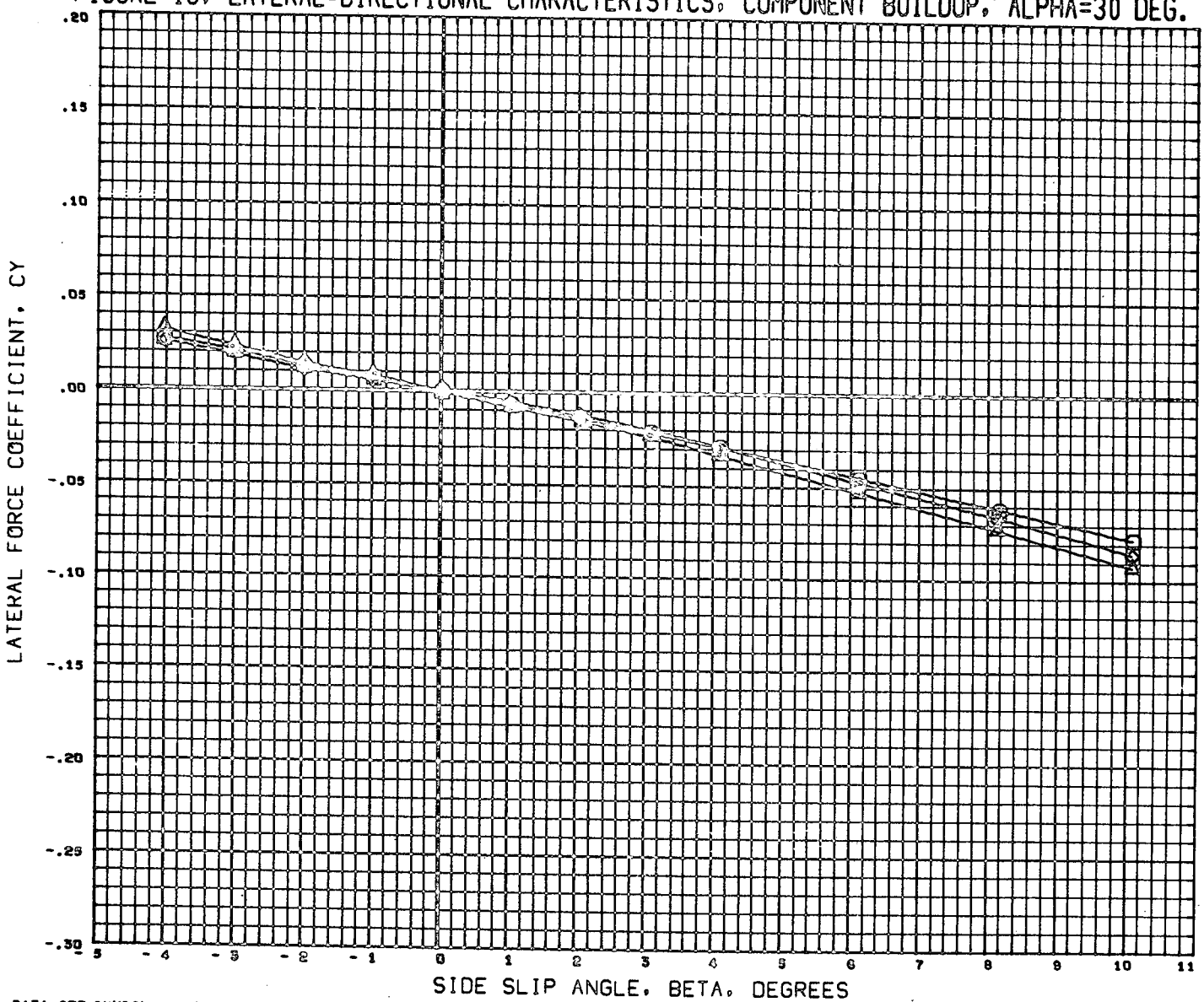
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49027)	○	MSFC 507 GAC H-33 ORB. BSW4
(A49026)	☒	MSFC 507 GAC H-33 ORB. BSW4V5(+30,-30)
(A49325)	◇	MSFC 507 GAC H-33 ORB. BSW4V5

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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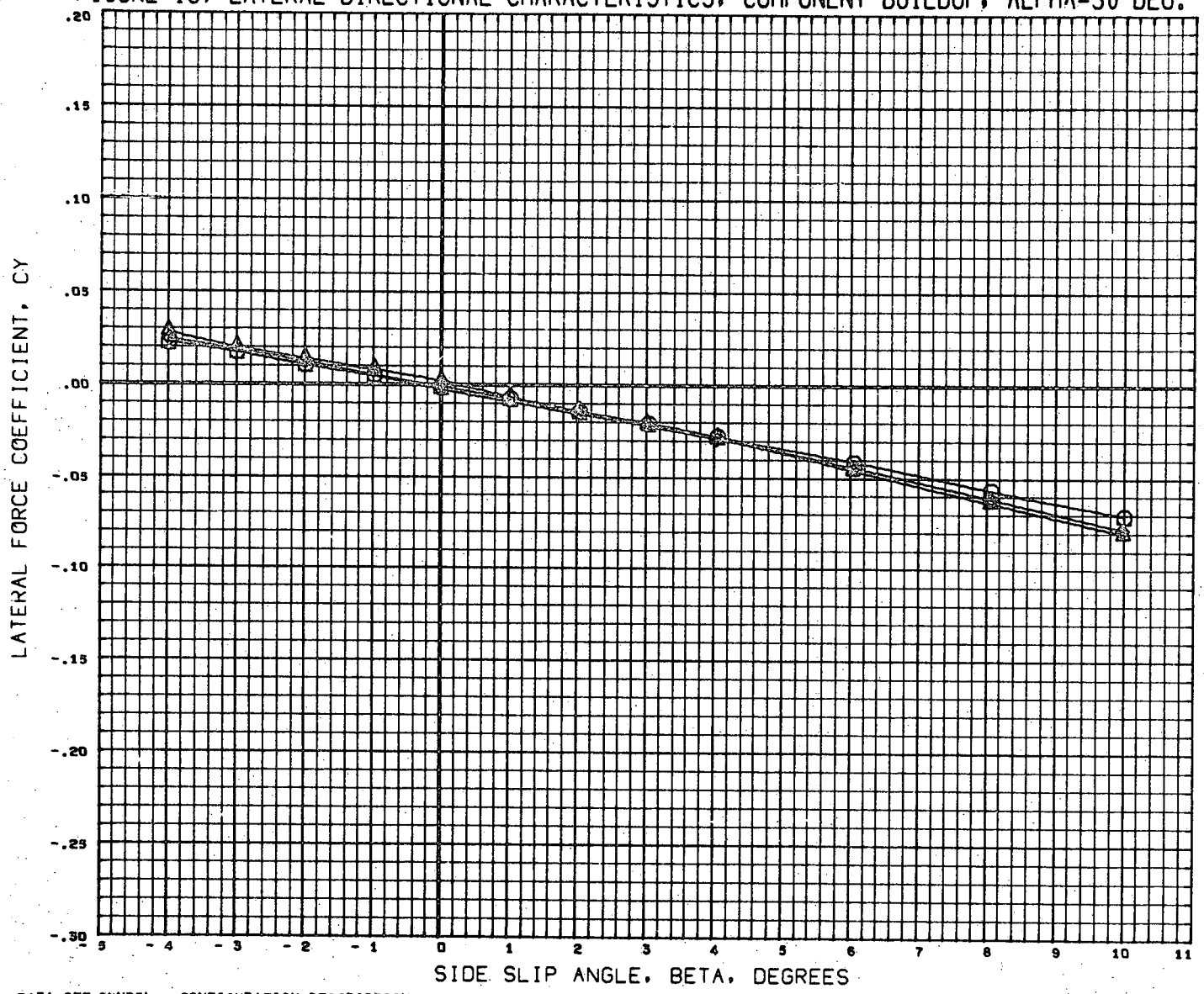
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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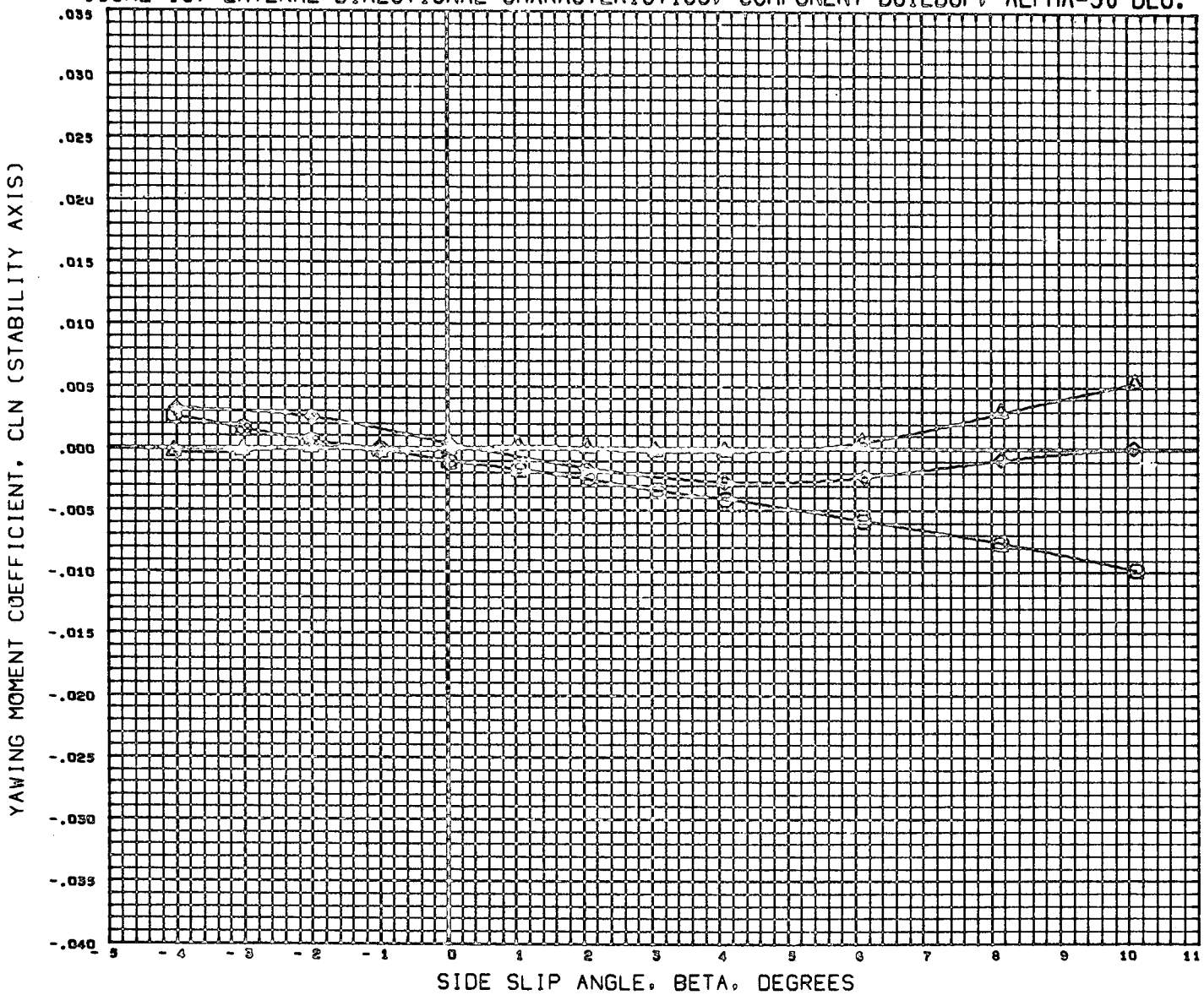
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 907 GAC M-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 907 GAC M-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 907 GAC M-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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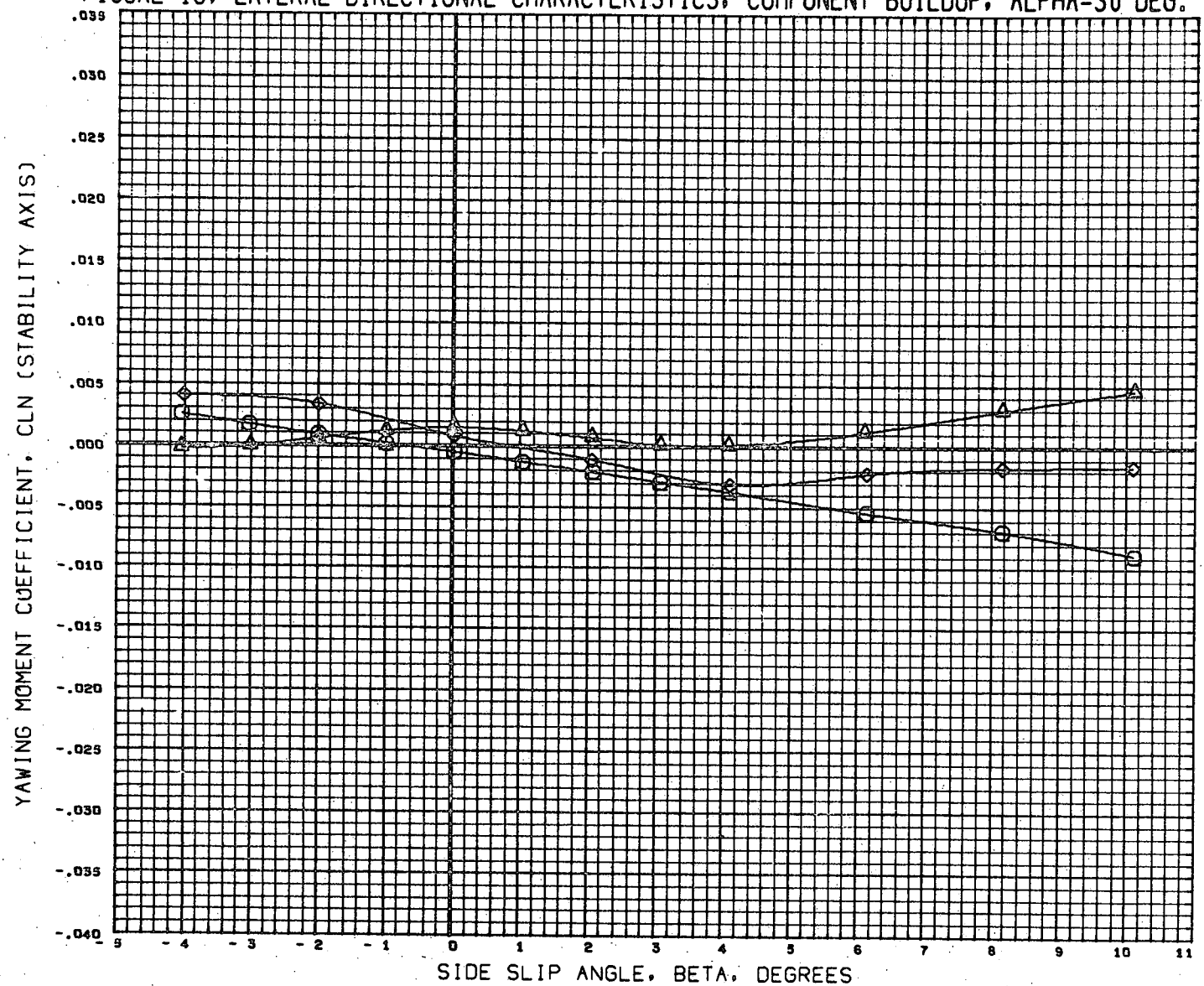
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 907 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 907 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49825)	◇	MSFC 907 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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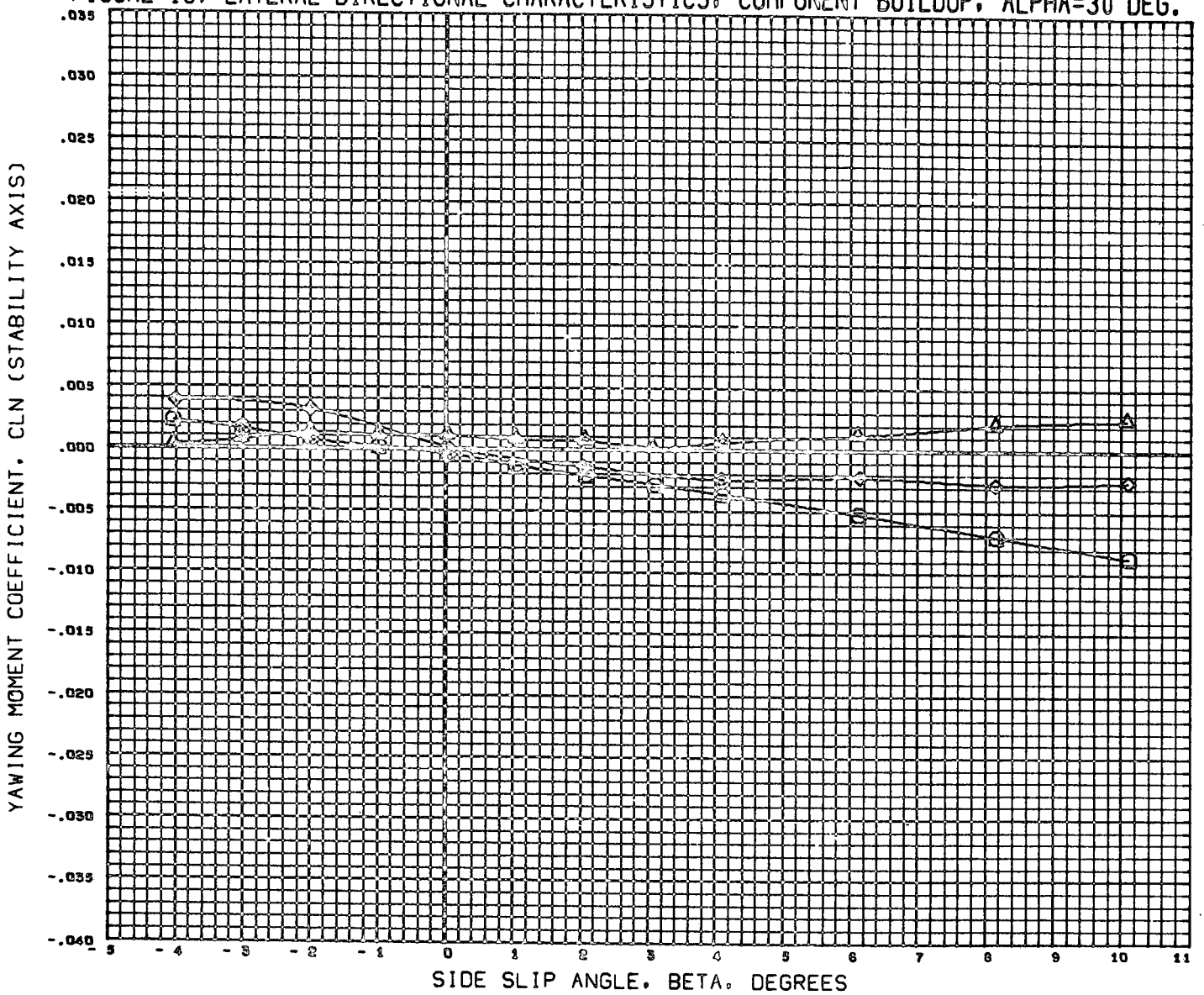
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 907 GAC M-33 ORB. BSW4	0.000	0.000		
(A49026)	△	MSFC 907 GAC M-33 ORB. BSW4VS(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 907 GAC M-33 ORB. BSW4VS	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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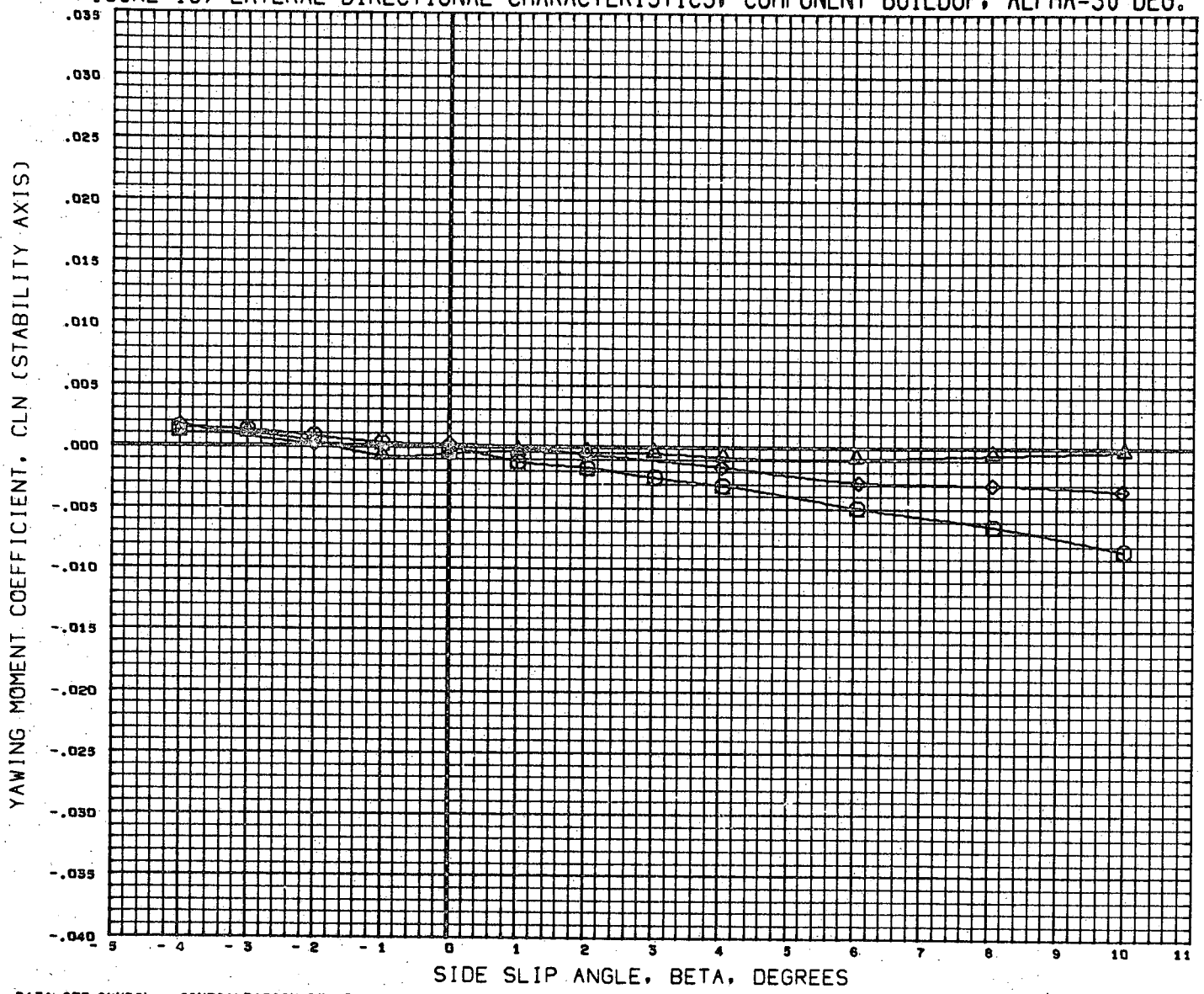
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.96

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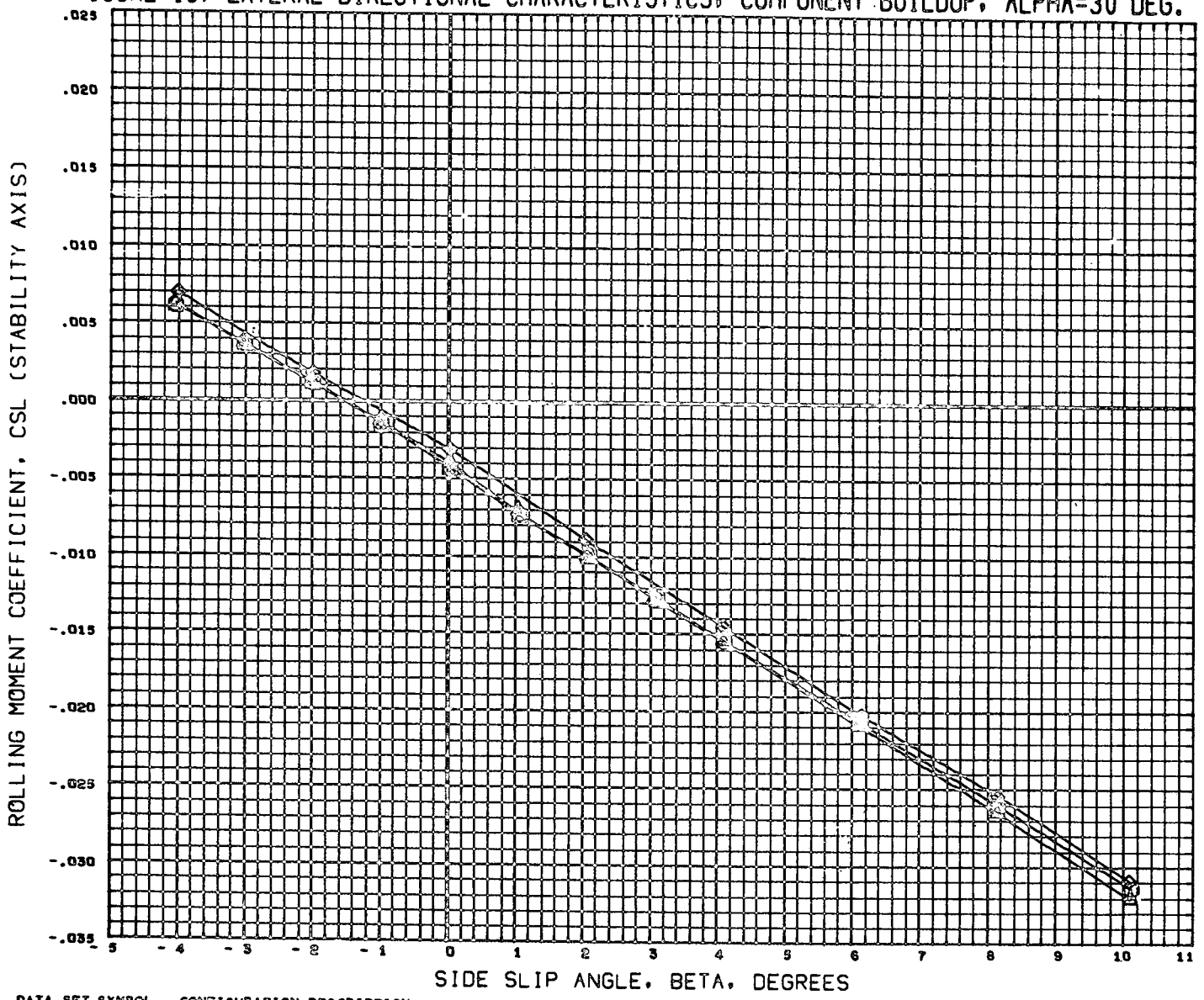
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 307 GAC M-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 307 GAC M-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49525)	◇	MSFC 307 GAC M-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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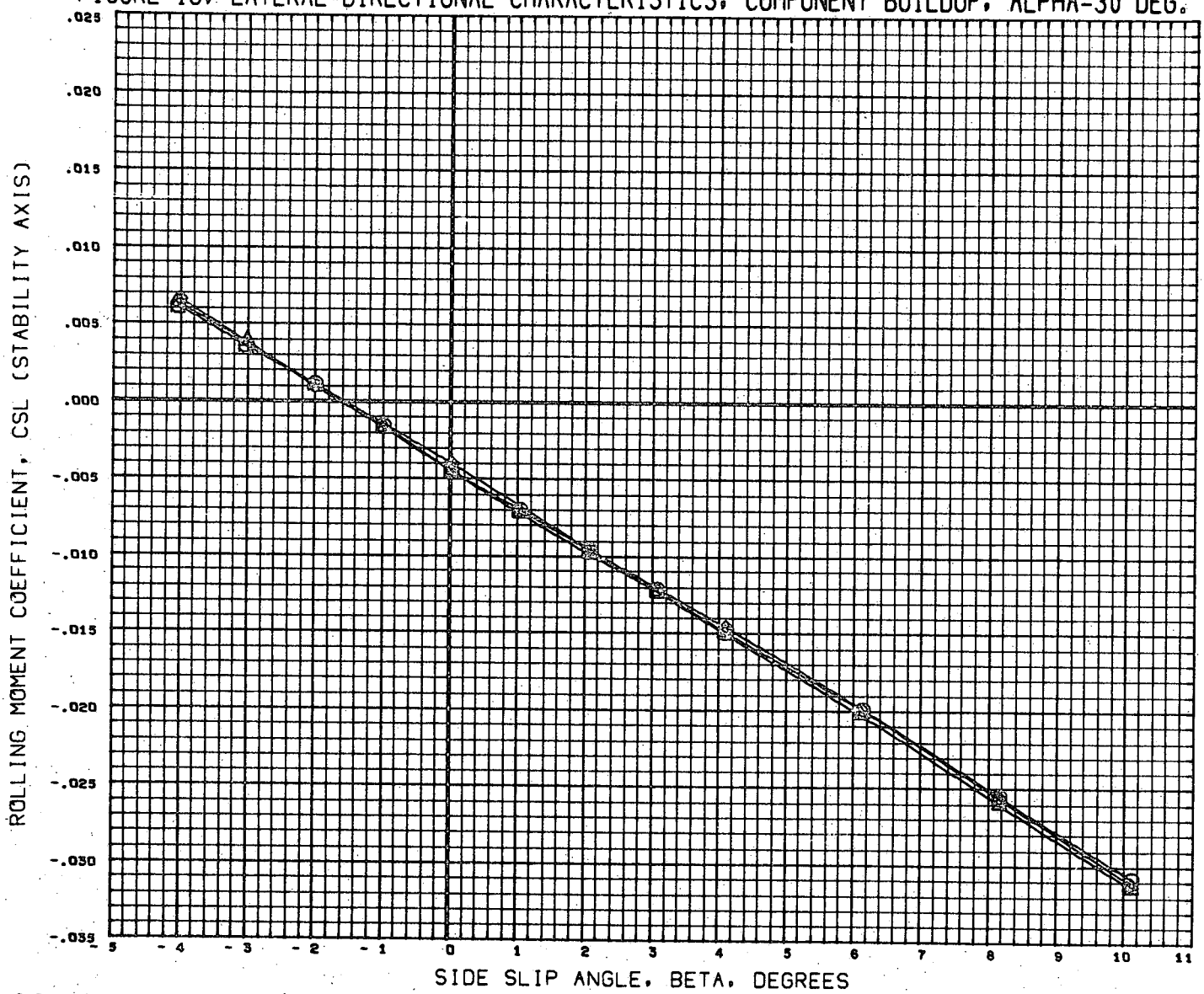
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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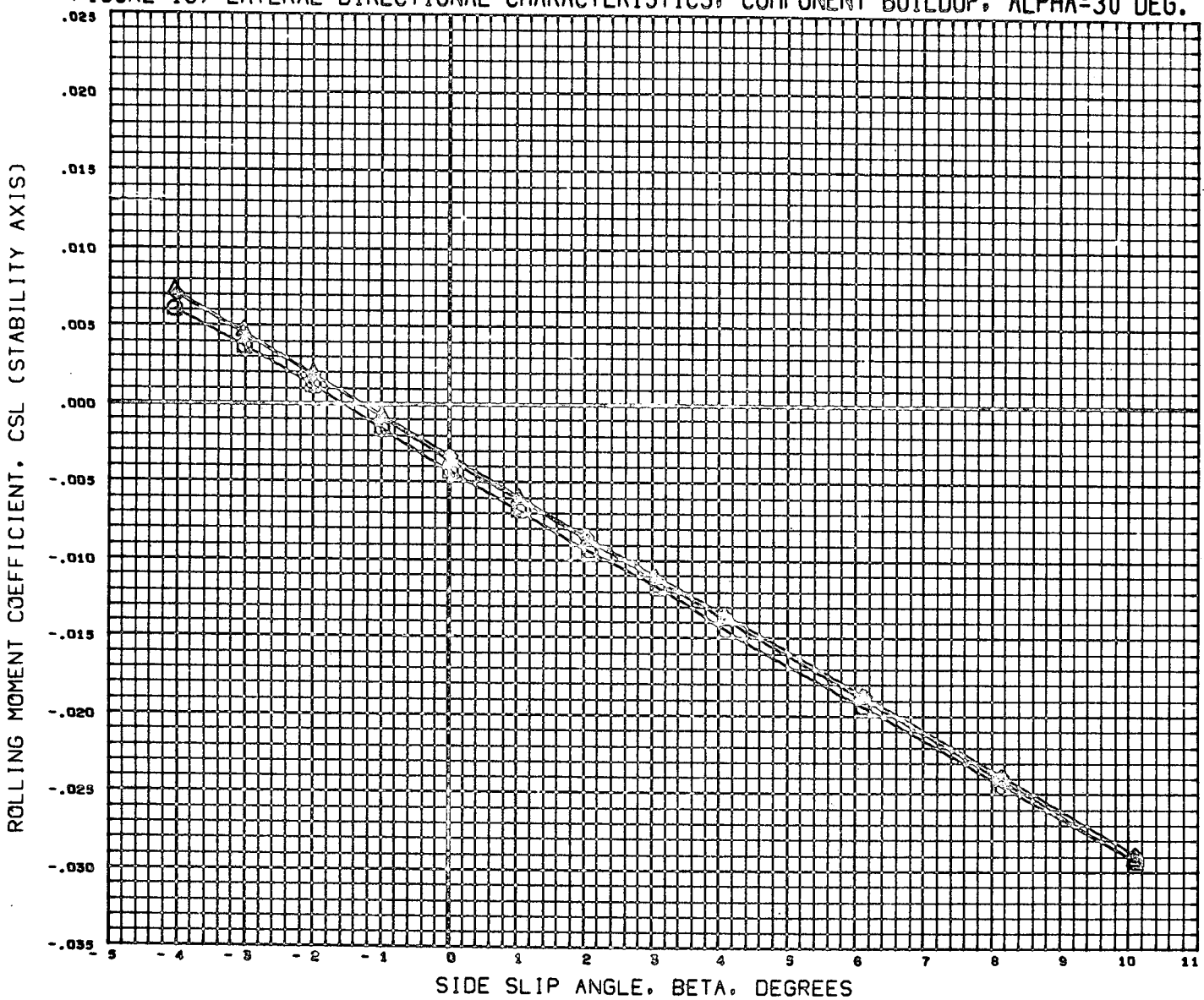
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 907 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 907 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49325)	◇	MSFC 907 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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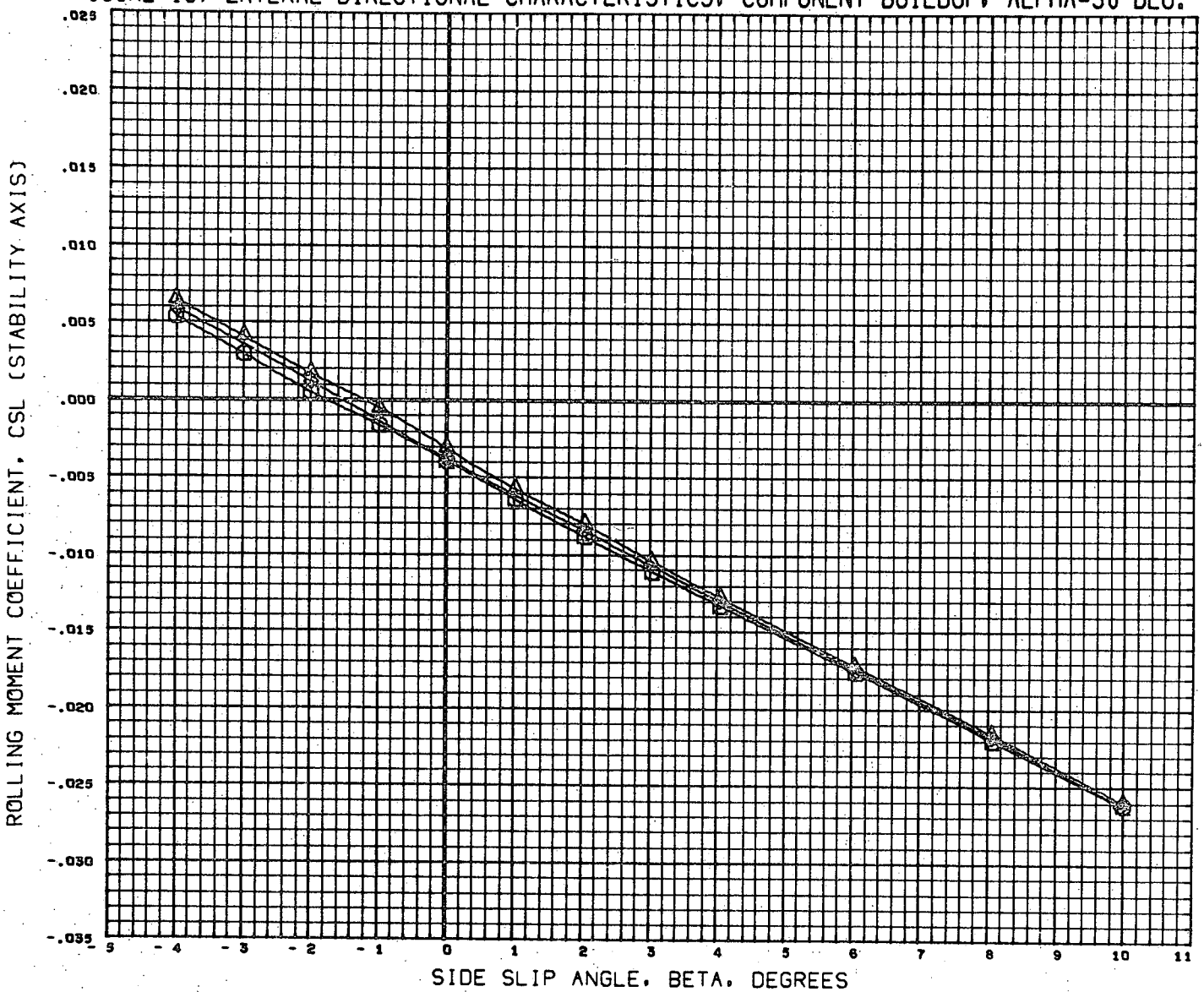
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=30 DEG.



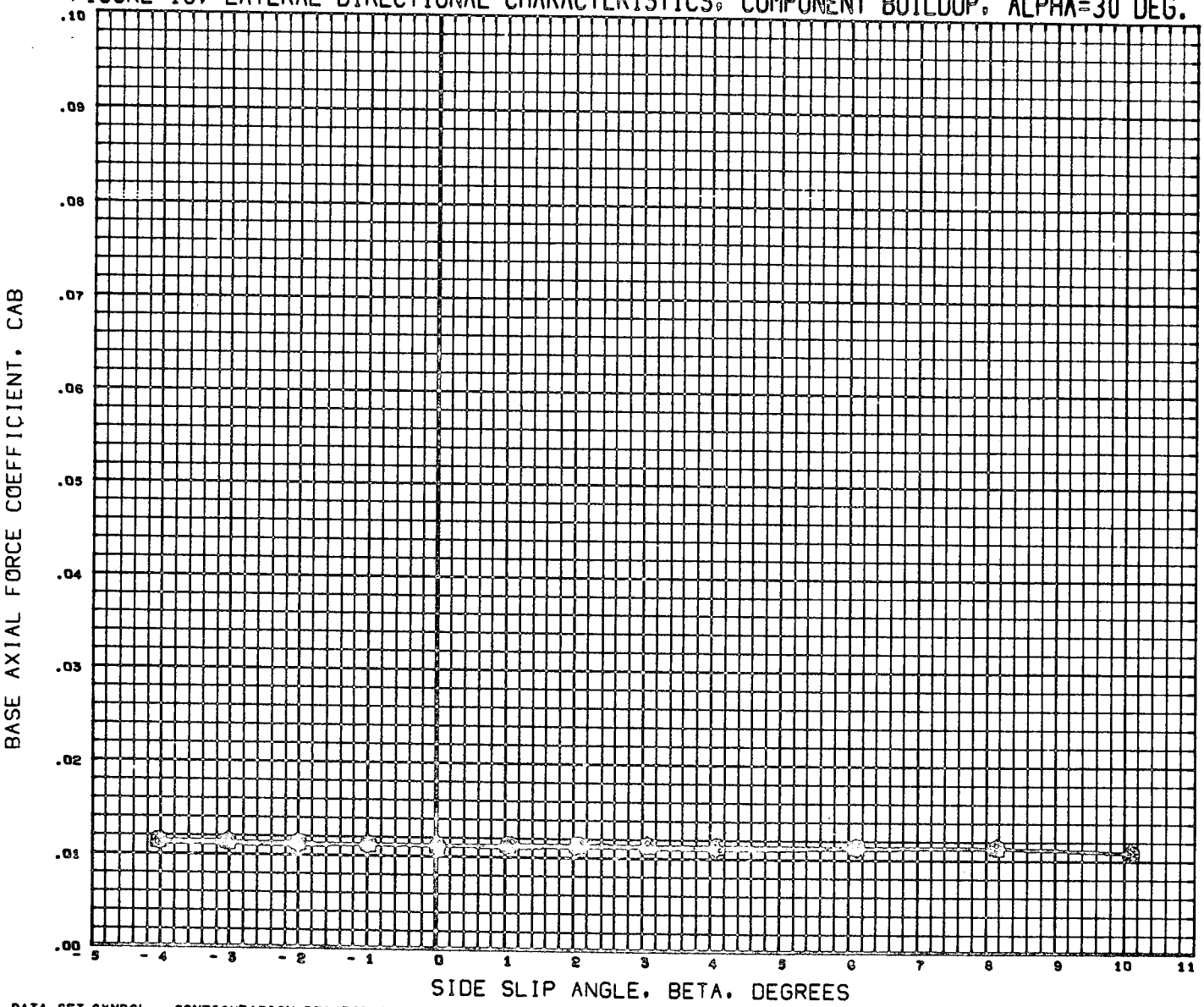
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.96

FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49325)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 2.99

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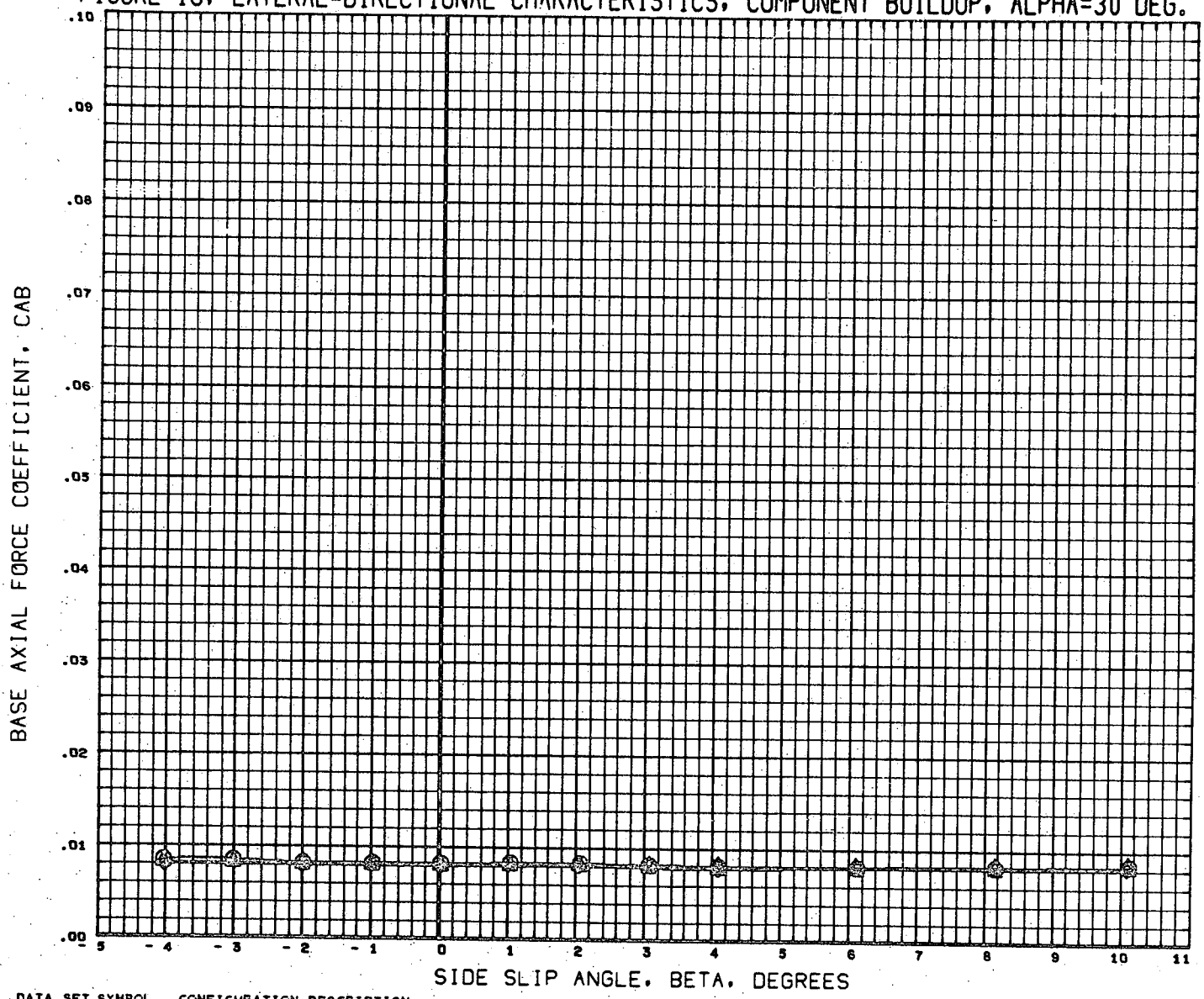
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 3.48

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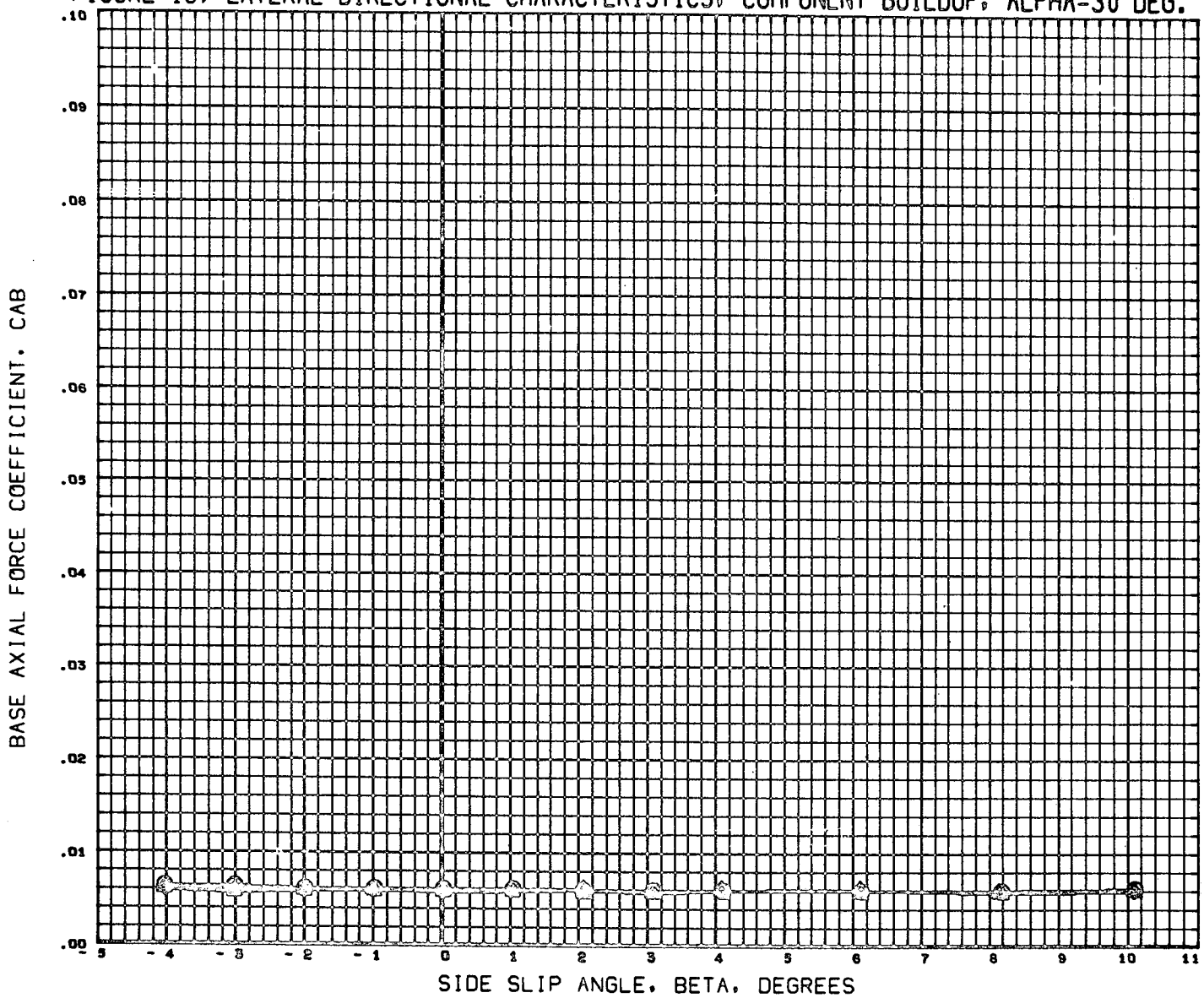
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP. ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49325)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

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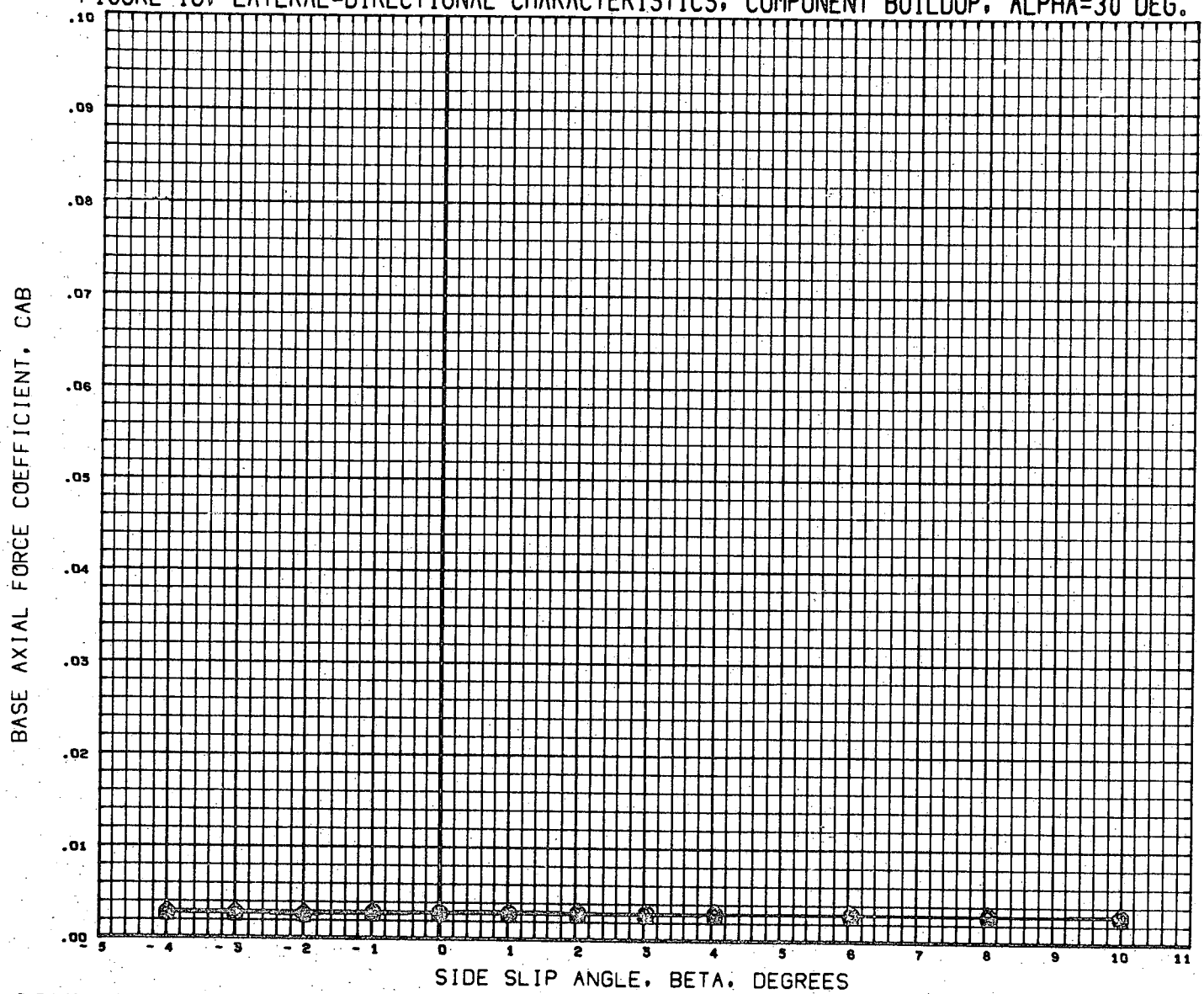
FIGURE 16. LATERAL-DIRECTIONAL CHARACTERISTICS, COMPONENT BUILDUP, ALPHA=30 DEG.



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49027)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49S25)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.96

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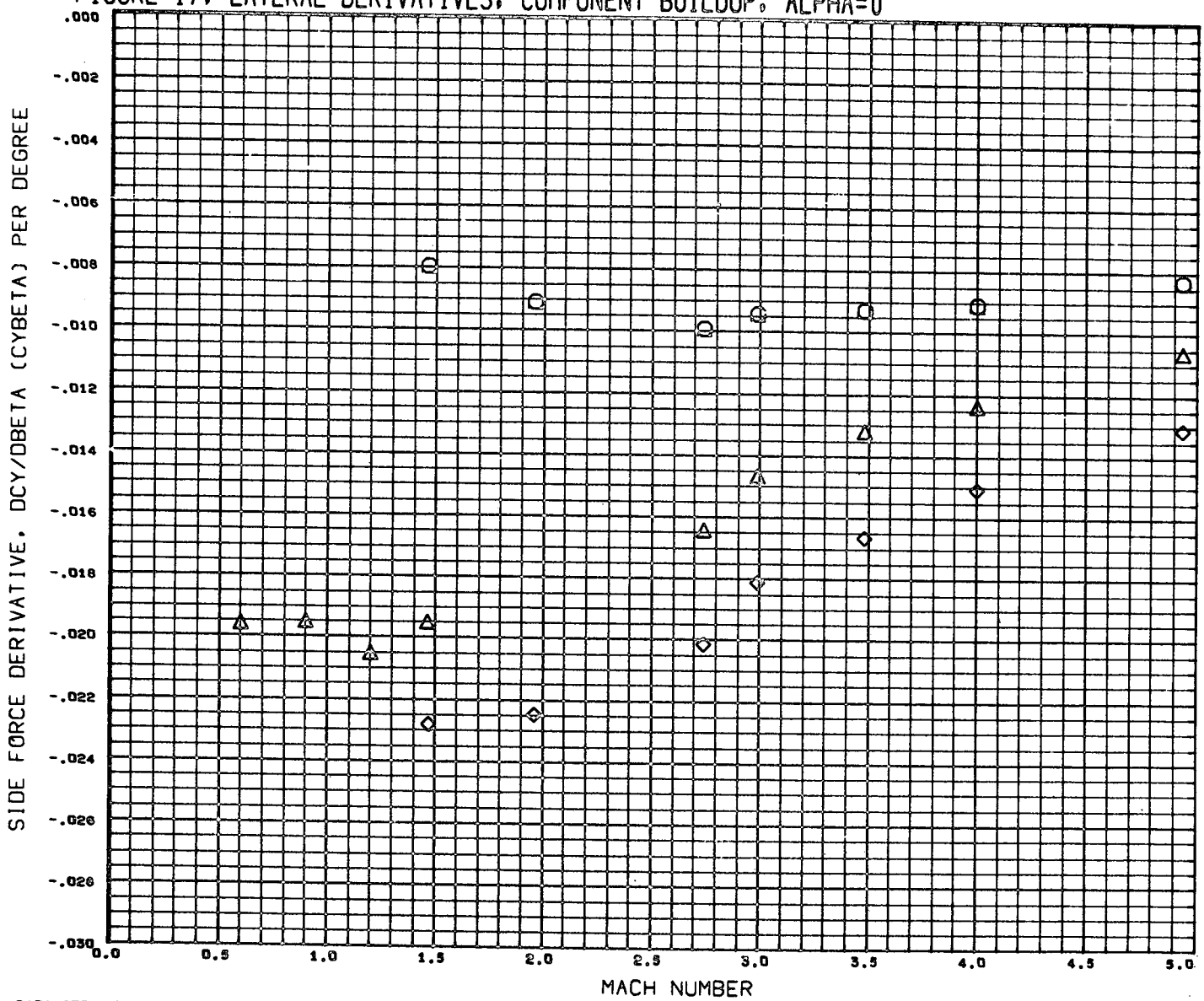
FIGURE 17. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49M14)	○	MSFC 507 GAC M-33 ORB. B5W4
(A49M15)	△	MSFC 507 GAC M-33 ORB. B5W4V5
(A49M16)	◇	MSFC 507 GAC M-33 ORB. B5W4V5(+30,-30)

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	0.000	0.000
0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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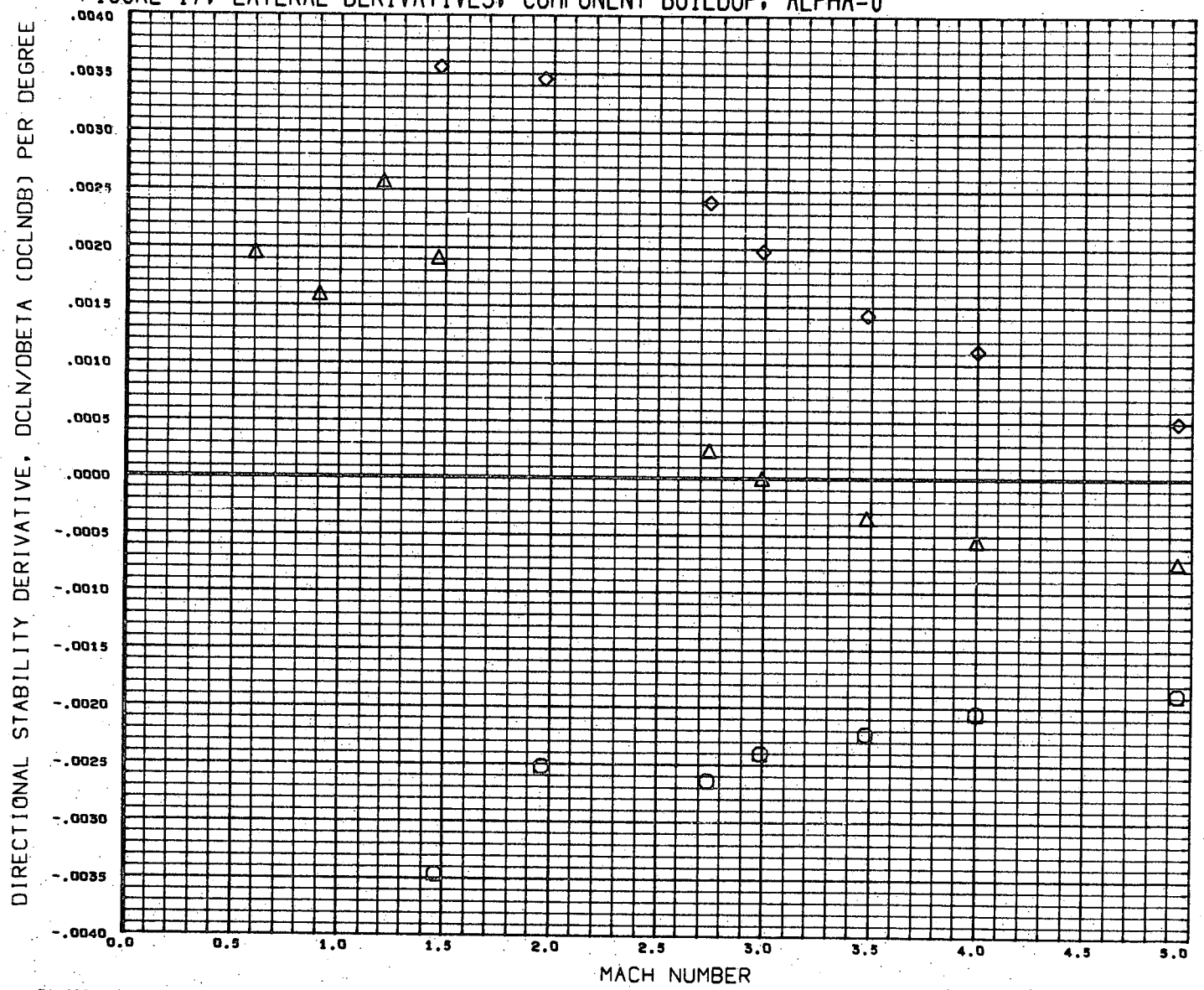
FIGURE 17. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49M14)	○	MSFC 507 GAC H-33 ORB. B5W4
(A49M15)	△	MSFC 507 GAC H-33 ORB. B5W4V5
(A49M16)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	0.000	0.000
0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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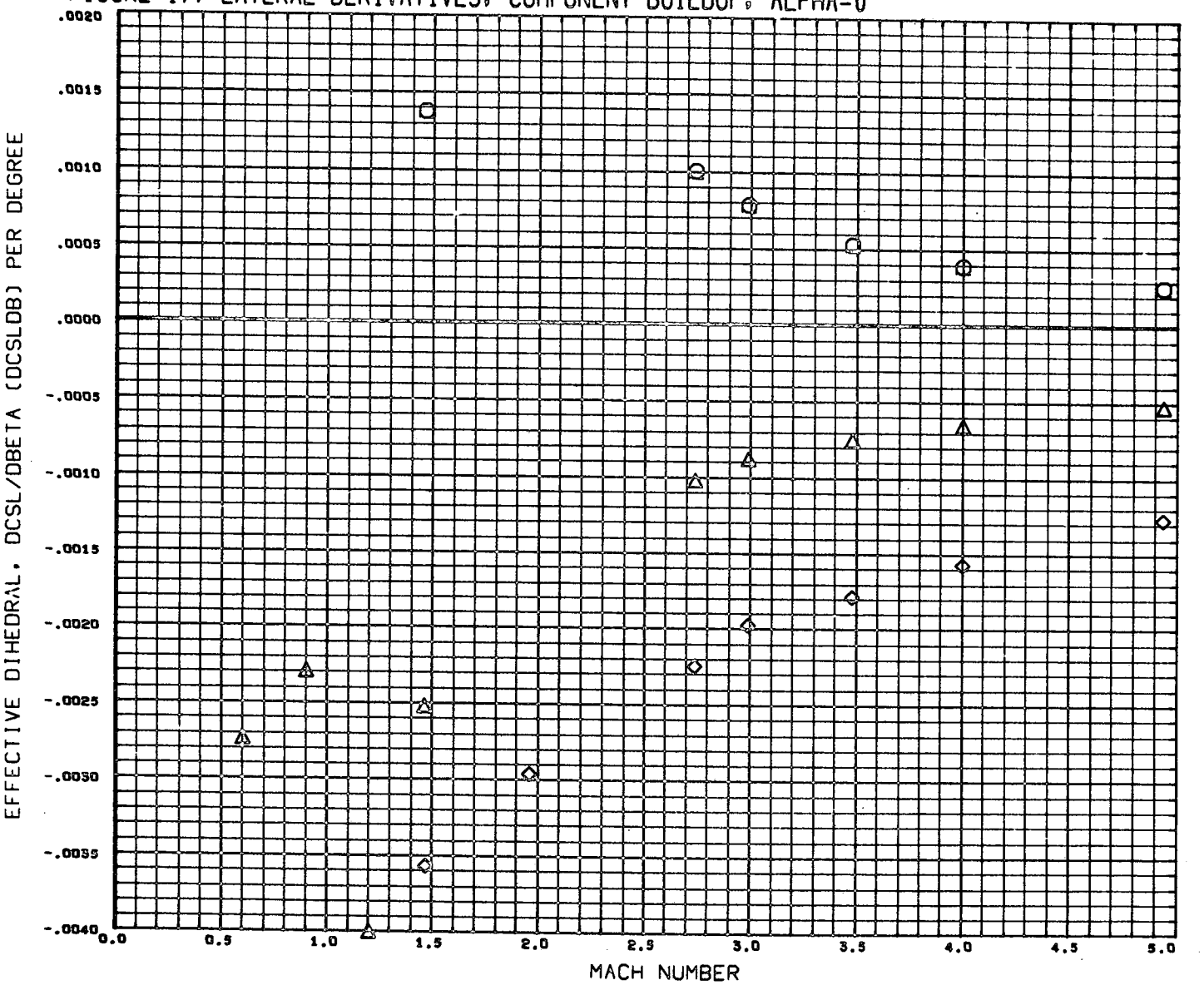
FIGURE 17. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=0



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49N14)	○	MSFC 507 GAC H-33 ORB. B5W4
(A49M15)	△	MSFC 507 GAC H-33 ORB. B5W4V5
(A49M16)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	0.000	0.000
0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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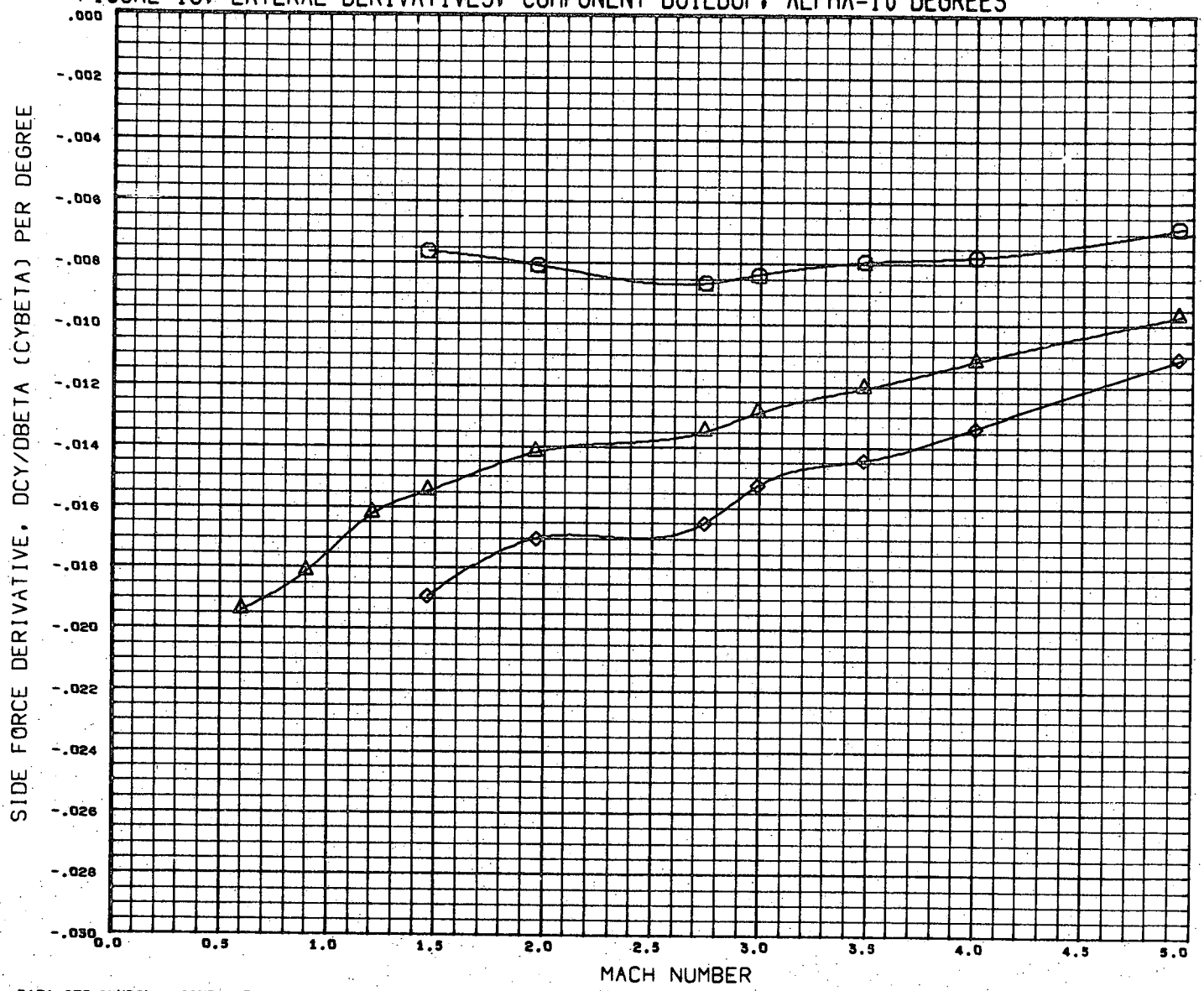
FIGURE 18. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=10 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49M13)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49029)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49M09)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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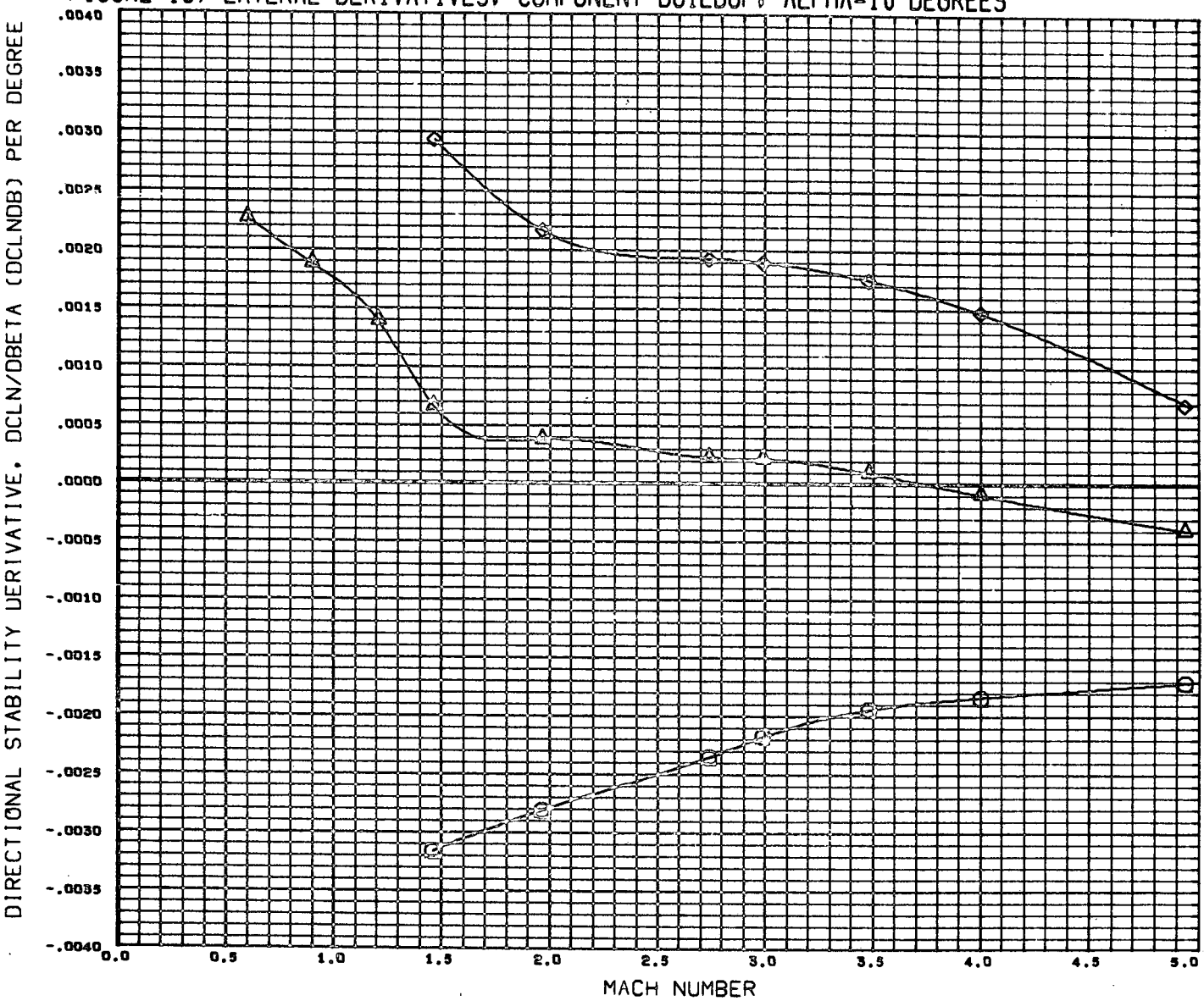
FIGURE 18, LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=10 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49M13)	○	MSFC 507 GAC H-33 ORB. B5W4
(A49029)	△	MSFC 507 GAC H-33 ORB. B5W4V5
(A49M09)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000		
0.000	0.000	0.000	0.000
0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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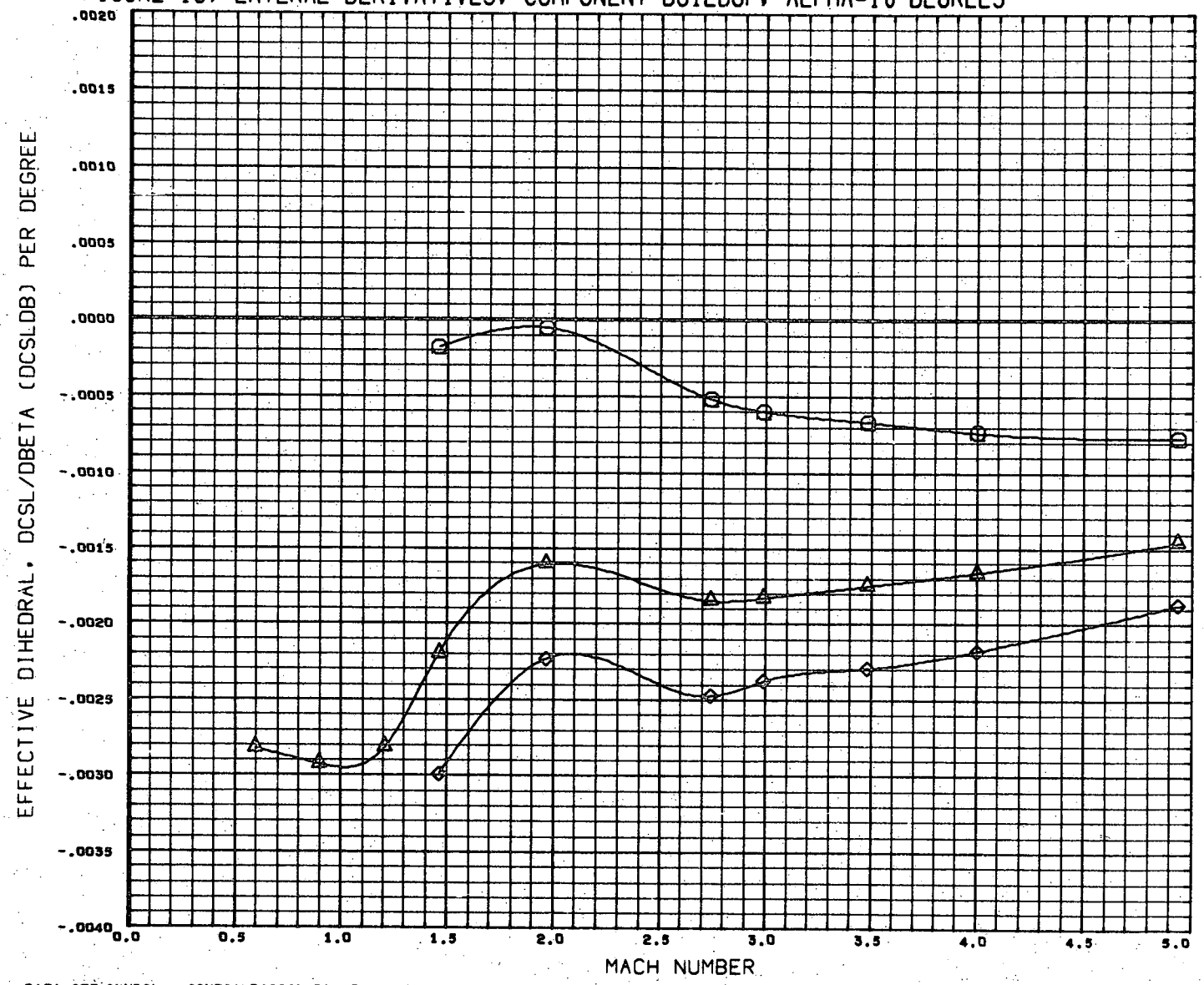
FIGURE 18. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=10 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49M13)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		
(A49029)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49M09)	◇	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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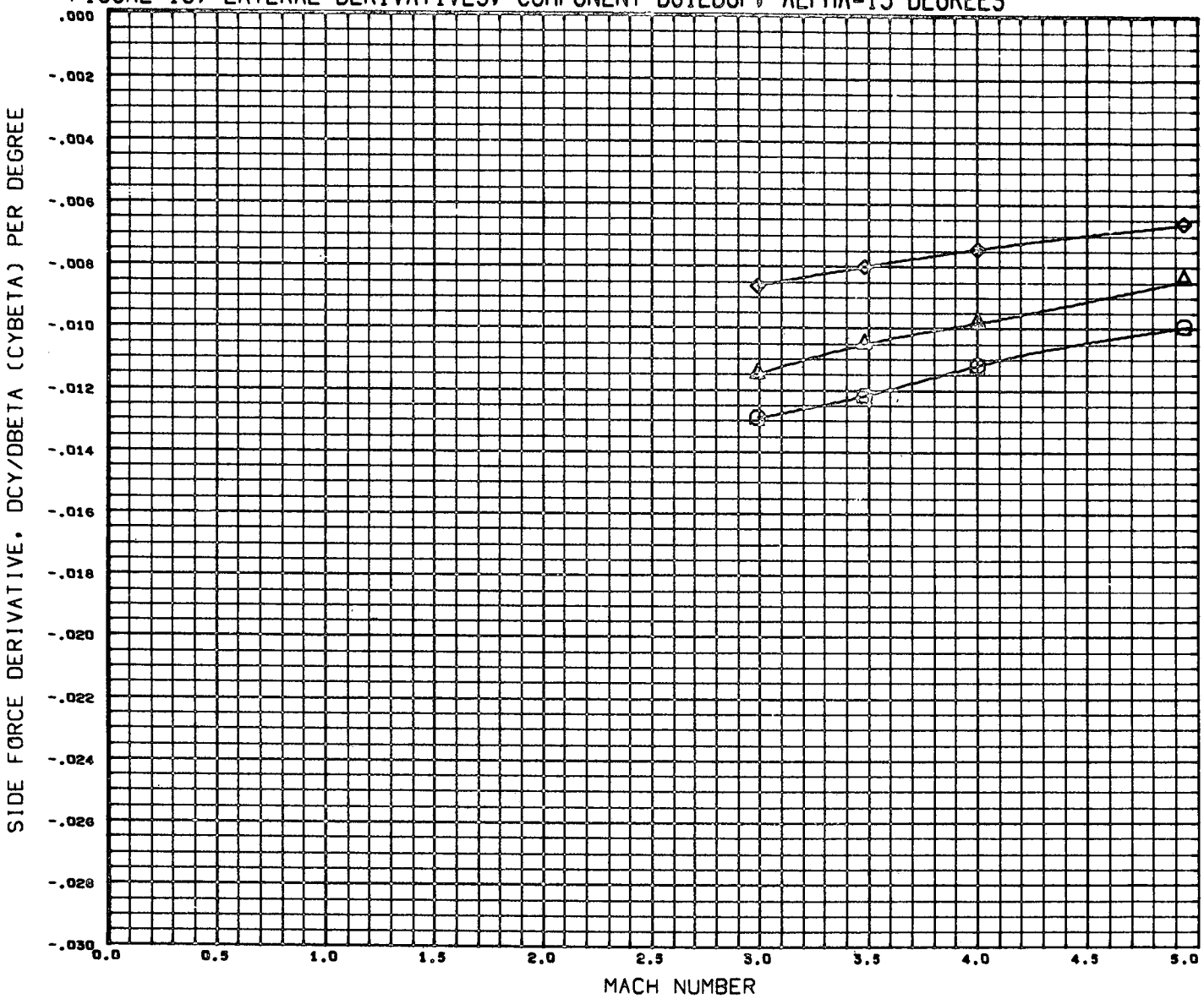
FIGURE 19. LATERAL DERIVATIVES. COMPONENT BUILDUP. ALPHA=15 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49010)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49012)	◇	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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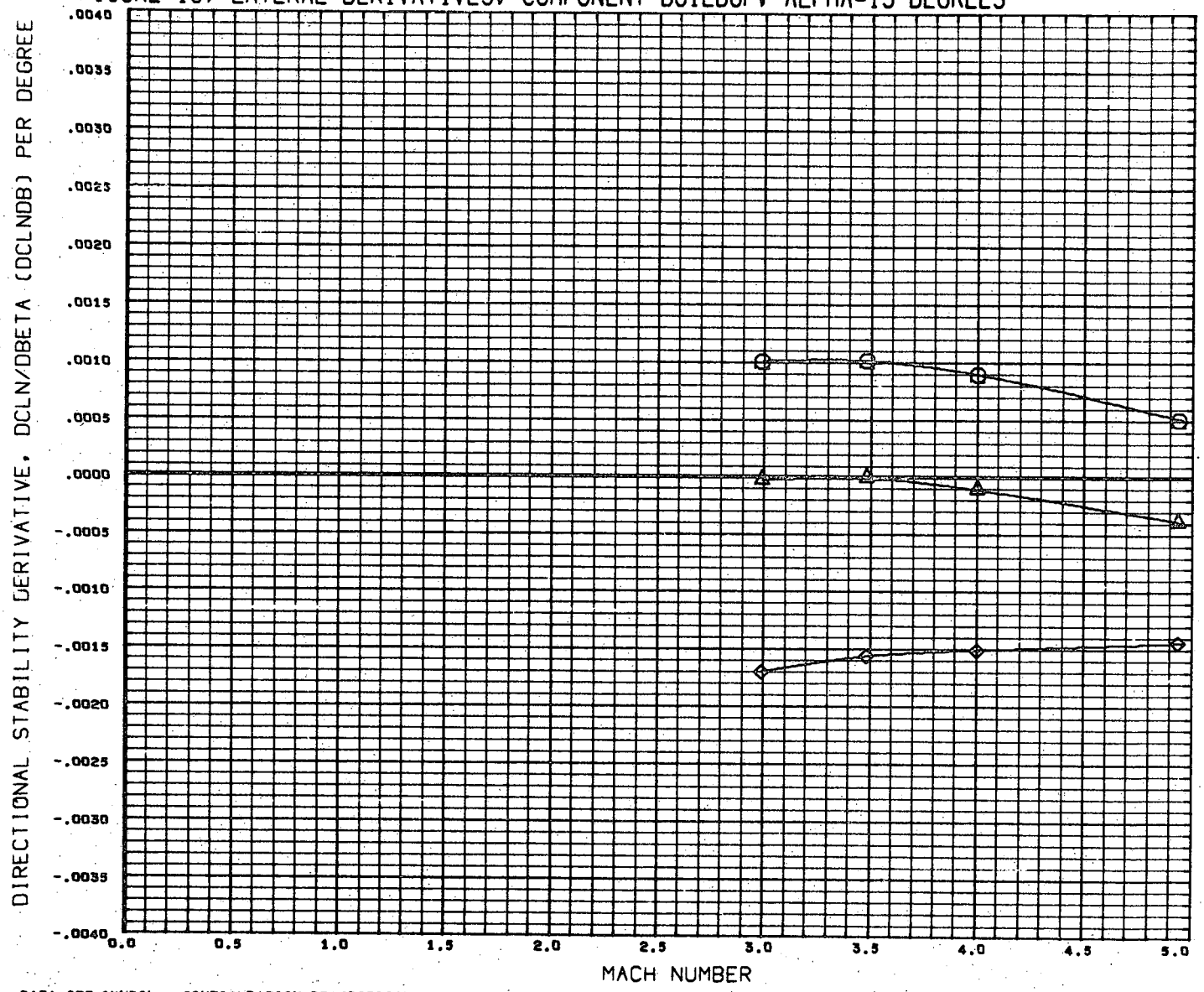
FIGURE 19. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=15 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49010)	○	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(A49011)	△	MSFC 507 GAC H-33 ORB. B5W4V5
(A49012)	◇	MSFC 507 GAC H-33 ORB. B5W4

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000
0.000	0.000		

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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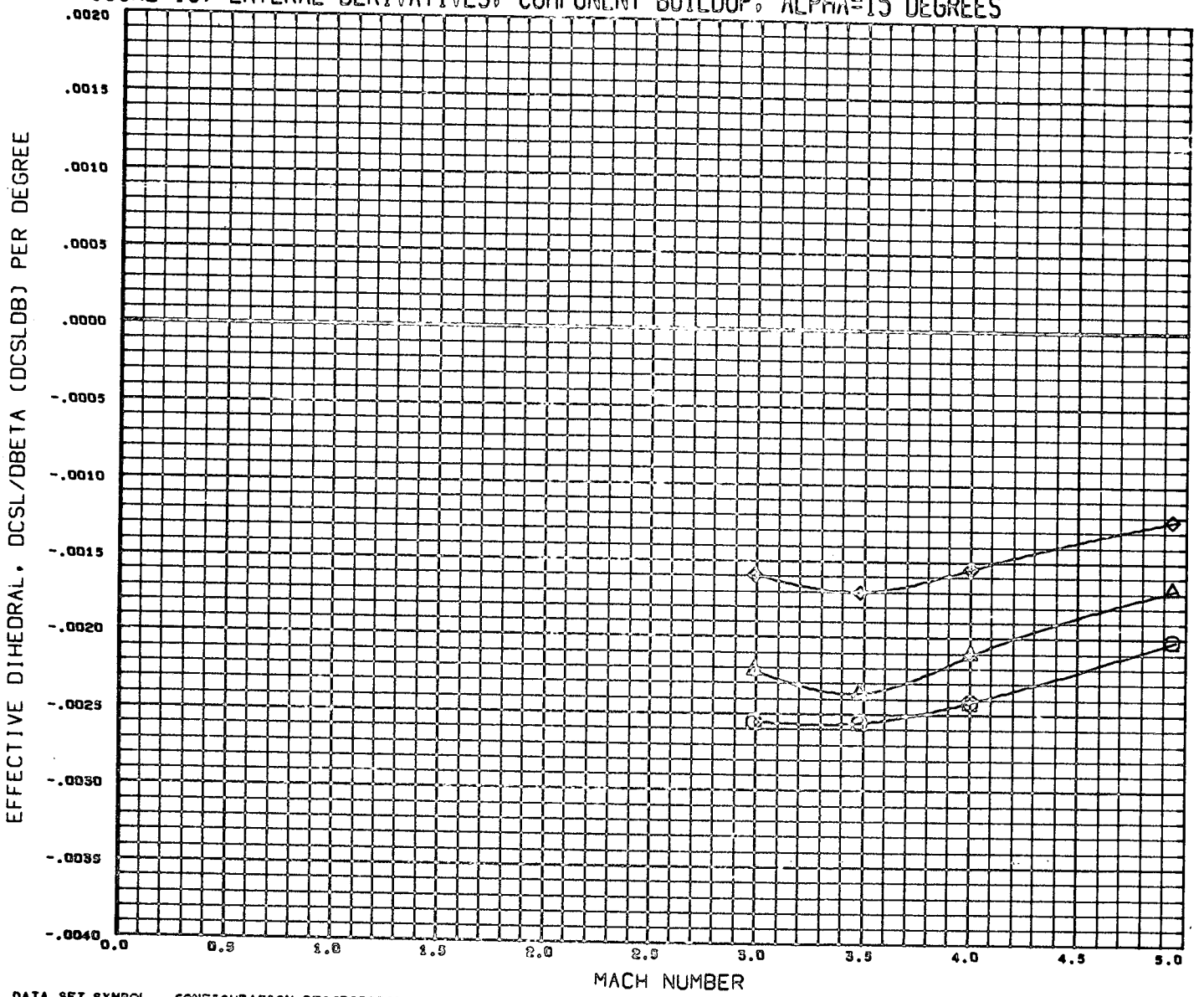
FIGURE 19. LATERAL DERIVATIVES. COMPONENT BUILDUP. ALPHA=15 DEGREES



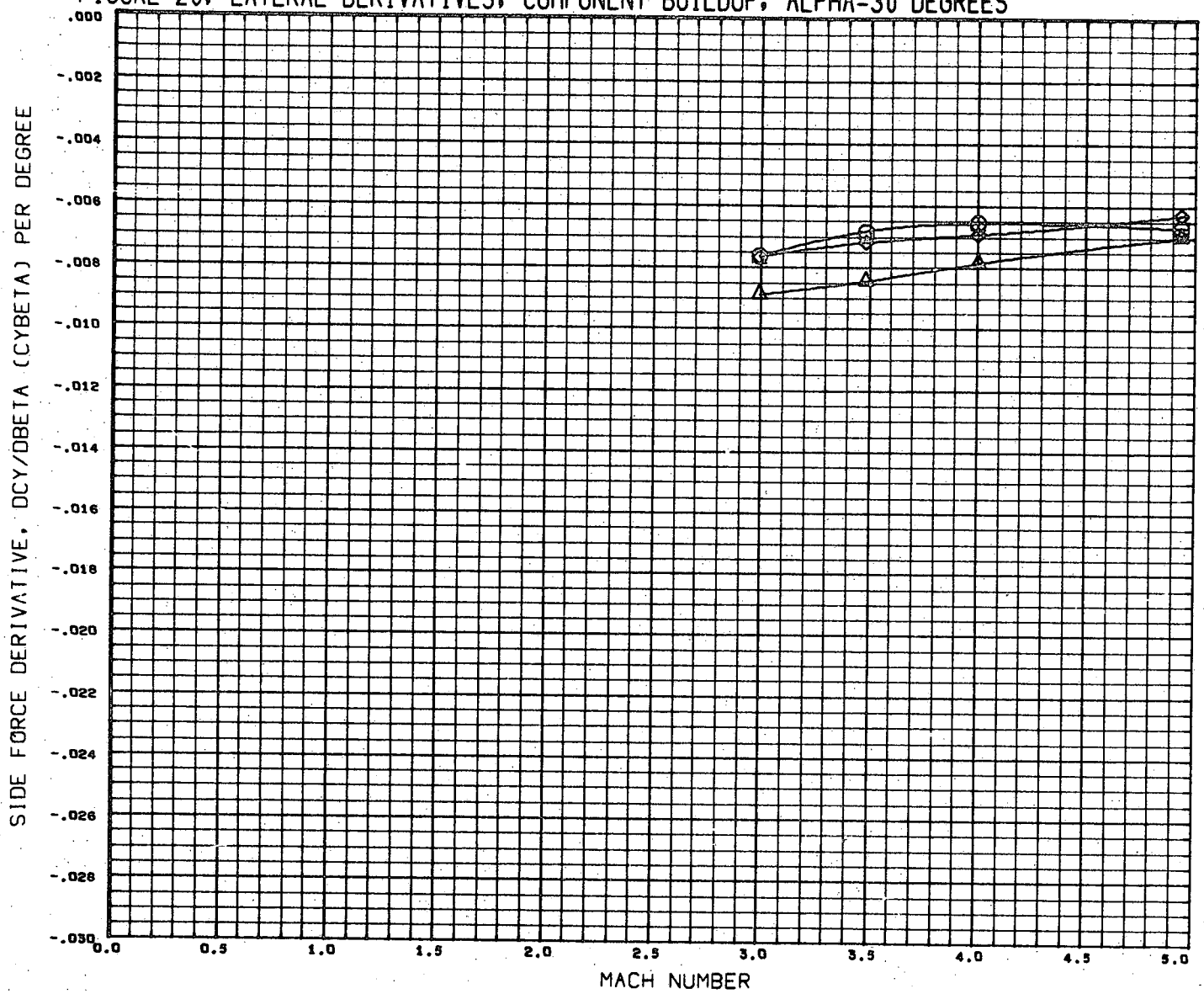
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49010)	○	MSFC 907 GAC M-33 ORB. BSW4VS(+30,-30)
(A49011)	△	MSFC 907 GAC M-33 ORB. BSW4VS
(A49012)	◇	MSFC 907 GAC M-33 ORB. BSW4

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000
0.000	0.000		

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

FIGURE 20. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49025)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49027)	◇	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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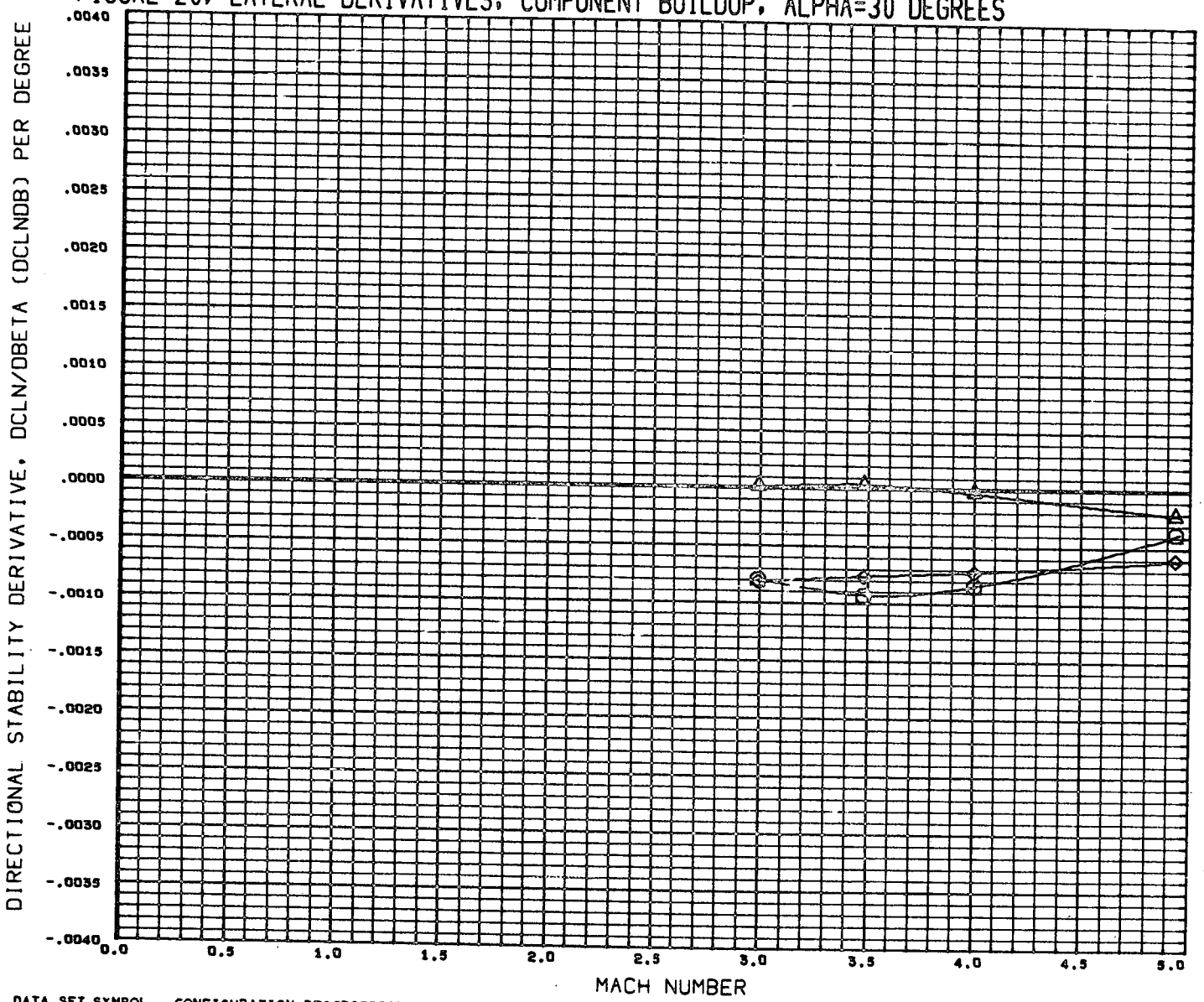
FIGURE 20. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49025)	○	MSFC 507 GAC H-33 ORB. B5W4V5
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(A49027)	◇	MSFC 507 GAC H-33 ORB. B5W4

ELEVTR	AILERN	LRUDDR	RRUDDR
0.000	0.000	0.000	0.000
0.000	0.000	30.000	-30.000
0.000	0.000		

REFERENCE INFORMATION

SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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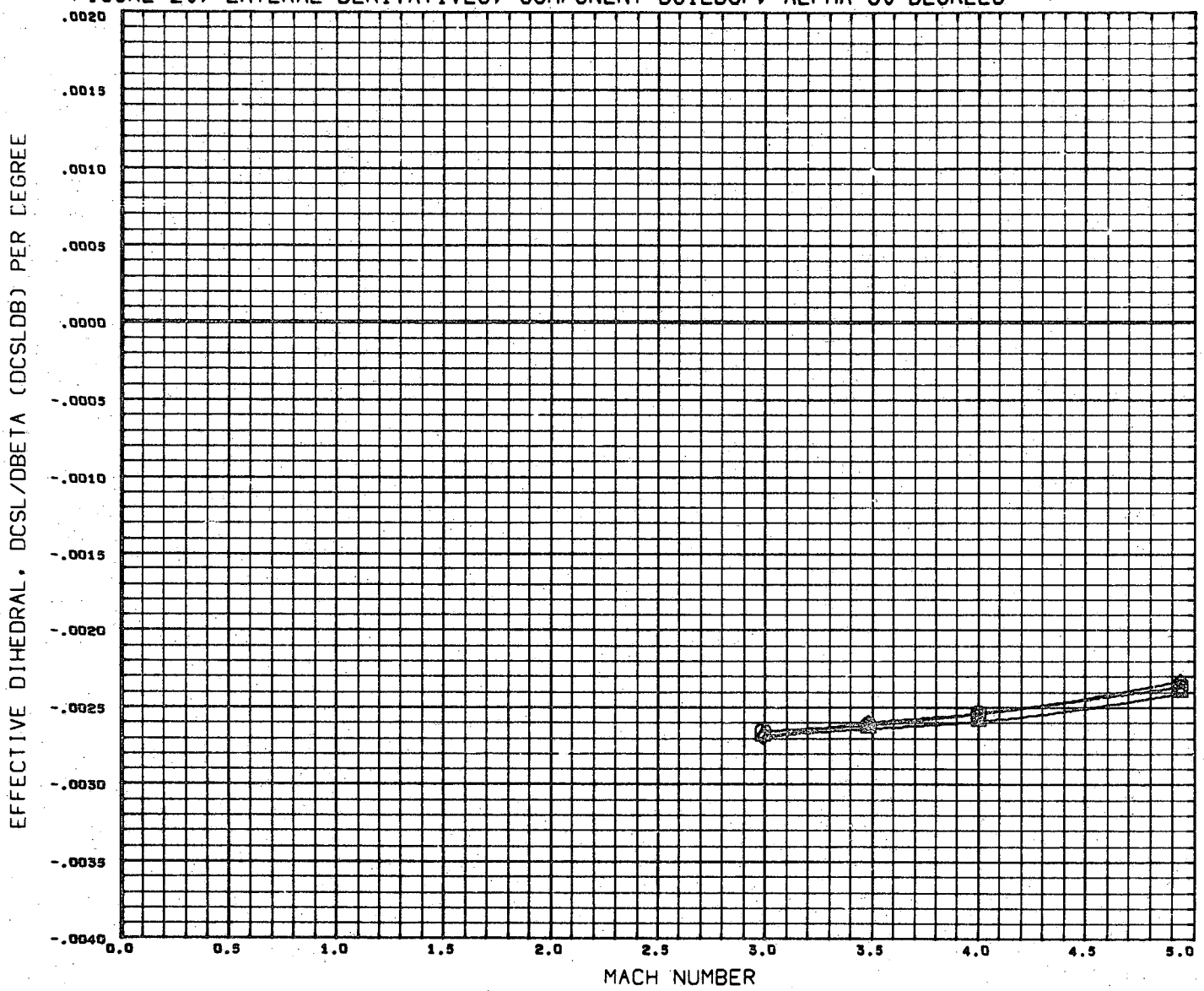
FIGURE 20. LATERAL DERIVATIVES, COMPONENT BUILDUP, ALPHA=30 DEGREES



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR
(A49025)	○	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000
(A49026)	△	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000
(A49027)	◇	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000		

REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	