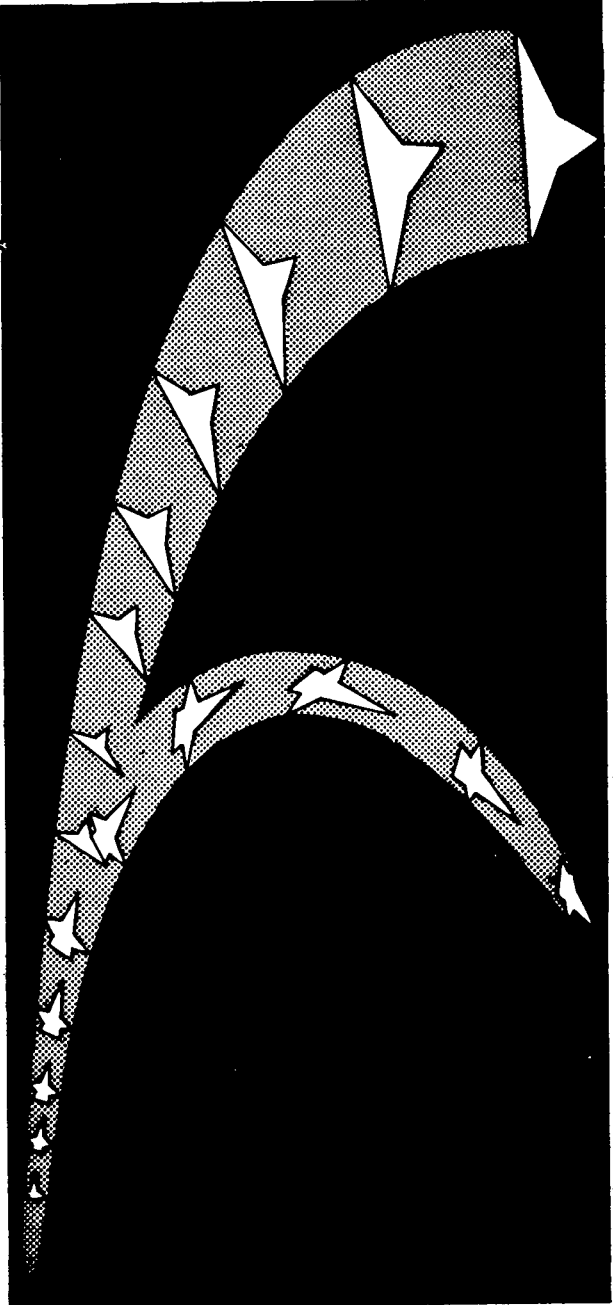


*Copy # 5*  
*MIX*

(NASA-CR-120013) SPACE SHUTTLE: STATIC  
AERODYNAMIC CHARACTERISTICS AND CONTROL  
EFFECTIVENESS OF THE GAC H-33 ORBITER AT  
MACH NUMBERS FROM 0.6 TO 4.96  
(Chrysler Corp.) Jun. 1972 223 p CSCL 22B G3/31 31323

DMS-DR-1184  
N72-26802 120,013  
E 1972  
Unclas



—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**



**MSFC 14-INCH  
TRISONIC WIND TUNNEL**

**Marshall Space  
Flight Center**

**N A S A**

SADSAC SPACE SHUTTLE  
AEROTHERMODYNAMIC  
DATA MANAGEMENT SYSTEM

CONTRACT NAS8-4016  
MARSHALL SPACE FLIGHT CENTER



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

Reproduced by  
**NATIONAL TECHNICAL  
INFORMATION SERVICE**  
U S Department of Commerce  
Springfield VA 22151

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. E. Vaughn DATA OPERATIONS: H. C. Zimmerle  
 FOR John E. Vaughn H. C. Zimmerle

RELEASE APPROVAL: J. E. Vaughn  
 FOR N. D. Kemp, Supervisor  
 Aero Thermo Data Group

CONTRACT NAS 8-4016

AMENDMENT 158

DRL 297 - 84a

This report has been prepared by Chrysler Corporation Space Division under a Data Management Contract to the NASA. Chrysler assumes no responsibility for the data presented herein other than its display characteristics.

**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

## TABLE OF CONTENTS

	<u>PAGE NUMBER</u>
SUMMARY	1
NOMENCLATURE	2
CONFIGURATIONS INVESTIGATED	5
TEST FACILITY DESCRIPTION	6
DATA REDUCTION	7
TABLES	
I    TEST CONDITIONS	8
II   DATASET COLLATION SHEETS	9 - 11
III  DIMENSIONAL DATA	12 - 16
IV   INDEX OF MODEL FIGURES	17
V    INDEX OF DATA FIGURES	18
FIGURES	
MODEL	20
DATA	23

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  $0^{\circ}$  to  $20^{\circ}$ . Then an adaptor was set to give the sting an offset angle and  $20^{\circ}$  to  $40^{\circ}$  angle of attack was obtained. Characteristics in sideslip were determined by varying sideslip angle from  $-4^{\circ}$  to  $10^{\circ}$  with angle of attack set at  $0^{\circ}$ ,  $10^{\circ}$ ,  $15^{\circ}$ , and  $30^{\circ}$ .

An anomalous shift in the rolling moment data for the angle of attack range of  $20^{\circ}$  to  $40^{\circ}$  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

<u>SYMBOL</u>	<u>SADSAC SYMBOL</u>	<u>DEFINITION</u>
a		speed of sound; m/sec, ft/sec
C <sub>p</sub>	CP	pressure coefficient; $(p_1 - p_\infty)/q$
M	MACH	Mach number; $V/a$
p		pressure; N/m <sup>2</sup> , psf
q	Q(NSM) Q(PSF)	dynamic pressure; $1/2\rho V^2$ , N/m <sup>2</sup> , psf
RN/L	RN/L	unit Reynolds number; per m, per ft
V		velocity; m/sec, ft/sec
$\alpha$	ALPHA	angle of attack, degrees
$\beta$	BETA	angle of sideslip, degrees
$\psi$	PSI	angle of yaw, degrees
$\phi$	PHI	angle of roll, degrees
$\rho$		mass density; kg/m <sup>3</sup> , slugs/ft <sup>3</sup>
<u>Reference &amp; C.G. Definitions</u>		
A <sub>b</sub>		base area; m <sup>2</sup> , ft <sup>2</sup>
b	BREF	wing span or reference span; m, ft
c.g.		center of gravity
$\frac{l_{REF}}{c}$	LREF	reference length or wing mean aerodynamic chord; m, ft
S	SREF	wing area or reference area; m <sup>2</sup> , ft <sup>2</sup>
	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
<u>SUBSCRIPTS</u>		
b		base
l		local
s		static conditions
t		total conditions
$\infty$		free stream

NOMENCLATURE (Continued)

Body-Axis System

<u>SYMBOL</u>	<u>SADSAC SYMBOL</u>	<u>DEFINITION</u>
$C_N$	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; $\frac{\text{pitching moment}}{qS l_{REF}}$
$C_n$	CYN	yawing-moment coefficient; $\frac{\text{yawing moment}}{qS b}$
$C_l$	CLB	rolling-moment coefficient; $\frac{\text{rolling moment}}{qS b}$

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; $\frac{\text{pitching moment}}{qS l_{REF}}$
$C_n$	CLN	yawing-moment coefficient; $\frac{\text{yawing moment}}{qS b}$
$C_l$	CLB	rolling-moment coefficient; $\frac{\text{rolling moment}}{qS b}$
L/D	L/D	lift-to-drag ratio; $C_L/C_D$

ADDITIONS TO SADSAC NOMENCLATURE  
FOR  
MSFC TWT TEST NO. 507

<u>SYMBOL</u>	<u>SADSAC SYMBOL</u>	<u>DEFINITION</u>
$\delta_{e_L}$	ELVN-L	left elevon, surface deflection angle, positive deflection, trailing edge down; degrees
$\delta_{e_R}$	ELVN-R	right elevon, surface deflection angle, positive deflection, trailing edge down; degrees
$\delta_a$	AILERN	total aileron deflection angle in degrees, $(\delta_{e_L} - \delta_{e_R})/2$
$\delta_e$	ELEVTR	elevator deflection angle in degrees, $(\delta_{e_L} + \delta_{e_R})/2$
$\delta_{r_L}$	LRUDDR	left split rudder surface deflection angle, degrees; positive deflection, trailing edge to the left
$\delta_{r_R}$	RRUDDR	right split rudder surface deflection angle, degrees; positive deflection, trailing edge to the left.
$\delta_r$	RUDDER	assymetrical split rudder deflection for directional control, $(\delta_{r_L} + \delta_{r_R})/2$ ; degrees
$C_{m\alpha}$	CLMALF	derivative of pitching moment coefficient with respect to alpha, (alpha = 0 to 5°); per degree
$C_{L\alpha}$	CLALFA	derivative of lift coefficient with respect to alpha, (alpha = 0 to 5°); per degree
$C_{y\beta}$	CYBETA	derivative of side-force coefficient with respect to beta (beta = ±5°); per degree
$C_{n\beta}$	DCLNDB	derivative of yawing moment coefficient with respect to beta (beta = ±5°); per degree, stability axis system
$C_{l\beta}$	DCSLDB	derivative of rolling moment coefficient with respect to beta (beta = ±5°); per degree, stability axis system
$\alpha_{(C_L = 0)}$	ALFCL $\phi$	angle of attack at zero lift coefficient (CL = 0); degrees



ADDITIONS TO SADSAC NOMENCLATURE  
(Continued)

<u>SYMBOL</u>	<u>SADSAC SYMBOL</u>	<u>DEFINITION</u>
$C_{D_0}$	$CD\phi$	drag coefficient at zero lift coefficient ( $CL = 0$ )
$C_{m\alpha = 0}$	$CLMAF\phi$	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 Transonic 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  $-40^{\circ}\text{F}$  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  $180^{\circ}\text{F}$ . 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  $20^{\circ}$  ( $\pm 10^{\circ}$ ). Sting offsets and extensions are available for obtaining various maximum angles of attack up to  $90^{\circ}$ .

### 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:

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

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

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

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

$$C_{A_b} = - \left[ C_{p_1} \left( \frac{A}{3} \right) + C_{p_2} \left( \frac{A}{3} \right) + C_{p_3} \left( \frac{A}{3} \right) \right] / S_{\text{ref}}$$

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 x 10 <sup>6</sup>	4.340	98
0.90	6.3 x 10 <sup>6</sup>	7.389	96
1.20	6.7 x 10 <sup>6</sup>	9.143	97
1.46	7.5 x 10 <sup>6</sup>	10.769	95
1.96	7.4 x 10 <sup>6</sup>	10.982	112
2.74	4.7 x 10 <sup>6</sup>	6.380	138
2.99	5.3 x 10 <sup>6</sup>	6.066	103
3.48	7.0 x 10 <sup>6</sup>	6.856	104
4.00	8.2 x 10 <sup>6</sup>	6.635	104
4.96	5.4 x 10 <sup>6</sup>	3.068	103

BALANCE UTILIZED: MSFC No. 201

**CAPACITY:**

NF 60 #  
 SF 20 #  
 AF 30 #  
 PM 60 in-#  
 YM 20 in-#  
 RM 25 in-#

**ACCURACY:**

.15 #  
.05 #  
.08 #  
.15 in-#  
.05 in-#  
.06 in-#

**COEFFICIENT  
TOLERANCE:**

Varies with Dynamic  
Pressure  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**COMMENTS:**







TABLE III.  
DIMENSIONAL DATA

MODEL COMPONENT: BODY - B<sub>5</sub>

GENERAL DESCRIPTION: BASIC H-33 ORBITER BODY

DRAWING NUMBER: \_\_\_\_\_

DIMENSIONS:

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



TABLE III. (Continued)

MODEL COMPONENT: WING - W<sub>L</sub>

GENERAL DESCRIPTION: BASIC H-33 ORBITER WING

DRAWING NUMBER: \_\_\_\_\_

<u>TOTAL DATA</u>	<u>FULL-SCALE</u>	<u>.003366</u> <u>MODEL SCALE</u>
	(ft.orft. <sup>2</sup> )	(in.orin. <sup>2</sup> )
Area		
Planform	<u>4840</u>	<u>7.897</u>
Wetted	<u>5940</u>	<u>9.691</u>
Span (equivalent)	<u>94.5</u>	<u>3.817</u>
Aspect Ratio	<u>1.845</u>	<u>1.845</u>
Rate of Taper		
Taper Ratio	<u>.178</u>	<u>.178</u>
Diehedral Angle, degrees	<u>5°</u>	<u>5°</u>
Incidence Angle, degrees	<u>2°@body-3°@tip</u>	<u>2°@body-3°@ tip</u>
Aerodynamic Twist, degrees		
Toe-In Angle		
Cant Angle		
Sweep Back Angles, degrees		
Leading Edge	<u>55°</u>	<u>55°</u>
Trailing Edge	<u>-5°</u>	<u>-5°</u>
0.25 Element Line	<u>46.32°</u>	<u>46.32°</u>
Chords:		
Root (Wing Sta. 0.0)	<u>86.96</u>	<u>3.512</u>
Tip, (equivalent)	<u>15.48</u>	<u>.625</u>
MAC,	<u>59.5</u>	<u>2.403</u>
Fus. Sta. of .25 MAC		
W.P. of .25 MAC		
Airfoil Section		
Root	<u>t/c=9.5%cambered</u>	<u>t/c=9.5%cambered</u>
Tip	<u>" " sect. "</u>	<u>" " " "</u>
<u>EXPOSED DATA</u>		
Area	<u>2900</u>	<u>4.731</u>
Span, (equivalent)	<u>69.5</u>	<u>2.807</u>
Aspect Ratio	<u>1.666</u>	<u>1.666</u>
Taper Ratio	<u>.228</u>	<u>.228</u>
Chords		
Root	<u>67.98</u>	<u>2.746</u>
Tip	<u>15.48</u>	<u>.625</u>
MAC	<u>47.2</u>	<u>1.907</u>
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: \_\_\_\_\_

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

TABLE III. (Continued)

MODEL COMPONENT: C VERTICAL TAIL - V5

GENERAL DESCRIPTION: BASIC H-33 ORBITER VERTICAL TAIL

DRAWING NUMBER: \_\_\_\_\_

DIMENSIONS:

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

MODEL COMPONENT: RUDDER (FOR V<sub>5</sub> VERTICAL TAIL)

GENERAL DESCRIPTION: MOVABLE CONTROL SURFACE ASSOCIATED WITH THE V<sub>5</sub> VERTICAL TAIL

DRAWING NUMBER: \_\_\_\_\_

DIMENSIONS:

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

TABLE IV.  
INDEX OF MODEL FIGURES

FIGURE	DESCRIPTION	PAGE NUMBER
1	Axis System	20
2	H-33 Orbiter Without External Tanks	21
3	Photograph of Tunnel Installation of Configuration B <sub>5</sub> W <sub>4</sub> V <sub>5</sub>	22

TABLE V. INDEX OF DATA FIGURES

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
Figure 1, Basic Longitudinal Characteristics - ELEVTR=0, LRUDDR=0, RRUDDR=0 Degrees	A	MACH	1-10
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
Figure 18, Lateral Derivatives, Component Buildup, ALPHA=10 Degrees	F	Configuration	211-213
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, CIM, CAB vs. ALPHA  
CL vs. CIM, CD
- (B) CL, CIM vs. ALPHA  
CL vs. CD
- (C) CY, CIN, CSL vs. ALPHA
- (D) CY, CIN, CSL, CAB vs. BETA
- (E) CLAIFA, ALFCL $\phi$ , CIMAI $\phi$ , CIMAF $\phi$ , CD $\phi$  vs. MACH
- (F) CYBETA, DCIADB, DCSIDB 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.

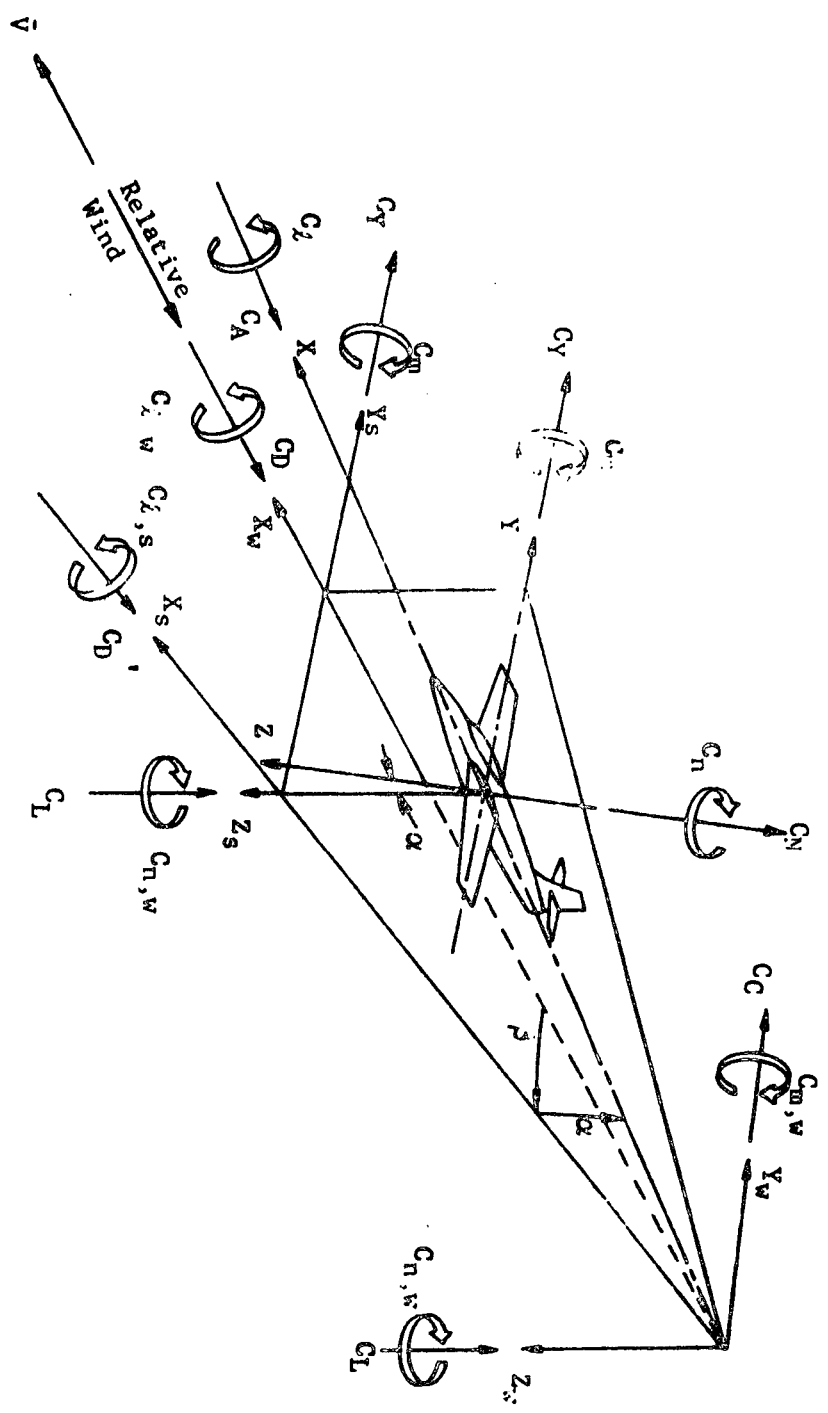


Figure 1. Axis systems, showing direction and sense of force and moment coefficients, angle of attack, and sideslip angle



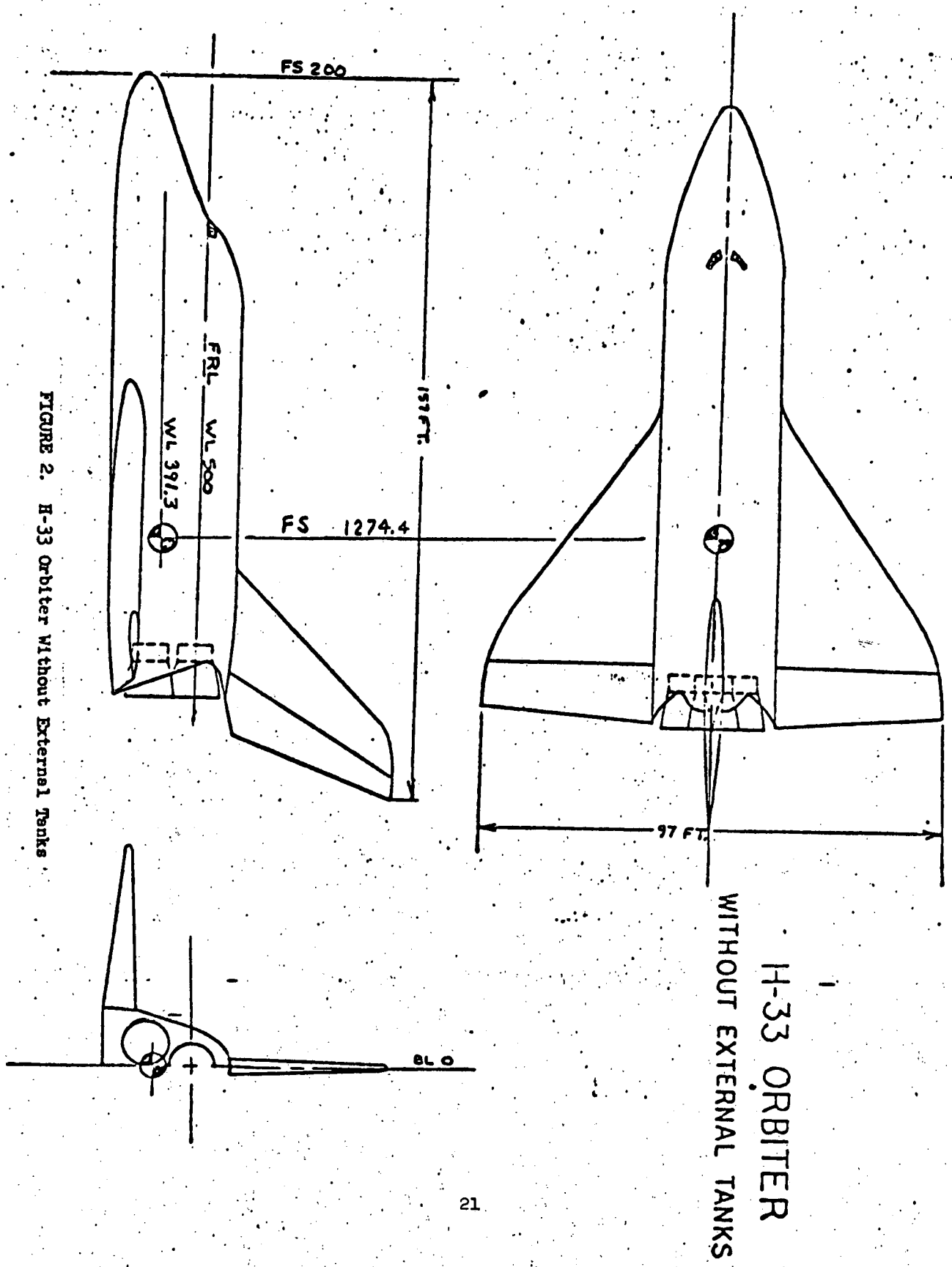
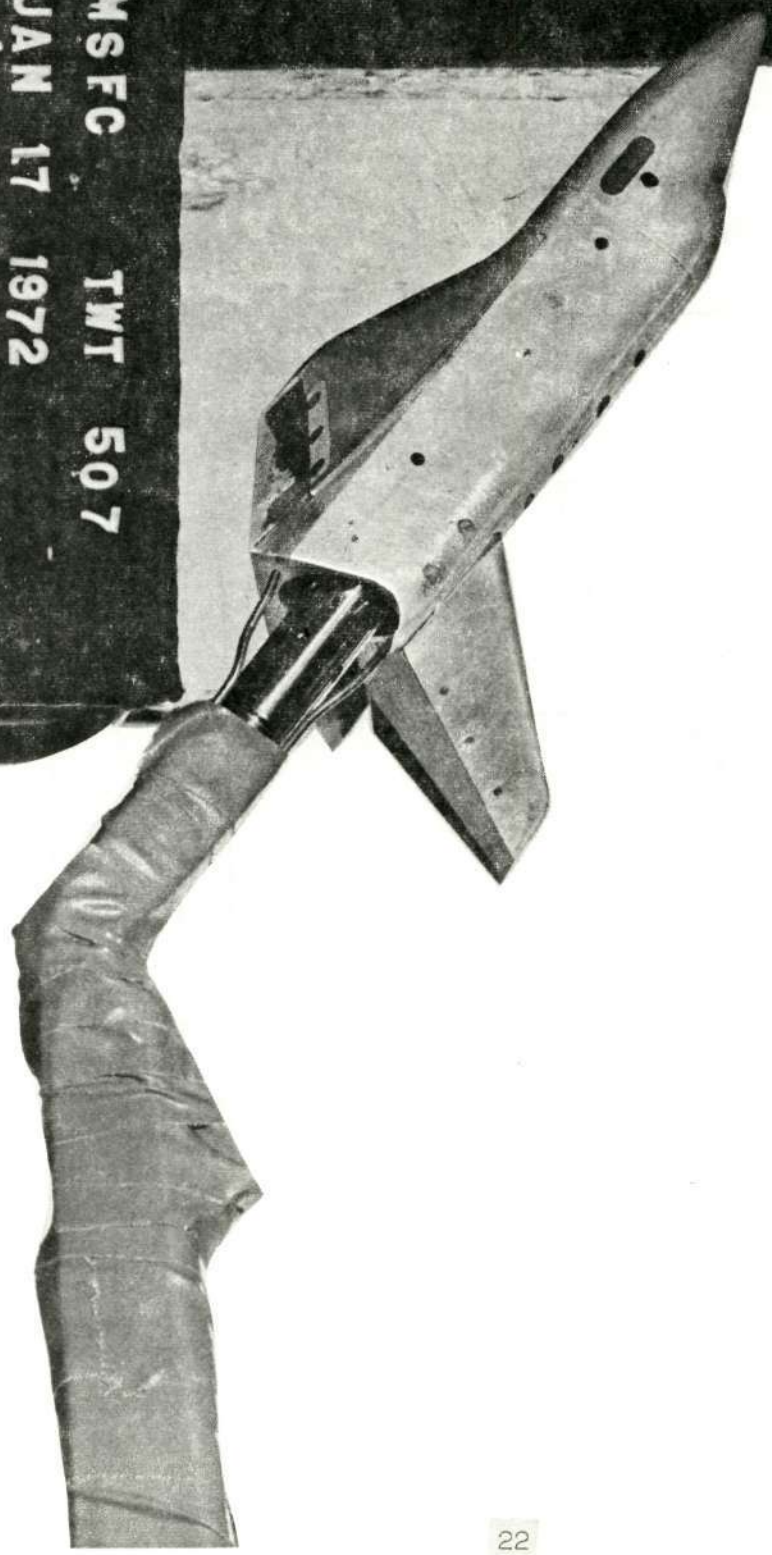
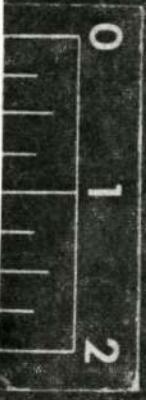


FIGURE 2. H-33 Orbiter Without External Tanks

NASA - MSFC  
S&E - Aero - AE

MSFC TWT 507  
JAN 17 1972  
CONFIG  
B 5 W 4 V 5



Reproduced from  
best available copy.

FIGURE 3. PHOTOGRAPH OF TUNNEL INSTALLATION OF  
CONFIGURATION B<sub>5</sub>W<sub>4</sub>V<sub>5</sub>

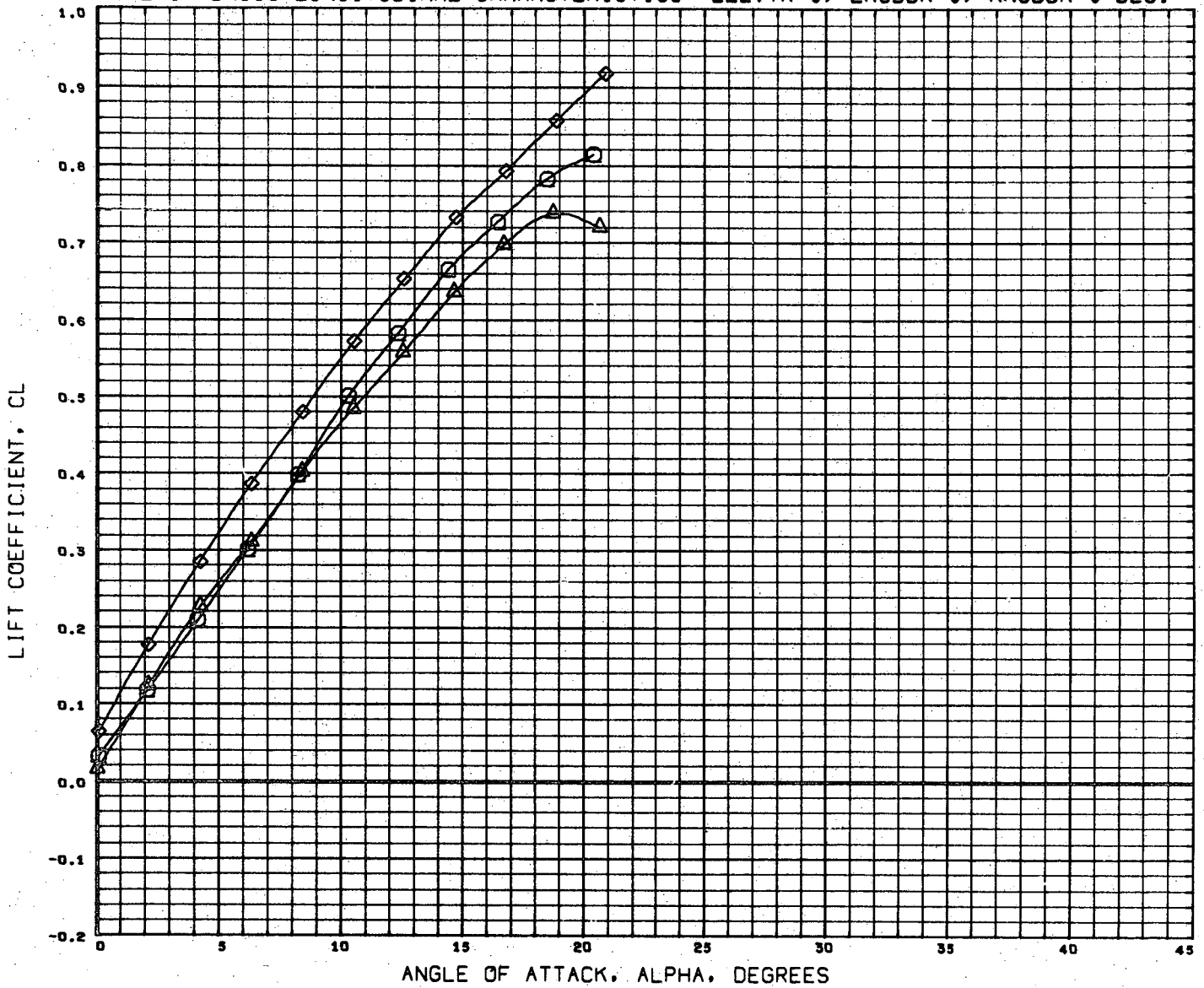
08-2-72

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		

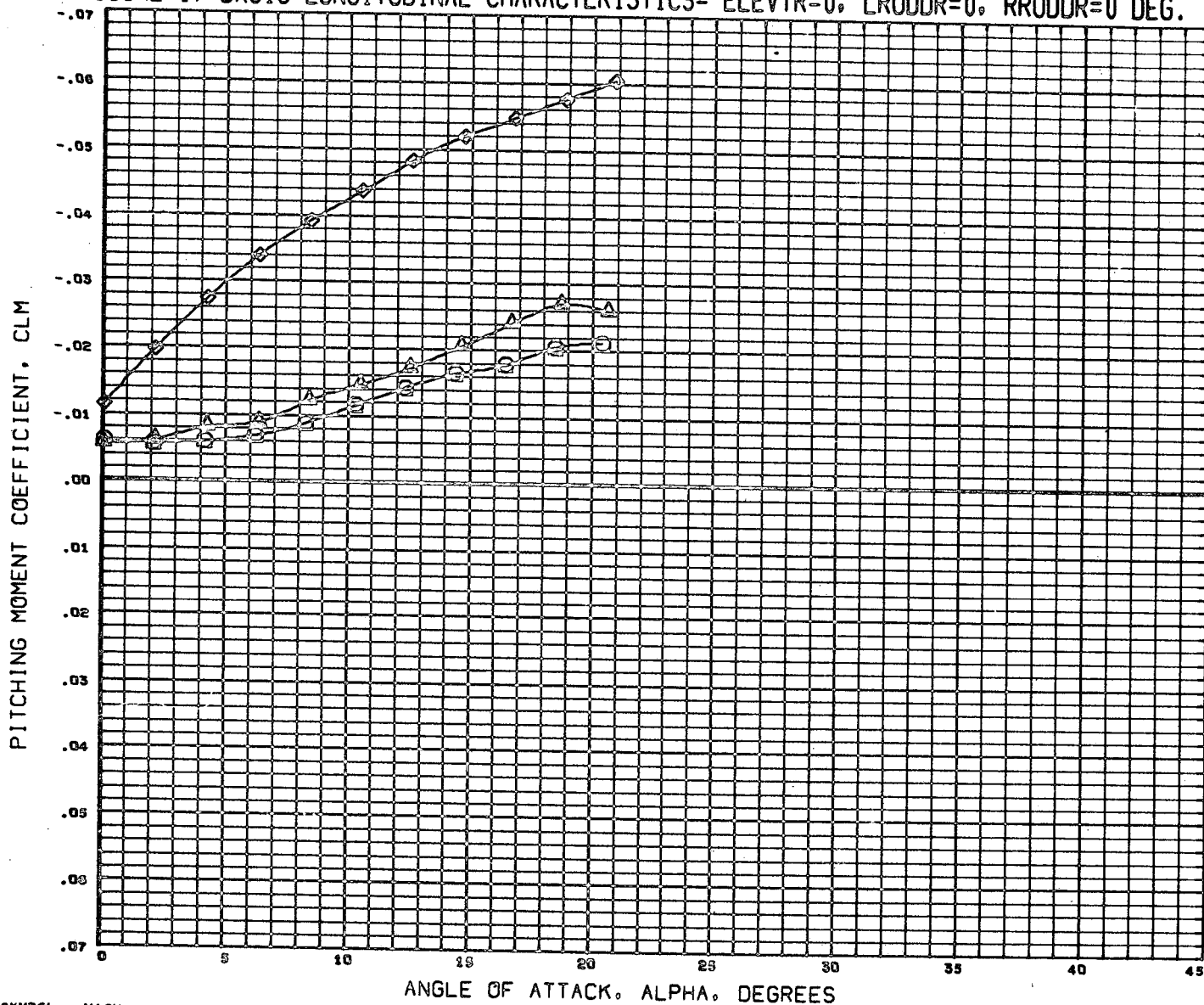
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	6.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5

(A49038) 03 MAR 72 PAGE 1

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



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

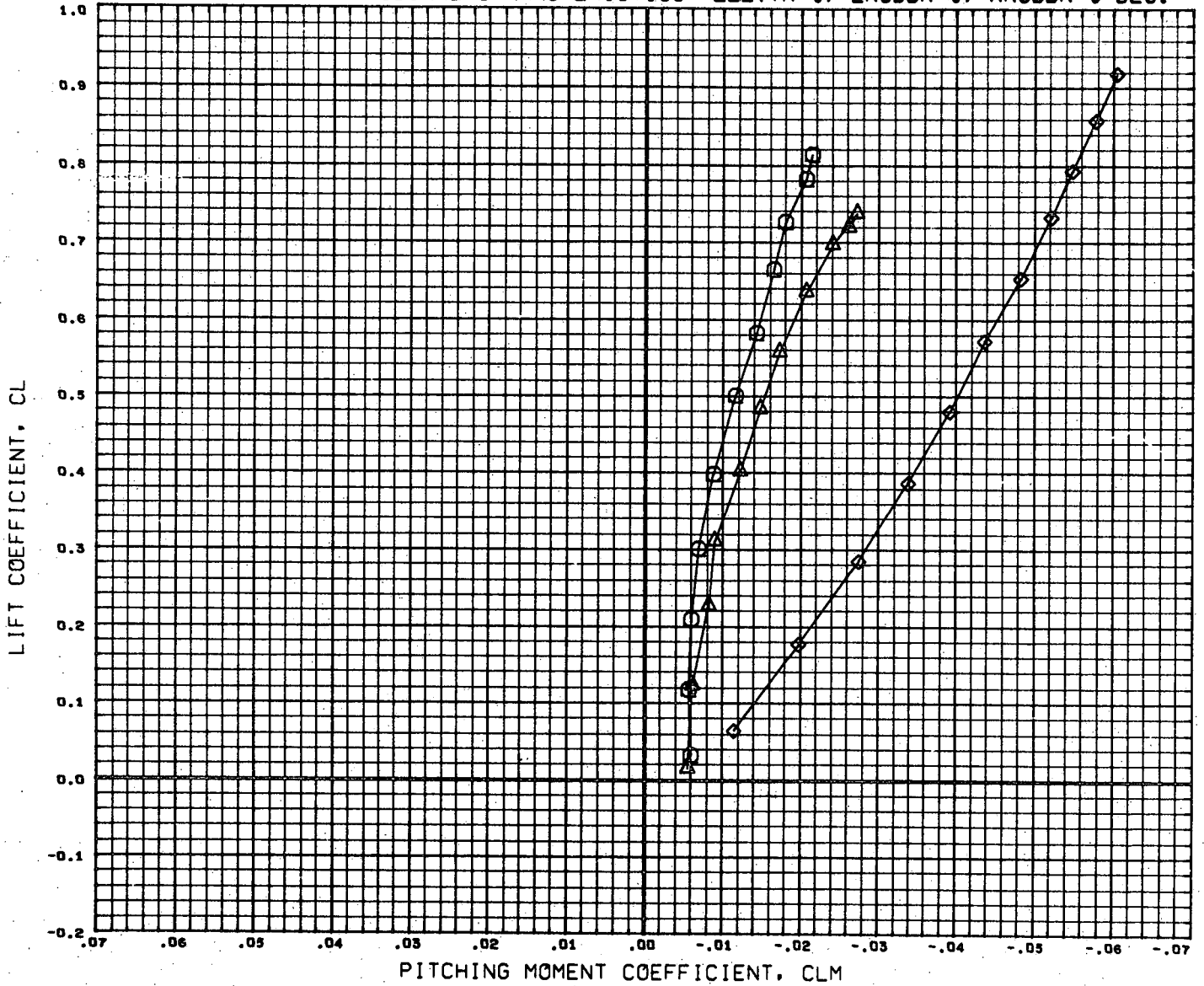
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5

(A49038) 03 MAR 72 PAGE 2

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		

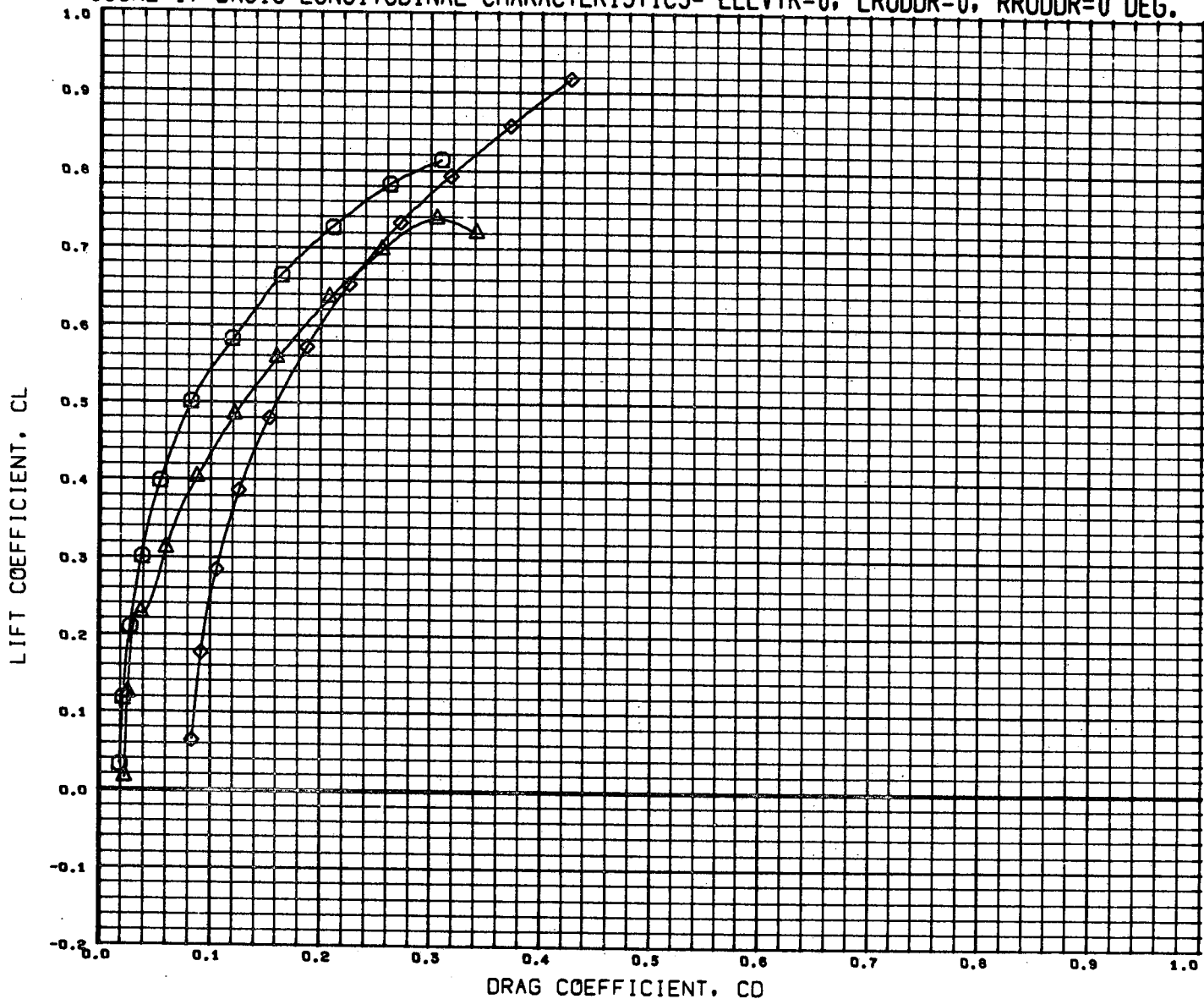
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN.
LREF	5.4530	IN.
BREF	3.8170	IN.
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5

(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	ATLERN	0.000	LRUDDR	0.000
◇	1.199	RRUDDR	0.000		

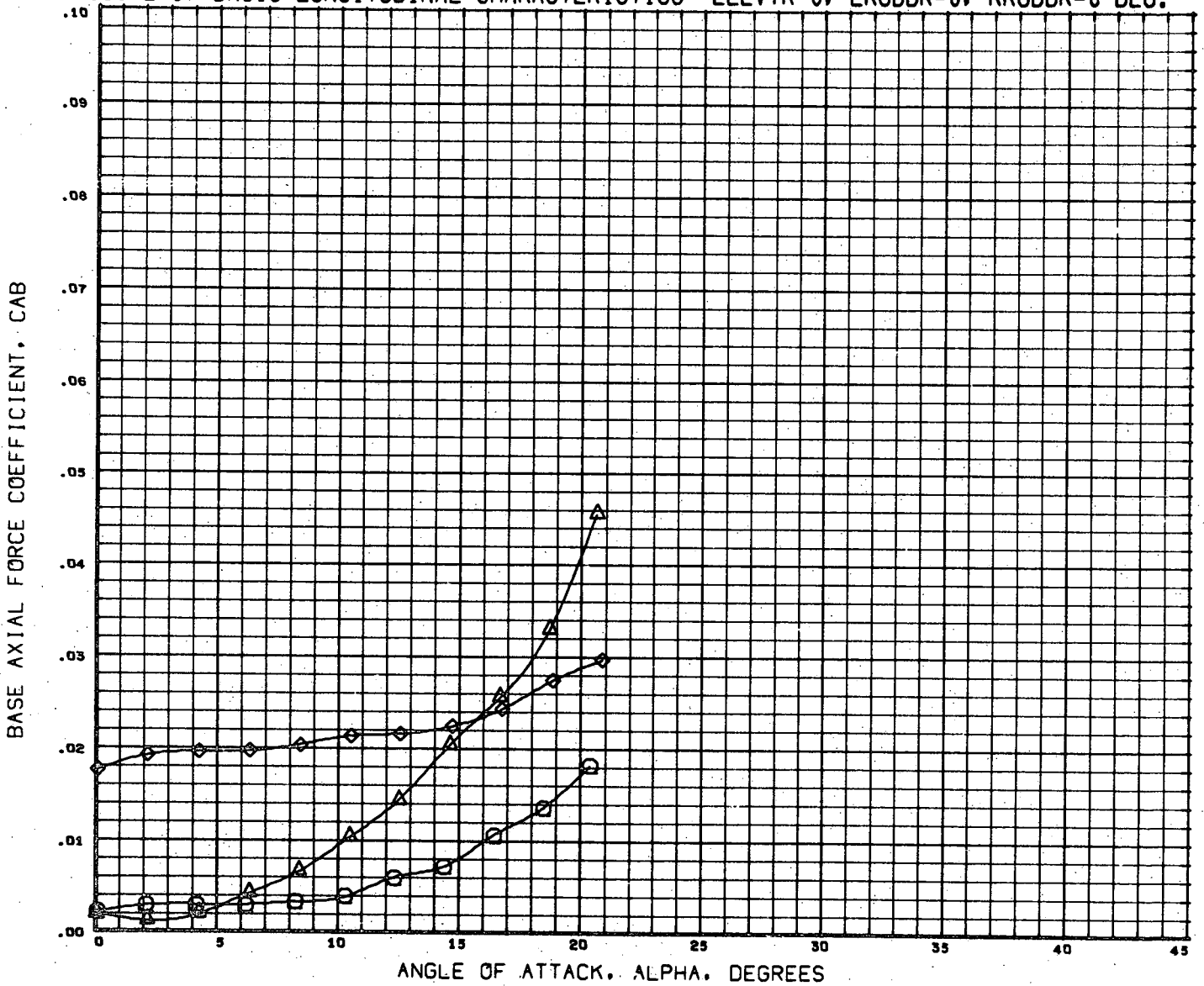
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN.
BREF	3.8170	IN.
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

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		

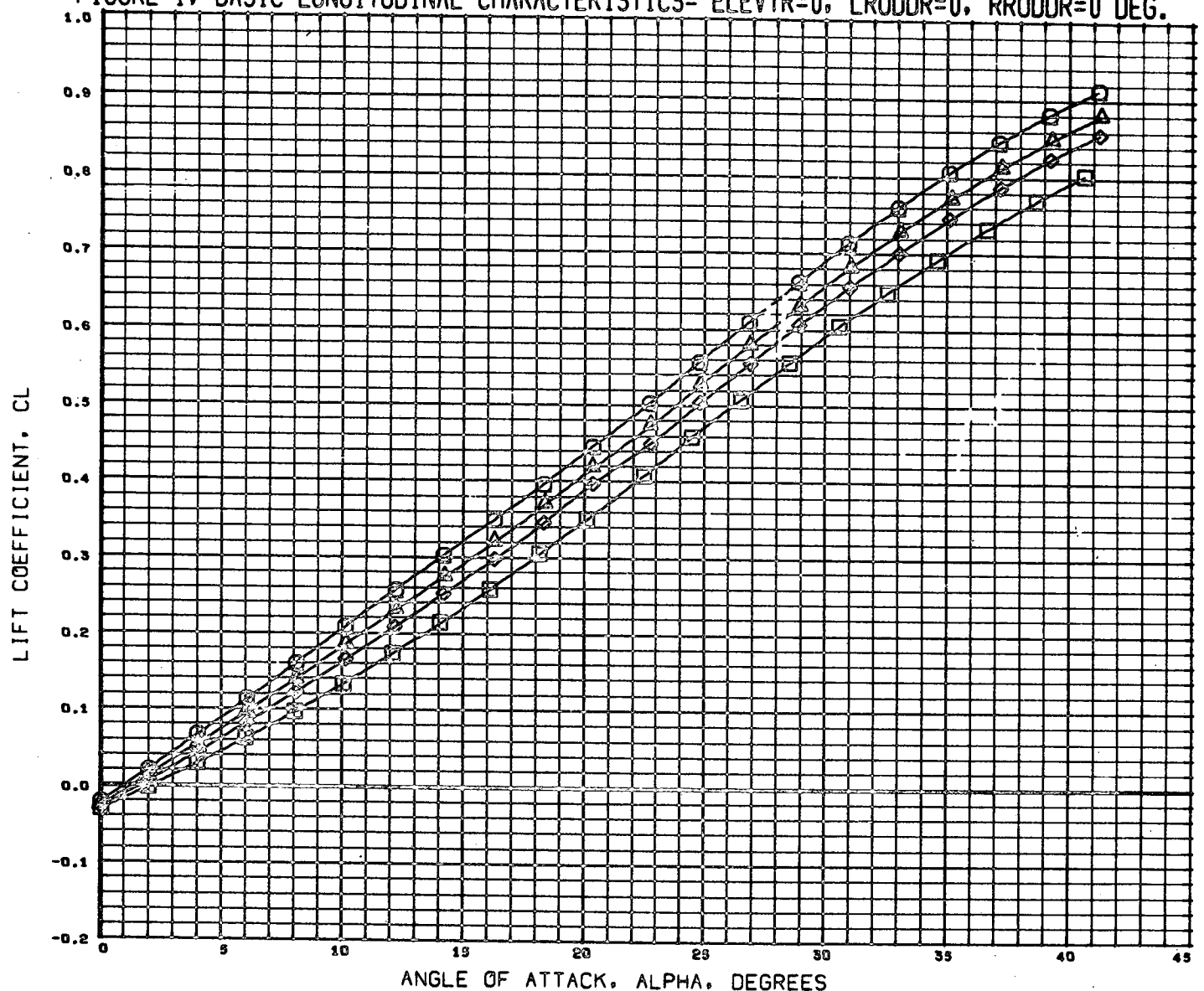
REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5



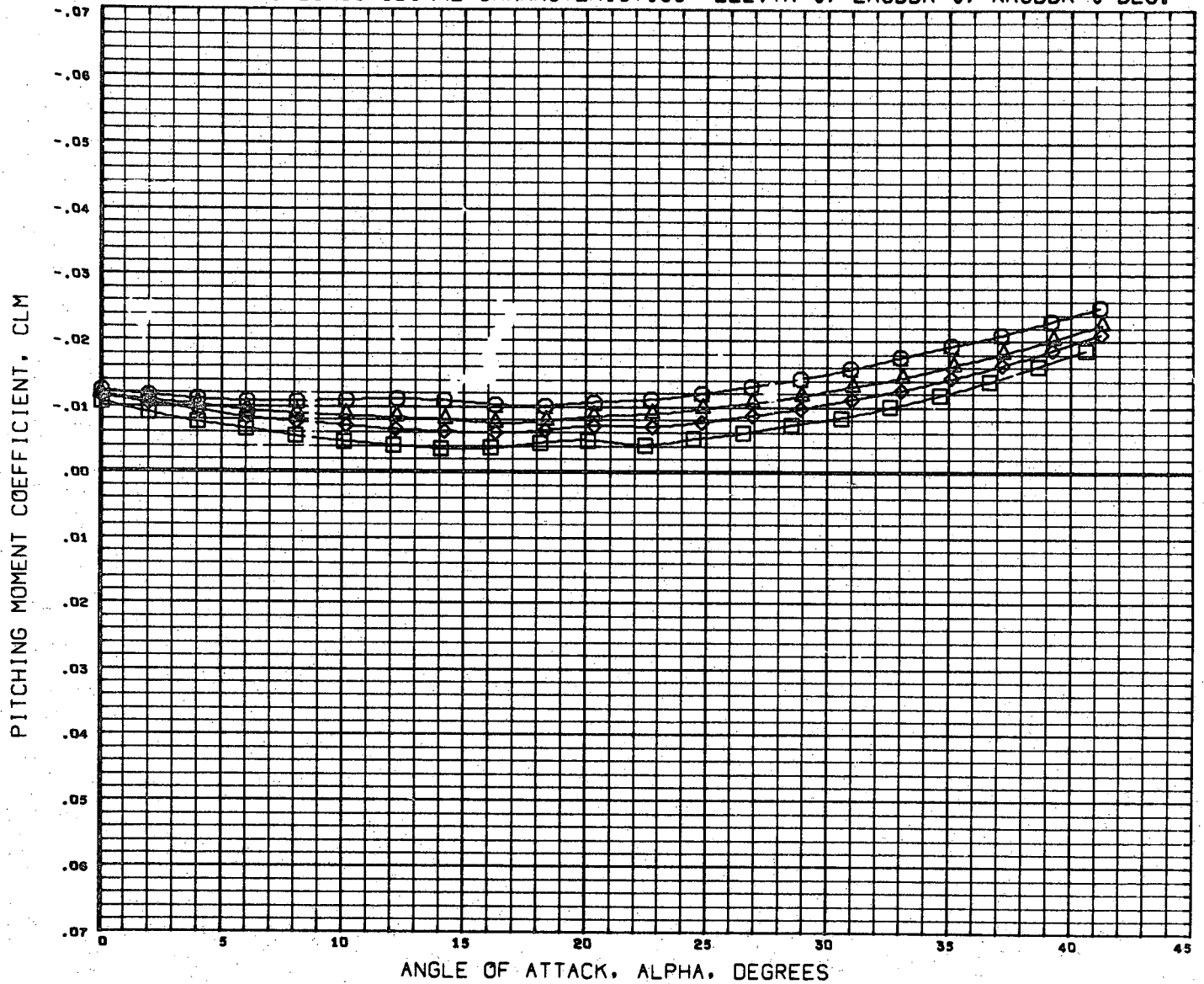
FIGURE 1. BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=0, RRUDDR=0 DEG.



SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	2.990	BETA	0.000	ELEVTR	0.000	SREF	7.8970	sq. in
△	3.480	ATLERN	0.000	LRUDDR	0.000	LREF	5.4530	IN
◇	4.000	RRUDDR	0.000			BREF	3.8170	IN
□	4.999					XMRP	1274.4040	IN.
						YMRP	0.0000	IN.
						ZMRP	391.3004	IN.
						SCALE	0.0034	

DATA HIST. CODE #6

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

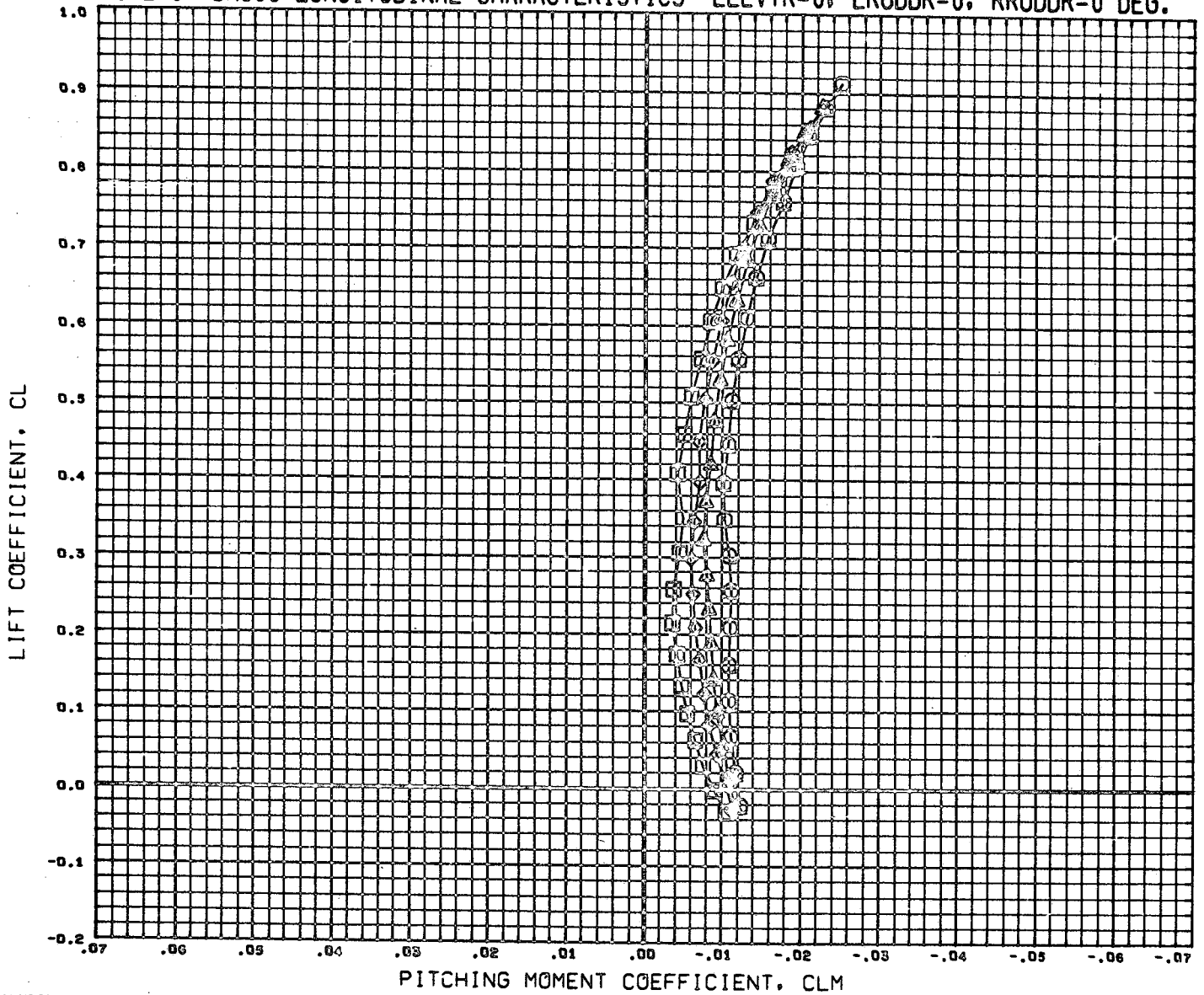


SYMBOL	MACH	PARAMETRIC VALUES			
○	2.990	BETA	0.000	ELEVTR	0.000
◇	3.480	AILERN	0.000	LRUDDR	0.000
△	4.000	RRUDDR	0.000		
□	4.959				

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 \*G

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



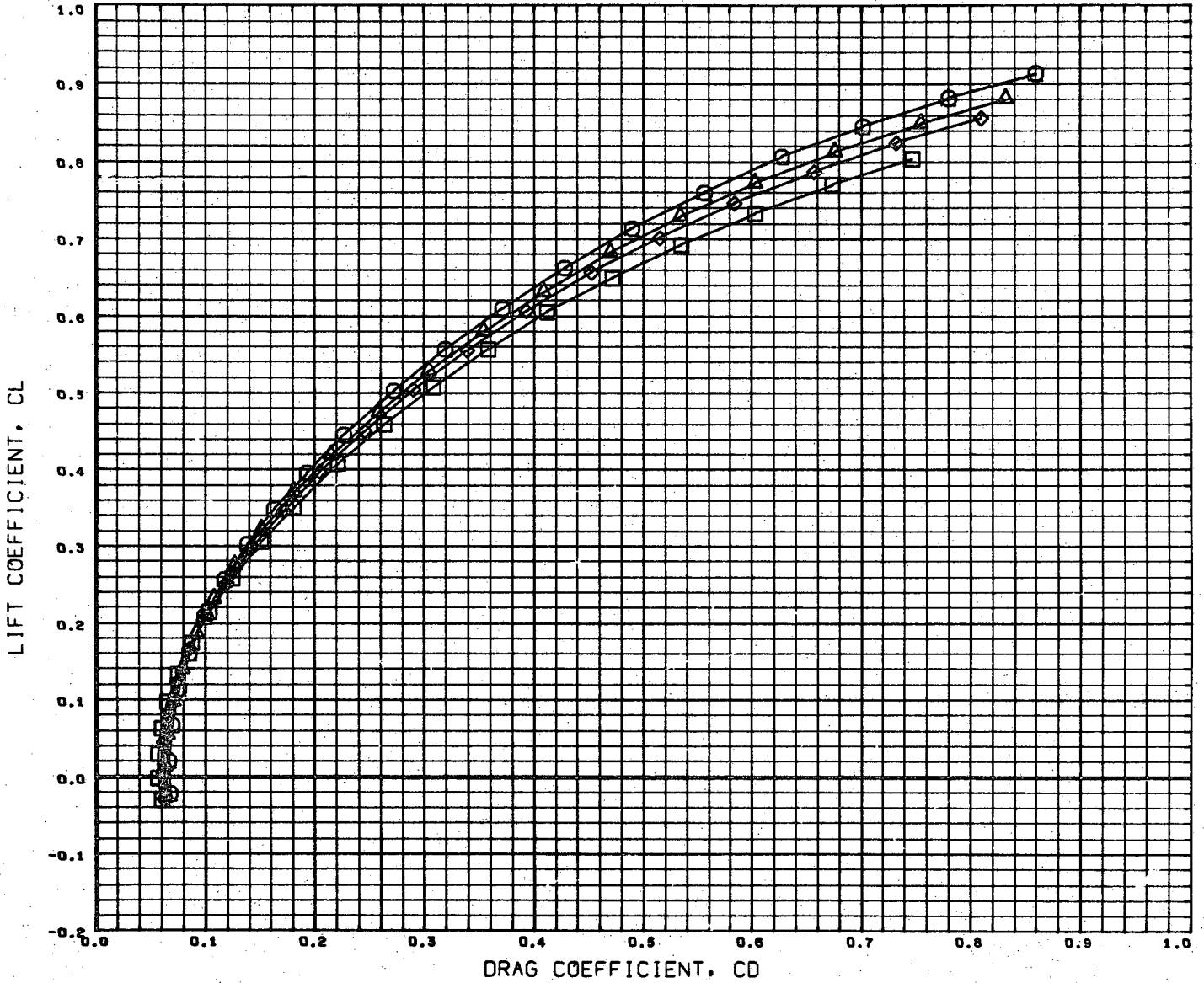
SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	2.990	BETA	0.000	ELEVTR	0.000	SREF	7.8970	SG.IN
△	3.480	AILERN	0.000	LRUDDR	0.000	LREF	5.4530	IN
◇	4.000	RRUDDR	0.000			BREF	3.8170	IN
□	4.959					XMRP	1274.4040	IN.
						YMRP	0.0000	IN.
						ZMRP	391.3004	IN.
						SCALE	0.0034	

DATA HIST. CODE \*6

MSFC 507 GAC H-33 ORB. B5W4V5

(A49S08) 31 MAY 72 PAGE 8

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				

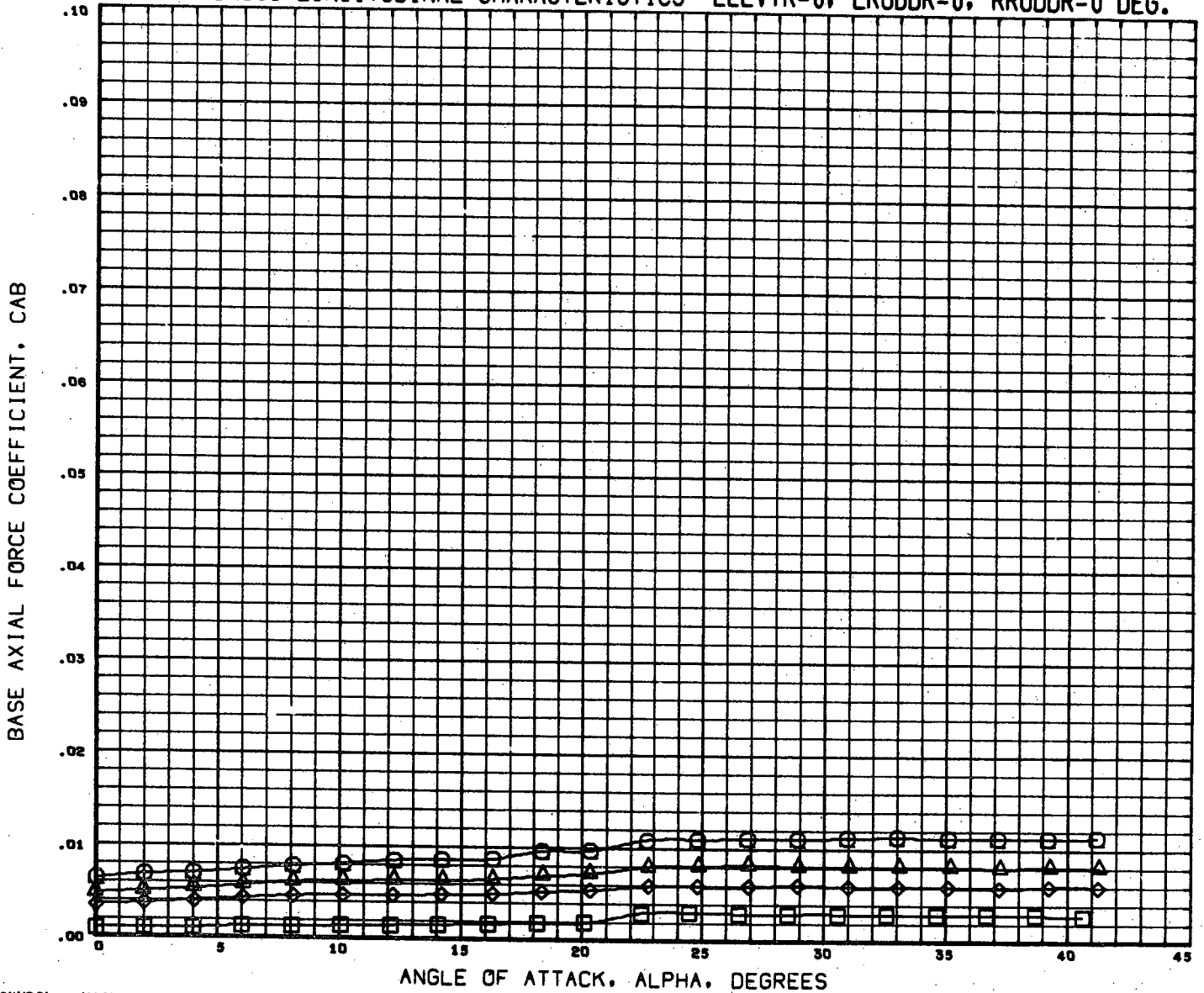
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN.
BREF	3.8170	IN.
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE \*6

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				

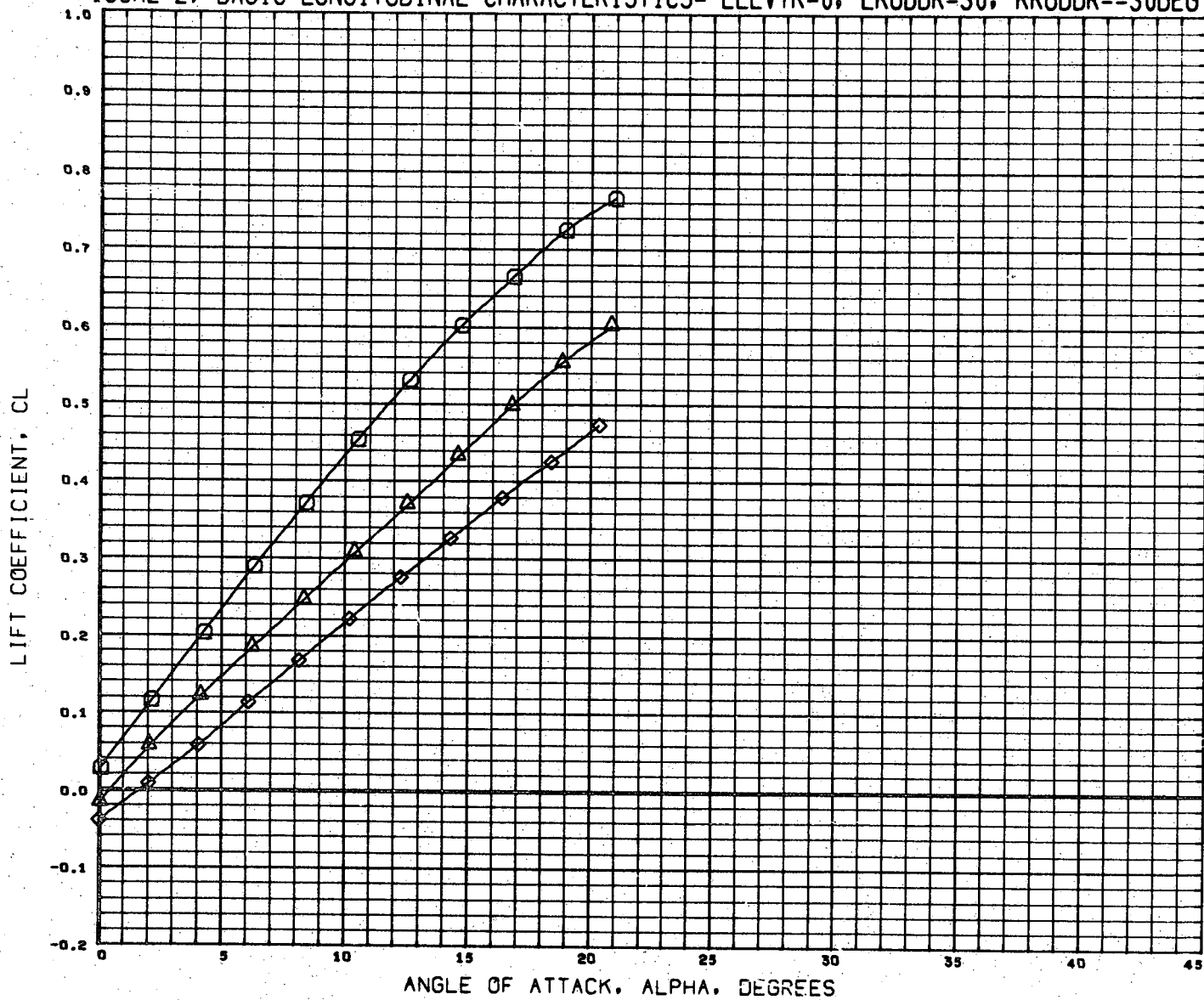
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE #6

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		

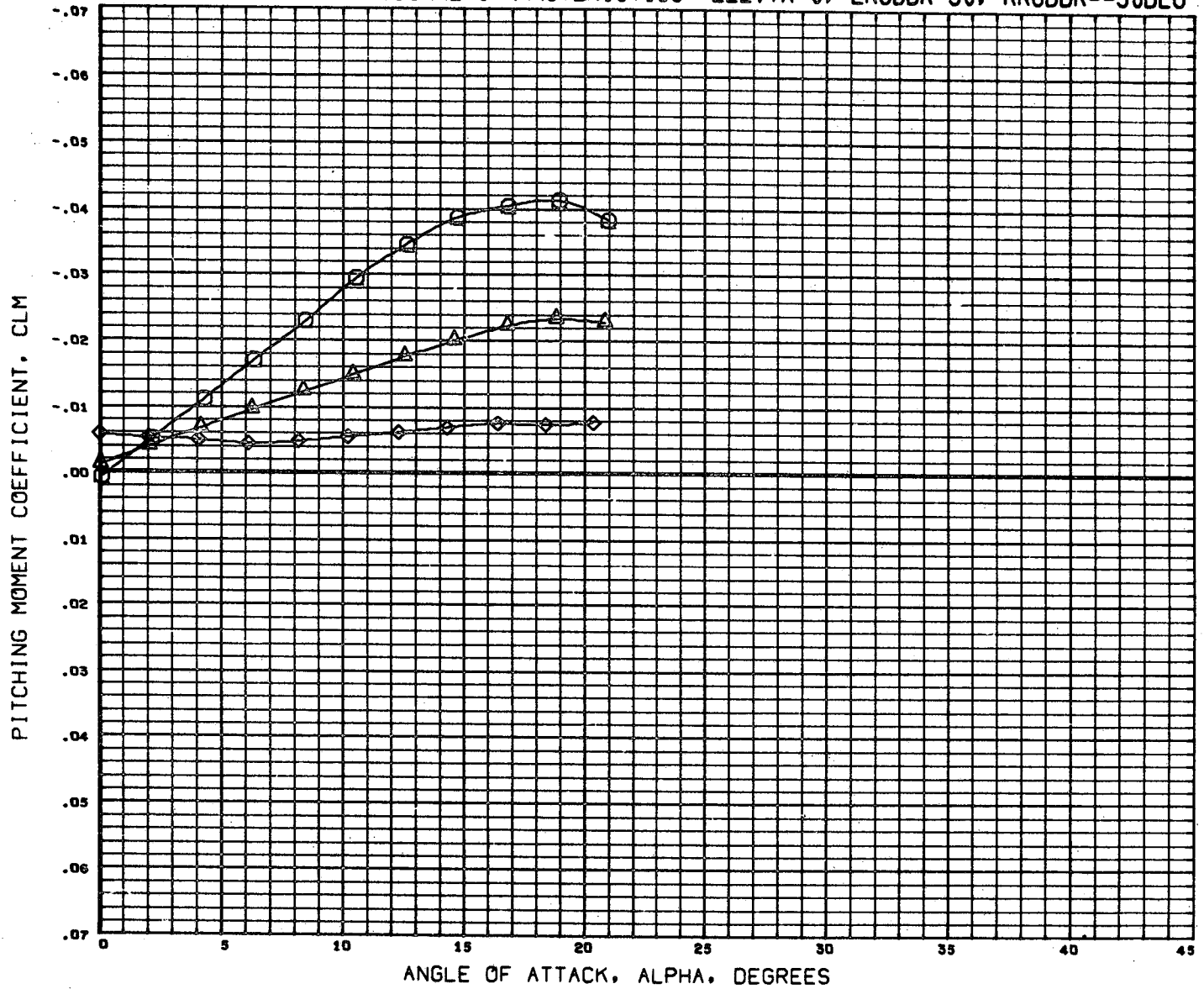
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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		

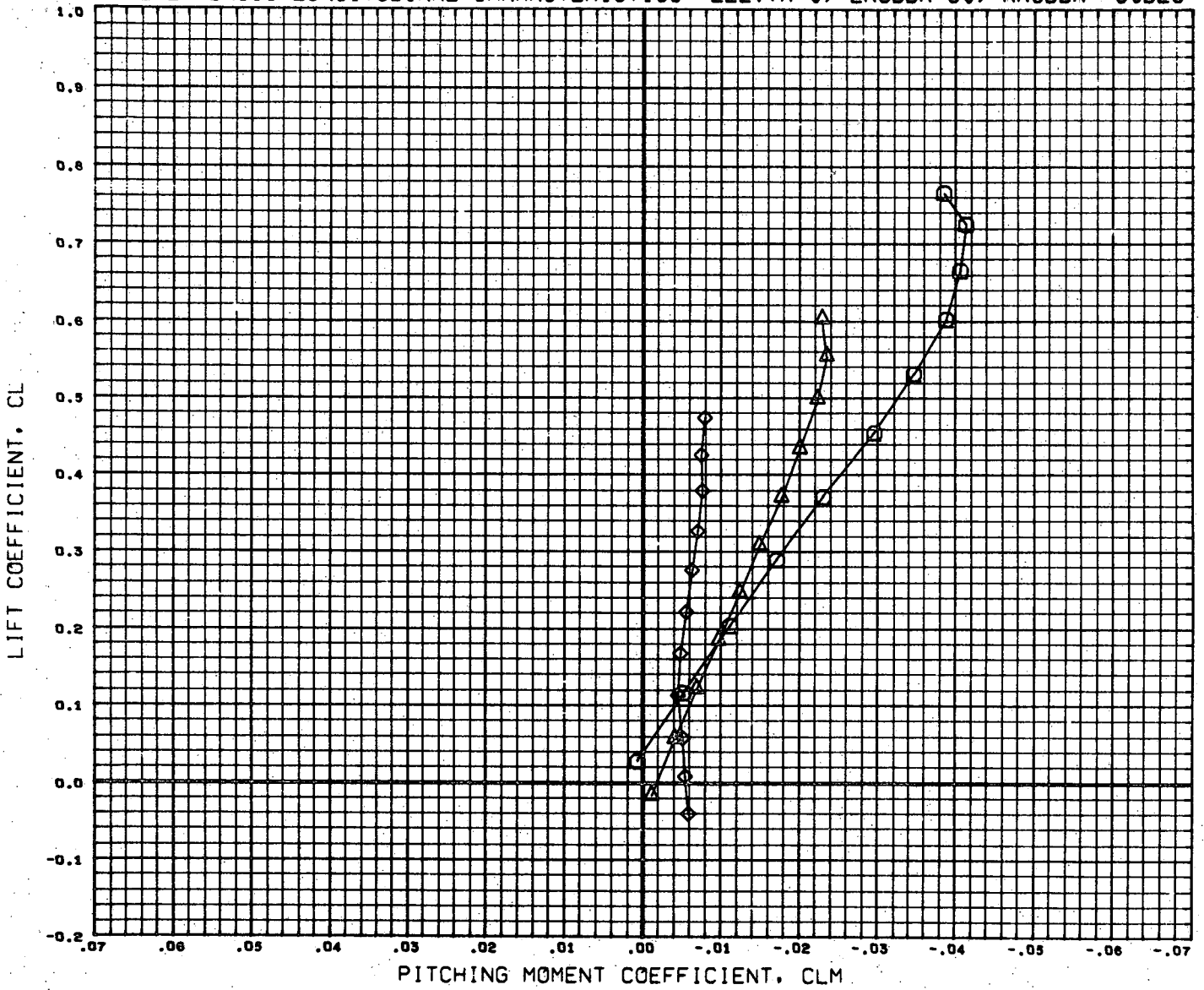
REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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

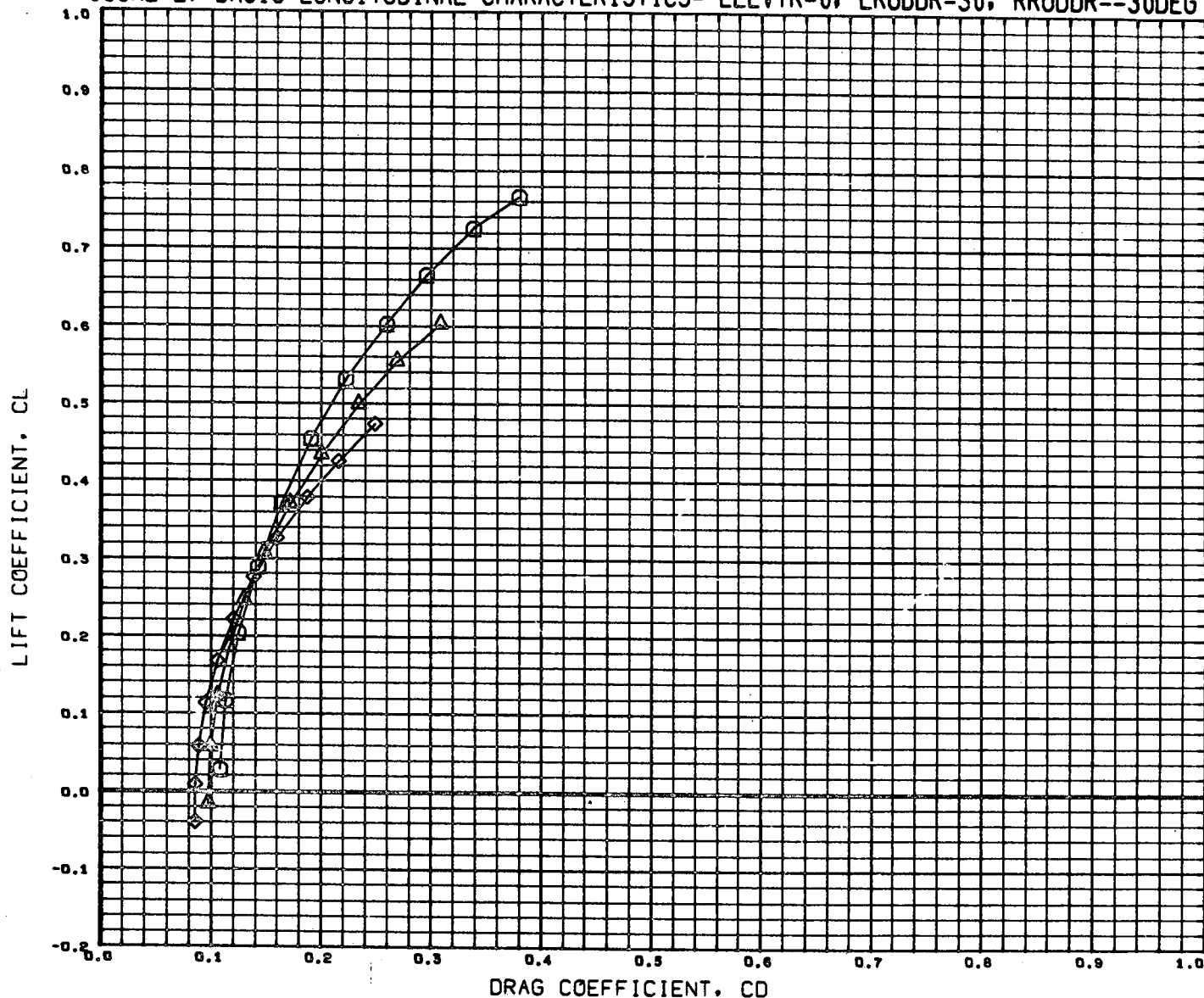


SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	1.466	BETA	0.000	ELEVTR	0.000	SREF	7.8970	SQ. IN.
△	1.953	AILERN	0.000	LRUDDR	30.000	LREF	5.4530	IN.
◇	2.740	RRUDDR	-30.000			BREF	3.8170	IN.
						XMRP	1274.4040	IN.
						YMRP	0.0000	IN.
						ZMRP	391.3004	IN.
						SCALE	0.0034	

REFERENCE FILE AER/T-PT-140



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		

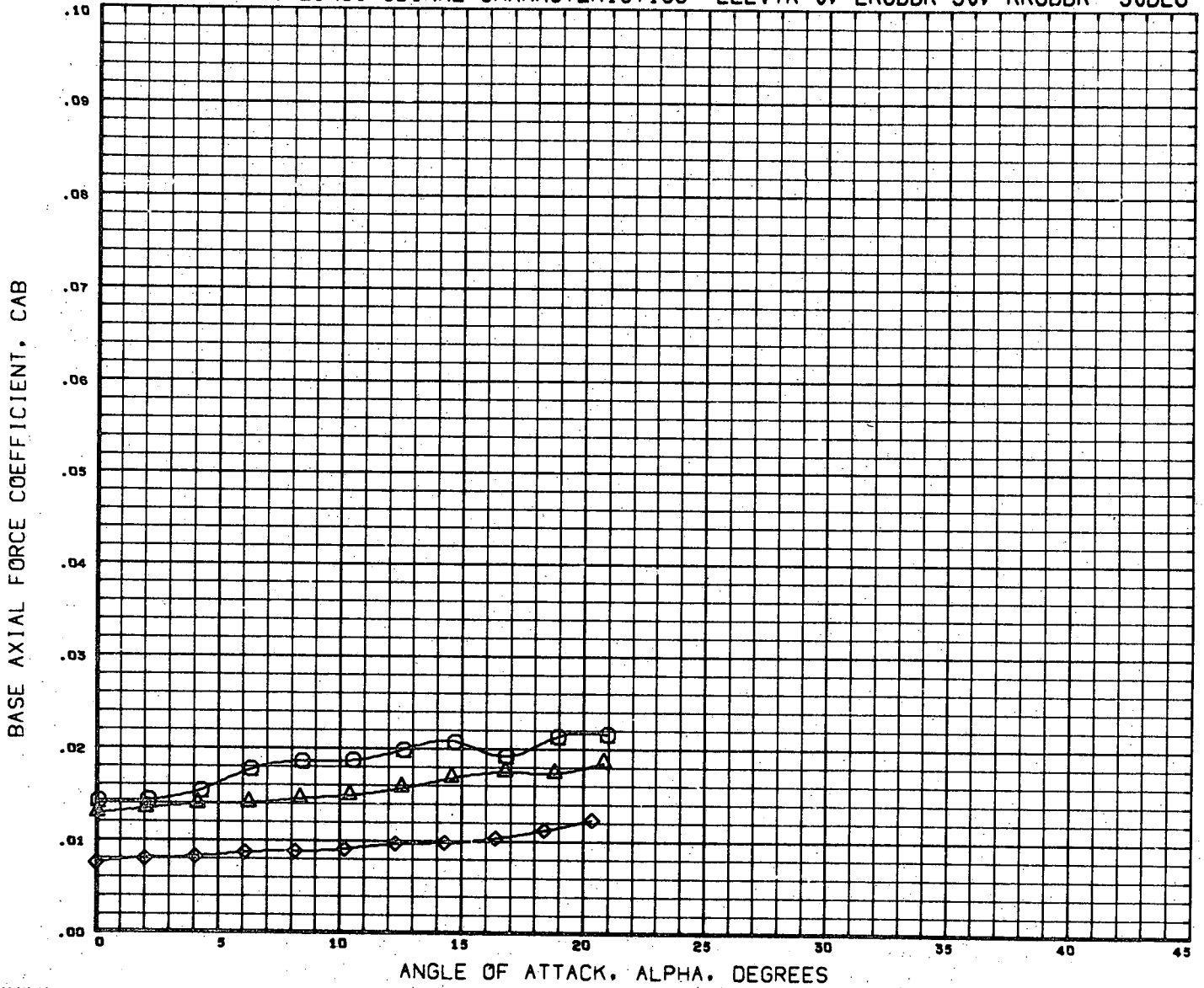
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)

(A49035) 03 MAR 72 PAGE 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	ATLERN	0.000	LRUDDR	30.000
◇	2.740	RRUDDR	-30.000		

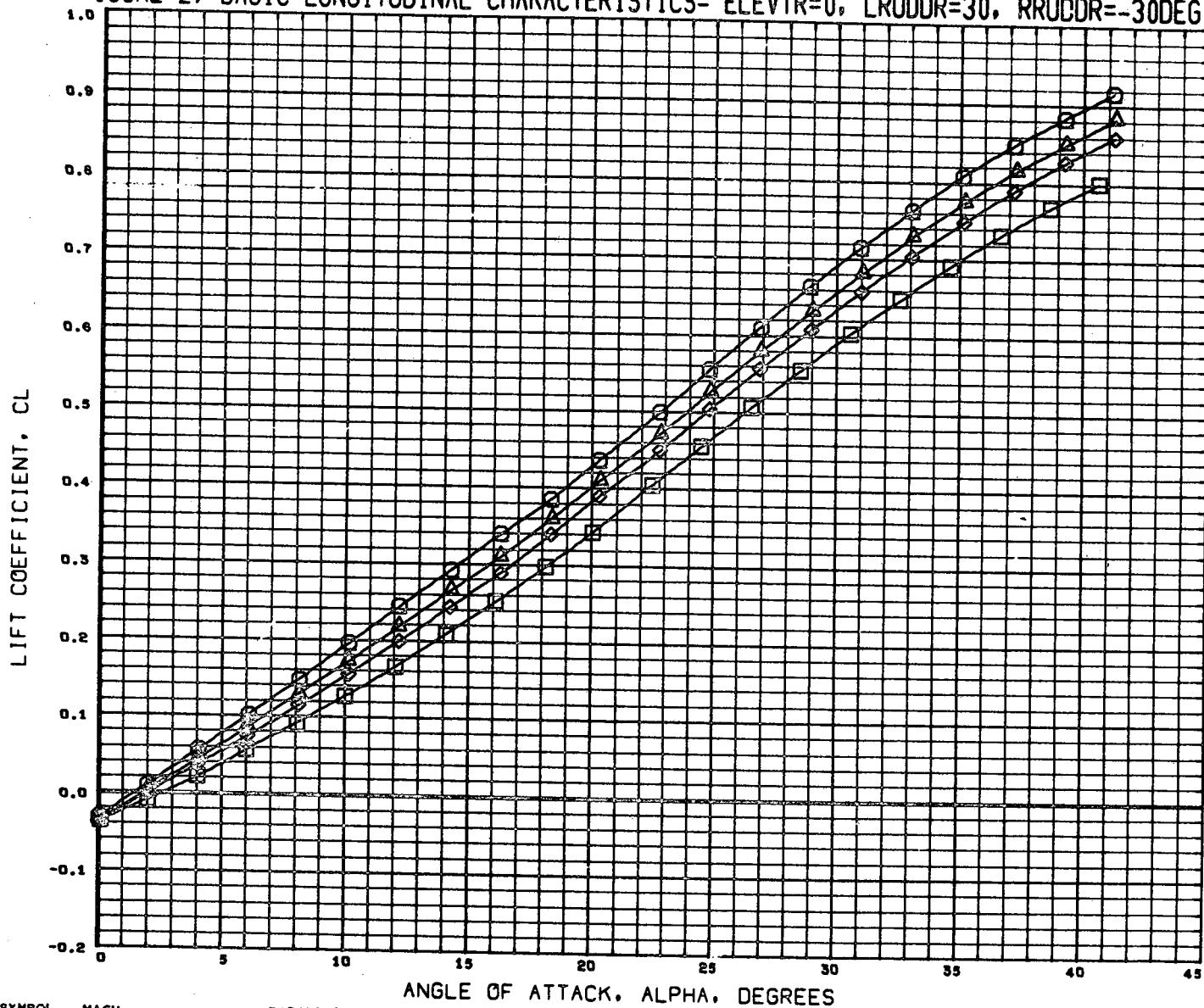
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN.
LREF	5.4530	IN.
BREF	3.8170	IN.
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

REFERENCE FILE AER/T-PT-140

MSFC 507 GAC H-33 ORB. B5W4V5(+30.-30)

(A49035) 03 MAR 72 PAGE 15

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	ATLERN	0.000	LRUDDR	30.000
◇	4.000	RRUDDR	- 30.000		
□	4.959				

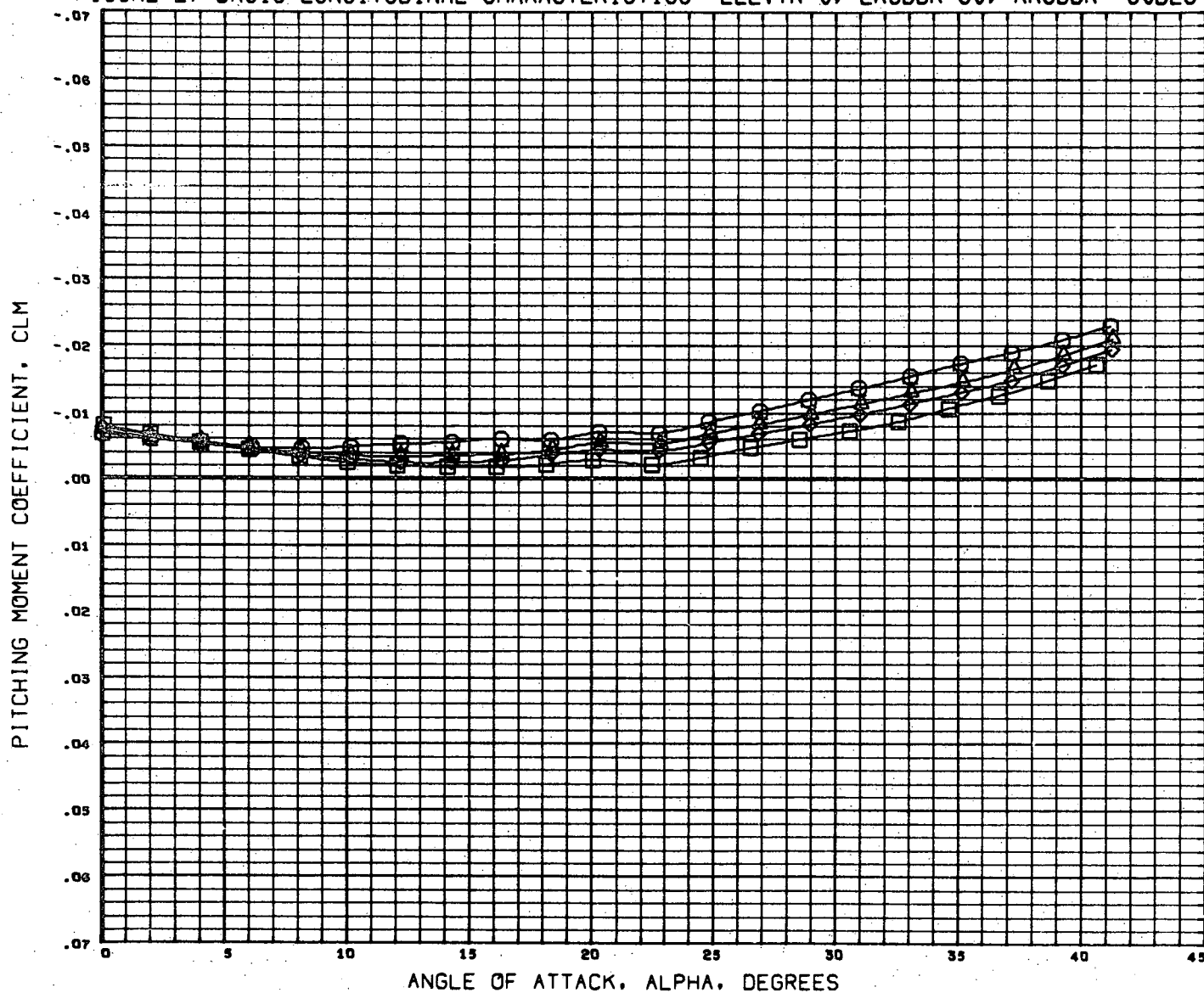
REFERENCE INFORMATION		
SREF	7.8970	50. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE \*6

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



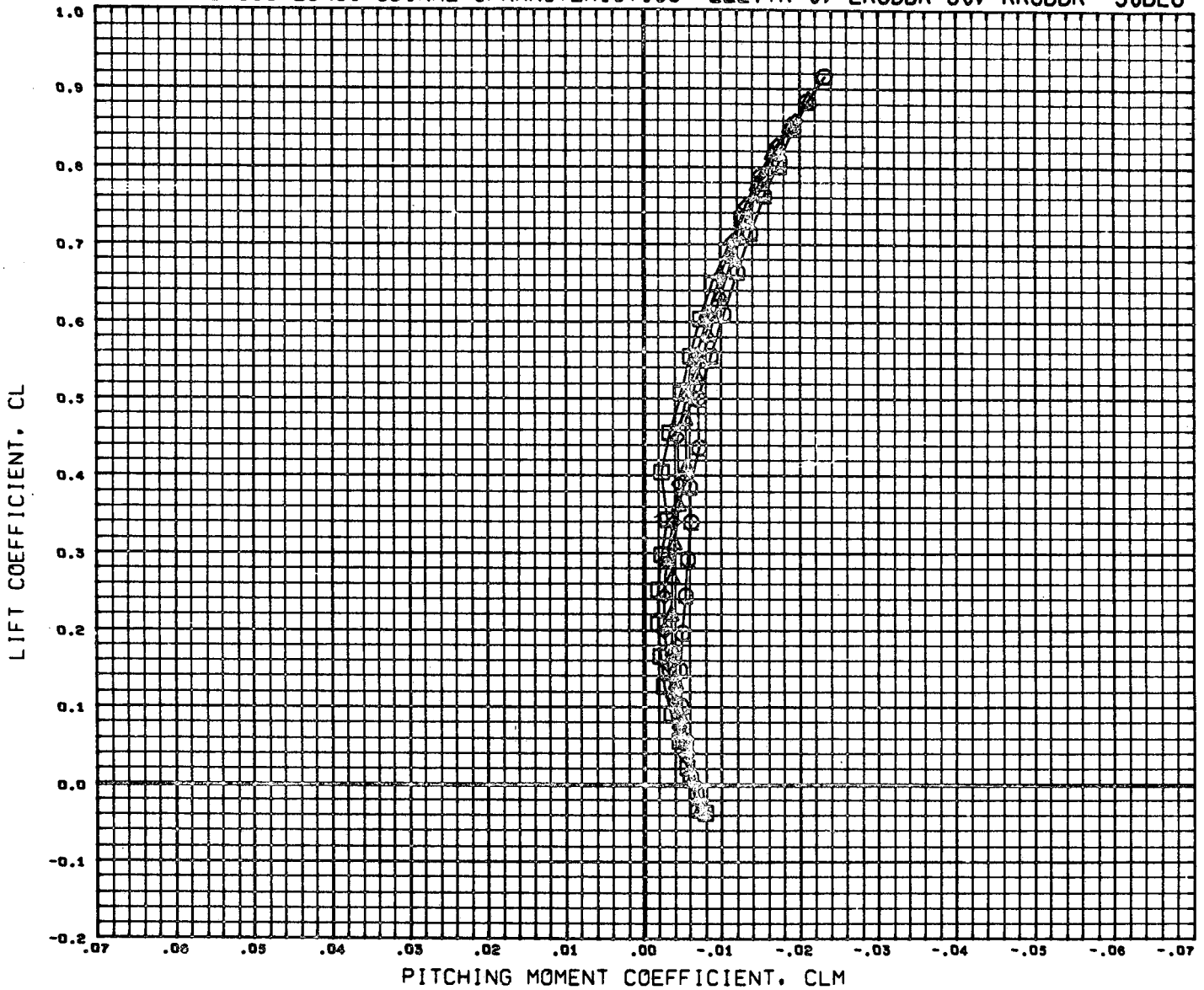
SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	2.990	BETA	0.000	ELEVTR	0.000	SREF	7.8970	SQ. IN
◇	3.480	AILERN	0.000	LRUDDR	30.000	LREF	5.4530	IN
△	4.000	RRUDDR	-30.000			BREF	3.8170	IN
□	4.999					XMRP	1274.4040	IN.
						YMRP	0.0000	IN.
						ZMRP	391.3004	IN.
						SCALE	0.0034	

DATA HIST. CODE \*6

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



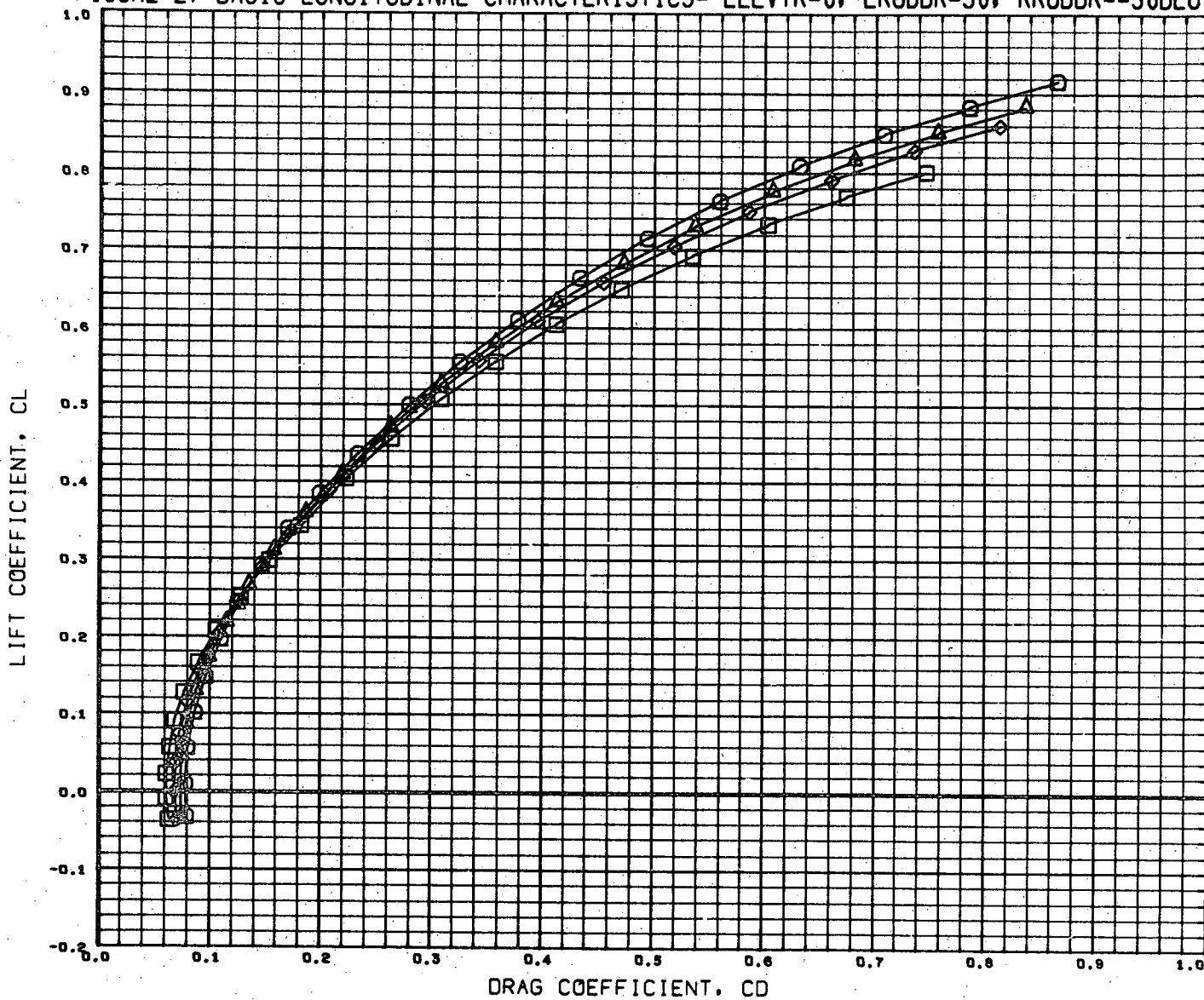
SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	2.990	BETA	0.000	ELEVTR	0.000	SREF	7.8970	SQ. IN
△	3.480	AILERN	0.000	LRUDDR	30.000	LREF	5.4530	IN.
◇	4.000	RRUDDR	- 30.000			BREF	3.8170	IN.
□	4.959					XMRP	1274.4040	IN.
						YMRP	0.0000	IN.
						ZMRP	391.3004	IN.
						SCALE	0.0034	

DATA HIST. CODE \*6

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
△	3.490	AILERN	0.000	LRUDDR	30.000
◇	4.000	RRUDDR	-30.000		
□	4.999				

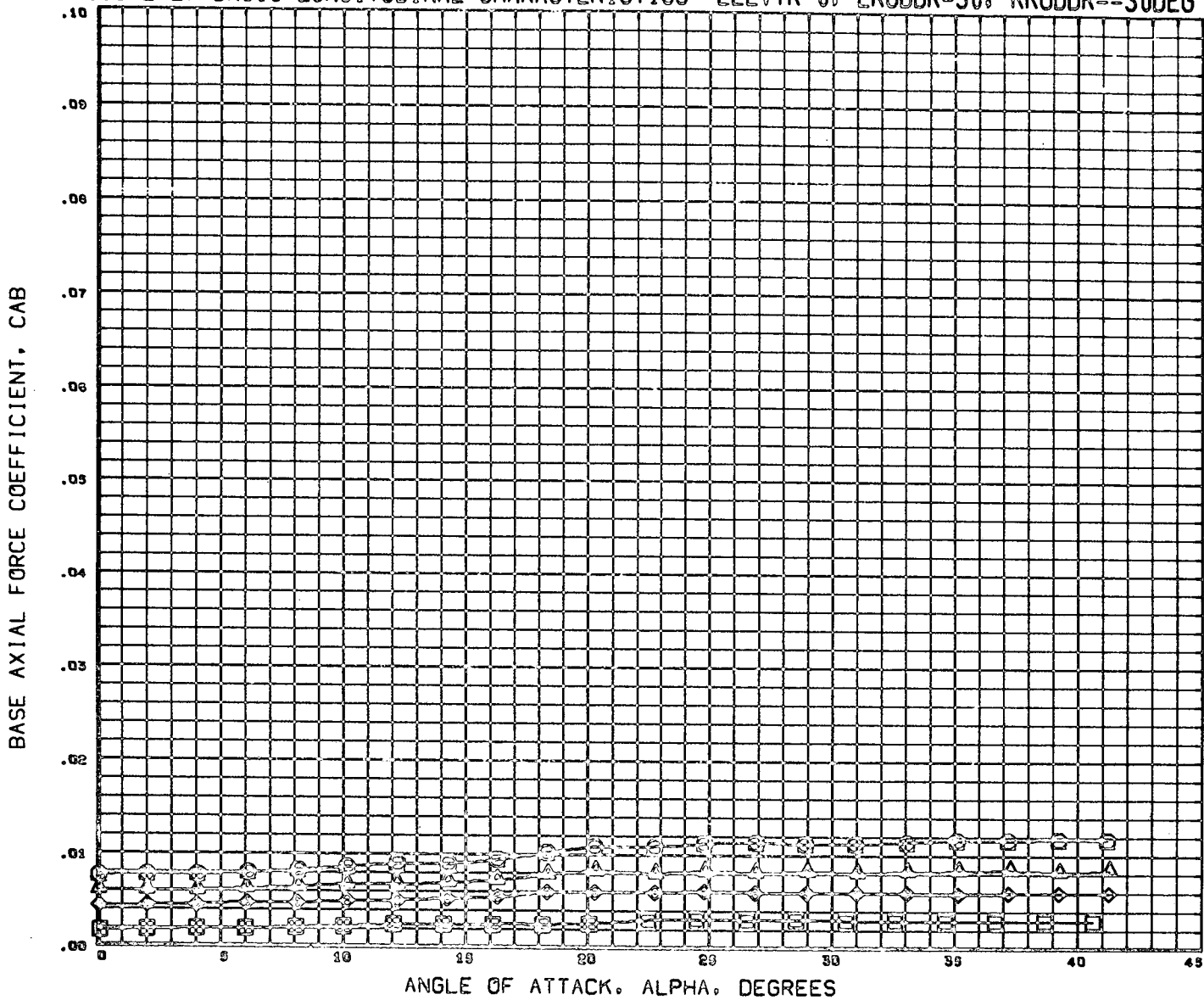
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE \*6

MSFC 507 GAC H-33 ORB. B5W4V5(+30.-30)

(A49S01) 31 MAY 72 PAGE 19

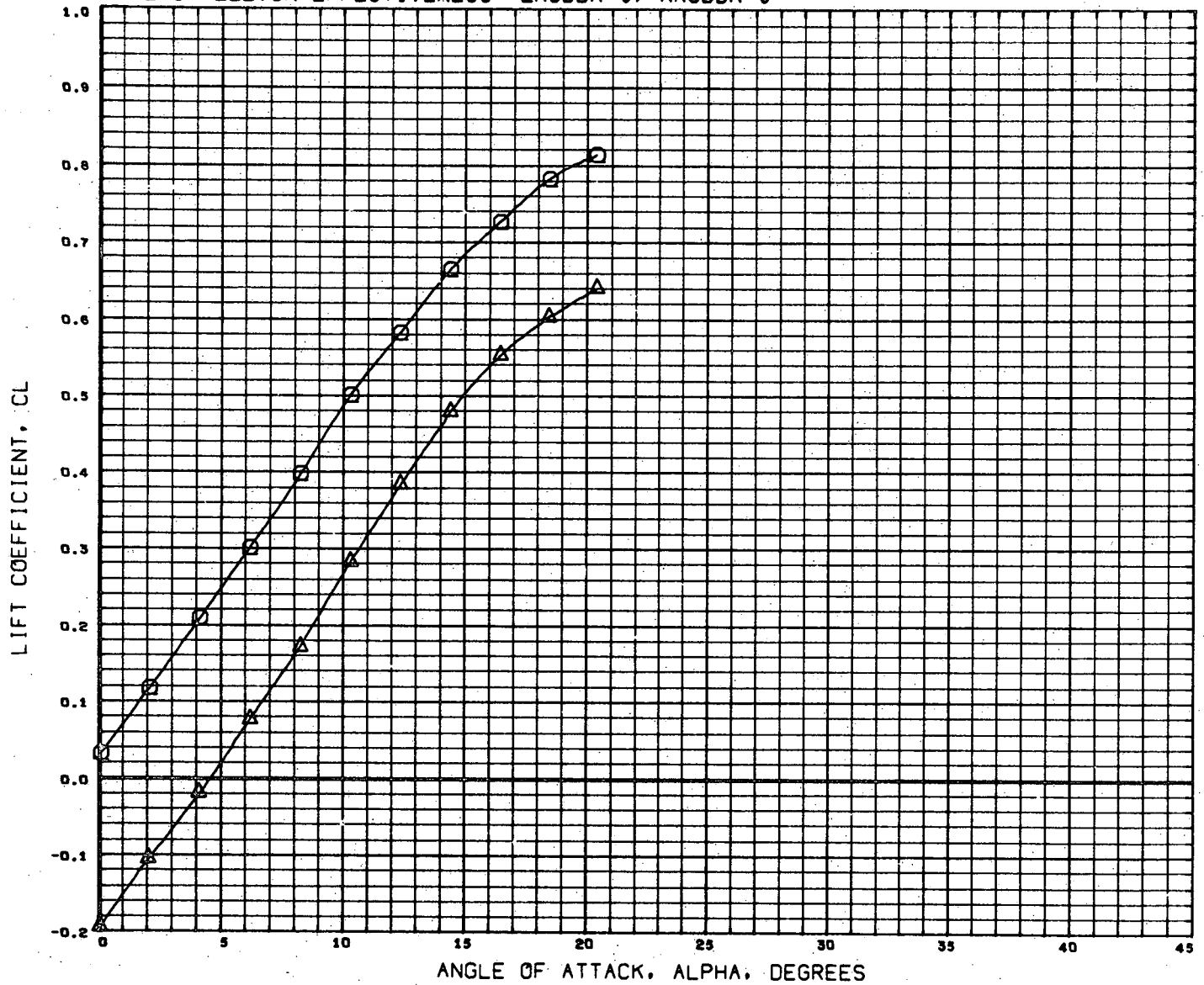
FIGURE 2, BASIC LONGITUDINAL CHARACTERISTICS- ELEVTR=0, LRUDDR=30, RRUDDR=-30DEG



SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	2.990	BETA	0.000	ELEVTR	0.000	SREF	7.6970	SG.IN
△	3.400	AILERN	0.000	LRUDDR	30.000	LREF	5.4930	IN
◇	4.000	RRUDDR	-30.000			BREF	3.6170	IN
□	4.990					XMRP	1274.4040	IN.
						YMRP	0.0000	IN.
						ZMRP	391.3004	IN.
						SCALE	0.0034	

DATA HIST. CODE 06

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49038) ○	MSFC 307 GAC H-33 ORB. B5W4V5
(A49039) △	MSFC 307 GAC H-33 ORB. B5W4(-10)V5

BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

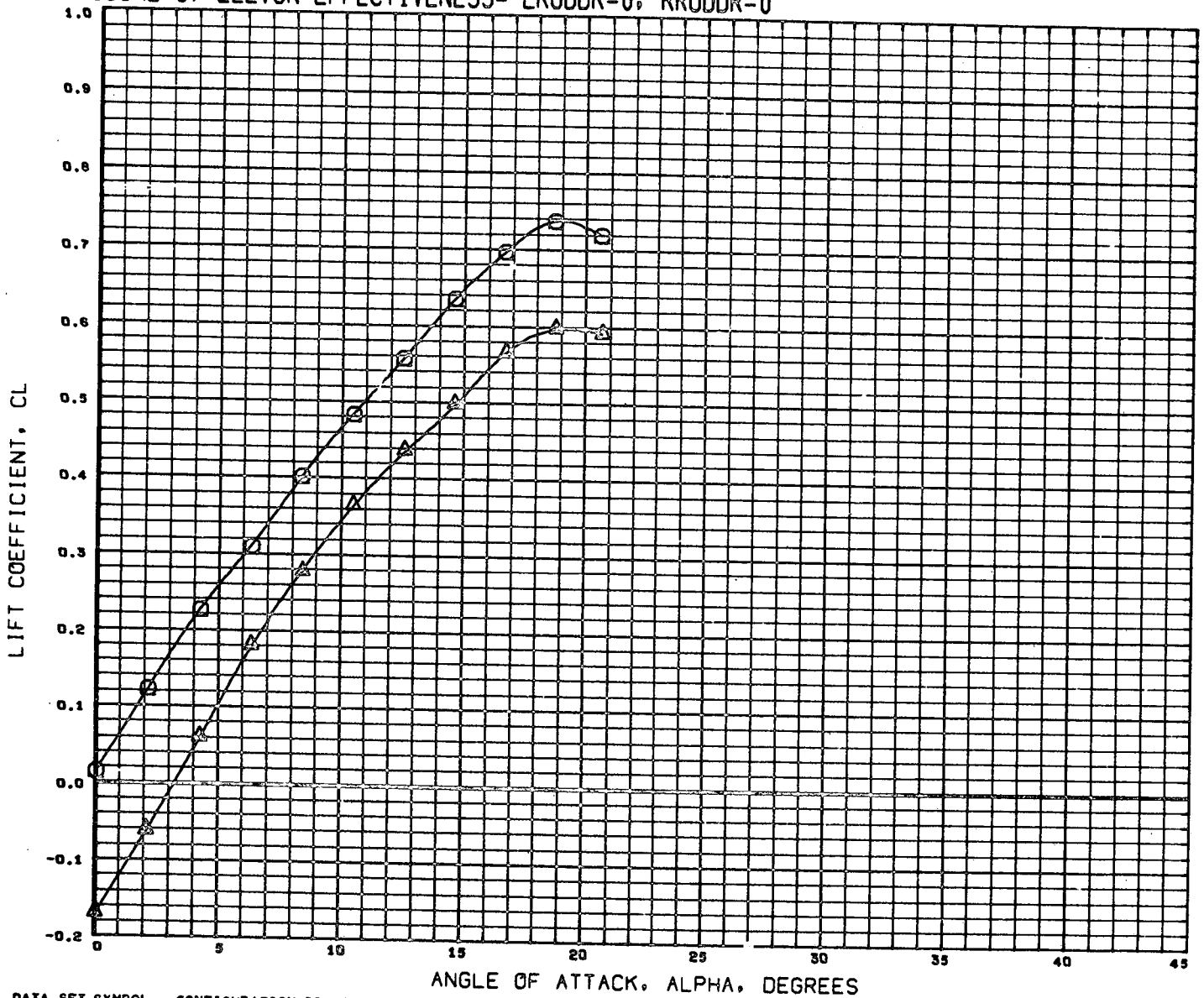
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH .60

PAGE 21



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



DATA SET SYMBOL    CONFIGURATION DESCRIPTION  
 (A49038)     $\bigcirc$     NSFC 507 GAC H-33 ORB, B5W4V5  
 (A49039)     $\triangle$     NSFC 507 GAC H-33 ORB, B5W4(-10)V5

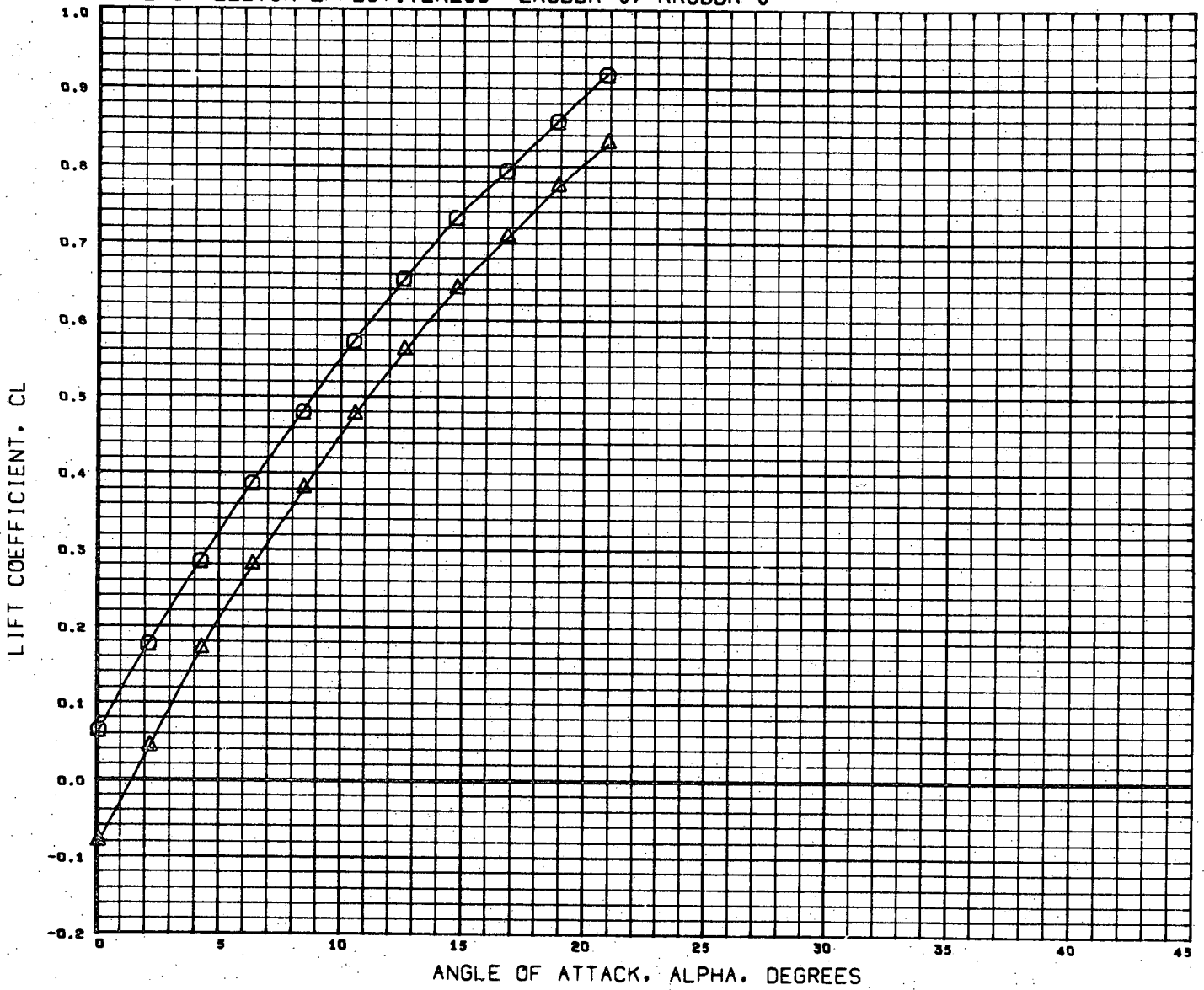
BETA    ELEVTR    AILERN  
 0.000    0.000    0.000  
 0.000    -10.000    0.000

REFERENCE INFORMATION  
 SREF    7.8970    SQ. IN  
 LREF    5.4530    IN  
 BREF    3.6170    IN  
 XMRP    1274.4040    IN.  
 YMRP    0.0000    IN.  
 ZMRP    391.3004    IN.  
 SCALE    0.0034

MACH    .90

PAGE    22

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49038)	MSFC 307 GAC H-33 ORB, B5W4V5
(A49039)	MSFC 307 GAC H-33 ORB, B5W4(-10)V5

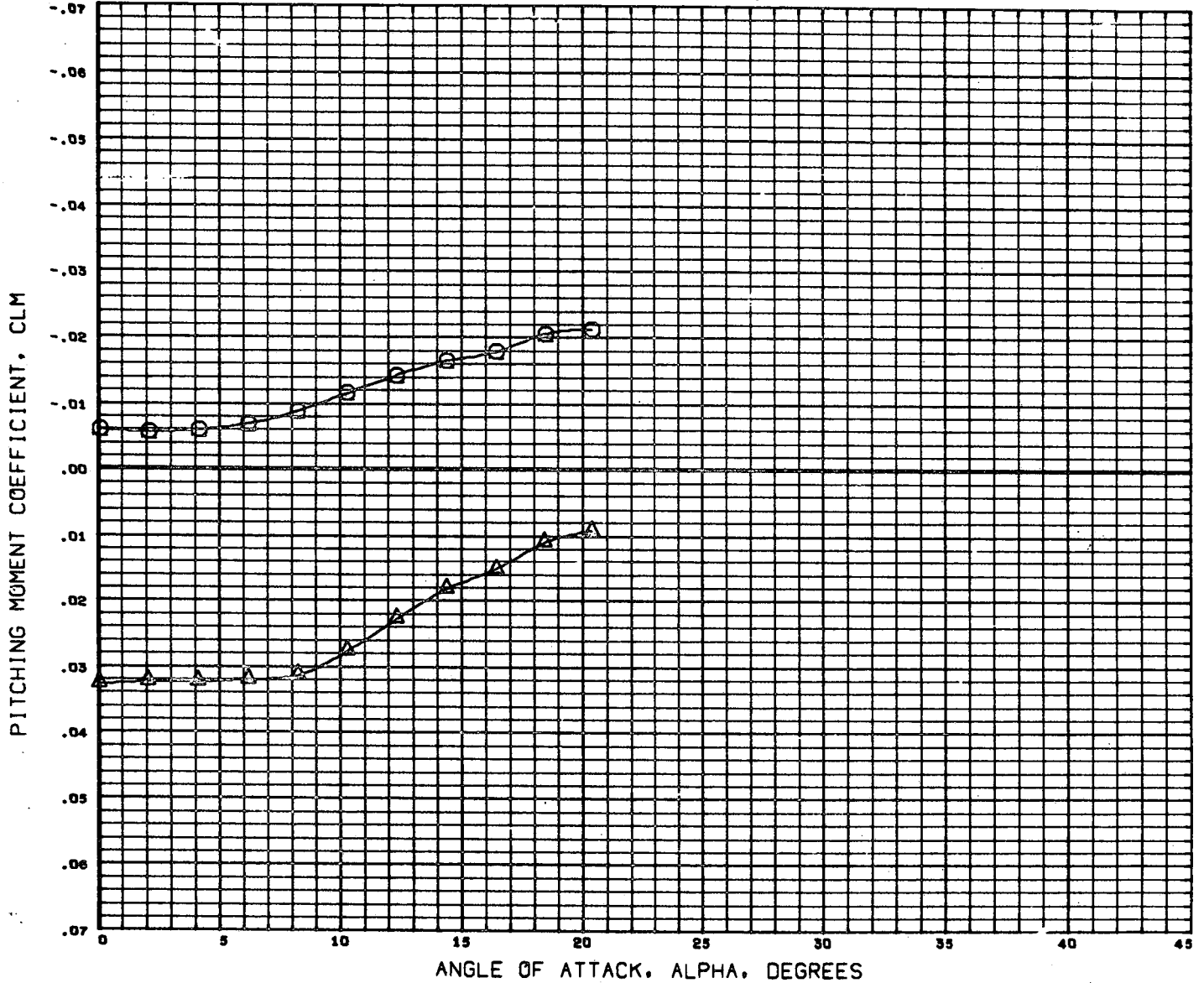
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

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	0.0334	

MACH 1.20

PAGE 23

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49038) ○	MSFC 307 GAC H-33 ORB. B5W4V5
(A49039) △	MSFC 307 GAC H-33 ORB. B5W4(-10)V5

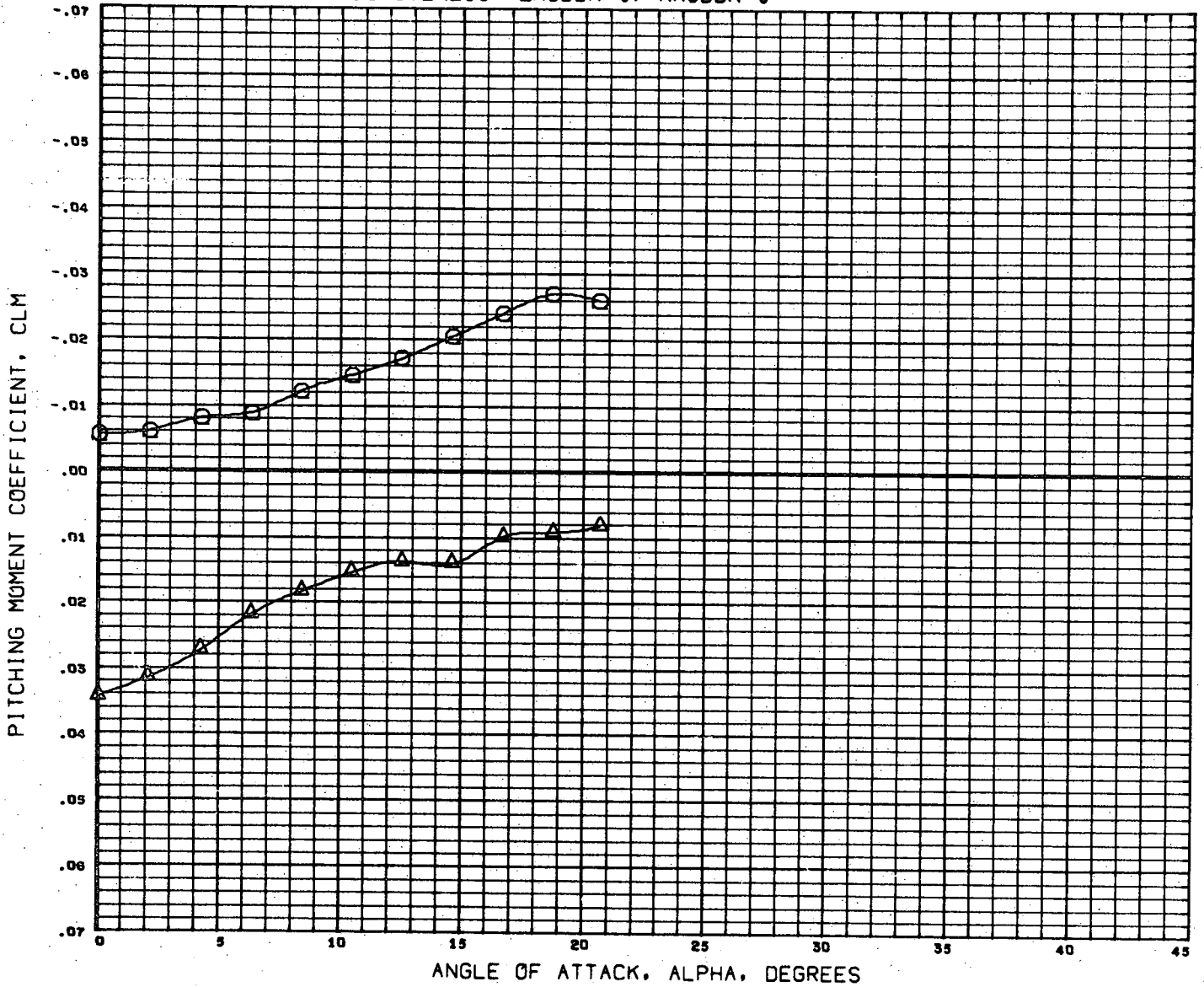
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XM RP	1274.4040	IN.
YM RP	0.0000	IN.
ZM RP	391.3004	IN.
SCALE	0.0034	

MACH .60

PAGE 24

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

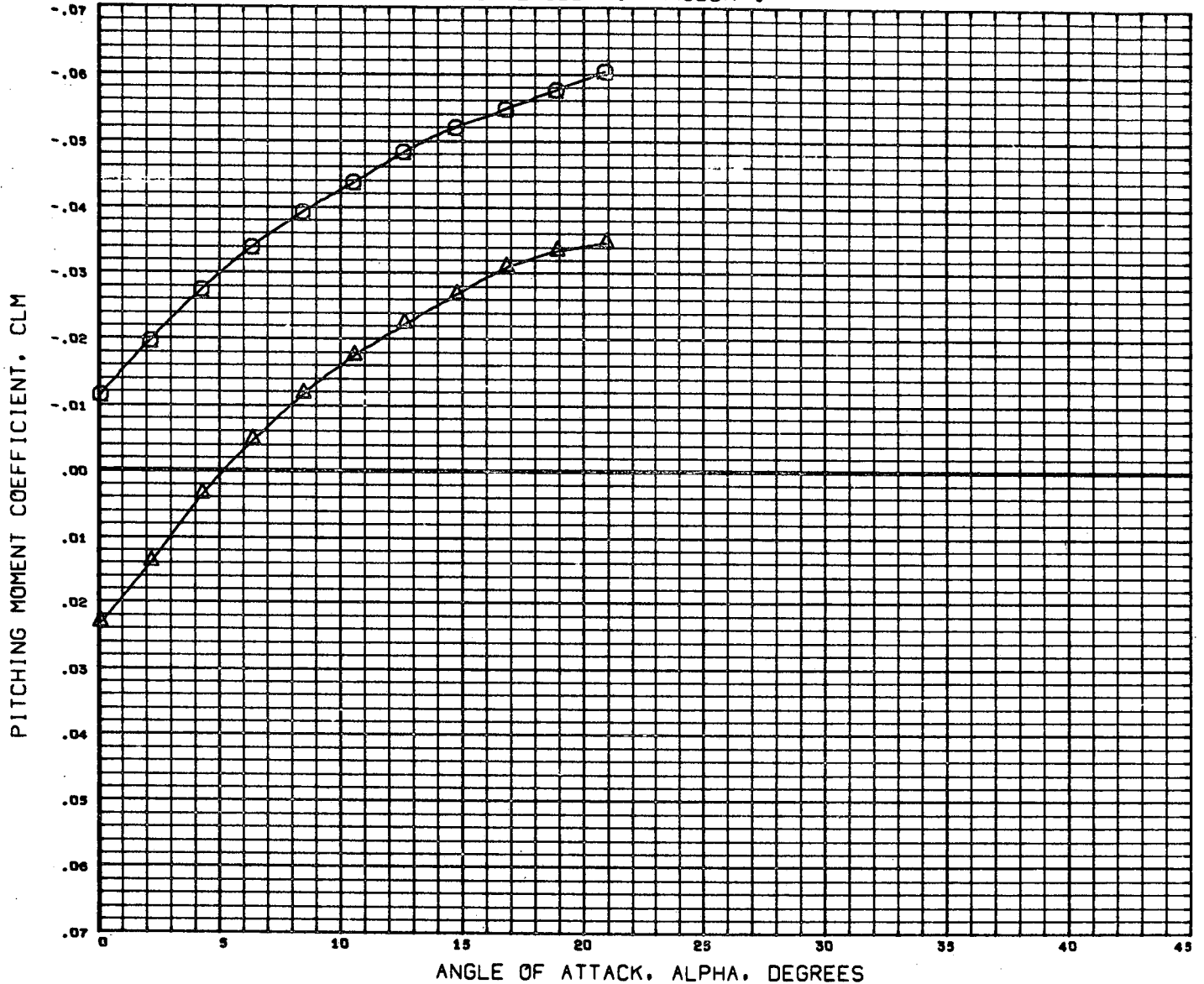
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

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 .90

PAGE 25

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49038)	MSFC 507 GAC H-33 ORB, B5W4V3
(A49039)	MSFC 507 GAC H-33 ORB, B5W4(-10)V5

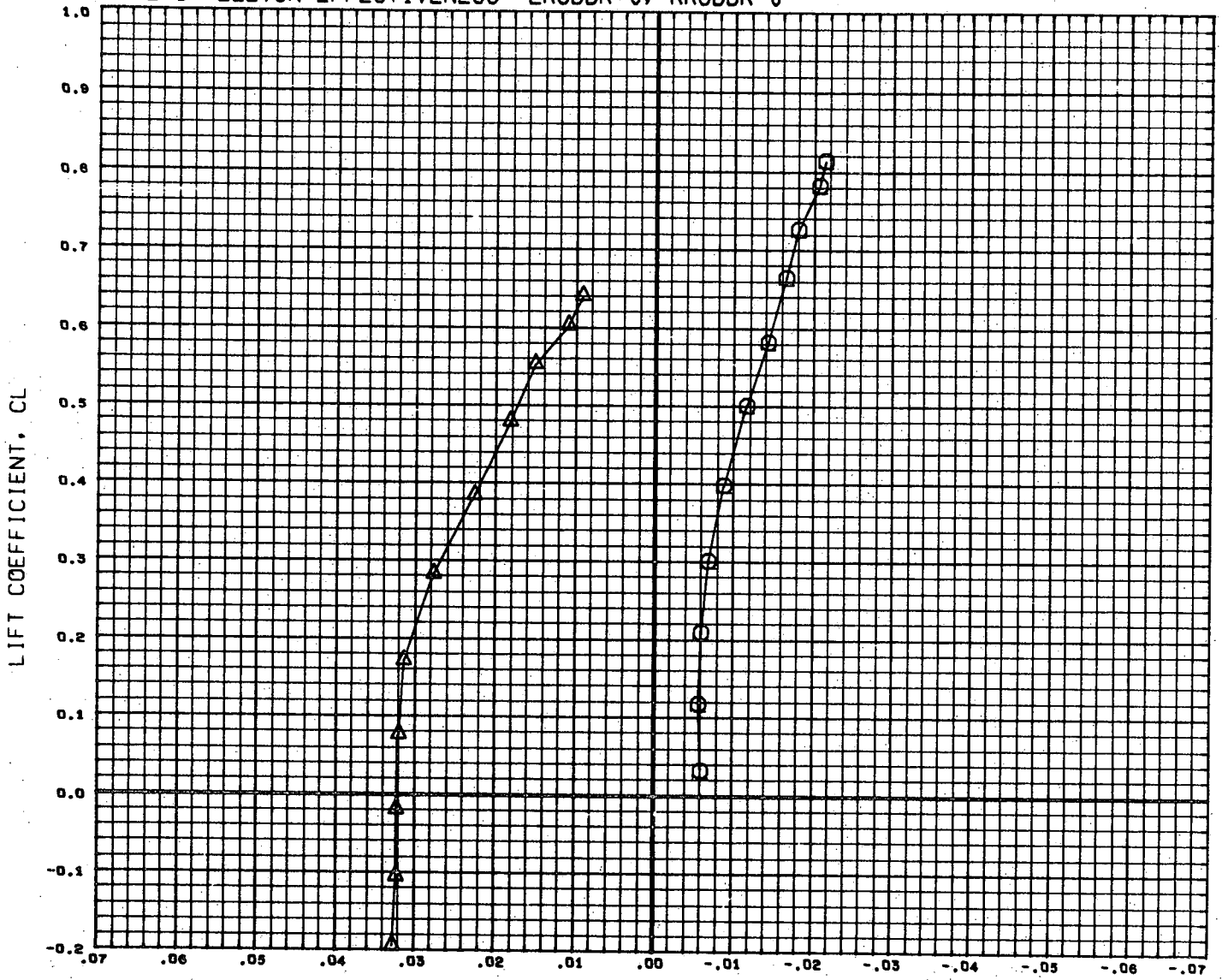
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

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 1.20

PAGE 26

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



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

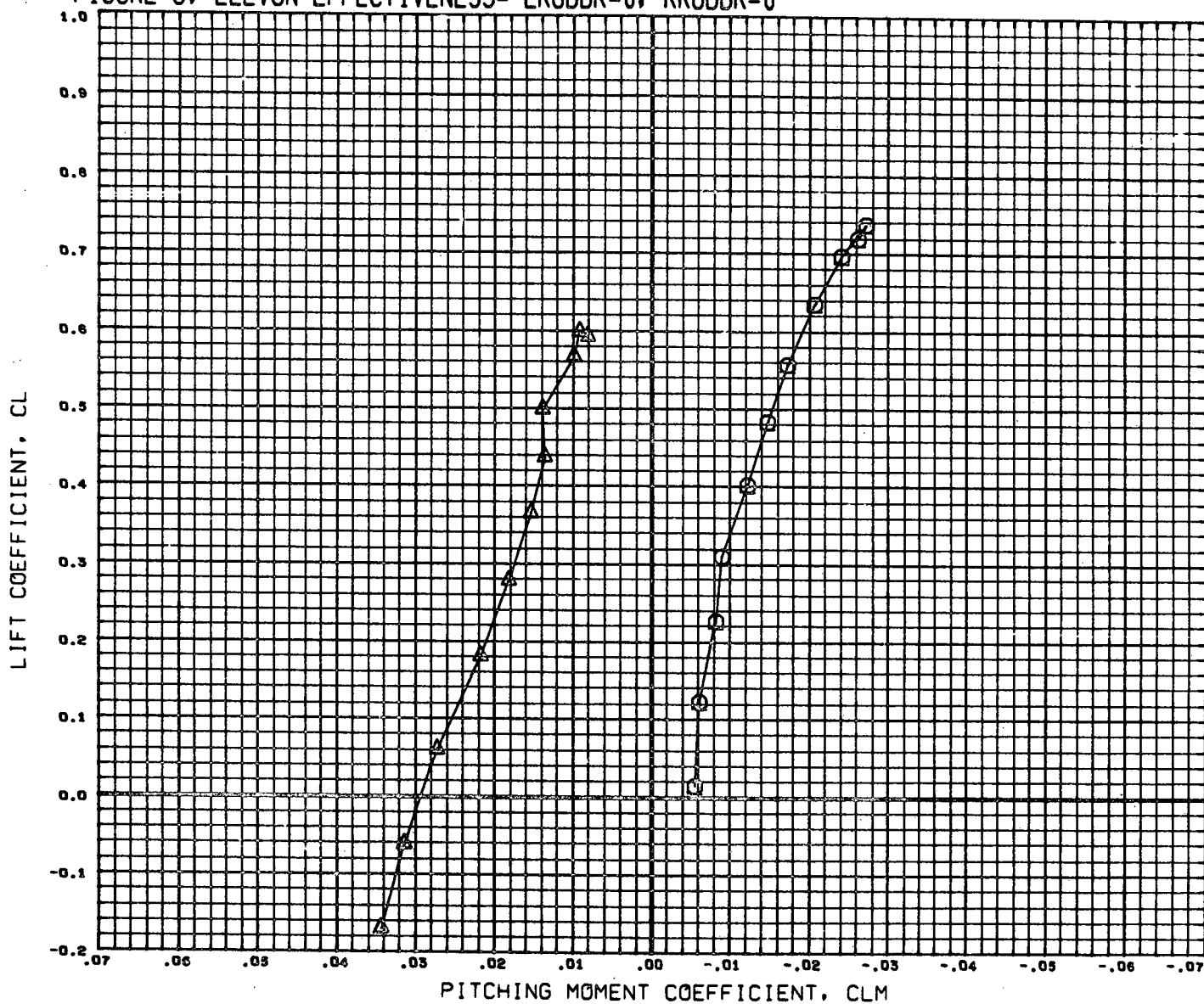
BETA 0.000 0.000 ELEVTR 0.000 -10.000 AILERN 0.000 0.000

REFERENCE INFORMATION  
 SREF 7.8970 SQ. IN  
 LREF 5.4530 IN  
 BREF 3.6170 IN  
 XMRP 1274.4040 IN.  
 YMRP 0.0000 IN.  
 ZMRP 391.3004 IN.  
 SCALE 0.0034

MACH .60

PAGE 27

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49038) ○	MSFC 507 GAC H-33 ORB. B9W4V5
(A49039) △	MSFC 507 GAC H-33 ORB. B9W4(-10)V5

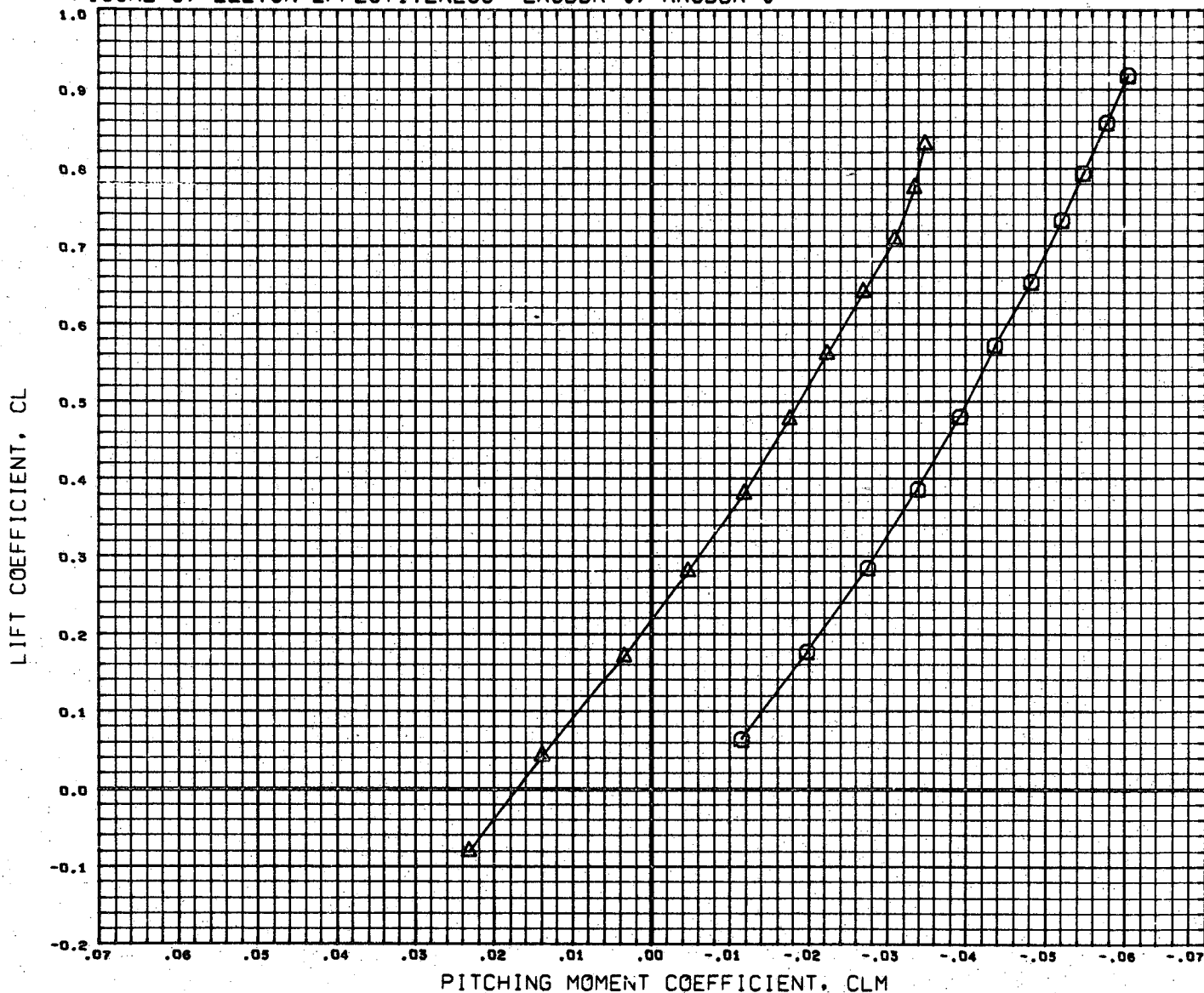
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

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

PAGE 28

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

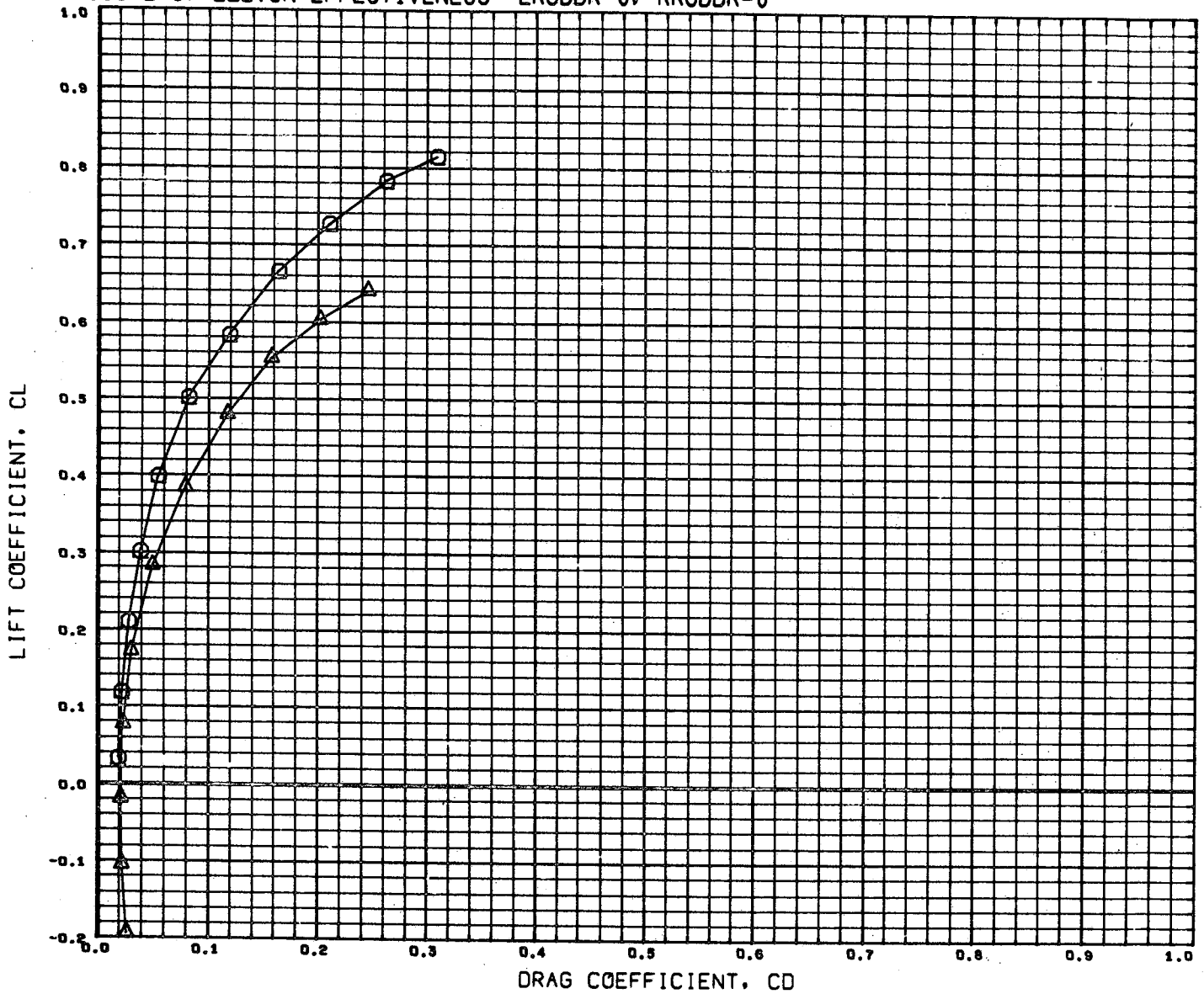
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 1.20

PAGE 29



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

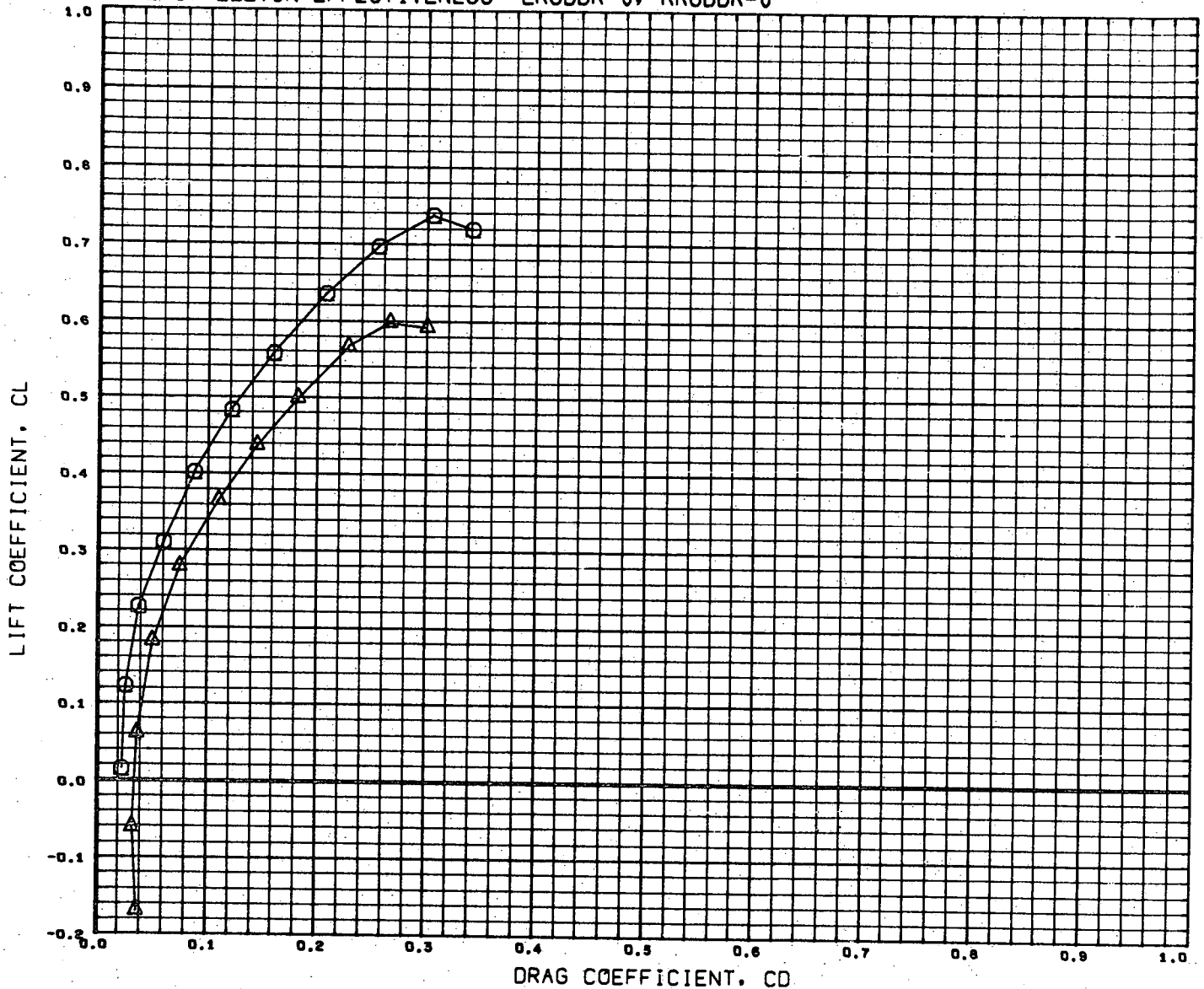
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

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

PAGE 30

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

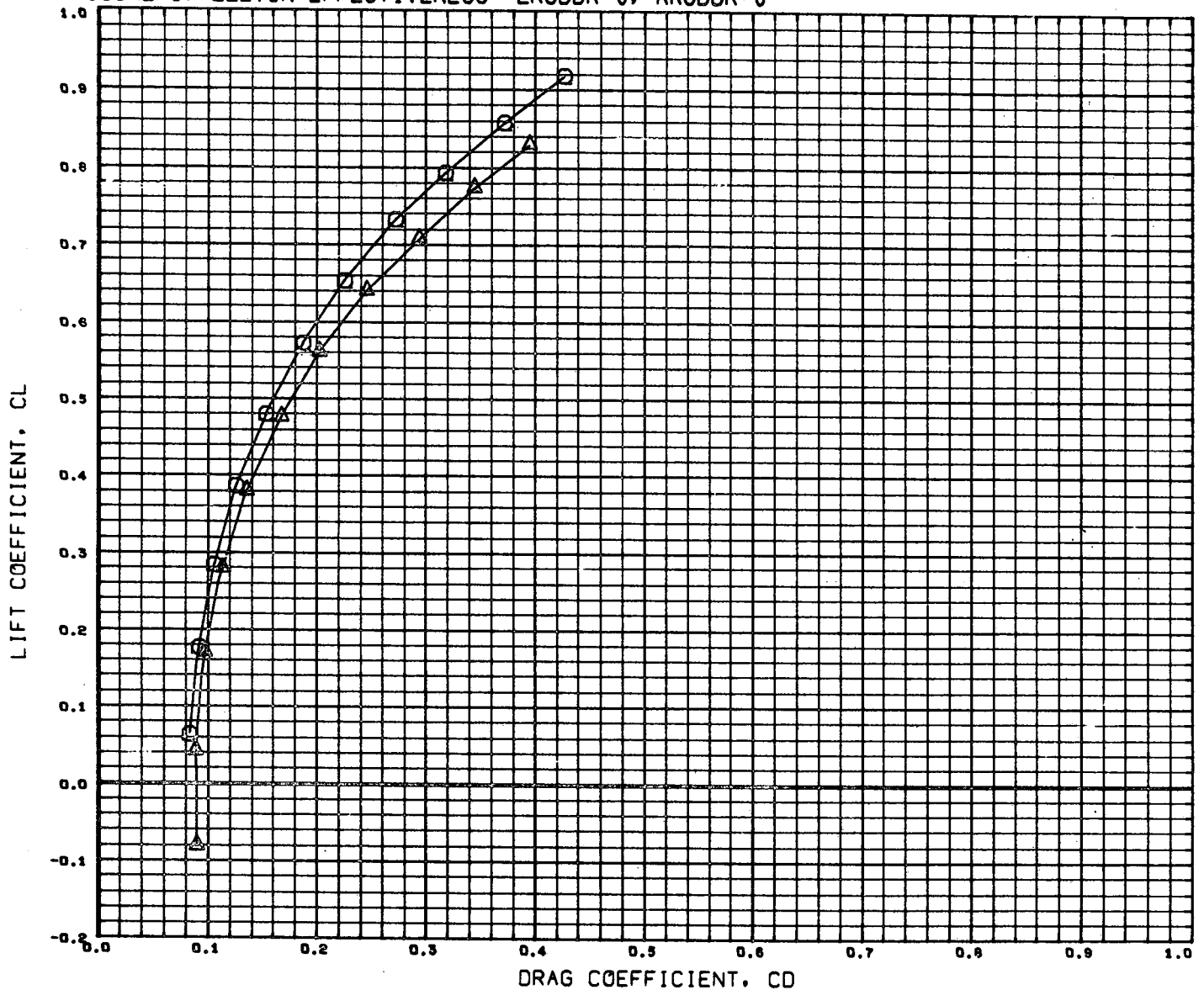
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

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

PAGE 31

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49038) ○	MSFC 507 GAC H-33 ORB. B3W4V5
(A49039) △	MSFC 507 GAC H-33 ORB. B3W4(-10)V5

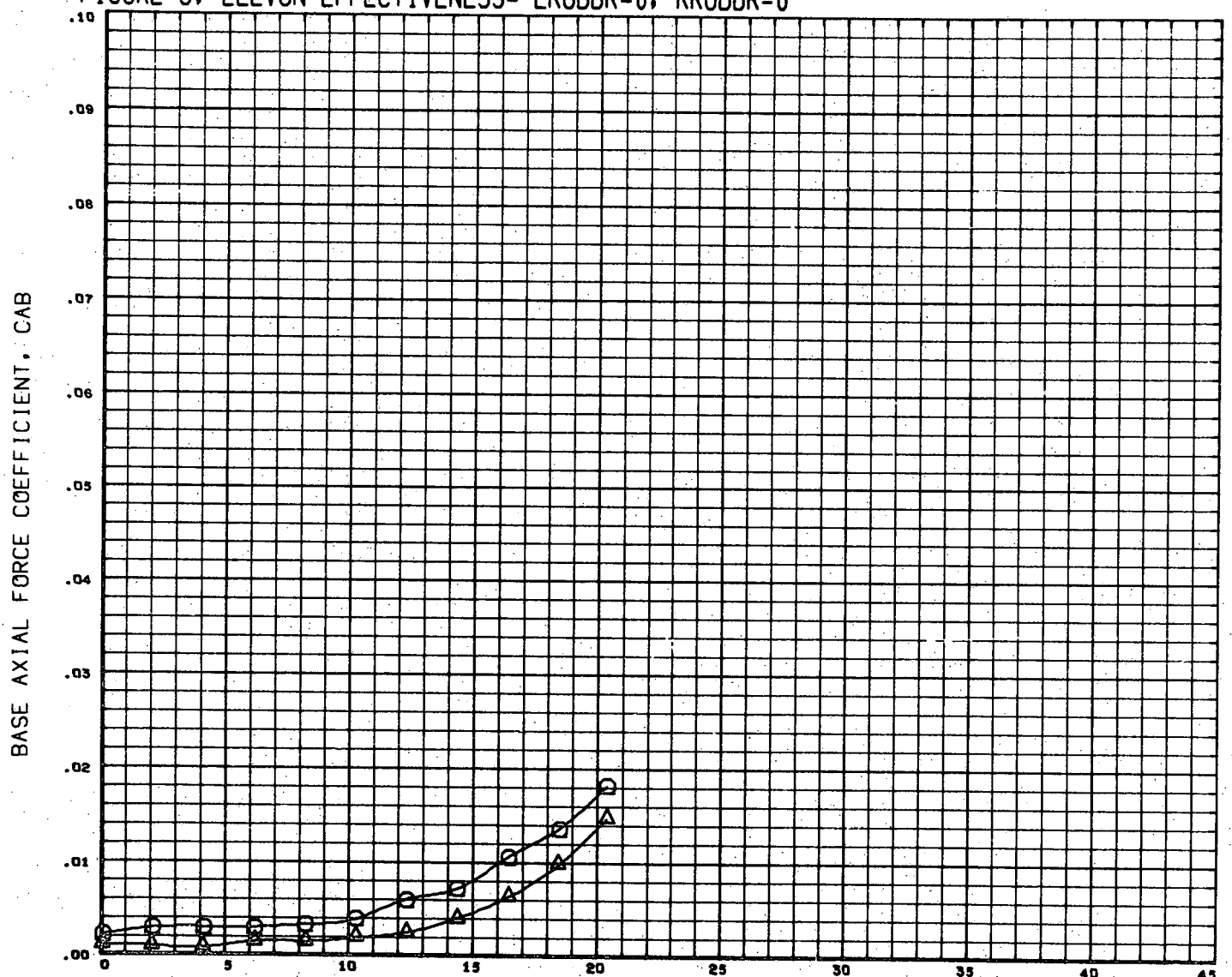
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRF	1274.4040	IN.
YMRF	0.0000	IN.
ZMRF	391.3004	IN.
SCALE	0.0034	

MACH 1.20

PAGE 32

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



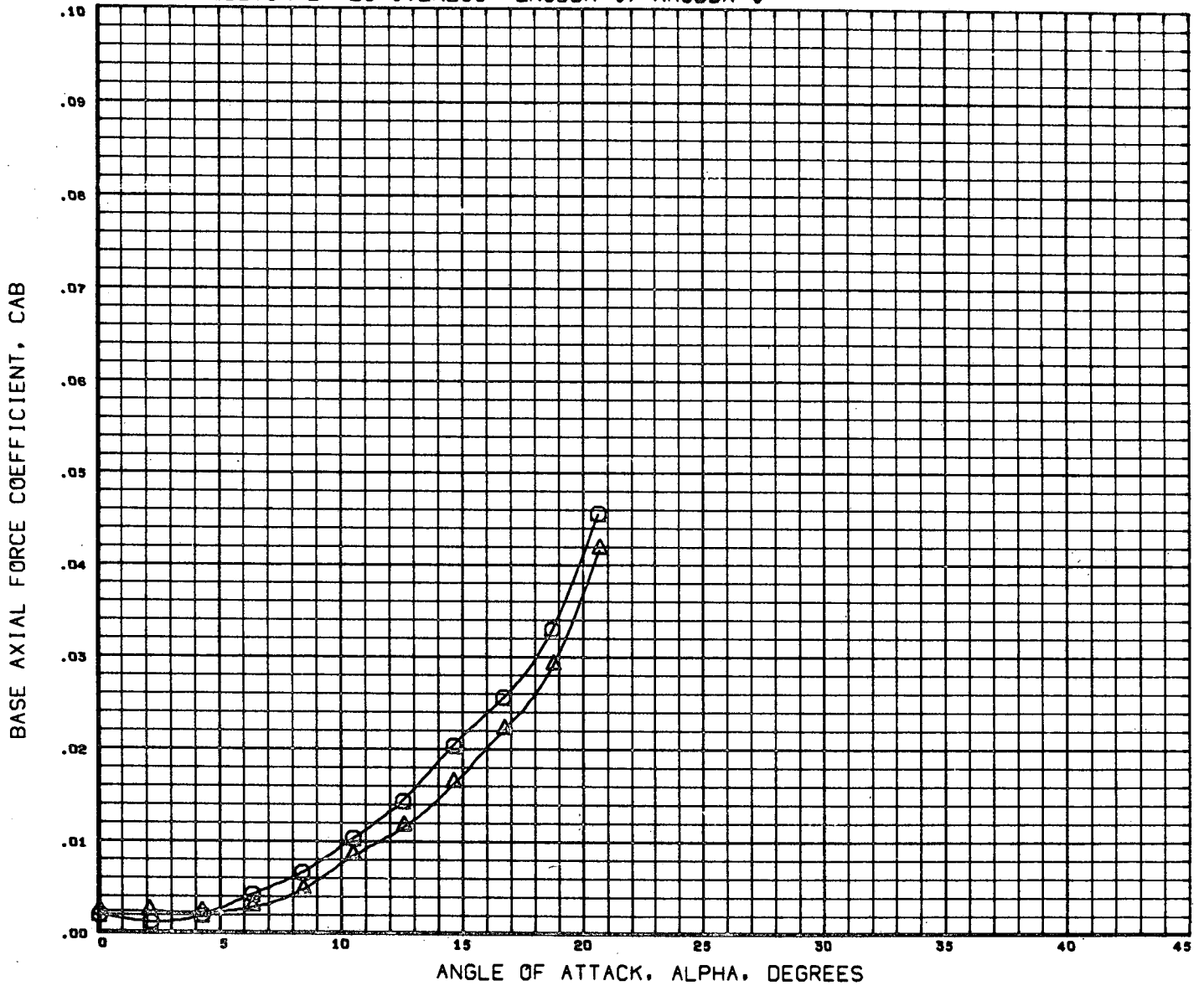
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49038)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49039)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5	0.000	-10.000	0.000	LREF 5.4530 IN
					BREF 3.8170 IN
					XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH .60

56

C.2

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

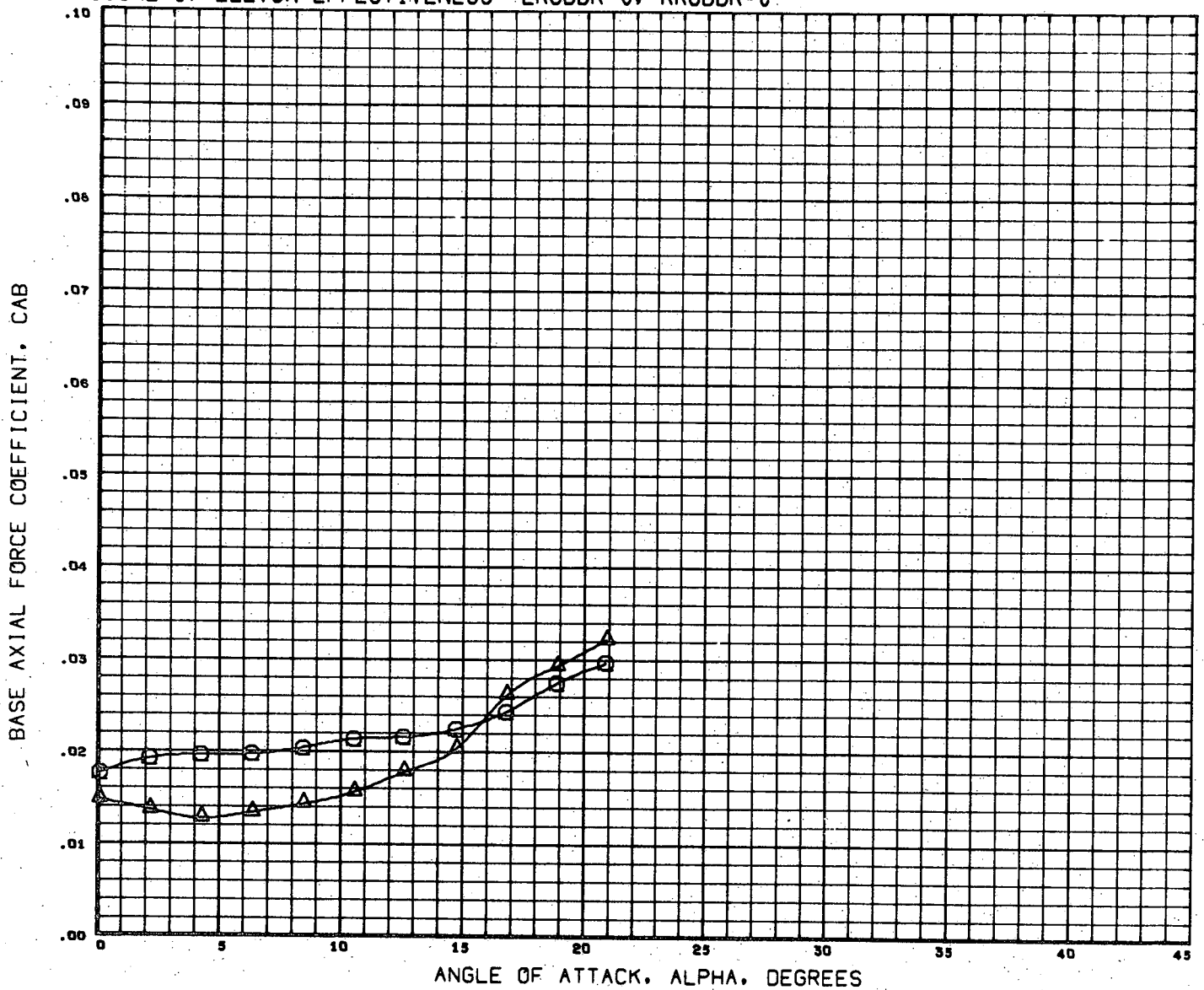
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

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 .90

PAGE 34

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

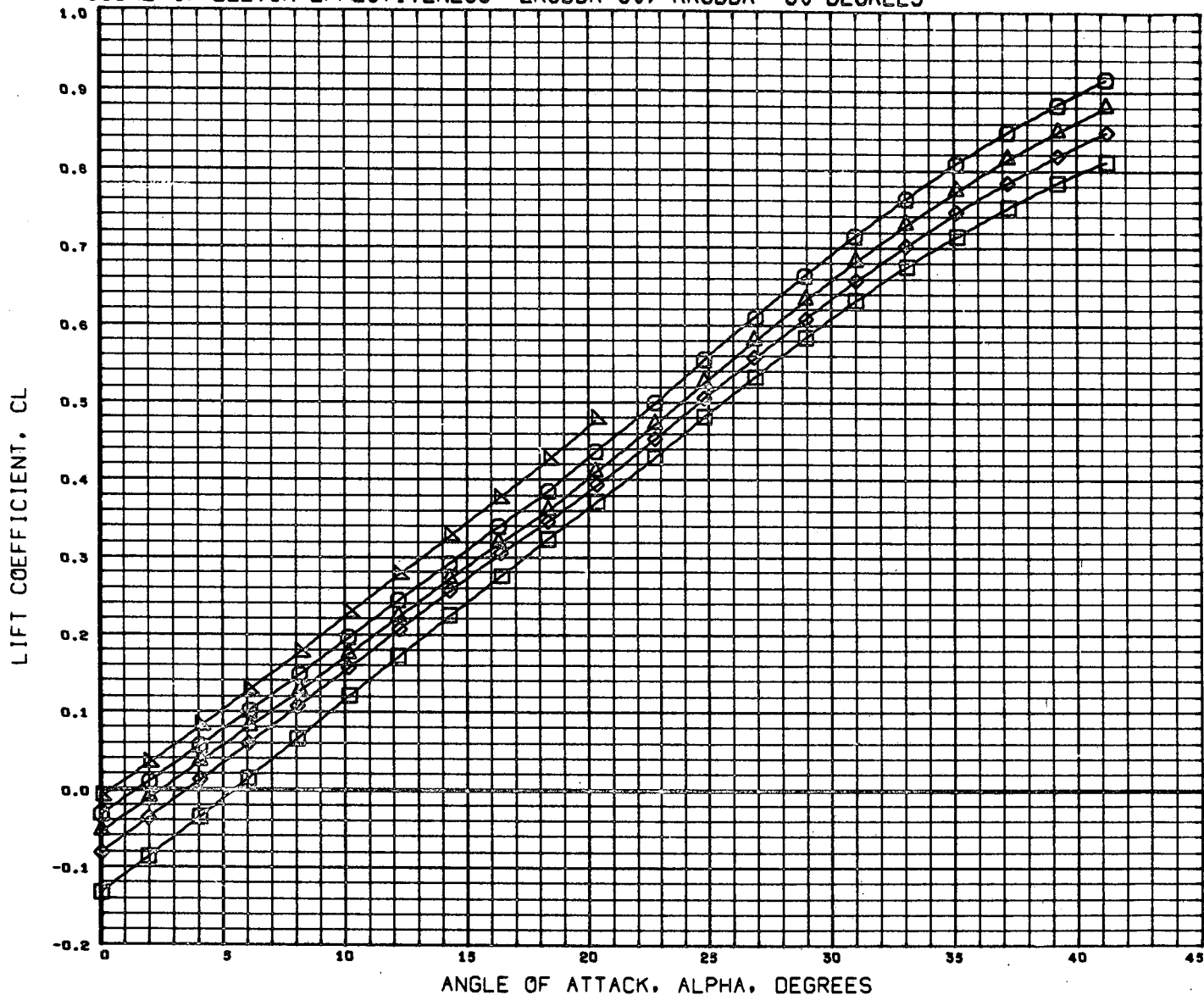
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	-10.000	0.000

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 1.20

PAGE 35

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

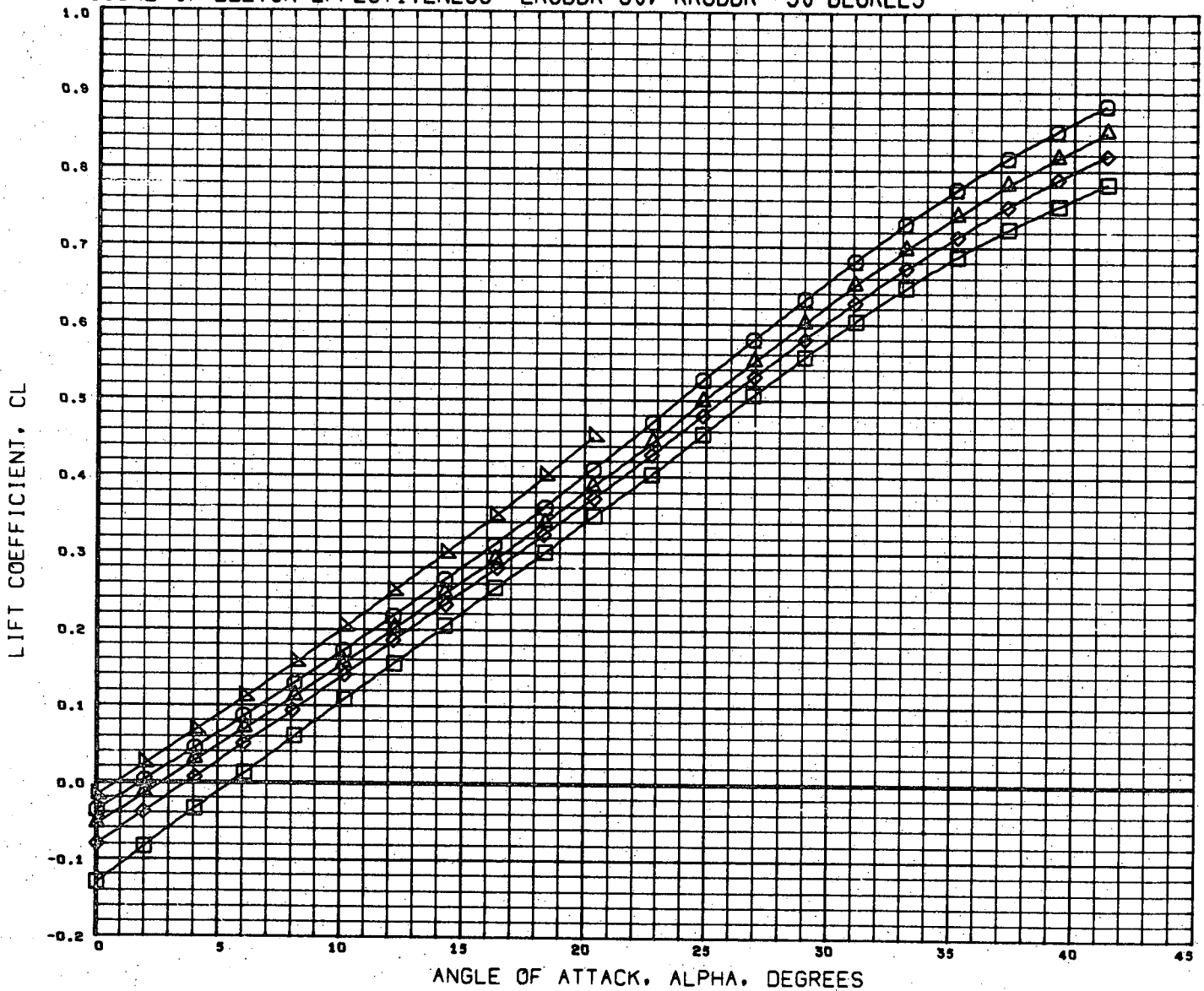


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4 (-10) V5 (+30, -30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	BREF 3.6170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4 (-40) V5 (+30, -30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49D06)	MSFC 507 GAC H-33 ORB. B5W4 (+10) V5 (+30, -30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 2.99

PAGE 36

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



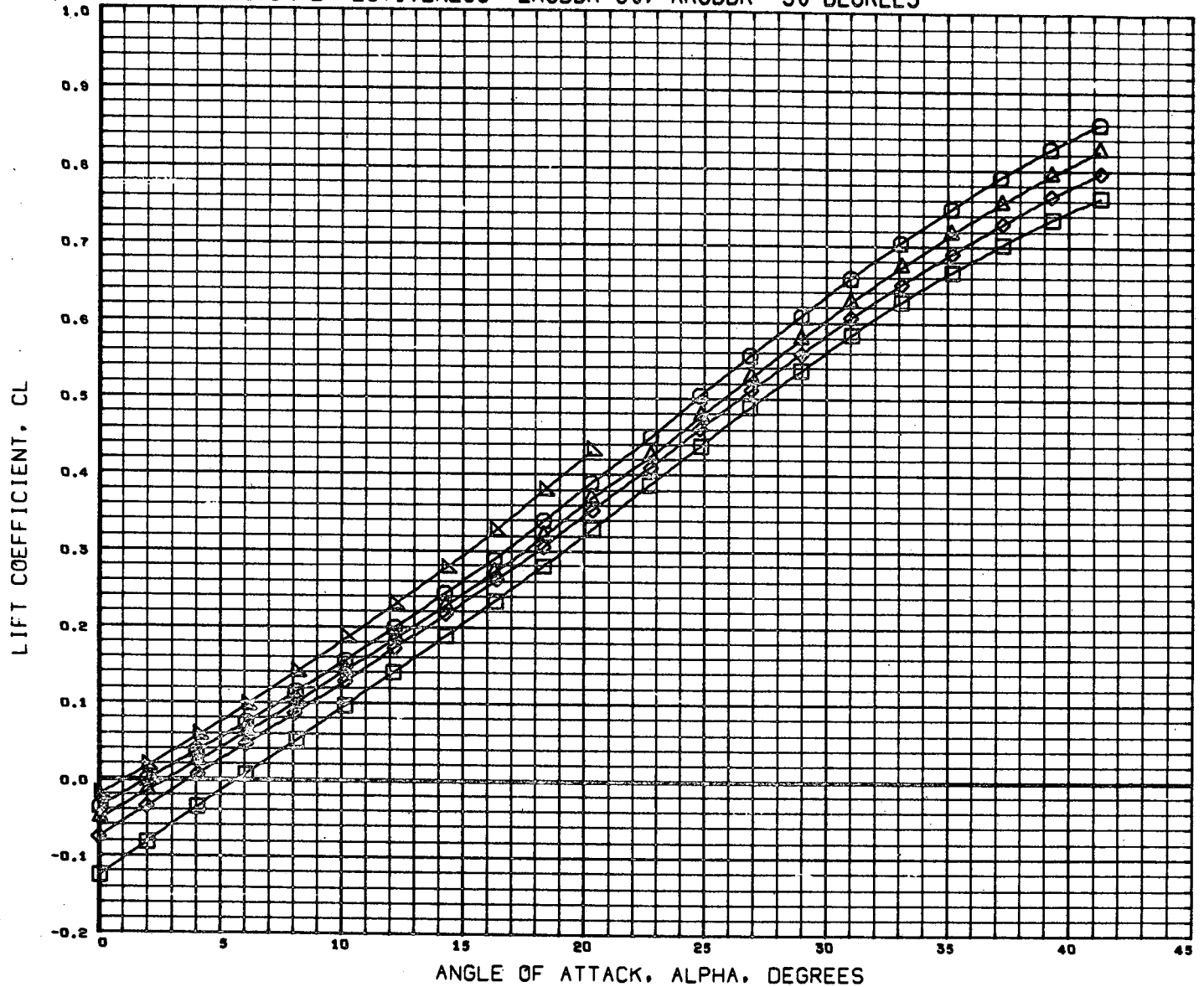
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION	
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF	7.8970 SQ. IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4 (-10) V5 (+30, -30)	0.000	-10.000	0.000	LREF	5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	BREF	3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4 (-40) V5 (+30, -30)	0.000	-40.000	0.000	XMRP	1274.4040 IN.
(A49D06)	MSFC 507 GAC H-33 ORB. B5W4 (+10) V5 (+30, -30)	0.000	10.000	0.000	YMRP	0.0000 IN.
					ZMRP	391.3004 IN.
					SCALE	0.0034

MACH 3.48

PAGE 37



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

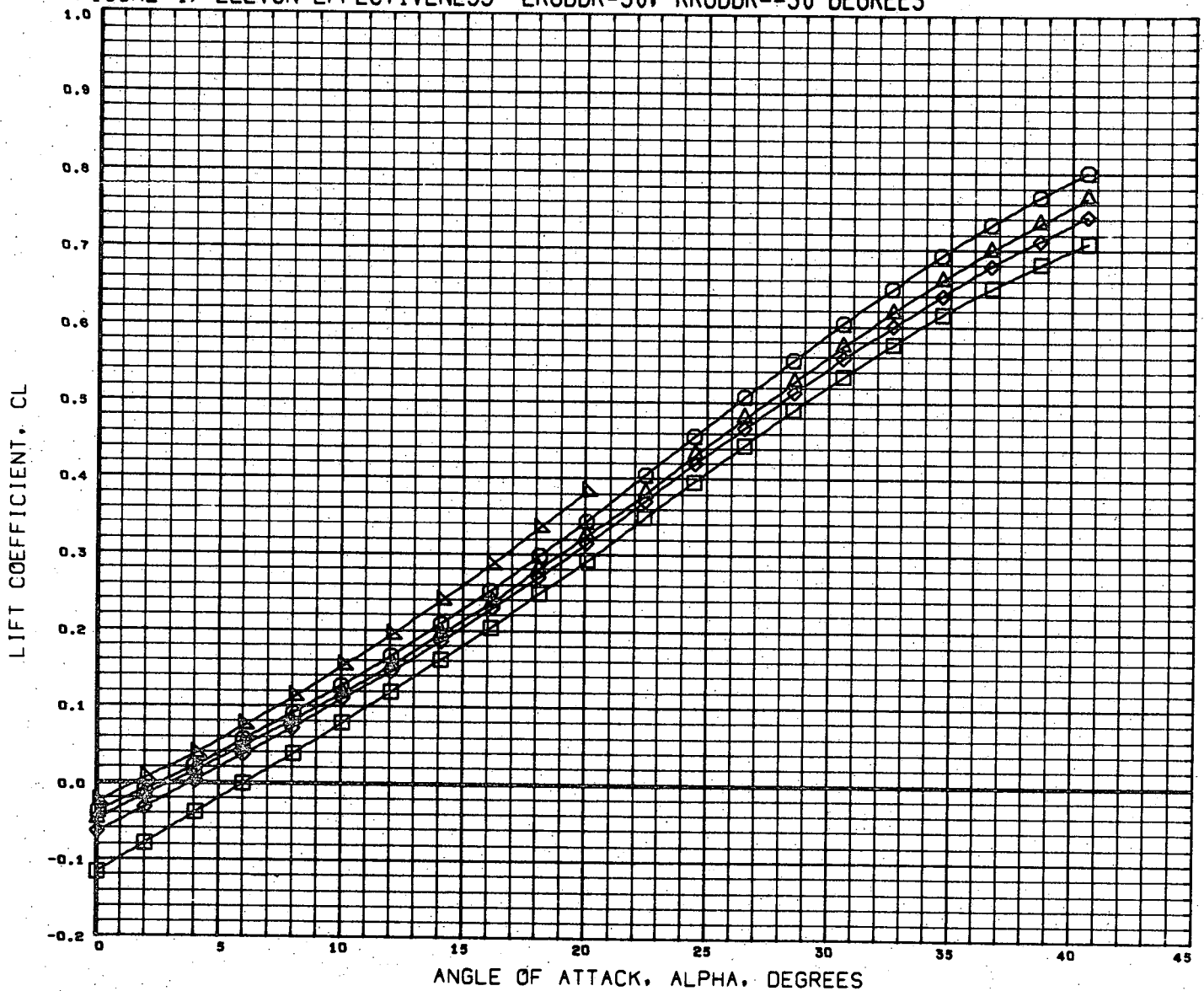


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49801)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49802)	MSFC 507 GAC H-33 ORB. B5W4 (-10) V5 (+30, -30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49803)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49804)	MSFC 507 GAC H-33 ORB. B5W4 (-40) V5 (+30, -30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49806)	MSFC 507 GAC H-33 ORB. B5W4 (+10) V5 (+30, -30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.00

PAGE 38

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

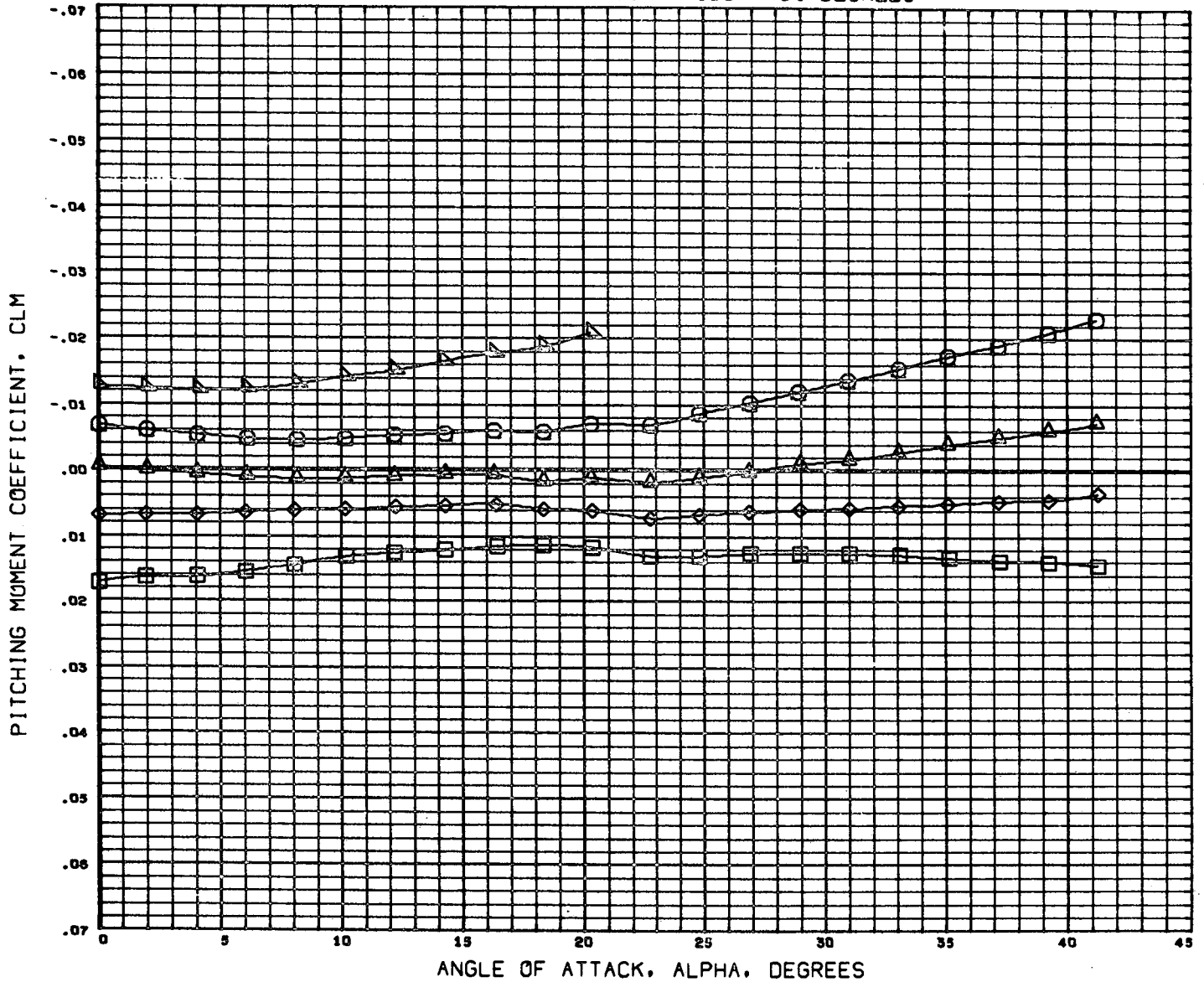


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 307 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ.IN
(A49S02)	MSFC 307 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 307 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 307 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49S06)	MSFC 307 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.96

PAGE 39

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

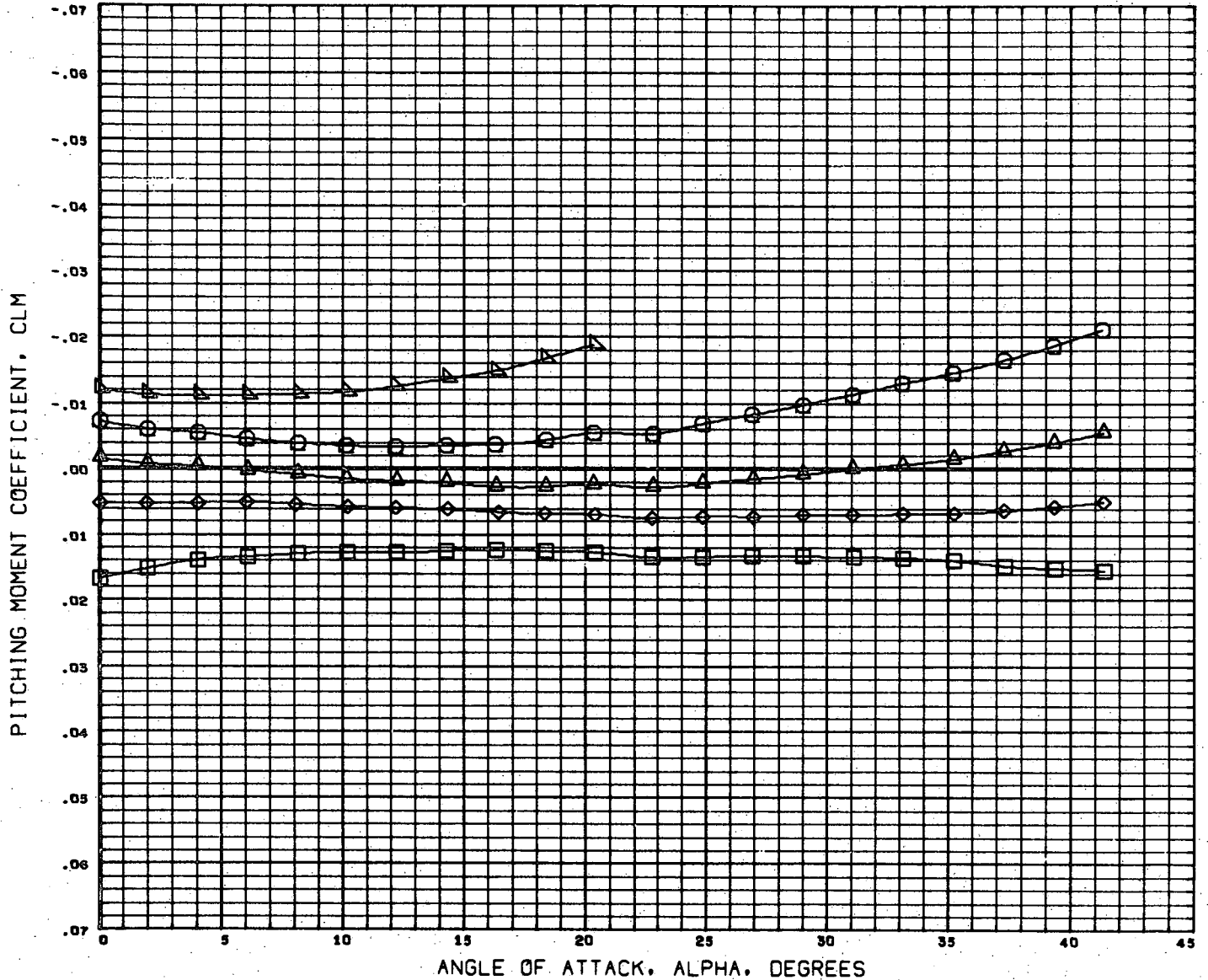


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49801)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49802)	MSFC 507 GAC H-33 ORB. B5W4 (-10) V5 (+30, -30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49803)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49805)	MSFC 507 GAC H-33 ORB. B5W4 (-40) V5 (+30, -30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49806)	MSFC 507 GAC H-33 ORB. B5W4 (+10) V5 (+30, -30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 2.99

PAGE 40

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

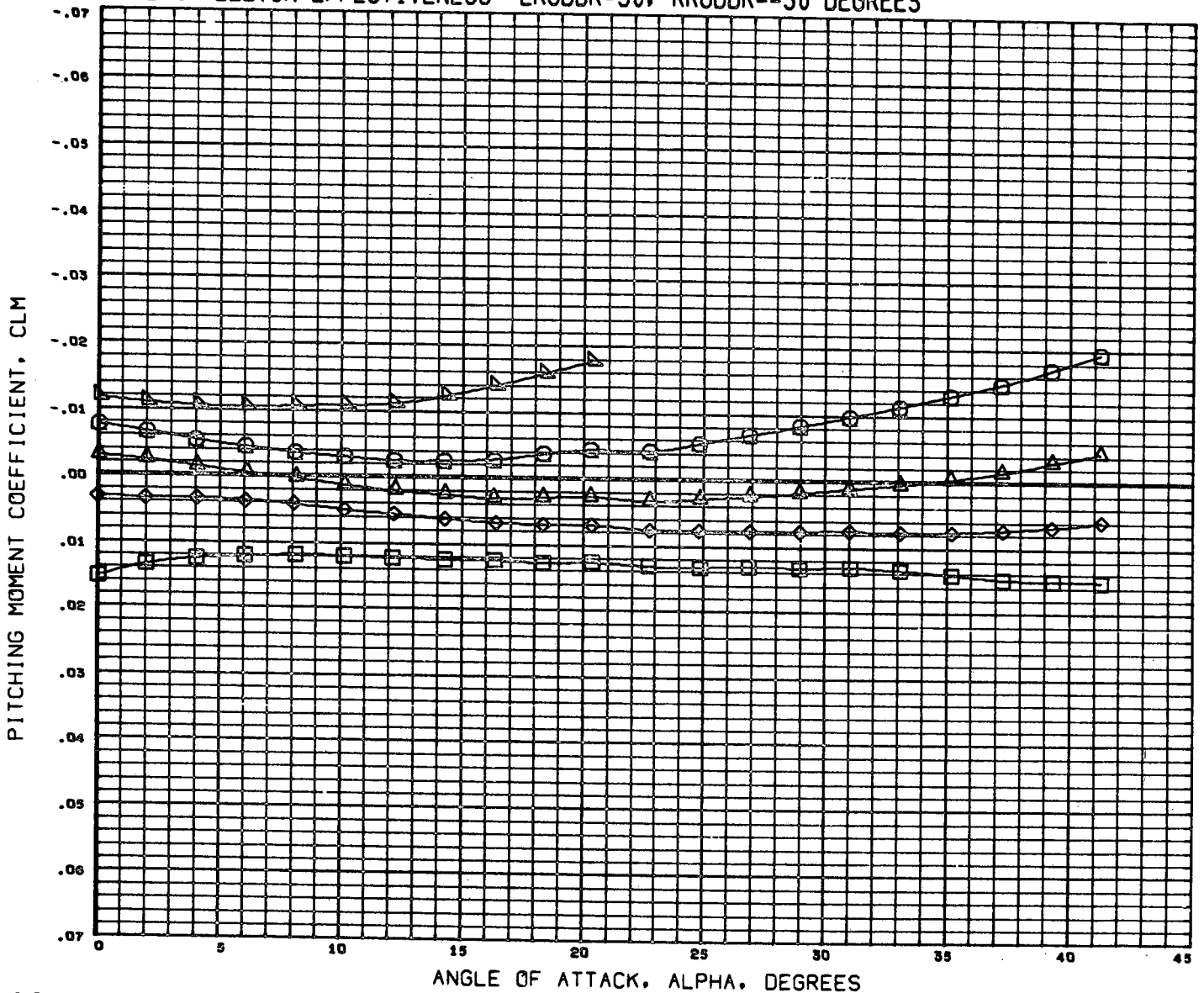


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4 (-10) V5 (+30, -30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4 (-40) V5 (+30, -30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49006)	MSFC 507 GAC H-33 ORB. B5W4 (+10) V5 (+30, -30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 3.48

PAGE 41

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

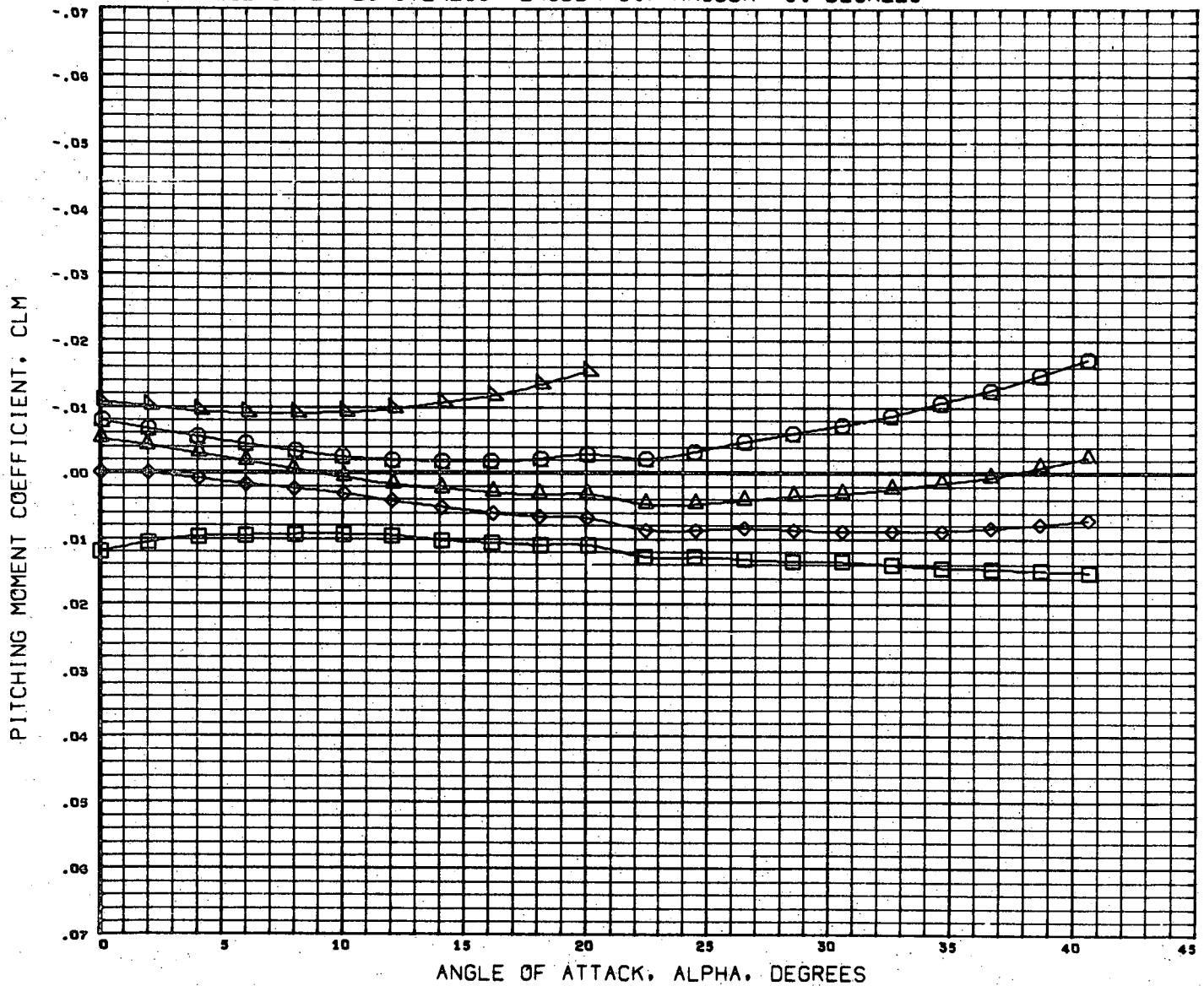


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ.IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4 (-10)V5 (+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5 (+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4 (-40)V5 (+30,-30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49006)	MSFC 507 GAC H-33 ORB. B5W4 (+10)V5 (+30,-30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.00

PAGE 42

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

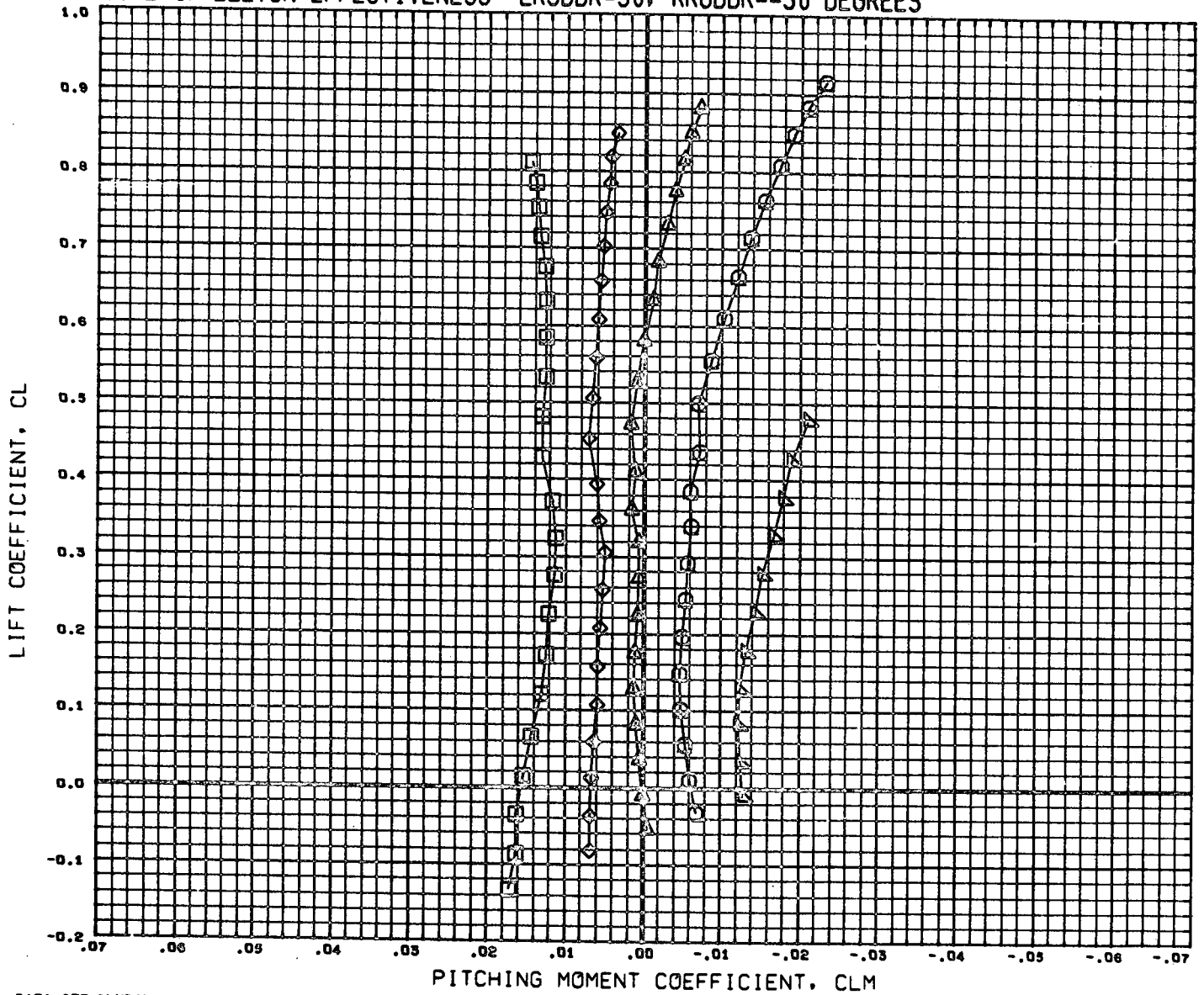


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION	
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000	SREF	7.8970 SQ. IN.
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF	5.4530 IN.
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF	3.8170 IN.
(A49S04)	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRP	1274.4040 IN.
(A49D06)	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRP	0.0000 IN.
					ZMRP	391.3004 IN.
					SCALE	0.0034

MACH 4.96

PAGE 43

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

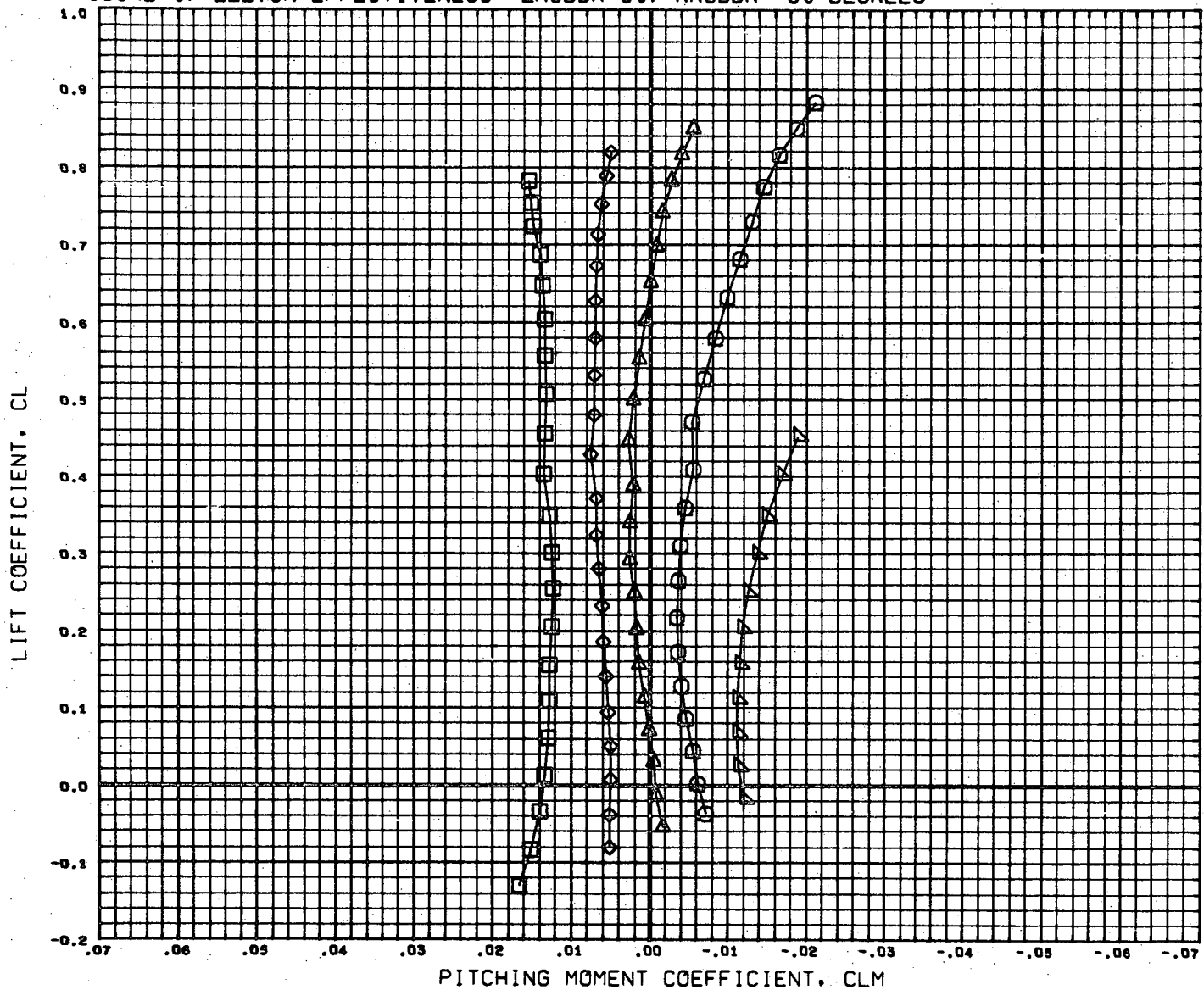


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49801)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49802)	MSFC 507 GAC H-33 ORB. B5W4 (-10) V5 (+30, -30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49803)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49805)	MSFC 507 GAC H-33 ORB. B5W4 (-40) V5 (+30, -30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49808)	MSFC 507 GAC H-33 ORB. B5W4 (+10) V5 (+30, -30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 2.99

PAGE 44

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



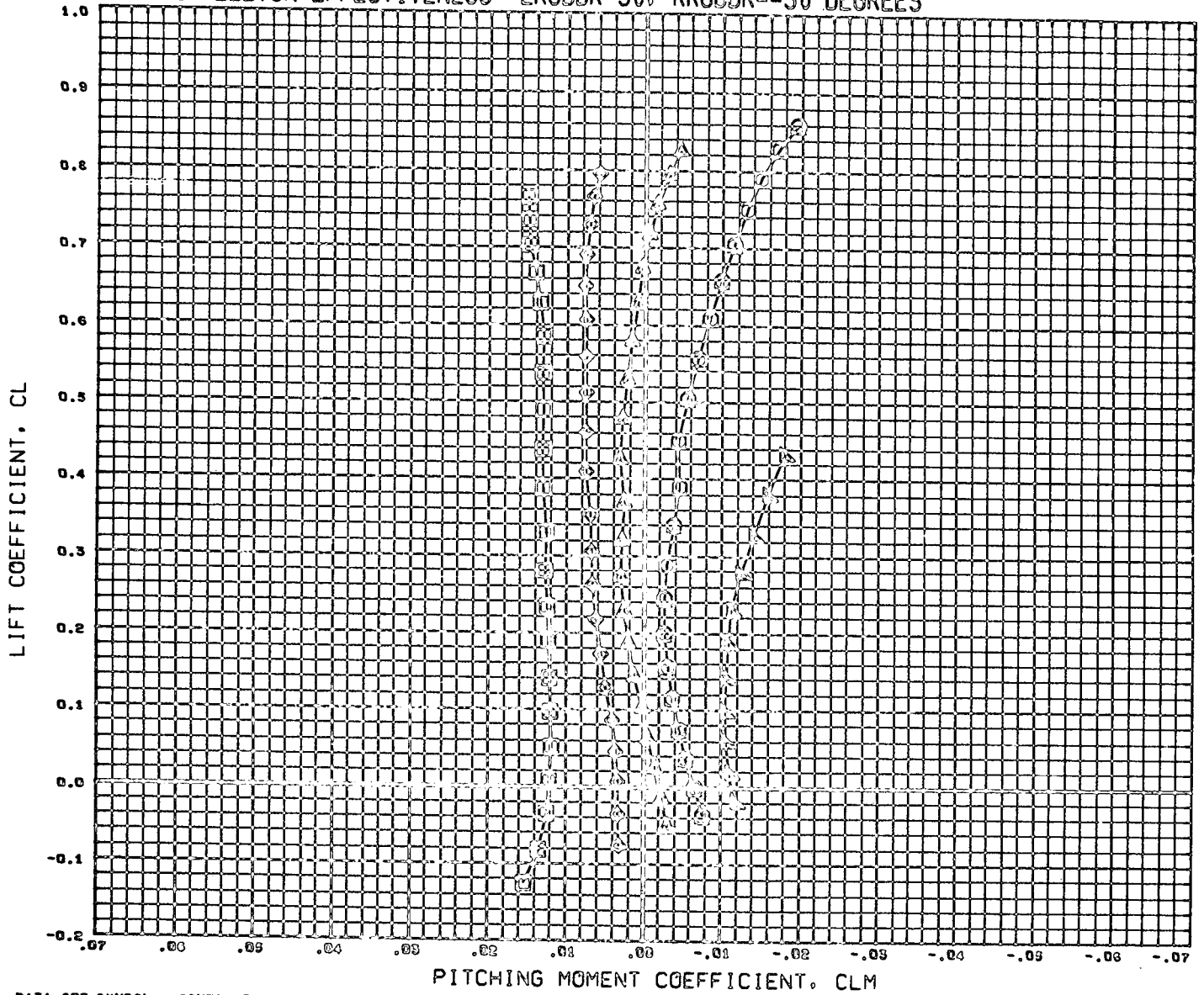
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V3(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49006)	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 3.48

PAGE 45



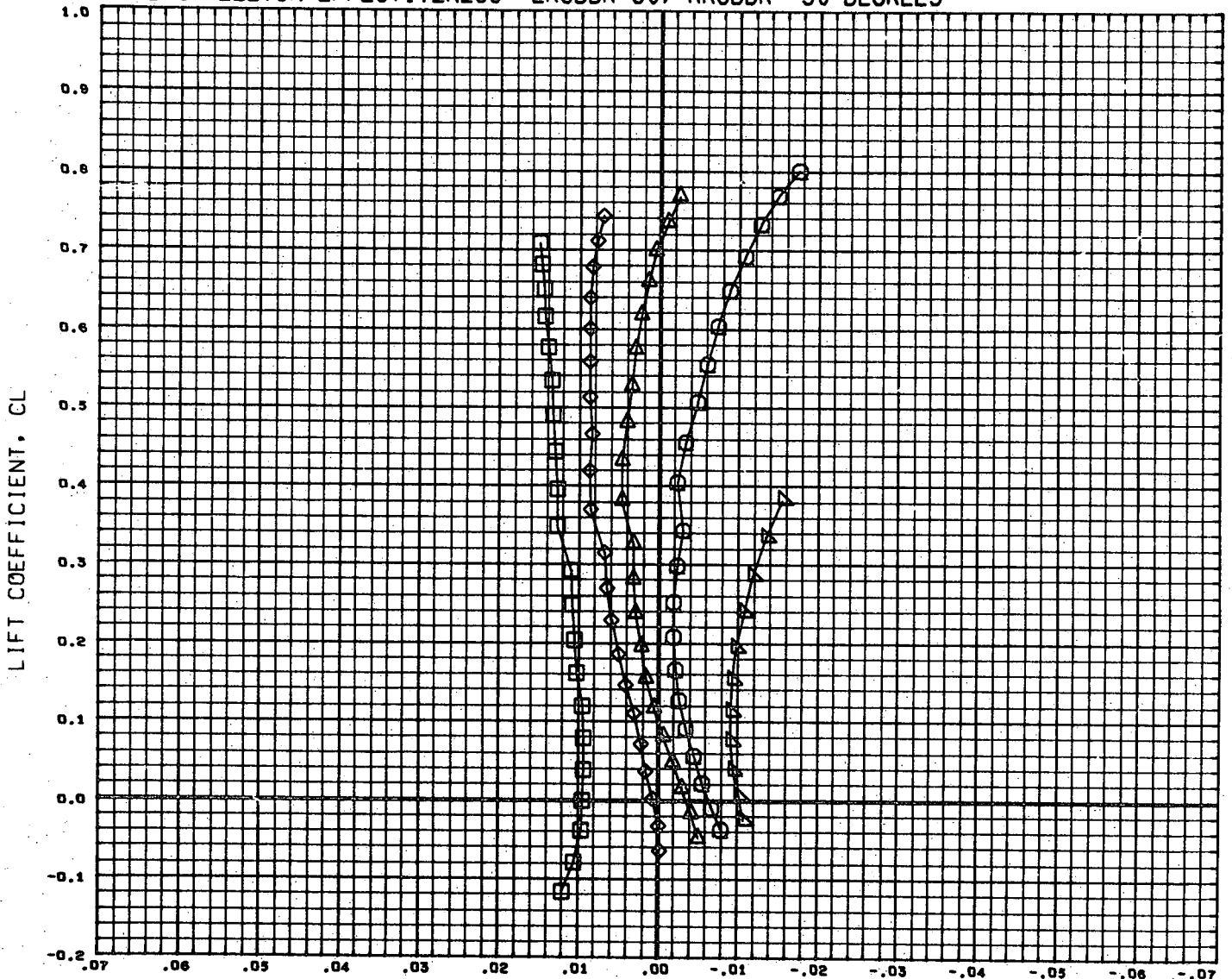
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BEVA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49801)	MSFC 907 6AC H-38 ORB. BSM4V9(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ.IN
(A49802)	MSFC 907 6AC H-38 ORB. BSM4(-10)V9(+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49803)	MSFC 907 6AC H-38 ORB. BSM4(-20)V9(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49804)	MSFC 907 6AC H-38 ORB. BSM4(-40)V9(+30,-30)	0.000	-40.000	0.000	XHRP 1274.4040 IN.
(A49806)	MSFC 907 6AC H-38 ORB. BSM4(+10)V9(+30,-30)	0.000	10.000	0.000	YHRP 0.0000 IN.
					ZHRP 391.3004 IN.
					SCALE 0.0034

MACH 4.00

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



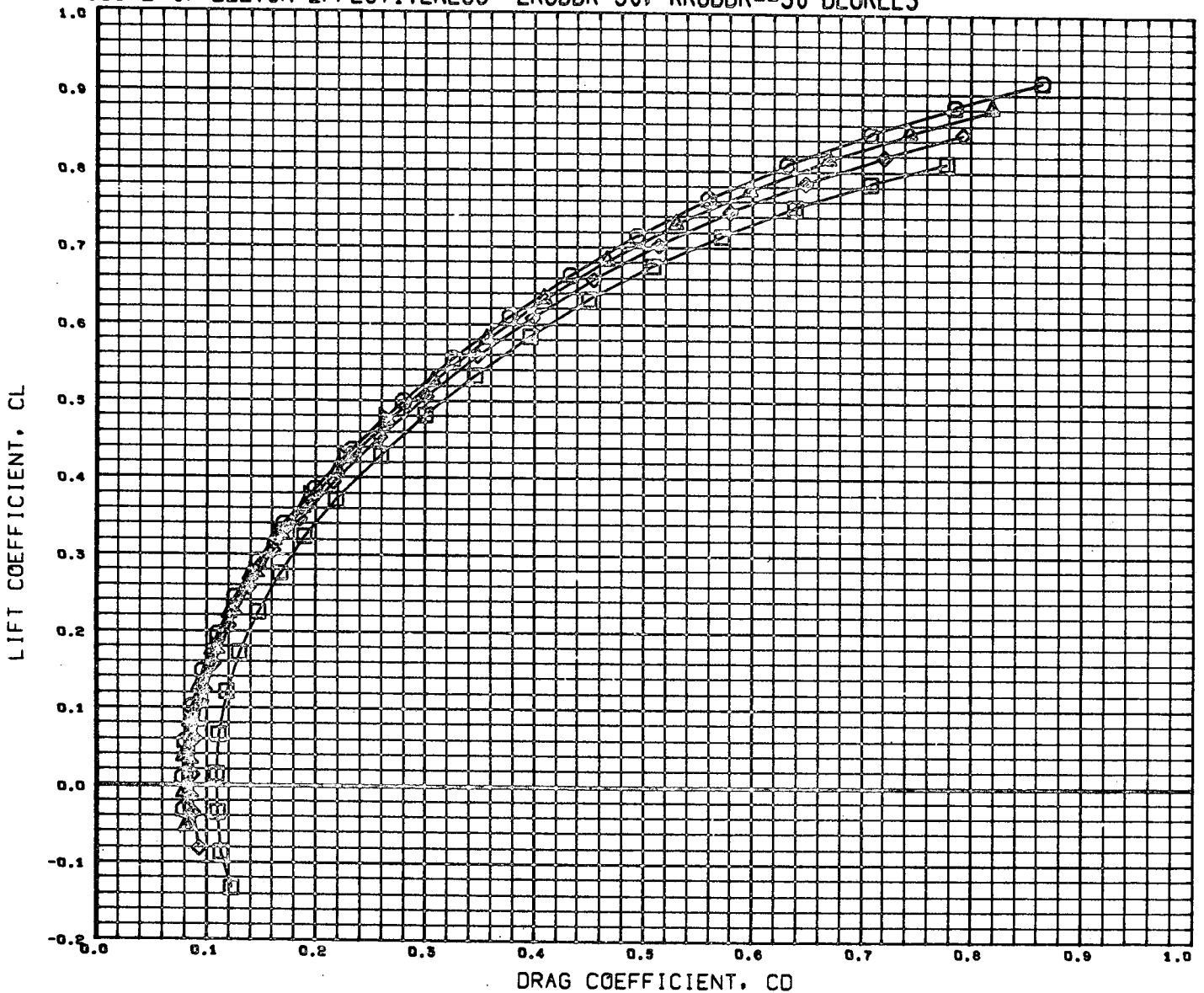
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49501)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ.IN
(A49502)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF 3.4530 IN
(A49503)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49505)	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49006)	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.96

PAGE 47

70

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



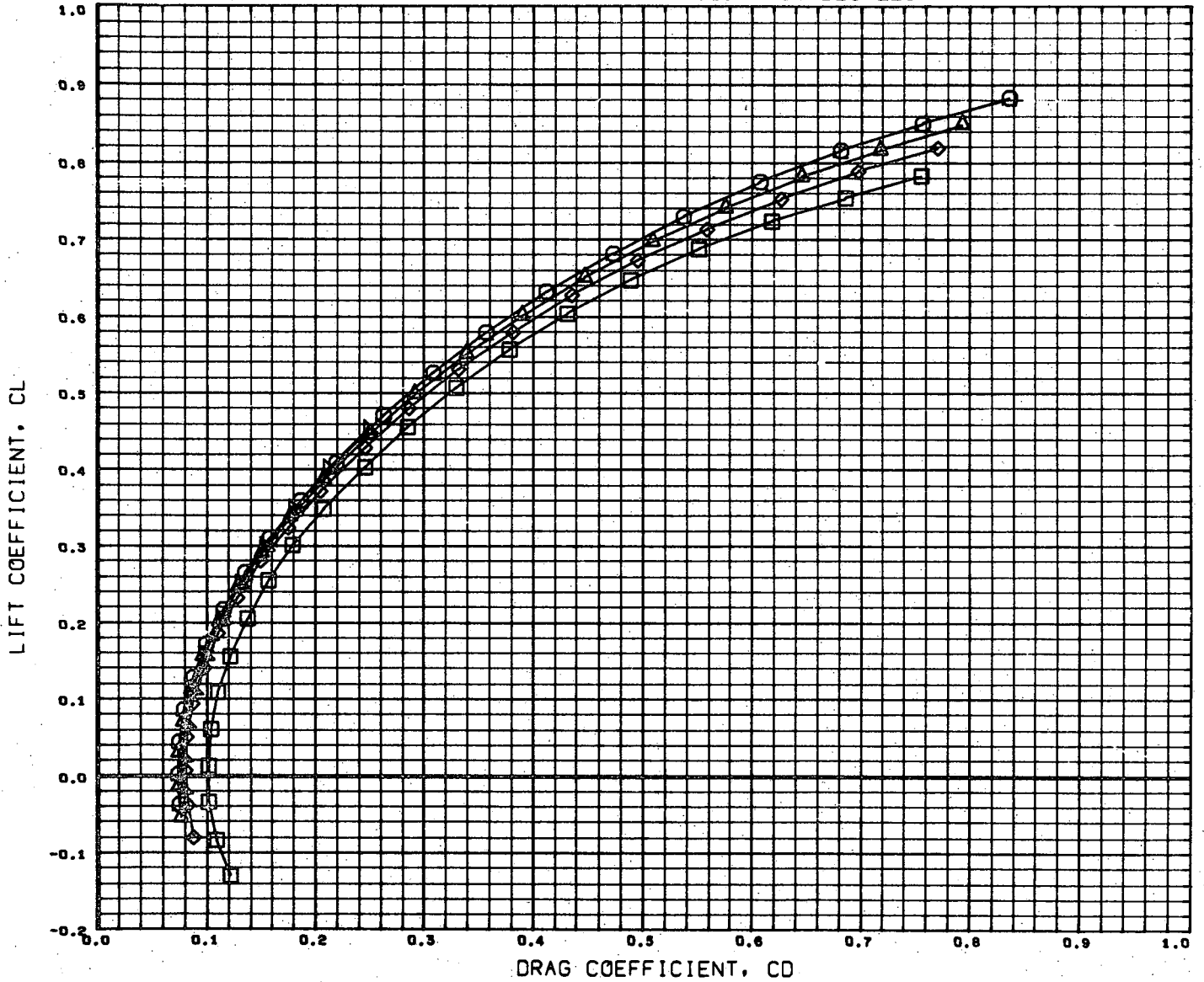
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49801)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49802)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49803)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49805)	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49806)	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 2.99

PAGE 48

71

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



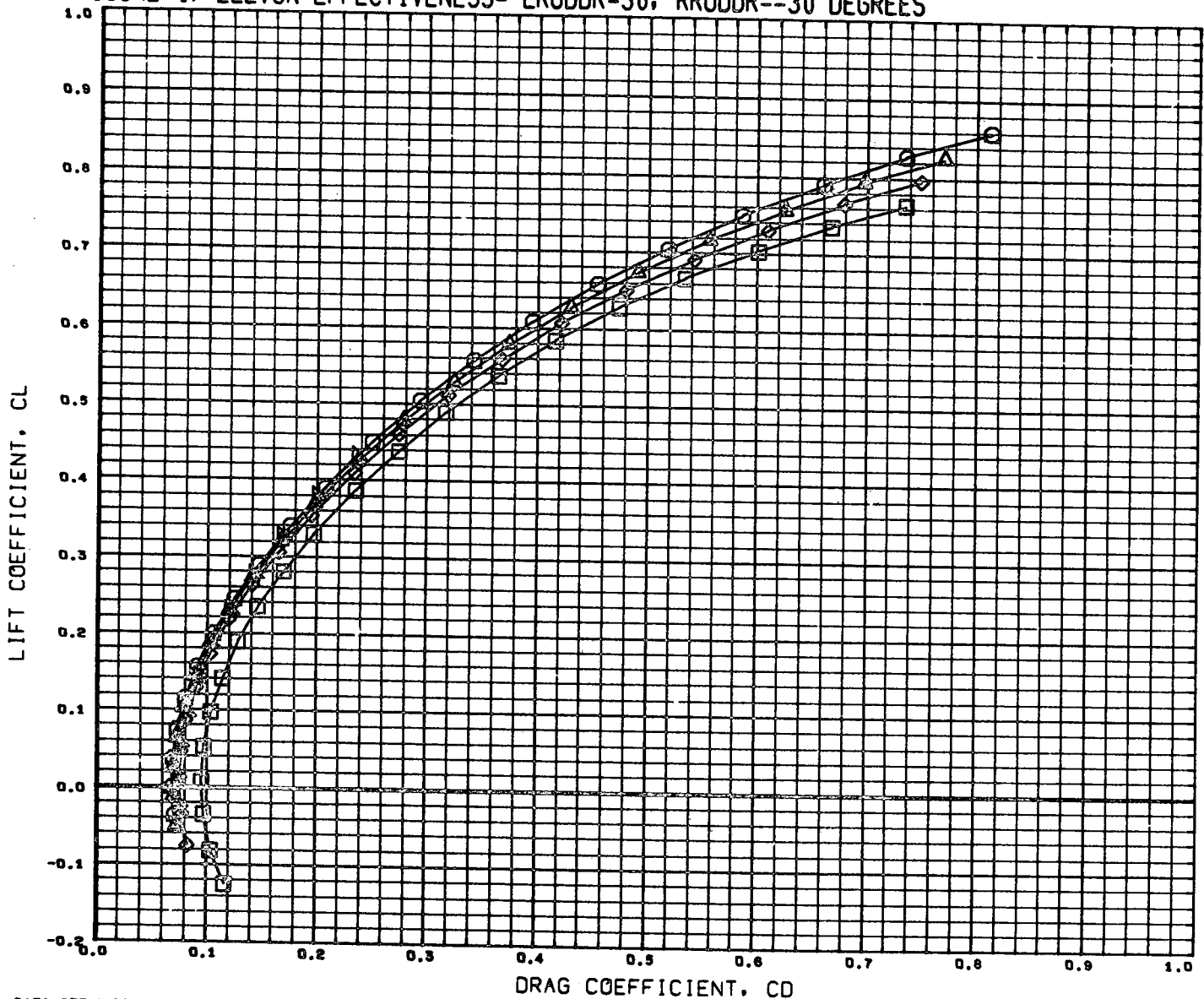
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49006)	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 3.48

PAGE 49

72

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

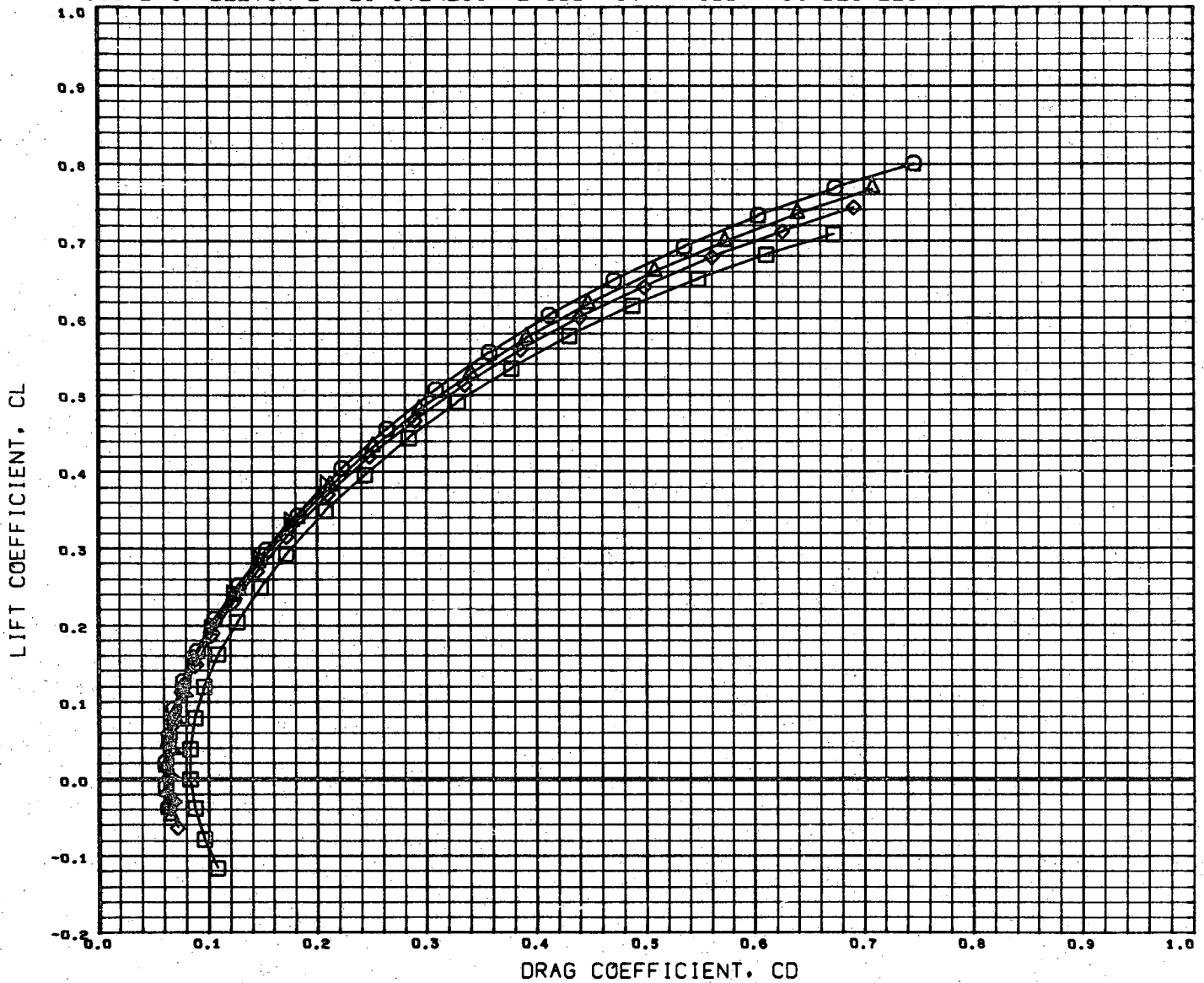


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 307 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ.IN
(A49S02)	MSFC 307 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 307 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 307 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49006)	MSFC 307 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.00

PAGE 50

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



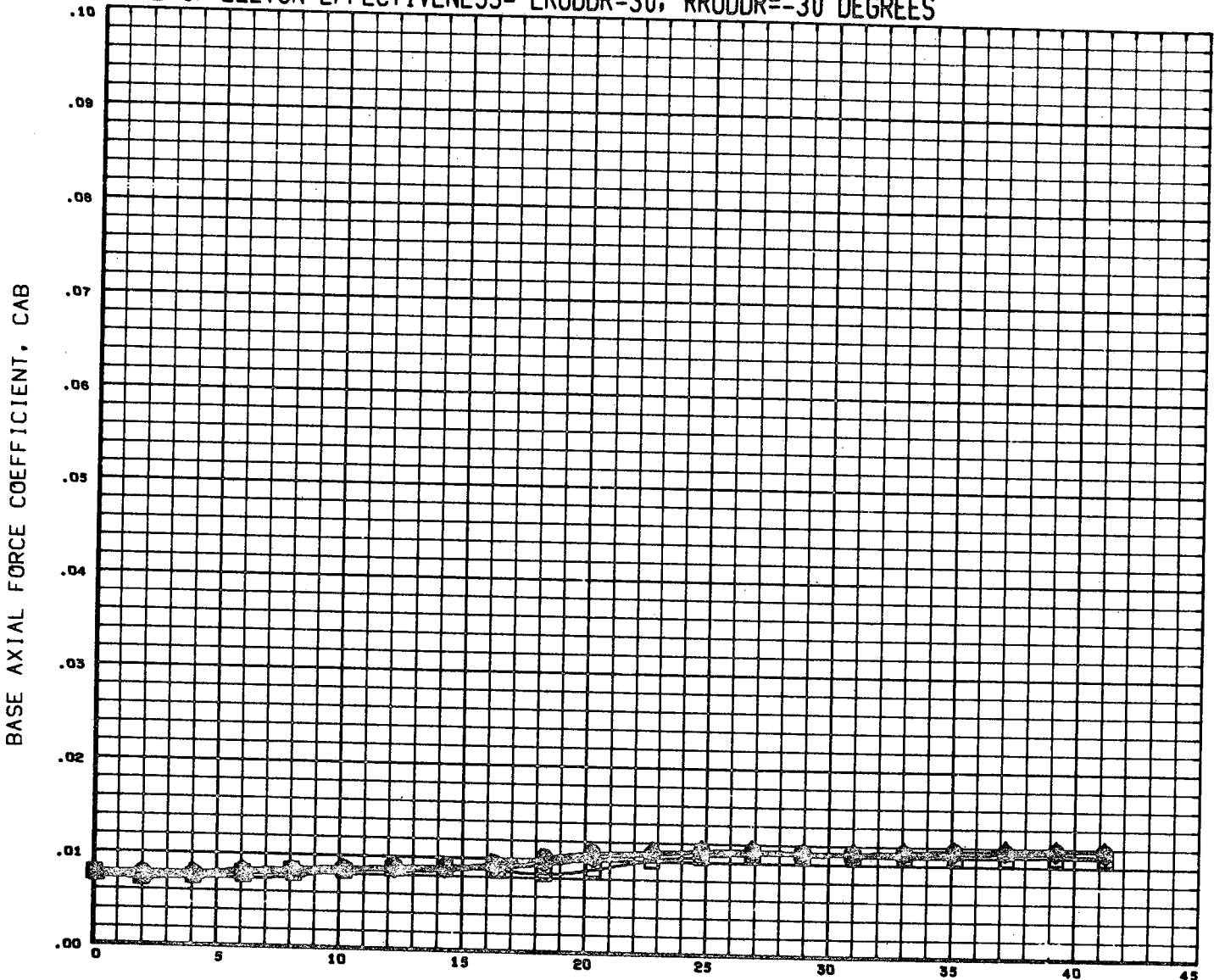
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ.IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49006)	MSFC 507 GAC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.96

PAGE 51

7A

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

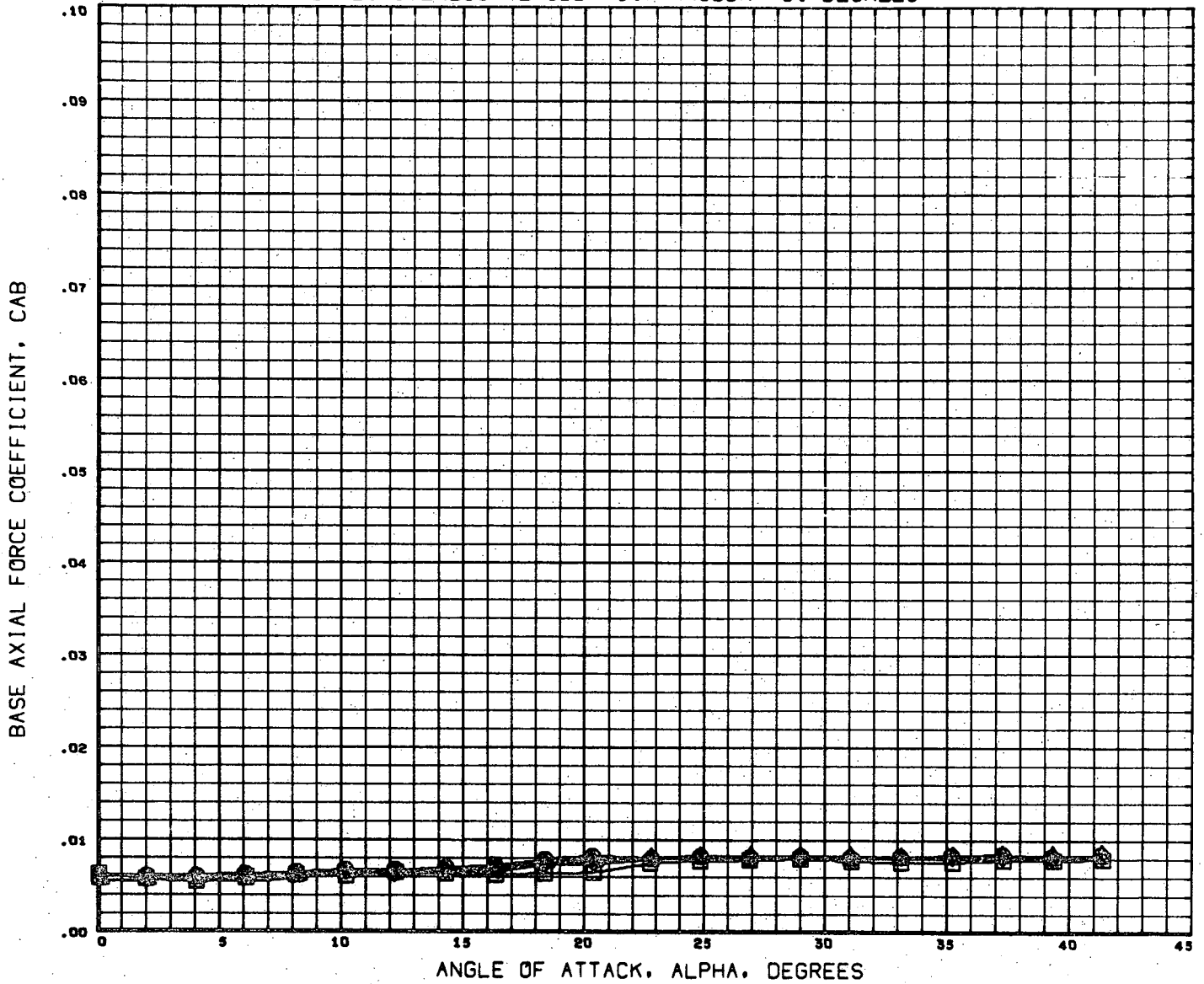


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 6AC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49S02)	MSFC 507 6AC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 6AC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 6AC H-33 ORB. B5W4(-40)V5(+30,-30)	0.000	-40.000	0.000	XMRF 1274.4040 IN.
(A49S06)	MSFC 507 6AC H-33 ORB. B5W4(+10)V5(+30,-30)	0.000	10.000	0.000	YMRF 0.0000 IN.
					ZMRF 391.3004 IN.
					SCALE 0.0034

MACH 2.99

75

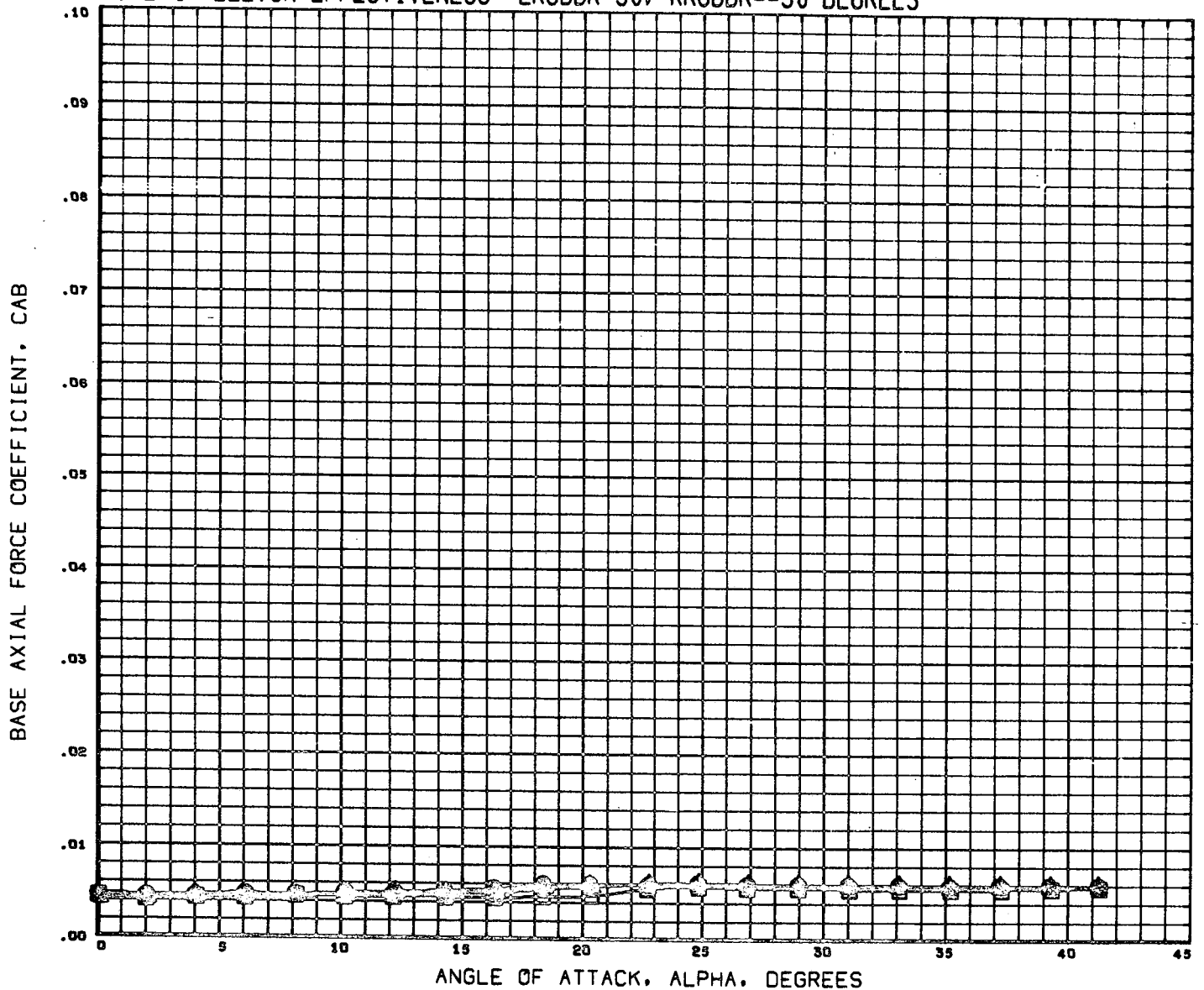
FIGURE 4. ELEVON EFFECTIVENESS- LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4 (-10)V5 (+30, -30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5 (+30, -30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4 (-40)V5 (+30, -30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49S06)	MSFC 507 GAC H-33 ORB. B5W4 (+10)V5 (+30, -30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034



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



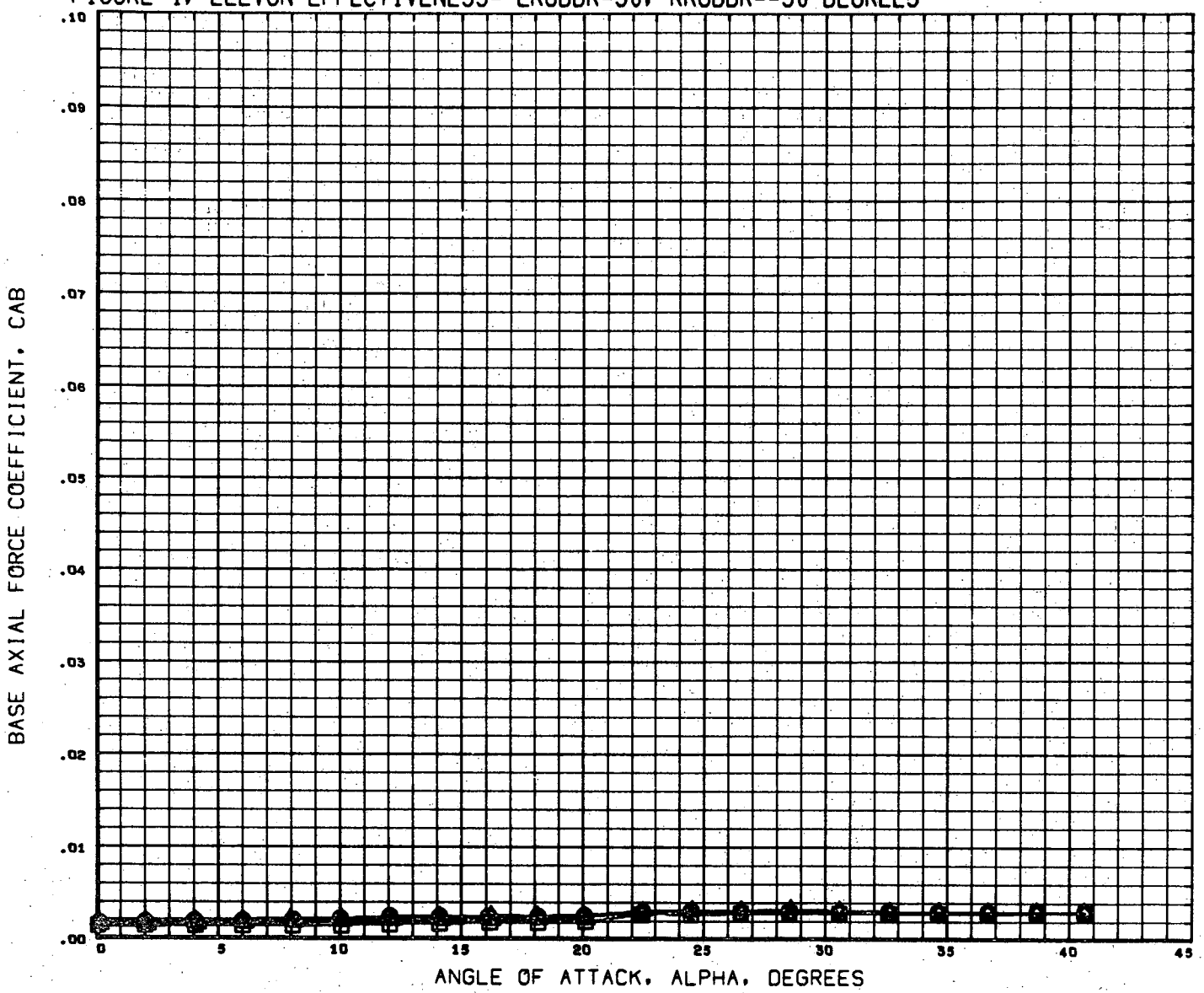
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4 (-10) V5 (+30, -30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4 (-40) V5 (+30, -30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49S06)	MSFC 507 GAC H-33 ORB. B5W4 (+10) V5 (+30, -30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.00

PAGE 54

*Handwritten mark*

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

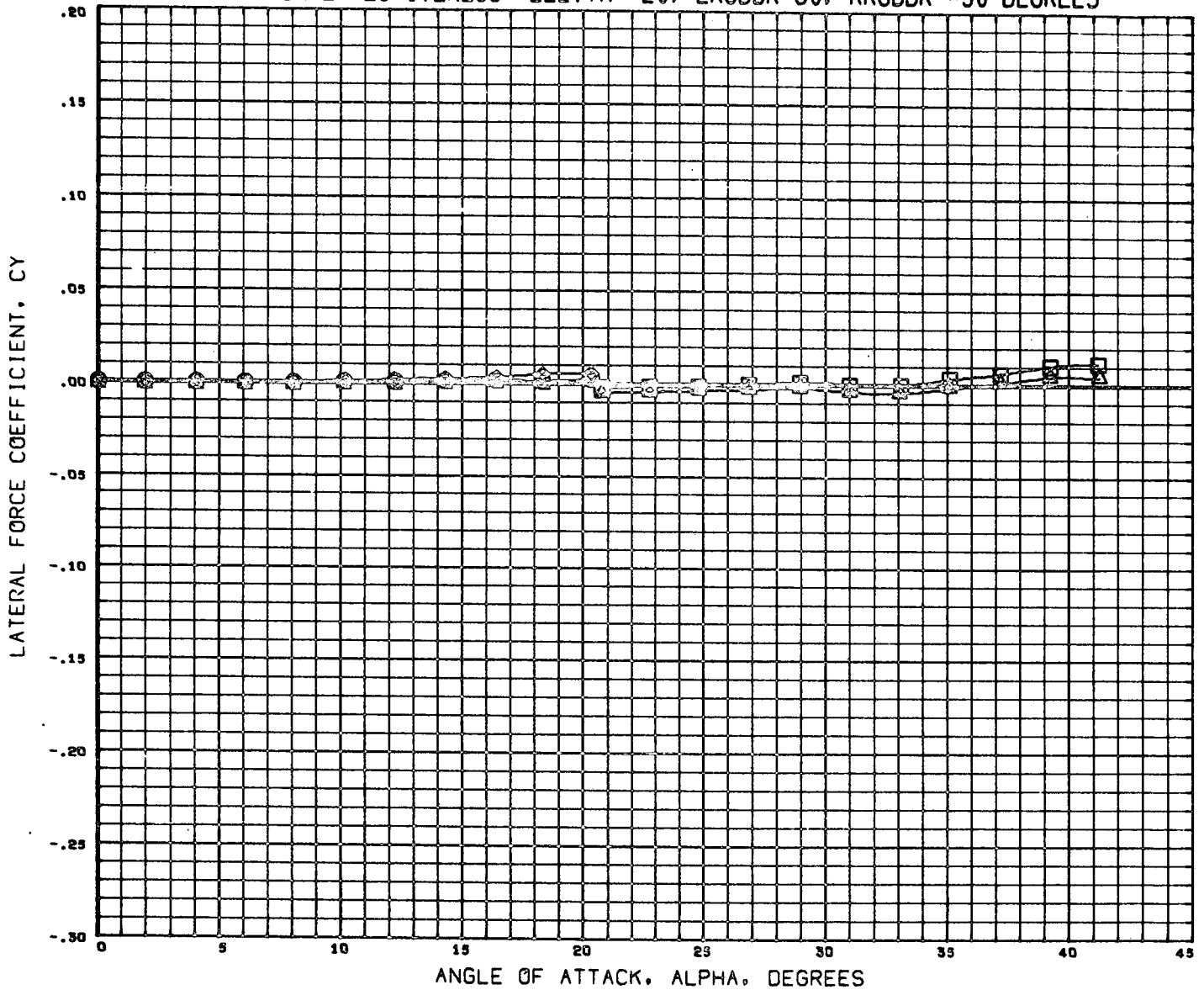


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49S02)	MSFC 507 GAC H-33 ORB. B5W4 (-10)V5 (+30, -30)	0.000	-10.000	0.000	LREF 5.4530 IN
(A49S03)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5 (+30, -30)	0.000	-20.000	0.000	BREF 3.8170 IN
(A49S05)	MSFC 507 GAC H-33 ORB. B5W4 (-40)V5 (+30, -30)	0.000	-40.000	0.000	XMRP 1274.4040 IN.
(A49S06)	MSFC 507 GAC H-33 ORB. B5W4 (+10)V5 (+30, -30)	0.000	10.000	0.000	YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.96

78

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

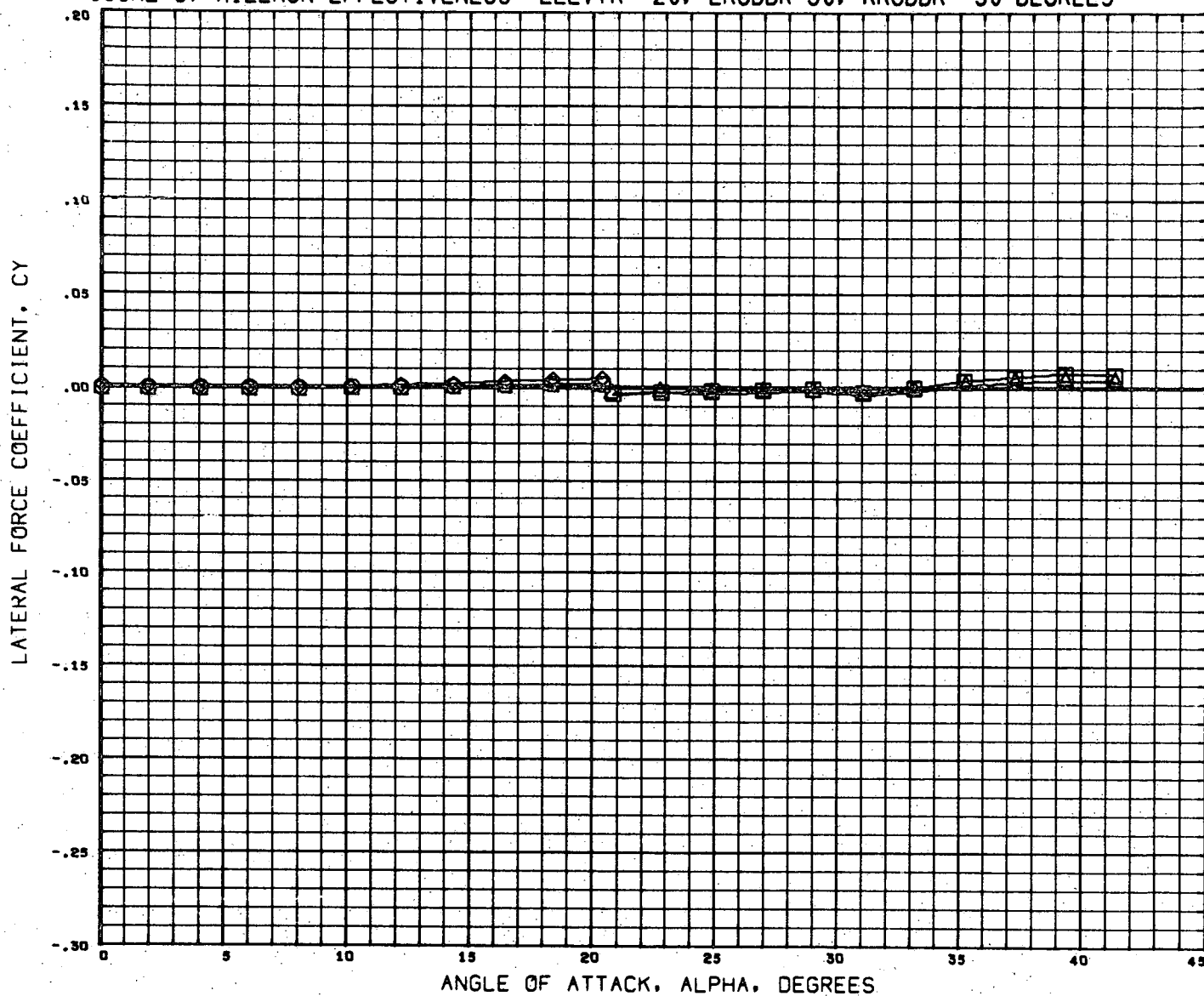


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 2.99

PAGE 56

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

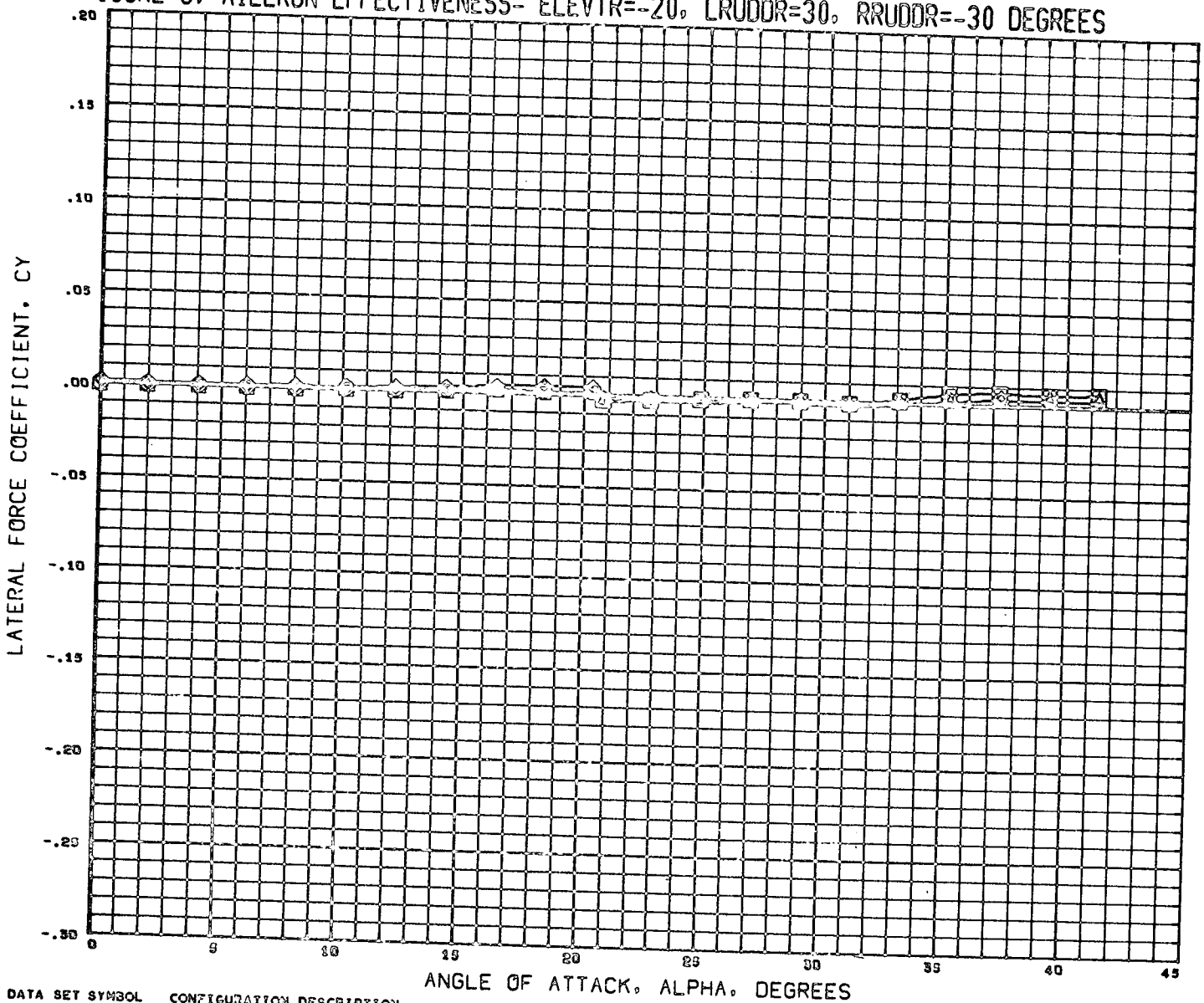


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5 (+30,-30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5 (+30,-30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10,-30)V5 (+30,-30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10,-30)V5 (+30,-30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 3.48

PAGE 57

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

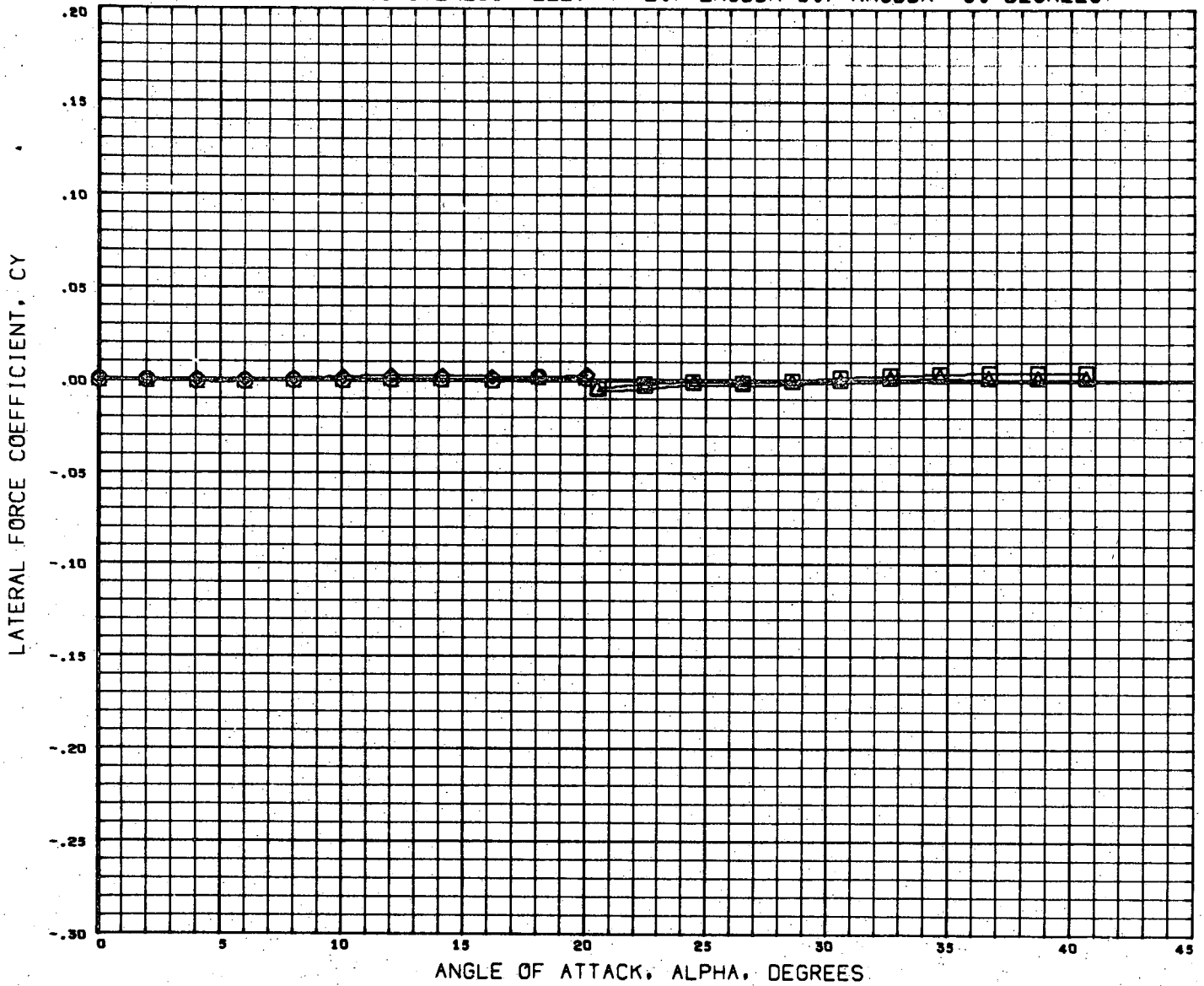


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 907 6AC H-33 ORB. B9W4 (-20) VS (+30, -30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 907 6AC H-33 ORB. B9W4 (-20) VS (+30, -30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 907 6AC H-33 ORB. B9W4 (-10, -30) VS (+30, -30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 907 6AC H-33 ORB. B9W4 (-10, -30) VS (+30, -30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.00

PAGE 58

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

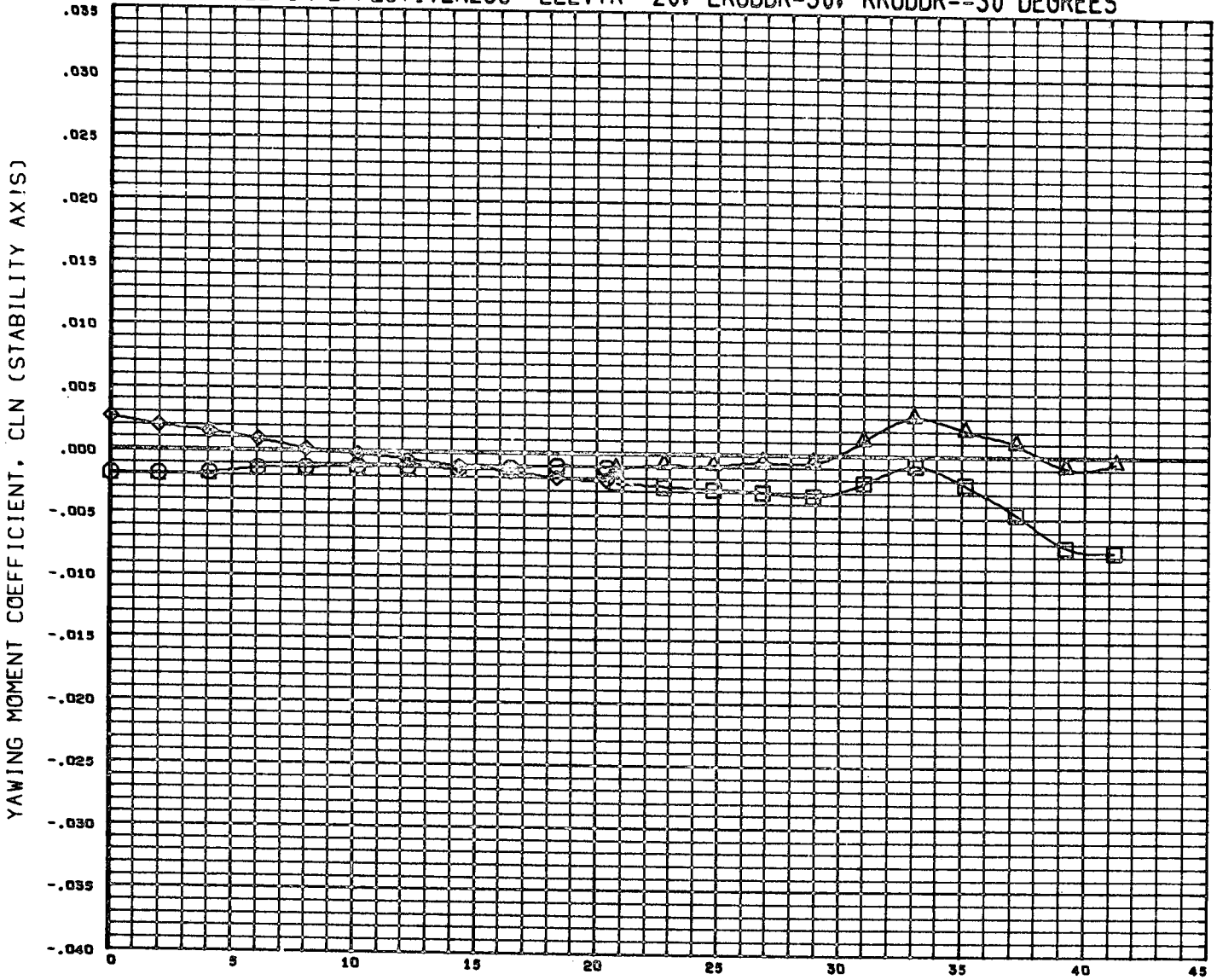


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4(-10,-30)V5(+30,-30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.96

PAGE 59

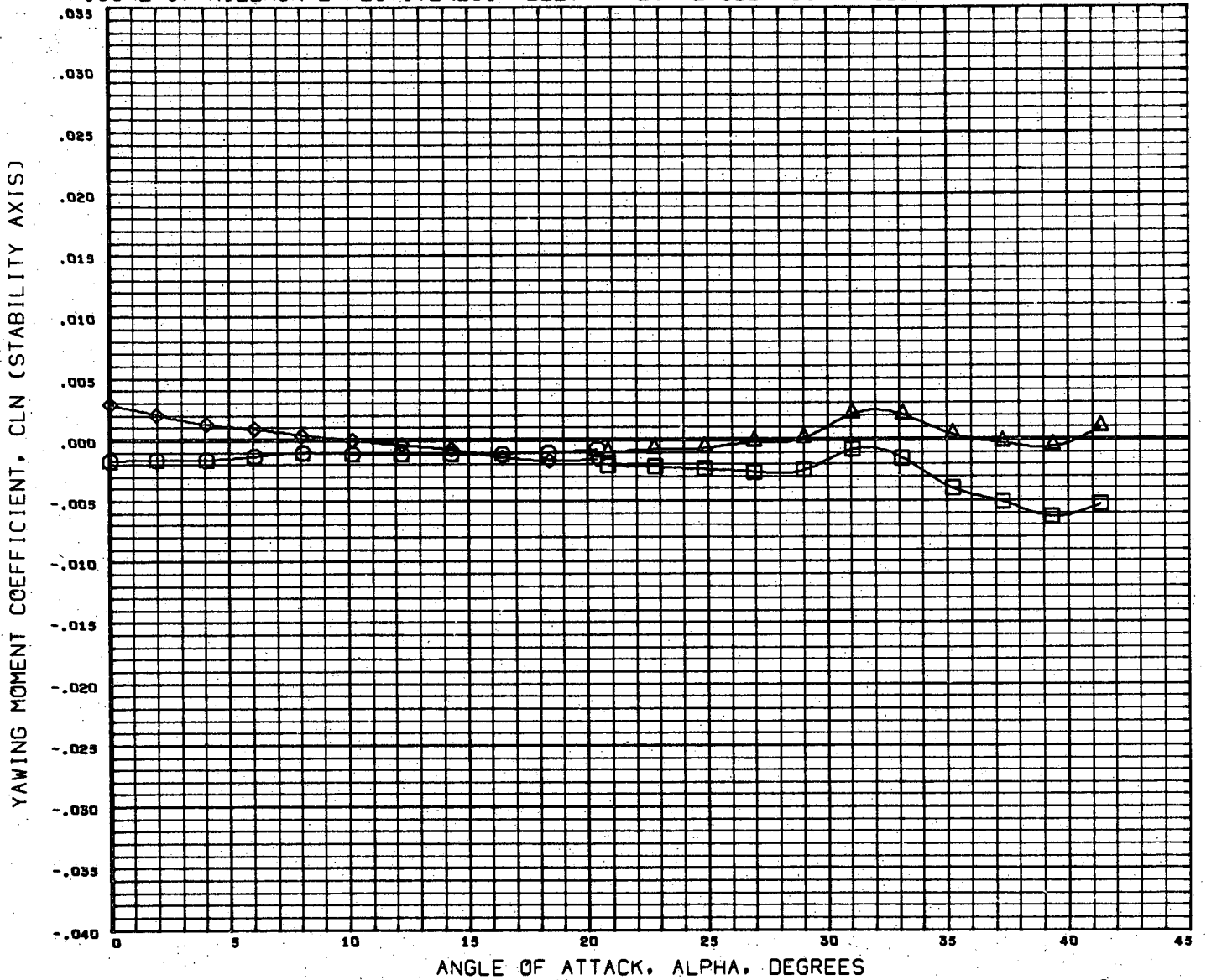
FIGURE 5. AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V3 (+30, -30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V3 (+30, -30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 2.99

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 3.48

PAGE 61



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

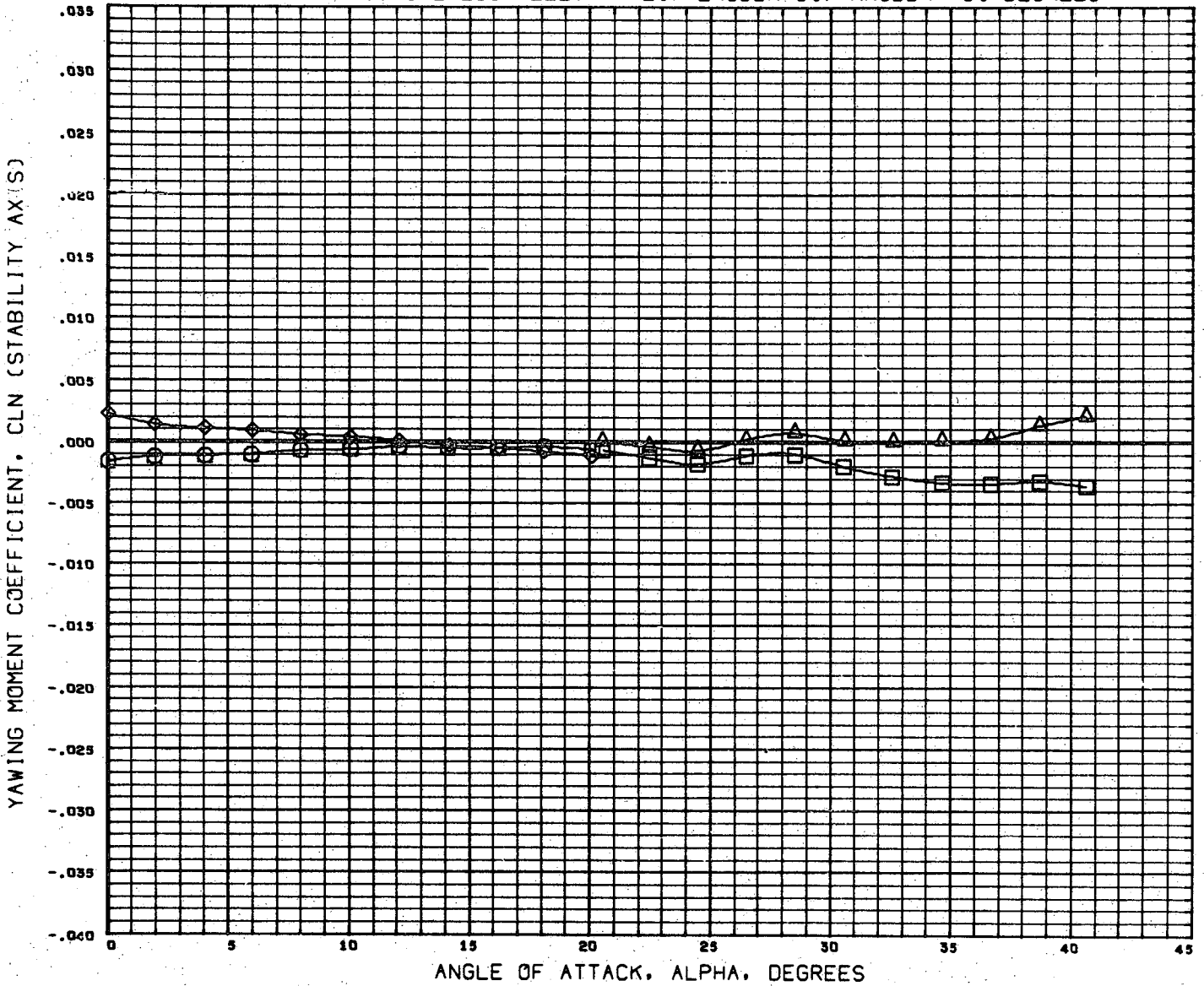


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.00

PAGE 62

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

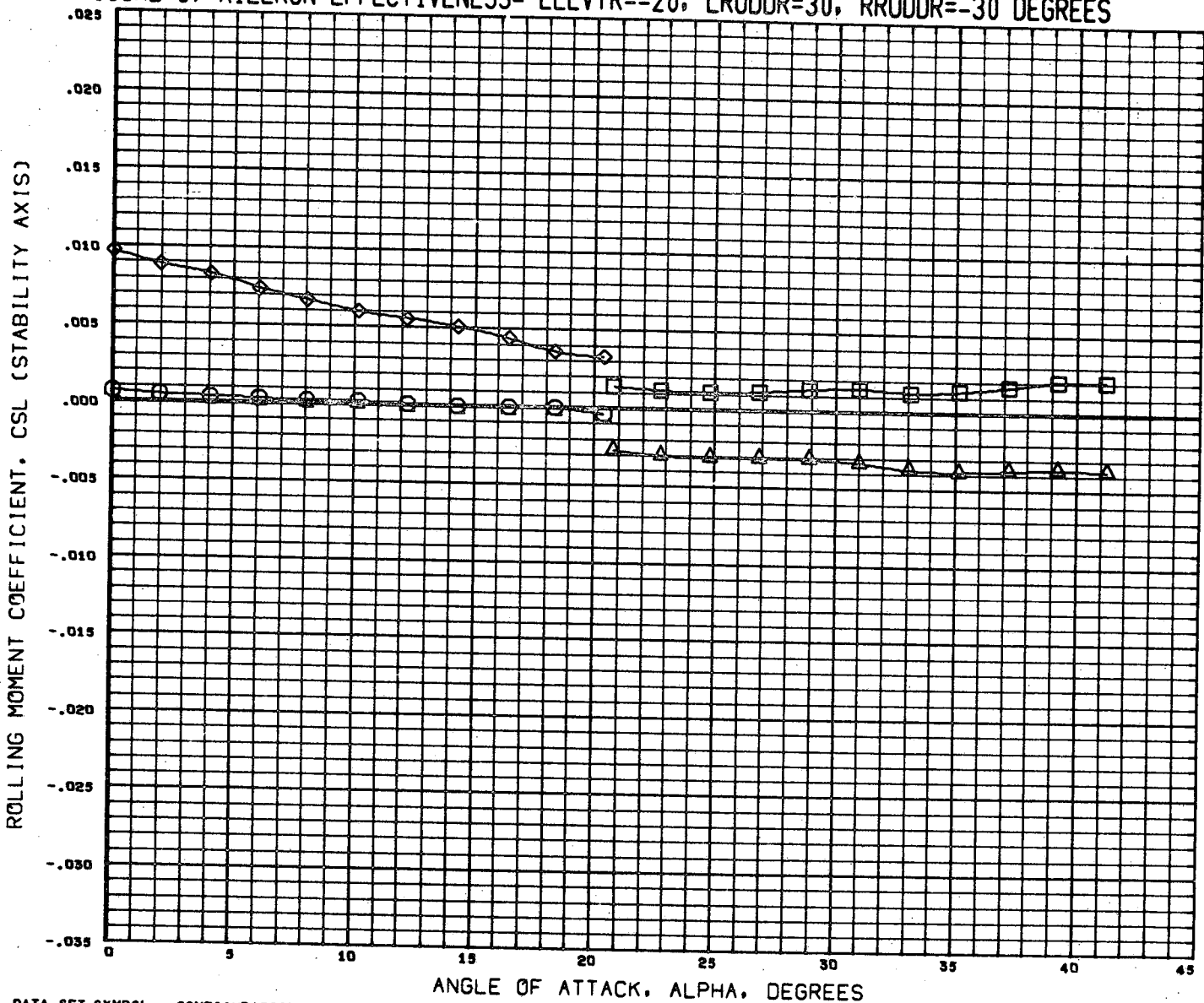


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.96

PAGE 63

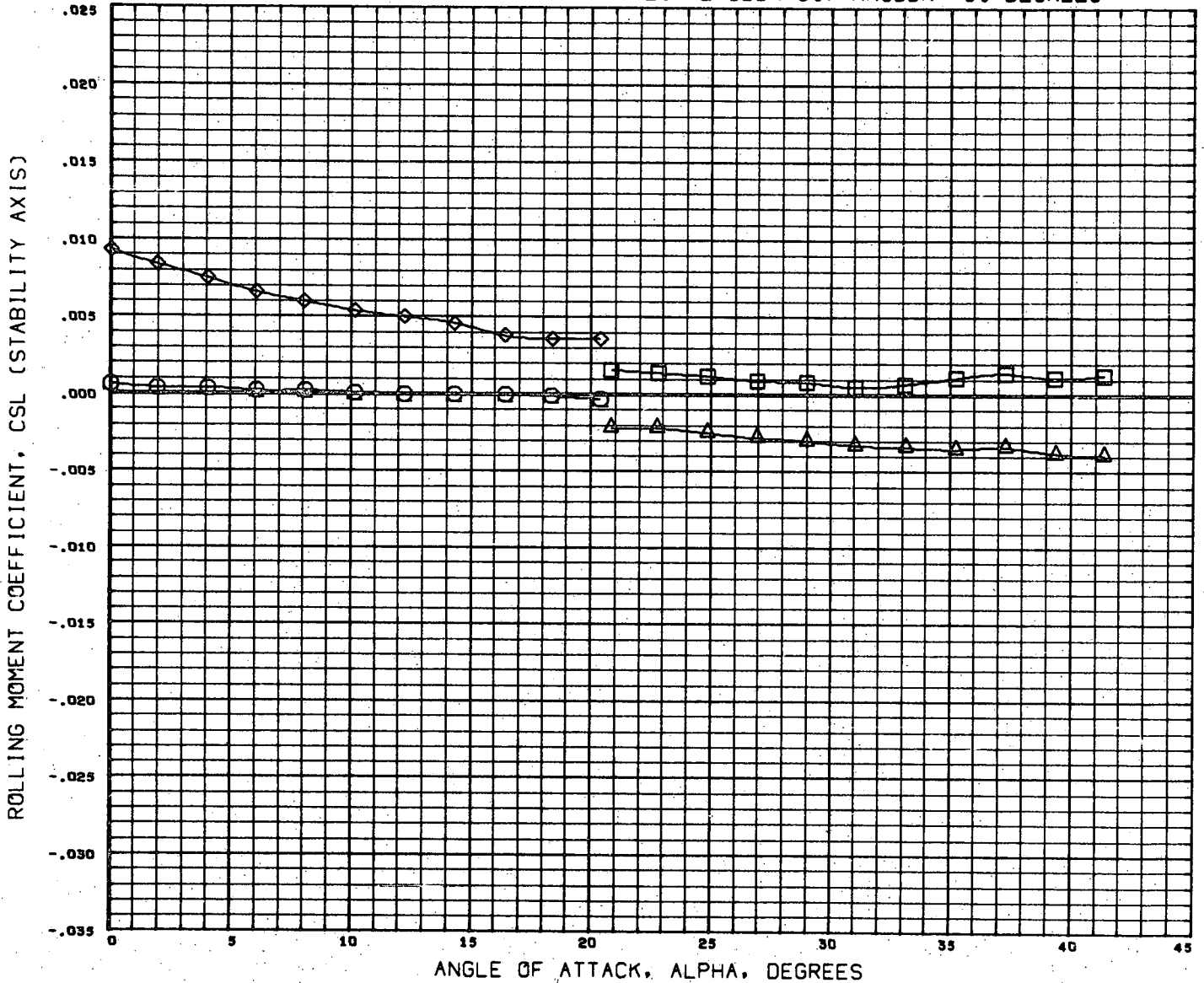
FIGURE 5,AILERON EFFECTIVENESS- ELEVTR=-20, LRUDDR=30, RRUDDR=-30 DEGREES



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION	
(A49003)	MSFC 507 GAC H-33 ORB. BSW4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	SREF	7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. BSW4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	LREF	5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. BSW4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	BREF	3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. BSW4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	XMRP	1274.4040 IN.
					YMRP	0.0000 IN.
					ZMRP	391.3004 IN.
					SCALE	0.0034

MACH 2.99

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

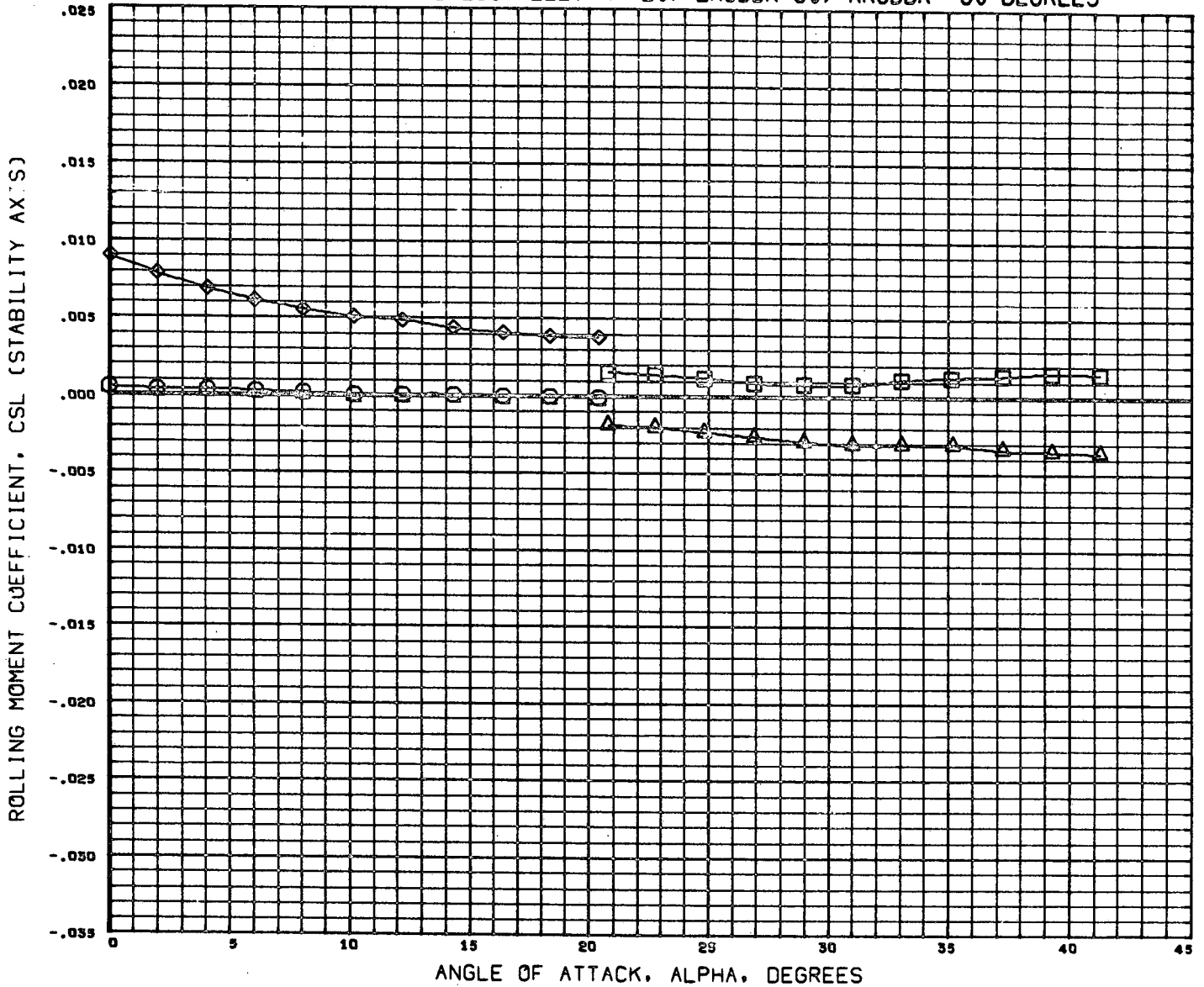


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	LREF 5.4530 IN.
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	BREF 3.8170 IN.
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 3.48

PAGE 65

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

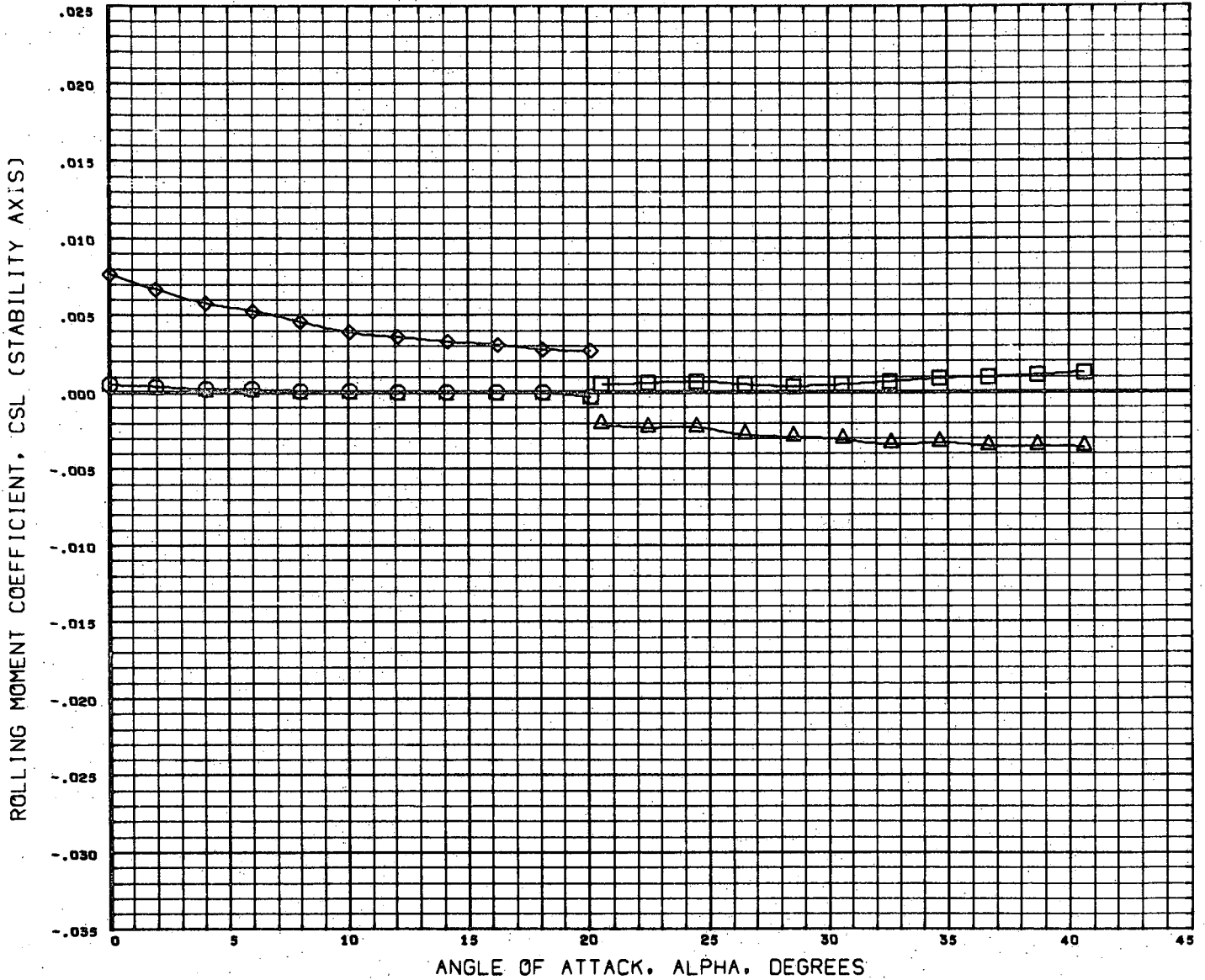


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	SREF 7.8970 SQ. IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10, -30) V5 (+30, -30)	0.000	-20.000	10.000	XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.00

PAGE 66

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

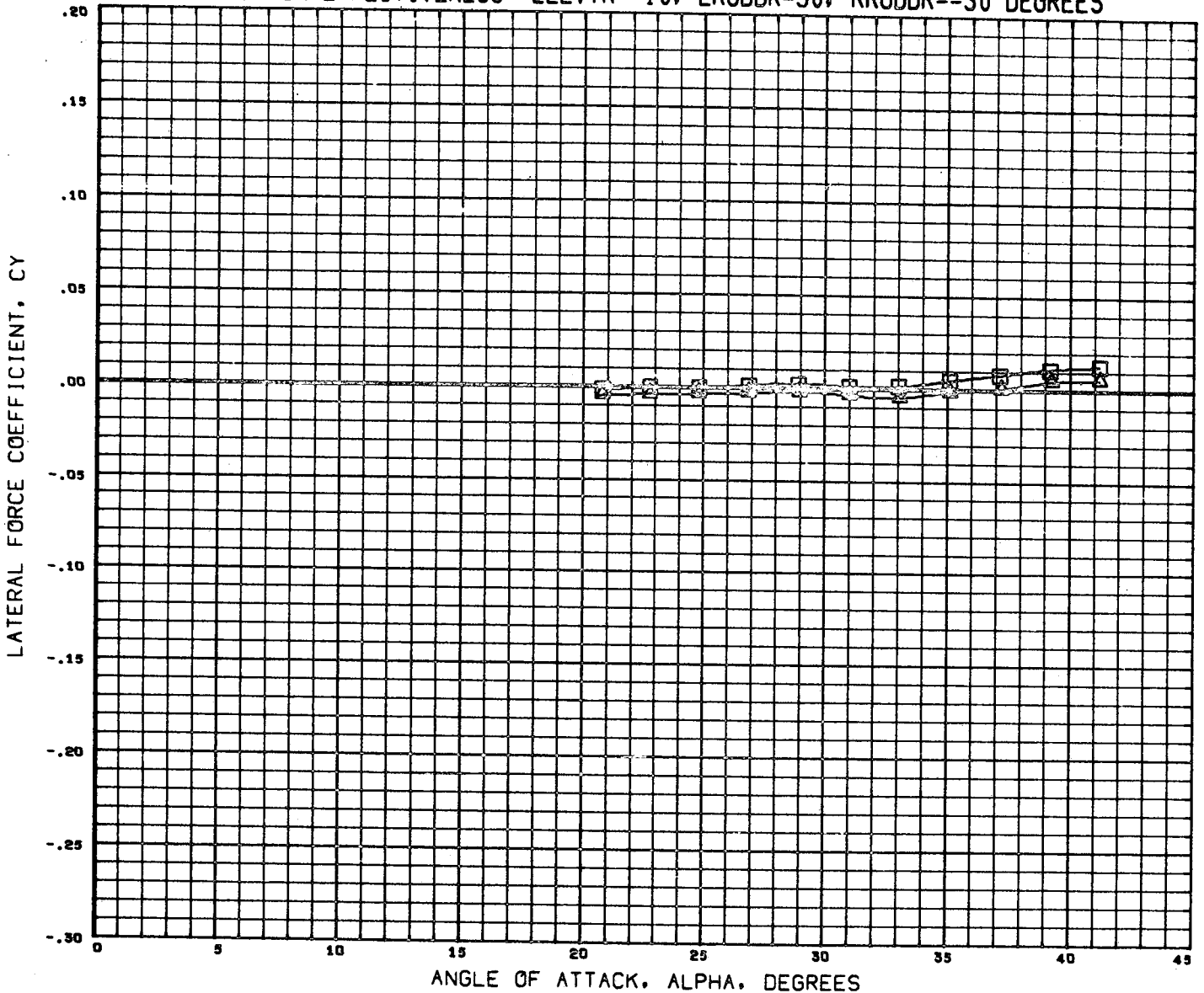


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49003)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5(+30,-30)	0.000	-20.000	0.000	SREF 7.8970 SQ.IN
(A49020)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5(+30,-30)	0.000	-20.000	0.000	LREF 5.4530 IN
(A49004)	MSFC 507 GAC H-33 ORB. B5W4 (-10,-30)V5(+30,-30)	0.000	-20.000	10.000	BREF 3.8170 IN
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10,-30)V5(+30,-30)	0.000	-20.000	10.000	XMRF 1274.4040 IN.
					YMRF 0.0000 IN.
					ZMRF 391.3004 IN.
					SCALE 0.0034

MACH 4.96

PAGE 67

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49018)	MSFC 507 GAC H-33 ORB. B5W4 (-10)V5 (+30,-30)
(A49023)	MSFC 507 GAC H-33 ORB. B5W4 (0,-20)V5

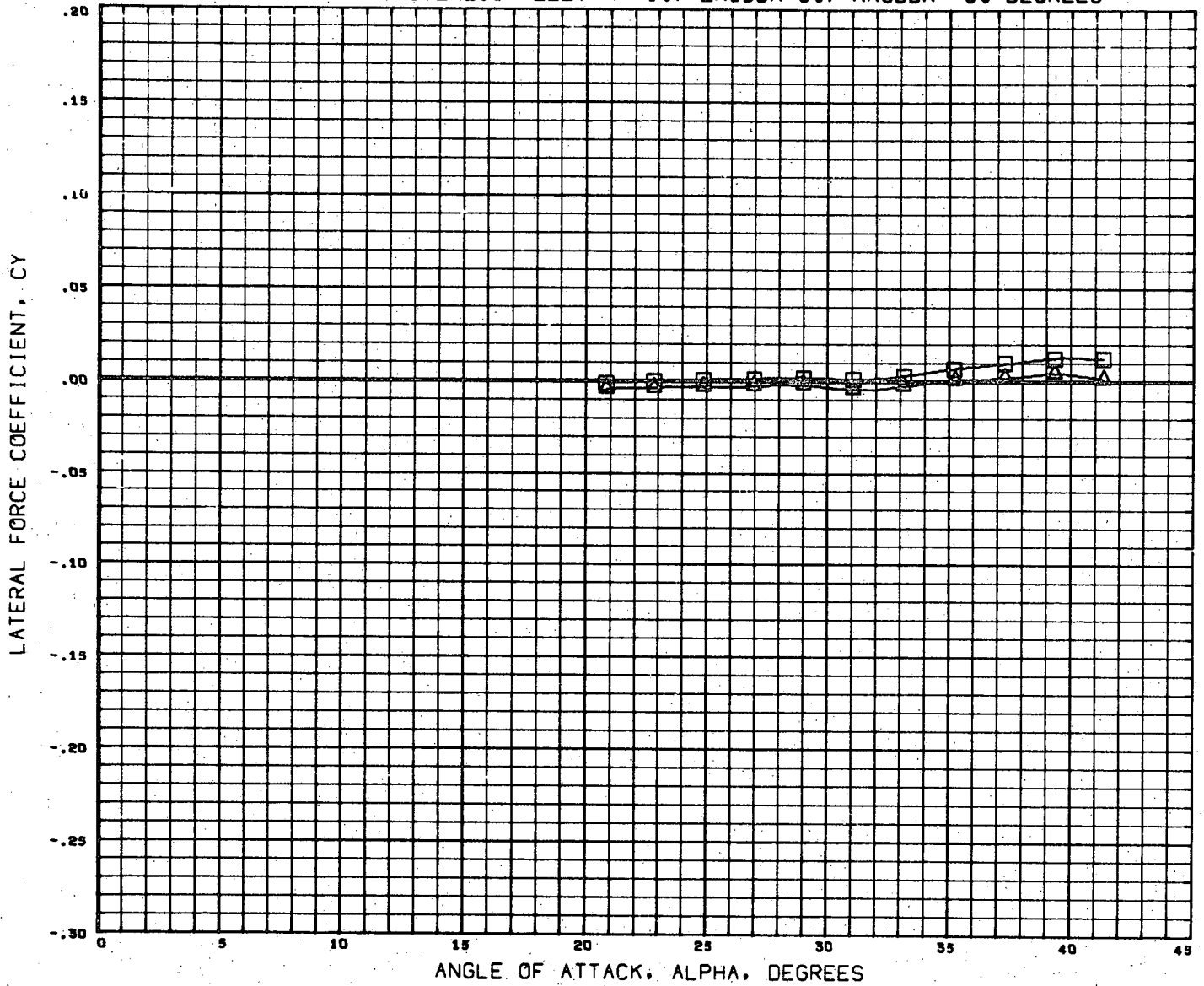
BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

REFERENCE INFORMATION		
SREF	7.8970	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	

MACH 2.99

PAGE 68

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49019)	MSFC 507 GAC H-33 ORB. B5W4 (-10)V5 (+30,-30)
(A49023)	MSFC 507 GAC H-33 ORB. B5W4 (0,-20)V5

BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

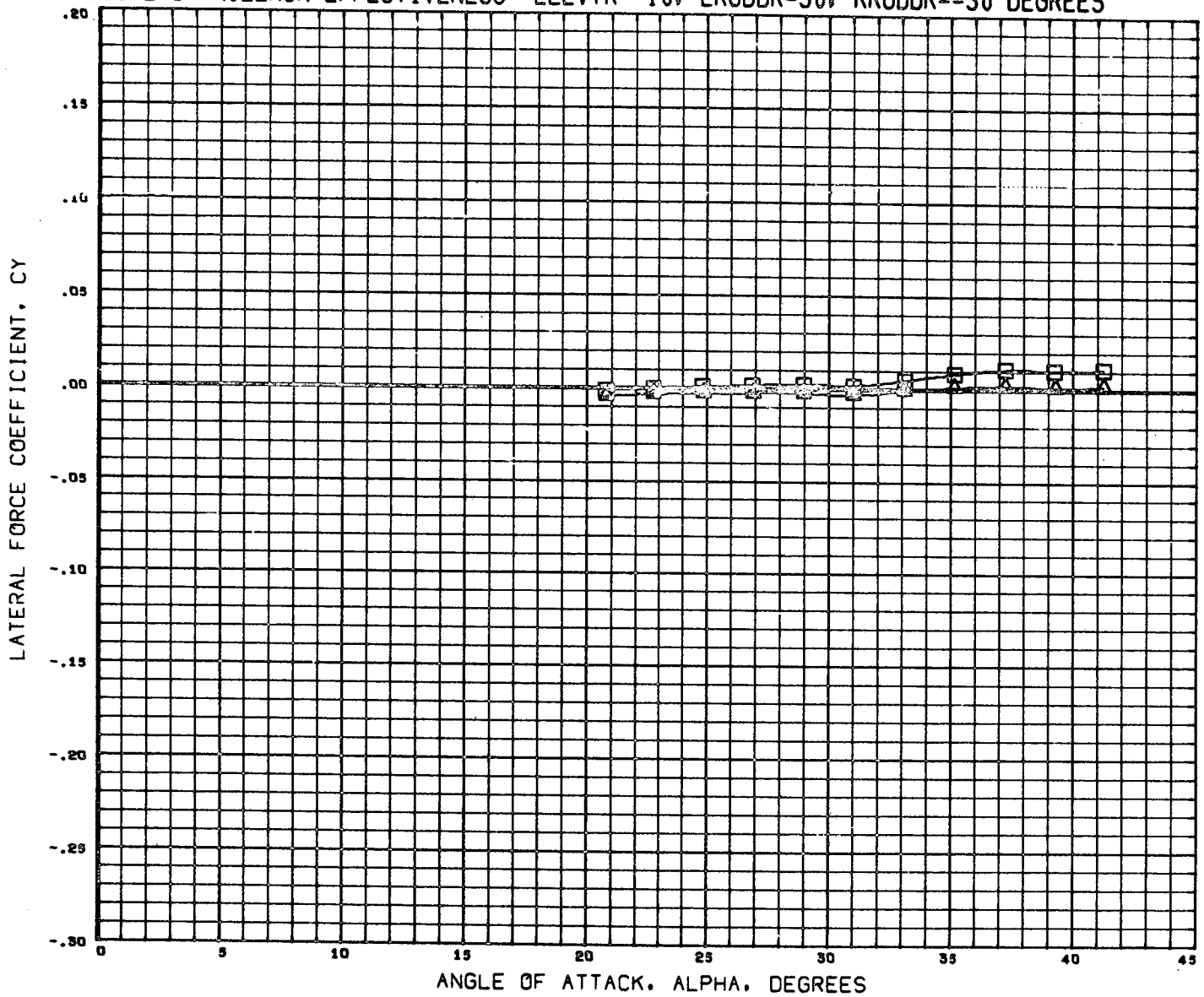
REFERENCE INFORMATION	
SREF	7.8970 SQ. IN
LREF	5.4530 IN
BREF	3.8170 IN
XMRP	1274.4040 IN.
YMRP	0.0000 IN.
ZMRP	391.3004 IN.
SCALE	0.0034

MACH 3.48

PAGE 69



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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49018)	MSFC 507 GAC H-33 ORB. B5W4 (-10)V5 (+30,-30)
(A49023)	MSFC 507 GAC H-33 ORB. B5W4 (0,-20)V5

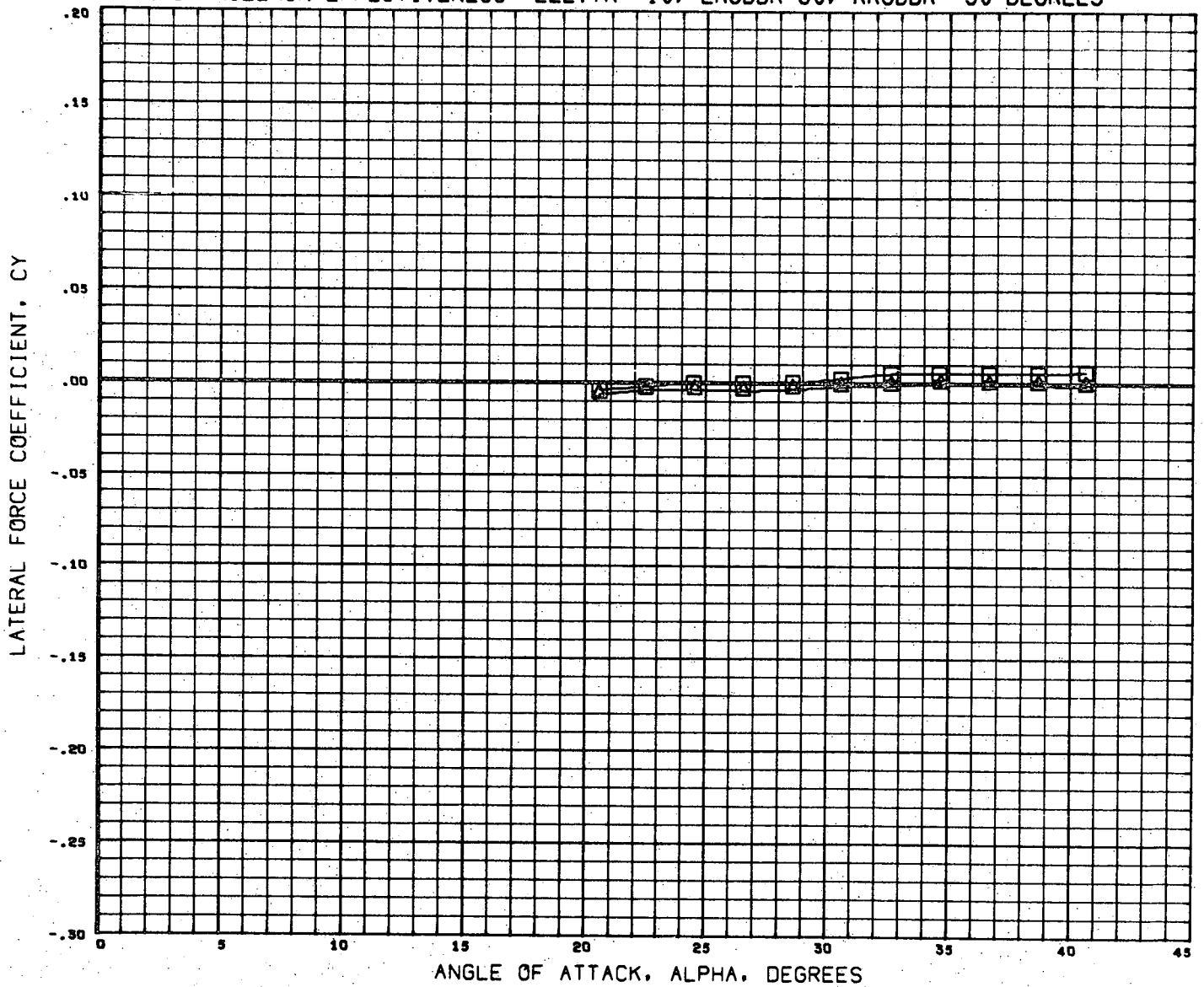
BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

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

MACH 4.00

PAGE 70

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49018)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)
(A49023)	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5

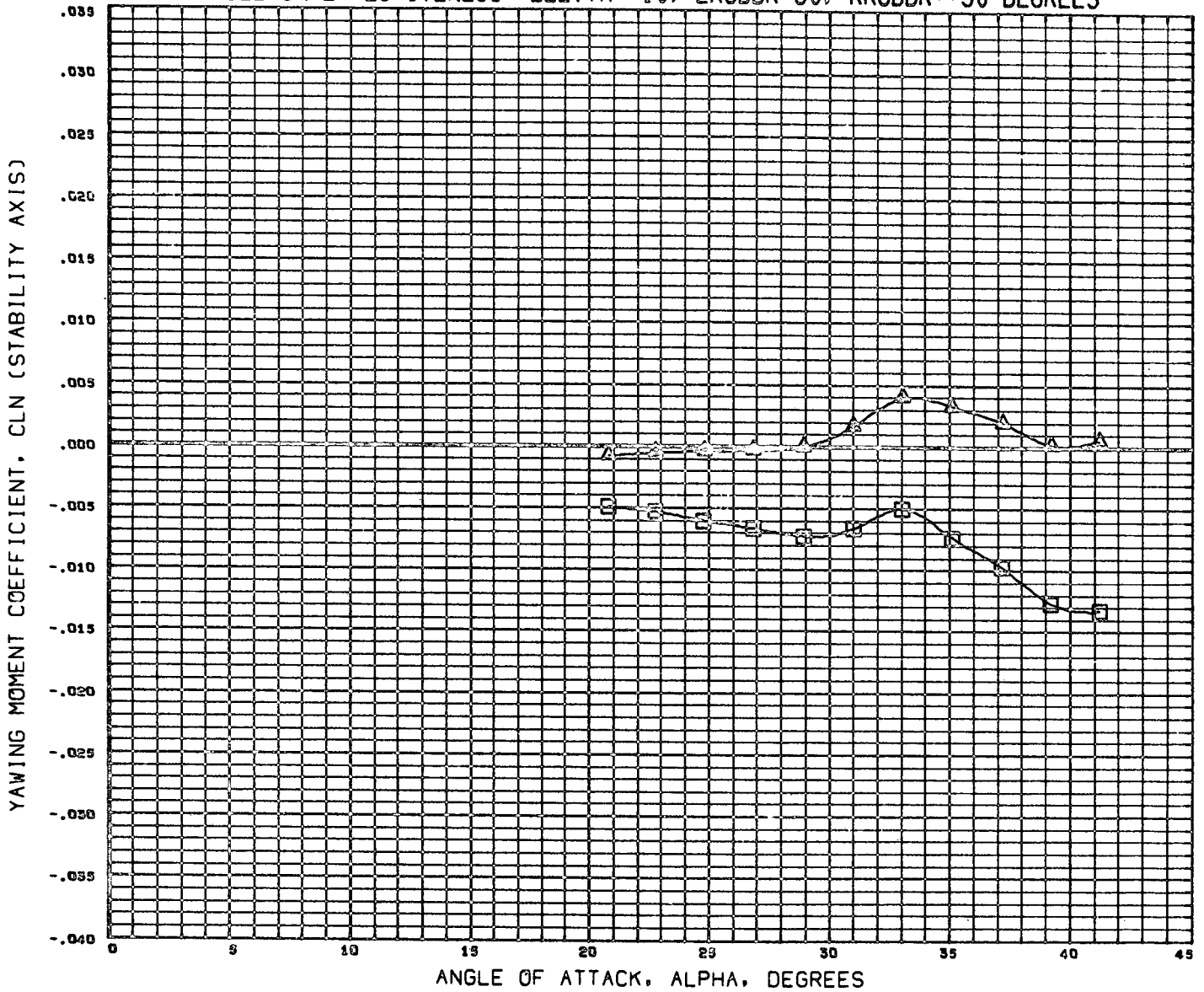
BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

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	

MACH 4.96

PAGE 71

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49018) $\triangle$	MSFC 307 GAC H-33 CRB. B9W4(-10)V5(+30,-30)
(A49023) $\square$	MSFC 307 GAC H-33 CRB. B9W4(0,-20)V5

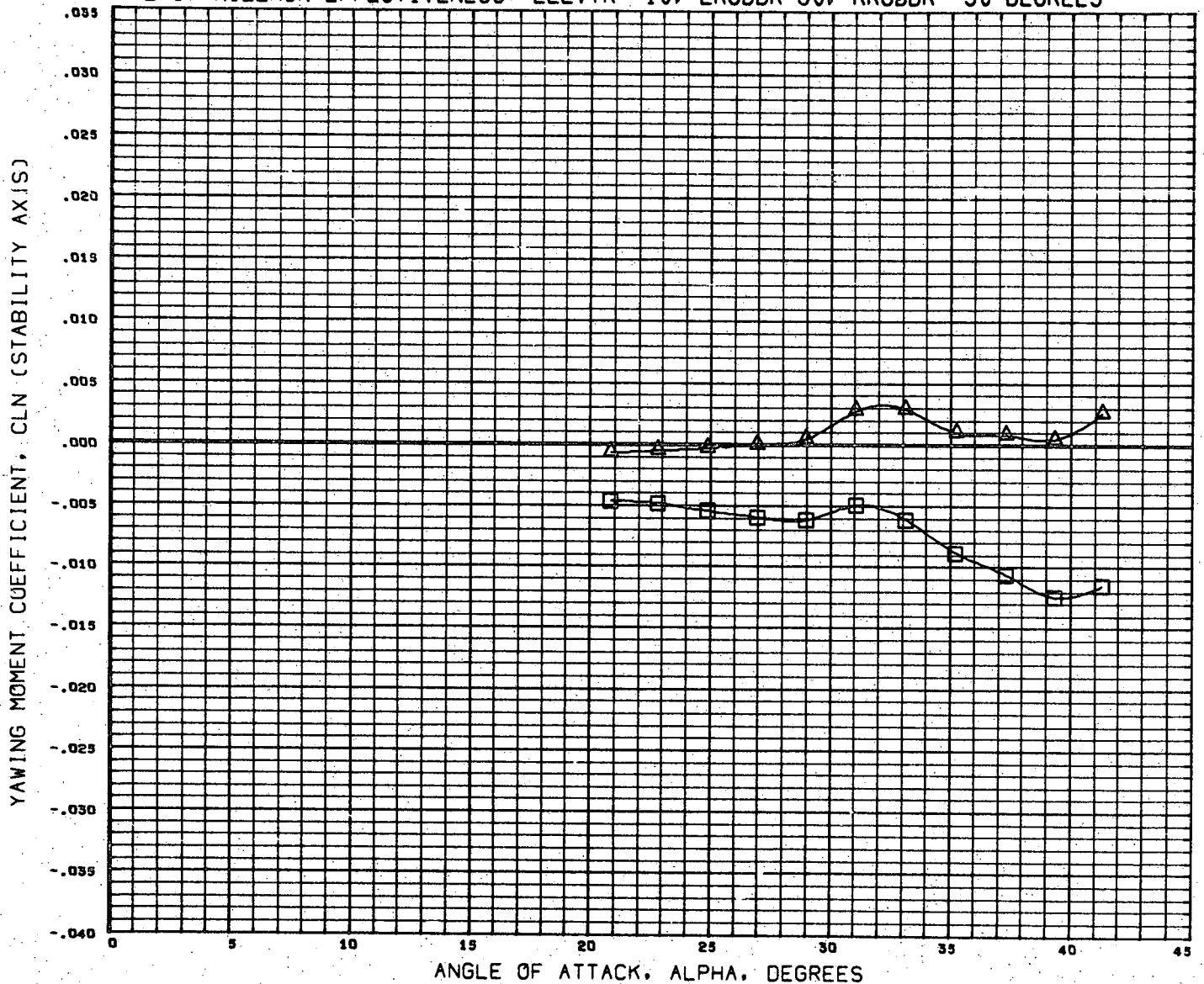
BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

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	

MACH 2.99

PAGE 72

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49018) $\triangle$	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)
(A49023) $\square$	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5

BETA	ELEVTR	AILERN
0.000	-10.000	0.000
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

MACH 3.48

PAGE 73

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49018) $\triangle$	MSFC 907 GAC H-33 CRG. BSW4 (-10) VS (+30, -30)
(A49023) $\square$	MSFC 907 GAC H-33 CRG. BSW4 (0, -20) VS

BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

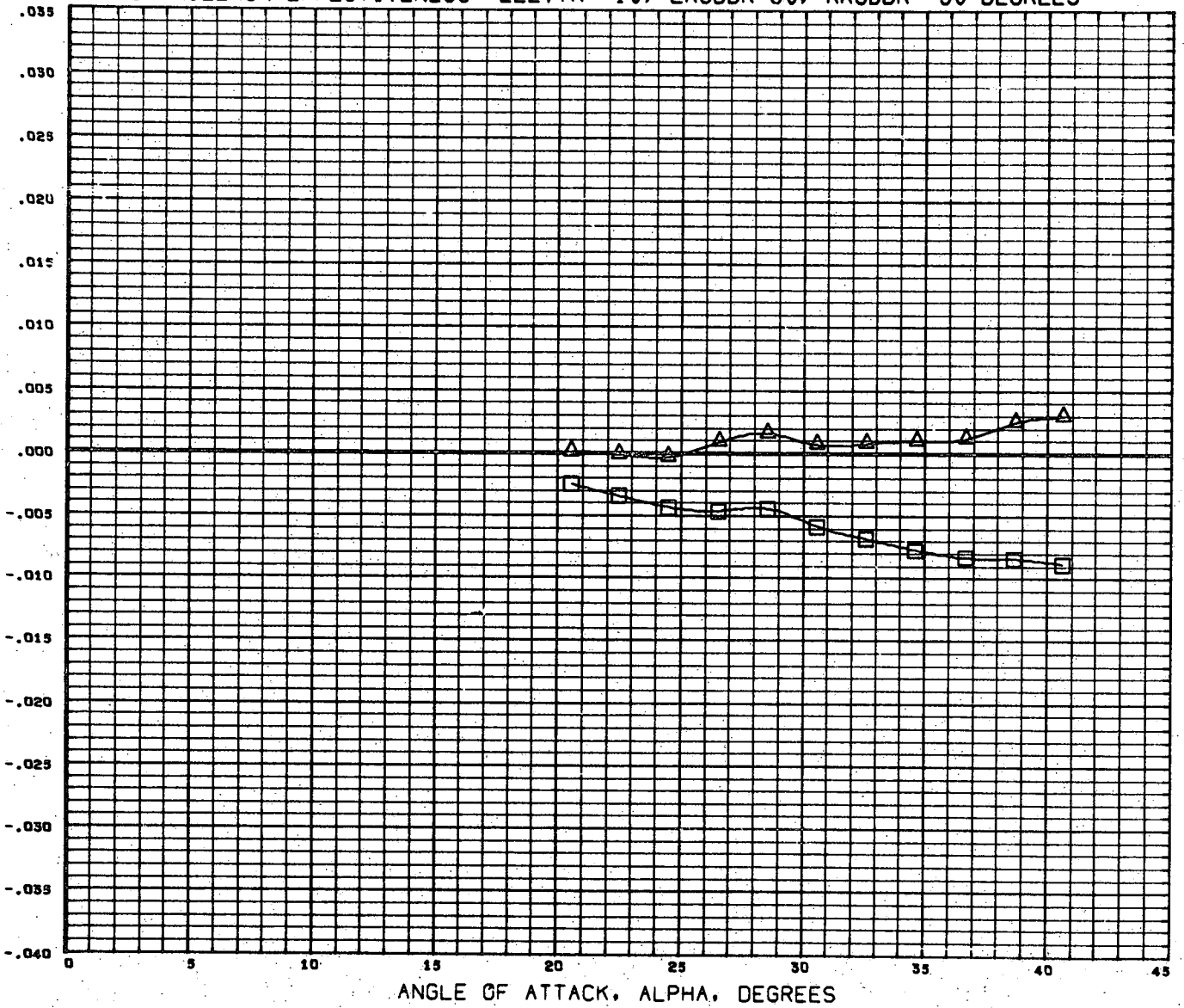
REFERENCE INFORMATION		
SREF	7.8977	SQ. IN
LREF	5.4330	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 4.00

PAGE 74

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

YAWING MOMENT COEFFICIENT, CLN (STABILITY AXIS)



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49018) $\triangle$	MSFC 307 GAC H-33 ORB. B5W4(-10)V5(+30,-30)
(A49023) $\square$	MSFC 307 GAC H-33 ORB. B5W4(0,-20)V5

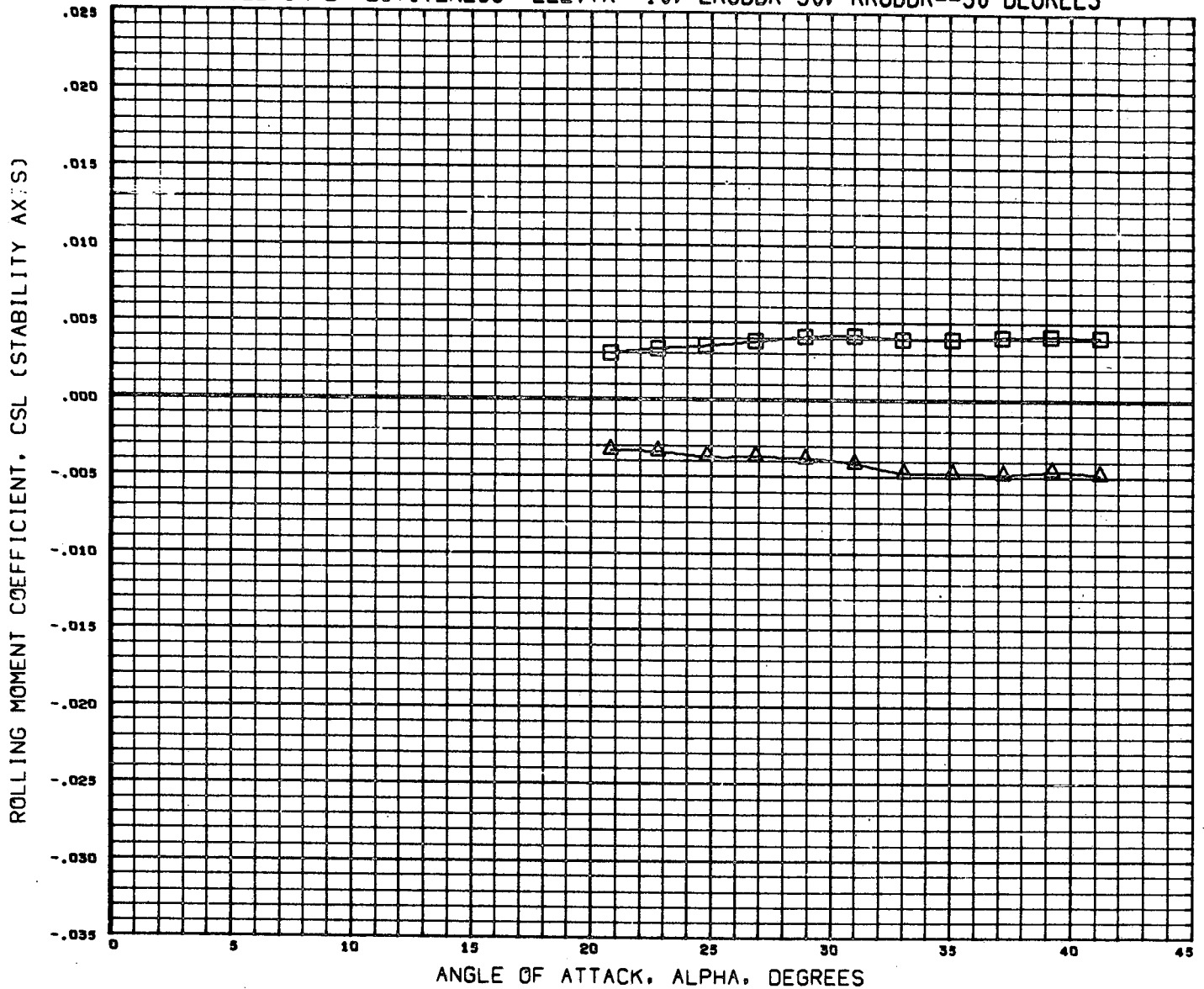
BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

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

MACH 4.96

PAGE 75

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49018)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)
(A49023)	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5

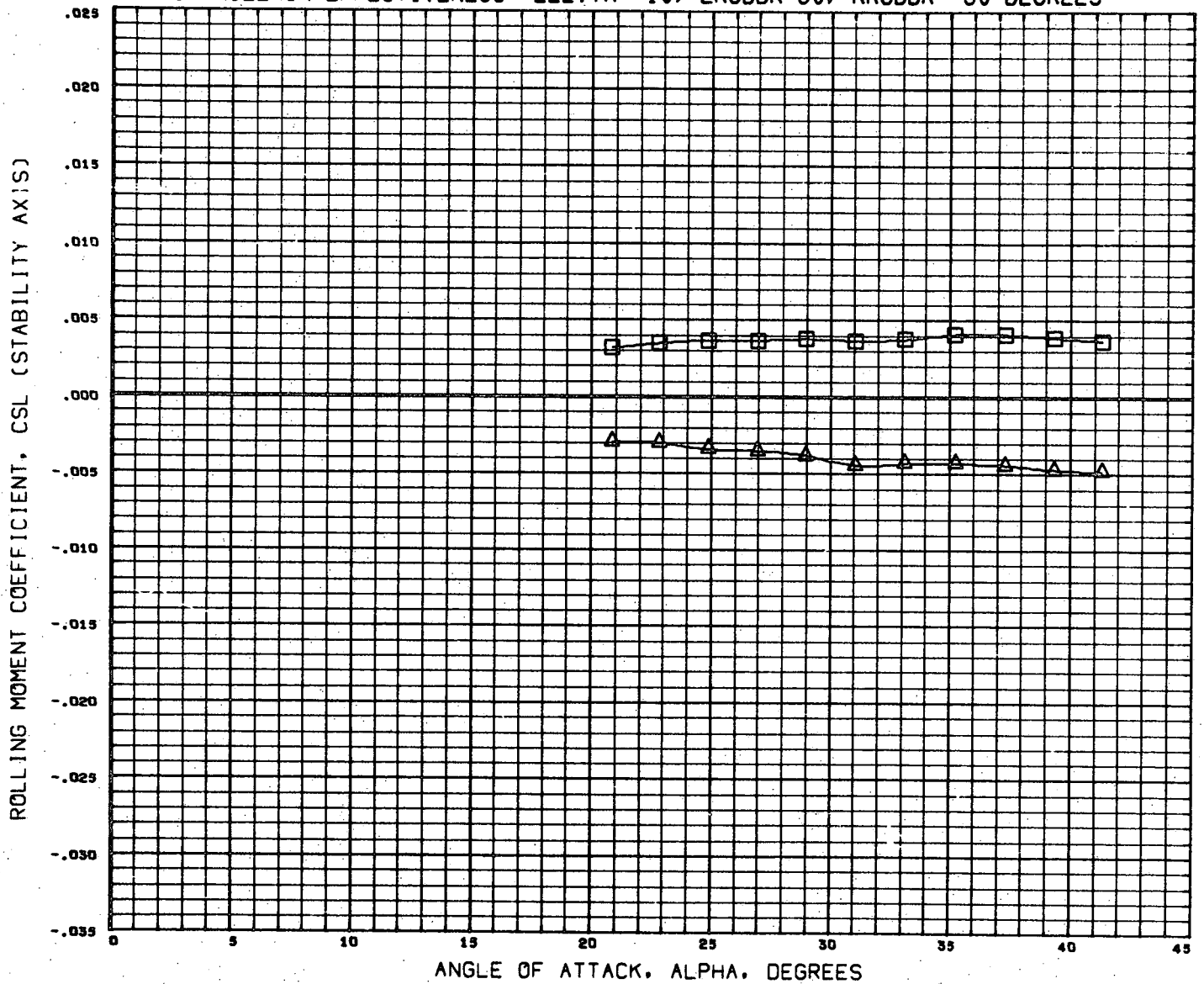
BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

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	

MACH 2.99

PAGE 76

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



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

BETA	ELEVTR	AILERN
0.000	-10.000	0.000
0.000	-10.000	10.000

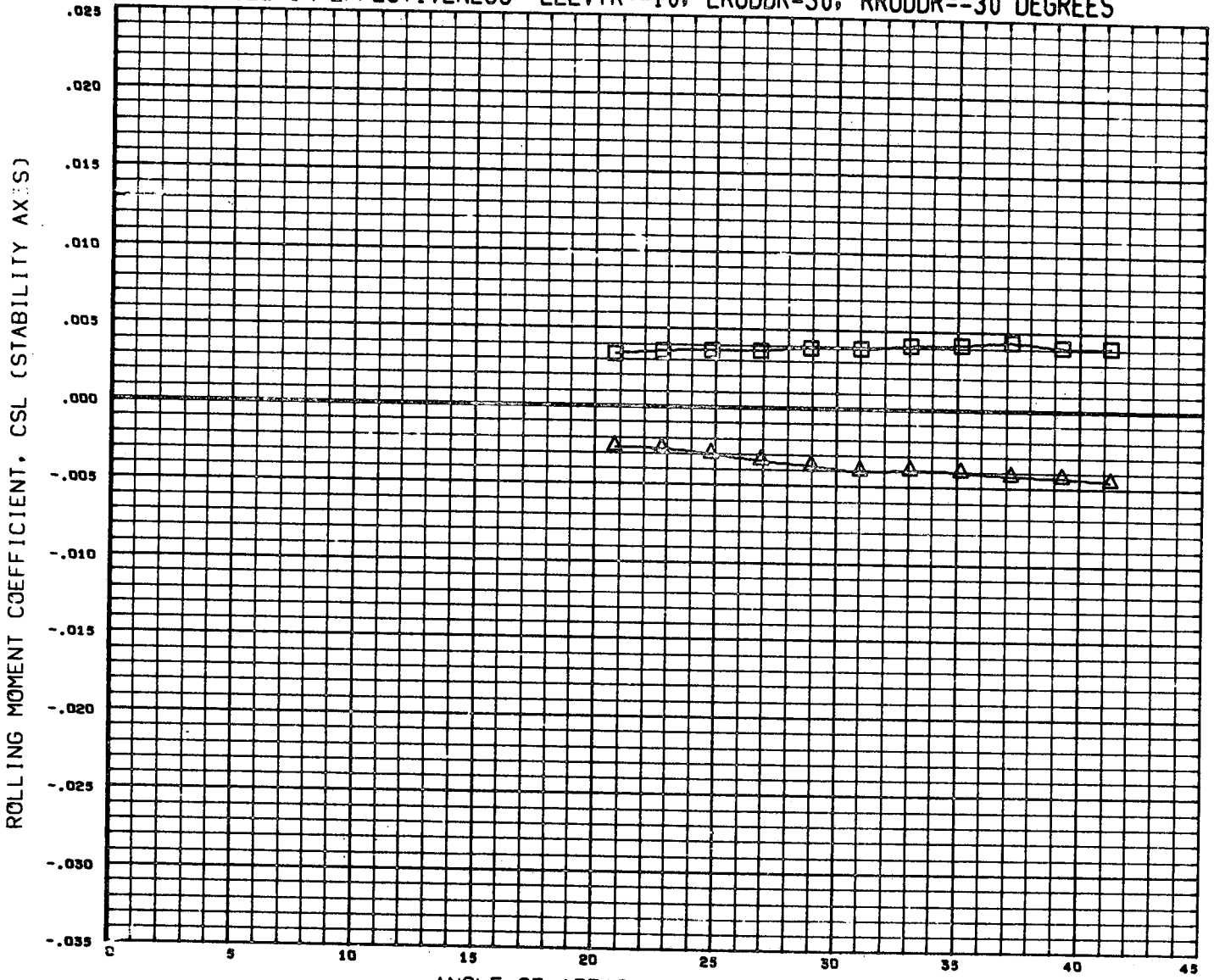
REFERENCE INFORMATION	
SREF	7.8970 SQ. IN
LREF	5.4530 IN
BREF	3.8170 IN
XMRP	1274.4040 IN.
YMRP	0.0000 IN.
ZMRP	391.3004 IN.
SCALE	0.0034

MACH 3.48

PAGE 77



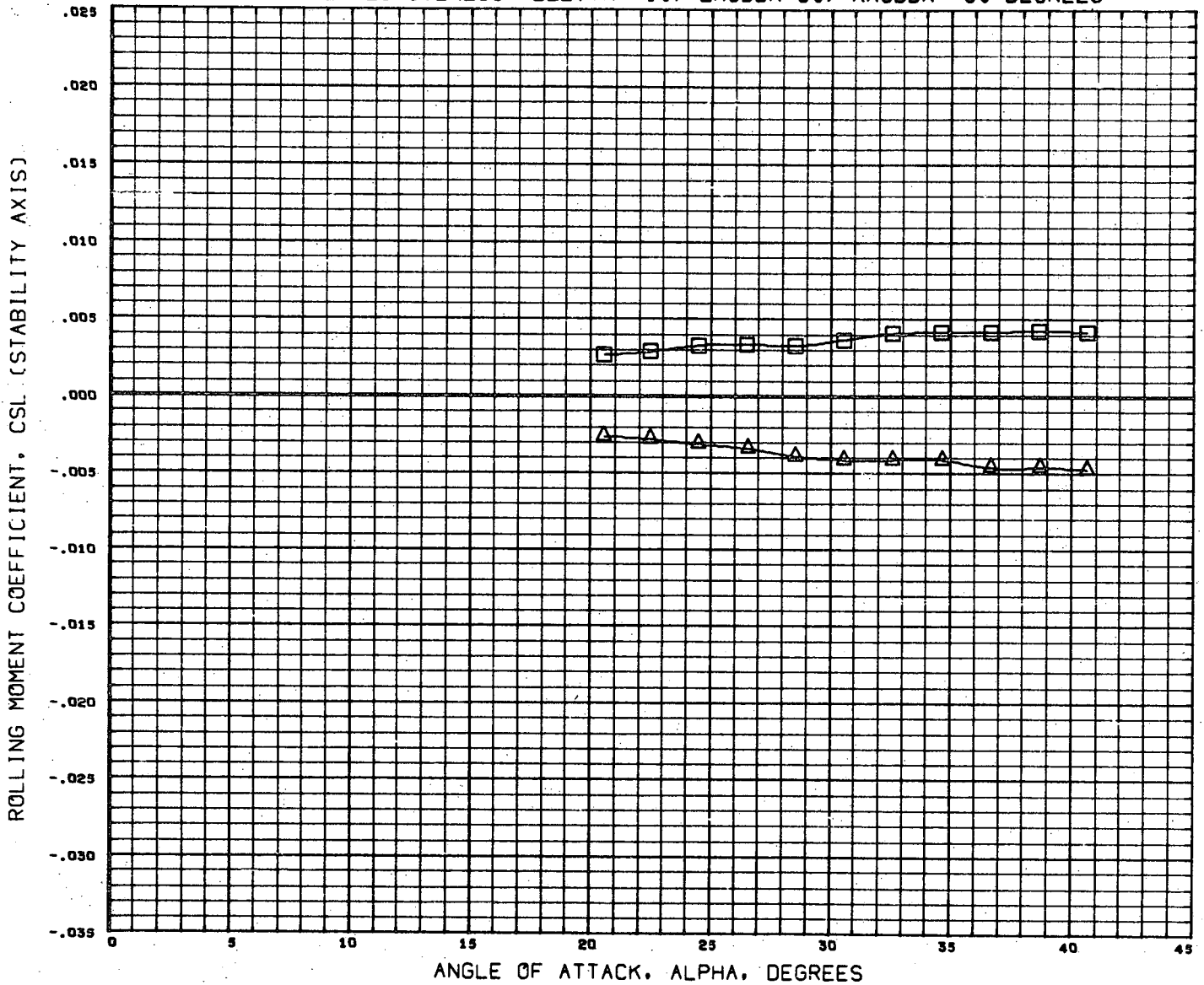
FIGURE 6, AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RUDDR=-30 DEGREES



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49018)	MSFC 507 GAC H-33 ORB. B5W4 (-10)V5 (+30, -30)	0.000	-10.000	0.000	GRES 7.8970 SQ. IN
(A49023)	MSFC 507 GAC H-33 ORB. B5W4 (0, -20)V5	0.000	-10.000	10.000	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 6, AILERON EFFECTIVENESS- ELEVTR=-10, LRUDDR=30, RRUDDR=-30 DEGREES

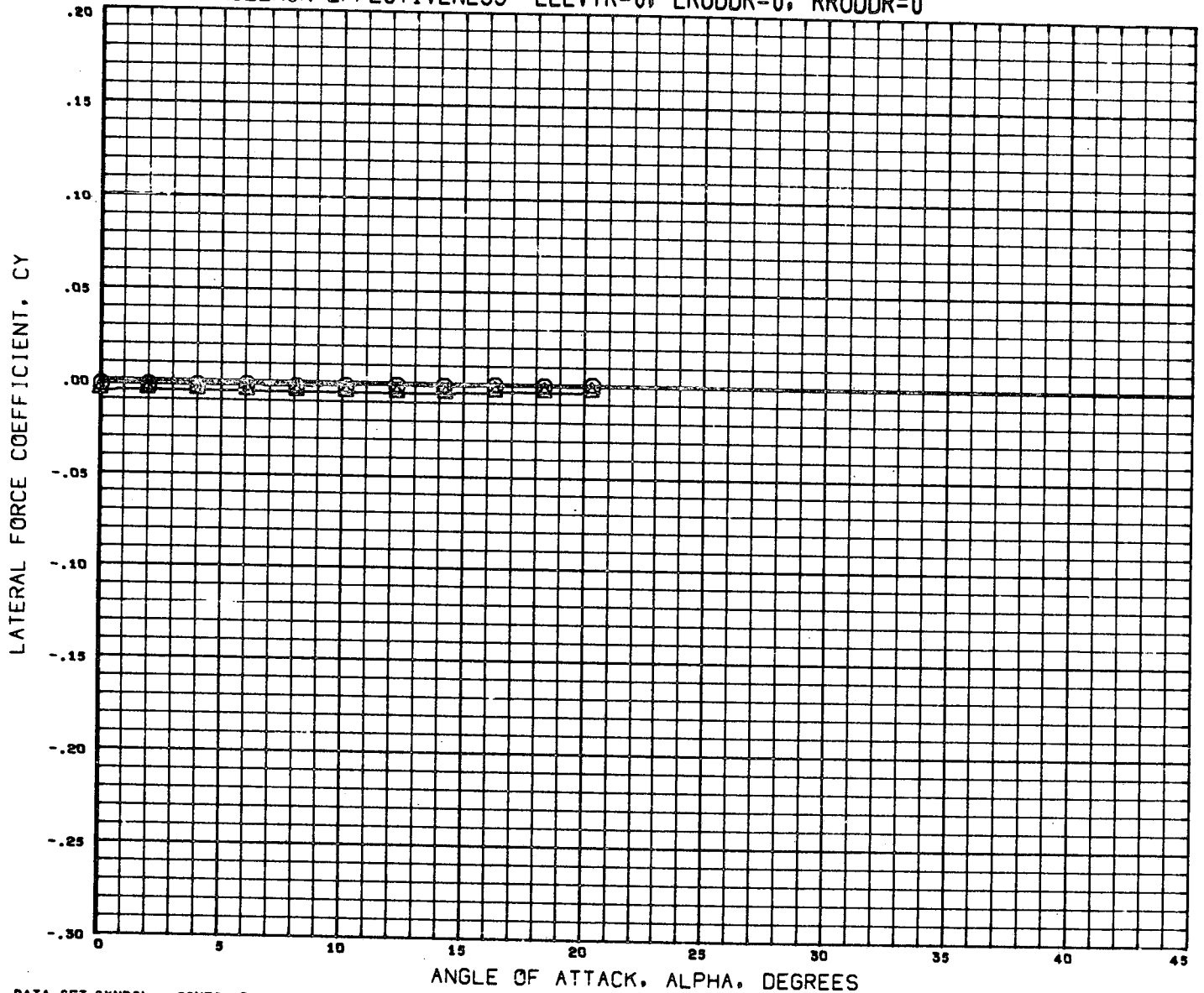


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ELEVTR	AILERN	REFERENCE INFORMATION
(A49018)	MSFC 507 GAC H-33 ORB. B5W4(-10)V5(+30,-30)	0.000	-10.000	0.000	SREF 7.8970 SQ. IN
(A49023)	MSFC 507 GAC H-33 ORB. B5W4(0,-20)V5	0.000	-10.000	10.000	LREF 5.4530 IN
					BREF 3.8170 IN
					XMRP 1274.4040 IN.
					YMRP 0.0000 IN.
					ZMRP 391.3004 IN.
					SCALE 0.0034

MACH 4.96

PAGE 79

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49X08)	MSFC 507 GAC H-33 ORB. B5W4V5
(A49036)	MSFC 507 GAC H-33 ORB. B5W4(-10,+10)V5

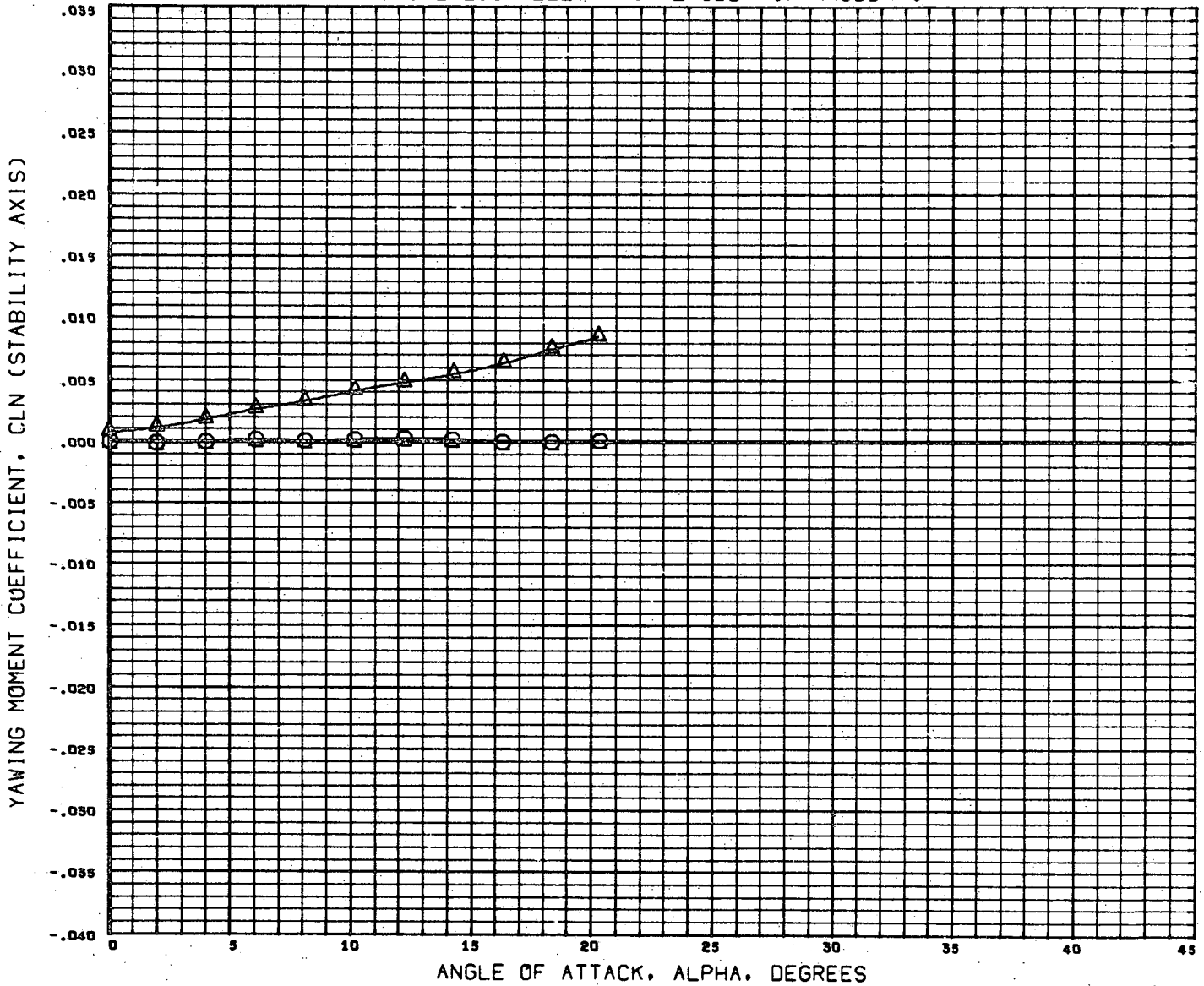
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	0.000	-10.000

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	

MACH 2.99

PAGE 80

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49X08) ○	MSFC 507 GAC H-33 ORB. B5W4V5
(A49D36) △	MSFC 507 GAC H-33 ORB. B5W4(-10,+10)V5

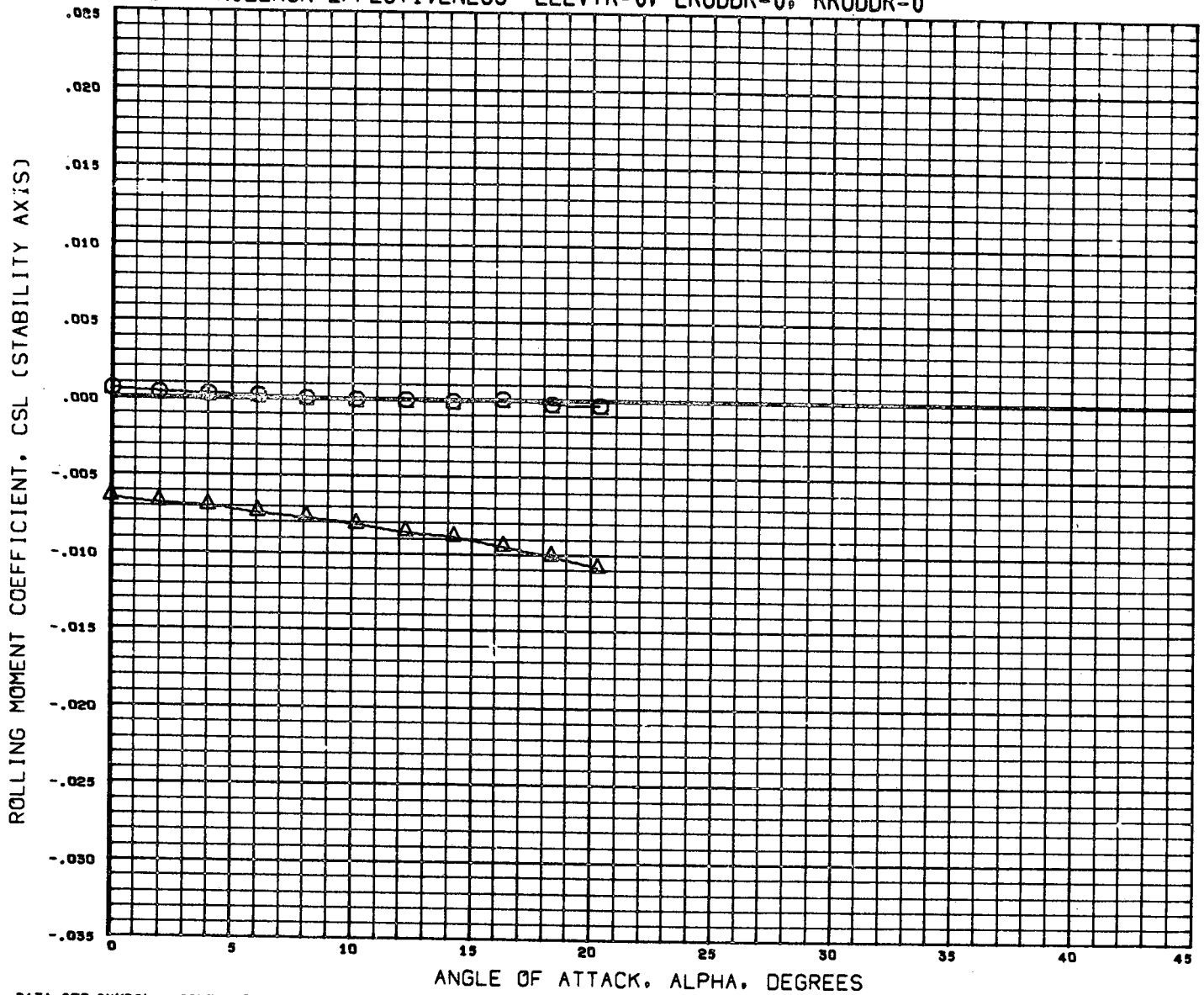
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	0.000	-10.000

REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRF	1274.4040	IN.
YMRF	0.0030	IN.
ZMRF	391.3004	IN.
SCALE	0.0034	

MACH 2.99

PAGE 81

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49X08)	MSFC 507 GAC H-33 ORB. B5W4V5
(A49036)	MSFC 507 GAC H-33 ORB. B5W4(-10,+10)V5

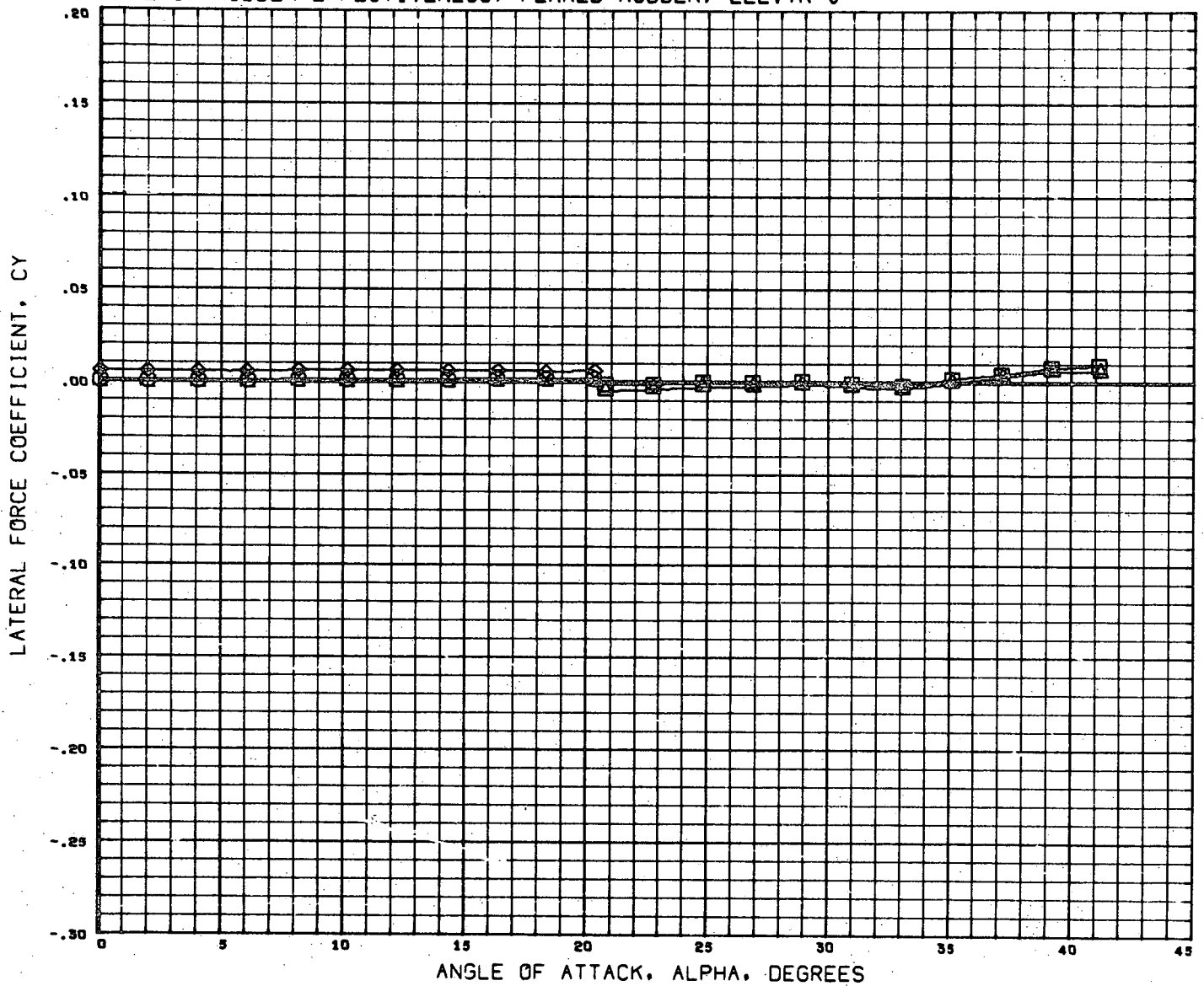
BETA	ELEVTR	AILERN
0.000	0.000	0.000
0.000	9.000	-10.000

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	

MACH 2.99

PAGE 82

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

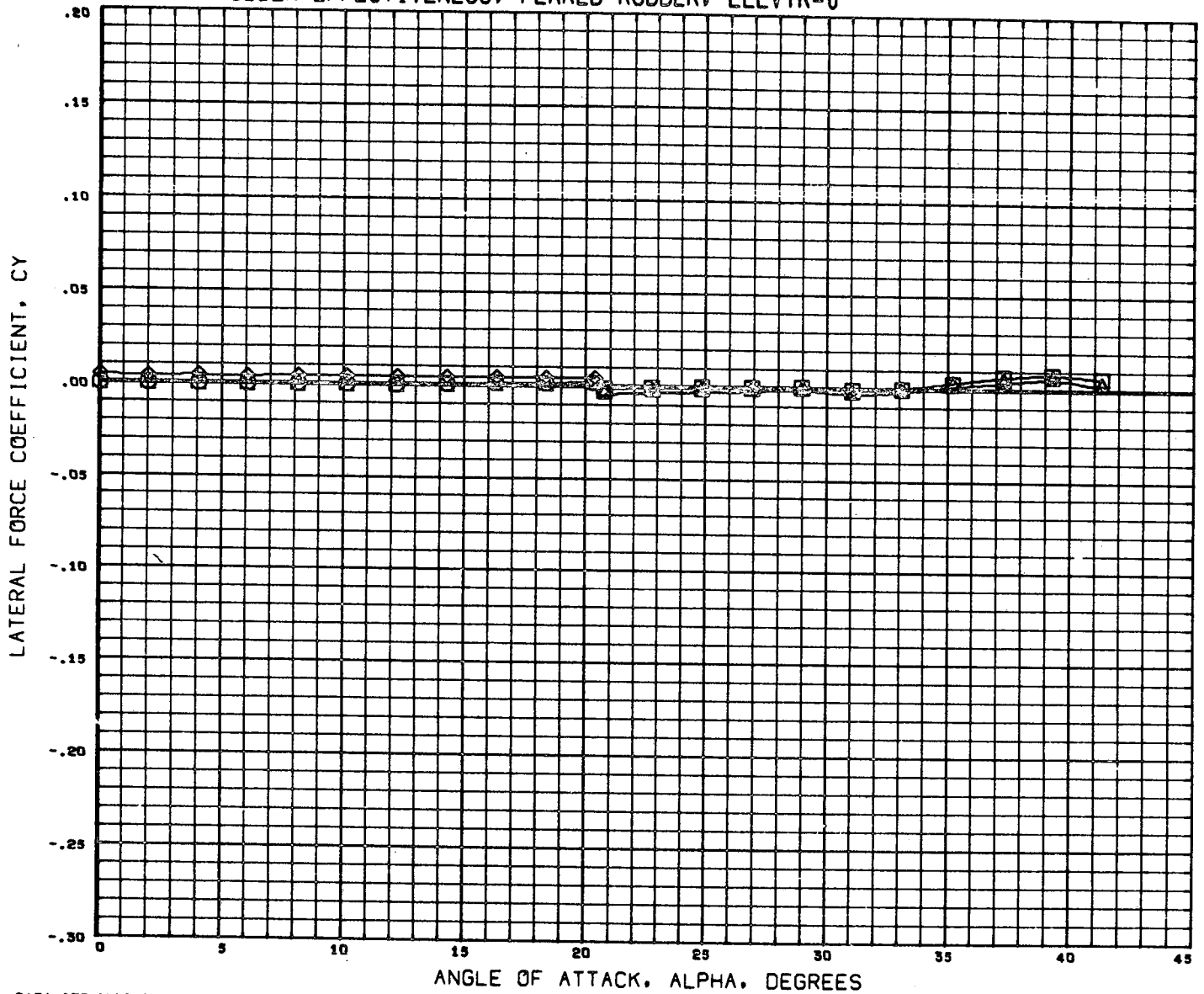


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ.IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 2.99

PAGE 83

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

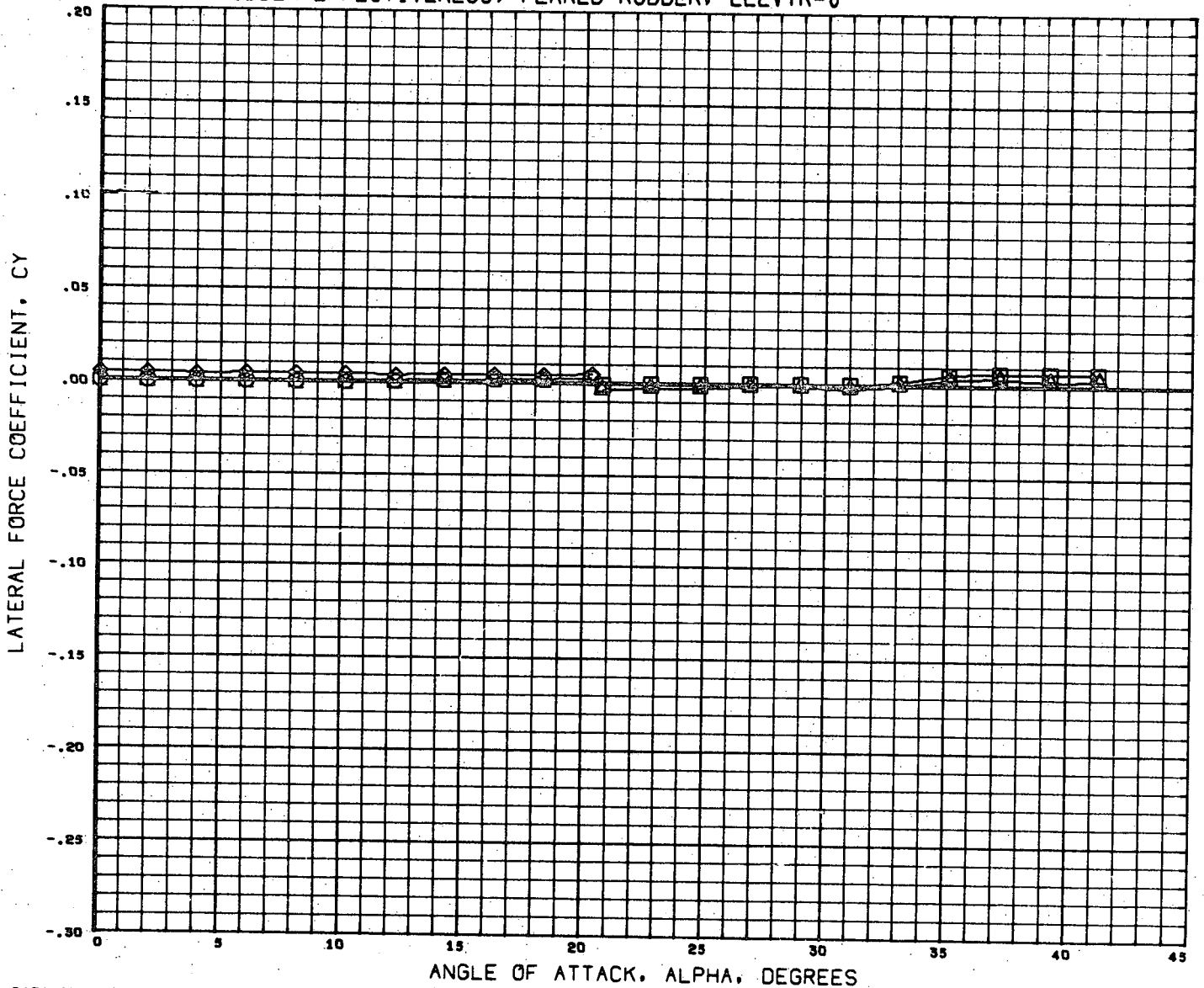


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ATLERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V5 (+35, -25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V5 (+35, -25)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 3.48

PAGE 84

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



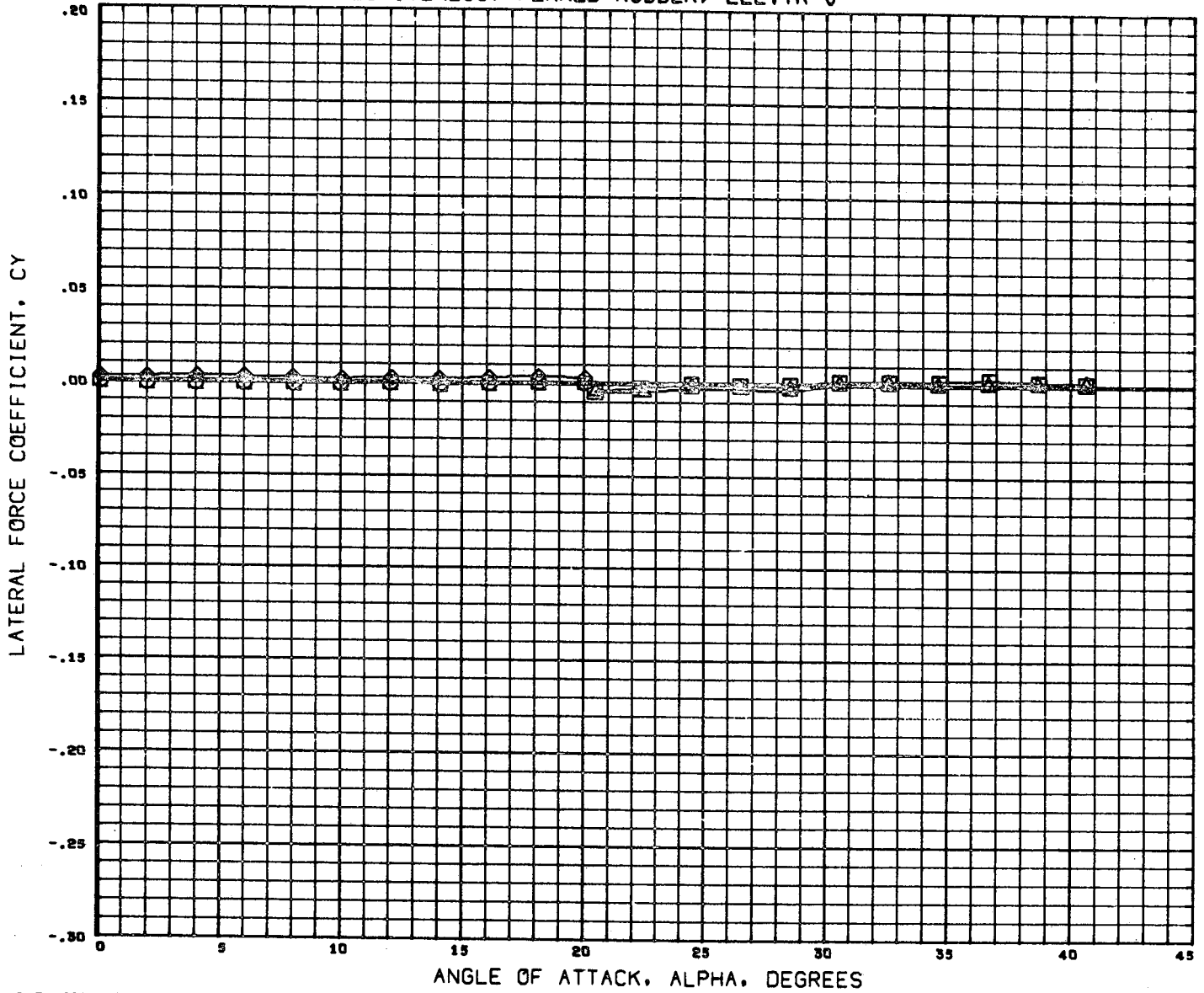
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	SREF	7.8970 SQ. IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000	BREF	3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.00

PAGE 85



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

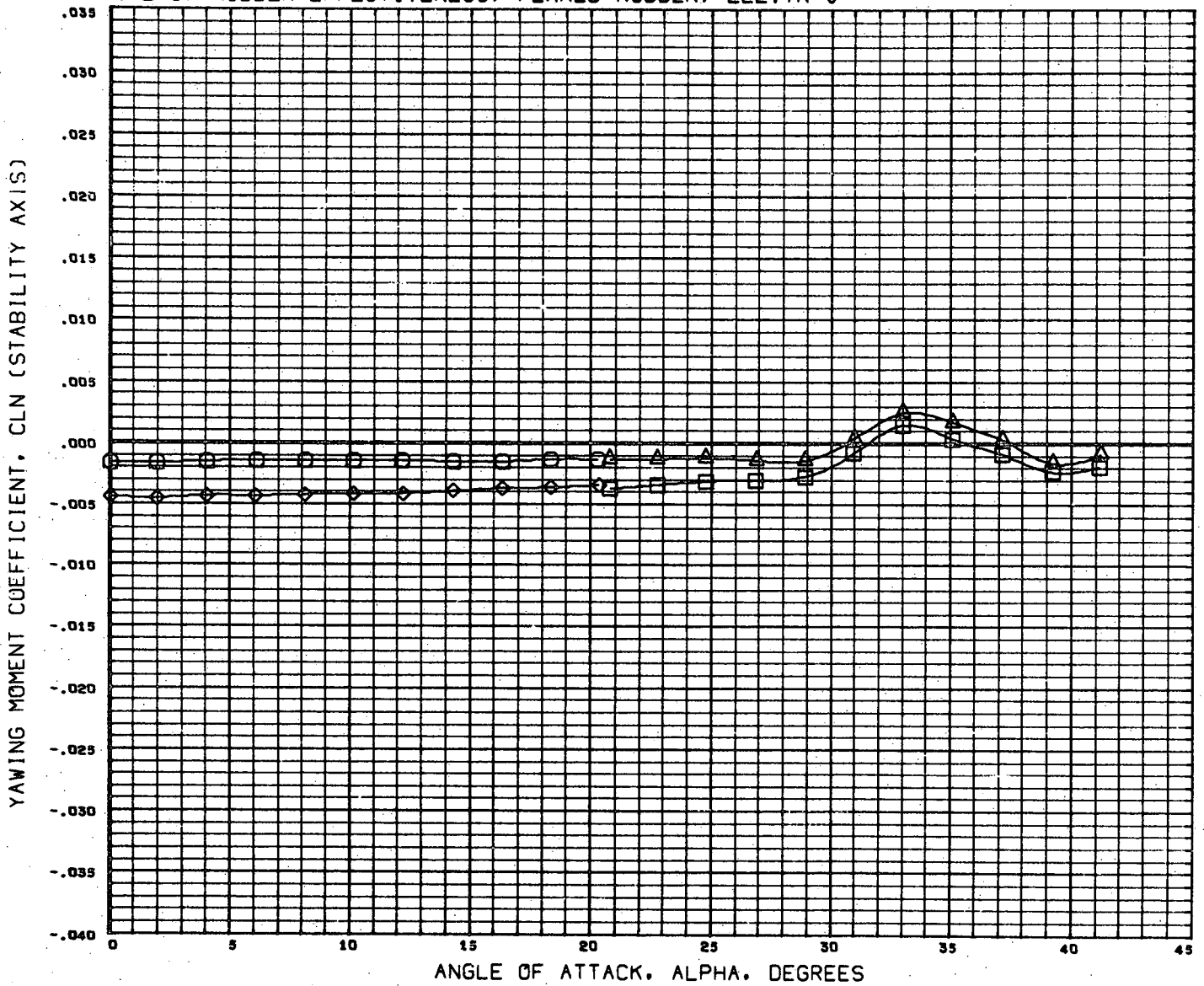


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 307 GAC H-33 ORB. B5W4V5 (+30,-30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49017)	MSFC 307 GAC H-33 ORB. B5W4V5 (+30,-30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 307 GAC H-33 ORB. B5W4V5 (+35,-25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 307 GAC H-33 ORB. B5W4V5 (+35,-25)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.96

PAGE 86

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

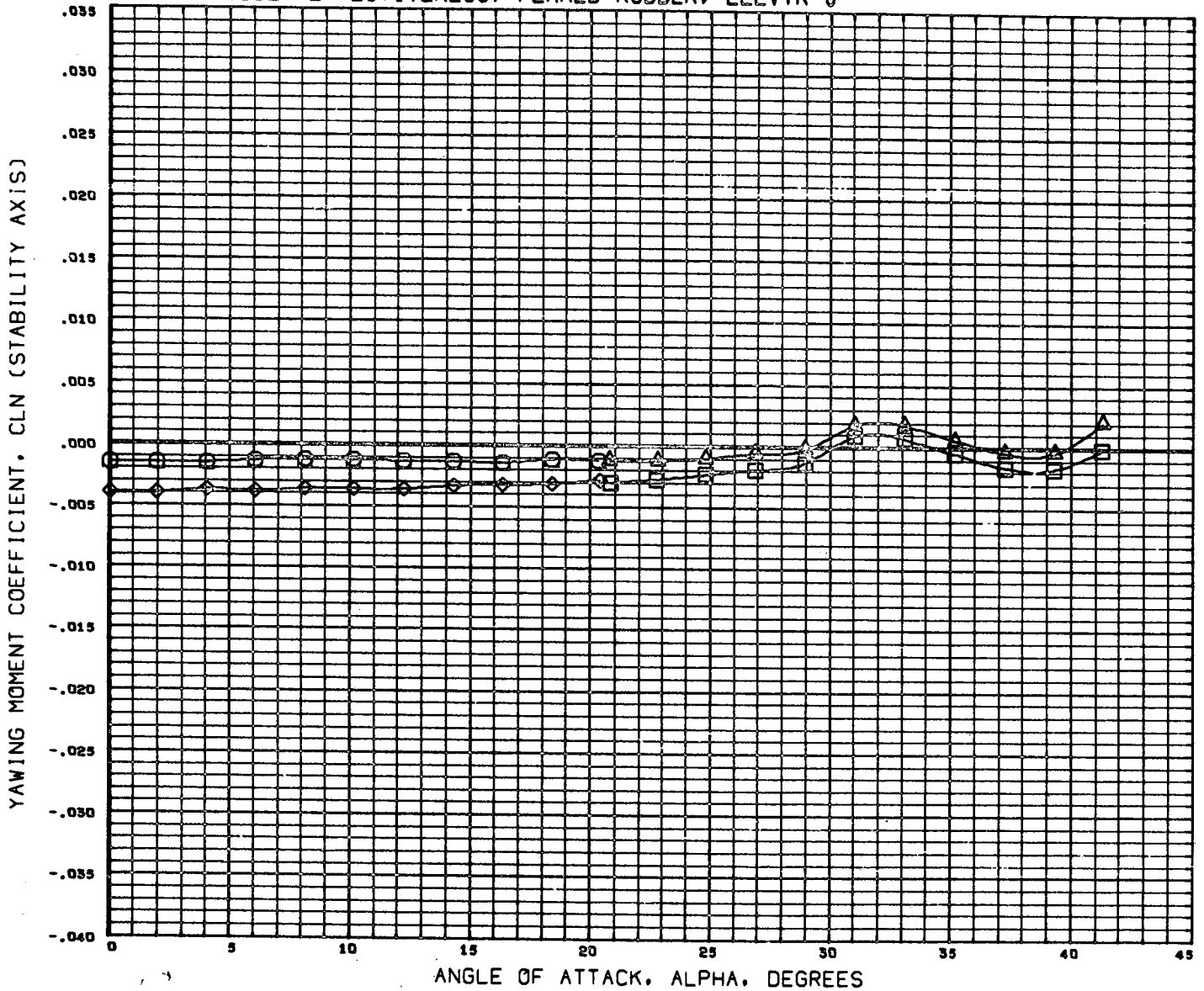


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ.IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN.
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V3 (+35, -25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN.
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V3 (+35, -25)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 2.99

PAGE 87

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

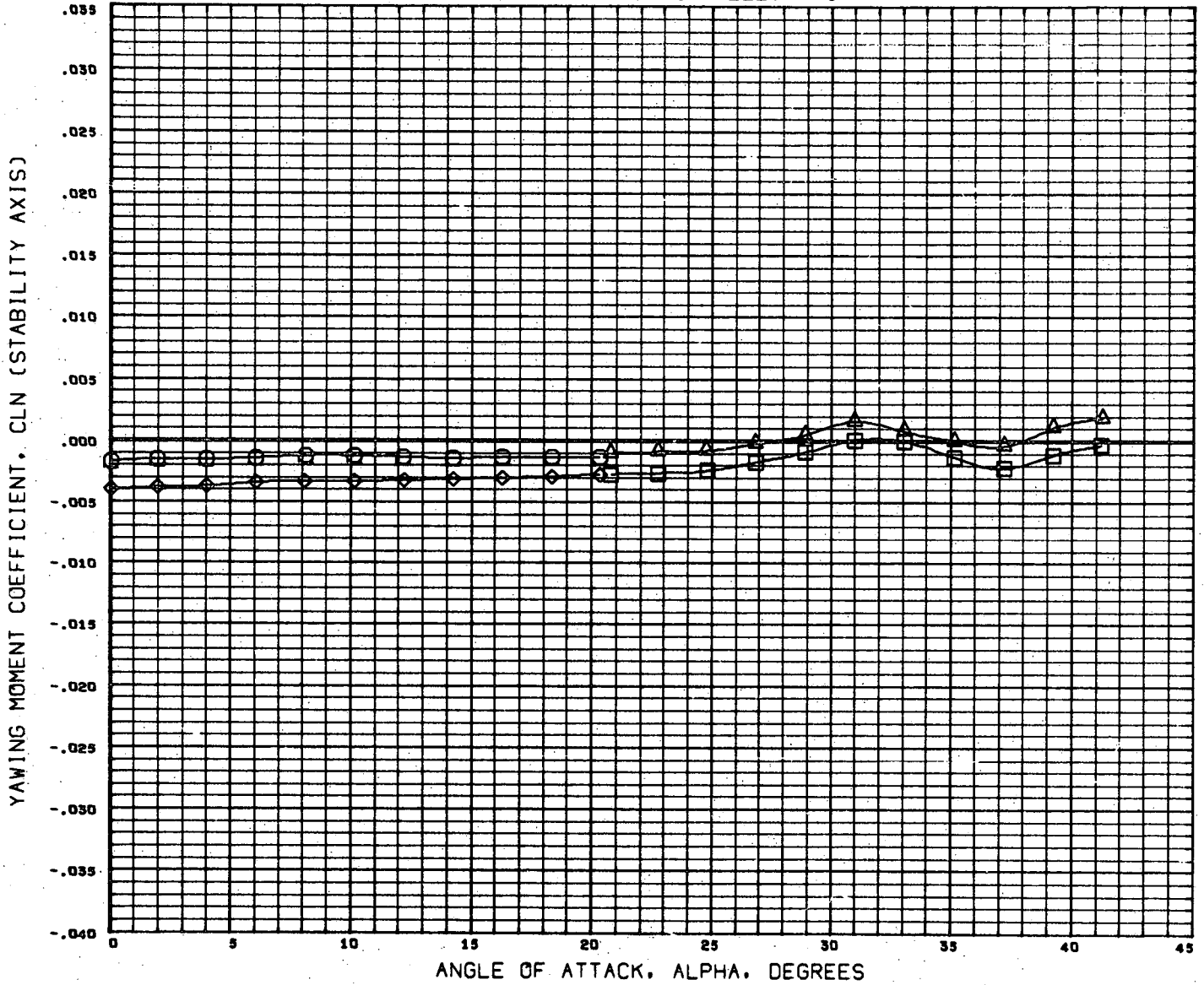


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V5 (+35, -25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V5 (+35, -25)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 791.3004 IN. SCALE 0.0034

MACH 3.48

PAGE 88

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

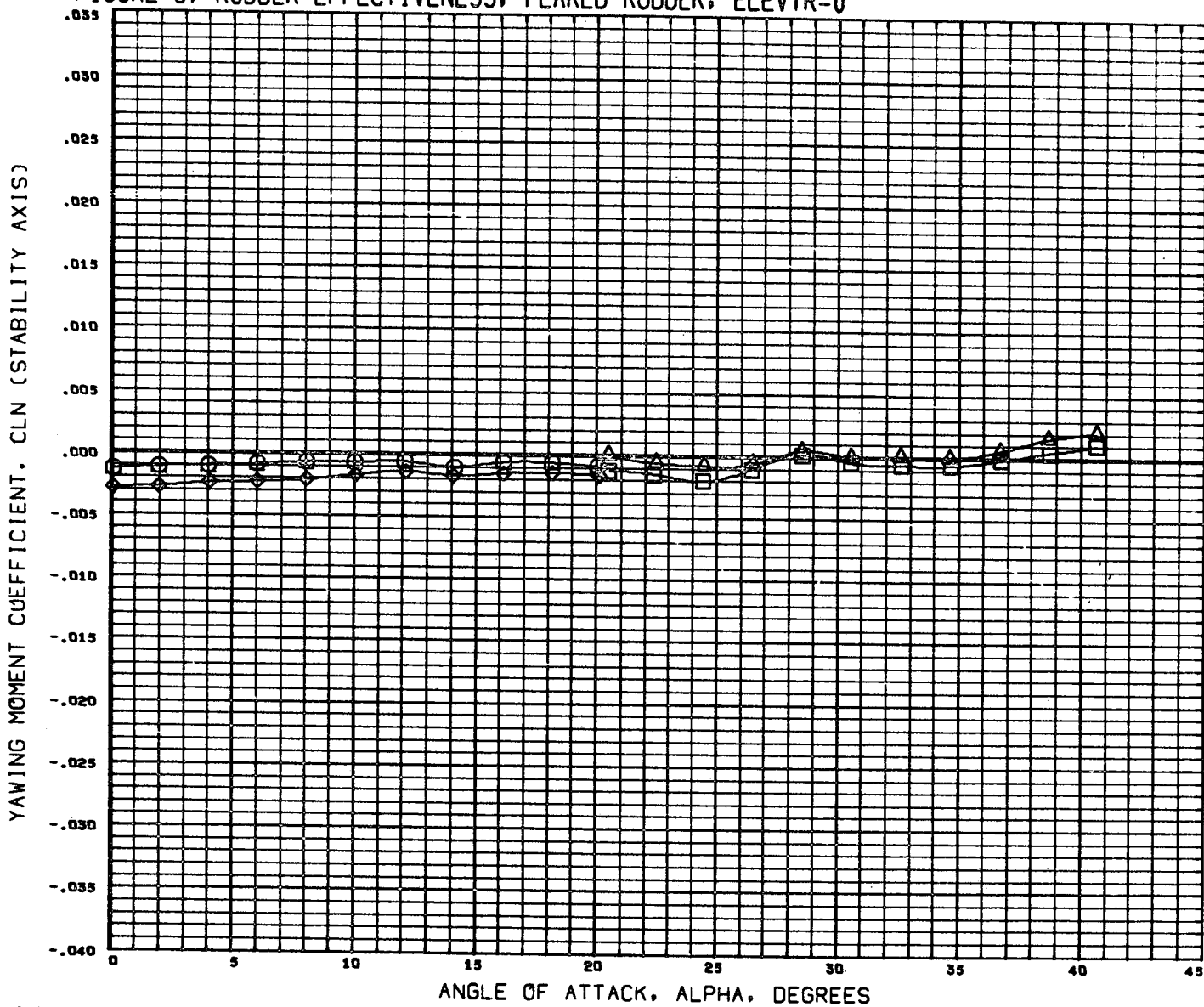


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30,-30)	0.000	0.000	30.000	-30.000	SREF	7.8970 SQ.IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30,-30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V5 (+35,-25)	0.000	0.000	35.000	-25.000	BREF	3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V5 (+35,-25)	0.000	0.000	35.000	-25.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.00

PAGE 89

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

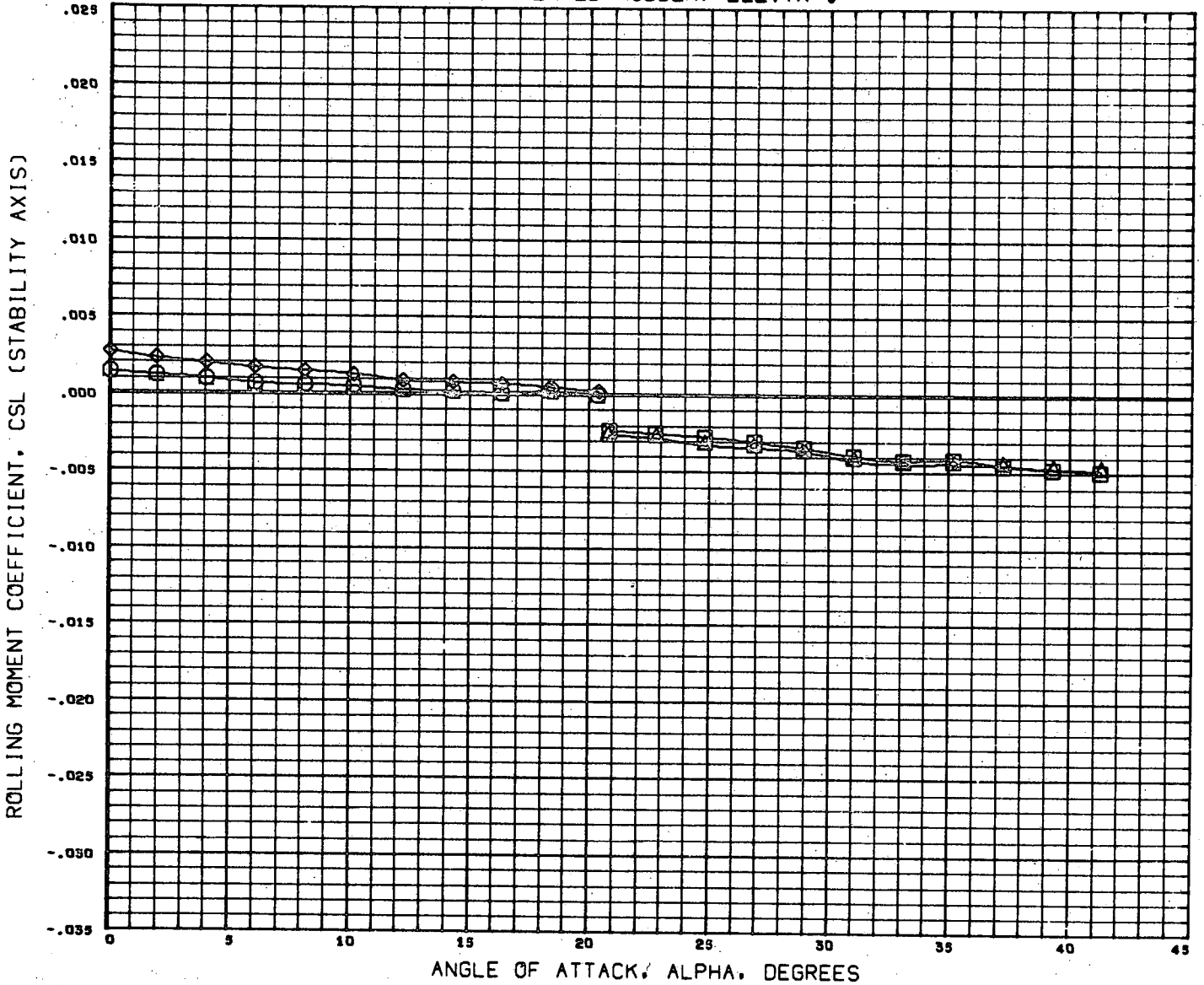


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V5(+35,-25)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 4.96

PAGE 90

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



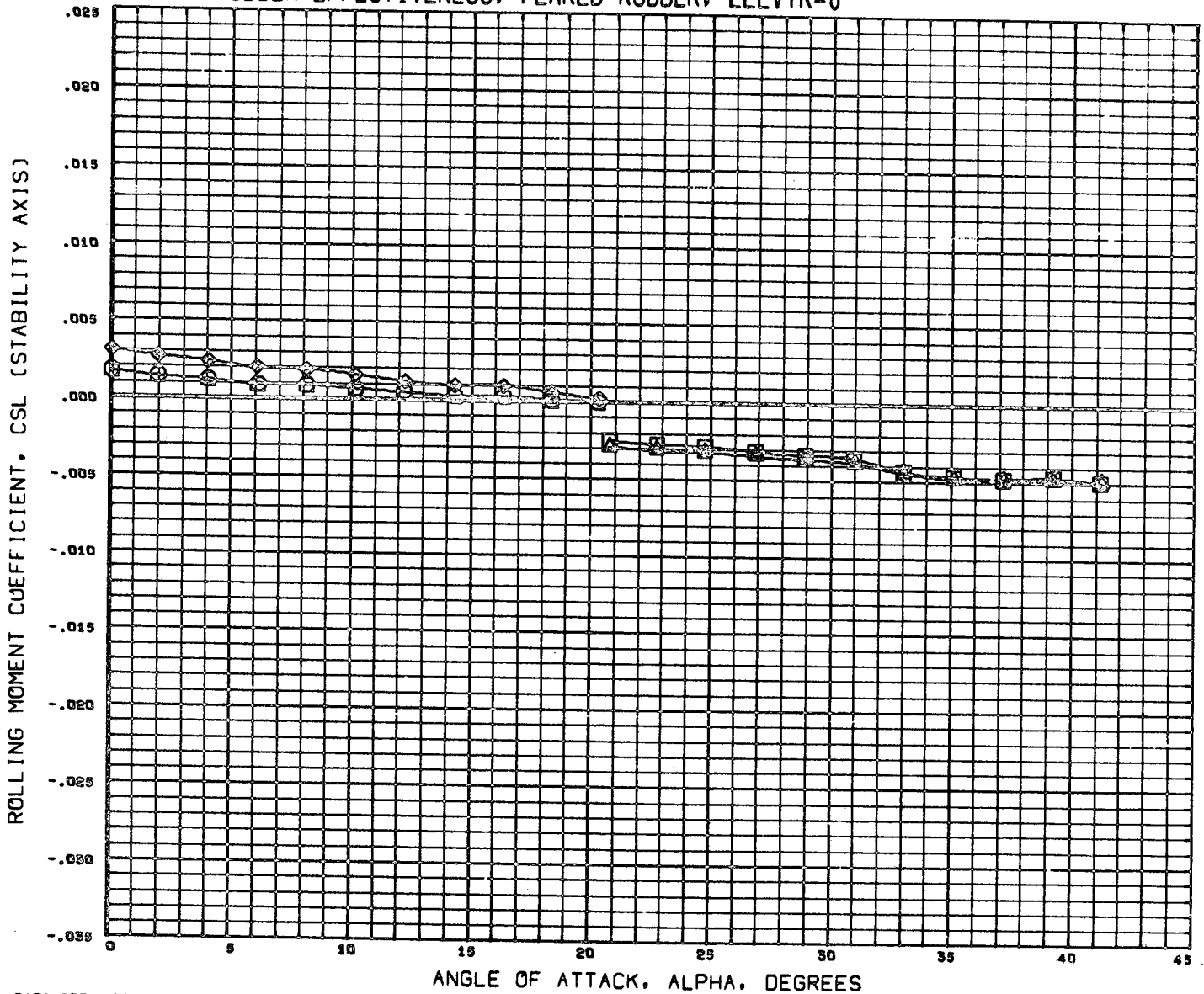
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V5(+33,-23)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V5(+33,-23)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 3.48

PAGE 92

C.3

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

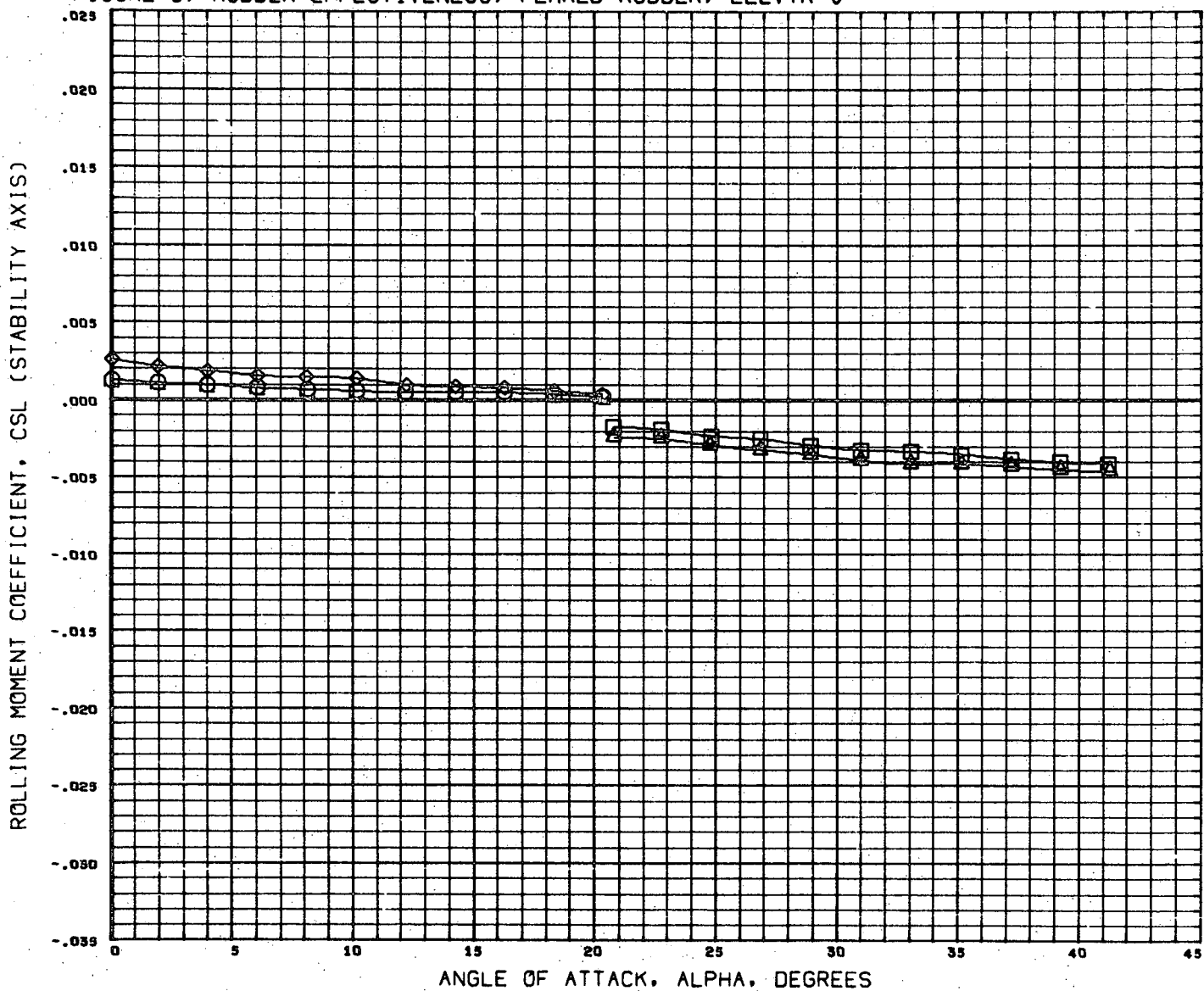


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 507 GAC H-33 ORB. 85W4V5 (+30,-30)	0.000	0.000	30.000	-30.000	SREF 7.8970 90.IN
(A49017)	MSFC 507 GAC H-33 ORB. 85W4V5 (+30,-30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. 85W4V5 (+35,-25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. 85W4V5 (+35,-25)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 2.99

PAGE 91

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



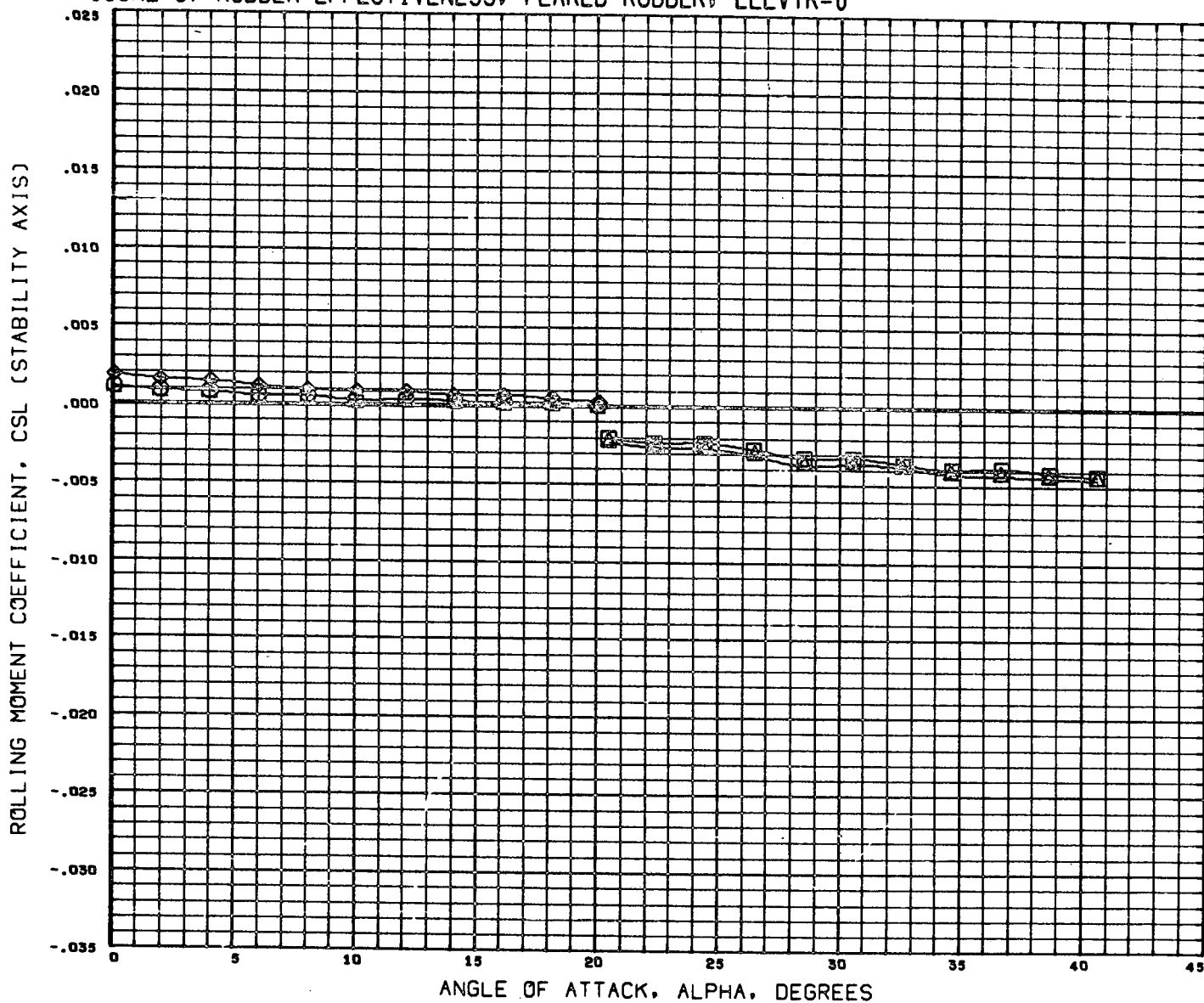
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 307 GAC H-33 ORB. B5W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49017)	MSFC 307 GAC H-33 ORB. B5W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 307 GAC H-33 ORB. B5W4V3 (+35, -25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 307 GAC H-33 ORB. B5W4V3 (+35, -25)	0.000	0.000	35.000	-25.000	XMRP 1274.4640 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.00

PAGE 93



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

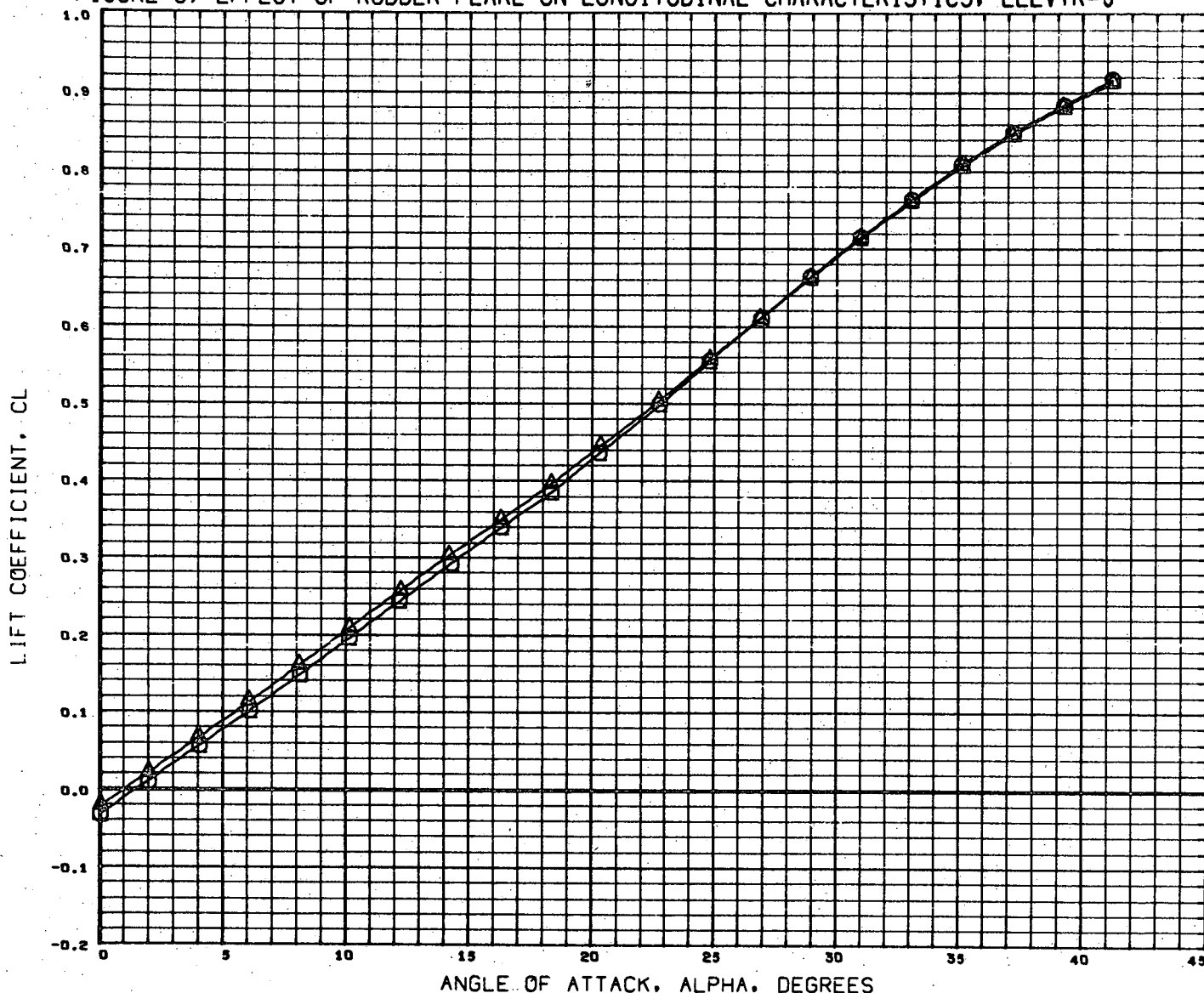


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49001)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49017)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49007)	MSFC 507 GAC H-33 ORB. B5W4V5 (+35, -25)	0.000	0.000	35.000	-25.000	BREF 3.8170 IN
(A49022)	MSFC 507 GAC H-33 ORB. B5W4V5 (+35, -25)	0.000	0.000	35.000	-25.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 4.96

PAGE 94

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

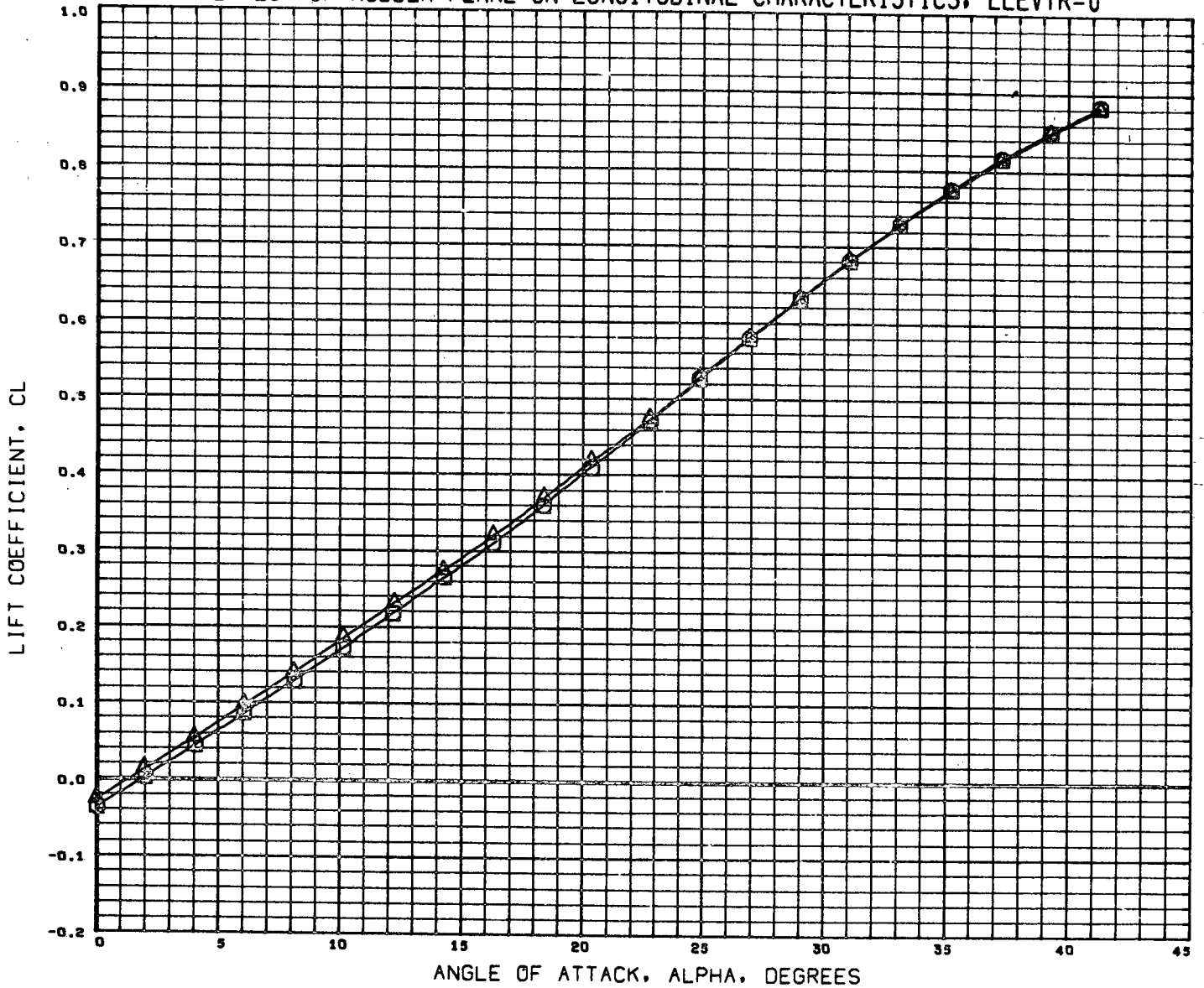


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILRN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49S01)	MSFC 907 GAC H-33 ORB. 85W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49S08)	MSFC 507 GAC H-33 ORB. 85W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
						BREF 3.8170 IN
						XMRF 1274.4040 IN.
						YMRF 0.0000 IN.
						ZMRF 391.3004 IN.
						SCALE 0.0034

MACH 2.99

PAGE 95

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



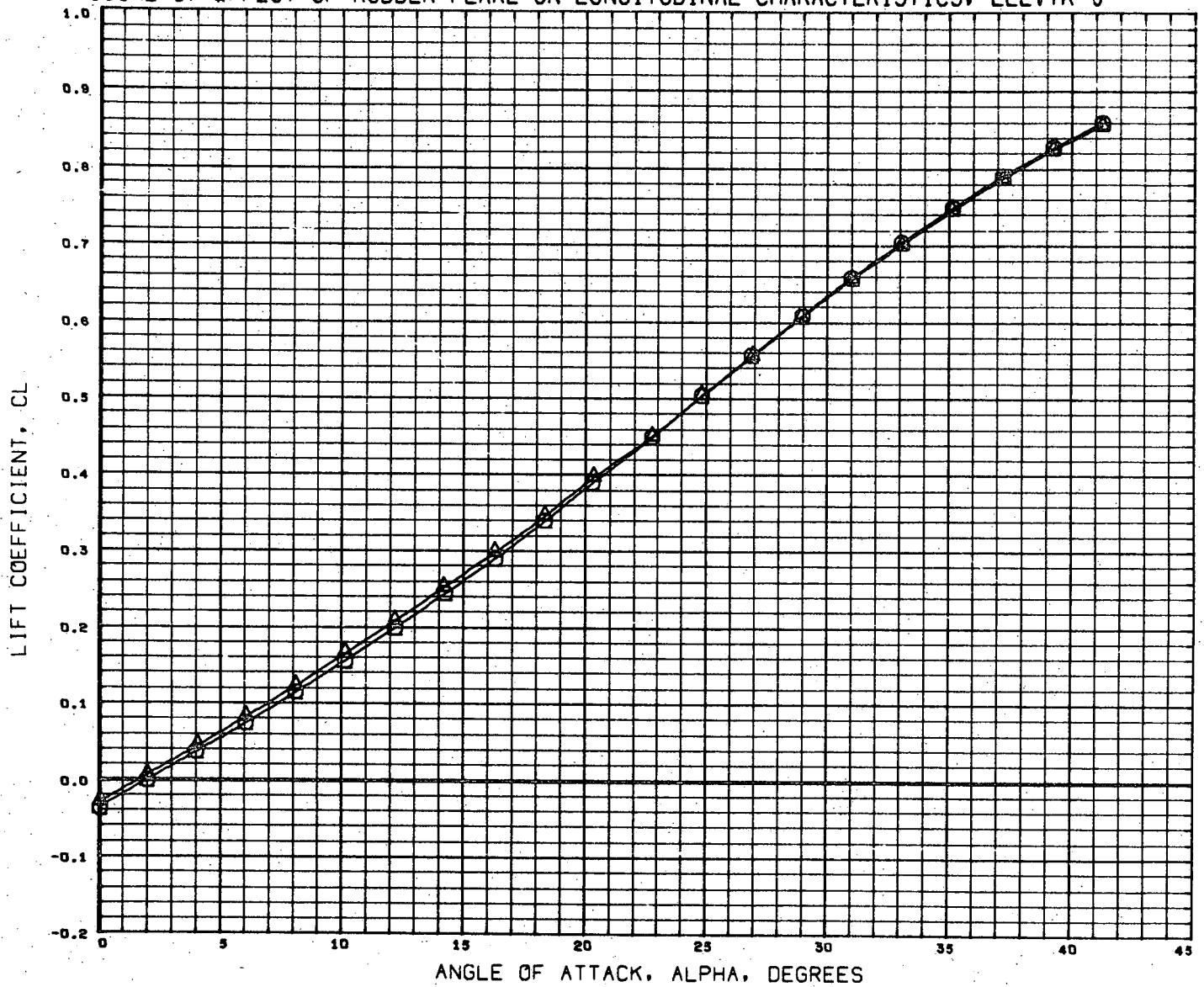
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	MSFC 507 GAC H-33 ORB. B3W4V5 (+30, -30)
(A49S08)	MSFC 507 GAC H-33 ORB. B3W4V5

BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	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

PAGE 96

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



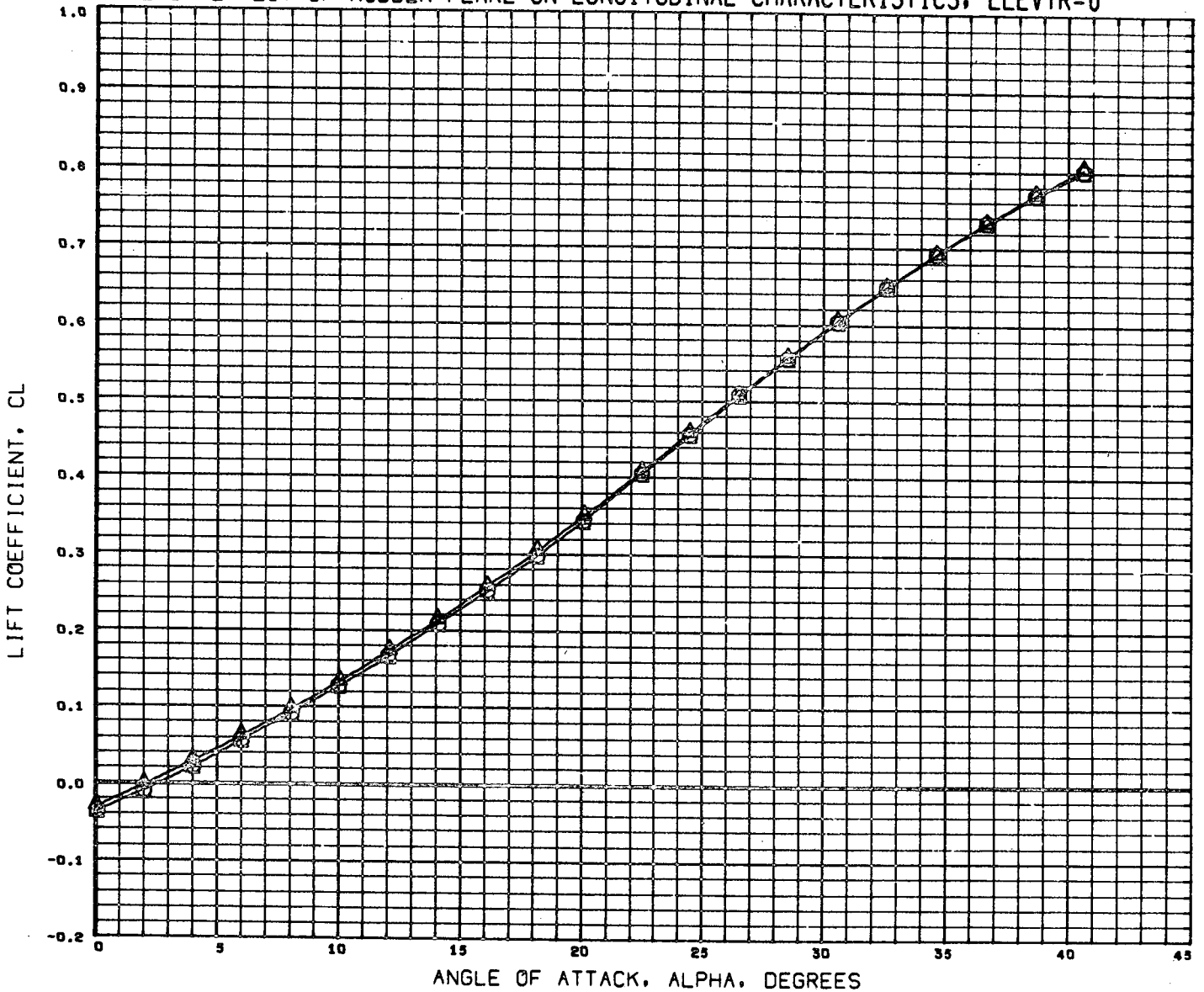
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)
(A49S08)	MSFC 507 GAC H-33 ORB. B5W4V5

BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	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

PAGE 97

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



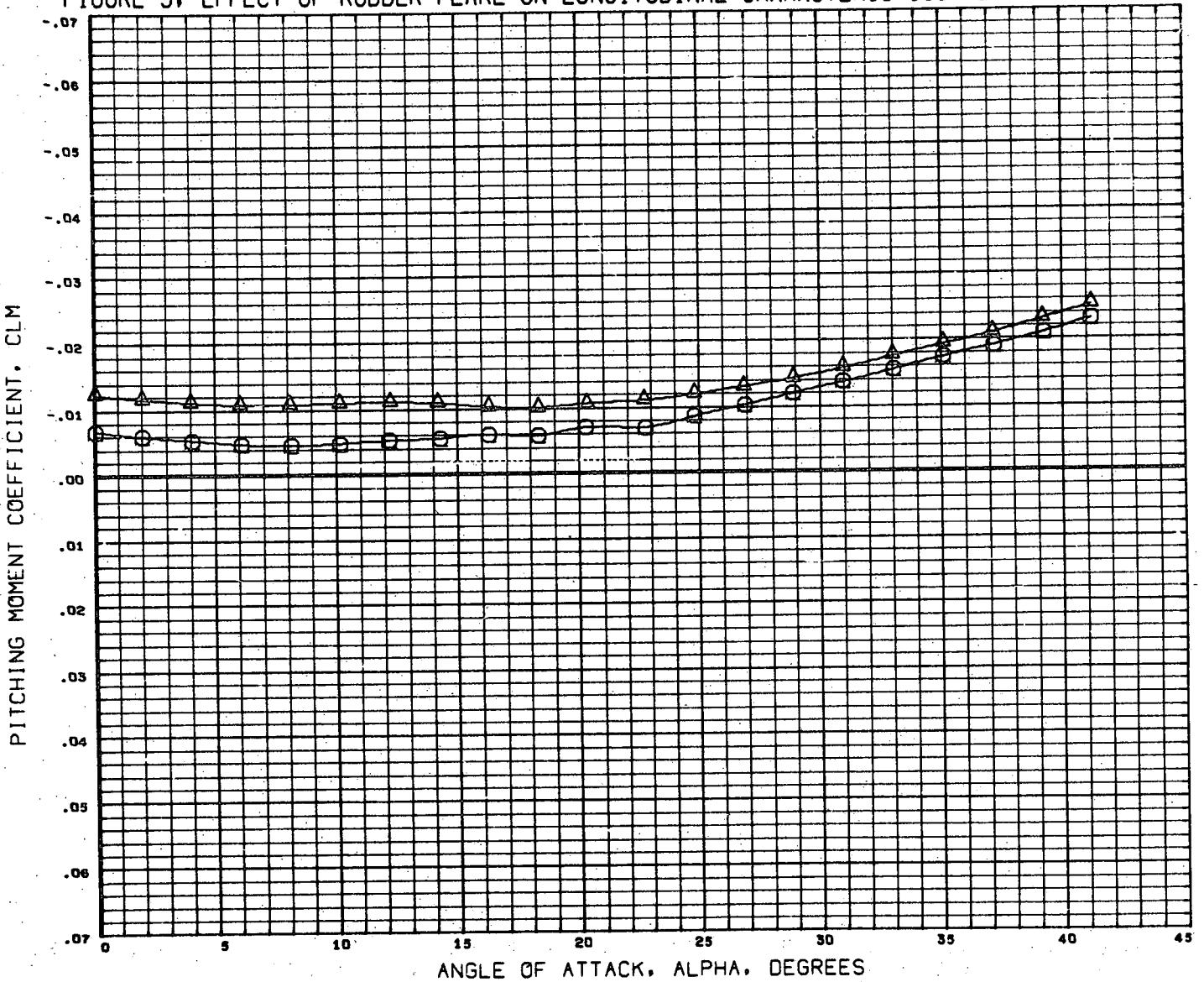
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILRN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
(A49S08)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
						BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.96

PAGE 98

121

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



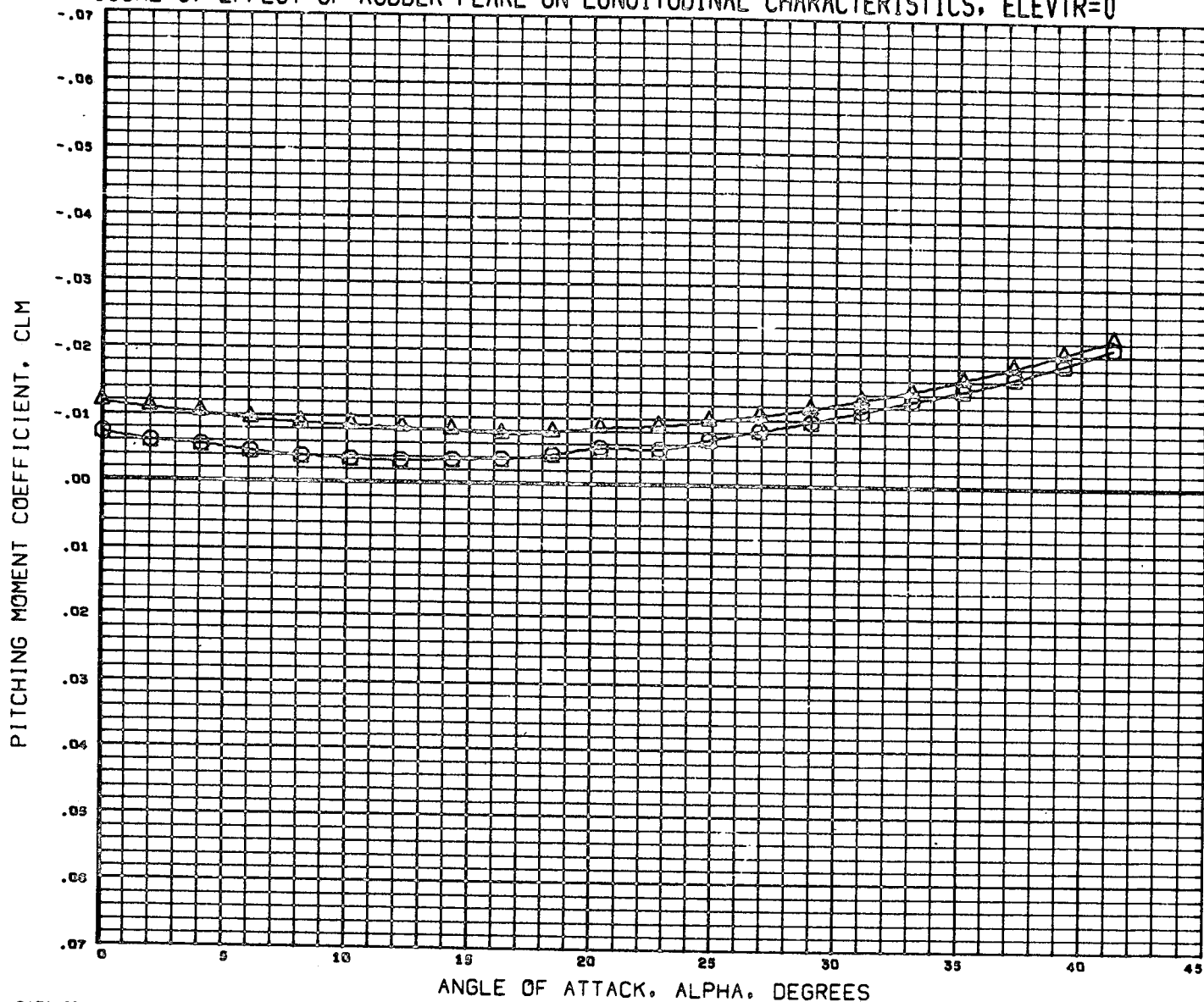
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49501)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)
(A49508)	MSFC 507 GAC H-33 ORB. B5W4V5

BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
0.000	0.000	30.000	-30.000	SREF	7.8970 SQ. IN
0.000	0.000	0.000	0.000	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

PAGE 99

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

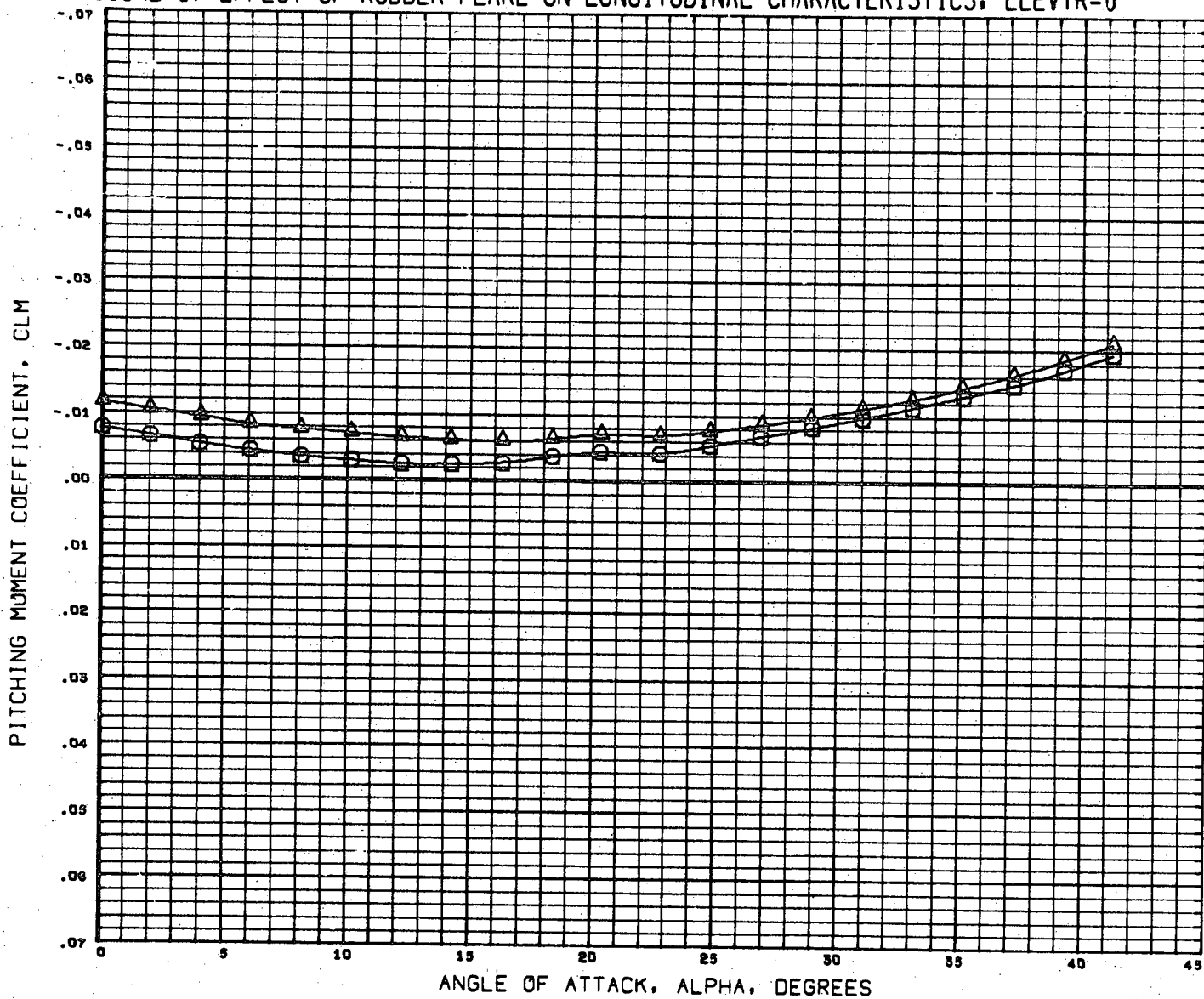


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49801)	HSFC 307 GAC M-33 ORB. B9W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	SREF	7.8970 SQ. IN
(A49800)	HSFC 307 GAC M-33 ORB. B9W4V3	0.000	0.000	0.000	0.000	LREF	5.4530 IN
						BREF	3.8170 IN
						XMRF	1274.4040 IN.
						YMRF	0.0000 IN.
						ZMRF	391.3004 IN.
						SCALE	0.0034

MACH 3.48

PAGE 100

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	MSFC 507 GAC H-33 ORB, 85W4V5 (+30, -30)
(A49S08)	MSFC 507 GAC H-33 ORB, 85W4V5

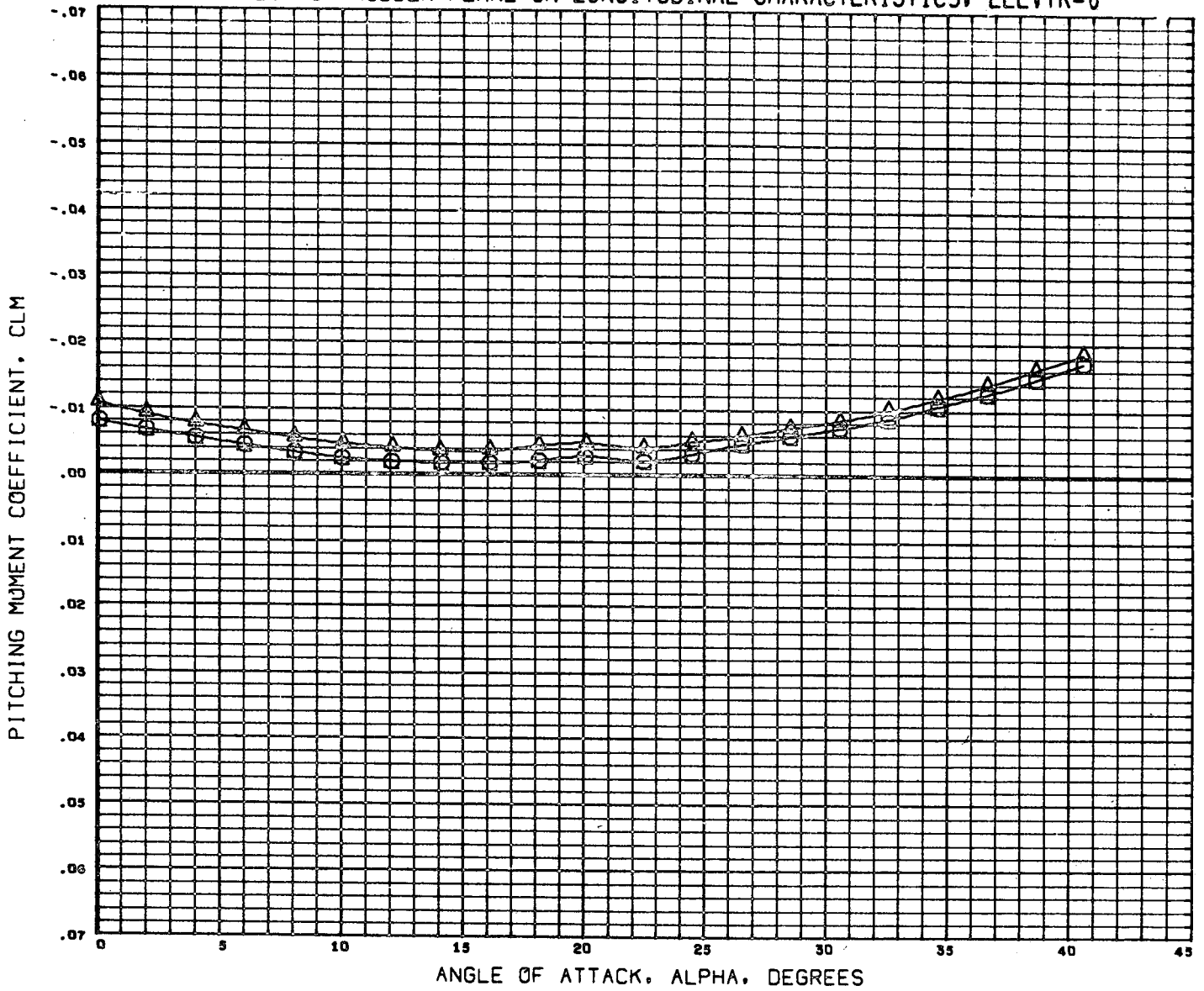
BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	LREF 3.4530 IN
				BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

MACH 4.00

PAGE 101



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



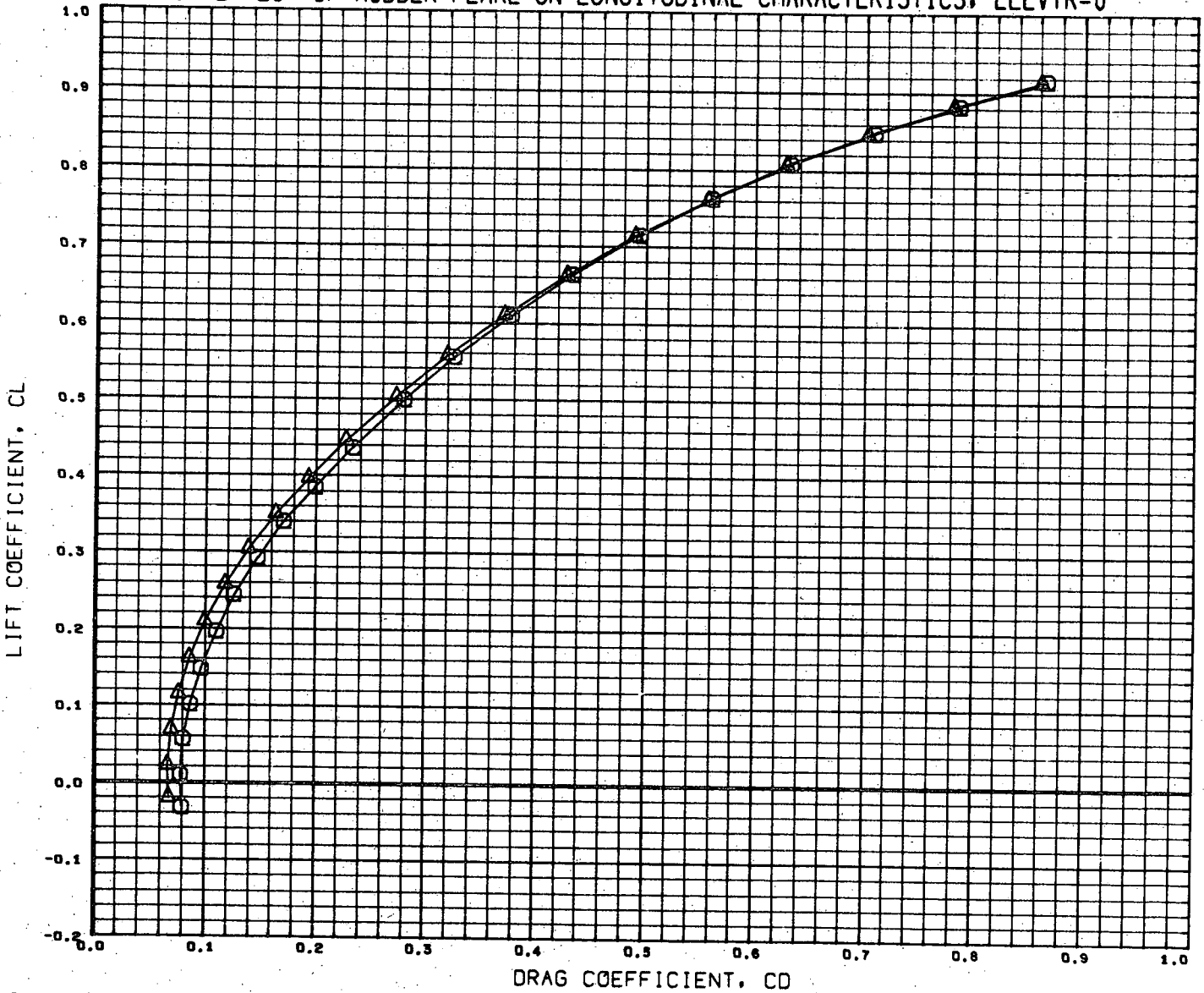
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	MSFC 507 GAC H-33 ORB. B3W4V3 (+30,-30)
(A49S06)	MSFC 507 GAC H-33 ORB. B3W4V3

BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ.IN
0.000	0.000	0.000	0.000	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

PAGE 102

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



DATA SET SYMBOL    CONFIGURATION DESCRIPTION  
 (A49S01)    MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)  
 (A49S08)    MSFC 507 GAC H-33 ORB. B5W4V5

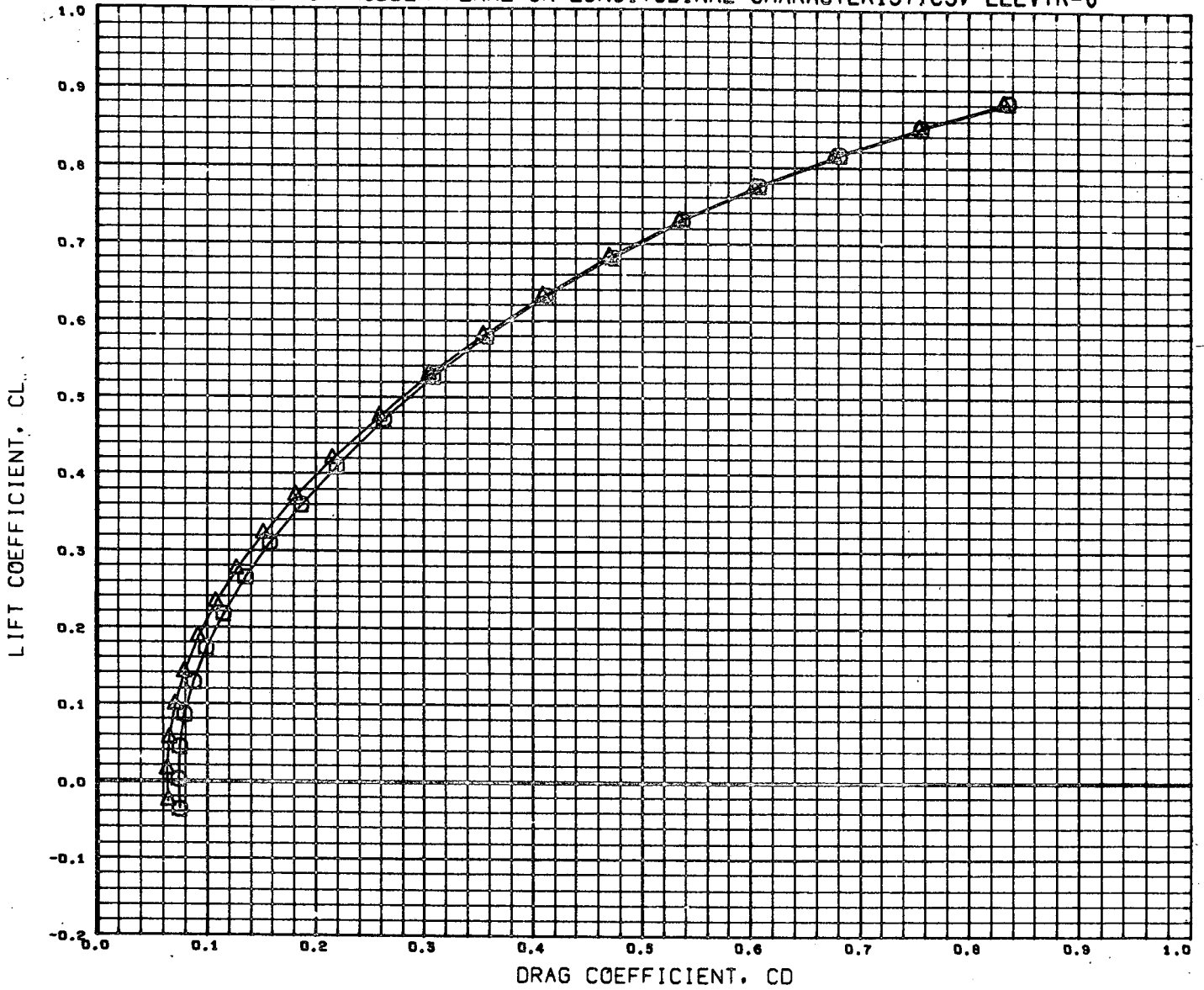
BETA    AILERN    LRUDDR    RRUDDR  
 0.000    0.000    30.000    -30.000  
 0.000    0.000    0.000    0.000

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

MACH    2.99

PAGE    103

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

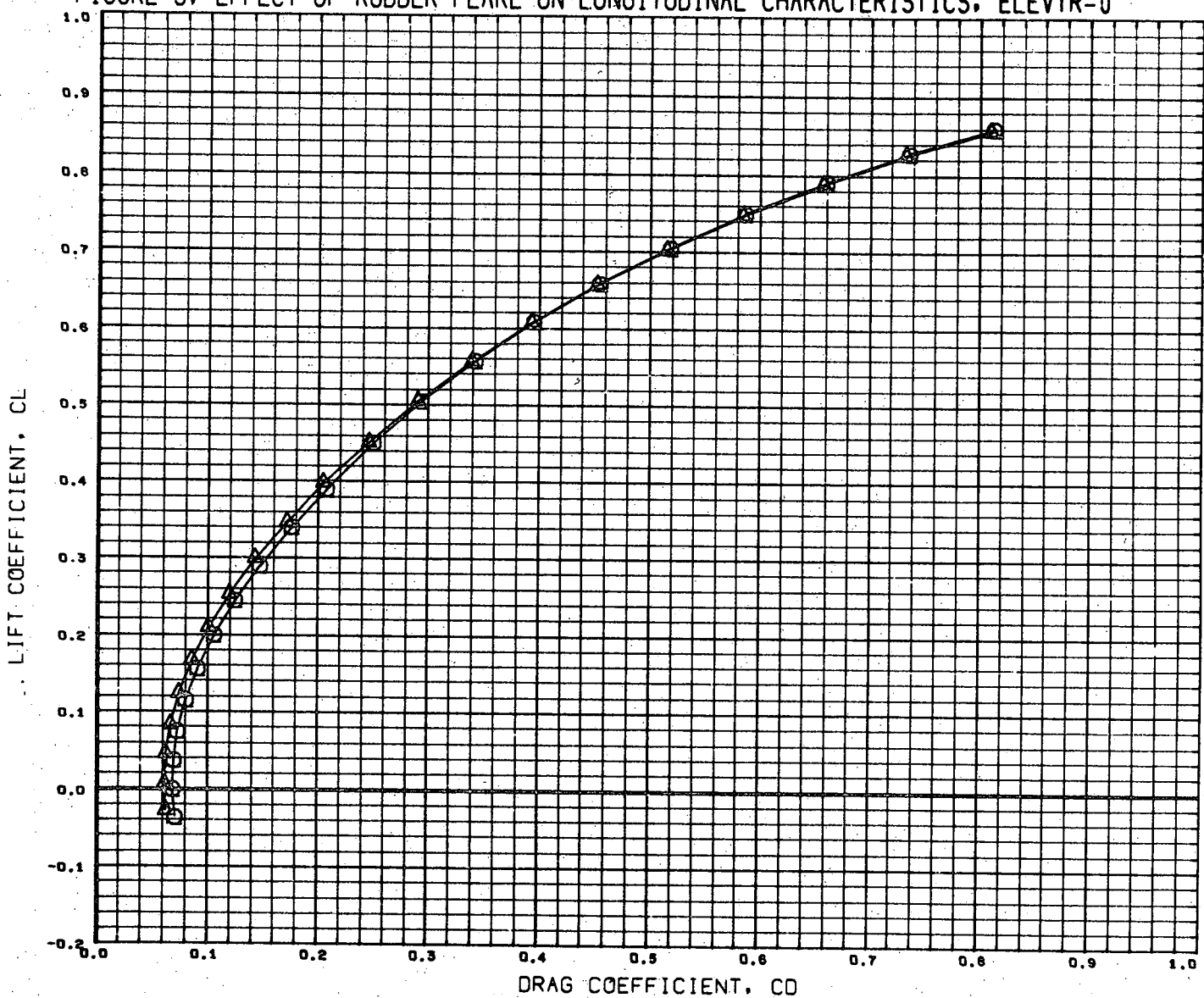


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	AILRN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49SD1)	MSFC 507 GAC H-33 ORB, B5W4V5(+30,-30)	0,000	0,000	30,000	-30,000	SREF	7,8970 SQ. IN
(A49SD8)	MSFC 507 GAC H-33 ORB, B5W4V5	0,000	0,000	0,000	0,000	LREF	5,4530 IN
						BREF	3,8170 IN
						XMRP	1274,4040 IN.
						YMRP	0,0000 IN.
						ZMRP	391,3004 IN.
						SCALE	0,0034

MACH 3.48

PAGE 104

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)
(A49S08)	MSFC 507 GAC H-33 ORB. B5W4V5

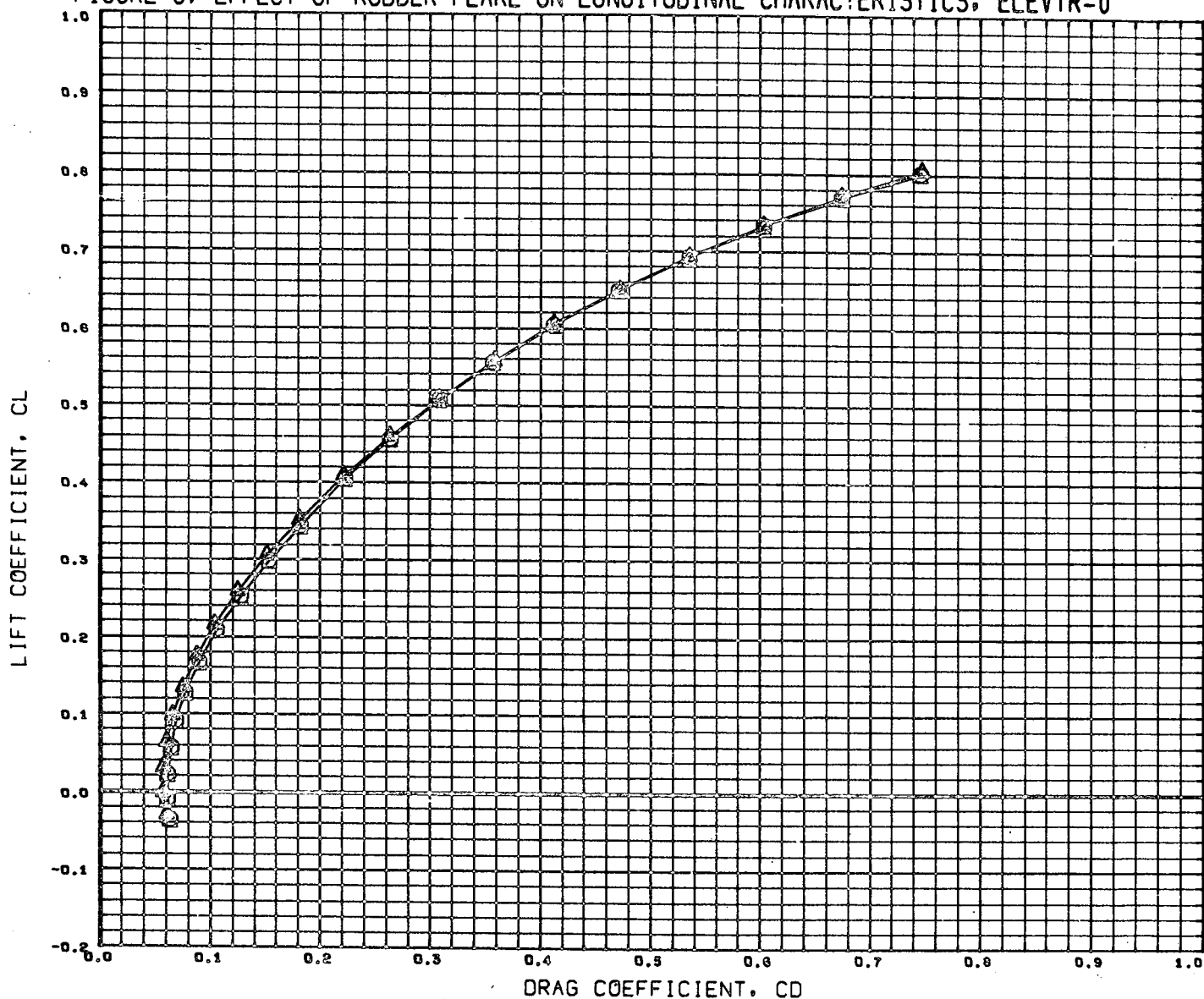
BETA	AILERN	LRUDDR	RRUDDR
0.000	0.000	30.000	-30.000
0.000	0.000	0.000	0.000

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

MACH 4.00

PAGE 105

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



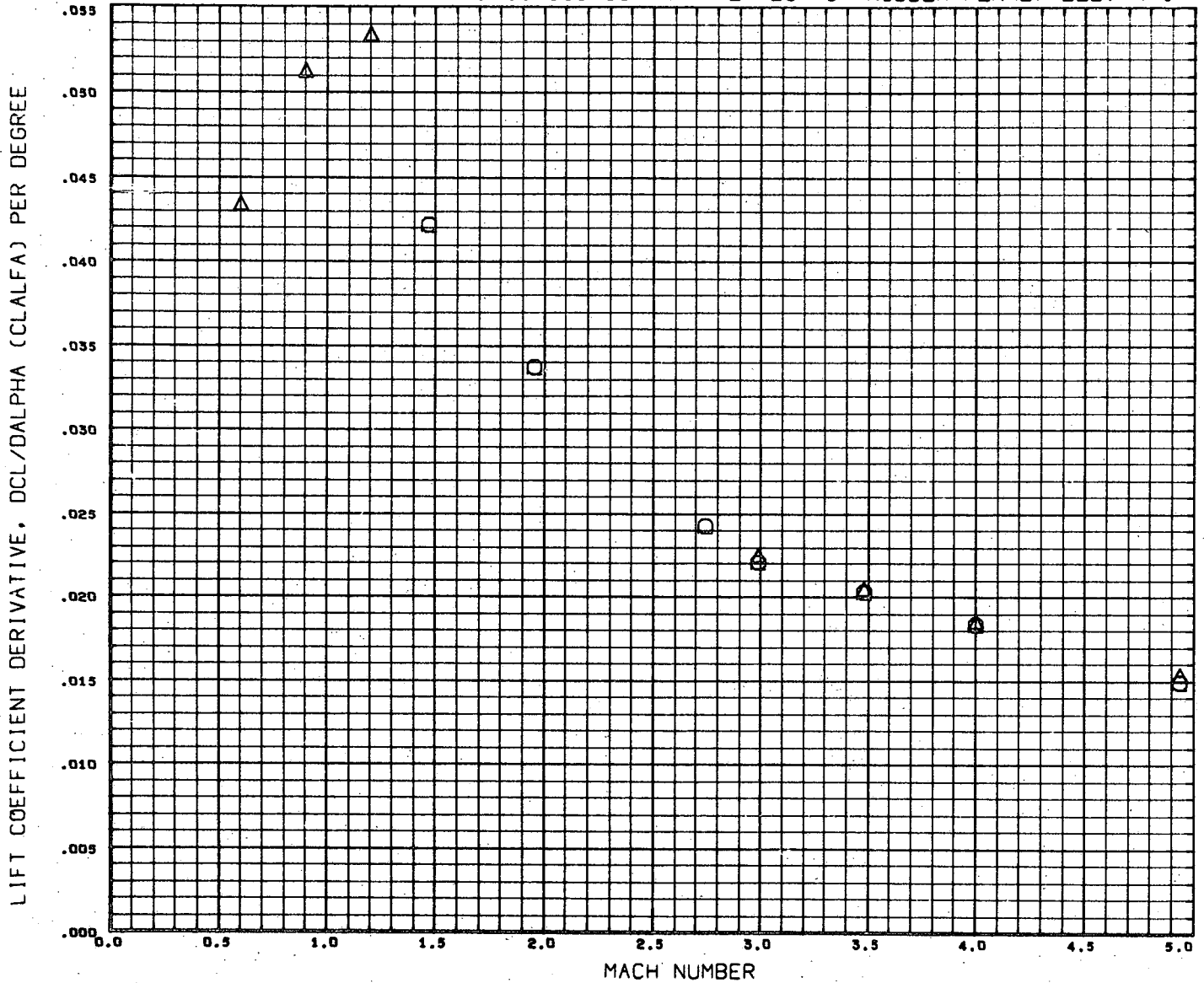
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49S01)	MSFC 507 GAC H-33 ORB. B9W4V5 (+30, -30)
(A49S08)	MSFC 507 GAC H-33 ORB. B9W4V5

BETA	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	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

PAGE 106

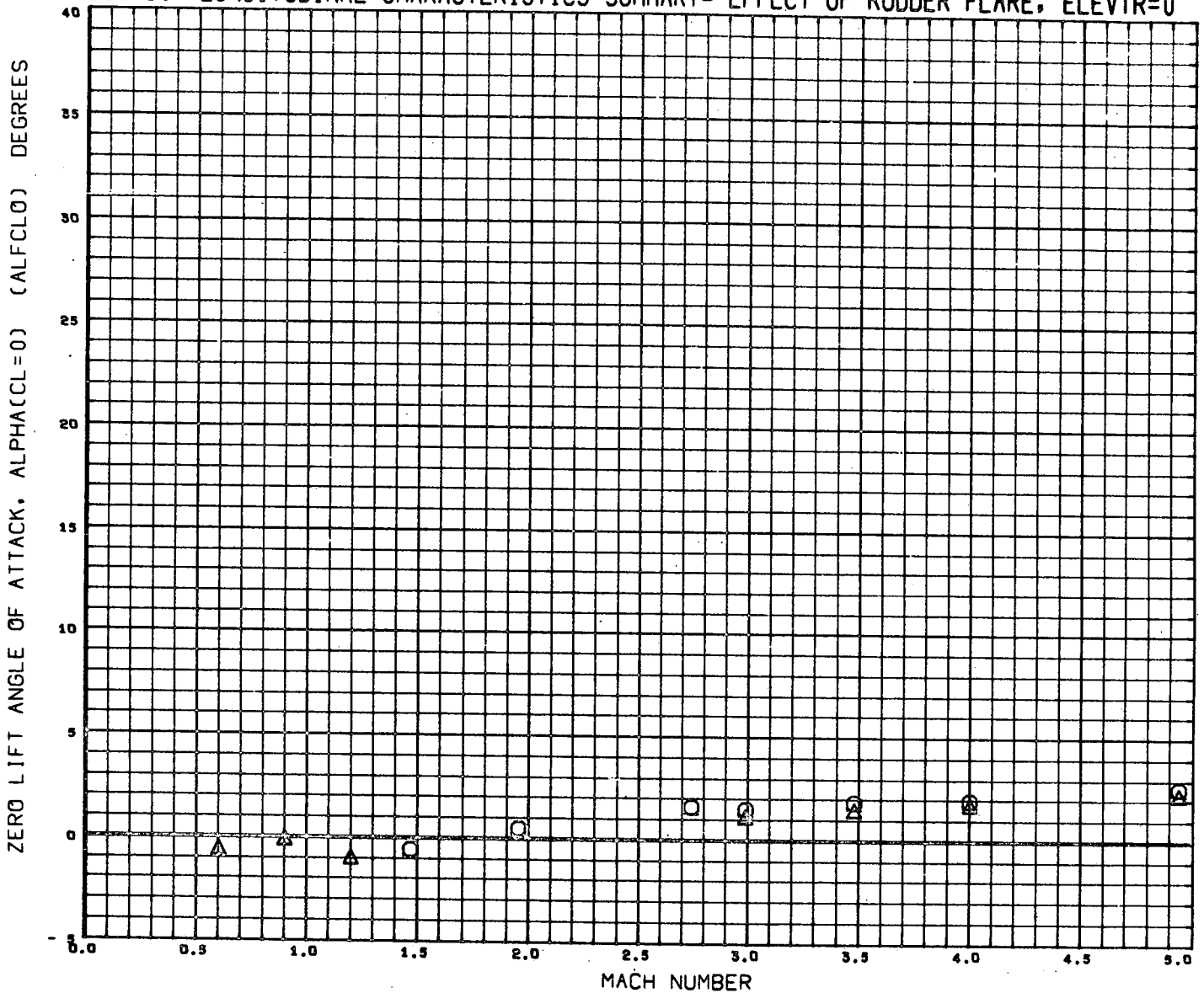
FIG. 10. LONGITUDINAL CHARACTERISTICS SUMMARY- EFFECT OF RUDDER FLARE, ELEVTR=0



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	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	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

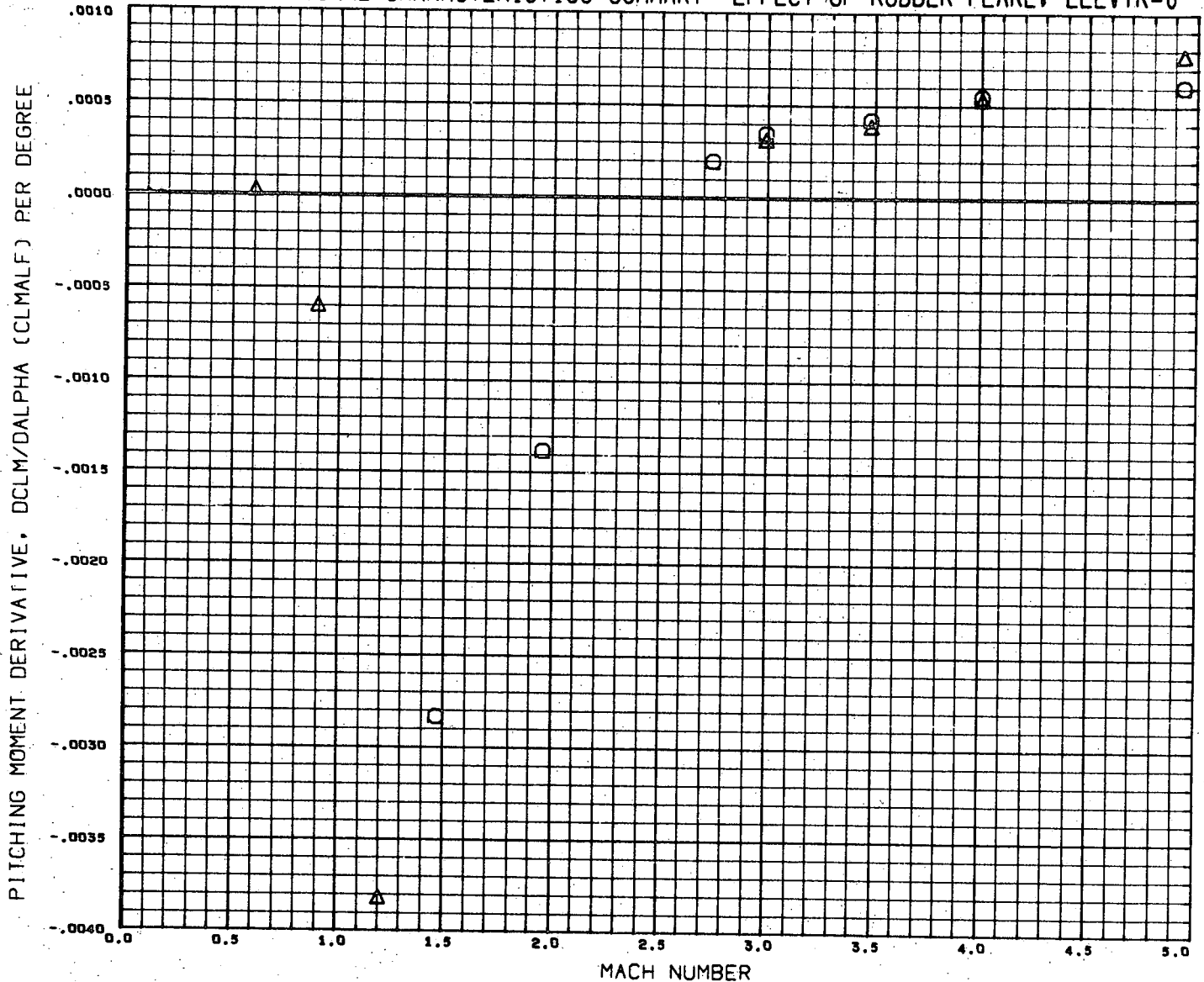


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(B49M01) ○	MSFC 307 GAC H-33 ORB. 85W4V5 (+30, -30)
(B49M08) △	MSFC 307 GAC H-33 ORB. 85W4V5

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
0.000	0.000	30.000	-30.000	SREF	7.8970 SQ. IN
0.000	0.000	0.000	0.000	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

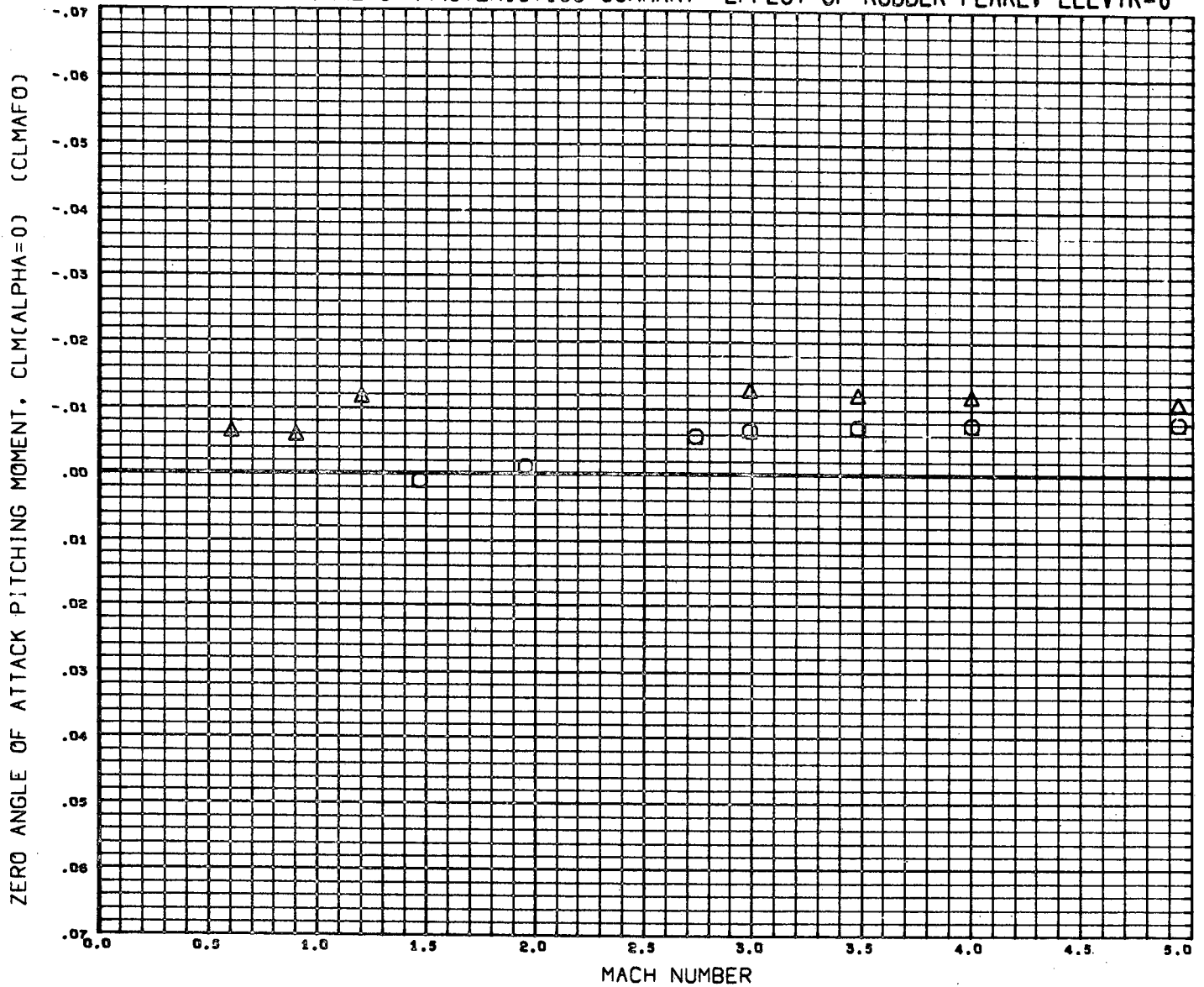


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(B49M01) ○	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)
(B49M08) △	MSFC 507 GAC H-33 ORB. B5W4V5

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	LREF 5.4530 IN
				BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034



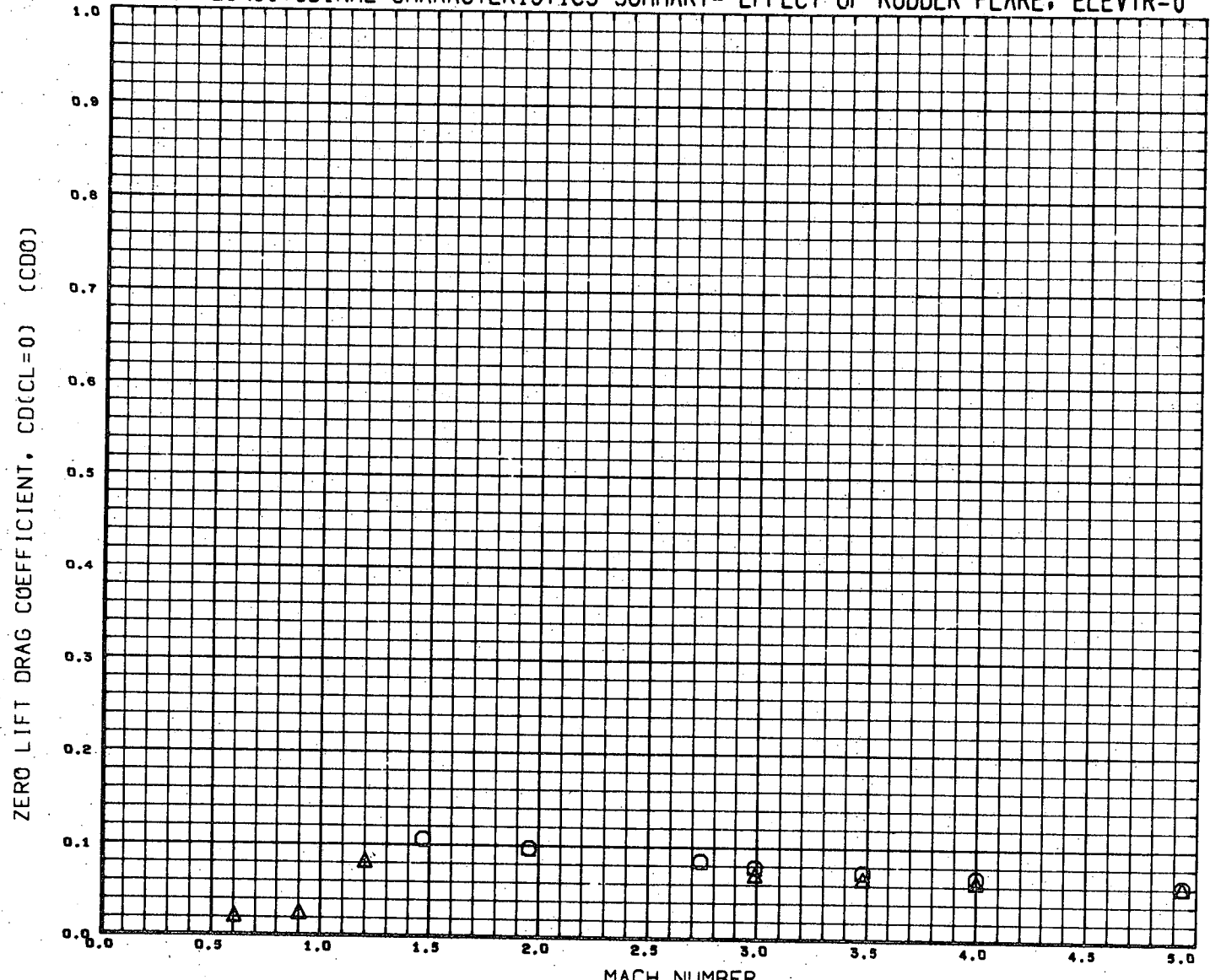
FIG. 10, LONGITUDINAL CHARACTERISTICS SUMMARY- EFFECT OF RUDDER FLARE, ELEVTR=0



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(B49M01)	MSFC 507 GAC M-33 ORB. B5W4V3(+30,-30)
(B49M08)	MSFC 507 GAC M-33 ORB. B5W4V5

ELEVTR	ATLERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	LREF 5.4830 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

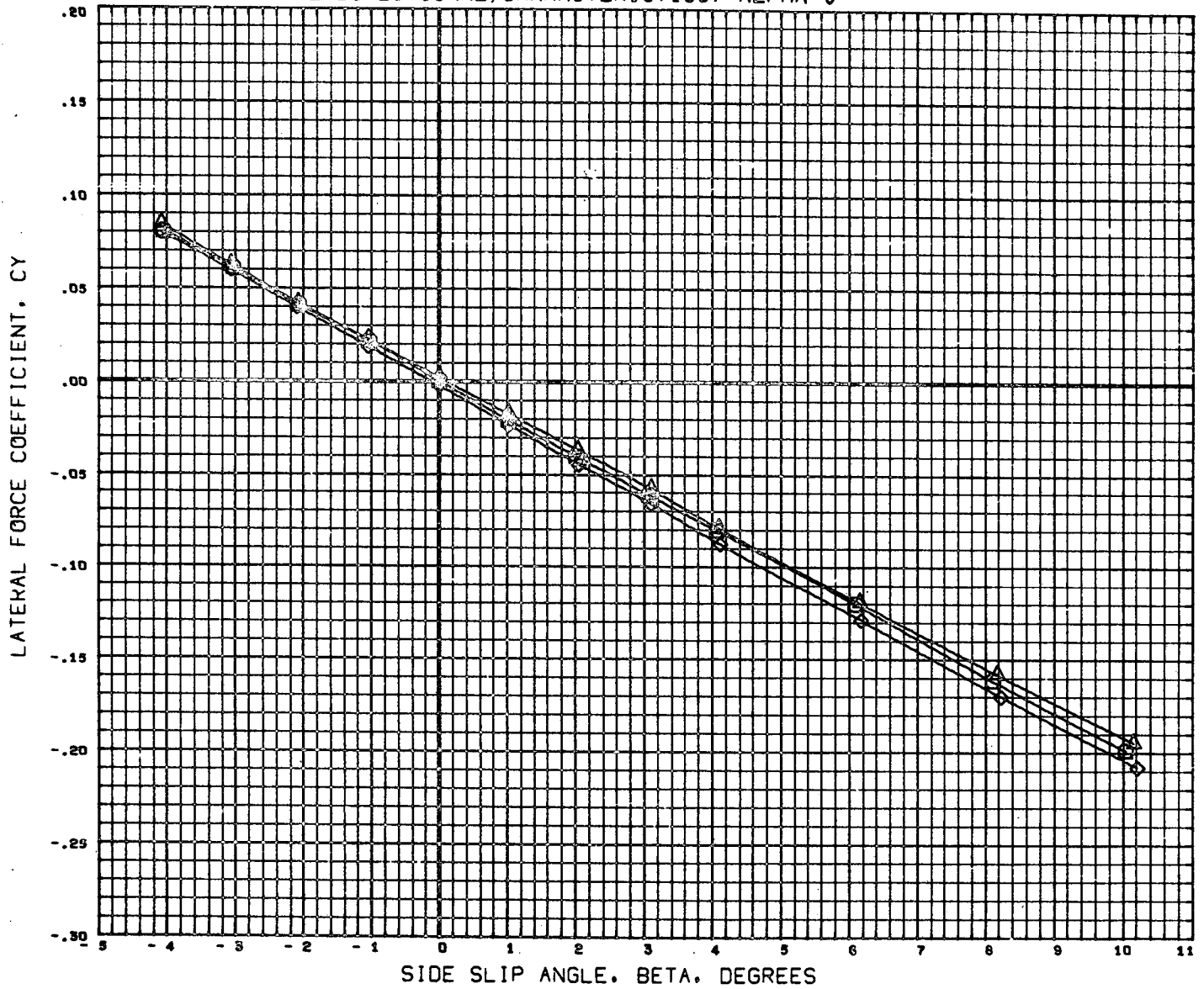


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(B49M01)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)
(B49M08)	MSFC 507 GAC H-33 ORB. B5W4V5

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	LREF 5.4530 IN
				BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

FIGURE 11. LATERAL-DIRECTIONAL CHARACTERISTICS, ALPHA=0



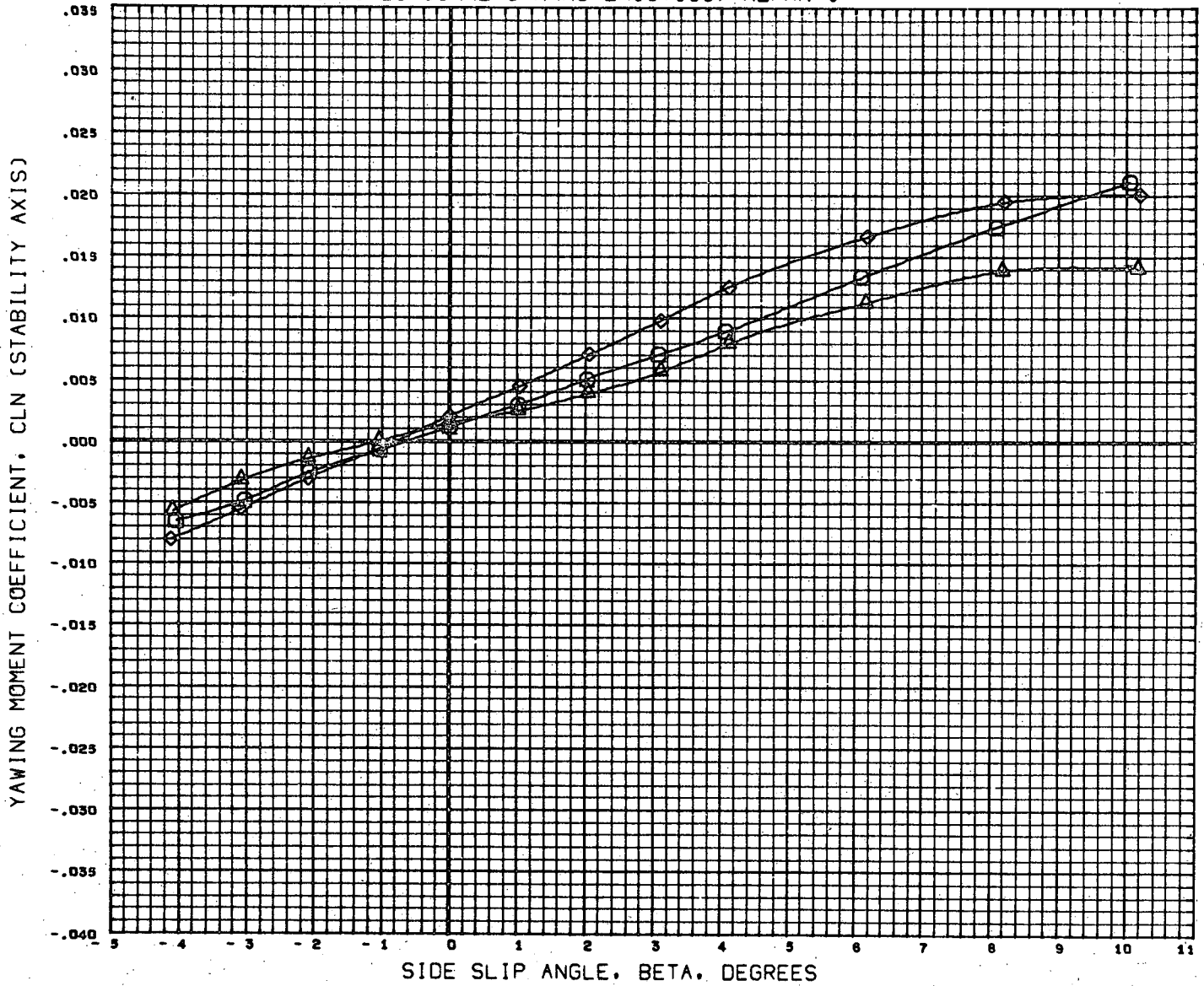
SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	0.599	ALPHA	0.000	ELEVTR	0.000	SREF	7.8970	SQ. IN
△	0.900	AILERN	0.000	LRUDDR	0.000	LREF	5.4530	IN
◇	1.198	RRUDDR	0.000			BREF	3.8170	IN
						XMRP	1274.4040	IN.
						YMRP	0.0000	IN.
						ZMRP	391.3004	IN.
						SCALE	0.0034	

DATA HIST. CODE #A

MSFC 507 GAC H-33 ORB. B5W4V5

(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		

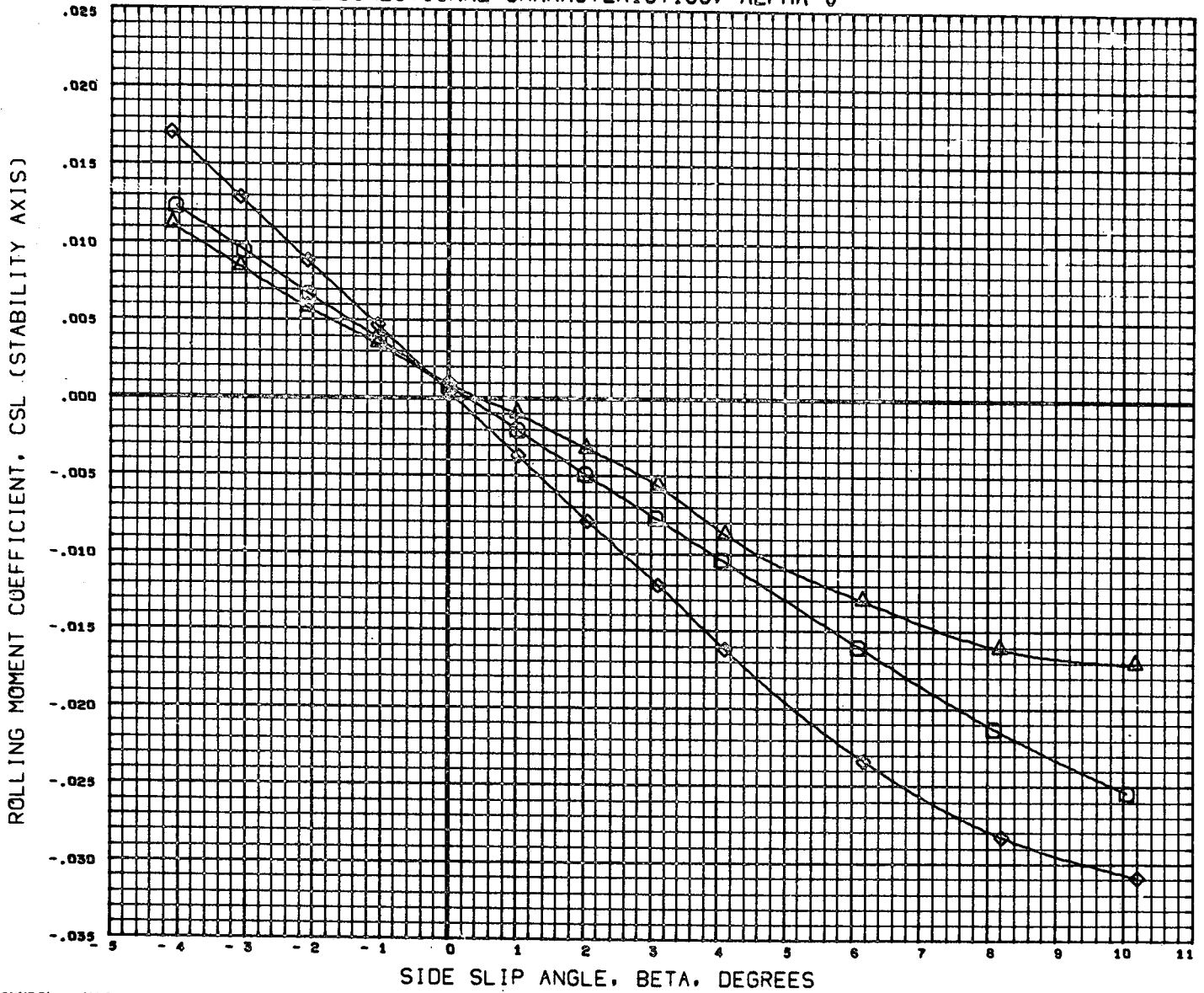
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE #A

MSFC 507 GAC H-33 ORB. B5W4V5

(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	ATLERN	0.000	LRUDDR	0.000
◇	1.198	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	

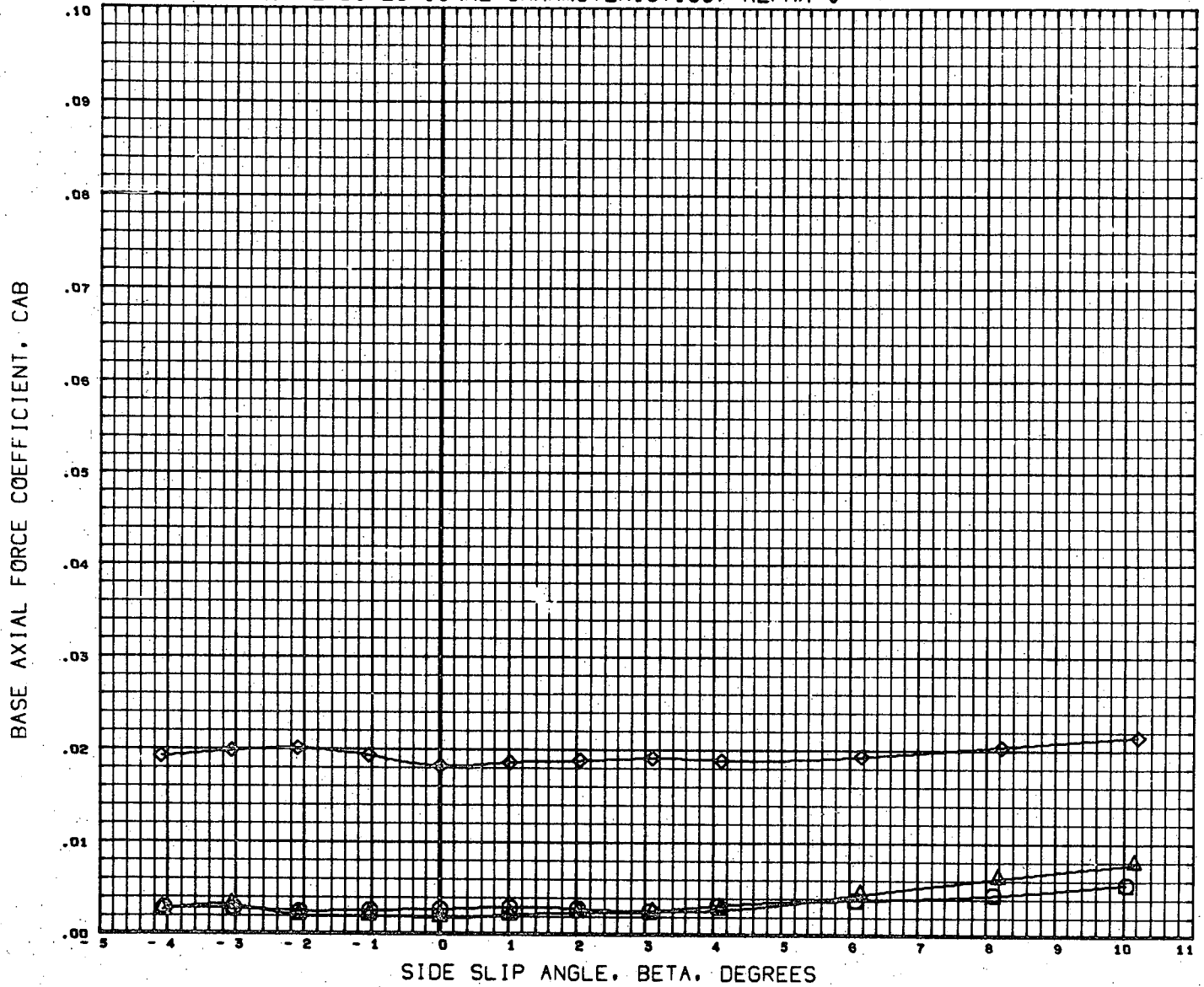
DATA HIST. CODE #A

MSFC 507 GAC H-33 ORB. B5W4V5

(A49X34) 31 MAY 72 PAGE 114

137

FIGURE 11, LATERAL-DIRECTIONAL CHARACTERISTICS, ALPHA=0



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

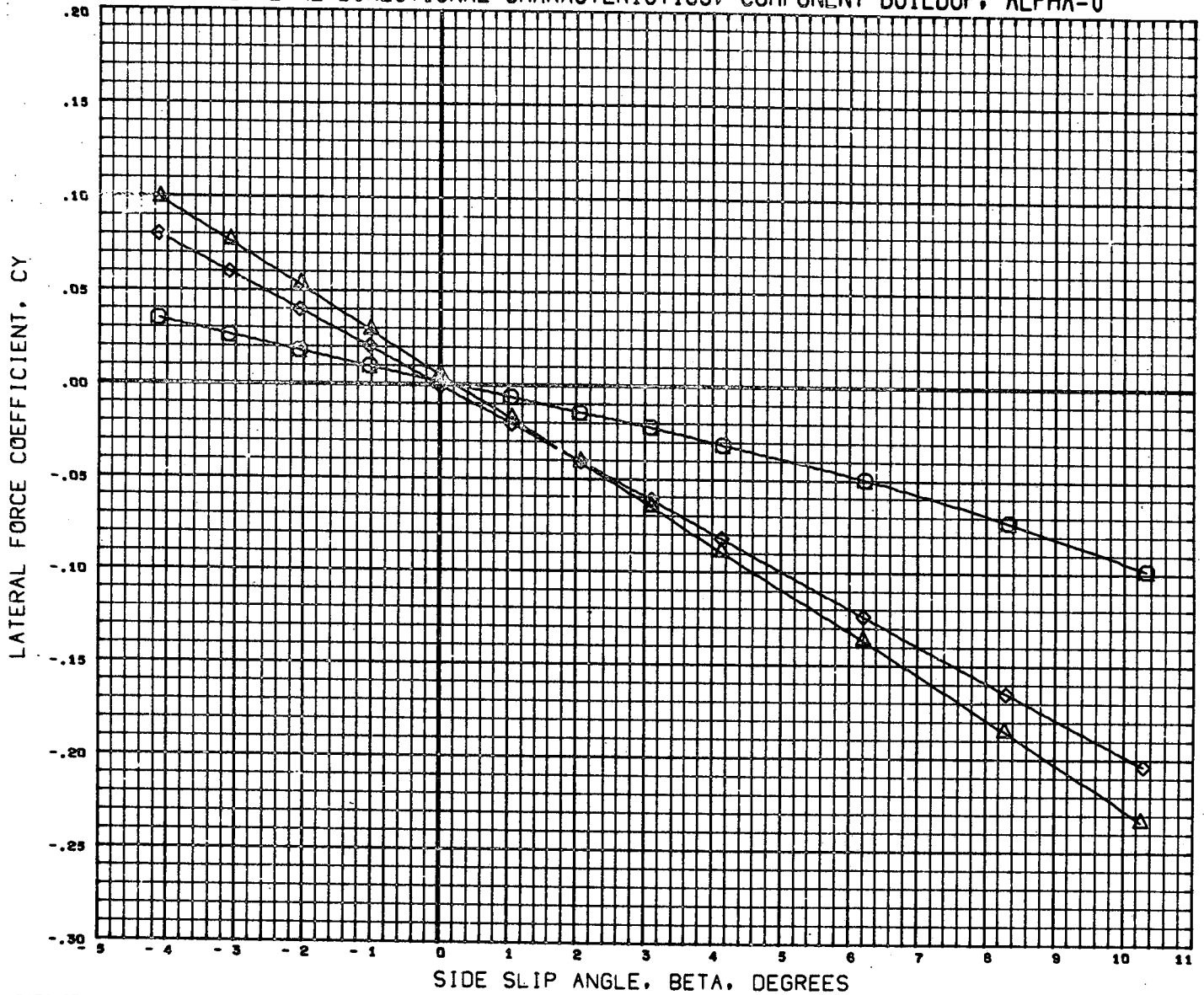
REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE \*A

MSFC 507 GAC H-33 ORB. B5W4V5

(A49X34) 31 MAY 72 PAGE 115

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

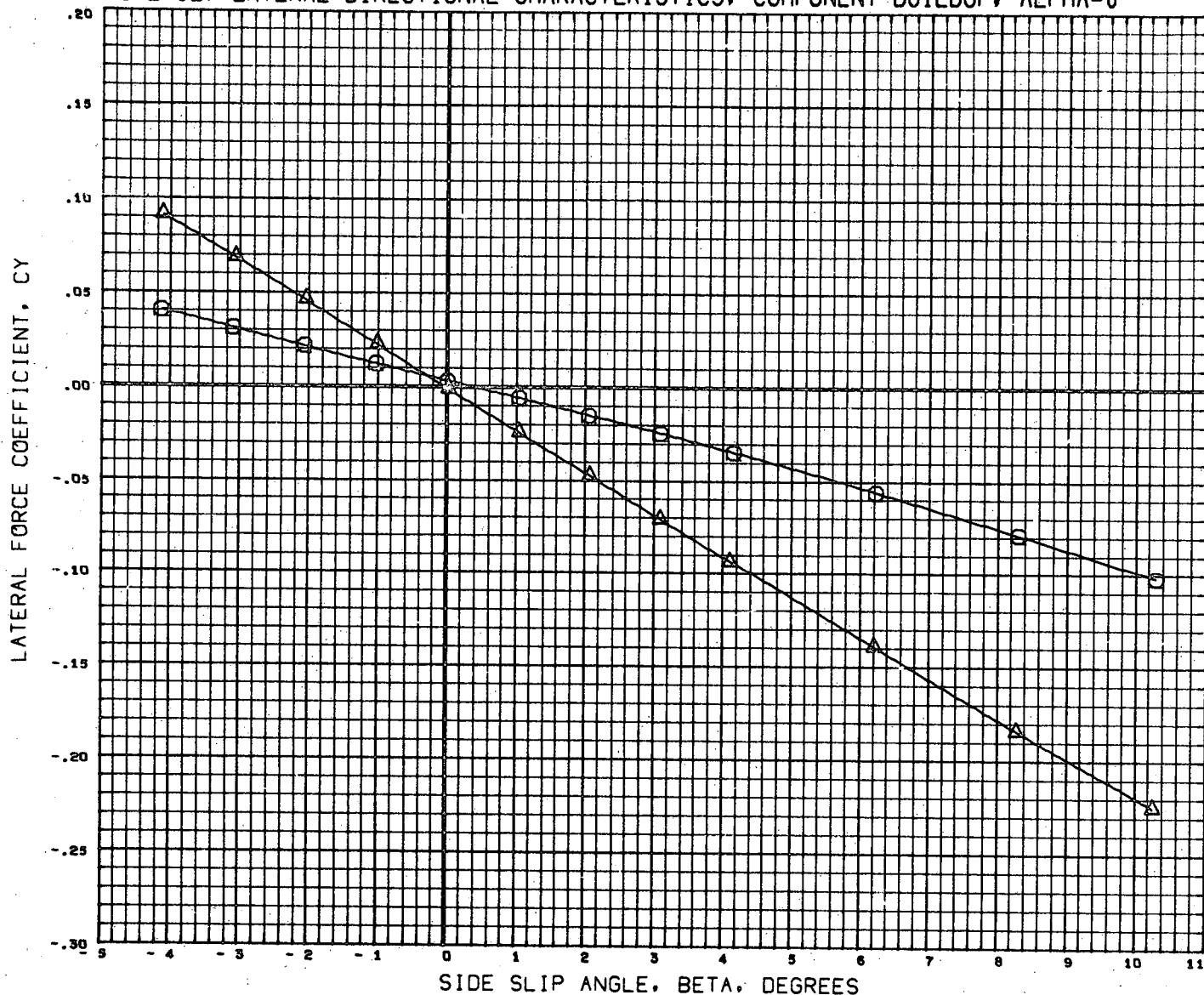


DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49028)	○	MSFC 307 GAC H-33 ORB. B5W4	0.000	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49033)	△	MSFC 307 GAC H-33 ORB. B5W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49Y34)	◇	MSFC 307 GAC H-33 ORB. B5W4V3	0.000	0.000	0.000	0.000	BREF 3.8170 IN
							XMRP 1274.4040 IN.
							YMRP 0.0000 IN.
							ZMRP 391.3004 IN.
							SCALE 0.0034

MACH 1.46

PAGE 116

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



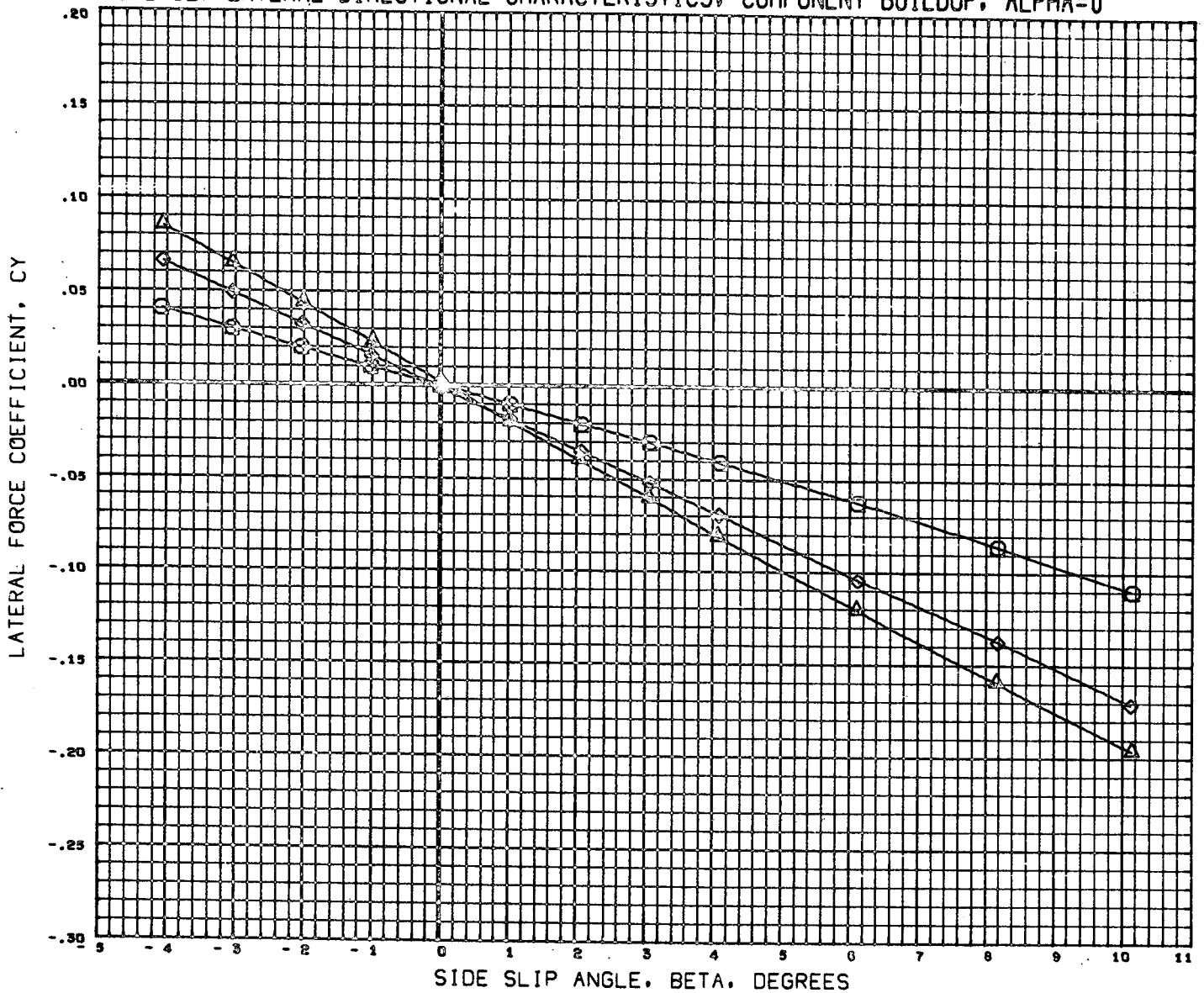
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49028)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49033)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49Y34)	DATA NOT AVAILABLE FOR ALL CONDITIONS	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 1.96

PAGE 117



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

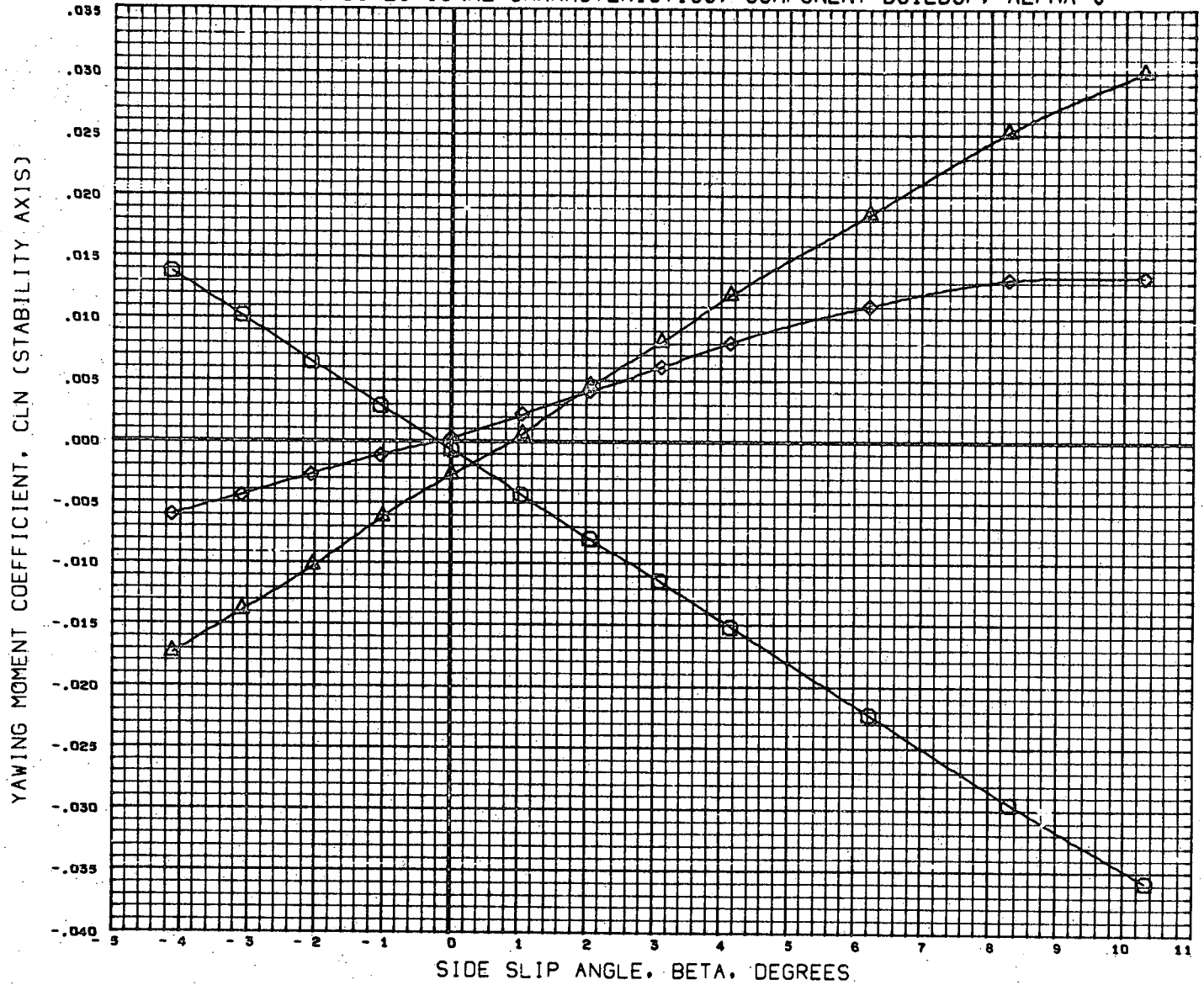


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49026)	MSFC 507 GAC H-33 ORB. B3W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49033)	MSFC 507 GAC H-33 ORB. B3W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49Y34)	MSFC 507 GAC H-33 ORB. B3W4V3	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.74

PAGE 118

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

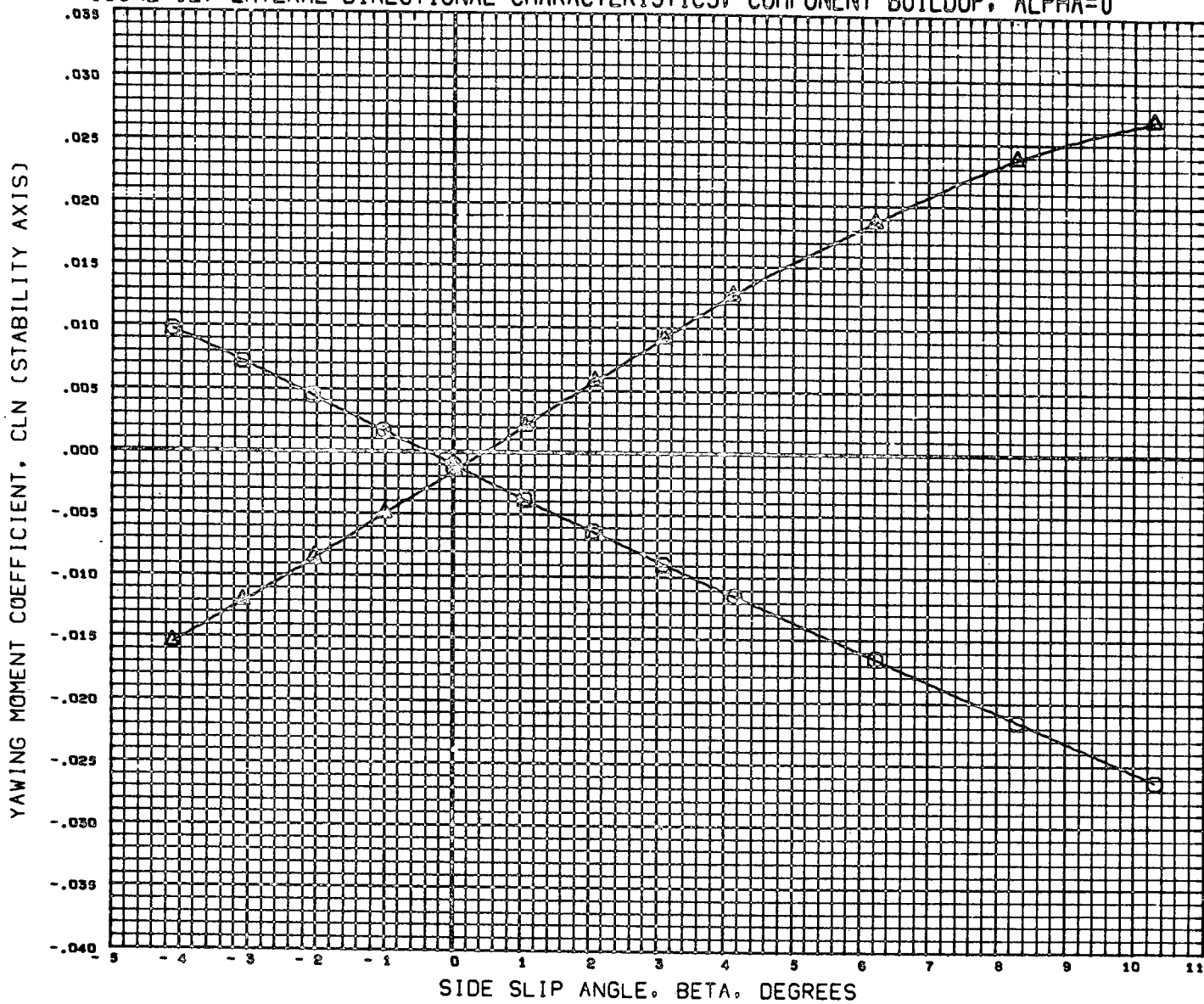


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49028)	MSFC 307 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49033)	MSFC 307 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49Y34)	MSFC 307 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 1.46

PAGE 119

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

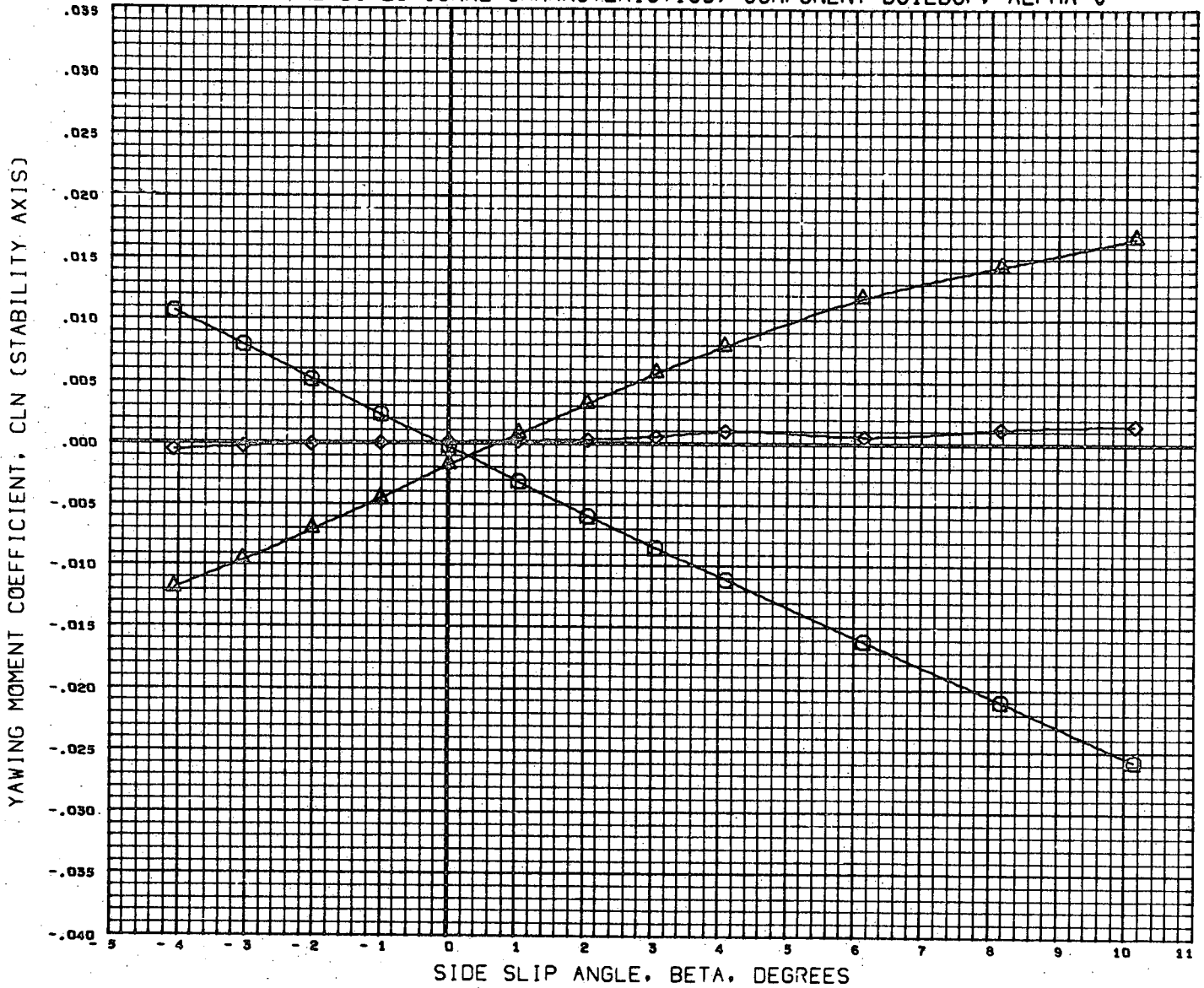


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49028)	MSFC 907 GAC H-33 ORB. BSW4	0.000	0.000			SREF 7.8970 SQ. IN
(A49033)	MSFC 907 GAC H-33 ORB. B9W4V3(+30,-30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49Y34)	DATA NOT AVAILABLE FOR ALL CONDITIONS	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 1.96

PAGE 120

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

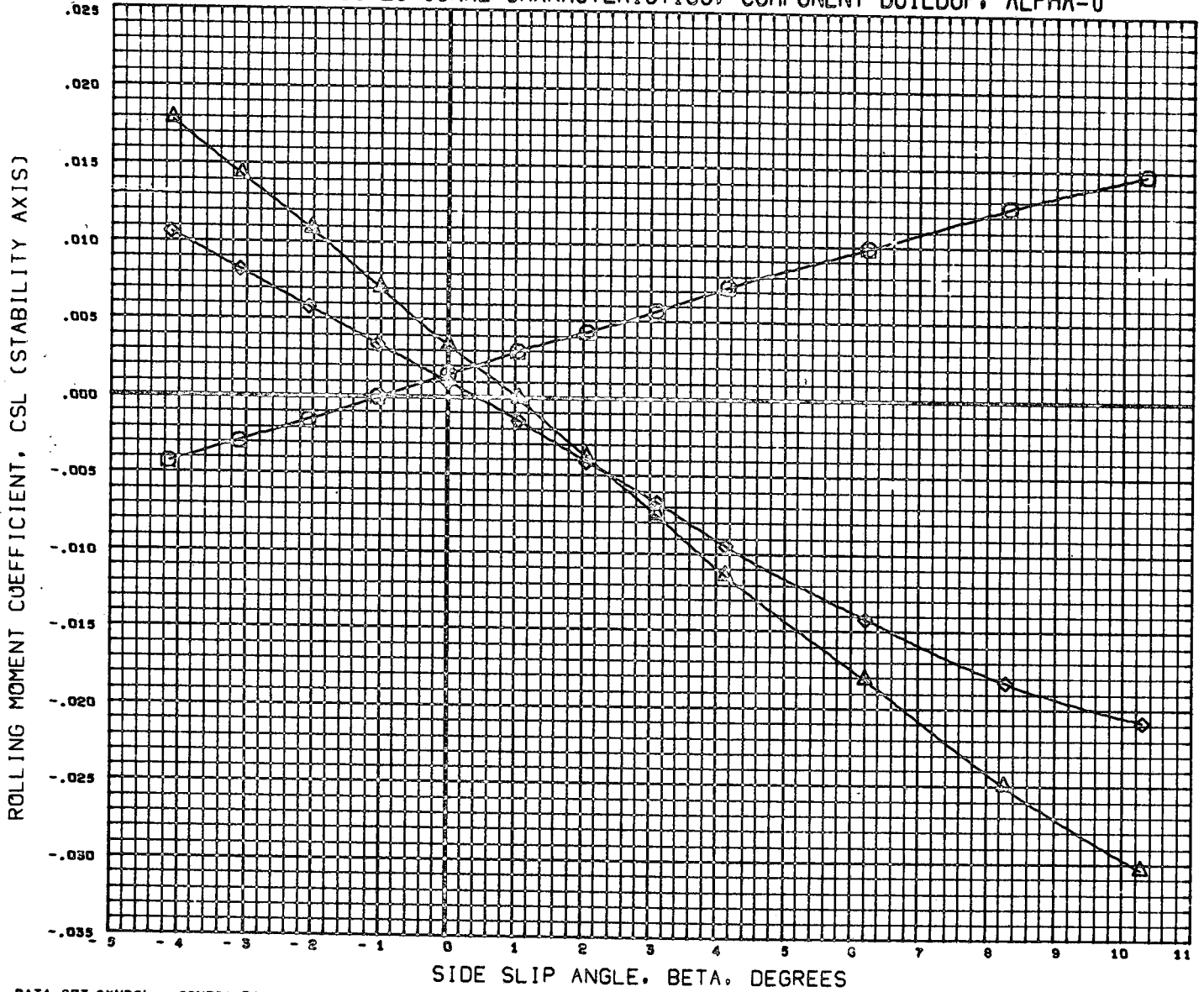


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49028)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49033)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49Y34)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.74

PAGE 121

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

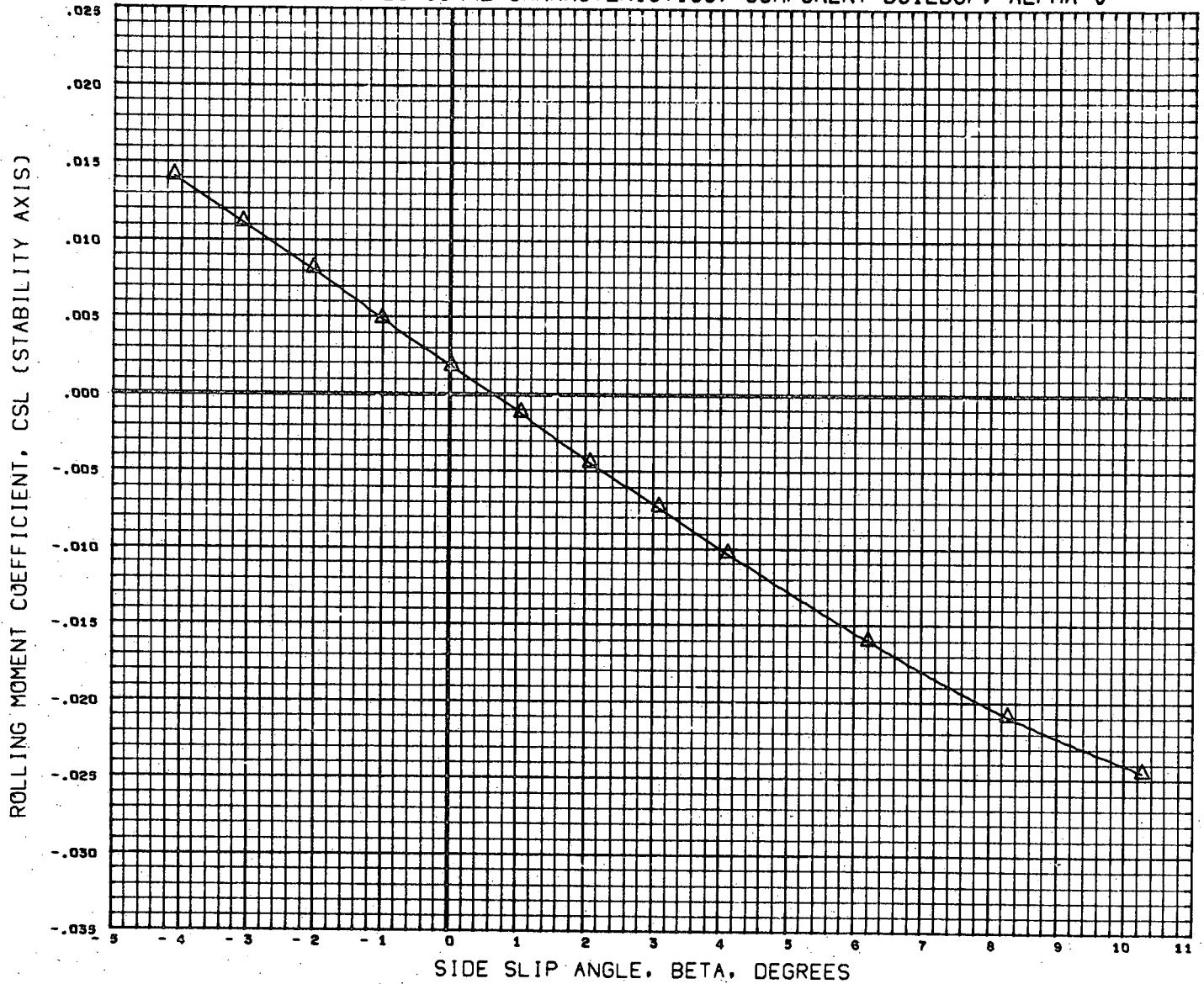


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49028)	MSFC 907 GAC H-33 ORB. B9W4	0.000	0.000	0.000	0.000	SREF	7.8970 SQ. IN
(A49033)	MSFC 907 GAC H-33 ORB. B9W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49134)	MSFC 907 GAC H-33 ORB. B9W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 1.46

PAGE 122

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



DATA SET SYMBOL    CONFIGURATION DESCRIPTION  
 (A49033)    Δ    MSFC 507 GAC H-33 ORB. B3W4V5(+30,-30)

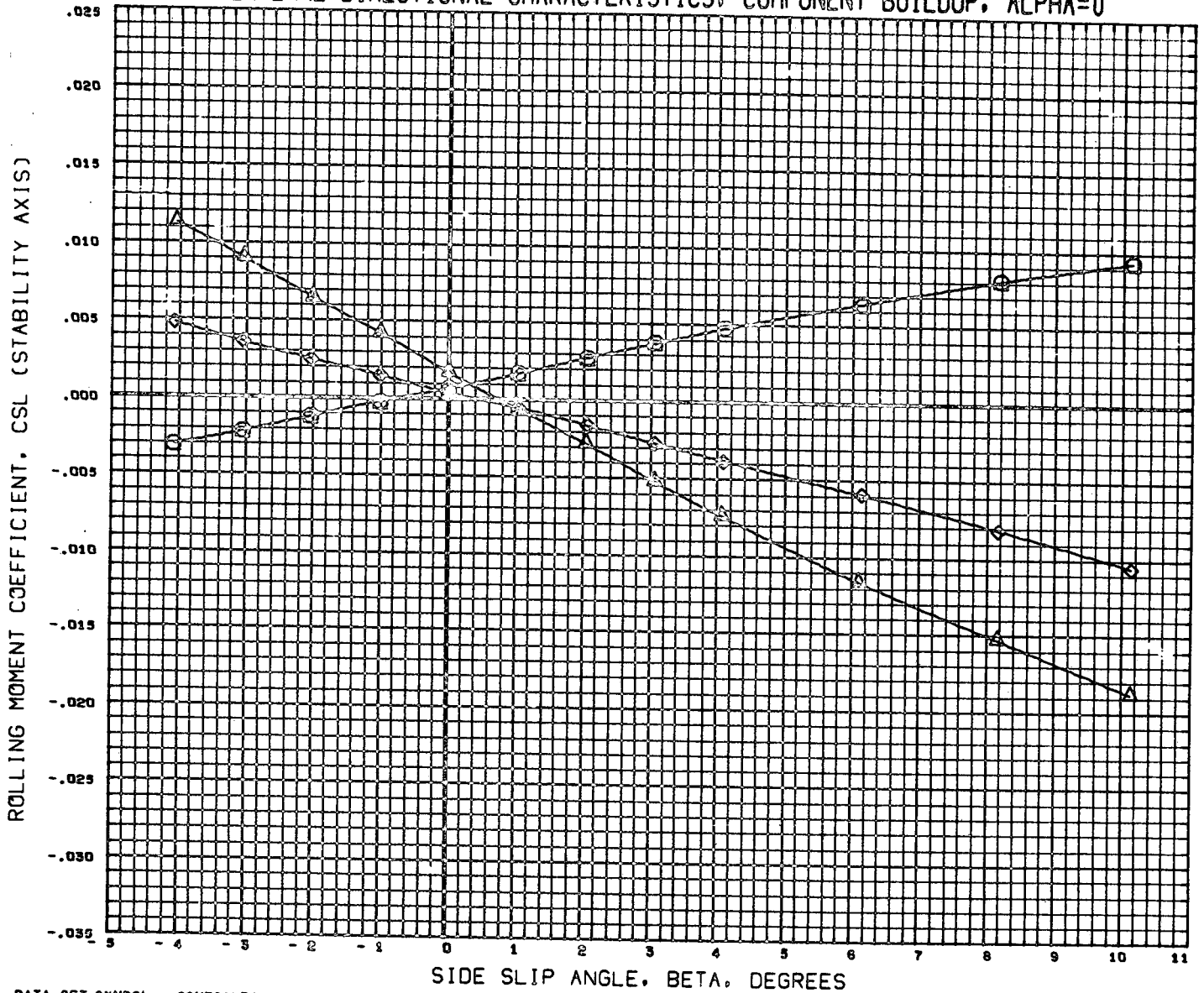
ELEVTR    AILERN    LRUDDR    RRUDDR  
 0.000    0.000    30.000    -30.000

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

PAGE    123

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

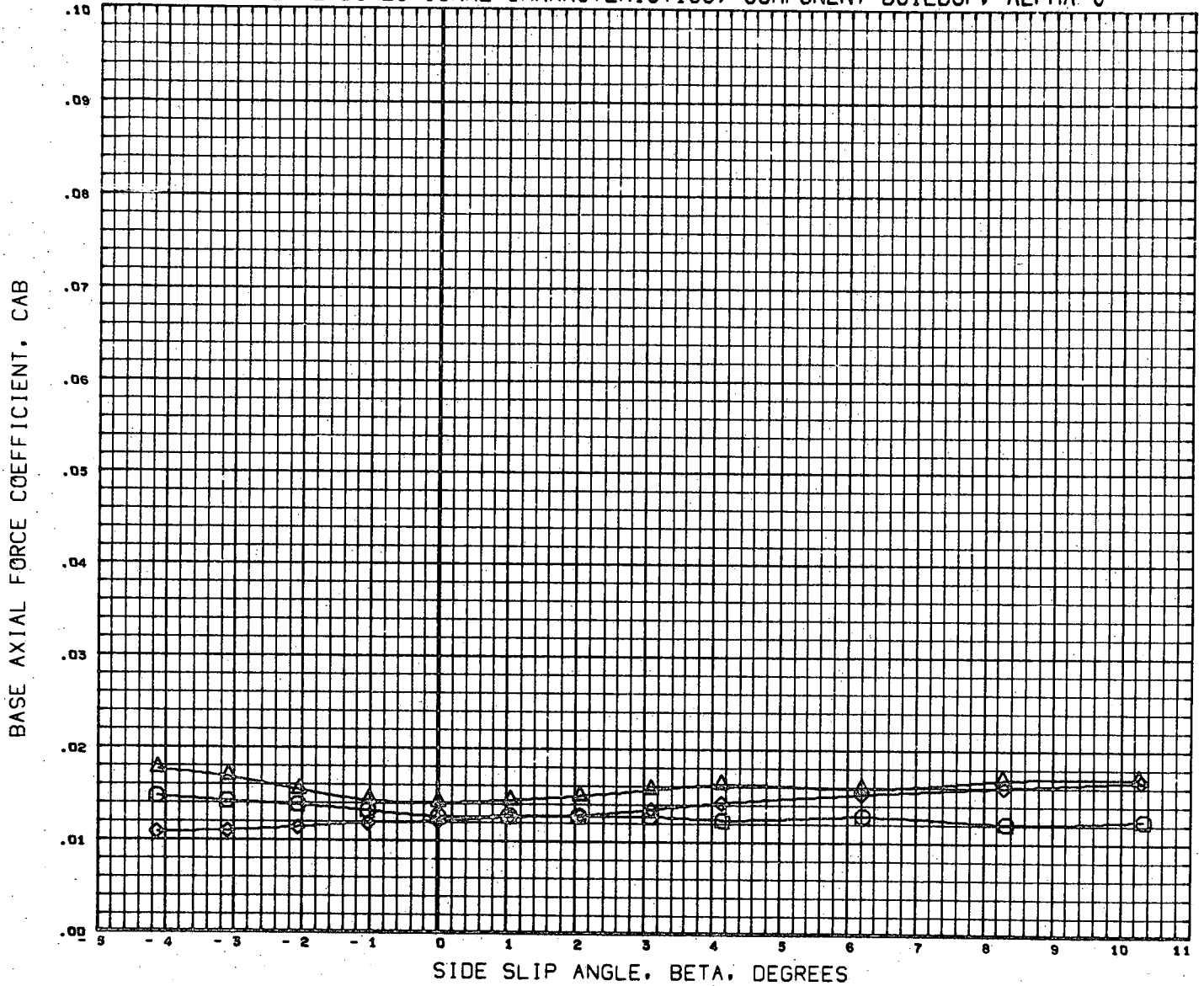


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49028)	MSFC 507 GAC M-33 ORB. BSM4	0.000	0.000			SREF 7.8970 SQ. IN
(A49033)	MSFC 507 GAC M-33 ORB. BSM4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49Y34)	MSFC 507 GAC M-33 ORB. BSM4V5	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 2.74

137

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



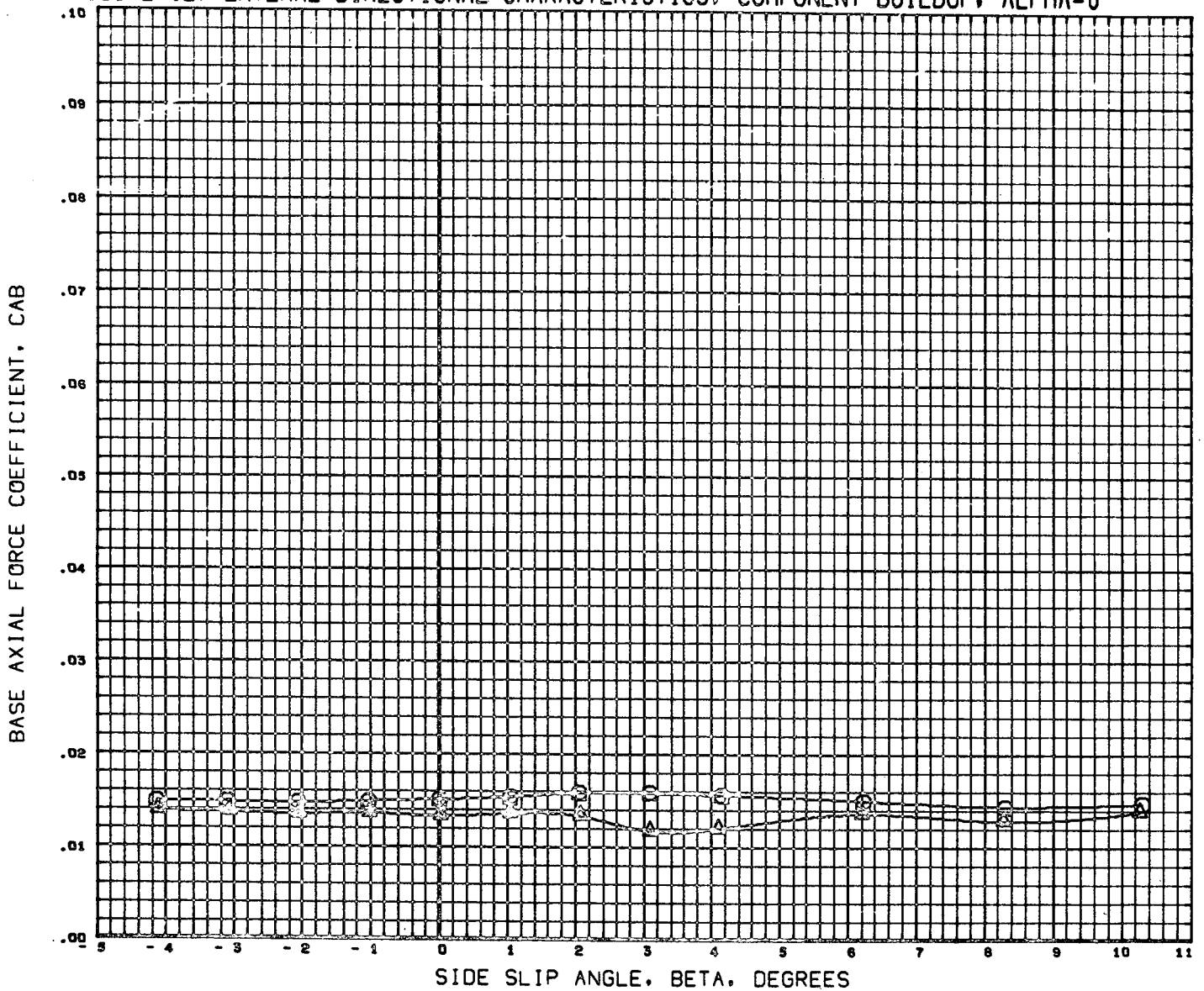
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49028)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49033)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49Y34)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 1.46

PAGE 125



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

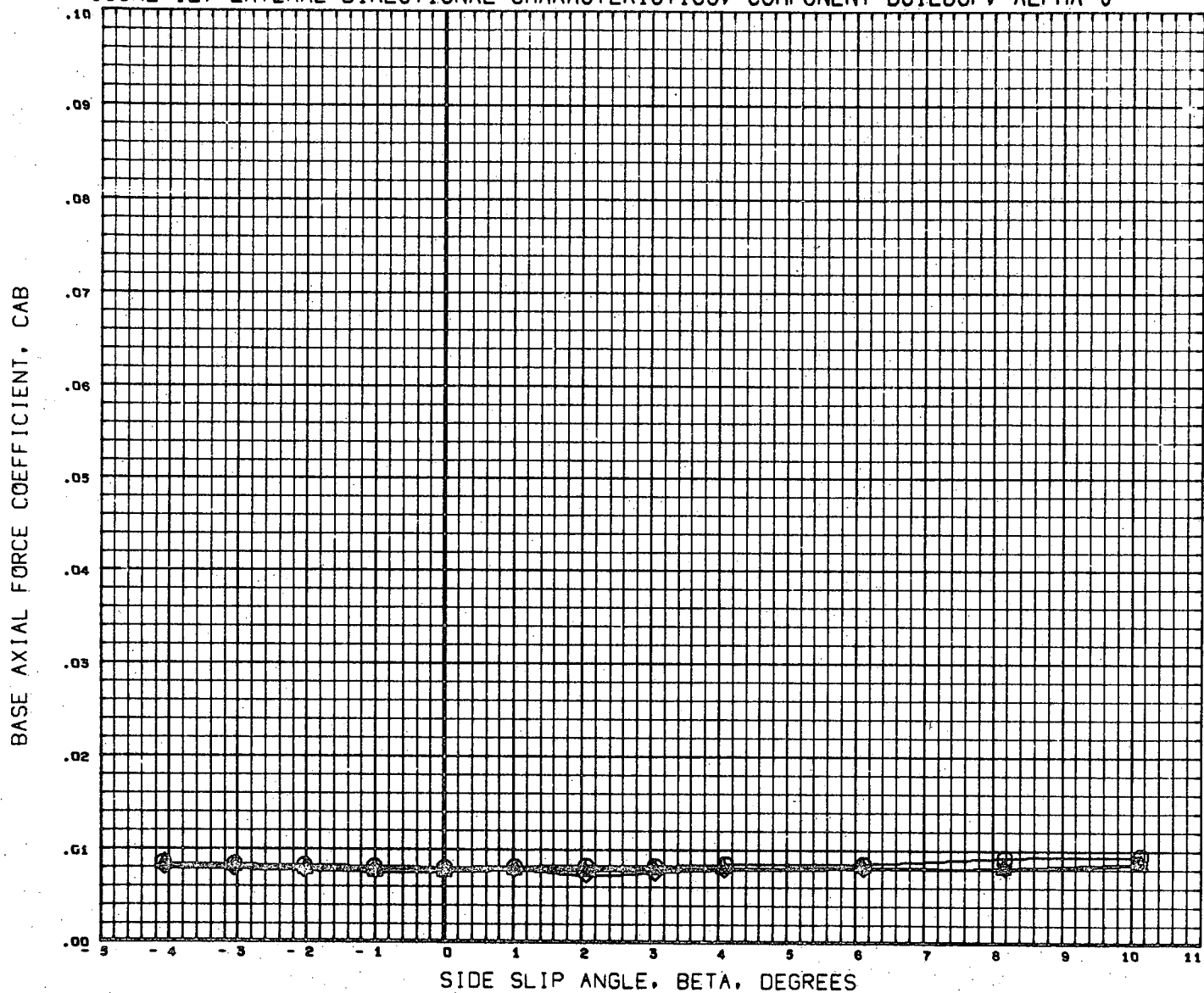


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49026)	MSFC 507 GAC H-35 ORB. 89W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49033)	MSFC 507 GAC H-35 ORB. 89W4V5(+30,-30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49Y34)	DATA NOT AVAILABLE FOR ALL CONDITIONS	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 1.96

PAGE 126

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

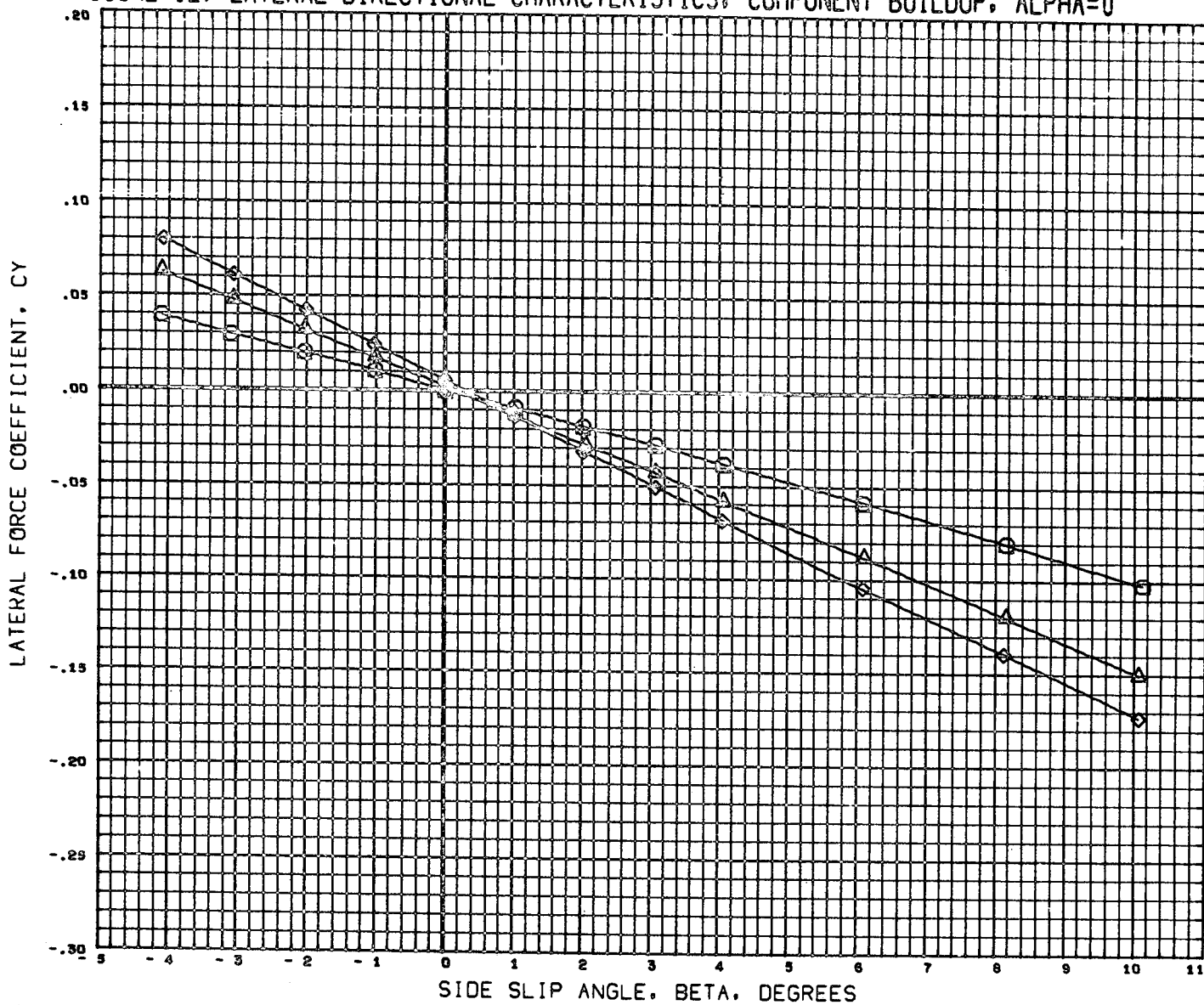


DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49028)	○	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ.IN
(A49033)	△	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4830 IN
(A49Y34)	◇	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
							XMRP	1274.4040 IN.
							YMRP	0.0000 IN.
							ZMRP	391.3004 IN.
							SCALE	0.0034

MACH 2.74

PAGE 127

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

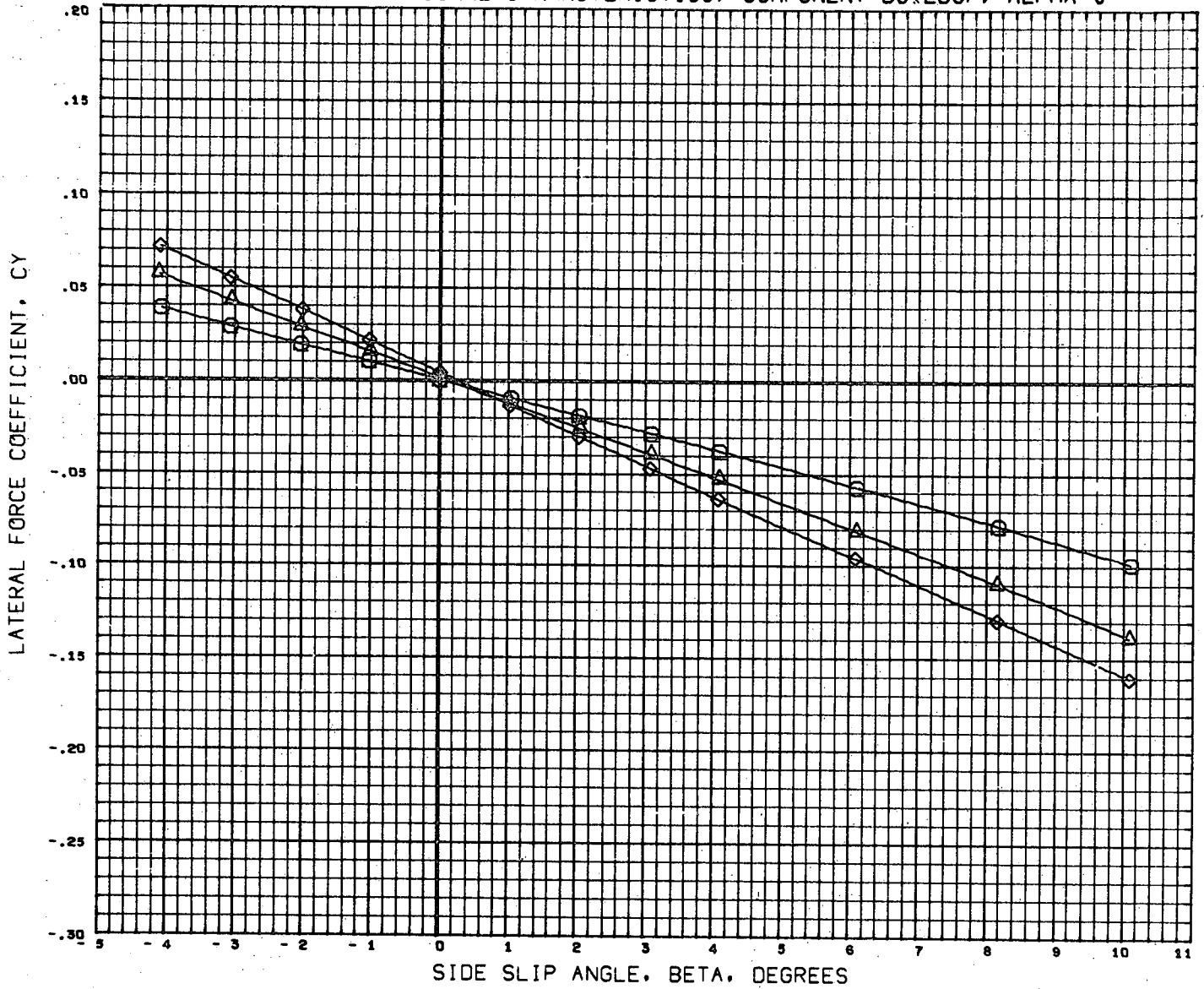


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49014)	MSFC 507 6AC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49015)	MSFC 507 6AC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF	5.4530 IN
(A49016)	MSFC 507 6AC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.99

PAGE 128

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



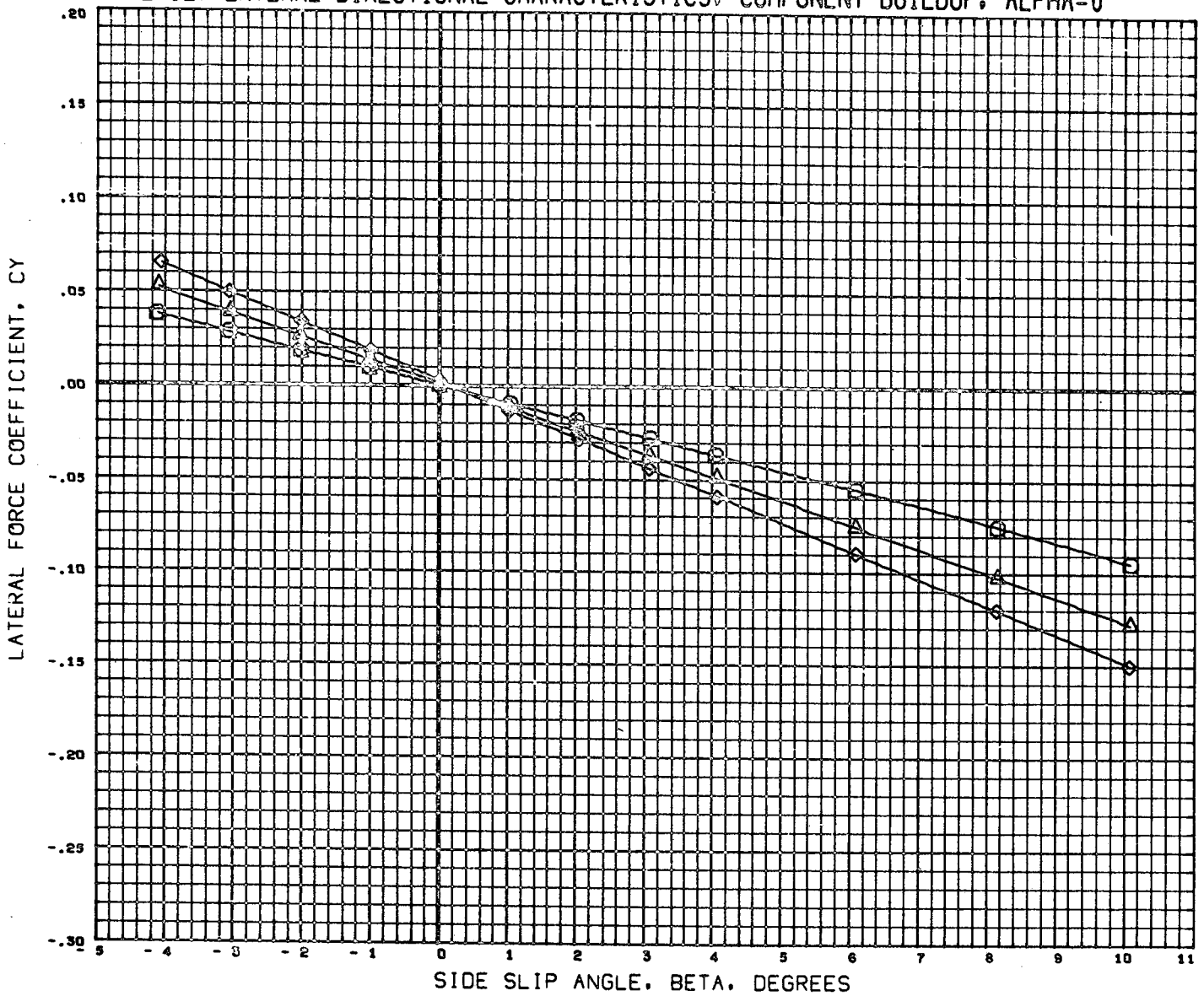
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A49014)	○	MSFC 507 GAC H-33 ORB. B5W4
(A49015)	△	MSFC 507 GAC H-33 ORB. B5W4V5
(A49016)	◇	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000			SREF 7.8970 SQ. IN
0.000	0.000			LREF 5.4530 IN
0.000	0.000	0.000	0.000	BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

MACH 3.48

PAGE 129

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

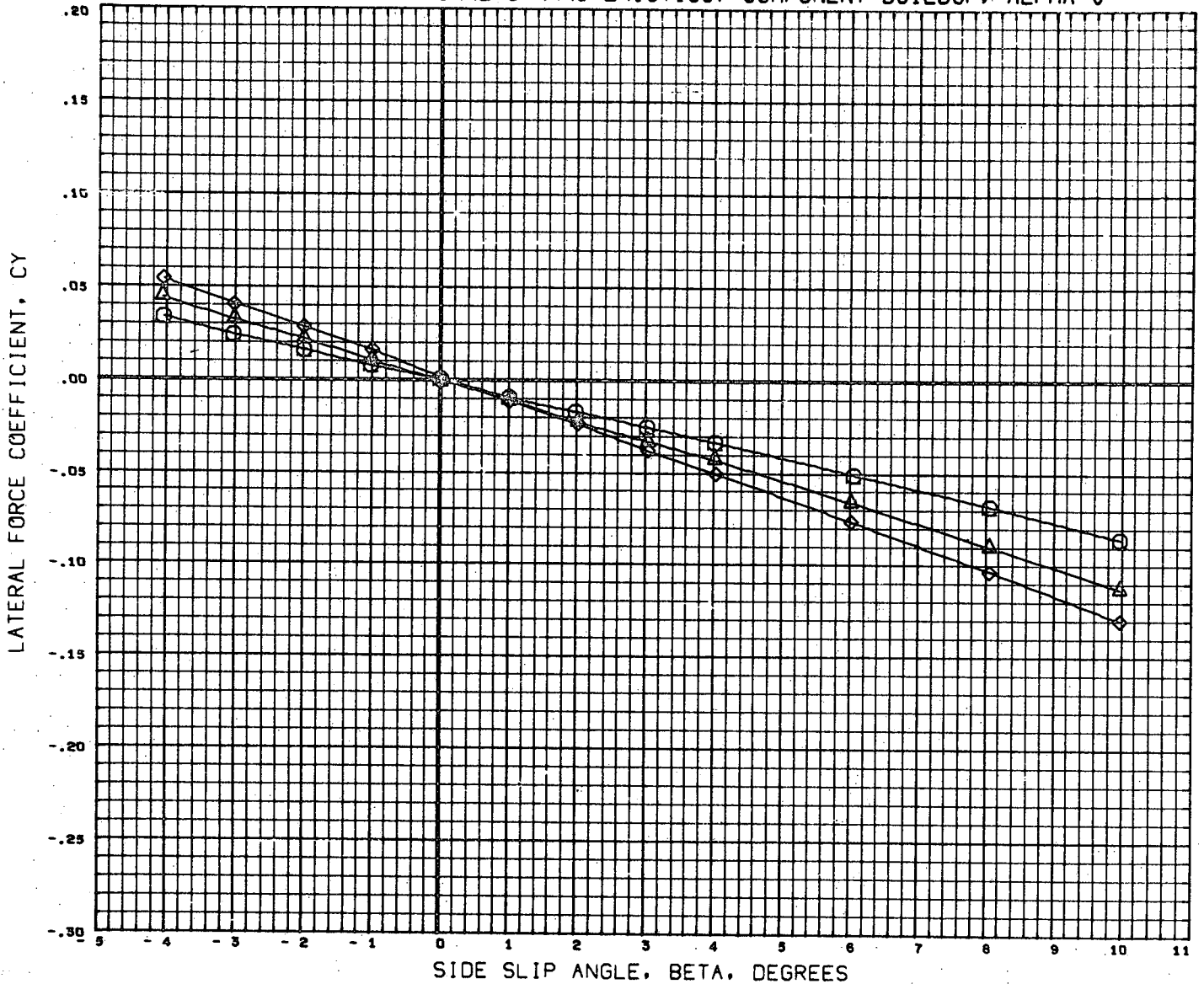


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49D14)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ.IN
(A49D15)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF	5.4530 IN
(A49D16)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	0.000	BREF	3.8170 IN
				30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.00

PAGE 130

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

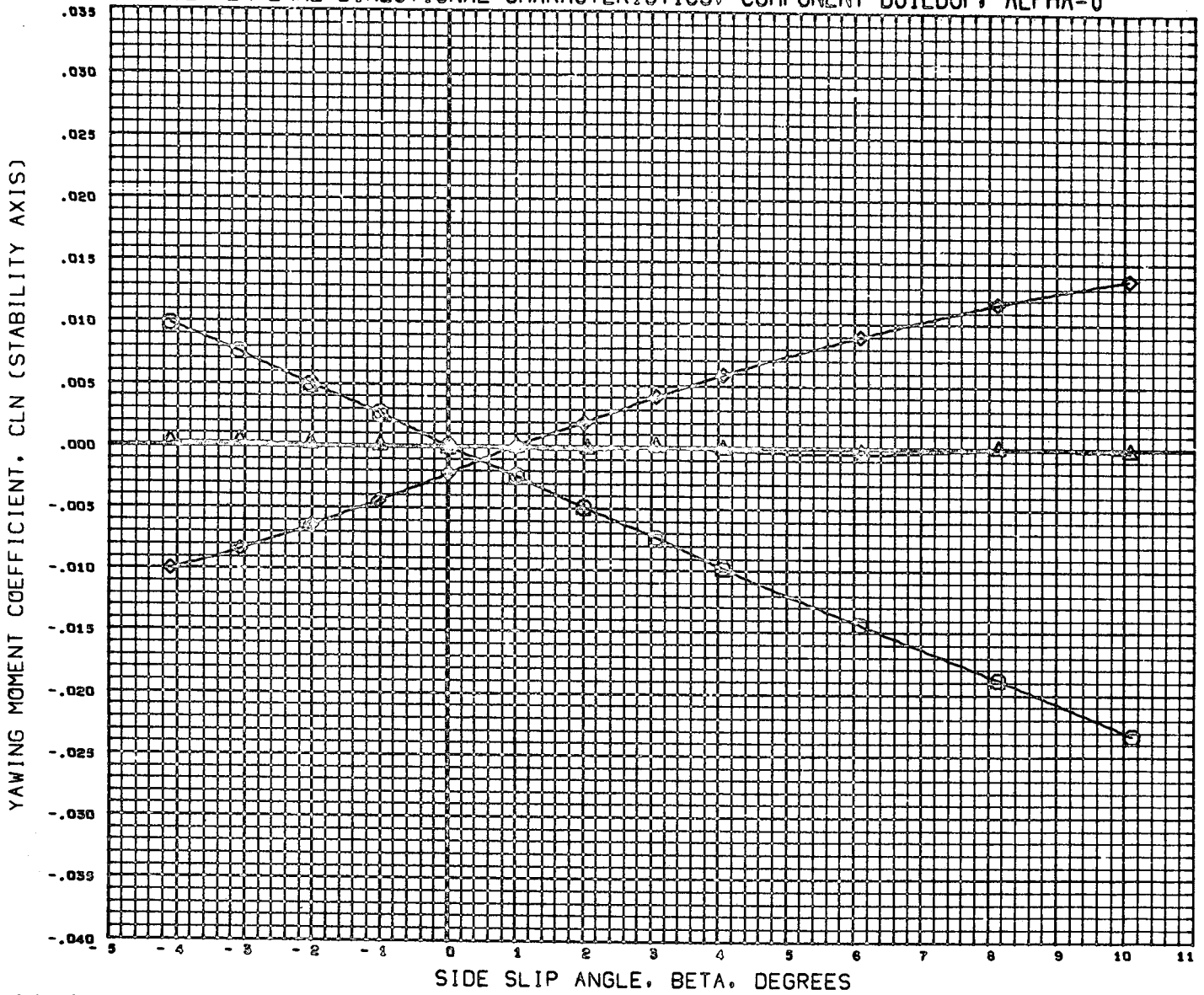


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49014)	MSFC 507 GAC H-33 ORB. BSW4	0.000	0.000			SREF 7.8970 SQ. IN
(A49015)	MSFC 507 GAC H-33 ORB. BSW4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49016)	MSFC 507 GAC H-33 ORB. BSW4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.96

PAGE 131

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

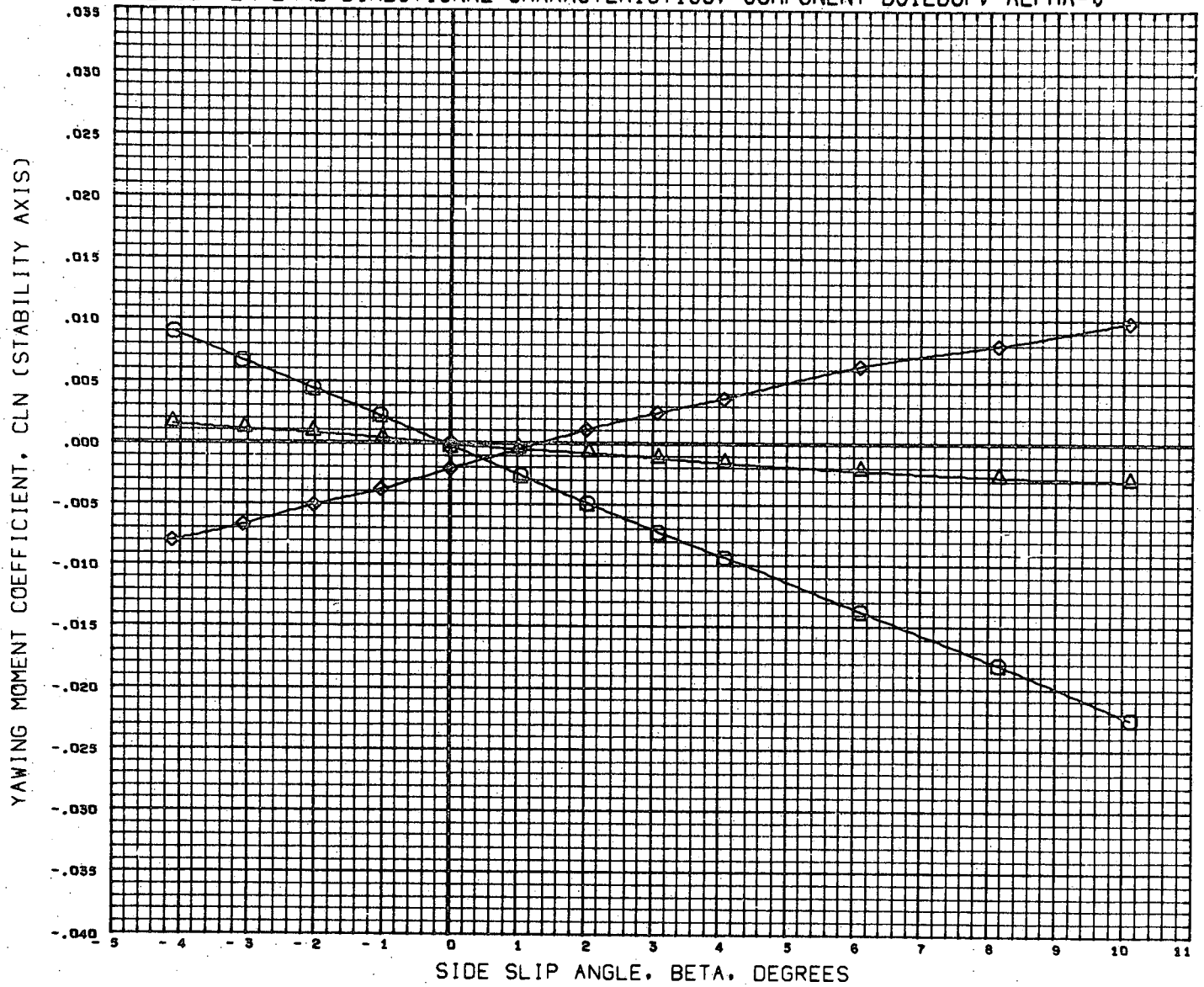


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49014)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49015)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF 5.4530 IN
(A49016)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 2.99

PAGE 132

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



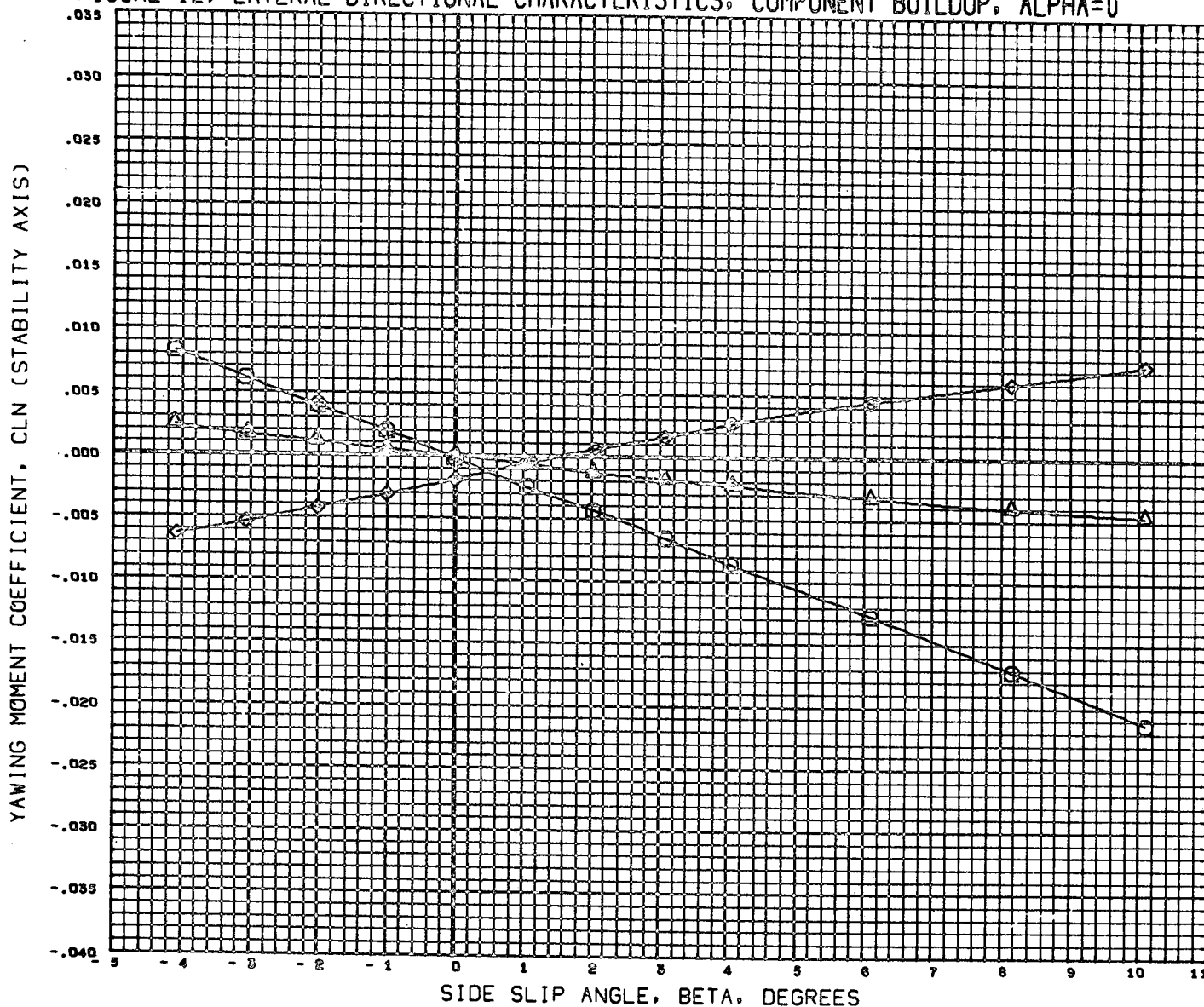
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49014)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49015)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF 5.4530 IN
(A49016)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 3.48

PAGE 133



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

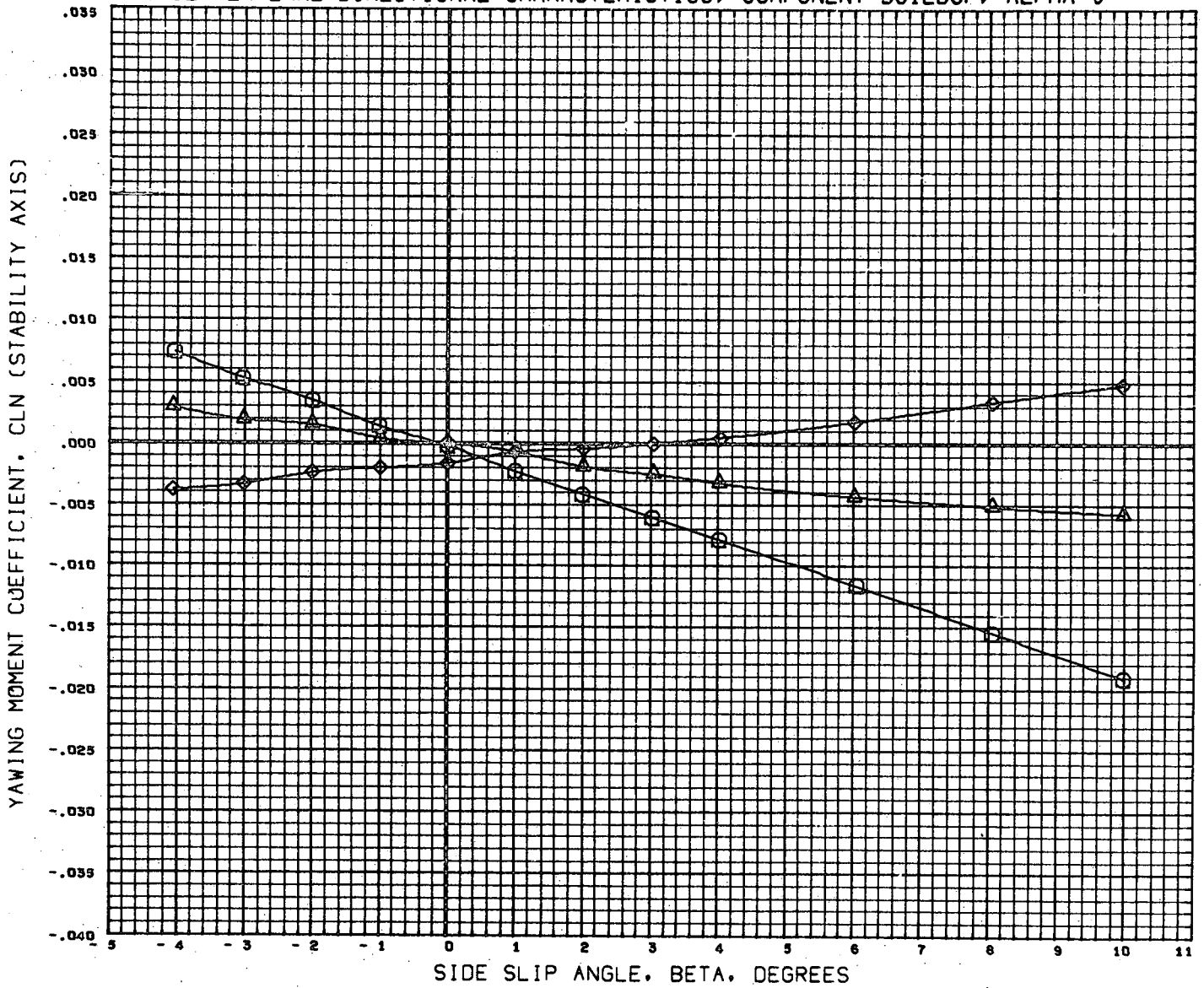


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49014)	MSFC 907 GAC H-33 ORB. B9W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49015)	MSFC 907 GAC H-33 ORB. B9W4V9	0.000	0.000			LREF	5.4530 IN
(A49016)	MSFC 907 GAC H-33 ORB. B9W4V9 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.6170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.00

PAGE 134

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

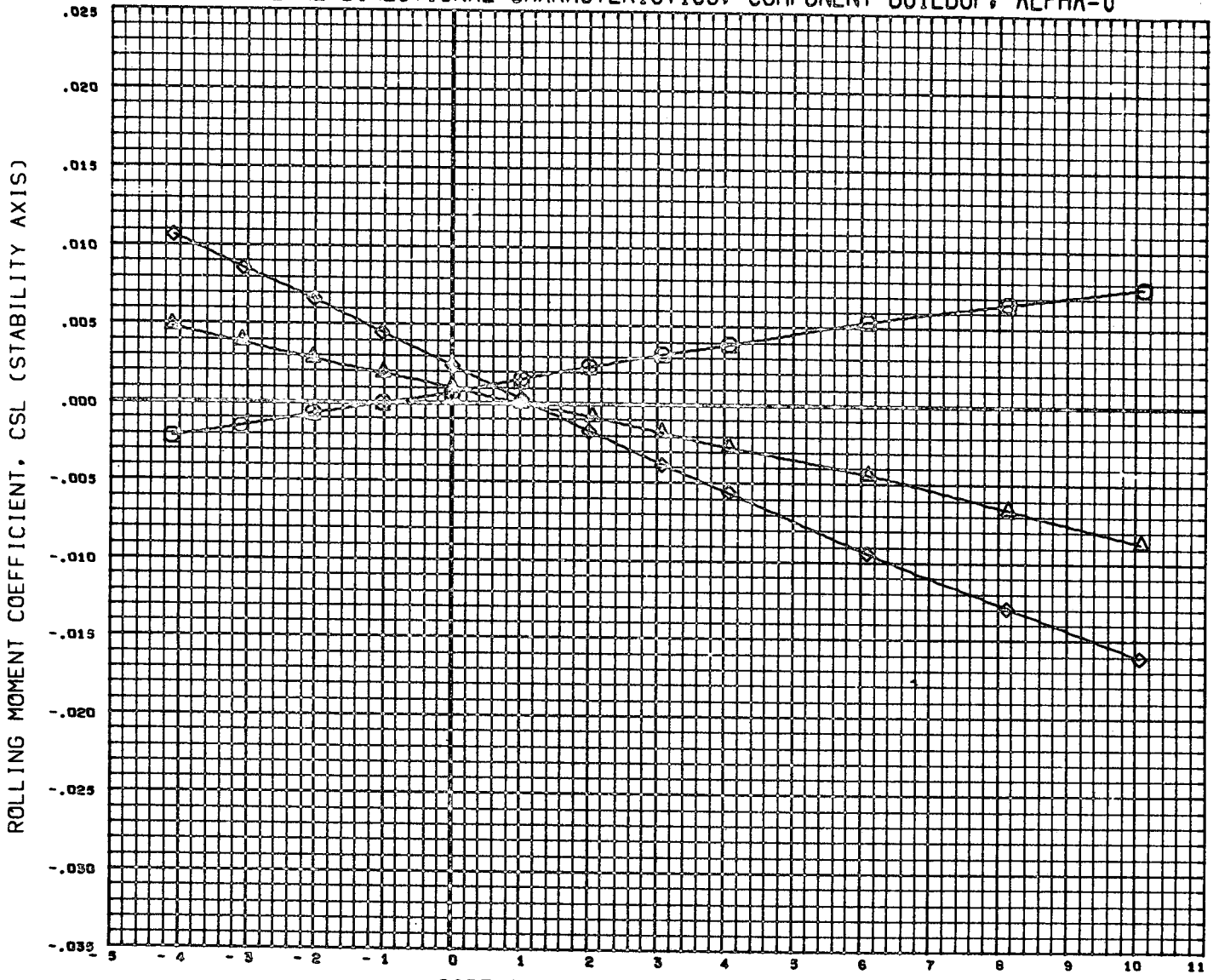


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49D14)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49D15)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF	5.4530 IN
(A49D16)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.96

PAGE 135

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

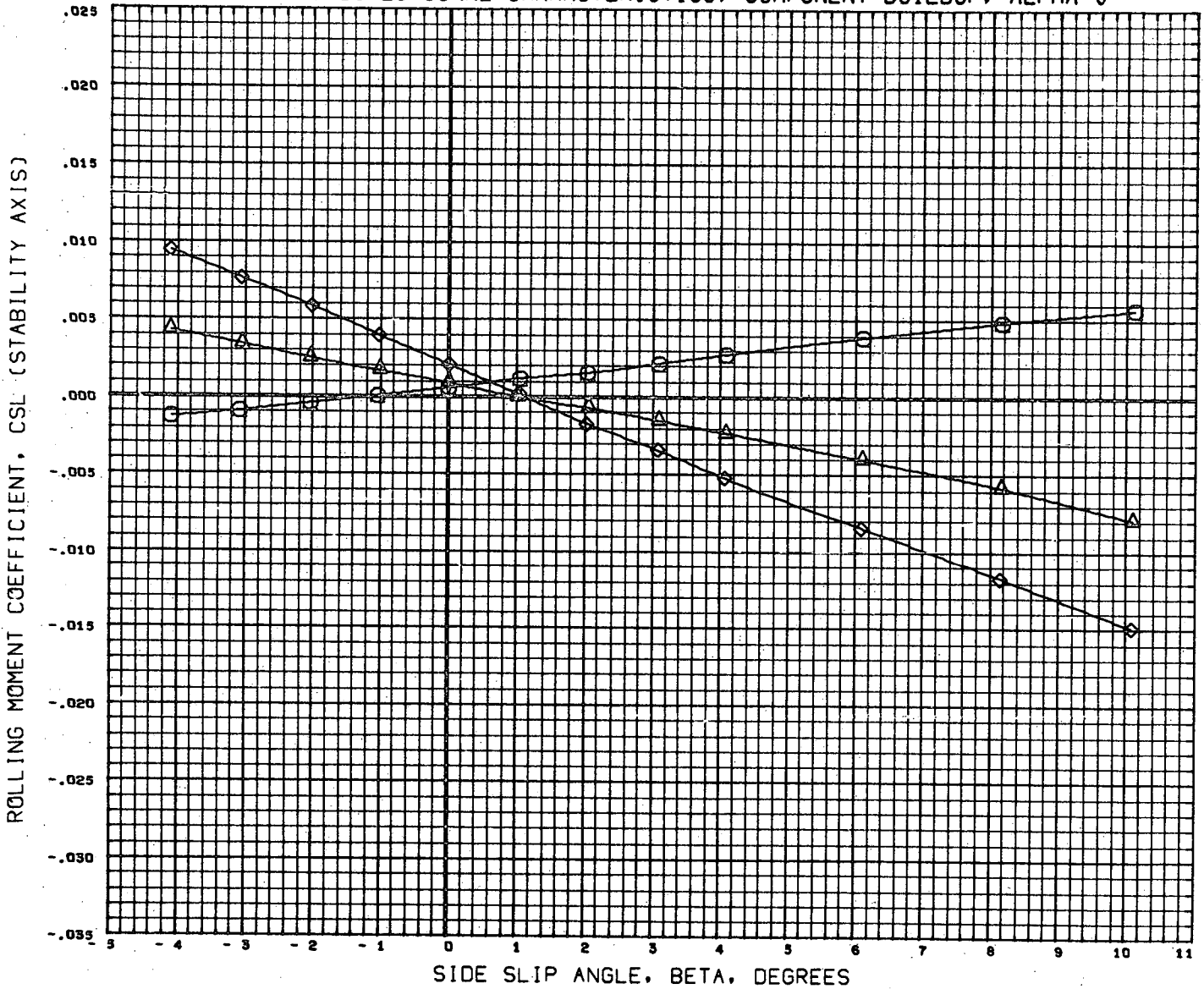


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49014)	MSFC 507 6AC H-33 ORB. B5W4
(A49015)	MSFC 507 6AC H-33 ORB. B5W4V5
(A49016)	MSFC 507 6AC H-33 ORB. B5W4V5 (+30, -30)

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000			SREF 7.8970 SQ. IN
0.000	0.000			LREF 5.4530 IN
		0.000	0.000	BREF 3.8170 IN
				XM RP 1274.4040 IN.
				YM RP 0.0000 IN.
				ZM RP 391.3004 IN.
				SCALE 0.0034

MACH 2.99

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

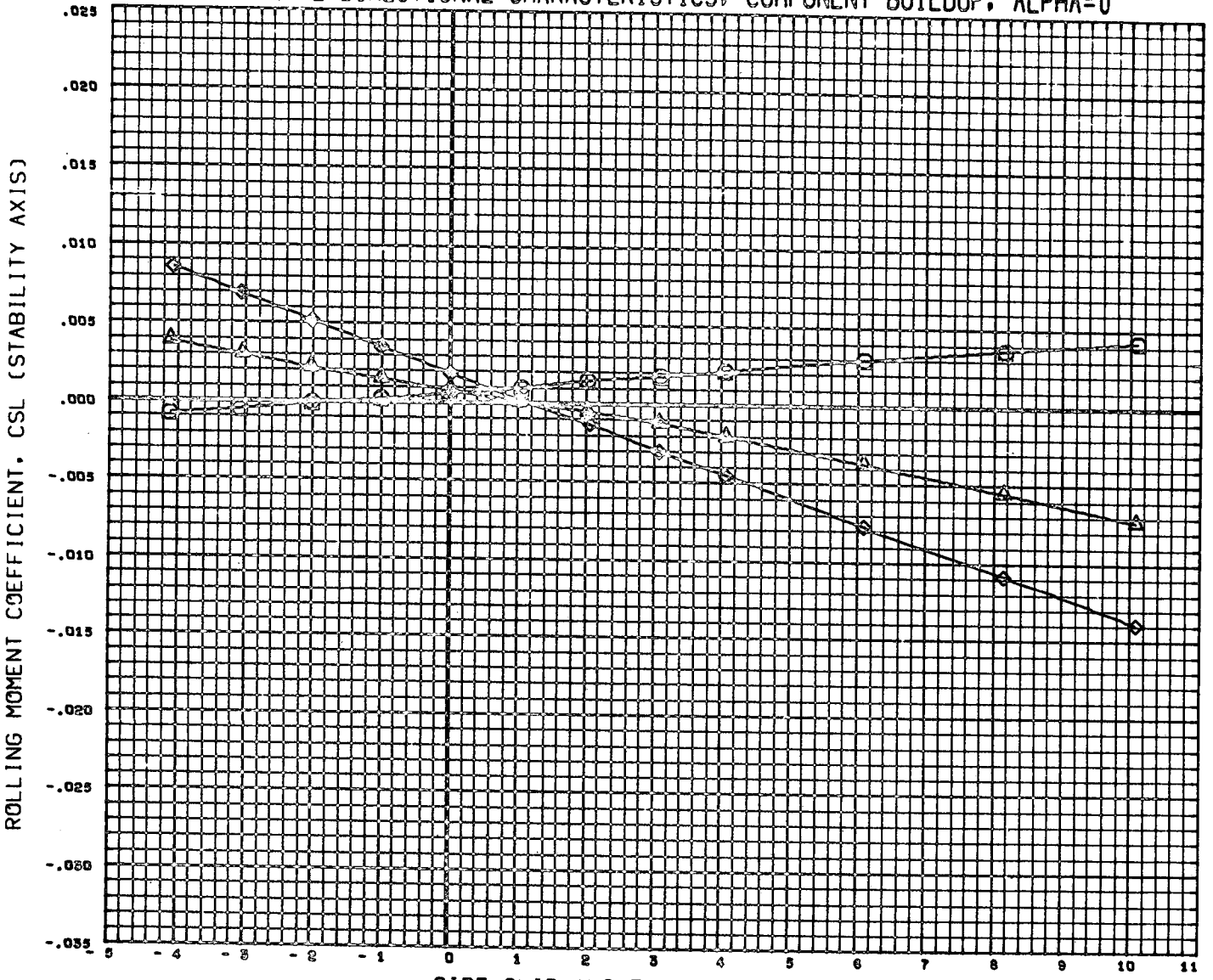


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49D14)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49D15)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF	5.4530 IN
(A49D16)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 3.48

PAGE 137

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

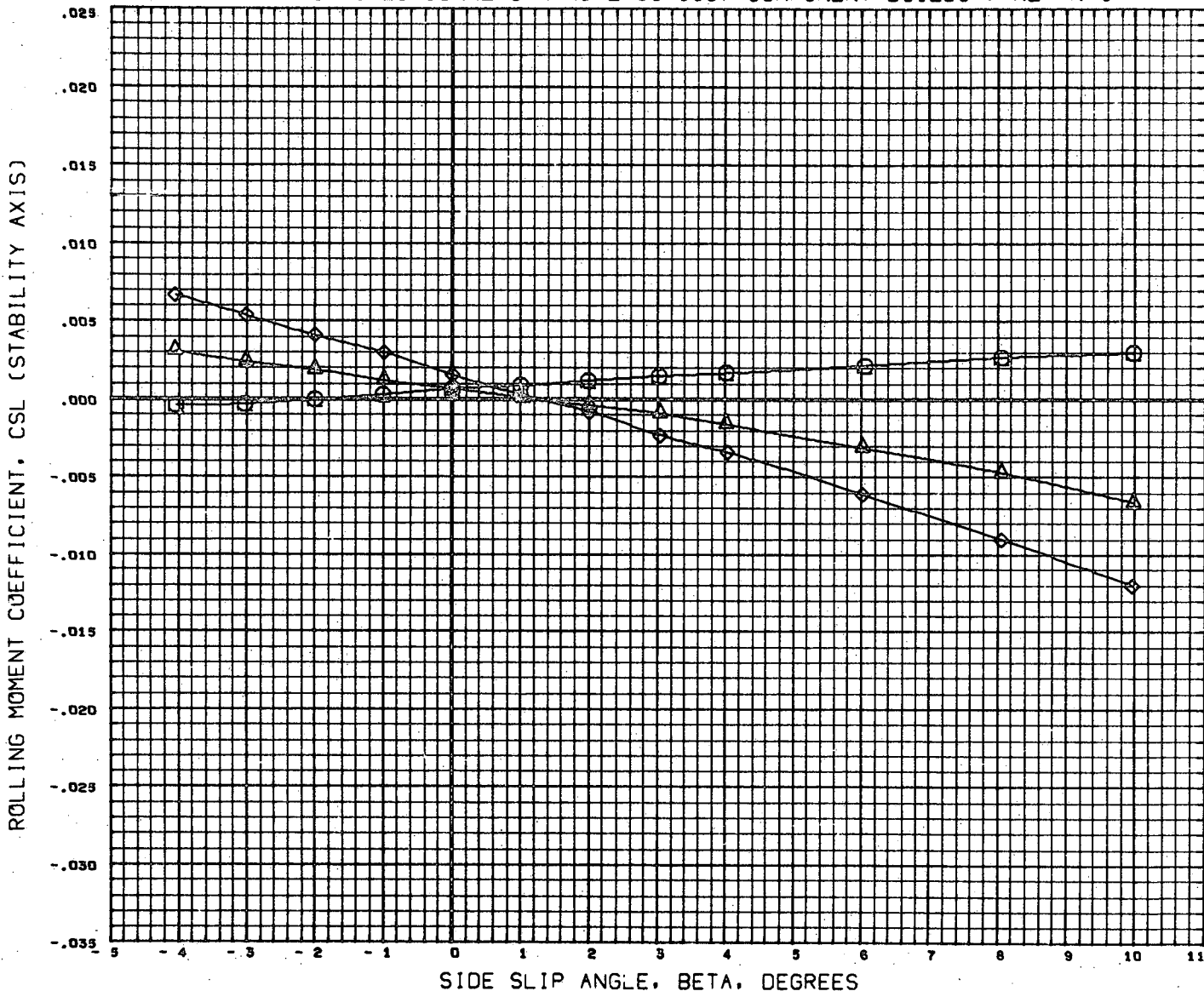


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49014)	HSFC 907 GAC H-33 ORB. B9W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49015)	HSFC 907 GAC H-33 ORB. B9W4V5	0.000	0.000			LREF 5.4530 IN
(A49016)	HSFC 907 GAC H-33 ORB. B9W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.00

PAGE 138

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

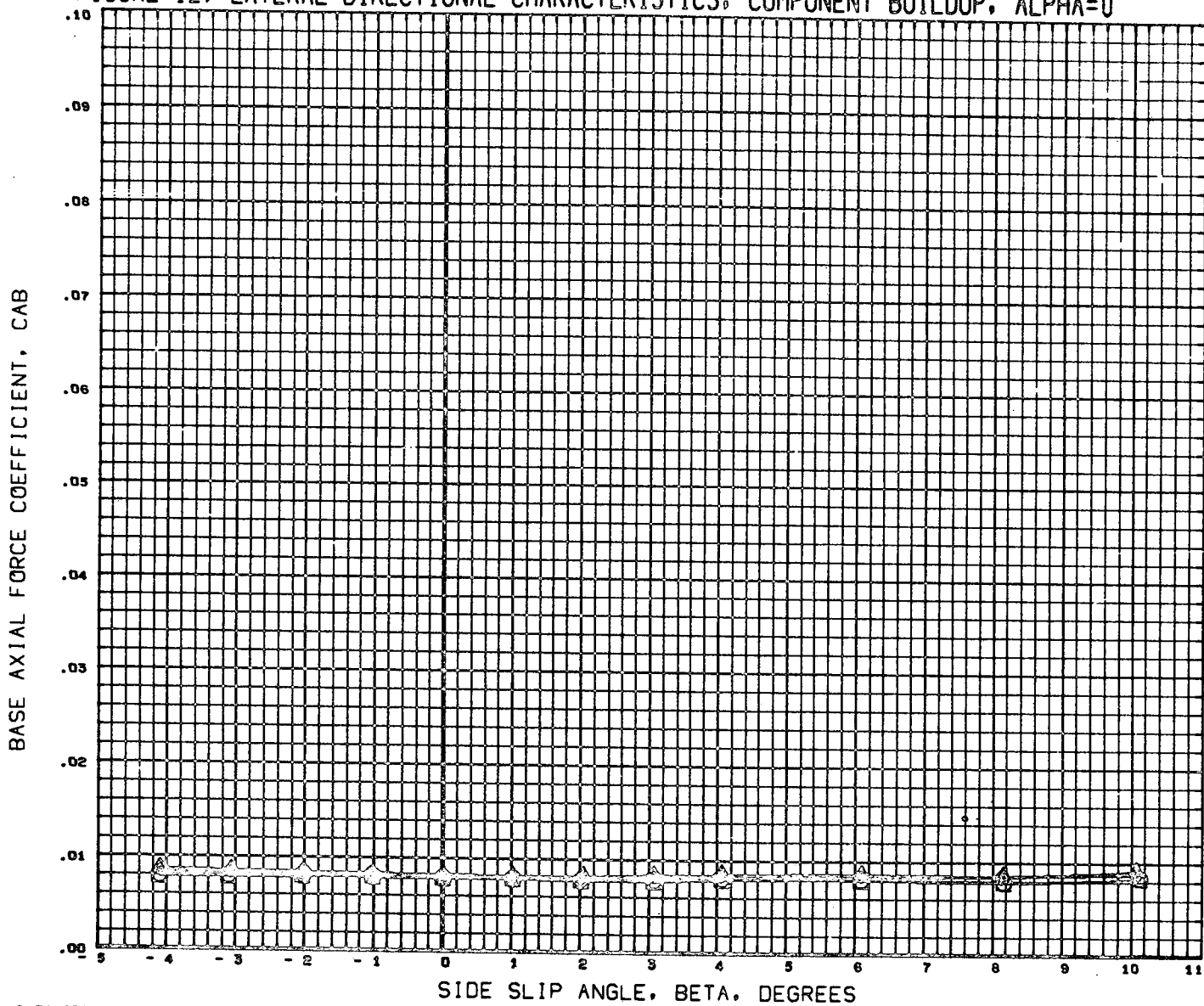


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49014)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ.IN
(A49015)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49016)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.96

PAGE 139

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

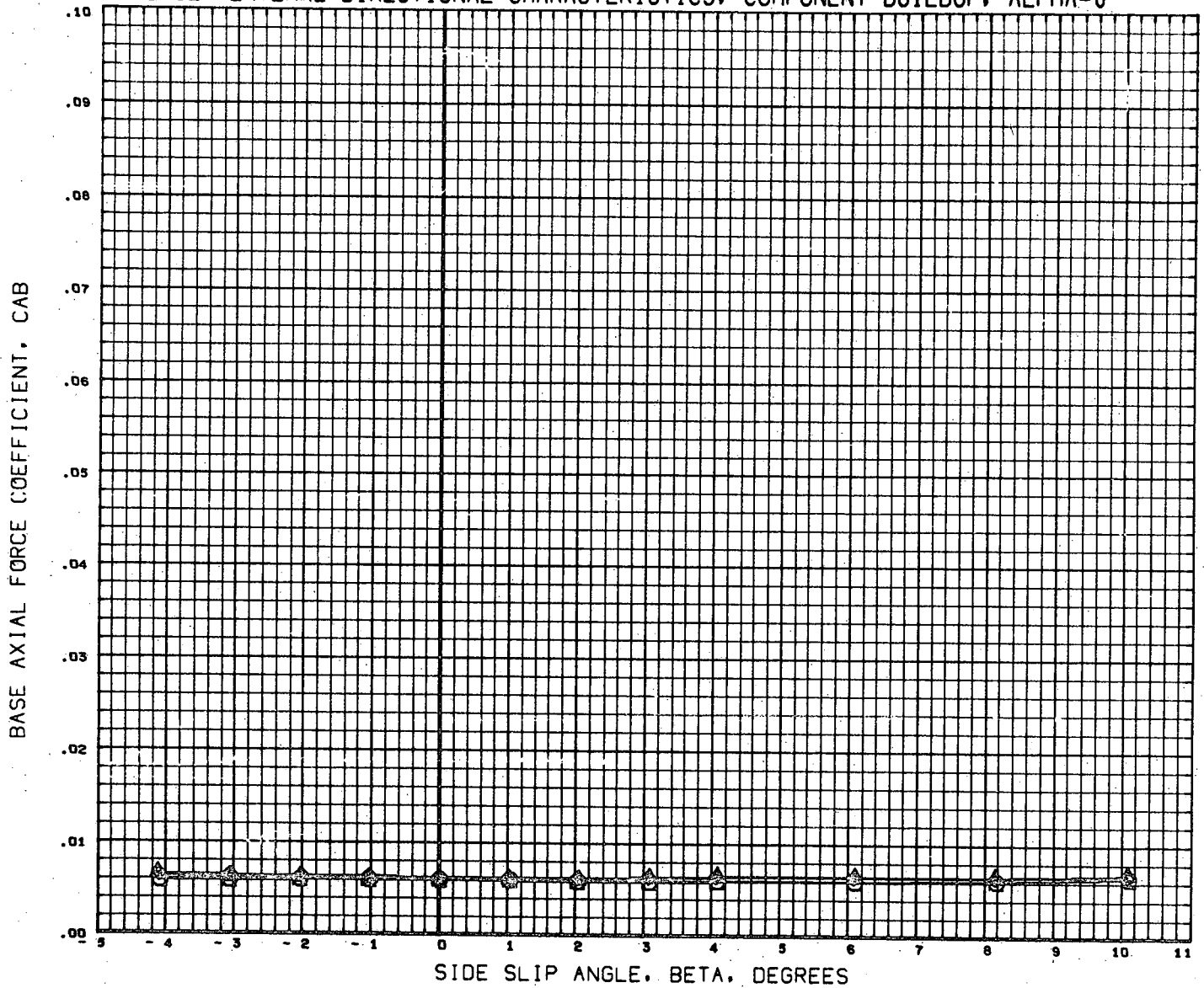


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49014)	MSFC 507 GAC H-33 ORB. 85W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49015)	MSFC 507 GAC H-33 ORB. 85W4V5	0.000	0.000			LREF	5.4530 IN
(A49016)	MSFC 507 GAC H-33 ORB. 85W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.99

PAGE 140

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49014) ○	MSFC 507 GAC H-33 ORB. B5W4
(A49015) △	MSFC 507 GAC H-33 ORB. B5W4V5
(A49016) ◇	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

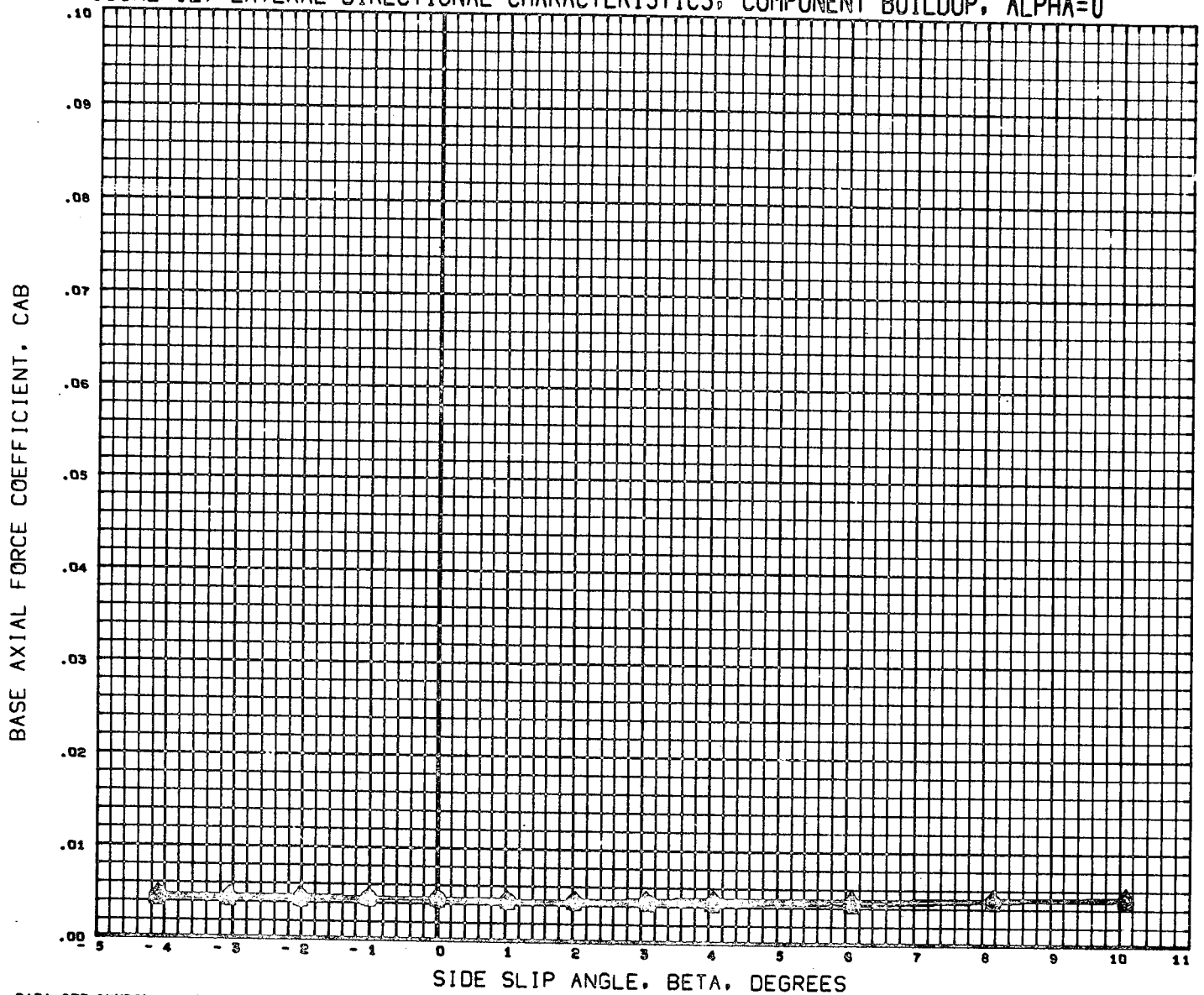
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

MACH 3.48

PAGE 141



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



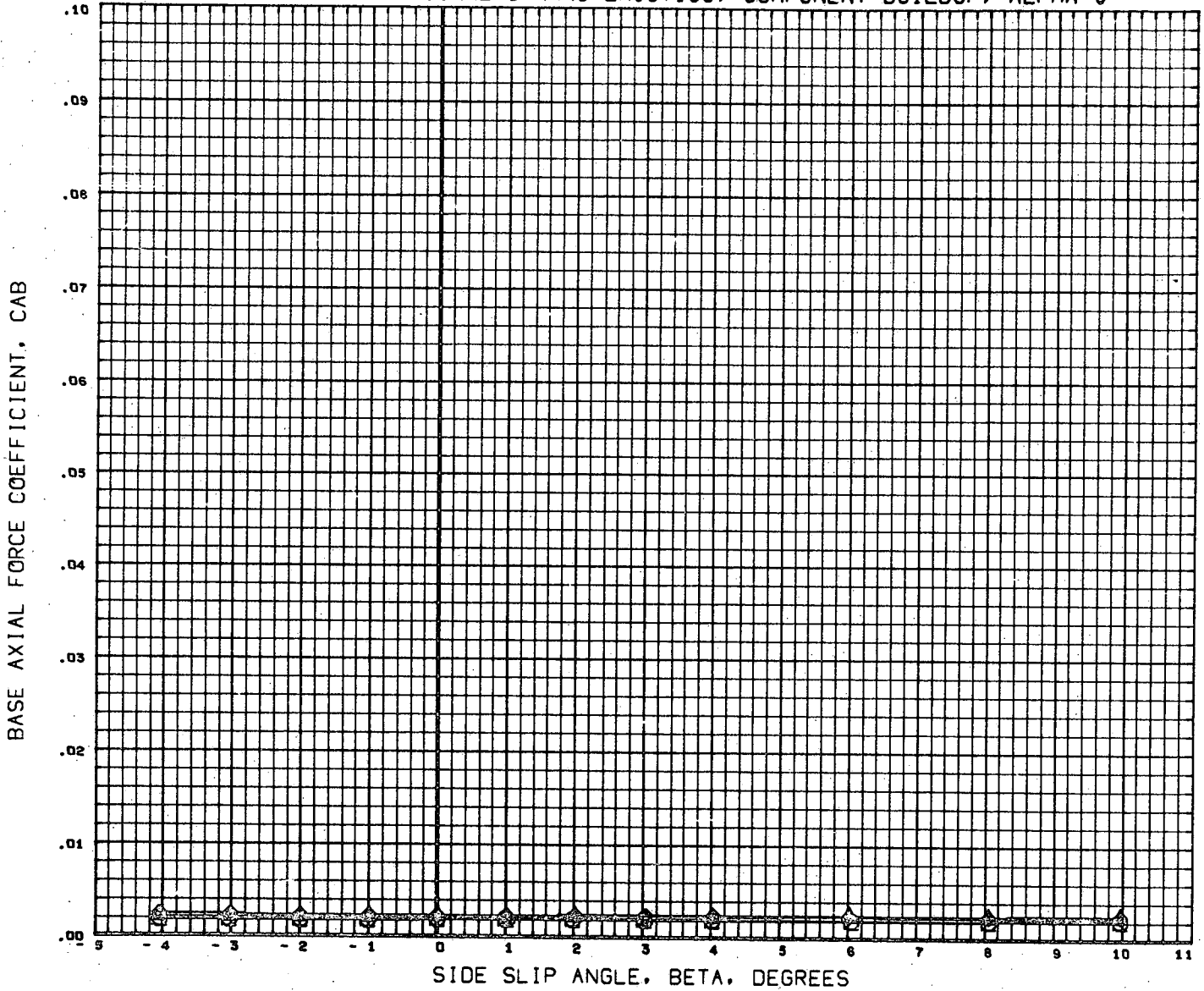
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49014)	MSFC 507 GAC M-33 ORB. B9W4	0.000	0.000			SREF 7.8970 SQ.IN
(A49015)	MSFC 507 GAC M-33 ORB. B9W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49016)	MSFC 507 GAC M-33 ORB. B9W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XHRP 1274.4040 IN.
						YHRP 0.0000 IN.
						ZHRP 391.3004 IN.
						SCALE 0.0034

MACH 4.00

PAGE 142

135

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

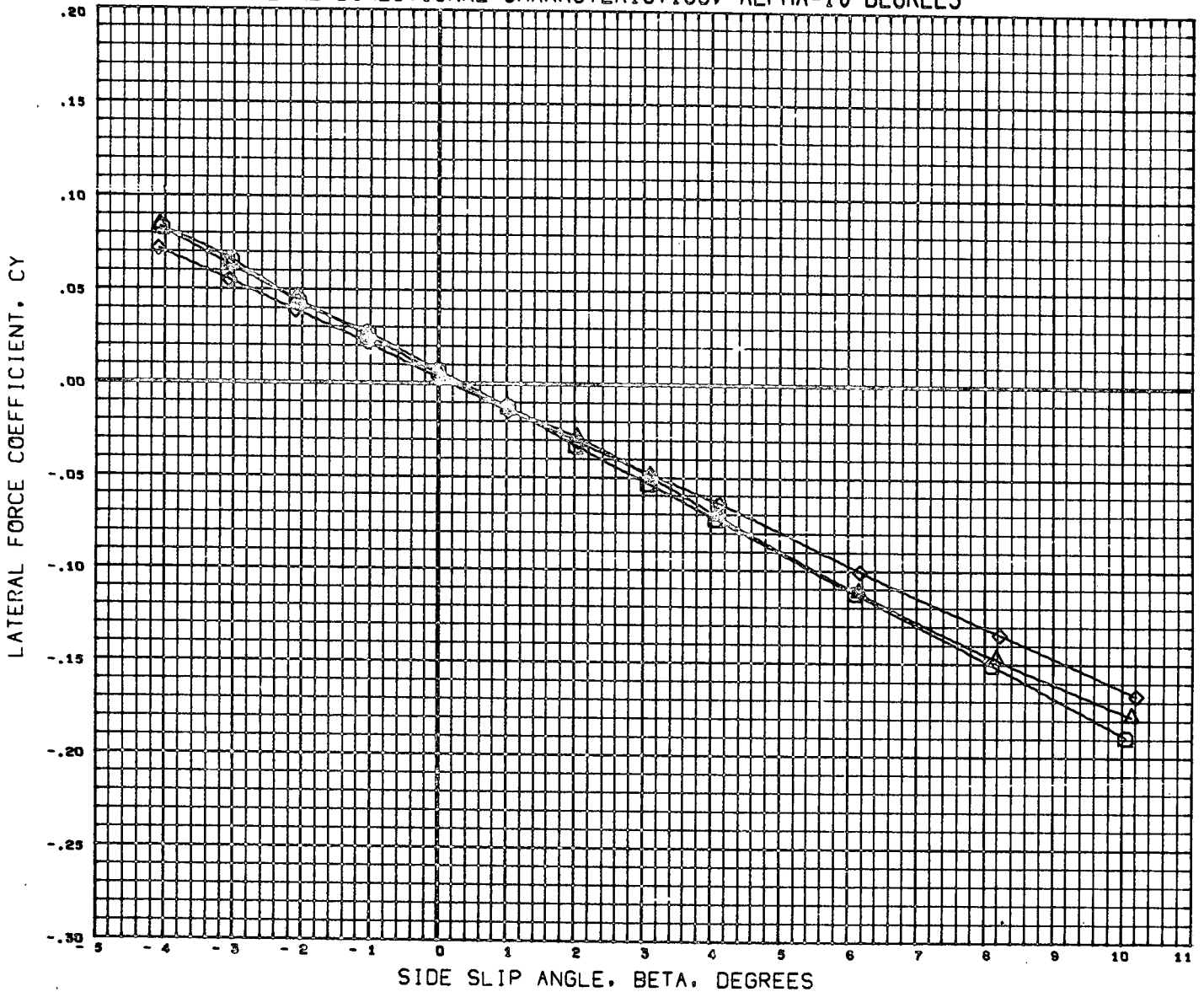


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49D14)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49D15)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF	5.4530 IN
(A49D16)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XM RP	1274.4040 IN.
						YM RP	0.0000 IN.
						ZM RP	391.3004 IN.
						SCALE	0.0034

MACH 4.96

PAGE 143

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



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

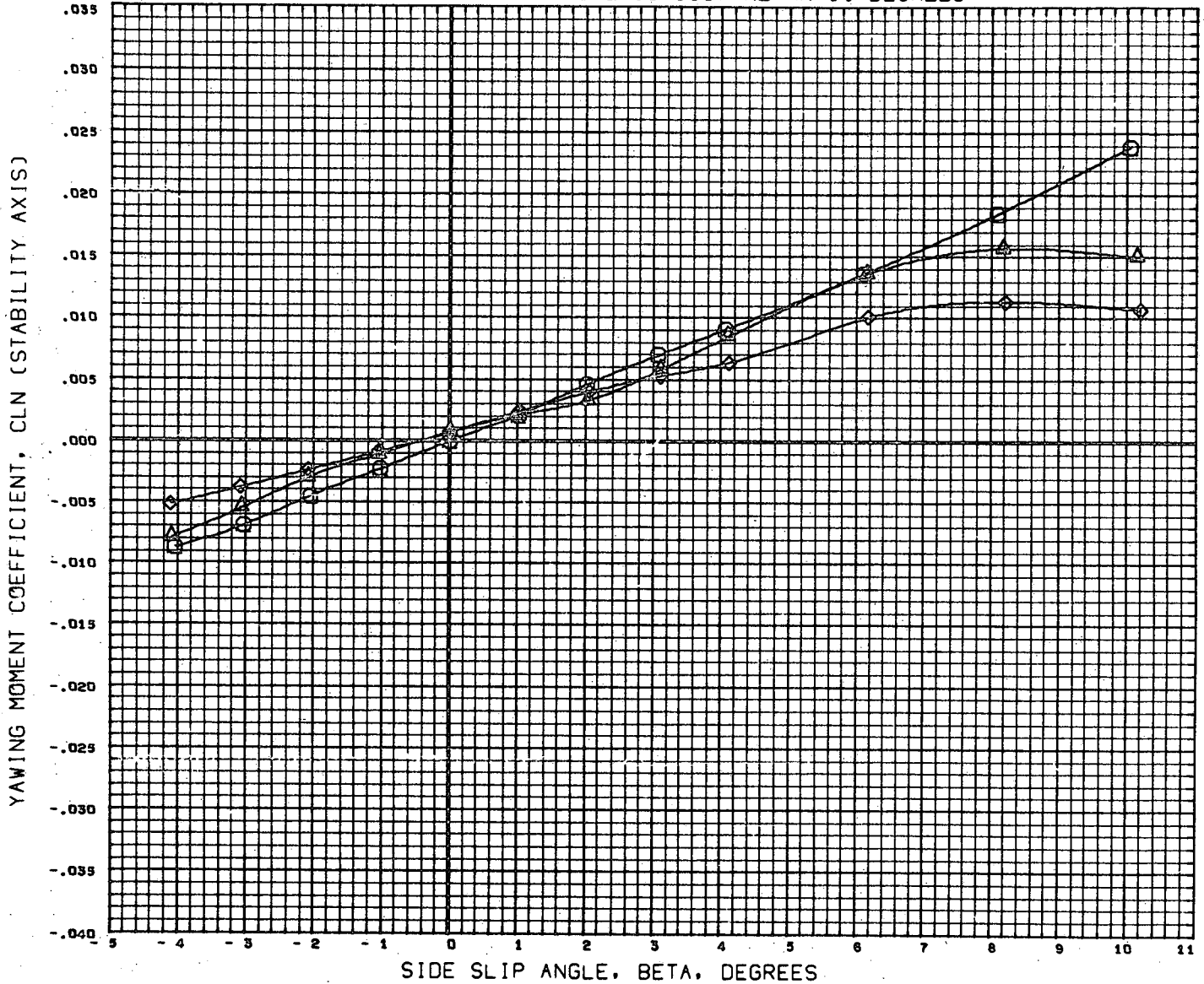
REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4550	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE #A

MSFC 507 GAC H-33 ORB. B5W4V5

(A49X29) 31 MAY 72 PAGE 144

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



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

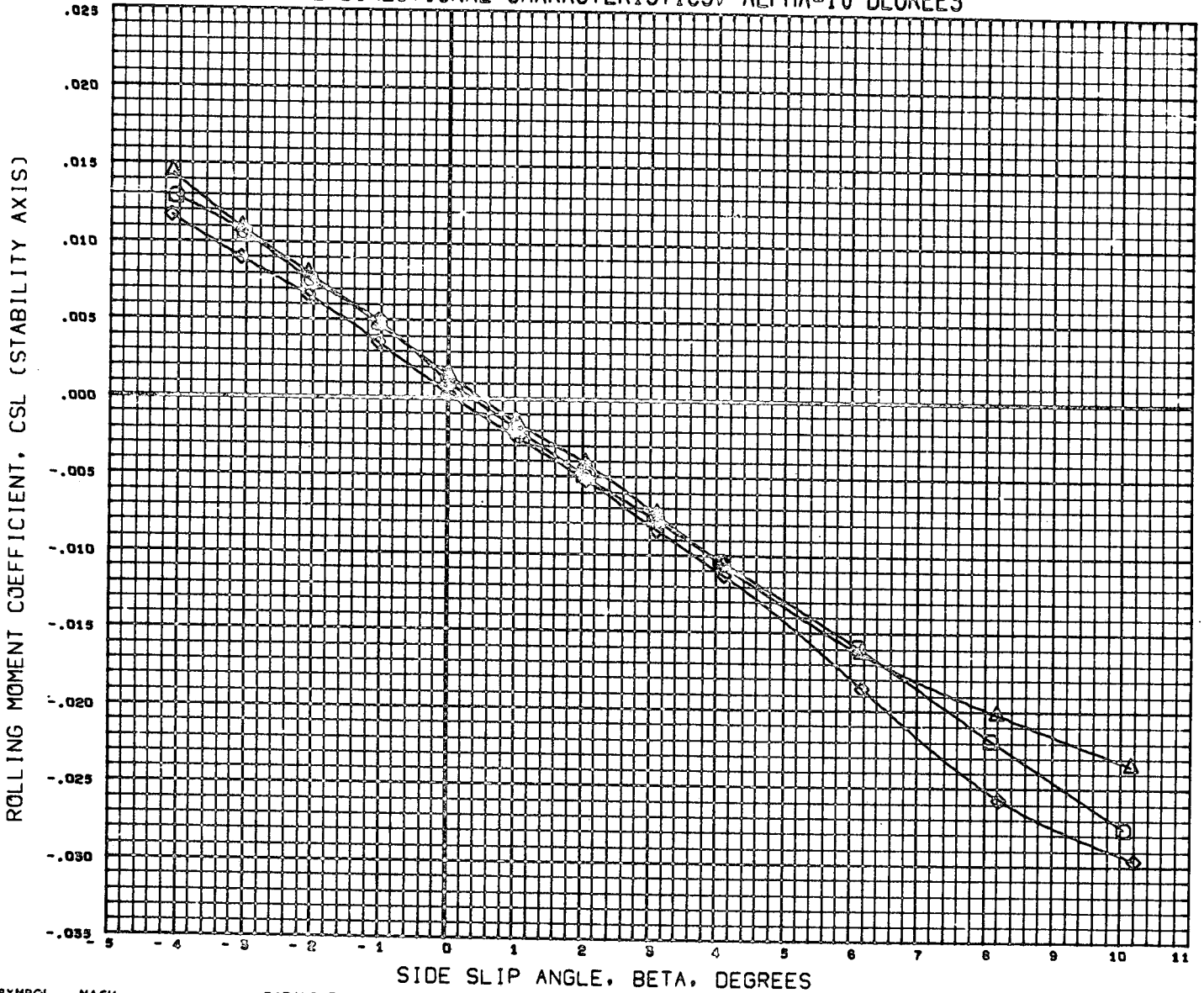
REFERENCE INFORMATION		
SREF	7.8970	SG. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

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
○	0.698	AILERN 0.000 LRUDDR 0.000
◇	1.204	RRUDDR 0.000

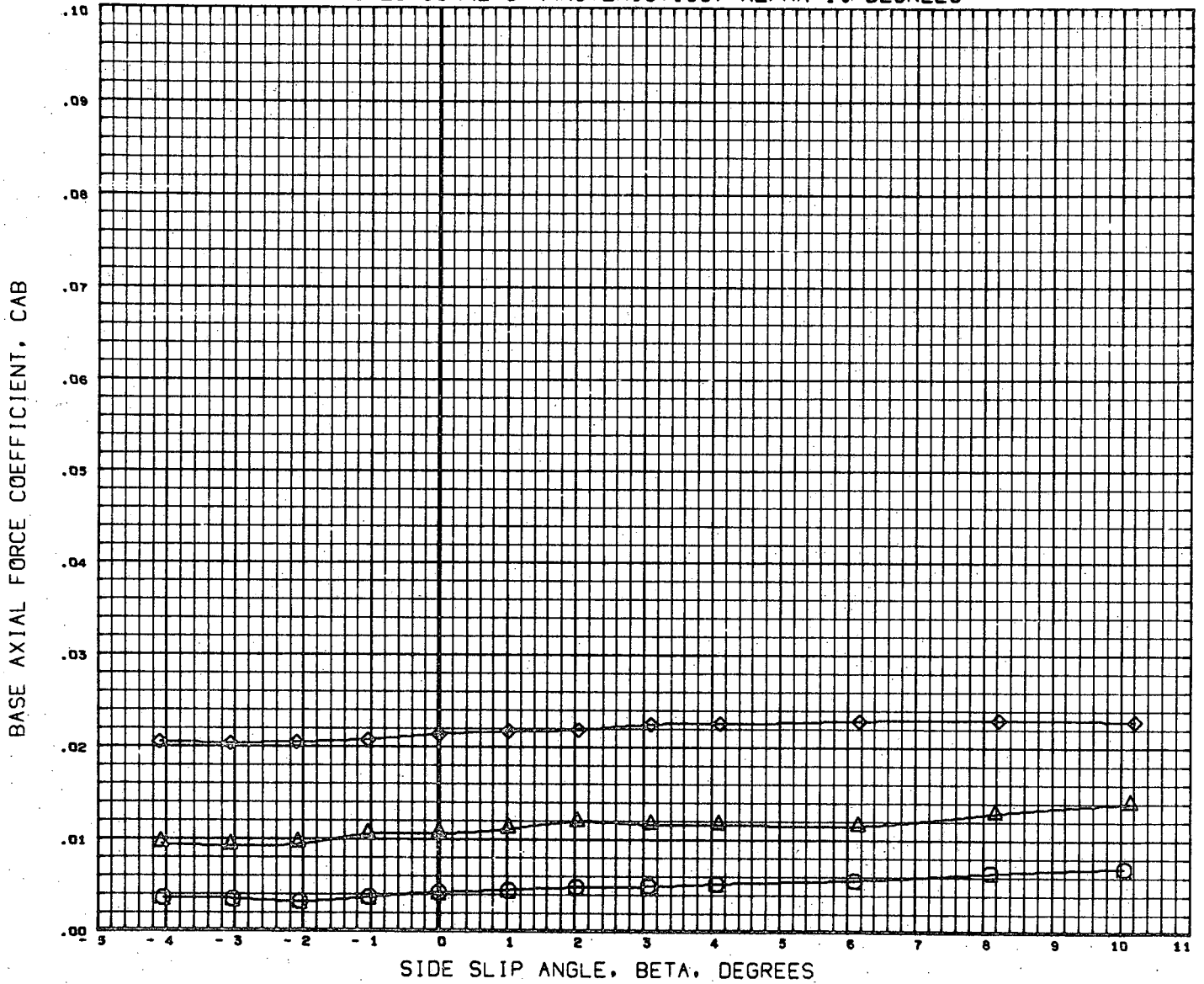
REFERENCE INFORMATION		
SREF	7.8970	SQ. IN
LREF	5.4530	IN
BREF	3.8170	IN
XMHP	1274.4040	IN.
YMHP	0.0000	IN.
ZMHP	391.3004	IN.
SCALE	0.0034	

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

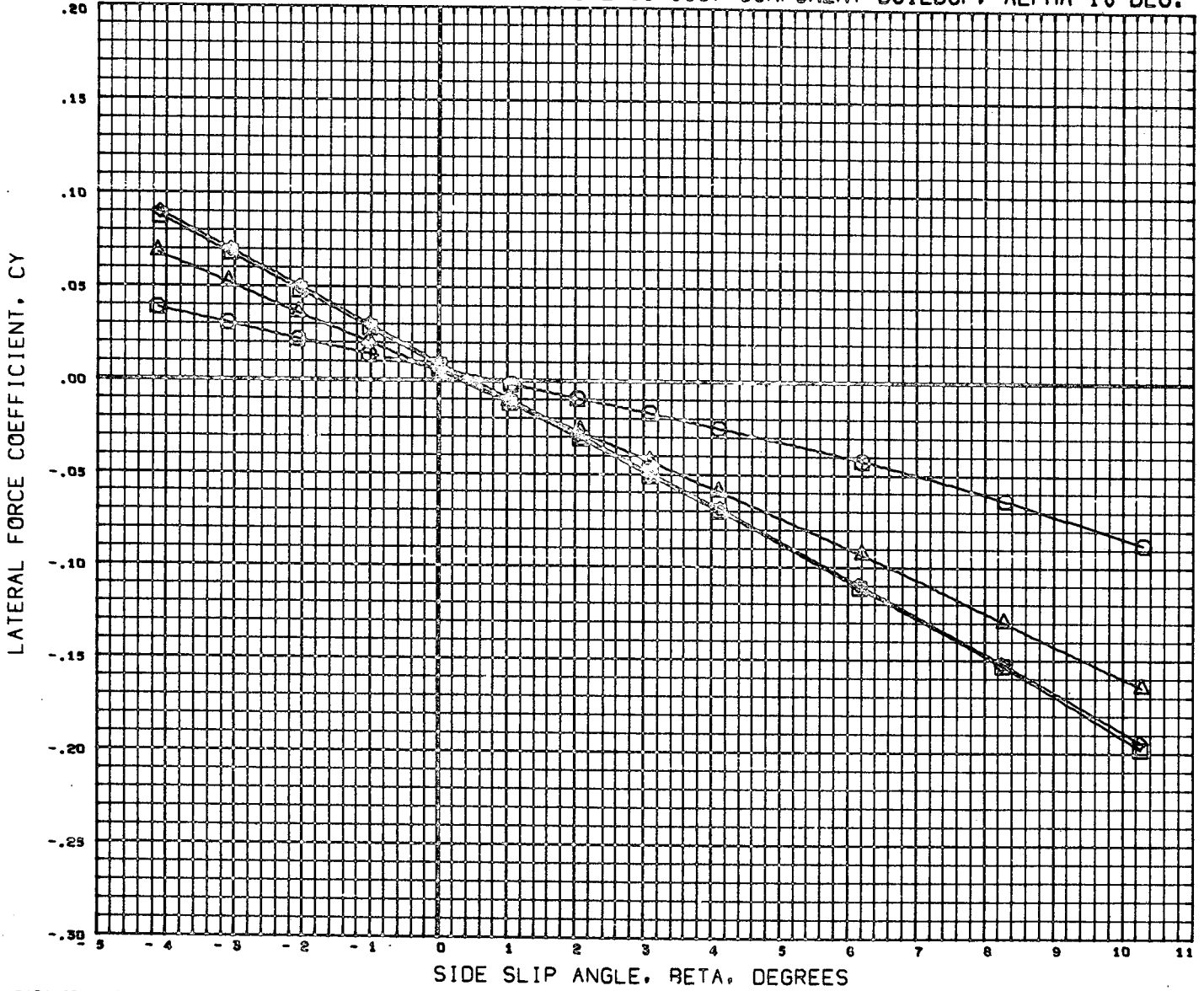
REFERENCE INFORMATION		
SREF	7.8970	SQ.IN
LREF	5.4530	IN
BREF	3.8170	IN
XMRP	1274.4040	IN.
YMRP	0.0000	IN.
ZMRP	391.3004	IN.
SCALE	0.0034	

DATA HIST. CODE #A

MSFC 507 GAC H-33 ORB. B5W4V5

(A49x29) 31 MAY 72 PAGE 147

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



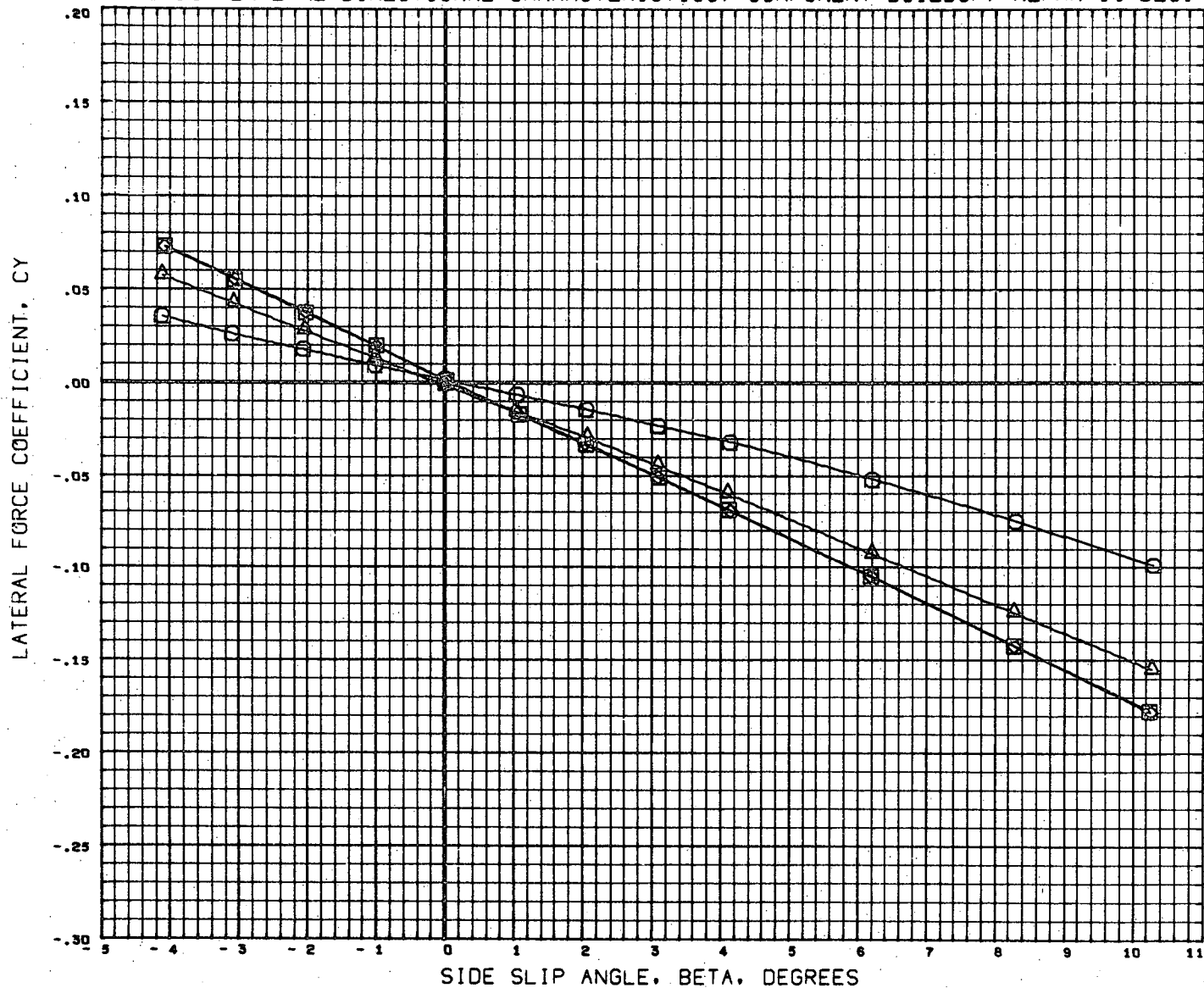
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49031)	HSFC 507 GAC H-33 ORB. BSW4	0.000	0.000			SREF	7.8970 SQ. IN
(A49Y29)	HSFC 507 GAC H-33 ORB. BSW4V5	0.000	0.000			LREF	5.4530 IN
(A49032)	HSFC 507 GAC H-33 ORB. BSW4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49X30)	HSFC 507 GAC H-33 ORB. BSW4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 1.46

PAGE 148

178

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



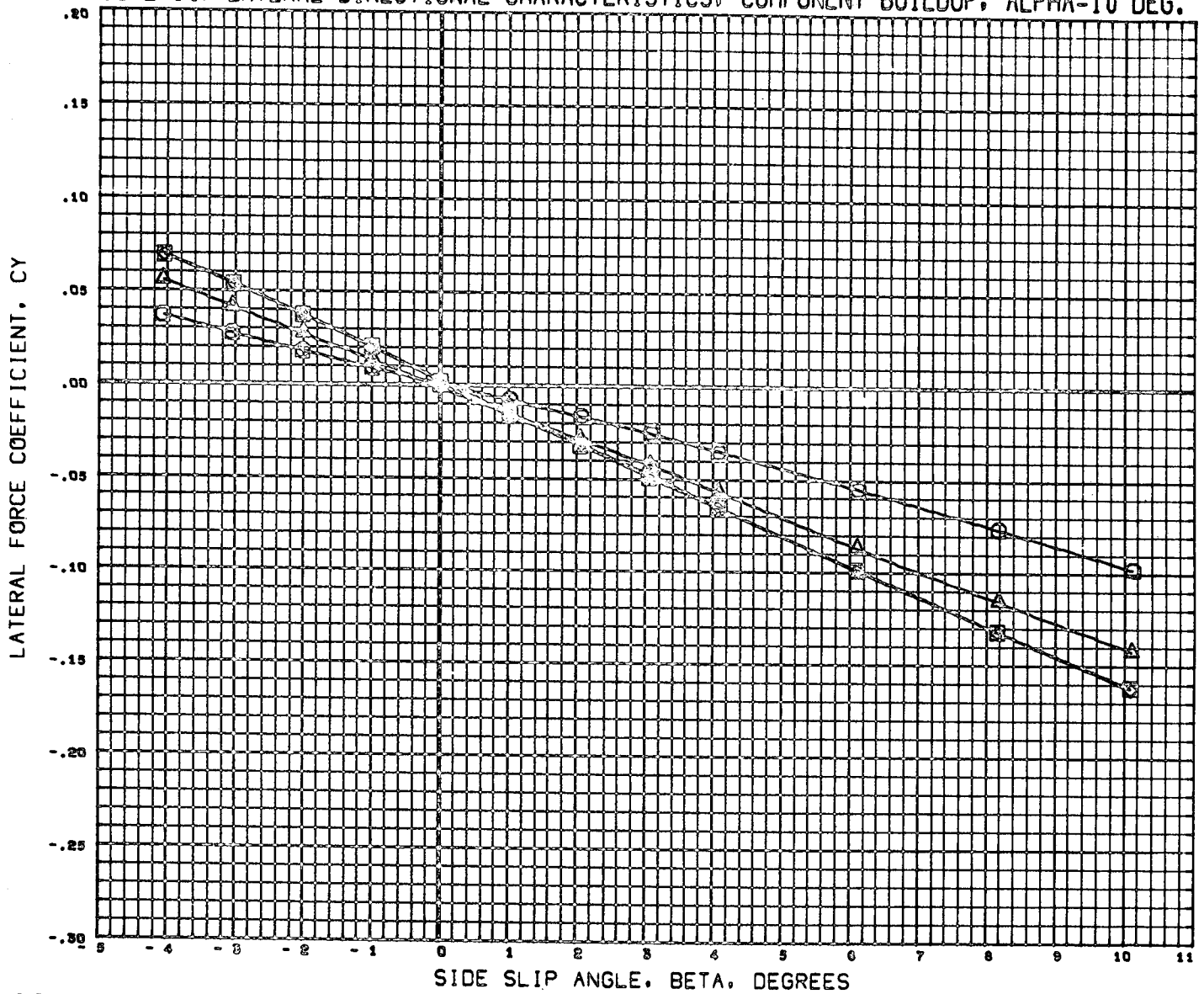
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49031)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49Y29)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49032)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49X30)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 1.96

PAGE 149



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

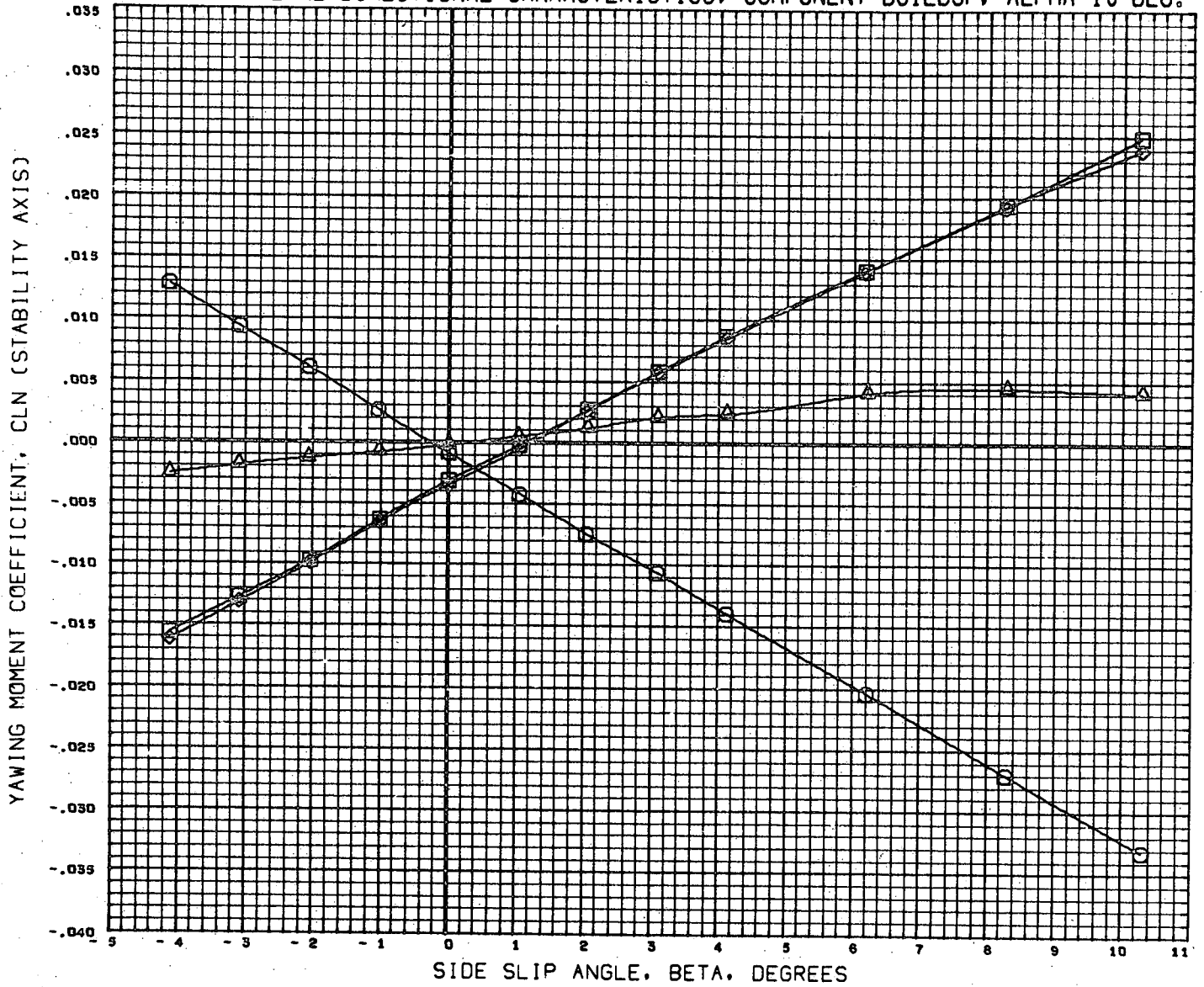


DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49031)	○	MSFC 307 GAC H-33 ORB. 89W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49Y29)	△	MSFC 307 GAC H-33 ORB. 89W4V3	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49032)	◇	MSFC 307 GAC H-33 ORB. 89W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49X30)	□	MSFC 307 GAC H-33 ORB. 89W4 (-20) V3 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 2.74

173

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



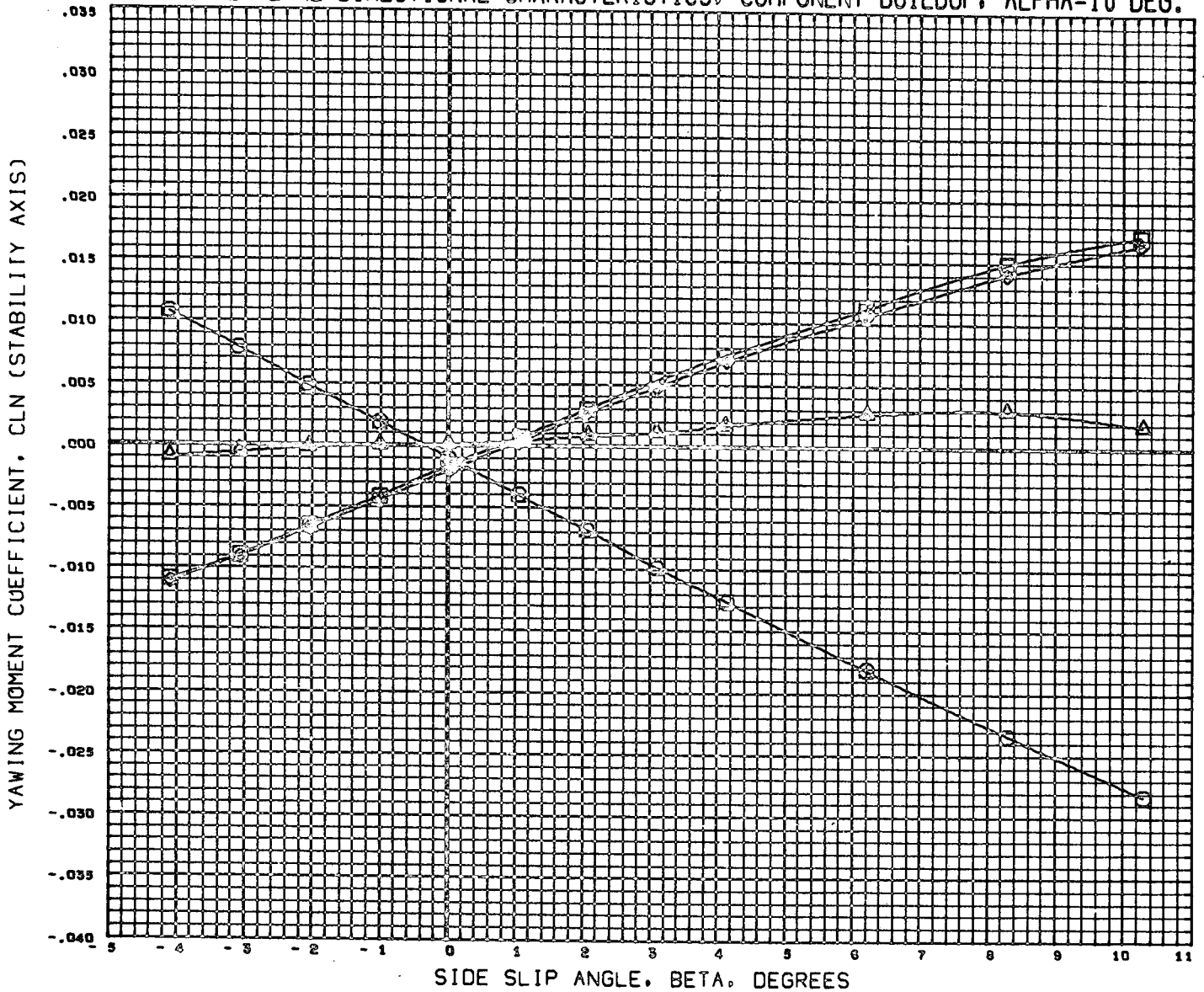
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49031)	MSFC 507 GAC H-33 ORB. 85W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49Y29)	MSFC 507 GAC H-33 ORB. 85W4V5	0.000	0.000			LREF	5.4530 IN
(A49032)	MSFC 507 GAC H-33 ORB. 85W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49X30)	MSFC 507 GAC H-33 ORB. 85W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 1.46

PAGE 151

C.9

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

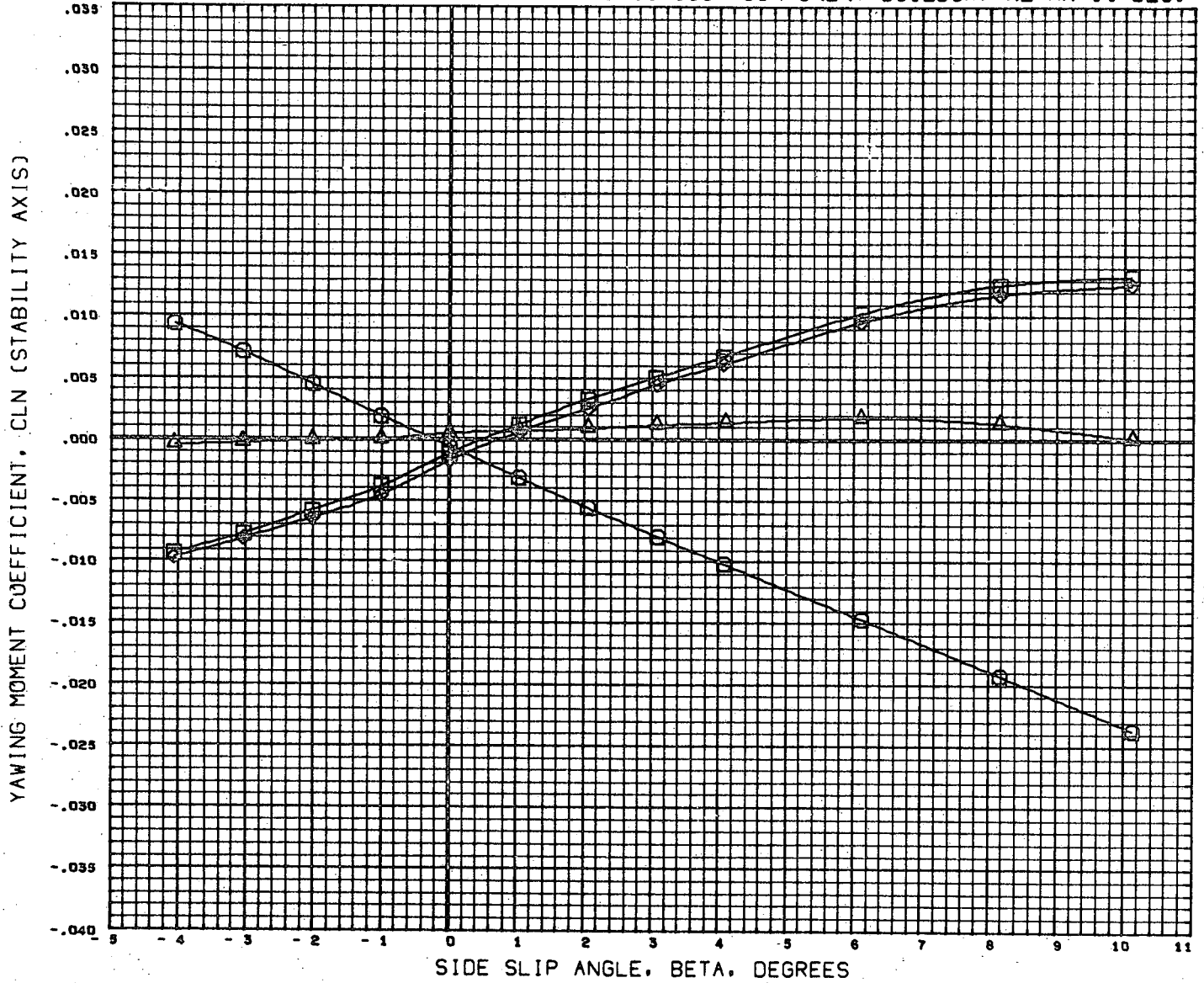


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49031)	HSFC 907 GAC H-33 ORB. B9W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49Y29)	HSFC 907 GAC H-33 ORB. B9W4V5	0.000	0.000			LREF 5.4530 IN
(A49032)	HSFC 907 GAC H-33 ORB. B9W4V9 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49X30)	HSFC 907 GAC H-33 ORB. B9W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 1.96

PAGE 152

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

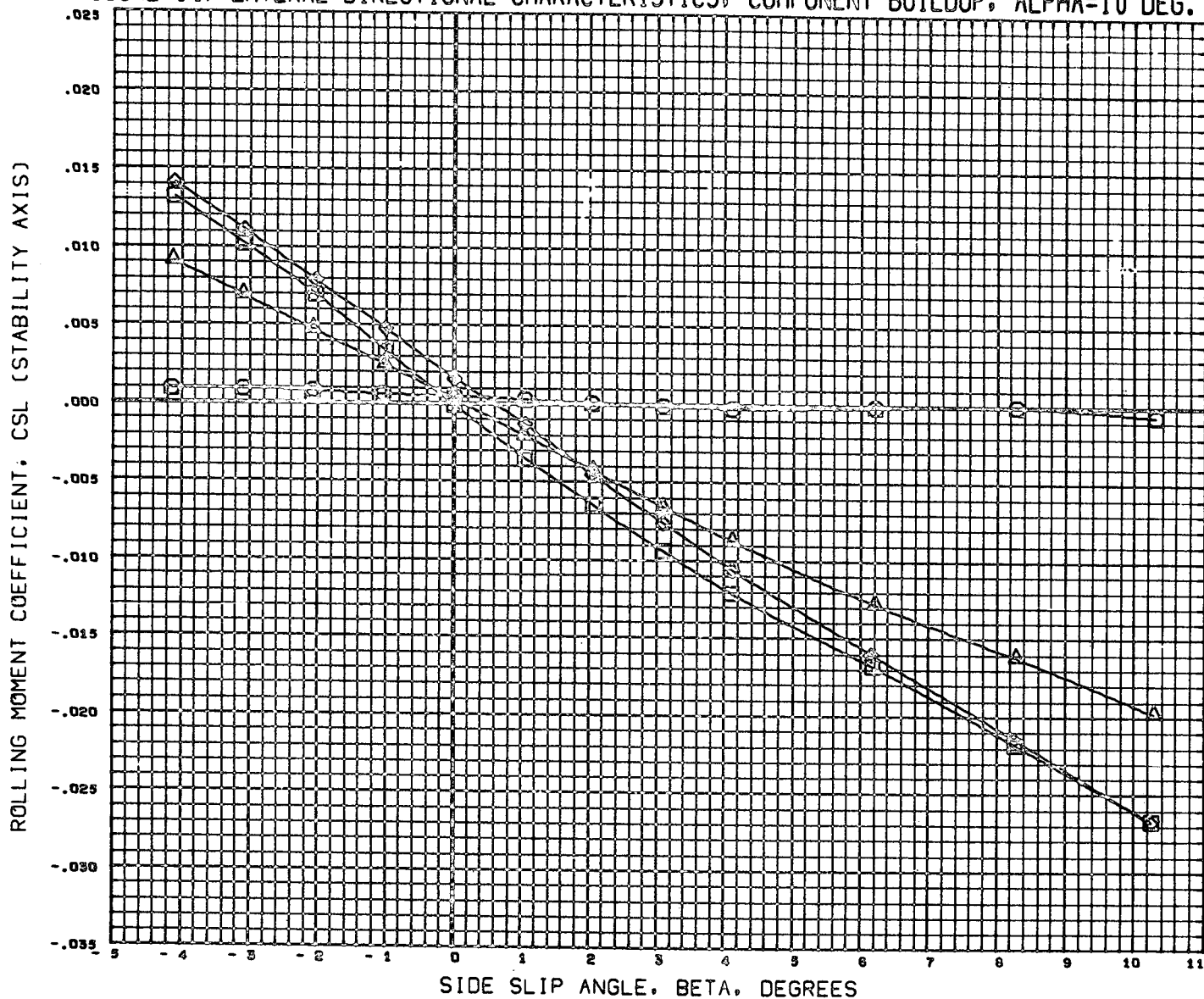


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49031)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49Y29)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF 5.4530 IN
(A49032)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49X30)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 2.74

PAGE 153

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



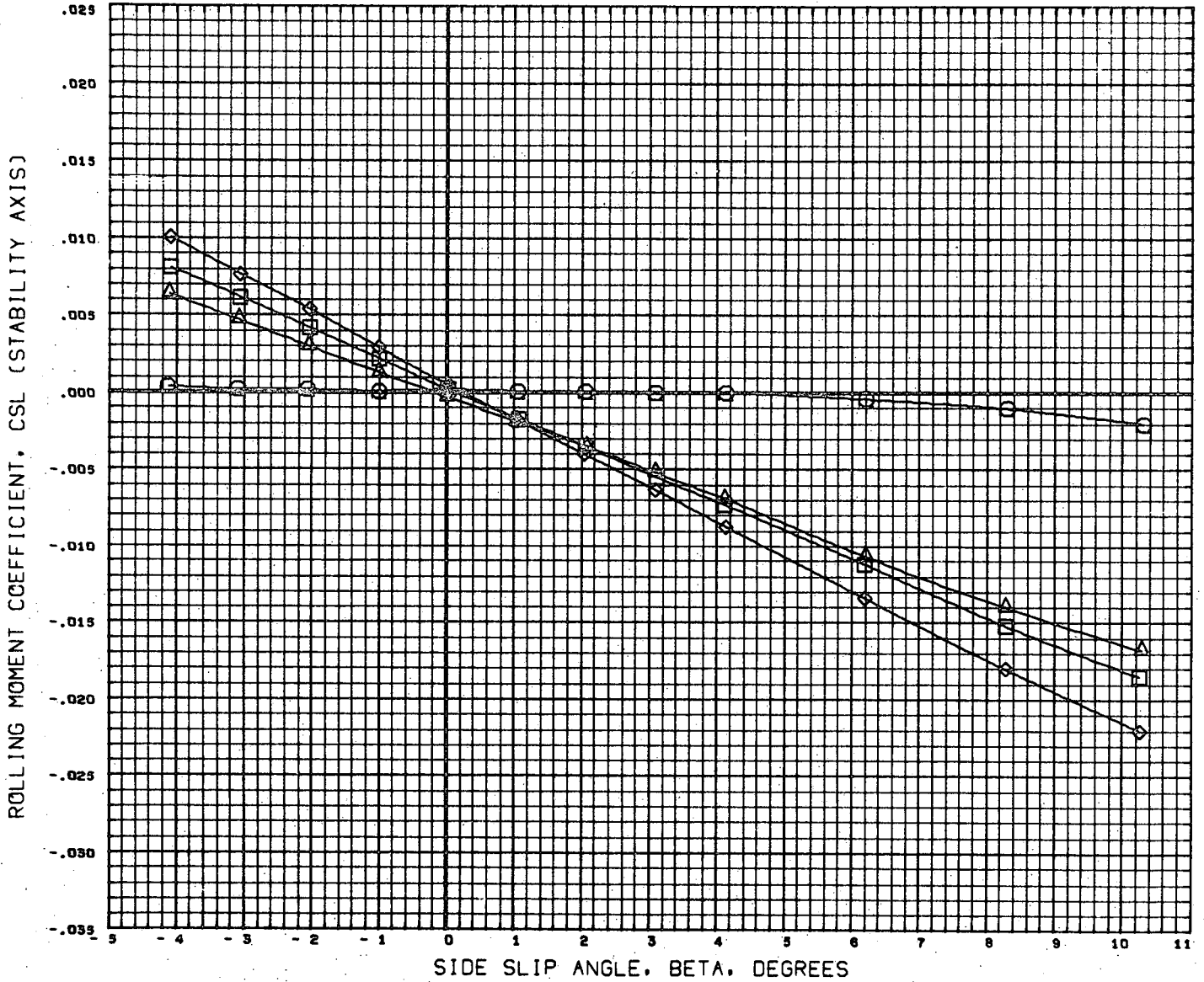
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49031)	MSFC 507 GAC M-33 ORB. B3W4	0.000	0.000			SREF 7.6970 SQ. IN
(A49Y29)	MSFC 507 GAC M-33 ORB. B3W4V3	0.000	0.000			LREF 5.4530 IN
(A49032)	MSFC 507 GAC M-33 ORB. B3W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49X30)	MSFC 507 GAC M-33 ORB. B3W4 (-20) V3 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 1.46

PAGE 154

177

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

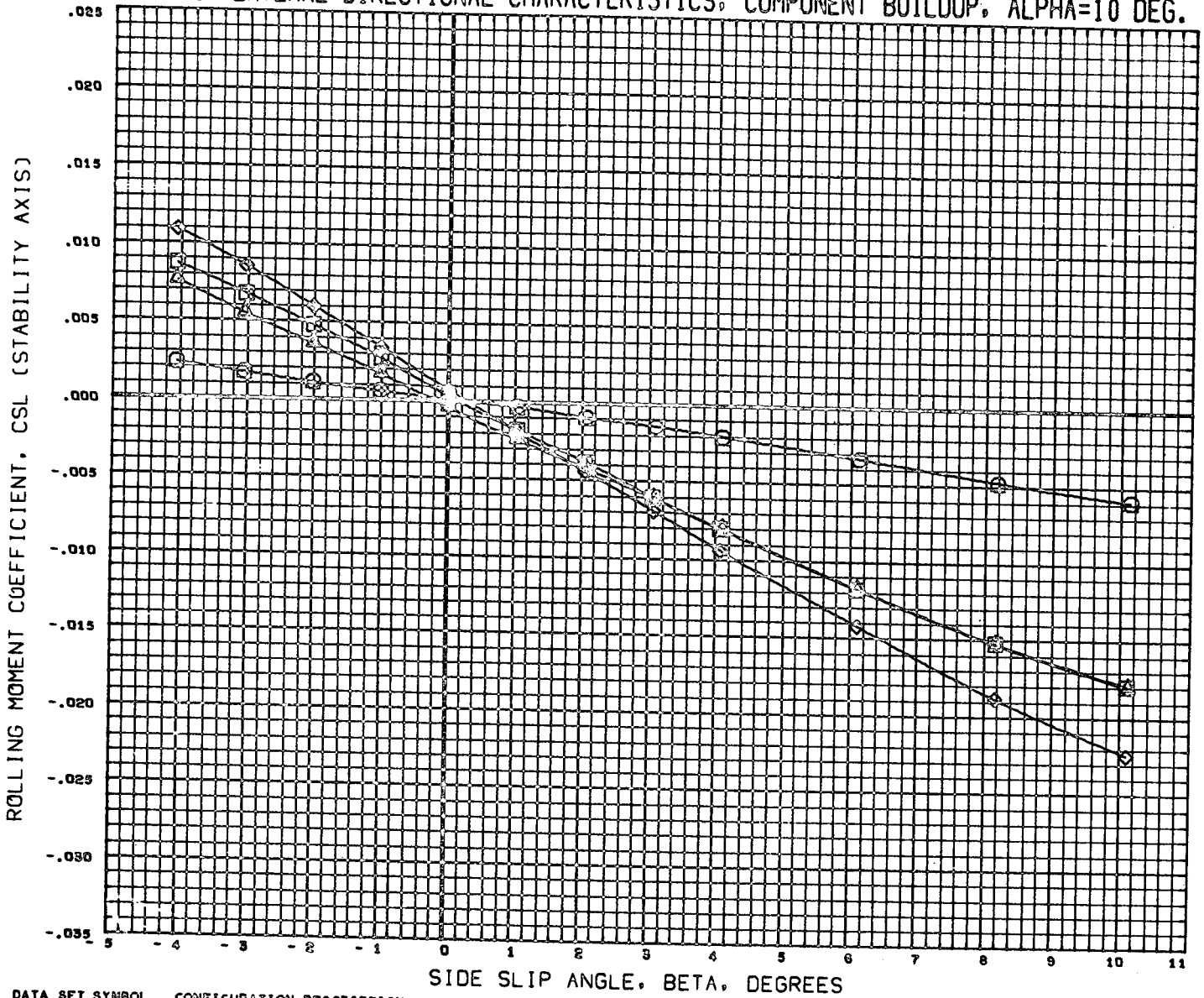


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49031)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49Y29)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49032)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49X30)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN; YMRP 0.0000 IN; ZMRP 391.3004 IN; SCALE 0.0034

MACH 1.96

PAGE 155

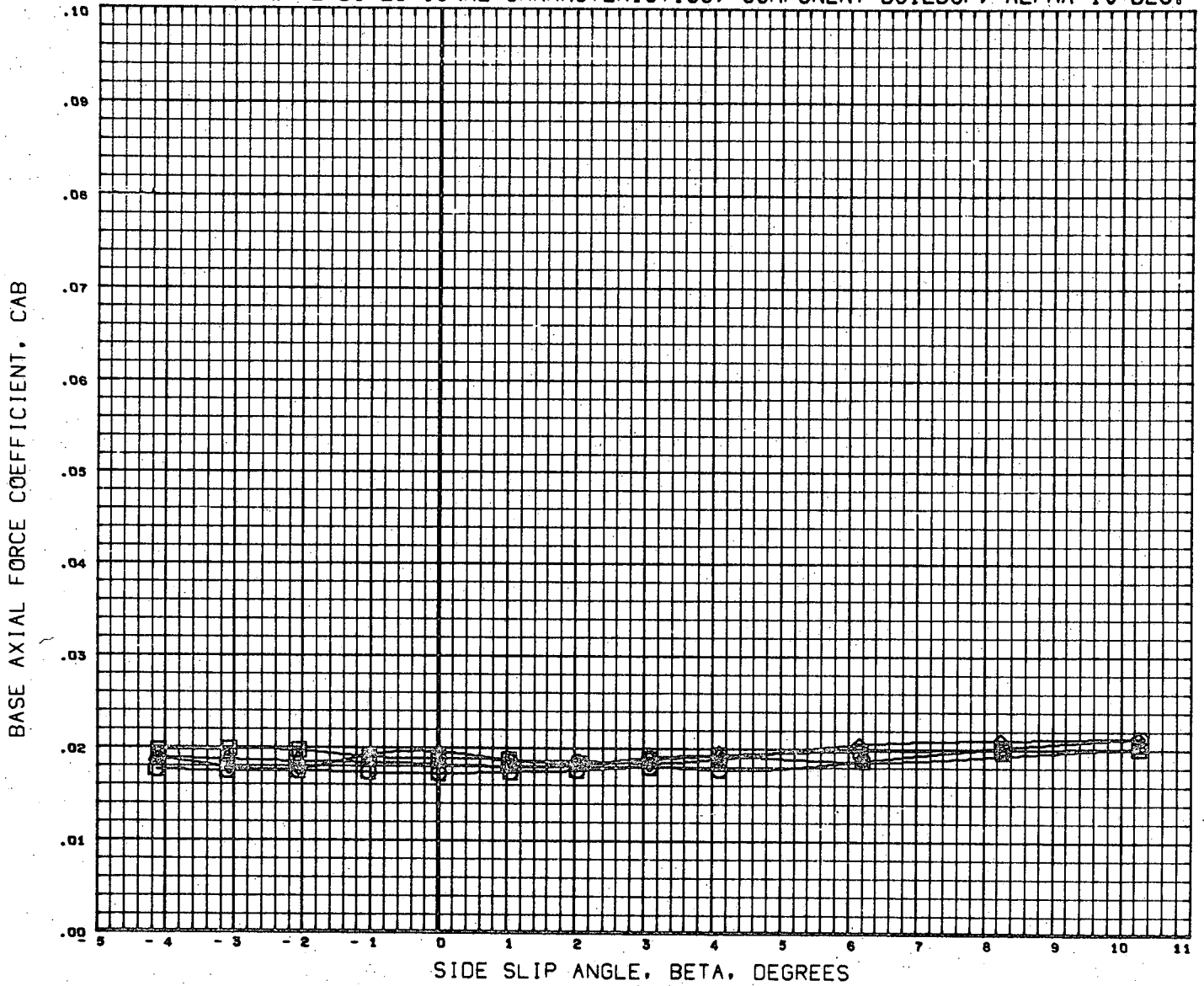
FIGURE 14. LATERAL-DIRECTIONAL CHARACTERISTICS. COMPONENT BUILDUP, ALPHA=10 DEG.



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49031)	MSFC 507 GAC H-33 ORB. B9W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49Y29)	MSFC 507 GAC H-33 ORB. B9W4V5	0.000	0.000			LREF 5.4530 IN
(A49032)	MSFC 507 GAC H-33 ORB. B9W4V5 (+30, -30)	0.000	0.000	0.000	0.000	BREF 3.8170 IN
(A49X30)	MSFC 507 GAC H-33 ORB. B9W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 2.74

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



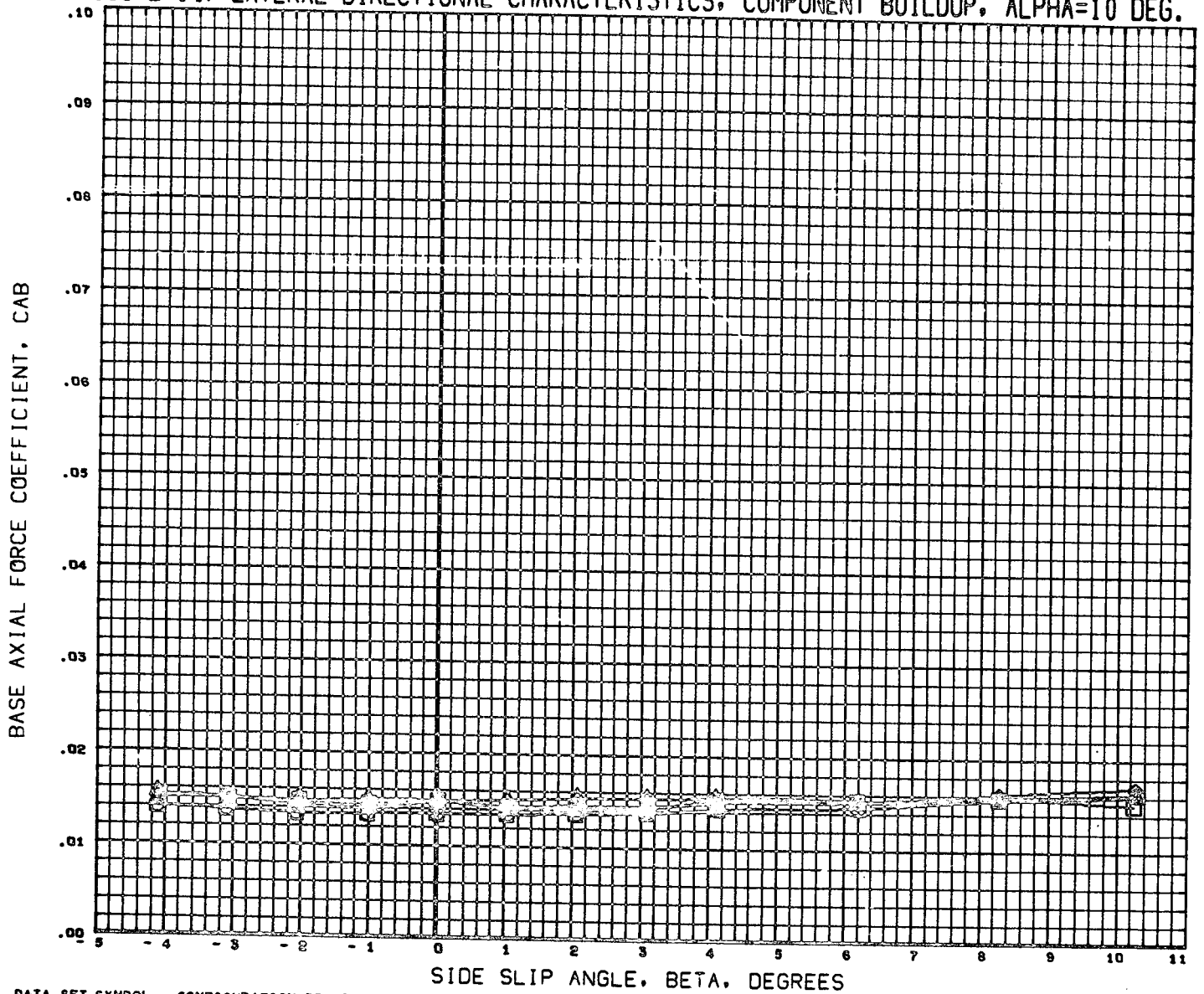
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49031)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49Y29)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF	5.4530 IN
(A49032)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49X30)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 1.46

PAGE 157



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

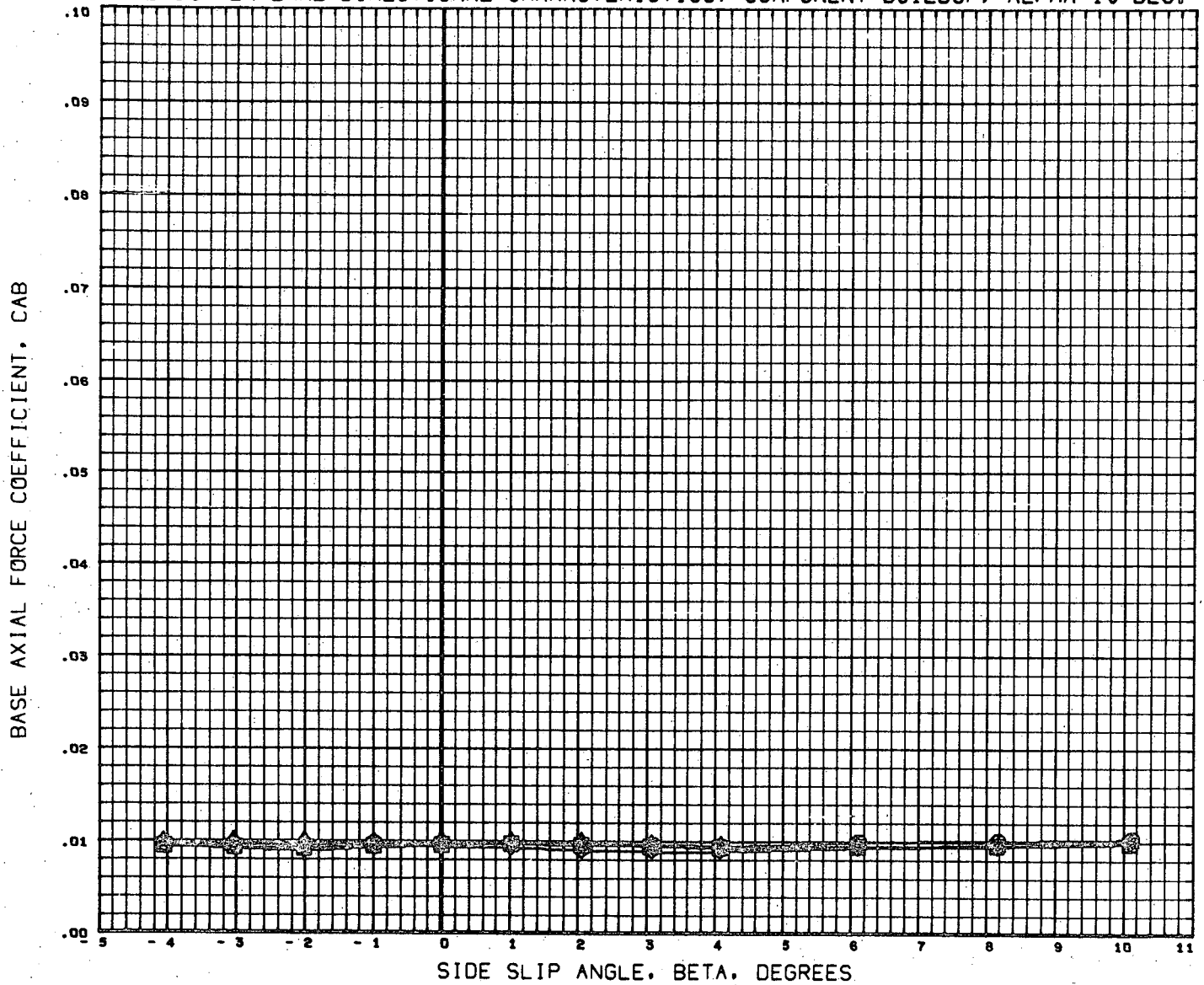


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49031)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49Y29)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF	5.4530 IN
(A49032)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49X30)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 1.96

PAGE 158

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

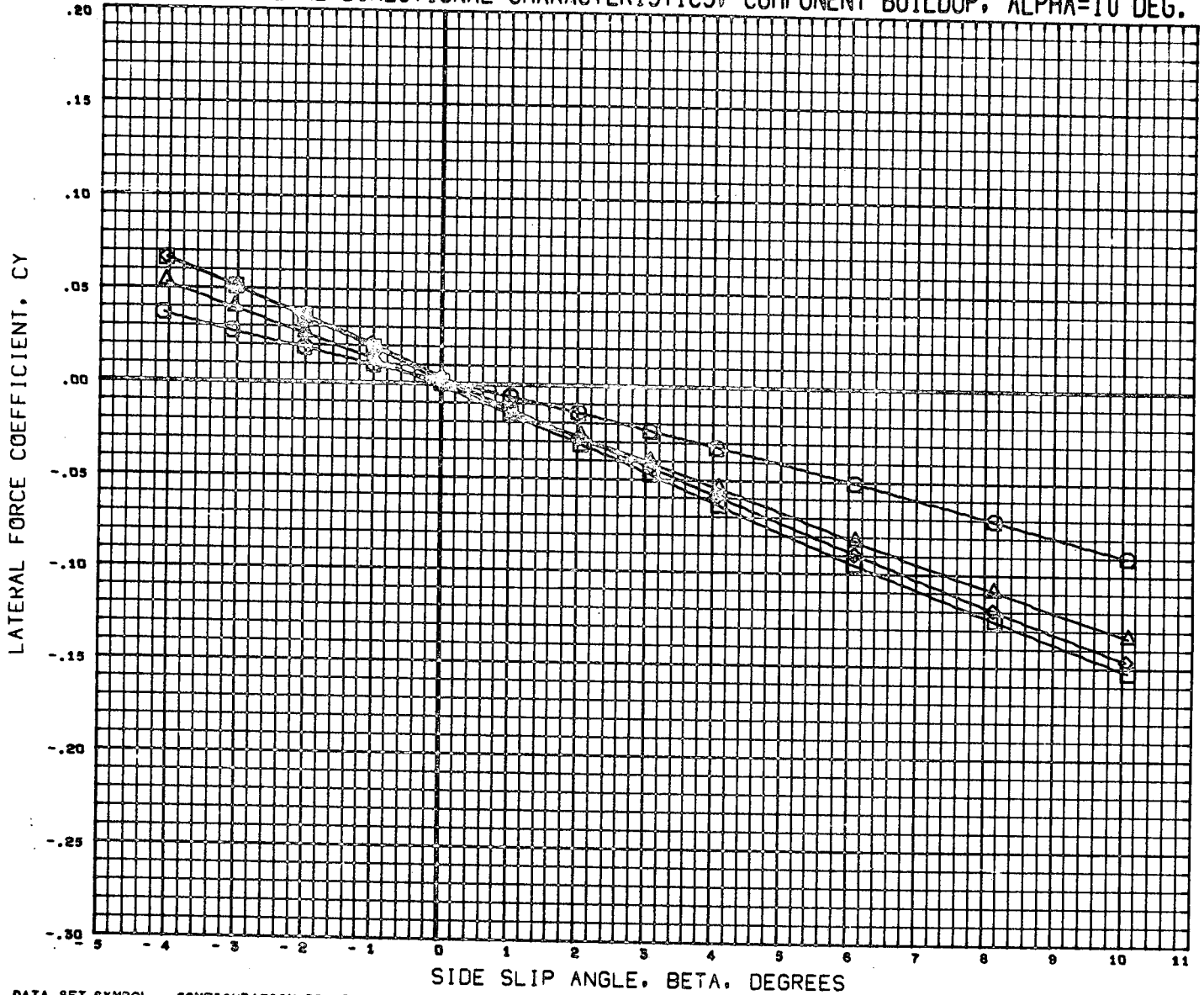


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49031)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ.IN
(A49Y29)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49032)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49X30)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30,-30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 2.74

PAGE 159

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

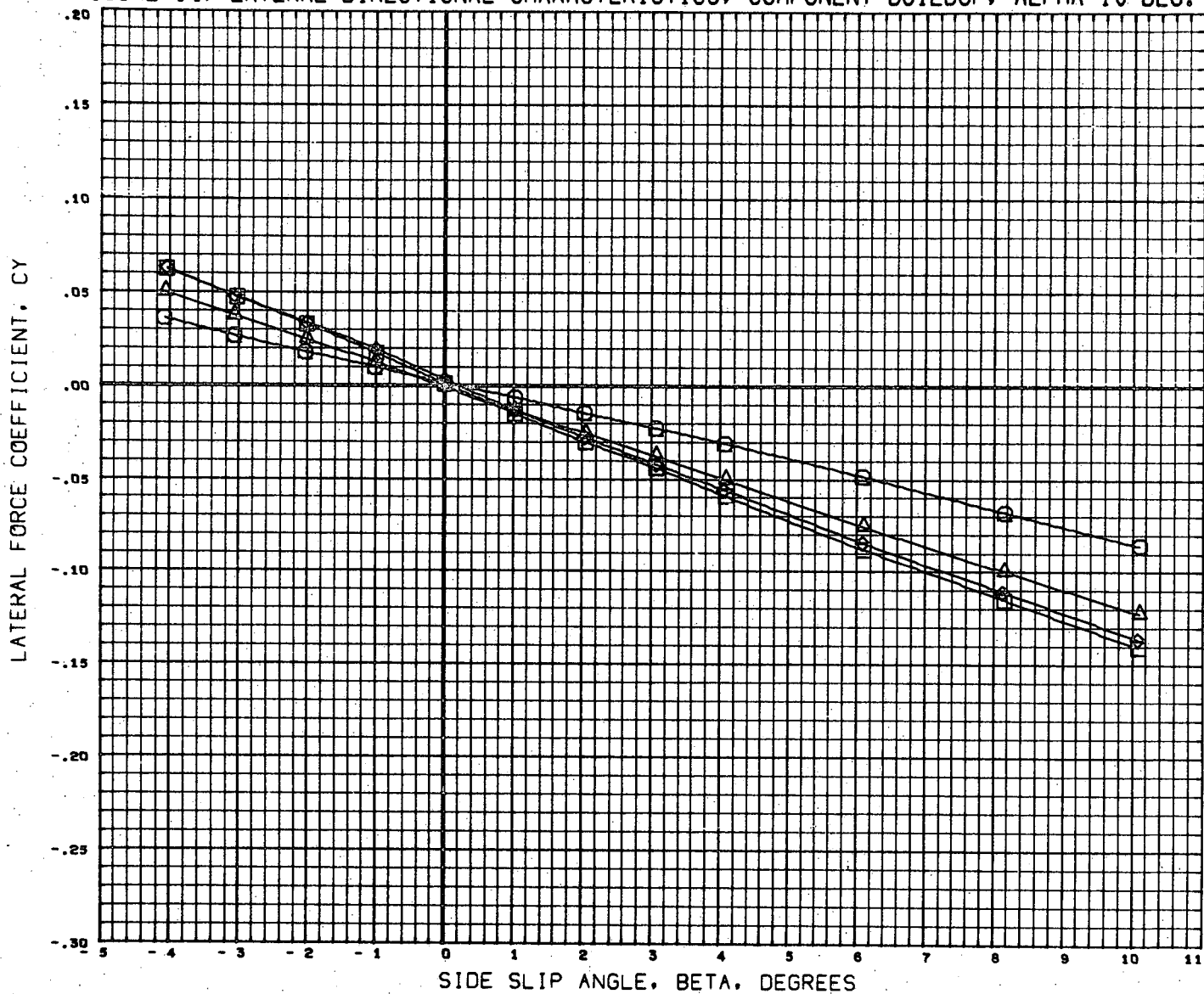


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49013)	MSFC 507 6AC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49229)	MSFC 507 6AC H-33 ORB. B9W4V5	0.000	0.000			LREF 5.4530 IN
(A49009)	MSFC 507 6AC H-33 ORB. B9W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49Y30)	MSFC 507 6AC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 2.99

PAGE 160

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

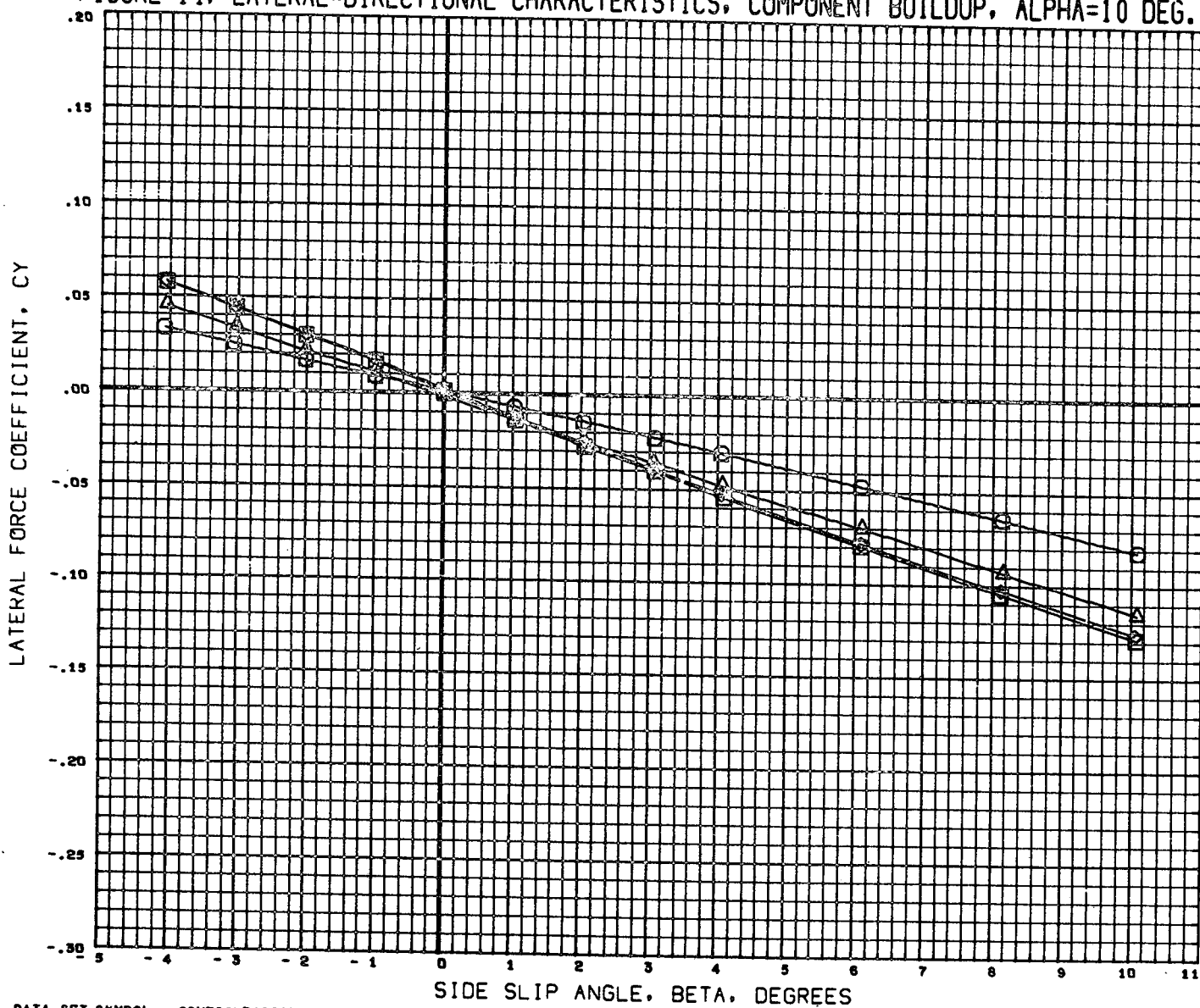


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49013)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49229)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF	5.4530 IN.
(A49009)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN.
(A49Y30)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 3.48

PAGE 161

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

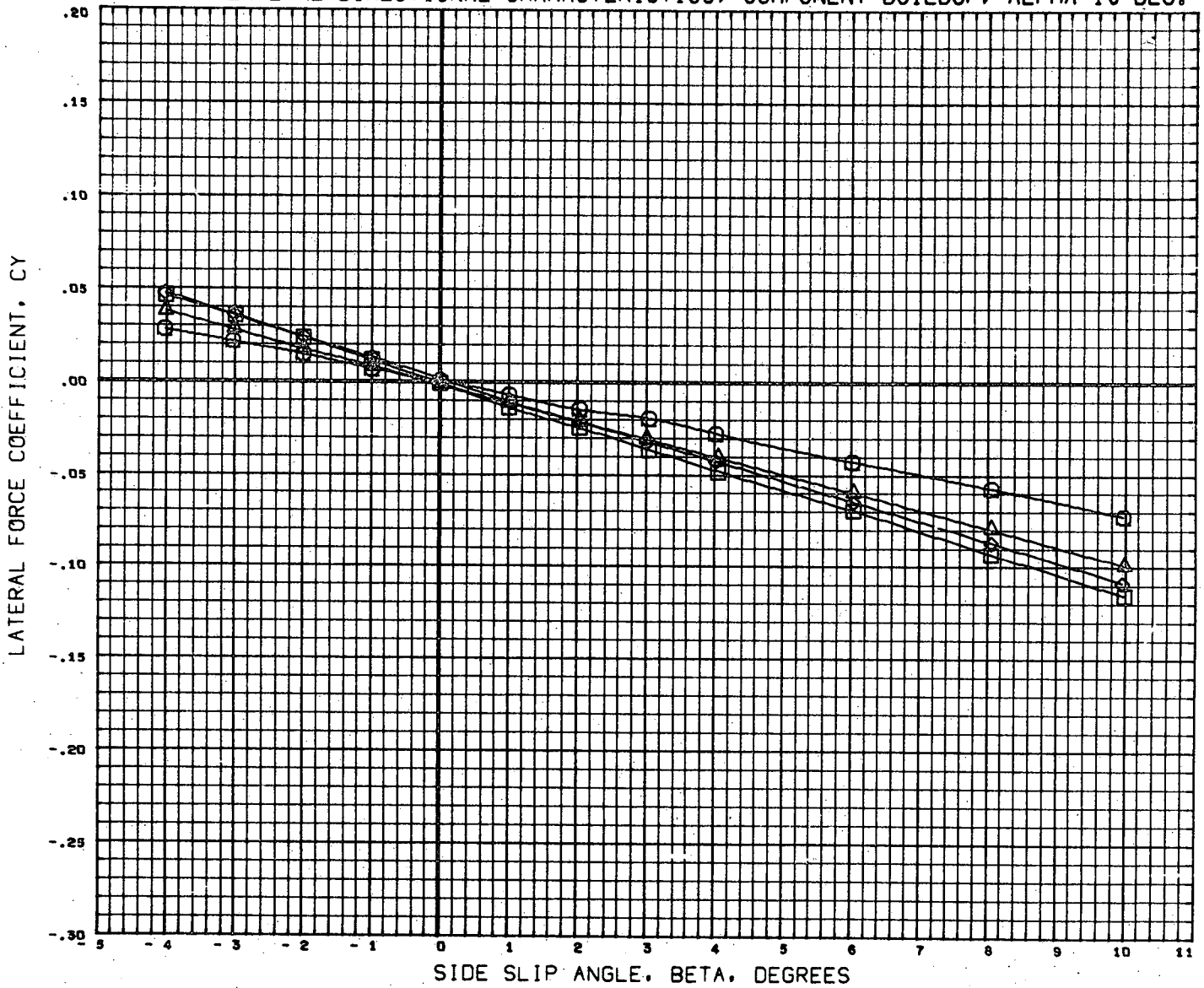


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49013)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49229)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF 5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	0.000	0.000	BREF 3.8170 IN
(A49730)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 4.00

PAGE 162

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

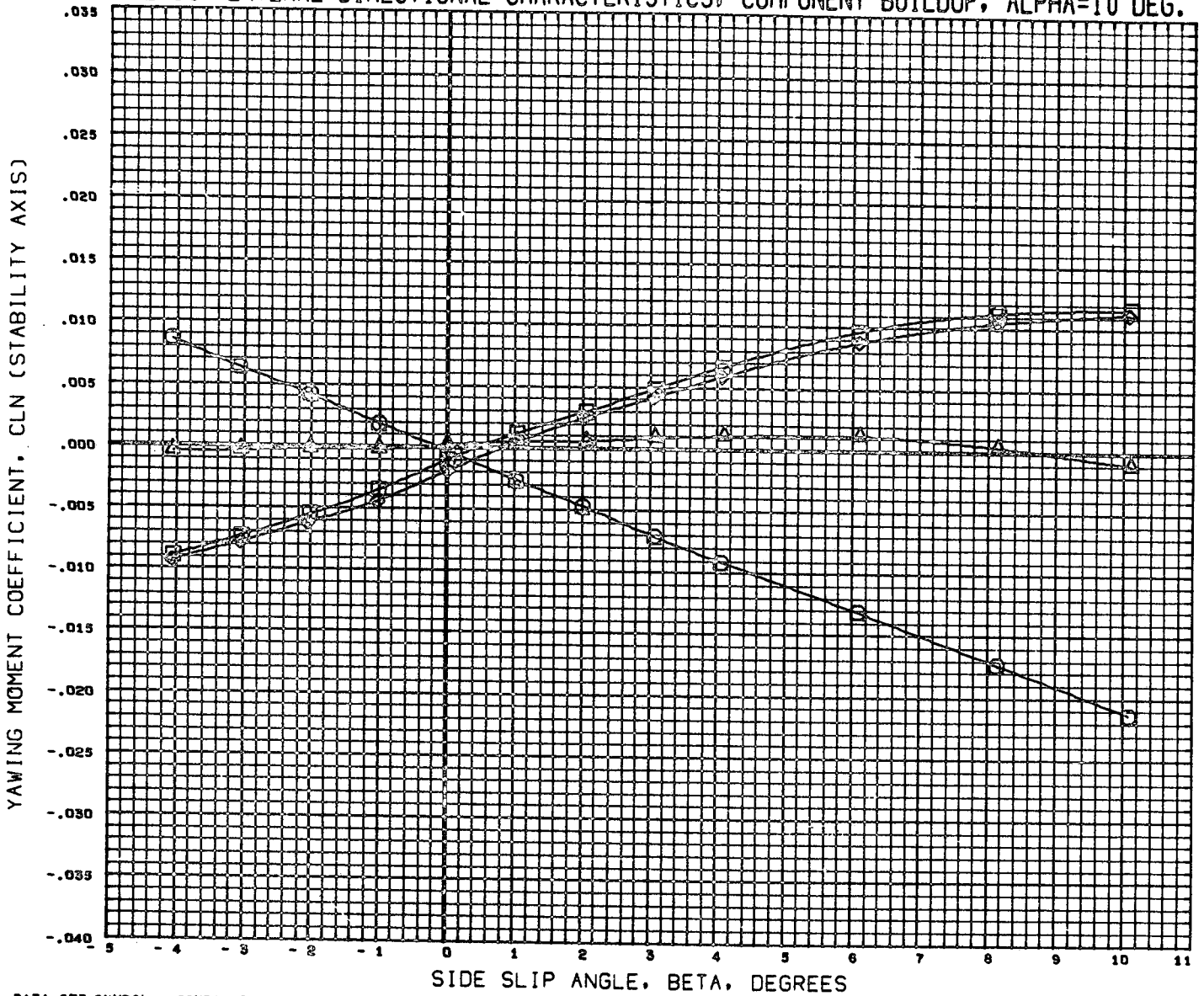


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49013)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49229)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 4.96

PAGE 163

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

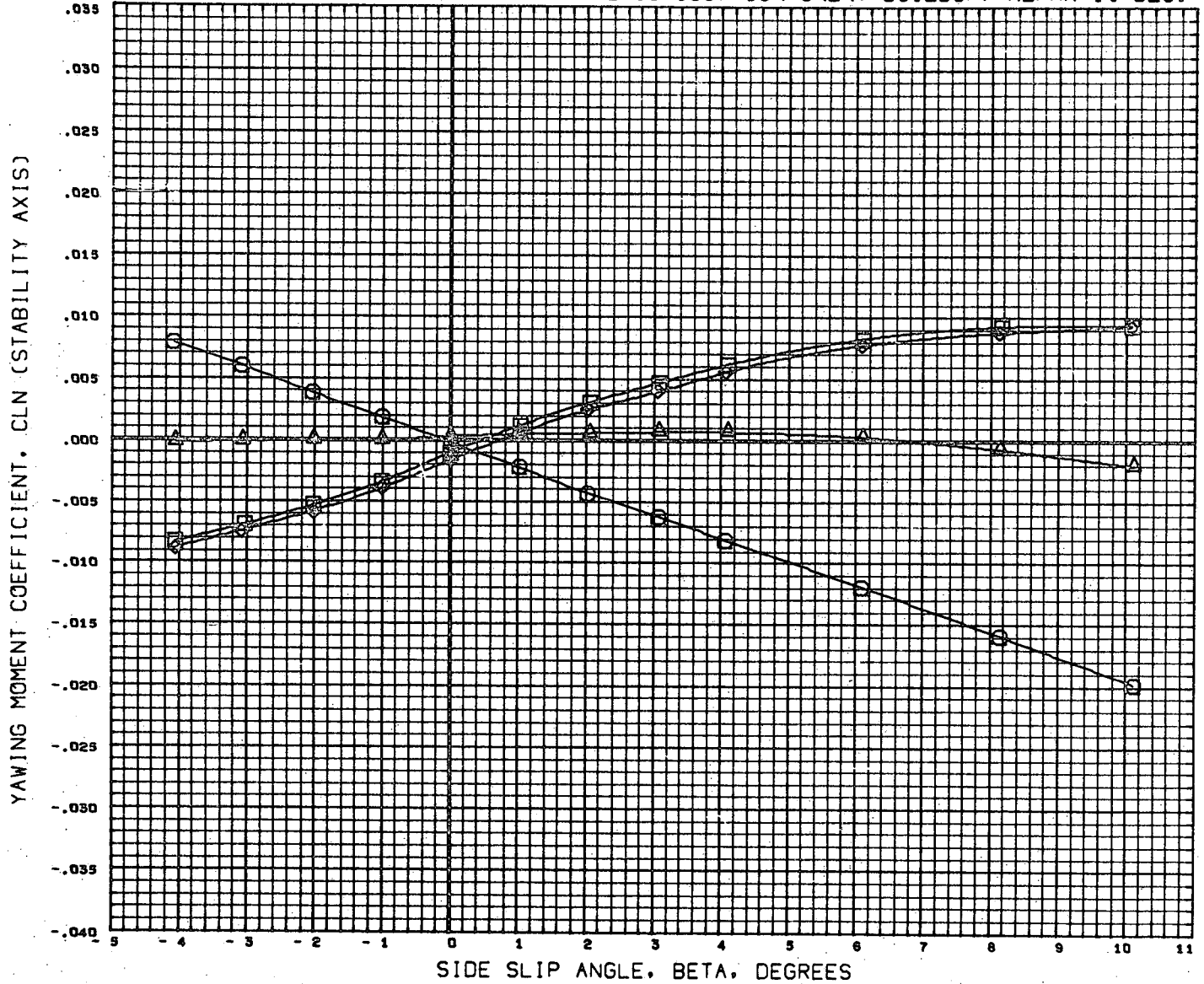


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49013)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49229)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF	5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.99

PAGE 164

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



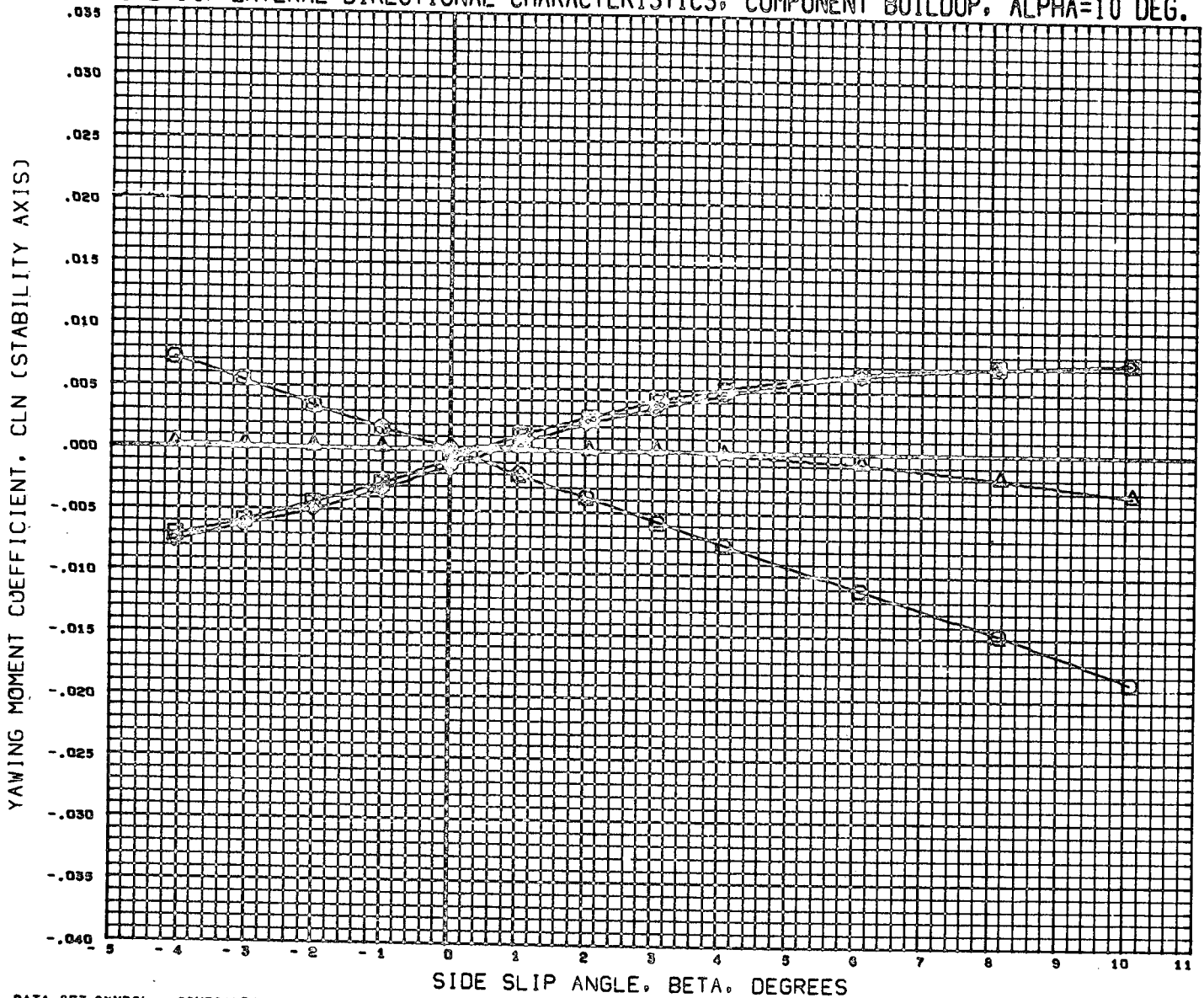
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49013)	MSFC 507 GAC H-33 ORB. 85W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49229)	MSFC 507 GAC H-33 ORB. 85W4V5	0.000	0.000			LREF 5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. 85W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. 85W4(-20)V5(+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 3.48

PAGE 165



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

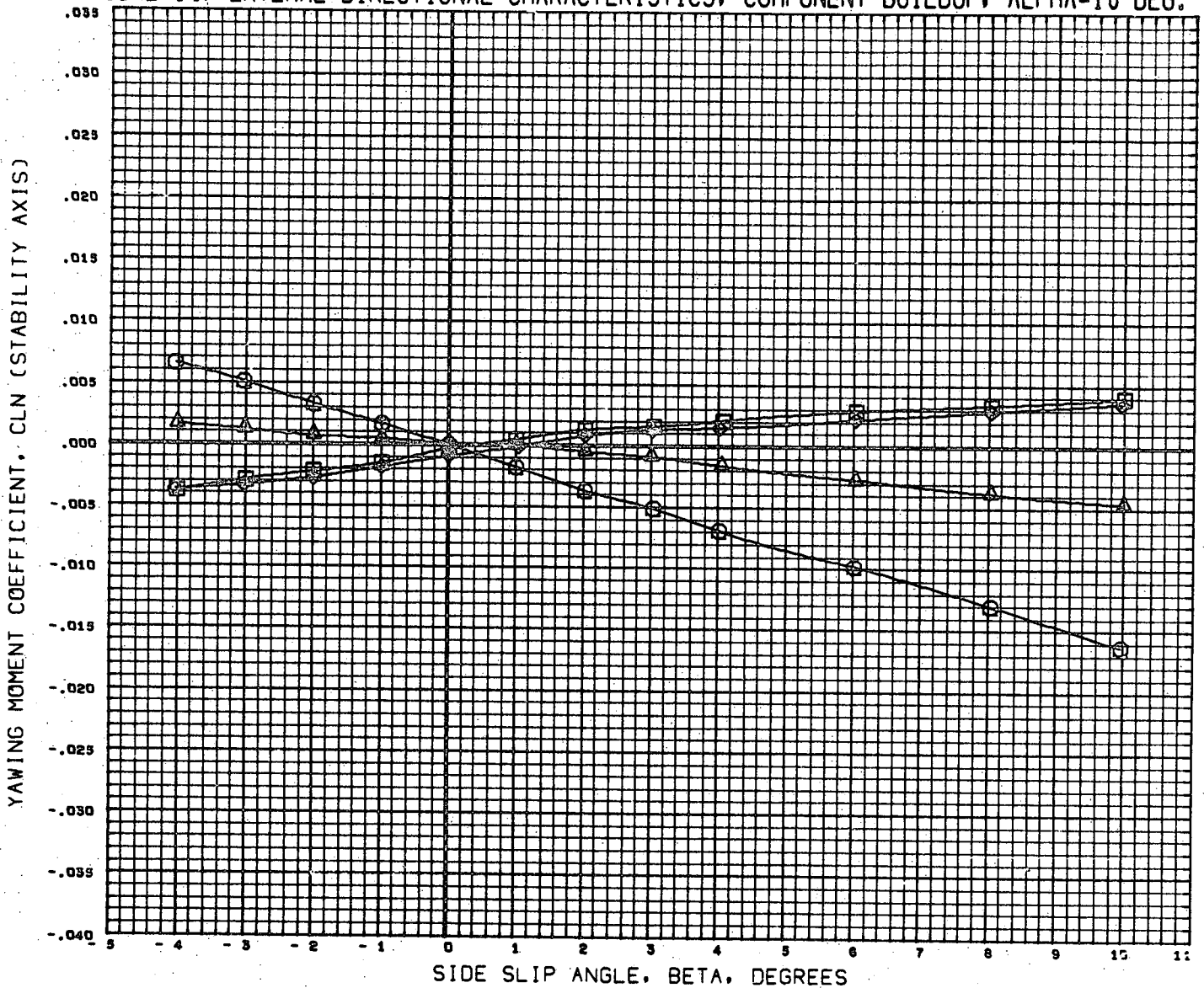


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49013)	MSFC 507 6AC H-33 ORB. BSW4	0.000	0.000			SREF	7.8970 SQ. IN
(A49229)	MSFC 507 6AC H-33 ORB. BSW4V5	0.000	0.000			LREF	5.4530 IN
(A49009)	MSFC 507 6AC H-33 ORB. BSW4V5 (+30, -30)	0.000	0.000	0.000	0.000	BREF	3.8170 IN
(A49Y30)	MSFC 507 6AC H-33 ORB. BSW4 (-20)V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.00

PAGE 166

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

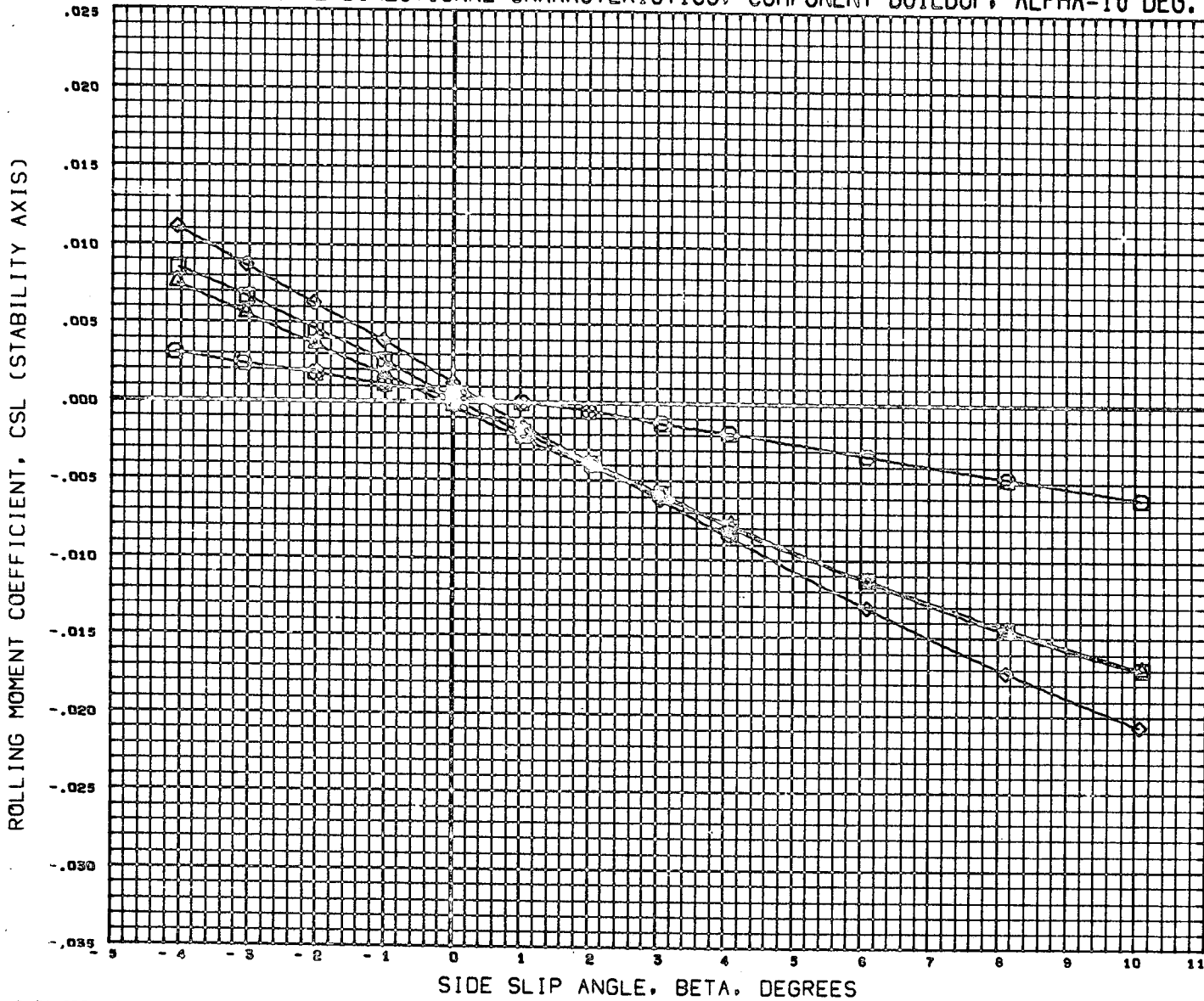


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49D13)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49Z29)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF	5.4530 IN
(A49Q09)	MSFC 507 GAC H-33 ORB. B5W4V5(+30, -30)	0.000	0.000	0.000	0.000	BREF	3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.96

PAGE 167

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

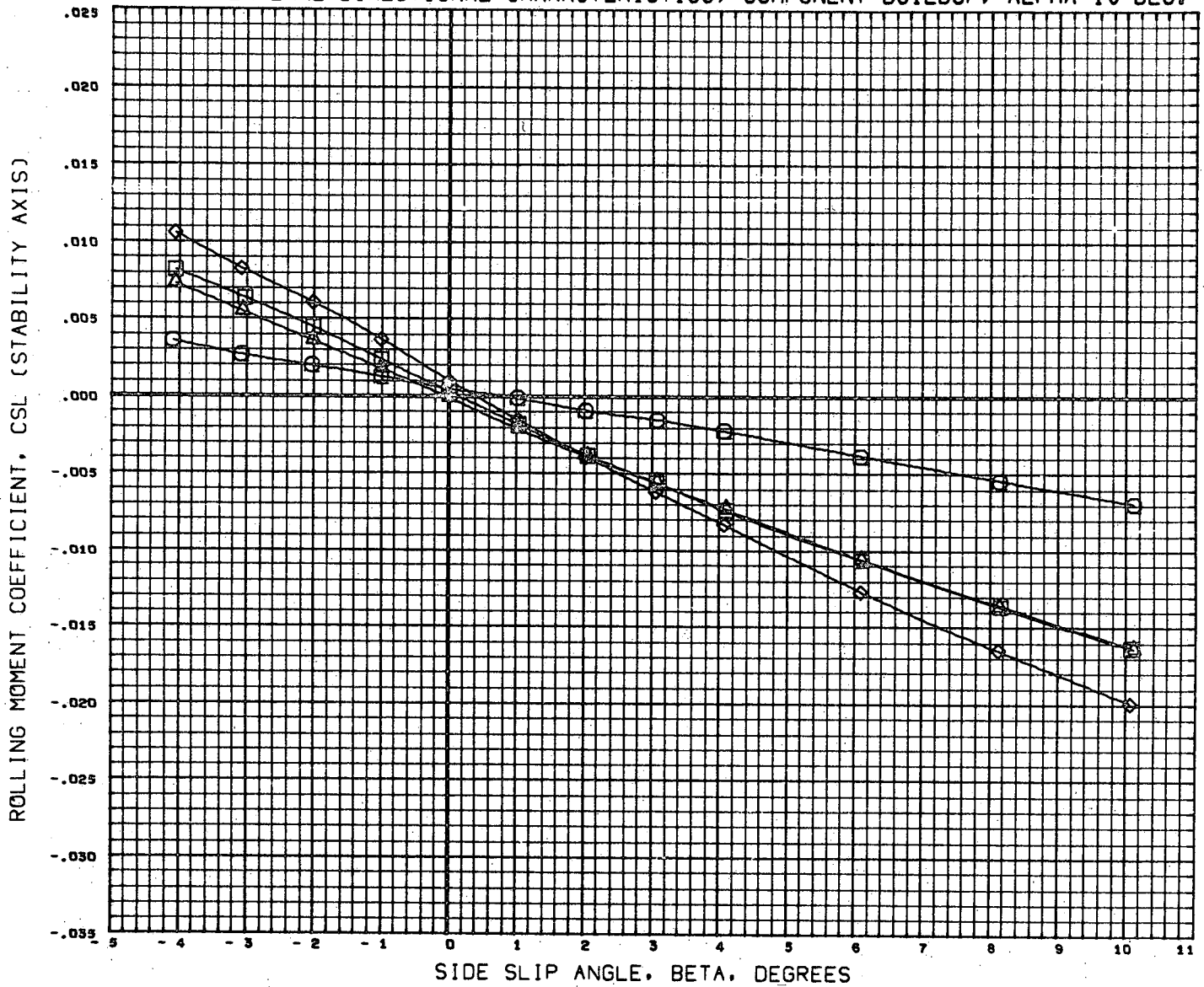


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49013)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49229)	MSFC 507 GAC H-33 ORB. B5W4V3	0.000	0.000			LREF 5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. B5W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V3 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 2.99

PAGE 168

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

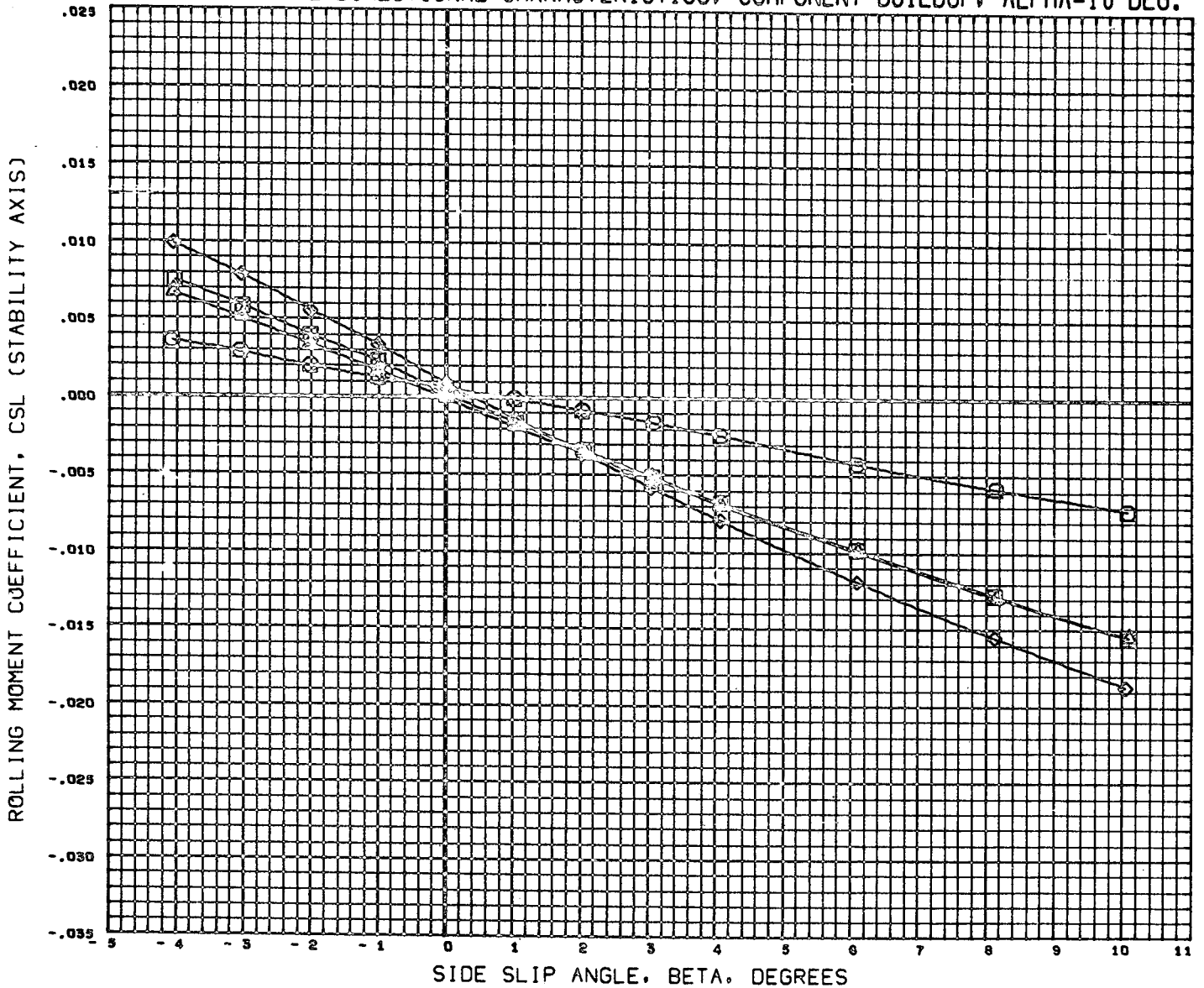


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49013)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49Z29)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF	5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 3.48

PAGE 169

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

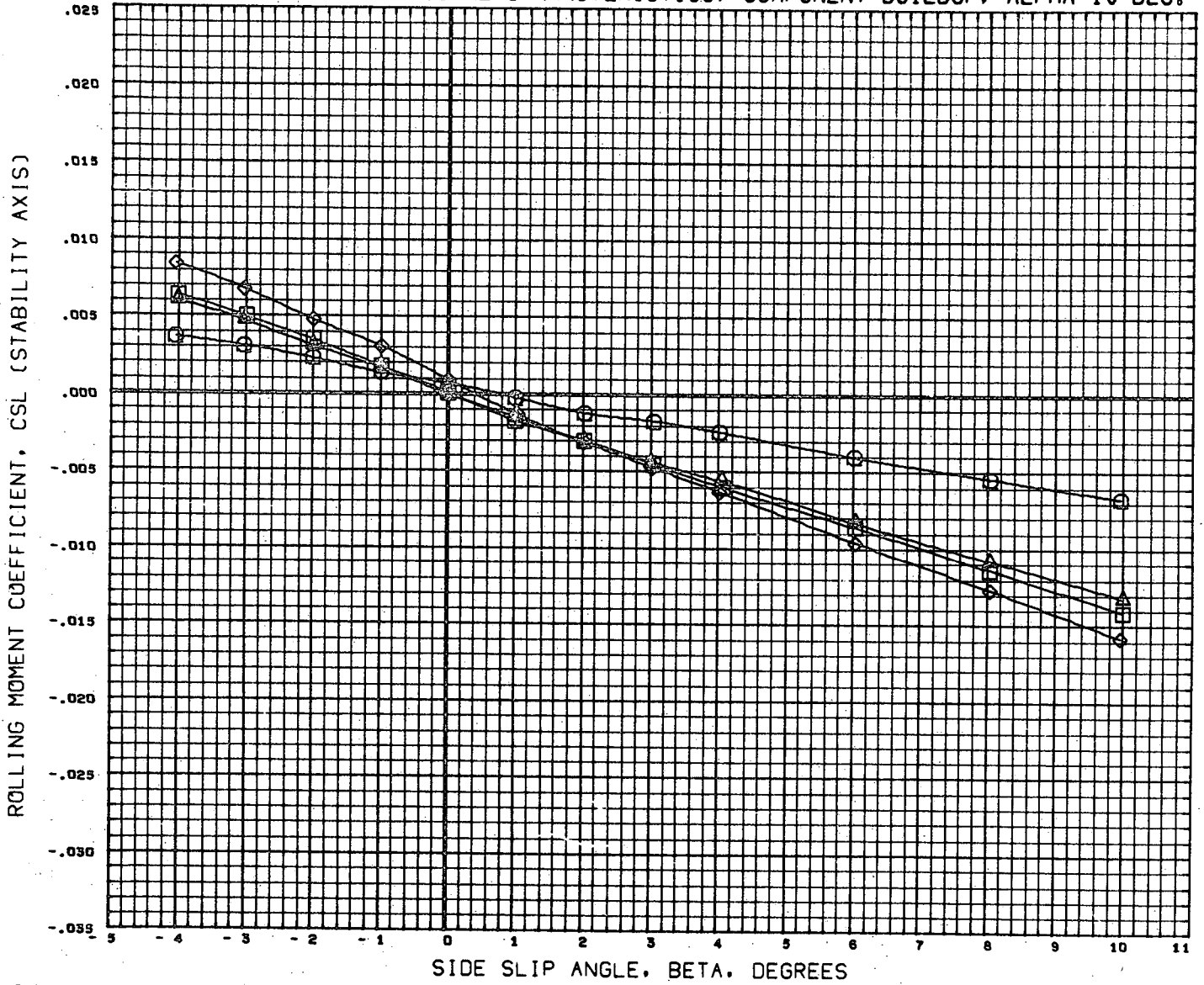


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49013)	MSFC 507 GAC H-33 ORB. B9W4	0.000	0.000			SREF 7.8970 SQ.IN
(A49229)	MSFC 507 GAC H-33 ORB. B9W4V5	0.000	0.000			LREF 5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. B9W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. B9W4 (-20)V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 4.00

PAGE 170

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

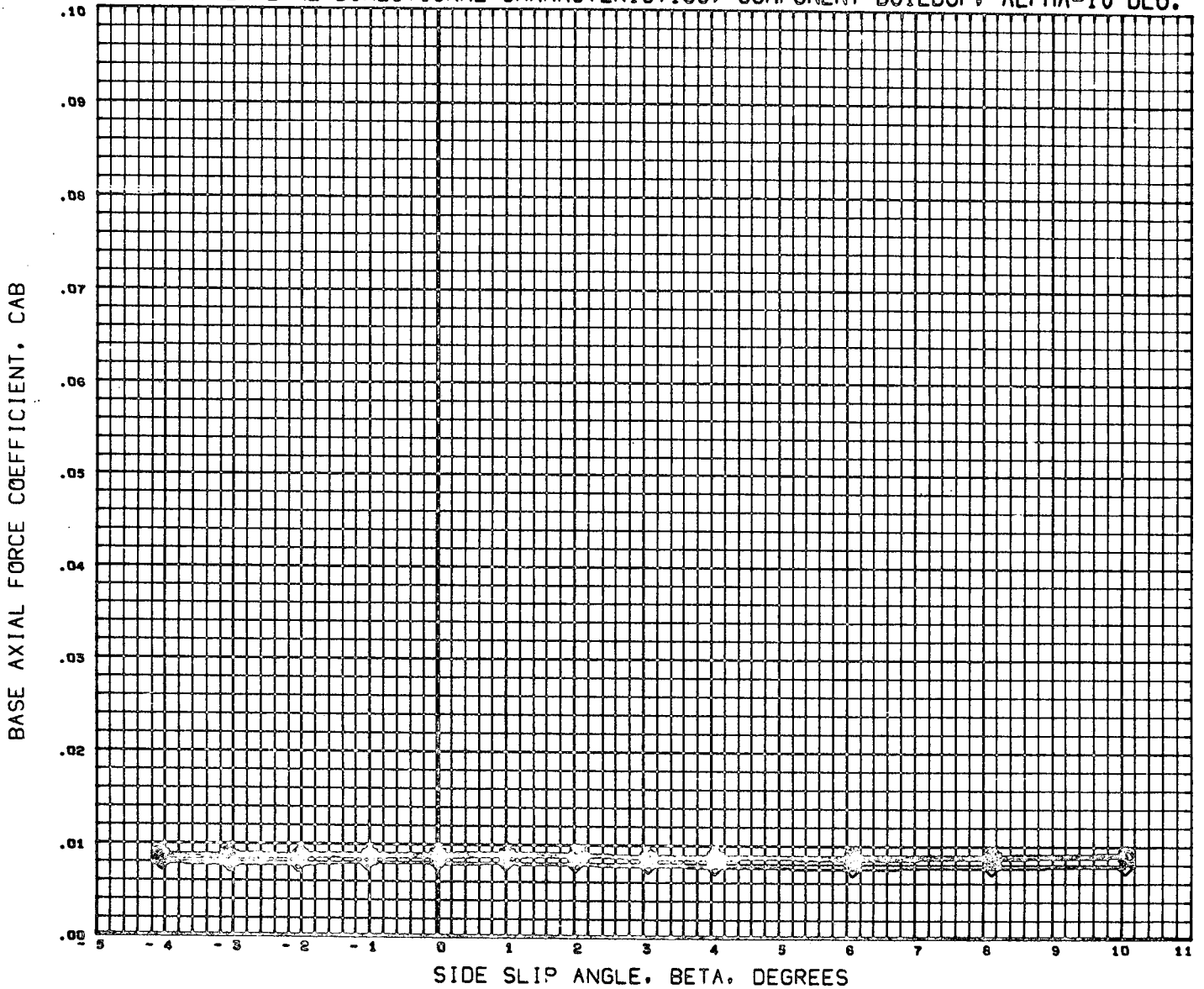


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49013)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49229)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF	5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. B5W4(-20)V5(+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.96

PAGE 171

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



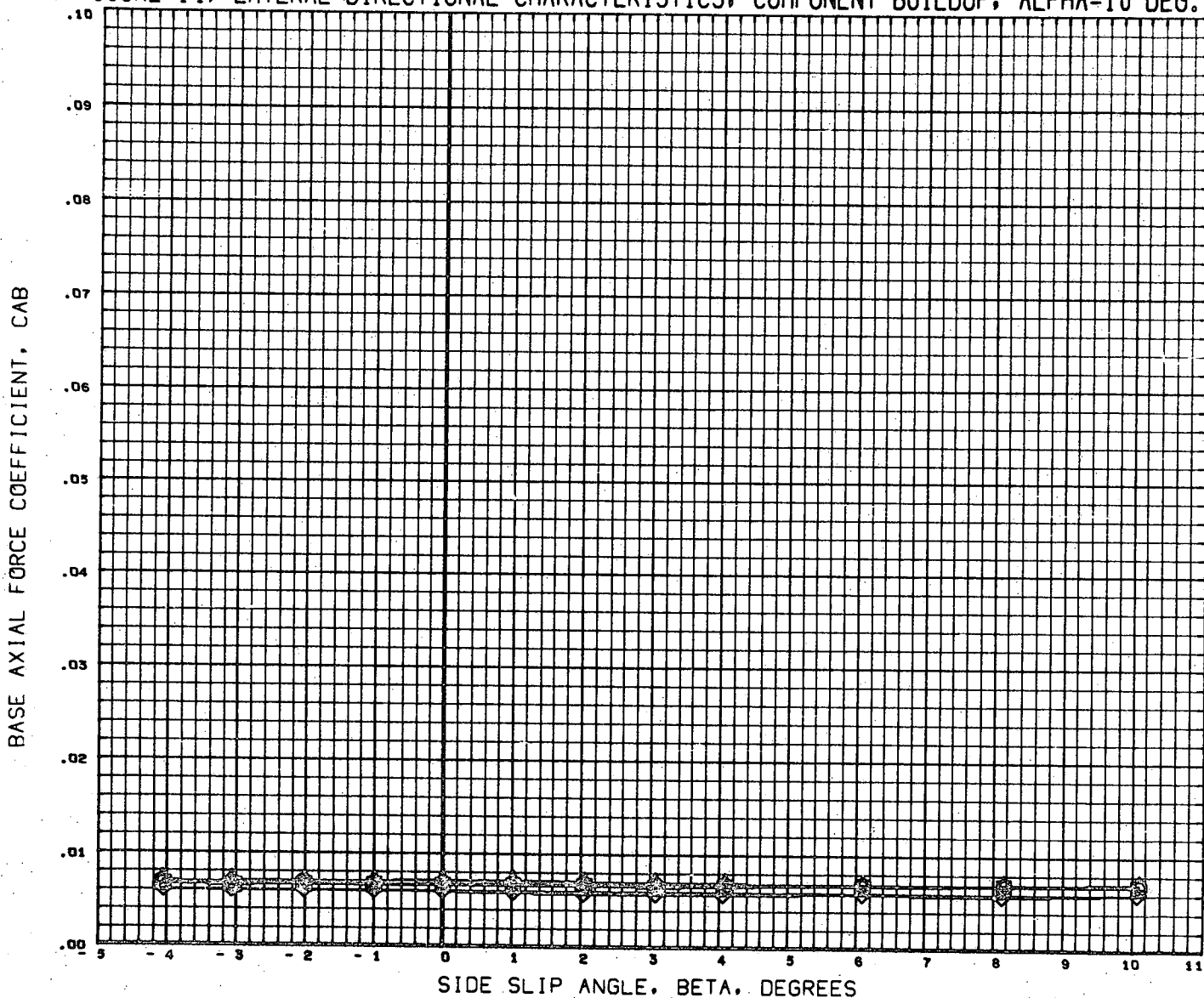
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49013)	MSFC 907 GAC M-33 ORB. B9W4	0.000	0.000			SREF	7.8970 SQ.IN
(A49229)	MSFC 907 GAC M-33 ORB. B9W4V9	0.000	0.000			LREF	5.4530 IN
(A49009)	MSFC 907 GAC M-33 ORB. B9W4V9 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49130)	MSFC 907 GAC M-33 ORB. B9W4(-20) V9(+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.99

PAGE 172

145

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



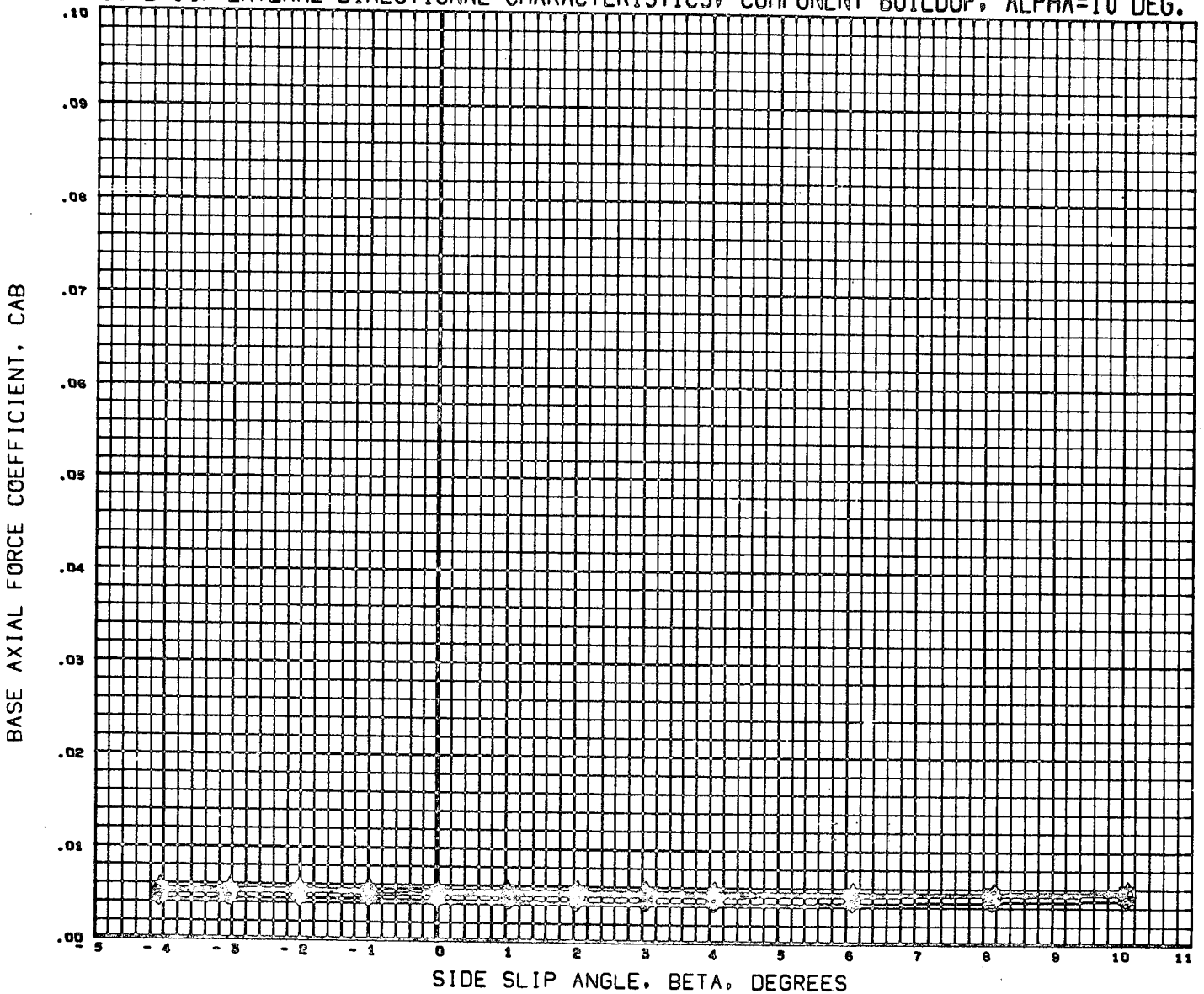
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49013)	HSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49229)	HSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF 5.4530 IN
(A49009)	HSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
(A49Y30)	HSFC 507 GAC H-33 ORB. B5W4 (-20)V5 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 3.48

PAGE 173



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

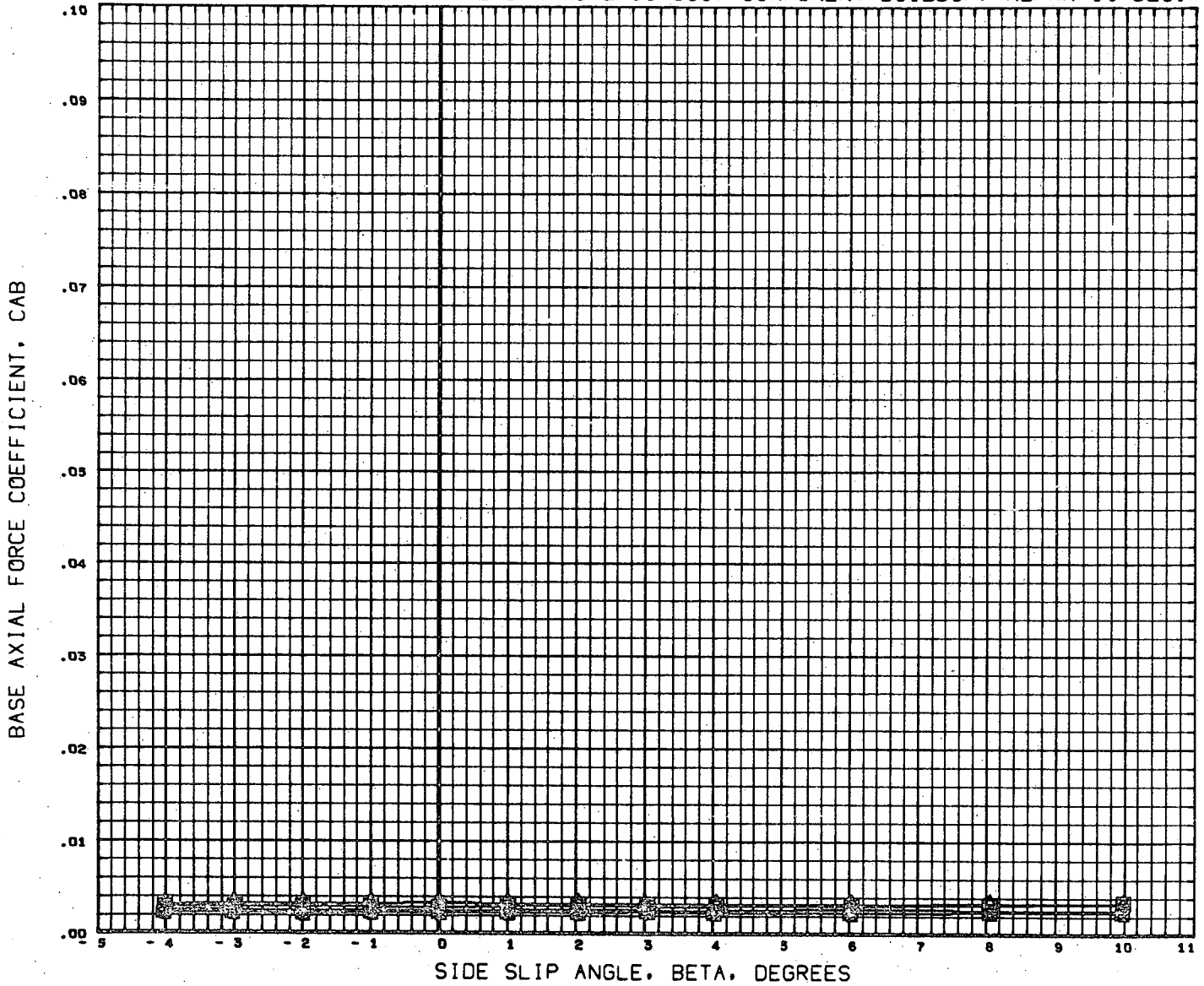


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49013)	MSFC 307 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ.IN
(A49229)	MSFC 307 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF 5.4530 IN
(A49009)	MSFC 307 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30,000	-30,000	BREF 3.8170 IN
(A49Y30)	MSFC 307 GAC H-33 ORB. B5W4 (-20) V5 (+30, -30)	-20.000	0.000	30,000	-30,000	XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 4.00

PAGE 174

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

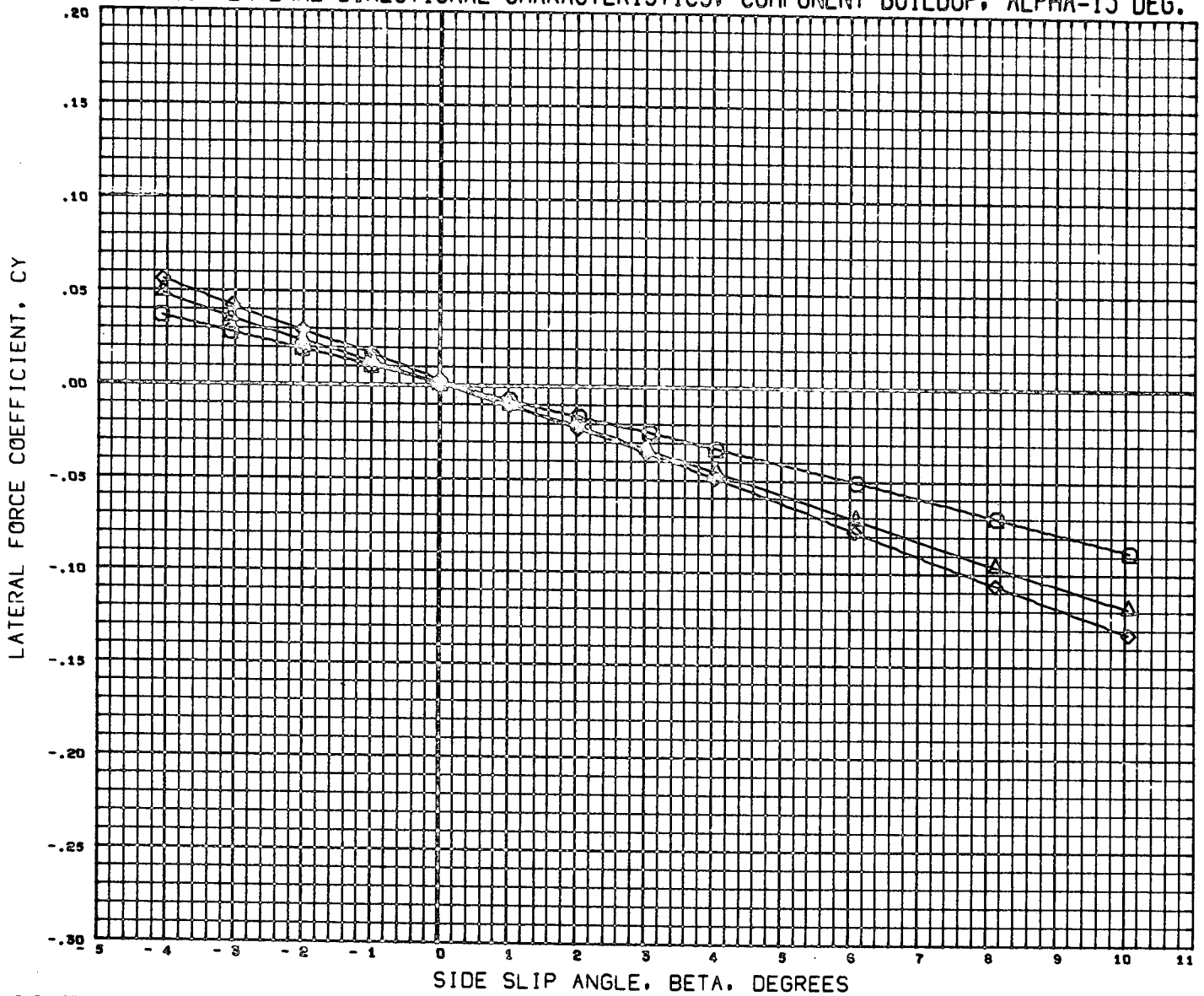


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49013)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49228)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF	5.4530 IN
(A49009)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
(A49Y30)	MSFC 507 GAC H-33 ORB. B5W4 (-20)V3 (+30, -30)	-20.000	0.000	30.000	-30.000	XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.96

PAGE 175

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

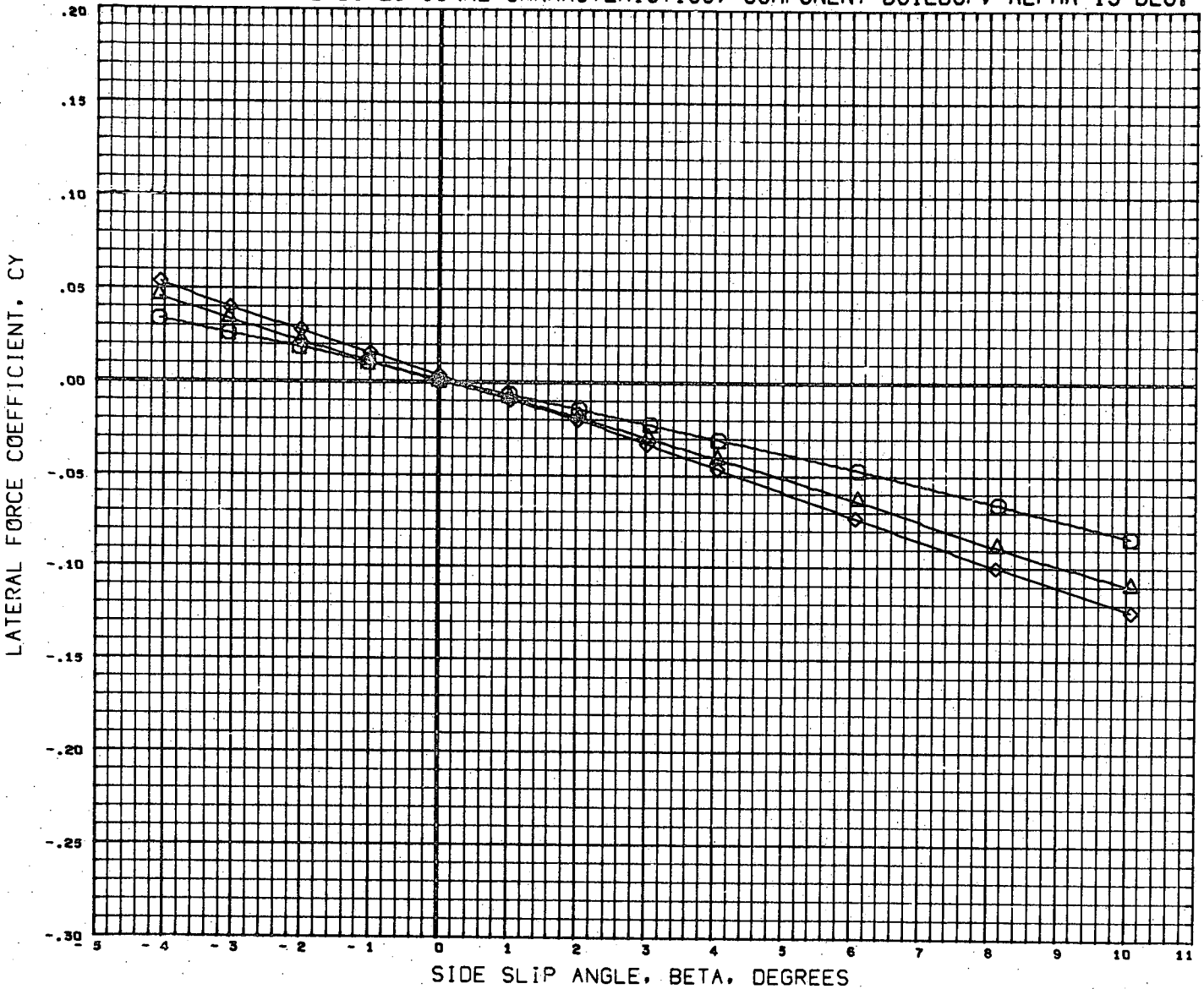


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49012)	M3FC 307 GAC M-33 ORB. B9W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49011)	M3FC 307 GAC M-33 ORB. B9W4V5	0.000	0.000			LREF	5.4530 IN
(A49010)	M3FC 307 GAC M-33 ORB. B9W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.99

PAGE 176

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

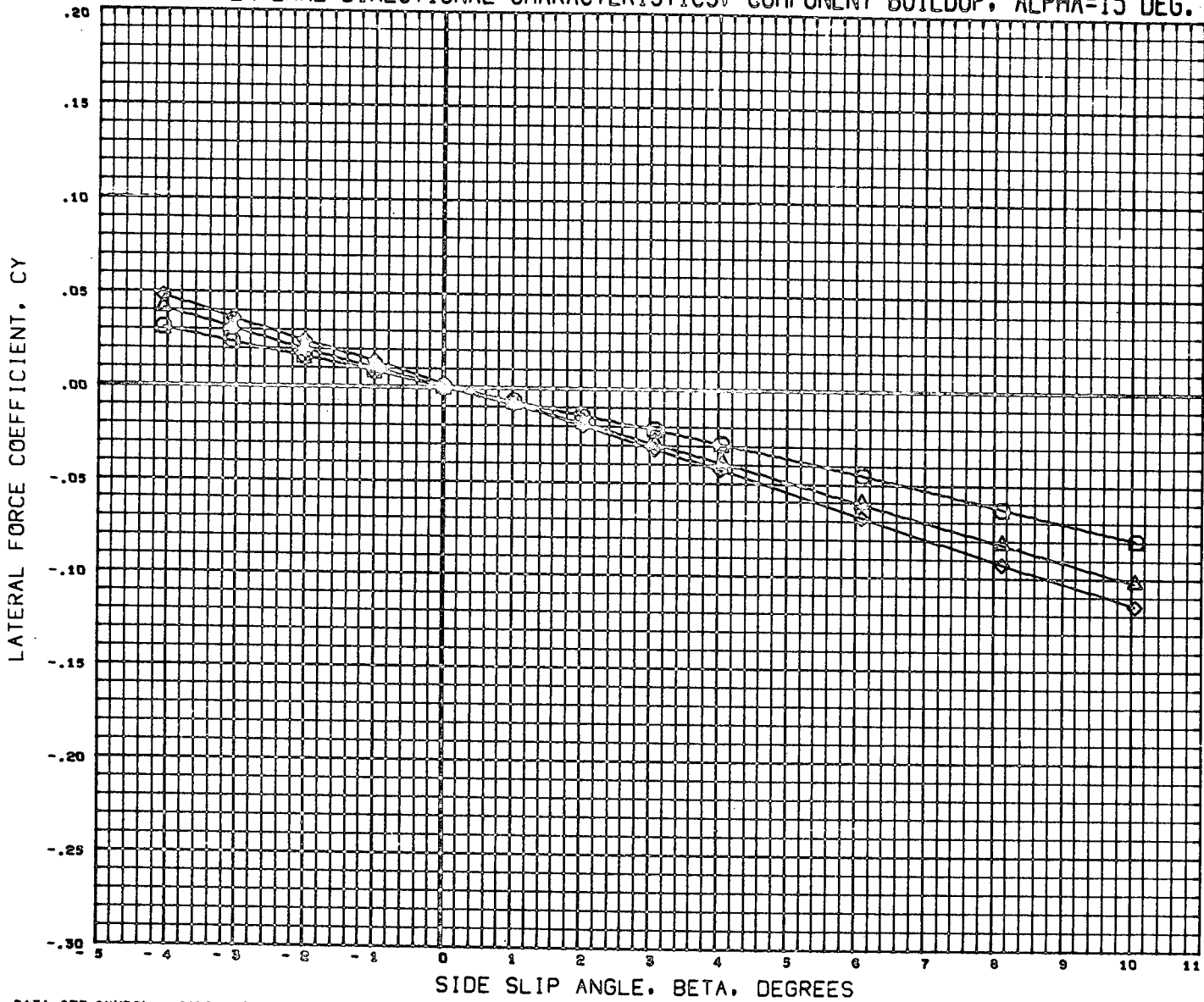


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49D12)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49D11)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF	5.4530 IN
(A49D10)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 3.48

PAGE 177

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

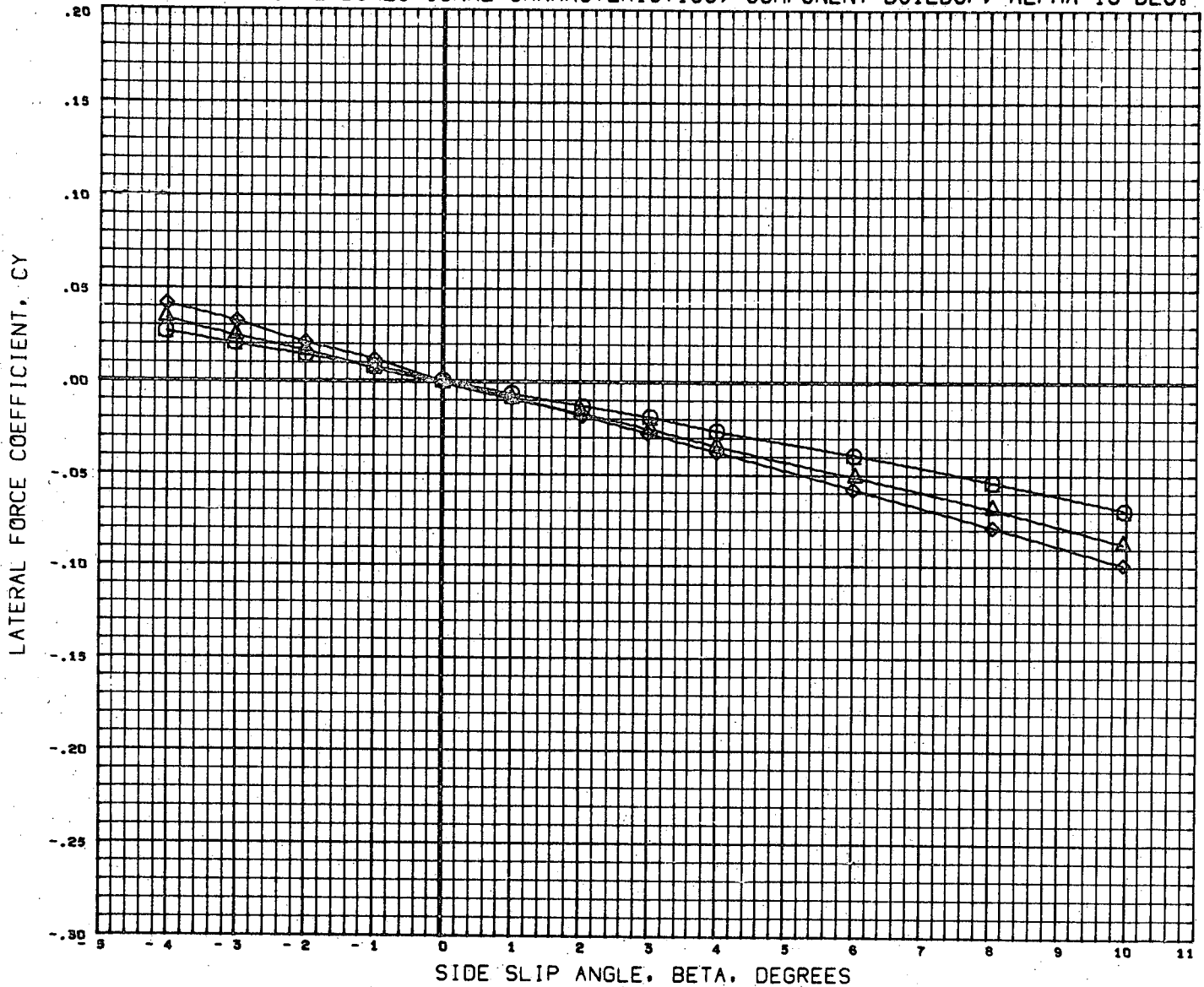


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49012)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49011)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49010)	MSFC 507 GAC H-33 ORB. B5W4V9 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRF 1274.4040 IN.
						YMRF 0.0000 IN.
						ZMRF 391.3004 IN.
						SCALE 0.0034

MACH 4.00

PAGE 178

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

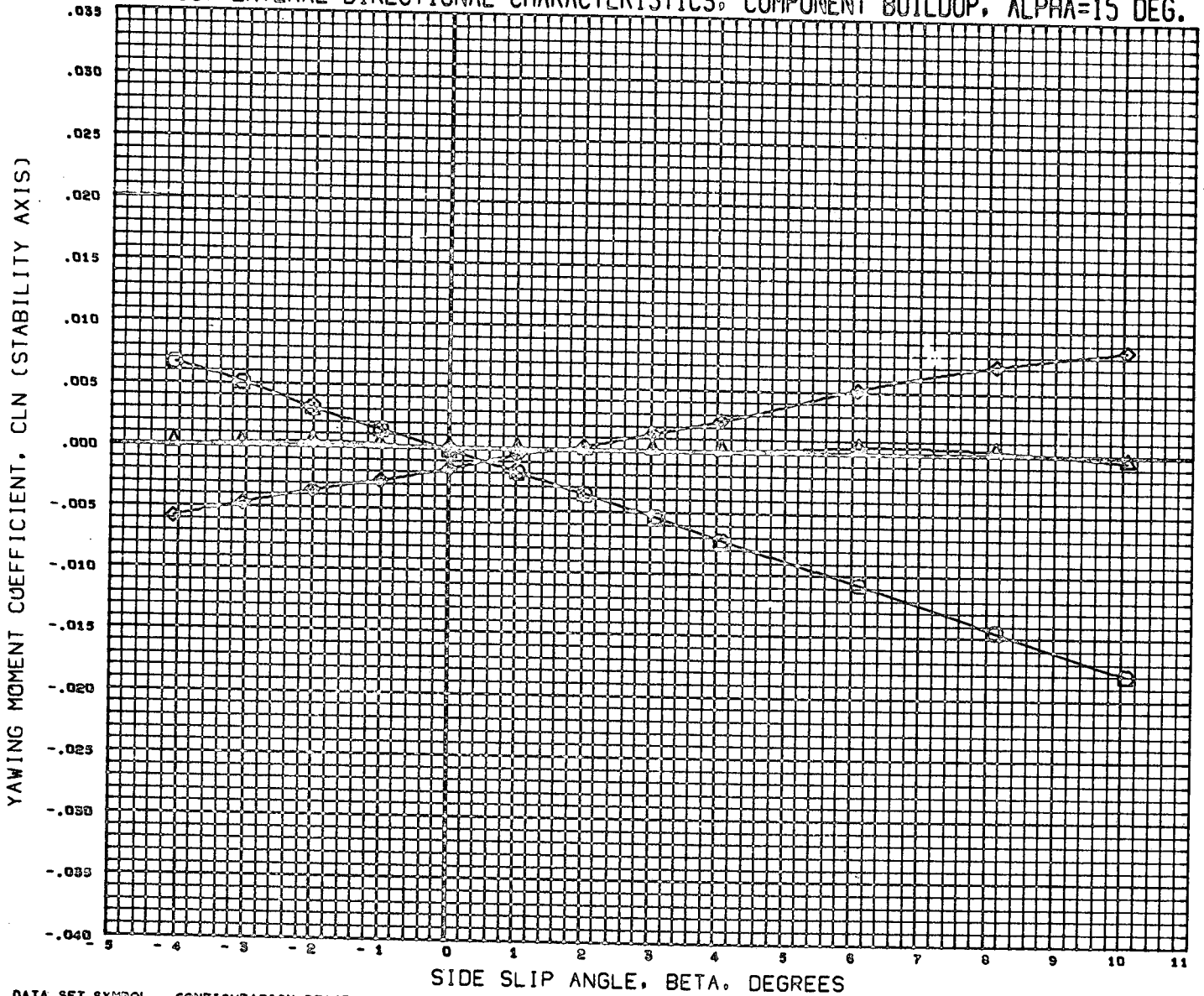


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49012)	MSFC 507 GAC H-33 ORB. 85W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49011)	MSFC 507 GAC H-33 ORB. 85W4V5	0.000	0.000	0.000	0.000	LREF	5.4550 IN
(A49010)	MSFC 507 GAC H-33 ORB. 85W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.96

PAGE 179

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



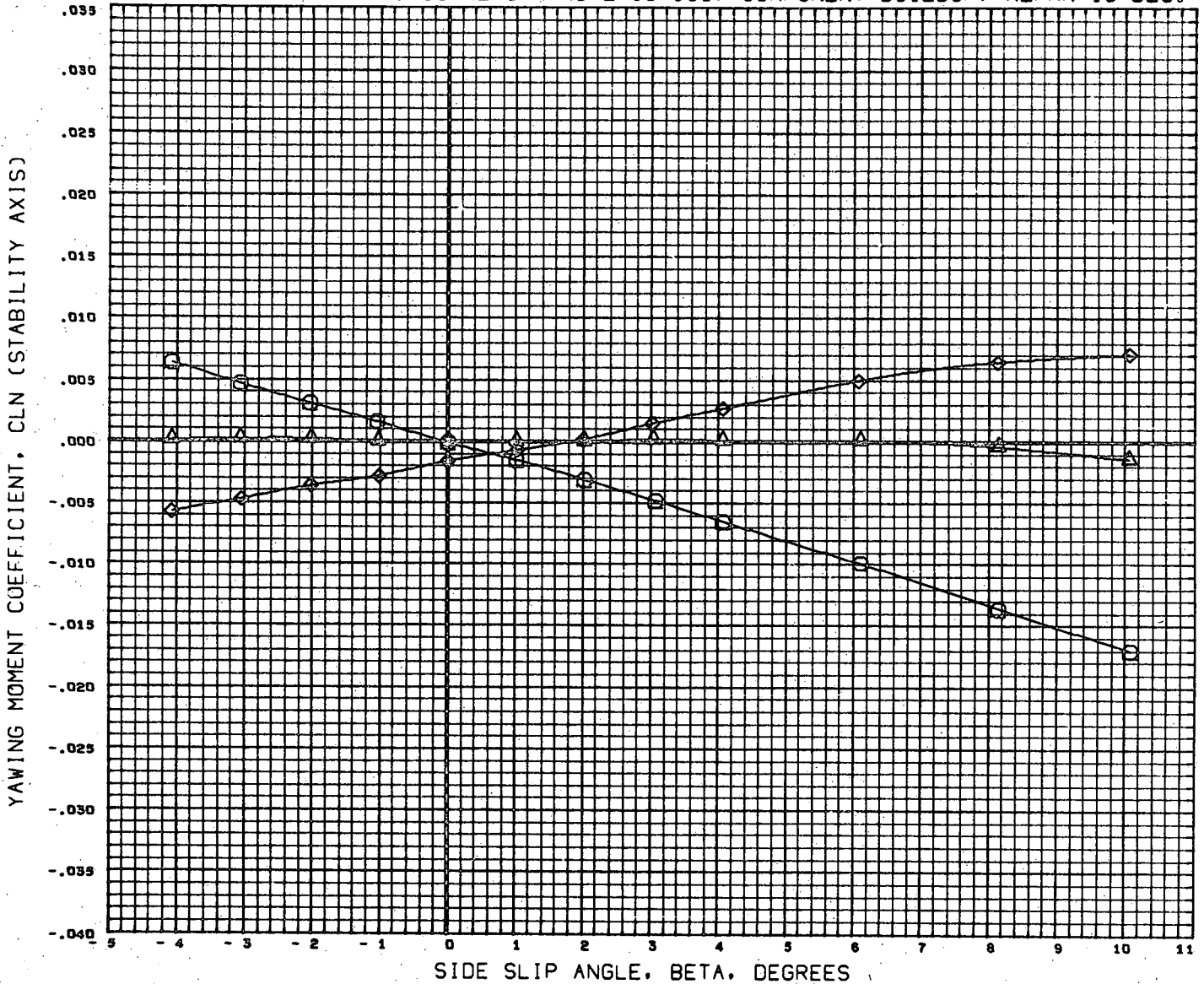
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49012) ○	MSFC 507 GAC M-33 ORB. B5W4
(A49011) △	MSFC 507 GAC M-33 ORB. B5W4VS
(A49010) ◇	MSFC 507 GAC M-33 ORB. B5W4VS (+30, -30)

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
0.000	0.000			SREF	7.8970 SQ. IN
0.000	0.000			LREF	5.4530 IN
0.000	0.000	0.000	0.000	BREF	3.8170 IN
				XM RP	1274.4040 IN.
				YM RP	0.0000 IN.
				ZM RP	391.3004 IN.
				SCALE	0.0034

MACH 2.99

PAGE 180

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



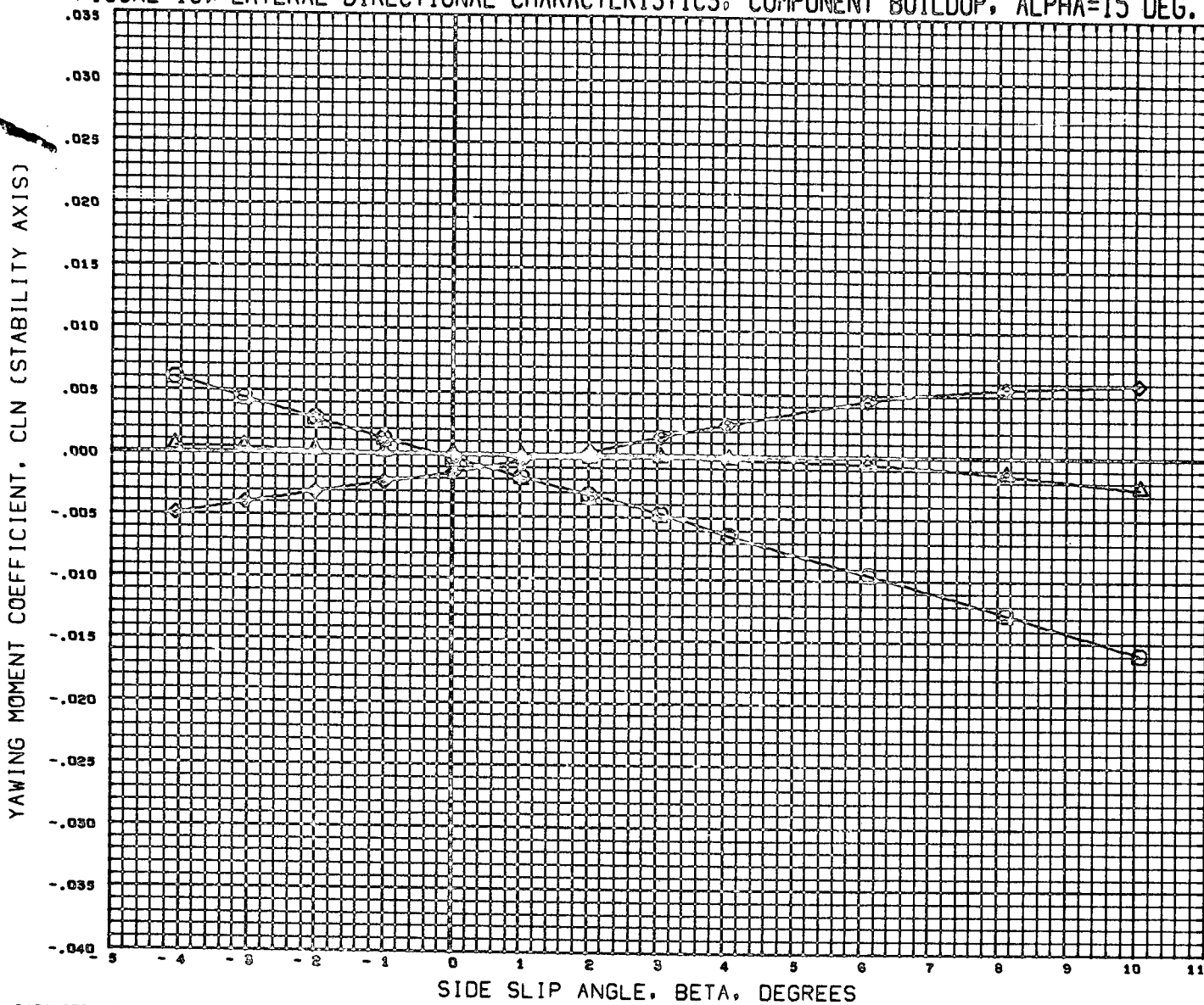
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49012)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49011)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49010)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 3.48

PAGE 181



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

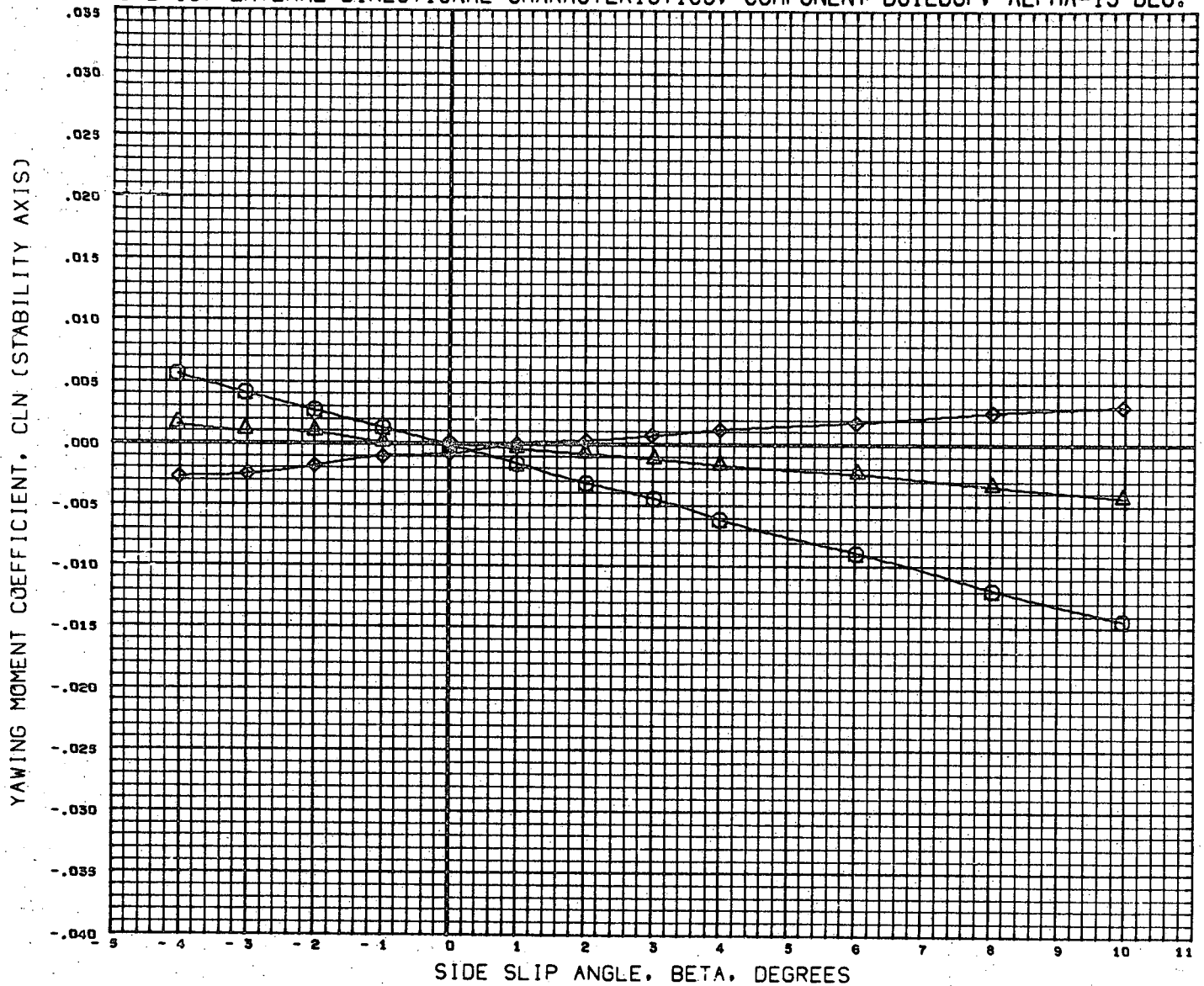


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49012)	MSFC 507 6AC H-33 ORB. BSW4	0.000	0.000			SREF	7.8970 SQ. IN
(A49011)	MSFC 507 6AC H-33 ORB. BSW4V5	0.000	0.000			LREF	5.4530 IN
(A49010)	MSFC 507 6AC H-33 ORB. BSW4V3 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.00

PAGE 182

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

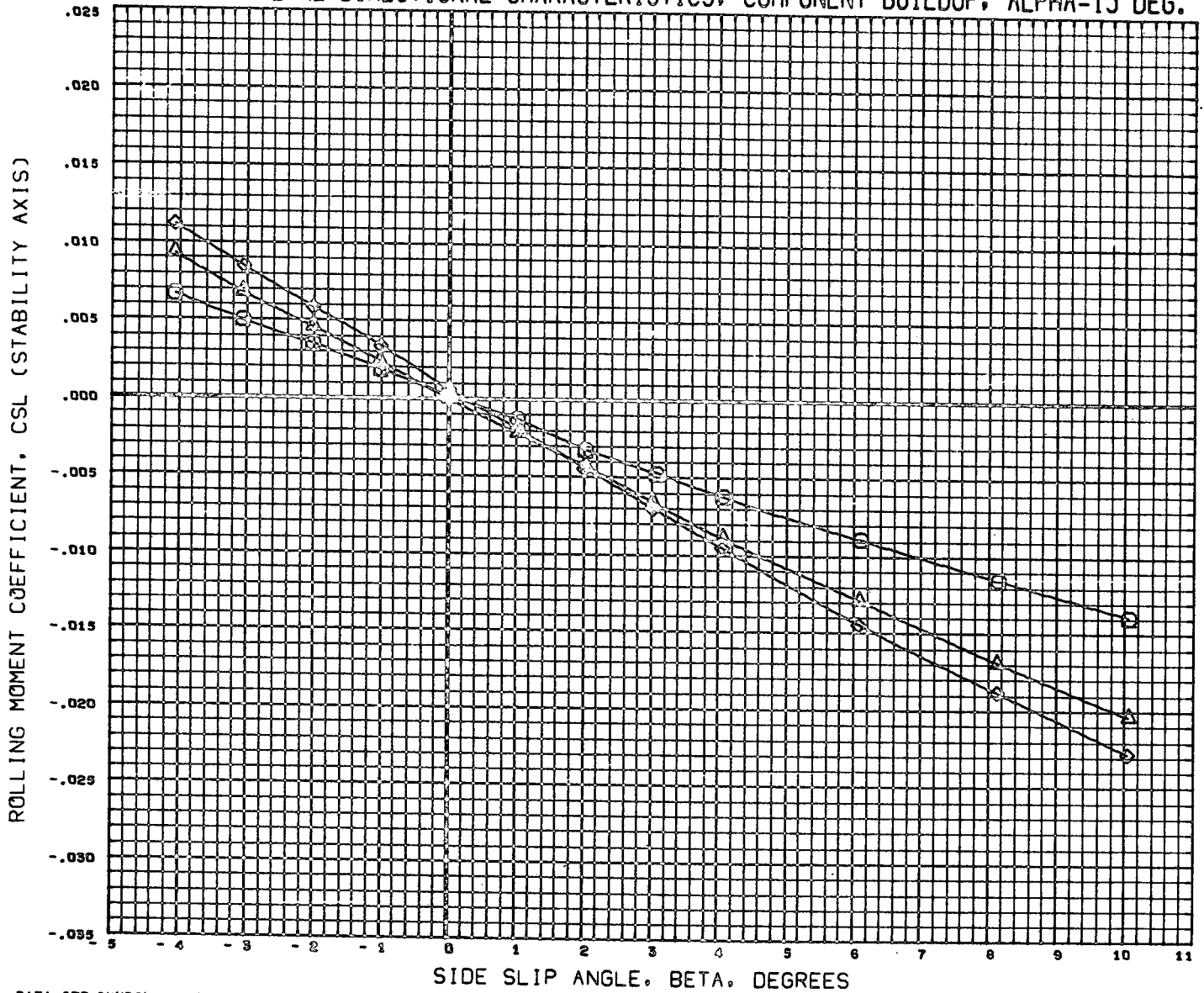


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49012)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49011)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49010)	MSFC 507 GAC H-33 ORB. B5W4V5(+30,-30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.96

PAGE 183

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

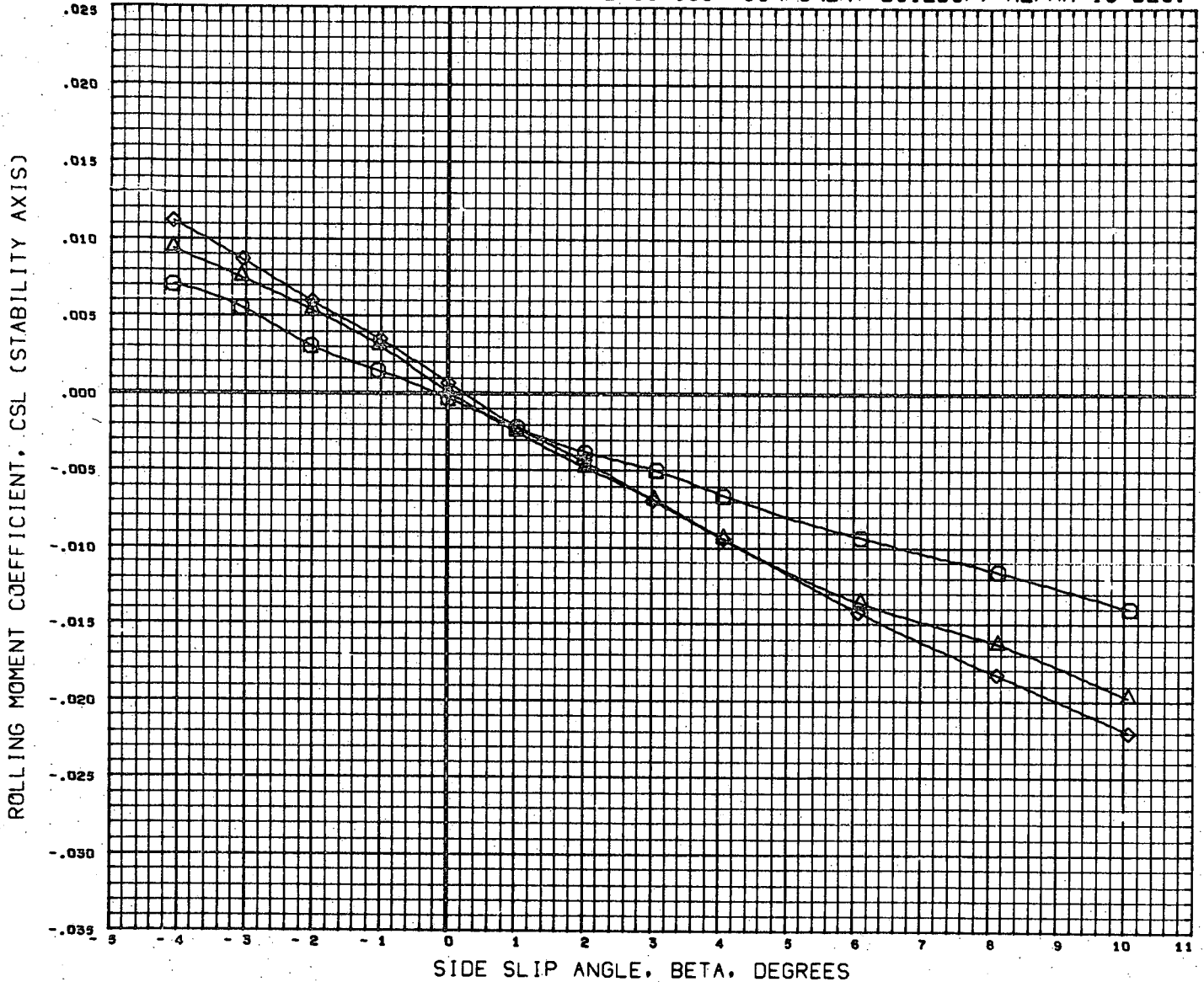


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49012)	MSFC 507 6AC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49011)	MSFC 507 6AC H-33 ORB. B5W4V5	0.000	0.000			LREF 5.4530 IN
(A49010)	MSFC 507 6AC H-33 ORB. B5W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 2.99

PAGE 184

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

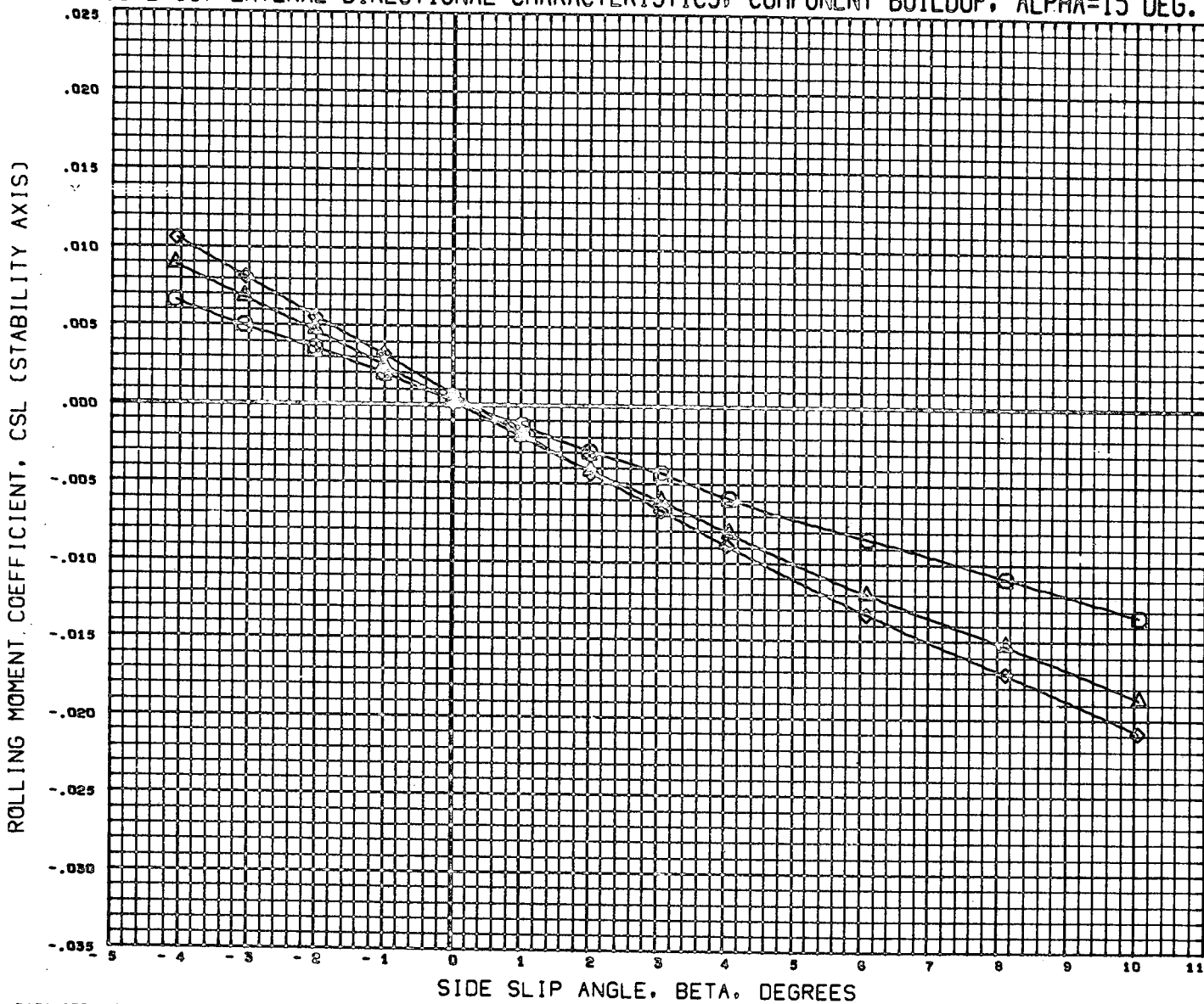


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49012)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49011)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF 5.4530 IN
(A49010)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 3.48

PAGE 185

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

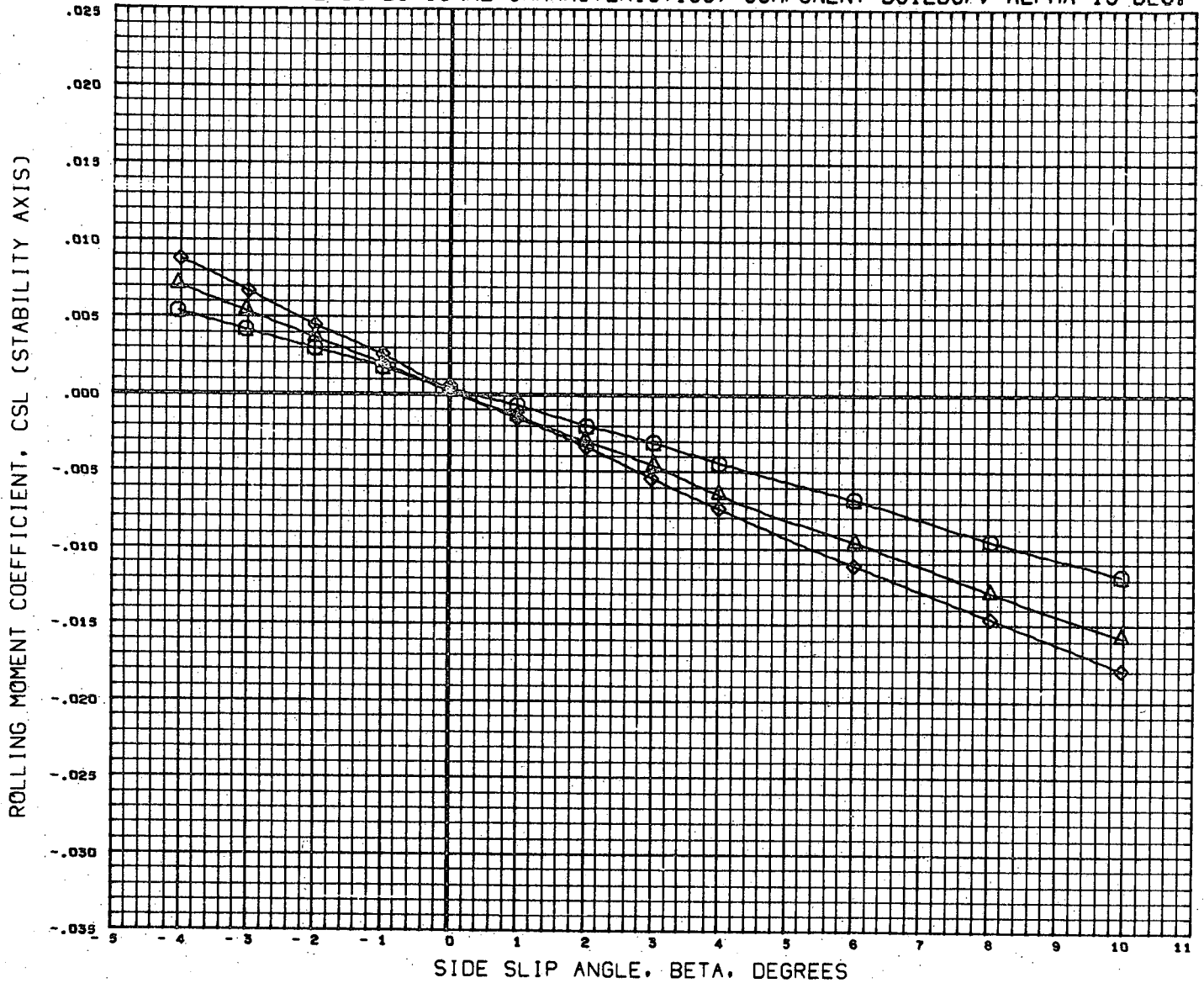


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49012)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49011)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	1.000	0.000	0.000	LREF	5.4530 IN
(A49010)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.00

PAGE 186

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

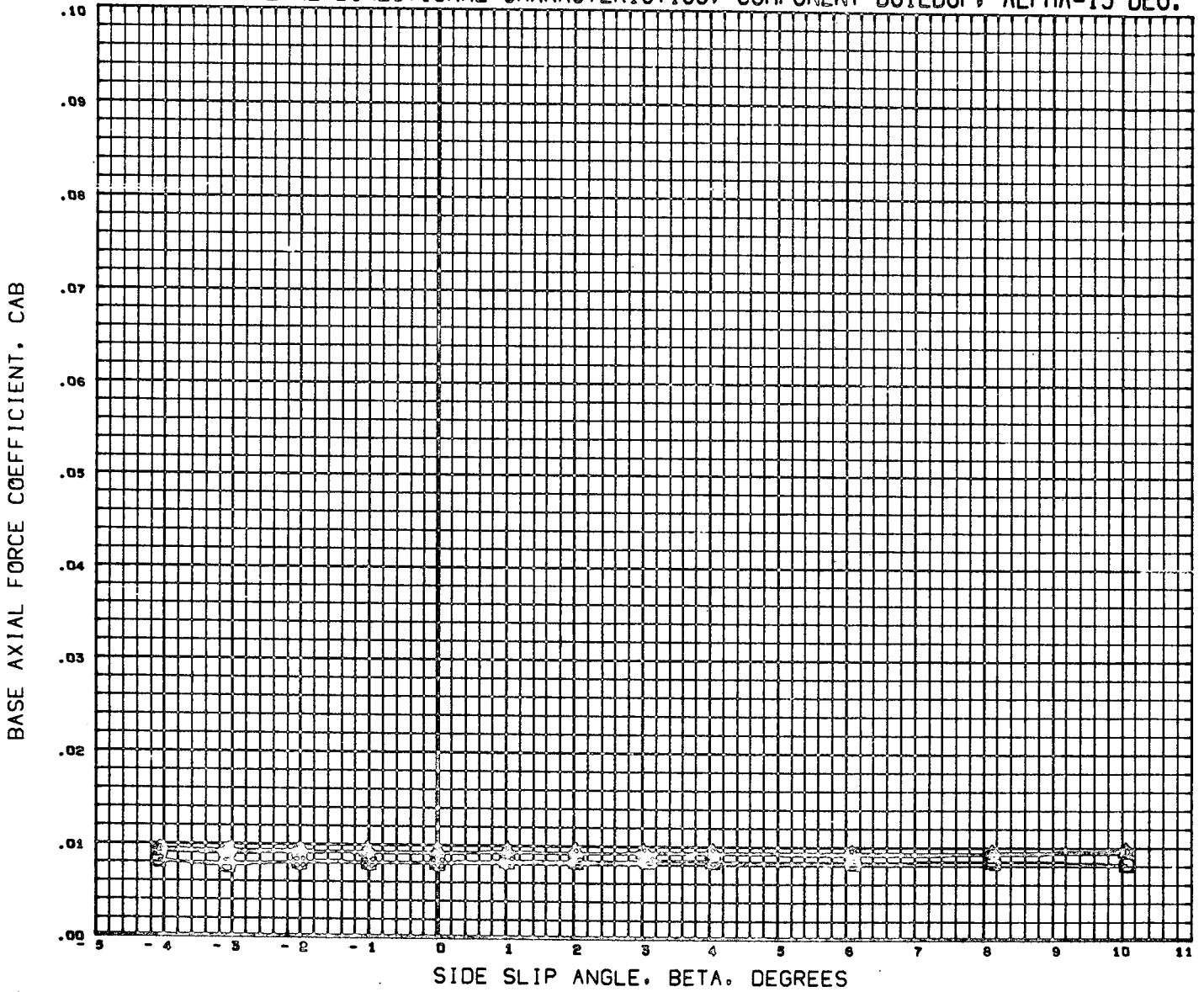


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49012)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49011)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000			LREF	5.4530 IN
(A49010)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.96

PAGE 187

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

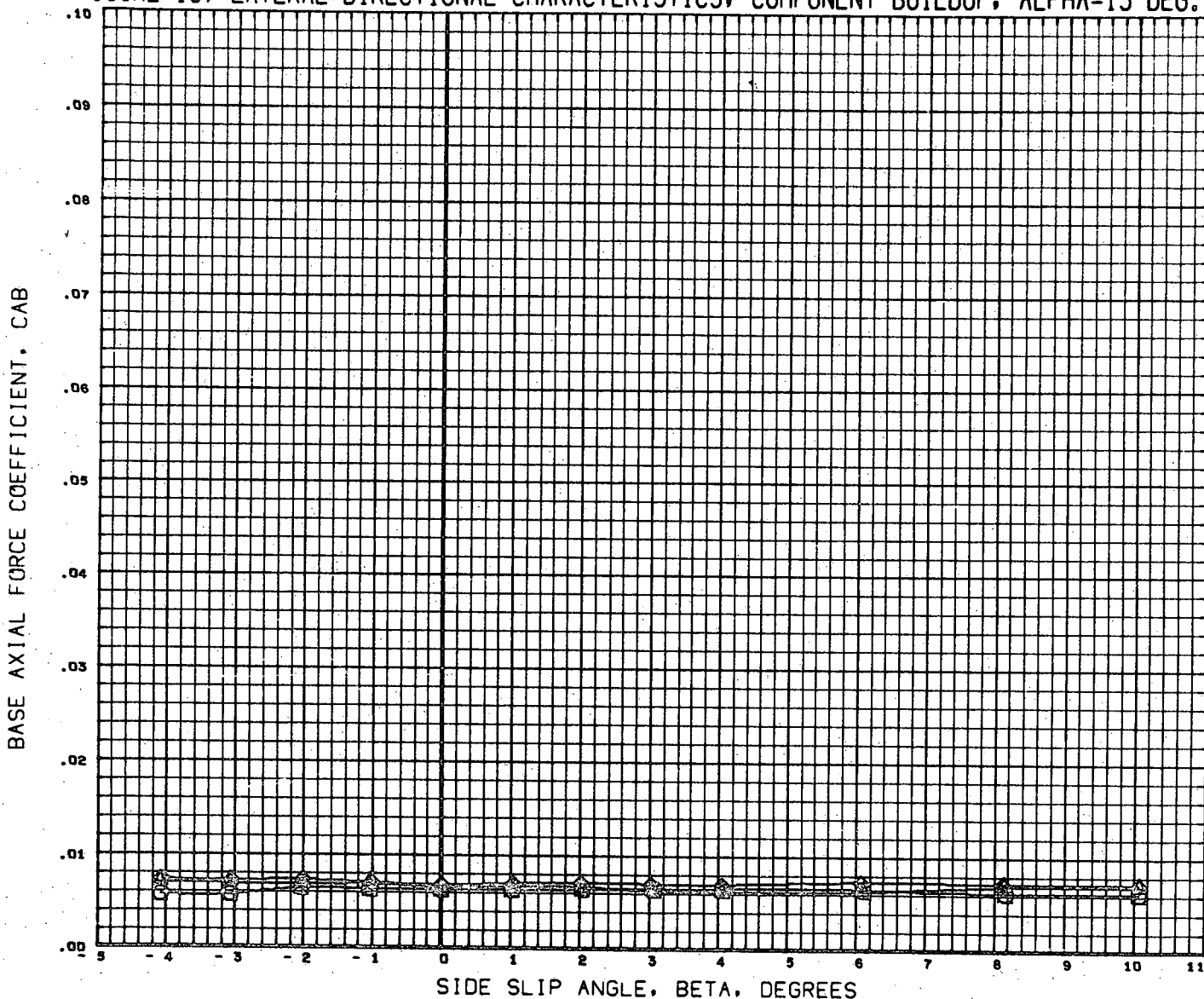


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49012)	MSFC 507 GAC H-33 ORB. B3W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49011)	MSFC 507 GAC H-33 ORB. B3W4V3	0.000	0.000	0.000	0.000	LREF	5.4530 IN
(A49010)	MSFC 507 GAC H-33 ORB. B3W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.99

PAGE 188

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



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

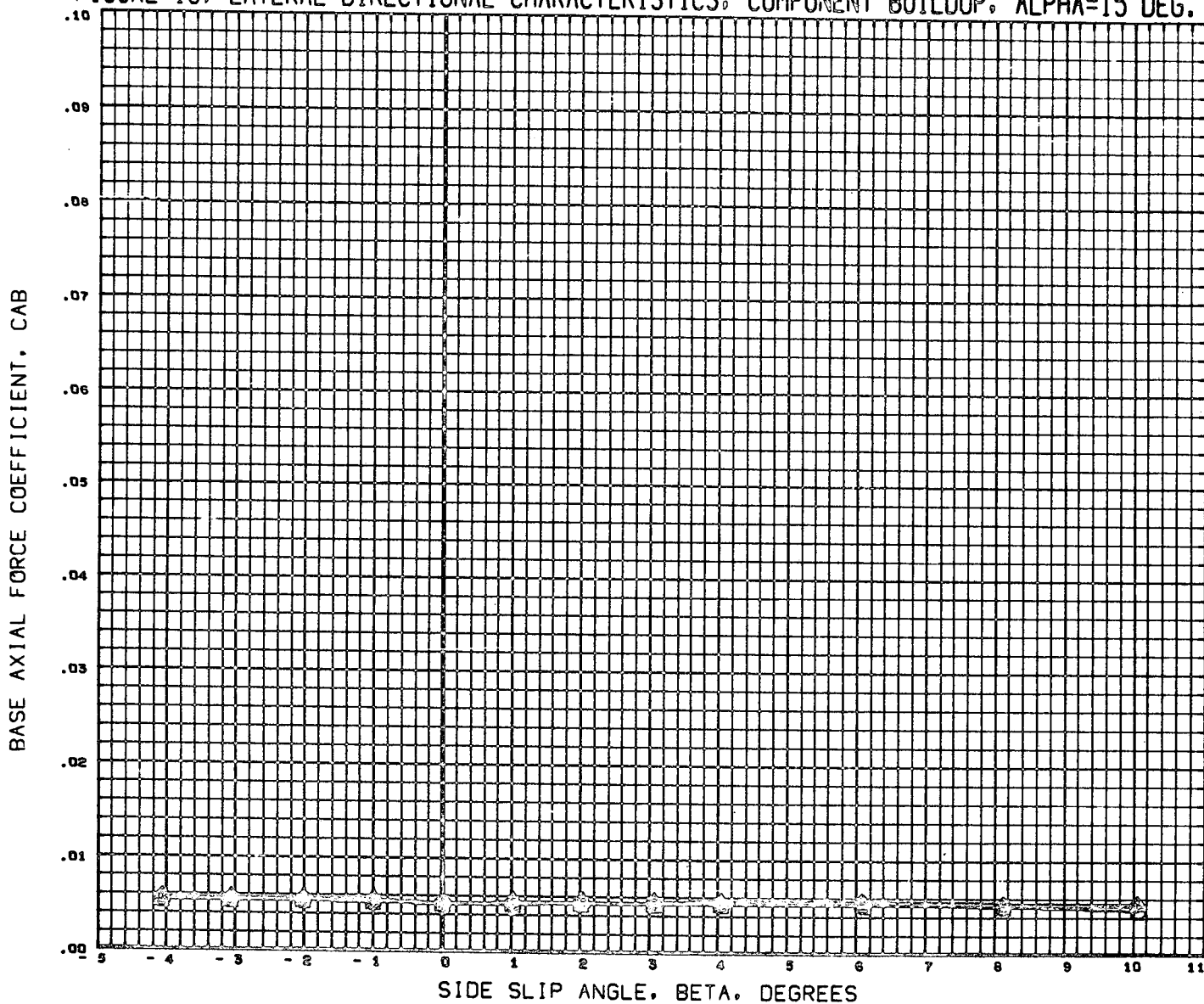
ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000			SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	LREF 5.4530 IN
0.000	0.000	30.000	-30.000	BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

MACH 3.48

PAGE 189



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



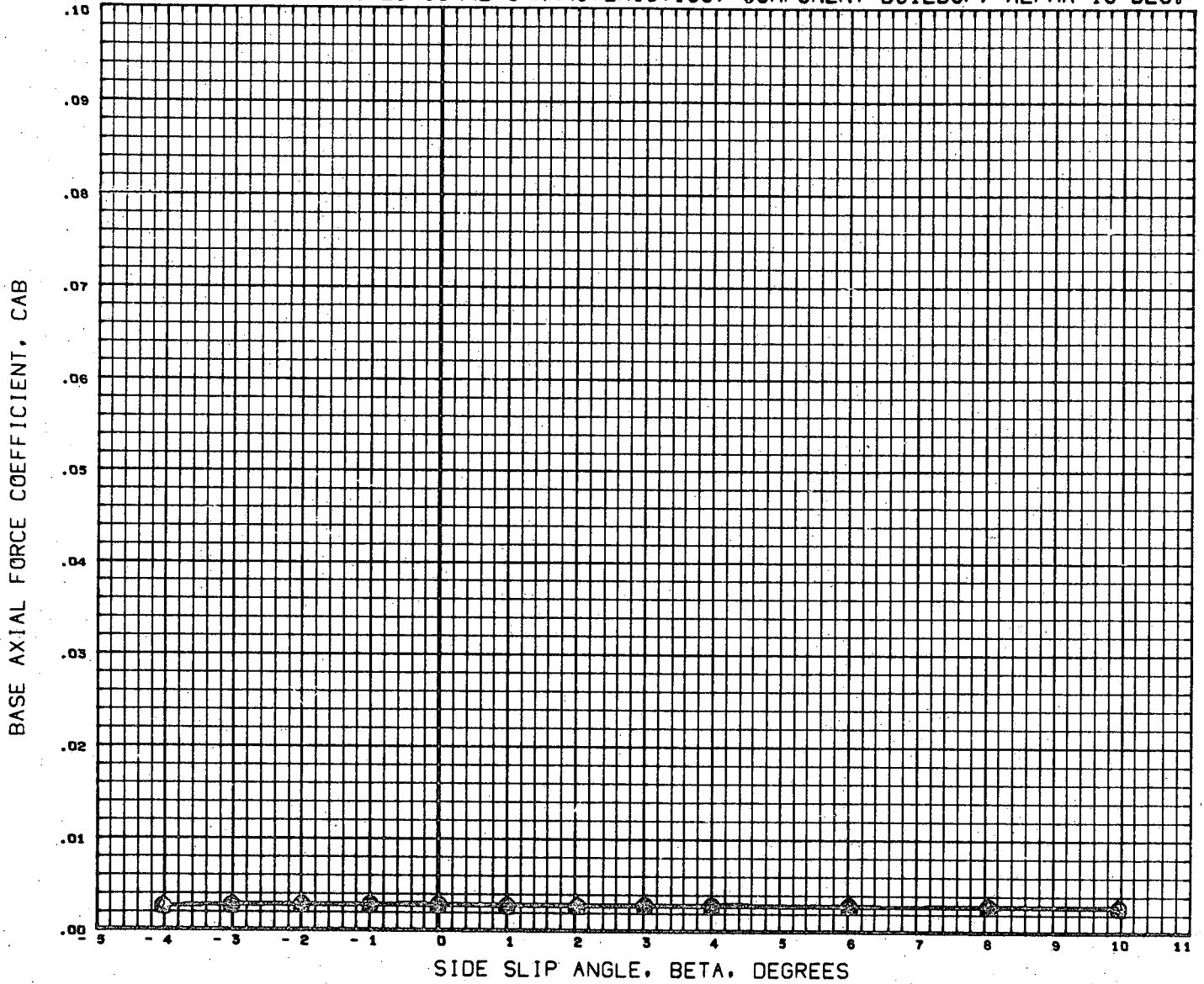
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49012) ○	MSFC 507 GAC H-33 ORB. 85W4
(A49011) △	MSFC 507 GAC H-33 ORB. 85W4V5
(A49010) ◇	MSFC 507 GAC H-33 ORB. 85W4V5 (°30, -30)

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
0.000	0.000			SREF	7.8970 SQ. IN
0.000	0.000			LREF	5.4530 IN
0.000	0.000	0.000	0.000	BREF	3.8170 IN
				XMRP	1274.4040 IN.
				YMRP	0.0000 IN.
				ZMRP	391.3004 IN.
				SCALE	0.0034

MACH 4.00

PAGE 190

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

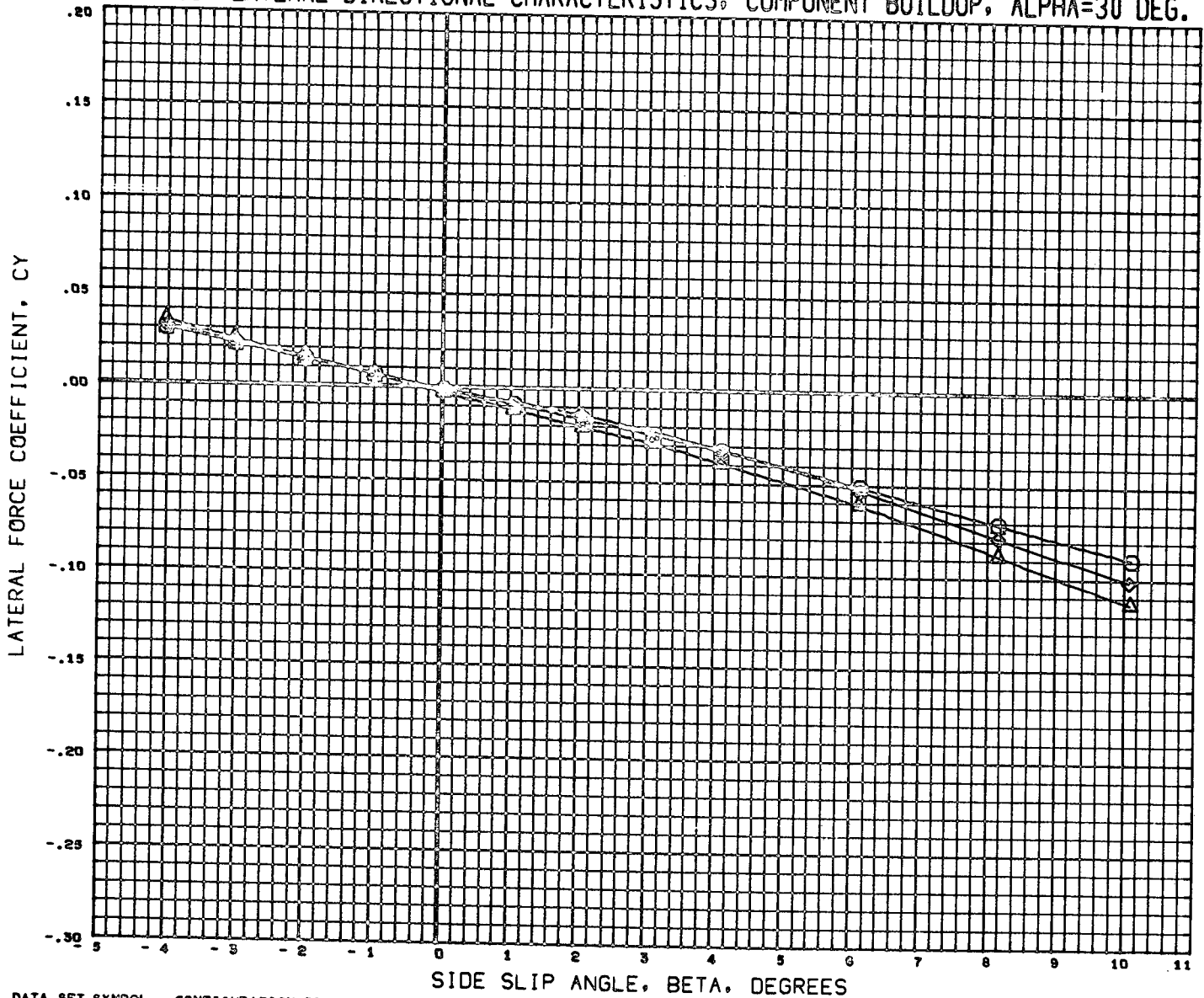


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49D12)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49D11)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49D10)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.96

PAGE 191

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



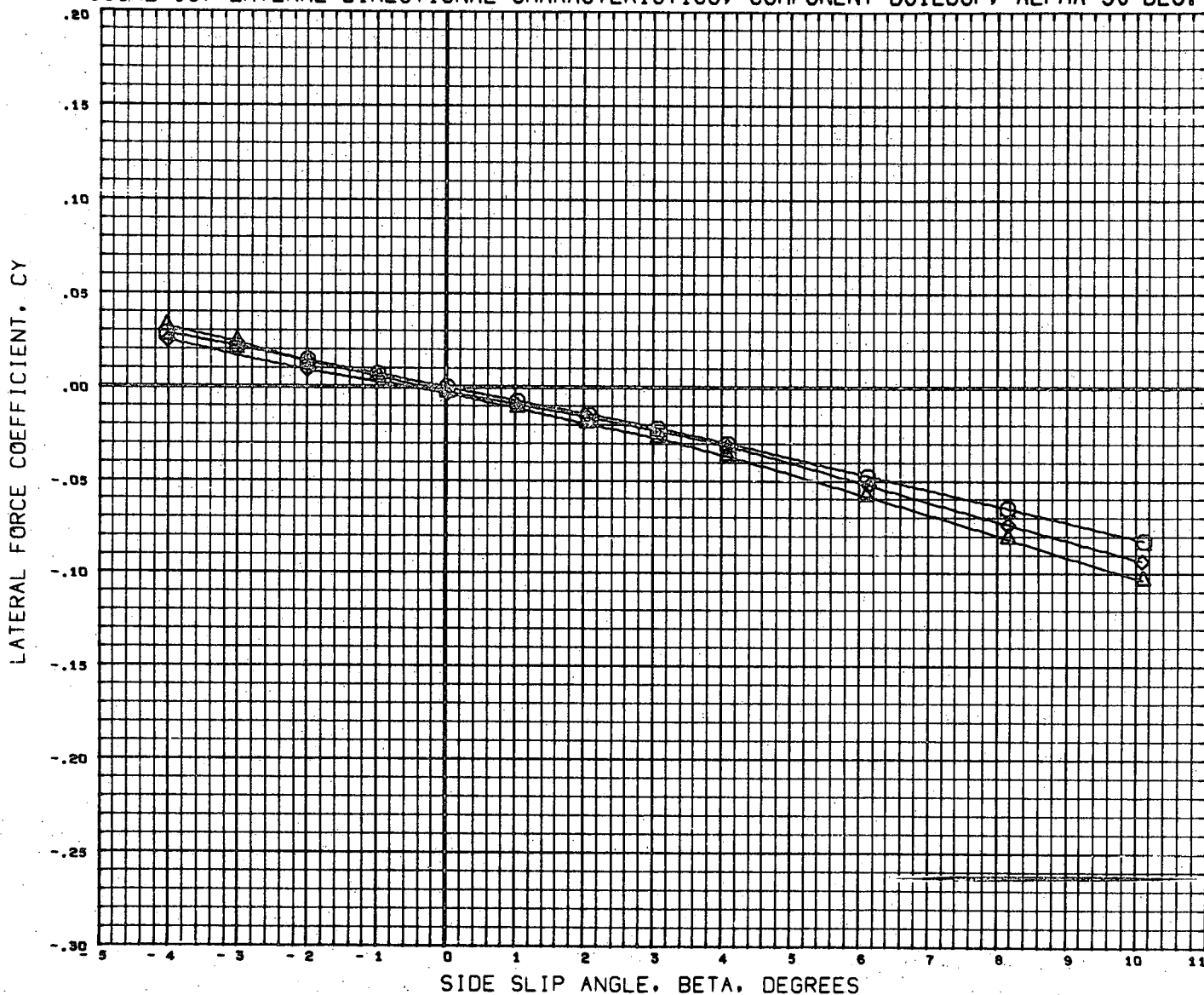
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49027)	MSFC 507 GAC H-33 ORB. B9W4
(A49028)	MSFC 507 GAC H-33 ORB. B9W4V5 (+30, -30)
(A49029)	MSFC 507 GAC H-33 ORB. B9W4V5

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000			SREF 7.8970 SQ. IN
0.000	0.000	30.000	-30.000	LREF 5.4530 IN
0.000	0.000	0.000	0.000	BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

MACH 2.99

PAGE 192

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

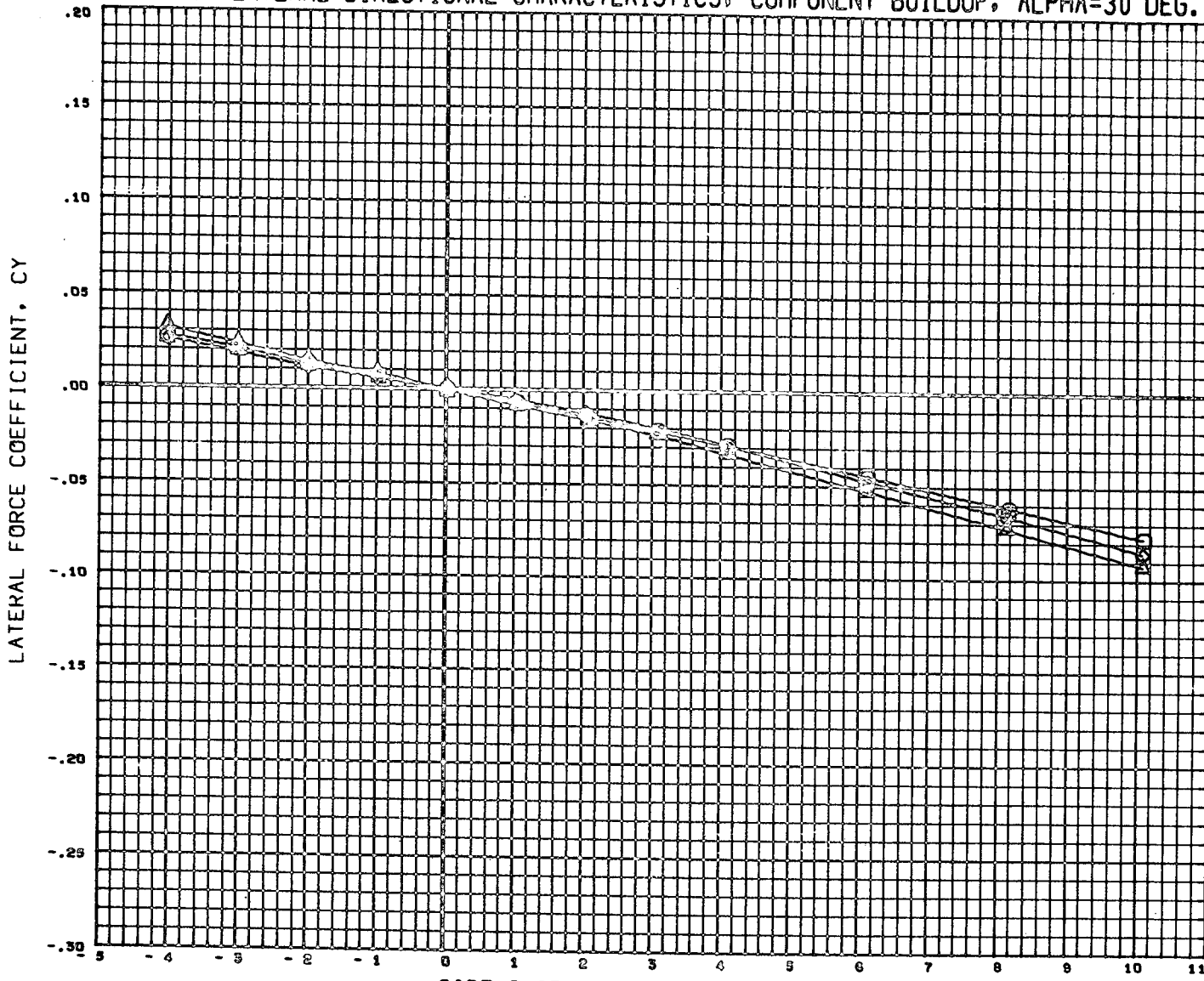


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49027)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49026)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49S25)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 3.48

PAGE 193

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

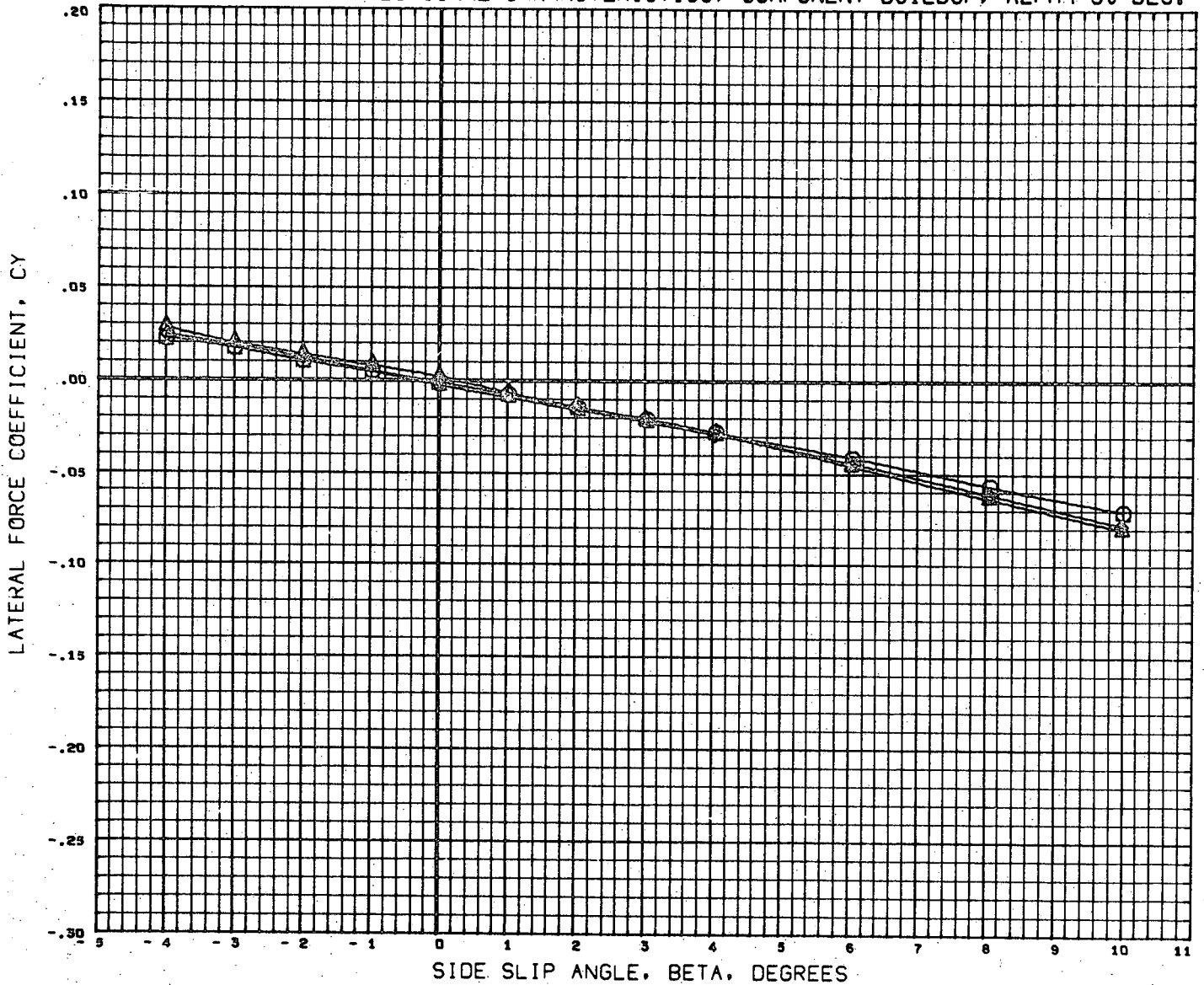


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49027)	MSFC 507 GAC H-33 ORB. B9W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49026)	MSFC 507 GAC H-33 ORB. B9W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49825)	MSFC 507 GAC H-33 ORB. B9W4V5	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.00

PAGE 194

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



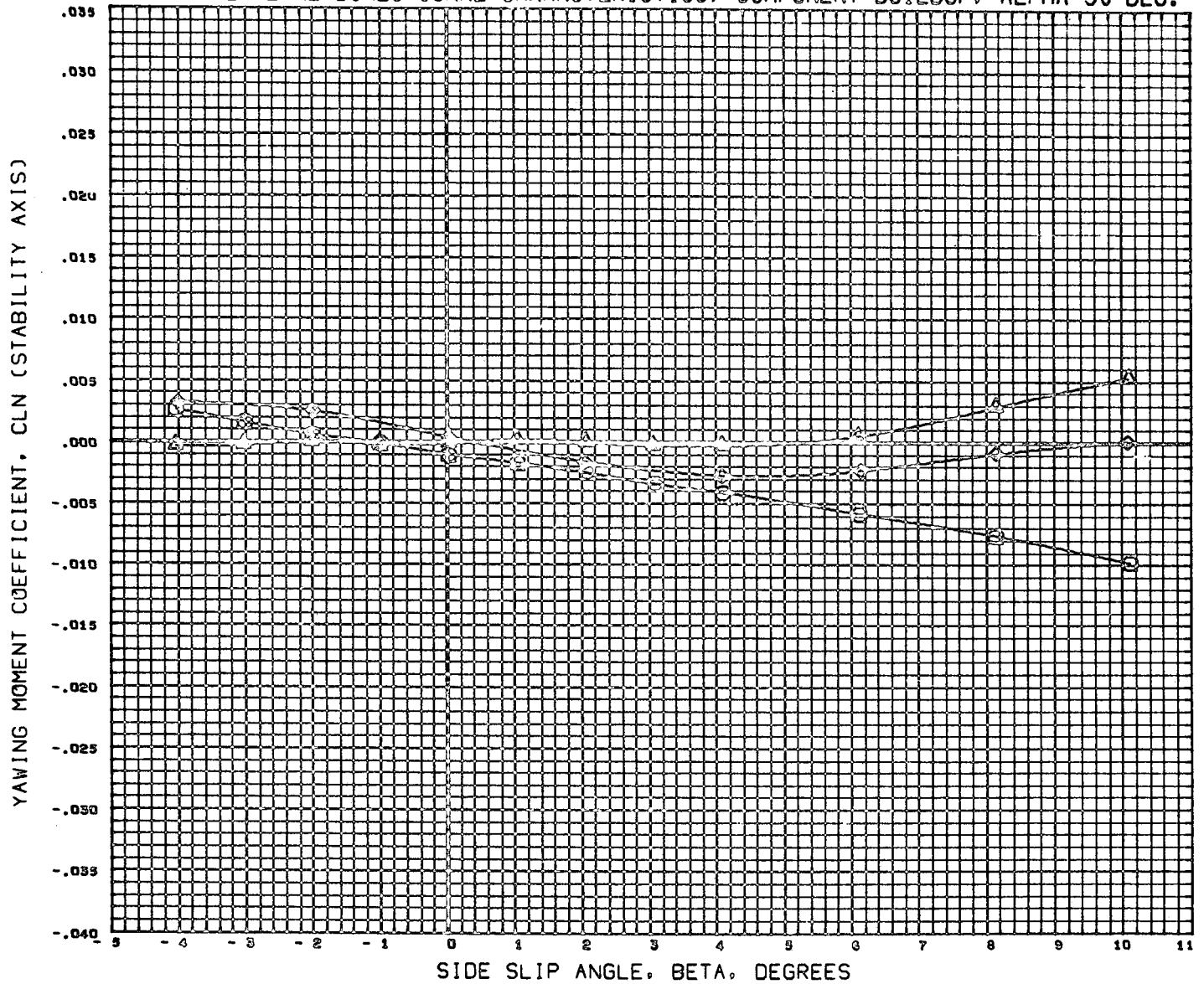
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49027)	MSFC 507 GAC H-33 ORB. B5W4
(A49026)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)
(A49325)	MSFC 507 GAC H-33 ORB. B5W4V5

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000			SREF 7.8970 SQ. IN
0.000	0.000	30.000	-30.000	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

PAGE 195

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

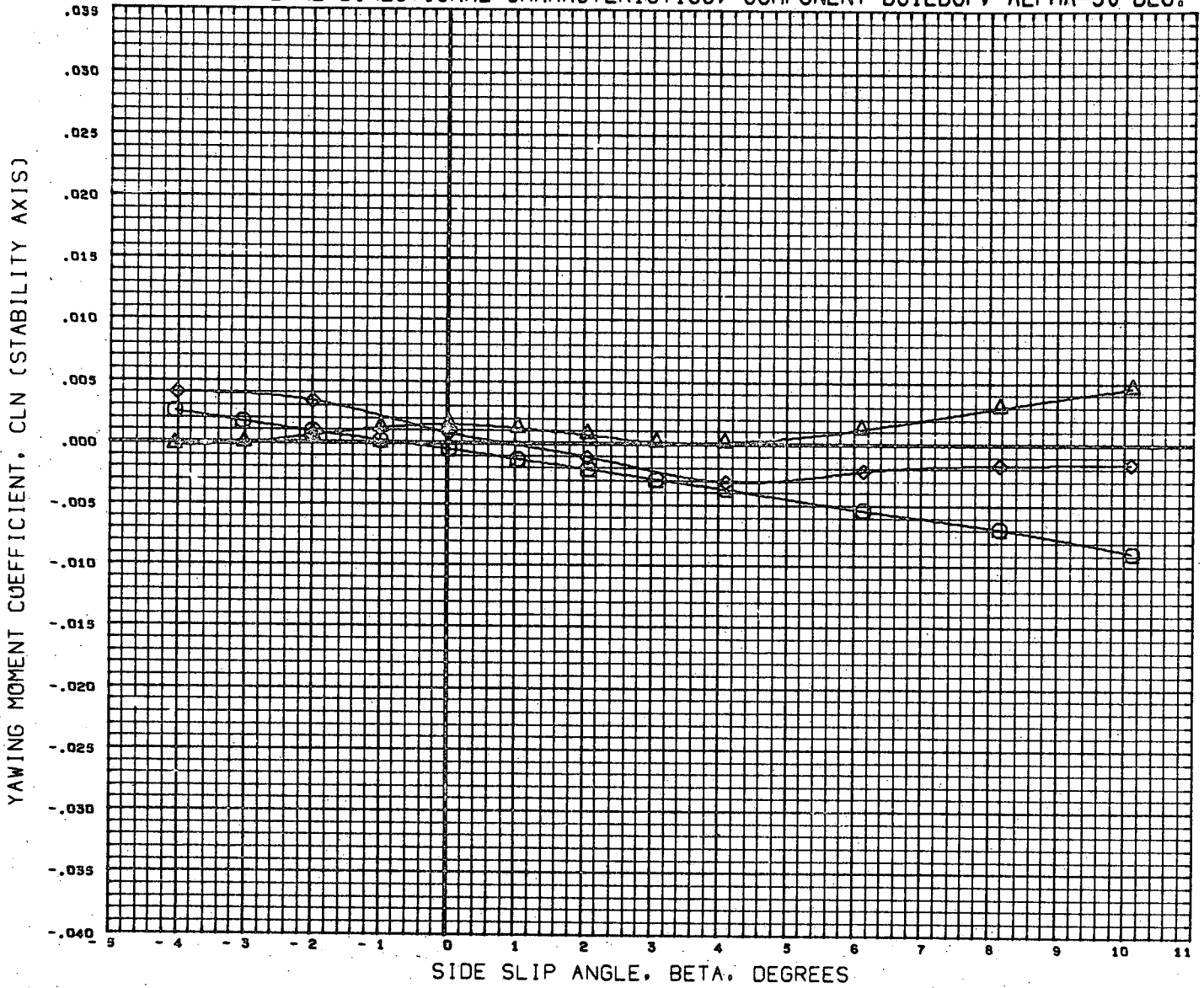


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49027)	MSFC 507 GAC M-33 ORB. 85W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49026)	MSFC 507 GAC M-33 ORB. 85W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49025)	MSFC 507 GAC M-33 ORB. 85W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.99

PAGE 196

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



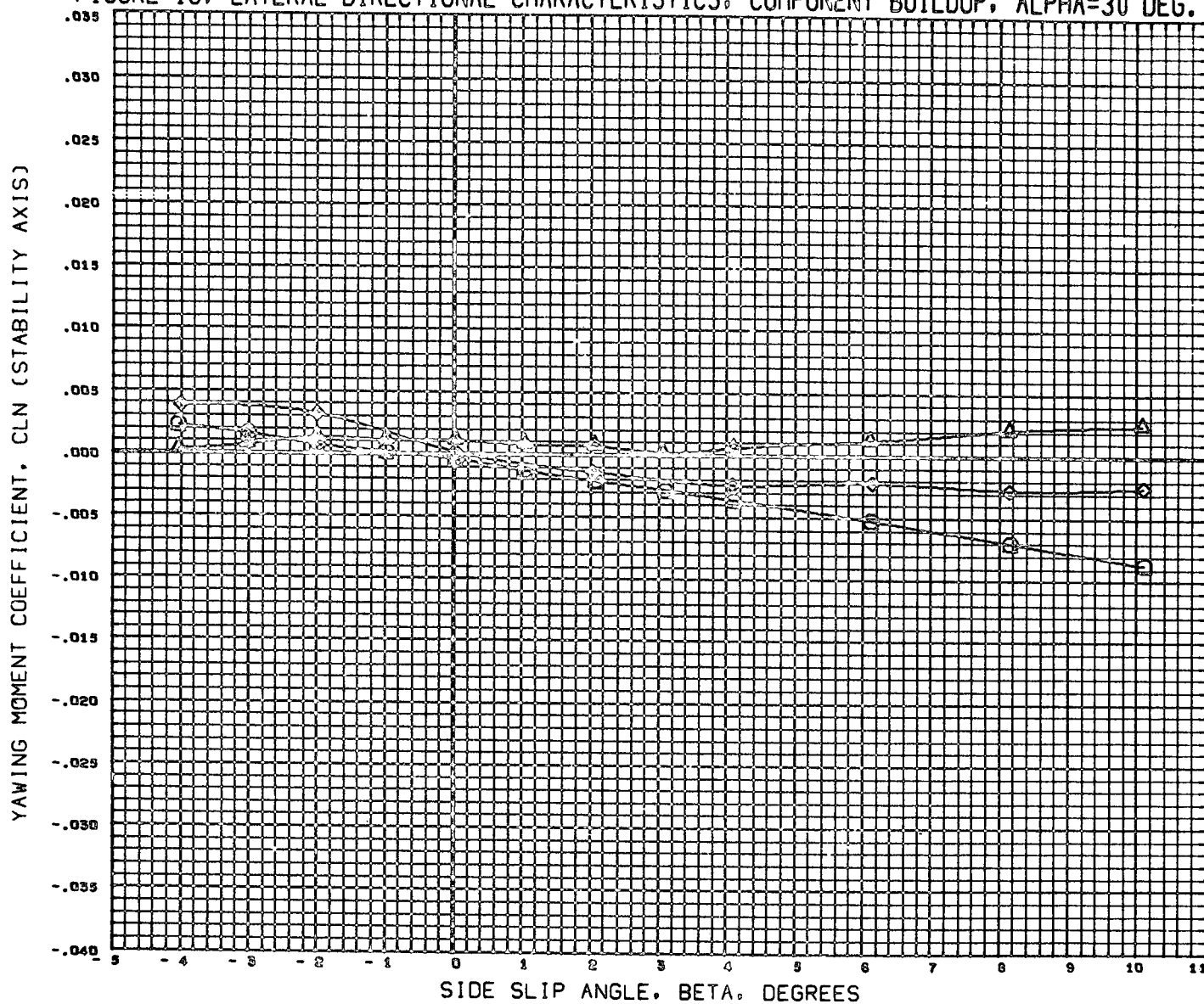
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49027)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49026)	MSFC 307 GAC H-33 ORB. B5W4V5 (+30,-30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49525)	MSFC 307 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 3.48

PAGE 197



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

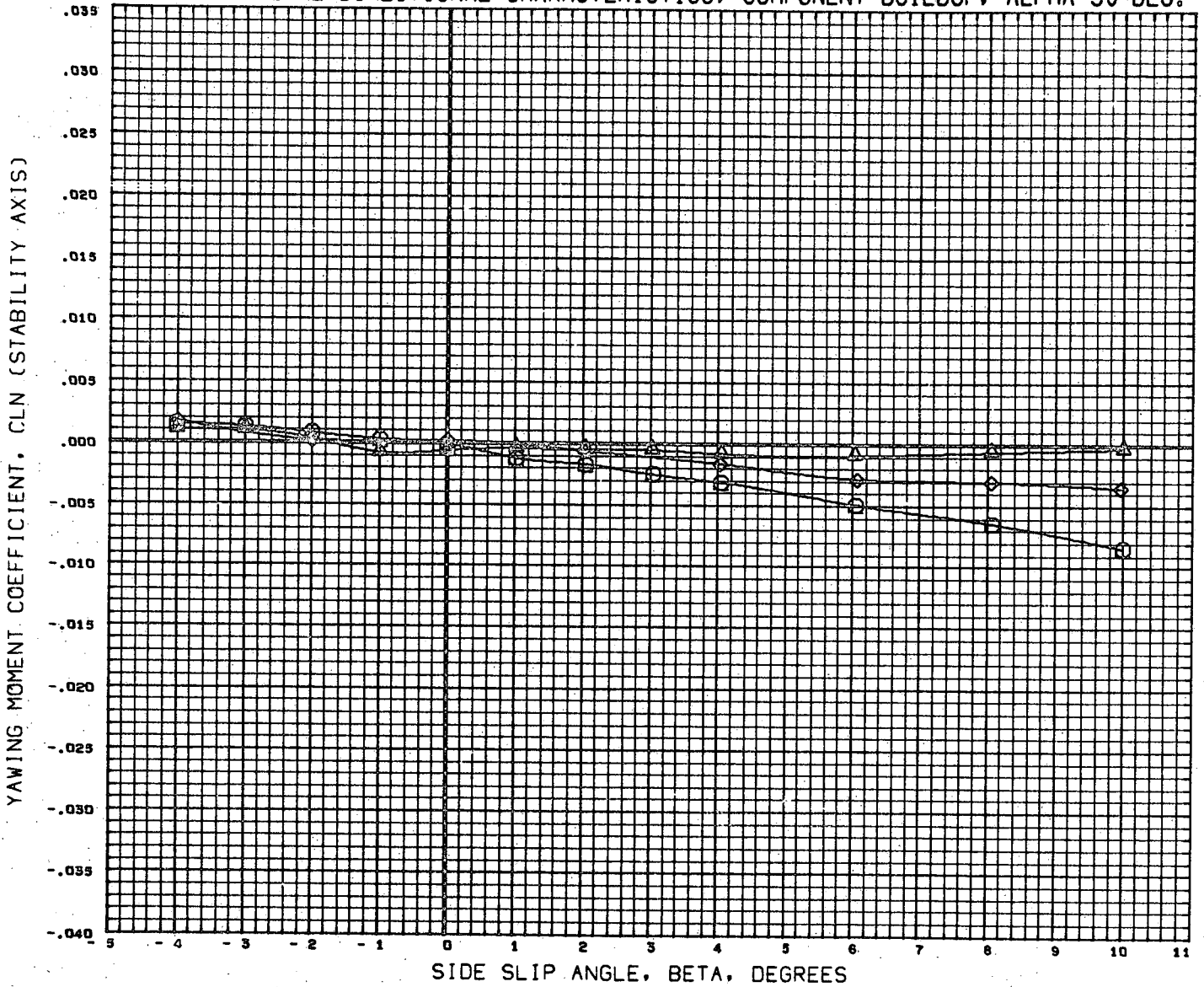


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49027)	MSFC 507 6AC H-33 ORB, B9W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49026)	MSFC 507 6AC H-33 ORB, B9W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49525)	MSFC 507 6AC H-33 ORB, B9W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.00

PAGE 198

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

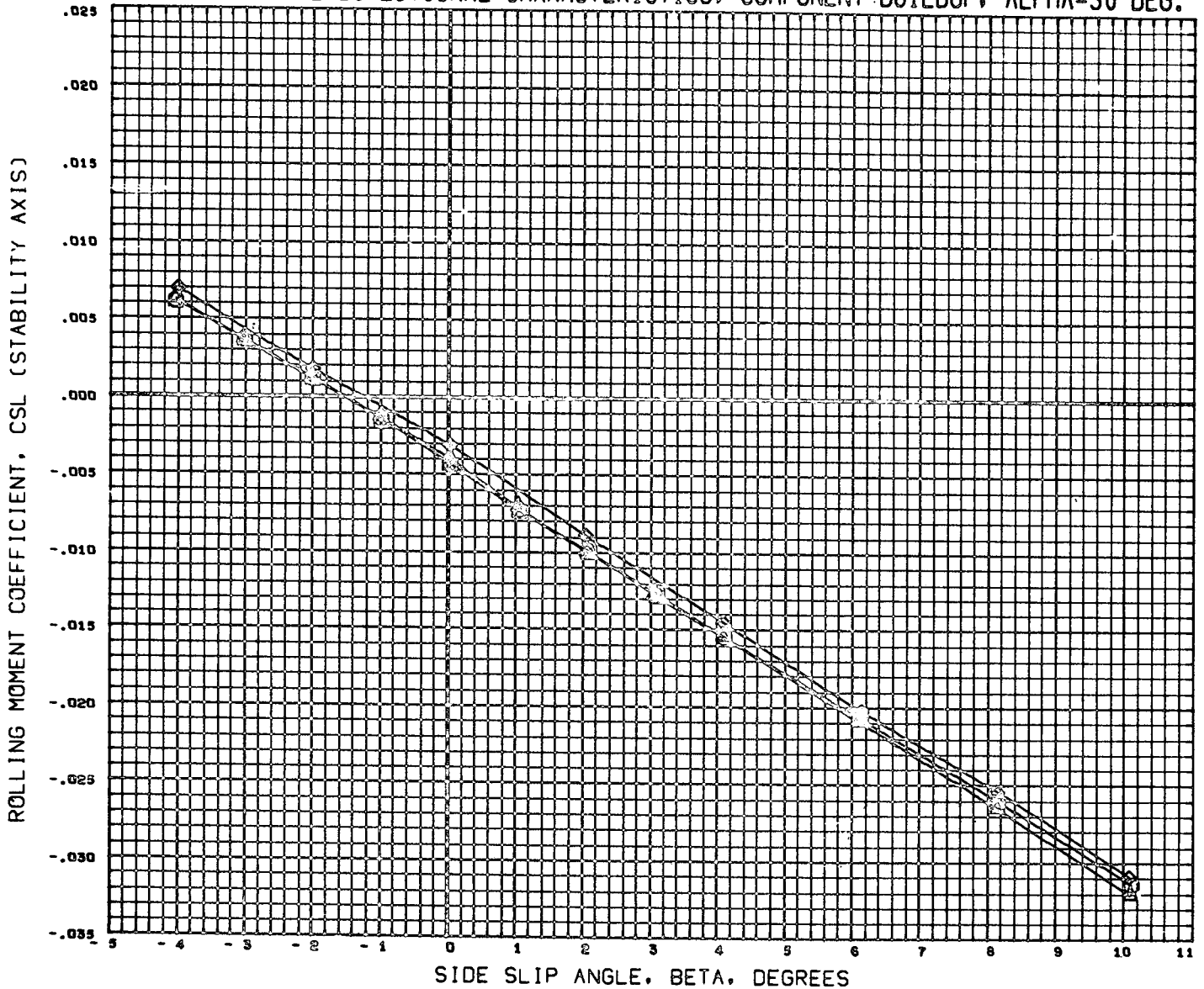


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49027)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ. IN
(A49026)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49025)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 4.96

PAGE 199

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

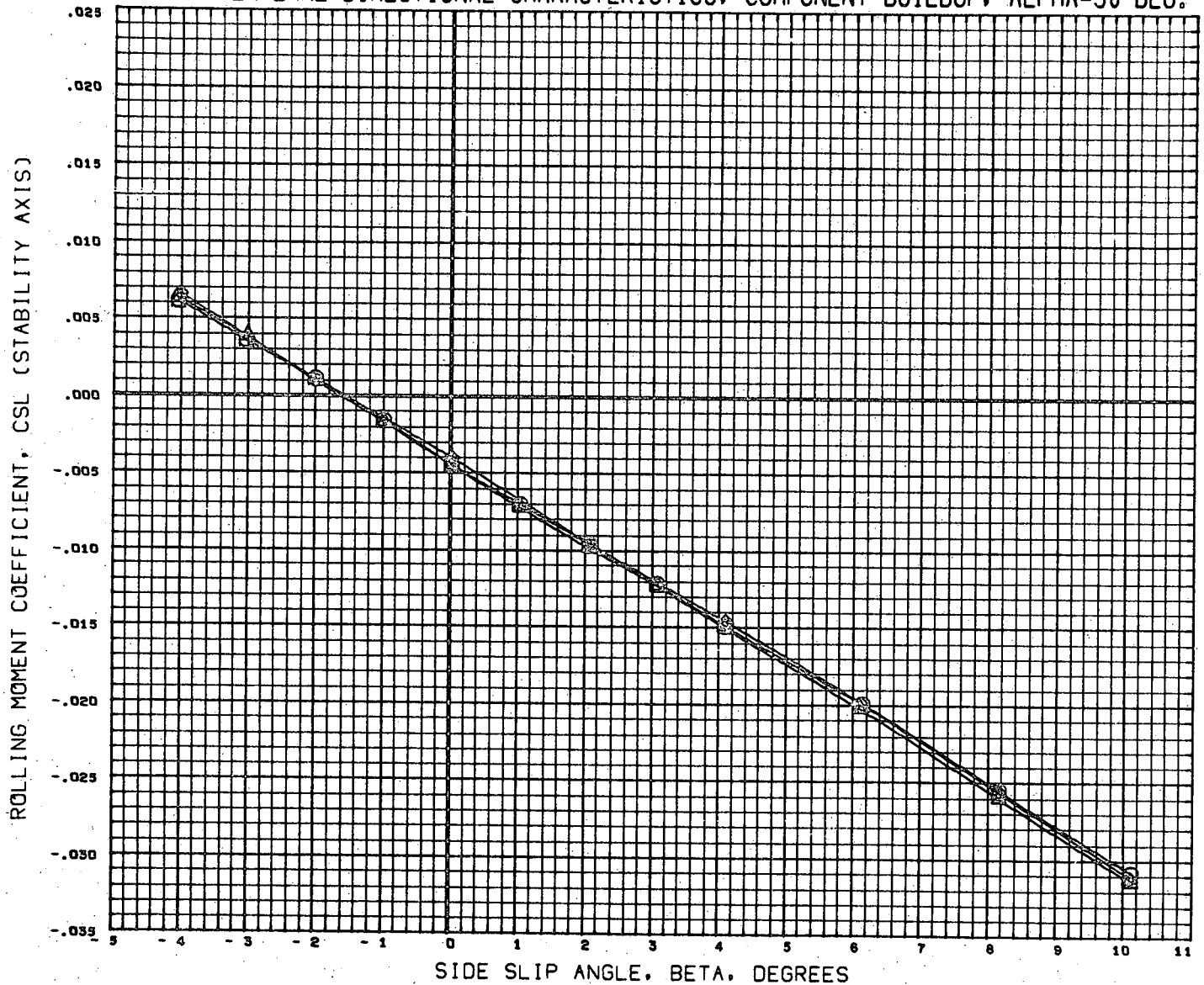


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49021)	MSFC 307 GAC M-33 ORB. B3W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49026)	MSFC 307 GAC M-33 ORB. B3W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49025)	MSFC 307 GAC M-33 ORB. B3W4V5	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 2.99

PAGE 200

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

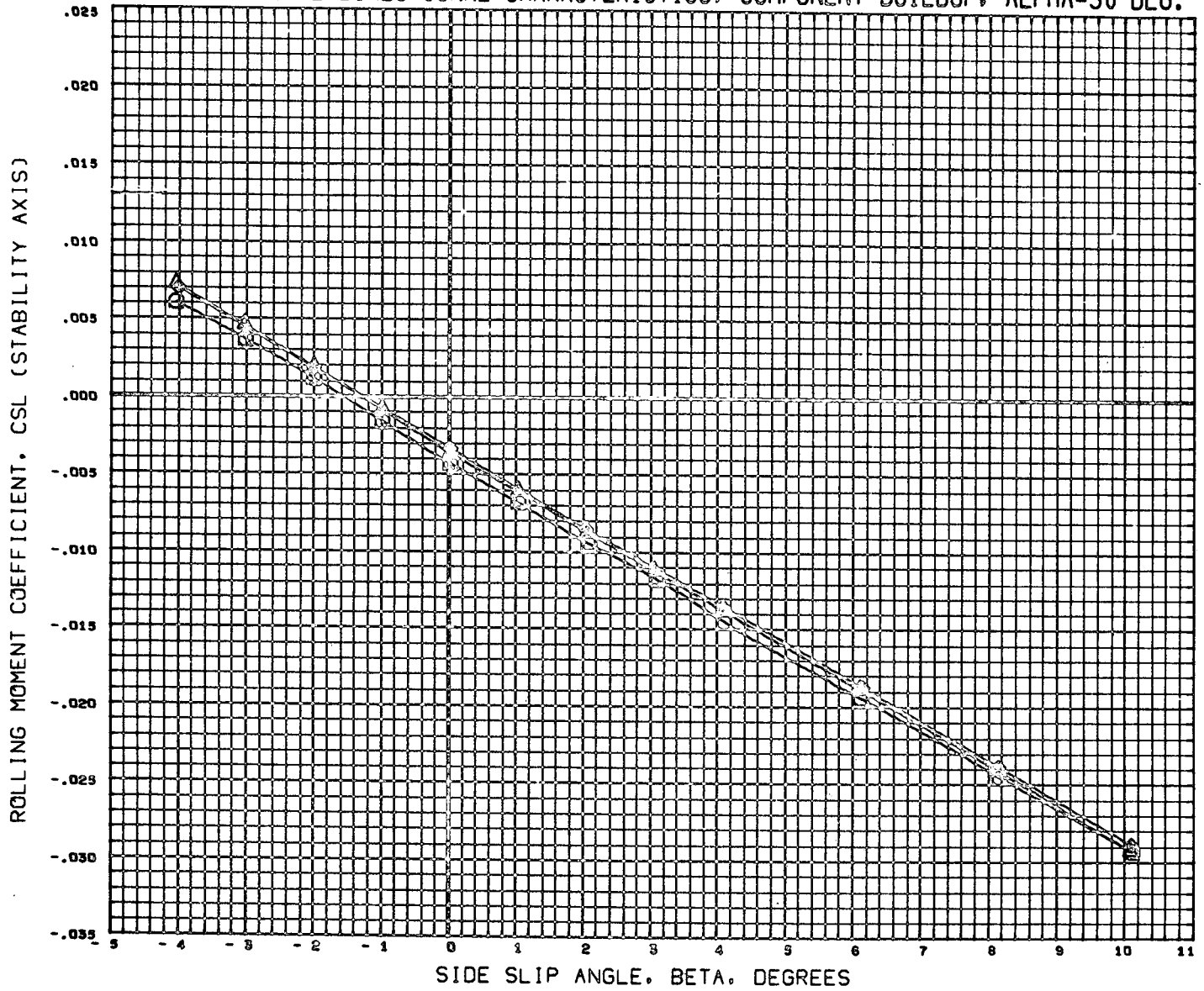


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49027)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ.IN
(A49026)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49S25)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 3.48

PAGE 201

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

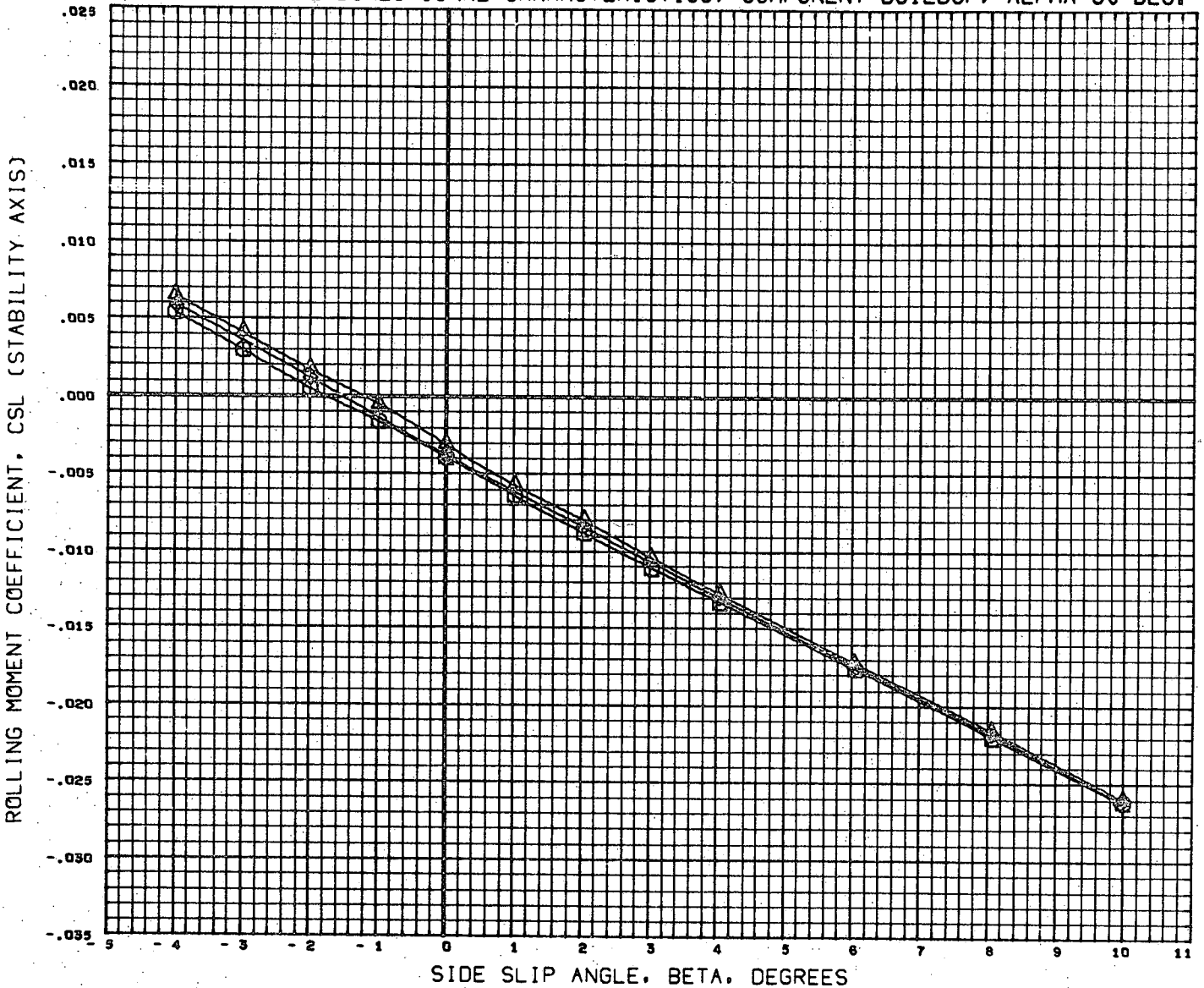


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49027)	MSFC 507 6AC H-33 ORB. B5W4	0.000	0.000	0.000	0.000	SREF 7.8970 SQ. IN
(A49026)	MSFC 507 6AC H-33 ORB. B5W4V9 (+30,-30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49025)	MSFC 507 6AC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.00

PAGE 202

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

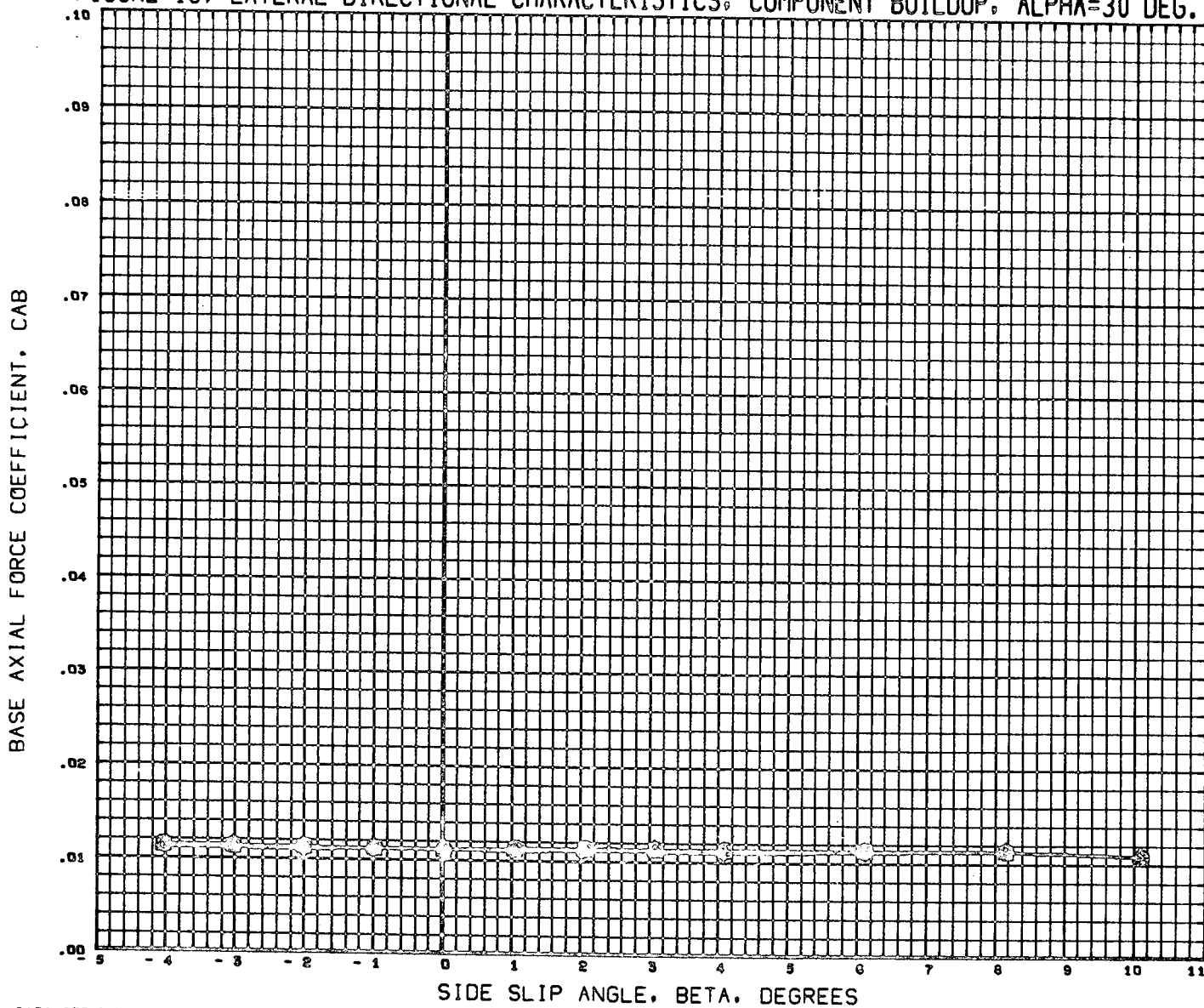


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49027)	HSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49026)	HSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49025)	HSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.96

PAGE 203

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

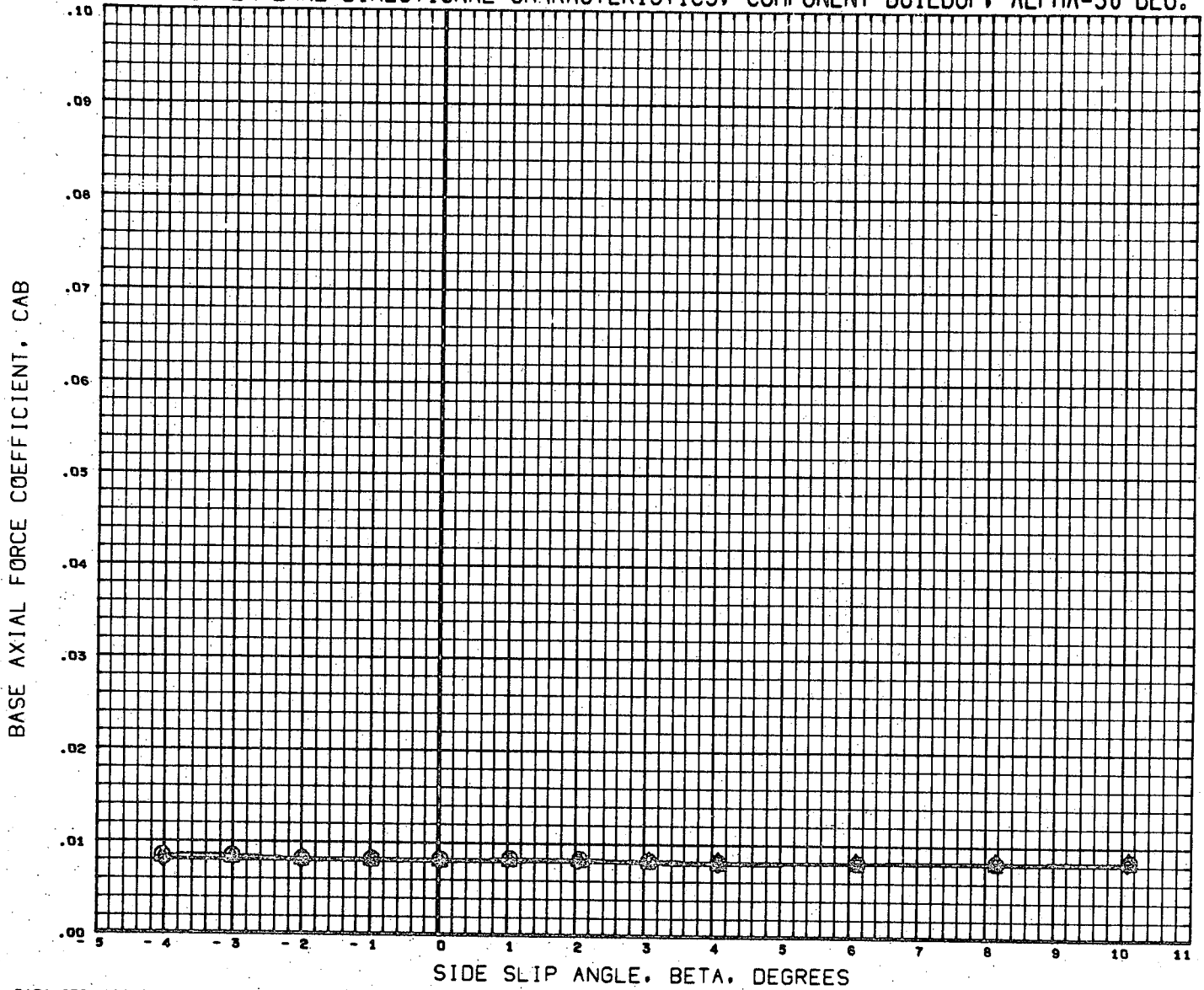


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
(A49027)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF	7.8970 SQ.IN
(A49026)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF	5.4530 IN
(A49925)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF	3.8170 IN
						XMRP	1274.4040 IN.
						YMRP	0.0000 IN.
						ZMRP	391.3004 IN.
						SCALE	0.0034

MACH 2.99

PAGE 204

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



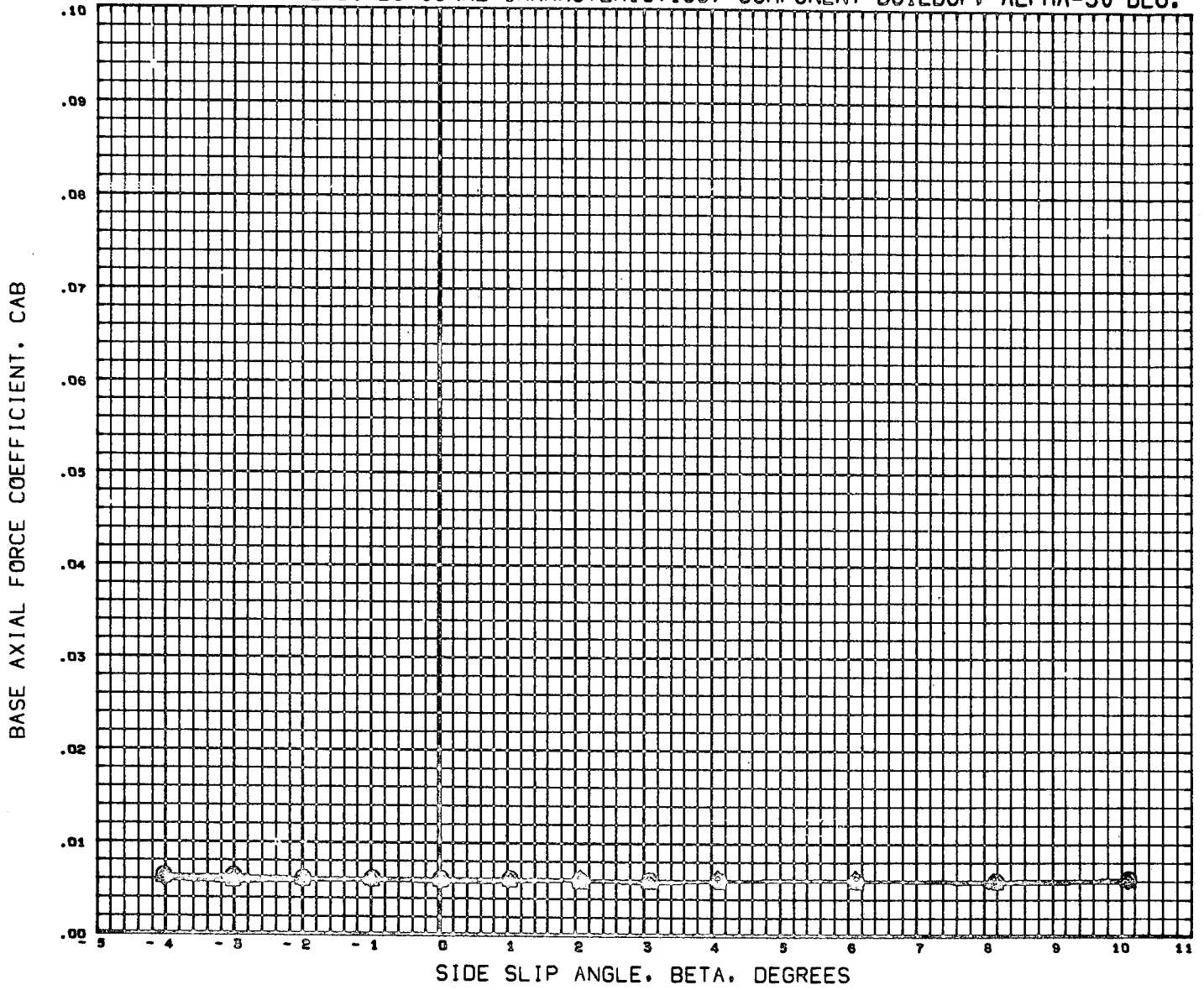
DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49027)	MSFC 507 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49026)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49825)	MSFC 507 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 3.48

PAGE 205



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

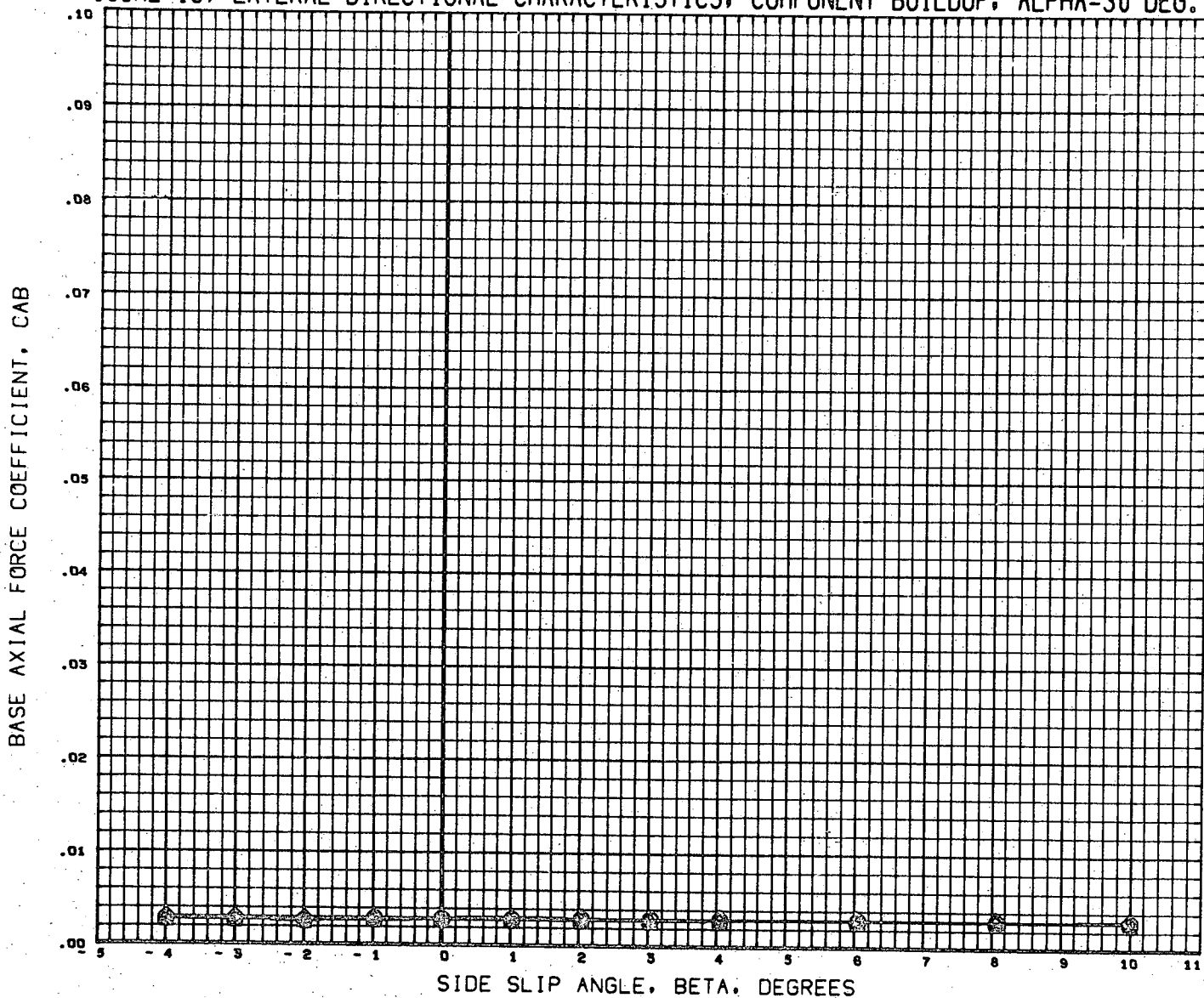


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49027)	MSFC 907 GAC H-33 ORB. B9W4	0.000	0.000			SREF 7.8970 SQ.IN
(A49026)	MSFC 907 GAC H-33 ORB. B9W4V3 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49825)	MSFC 907 GAC H-33 ORB. B9W4V3	0.000	0.000	0.000	0.000	BREF 3.8170 IN XMRP 1274.4040 IN. YMRP 0.0000 IN. ZMRP 391.3004 IN. SCALE 0.0034

MACH 4.00

PAGE 206

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

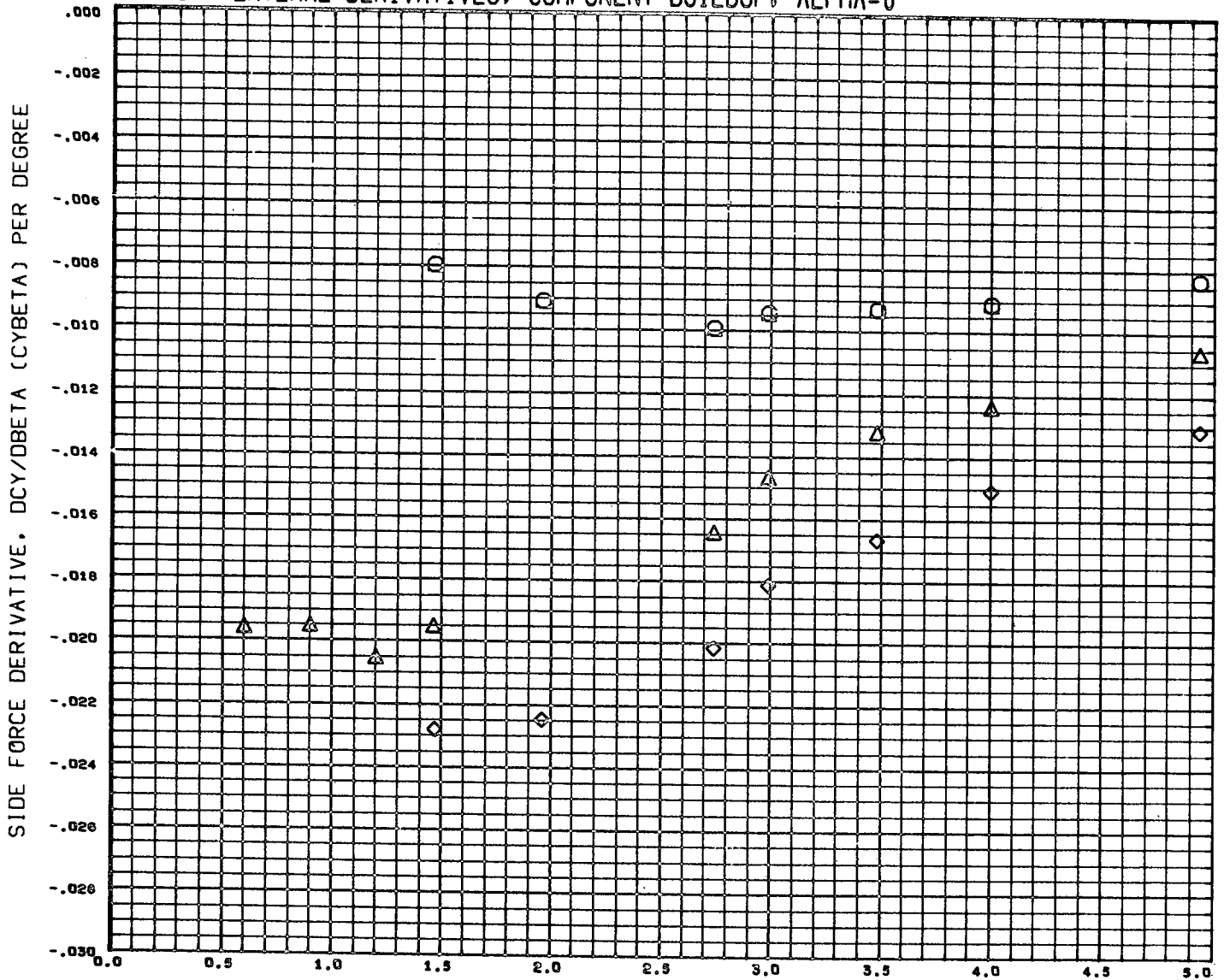


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49027)	MSFC 307 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49026)	MSFC 307 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	LREF 5.4530 IN
(A49325)	MSFC 307 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

MACH 4.96

PAGE 207

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

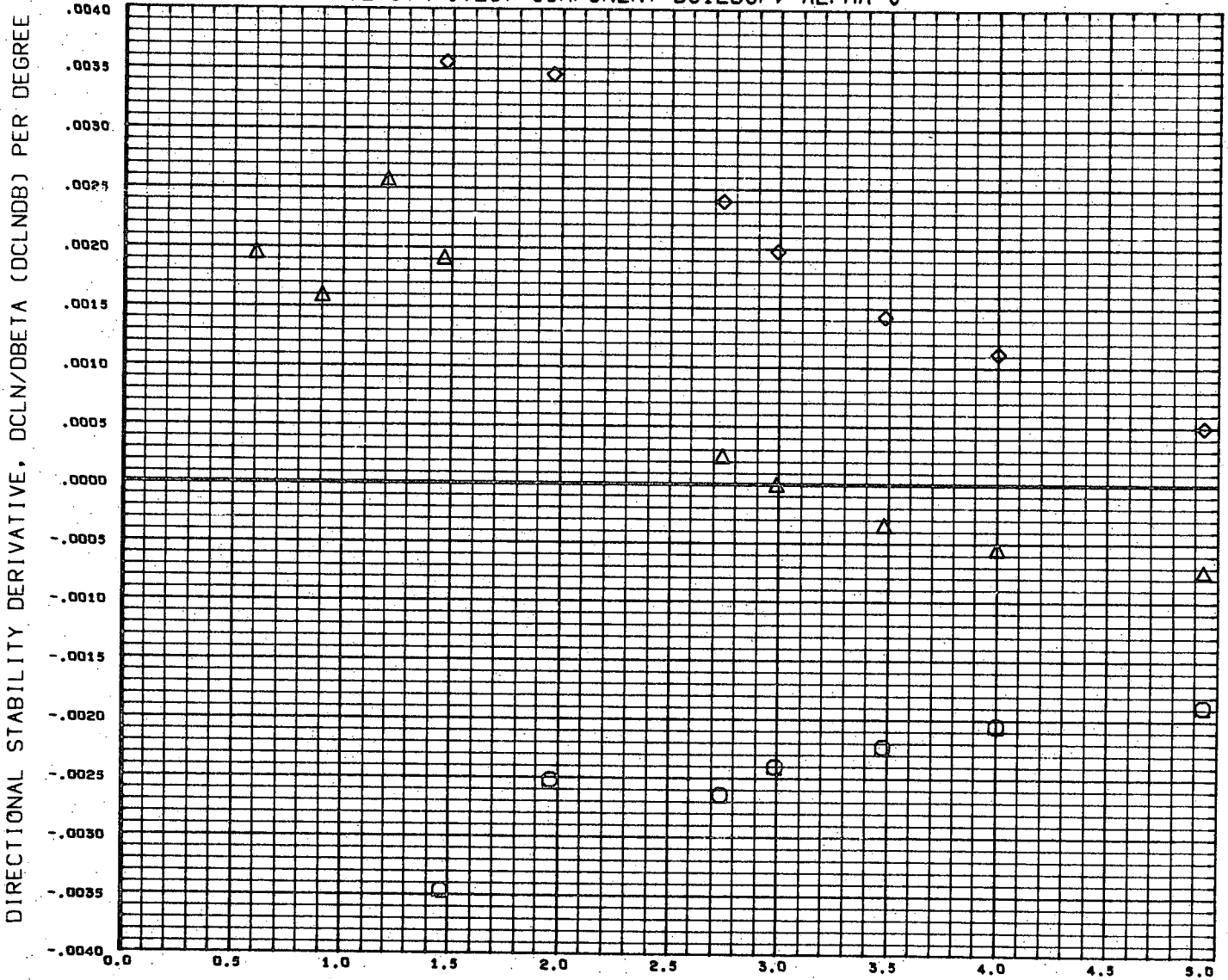


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49M14)	MSFC 507 GAC M-33 ORB. B9W4
(A49M15)	MSFC 507 GAC M-33 ORB. B9W4V3
(A49M16)	MSFC 507 GAC M-33 ORB. B9W4V5 (+30, -30)

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000			SREF 7.8970 SQ. IN
0.000	0.000			LREF 5.4530 IN
0.000	0.000	30.000	-30.000	BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

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

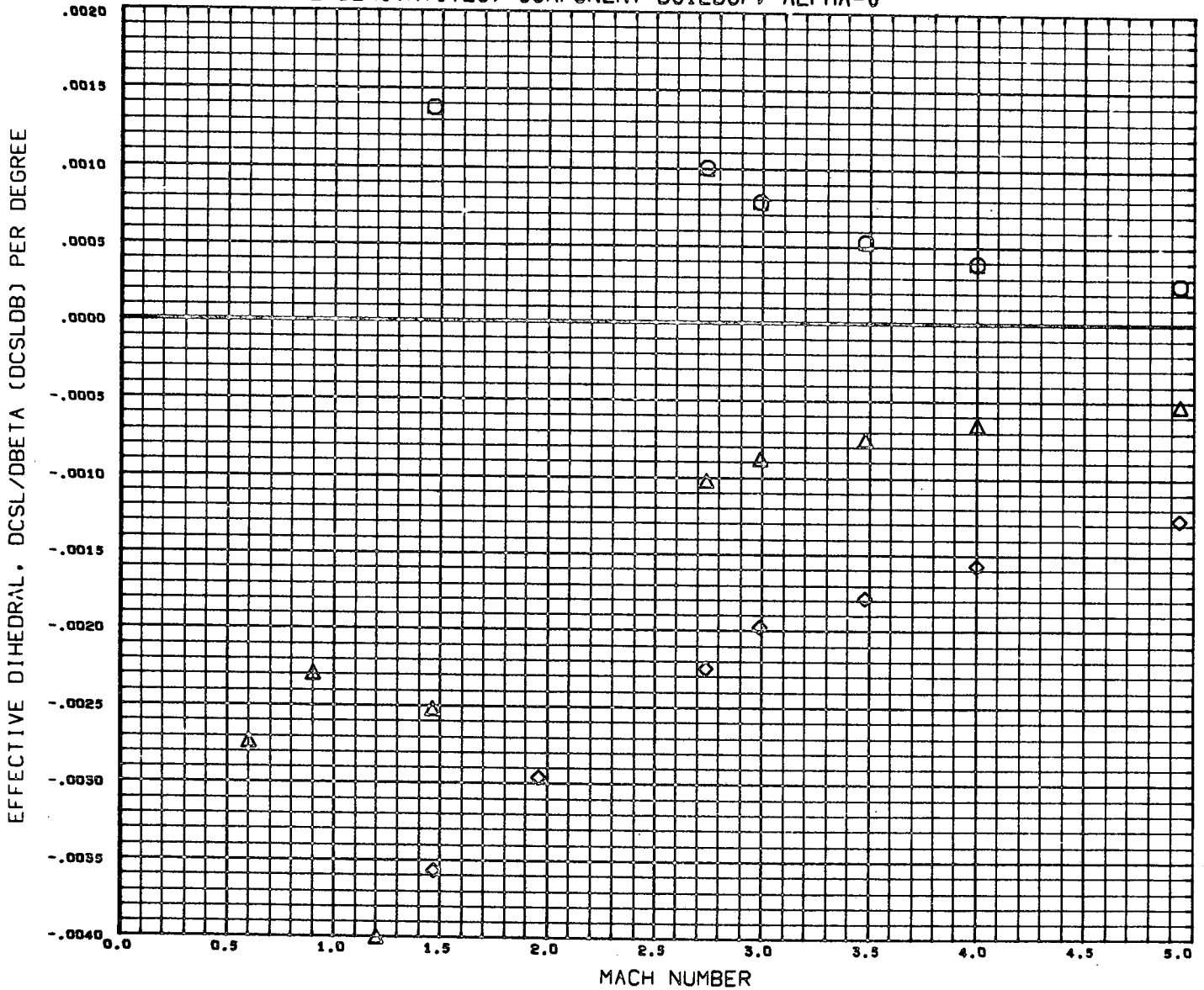


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49M14) ○	MSFC 507 GAC H-33 ORB. B5W4
(A49M15) △	MSFC 507 GAC H-33 ORB. B5W4V5
(A49M16) ◇	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
0.000	0.000			SREF	7.8970 SQ. IN
0.000	0.000			LREF	5.4530 IN
0.000	0.000	0.000	0.000	BREF	3.8170 IN
				XMRP	1274.4040 IN.
		30.000	-30.000	YMRP	0.0000 IN.
				ZMRP	391.3004 IN.
				SCALE	0.0034

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

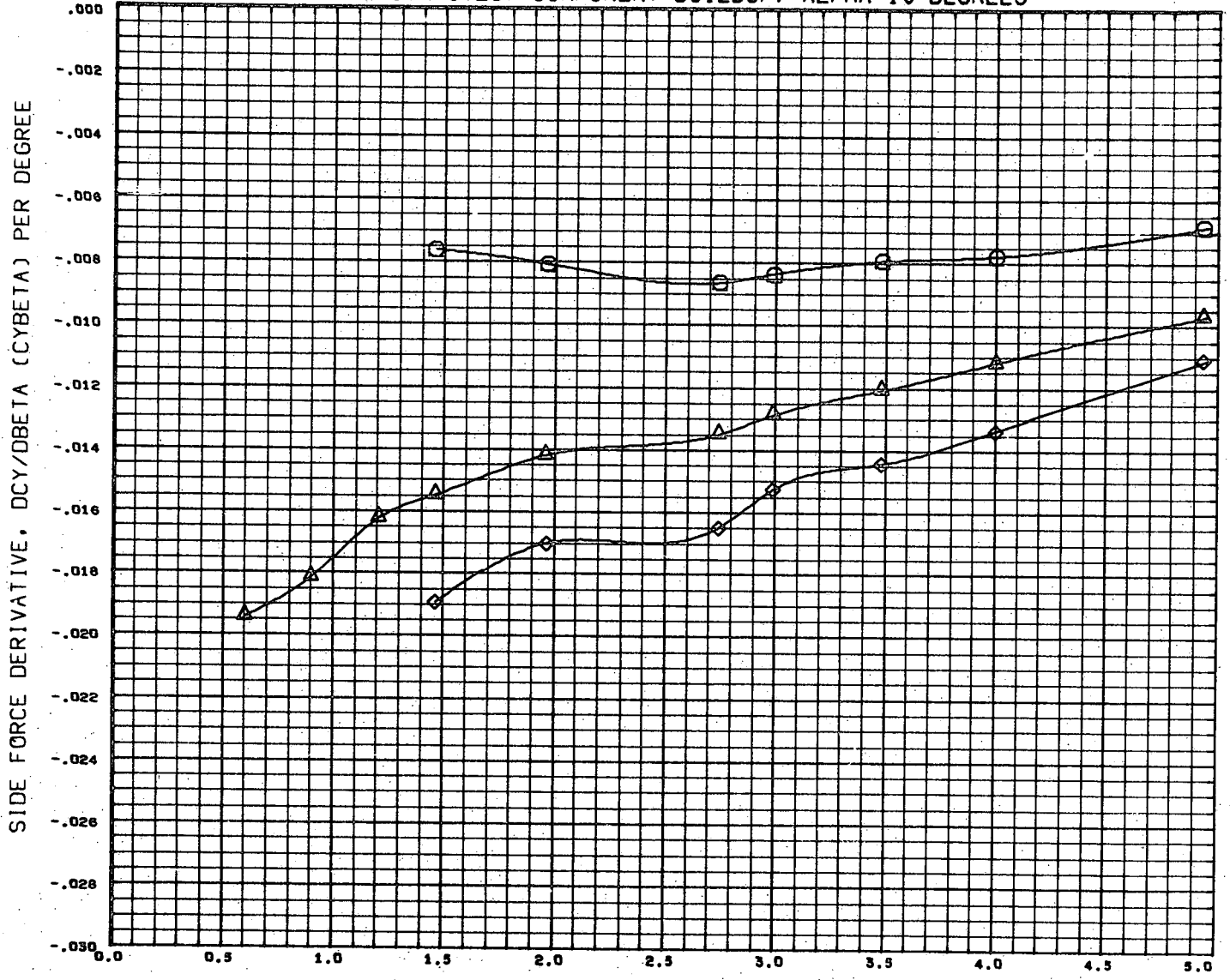


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49N14)	MSFC 507 GAC H-33 ORB. B5W4
(A49N15)	MSFC 507 GAC H-33 ORB. B5W4V3
(A49N16)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000			SREF 7.8970 SQ.IN
0.000	0.000			LREF 5.4530 IN
0.000	0.000	0.000	0.000	BREF 3.8170 IN
		30.000	-30.000	XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

0.5

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

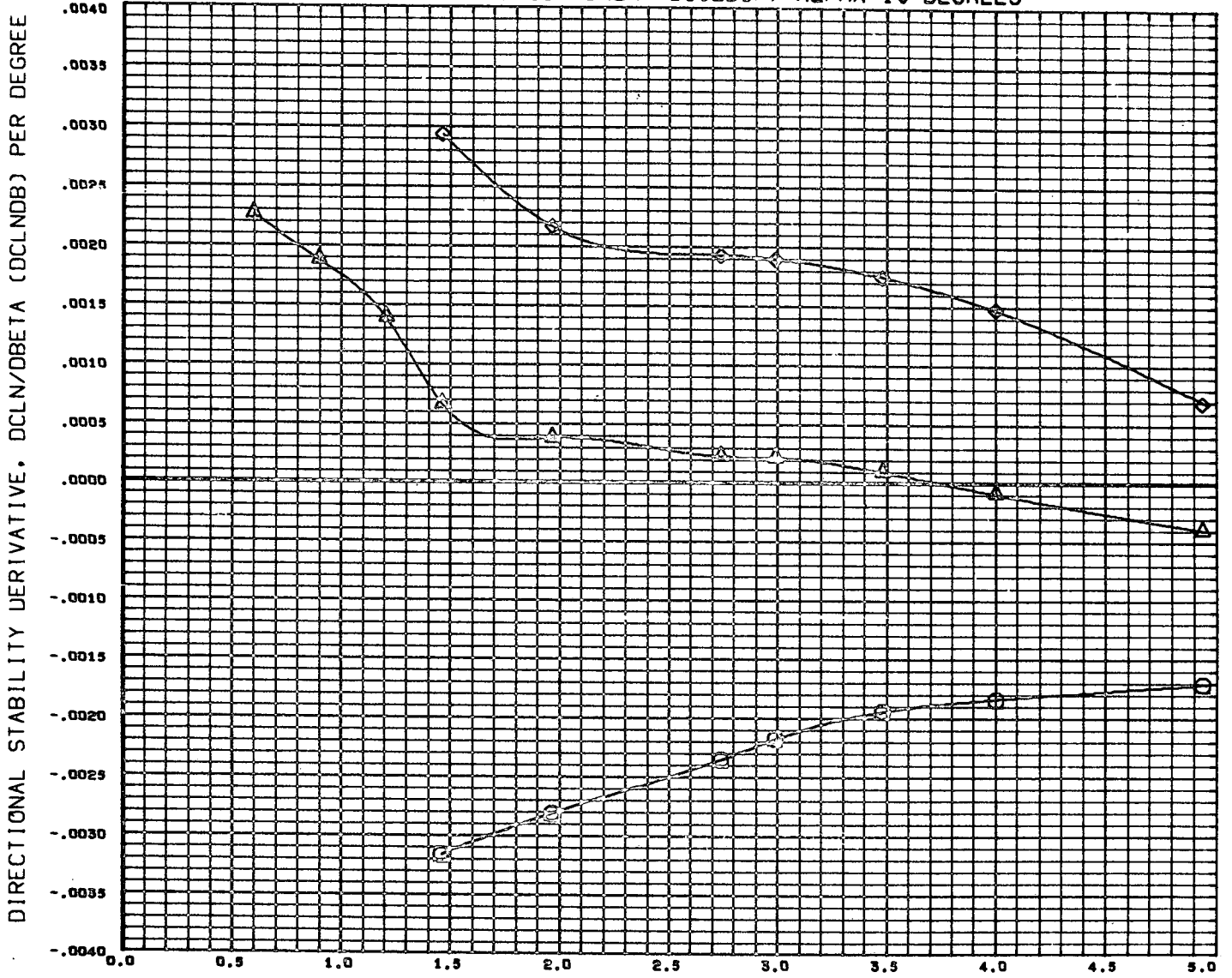


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49M13)	MSFC 507 GAC H-33 ORB. B5W4
(A49O29)	MSFC 507 GAC H-33 ORB. B5W4V5
(A49M09)	MSFC 507 GAC H-33 ORB. B5W4V5(+30, -30)

MACH NUMBER

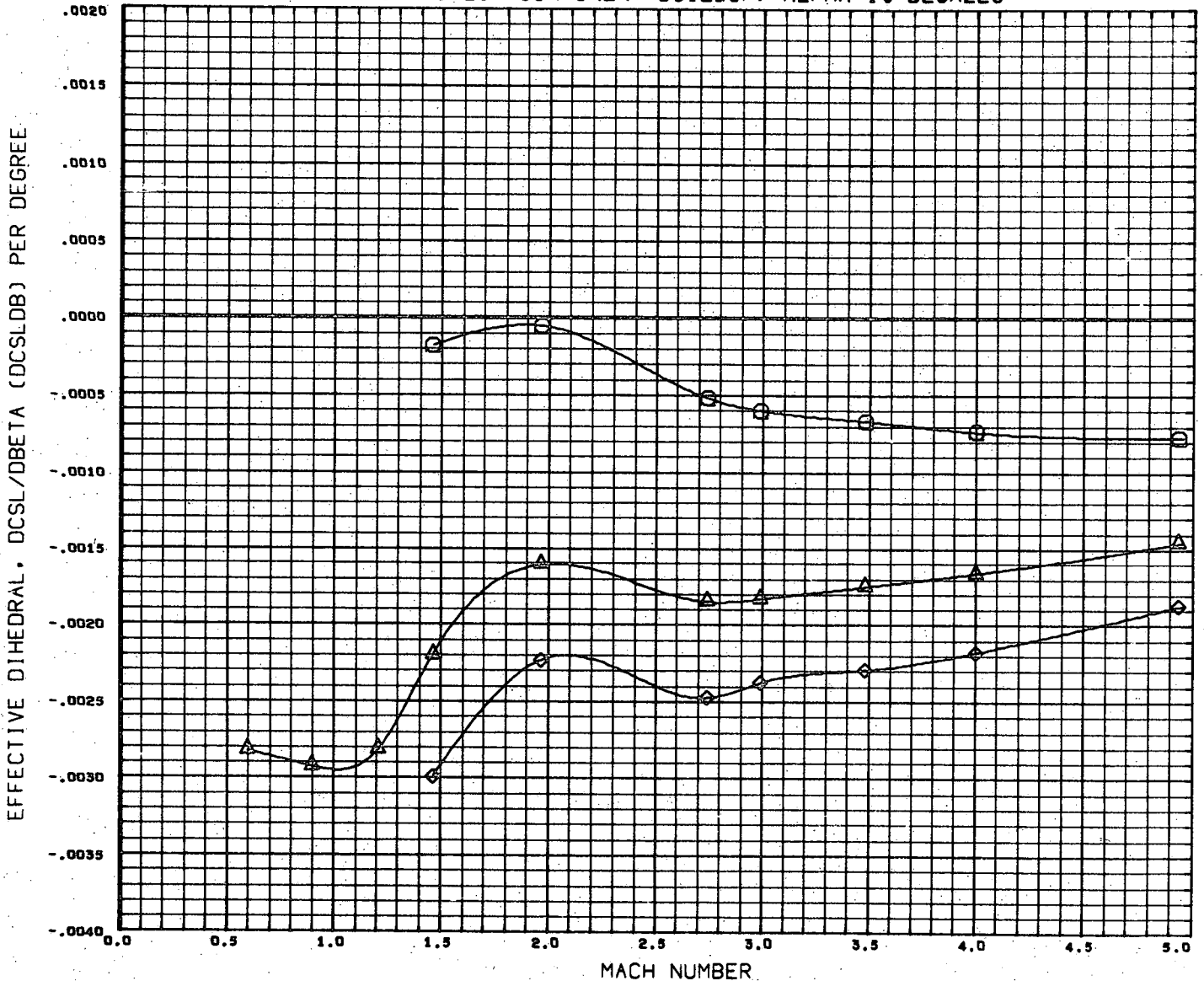
ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000			SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	LREF 5.4530 IN
0.000	0.000	30.000	-30.000	BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
(A49M13)	MSFC 907 GAC H-33 ORB. B5W4	0.000	0.000			SREF 7.8970 SQ. IN
(A49O29)	MSFC 907 GAC H-33 ORB. B5W4V5	0.000	0.000	0.000	0.000	LREF 5.4530 IN
(A49M09)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)	0.000	0.000	30.000	-30.000	BREF 3.8170 IN
						XMRP 1274.4040 IN.
						YMRP 0.0000 IN.
						ZMRP 391.3004 IN.
						SCALE 0.0034

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



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49M13)	MSFC 507 GAC H-33 ORB. B5W4
(A49O29)	MSFC 507 GAC H-33 ORB. B5W4V3
(A49M09)	MSFC 507 GAC H-33 ORB. B5W4V3 (+30, -30)

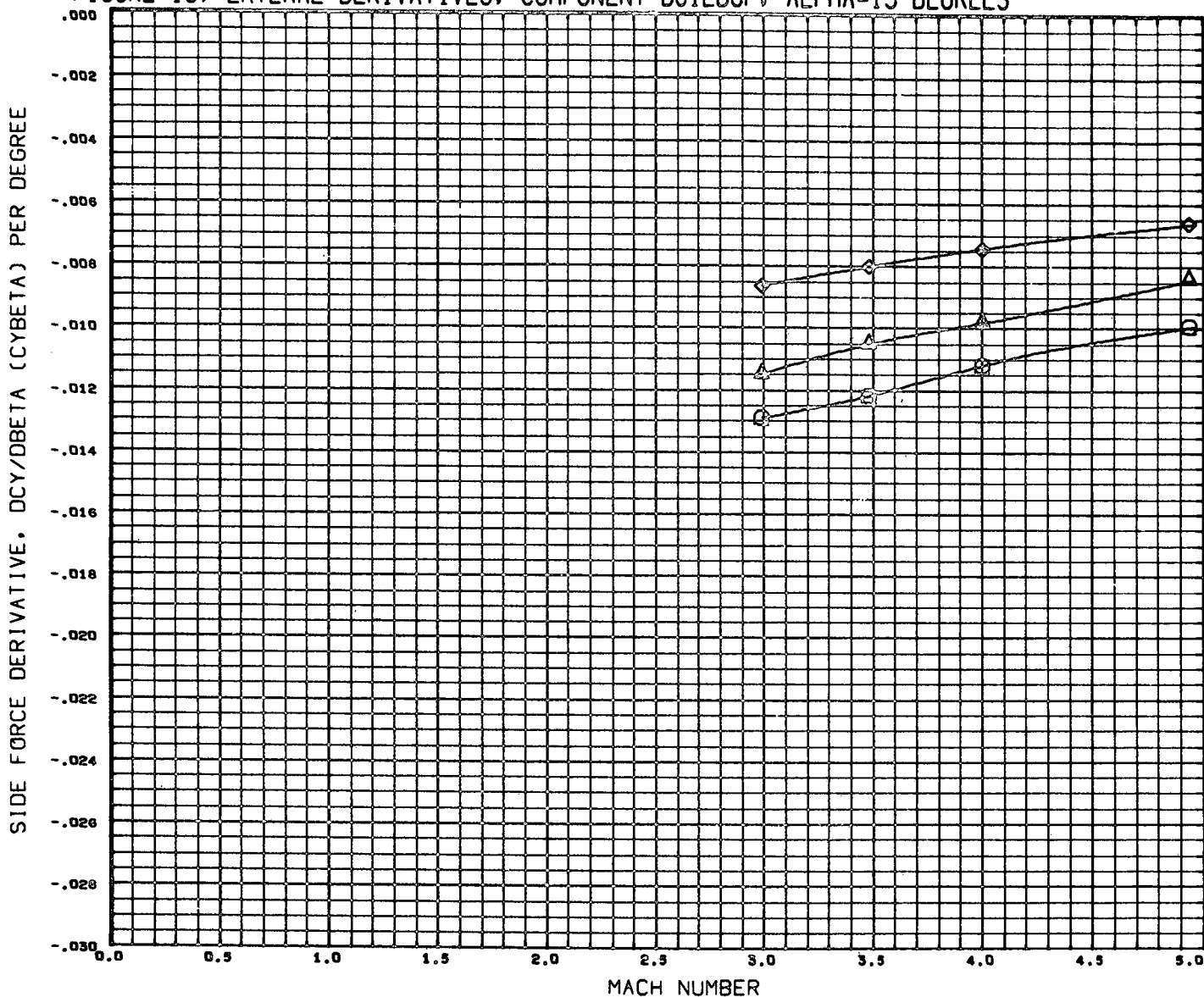
MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR
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



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

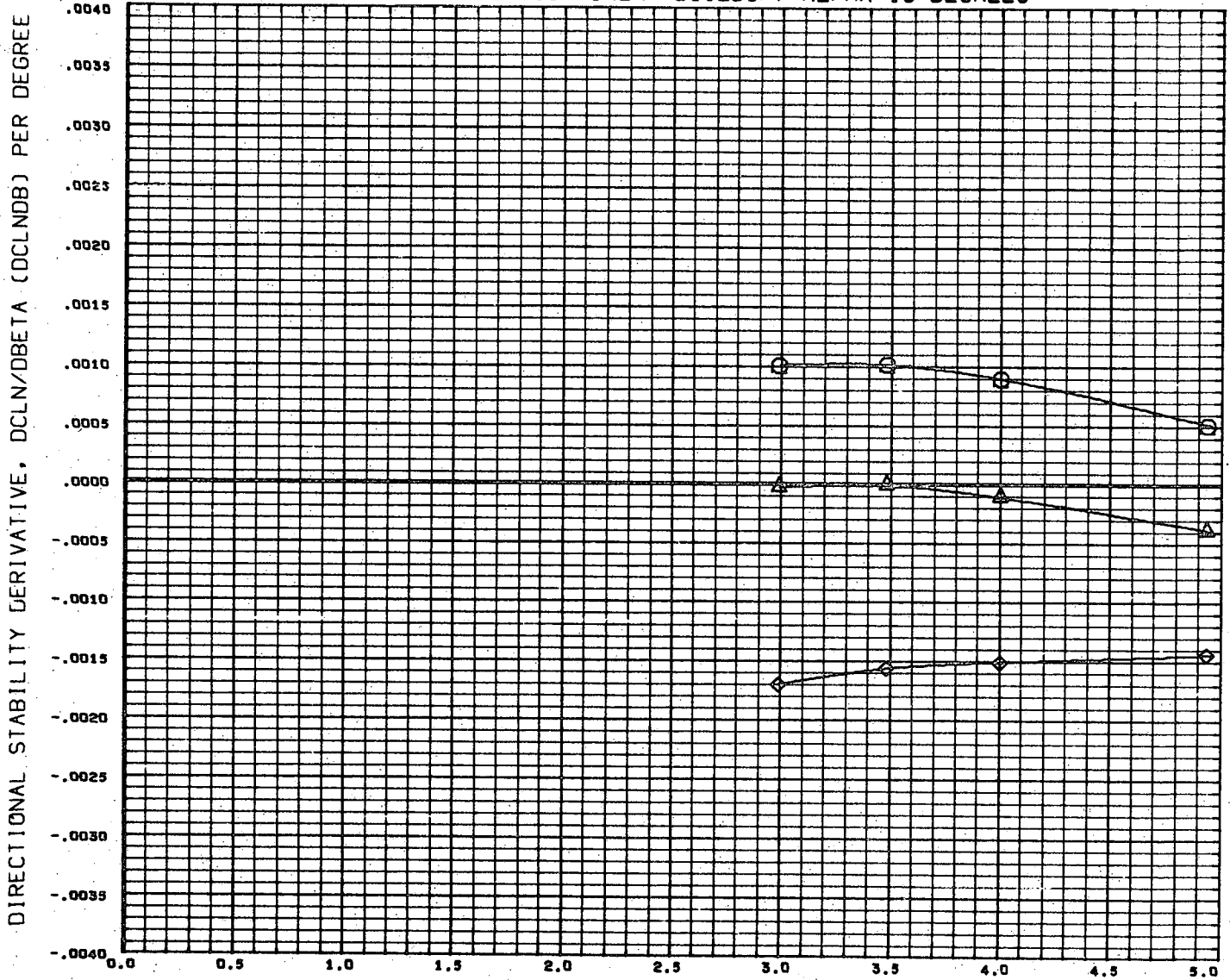


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49010)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)
(A49011)	MSFC 507 GAC H-33 ORB. B5W4V5
(A49012)	MSFC 507 GAC H-33 ORB. B5W4

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	30.000	-30.000	SREF 7.8970 SQ. IN
0.000	0.000	0.000	0.000	LREF 5.4530 IN
				BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

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

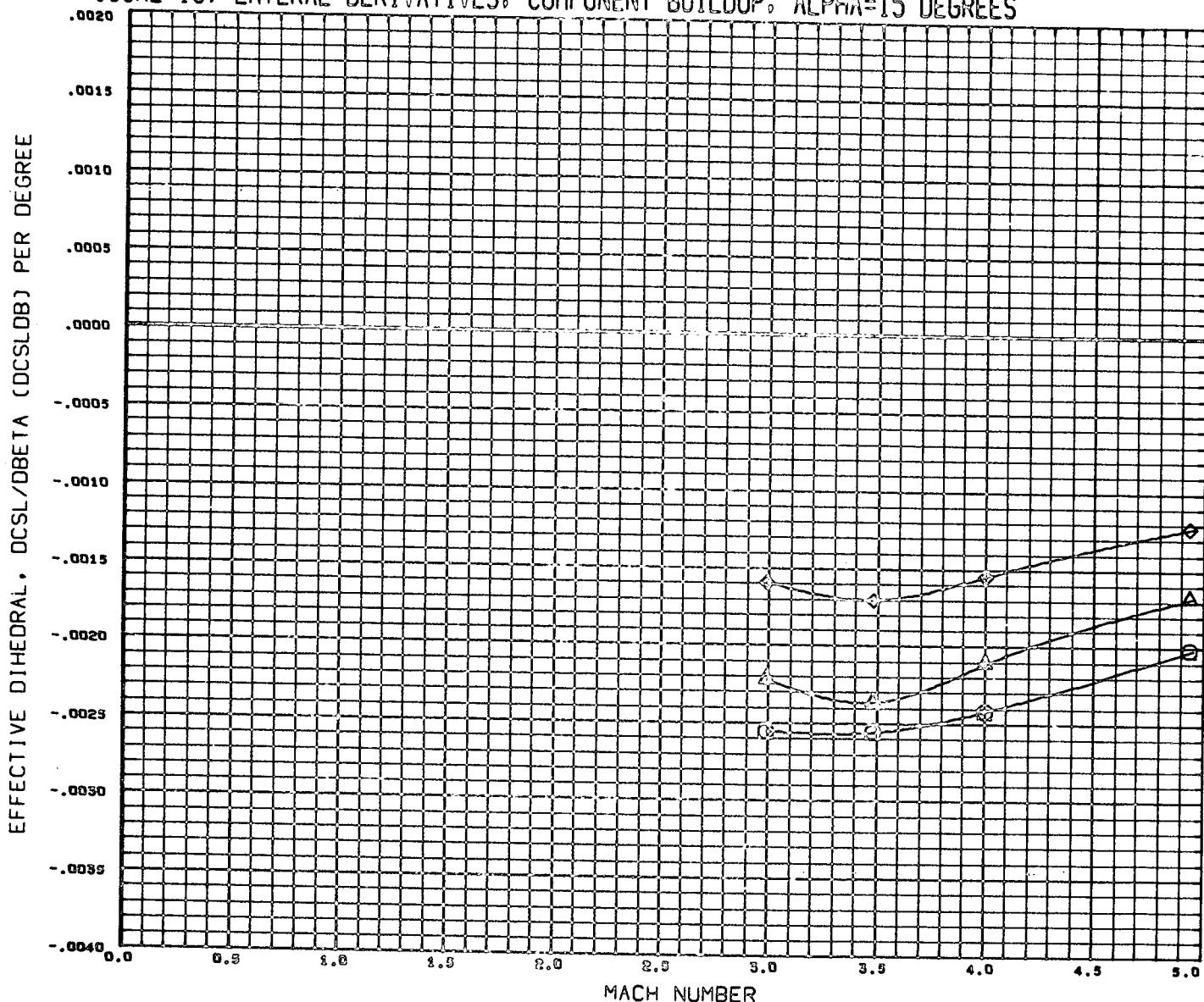


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49010)	MSFC 507 CAC H-33 ORB. B5W4V5 (+30, -30)
(A49011)	MSFC 507 CAC H-33 ORB. B5W4V5
(A49012)	MSFC 507 CAC H-33 ORB. B5W4

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
0.000	0.000	30.000	-30.000	SREF	7.8970 SQ. IN
0.000	0.000	0.000	0.000	LREF	5.4530 IN
0.000	0.000			BREF	3.8170 IN
				XMRP	1274.4040 IN.
				YMRP	0.0000 IN.
				ZMRP	391.3004 IN.
				SCALE	0.0034

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

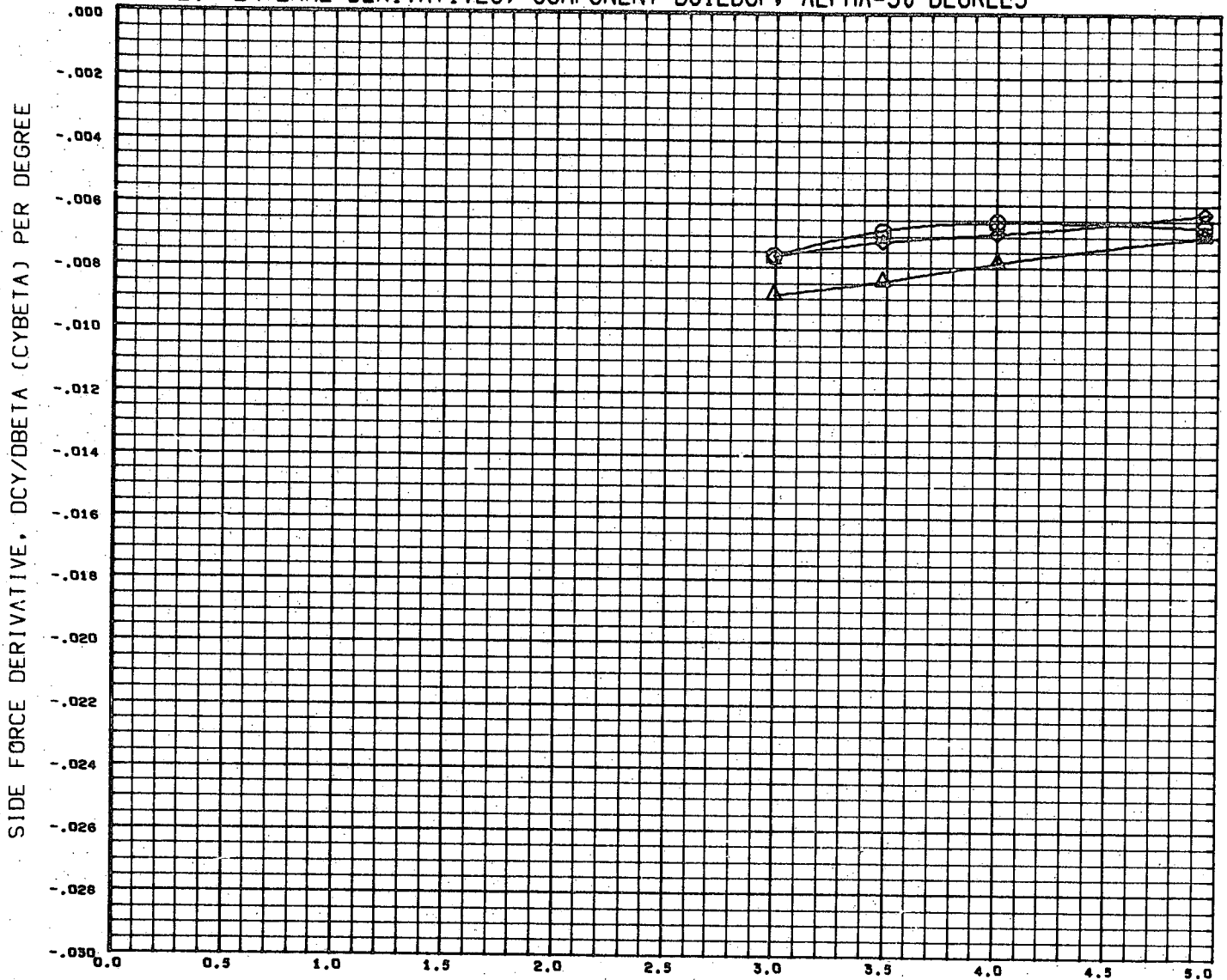


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49010) ◊	MSFC 507 GAC M-33 ORG. 85M4V5 (+30, -30)
(A49011) △	MSFC 507 GAC M-33 ORG. 85M4V5
(A49012) ○	MSFC 507 GAC M-33 ORG. 85M4

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
0.000	0.000	30.000	-30.000	SREF	7.8970 SQ. IN
0.000	3.000	0.000	0.000	LREF	5.4530 IN
0.000	0.000			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

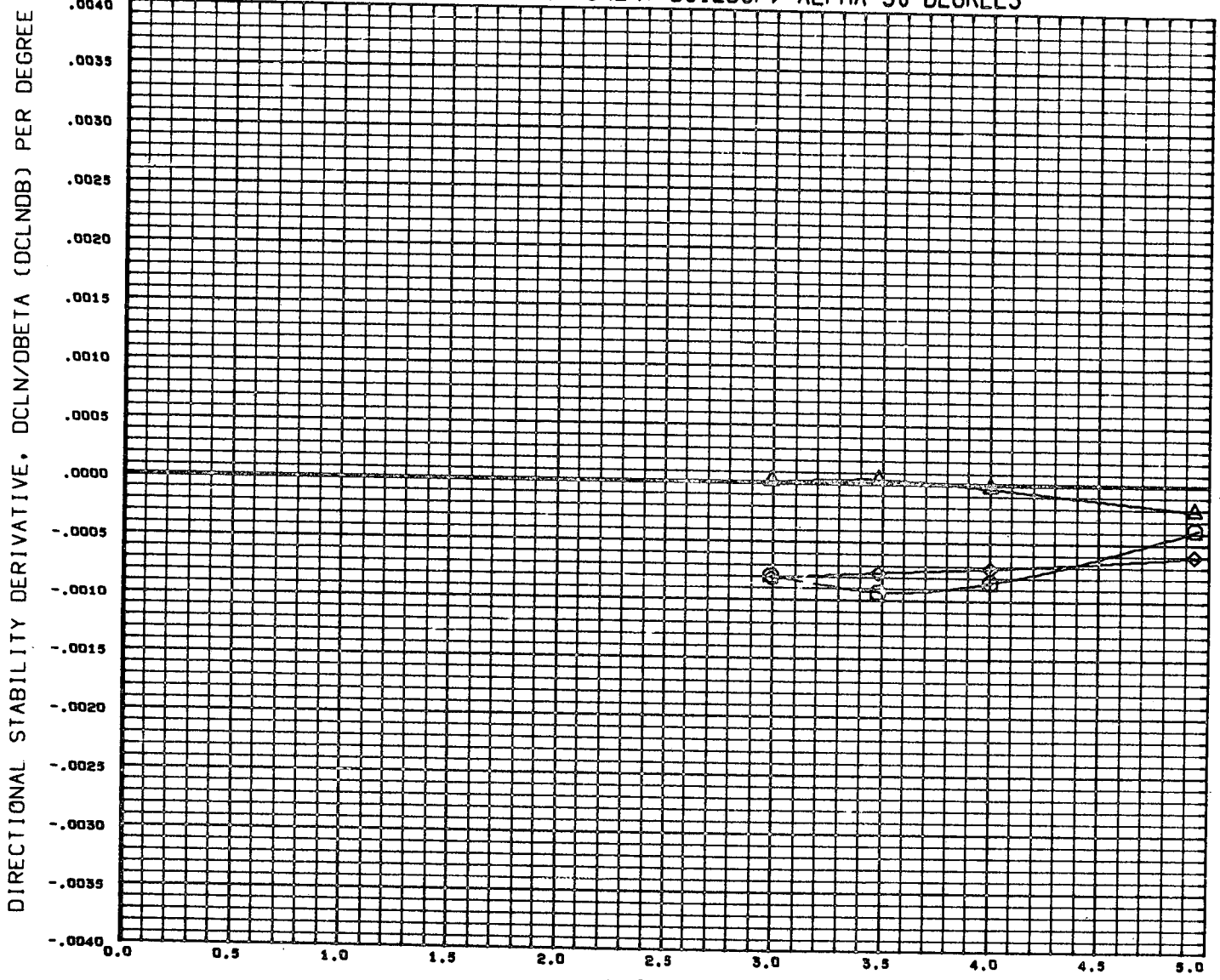


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49025) ○	MSFC 507 GAC H-33 ORB. B5W4V5
(A49026) △	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)
(A49027) ◇	MSFC 507 GAC H-33 ORB. B5W4

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION	
0.000	0.000	0.000	0.000	SREF	7.8970 SQ. IN
0.000	0.000	30.000	-30.000	LREF	5.4530 IN
0.000	0.000			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

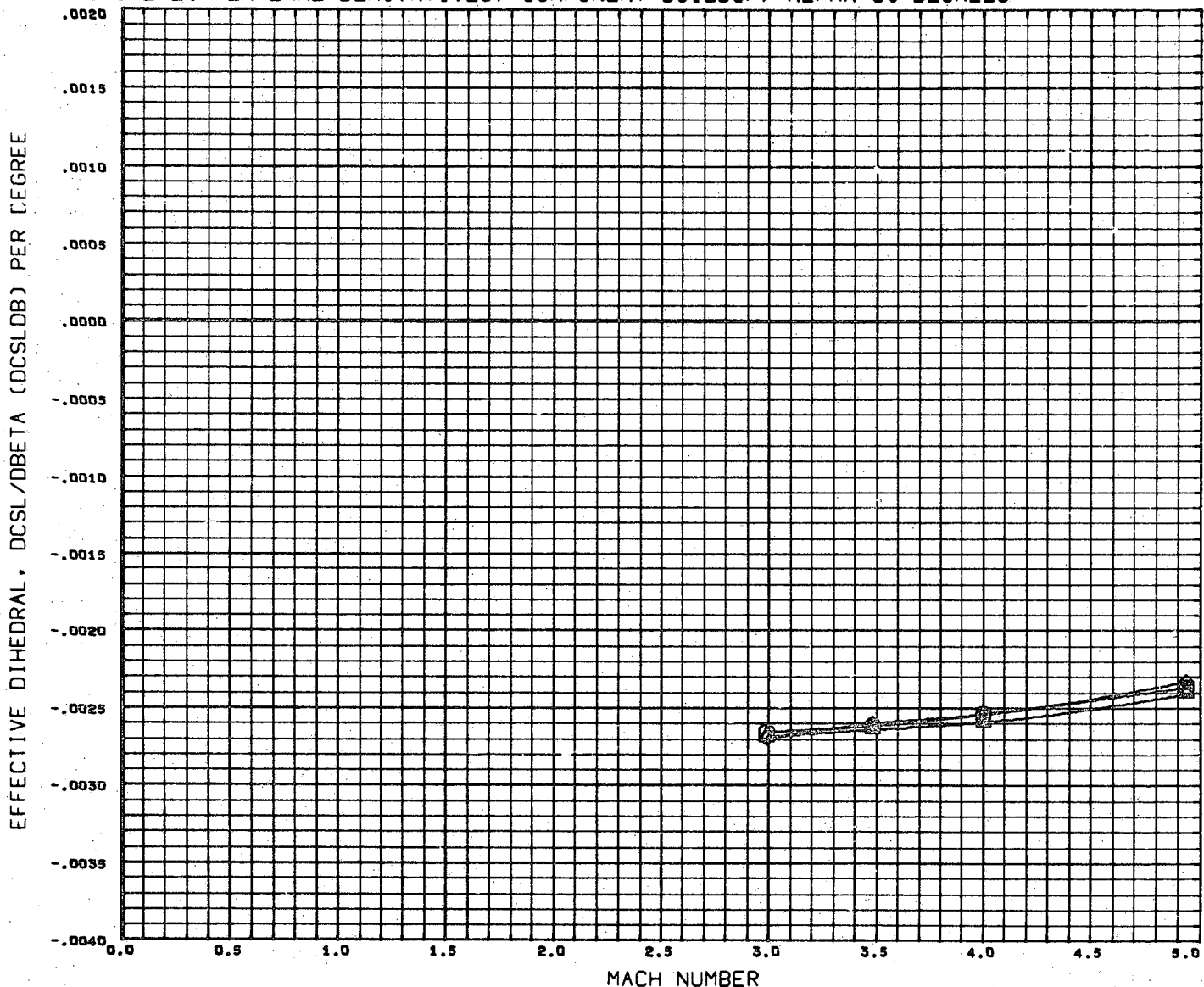


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A49025)	MSFC 507 GAC H-33 ORB. B5W4V5
(A49026)	MSFC 507 GAC H-33 ORB. B5W4V5 (+30, -30)
(A49027)	MSFC 507 GAC H-33 ORB. B5W4

MACH NUMBER

ELEVTR	AILERN	LRUDDR	RRUDDR	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 7.8970 SQ. IN
0.000	0.000	30.000	-30.000	LREF 5.4530 IN
0.000	0.000			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
(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	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 7.8970 SQ. IN
0.000	0.000	30.000	-30.000	LREF 5.4530 IN
0.000	0.000			BREF 3.8170 IN
				XMRP 1274.4040 IN.
				YMRP 0.0000 IN.
				ZMRP 391.3004 IN.
				SCALE 0.0034

242