

—SPACE SHUTTLE—

**AERODYNAMIC STATIC STABILITY  
CHARACTERISTICS, FIN  
EFFECTIVENESS, AND FIN LOCATION  
OF THE MSFC 33-FOOT  
PRESSURE FED BOOSTER AT HIGH  
ANGLES OF ATTACK**

by

**Thomas Hamilton, NSI**

**MSFC 14X14-INCH  
TRISONIC WIND TUNNEL**

**Marshall Space Flight  
Center**



**N A S A**

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**SADSAC SPACE SHUTTLE  
AEROTHERMODYNAMIC  
DATA MANAGEMENT SYSTEM**

**CONTRACT NAS3-4016  
MARSHALL SPACE FLIGHT CENTER**

**SPACE DIVISION**



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SADSAC/SPACE SHUTTLE

WIND TUNNEL TEST DATA REPORT

CONFIGURATION: 0.00280 Scale MSFC 33-Foot Pressure Fed Booster

TEST PURPOSE: To Determine the Aerodynamic Static Stability Characteristics,  
Fin Effectiveness, and Fin Location of the MSFC 33-Foot Pressure  
Fed Booster at High Angles of Attack

TEST FACILITY: NASA-MSFC 14 x 14 Inch Trisonic Wind Tunnel

TESTING AGENCY: Northrop Services, Inc., Huntsville, Alabama

TEST NO. & DATE: MSFC TWT 524; 4 February 1972

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PROJECT ENGINEER(S): Thomas Hamilton, NSI

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CONTRACT NAS 8-4016

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AERODYNAMIC STATIC STABILITY CHARACTERISTICS,  
FIN EFFECTIVENESS, AND FIN LOCATION OF THE  
MSFC 33-FOOT PRESSURE FED BOOSTER AT HIGH ANGLES OF ATTACK

By Thomas Hamilton

ABSTRACT

Experimental aerodynamic investigations were conducted in the NASA/MSFC 14 x 14 Inch Trisonic Wind Tunnel during early February 1972 on a 0.00280 scale model of the MSFC 33-foot diameter space shuttle pressure fed booster configuration. The basic configuration tested was a 40° cone/cylinder/7° frustrum designated the MSFC 33-foot pressure fed booster. Six component aerodynamic force and moment data were recorded over a Mach number range from 0.9 to 5.0 at angles of attack from +20° to +90° at 0° sideslip and over a sideslip range from -10° to +10° at 30°, 50°, 60° and 80° angles of attack. Primary configuration variables were fin deflection angle and vertical position on the frustrum.

NOMENCLATURE  
General

| <u>SYMBOL</u> | <u>SADSAC<br/>SYMBOL</u> | <u>DEFINITION</u>                               |
|---------------|--------------------------|-------------------------------------------------|
| $a$           |                          | speed of sound; m/sec, ft/sec                   |
| $C_p$         | CP                       | pressure coefficient; $(p_1 - p_\infty)/q$      |
| $M$           | MACH                     | Mach number; $V/a$                              |
| $p$           |                          | pressure; $N/m^2$ , psf                         |
| $q$           | Q(NSM)<br>Q(PSF)         | dynamic pressure; $1/2\rho V^2$ , $N/m^2$ , psf |
| RN/L          | RN/L                     | unit Reynolds number; per m, per ft             |
| $V$           |                          | velocity; m/sec, ft/sec                         |
| $\alpha$      | 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; $kg/m^3$ , slugs/ft <sup>3</sup>  |

Reference & C.G. Definitions

|                     |      |                                                        |
|---------------------|------|--------------------------------------------------------|
| $A_b$               |      | base area; $m^2$ , $ft^2$                              |
| $b$                 | BREF | wing span or reference span; m, ft                     |
| c.g.                |      | center of gravity                                      |
| $\frac{l}{c}_{REF}$ | LREF | reference length or wing mean aerodynamic chord; m, ft |
| $S$                 | SREF | wing area or reference area; $m^2$ , $ft^2$            |
|                     | MRP  | moment reference point                                 |
|                     | XMRP | moment reference point on X axis                       |
|                     | YMRP | moment reference point on Y axis                       |
|                     | ZMRP | moment reference point on Z axis                       |

SUBSCRIPTS

|          |                   |
|----------|-------------------|
| $b$      | base              |
| $l$      | local             |
| $s$      | static conditions |
| $t$      | total conditions  |
| $\infty$ | free stream       |

# NOMENCLATURE (Continued)

## Body-Axis System

| <u>SYMBOL</u> | <u>SADSAC<br/>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; $\frac{\text{base force}}{qS}$<br>$-A_b(p_b - p_\infty)/qS$ |
| $C_{A_f}$     | 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; $\frac{\text{yawing moment}}{qS b}$                      |
| $C_l$         | CBL                      | 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; $\frac{\text{yawing moment}}{qS b}$           |
| $C_l$     | CSL | rolling-moment coefficient; $\frac{\text{rolling moment}}{qS b}$         |
| $L/D$     | L/D | lift-to-drag ratio; $C_L/C_D$                                            |

ADDITIONS TO NOMENCLATURE  
FOR  
MSFC 524

| <u>SYMBOL</u> | <u>SADSAC<br/>SYMBOL</u> | <u>DEFINITION</u>                                                  |
|---------------|--------------------------|--------------------------------------------------------------------|
| $CA_{BAL}$    |                          | Balance axial force coefficient; $FA_{BAL}/qS$                     |
| $C_{P1}$      |                          | Base pressure coefficient (1); $(P_{B1} - P_{\infty})/q$           |
| $C_{P2}$      |                          | Base pressure coefficient (2); $(P_{B2} - P_{\infty})/q$           |
| $\delta_F$    |                          | Fin deflection angle; positive TE down                             |
| $\delta_{FE}$ | DELFE                    | Fin deflection angle when used as an elevator;<br>positive TE down |
| $\delta_{FA}$ | DELFA                    | Fin deflection angle when used as an aileron;<br>positive TE down  |
| $\Gamma$      |                          | Fin dihedral angle; positive up                                    |
| LOC           | POS                      | Fin vertical location on frustrum, 1-lower,<br>2-middle, 3-upper   |

## CONFIGURATION DESCRIPTION

The basic pressure fed booster configuration was a 40° cone/cylinder/7° frustrum designated the MSFC 33-foot pressure fed booster. Component configuration symbols and descriptions are listed as follows:

| <u>SYMBOL</u> | <u>CONFIGURATION</u>                                                                                                                                                                                                                       |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $N_1 B_1 R_1$ | MSFC 33 foot pressure fed booster body with 40° conical nose, 33 ft diameter full scale cylindrical body and 7° aft frustrum. Full scale length is 146.1 ft. Five rocket engines shown in Figure 4a are located on the base.               |
| $N_2$         | 40° conical nose identical to $N_1$ except a 3/8 x 1-3/8 inch slot is machined in it to allow for the forward sting mount for angles-of-attack from 50° to 90°.                                                                            |
| $F_2$         | Two 750 sq. ft. full scale fins located at various vertical positions on the frustrum at a constant dihedral angle of 30°. The fins are capable of being set at various deflection angles. Fin location and drawing are shown in Figure 9. |
| $X_1, X_2$    | Fairings used to blend the fins to the body frustrum for the lower and middle positions, respectively. See Figure 11 for location.                                                                                                         |

Model dimensional information for these components is given in the model component description sheets.

## TEST FACILITY DESCRIPTION

The MSFC 14 x 14 Inch Trisonic Wind Tunnel is an intermittent blowdown tunnel which operates by high pressure air flowing from storage to either vacuum or atmospheric conditions. A Mach number range from 0.2 to 5.85 is covered by utilizing two interchangeable test sections. The transonic section permits testing at Mach 0.20 to 2.50, and the supersonic section permits testing at Mach 2.75 to 5.85. Mach numbers between 0.2 and 0.9 are obtained by using a controllable diffuser. The range from 0.95 to 1.3 is achieved through the use of plenum suction and perforated walls. Mach numbers of 1.46, 1.96 and 2.48 are produced by interchangeable sets of fixed contour nozzle blocks. Above Mach 2.48 a set of fixed contour nozzle blocks are tilted and translated automatically to produce any desired Mach number in 0.25 increments.

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

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

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

## DATA REDUCTION

Six component force and moment data were recorded using an internal strain gage balance. Aerodynamic coefficients were calculated for the body and stability axis reference systems. Data reduction included an axial force static tare. Base and cavity pressures were measured, with sting aft mounted only, to determine base axial force and sting cavity axial force correction. The model reference dimensions utilized in reducing the data are listed below

$$S_{\text{ref}} = \text{Booster Body } (N_1B_1R_1 \text{ or } N_2B_1R_1) \\ \text{Cylinder cross section area} = 0.965 \text{ sq. in.}$$

$$l_{\text{ref}} = \text{Booster Body } (N_1B_1R_1 \text{ or } N_2B_1R_1) \\ \text{Length} = \text{from nose to aft end of } 7^\circ \text{ frustrum} = 4.908 \text{ in.}$$

The moment reference center (MRC) is on a line coincident with the body longitudinal centerline 60 percent of the body length aft of the nose.

$$\text{MRC} = 60\% \text{ body length aft of nose} = 2.945 \text{ in.}$$

The moment reference center location is shown in Figure 2.

Two base pressures were recorded for the aft mounted sting case only and used to determine base axial force  $C_{A_B}$  correlation to total axial force  $C_{A_T}$ .

$$C_{A_B} = - \frac{C_{P_1} A_{B_1}}{S_{\text{ref}}} - \frac{C_{P_2} A_{B_2}}{S_{\text{ref}}}$$

$$C_{A_T} = C_{A_{BAL}}$$

Base areas for the booster configurations are listed below

| CONFIGURATION     | $A_{B_1}(\text{in.}^2)$ | $A_{B_2}(\text{in.}^2)$ |
|-------------------|-------------------------|-------------------------|
| $N_1B_1R_1$       | 0.774                   | 0.774                   |
| $N_2B_1R_1$       | N/A                     | N/A                     |
| $N_2B_1R_1X_1F_2$ | N/A                     | N/A                     |
| $N_2B_1R_1X_2F_2$ | N/A                     | N/A                     |

Base pressure 1 was located on the upper half of the body base and base pressure 2 was located on the lower half of the body base for body alone.

TABLE I.

TEST CONDITIONS

TEST MSEC 524

[illegible]

BALANCE UTILIZED: MSFC No. 201 Balance

**CAPACITY:**

|    |          |
|----|----------|
| NF | 120 lb   |
| SF | 20 lb    |
| AF | 30 lb    |
| PM | 60 in-lb |
| YM | 20 in-lb |
| RM | 25 in-lb |

**ACCURACY:**

100

COEFFICIENT  
TOLERANCE:

100

**COMMENTS :**

TABLE II.  
TEST MSC TWT SZY DATA SET COLLATION SHEET

☐ PRETEST  
☒ POSTTEST

| DATA SET IDENTIFIER | CONFIGURATION                        | SCHD. |   |      | PARAMETERS |     |  | NO. RUNS | MACH NUMBERS |     |      |      |      |      |      |  |
|---------------------|--------------------------------------|-------|---|------|------------|-----|--|----------|--------------|-----|------|------|------|------|------|--|
|                     |                                      | a     | b | f    | LOC        | T   |  |          | 0.9          | 1.2 | 1.46 | 1.96 | 2.74 | 3.48 | 4.96 |  |
| R59 001             | N <sub>1</sub> B, R <sub>2</sub>     | A     | 0 | —    | —          | —   |  | 4        | 1            | 2   |      | 12   |      |      | 3    |  |
| 002                 |                                      | B     | 0 |      |            |     |  | 4        | 4            | 3   |      | 11   |      |      | 14   |  |
| 003                 |                                      | C     | 0 |      |            |     |  | 4        | 8            | 7   |      | 9    |      |      | 16   |  |
| 004                 |                                      | D     | 0 |      |            |     |  | 4        | 5            | 6   |      | 10   |      |      | 15   |  |
| 005                 | N <sub>2</sub> B, R <sub>2</sub>     | C     | 0 |      |            |     |  | 5        | 139          |     |      | 94   | 19   | 18   | 17   |  |
| 006                 |                                      | D     | 0 |      |            |     |  | 5        | 140          |     |      | 95   | 20   | 21   | 22   |  |
| 007                 |                                      | E     | 0 |      |            |     |  | 5        | 142          |     |      | 85   | 77   | 76   | 24   |  |
| 008                 |                                      | F     | 0 |      |            |     |  | 5        | 141          |     |      | 96   | 78   | 79   | 23   |  |
| 009                 | N <sub>2</sub> B, R <sub>2</sub> , E | C     | 0 | 15°  | 1          | 30° |  | 3        | 134          |     |      | 110  |      |      | 28   |  |
| 010                 |                                      | C     | 0 | 0°   |            |     |  | 5        | 131          |     |      | 111  | 66   | 65   | 25   |  |
| 011                 |                                      | C     | 0 | -15° |            |     |  | 3        | 135          |     |      | 107  |      |      | 29   |  |
| 012                 |                                      | C     | 0 | -30° |            |     |  | 5        | 138          |     |      | 106  | 71   | 72   | 32   |  |
| 013                 |                                      | C     | 0 | -45° |            |     |  | 2        |              |     |      | 103  |      |      | 33   |  |
| 014                 |                                      | D     | 0 | 15°  |            |     |  | 3        | 133          |     |      |      |      |      | 27   |  |
| 015                 |                                      | D     | 0 | 0°   |            |     |  | 5        | 132          |     |      | 112  | 67   | 68   | 26   |  |
| 016                 |                                      | D     | 0 | -15° |            |     |  | 3        | 136          |     |      | 103  |      |      | 30   |  |
| 017                 |                                      | D     | 0 | -30° |            |     |  | 5        | 137          |     |      | 105  | 70   | 69   | 31   |  |
| 018                 |                                      | D     | 0 | -45° |            |     |  | 2        |              |     |      | 104  |      |      | 34   |  |
| 019                 |                                      | E     | 0 | 0°   |            |     |  | 5        | 130          |     |      | 114  | 63   | 64   | 36   |  |
| 020                 |                                      | F     | 0 | 0°   |            |     |  | 5        | 129          |     |      | 113  | 63   | 61   | 35   |  |

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

24M 16M 16Y 16Z 16A 16B 16C 16D 16E 16F 16G 16H 16I 16J 16K 16L 16M 16N 16O 16P 16Q 16R 16S 16T 16U 16V 16W 16X 16Y 16Z

COEFFICIENTS  
a or b  
SCHEDULES

A: X = 20° to 40° ΔX = 2° C: A = 50° to 70° ΔA = 2°  
B: A = 40° to 60° ΔA = 2° D: A = 70° to 90° ΔA = 2° E: B = -10° to 10° ΔB = 2°

IDPVAR(1) IDPVAR(2) NDV

TABLE II. (Continued)  
TEST MSAC TWT 524 DATA SET COLLATION SHEET

☐ PRETEST  
☒ POSTTEST

| DATA SET IDENTIFIER | CONFIGURATION         | SCHD.    |         | PARAMETERS |     |          | NO. RUNS | MACH NUMBERS |     |      |      |      |      |      |  |
|---------------------|-----------------------|----------|---------|------------|-----|----------|----------|--------------|-----|------|------|------|------|------|--|
|                     |                       | $\alpha$ | $\beta$ | $\delta F$ | LOC | $\Gamma$ |          | 0.9          | 1.2 | 1.46 | 1.96 | 2.74 | 3.48 | 4.96 |  |
| R59 021             | $N_2 B, R, X_2 F_2$   | C        | 0       | 15°        | 2   | 30°      | 3        |              | 122 |      | 90   |      |      | 41   |  |
| 022                 |                       | C        | 0       | 0°         |     |          | 5        |              | 125 |      | 86   | 55   | 56   | 40   |  |
| 023                 |                       | C        | 0       | -15°       |     |          | 3        |              | 122 |      | 98   |      |      | 44   |  |
| 024                 |                       | C        | 0       | -30°       |     |          | 5        |              | 118 |      | 99   | 50   | 49   | 45   |  |
| 025                 |                       | C        | 0       | -45°       |     |          | 3        |              | 119 |      | 102  |      |      | 48   |  |
| 026                 |                       | D        | 0       | 15°        |     |          | 3        |              | 124 |      | 91   |      |      | 42   |  |
| 027                 |                       | D        | 0       | 0°         |     |          | 5        |              | 125 |      | 87   | 54   | 53   | 33   |  |
| 028                 |                       | D        | 0       | -15°       |     |          | 3        |              | 121 |      | 97   |      |      | 43   |  |
| 029                 |                       | D        | 0       | -30°       |     |          | 5        |              | 117 |      | 100  | 51   | 52   | 46   |  |
| 030                 |                       | D        | 0       | -45°       |     |          | 3        |              | 120 |      | 101  |      |      | 47   |  |
| 031                 |                       | 60       | E       | 0°         |     |          | 5        |              | 122 |      | 89   | 58   | 57   | 37   |  |
| 032                 |                       | 80       | E       | 0°         |     |          | 5        |              | 123 |      | 88   | 59   | 60   | 38   |  |
| 033                 | $N_2 B, R, X, F_2$    | 60       | E       | -30°       | 1   |          | 1        |              |     |      |      |      |      | 75   |  |
| 034                 |                       | C        | 0       | 30/-30     |     |          | 1        |              |     |      |      |      |      | 73   |  |
| 035                 |                       | D        | 0       | 30/-30     |     |          | 1        |              |     |      |      |      |      | 74   |  |
| 036                 |                       | C        | 0       | 0°         | 3   |          | 1        |              |     |      |      |      |      | 81   |  |
| 037                 |                       | D        | 0       | 0°         |     |          | 1        |              |     |      |      |      |      | 80   |  |
| 038                 | $N_2 B, R, (BAG OFF)$ | C        | 0       |            |     |          | 2        |              |     |      | 82   |      |      | 72   |  |
| 039                 |                       | D        | 0       |            |     |          | 2        |              |     |      | 83   |      |      | 93   |  |
| 040                 |                       | 80       | E       |            |     |          | 1        |              |     |      | 84   |      |      |      |  |

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

CLM 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

COEFFICIENTS  
 $\alpha$  or  $\beta$   
SCHEDULES

C:  $\alpha = 50^\circ$  to  $70^\circ$   $\Delta\alpha = 2^\circ$  E:  $\beta = -10^\circ$  to  $10^\circ$   $\Delta\beta = 2^\circ$   
D:  $\alpha = 70^\circ$  to  $90^\circ$   $\Delta\alpha = 2^\circ$

IDPVAR(1) IDPVAR(2) NDV

☐ PRETEST  
☒ POSTTEST

11

TABLE III.

## DIMENSIONAL DATA

MODEL COMPONENT: BODY - N<sub>1</sub>B<sub>1</sub>R<sub>1</sub>GENERAL DESCRIPTION: MSFC Pressure Fed Booster Body which  
Accommodates Sting from Aft EndDRAWING NUMBER: \_\_\_\_\_DIMENSIONS:

|                              | <u>FULL-SCALE</u> | <u>MODEL SCALE</u> |
|------------------------------|-------------------|--------------------|
| Length, ft.                  | <u>146.1</u>      | <u>0.409</u>       |
| Max. Width, inches           | <u>501.6</u>      | <u>1.432</u>       |
| Max. Depth, inches           | <u>501.6</u>      | <u>1.432</u>       |
| Fineness Ratio               | <u>4.425</u>      | <u>4.425</u>       |
| Area, ft <sup>2</sup>        |                   |                    |
| Max. Cross-Sectional         | <u>855.3</u>      | <u>0.0067</u>      |
| Planform                     | <u>          </u> | <u>          </u>  |
| Wetted                       | <u>          </u> | <u>          </u>  |
| Base                         | <u>1437.9</u>     | <u>0.0115</u>      |
| Body Diameter, inches        | <u>396.0</u>      | <u>1.109</u>       |
| Base Diameter, inches        | <u>501.6</u>      | <u>1.432</u>       |
| Base Flare Angle, degrees    | <u>7°</u>         | <u>7°</u>          |
| Conical Nose Angles, degrees | <u>40°</u>        | <u>40°</u>         |

TABLE III. (CONTINUED)

MODEL COMPONENT: BODY - N<sub>2</sub>B<sub>1</sub>R<sub>1</sub>GENERAL DESCRIPTION: MSFC Pressure Fed Booster Body which Accommodates Sting  
from Forward EndDRAWING NUMBER: \_\_\_\_\_DIMENSIONS:FULL-SCALEMODEL SCALE

|                             |                   |                   |
|-----------------------------|-------------------|-------------------|
| Length, ft.                 | <u>146.1</u>      | <u>0.409</u>      |
| Max. Width, inches          | <u>501.6</u>      | <u>1.432</u>      |
| Max. Depth, inches          | <u>501.6</u>      | <u>1.432</u>      |
| Fineness Ratio              | <u>4.425</u>      | <u>4.425</u>      |
| Area, ft <sup>2</sup>       |                   |                   |
| Max. Cross-Sectional        | <u>855.3</u>      | <u>0.0067</u>     |
| Planform                    | <u>          </u> | <u>          </u> |
| Wetted                      | <u>          </u> | <u>          </u> |
| Base                        | <u>1437.9</u>     | <u>0.0115</u>     |
| Body Diameter, inches       | <u>396.0</u>      | <u>1.109</u>      |
| Base Diameter, inches       | <u>501.6</u>      | <u>1.432</u>      |
| Base Flare Angle, degrees   | <u>7°</u>         | <u>7°</u>         |
| Conical Nose Angle, degrees | <u>40°</u>        | <u>40°</u>        |

TABLE III. (CONCLUDED)

MODEL COMPONENT: Fin - F2

GENERAL DESCRIPTION: Fins for MSFC Pressure Fed Booster Dihedral = 30°

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

DIMENSIONS:

|                                                     | <u>FULL-SCALE</u> | <u>MODEL SCALE</u> |
|-----------------------------------------------------|-------------------|--------------------|
| Area                                                | <u>750.0</u>      | <u>0.0059</u>      |
| Span (equivalent)                                   | <u>376.7</u>      | <u>1.055</u>       |
| Inb'd equivalent chord                              | <u>430.0</u>      | <u>1.204</u>       |
| Outb'd equivalent chord                             | <u>143.2</u>      | <u>0.401</u>       |
| Ratio movable surface chord/<br>total surface chord |                   |                    |
| At Inb'd equiv. chord                               | <u>          </u> | <u>          </u>  |
| At Outb'd equiv. chord                              | <u>          </u> | <u>          </u>  |
| Sweep Back Angles, degrees                          |                   |                    |
| Leading Edge                                        | <u>45°</u>        | <u>45°</u>         |
| Tailing Edge                                        | <u>13.45°</u>     | <u>13.45°</u>      |
| Hingeline                                           | <u>          </u> | <u>          </u>  |
| Area Moment (Normal to hinge line)                  | <u>          </u> | <u>          </u>  |

TABLE IV.  
INDEX OF MODEL FIGURES

| FIGURE | DESCRIPTION                               | PAGE<br>NUMBER |
|--------|-------------------------------------------|----------------|
| 1      | Axis System                               | 19             |
| 2      | MSFC In House Pressure Fed Booster        | 20             |
| 3      | Base Pressure and Area Locations          | 21             |
| 4a     | Pressure Fed Booster Showing Model Parts  | 22             |
| 4b     | Parts List for Pressure Fed Booster Model | 23             |
| 5      | Sting Adapter                             | 24             |
| 6      | Nose Number 1 and 2                       | 25             |
| 7      | Balance Block                             | 26             |
| 8      | Shroud                                    | 27             |
| 9      | Fin                                       | 28             |
| 10     | Engine                                    | 29             |
| 11a    | Fairing X1                                | 30             |
| 11b    | Fairing X2                                | 31             |
| 12     | Photograph Showing Model Parts            | 32             |
| 13     | Photograph Showing Aft Mount              | 33             |
| 14     | Photograph Showing Forward Mount          | 34             |
| 15     | Photograph Showing Tunnel Installation    | 35             |

TABLE V. INDEX OF DATA FIGURES

| TITLE                                                                                                            | PLOTTED      |          | CONDITIONS<br>VARYING | PAGES   |
|------------------------------------------------------------------------------------------------------------------|--------------|----------|-----------------------|---------|
|                                                                                                                  | COEFFICIENTS | SCHEDULE |                       |         |
| Body Alone Effect of Mach Number on Longitudinal Characteristics                                                 | (A)          |          | Mach Number           | 1-18    |
| Body + 750 Sq. Ft. Fin, Effect of Fin Vertical Position on Longitudinal Characteristics ( $\delta_F=15^\circ$ )  | (A)          |          | Fin Position          | 19-45   |
| Body + 750 Sq. Ft. Fin, Effect of Fin Vertical Position on Longitudinal Characteristics ( $\delta_F=0^\circ$ )   | (A)          |          | Fin Position          | 46-90   |
| Body + 750 Sq. Ft. Fin, Effect of Fin Vertical Position on Longitudinal Characteristics ( $\delta_F=-15^\circ$ ) | (A)          |          | Fin Position          | 91-117  |
| Body + 750 Sq. Ft. Fin, Effect of Fin Vertical Position on Longitudinal Characteristics ( $\delta_F=-30^\circ$ ) | (A)          |          | Fin Position          | 118-162 |
| Body + 750 Sq. Ft. Fin, Effect of Fin Vertical Position on Longitudinal Characteristics ( $\delta_F=-45^\circ$ ) | (A)          |          | Fin Position          | 163-189 |
| Body + 750 Sq. Ft. Fin, Effect of Fin Deflection on Longitudinal Characteristics (POS=1)                         | (A)          |          | $\delta_F$            | 190-234 |
| Body + 750 Sq. Ft. Fin, Effect of Fin Deflection on Longitudinal Characteristics (POS=2)                         | (A)          |          | $\delta_F$            | 235-279 |
| Body Alone Effect of Mach Number on Directional Characteristics                                                  | (B)          |          | Mach Number           | 280-295 |
| Body + 750 Sq. Ft. Fin, Effect of Fin Vertical Position on Directional Characteristics (POS=1)                   | (B)          |          | Mach Number           | 296-303 |
| Body + 750 Sq. Ft. Fin, Effect of Fin Vertical Position on Directional Characteristics (POS=2)                   | (B)          |          | Mach Number           | 304-311 |

TABLE V. INDEX OF DATA FIGURES  
(CONCLUDED)

| TITLE                                                                   | PLOTTED<br>COEFFICIENTS<br>SCHEDULE |  | CONDITIONS<br>VARYING   | PAGES   |
|-------------------------------------------------------------------------|-------------------------------------|--|-------------------------|---------|
|                                                                         | (B)                                 |  | Configuration,<br>Alpha |         |
| Effect of Fin Off and Fin On Position on<br>Directional Characteristics |                                     |  |                         | 312-331 |

PLOTTED COEFFICIENTS SCHEDULE:

- (A) C<sub>LM</sub>, C<sub>N</sub>, C<sub>A</sub>, C<sub>L</sub>, C<sub>D</sub>, L/D vs. ALPHA  
C<sub>N</sub>, C<sub>L</sub> vs. C<sub>LM</sub>; C<sub>L</sub> vs. C<sub>D</sub>
- (B) C<sub>Y</sub>, C<sub>BL</sub>, C<sub>YN</sub> vs. BETA; C<sub>Y</sub> vs. C<sub>YN</sub>

MODEL    FIGURES

- 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.

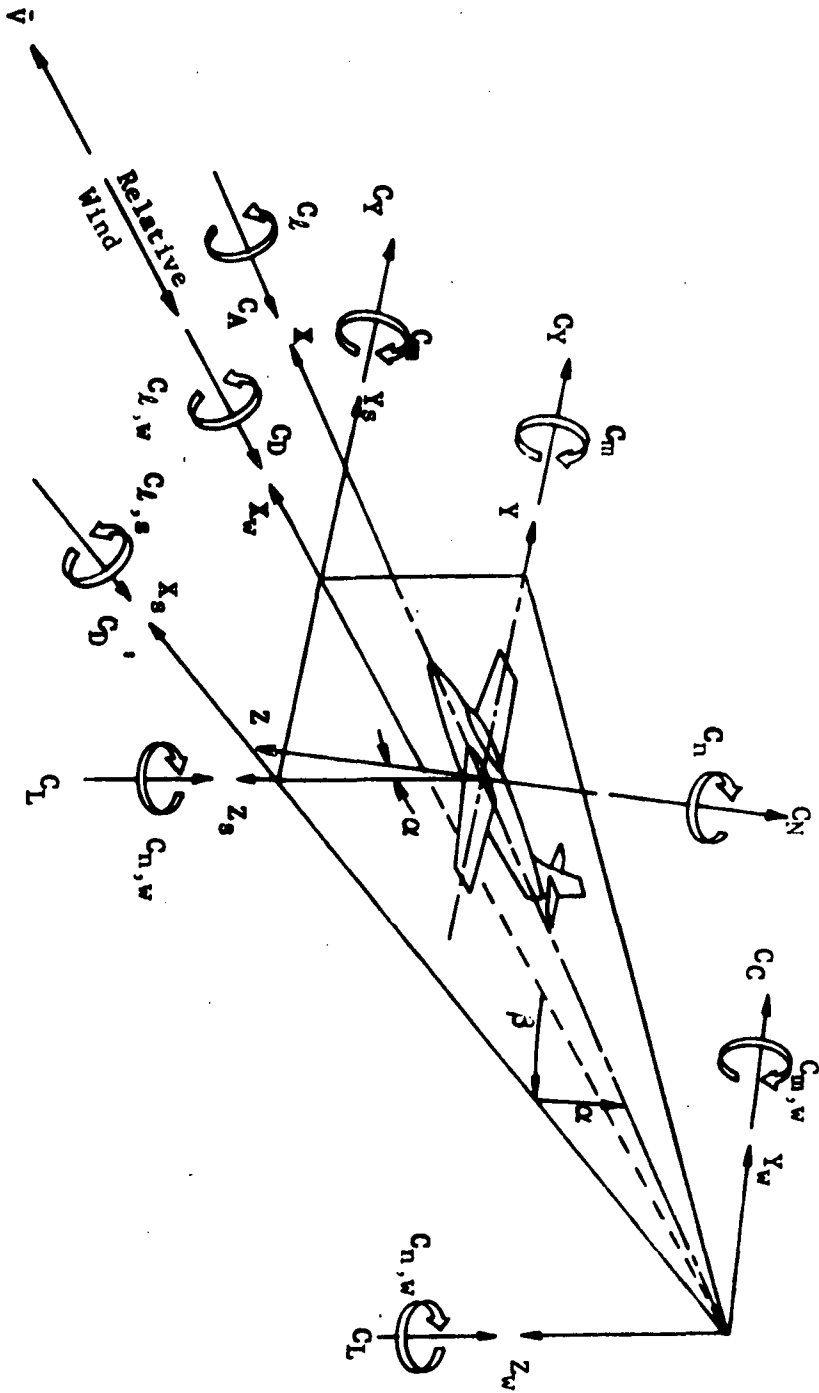


Figure 1. Axis systems, showing direction and sense of force and moment coefficients, angle of attack, and sideslip angle

NOTE: DIMENSIONS IN INCHES

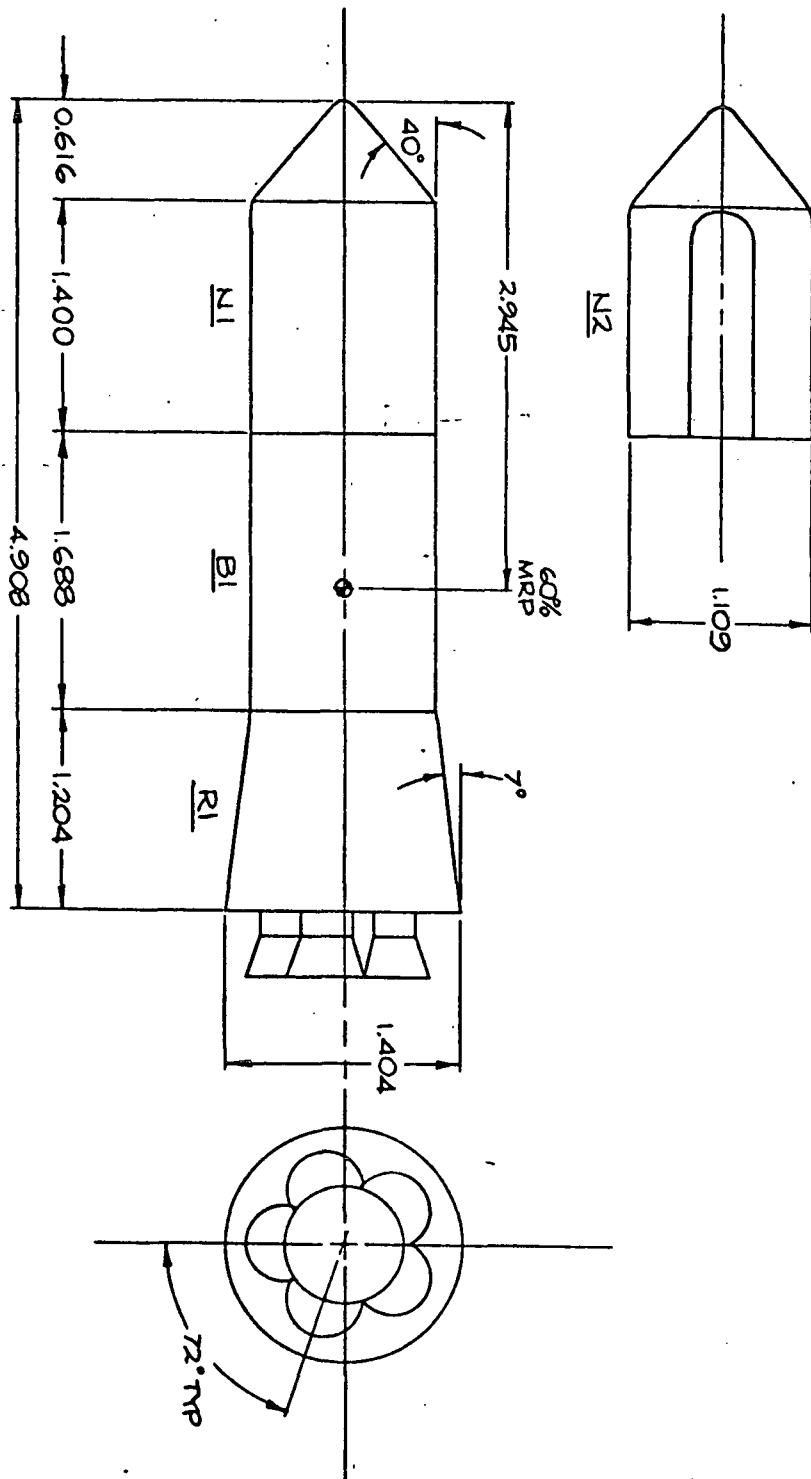
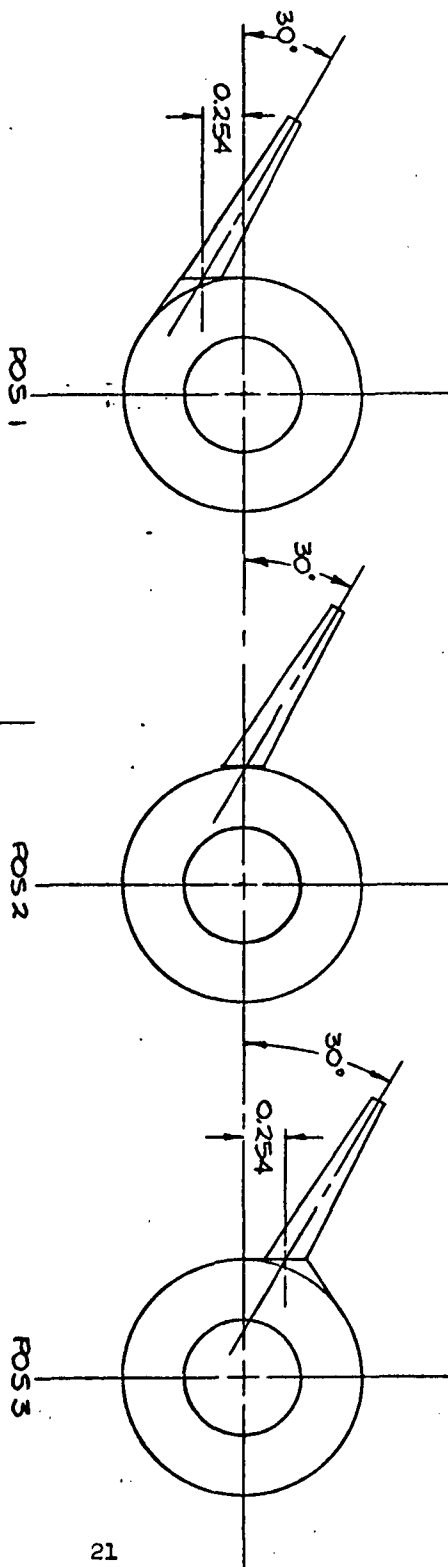


FIGURE 2. MSFC IN-HOUSE PRESSURE FED BOOSTER

VERTICAL POSITION OF FILLS  
(750 FT<sup>3</sup> FILL ILLUS)



NOTE: ALL VIEWS LOOKING FWD  
ALL DIMENSIONS IN INCHES  
SCALE=0.00280 FULL SCALE

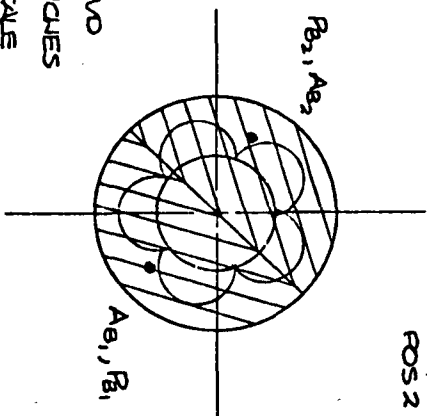


FIGURE 3. BASE PRESSURE AND AREA LOCATIONS

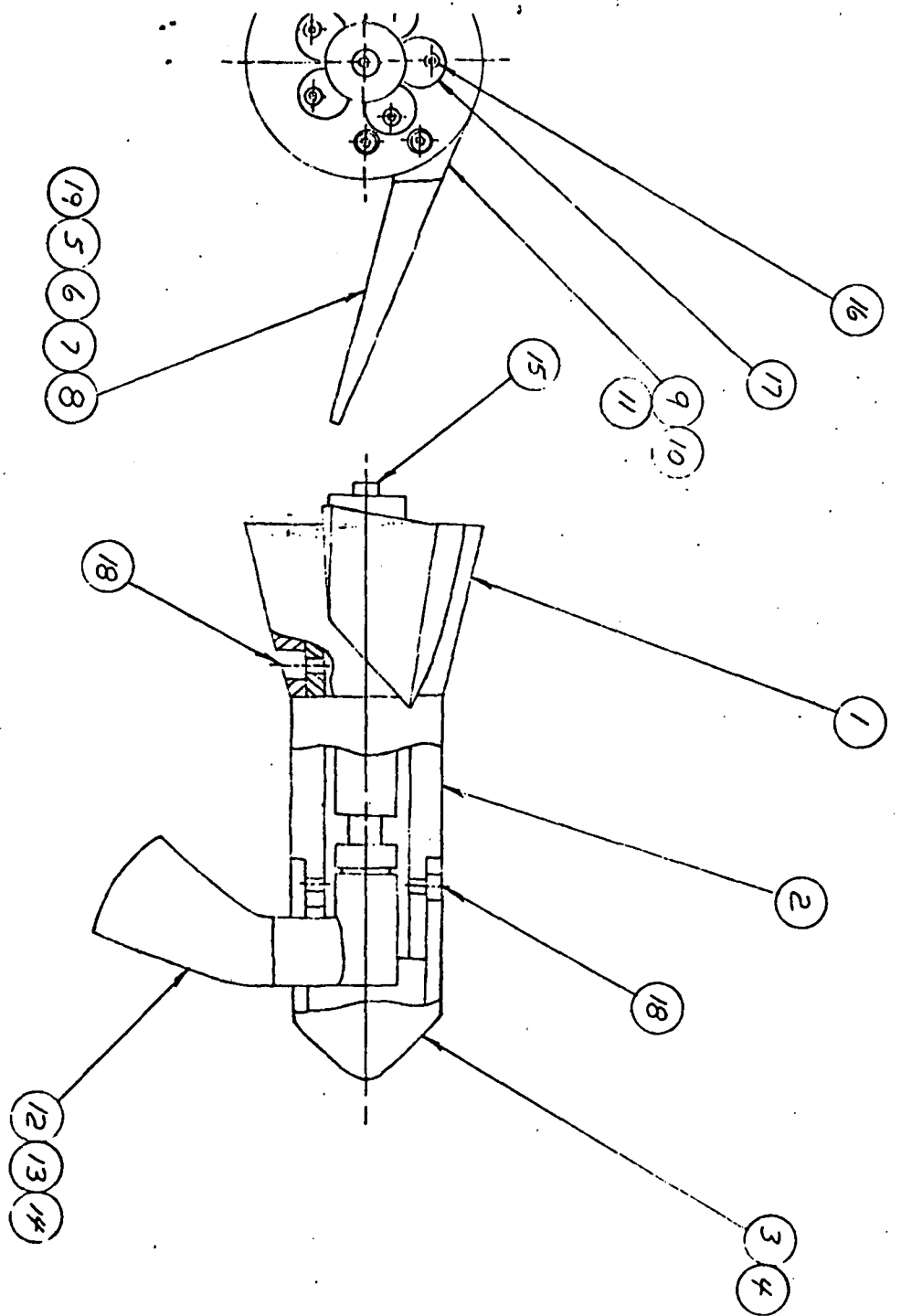


FIGURE 4a. PRESSURE FED BOOSTER SHOWING MODEL PARTS

| No. | Part                                             | No. Req'd.              |
|-----|--------------------------------------------------|-------------------------|
| 1   | SHROUD                                           | 1                       |
| 2   | BALANCE BLOCK                                    | 1                       |
| 3   | NOSE #1                                          | 1                       |
| 4   | NOSE #2                                          | 1                       |
| 5   | FIN #1                                           | 2 (1 OPP HAND)          |
| 6   | FIN #2                                           | " "                     |
| 7   | FIN #3                                           | " "                     |
| 8   | FIN #4                                           | " "                     |
| 9   | ENGINE #1                                        | 1                       |
| 10  | ENGINE #2                                        | 1 (OPP HAND #1)         |
| 11  | ENGINE                                           | 2                       |
| 12  | STAIN ROOPER                                     | 1                       |
| 13  | #2-56-2 E.P. SET SCRE. x $\frac{1}{8}$ L.        | 3                       |
| 14  | #0-80-2 E.P. SET SCRE. x $\frac{1}{8}$ L.        | 4                       |
| 15  | #2 CAP SCRE. x $\frac{3}{8}$ TO $\frac{1}{2}$ L. | 1 (TO FIT BALANCE #201) |
| 16  | #1-72 CAP SCRE. x $\frac{3}{16}$ L.              | 5                       |
| 17  | ENGINE                                           | 5 (FROM EXISTING MODEL) |
| 18  | PIN                                              | 2 " "                   |
| 19  | LEVEL BLOCK                                      | 2 (1 OPP HAND)          |

FIGURE 4b. PARTS LIST FOR PRESSURE FED BOOSTER MODEL







1. THESE 4 HOLES MUST BE  
COILED WITH .250 DIA  
HOLES IN NOSE / SHOULD  
TO ALLOW NO GAP  
SHOULDER - R. THE SHOULDER  
IS INTERCHANGEABLE EA  
END. THE RAIN NOSE ATTACH.  
TO LEFT END / THE SLOTTED  
MODE TO RIGHT END



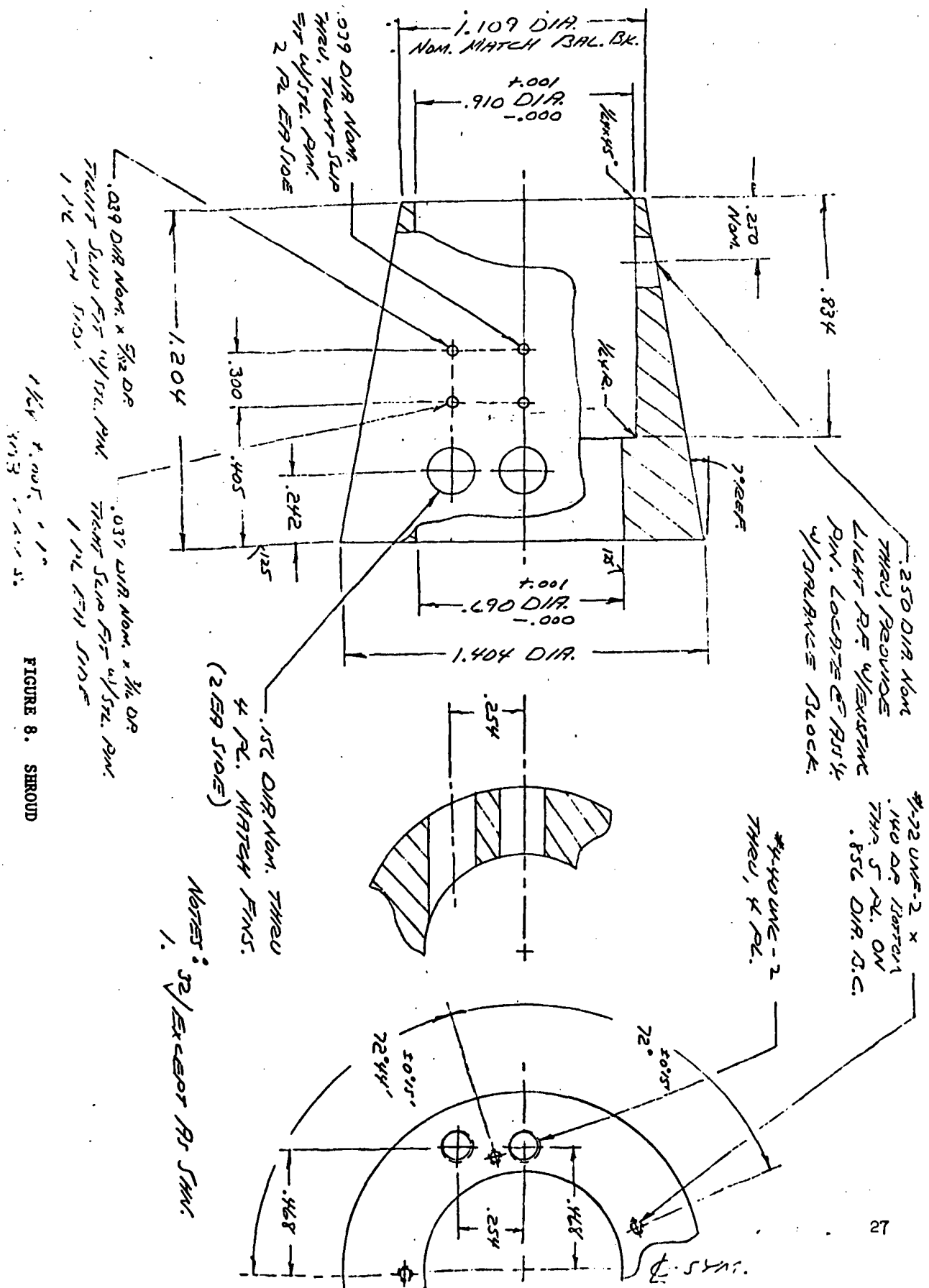


FIGURE 8. SHROUD

| NO. | H    | B     | C    | D     | E   | G       | NO. Holes              | NO. Holes |
|-----|------|-------|------|-------|-----|---------|------------------------|-----------|
| 1   | .401 | 1.406 | .070 | 1.427 | 40° | 15° 1'  | 1 AS SHN. & 1 OFF HAND | 4° 11'    |
| 2   | "    | 1.055 | "    | 1.116 | 45° | 13° 27' | "                      | 4° 59'    |
| 3   | "    | .703  | "    | .764  | 50° | 2° 53'  | "                      | 5° 56'    |
| 4   | .186 | 1.218 | .032 | 1.279 | 45° | 9° 20'  | "                      | 5° 1'     |

| H    |
|------|
| .276 |
| .254 |
| .216 |
| .246 |

NOTES:

1. 32/

2. BREAK SHARP EDGES.

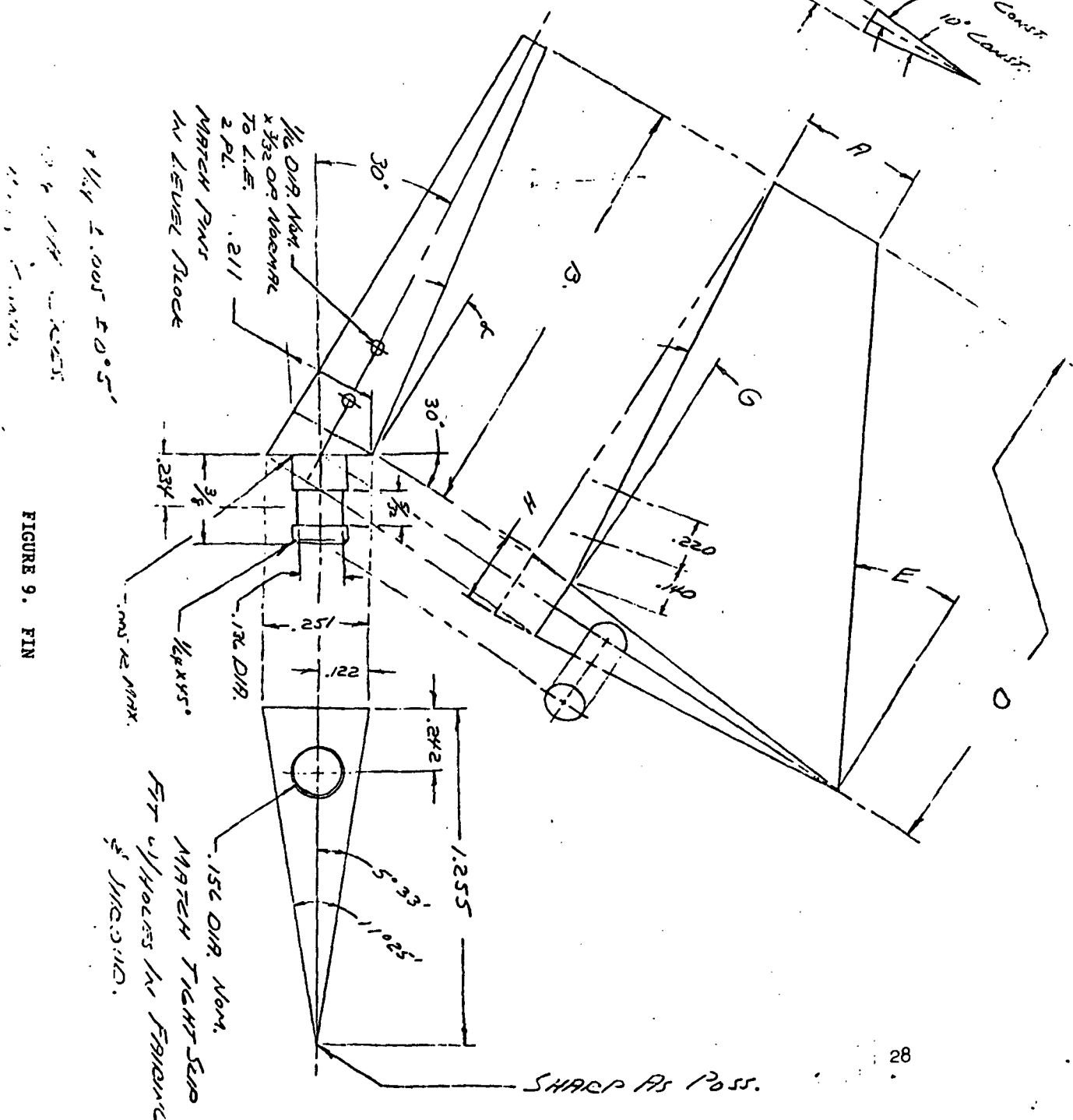
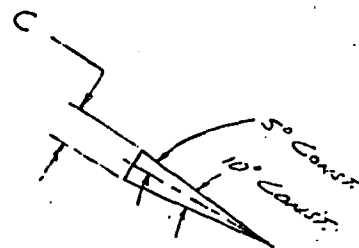
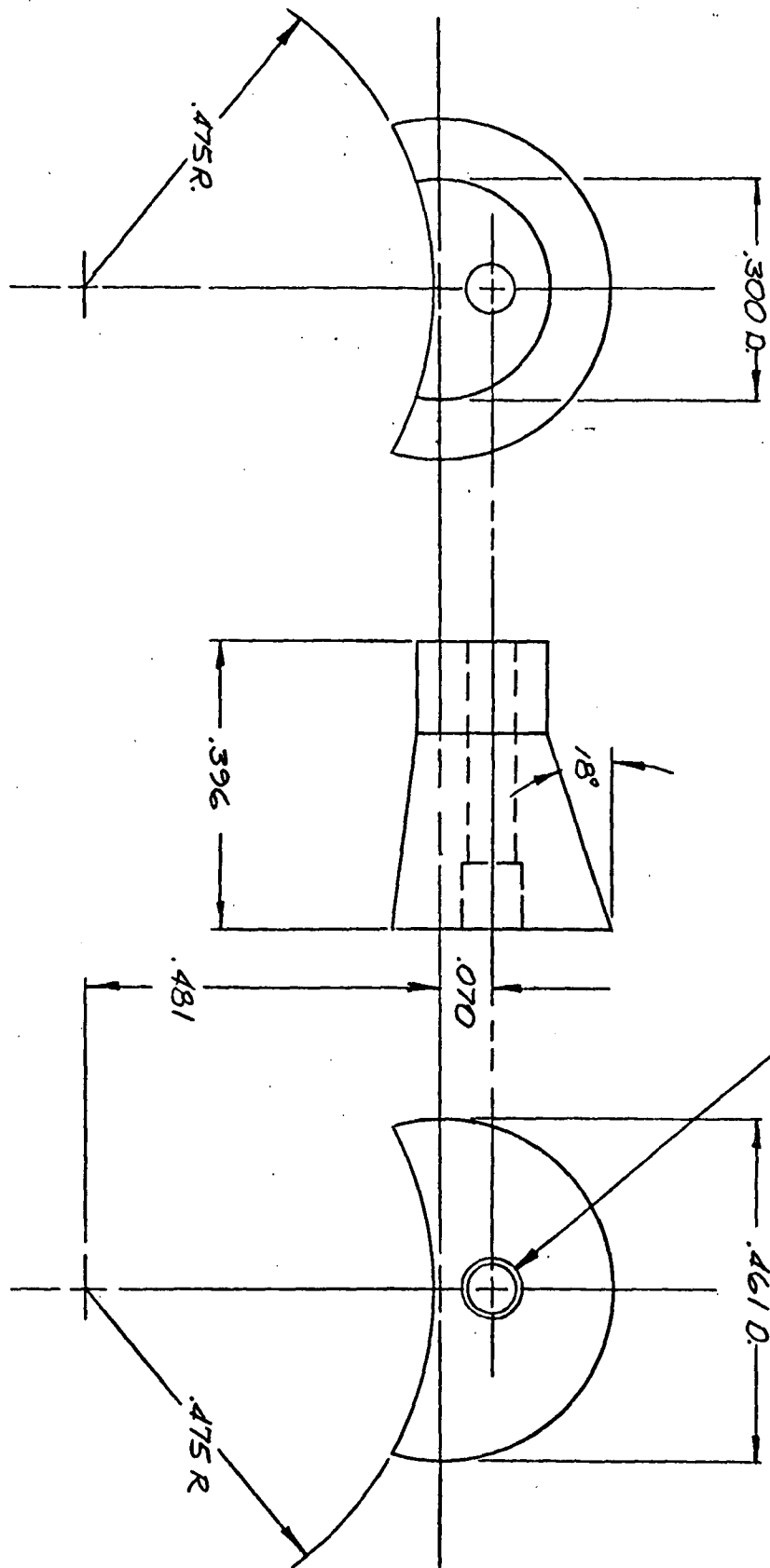


FIGURE 9. FIN



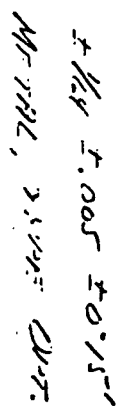
DRILL & C/T BORE FOR  
#1-72 SOCKET HD CAP SCR

MATERIAL -17-074 HT H900

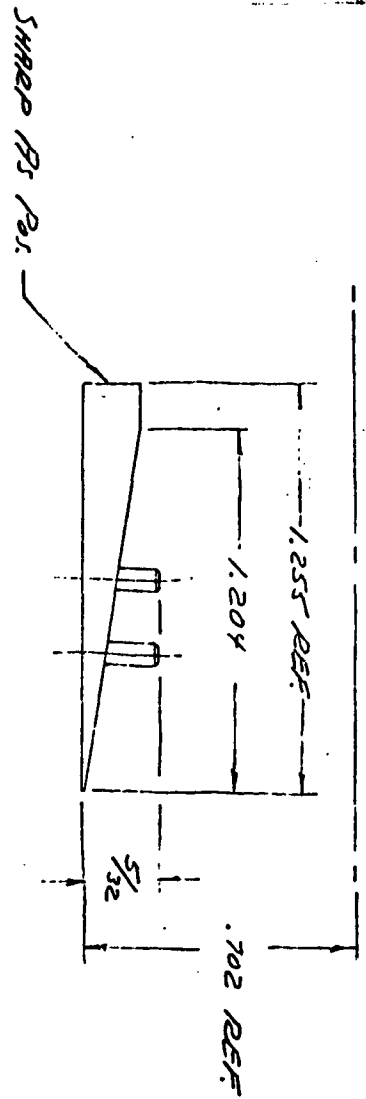
FIGURE 10. ENGINE

Technical drawing of a mechanical part, likely a cross-section of a shaft or a similar component. The drawing includes the following dimensions and features:

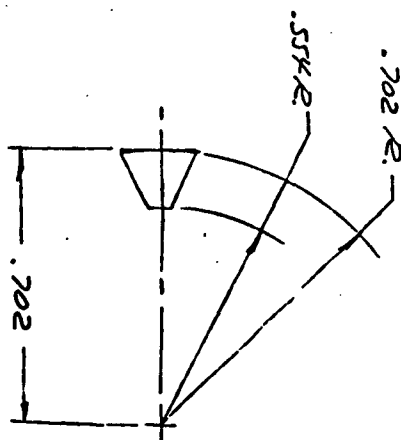
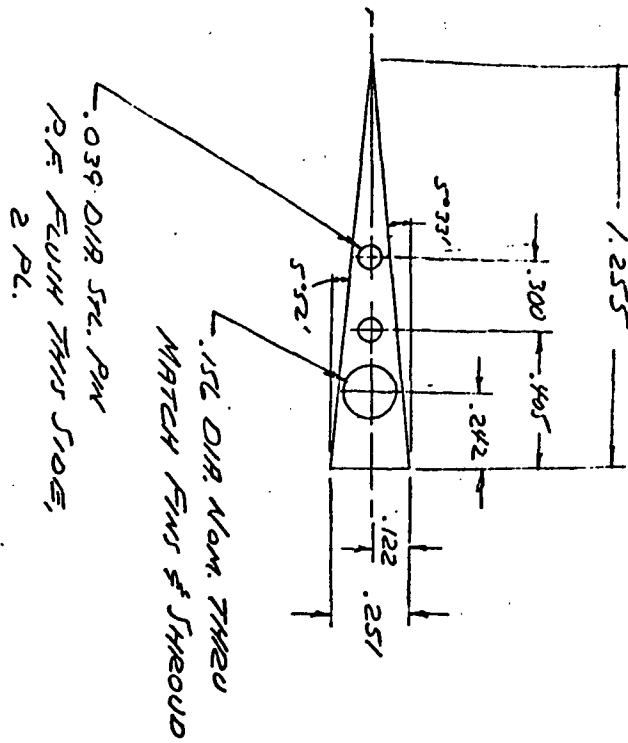
- Overall Length:** 1.255 REF.
- Overall Width:** 1.204
- Left End Feature:** A circular feature with a diameter of  $\frac{9}{32}$ .
- Internal Features:** Two rectangular features, each with a width of  $\frac{9}{32}$ .
- Right End Feature:** A circular feature with a diameter of  $\frac{9}{32}$ .
- Bottom Dimension:** .702 REF.



**FIGURE 11a. PAIRING XI**



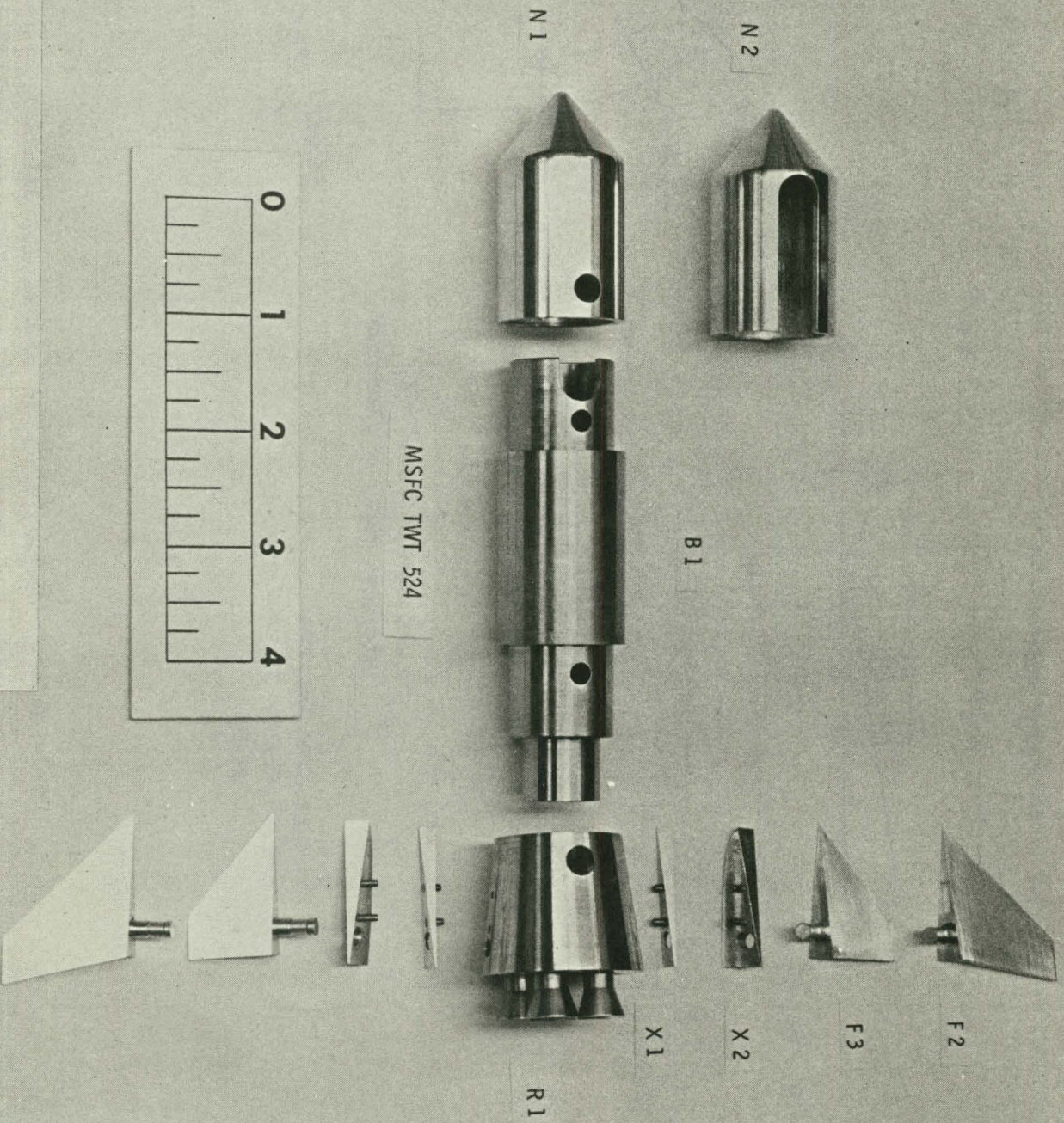
2 PARTS REQ'D.



NOTES: 32  
1. ✓

FIGURE 11b. FAIRING X2

FIGURE 12. PHOTOGRAPH SHOWING MODEL PARTS



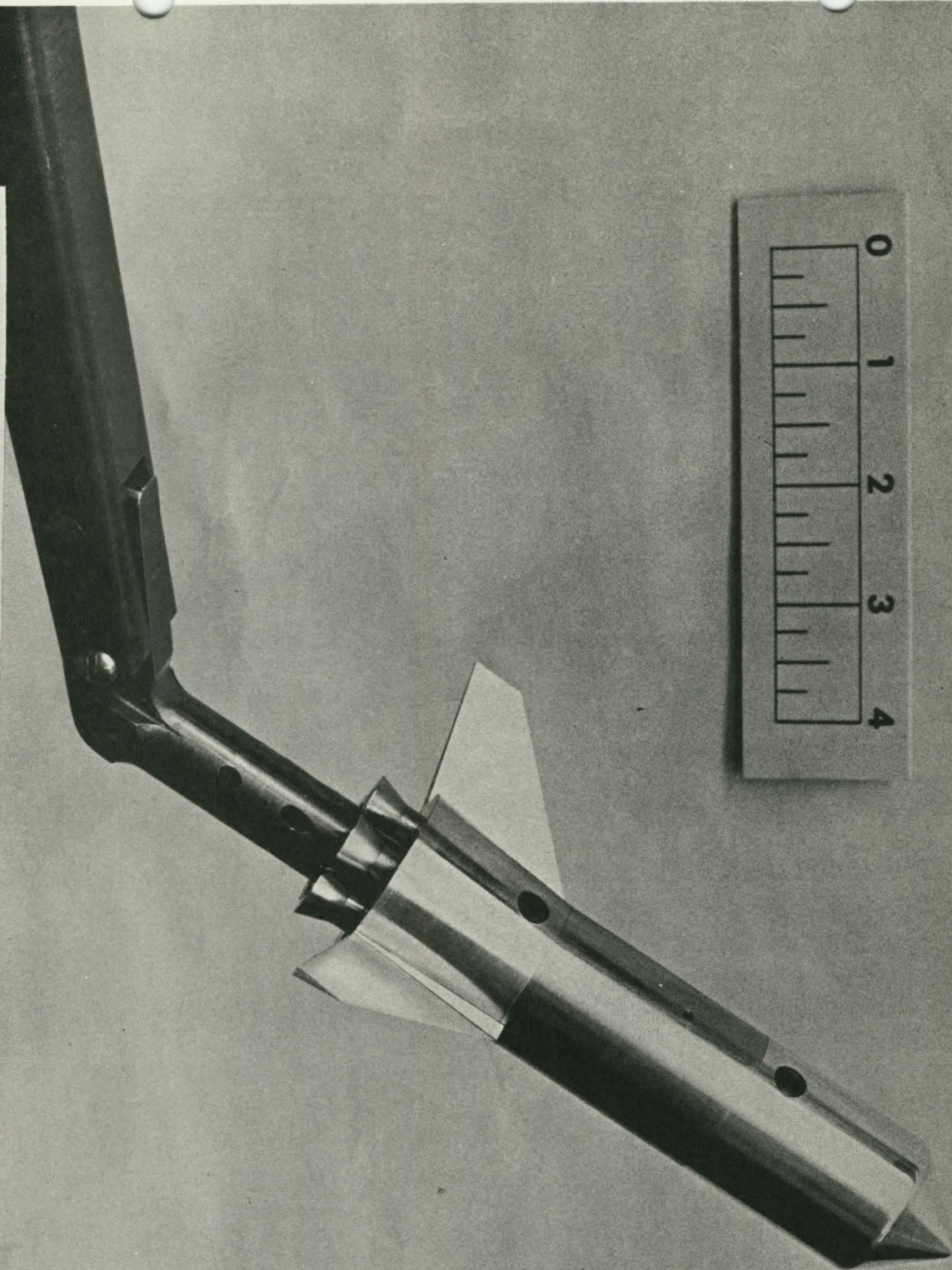
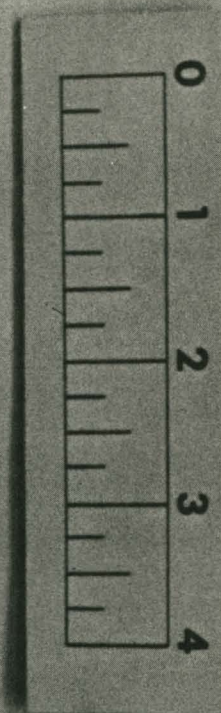


FIGURE 13. PHOTOGRAPH SHOWING AFT MOUNT

NASA-MSFC  
S&E-Aero-AE

02-23-72

35-1.72

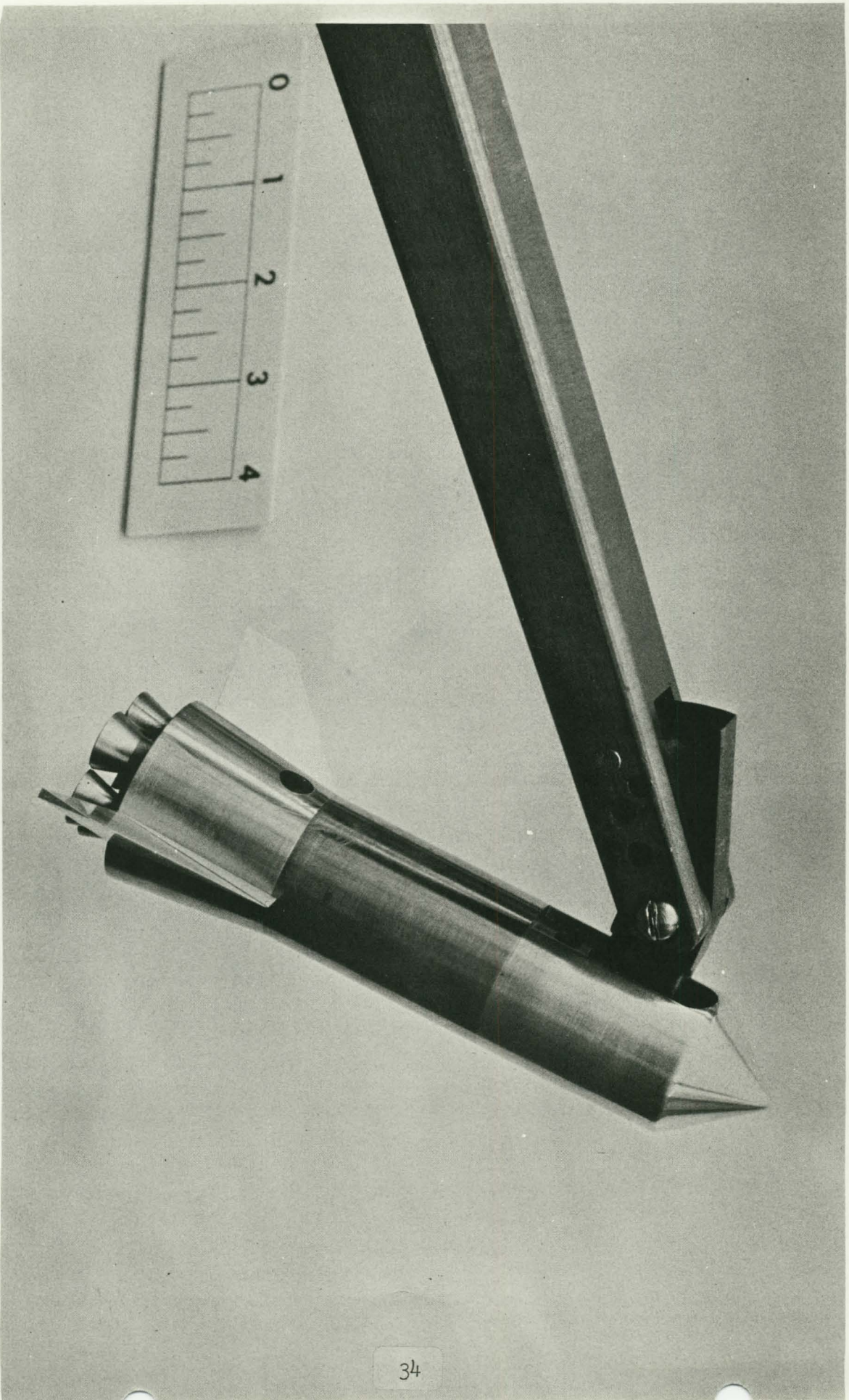


FIGURE 14. PHOTOGRAPH SHOWING FORWARD MOUNT

NASA-MSFC  
S&E-Aero-AE

02-23-72

35-2.72

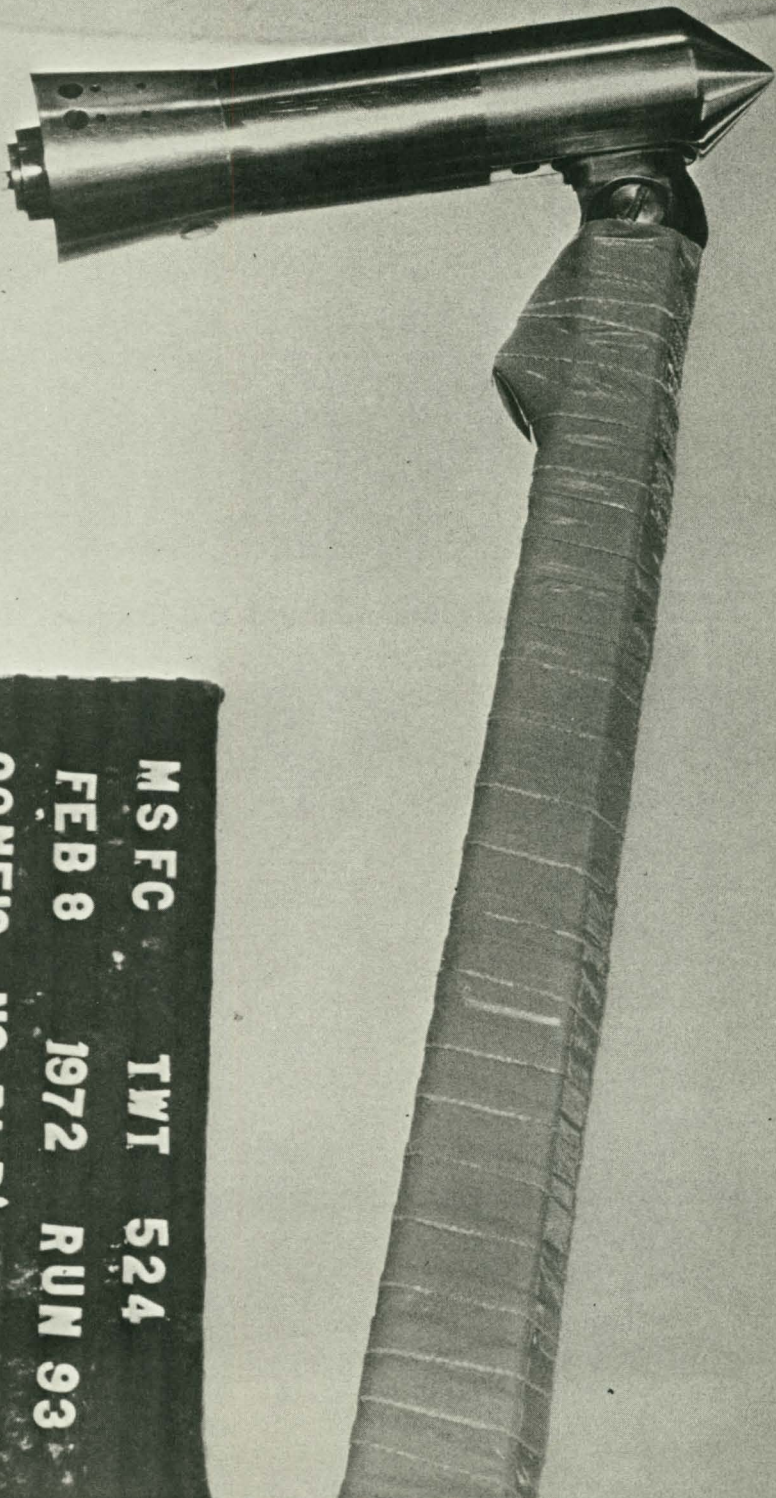
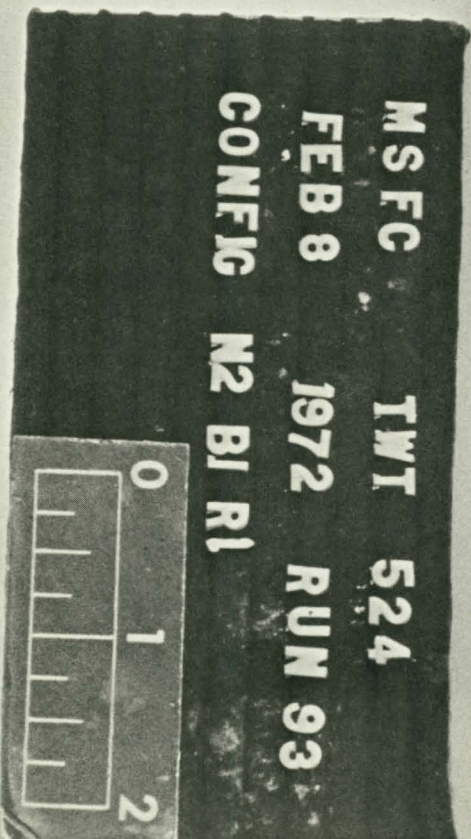


FIGURE 15. PHOTOGRAPH SHOWING TUNNEL INSTALLATION



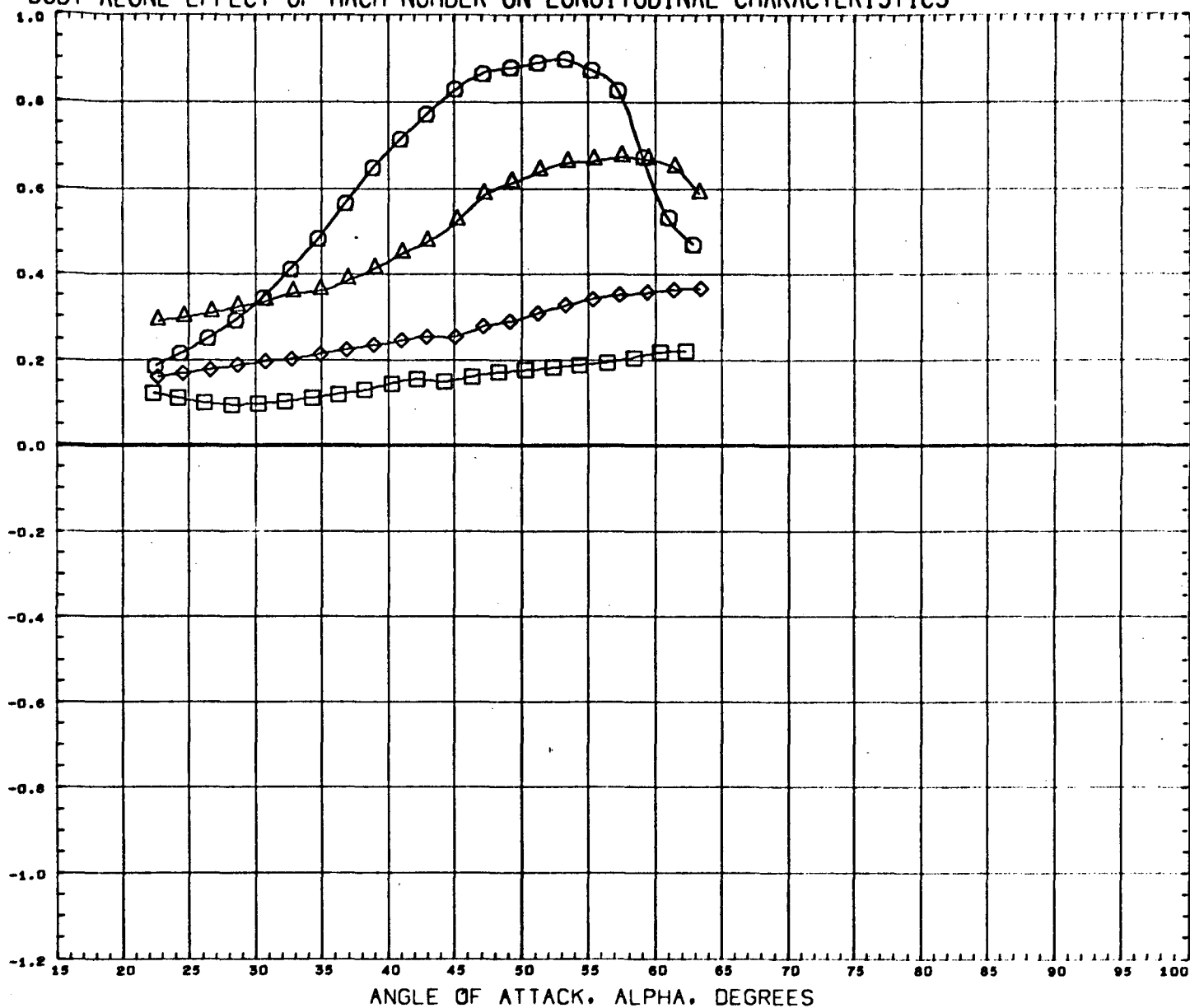
P L O T T E D     D A T A

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

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS

PITCHING MOMENT COEFFICIENT, CLM



ANGLE OF ATTACK, ALPHA, DEGREES

| SYMBOL | MACH  | BETA | PARAMETRIC VALUES |
|--------|-------|------|-------------------|
| ○      | 0.897 |      | 0.000             |
| △      | 1.197 |      |                   |
| ◇      | 1.953 |      |                   |
| □      | 4.959 |      |                   |

DATA HIST. CODE TV#6

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| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

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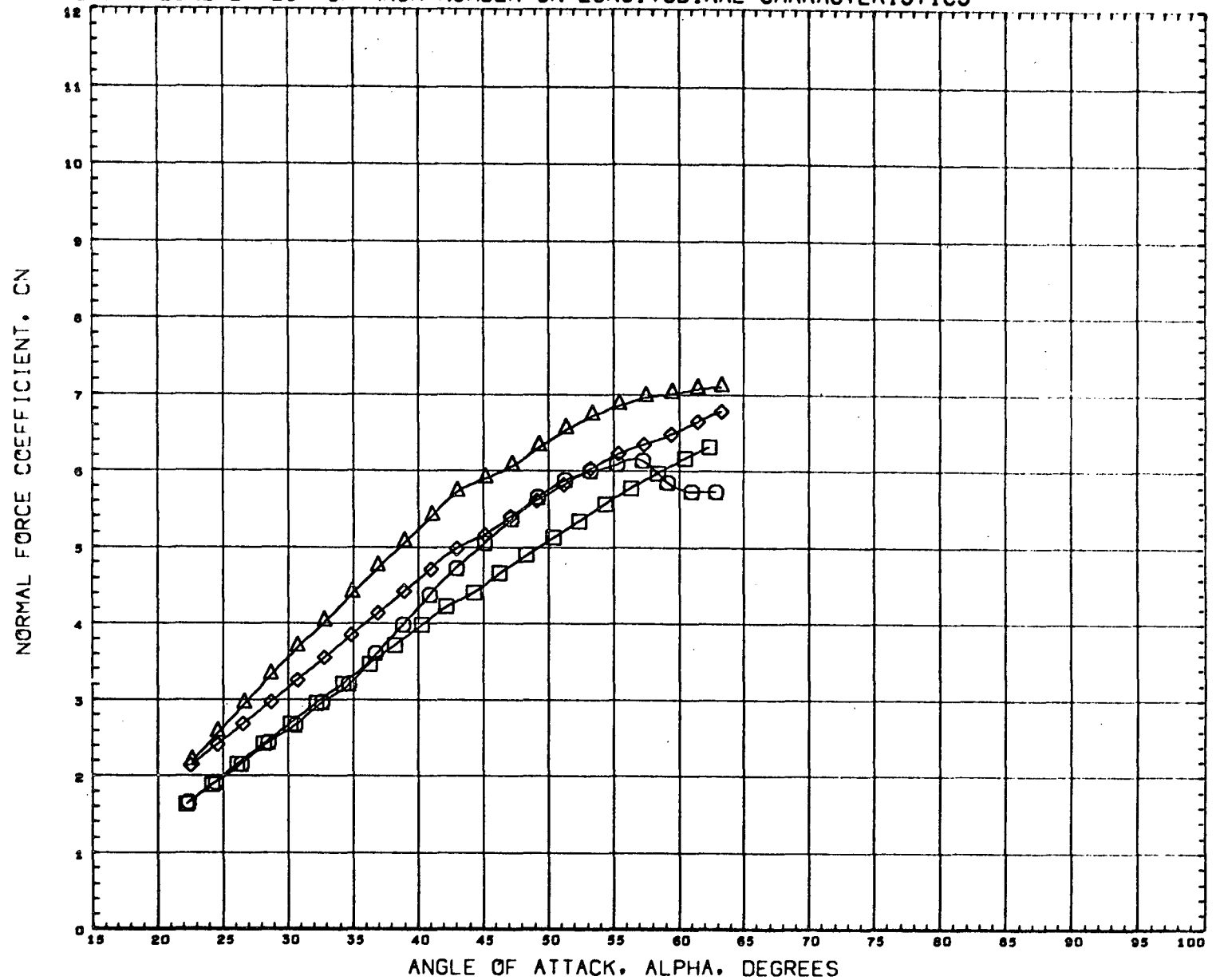
N1B1R1

(B59S01) 08 MAR 72

PAGE

1

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



ANGLE OF ATTACK, ALPHA, DEGREES

SYMBOL MACH BETA PARAMETRIC VALUES  
 ○ 0.897  
 △ 1.197  
 ◇ 1.953  
 □ 4.959

DATA HIST. CODE TV#G

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 BREF 4.9080 IN.  
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MSFC TWT 524 33 FOOT BOOSTER

N1B1R1

(B59S01)

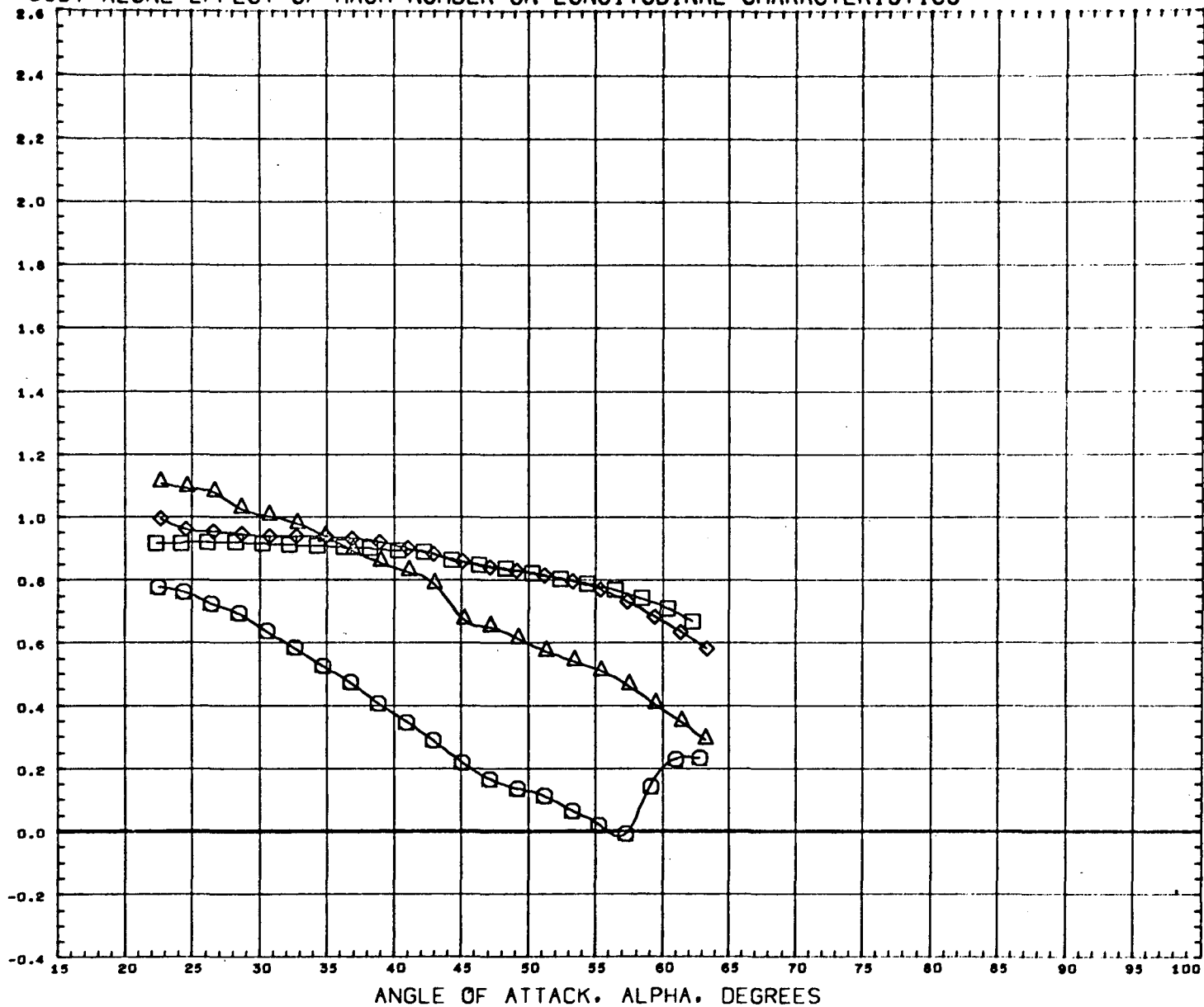
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PAGE

2

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS

AXIAL FORCE COEFFICIENT,  $C_A$



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 △ 1.197  
 ◇ 1.953  
 □ 4.959

DATA HIST. CODE TV#G

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MSFC TWT 524 33 FOOT BOOSTER

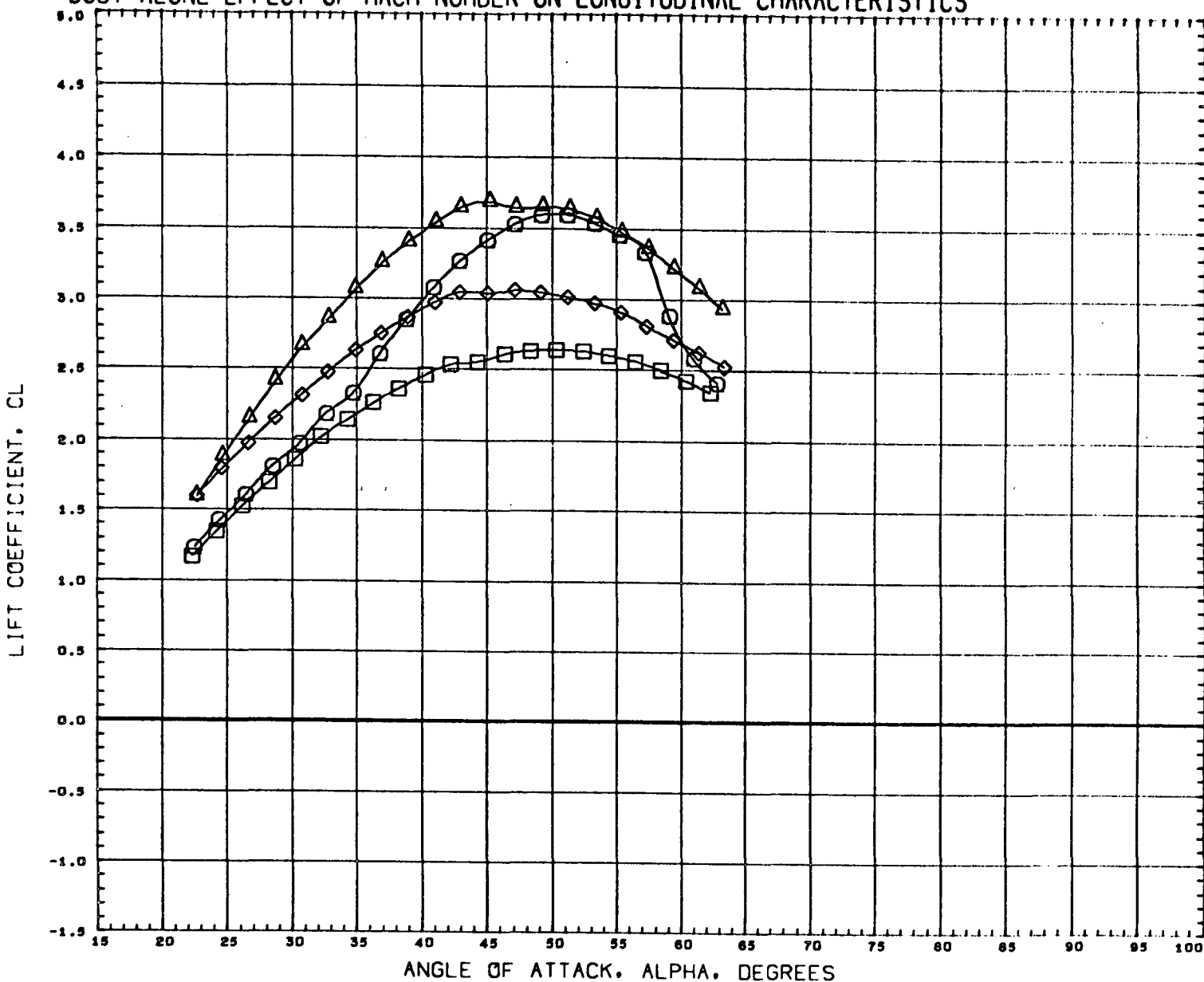
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PAGE

3

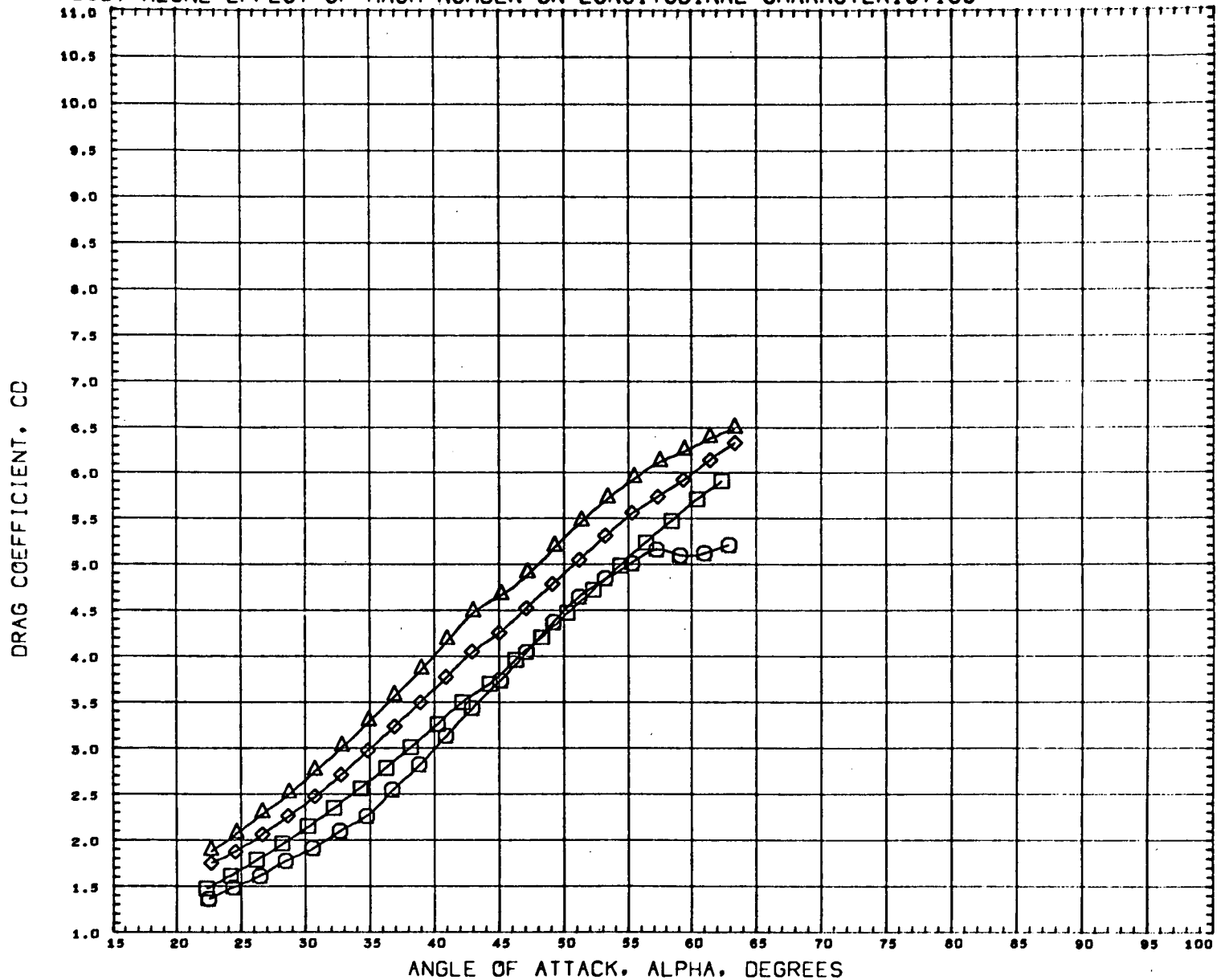
# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



| SYMBOL | MACH  | BETA | PARAMETRIC VALUES | REFERENCE INFORMATION |        |        |
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| △      | 1.197 |      |                   | LREF                  | 4.9080 | IN.    |
| ◇      | 1.953 |      |                   | BREF                  | 4.9080 | IN.    |
| □      | 4.959 |      |                   | XMRP                  | 2.9450 | IN.    |
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DATA HIST. CODE TV\*G

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



SYMBOL MACH BETA PARAMETRIC VALUES  
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 △ 1.197  
 ◇ 1.953  
 □ 4.959

DATA HIST. CODE TV#G

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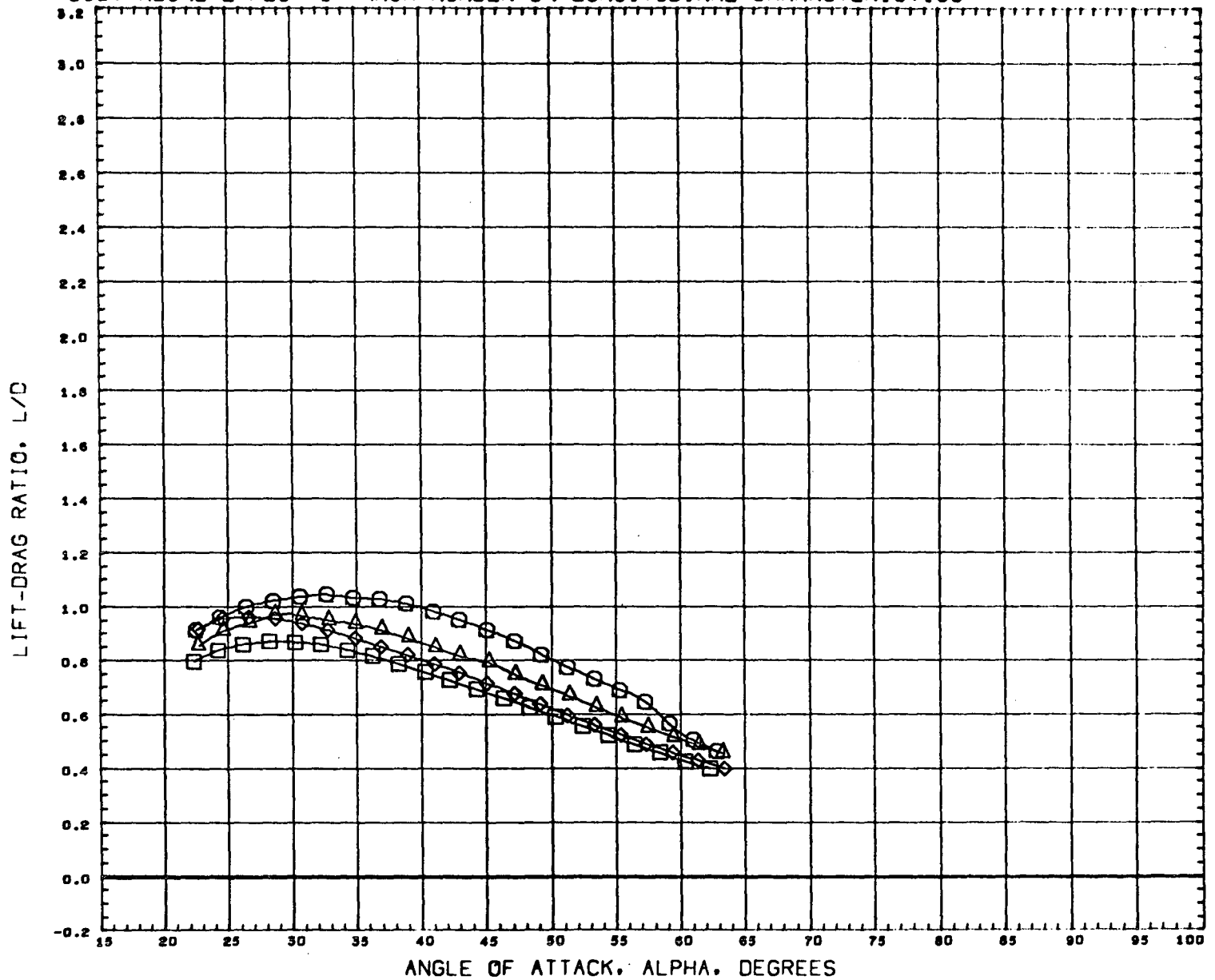
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PAGE

5

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



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| △      | 1.197 |      |                   |
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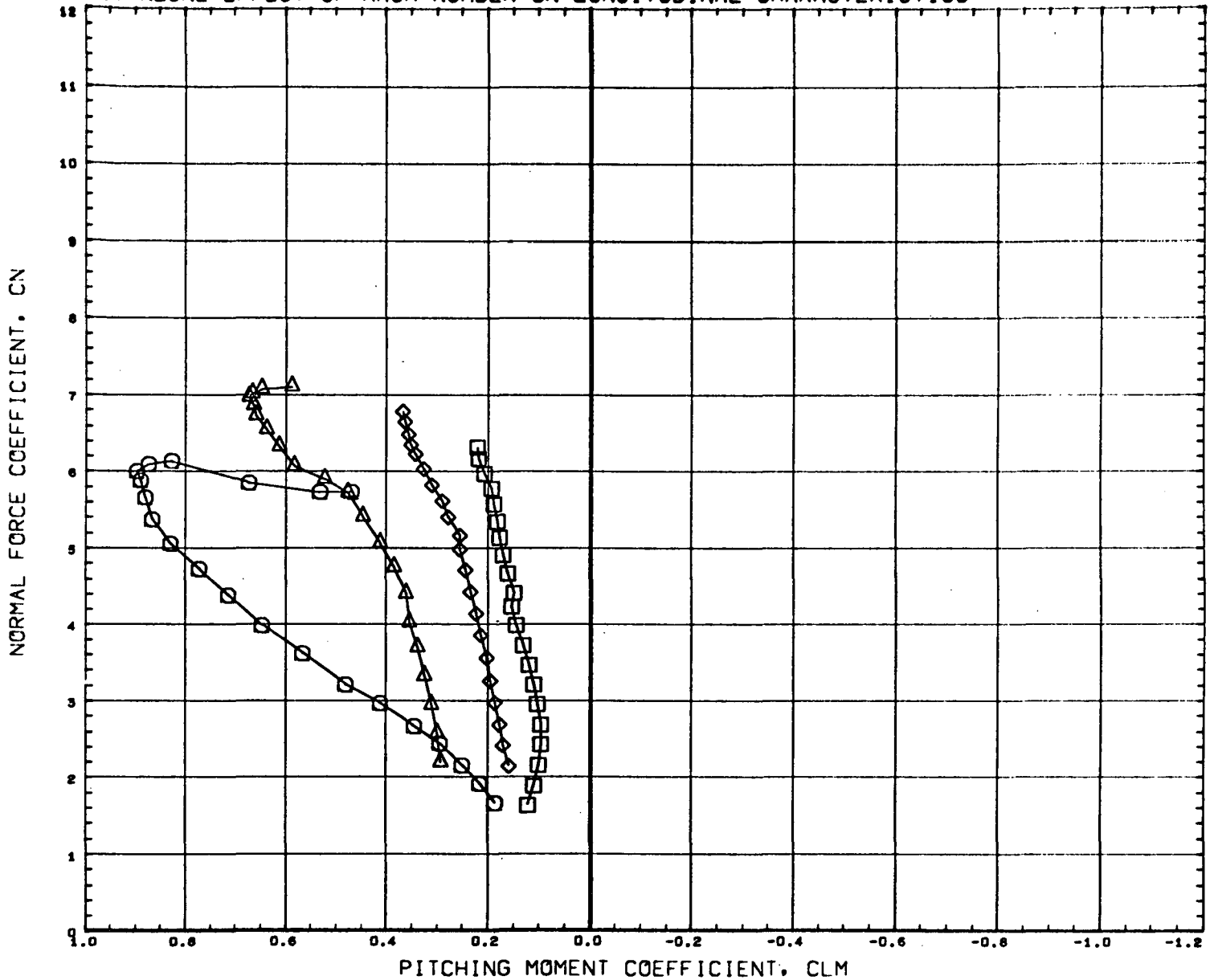
N1B1R1

(B59S01) 08 MAR 72

PAGE

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# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



|        |       |      |                   |
|--------|-------|------|-------------------|
| SYMBOL | MACH  | BETA | PARAMETRIC VALUES |
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| △      | 1.197 |      |                   |
| ◇      | 1.953 |      |                   |
| □      | 4.959 |      |                   |

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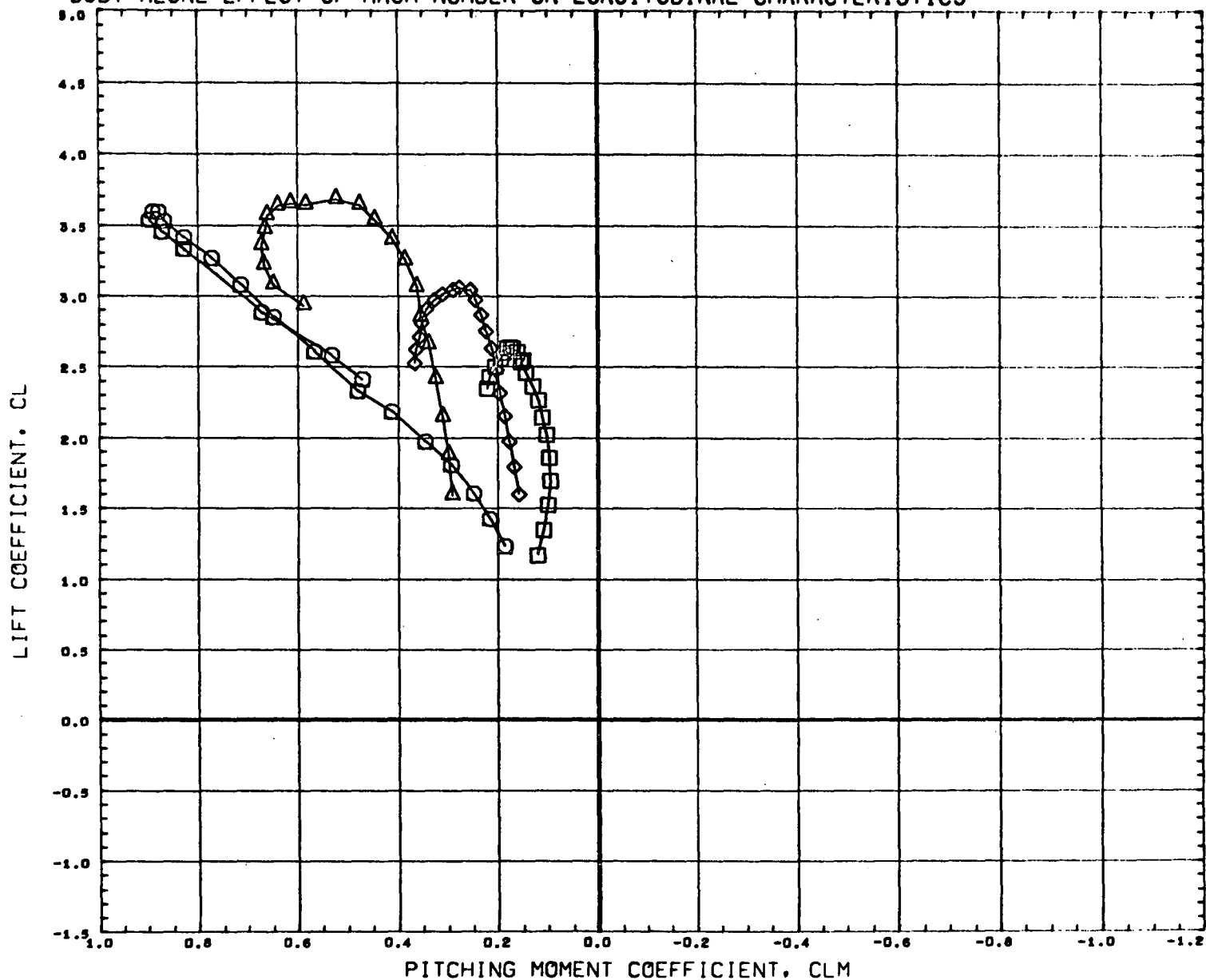
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(B59S01) 08 MAR 72

PAGE

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# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS

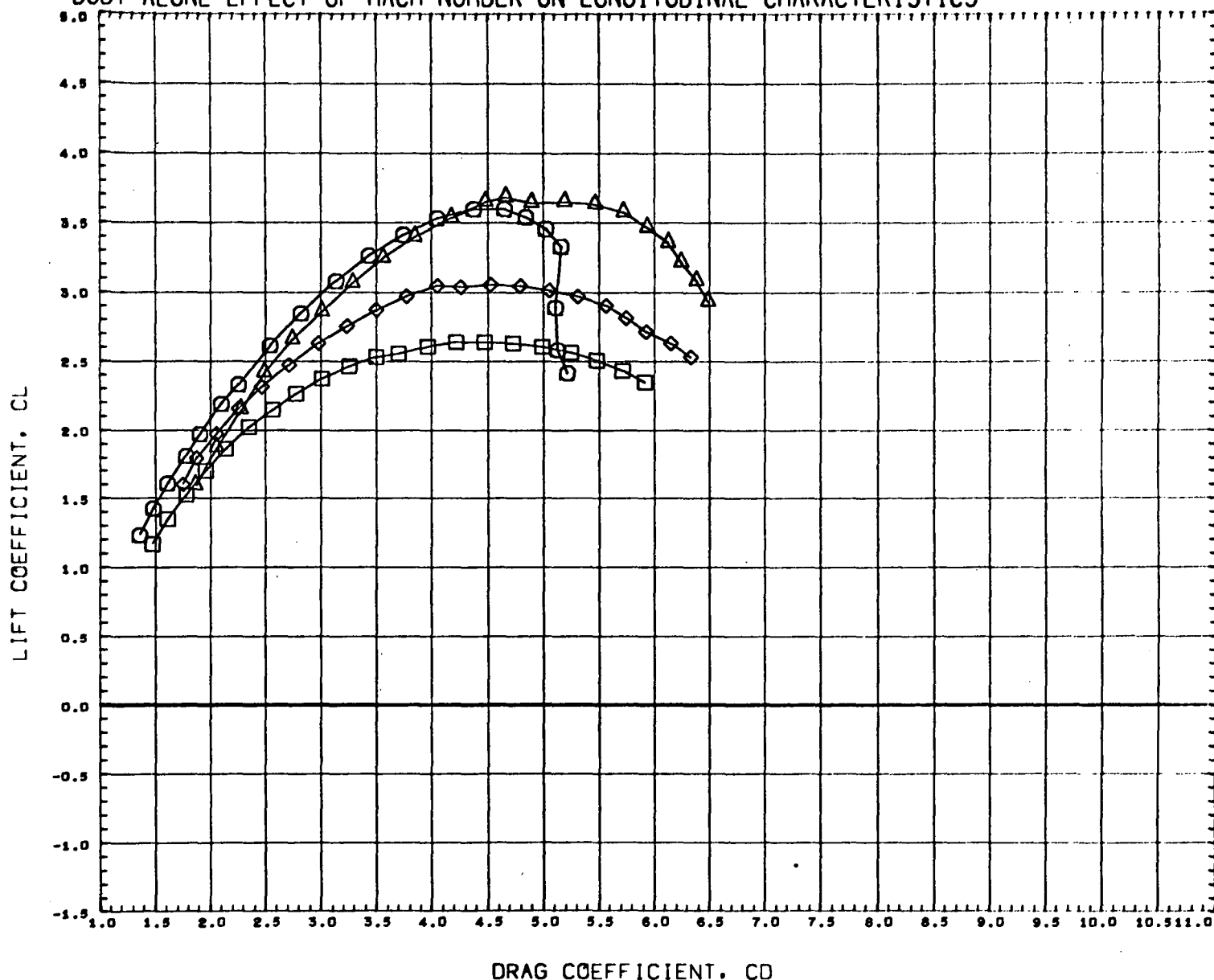


| SYMBOL      | MACH  | BETA | PARAMETRIC VALUES |
|-------------|-------|------|-------------------|
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| $\triangle$ | 1.197 |      |                   |
| $\diamond$  | 1.953 |      |                   |
| $\square$   | 4.959 |      |                   |

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
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| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

DATA HIST. CODE TV\*G

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



| SYMBOL | MACH  | BETA | PARAMETRIC VALUES |
|--------|-------|------|-------------------|
| ○      | 0.897 |      | 0.000             |
| △      | 1.197 |      |                   |
| ◇      | 1.953 |      |                   |
| □      | 4.959 |      |                   |

DATA HIST. CODE TV#6

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| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

MSFC TWT 524 33 FOOT BOOSTER

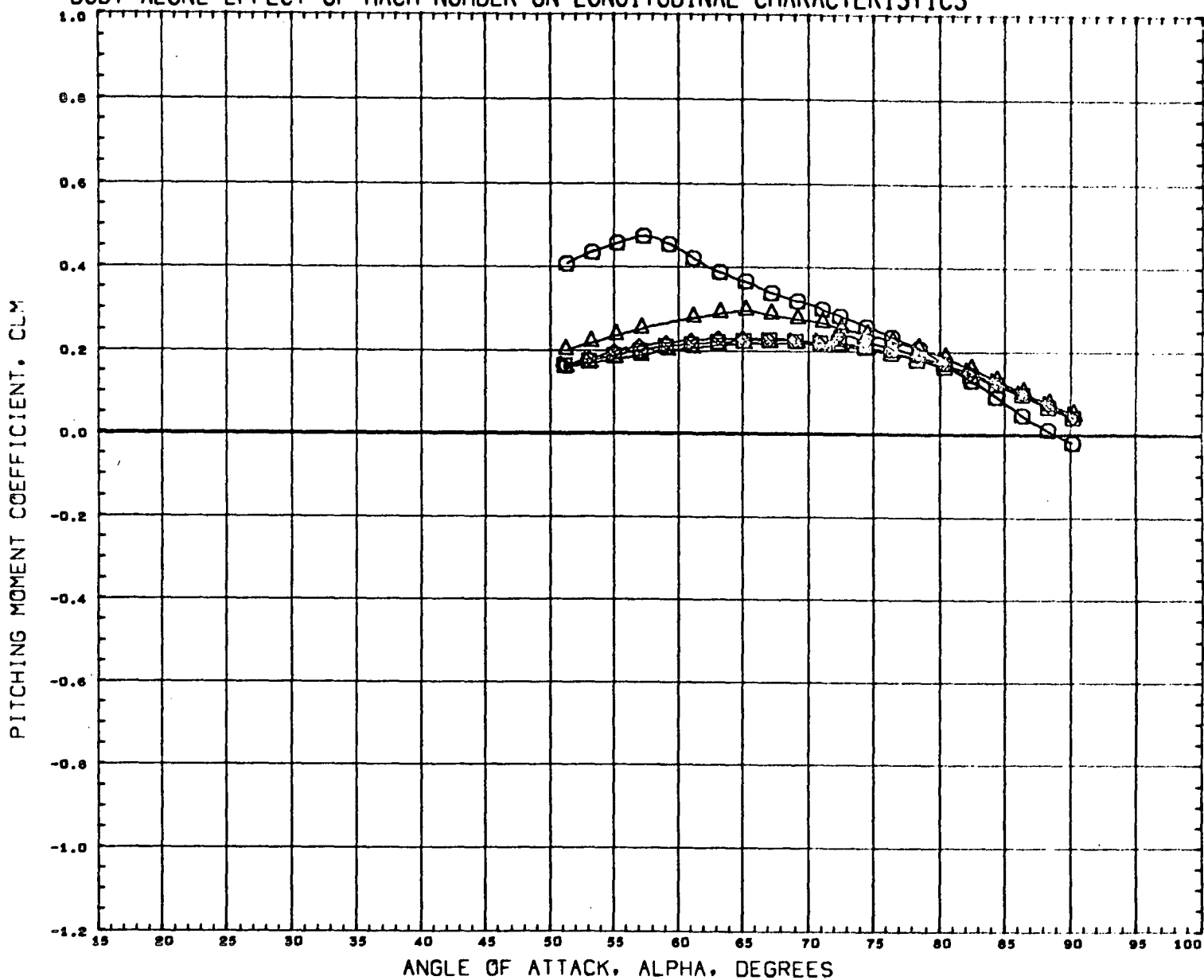
N1B1R1

(B59S01) 08 MAR 72

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# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



| SYMBOL | MACH  | BETA | PARAMETRIC VALUES |
|--------|-------|------|-------------------|
| ○      | 1.197 |      | 0.000             |
| △      | 1.956 |      |                   |
| □      | 2.740 |      |                   |
| ◇      | 3.480 |      |                   |
| ×      | 4.959 |      |                   |

DATA HIST. CODE TV\*6

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

MSFC TWT 524 33 FOOT BOOSTER

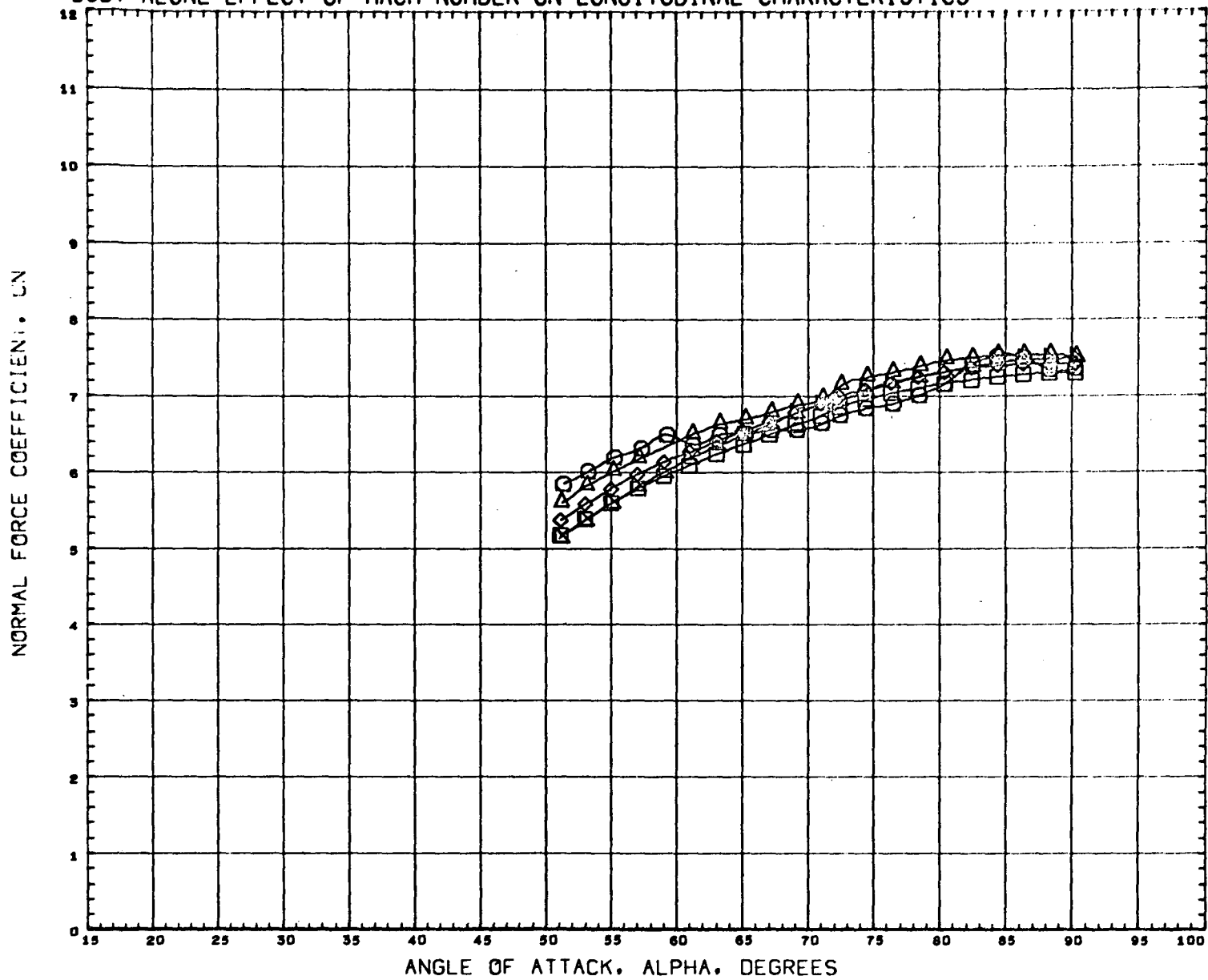
N2B1R1

(B59S05) 08 MAR 72

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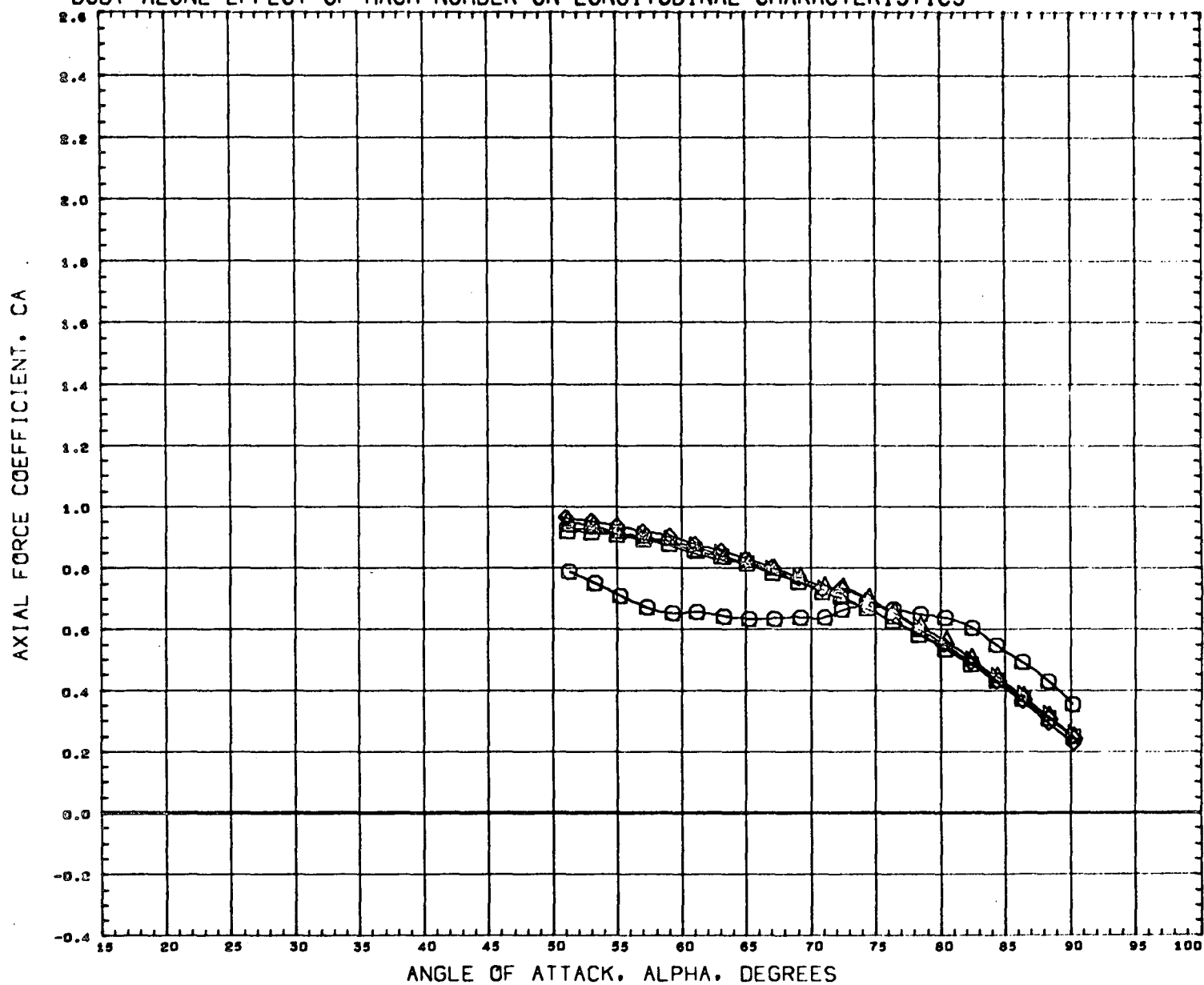
# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



| SYMBOL | MACH  | BETA | PARAMETRIC VALUES | REFERENCE INFORMATION |
|--------|-------|------|-------------------|-----------------------|
| ○      | 1.197 |      | 0.000             | SREF 0.9650 SQ. IN    |
| ◇      | 1.956 |      |                   | LREF 4.9080 IN.       |
| △      | 2.740 |      |                   | BREF 4.9080 IN.       |
| □      | 3.480 |      |                   | XMRP 2.9450 IN.       |
| ×      | 4.959 |      |                   | YMRP 0.0000 IN.       |
|        |       |      |                   | ZMRP 0.0000 IN.       |
|        |       |      |                   | SCALE 0.0026          |

DATA HIST. CODE TV\*G

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS

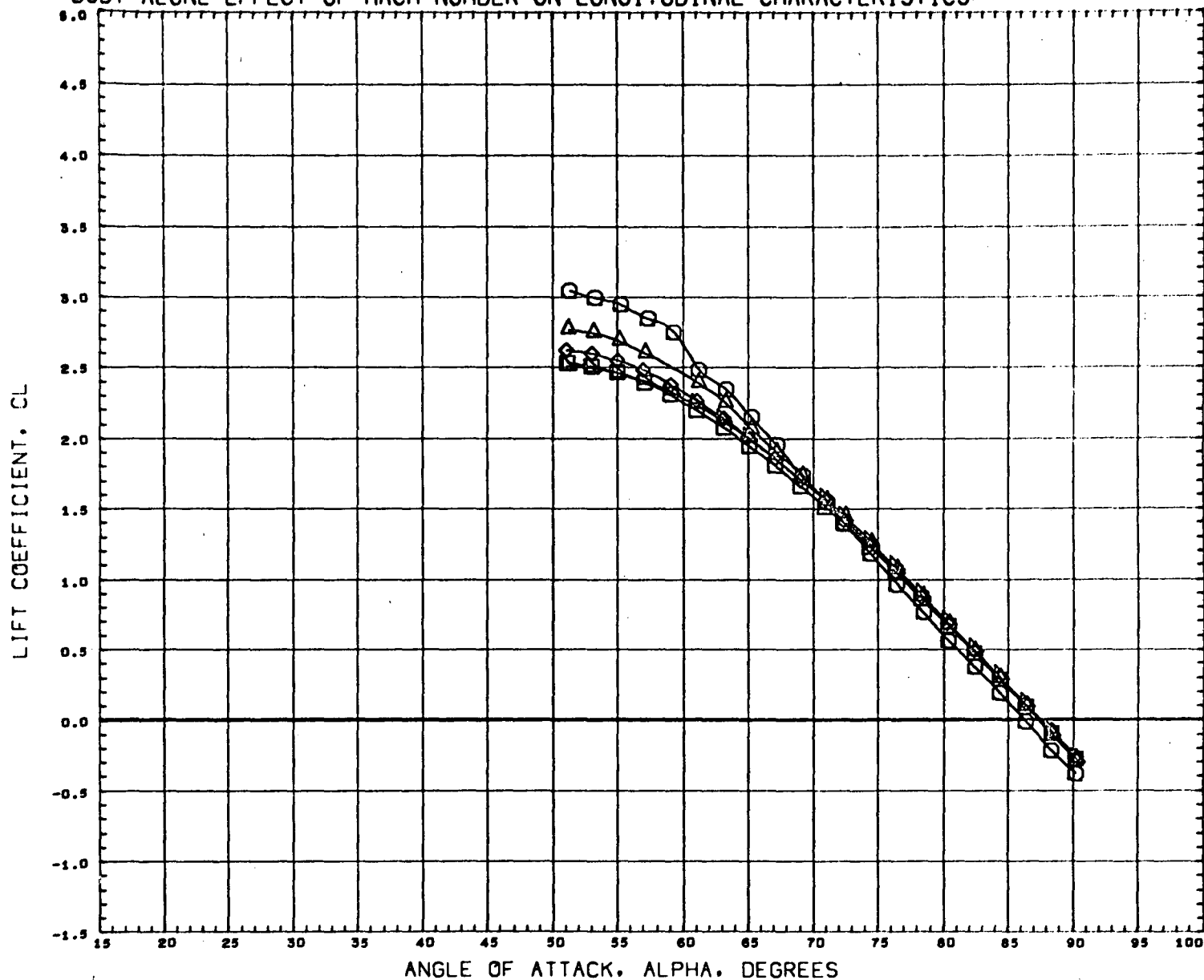


SYMBOL MACH PARAMETRIC VALUES  
 ○ 1.197 BETA 0.000  
 ◇ 1.956  
 △ 2.740  
 □ 3.480  
 ◻ 4.959

DATA HIST. CODE TV#6

REFERENCE INFORMATION  
 SREF 0.9650 SQ. IN  
 LREF 4.9080 IN.  
 BREF 4.9080 IN.  
 XMRP 2.9450 IN.  
 YMRP 0.0000 IN.  
 ZMRP 0.0000 IN.  
 SCALE 0.0028

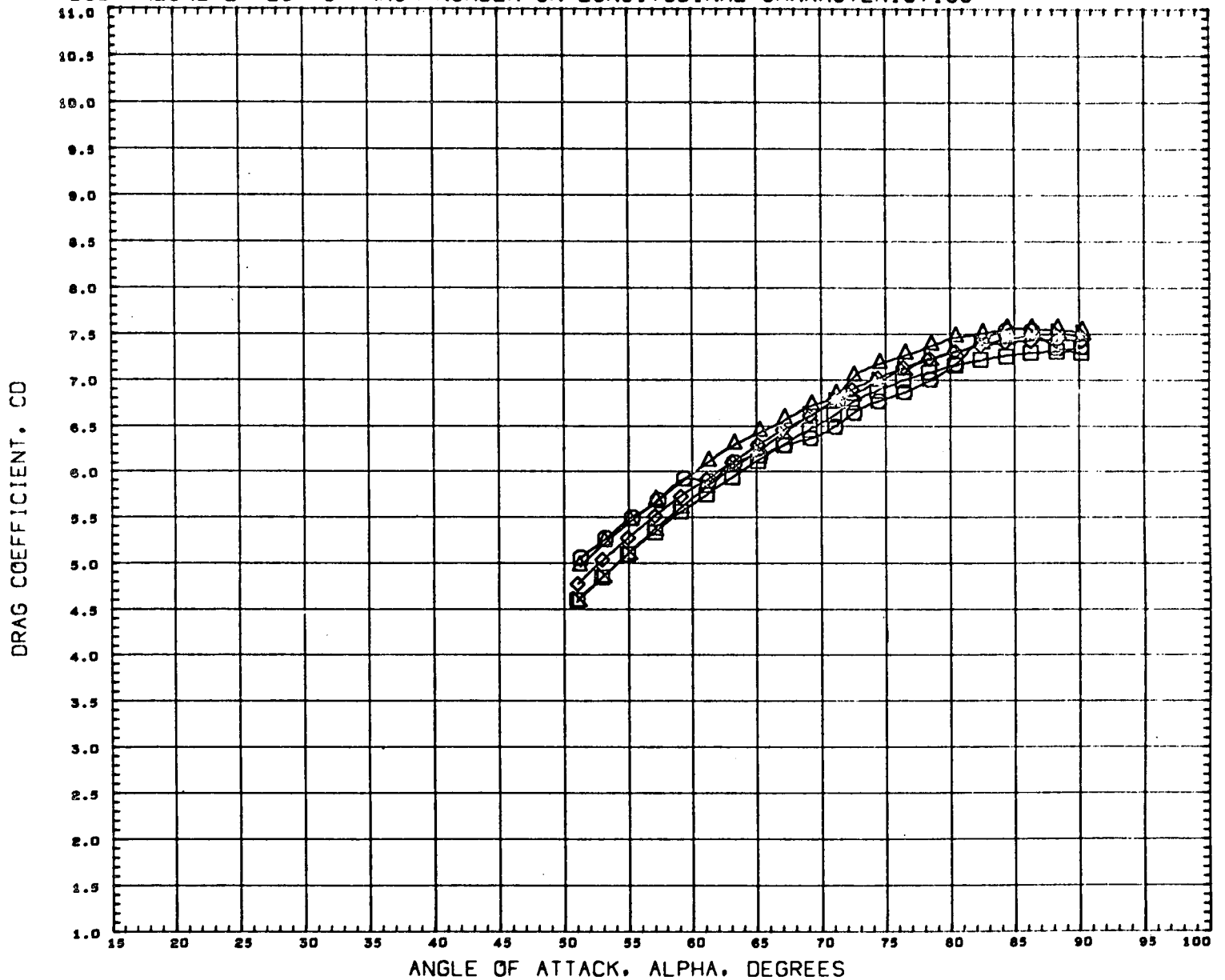
# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



| SYMBOL | MACH  | BETA | PARAMETRIC VALUES | REFERENCE INFORMATION |
|--------|-------|------|-------------------|-----------------------|
| ○      | 1.197 |      | 0.000             | SREF 0.9650 sq. in    |
| △      | 1.956 |      |                   | LREF 4.9080 in.       |
| ◇      | 2.740 |      |                   | BREF 4.9080 in.       |
| □      | 3.480 |      |                   | XMRP 2.9450 in.       |
| ▽      | 4.959 |      |                   | YMRP 0.0000 in.       |
|        |       |      |                   | ZMRP 0.0000 in.       |
|        |       |      |                   | SCALE 0.0028          |

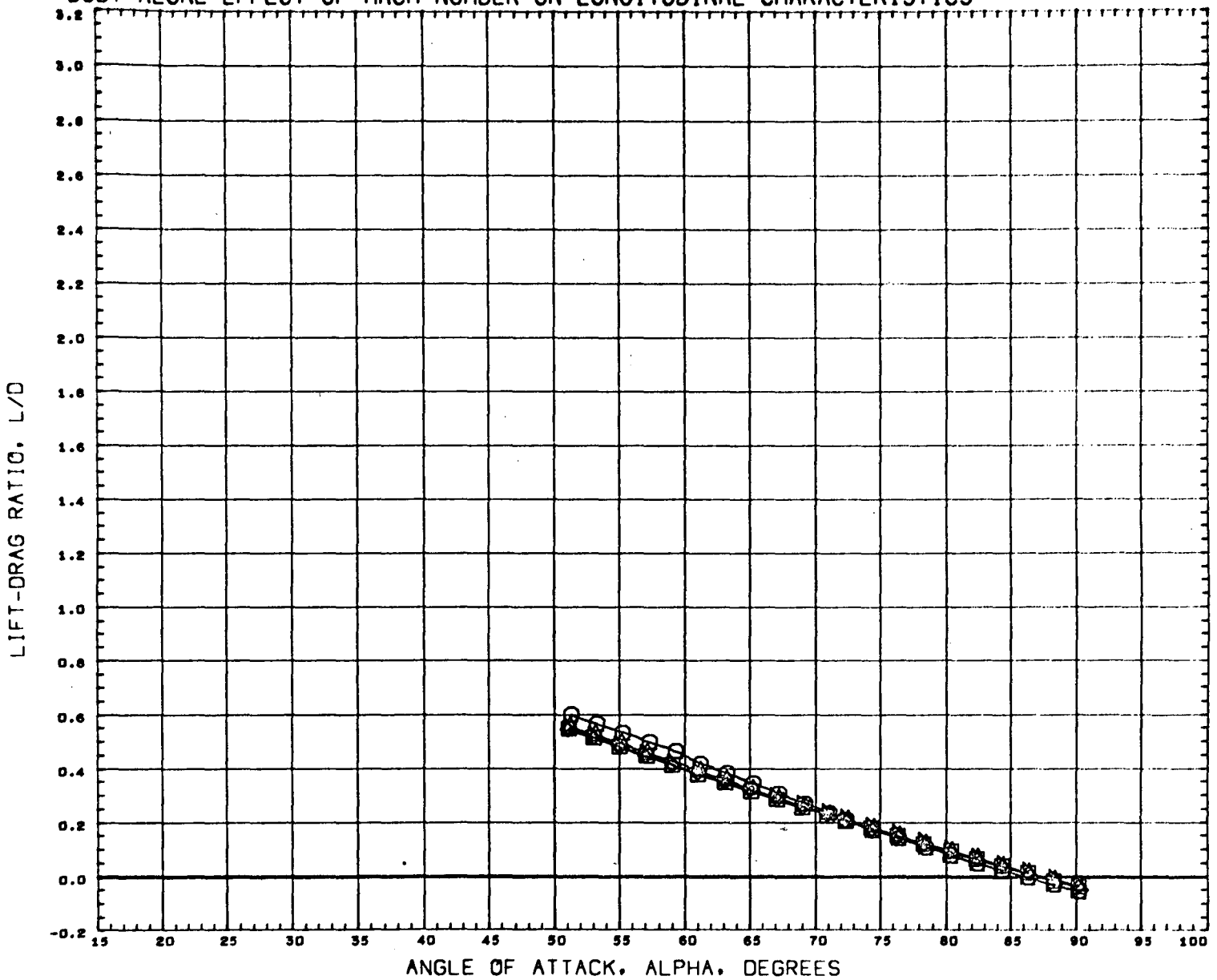
DATA HIST. CODE TV\*G

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



| SYMBOL | MACH  | BETA  | PARAMETRIC VALUES | REFERENCE INFORMATION |
|--------|-------|-------|-------------------|-----------------------|
| □      | 1.197 | 0.000 |                   | SREF 0.9650 SQ. IN    |
| ◇      | 1.956 |       |                   | LREF 4.9080 IN.       |
| △      | 2.740 |       |                   | BREF 4.9080 IN.       |
| ○      | 3.480 |       |                   | XMRP 2.9450 IN.       |
| ×      | 4.959 |       |                   | YMRP 0.0000 IN.       |
|        |       |       |                   | ZMRP 0.0000 IN.       |
|        |       |       |                   | SCALE 0.0028          |

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



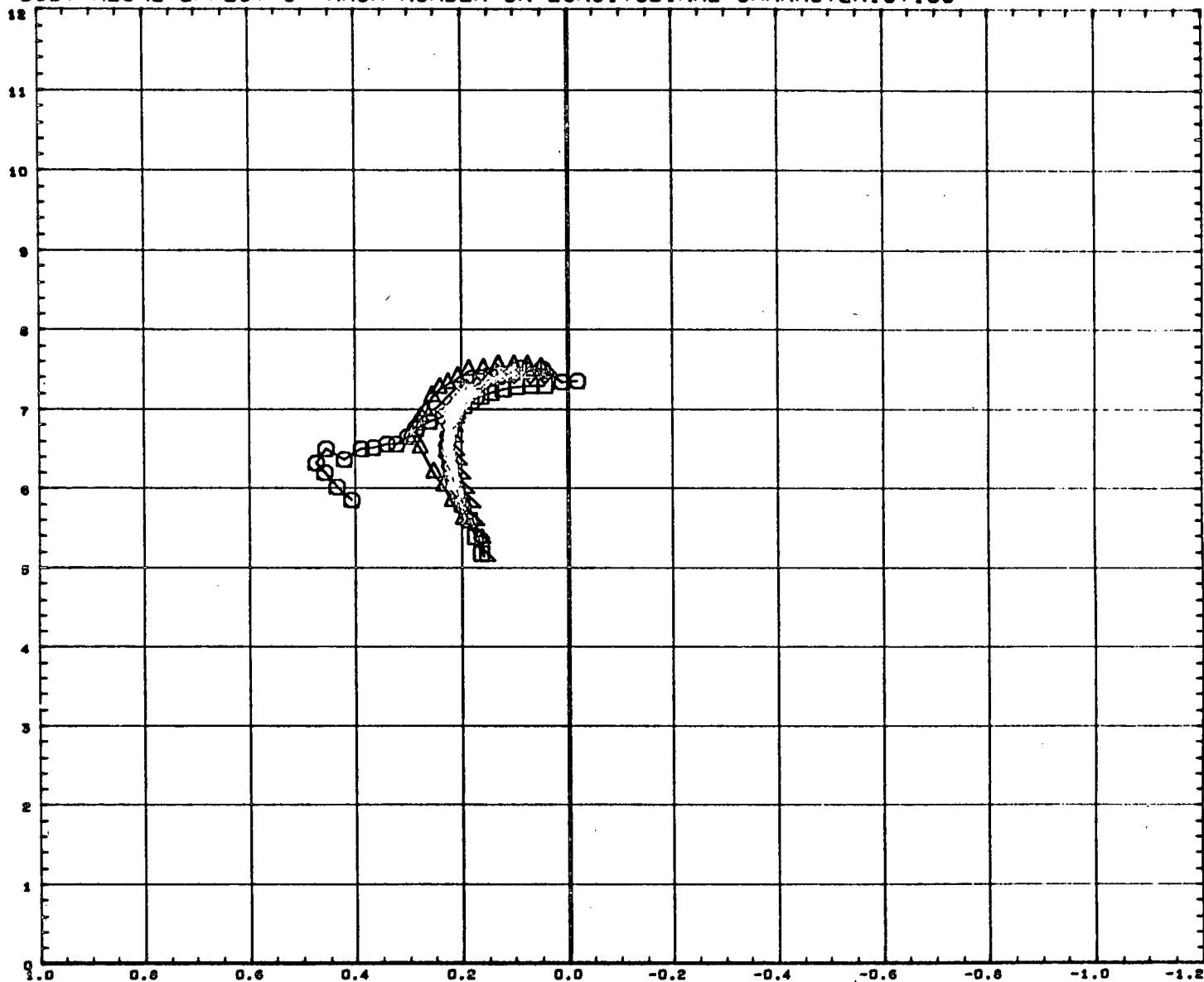
|        |       |       |                   |
|--------|-------|-------|-------------------|
| SYMBOL | MACH  | BETA  | PARAMETRIC VALUES |
| ○      | 1.197 | 0.000 |                   |
| △      | 1.956 |       |                   |
| ◇      | 2.740 |       |                   |
| □      | 3.480 |       |                   |
| ◻      | 4.959 |       |                   |

|                       |        |        |
|-----------------------|--------|--------|
| REFERENCE INFORMATION |        |        |
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

DATA HIST. CODE TV#G

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS

NORMAL FORCE COEFFICIENT, CN



PITCHING MOMENT COEFFICIENT, CLM

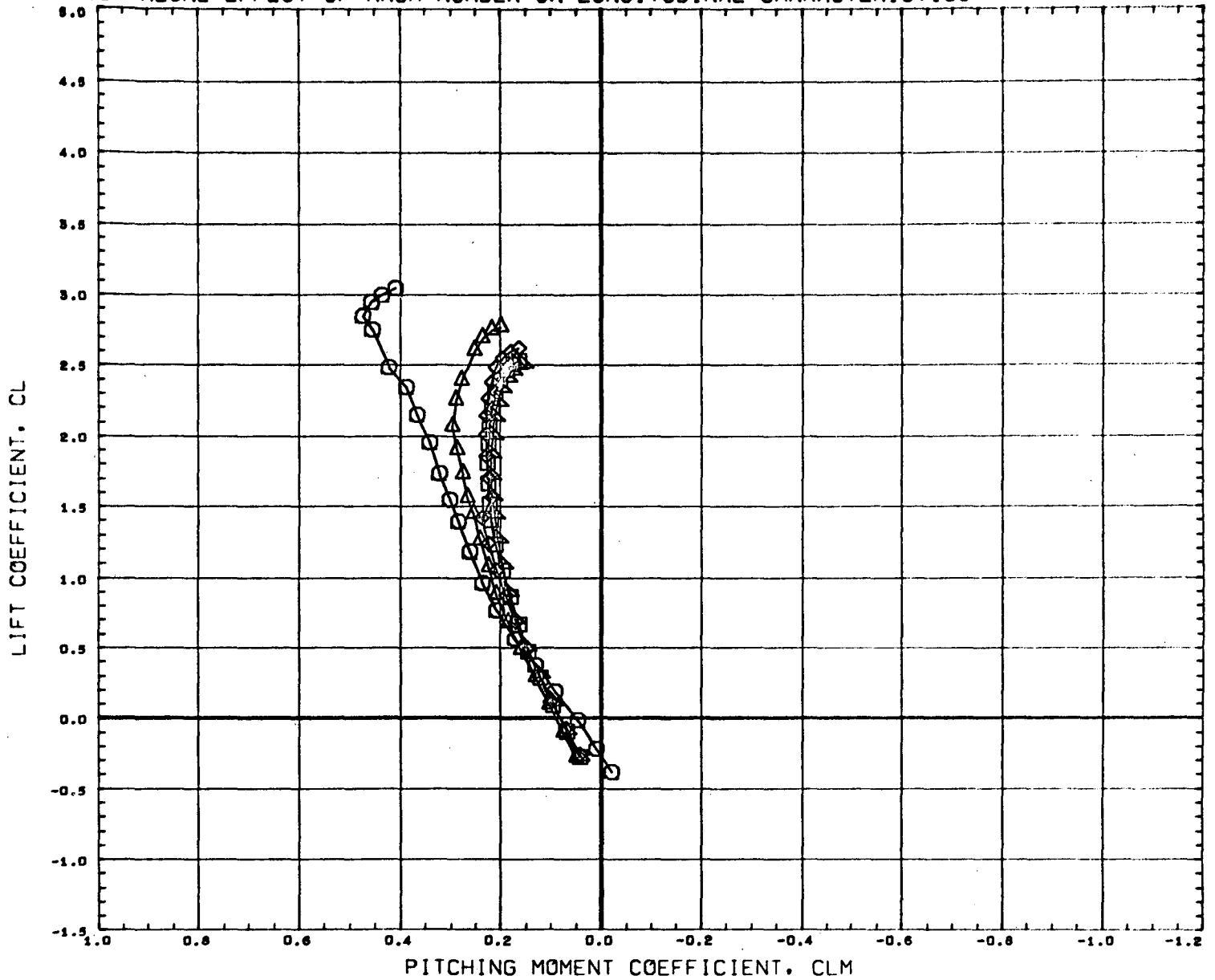
SYMBOL  
○  
△  
◇  
□  
▽

| MACH  | BETA | PARAMETRIC VALUES |
|-------|------|-------------------|
| 1.197 |      | 0.000             |
| 1.956 |      |                   |
| 2.740 |      |                   |
| 3.480 |      |                   |
| 4.959 |      |                   |

DATA HIST. CODE TV#6

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS

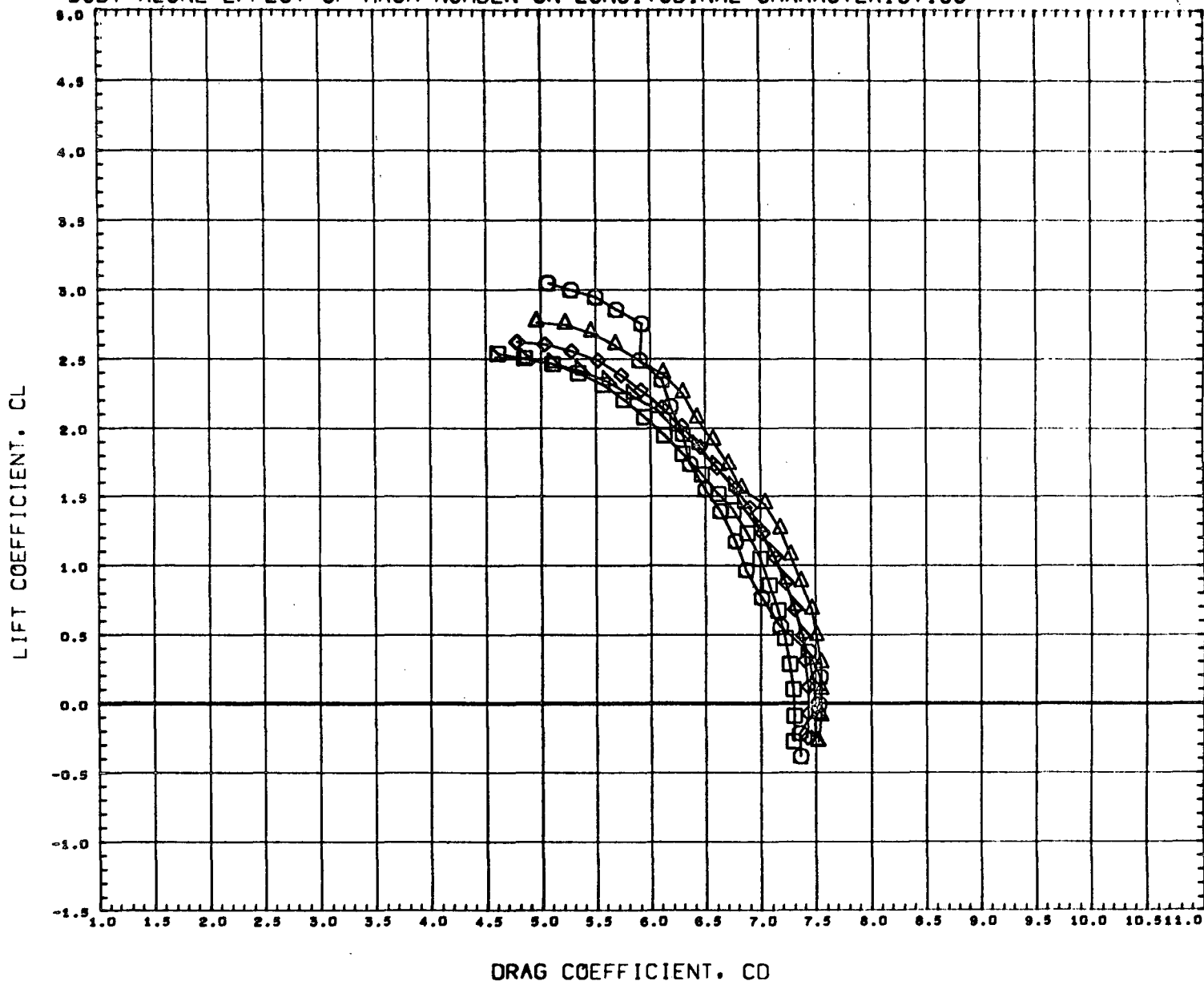


|        |       |      |                   |
|--------|-------|------|-------------------|
| SYMBOL | MACH  | BETA | PARAMETRIC VALUES |
| ○      | 1.197 |      | 0.000             |
| △      | 1.956 |      |                   |
| ◇      | 2.740 |      |                   |
| □      | 3.480 |      |                   |
| ○      | 4.959 |      |                   |

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

DATA HIST. CODE TV\*G

# BODY ALONE EFFECT OF MACH NUMBER ON LONGITUDINAL CHARACTERISTICS



| SYMBOL | MACH  | BETA | PARAMETRIC VALUES |
|--------|-------|------|-------------------|
| ○      | 1.197 |      | 0.000             |
| △      | 1.956 |      |                   |
| ◇      | 2.740 |      |                   |
| □      | 3.480 |      |                   |
| ▽      | 4.959 |      |                   |

DATA HIST. CODE TV#G

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9060 | IN.    |
| BREF                  | 4.9060 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

MSFC TWT 524 33 FOOT BOOSTER

N2B1R1

(B59S05)

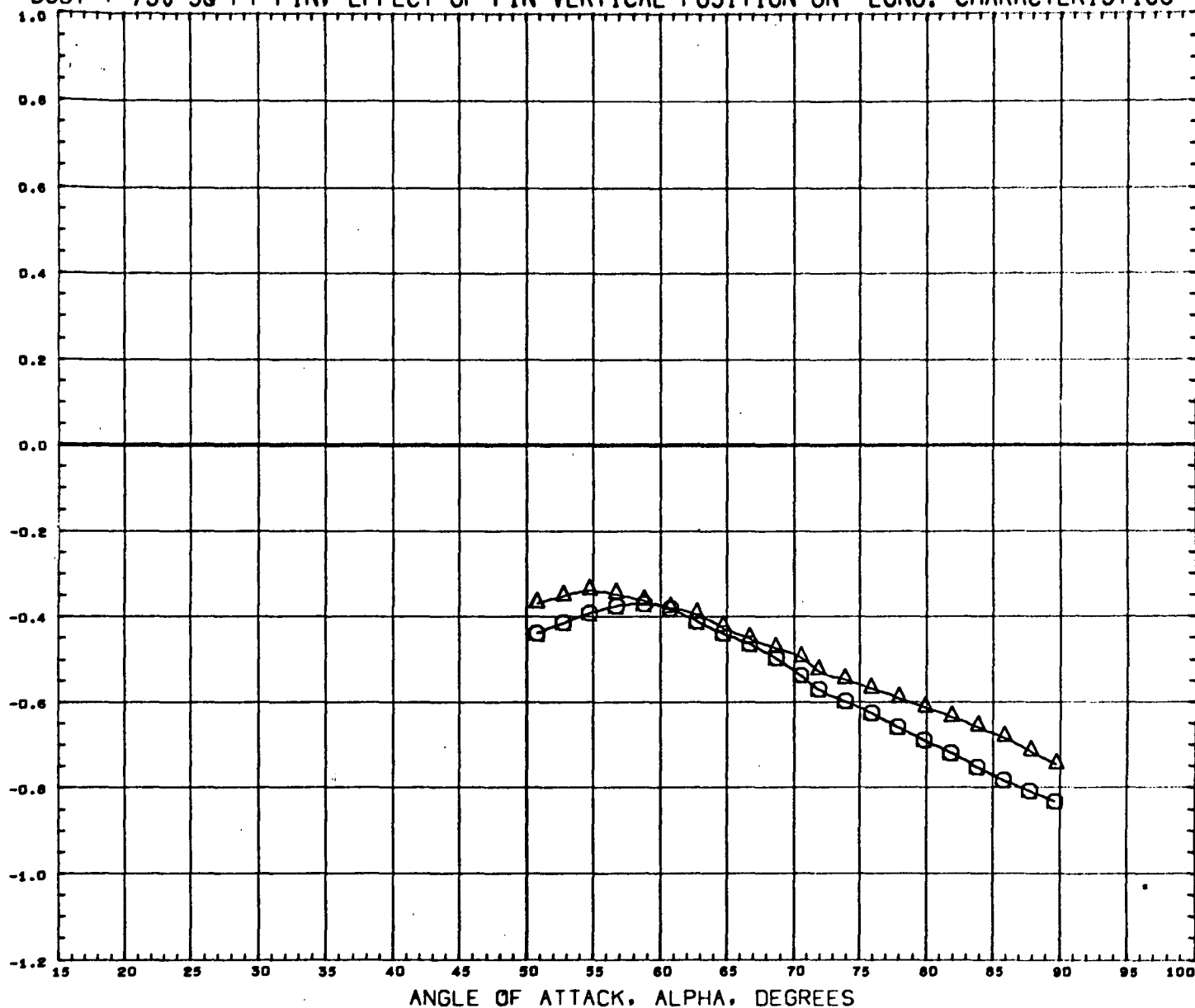
08 MAR 72

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# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

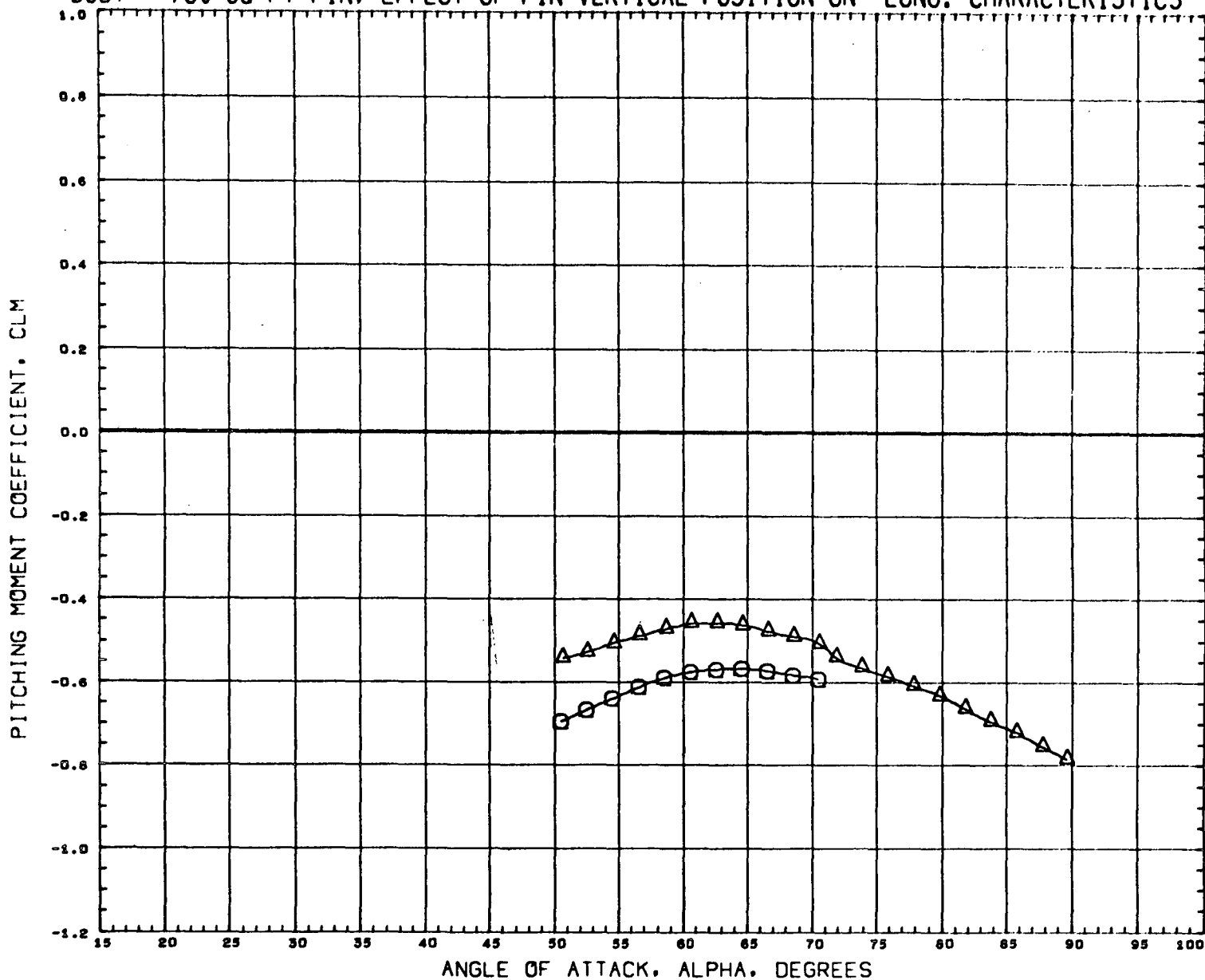
PITCHING MOMENT COEFFICIENT, CLM



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59S09)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S21)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.198

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

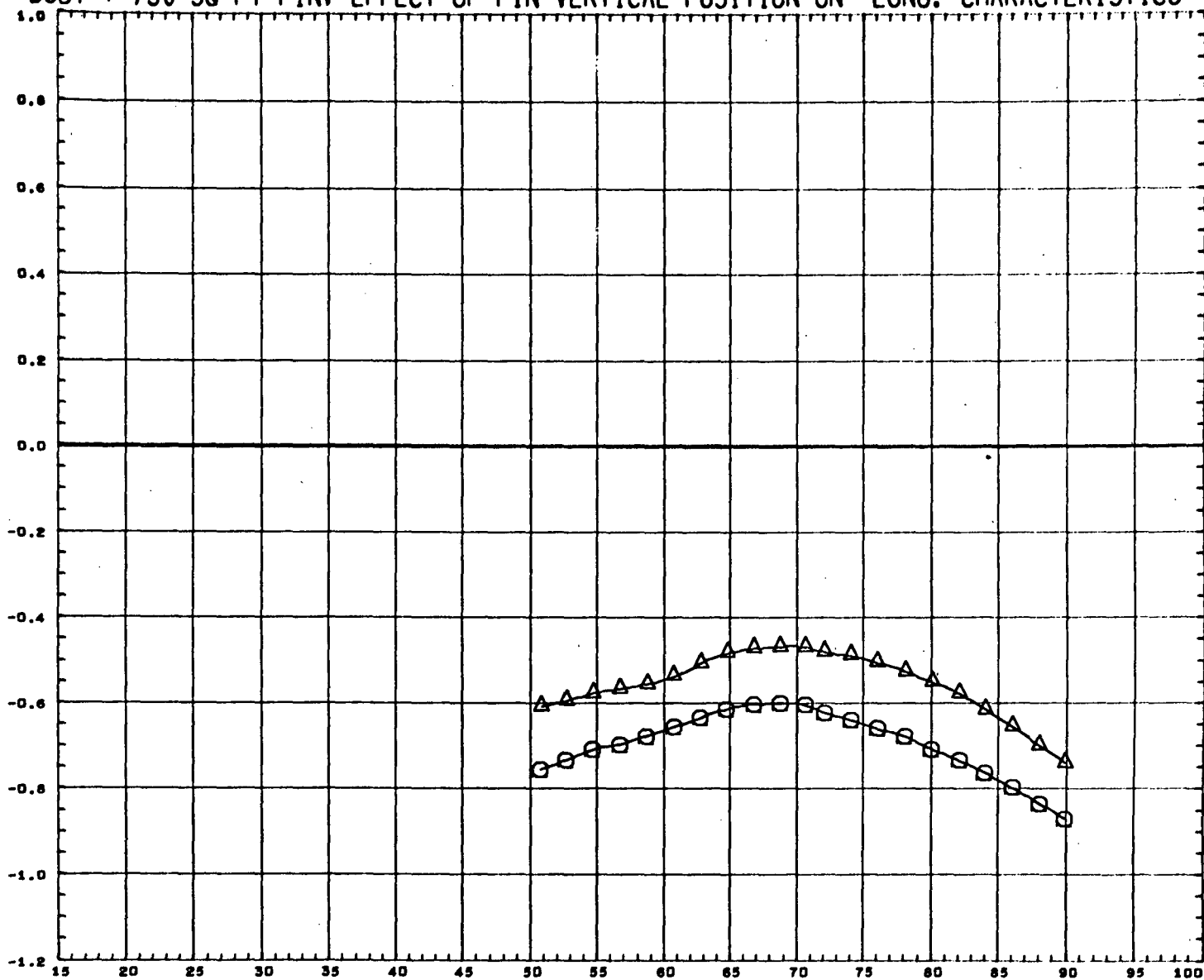


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859309)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859321)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.964

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

PITCHING MOMENT COEFFICIENT, CLM



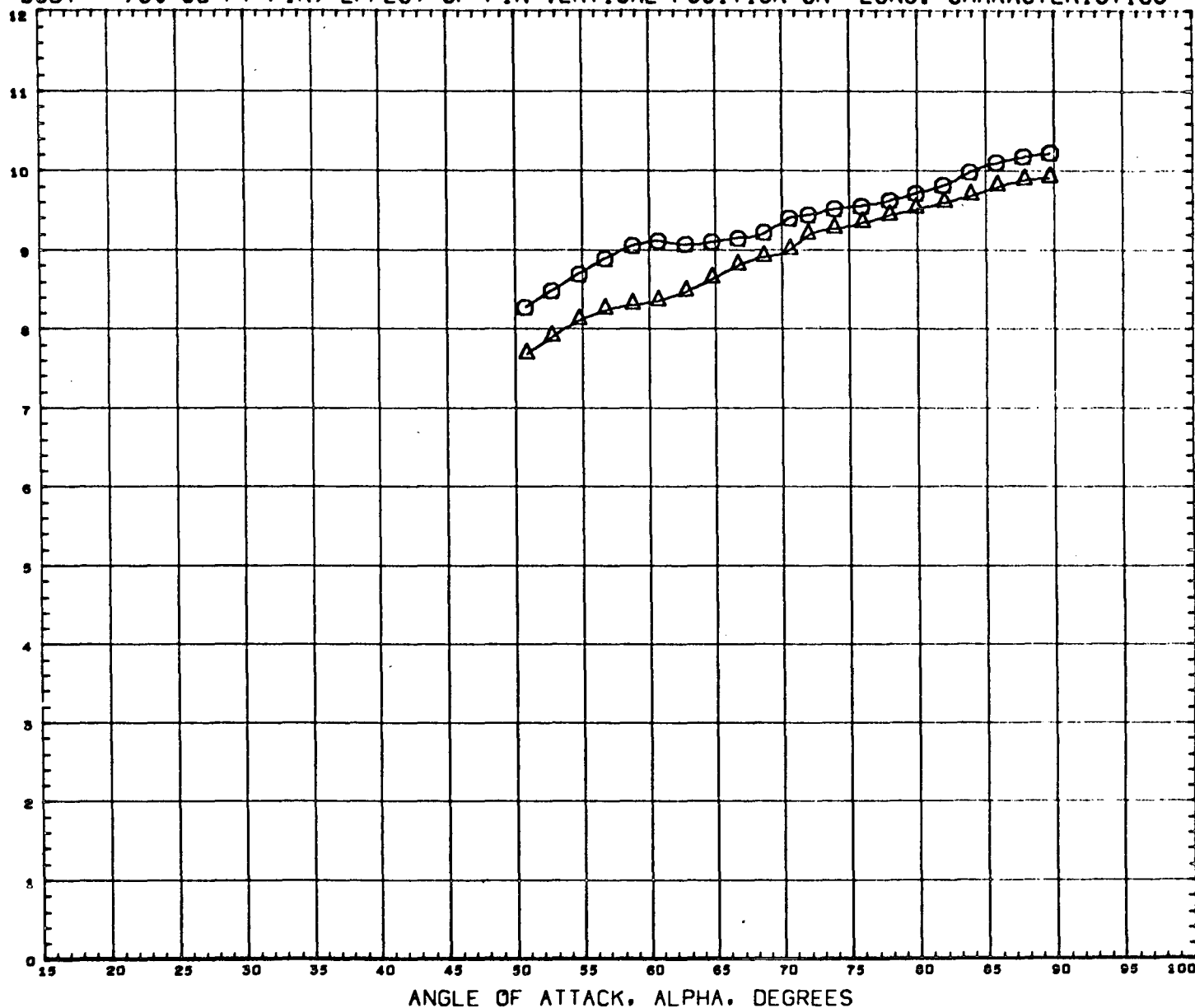
ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|--------|-------|-----------------------|
| (B59309)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59321)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                              |       |       |        |       | BREF 4.9080 IN.       |
|                 |                              |       |       |        |       | XMRP 2.9450 IN.       |
|                 |                              |       |       |        |       | YMRP 0.0000 IN.       |
|                 |                              |       |       |        |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |        |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

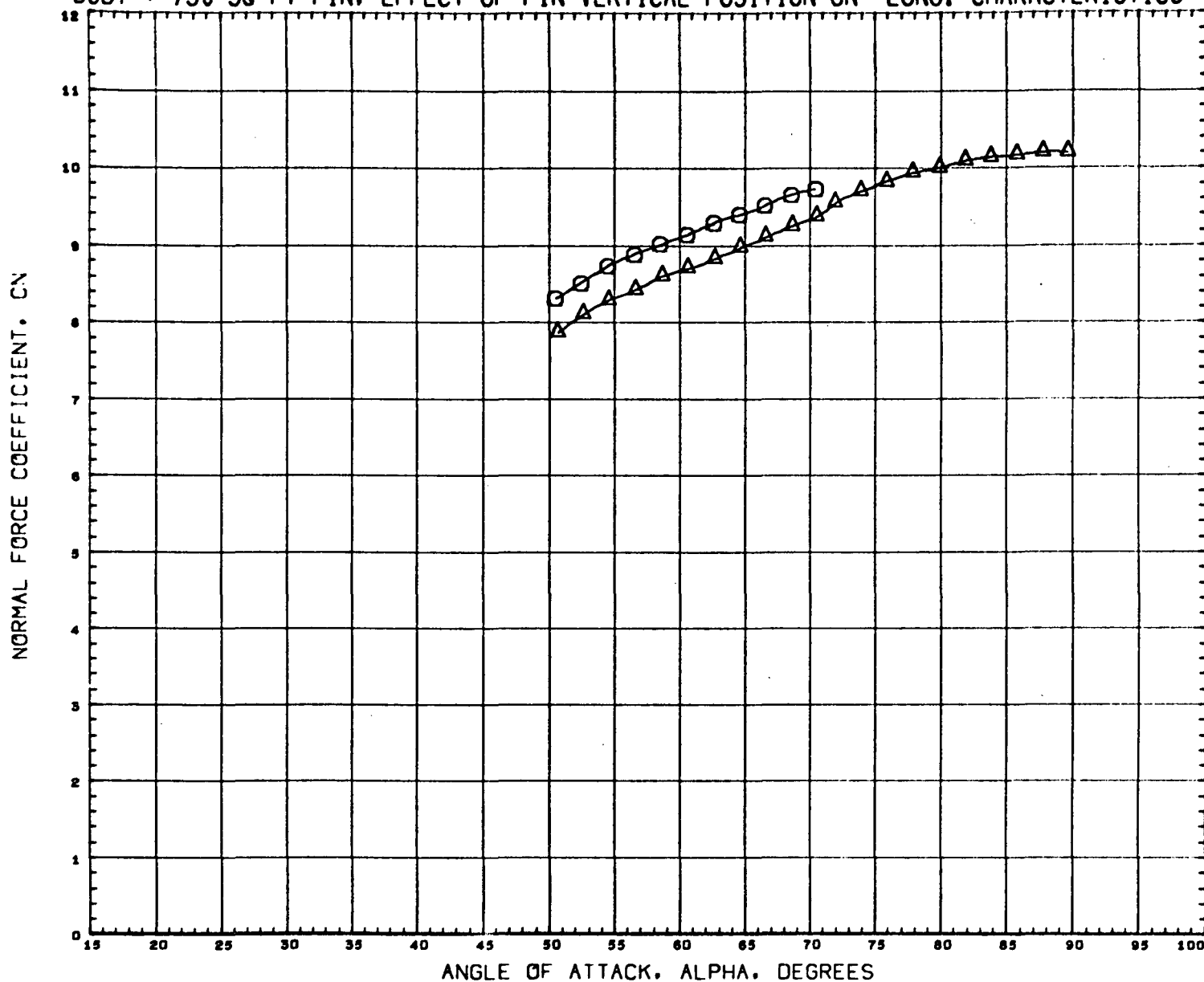
NORMAL FORCE COEFFICIENT, CN



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859309)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.198

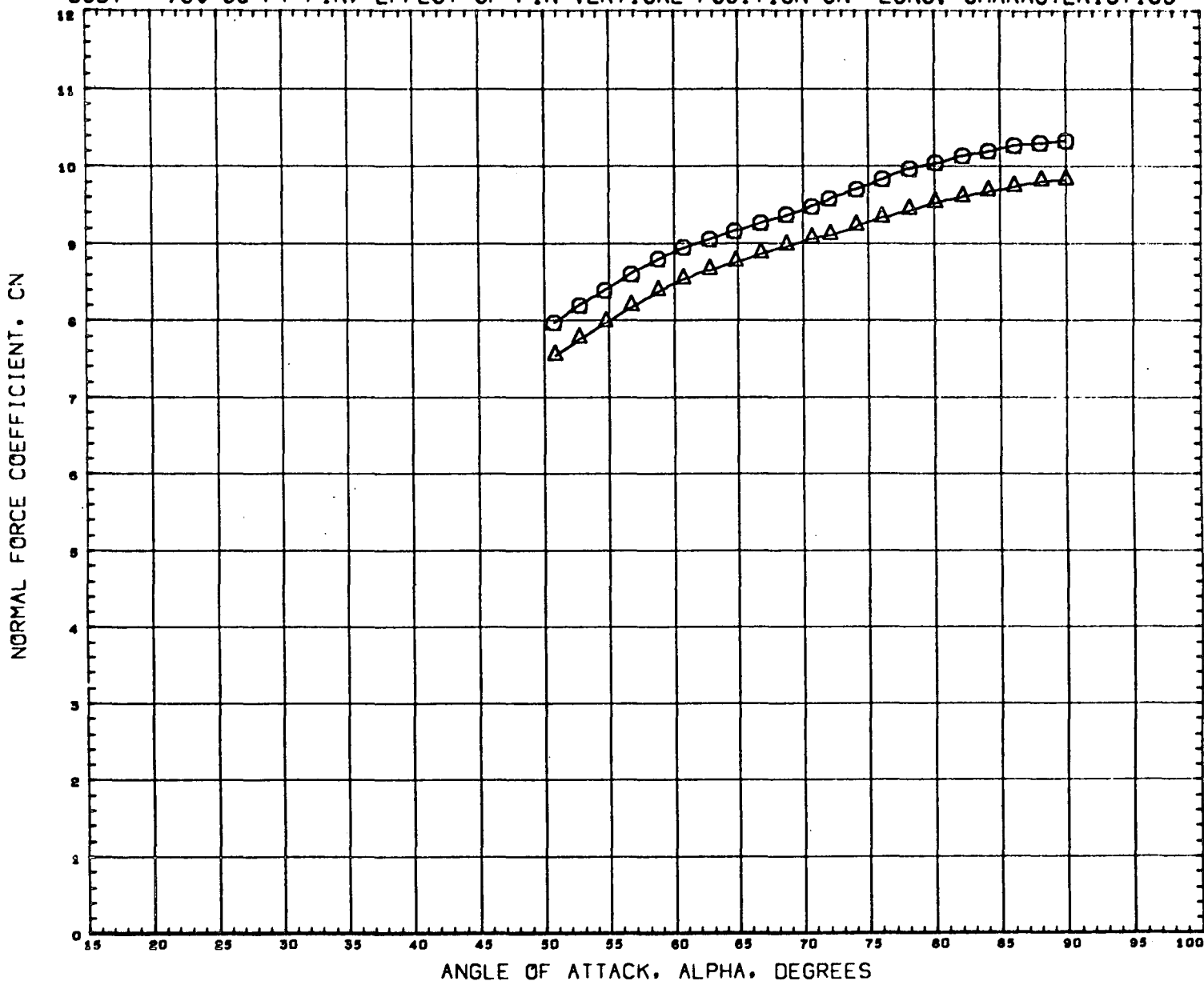
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.964

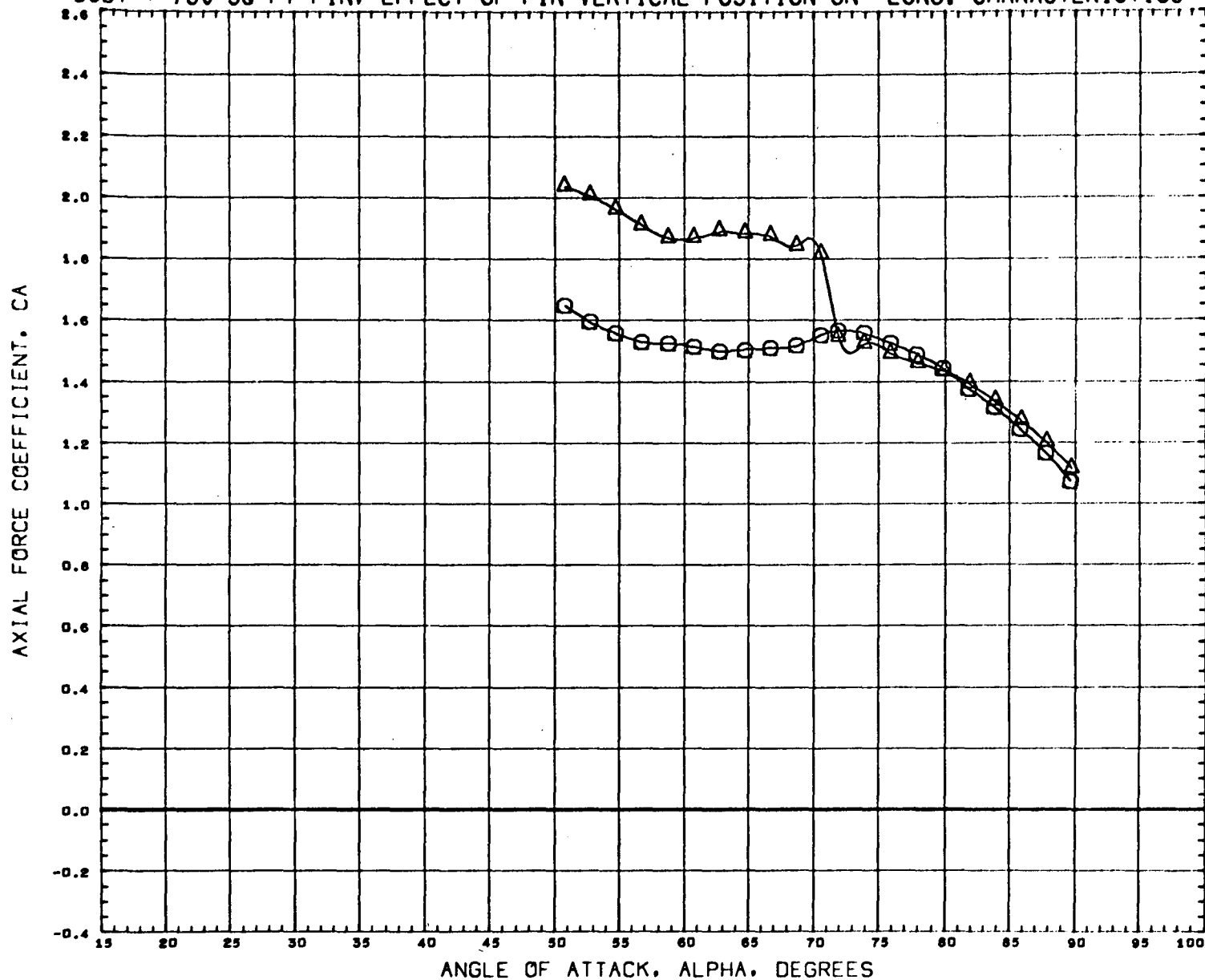
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

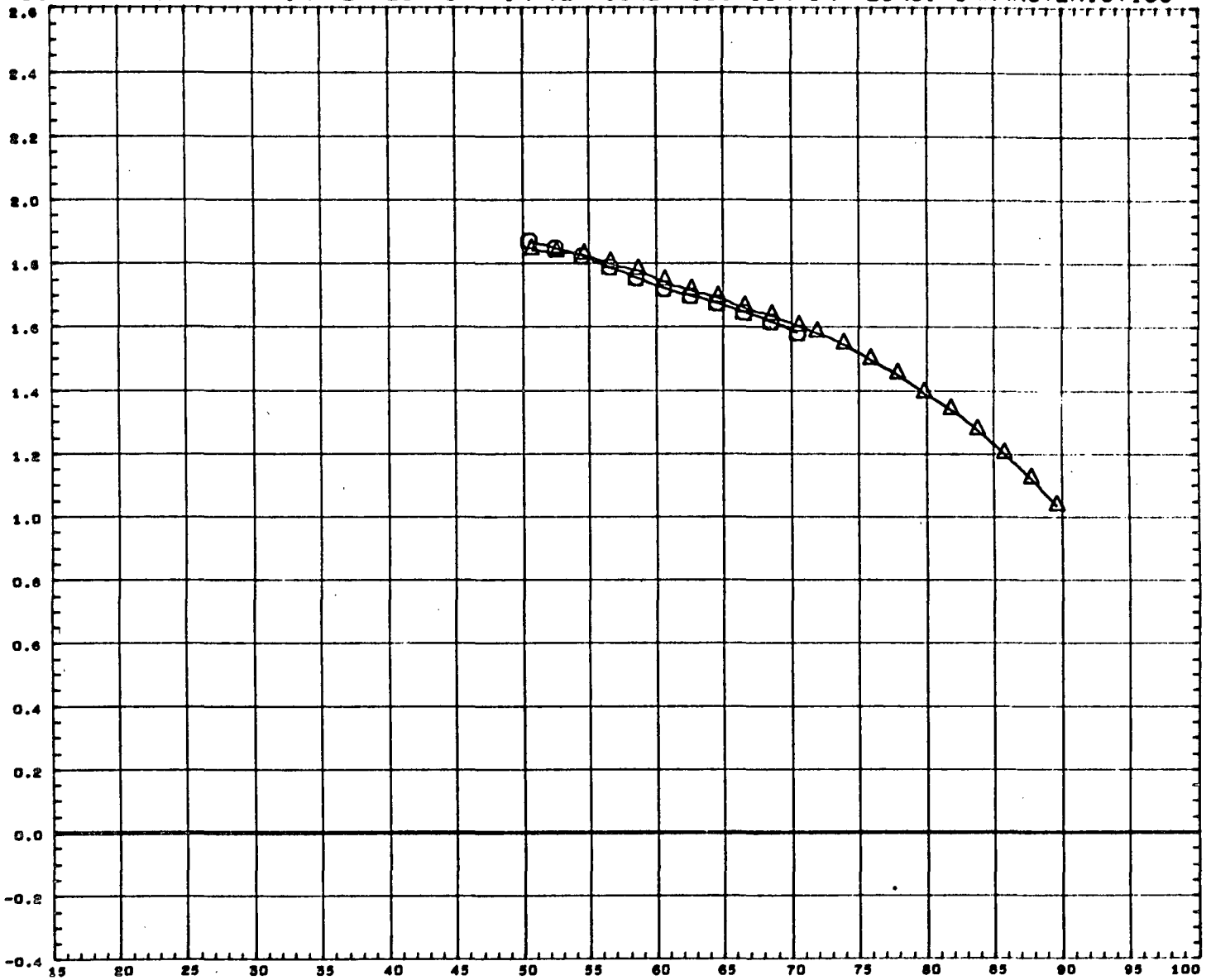


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59S09)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S21)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.198

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

AXIAL FORCE COEFFICIENT, CA



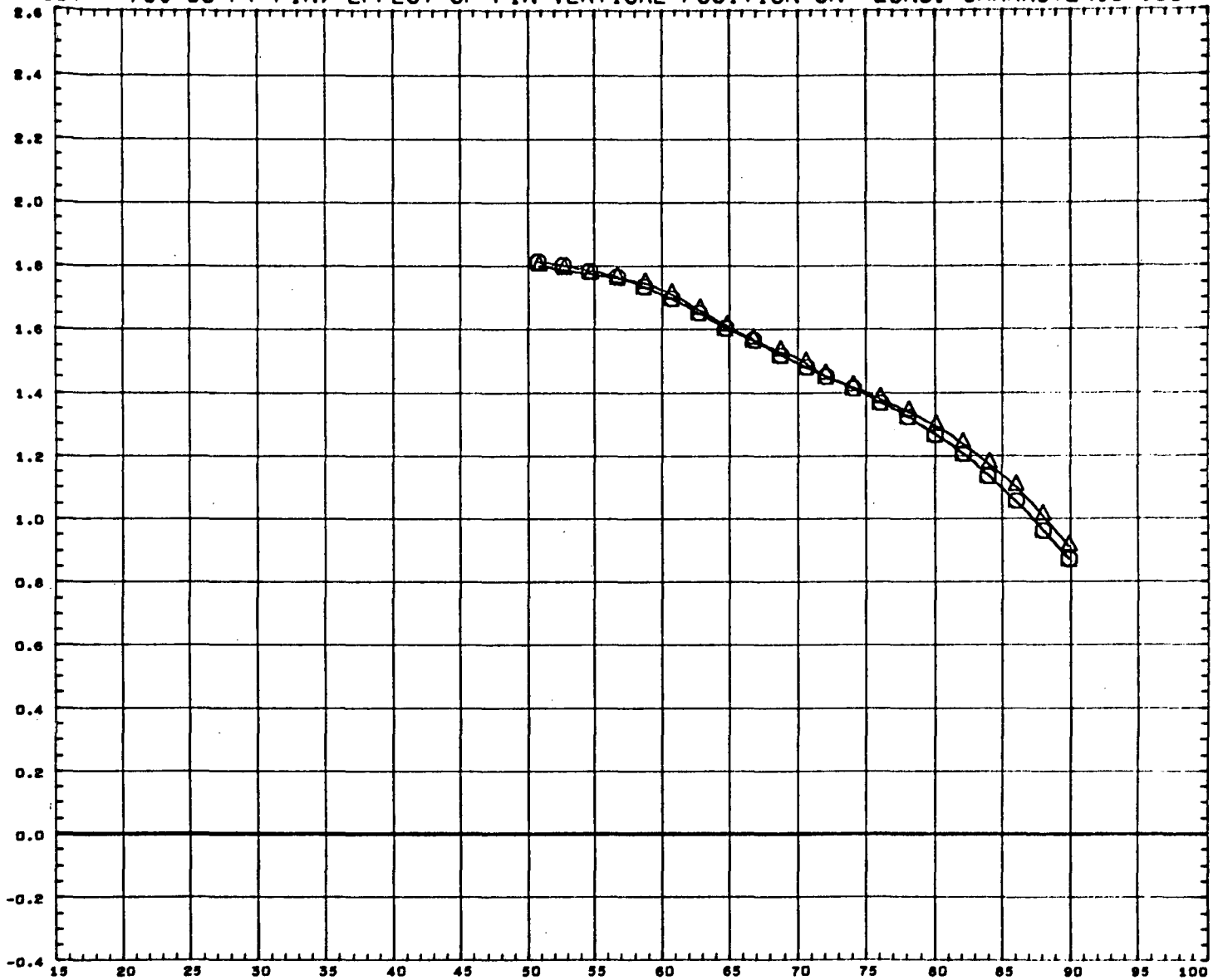
ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.964

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

AXIAL FORCE COEFFICIENT, CA

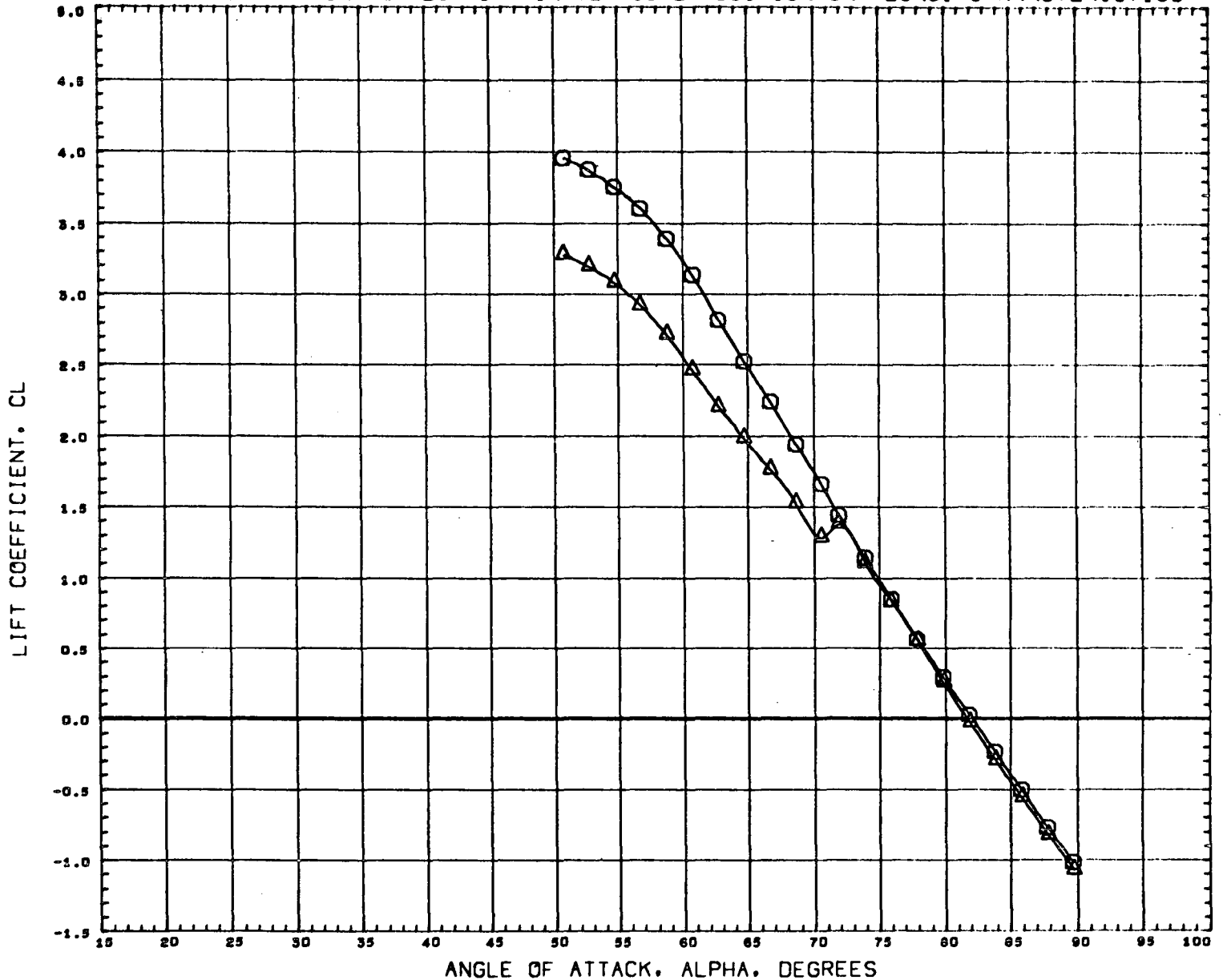


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 4.959

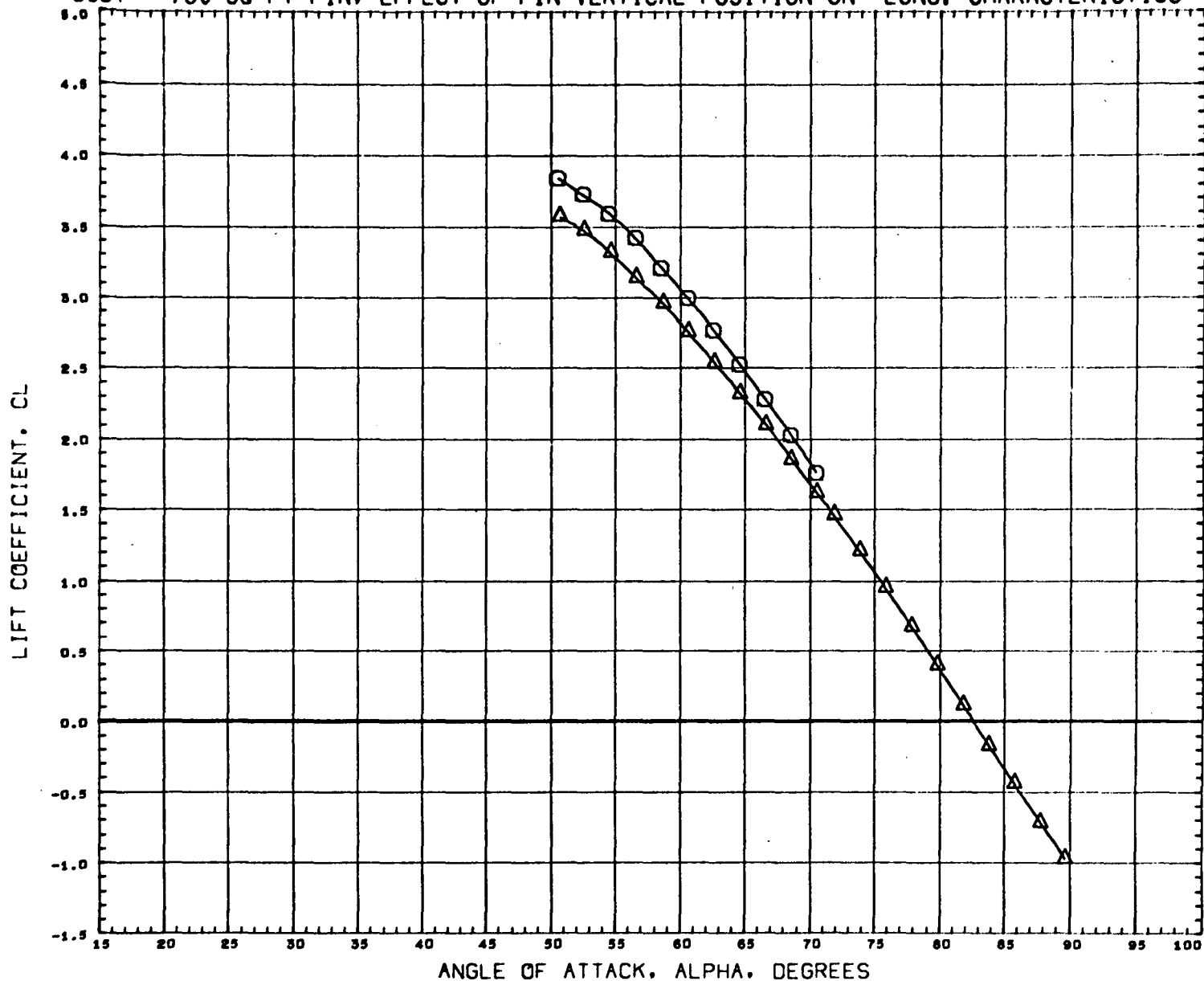
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XHRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.198

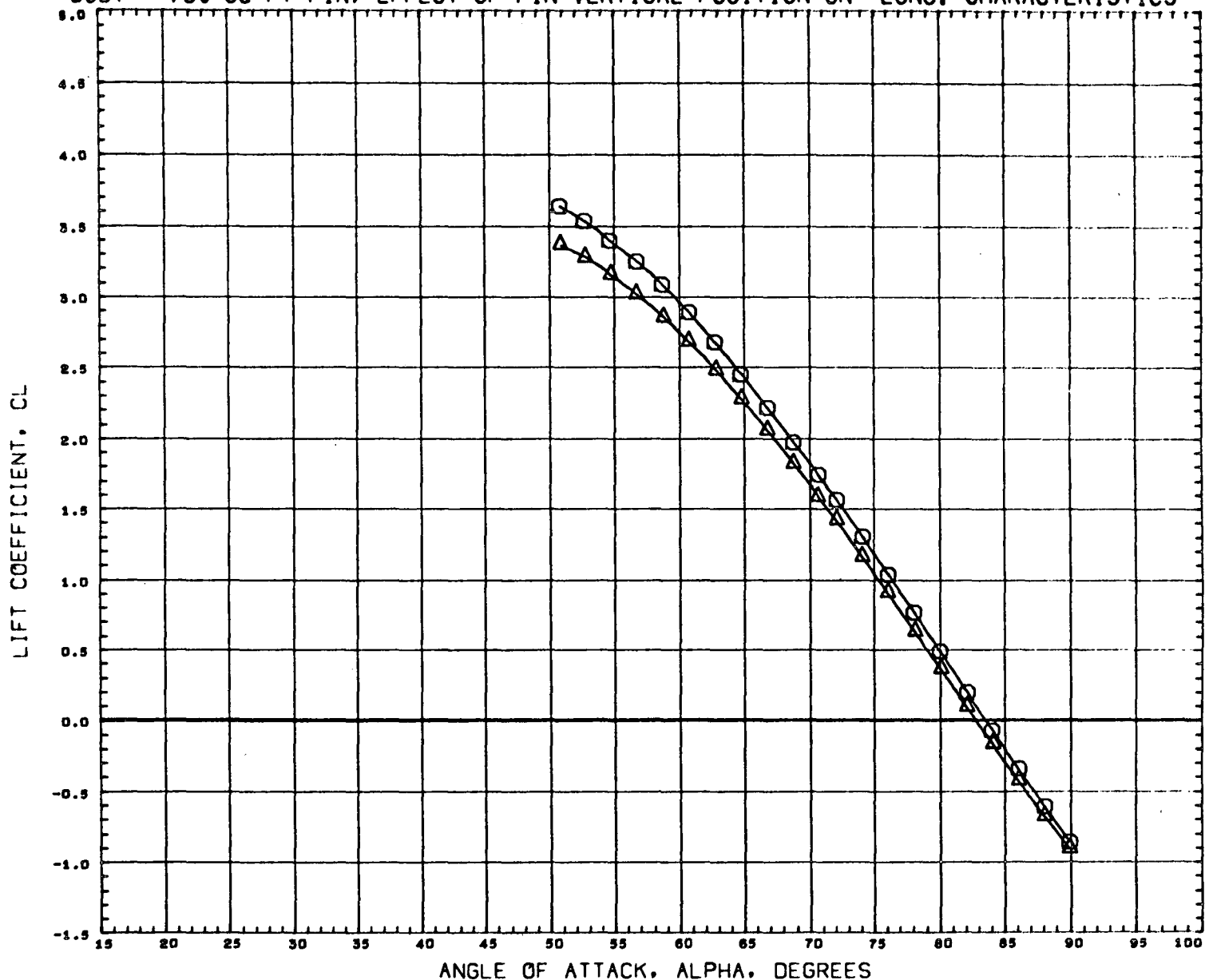
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |        |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |        |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |        |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |        |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |        |       | SCALE 0.0028          |

MACH 1.964

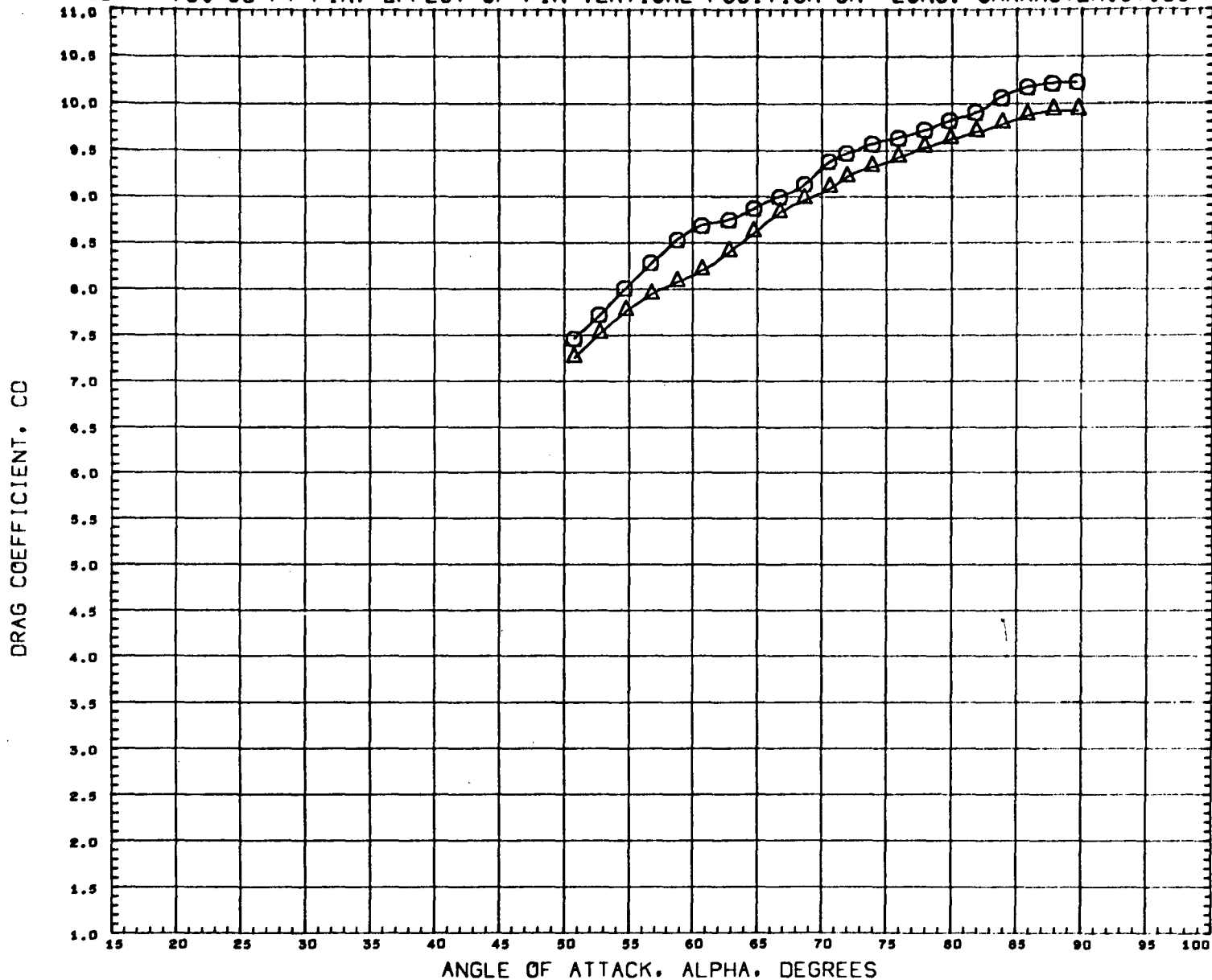
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |        |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |        |       | XMRF 2.9450 IN.       |
|                 |                                         |       |       |        |       | YMRF 0.0000 IN.       |
|                 |                                         |       |       |        |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |        |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

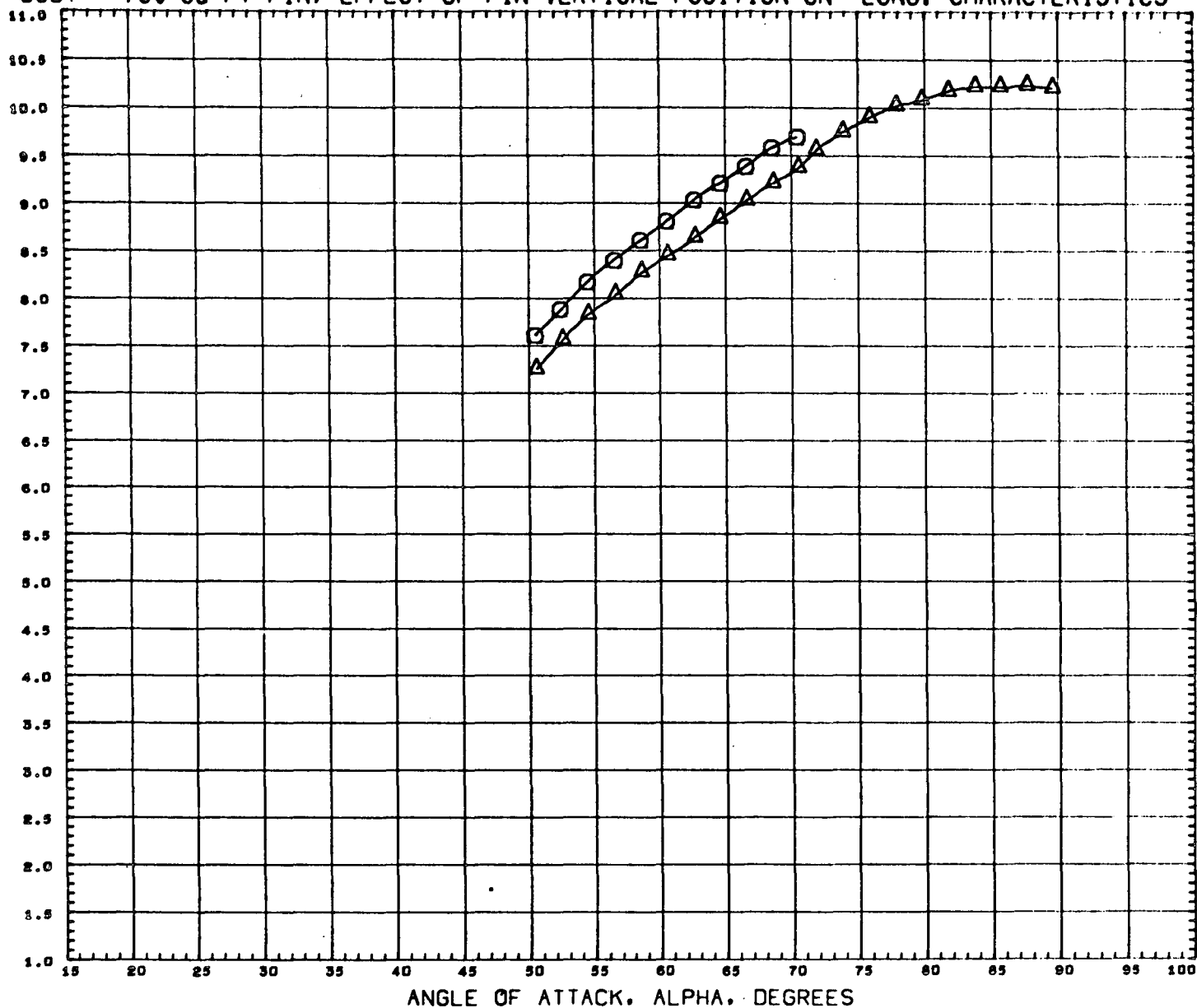


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59909)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59921)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.198

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

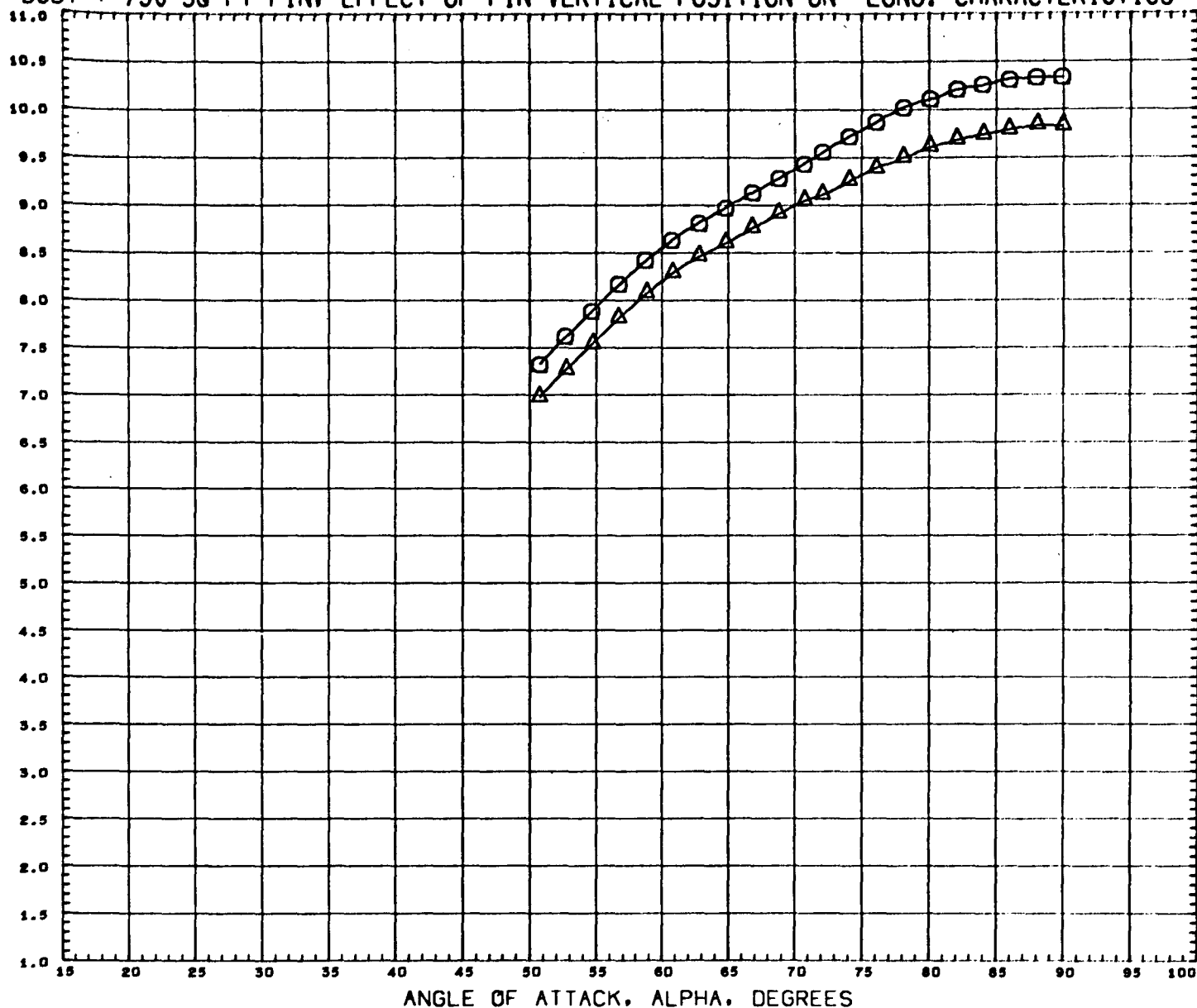
DRAG COEFFICIENT, CD



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.964

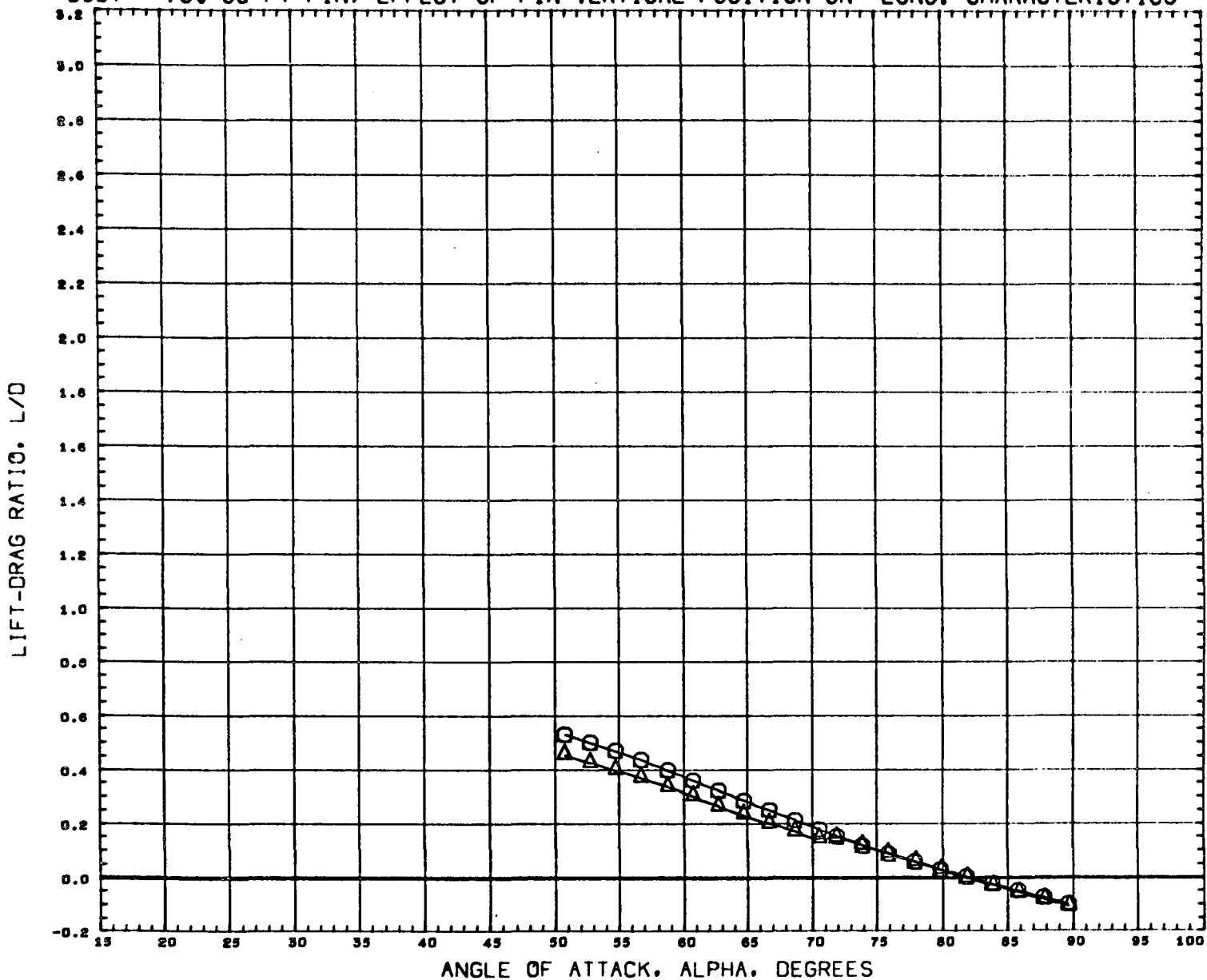
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859S09)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859S21)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |        |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

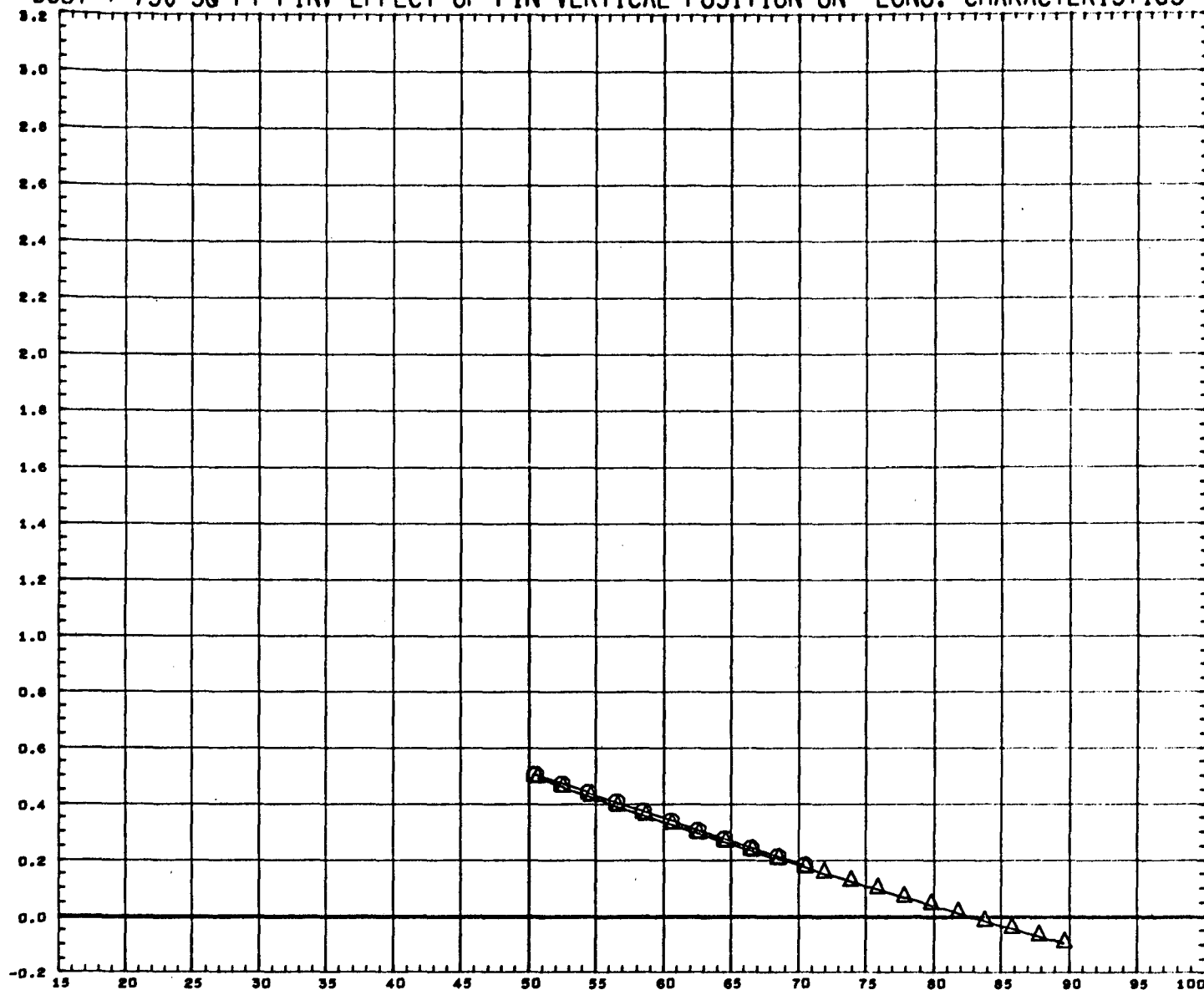


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59309)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.198

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

LIFT-DRAG RATIO, L/D

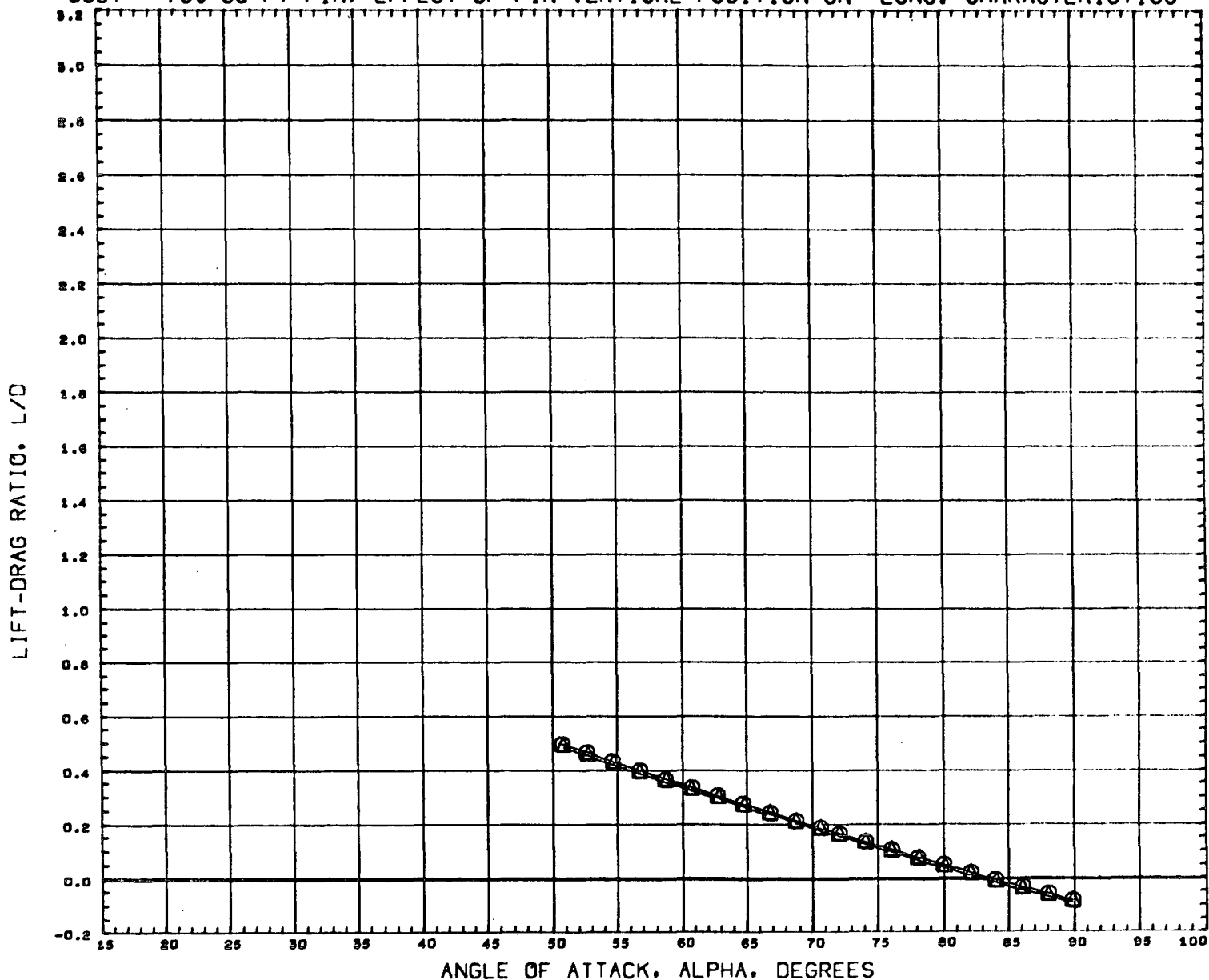


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.964

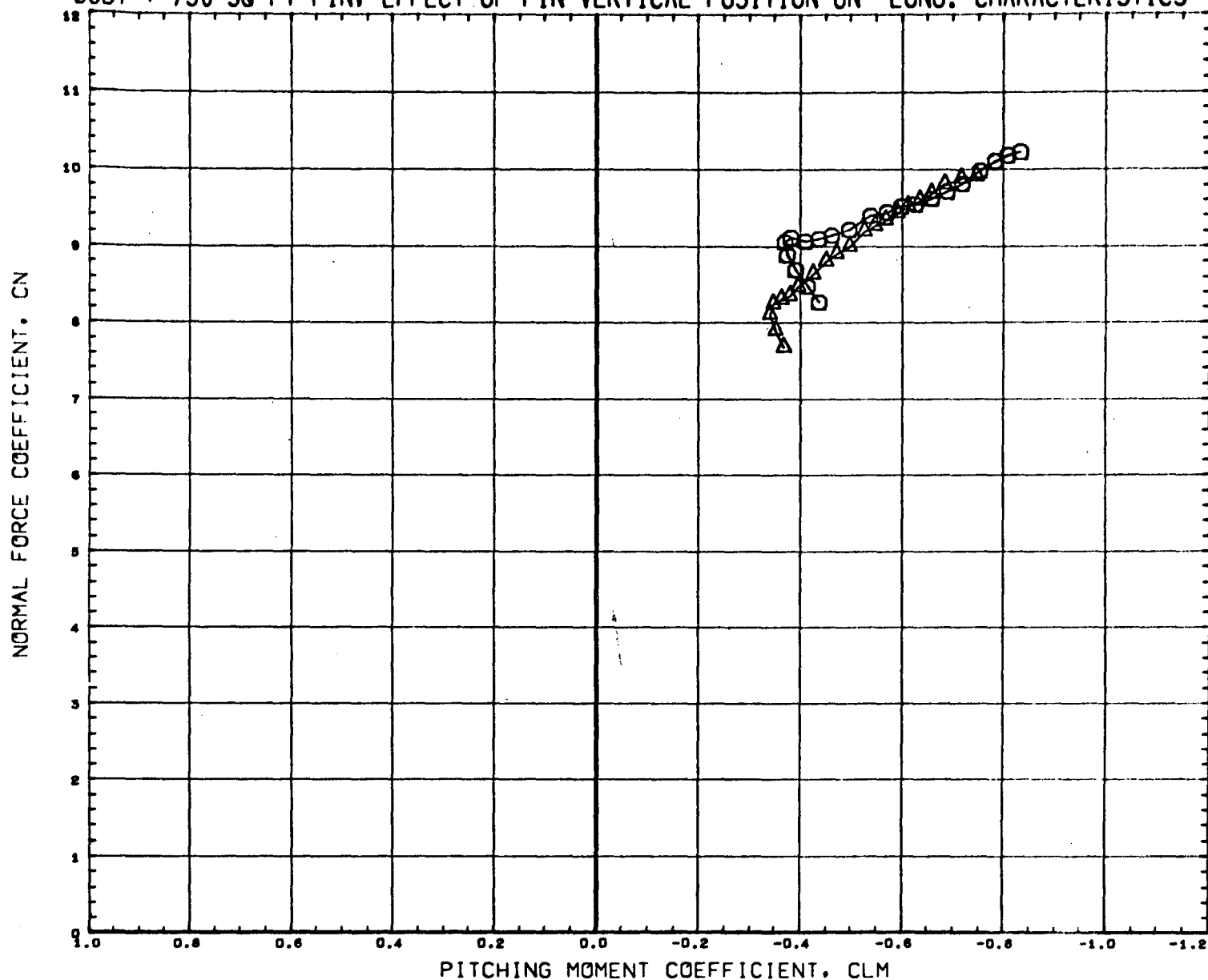
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859309)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMNP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMNP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMNP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 4.959

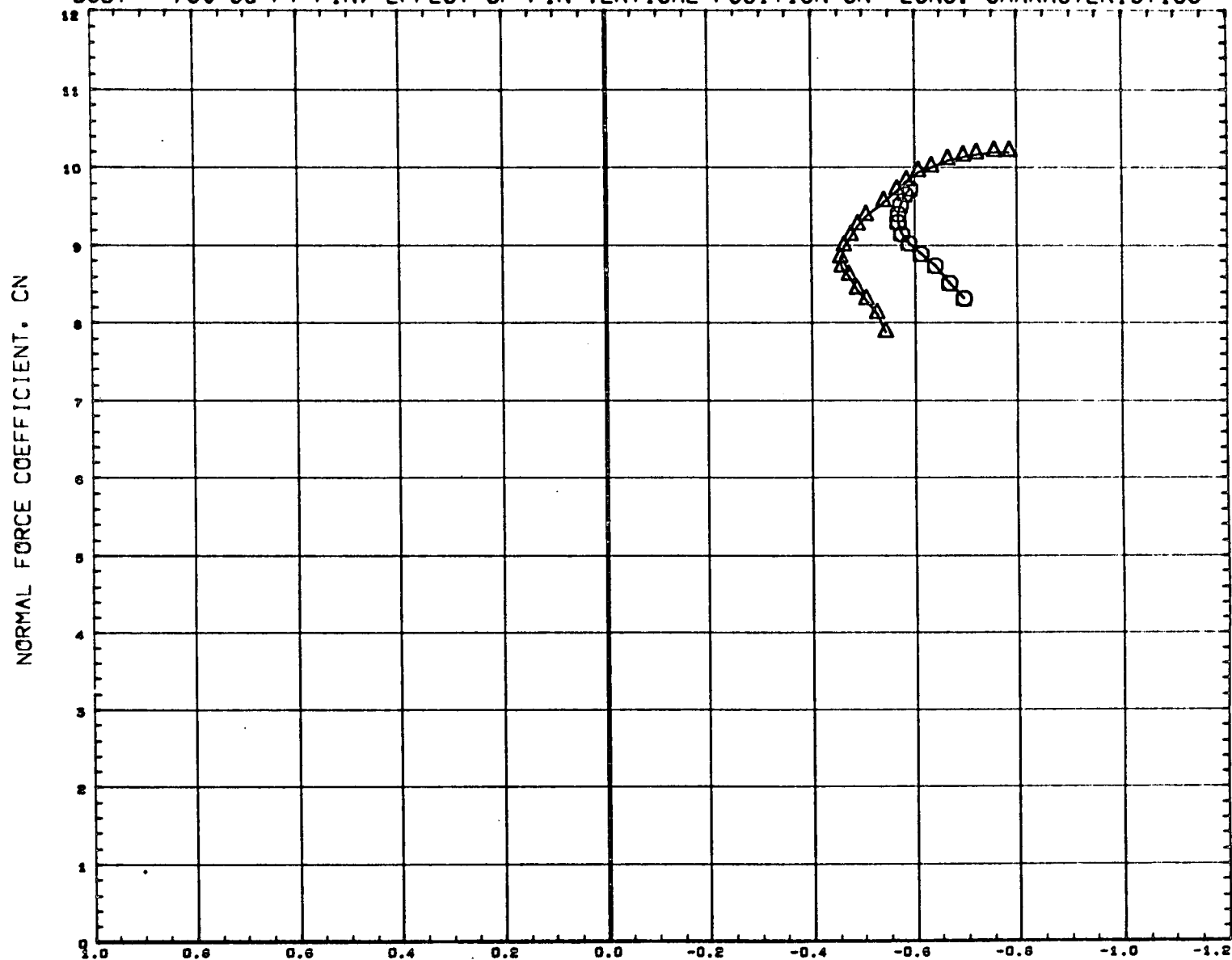
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|
| (B59509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF 0.9650 30. IN    |
| (B59521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |        |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |        |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |        |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |        |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |        |       | SCALE 0.0028          |

MACH 1.198

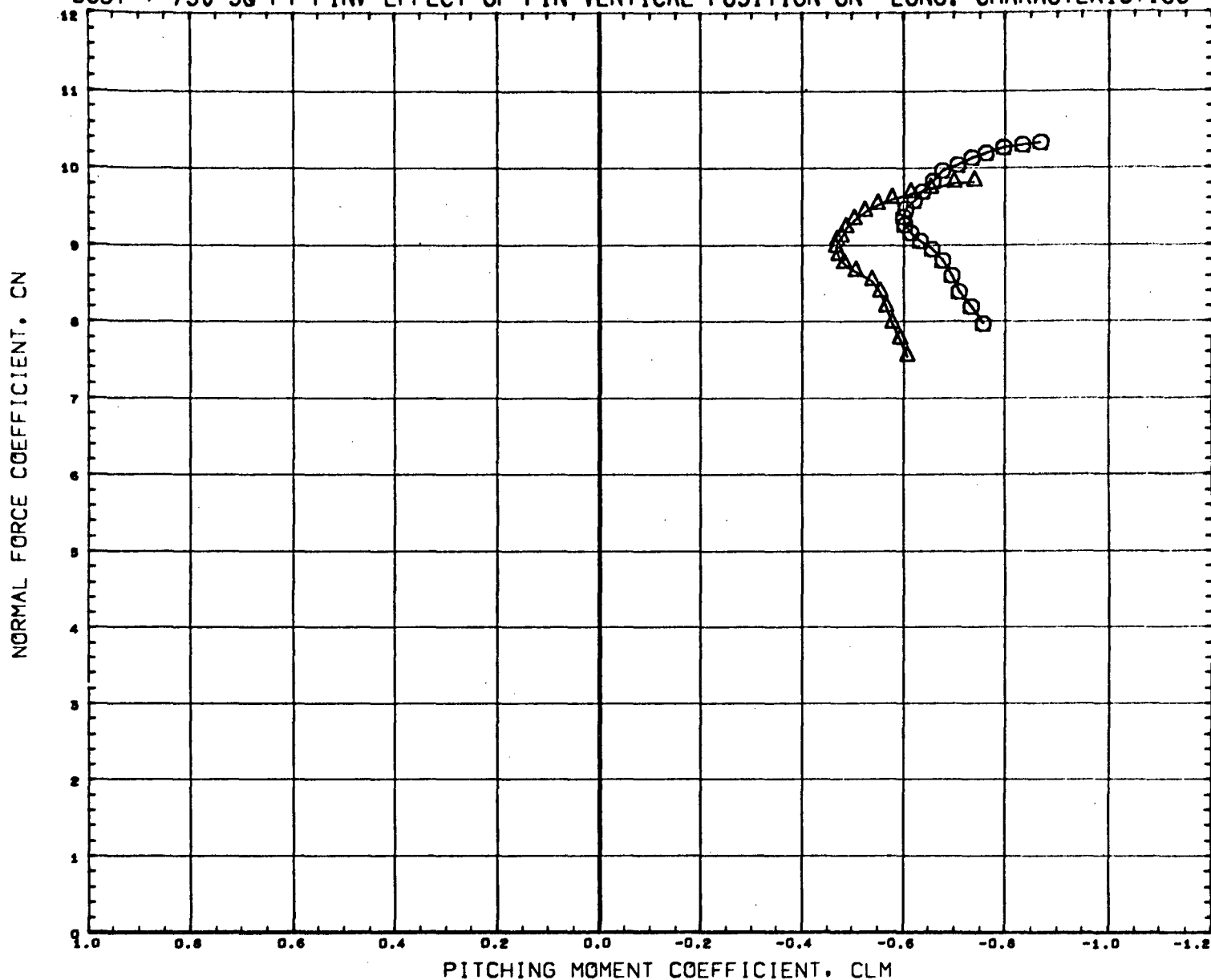
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.964

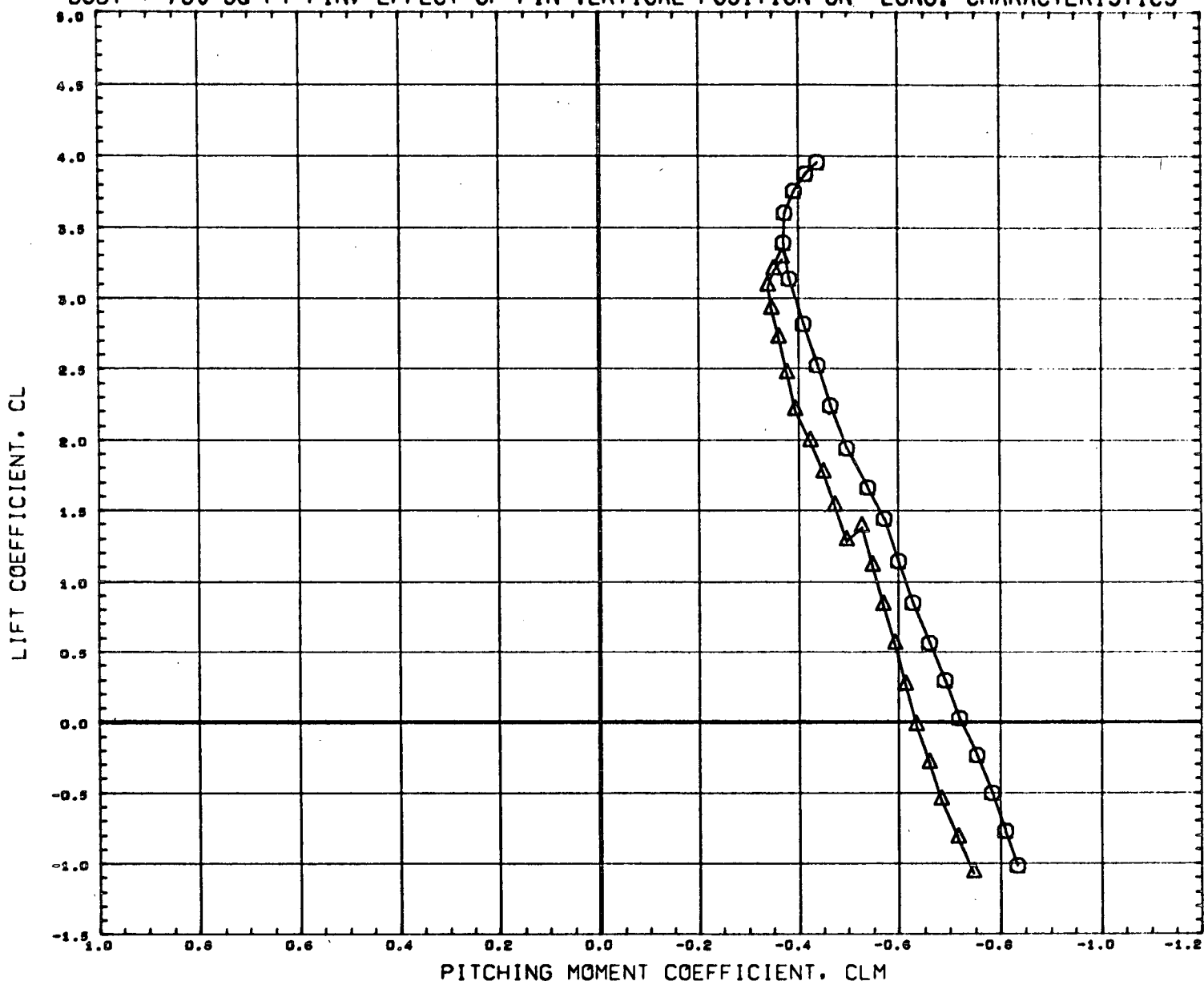
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|
| (859509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF 0.9650 sq. IN    |
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |        |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |        |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |        |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |        |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |        |       | SCALE 0.0028          |

MACH 4.959

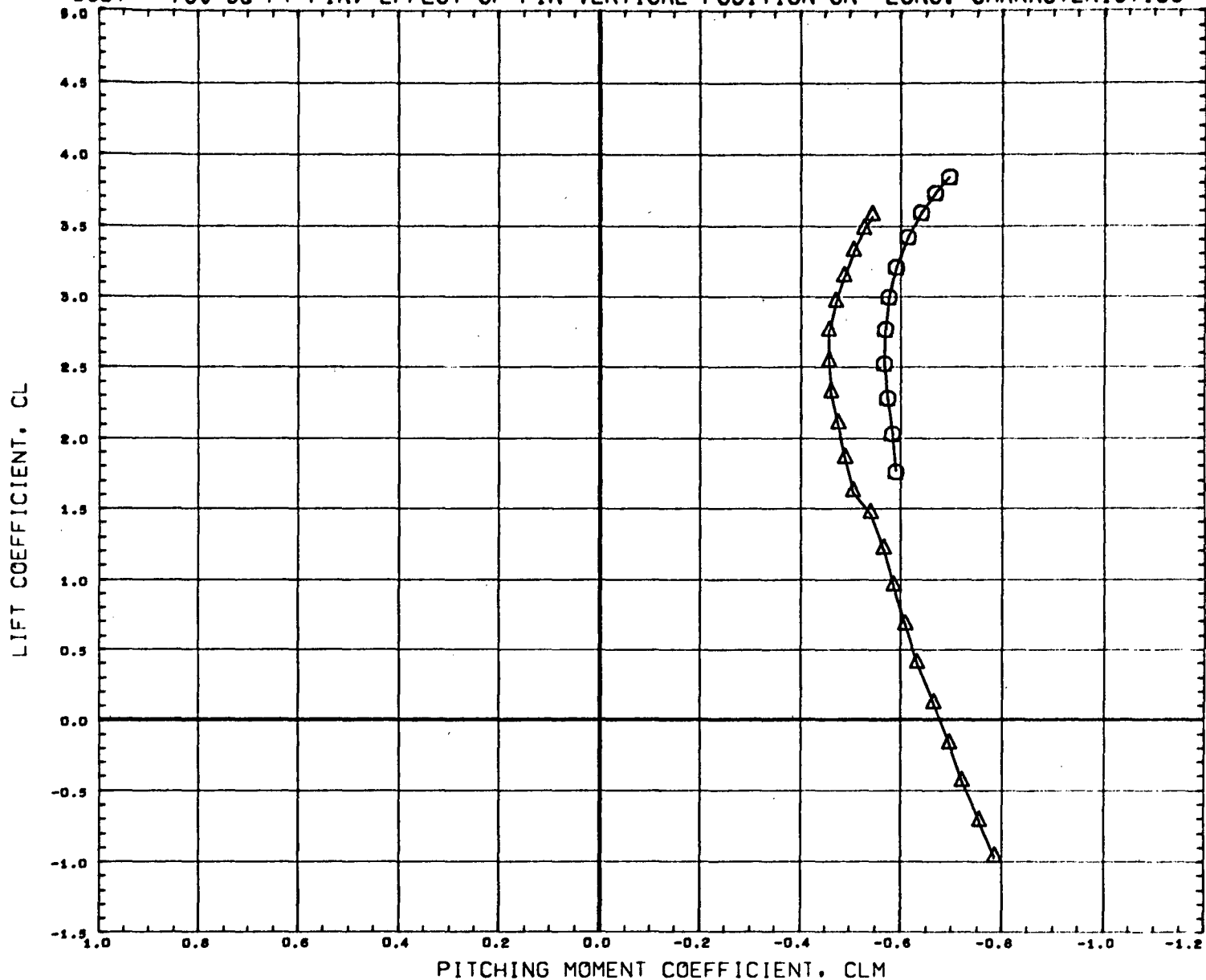
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRF                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.198

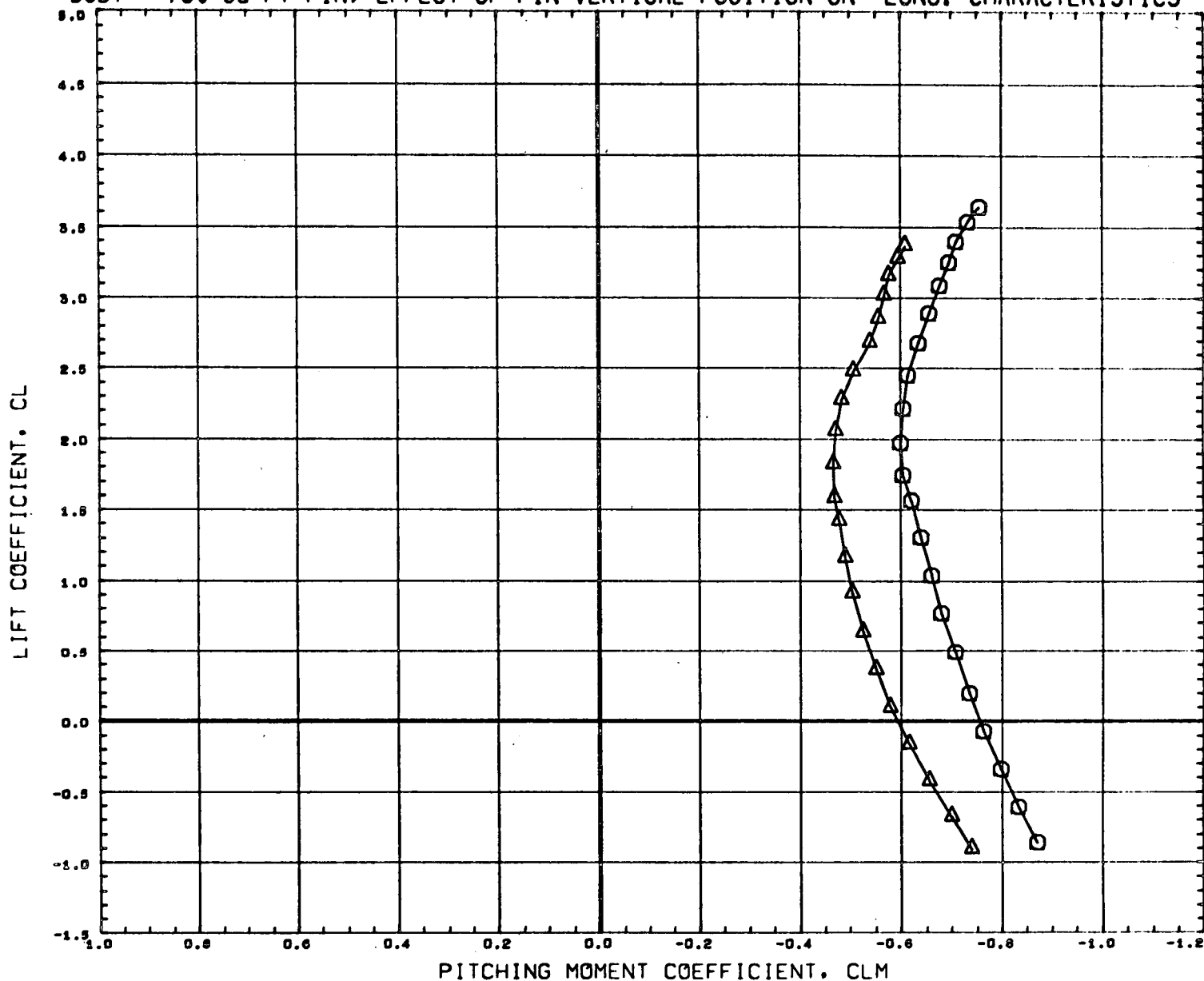
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.964

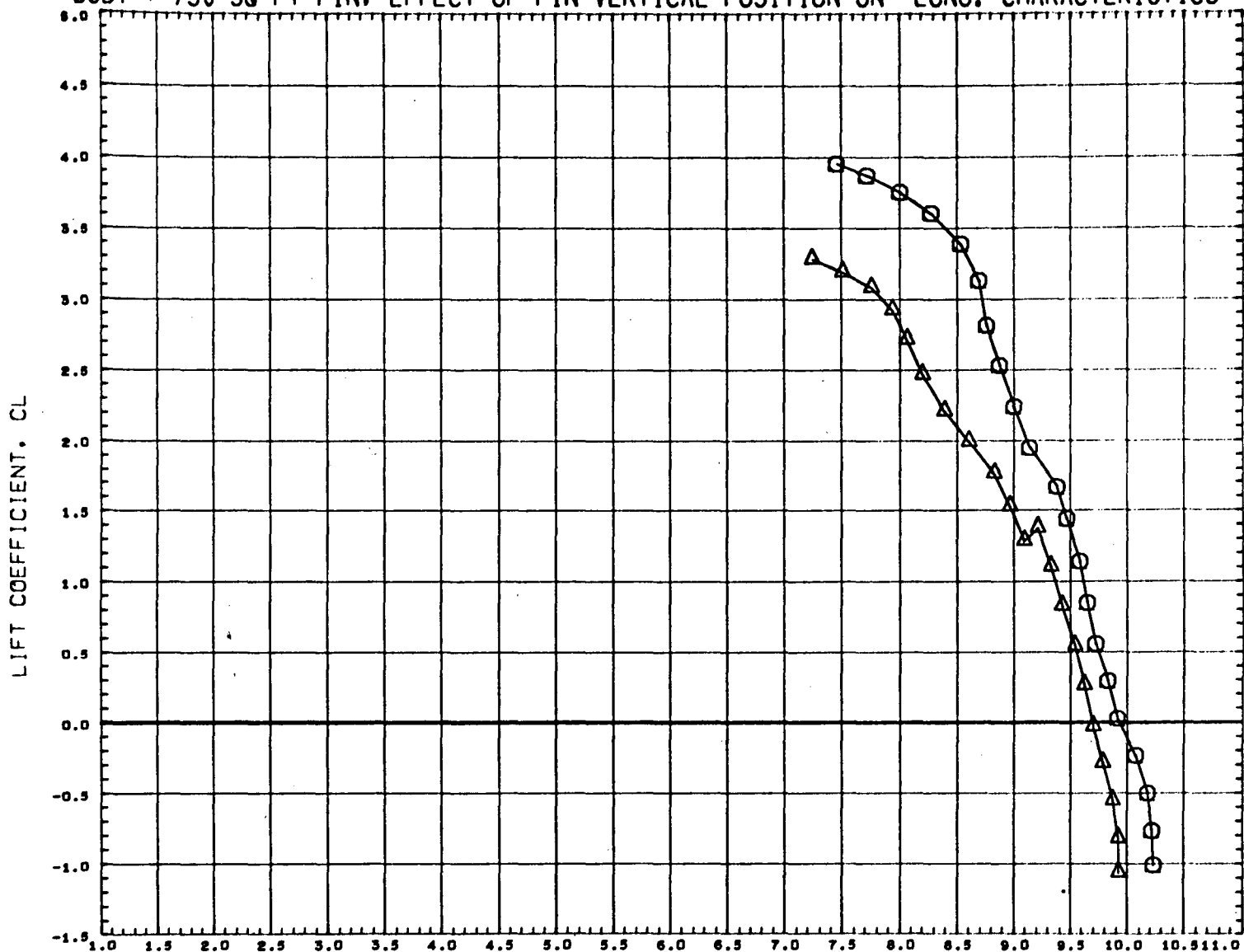
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59309)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |        |       | SCALE                 | 0.0026        |

MACH 4.959

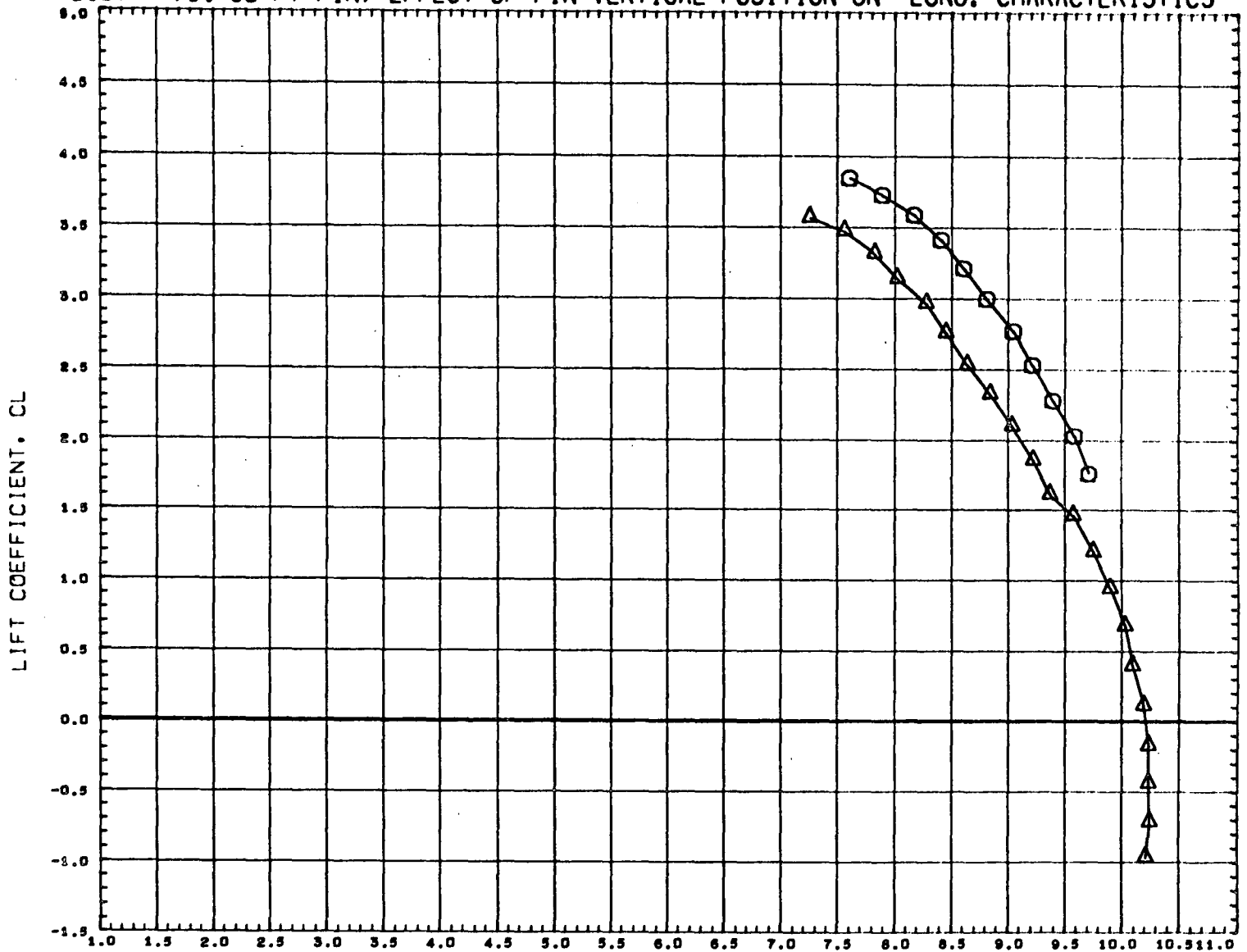
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL |   | CONFIGURATION DESCRIPTION |                 | BETA       | POS   | DELFE | DELFA  | REFERENCE INFORMATION |                    |
|-----------------|---|---------------------------|-----------------|------------|-------|-------|--------|-----------------------|--------------------|
| (B59809)        | Q | MSFC TWT 524              | 33 FOOT BOOSTER | N2B1R1X1F2 | 0.000 | 1.000 | 15.000 | 0.000                 | SREF 0.9650 SQ. IN |
| (B59821)        | A | MSFC TWT 524              | 33 FOOT BOOSTER | N2B1R1X2F2 | 0.000 | 2.000 | 15.000 | 0.000                 | LREF 4.9080 IN.    |
|                 |   |                           |                 |            |       |       |        |                       | BREF 4.9080 IN.    |
|                 |   |                           |                 |            |       |       |        |                       | XMRP 2.9450 IN.    |
|                 |   |                           |                 |            |       |       |        |                       | YMRP 0.0000 IN.    |
|                 |   |                           |                 |            |       |       |        |                       | ZMRP 0.0000 IN.    |
|                 |   |                           |                 |            |       |       |        |                       | SCALE 0.0028       |

MACH 1.198

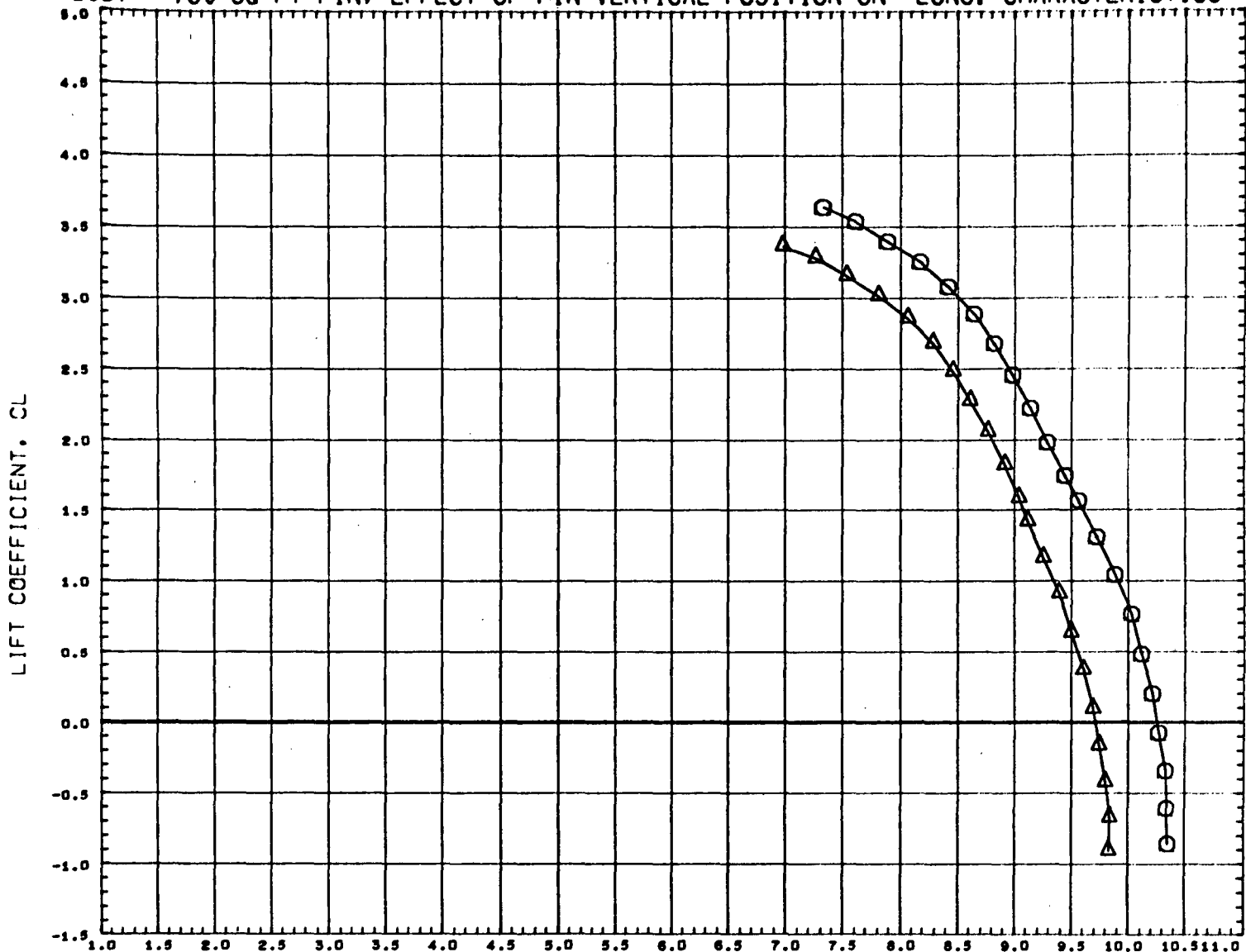
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL |   | CONFIGURATION DESCRIPTION |                 | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|---|---------------------------|-----------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59309)        | Q | MSFC TWT 524              | 33 FOOT BOOSTER | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59321)        | A | MSFC TWT 524              | 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |   |                           |                 |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |   |                           |                 |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |   |                           |                 |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |       |       |        |       | SCALE                 | 0.0028        |

MACH 1.964

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

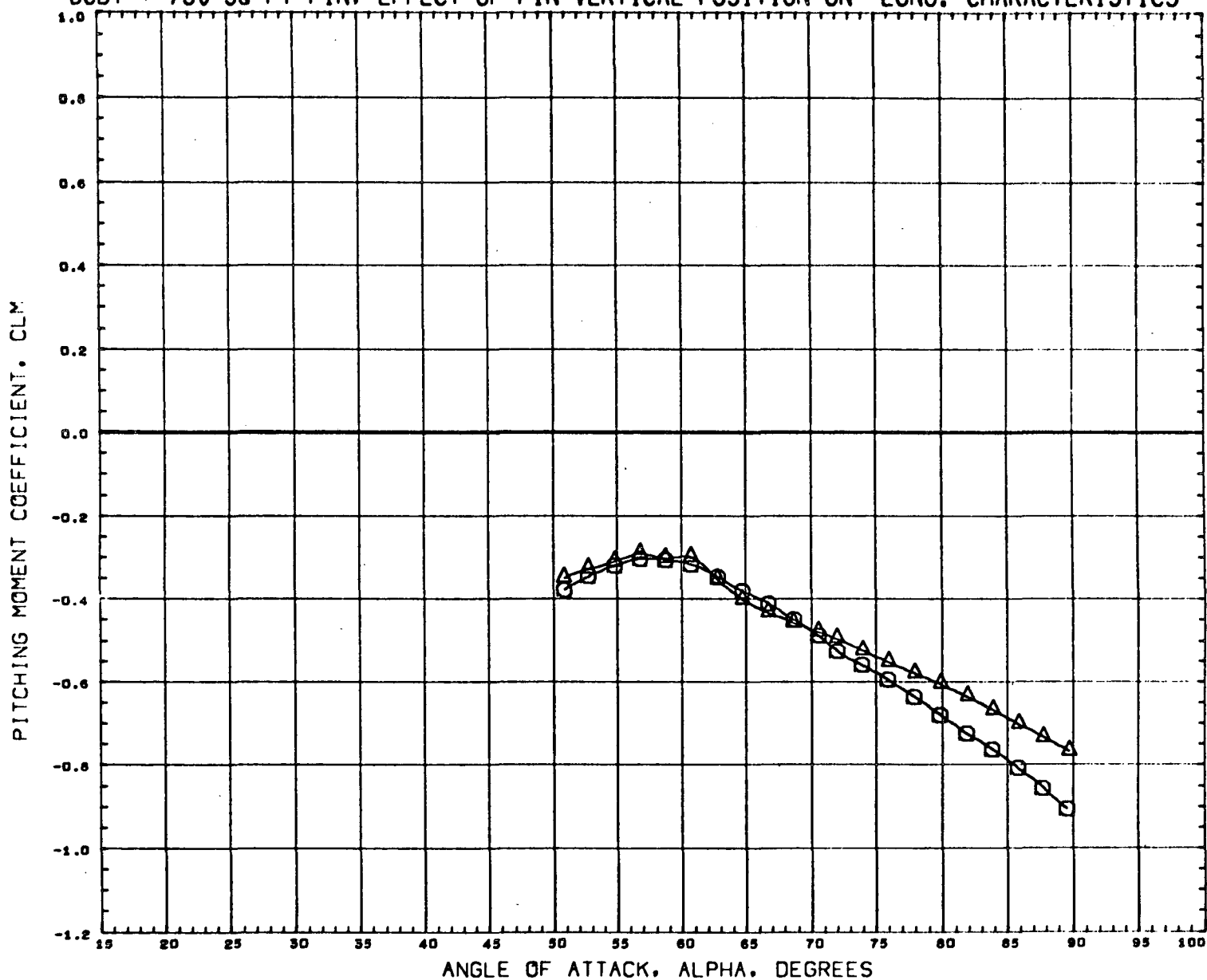


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE  | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|--------|-------|-----------------------|---------------|
| (B59S09)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S21)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |        |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |        |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |        |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |        |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |        |       | SCALE                 | 0.0028        |

MACH 4.959

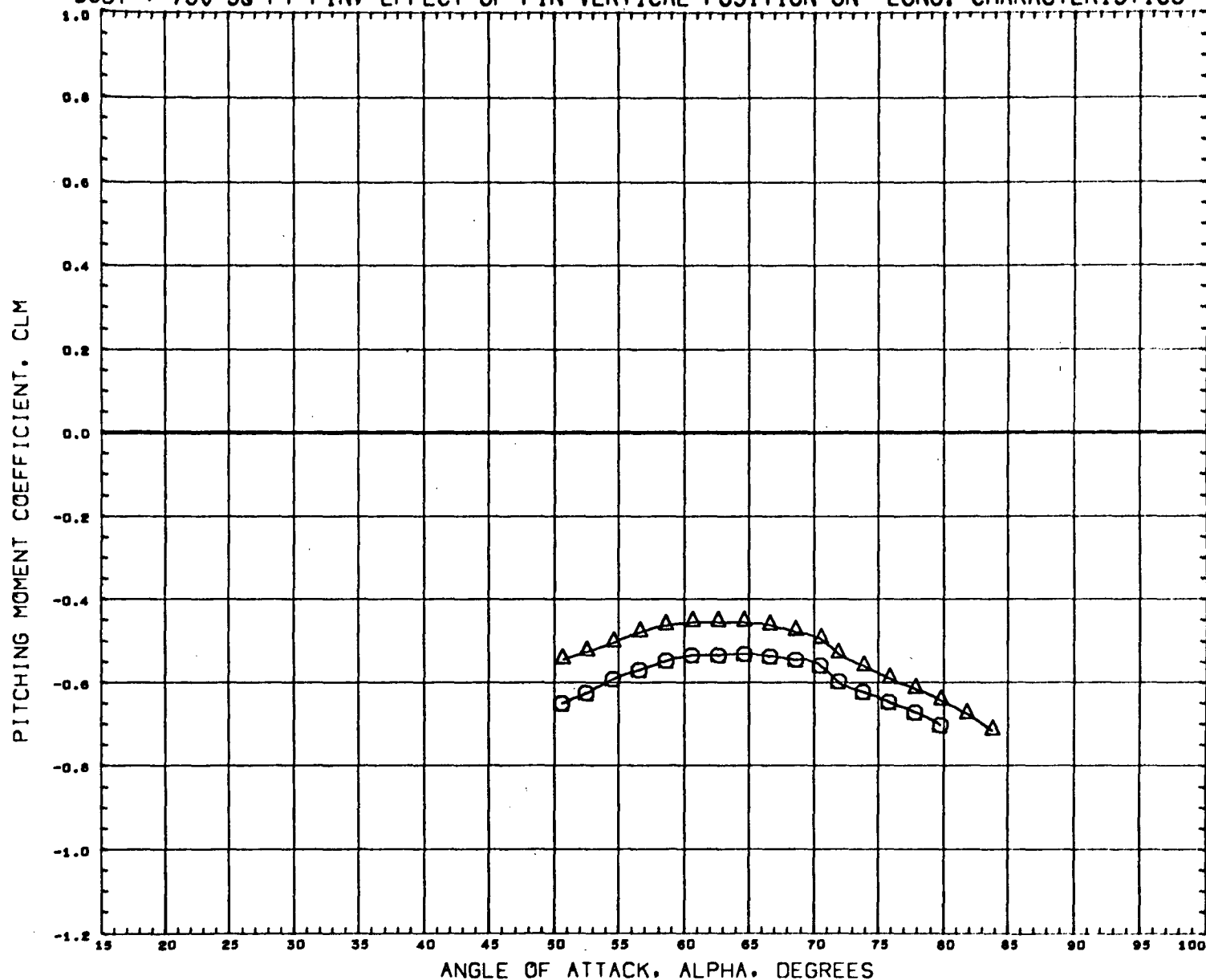
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.195

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

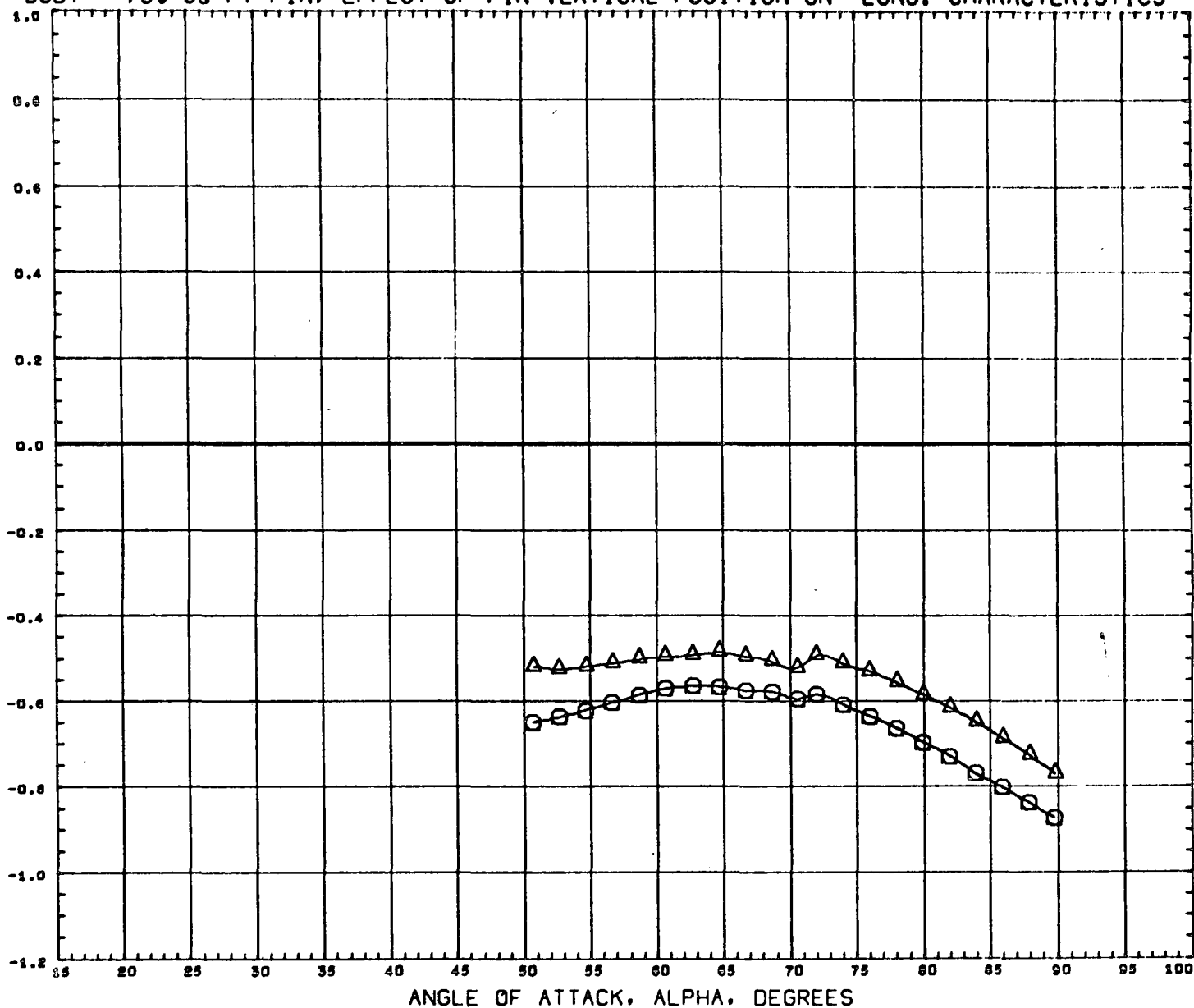


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.961

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

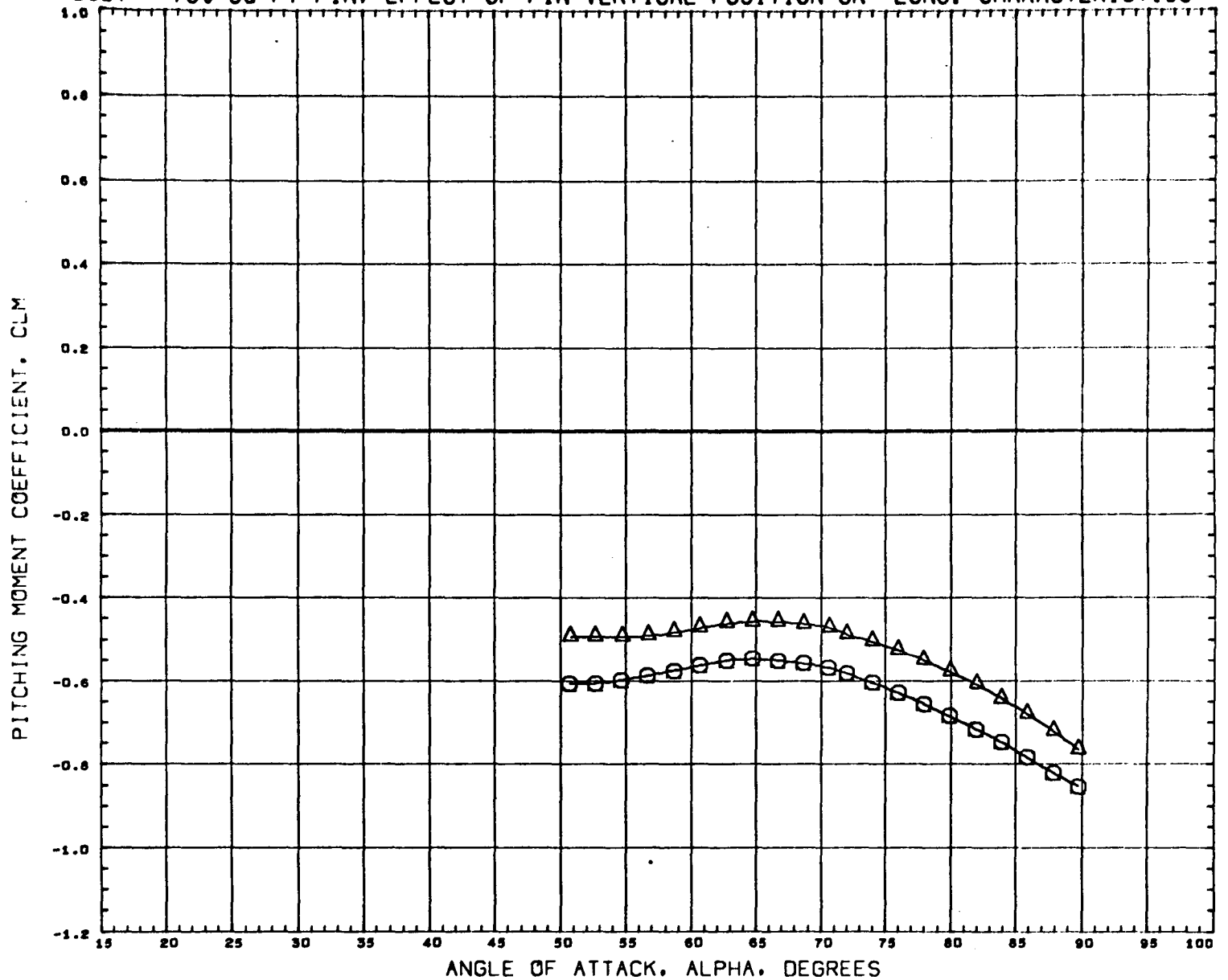
PITCHING MOMENT COEFFICIENT, CLM



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 2.740

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

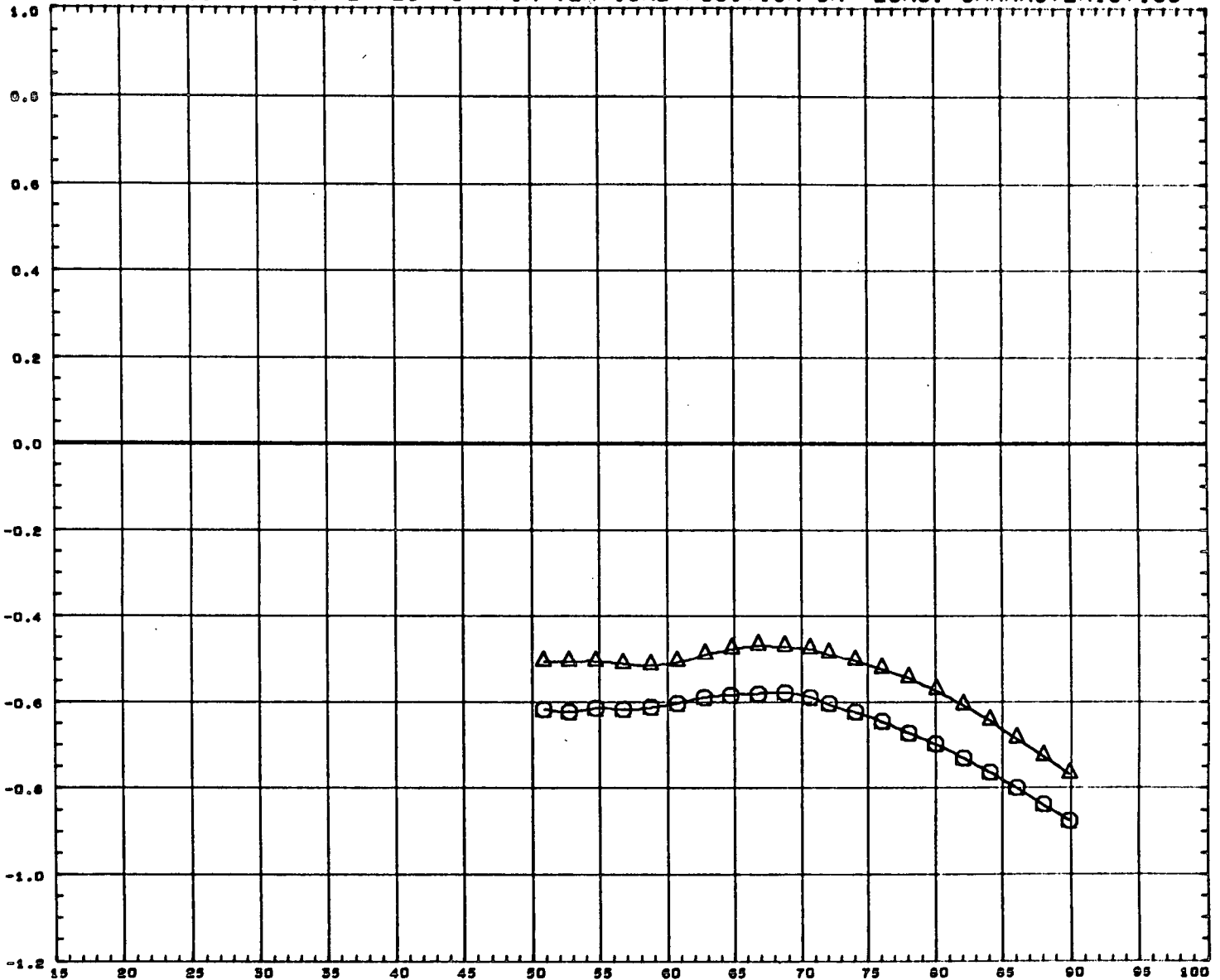


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |       |       | SCALE                 | 0.0028        |

MACH 3.480

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

PITCHING MOMENT COEFFICIENT, CLM

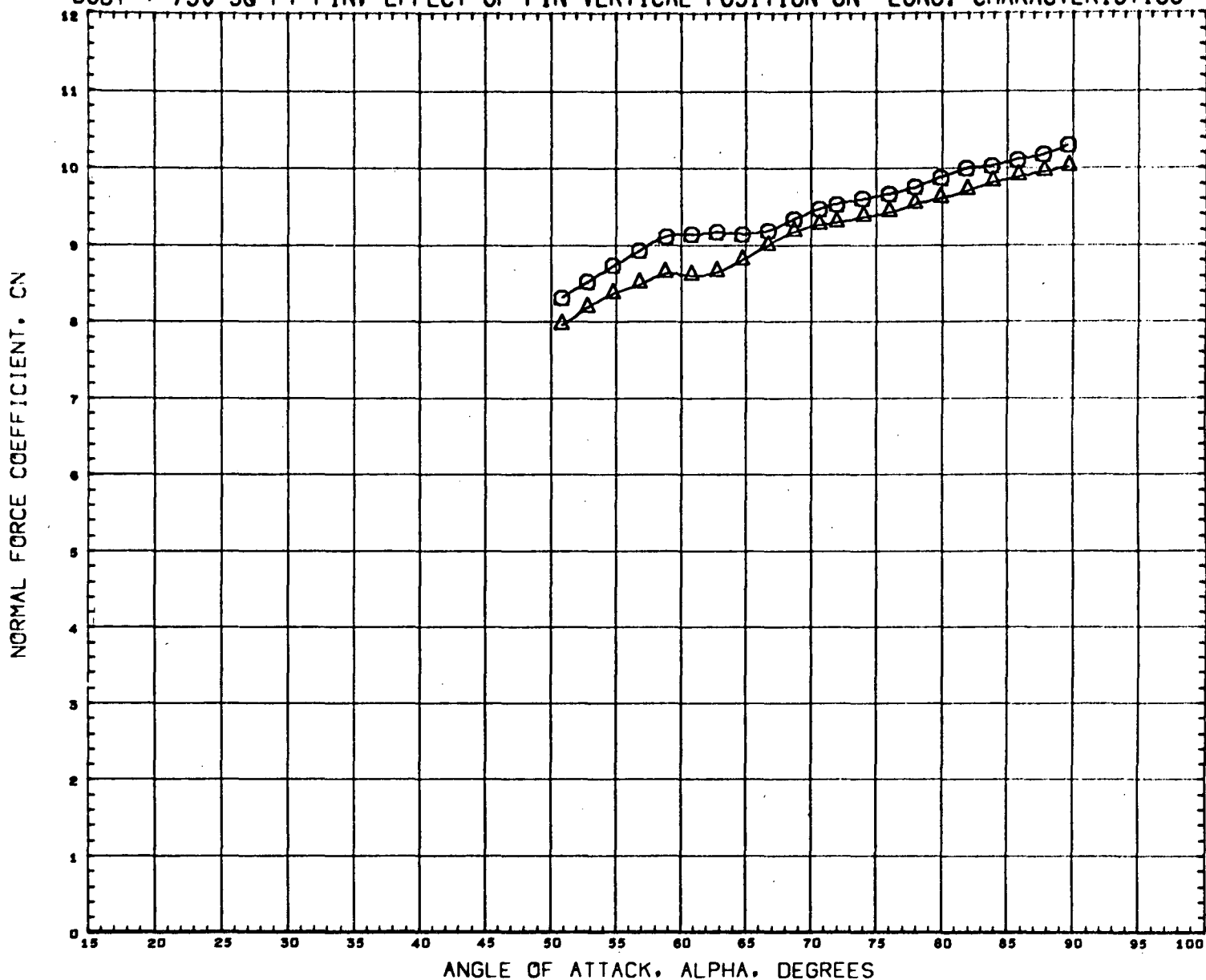


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (B59822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 4.959

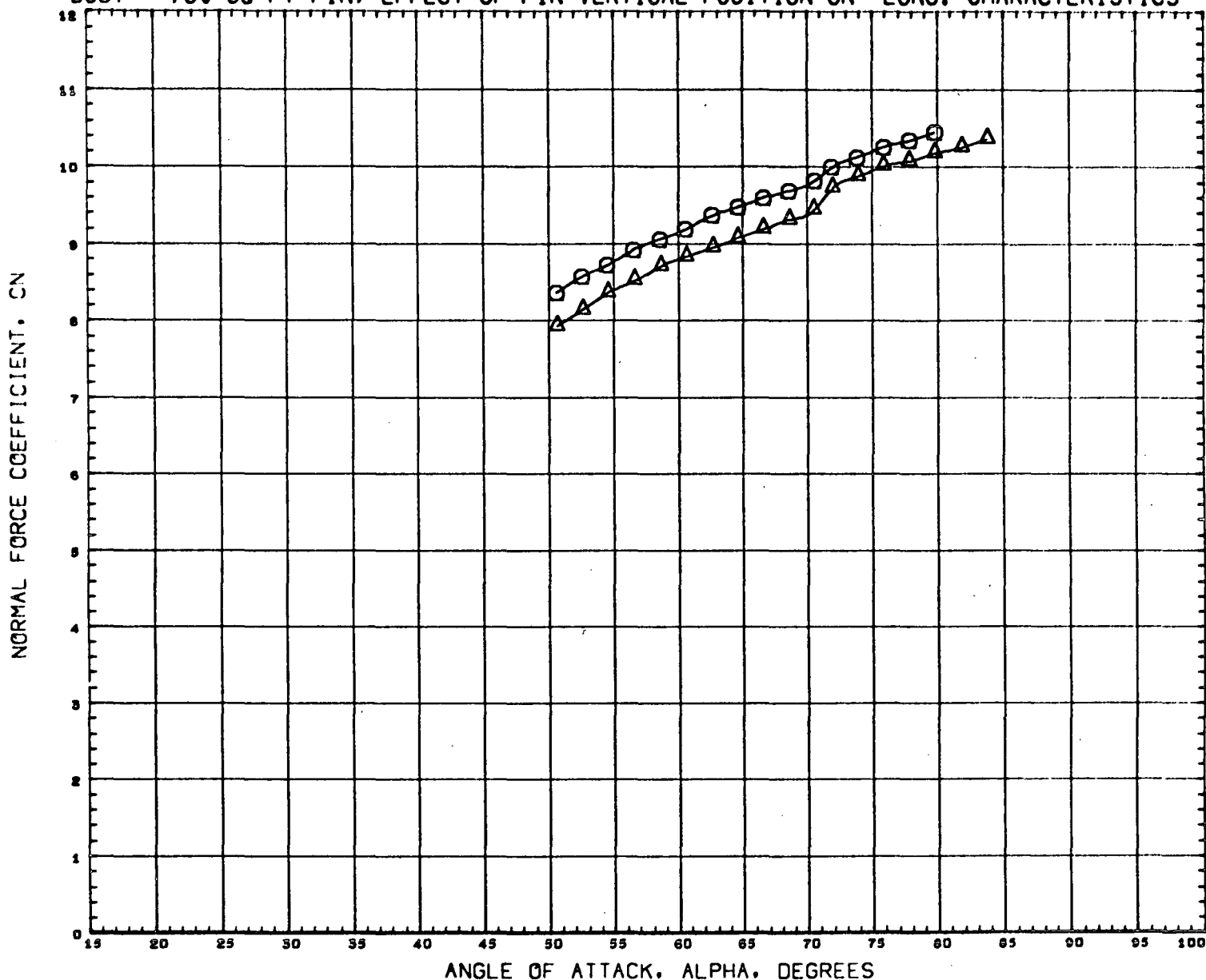
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.195

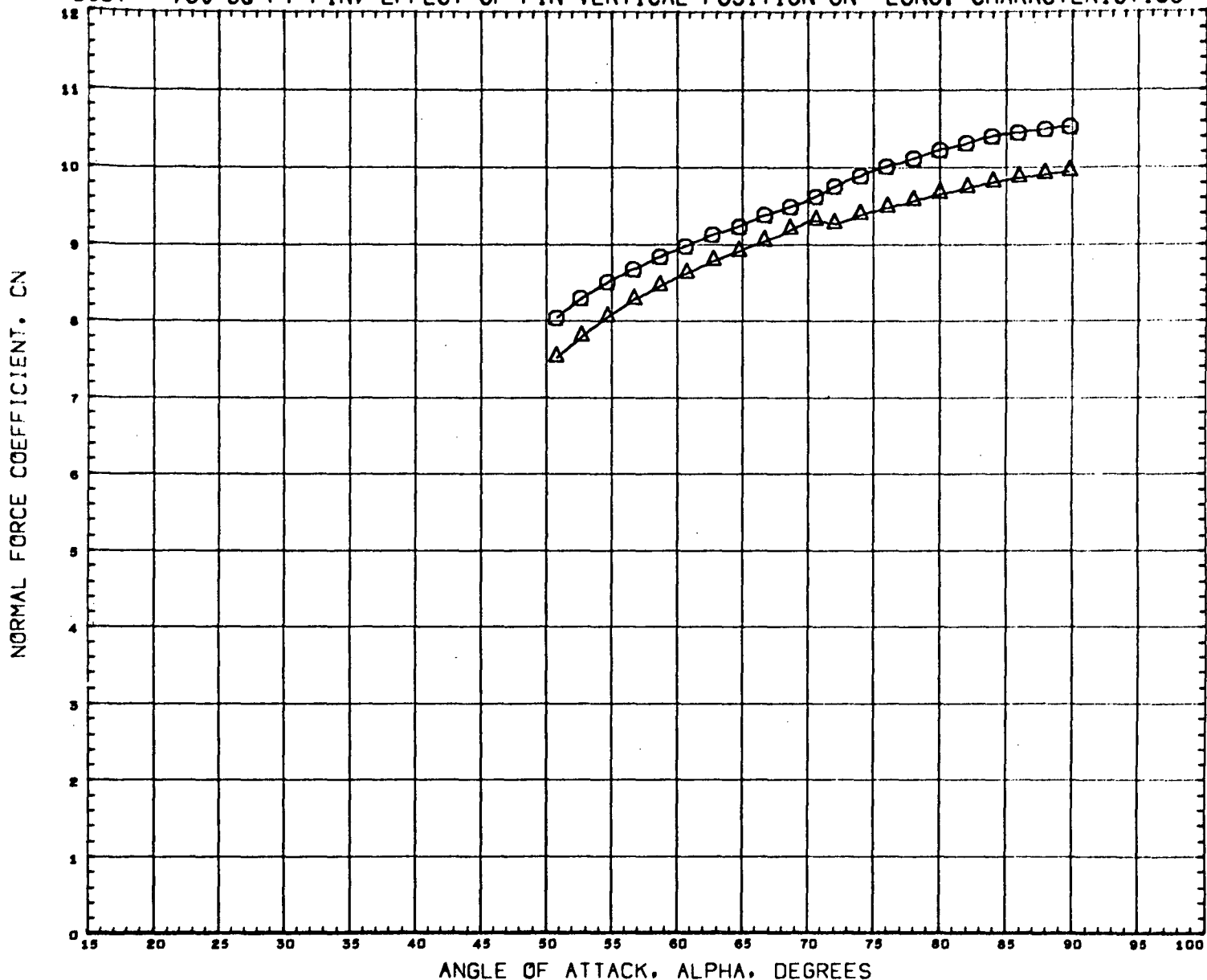
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0026        |

MACH 1.961

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

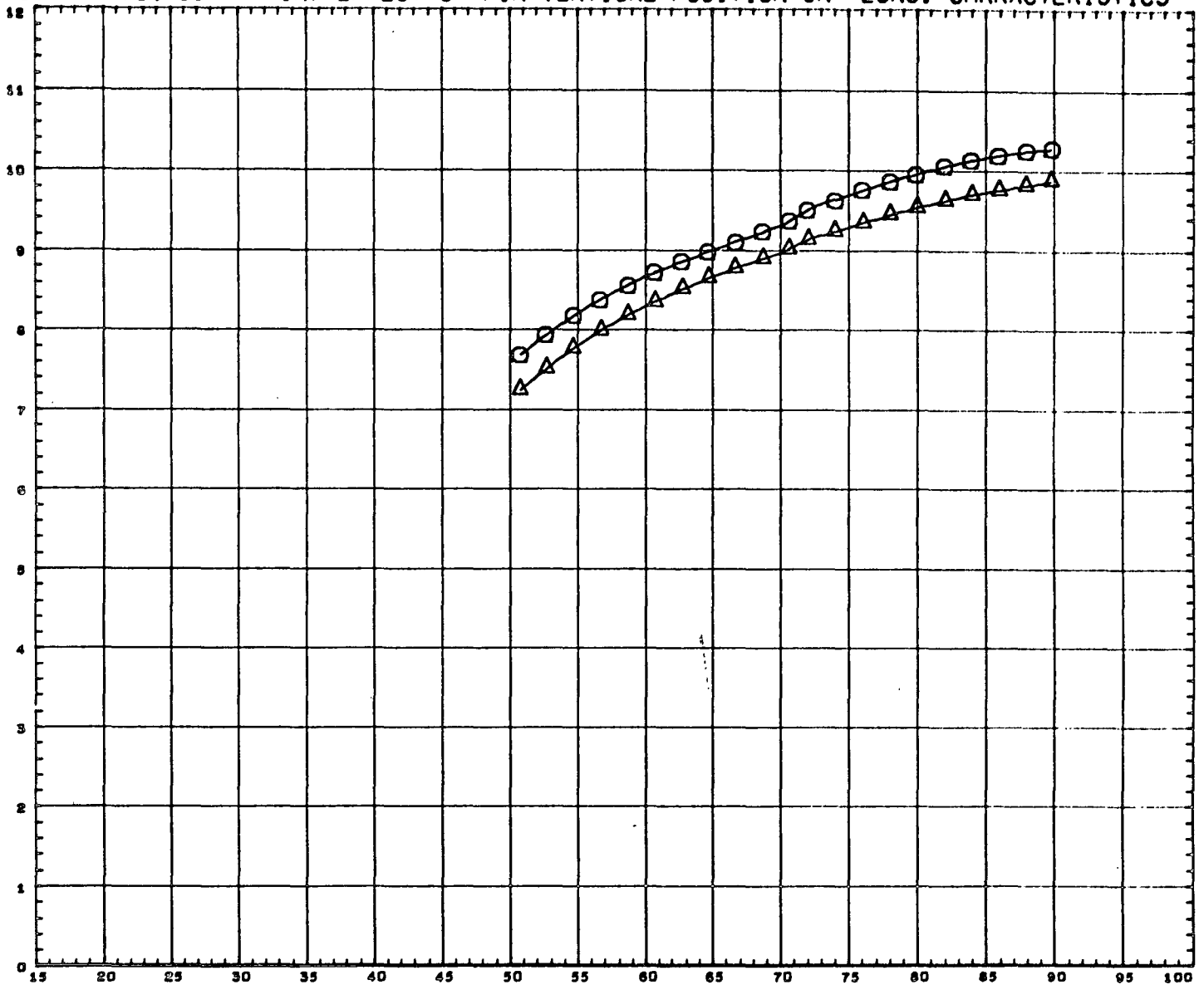


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 2.740

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

NORMAL FORCE COEFFICIENT, CN



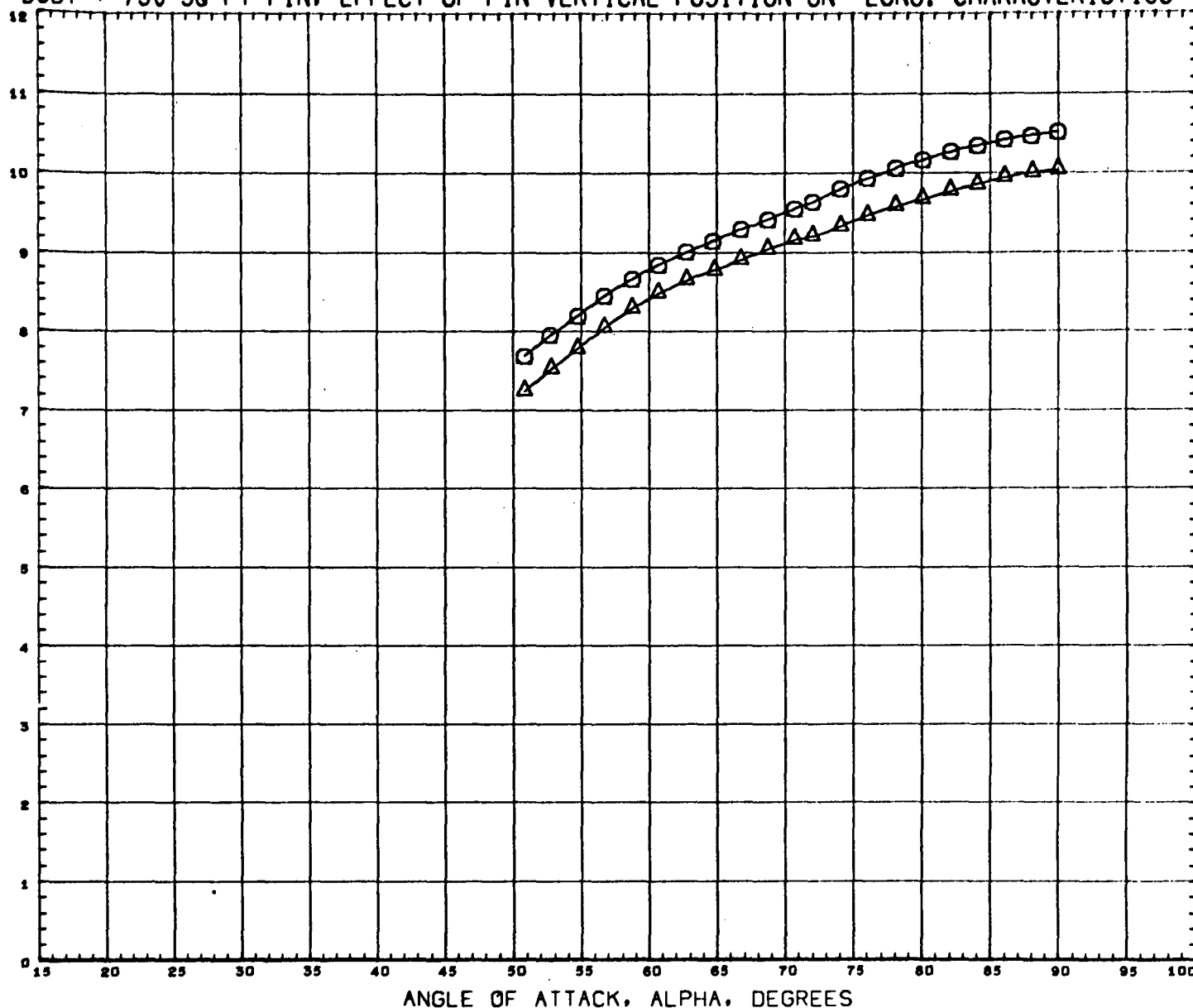
ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |       |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |       |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |       |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |       |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |       |       | SCALE 0.0028          |

MACH 3.480

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

NORMAL FORCE COEFFICIENT, CN

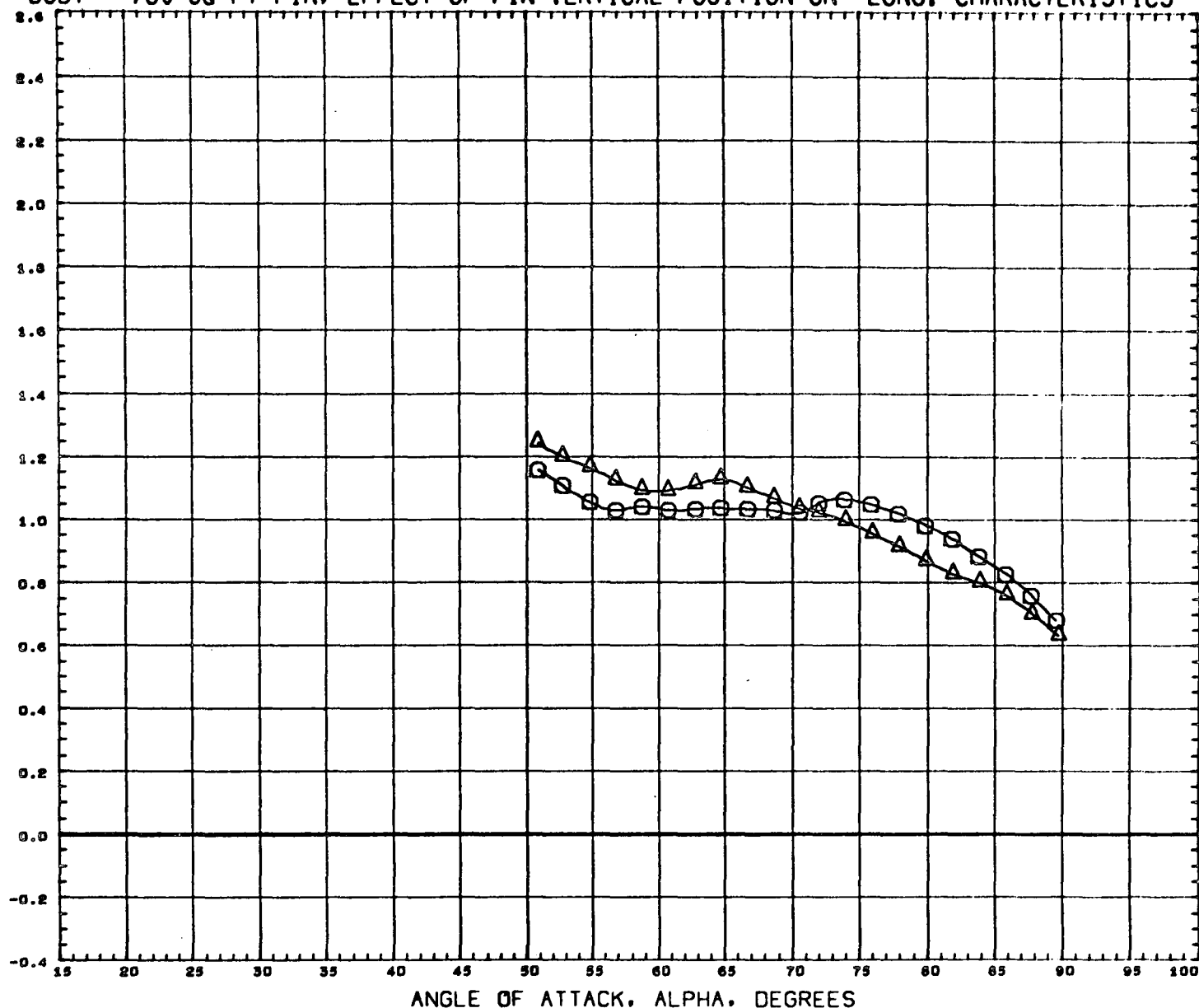


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59S10)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S22)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |       |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

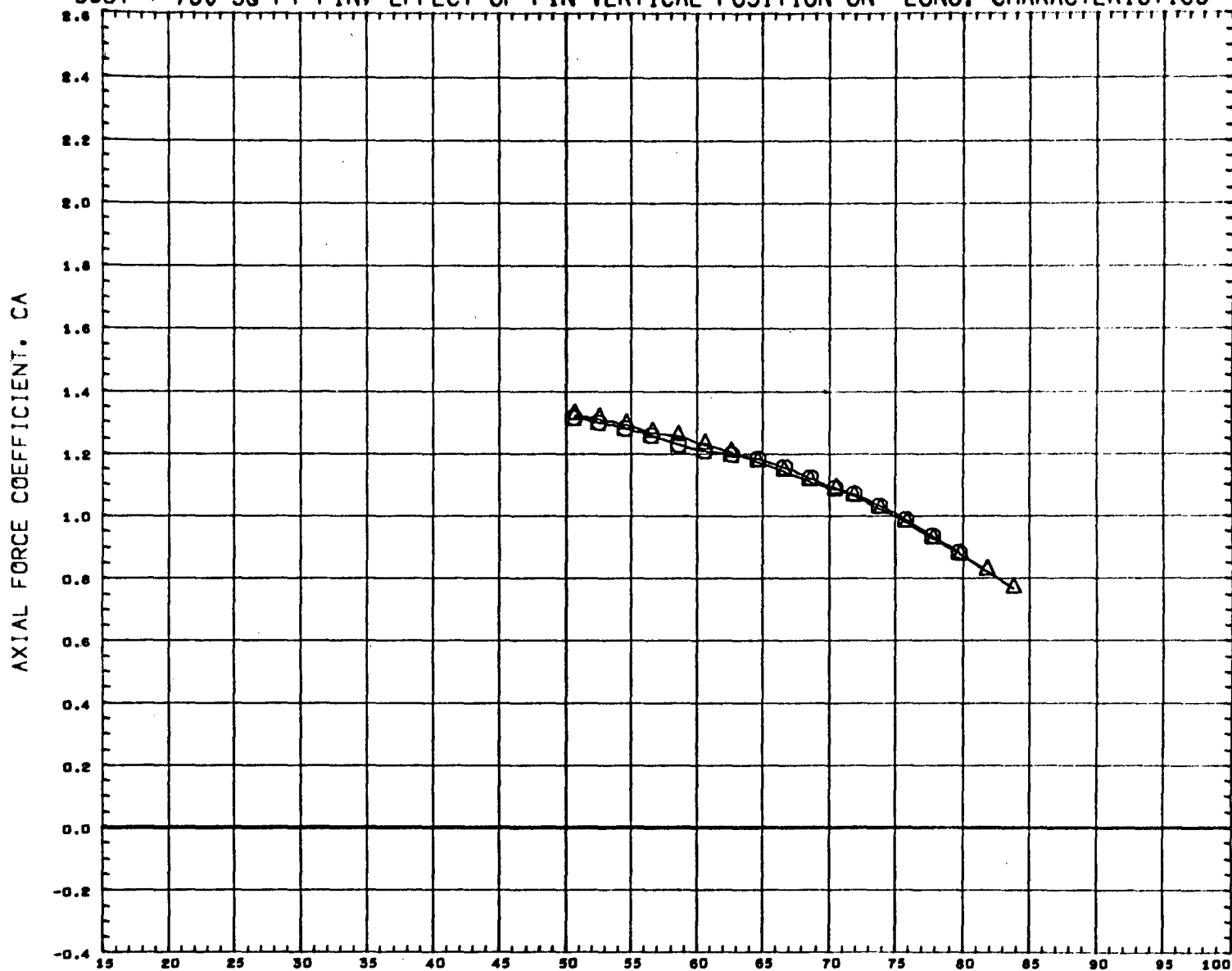
AXIAL FORCE COEFFICIENT, CA



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59S10)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S22)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.195

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

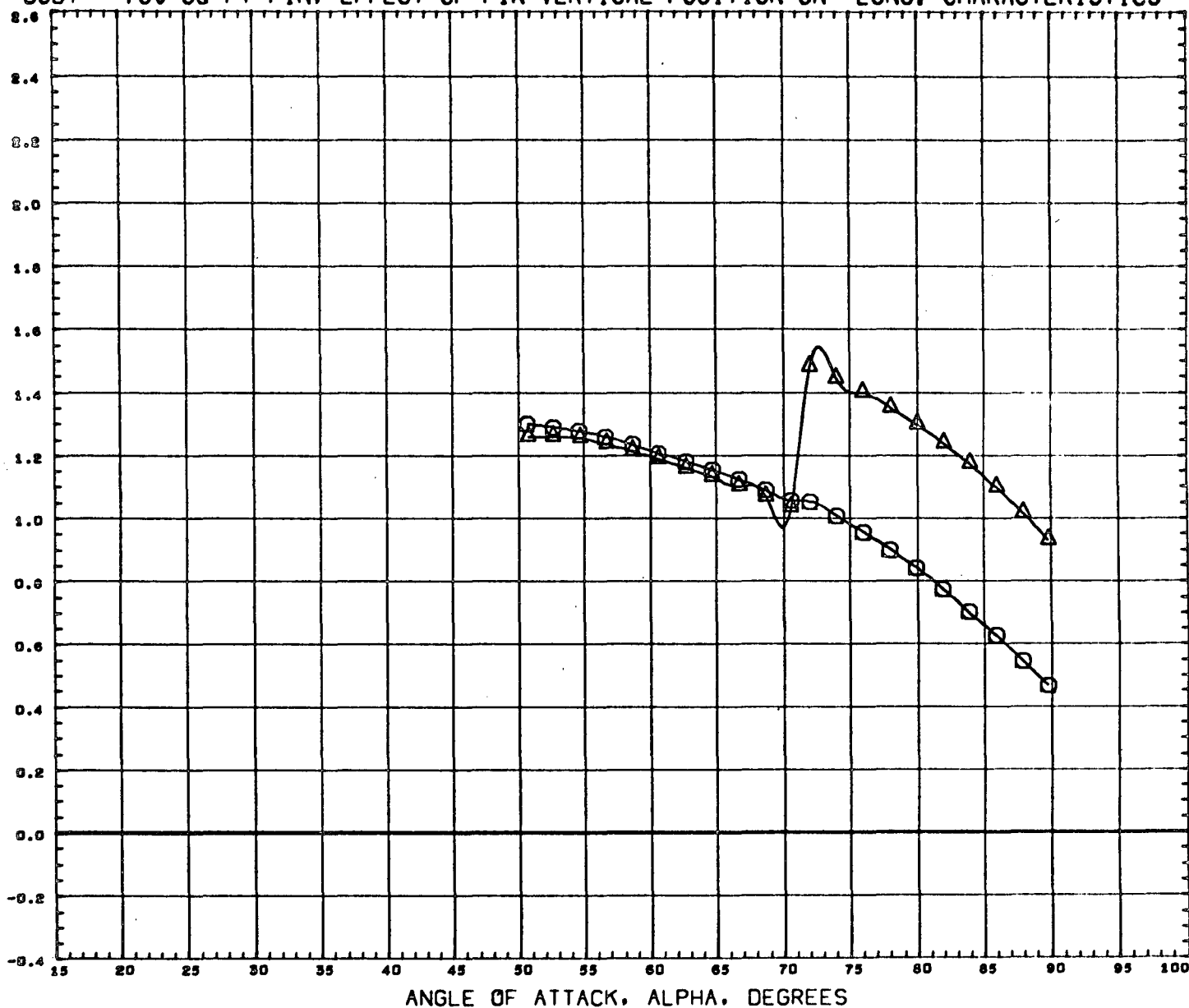


| DATA SET SYMBOL |   | CONFIGURATION DESCRIPTION |                 | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|---|---------------------------|-----------------|-------|-------|-------|-------|-----------------------|---------------|
| (859510)        | Q | MSFC TWT 524              | 33 FOOT BOOSTER | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | A | MSFC TWT 524              | 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |   |                           |                 |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |   |                           |                 |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |   |                           |                 |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.961

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

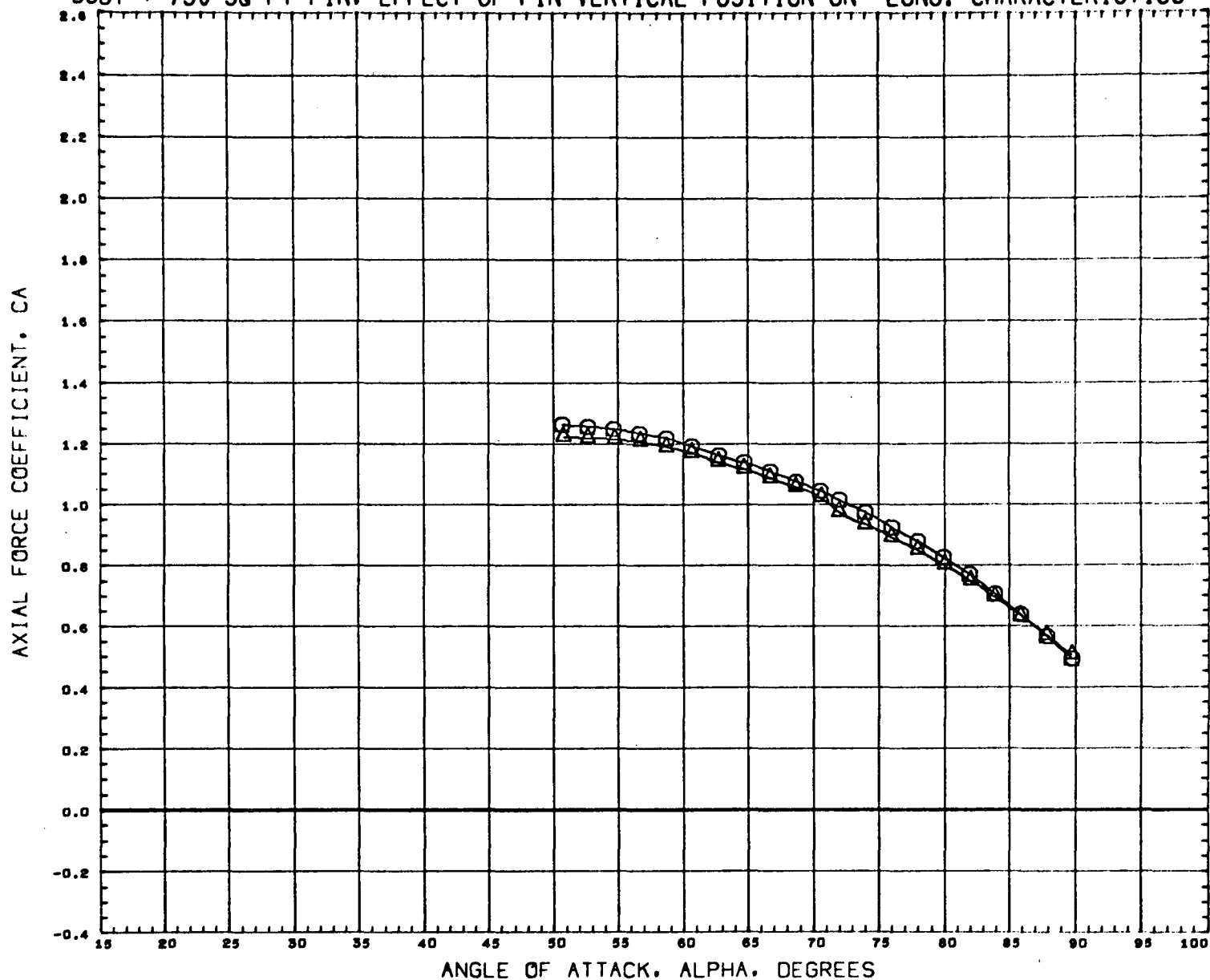
AXIAL FORCE COEFFICIENT, CA



| DATA SET | SYMBOL | CONFIGURATION | DESCRIPTION     | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|----------|--------|---------------|-----------------|-------|-------|-------|-------|-----------------------|---------------|
| (859810) | Q      | MSFC TWT 524  | 33 FOOT BOOSTER | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (859822) | A      | MSFC TWT 524  | 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|          |        |               |                 |       |       |       |       | BREF                  | 4.9080 IN.    |
|          |        |               |                 |       |       |       |       | XMRP                  | 2.9450 IN.    |
|          |        |               |                 |       |       |       |       | YMRP                  | 0.0000 IN.    |
|          |        |               |                 |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|          |        |               |                 |       |       |       |       | SCALE                 | 0.0028        |

MACH 2.740

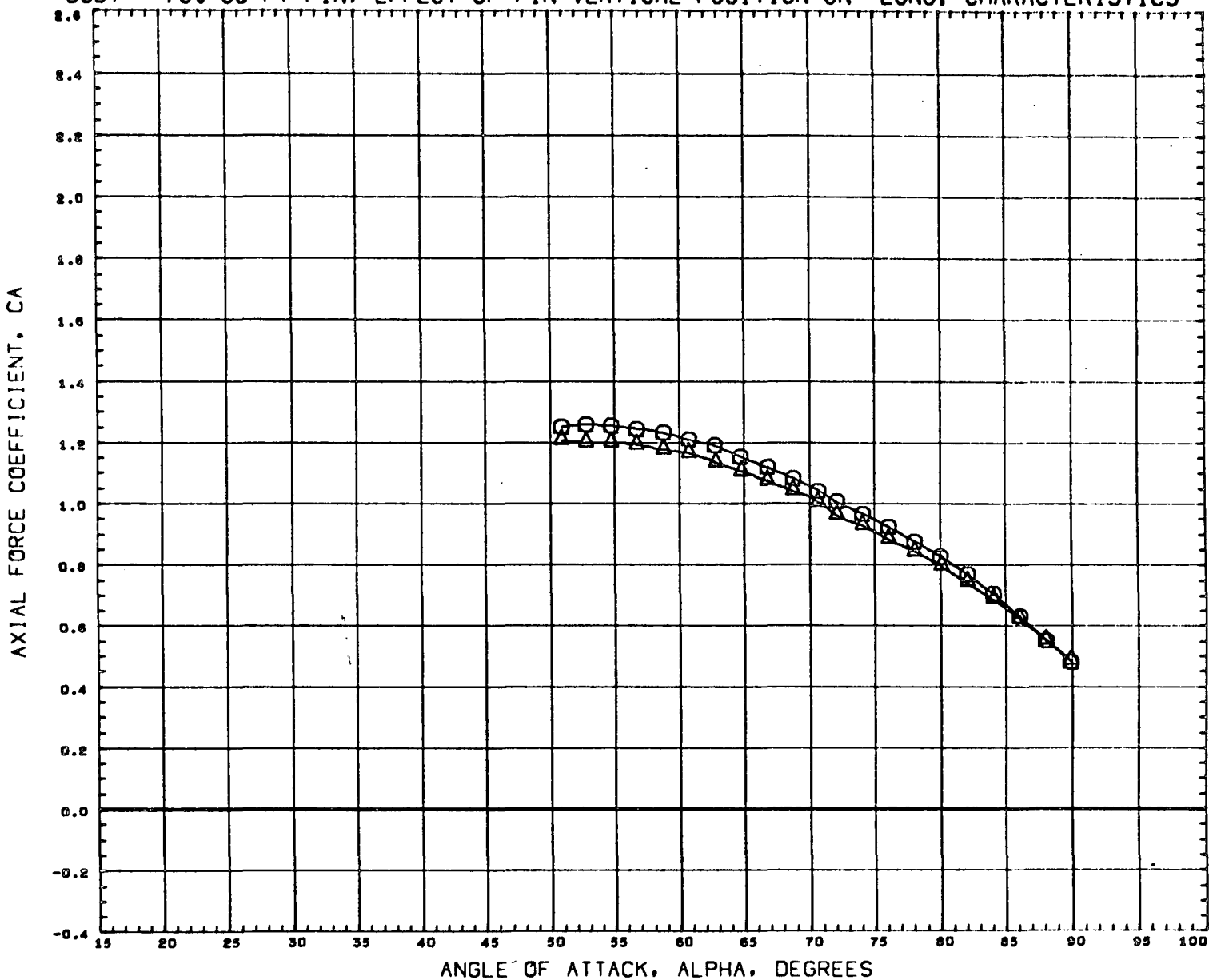
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859S10)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859S22)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 3.480

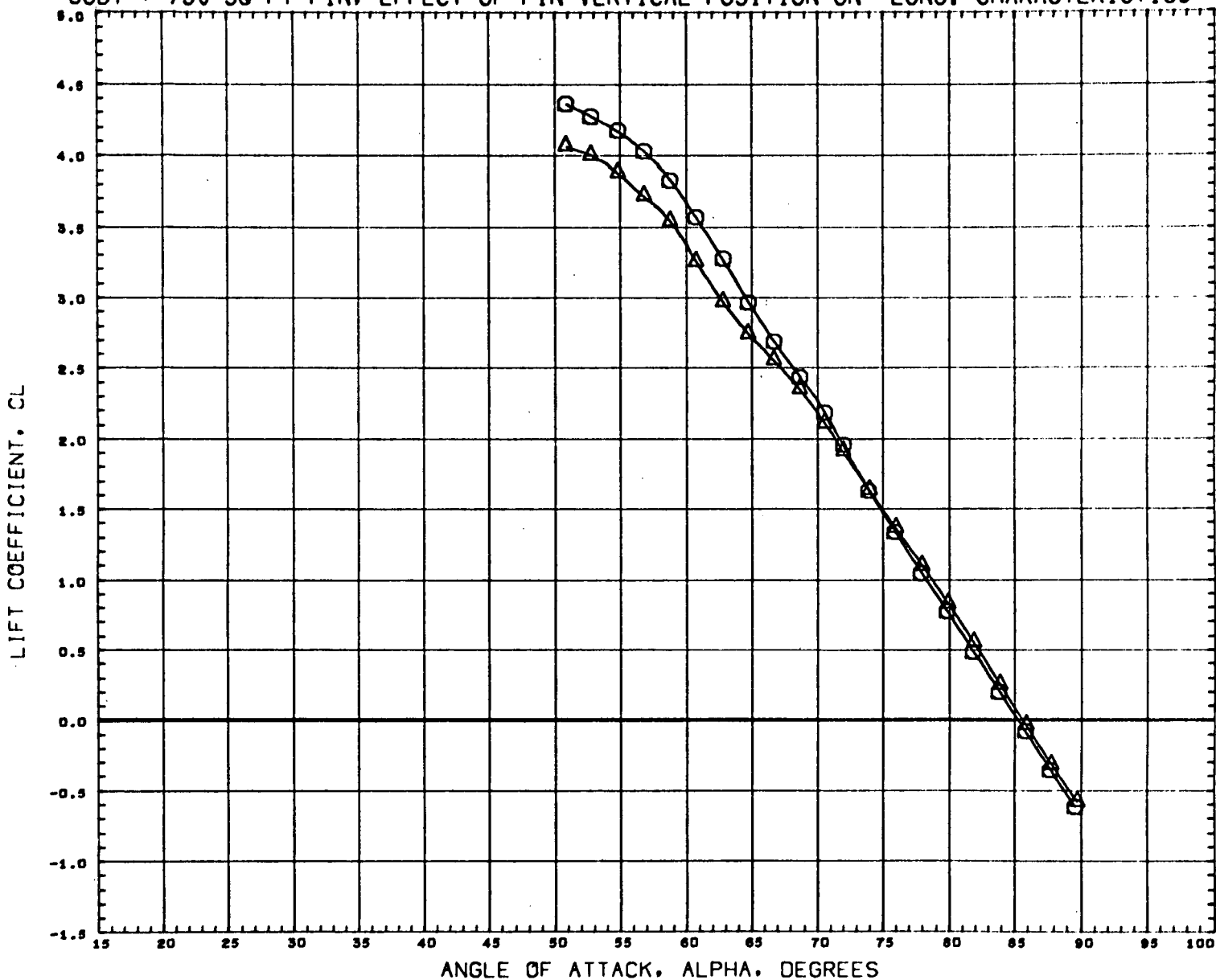
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET | SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|----------|--------|-----------------------------------------|-------|-------|-------|-------|-----------------------|
| (B59910) | ○      | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59922) | △      | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
|          |        |                                         |       |       |       |       | BREF 4.9080 IN.       |
|          |        |                                         |       |       |       |       | XMRP 2.9450 IN.       |
|          |        |                                         |       |       |       |       | YMRP 0.0000 IN.       |
|          |        |                                         |       |       |       |       | ZMRP 0.0000 IN.       |
|          |        |                                         |       |       |       |       | SCALE 0.0028          |

MACH 4.959

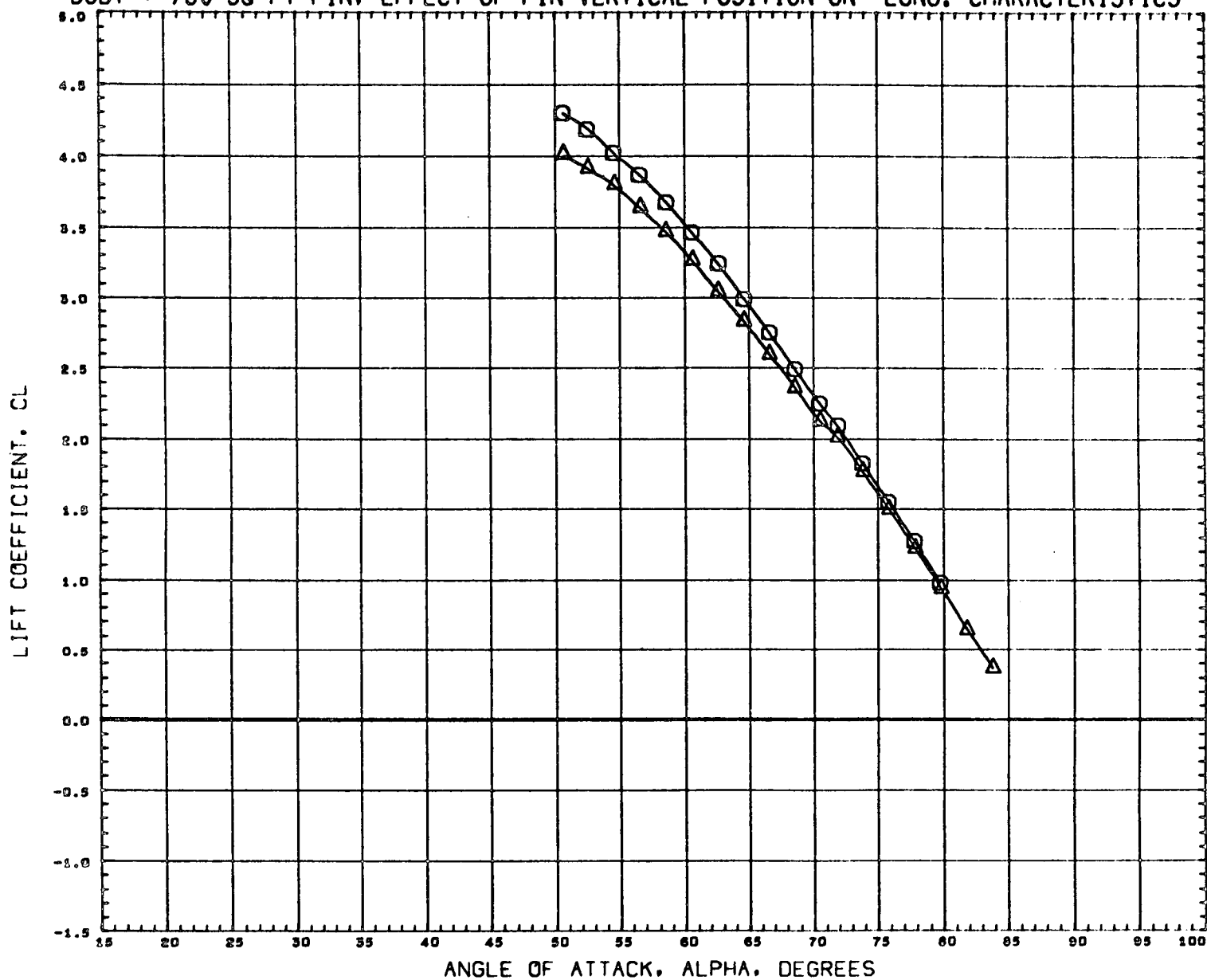
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XHRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.195

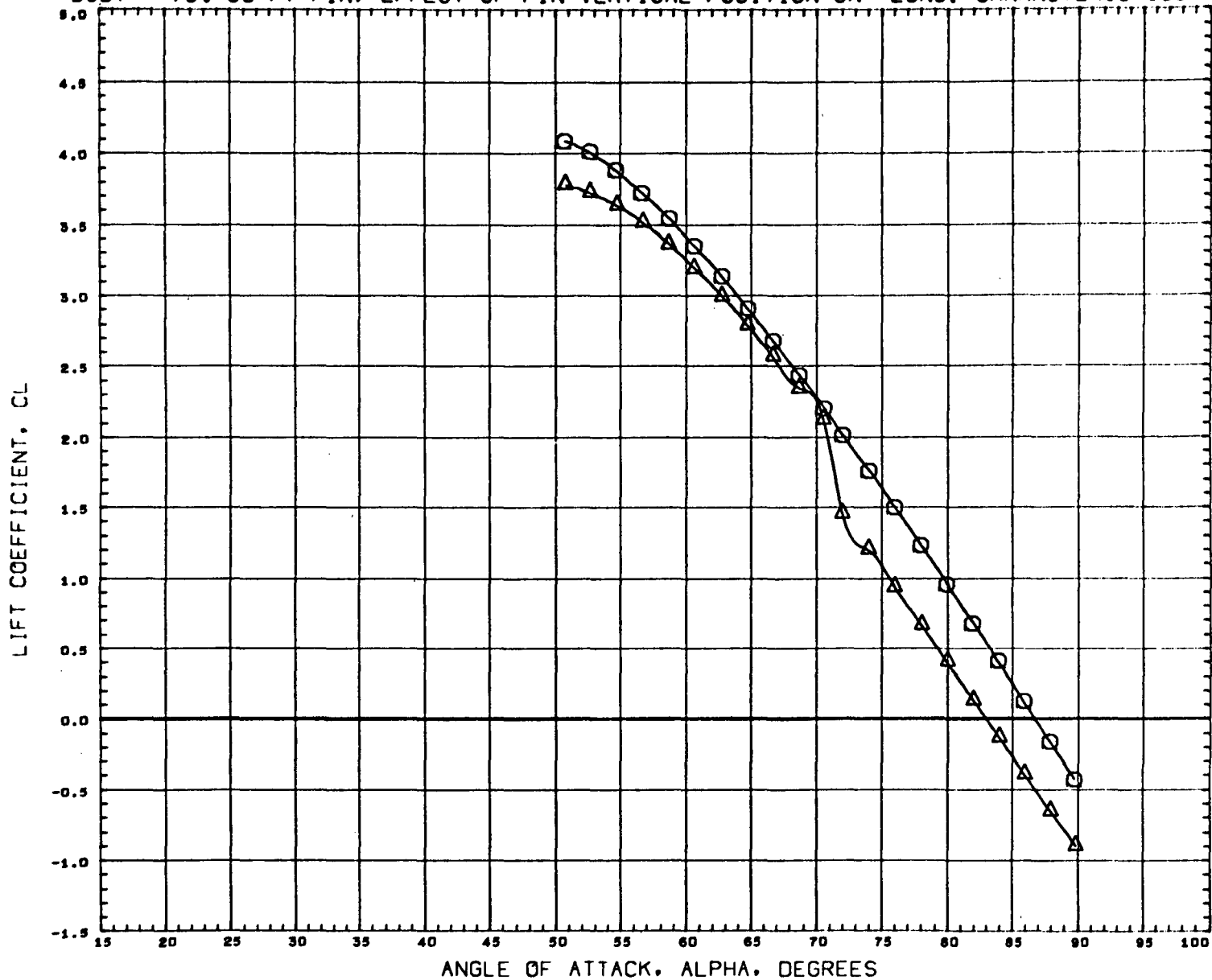
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59S10)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S22)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.961

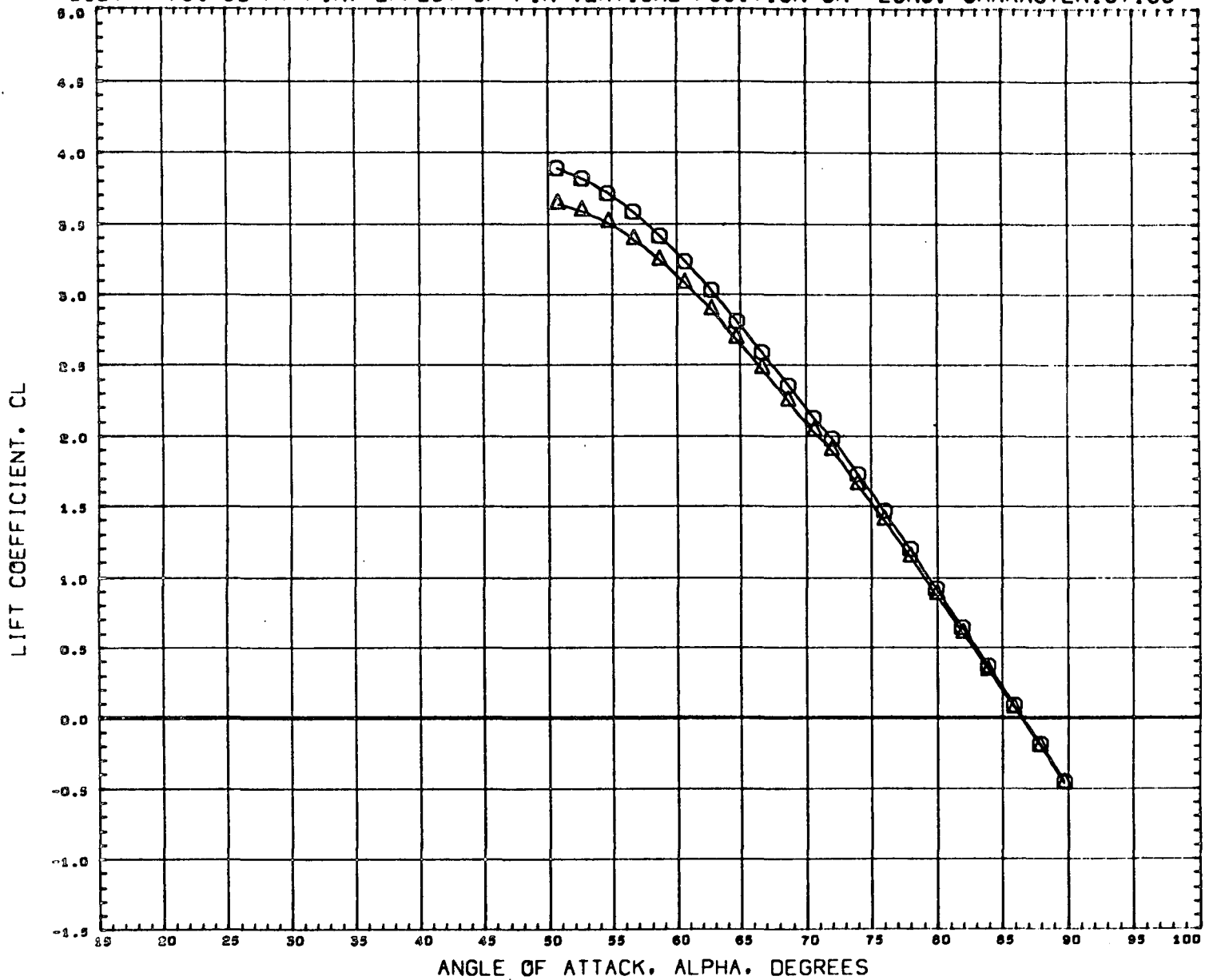
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (B59822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 2.740

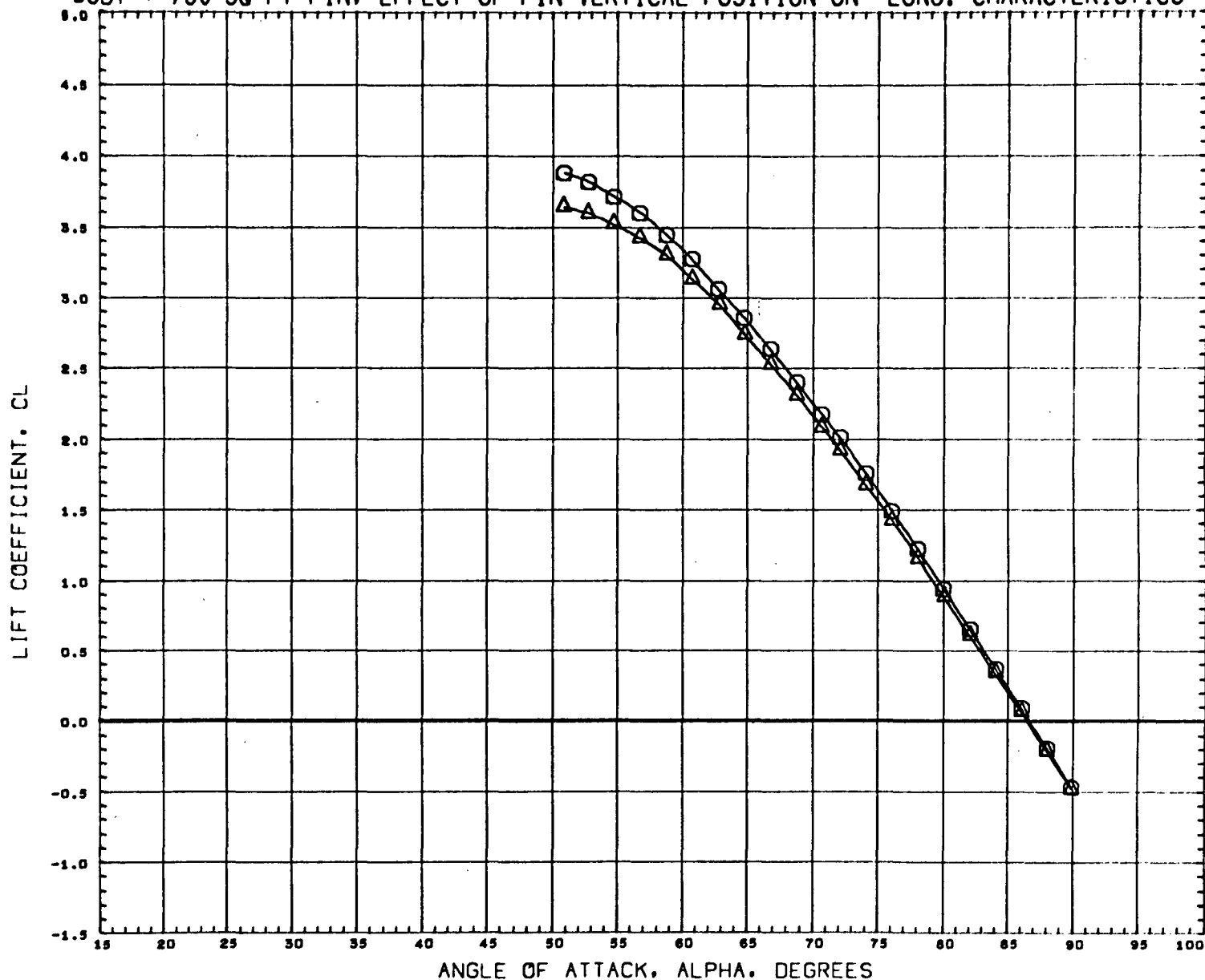
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 3.460

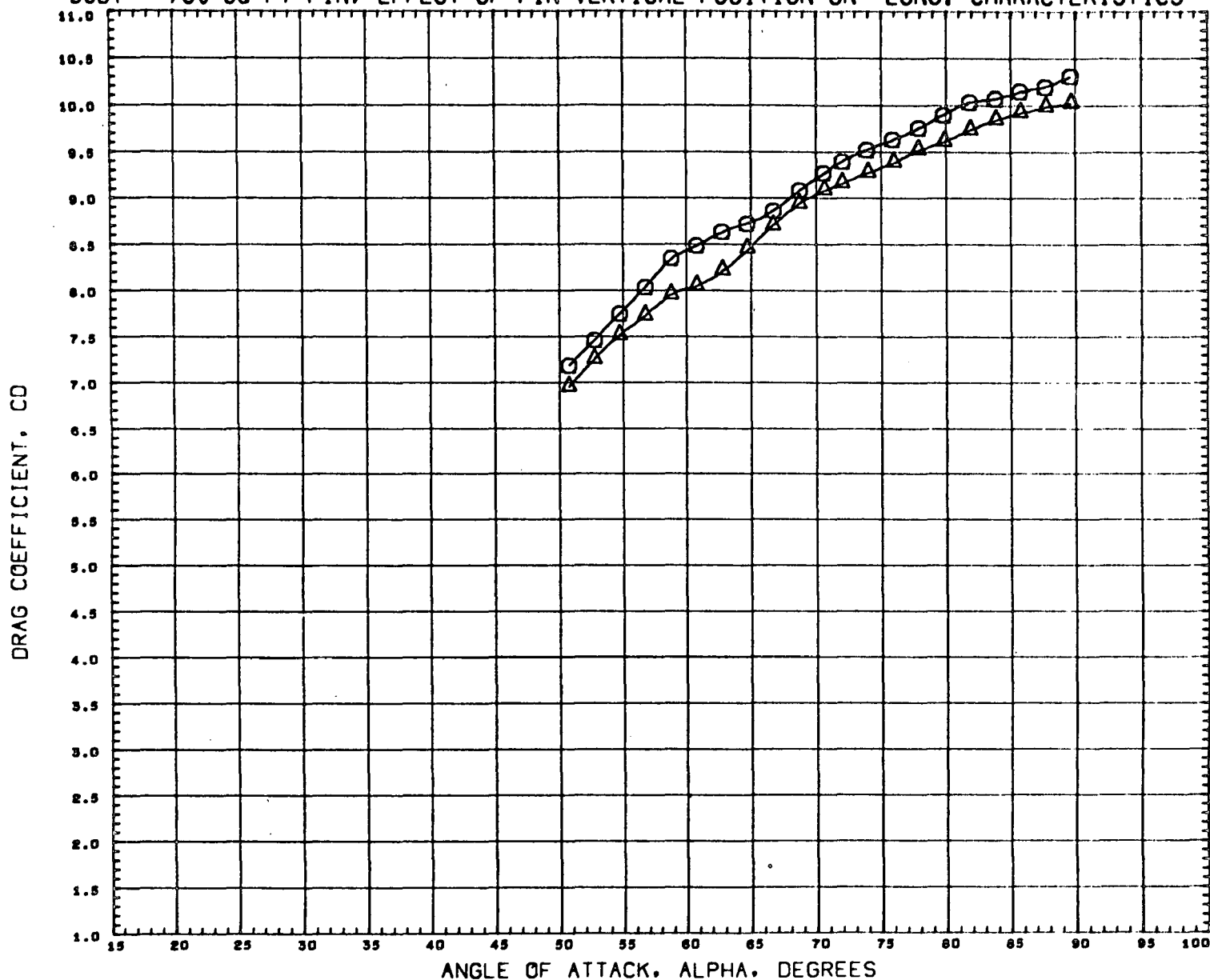
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 4.959

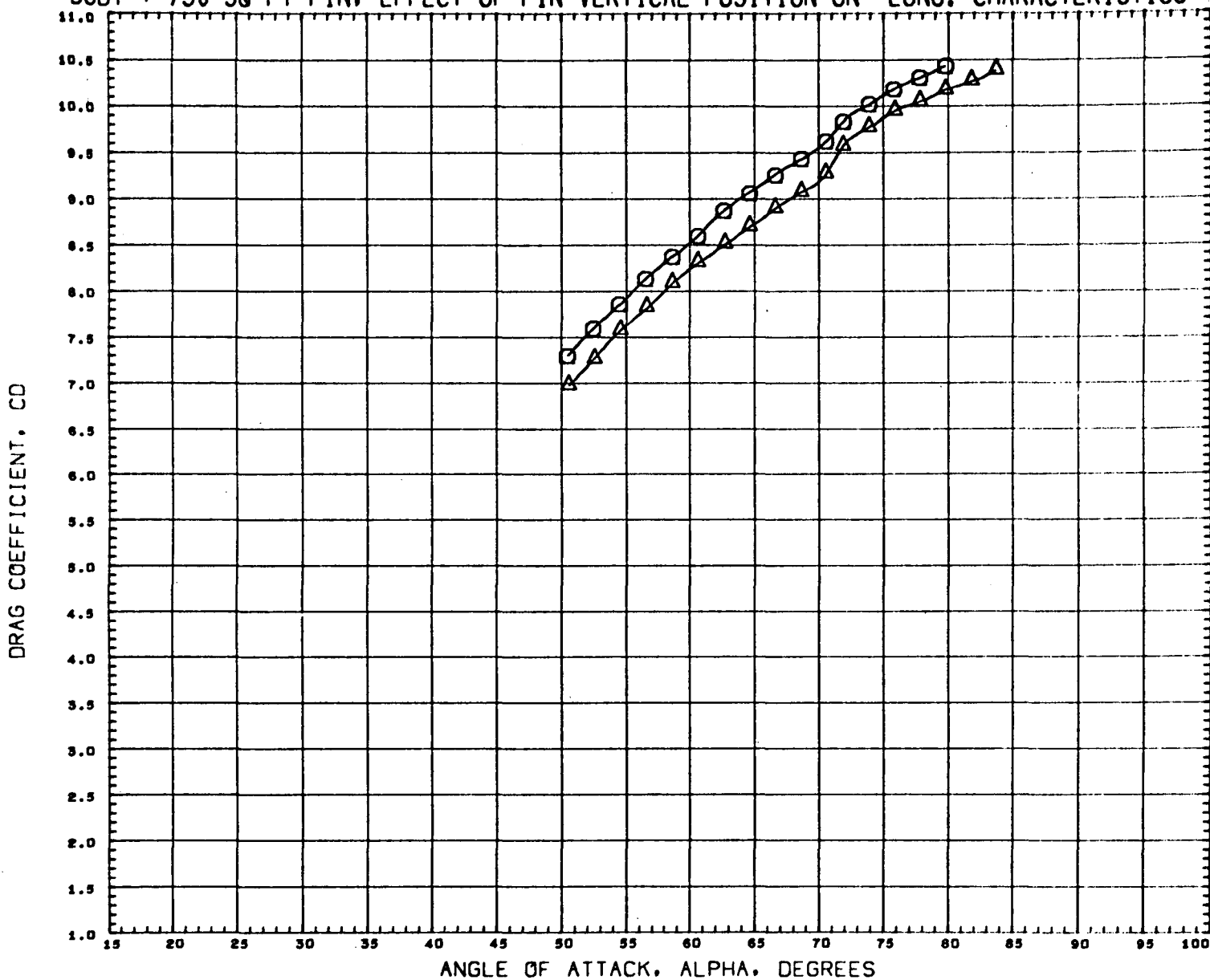
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|
| (B59310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF 0.9650 sq. in    |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF 4.9080 in.       |
|                 |                                         |       |       |       |       | BREF 4.9080 in.       |
|                 |                                         |       |       |       |       | XMRP 2.9450 in.       |
|                 |                                         |       |       |       |       | YMRP 0.0000 in.       |
|                 |                                         |       |       |       |       | ZMRP 0.0000 in.       |
|                 |                                         |       |       |       |       | SCALE 0.0020          |

MACH 1.195

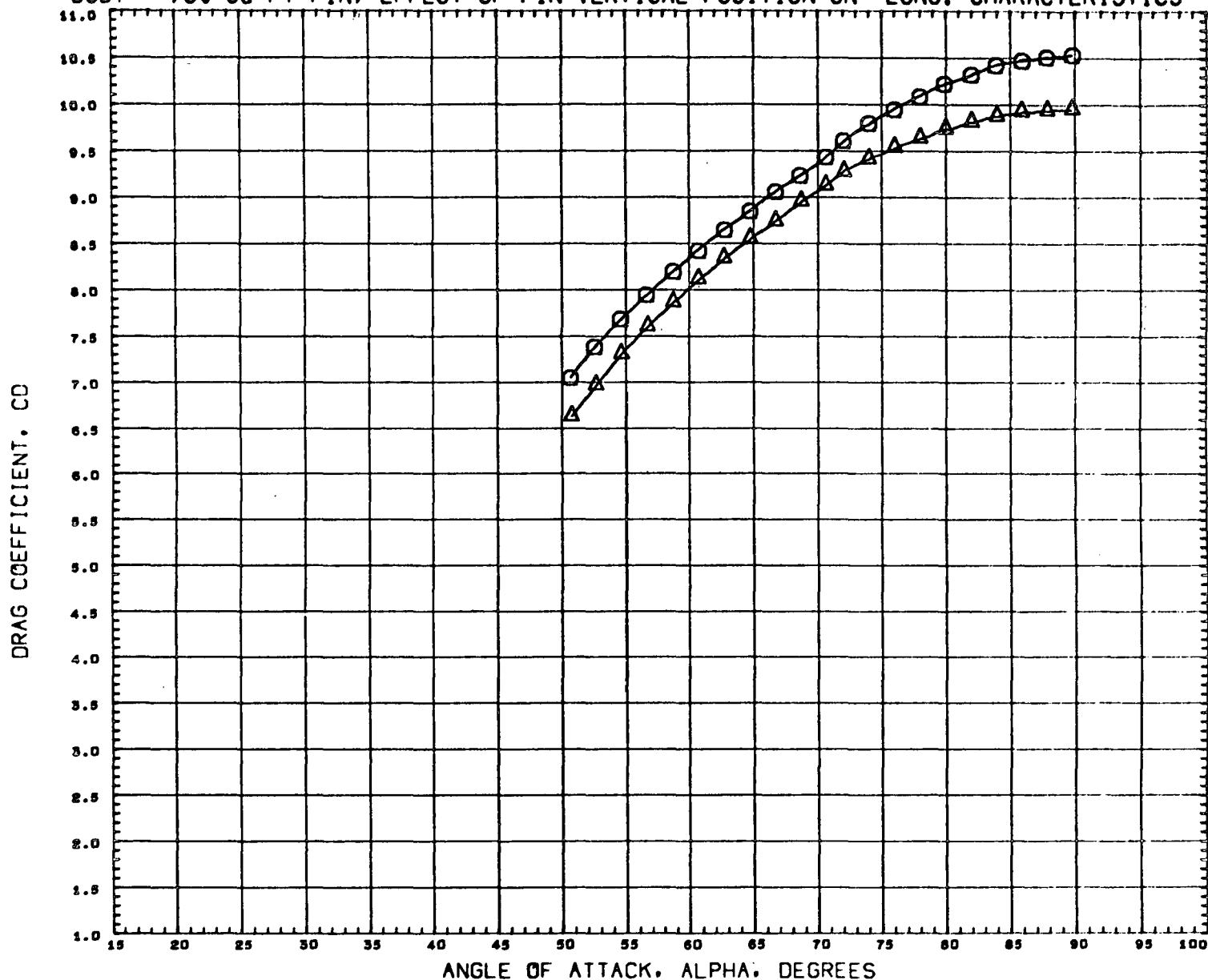
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59S10)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S22)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.961

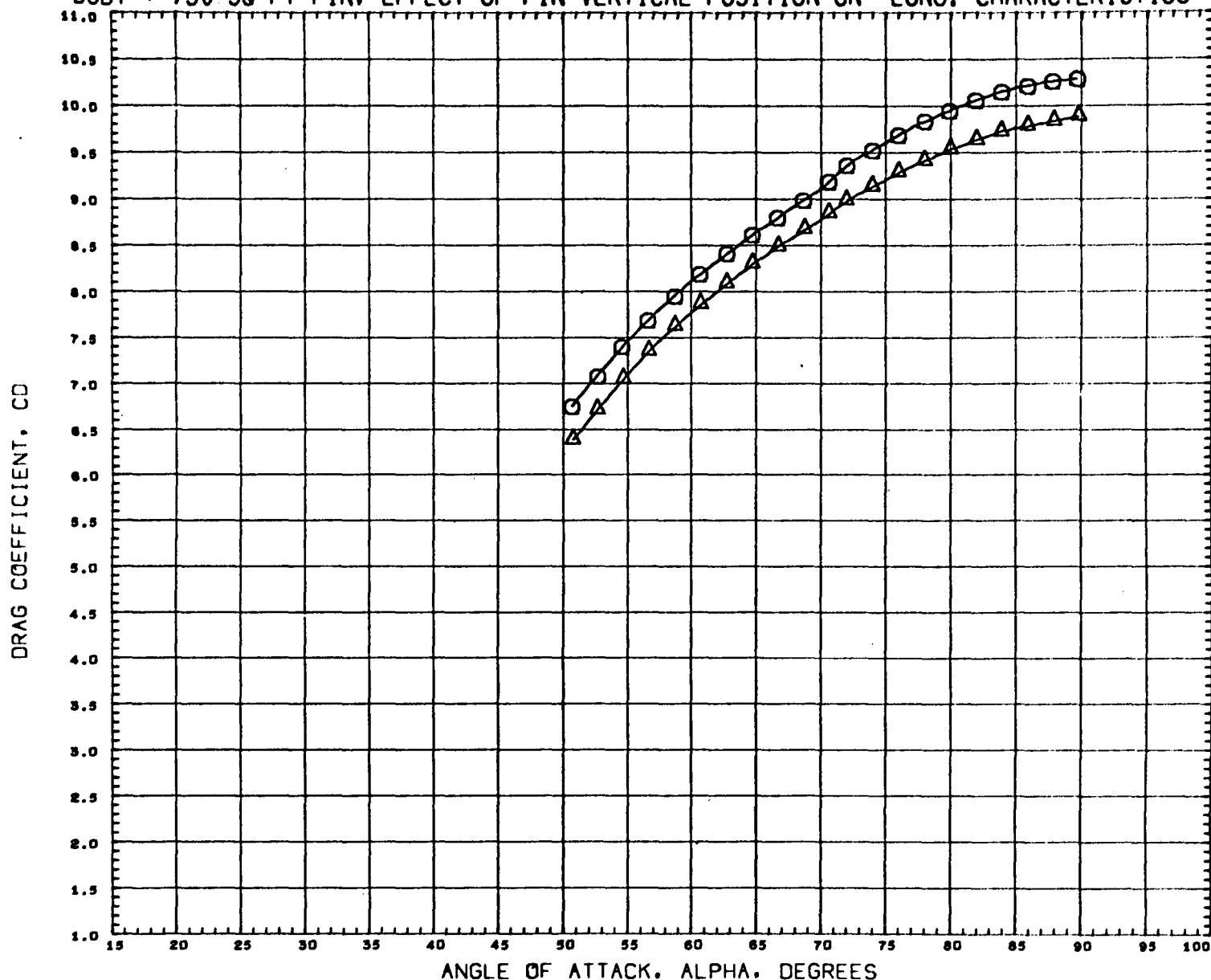
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XHRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 2.740

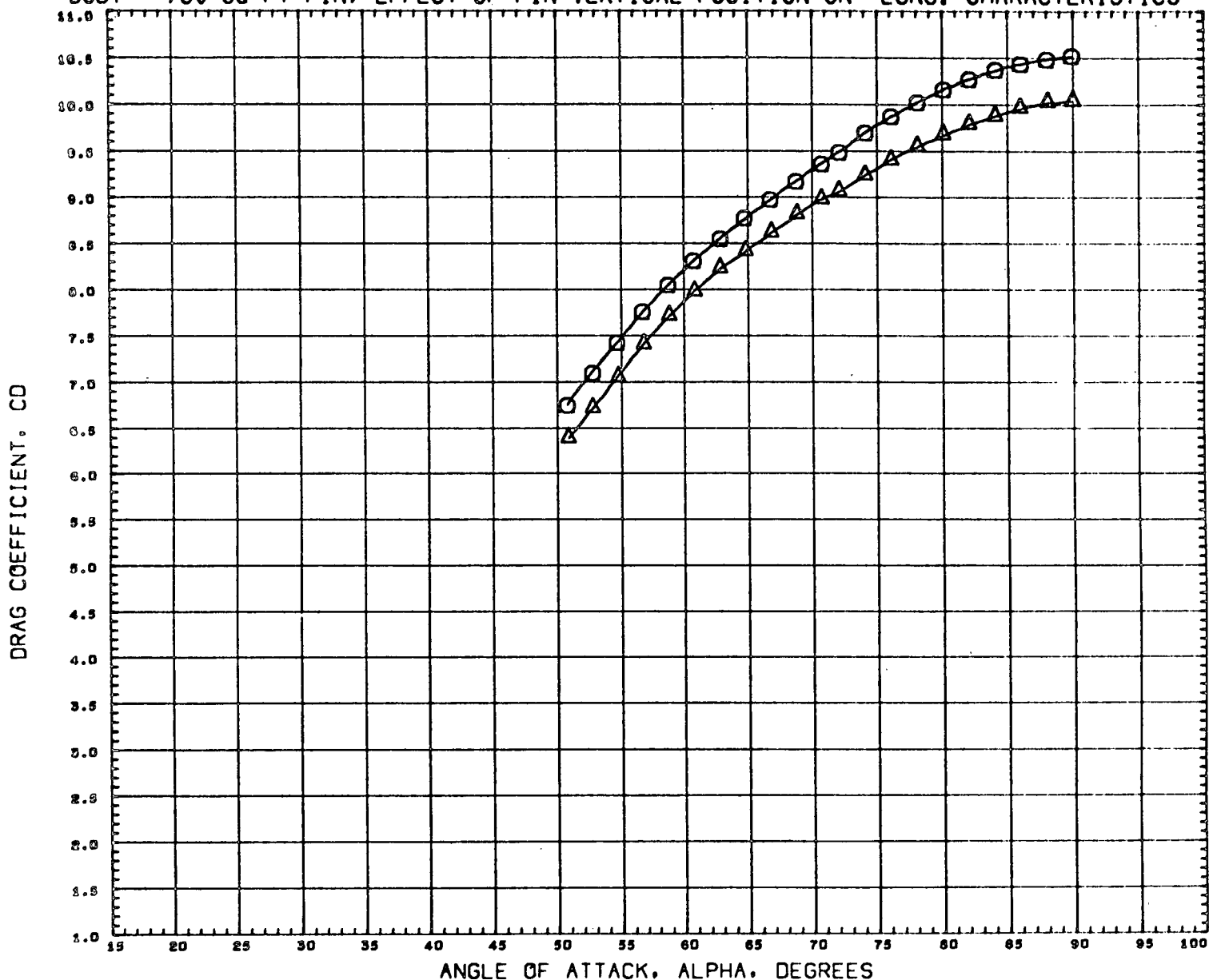
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XHRP                  | 2.9430 IN.    |
|                 |                                         |       |       |       |       | YHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 3.480

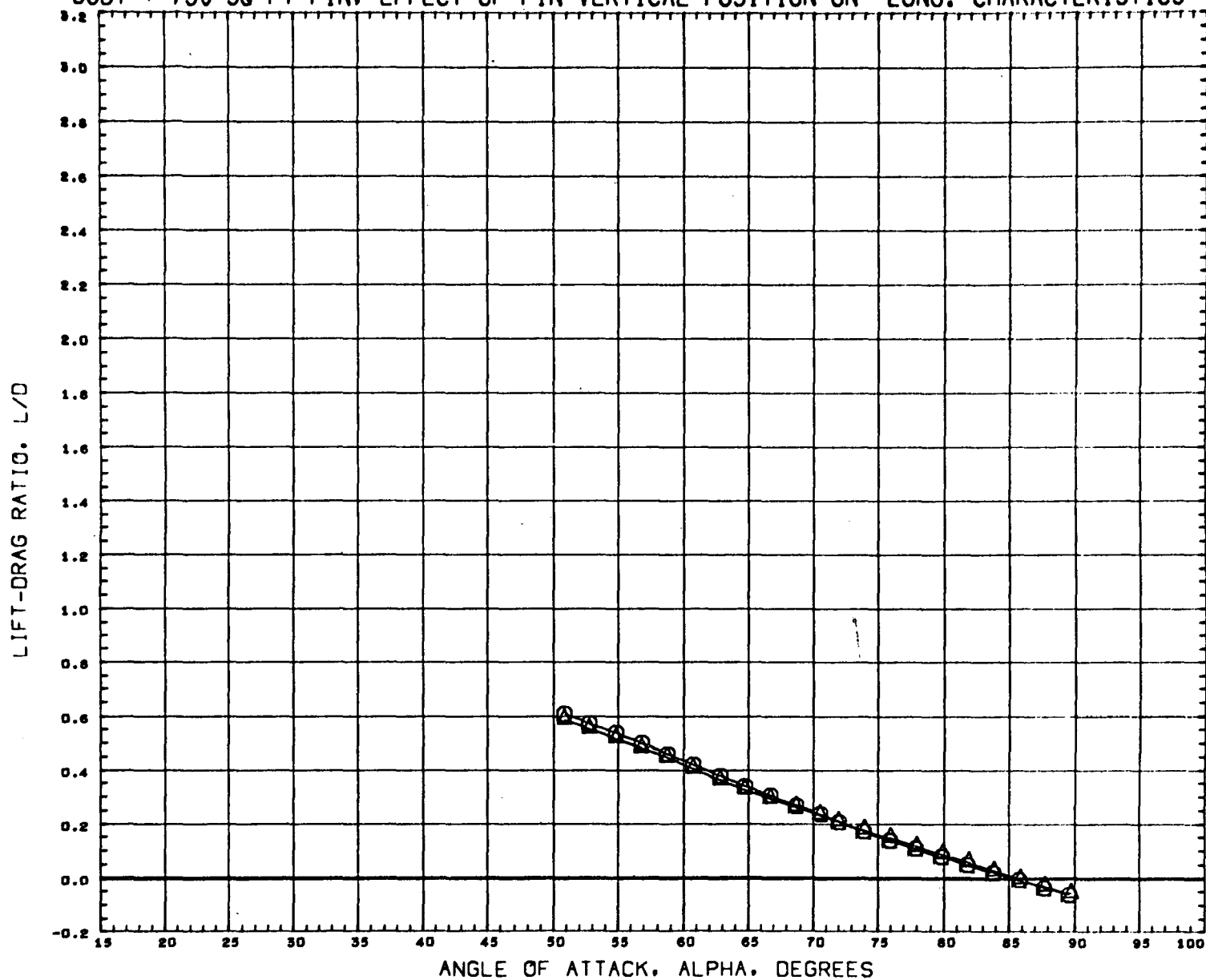
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0026        |

MACH 4.959

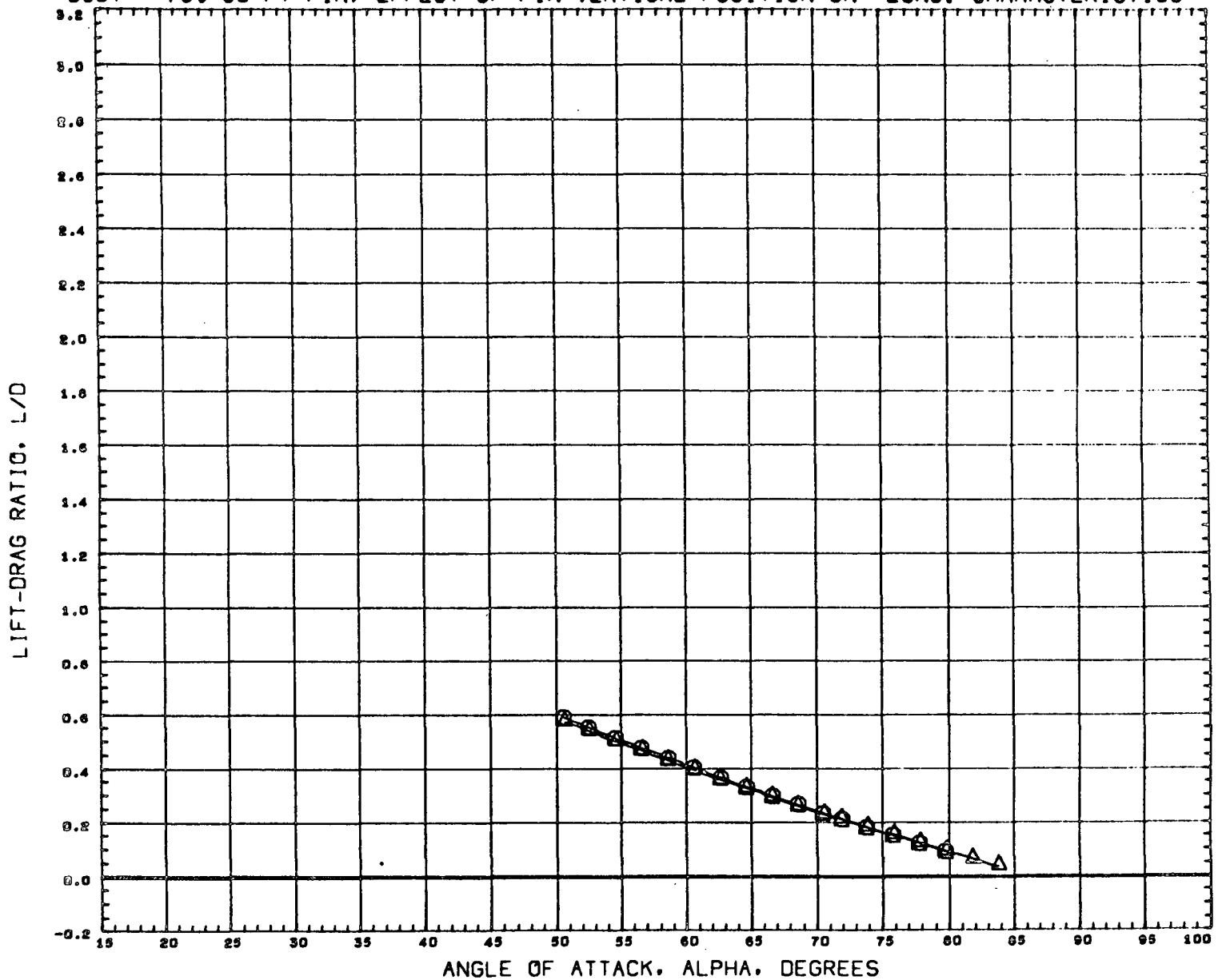
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XHRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZHRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.195

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

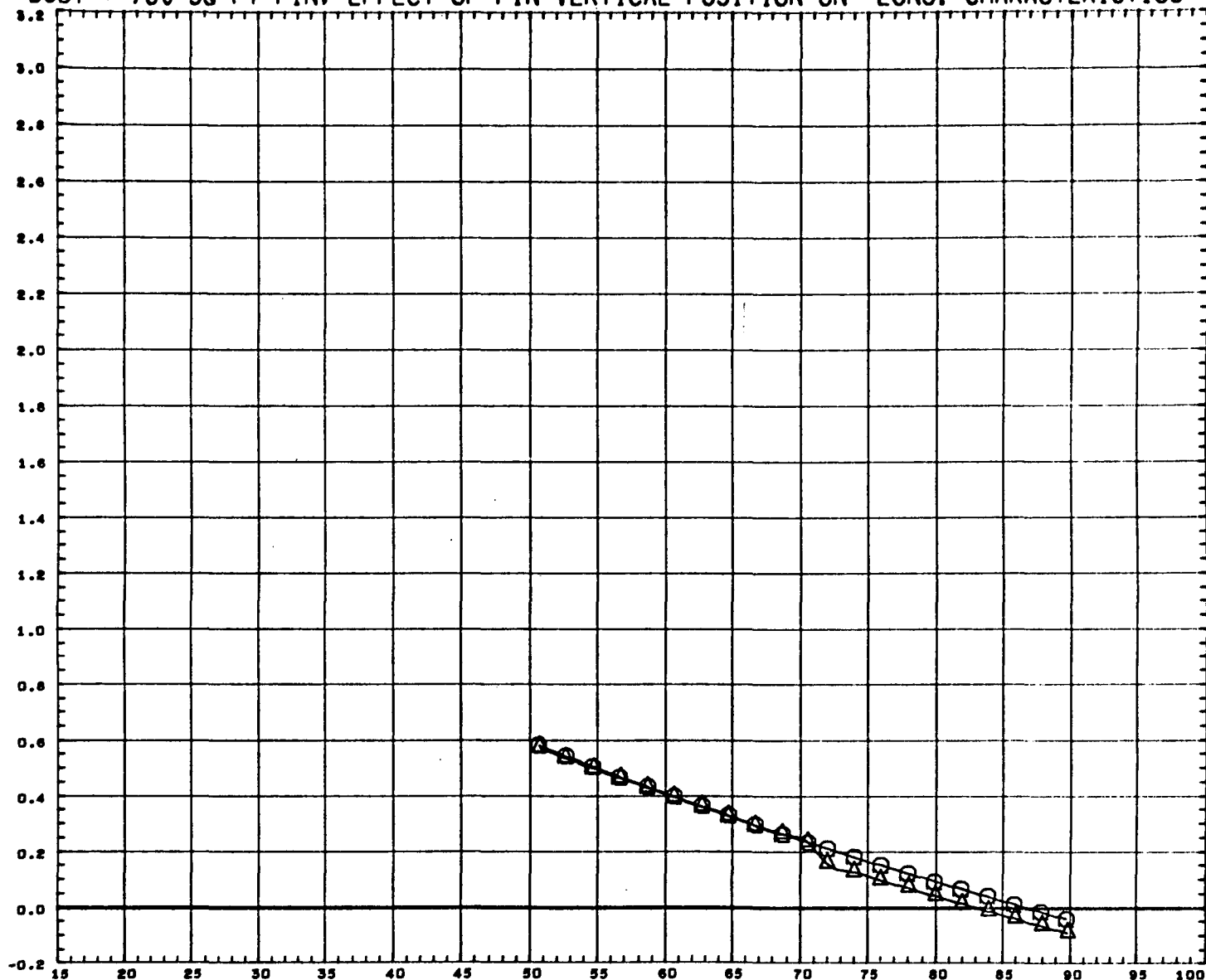


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.961

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

LIFT-DRAG RATIO, L/D

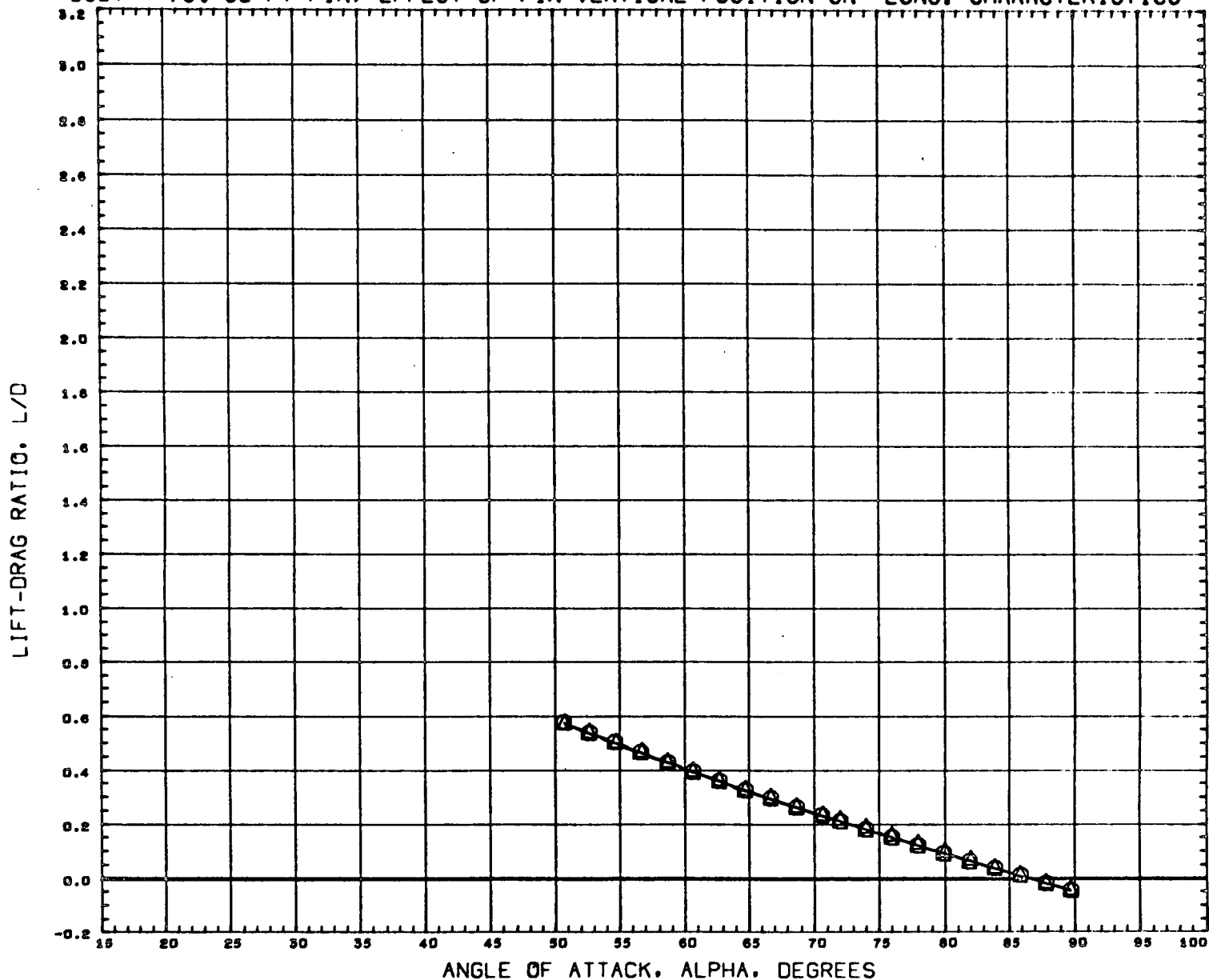


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 2.740

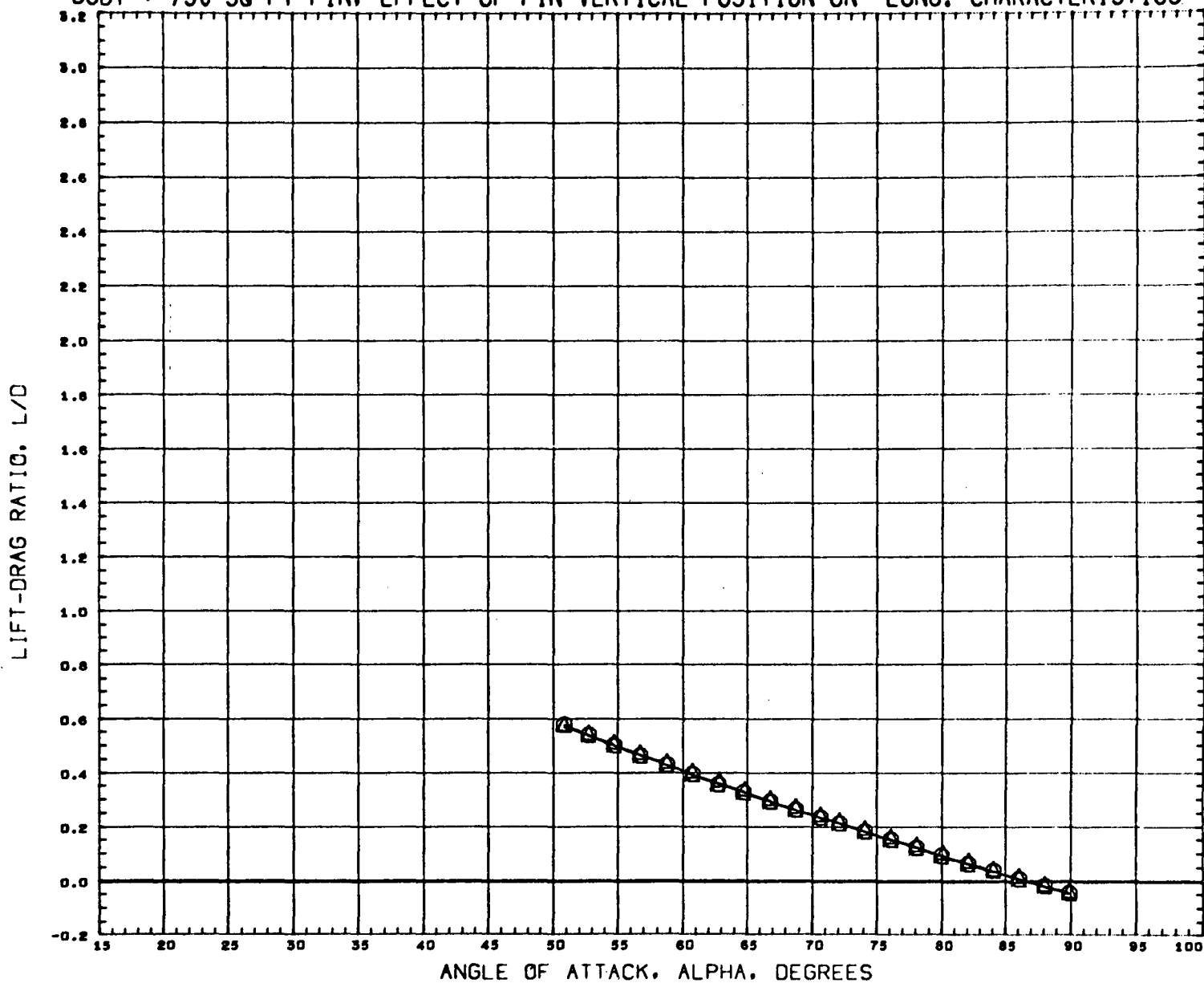
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59S10)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S22)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 3.480

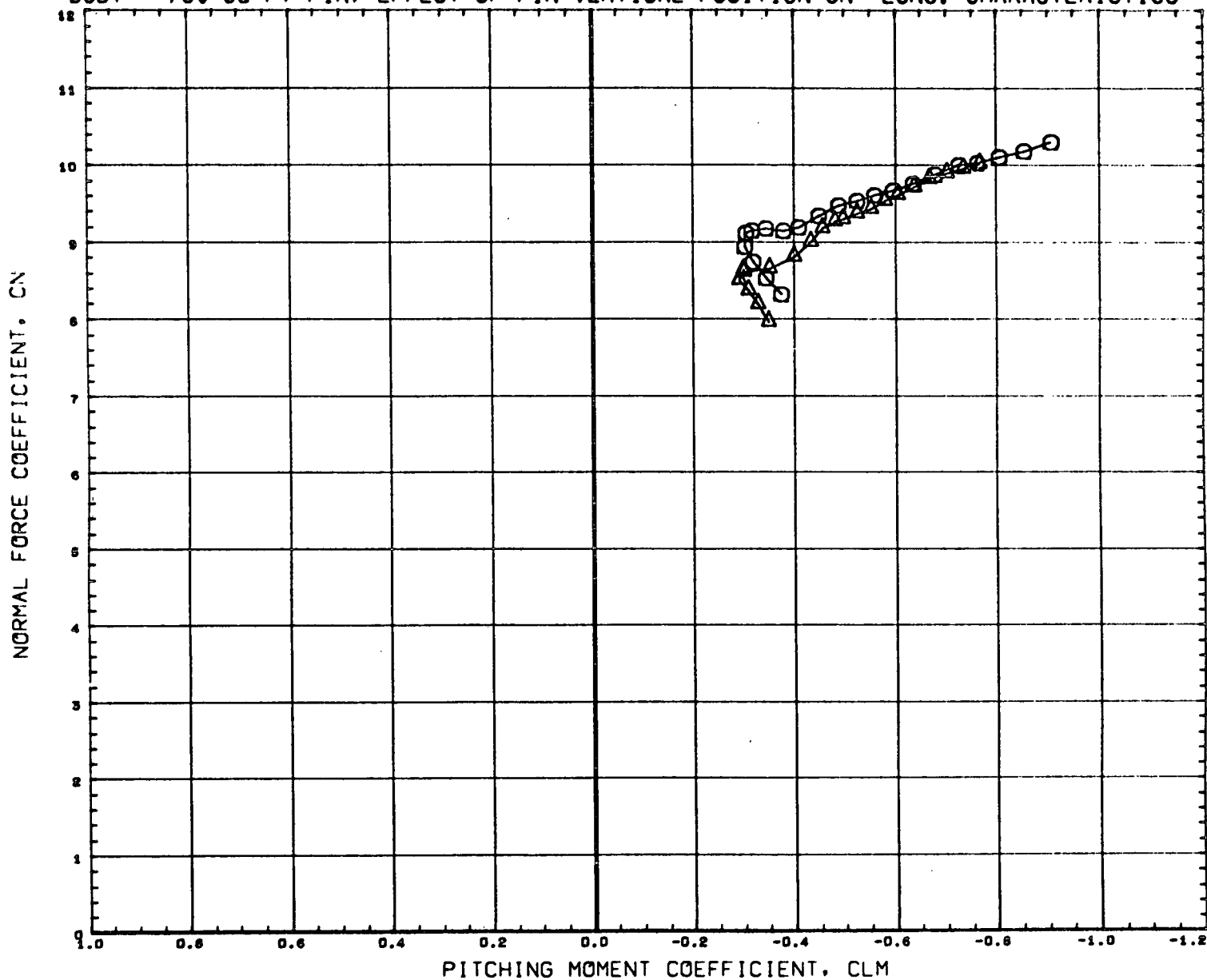
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |       |       | SCALE                 | 0.0028        |

MACH 4.959

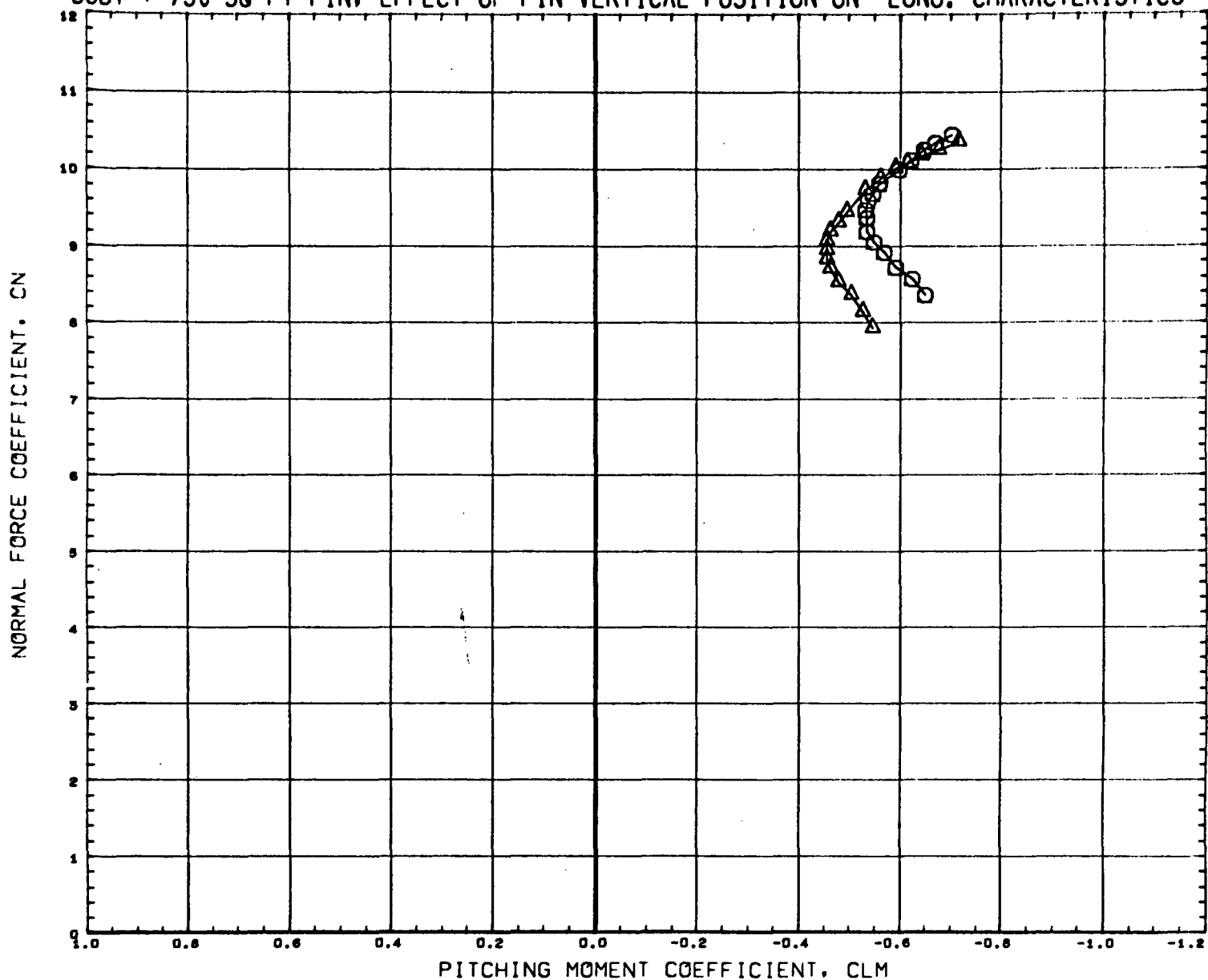
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.195

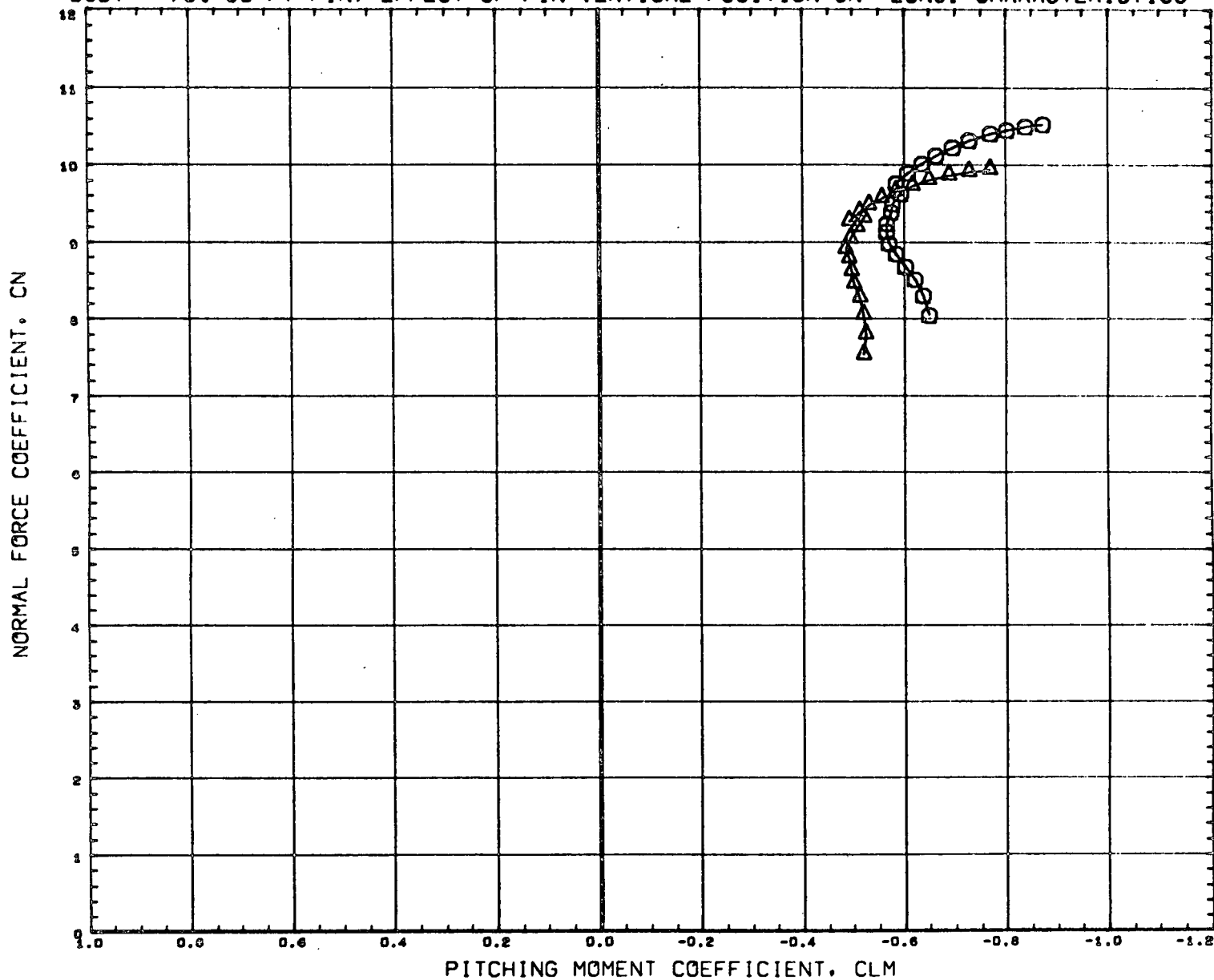
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER N281R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N281R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.961

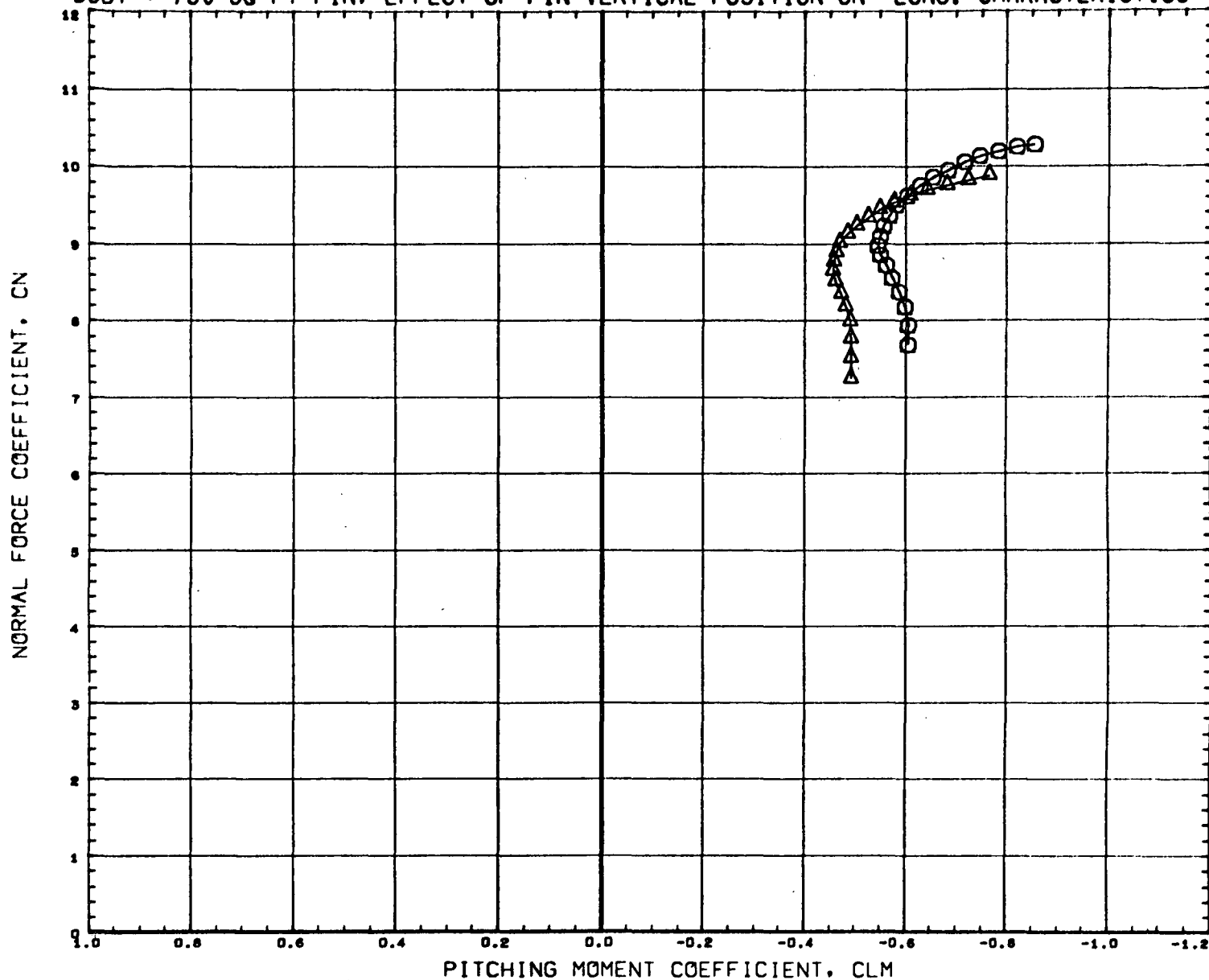
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (059S10)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (059S22)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 2.740

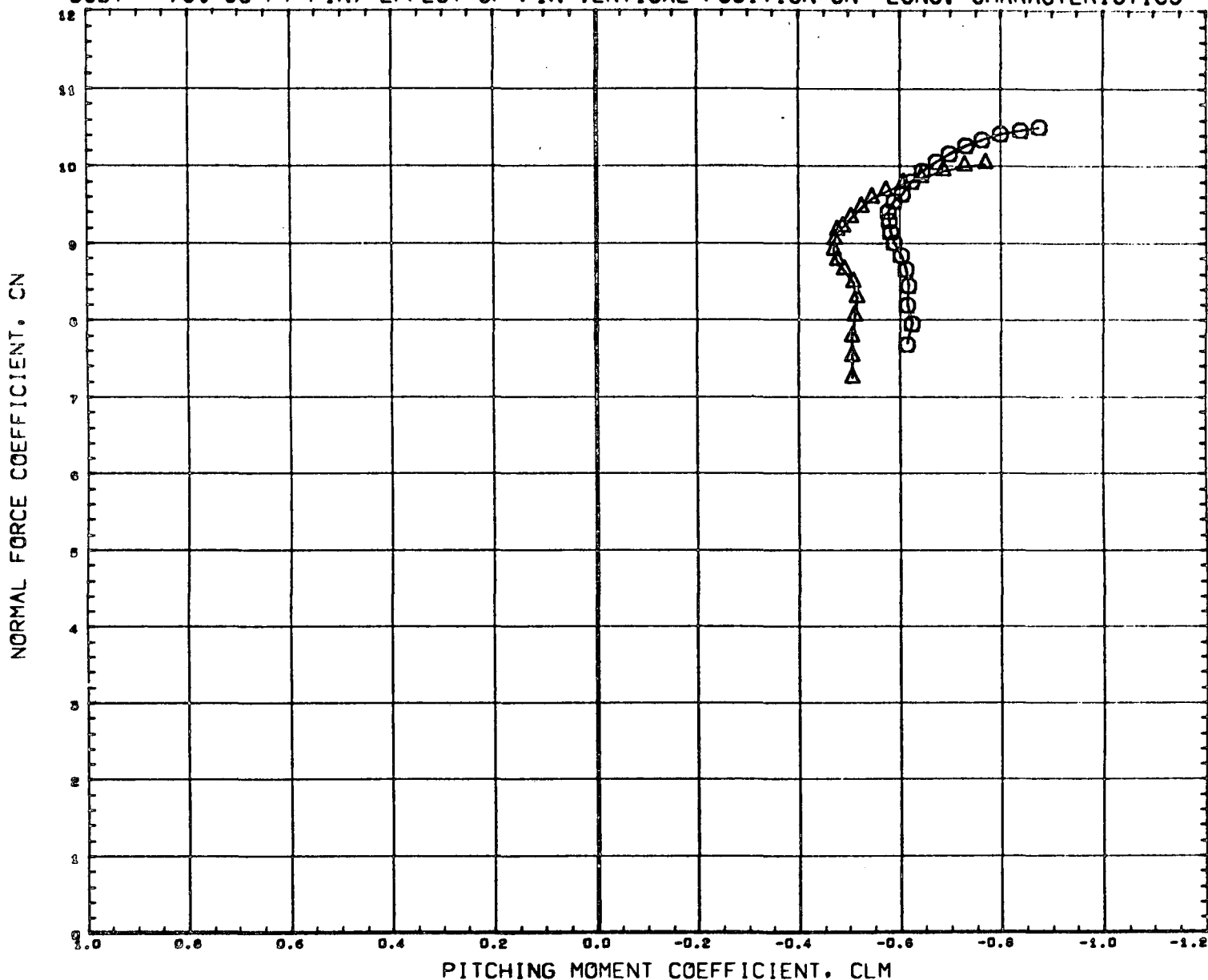
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59910)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59922)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 3.480

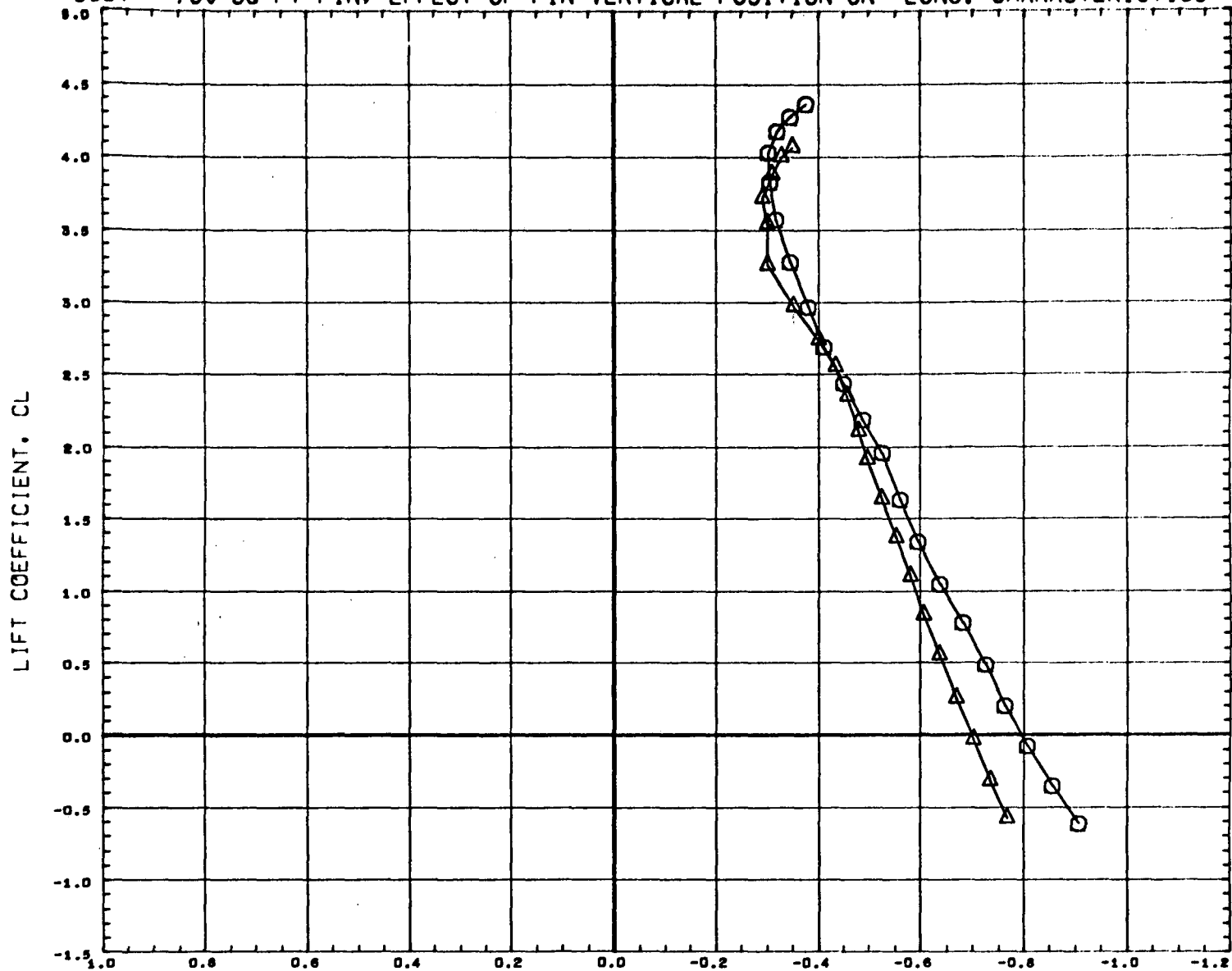
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 4.959

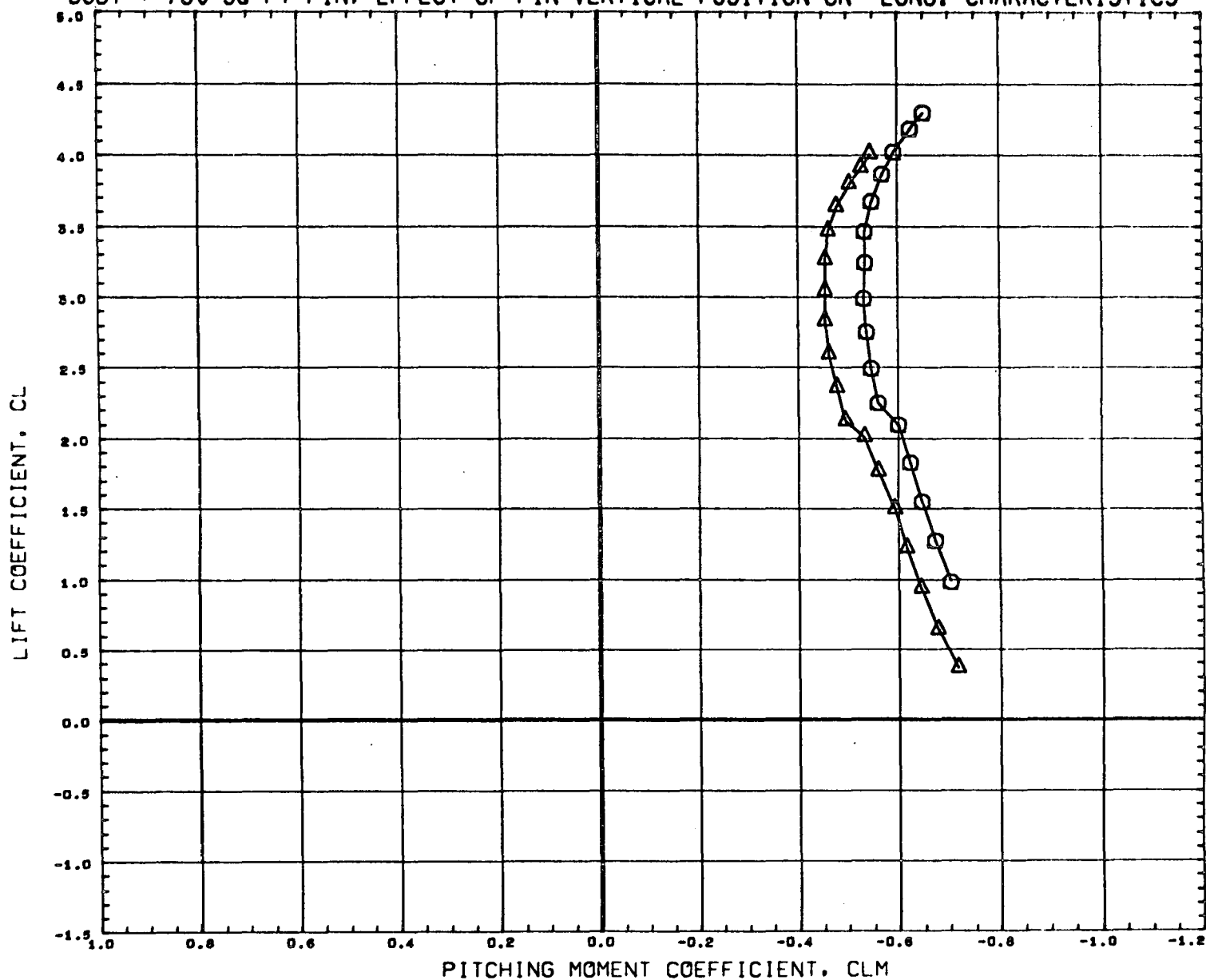
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL |   |              |                 | CONFIGURATION DESCRIPTION |       |       |       | REFERENCE INFORMATION |       |        |        |
|-----------------|---|--------------|-----------------|---------------------------|-------|-------|-------|-----------------------|-------|--------|--------|
| (B59S10)        | Q | MSFC TWT 524 | 33 FOOT BOOSTER | N2B1R1X1F2                | BETA  | POS   | DELFE | DELFA                 | SREF  | 0.9650 | SQ. IN |
| (B59S22)        | A | MSFC TWT 524 | 33 FOOT BOOSTER | N2B1R1X2F2                | 0.000 | 1.000 | 0.000 | 0.000                 | LREF  | 4.9060 | IN.    |
|                 |   |              |                 |                           | 0.000 | 2.000 | 0.000 | 0.000                 | BREF  | 4.9060 | IN.    |
|                 |   |              |                 |                           |       |       |       |                       | XMRP  | 2.9450 | IN.    |
|                 |   |              |                 |                           |       |       |       |                       | YMRP  | 0.0000 | IN.    |
|                 |   |              |                 |                           |       |       |       |                       | ZMRP  | 0.0000 | IN.    |
|                 |   |              |                 |                           |       |       |       |                       | SCALE | 0.0028 |        |

MACH 1.195

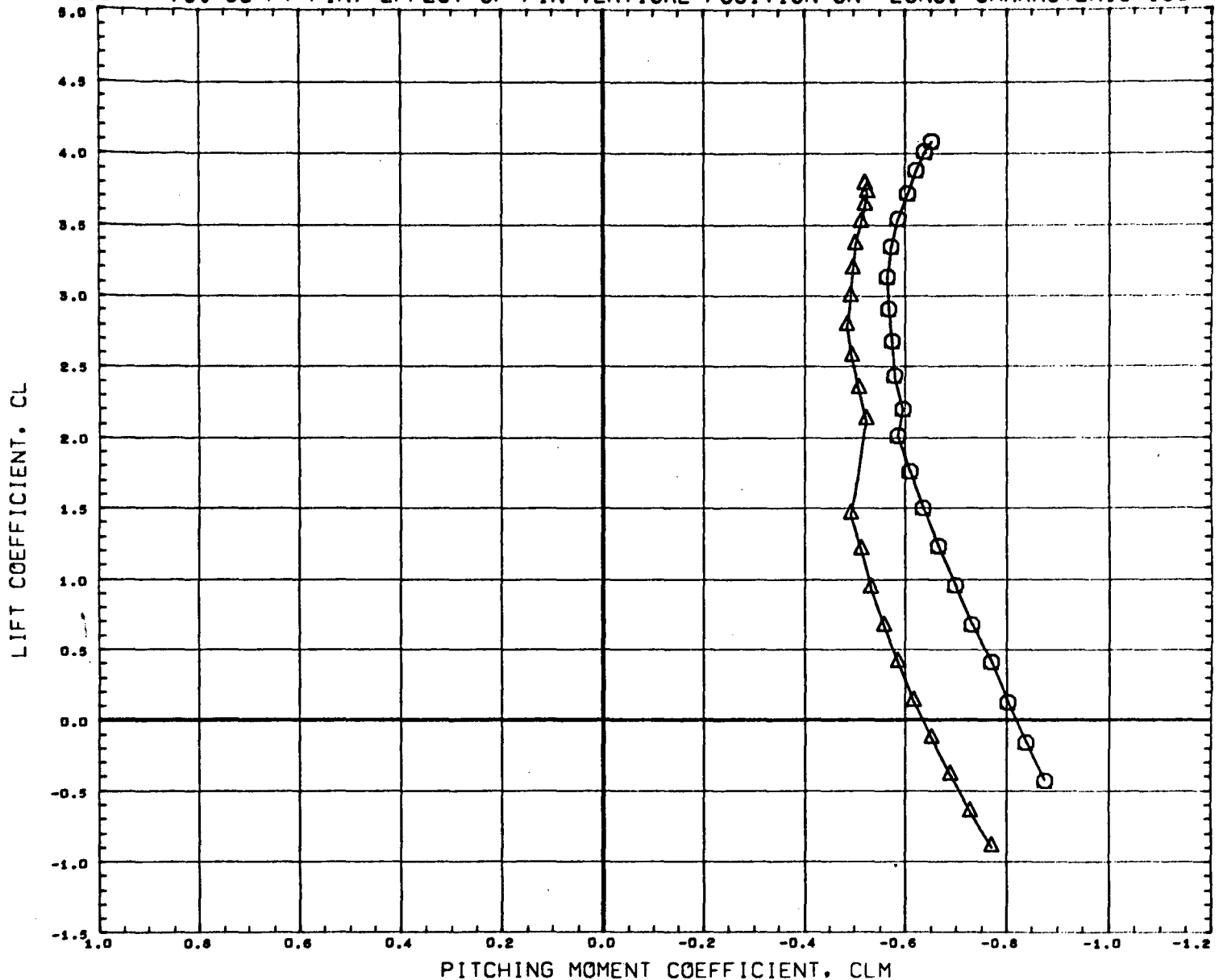
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 39. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9060 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9060 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0026        |

MACH 1.961

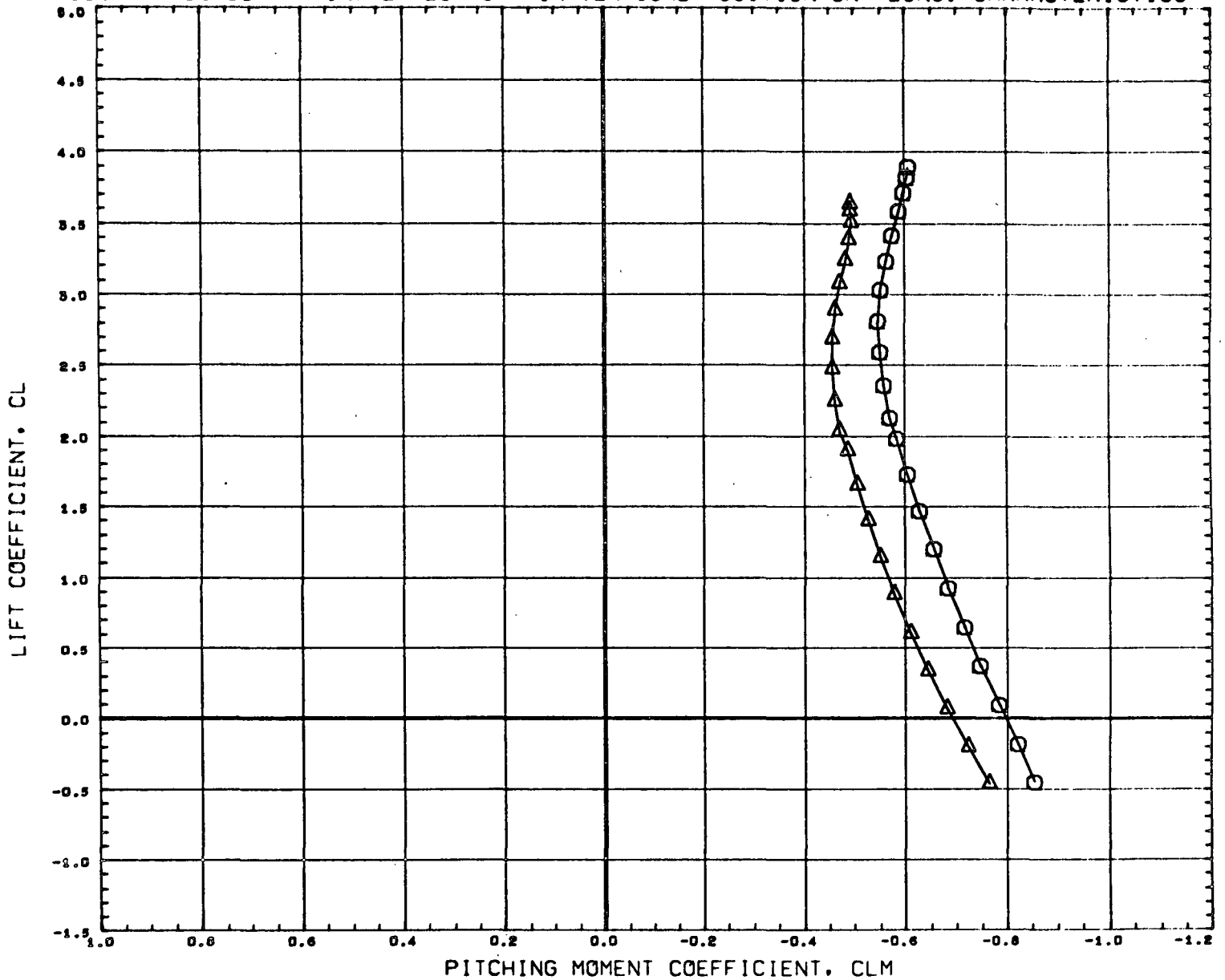
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (859910)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859922)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRF                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 2.740

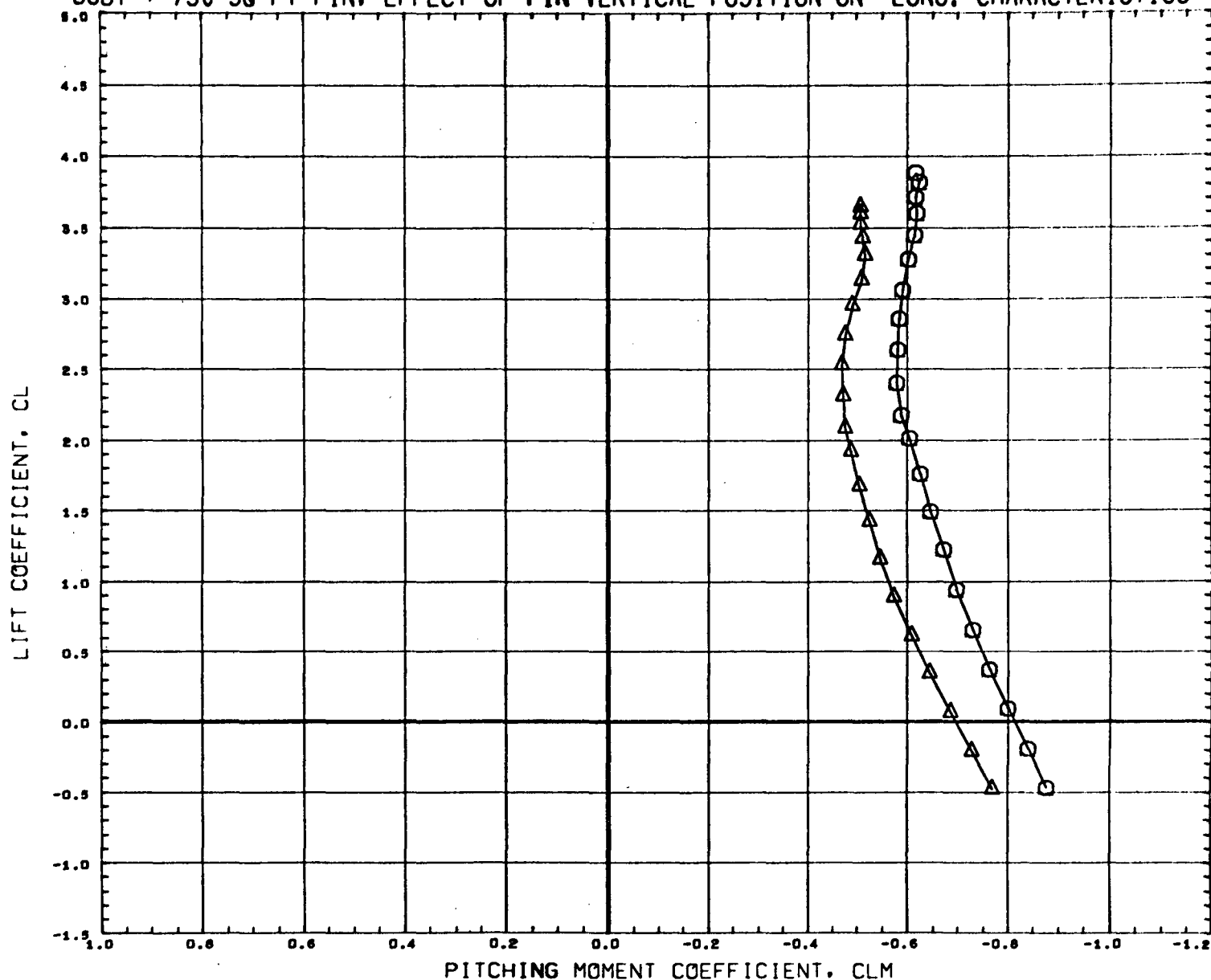
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59910)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59922)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRF                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 3.480

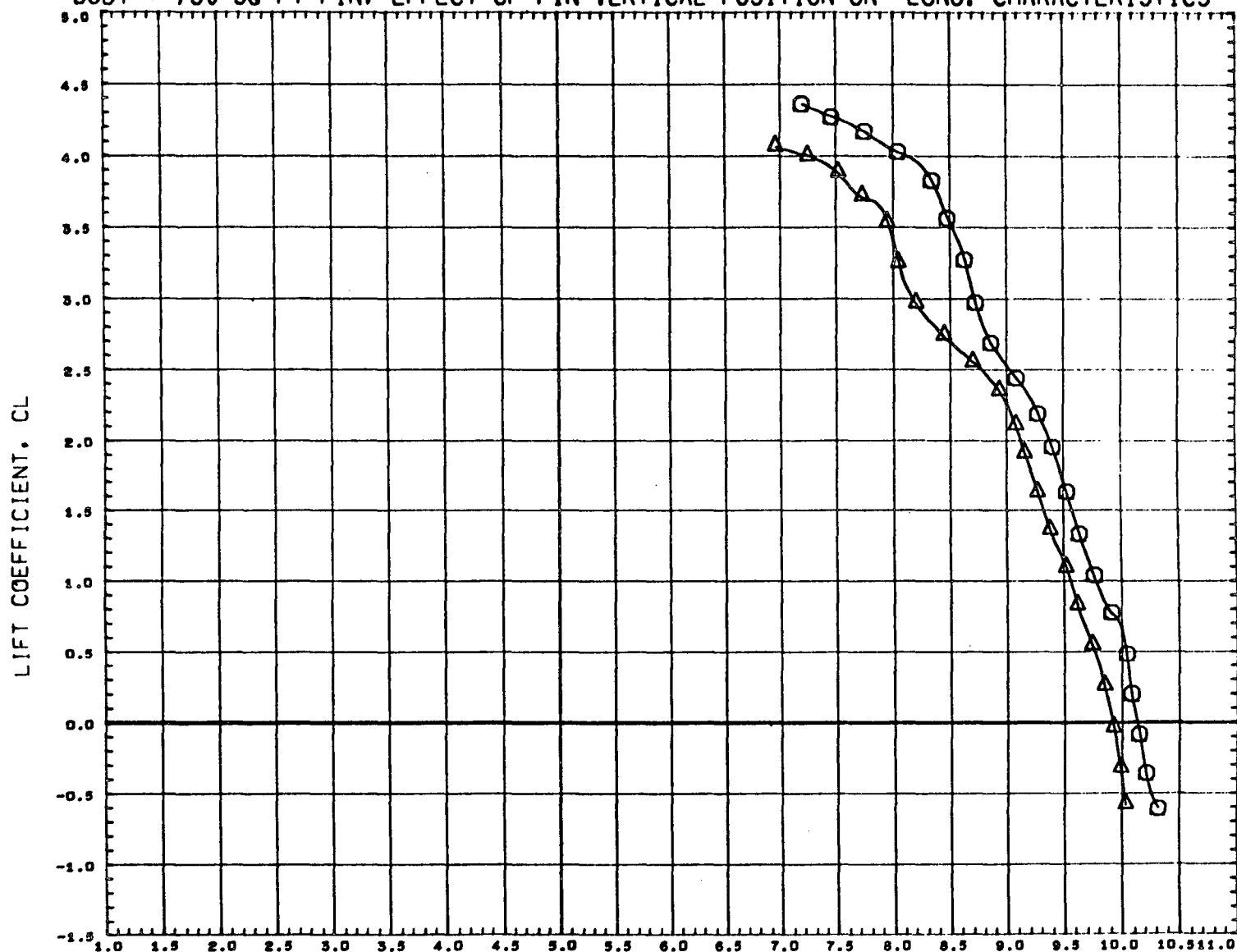
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|-------|-------|-----------------------|---------------|
| (B59310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |       |       | SCALE                 | 0.0028        |

MACH 4.959

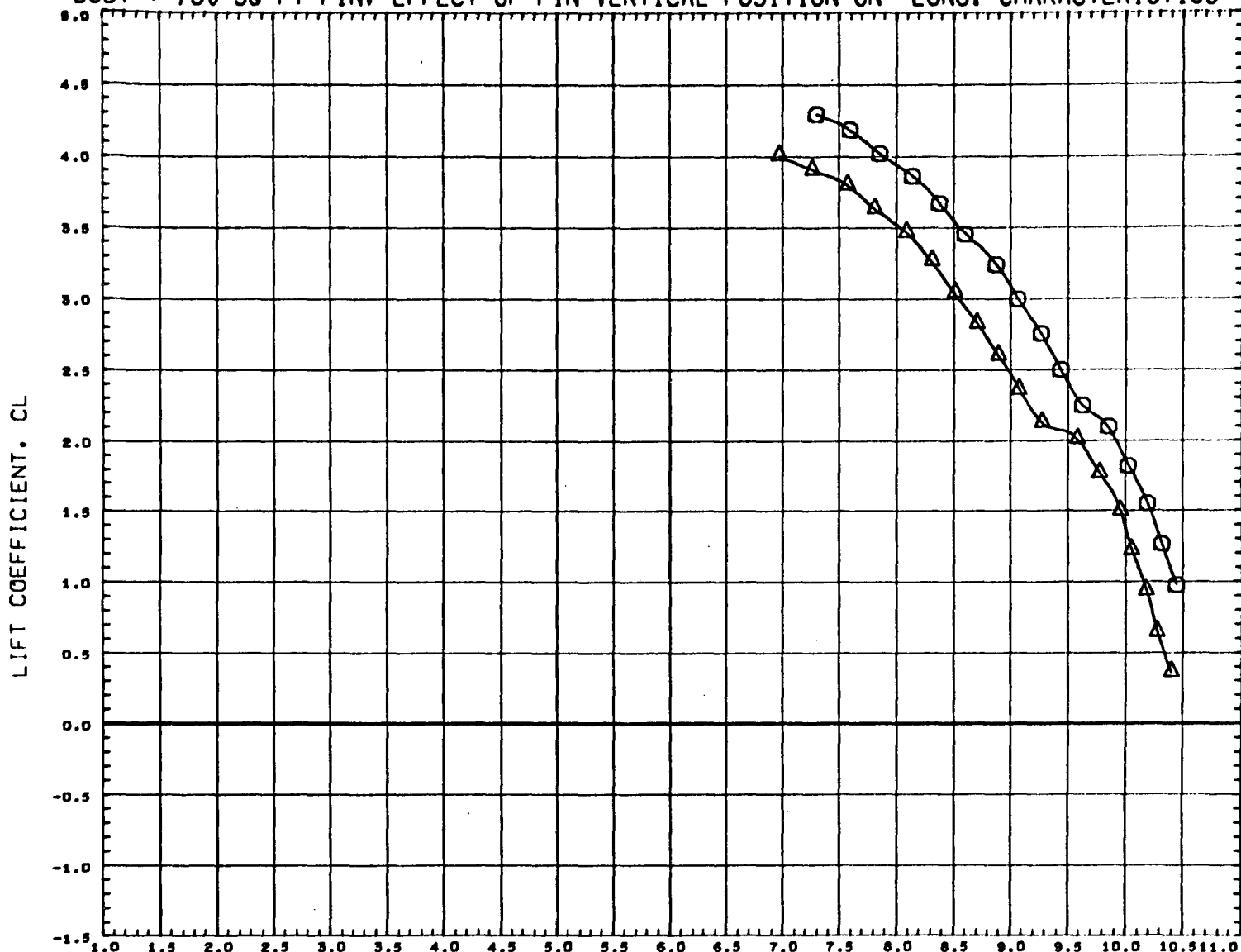
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL |   | CONFIGURATION DESCRIPTION |                 | BETA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|---|---------------------------|-----------------|-------|-------|-------|-------|-----------------------|---------------|
| (859310)        | ○ | MSFC TWT 524              | 33 FOOT BOOSTER | 0.000 | 1.000 | 0.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859322)        | △ | MSFC TWT 524              | 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |   |                           |                 |       |       |       |       | BREF                  | 4.9080 IN.    |
|                 |   |                           |                 |       |       |       |       | XMRP                  | 2.9450 IN.    |
|                 |   |                           |                 |       |       |       |       | YMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |       |       |       |       | ZMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |       |       |       |       | SCALE                 | 0.0028        |

MACH 1.195

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



DATA SET SYMBOL    CONFIGURATION DESCRIPTION  
 (859810)       MSFC TWT 524    33 FOOT BOOSTER  
 (859522)       MSFC TWT 524    33 FOOT BOOSTER

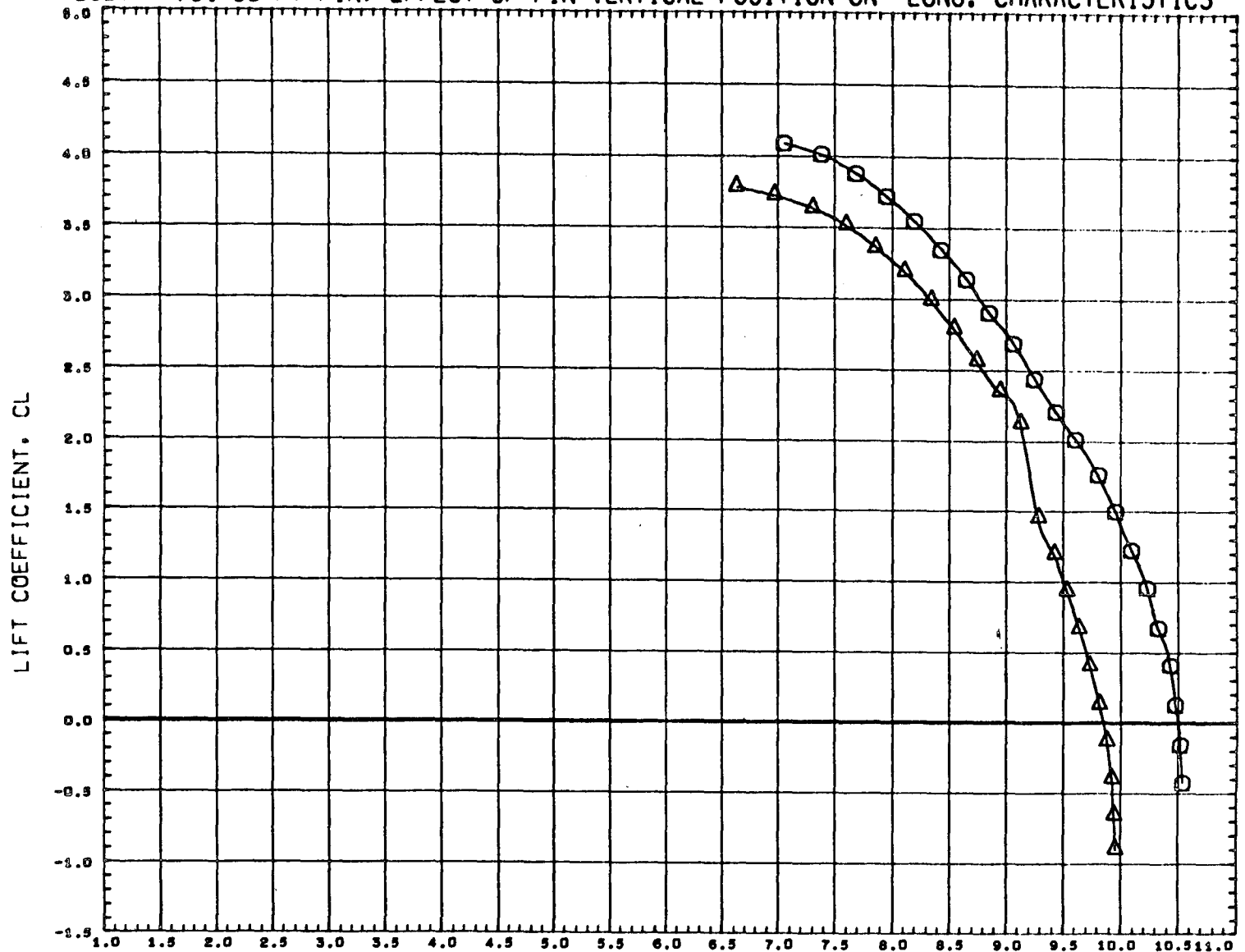
N2B1R1X1F2  
 N2B1R1X2F2

BETA    POS    DELFE    DELFA  
 0.000    1.000    0.000    0.000  
 0.000    2.000    0.000    0.000

REFERENCE INFORMATION  
 SREF    0.9650    SQ. IN  
 LREF    4.9080    IN.  
 BREF    4.9080    IN.  
 XMRP    2.9450    IN.  
 YMRP    0.0000    IN.  
 ZMRP    0.0000    IN.  
 SCALE    0.0028

MACH    1.961

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (B59810) MSFC TWT 524 33 FOOT BOOSTER  
 (B59822) MSFC TWT 524 33 FOOT BOOSTER

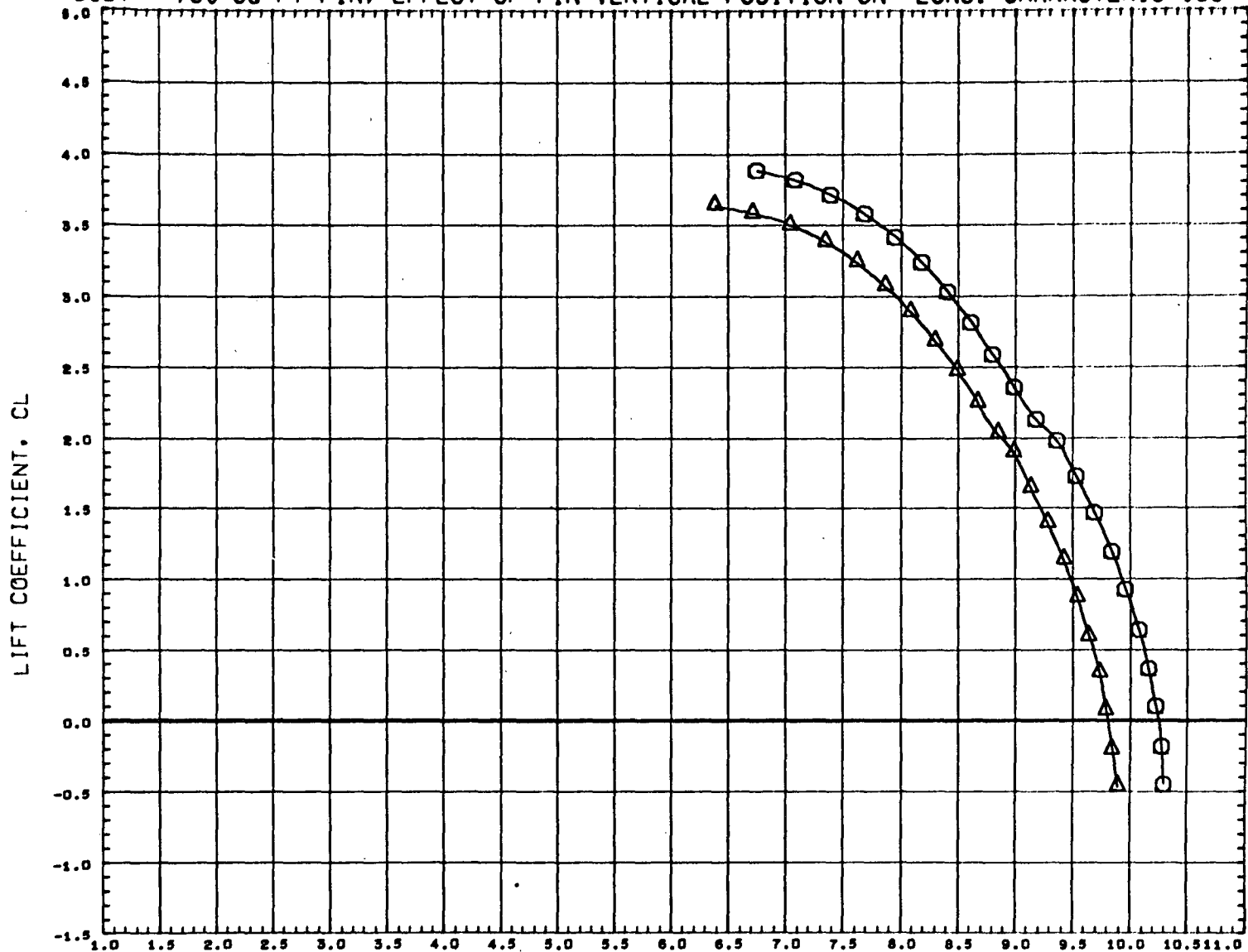
N2B1R1X1F2  
 N2B1R1X2F2

BETA POS DELFE DELFA  
 0.000 1.000 0.000 0.000  
 0.000 2.000 0.000 0.000

REFERENCE INFORMATION  
 SREF 0.9650 SQ. IN  
 LREF 4.9080 IN.  
 BREF 4.9080 IN.  
 XMRP 2.9450 IN.  
 YMRP 0.0000 IN.  
 ZMRP 0.0000 IN.  
 SCALE 0.0028

MACH 2.740

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



DATA SET SYMBOL      CONFIGURATION DESCRIPTION  
 (B59810)      MSFC TWT 524      33 FOOT BOOSTER  
 (B59822)      MSFC TWT 524      33 FOOT BOOSTER

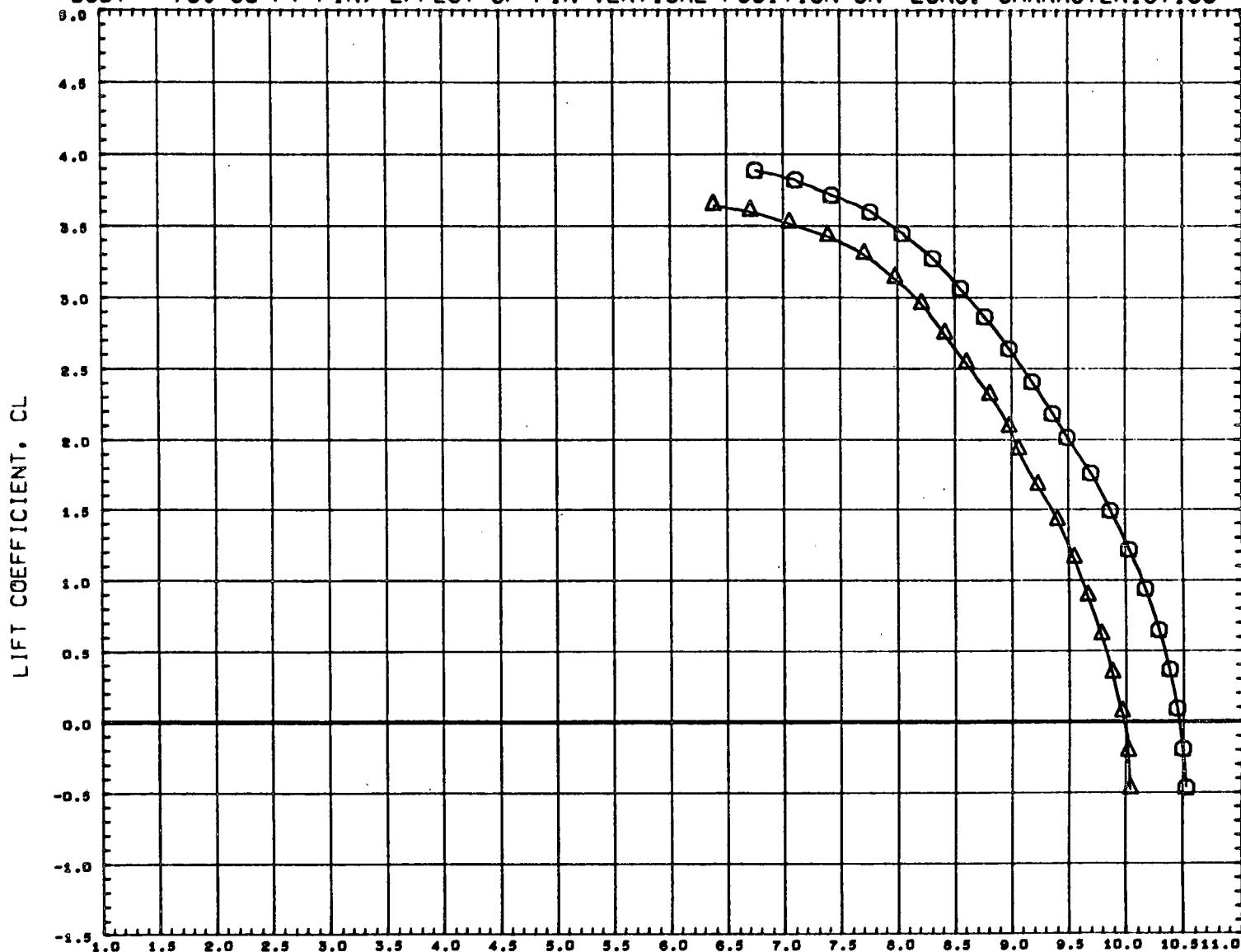
N2B1R1X1F2  
 N2B1R1X2F2

| BETA  | POS   | DELFE | DELFA |
|-------|-------|-------|-------|
| 0.000 | 1.000 | 0.000 | 0.000 |
| 0.000 | 2.000 | 0.000 | 0.000 |

| REFERENCE INFORMATION |               |
|-----------------------|---------------|
| SREF                  | 0.9650 SQ. IN |
| LREF                  | 4.9080 IN.    |
| BREF                  | 4.9080 IN.    |
| XMRF                  | 2.9450 IN.    |
| YMRF                  | 0.0000 IN.    |
| ZMRF                  | 0.0000 IN.    |
| SCALE                 | 0.0028        |

MACH      3.480

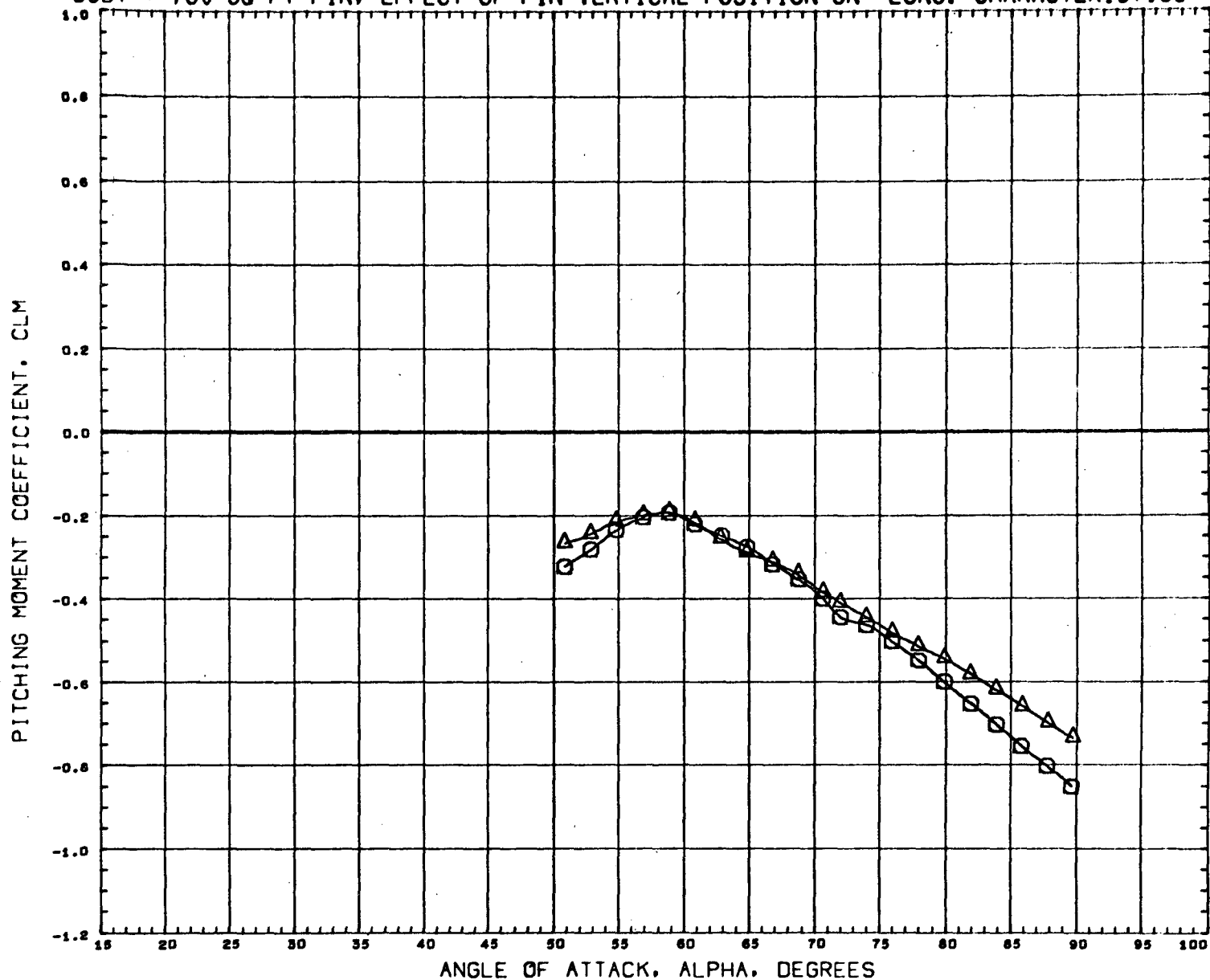
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL |   |              |                 | CONFIGURATION DESCRIPTION |       |       |       | REFERENCE INFORMATION |       |        |        |
|-----------------|---|--------------|-----------------|---------------------------|-------|-------|-------|-----------------------|-------|--------|--------|
| (B59810)        | Q | MSFC TWT 524 | 33 FOOT BOOSTER | N2B1R1X1F2                | BETA  | POS   | DELFE | DELFA                 | SREF  | 0.9650 | 30. IN |
| (B59822)        | A | MSFC TWT 524 | 33 FOOT BOOSTER | N2B1R1X2F2                | 0.000 | 1.000 | 0.000 | 0.000                 | LREF  | 4.9080 | IN.    |
|                 |   |              |                 |                           | 0.000 | 2.000 | 0.000 | 0.000                 | SREF  | 4.9080 | IN.    |
|                 |   |              |                 |                           |       |       |       |                       | XMRP  | 2.9450 | IN.    |
|                 |   |              |                 |                           |       |       |       |                       | YMRP  | 0.0000 | IN.    |
|                 |   |              |                 |                           |       |       |       |                       | ZMRP  | 0.0000 | IN.    |
|                 |   |              |                 |                           |       |       |       |                       | SCALE | 0.0028 |        |

MACH 4.959

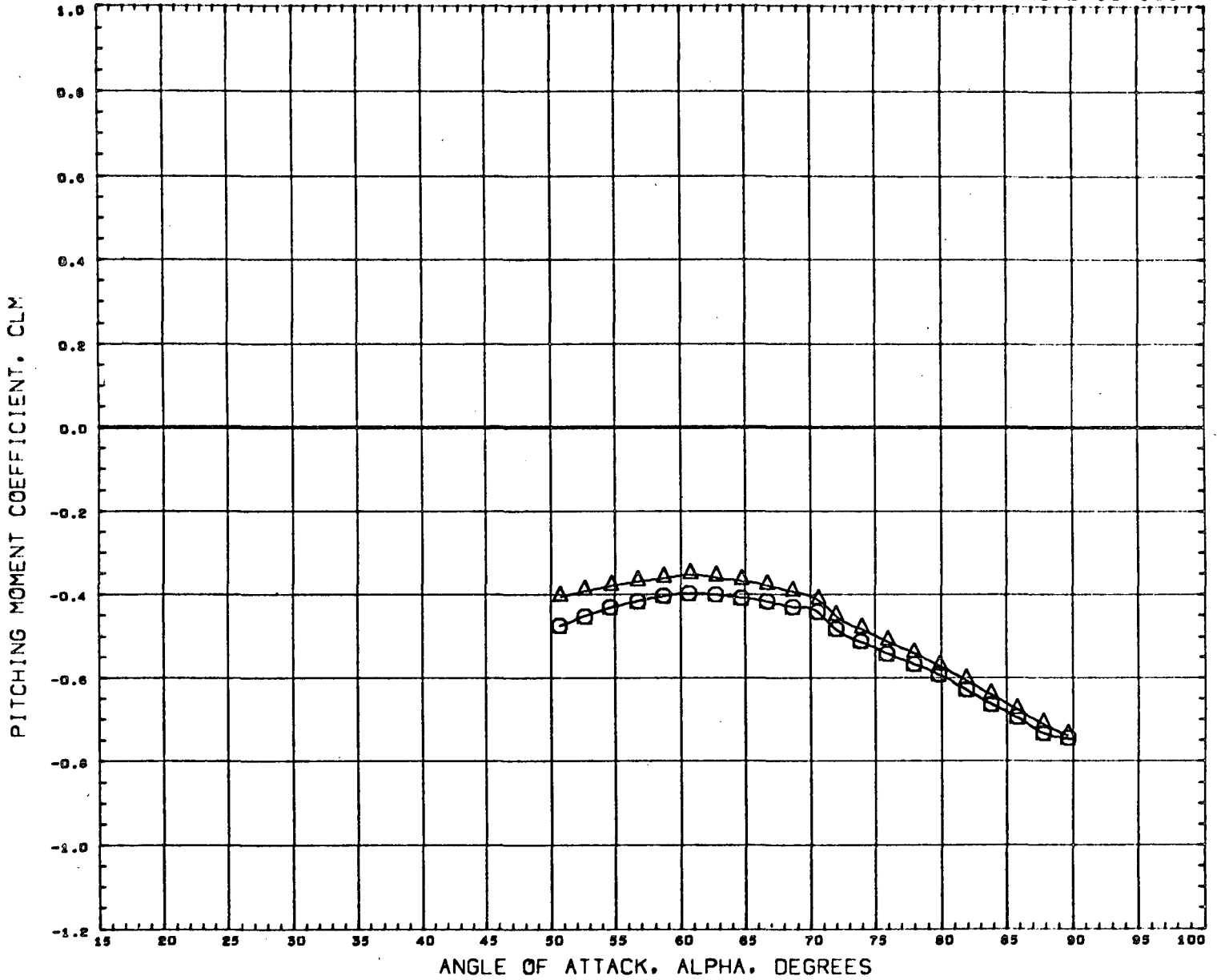
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59311)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59323)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | SREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

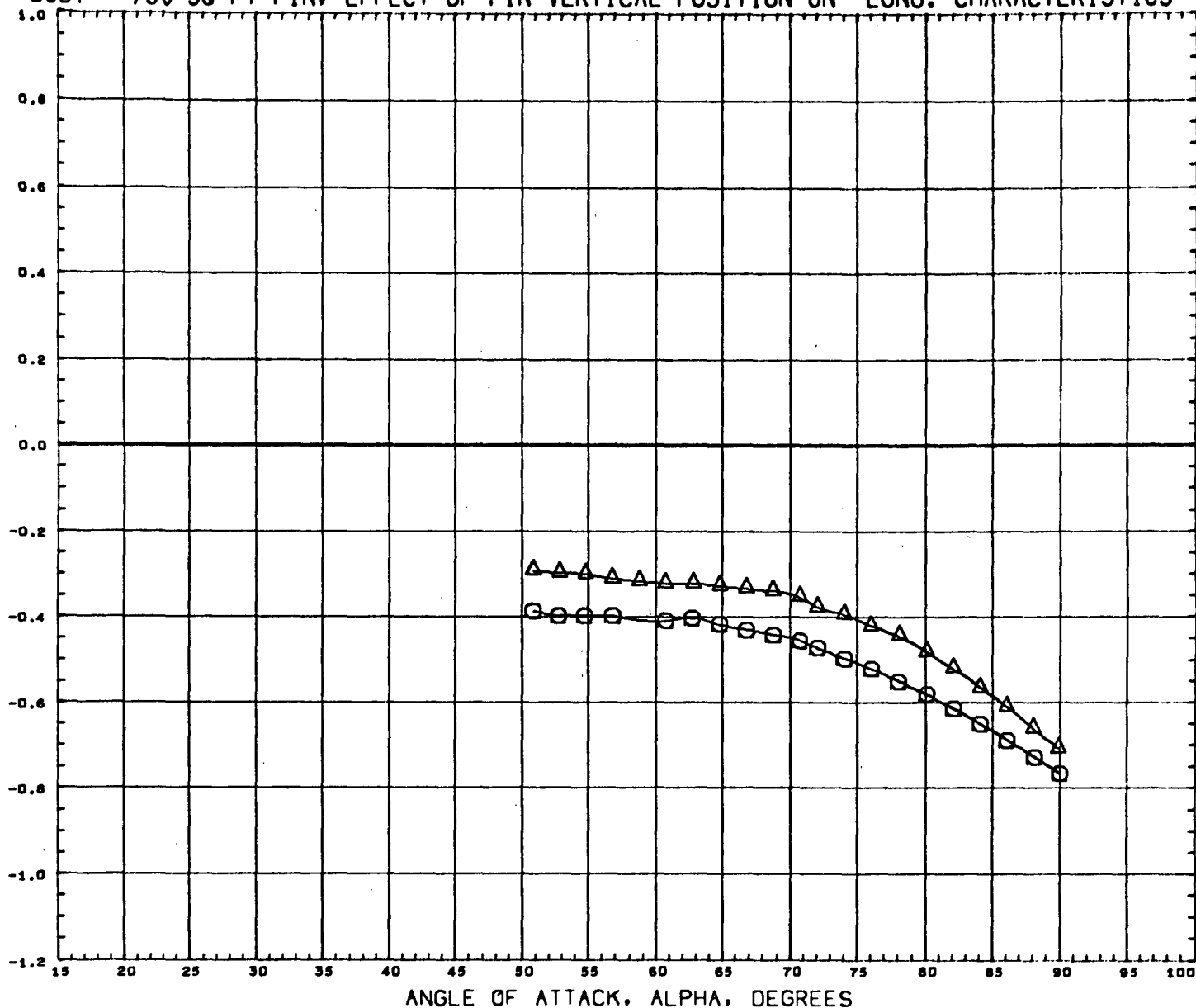


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.958

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

PITCHING MOMENT COEFFICIENT, CLM

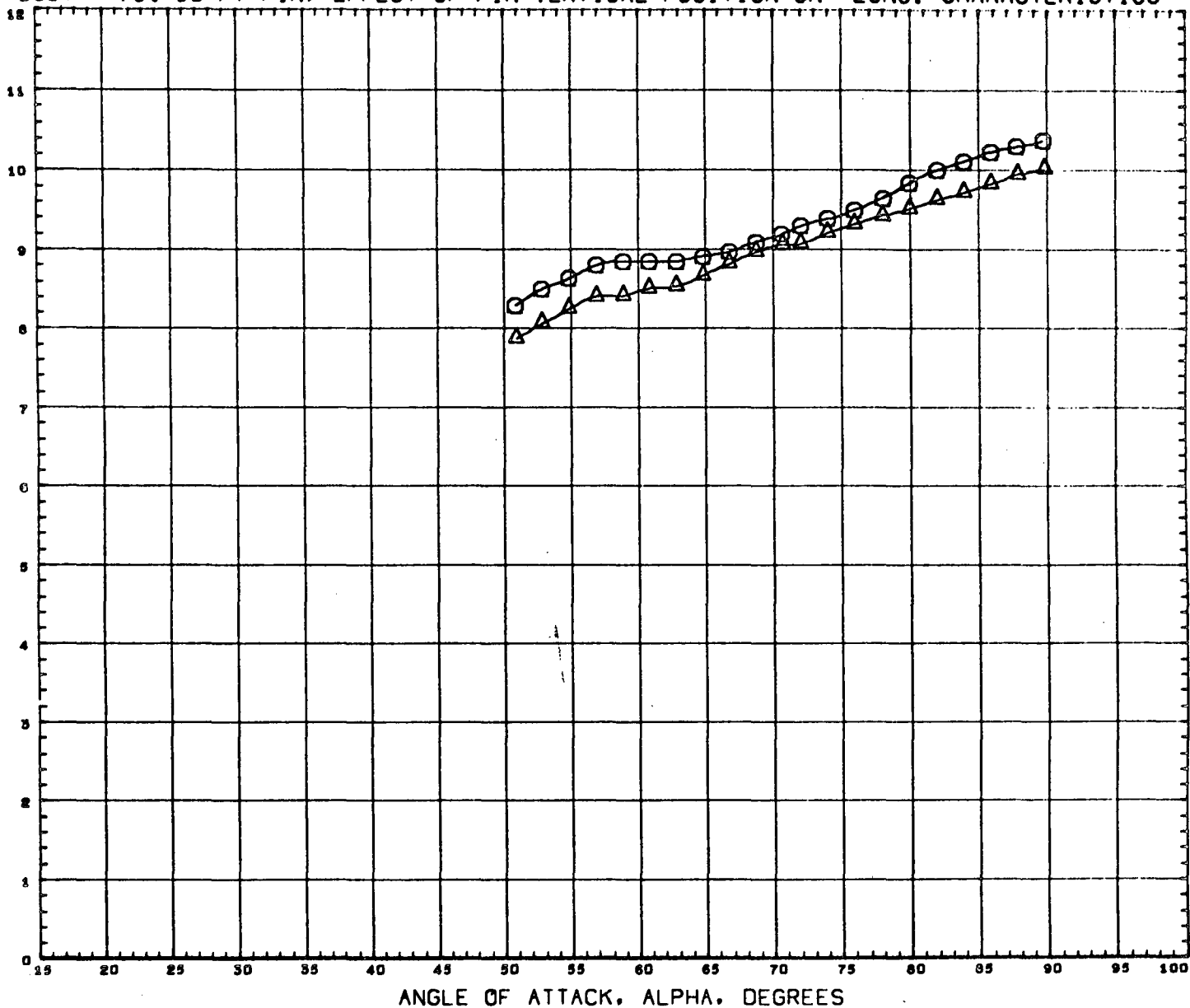


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRRP                 | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRRP                 | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRRP                 | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0026        |

MACH 4.959

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

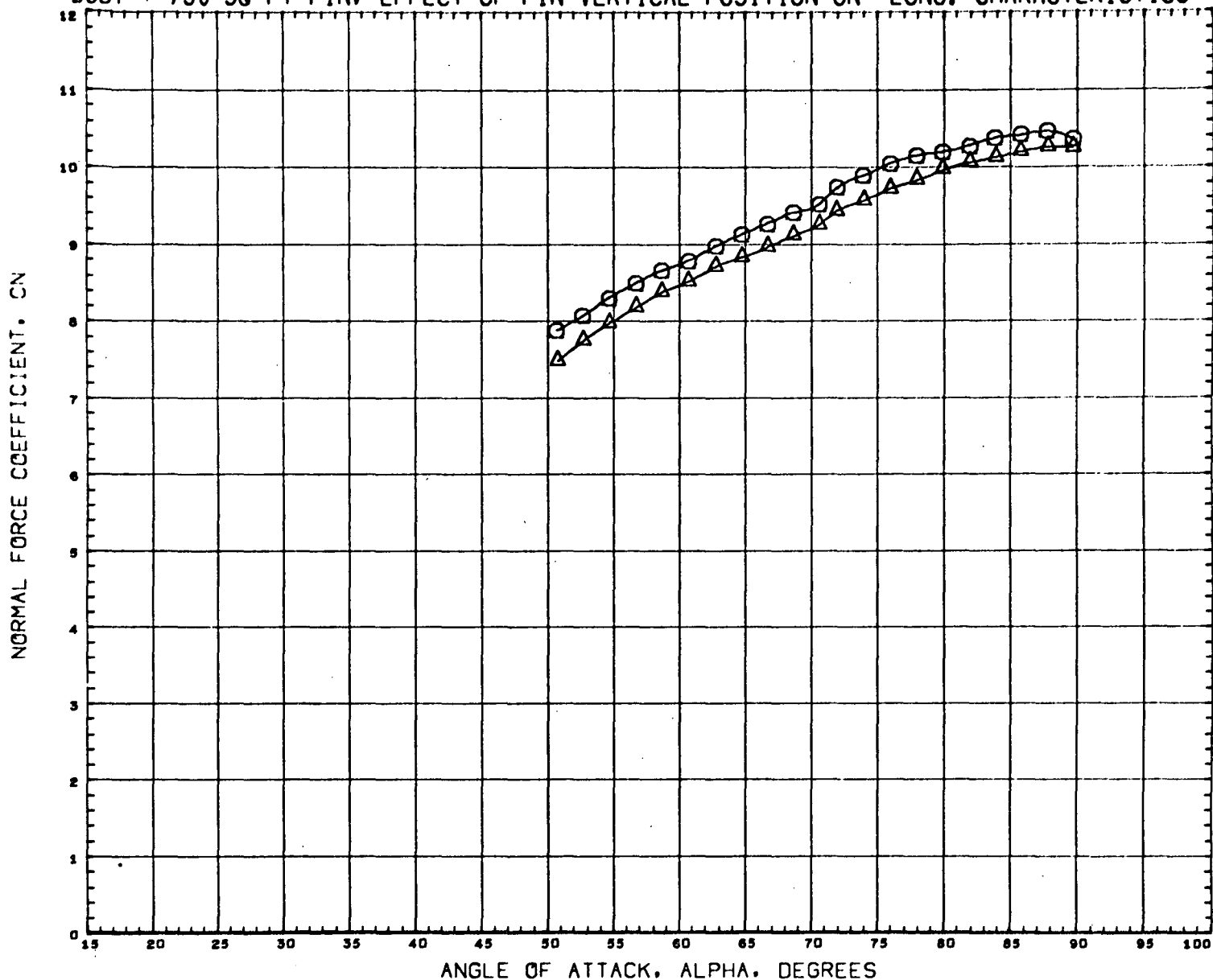
NORMAL FORCE COEFFICIENT, CN



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59311)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

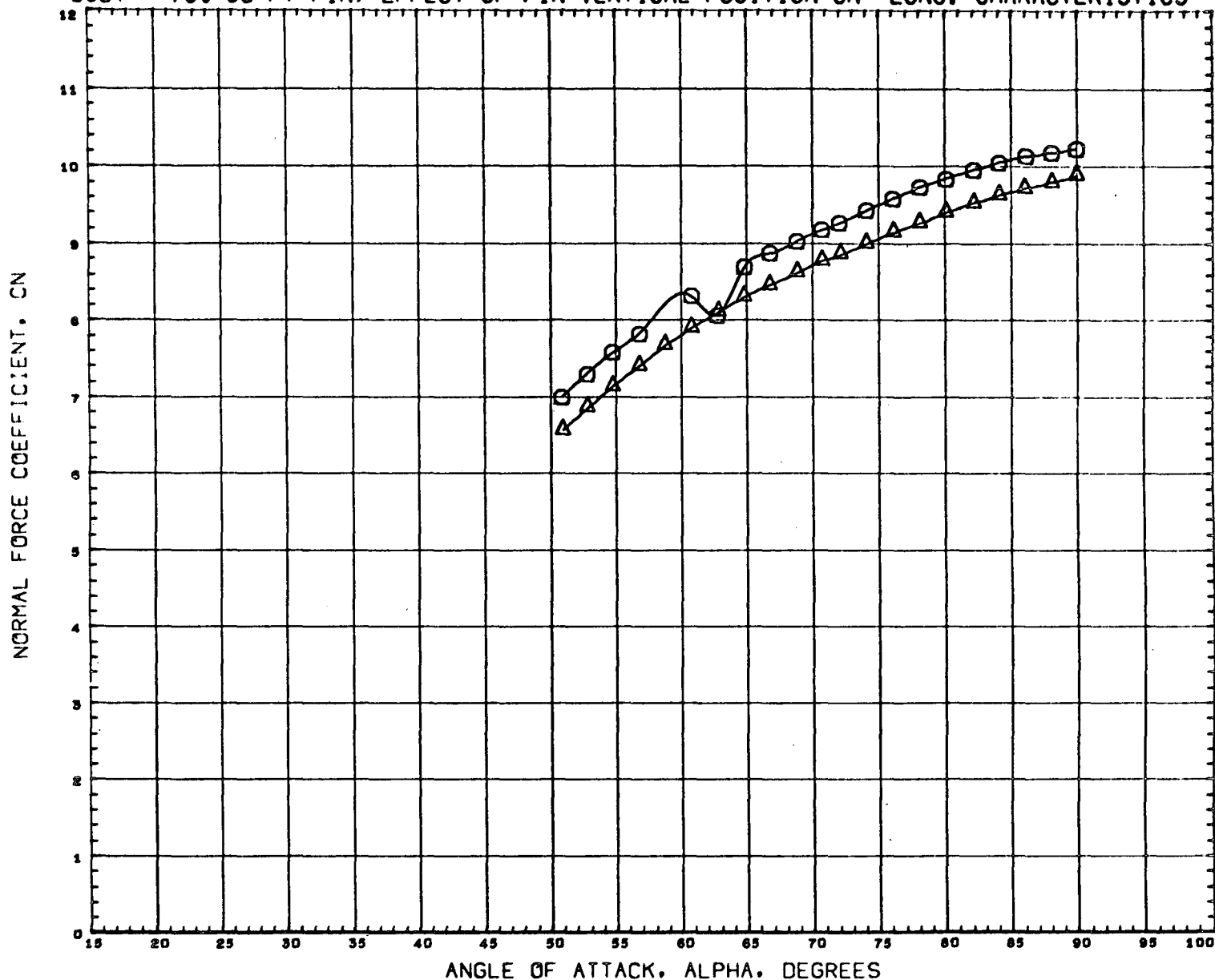
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.958

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

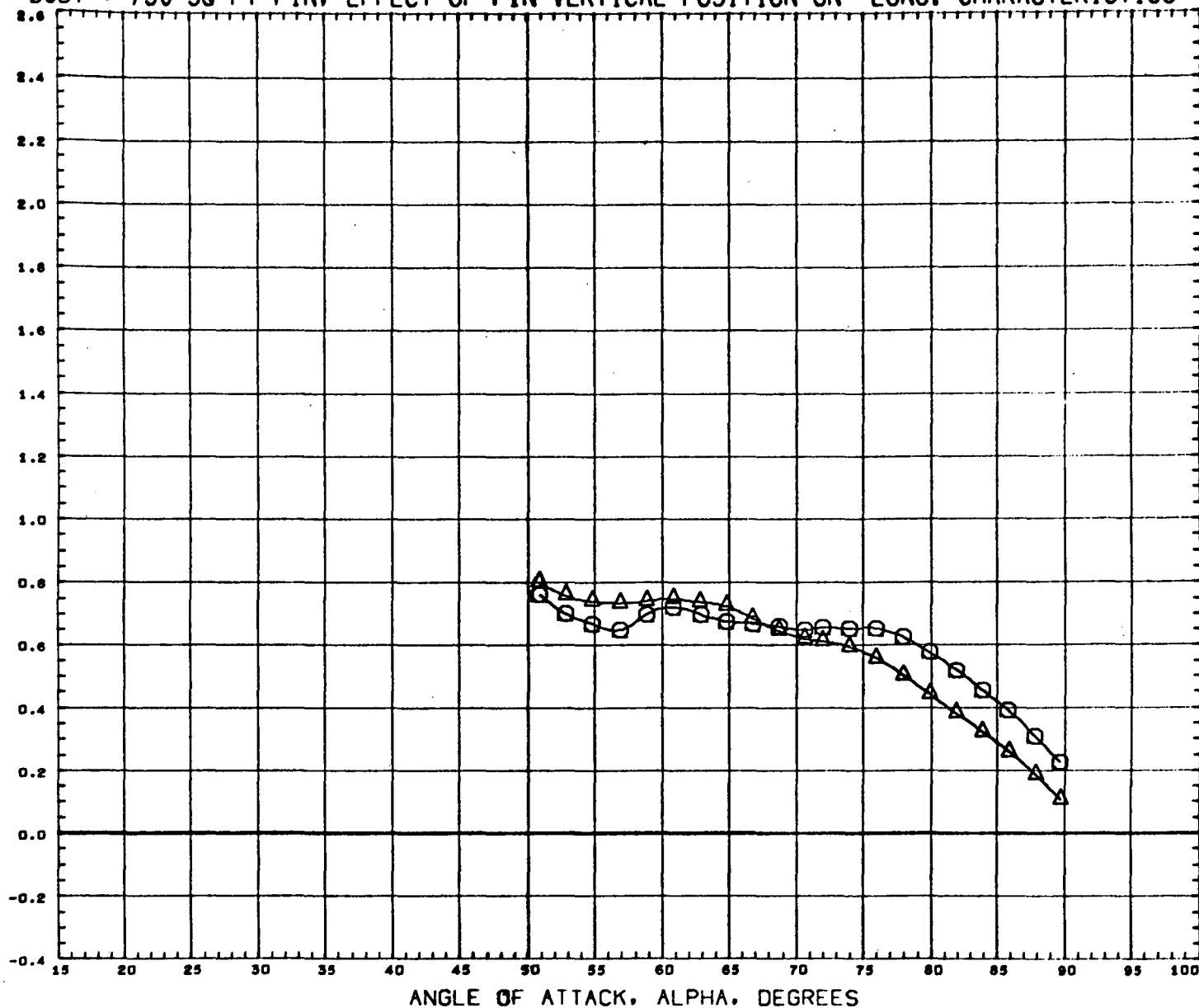


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859511)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0026        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

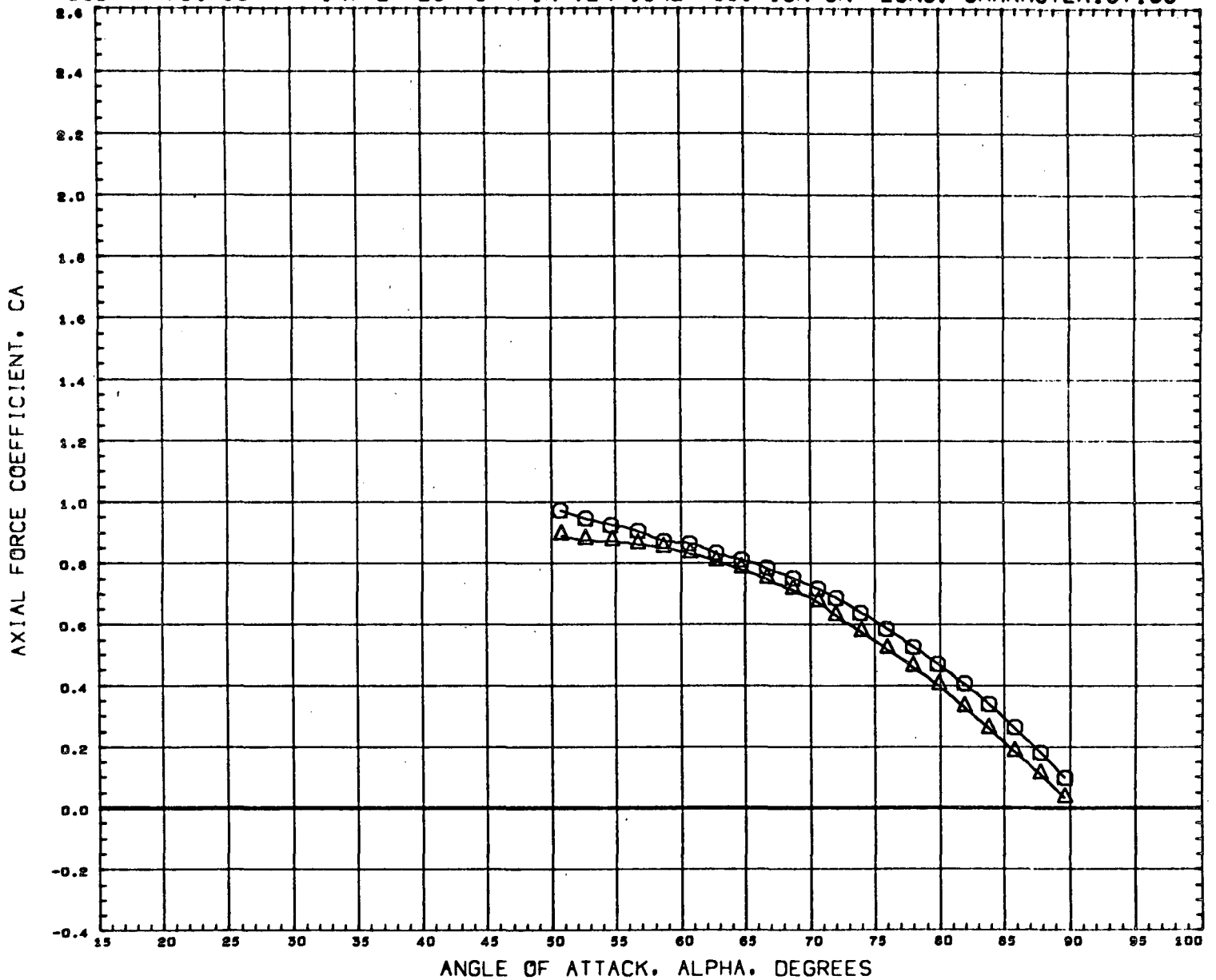
AXIAL FORCE COEFFICIENT,  $C_A$



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | OREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0026          |

MACH 1.196

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

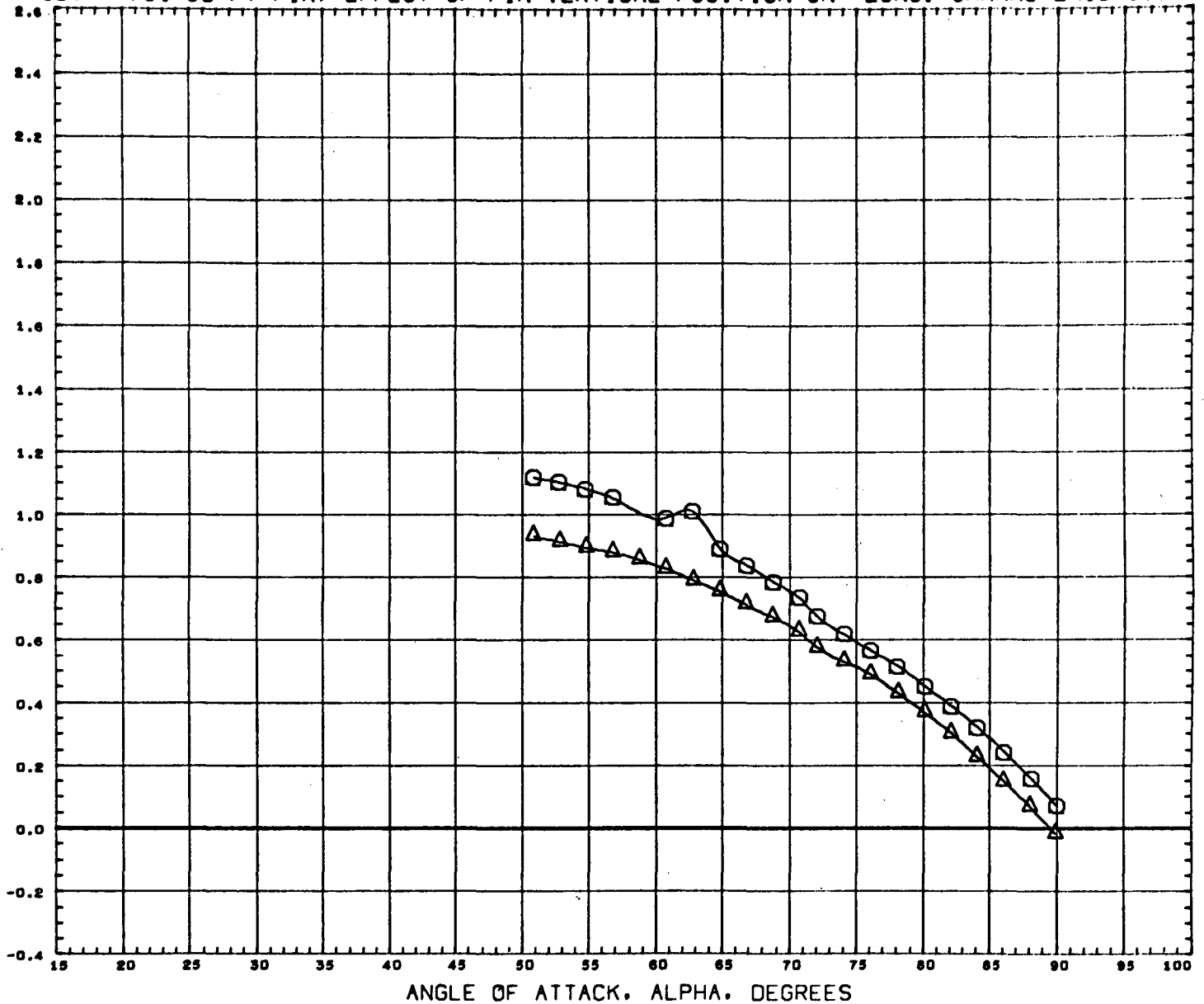


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S11)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (B59S23)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.958

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

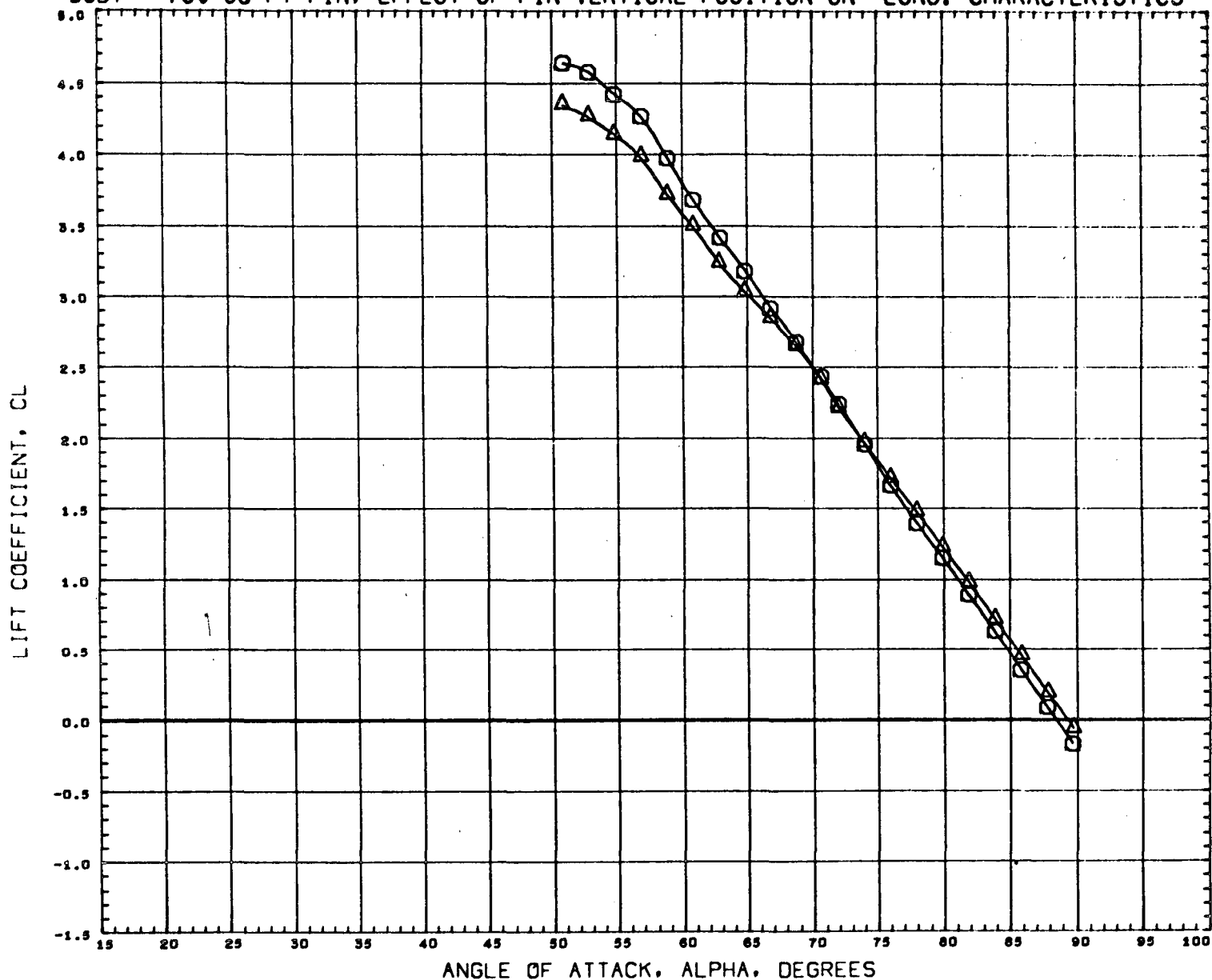
AXIAL FORCE COEFFICIENT, CA



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859S11)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859S23)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9060 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9060 IN.    |
|                 |                                         |       |       |         |       | XMNP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMNP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMNP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.939

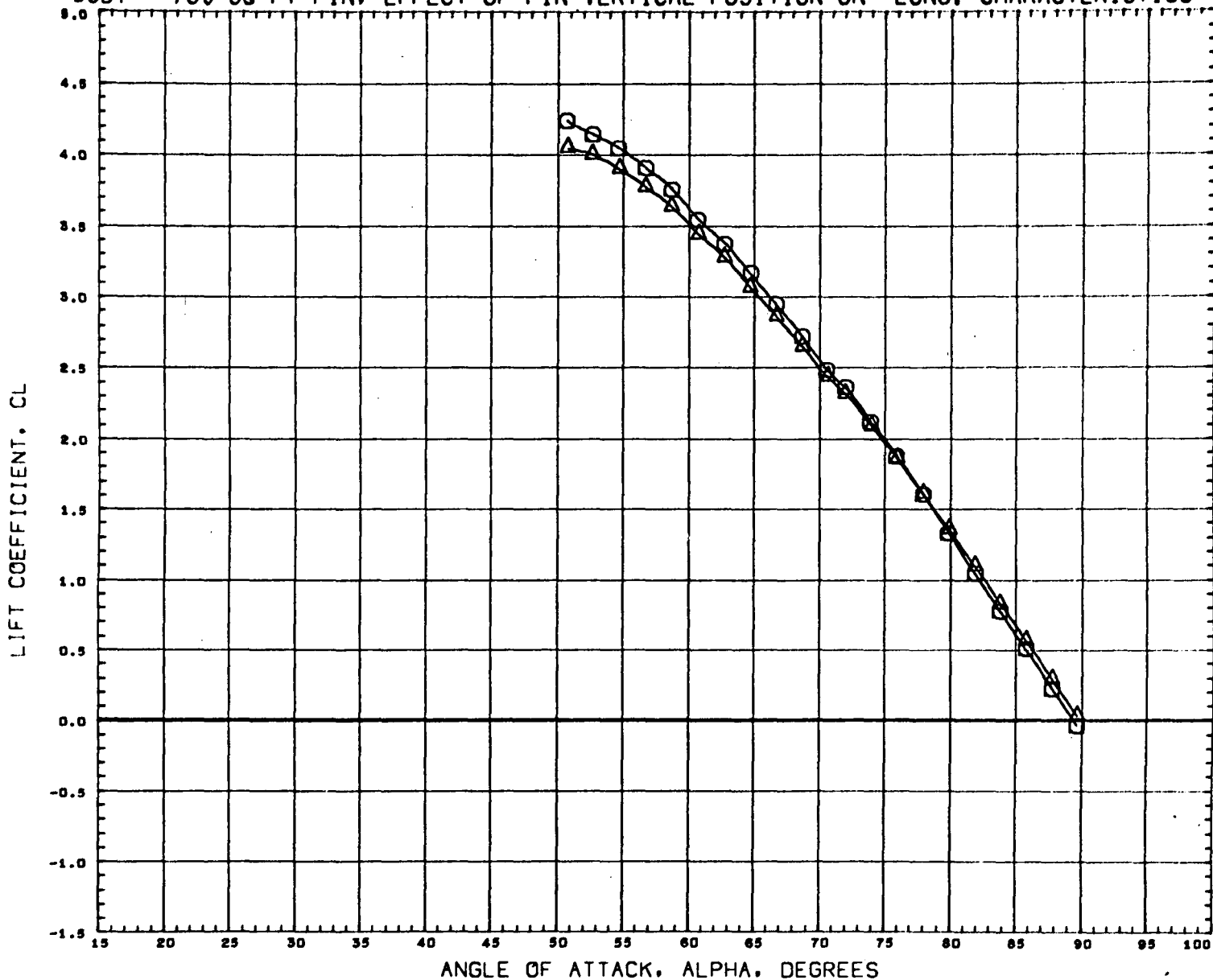
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859311)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRF 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.196

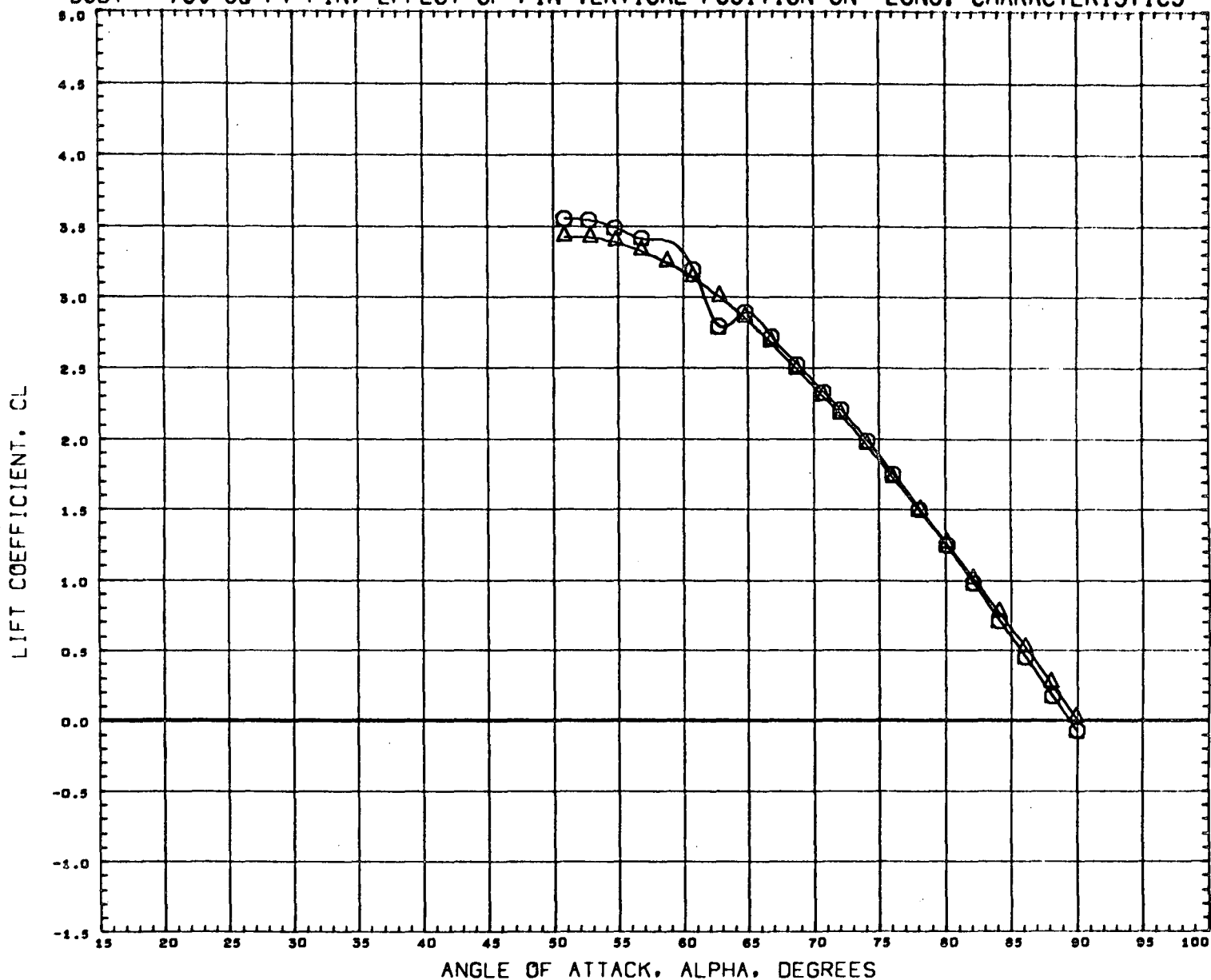
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59823)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.958

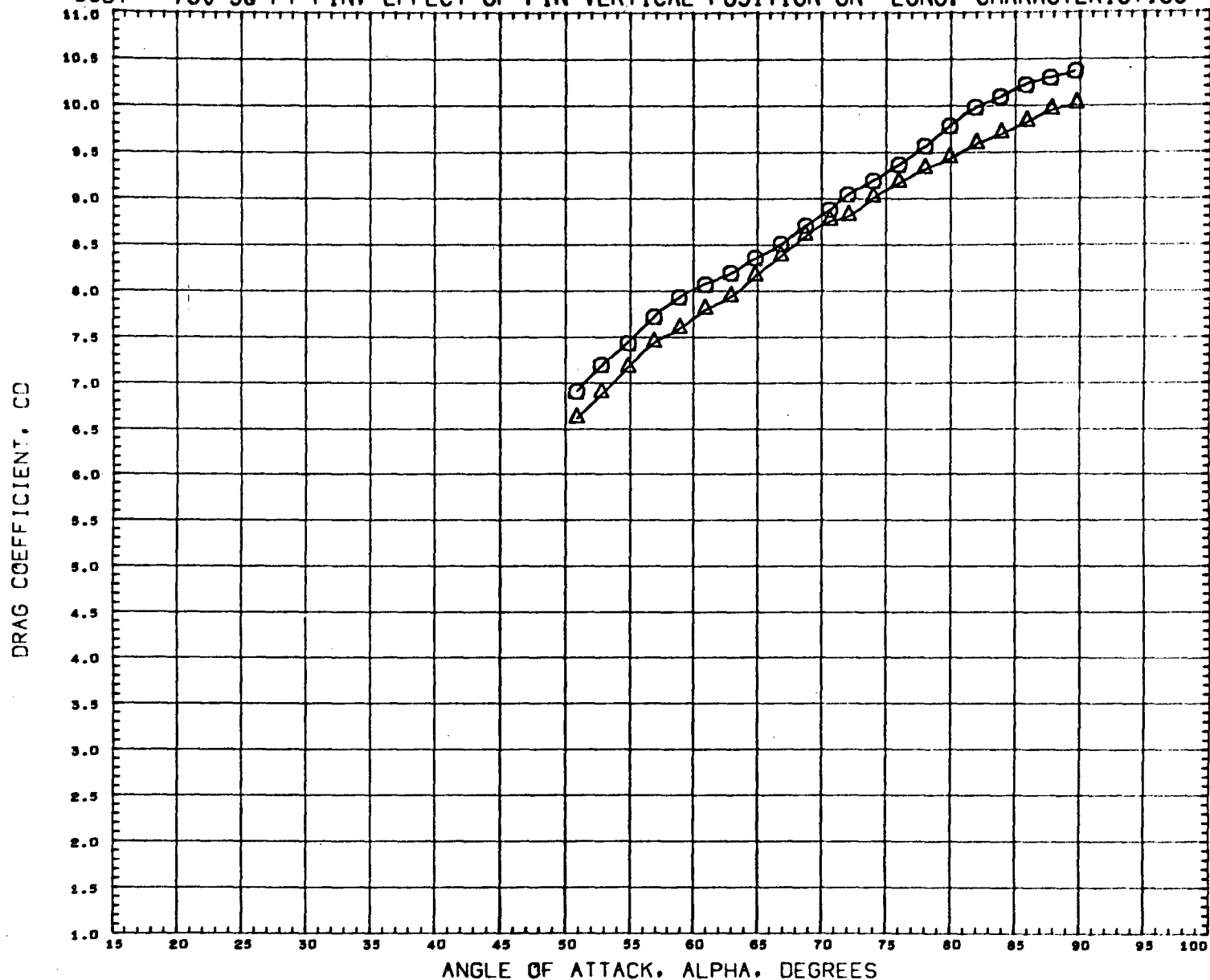
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859S11)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859S23)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

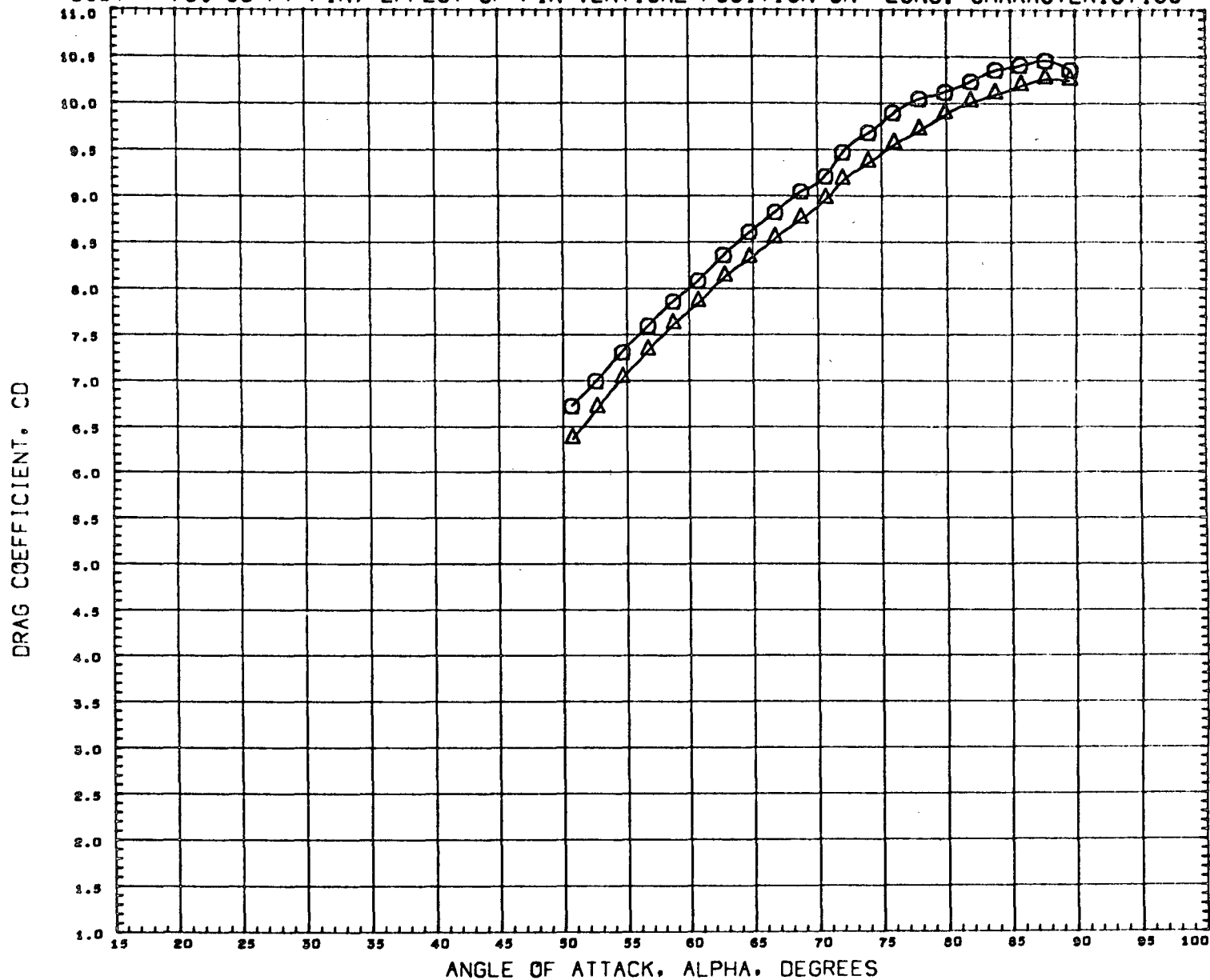
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59911)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59923)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

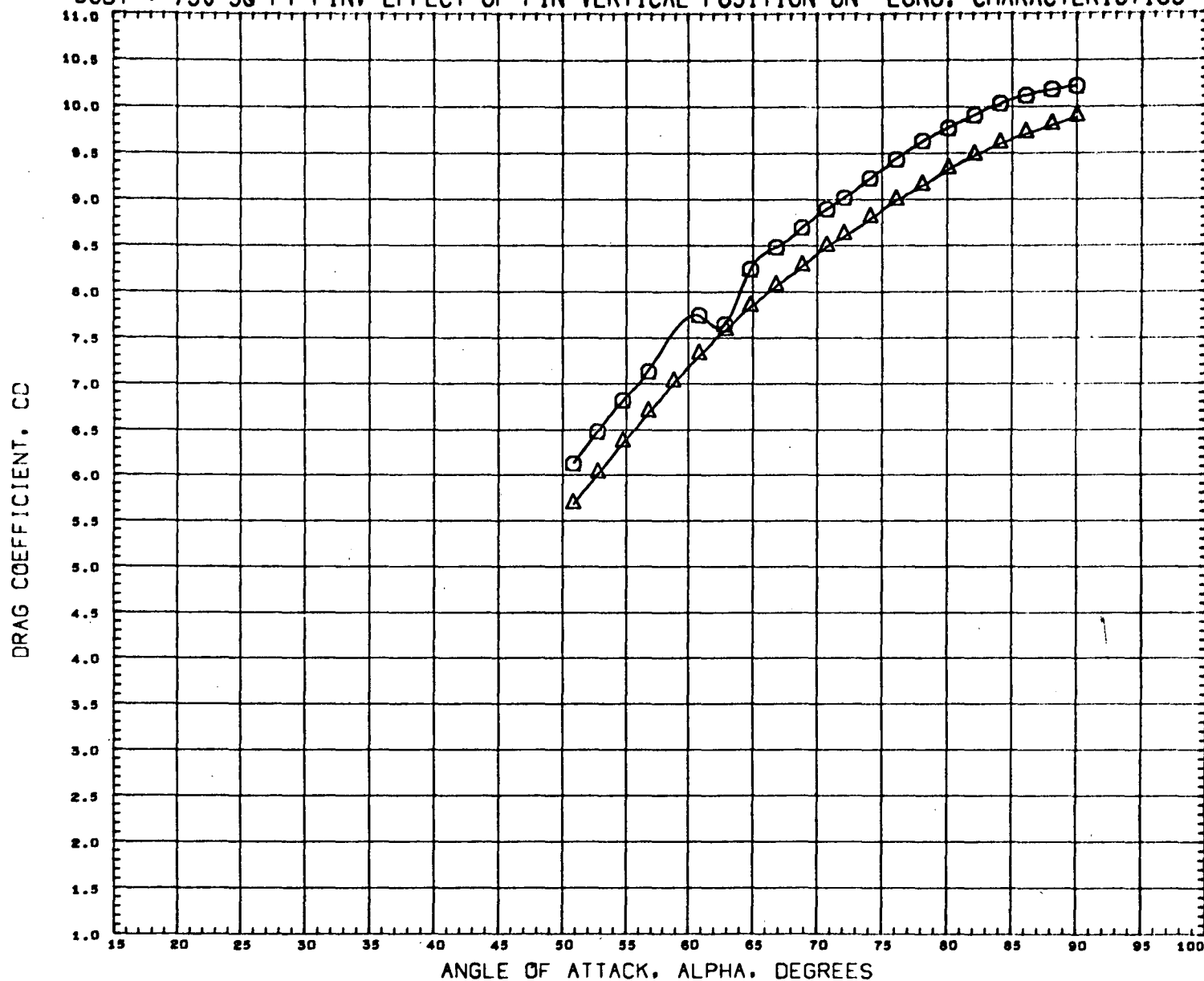
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S11)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S23)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.958

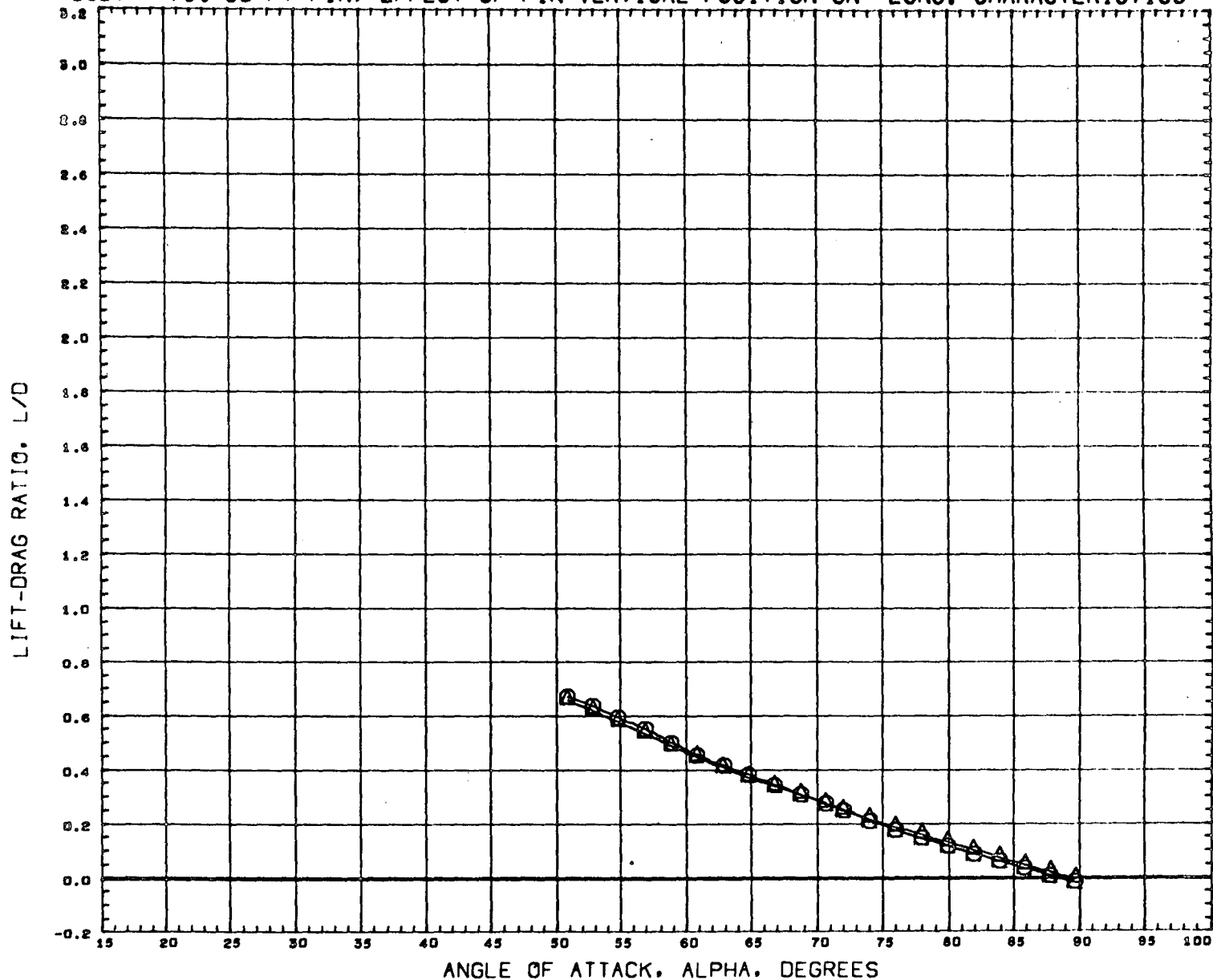
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859311)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

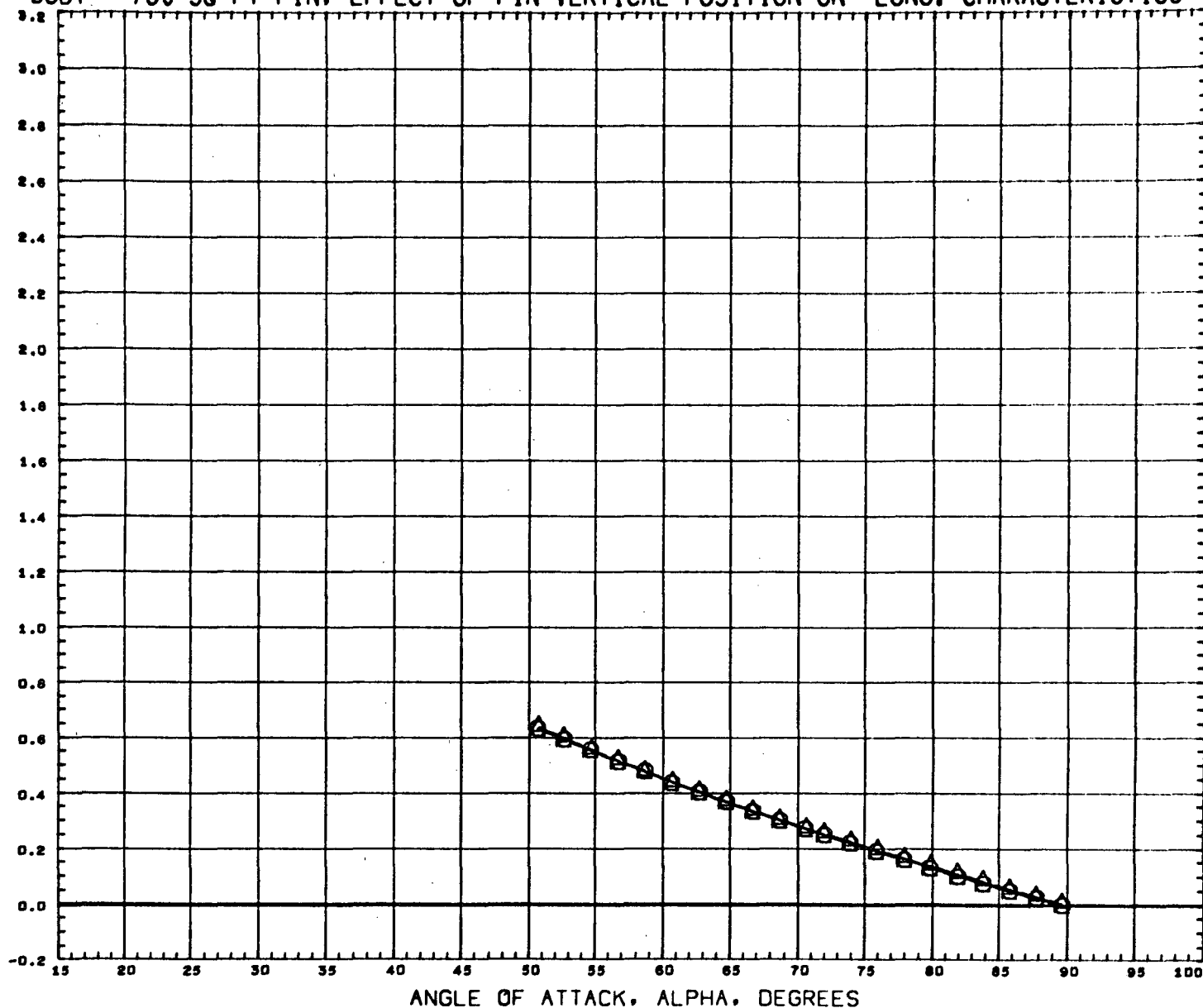


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF 0.9650 sq. IN    |
| (B59523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.196

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

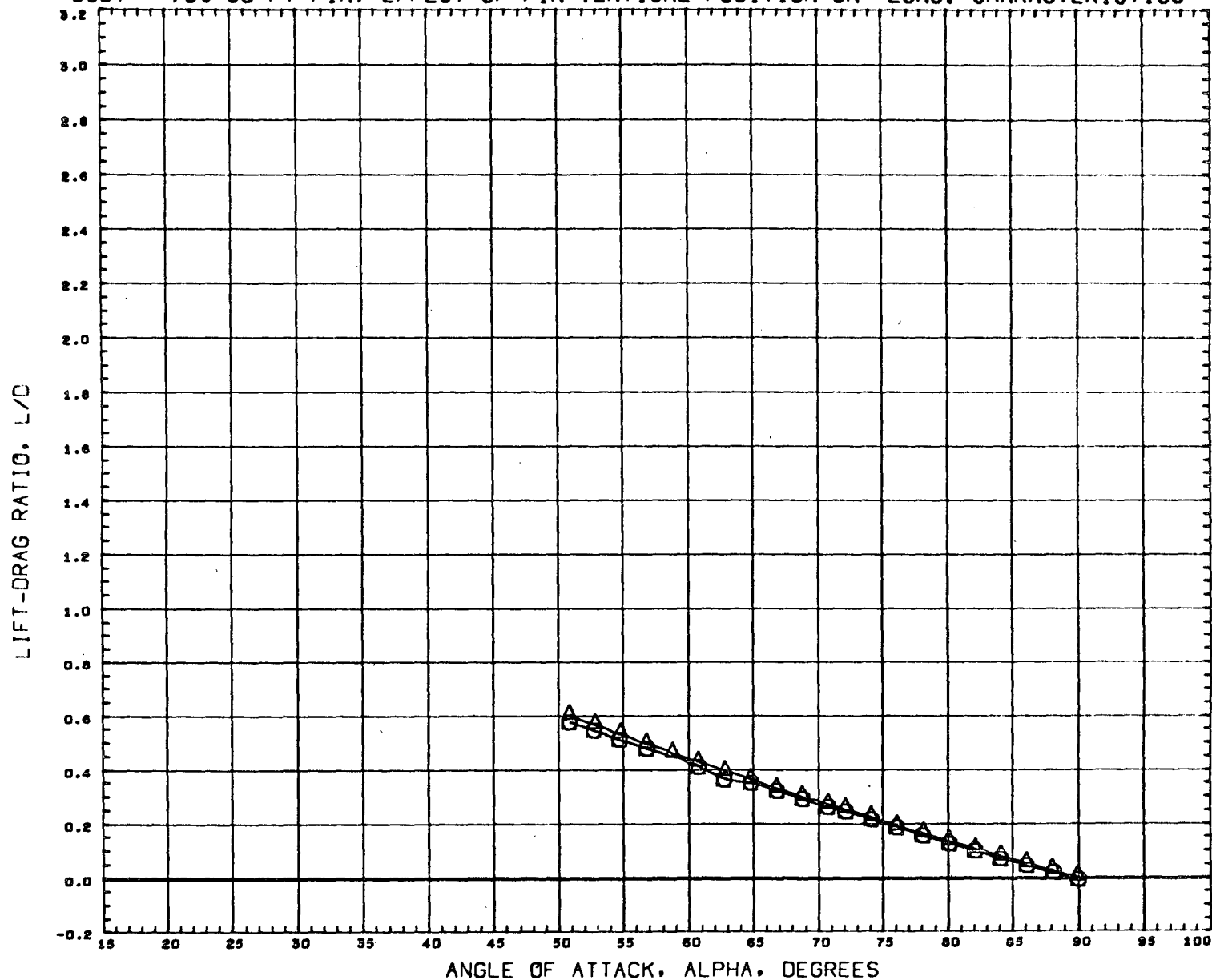
LIFT-DRAG RATIO, L/D



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 30. IN |
| (859823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.958

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

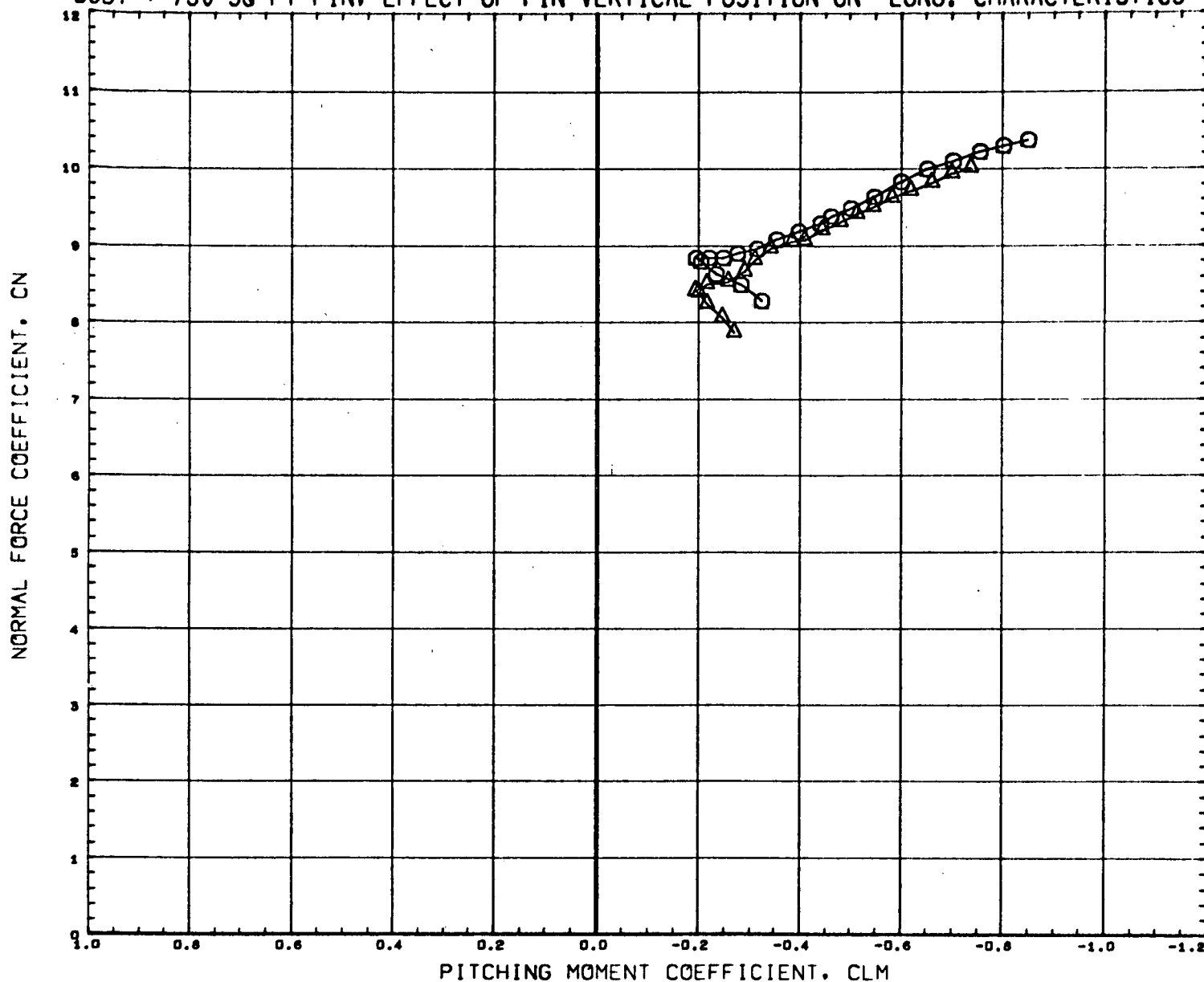


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S11)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S23)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

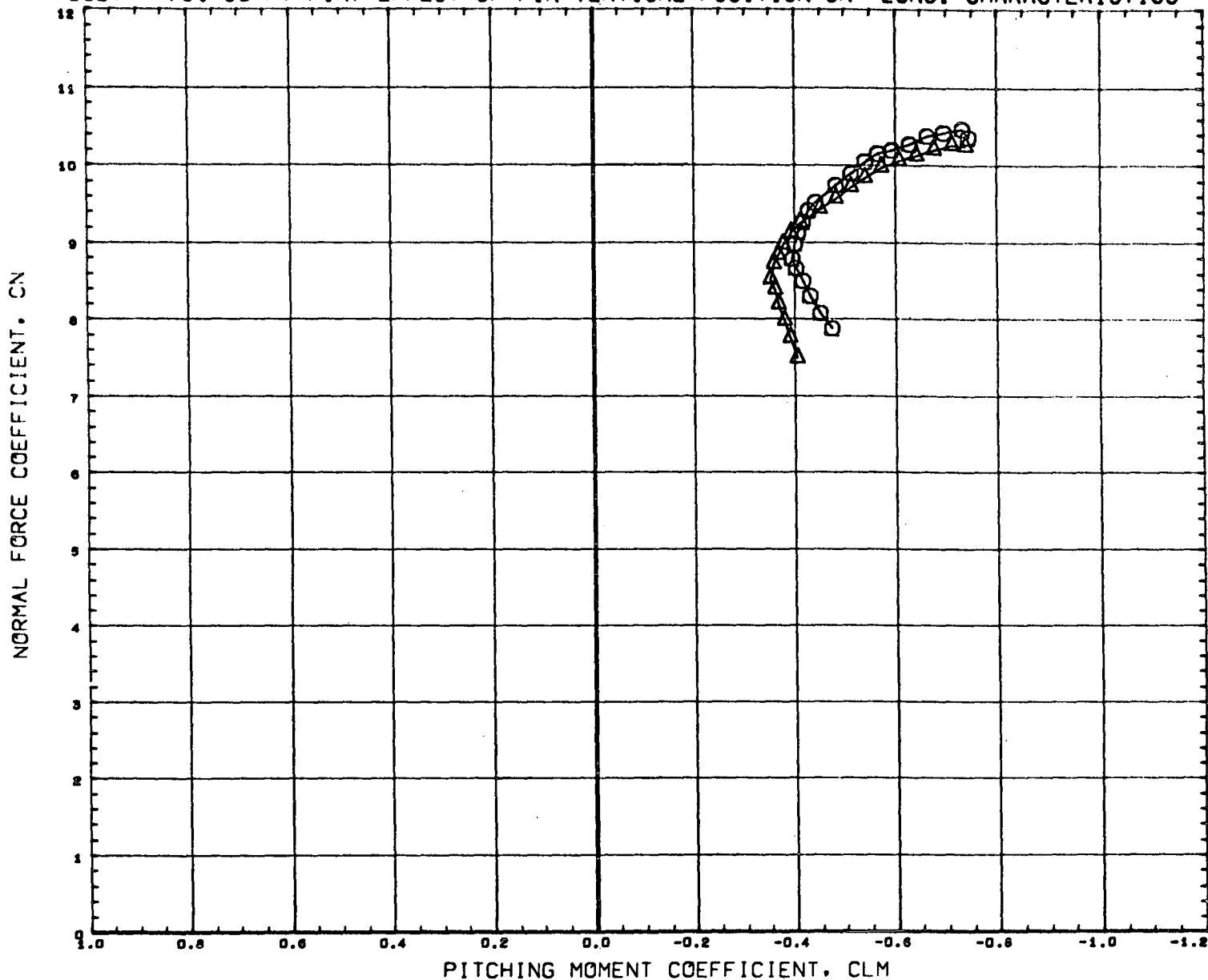
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 Sq. IN |
| (859823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

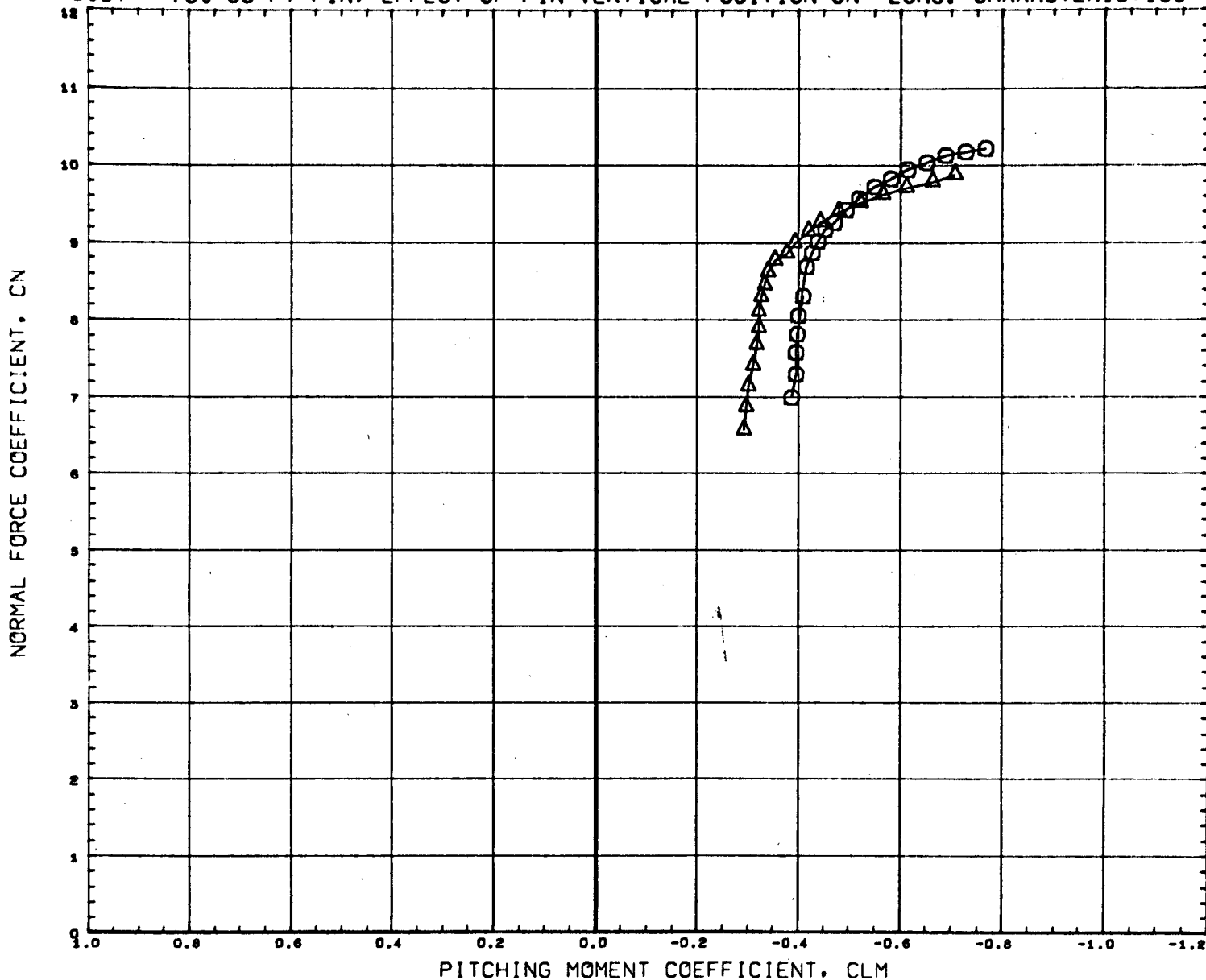
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.958

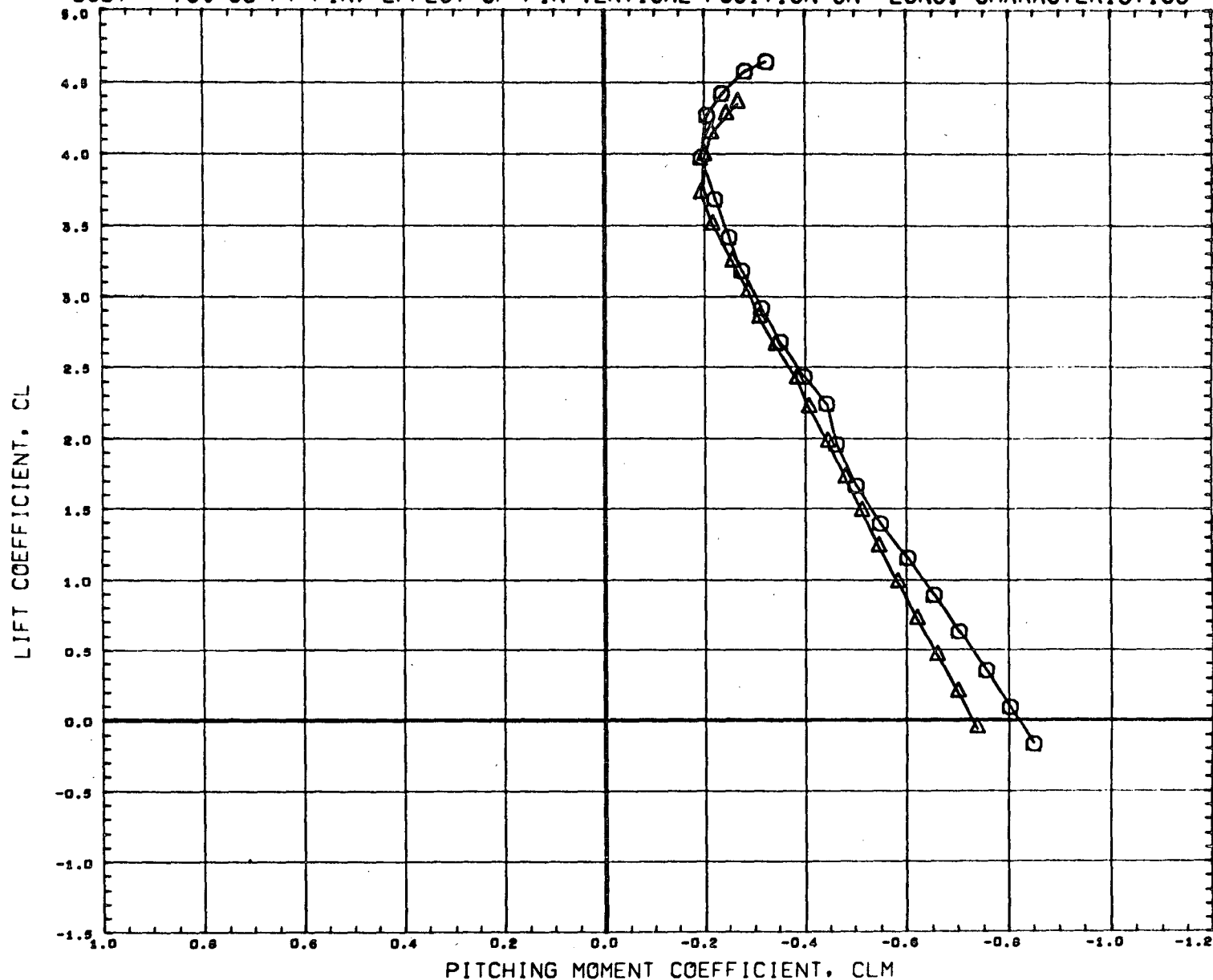
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

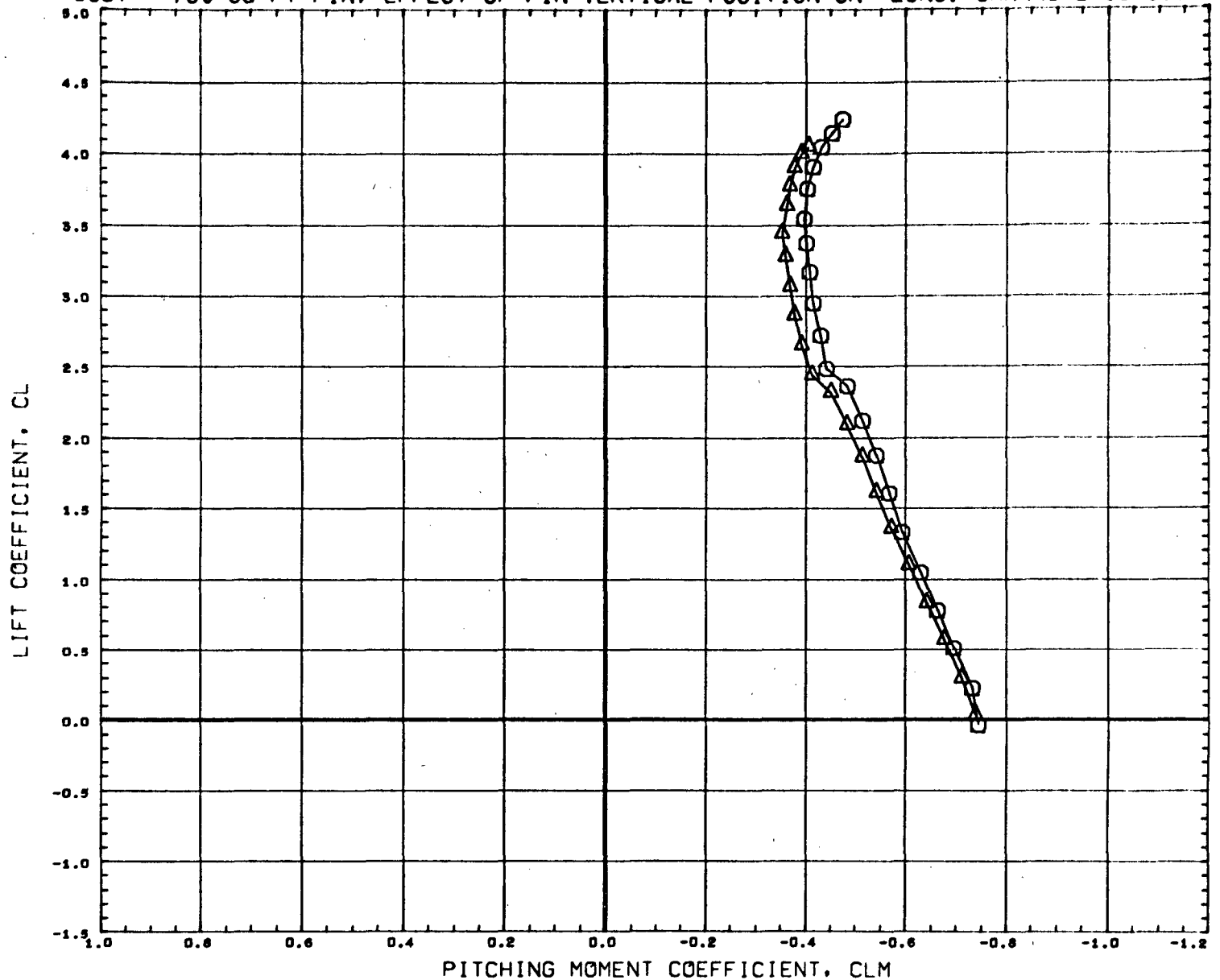
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (B59823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

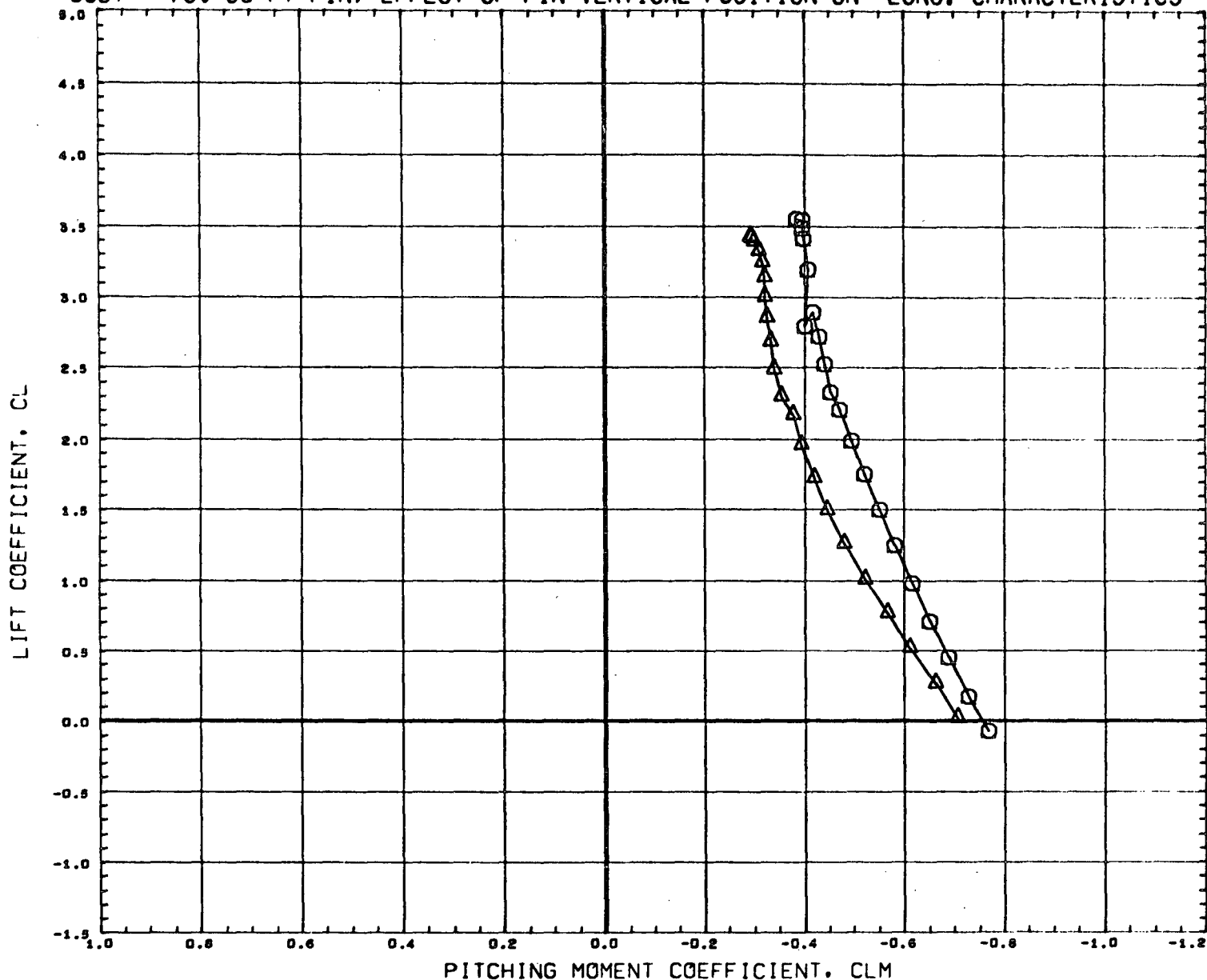
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.958

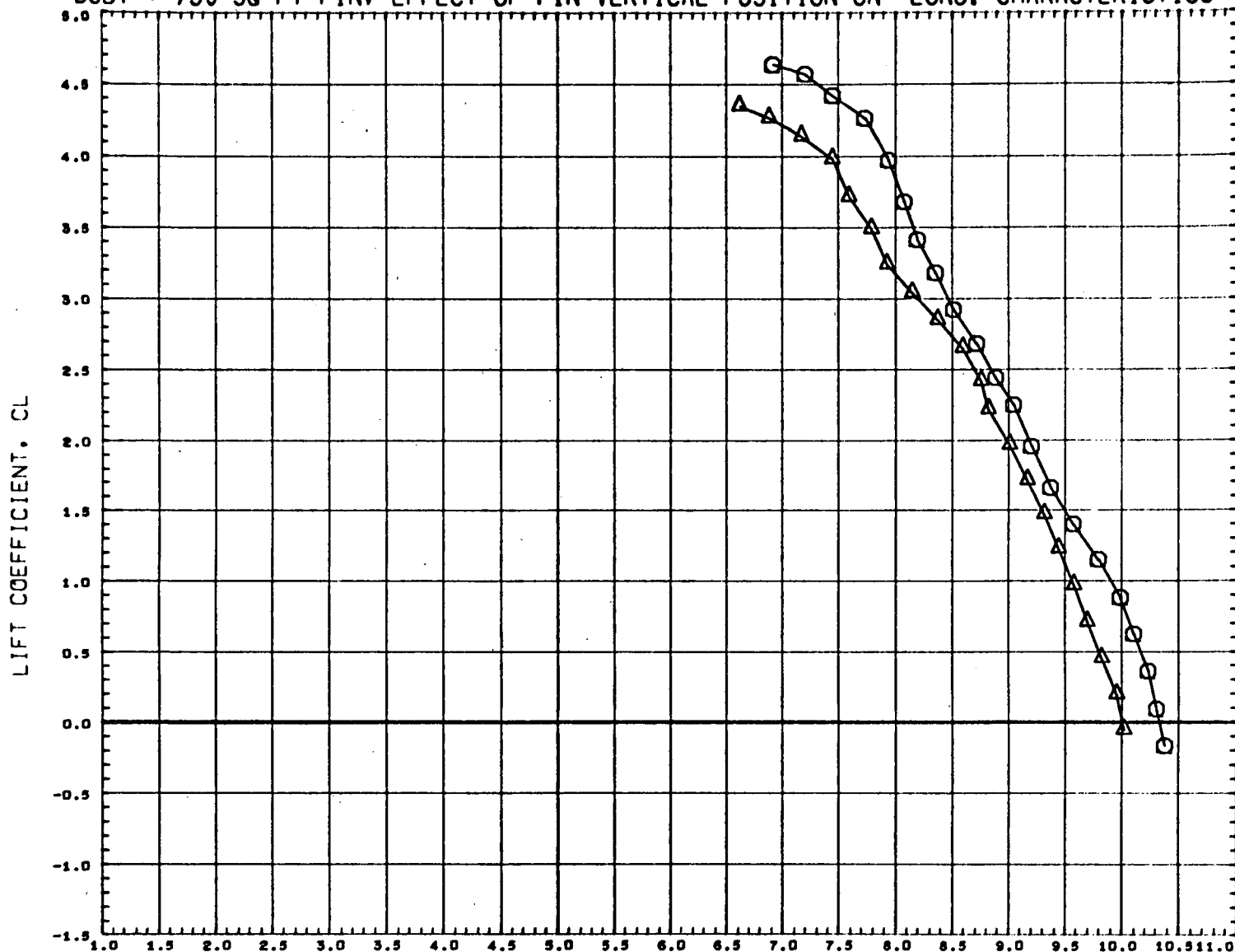
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

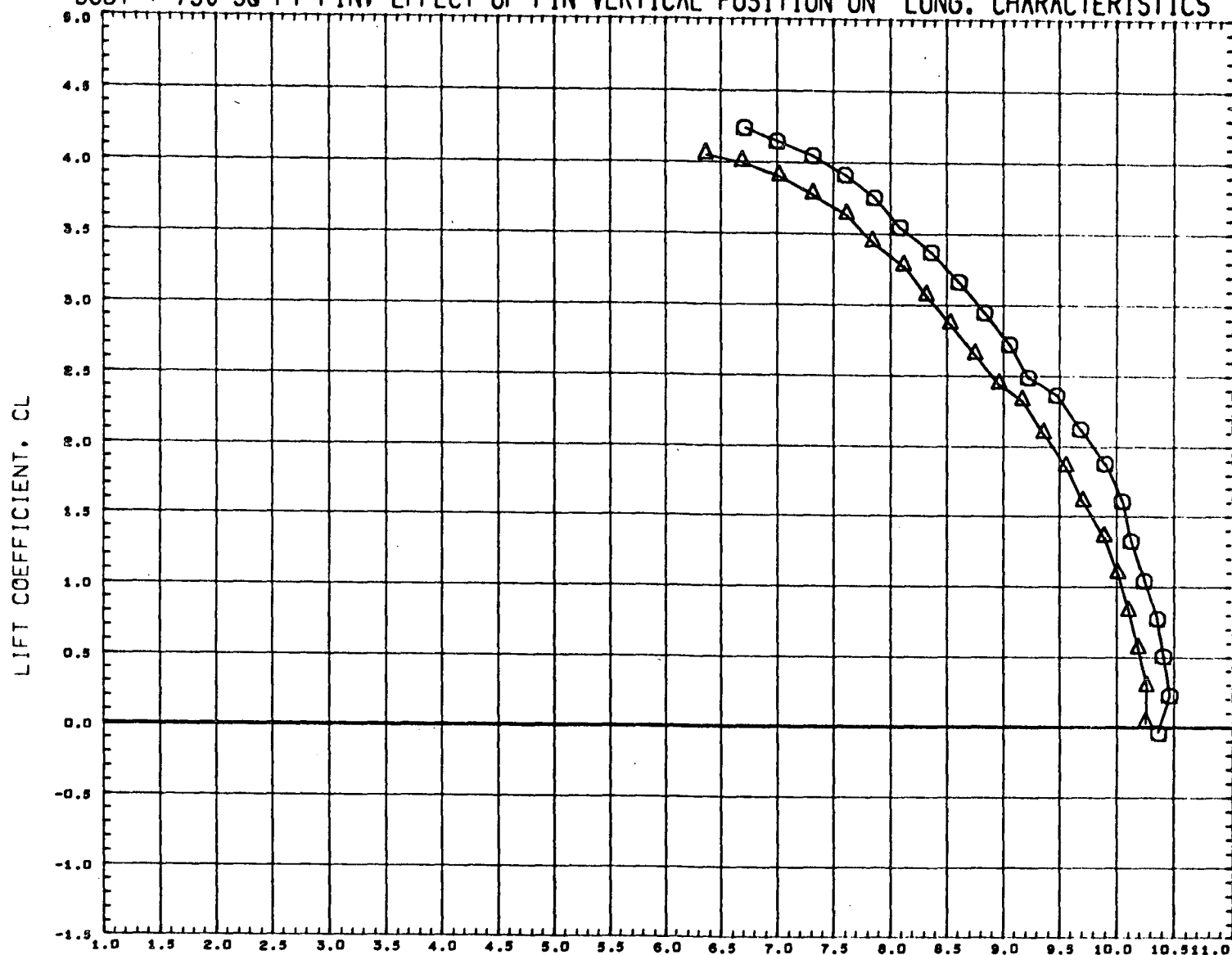


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S11)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S23)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                              |       |       |         |       | BREF 4.9080 IN.       |
|                 |                              |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                              |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0026          |

MACH 1.196

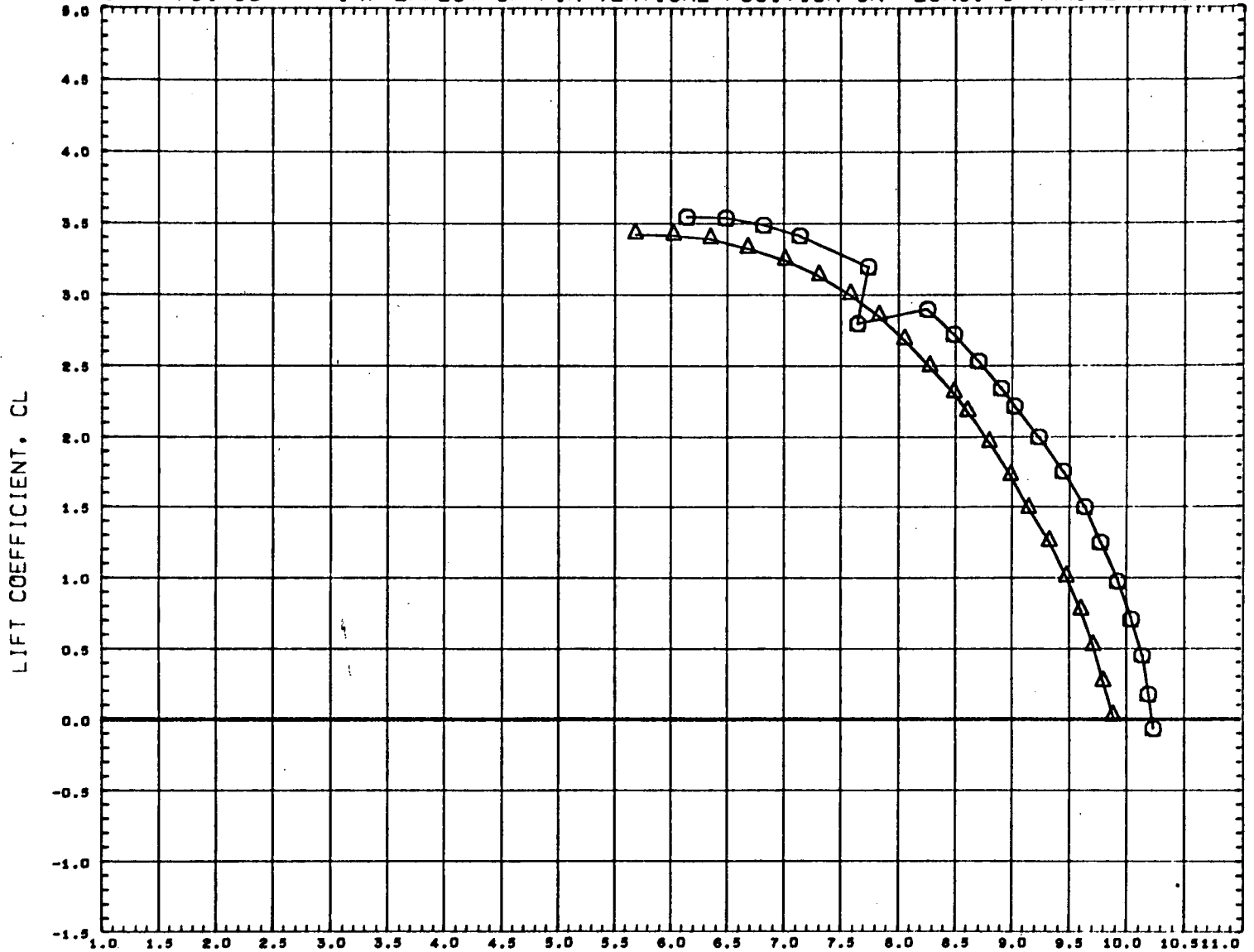
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL |   | CONFIGURATION DESCRIPTION |                 | BETA       |       | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|---|---------------------------|-----------------|------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59811)        | ○ | MSFC TWT 524              | 33 FOOT BOOSTER | N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59823)        | △ | MSFC TWT 524              | 33 FOOT BOOSTER | N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |   |                           |                 |            |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |   |                           |                 |            |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |   |                           |                 |            |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |            |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |            |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.958

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

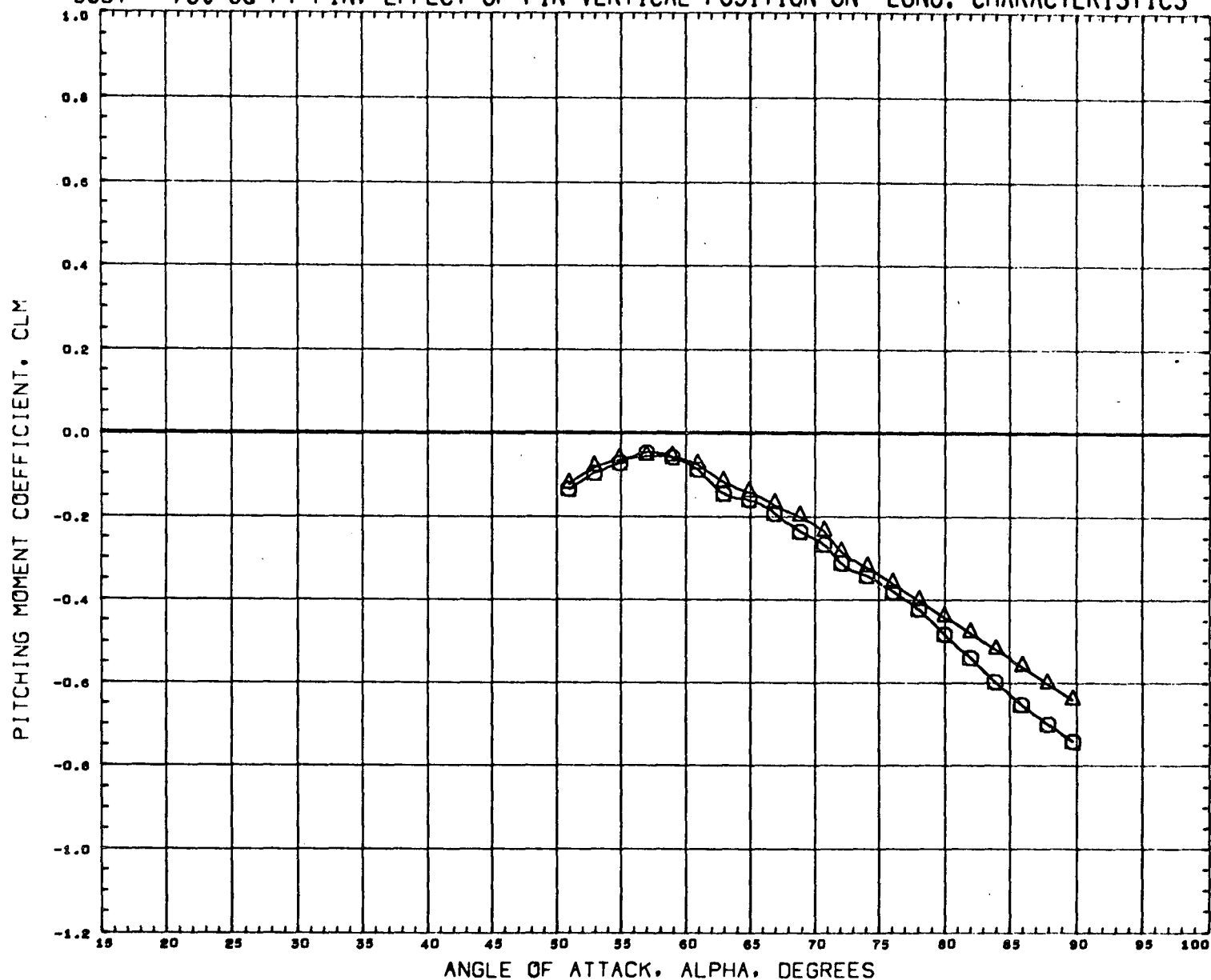


DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    |            | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|------------|-------|-------|---------|-------|-----------------------|
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859823)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                              |            |       |       |         |       | BREF 4.9080 IN.       |
|                 |                              |            |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                              |            |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                              |            |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |            |       |       |         |       | SCALE 0.0028          |

MACH 4.959

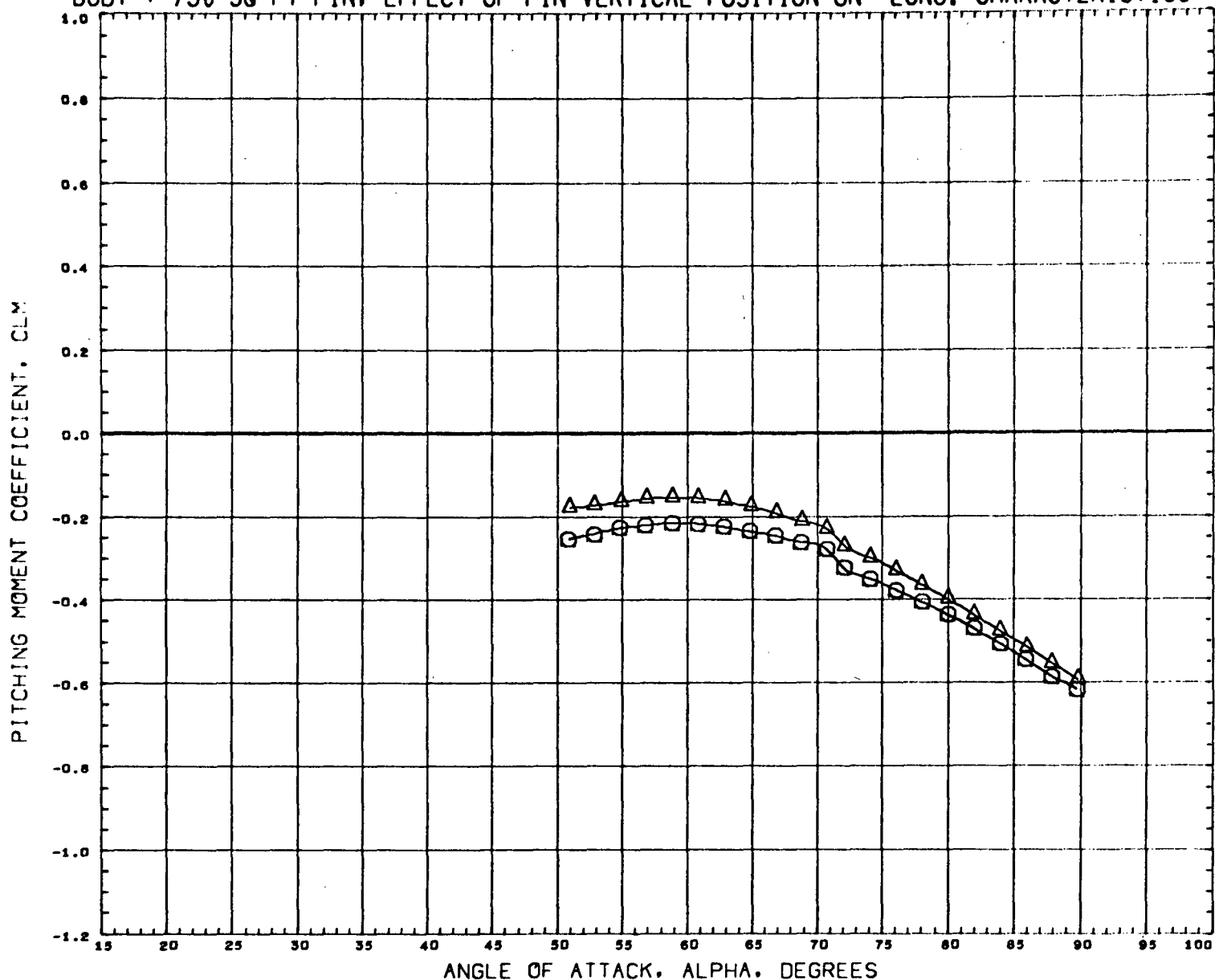
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.194

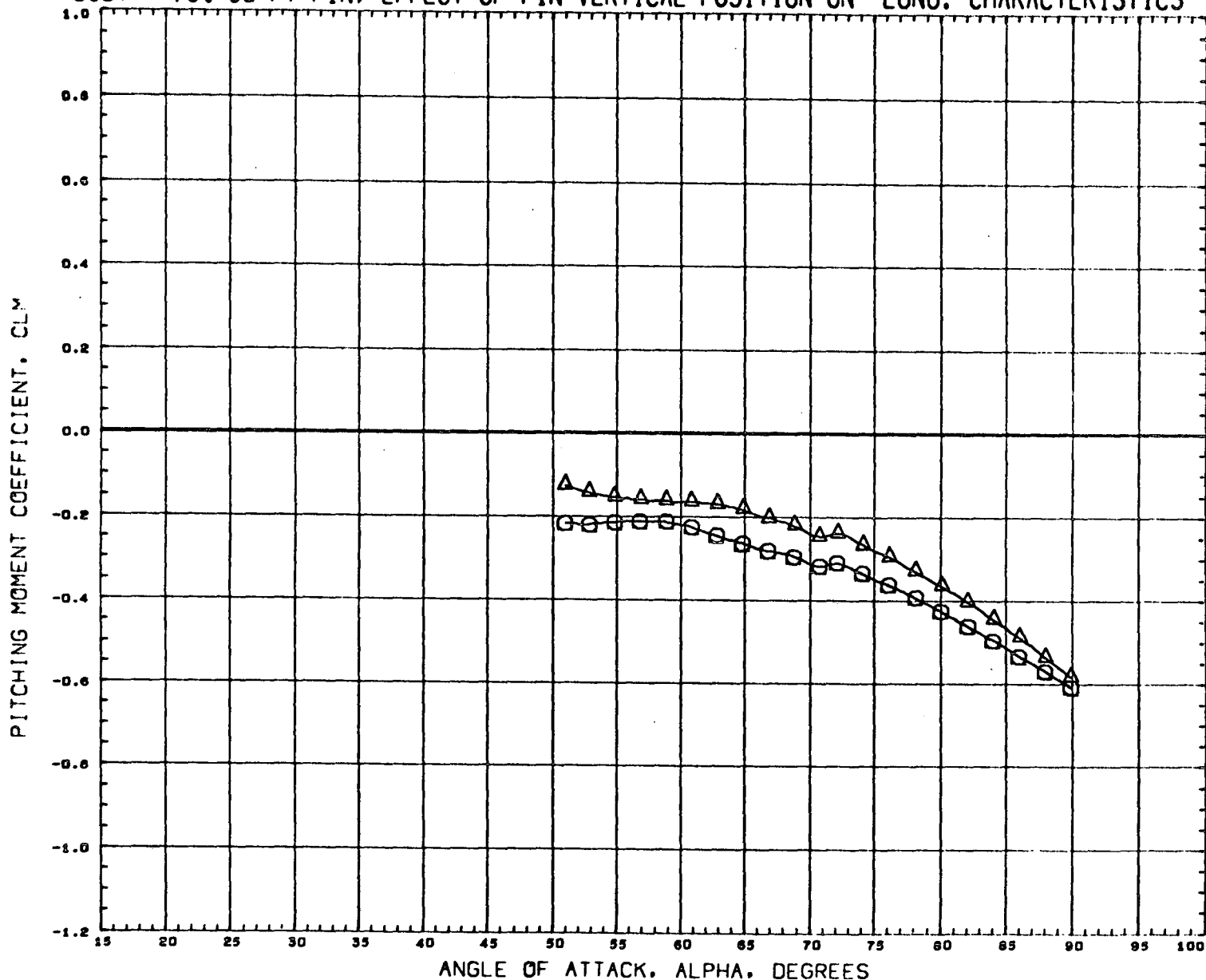
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

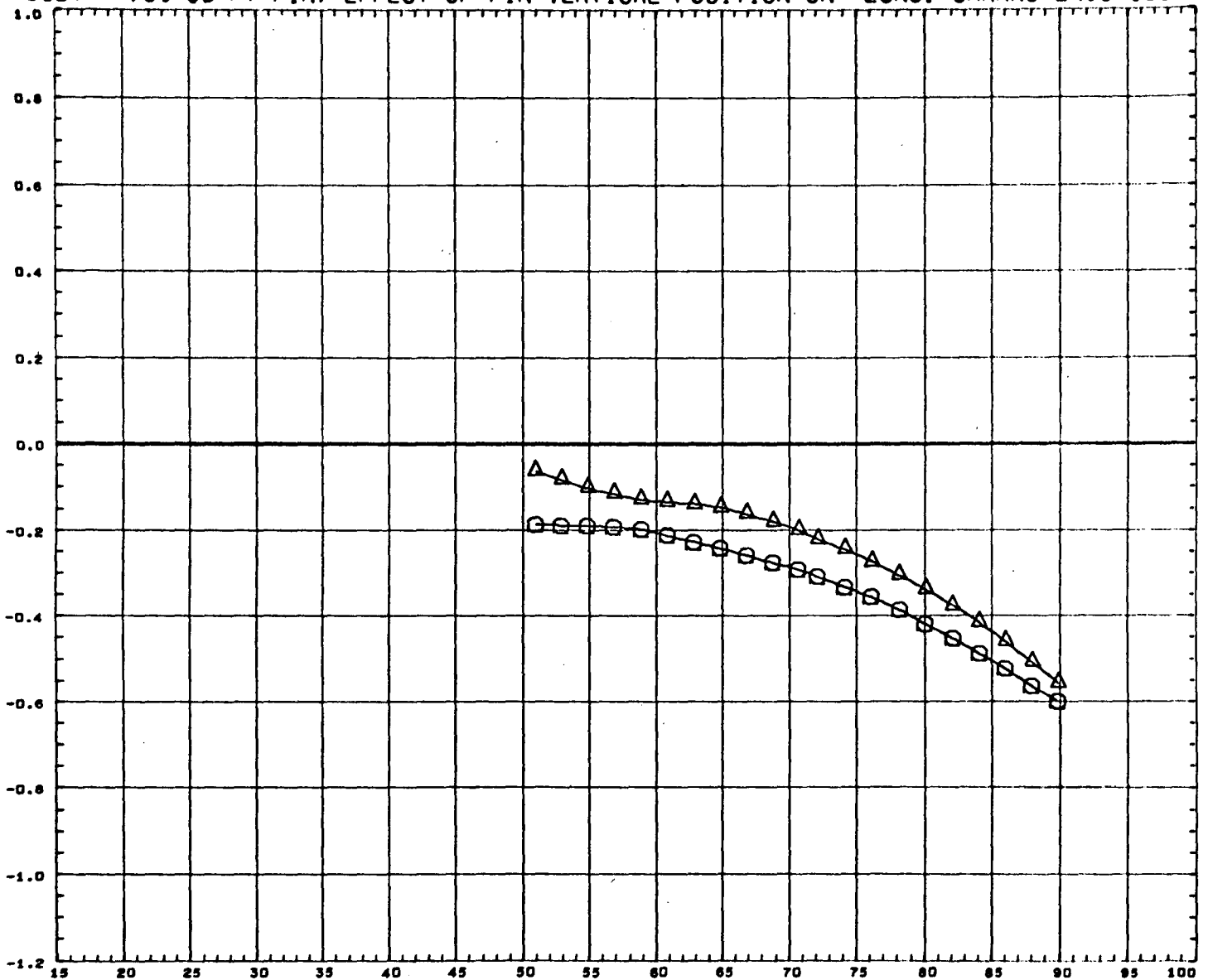


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859S12)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (859S24)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

PITCHING MOMENT COEFFICIENT, CLM

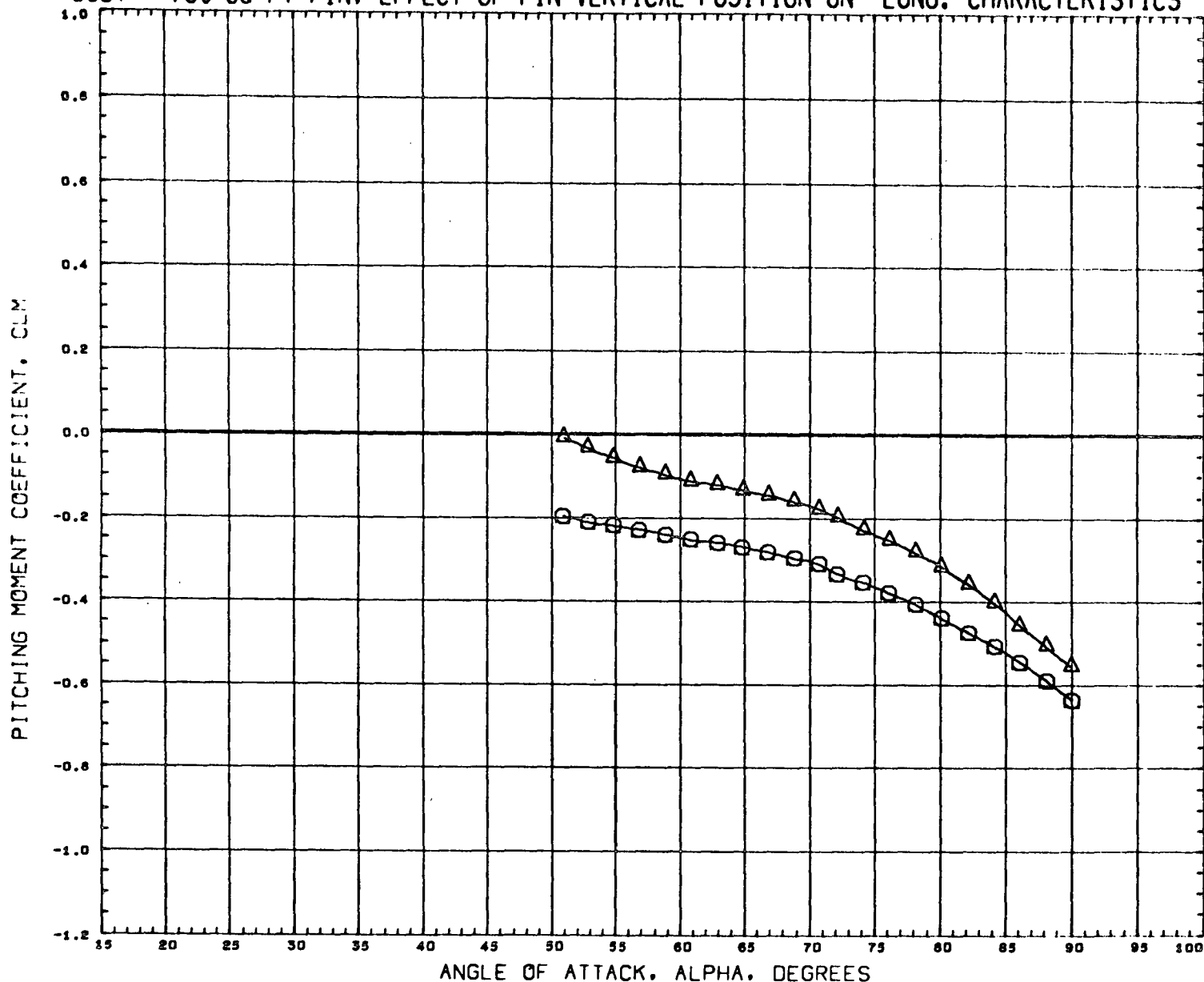


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.460

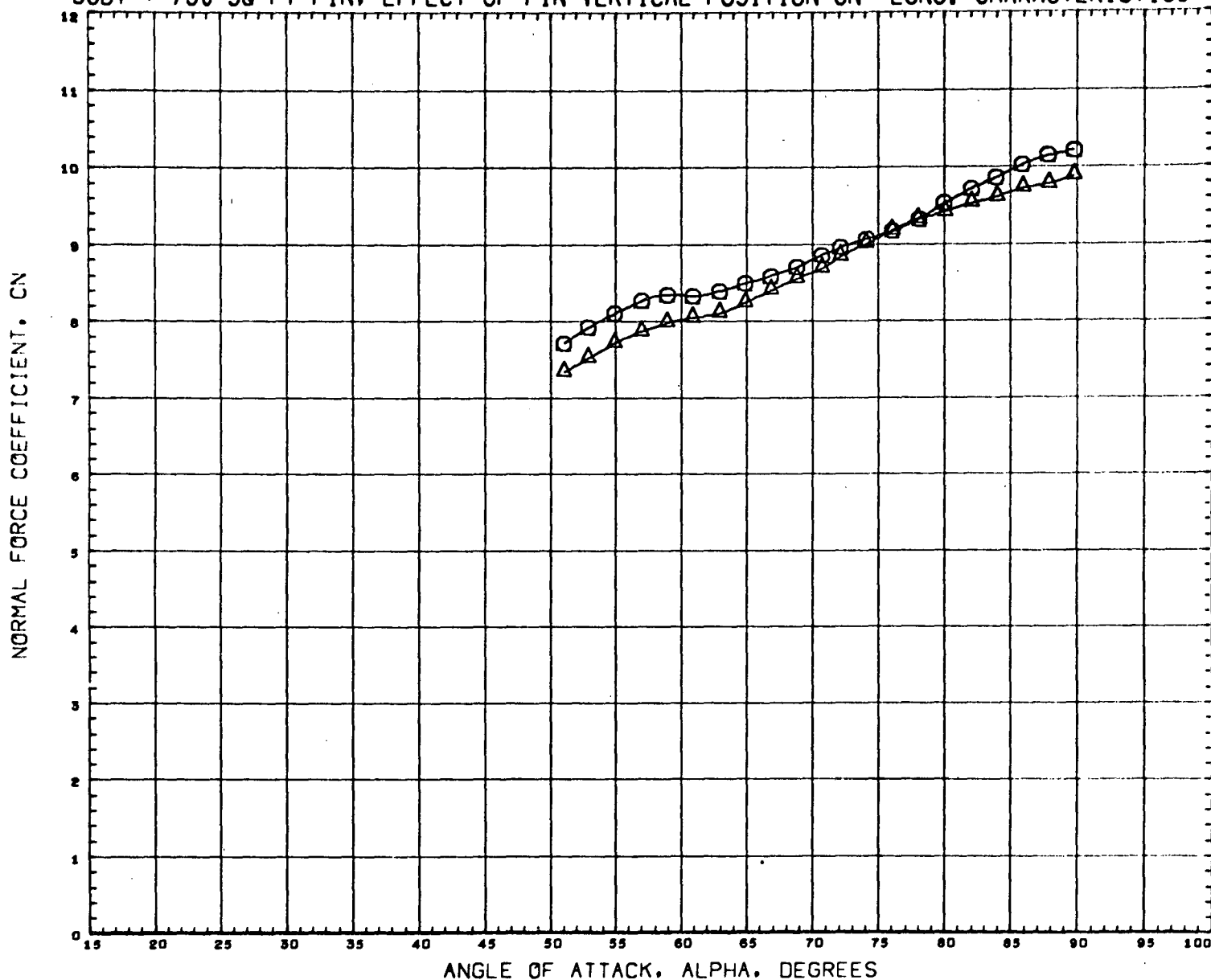
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (899912)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (899924)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

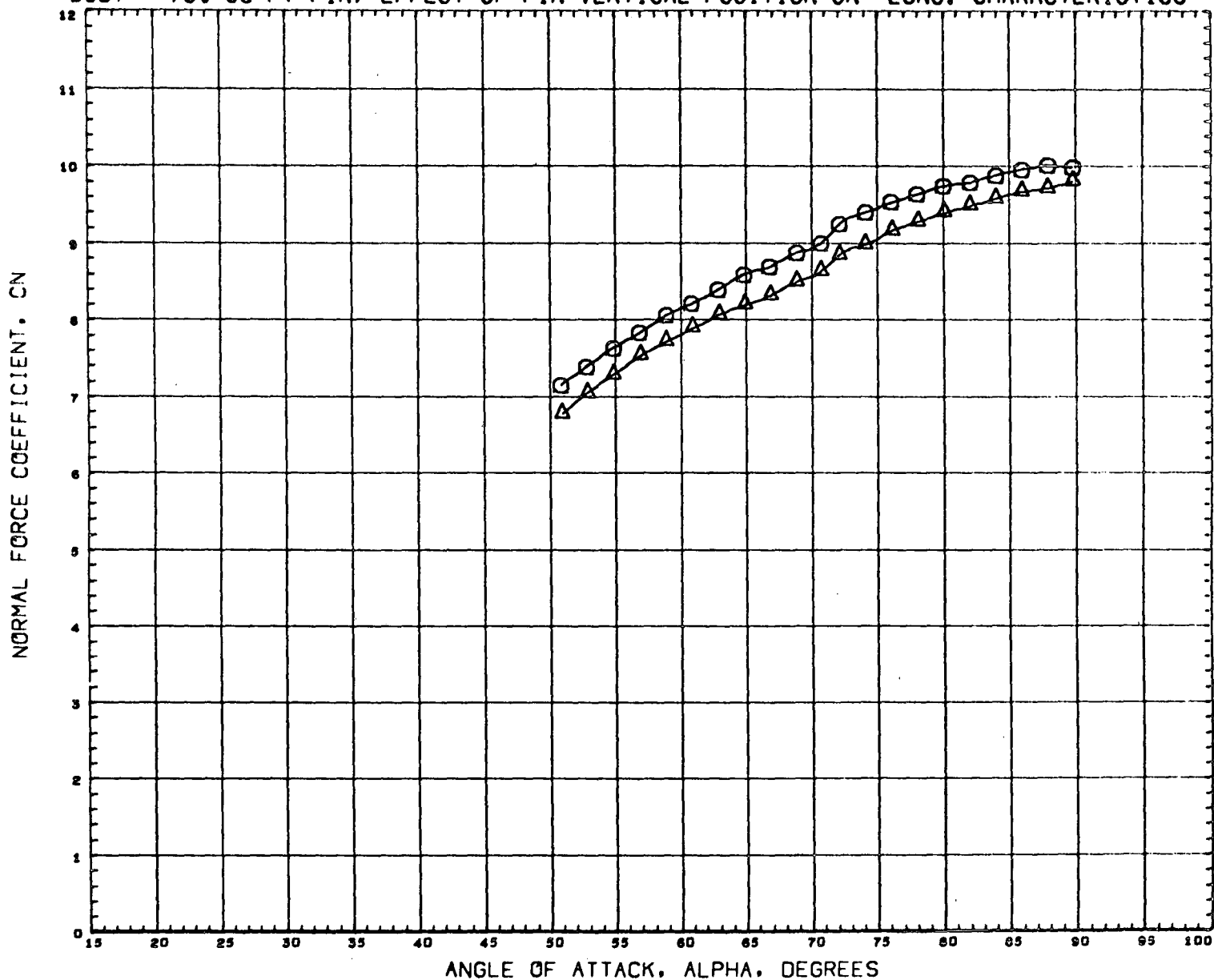
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.194

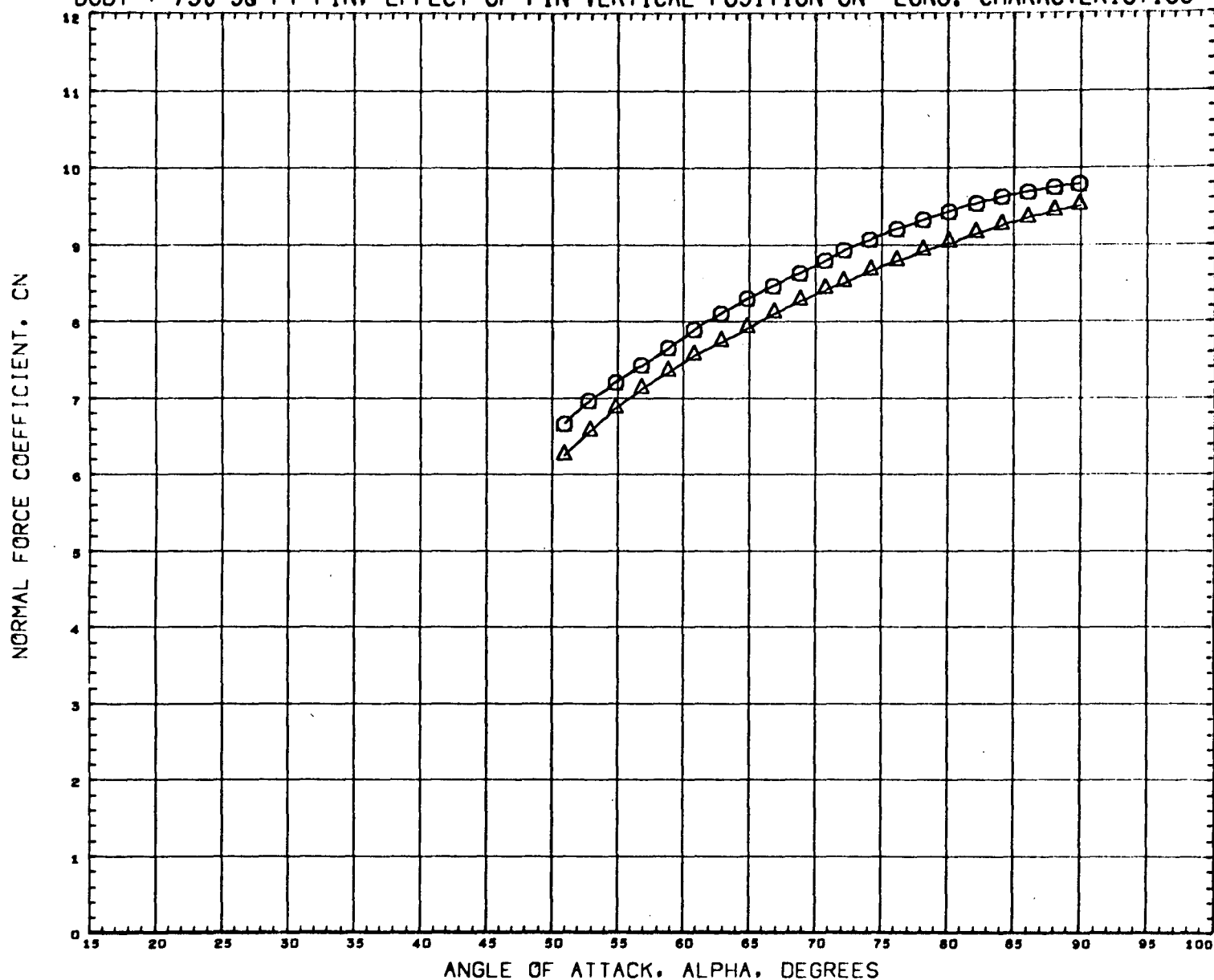
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59912)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59924)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

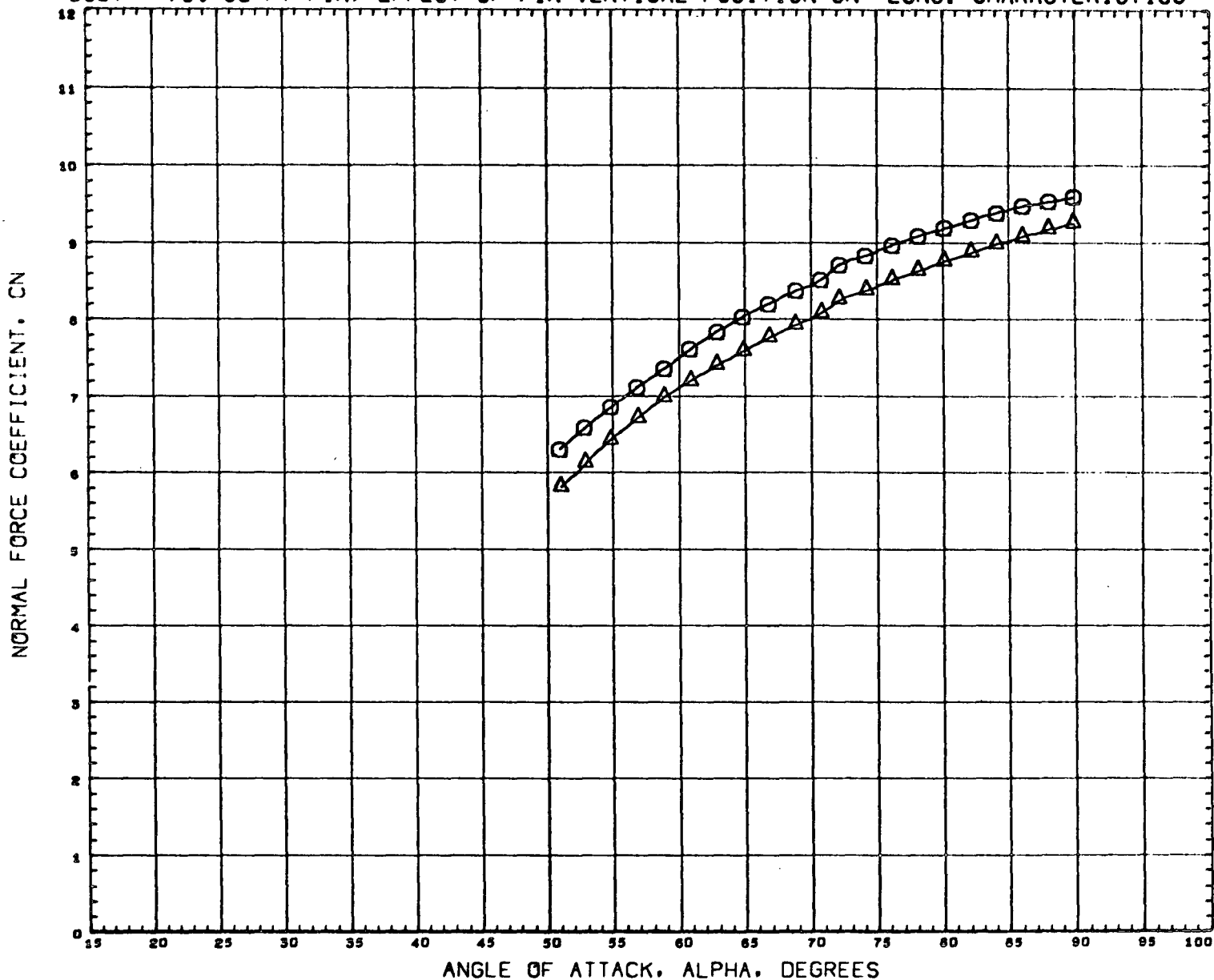
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59912)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59924)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

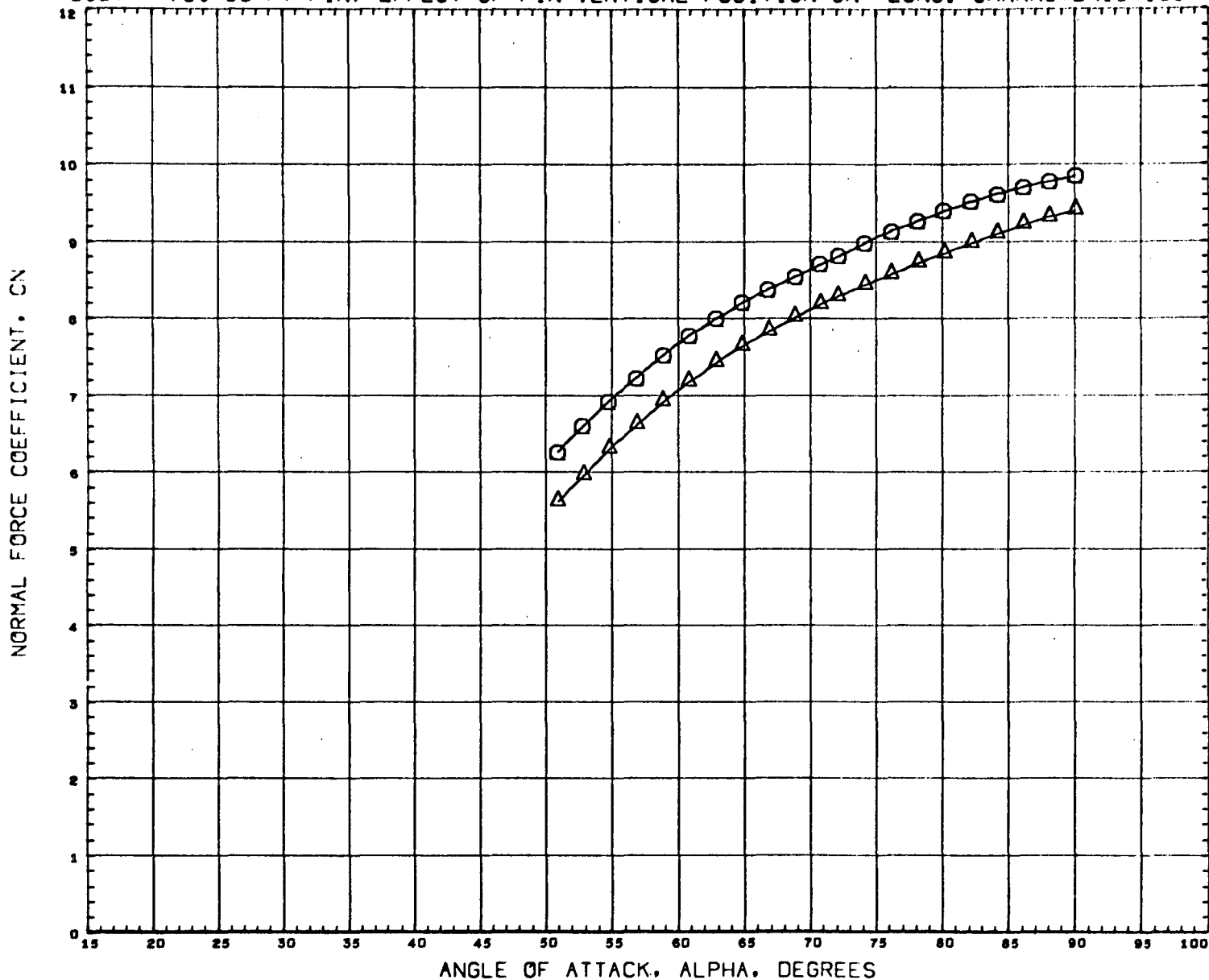
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.460

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

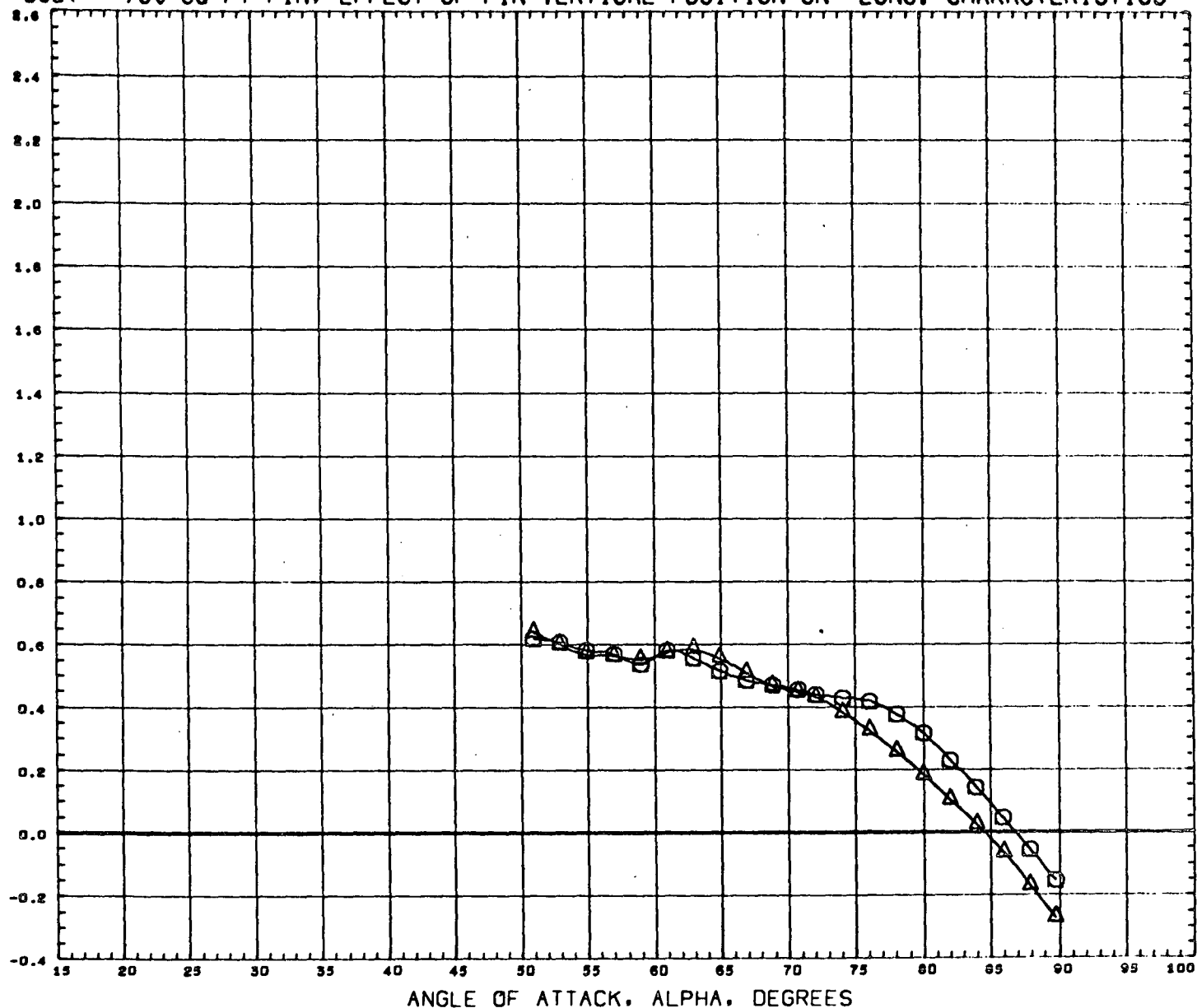


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

AXIAL FORCE COEFFICIENT, CA

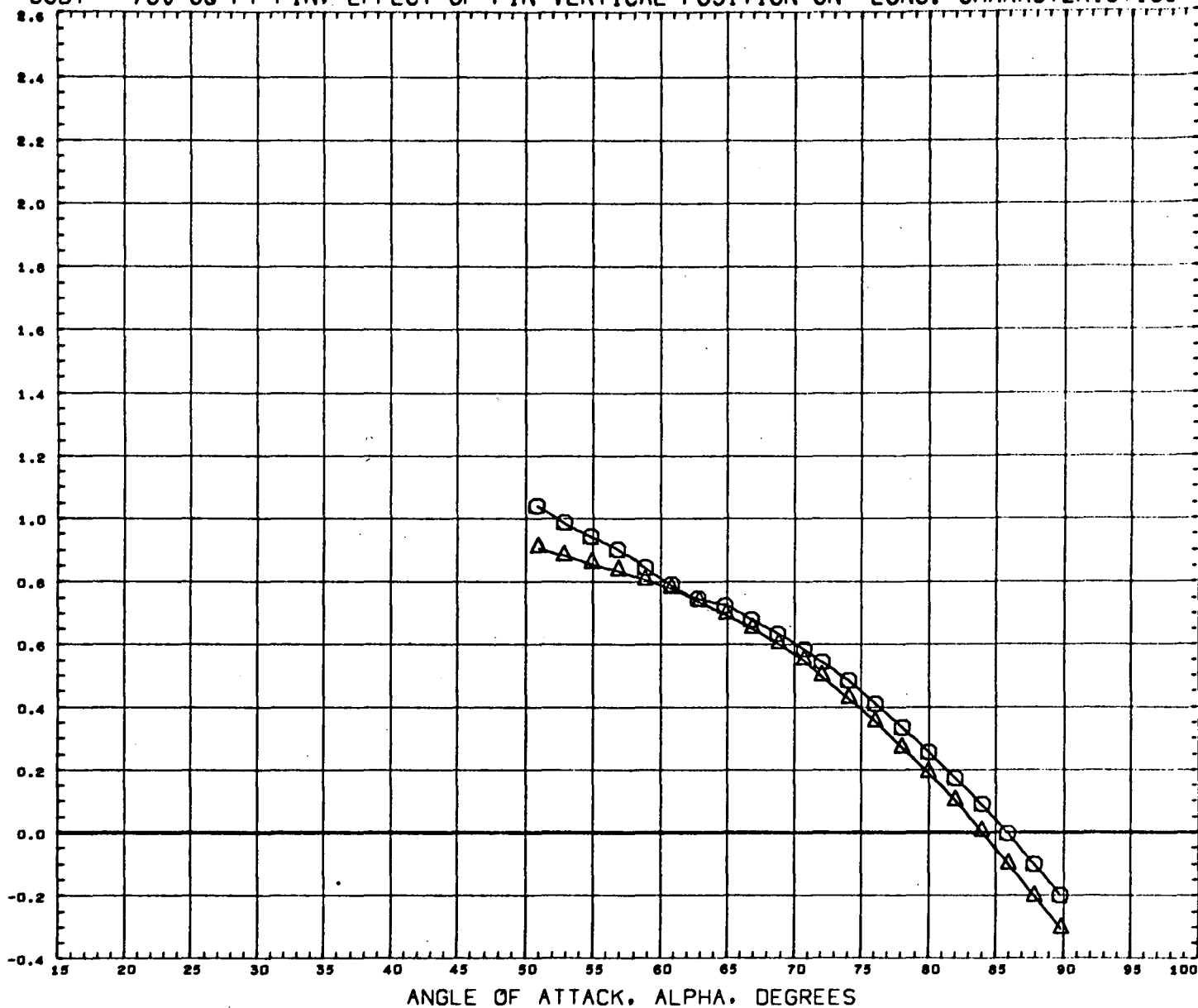


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 sq. IN    |
| (B59824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.194

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

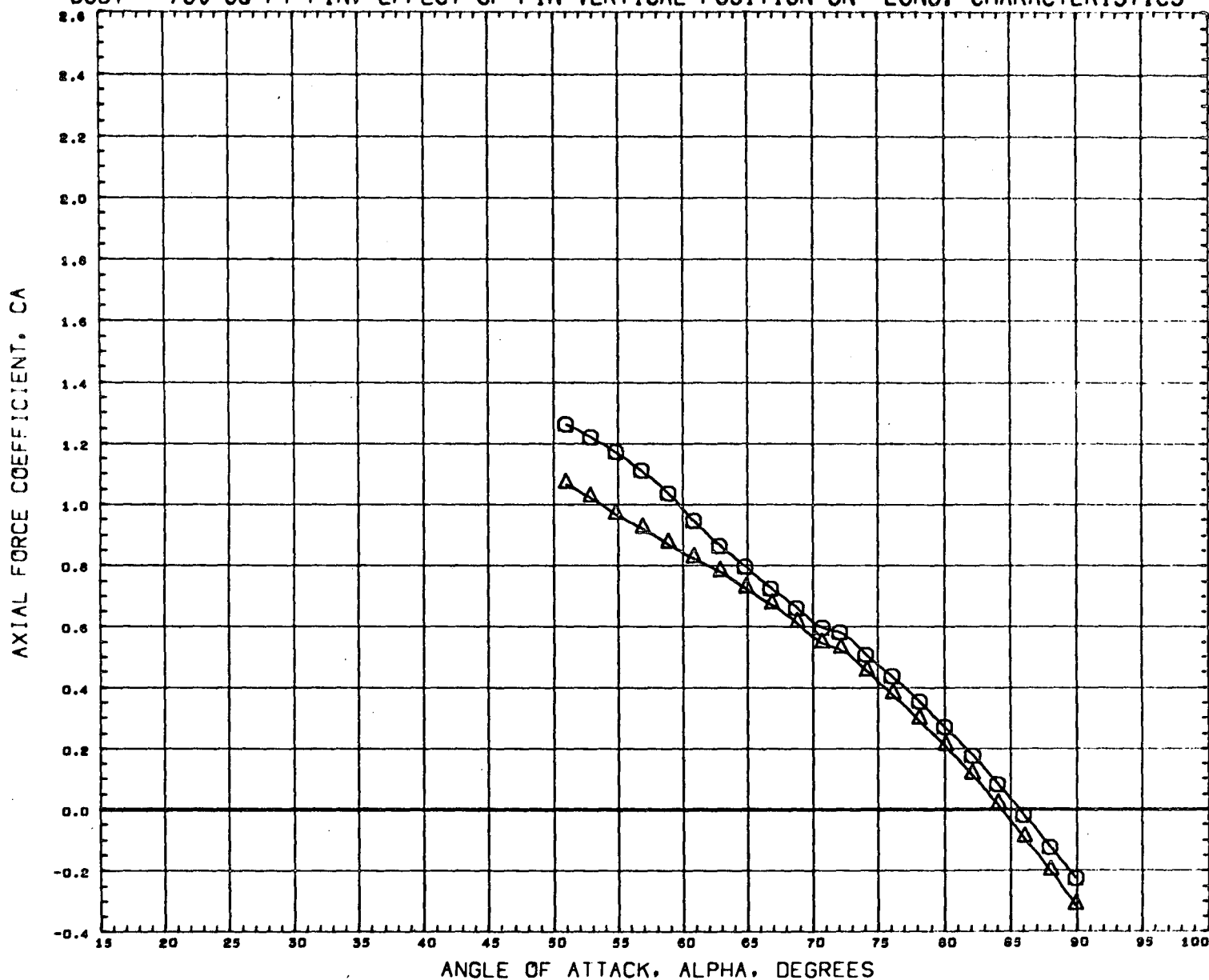
AXIAL FORCE COEFFICIENT, CA



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859812)        | M3FC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859824)        | M3FC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0026        |

MACH 1.959

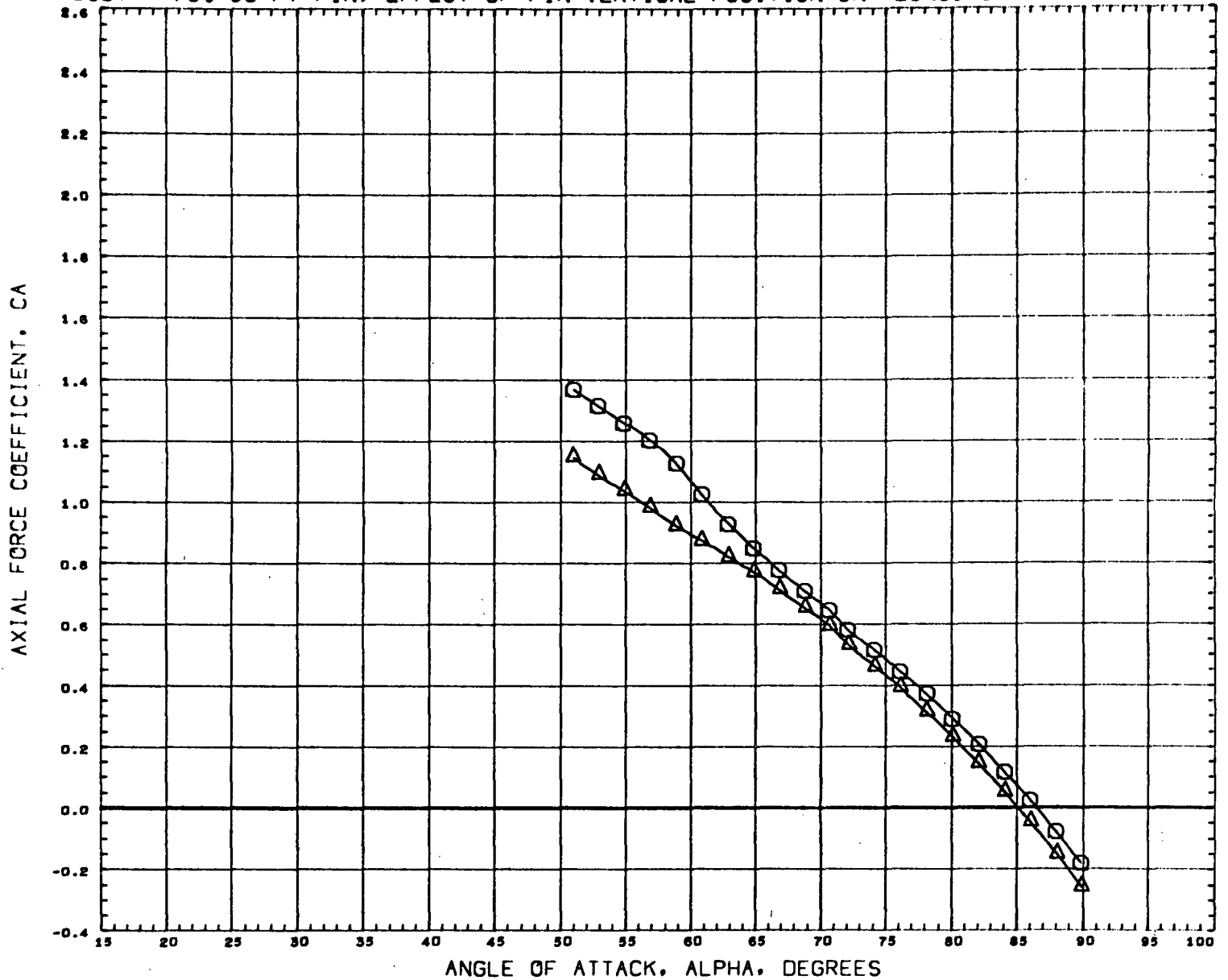
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 50. IN    |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | YMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 2.740

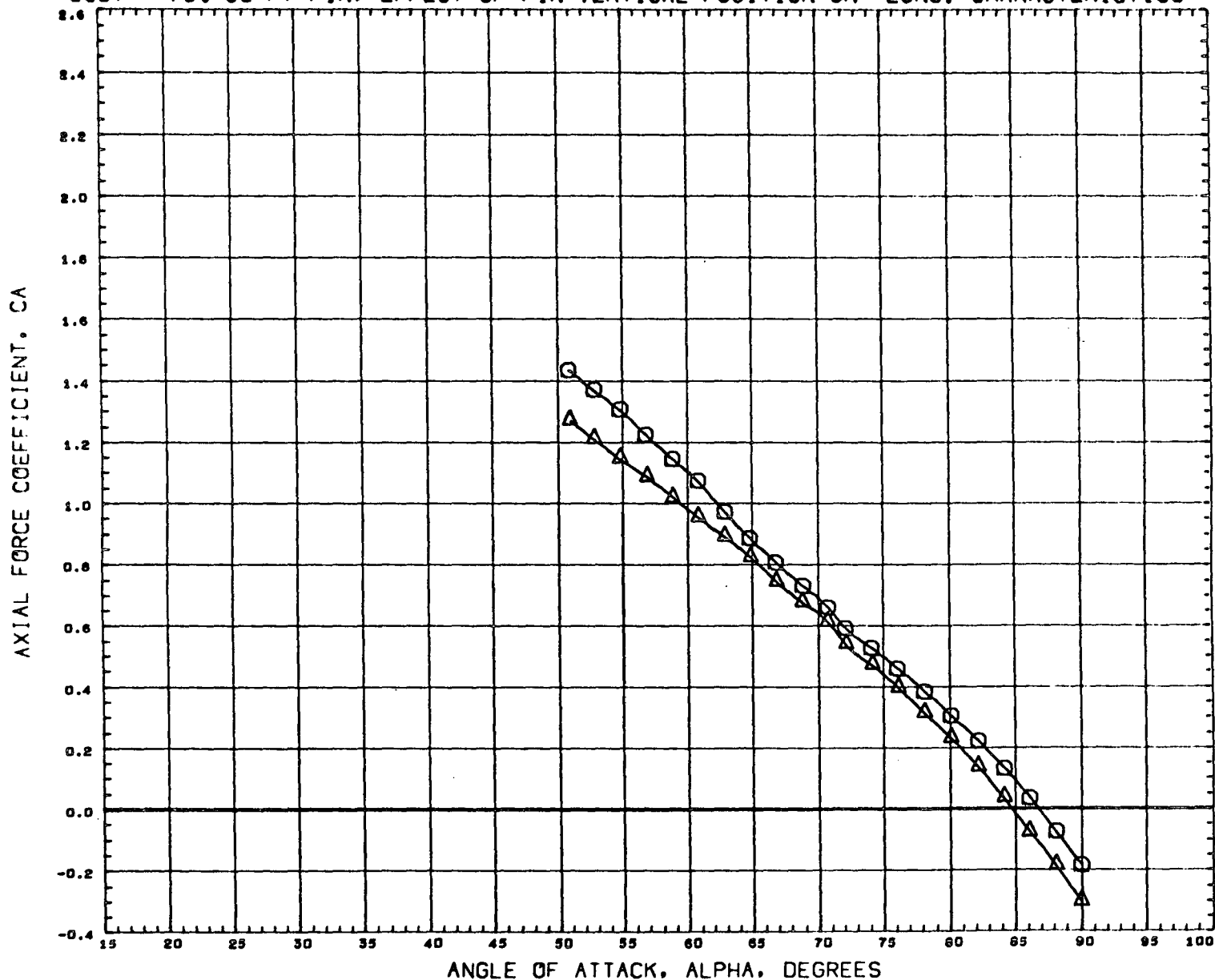
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59912)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59924)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0026        |

MACH 3.480

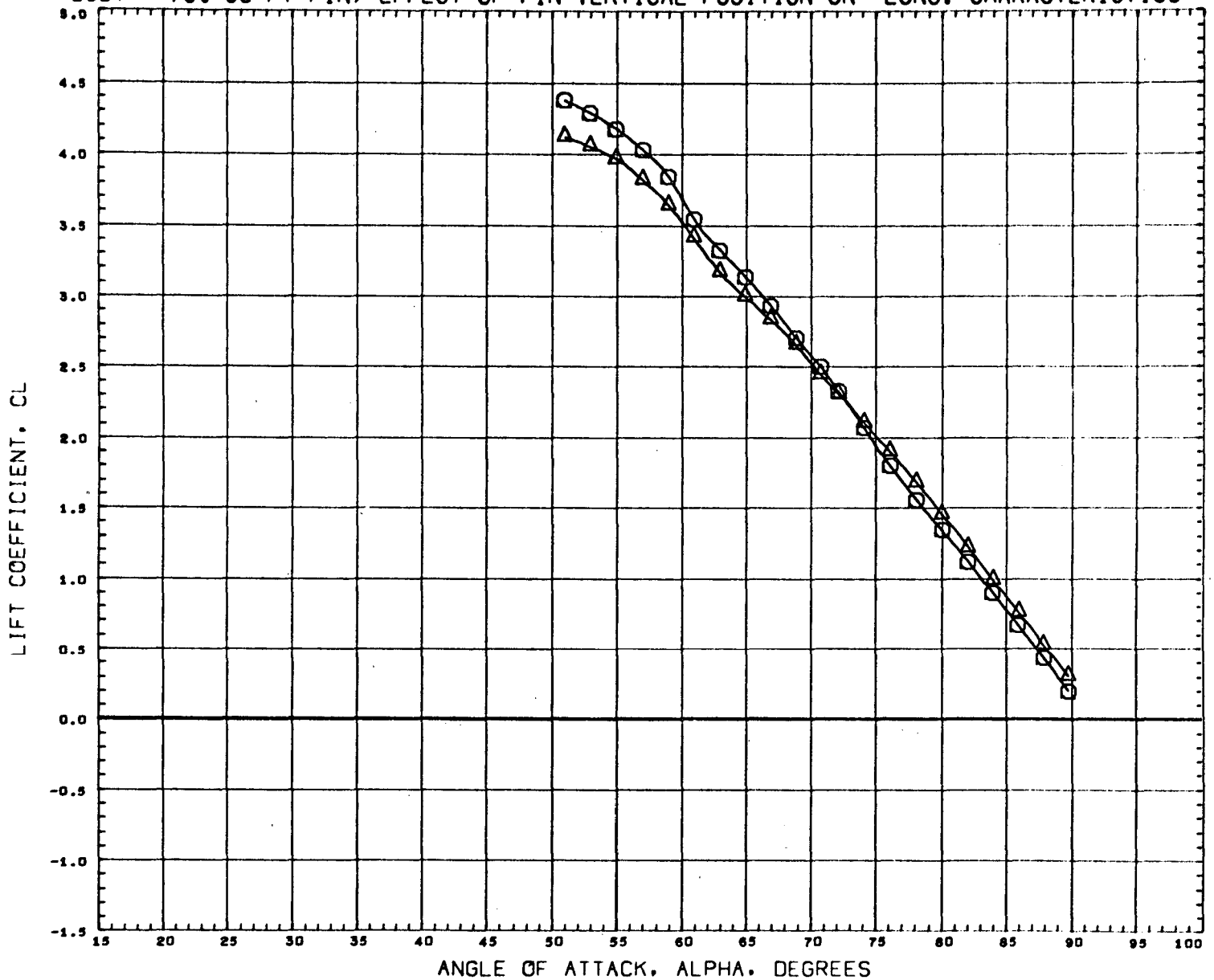
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

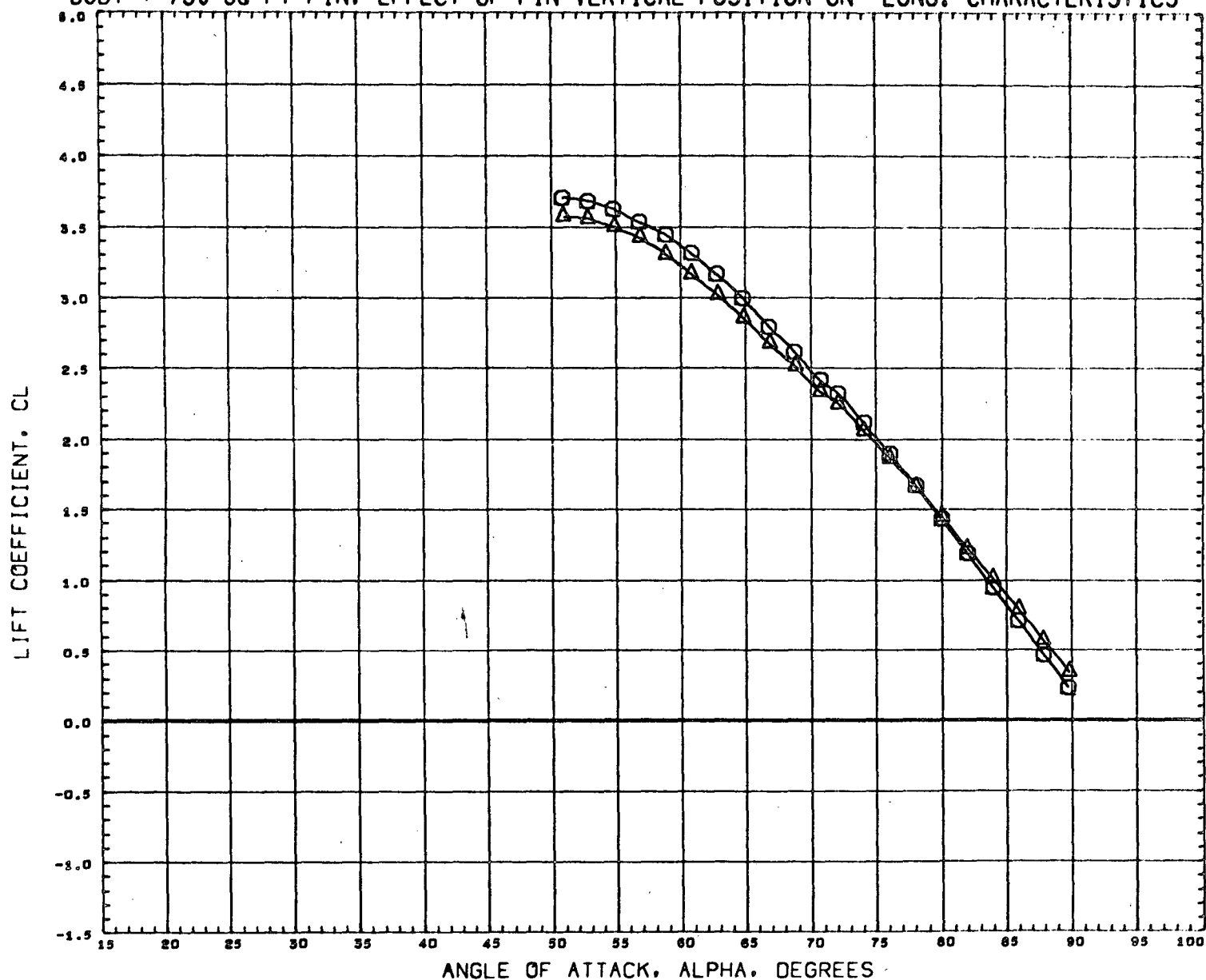
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 Sq. IN |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0026        |

MACH 1.194

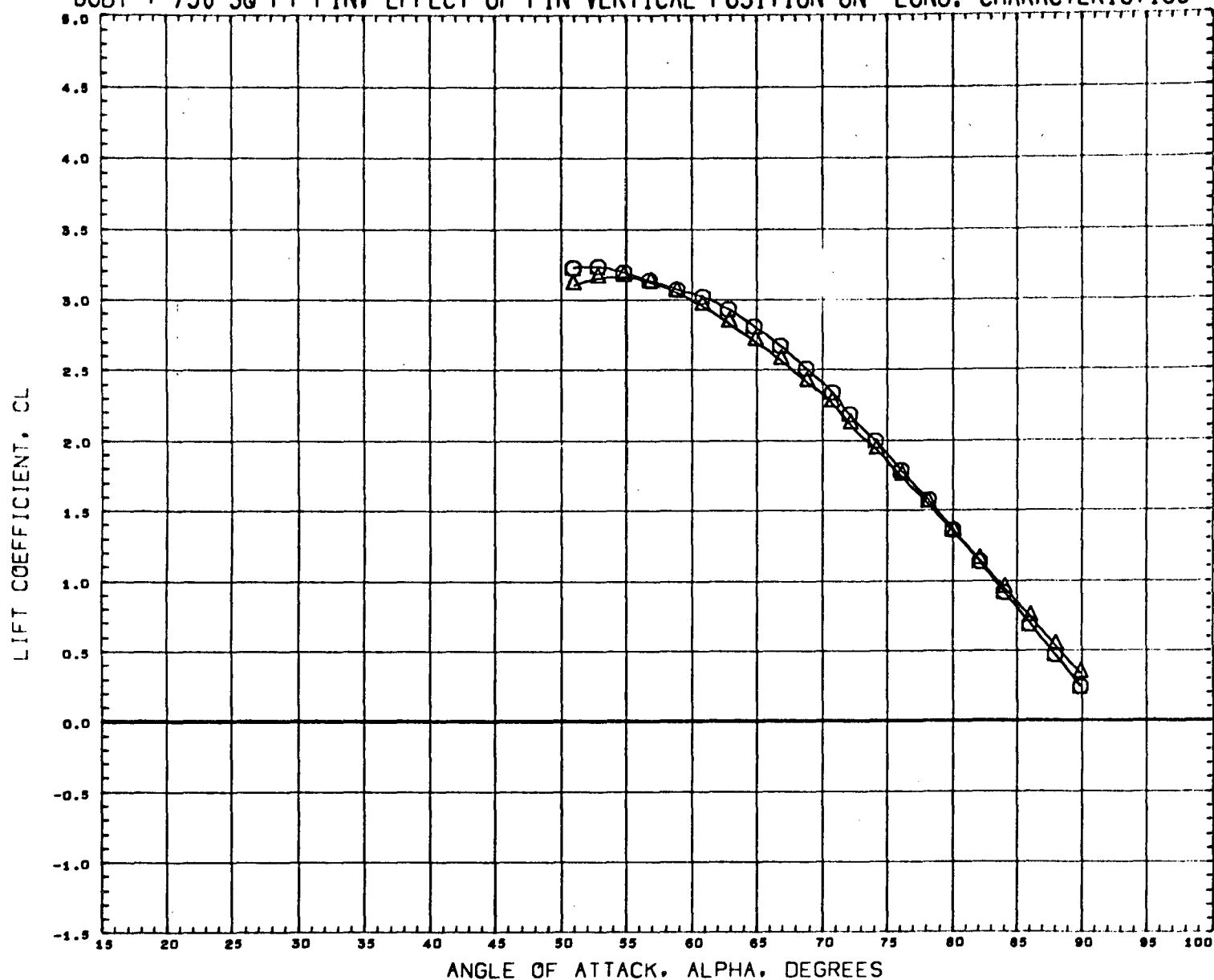
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59824)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.959

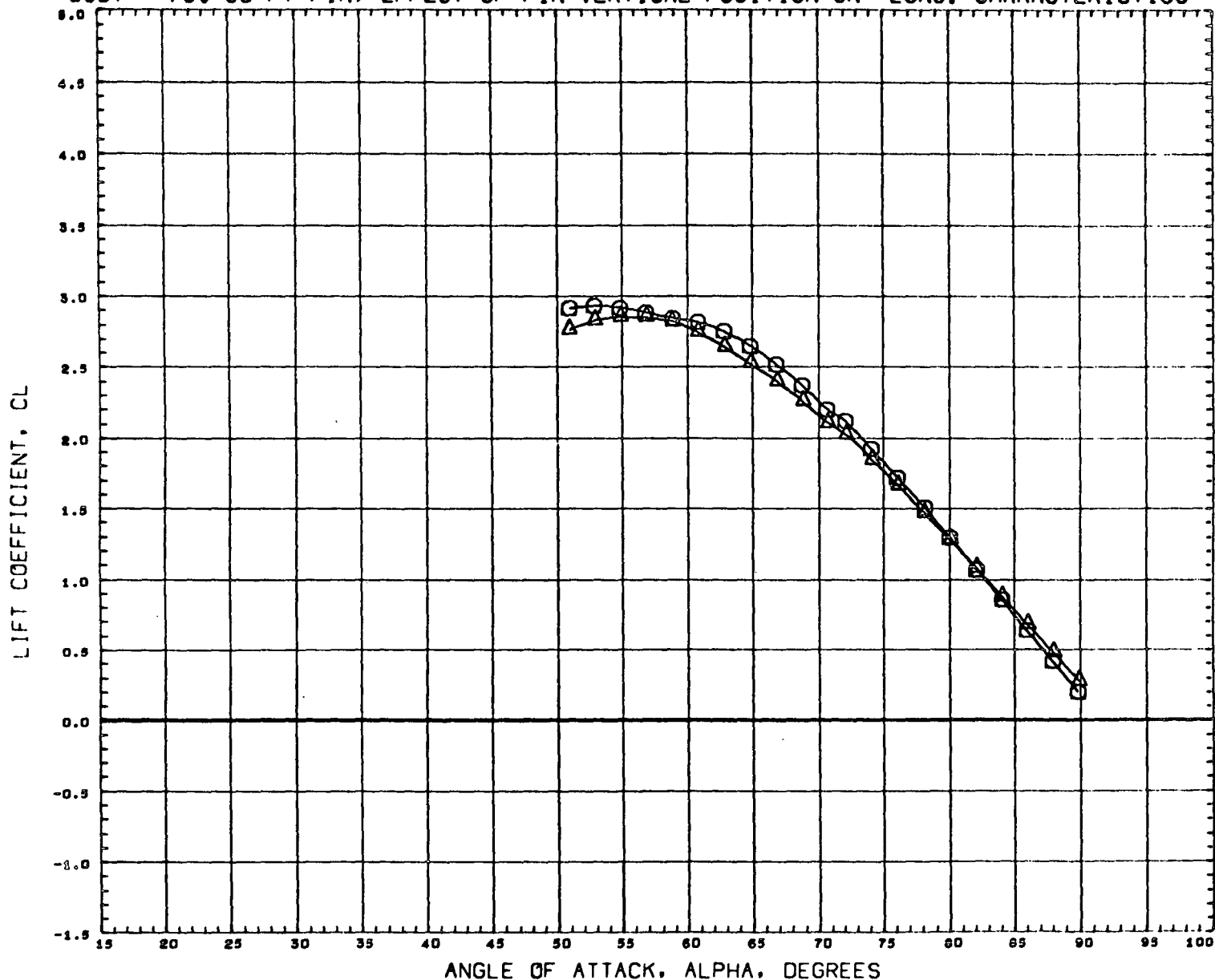
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859512)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

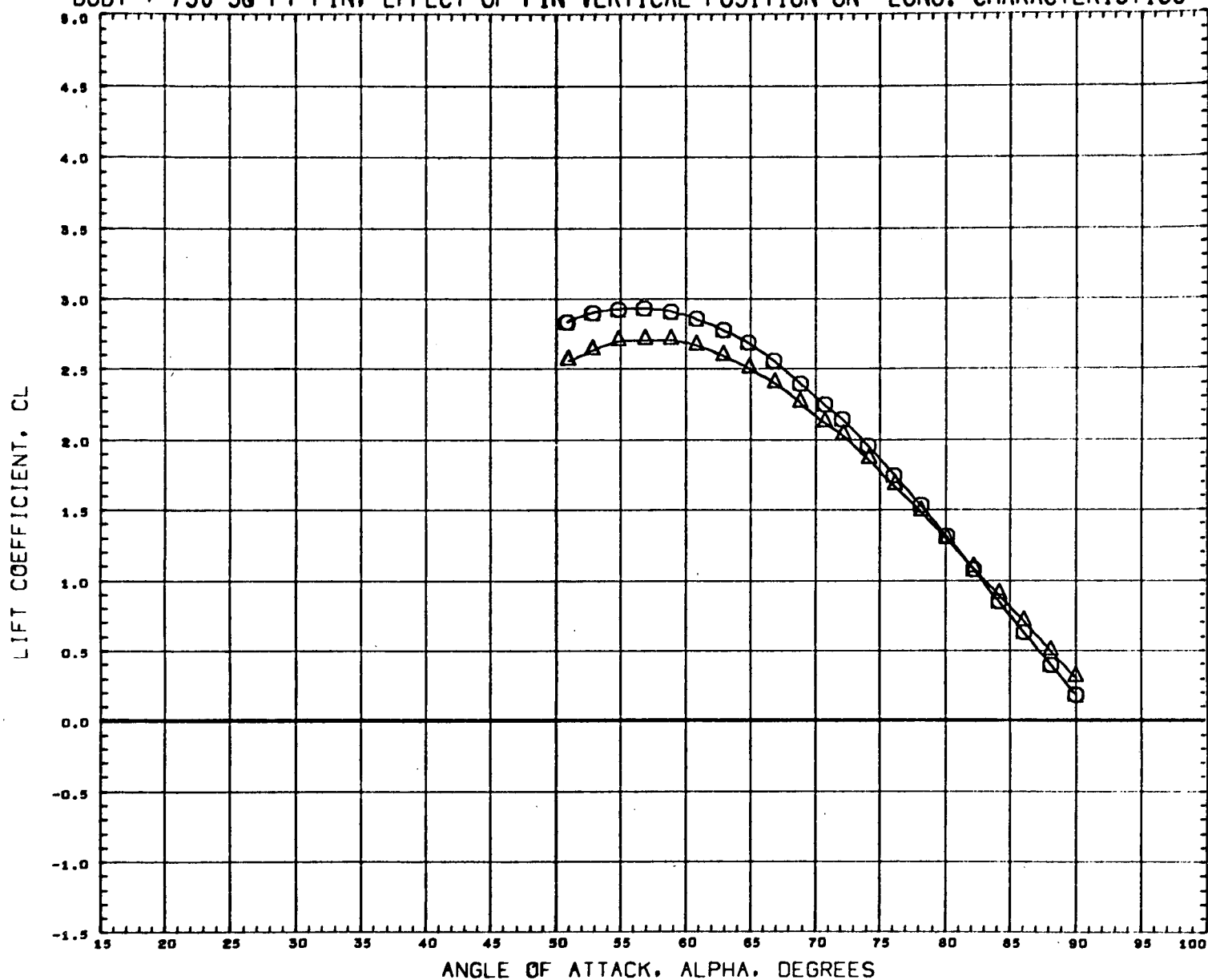
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

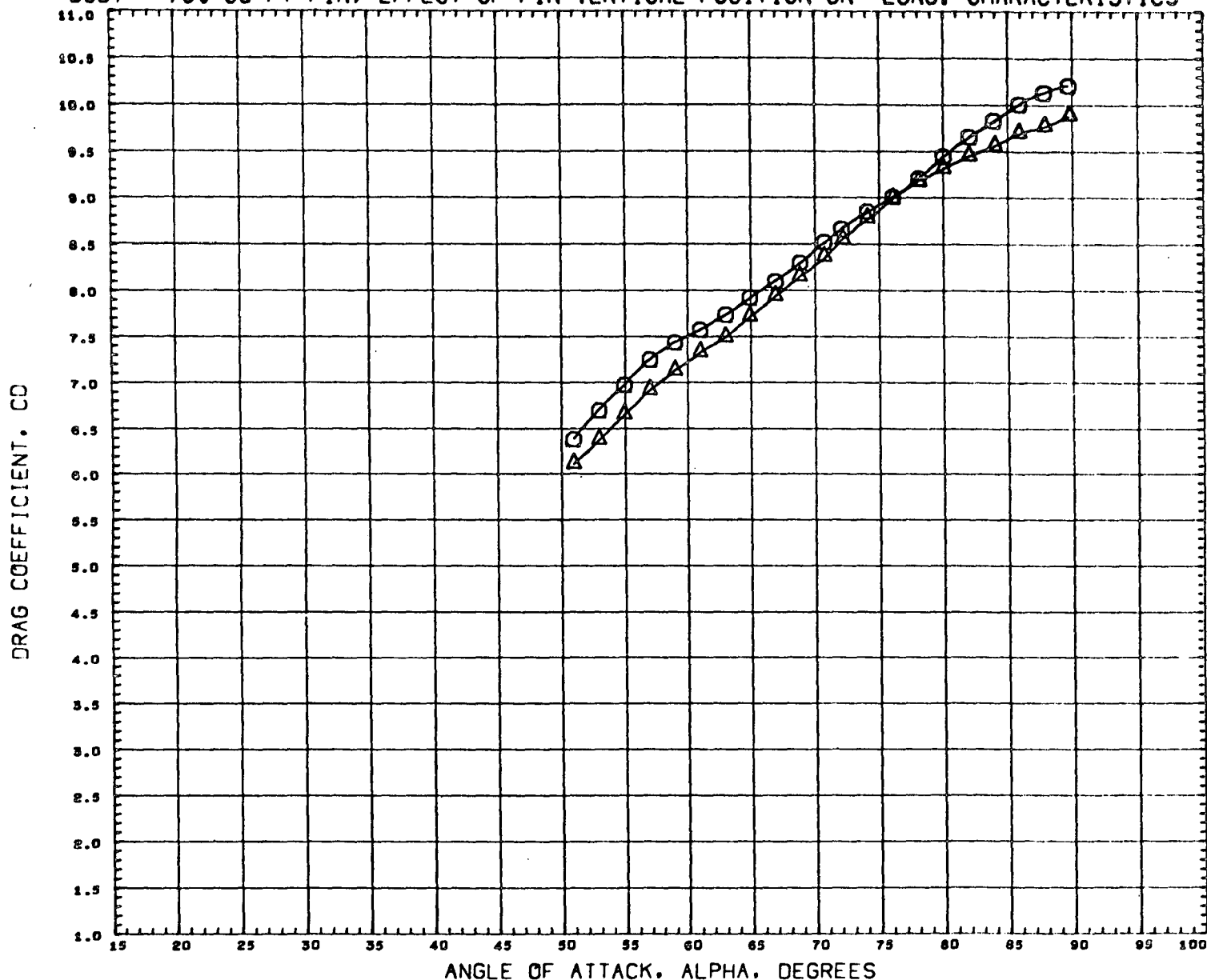


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRF                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

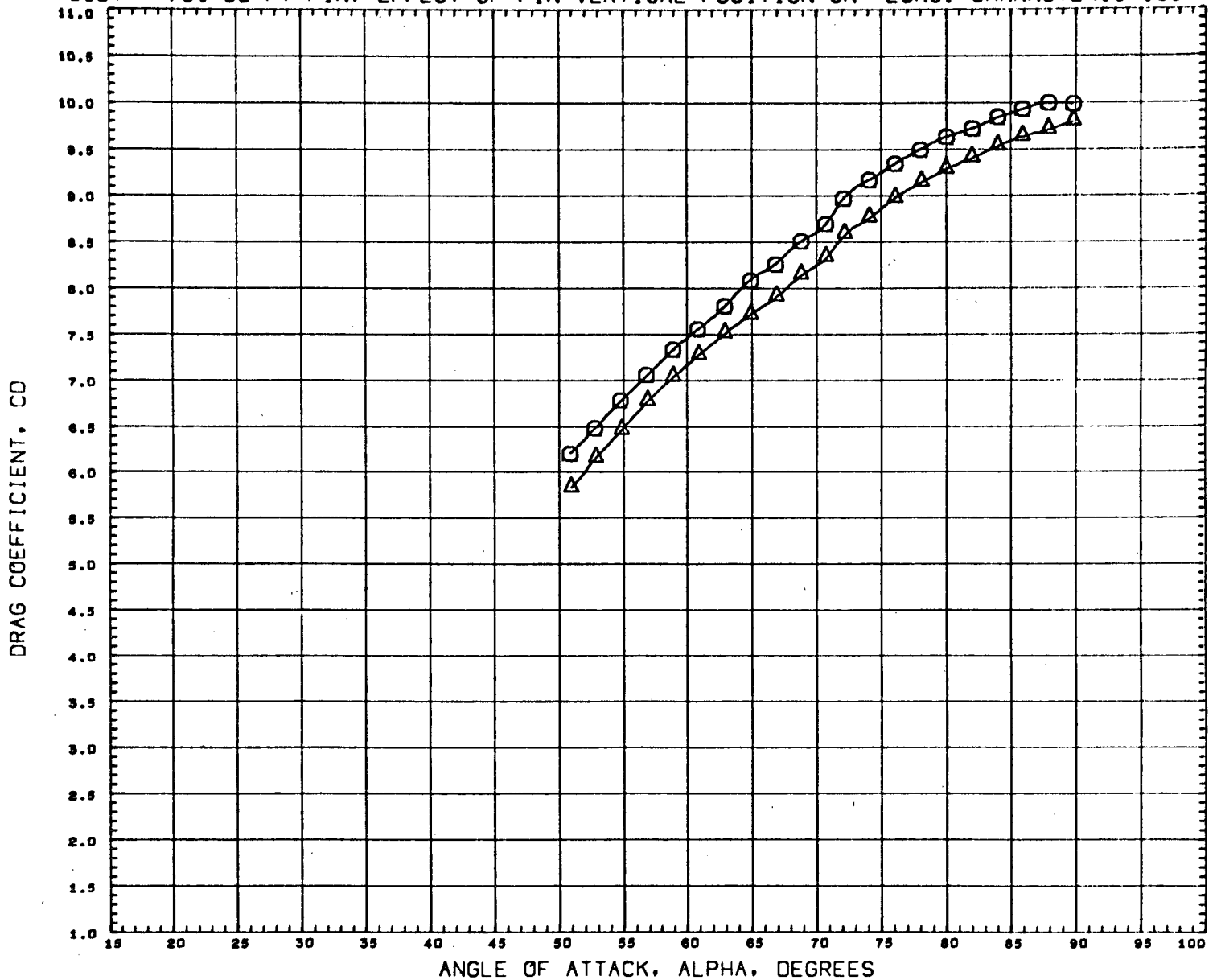
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 30. IN    |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRF 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.194

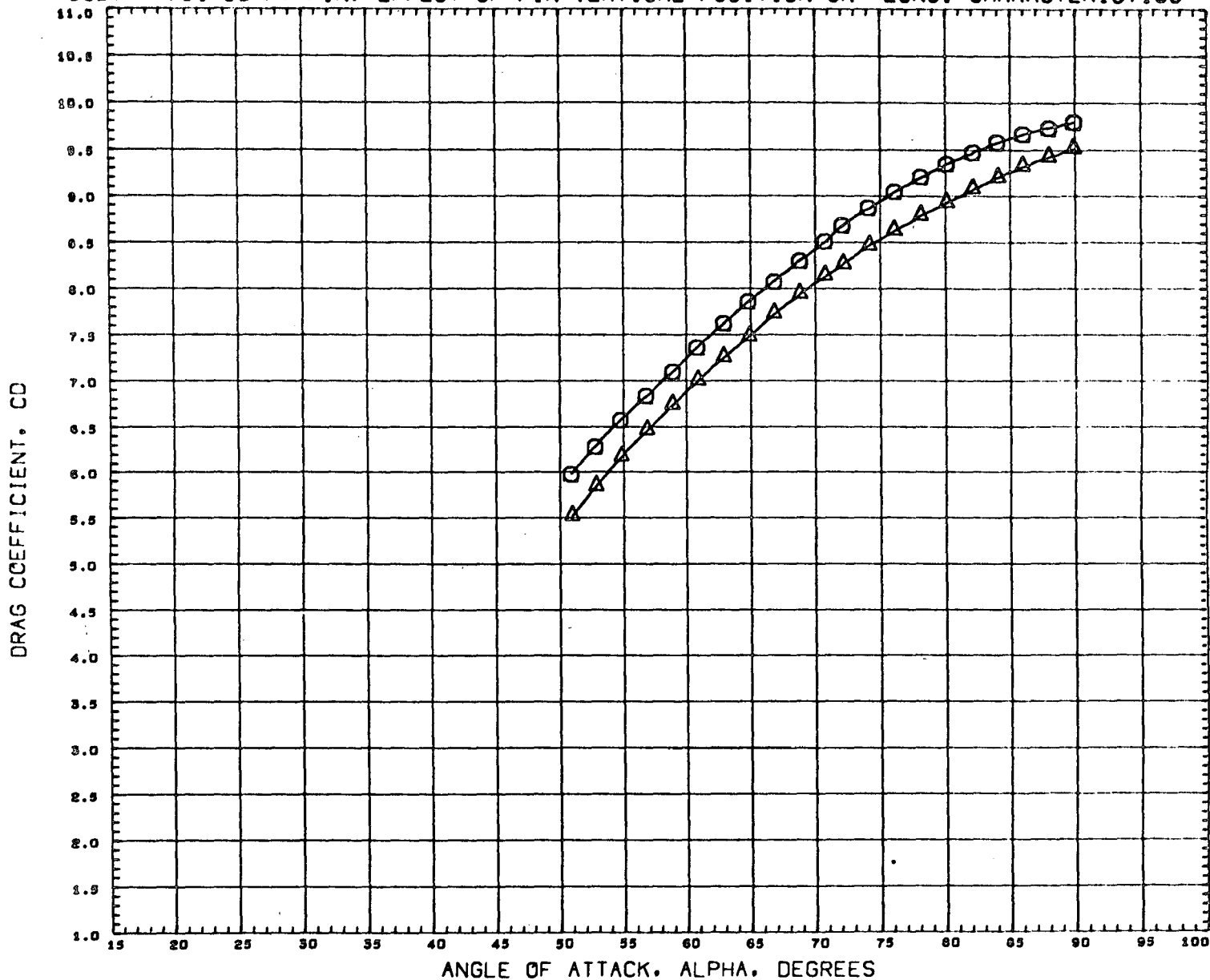
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.959

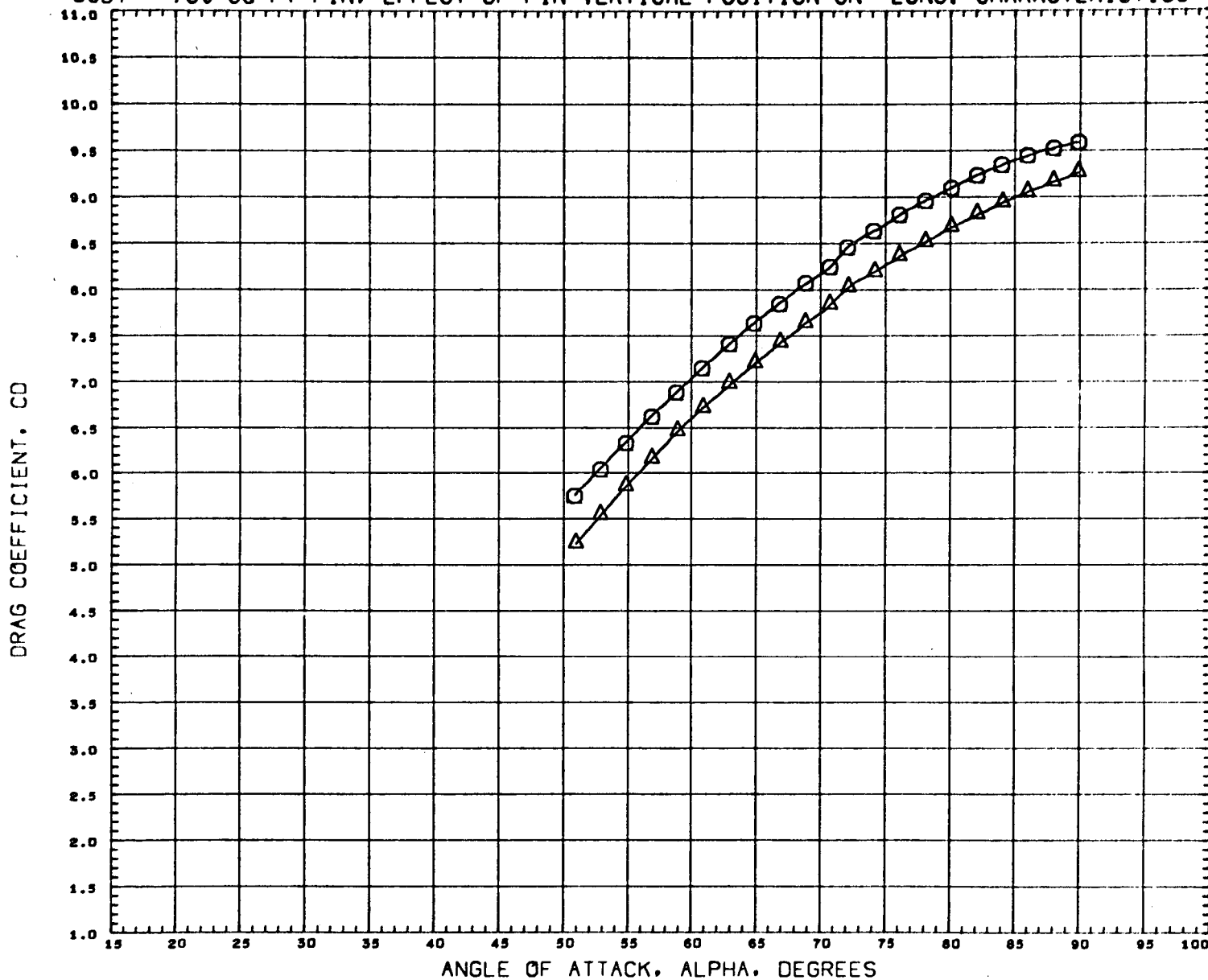
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

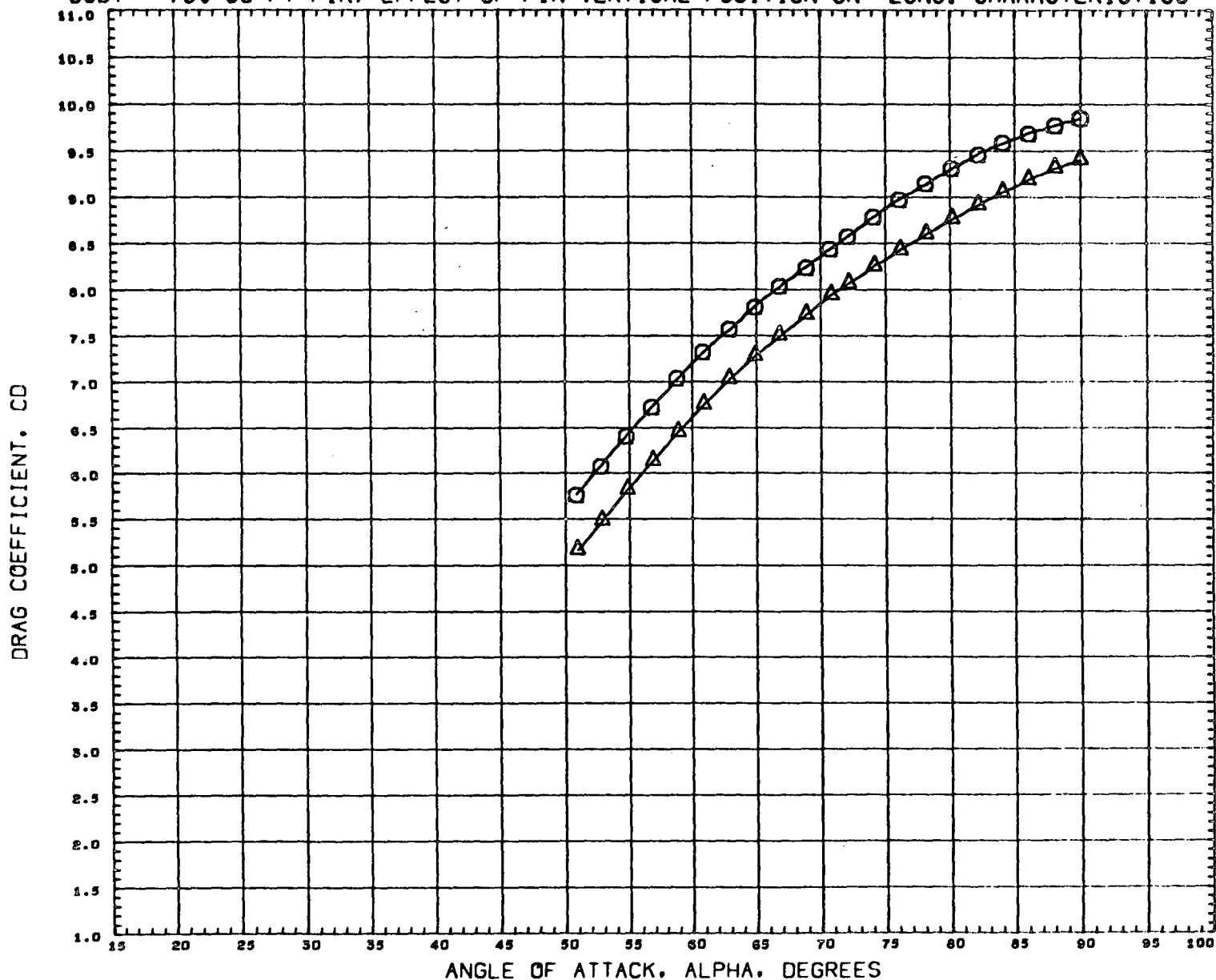
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59912)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59924)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0026        |

MACH 3.480

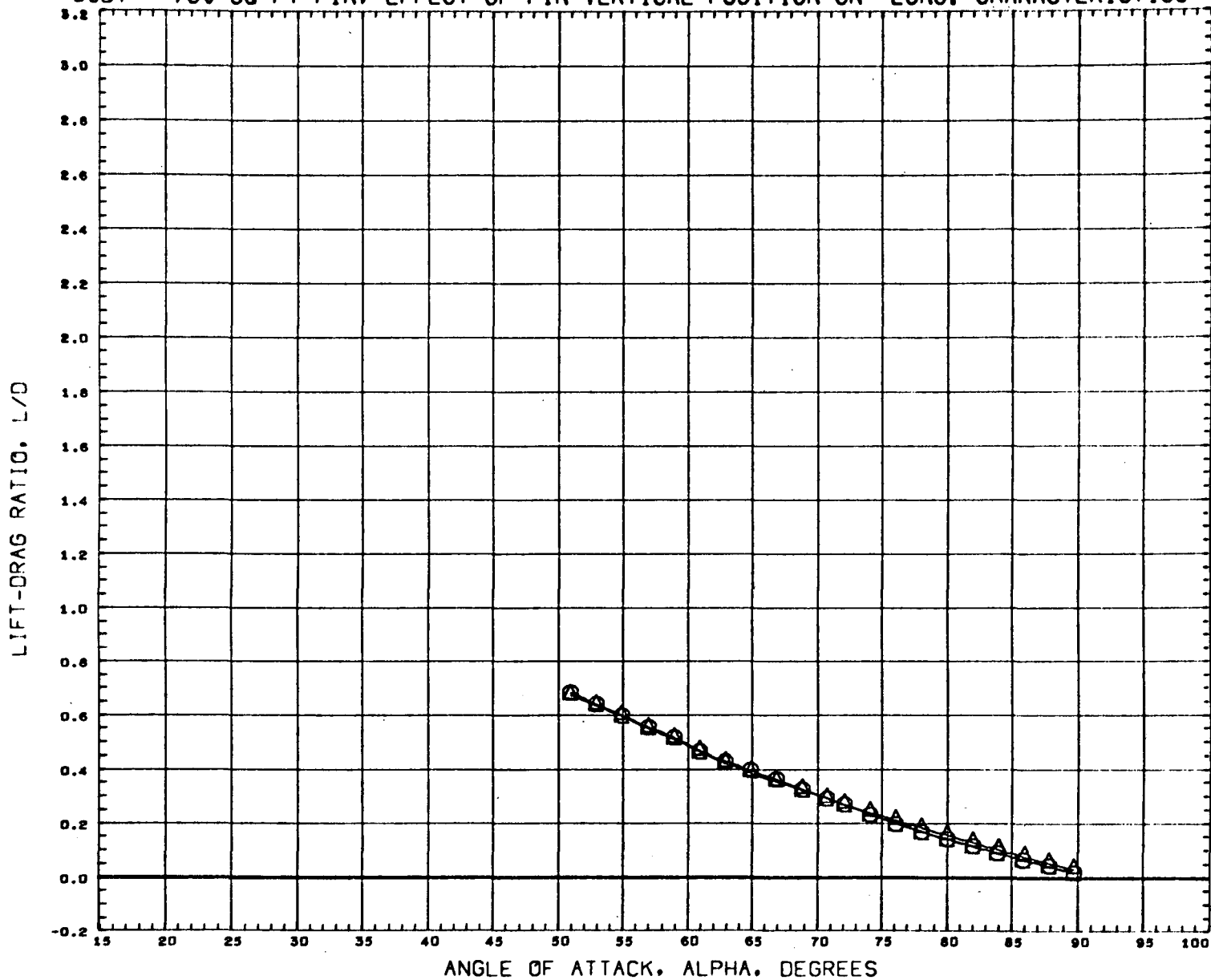
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59912)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59924)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

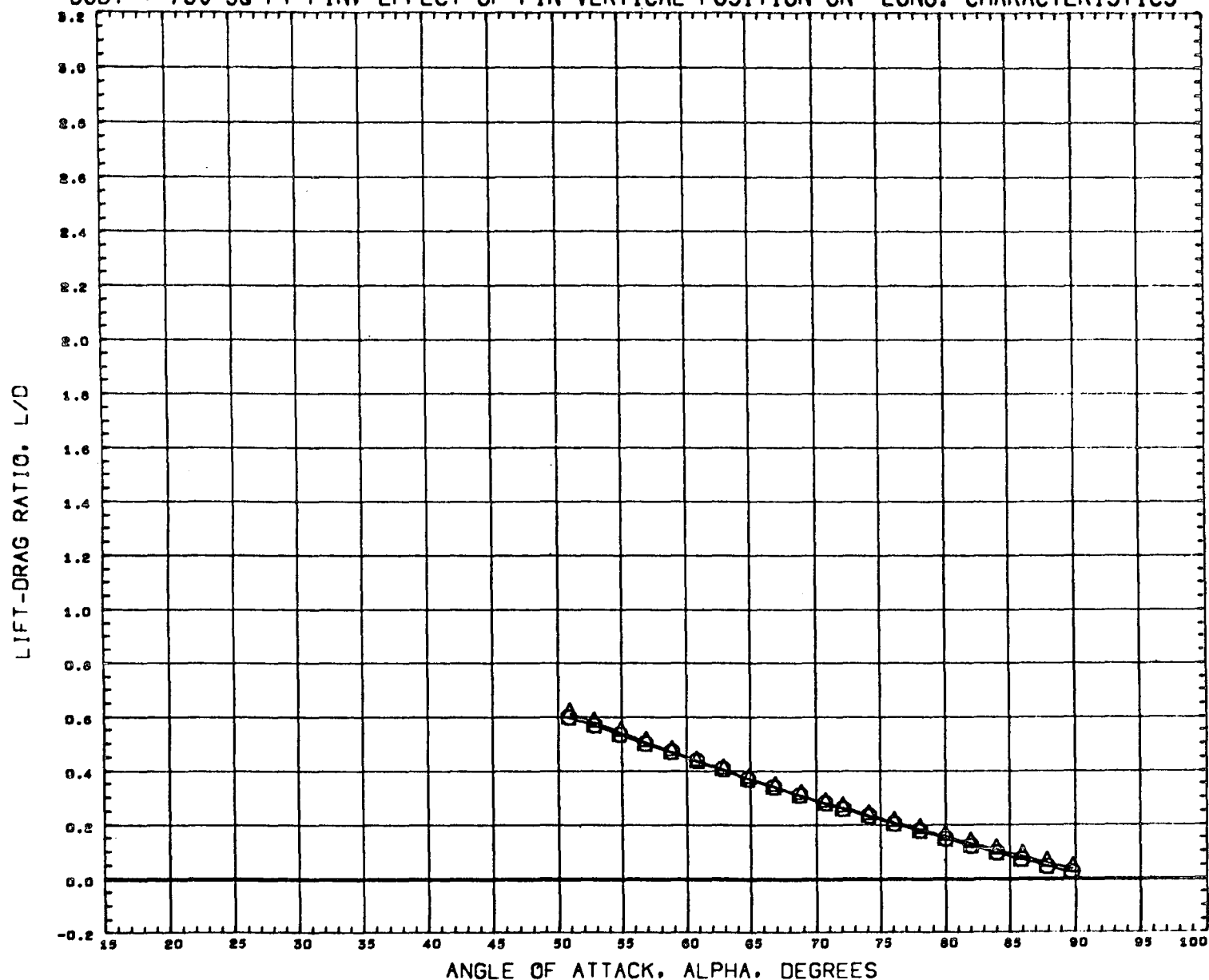
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859312)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 sq. IN |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.194

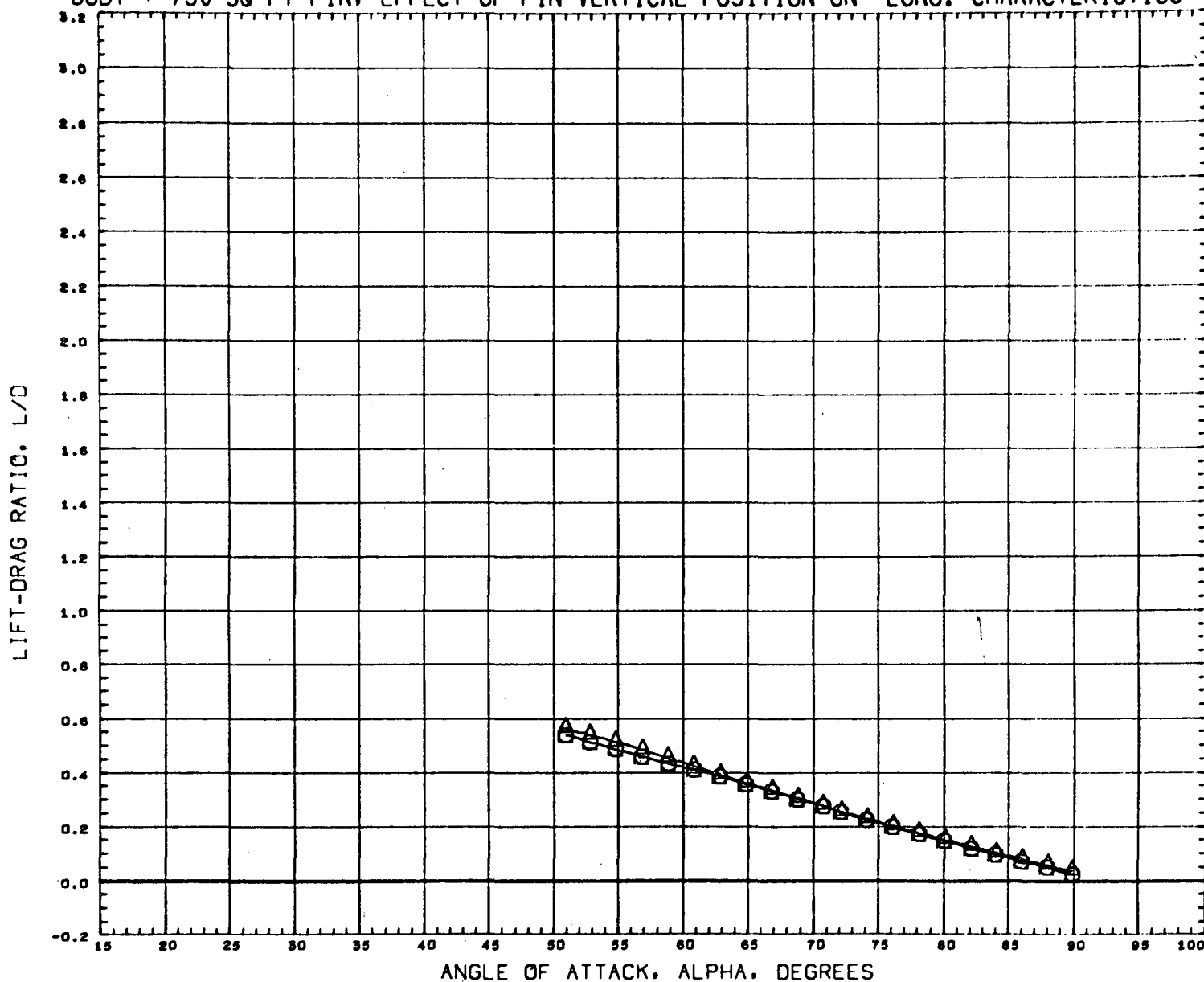
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

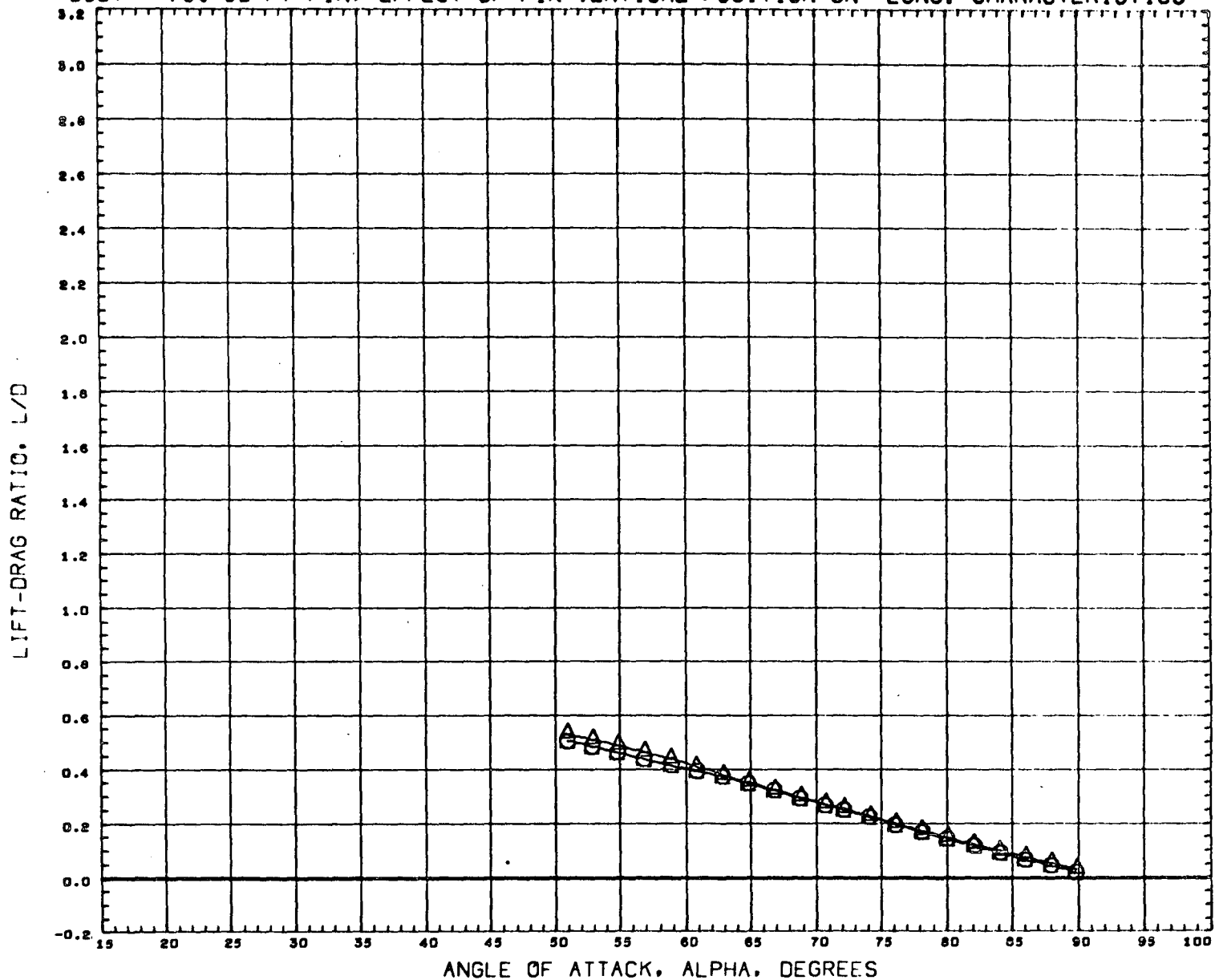
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET | SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|----------|--------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859812) |        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 90. IN |
| (859824) |        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|          |        |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|          |        |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|          |        |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|          |        |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|          |        |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

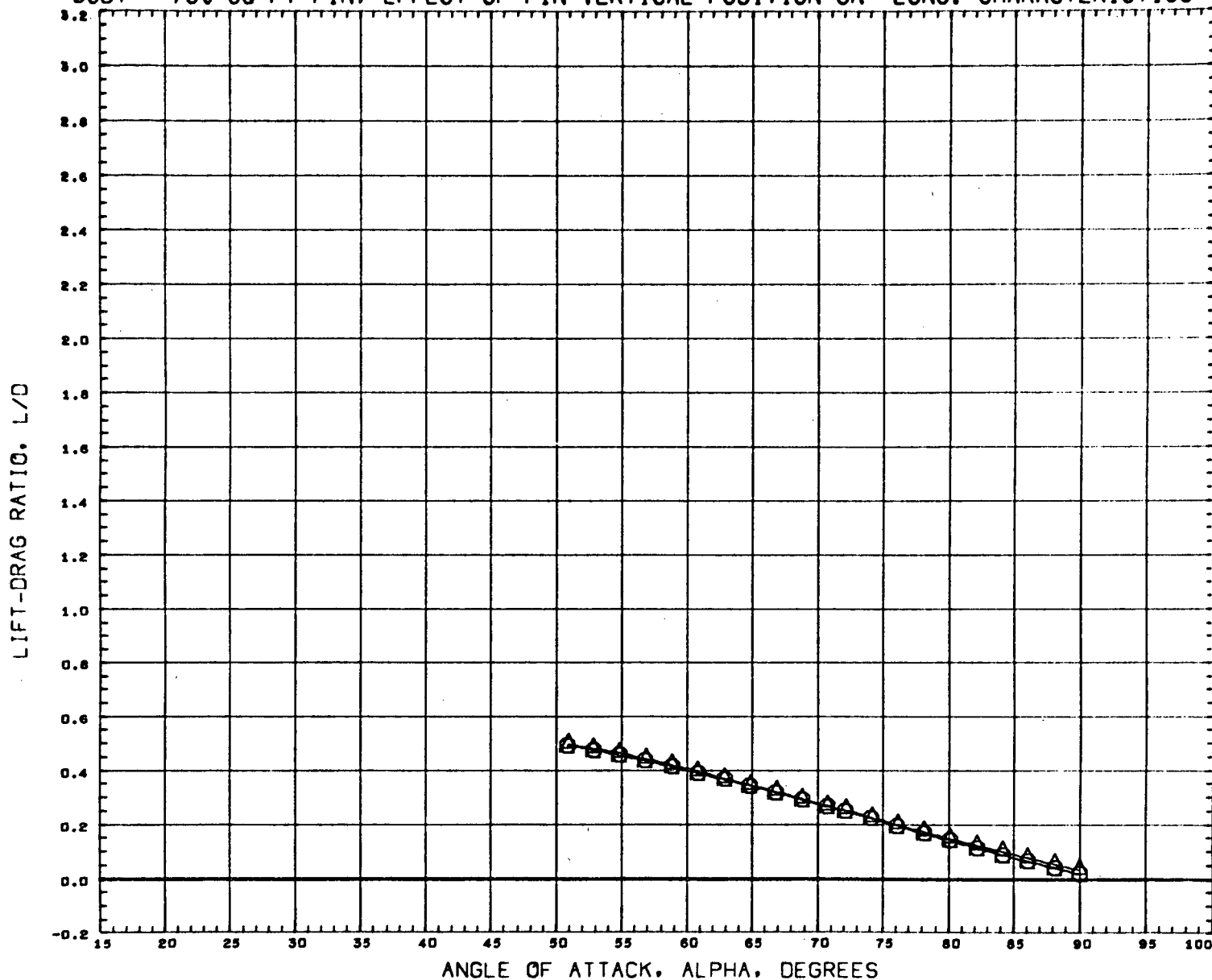
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

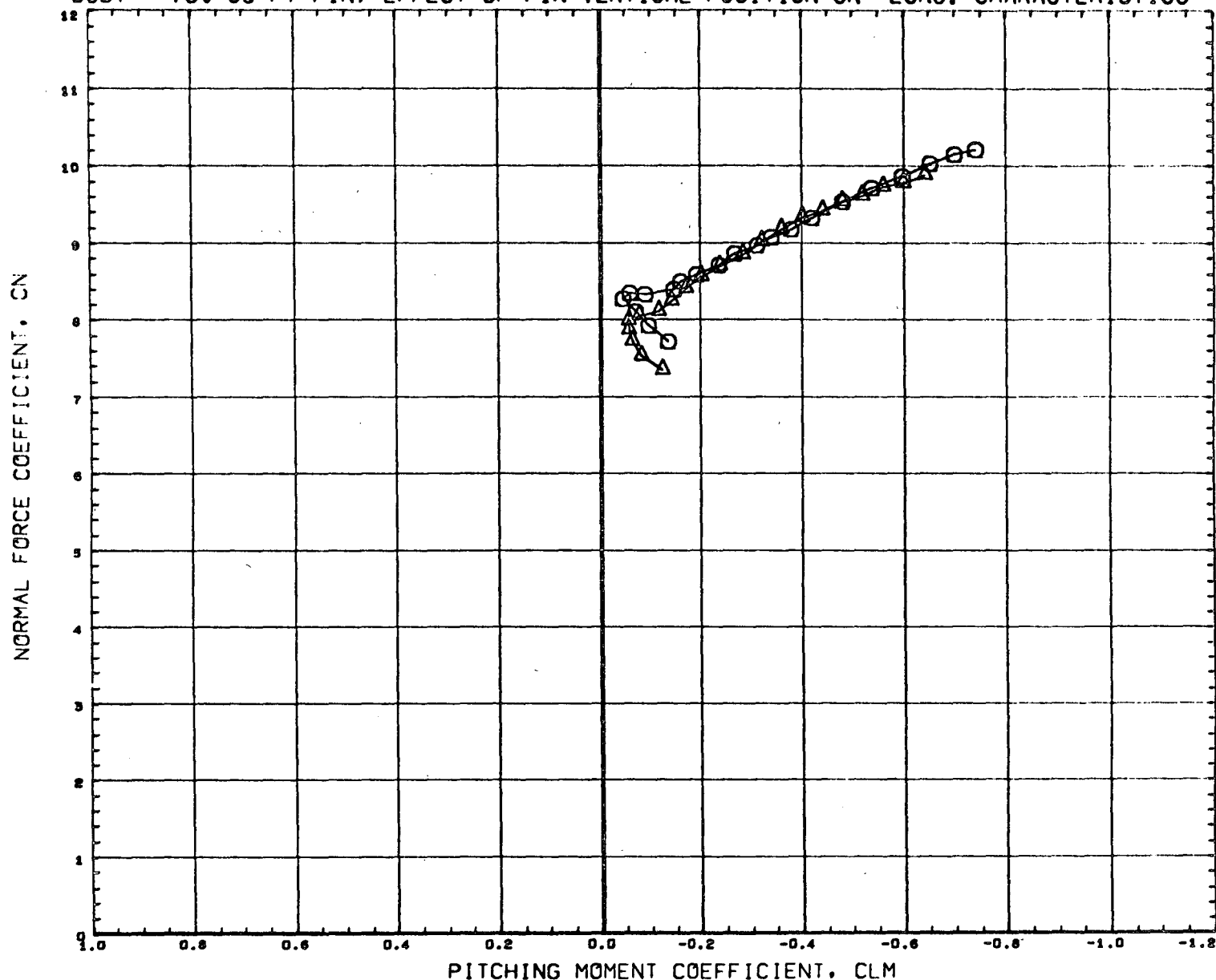
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 sq. IN    |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

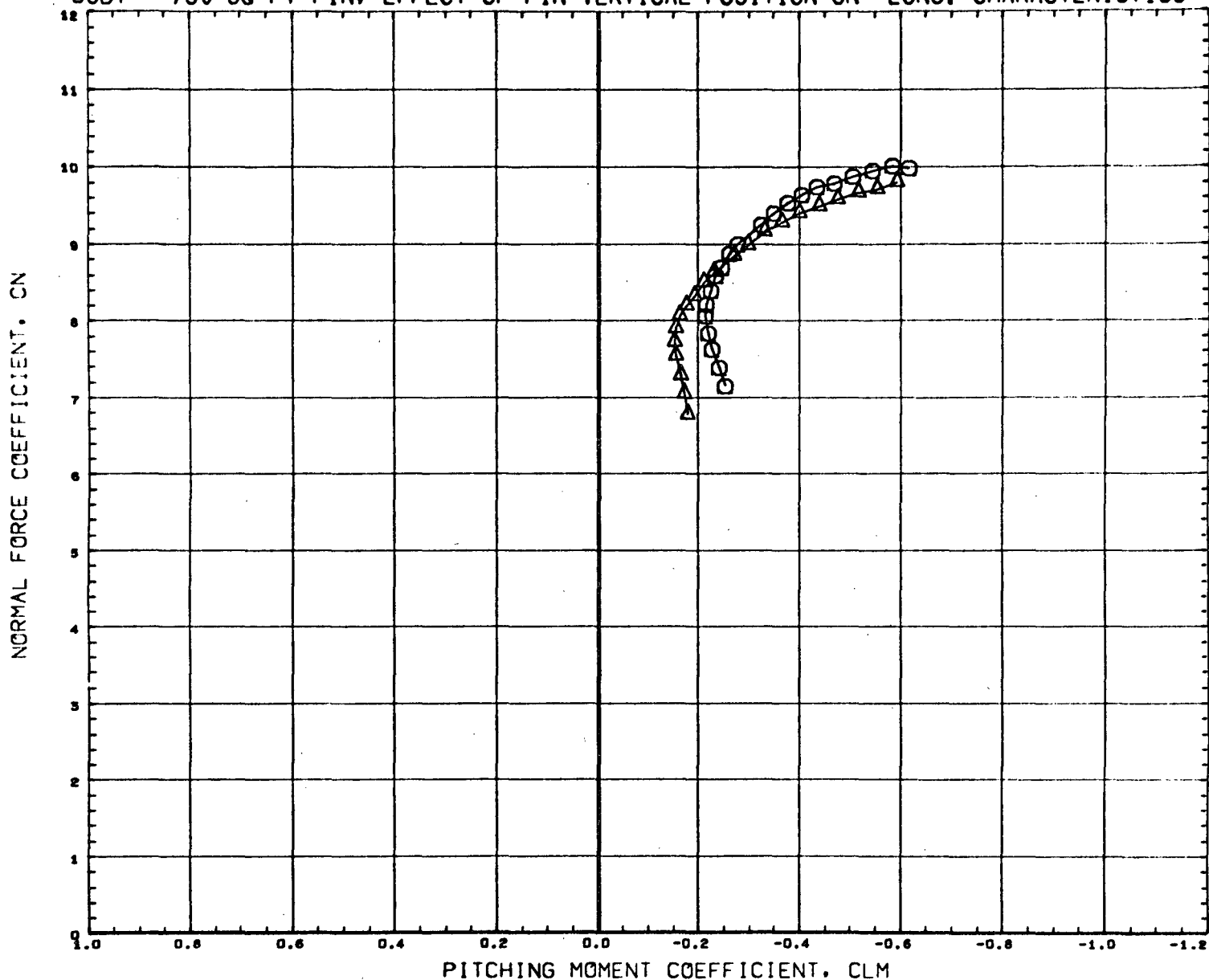
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59824)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9430 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0026        |

MACH 1.194

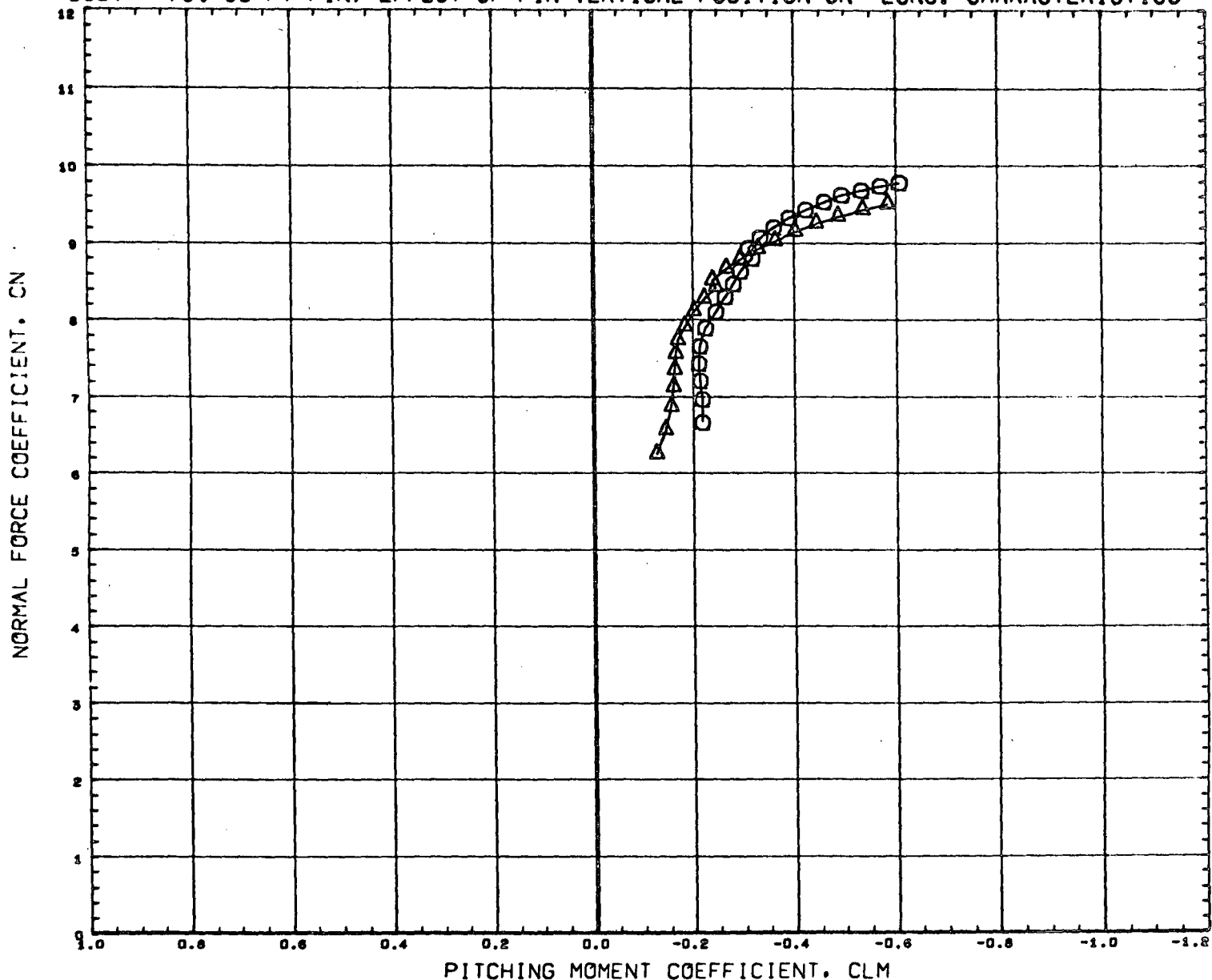
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET | SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|----------|--------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S12) | ○      | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S24) | △      | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|          |        |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|          |        |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|          |        |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|          |        |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|          |        |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.959

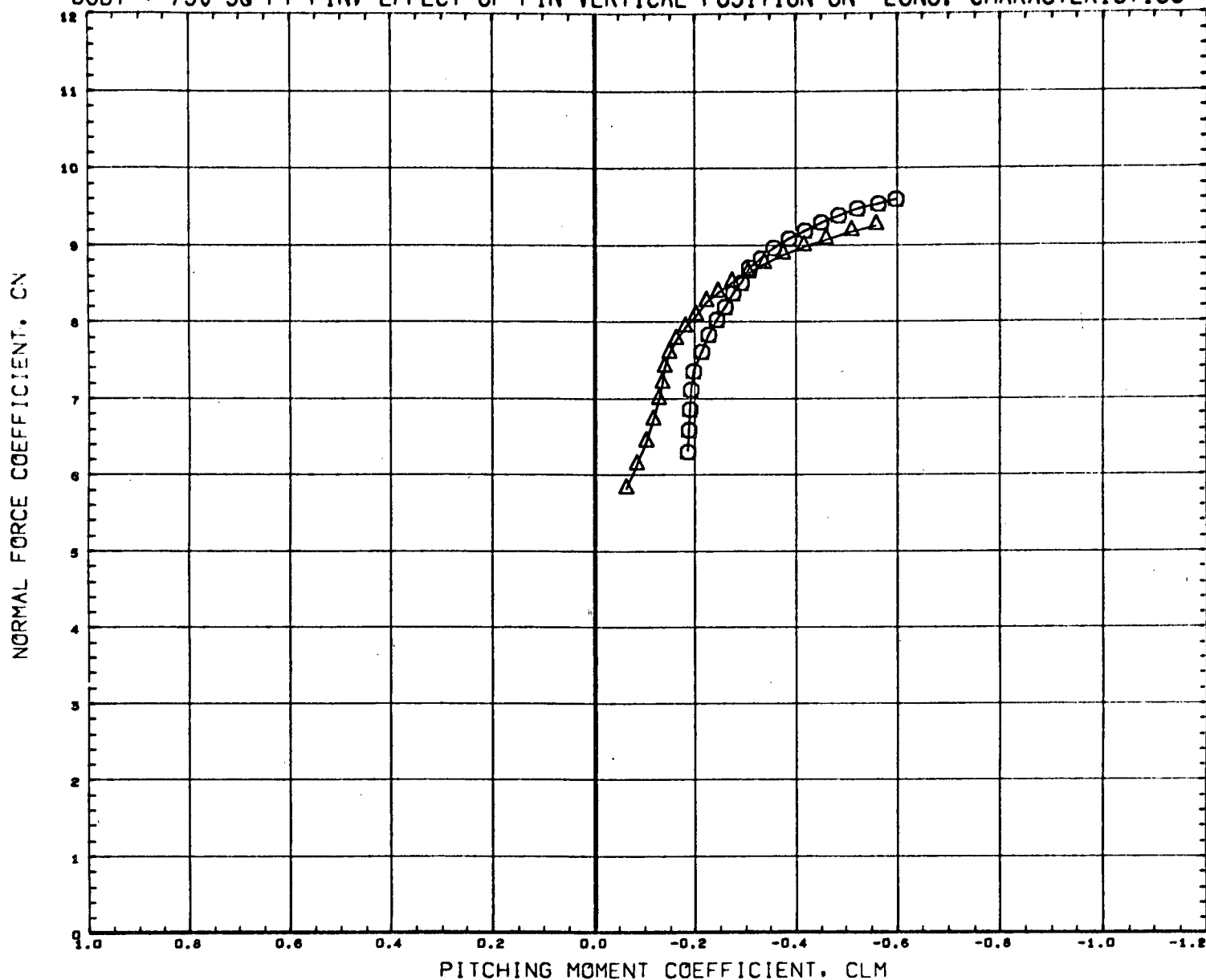
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

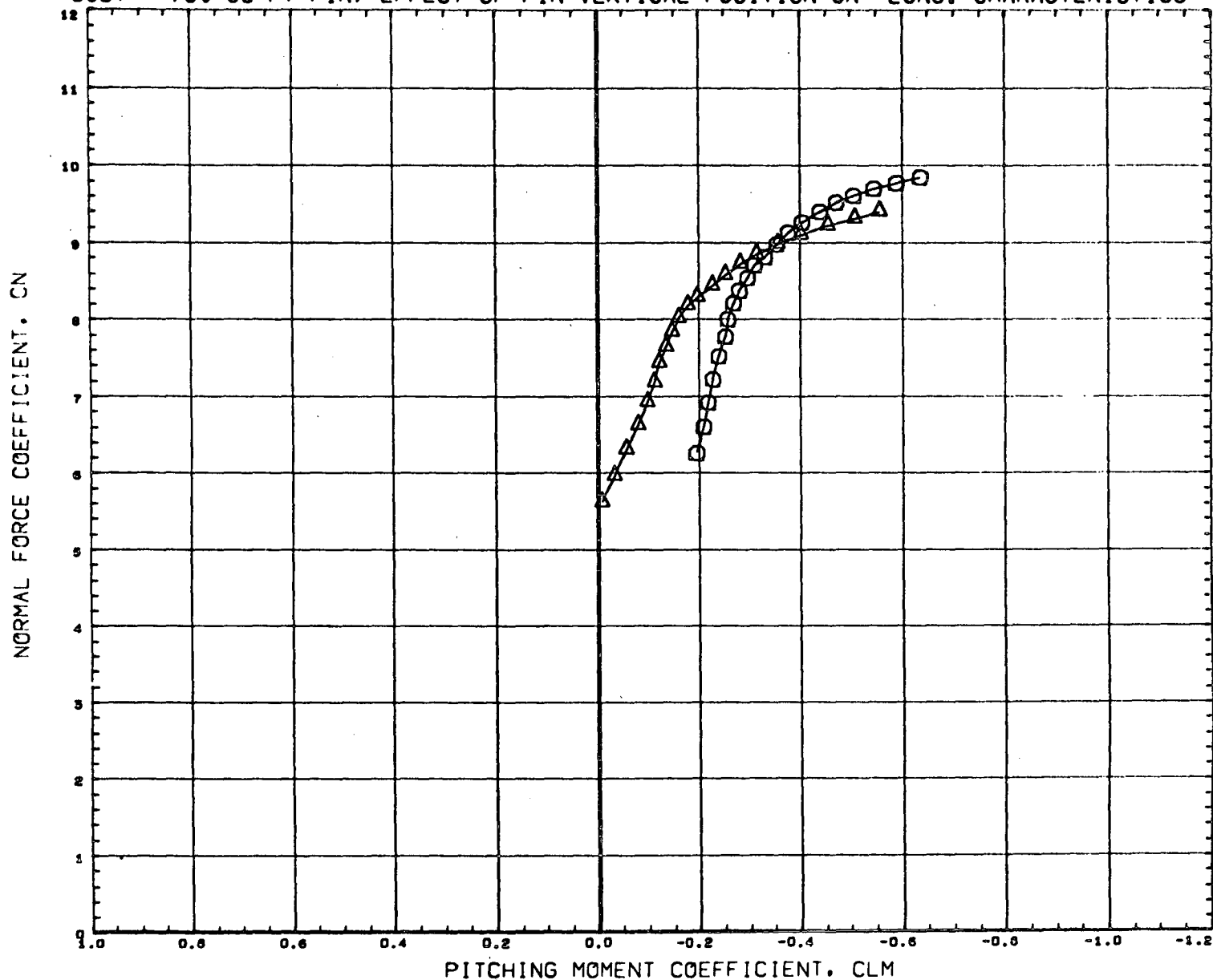
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

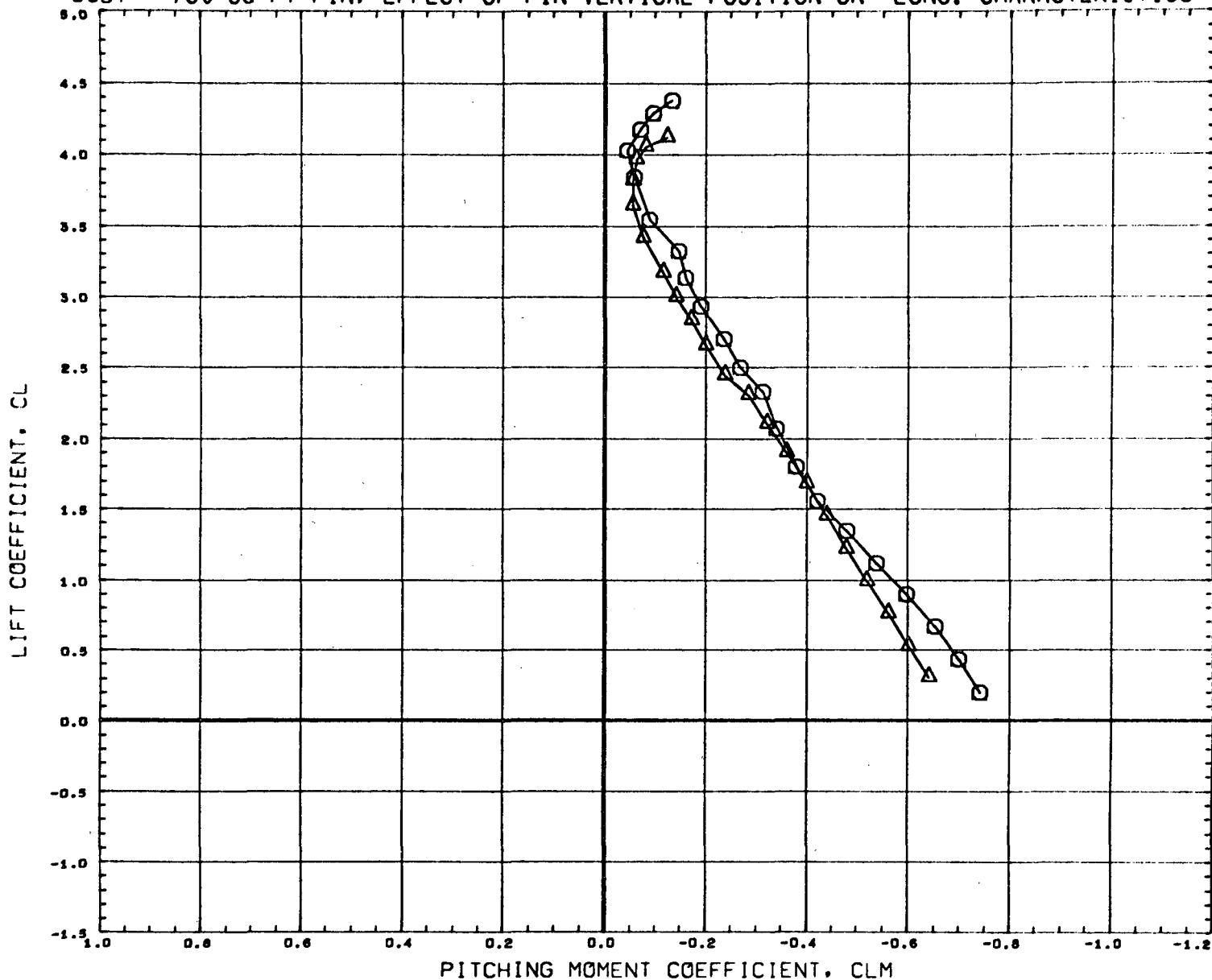
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

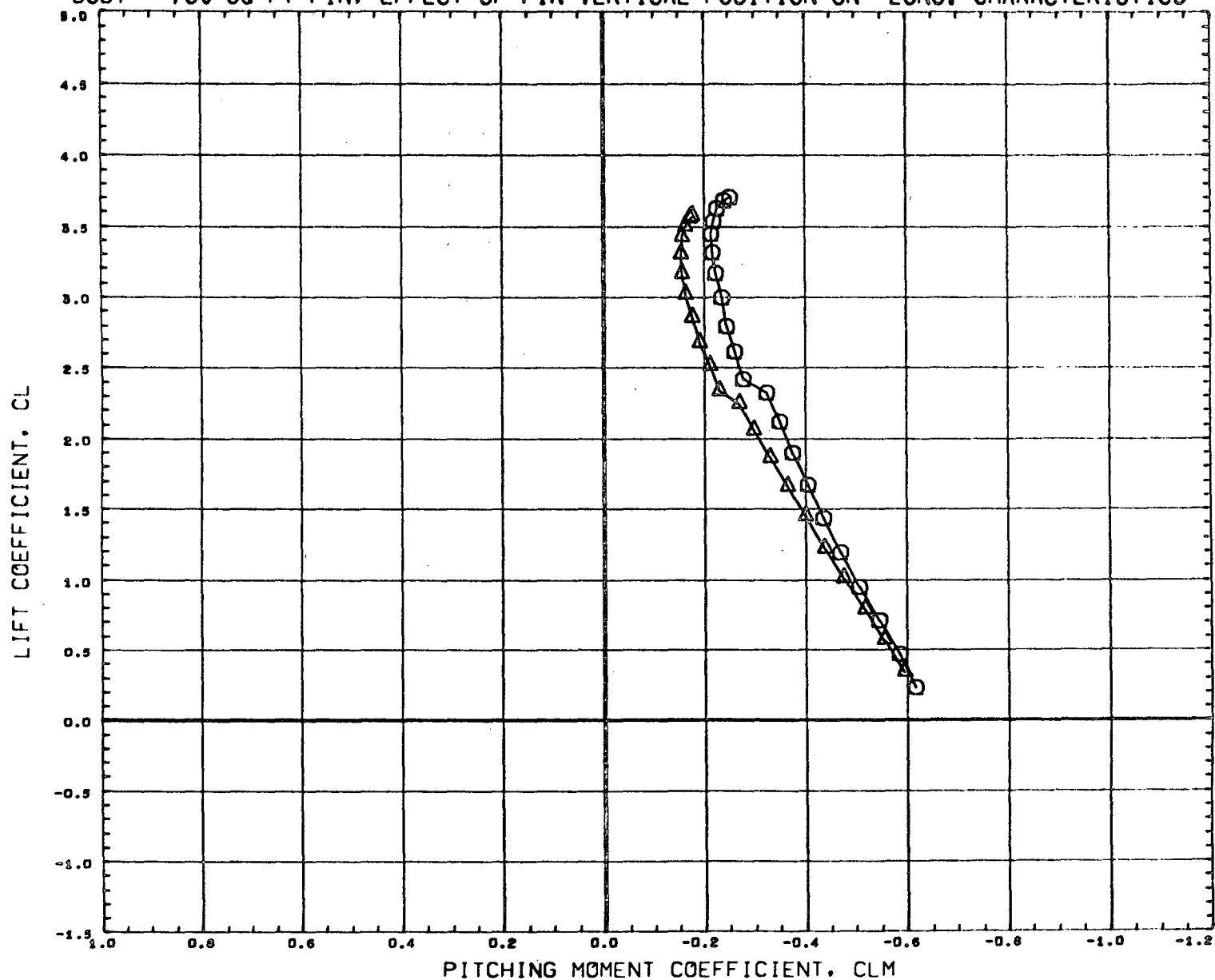
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.194

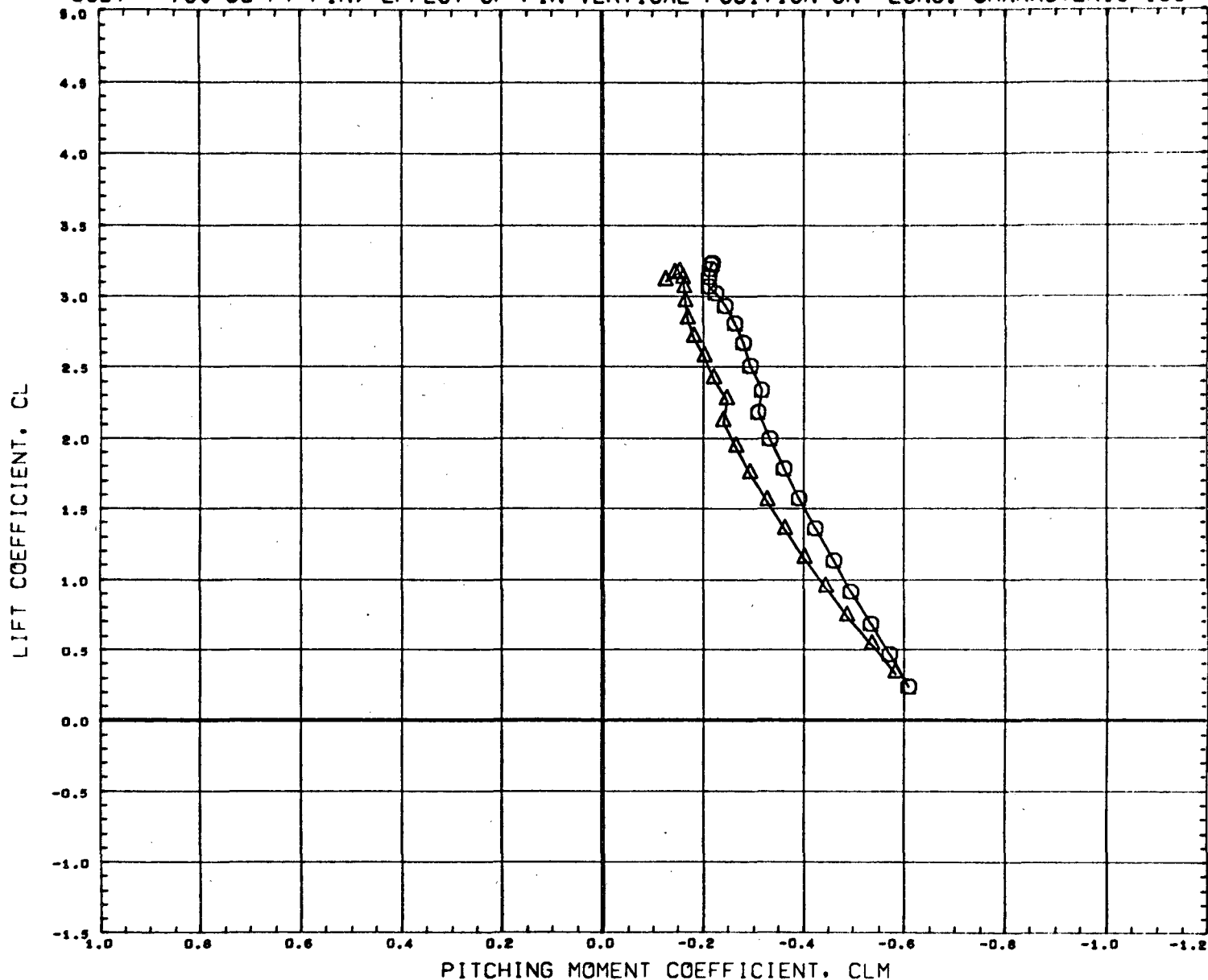
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.959

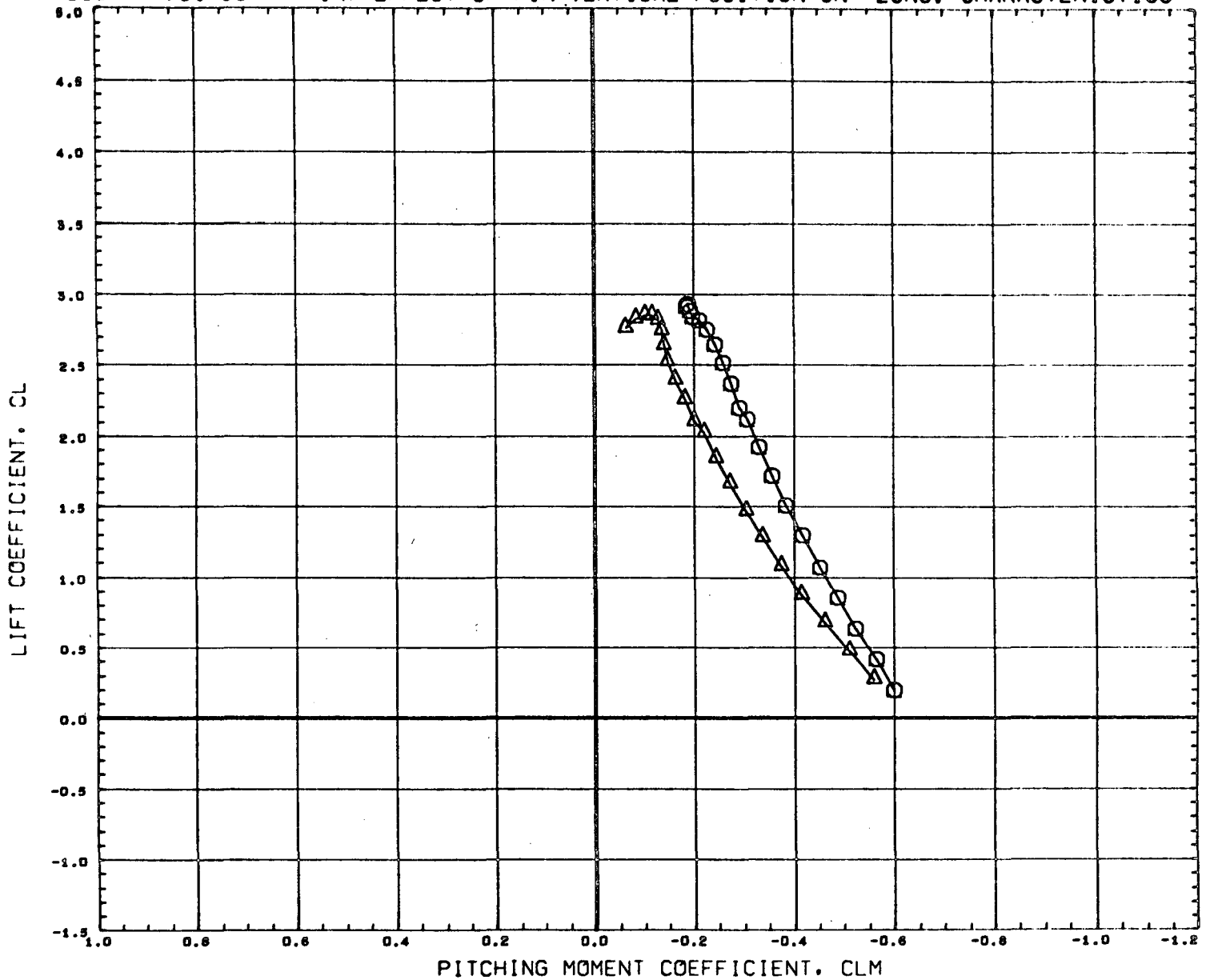
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 2.740

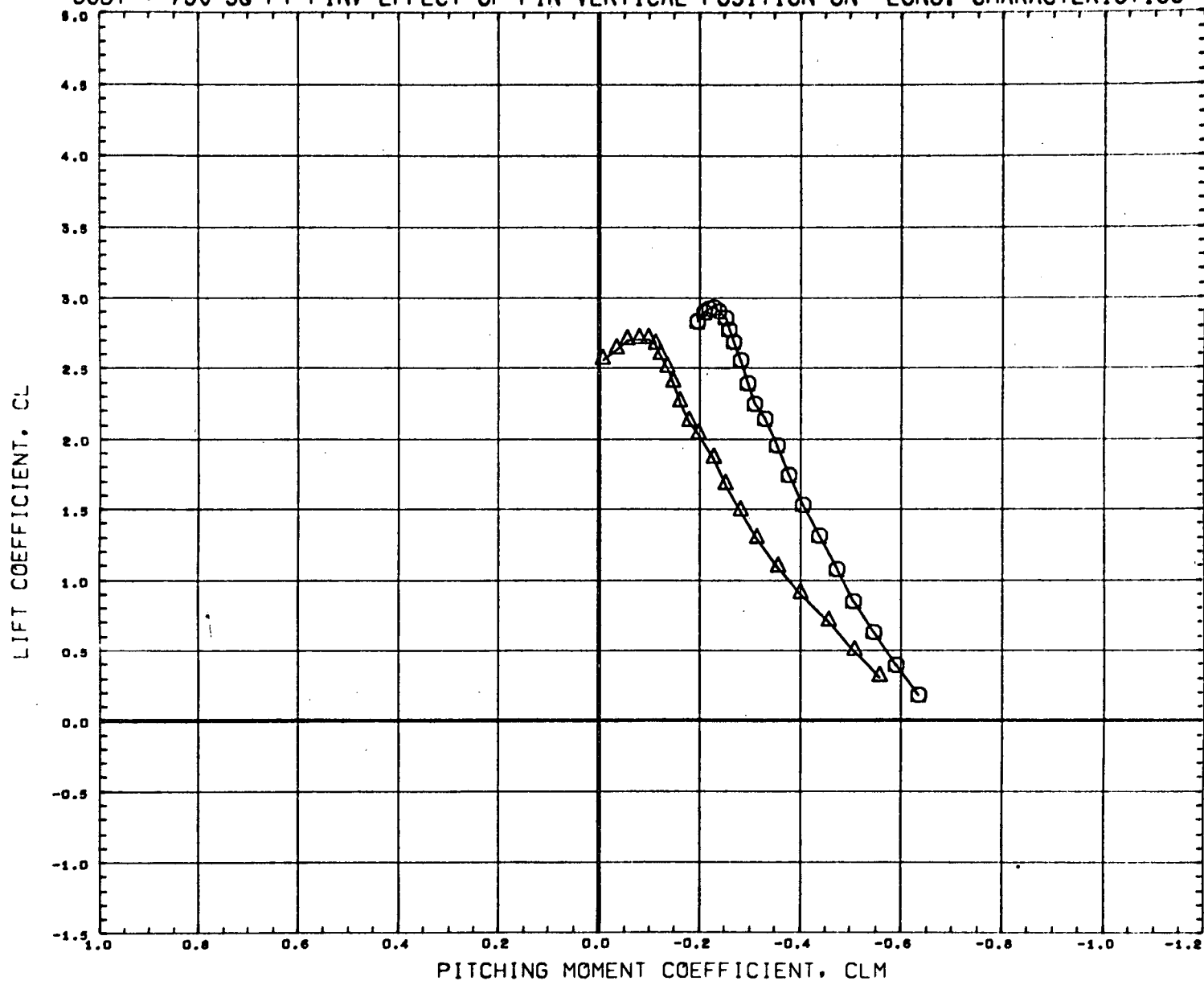
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRF 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 3.480

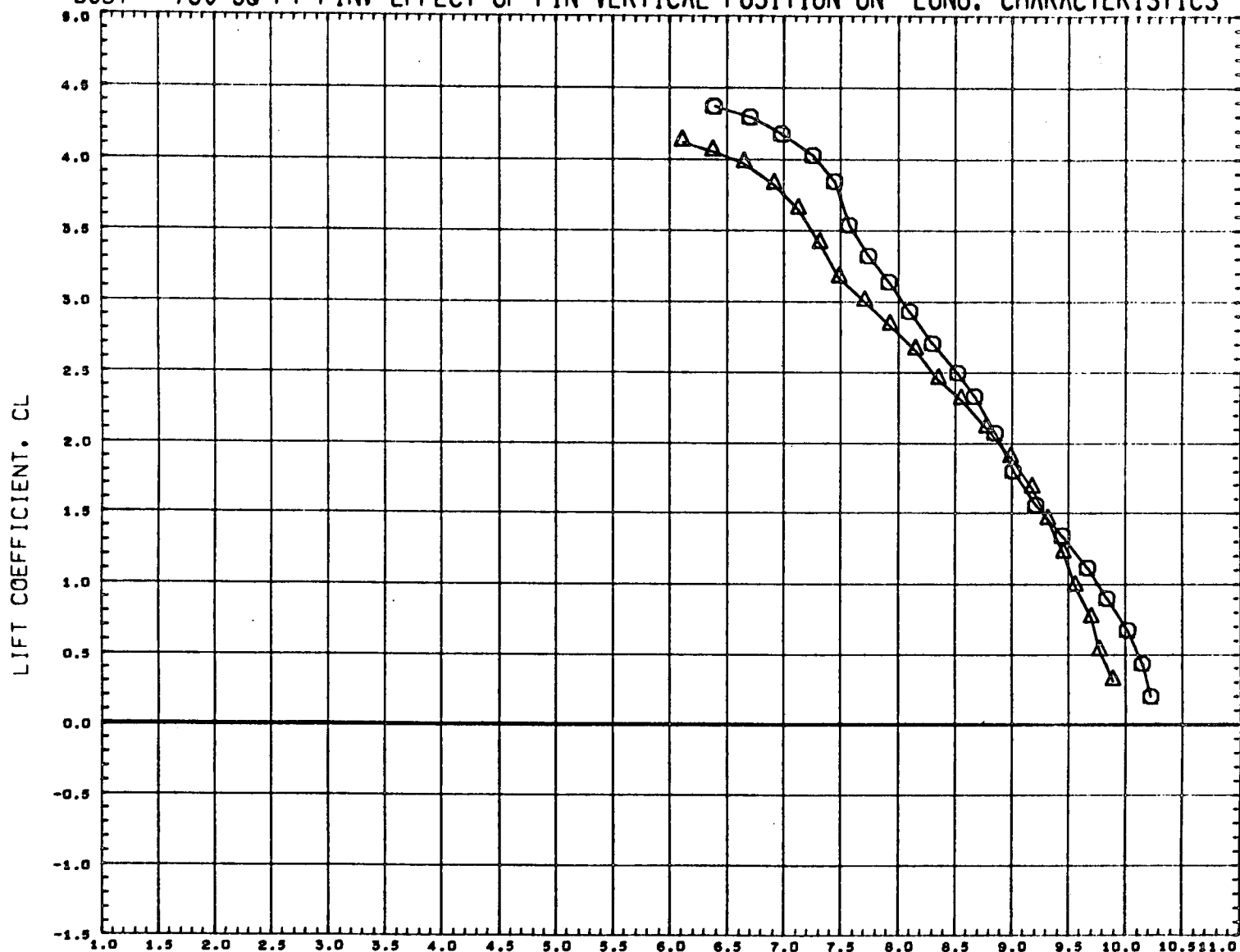
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59912)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59924)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

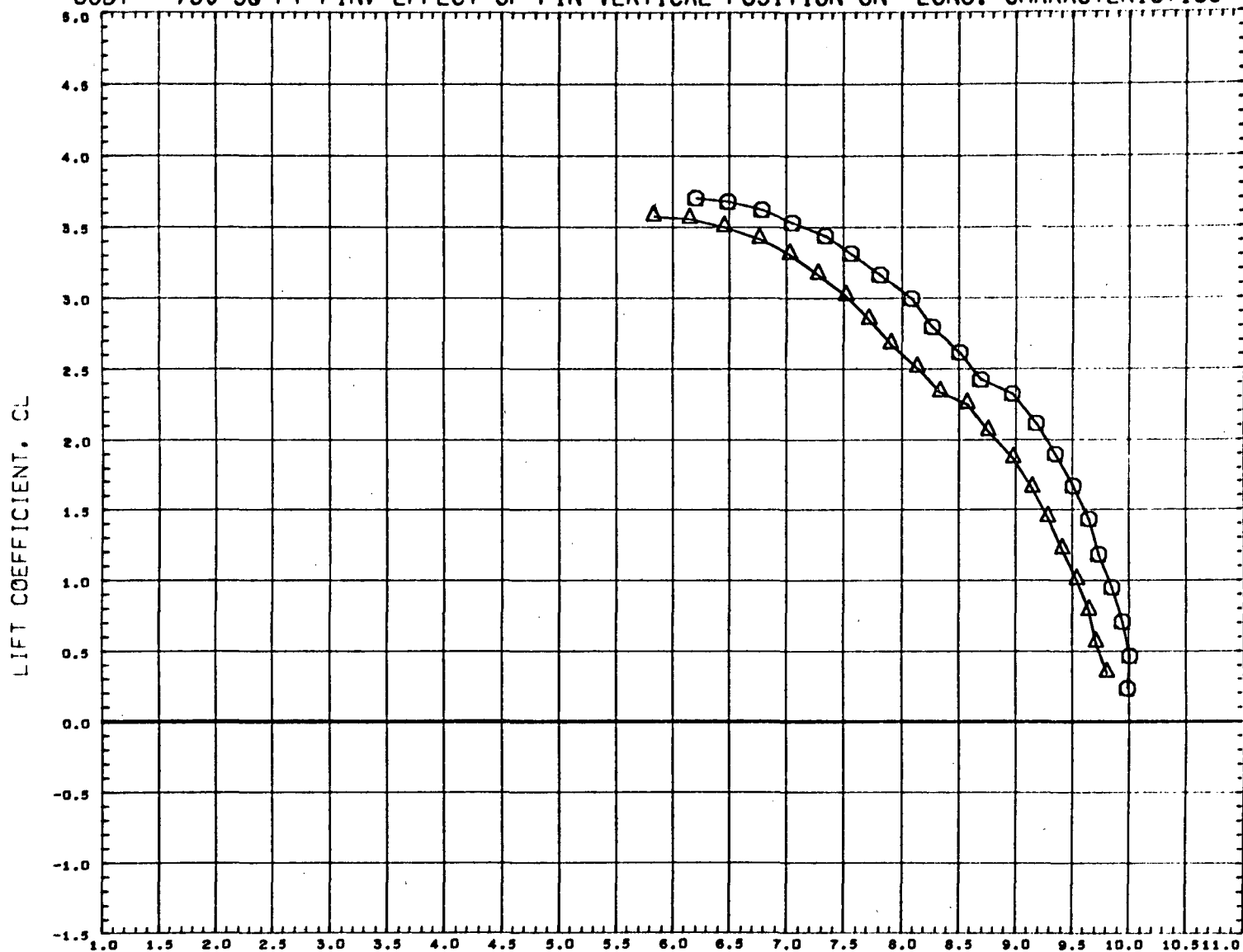


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (859312)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                              |       |       |         |       | BREF 4.9080 IN.       |
|                 |                              |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                              |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0028          |

MACH 1.194

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    |
|-----------------|------------------------------|
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER |
| (B59524)        | MSFC TWT 524 33 FOOT BOOSTER |

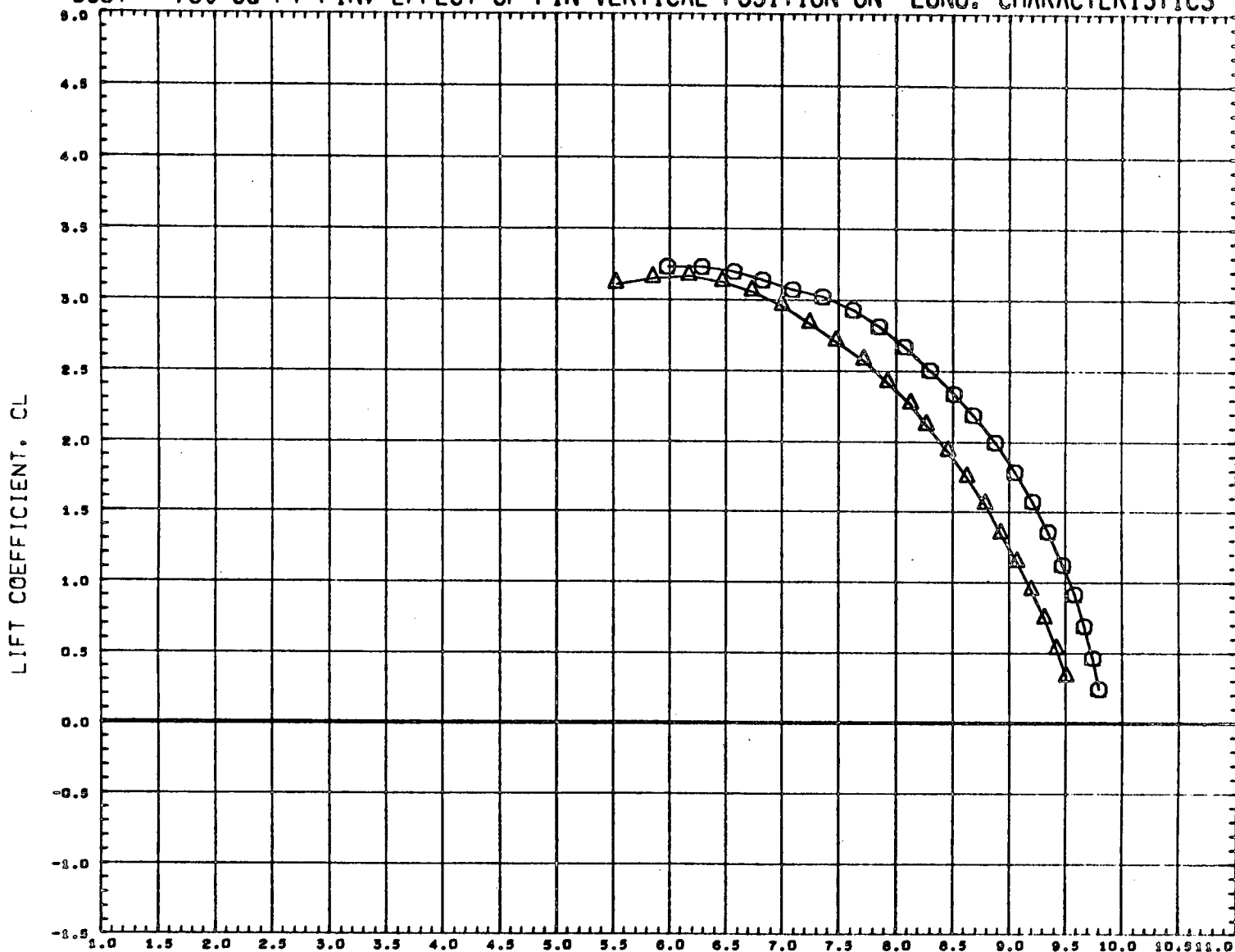
|            |
|------------|
| N2B1R1X1F2 |
| N2B1R1X2F2 |

| BETA  | POS   | DELFE   |
|-------|-------|---------|
| 0.000 | 1.000 | -30.000 |
| 0.000 | 2.000 | -30.000 |

| DELFA | REFERENCE INFORMATION |
|-------|-----------------------|
| 0.000 | SREF 0.9650 SQ. IN    |
| 0.000 | LREF 4.9080 IN.       |
|       | BREF 4.9080 IN.       |
|       | XMRP 2.9450 IN.       |
|       | YMRP 0.0000 IN.       |
|       | ZMRP 0.0000 IN.       |
|       | SCALE 0.0028          |

MACH 1.959

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

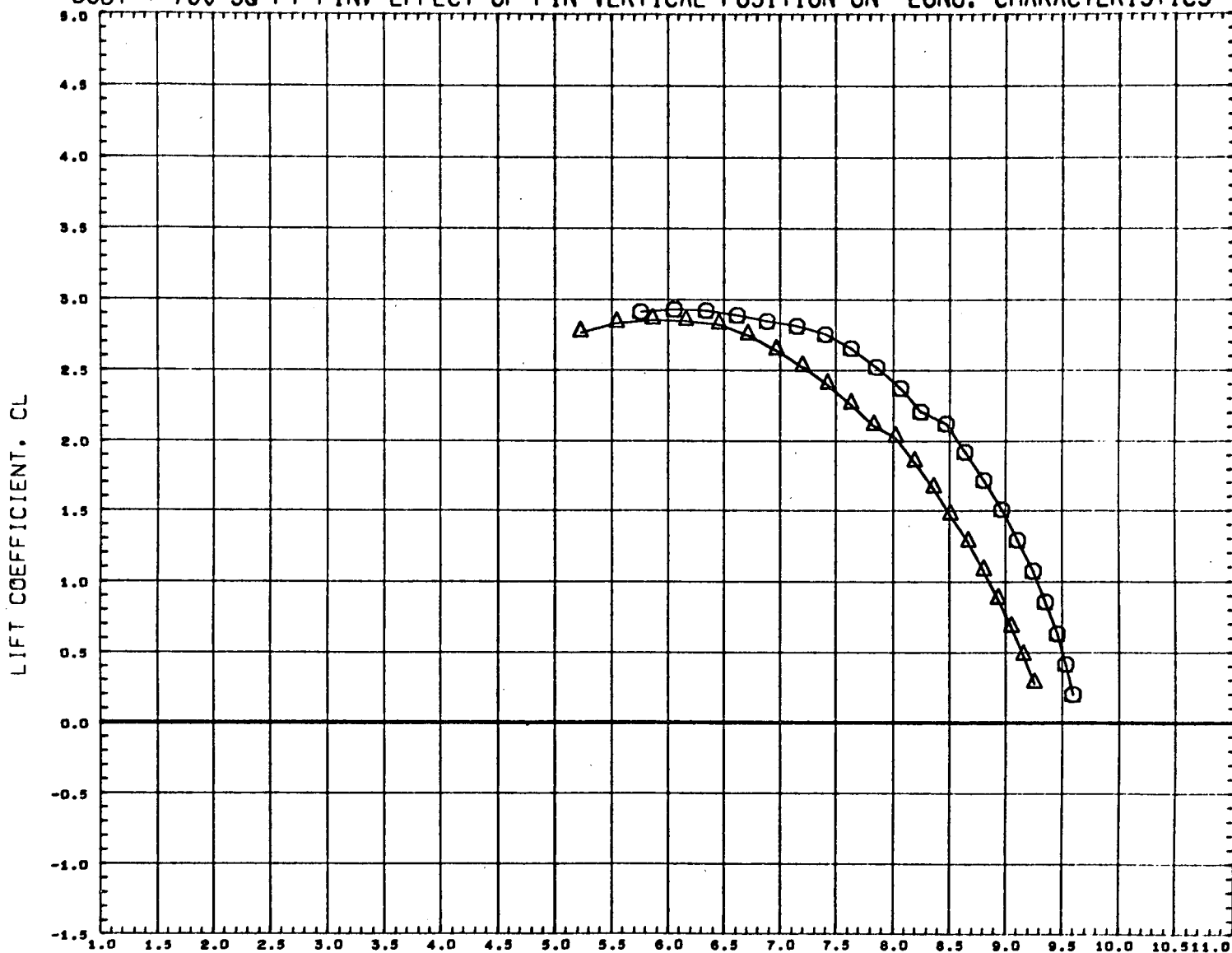


DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59824)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                              |       |       |         |       | BREF 4.9080 IN.       |
|                 |                              |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                              |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0028          |

MACH 2.740

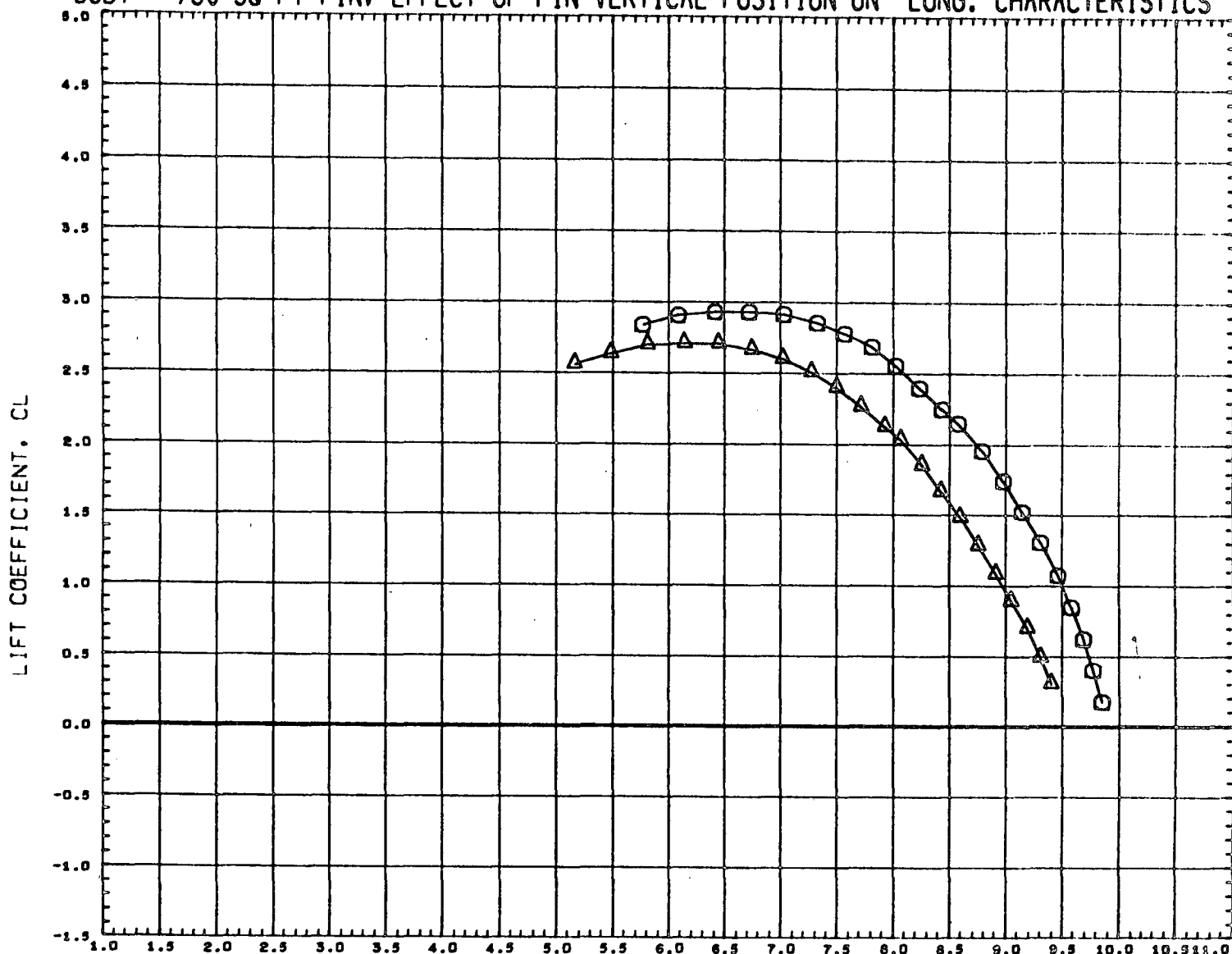
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL |   | CONFIGURATION DESCRIPTION |                 | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|---|---------------------------|-----------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59912)        | ○ | MSFC TWT 524              | 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59924)        | △ | MSFC TWT 524              | 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |   |                           |                 |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |   |                           |                 |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |   |                           |                 |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |   |                           |                 |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

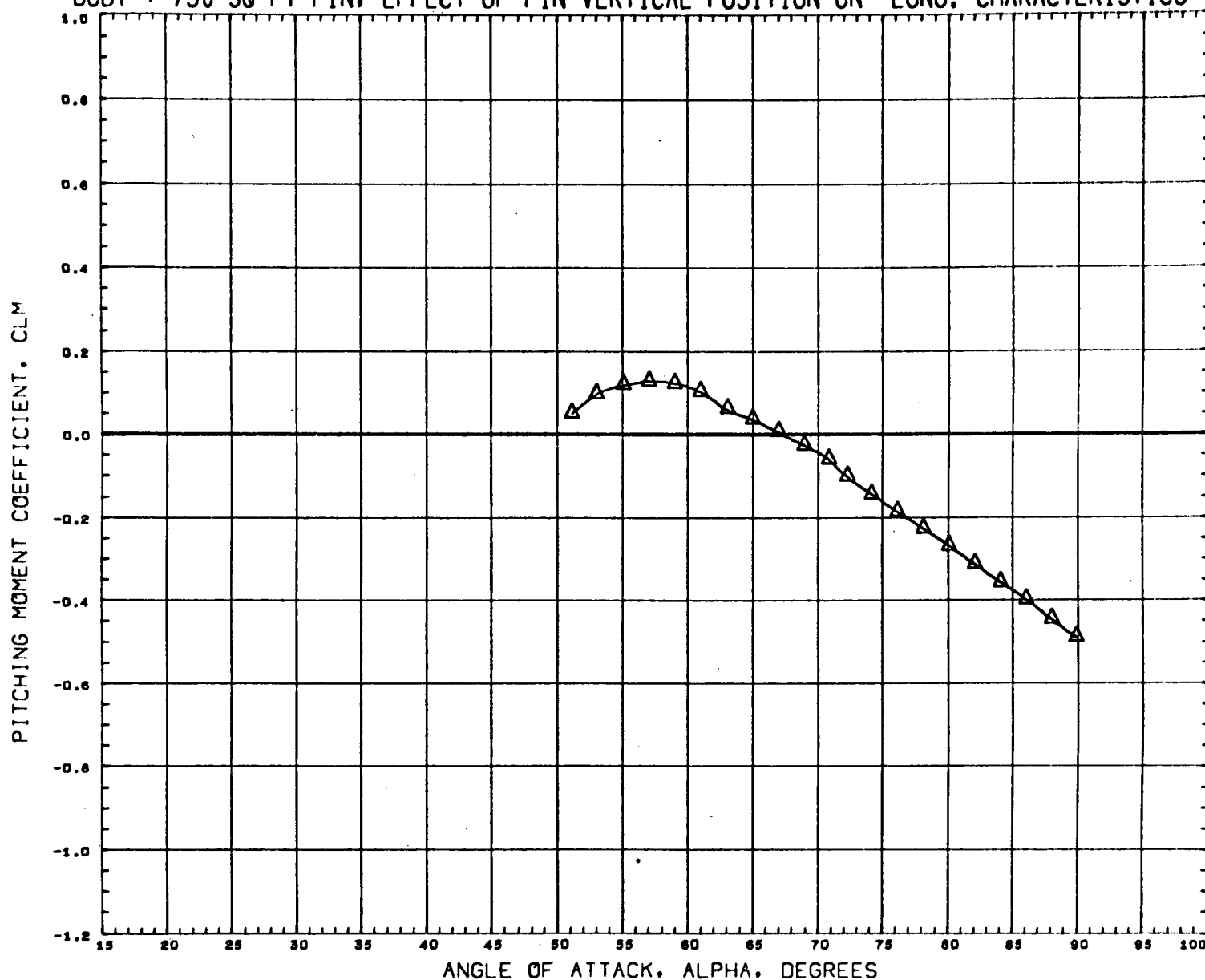


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859S12)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -30.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859S24)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9430 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

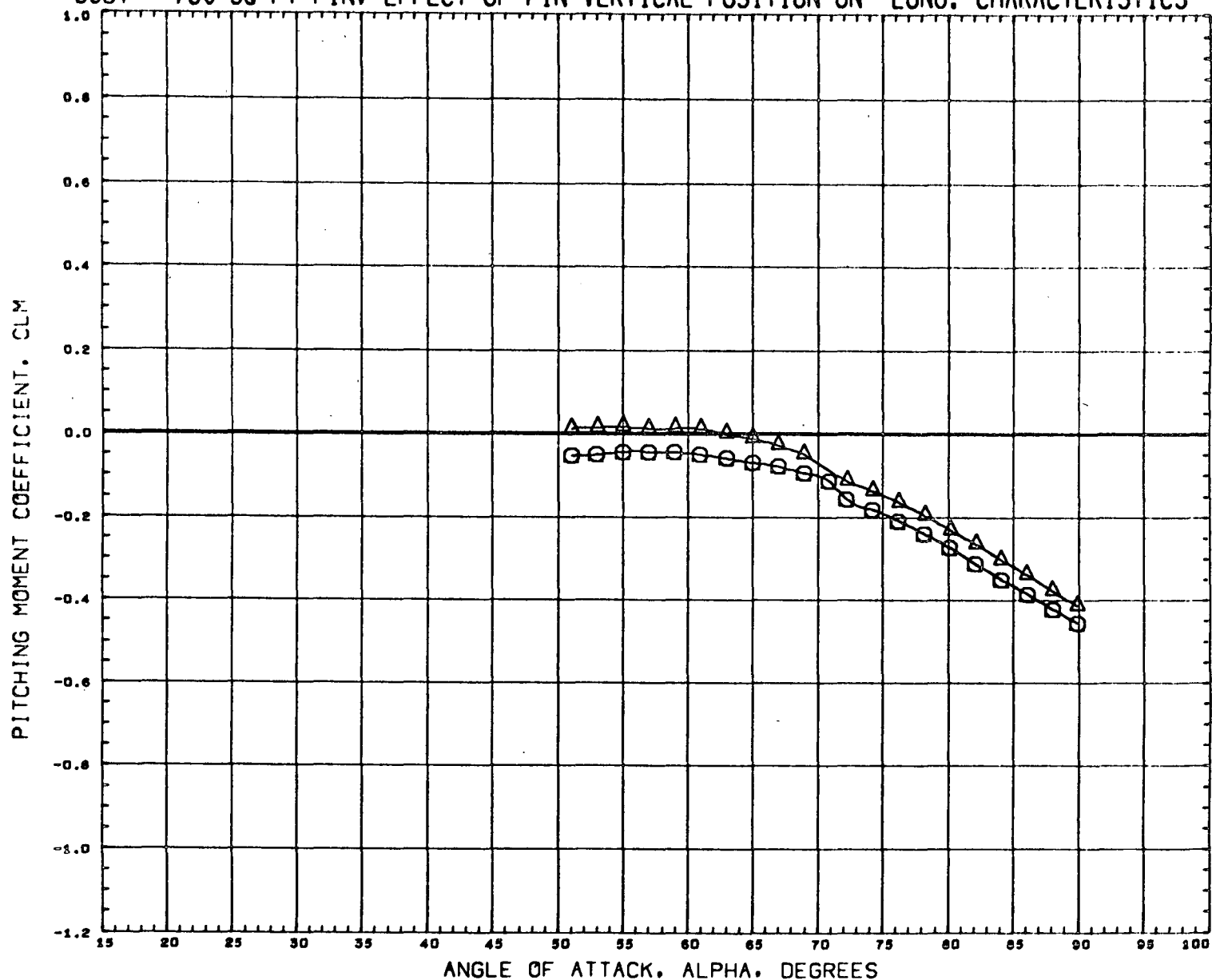
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

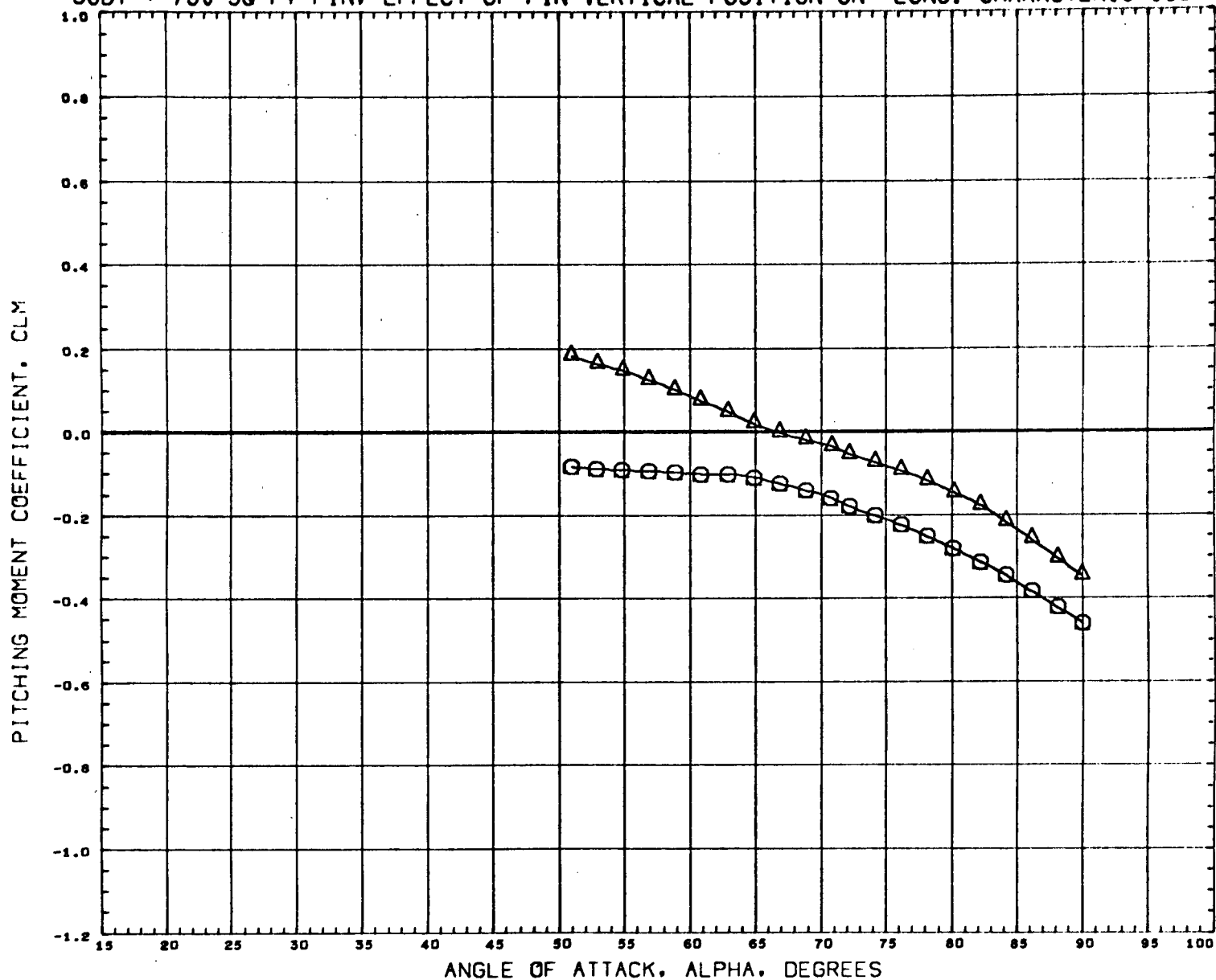
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.955

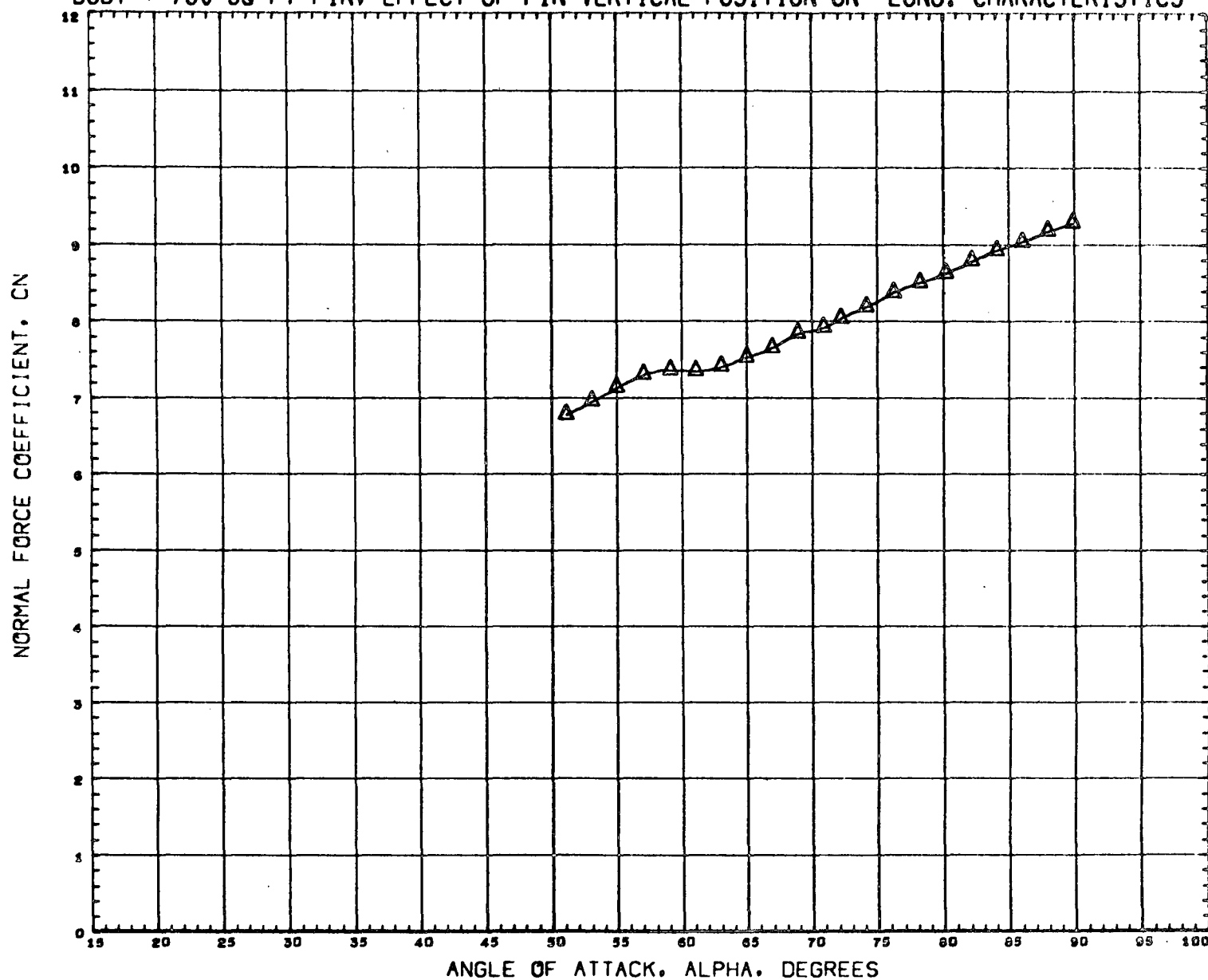
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59513)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

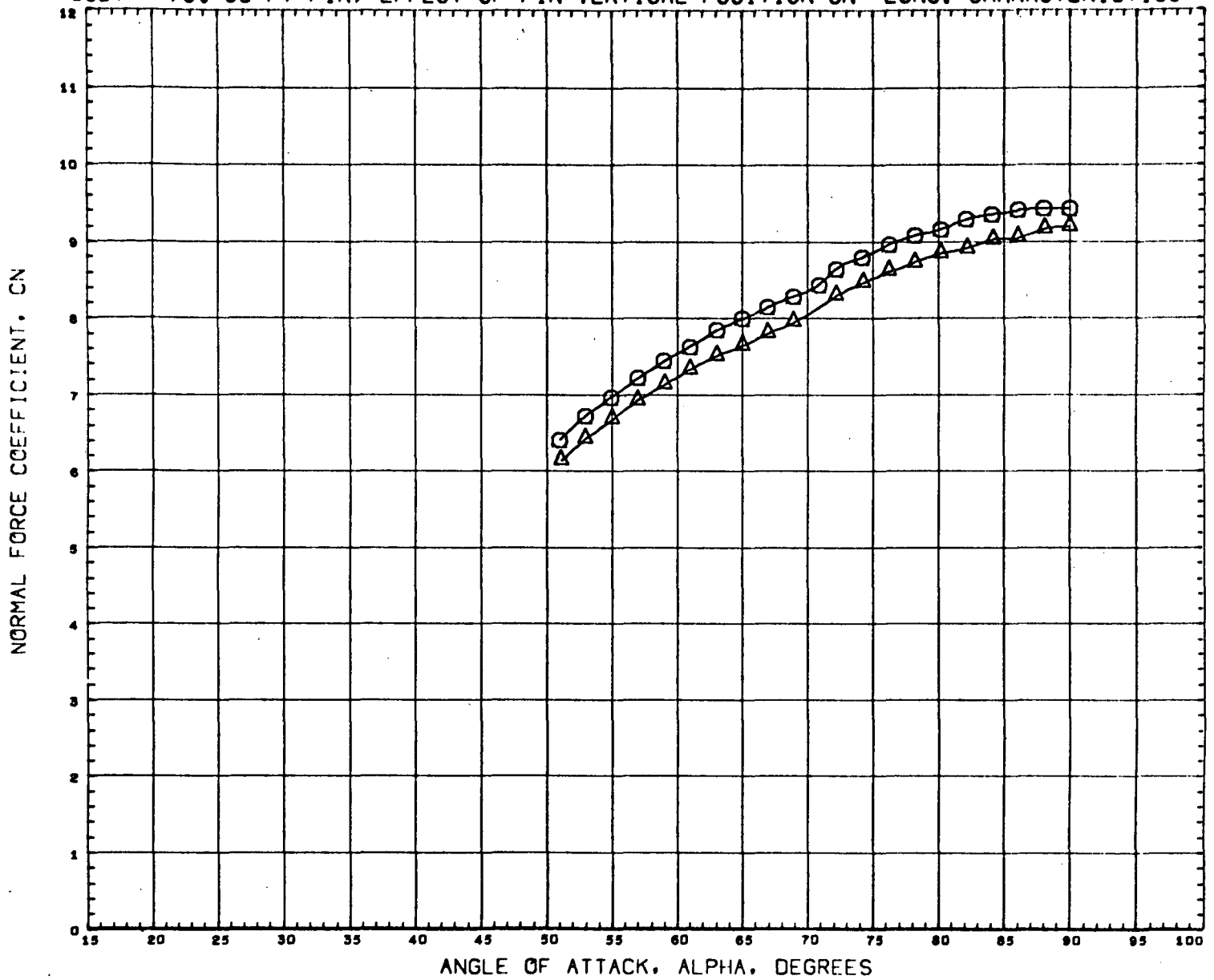


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | OREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

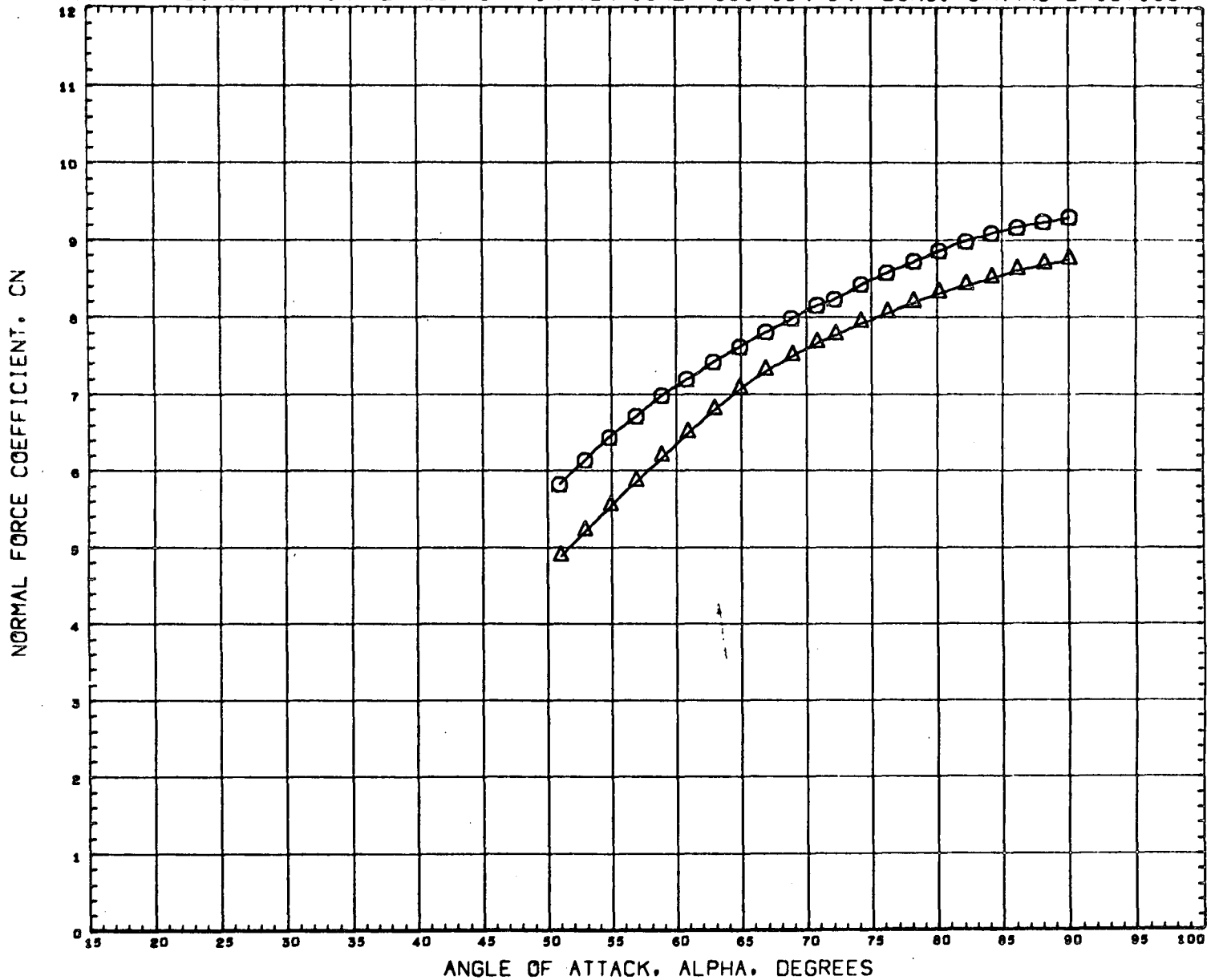
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.935

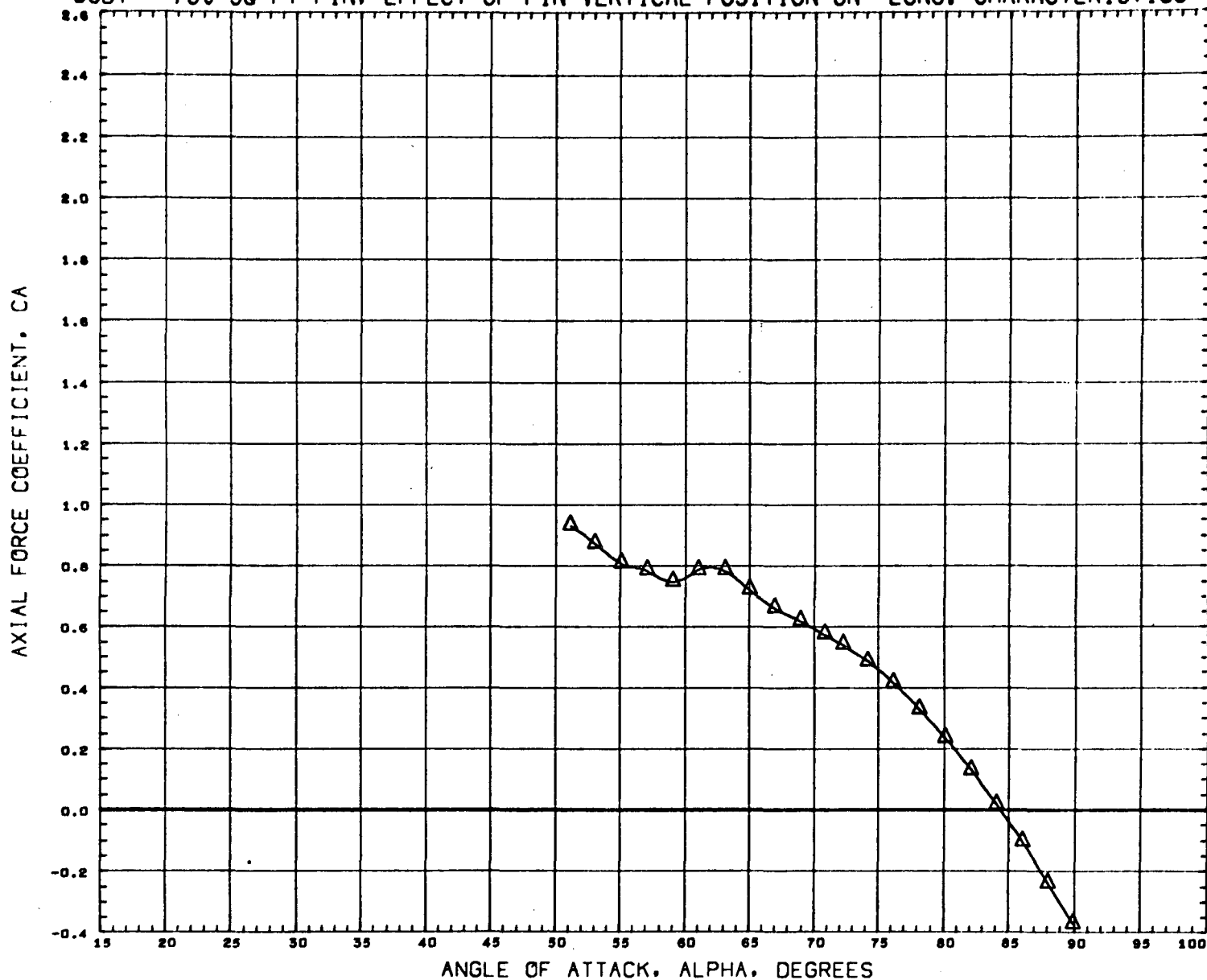
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859313)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.939

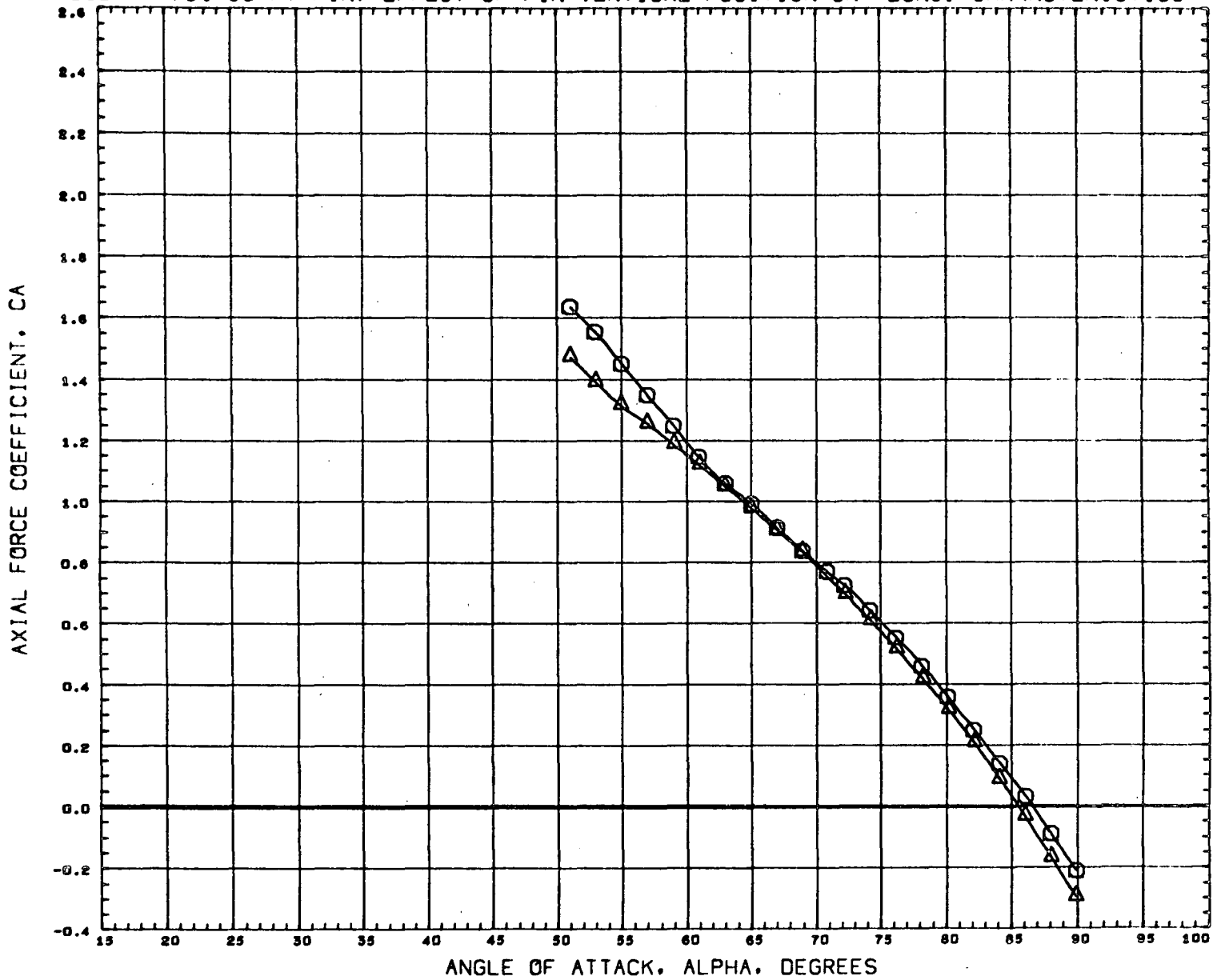
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 39. IN |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

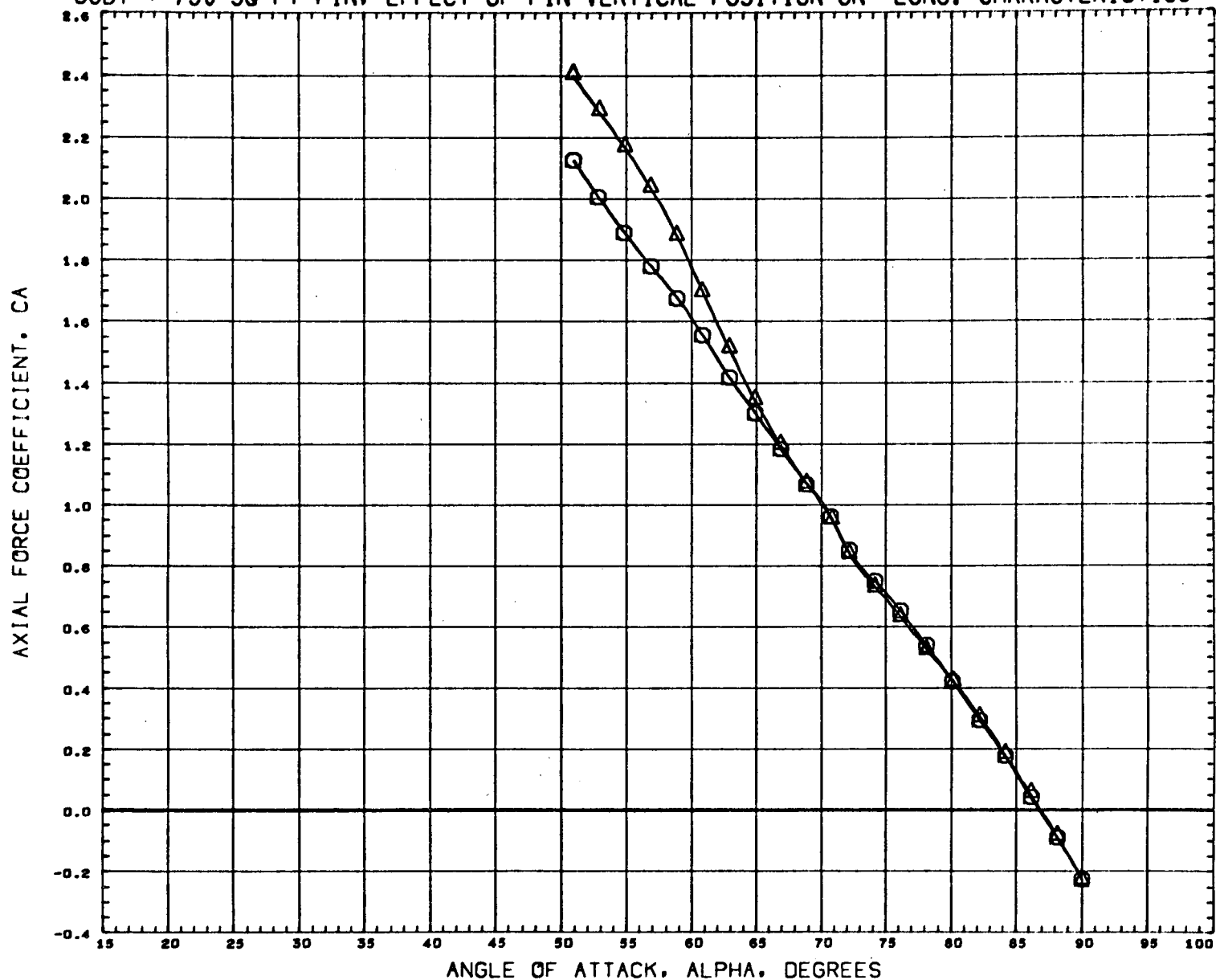
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859513)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.955

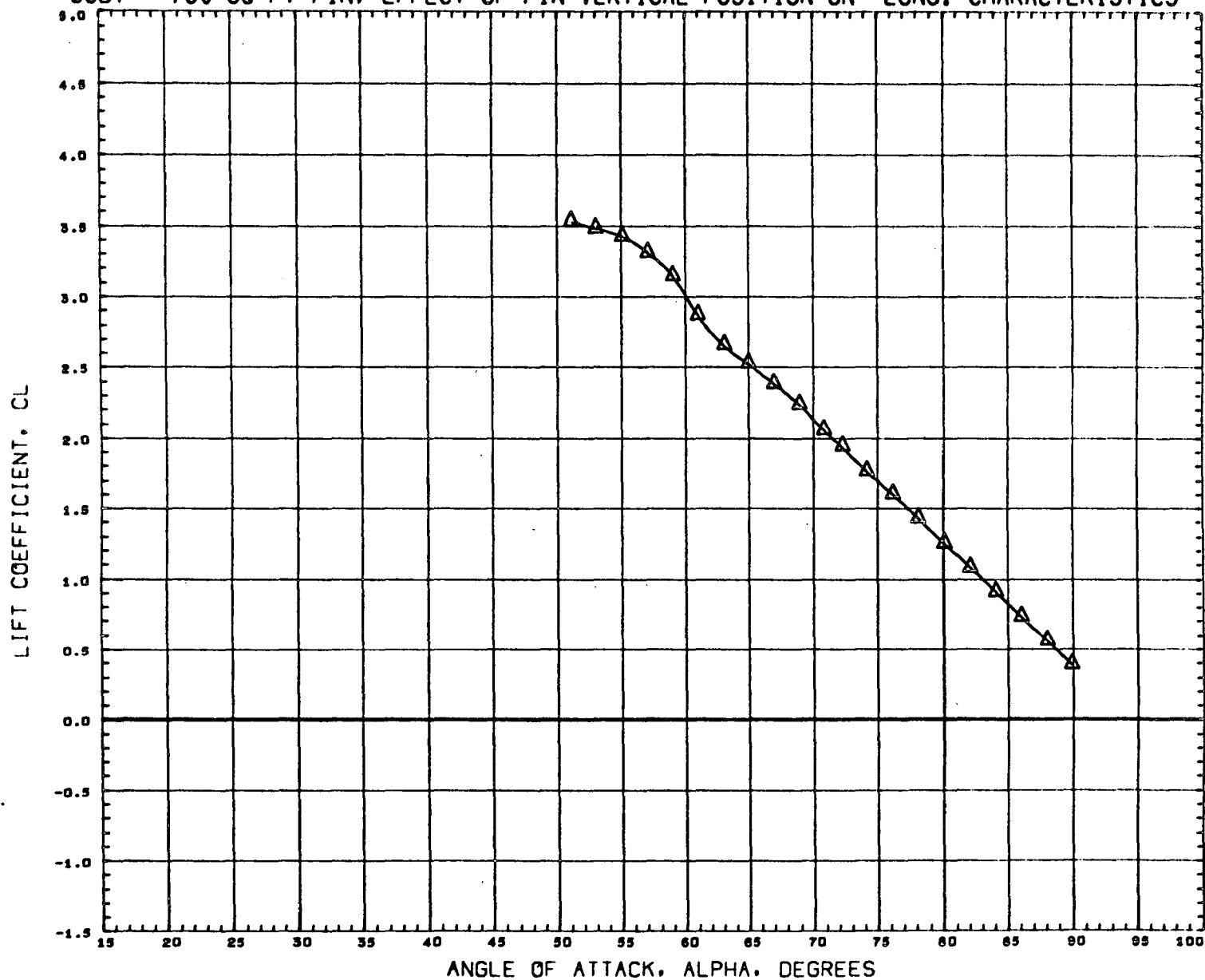
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59513)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | BREF 4.9080 IN.       |
|                 |                                         |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                                         |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



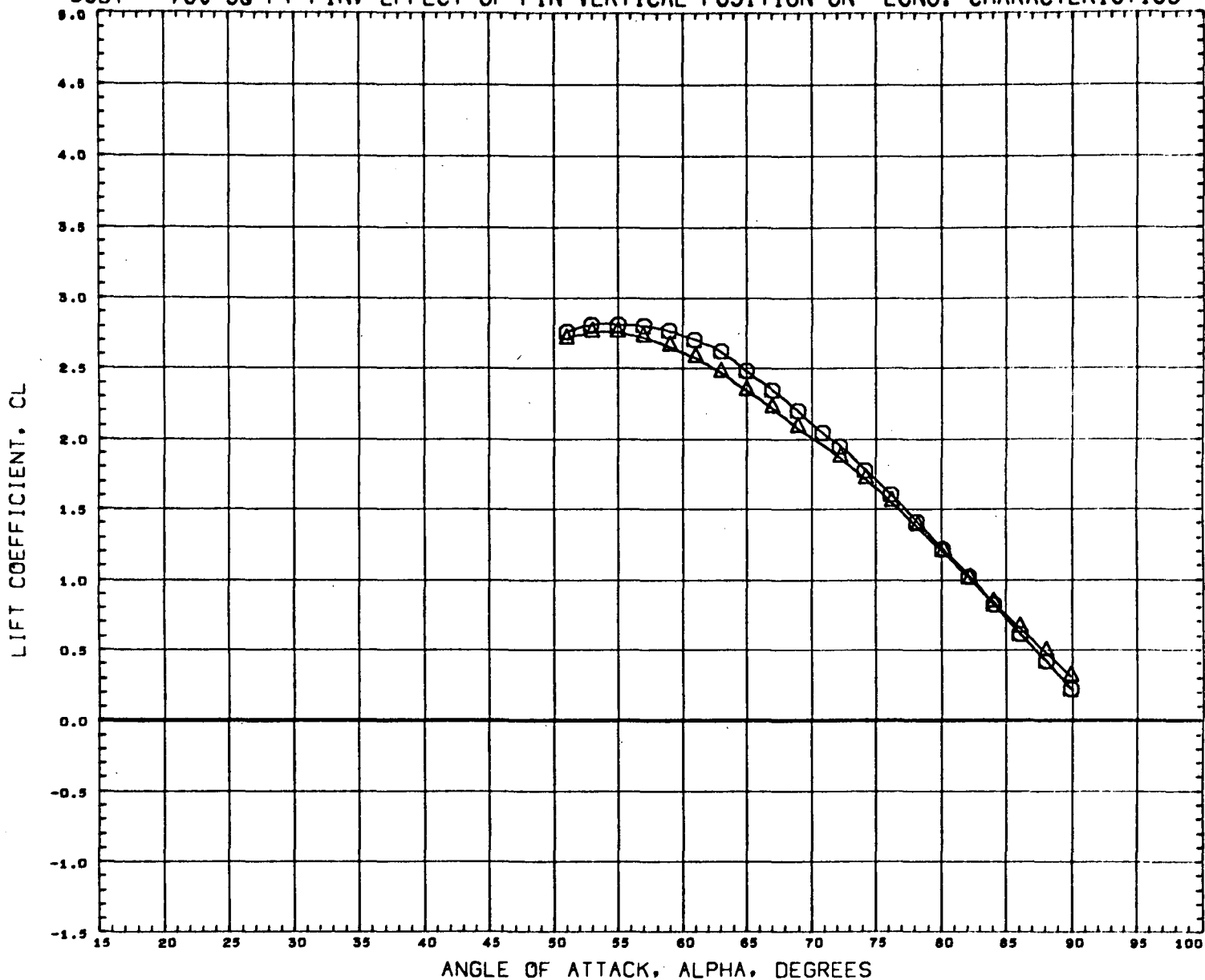
DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (859513) DATA NOT AVAILABLE FOR ALL CONDITIONS  
 (859525) MSFC TWT 524 33 FOOT BOOSTER N281R1X2F2

BETA POS DELFE DELFA  
 0.000 1.000 -45.000 0.000  
 0.000 2.000 -45.000 0.000

REFERENCE INFORMATION  
 SREF 0.9650 SQ. IN  
 LREF 4.9080 IN.  
 BREF 4.9080 IN.  
 XMRP 2.9450 IN.  
 YMRP 0.0000 IN.  
 ZMRP 0.0000 IN.  
 SCALE 0.0028

MACH 1.196

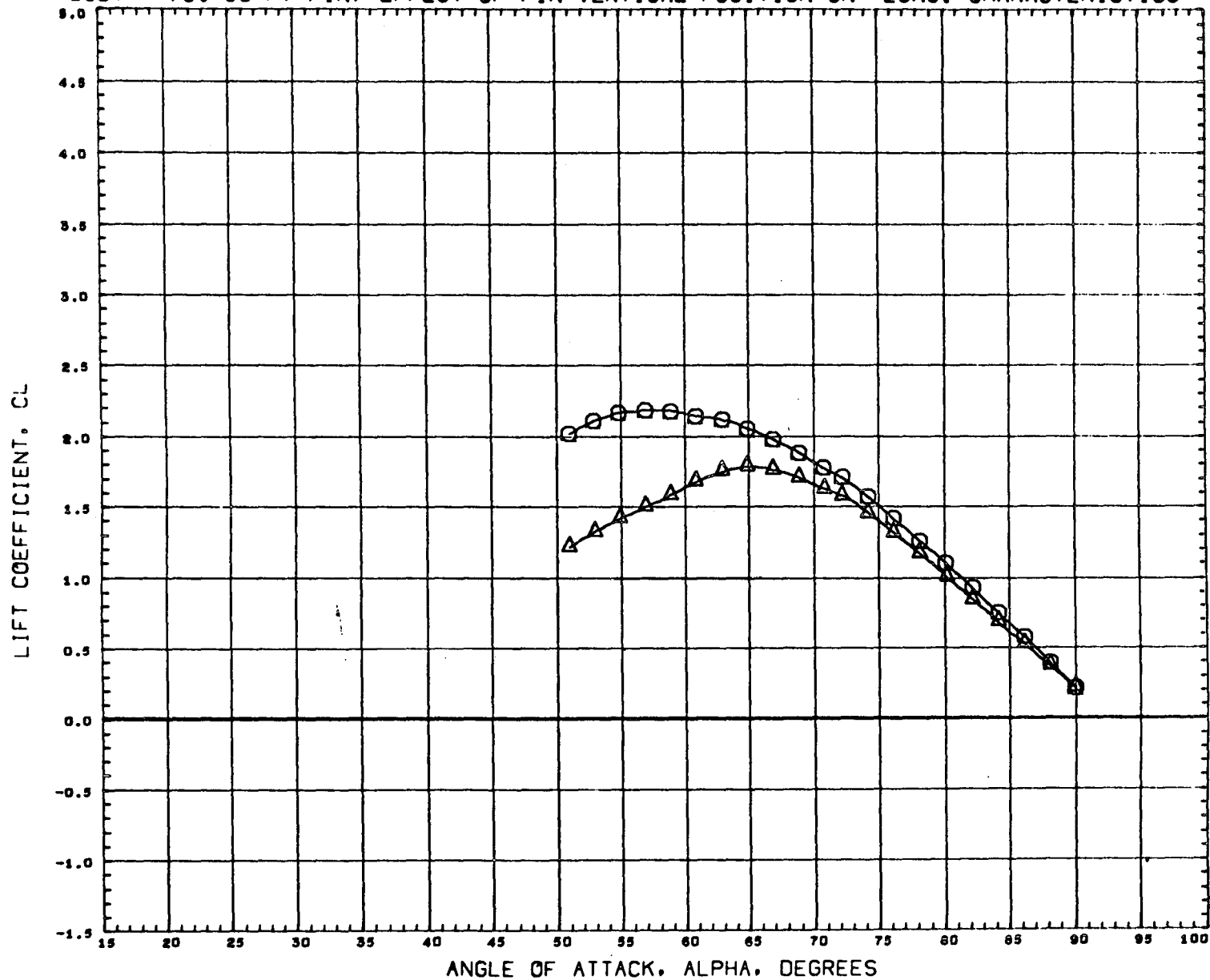
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859513)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.955

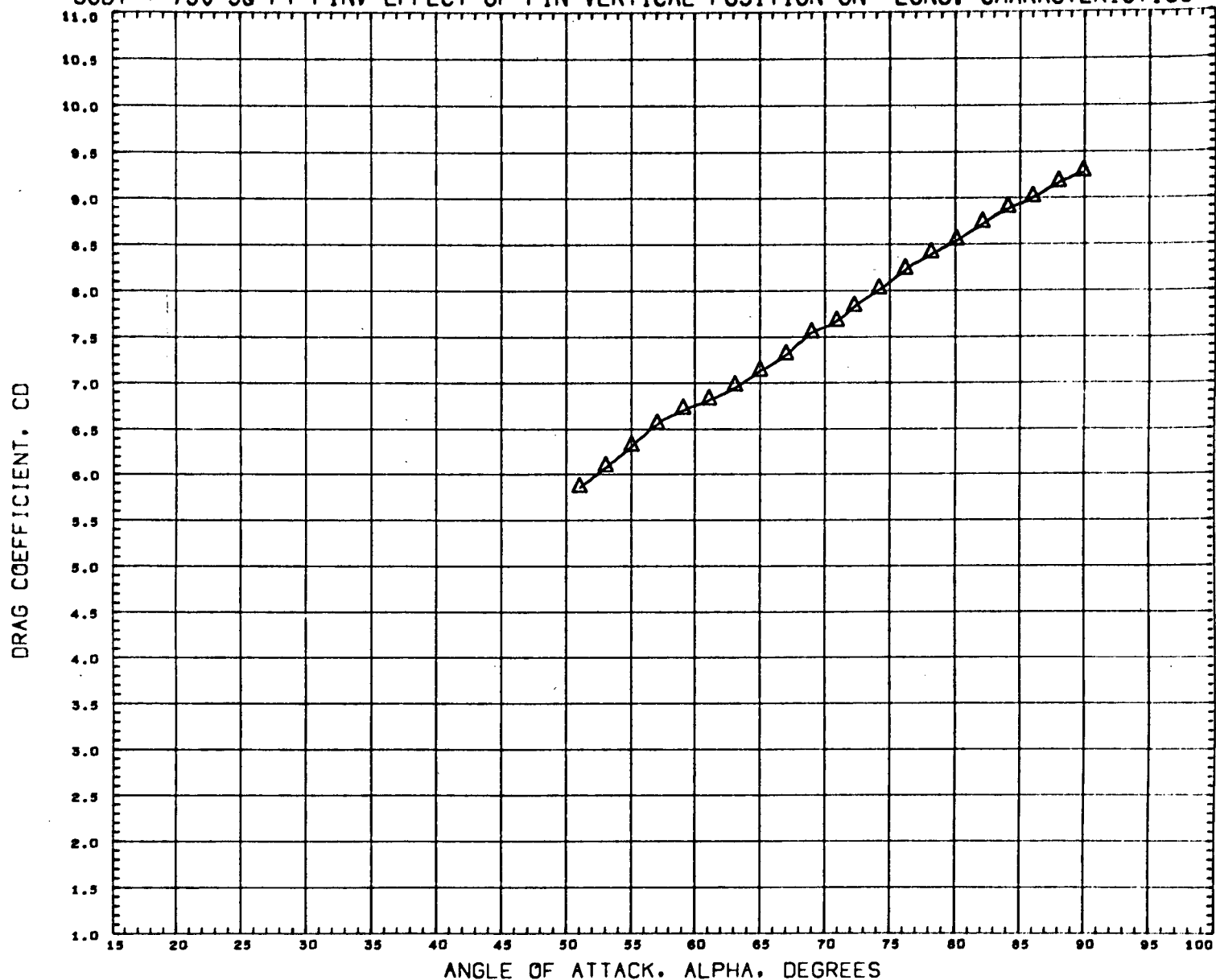
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59313)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59325)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 2.9430 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0028 IN.    |
|                 |                              |       |       |         |       | SCALE                 |               |

MACH 4.959

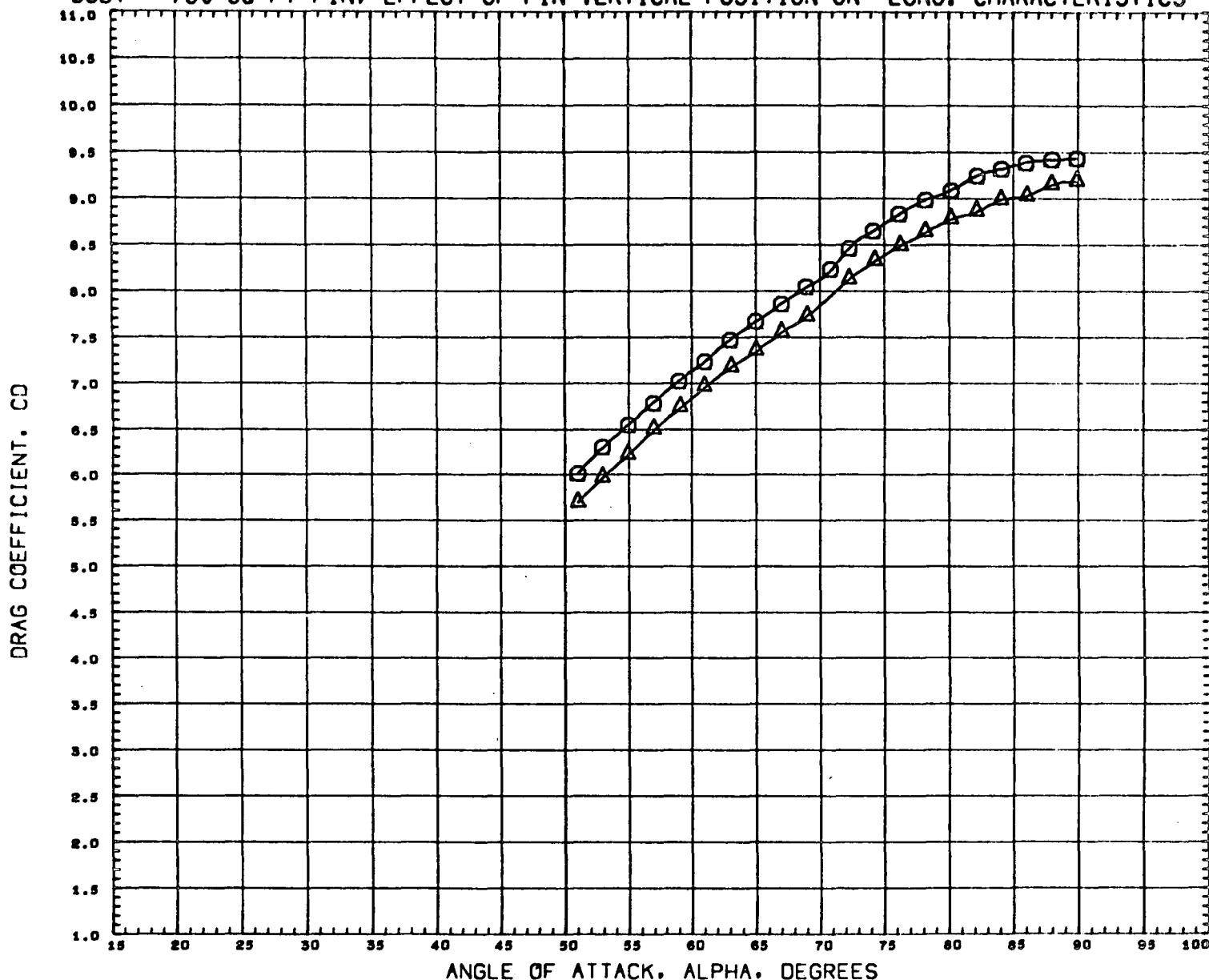
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859313)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

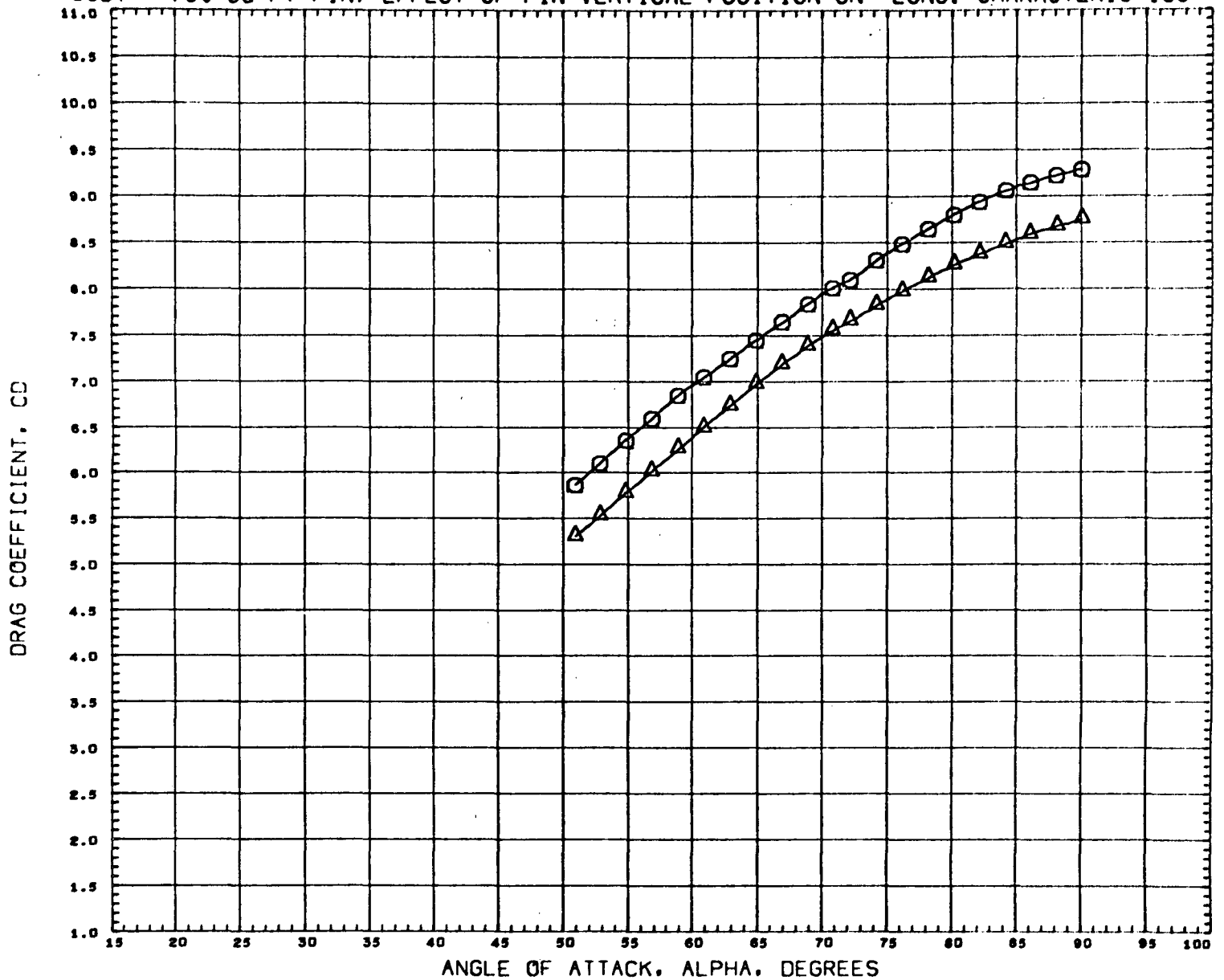
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59313)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.955

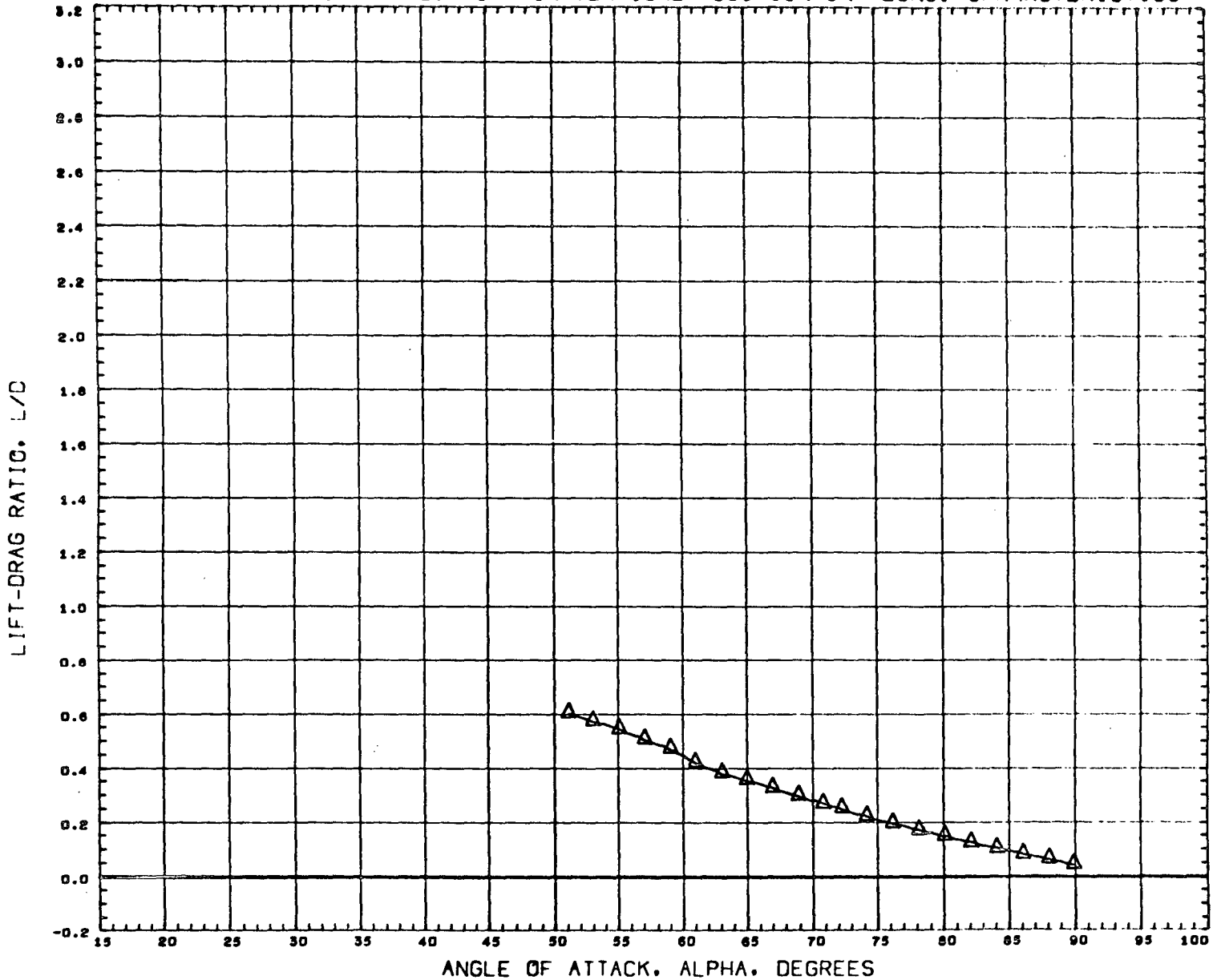
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859313)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRF                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

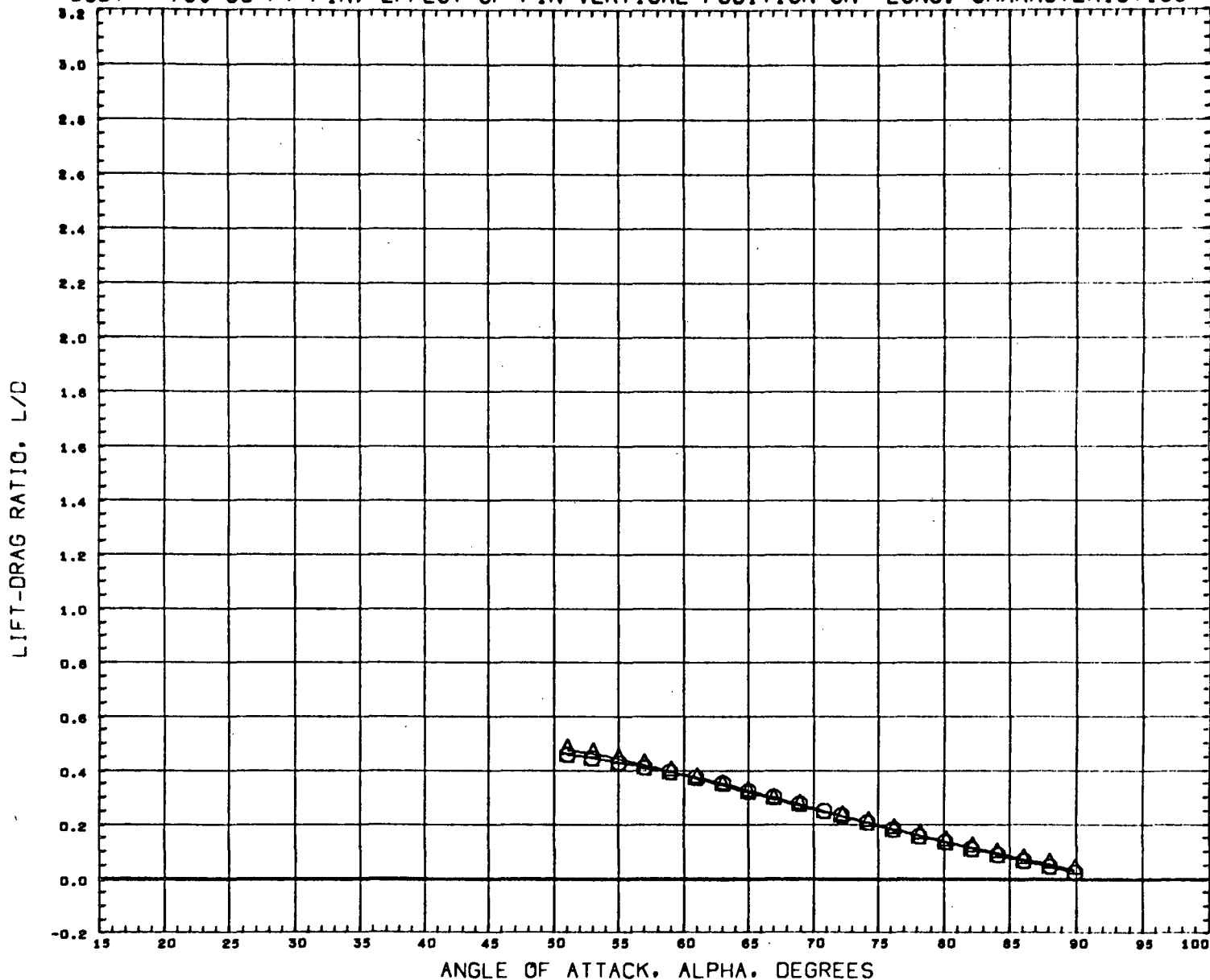
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59513)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9630 SQ. IN |
| (B59525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

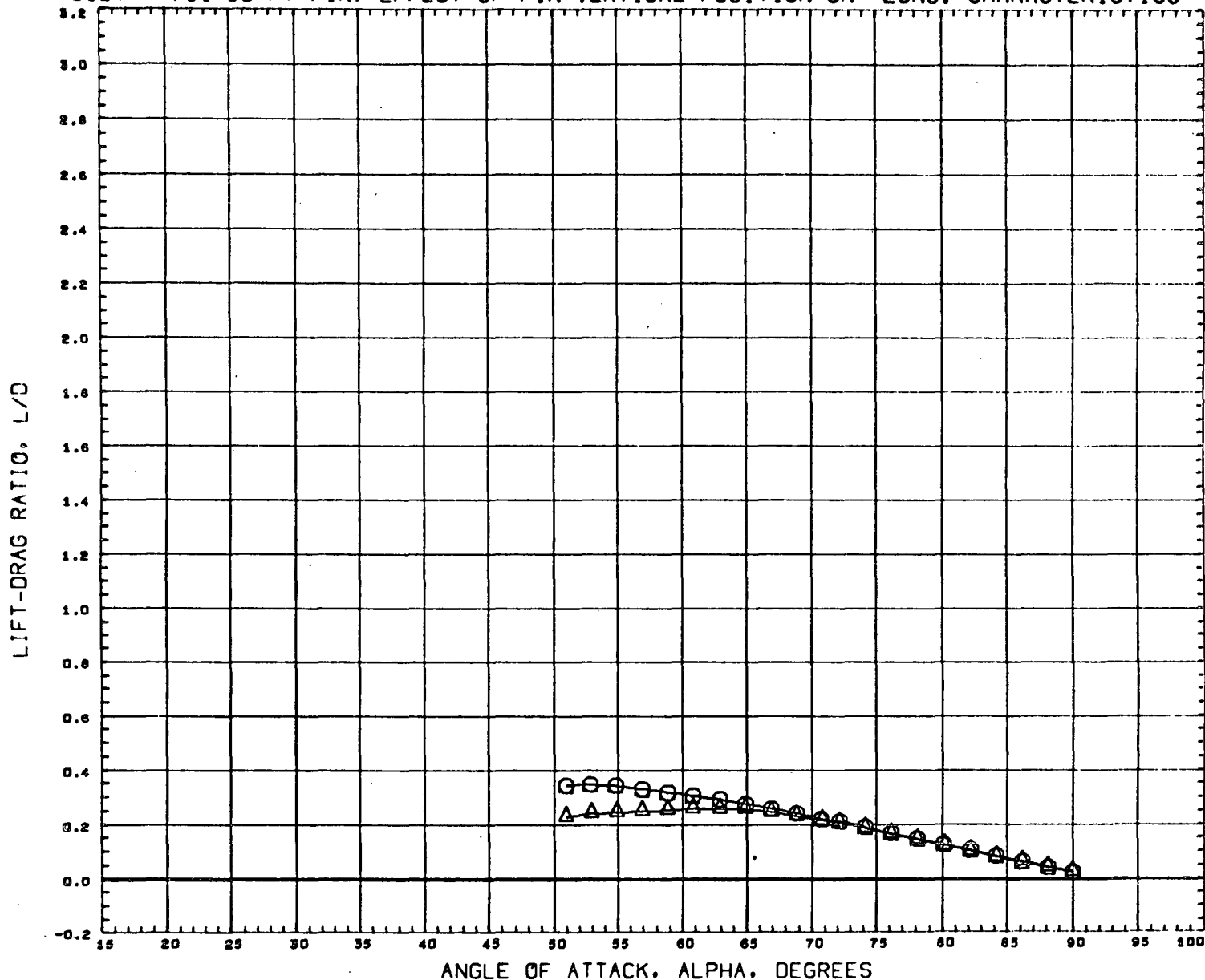
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859313)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.955

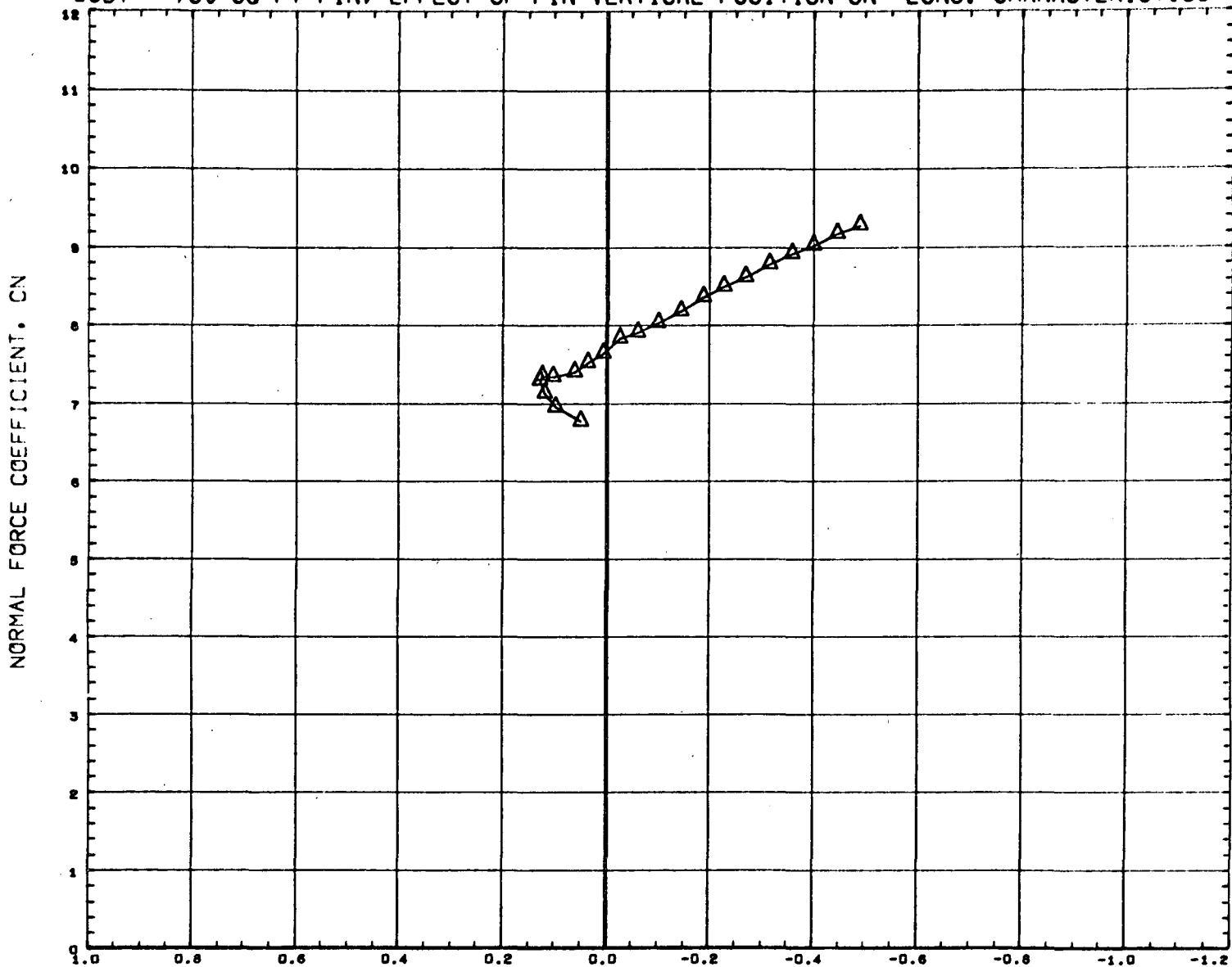
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                              |       |       |         |       | XMRP                  | 2.9490 IN.    |
|                 |                              |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

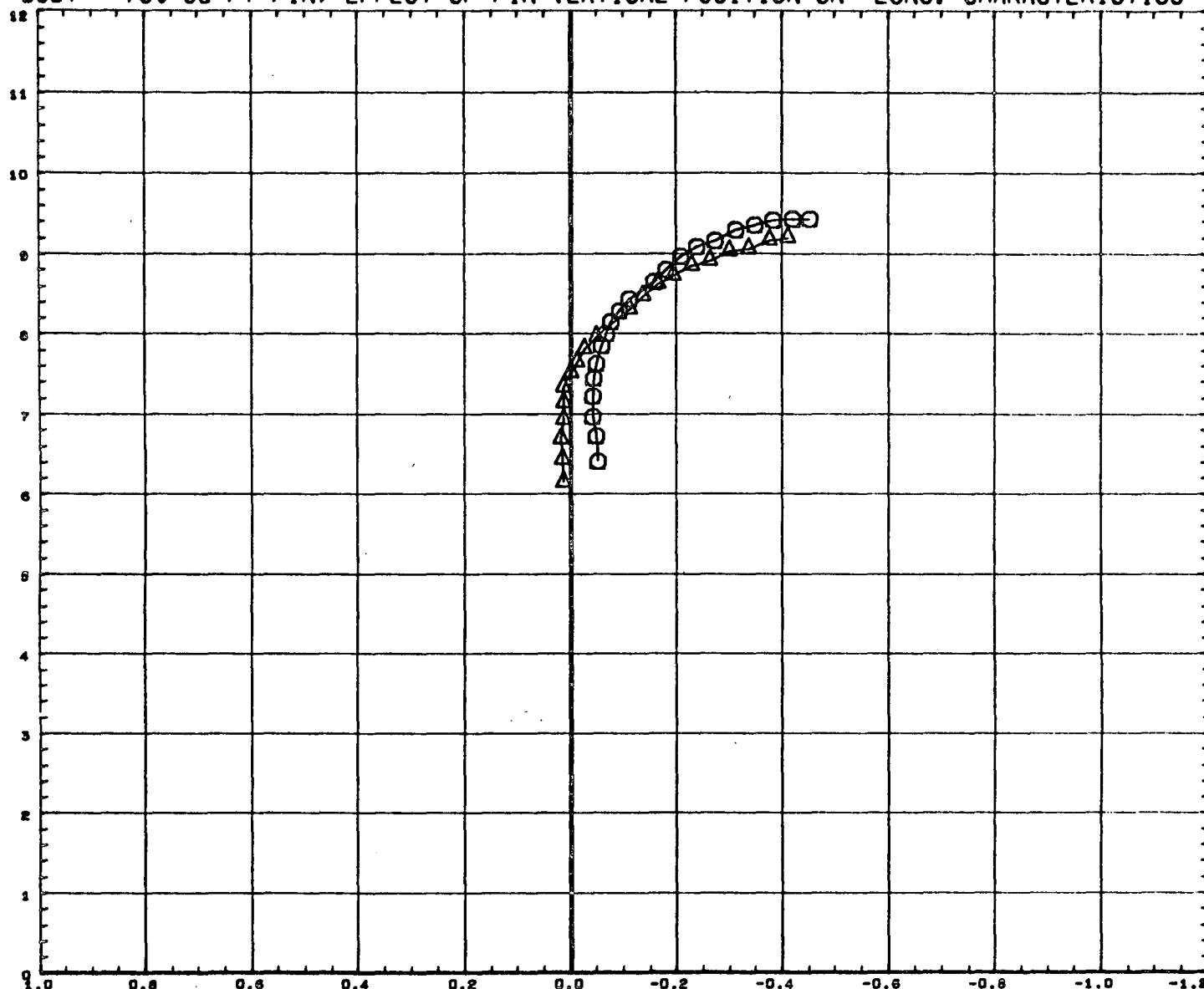


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59513)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

NORMAL FORCE COEFFICIENT, CN



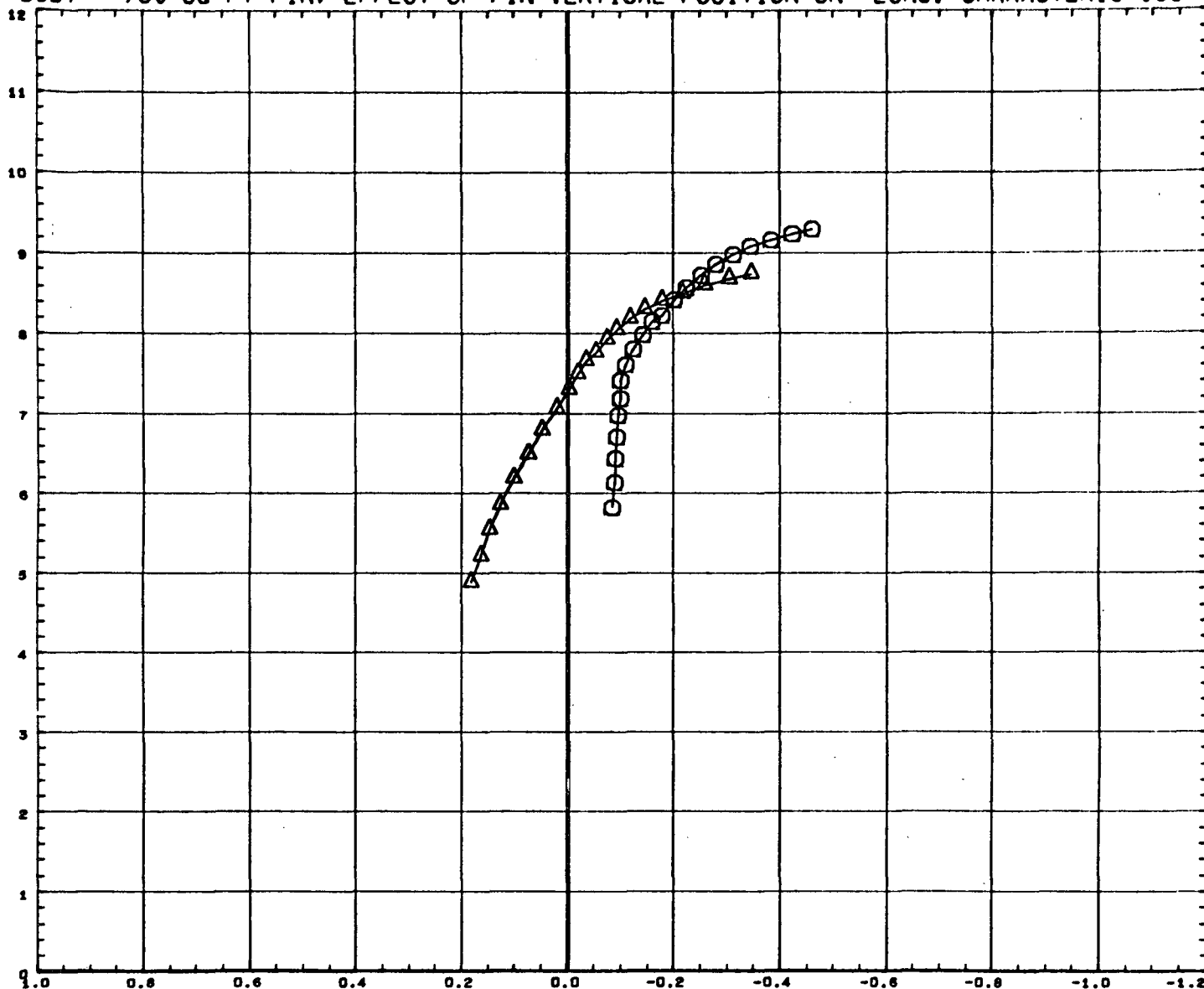
PITCHING MOMENT COEFFICIENT, CLM

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRF                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.955

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

NORMAL FORCE COEFFICIENT, CN

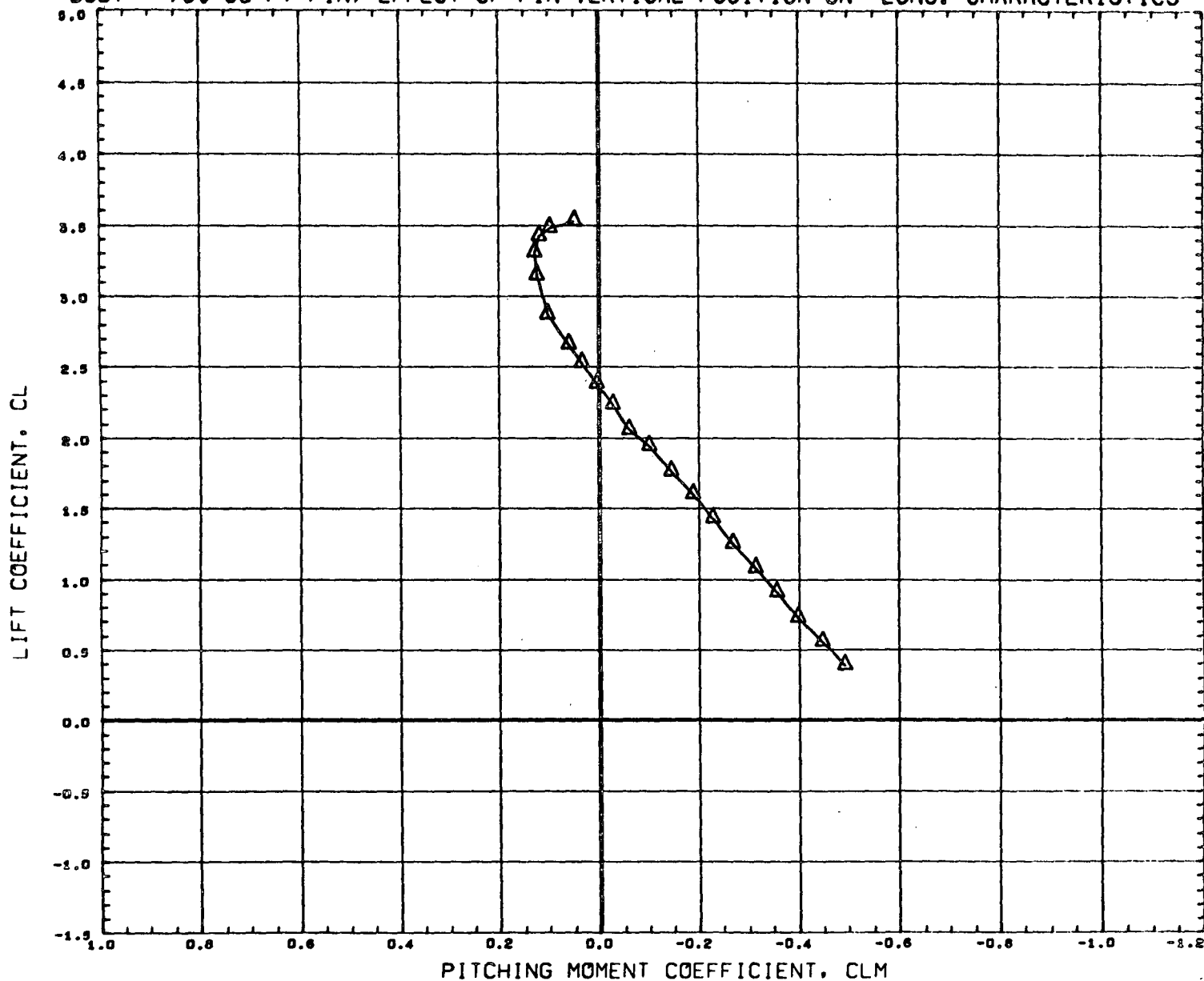


PITCHING MOMENT COEFFICIENT, CLM

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S13)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S25)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



DATA SET SYMBOL CONFIGURATION DESCRIPTION

(859513) DATA NOT AVAILABLE FOR ALL CONDITIONS  
 (859525) MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2

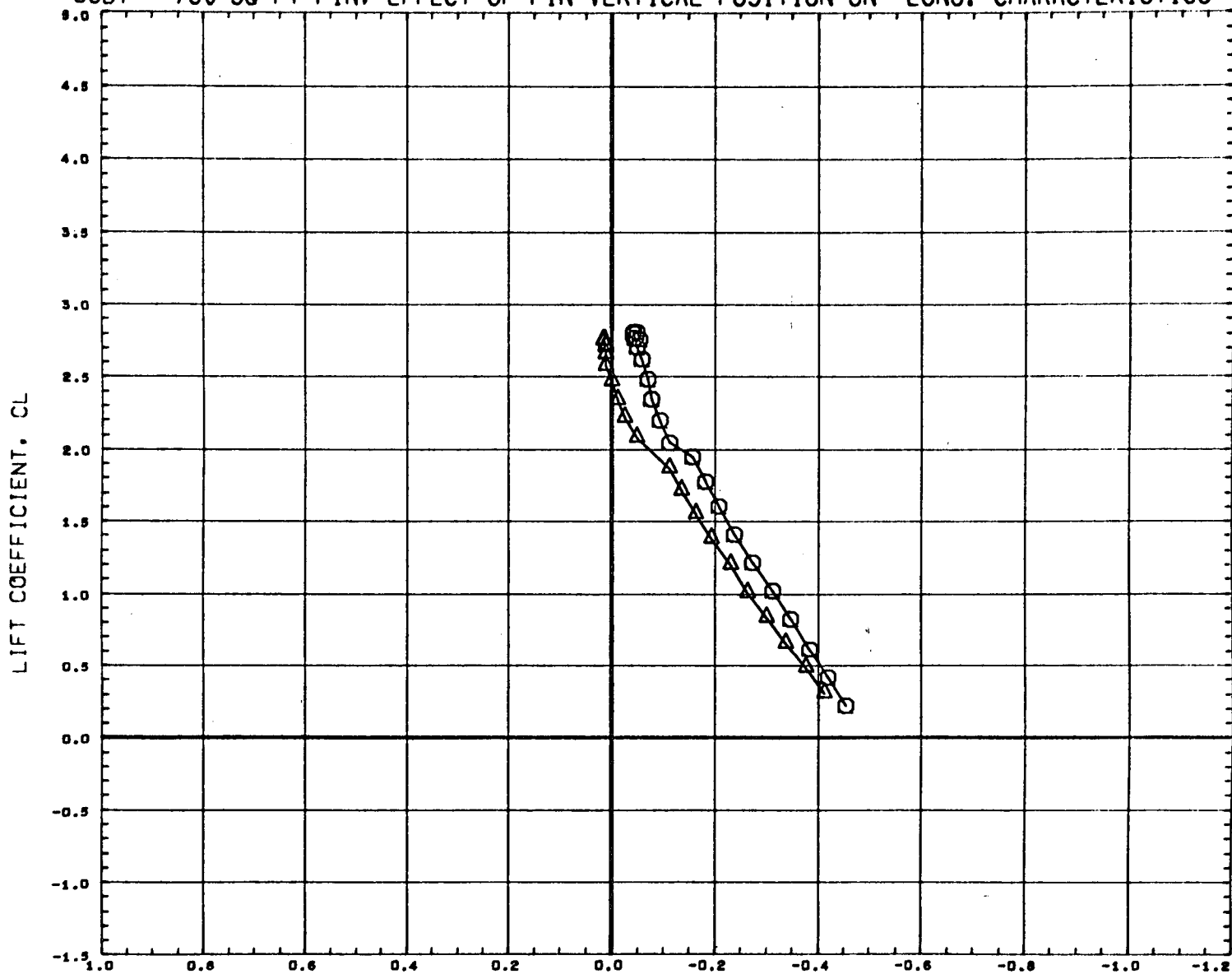
| BETA  | POS   | DELFE   | DELFA |
|-------|-------|---------|-------|
| 0.000 | 1.000 | -45.000 | 0.000 |
| 0.000 | 2.000 | -45.000 | 0.000 |

REFERENCE INFORMATION

|       |        |        |
|-------|--------|--------|
| SREF  | 0.9650 | SQ. IN |
| LREF  | 4.9080 | IN.    |
| BREF  | 4.9080 | IN.    |
| XMRP  | 2.9450 | IN.    |
| YMRP  | 0.0000 | IN.    |
| ZMRP  | 0.0000 | IN.    |
| SCALE | 0.0028 |        |

MACH 1.196

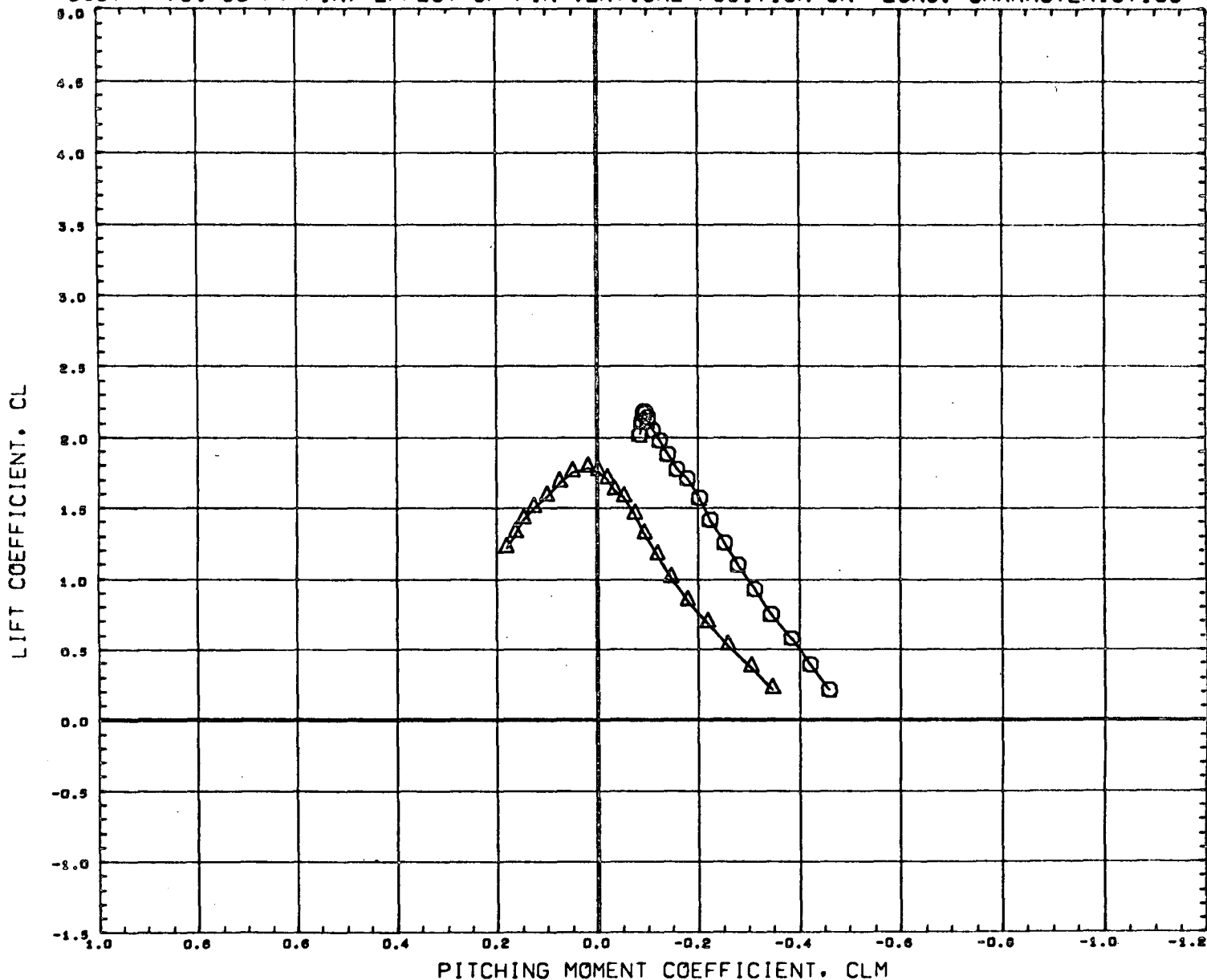
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S13)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -45.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S25)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                              |       |       |         |       | BREF 4.9080 IN.       |
|                 |                              |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                              |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0028          |

MACH 1.955

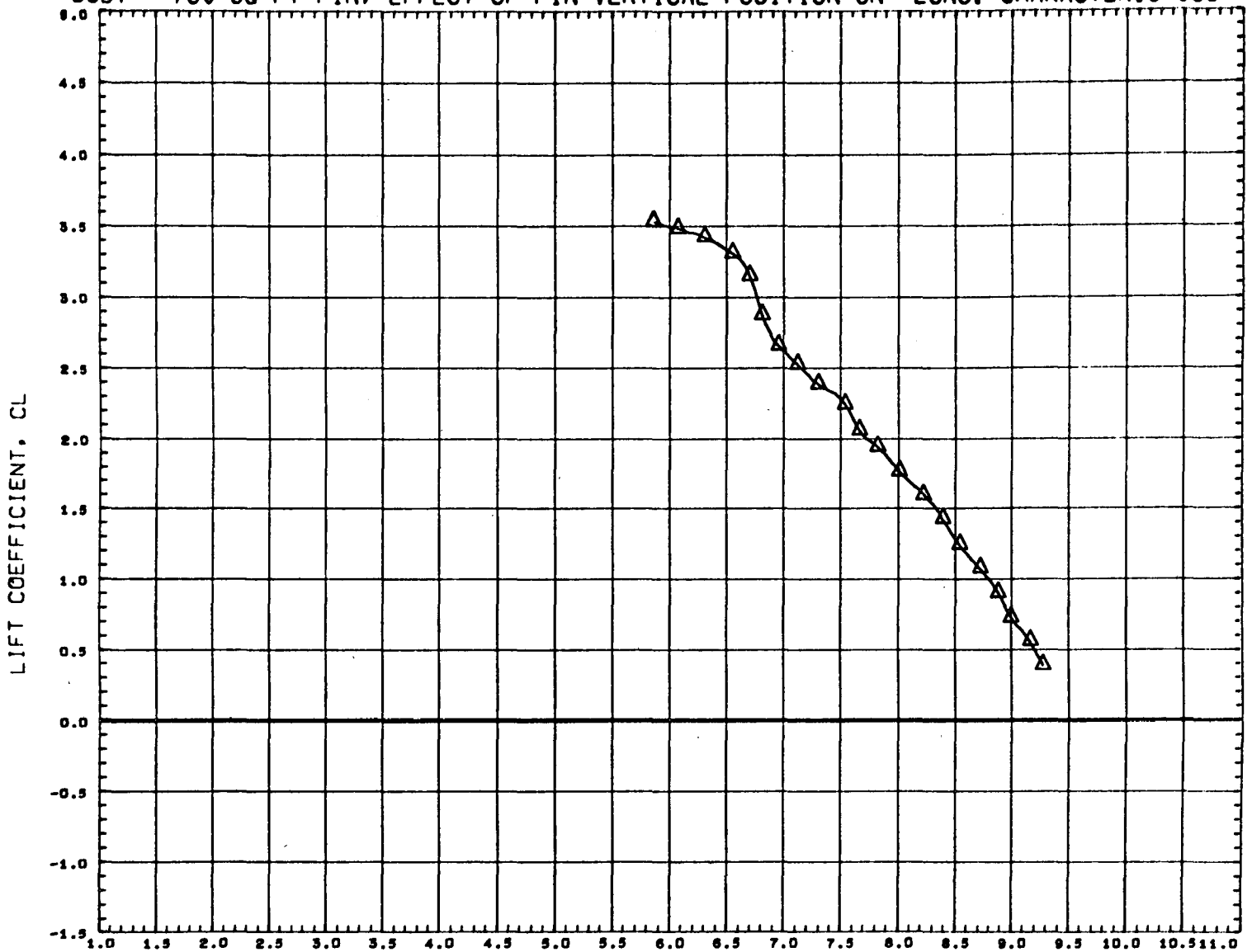
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S13)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S25)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRP                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

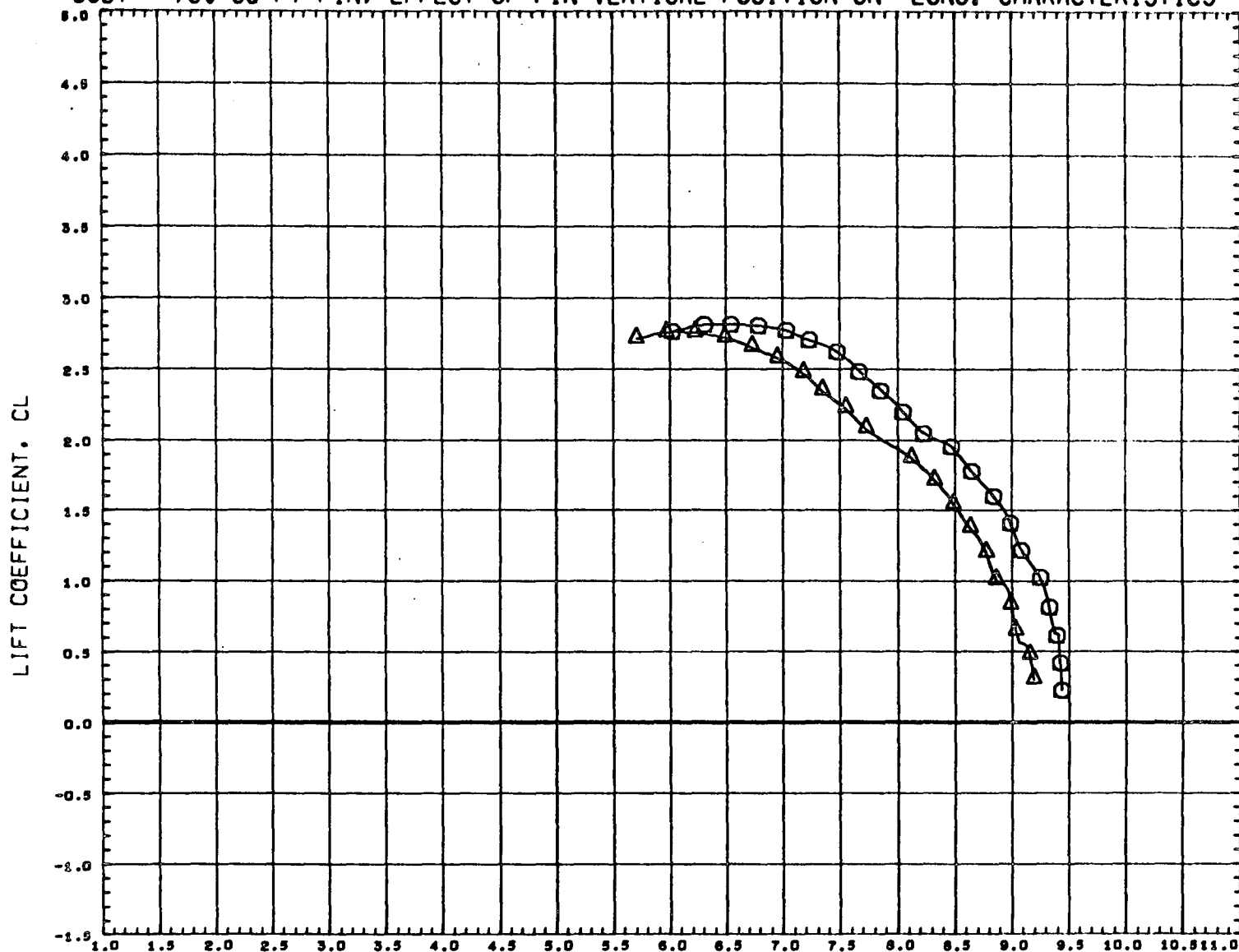


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S13)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S25)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | LREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | BREF                  | 4.9080 IN.    |
|                 |                                         |       |       |         |       | XMRF                  | 2.9450 IN.    |
|                 |                                         |       |       |         |       | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.196

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

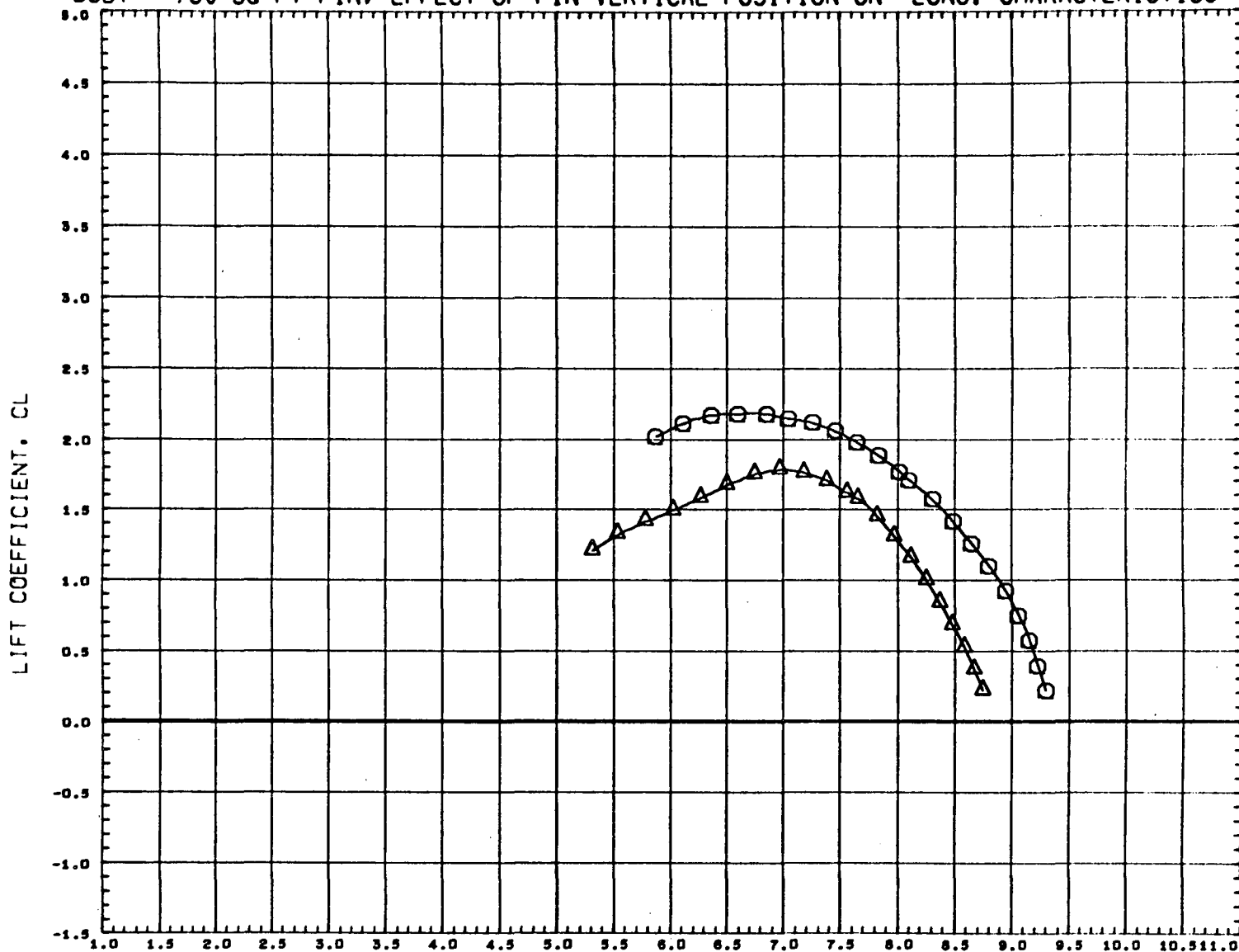


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -45.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                              |       |       |         |       | BREF 4.9080 IN.       |
|                 |                              |       |       |         |       | XHRP 2.9450 IN.       |
|                 |                              |       |       |         |       | YHRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZHRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0028          |

MACH 1.955

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON LONG. CHARACTERISTICS

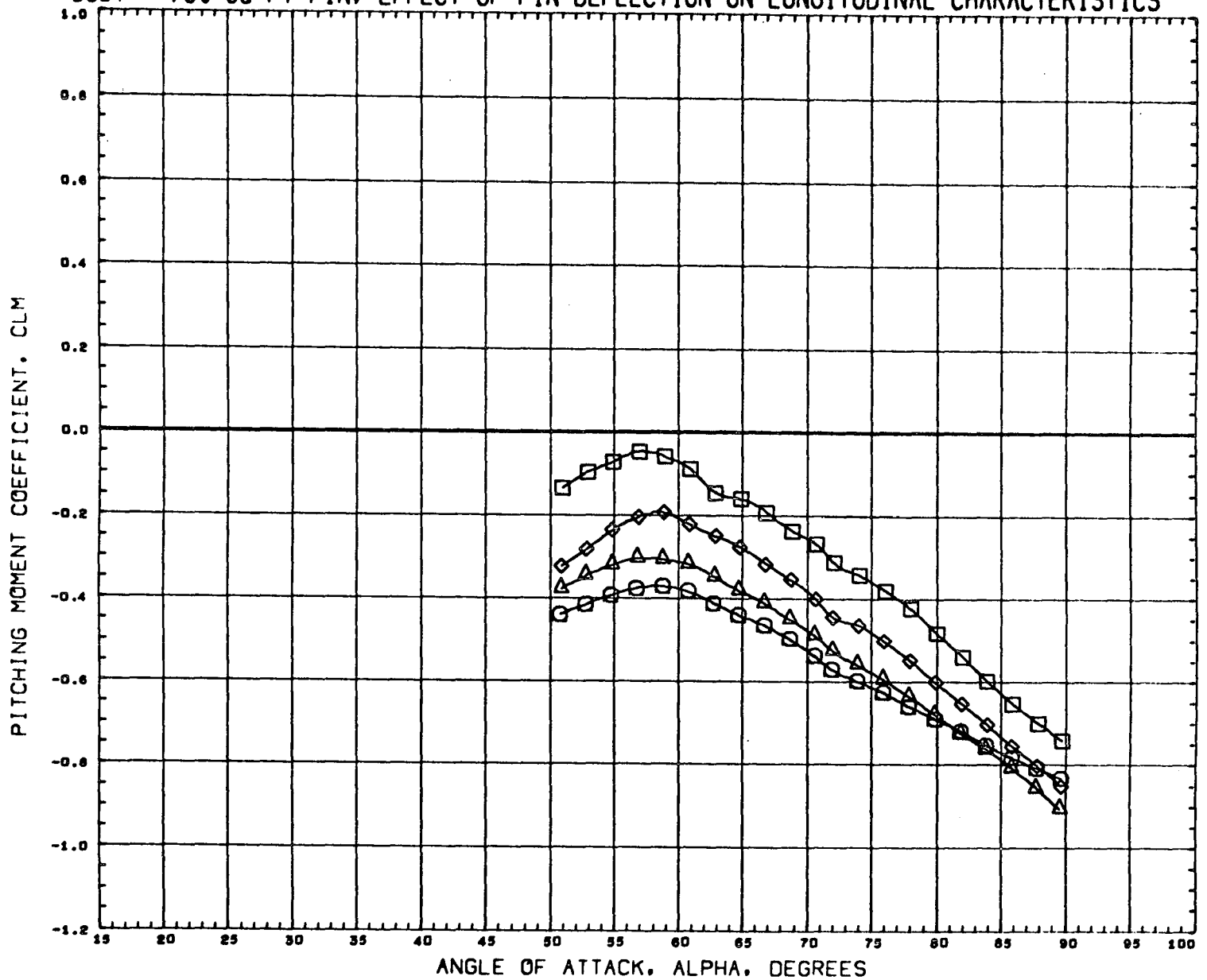


DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (B59913)        | M3FC TWT 524 33 FOOT BOOSTER | 0.000 | 1.000 | -45.000 | 0.000 | SREF 0.9650 SQ. IN    |
| (B59925)        | M3FC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | LREF 4.9080 IN.       |
|                 |                              |       |       |         |       | BREF 4.9080 IN.       |
|                 |                              |       |       |         |       | XMRP 2.9450 IN.       |
|                 |                              |       |       |         |       | YMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

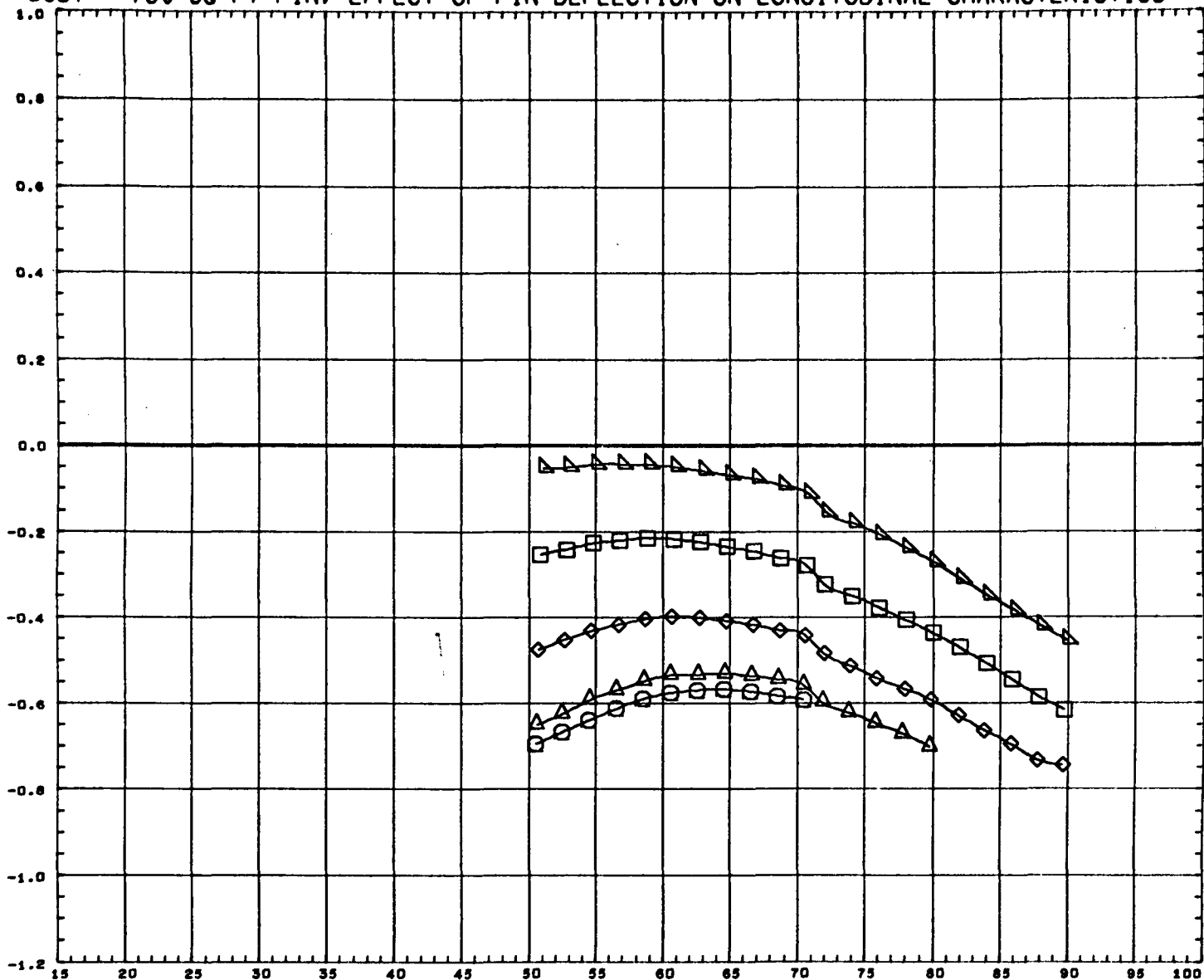


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0026          |

MACH 1.198

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

PITCHING MOMENT COEFFICIENT, CLM

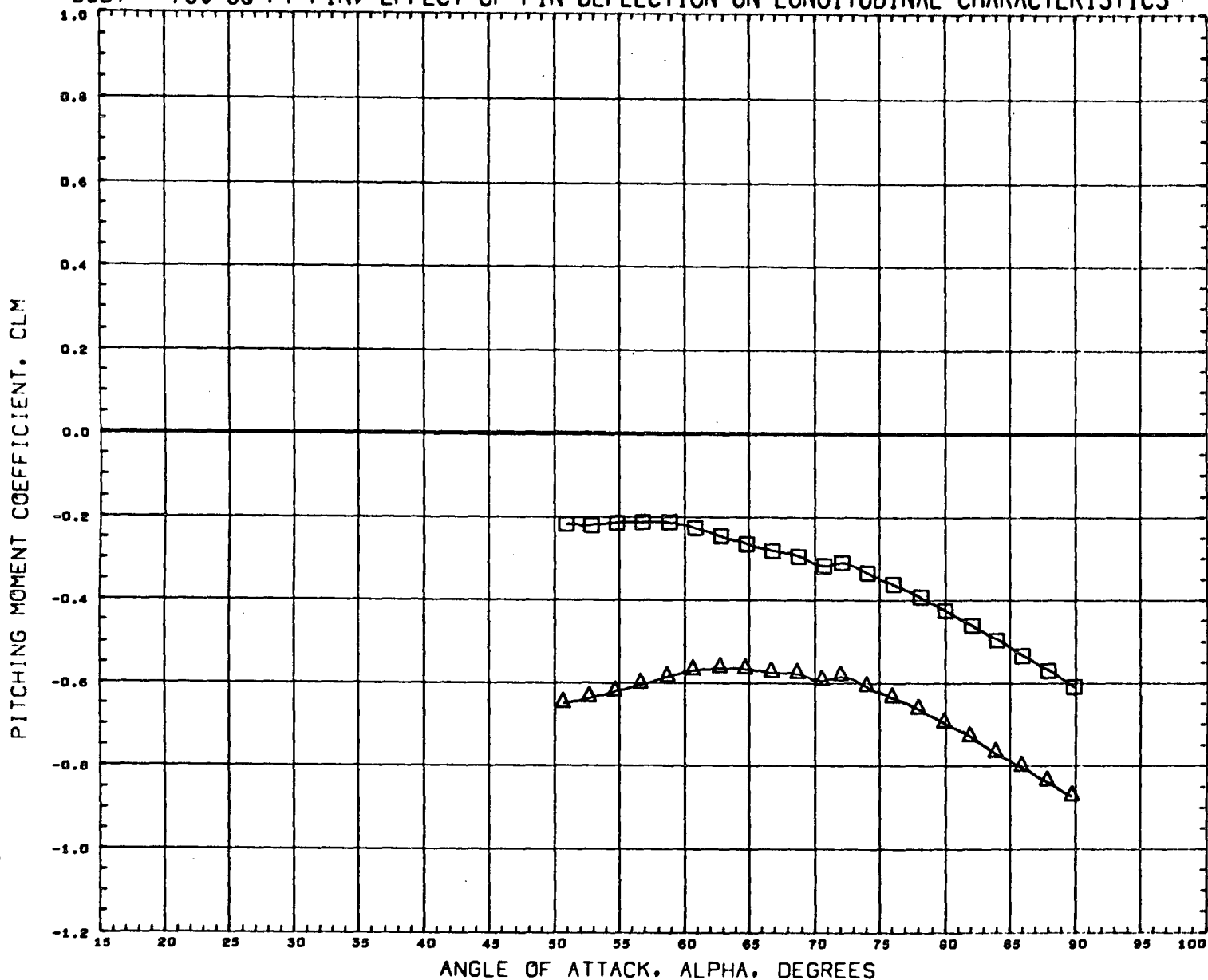


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859309)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859311)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859313)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.964

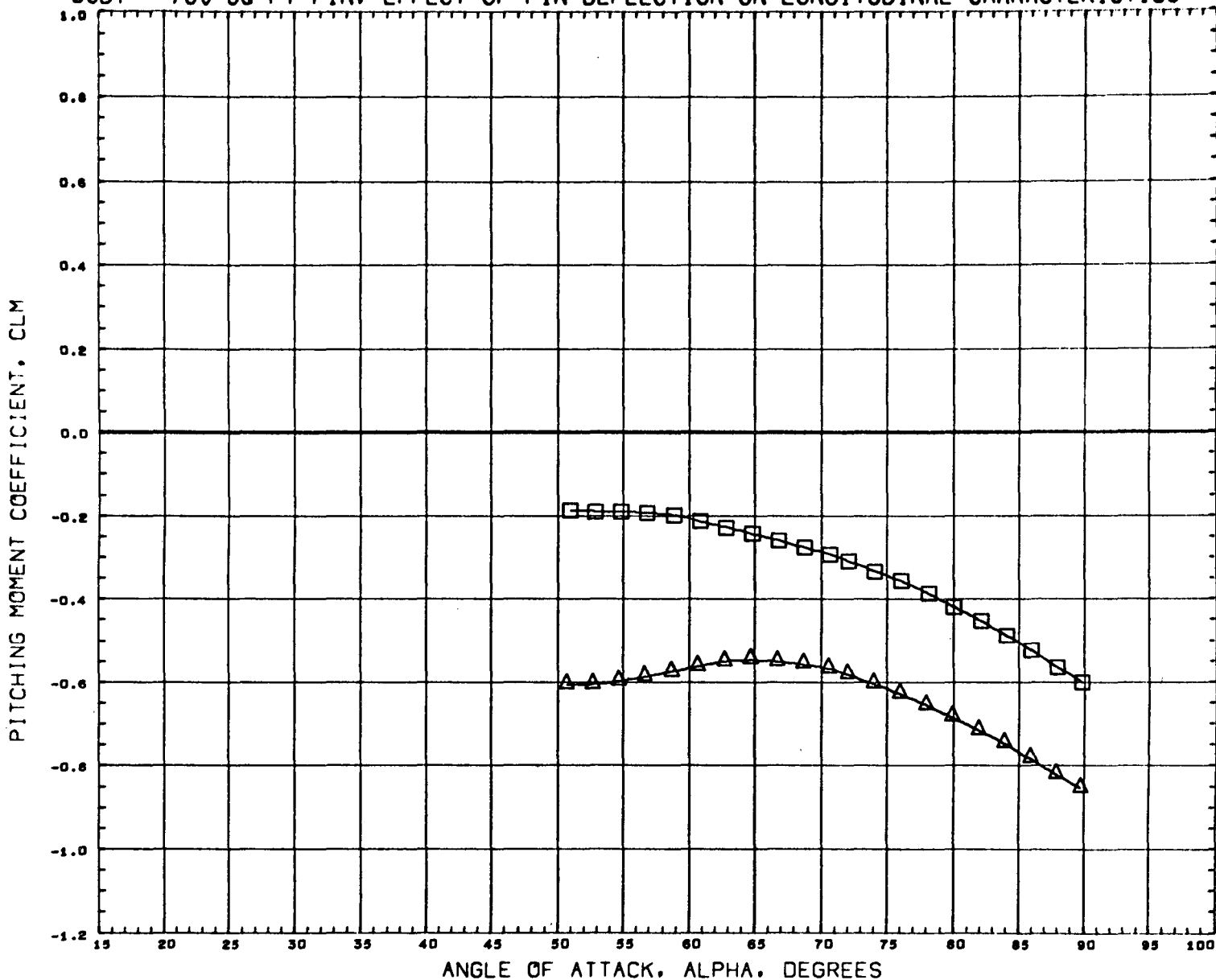
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859309)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859311)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | YMRP                  | 2.9450 IN.    |
| (859313)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

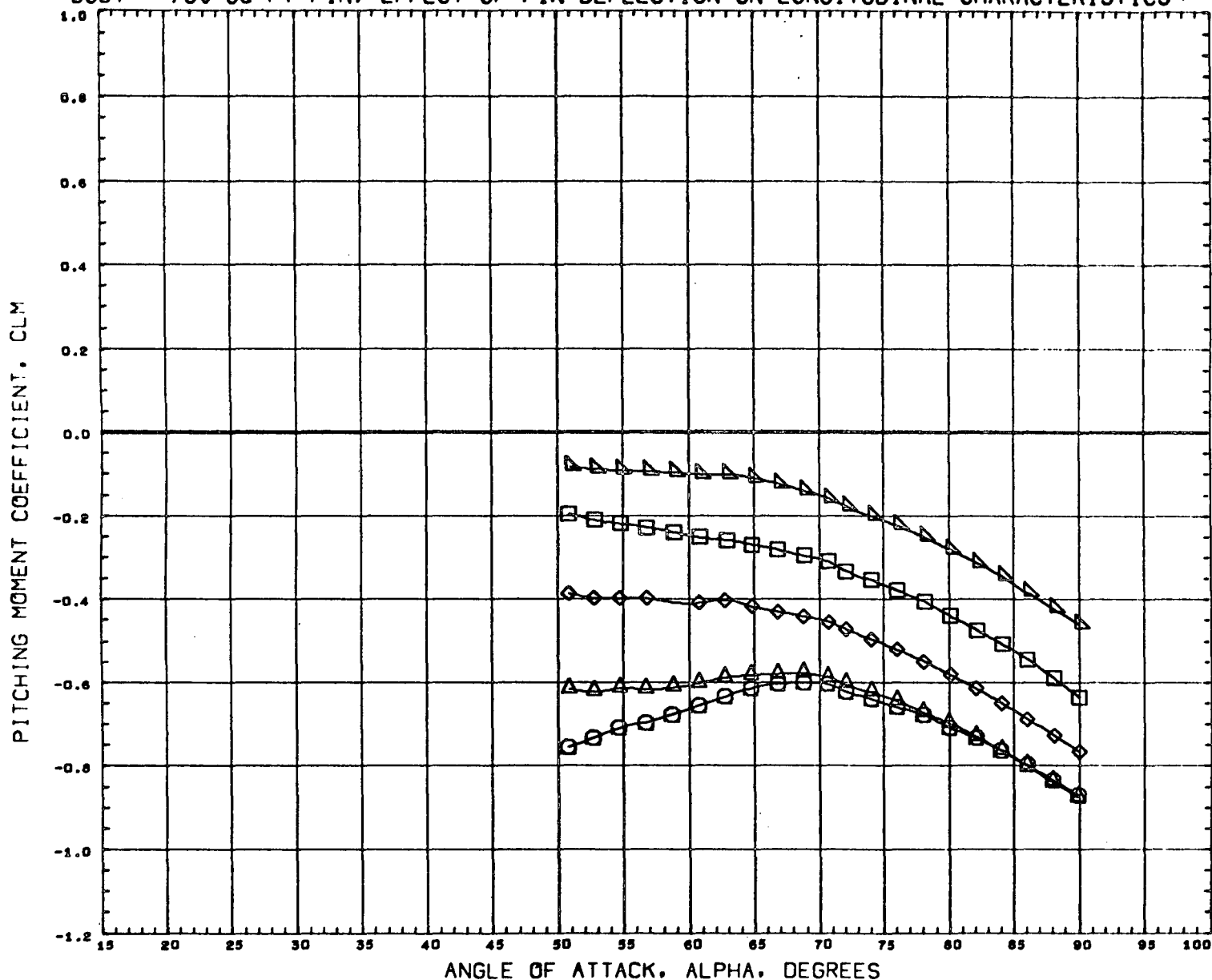
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

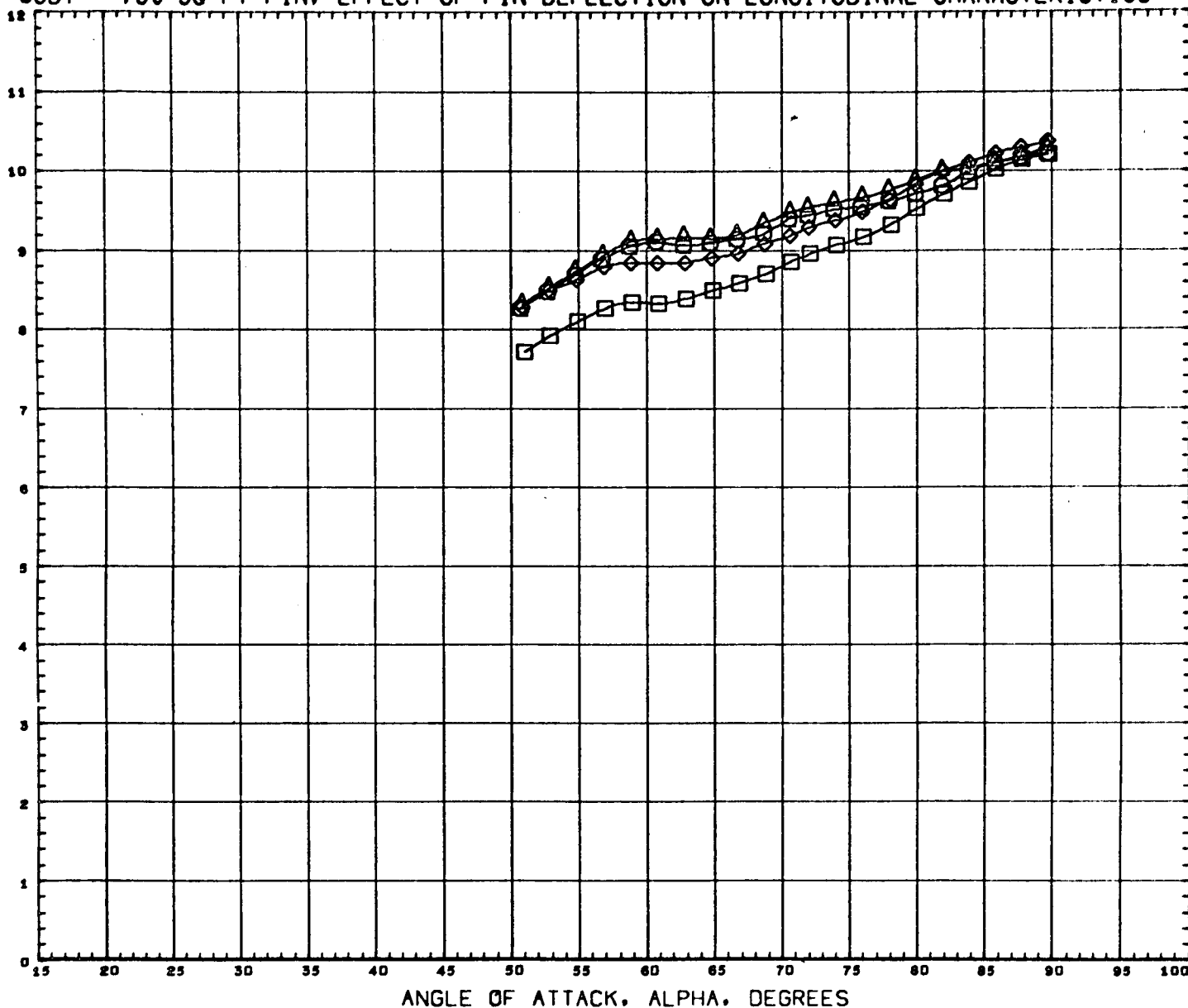


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | YMRP 2.9450 IN.       |
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

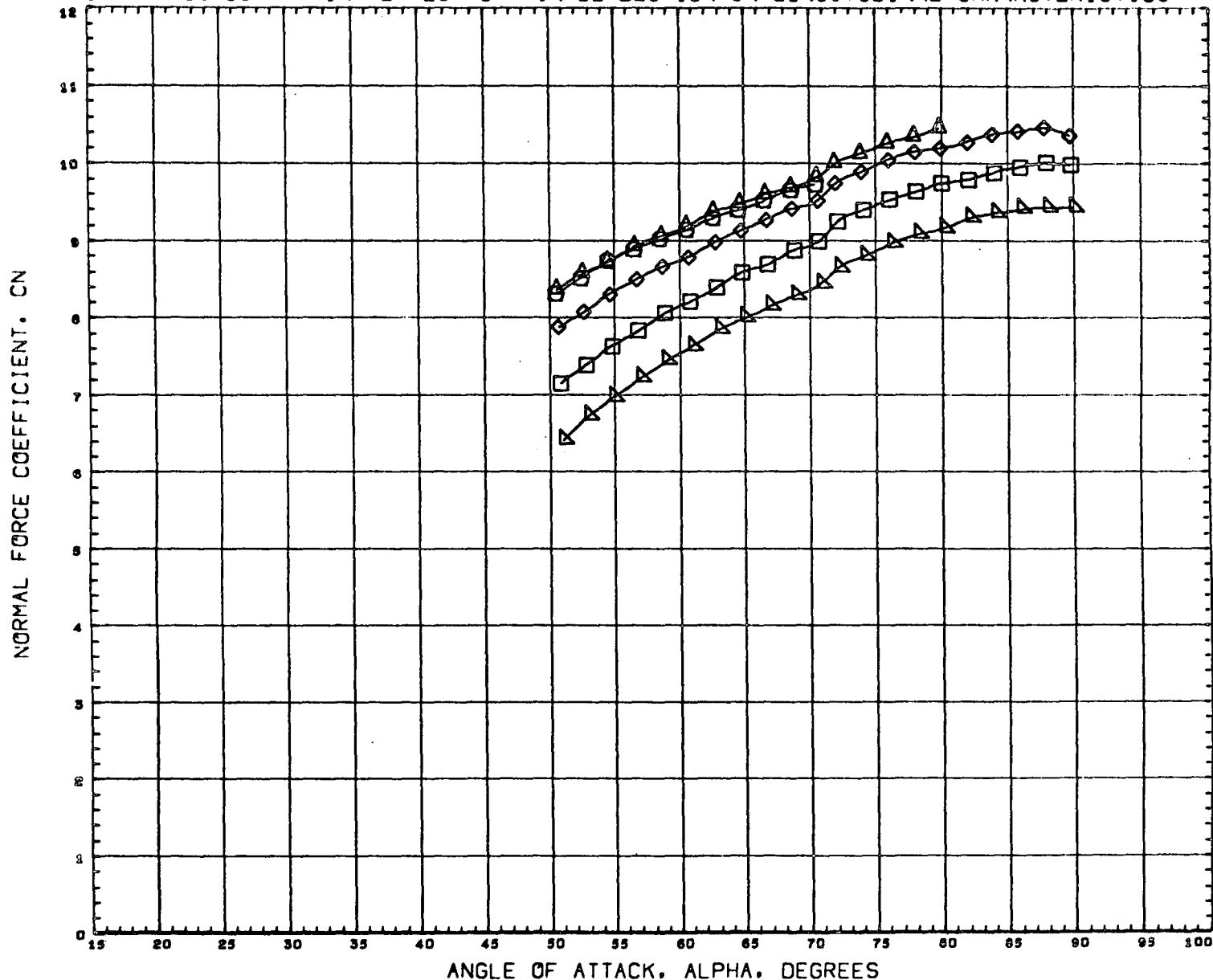
NORMAL FORCE COEFFICIENT, CN



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.198

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

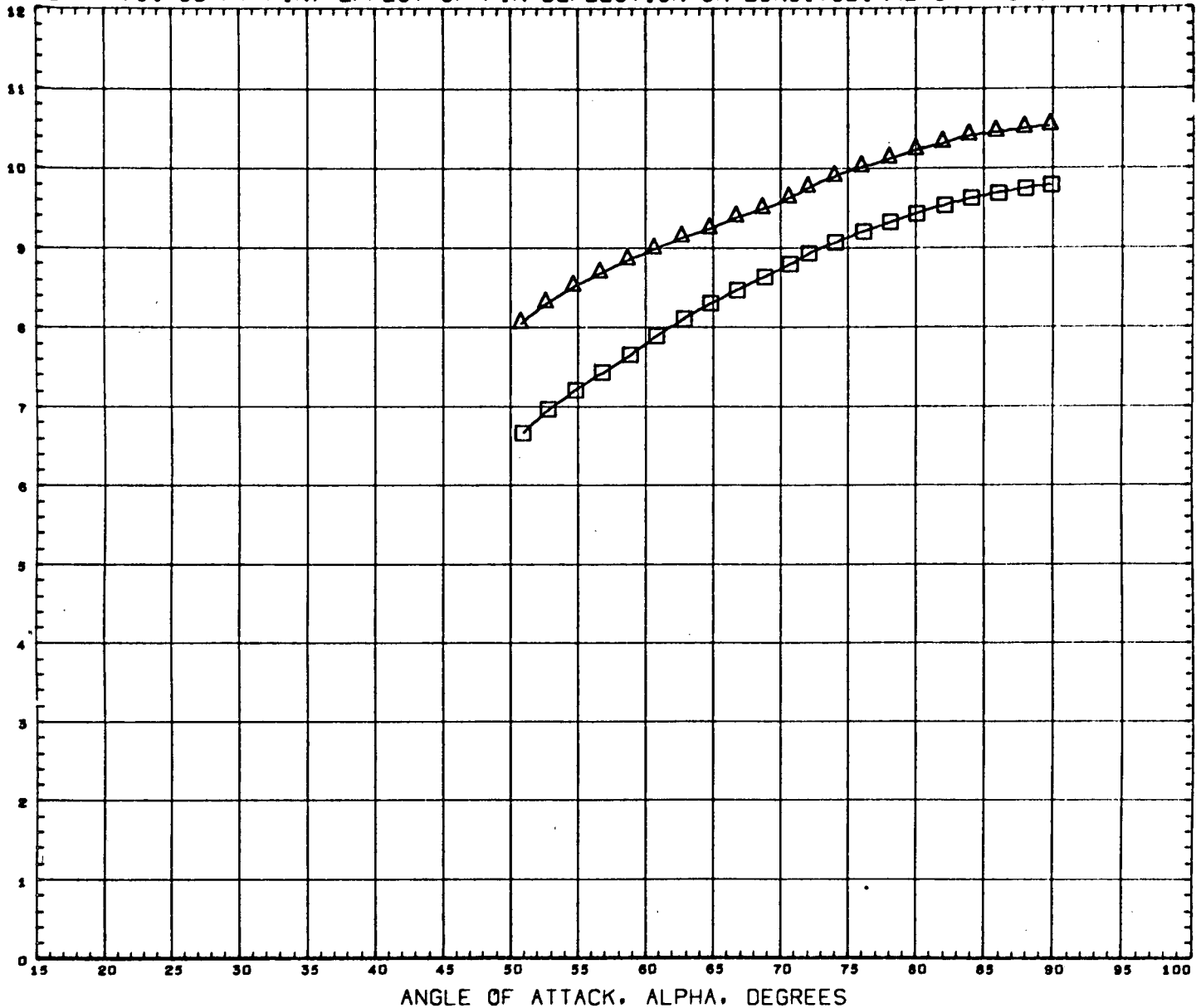


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.964

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

NORMAL FORCE COEFFICIENT, CN

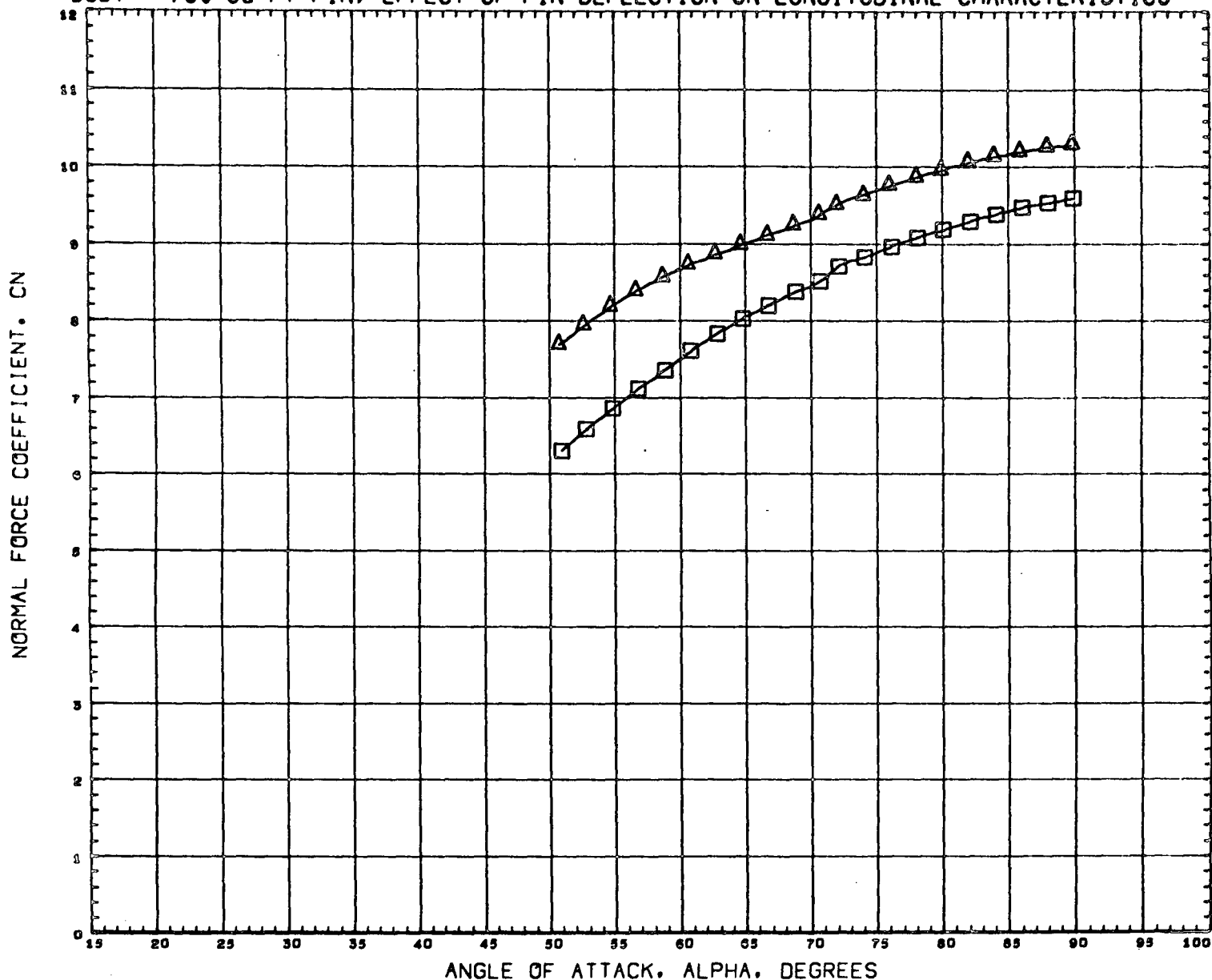


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59309)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59311)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (B59313)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

57

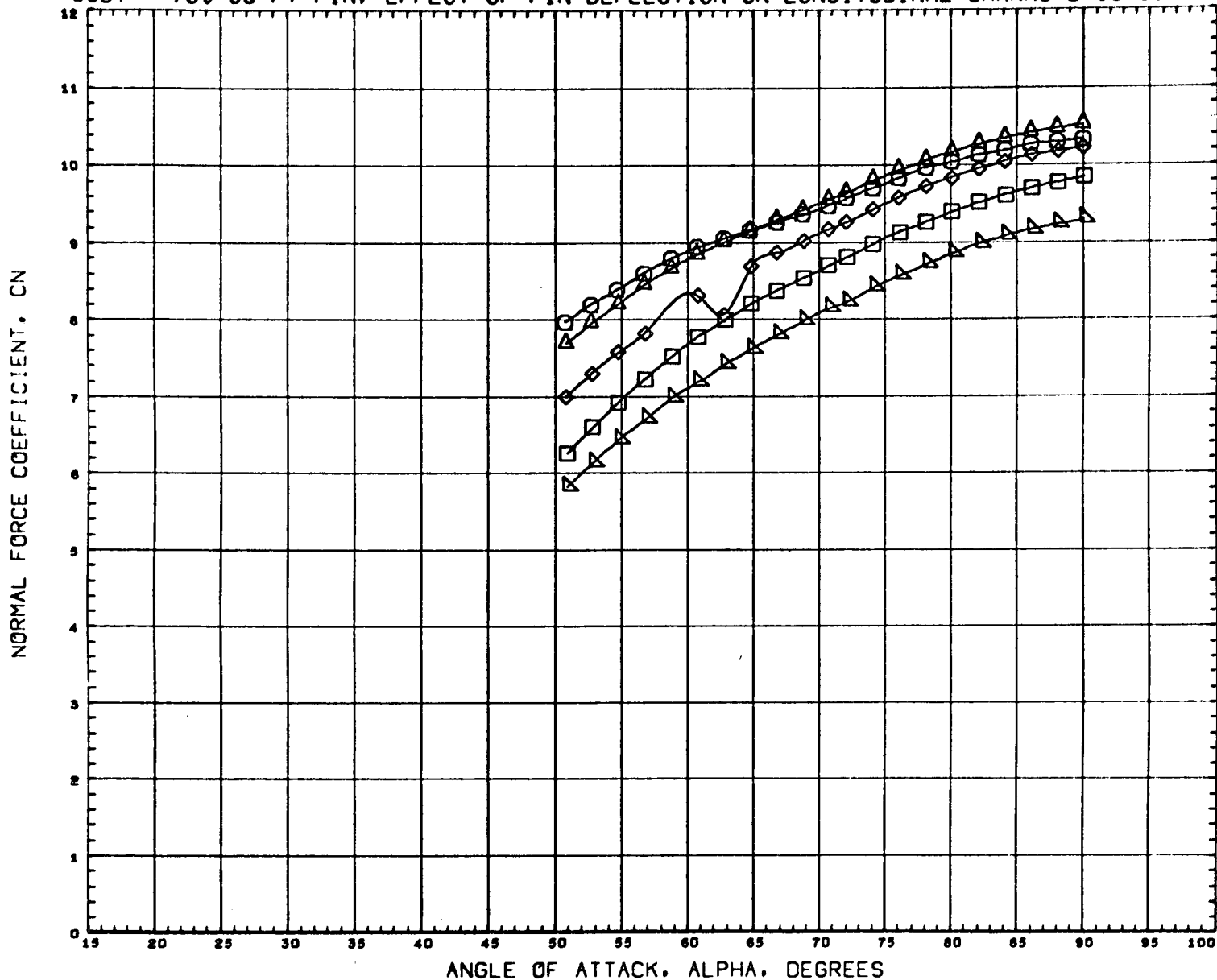
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

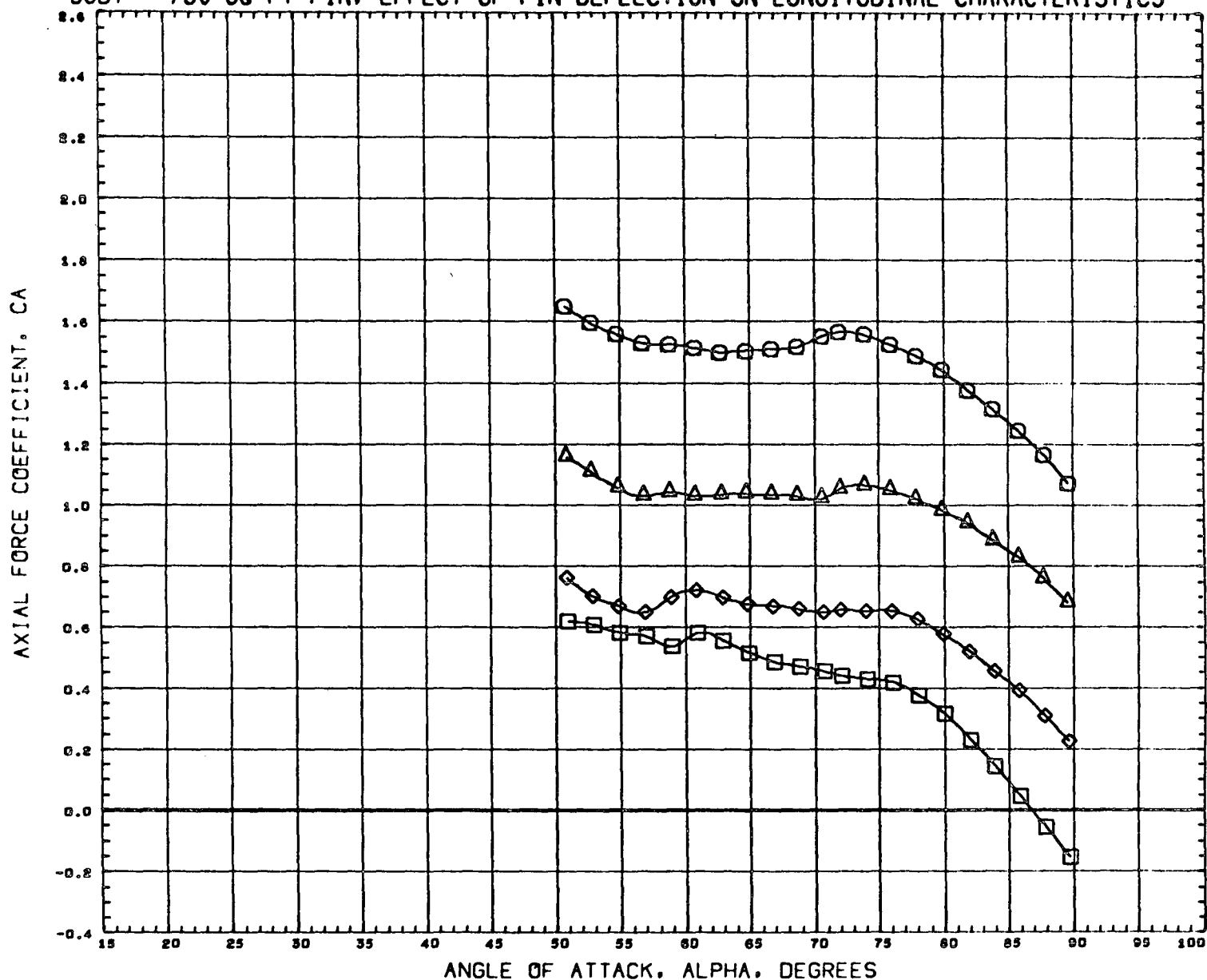
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59309)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59310)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59311)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59312)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (B59313)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

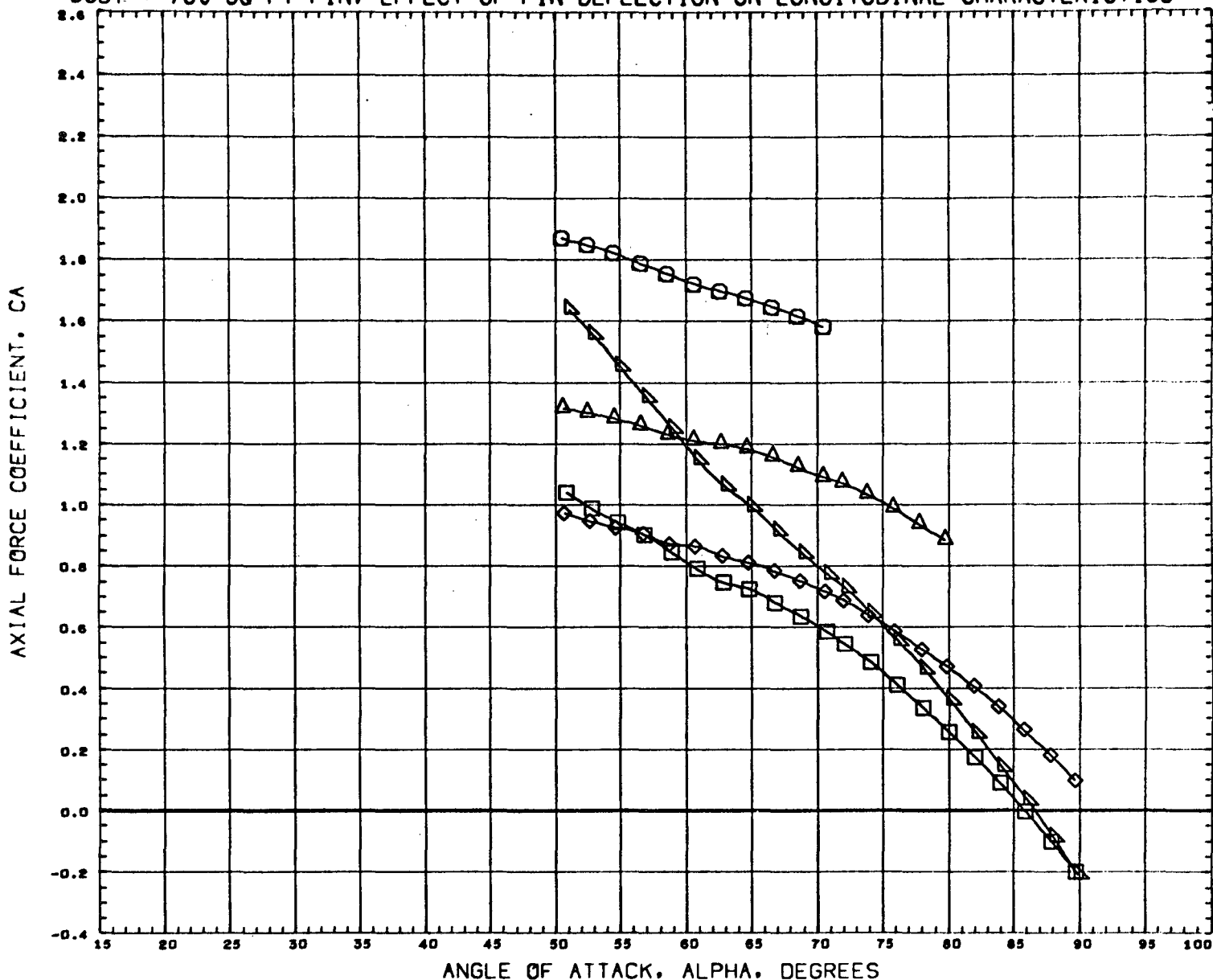
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.198

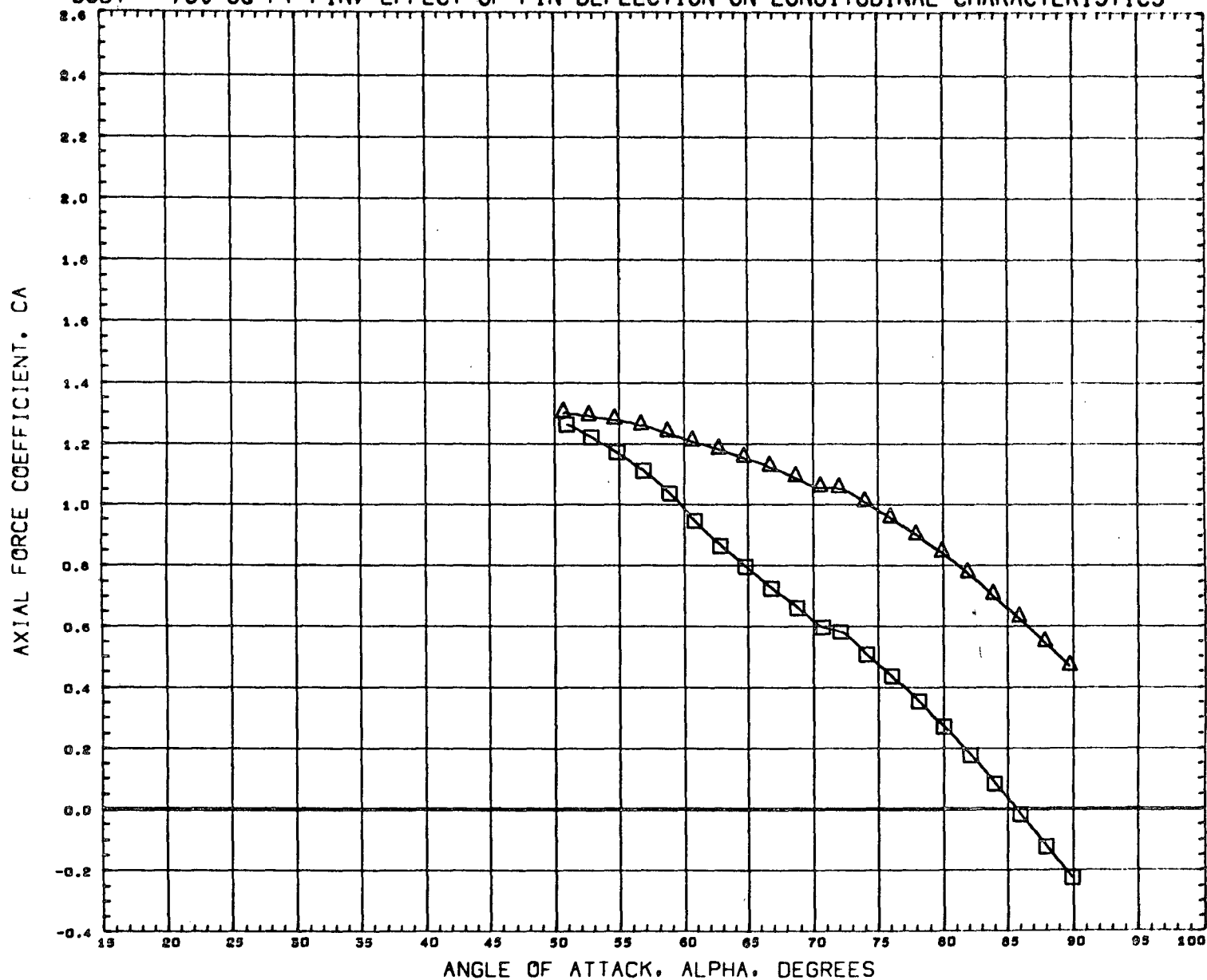
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (859513)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.964

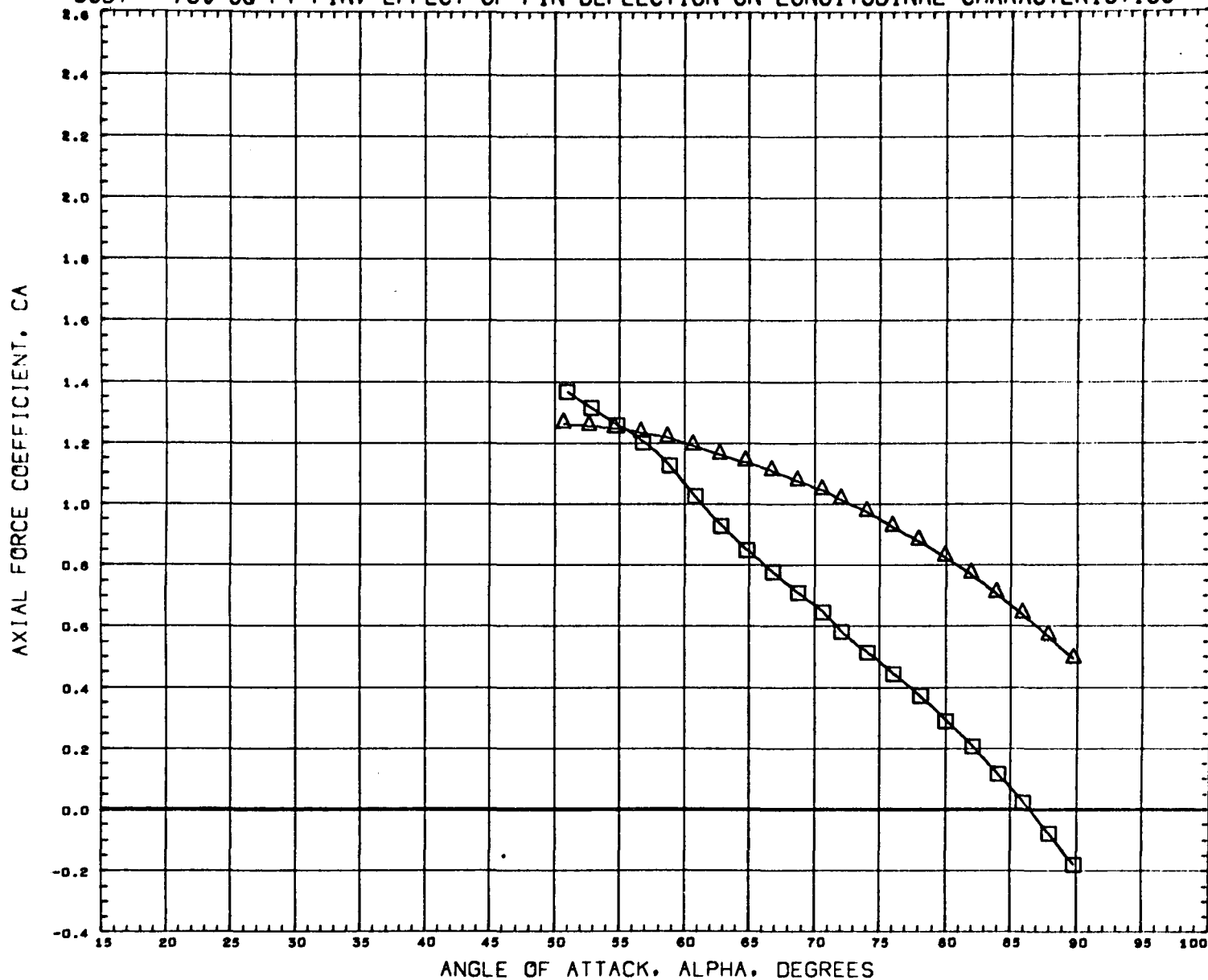
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

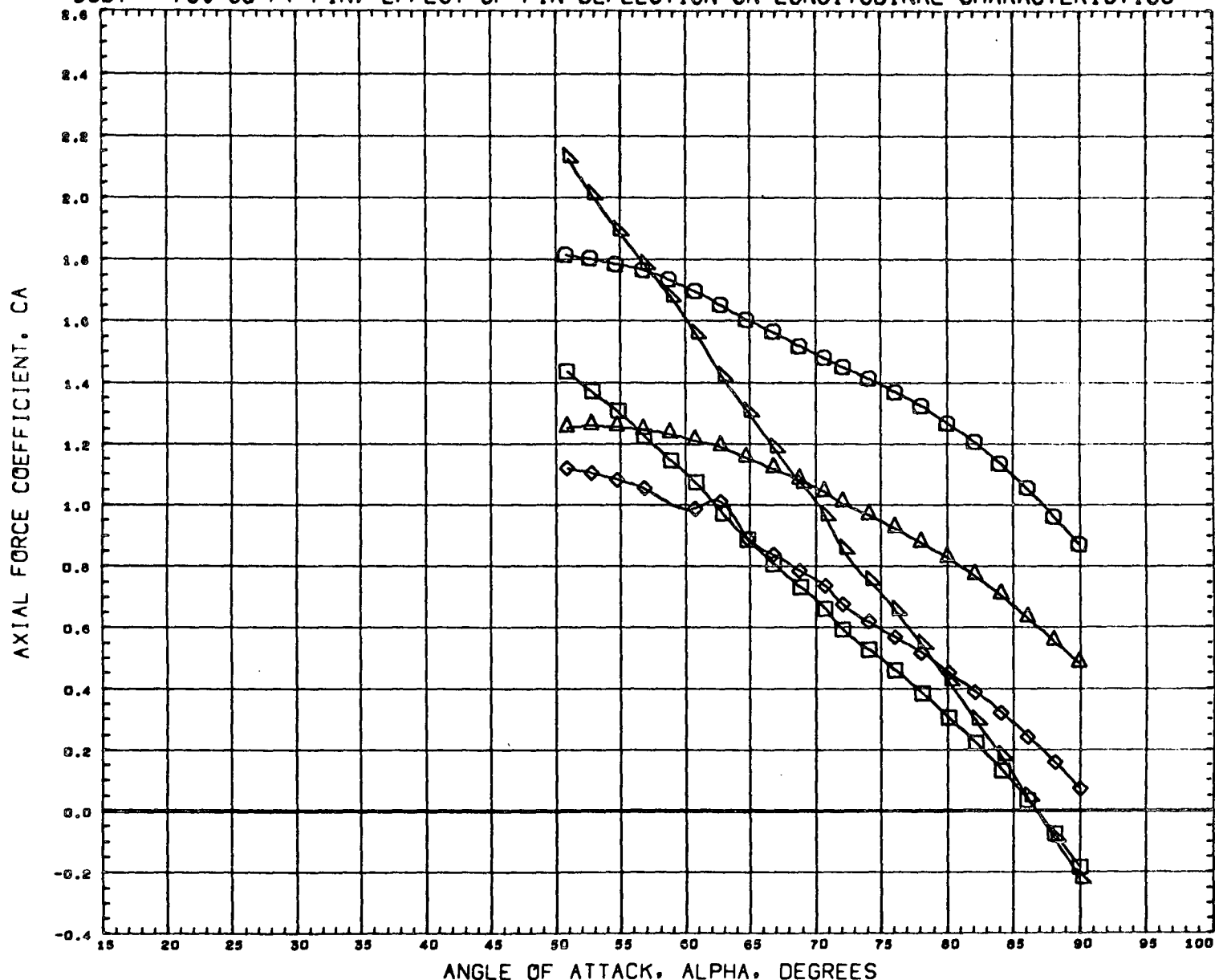
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

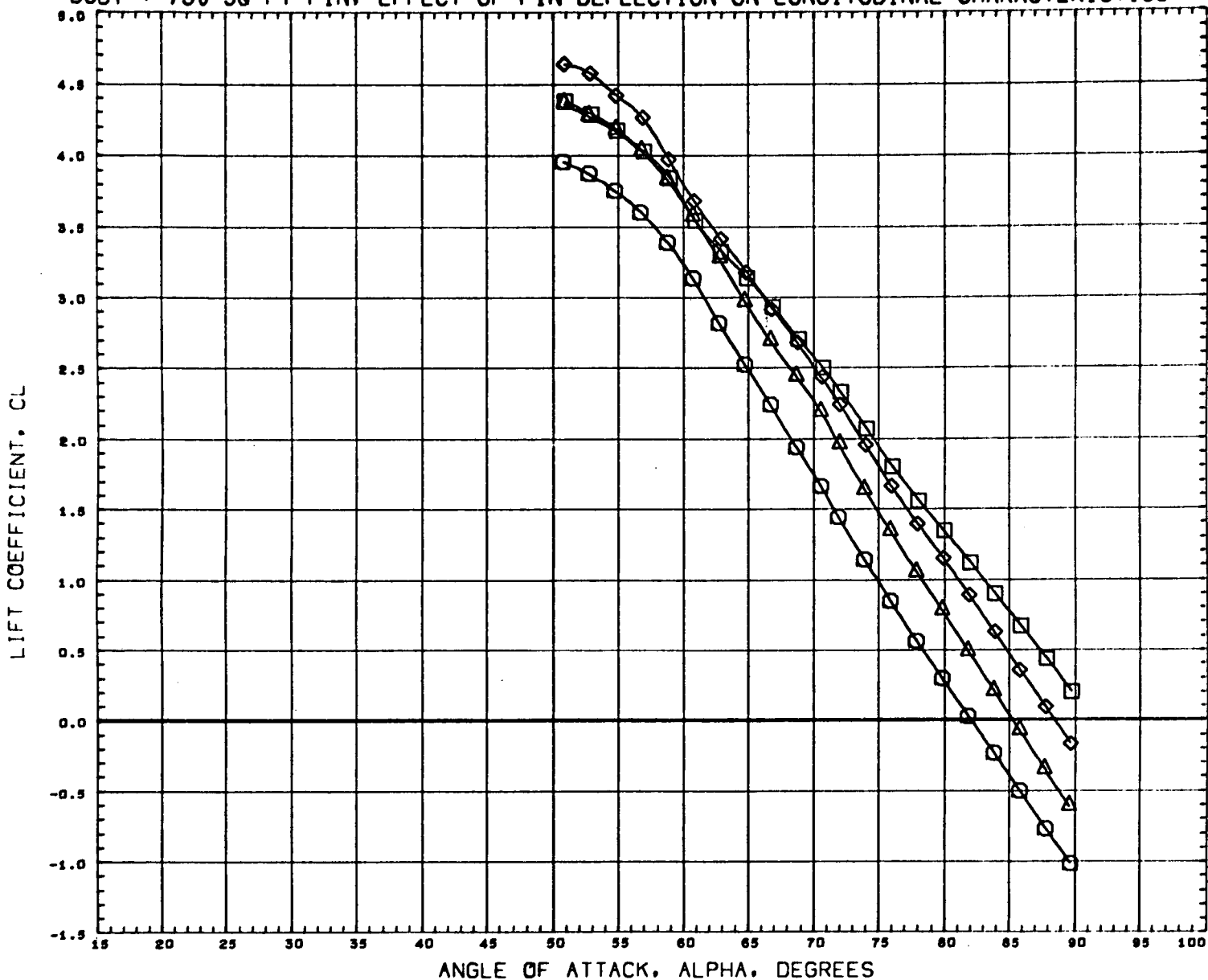


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 sq. IN    |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.999

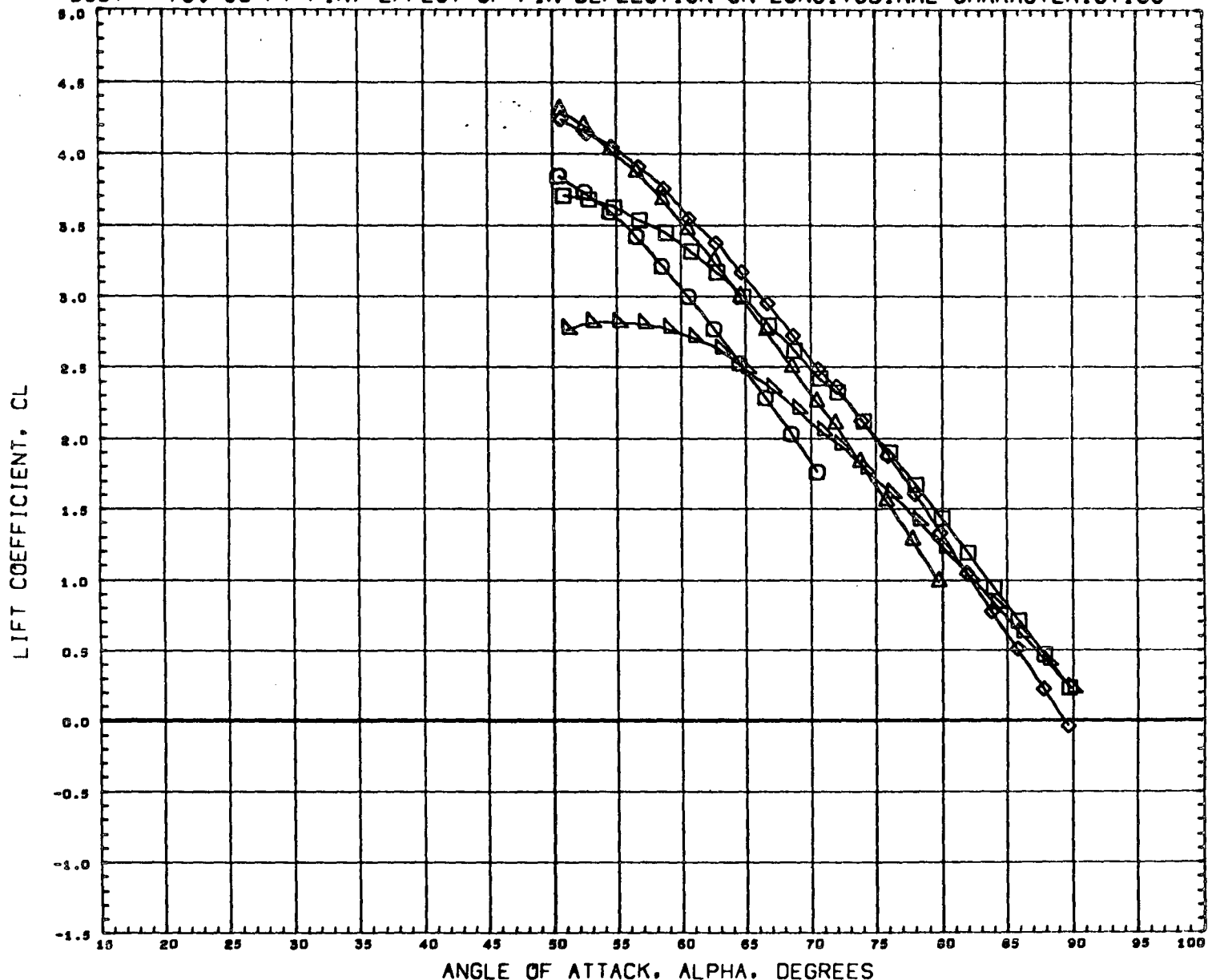
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMPP                  | 2.9450 IN.    |
| (B59513)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMPP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMPP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.198

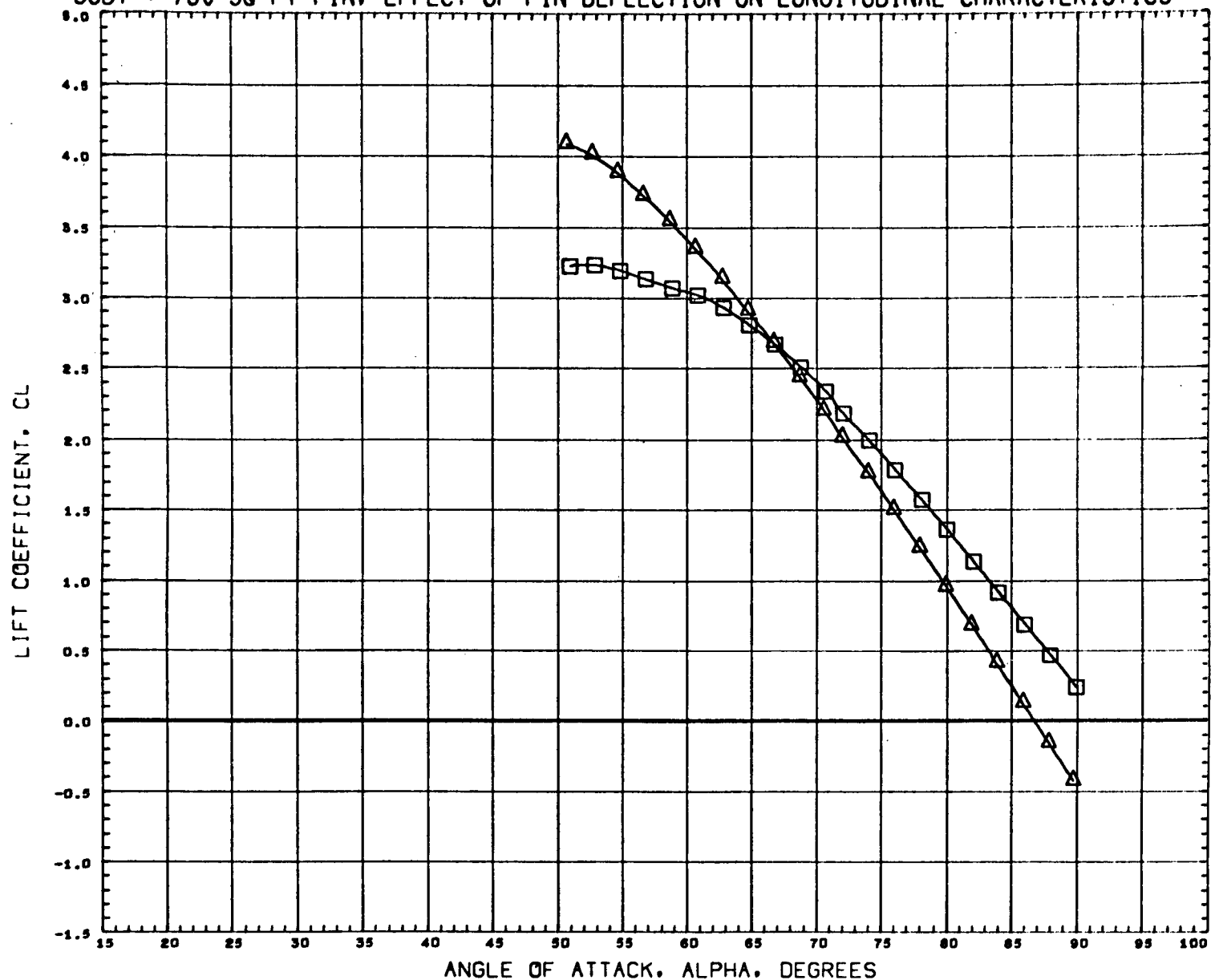
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0026          |

MACH 1.964

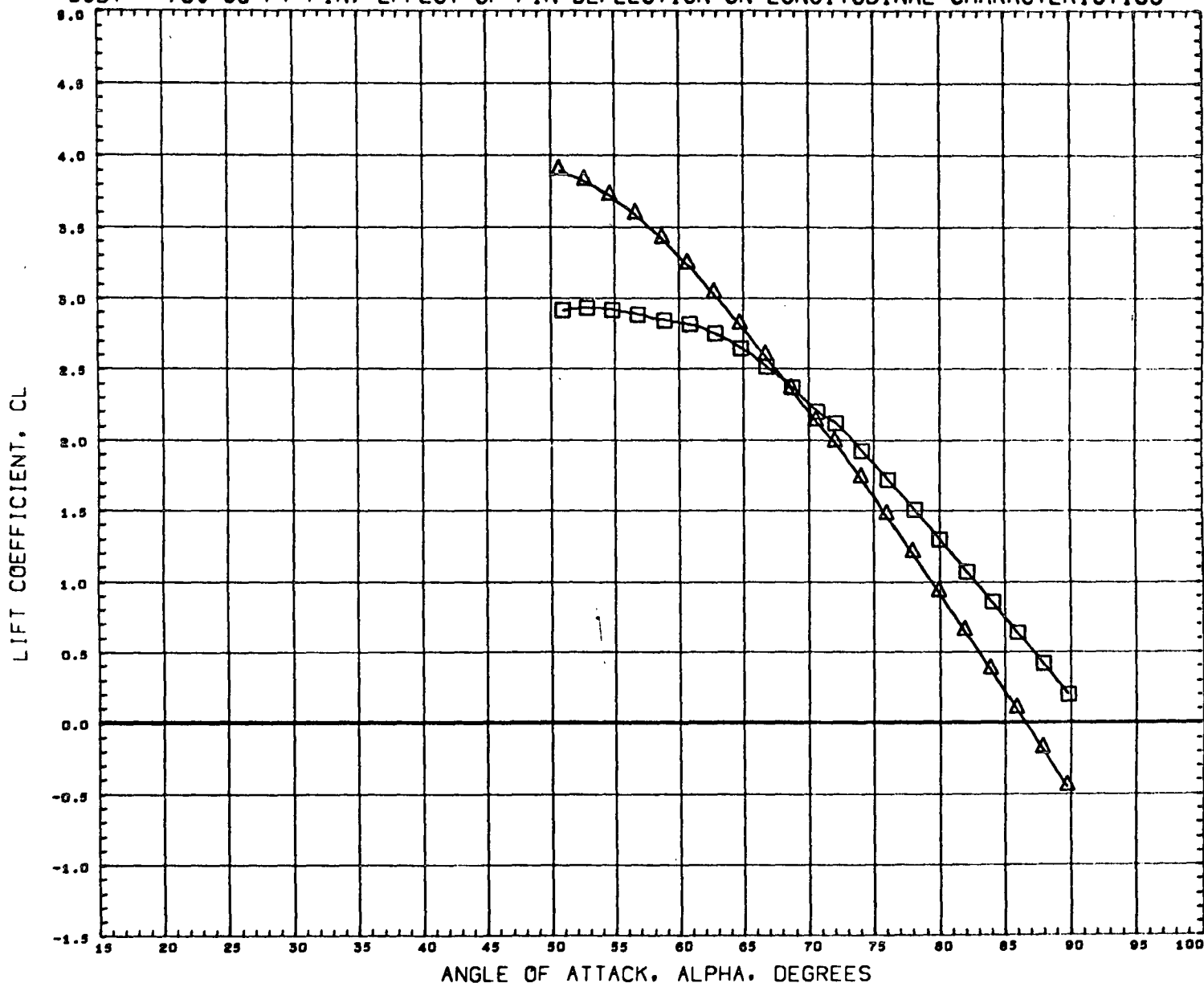
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRF                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

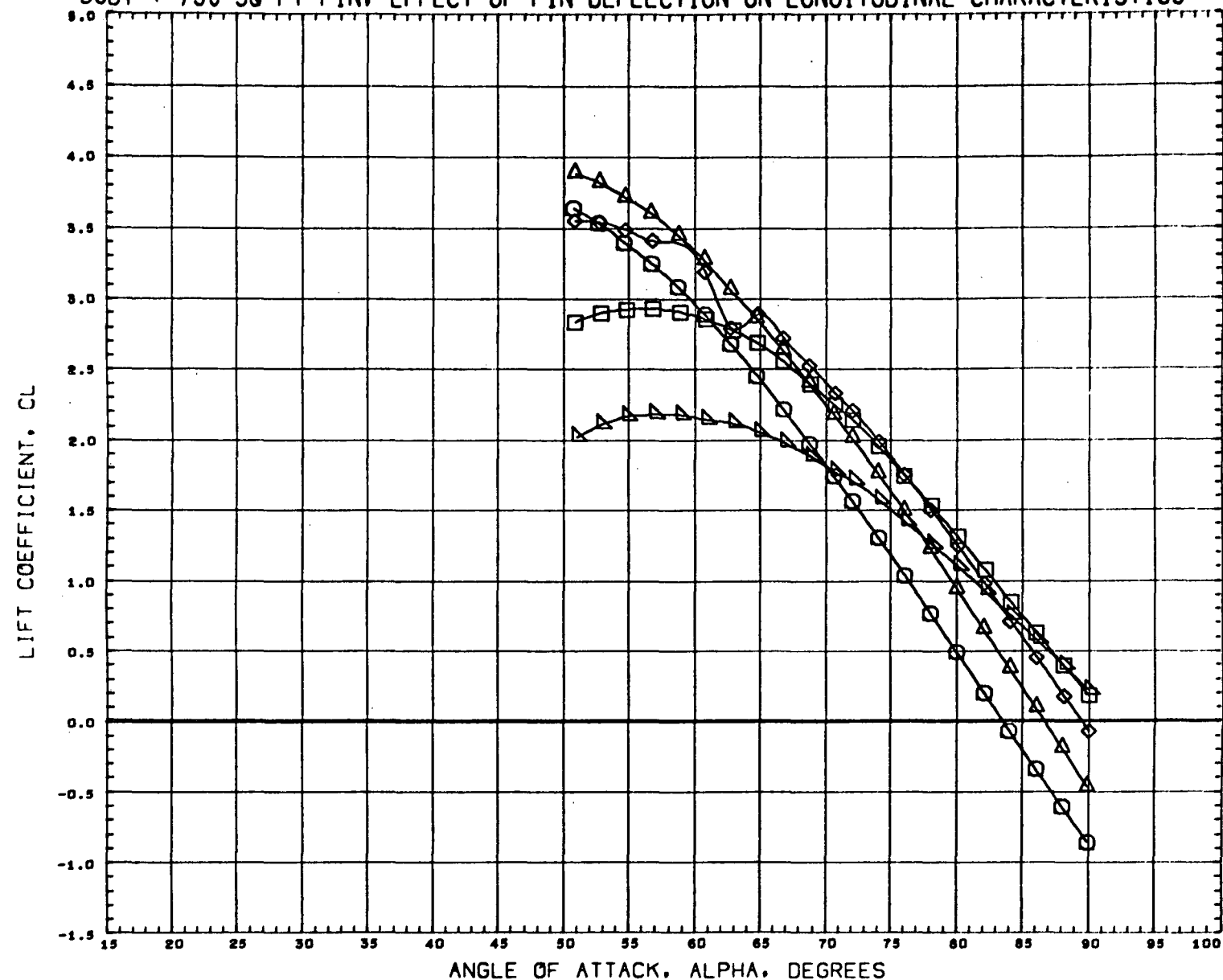
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

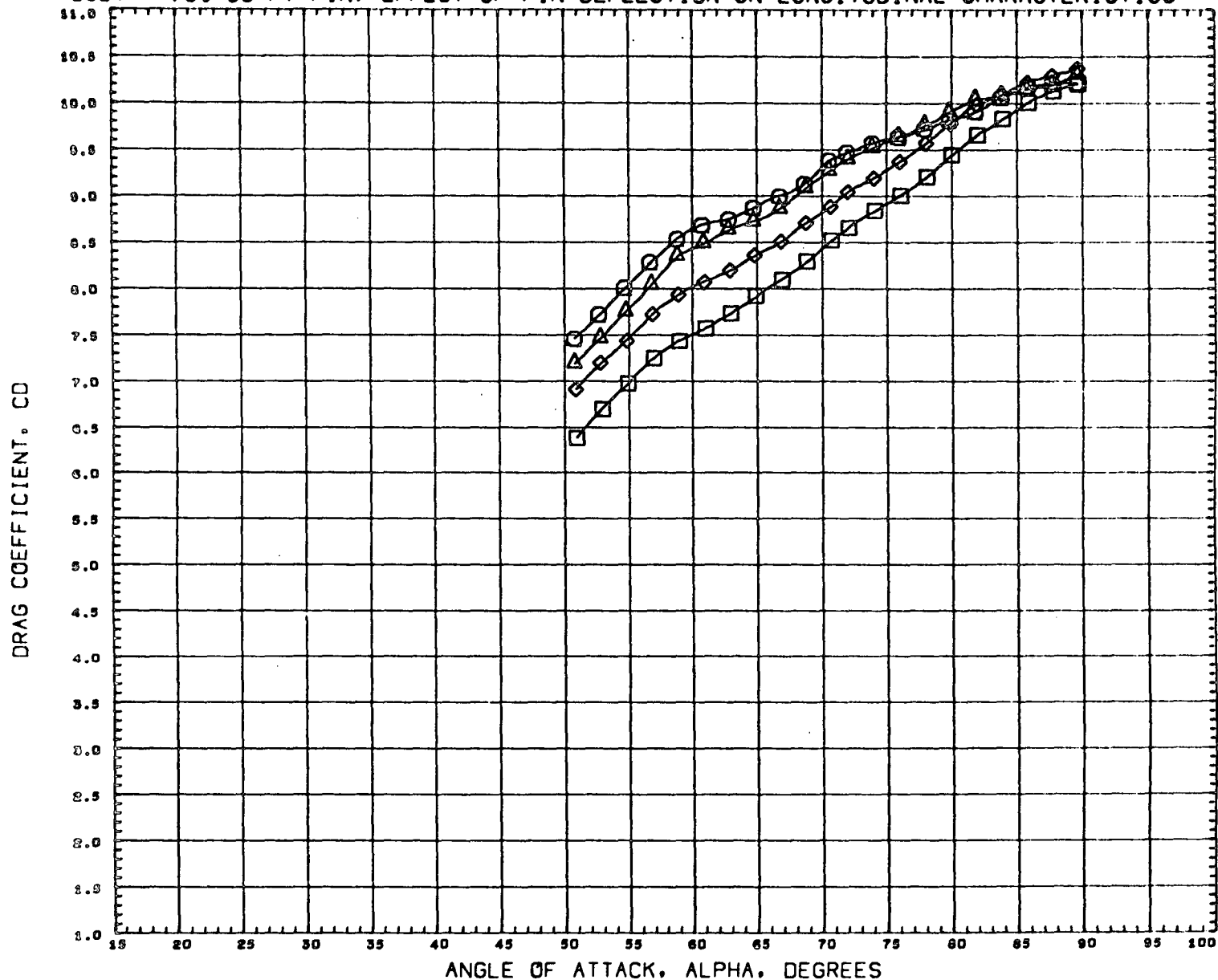
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0026          |

MACH 4.959

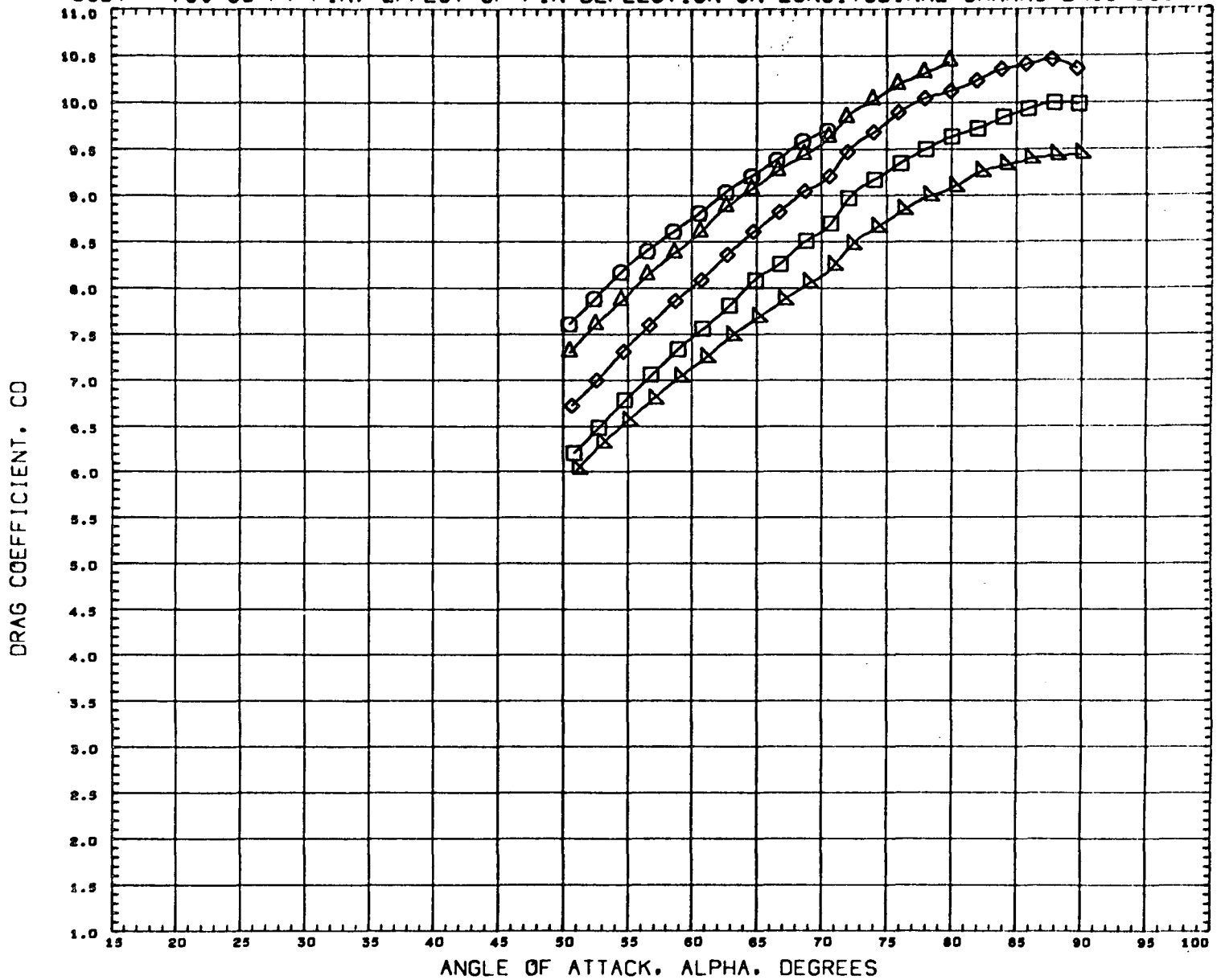
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 30. IN |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | YMRP                  | 2.9450 IN.    |
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.198

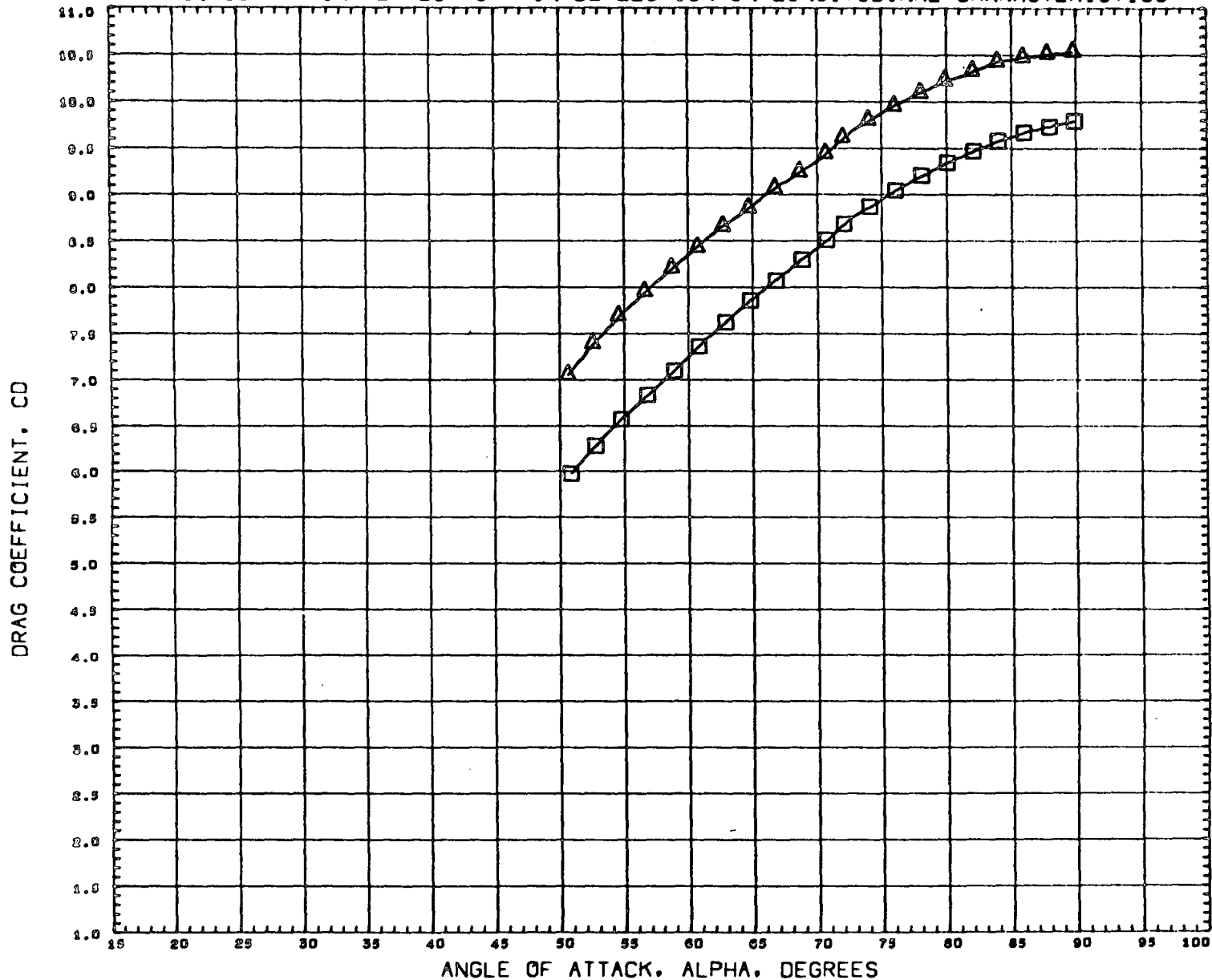
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859513)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.964

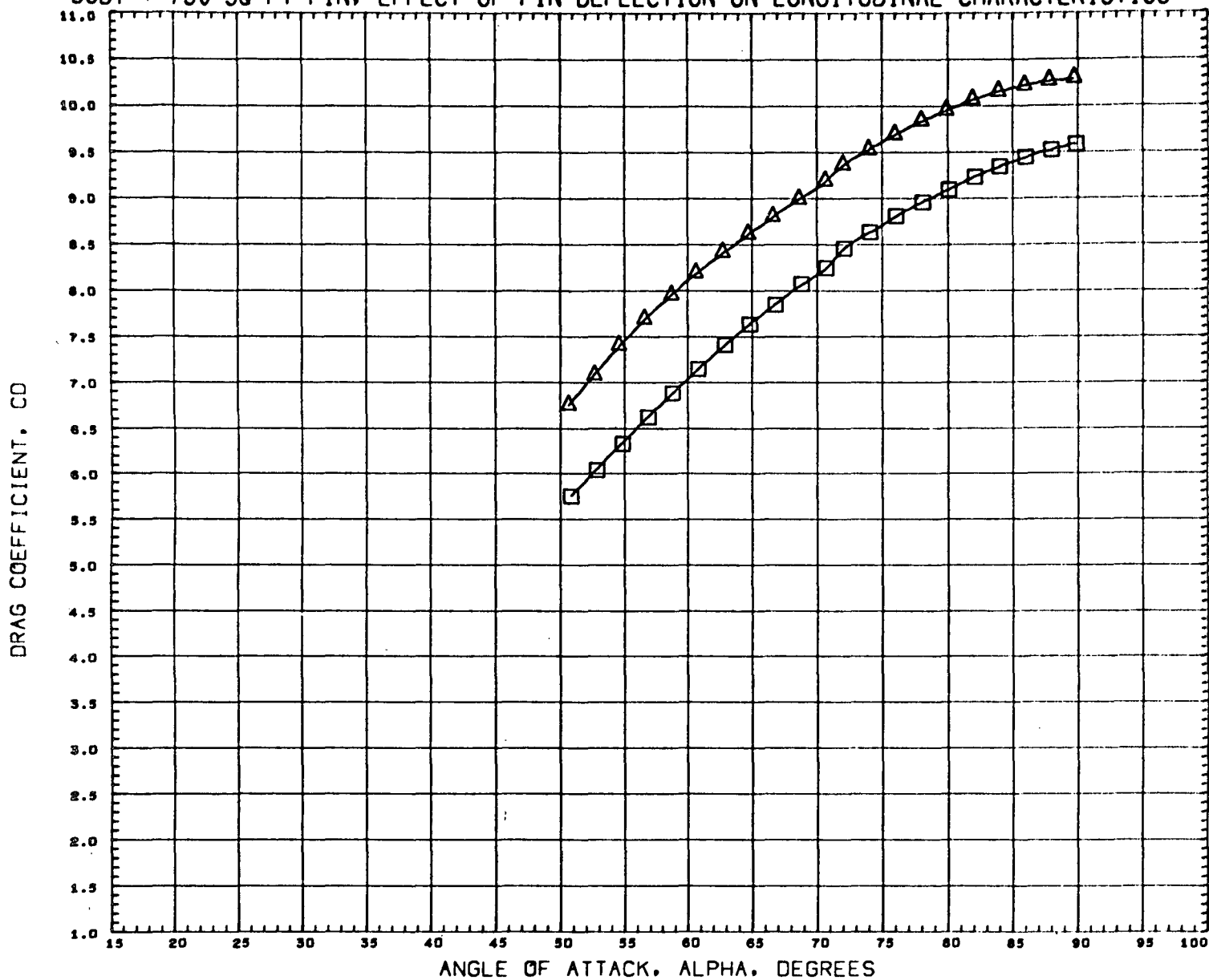
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

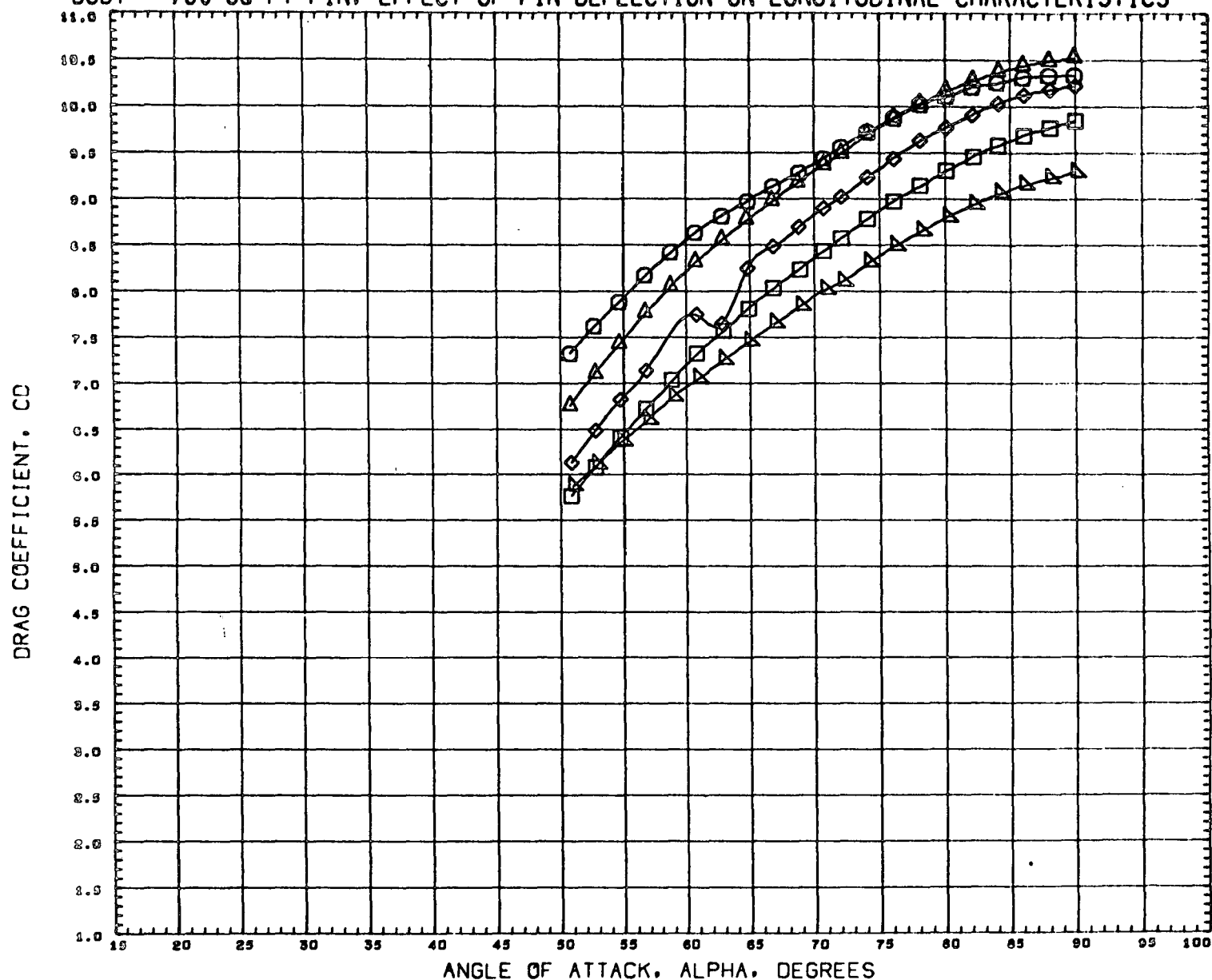
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRF                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.460

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

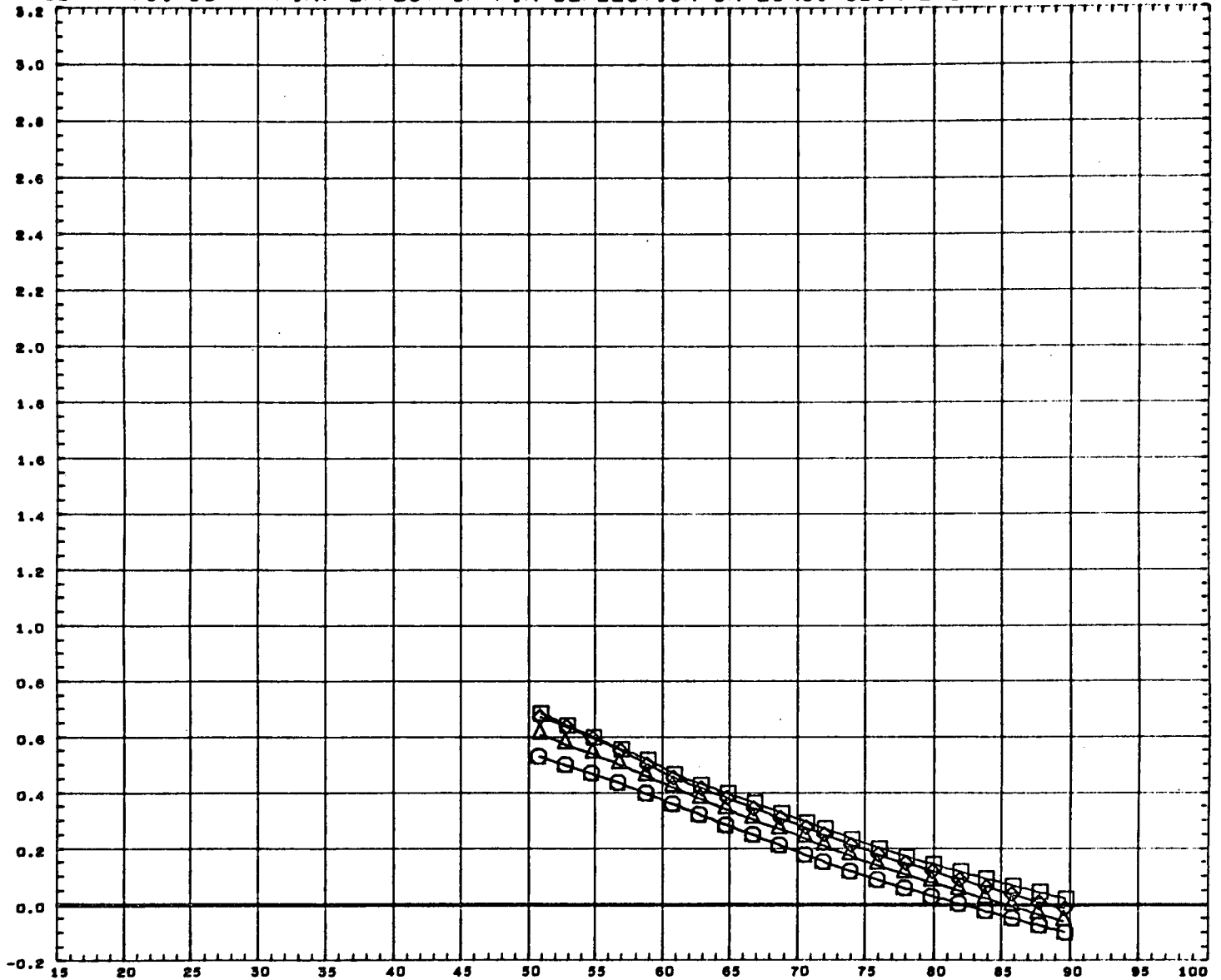


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (B59813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

LIFT-DRAG RATIO, L/D

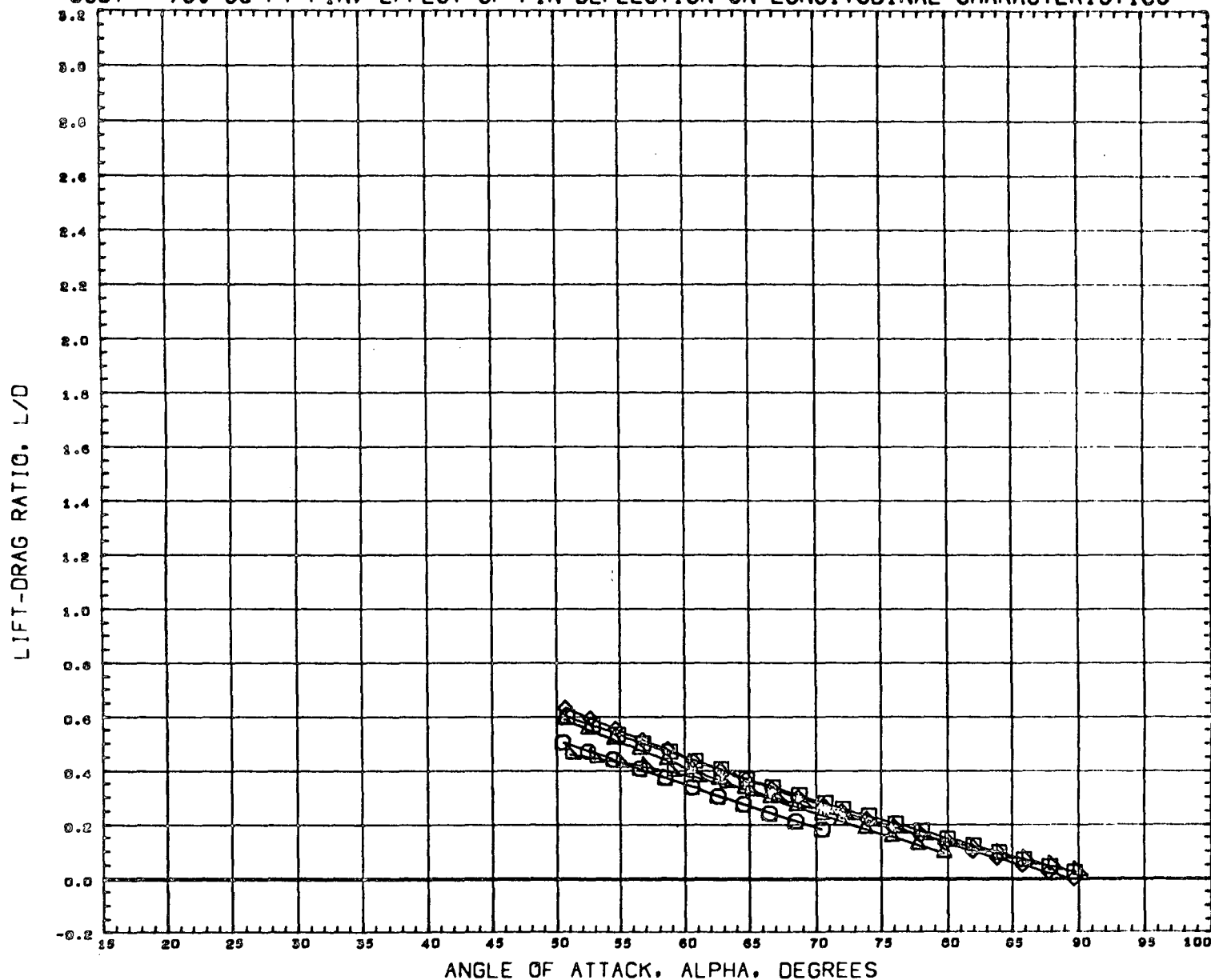


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.198

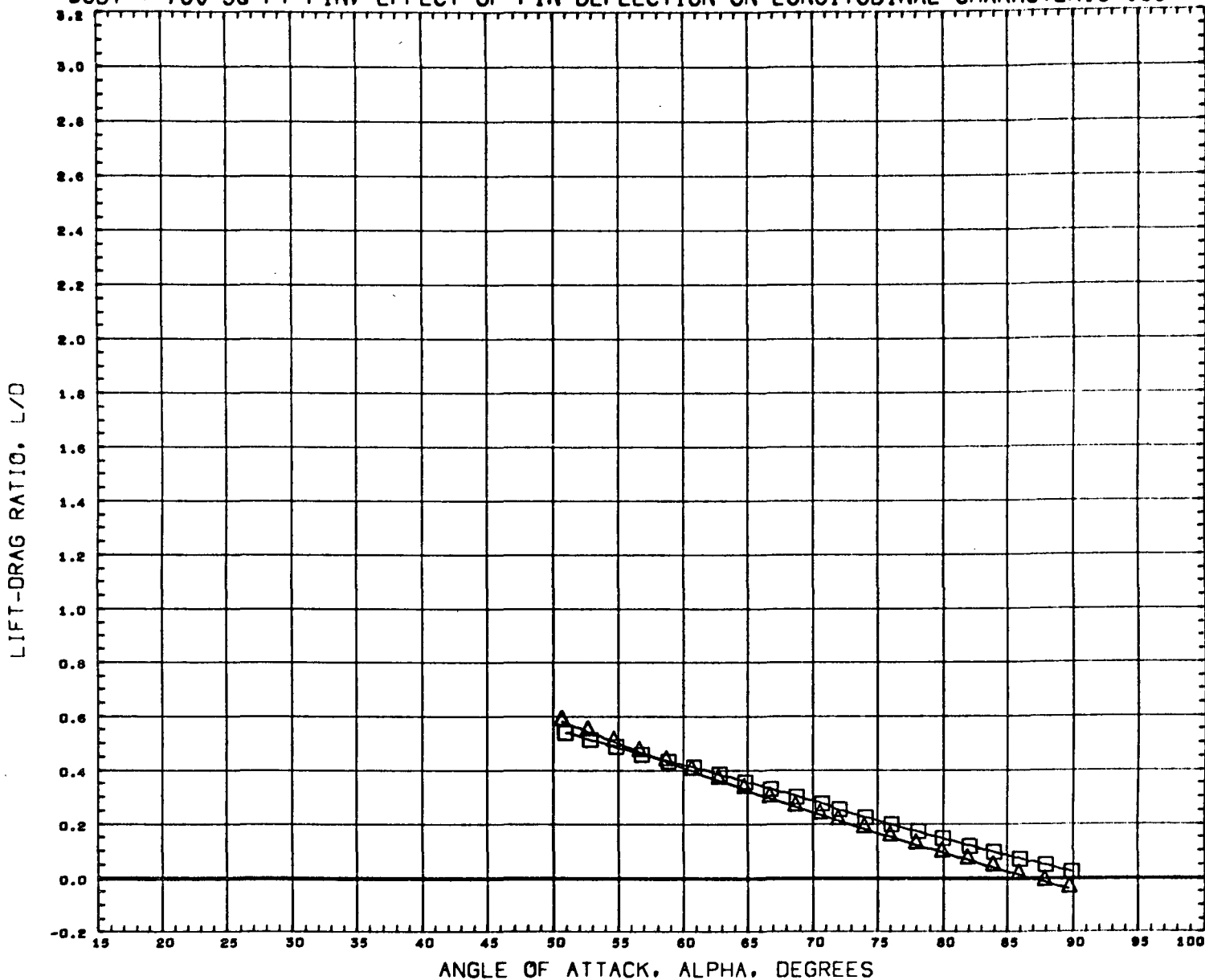
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 sq. IN    |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.964

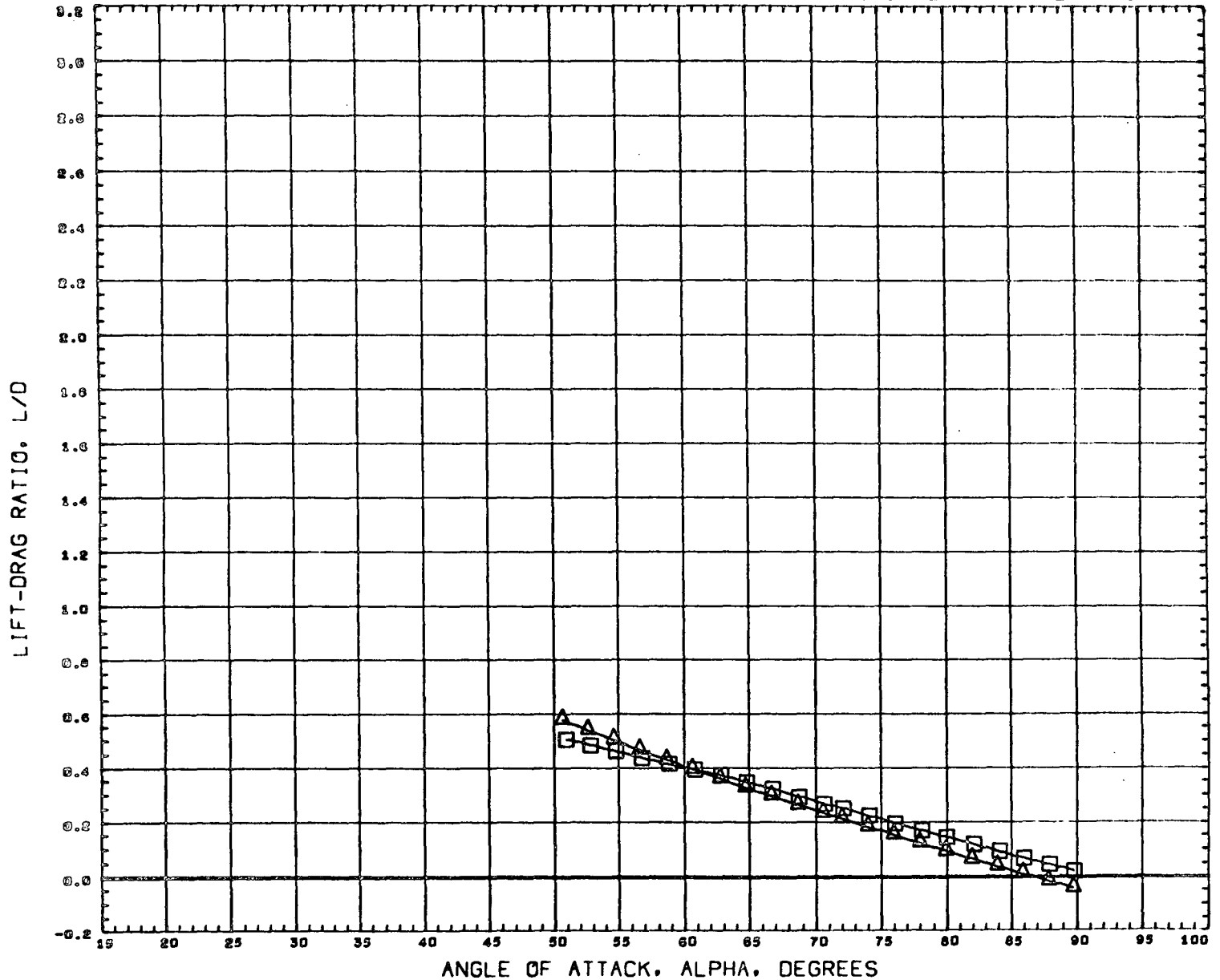
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

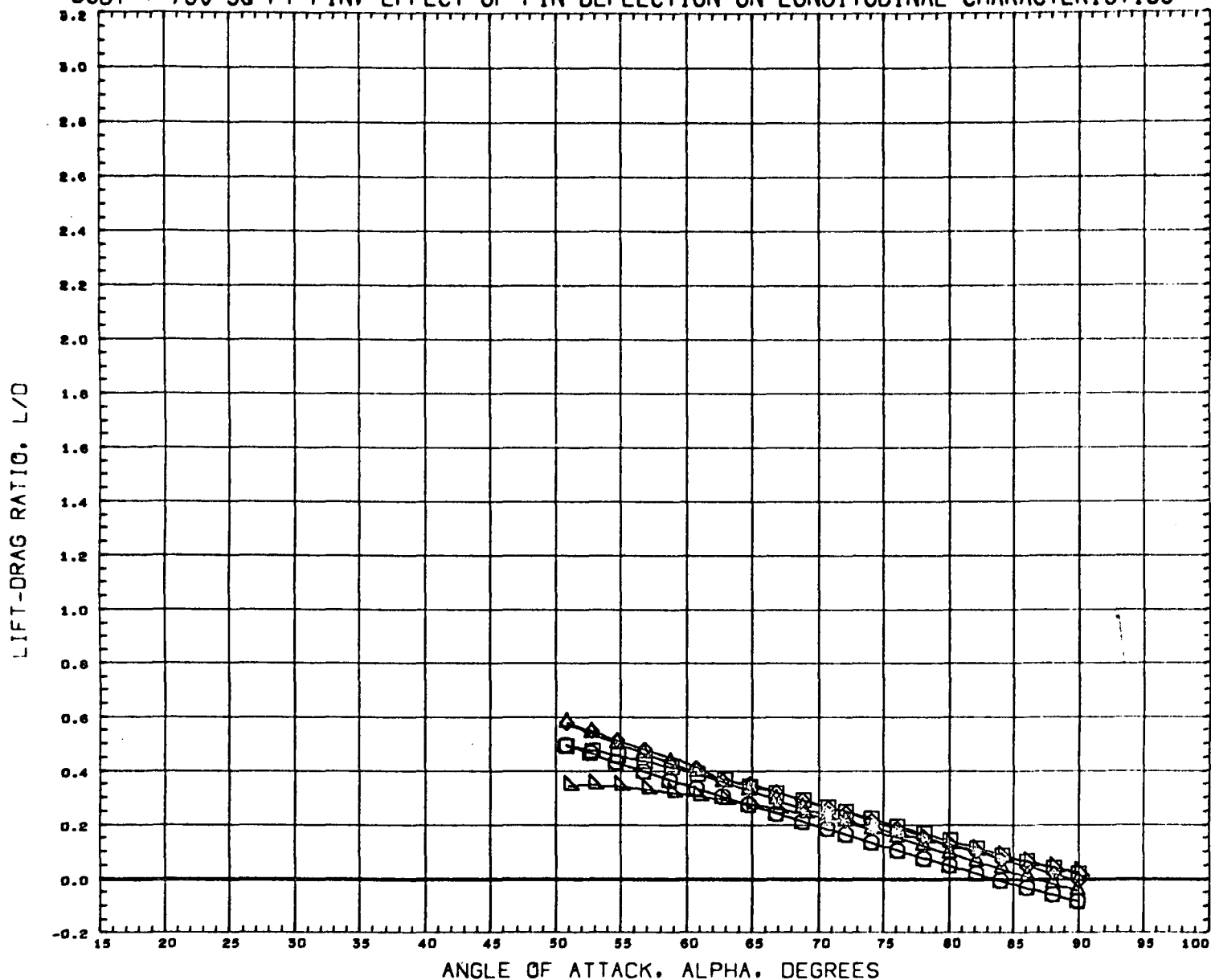
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.400

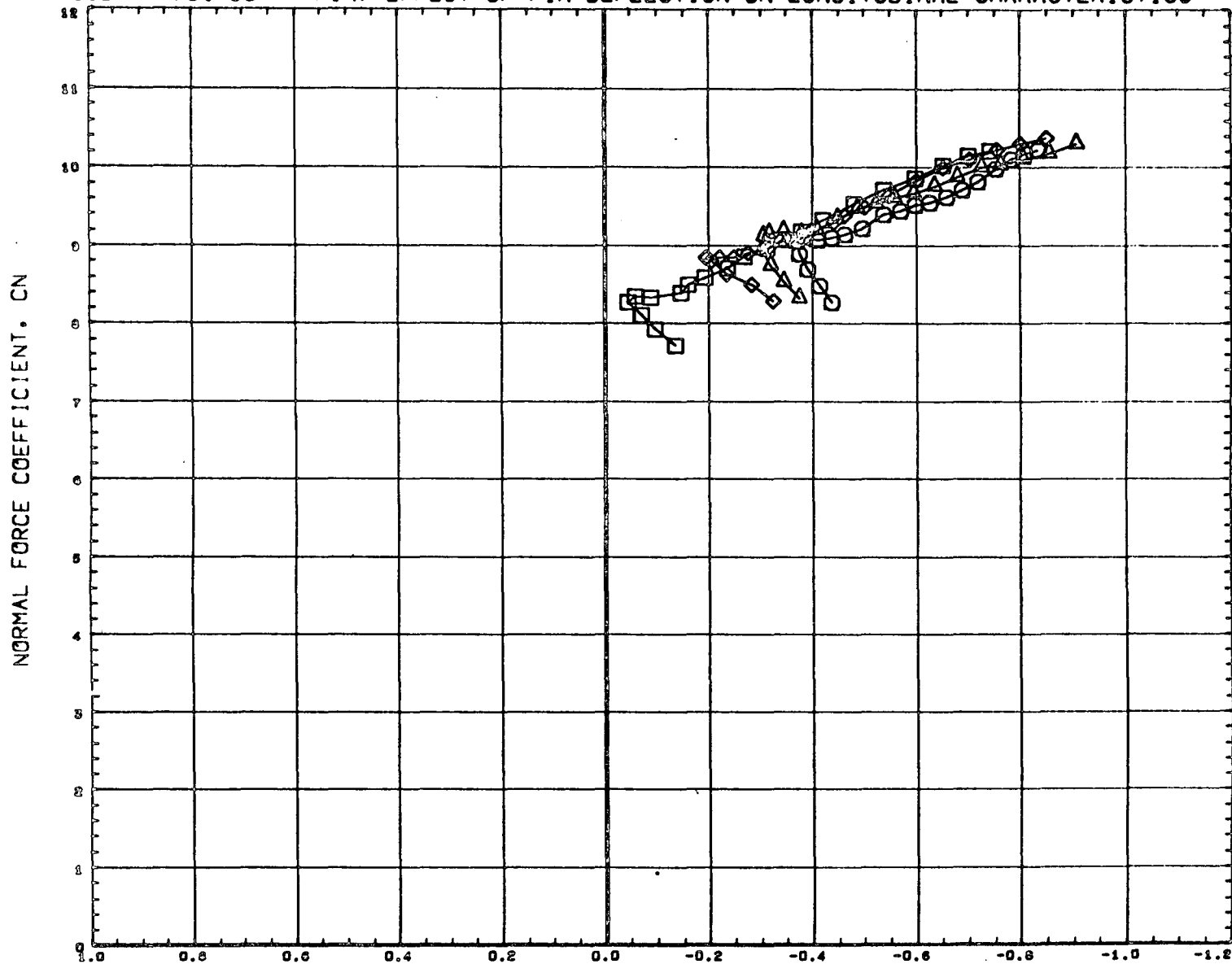
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S09)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S10)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59S11)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59S13)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

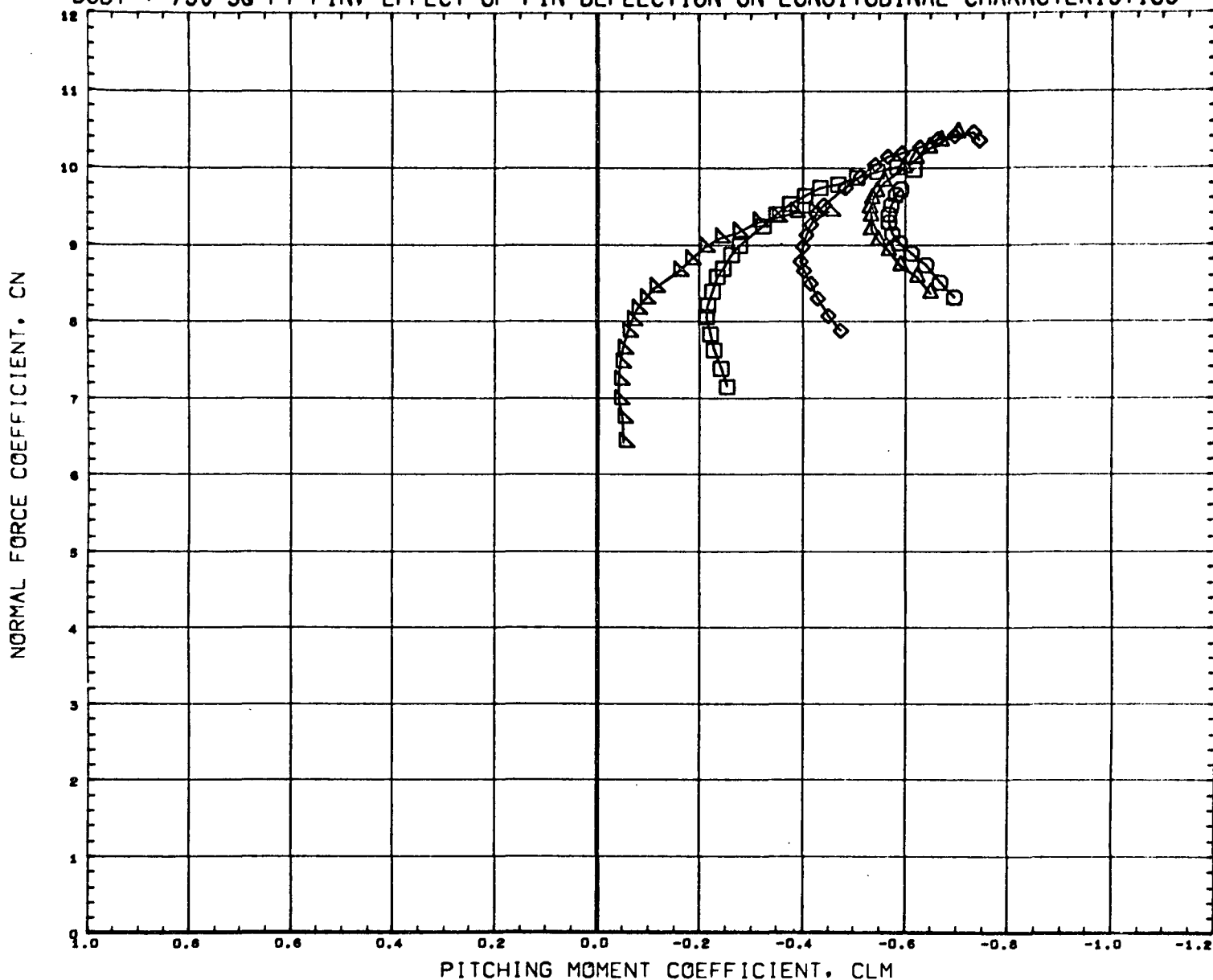


PITCHING MOMENT COEFFICIENT, CLM

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 30. IN    |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | SREF 4.9080 IN.       |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.198

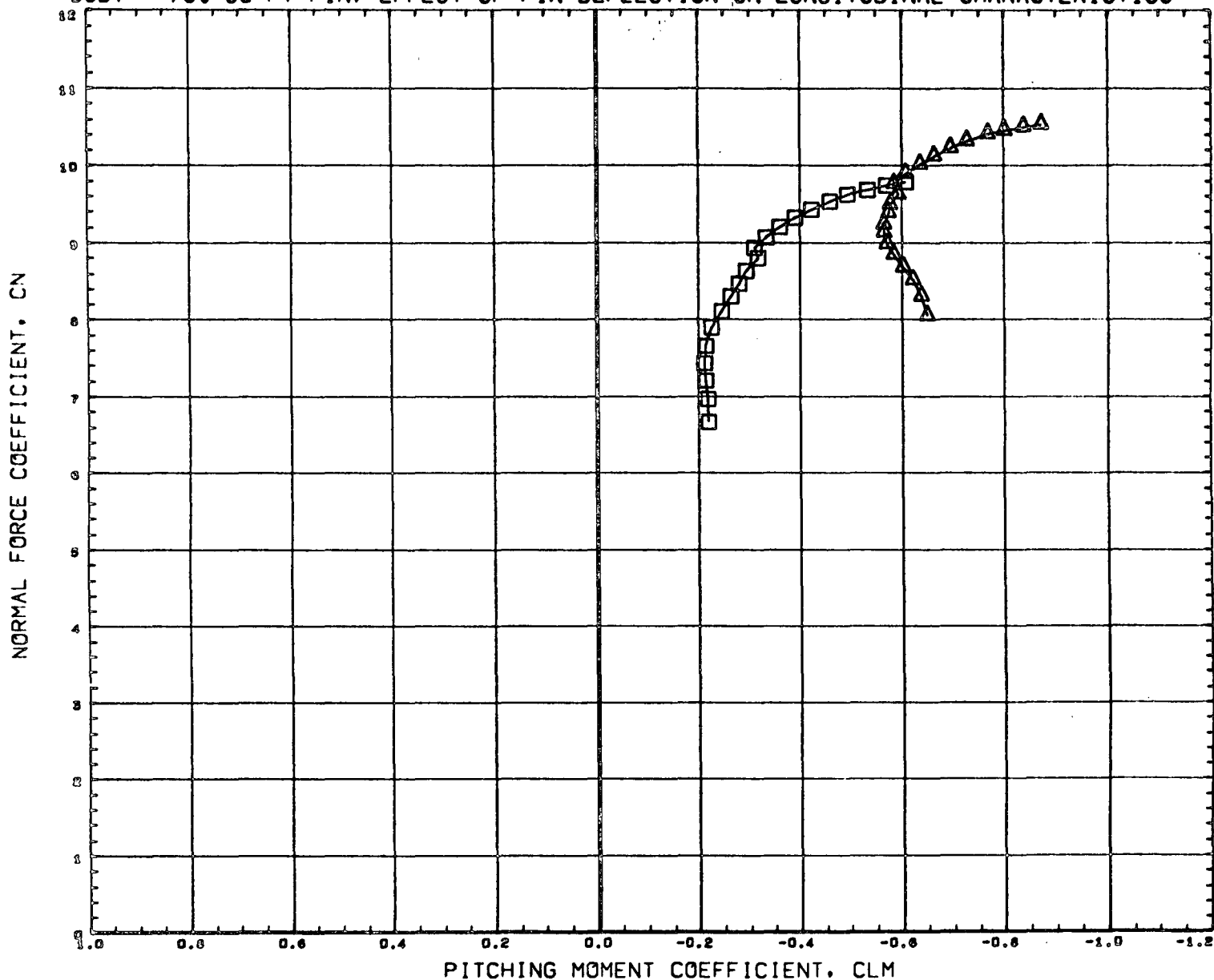
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59509)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59511)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XHRP 2.9450 IN.       |
| (B59513)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YHRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZHRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.964

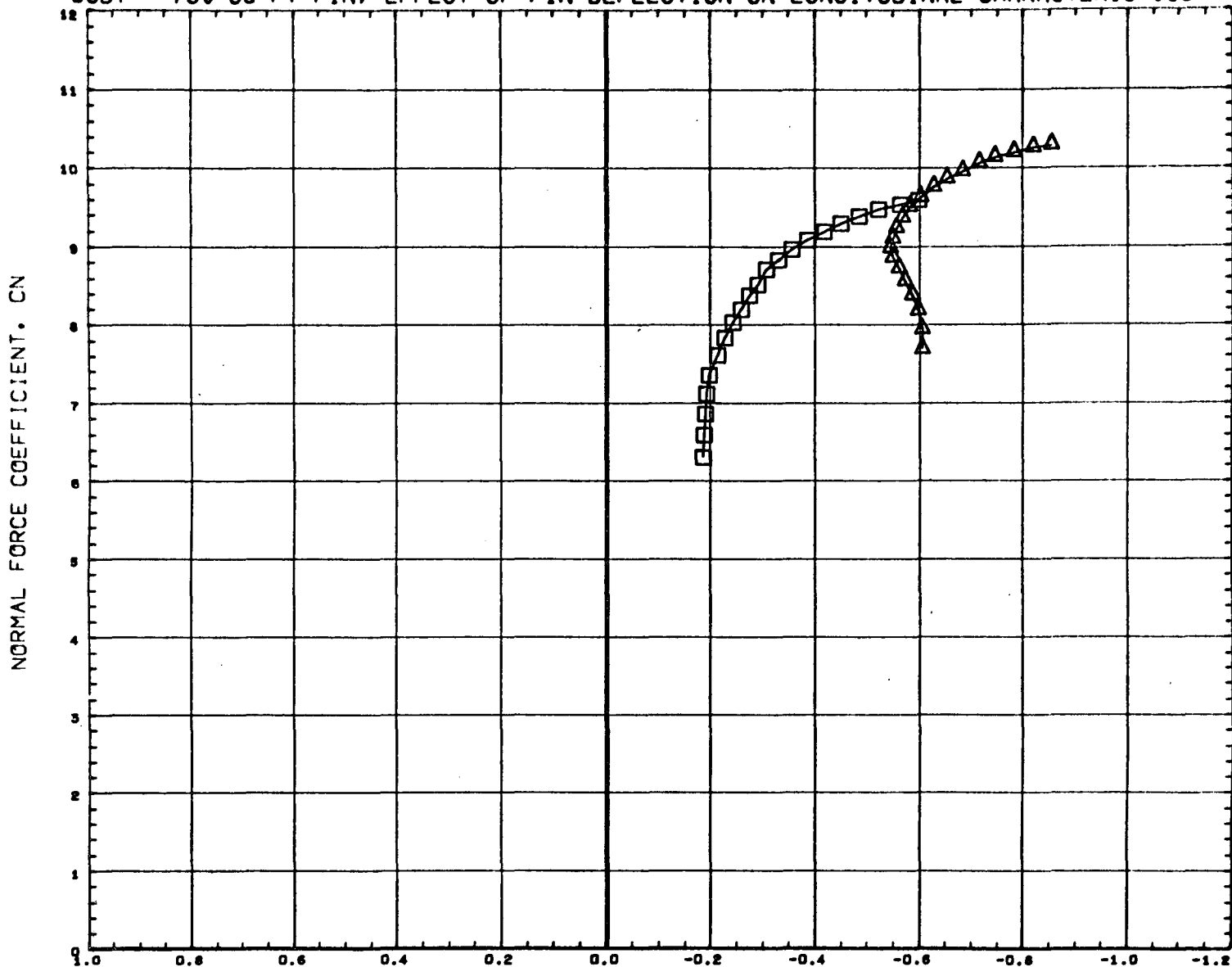
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

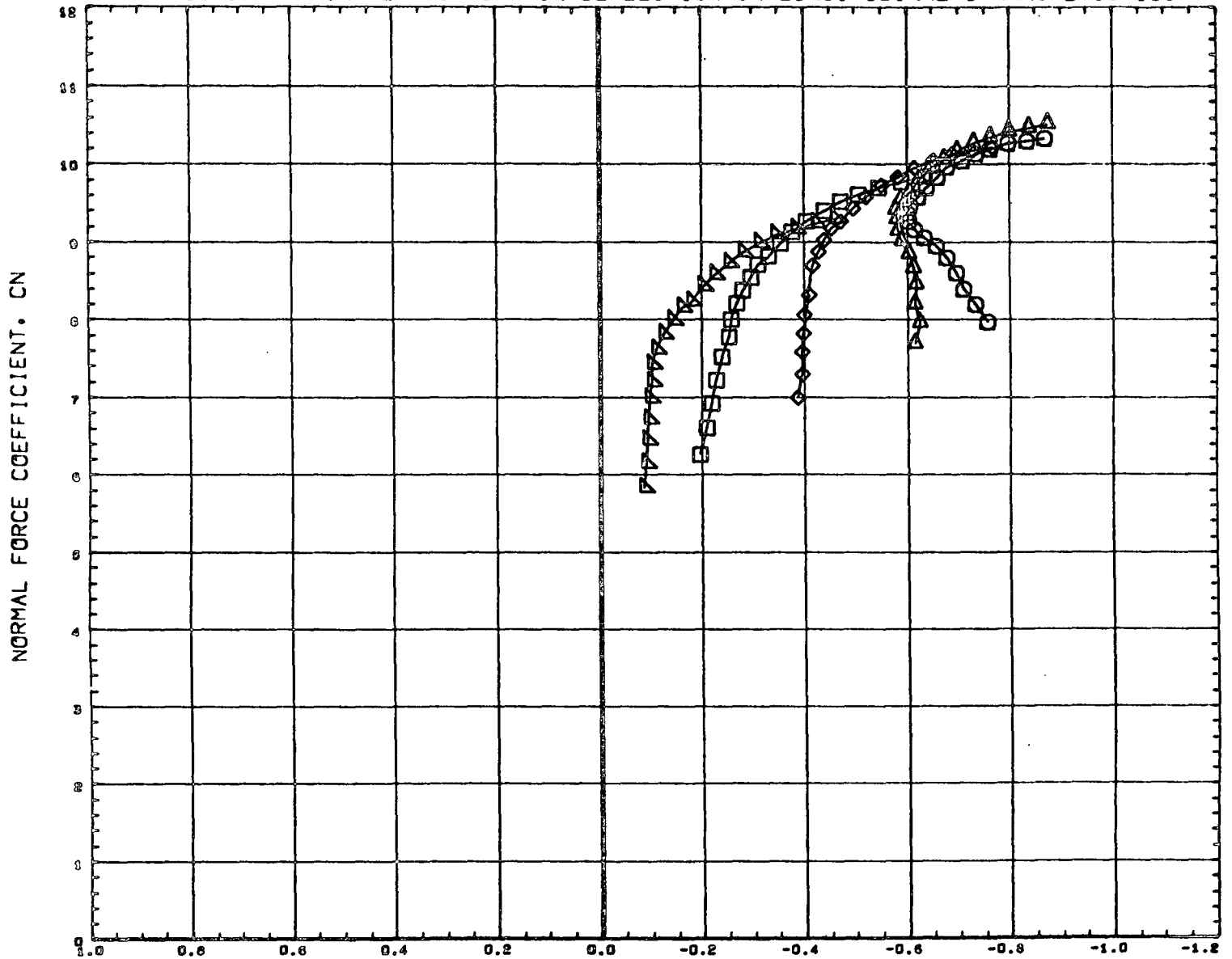
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59509)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59511)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (B59513)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 5.480

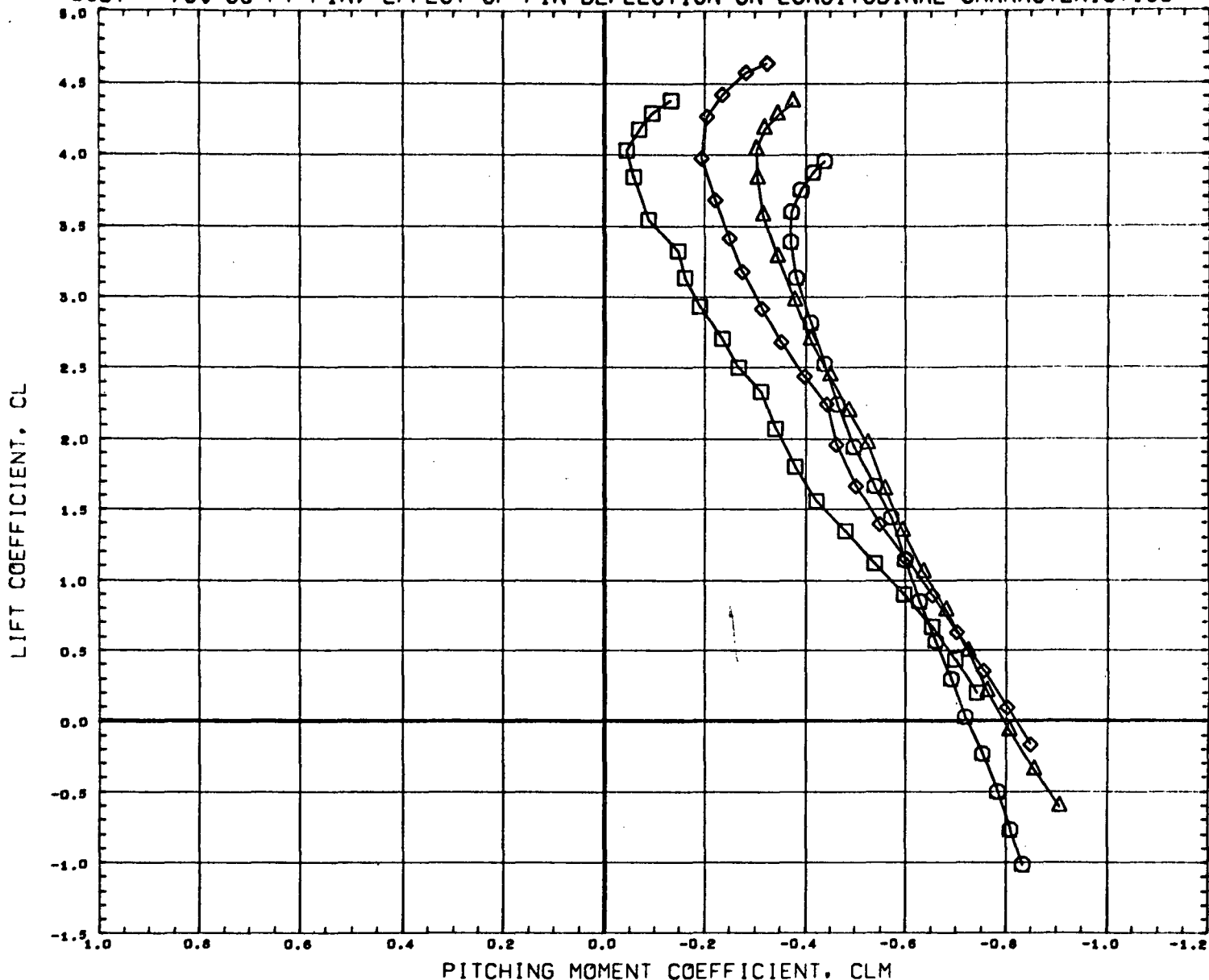
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (B59813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

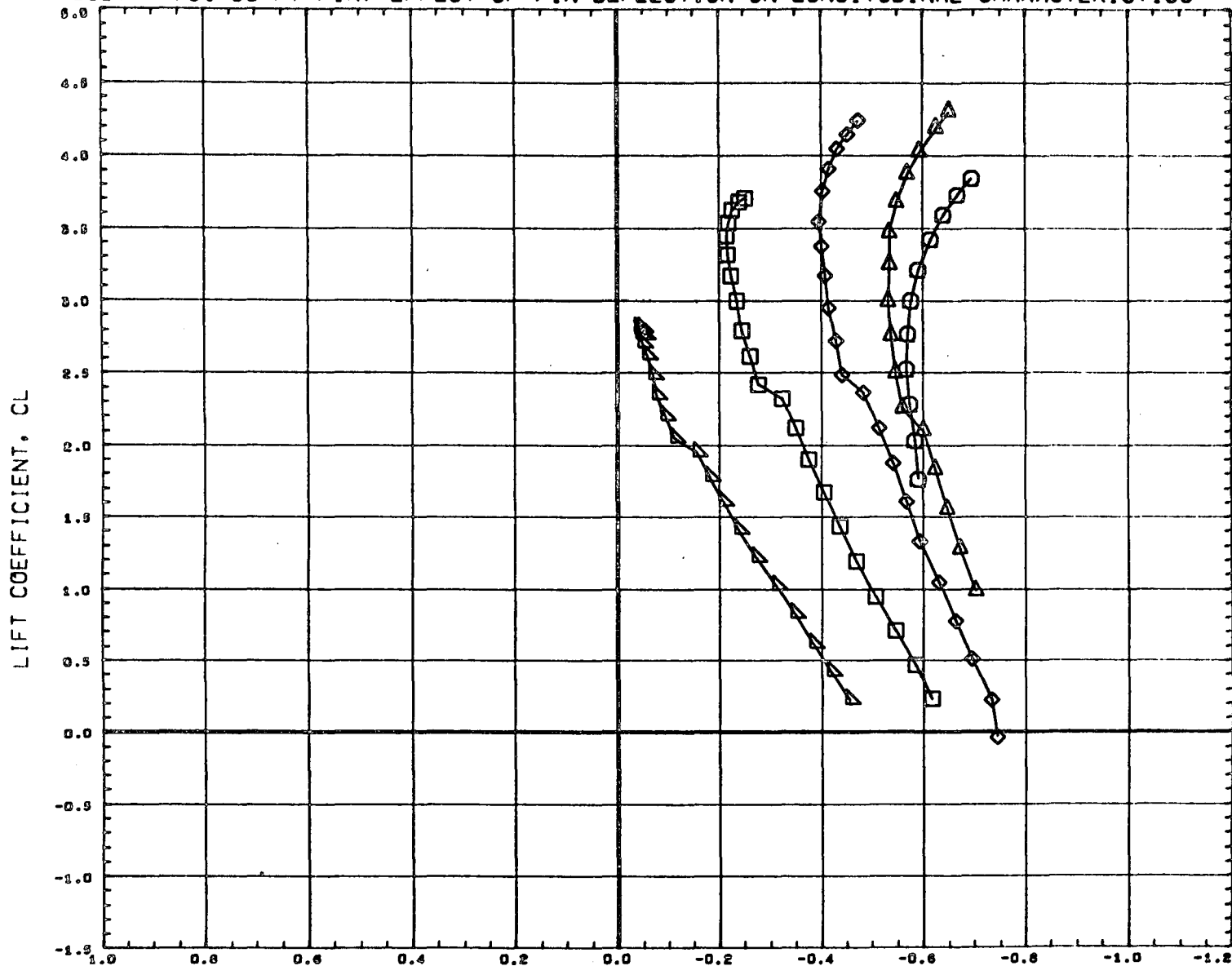
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S09)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S10)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59S11)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59S12)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59S13)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.198

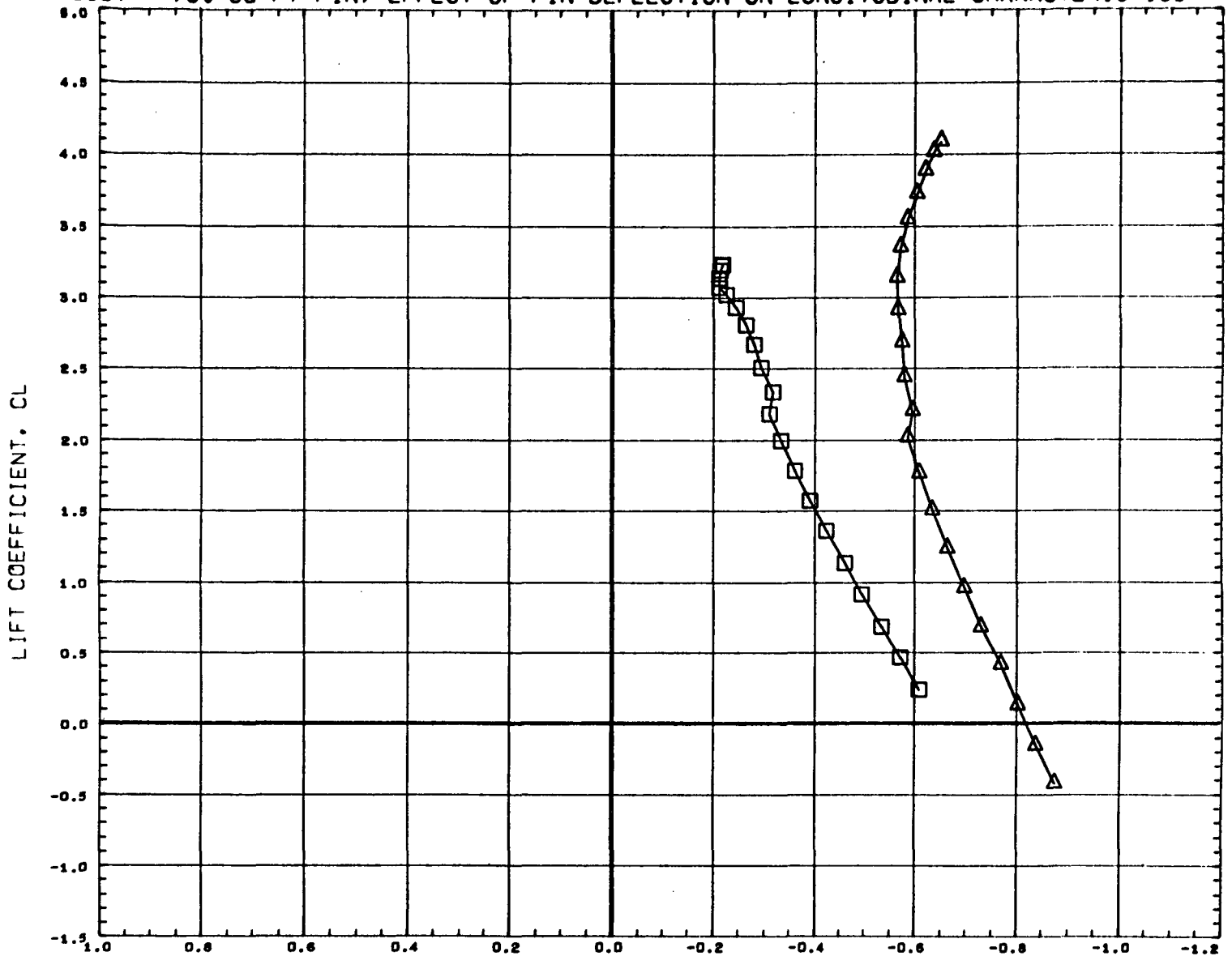
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| PITCHING MOMENT COEFFICIENT. CLM |  |                           |    |              |            |       |       |         |                       |       |        |        |
|----------------------------------|--|---------------------------|----|--------------|------------|-------|-------|---------|-----------------------|-------|--------|--------|
| DATA SET SYMBOL                  |  | CONFIGURATION DESCRIPTION |    |              | BETA       | POS   | DELFE | DELFA   | REFERENCE INFORMATION |       |        |        |
| (859809)                         |  | MSFC TWT 524              | 33 | FOOT BOOSTER | N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000                 | SREF  | 0.9650 | SQ. IN |
| (859810)                         |  | MSFC TWT 524              | 33 | FOOT BOOSTER | N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000                 | LREF  | 4.9080 | IN.    |
| (859811)                         |  | MSFC TWT 524              | 33 | FOOT BOOSTER | N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000                 | BREF  | 4.9080 | IN.    |
| (859812)                         |  | MSFC TWT 524              | 33 | FOOT BOOSTER | N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000                 | XMRF  | 2.9450 | IN.    |
| (859813)                         |  | MSFC TWT 524              | 33 | FOOT BOOSTER | N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000                 | YMRF  | 0.0000 | IN.    |
|                                  |  |                           |    |              |            |       |       |         |                       | ZMRF  | 0.0000 | IN.    |
|                                  |  |                           |    |              |            |       |       |         |                       | SCALE | 0.0028 |        |
| MACH                             |  | 1.964                     |    |              |            |       |       |         |                       |       |        |        |

MACH 1.964

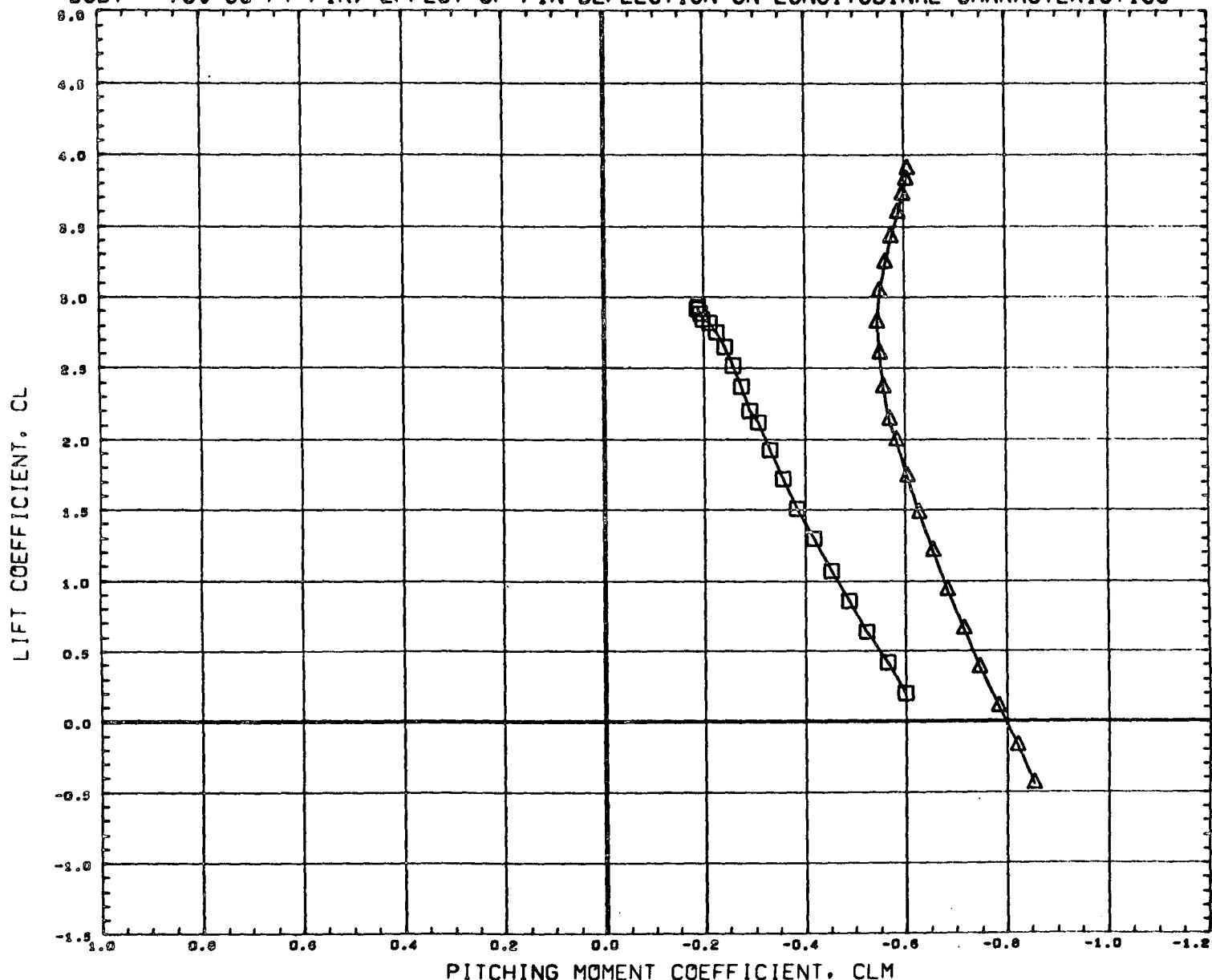
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859509)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859510)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859511)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859512)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859513)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

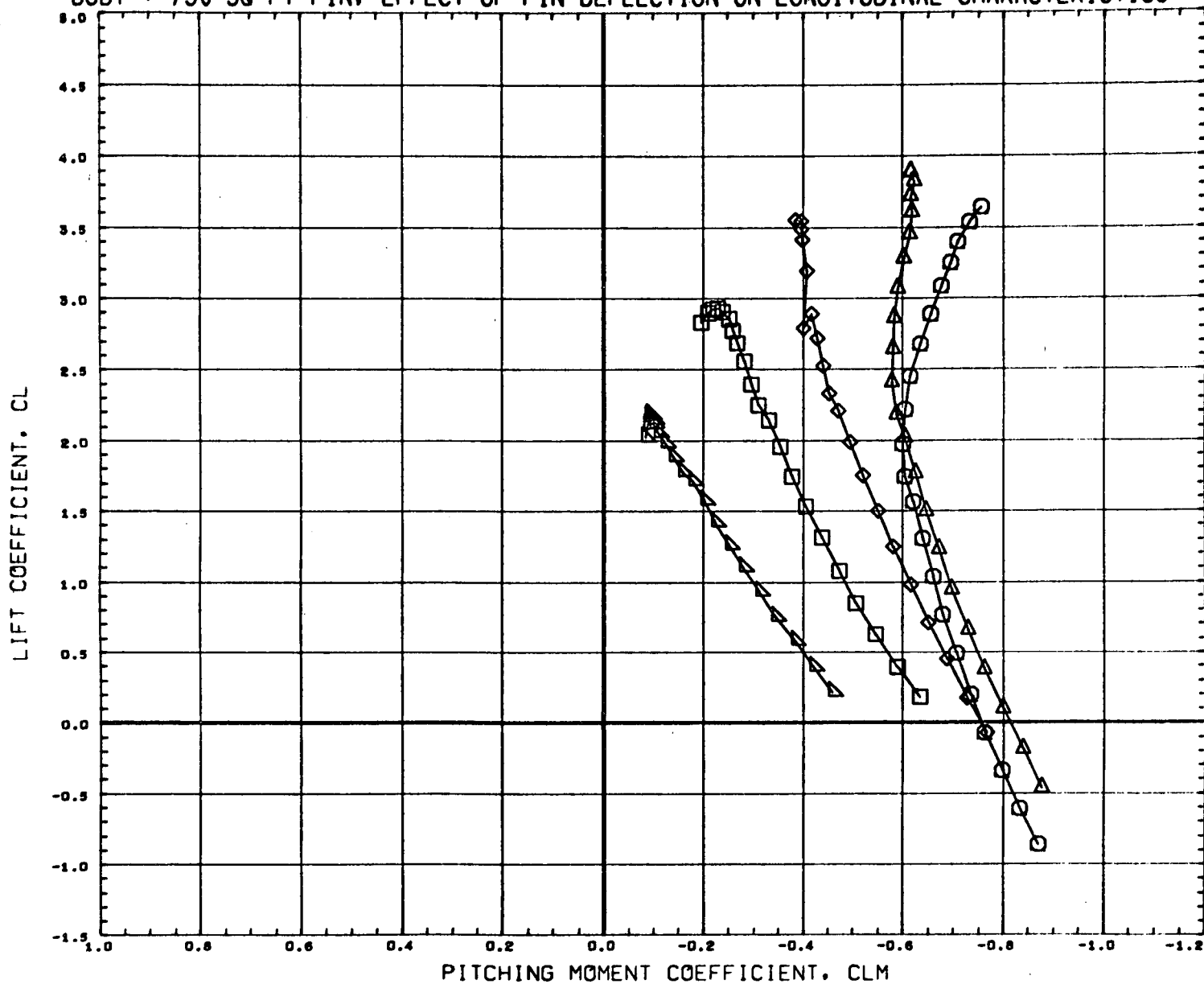
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 324 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 324 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

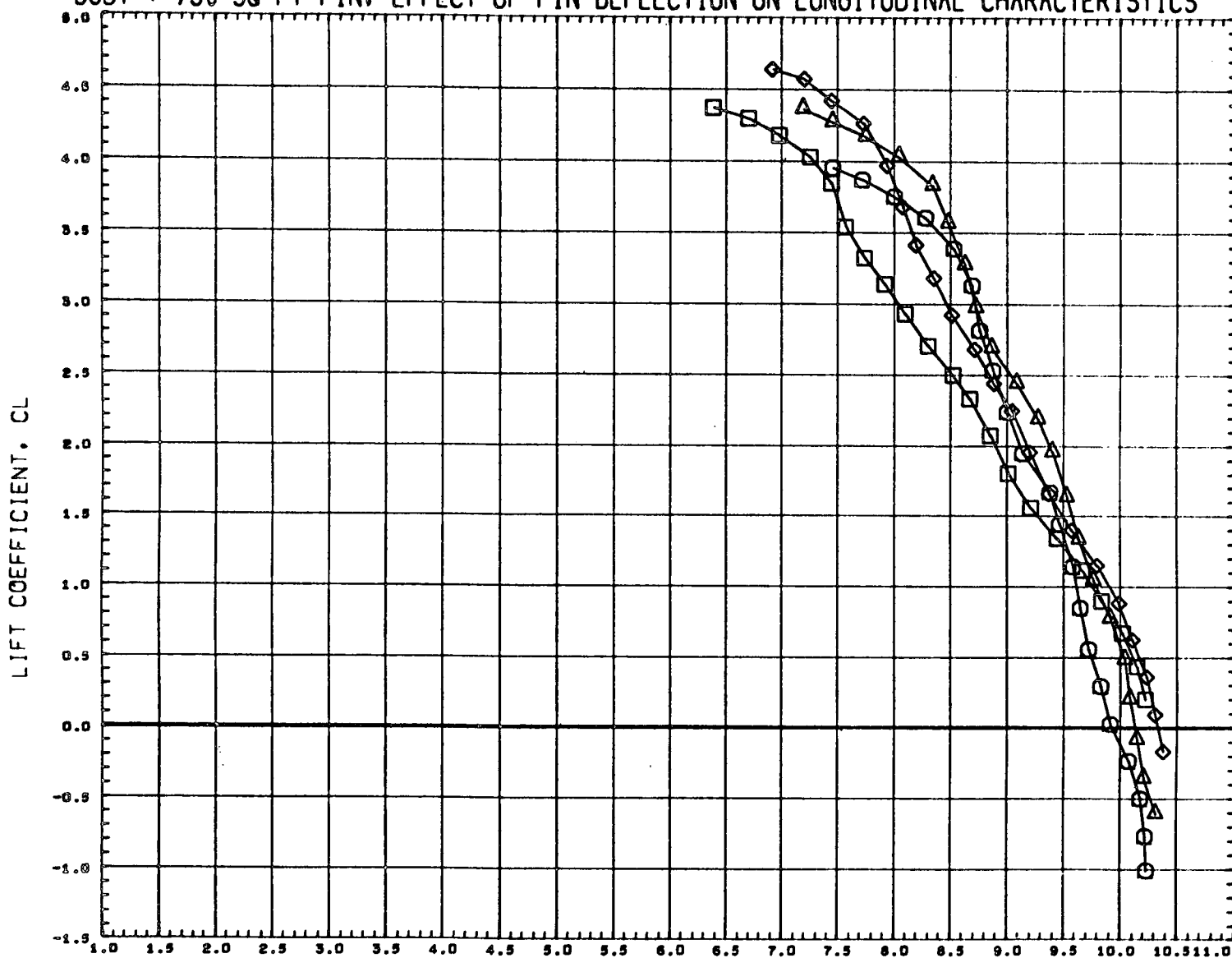
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRF                  | 2.9450 IN.    |
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

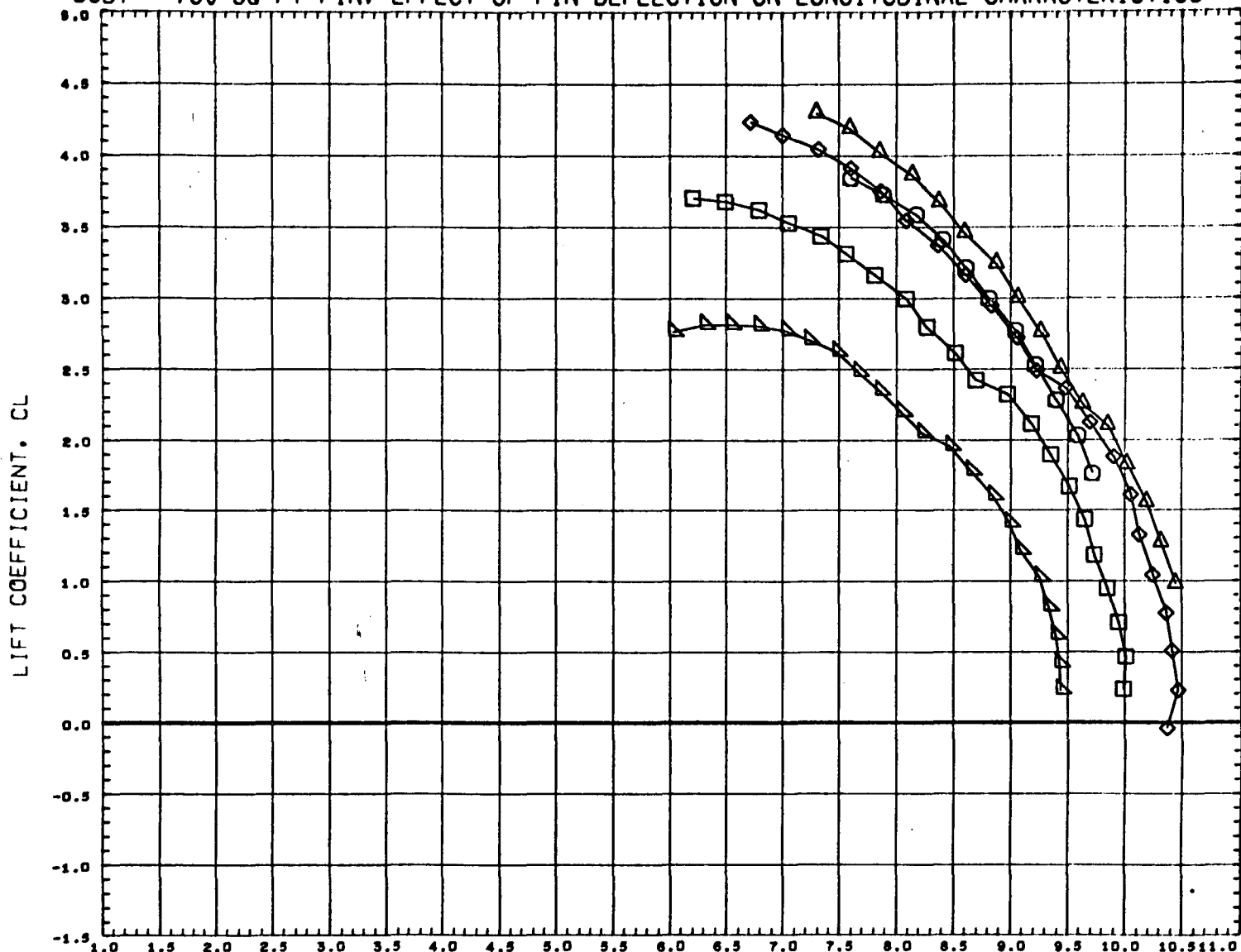


DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.198

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

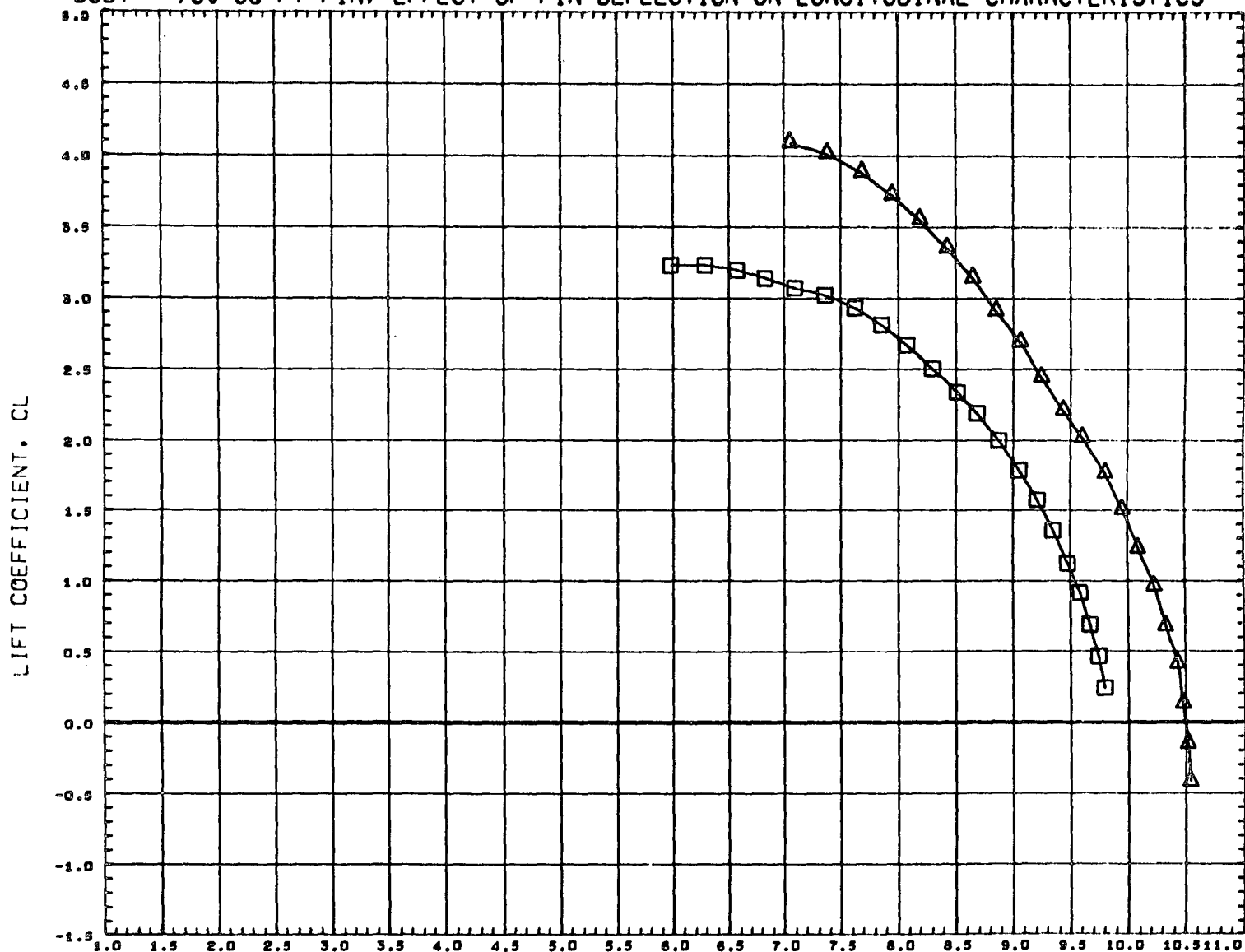


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859809)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859811)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XHRP 2.9450 IN.       |
| (859813)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YHRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZHRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.964

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



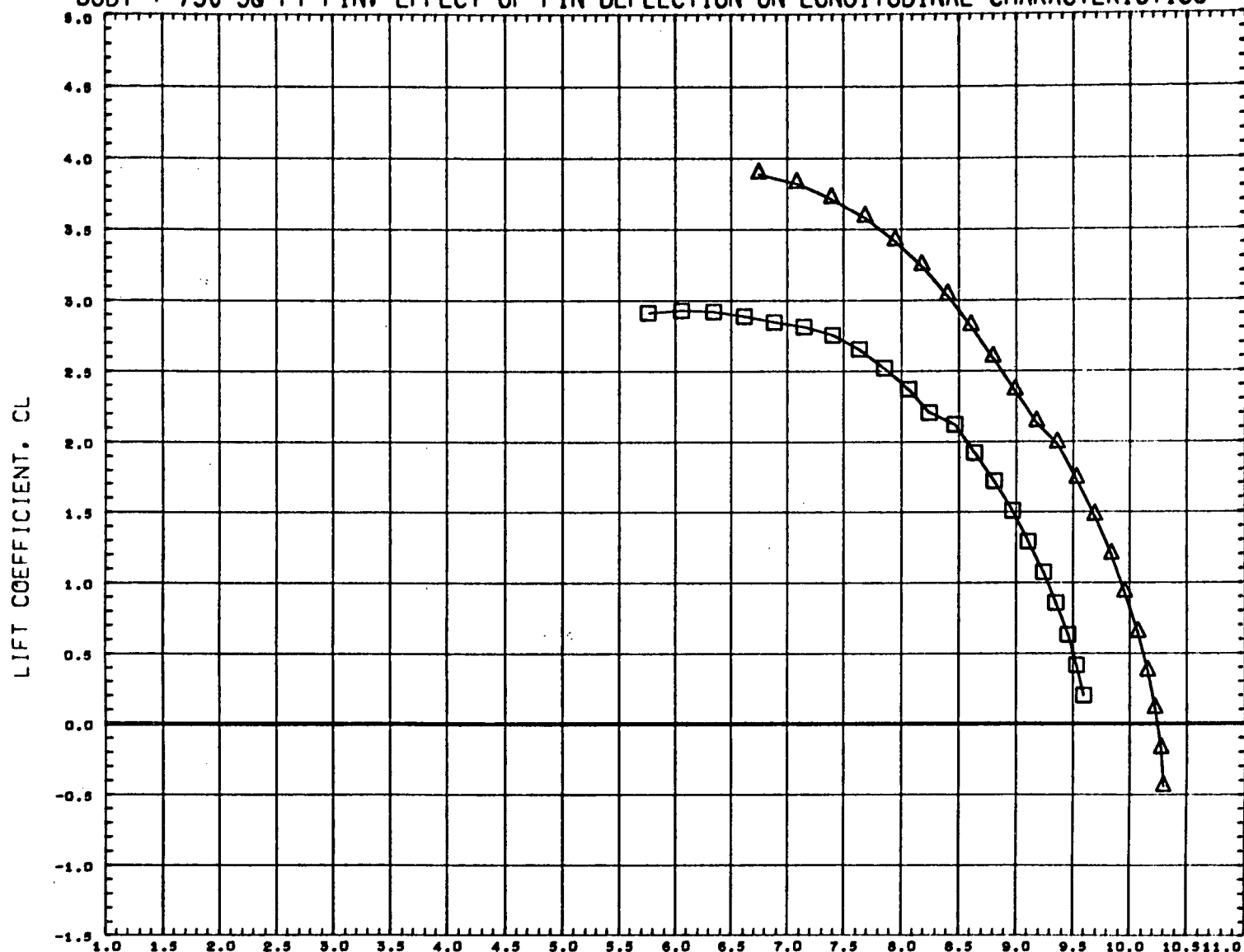
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               |
|-----------------|-----------------------------------------|
| (B59809)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 |
| (B59811)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 |
| (B59813)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   |

MACH 2.740

## DRAG COEFFICIENT, CD

| BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-------|-------|---------|-------|-----------------------|---------------|
| 0.000 | 1.000 | 15.000  | 0.000 | SREF                  | 0.9650 sq. in |
| 0.000 | 1.000 | 0.000   | 0.000 | LREF                  | 4.9080 in.    |
| 0.000 | 1.000 | -15.000 | 0.000 | BREF                  | 4.9080 in.    |
| 0.000 | 1.000 | -30.000 | 0.000 | XMRP                  | 2.9450 in.    |
| 0.000 | 1.000 | -45.000 | 0.000 | YMRP                  | 0.0000 in.    |
|       |       |         |       | ZMRP                  | 0.0000 in.    |
|       |       |         |       | SCALE                 | 0.0028        |

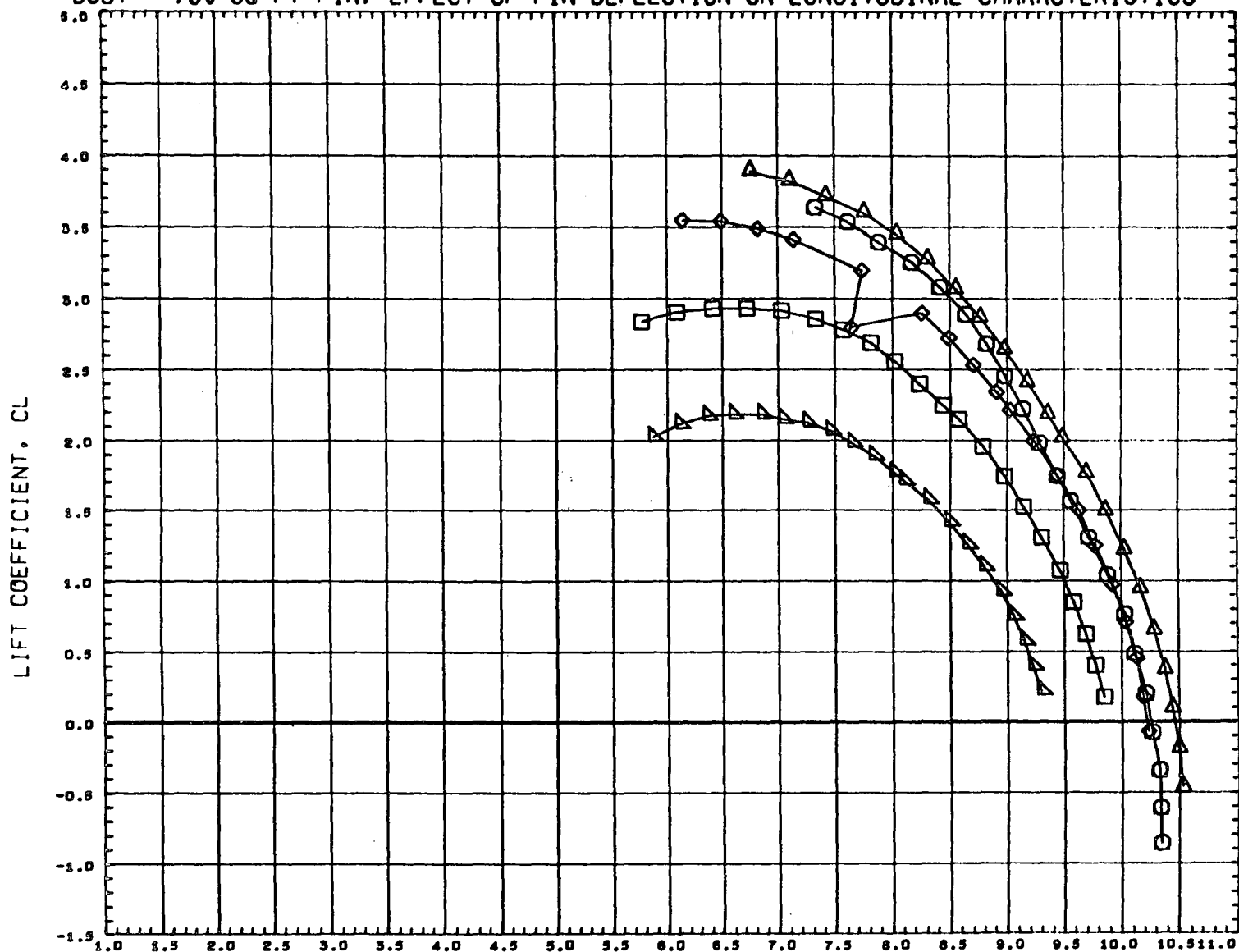
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DRAG COEFFICIENT, CD |                                         | DELTA |       | REFERENCE INFORMATION |       |
|----------------------|-----------------------------------------|-------|-------|-----------------------|-------|
| DATA SET SYMBOL      | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE                 | DELFA |
| (859809)             | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | 15.000                | 0.000 |
| (859810)             | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | 0.000                 | 0.000 |
| (859811)             | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -15.000               | 0.000 |
| (859812)             | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 0.000 | 1.000 | -30.000               | 0.000 |
| (859813)             | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 1.000 | -45.000               | 0.000 |
|                      |                                         |       |       | SCALE                 |       |
|                      |                                         |       |       | 0.0028                |       |

MACH 3.480

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

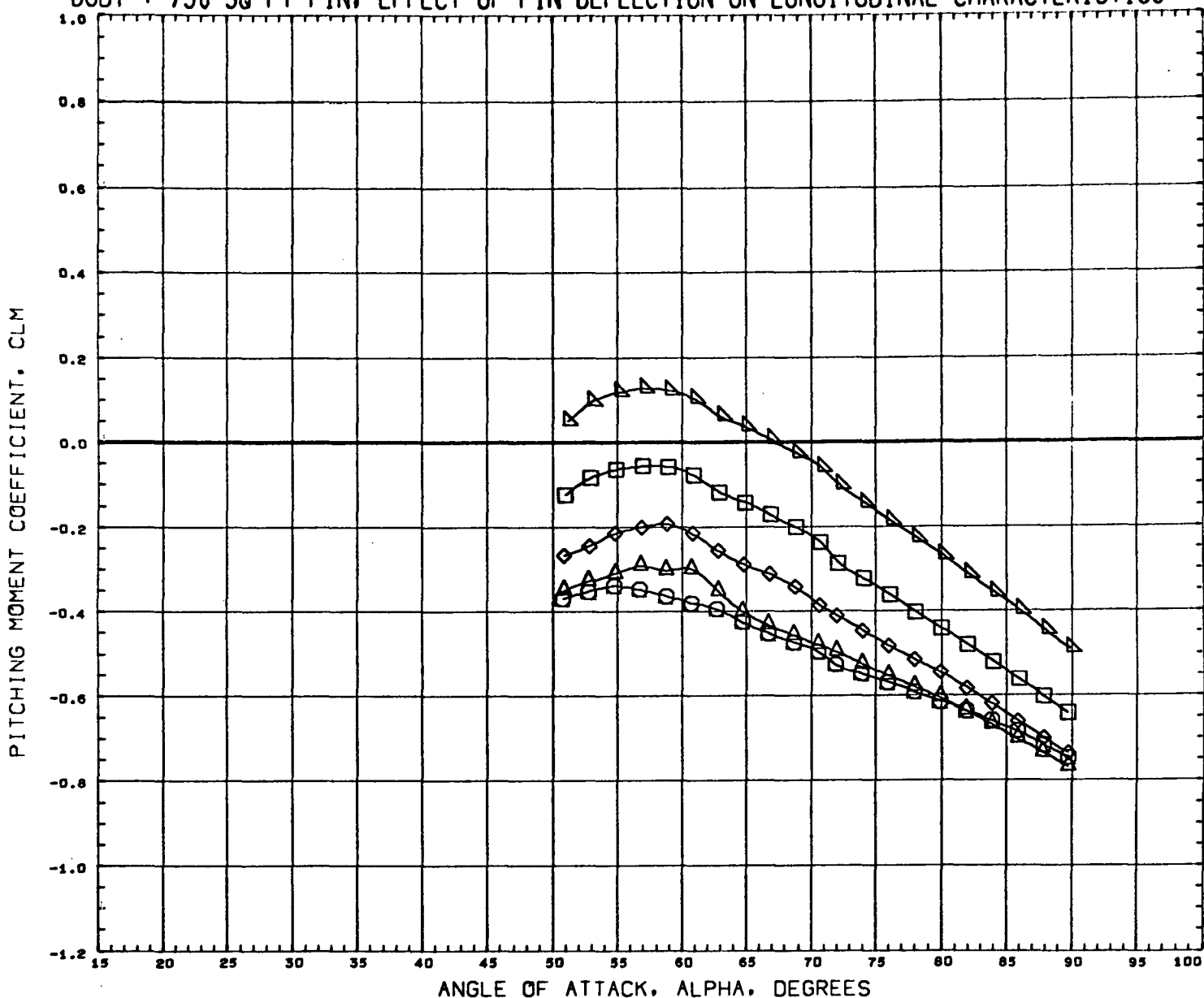


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    |            | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|------------|-------|-------|---------|-------|-----------------------|
| (B59809)        | MSFC TWT 524 33 FOOT BOOSTER | N281R1X1F2 | 0.000 | 1.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59810)        | MSFC TWT 524 33 FOOT BOOSTER | N281R1X1F2 | 0.000 | 1.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59811)        | MSFC TWT 524 33 FOOT BOOSTER | N281R1X1F2 | 0.000 | 1.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59812)        | MSFC TWT 524 33 FOOT BOOSTER | N281R1X1F2 | 0.000 | 1.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59813)        | MSFC TWT 524 33 FOOT BOOSTER | N281R1X1F2 | 0.000 | 1.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                              |            |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |            |       |       |         |       | SCALE 0.0028          |

MACH 4.959

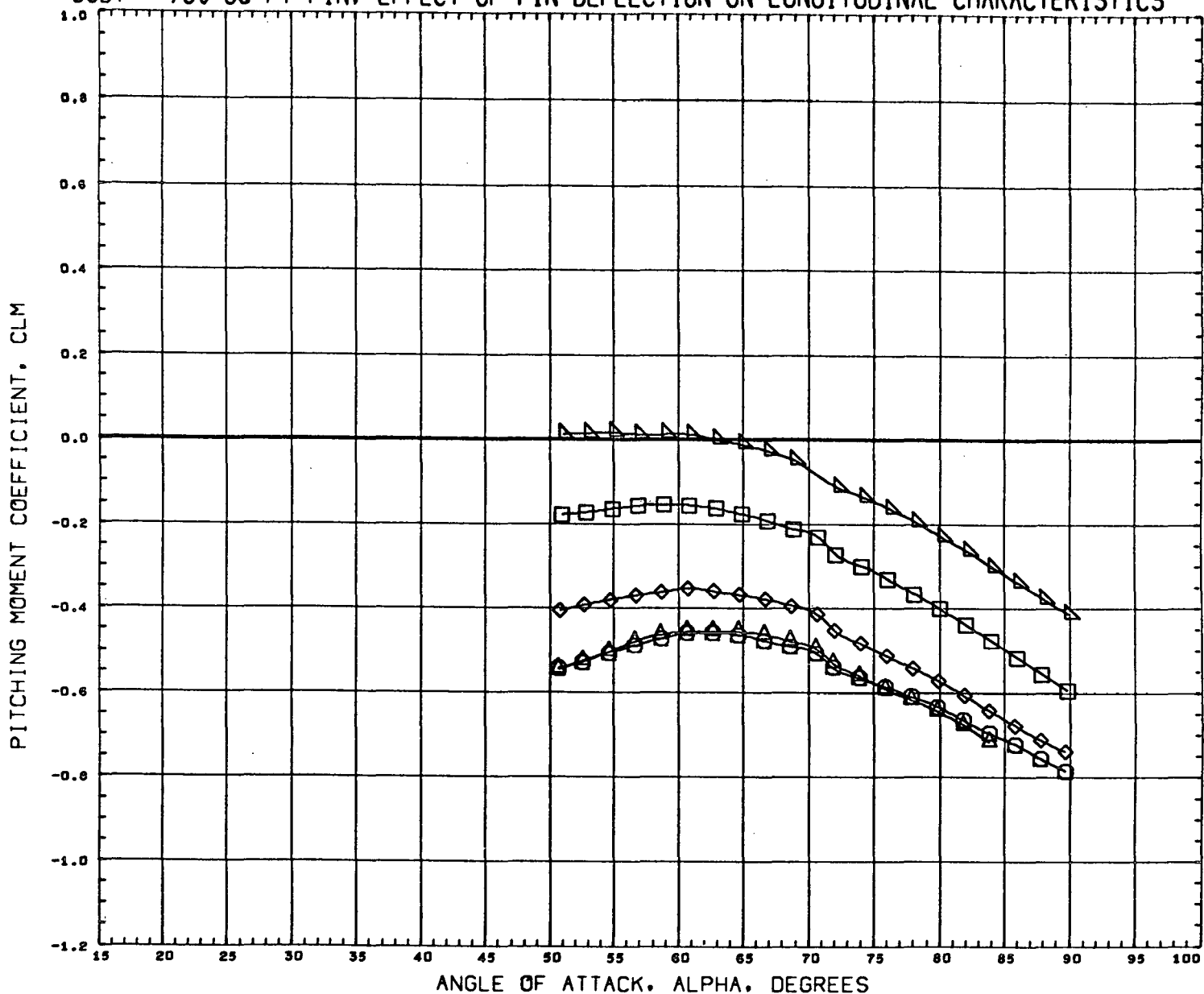
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.194

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

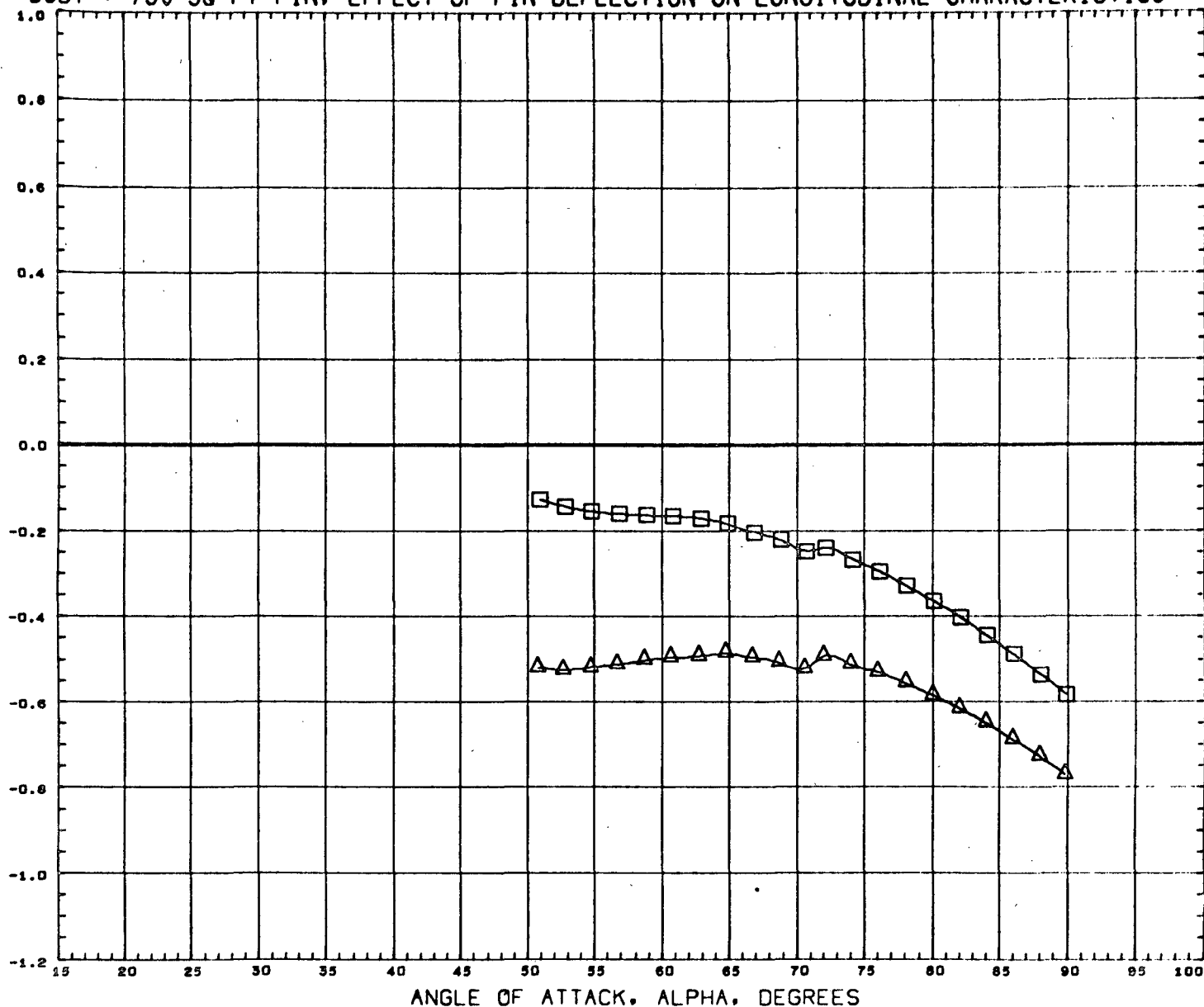


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFA   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S21)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S22)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59S23)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59S25)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

PITCHING MOMENT COEFFICIENT, CLM

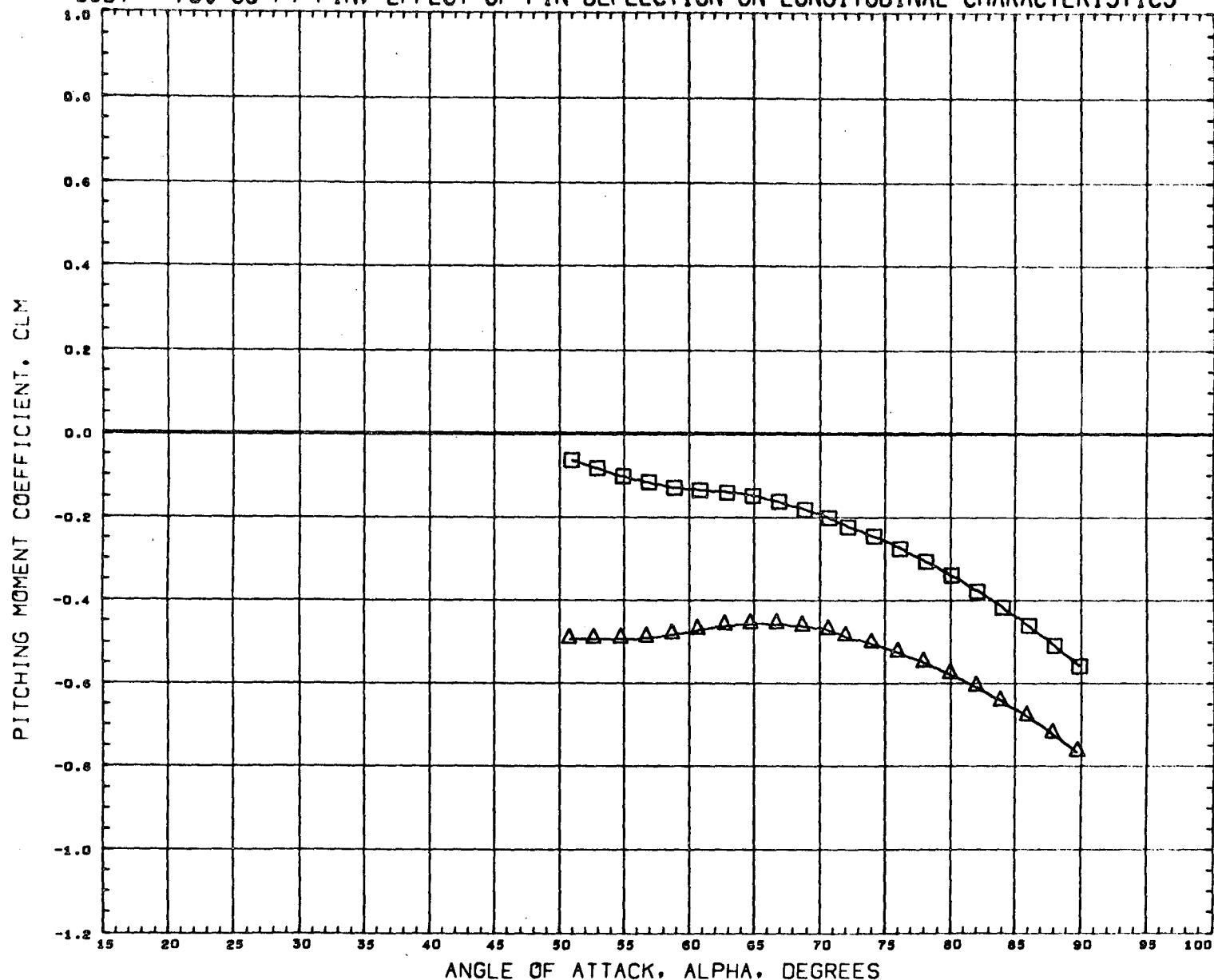


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9690 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859525)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

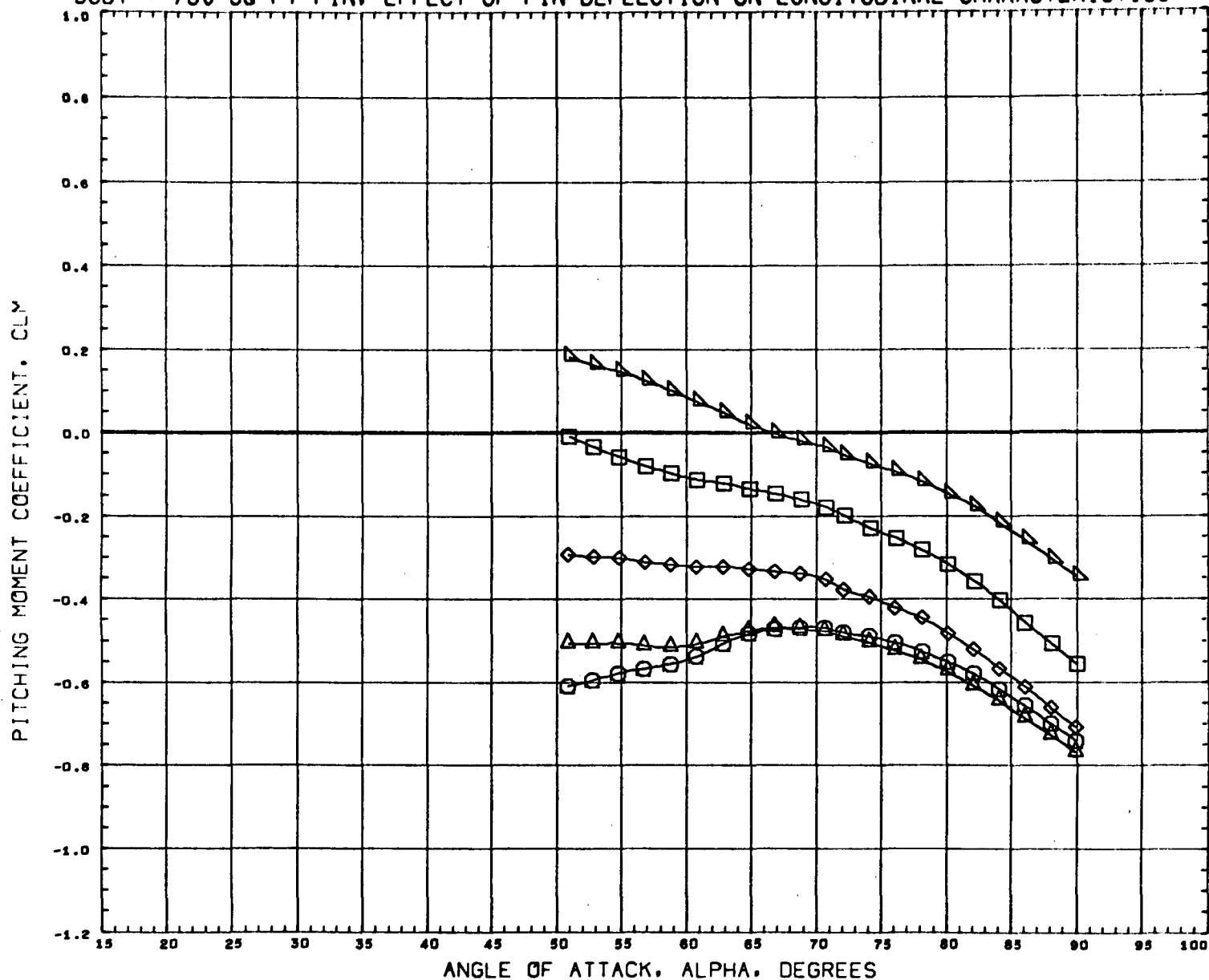
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859321)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859323)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | YMRP                  | 2.9450 IN.    |
| (859325)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0026        |

MACH 3.480

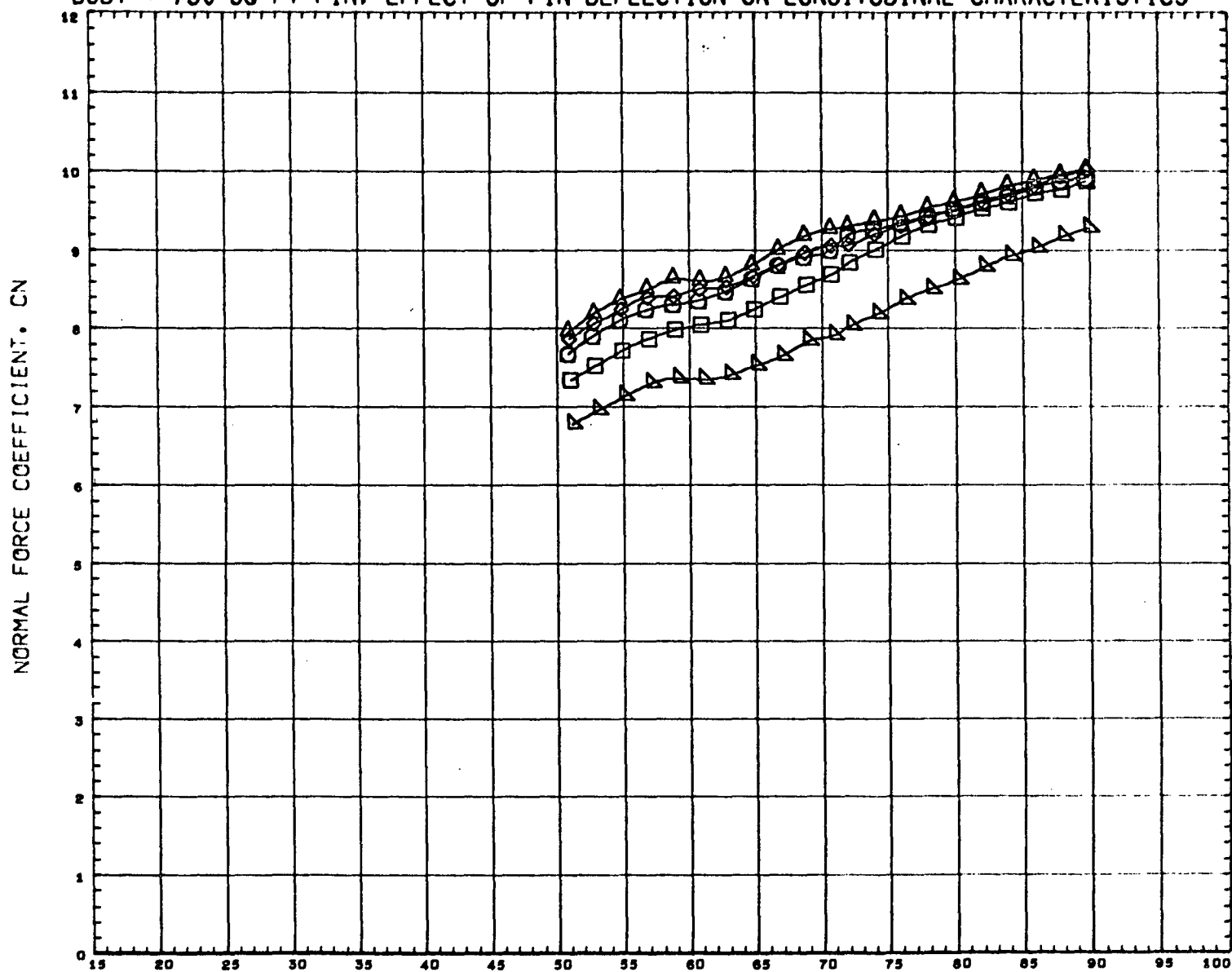
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | YMRP 2.9450 IN.       |
| (B59525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

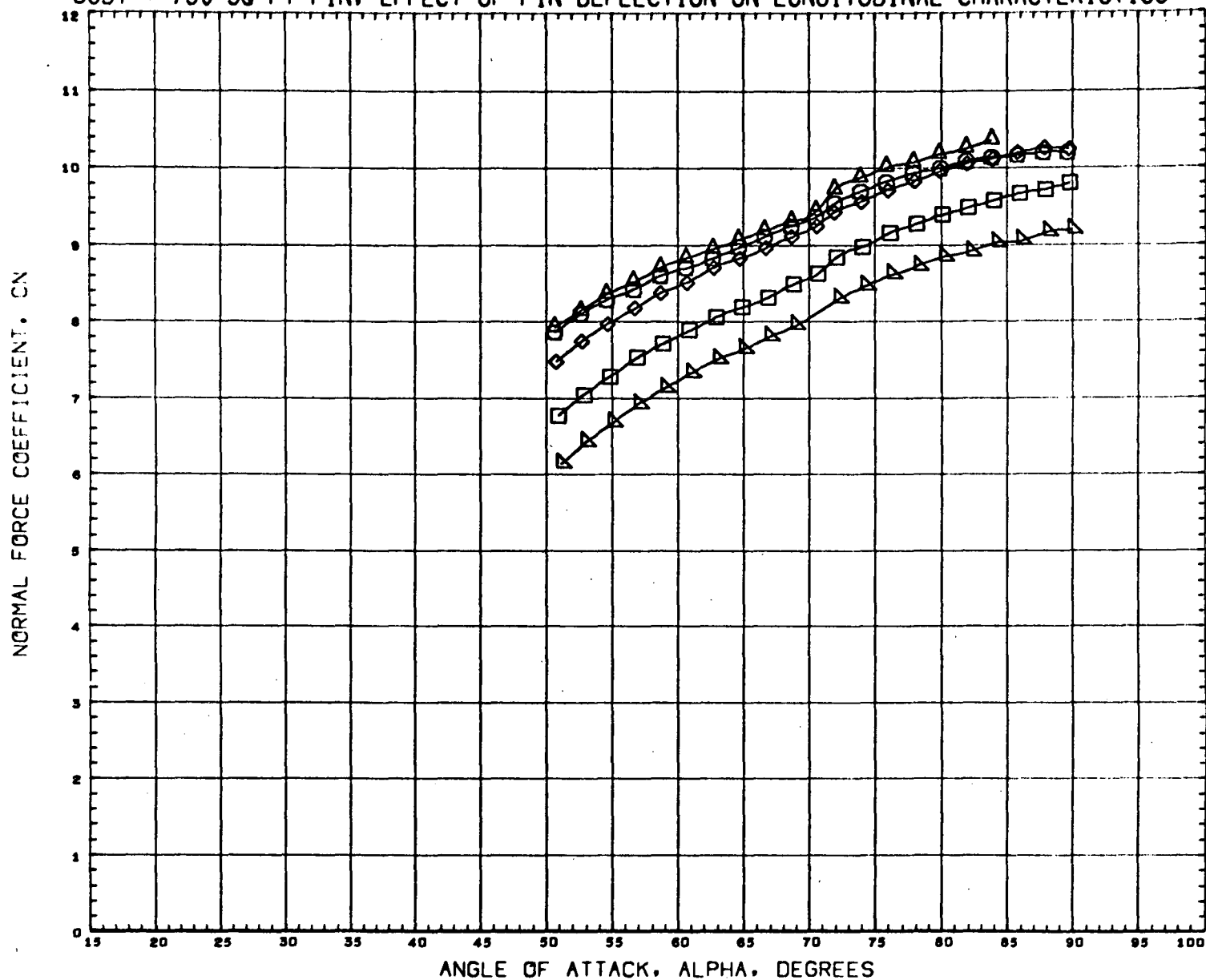


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.194

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

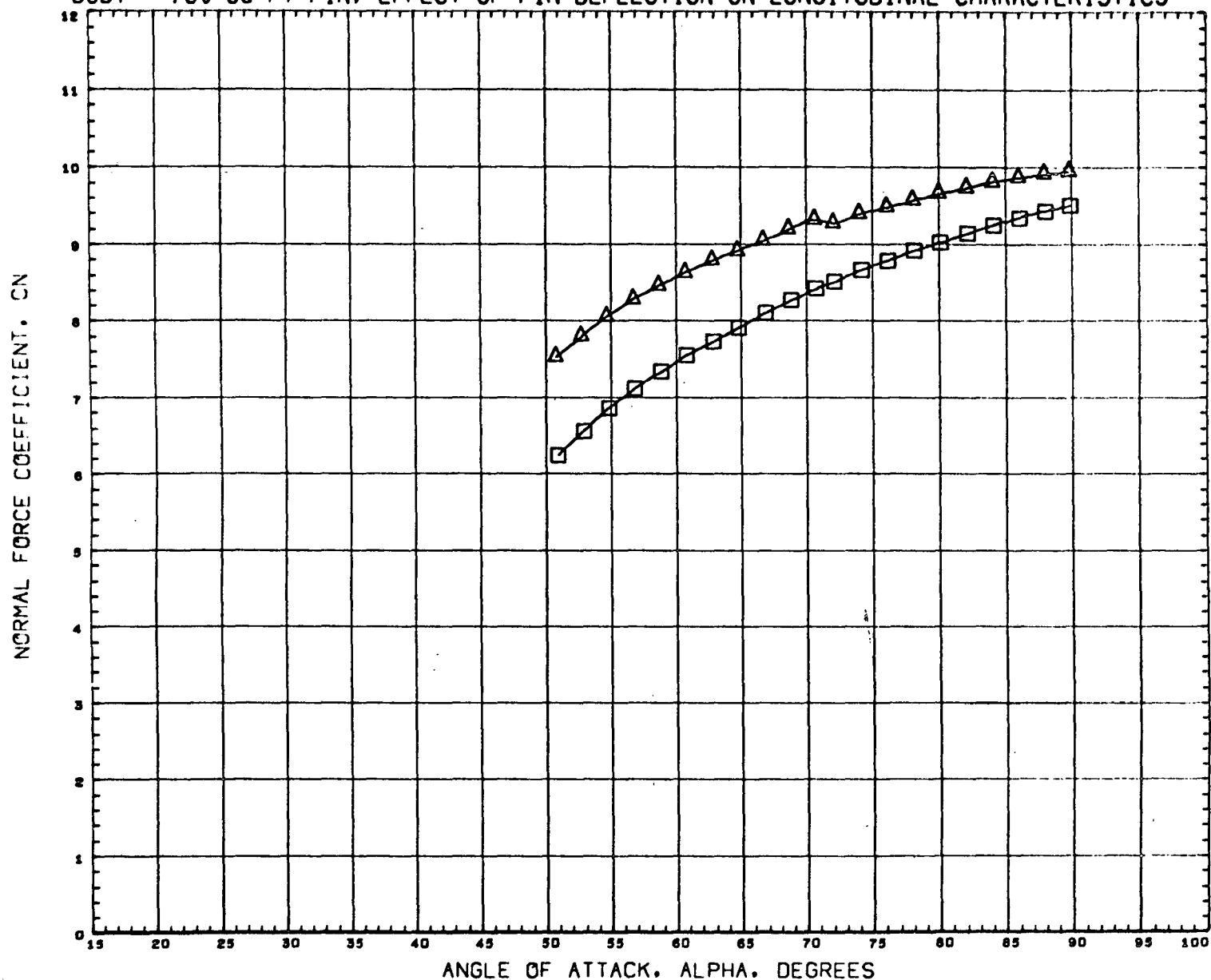


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (B59325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0026          |

MACH 1.959

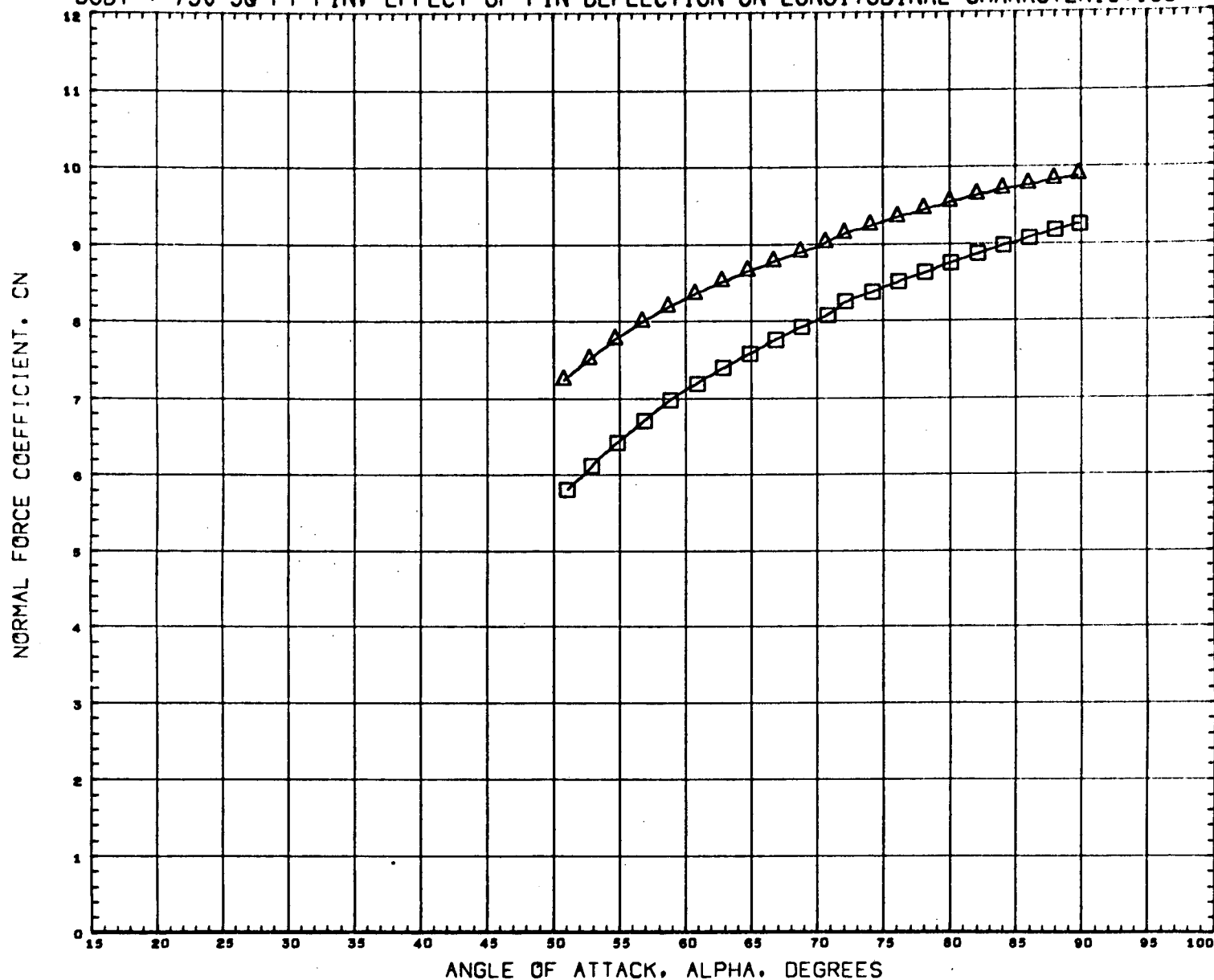
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859525)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

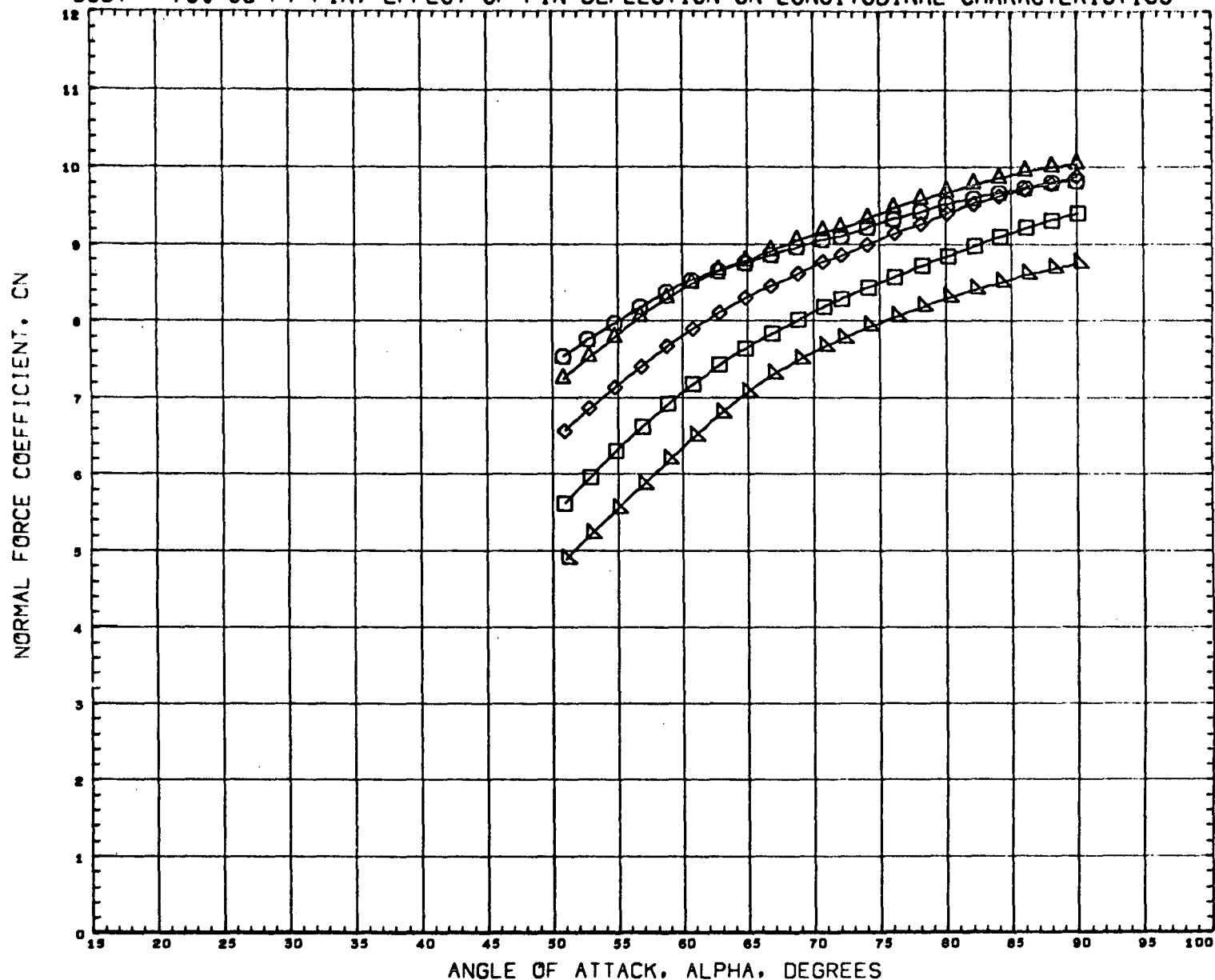


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59821)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59823)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF                  | 2.9450 IN.    |
| (B59825)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

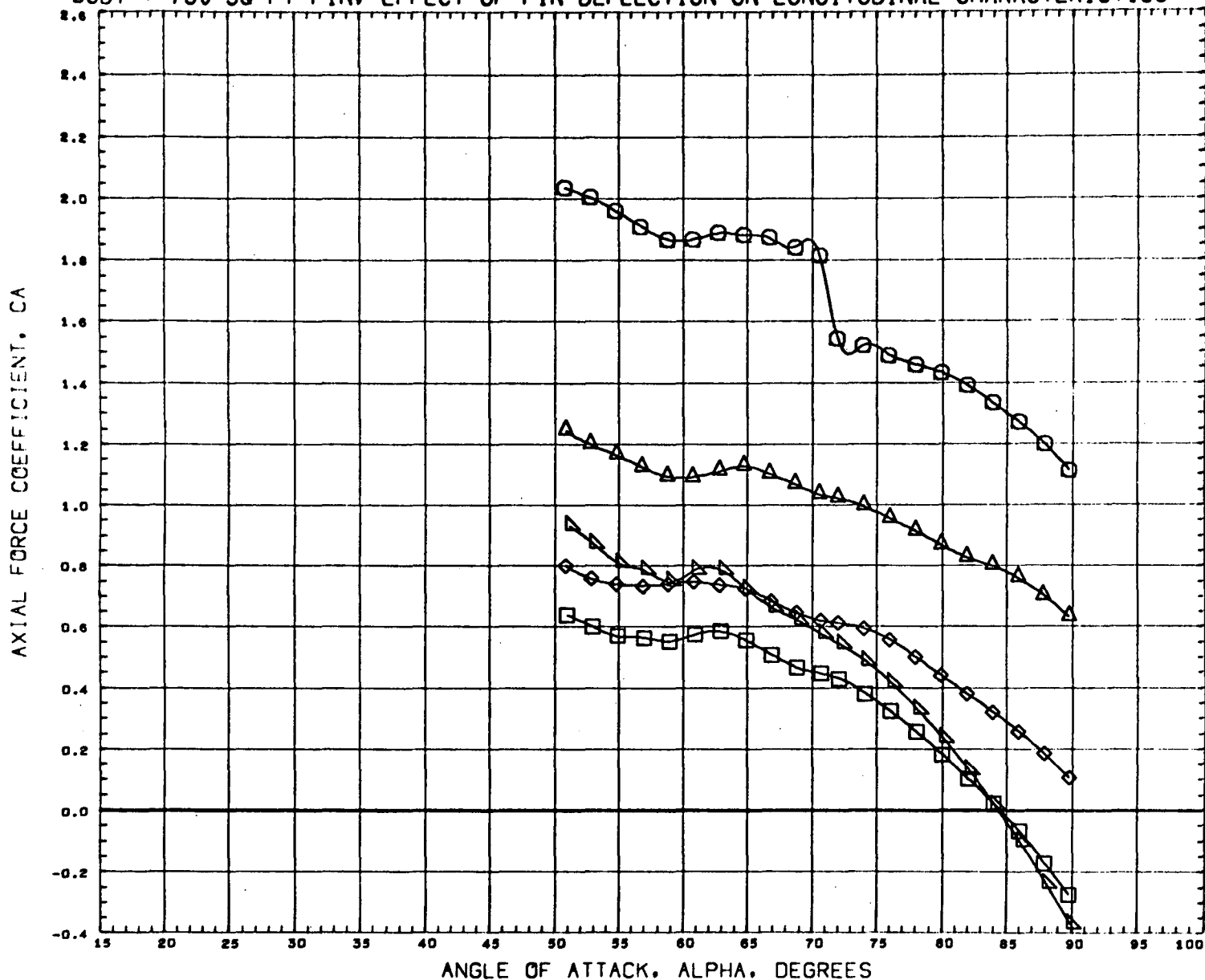


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

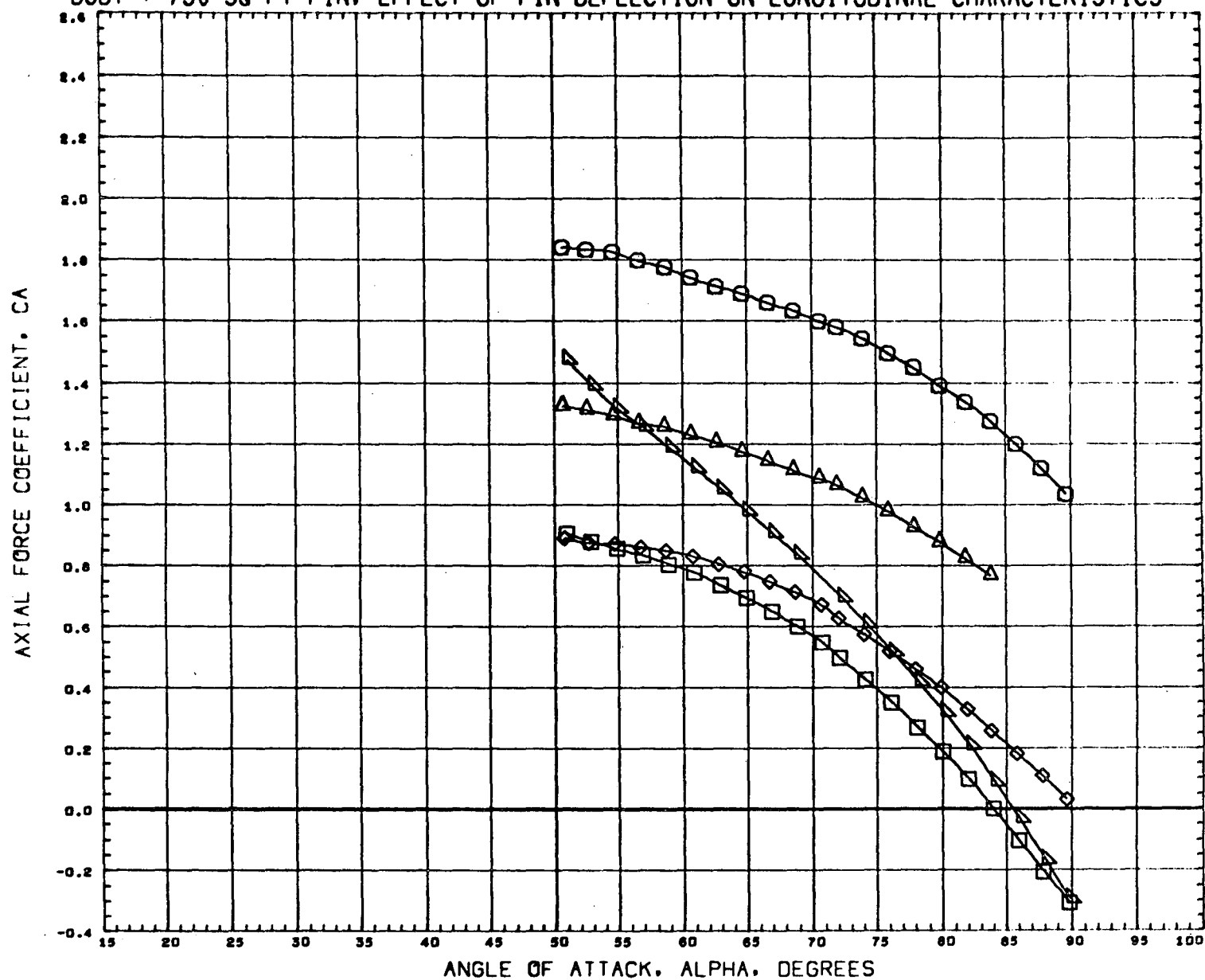
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF                  | 2.9450 IN.    |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.194

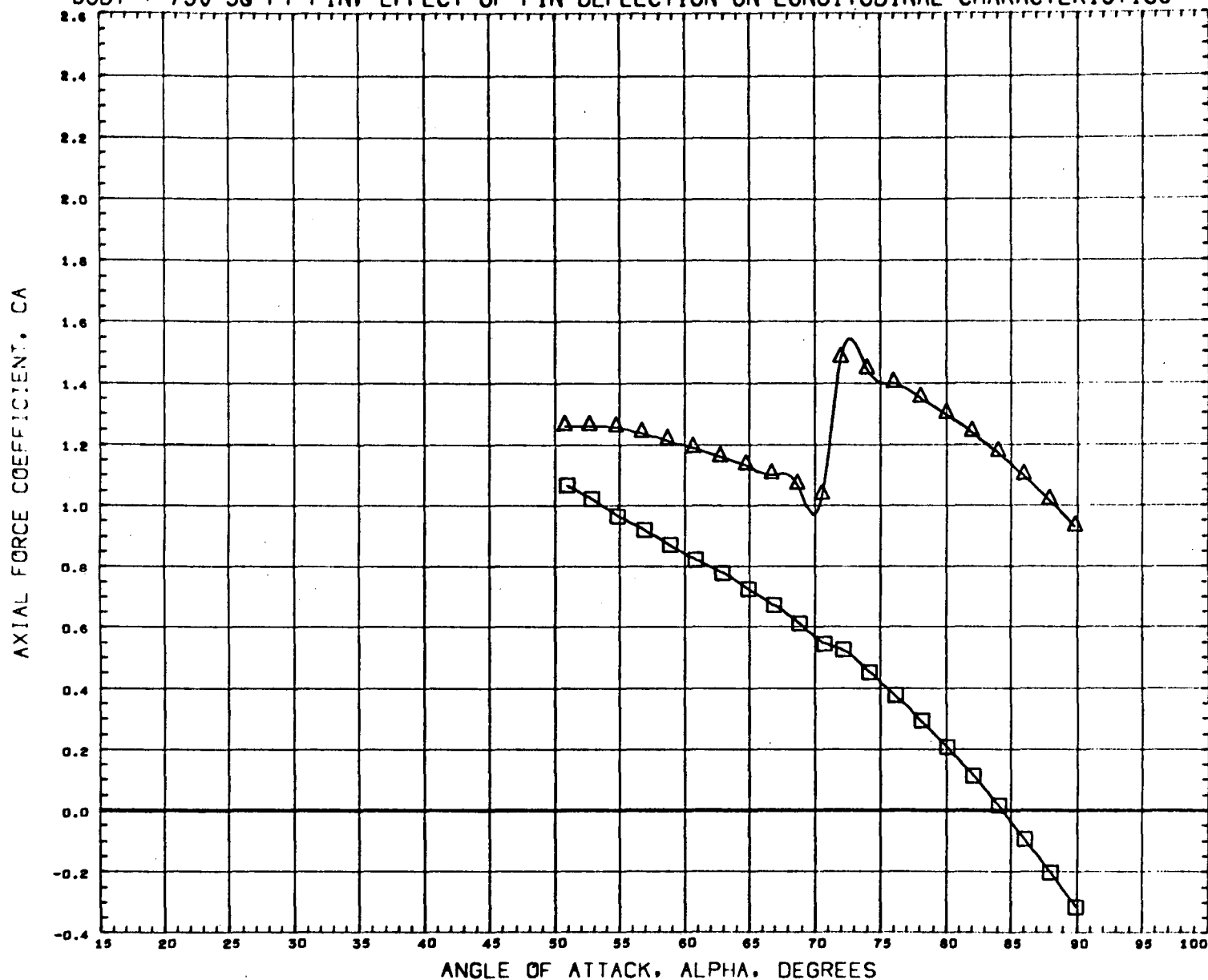
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

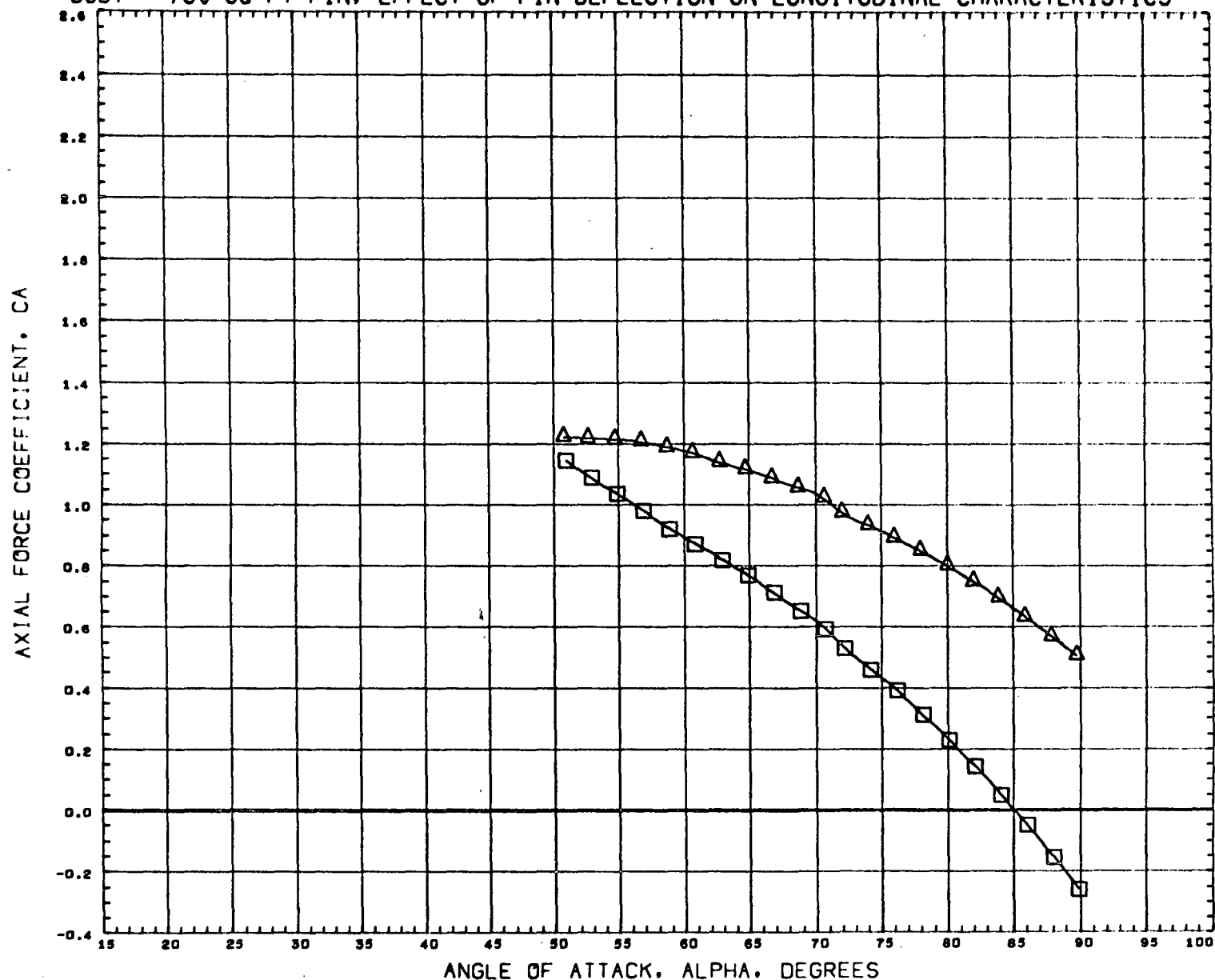
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59321)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59323)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF                  | 2.9450 IN.    |
| (B59325)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

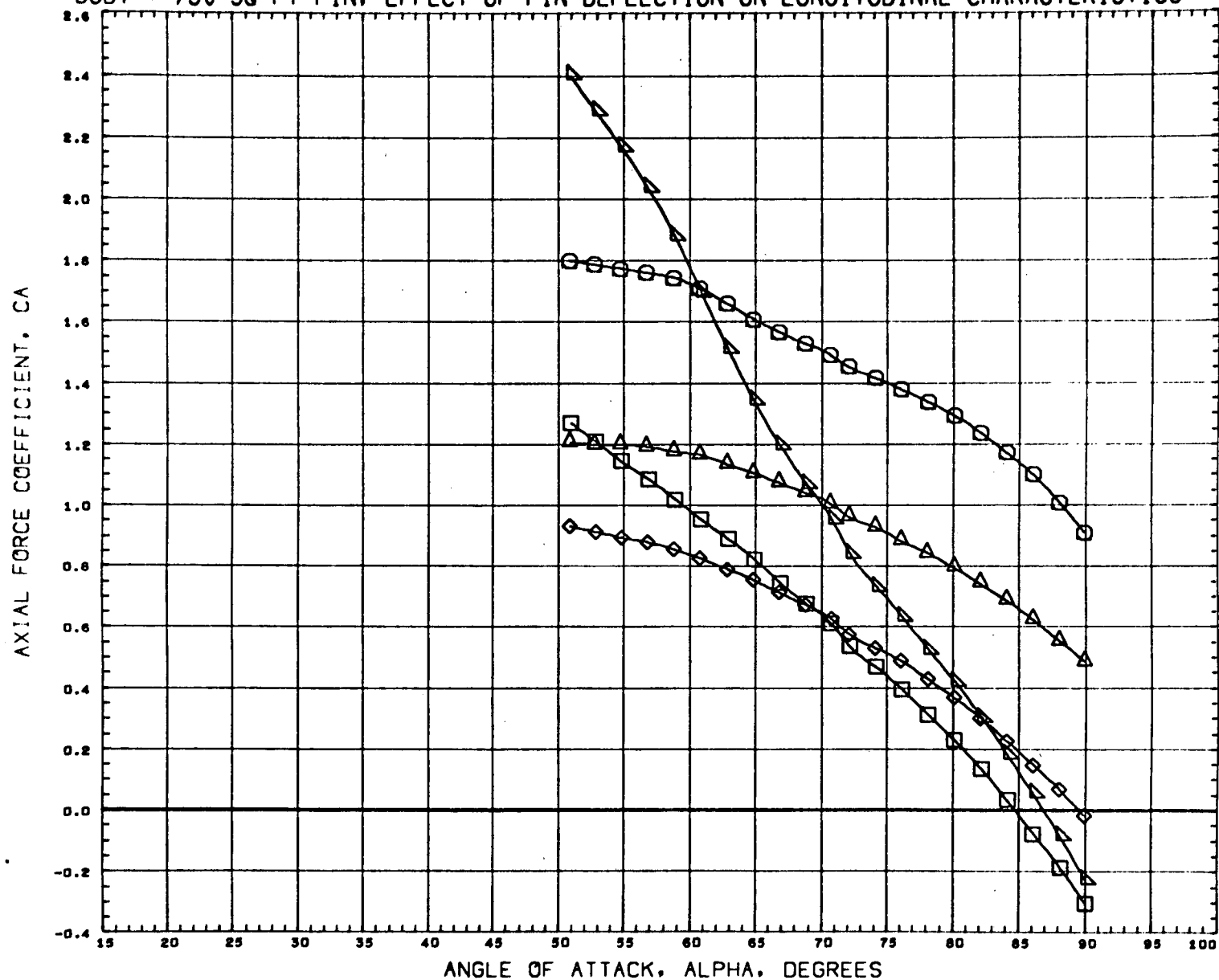
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59321)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59323)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (B59325)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

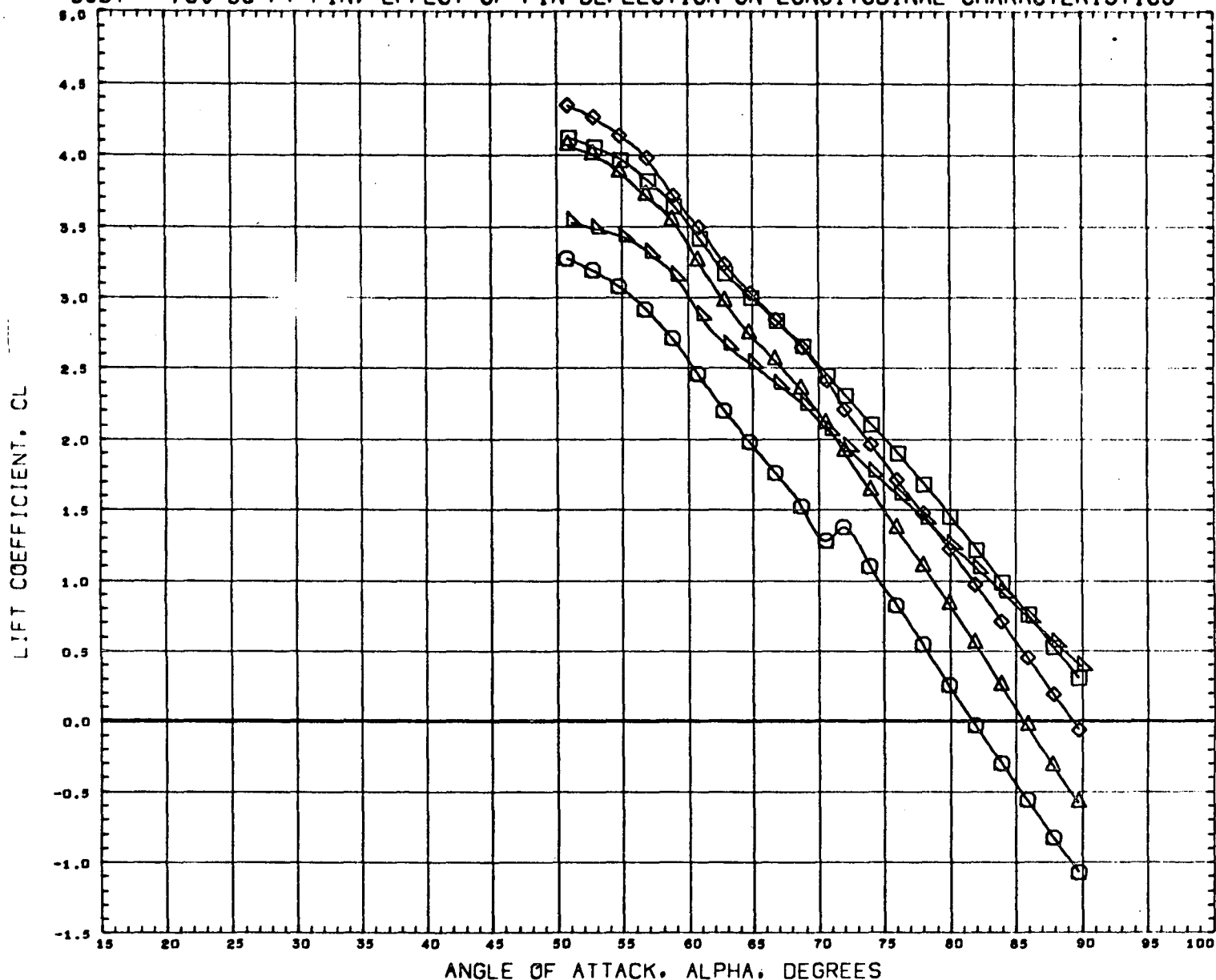
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 2.9450 IN.       |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | YMRP 0.0000 IN.       |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

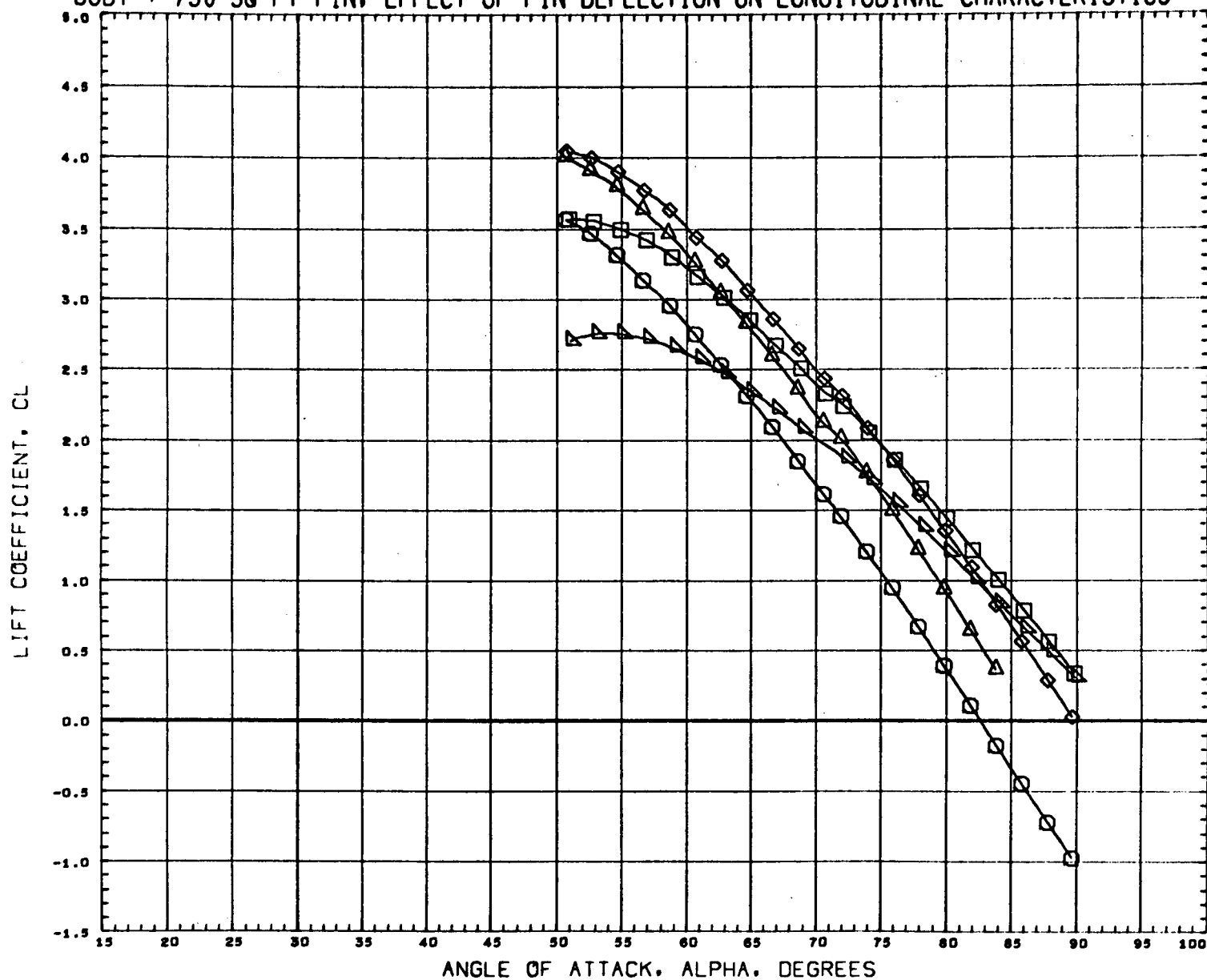
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | XMNP                  | 2.9450 IN.    |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | YMNP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | ZMNP                  | 0.0000 IN.    |
|                 |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.194

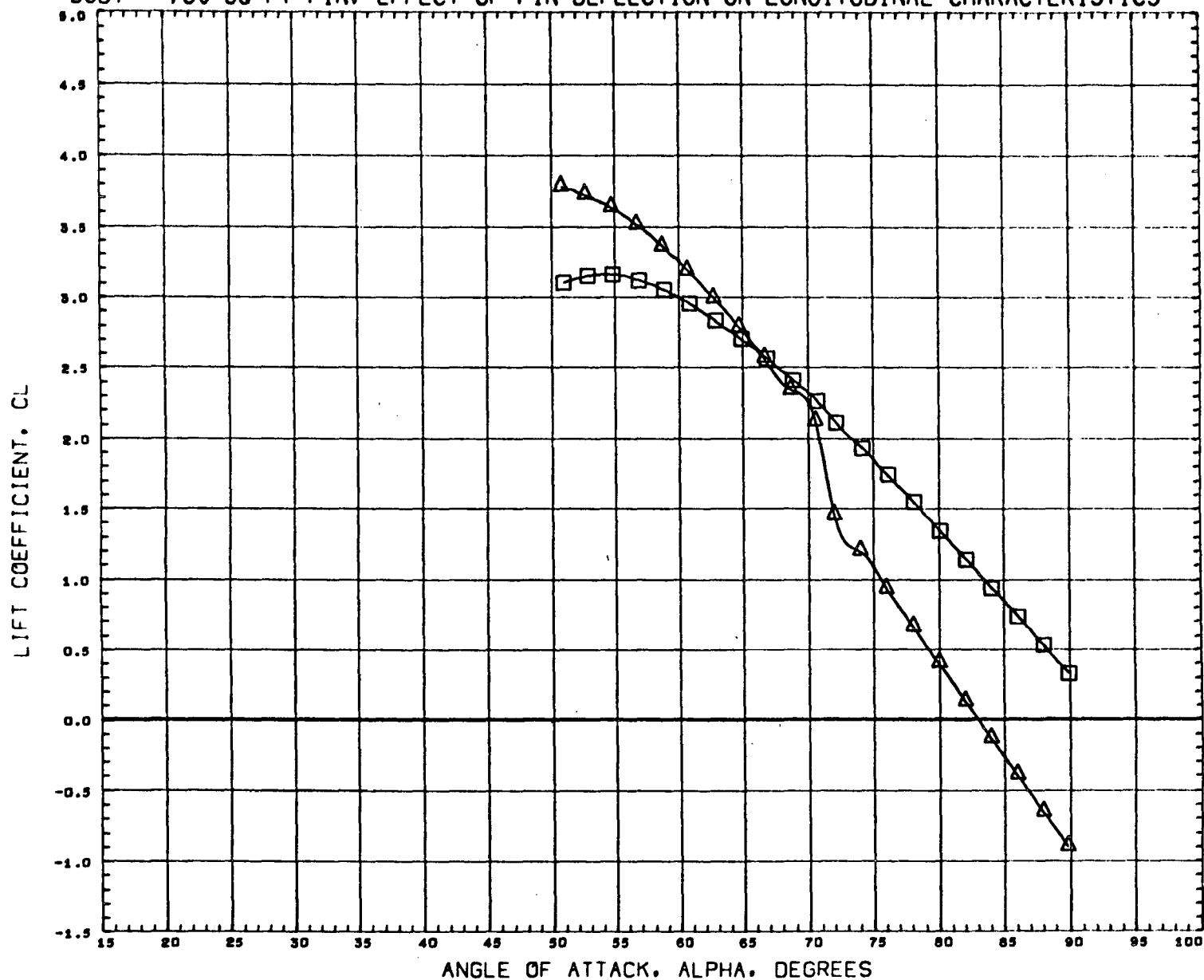
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59921)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59922)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59923)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59924)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59925)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

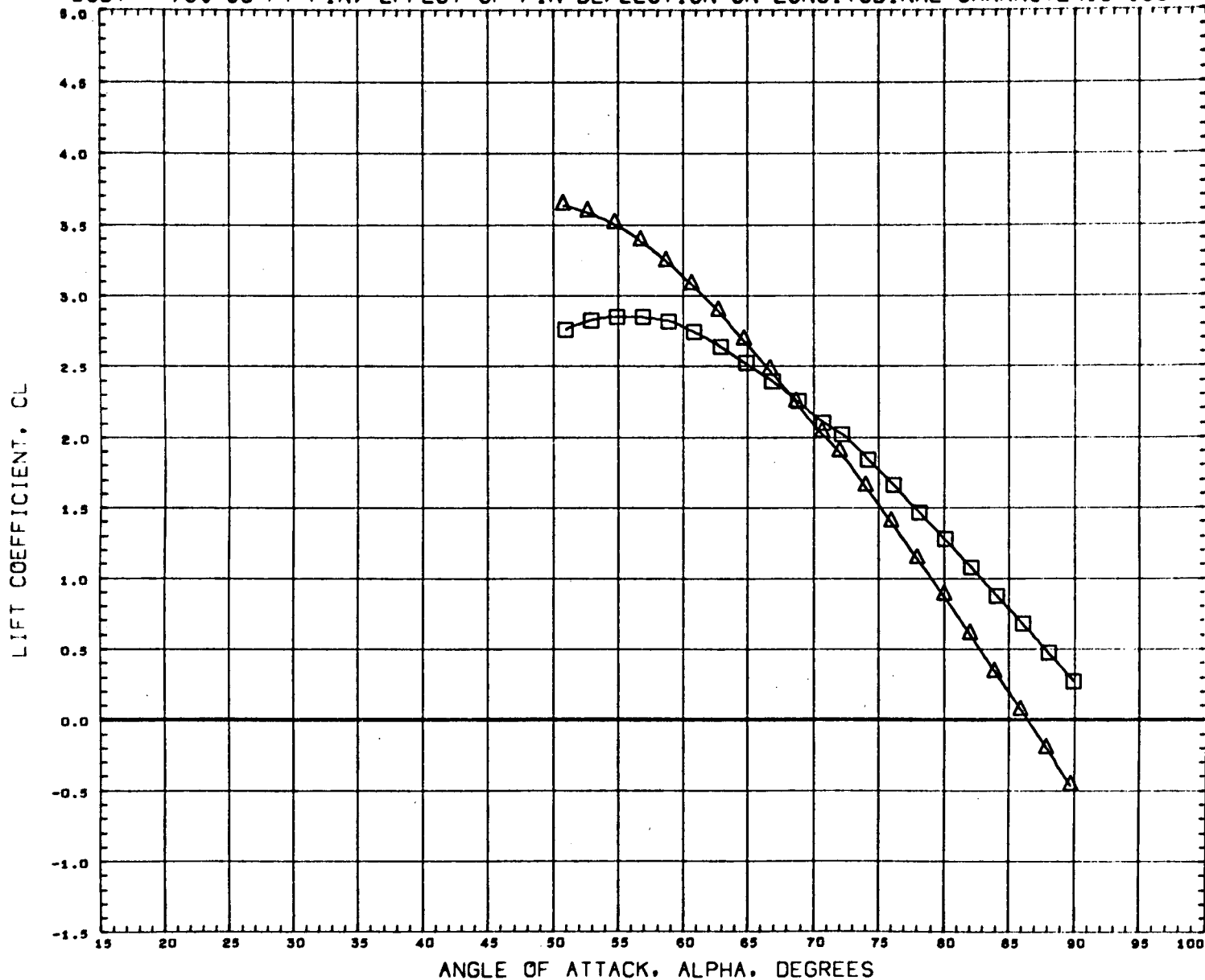
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859525)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

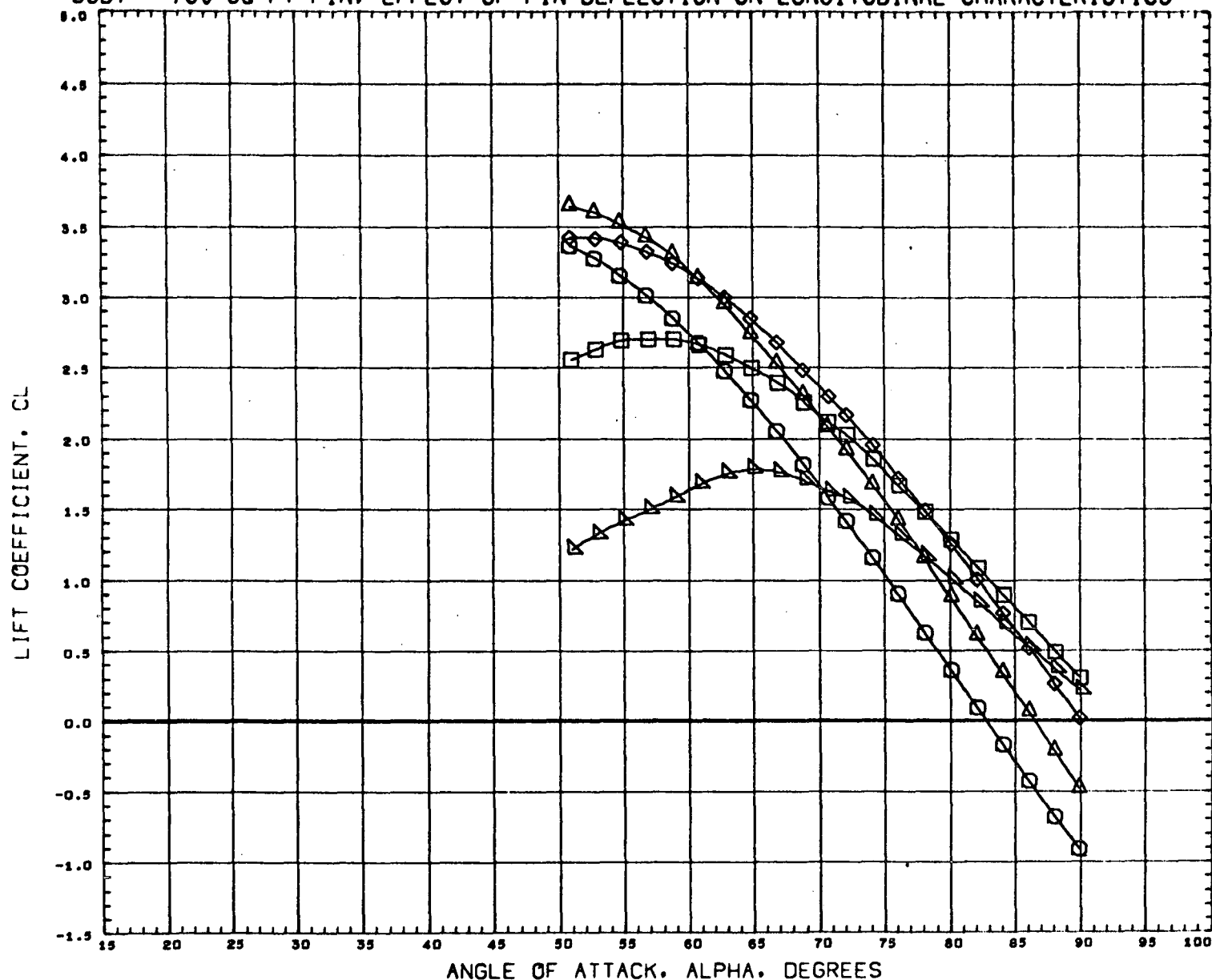
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59S21)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59S22)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59S23)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (B59S25)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

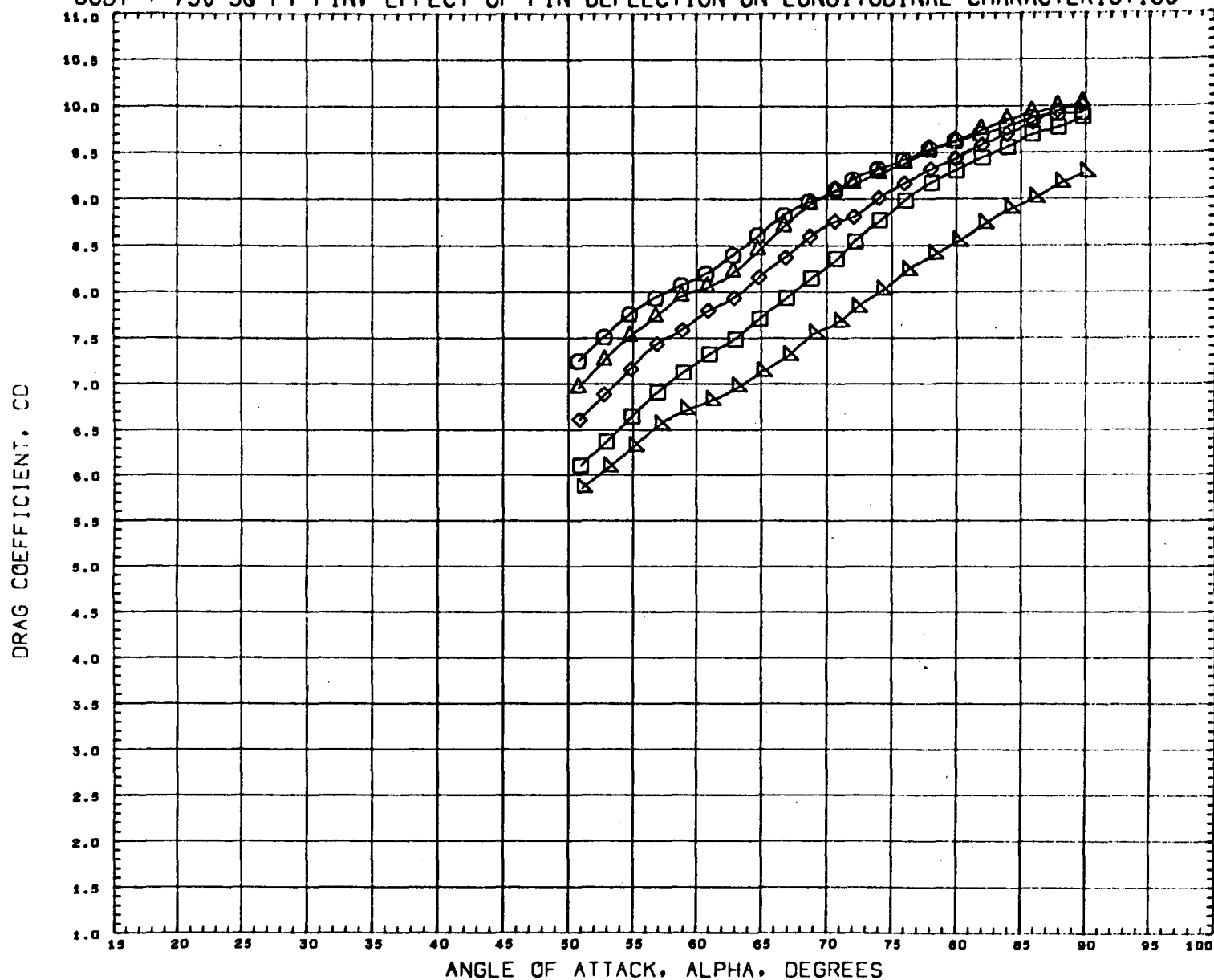
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET | SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|----------|--------|------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59821) | ○      | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 3Q. IN |
| (B59822) | ◇      | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59823) | ◻      | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59824) | ○      | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | YMRP                  | 2.9450 IN.    |
| (B59825) | ▽      | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|          |        |                              |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|          |        |                              |       |       |         |       | SCALE                 | 0.0028        |

MACH 4.959

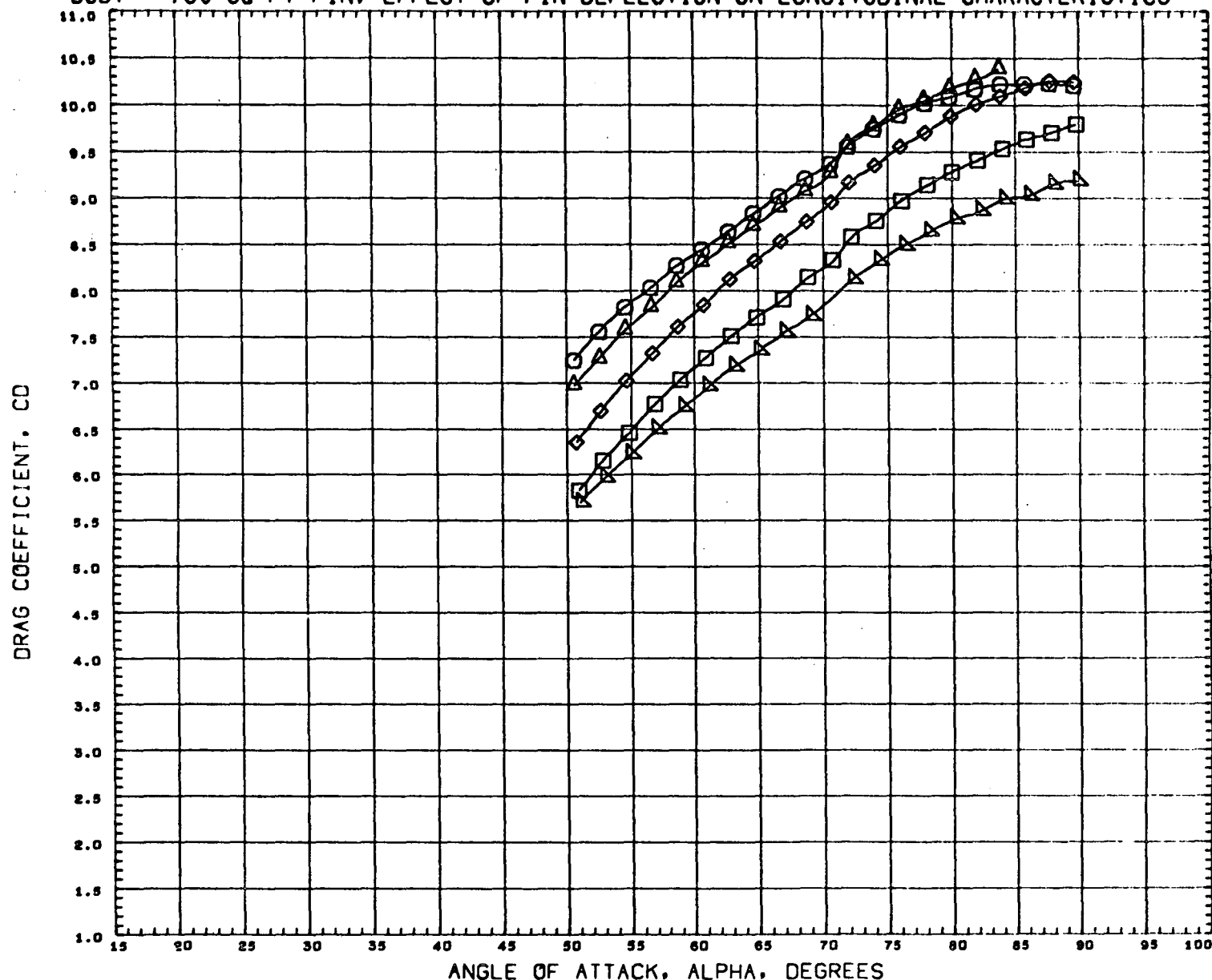
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 sq. IN    |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.194

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

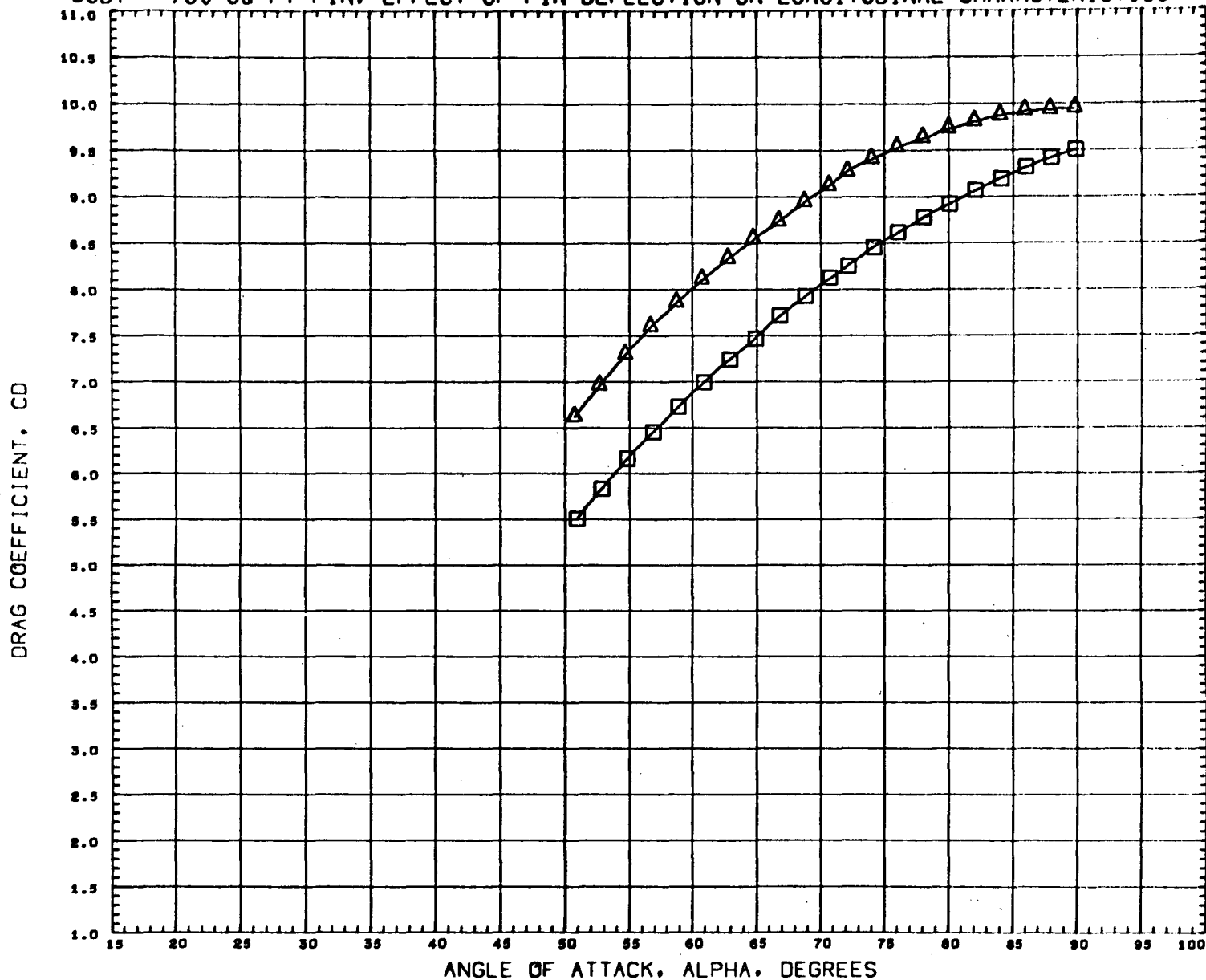


ANGLE OF ATTACK, ALPHA, DEGREES

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (859325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

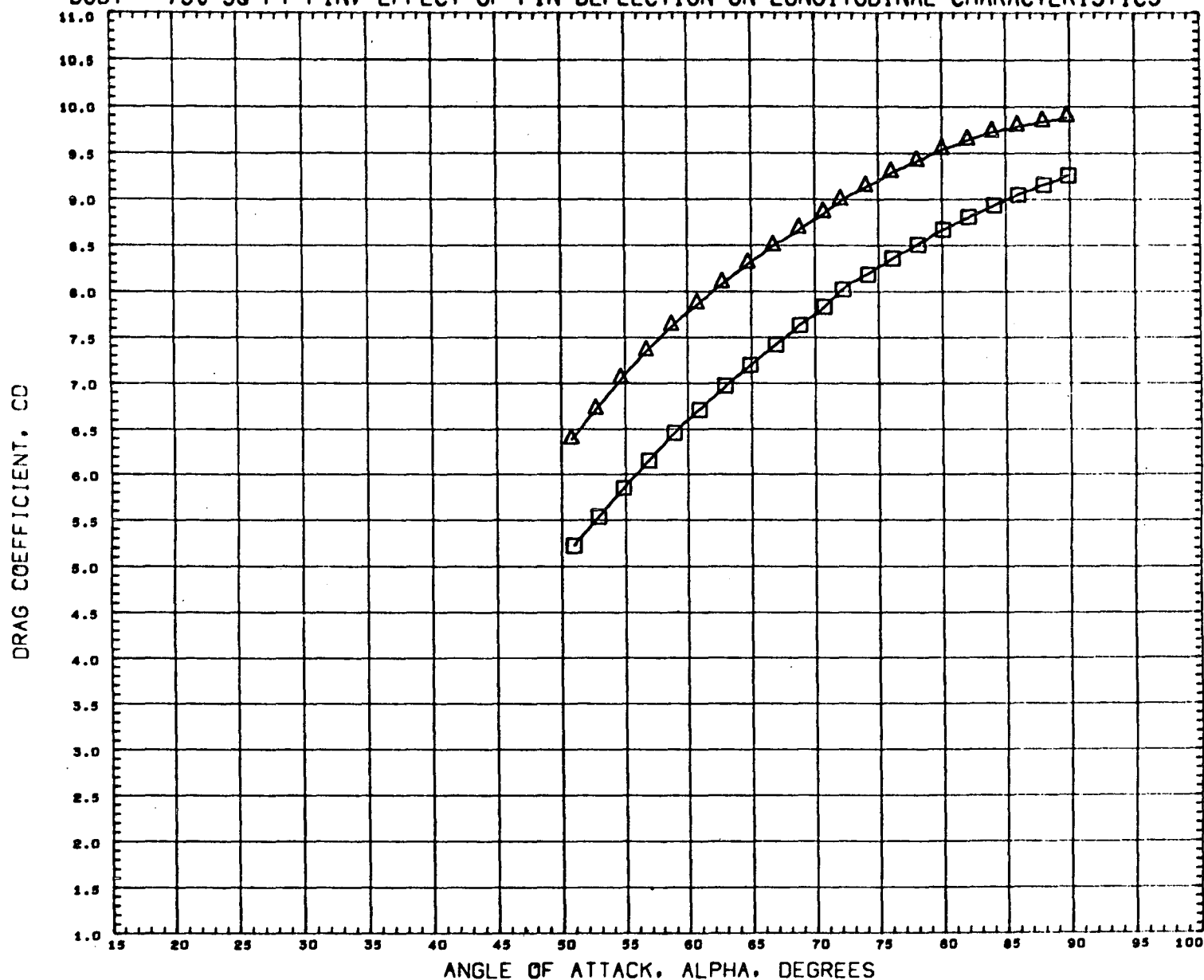
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859525)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

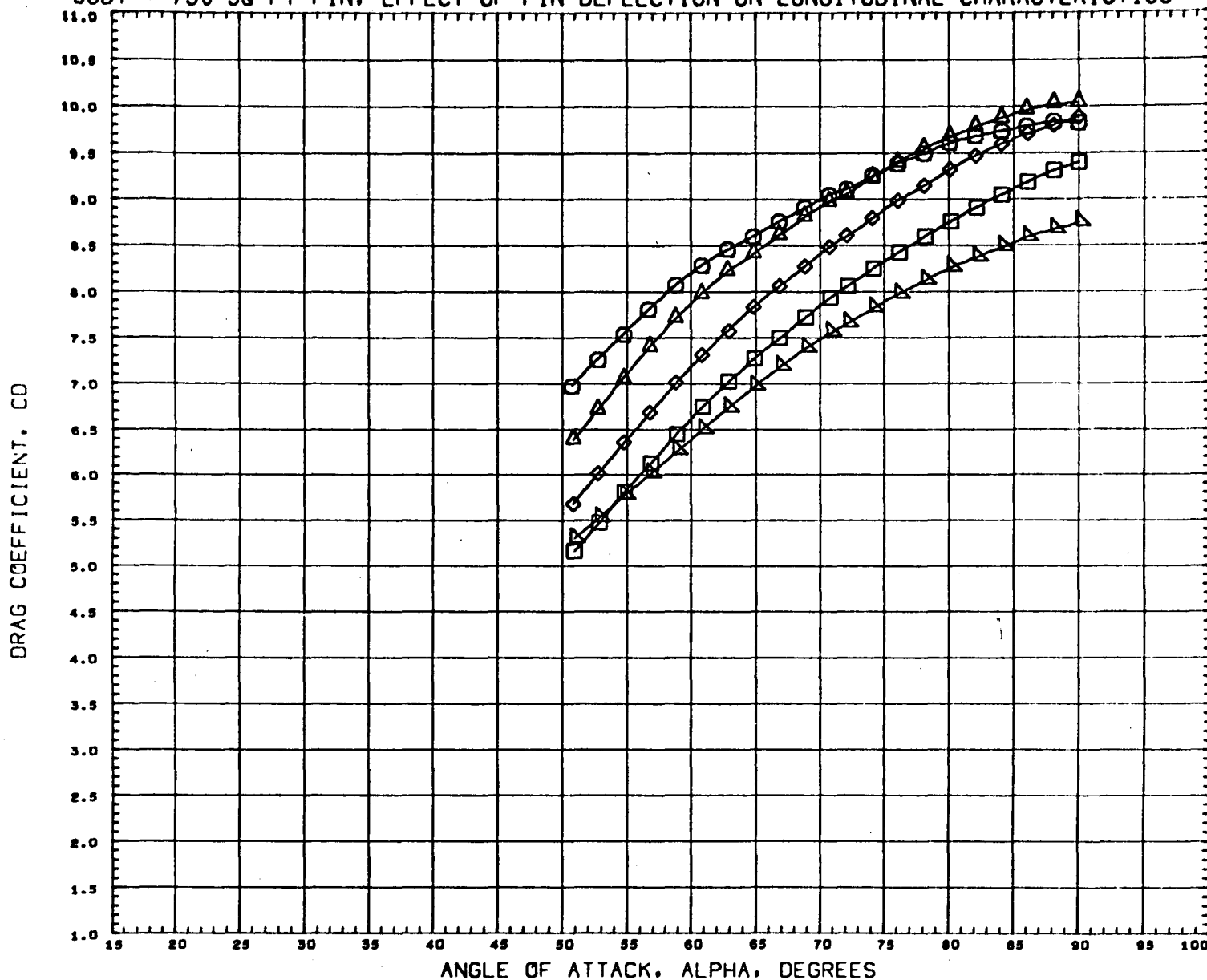
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859821)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859823)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF                  | 2.9450 IN.    |
| (859825)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

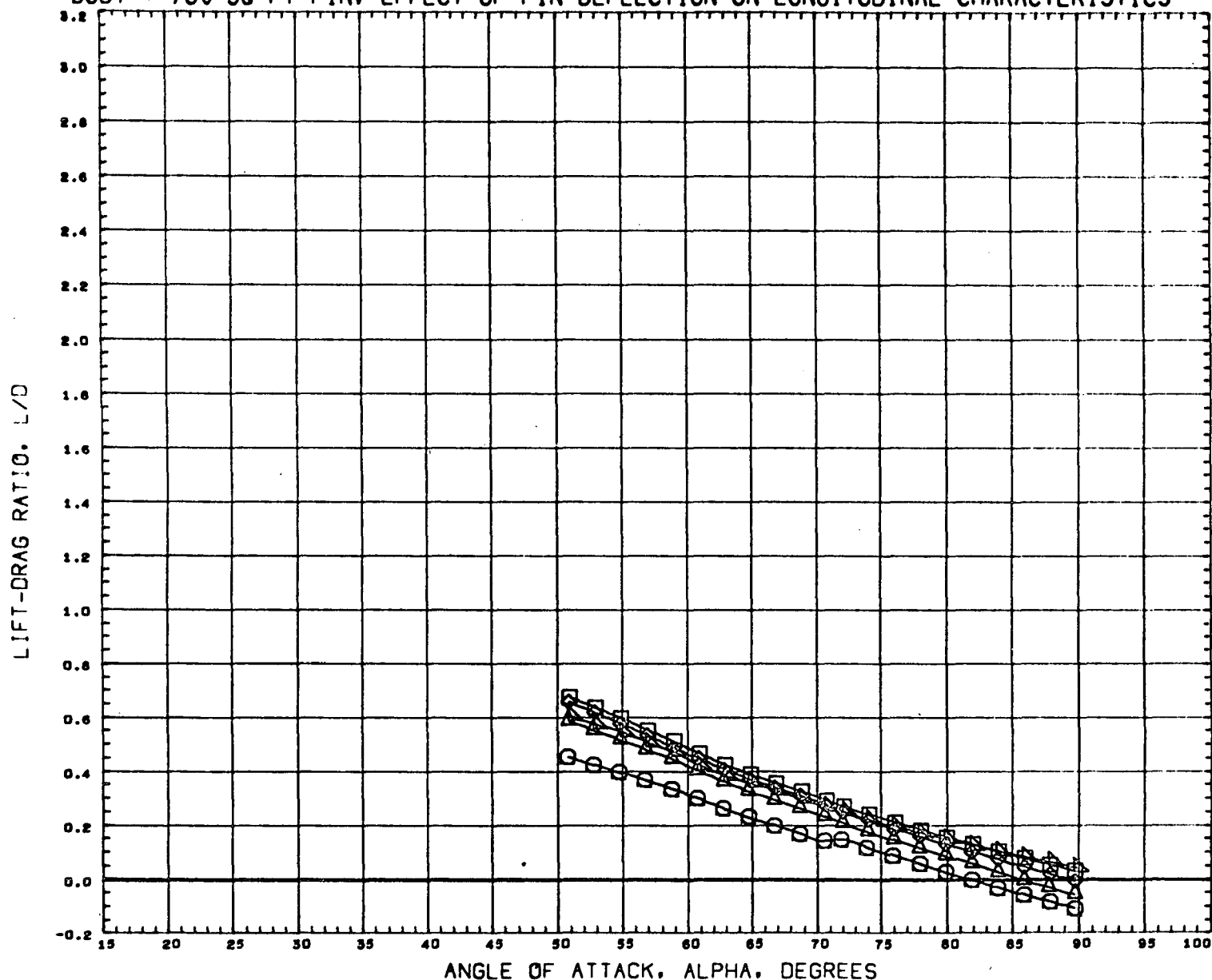
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFA   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 sq. IN    |
| (B59822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

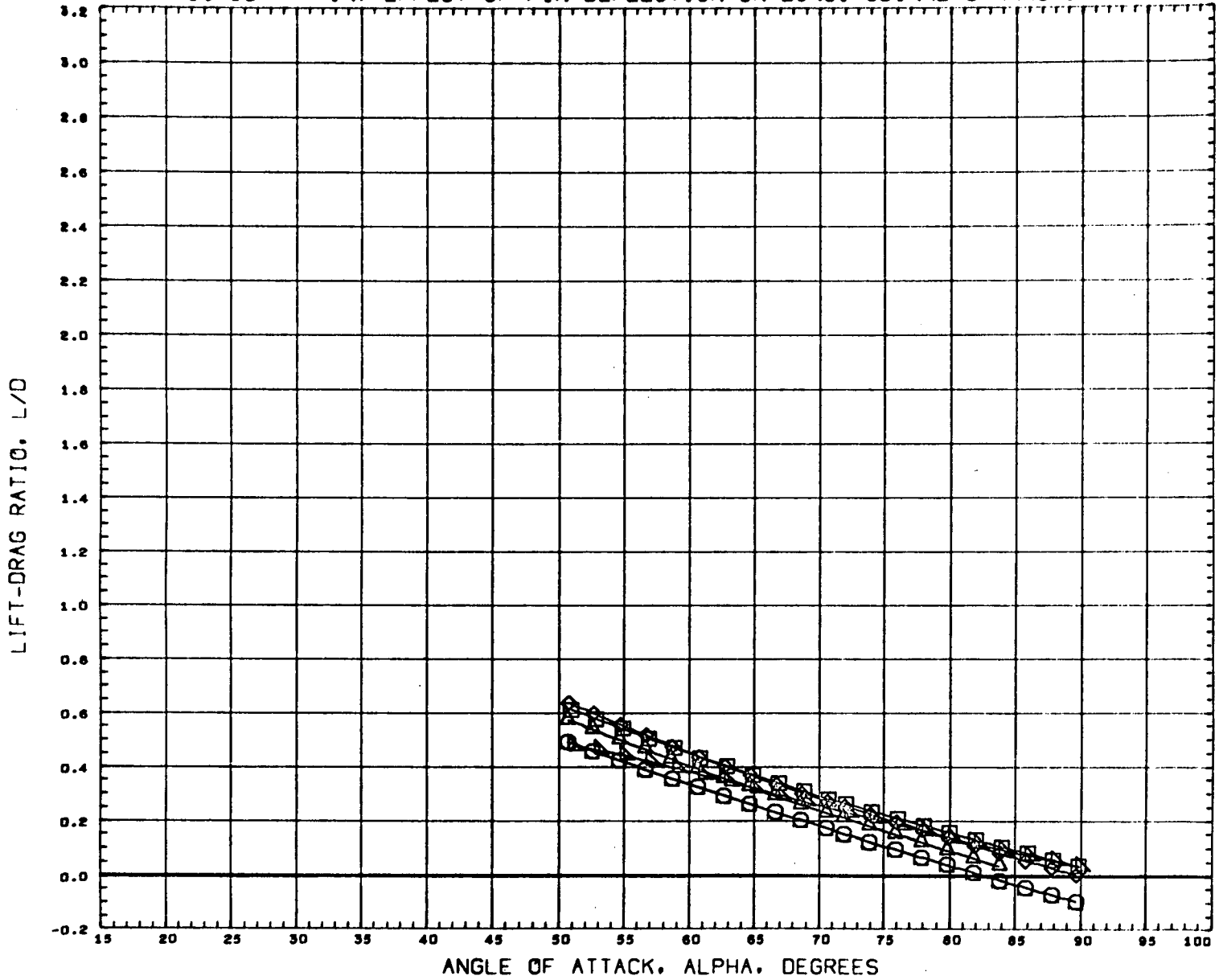
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | YMRP                  | 2.9450 IN.    |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.194

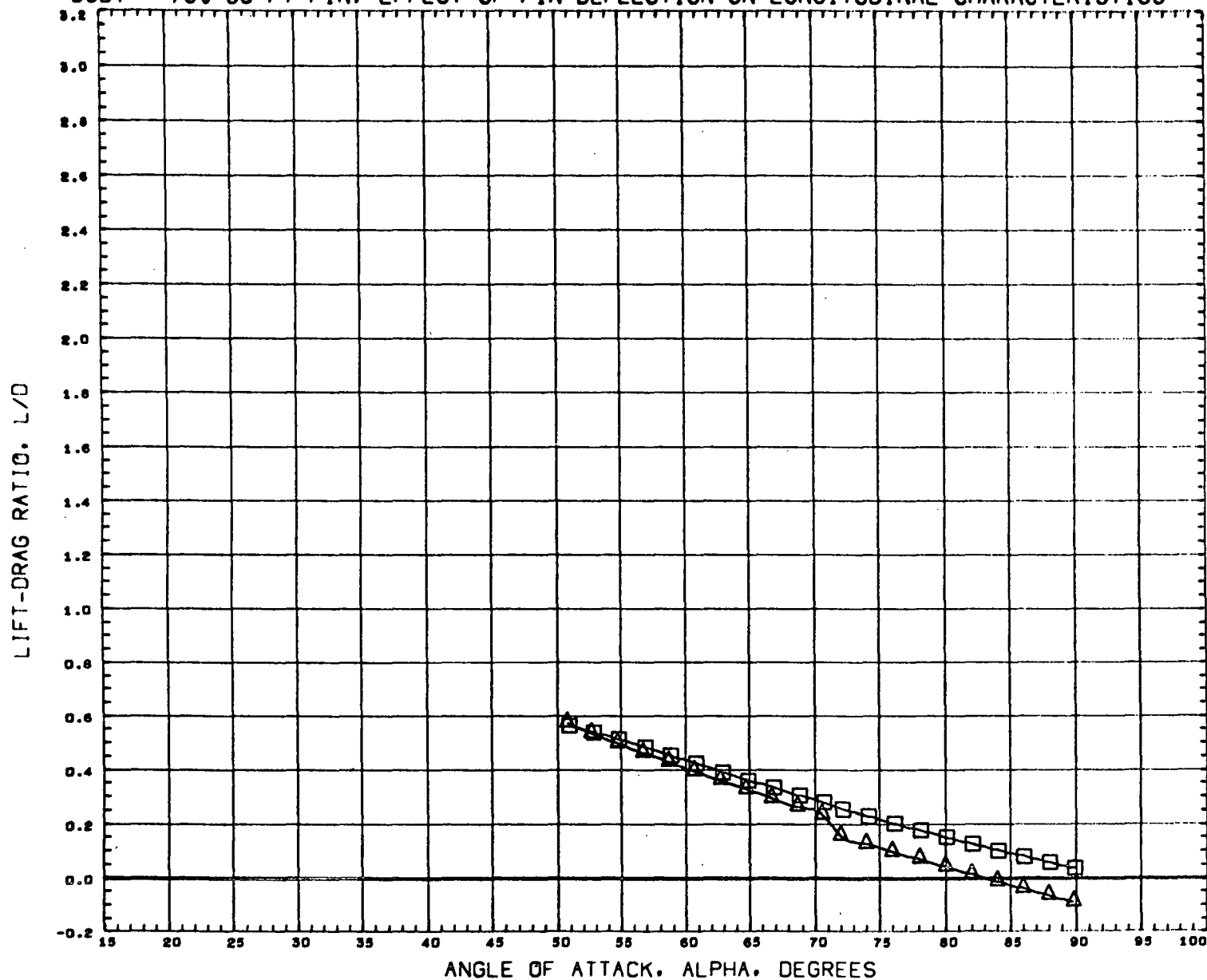
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859821)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859823)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859825)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 1.959

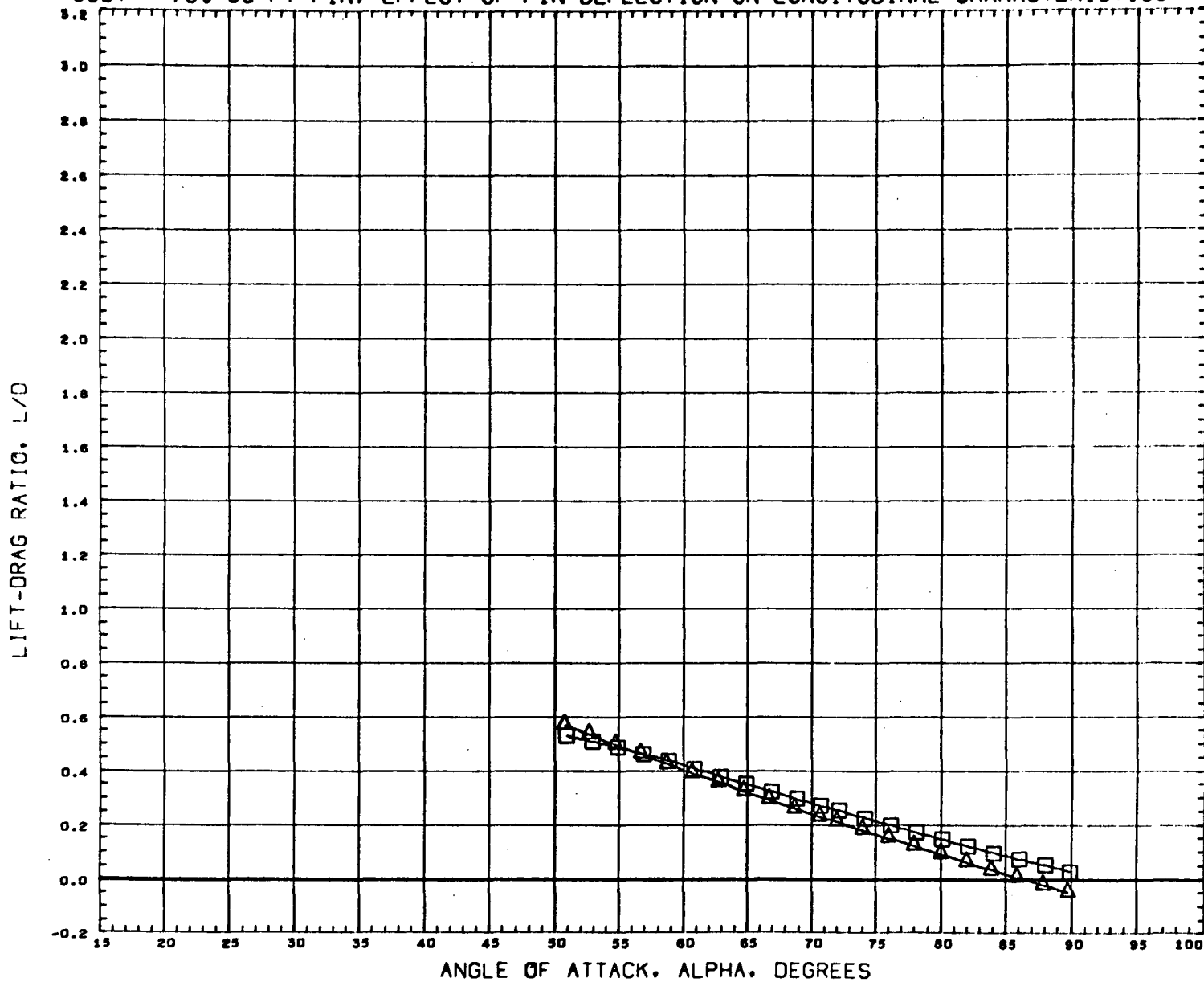
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859821)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859823)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859825)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

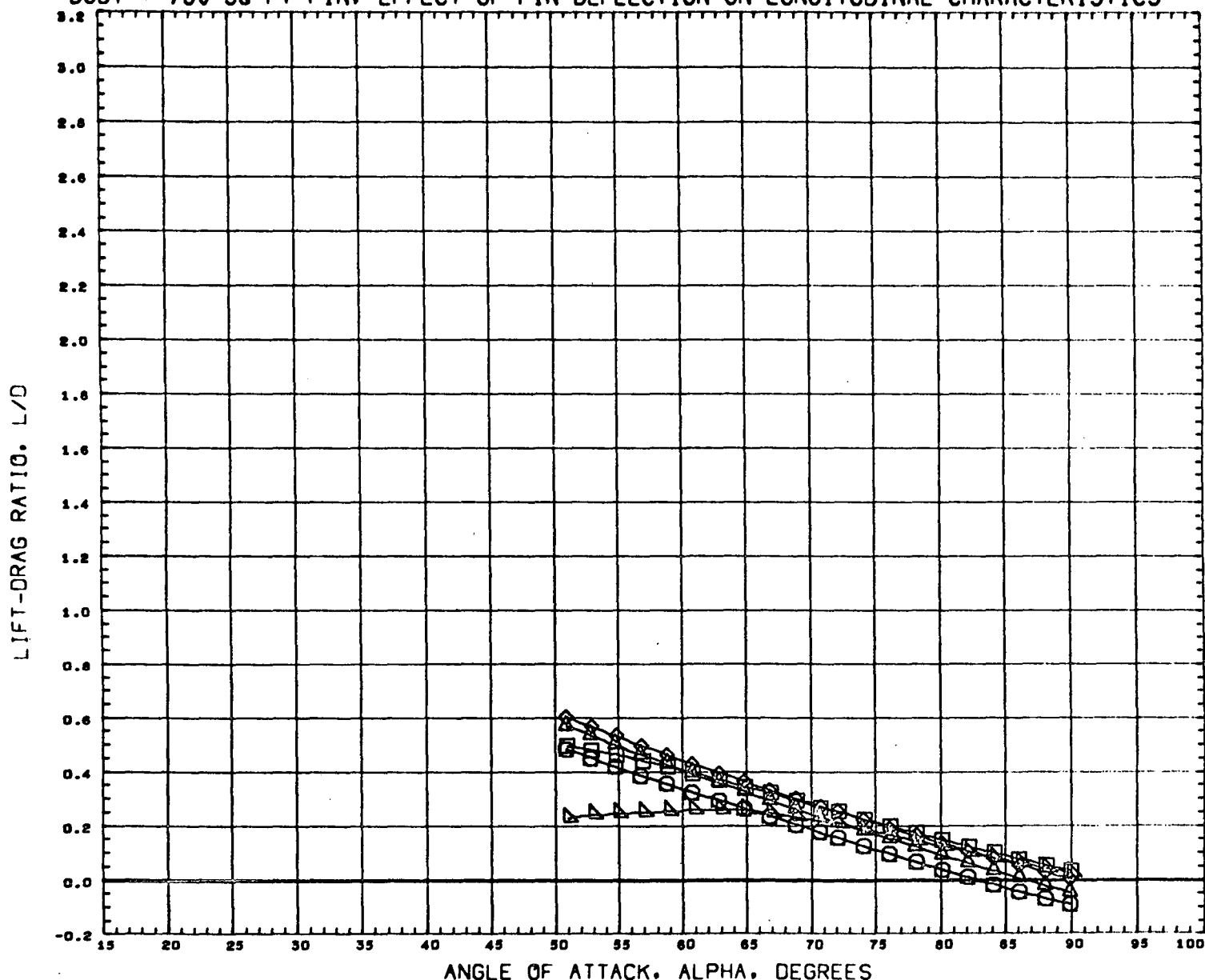
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859525)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

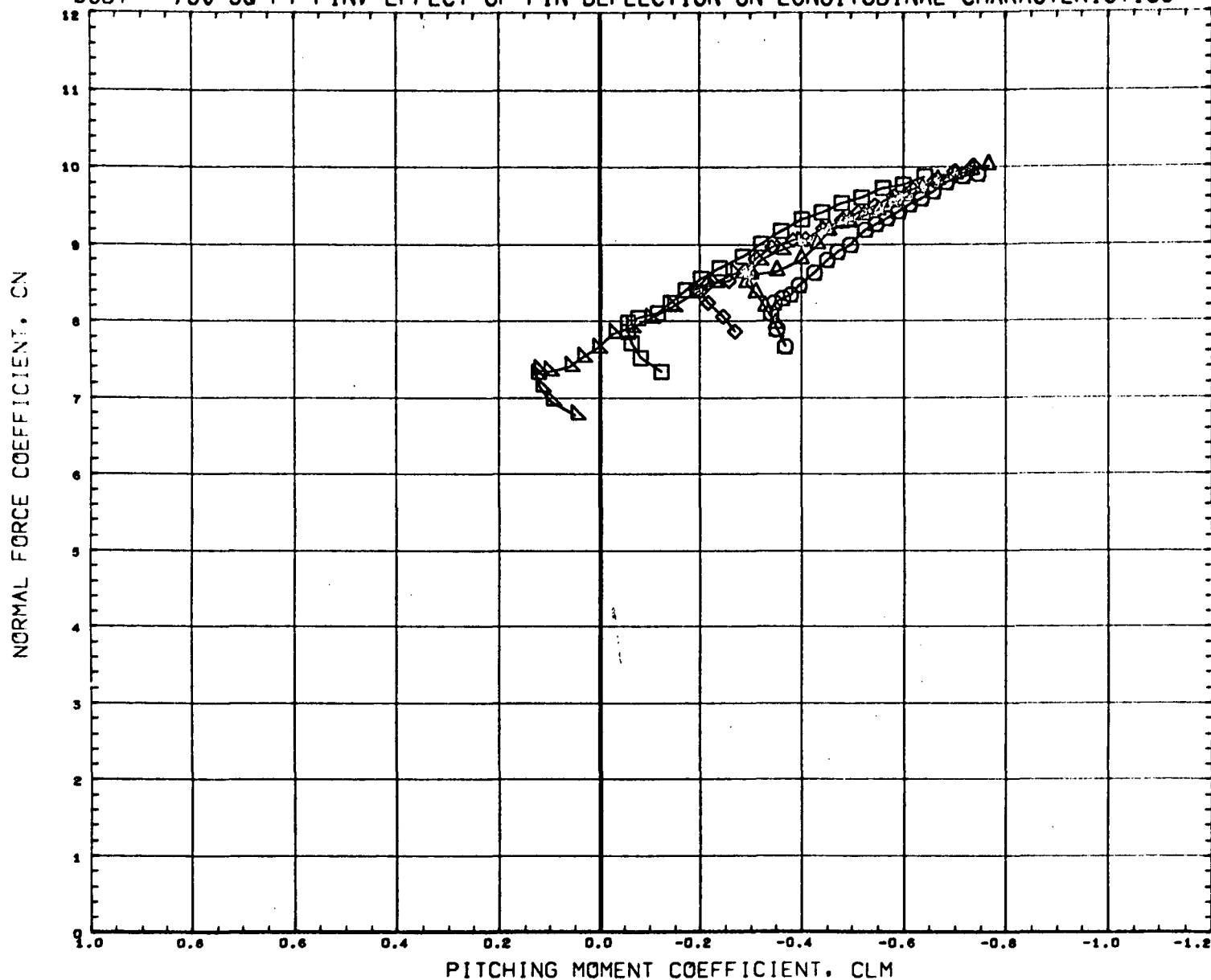
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (059321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (059322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (059323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (059324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (059325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

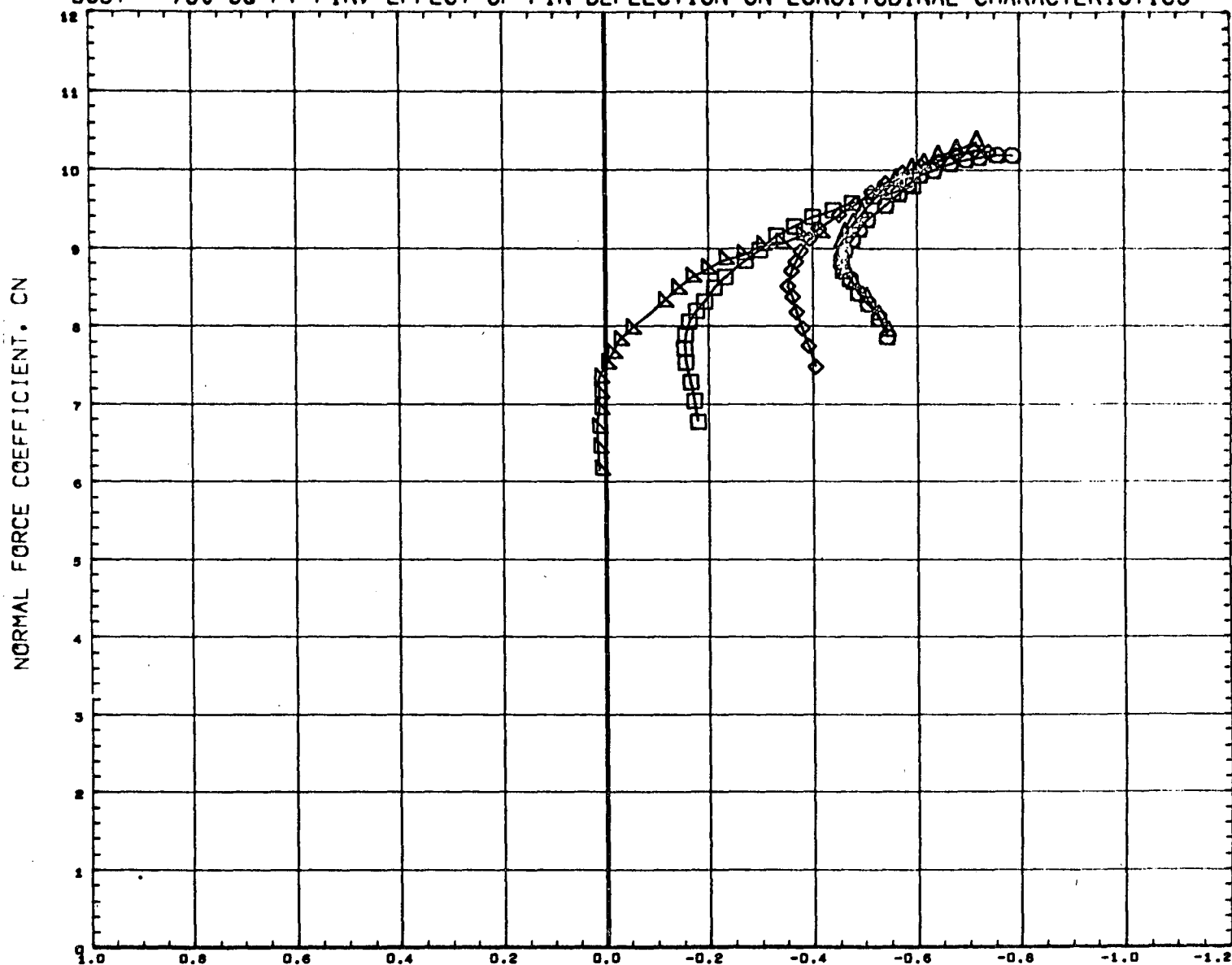
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.194

# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

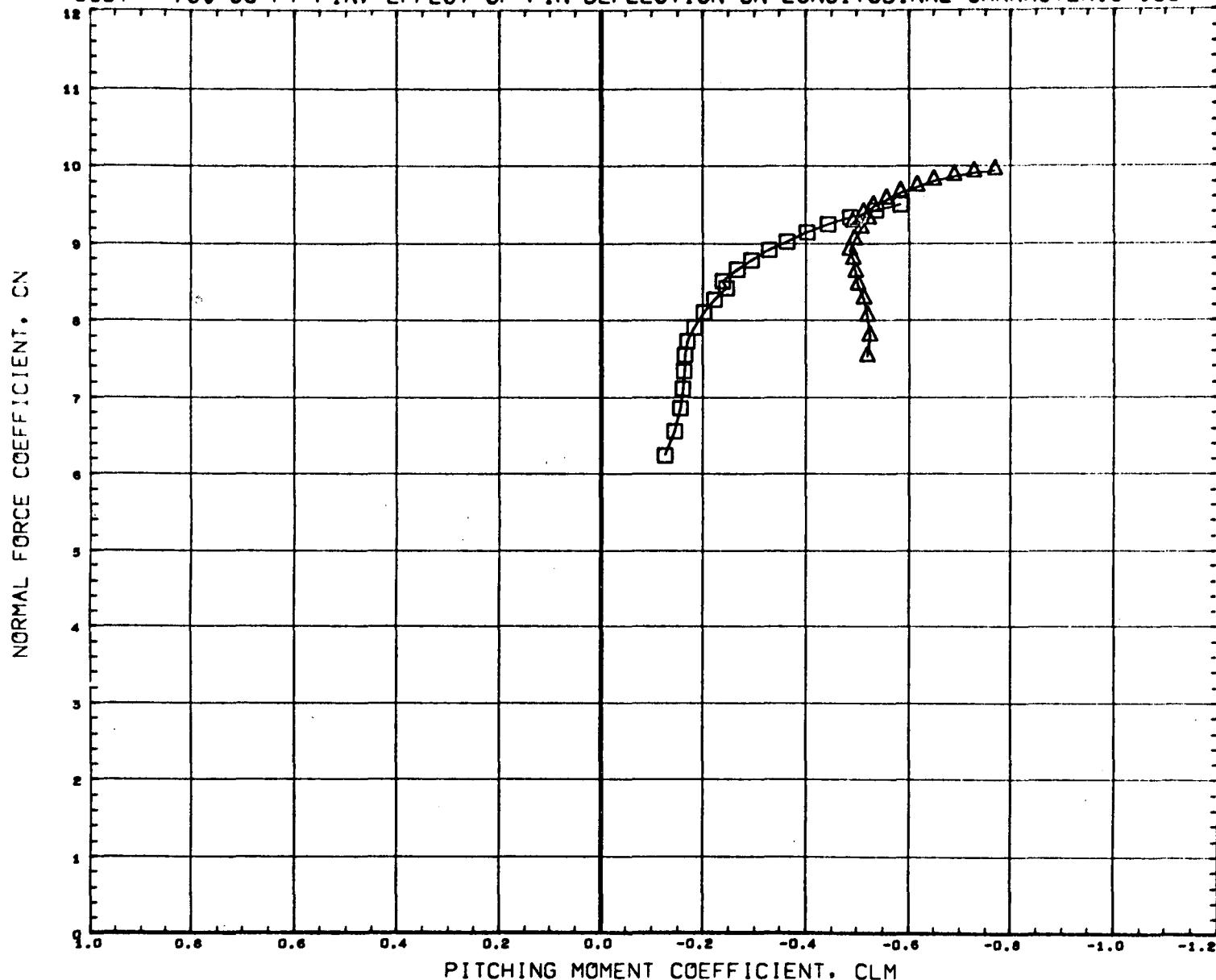


PITCHING MOMENT COEFFICIENT, CLM

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (859325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

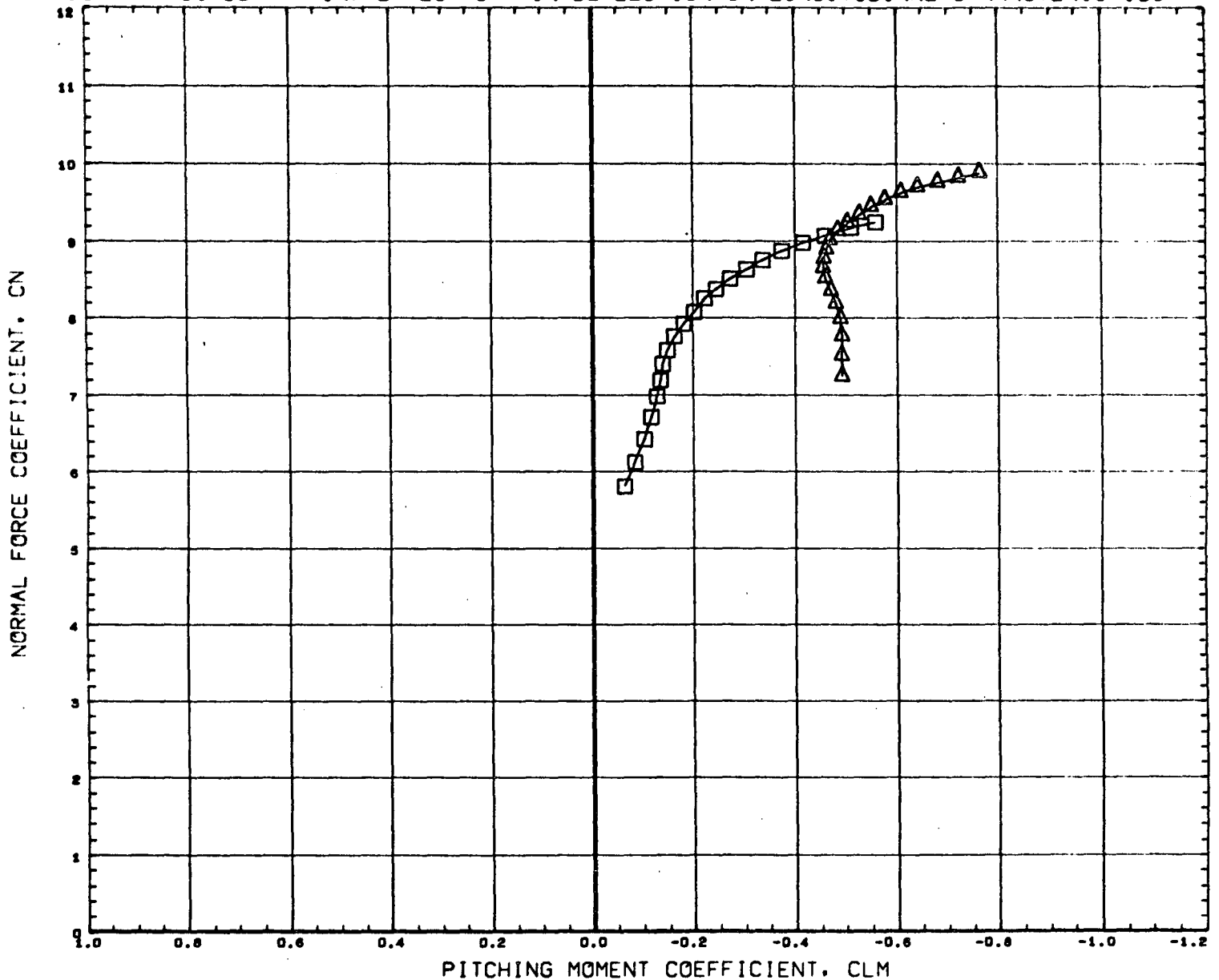
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF                  | 2.9450 IN.    |
| (859525)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRF                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

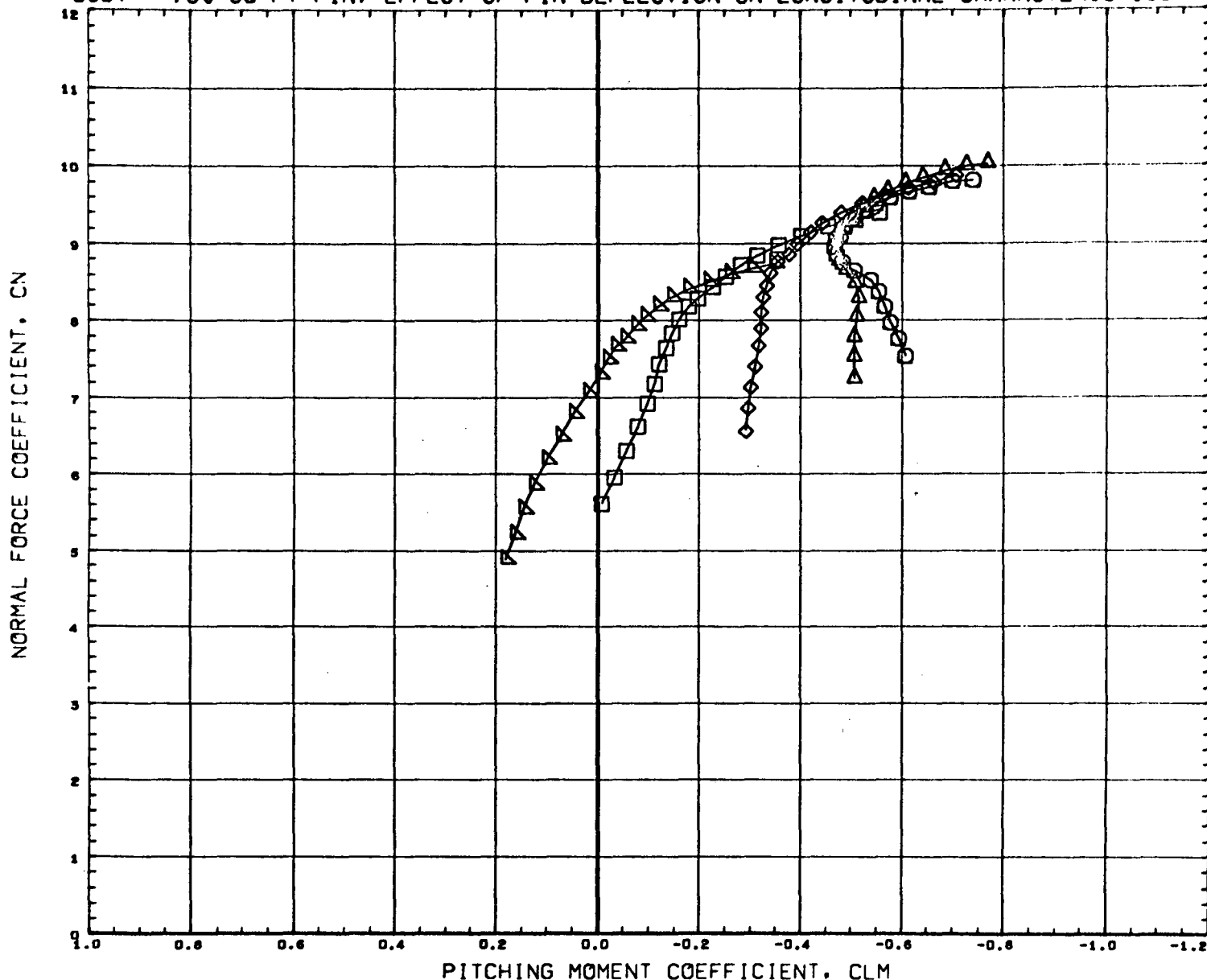
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859321)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 30. IN |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859323)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859325)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

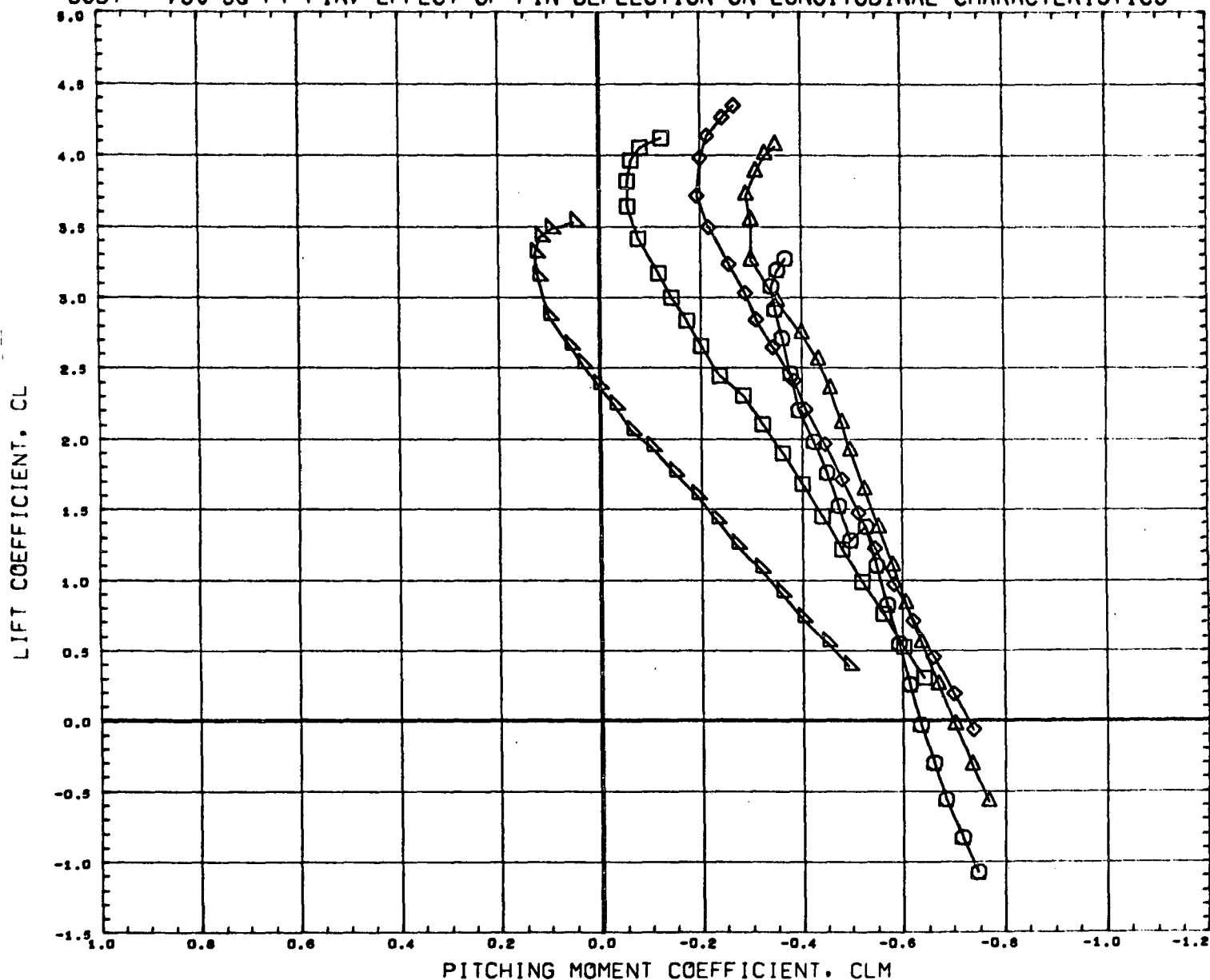
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 30. IN    |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

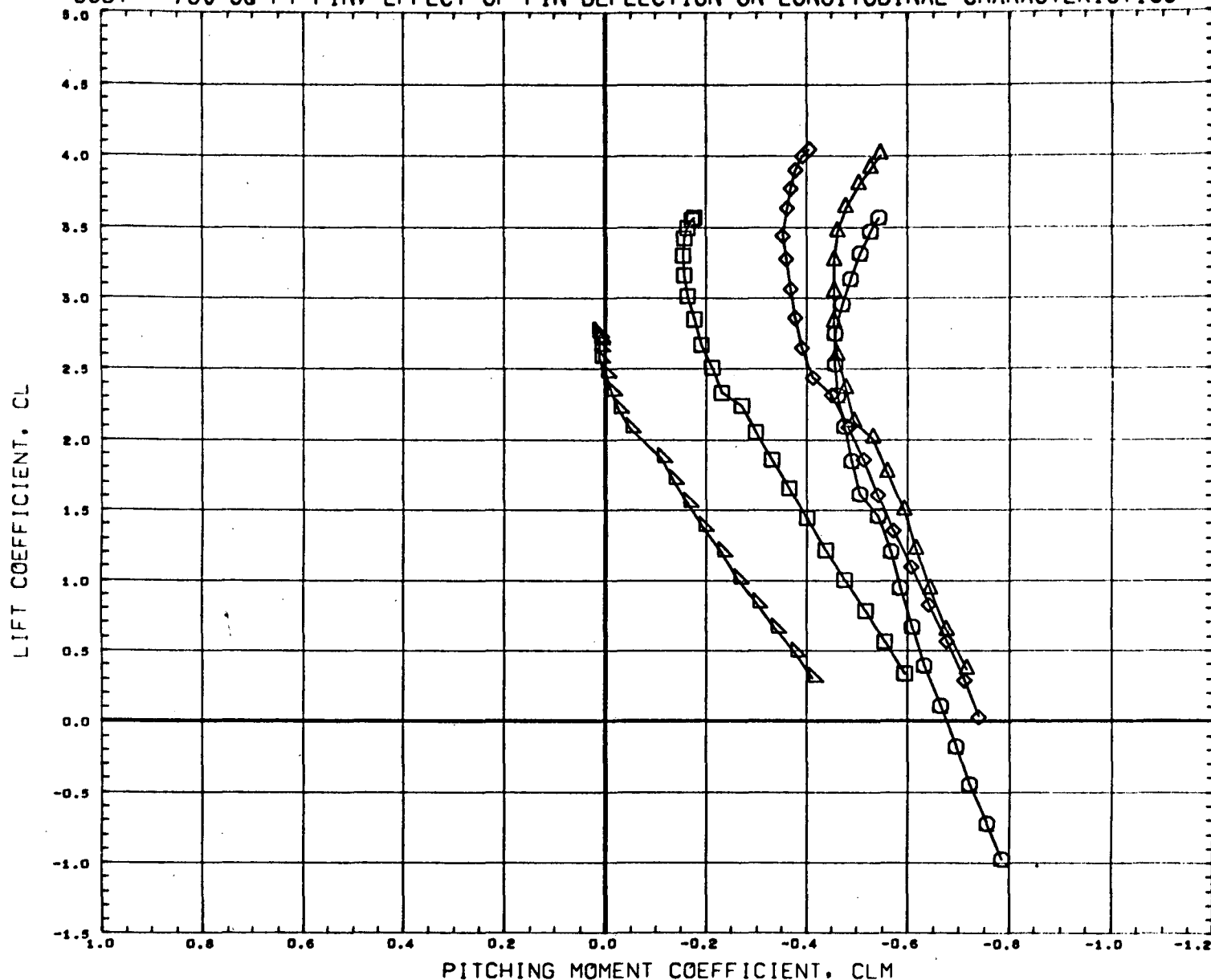
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (859321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (859322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.194

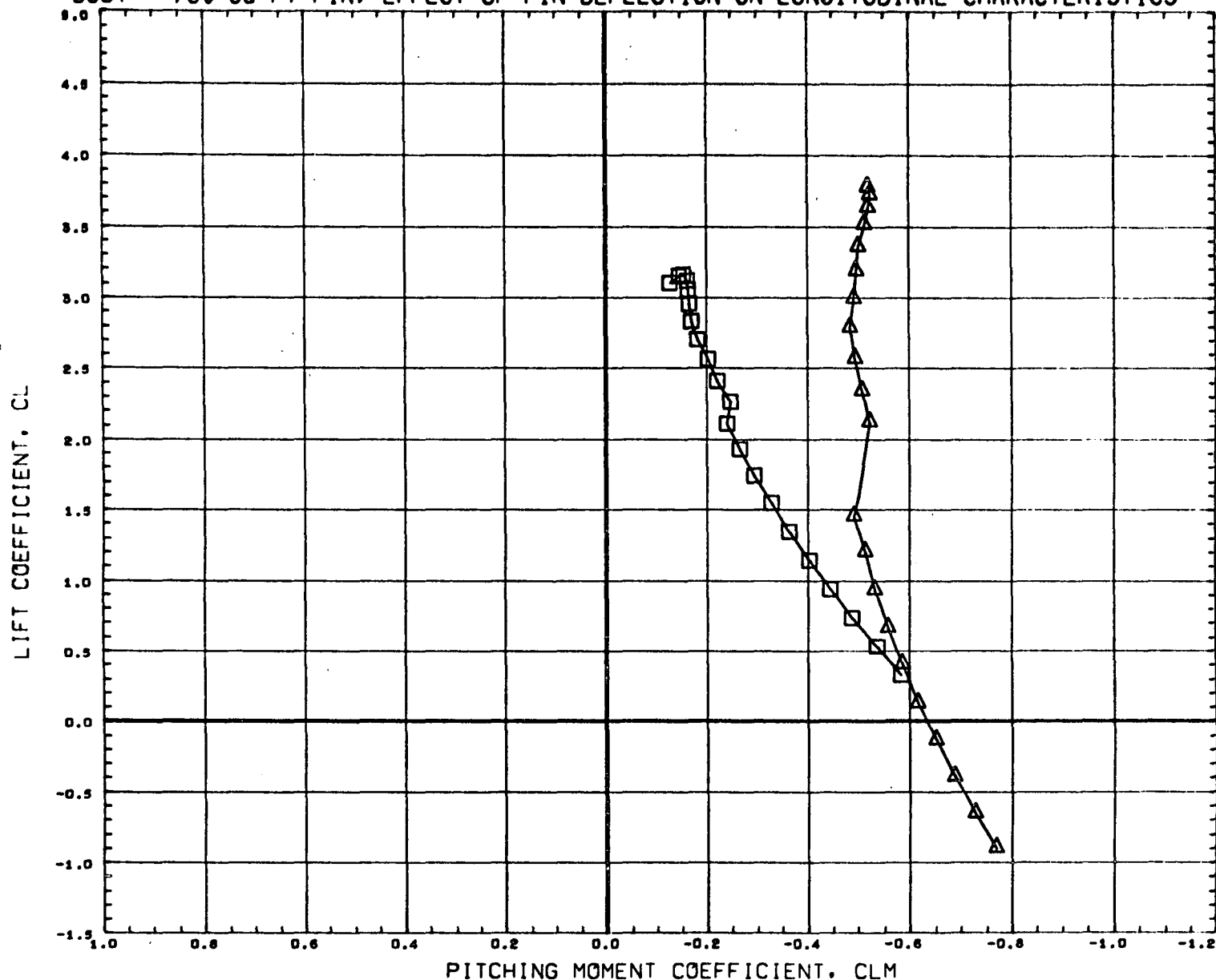
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 1.959

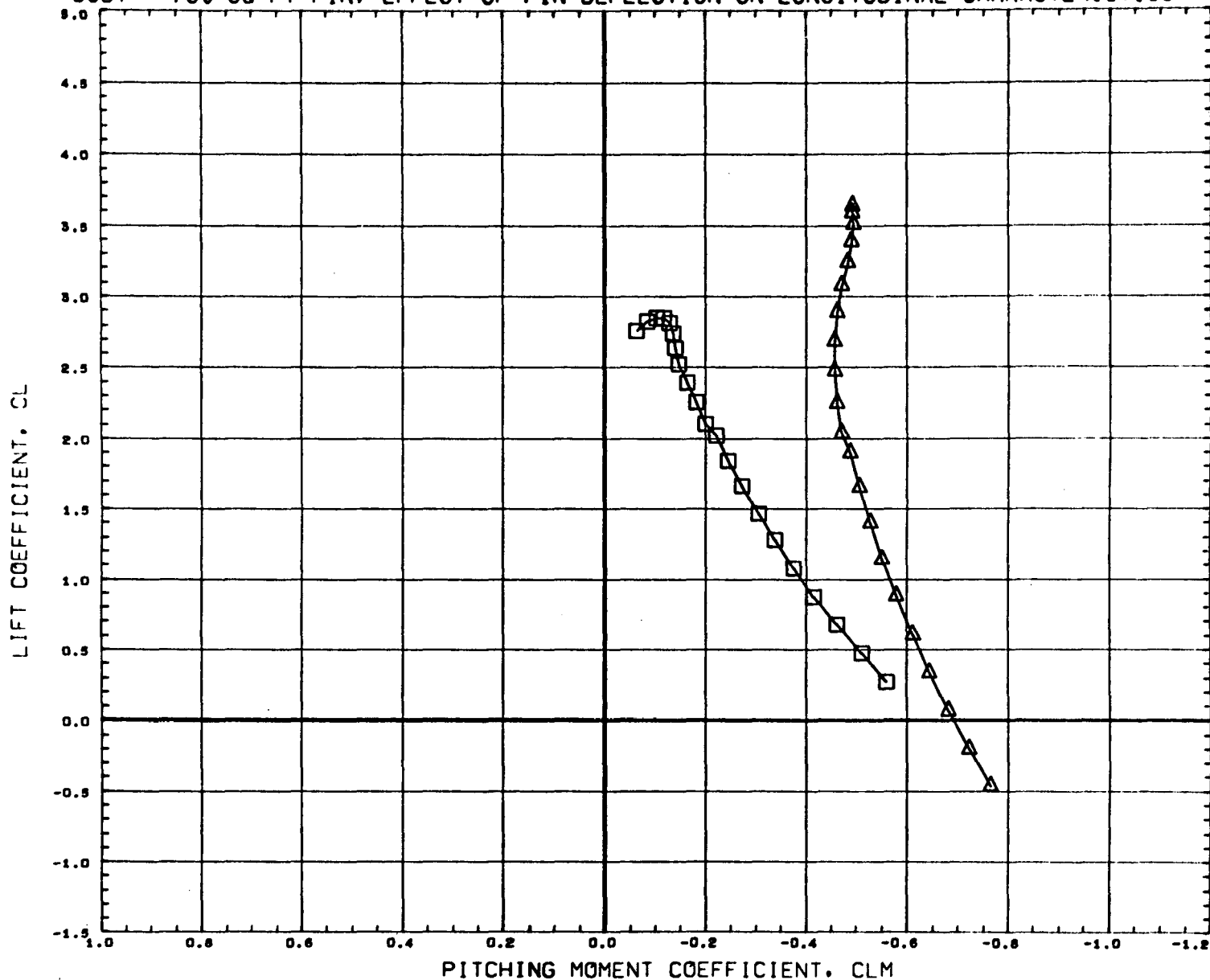
# BODY + 750 SQ FT FIN. EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | YMRP                  | 2.9450 IN.    |
| (859525)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

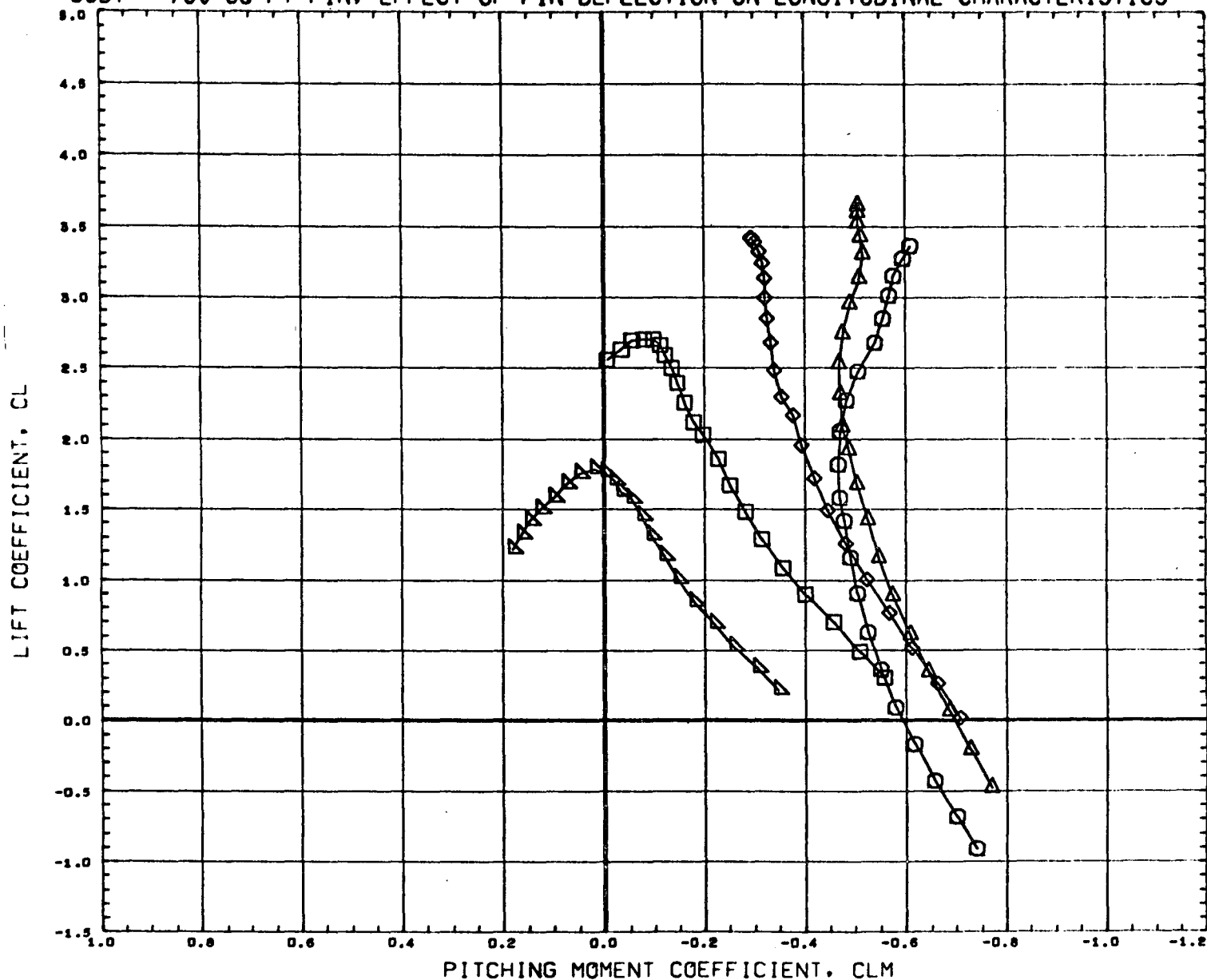
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (B59321)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (B59323)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (B59325)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

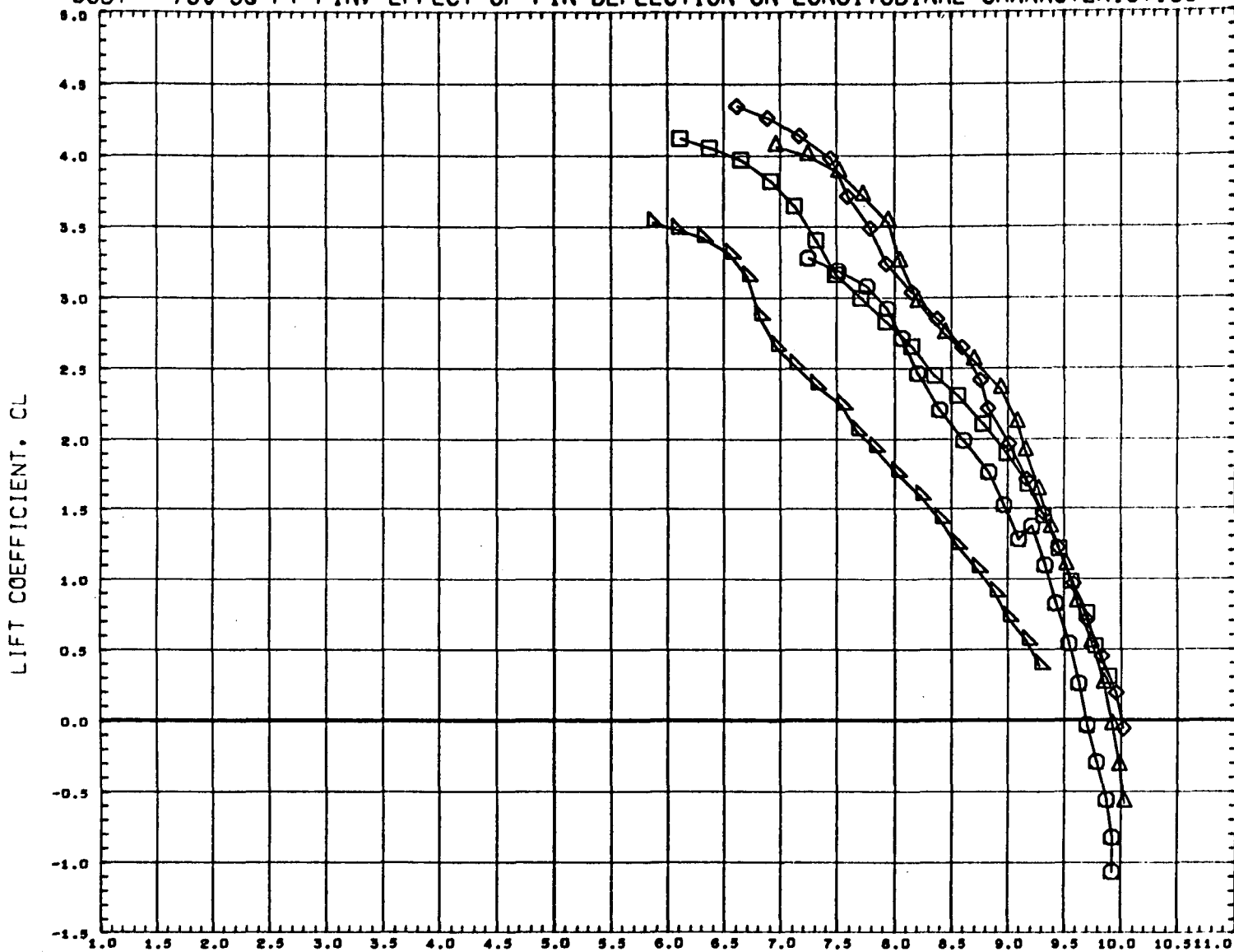
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|
| (B59321)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 30. IN    |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59323)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRF 2.9450 IN.       |
| (B59325)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -45.000 | 0.000 | YMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | ZMRF 0.0000 IN.       |
|                 |                                         |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

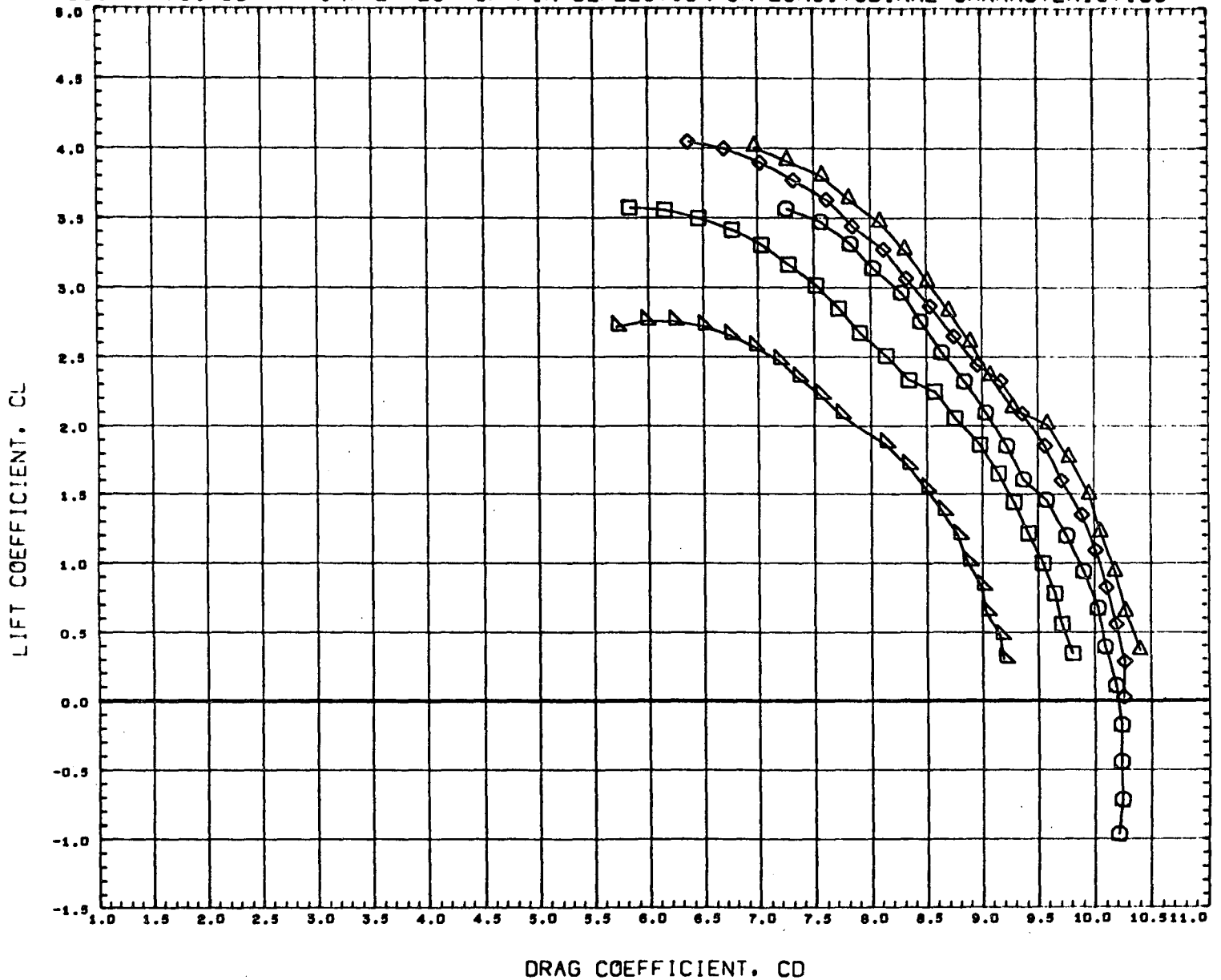


DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (B59S21)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59S22)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59S23)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | BREF 2.9450 IN.       |
| (B59S24)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 0.0000 IN.       |
| (B59S25)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0028          |

MACH 1.194

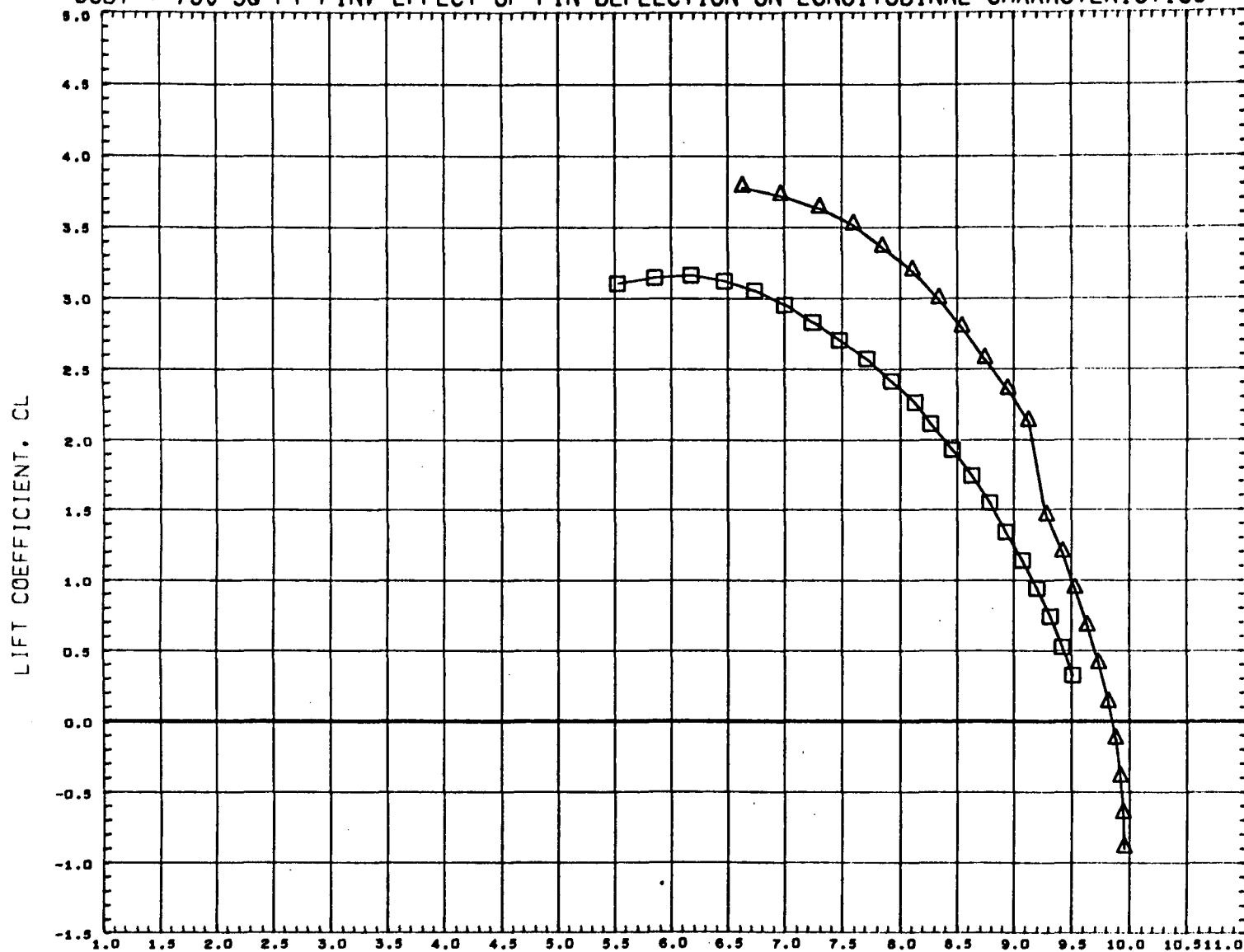
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (B59321)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 SQ. IN    |
| (B59322)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (B59323)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (B59324)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (B59325)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0028          |

MACH 1.959

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

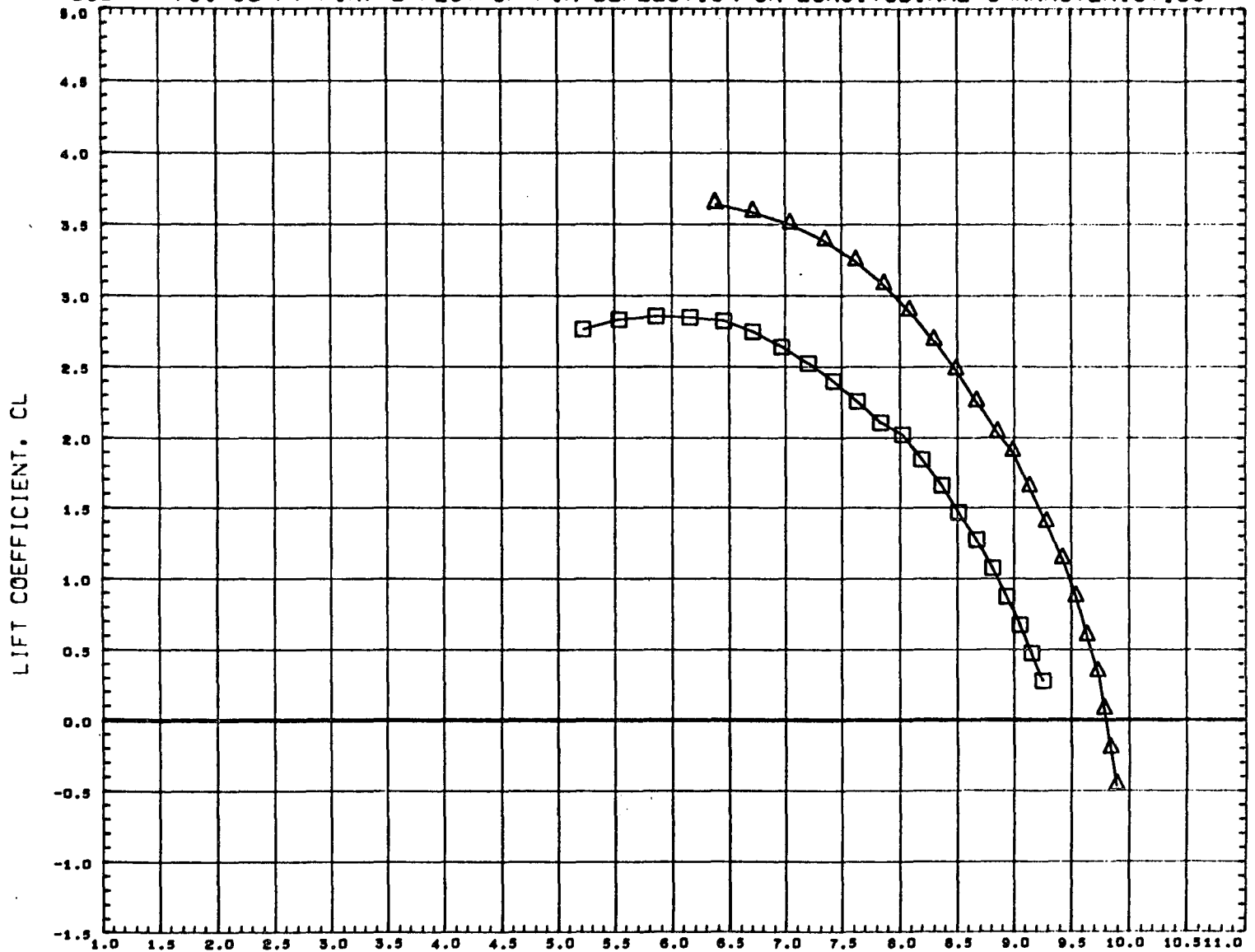


DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859521)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859523)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859525)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 2.740

# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS

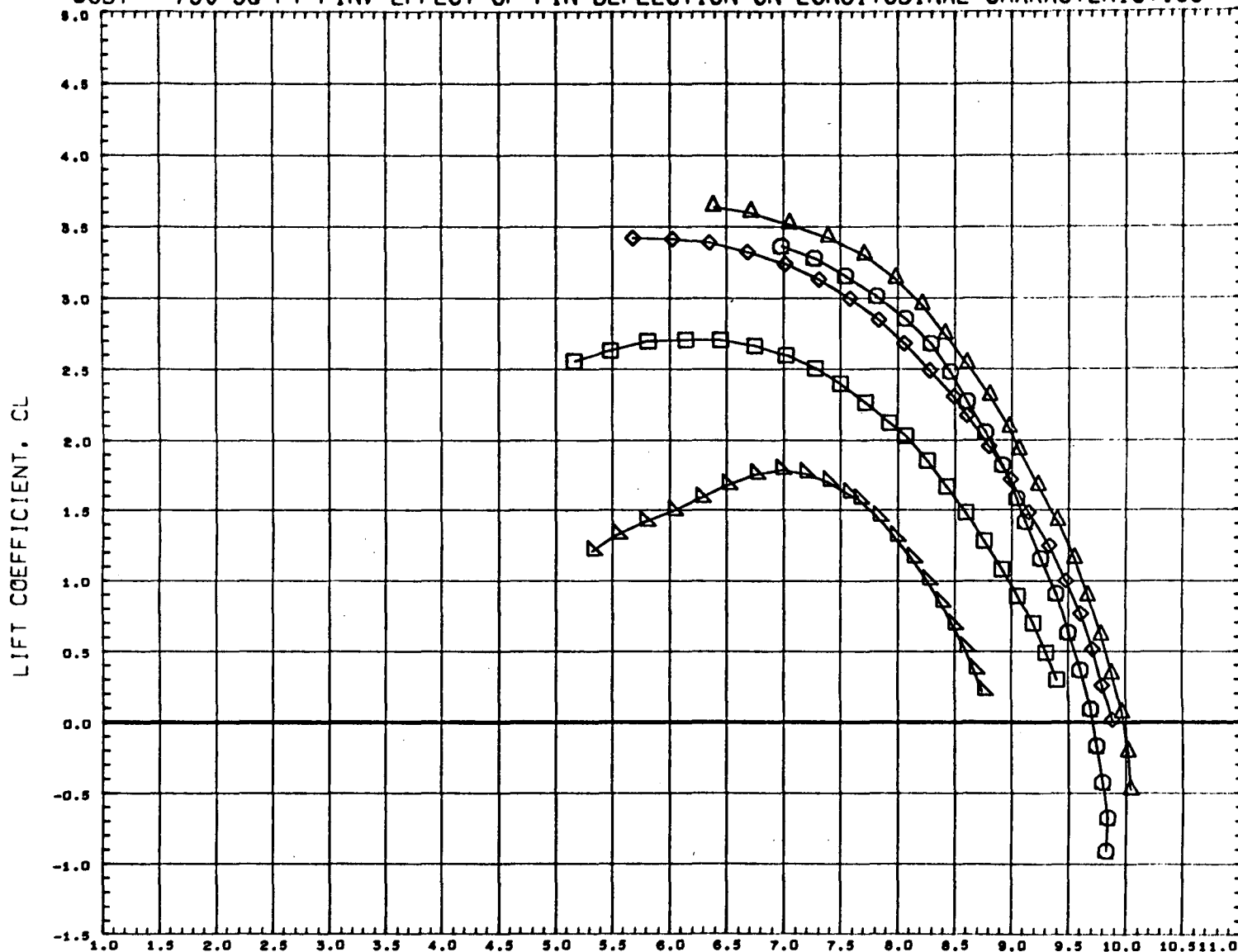


## DRAG COEFFICIENT, CD

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|-------|-------|---------|-------|-----------------------|---------------|
| (859821)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | 15.000  | 0.000 | SREF                  | 0.9650 SQ. IN |
| (859822)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | 0.000   | 0.000 | LREF                  | 4.9080 IN.    |
| (859823)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -15.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (859824)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 0.000 | 2.000 | -30.000 | 0.000 | XMRP                  | 2.9450 IN.    |
| (859825)        | DATA NOT AVAILABLE FOR ALL CONDITIONS   | 0.000 | 2.000 | -45.000 | 0.000 | YMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | ZMRP                  | 0.0000 IN.    |
|                 |                                         |       |       |         |       | SCALE                 | 0.0028        |

MACH 3.480

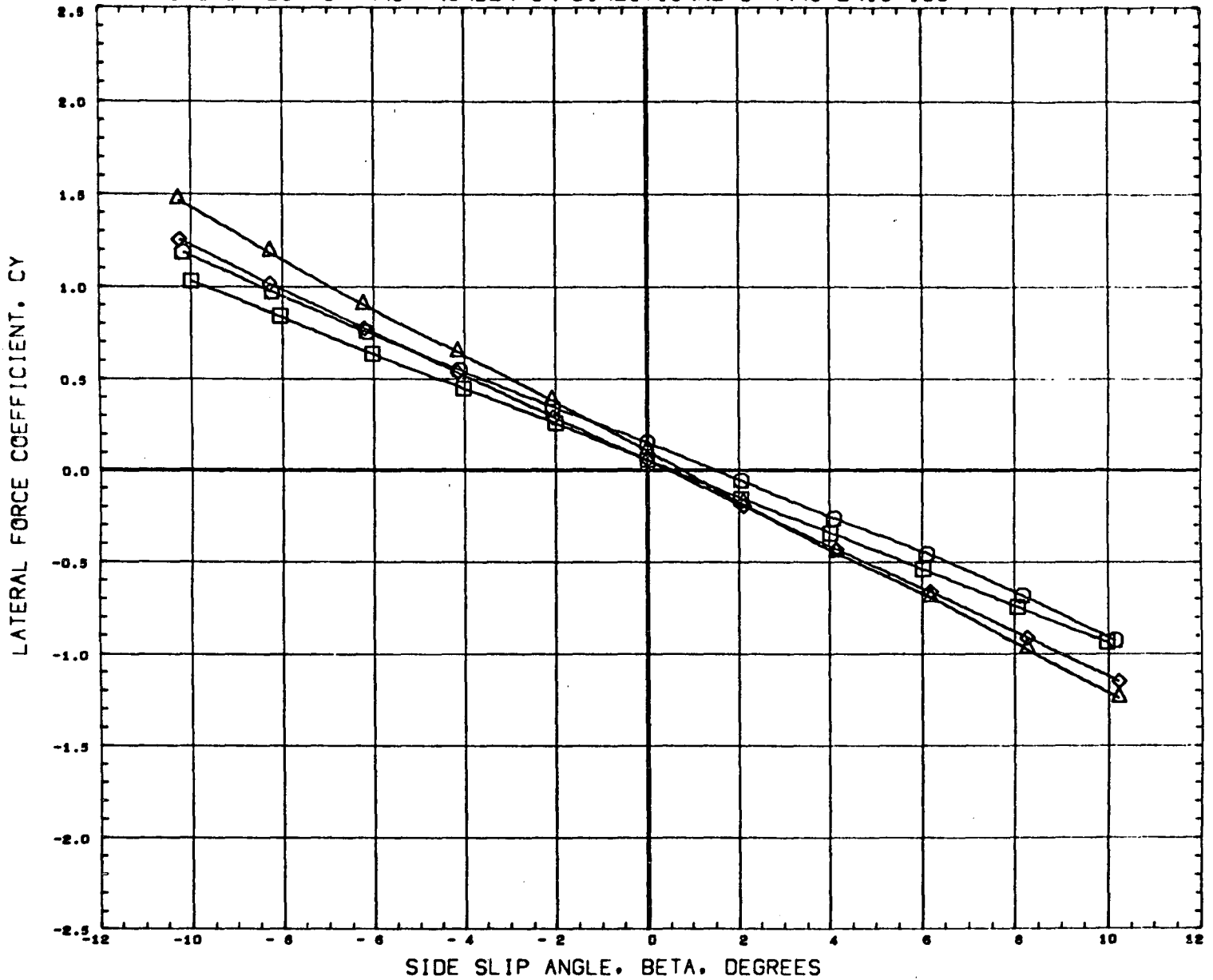
# BODY + 750 SQ FT FIN, EFFECT OF FIN DEFLECTION ON LONGITUDINAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | BETA  | POS   | DELFE   | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|-------|-------|---------|-------|-----------------------|
| (859521)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 15.000  | 0.000 | SREF 0.9650 sq. IN    |
| (859522)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | 0.000   | 0.000 | LREF 4.9080 IN.       |
| (859523)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -15.000 | 0.000 | BREF 4.9080 IN.       |
| (859524)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -30.000 | 0.000 | XMRP 2.9450 IN.       |
| (859525)        | MSFC TWT 524 33 FOOT BOOSTER | 0.000 | 2.000 | -45.000 | 0.000 | YMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | ZMRP 0.0000 IN.       |
|                 |                              |       |       |         |       | SCALE 0.0028          |

MACH 4.959

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS

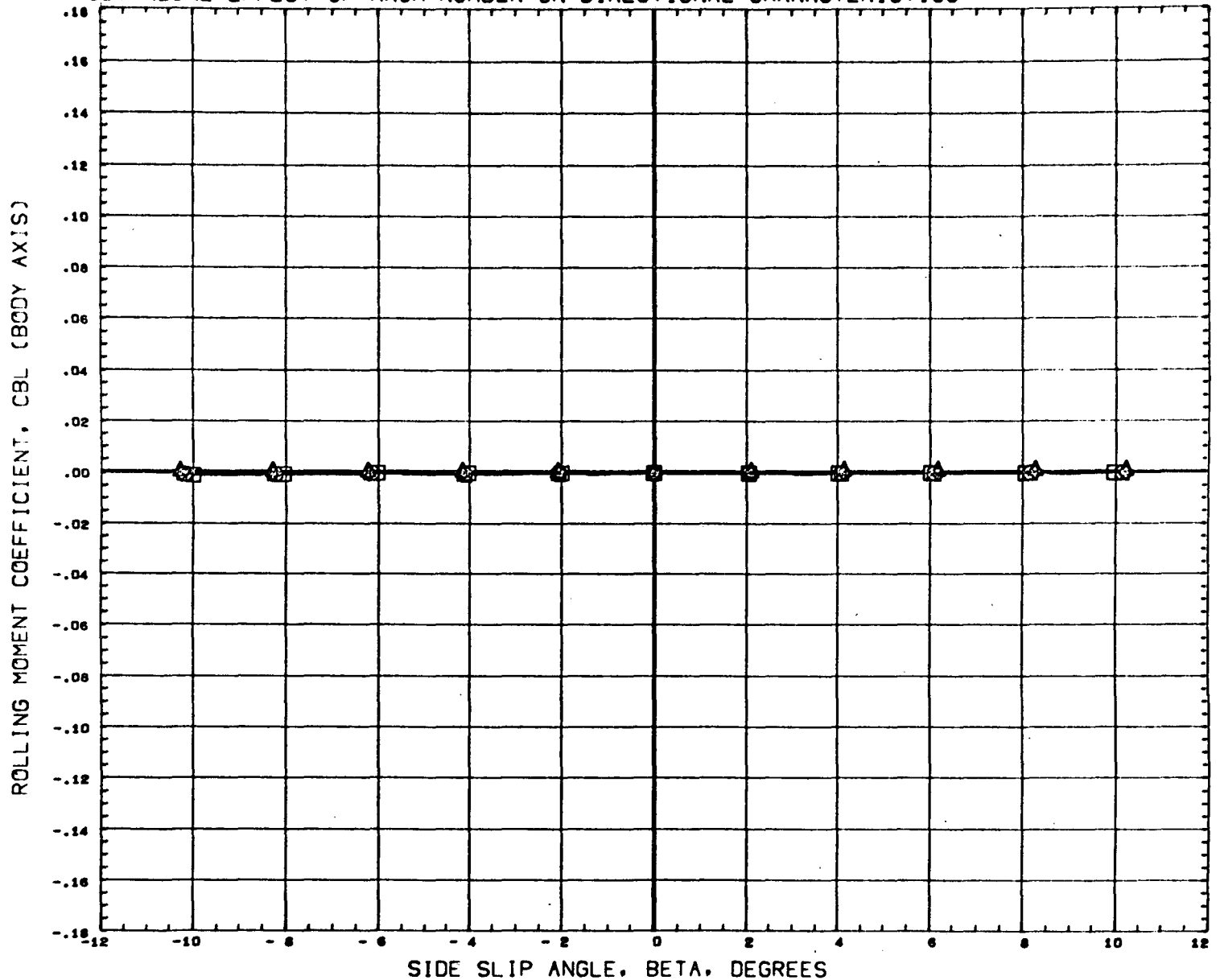


| SYMBOL | MACH  | ALPHA  | PARAMETRIC VALUES |
|--------|-------|--------|-------------------|
| △      | 0.901 | 32.000 |                   |
| ◇      | 1.198 |        |                   |
| ○      | 1.933 |        |                   |
| □      | 4.959 |        |                   |

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9060 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

REFERENCE FILE

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS

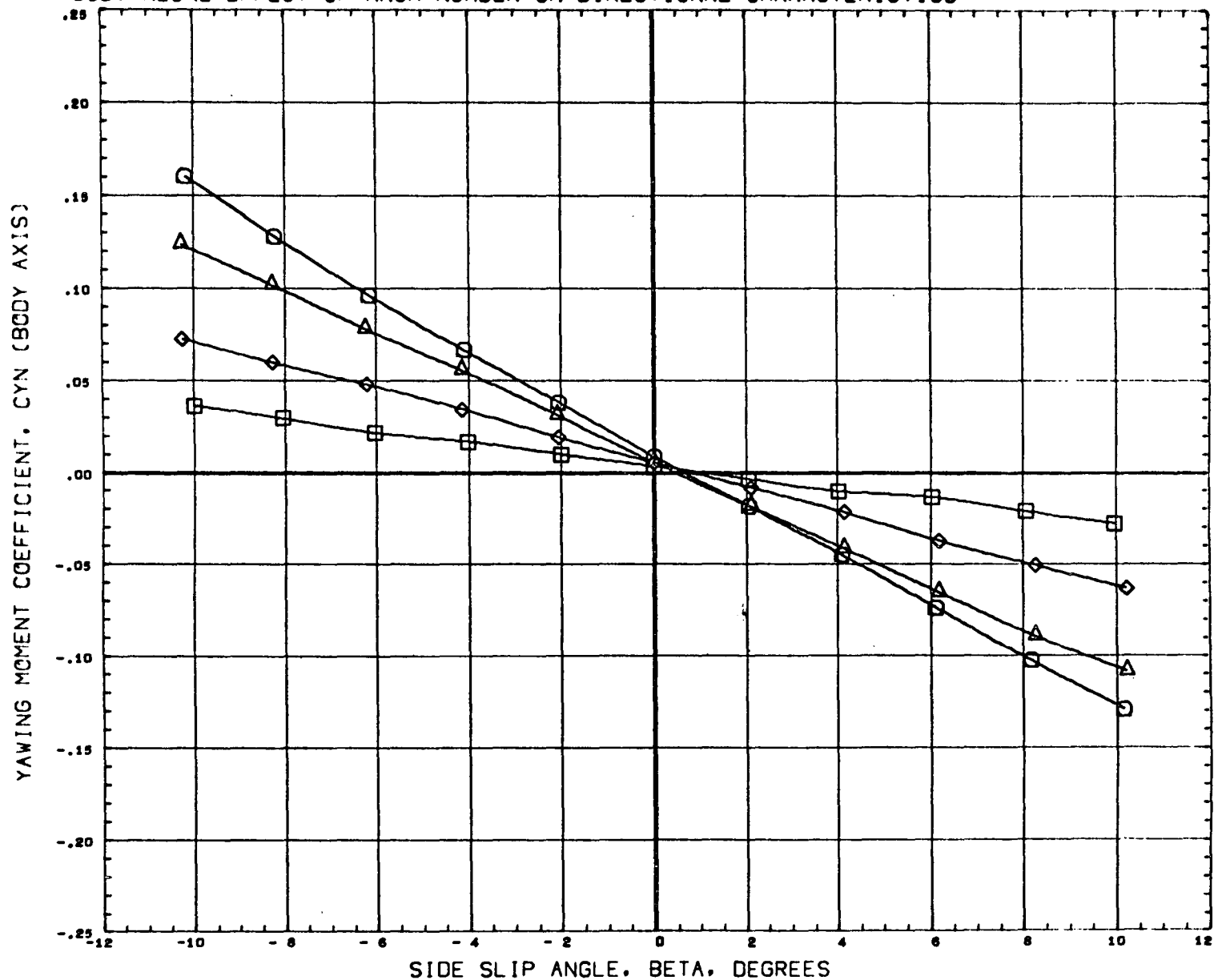


| SYMBOL | MACH  | ALPHA  | PARAMETRIC VALUES |
|--------|-------|--------|-------------------|
| ◇      | 0.901 | 32.000 |                   |
| △      | 1.198 |        |                   |
| ◇      | 1.933 |        |                   |
| □      | 4.939 |        |                   |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES |
|--------|-------|-------------------|
| ○      | 0.901 | ALPHA 32.000      |
| △      | 1.198 |                   |
| ◇      | 1.953 |                   |
| □      | 4.959 |                   |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | sq. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

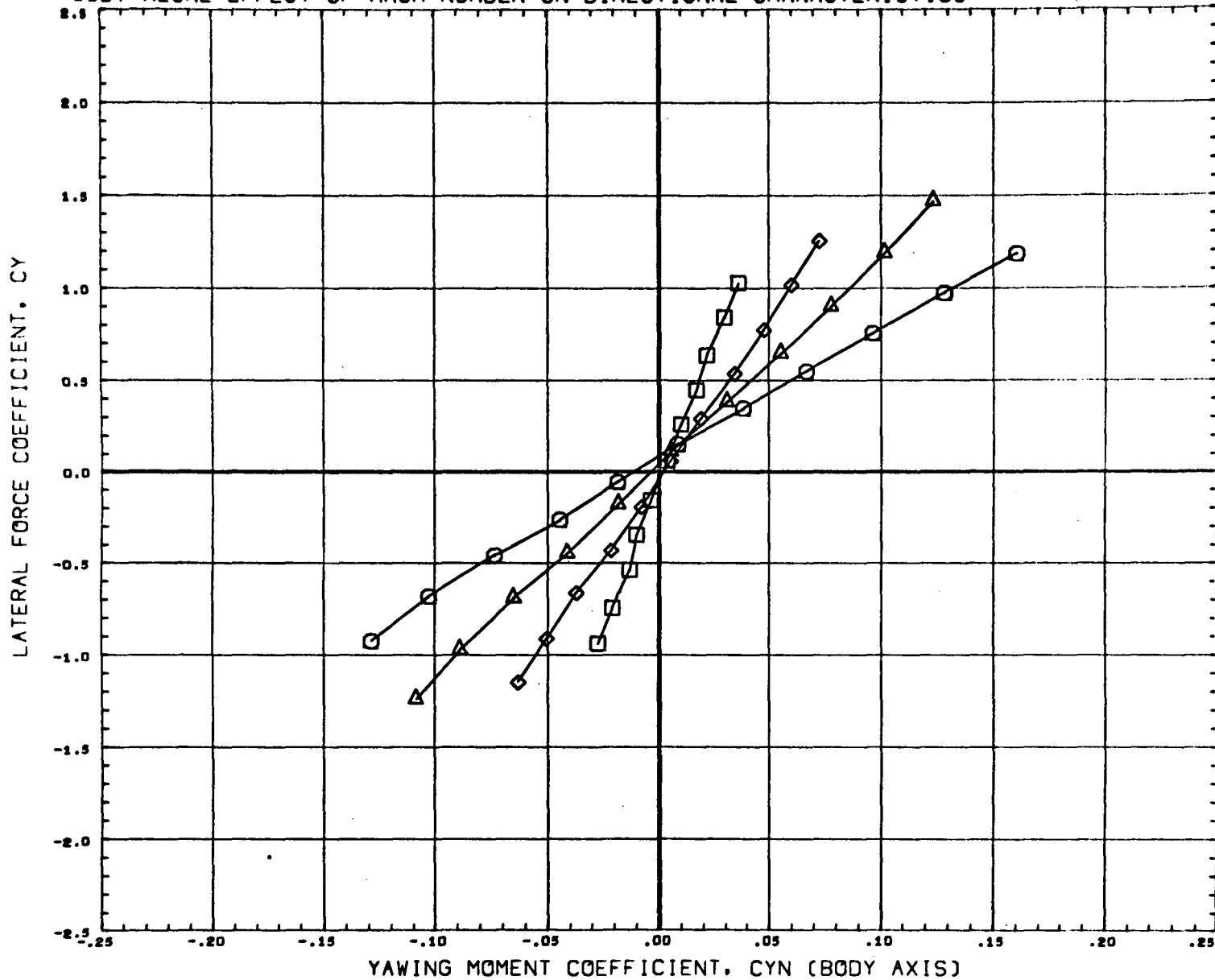
MSFC TWT 524 33 FOOT BOOSTER

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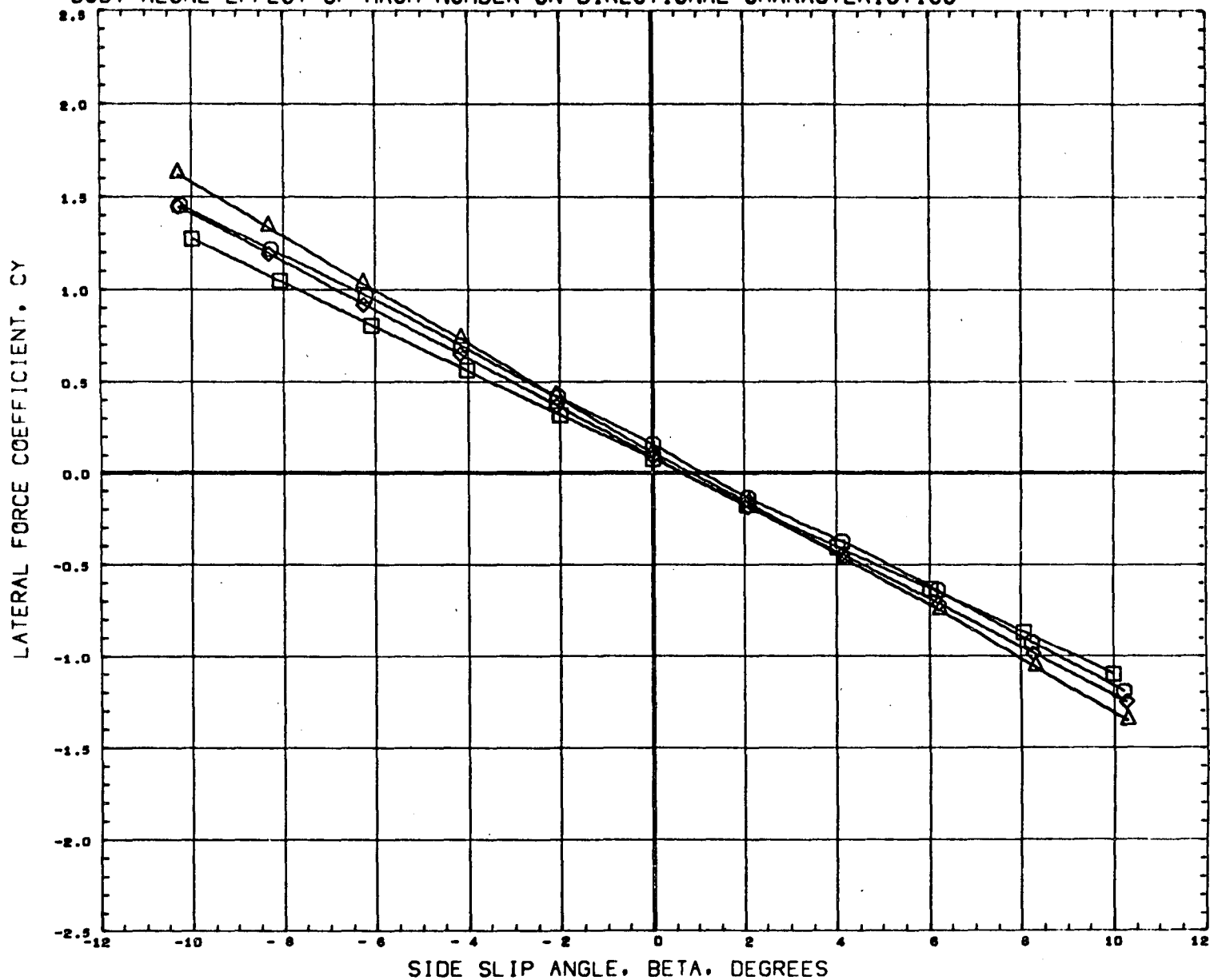
# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



| SYMBOL | MACH  | ALPHA | PARAMETRIC VALUES | REFERENCE INFORMATION |        |        |
|--------|-------|-------|-------------------|-----------------------|--------|--------|
| ○      | 0.901 |       | 32.000            | SREF                  | 0.9650 | 34. IN |
| △      | 1.198 |       |                   | LREF                  | 4.9080 | IN.    |
| ◇      | 1.953 |       |                   | BREF                  | 4.9080 | IN.    |
| □      | 4.959 |       |                   | XMRP                  | 2.9450 | IN.    |
|        |       |       |                   | YMRP                  | 0.0000 | IN.    |
|        |       |       |                   | ZMRP                  | 0.0000 | IN.    |
|        |       |       |                   | SCALE                 | 0.0028 |        |

REFERENCE FILE

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS

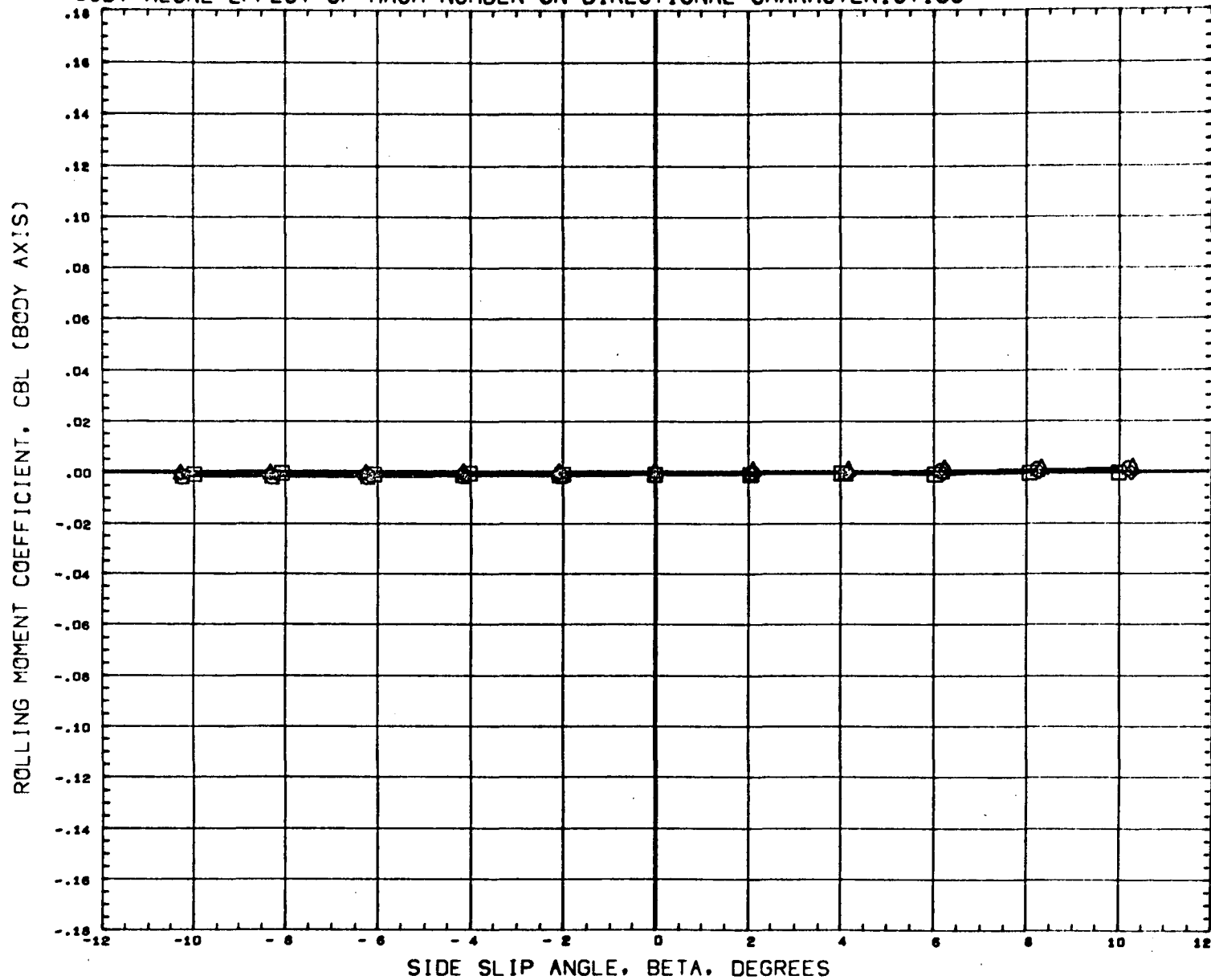


| SYMBOL | MACH  | PARAMETRIC VALUES |
|--------|-------|-------------------|
| ○      | 0.899 | ALPHA 53.000      |
| △      | 1.200 |                   |
| ◇      | 1.965 |                   |
| □      | 4.999 |                   |

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| YMRP                  | 2.9450 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0026 | IN.    |

REFERENCE FILE

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS

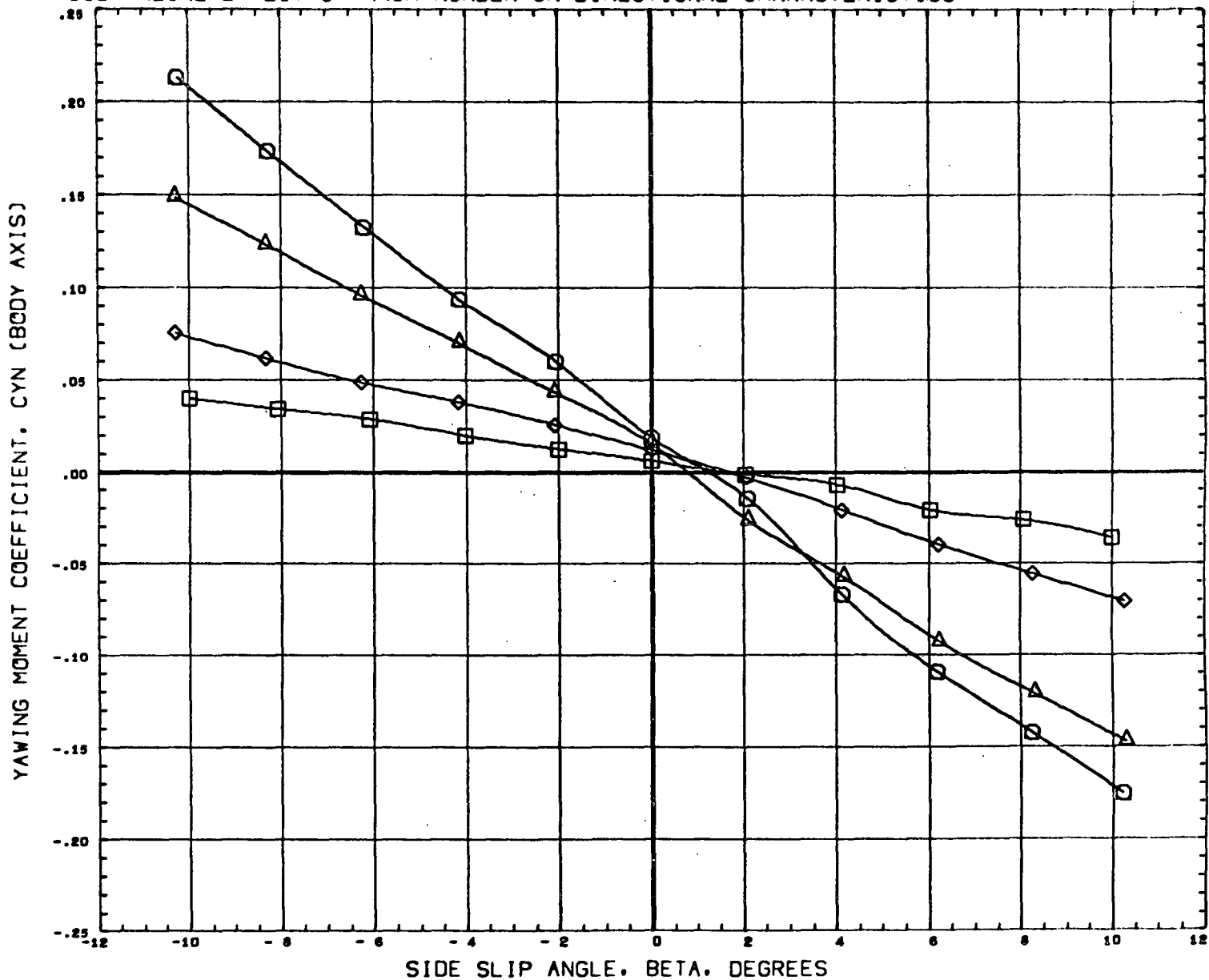


|        |       |       |                   |
|--------|-------|-------|-------------------|
| SYMBOL | MACH  | ALPHA | PARAMETRIC VALUES |
| ○      | 0.899 |       | 53.000            |
| △      | 1.200 |       |                   |
| ◇      | 1.965 |       |                   |
| □      | 4.959 |       |                   |

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

REFERENCE FILE

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS

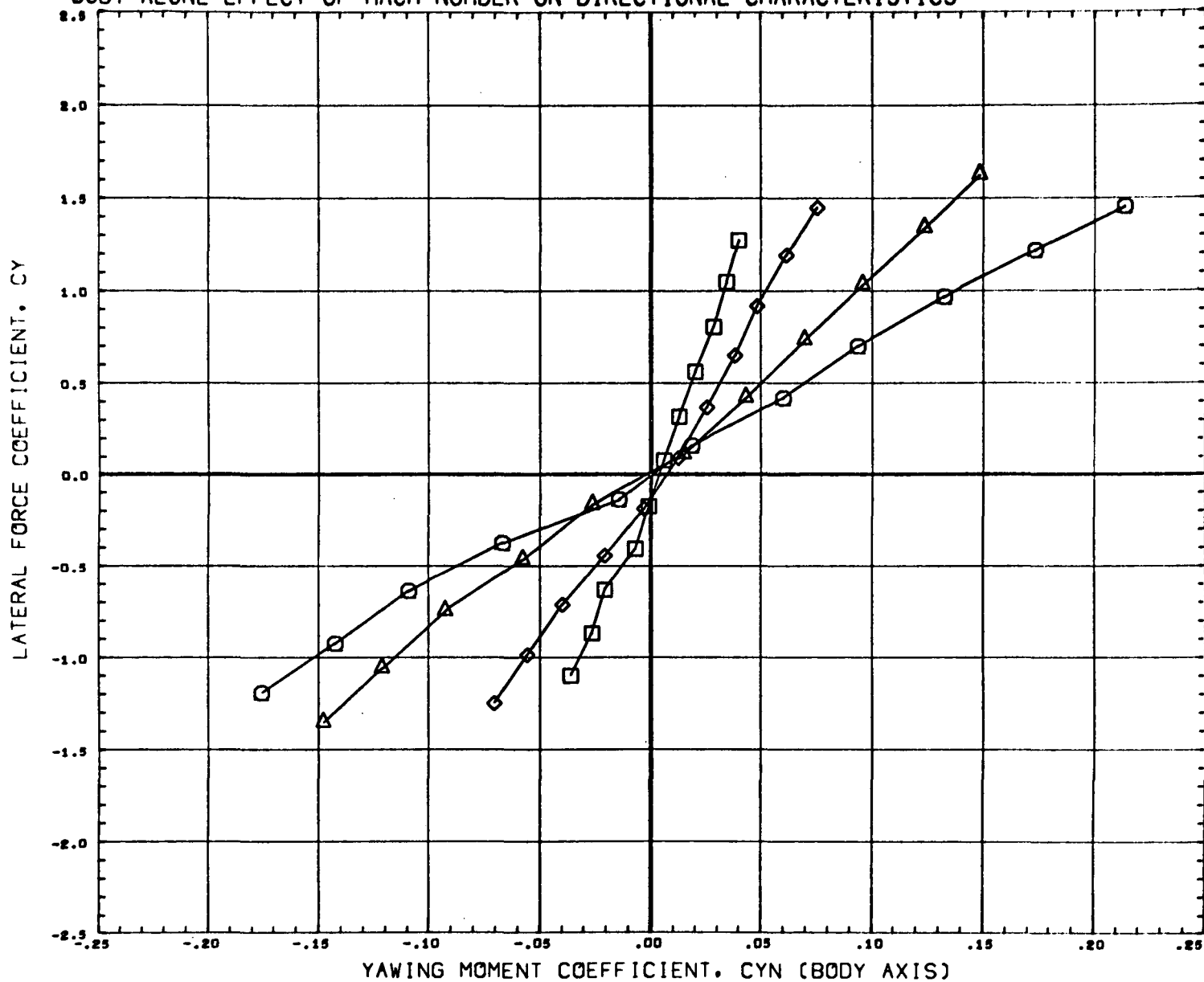


| SYMBOL | MACH  | ALPHA | PARAMETRIC VALUES |
|--------|-------|-------|-------------------|
| ○      | 0.899 |       | 53.000            |
| △      | 1.200 |       |                   |
| ◇      | 1.965 |       |                   |
| □      | 4.959 |       |                   |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



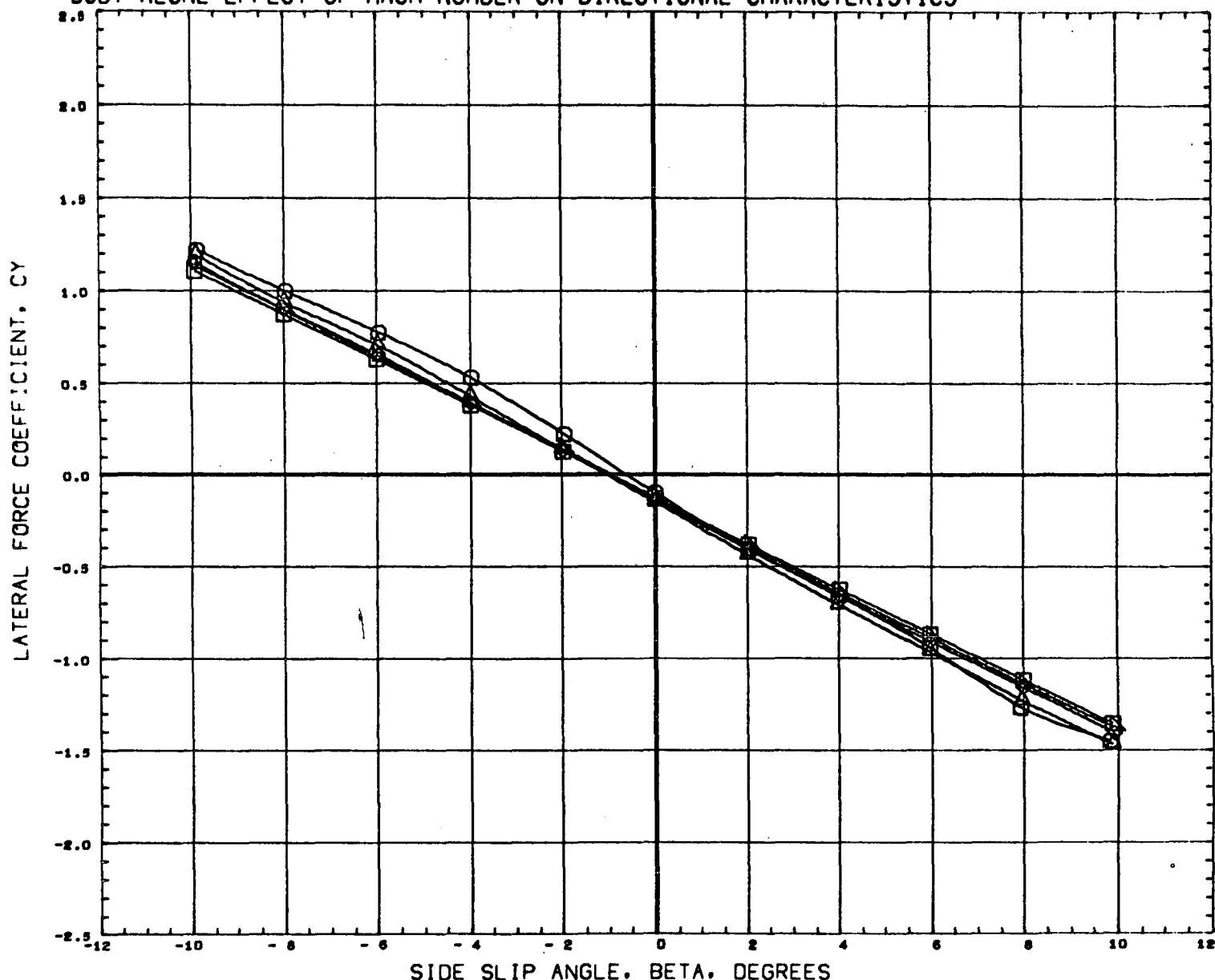
|        |       |       |                   |
|--------|-------|-------|-------------------|
| SYMBOL | MACH  | ALPHA | PARAMETRIC VALUES |
| ○      | 0.899 |       | 93.000            |
| △      | 1.200 |       |                   |
| ◇      | 1.965 |       |                   |
| □      | 4.959 |       |                   |

REFERENCE FILE

## REFERENCE INFORMATION

|       |        |        |
|-------|--------|--------|
| SREF  | 0.9650 | SQ. IN |
| LREF  | 4.9080 | IN.    |
| BREF  | 4.9080 | IN.    |
| XMRP  | 2.9450 | IN.    |
| YMRP  | 0.0000 | IN.    |
| ZMRP  | 0.0000 | IN.    |
| SCALE | 0.0028 |        |

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES |
|--------|-------|-------------------|
| ○      | 1.197 | ALPHA 60.000      |
| △      | 1.957 |                   |
| ◇      | 2.740 |                   |
| □      | 3.480 |                   |
| ◊      | 4.959 |                   |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | 90. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

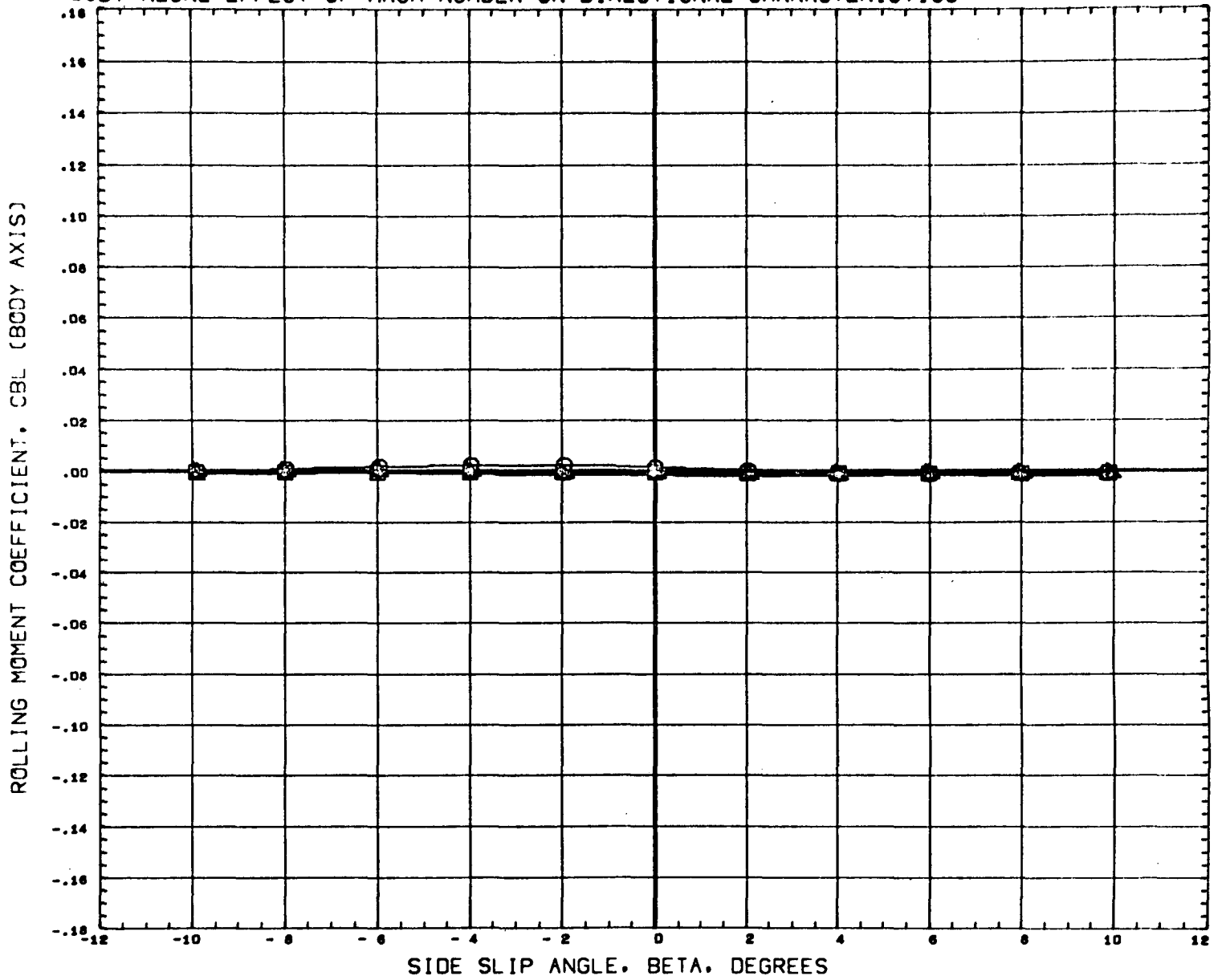
MSFC TWT 524 33 FOOT BOOSTER

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# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS

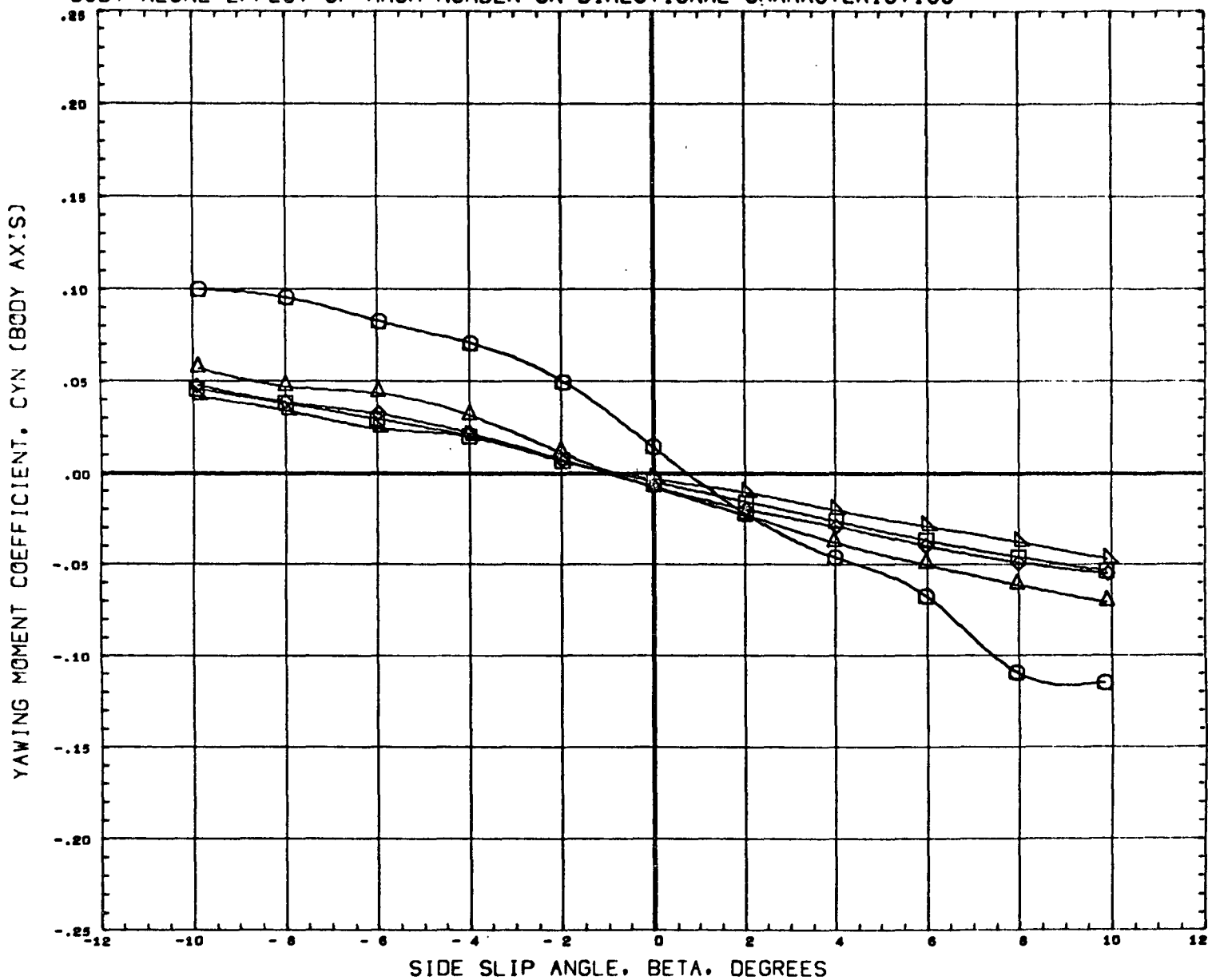


|                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |        |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|-------------------|
| SYMBOL<br><br><br><br><br> | MACH  | ALPHA  | PARAMETRIC VALUES |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1.197 | 60.000 |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1.957 |        |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2.740 |        |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3.480 |        |                   |
| 4.959                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |        |                   |

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9060 | IN.    |
| BREF                  | 4.9060 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

REFERENCE FILE

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



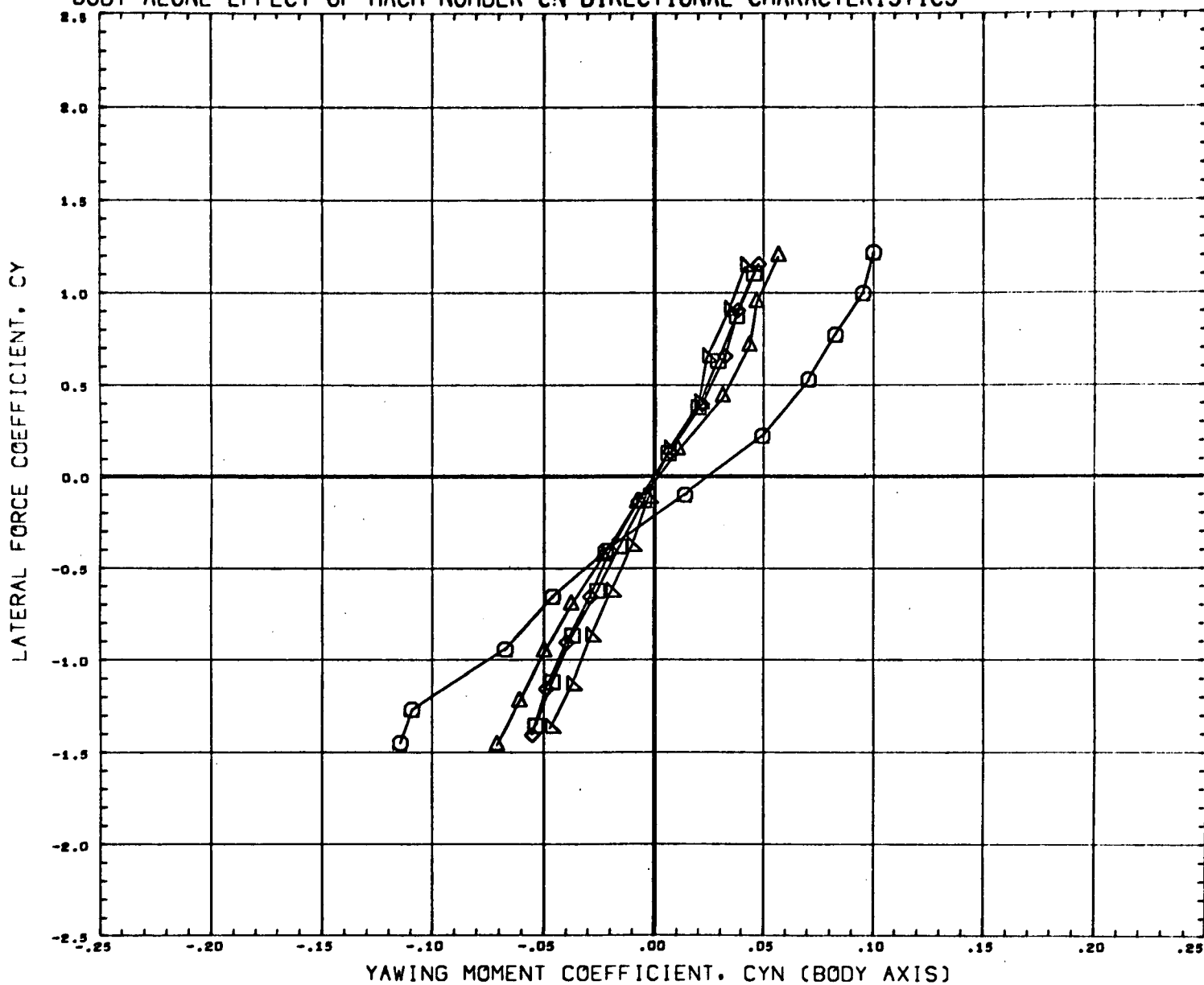
SYMBOL MACH  
 ○ 1.197  
 △ 1.957  
 ◇ 2.740  
 □ 3.480  
 ▽ 4.959

PARAMETRIC VALUES  
 ALPHA 60.000

REFERENCE FILE

REFERENCE INFORMATION  
 SREF 0.9650 SQ. IN  
 LREF 4.9080 IN.  
 OREF 4.9080 IN.  
 XMRP 2.9450 IN.  
 YMRP 0.0000 IN.  
 ZMRP 0.0000 IN.  
 SCALE 0.0028

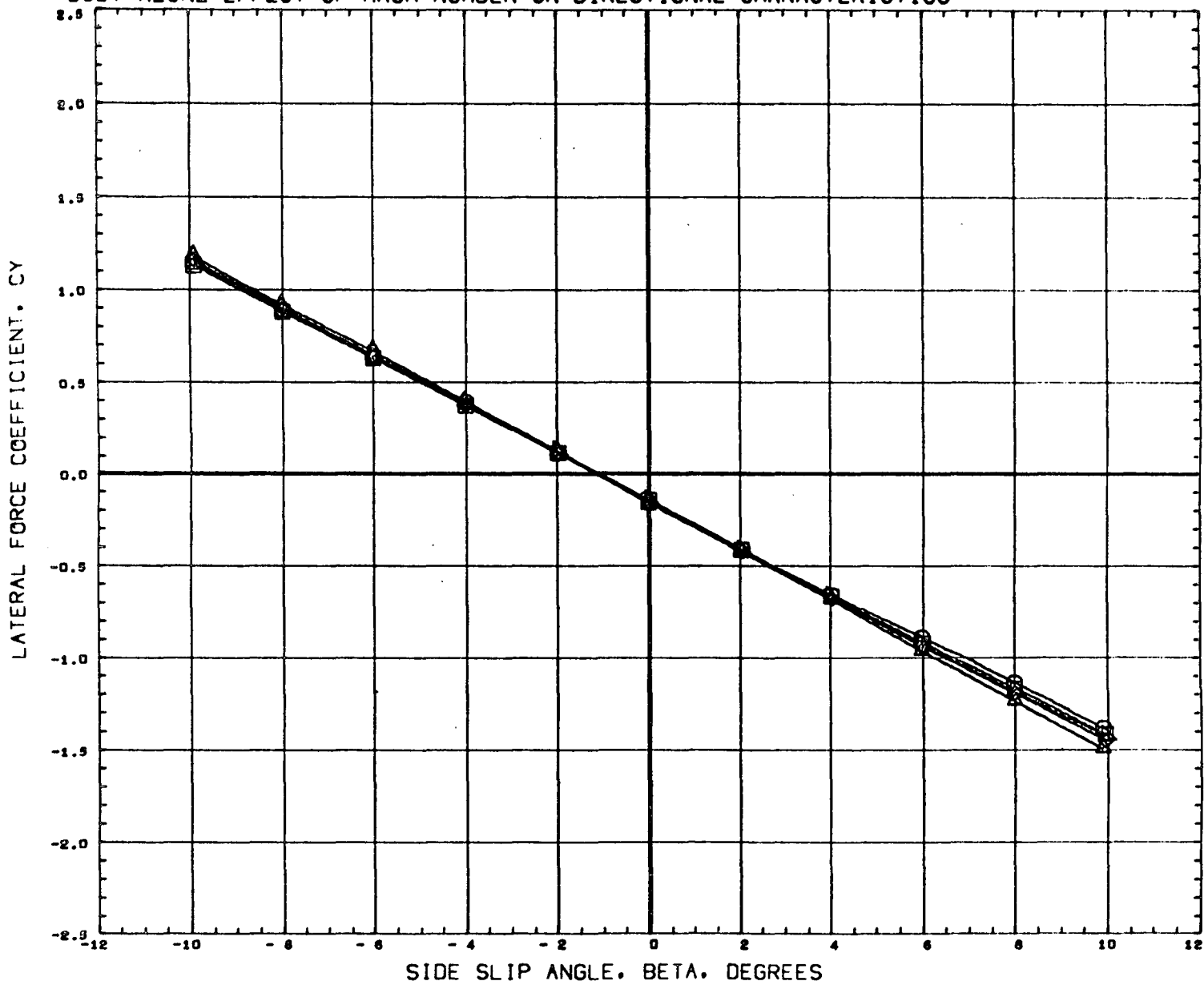
# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES | REFERENCE INFORMATION |
|--------|-------|-------------------|-----------------------|
| ○      | 1.197 | ALPHA 60.000      | SREF 0.9650 SQ. IN    |
| △      | 1.957 |                   | LREF 4.9080 IN.       |
| ◇      | 2.740 |                   | BREF 4.9080 IN.       |
| □      | 3.480 |                   | XMRP 2.9450 IN.       |
| ×      | 4.959 |                   | YMRP 0.0000 IN.       |
|        |       |                   | ZMRP 0.0000 IN.       |
|        |       |                   | SCALE 0.0028          |

REFERENCE FILE

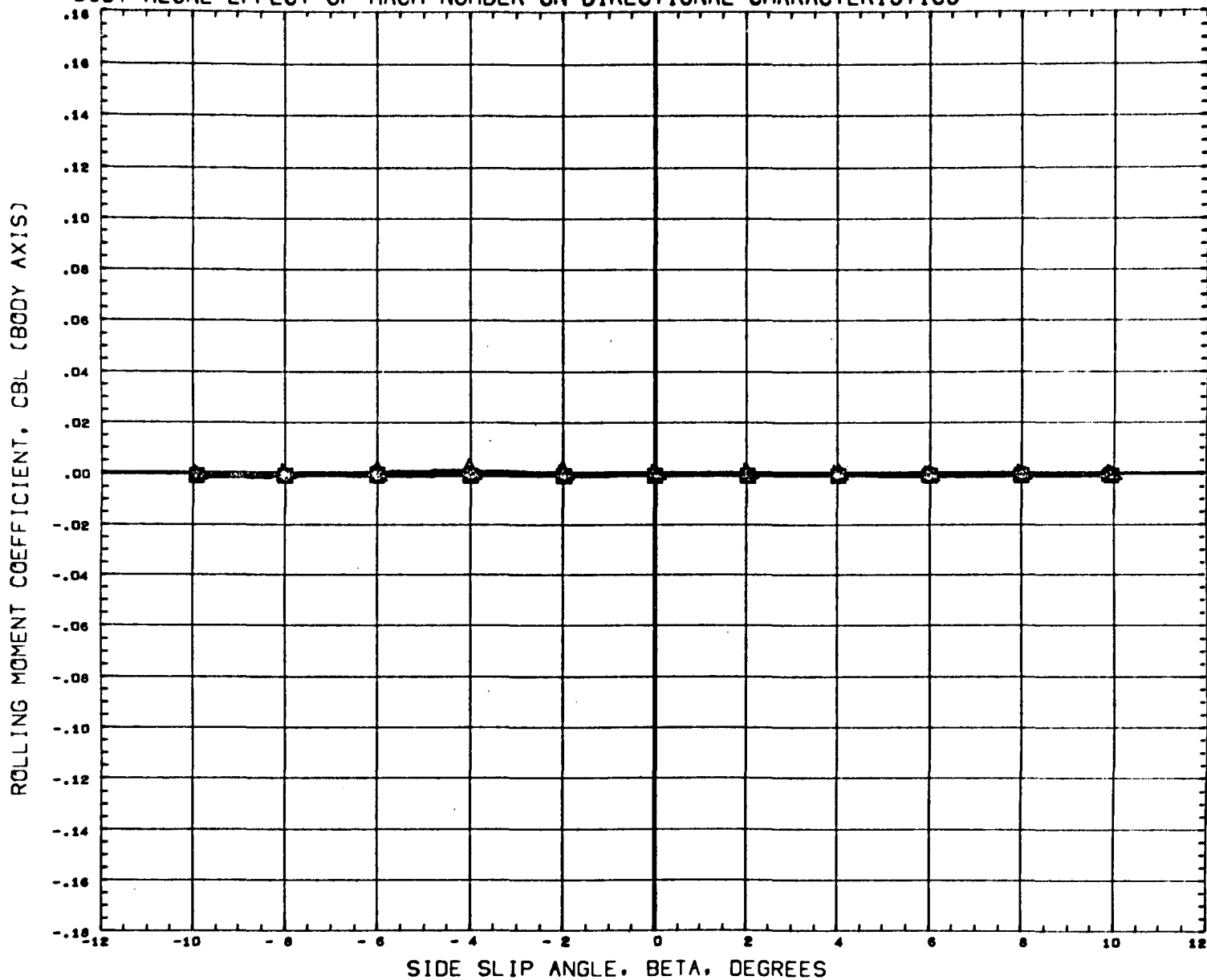
# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES | REFERENCE INFORMATION |
|--------|-------|-------------------|-----------------------|
| ○      | 1.197 | ALPHA 80.000      | SREF 0.9650 SQ. IN    |
| △      | 1.955 |                   | LREF 4.9080 IN.       |
| ◇      | 2.740 |                   | BREF 4.9080 IN.       |
| □      | 3.480 |                   | XMRP 2.9450 IN.       |
| ◇      | 4.959 |                   | YMRP 0.0000 IN.       |
|        |       |                   | ZMRP 0.0000 IN.       |
|        |       |                   | SCALE 0.0028          |

REFERENCE FILE

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS

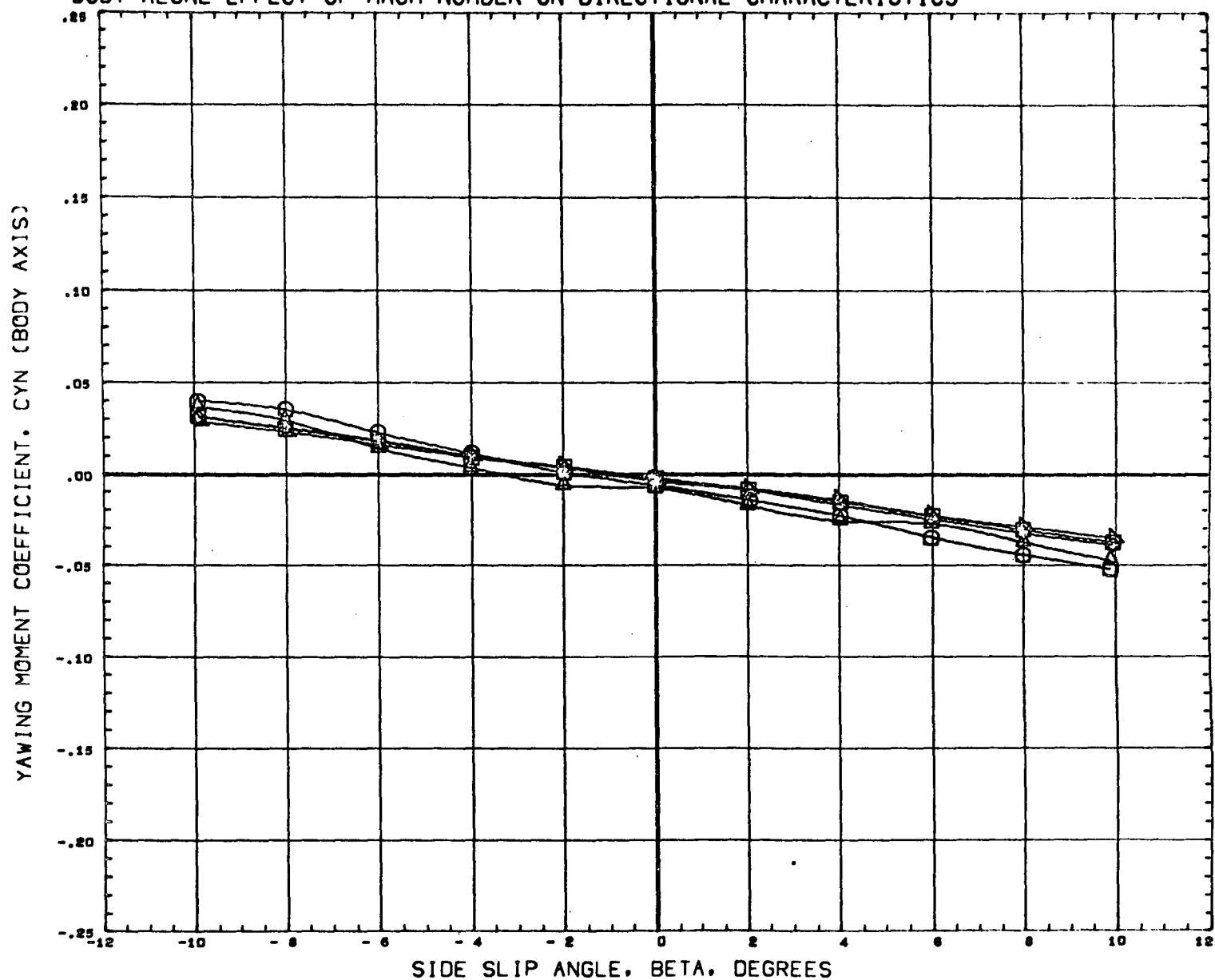


| SYMBOL | MACH  | ALPHA  | PARAMETRIC VALUES |
|--------|-------|--------|-------------------|
| ◇      | 1.197 | 60.000 |                   |
| ◇      | 1.955 |        |                   |
| ◇      | 2.740 |        |                   |
| ◇      | 3.480 |        |                   |
| ◇      | 4.959 |        |                   |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9060 | IN.    |
| BREF                  | 4.9060 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



| SYMBOL | MACH  | ALPHA  | PARAMETRIC VALUES |
|--------|-------|--------|-------------------|
| ○      | 1.197 | 80.000 |                   |
| △      | 1.955 |        |                   |
| ◇      | 2.740 |        |                   |
| □      | 3.480 |        |                   |
| ◊      | 4.959 |        |                   |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | 50. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

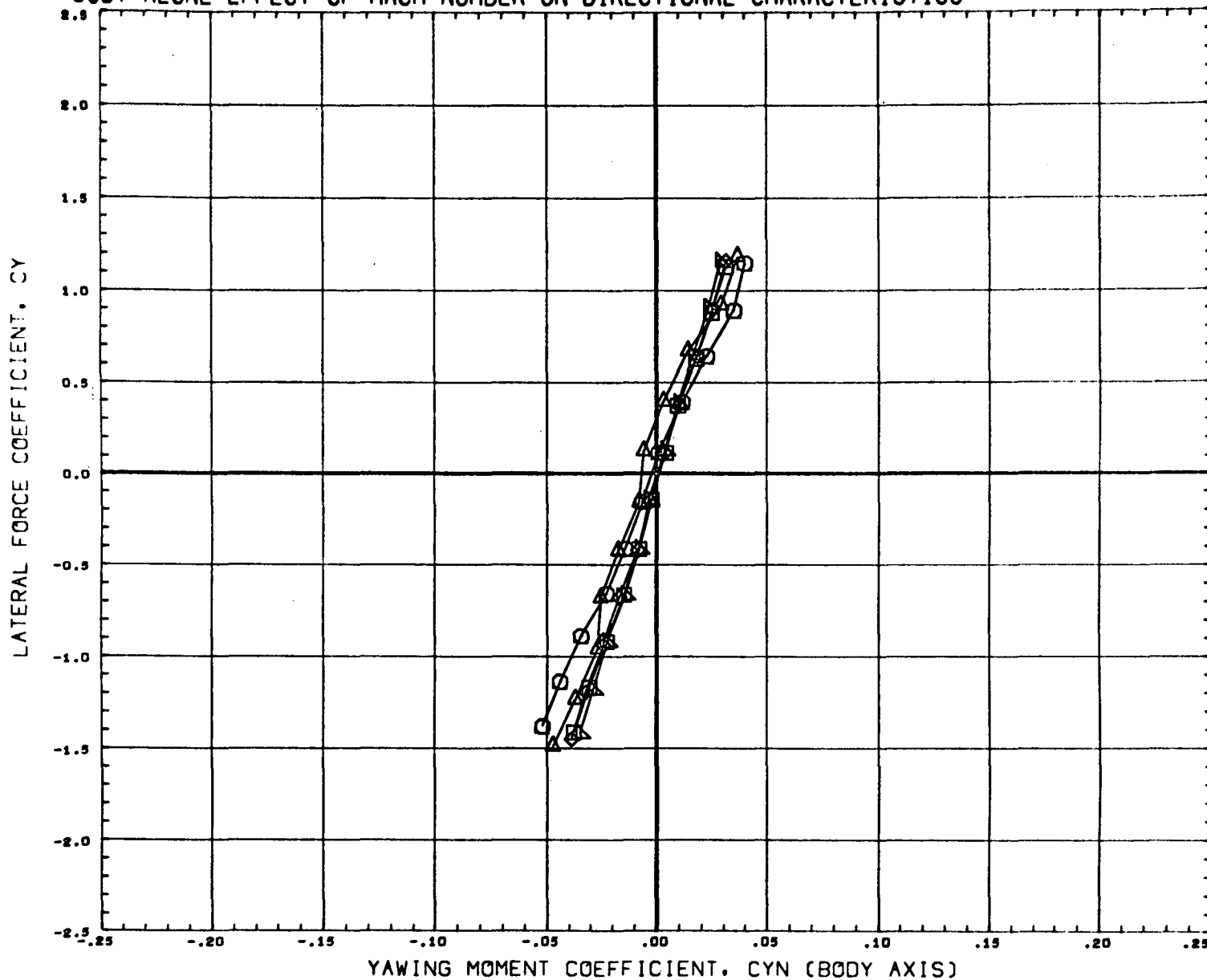
MSFC TWT 524 33 FOOT BOOSTER

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# BODY ALONE EFFECT OF MACH NUMBER ON DIRECTIONAL CHARACTERISTICS



| SYMBOL | MACH  | ALPHA  | PARAMETRIC VALUES |
|--------|-------|--------|-------------------|
| ○      | 1.197 | 80.000 |                   |
| △      | 1.955 |        |                   |
| ◇      | 2.740 |        |                   |
| □      | 3.480 |        |                   |
| ○      | 4.959 |        |                   |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | 80. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

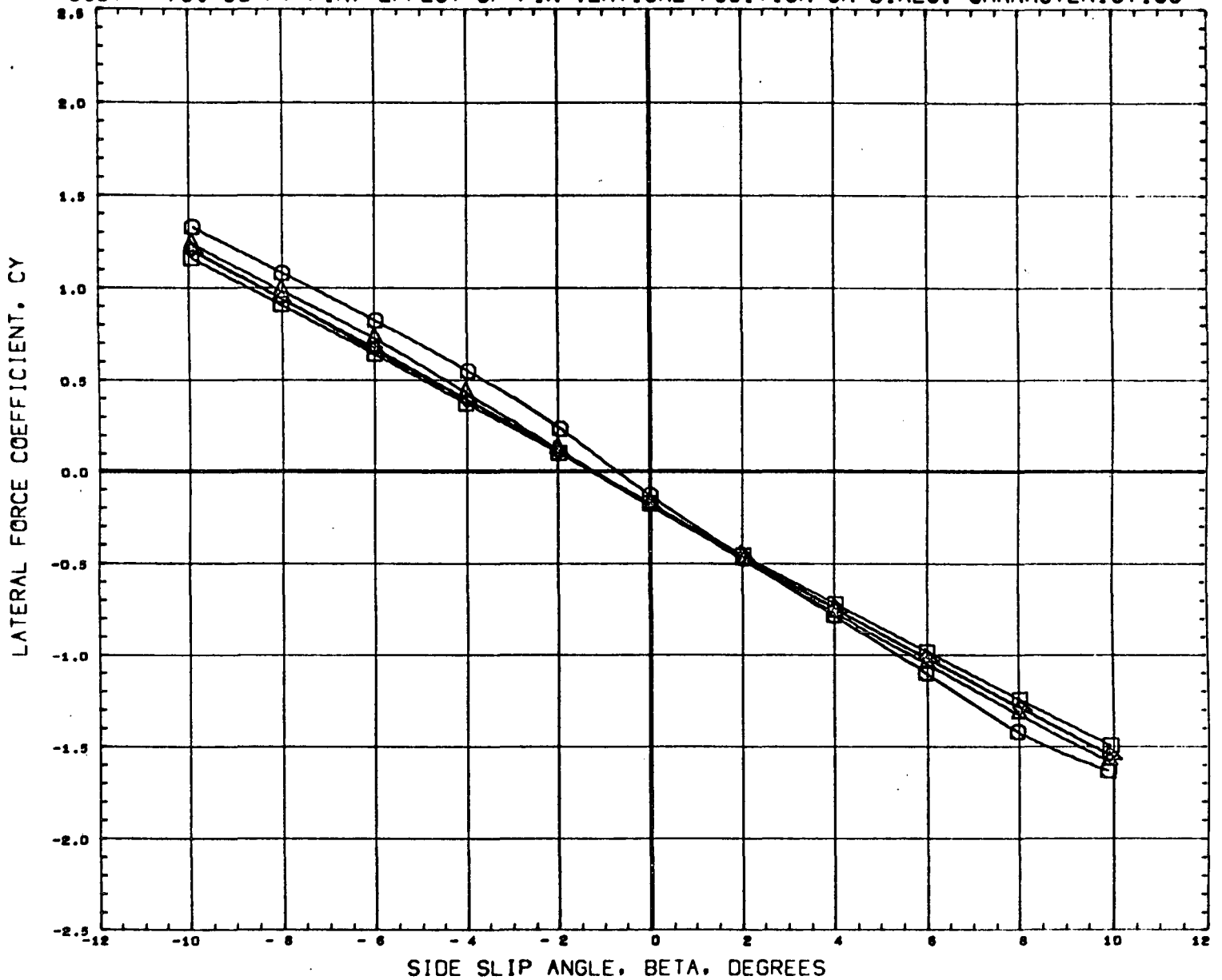
MSFC TWT 524 33 FOOT BOOSTER

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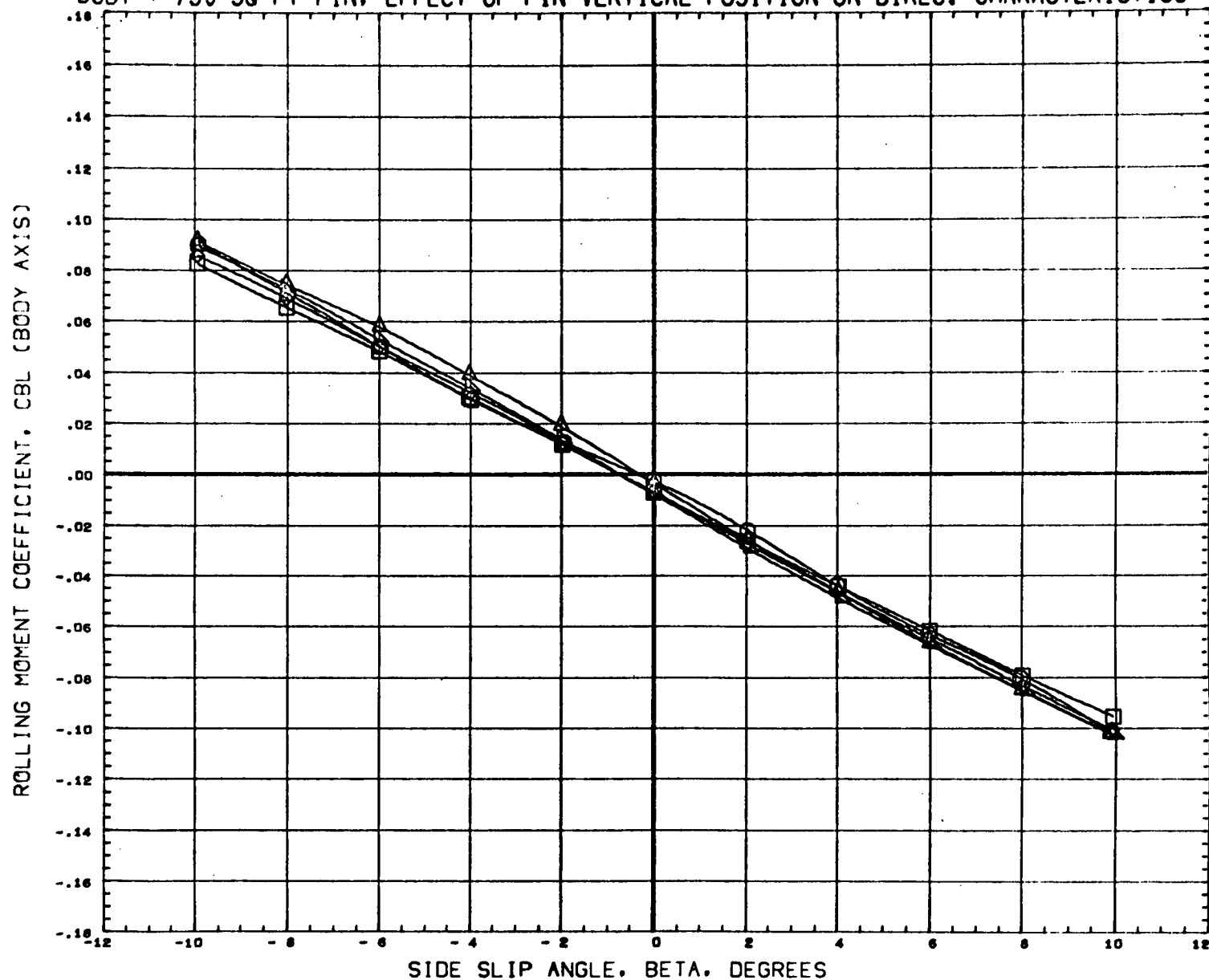
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES |        |       |       | REFERENCE INFORMATION |        |        |
|--------|-------|-------------------|--------|-------|-------|-----------------------|--------|--------|
| ○      | 1.196 | ALPHA             | 60.000 | POS   | 1.000 | SREF                  | 0.9650 | SQ. IN |
| △      | 1.959 | DELFE             | 0.000  | DELFA | 0.000 | LREF                  | 4.9080 | IN.    |
| □      | 2.740 |                   |        |       |       | BREF                  | 4.9080 | IN.    |
| ◇      | 3.480 |                   |        |       |       | XMRP                  | 2.9450 | IN.    |
| ×      | 4.959 |                   |        |       |       | YMRP                  | 0.0000 | IN.    |
|        |       |                   |        |       |       | ZMRP                  | 0.0000 | IN.    |
|        |       |                   |        |       |       | SCALE                 | 0.0028 |        |

REFERENCE FILE

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS

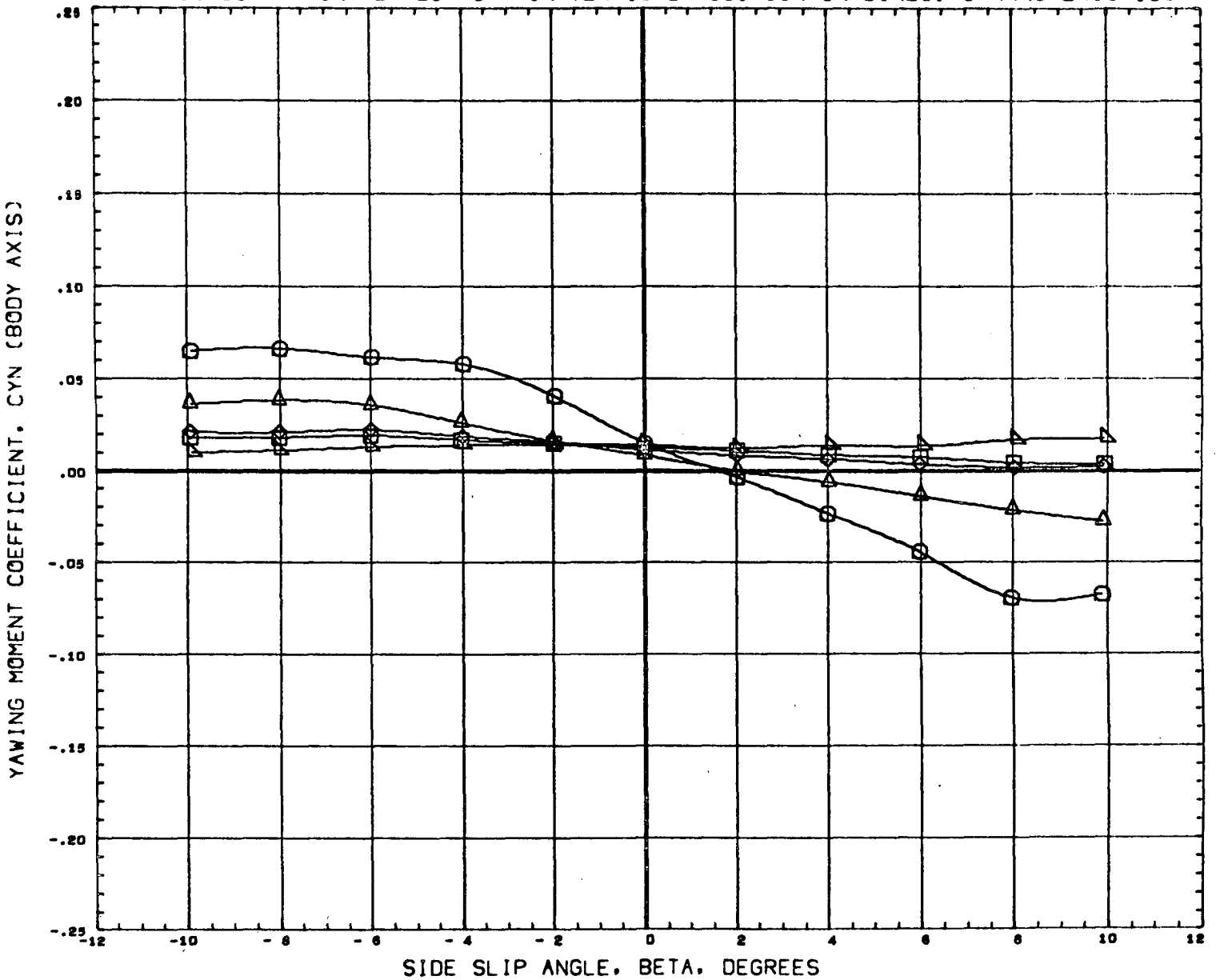


| SYMBOL | MACH  | PARAMETRIC VALUES       |
|--------|-------|-------------------------|
| ◇      | 1.196 | ALPHA 60.000 POS 1.000  |
| △      | 1.959 | DELFE 0.000 DELFA 0.000 |
| □      | 2.740 |                         |
| ◇      | 3.480 |                         |
| △      | 4.959 |                         |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9850 | sq. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

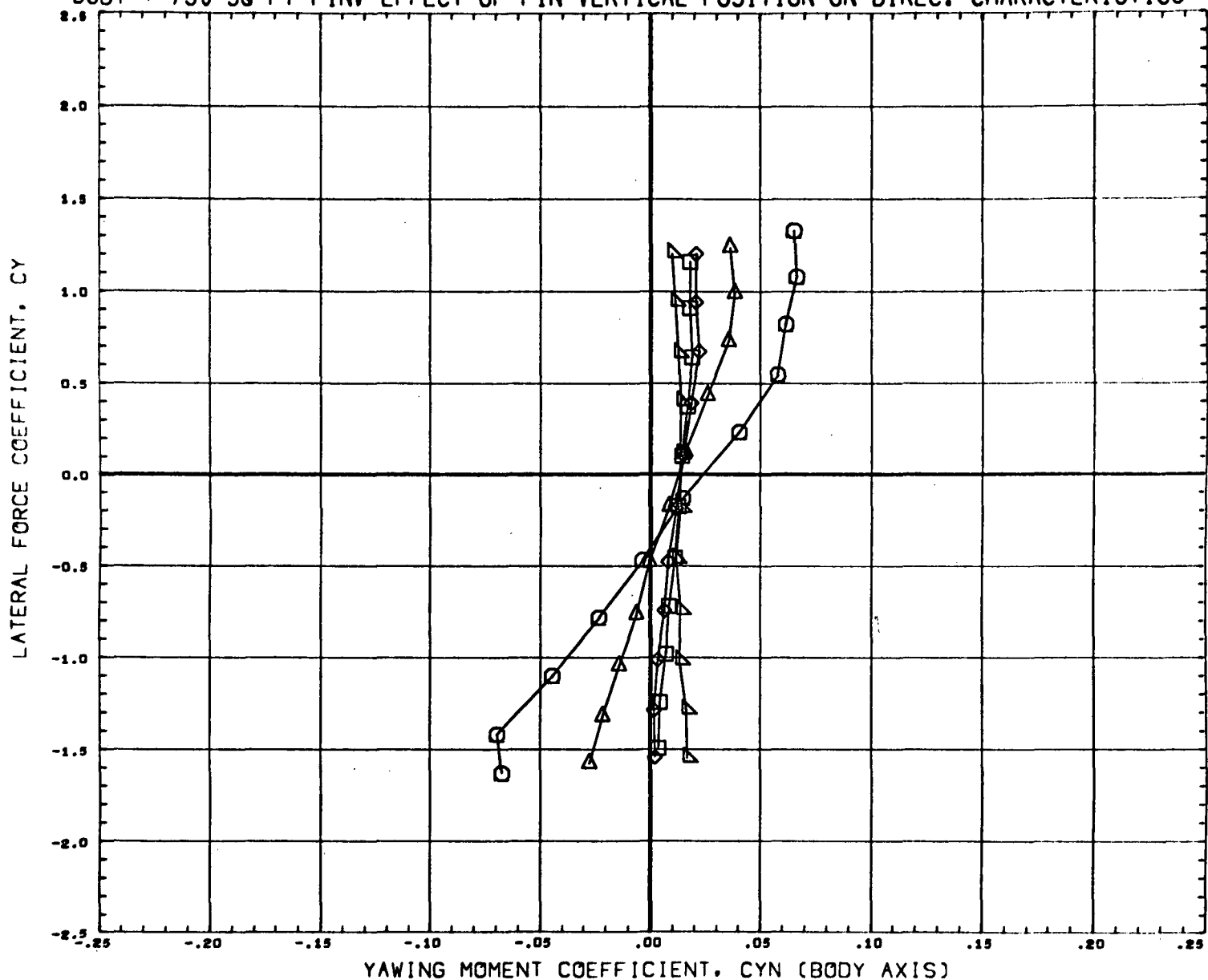
# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS



| SYMBOL | MACH  | ALPHA  | DELFE | PARAMETRIC VALUES | POS   | DELFA | REFERENCE INFORMATION | SQ. IN |
|--------|-------|--------|-------|-------------------|-------|-------|-----------------------|--------|
| ○      | 1.196 | 60.000 | 0.000 | 1.000             | 0.000 | 0.000 | SRF                   | 0.9650 |
| ◇      | 1.959 | 60.000 | 0.000 | 1.000             | 0.000 | 0.000 | LREF                  | 4.9080 |
| △      | 2.740 | 60.000 | 0.000 | 1.000             | 0.000 | 0.000 | BREF                  | 4.9080 |
| □      | 3.480 | 60.000 | 0.000 | 1.000             | 0.000 | 0.000 | XMRP                  | 2.9450 |
| ◇      | 4.959 | 60.000 | 0.000 | 1.000             | 0.000 | 0.000 | YMRP                  | 0.0000 |
|        |       |        |       |                   |       |       | ZMRP                  | 0.0000 |
|        |       |        |       |                   |       |       | SCALE                 | 0.0028 |

REFERENCE FILE

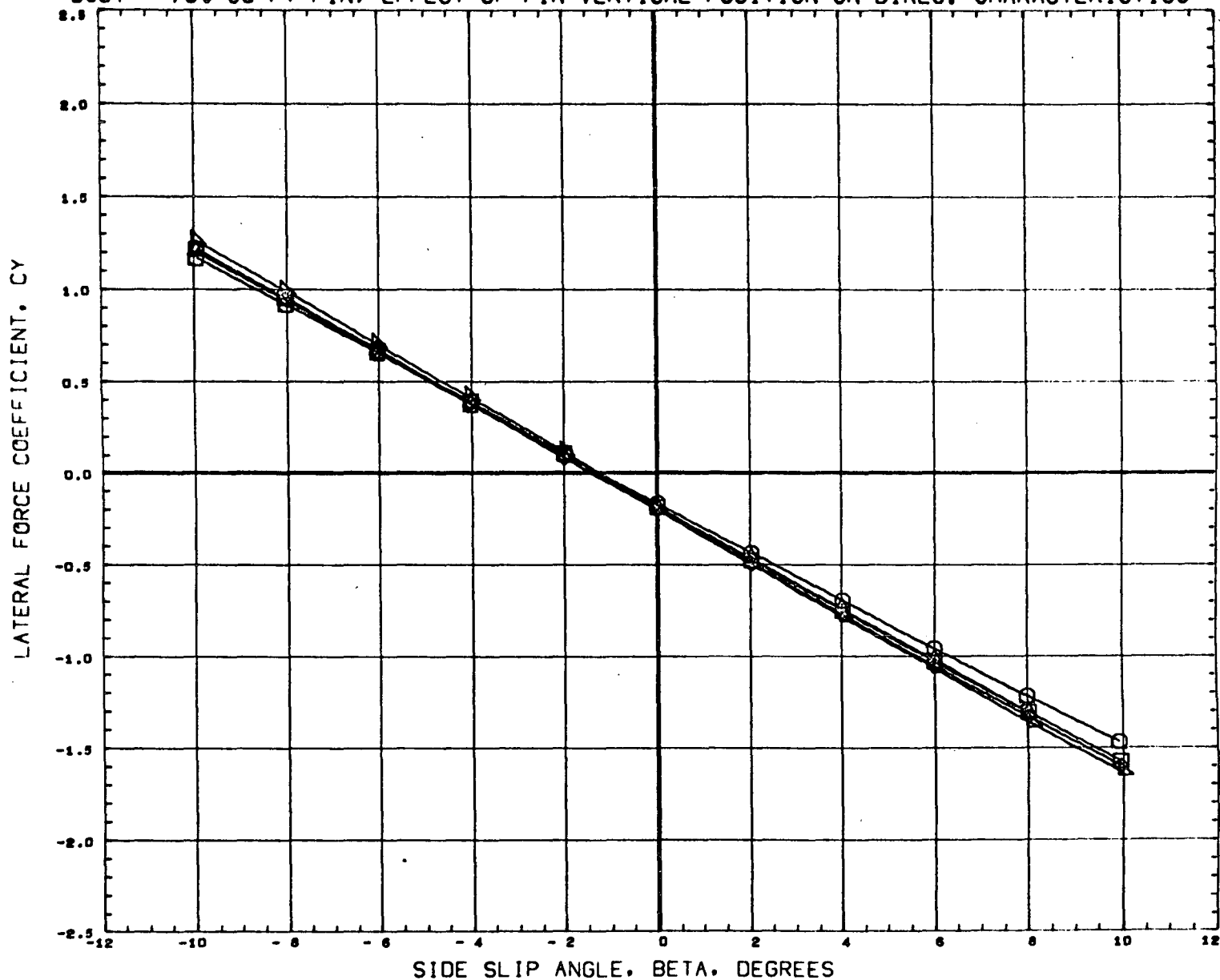
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES |        |       |       | REFERENCE INFORMATION |        |        |
|--------|-------|-------------------|--------|-------|-------|-----------------------|--------|--------|
| ○      | 1.196 | ALPHA             | 60.000 | POS   | 1.000 | SREF                  | 0.9650 | sq. IN |
| △      | 1.959 | DELFE             | 0.000  | DELFA | 0.000 | LREF                  | 4.9080 | IN.    |
| ◇      | 2.740 |                   |        |       |       | BREF                  | 4.9080 | IN.    |
| □      | 3.480 |                   |        |       |       | XMRP                  | 2.9450 | IN.    |
| ▽      | 4.959 |                   |        |       |       | YMRP                  | 0.0000 | IN.    |
|        |       |                   |        |       |       | ZMRP                  | 0.0000 | IN.    |
|        |       |                   |        |       |       | SCALE                 | 0.0028 |        |

REFERENCE FILE

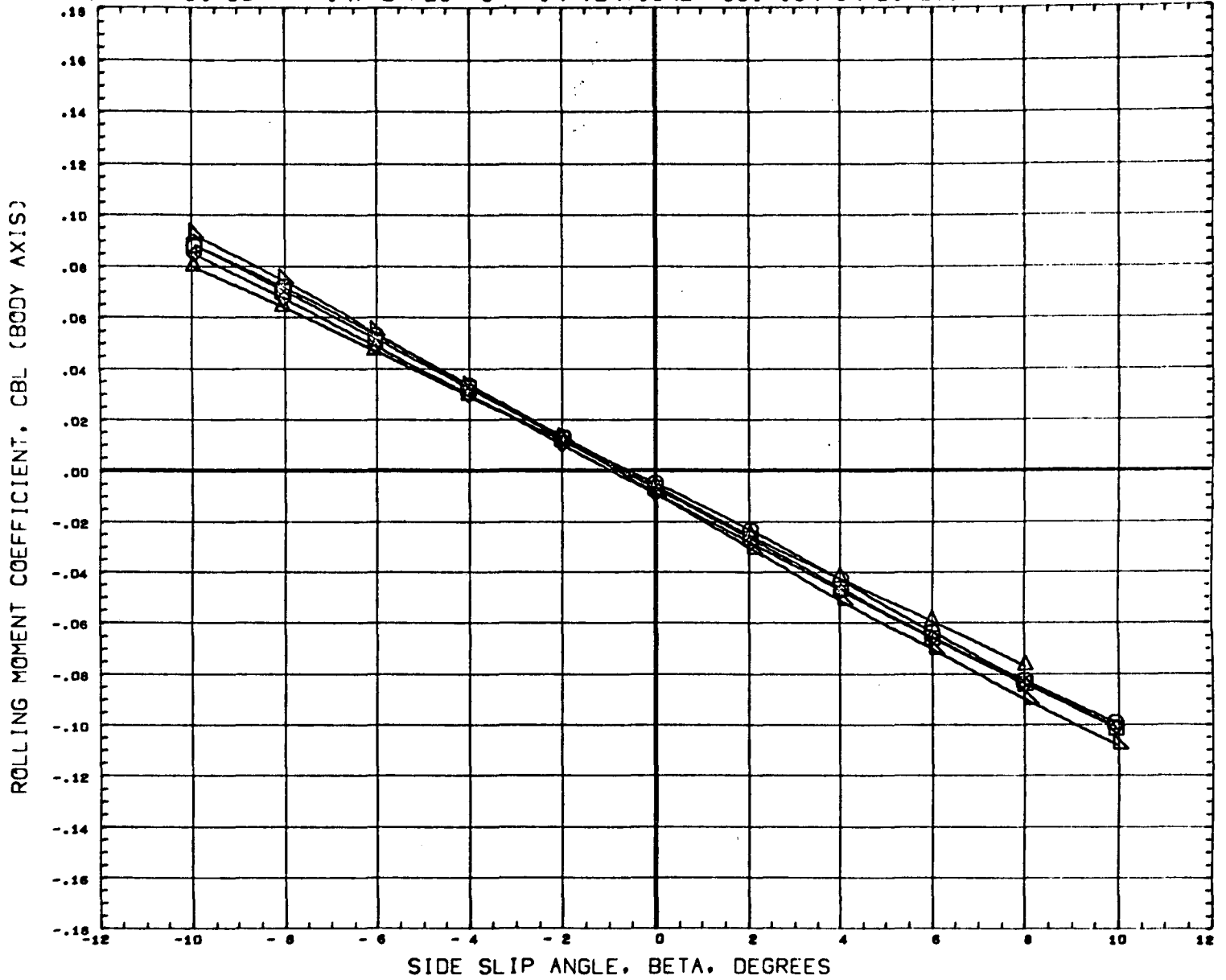
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS



| SYMBOL | PARAMETRIC VALUES |       |        |       |       | REFERENCE INFORMATION |        |        |
|--------|-------------------|-------|--------|-------|-------|-----------------------|--------|--------|
|        | MACH              | ALPHA | 80.000 | POS   | 1.000 | SREF                  | 0.9650 | SQ. IN |
| ○      | 1.203             | DELFE | 0.000  | DELFA | 0.000 | LREF                  | 4.9080 | IN.    |
| △      | 1.956             |       |        |       |       | BREF                  | 4.9080 | IN.    |
| ◇      | 2.740             |       |        |       |       | XNRP                  | 2.9450 | IN.    |
| □      | 3.480             |       |        |       |       | YNRP                  | 0.0000 | IN.    |
| ◻      | 4.959             |       |        |       |       | ZNRP                  | 0.0000 | IN.    |
|        |                   |       |        |       |       | SCALE                 | 0.0028 |        |

REFERENCE FILE

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS

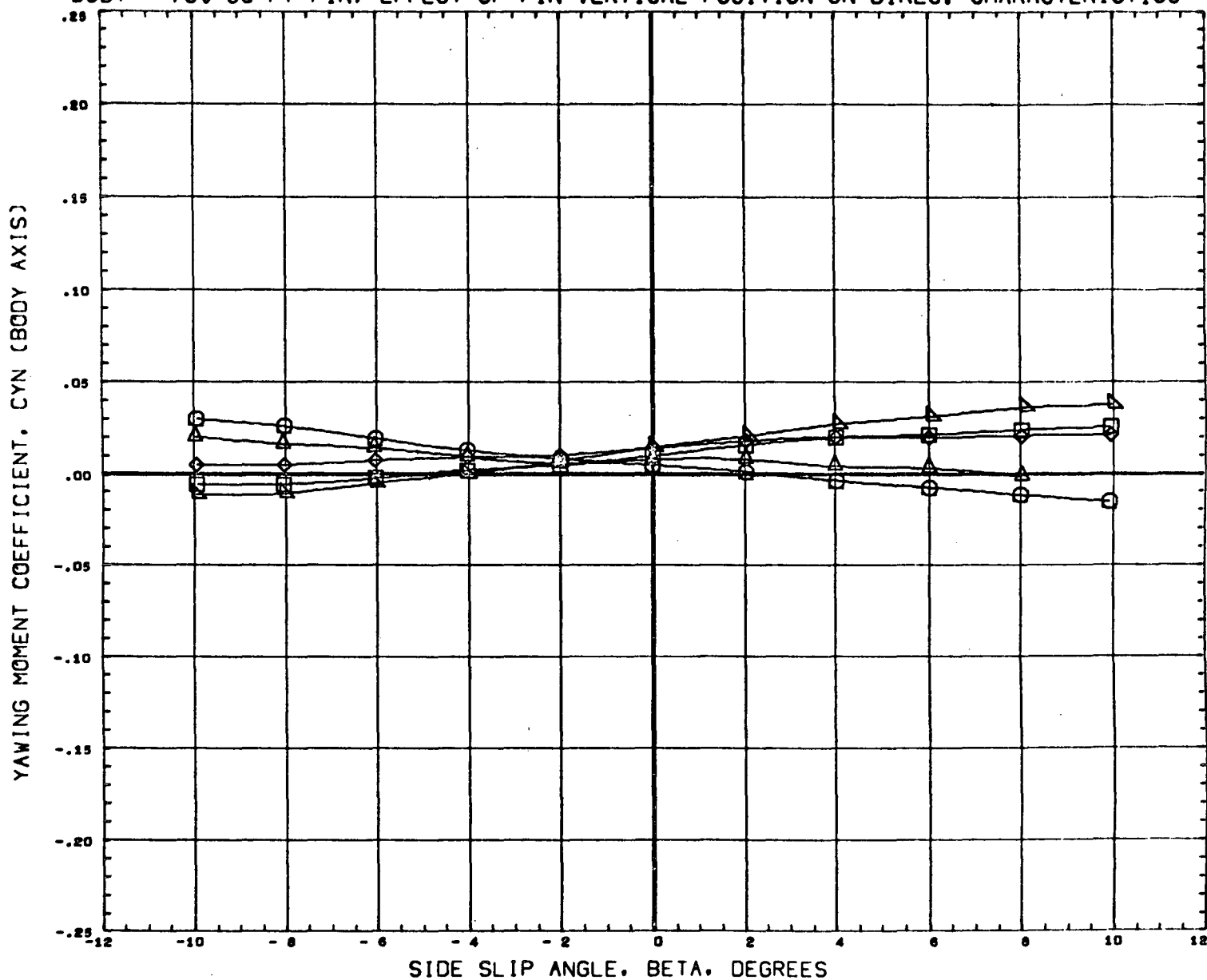


| SYMBOL | MACH  | ALPHA  | PARAMETRIC VALUES | POS | DELFA |
|--------|-------|--------|-------------------|-----|-------|
| ○      | 1.203 | 80.000 | 1.000             |     |       |
| ◇      | 1.956 | 0.000  | 0.000             |     |       |
| △      | 2.740 |        |                   |     |       |
| □      | 3.480 |        |                   |     |       |
| ▽      | 4.959 |        |                   |     |       |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | sq. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS

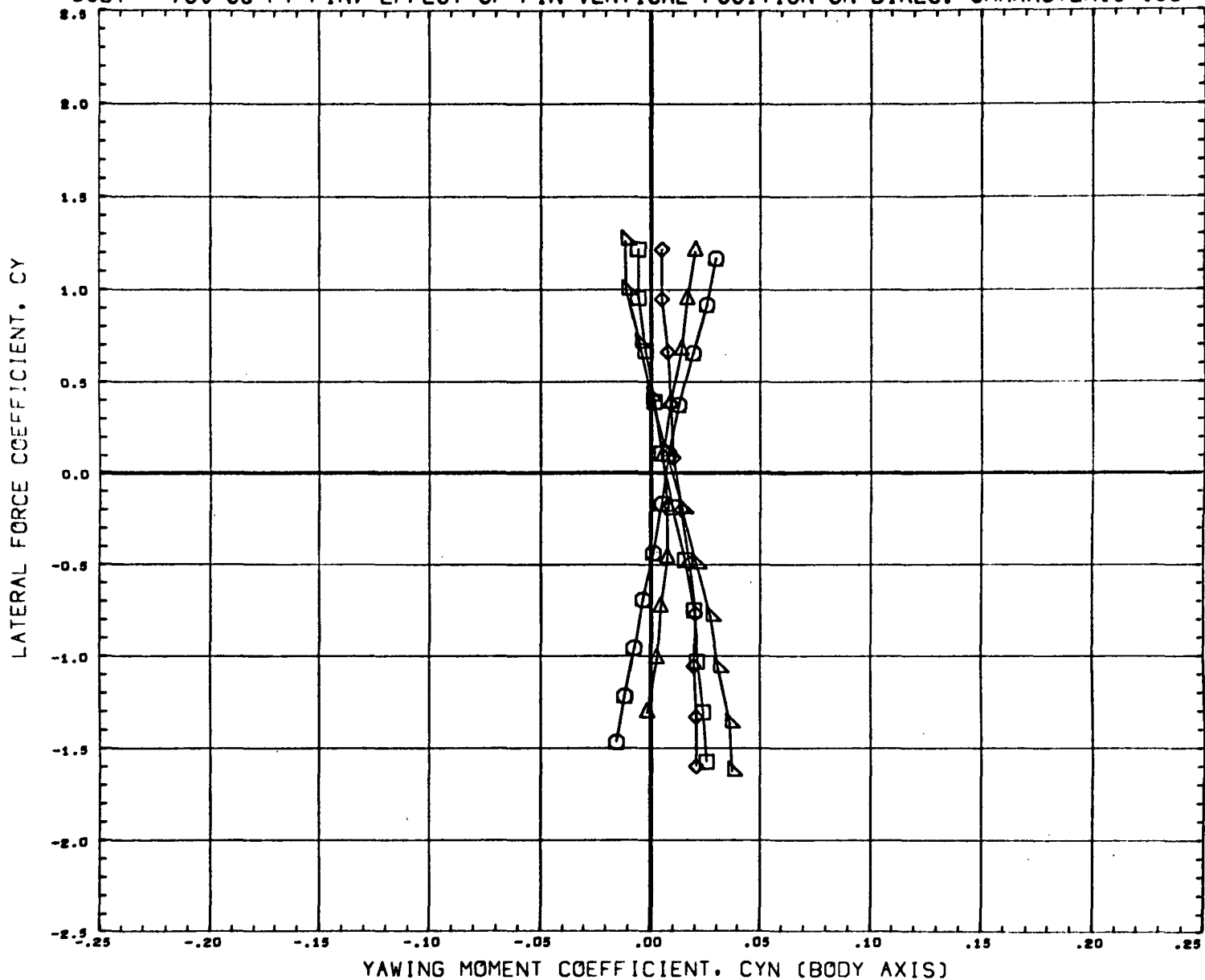


| SYMBOL | MACH  | PARAMETRIC VALUES |        |       |       |
|--------|-------|-------------------|--------|-------|-------|
| ○      | 1.203 | ALPHA             | 60.000 | POS   | 1.000 |
| △      | 1.956 | DELFE             | 0.000  | DELFA | 0.000 |
| ◇      | 2.740 |                   |        |       |       |
| □      | 3.480 |                   |        |       |       |
| ▽      | 4.959 |                   |        |       |       |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

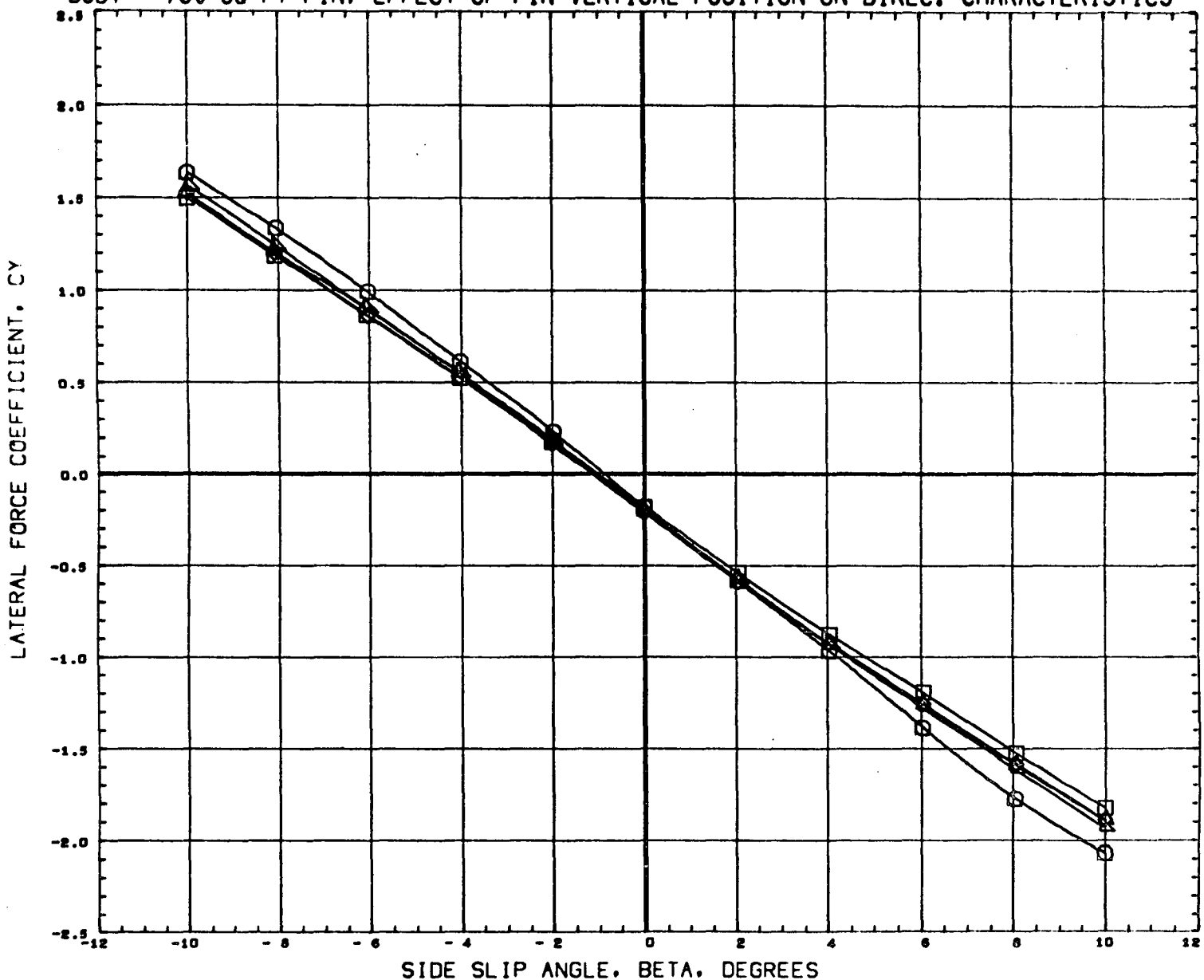
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES |        |       |       | REFERENCE INFORMATION |        |        |
|--------|-------|-------------------|--------|-------|-------|-----------------------|--------|--------|
| ○      | 1.203 | ALPHA             | 80.000 | POS   | 1.000 | SREF                  | 0.9650 | SQ. IN |
| ◇      | 1.956 | DELFE             | 0.000  | DELFA | 0.000 | LREF                  | 4.9080 | IN.    |
| □      | 2.740 |                   |        |       |       | BREF                  | 4.9080 | IN.    |
| △      | 3.460 |                   |        |       |       | XMRP                  | 2.9450 | IN.    |
|        | 4.959 |                   |        |       |       | YMRP                  | 0.0000 | IN.    |
|        |       |                   |        |       |       | ZMRP                  | 0.0000 | IN.    |
|        |       |                   |        |       |       | SCALE                 | 0.0028 |        |

REFERENCE FILE

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS

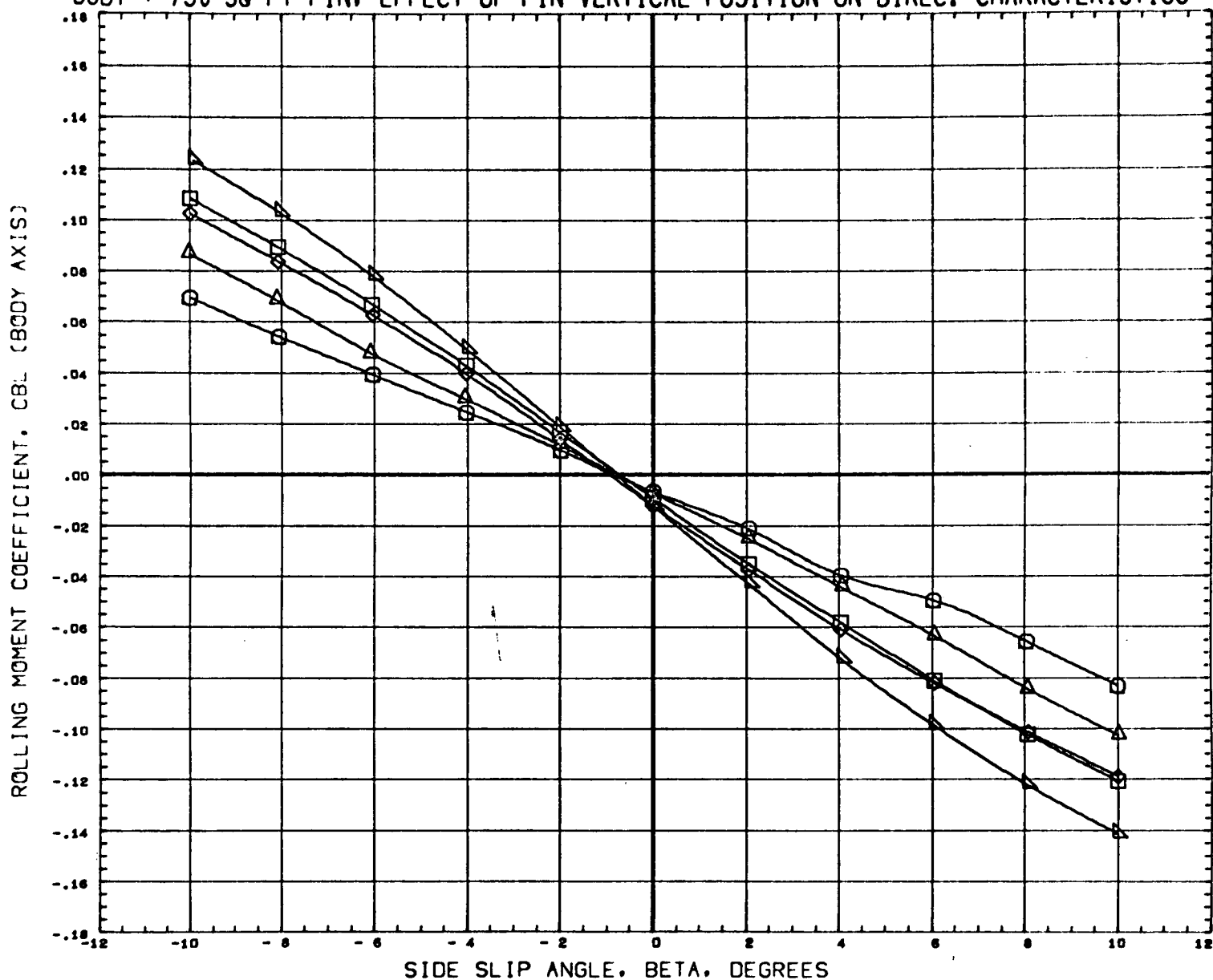


| SYMBOL | MACH  | PARAMETRIC VALUES |        |       |       |
|--------|-------|-------------------|--------|-------|-------|
| ○      | 1.194 | ALPHA             | 60.000 | POS   | 2.000 |
| △      | 1.960 | DELFE             | 0.000  | DELFA | 0.000 |
| ◇      | 2.740 |                   |        |       |       |
| □      | 3.460 |                   |        |       |       |
| ◻      | 4.959 |                   |        |       |       |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | Sq. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS

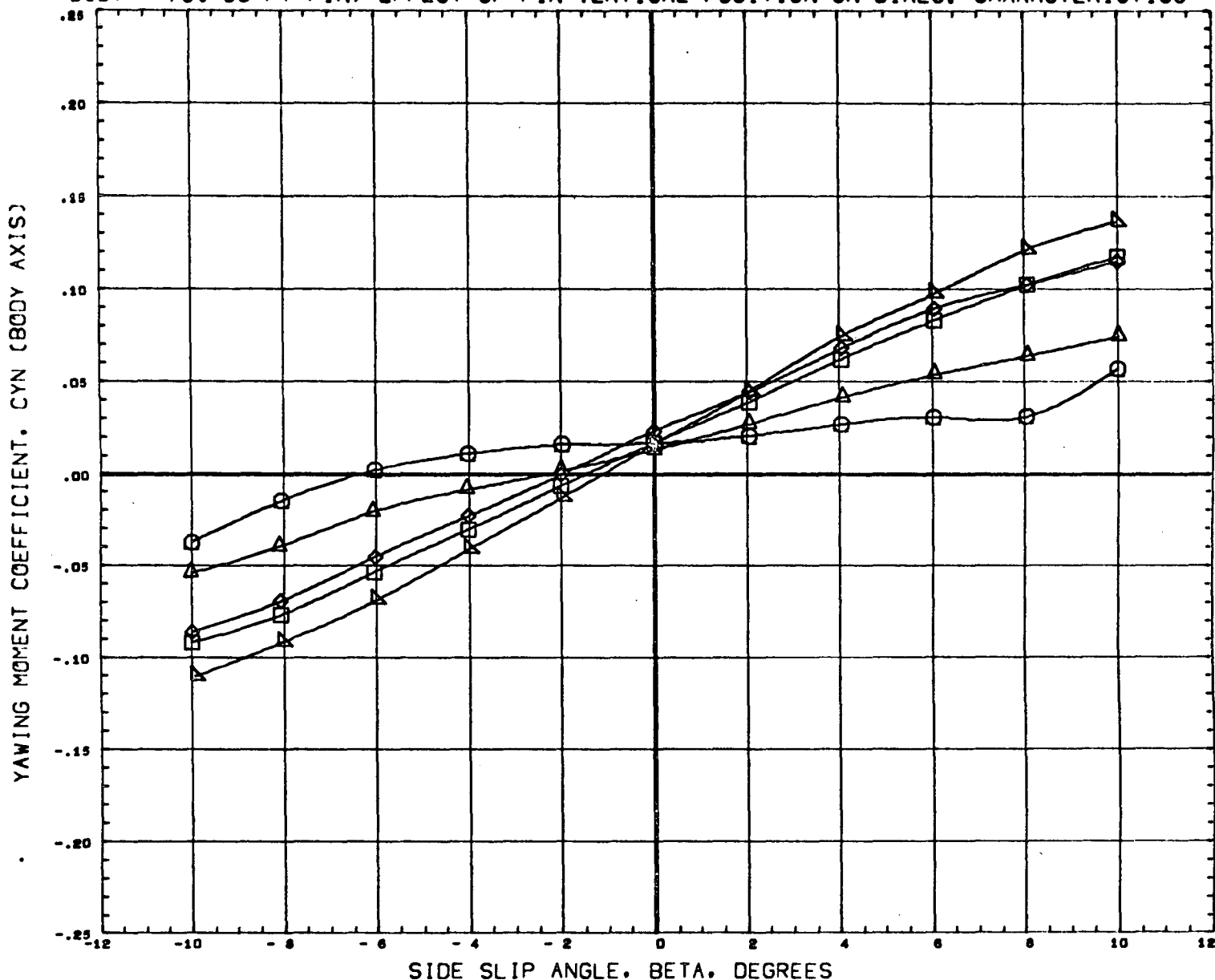


| SYMBOL | MACH  | PARAMETRIC VALUES       |
|--------|-------|-------------------------|
| ○      | 1.194 | ALPHA 60.000 POS 2.000  |
| △      | 1.960 | DELFE 0.000 DELFA 0.000 |
| ◇      | 2.740 |                         |
| □      | 3.480 |                         |
| ▽      | 4.959 |                         |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | sq. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS

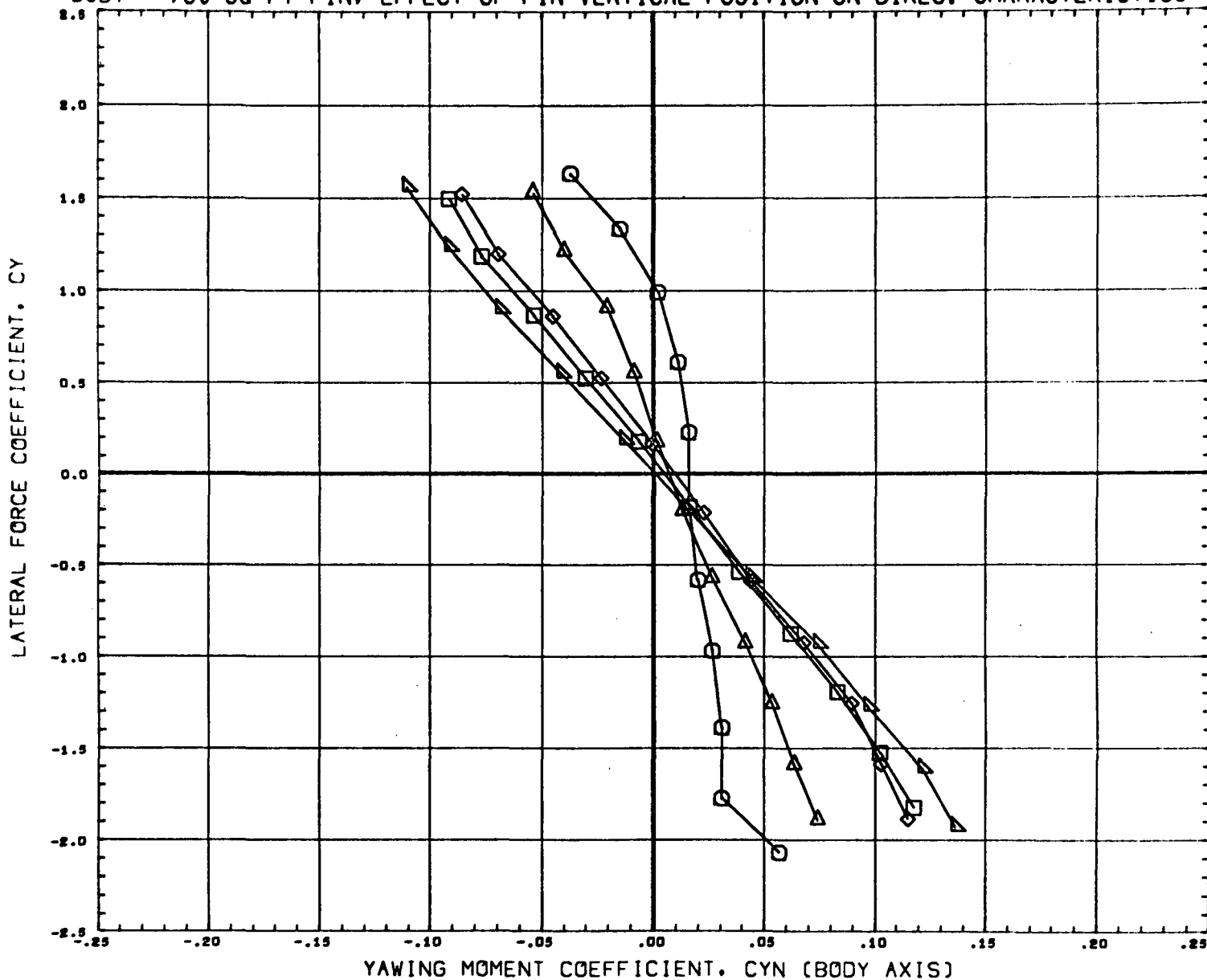


| SYMBOL | MACH  | PARAMETRIC VALUES |        |       |       |
|--------|-------|-------------------|--------|-------|-------|
| ○      | 1.194 | ALPHA             | 60.000 | POS   | 2.000 |
| △      | 1.960 | DELFE             | 0.000  | DELFA | 0.000 |
| □      | 2.740 |                   |        |       |       |
| ◇      | 3.480 |                   |        |       |       |
| ×      | 4.959 |                   |        |       |       |

REFERENCE FILE

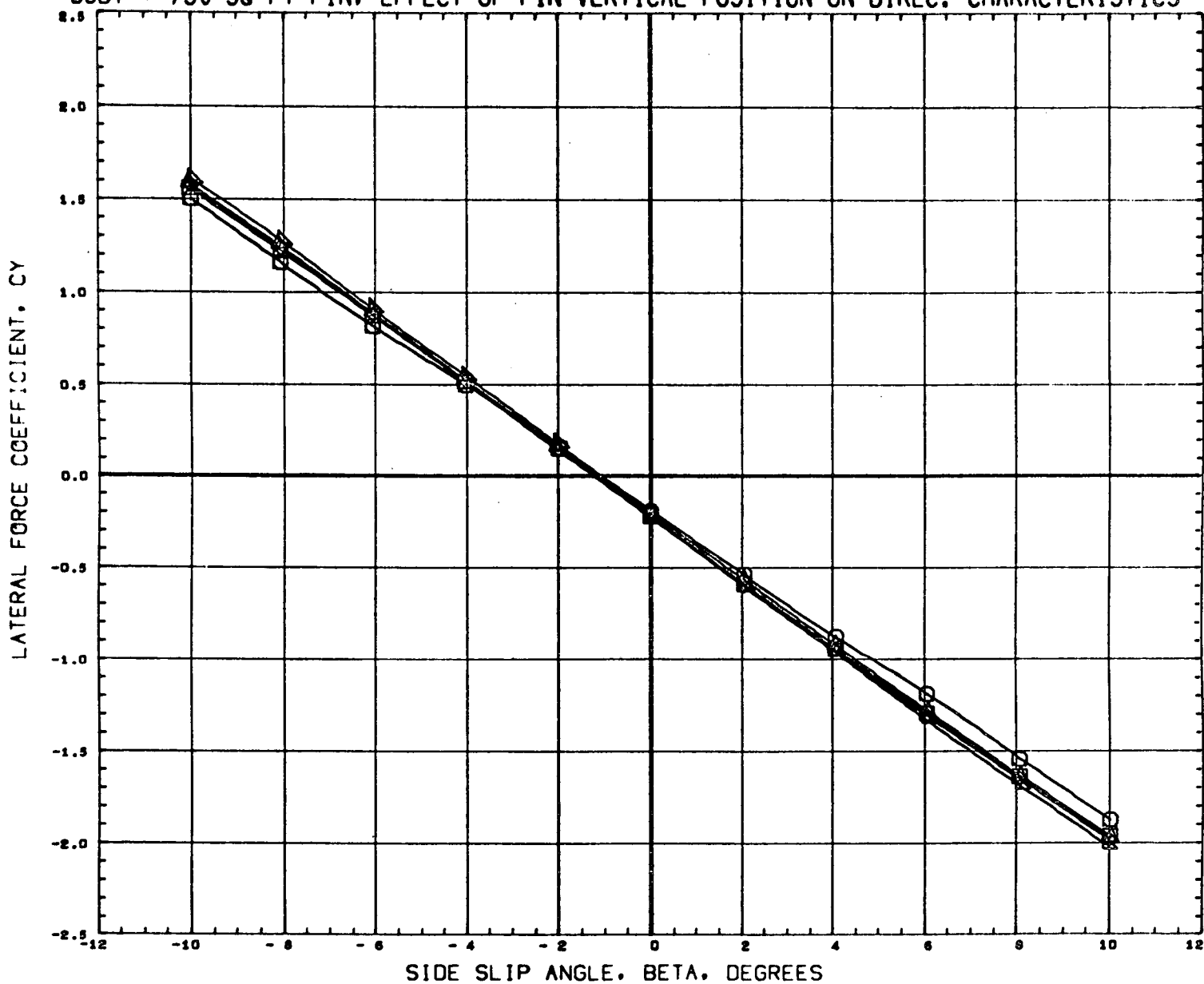
| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9690 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0026 |        |

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES       | REFERENCE INFORMATION |
|--------|-------|-------------------------|-----------------------|
| ○      | 1.194 | ALPHA 60.000 POS 2.000  | SREF 0.9650 SQ. IN    |
| ◇      | 1.960 | DELFE 0.000 DELFA 0.000 | LREF 4.9080 IN.       |
| □      | 2.740 |                         | BREF 4.9080 IN.       |
| △      | 3.480 |                         | XMRP 2.9450 IN.       |
| ▽      | 4.999 |                         | YMRP 0.0000 IN.       |
|        |       |                         | ZMRP 0.0000 IN.       |
|        |       |                         | SCALE 0.0028          |

# BODY + 750 SQ FT FIN. EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS

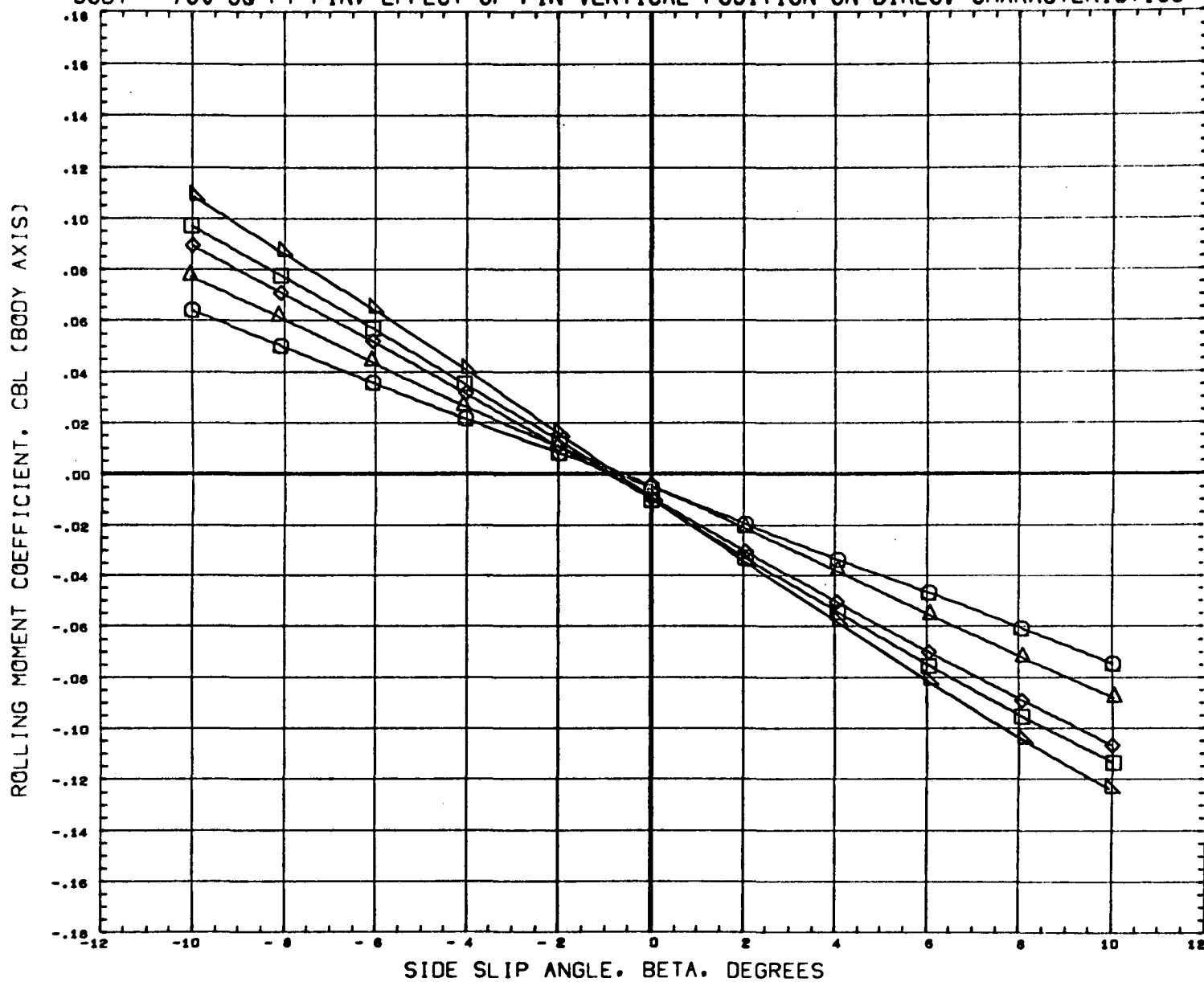


| SYMBOL | MACH  | PARAMETRIC VALUES |        |       |       |
|--------|-------|-------------------|--------|-------|-------|
| ○      | 1.197 | ALPHA             | 80.000 | POS   | 2.000 |
| △      | 1.950 | DELFE             | 0.000  | DELFA | 0.000 |
| ◇      | 2.740 |                   |        |       |       |
| ◊      | 3.480 |                   |        |       |       |
| ◻      | 4.959 |                   |        |       |       |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0029 |        |

# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS

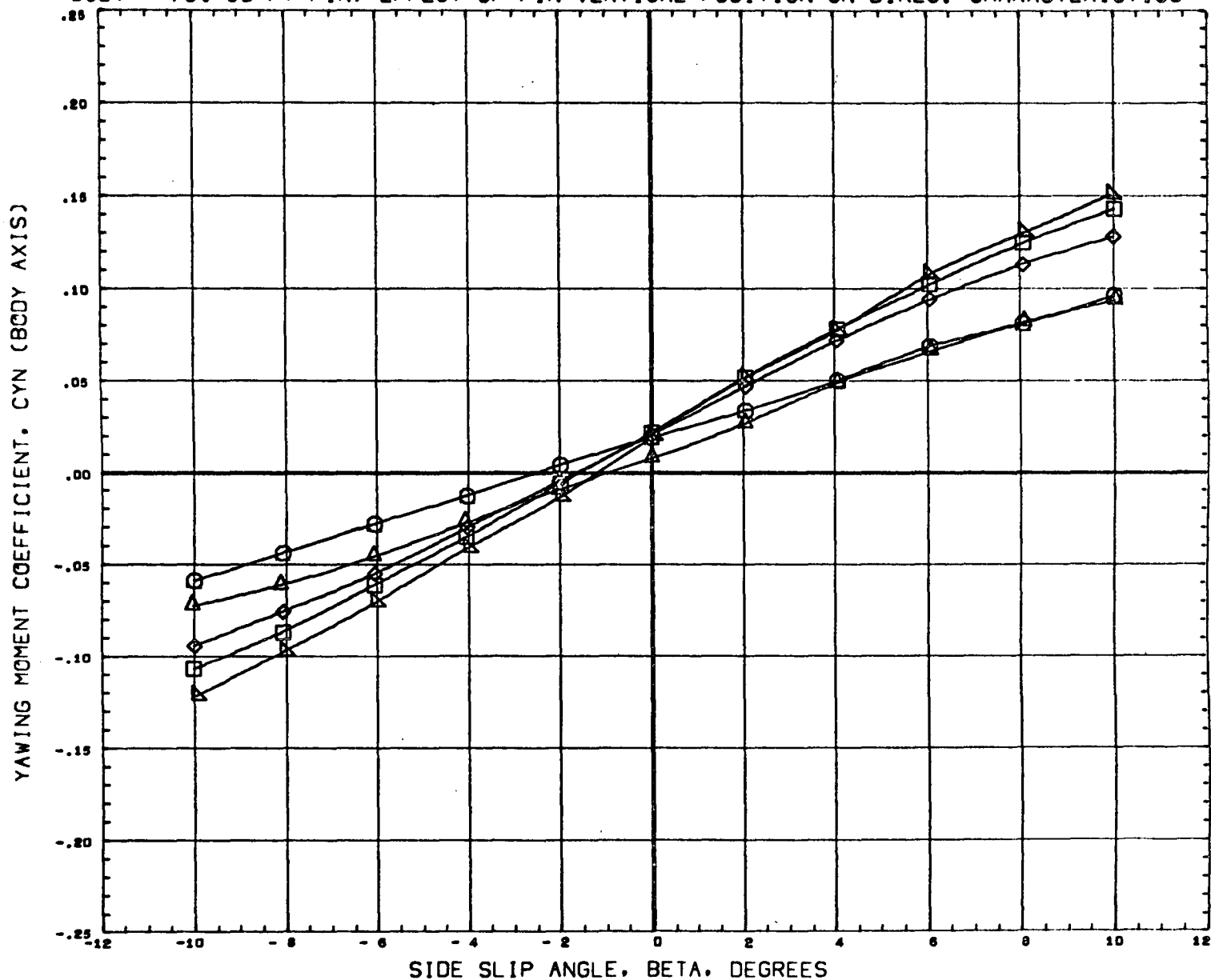


| SYMBOL | MACH  | PARAMETRIC VALUES       |
|--------|-------|-------------------------|
| ○      | 1.197 | ALPHA 80.000 POS 2.000  |
| ◇      | 1.950 | DELFE 0.000 DELFA 0.000 |
| △      | 2.740 |                         |
| □      | 3.480 |                         |
| ▽      | 4.959 |                         |

REFERENCE FILE

| REFERENCE INFORMATION |        |        |
|-----------------------|--------|--------|
| SREF                  | 0.9650 | SQ. IN |
| LREF                  | 4.9080 | IN.    |
| BREF                  | 4.9080 | IN.    |
| XMRP                  | 2.9450 | IN.    |
| YMRP                  | 0.0000 | IN.    |
| ZMRP                  | 0.0000 | IN.    |
| SCALE                 | 0.0028 |        |

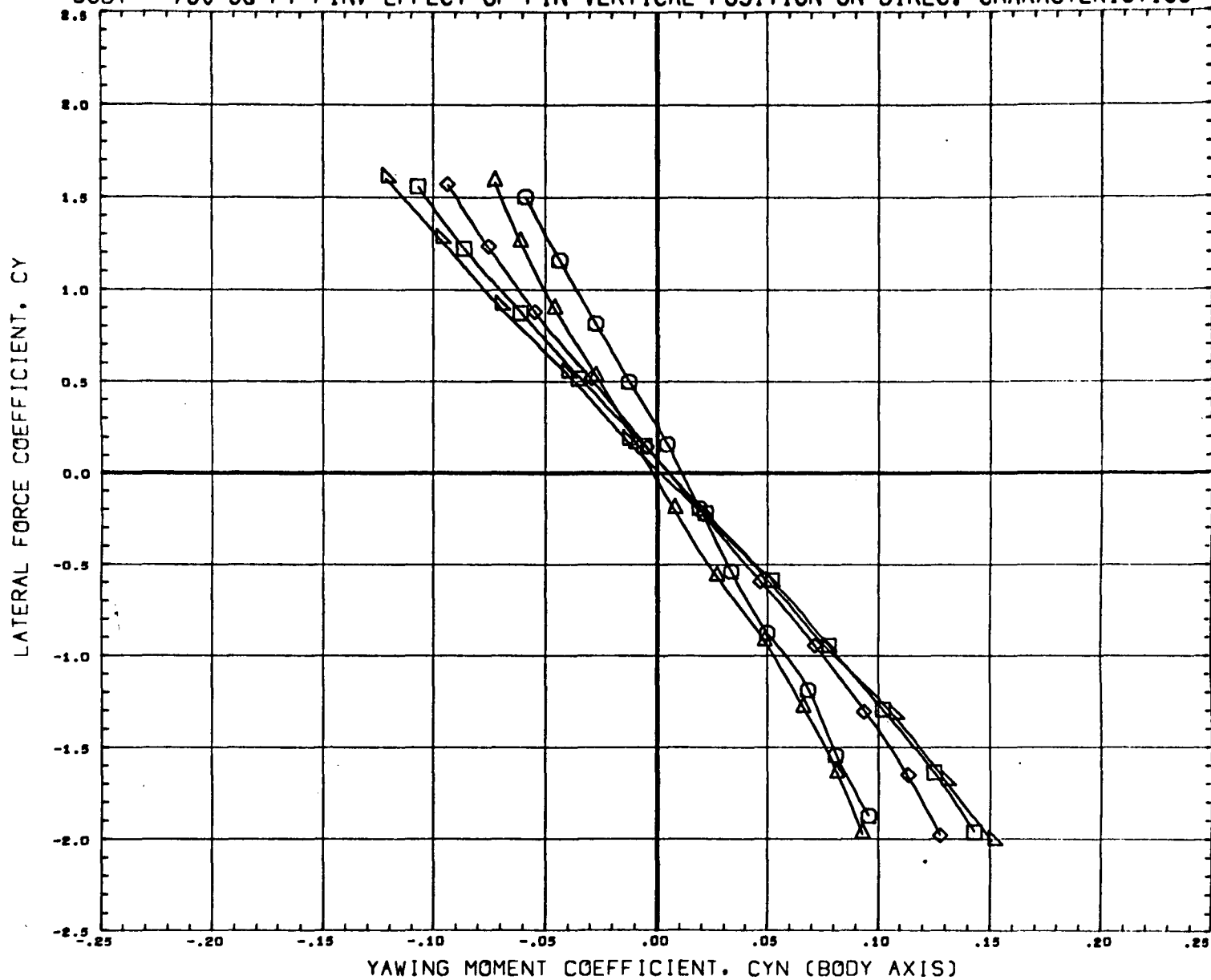
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES |        |       |       | REFERENCE INFORMATION |        |        |
|--------|-------|-------------------|--------|-------|-------|-----------------------|--------|--------|
| ○      | 1.197 | ALPHA             | 80.000 | POS   | 2.000 | SREF                  | 0.9650 | SQ. IN |
| △      | 1.950 | DELFE             | 0.000  | DELFA | 0.000 | LREF                  | 4.9080 | IN.    |
| ◇      | 2.740 |                   |        |       |       | BREF                  | 4.9080 | IN.    |
| □      | 3.480 |                   |        |       |       | XMRP                  | 2.9450 | IN.    |
| ◻      | 4.959 |                   |        |       |       | YMRP                  | 0.0000 | IN.    |
|        |       |                   |        |       |       | ZMRP                  | 0.0000 | IN.    |
|        |       |                   |        |       |       | SCALE                 | 0.0028 |        |

REFERENCE FILE

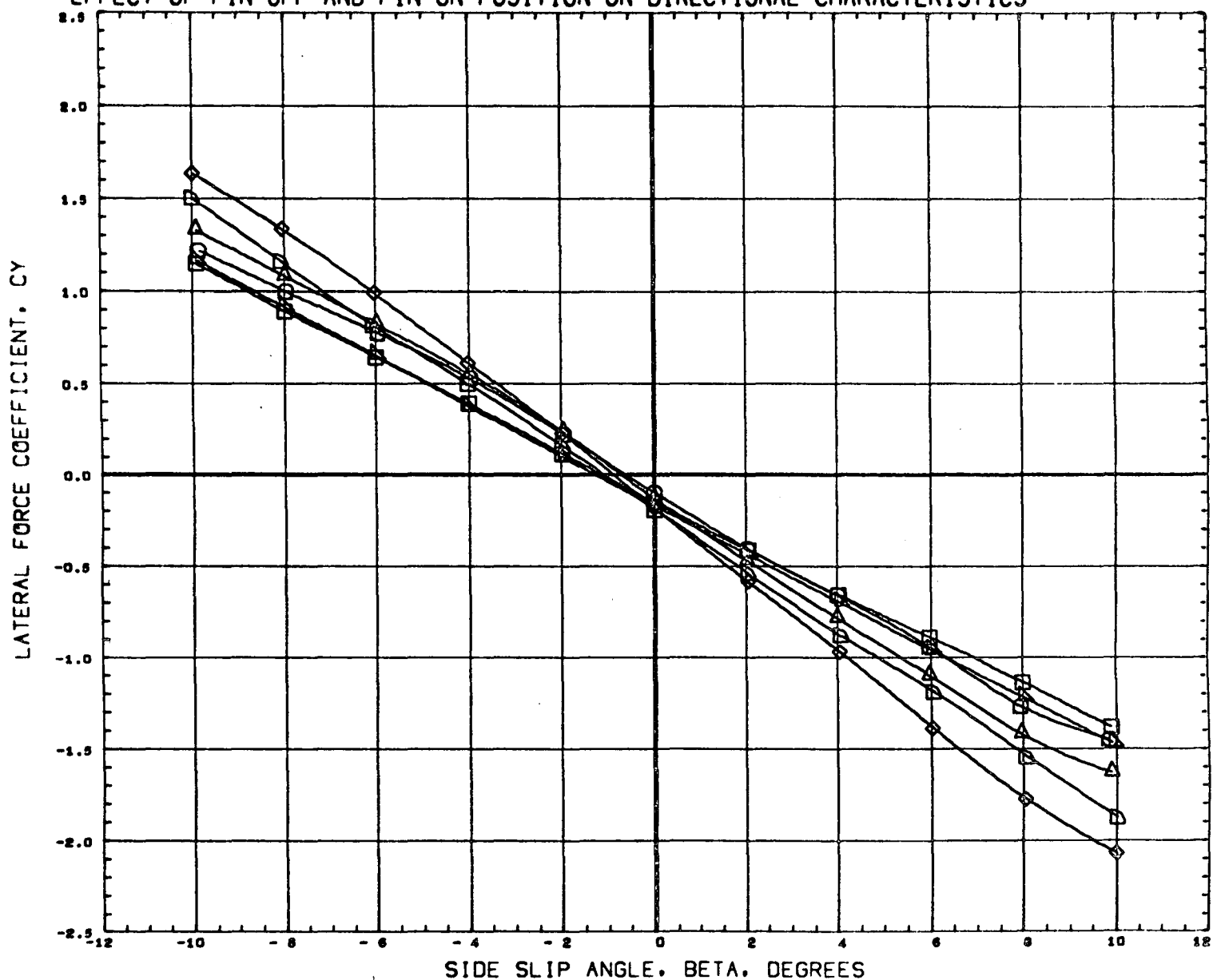
# BODY + 750 SQ FT FIN, EFFECT OF FIN VERTICAL POSITION ON DIREC. CHARACTERISTICS



| SYMBOL | MACH  | PARAMETRIC VALUES       | REFERENCE INFORMATION |
|--------|-------|-------------------------|-----------------------|
| ○      | 1.197 | ALPHA 80.000 POS 2.000  | SREF 0.9650 SQ. IN    |
| ◇      | 1.990 | DELFE 0.000 DELFA 0.000 | LREF 4.9080 IN.       |
| □      | 2.740 |                         | BREF 4.9080 IN.       |
| △      | 3.480 |                         | XMRP 2.9450 IN.       |
| ▽      | 4.959 |                         | YMRP 0.0000 IN.       |
|        |       |                         | ZMRP 0.0000 IN.       |
|        |       |                         | SCALE 0.0028          |

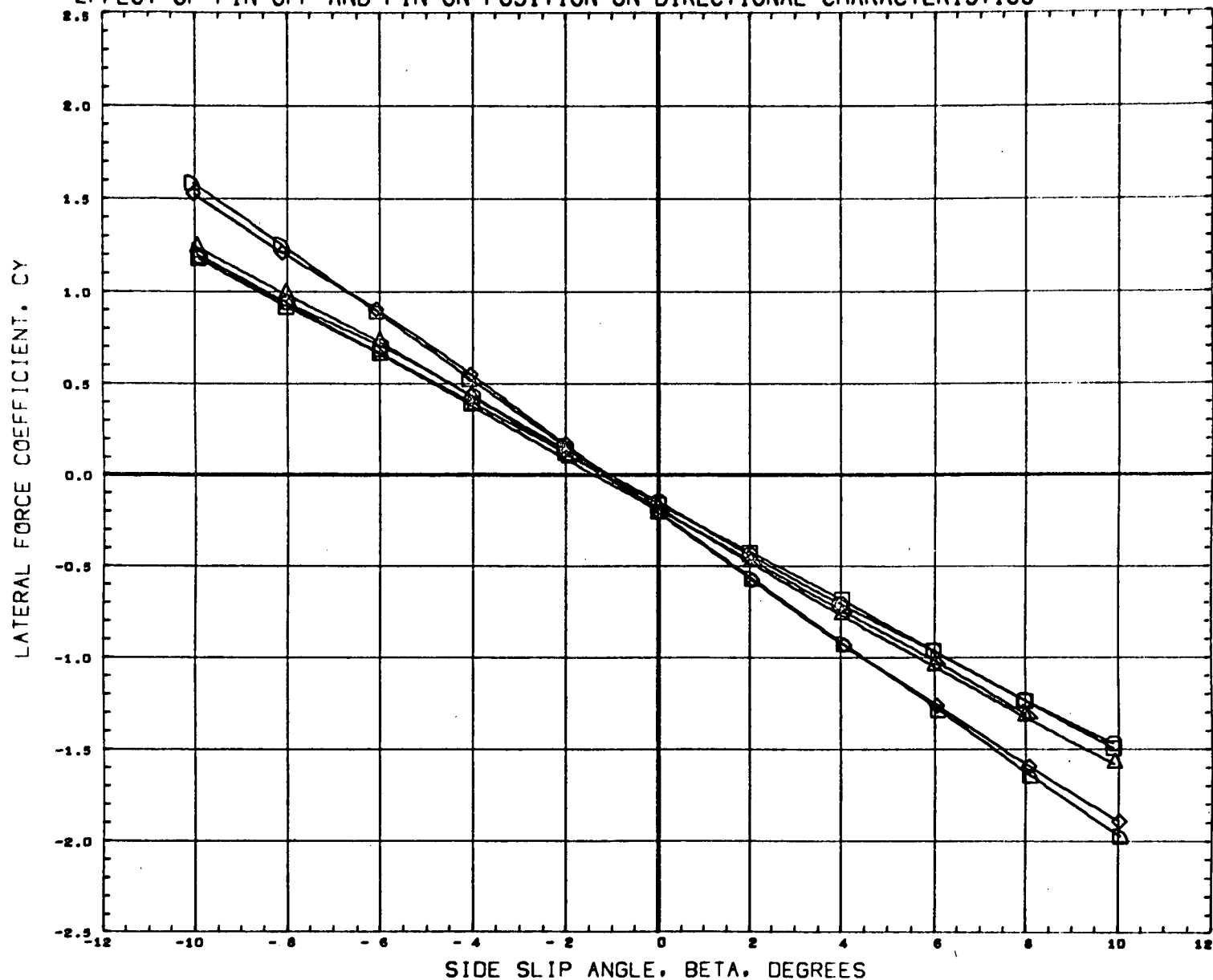
REFERENCE FILE

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



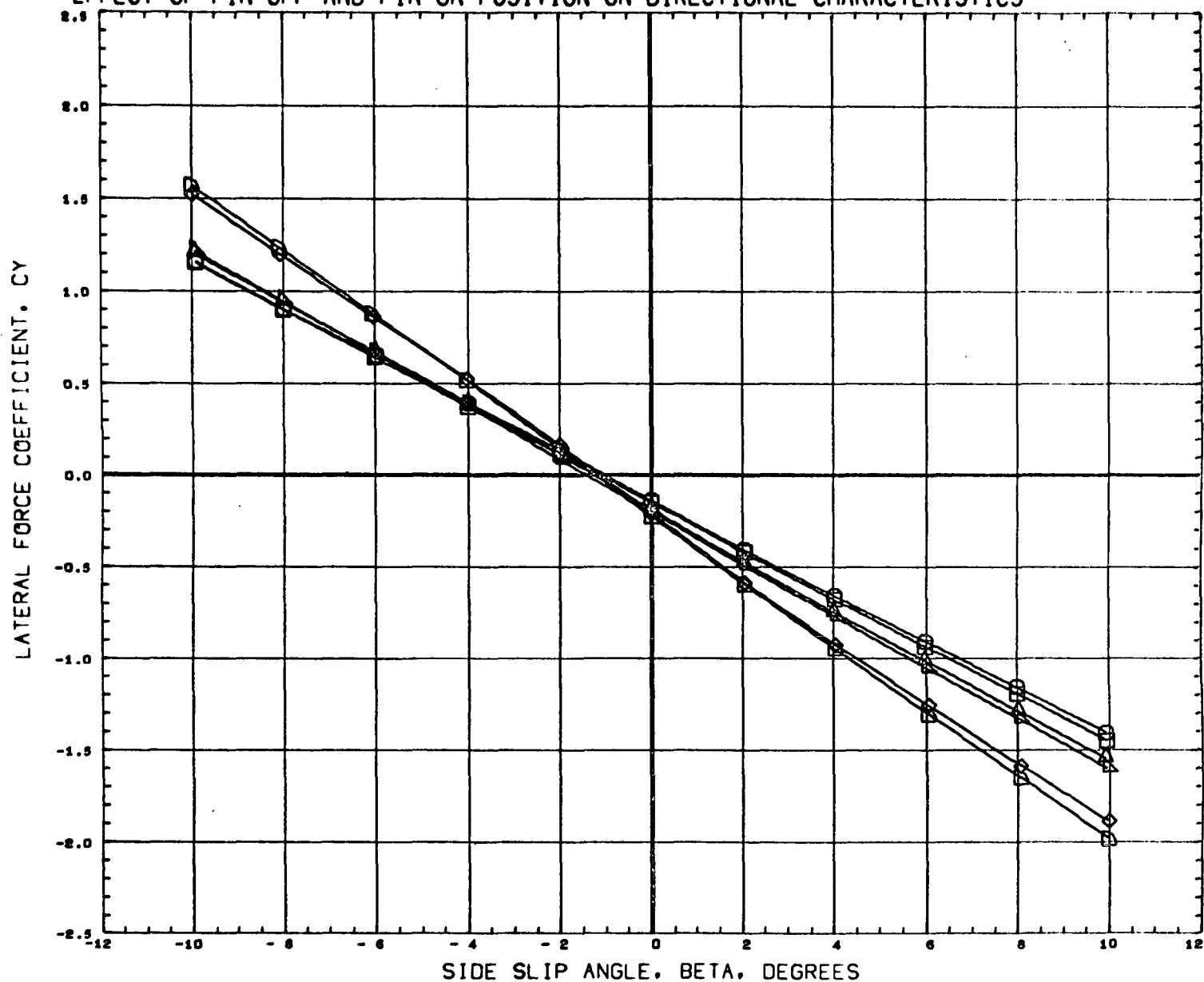
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 39. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9060 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9060 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0026          |
| MACH            | 1.197                                   |        |       |       |       |                       |

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



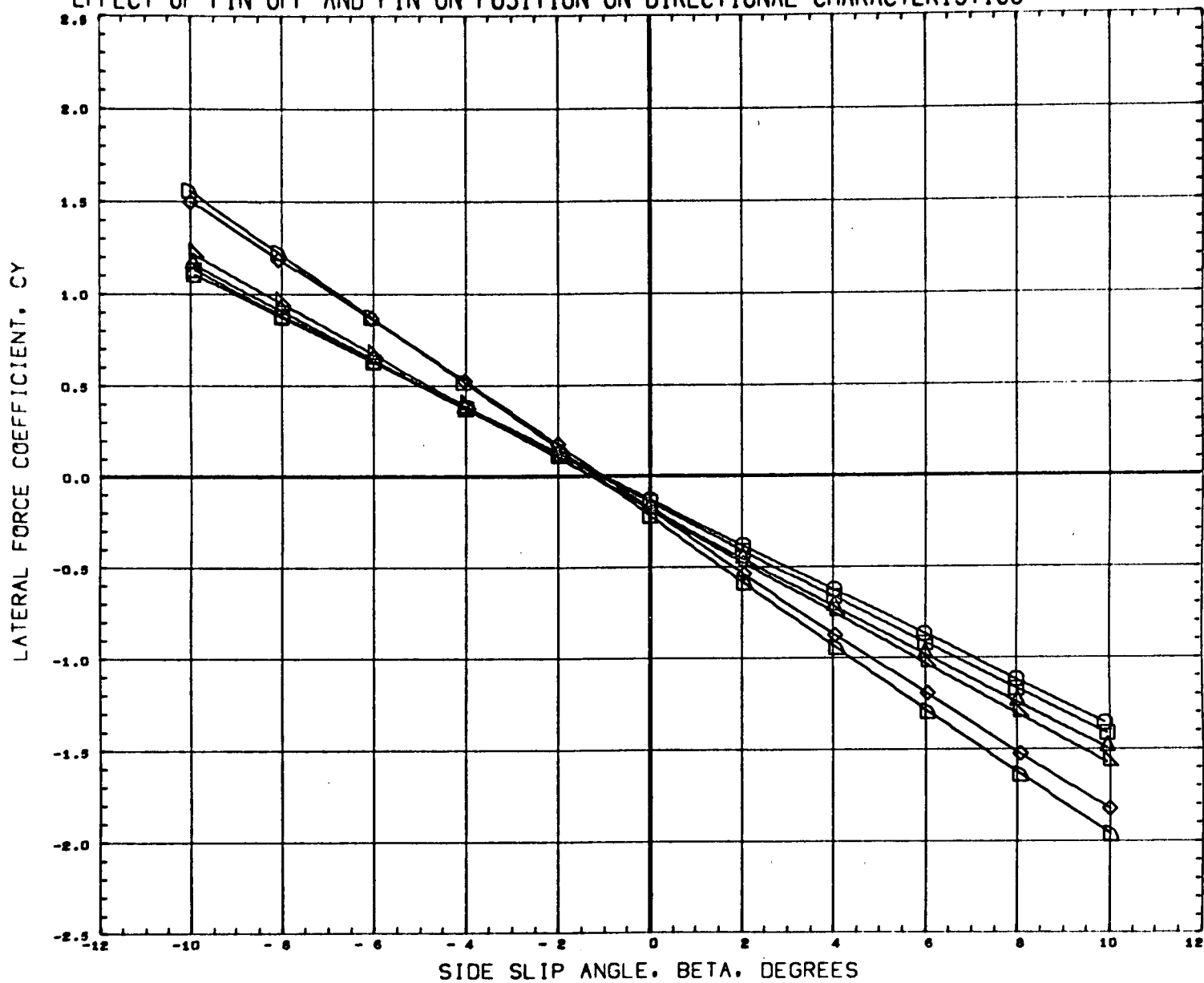
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|---------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF                  | 0.9650 SQ. IN |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP                  | 2.9450 IN.    |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP                  | 0.0000 IN.    |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |        |       |       |       | SCALE                 | 0.0028        |
| MACH 1.937      |                                         |        |       |       |       |                       |               |

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XHRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YHRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZHRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |
| MACH 2.740      |                                         |        |       |       |       |                       |

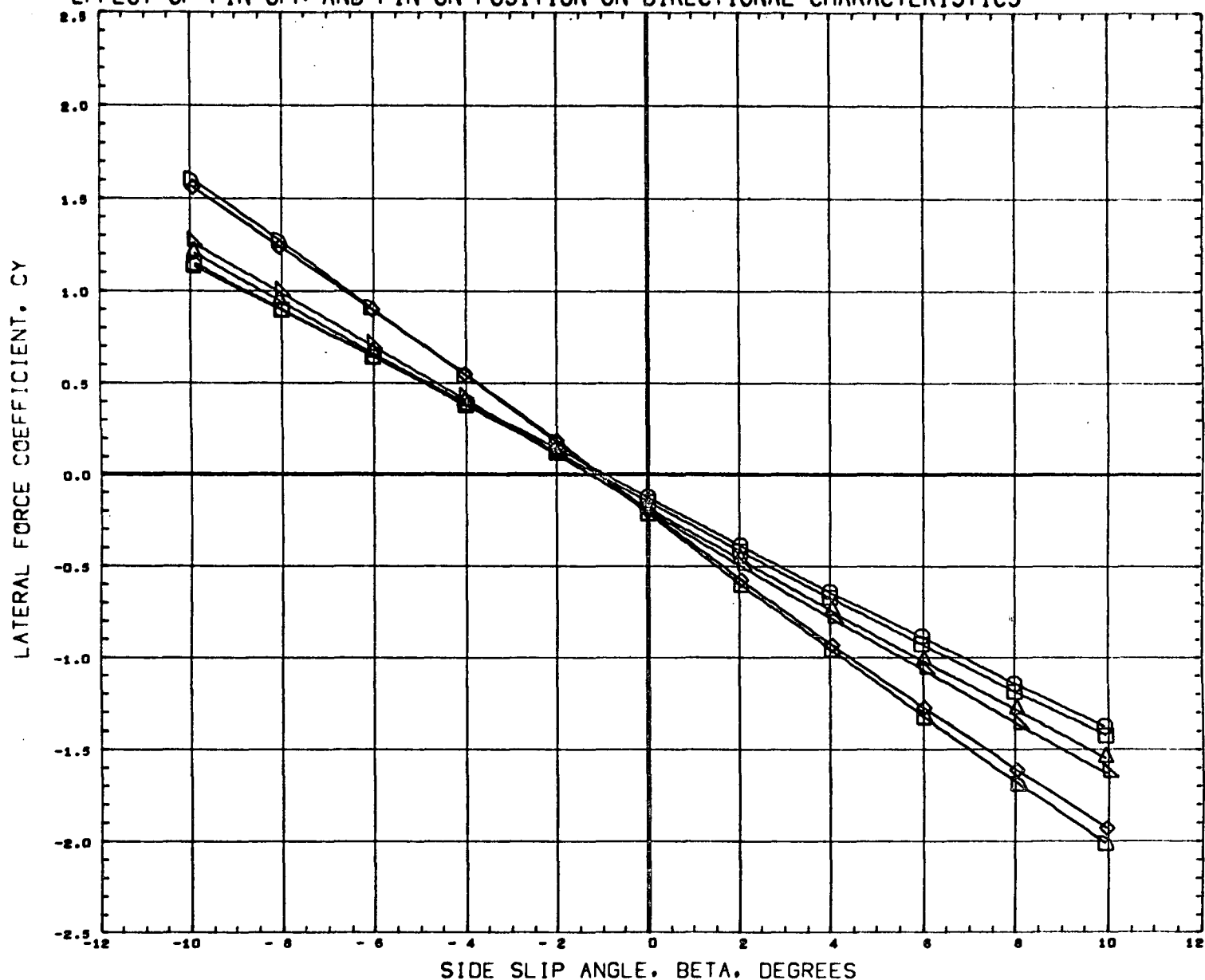
# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |
| MACH            | 3.480                                   |        |       |       |       |                       |

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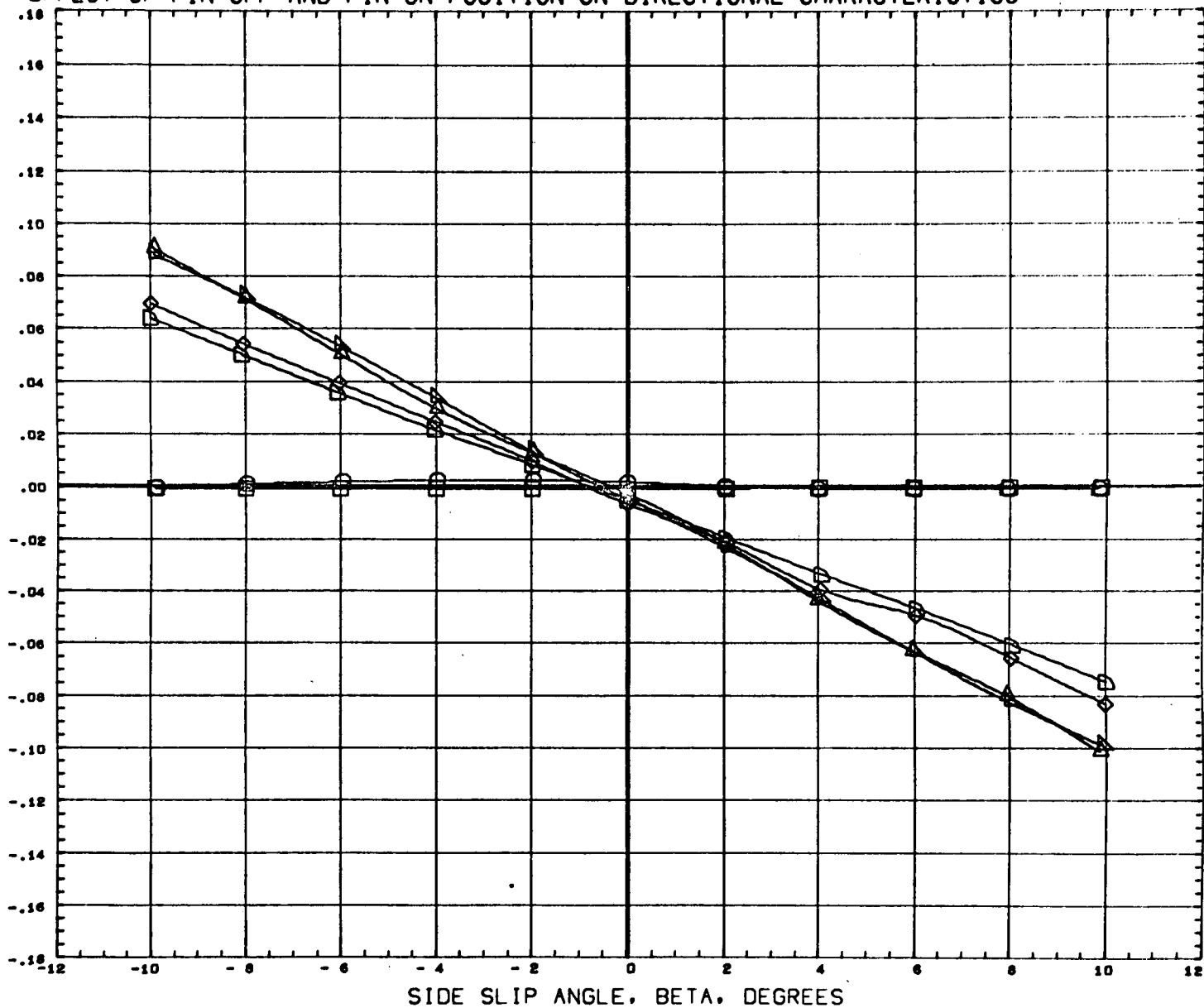
# EFFECT OF FIN OFF. AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9060 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9060 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |
| MACH 4.959      |                                         |        |       |       |       |                       |

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS

ROLLING MOMENT COEFFICIENT, CBL (BODY AXIS)

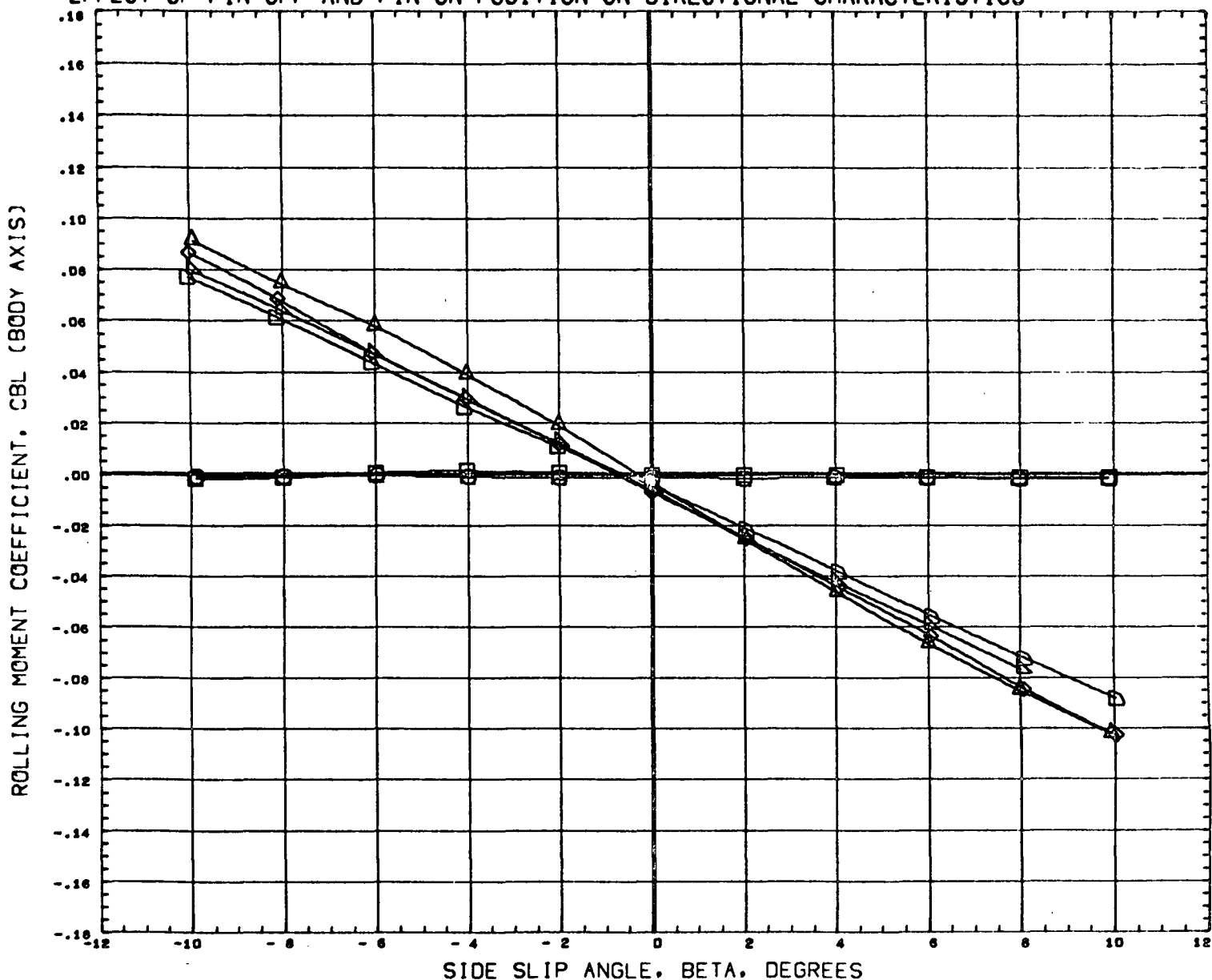


| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    |            | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|------------|--------|-------|-------|-------|-----------------------|---------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1     | 60.000 |       |       |       | SREF                  | 0.9650 SQ. IN |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1     | 80.000 |       |       |       | XMRP                  | 2.9450 IN.    |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP                  | 0.0000 IN.    |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                              |            |        |       |       |       | SCALE                 | 0.0028        |

MACH

1.197

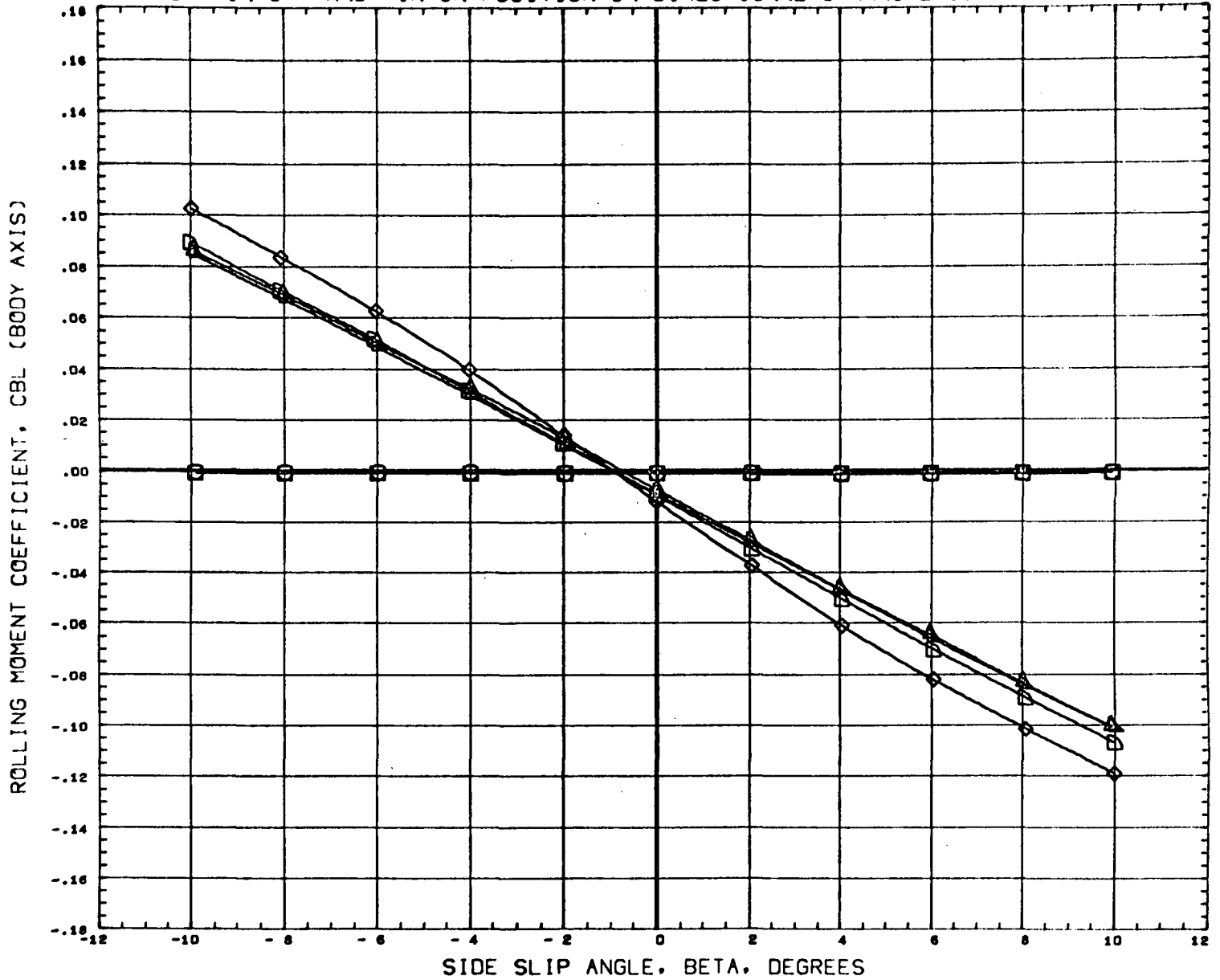
# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER | 80.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER | 80.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                              |        |       |       |       | SCALE 0.0028          |

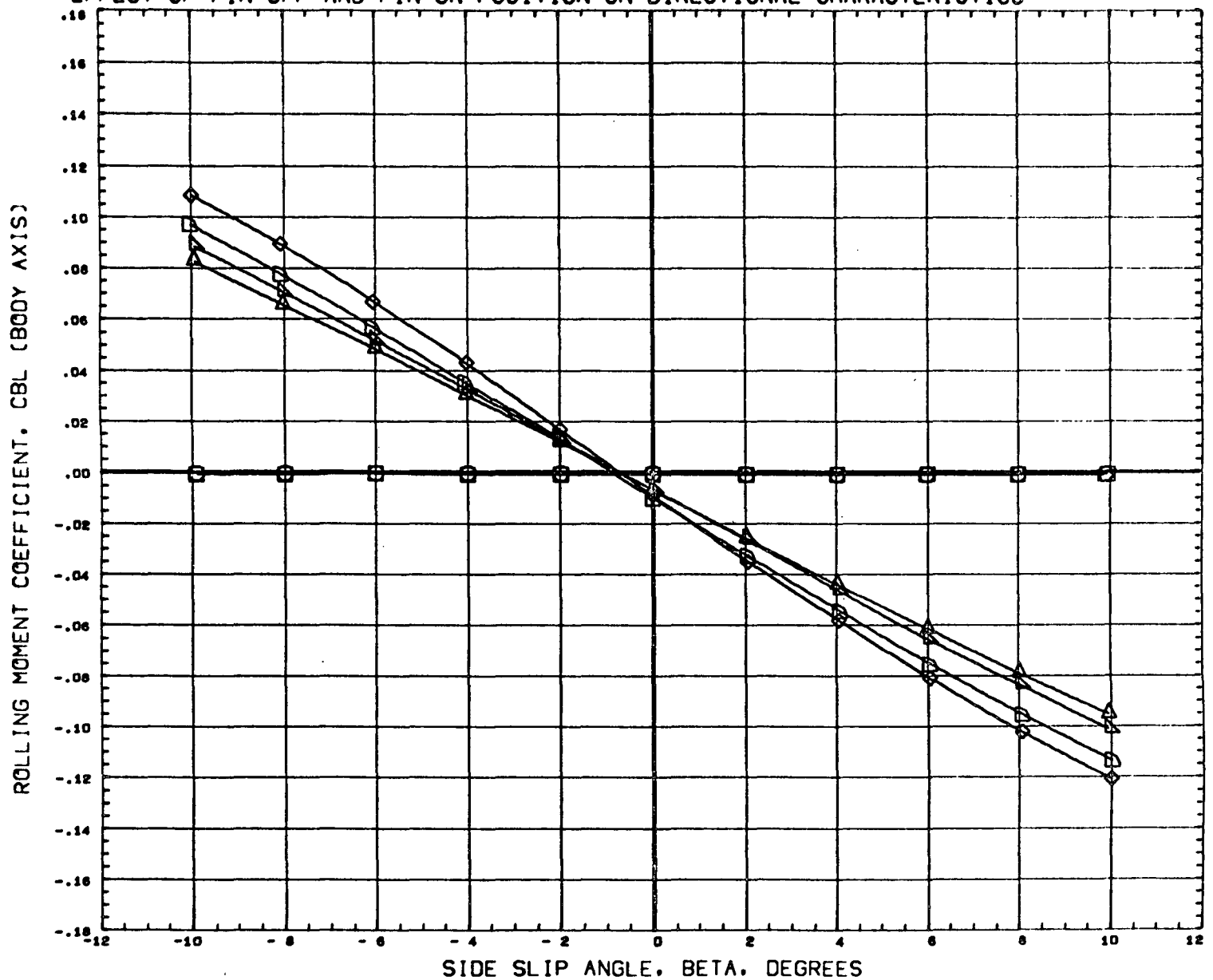
MACH 1.957

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|---------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF                  | 0.9650 SQ. IN |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | XMRF                  | 2.9450 IN.    |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | YMRF                  | 0.0000 IN.    |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | ZMRF                  | 0.0000 IN.    |
|                 |                                         |        |       |       |       | SCALE                 | 0.0028        |
| MACH 2.740      |                                         |        |       |       |       |                       |               |

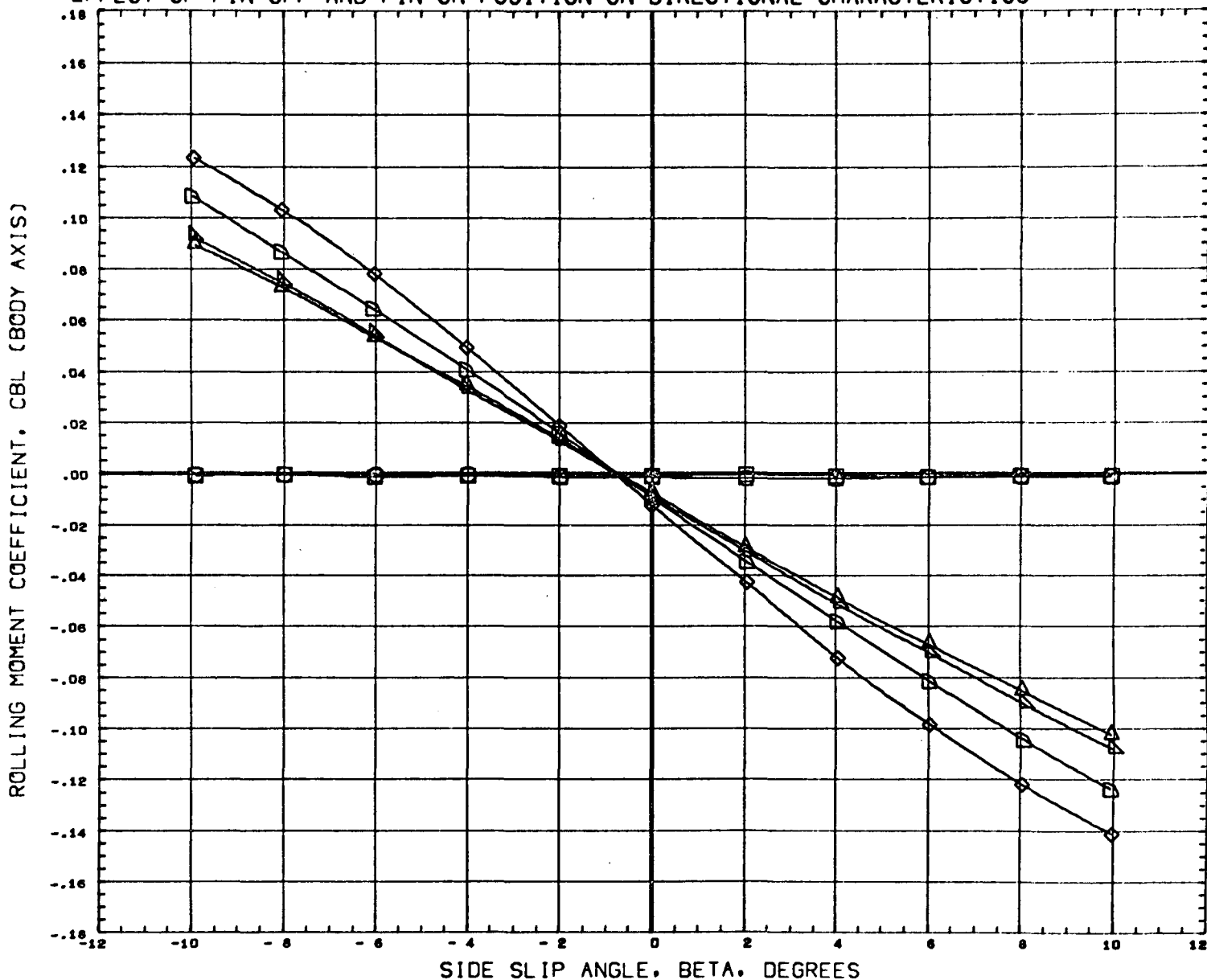
# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |

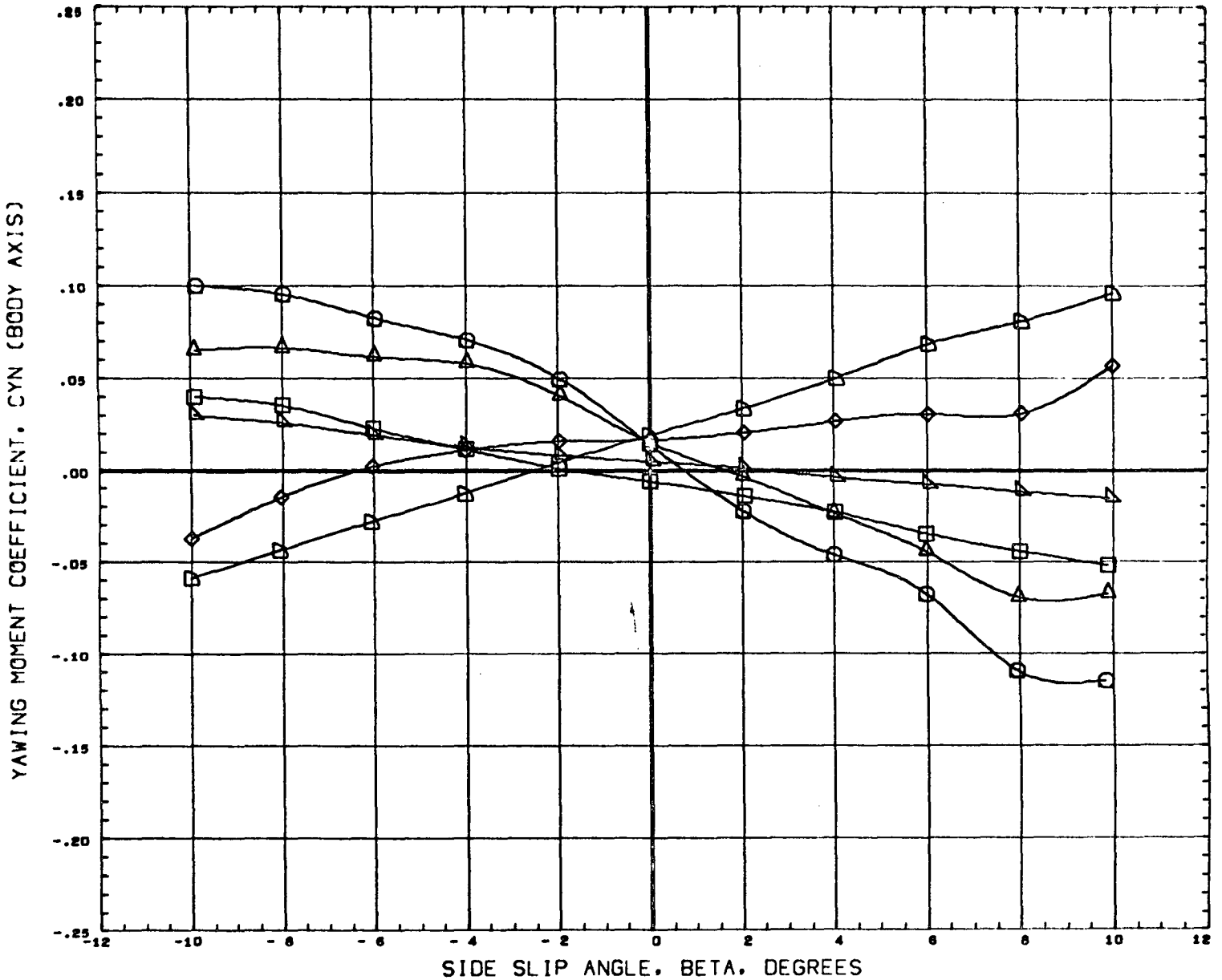
MACH 3.480

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|---------------|
| (A59007)        | MSFC TWT 524 35 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF                  | 0.9650 SQ. IN |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP                  | 2.9450 IN.    |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP                  | 0.0000 IN.    |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |        |       |       |       | SCALE                 | 0.0028        |
| MACH            | 4.959                                   |        |       |       |       |                       |               |

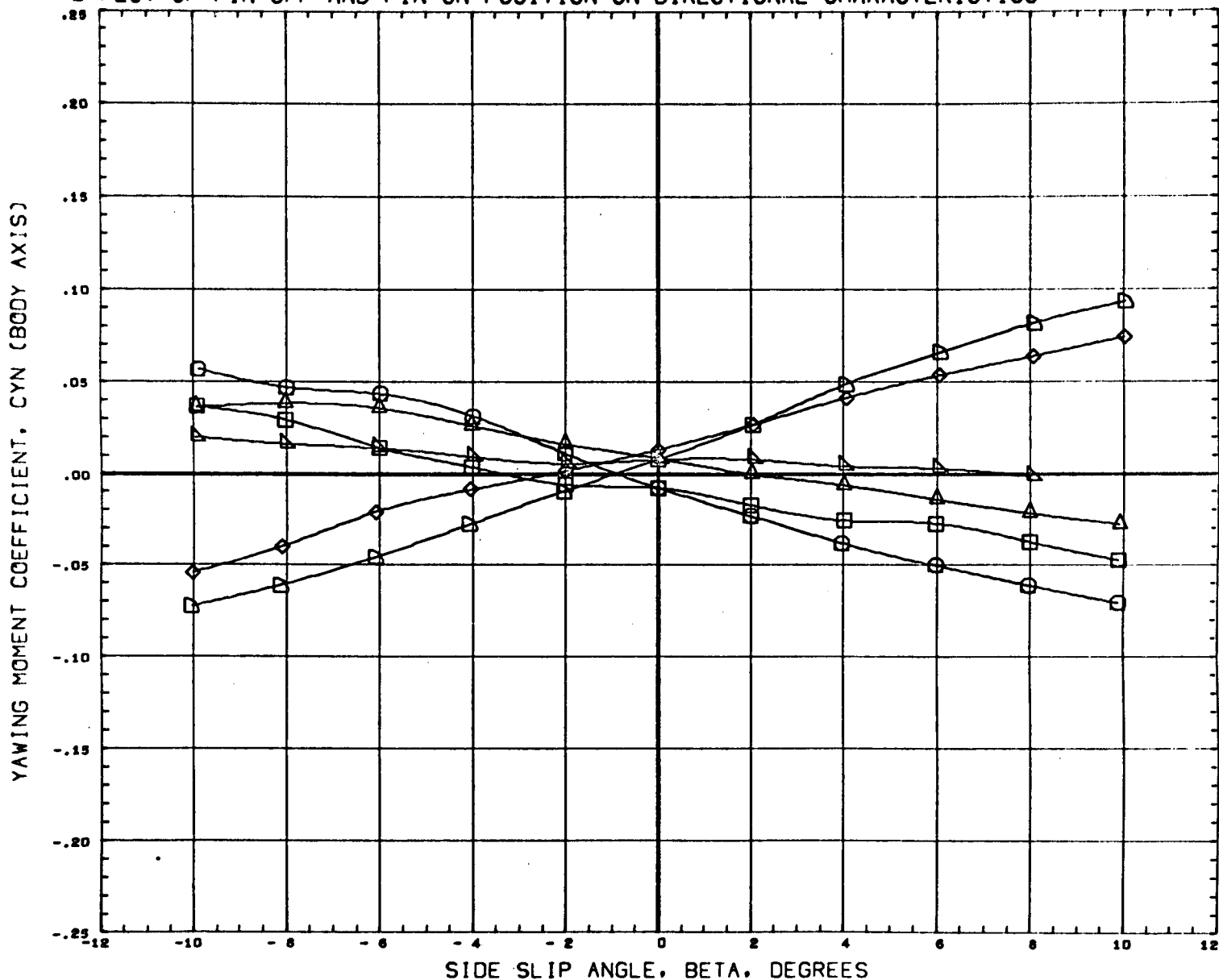
# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 sq. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |

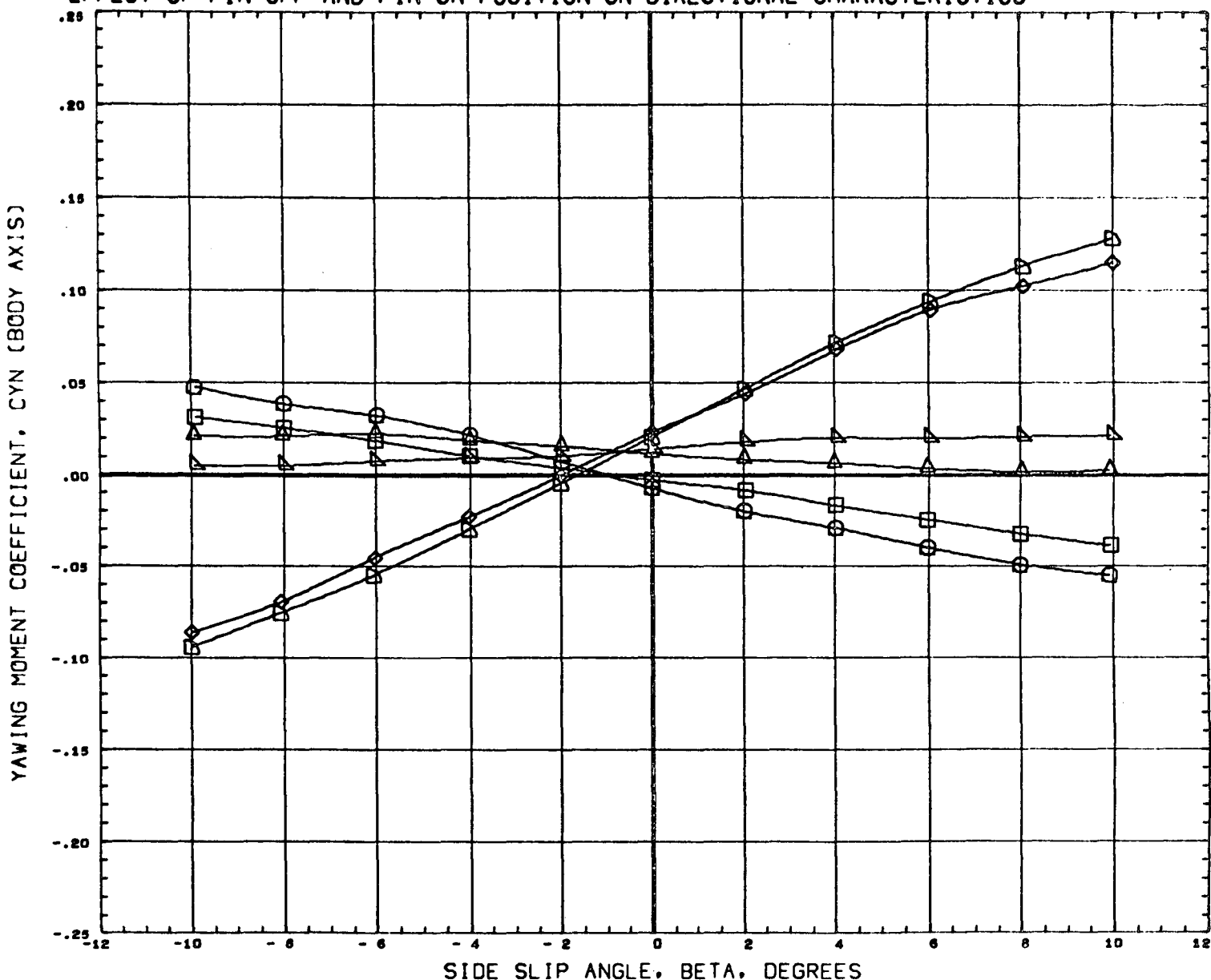
MACH 1.197

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



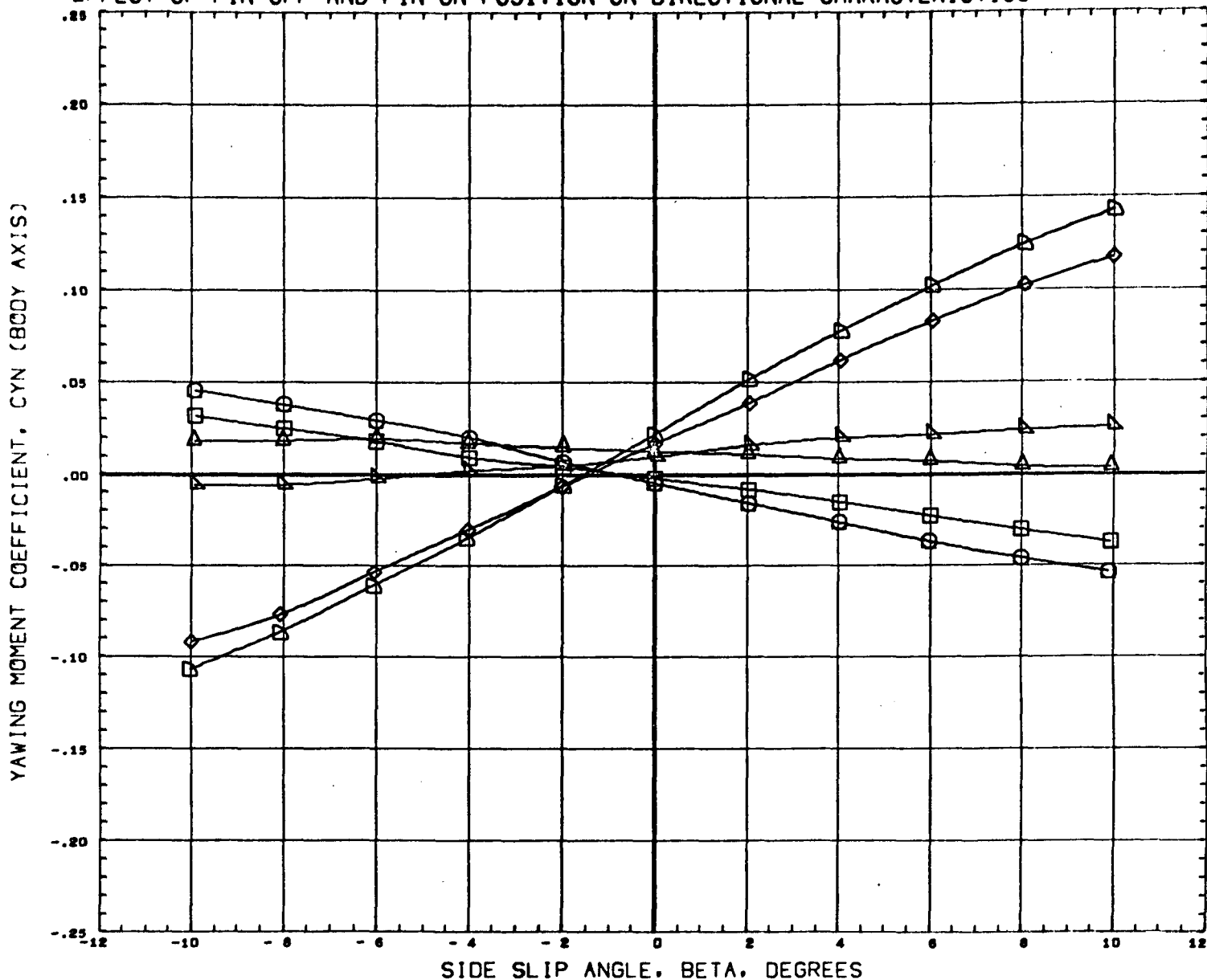
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|---------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF                  | 0.9650 SQ. IN |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP                  | 2.9450 IN.    |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP                  | 0.0000 IN.    |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |        |       |       |       | SCALE                 | 0.0028        |
| MACH 1.957      |                                         |        |       |       |       |                       |               |

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |
| MACH            | 2.740                                   |        |       |       |       |                       |

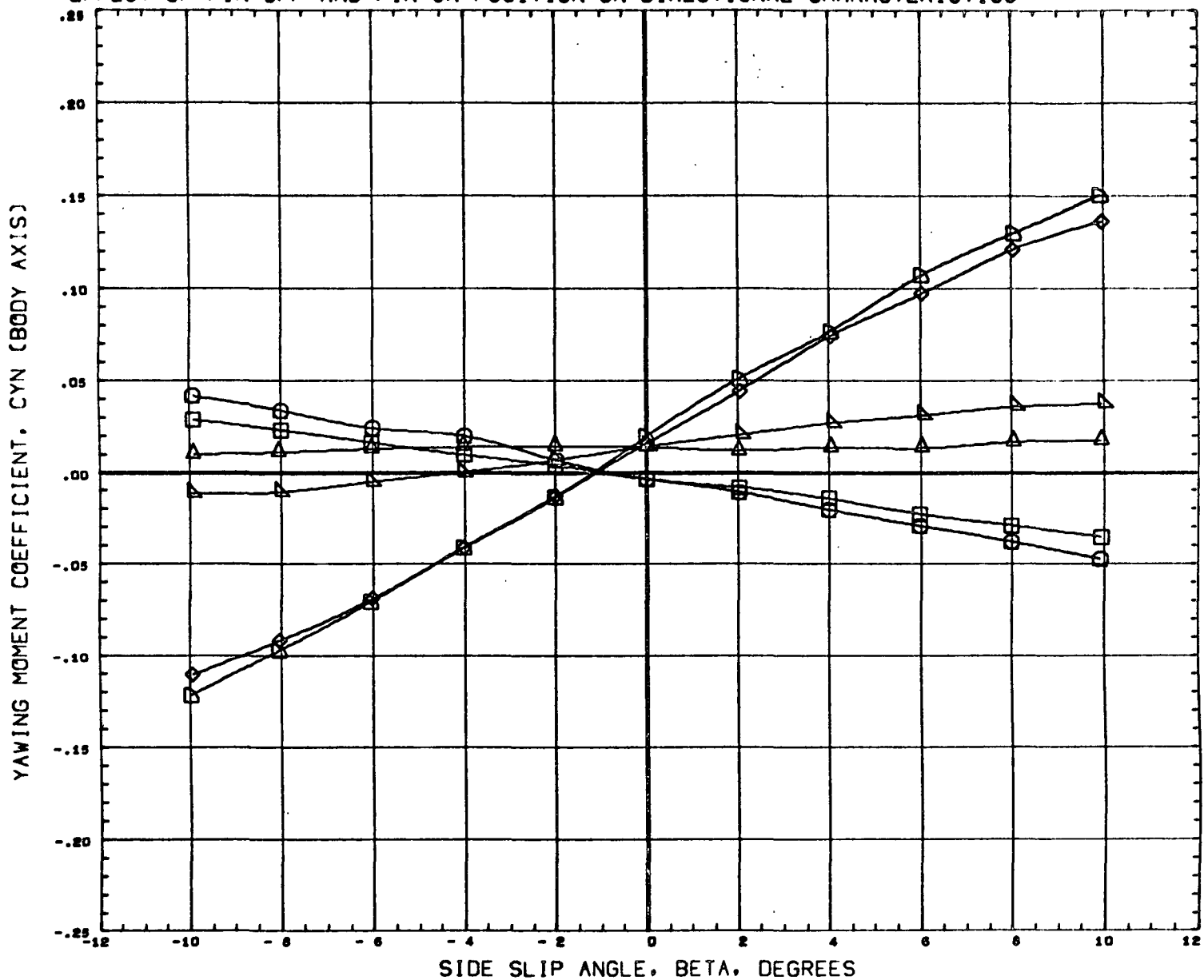
# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |

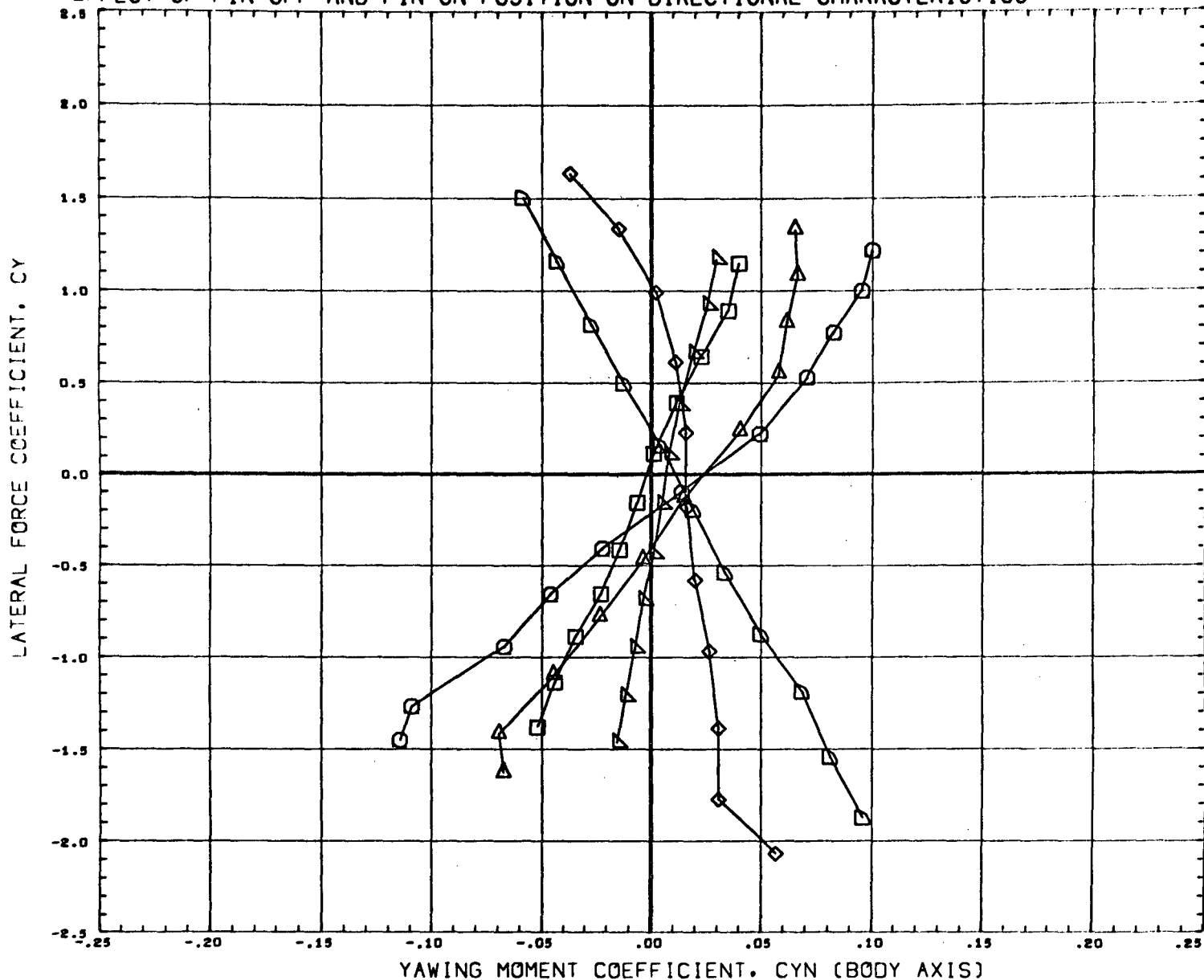
MACH 3.480

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION    |            | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|------------------------------|------------|--------|-------|-------|-------|-----------------------|---------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1     | 60.000 |       |       |       | SREF                  | 0.9650 SQ. IN |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1     | 80.000 |       |       |       | XMRP                  | 2.9450 IN.    |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP                  | 0.0000 IN.    |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER | N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                              |            |        |       |       |       | SCALE                 | 0.0028        |
| MACH 4.959      |                              |            |        |       |       |       |                       |               |

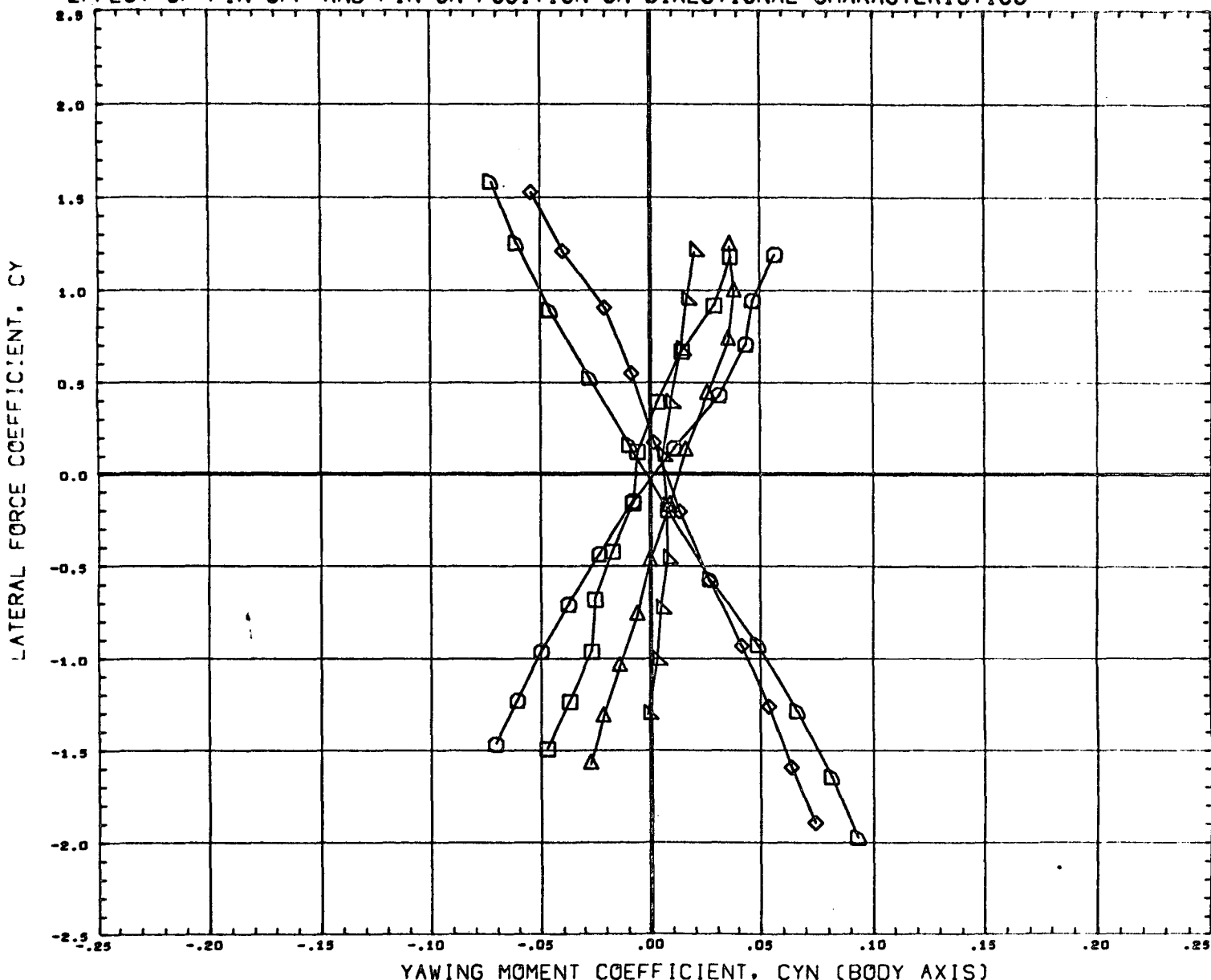
# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |

MACH 1.197

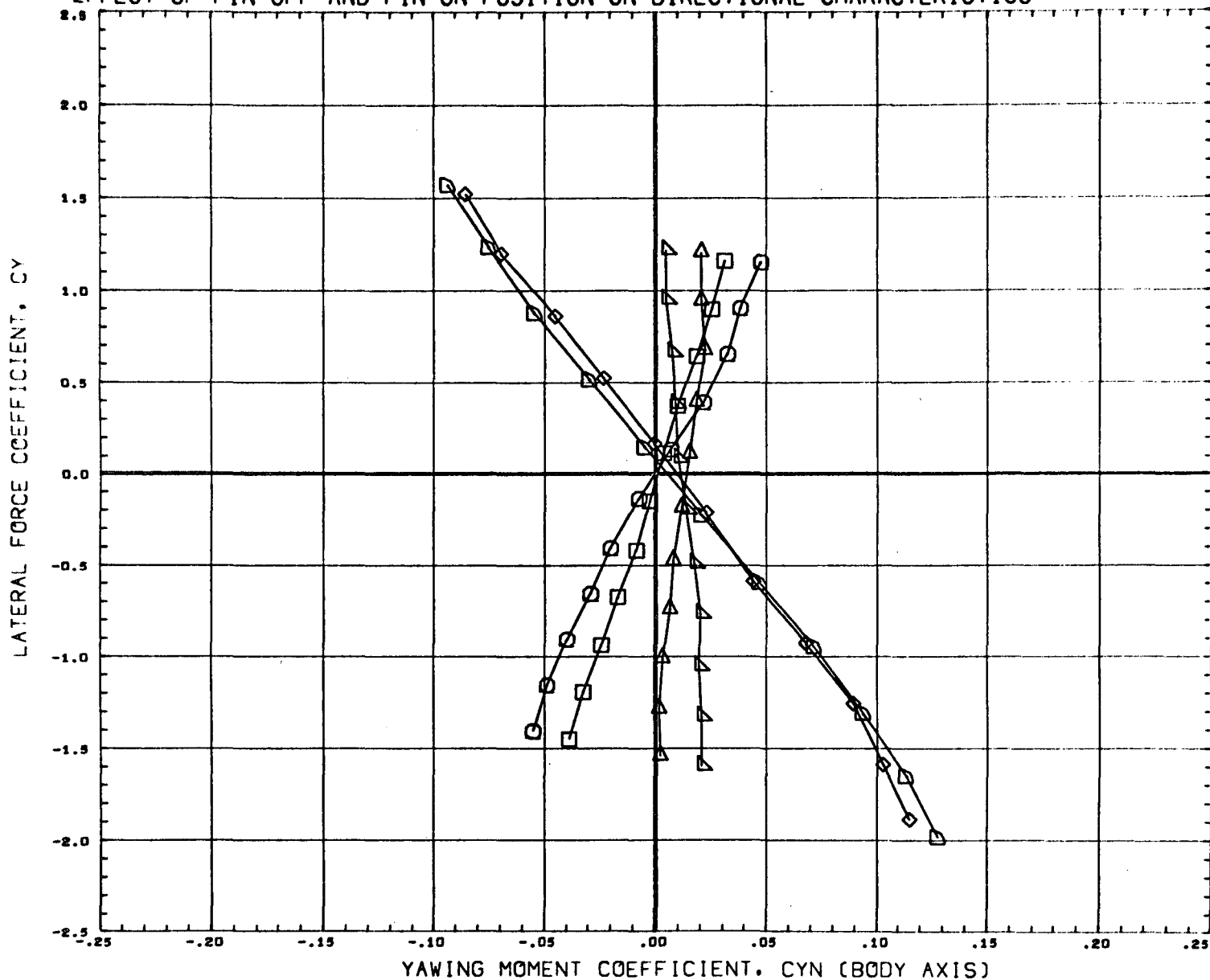
# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | 3REF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XHRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YHRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZHRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |

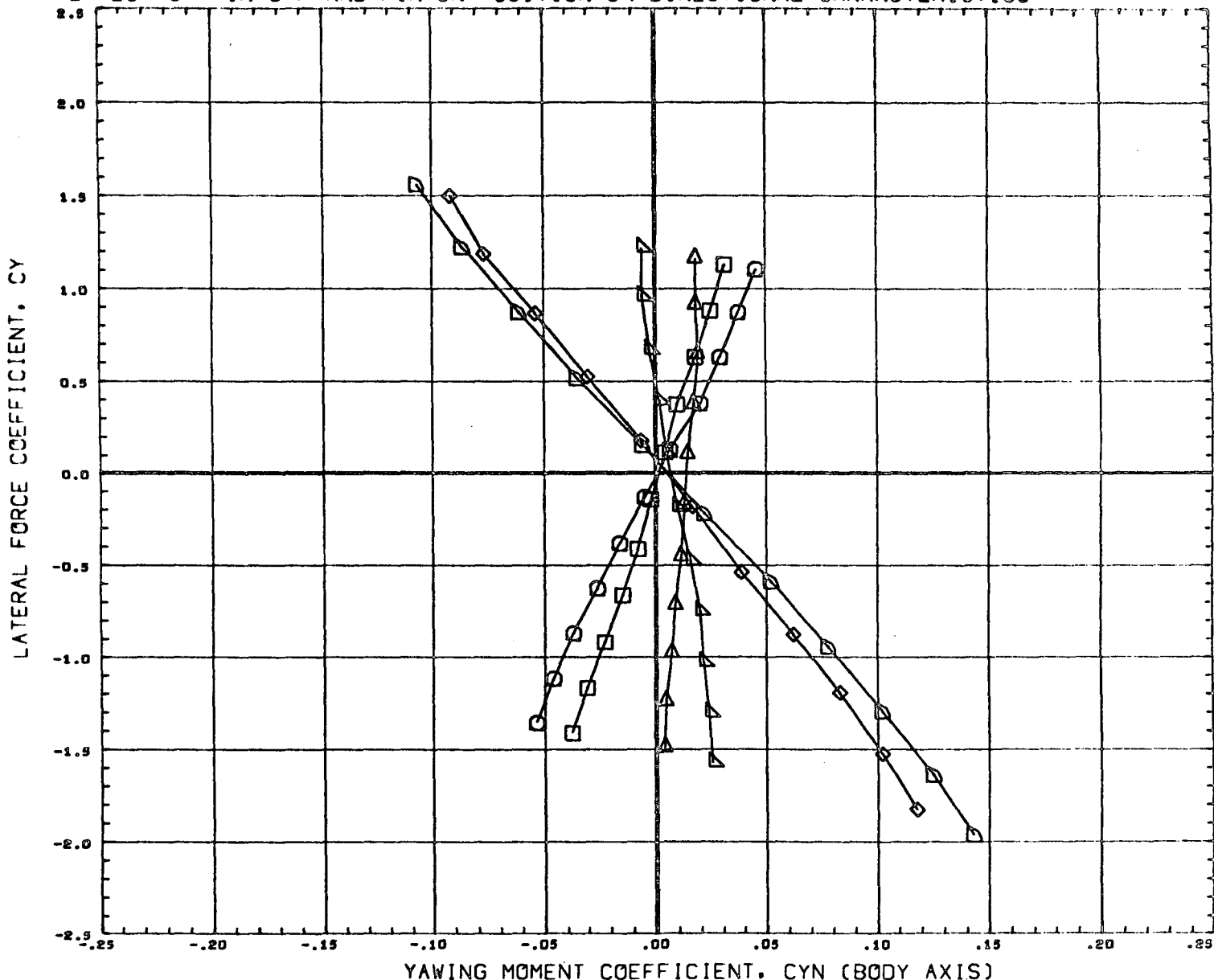
MACH 1.957

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



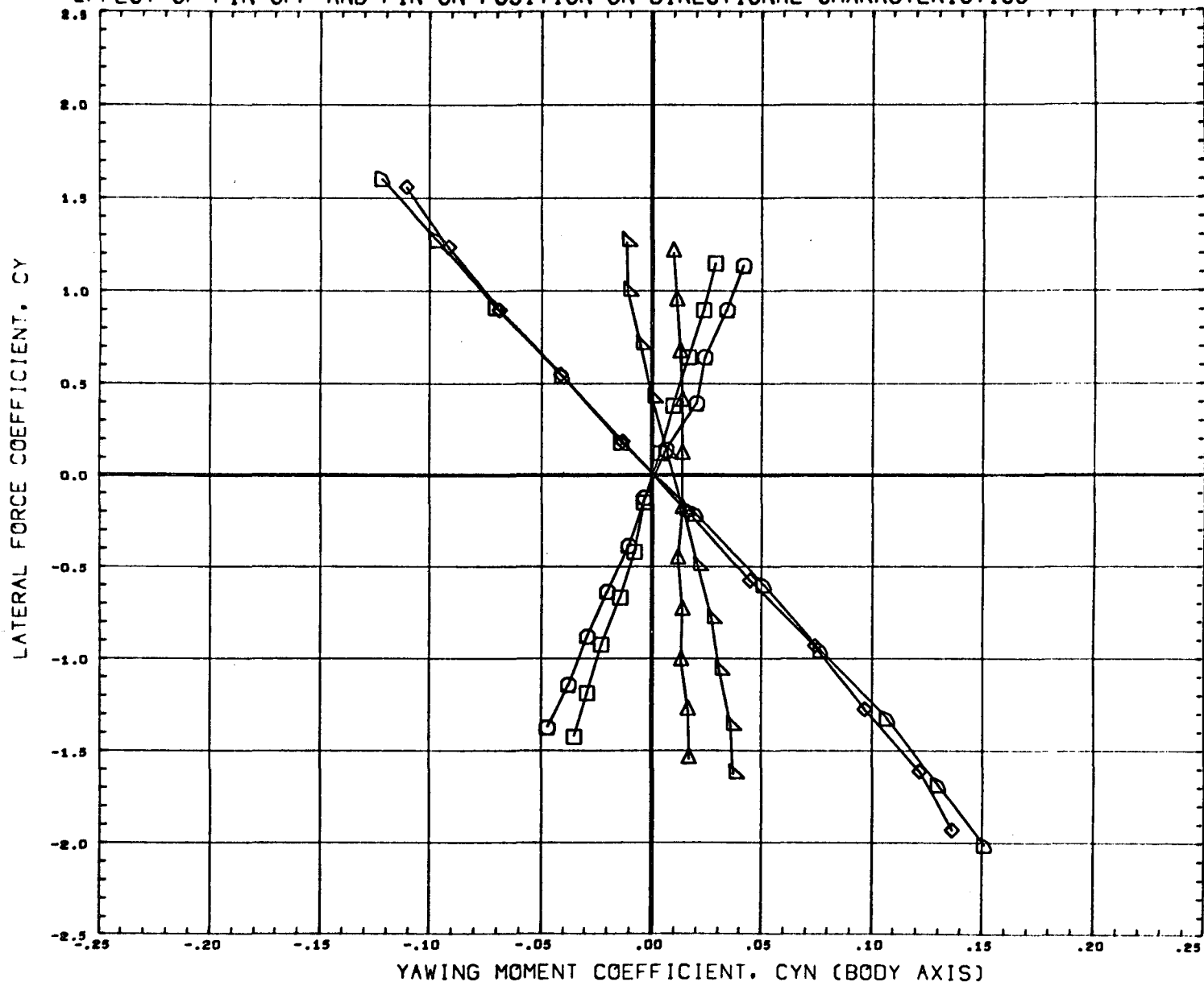
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |               |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|---------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF                  | 0.9650 SQ. IN |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF                  | 4.9080 IN.    |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF                  | 4.9080 IN.    |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP                  | 2.9450 IN.    |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP                  | 0.0000 IN.    |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP                  | 0.0000 IN.    |
|                 |                                         |        |       |       |       | SCALE                 | 0.0028        |
| MACH 2.740      |                                         |        |       |       |       |                       |               |

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9690 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |
| MACH            | 3.480                                   |        |       |       |       |                       |

# EFFECT OF FIN OFF AND FIN ON POSITION ON DIRECTIONAL CHARACTERISTICS



| DATA SET SYMBOL | CONFIGURATION DESCRIPTION               | ALPHA  | POS   | DELFE | DELFA | REFERENCE INFORMATION |
|-----------------|-----------------------------------------|--------|-------|-------|-------|-----------------------|
| (A59007)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 60.000 |       |       |       | SREF 0.9650 SQ. IN    |
| (A59019)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 60.000 | 1.000 | 0.000 | 0.000 | LREF 4.9080 IN.       |
| (A59031)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 60.000 | 2.000 | 0.000 | 0.000 | BREF 4.9080 IN.       |
| (A59008)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1     | 80.000 |       |       |       | XMRP 2.9450 IN.       |
| (A59020)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X1F2 | 80.000 | 1.000 | 0.000 | 0.000 | YMRP 0.0000 IN.       |
| (A59032)        | MSFC TWT 524 33 FOOT BOOSTER N2B1R1X2F2 | 80.000 | 2.000 | 0.000 | 0.000 | ZMRP 0.0000 IN.       |
|                 |                                         |        |       |       |       | SCALE 0.0028          |
| MACH            | 4.959                                   |        |       |       |       |                       |