

QC  
Auro  
C-105  
P/WT/50

QCX  
Auro  
CF105  
P-WT-50

13

FILE IN VAULT

C-105 <sup>ABW</sup> ANALYZED P/Wind Tunnel/50

C.A.L. WIND TUNNEL TESTS

DERIVATIVES & ZERO VALUES

OCTOBER 1954 TESTS

Copy 2

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ANALYZED



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Canada

Conseil national de recherches  
Canada

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TP

DATE

Report no.: QCX - AVRO - CF105 - P-WT-50

has been  downgraded to: \_\_\_\_\_

de-classified

by (Name): Michel W. Drapeau

(Dept.): A/DND Coordinator, Access to Information

Date: Dec. 7, 1992

R. Auger  
Signature



45107

12417887



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A. V. ROE CANADA LIMITED  
MALTON - ONTARIO

TECHNICAL DEPARTMENT (Aircraft)

AIRCRAFT:

REPORT NO. P/WIND TUNNEL/50

FILE NO:

NO OF SHEETS: \_\_\_\_\_

TITLE:

C.A.L. WIND TUNNEL TESTS

DERIVATIVES AND ZERO VALUES

OCTOBER 1954 TEST

Classification <sup>confirmed as:</sup> ~~cancelled / changed to:~~ UNCLASSIFIED

By authority of: DRDA 7/DARFT 5-8/DAS Eng 6-4-5

Date: 5 Nov 1992

Signature: B. Aubrey

Unit / Rank / Appointment: DSIS 3, Secretary CRAD HQ DRP

PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SUPERVISED BY \_\_\_\_\_ DATE \_\_\_\_\_

APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

ISSUE NO.	REVISION NO.	REVISED BY	APPROVED BY	DATE	REMARKS

TECHNICAL DEPARTMENT (Aircraft)

REPORT NO. P/WIND TUNNEL/50

SHEET NO. 1

AIRCRAFT:

C-105

OCTOBER 1954  
TESTS

PREPARED BY

DATE

J.P. Clark

December 1954

CHECKED BY

DATE

INDEX

Longitudinal Stability

Section

1. Lift

1.  $C_{L\alpha}$

2.  $q_0$

2. Pitching Moment

1. a.c.

2.  $C_{M_0}$

3. Elevator Effectiveness

1.  $C_{L\delta}$

2.  $C_{M\delta}$  const.  $C_L$

3.  $C_{M\delta}$  const.  $\alpha$

4. c.p.

Lateral Stability

4. Sideslip Derivatives

1.  $C_{N\beta}$

2.  $C_{l\beta}$

3.  $C_{y\beta}$

5. Vertical Tail Effectiveness

1.  $a_1$

2. a.c.

3.  $\eta_{a.c.}$

6. Aileron c.p.

1.  $C_{M\delta}$

2.  $a_2$

3. c.p.

4.  $\eta_{c.p.}$

5.  $C_{l\delta}$

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1.1

1.2

2.1

2.2

3.1

3.2

3.3

3.4

4.1

4.2

4.3

5.1

5.2

5.3

6.1

6.2

6.3

6.4

6.5

TECHNICAL DEPARTMENT (Aircraft)

REPORT NO. P/WIND TUNNEL/50

SHEET NO. 11

AIRCRAFT:

C-105

OCTOBER 1954  
TESTS

PREPARED BY

DATE

J.P. Clark

December 1954

CHECKED BY

DATE

Hinge Moments

Section

7. Elevator

1.  $CH_0$

7.1

2.  $CH_q$

7.2

3.  $CH_\delta$

7.3

8. Aileron

1.  $CH_0$

8.1

2.  $CH_q$

8.2

3.  $CH_\delta$

8.3

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C105  
C.A.L. N.T. TESTS OCT. 54

C<sub>105</sub> vs Mach No  
C<sub>105</sub> B<sub>1</sub> 1/4 B<sub>2</sub> R<sub>1</sub> N<sub>1</sub>

C<sub>105</sub>  
PER DEF.

06

05

04

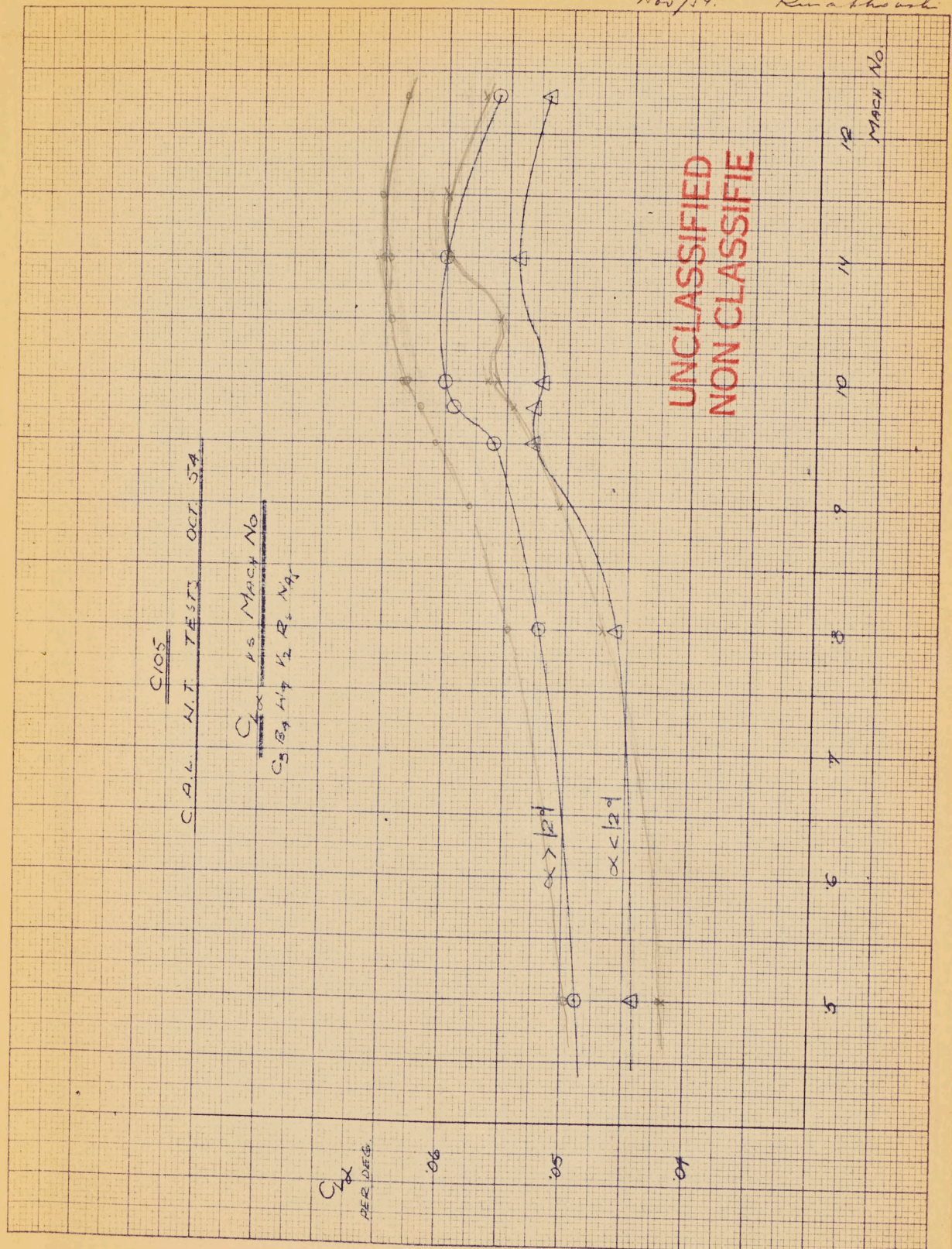
$\alpha > 12^\circ$

$\alpha < 12^\circ$

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NON CLASSIFIED

Mach No  
12  
14  
10  
8  
7  
6  
5

P/WT/50  
Nov/54. Ken a b h o u k i  
1.1.



C/05  
S.A.L. H.T. TESTS OCT. 54

X<sub>0</sub> 13 MACH 16  
C<sub>3</sub> B<sub>4</sub> M<sub>9</sub> 1/2 R<sub>3</sub> M<sub>5</sub>

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NON CLASSIFIE

$\alpha$   
1°

P/W 150  
Nov/54 Kurabandi 1.2.

M2  
Mach No

12

11

10

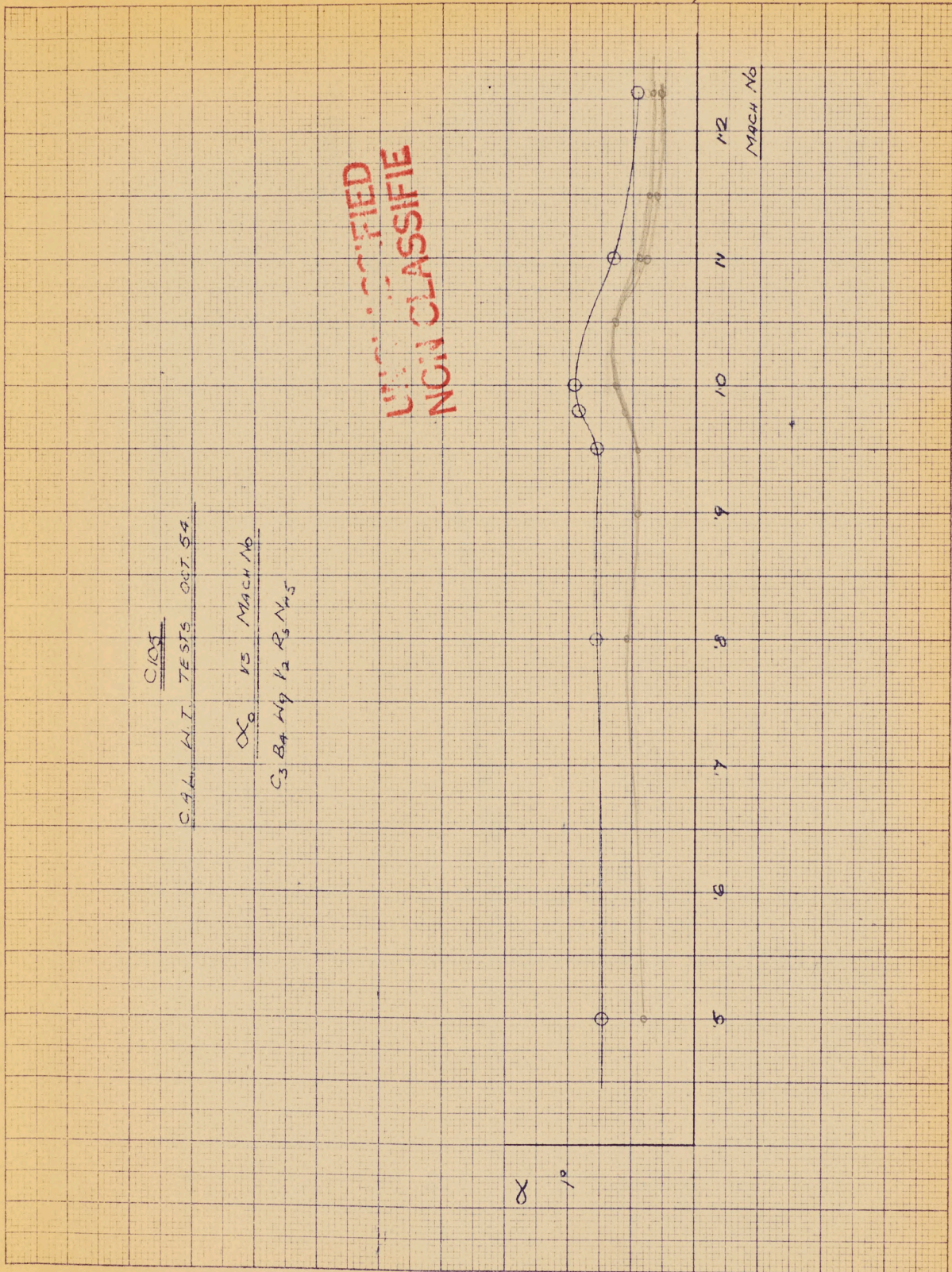
9

8

7

6

5



2.1  
OCT. 24

2.1  
OCT. 24

P/117/50

2.1  
OCT. 24

100

50

0

-50

-100

10

5

6

7

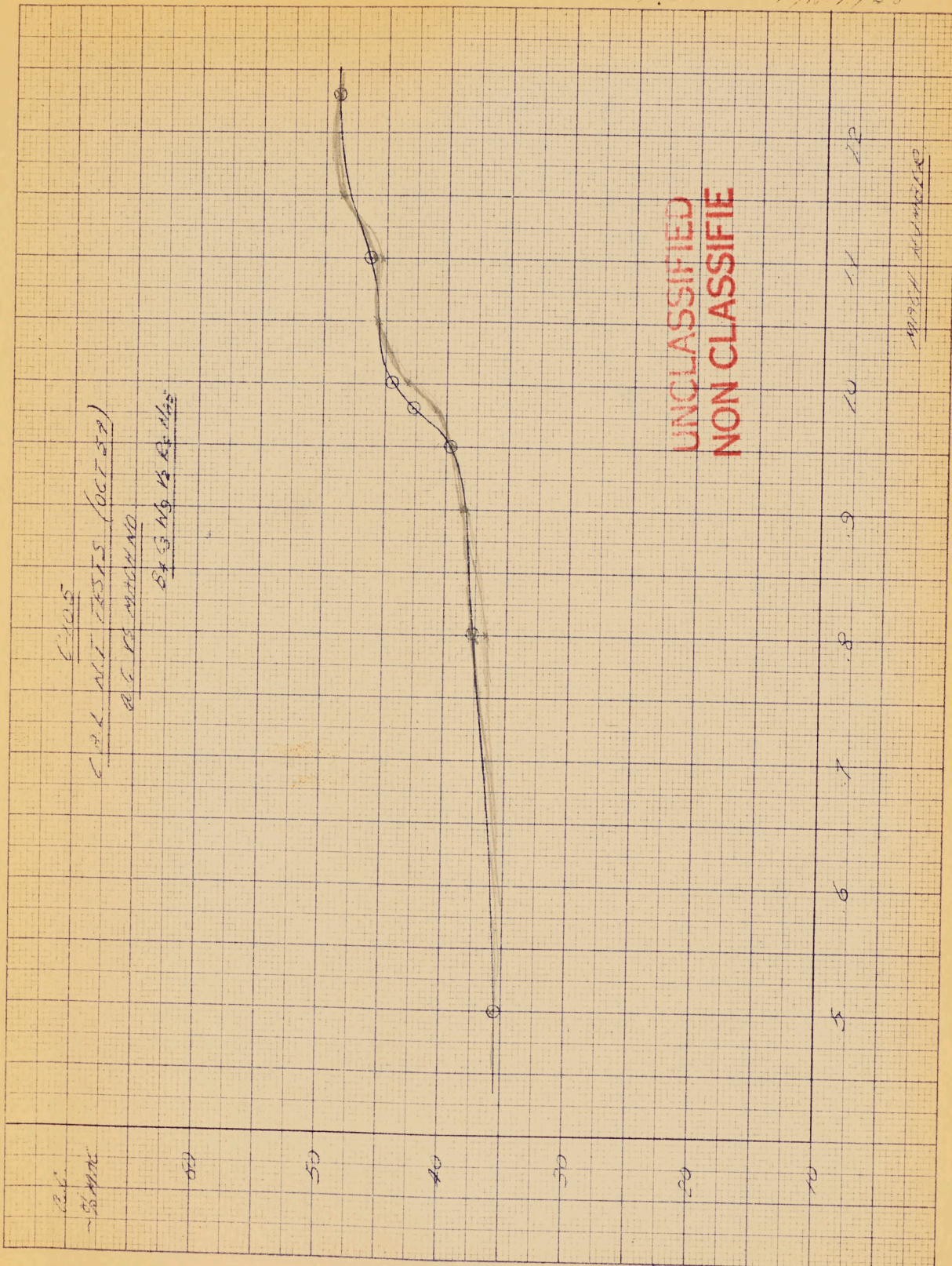
8

9

10

11

12



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APPROX. 11/11/50

CMB

6-2-57  
CMB  
CMB 15 MARCH 1957  
BASE NO 1213 ALSO

.05

.04

.03

.02

.01

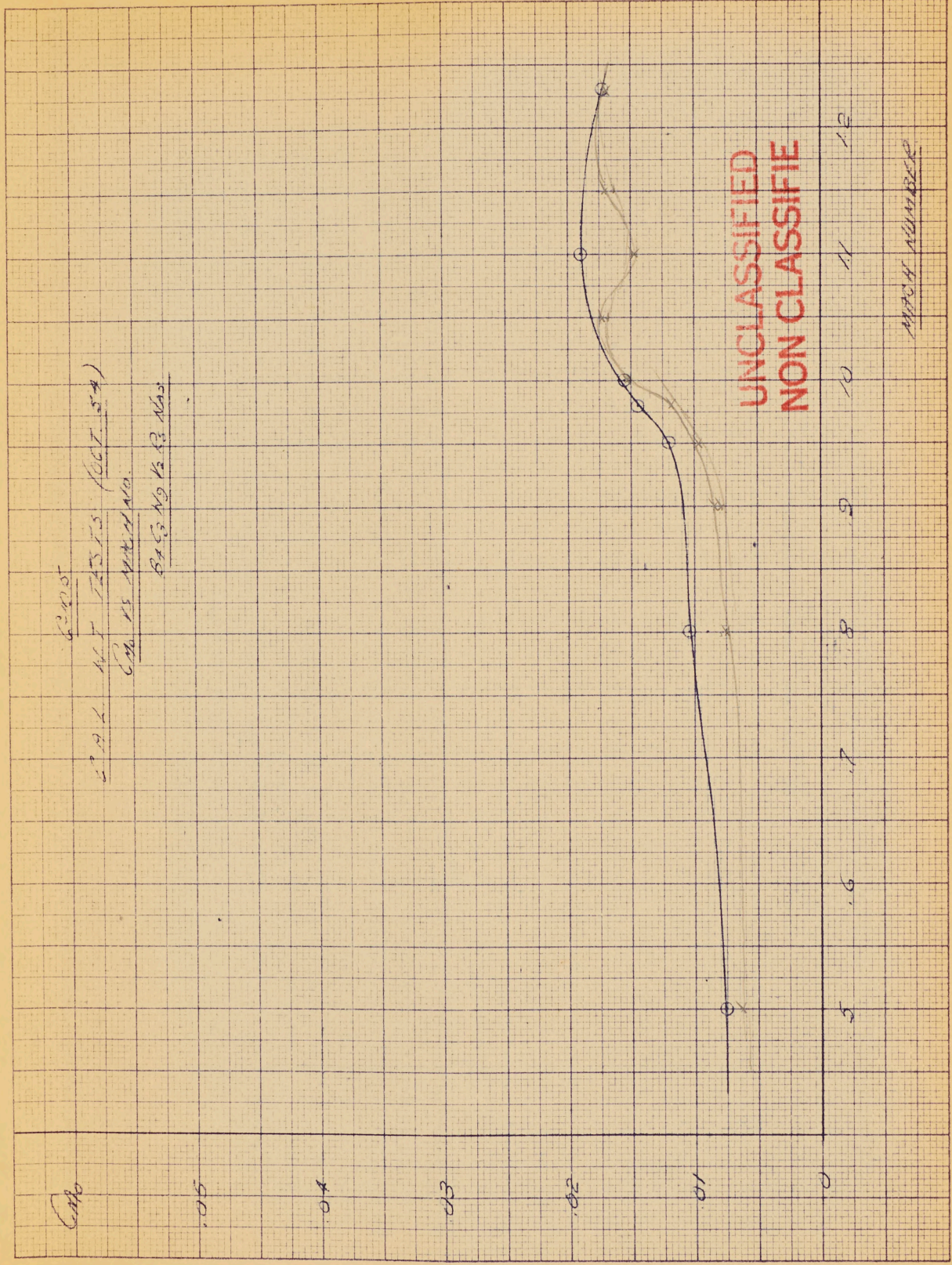
0

5 6 7 8 9 10 11 12

MACH NUMBER

2.2. P/W 140  
807.54. CLARK

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C-105  
 CAL. WT TESTS OCT 54

$C_L$  VS  $\delta e$   
 $\alpha = 0^\circ$

Config. B<sub>4</sub> C<sub>3</sub> W<sub>3</sub> V<sub>2</sub> R<sub>4</sub> N<sub>4</sub>S

$C_L 0.1$

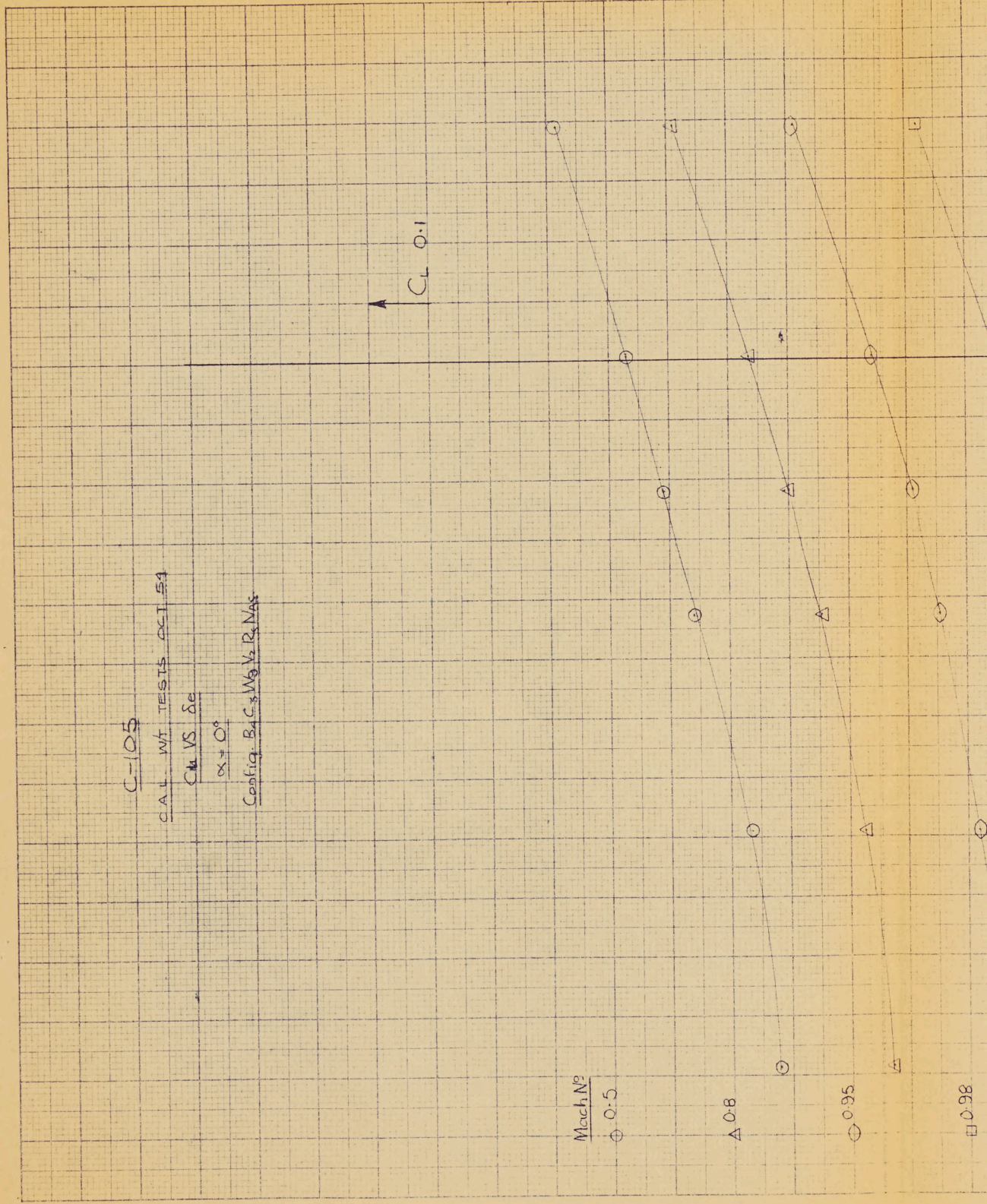
Mach N<sup>2</sup>

⊕ 0.5

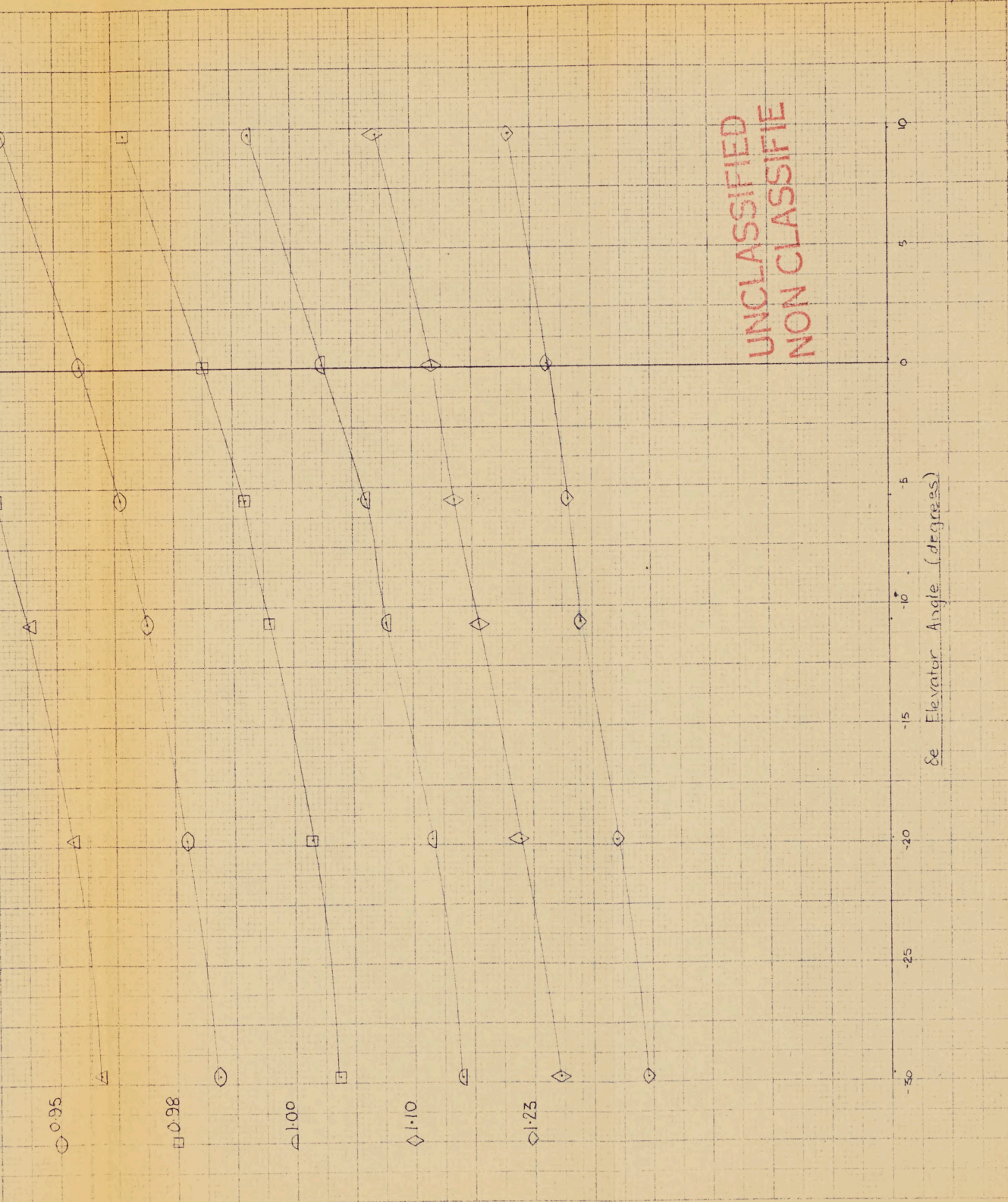
△ 0.8

⊖ 0.95

□ 0.98



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C.105  
C.A.S. WIND TUNNEL TESTS OCT 54

S<sub>1</sub> B<sub>1</sub> A<sub>1</sub> K<sub>1</sub> R<sub>1</sub> N<sub>1</sub>S

C<sub>L</sub> vs α

α = 2°

MACH No

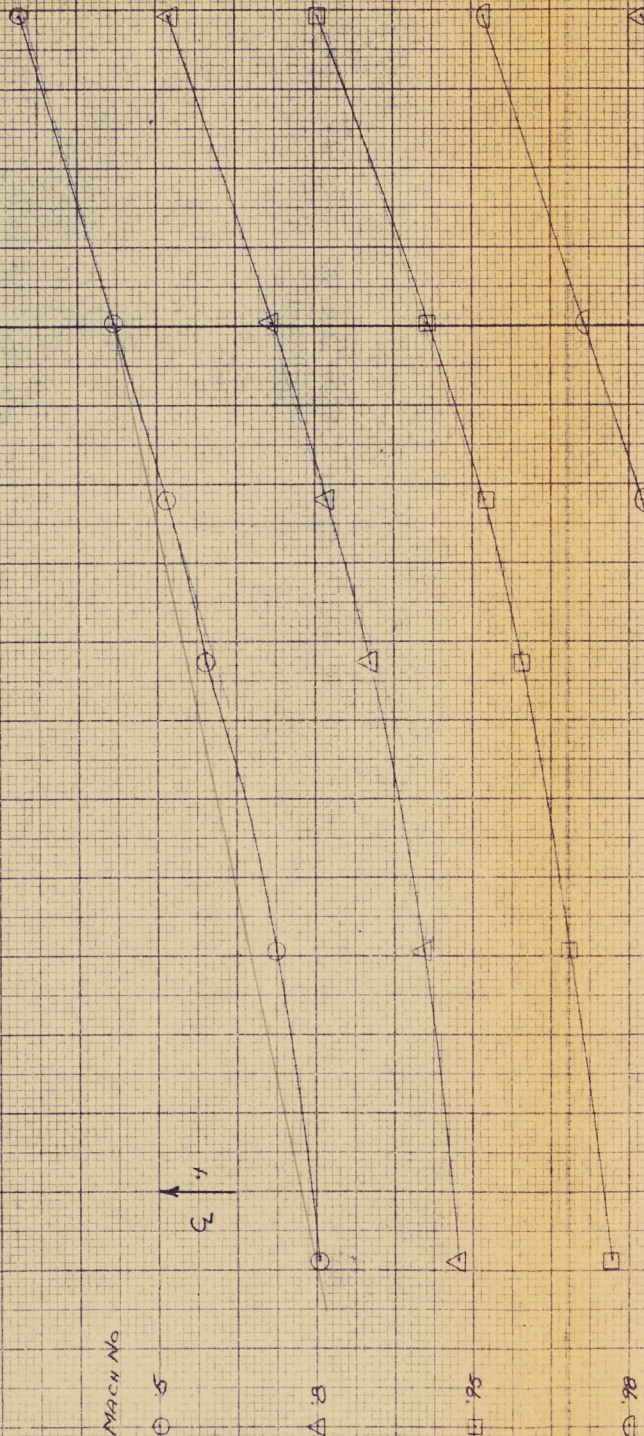
○ .5

△ .8

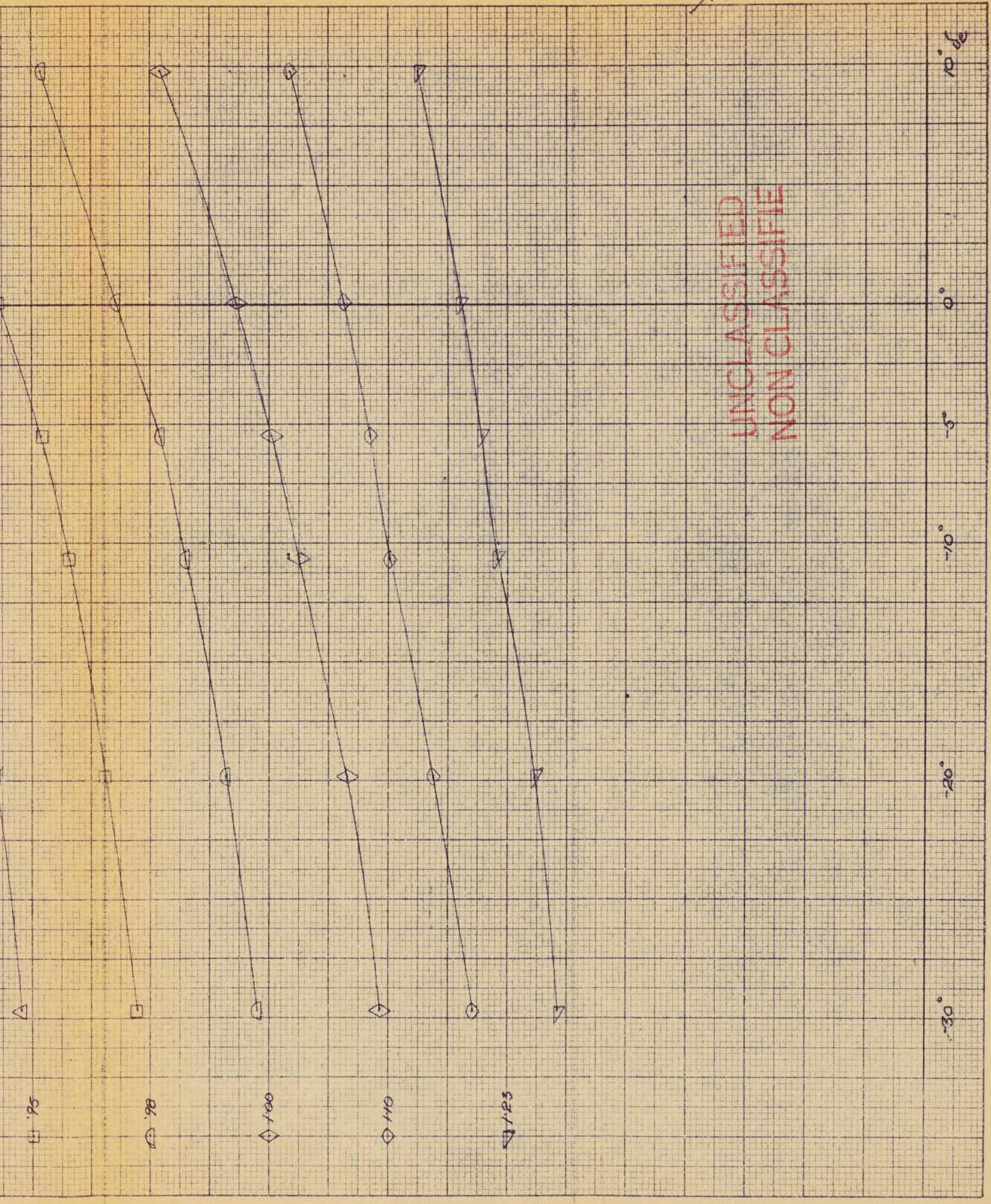
□ .95

◇ .98

↑  
 4  
 3



3.1.2. P/WF 150  
Nov/54 Kwakhsu



$C = 1.05$

S.A.L. W/T TESTS 21154

$C_L$  VS.  $\delta\epsilon$

SE 70

Config:  $B_1 C_3 W_3 V_2 R_1 N_{145}$

$C_L$  0.1

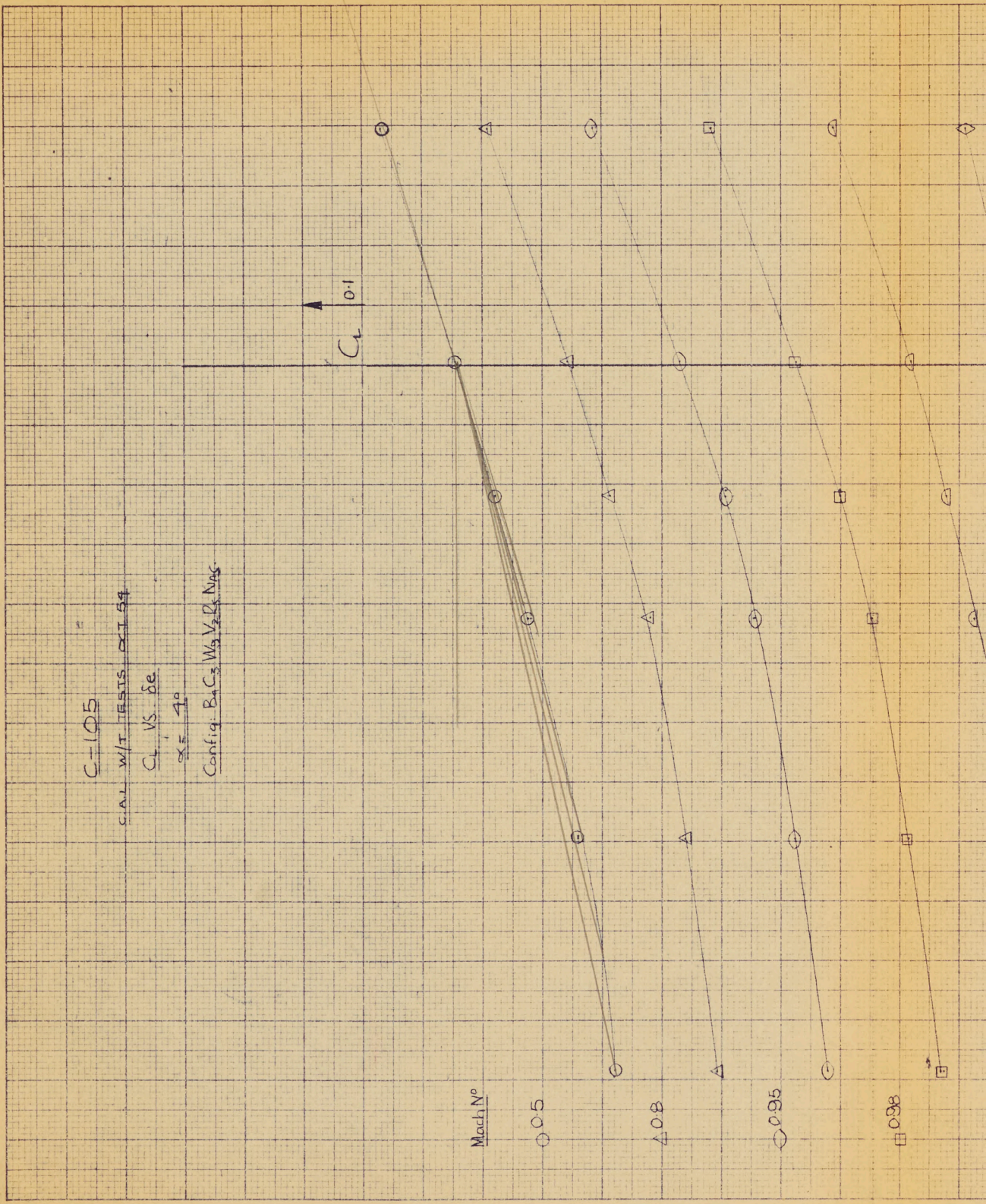
Mach No

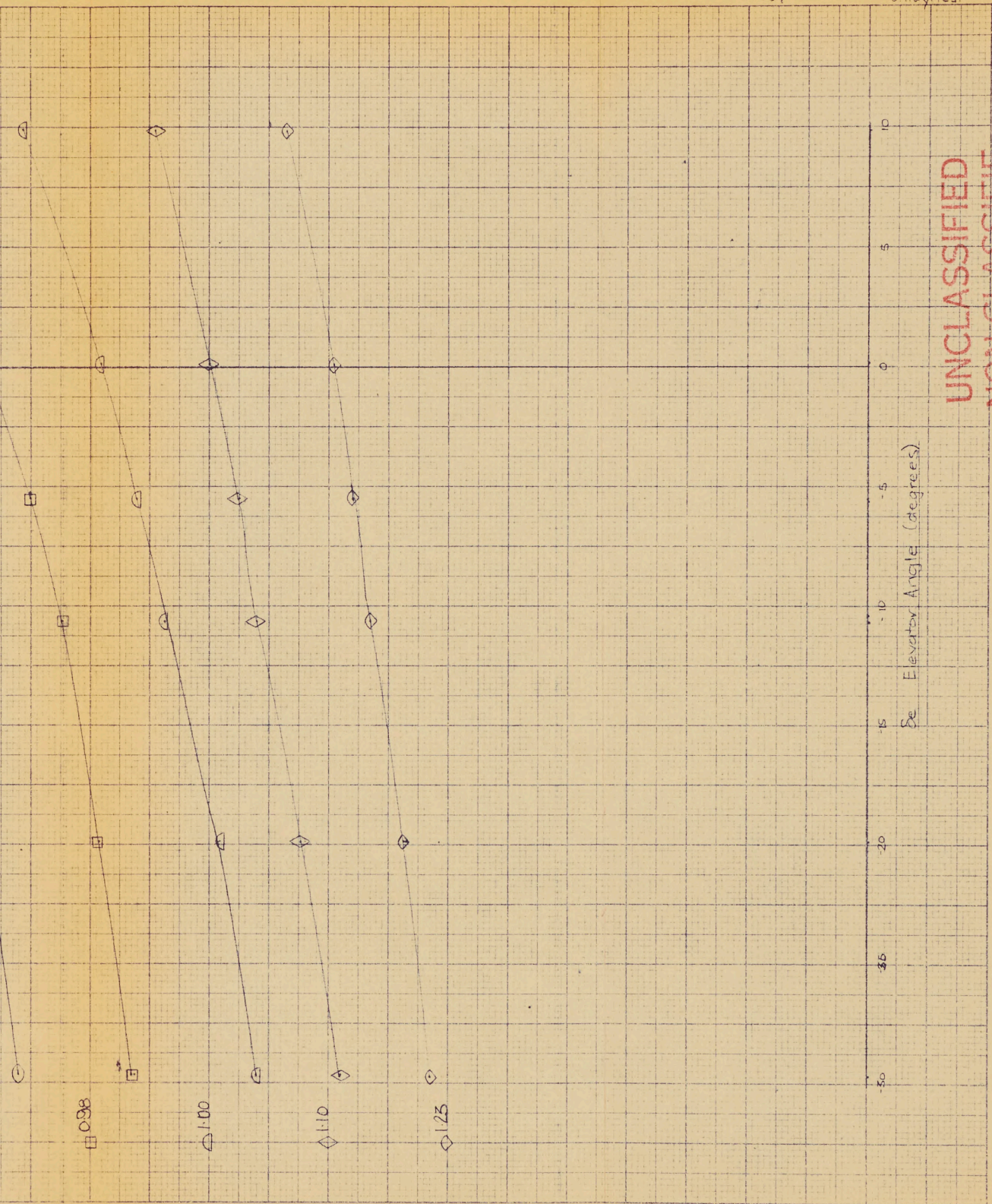
0.5

0.8

0.95

0.98





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NON CLASSIFIE

C105  
C.A.L. WIND TUNNEL TESTS OCT. 54

C<sub>3</sub> B<sub>1</sub> M<sub>9</sub> K<sub>3</sub> N<sub>1</sub>

C<sub>L</sub> vs  $\alpha$

$\alpha = 6^\circ$

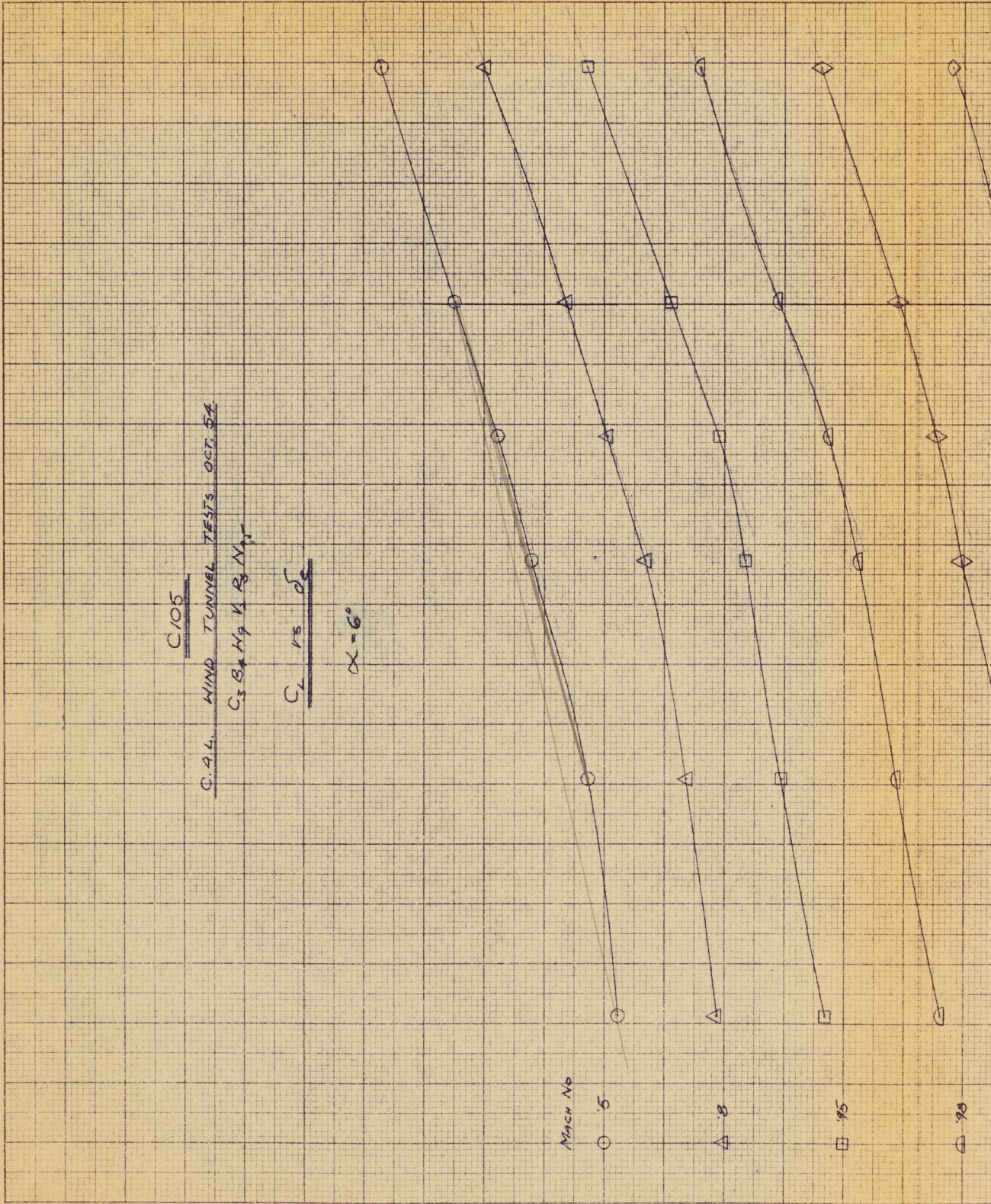
MACH No

○ .5

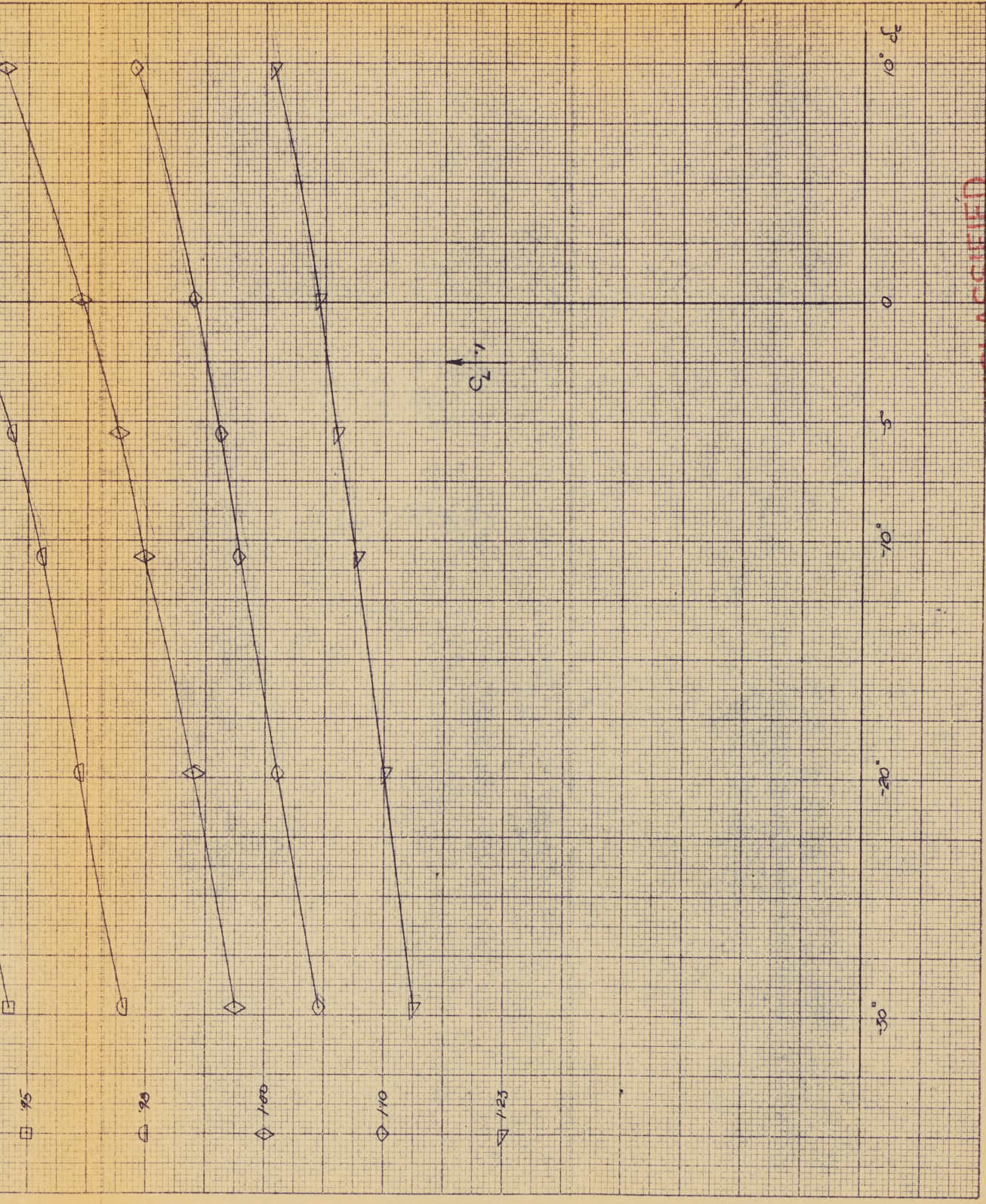
△ .8

□ .85

◇ .90



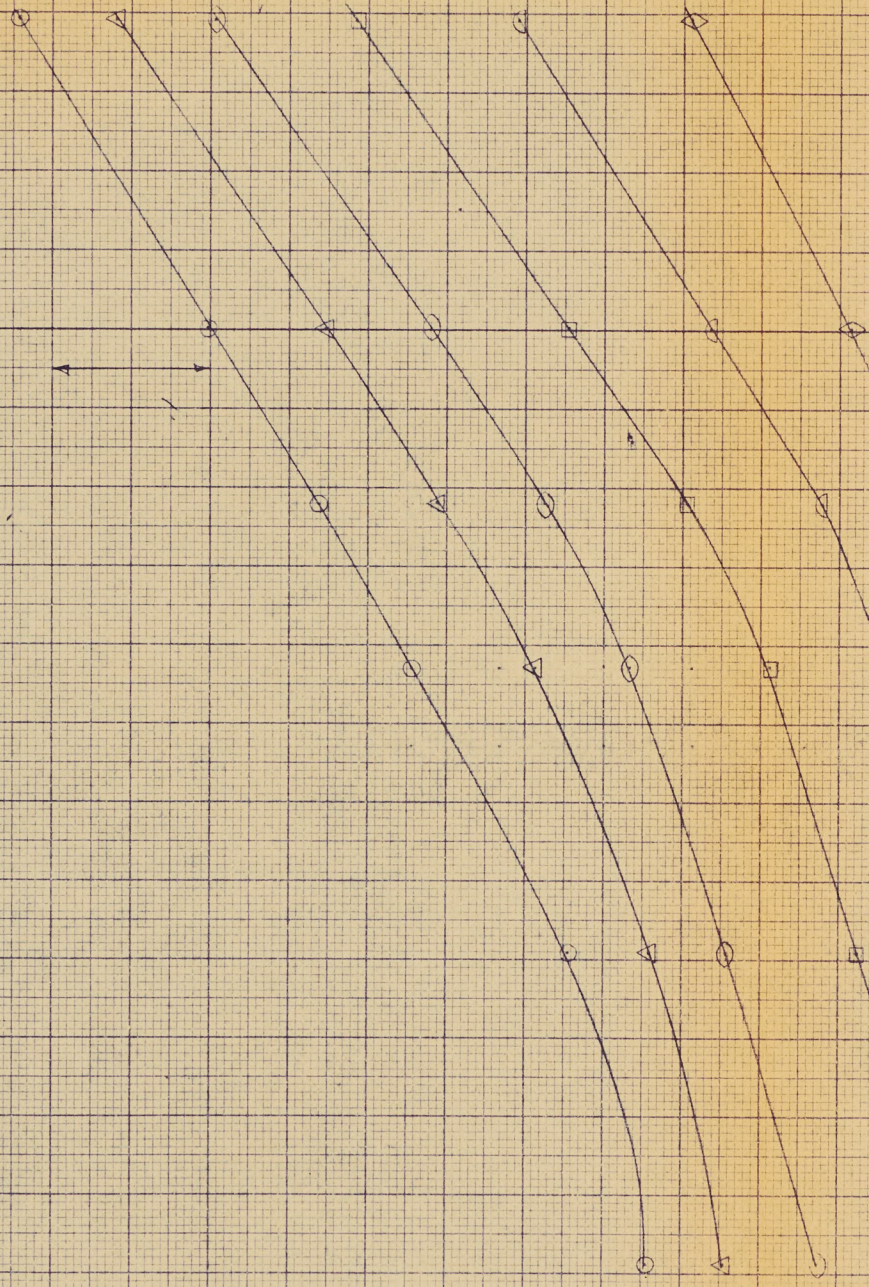
3.1.4. P/WT 150  
No. 174 Kwathouh



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NON CLASSIFIE

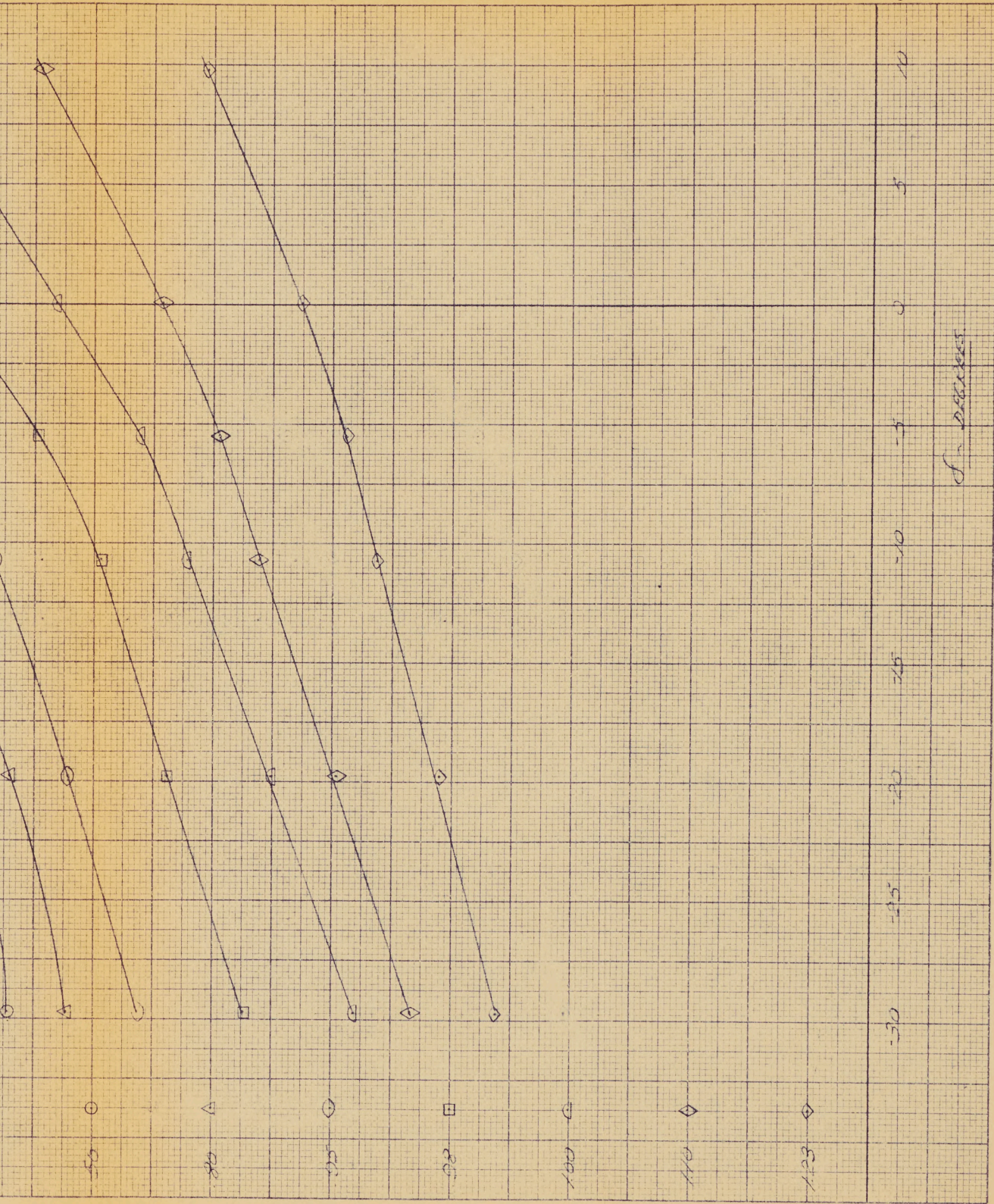
C-105  
CALC WIND TUNNEL TESTS (ACI 558)  
C<sub>p</sub> vs  $\alpha$   
 $\alpha = 5^\circ$   
8/22/54 to 8/23/54

C<sub>p</sub>



3-1-5

P/W 1/30.  
CLARK.



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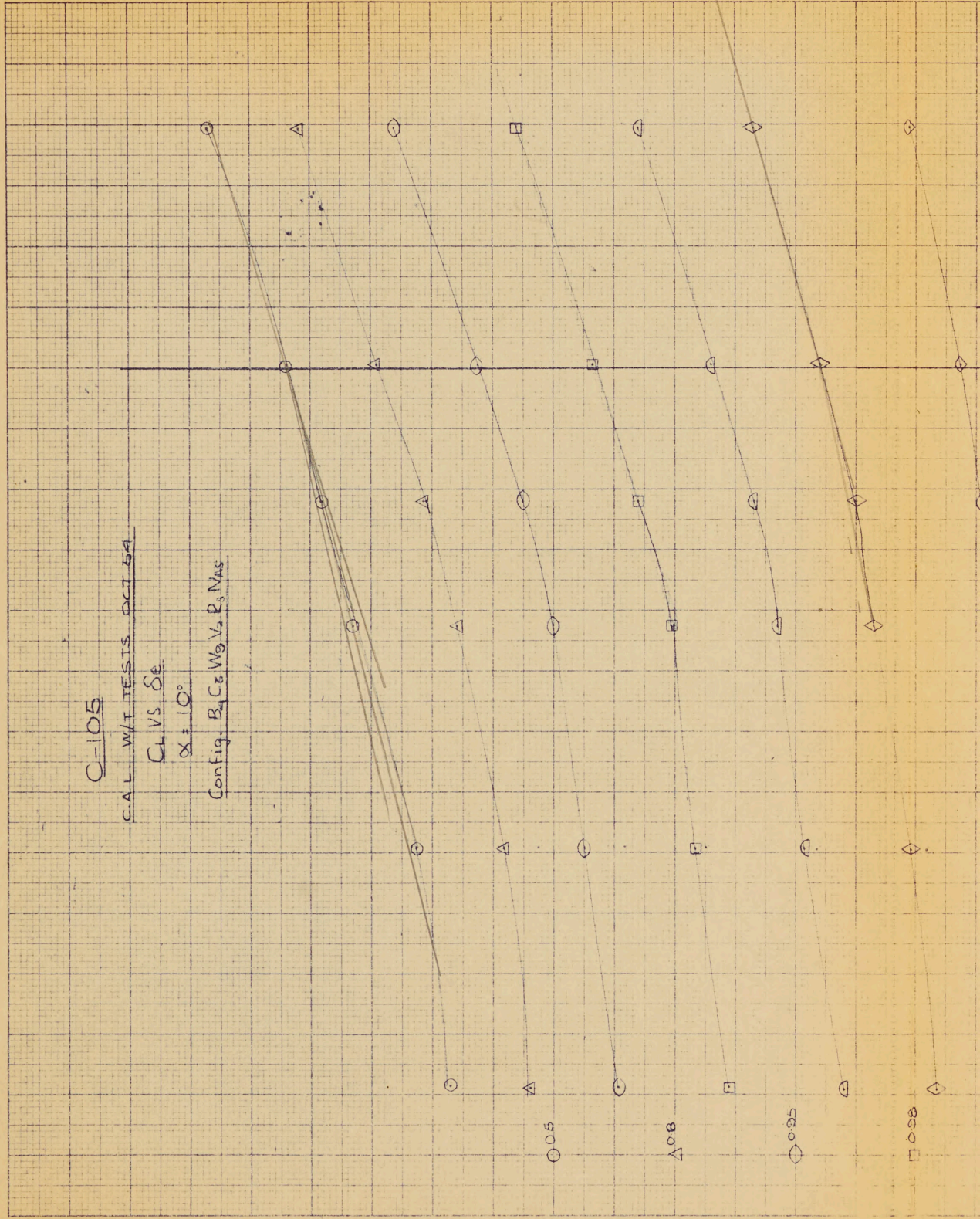
C-105

CAL. W/T TESTS OCT 54

CL VS  $\delta\epsilon$

$\alpha = 10^\circ$

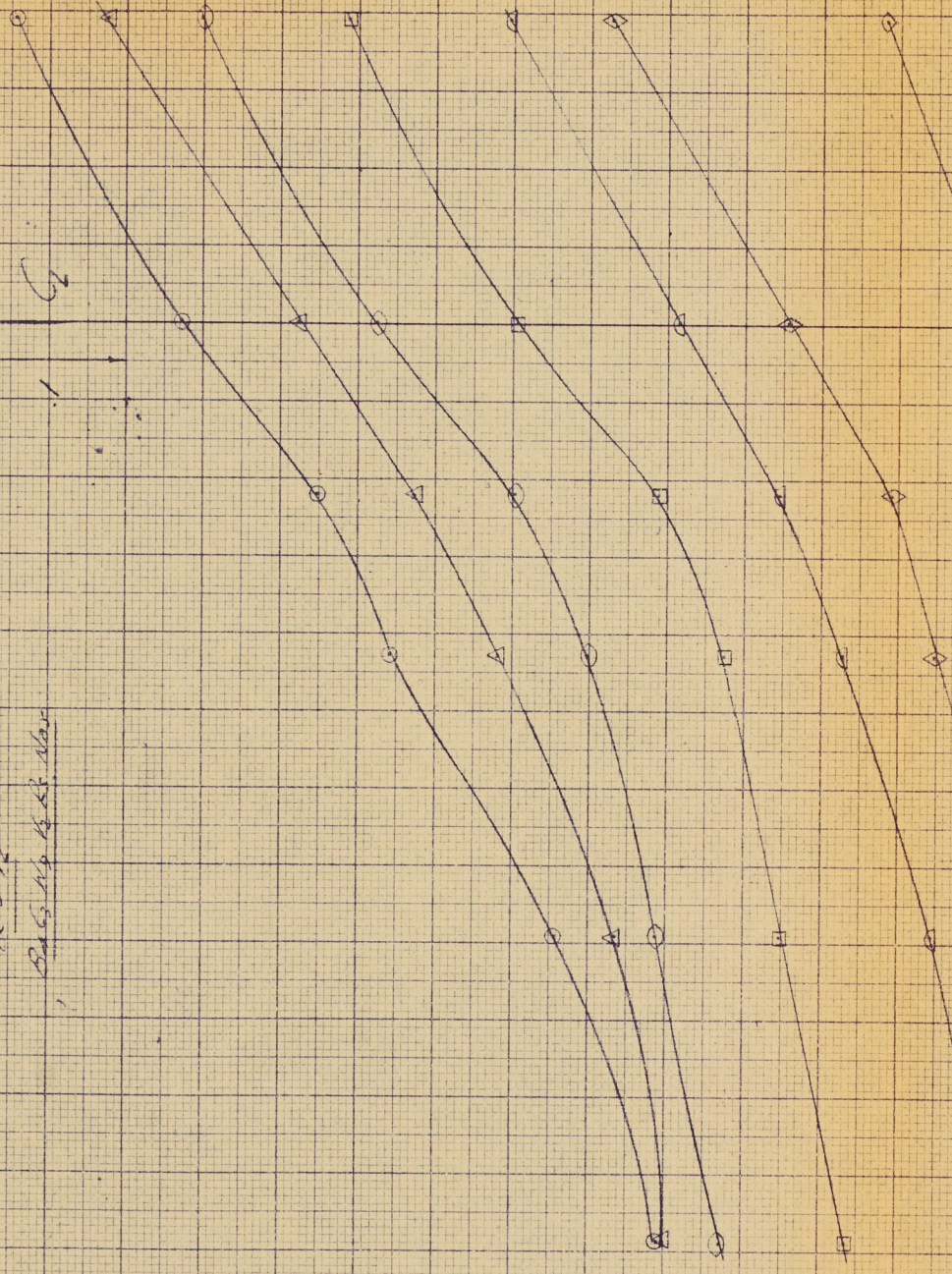
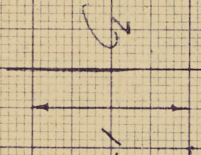
Config. B<sub>1</sub> C<sub>6</sub> W<sub>6</sub> V<sub>2</sub> R<sub>5</sub> N<sub>4</sub>S





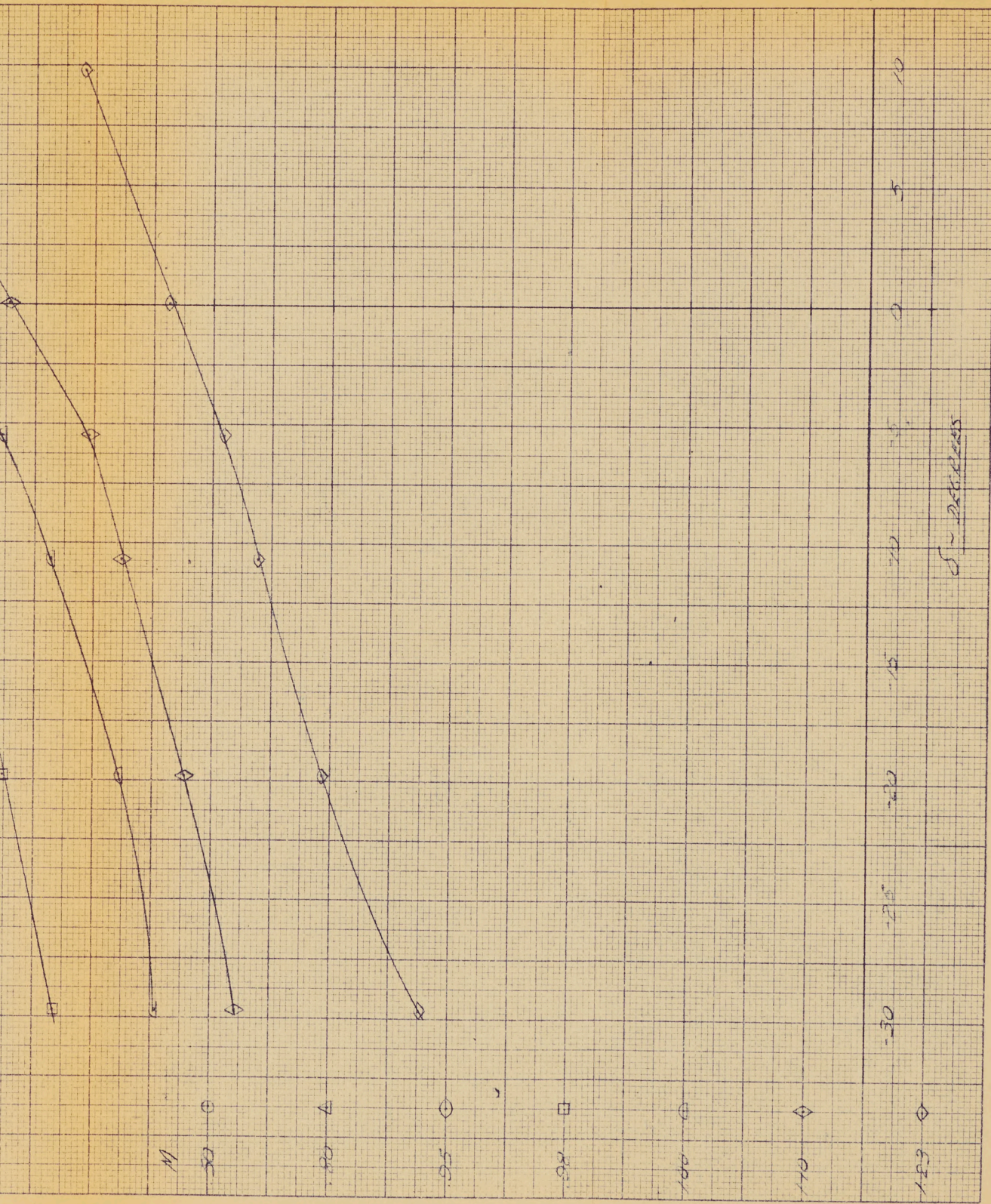
UNCLASSIFIED  
NON CLASSIFIE

C103  
 P.P. & AMP. TUNING TESTS (OUT 50)  
 $\frac{C_{103}}{C_{115} \delta}$   
 $N = 12$   
 B.C.S. 100 to 1000



3.1.7

P/W/150.  
CLARK.

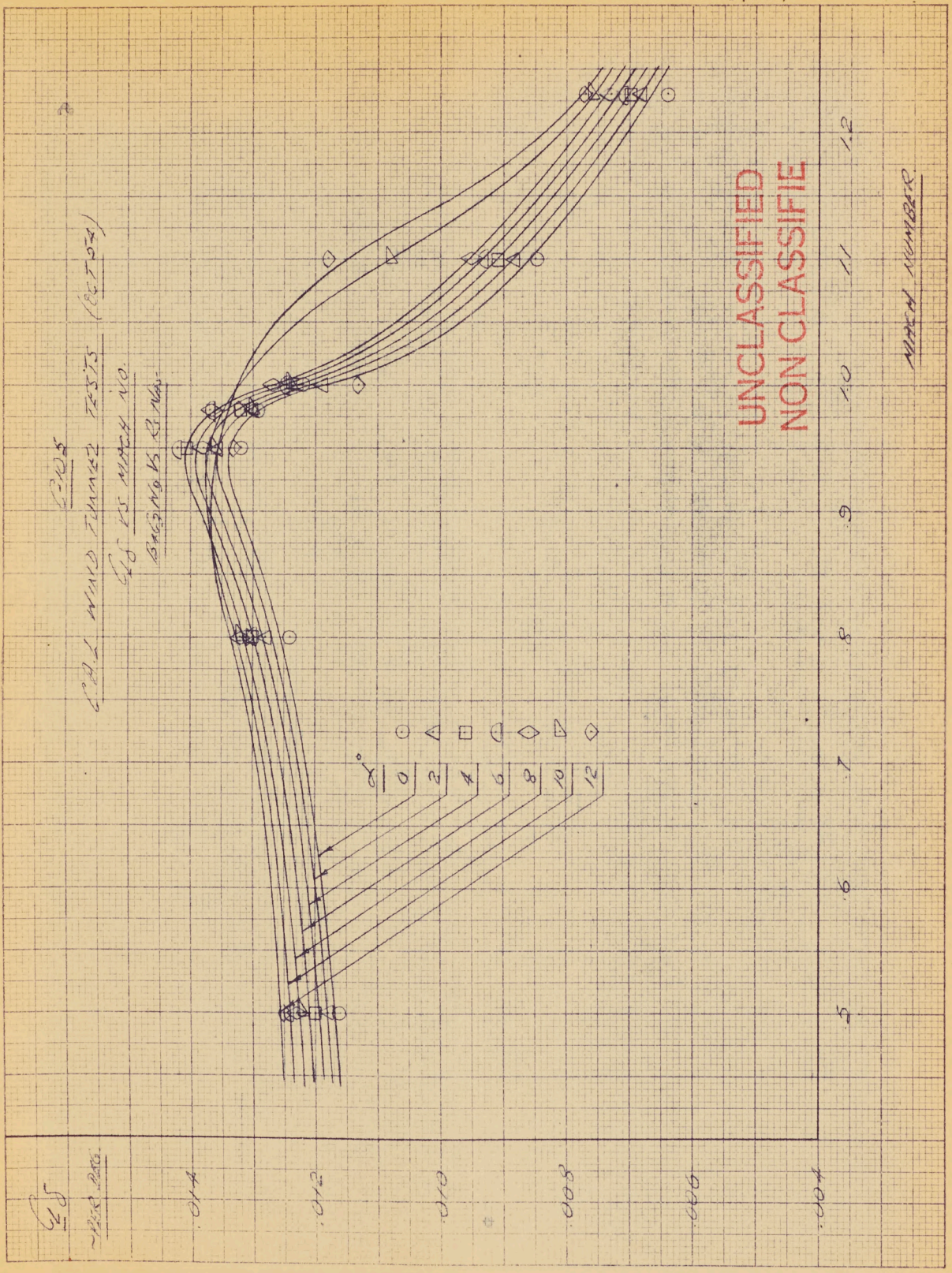


$\delta \sim \text{DEFLECTIONS}$

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NON CLASSIFIED

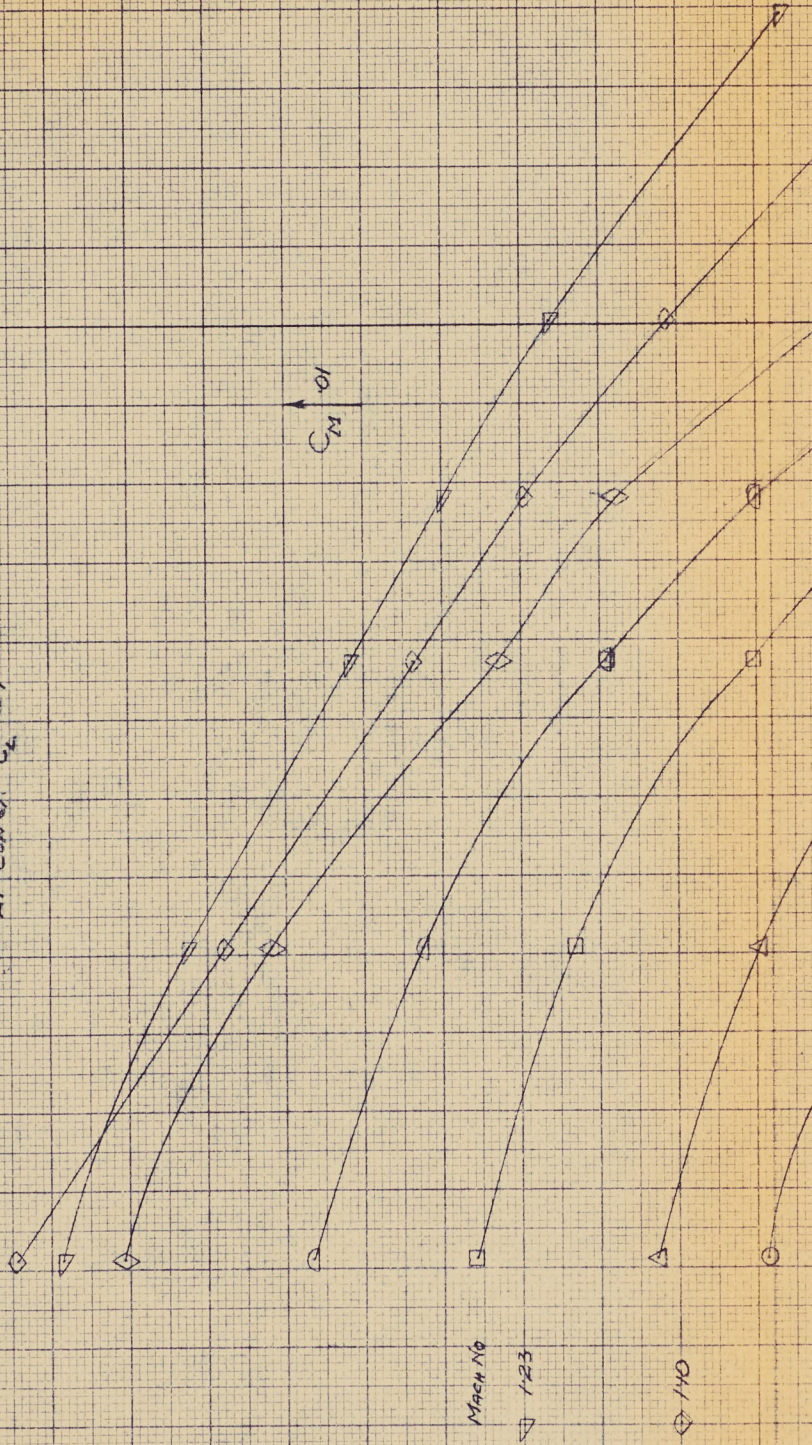
3.1.2. P/W-T/50.  
 FEB. 55. CLARK.

KE 10 X 10 TO THE 1/2 INCH  
 KEUFFEL & ESSER CO. 359-124  
 MADE IN U.S.A.

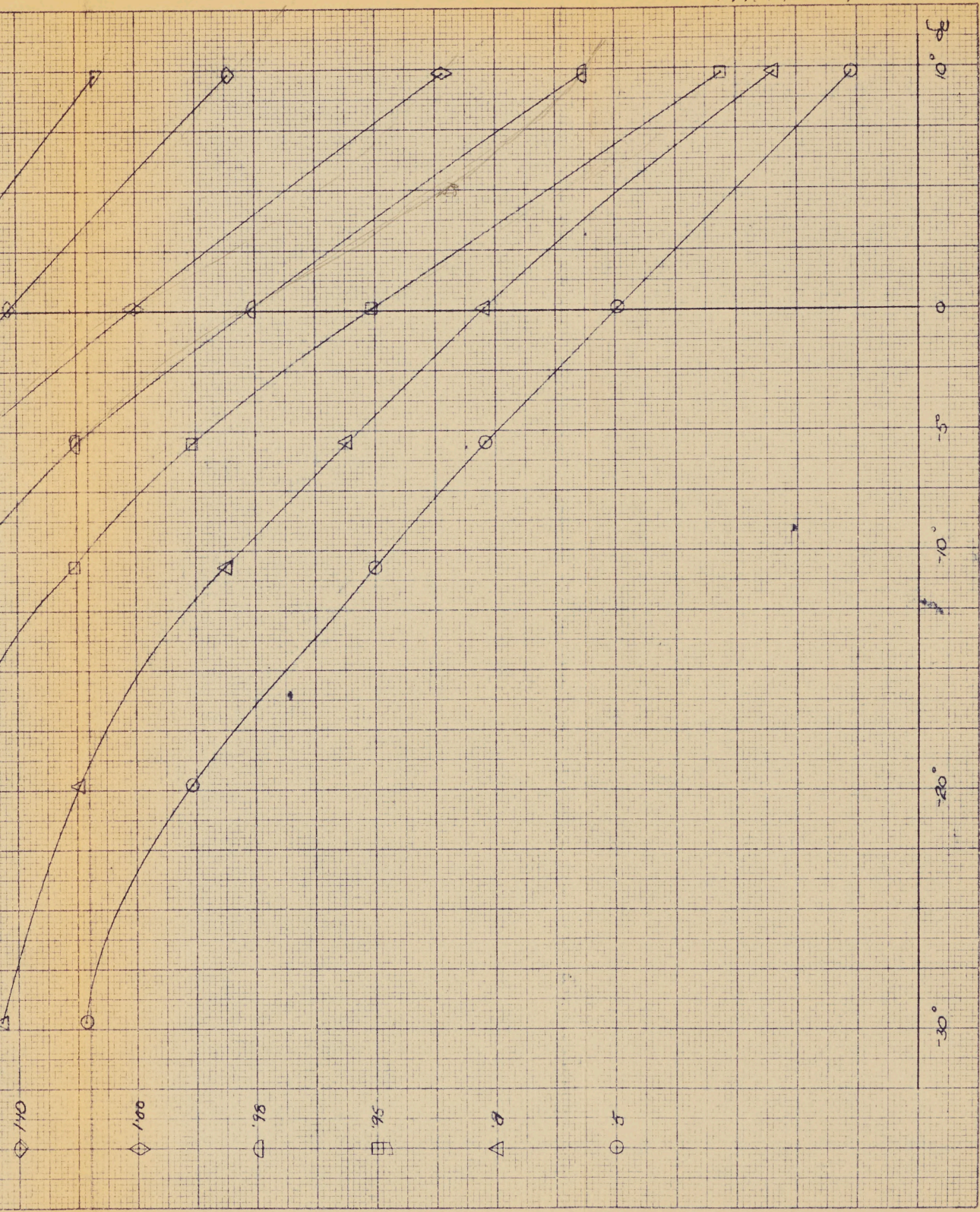


C-108  
 CAL WIND TUNNEL TESTS (REVIS)  
 15 MARCH NO.  
 BRADNOR'S SIGN.

C 105  
C.A.4. HIND TUNNEL TESTS OCT. 57  
C38 by K.R. Mar  
CM 15 de  
AT CONST.  $C_h = 1$



3.2.4. P/WT 150  
 NIT. 54 Kwaaboski



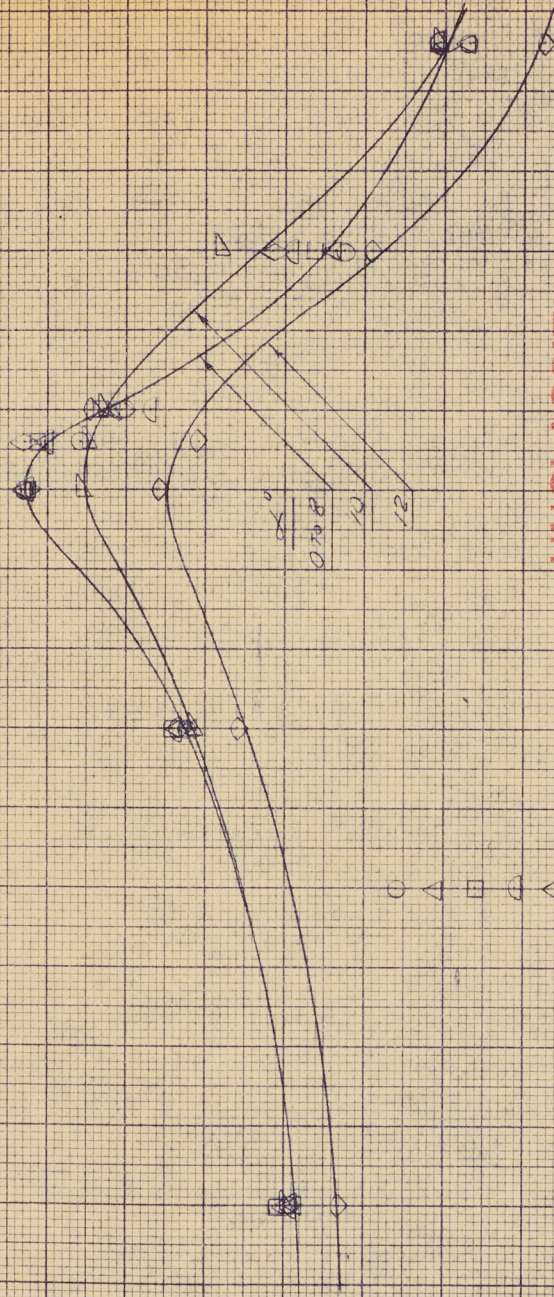
UNCLASSIFIED  
 NON CLASSIFIE

3.2.2 P/W.T. / 50 ✓  
FEB. 55 CLARK.

C-105  
CAL. AND TUNNEL TESTS (OCT 54)  
CNG (2) IS MAIN NO.  
BEG AS IS B.N.W.

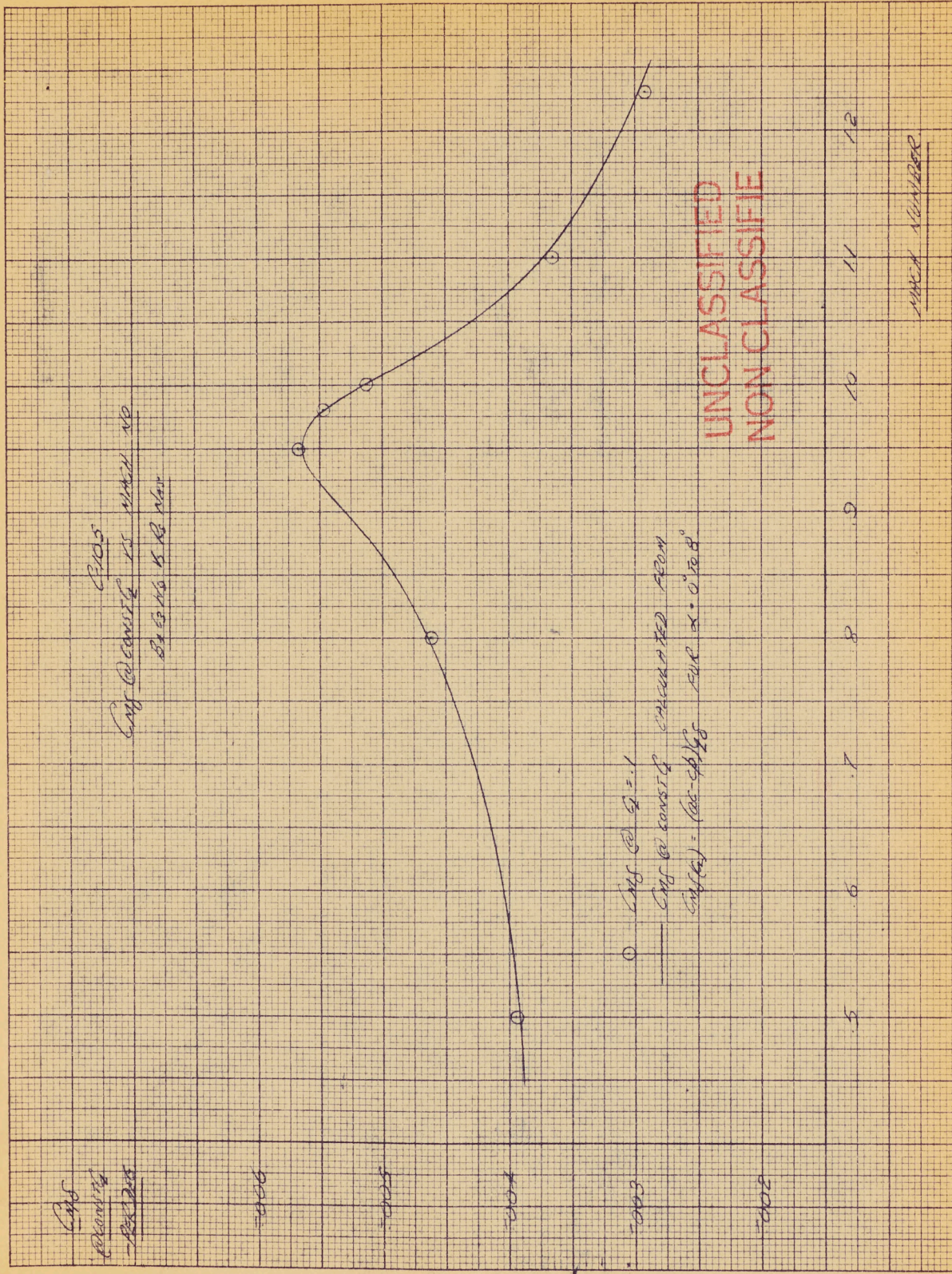
CNG  
B.N.W.  
- B.C. 2.05

7006  
7005  
7004  
7003  
7002



UNCLASSIFIED  
NON CLASSIFIE

MARCH NUMBER



C-105

CAL W/T TESTS - Oct 54

CM vs  $\delta e$

$\alpha = 0$

Config B<sub>4</sub> C<sub>5</sub> W<sub>9</sub> V<sub>1/2</sub> P<sub>5</sub> N<sub>as</sub>

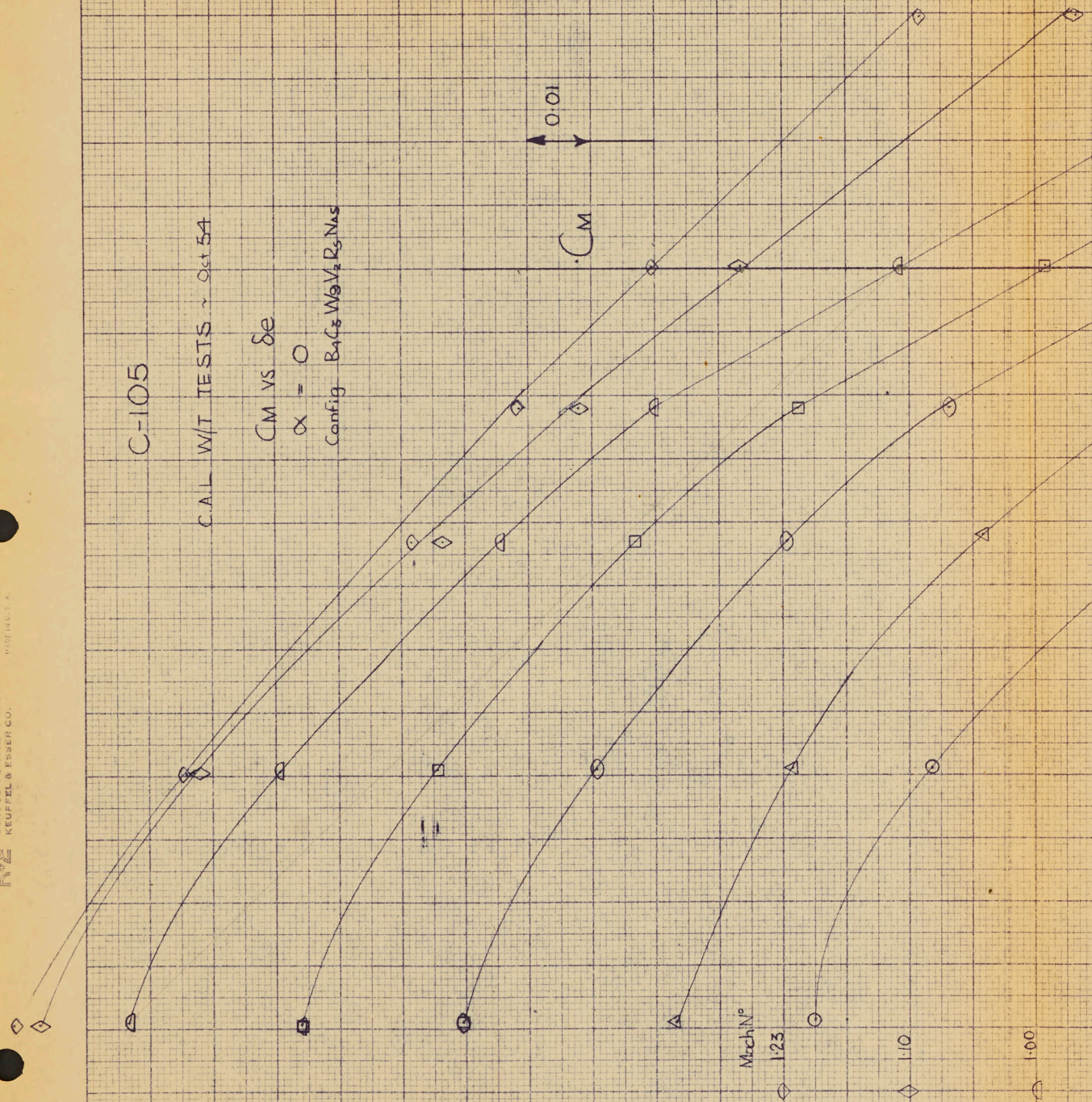
0.01  
CM

Mach N°

1.23

1.10

1.00

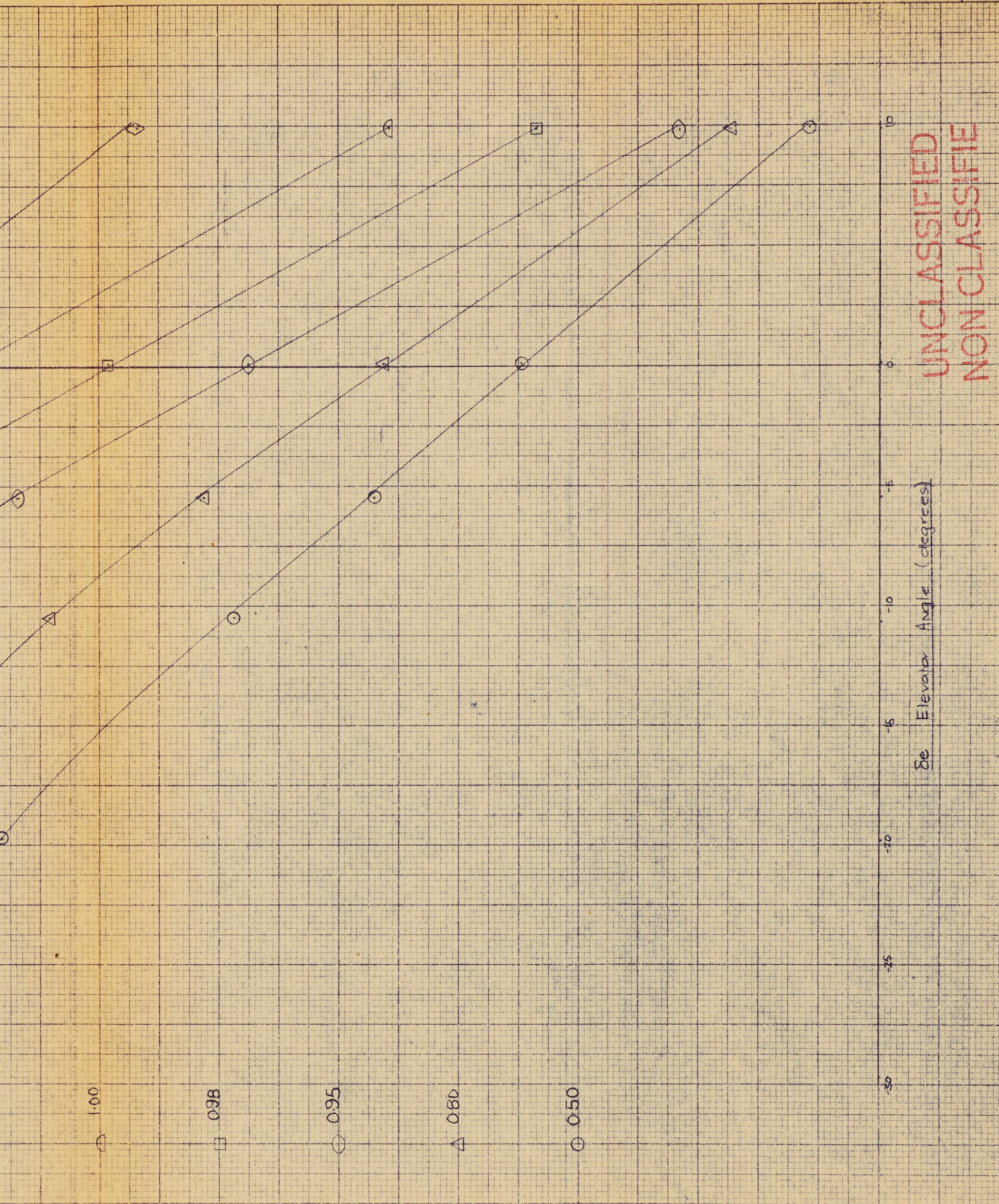


P/WT/50

331

Oct 54

G.W. Haynes



C=1.05

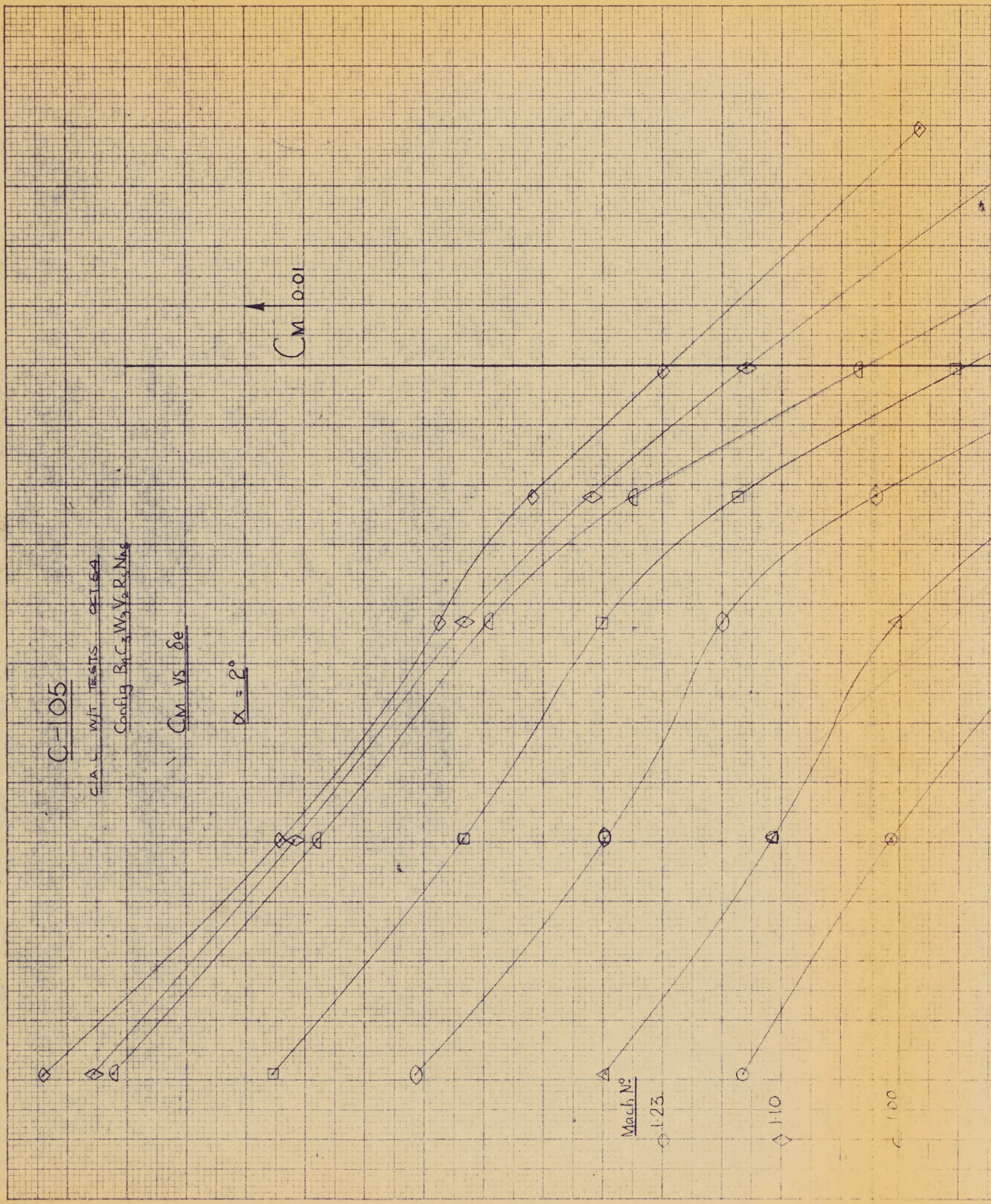
CALC W/T TESTS OF T-5A

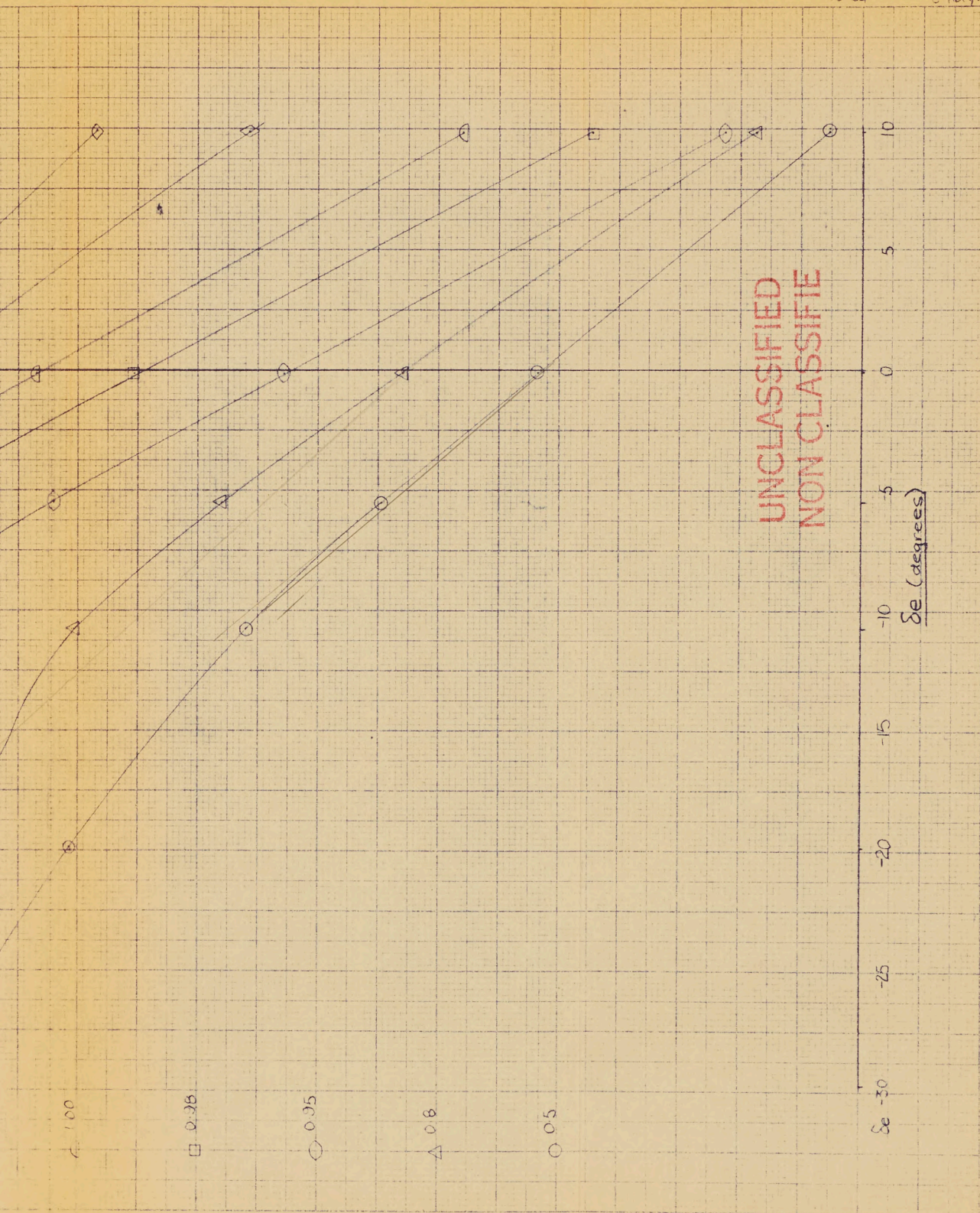
Config B<sub>1</sub> W<sub>3</sub> V<sub>2</sub> R<sub>1</sub> N<sub>6</sub>g

C<sub>M</sub> VS  $\delta e$

$\alpha = 2^\circ$

C<sub>M</sub> 0.01





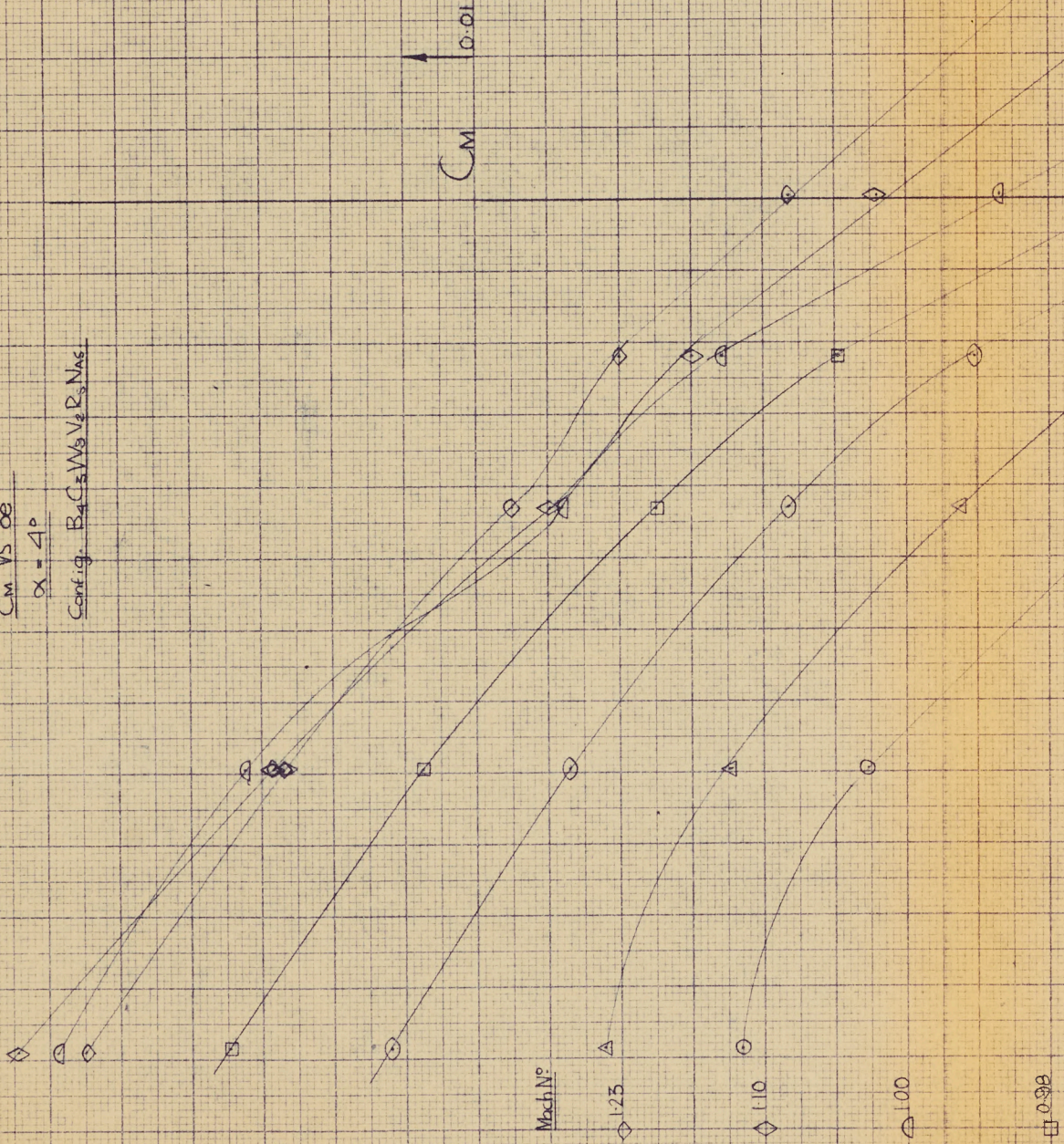
C-105

CAL W/T TESTS OCT 54

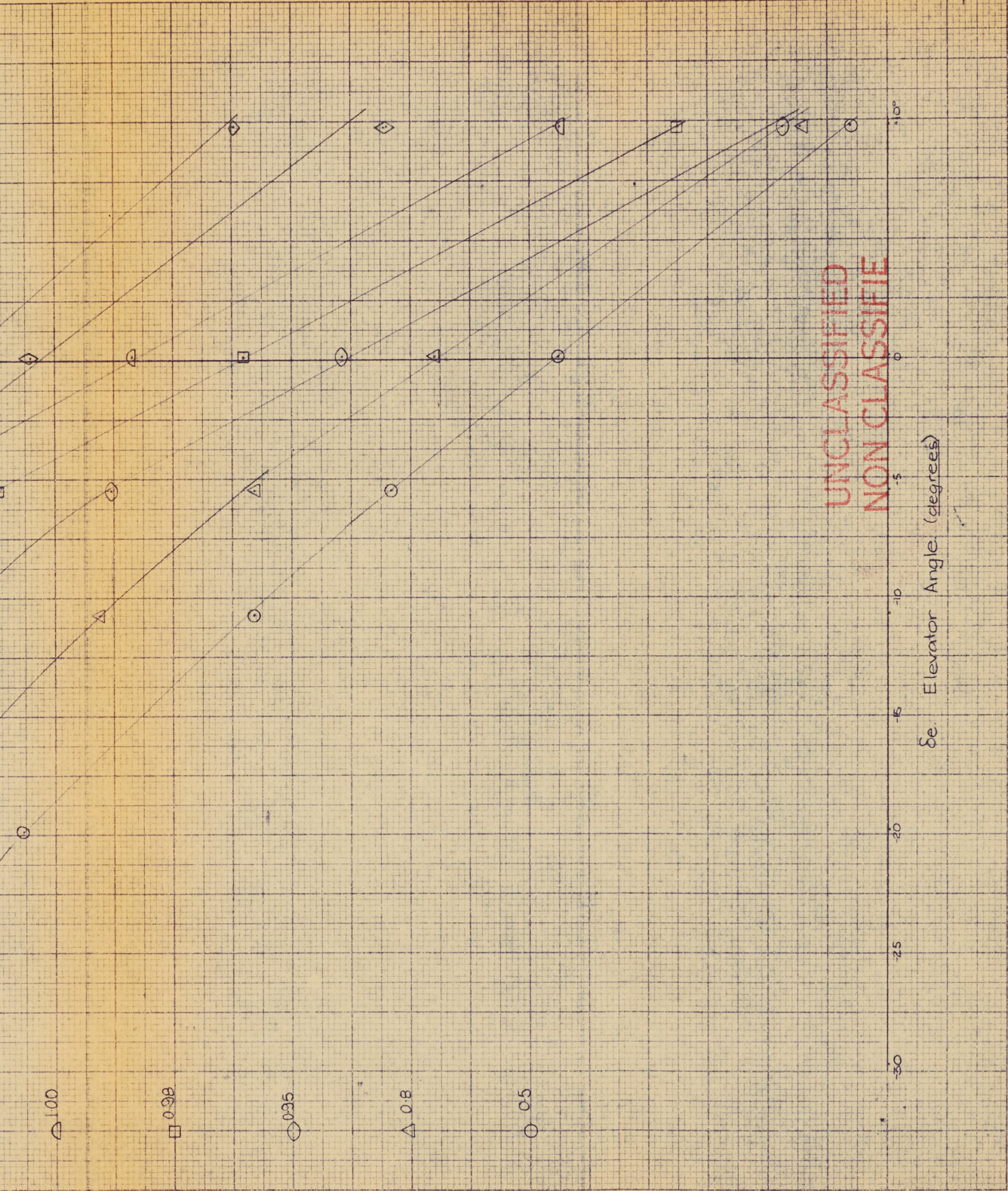
CM VS  $\delta e$

$\alpha = 4^\circ$

Conf. g.  $B_4 C_5 W_3 V_2 R_5 N_{4s}$



◻ 0.98



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C-105

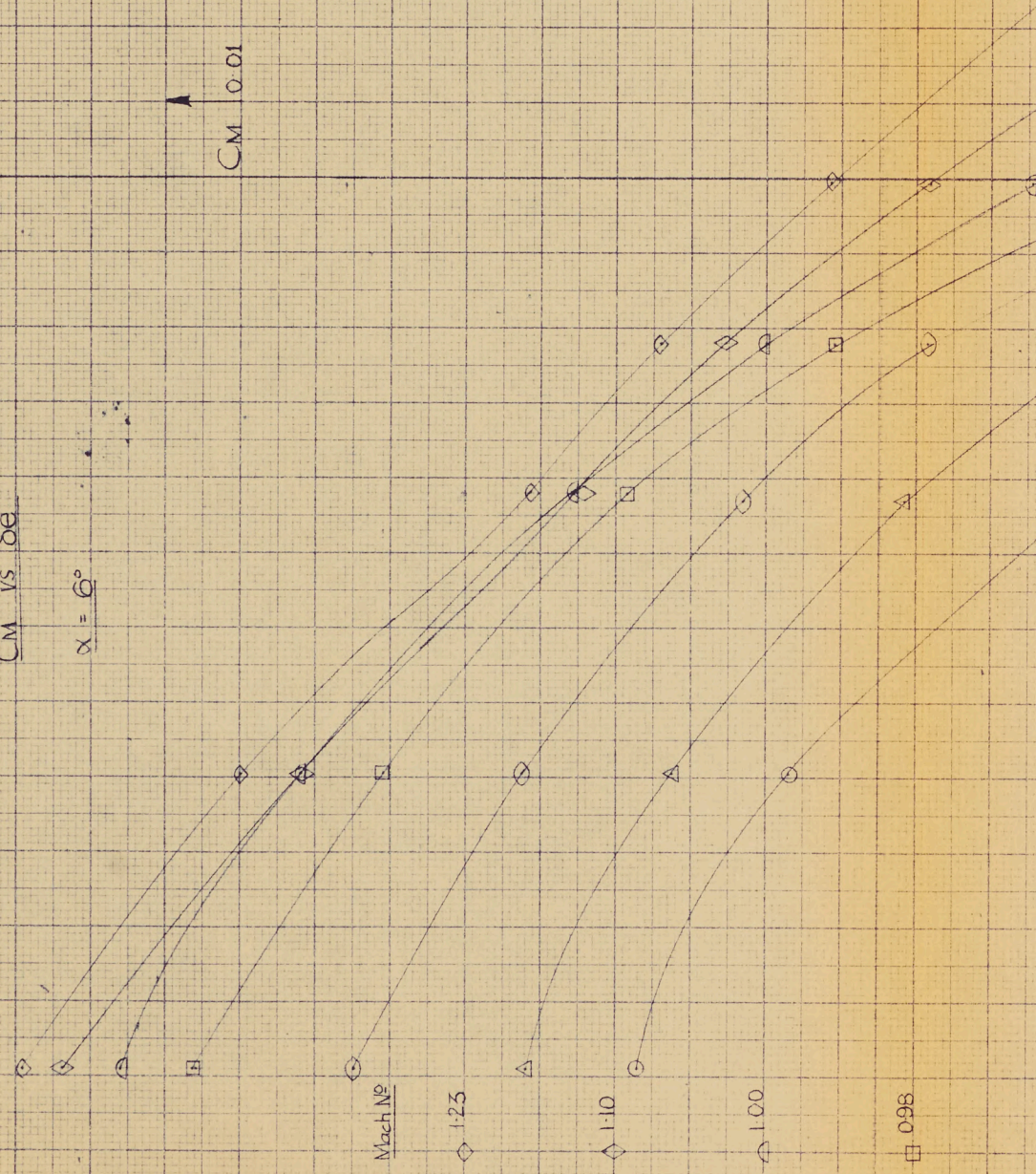
CAL W/T TESTS OCT 1954

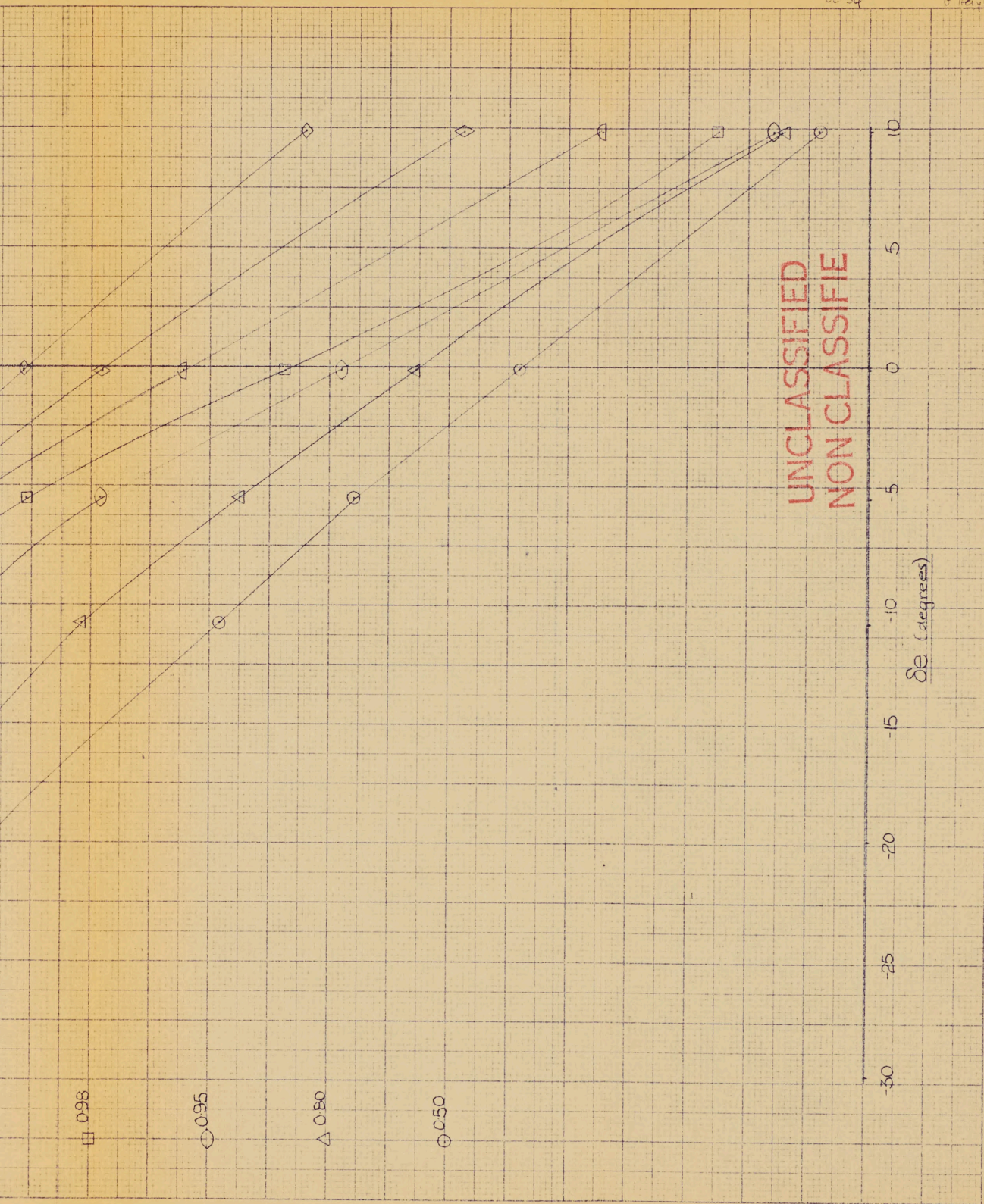
Config B<sub>1</sub> C<sub>3</sub> W<sub>2</sub> V<sub>2</sub> R<sub>3</sub> N<sub>4</sub> S

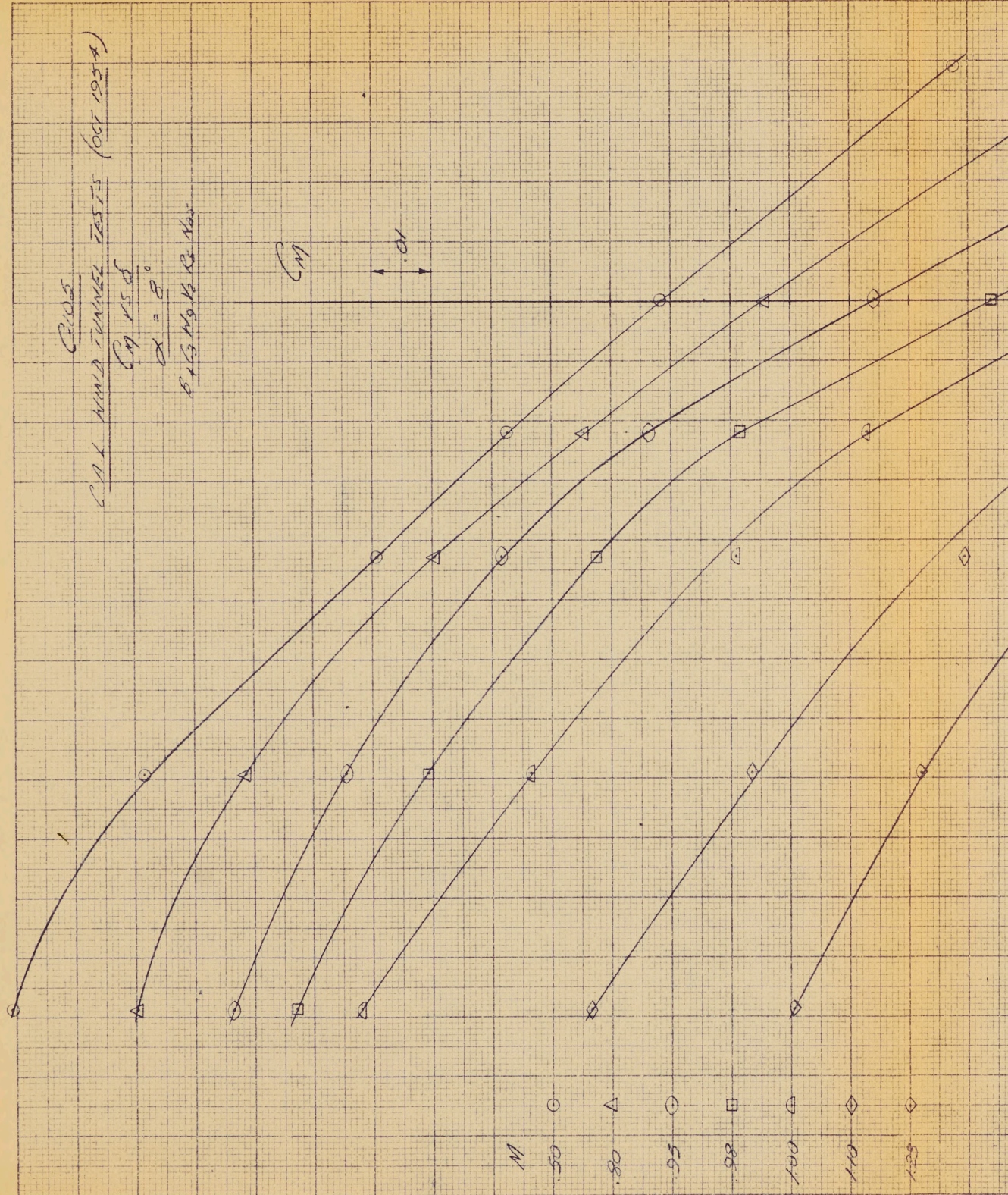
CM vs  $\delta e$

$\alpha = 6^\circ$

CM 0.01







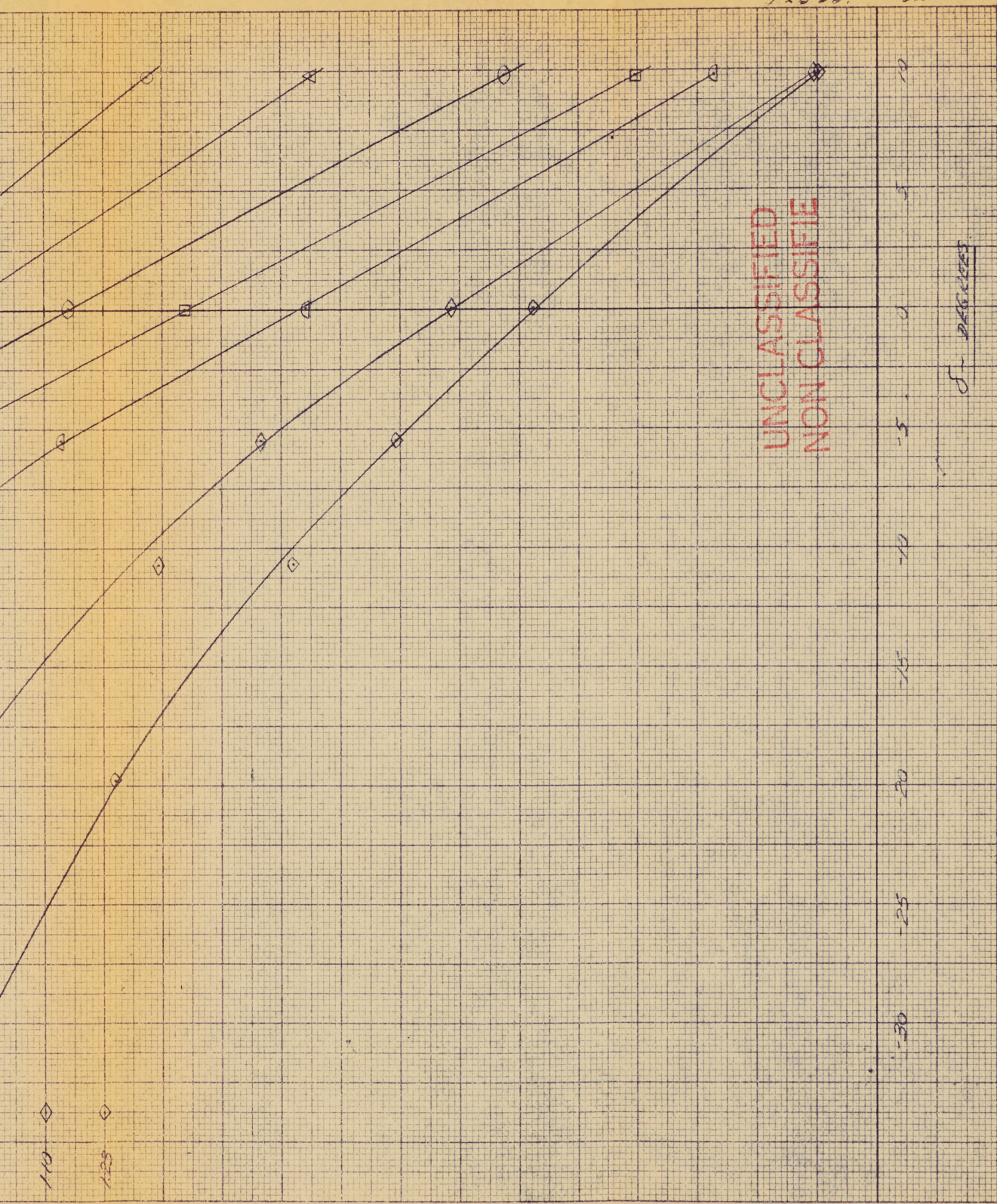
CRUS  
 CAL WIND TUNNEL TESTS (OCT 1954)  
 CM 15.8  
 $\alpha = 8^\circ$   
 P & G No. 42 R. New

335

P/W T/30

FEB 55.

CLARK.

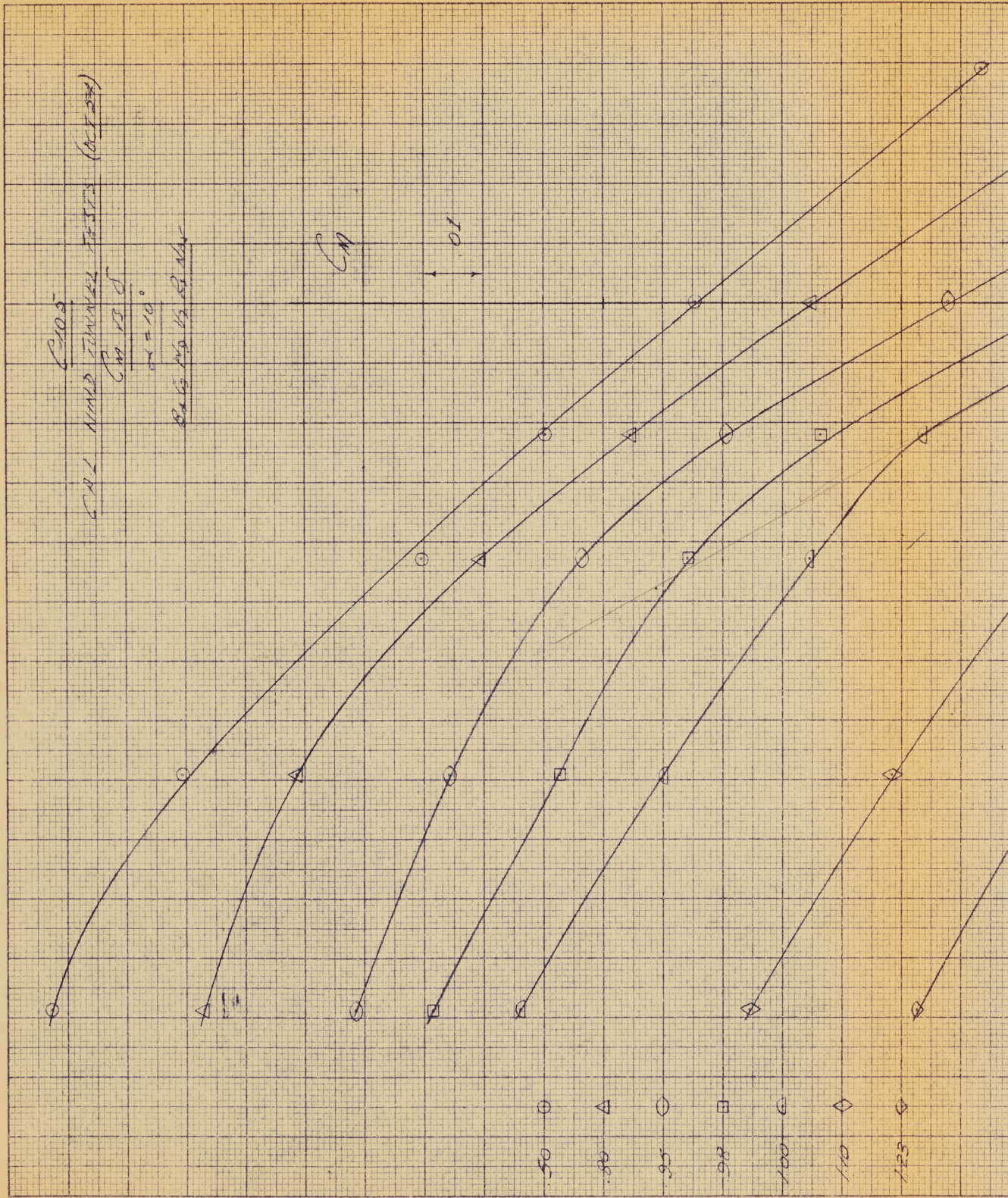


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DAYS

110

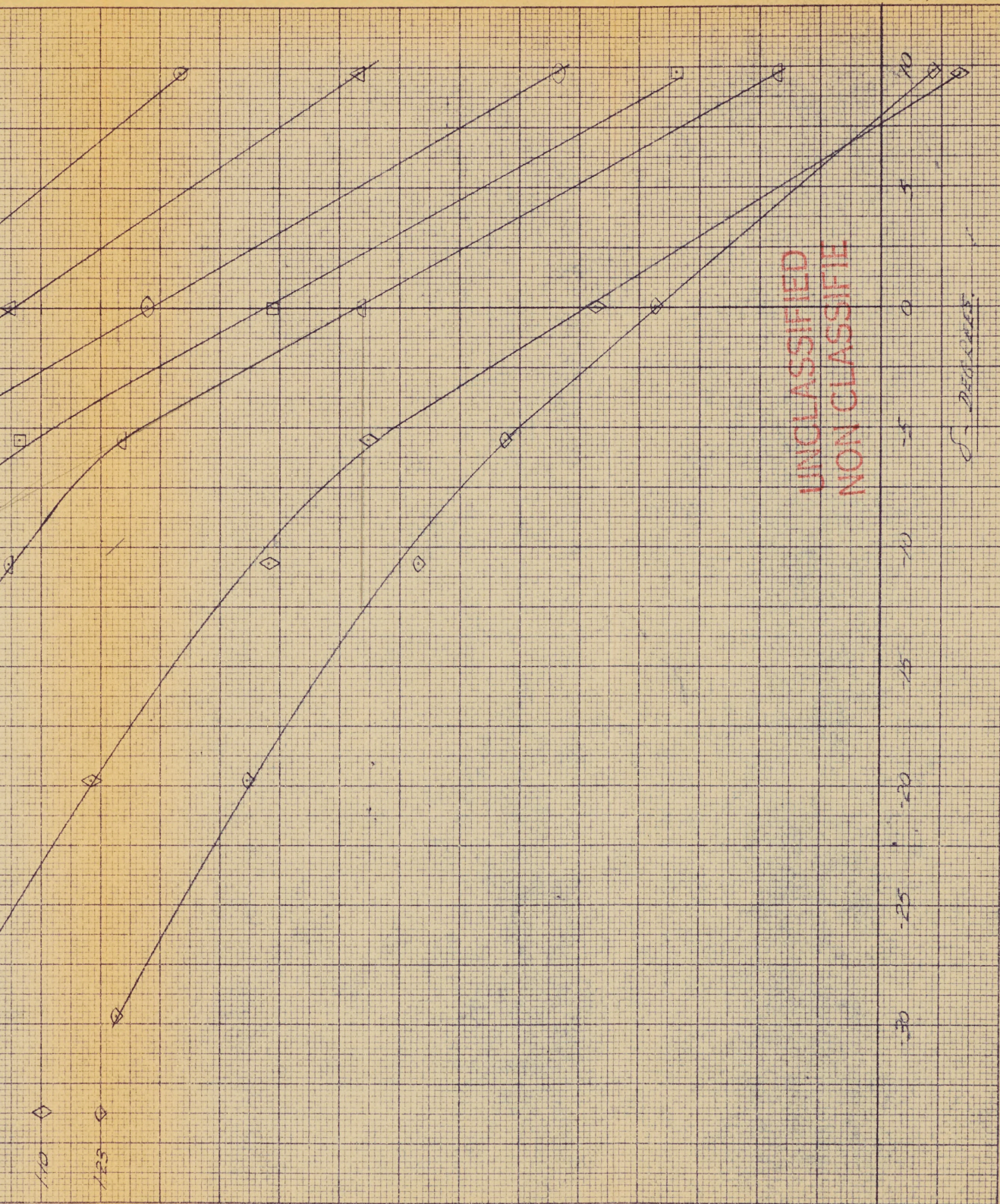
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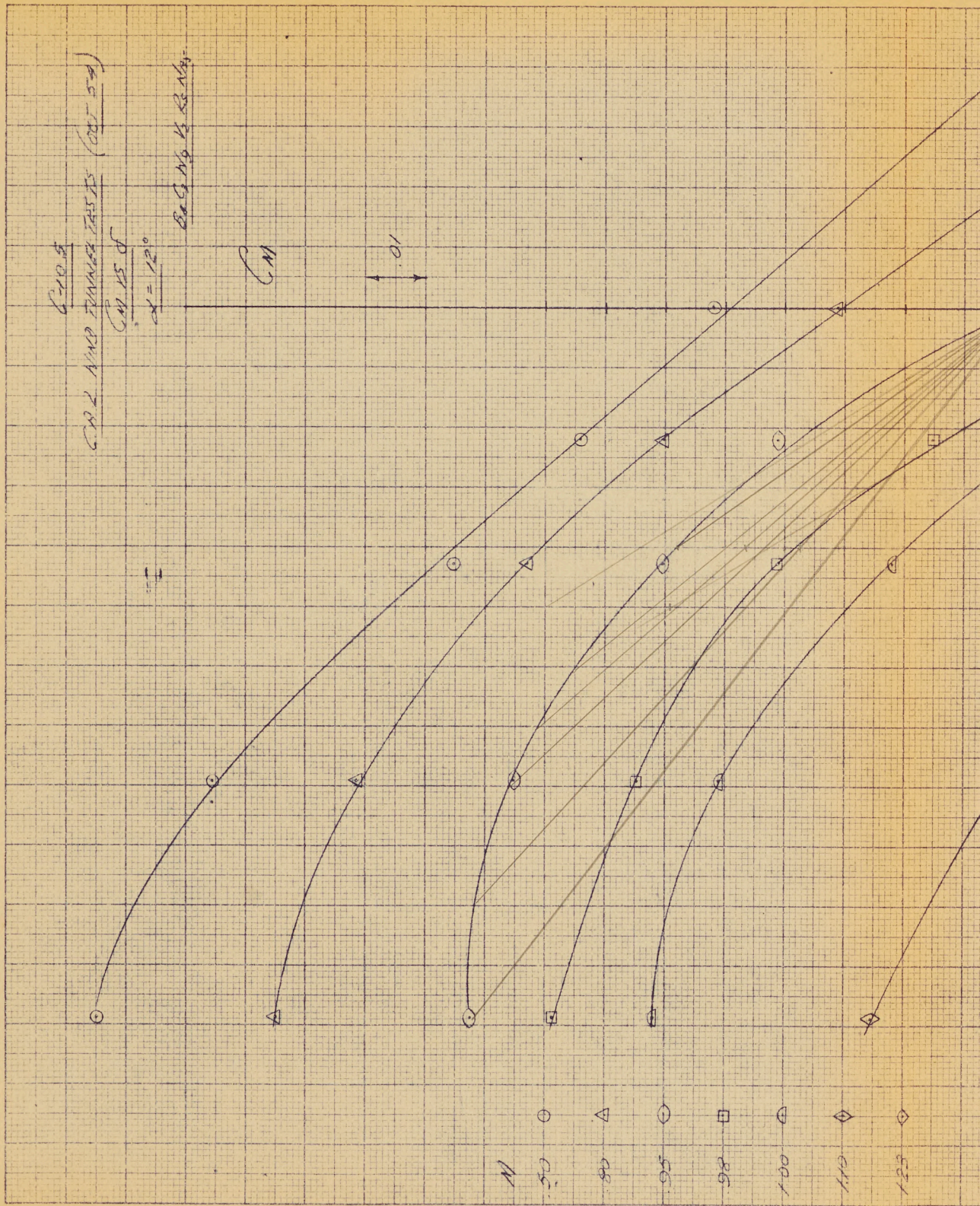


3.76

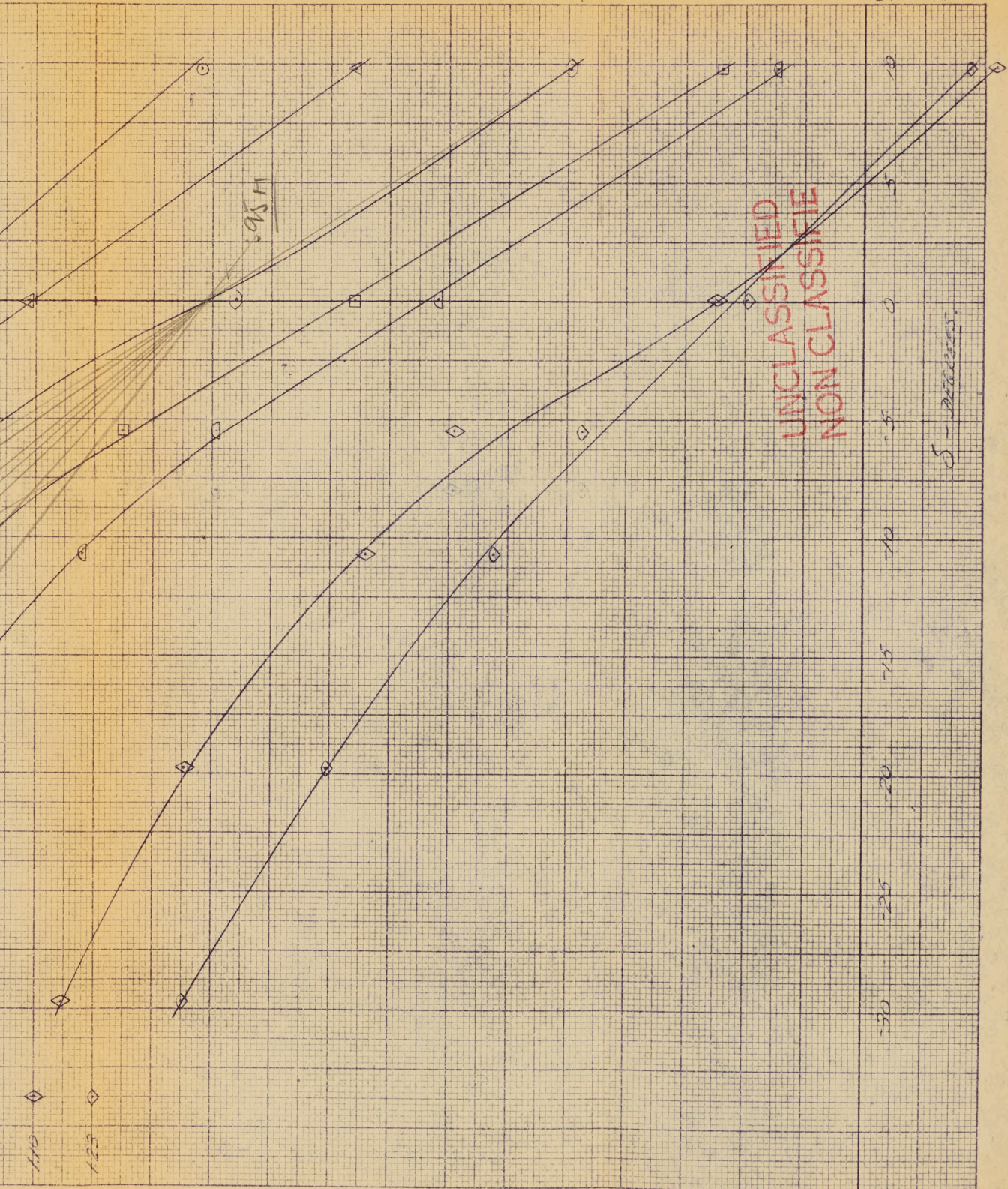
P/W 1/50

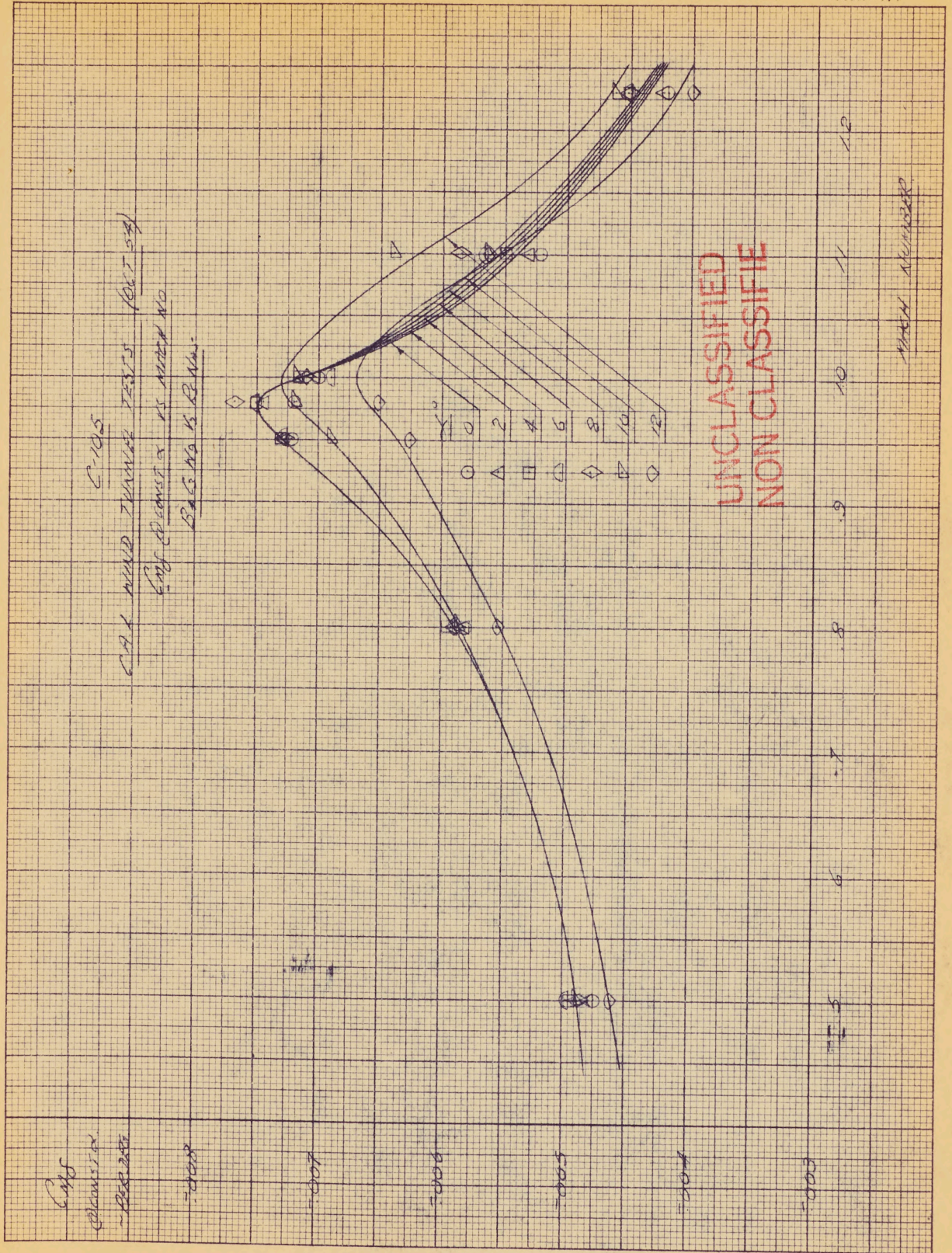
CLARK.



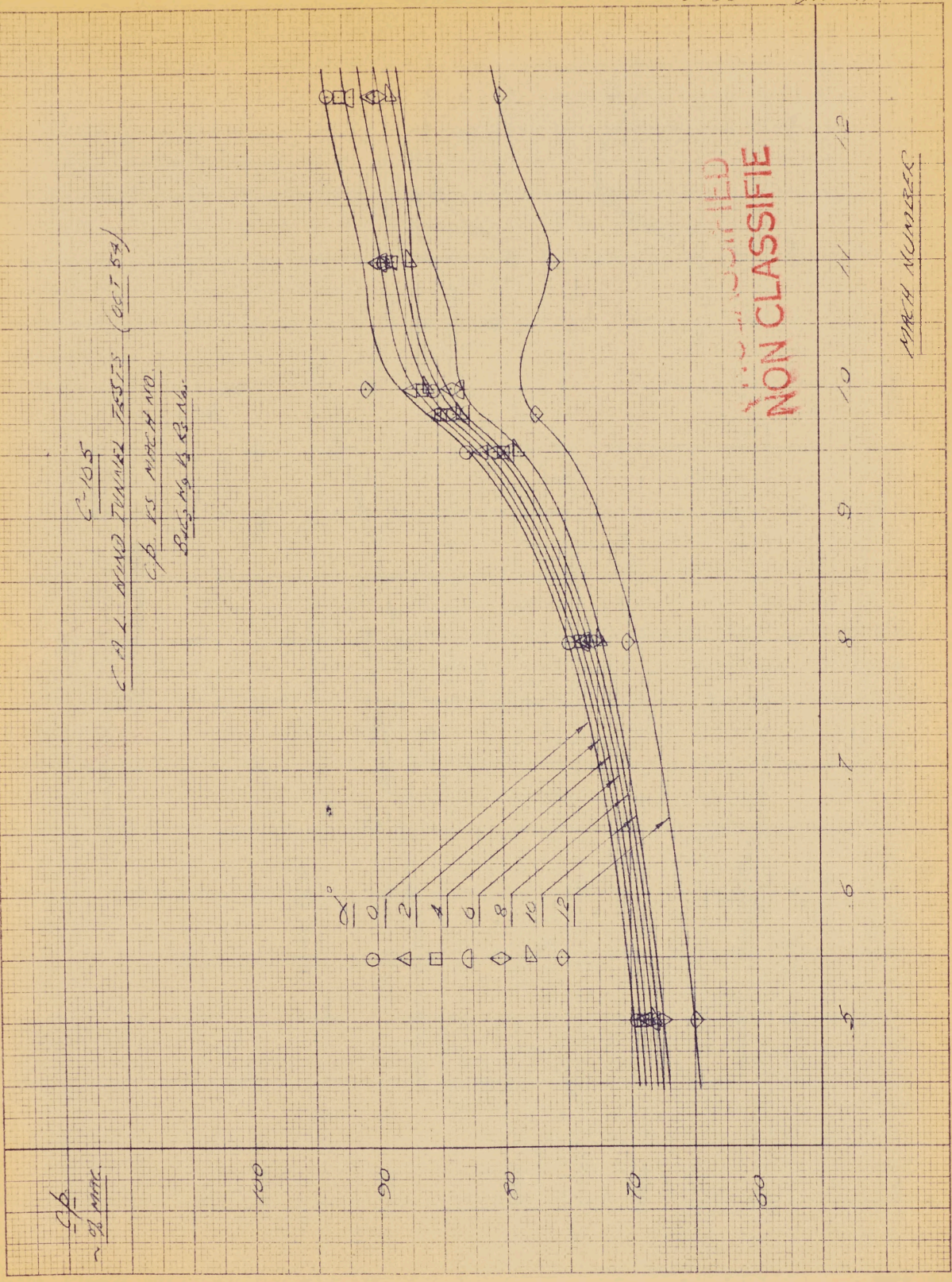


3.37 9/25/50  
Chart.

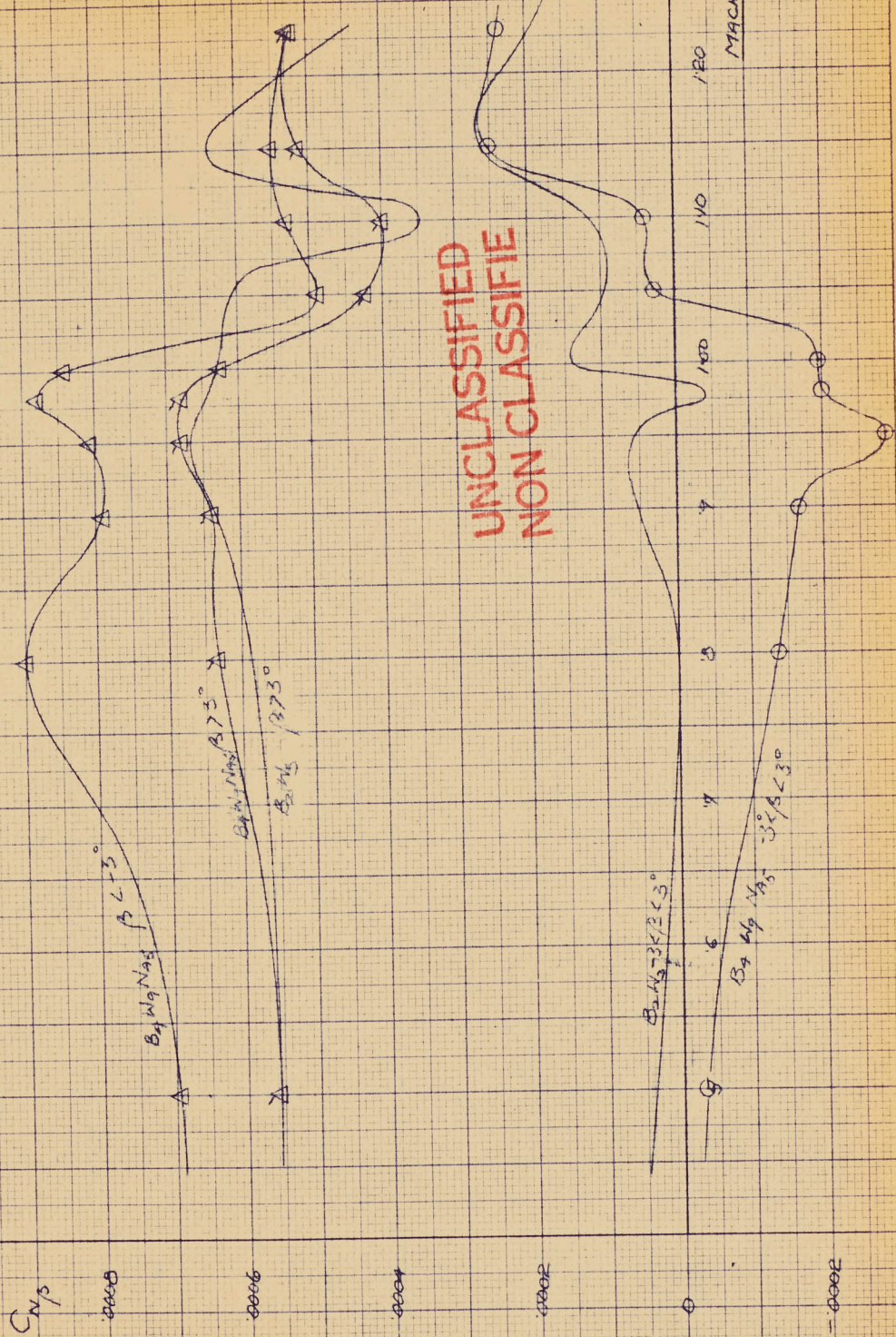




341. P/W 7/50  
FEB. 55 CLARK



C105  
C.P.L. WIND TUNNEL TESTS QJ 57  
S<sub>1</sub> vs Mach No  
X ± 0.1°



10 X 10 TO THE 1/2 INCH 359-12  
KEUFEL & ISSER CO. MADE IN U.S.A.



C105  
CAL. WIND TUNNEL TESTS COT 57

$C_{N3}$  VS. MACH No  
 $\alpha = 17^\circ$

$C_{N3}$   
0.0000

0.0000

0.0000

0.0000

0

-0.0000

-0.0000

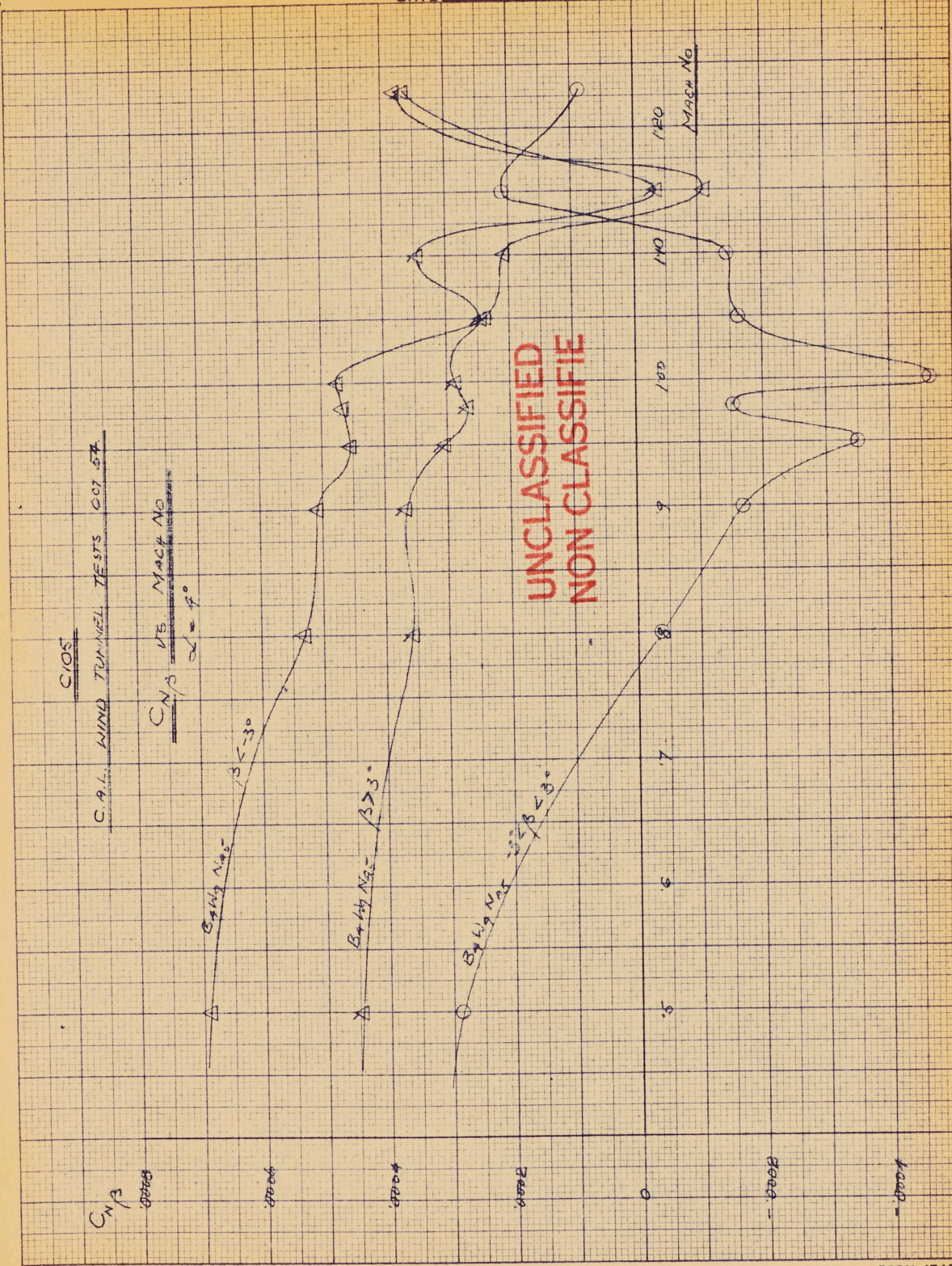
$B_{+14} N_{92}$   $\beta < 30^\circ$

$B_{+14} N_{92}$   $\beta > 30^\circ$

$B_{+14} N_{92}$   $\beta < 30^\circ$

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MACH No.  
1.00  
1.10  
1.20



UNCLASSIFIED  
NON CLASSIFIE

C105  
CAL WIND TUNNEL TESTS OCT 54  
CNS vs. Mach No  
 $\alpha = 6^\circ$

2000  
1000  
0  
-1000  
-2000  
-3000

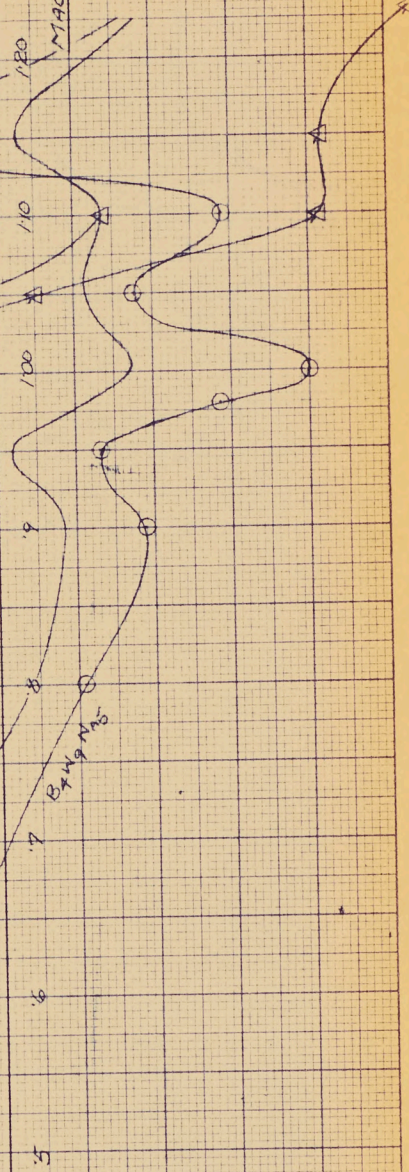
A  $B_{+1/2} M_{\infty} / \beta < -3^\circ$

$B_{2/3} \beta > 3^\circ$

$B_{+1/2} M_{\infty} / \beta < -3^\circ$

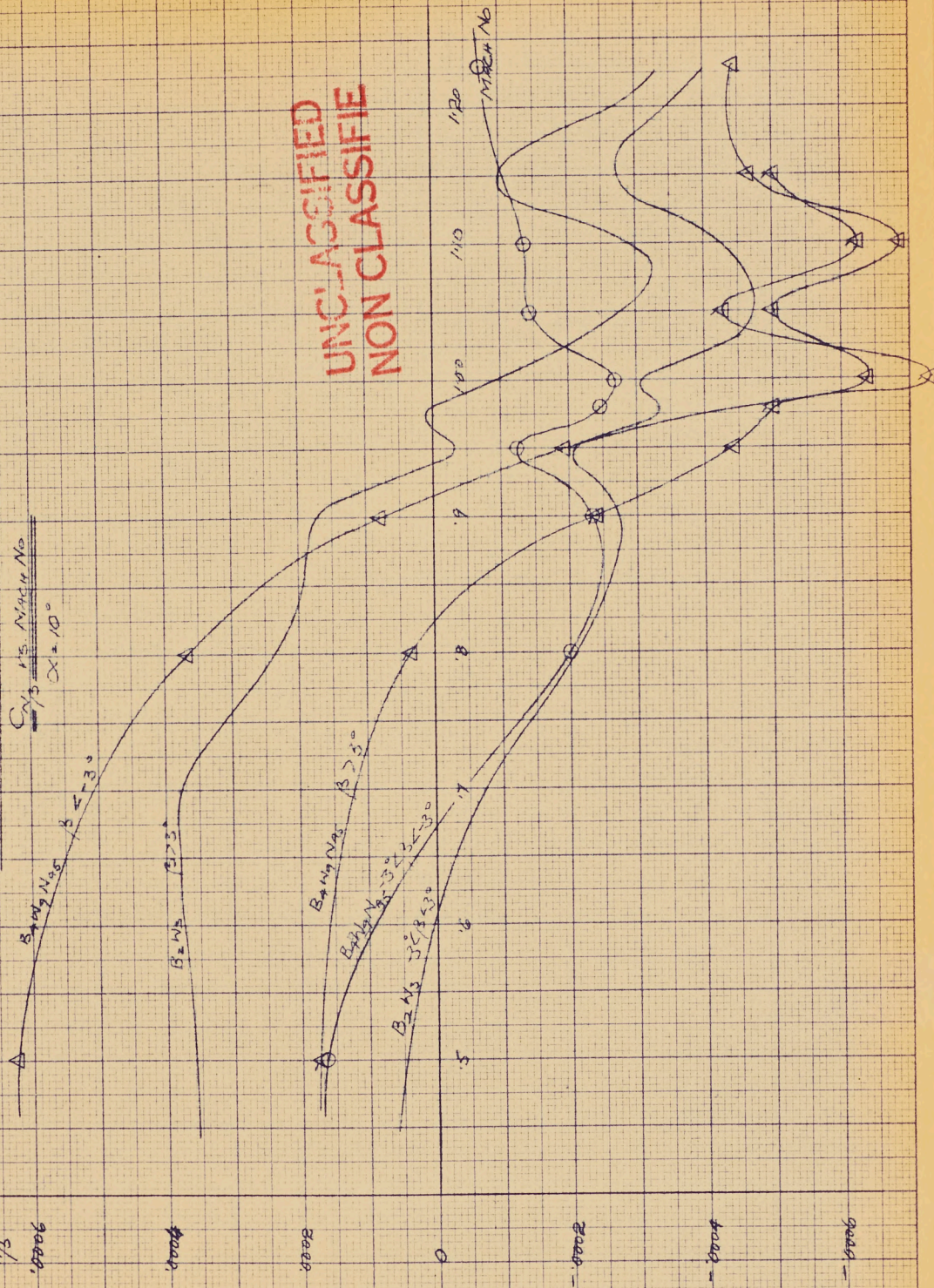
$B_{2/3} \beta < -3^\circ$

7  $B_{+1/2} M_{\infty}$



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C105  
C.A. WIND TUNNEL TESTS OCT 57  
C105 15 March No  
 $\alpha = 10^\circ$



10 X 10 TO THE 1/2 INCH 359-12  
KEUFEL & ESSER CO. MADE IN U.S.A.

C-105

CLAW TESTS OCT 54

CL vs Mach NP

Config B<sub>1</sub>C<sub>1</sub>V<sub>1</sub>R<sub>1</sub>N<sub>1</sub>S<sub>1</sub>

$\alpha = 0$

0.0004

0.0002

0.0001

C<sub>l<sub>g</sub></sub>  
(degrees)

0

0.0001

0.0002

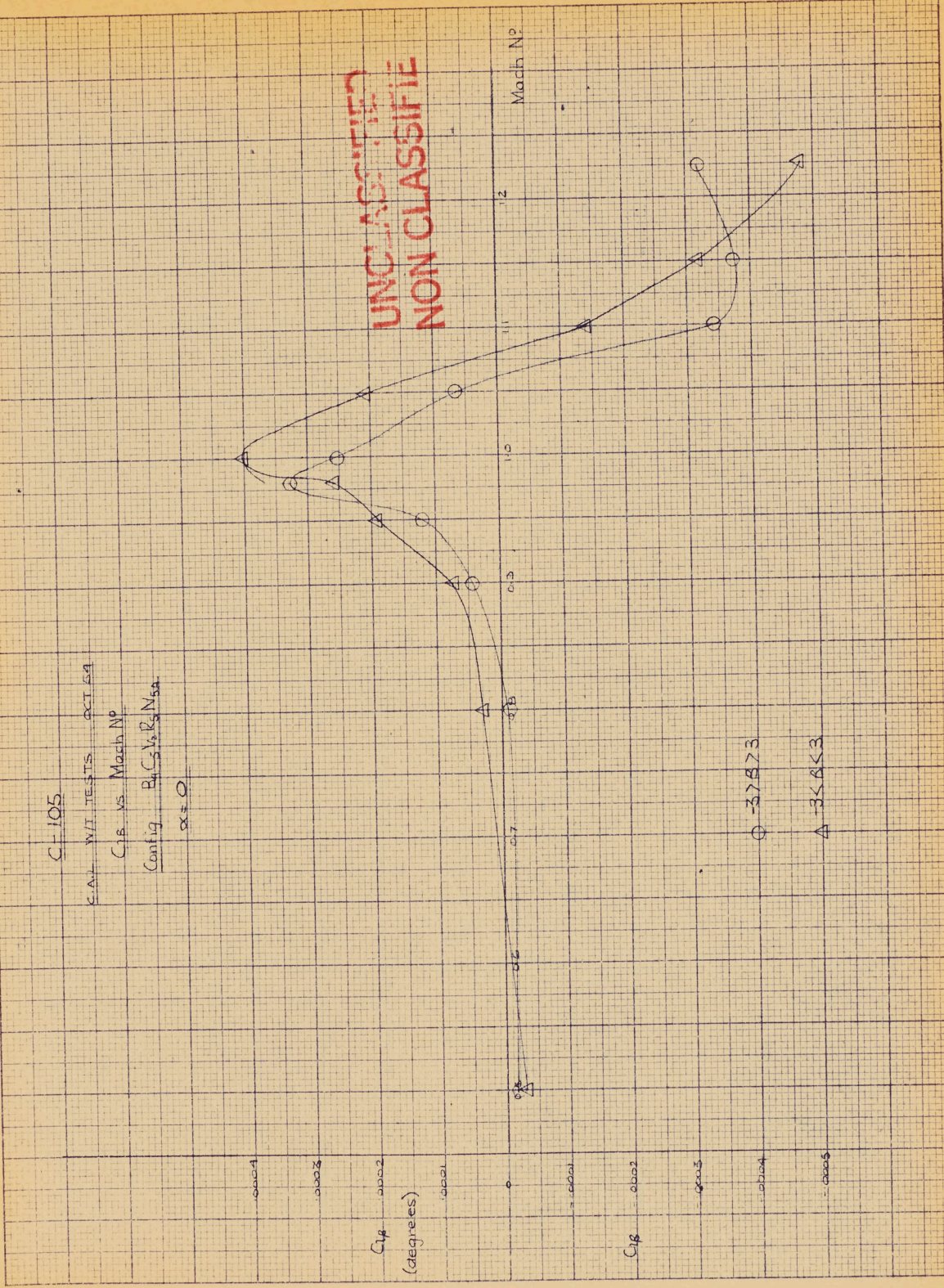
0.0003

0.0004

0.0005

Mach N<sub>2</sub>

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C-105

CAL WT TESTS OCT 54

$C_{Dp}$  vs Mach No

Config B<sub>4</sub>C<sub>5</sub>V<sub>3</sub>R<sub>3</sub>N<sub>3</sub>A

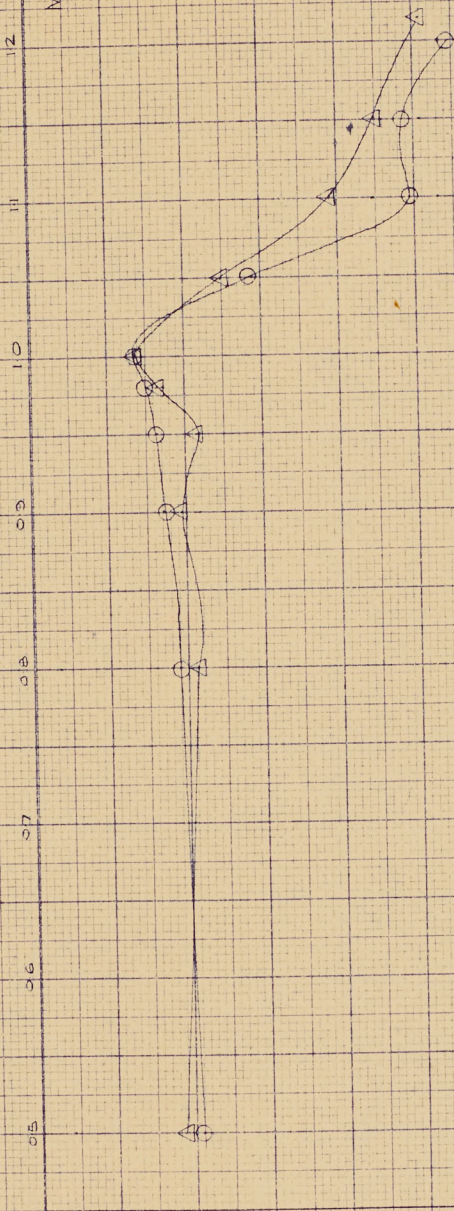
$\alpha = 2^\circ$

Mach No

0 0.02 0.04 0.06 0.08 0.10 0.12

0.002 0.004 0.006 0.008 0.010 0.012

$C_{Dp}$  (Degrees)



UNCLASSIFIED  
NON CLASSIFIED

$\alpha > 3^\circ$

$\alpha < 3^\circ$

C-105

CAL. W/T TESTS OXIAR

C<sub>D</sub> vs M

Config B<sub>1</sub>C<sub>6</sub>V<sub>2</sub>R<sub>5</sub>N<sub>5A</sub>

α = 4°

Mach. N°

1.2

1.1

1.0

0.9

0.8

0.7

0.6

0.5

0

C<sub>D</sub> - 0.008

(Degrees)

- 0.010

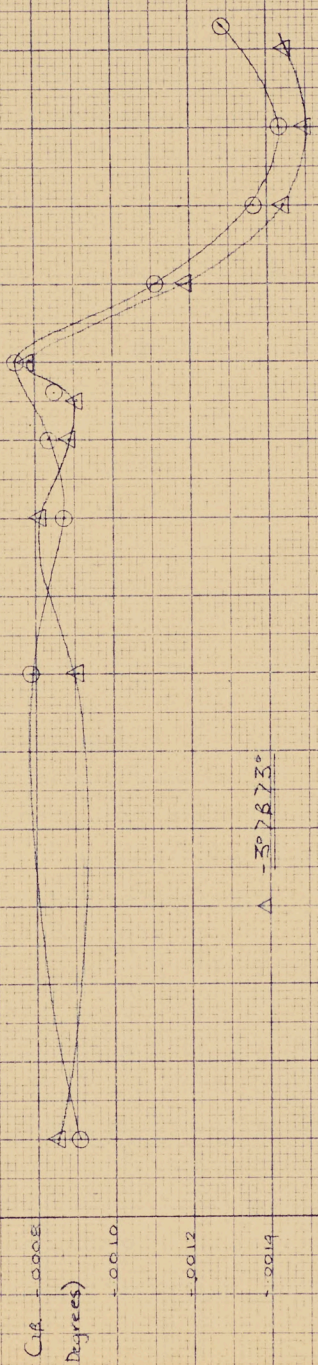
- 0.012

- 0.014

- 0.016

△ - 3° 28' 73"

○ - 3° 4' 3"

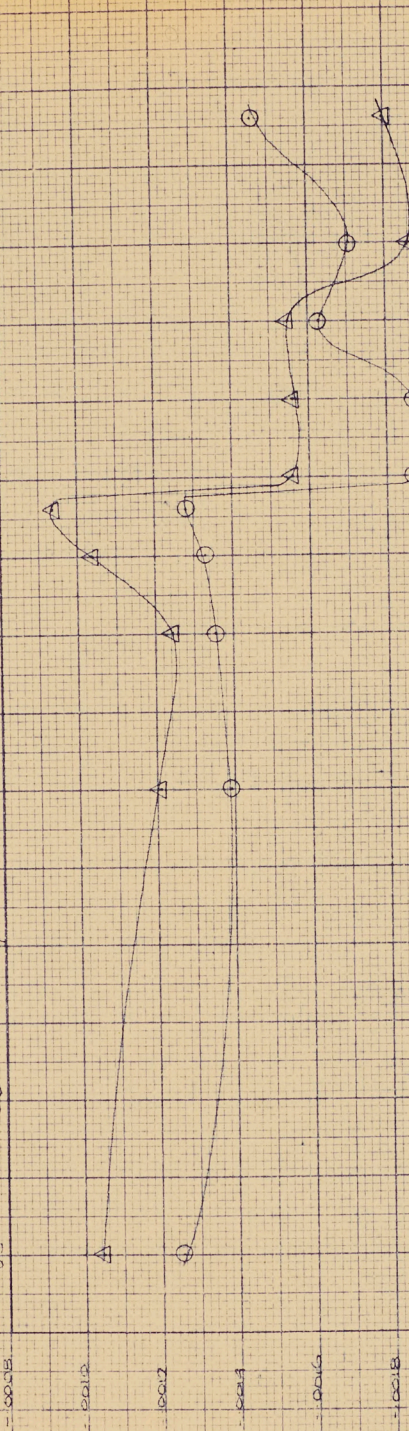


UNCLASSIFIED  
 NON CLASSIFIE

C-105  
 C.A.L. W/T TESTS OCT 54  
 C18 vs M  
 Config B<sub>4</sub> C<sub>5</sub> V<sub>2</sub> R<sub>3</sub> N<sub>3</sub>A  
 $\alpha = 6^\circ$

Mach N<sup>2</sup>

1.000E 0.95 0.90 0.85 0.80 0.75 0.70 0.65 0.60 0.55 0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.15 0.10 0.05 0.00



C<sub>18</sub>  
 (Degrees) 30 > B > 30

0 30 < B < 30

UNCLASSIFIED  
 NON CLASSIFIED

C-105  
 CAL. WT. TESTS OCT 59  
 CIB VS M  
 Config. B4 C5 V4 S4 N5 A1  
 $\alpha = 10^\circ$

Mach. N<sub>0</sub>

1.004 1.0016 1.0018 1.0020 1.0022

0.5

1.0

1.5

2.0

2.5

3.0

3.5

4.0

4.5

5.0

5.5

6.0

6.5

7.0

7.5

8.0

8.5

9.0

9.5

10.0

10.5

11.0

11.5

12.0

12.5

13.0

13.5

14.0

14.5

15.0

15.5

16.0

16.5

17.0

17.5

18.0

18.5

19.0

19.5

20.0

20.5

21.0

21.5

22.0

22.5

23.0

23.5

24.0

24.5

25.0

25.5

26.0

26.5

27.0

27.5

28.0

28.5

29.0

29.5

30.0

30.5

31.0

31.5

32.0

32.5

33.0

33.5

34.0

34.5

35.0

35.5

36.0

36.5

37.0

37.5

38.0

38.5

39.0

39.5

40.0

40.5

41.0

41.5

42.0

42.5

43.0

43.5

44.0

44.5

45.0

45.5

46.0

46.5

47.0

47.5

48.0

48.5

49.0

49.5

50.0

50.5

51.0

51.5

52.0

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53.0

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56.0

56.5

57.0

57.5

58.0

58.5

59.0

59.5

60.0

60.5

61.0

61.5

62.0

62.5

63.0

63.5

64.0

64.5

65.0

65.5

66.0

66.5

67.0

67.5

68.0

68.5

69.0

69.5

70.0

70.5

71.0

71.5

72.0

72.5

73.0

73.5

74.0

74.5

75.0

75.5

76.0

76.5

77.0

77.5

78.0

78.5

79.0

79.5

80.0

80.5

81.0

81.5

82.0

82.5

83.0

83.5

84.0

84.5

85.0

85.5

86.0

86.5

87.0

87.5

88.0

88.5

89.0

89.5

90.0

90.5

91.0

91.5

92.0

92.5

93.0

93.5

94.0

94.5

95.0

95.5

96.0

96.5

97.0

97.5

98.0

98.5

99.0

99.5

100.0

100.5

101.0

101.5

102.0

102.5

103.0

103.5

104.0

104.5

105.0

105.5

106.0

106.5

107.0

107.5

108.0

108.5

109.0

109.5

110.0

110.5

111.0

111.5

112.0

112.5

113.0

113.5

114.0

114.5

115.0

115.5

116.0

116.5

117.0

117.5

118.0

118.5

119.0

119.5

120.0

120.5

121.0

121.5

122.0

122.5

123.0

123.5

124.0

124.5

125.0

125.5

126.0

126.5

127.0

127.5

128.0

128.5

129.0

129.5

130.0

130.5

131.0

131.5

132.0

132.5

133.0

133.5

134.0

134.5

135.0

135.5

136.0

136.5

137.0

137.5

138.0

138.5

139.0

13

10 X 10 TO THE 1/8 INCH 359-12  
KEUFEL & ESSER CO. MADE IN U.S.A.

C-105

$C_{y\beta}$  vs Mach Number

C.A.L. Wind Tunnel Tests Oct. 1954

$C_{y\beta}$   
per degree

-.008

-.006

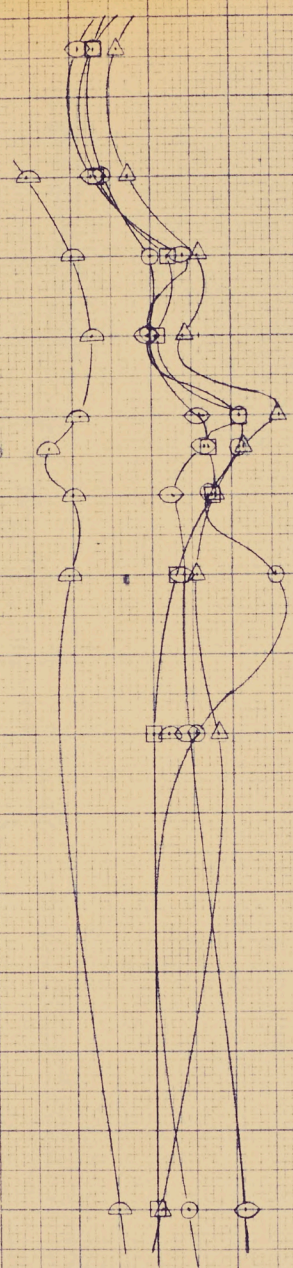
-.004

-.002

0

- $\alpha = 0^\circ$
- △  $\alpha = 2.1^\circ$
- ◇  $\alpha = 4.2^\circ$
- $\alpha = 6.3^\circ$
- ⊖  $\alpha = 10.5^\circ$

$-\alpha < \beta < \alpha$



UNCLASSIFIED  
NON CLASSIFIED

11 12  
Mach Number

K&E 10 X 10 TO THE 1/2 INCH 359-12 KEUFFEL & ESSER CO. MADE IN U.S.A.

C-105

C<sub>p</sub> vs Mach Number

C.A.L. Wind Tunnel Tests ~ Oct. 1954

C<sub>p</sub> per deg.

-0.10

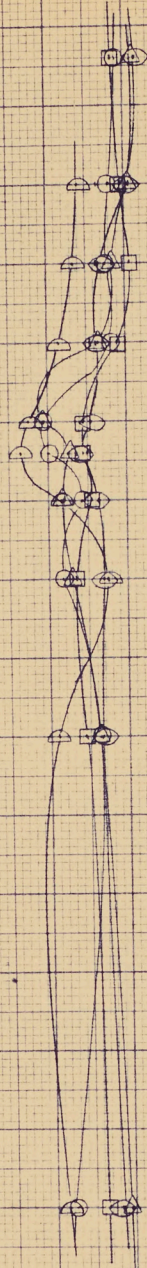
-0.08

-0.06

-0.04

-0.02

0



- $\alpha = 0$
- ▷  $\alpha = 2.10$
- ◇  $\alpha = 4.20$
- $\alpha = 6.30$
- ▽  $\alpha = 10.50$

$-4^\circ > \beta > 4^\circ$

UNCLASSIFIED  
NON CLASSIFIE

Mach Number

C-105

C.A.I. Wind Tunnel Tests ~ Oct 1954

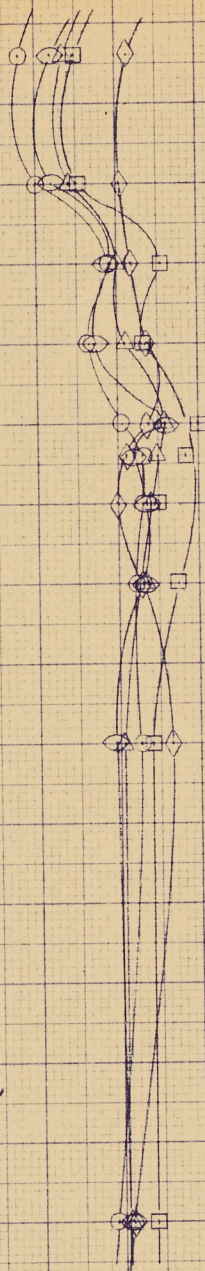
Effective  $C_{Dv}$  vs Mach Number.

Configuration B<sub>7</sub> G<sub>1</sub> W<sub>2</sub> K<sub>3</sub> R<sub>3</sub> Nos

$C_{Dv}$   
per degree

$\odot \alpha = 0$   
 $\triangleright \alpha = 21^\circ$   
 $\ominus \alpha = 42^\circ$   
 $\square \alpha = 63^\circ$   
 $\diamond \alpha = 10.5^\circ$

$-1^\circ \leq \beta \leq +1^\circ$



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Mach No

C-105

C.A.L. Wind Tunnel Tests ~ Oct. 1954

Effective  $C_{Dv}$  vs Mach Number

Configuration B<sub>1</sub> B<sub>2</sub> B<sub>3</sub> B<sub>4</sub> B<sub>5</sub>

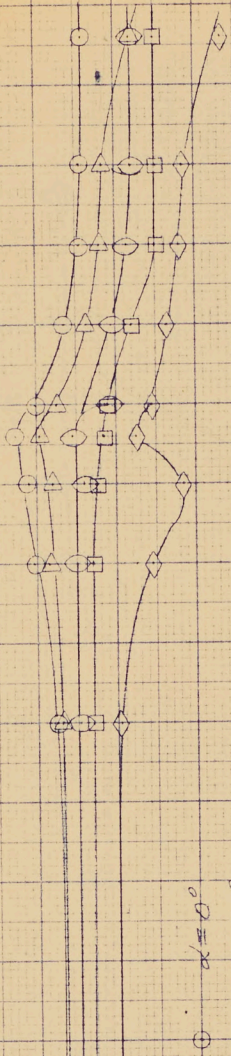
$C_{Dv}$   
per degree

.06

.04

.02

0



( $-4^\circ \leq \beta \leq 4^\circ$ )

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NON CLASSIFIE

Mach No.

C/105

CAL WIND TUNNEL TESTS.

OCT. 1954

SPANWISE QCC - FIN AND RUDDER.

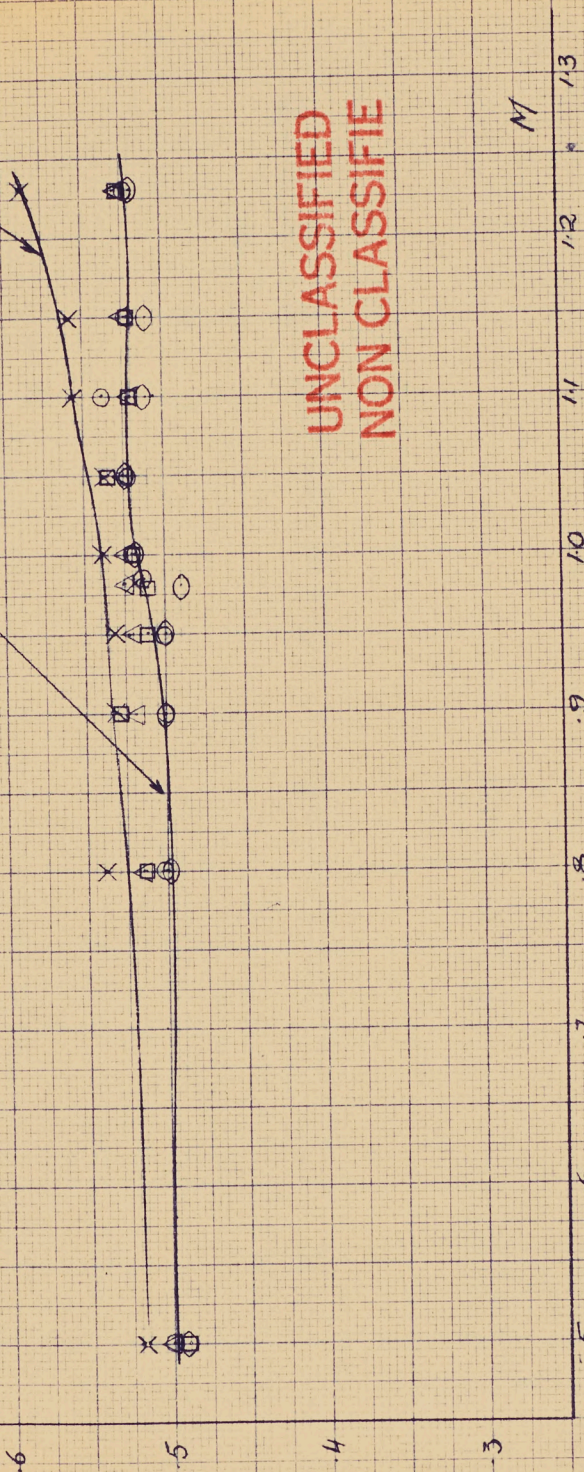
CONFIGURATION  $\delta_4$   $C_3$   $W_9$   $\frac{1}{2}$   $R_3$   $N_{45}$

$-3^\circ < \beta < 3^\circ$  (low range).

$\delta_c = \delta_a = \delta_r = 0$ .

$\odot \alpha = 0^\circ$   
 $\triangle \alpha = 2.1^\circ$   
 $\ominus \alpha = 4.2^\circ$   
 $\square \alpha = 6.3^\circ$   
 $\times \alpha = 10^\circ$

QCC  
mach of span



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NON CLASSIFIE

M

C 105  
CAL WIND TUNNEL TESTS  
OCTOBER 1954

SPANWISE ACC - FIN AND RUDDER

CONFIGURATION: Bu C<sub>3</sub> W<sub>9</sub> V<sub>6</sub> R<sub>3</sub> N<sub>4</sub> S

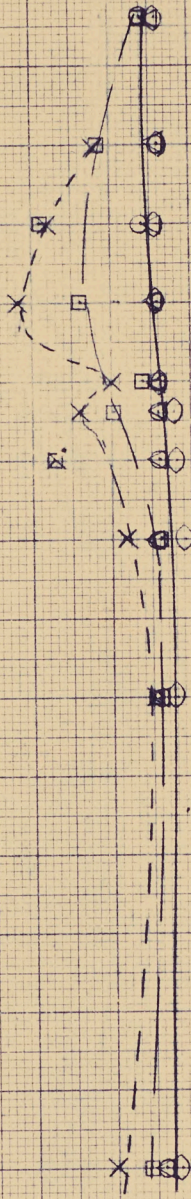
$3^\circ < \beta < -3^\circ$  (high range)

$\delta_c = \delta_a = \delta_r = 0$

- $\alpha = 0$
- △  $\alpha = 2.1^\circ$
- ⊙  $\alpha = 4.2^\circ$
- $\alpha = 6.3^\circ$
- ×  $\alpha = 10^\circ$

$\frac{ac}{\text{fraction of span}}$

6  
5  
4  
3



UNCLASSIFIED  
NON CLASSIFIED

MARCH NO.

13

12

11

10

9

8

7

6

5

C 105.

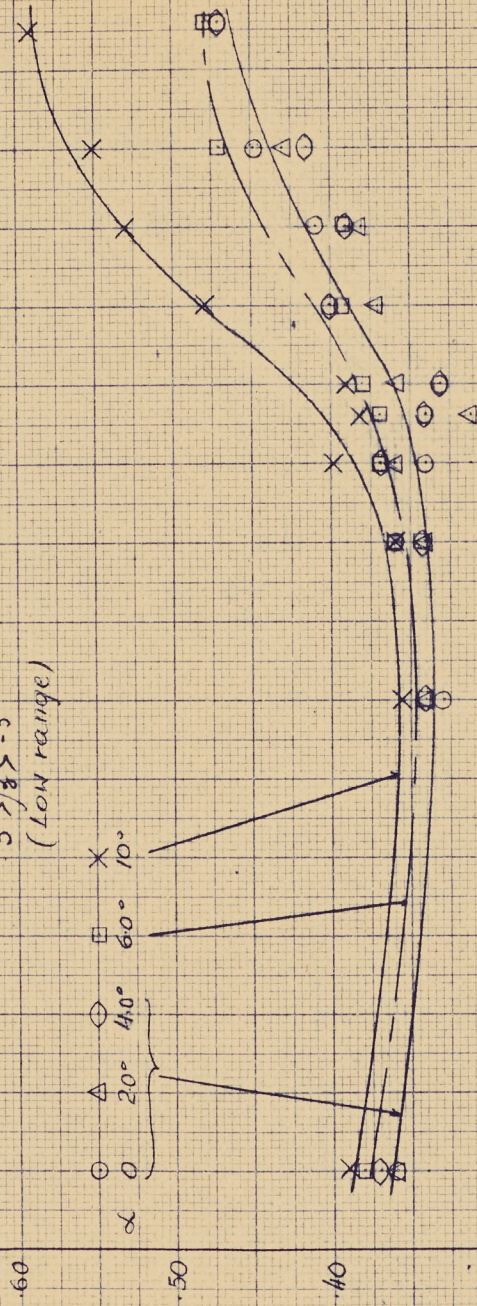
CAL. WIND TUNNEL TESTS.  
OCTOBER 1954.

CC  
traction  
mac.

CC - VERTICAL TAIL

CONFIGURATION: B<sub>4</sub> C<sub>3</sub> H<sub>9</sub> V<sub>2</sub> R<sub>3</sub> NAS

$3^\circ > \beta > -3^\circ$   
(Low range)



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Mach No.

.5 .6 .7 .8 .9 1.0 1.1 1.2

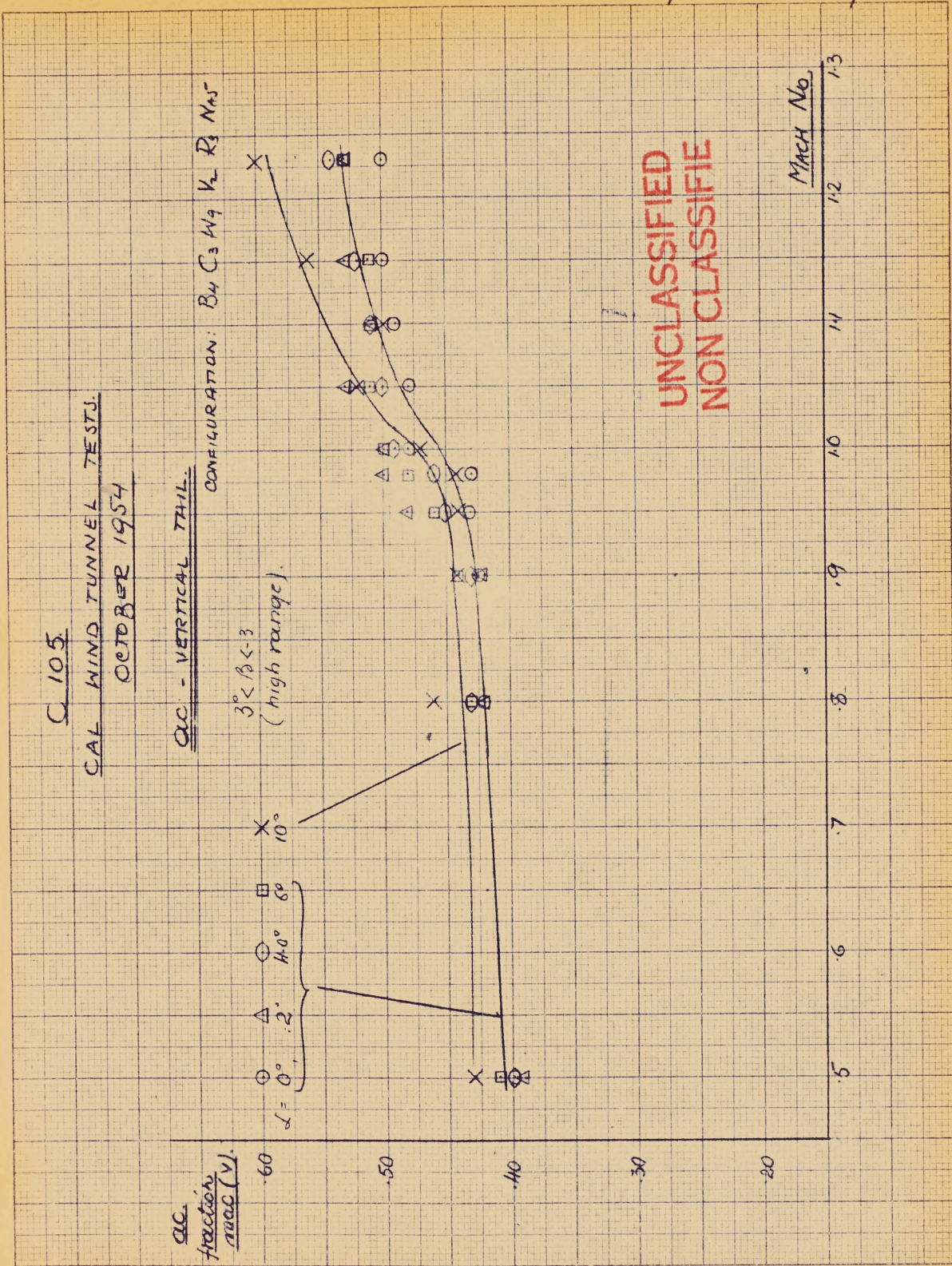
C. 105  
CAL WIND TUNNEL TESTS  
OCTOBER 1954

QC - VERTICAL TAIL  
 CONFIGURATION:  $B_4 C_3 W_9 V_2 R_3 N_{45}$

$3^\circ < \beta < 3$   
 (high range)

QC  
 fraction  
 $\frac{m_{QC}}{m_{AC}} (V)$

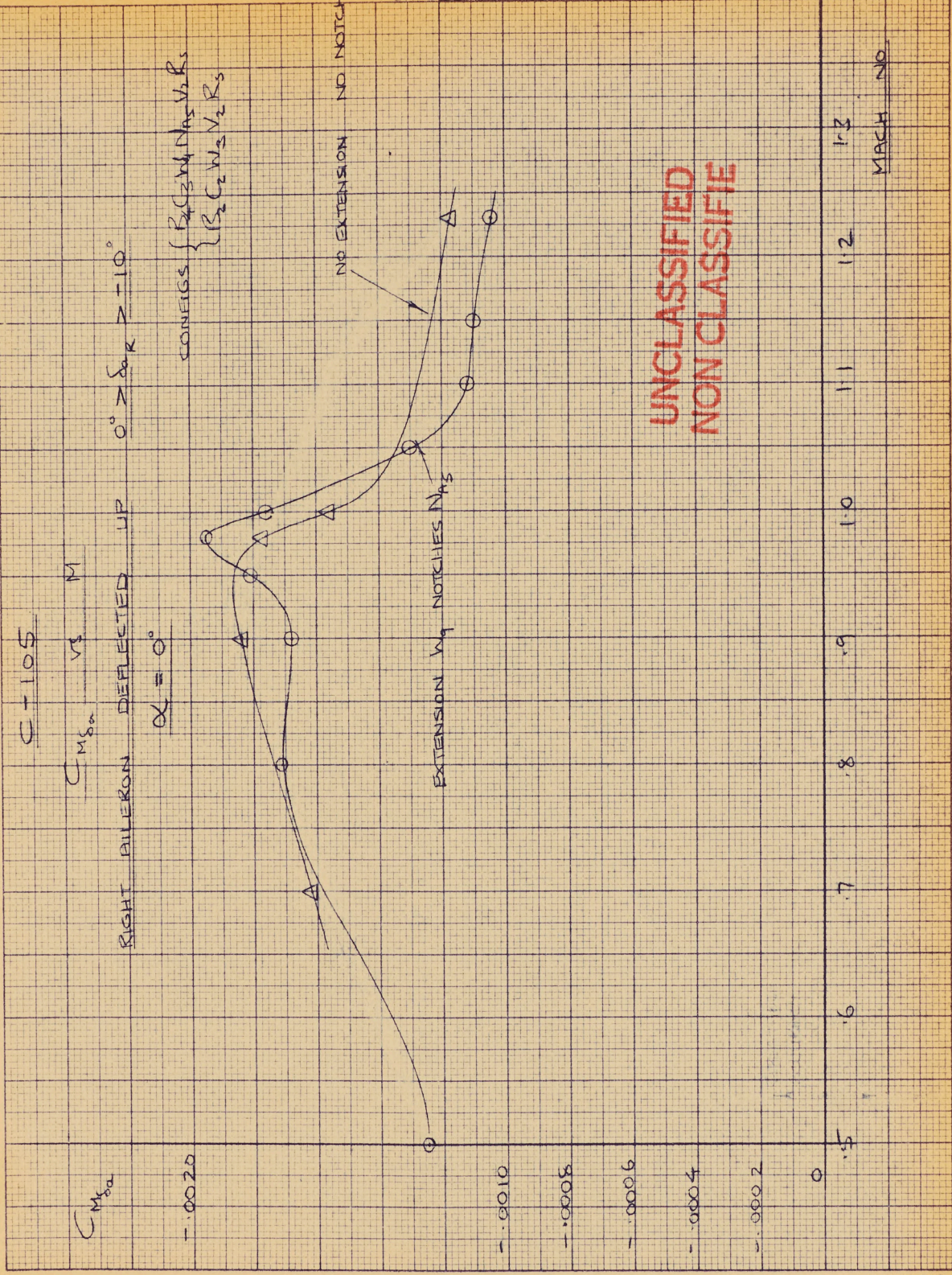
$\Delta = 0^\circ$   
 $\circ = 2^\circ$   
 $\square = 4^\circ$   
 $\diamond = 8^\circ$   
 $\times = 10^\circ$



UNCLASSIFIED  
 NON CLASSIFIED

MACH No.  
 1.3  
 1.2  
 1.1  
 1.0  
 .9  
 .8  
 .7  
 .6  
 .5

K&E 10 X 10 TO THE 1/2 INCH 359-12  
KEUFFEL & ESSER CO. MADE IN U.S.A.



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K&E 10 X 10 TO THE 1/2 INCH 359-12  
KEUFFEL & ESSER CO. MADE IN U.S.A.

C-105

$C_{M_{80}}$  vs  $M$

RIGHT AILERON DEFLECTED UP  $0^\circ > \delta_{aR} > -10^\circ$

$\alpha = 2^\circ$

CONFIGS  $\left\{ \begin{array}{l} B_4 C_3 W_4 N_4 V_2 R_9 \\ B_2 C_2 W_3 V_2 R_5 \end{array} \right.$

$C_{M_{80}}$

-0.0020

-0.0010

-0.0005

0

EXTENSION  $W_4$  NOTCHES  $N_4$

NO EXTENSION NO NOTCHES

UNCLASSIFIED  
NON CLASSIFIE

13

12

11

10

.9

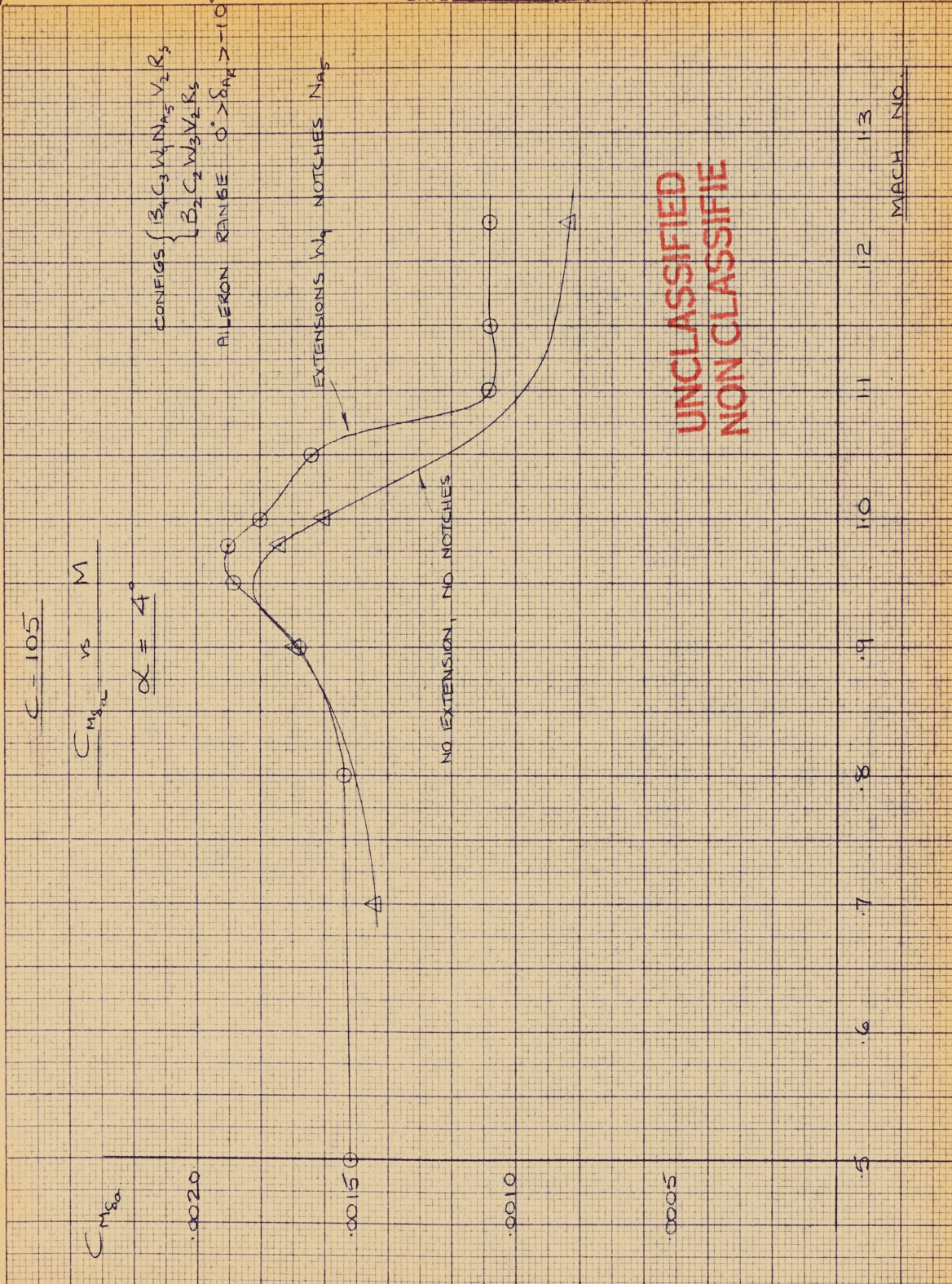
.8

.7

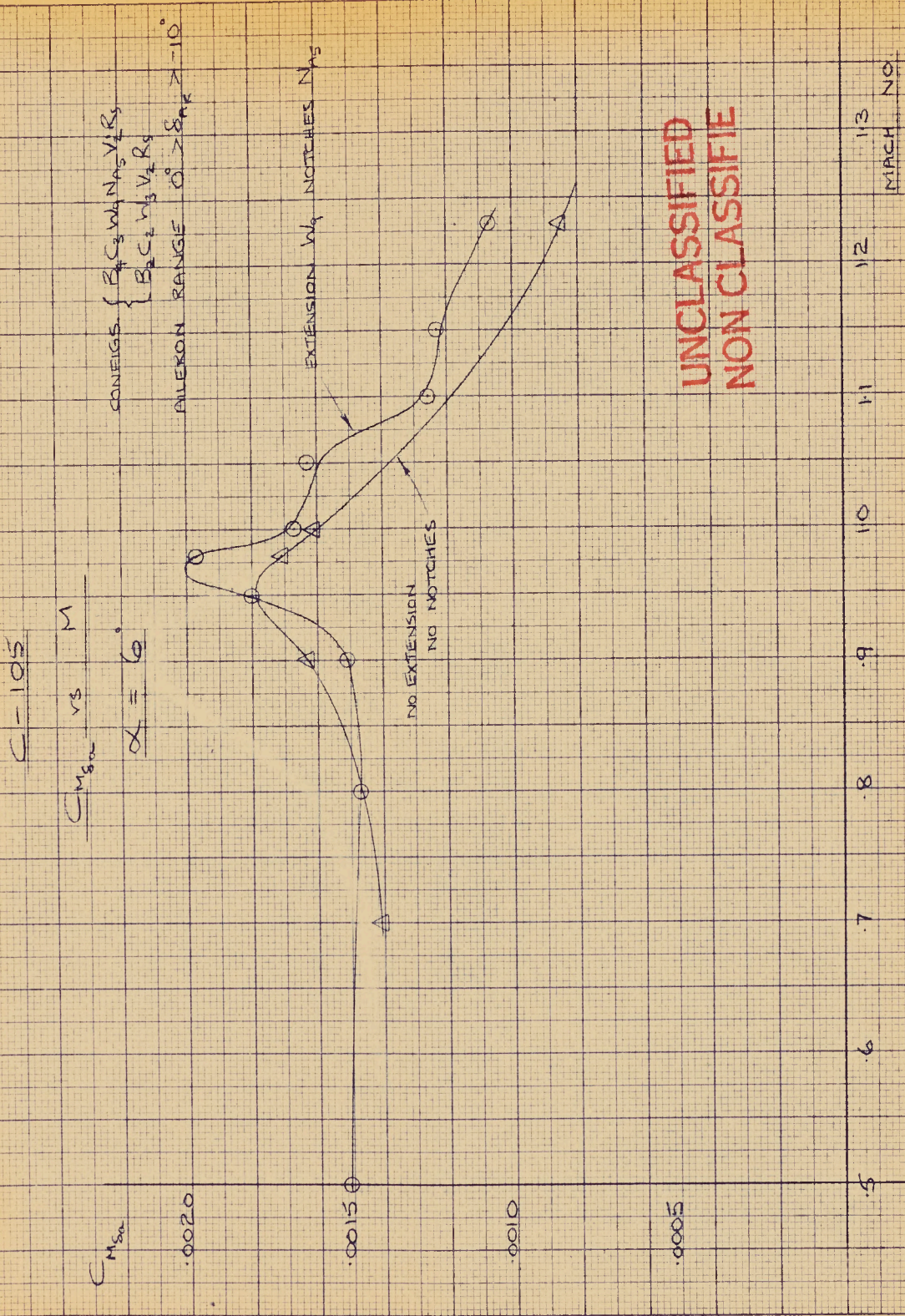
.6

.5

MACH NO.



UNCLASSIFIED  
NON CLASSIFIED



UNCLASSIFIED  
NON CLASSIFIE

MACH NO.

K&E 10 X 10 TO THE 1/2 INCH 359-12 KEUFFEL & ESSER CO. MADE IN U.S.A.

10 X 10 TO THE 1/8 INCH 359.12  
KEUFFEL & ESSER CO. MADE IN U.S.A.

C-105

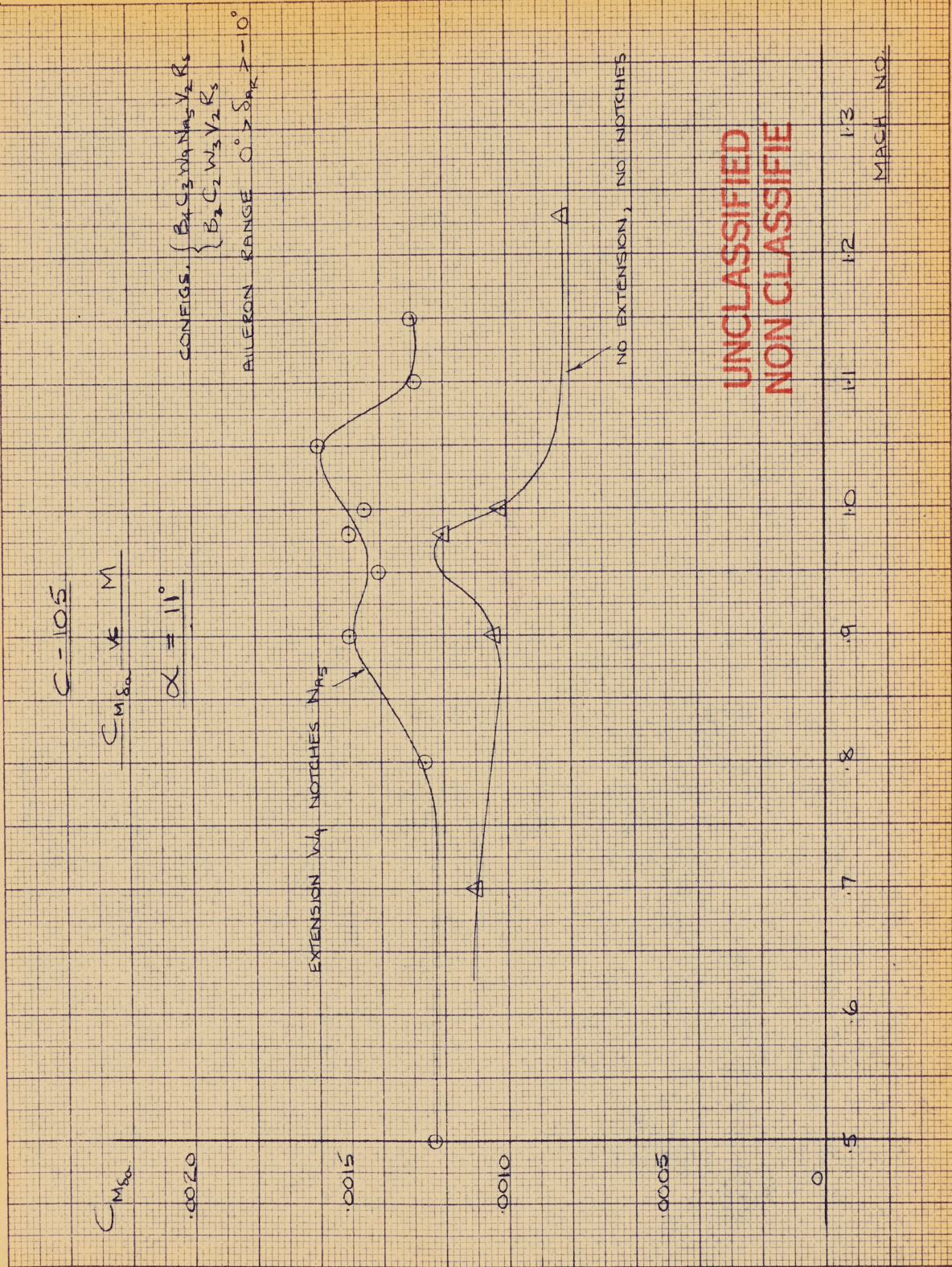
$C_{M_{60}}$  vs  $M$

$\alpha = 11^\circ$

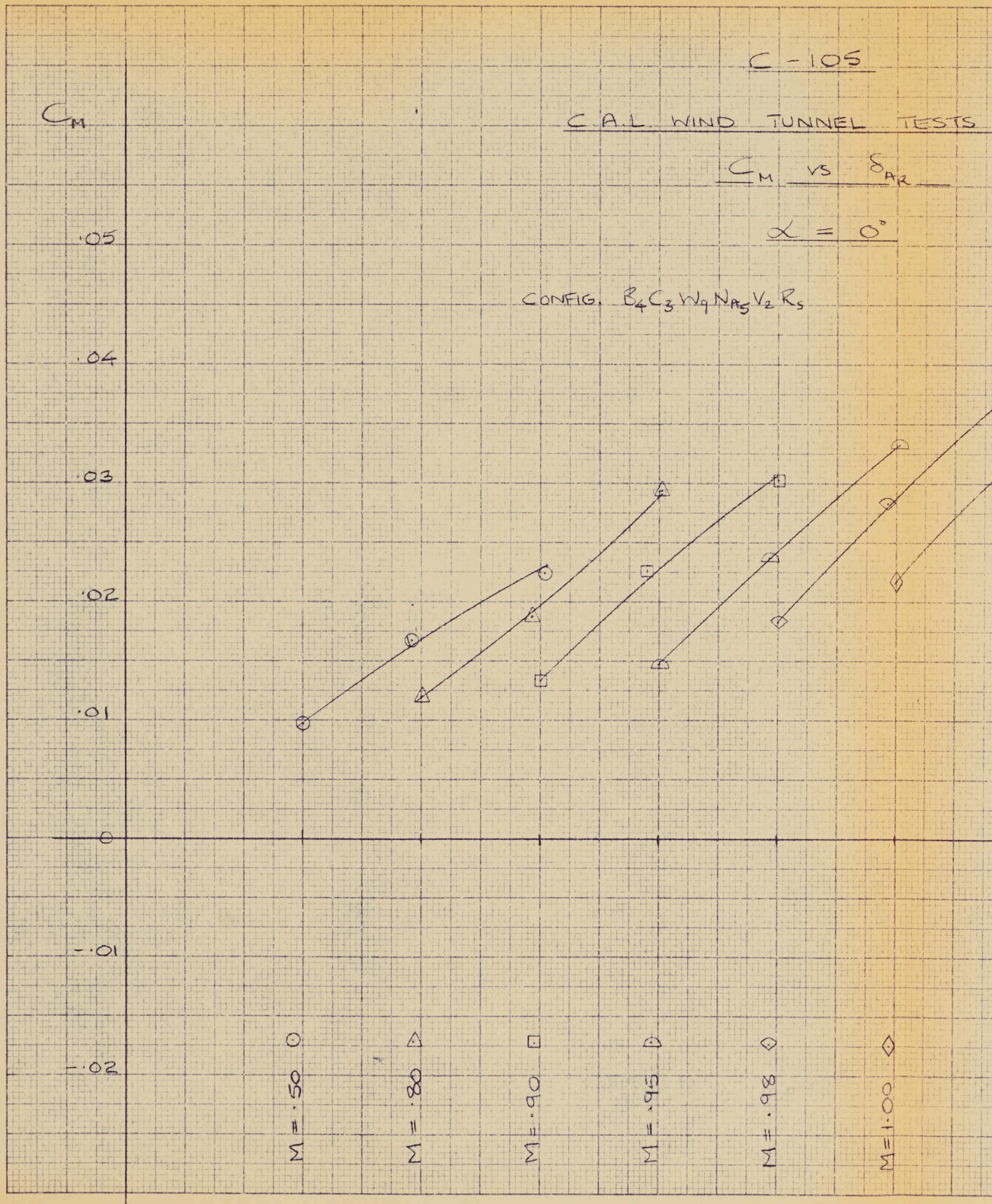
CONFIGS.  $\left\{ \begin{array}{l} B_4 C_3 W_4 N_4 V_2 R_3 \\ B_2 C_2 W_3 V_2 R_3 \end{array} \right.$   
AILERON RANGE  $0^\circ > \delta_{AK} > -10^\circ$

EXTENSION  $W_4$  NOTCHES  $N_4$

NO EXTENSION, NO NOTCHES



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NON CLASSIFIE

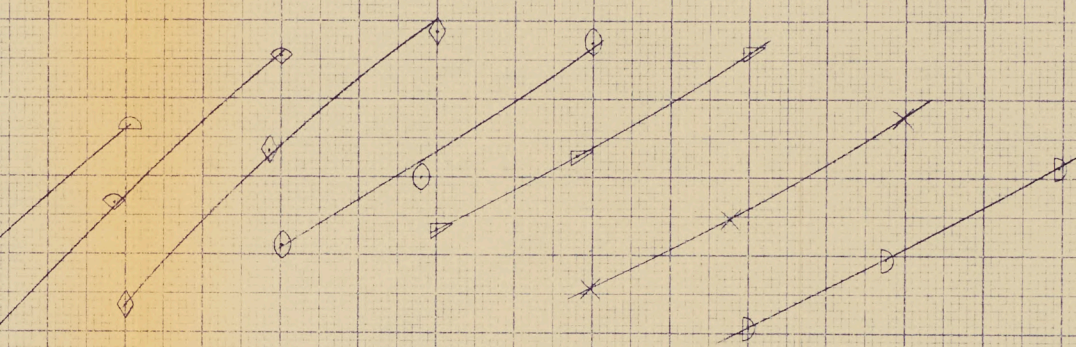


105

SNEL TESTS OCT. '54

VS  $\delta_{PR}$

= 0°



M=1.00 ◊

M=1.05 ○

M=1.10 ▽

M=1.15 X

M=1.23 ◻

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NON CLASSIFIED

$C_M$

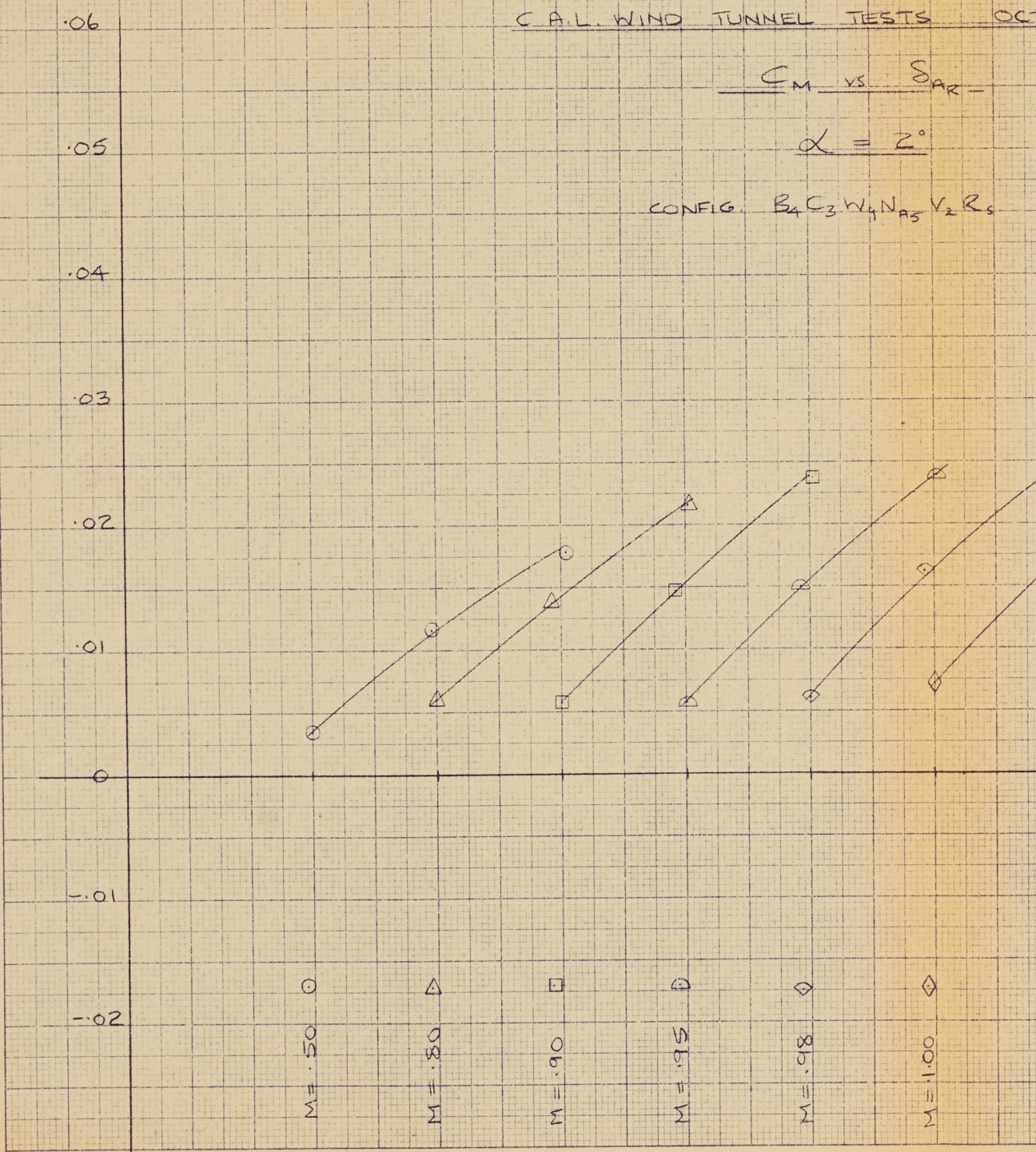
C-105

C.A.L. WIND TUNNEL TESTS

$C_M$  vs  $\delta_{AR}$

$\alpha = 2^\circ$

CONFIG.  $B_4 C_3 W_4 N_{A5} V_2 R_5$



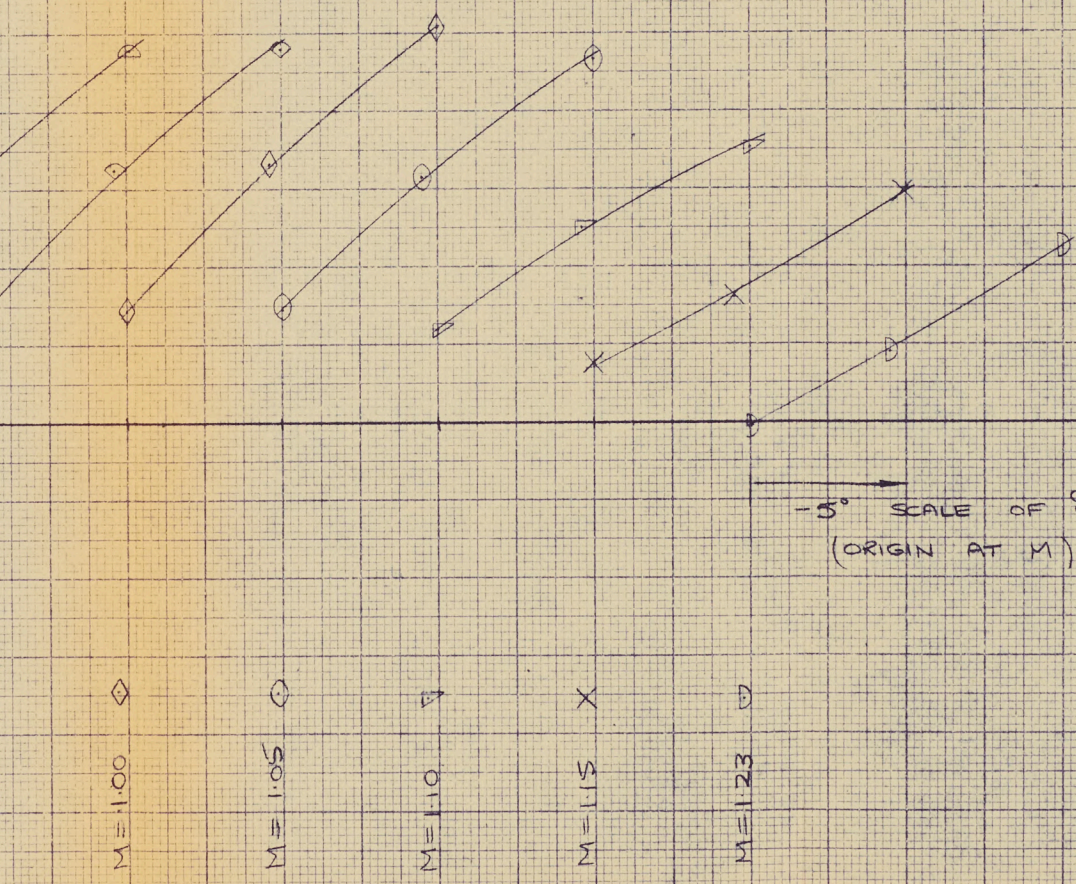
-105

TESTS OCT '54

vs  $\delta_{AR}$

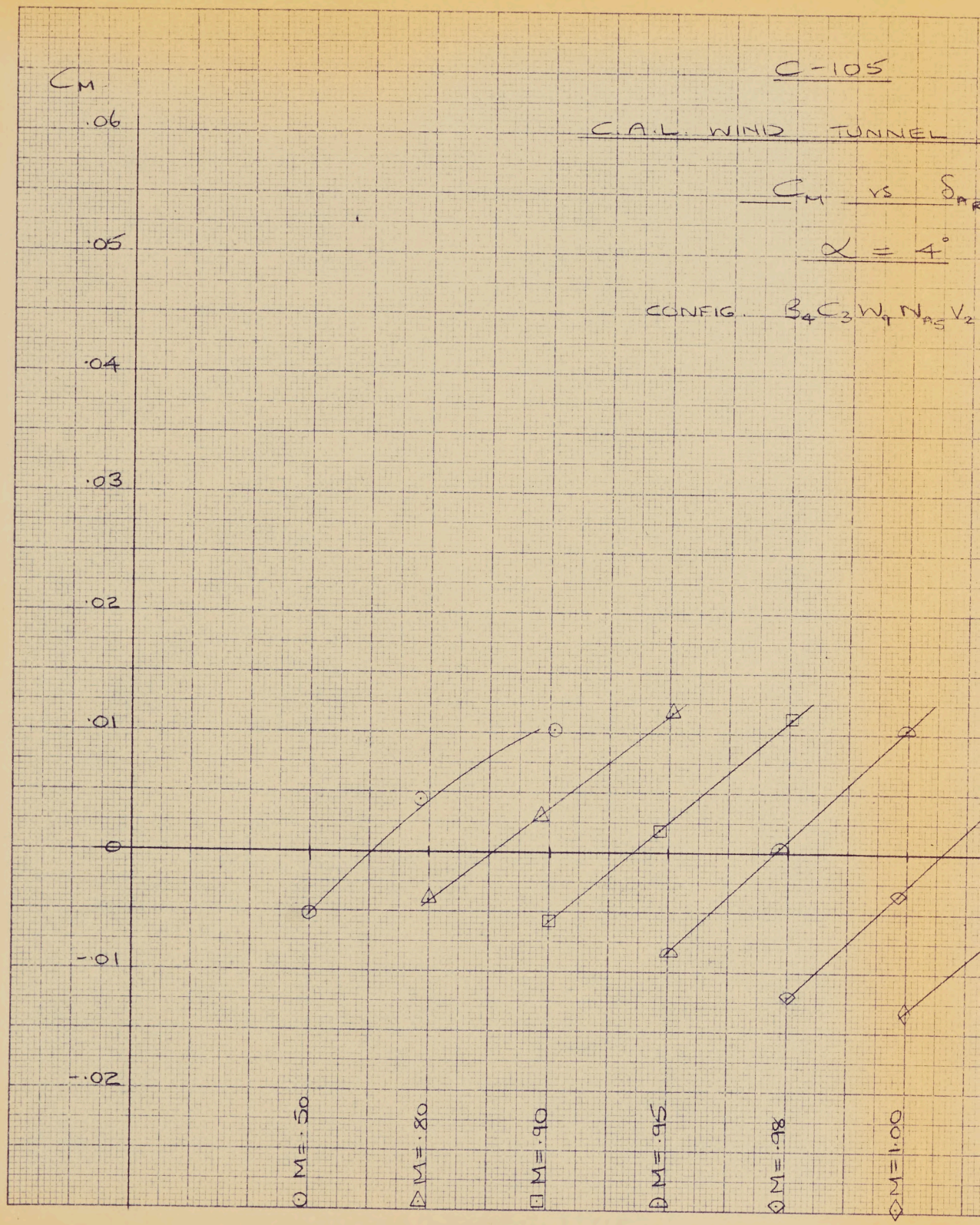
=  $Z^\circ$

$W_4 N_{A5} V_2 R_s$



UNCLASSIFIED  
NON CLASSIFIED

359-11L KUFFEL & ESSER CO.  
10 X 10 to the 12 inch, full lines accounted.  
MADE IN U.S.A.



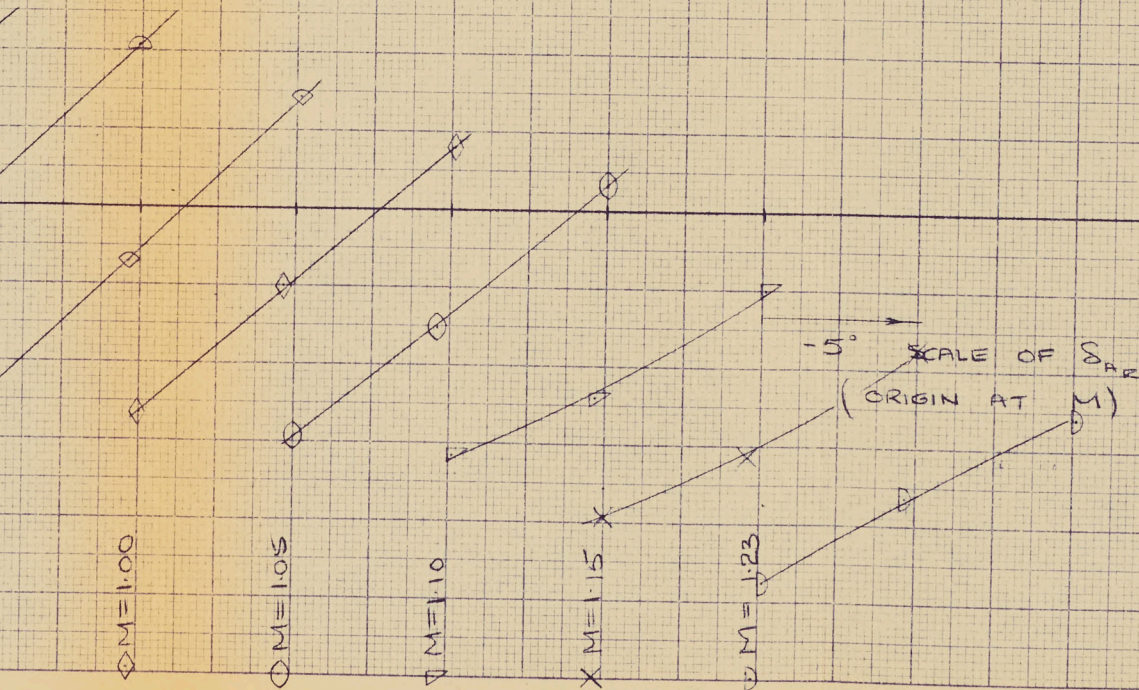
-105

TUNNEL TESTS OCT. '54

$M$  vs  $S_{AR}$

$\alpha = 4^\circ$

$C_4 C_3 W_4 N_{AS} V_2 R_5$



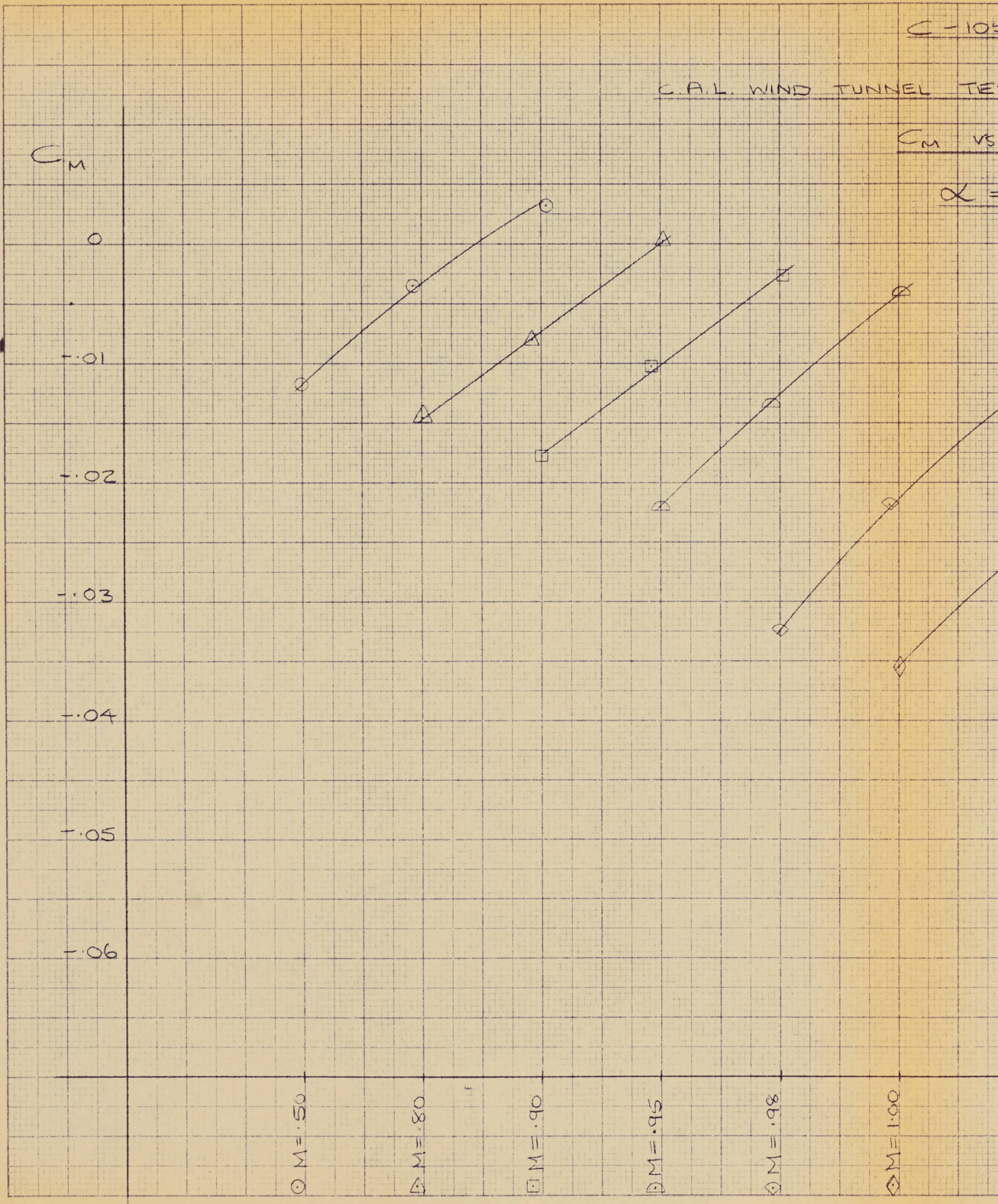
UNCLASSIFIED  
NON CLASSIFIE

C-105

C.A.L. WIND TUNNEL TEST

$C_M$  VS

$\alpha =$



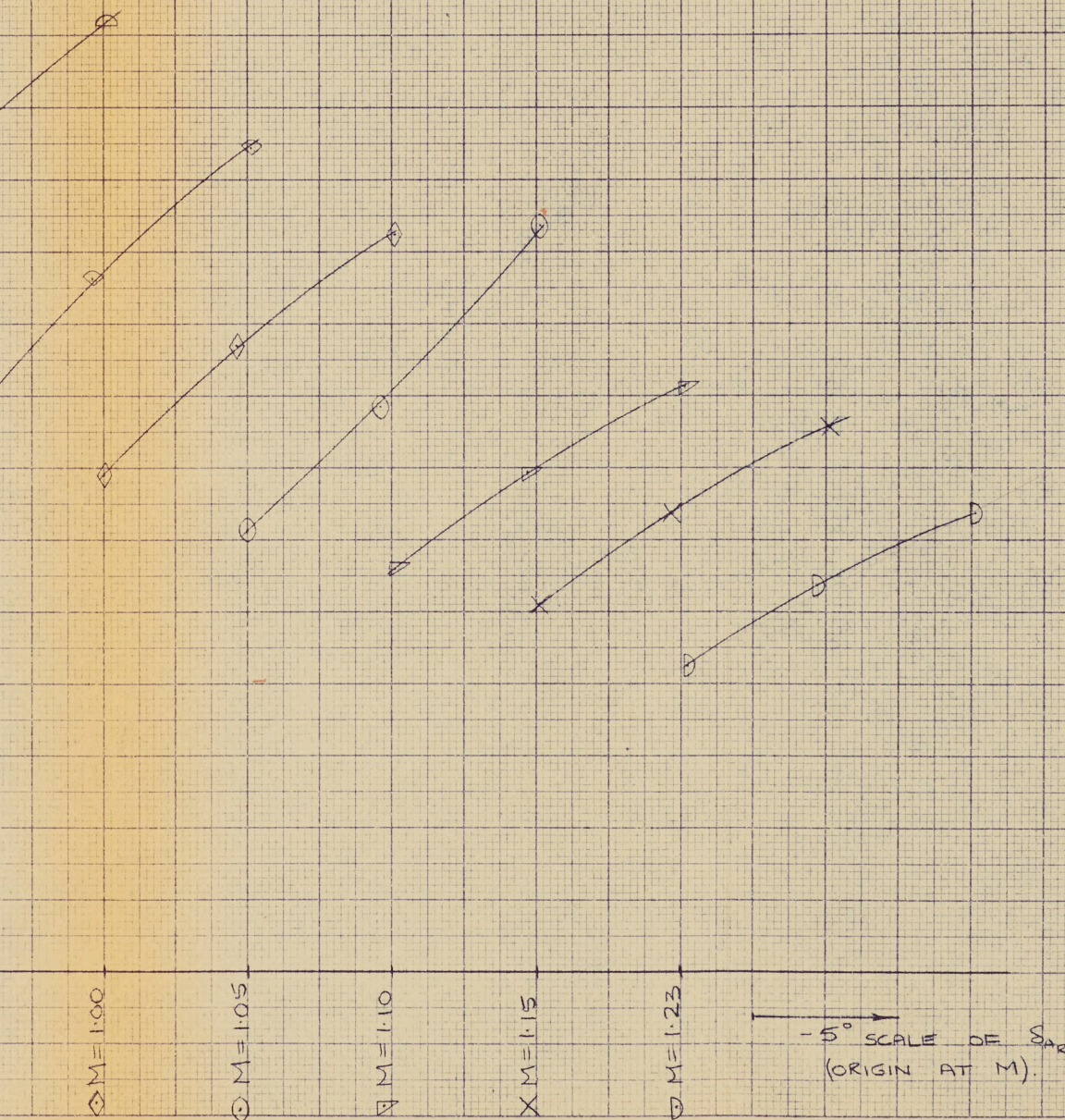
C-105

TUNNEL TESTS OCT. '54

$C_M$  vs  $\delta_{AR}$

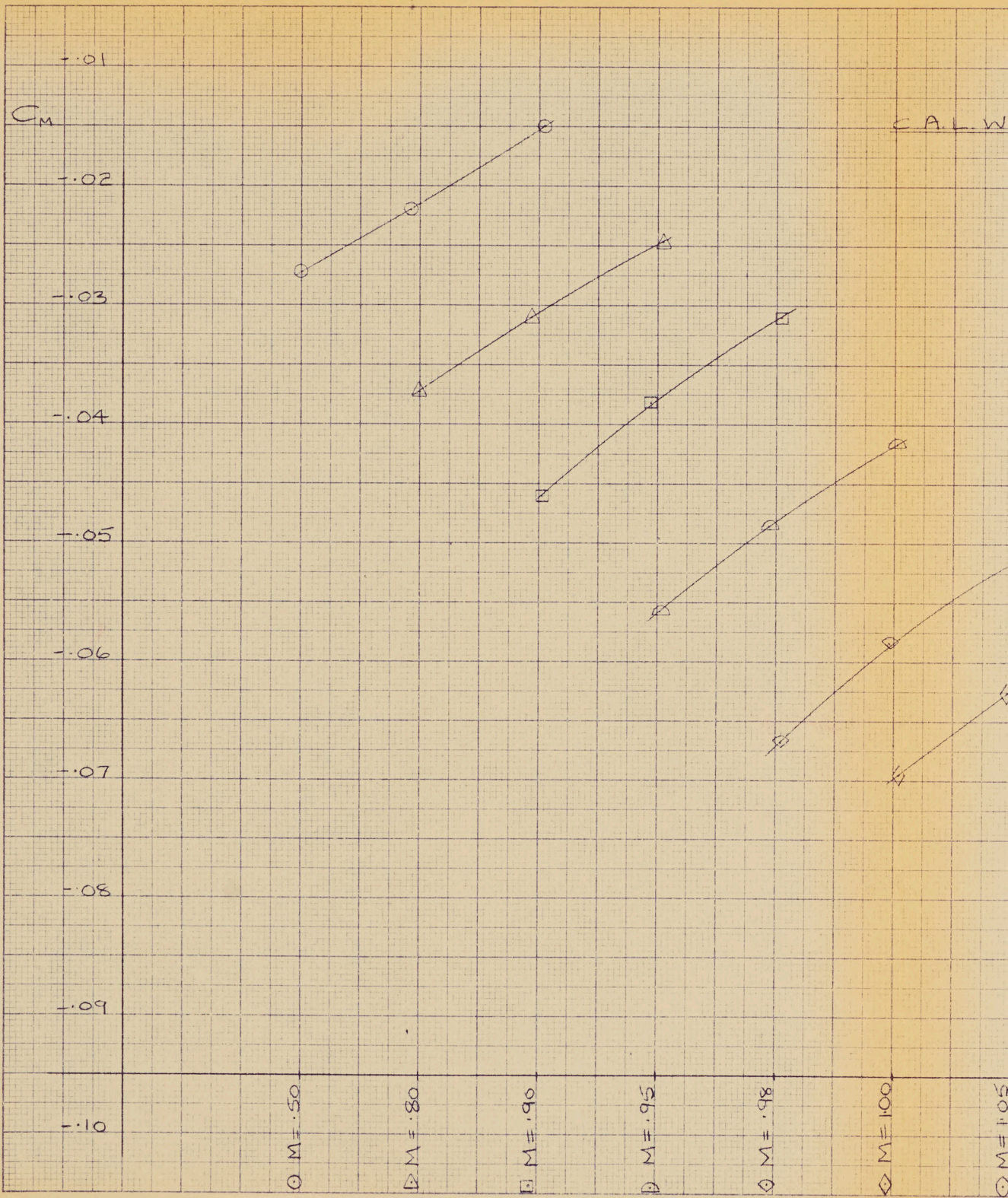
$\alpha = 6^\circ$

CONFIG.  $B_4 C_3 W_9 N_5 V_2 R_5$



-5° SCALE OF  $\delta_{AR}$   
(ORIGIN AT M)

UNCLASSIFIED  
NON CLASSIFIE



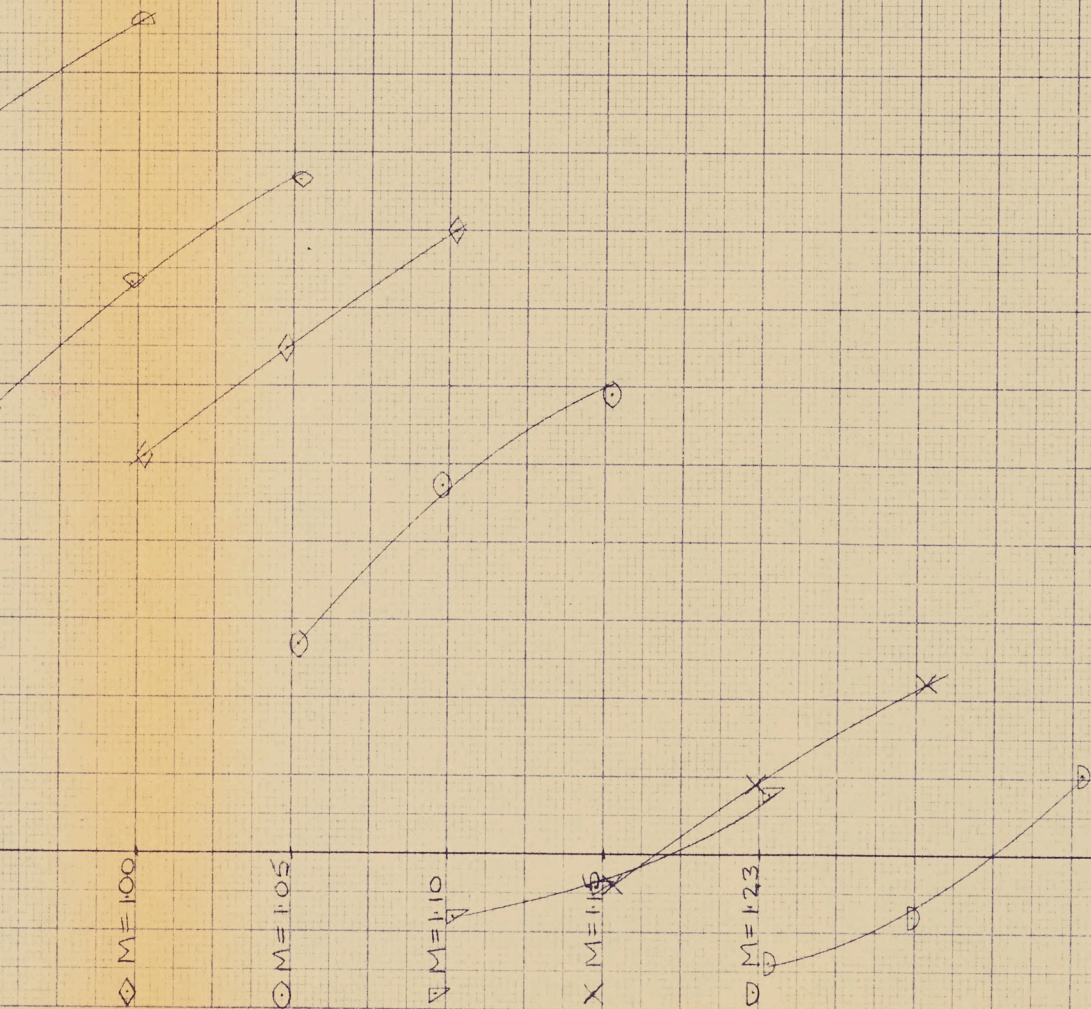
C-105

C.A.L. WIND TUNNEL TESTS OCT. '54

$C_M$  vs  $\delta_{AR}$

$\alpha = 11^\circ$

CONFIG.  $B_4 C_3 W_9 N_{A5} V_2 R_3$



UNCLASSIFIED  
NON CLASSIFIE

AIRCRAFT  
A. U. W.

COMPONENT

SHEET No. 6.2.1 REPORT No. P/WT/50  
DATE NOV '54 PREP. BY DT Stewart

10 X 10 TO THE 1/2 INCH 359-12  
KEUFFEL & ESSBERG CO. MADE IN U.S.A.

C-105

$C_{L_{AR}}$  vs. M.

$\alpha = 0^\circ$

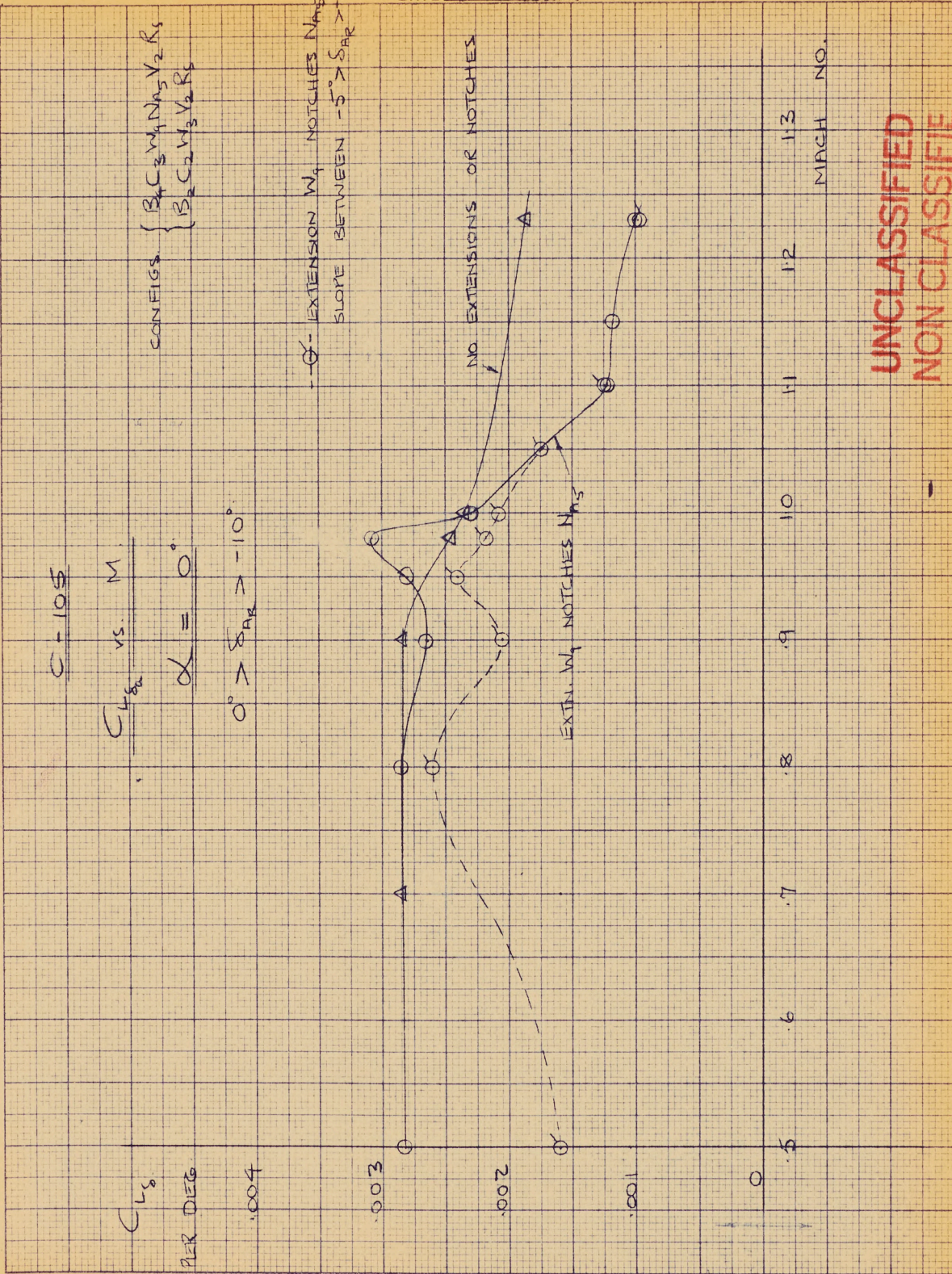
$0^\circ > \delta_{AR} > -10^\circ$

CONFIGS.  $\left\{ \begin{array}{l} B_4 C_4 N_4 A_5 V_2 R_5 \\ B_2 C_2 V_2 V_2 R_5 \end{array} \right.$

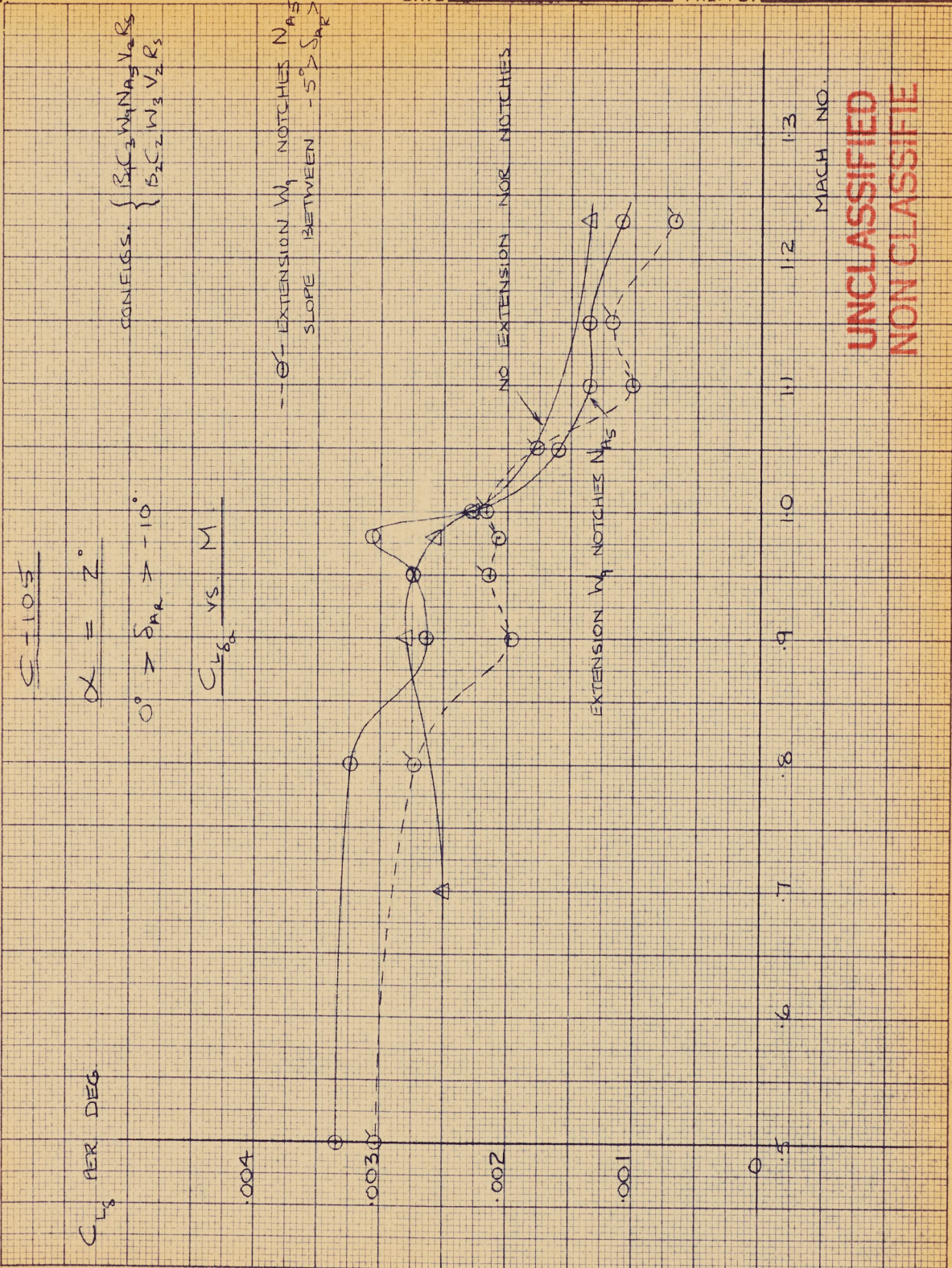
--- EXTENSION  $W_9$  NOTCHES  $N_{A5}$   
SLOPE BETWEEN  $-5^\circ > \delta_{AR} > -15^\circ$

! NO EXTENSIONS OR NOTCHES

EXTRA  $W_9$  NOTCHES  $N_{A5}$

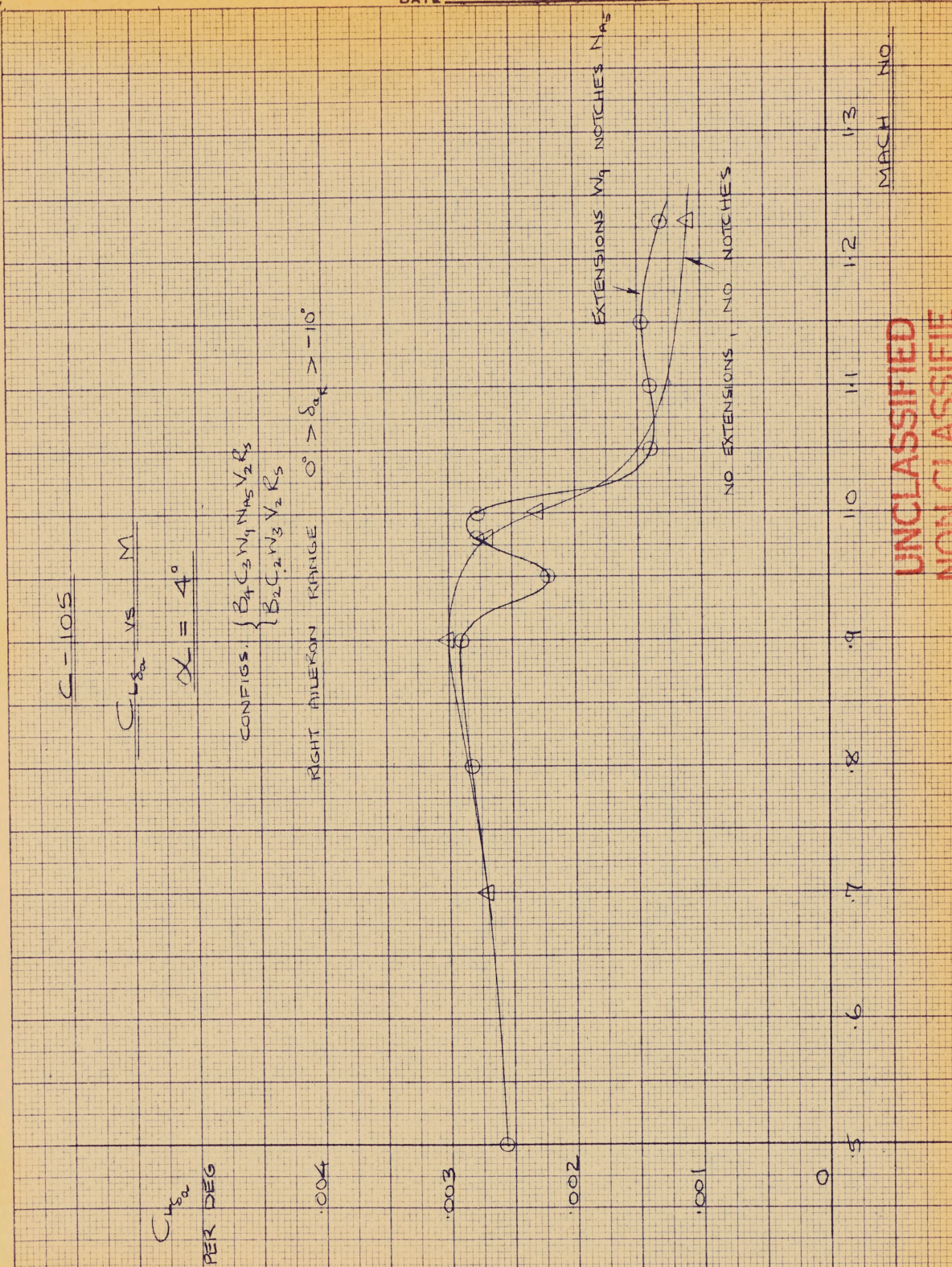


UNCLASSIFIED  
NON CLASSIFIED



MACH NO.

UNCLASSIFIED  
NON CLASSIFIED



UNCLASSIFIED  
NON CLASSIFIED

10 X 10 TO THE 1/2 INCH 359-12  
KEUFFEL & ESSER CO. MADE IN U.S.A.

C-105

$C_{L_{AR}}$  VS M

$\alpha = 6^\circ$

CONFIGS {  $B_1 C_3 B_4 N_4 S V_2 R_5$   
 $B_2 C_2 W_3 V_2 R_5$

RIGHT AILERON RANGE  $0^\circ > \delta_{AR} > -10^\circ$

$C_{L_8}$   
PER DEG.

.004

.003

.002

.001

0

.5

.6

.7

.8

.9

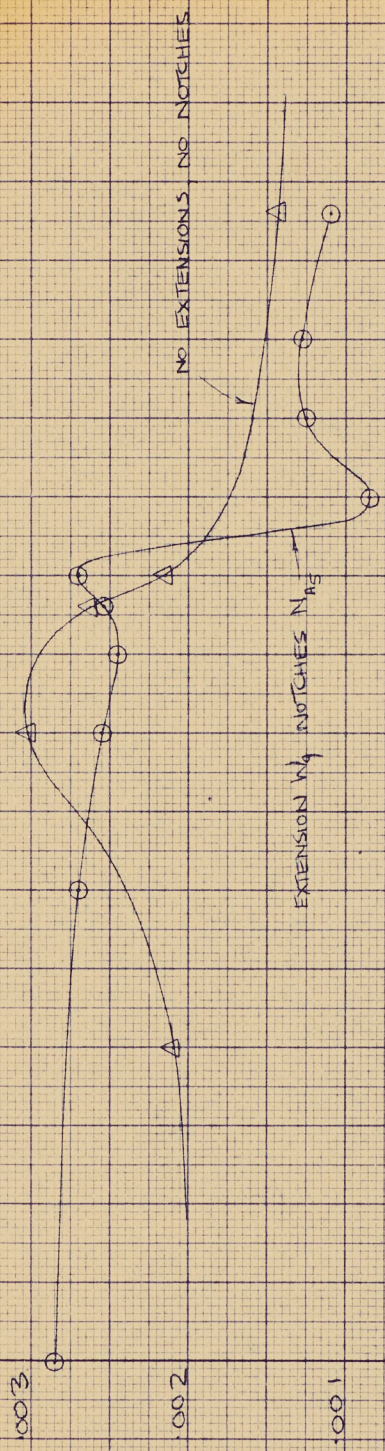
1.0

1.1

1.2

1.3

MACH NO.



UNCLASSIFIED  
NON CLASSIFIE

10 X 10 TO THE 1/2 INCH 359-12  
KEUFFEL & ESSER CO. MADE IN U.S.A.

C-105

$C_L$  vs M

$\alpha = 11^\circ$

CONFIGS.  $\left\{ \begin{array}{l} B_1 C_3 W_4 N_{A_2} V_2 K_3 \\ B_2 C_2 W_3 V_2 K_3 \end{array} \right.$

RIGHT ALLERON RANGE  $0^\circ > \delta_R > -10^\circ$

$C_L$   
PER DEG

.004

.003

.002

.001

0

EXTENSION  $W_4$  NOTCHES  $N_{A_2}$

NO EXTENSION, NO NOTCHES

UNCLASSIFIED  
NON CLASSIFIE

MARCH NO

11

12

13

10

11

12

13

.9

1.0

1.1

1.2

1.3

.8

0.9

1.0

1.1

1.2

1.3

.7

0.8

0.9

1.0

1.1

1.2

1.3

.6

0.7

0.8

0.9

1.0

1.1

1.2

1.3

.5

0.6

0.7

0.8

0.9

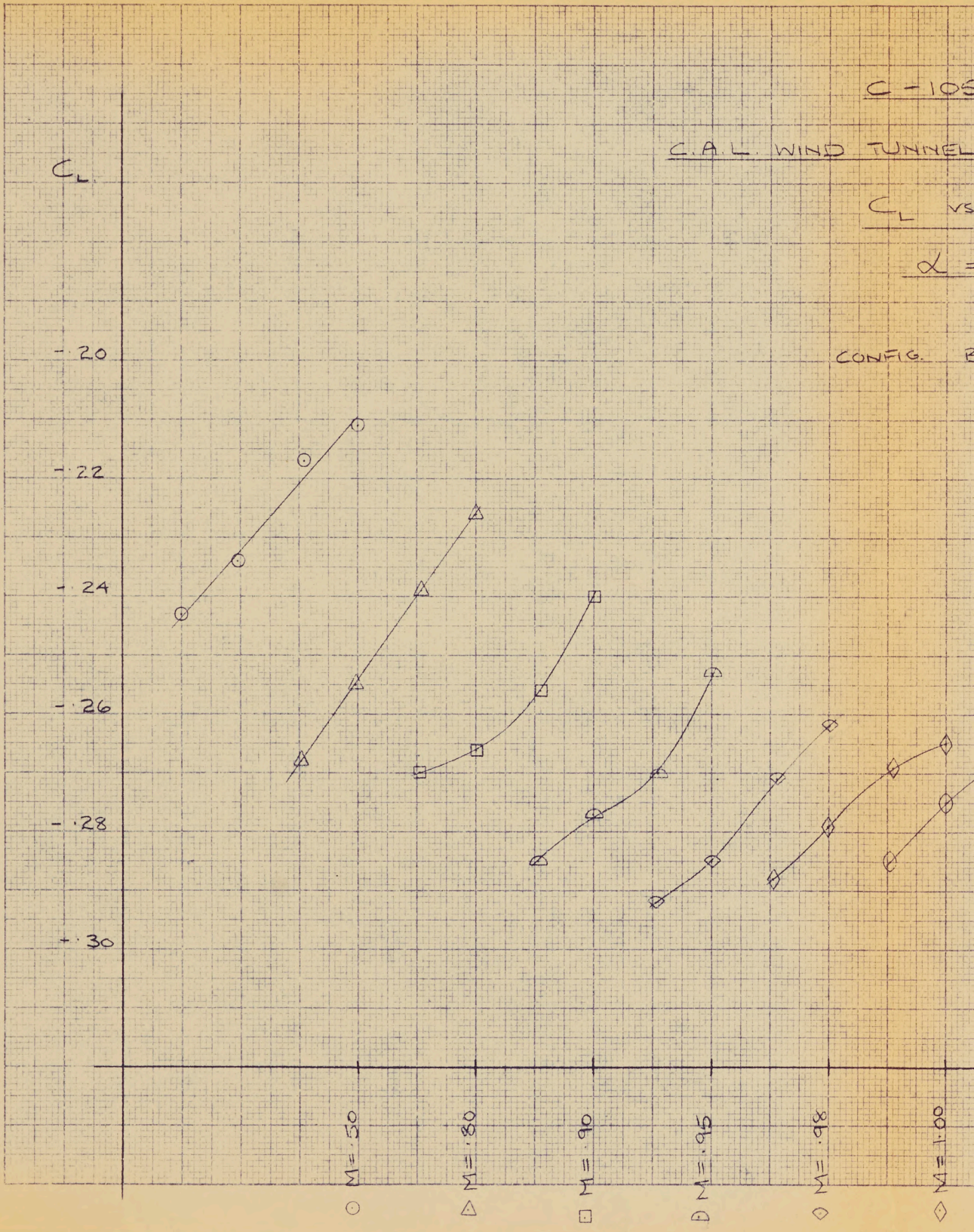
1.0

1.1

1.2

1.3

350-111 KROPPEN & ESSER CO.  
10 X 10 to the 1/2 inch, 850 lbs generator  
M.A.E. I.R. J. A.



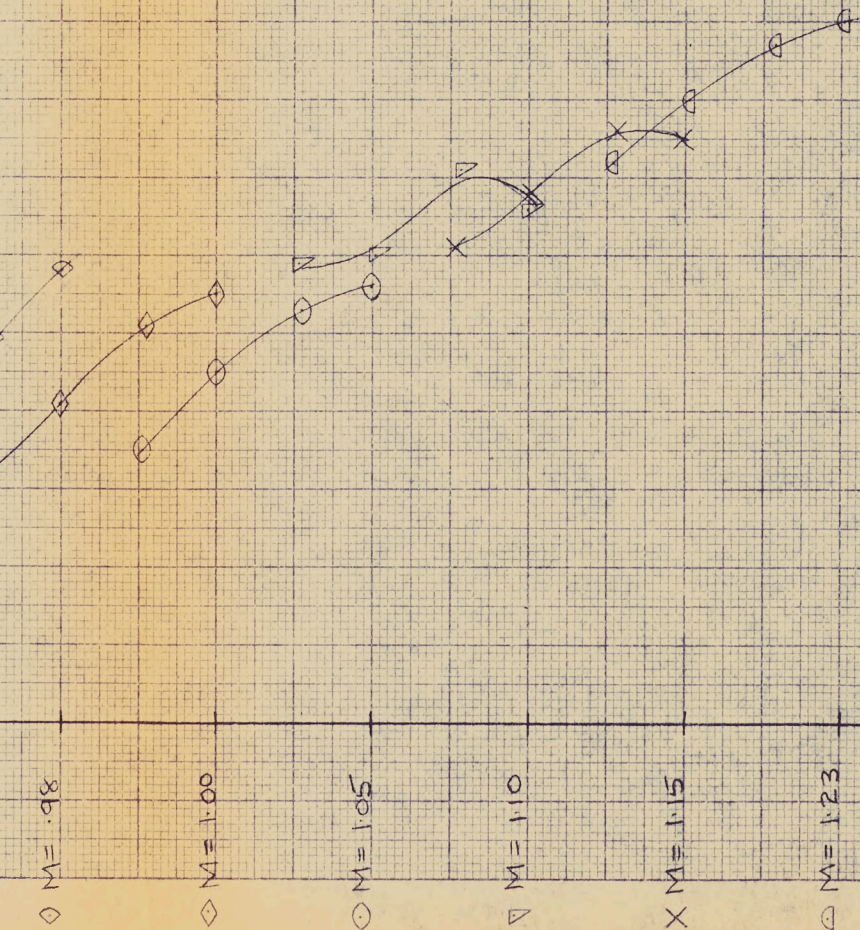
C-105

WIND TUNNEL TESTS OCT. '54

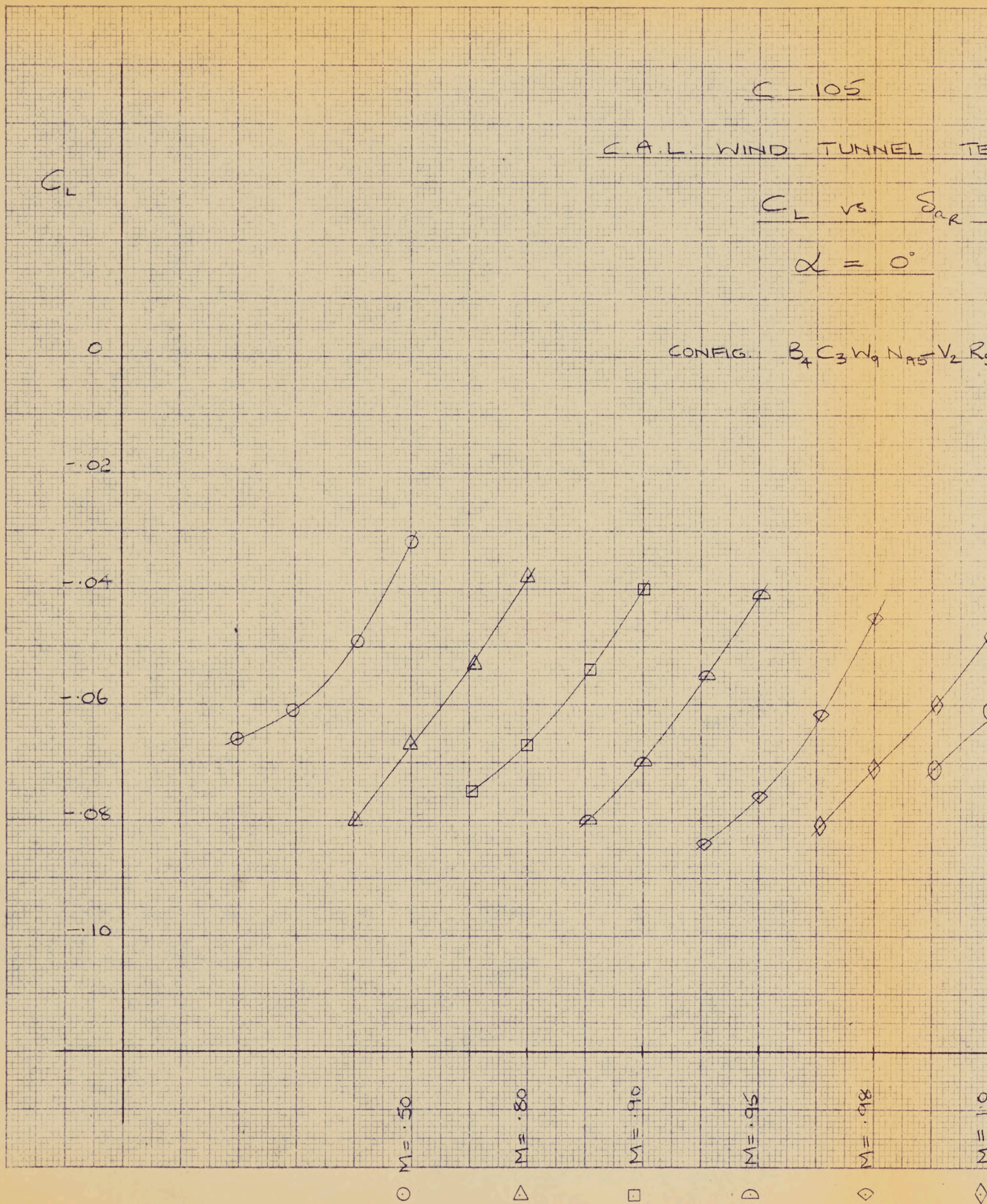
$C_L$  vs  $\delta_{0a}$

$\alpha = -4^\circ$

CONFIG.  $B_4 C_3 W_1 N_{A5} V_2 R_5$



UNCLASSIFIED  
 NON CLASSIFIED



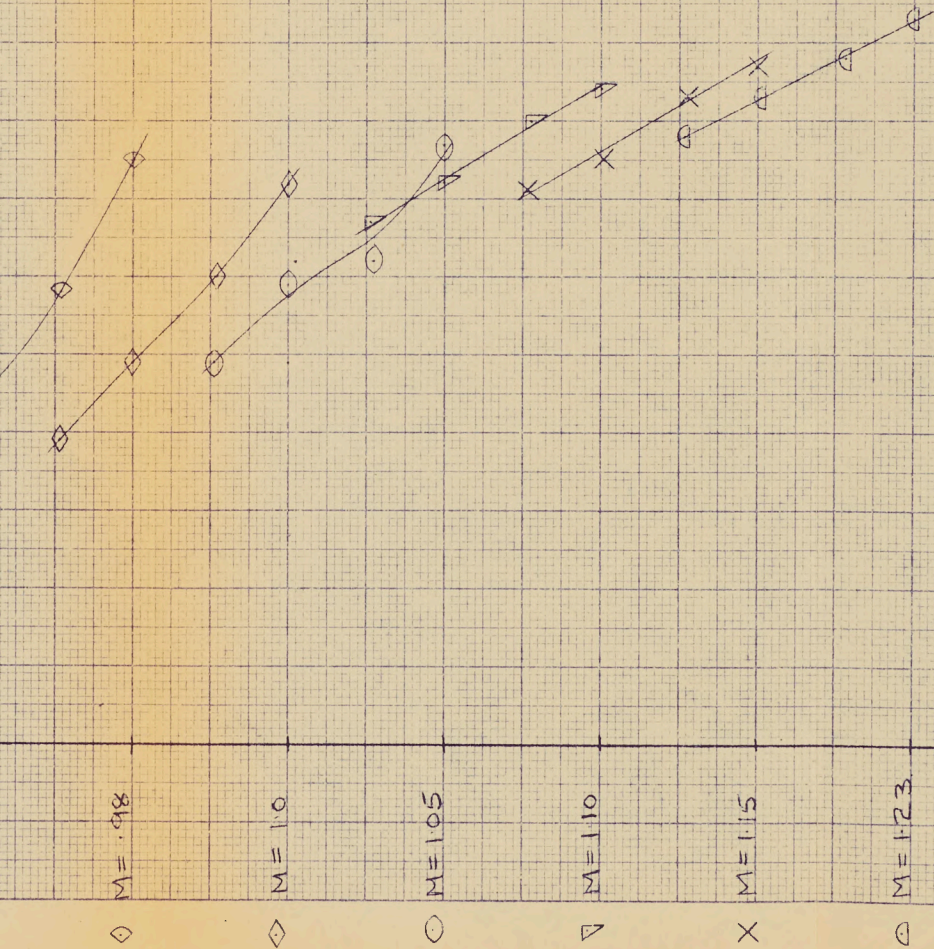
-105

TUNNEL TESTS OCT. '54

F<sub>L</sub> vs.  $\epsilon_{OR}$

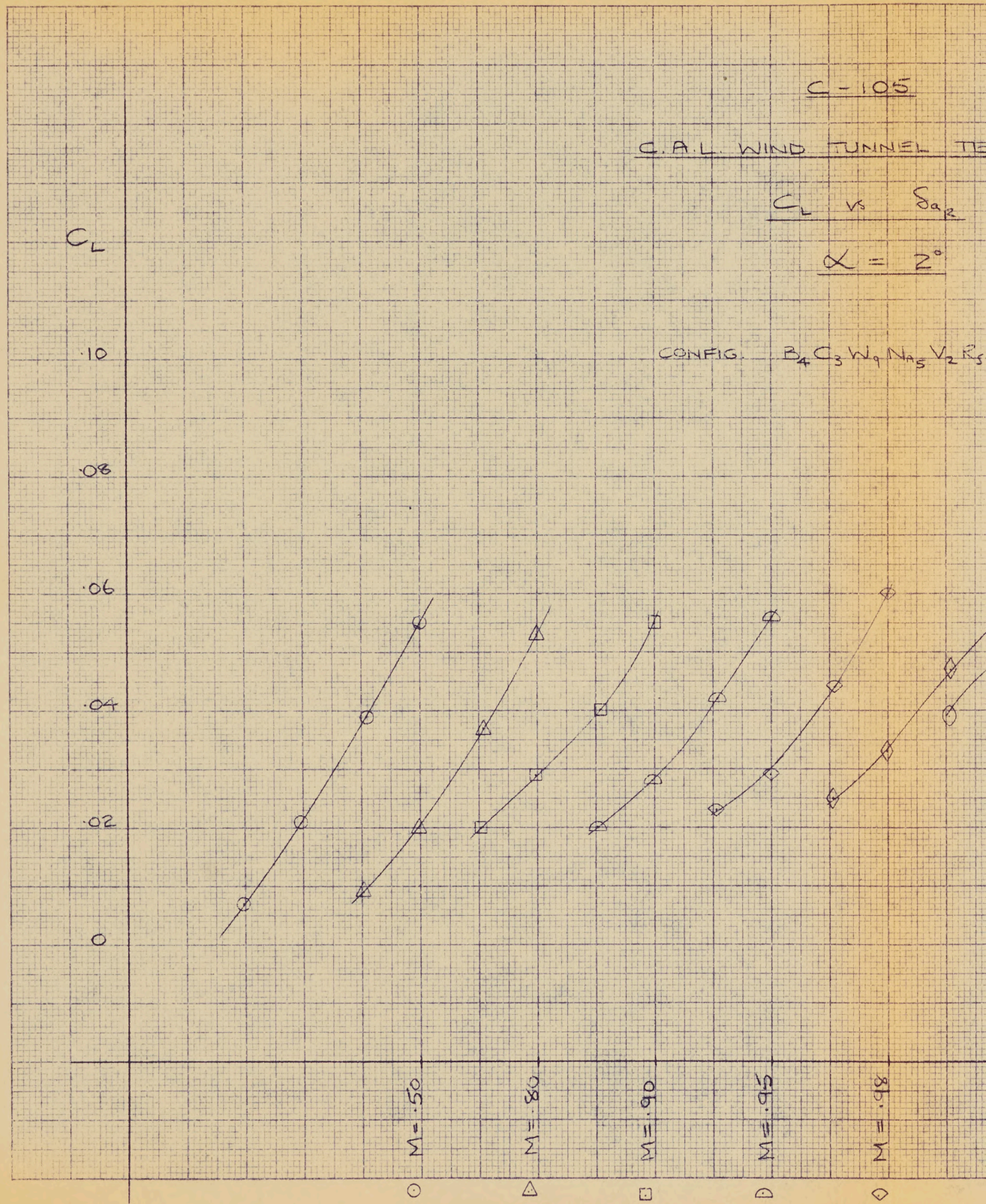
$\alpha = 0^\circ$

$B_4 C_3 W_9 N_{15} V_2 R_5$



UNCLASSIFIED  
NON CLASSIFIED

359-111 ALUETTE & ESSER CO.  
10 X 10 to the 1/2 inch, 8th flms mounted.  
MADE IN U.S.A.



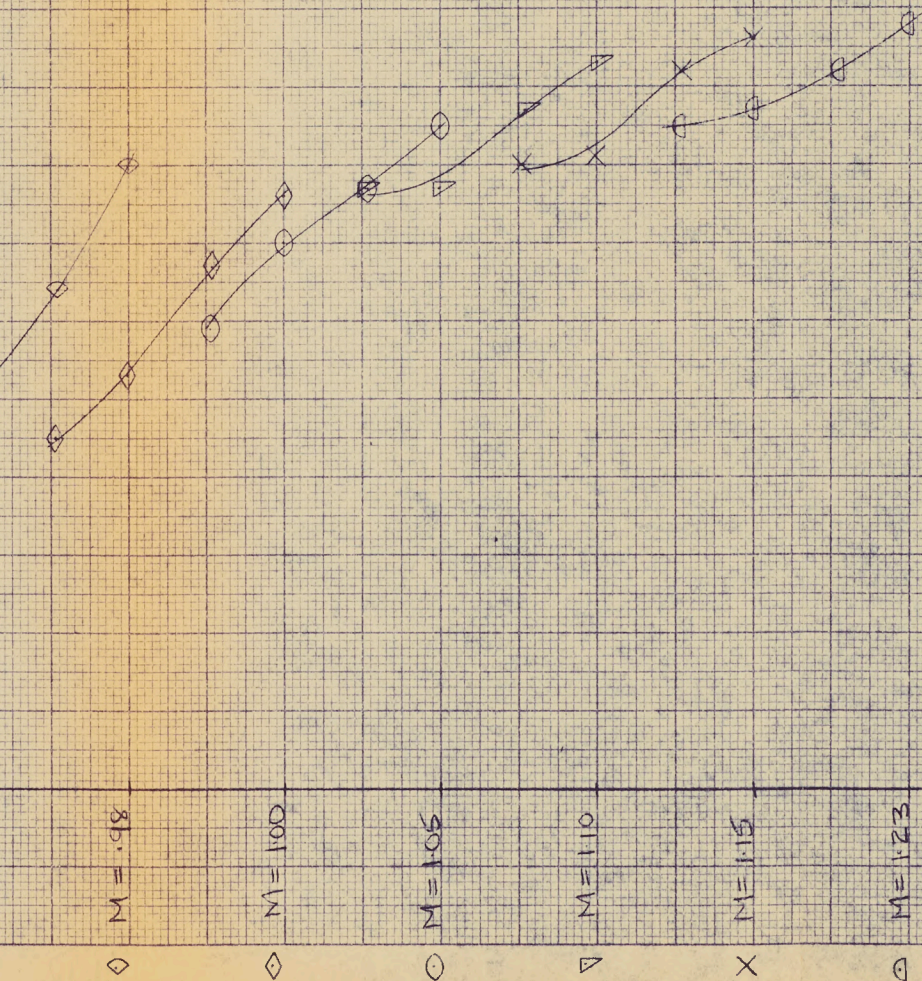
C-105

TUNNEL TESTS OCT. '54

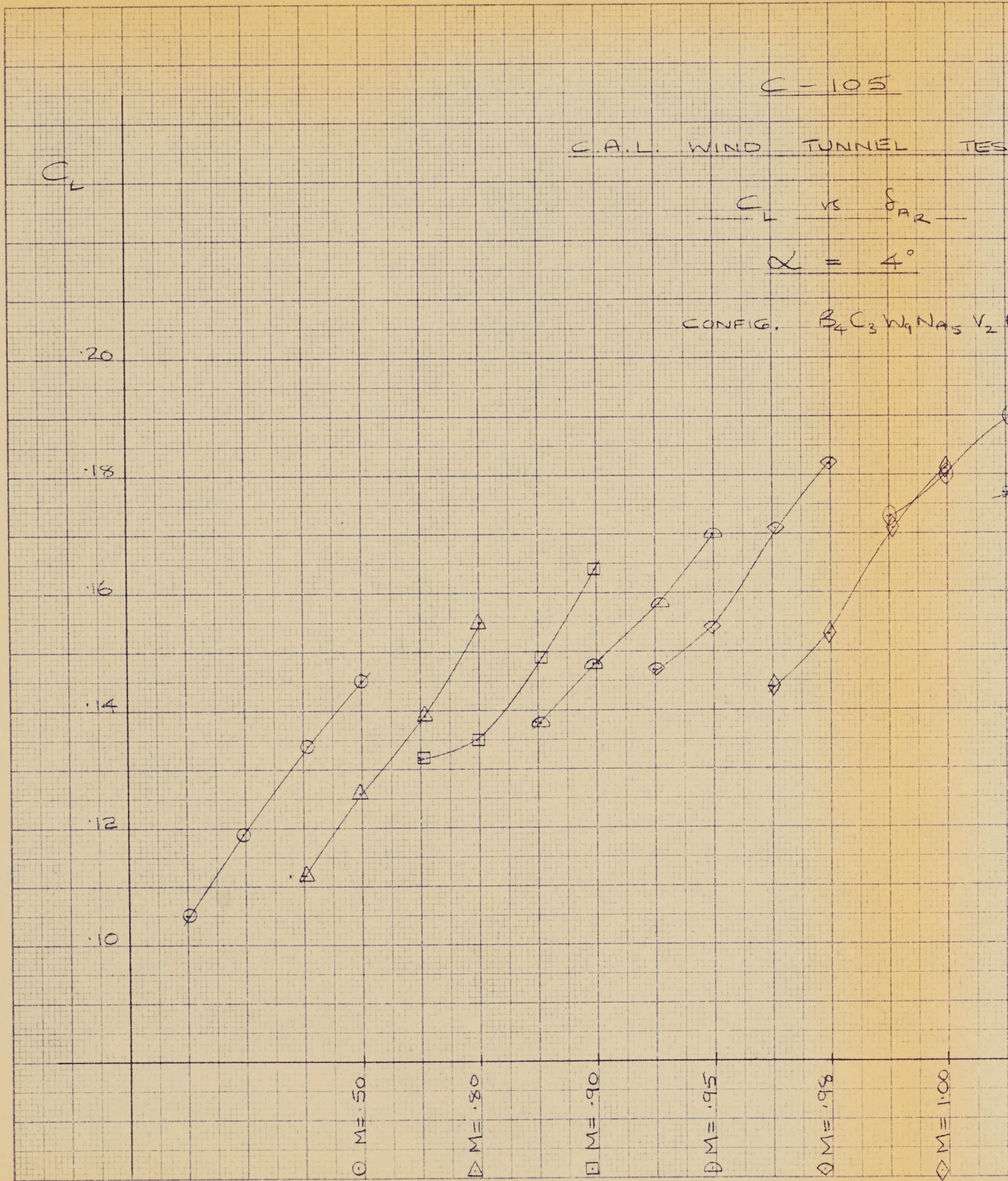
$\alpha$  vs  $\sigma_{aR}$

$\alpha = 2^\circ$

$\beta_4 C_3 W_9 N_5 V_2 R_5$



UNCLASSIFIED  
NON CLASSIFIE



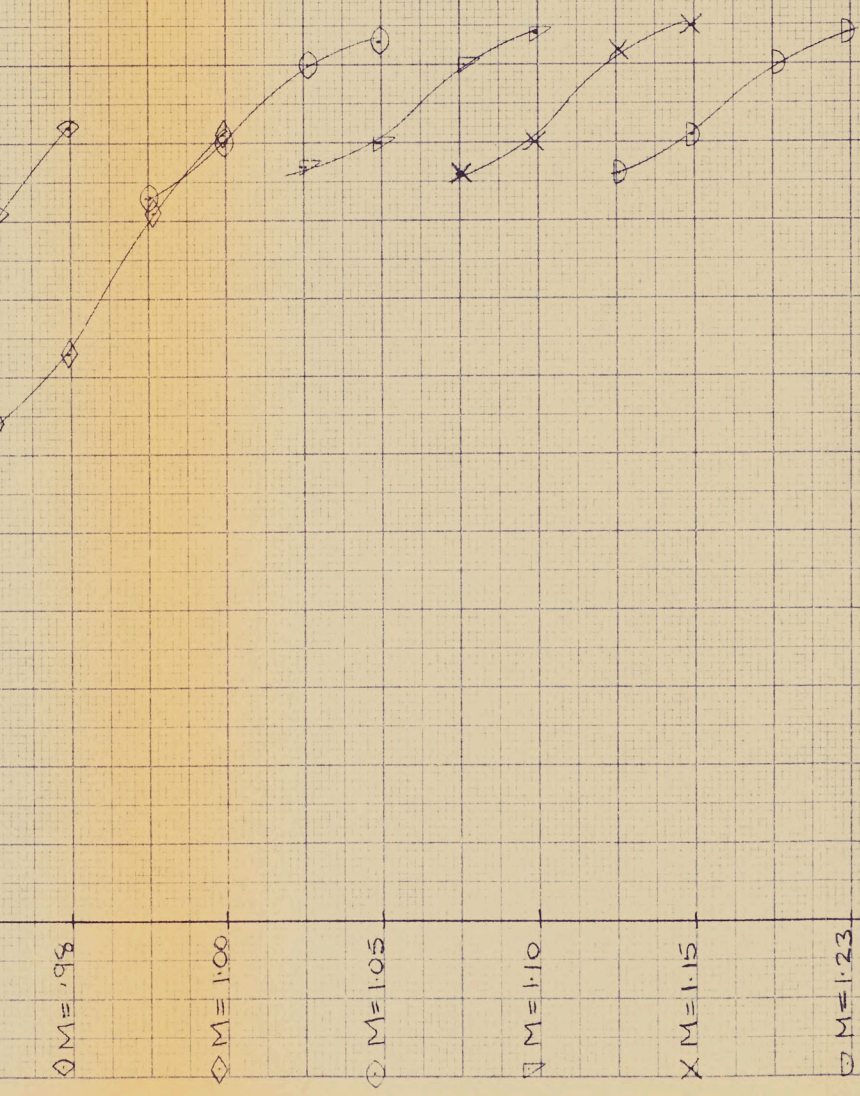
-105

TUNNEL TESTS OCT. '54.

vs  $\delta_{AR}$

$\alpha = 4^\circ$

$B_4C_3W_4Na_5V_2R_5$



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NON CLASSIFIE

C-105

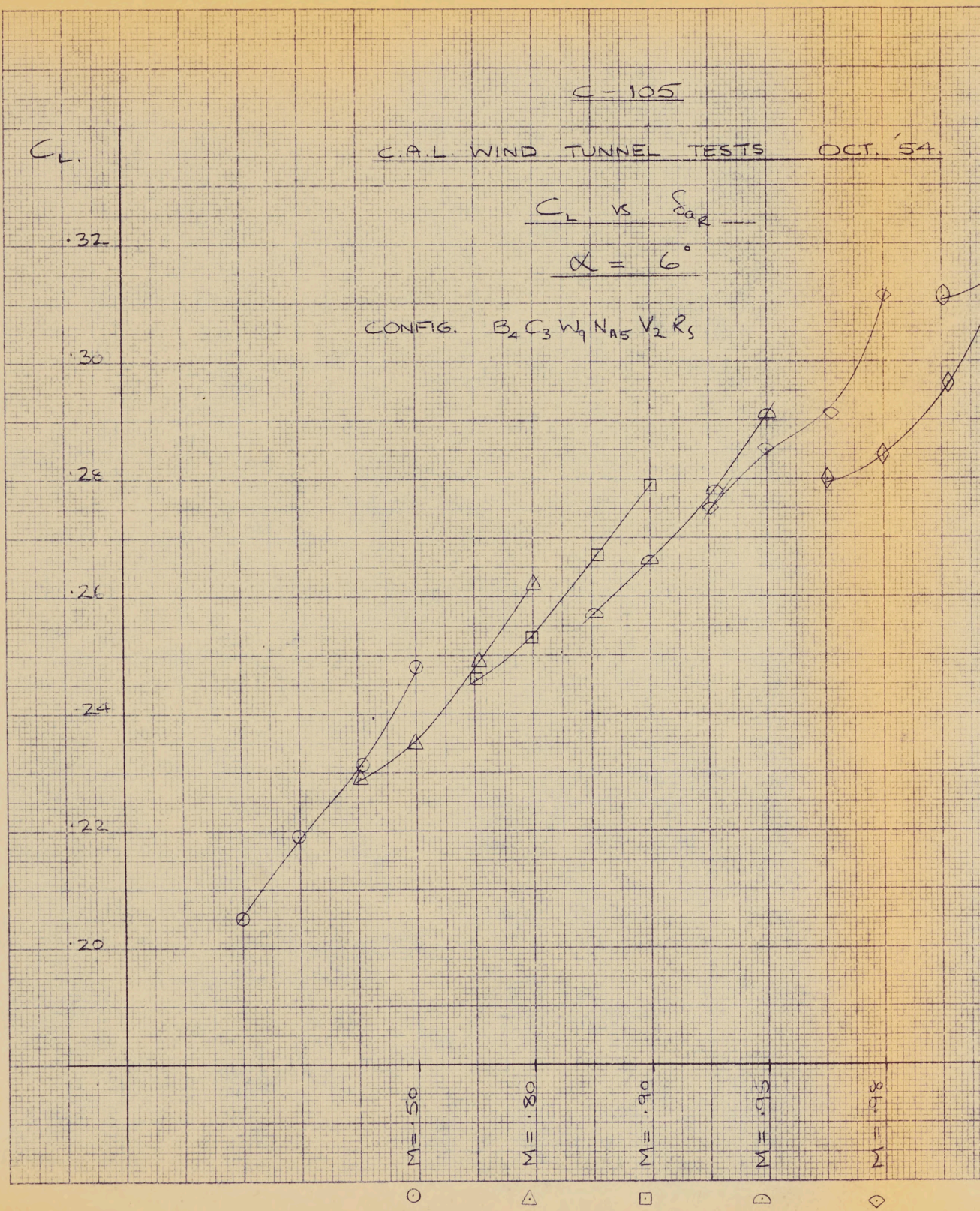
C.A.L. WIND TUNNEL TESTS OCT. '54.

$C_L$

$C_L$  vs  $S_{OAR}$

$\alpha = 6^\circ$

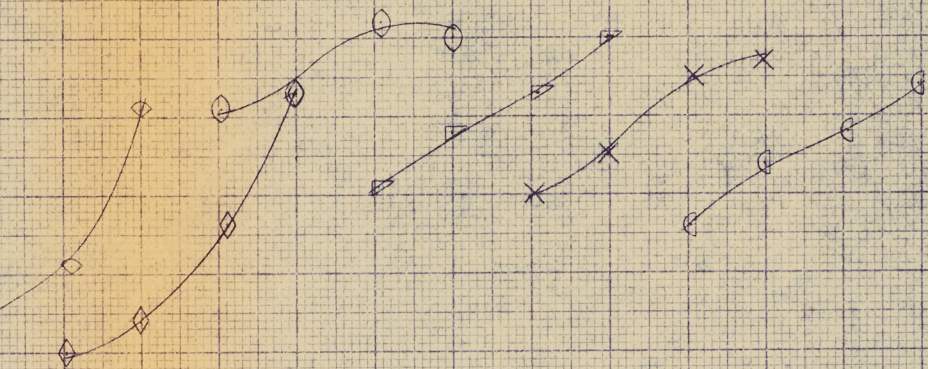
CONFIG.  $B_4 C_3 W_1 N_{A5} V_2 R_5$



P/WT/50  
Stewart

SHEET 6.2.10  
Oct '54.

OCT. '54.



◇ M = 98

◇ M = 100

◇ M = 105

◻ M = 110

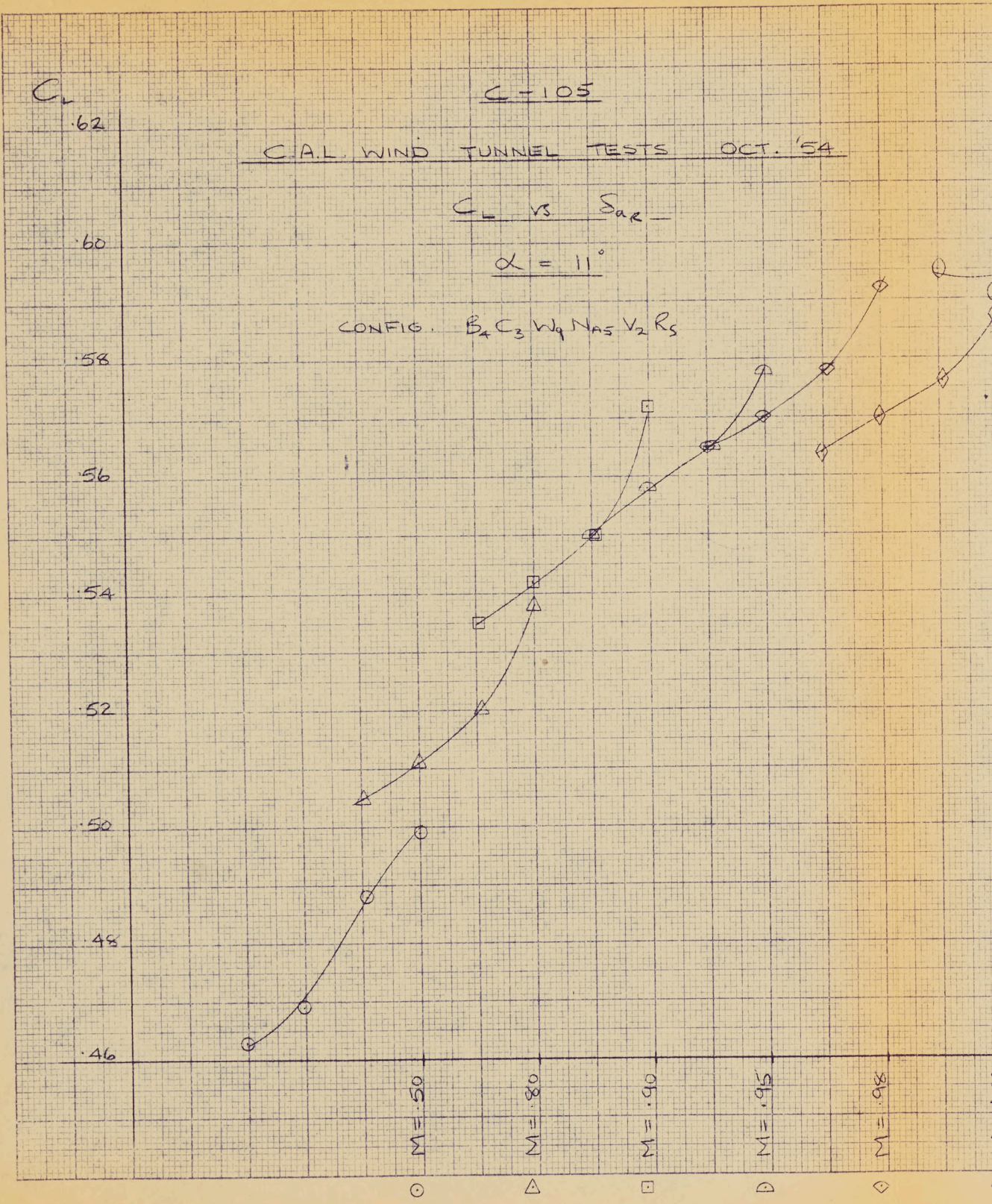
X M = 115

○ M = 123

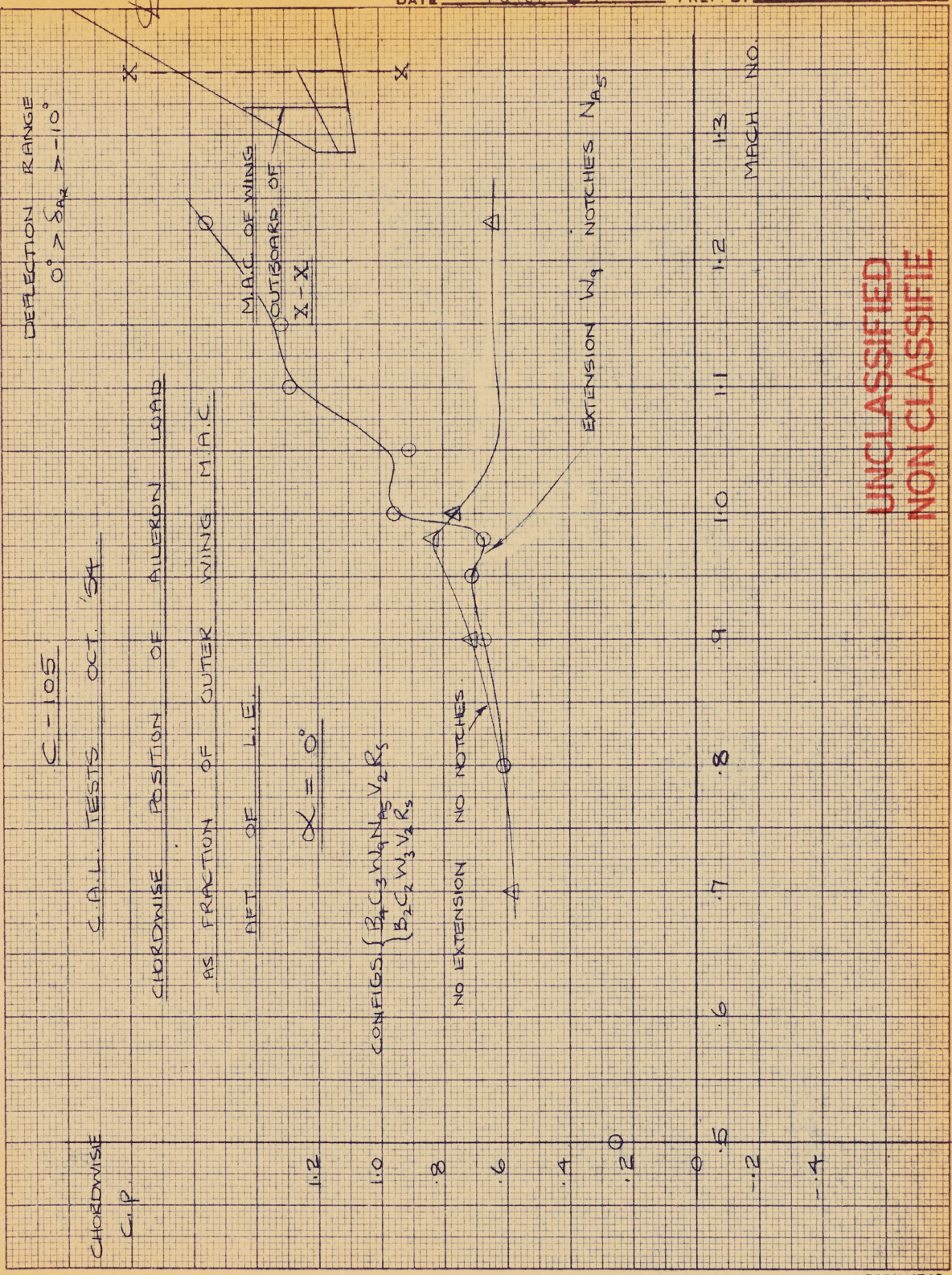
10°  
SCALE OF  $\delta_{or}$   
(ORIGIN AT M)

UNCLASSIFIED  
NON CLASSIFIED

359-11L KODAK SAFETY FILM  
10 X 10 to the 1/2 inch, 5th lines uncut.  
MAY 1954







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NON CLASSIFIE

C-105

C.A.L. TESTS OCT. '54

CHORDWISE  
C.P.

CHORDWISE POSITION OF AILERON LOAD  
AS FRACTION 'OF OUTER WING M.A.C.

AFT OF L.E.

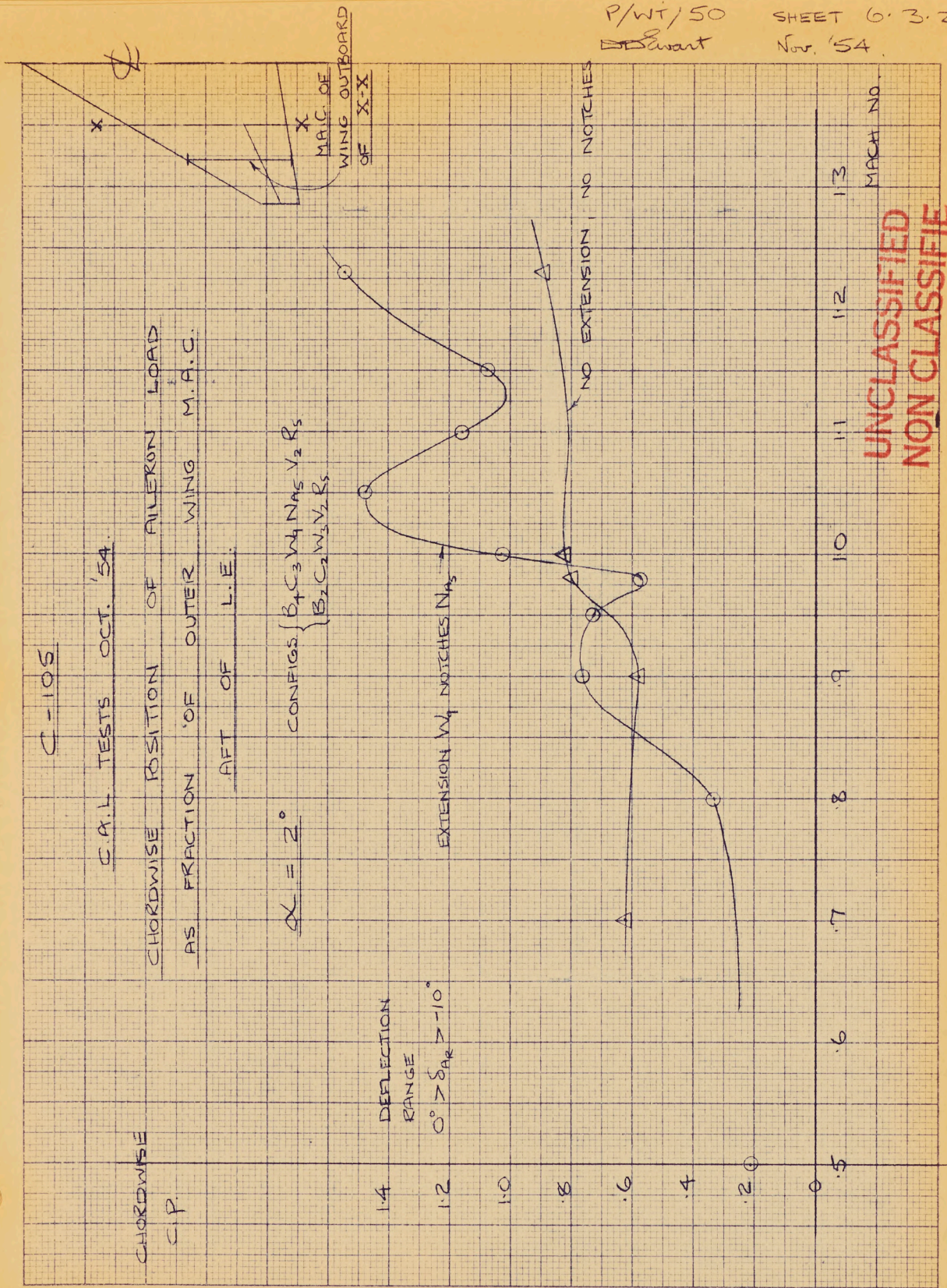
$\alpha = 2^\circ$

CONFIGS.  $\left\{ \begin{array}{l} B_1 C_3 W_4 N_A S V_2 R_S \\ B_2 C_2 W_3 V_1 R_S \end{array} \right.$

1.4 DEFLECTION  
RANGE  
1.2  $0^\circ > \delta_{AR} > -10^\circ$   
1.0  
.8  
.6  
.4  
.2  
0

EXTENSION  $W_4$  NOTCHES  $N_A S$

NO EXTENSION NO NOTCHES

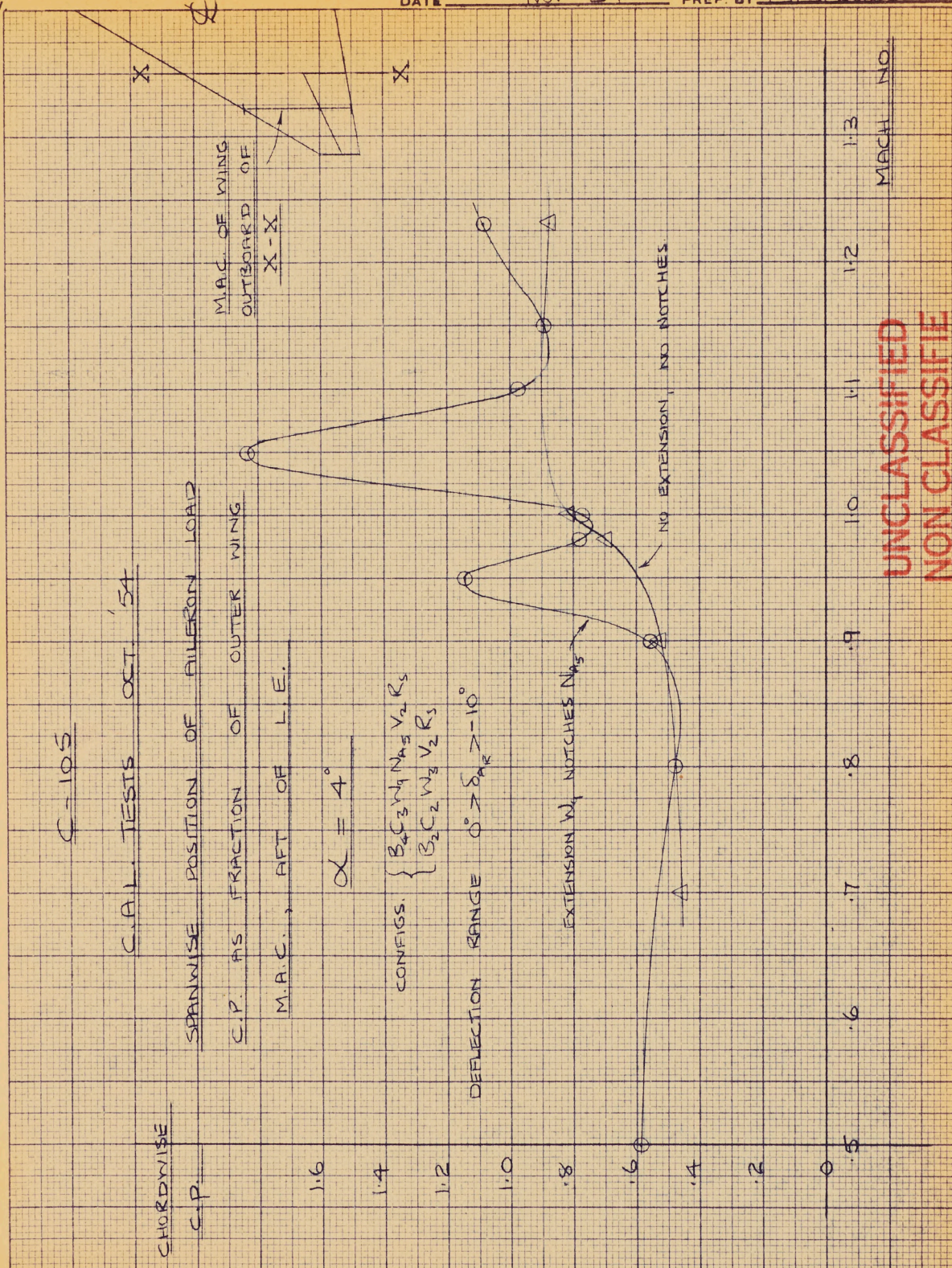


UNCLASSIFIED  
NON CLASSIFIE

P/WI/50  
Edward

SHEET 6.3.2  
Nov. '54

MACH NO.



UNCLASSIFIED  
NON CLASSIFIED

342

AIRCRAFT  
A. U. W.

COMPONENT

SHEET No. 6.3.4

REPORT No. P/W/150

DATE NOV '54

PREP. BY L. S. Swant

C-105

C.A.L. TESTS OCT. '54

CHORDWISE POSITION OF ALERON  
LOAD AS FRACTION OF OUTER  
WING M.A.C. ~ AFT OF L.E.

$\alpha = 6^\circ$

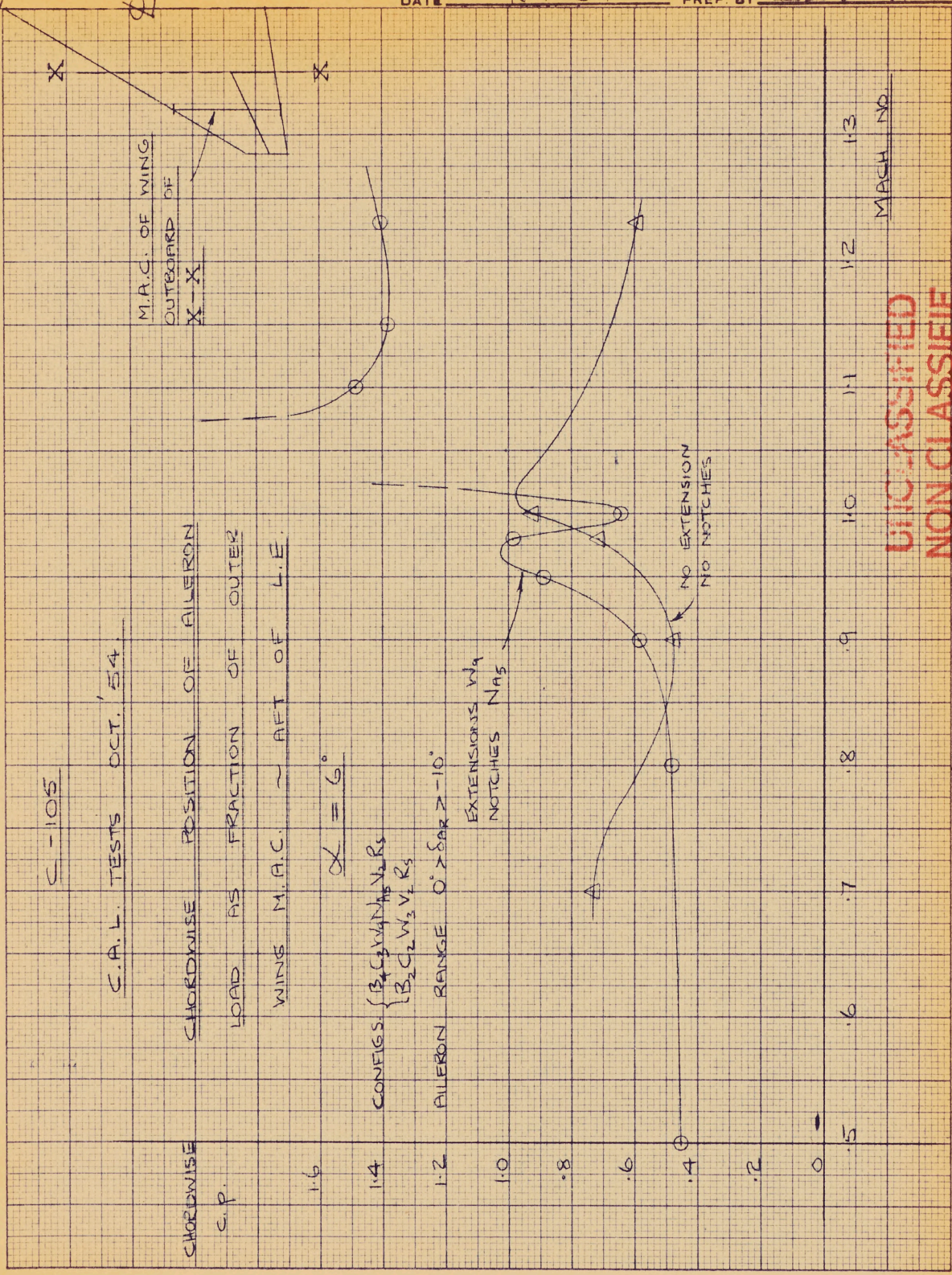
CONFIGS.  $\{ B_4 C_3 W_4 V_4 R_3 \}$   
 $\{ B_2 C_2 W_3 V_2 R_3 \}$

ALERON RANGE  $0^\circ > \delta a r > -10^\circ$

EXTENSIONS VIA NOTCHES N45

NO EXTENSION  
NO NOTCHES

M.A.C. OF WING  
OUTWARD OF  
X-X



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NON CLASSIFIED

C-105

C.A.I.L. TESTS OCT. '54

CHORDWISE POSITION OF AILERON

LOAD C.P. AS FRACTION OF

OUTER WING M.A.C.

APT OF L.E.

$\alpha = 11^\circ$

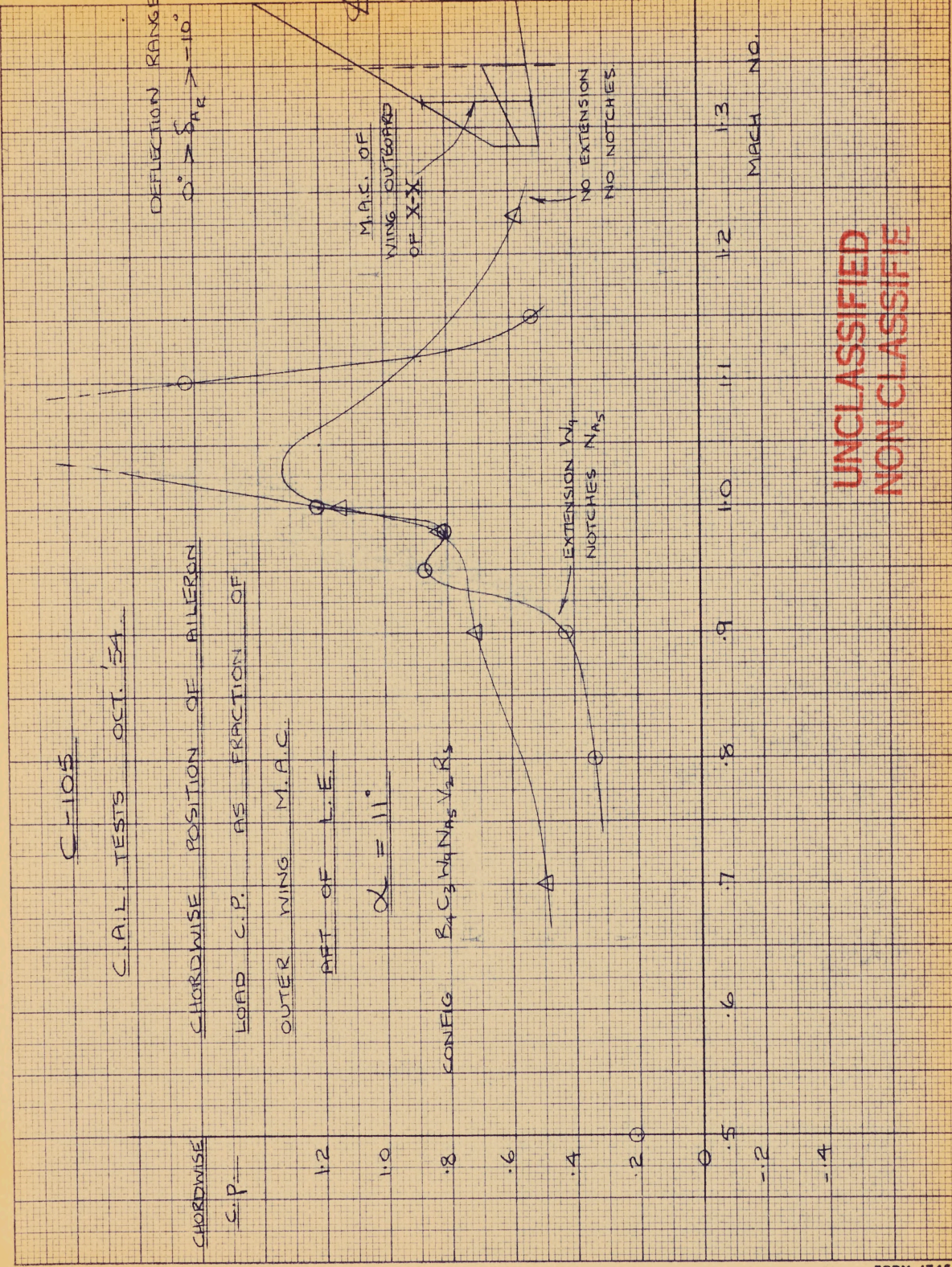
CONFIG B<sub>4</sub> C<sub>3</sub> W<sub>4</sub> N<sub>45</sub> V<sub>2</sub> R<sub>5</sub>

DEFLECTION RANGE  
0° → δ<sub>AR</sub> → -10°

M.A.C. OF  
WING OUTBOARD  
OF X-X

EXTENSION W<sub>4</sub>  
NOTCHES N<sub>45</sub>

NO EXTENSION  
NO NOTCHES



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C-105

S.A.L. TESTS OCT. '54

SPANWISE POSITION OF AILERON LOAD C.P.

AS FRACTION OF AILERON SPAN

FROM INBOARD END

$\alpha = 0^\circ$

CONFIG.  $B_4 C_3 W_9 N_{145} V_2 R_3$

AILERON RANGE  $0^\circ > \delta_{AR} > -10^\circ$

$\eta_{c.p.}$

1.6

1.4

1.2

1.0

.8

.6

.4

.2

0

-.2

-.4

13

12

11

10

.9

.8

.7

.6

.5

0

-.1

-.2

-.3

-.4

-.5

-.6

-.7

-.8

-.9

1.0

1.1

1.2

1.3

MARCH NO.

(CONFIG.  $B_2 C_2 W_2 V_2 R_5$ )

UNCLASSIFIED  
 NON CLASSIFIED

C-105

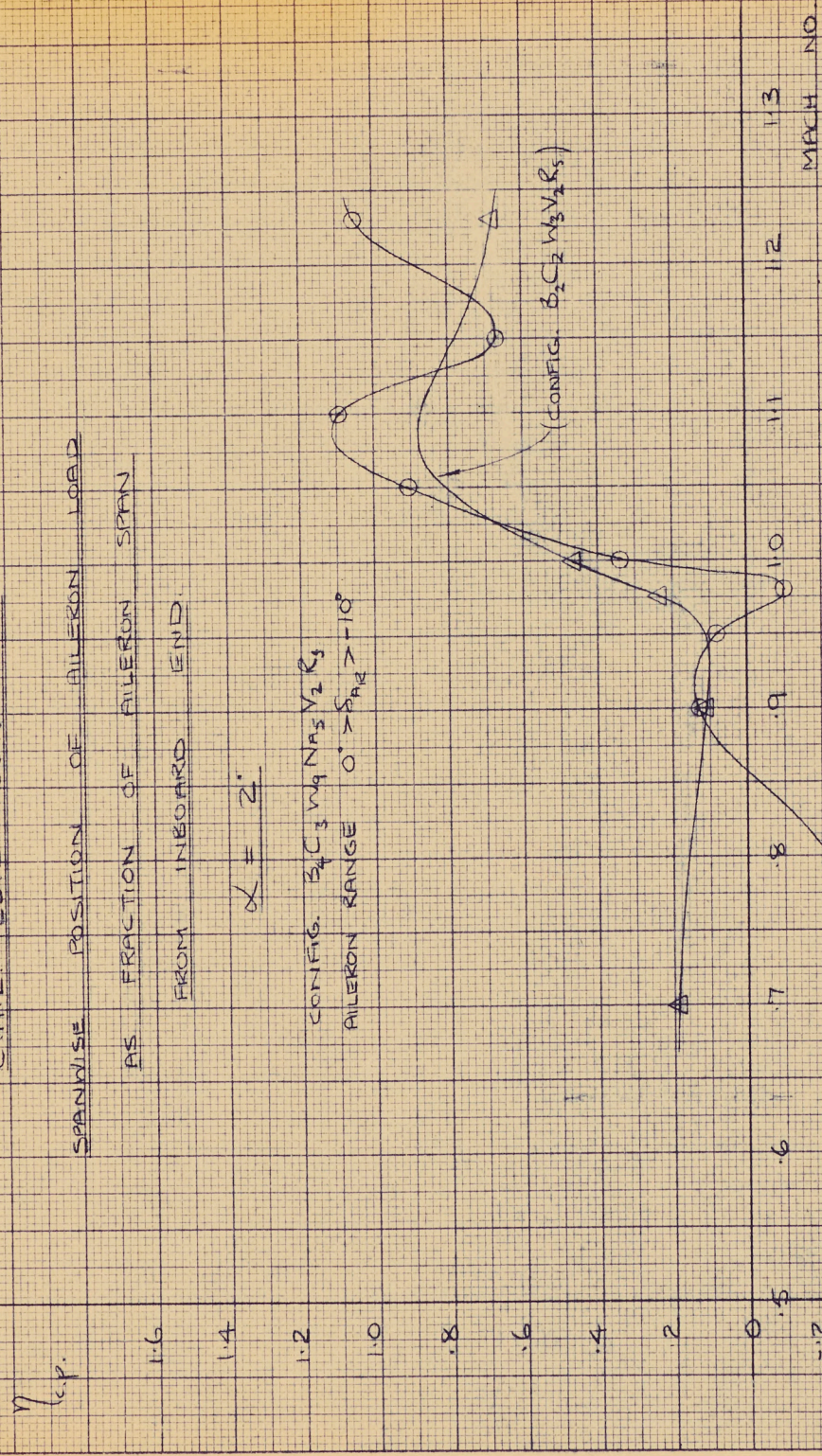
C.A.L. TESTS OCT. '54

SPANWISE POSITION OF AILERON LOAD  
AS FRACTION OF AILERON SPAN  
FROM INBOARD END

$\alpha = 2^\circ$

CONFIG.  $B_4 C_3 W_9 N_{A5} V_2 R_5$   
AILERON RANGE  $0^\circ > \delta_{AR} > -10^\circ$

(CONFIG.  $B_2 C_2 W_3 V_2 R_5$ )



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NON CLASSIFIED

C<sub>f</sub> = 105

C.A.L. TESTS OCT '54

SPANWISE POSITION OF AILERON LOAD

AS FRACTION OF AILERON SPAN

FROM INBOARD END

$\alpha = 4^\circ$

CONFIG.  $B_4 C_3 W_9 N_6 S_5 V_2 R_5$

AILERON RANGE  
 $0^\circ > \delta_{ail} > -10^\circ$

(CONFIG.  $B_2 C_2 W_3 V_2 R_3$ )

$\eta_{cp}$

1.6

1.4

1.2

1.0

.8

.6

.4

.2

0

-.2

-.4

.6

.7

.8

.9

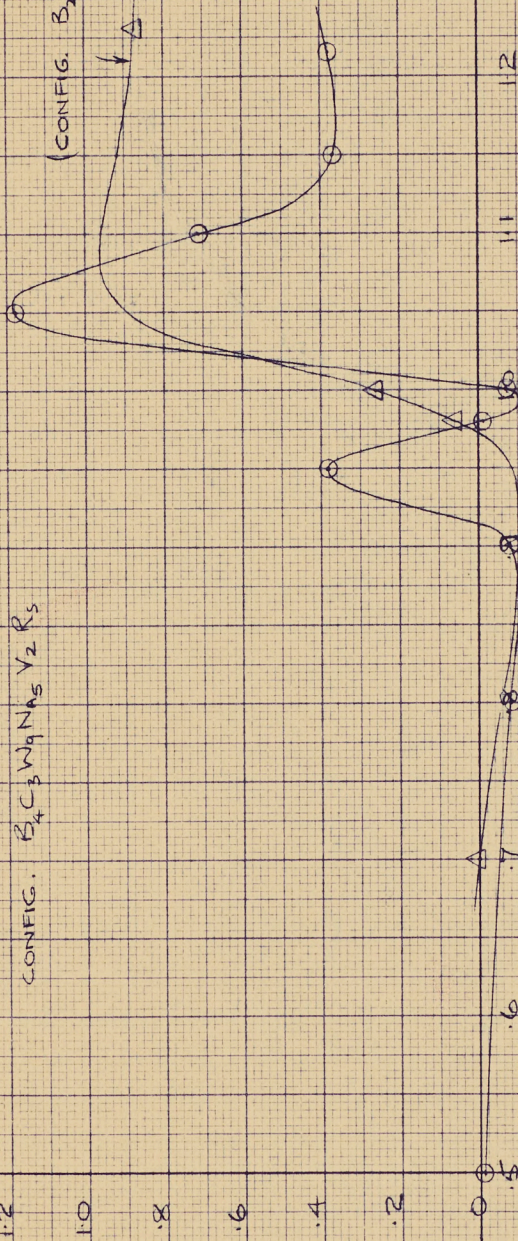
1.0

1.1

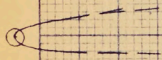
1.2

1.3

MACH NO.



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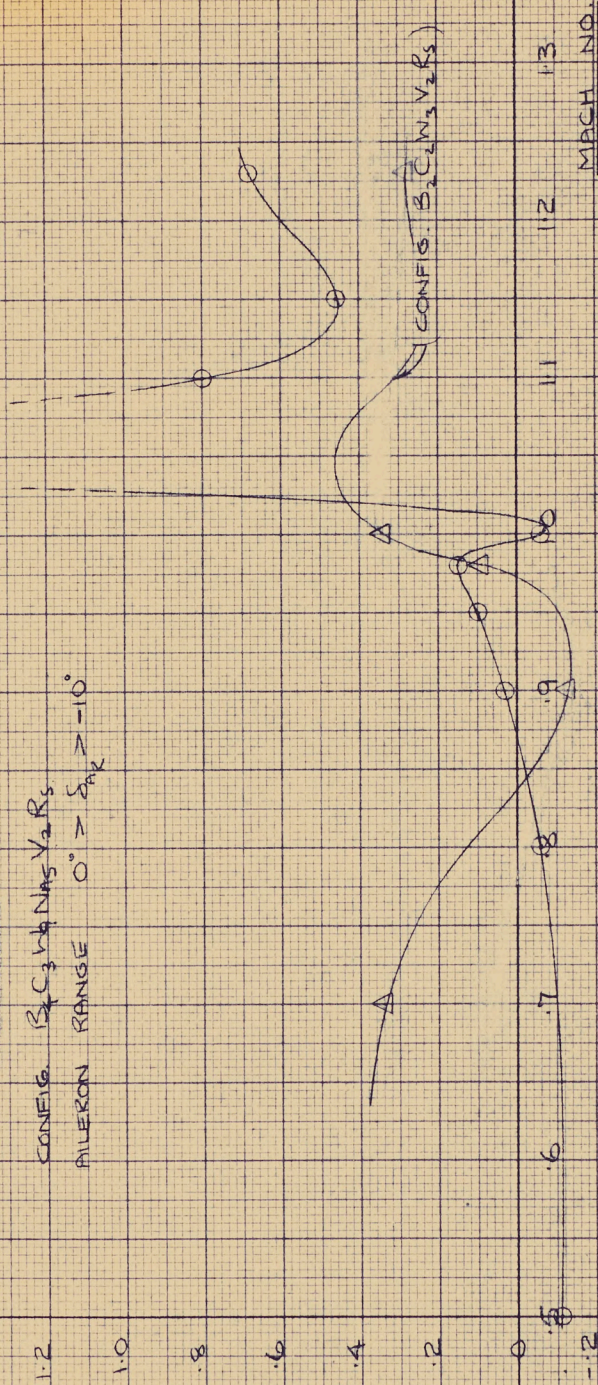
C-105

C.A.L. TESTS OCT. '5A

$\eta_{cp}$   
SPANWISE POSITION OF AILERON LOAD  
AS FRACTION OF AILERON SPAN  
FROM INBOARD END

$\alpha = 6^\circ$

CONFIG.  $B_1 C_1 N_1 V_2 R_1$   
AILERON RANGE  $0^\circ > \delta_{AK} \geq -10^\circ$



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NON CLASSIFIED

10 X 10 TO THE 1/2 INCH 359-12  
KEUFFEL & ESSER CO. MADE IN U.S.A.

301

C-105

C.A.L TESTS OCT. '54.

SPANWISE POSITION OF AILERON LOAF

AS FRACTION OF AILERON SPAN

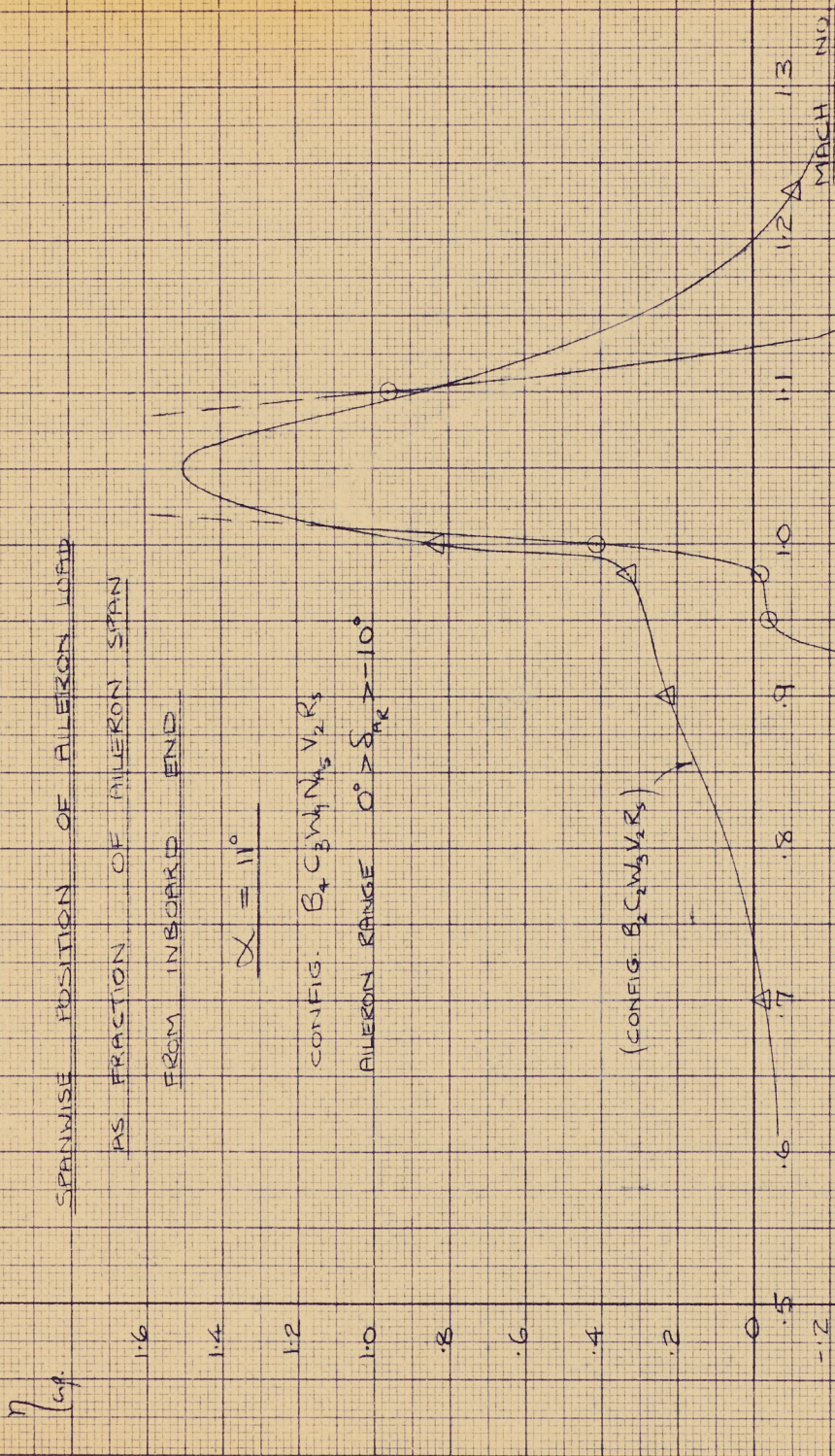
FROM INBOARD END

$\alpha = 11^\circ$

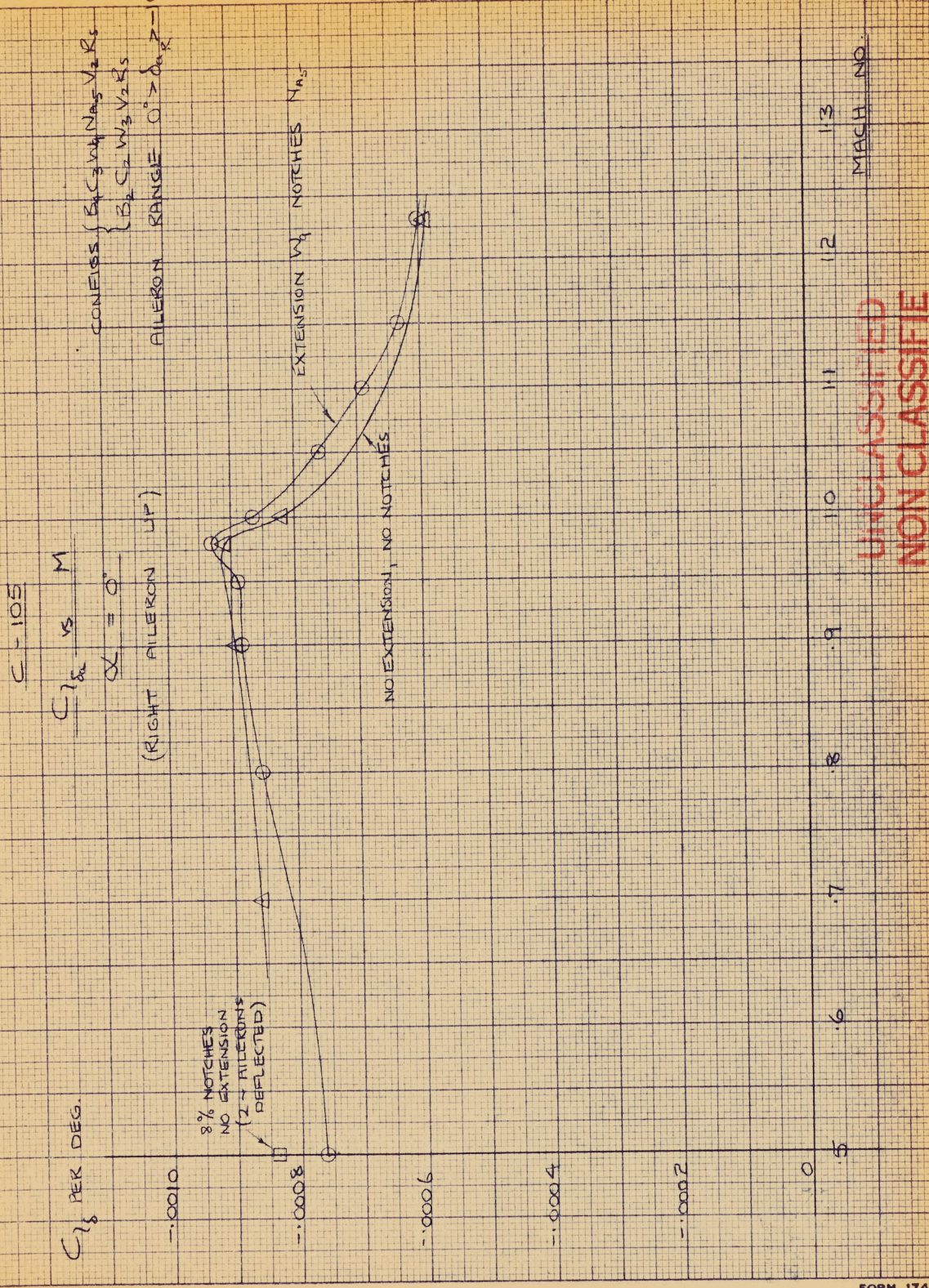
CONFIG.  $B_4 C_3 W_4 N_4 V_2 R_3$

AILERON RANGE  $0^\circ > \delta_{AR} > -10^\circ$

(CONFIG.  $B_2 C_2 W_3 V_2 R_3$ )



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C-105

$C_{L_{\alpha}}$  VS M  
 $\alpha = 2^\circ$

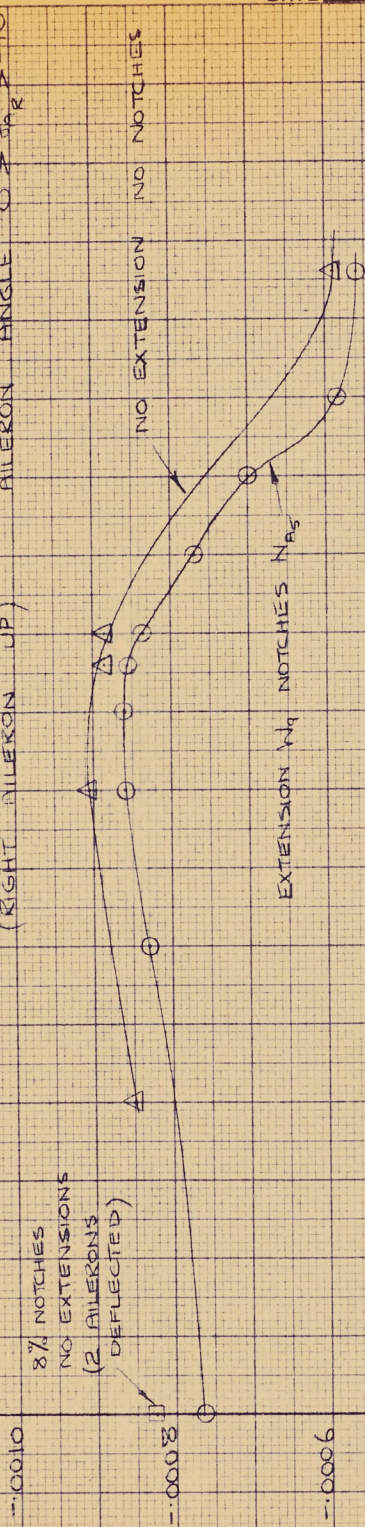
CONFIGS.  $\left\{ \begin{array}{l} B_1 C_3 W_4 N_{AS} V_2 R_5 \\ B_2 C_2 W_3 V_2 R_5 \end{array} \right.$   
AILERON ANGLE  $0^\circ > \alpha_R > -10^\circ$

$C_L$  PER DEG.

8% NOTCHES  
NO EXTENSIONS  
(2 AILERONS  
DEFLECTED)

NO EXTENSION NO NOTCHES

EXTENSION W/ NOTCHES  $N_{AS}$



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NON CLASSIFIE

MARCH NO.

13

12

11

10

9

8

7

6

5

10 X 10 TO THE 1/2 INCH 359-12  
KEUFFEL & ESSER CO. MADE IN U.S.A.

C-105

$C_{l_{\delta a}}$  vs M

$\alpha = 4^\circ$

(RIGHT AILERON UP)

CONFIGS.  $\left\{ \begin{array}{l} B_4 C_3 W_4 N_4 V_2 R_5 \\ B_2 C_2 W_3 V_2 R_5 \end{array} \right.$

AILERON ANGLE  $0^\circ \rightarrow \delta_{AR} \rightarrow -10^\circ$

$C_l$  PER DEG.

-.0010

8% NOTCH  
NO EXTENSION  
2 AILERONS DEFLECTED

-.0008

-.0006

-.0004

-.0002

0

MACH NO.

10 11 12 13

UNCLASSIFIED  
NON CLASSIFIE

C-105

$C_{L_8}$  vs M

$\alpha = 6^\circ$

(RIGHT AILERON UP)

$C_{L_8}$  PER DEG:

-.0010

8% NOTCHES, NO EXTENSION  
(2 AILERONS DEFLECTED)

-.0008

-.0006

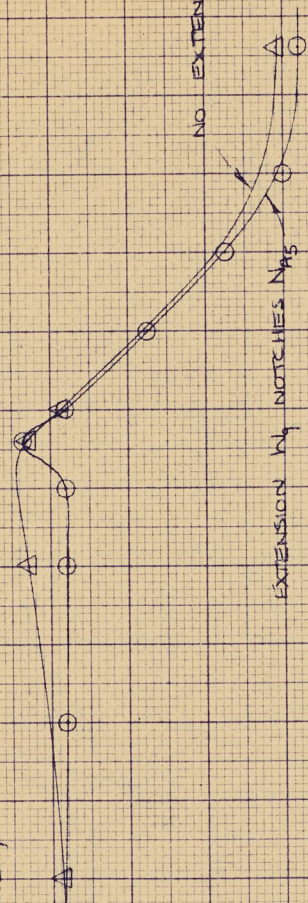
-.0004

-.0002

0

CONFIGS.  $\left\{ \begin{array}{l} B_1 C_3 A_1 N_4 V_2 R_3 \\ B_2 C_2 W_3 V_2 R_4 \end{array} \right.$

AILERON ANGLE  $0^\circ > \delta_{AK} > -10^\circ$



NO EXTENSION, NO NOTCHES

EXTENSION BY NOTCHES N45

MARCH NO.

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NON CLASSIFIE

C-105

$C_{L_{\alpha}}$  vs M

$\alpha = 11^\circ$

(RIGHT AILERON UP).

CONFIGS {  $B_4 C_3 W_1 N_1 V_2 R_5$   
 $B_2 C_2 W_3 V_2 R_5$   
AILERON RANGE  $0^\circ \geq \delta_{A/R} \geq -10^\circ$

$C_{L_{\alpha}}$  PER DEG

-.0010

-.0008

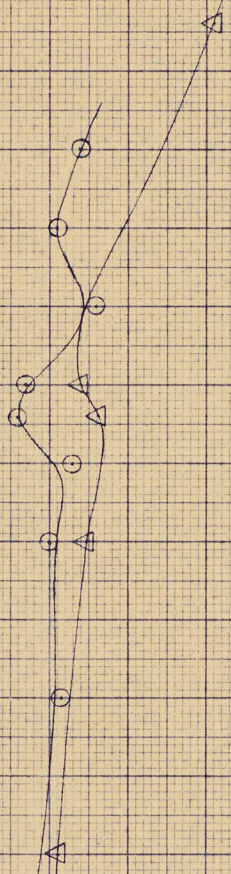
-.0006

-.0004

-.0002

0

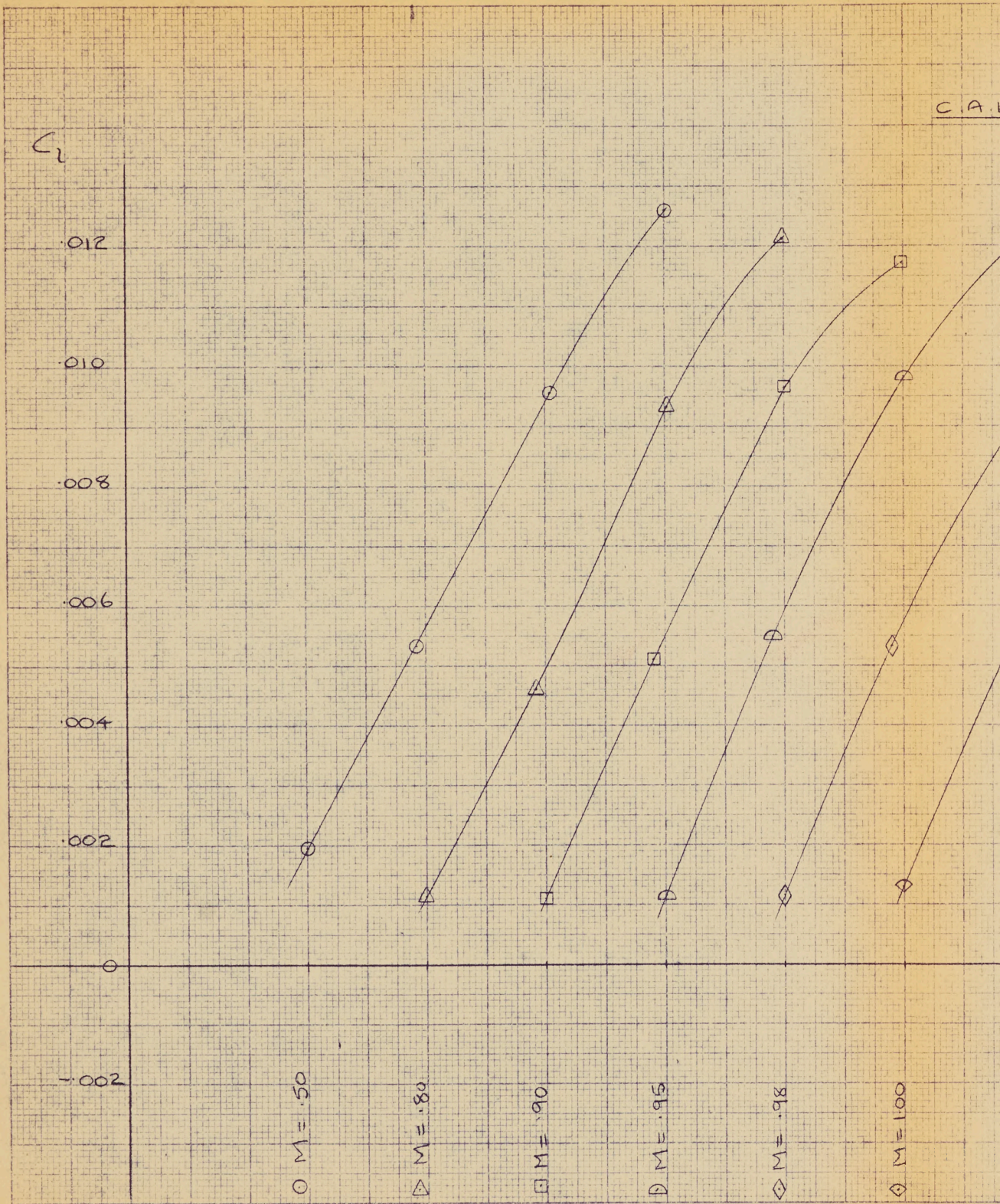
8% NOTCHES NO EXTENSION  
(2 AILERONS DEPLOYED)



MACH NO.

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NON CLASSIFIED

350 H.L. KEUFFEL & ESSER CO.  
10 X 10 to the 1/2 inch, 5th lines accepted.  
MADE IN U.S.A.

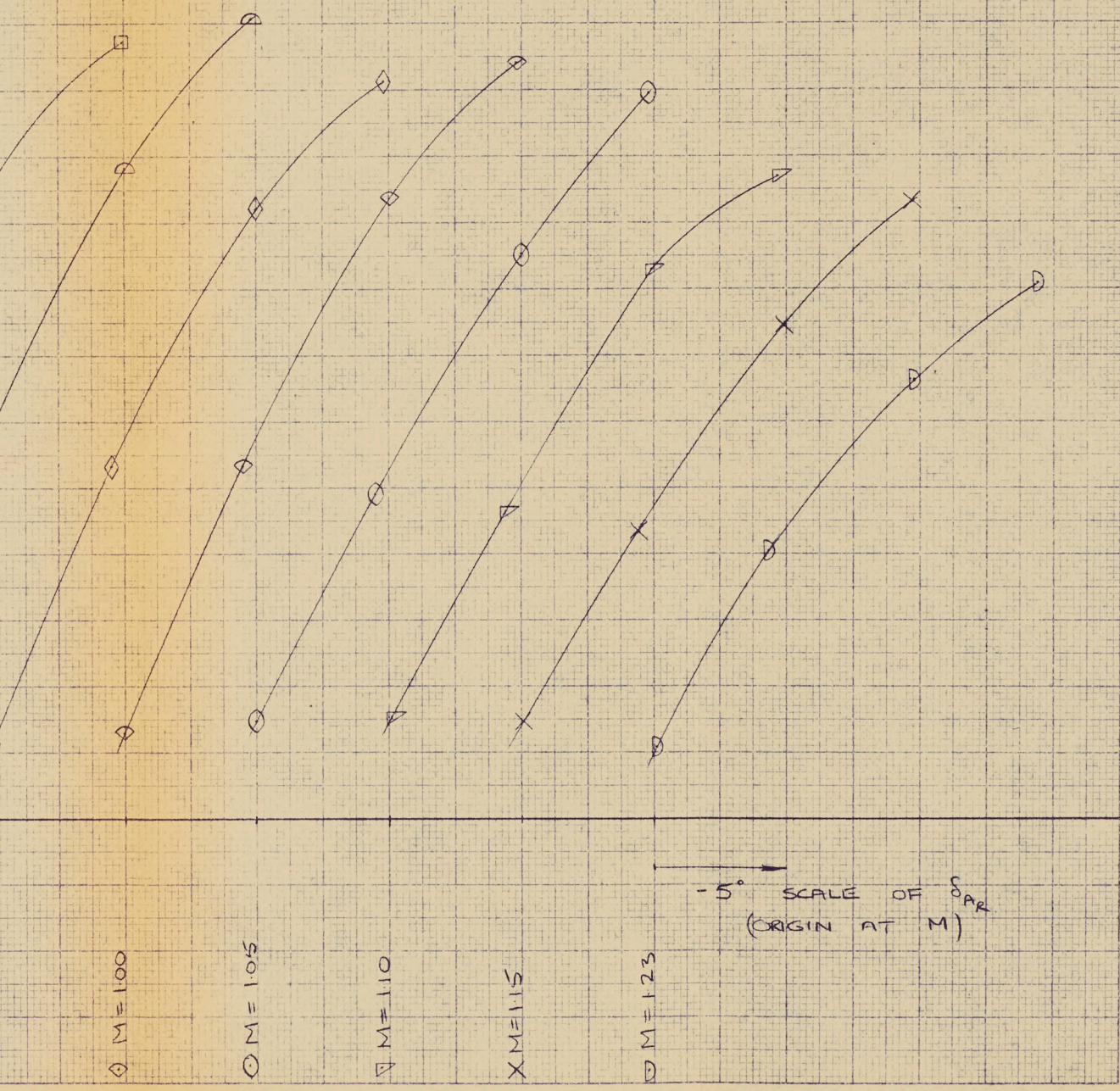


C-105

C.A.L. WIND TUNNEL TESTS OCT. '54

$C_L$  vs  $\delta_{AR}$   
 $\alpha = -4^\circ$

CONFIG  $B_4 C_3 W_9 N_{A5} V_2 R_5$



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308-11 KEUFFEL & ESSER CO.  
10 X 19 to the 1/2 inch 50 lb line accepted  
MADE IN U.S.A.

C-105  
C.A.L. WIND TUNNEL TESTS

$C_z \text{ vs } \delta_{AR}$   
 $\alpha = 0^\circ$

$C_z$

.012

.010

.008

.006

.004

.002

-.002

○  $M = .80$

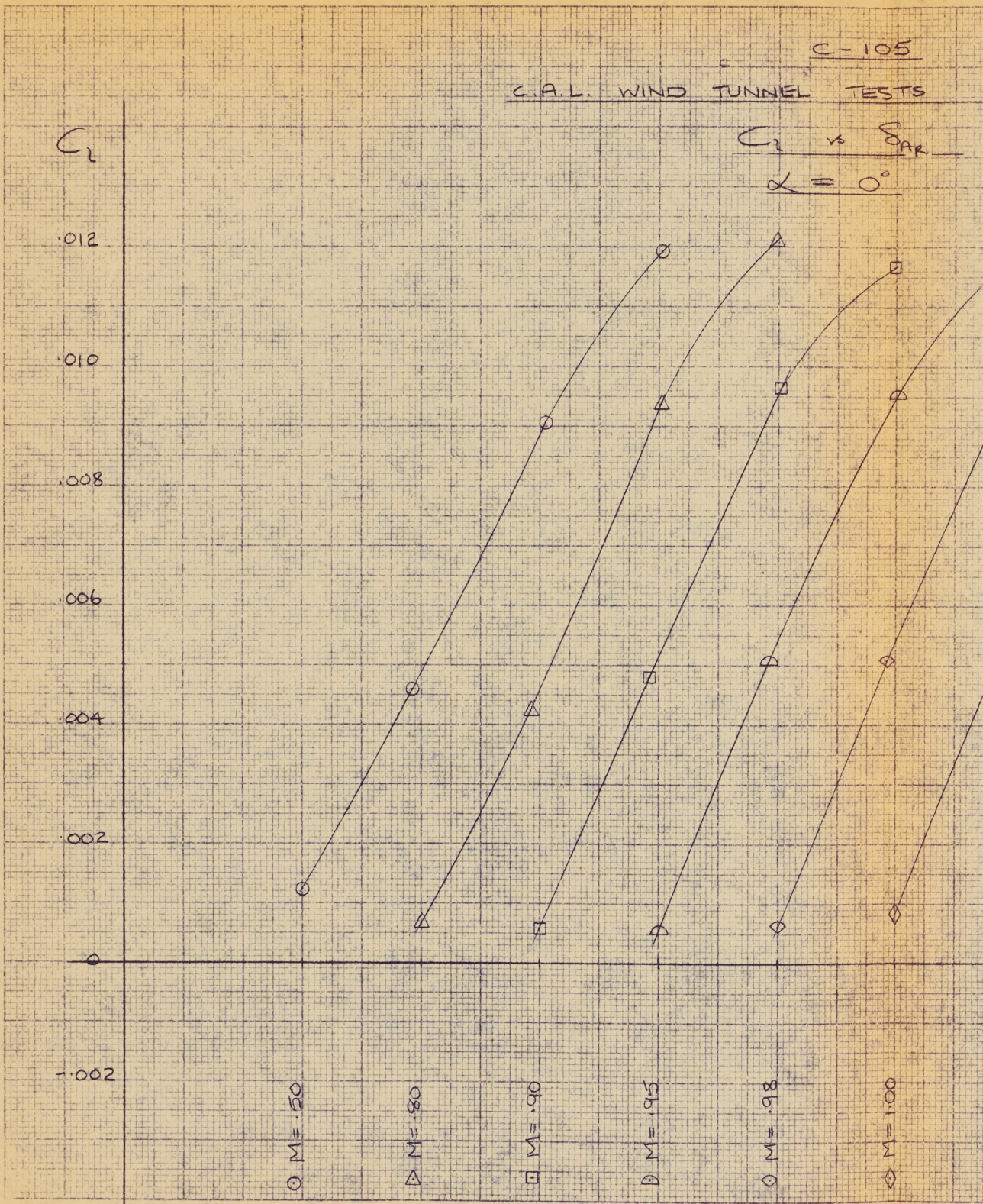
△  $M = .80$

□  $M = .90$

◇  $M = .95$

◇  $M = .98$

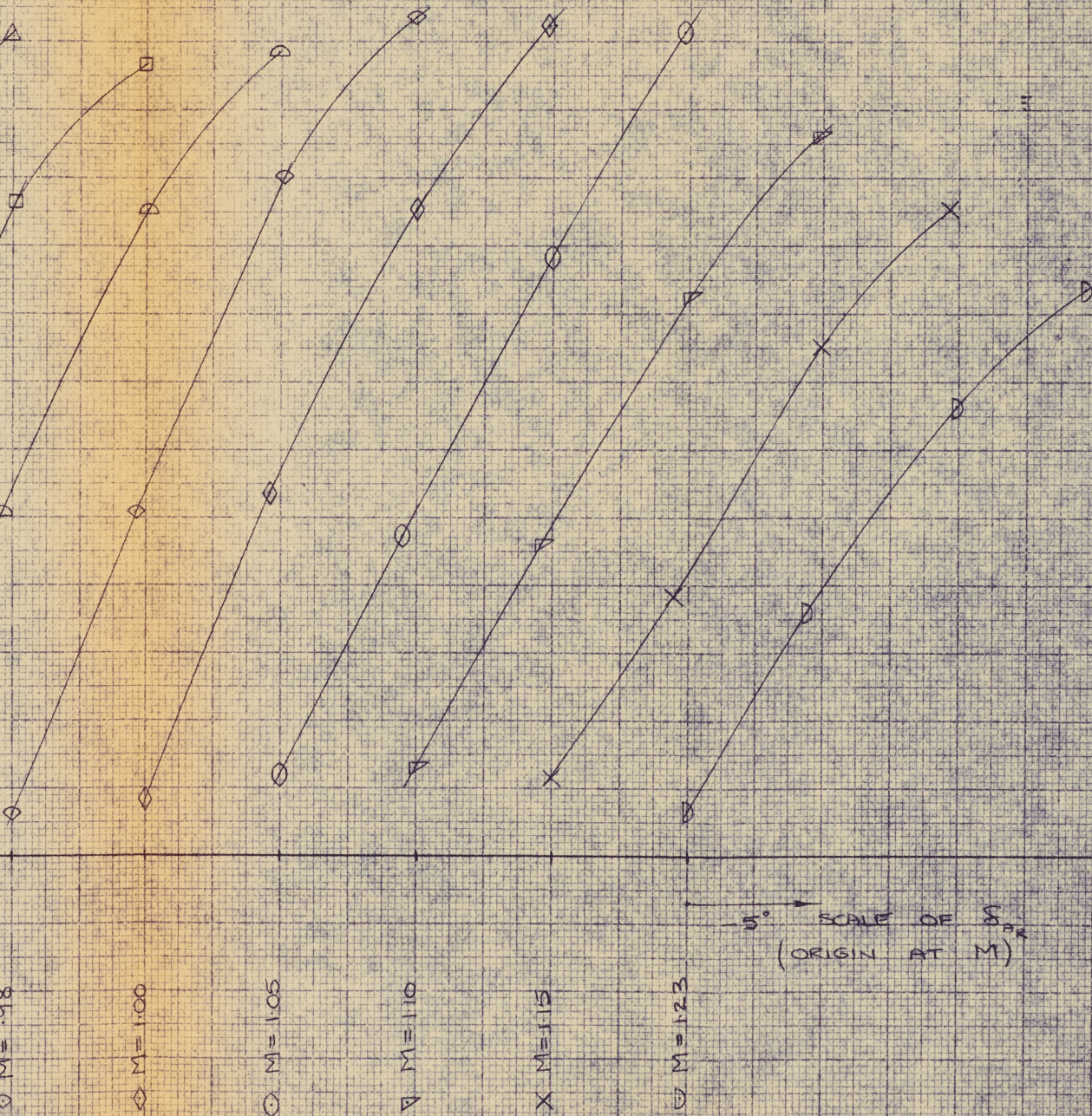
◇  $M = 1.00$



C-105

WIND TUNNEL TESTS OCT '54

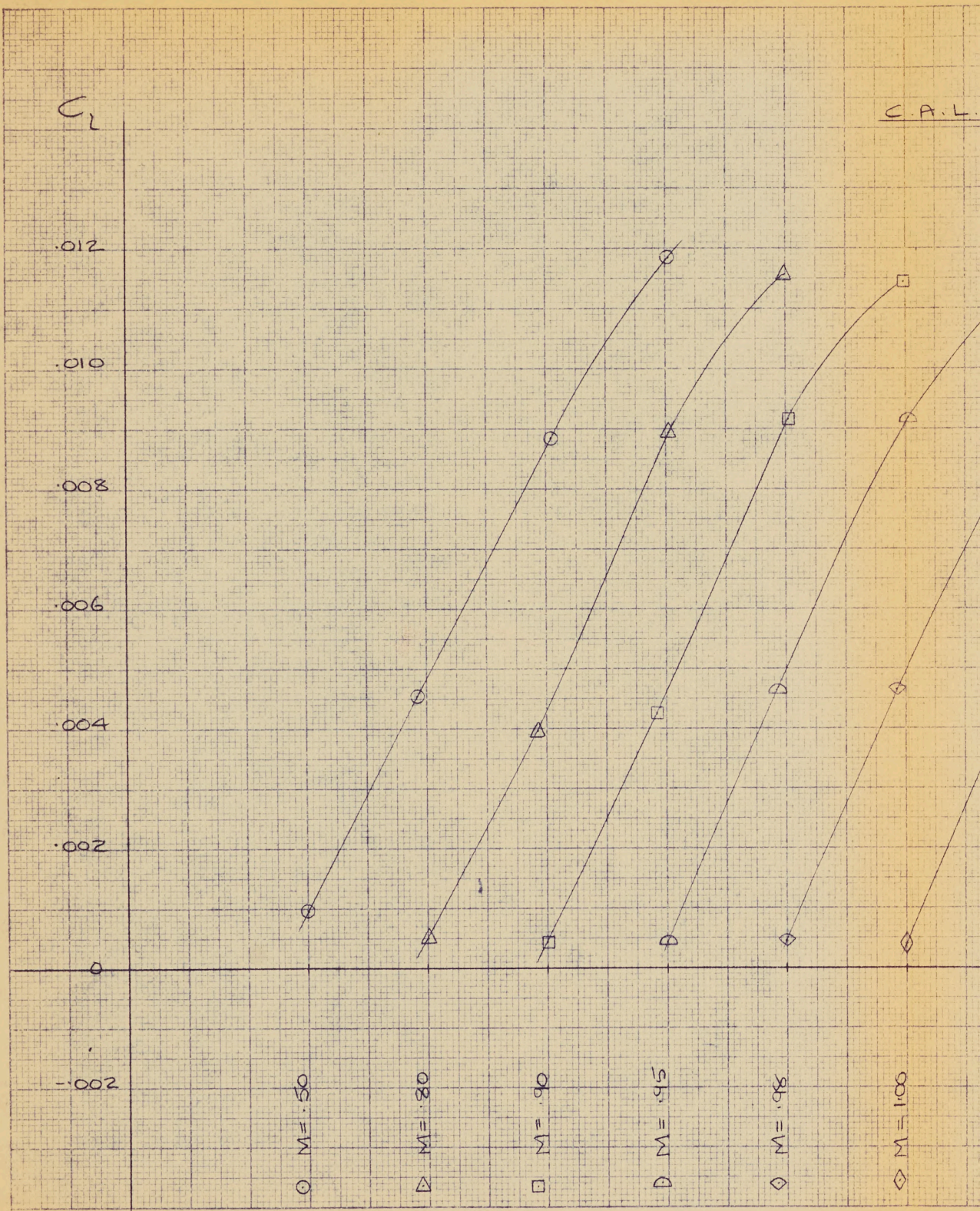
$\alpha = 0^\circ$



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C.A.L

$C_1$



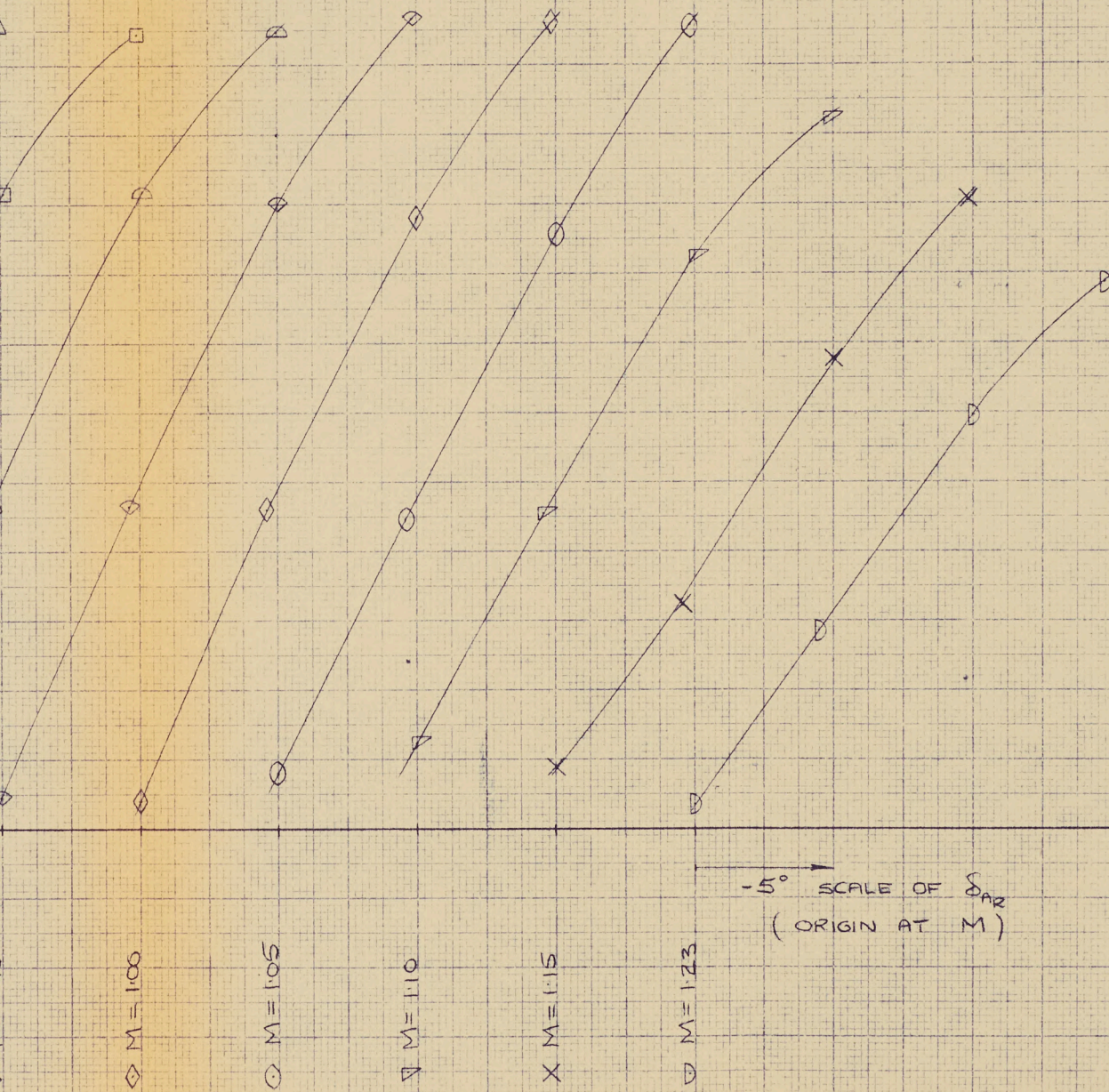
326-111 KUFFEL & ESSER CO.  
 19 X 10 to the 1/2 inch, 50th lines oriented.  
 MADE IN U.S.A.

C-105

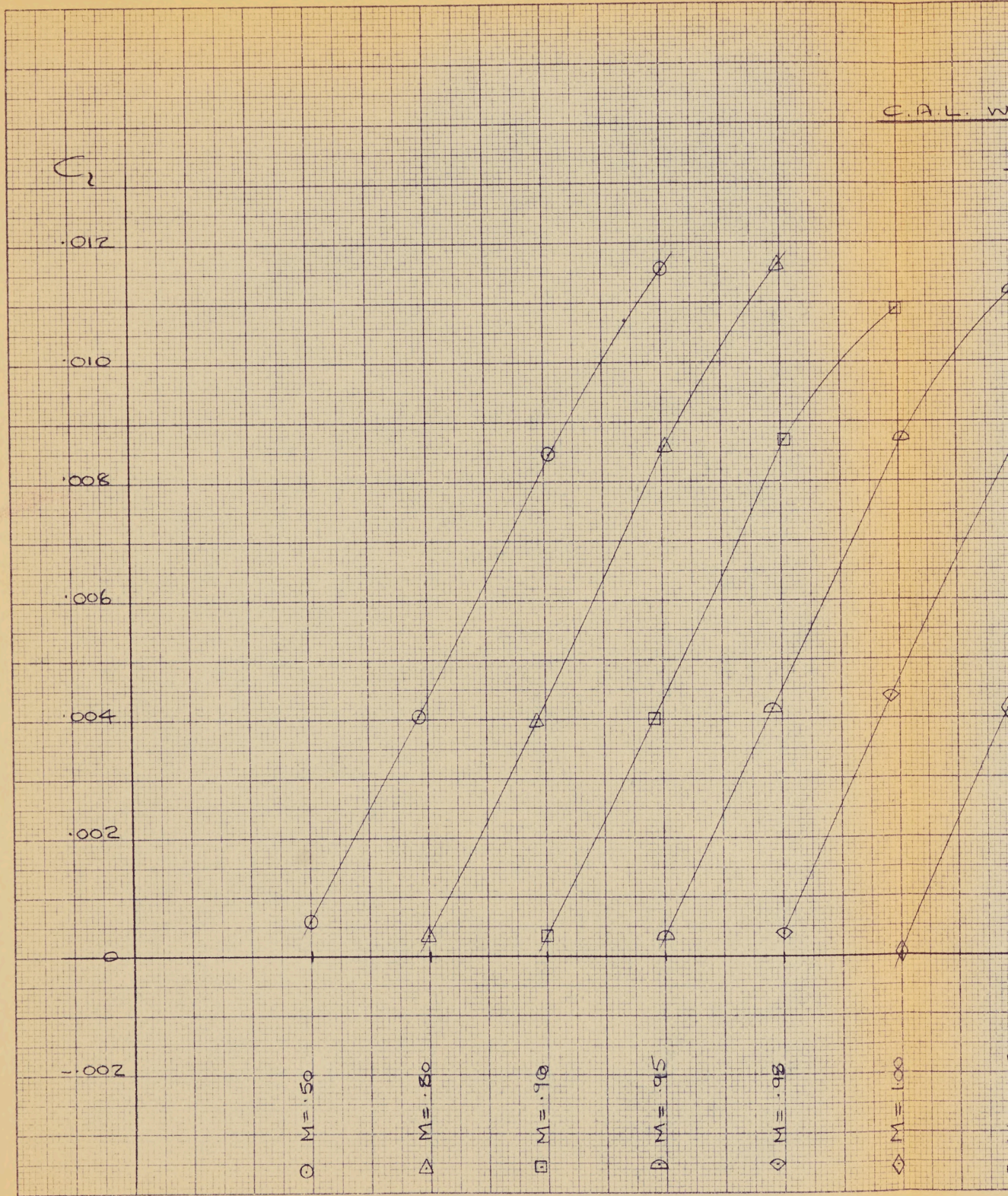
C.A.L. WIND TUNNEL TESTS. OCT '54.

$$C_L \text{ vs } \delta_{AR}$$

$$\alpha = 2^\circ$$



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NON CLASSIFIE



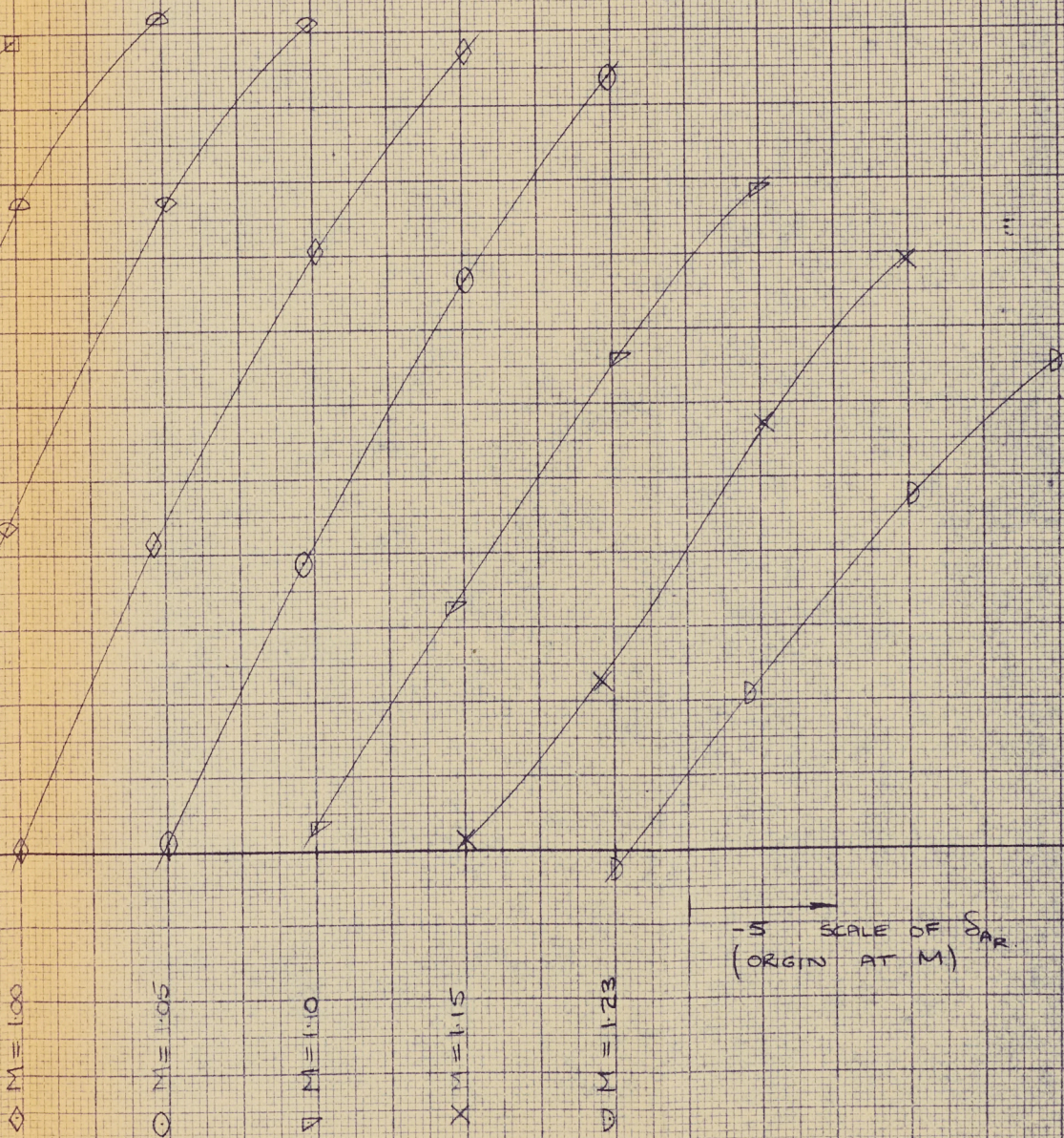
C-105

C.A.L. WIND TUNNEL TESTS OCT. 54

$C_L$  vs.  $C_{DPR}$

$\alpha = 4^\circ$

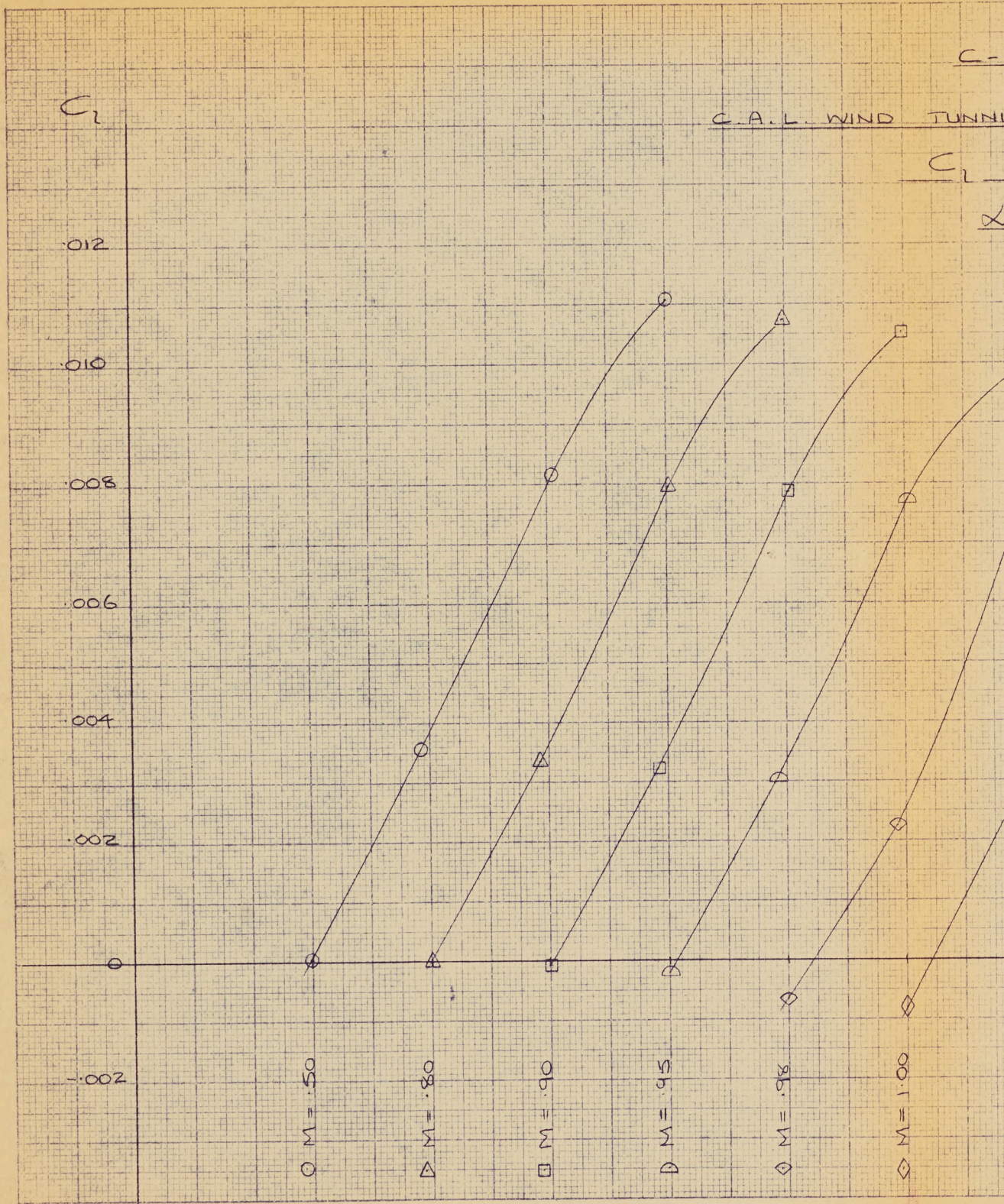
CONFIG.  $B_4 C_3 W_9 N_A S V_2 R_5$



-S SCALE OF  $C_{DPR}$   
(ORIGIN AT M)

UNCLASSIFIED  
NON CLASSIFIED

359-111 KUFFEL & ESSER CO.  
10 X 10 to 100 1/2 inch, 200 lines screen, et.  
MADE IN U. S. A.

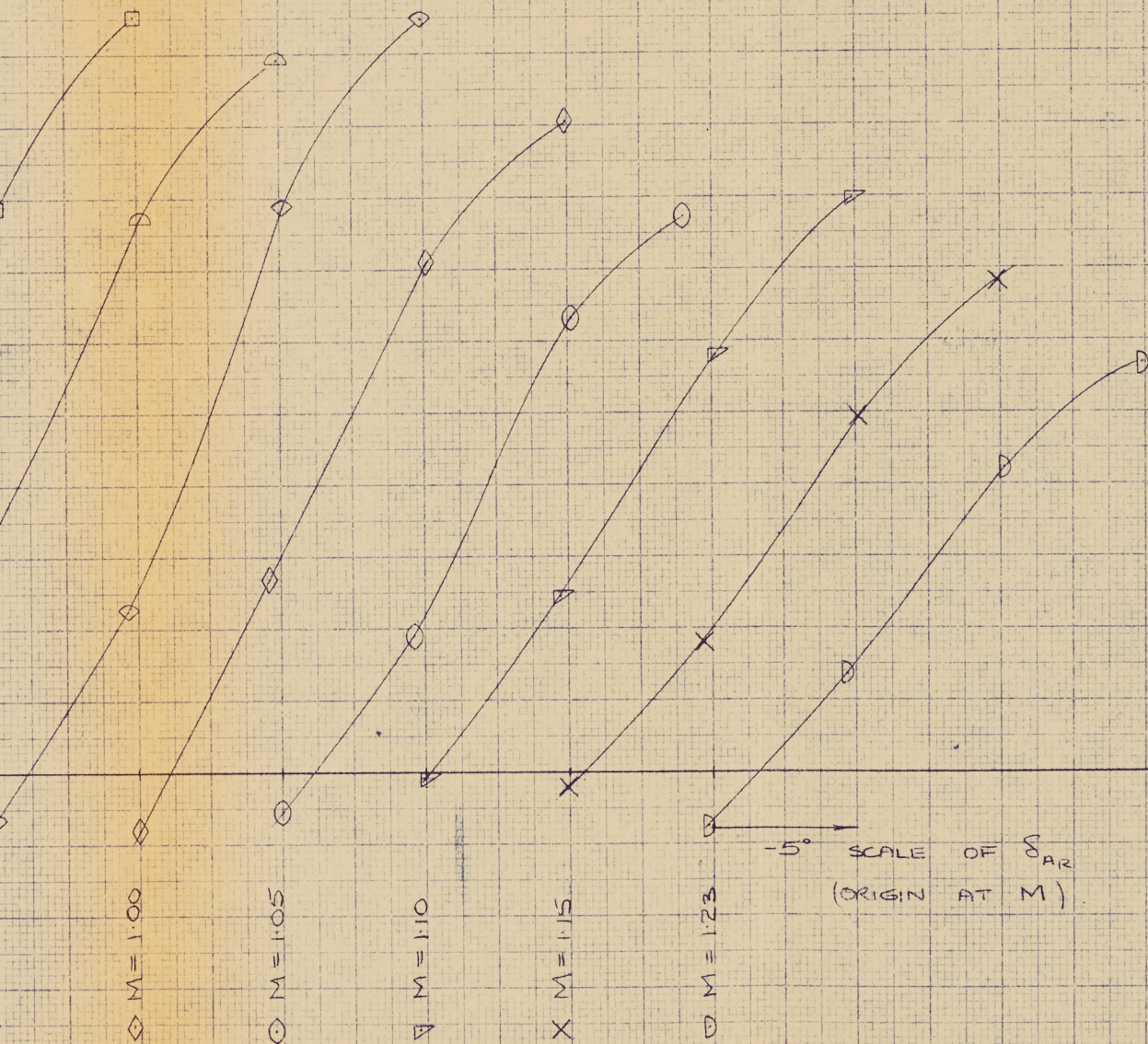


C-105

WIND TUNNEL TESTS OCT '54

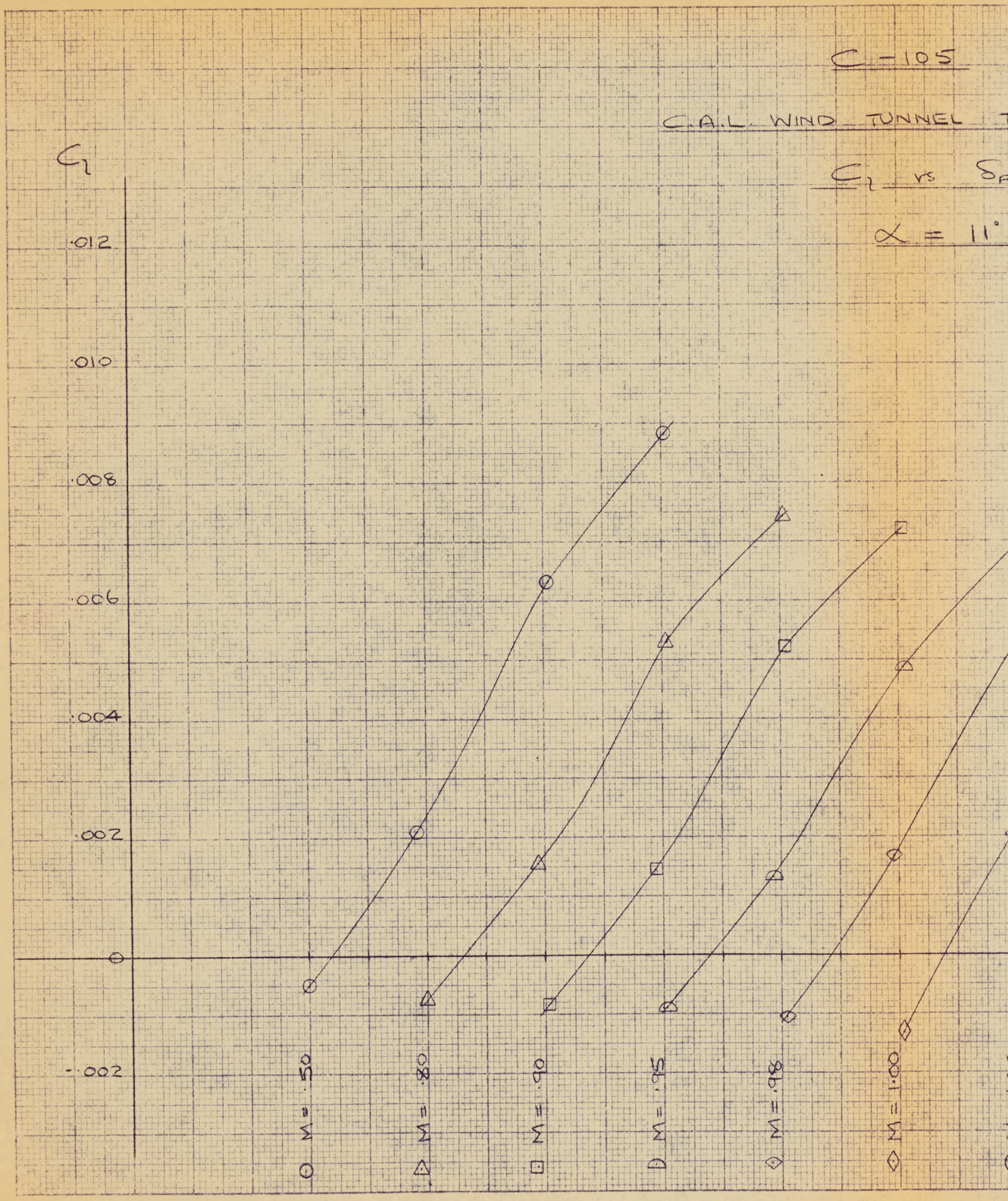
$C_L$  VS  $\delta_{AR}$

$\alpha = 6^\circ$



UNCLASSIFIED  
NON CLASSIFIED

559-111 KETTEL & ESSER CO.  
-10 X 10 to the 3/4 inch fish lines exhibited.  
4004 W. 11th

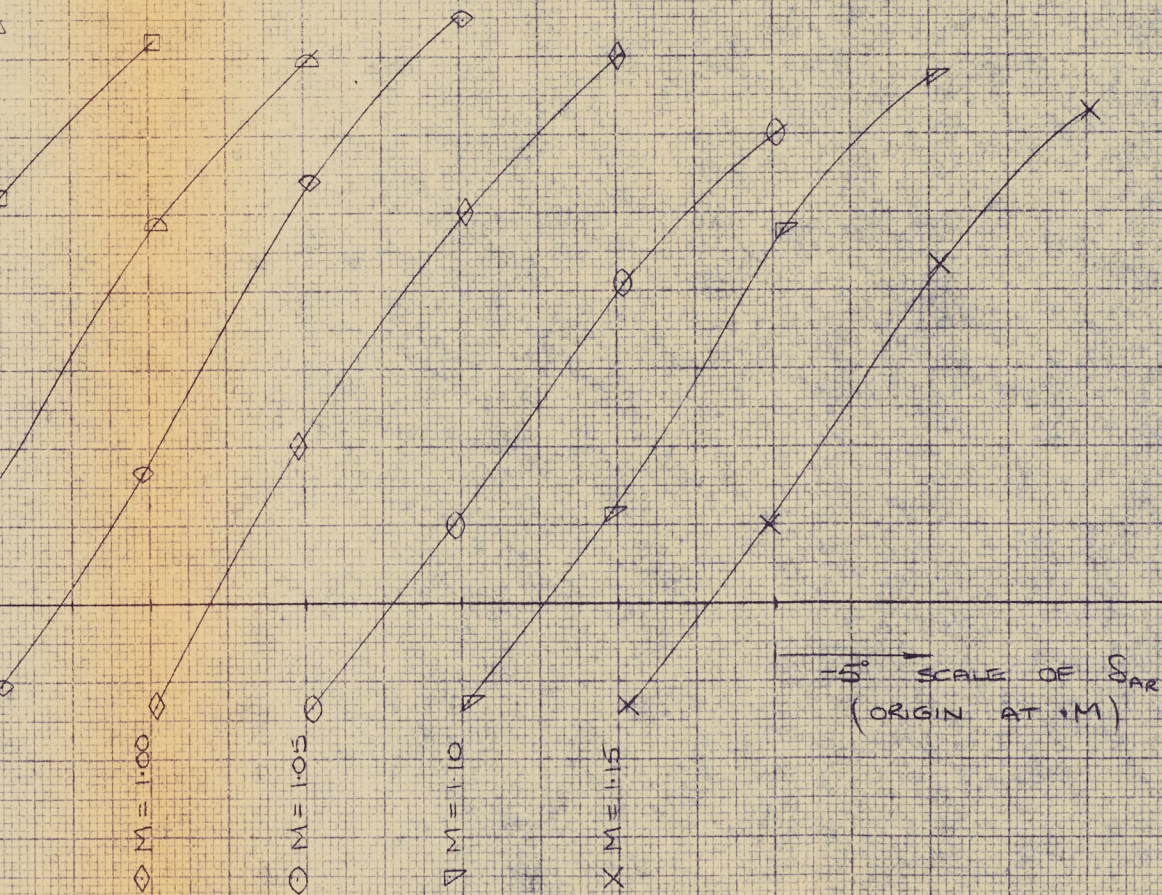


C-105

WIND TUNNEL TESTS OCT '54

$C_L$  vs  $\delta_{AR}$

$\alpha = 11^\circ$



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NON CLASSIFIED

C 105  
CAL. WIND TUNNEL TESTS OCT 54

C<sub>3</sub> B<sub>4</sub> H<sub>9</sub> K<sub>2</sub> R<sub>6</sub> N<sub>4</sub>C

Ch<sub>0</sub> 15 MARCH No

Ch<sub>0</sub>  
ELEVATION

06

04

02

0

-02

12

14

16

18

20

22

24

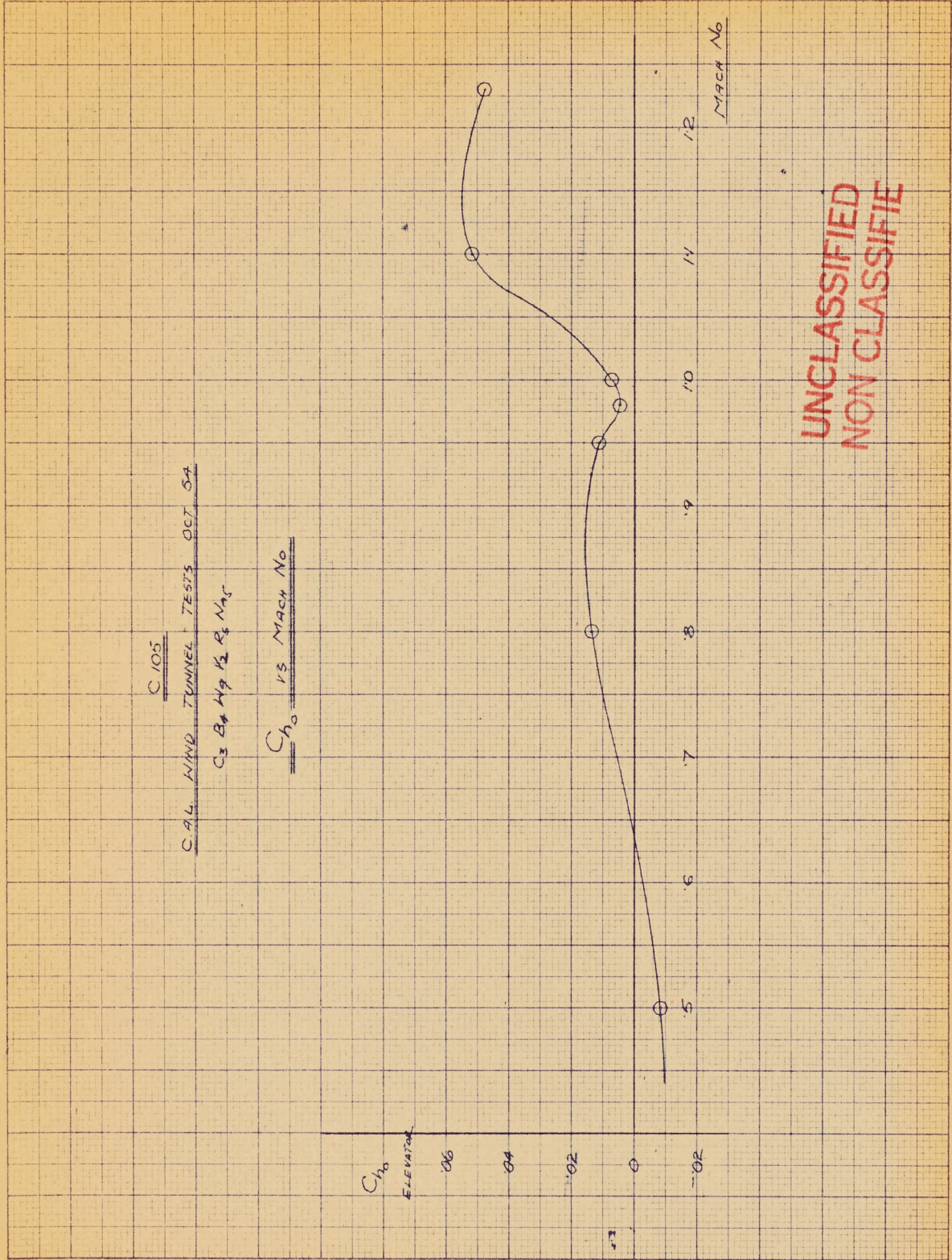
26

28

MARCH No

UNCLASSIFIED  
NON CLASSIFIED

7.1 P/WT/150  
Nov 54 K. Matkowski



7.2 P/W.T/50  
Nov 54 Kuratowski

C.105  
C.A.L. WIND TUNNEL TESTS OCT. 54

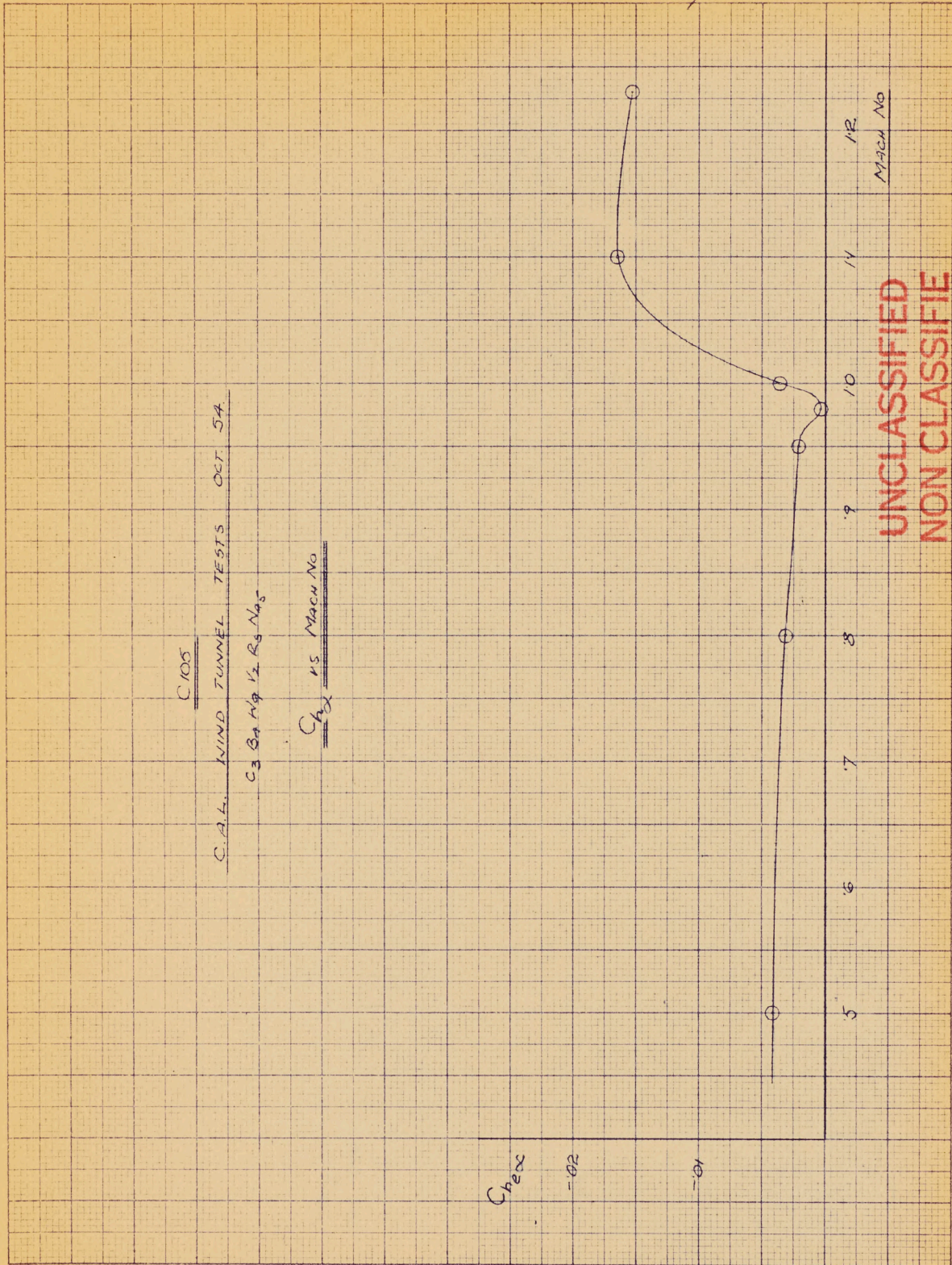
C3 Ba 1/4 1/2 R<sub>3</sub> No<sub>5</sub>

Ch<sub>2</sub> 1.5 Mach No

Ch<sub>2</sub>

-02

-01



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NON CLASSIFIE

C105  
C.A.G. MINQ. TUNNEL TESTS OCT 54

C<sub>3</sub> Re A<sub>1</sub> B<sub>3</sub> M<sub>10</sub>

C<sub>10</sub> vs C<sub>10</sub>

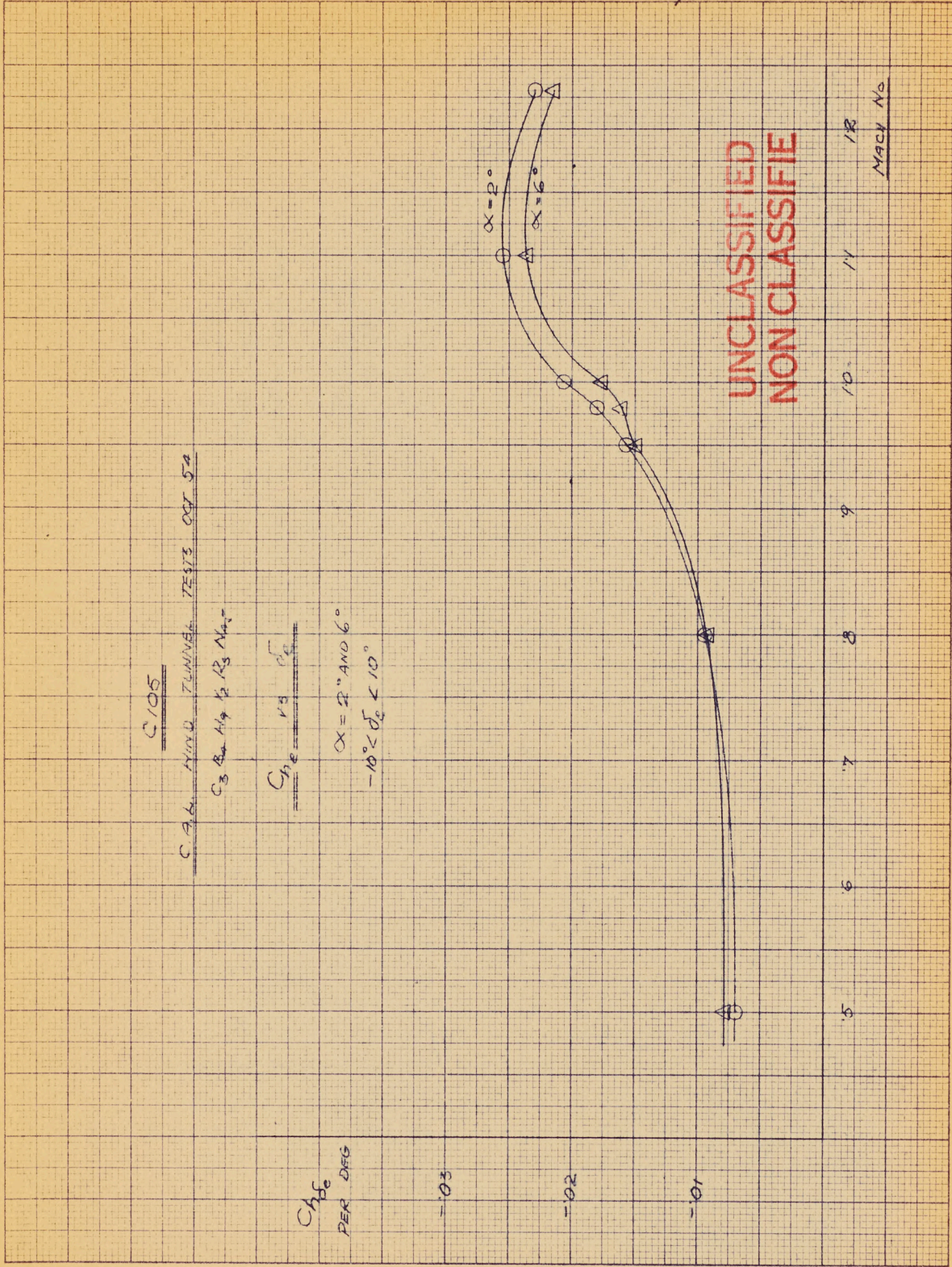
$\alpha = 2^\circ$  AND  $6^\circ$   
 $-10^\circ < \delta_c < 10^\circ$

C<sub>10</sub>  
PER DEG

-03

-02

-01



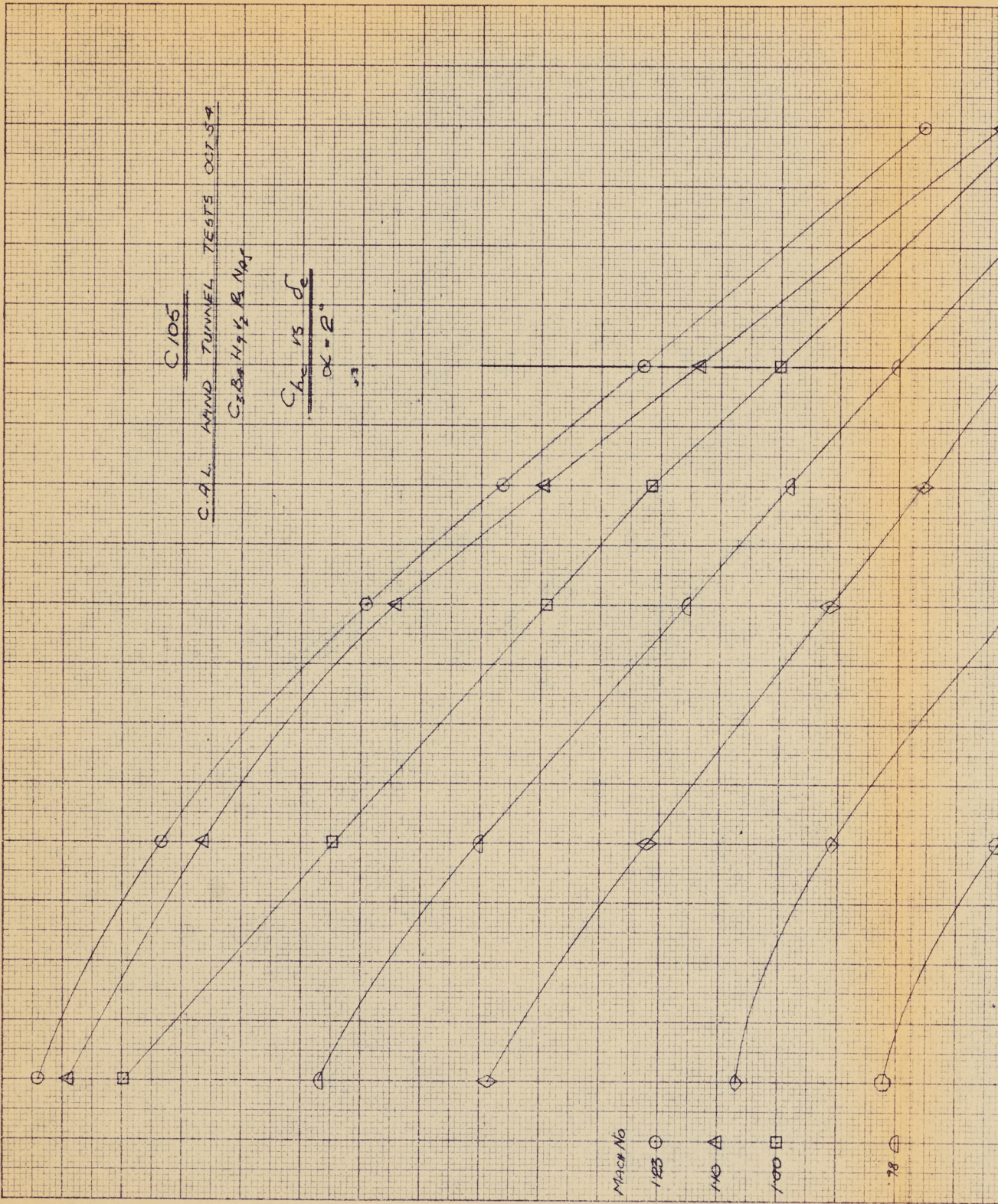
UNCLASSIFIED  
NON CLASSIFIED

Mach No

P/WT/50

C.106  
 C.A.L. WIND TUNNEL TESTS O.I.P. 5-4  
 C<sub>2</sub>B<sub>0</sub> H<sub>1/2</sub> B<sub>0</sub> N<sub>0</sub>

$$\frac{C_{he} \cdot B \cdot d_e}{\alpha = 2^\circ}$$



MACH No

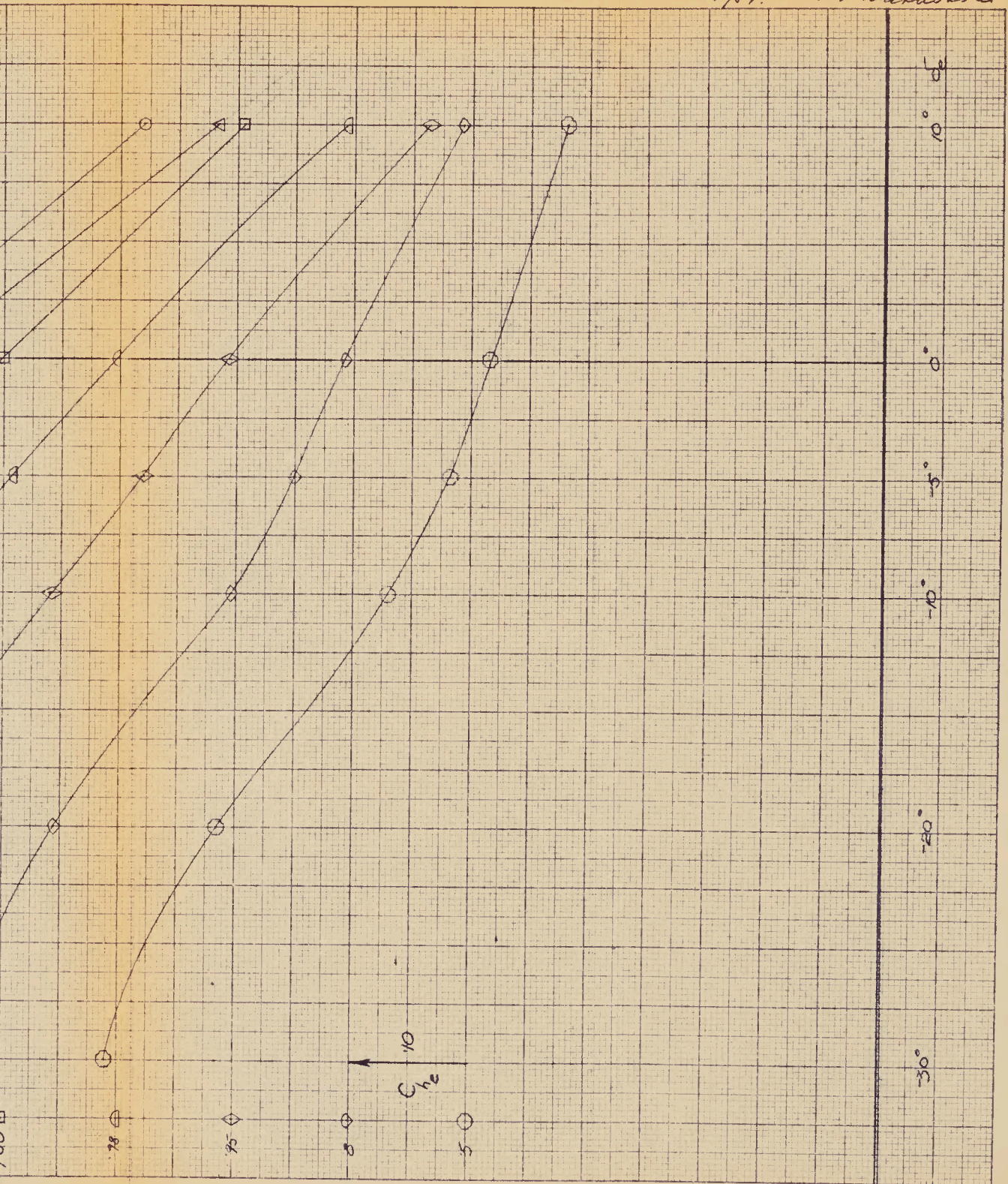
1.25 ○

1.40 △

1.60 □

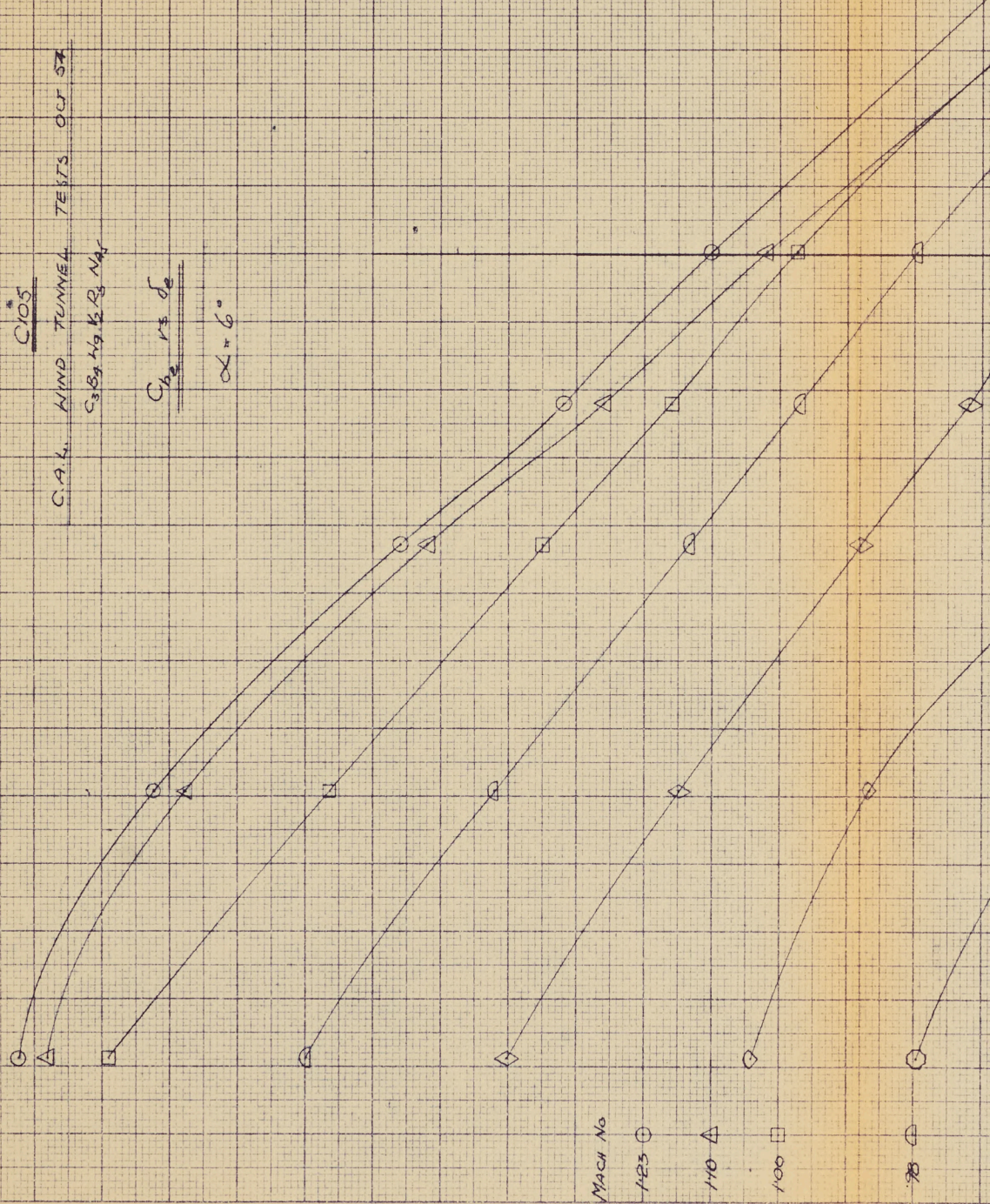
1.78 ◇

7.3.2. P/NT/50  
Nov/54. S. Kwathowski



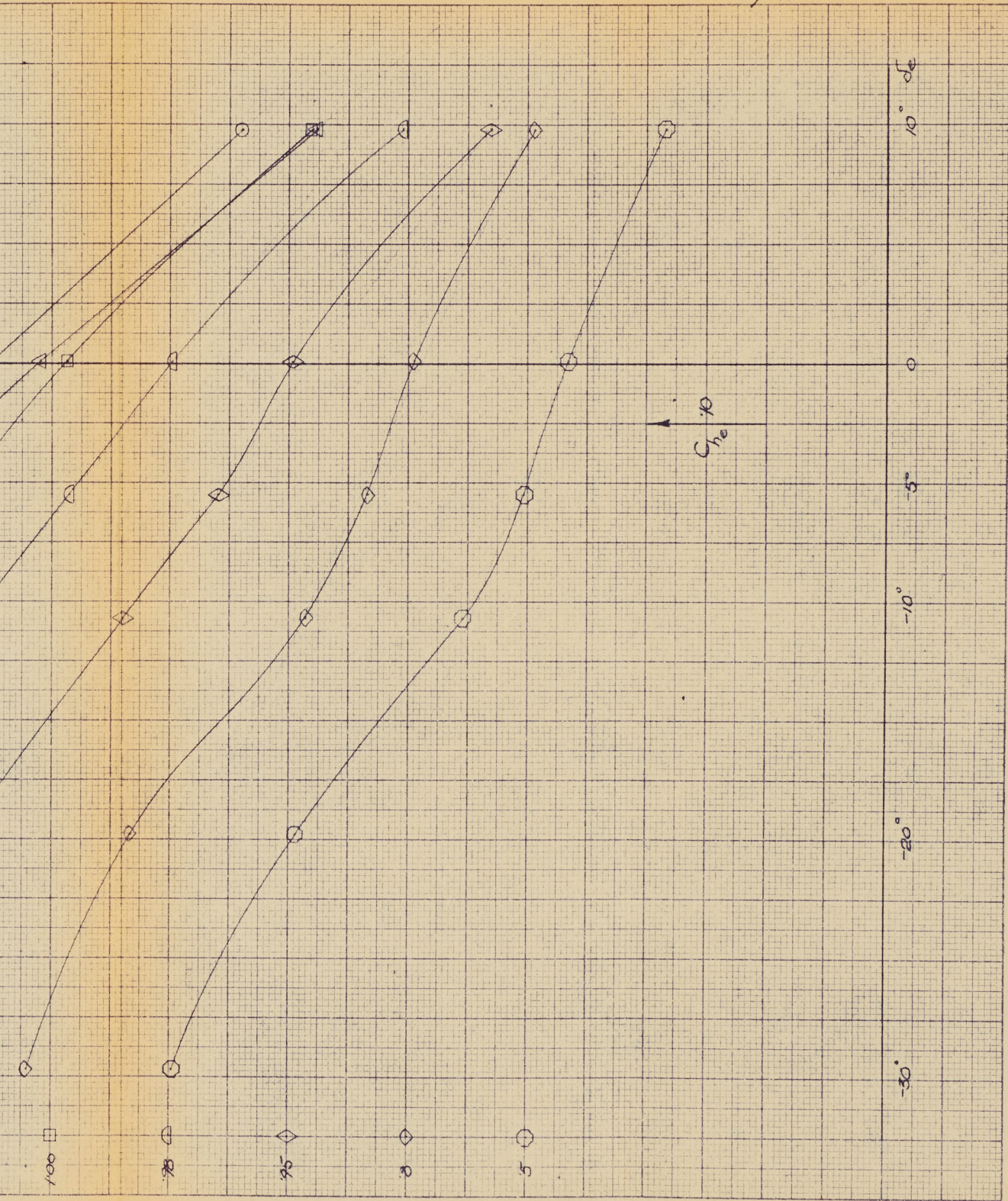
UNCLASSIFIED  
NON CLASSIFIE

C105  
C.A.L. WIND TUNNEL TESTS OCT 57  
S<sub>3</sub>B<sub>3</sub> 1/2 R<sub>3</sub> NA<sub>1</sub>  
C<sub>h2</sub> vs δe  
α = 6°



Mach No  
1.25 ○  
1.10 △  
1.00 □  
.90 ◇

7.33. P/WT 150  
Nov/54. S. Kwakhsush



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8.1

2/27/50

APR. 52.

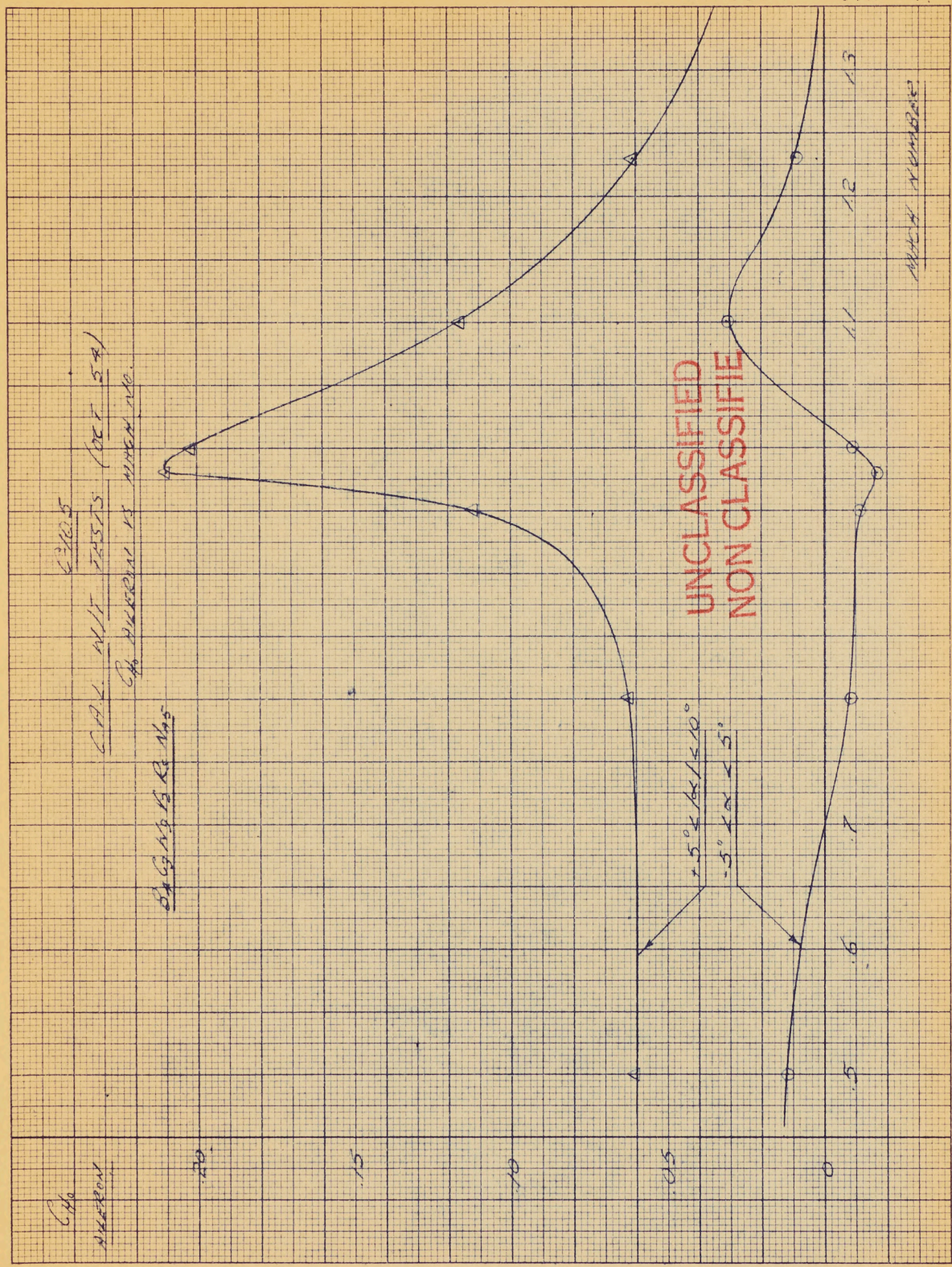
CRNK

KE 10 X 10 TO THE 1/2 INCH  
KLUFFEL & ESSER CO.  
359-12  
MADE IN U.S.A.

CH<sub>6</sub>  
AHERON

← 3/22/5  
CALC WITH TESTS (DET 54)  
ON AHERON IS WHEN NO.

DISCREPANCY

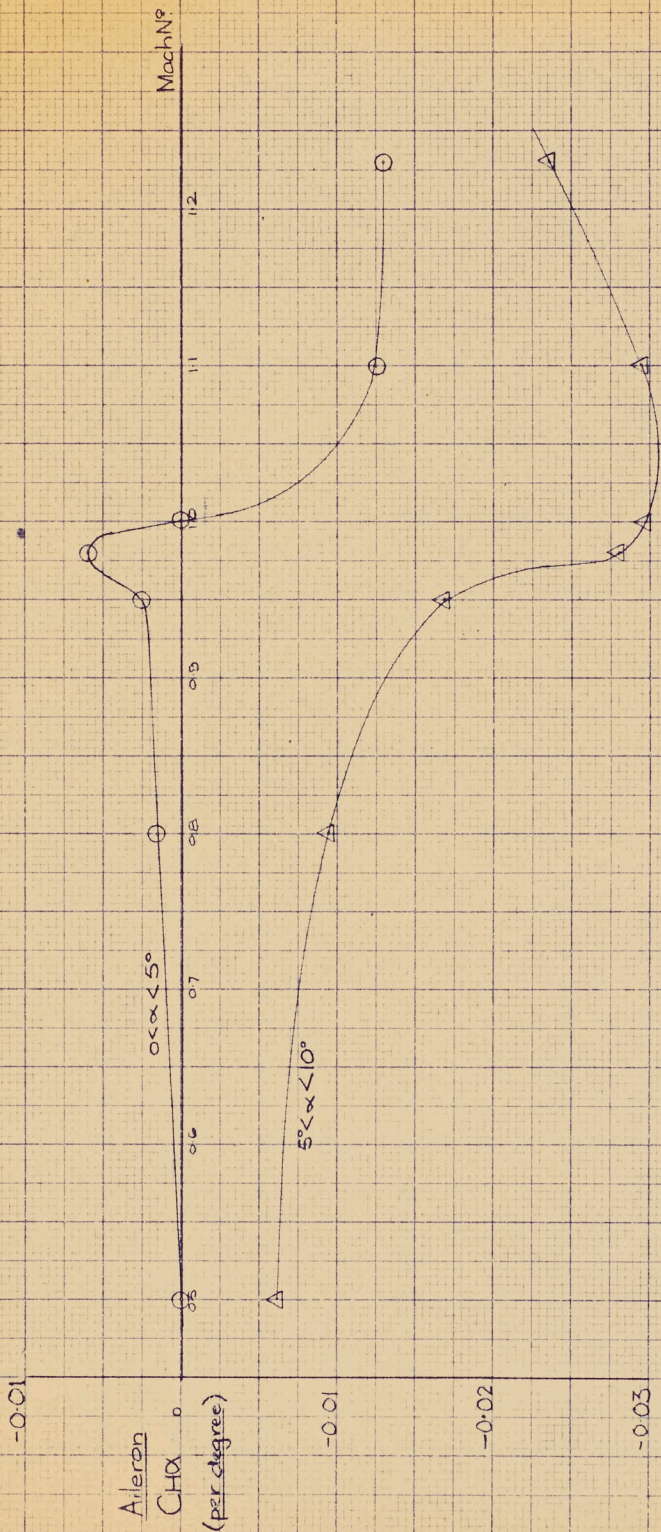


C-105

C.A.L. W/T TESTS OCT 54

Config:  $B_{C_2}$   $W_3$   $V_4$   $R_5$   $N_{AS}$

Aileron Chk vs MACH No



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C-105

SAIL W/T TESTS OCT 54  
Config B<sub>1</sub>C<sub>2</sub>W<sub>6</sub>V<sub>2</sub>P<sub>2</sub>N<sub>14</sub>  
Aileron CH $\delta$  VS Mach N<sup>o</sup>

Mach N<sup>o</sup>

v2

11

10

09

08

07

06

05

04

03

02

01

00

00

00

00

00

-002

-004

-006

-008

-010

-012

-014

-016

-018

CH $\delta$

$\alpha = 6^\circ$

$\alpha = 2^\circ$

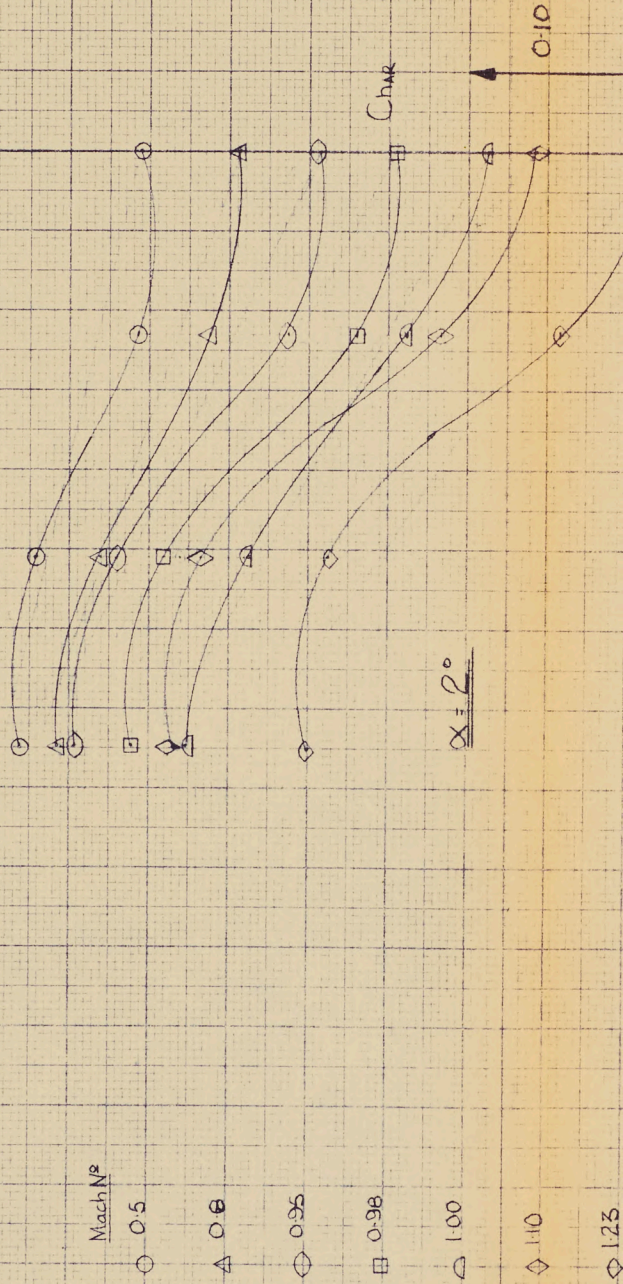
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NON CLASSIFIE

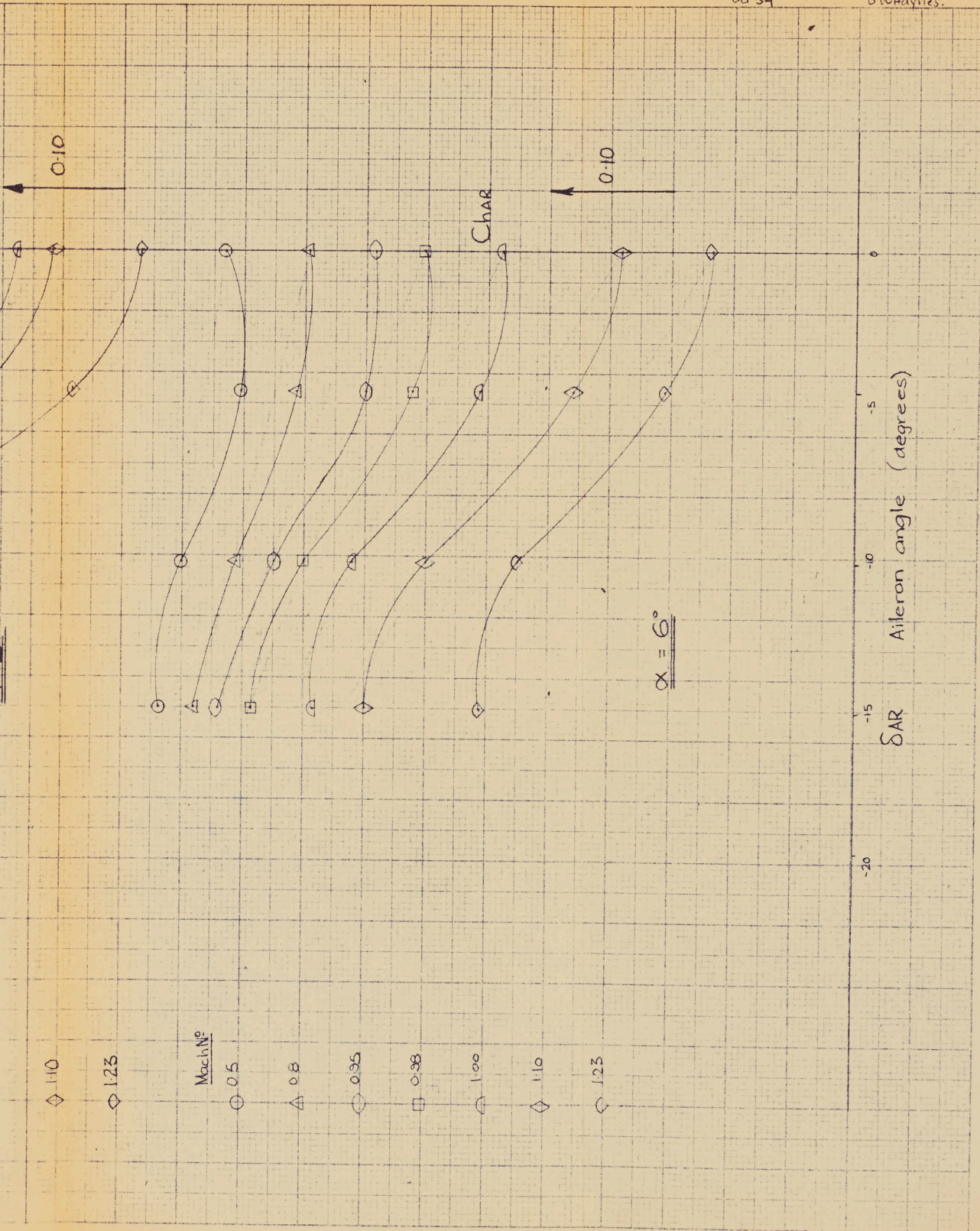
C-105

C.A.L. WIT TESTS OCT 154

Config B<sub>1</sub> C<sub>5</sub> W<sub>6</sub> V<sub>2</sub> R<sub>3</sub> N<sub>4</sub> S

Aluminum Ch (constant) VS SAR





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