

QC
Avro
C-105
P/WT/20
Vol. II

QC X
Avro
CF105
P-WT-20
v.2

(24)

FILE IN VAULT

C-105

P/WIND TUNNEL/20

DERIVATIVES AND ZERO VALUES

VOLUME II

ANALYZED

LATERAL STABILITY

2A

Copy No. 2

June 1954.

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ANALYZED

TO
A

DATE

Dec. 7, 1992

Report no.: QCX - AVRO - CF105- P-WT-20 V.2

has been downgraded to: _____

de-classified

by (Name): Michel W. Drapeau

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

Date: Dec. 7, 1992

R. Drapeau
Signature



45115

12416802



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A. V. ROE CANADA LIMITED
MALTON - ONTARIO

TECHNICAL DEPARTMENT (Aircraft)

AIRCRAFT: C-105

REPORT NO. P/WIND TUNNEL/20

FILE NO:

NO. OF SHEETS:

TITLE:

DERIVATIVES AND ZERO VALUES

VOLUME II

LATERAL STABILITY

Classification ^{confirmed as:} ~~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: DS1/3, Secretary CRAD HQ DRP

PREPARED BY

DATE June 1954.

CHECKED BY

DATE

SUPERVISED BY

DATE

APPROVED BY

DATE

ISSUE No	REVISION No	REVISED BY	APPROVED BY	DATE	REMARKS

AIRCRAFT: _____

PREPARED BY

DATE

J. Clark

June 1954.

CHECKED BY

DATE

INDEX

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<u>1. Sideslip Derivatives</u>	<u>Section</u>
<u>1. $C_{N\beta}$</u>	
1. Clean aircraft (fin on)	1.1.1
2. Clean aircraft (fin off)	1.1.2
3. Effect of tank	1.1.3
4. Effect of tank and brakes	1.1.4
<u>2. $C_{l\beta}$</u>	
1. Clean aircraft (fin on and off)	1.2.1
2. Effect of tank	1.2.2
3. Effect of tank and brakes	1.2.3
<u>3. $C_{y\beta}$</u>	
1. Clean aircraft (fin on)	1.3.1
2. Clean aircraft (fin off)	1.3.2
3. Effect of tank	1.3.3
4. Effect of tank and brakes	1.3.4
<u>2. Aileron Derivatives</u>	
1. $C_{N\delta_a}$	2.1
2. $C_{l\delta_a}$	2.2
3. $C_{y\delta_a}$	2.3
<u>3. Rudder Derivatives</u>	
1. $C_{N\delta_r}$	3.1
2. $C_{l\delta_r}$	3.2
3. $C_{y\delta_r}$	

AIRCRAFT
A. U. W.

COMPONENT

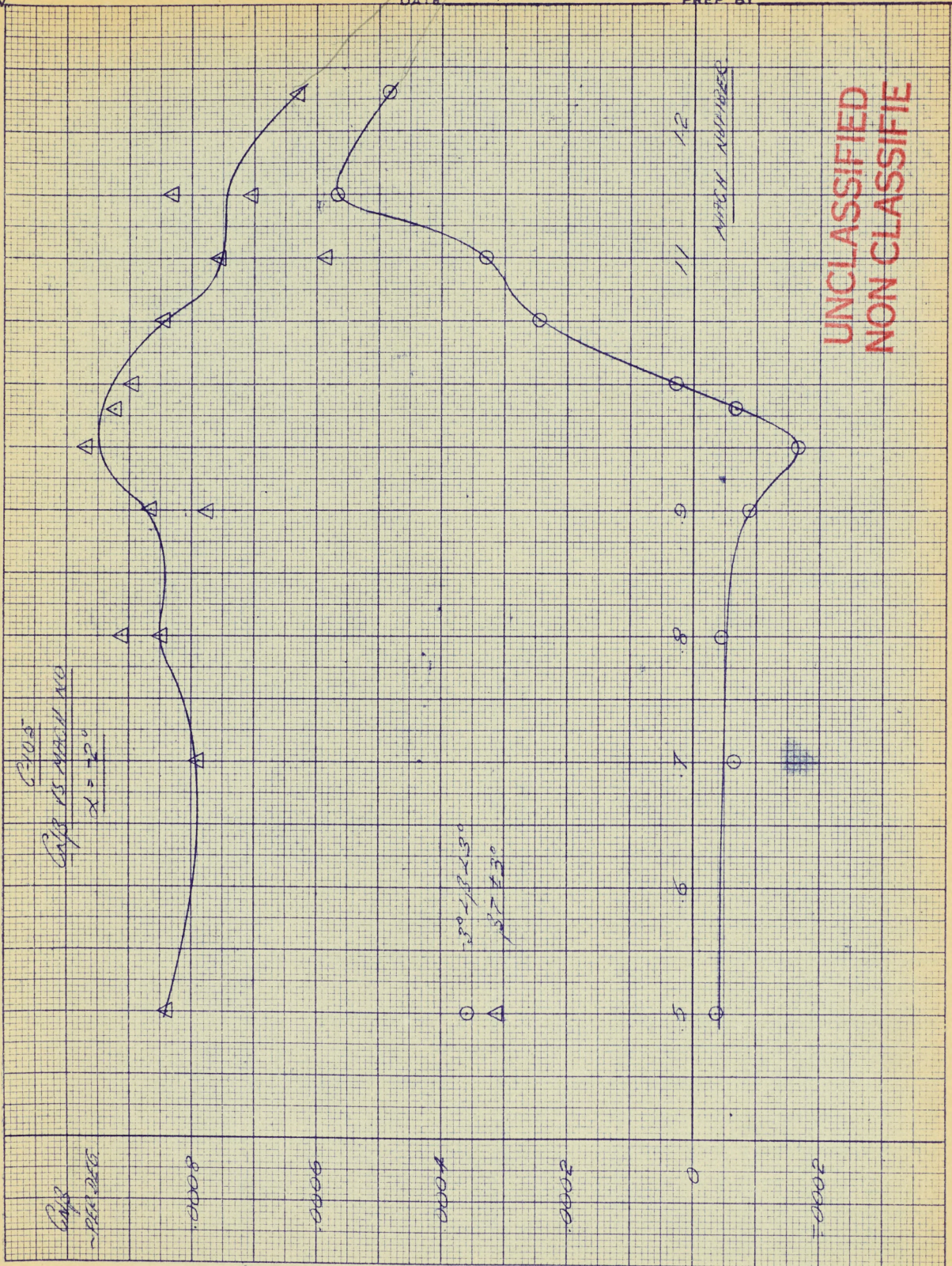
SHEET No. 1111

REPORT No. A/N.T/20.

DATE JUNE 27.

PREP BY CLARK

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359-12 NEUFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

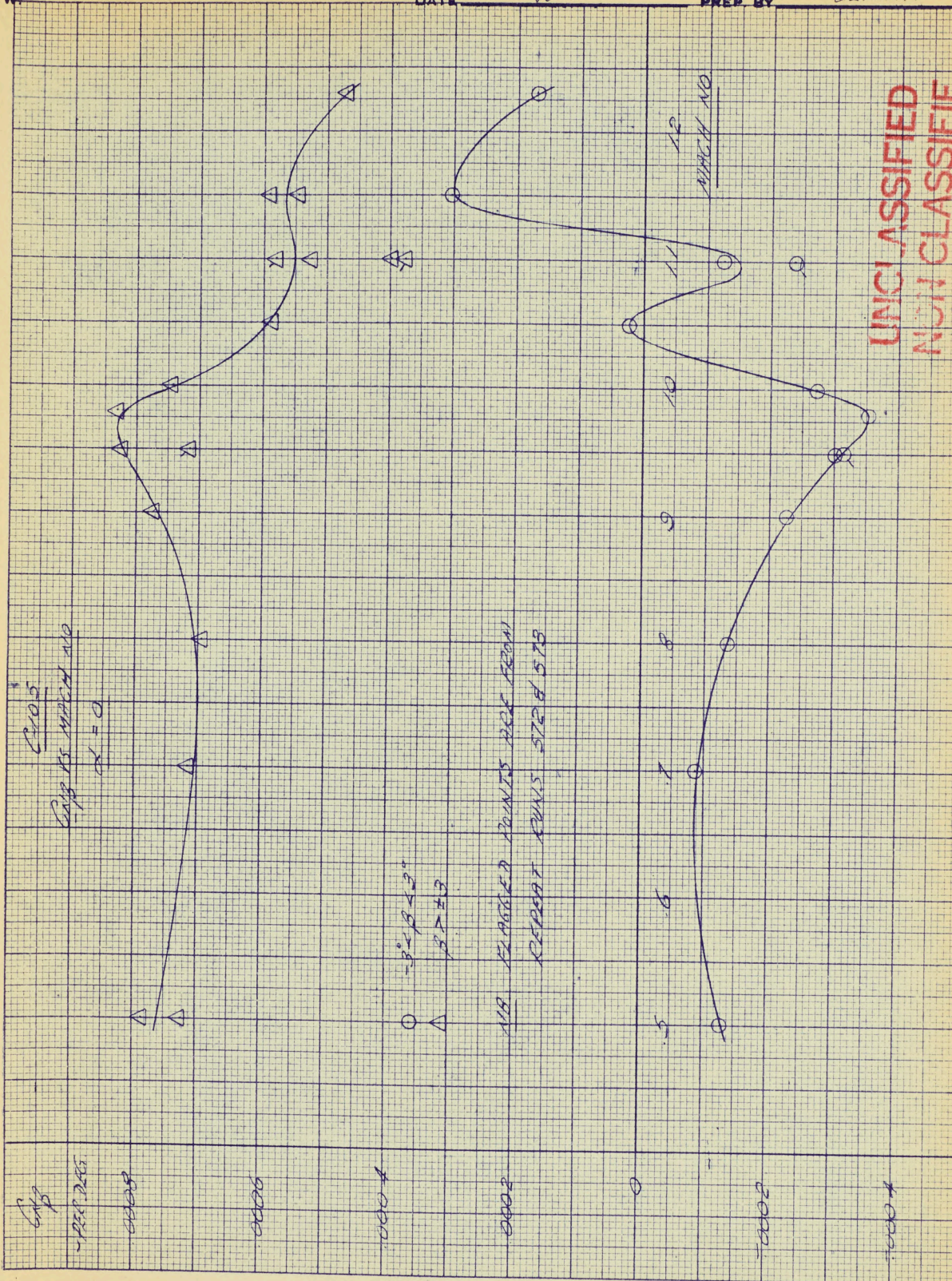
AIRCRAFT
A. U. W.

COMPONENT

SHEET No. 1112
DATE JUNE 54

REPORT No. P/W.F/20
PREP BY CLARK

759-12 KEUFFEL & ESSER CO
10 x 10 to 1/16" x 1/2" grid, 5/16" lines, 1/16" grid.
MADE IN U.S.A.



AIRCRAFT
A. U. W.

COMPONENT

SHEET No.

1.1.1.3.

REPORT No.

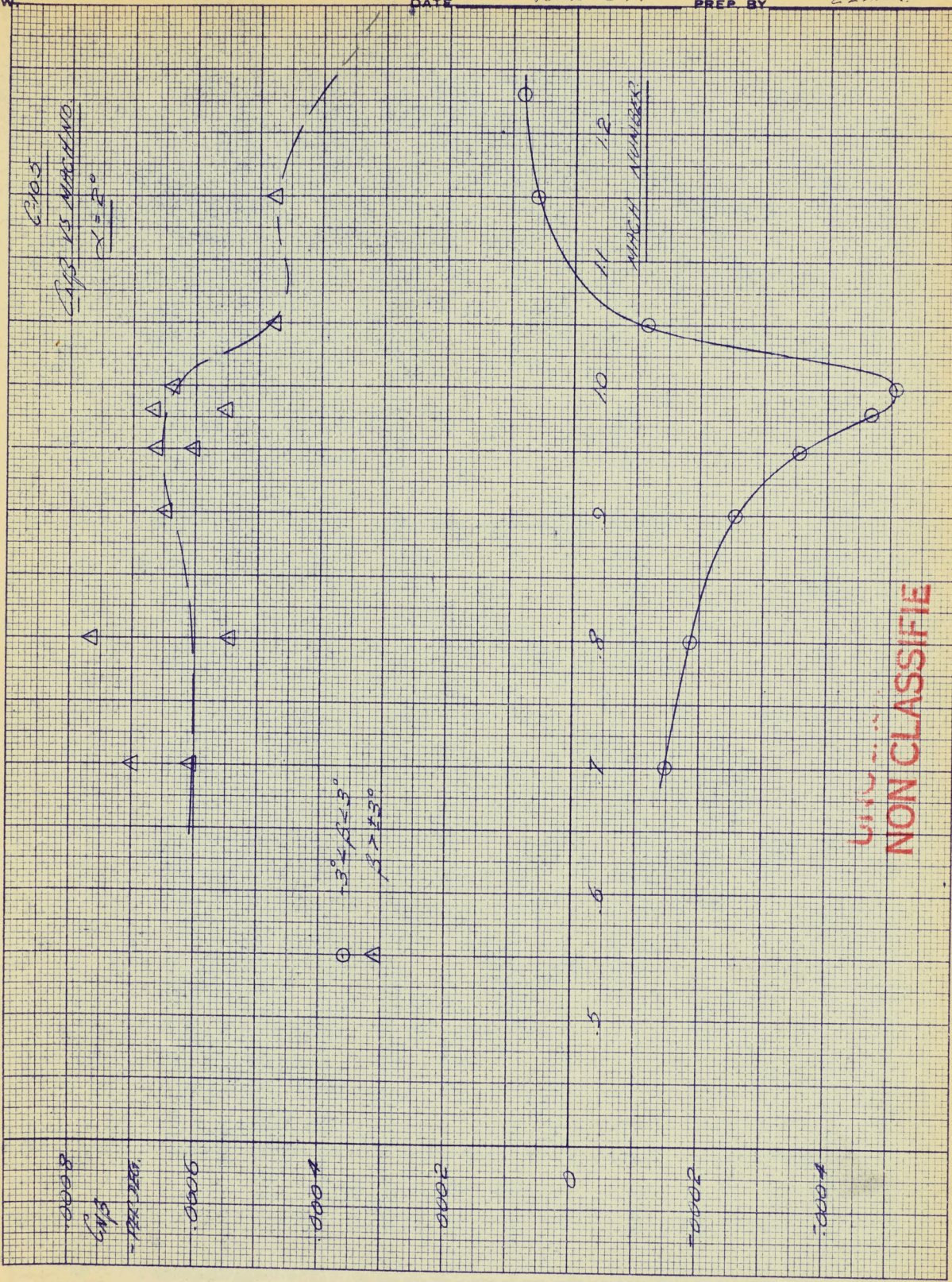
P/W T 120

DATE

JUNE 54.

PREP BY

CLARK.



359-12 KEUFFEL & ESSER CO
10 x 10 to the 1/2 inch, 5th lines accented
MADE IN U.S.A.

AIRCRAFT
A. U. W.

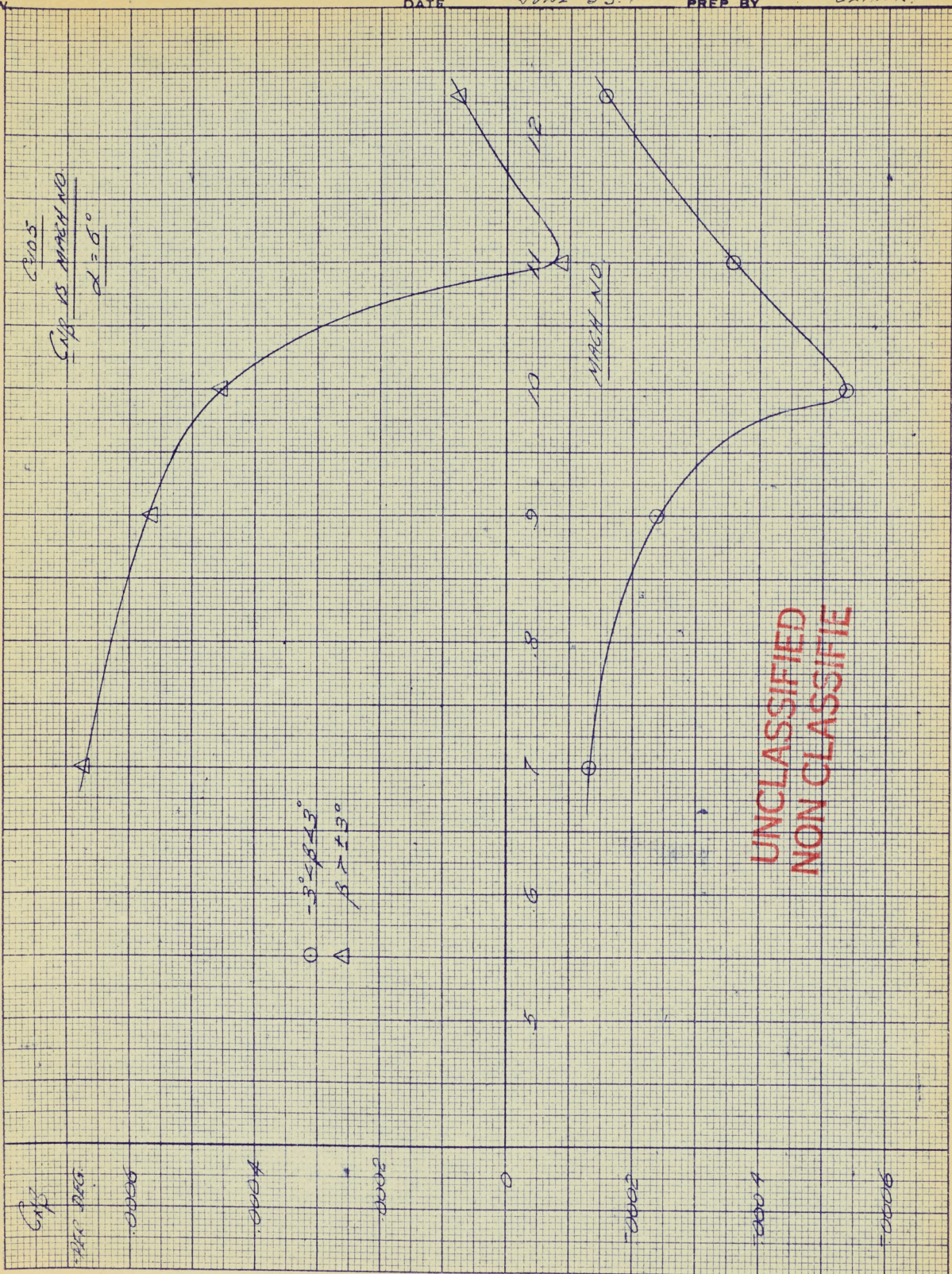
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SHEET No. 1114

REPORT No. P/N.T./20

DATE JUNE 53

PREP BY CLARK



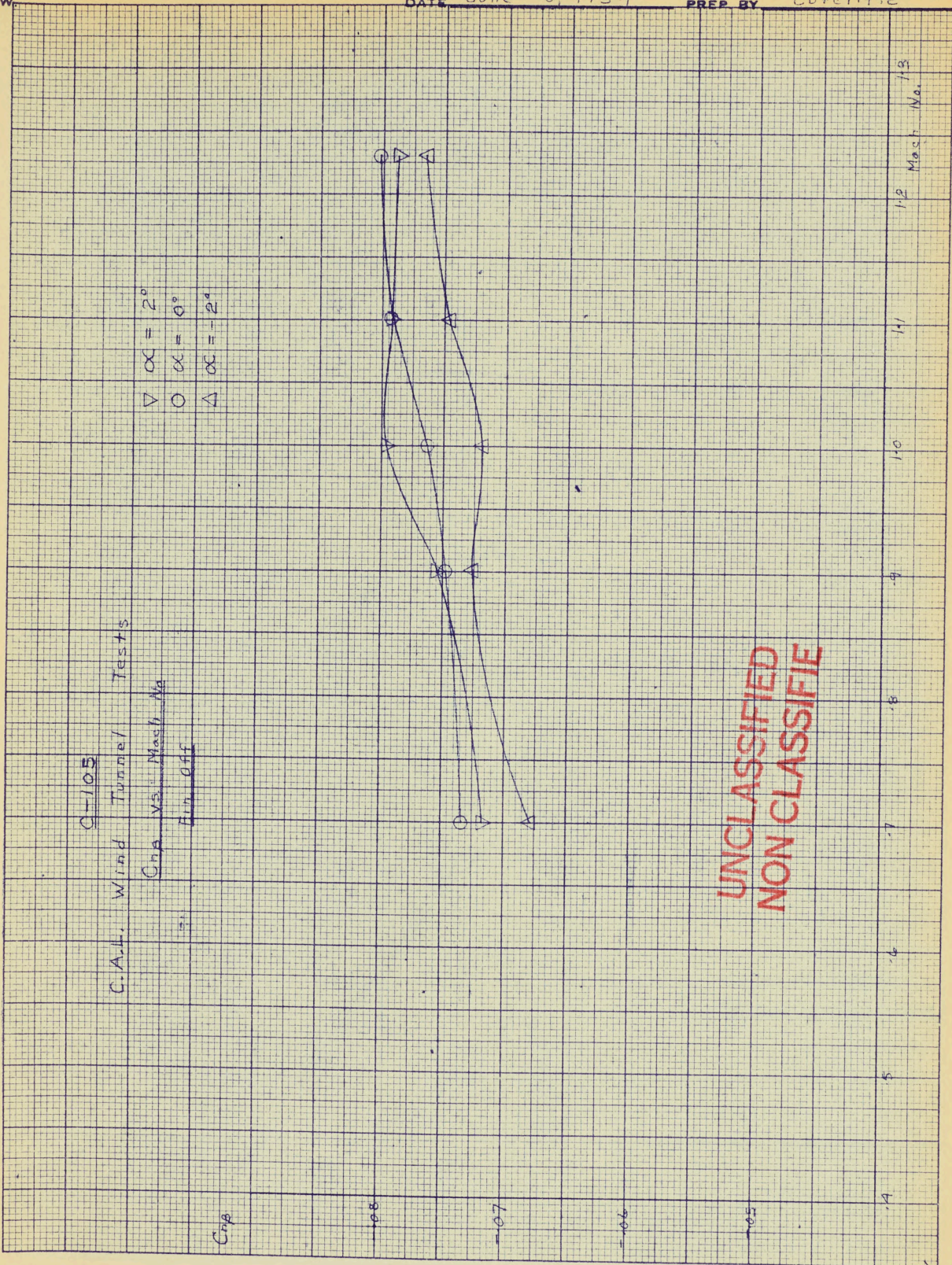
359-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, Six lines accounted.
MADE IN U.S.A.

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359 12 KEUFFEL & ESSER CO
10 x 10 inch graph paper
MADE IN U.S.A.

C-105
C.A.L. Wind Tunnel Tests
C_{np} vs. Mach No
Spin off

▽ $\alpha = 2^\circ$
○ $\alpha = 0^\circ$
△ $\alpha = -2^\circ$



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AIRCRAFT
A. U. W.

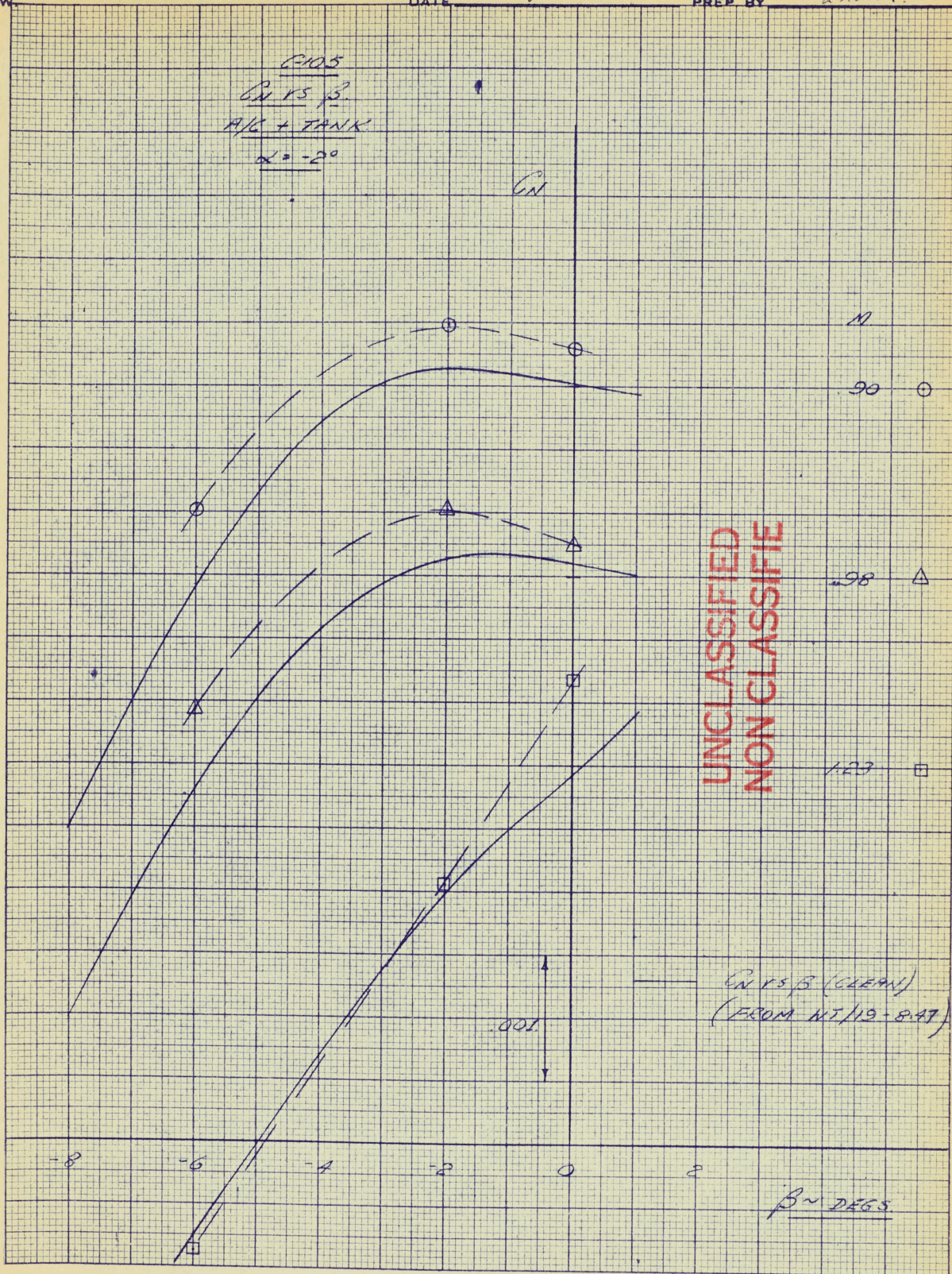
COMPONENT

SHEET No. 1.13.1.
DATE JUNE 54

REPORT No. P/W.T./20
PREP BY CLARK.

C105
CN 15 β
A/C + TANK
 $\alpha = -2^\circ$

CN



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359-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

AIRCRAFT
A. U. W.

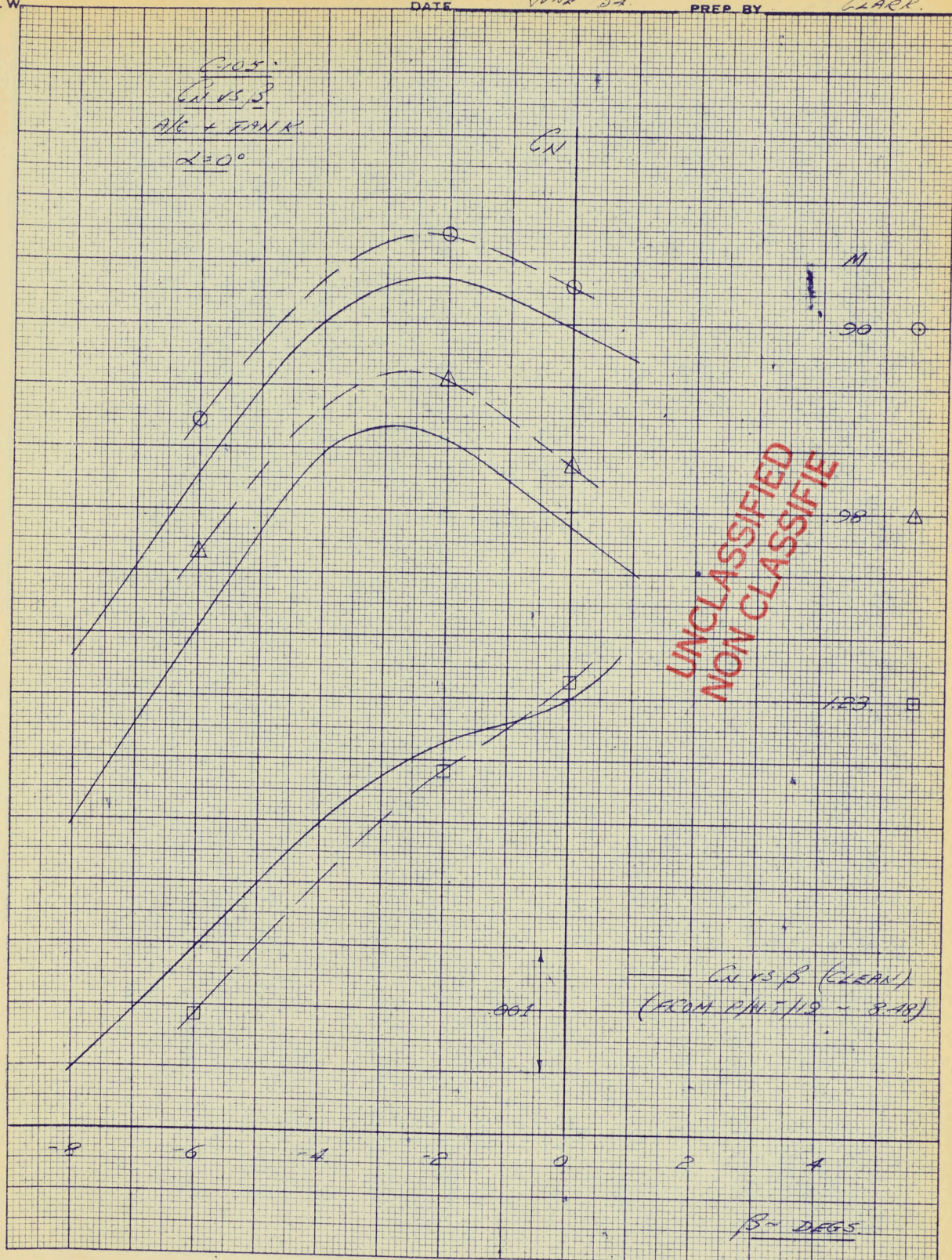
COMPONENT

SHEET No. 1.13.2

REPORT No. P/W.T/20

DATE JUNE 51

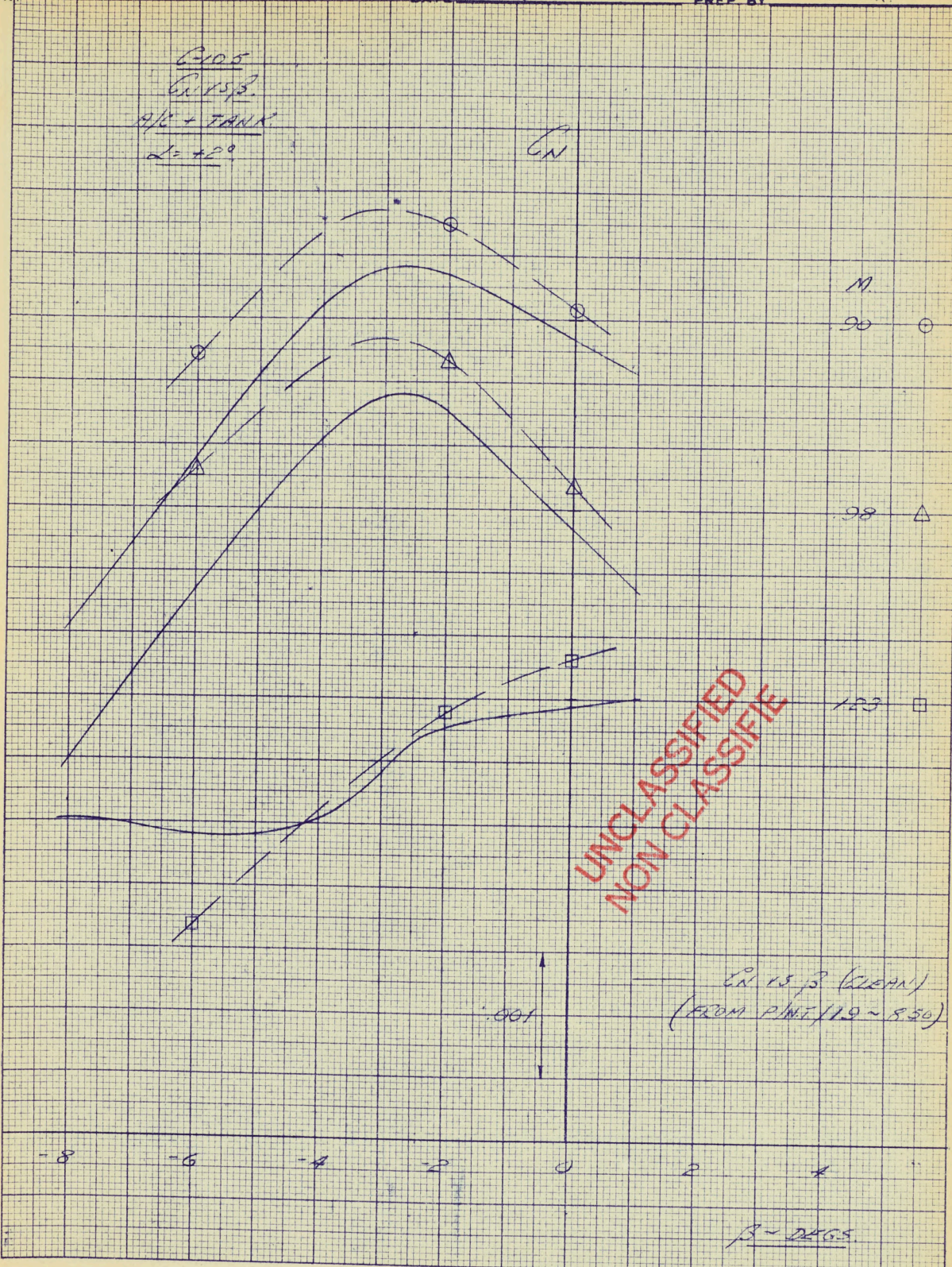
PREP BY CLARK



335-12 KEUFFEL & ESSER CO.
10 x 10 to 100 x 100 grid, 500 lines recommended.
MADE IN U.S.A.

C105
C153
A/C + TANK
L = 42°

CN

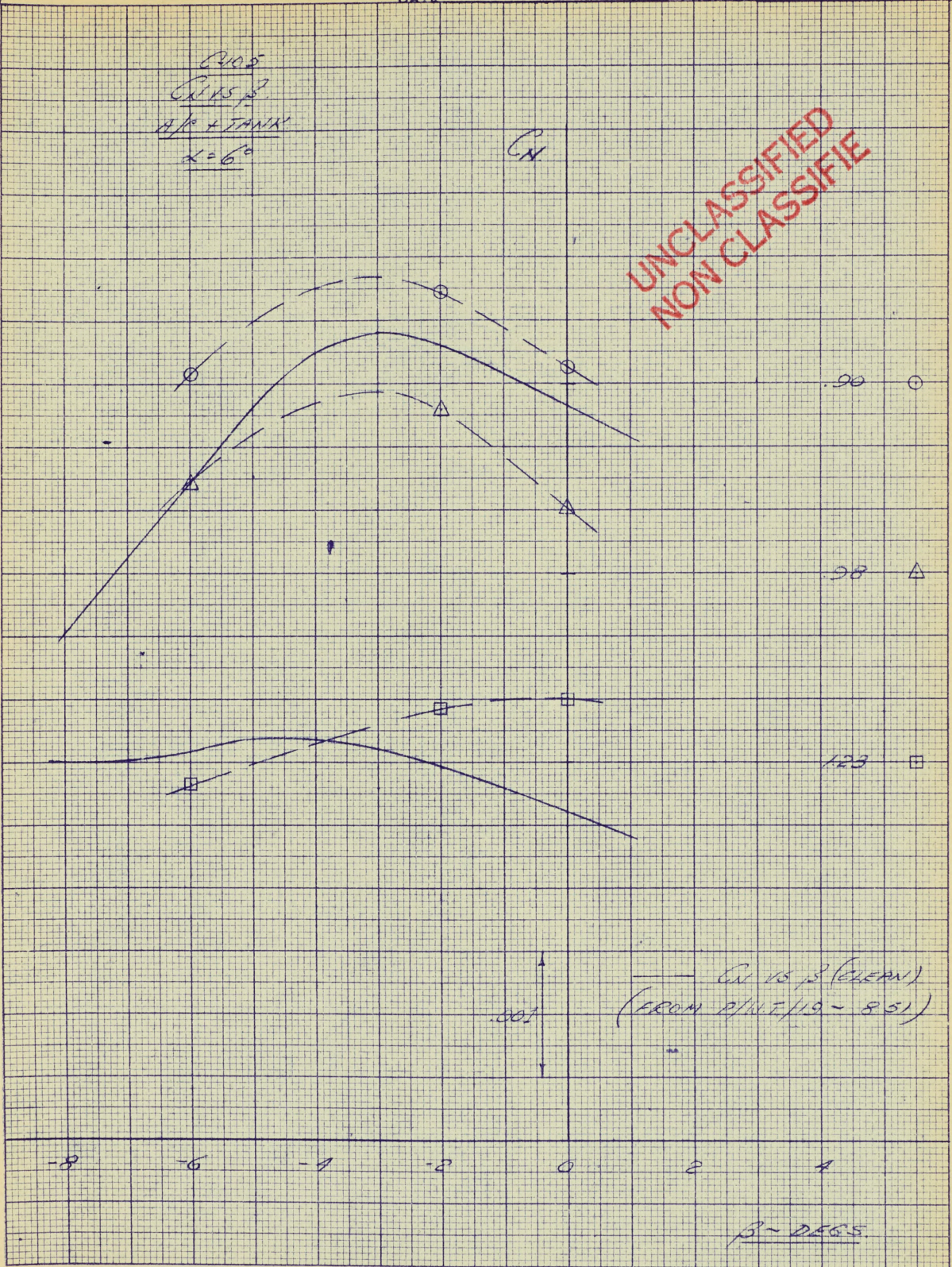


159-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

2105
CL 15, β
HP + TANK
 $\alpha = 6^\circ$

CN

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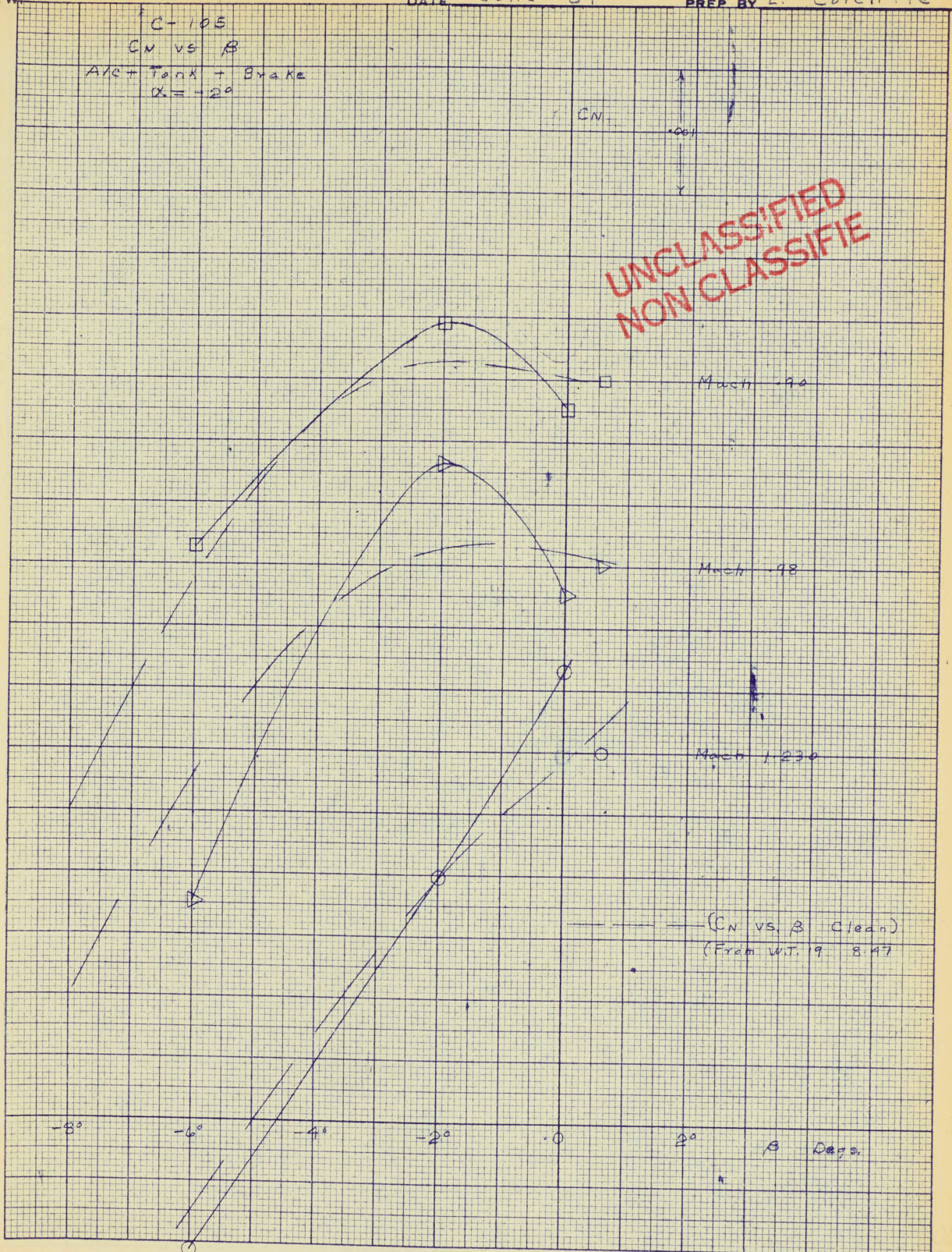


— CL 15, β (CLEAN)
(FROM P/W.7/19 - 8.51)

β - DEGS.

C-105
C_N vs β
Alt + Tank + Brake
 $X = -20$

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359-12 KEUFFEL & ESSER CO.
10 x 10 1/2 inch, 50 lines uncut.
MADE IN U.S.A.

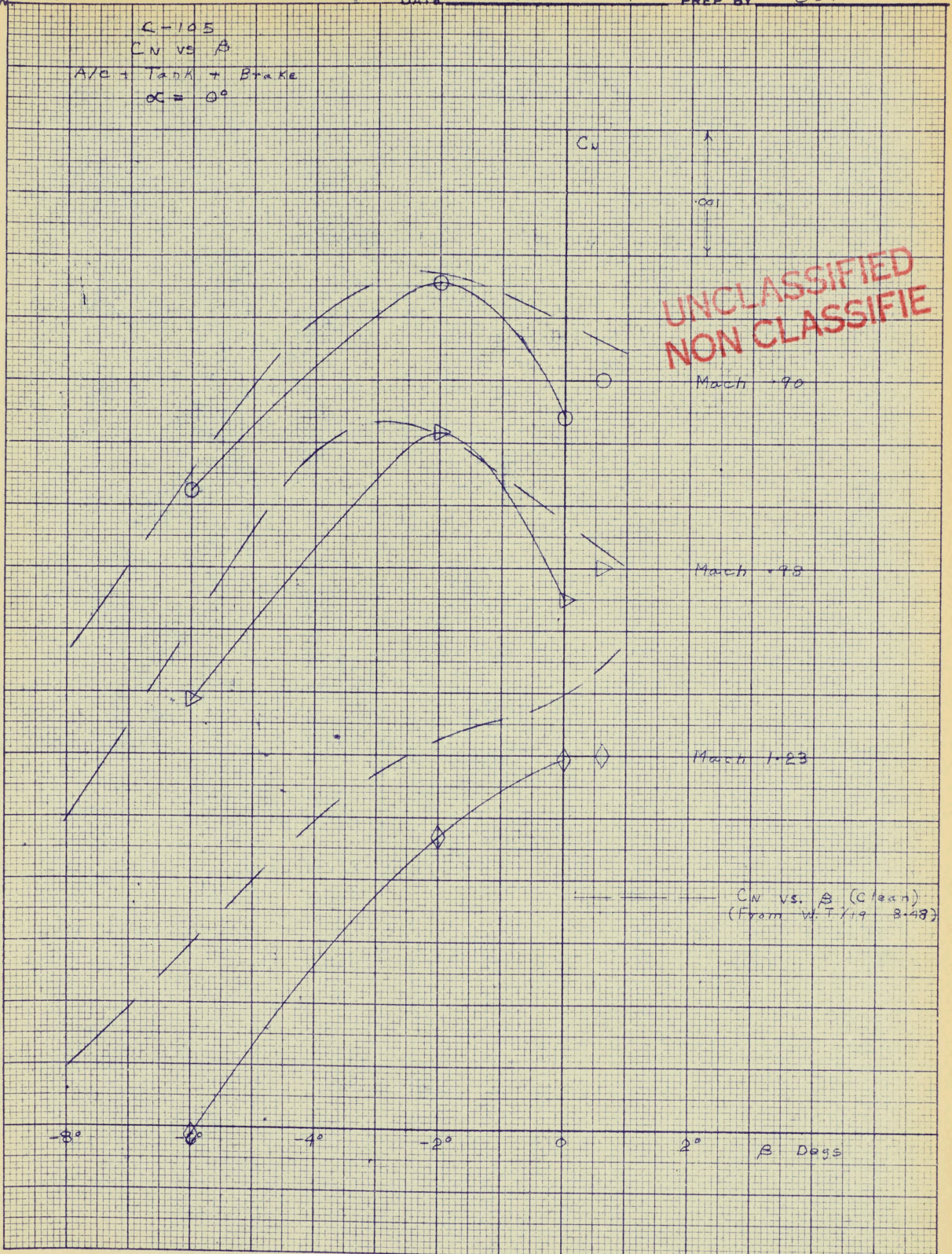
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A. U. W.

COMPONENT

SHEET No. 1-1-9-2
DATE June 1954

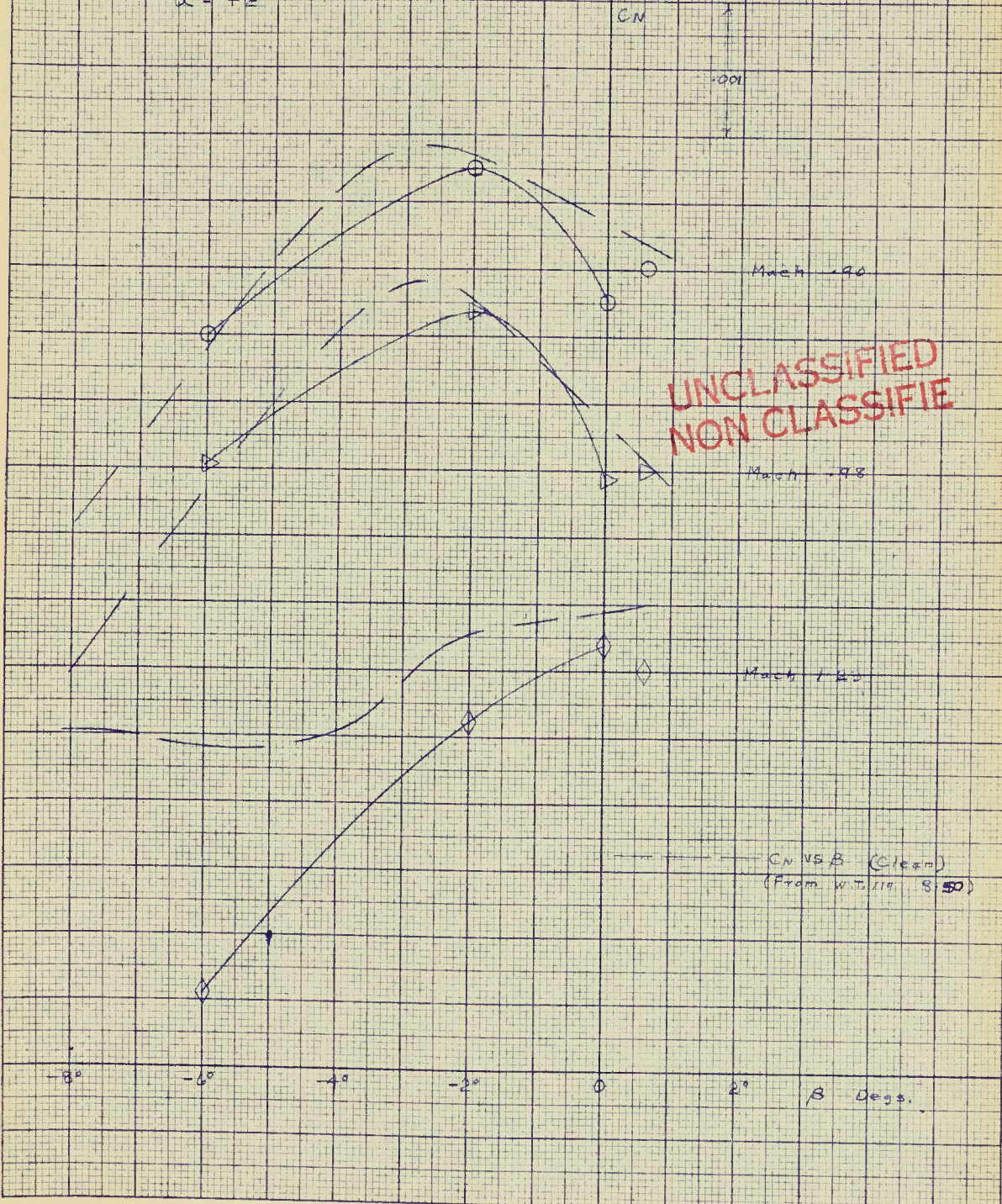
REPORT No. P/W.T./20
PREP BY Cutcliffe

C-105
CN vs β
A/c + Tank + Brake
 $\alpha = 0^\circ$



359-12 KEUFFEL & ESSER CO.
10 X 10 IN. GRID PAPER WITH LINES ACROSS
MADE IN U.S.A.

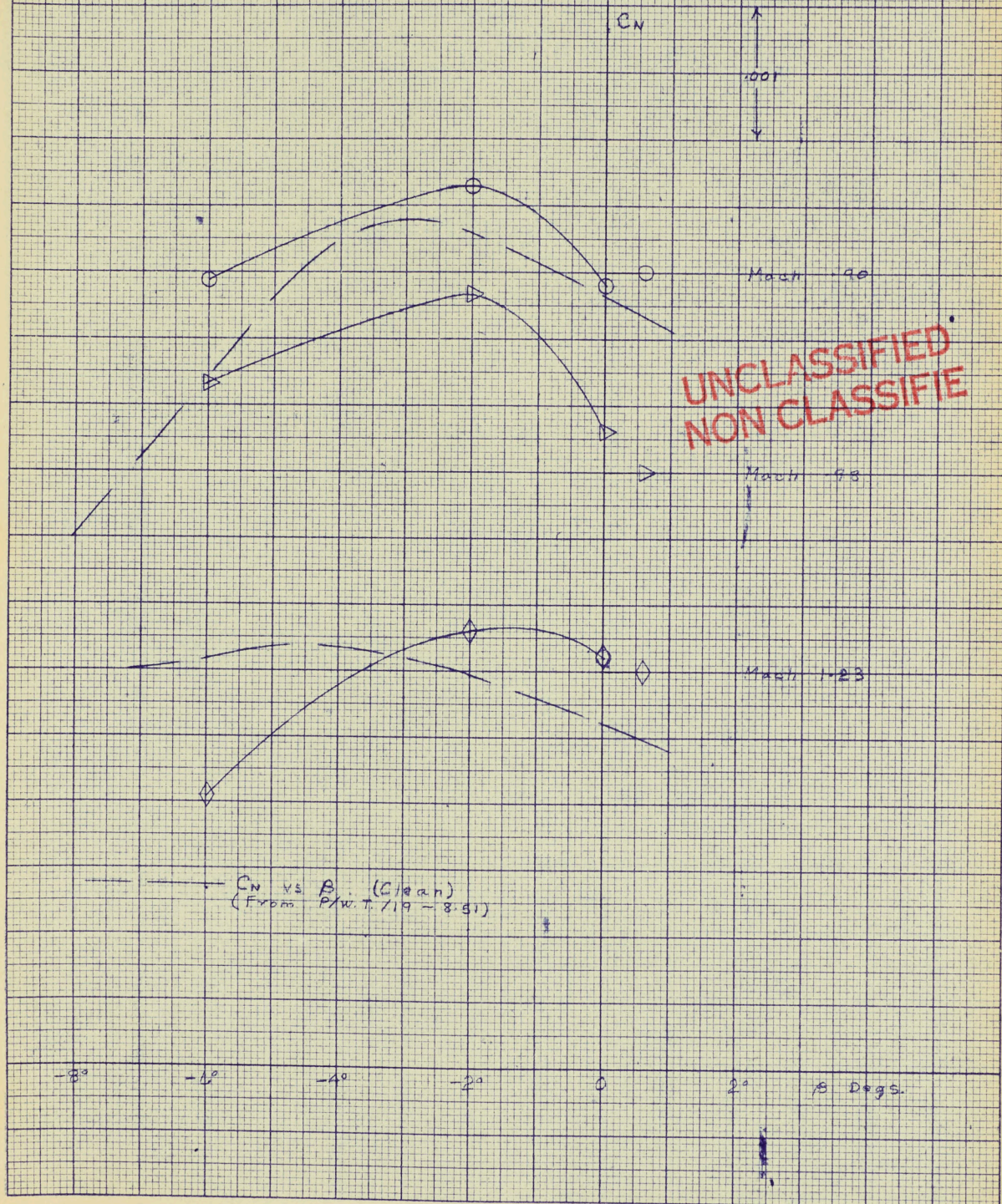
C-1195
CN VS. β
A/C + Tank + Brakes
 $\alpha = +12^\circ$



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NON CLASSIFIE

350-12 KEUFER & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

C-105
C_N vs α
A/C + Tank + Brake
 $\alpha = +6^\circ$



C_N vs α (Clean)
(From P/W.T./19-8-51)

-8° -6° -4° -2° 0 2° α Degs.

55013 NEUFEL & ESSER CO.
10 X 10 to the 1/2 inch 5/8 inch grid
MADE IN U.S.A.

C-105

C.A.L. WIND TUNNEL TESTS

$C_{L\beta}$ vs M

$\alpha = -2$

$C_{L\beta}$
PER DEGREE

-0.0006

-0.0004

-0.0002

0

+0.0002

+0.0004

+0.0006

+0.0008

+0.0010

+0.0012

M

1.2

1.1

1.0

.9

.8

.7

.6

.5

○ TAIL ON

○ TAIL OFF

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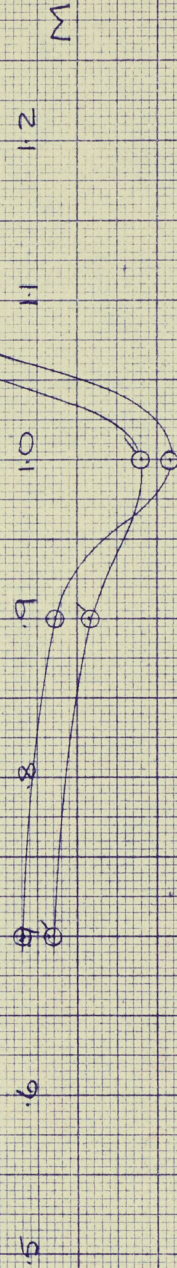
C-105
C.A.L. WIND TUNNEL TESTS
 C_{pb} vs M
 $\alpha = 0^\circ$

○ TAIL ON
○ TAIL OFF

C_{pb}
PER DEGREE

UNCLASSIFIED
NON CLASSIFIED

-0.0008
-0.0006
-0.0004
-0.0002
0
+0.0002
+0.0004



359-12 KEUFEL & ESSER CO
10 X 10 to 1/2 inch, 5th lines accented.
MADE IN U.S.A.

C-105

C.I.L. WIND TUNNEL TESTS

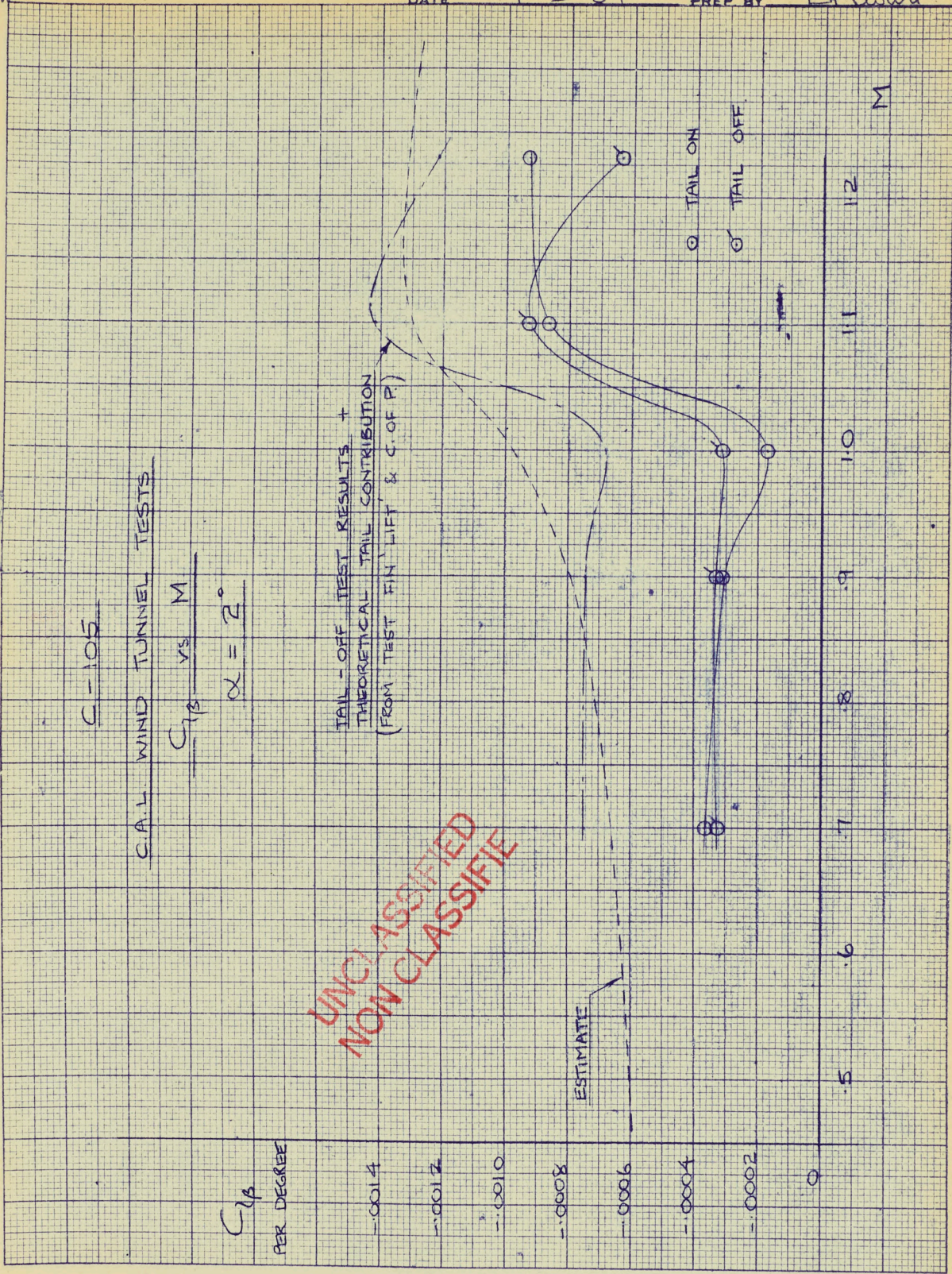
$C_{L\beta}$ vs M

$\alpha = 2^\circ$

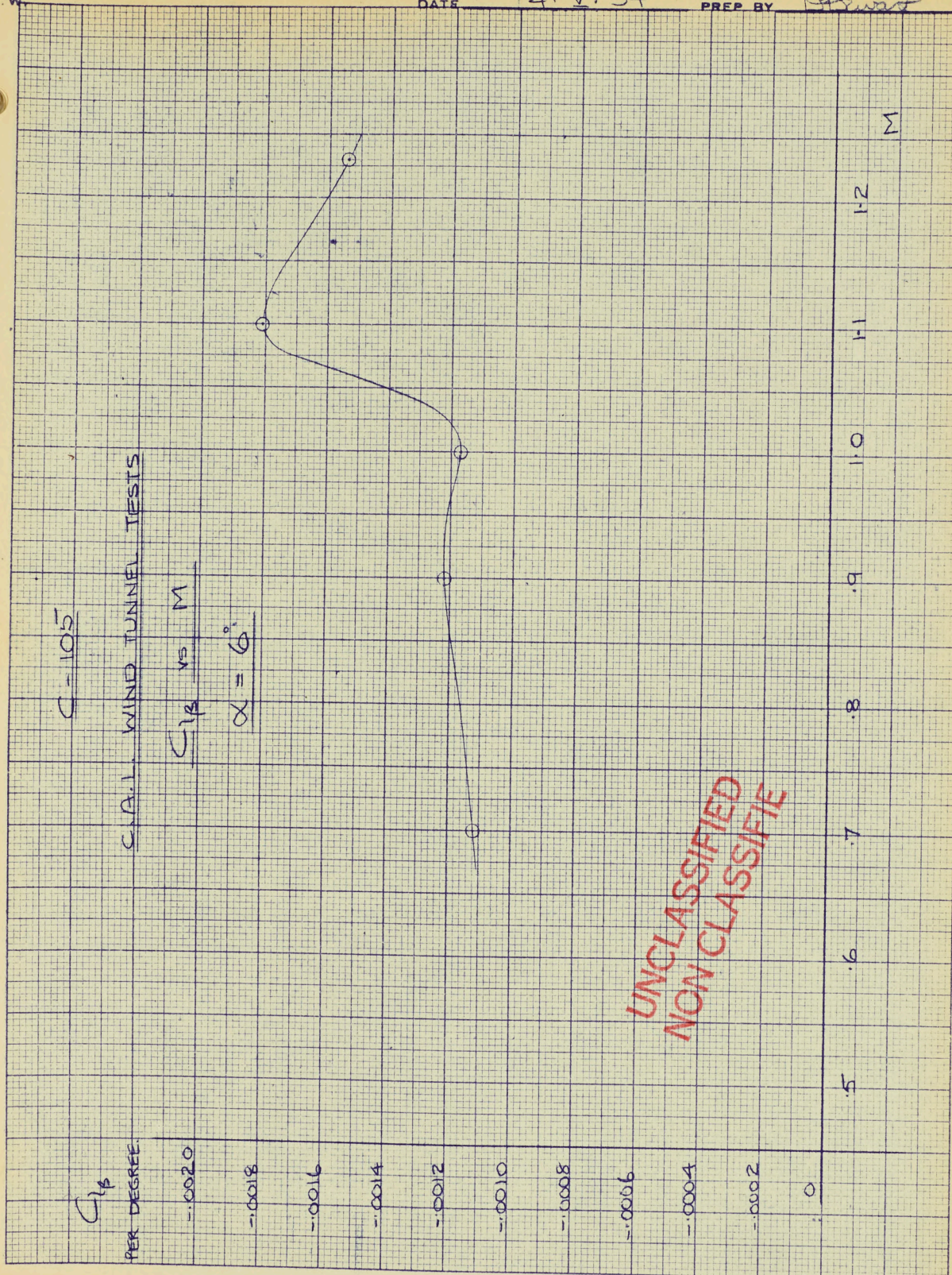
TAIL-OFF TEST RESULTS +
THEORETICAL TAIL CONTRIBUTION
(FROM TEST FIN LIFT & C.O.F.P)

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ESTIMATE



359-12 KUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5/8 lines accuracy.
MADE IN U.S.A.



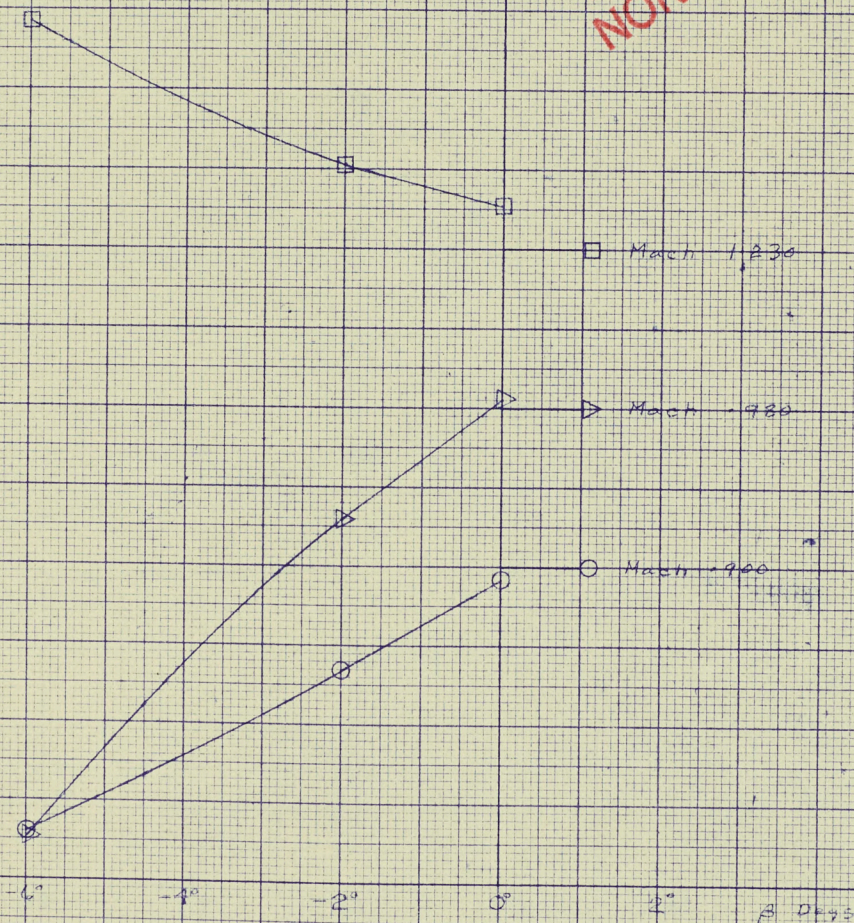
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375 12 KUFFEL & LESSER CO.
10 X 10 1/2 inch, 500 films accredited.
MADE IN U.S.A.

C-105
C_q vs. β
A/C + Tank
 $\alpha = -2^\circ$

C_q

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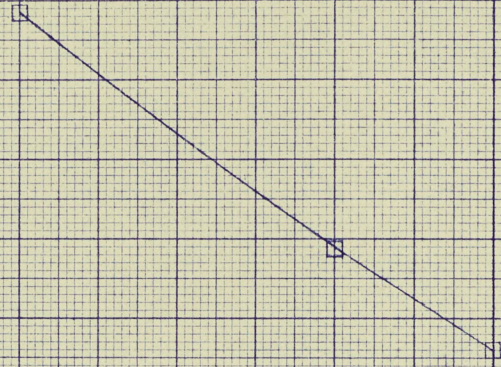
359-12 KEUFFEL & ESSER CO.
10 X 10 TO THE 1/2 INCH SIZE
MADE IN U.S.A.

C-105
C_L vs β
A/c + Tank
 $\alpha = 0^\circ$

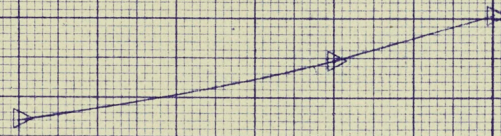
C_L

↑
0.01
↓

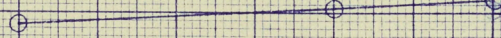
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□ Mach 1.230



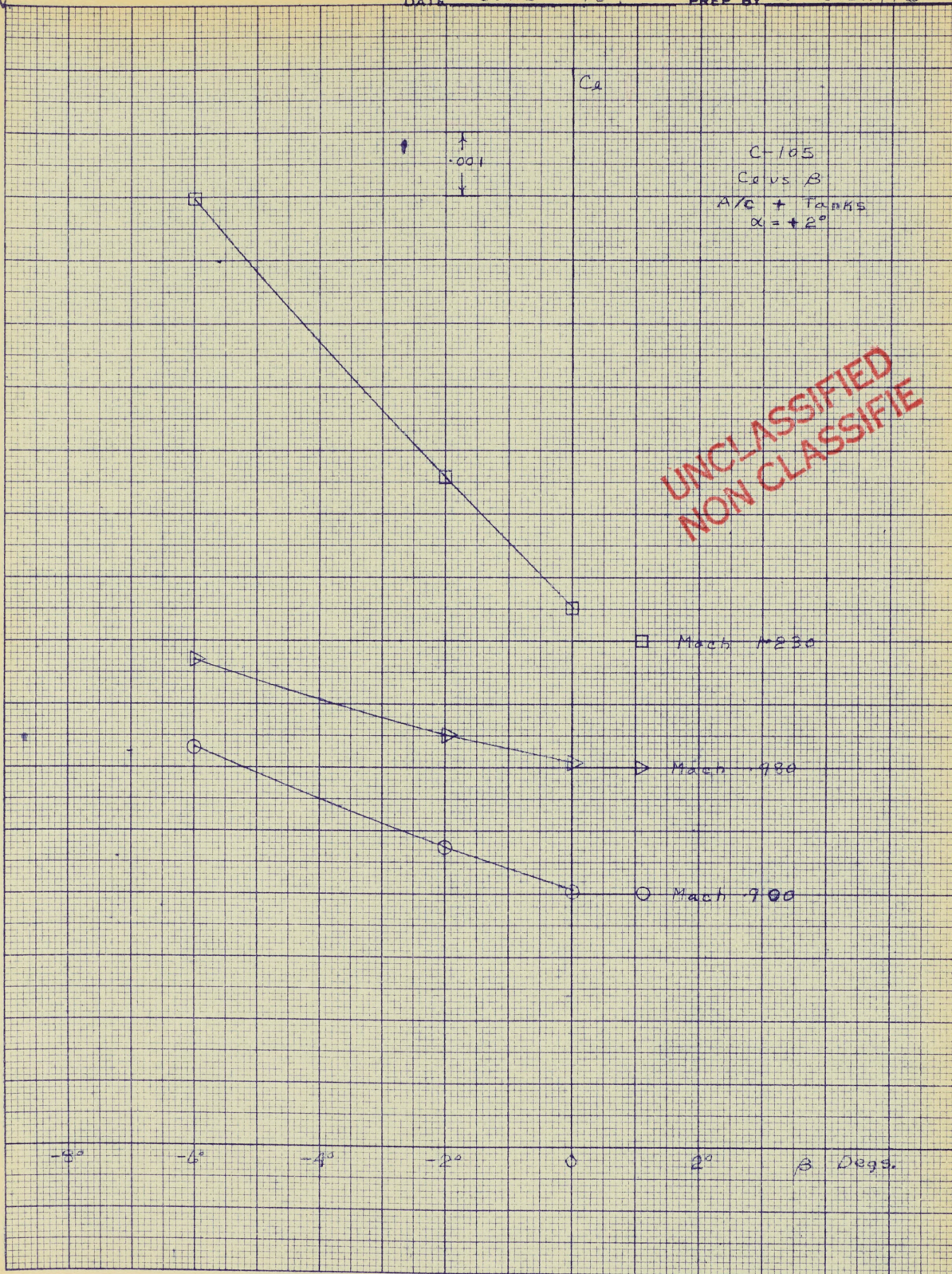
▷ Mach 1.780



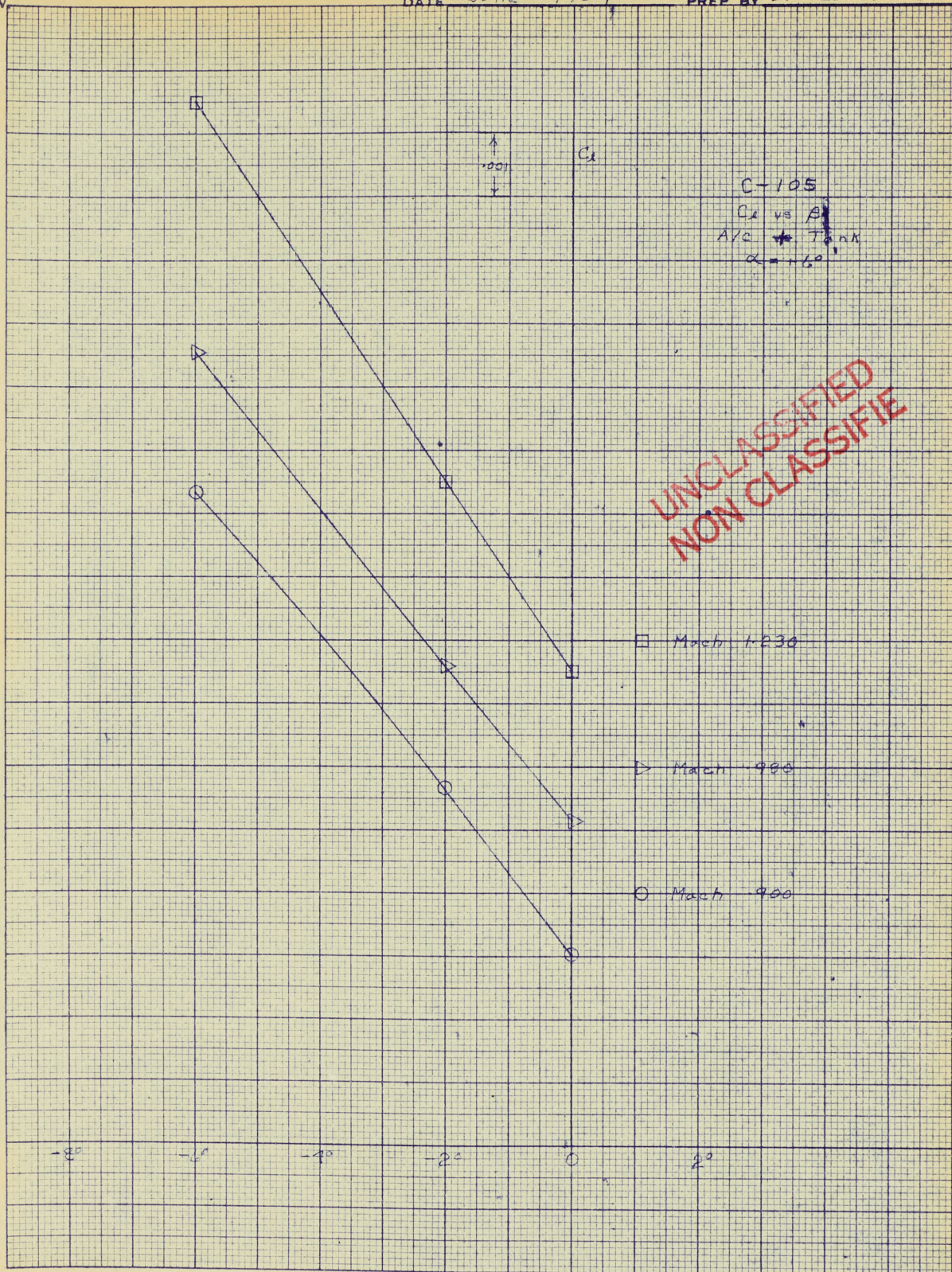
○ Mach 1.900

-8° -6° -4° -2° 0 2° β Degs

359-12 KEUFFEL & ESSER CO.
10 X 10 TO THE 1/2 INCH, 500 LINES ACROSS.
MADE IN U.S.A.



359-12 KEUFFEL & ESSER CO.
10 X 10 TO THE 1/100 INCH, 25 LINES ACCURATE.
MADE IN U.S.A.

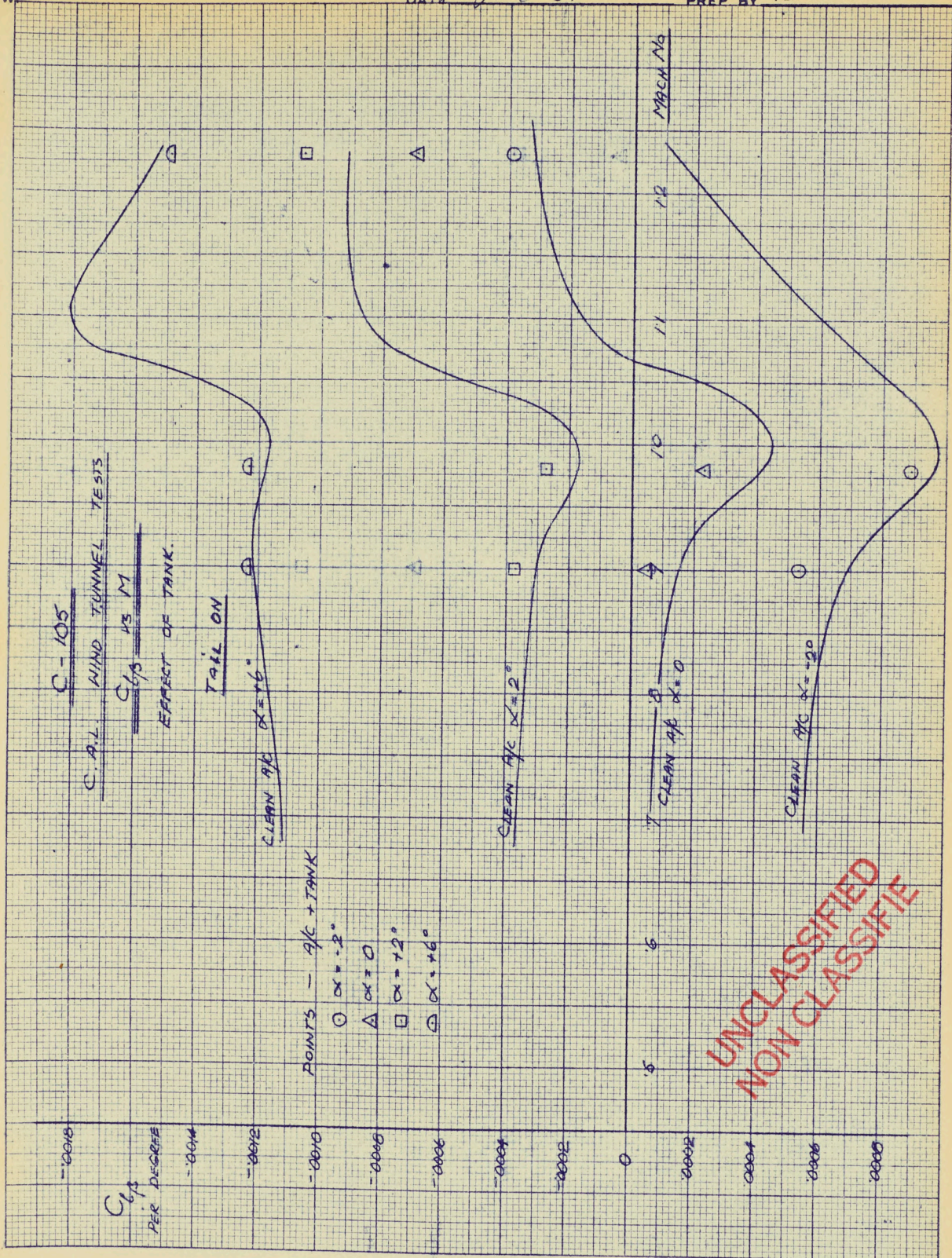


C-105
 C_x vs α
 A/c Tank
 $\alpha = 0$

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399-13 KEUFFEL & ESSER CO.
 10 x 10 to the 1/2 inch, 5th lines accented.
 MADE IN U.S.A.

359-12 KEUFFEL & ESSER CO.
10 x 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

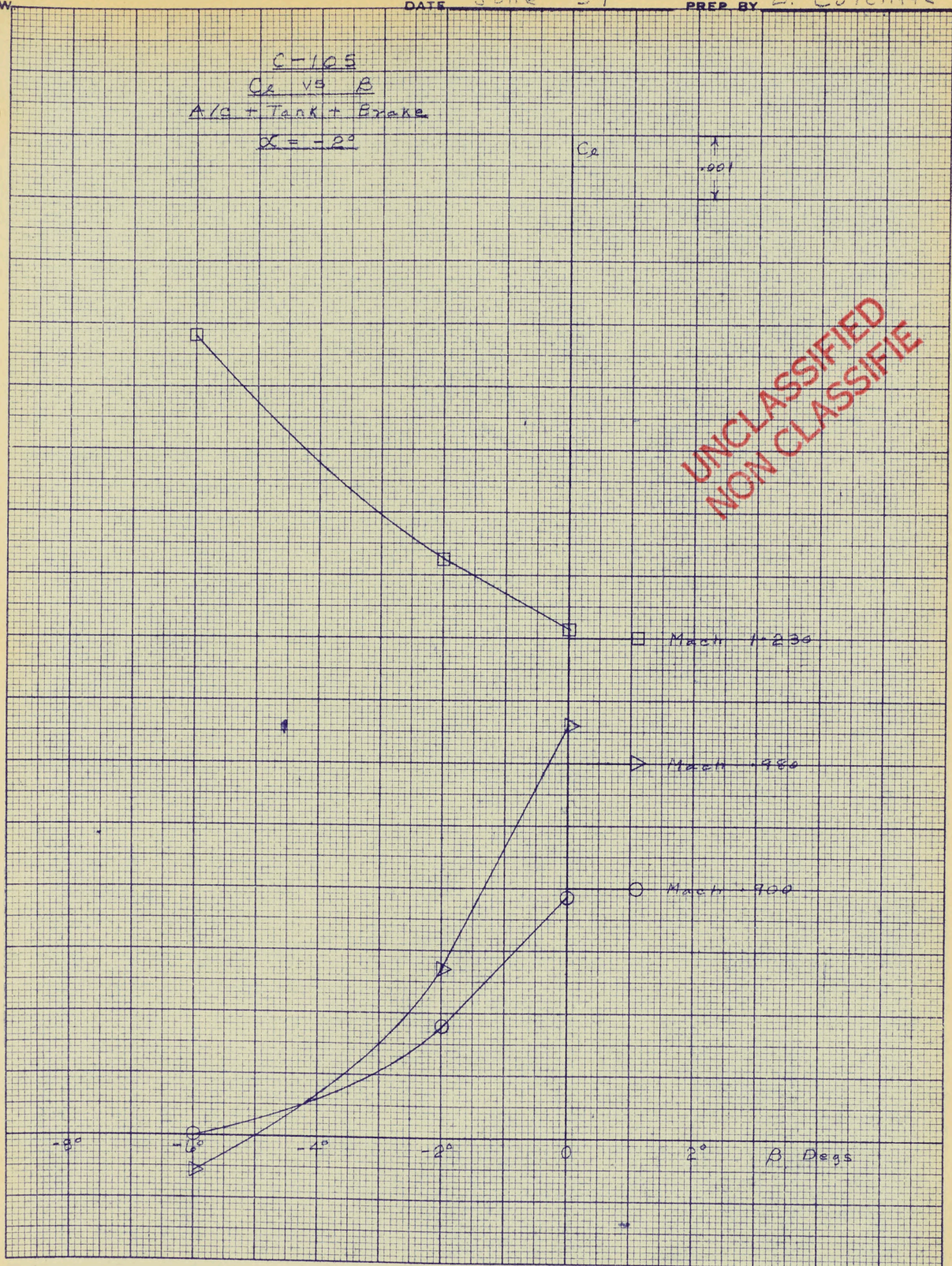


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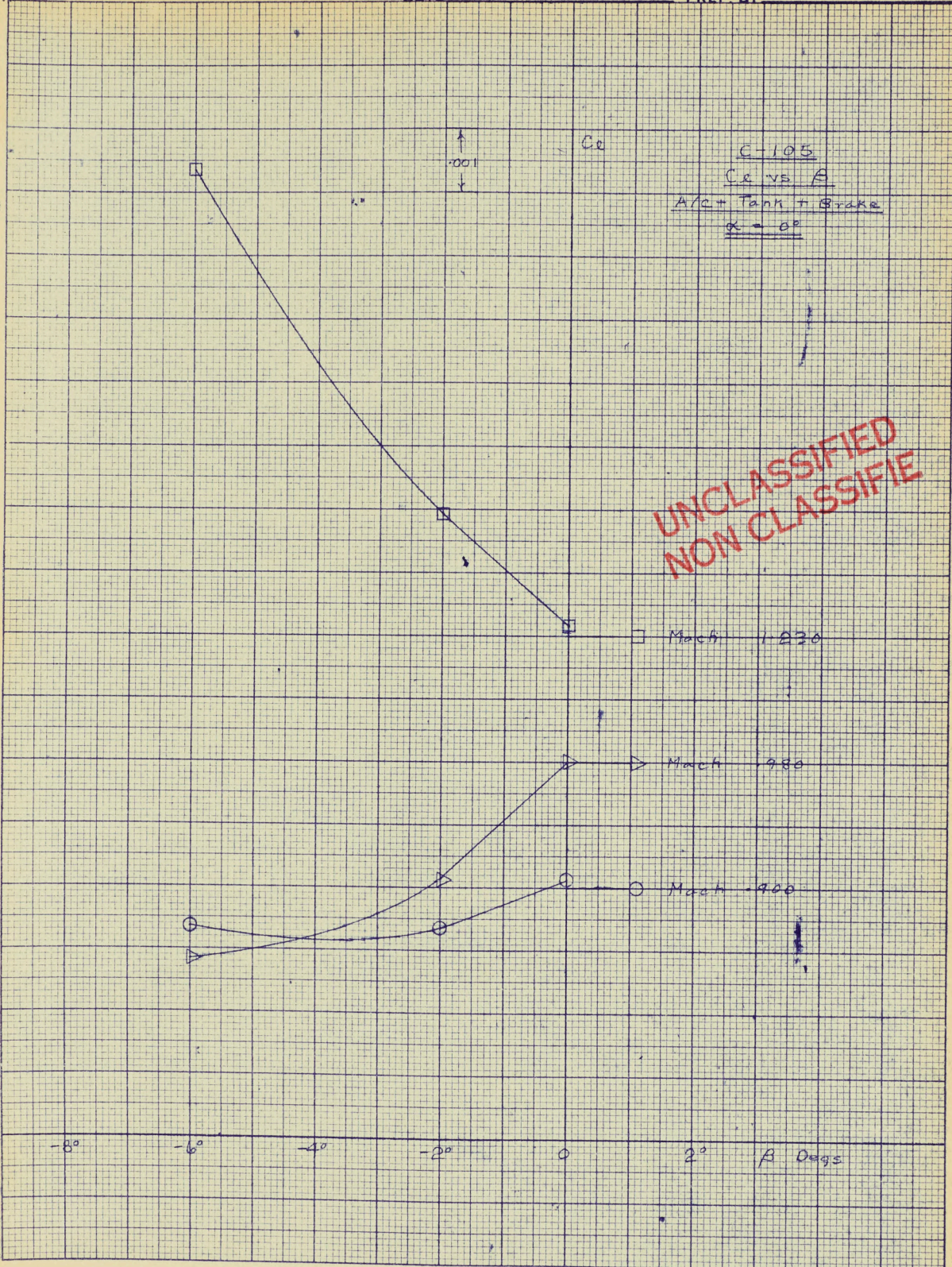
C-105
 C_L vs β
A/G + Tank + Brake
 $\alpha = -2^\circ$

C_L
↑
-001
↓

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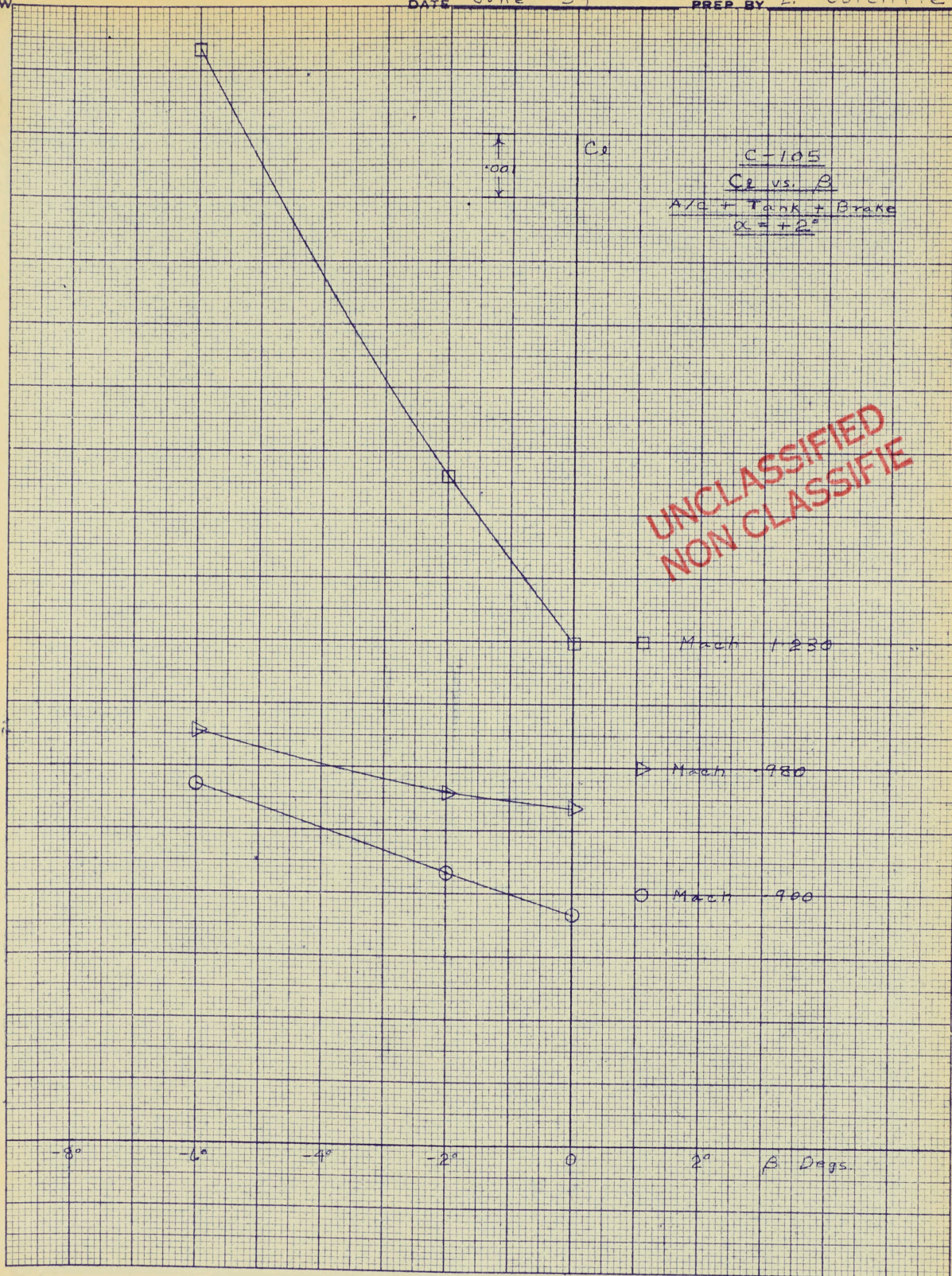


359.12 KEUFFEL & ESSER CO.
10 x 10 to 1/16" 1/2 inch, 5th lines accented.
MADE IN U.S.A.



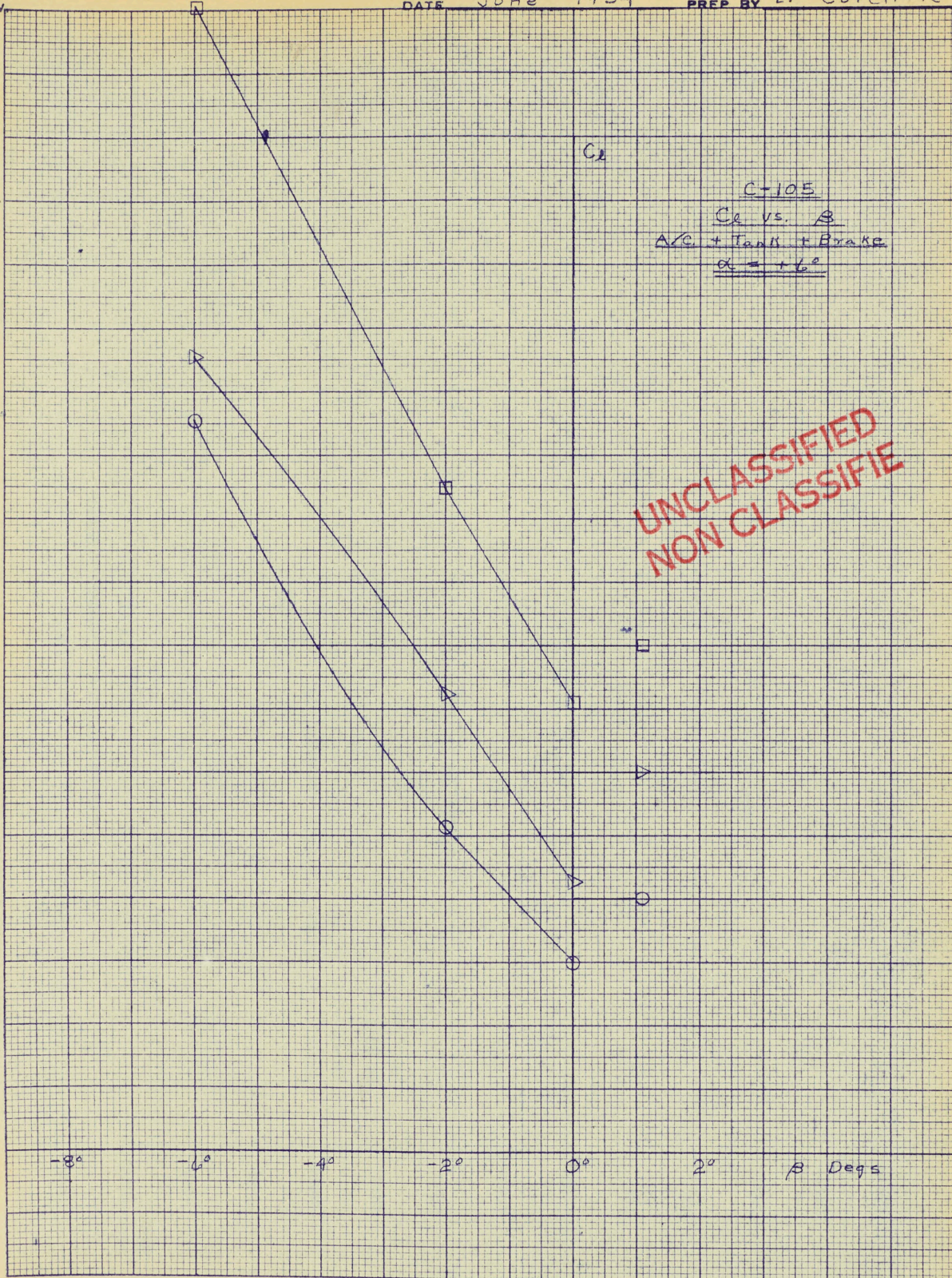
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359-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN U.S.A.

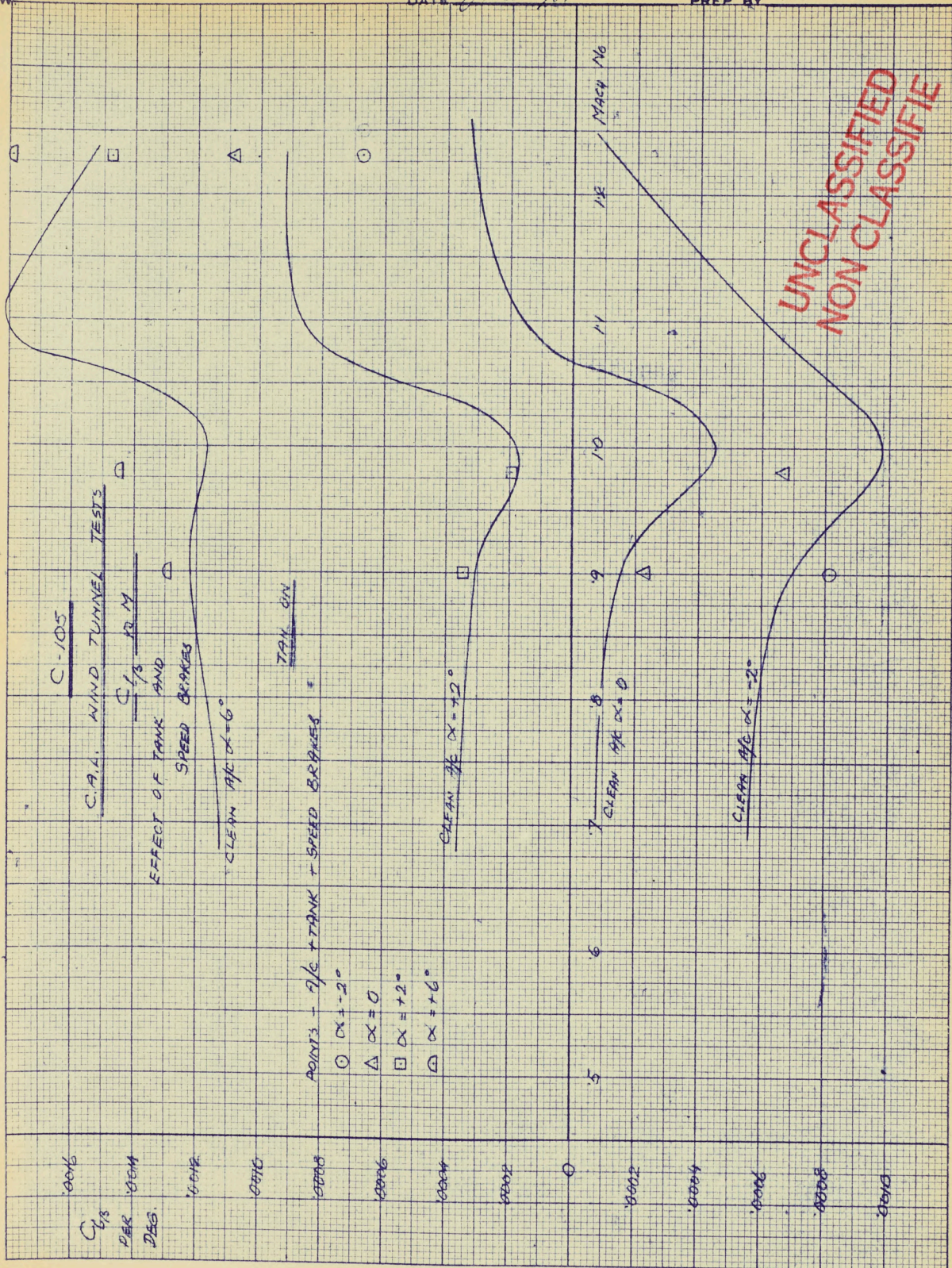


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359-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.



358.12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch. 5th lines accented.
MADE IN U.S.A.



359-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accord.
MADE IN U.S.A.

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C-105

C_{yp} vs Mach Number (tail and

CAL W-T Tests

- $\alpha = -2^\circ$
- △ $\alpha = 0^\circ$
- $\alpha = 2^\circ$
- ◇ $\alpha = 6^\circ$

C_{yp} per degree

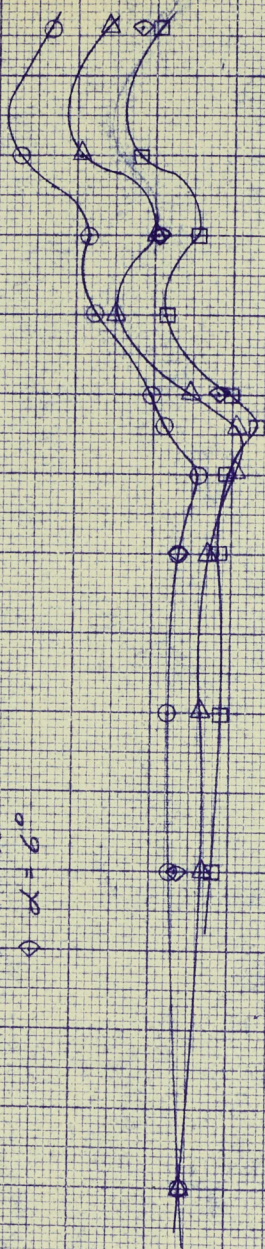
-0080

-0060

-0040

-0020

0



0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2

Mach Number

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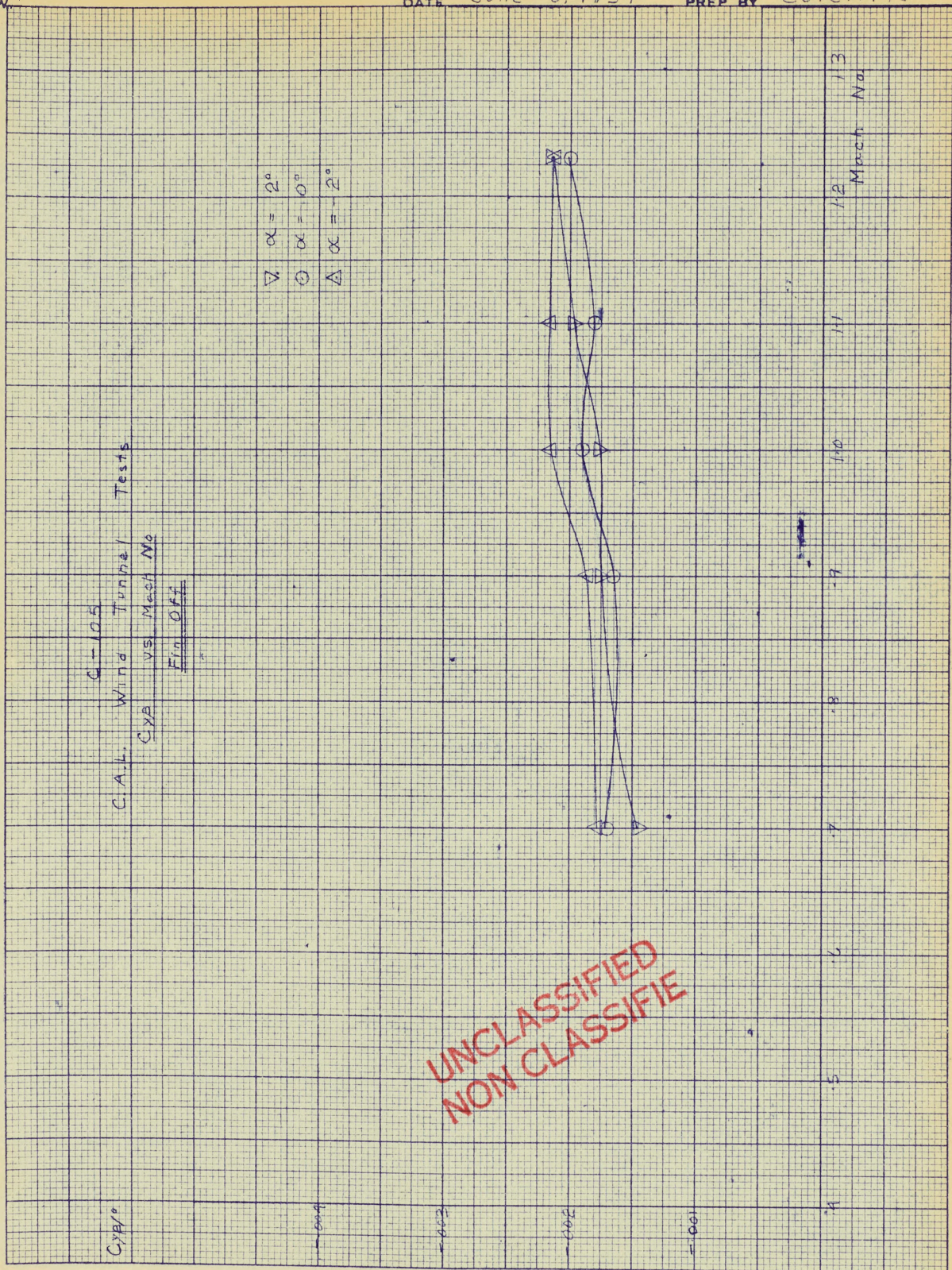
359-12. KEUFFEL & ESSER CO.
10 x 10 to the 1/2 inch, 5th lines accepted.
MADE IN U. S. A.

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A. U. W.

COMPONENT

SHEET No. 1321
DATE June 8, 1954

REPORT No. P1W.T.120
PREP BY Cutcliffe



C-105
C.A.L. Wind Tunnel Tests
CypA vs Mach No
Fin Off

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359-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accounted.
MADE IN U.S.A.

AIRCRAFT
A. U. W.

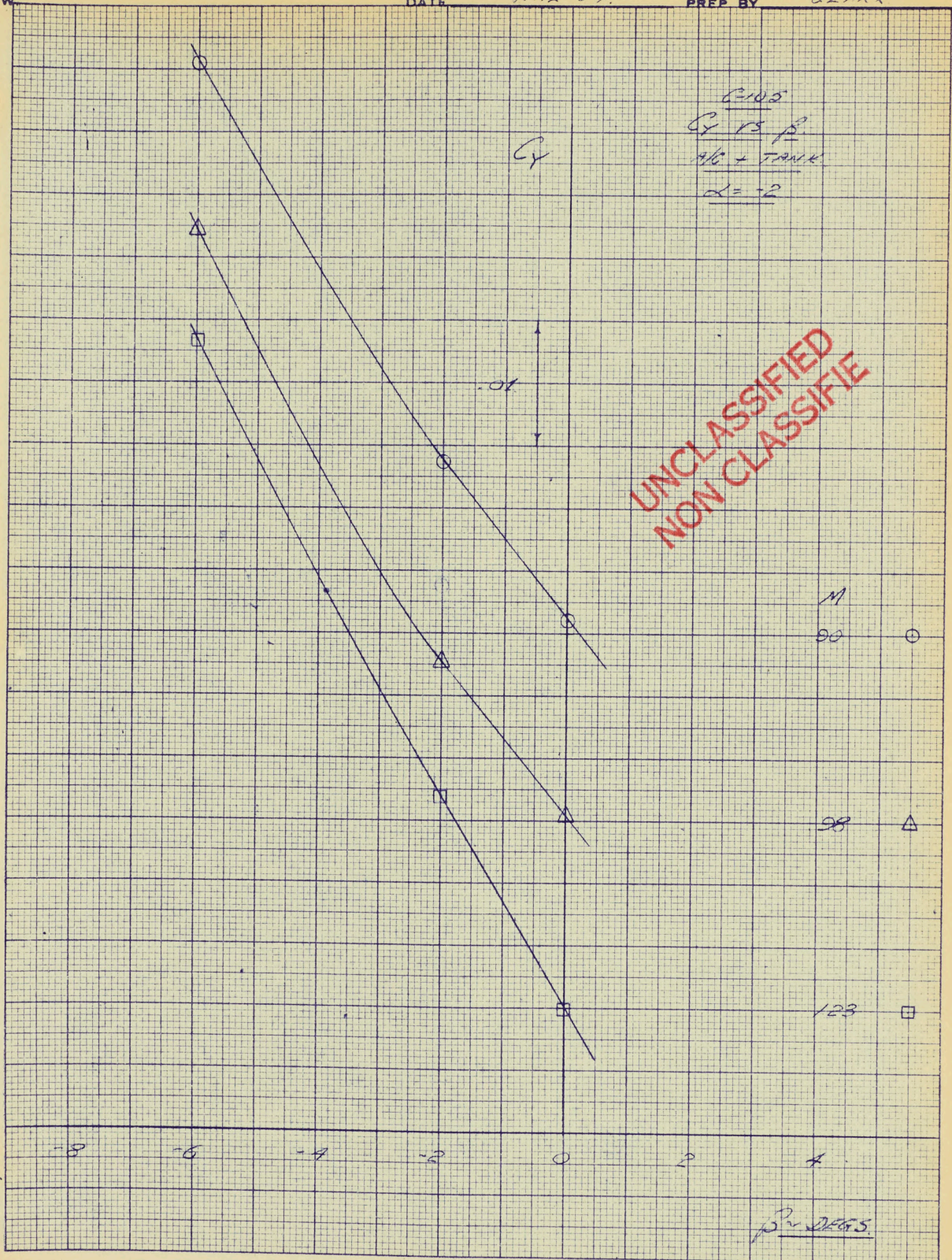
COMPONENT

SHEET No. 1331

REPORT No. P/W.T/20

DATE JUNE 5A

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399-12 KEUFFEL & ESSER CO
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

P. W. T. 20

AIRCRAFT

COMPONENT

SHEET No.

133.2

REPORT No.

P/W.T. 120

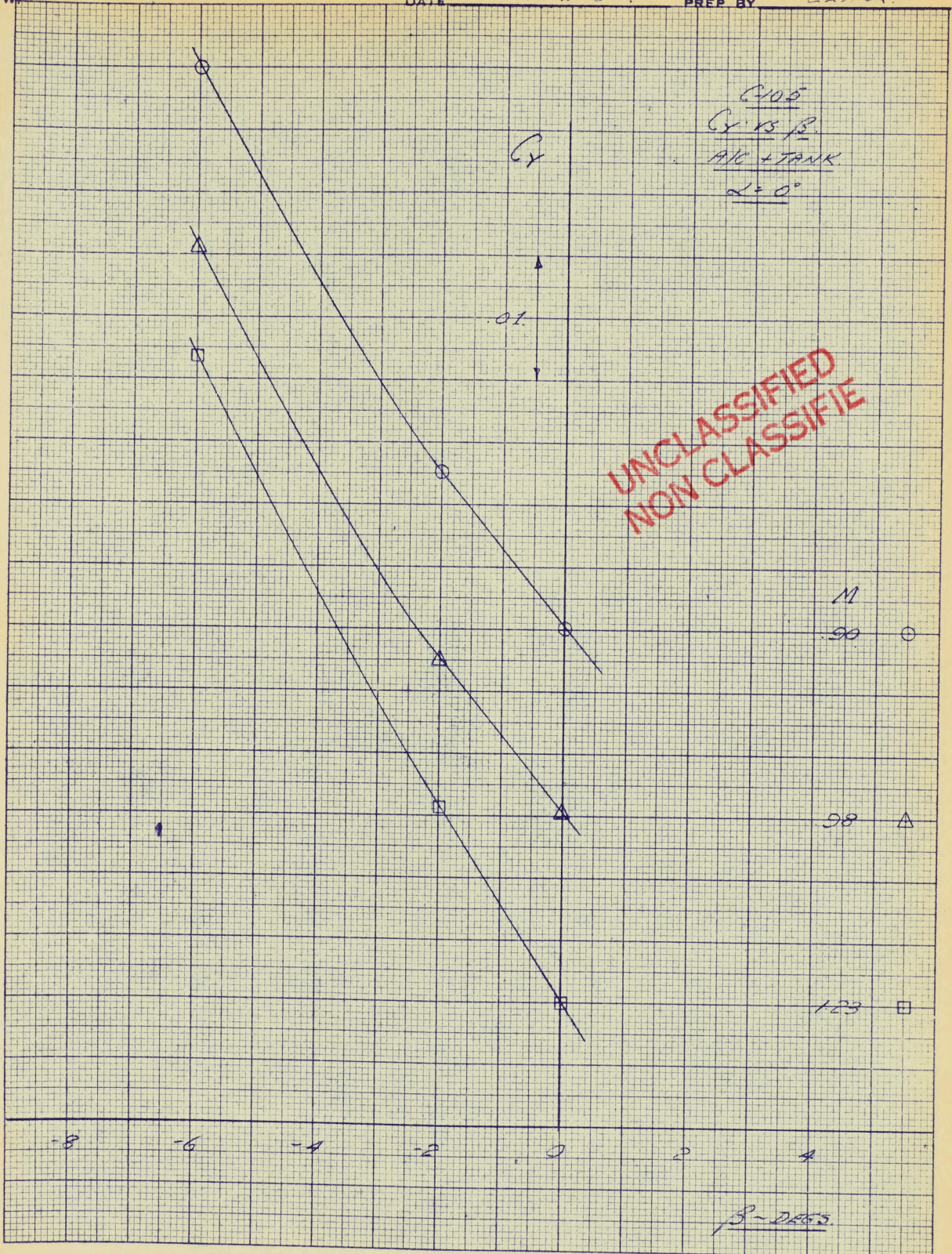
A. U. W.

DATE

JUNE 51.

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359-12 NEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 50 lines accounted.
MADE IN U.S.A.

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A. U. W.

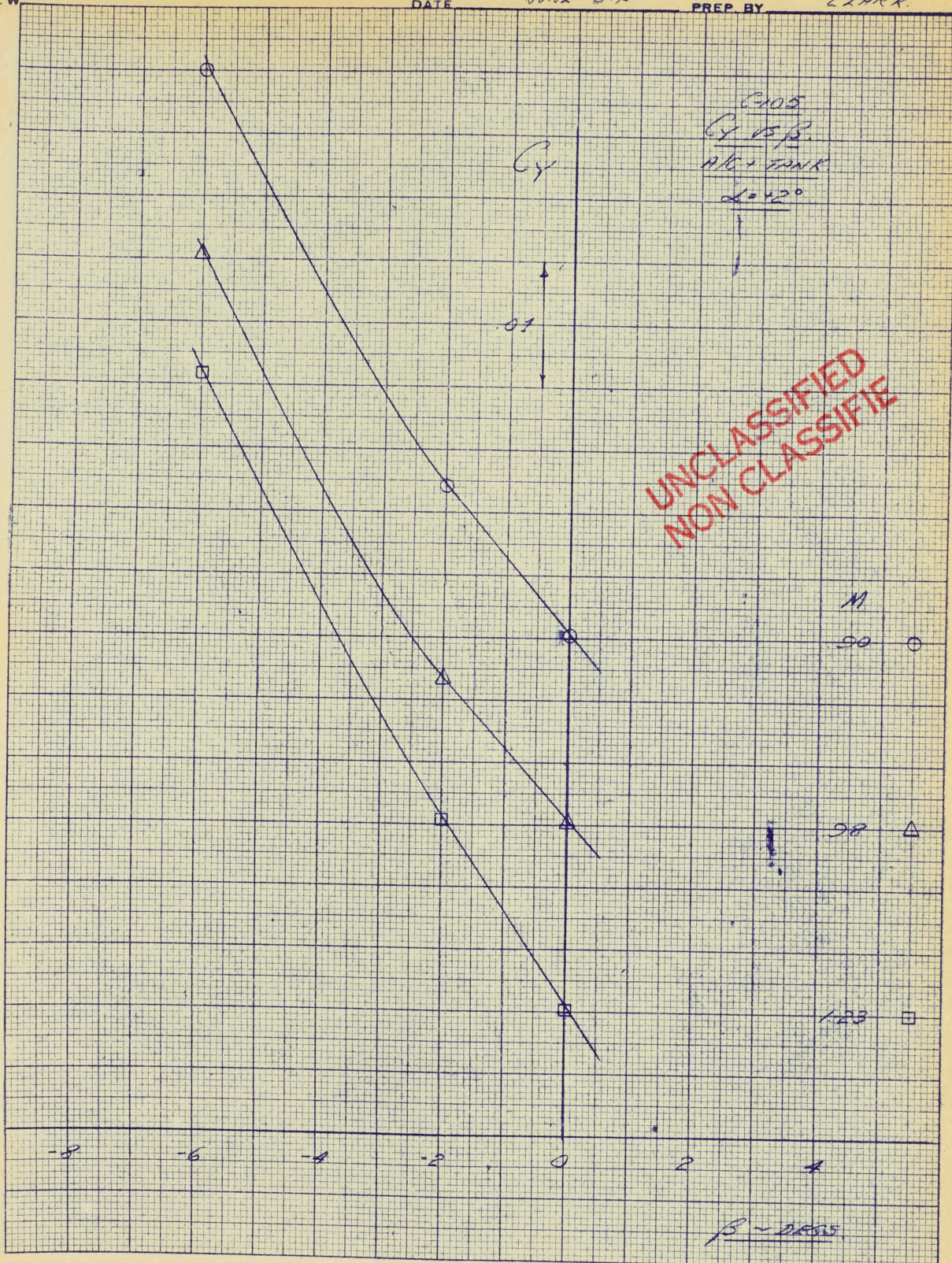
COMPONENT

SHEET No. 1333

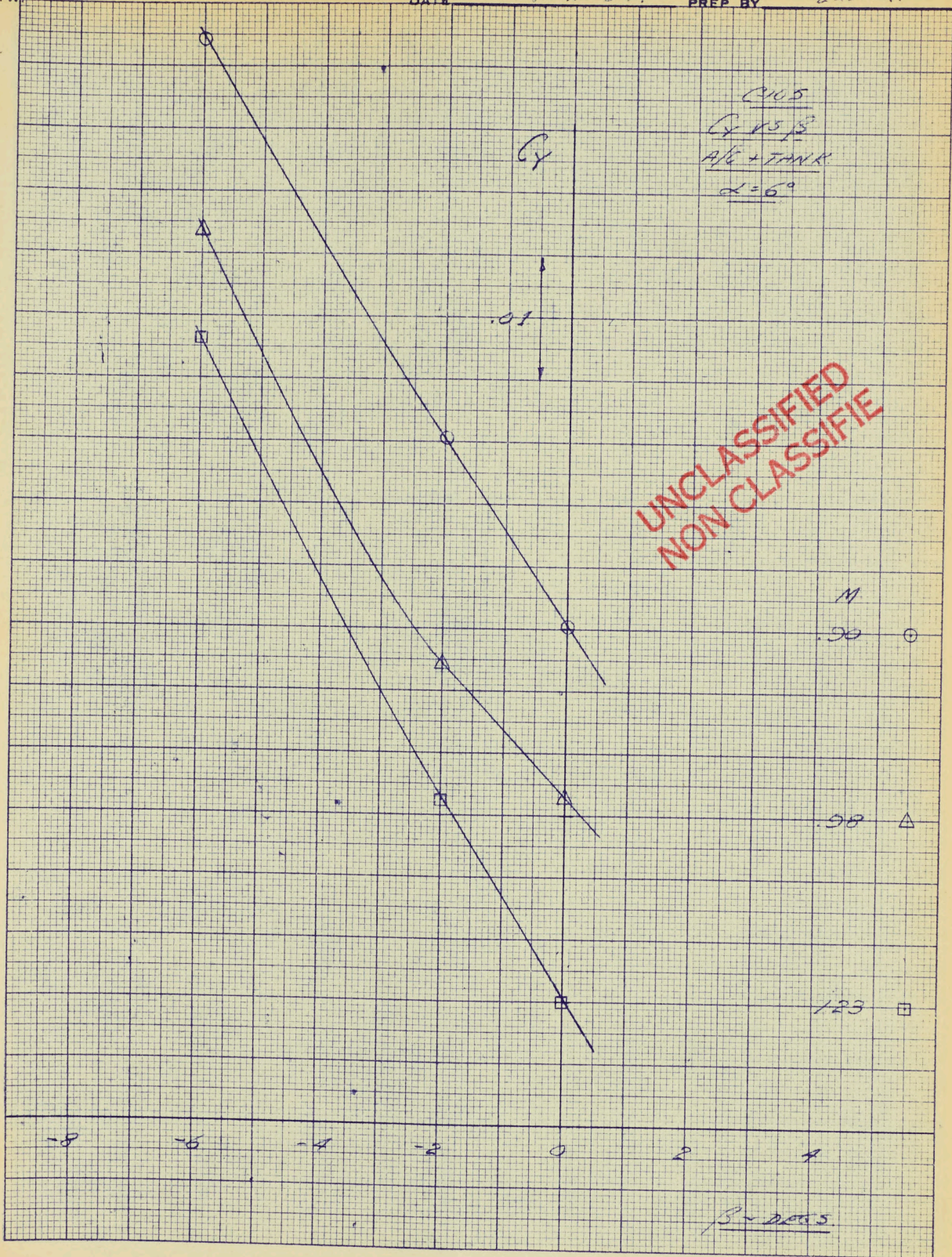
REPORT No. P/W 7/20

DATE JUNE 54

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359-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th limit accuracy.
MADE IN U.S.A.



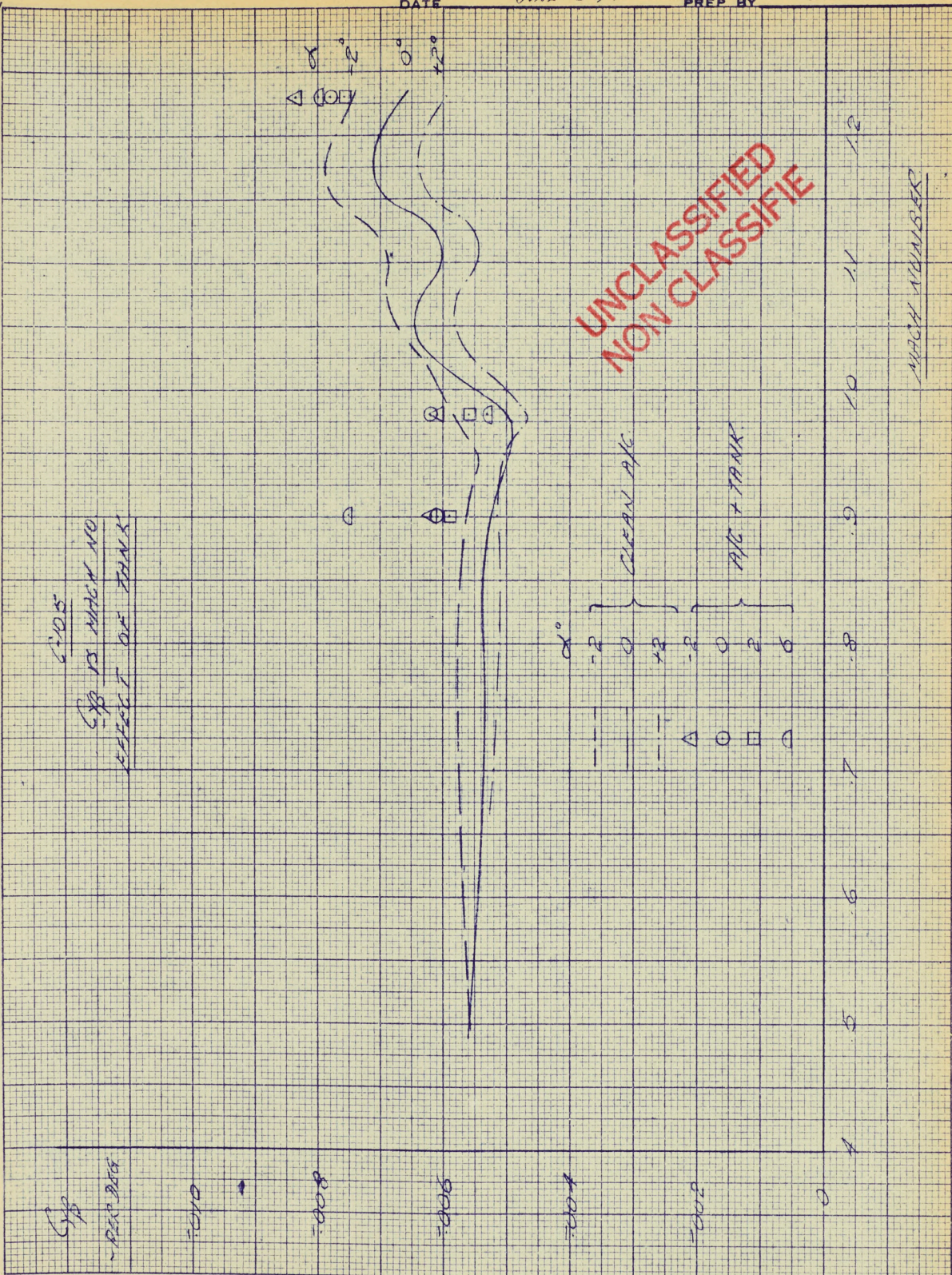
359-12, KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

AIRCRAFT
A. U. W.

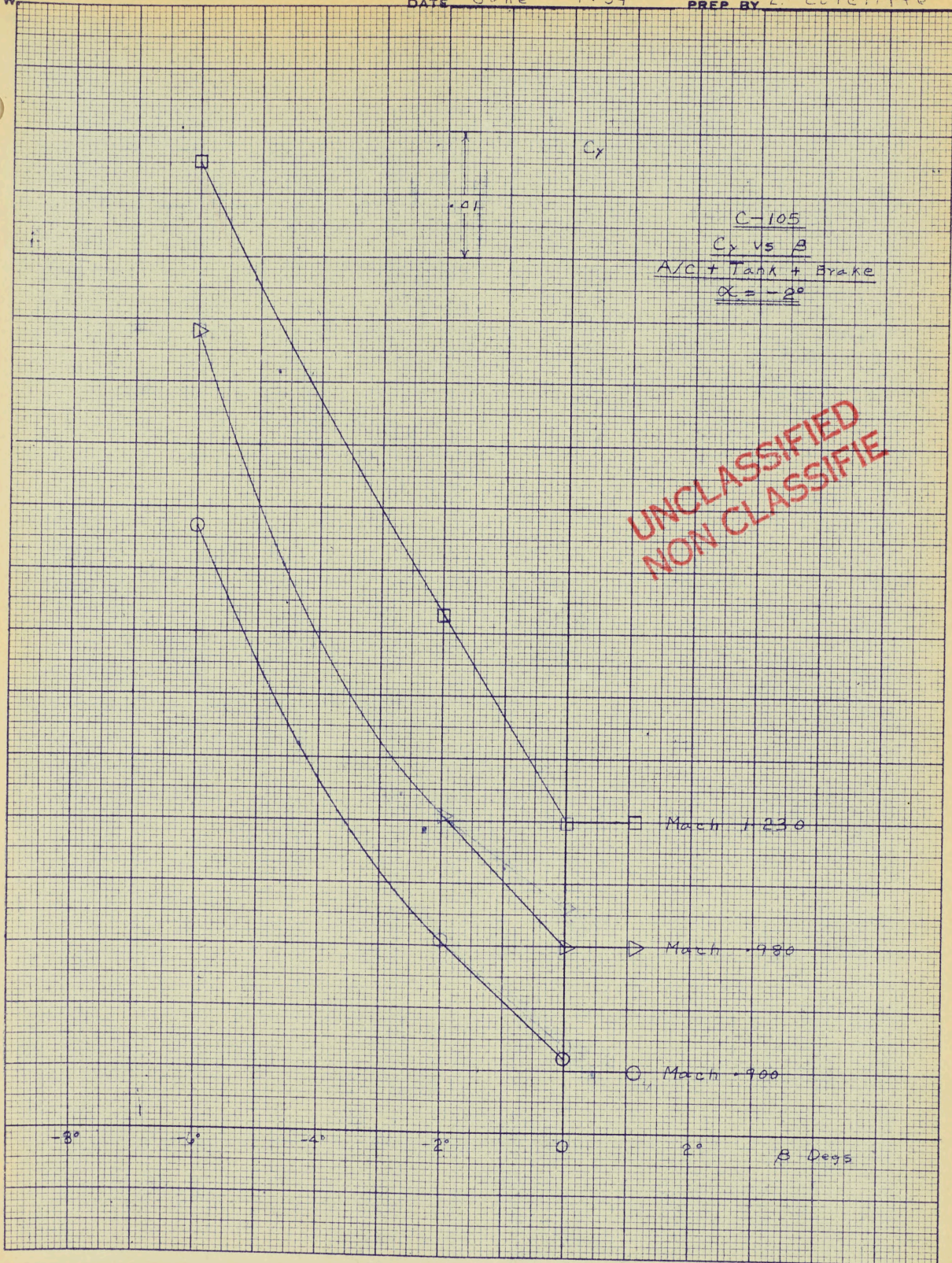
COMPONENT

SHEET No. 1335
DATE JUNE 54.

REPORT No. P/W.T./20.
PREP BY CLARK.



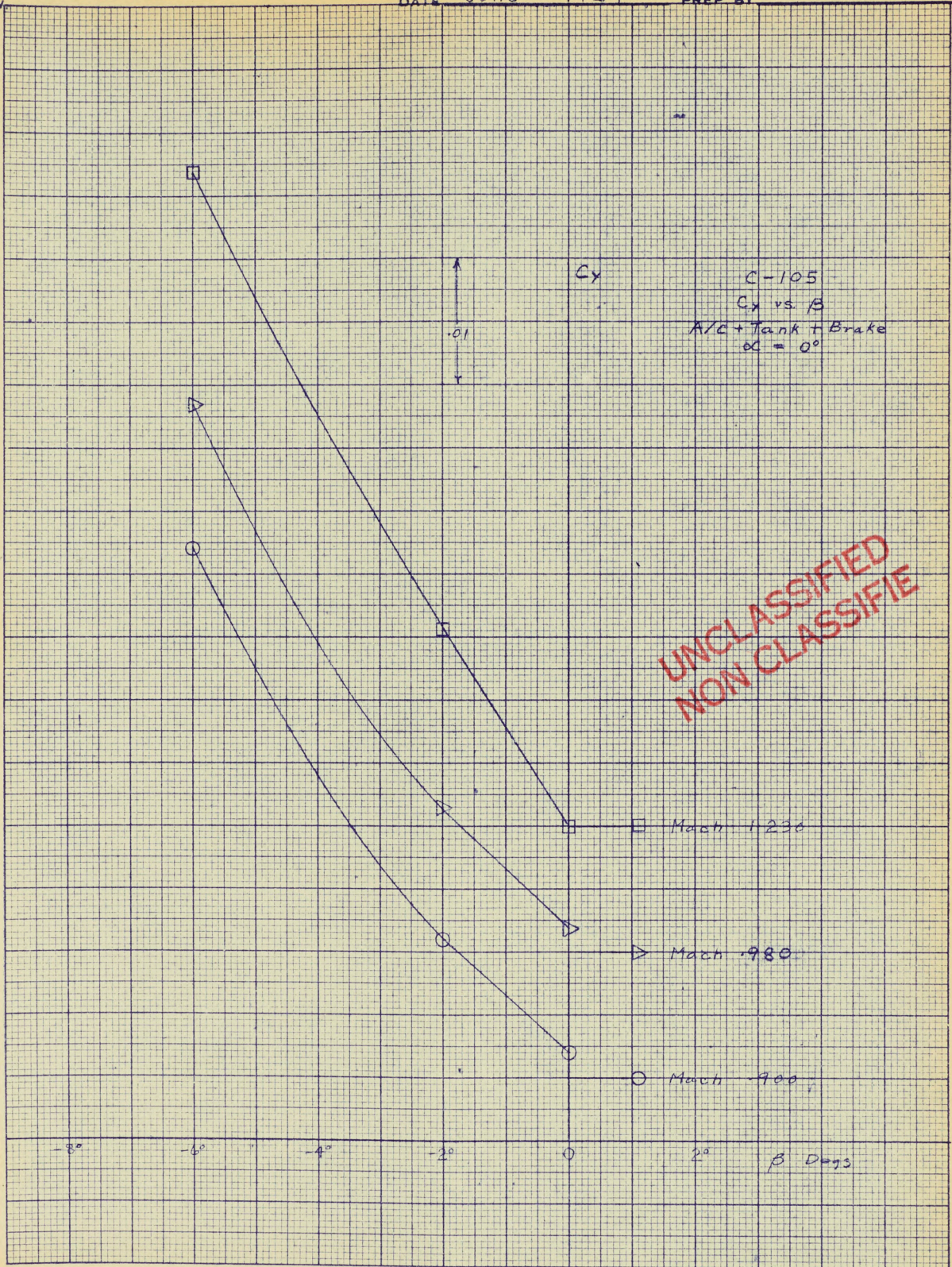
359-12 KEUFFEL & ESSER CO.
10 X 10 IN. 1/2 INCH. 14 LINES ACCENTED.
MADE IN U.S.A.



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C-105
 C_y vs α
A/C + Tank + Brake
 $\alpha = -2^\circ$

359.12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.



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359-12 KEUFFEL & ESSER CO.
10 x 10 to the 1/2 inch, 5th lines accented -
MADE IN U.S.A.

AIRCRAFT
A. U. W.

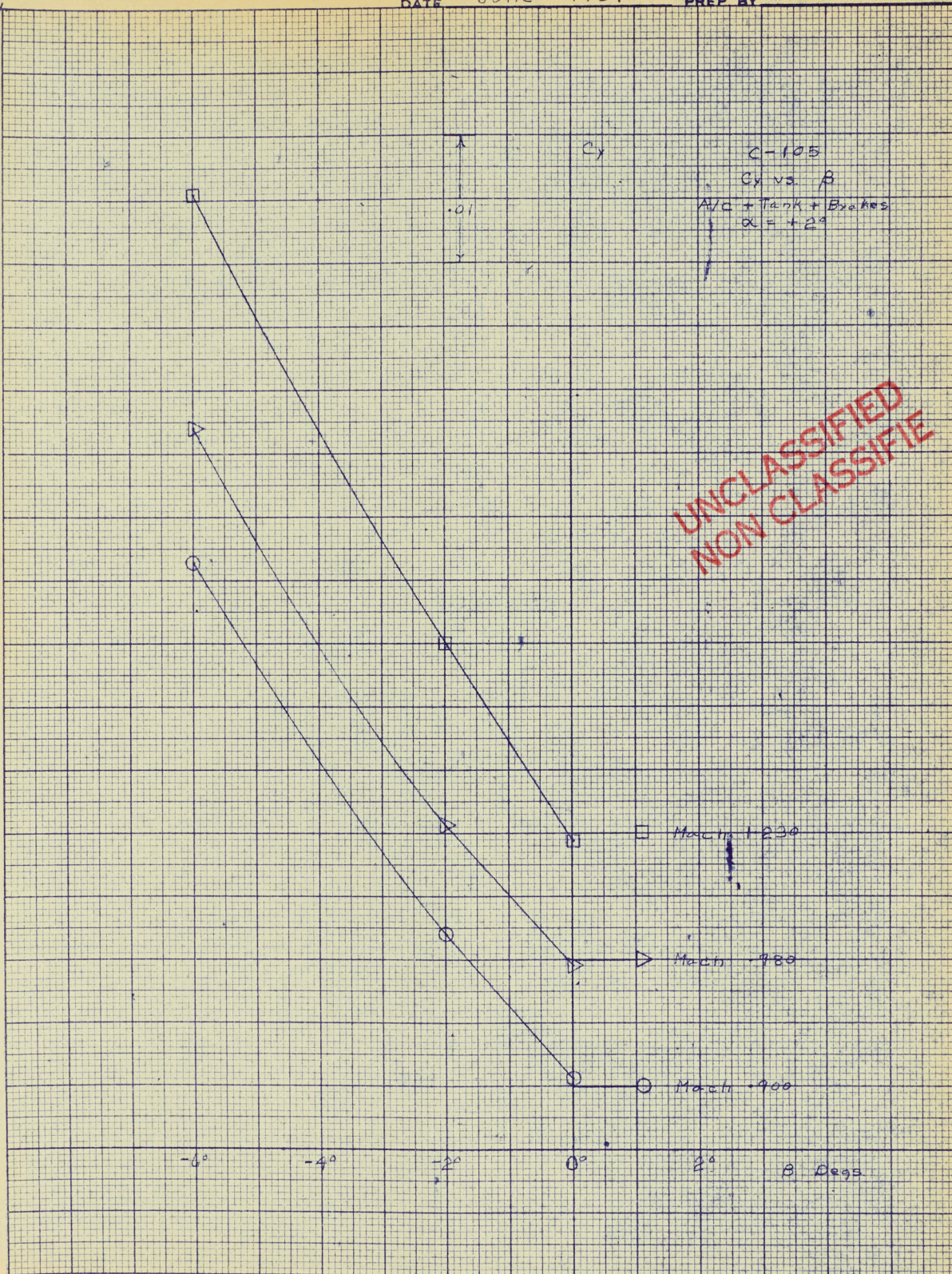
COMPONENT

SHEET No. 1-34-3

REPORT No. P/W.T. 129

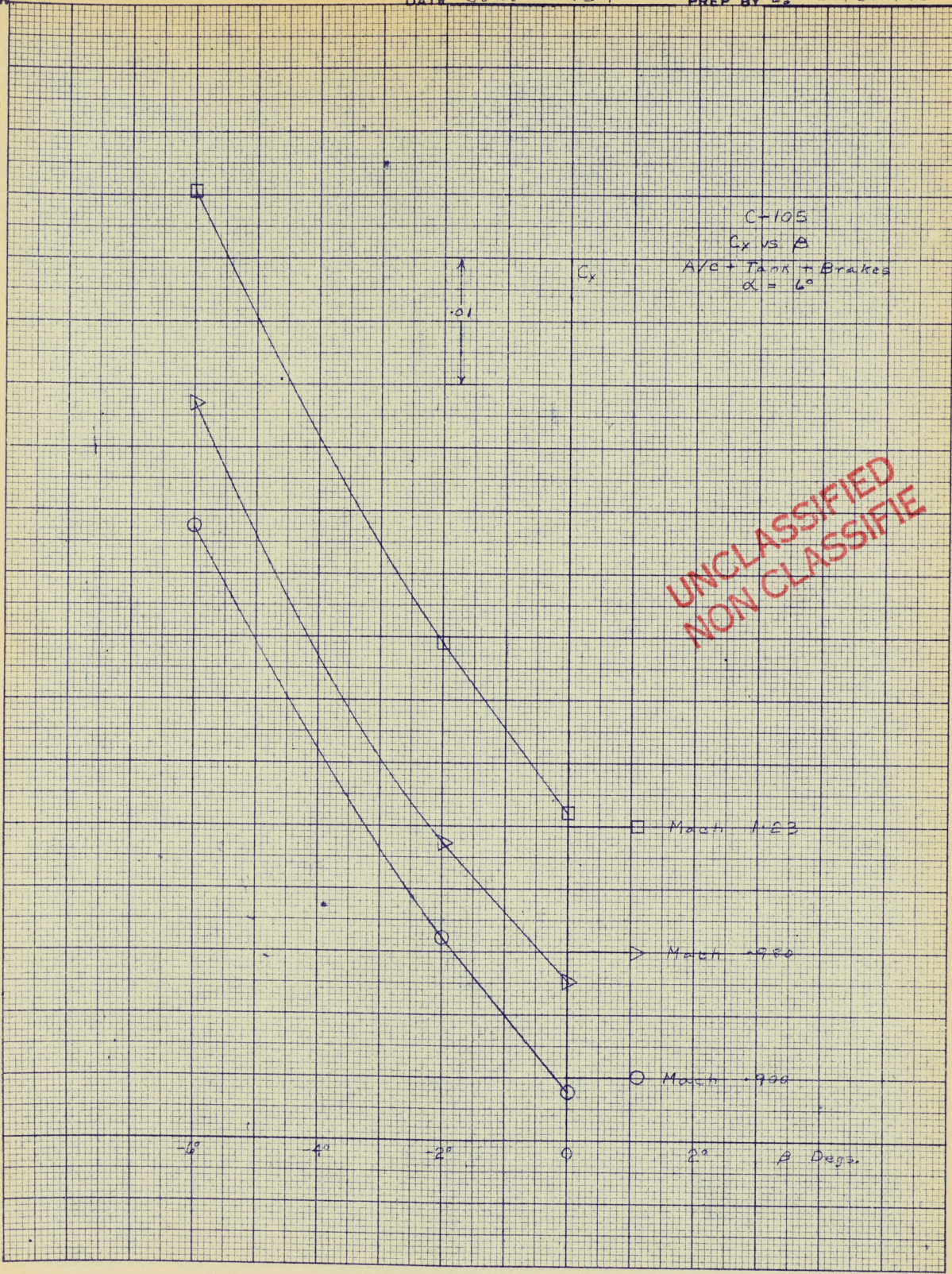
DATE June 1954

PREP BY L. Cutcliffe



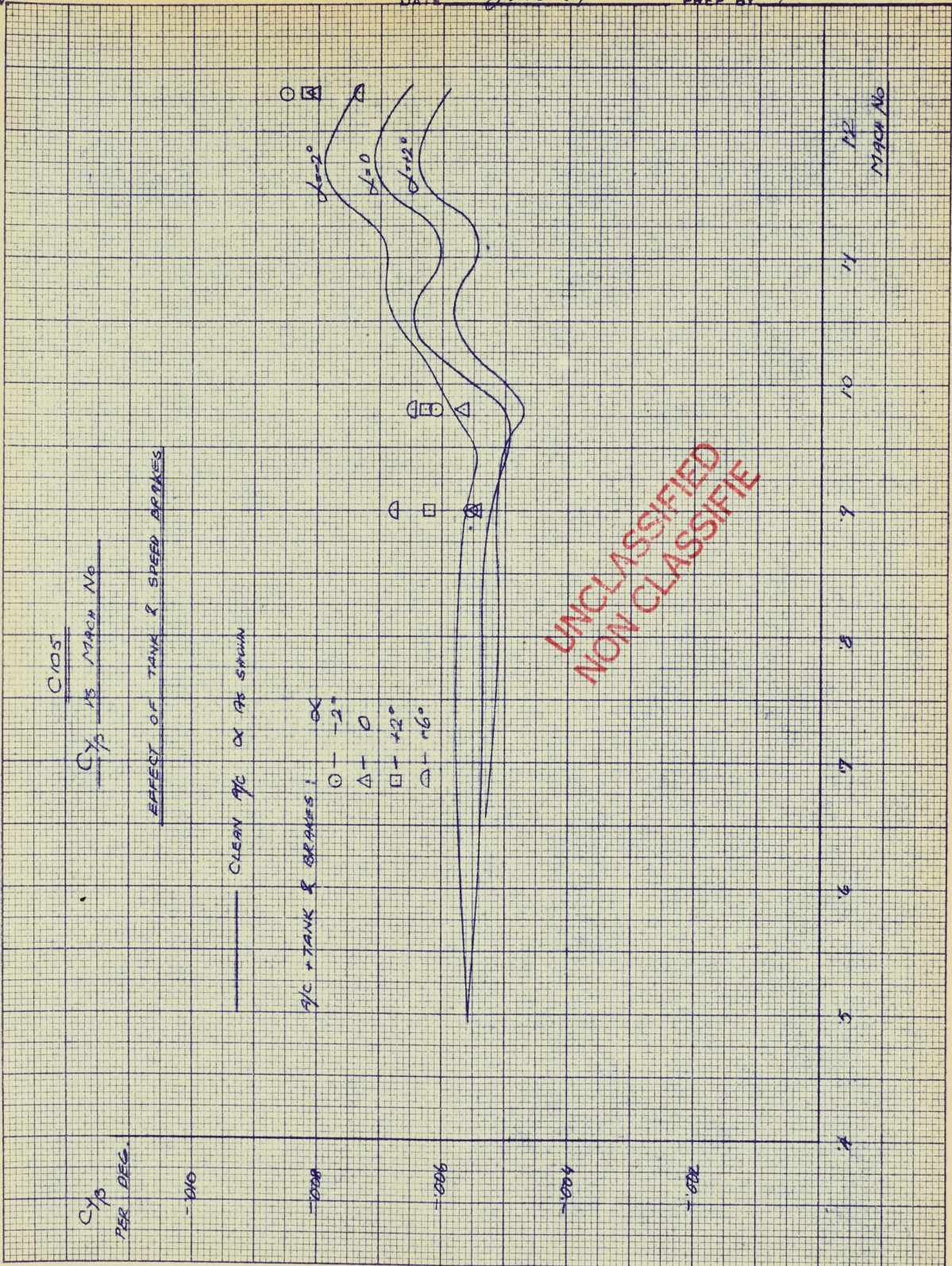
UNCLASSIFIED
NON CLASSIFIED

359-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

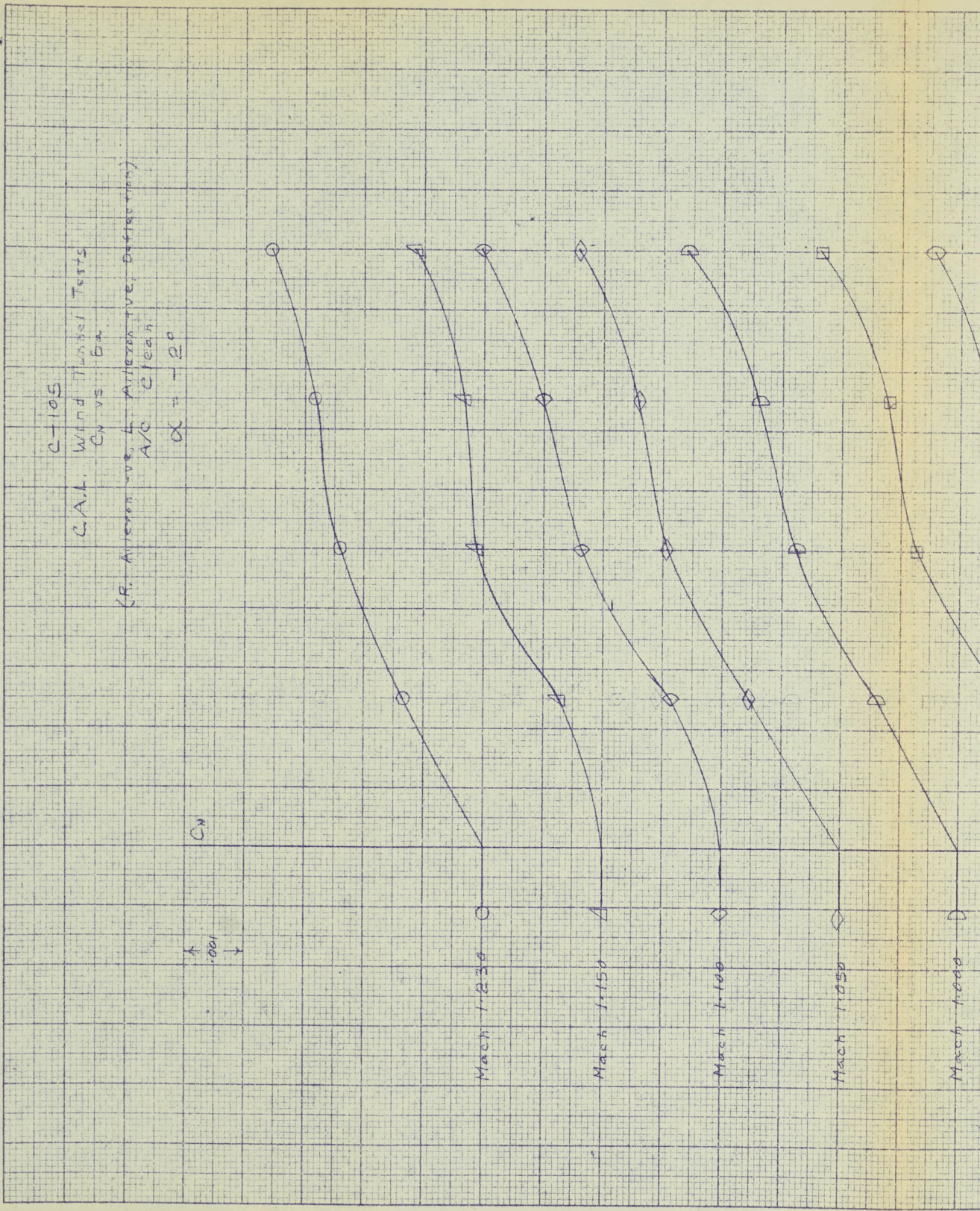


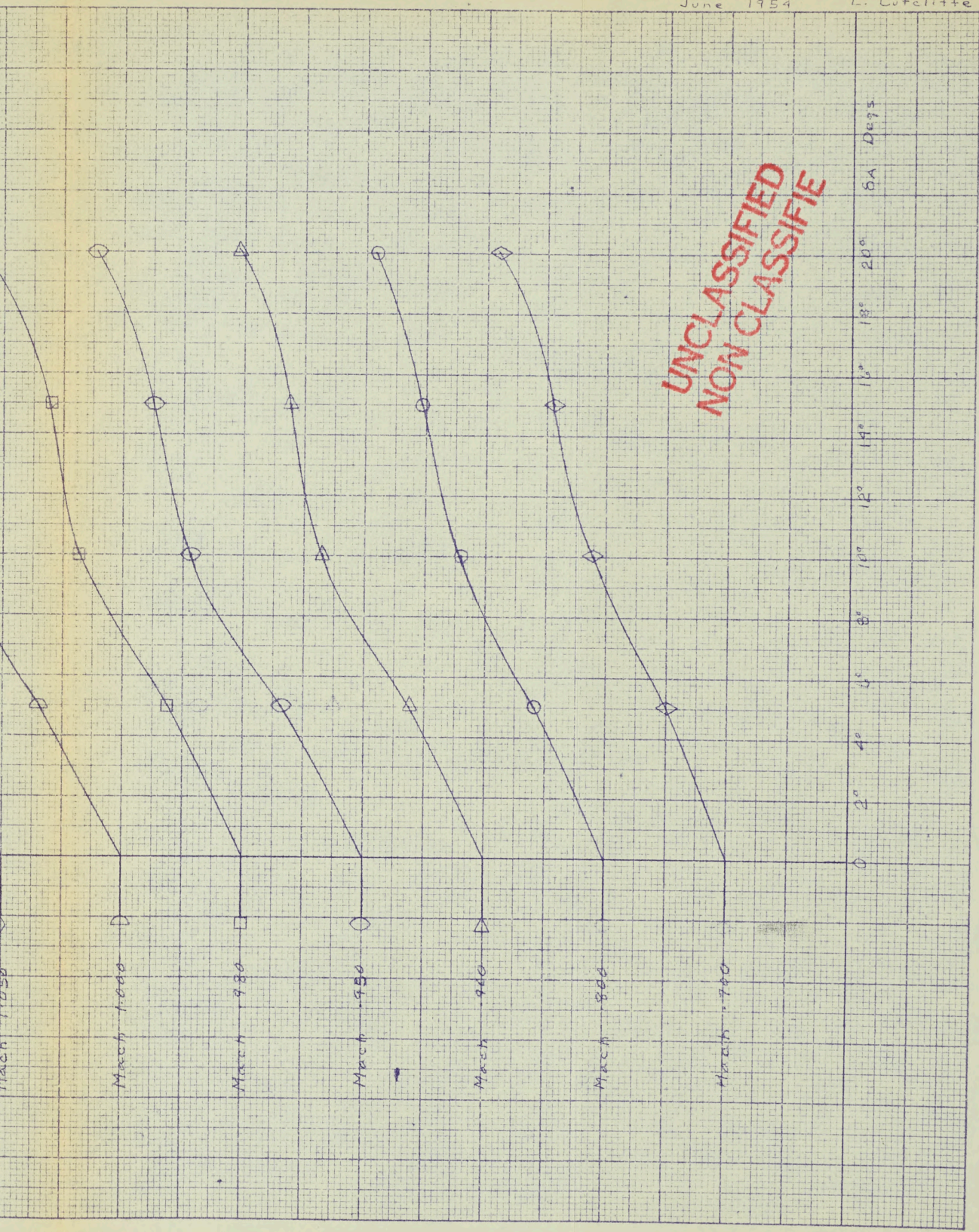
UNCLASSIFIED
NON CLASSIFIE

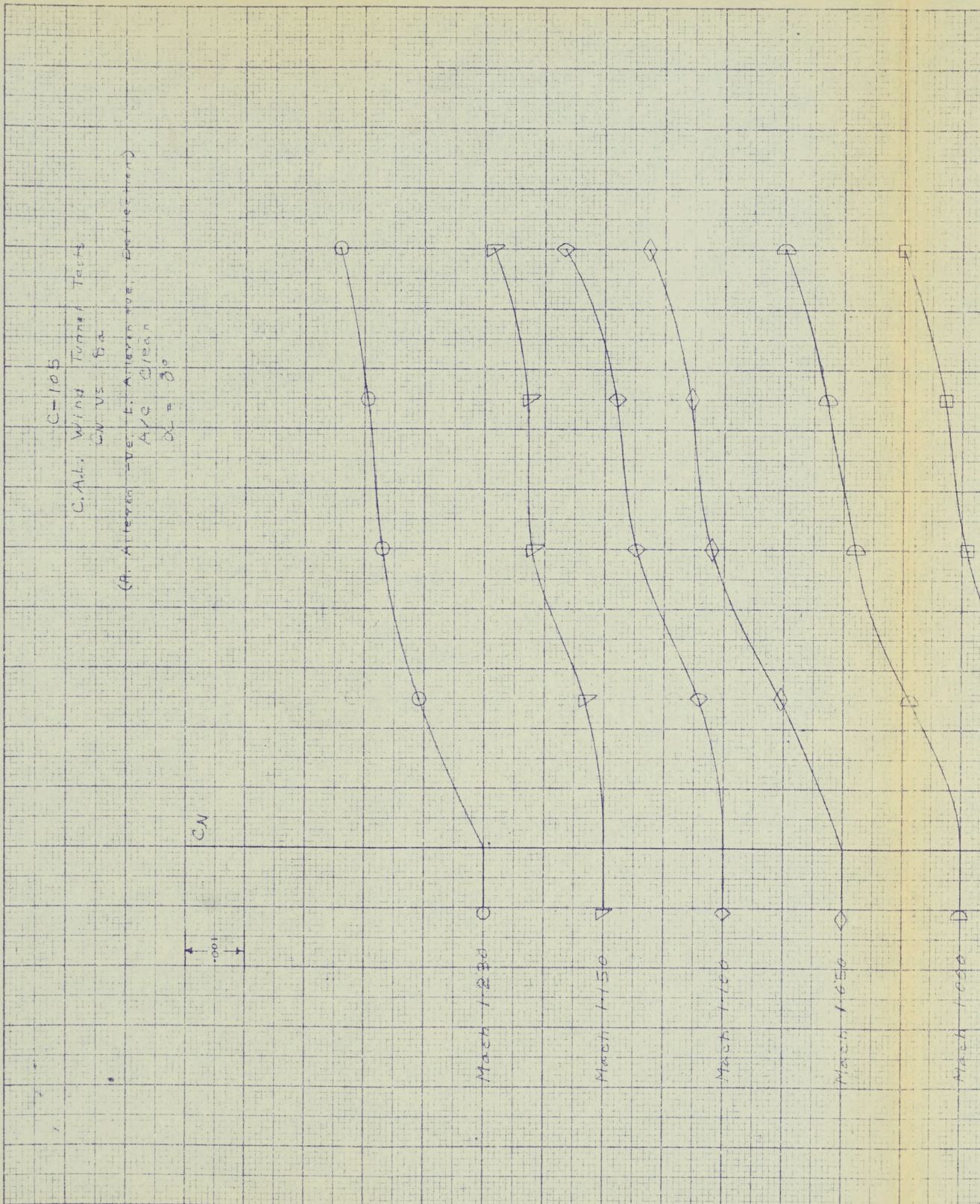
359.12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.

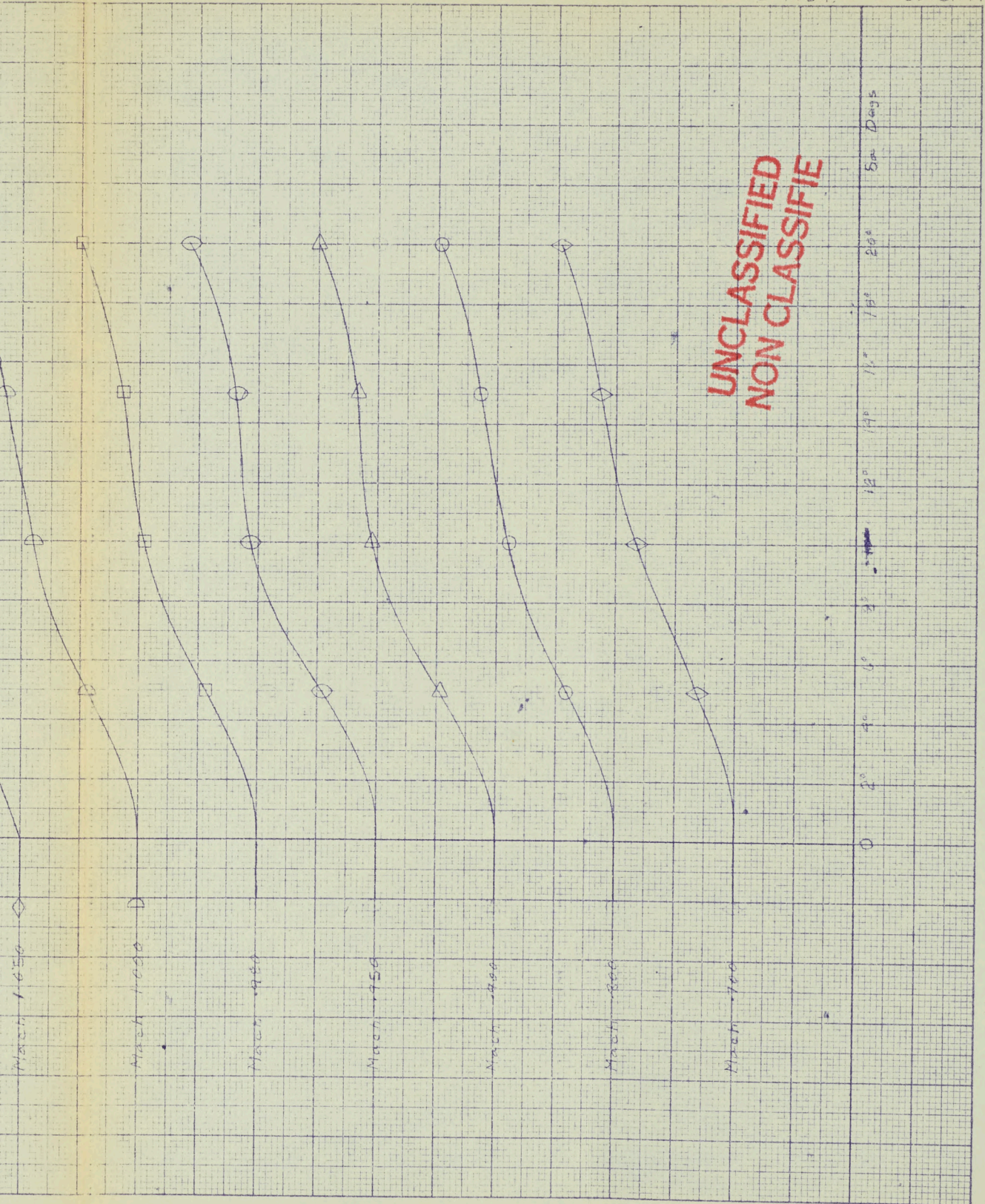


89912 - KUFFEL & ESSER CO
10 x 10 to the 1/2 inch, 5th lines accented.
MADE IN U.S.A.







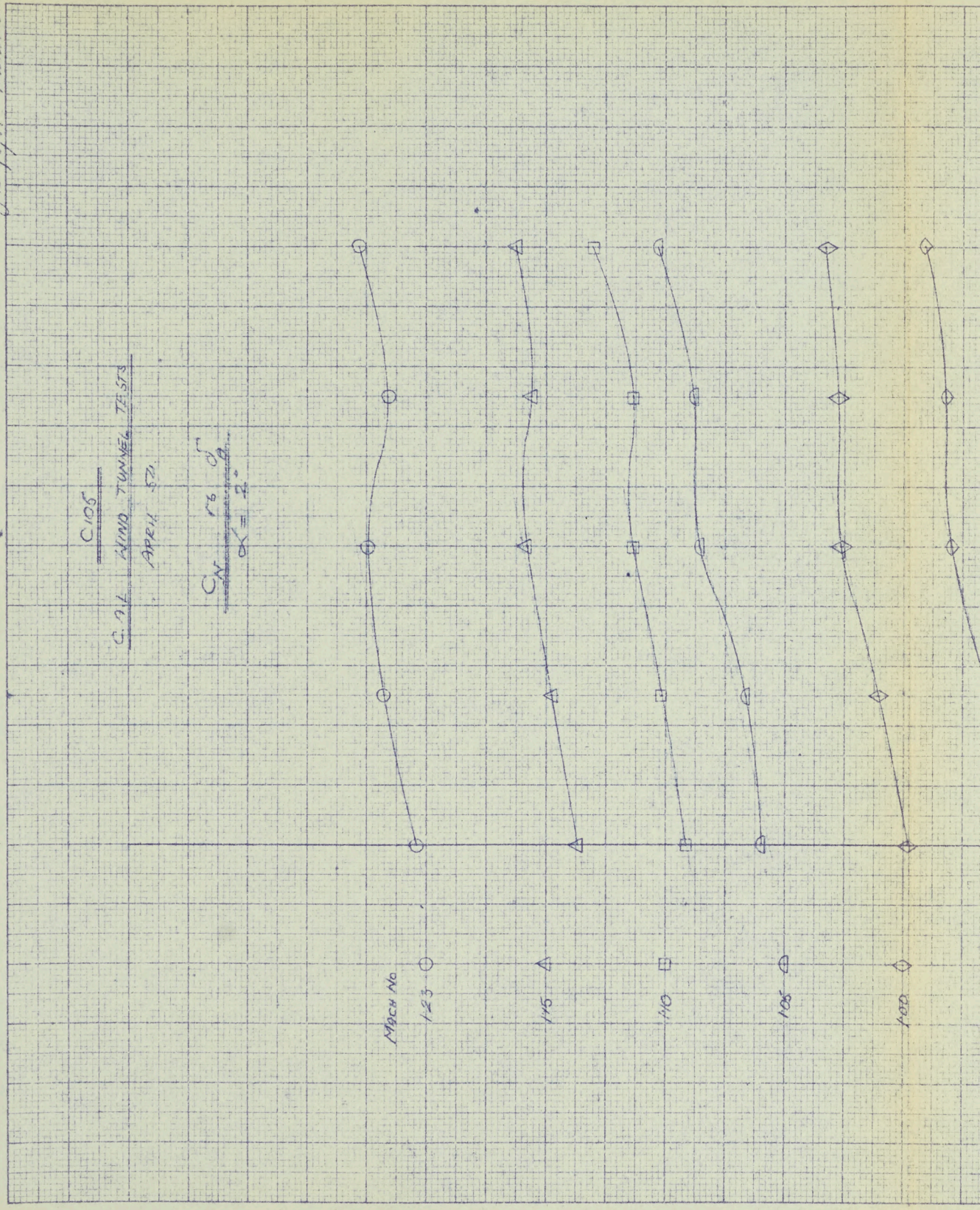


July 8/11 Kinsale

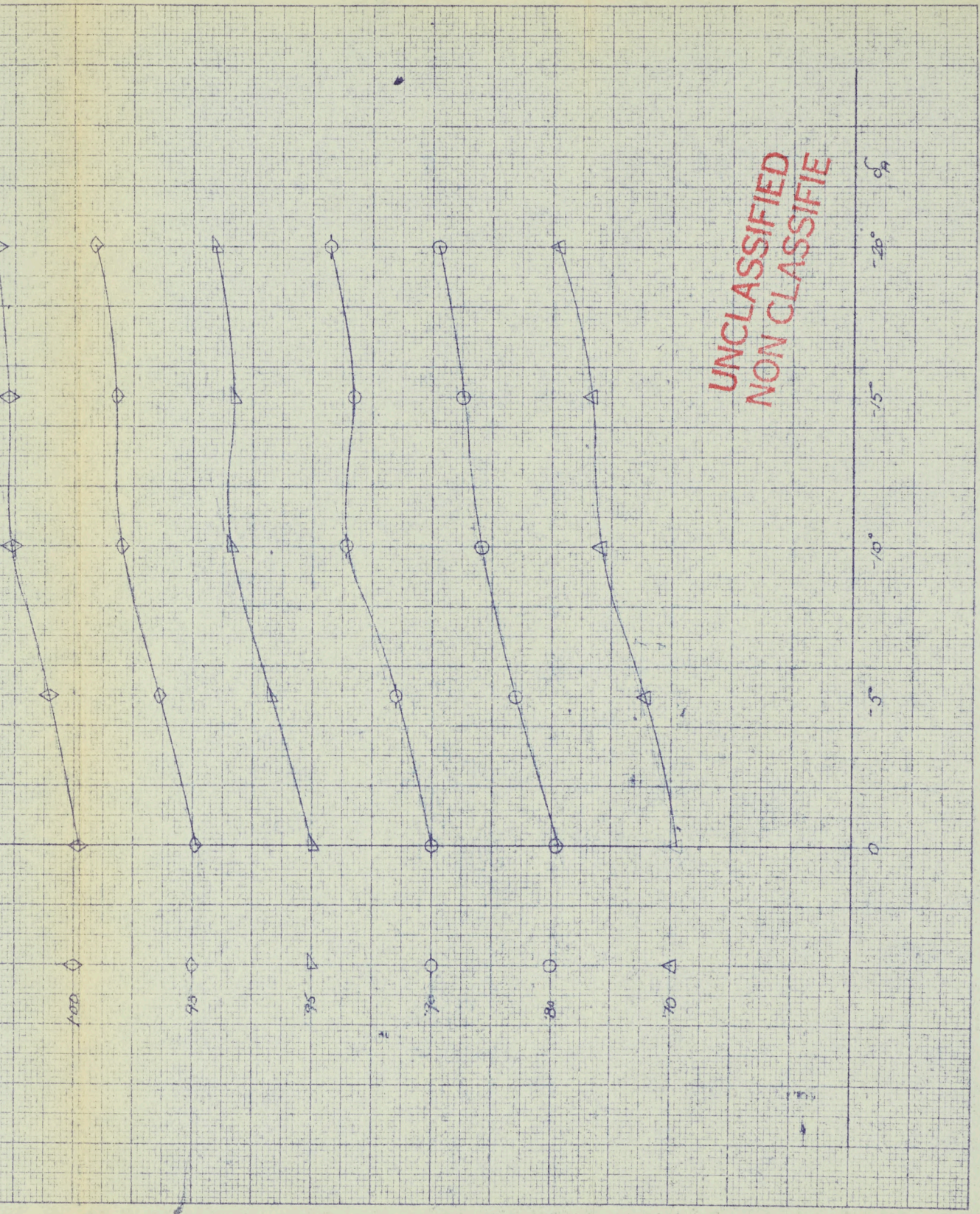
C106
C. 91. KINO TUNNEL TESTS
APRIL 571.

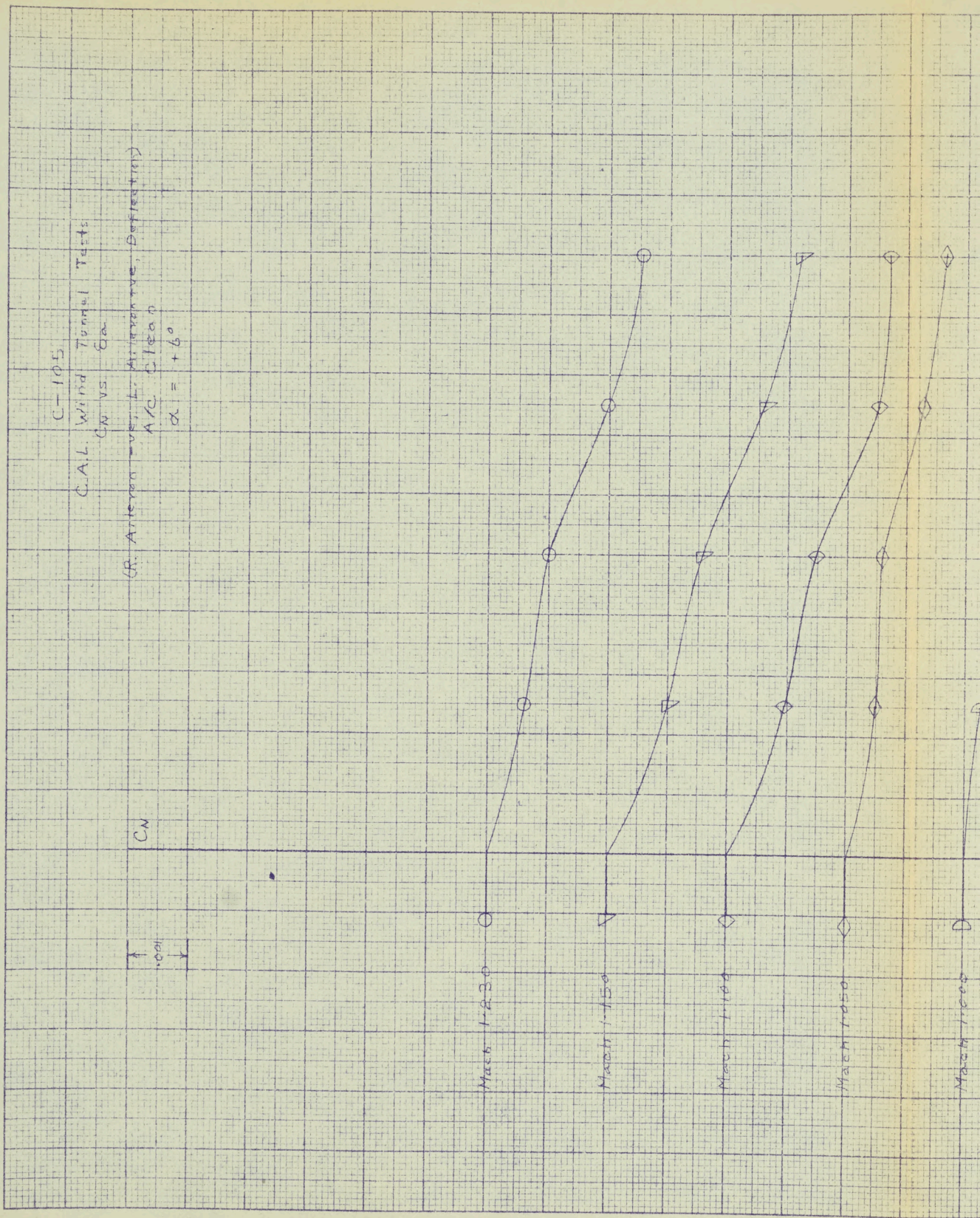
CA 16 0''
α = 1/2

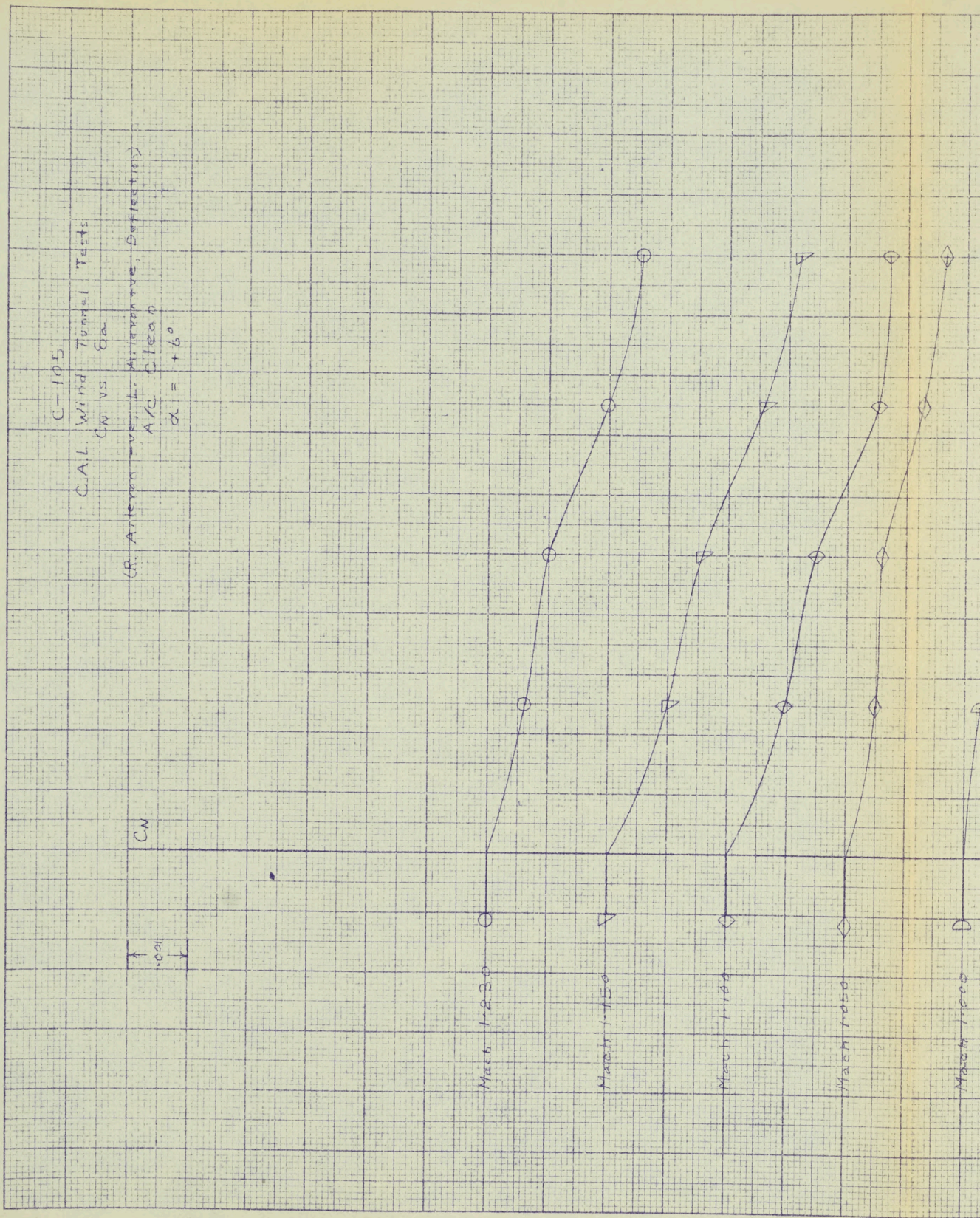
MBCN No
123
115
110
105
100



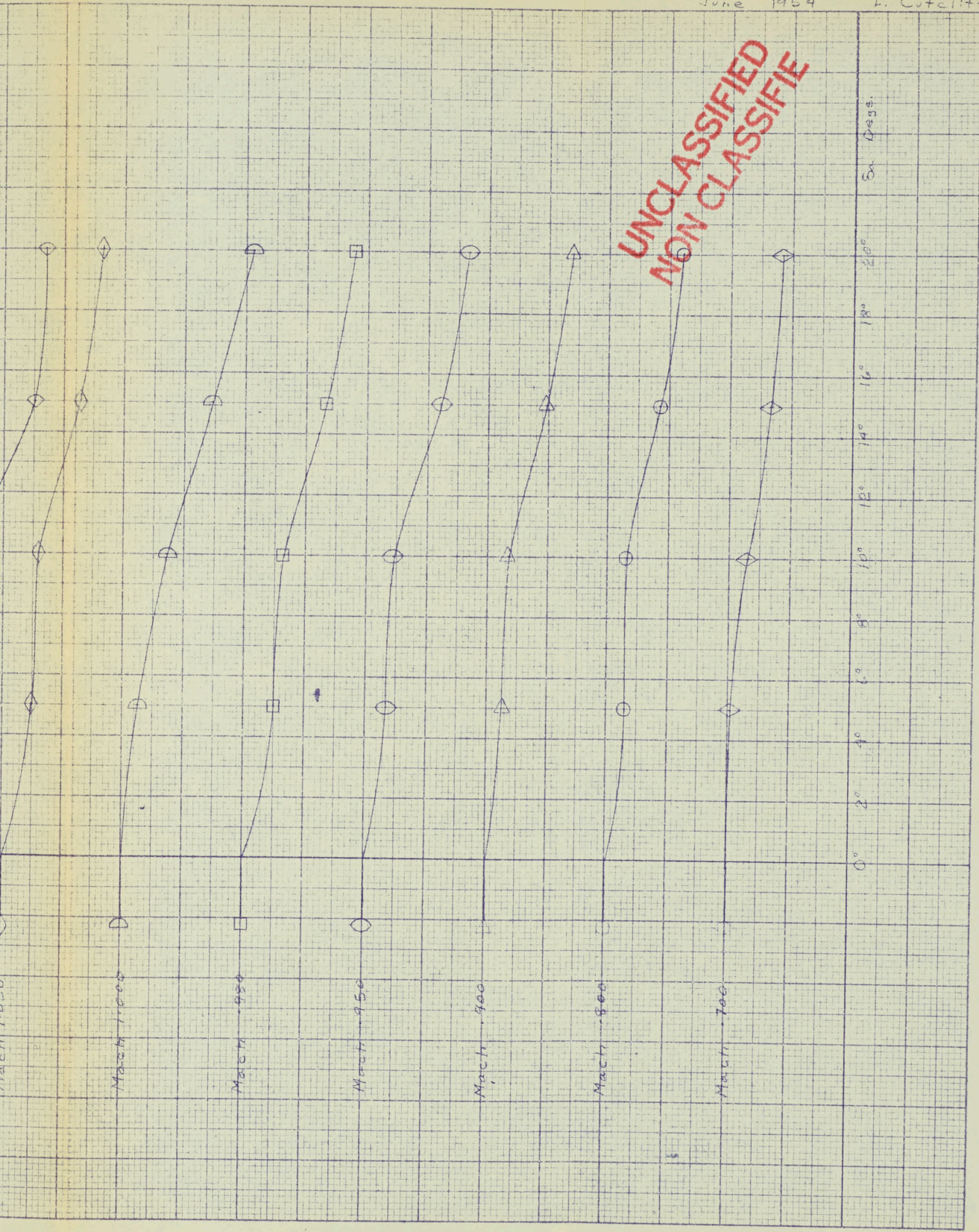
UNCLASSIFIED
NON CLASSIFIE







UNCLASSIFIED
NON CLASSIFIED



P/W.T./20 2.1.5.
 July 8/54 Kuntzhand.

359-12 KEUFFEL & ESSER CO.
 10 X 10 TO THE 1/2 INCH, 5th lines accounted.
 MADE IN U.S.A.

C/105
S.A.L. WIND TUNNEL TESTS APRIL 57.
 C_N vs MACH No
 $-10^\circ < \alpha < 10^\circ$

C_N
 PER 2 DEG.
 INCLUDED

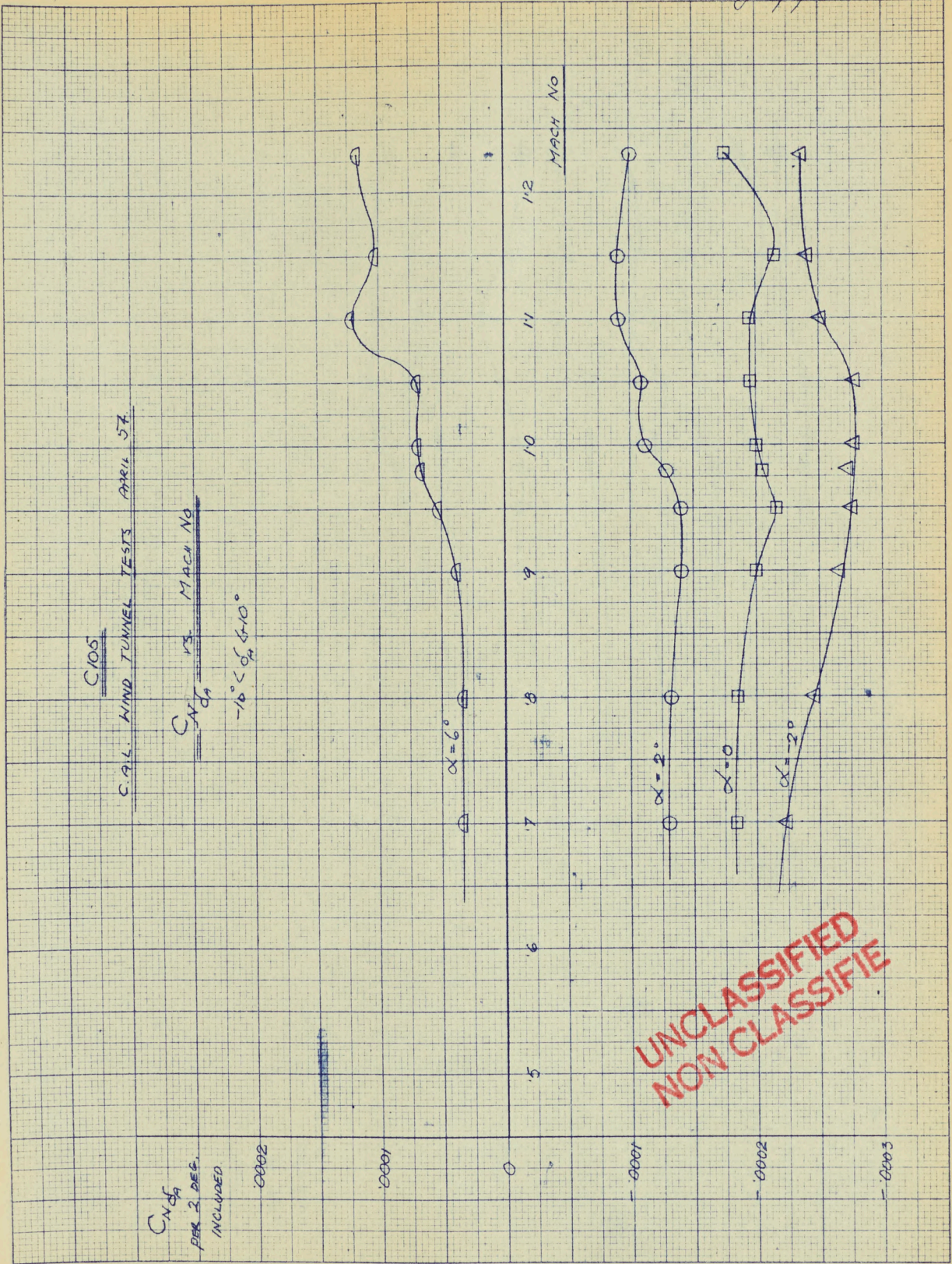
-0002

-0001

-0001

-0002

-0003



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PWT 20 2-1-6
 Aug 27/54 *J. Weissen*

C 105
 C.A.L. WIND TUNNEL TESTS
 $C_n \delta_A$ vs MACH
 $-10^\circ < \delta_A < +10^\circ$

$C_n \delta_A$
 per 2°
 included

.0004

.0002

-.0002

-.0004

$\alpha = 12^\circ$
 10°
 8°
 6°
 4°
 2°
 0°
 -2°

1.50
 Mach

1.20

1.10

1.00

.90

.80

.70

UNCLASSIFIED
 NON CLASSIFIE

C-105 CAL WIND TUNNEL TESTS

C_N vs δ_A

R Aileron Neg. L Aileron Pos

$\alpha = 4^\circ$

0.001

Mach

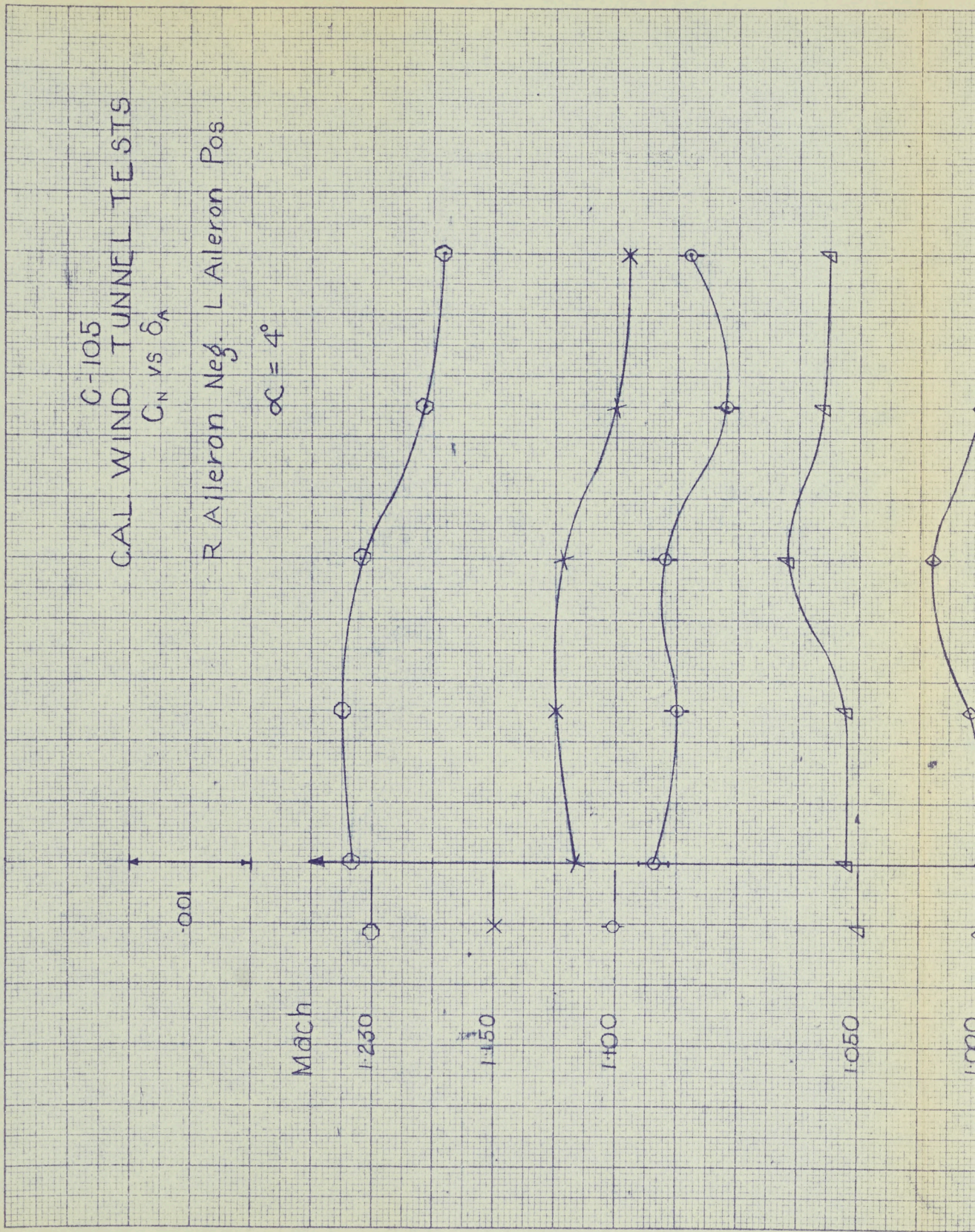
1.230

1.150

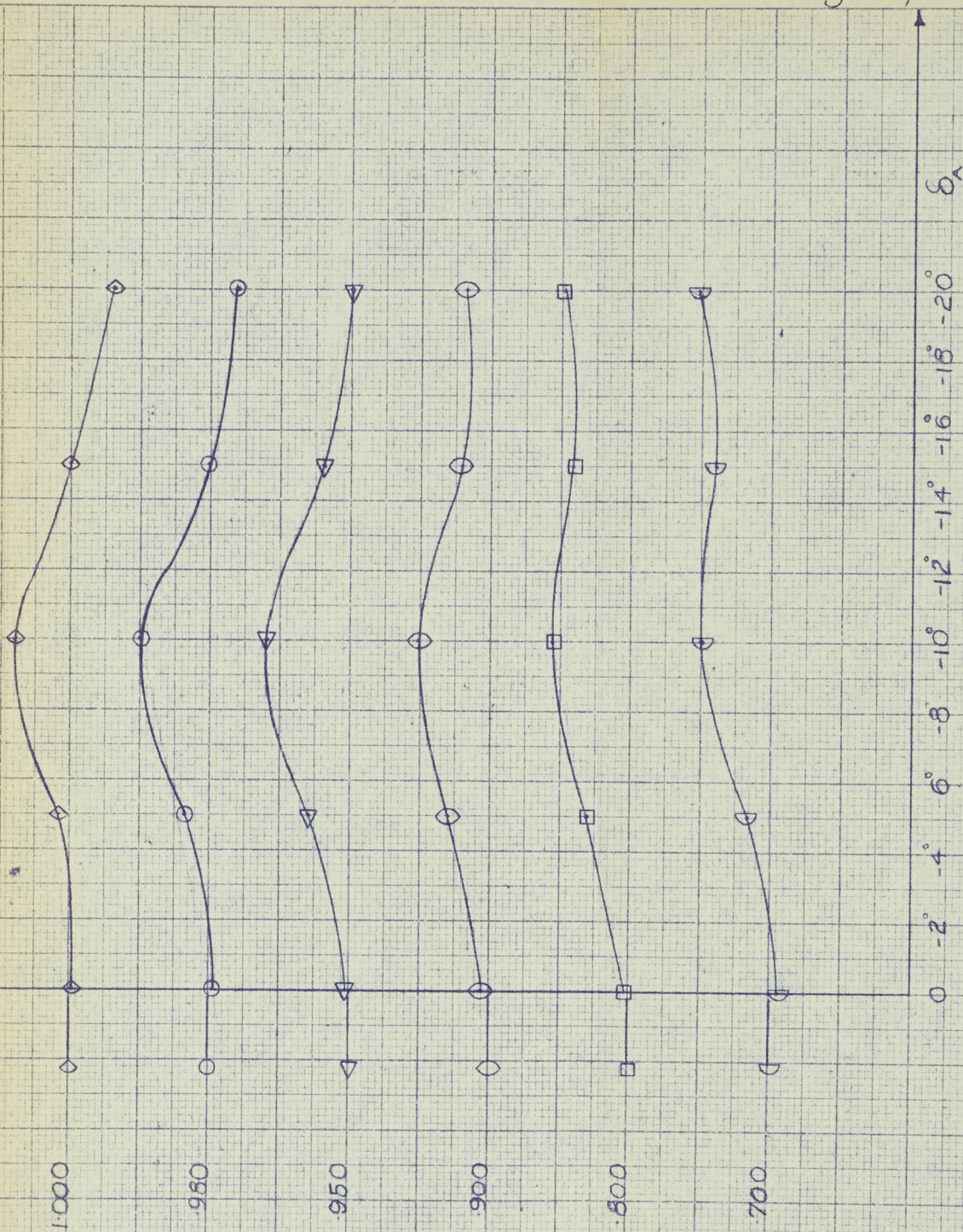
1.100

1.050

1.000



PWT 20 2.1.7
Aug 27/54 *J. Williams*



UNCLASSIFIED
NON CLASSIFIE

C-105
CAL. WIND TUNNEL TESTS
 C_N vs δ_A
R Aileron Neg L Aileron Pos.,
 $\alpha = 8^\circ$

.001

C_n

Mach

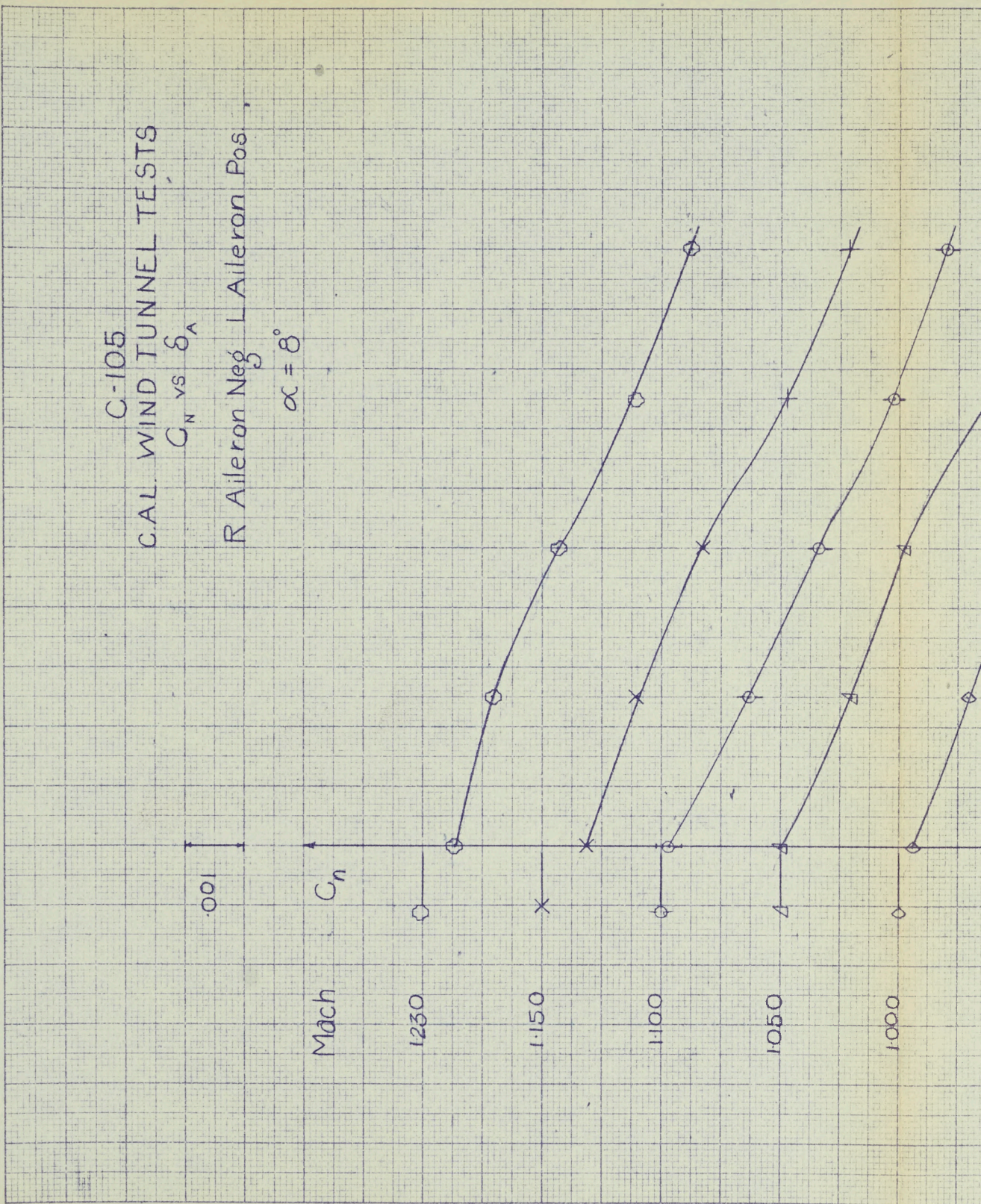
1.230

1.150

1.100

1.050

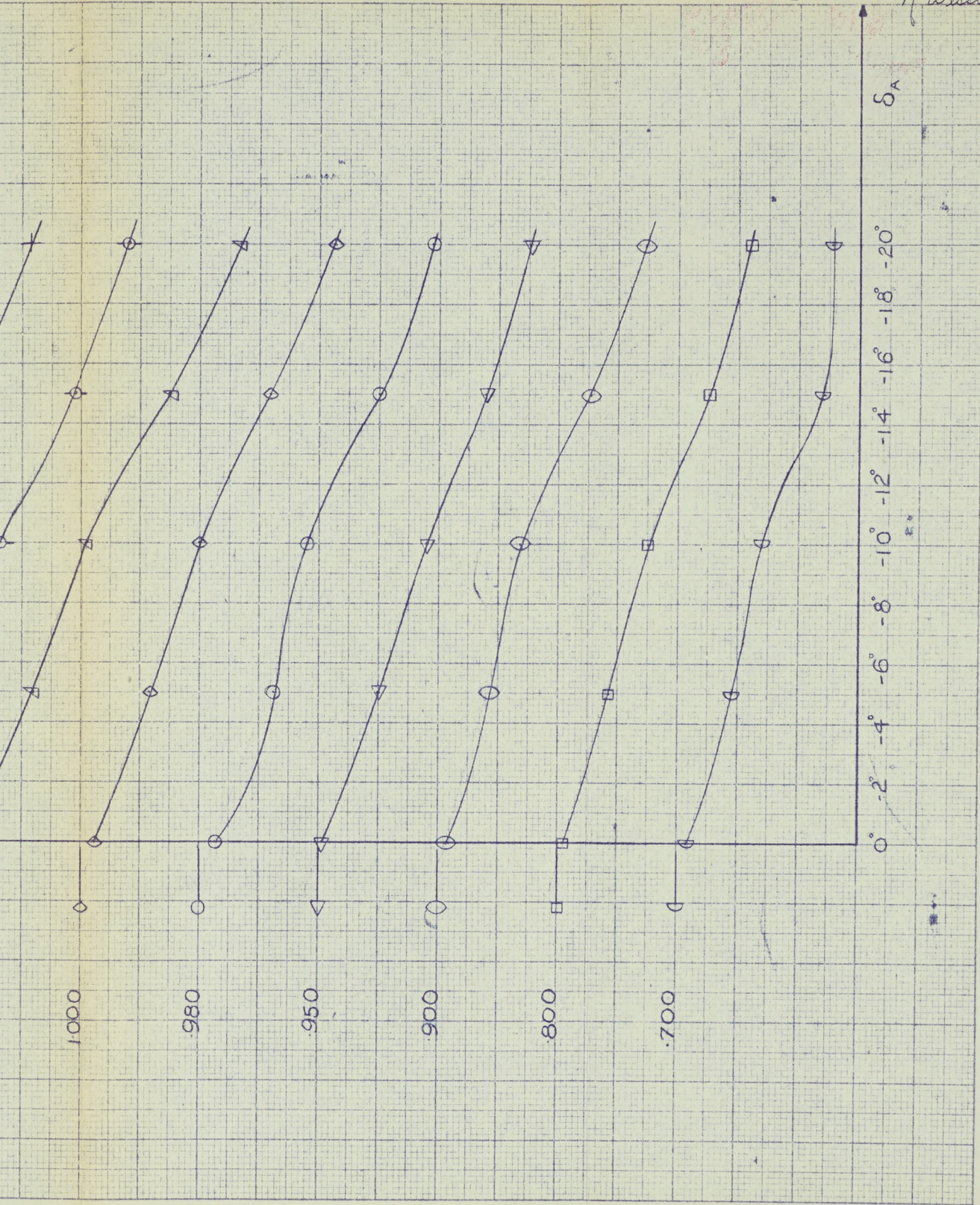
1.000



PWT 20 2-1-8

Aug 27/54

Wesson



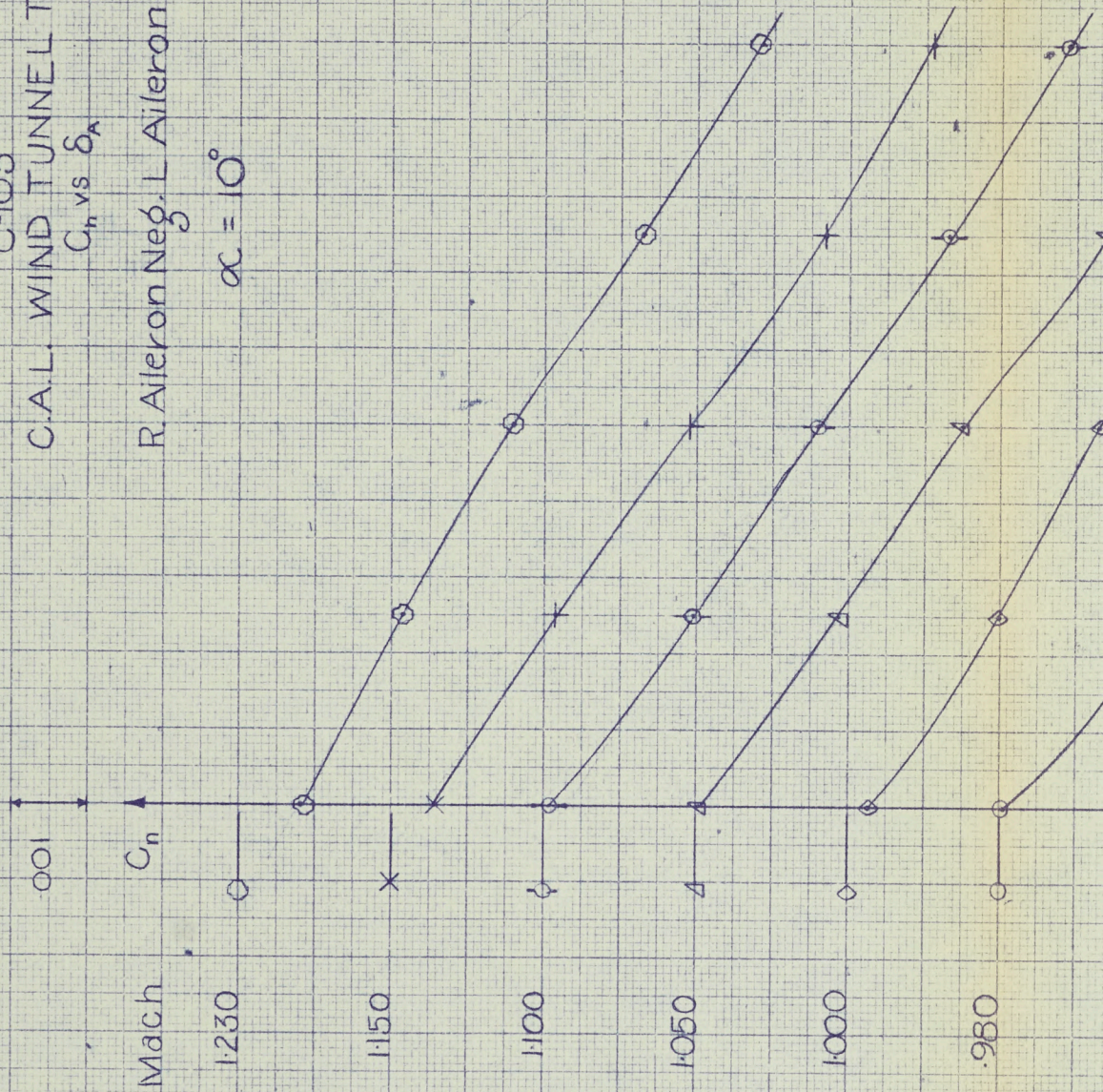
UNCLASSIFIED
NON CLASSIFIE

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

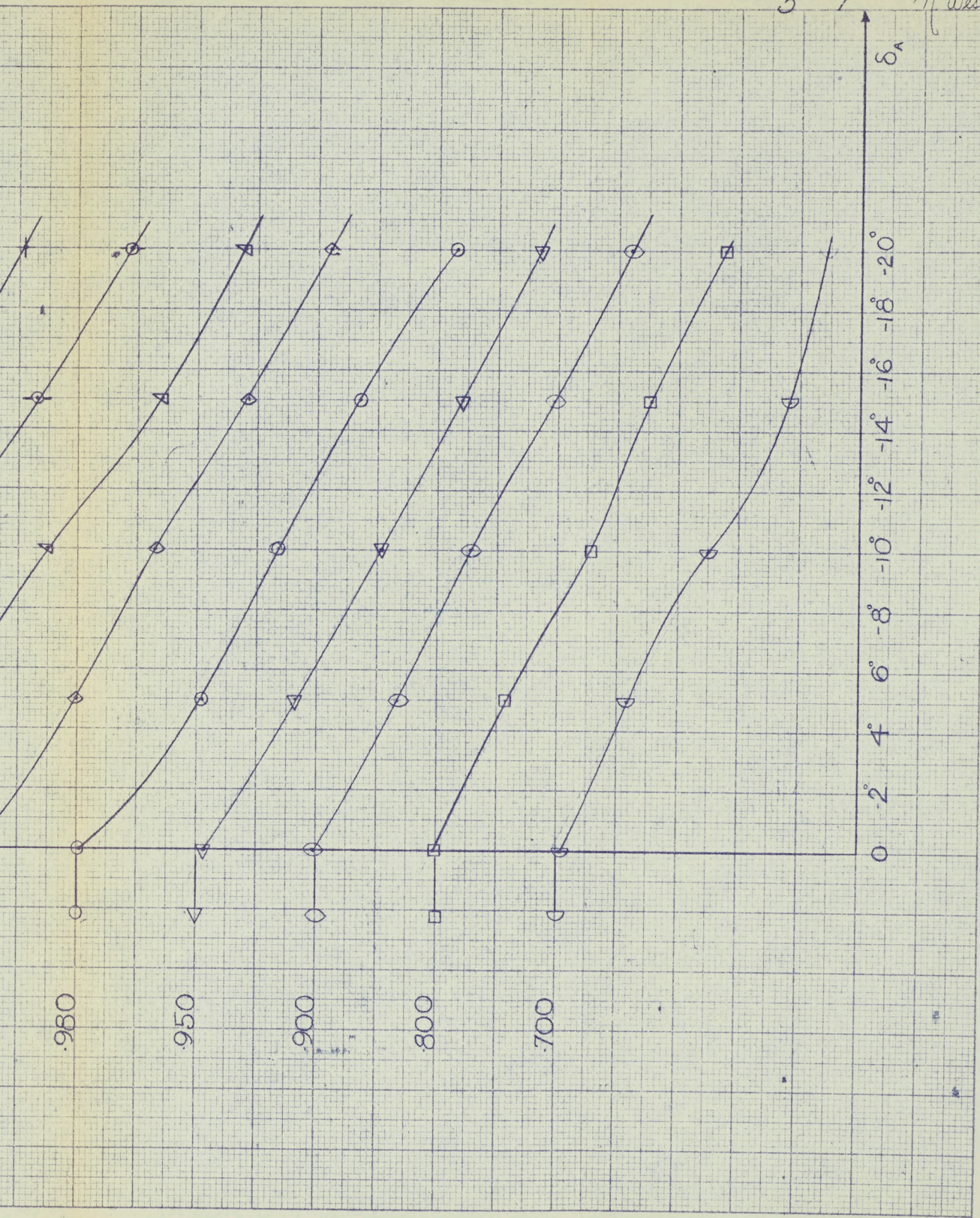
C_n vs δ_A

R. Aileron Neg. L. Aileron Pos.

$\alpha = 10^\circ$

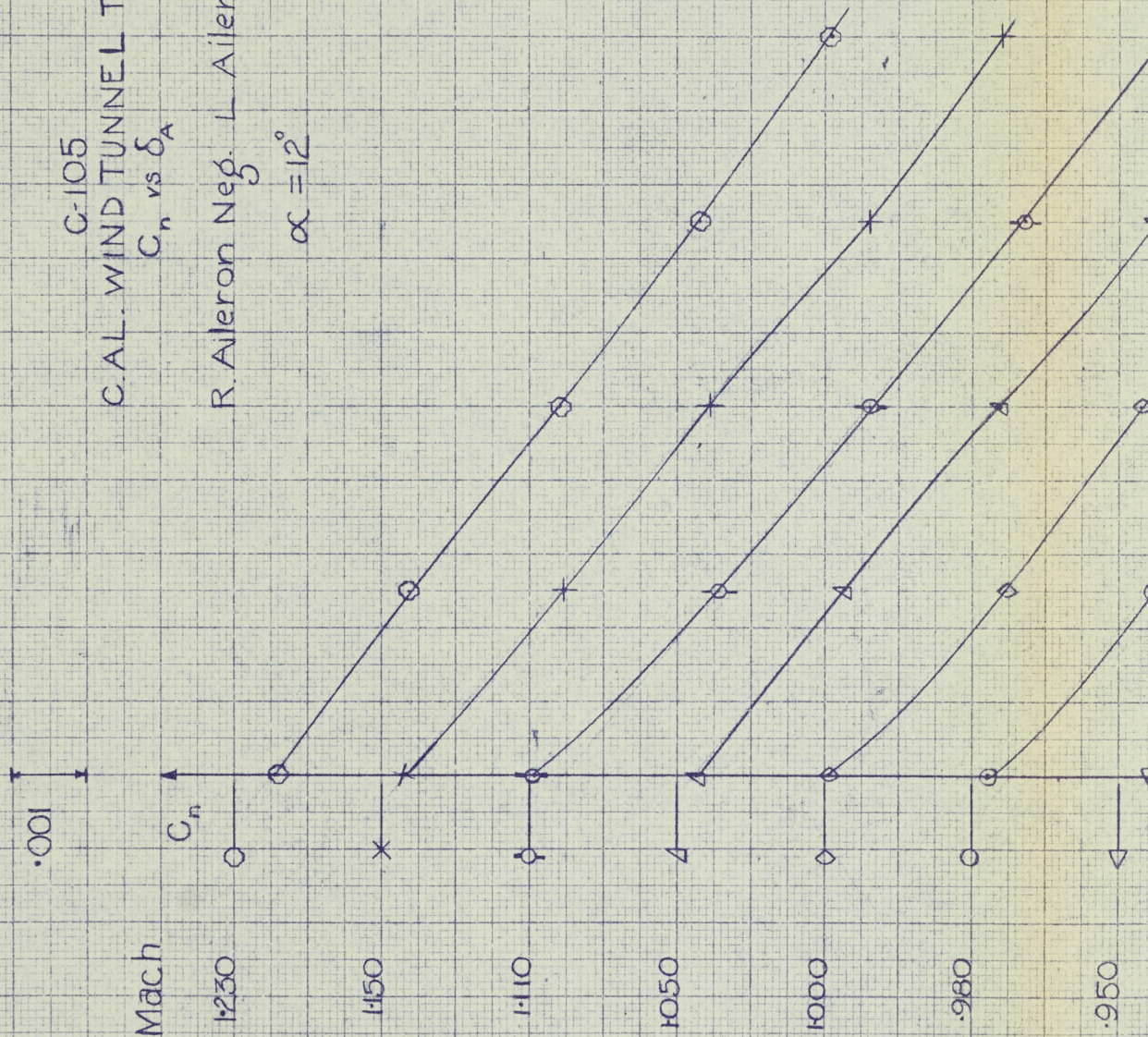


PWT 20 2-1-9
Aug 27/54 *Wessons*

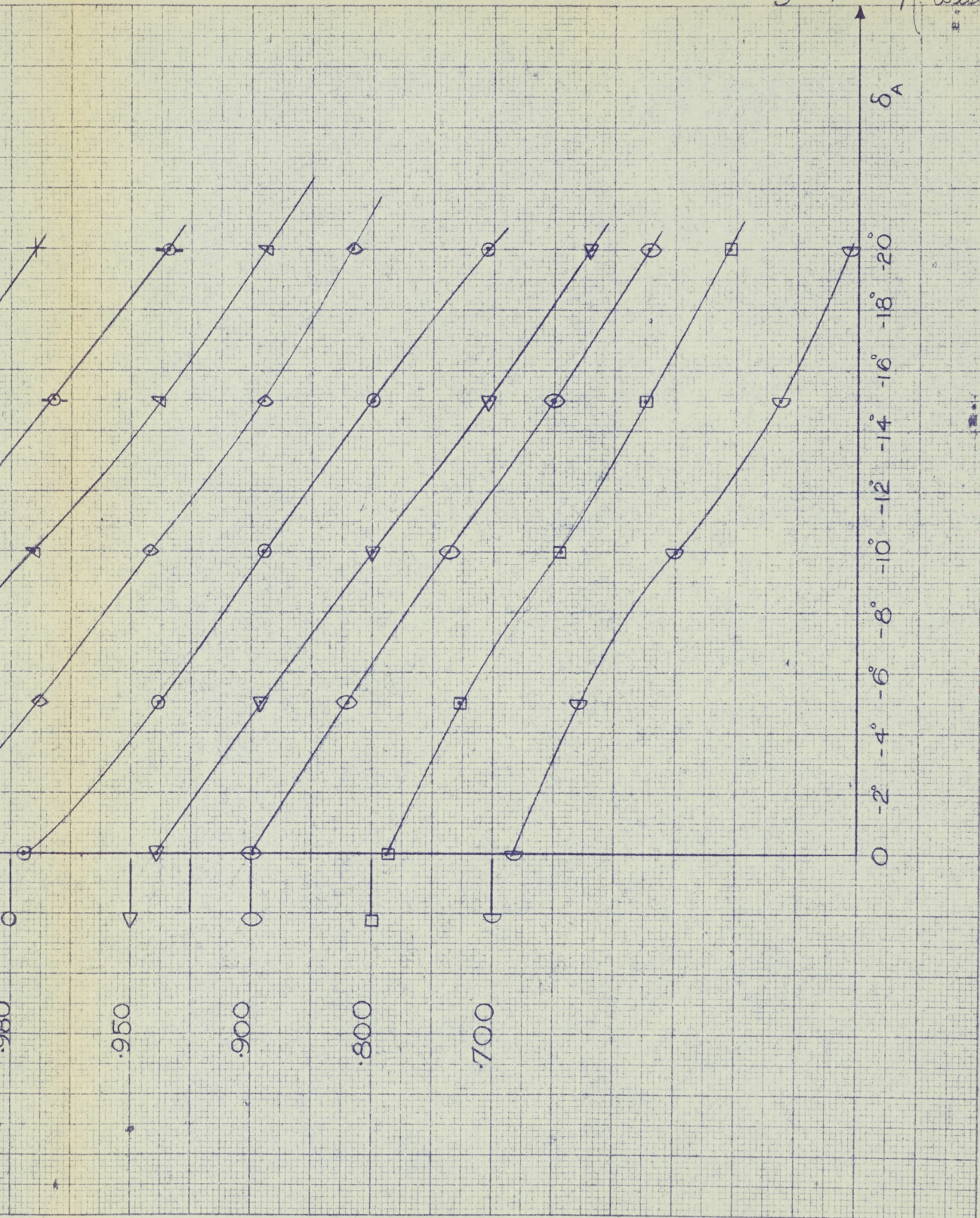


UNCLASSIFIED
NON CLASSIFIE

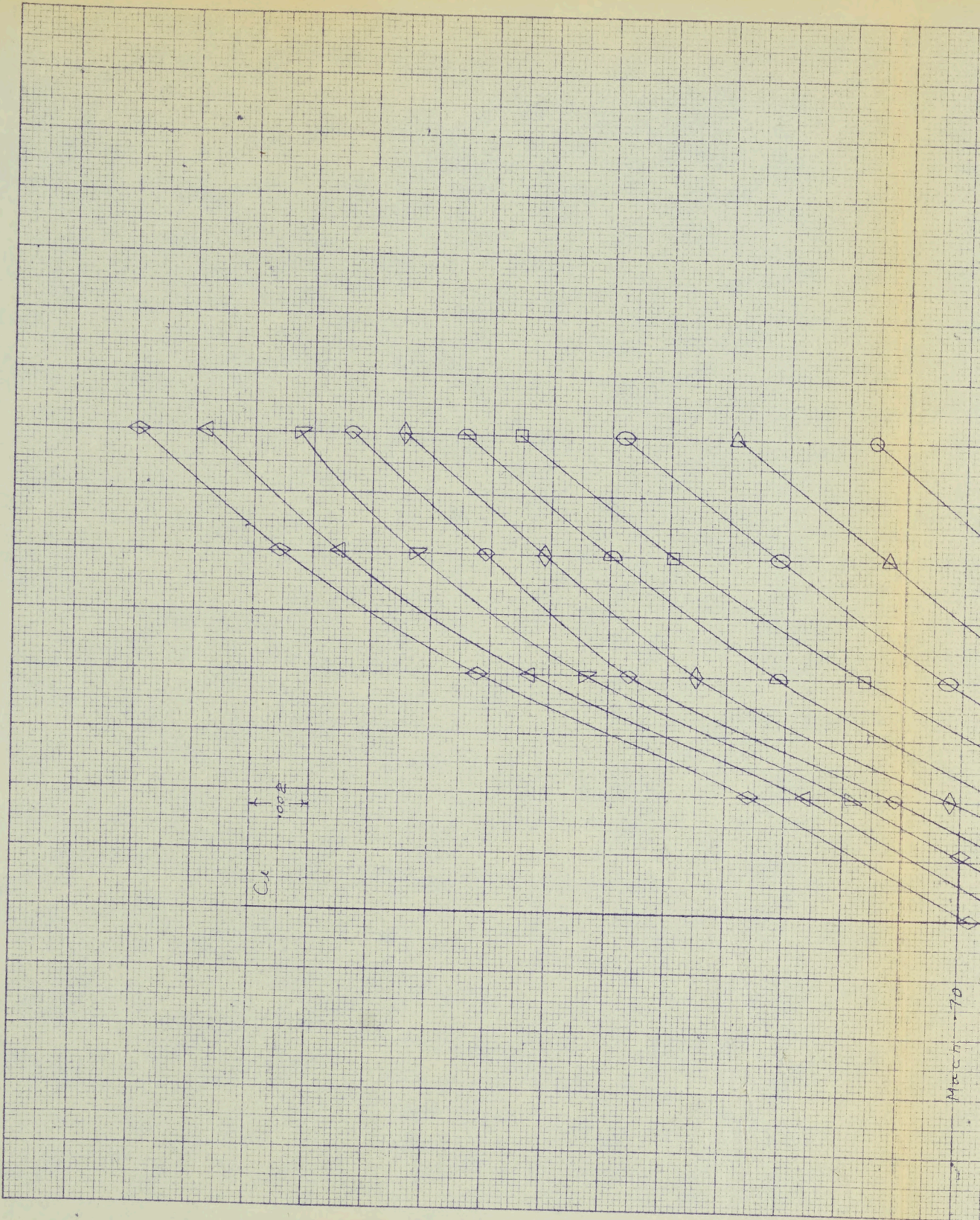
C-105
C.A.L. WIND TUNNEL TESTS
 C_n vs δ_A
R. Aileron Neg. L. Aileron Pos.
 $\alpha = 12^\circ$



PWT 20 2-1-10
Aug 27/54 *W. Weston*



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June 1954

L. Cutcliffe

C-105

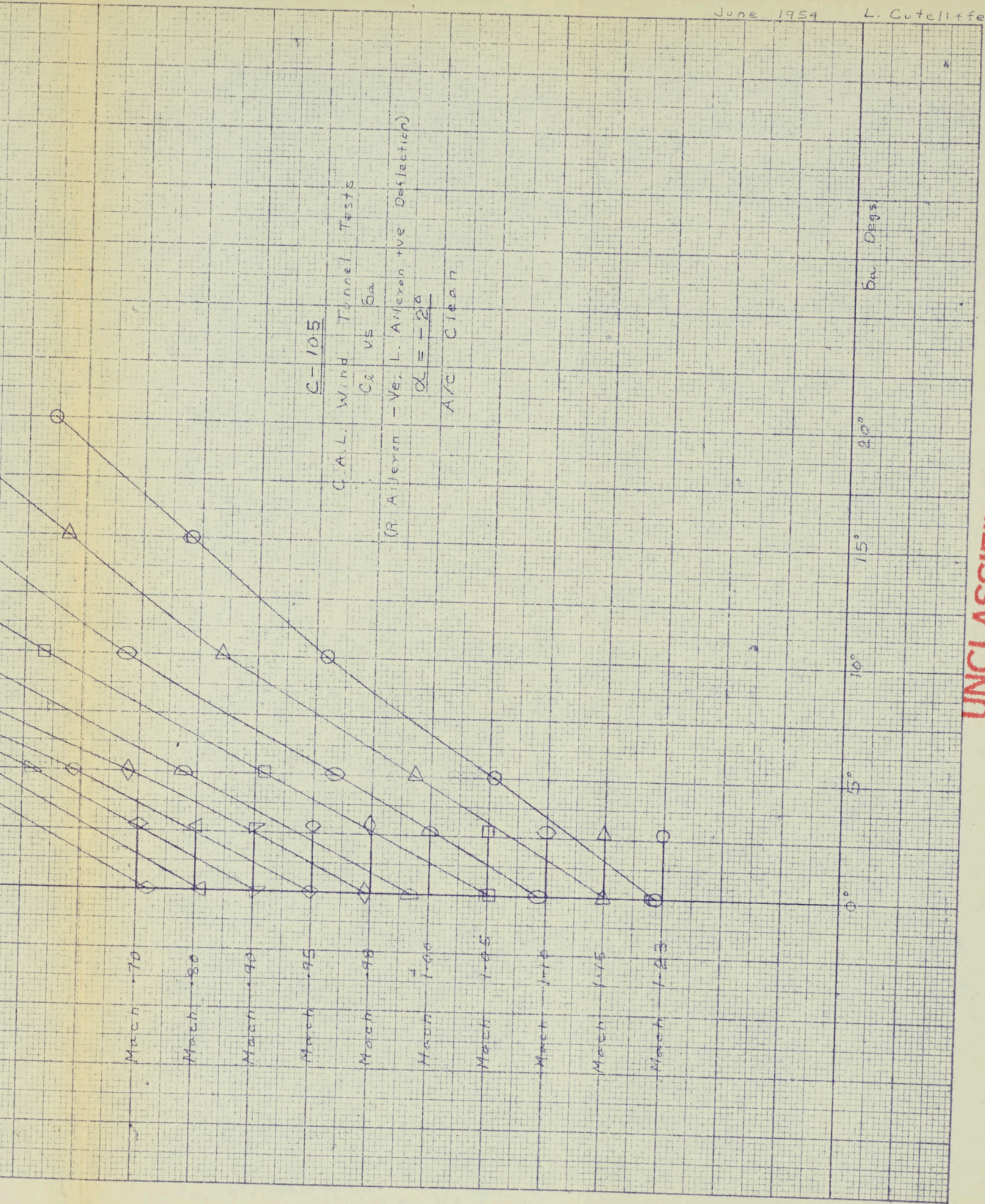
C.A.L. Wind Tunnel Tests

C_d vs α

(R. Airfoil - Ve. L. Airfoil +ve Deflection)

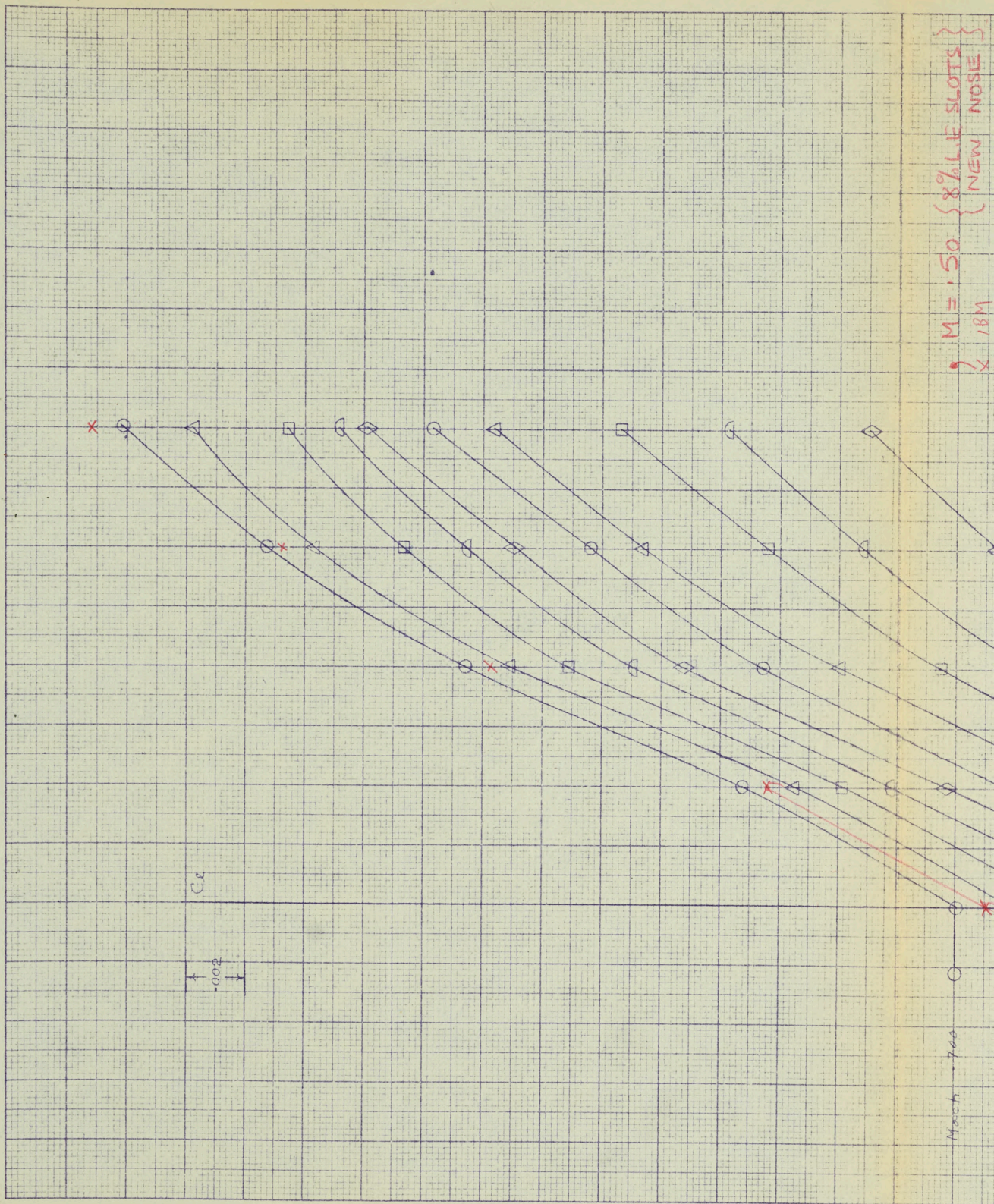
$\alpha = -2^\circ$

A/c Clean



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389-11L KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented,
MADE IN U.S.A.



M = 1.50 { 8% L.E. SLOTS }
NEW NOSE

Mach 1.00

M = 1.50 { 8% L.I.E SLOTS }
 X 18M { NEW NOSE }

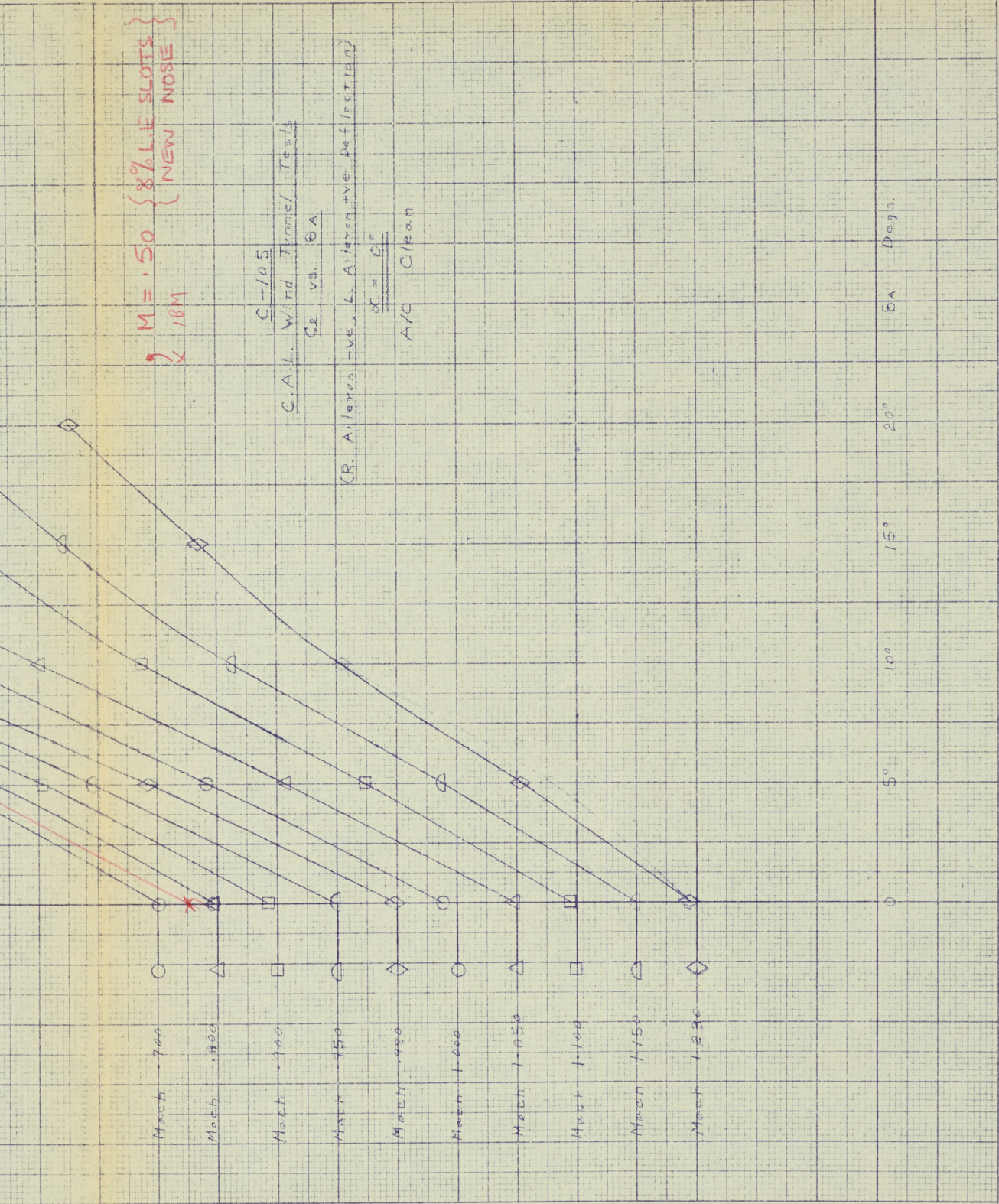
C-105
 C.A.L. Wind Tunnel Tests

Ce vs. BA

(R. Aileron -ve. L. Aileron +ve Deflection)

$$C_x = C_{x0}$$

A/C Clean



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 NON CLASSIFIE

C-105

CAL WIND TUNNEL TEST

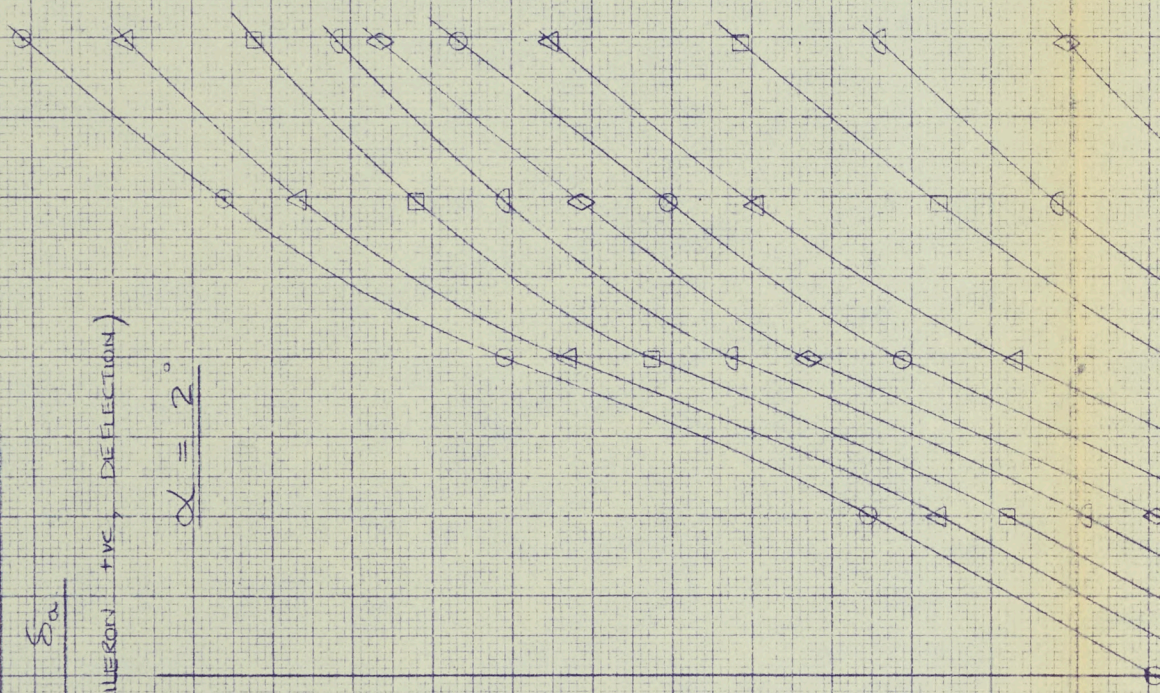
C_L vs δ_a

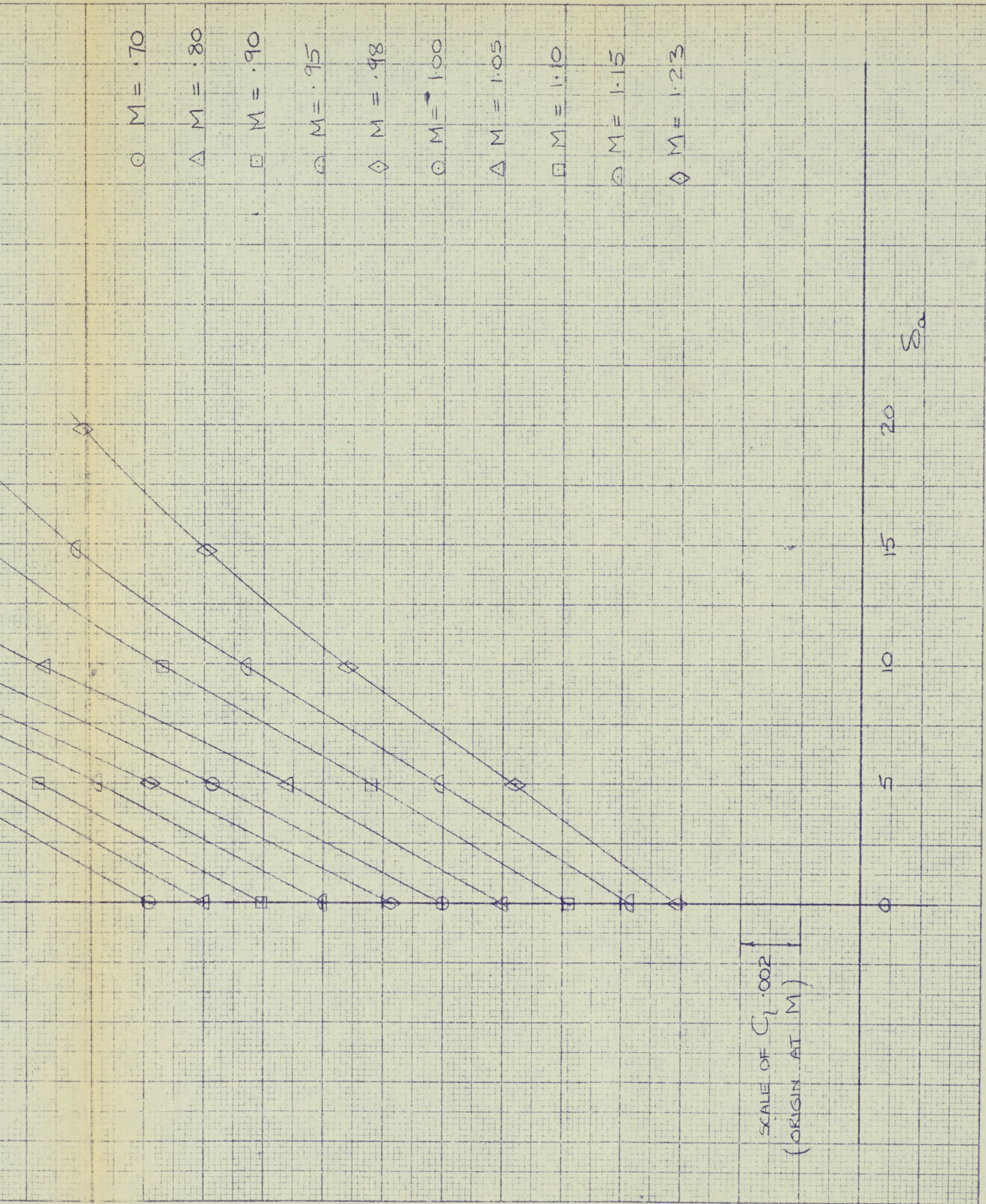
(R. PILERON - vs, L. ALLERON FIVE, DEFLECTION)

$\alpha = 2^\circ$

C_L

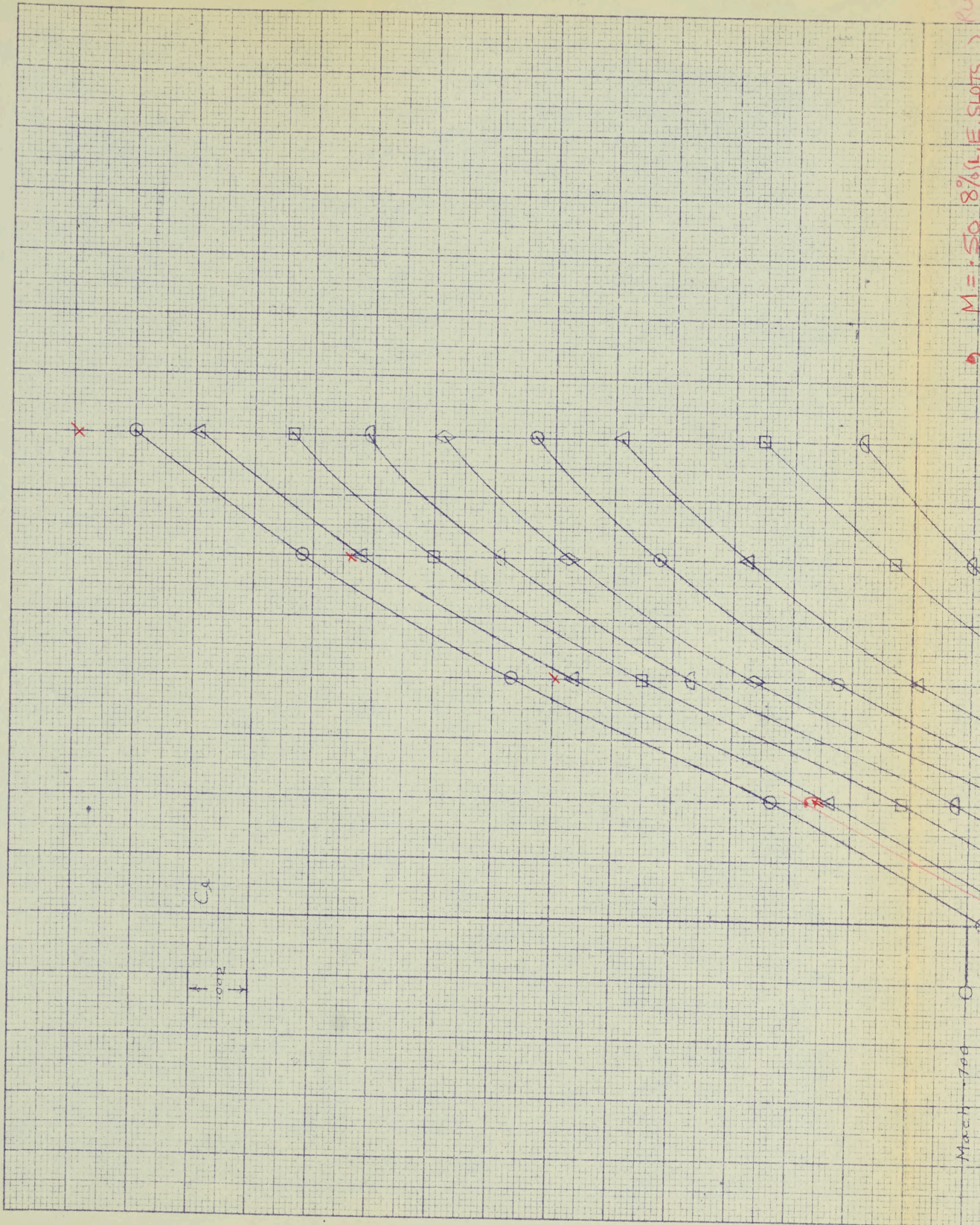
Sheet
~~Sheet~~
P/WT/20
6.V.54





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NON CLASSIFIE

339-11L KEUFFEL & ESSER CO.
10 X 10 1/2 inch, 50 lines/sq. inch
MADE IN U.S.A.



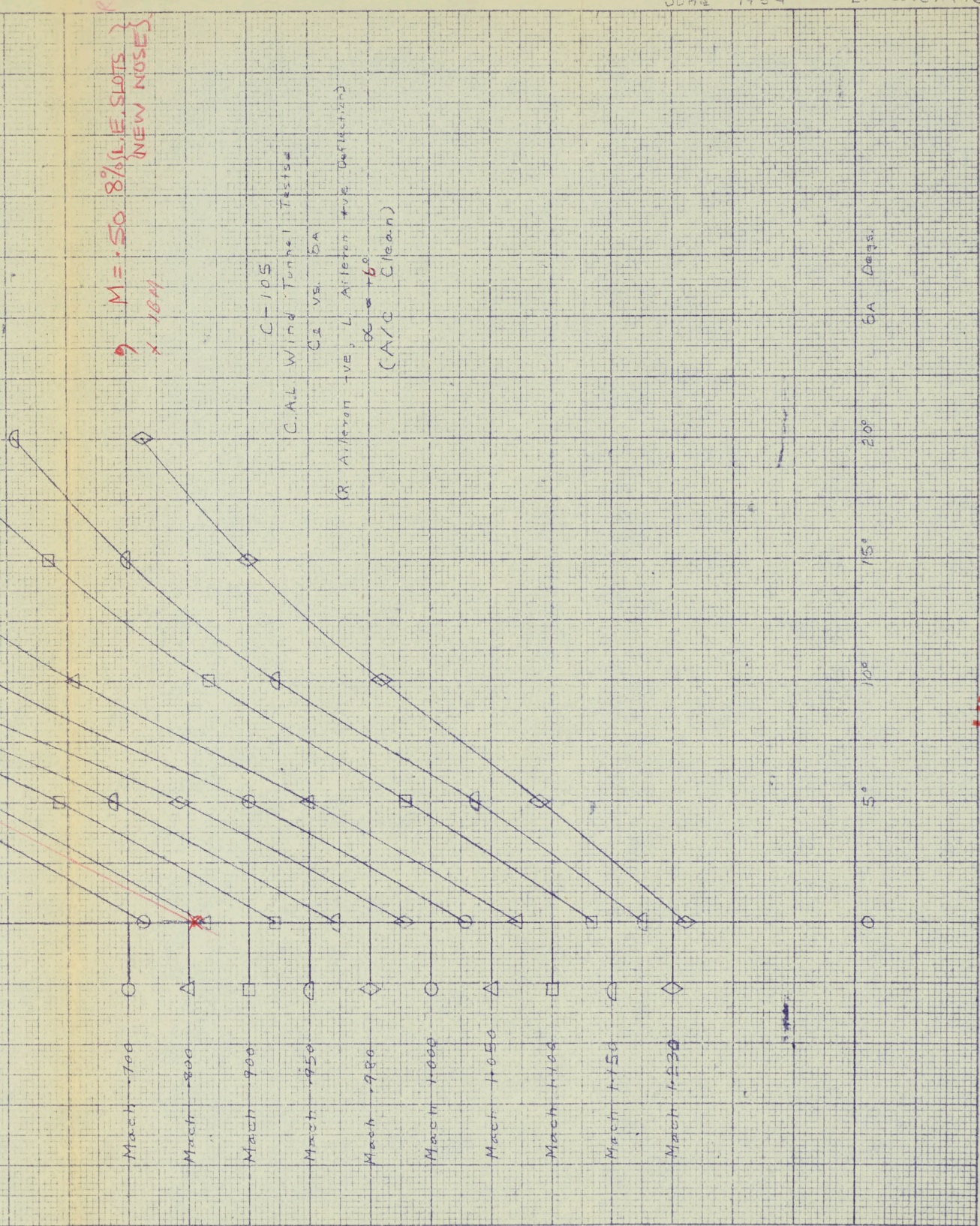
M = 50 8% (SLOTS) (KUM)

June 1954

L. Cutcliffe

M = 50 8% (L.E. SLOTS) (NEW NOSES)
X 1844

C-105
C.A.L. Wind Tunnel Tests
CI vs. CA
(R. Aileron -ve, L. Aileron +ve Deflection)
 $\alpha = +6^\circ$
(A/C Clean)



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NON CLASSIFIE

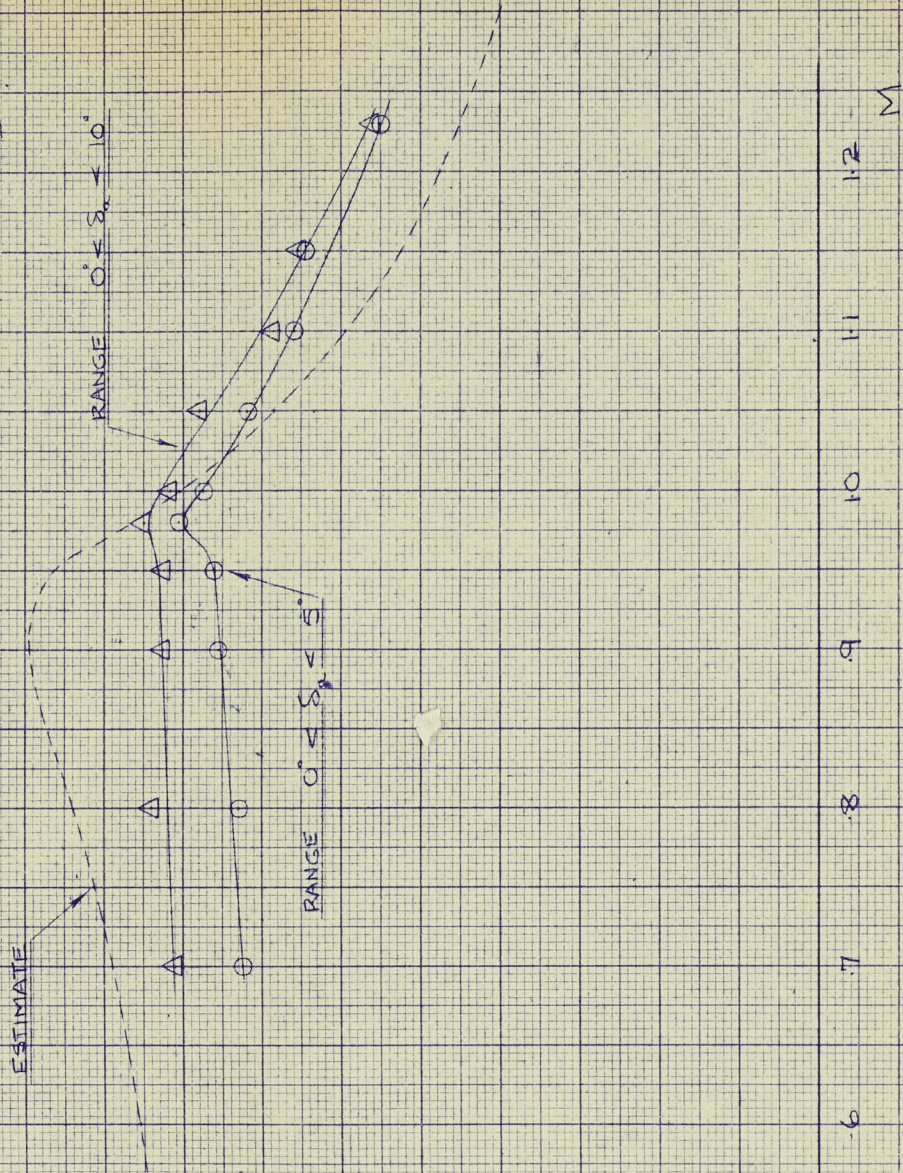
C-105
C.A.L. WIND TUNNEL TEST

$C_{L\alpha}$ vs M
 $\alpha = 2^\circ$

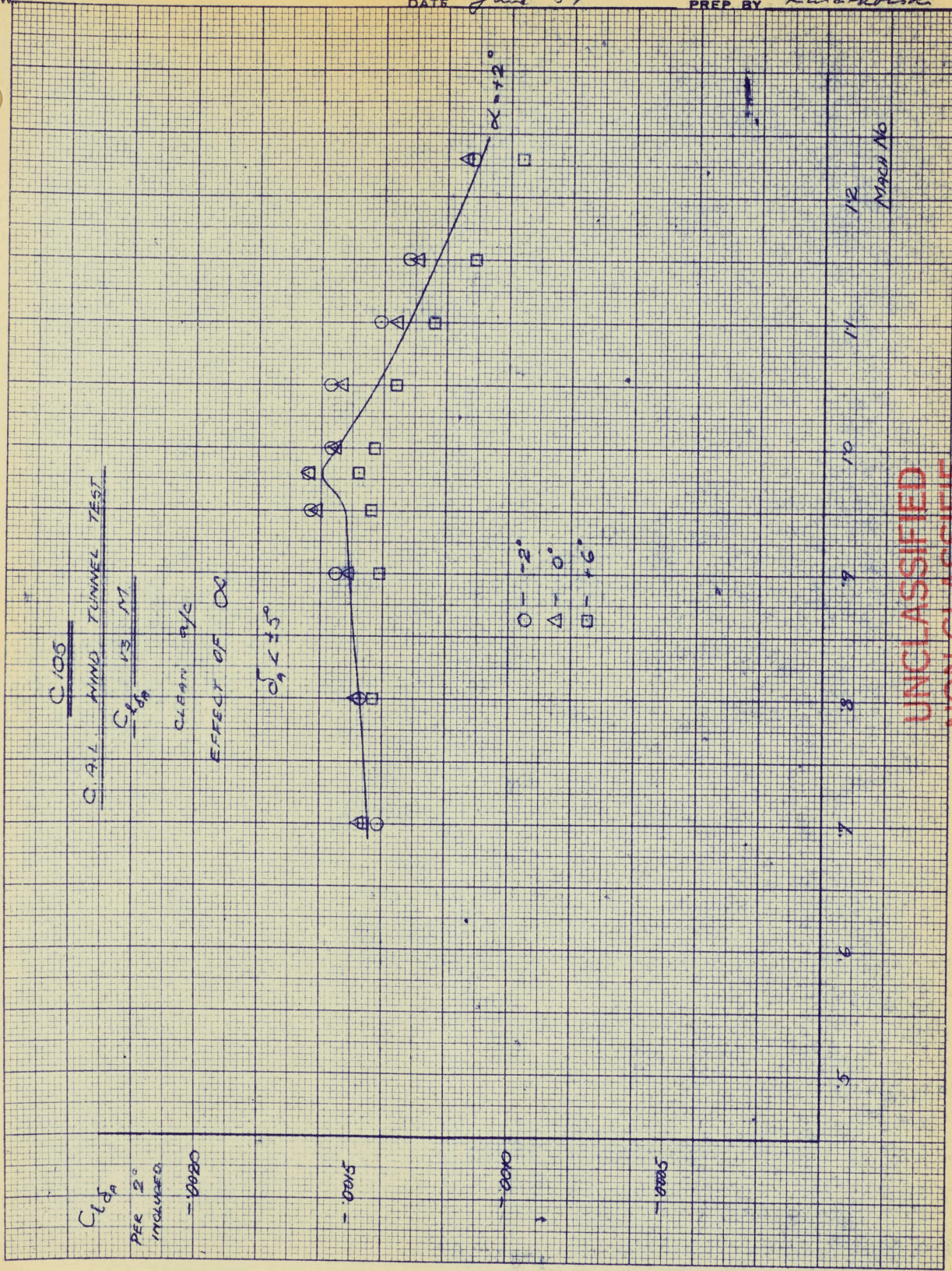
$C_{L\alpha}$
PER 2° DEG
INCLUDED

-0.002

-0.001



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NON CLASSIFIED

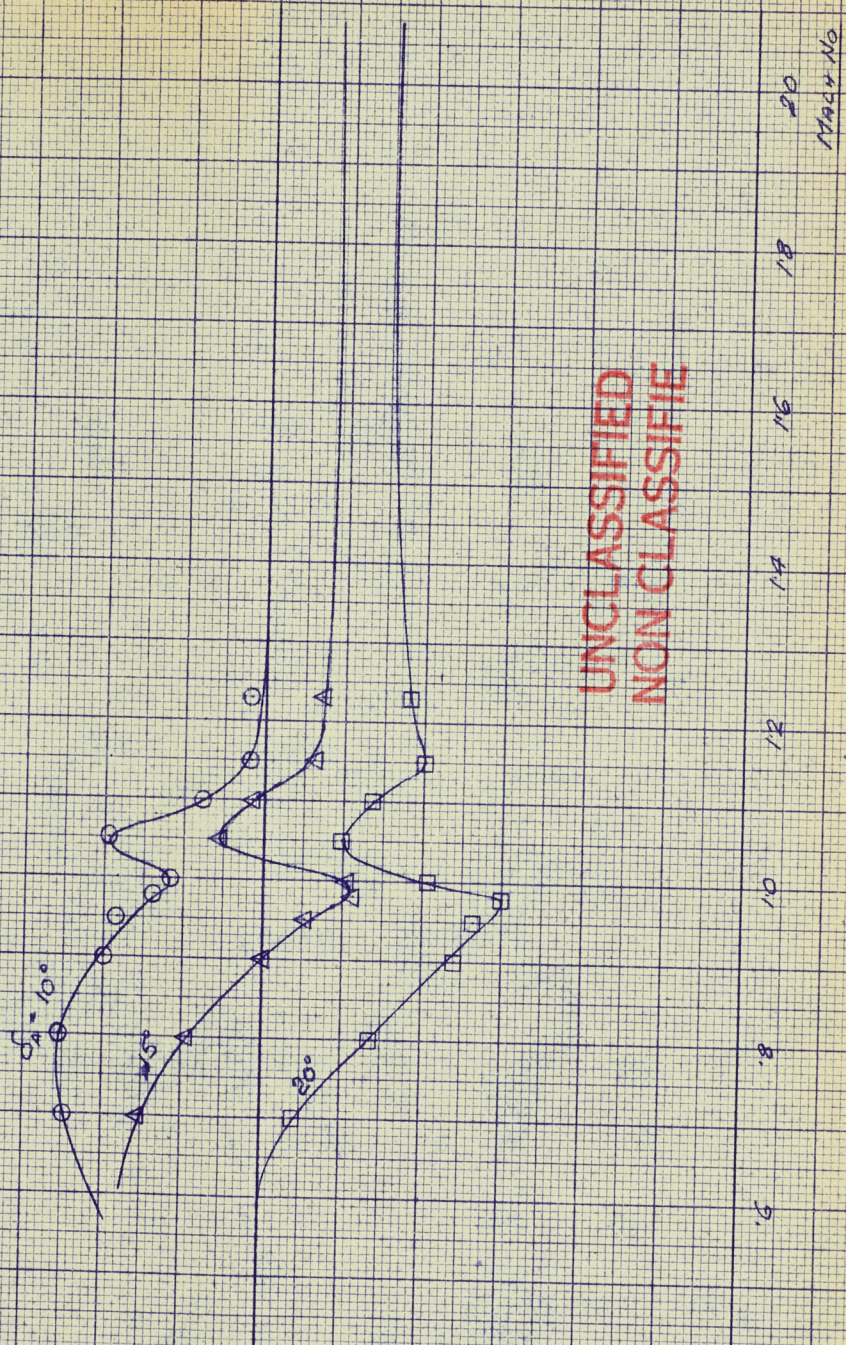
March No

459-12 KEUFFEL & ESSER CO.
10 x 10 to the 1/2 inch. 5th lines accounted.
MADE IN U.S.A.

399-12 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines recentered.
MADE IN U. S. A.

C105
CORNELL A.T. TESTS
NON-LINEARITY OF ROLLING EFFECTIVENESS
 $\alpha = 20^\circ$

$\frac{C_{L\beta}}{C_{L\beta}(\beta=0)}$
110%
100%
90%
50%

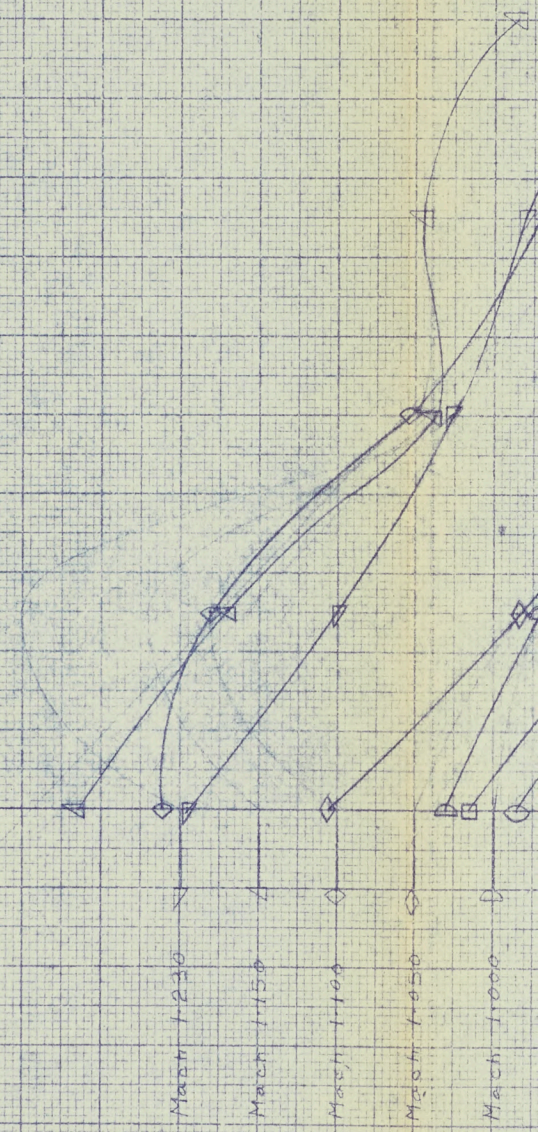


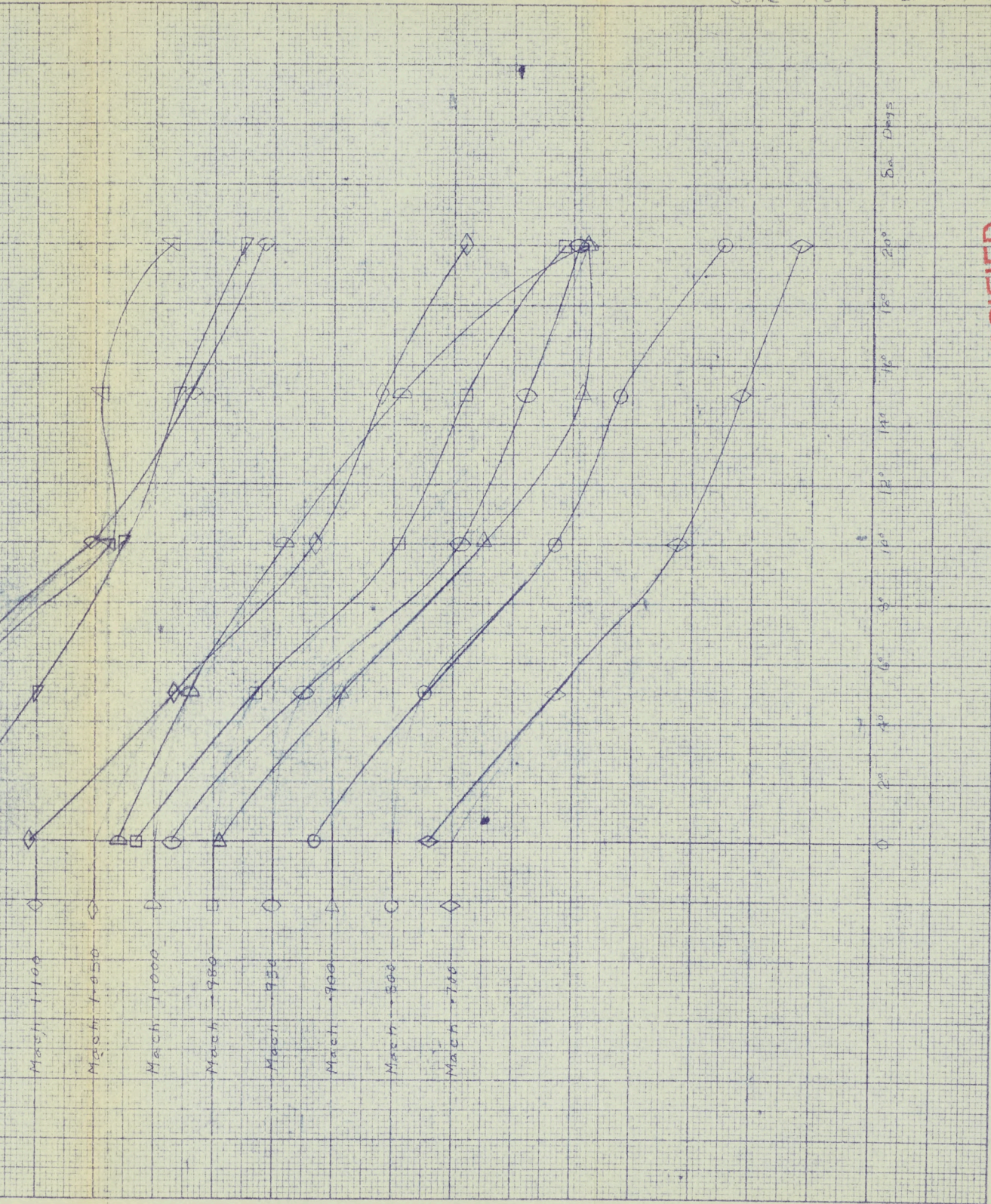
UNCLASSIFIED
NON CLASSIFIED

Mach No
20
18
16
14
12
10
8
6
4

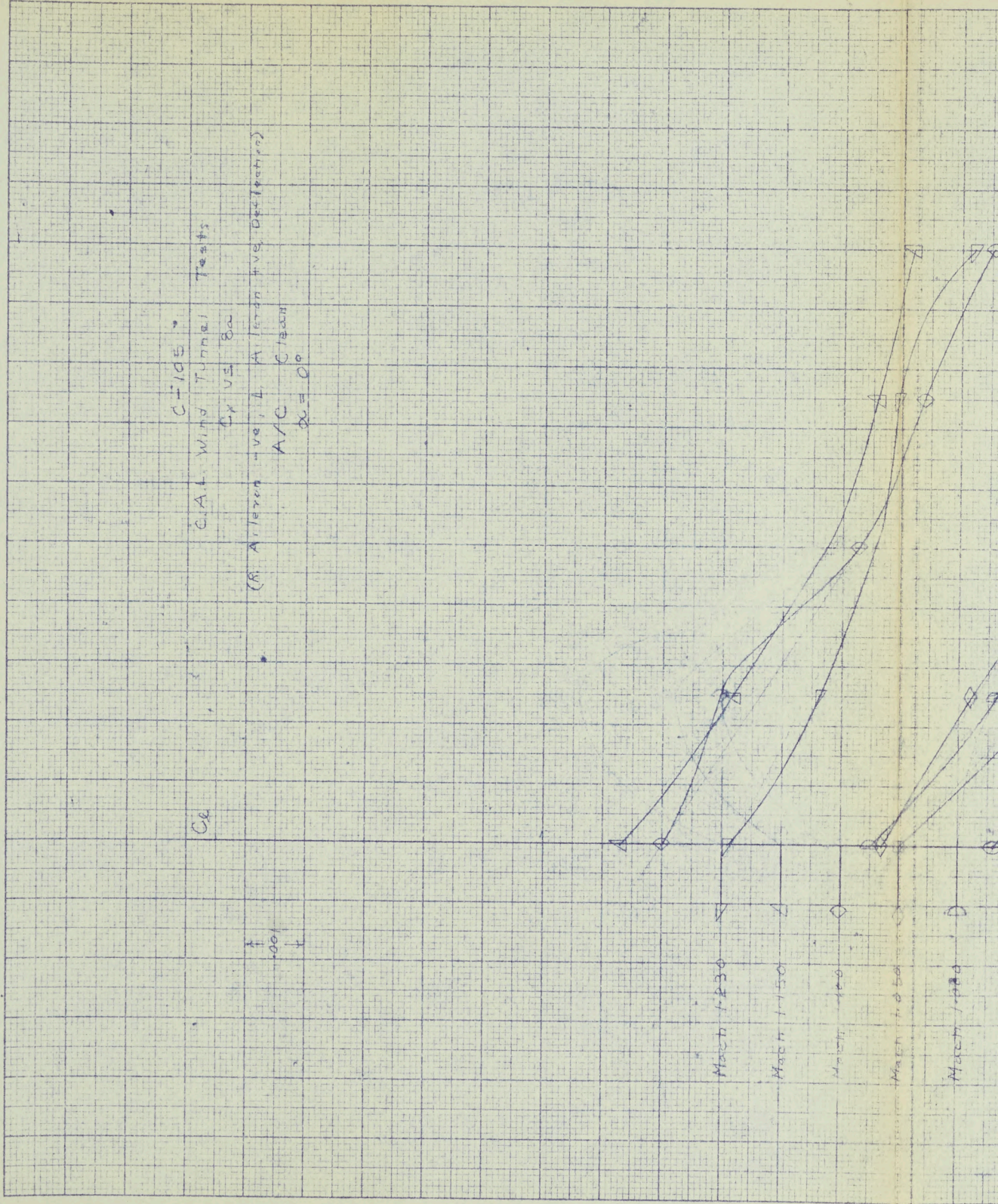
C-10E
Wind Tunnel Tests
Cx vs Ca
(B. Aileron + ve L. Aileron + ve Deflection)
AVG $\frac{S}{S_{ref}}$
 $\alpha = 20^\circ$

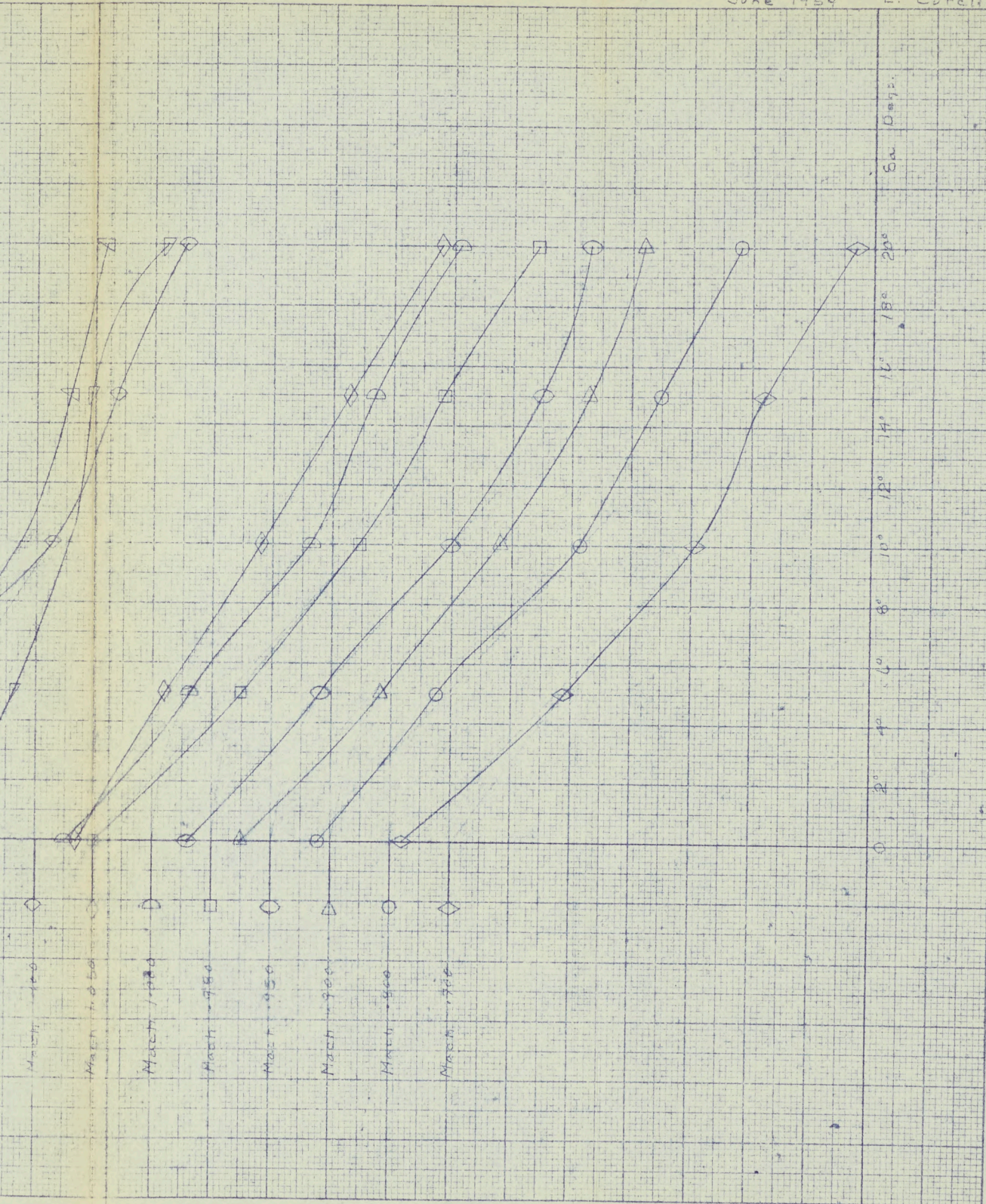
Ce
↑
↓



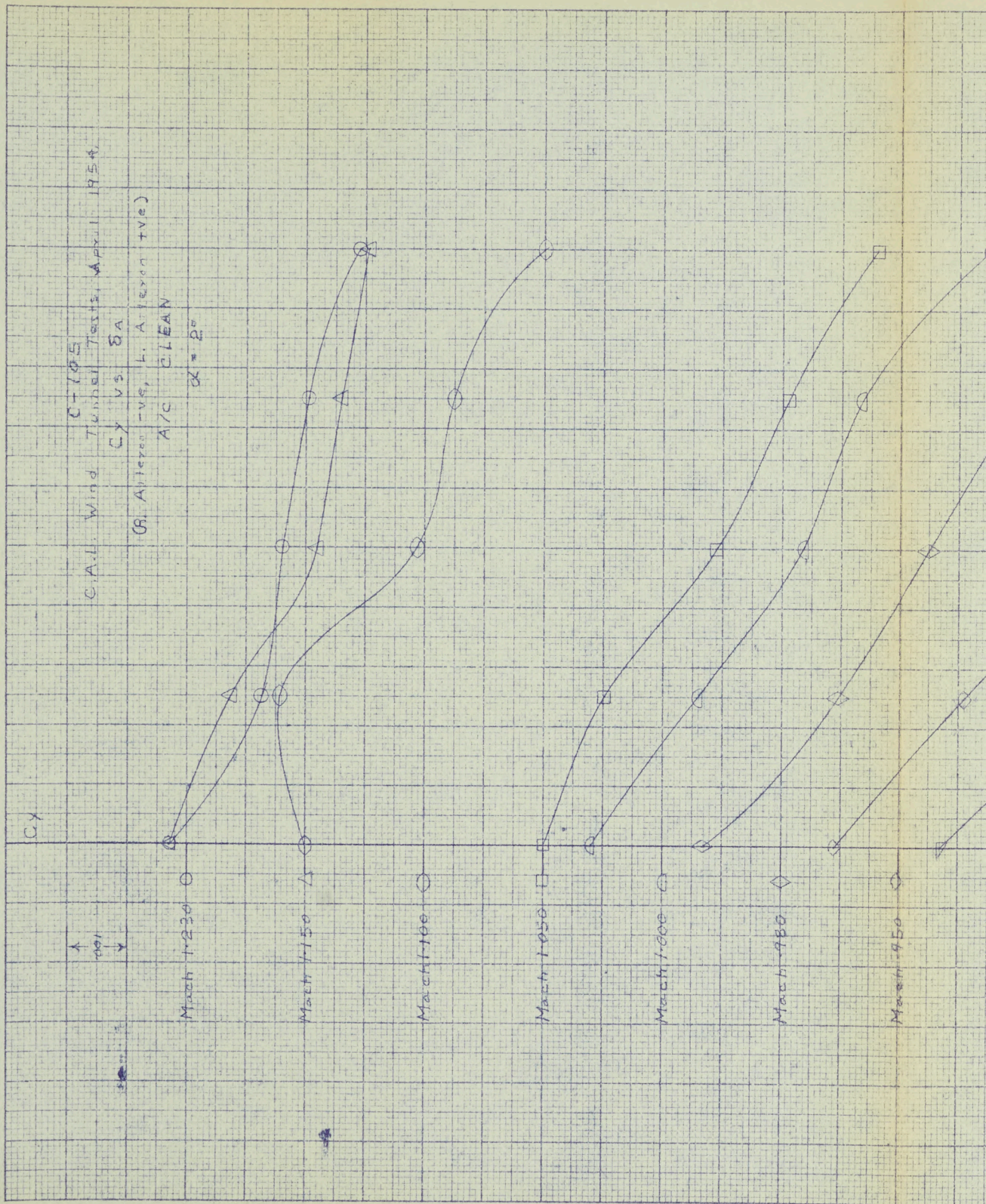


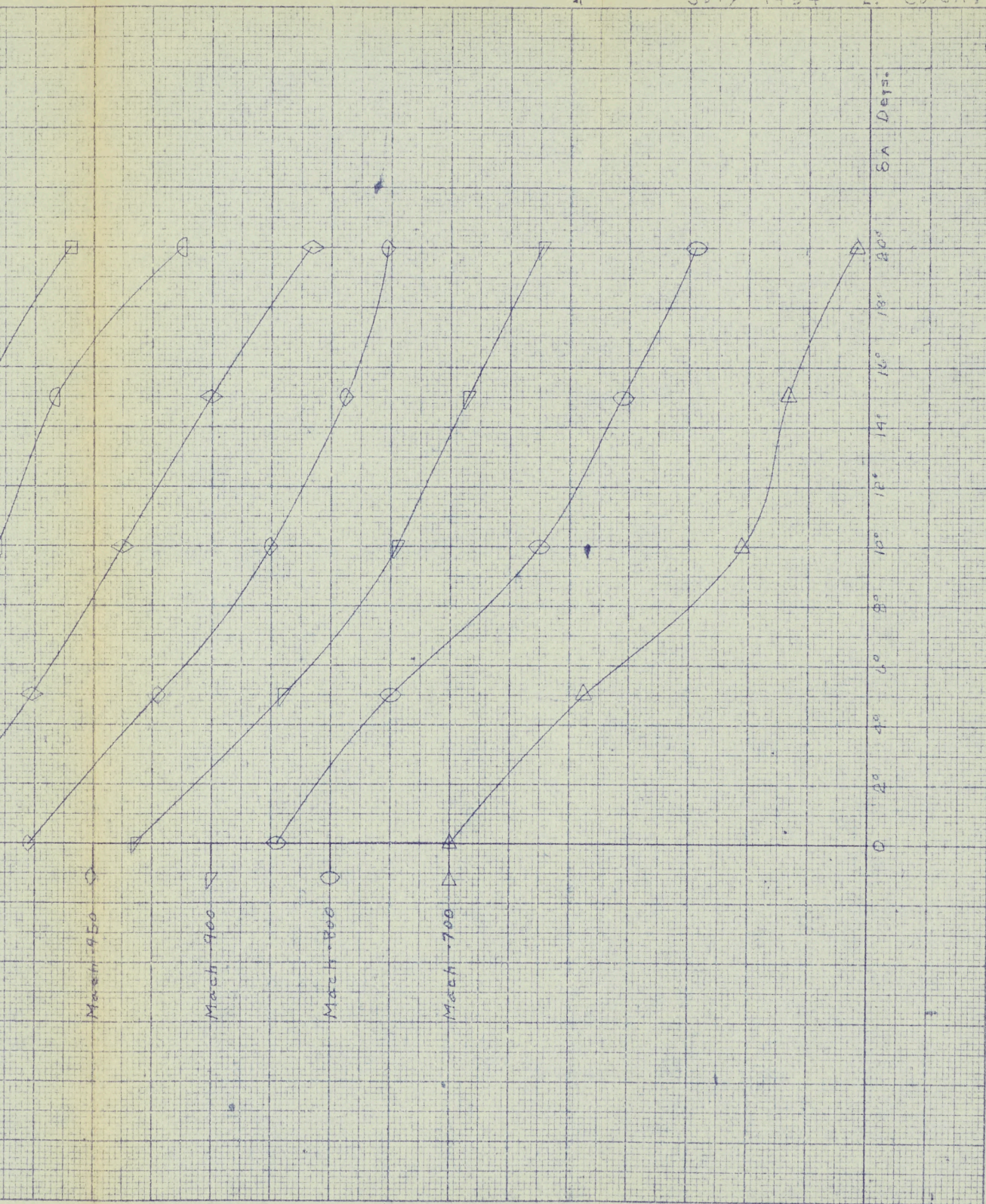
UNCLASSIFIED
NON CLASSIFIE





UNCLASSIFIED
NON CLASSIFIE

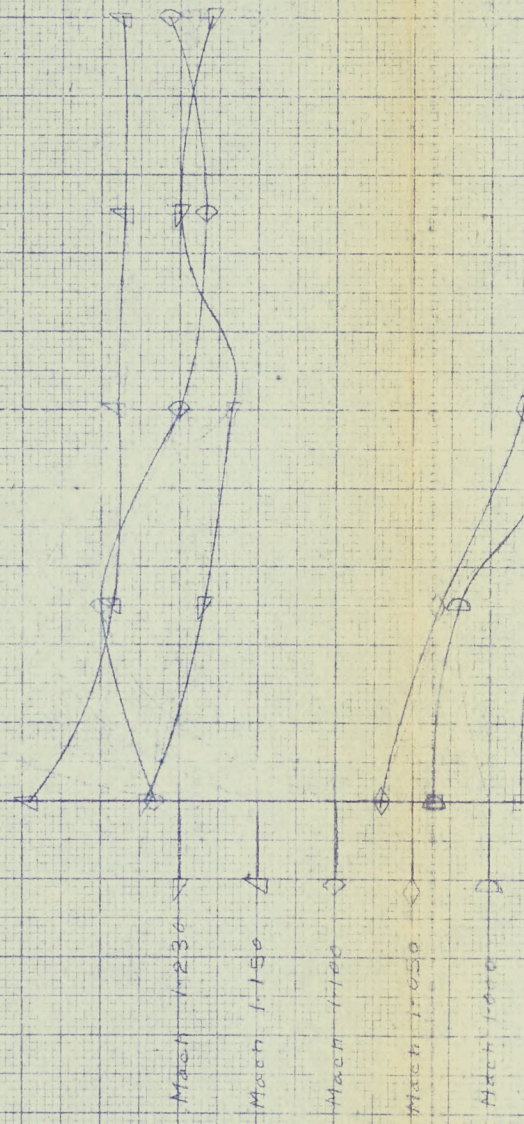


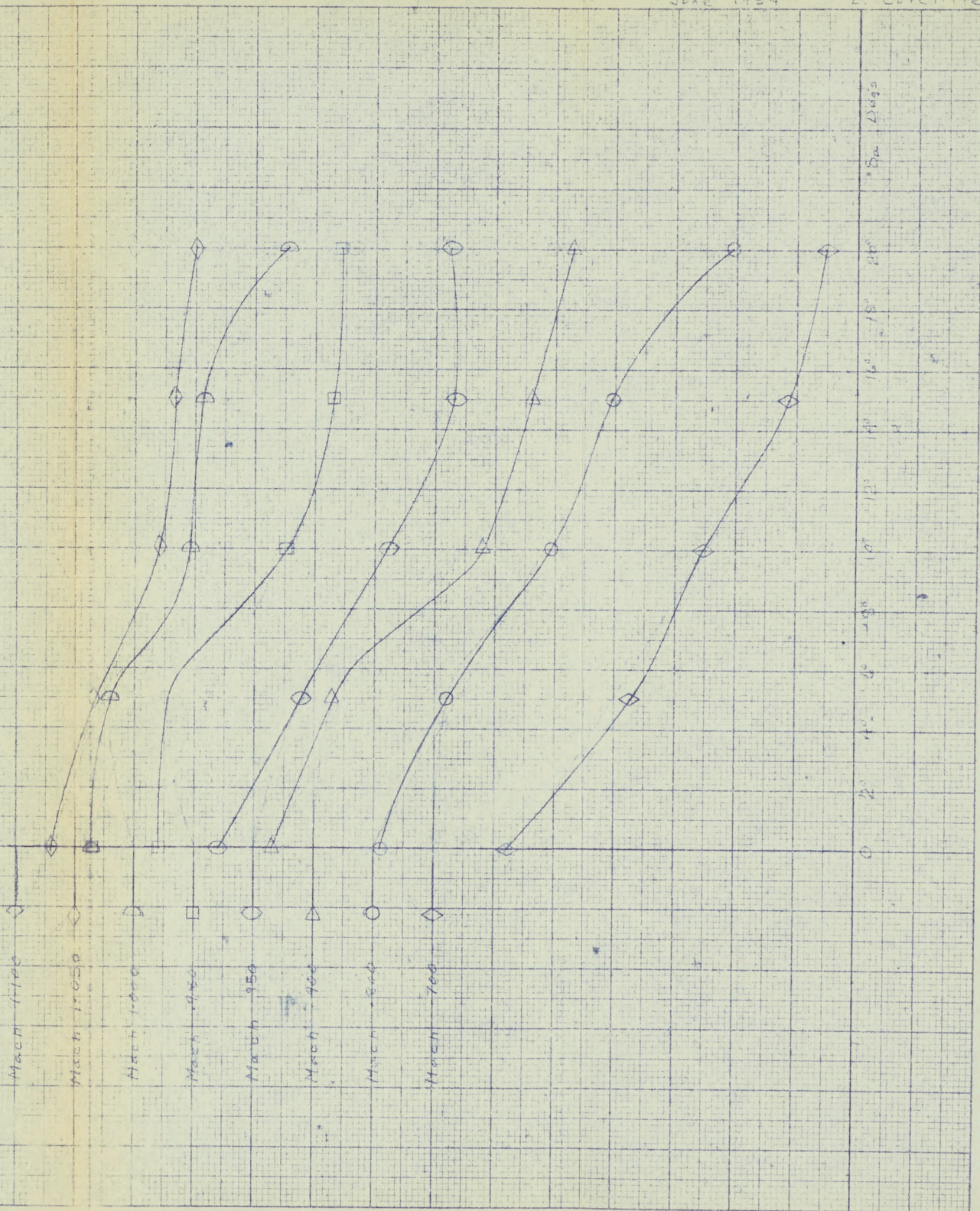


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NON CLASSIFIE

C-105
 C.A.L. Wind Tunnel Tests
 CX vs. SW
 (R. A. Lewis - ve. I. A. Lewis Ave. Distribution)
 AVE. SPEED
 CX = 6

CX





UNCLASSIFIED
NON CLASSIFIED

C/105
C. A. L. WIND TUNNEL TESTS
APRIL 54

CYCLE VS MACH No
 $-10 \leq \alpha \leq +10^\circ$

C/105
PER 2" INCL.

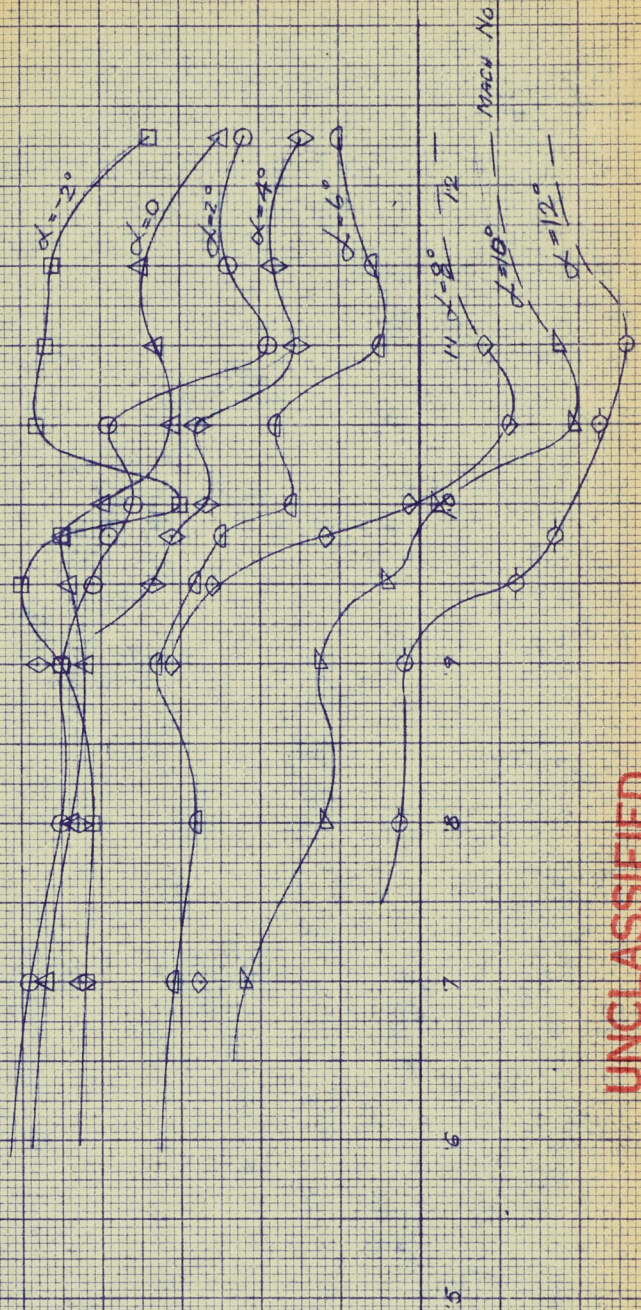
9000

4000

3000

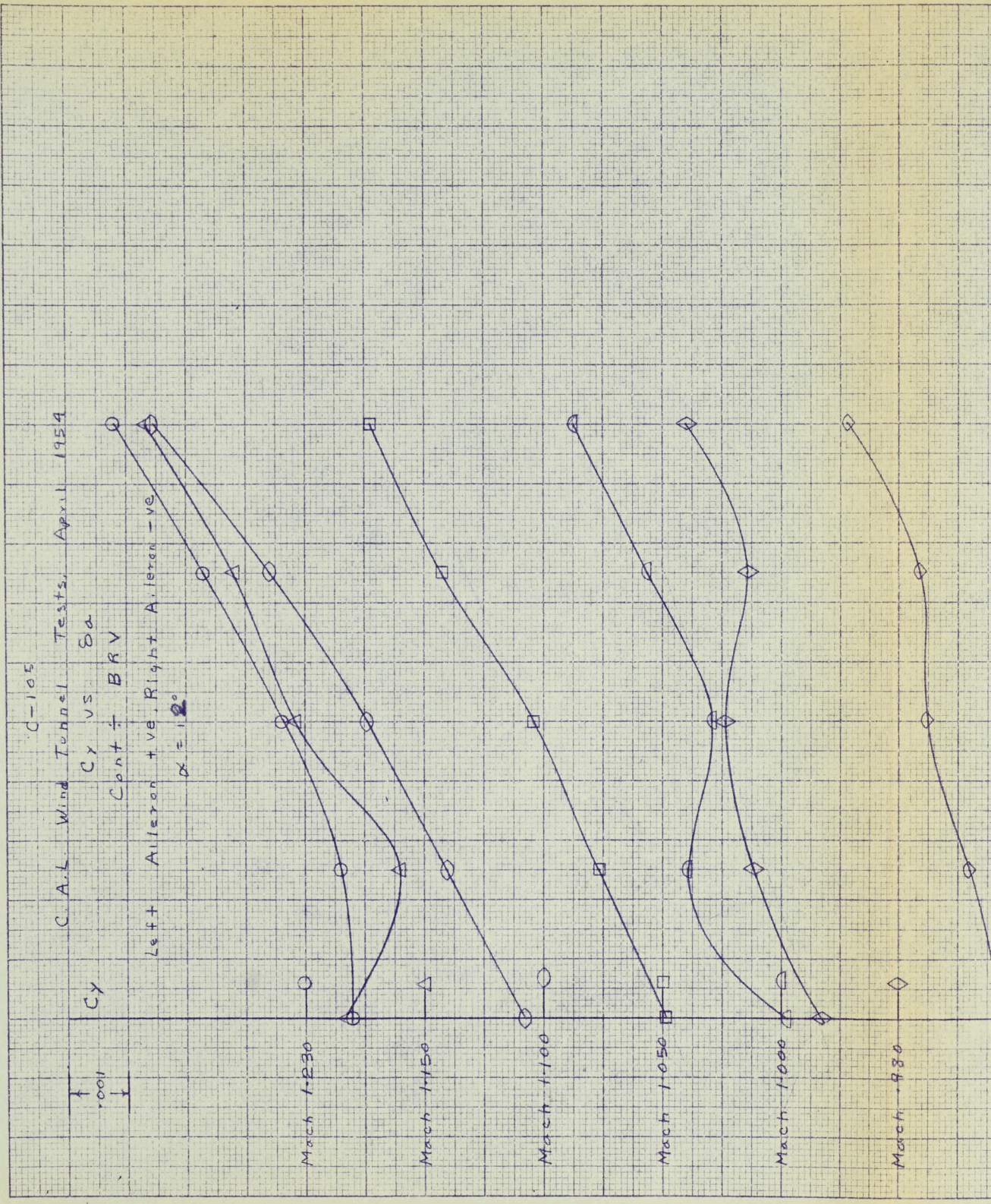
0

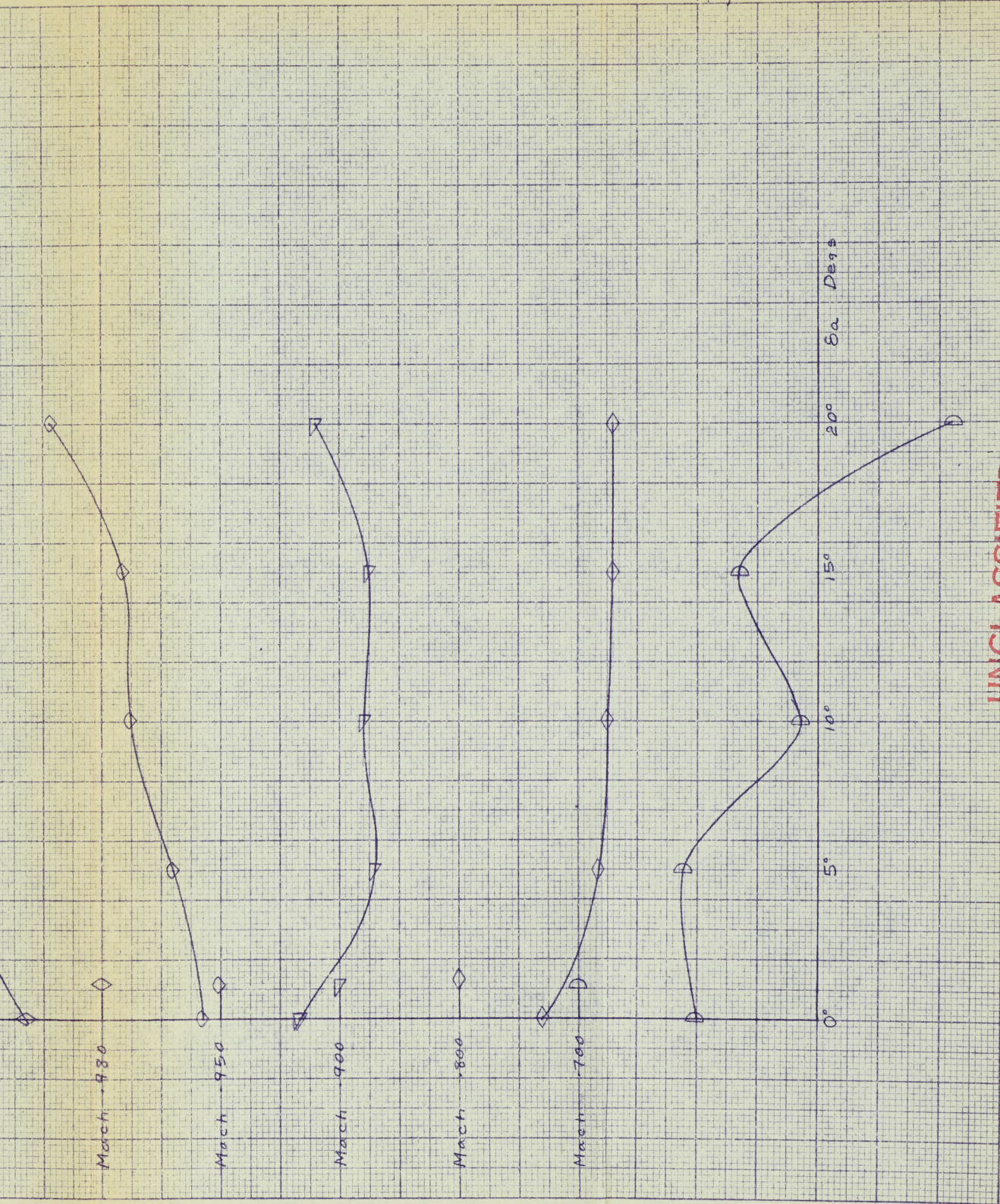
5000



P/W.T./20 2.35.
July 9/54 Kuznetsov

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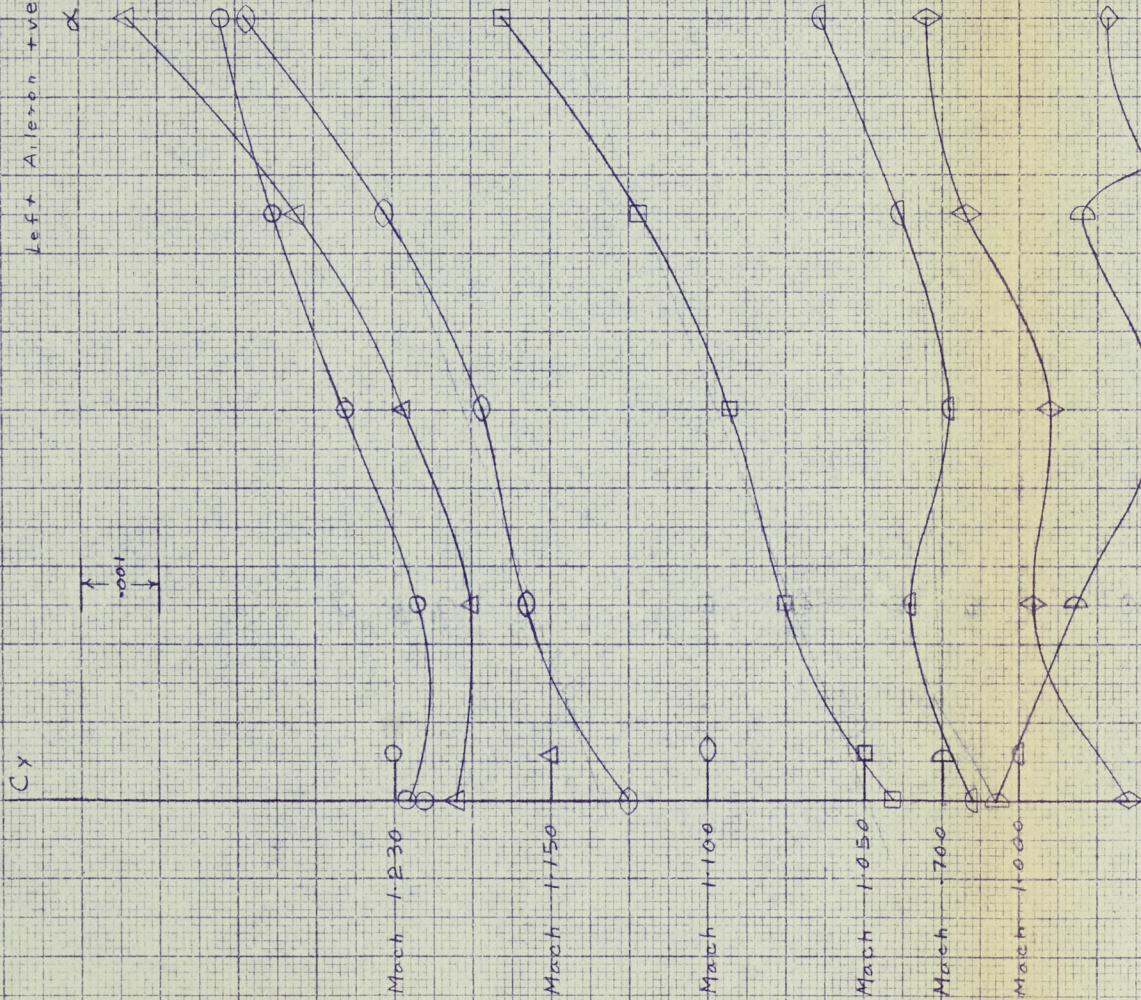
UNCLASSIFIED
NON CLASSIFIE

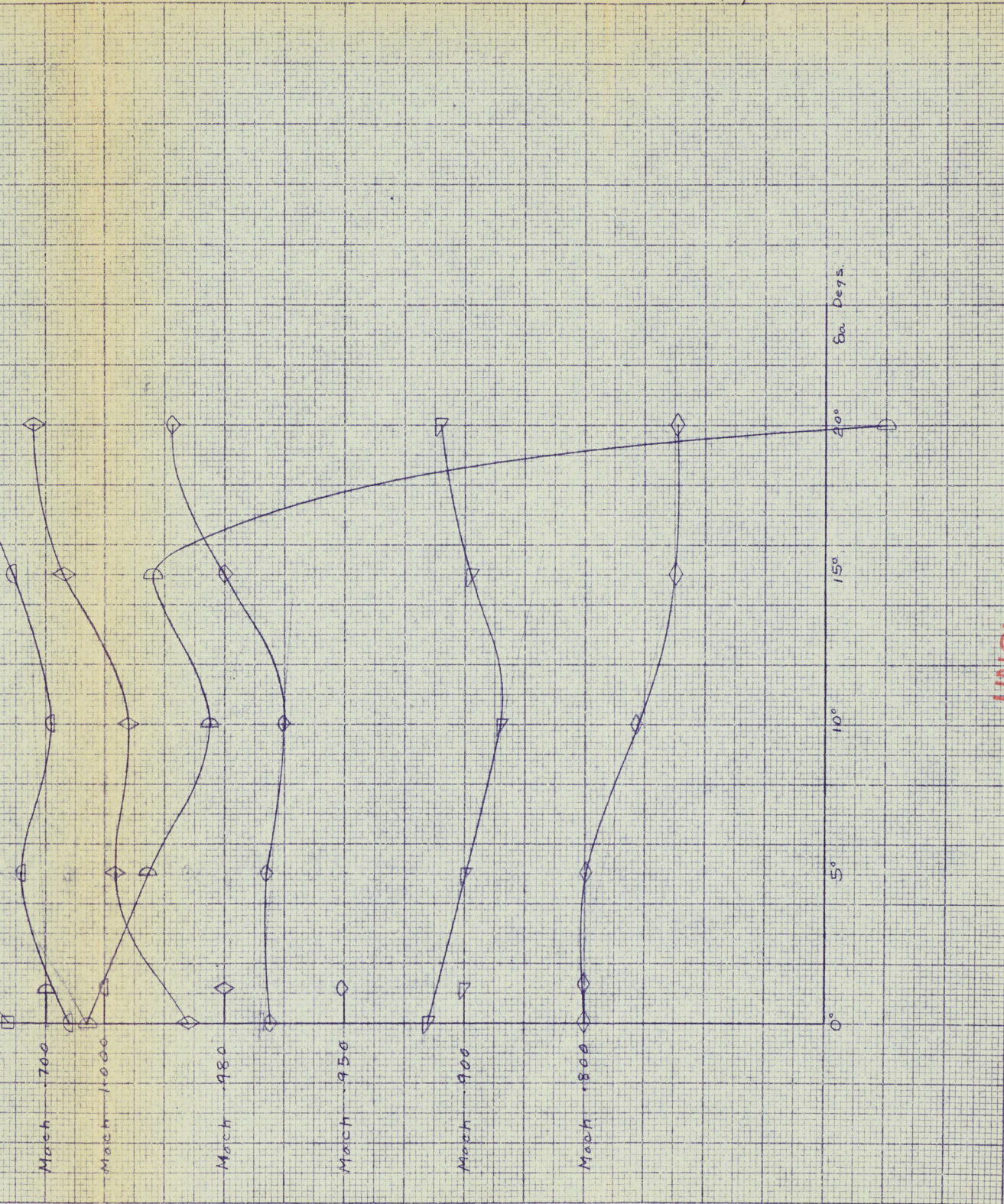
C-105
C.A.L. Wind Tunnel Tests, Apr. 1, 1954

Cy vs. δ_a
Cont. - B RV

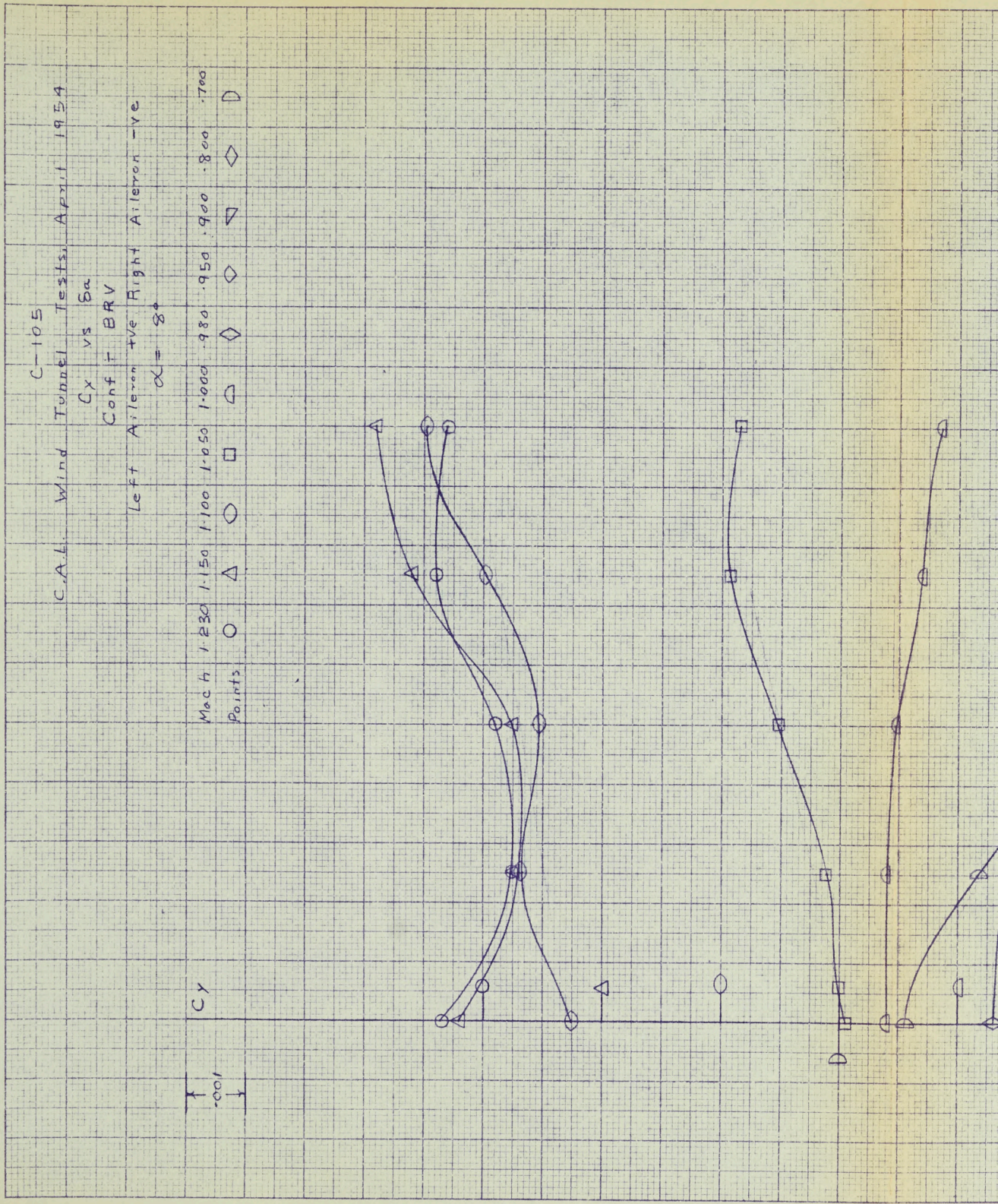
Left Aileron +ve, Right Aileron -ve

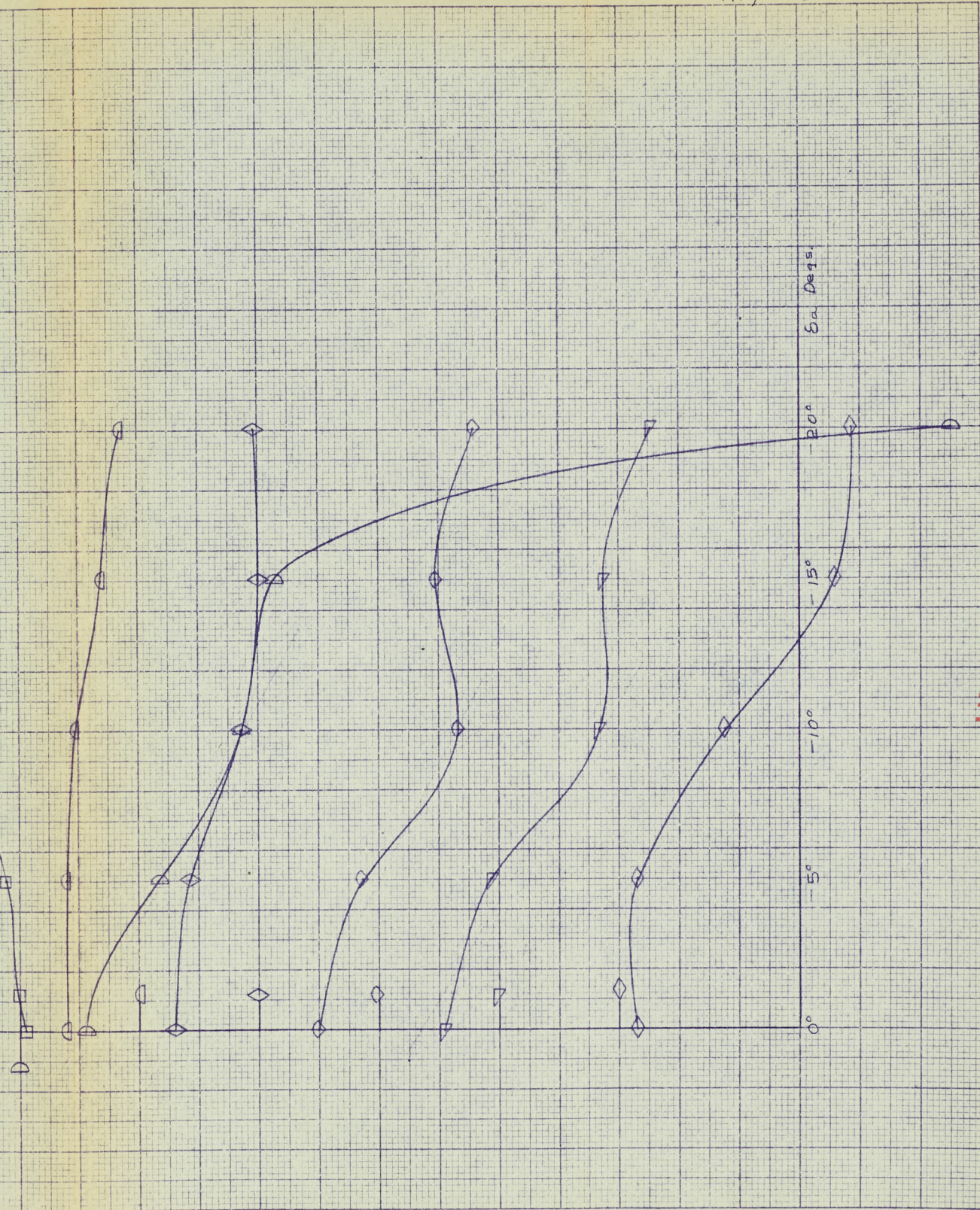
$\alpha = 10^\circ$





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CAL Wind Tunnel Tests, April 1954

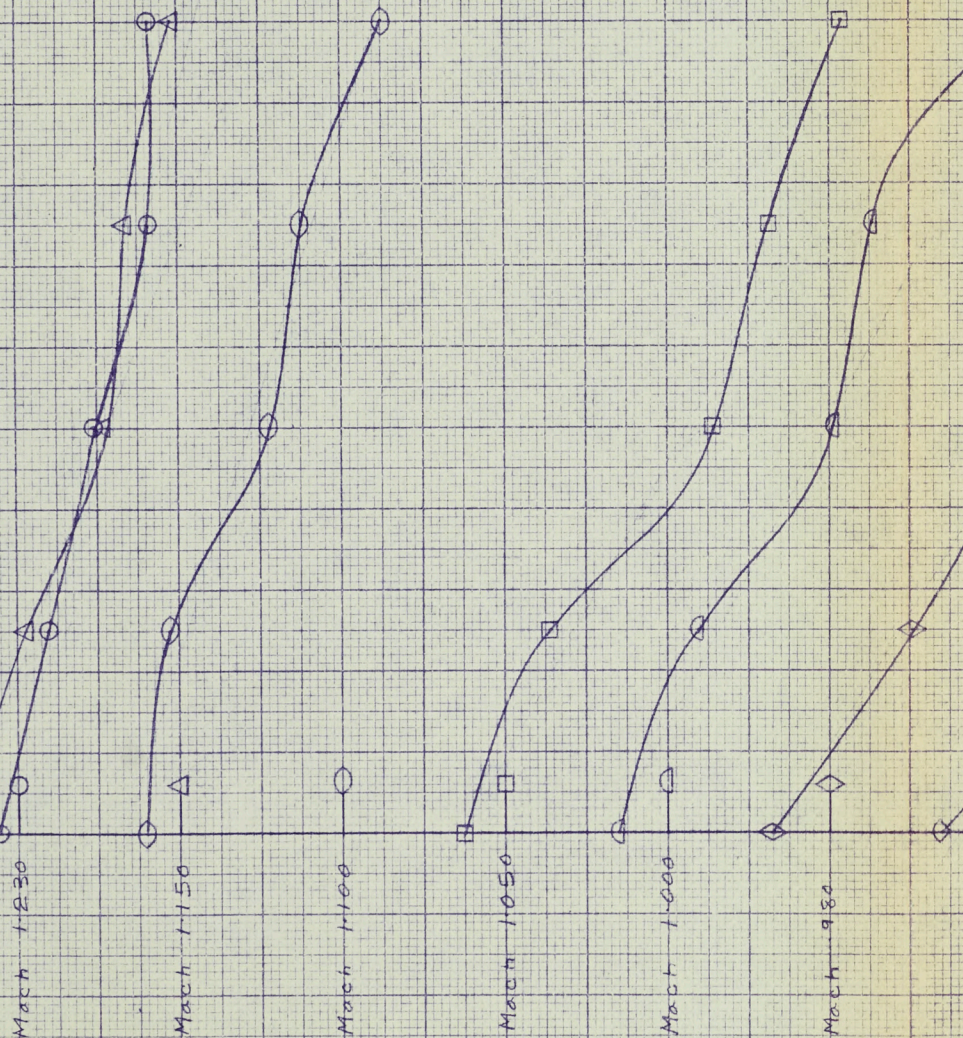
C-105

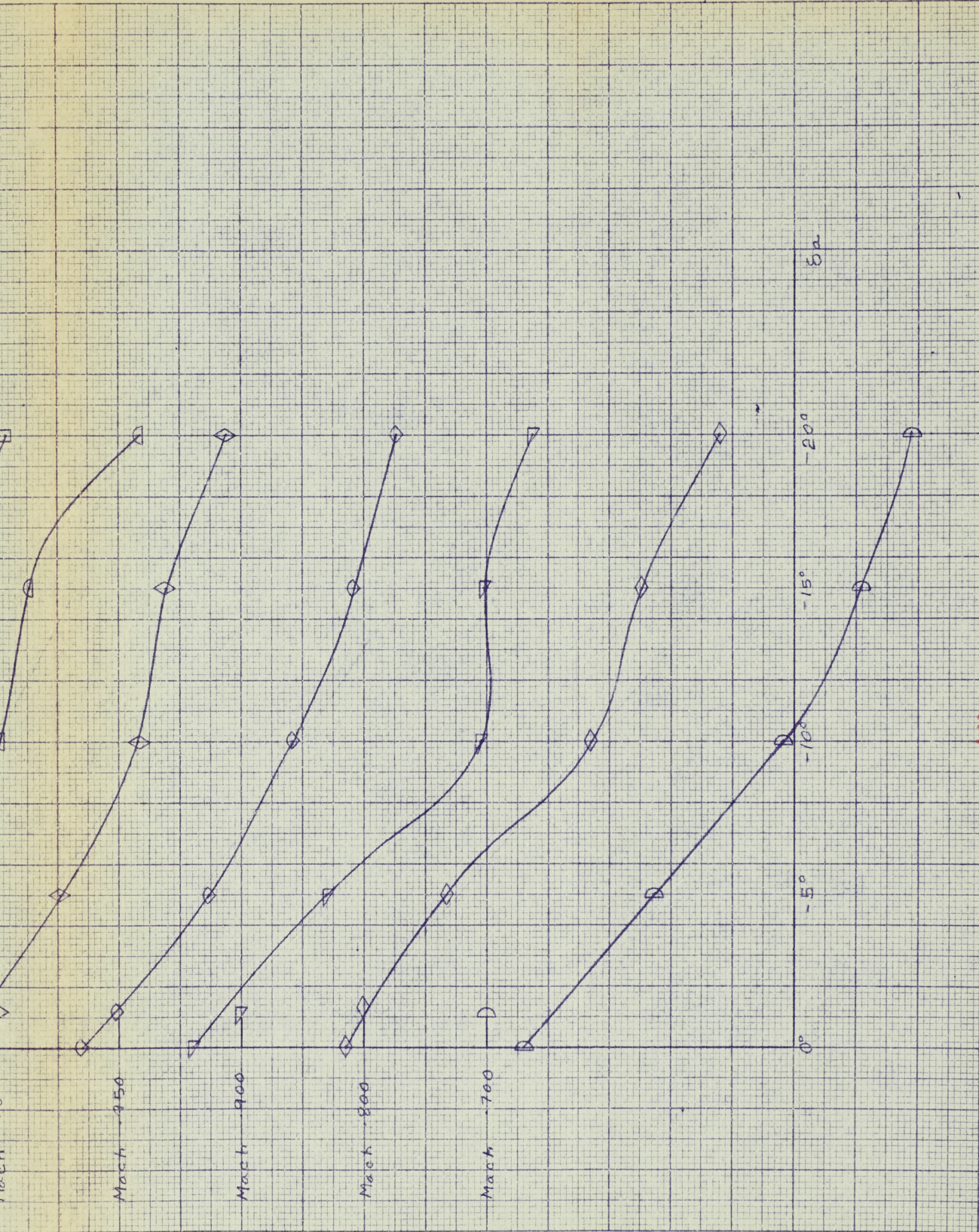
Cx vs. α
 Conf $\frac{1}{2}$ BRV

Left Aileron +ve, Right Aileron -ve
 $\alpha = 4^\circ$

\uparrow
 -0.01
 \downarrow

Cx





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C-1015
CoAlt. Wind Tunnel Tests
Cw vs BR
AVG Clean
 $\alpha = -20^\circ$

X
1001
Y

CN

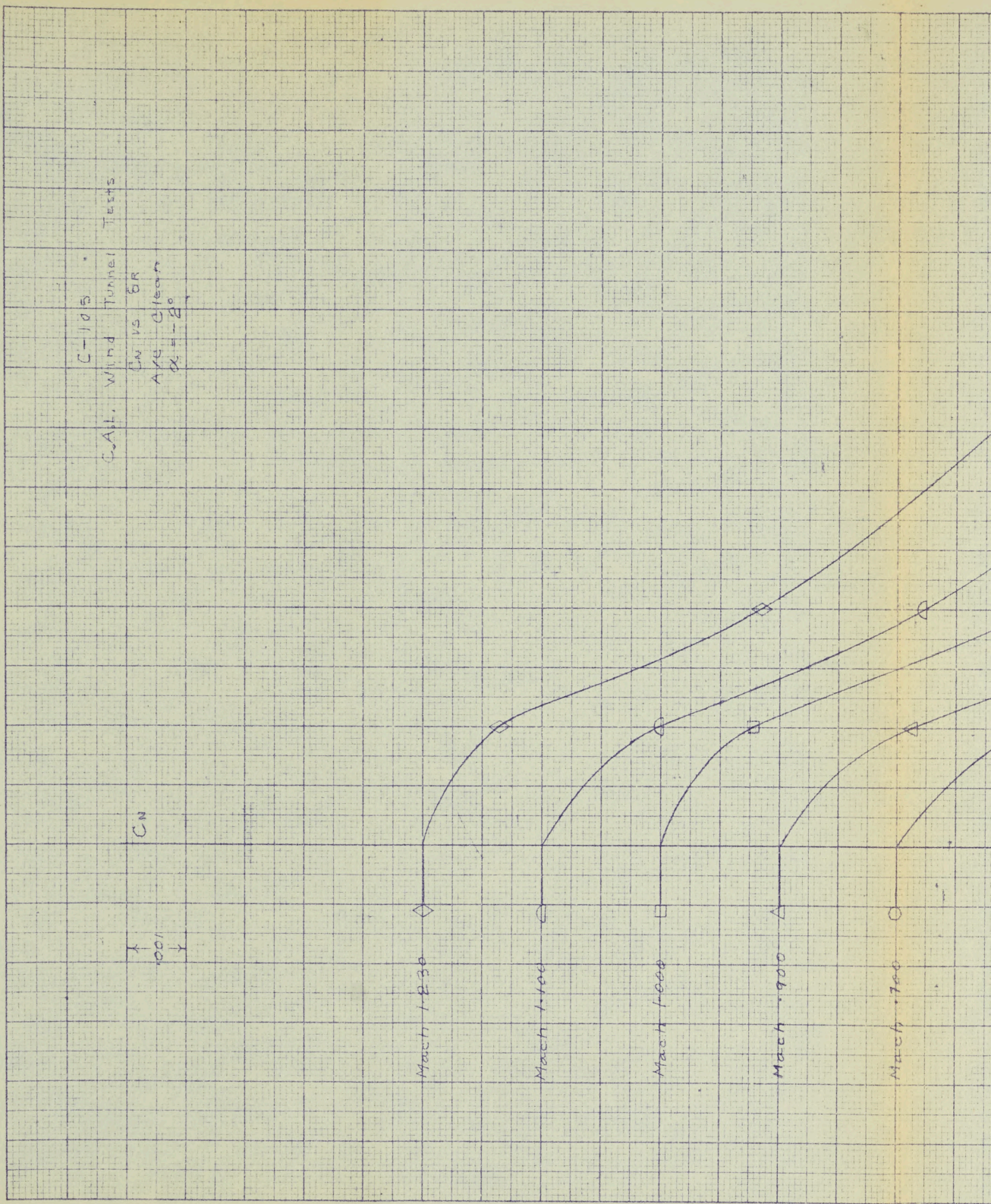
Mach 1.230

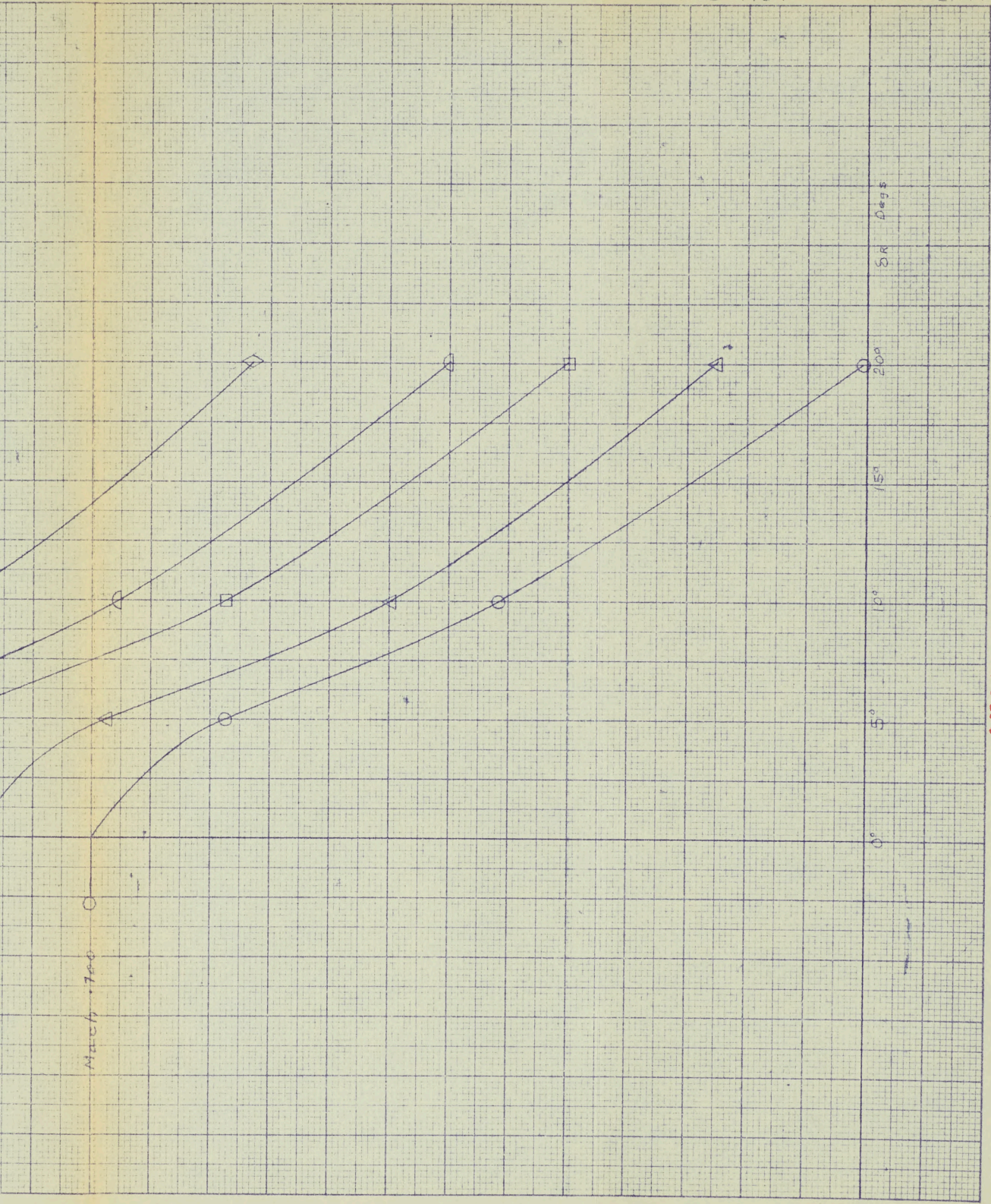
Mach 1.166

Mach 1.066

Mach .900

Mach .760





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P/WT/20
~~Exhibit~~ 4 V 54

C-103

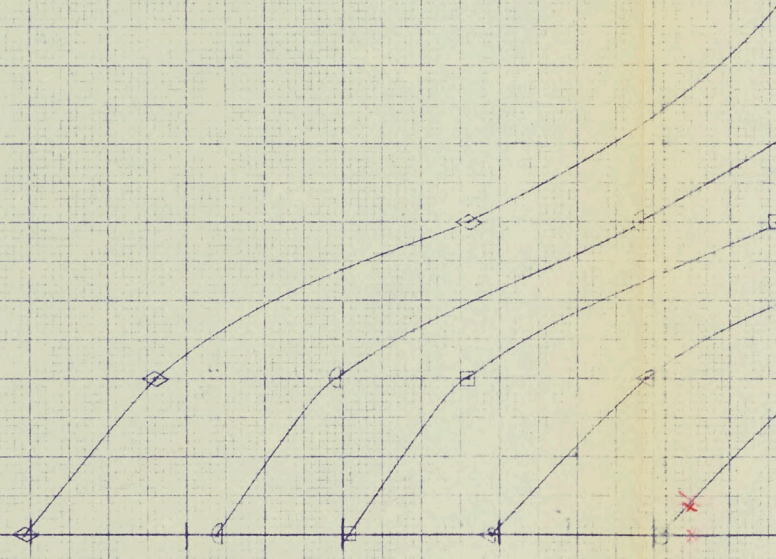
CAL WIND TUNNEL TESTS

C_N vs δ_R

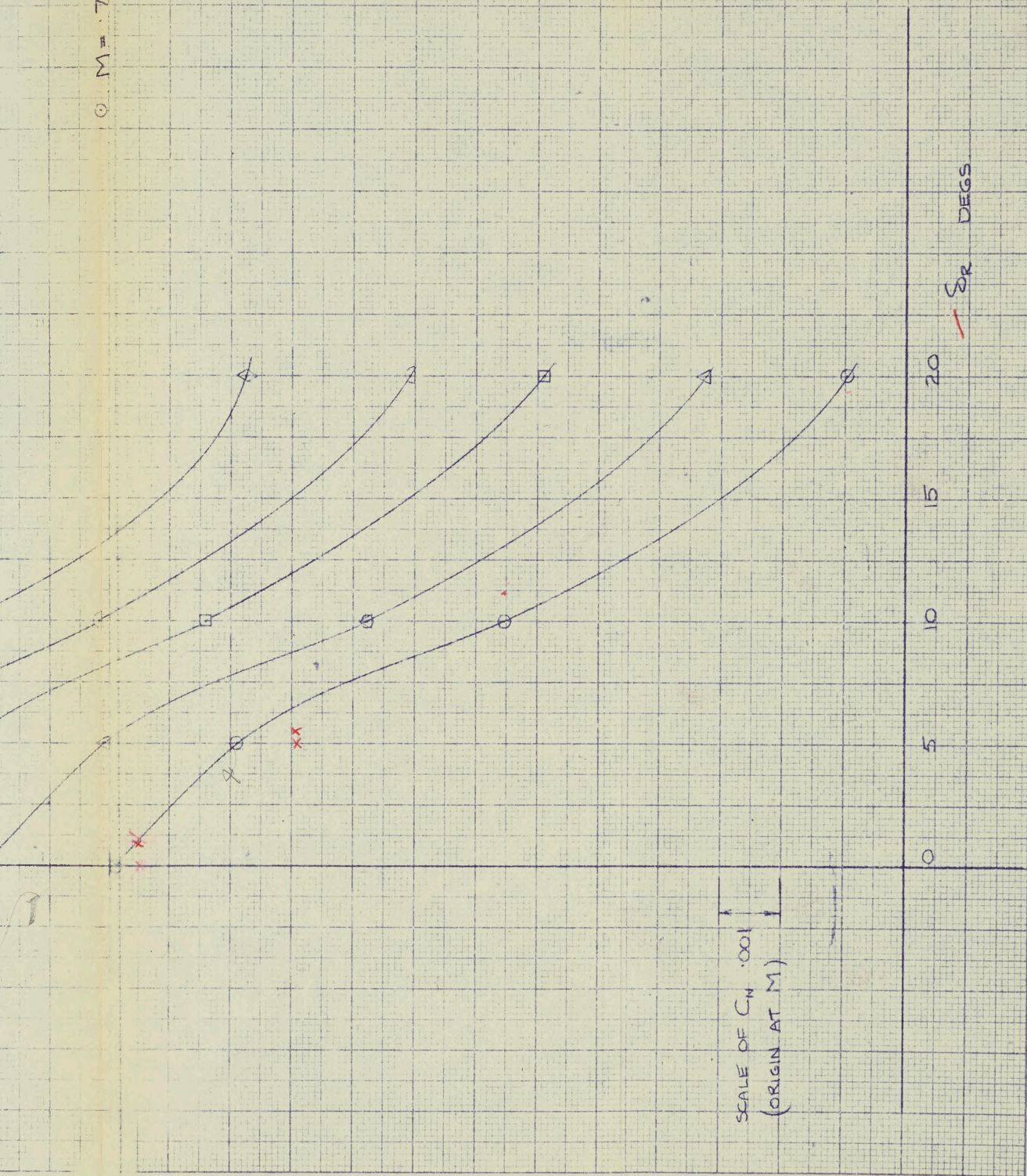
α = 0

C_N

- ◇ M = 1.23
- M = 1.10
- M = 1.00
- △ M = .90
- ⊙ M = .70



© M = .70



SCALE OF $C_w \cdot 1000$
(ORIGIN AT M)

δ_r DEGS

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P/WT/20
 Experiment 28 IV 54

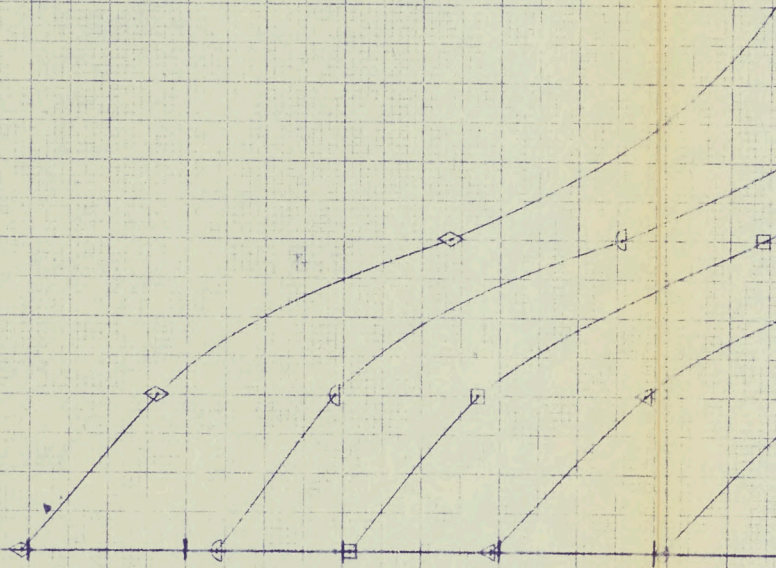
C-105

CAL WIND TUNNEL TESTS

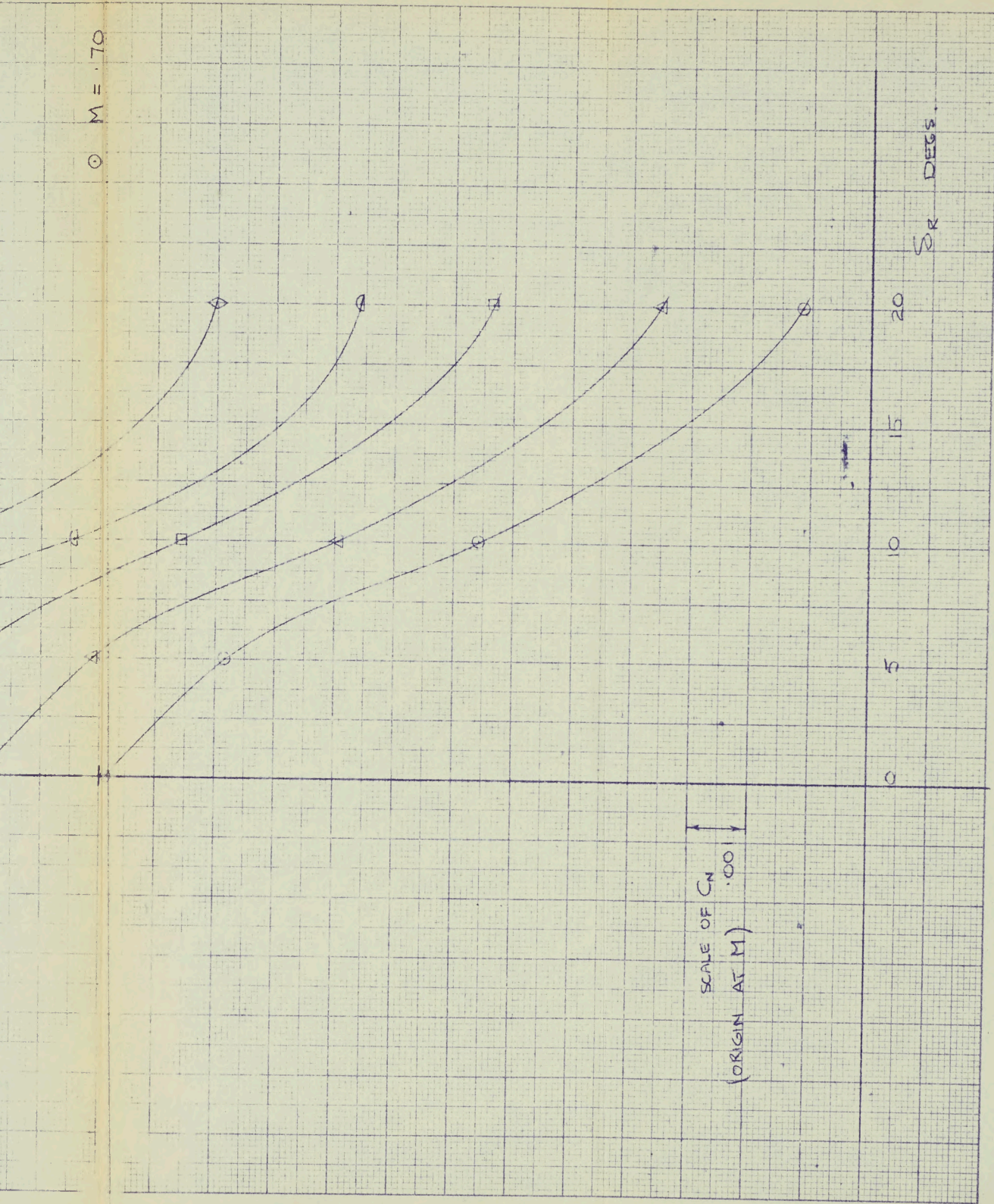
C_R vs S_k

$\alpha = 2$

- ◇ M = 1.23
- ◻ M = 1.10
- ◻ M = 1.00
- △ M = .90
- ⊙ M = .70



○ M = .70



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P/WF/20

Edward 4-V-5A

C-105

CAL WIND TUNNEL TESTS

C_N vs S_R

$\alpha = 6$

C_N

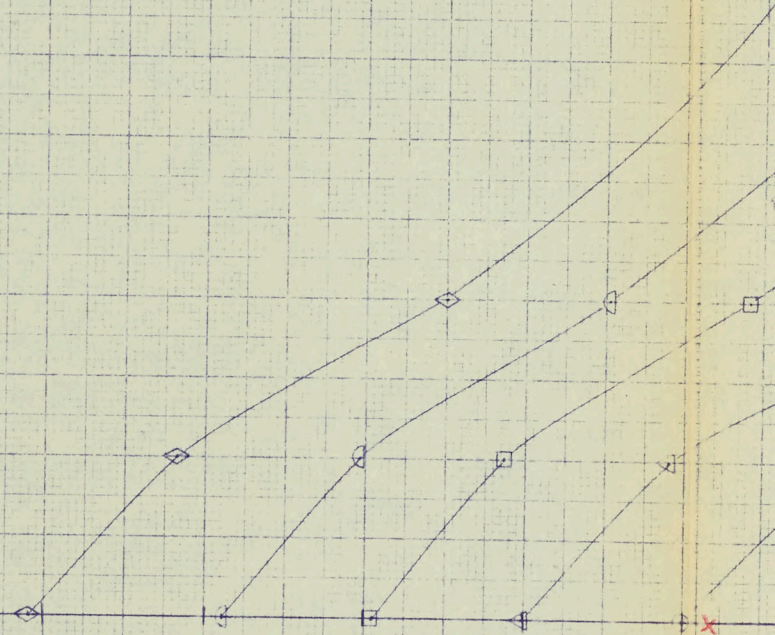
◇ $M = 1.23$

⊙ $M = 1.10$

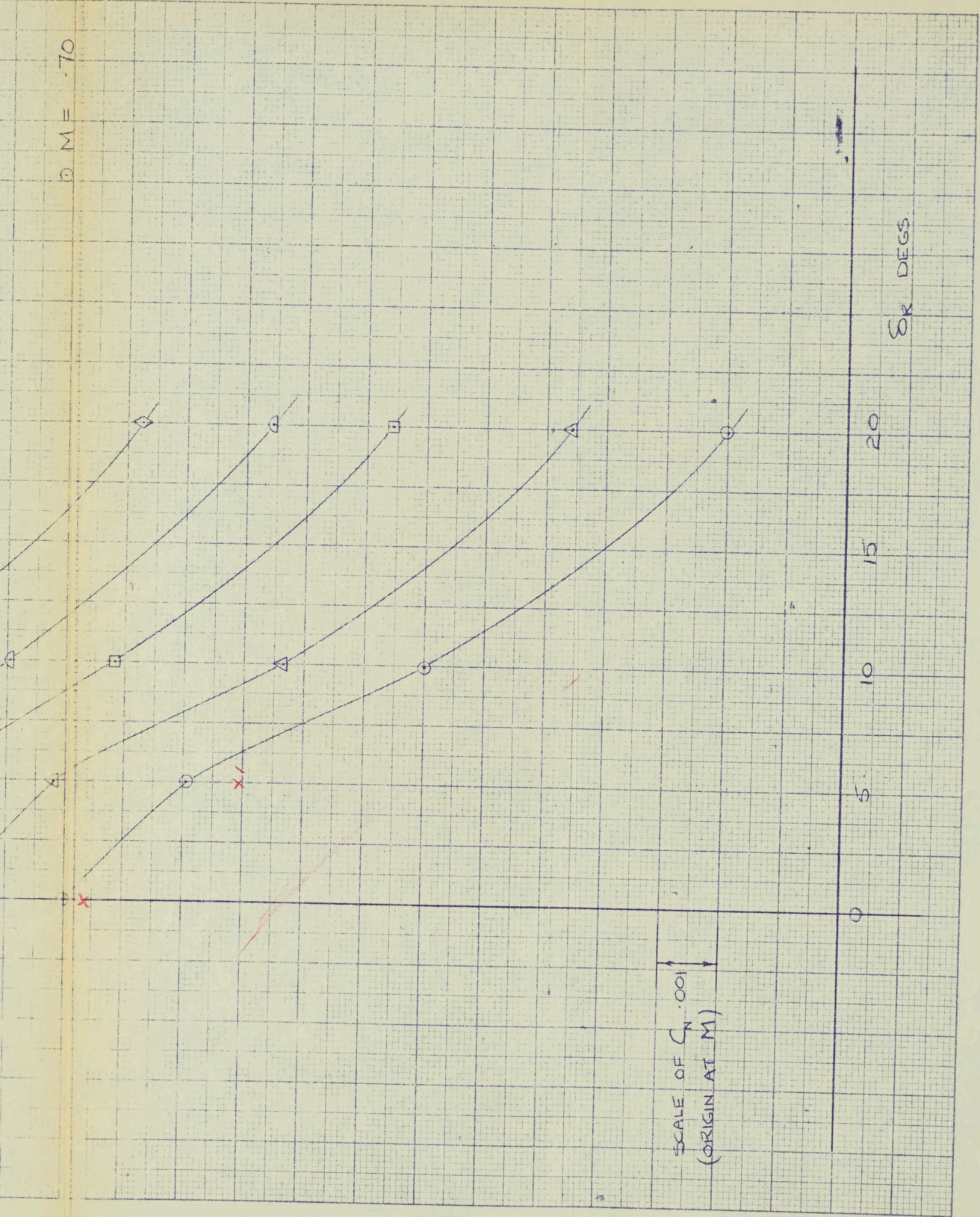
□ $M = 1.00$

△ $M = .90$

○ $M = .70$



$\sigma M = .70$



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59-12 KEUFFEL & ESSER CO.
10 X 10 TO 11.75 inch, 5th times accuracy.
MADE IN U.S.A.

C-105

CAL. WIND TUNNEL

$C_{N\delta_k}$ vs M

$\alpha = 0^\circ$

$C_{N\delta_k}$
PER DEG.

-0.0010
-0.0009
-0.0008
-0.0007
-0.0006
-0.0005
-0.0004
-0.0003
-0.0002
-0.0001
0

.5

.6

.7

.8

.9

1.0

1.1

1.2

M

ESTIMATE FOR $\alpha = 2^\circ$
(P/STAB/39)

RANGE $5^\circ < \delta_k < 10^\circ$

RANGE $0^\circ < \delta_k < 20^\circ$

RANGE $0^\circ < \delta_k < 5^\circ$

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359-12 KEUFFEL & ESSER CO.
 10 X 10 to 1/2 inch, 5th lines accented.
 MADE IN U.S.A.

AIRCRAFT
 A. U. W.

COMPONENT

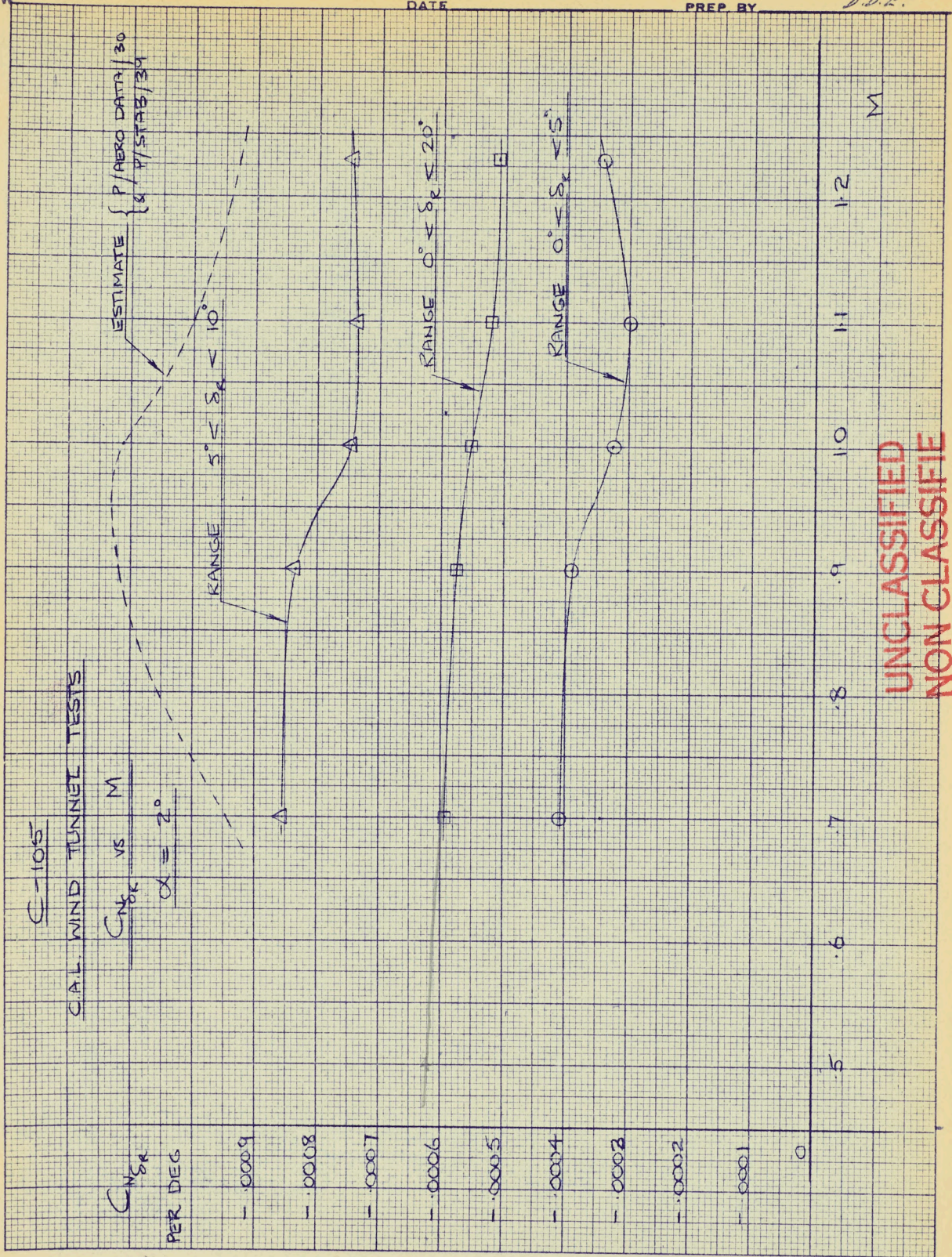
SHEET No. 318

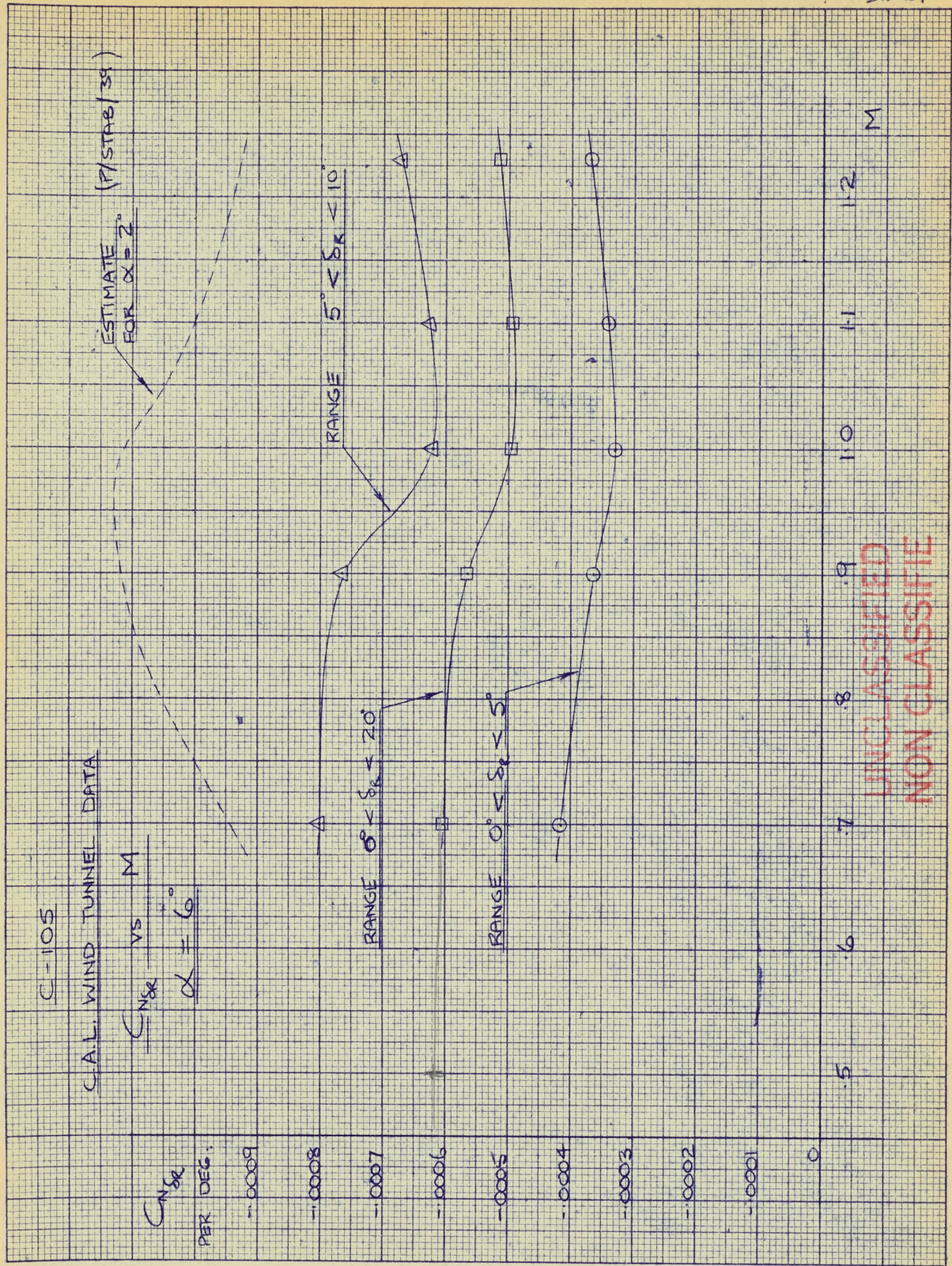
REPORT No. P/W.T./20

DATE

PREP BY

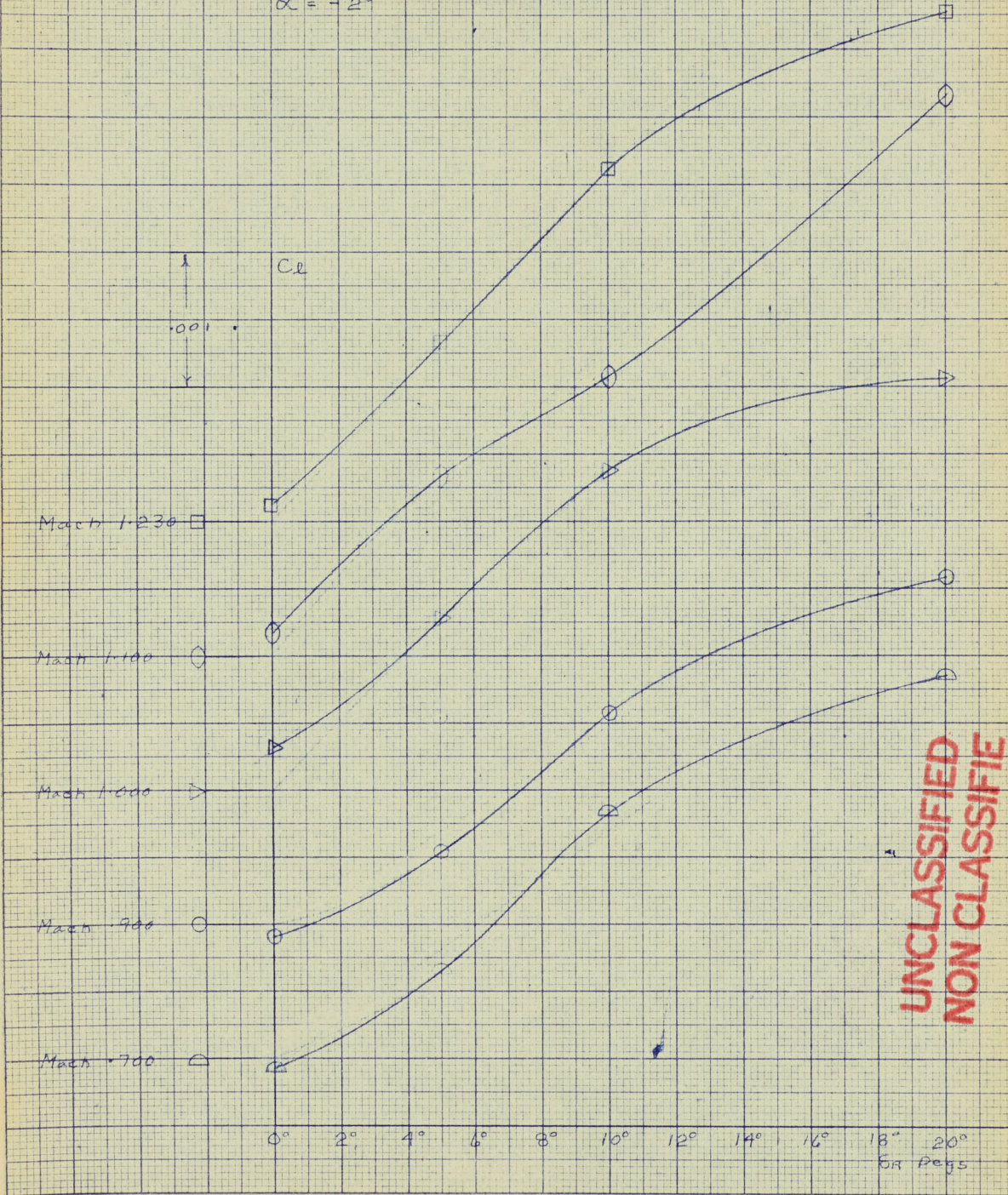
P.D.F.





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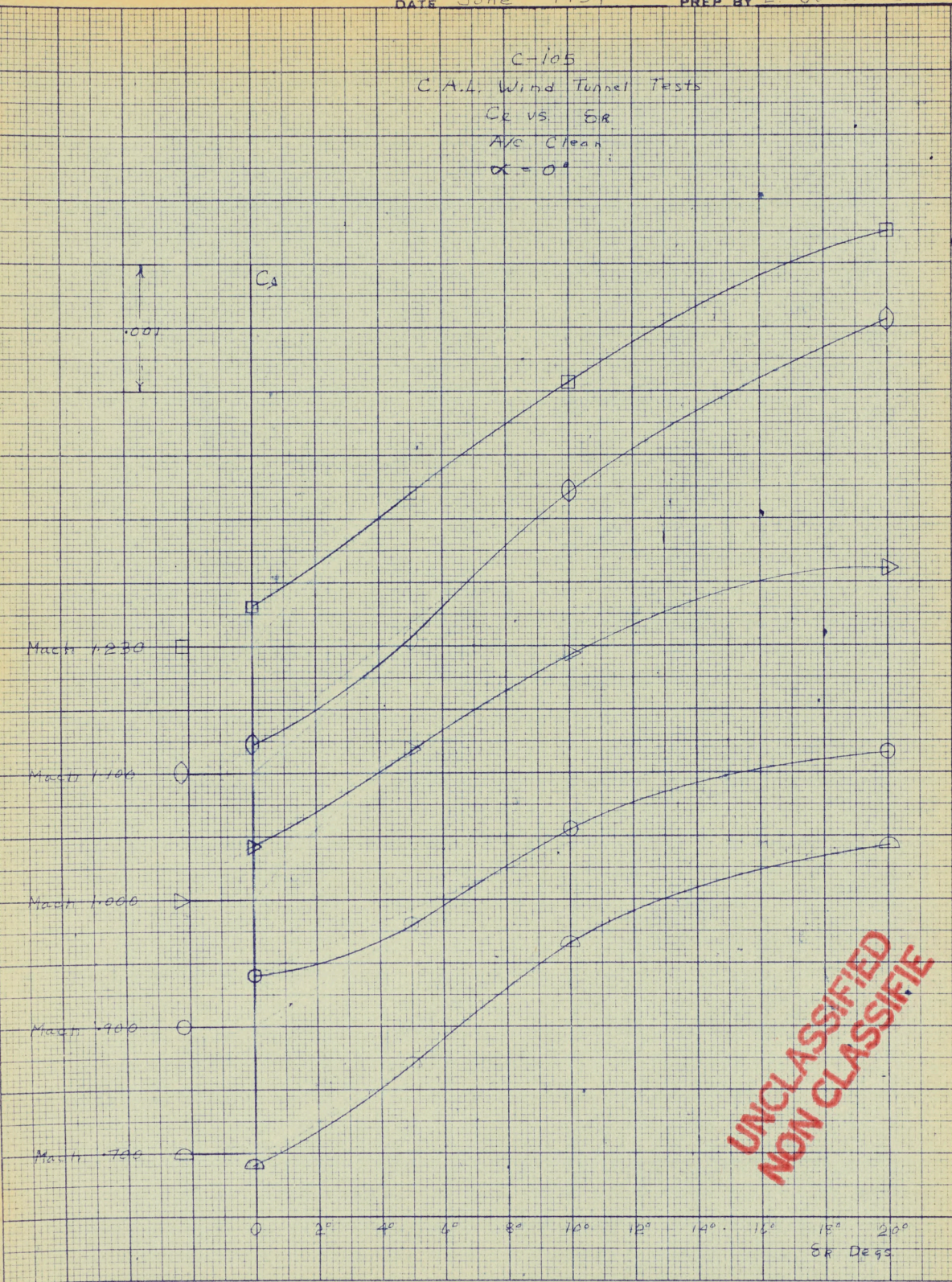
C-105
C.A.L. Wind Tunnel Tests
C vs α
A/B Clean
 $\alpha = -2^\circ$



59-13 KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN U.S.A.

UNCLASSIFIED
NON CLASSIFIED

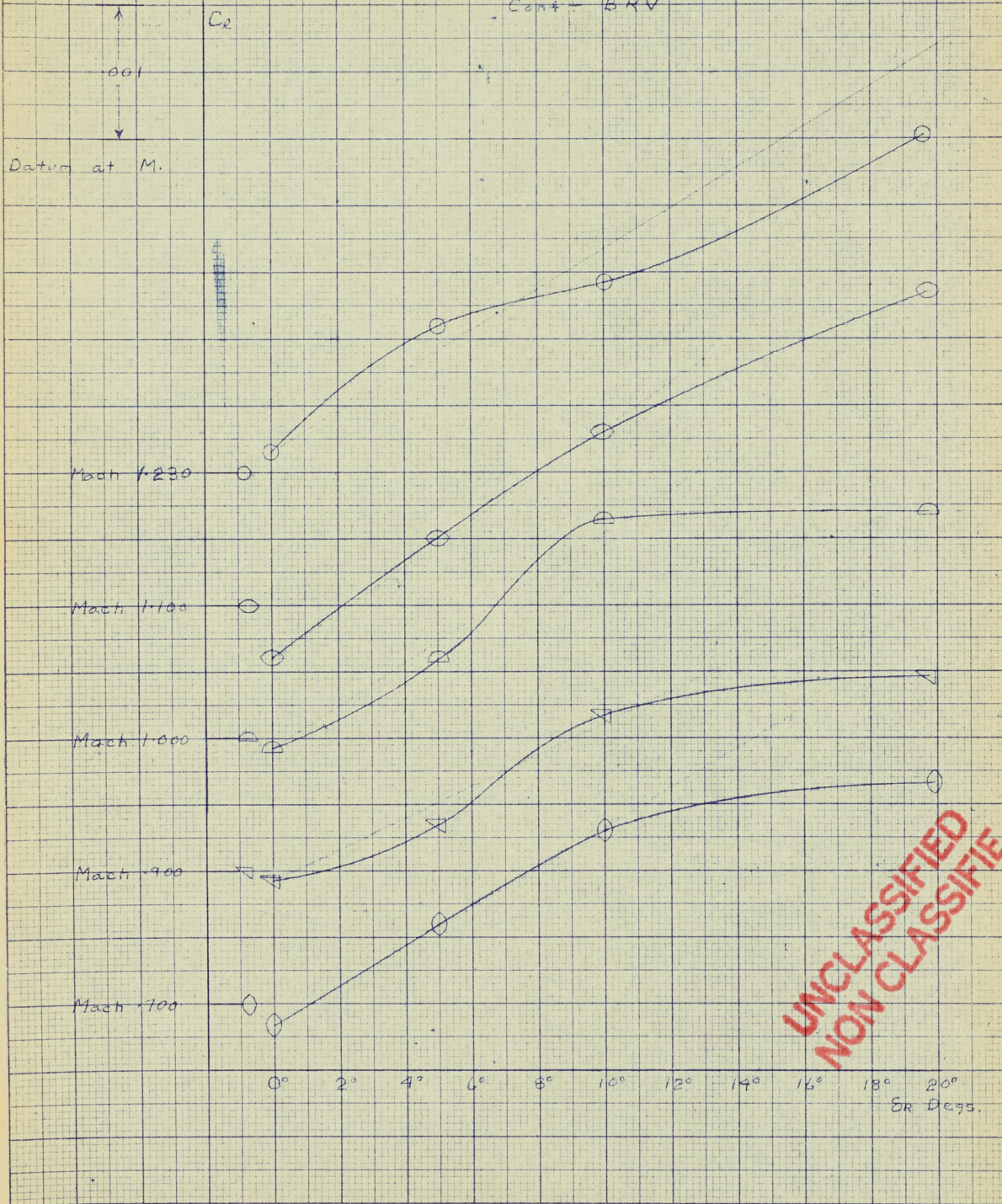
C-105
C.A.L. Wind Tunnel Tests
C_d vs. δR
A/c Clean
 $\alpha = 0^\circ$



359-12 KEUFFEL & ESSER CO.
10 X 10 TO THE 1/2 INCH, 5th LINES ACCENTED.
MADE IN U.S.A.

UNCLASSIFIED
NON CLASSIFIE

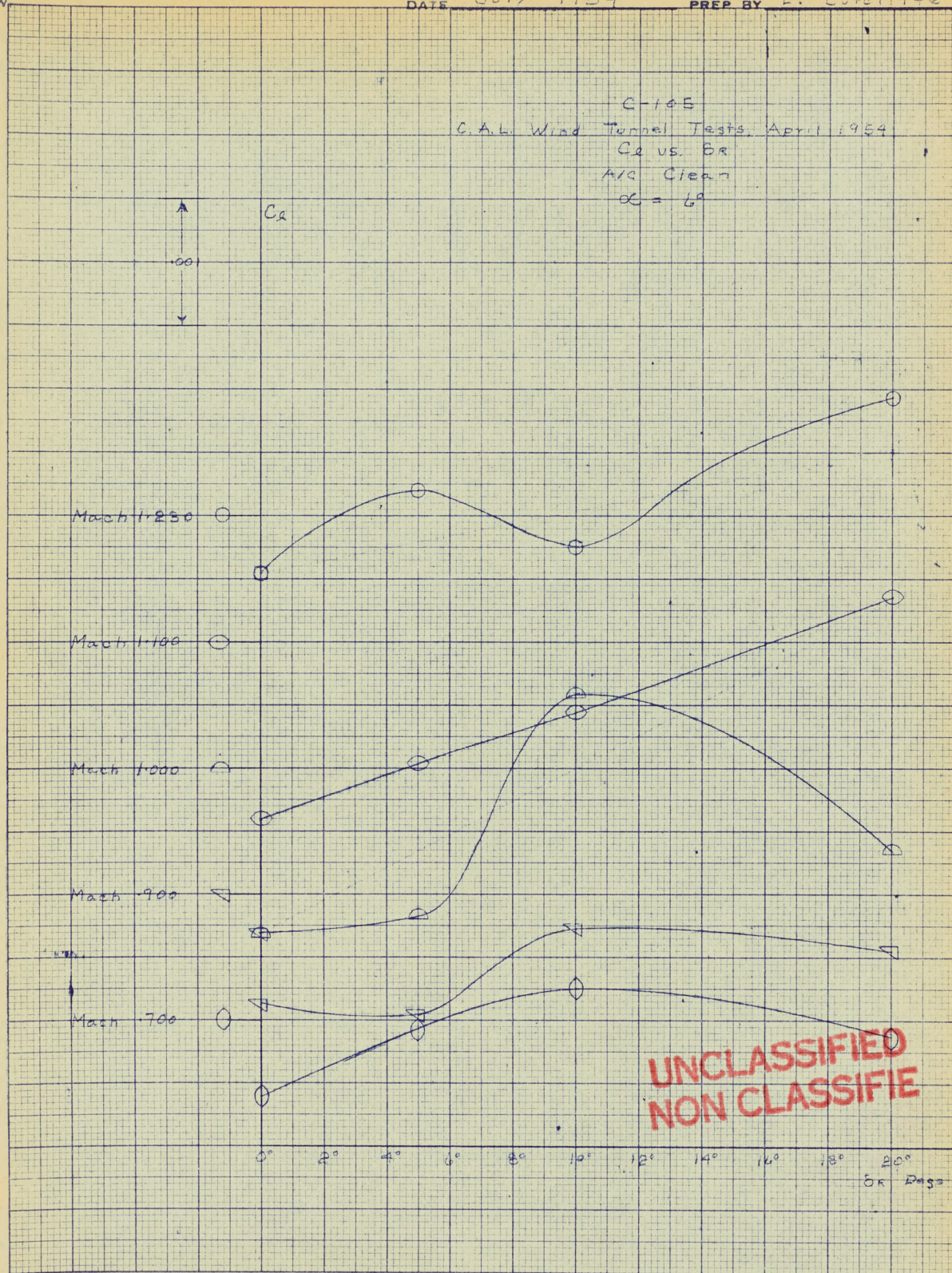
C-105
C.A.L. Wind Tunnel Tests, April 1954
 C_L vs. δA
 $\alpha = 2^\circ$
Cont. BRV



UNCLASSIFIED
NON CLASSIFIE

BR D 95.

C-145
 C.A.L. Wind Tunnel Tests, April 1954
 C_d vs. α
 A/C Clean
 $\alpha = 6^\circ$



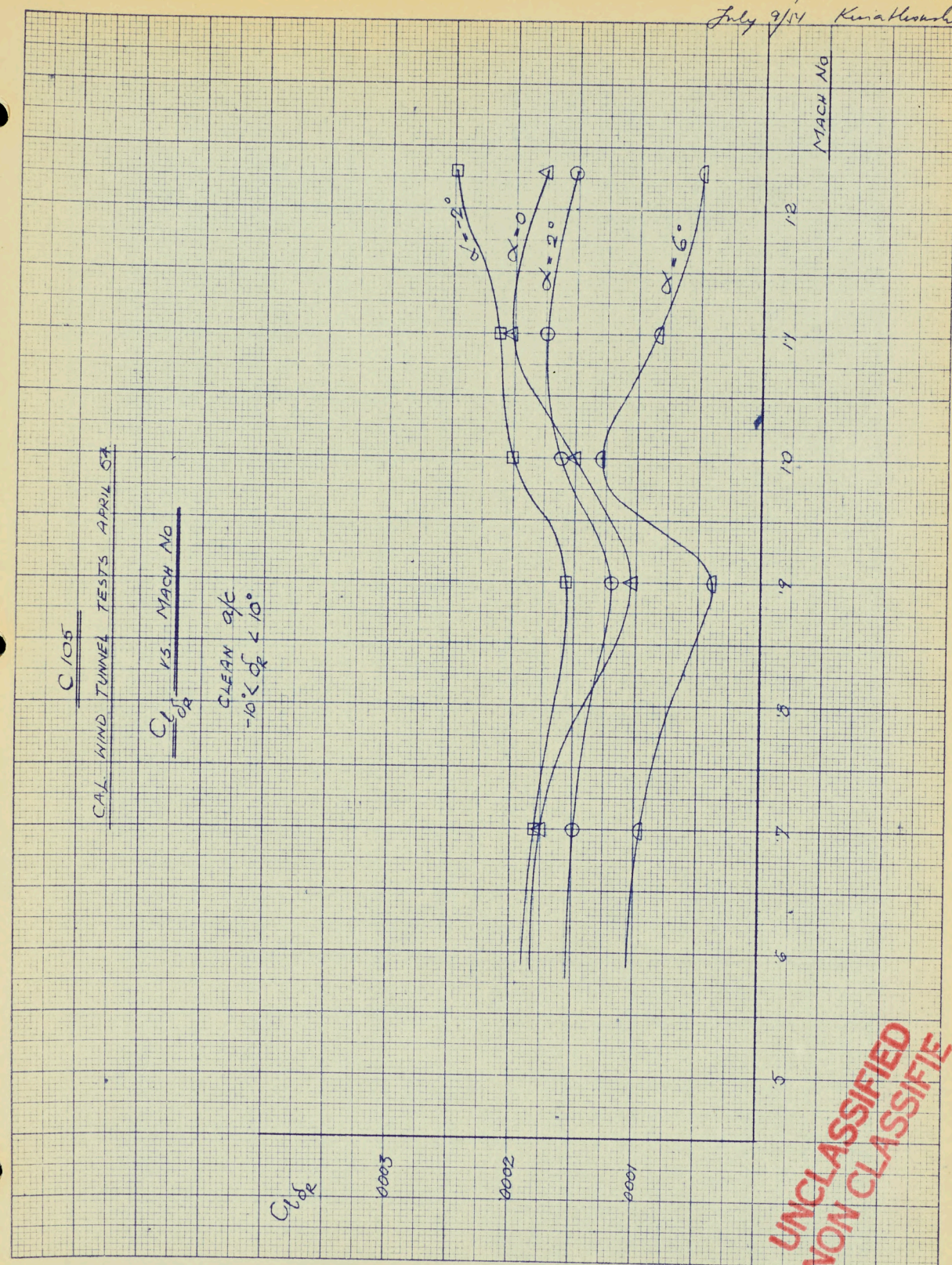
358-15 KNUFFEL & ESSER CO.
 10 x 10 to the 60 mesh 5th lines acounted
 MADE IN U.S.A.

P.H.T./20 325
 July 9/54 Kunihiroshi

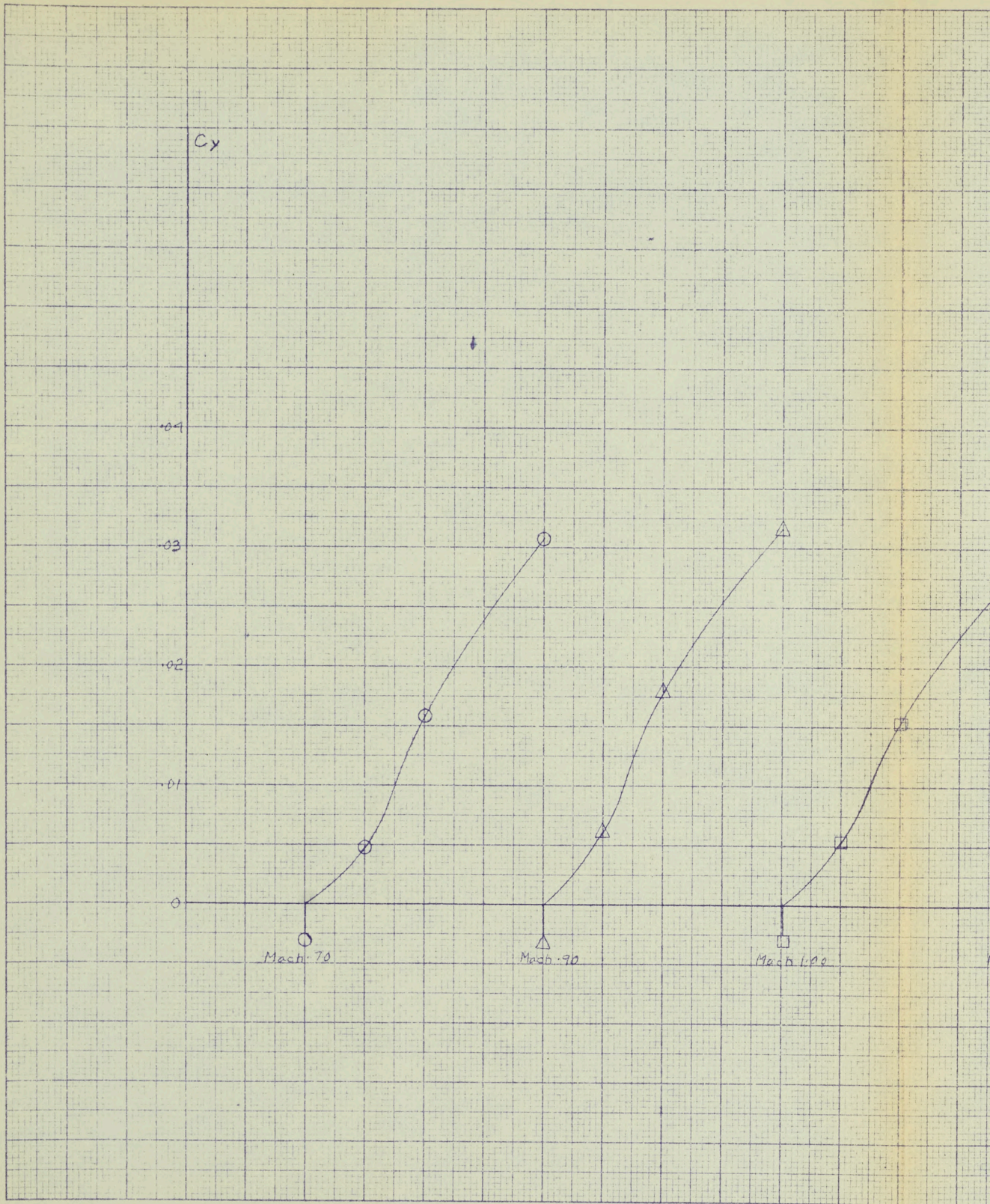
C 105
 CAL WIND TUNNEL TESTS APRIL 57

$C_{L\alpha}$ vs MACH No

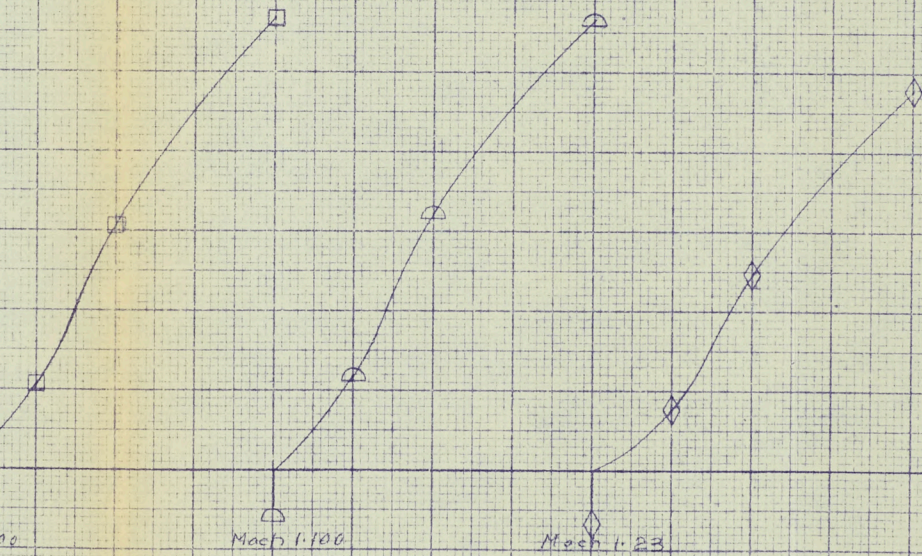
CLEAN air
 $-10^\circ < \alpha < 10^\circ$



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 NON CLASSIFIED

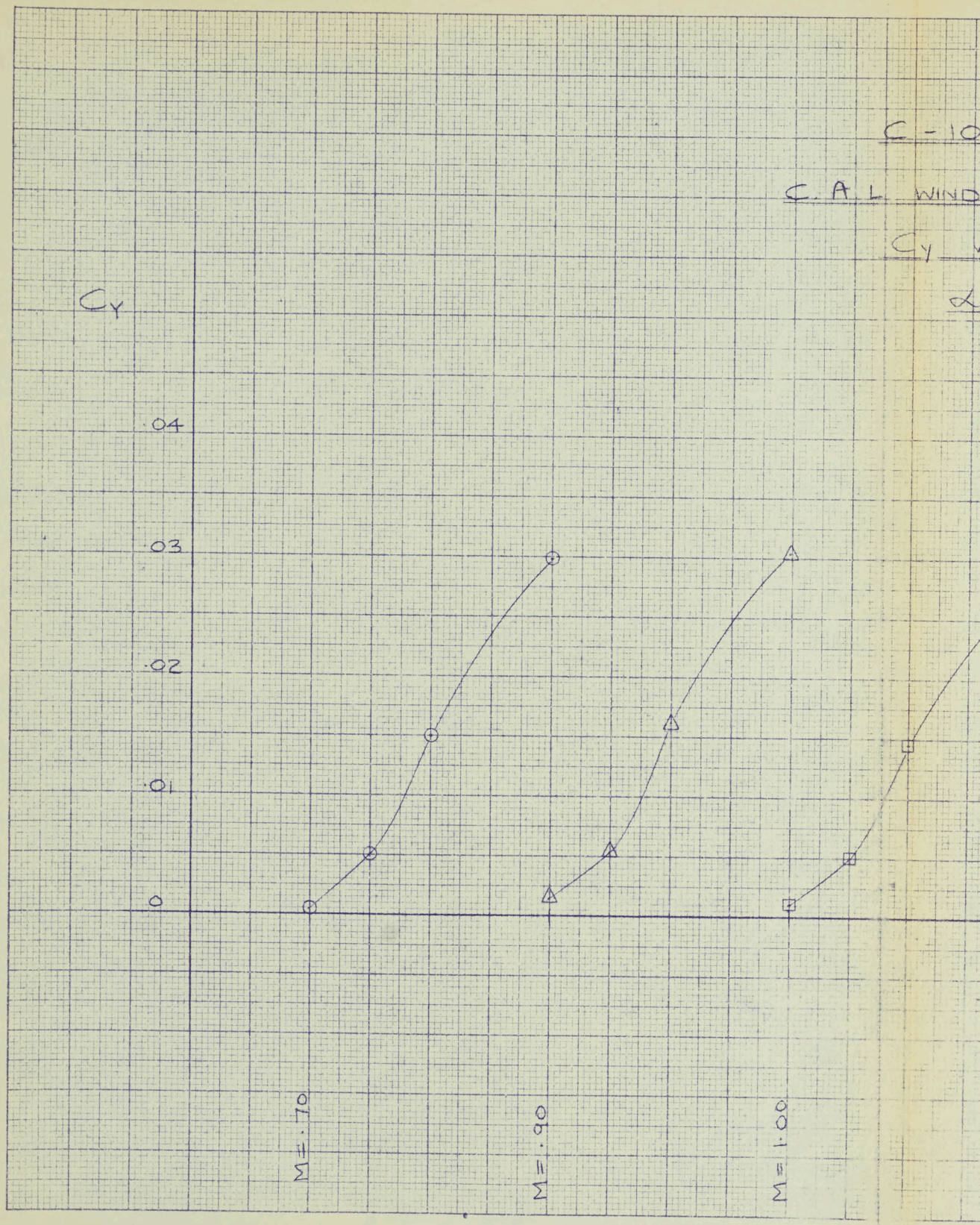


C-105
 C.A.L. Wind Tunnel Tests
 C_x vs S_R
 A/c Clean
 $\alpha = -2^\circ$



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359-11L KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th line accurate.
MADE IN U.S.A.



C-10

C.A.L. WIND

C_y

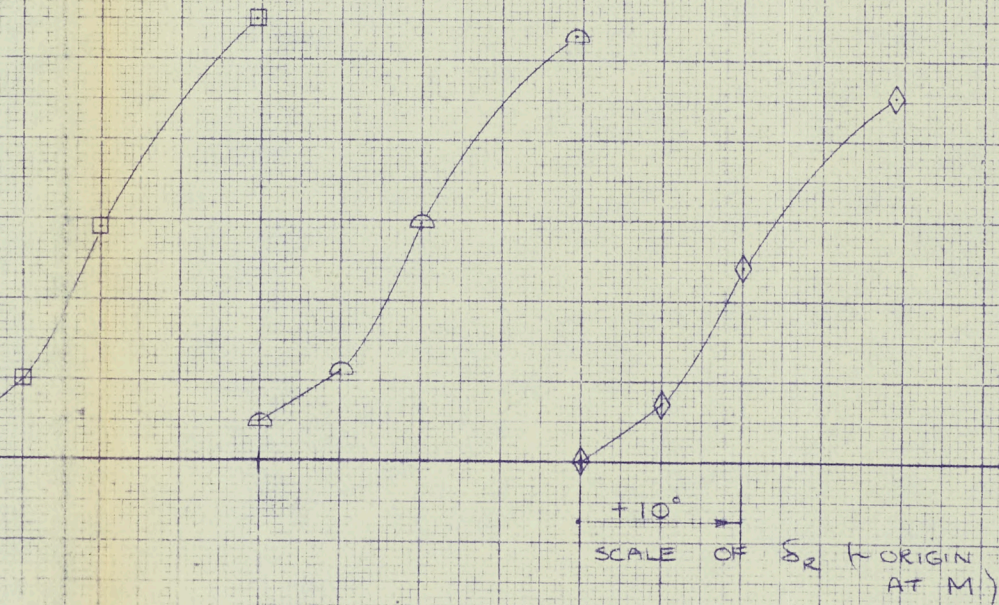
α

C-105

A L WIND TUNNEL TESTS

C_y vs δ_R

$\alpha = 0^\circ$



UNCLASSIFIED
NON CLASSIFIE

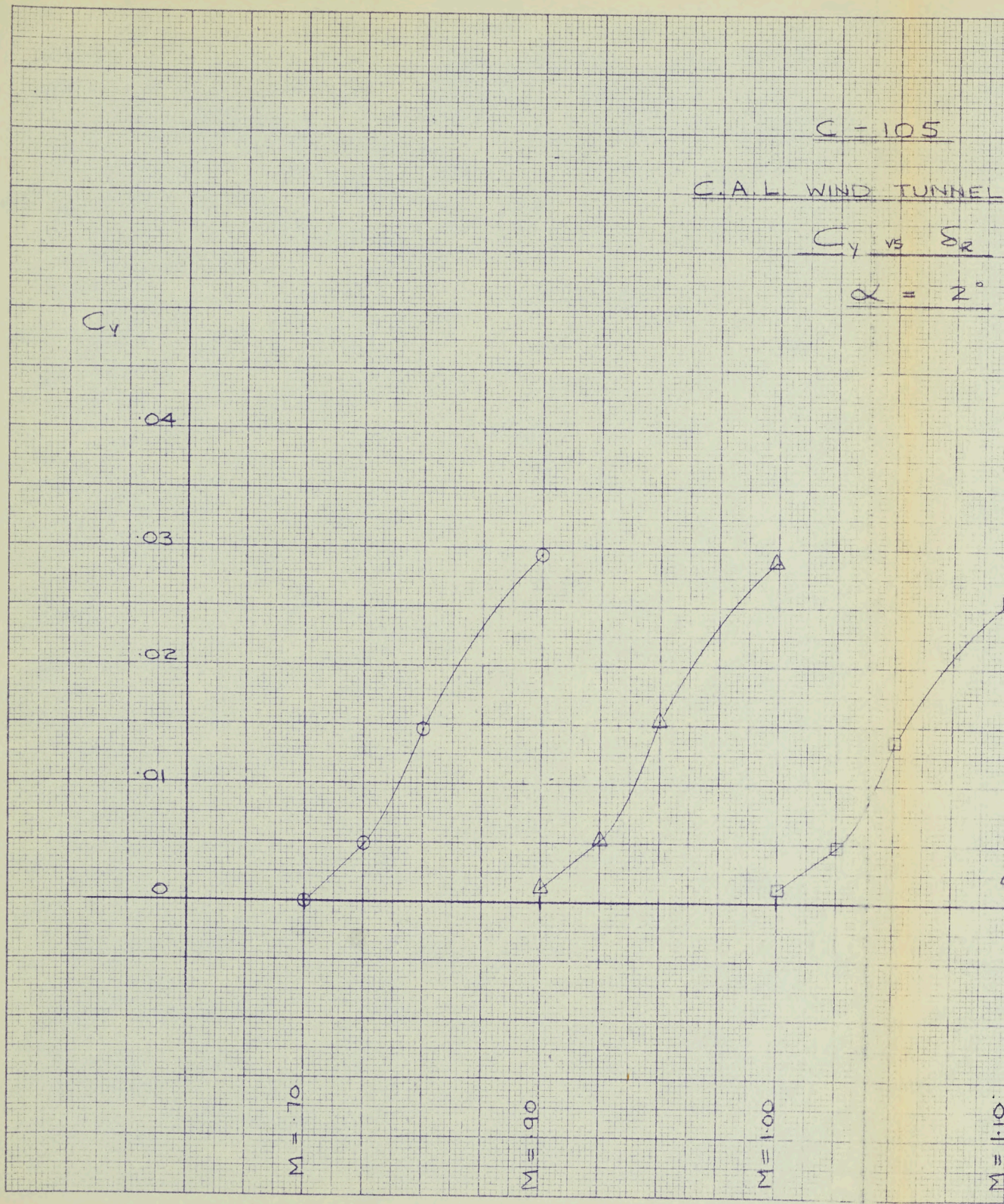
359-11L KEUFFEL & ESSER CO.
10 X 10 to the 15 inch, 34th lines horizontal.
MADE IN U.S.A.

C-105

C.A.L. WIND TUNNEL

C_y vs δ_R

$\alpha = 2^\circ$

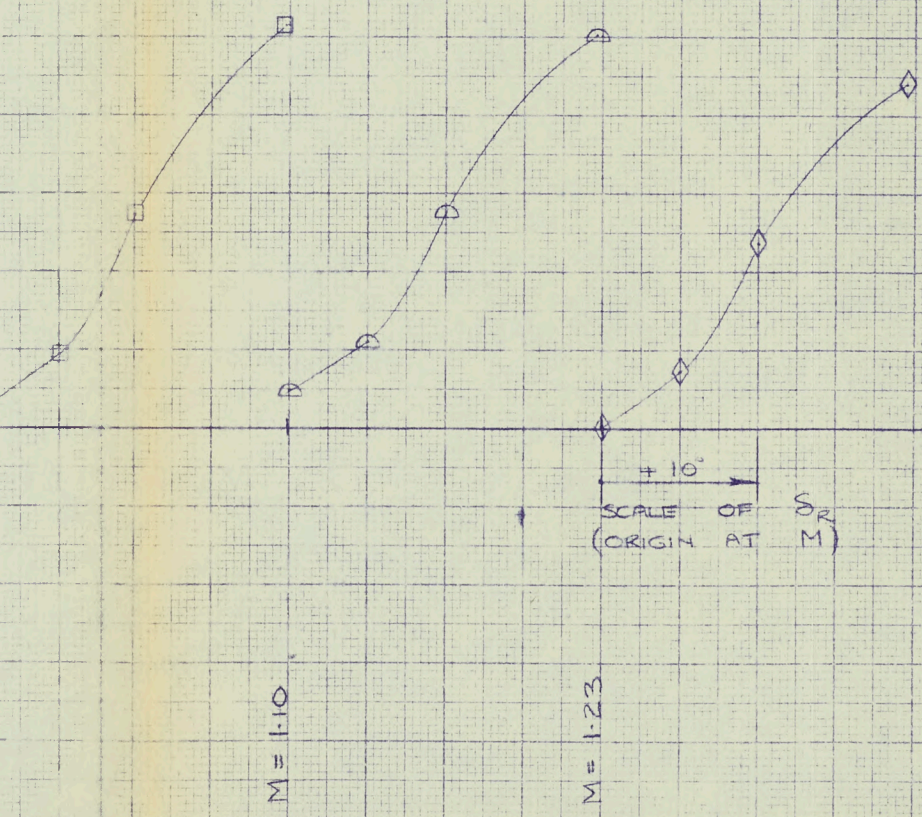


C-105

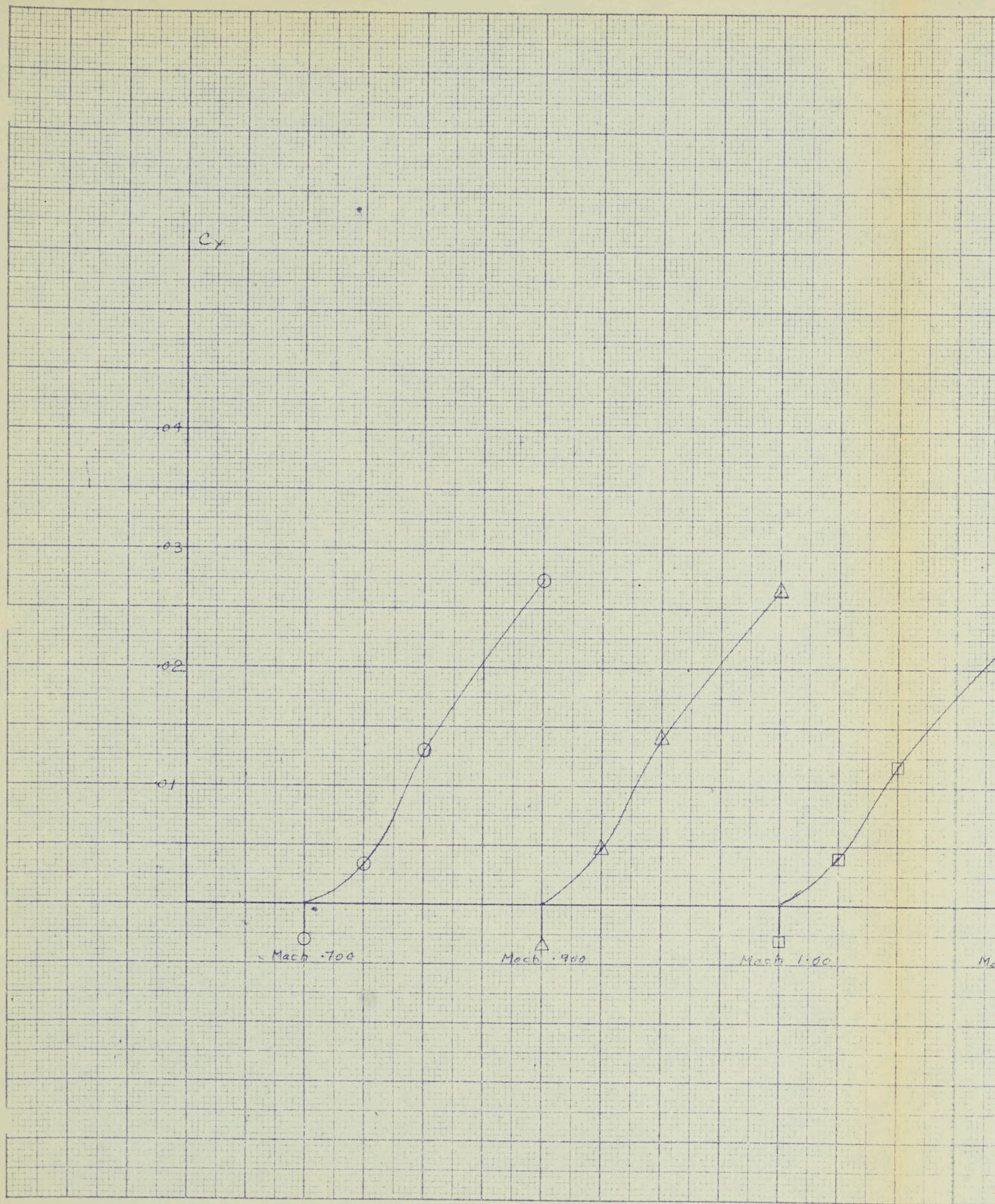
WIND TUNNEL TESTS

C_y vs S_R

$\alpha = 2^\circ$



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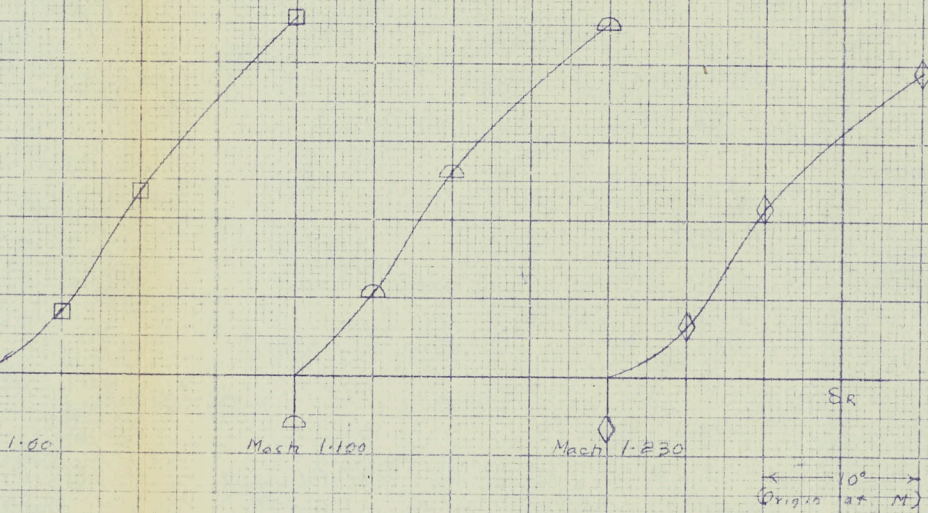


C-105
C.A.L. Wind Tunnel Tests

C_x vs S_R

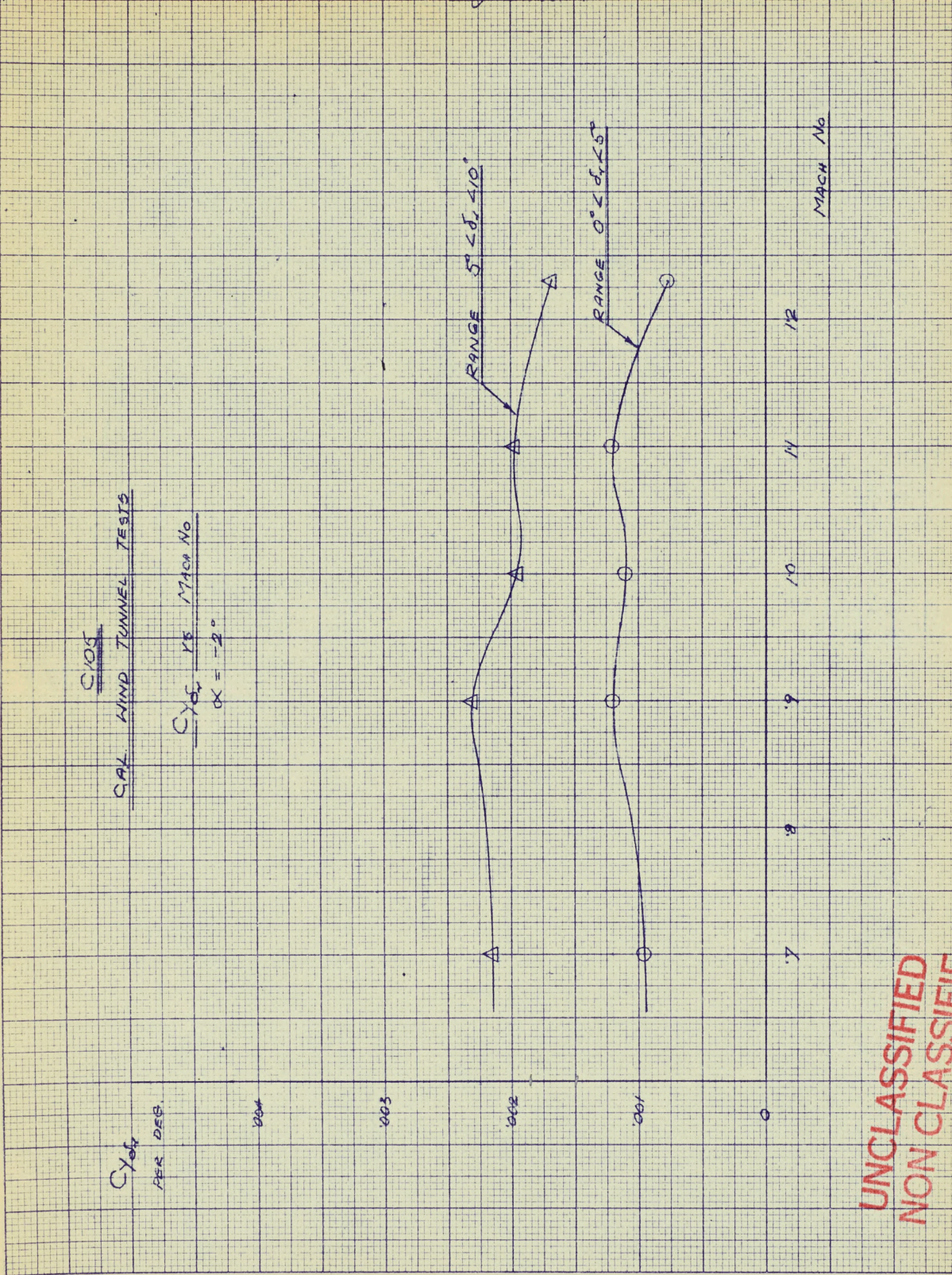
A/C Clean

$\alpha = +6^\circ$



350-111
10 x 10 to the 1/2 inch grid lines accurate
MAY 19 5 4
KUFFEL & ESSER CO.

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359-12 KUFFEL & ESSER CO
10 x 10 to 16 1/2 inch, 500 lines accuracy
MADE IN U.S.A.

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C-105

C.A.L. WIND TUNNEL TESTS

C_{YR} VS M

$\alpha = 0^\circ$

C_{YR}
(PER DEGREE)

.004

.003

.002

.001

0

RANGE $5^\circ < \delta_R < 10^\circ$

RANGE $0^\circ < \delta_R < 5^\circ$

1.3

1.2

1.1

1.0

.9

.8

.7

M

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NON CLASSIFIED

C-105

S. A. - WIND TUNNEL TESTS

$C_{Y_{SR}}$ vs. M

$\alpha = 2^\circ$

$C_{Y_{SR}}$
(PER DEGREE)

.003

.002

.001

0

RANGE $5^\circ < \delta_R < 10^\circ$

RANGE $0^\circ < \delta_R < 5^\circ$

.70 .8 .9 1.0 1.1 1.2 1.3 M

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C105
S.A.L. WIND TUNNEL TESTS.

S151 1.5 M

$\alpha = 6^\circ$

C_{Y02}
PER DEG.

0.004

0.003

0.002

0.001

0

RANGE $5^\circ < \alpha < 10^\circ$

RANGE $0^\circ < \alpha < 5^\circ$

MACH No

1.2

1.1

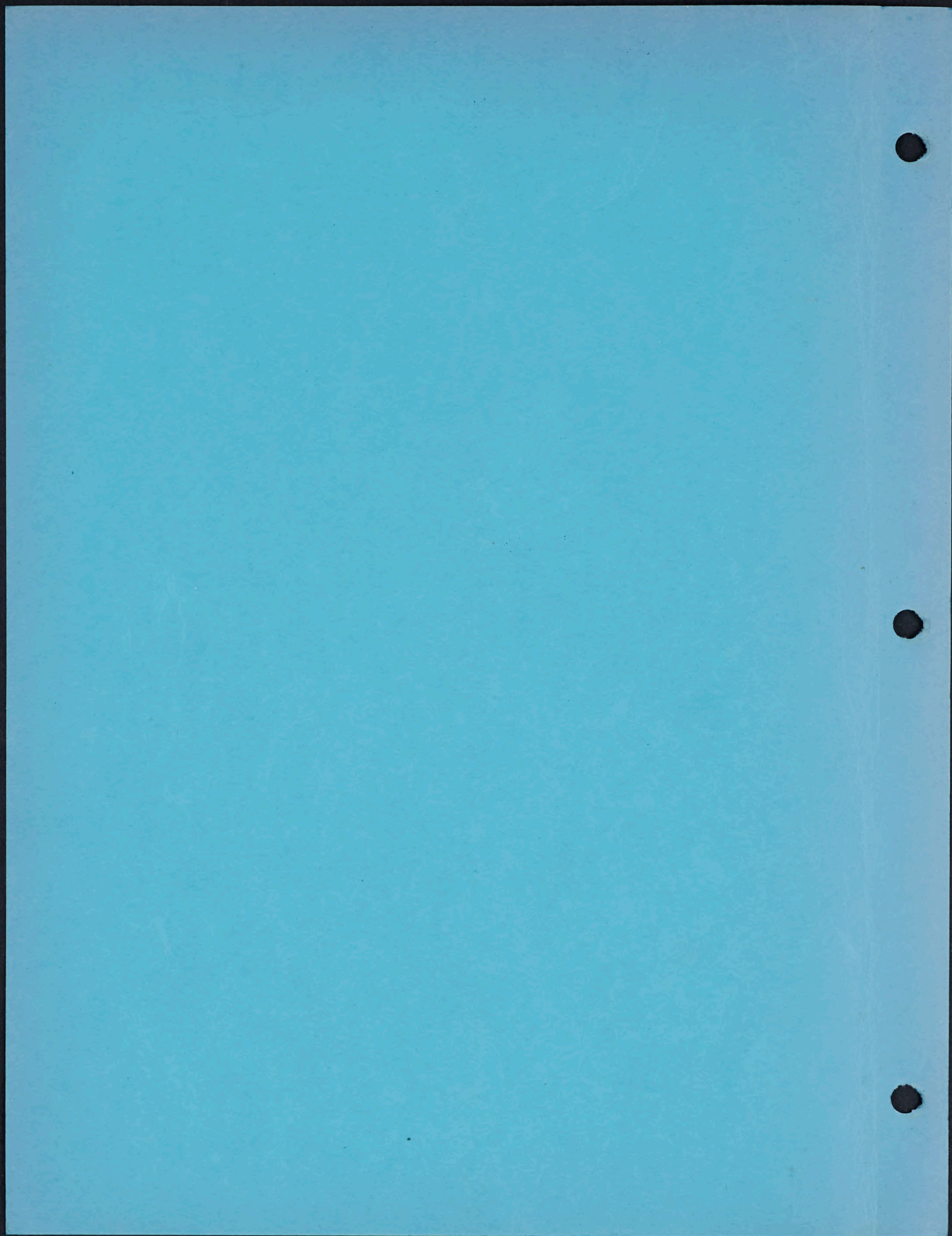
1.0

0.9

0.8

0.7

UNCLASSIFIED
NON CLASSIFIE



DUO-TANE
3558
MADE IN U.S.A.