

QC
Avro
C-105
P/WT/51

QCX
Avro
CF105
P-WT-51

③

FILE IN VAULT

C-105

P/Wind Tunnel/51

SECRET
ANALYZED

C.A.L. WIND TUNNEL TESTS

(OCTOBER 1954)

DERIVATIVES

COMPARISONS AND EXTRAPOLATIONS

Dec. 1954

~~SECRET~~ UNCLASSIFIED
UNCLASSIFIED / NON CLASSIFIÉ

ANALYZED



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Aeronautical and
Mechanical
Engineering Library

Conseil national de recherches
Canada
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Bibliothèque
d'aéronautique
et de génie mécanique

TO
A

DATE

Report no.: QCX-AVRO-CF105- P-WT-51

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



45109

12417869



A. V. ROE CANADA LIMITED
MALTON - ONTARIO

UNCLASSIFIED
UNCLASSIFIED / NON CLASSIFIÉ

TECHNICAL DEPARTMENT (Aircraft)

AIRCRAFT: C-105

REPORT NO. P/Wind Tunnel/51

FILE NO.

NO OF SHEETS

TITLE:

C.A.L. WIND TUNNEL TESTS

(OCTOBER 1954)

DERIVATIVES

COMPARISONS AND EXTRAPOLATIONS

Classification 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 Dec. 1954

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

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PREPARED BY

DATE

J.P. Clark

December 1954

CHECKED BY

DATE

INDEX

Longitudinal Stability

Section

1. Lift

- | | |
|------------------|-----|
| 1. $C_{L\alpha}$ | 1.1 |
| 2. q_0 | 1.2 |

2. Pitching Moment

- | | |
|--------------|-----|
| 1. a.c. | 2.1 |
| 2. C_{M_0} | 2.2 |

3. Elevator Effectiveness

- | | |
|-----------------------------------|-----|
| 1. C_{L_δ} | 3.1 |
| 2. C_{M_δ} const. C_L | 3.2 |
| 3. C_{M_δ} const. α | 3.3 |
| 4. c.p. | 3.4 |

Lateral Stability

4. Sideslip Derivatives

- | | |
|-----------------|-----|
| 1. $C_{N\beta}$ | 4.1 |
| 2. $C_{l\beta}$ | 4.2 |
| 3. $C_{y\beta}$ | 4.3 |

5. Vertical Tail Effectiveness

- | | |
|------------------|-----|
| 1. a_1 | 5.1 |
| 2. a.c. | 5.2 |
| 3. $\eta_{a.c.}$ | 5.3 |

6. Aileron c.p.

- | | |
|-------------------|-----|
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| 2. a_2 | 6.2 |
| 3. c.p. | 6.3 |
| 4. $\eta_{c.p.}$ | 6.4 |
| 5. $C_{l\delta}$ | 6.5 |

AIRCRAFT:

C-105

OCTOBER 1954

TESTS

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DATE

J.P. Clark

December 1954

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DATE

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Hinge Moments

Section

7. Elevator

1. CH_0

7.1

2. CH_d

7.2

3. CH_8

7.3

8. Aileron

1. CH_0

8.1

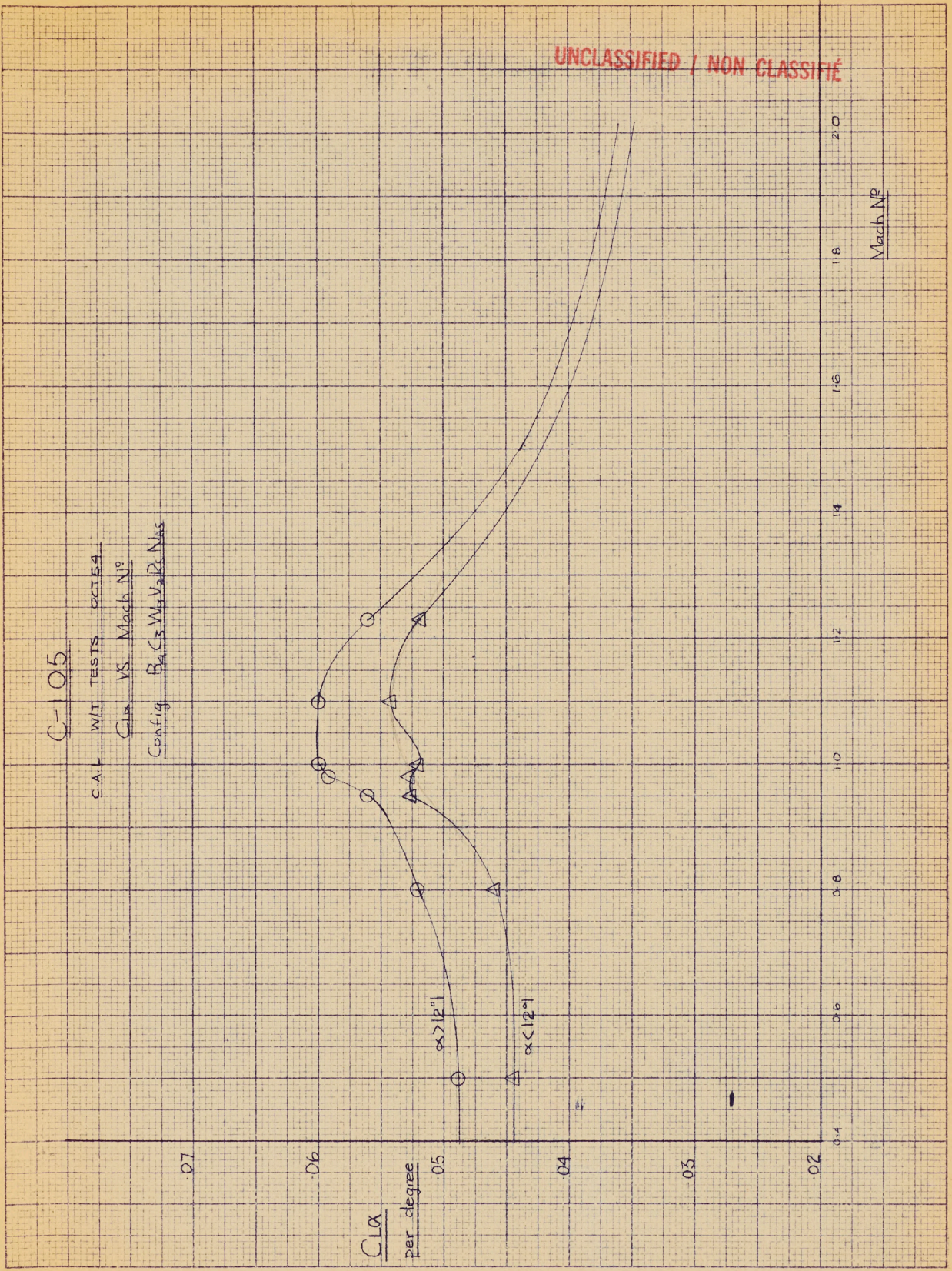
2. CH_d

8.2

3. CH_8

8.3

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C.A.L. WIT TESTS OCT 1954

CL_α VS Mach No

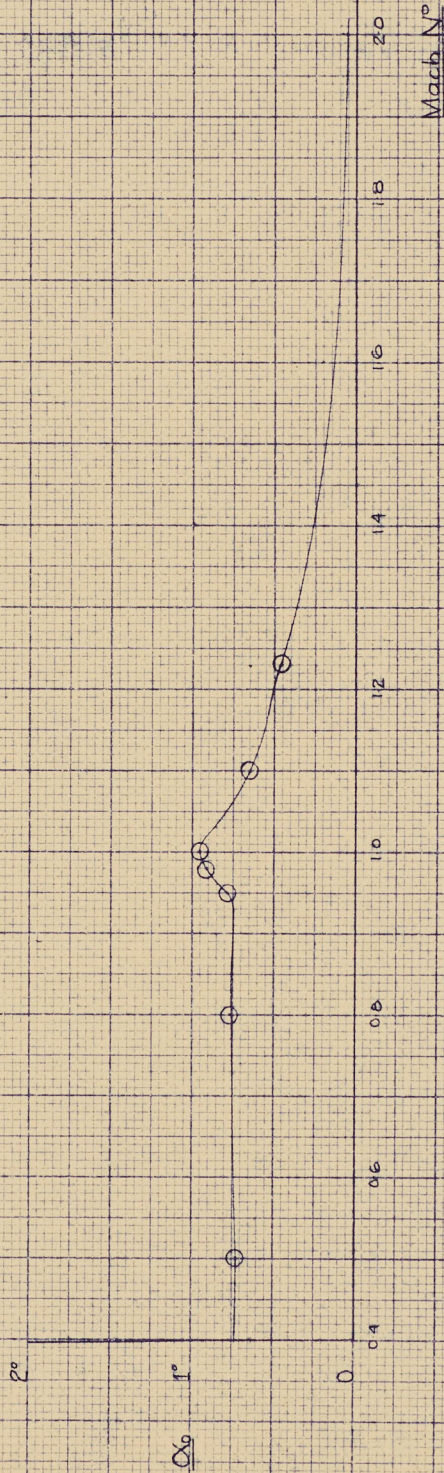
Config B₄ S₃ W₄ V₂ R₂ N₄ S

Cl_{α}
per degree

Mach No

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C-105
CAL W/T TESTS OCT 54
Xo 1/5 Mach No
Config B₁C₃ W₁V₂P₃ Max



359-12

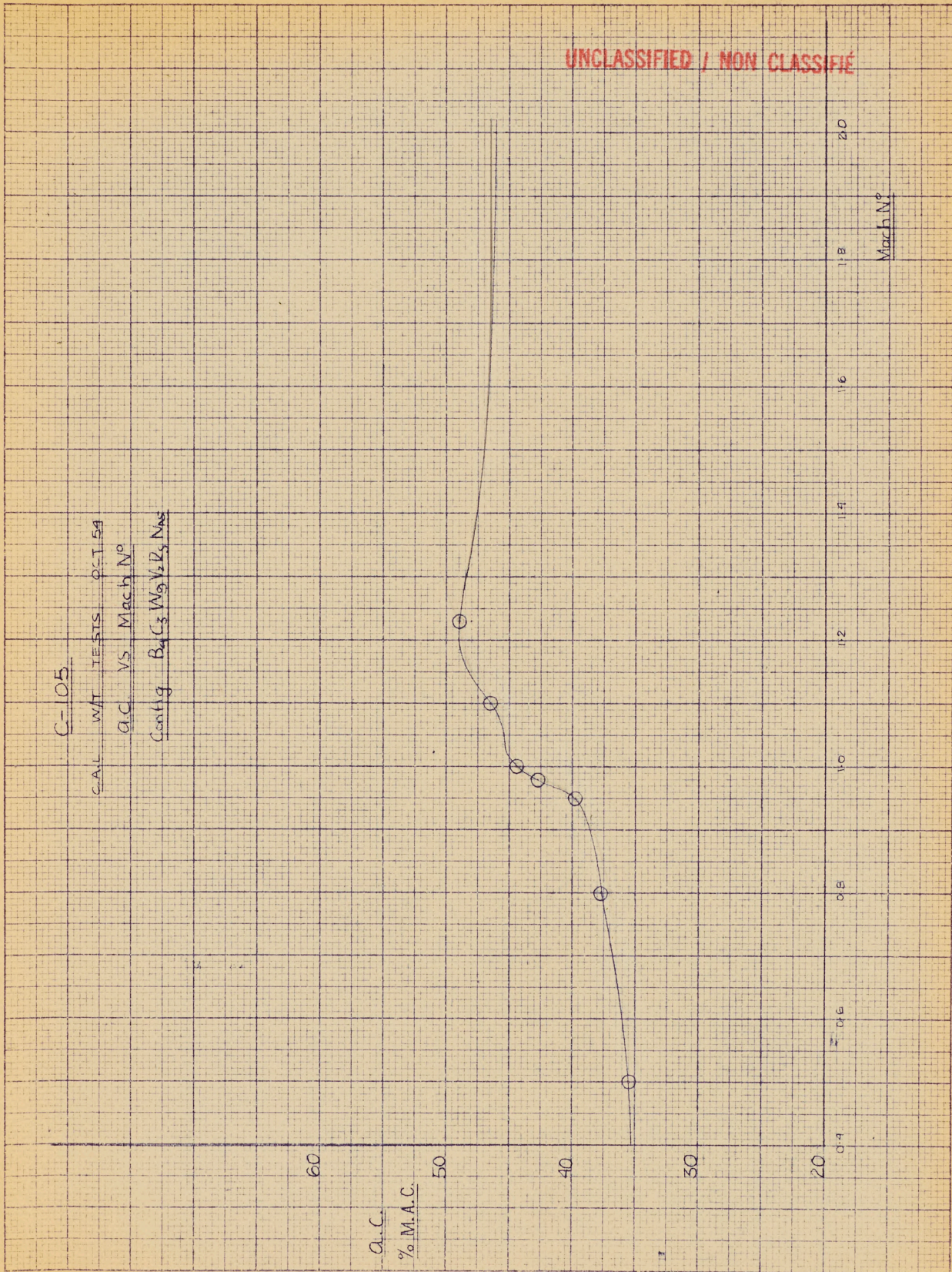
10 X 10 TO THE 1/2 INCH
KEUFFEL & ESSER CO.
MADE IN U.S.A.

R₄B

C-105

CAL W/T TESTS Q-T 154
a.c. vs Mach No
Contig B₄C₃W₉V₂R₅Nac

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a.c.
% M.A.C.

Mach No

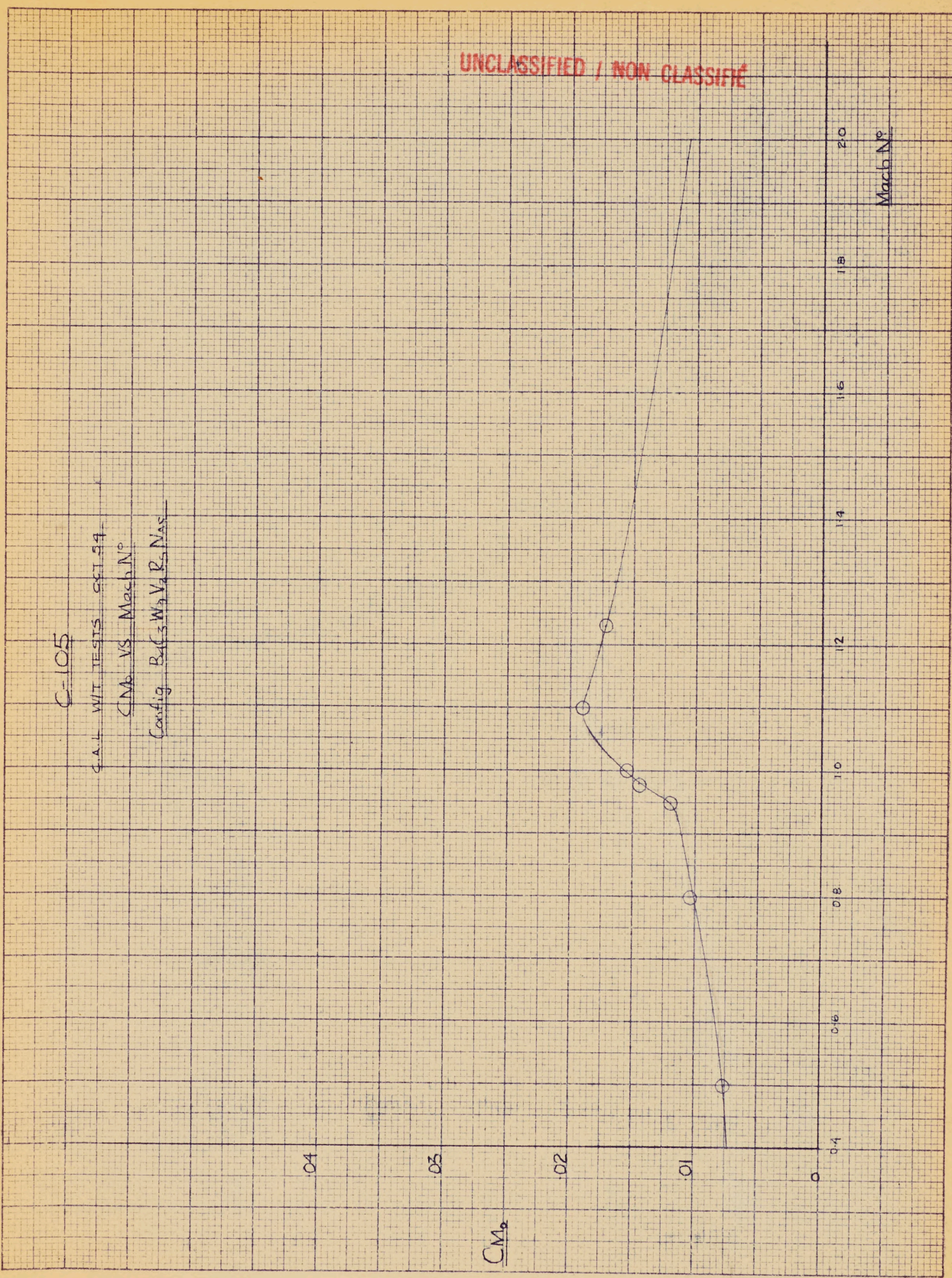
UNCLASSIFIED / NON CLASSIFIED

C-105

GAL WIT TESTS OCT 54

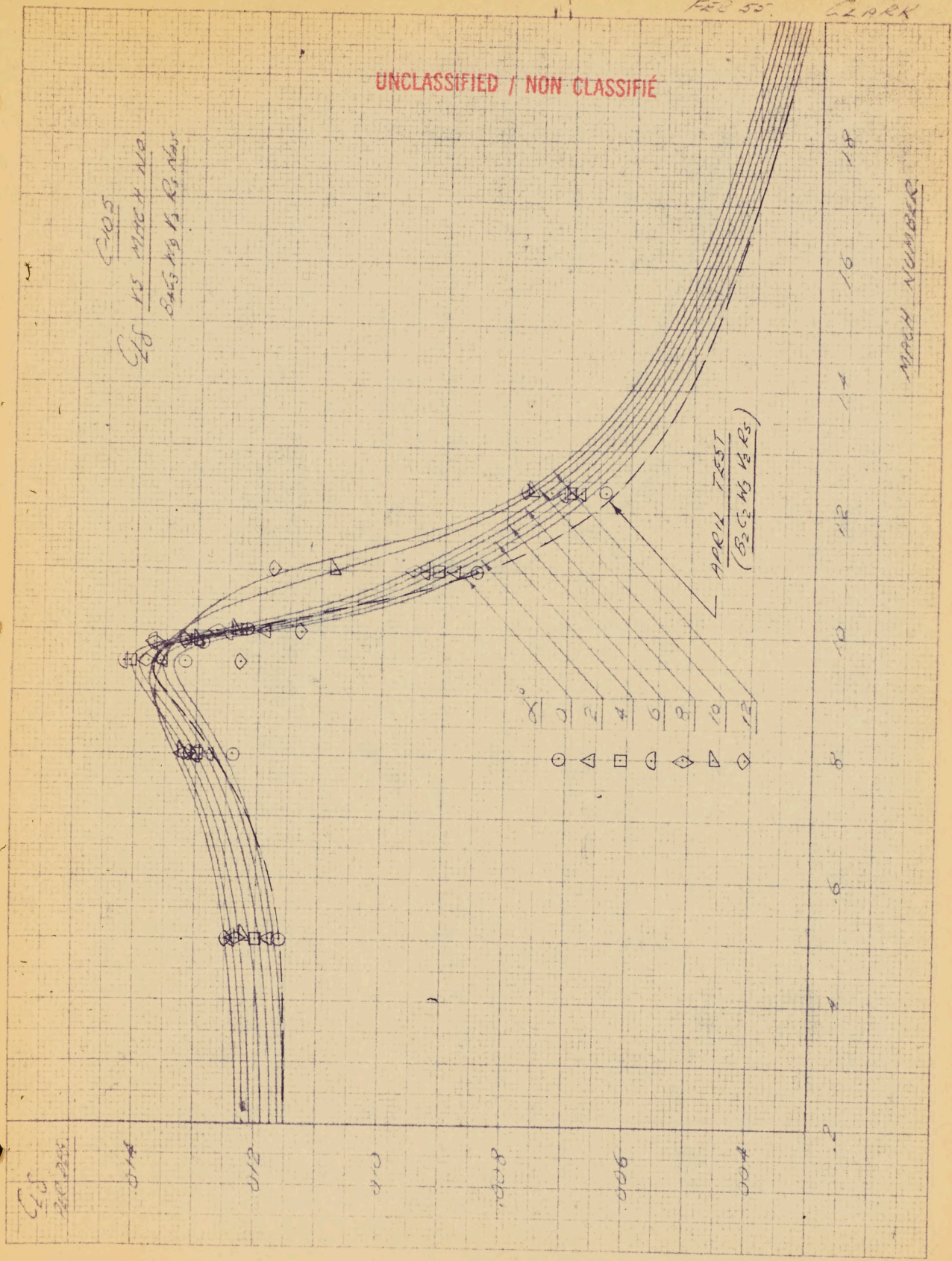
CINc VS Mach No

Config Refs W₃ V₃ B₃ Nas



31. P/N.T./51.72
FEB 55. CLARK

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FORM NO. X-10 TO THE 1-54 (REV. 5-53) 259 14
GPO: WASHINGTON: 1954

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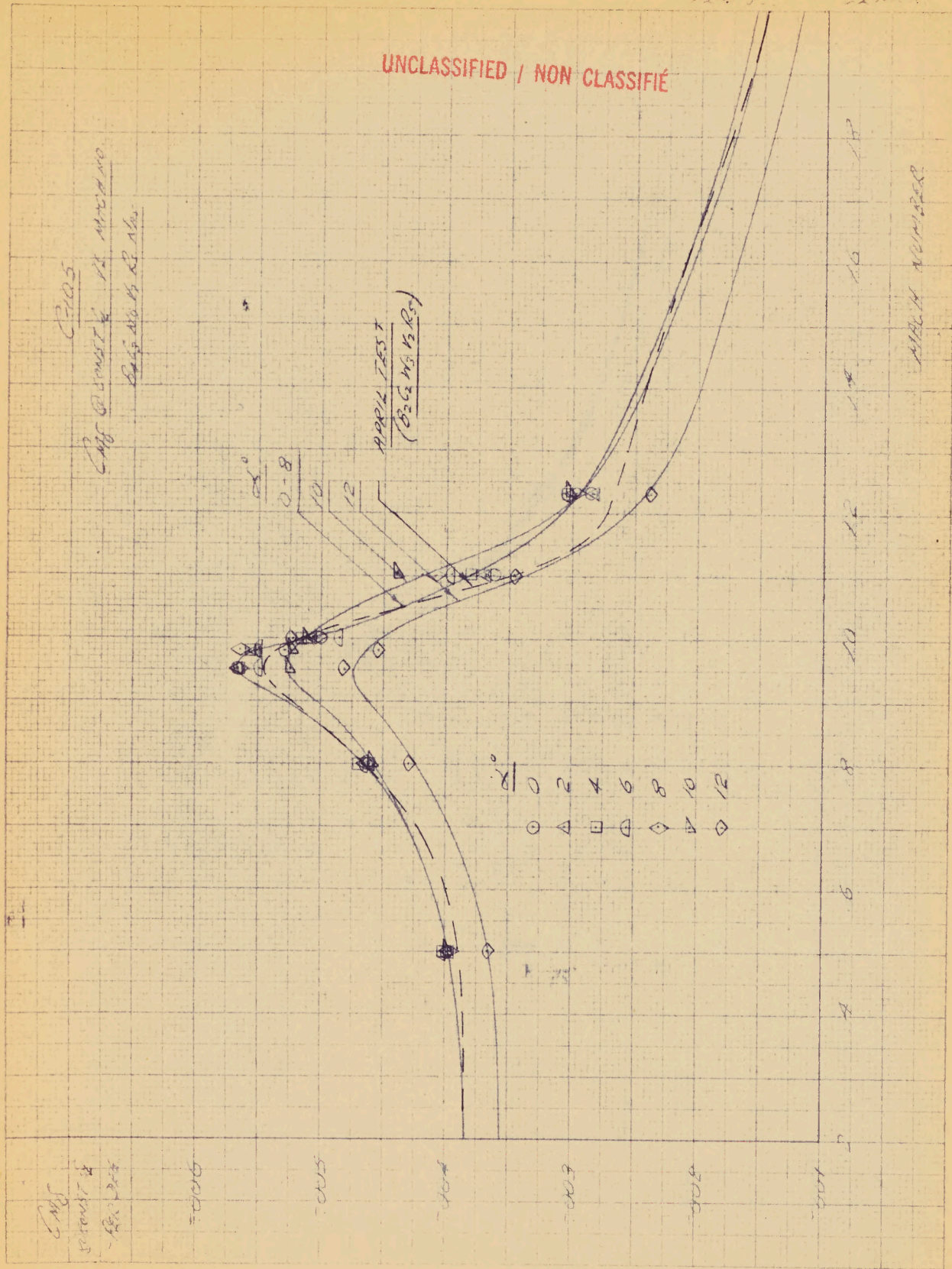
7.3.2. P/W T/51.12

FEEDS CLARK

C-105
Coff D. SMITH & H. M. RICHMOND
BAGS NO. 15 & 16

APPLY TEST
(BAGS NO. 15 & 16)

APPLY NUMBER



C-105
Coff D. SMITH & H. M. RICHMOND
BAGS NO. 15 & 16

FEEDS
2 4 6 8 10 12 14 16

APPLY NUMBER
2 4 6 8 10 12 14 16

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505
S. 11 X 10
S. 11 X 10
S. 11 X 10

EXPERIMENTAL

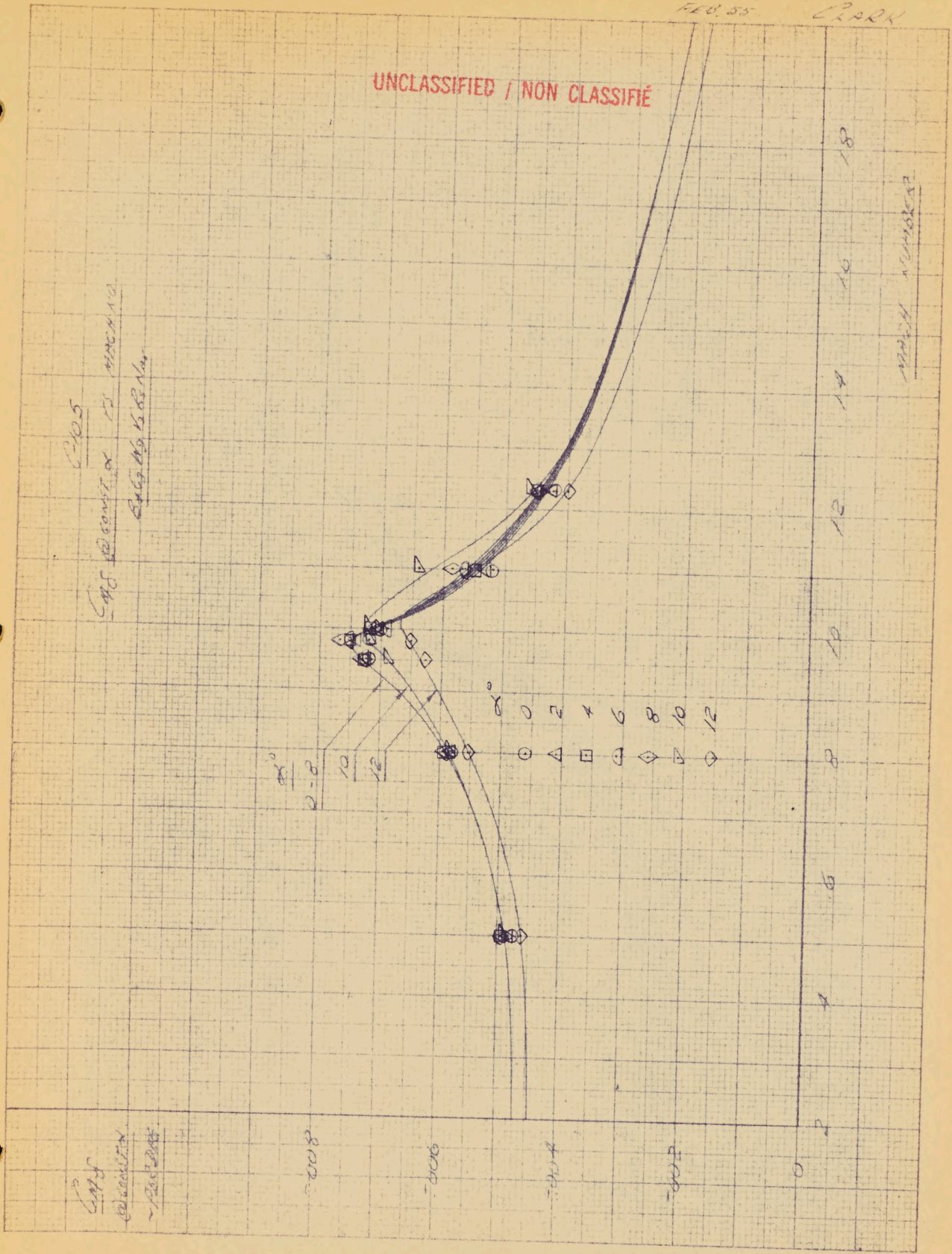
10 X 10 TO THE 15 INCH
HUFFEL & ESSER CO. MADE IN U.S.A.

800
800
800
800

0-2
10
12

0
2
4
6
8
10
12

0 2 4 6 8 10 12 14 16 18 20 21 22 24 26 28 30 31 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100

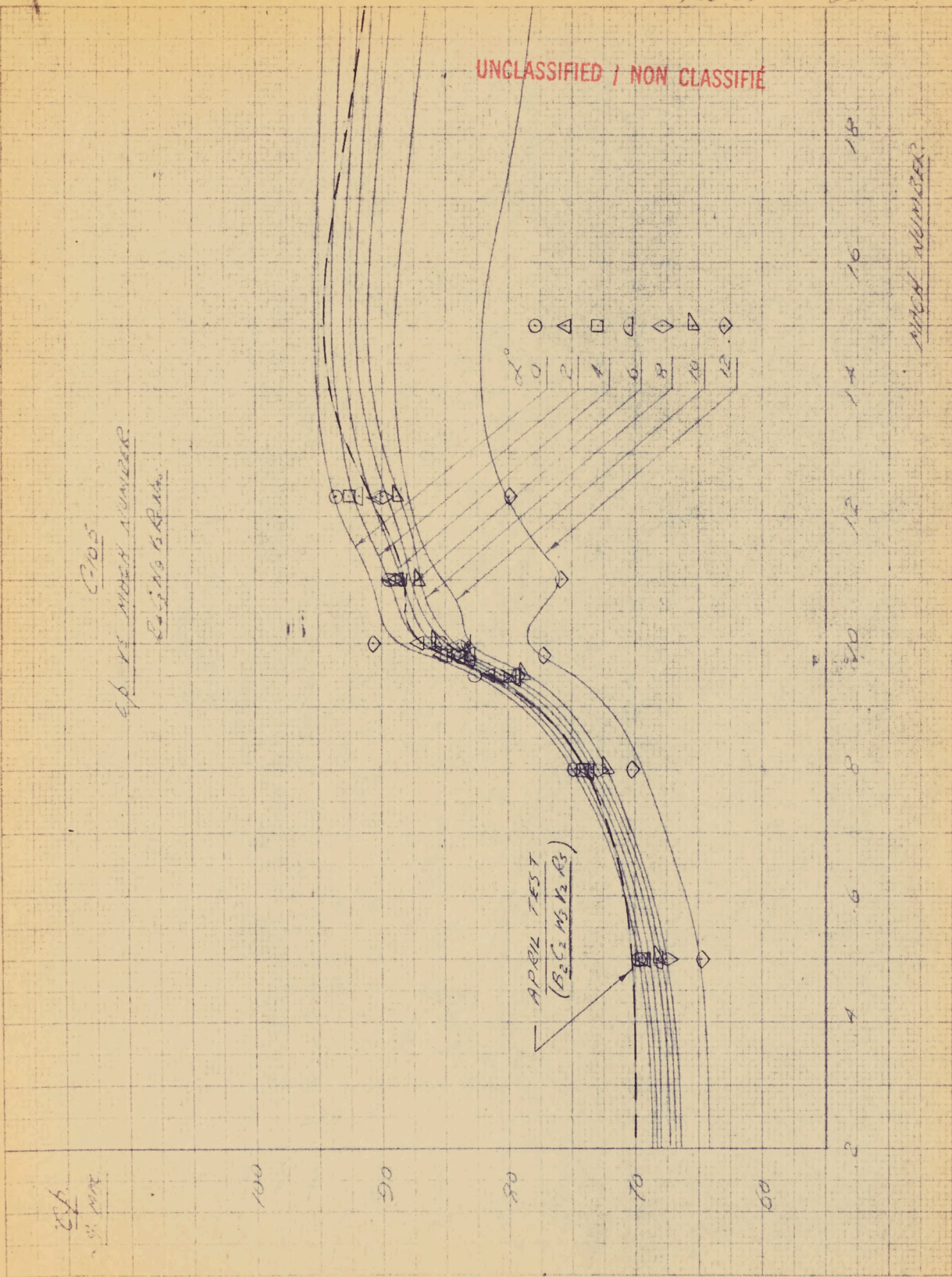


3.4.22 P/W.T. 151^{1/2}

148 55

CRK.

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4.1.1. P/WIND TUNNEL/SI
Dec 54. Knapkowski

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C105

C_M vs Mach No

$\beta \approx 3^\circ$

RIGID

B₁ C₁ 1/9 1/2 R₂ 1/8

C.G. = 28% C

C_M
PER DEG

0.006
0.004
0.002
0
-0.002
-0.004
-0.006
-0.008

$\alpha = 7^\circ$
10°
6°
2°
 $\alpha = 0^\circ$

MACH No

18

7/6

14

12

10

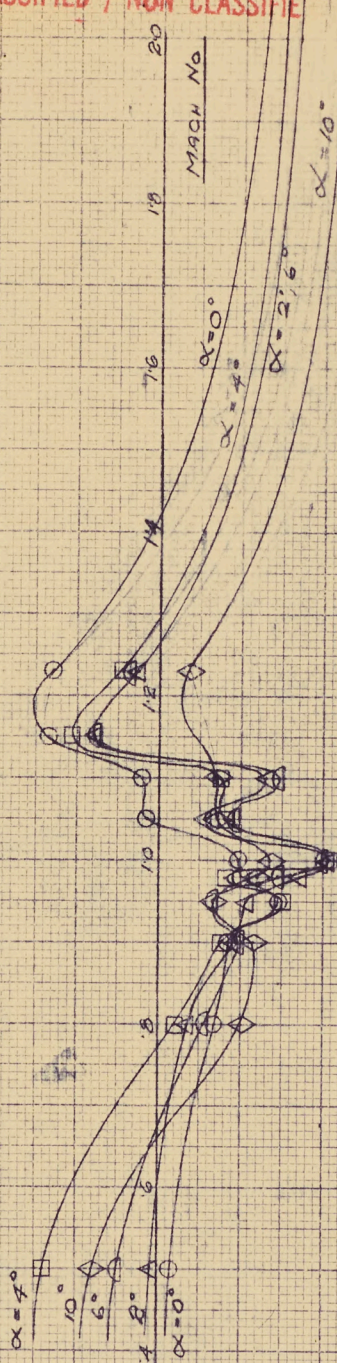
8

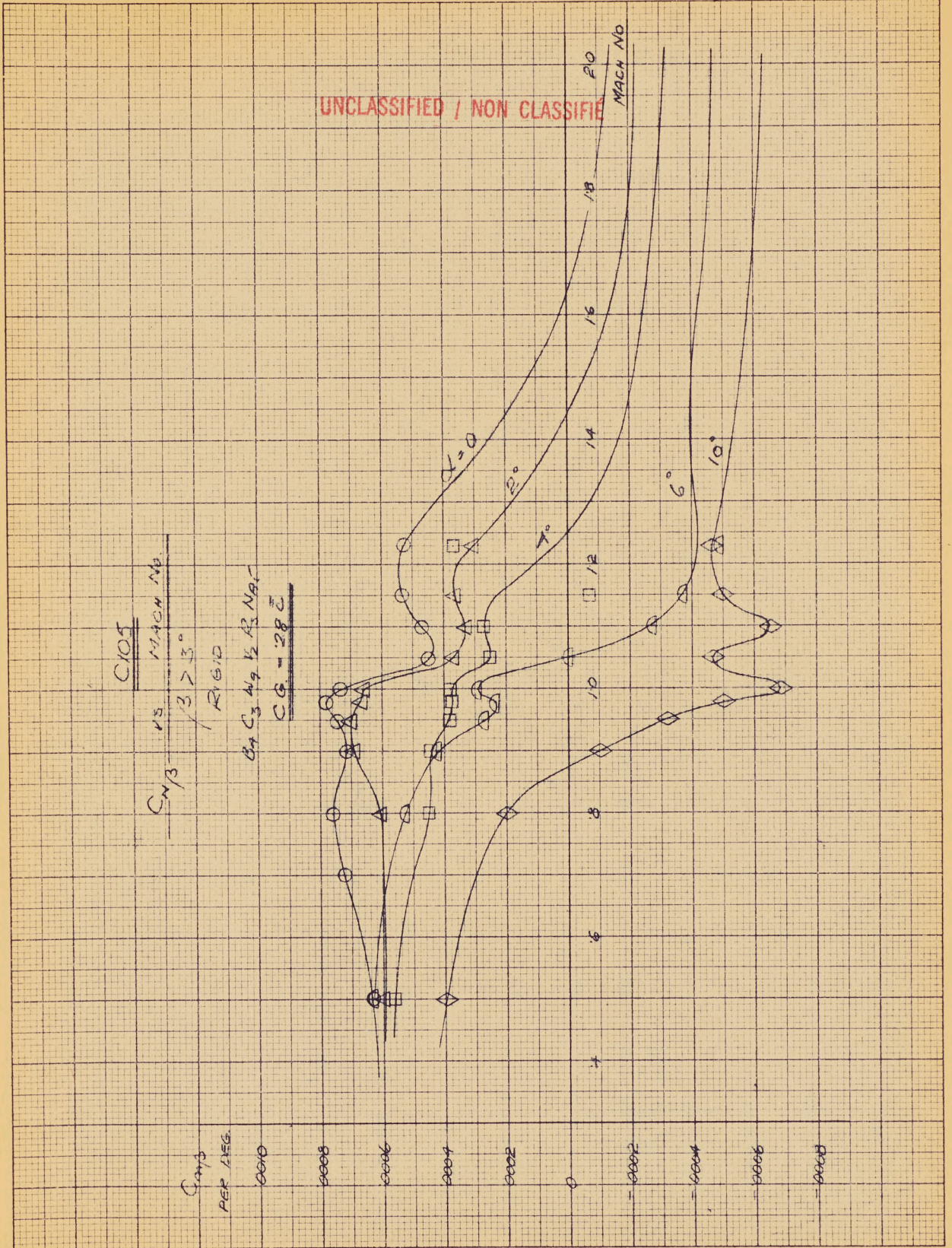
6

4

2

0





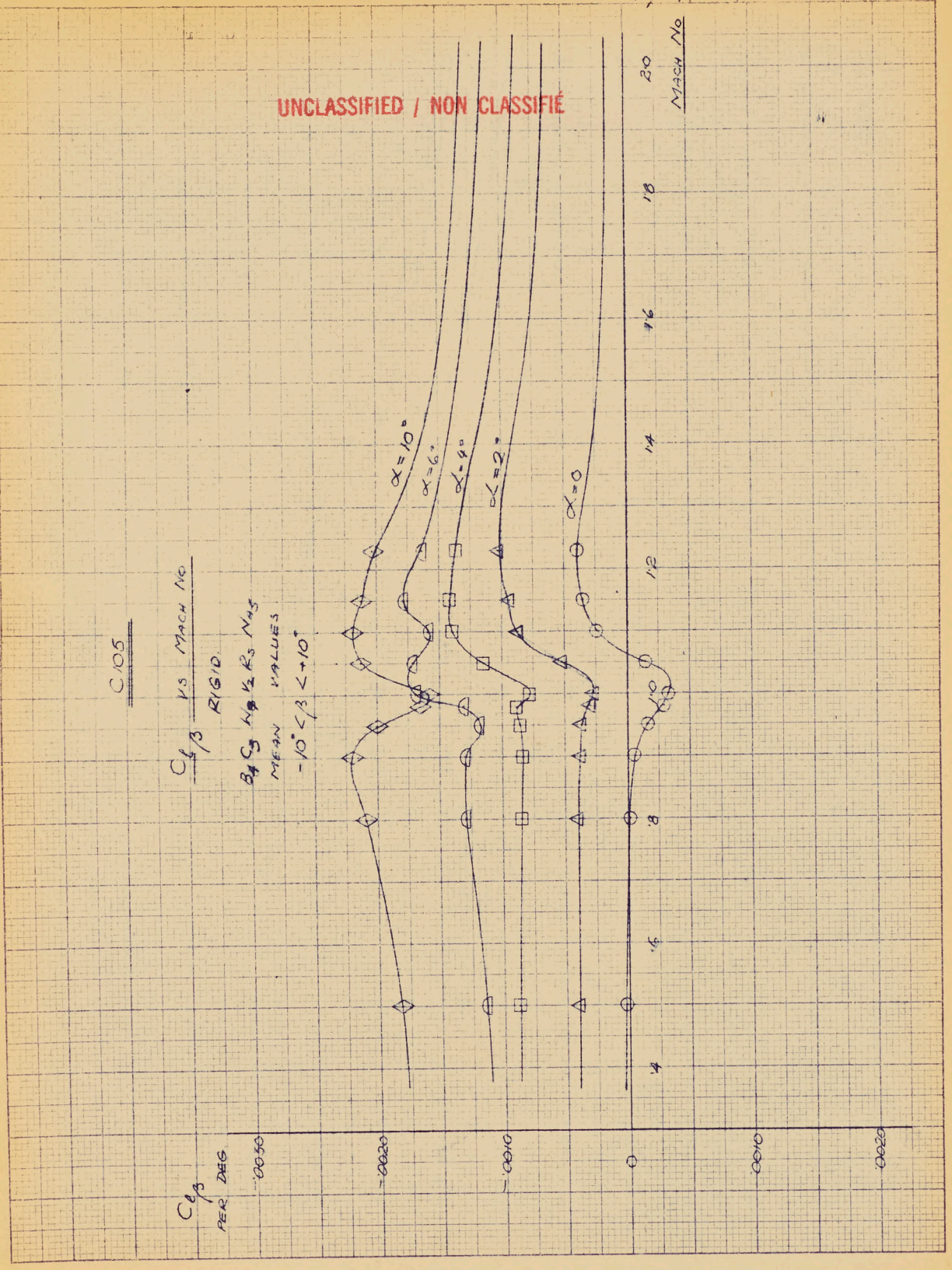
UNCLASSIFIED / NON CLASSIFIE

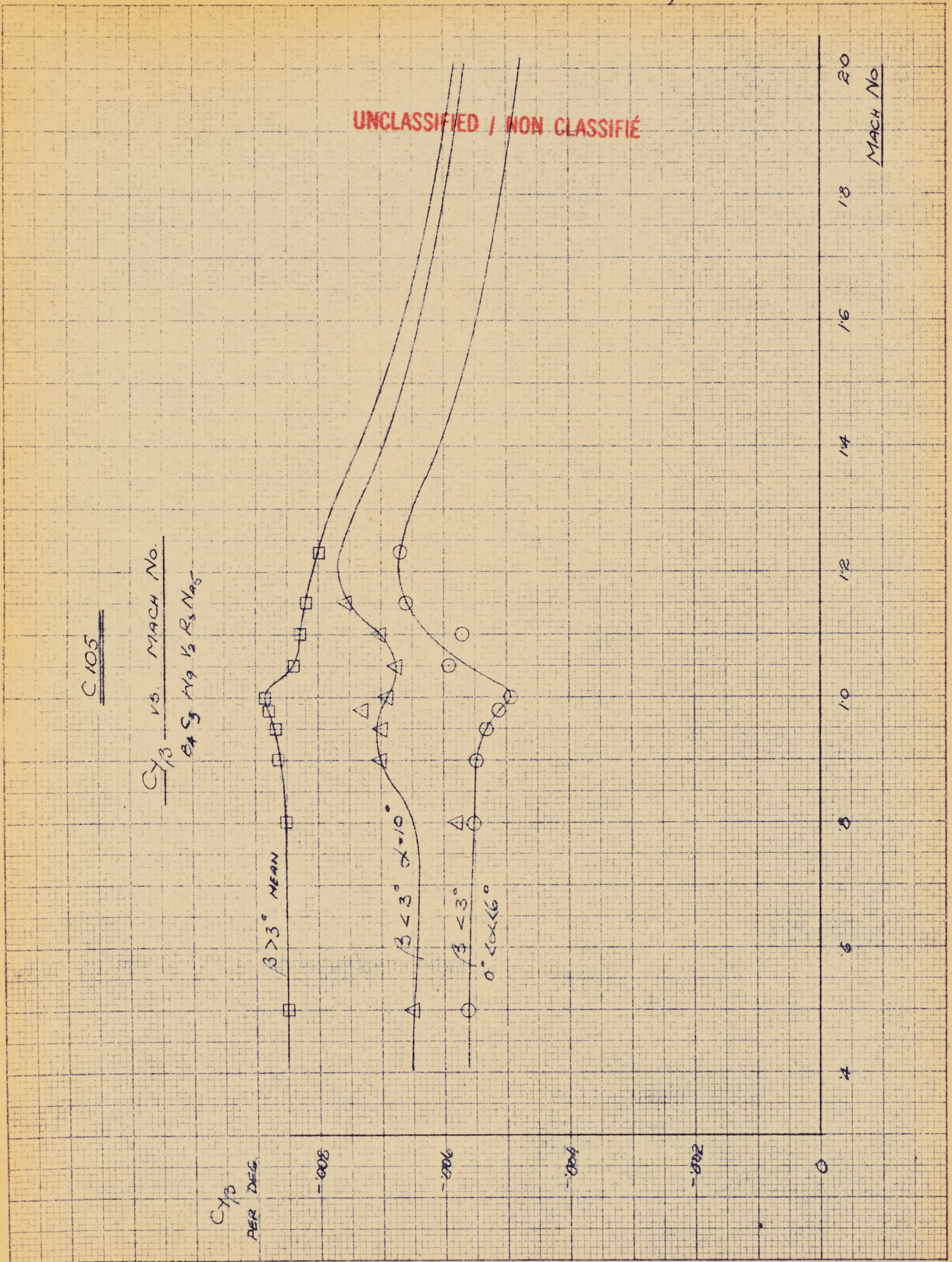
C105

$C_{f\beta}$ VS MACH No
 RIGID.
 By $S_{1/2}$ & $S_{2/3}$ Nos
 MEAN VALUES
 $-10^\circ < \beta < +10^\circ$

$C_{f\beta}$
 PER DEG

MACH No



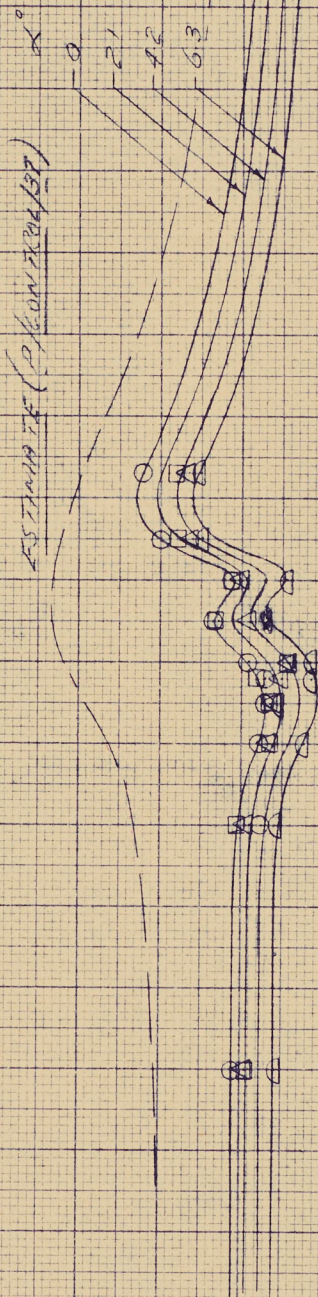


G-205
 CHEMICAL ANALYSIS TESTS (DET-5-A)
 Q.M. IS, MARCH 1954
 1-488-10
 CONFID: BAG 3 NO 2 K3 NMS

Q.M. 1
 -PER DEG.

0.8
 0.6
 0.4
 0.2

α°
 ○ 0
 △ 21
 □ 42
 ◐ 63



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MIRE NUMBER

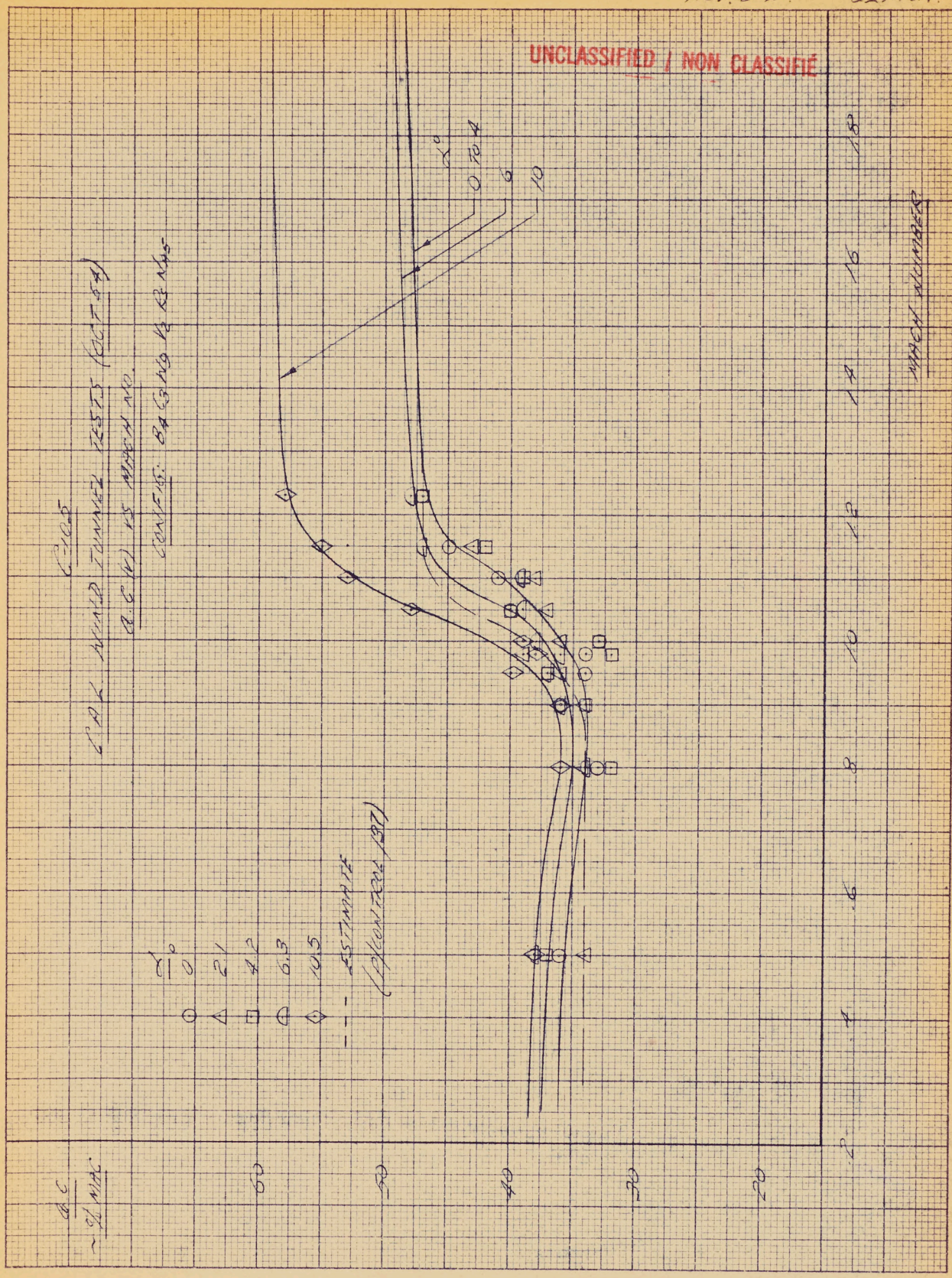
5.2. P/W/T/51
 Nov. 54. CLARK

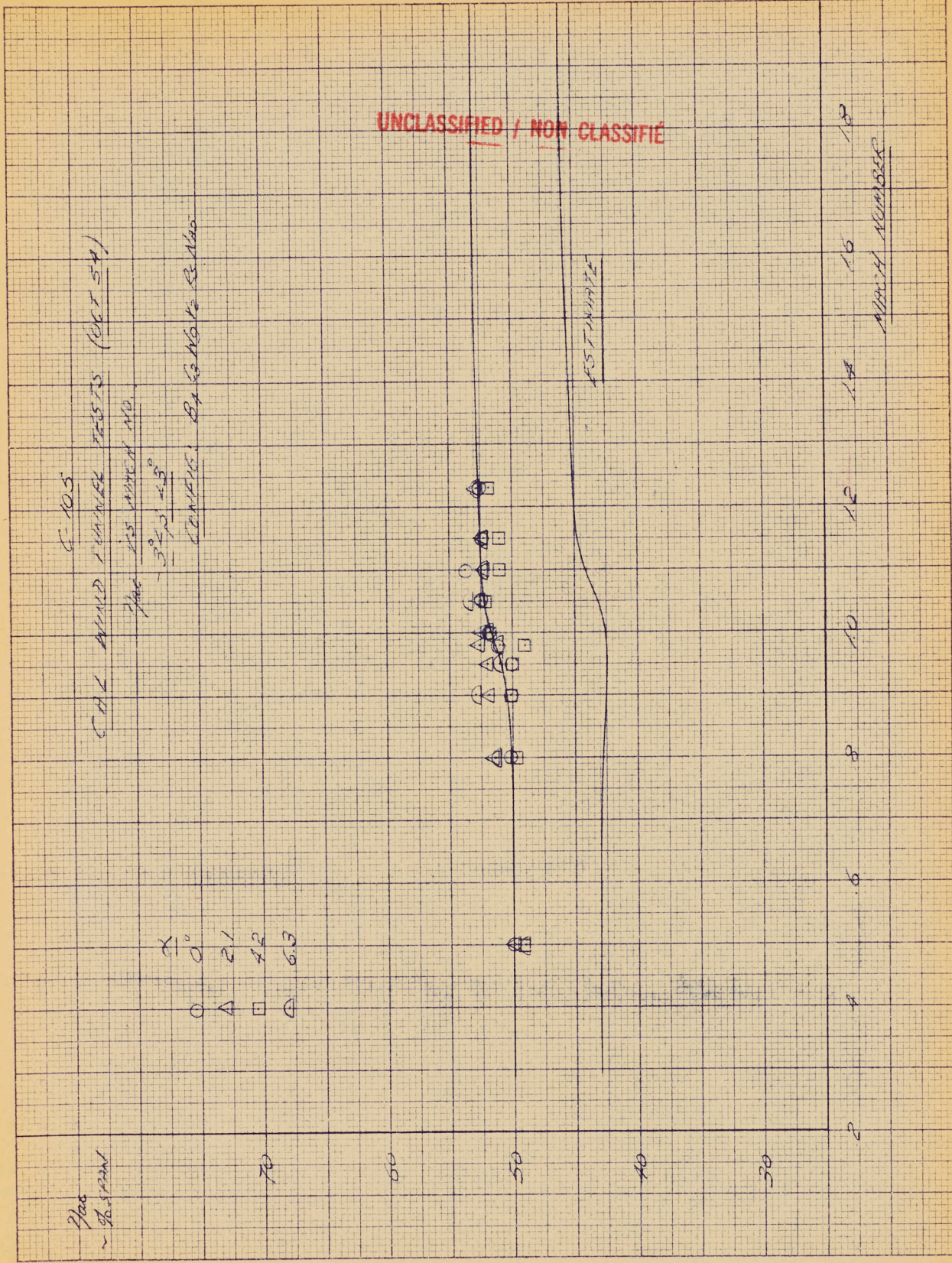
K&E 10 X 10 TO THE 1/2 INCH
 KEUFFEL & ESSER CO. 359-12
 MADE IN U.S.A.

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CLARK
 CLARK AIRMAIL TUNNEL TESTS (FACT 54)
 (B.C.N.) IS MICHEN NO.
 CONFIDENTIAL: BACING & READING

$\frac{\alpha}{\rho}$
 0
 21
 42
 63
 105
 --- ESTIMATE
 (P/CONFIDENTIAL)





C-105

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

C_{msc} VS MACH NO.

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

CONFIG. B₄C₃W₁N₄S V₂R₃
ONLY RIGHT ALLERON DEFLECTED.

C_{msc}
PER DEG.

-0.0020

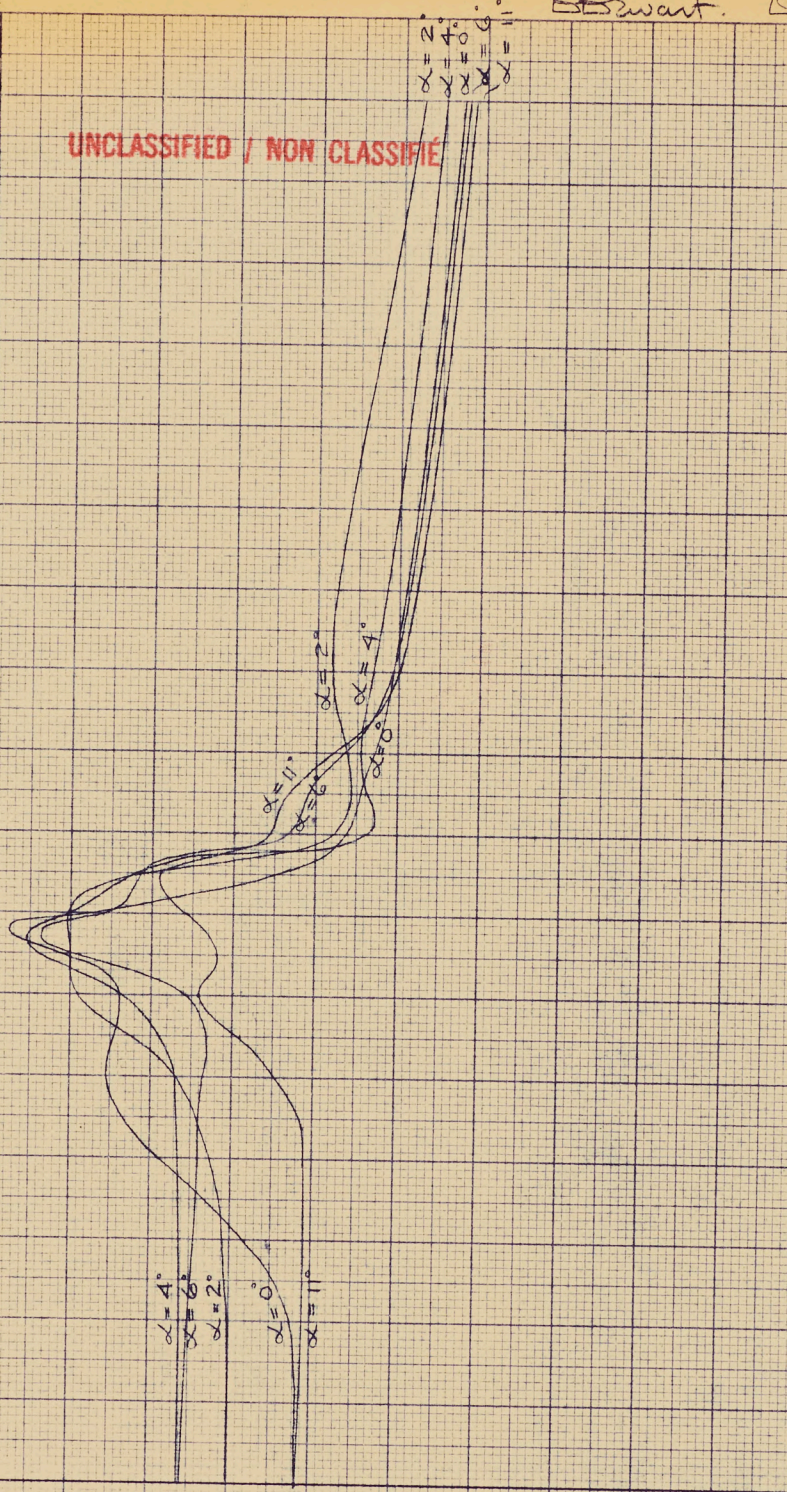
-0.0015

-0.0010

-0.0005

0

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MACH NO.
0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

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

C-105
 C.A.I.L. WIND TUNNEL TESTS OCT '54

$C_{L_{\delta a}}$ vs MACH NO.

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

$C_{L_{\delta a}}$
 PER DEG.

CONFIG. B₄C₃M₄N₄S V₂R₅
 ONLY RIGHT AILERON DEFLECTED

.004

$\alpha = 2^\circ$

$\alpha = 11^\circ$

$\alpha = 6^\circ$

$\alpha = 0^\circ$

$\alpha = 4^\circ$

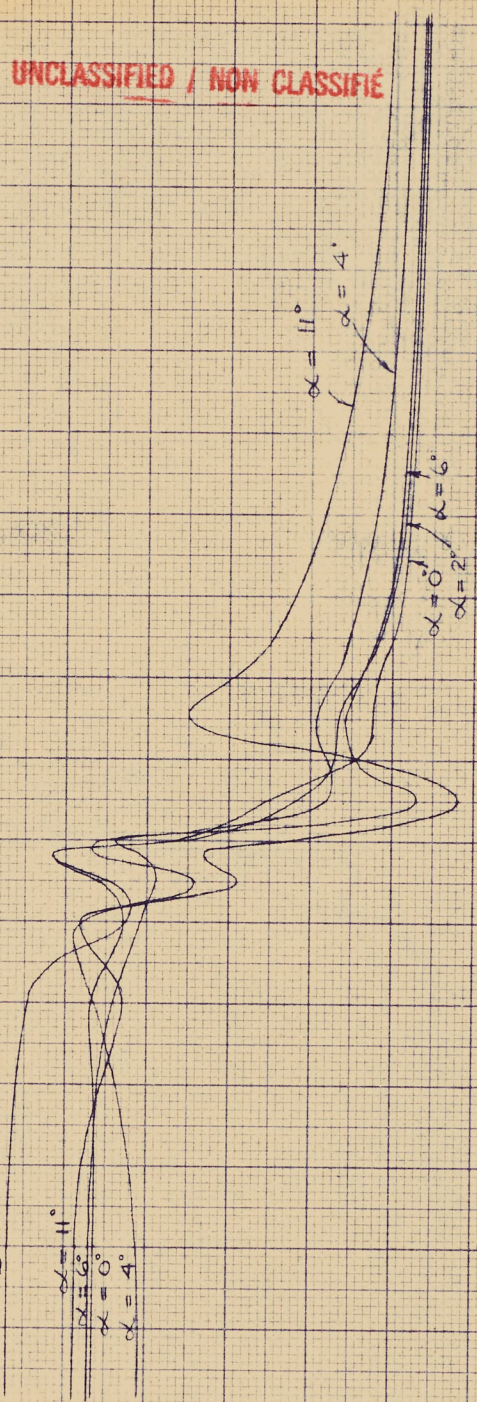
.003

.002

.001

0

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.4 .6 .8 1.0 1.2 1.4 1.6 1.8 2.0
 MACH NO.

3.42
3.05
 $(\alpha = 6^\circ)$ $(\alpha = 11^\circ)$

C-105

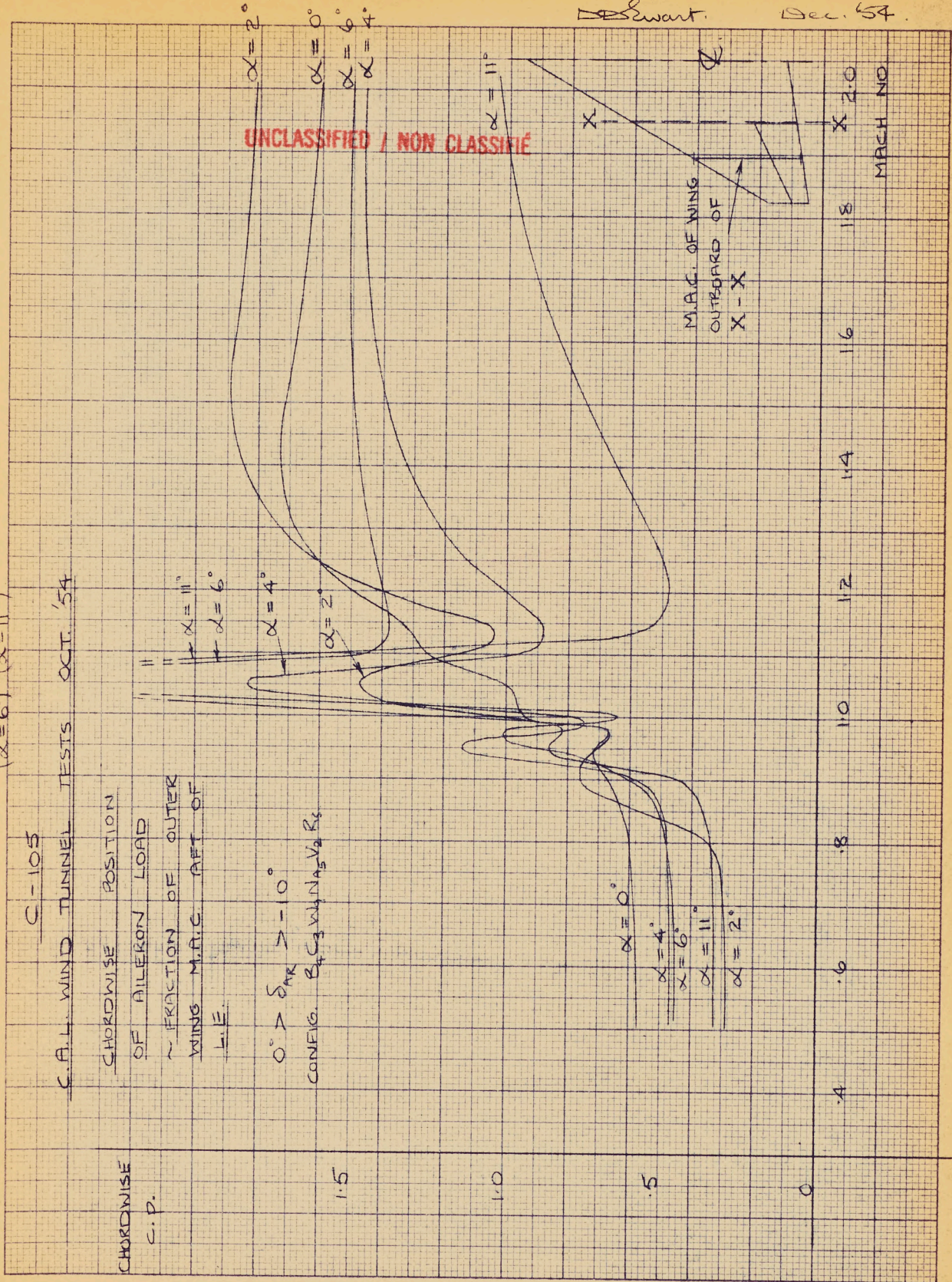
S.A.L. WIND TUNNEL TESTS OCT. '54

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

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

CONFIG. B₁ C₁ W₁ N₁ V₁ R₁

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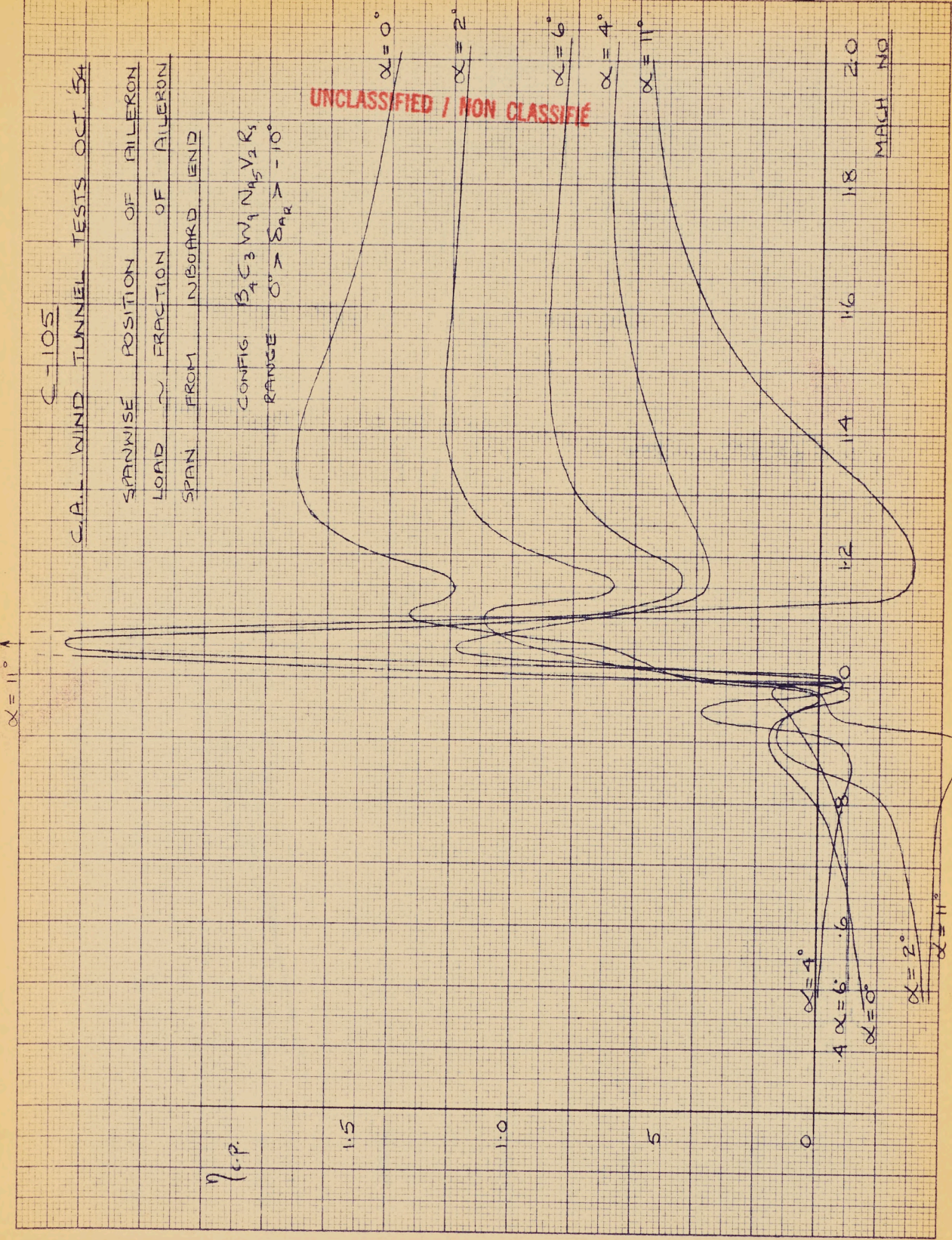


C-105
C.A.L. WIND TUNNEL TESTS OCT. 54

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

CONFIG. $B_4 C_3 W_4 N_{A_5} V_2 R_3$
RANGE $0^\circ > \delta_{AK} > -10^\circ$

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

$C_{L\delta_a}$ VS MACH NO.

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

ONLY RIGHT AIRLIFTON DEFLECTED.
CONFIG. $B_4 C_3 W_4 N_4 S V_2 R$

PER DES.
 $C_{L\delta_a}$

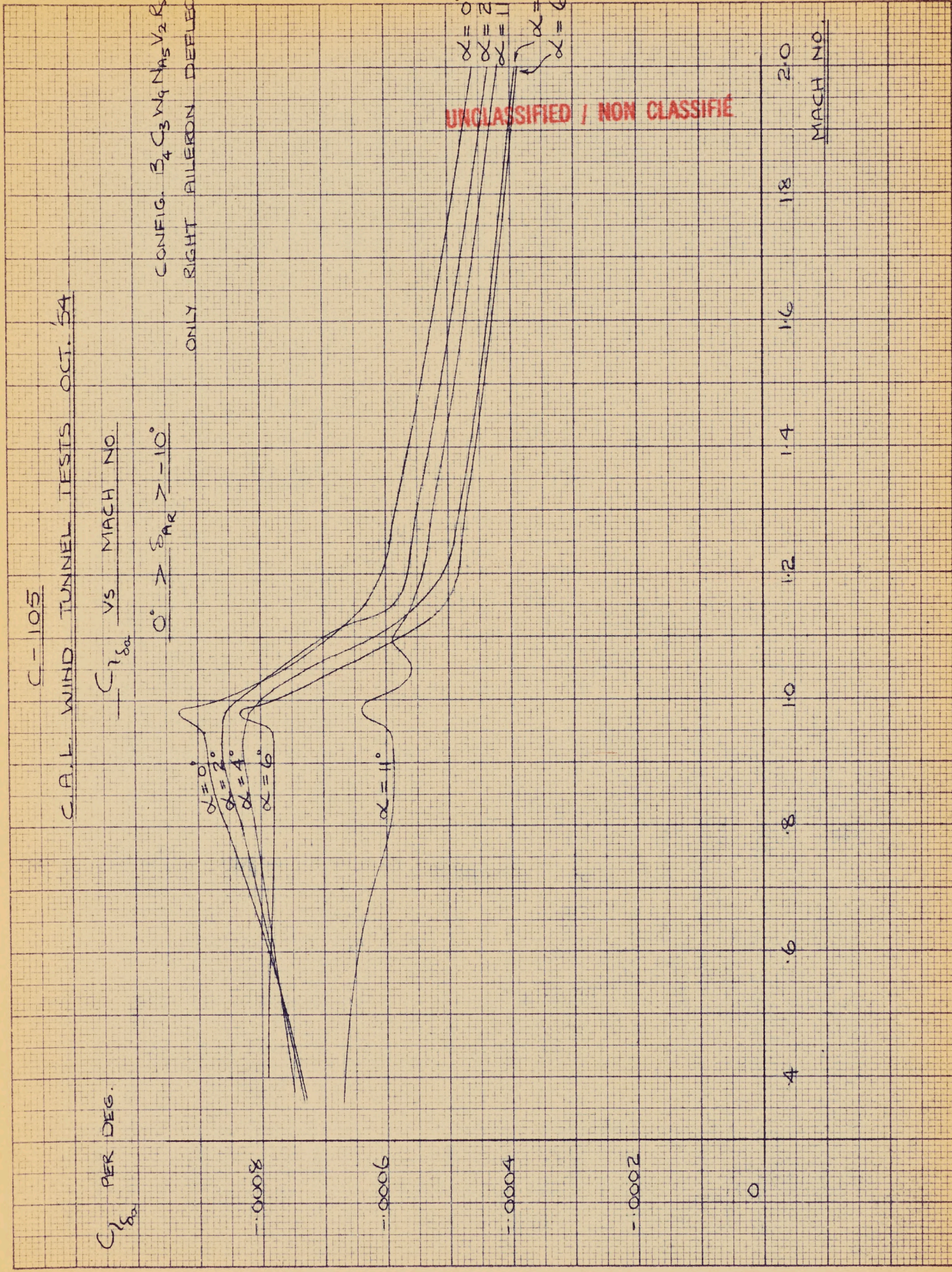
$\alpha = 0^\circ$
 $\alpha = 2^\circ$
 $\alpha = 4^\circ$
 $\alpha = 6^\circ$

$\alpha = 11^\circ$

$\alpha = 0^\circ$
 $\alpha = 2^\circ$
 $\alpha = 4^\circ$
 $\alpha = 6^\circ$

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MACH NO.



71

P/WT/51

Doc 5A.

CLARK

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540
ELEVATOR

6705
ELEVATOR IS MARKED

08

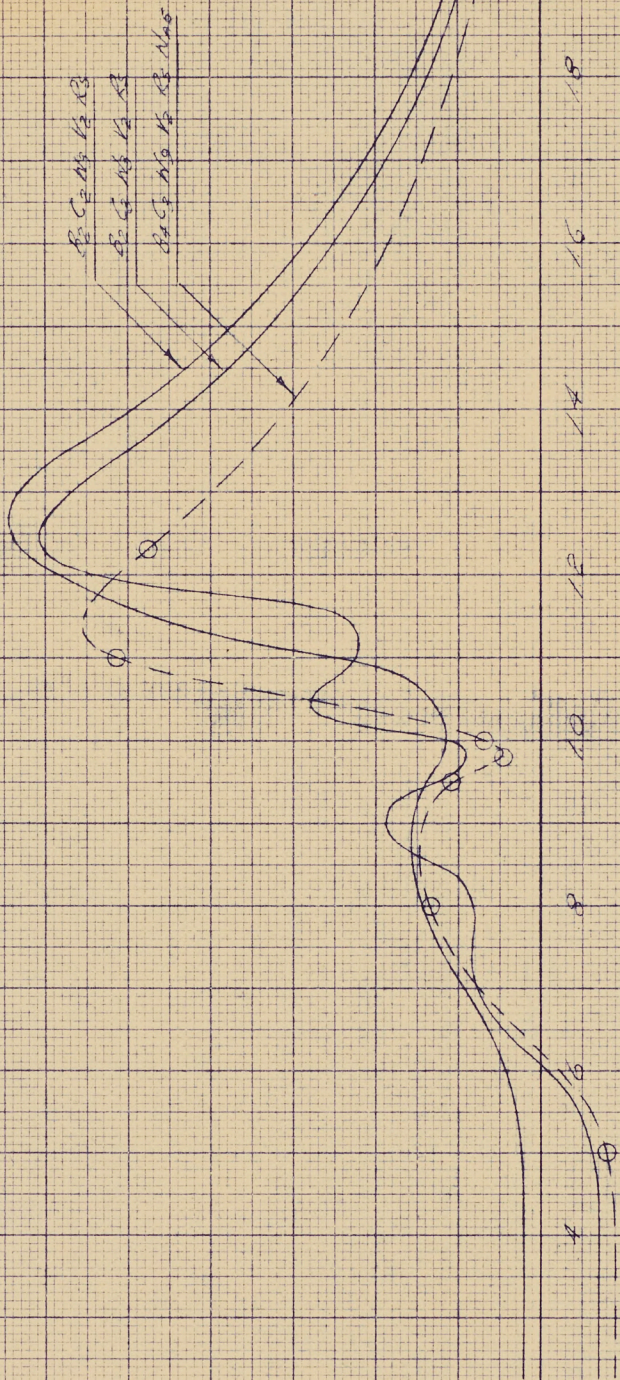
06

04

02

0

02



MACH NUMBER

18

16

14

12

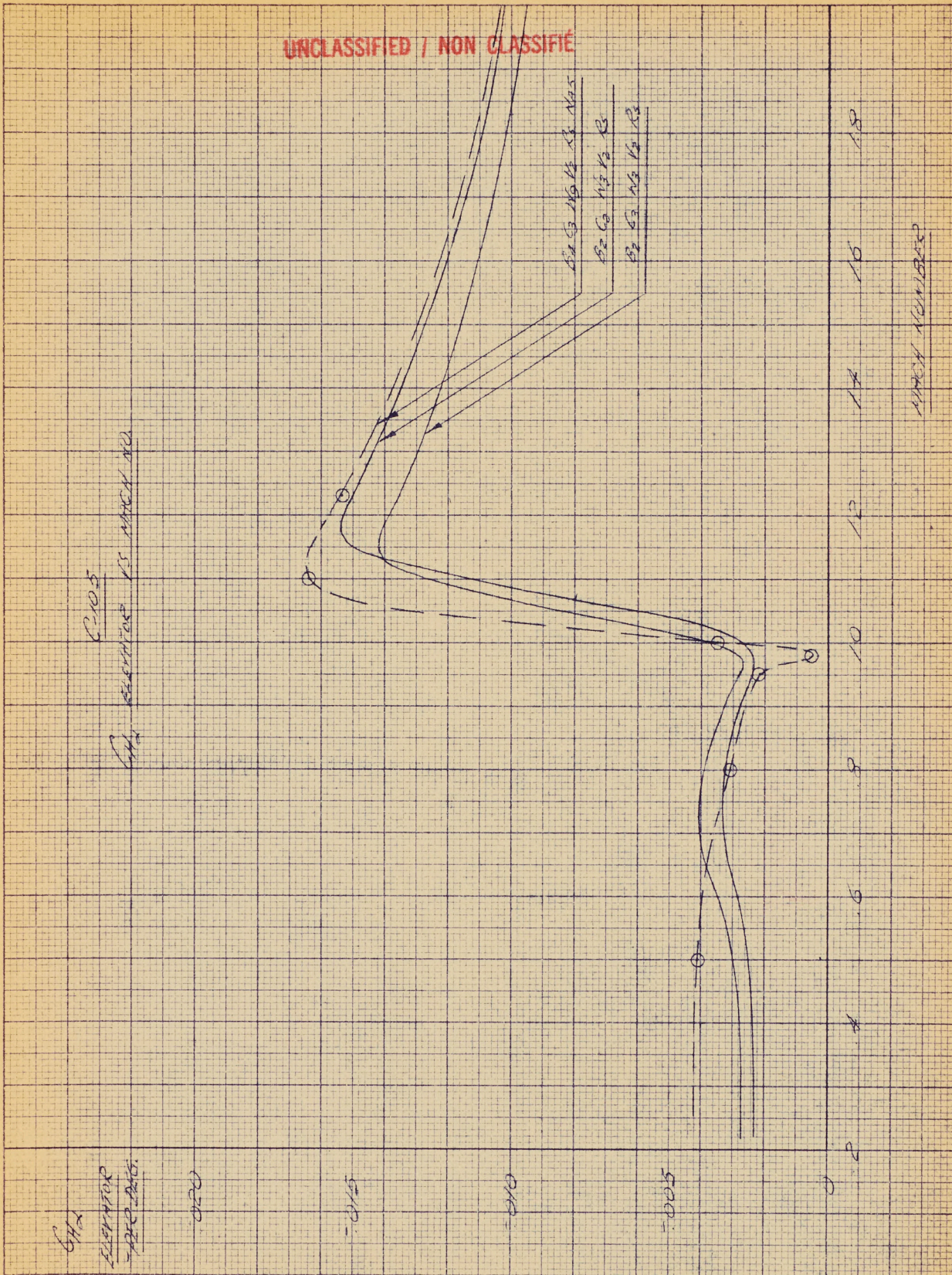
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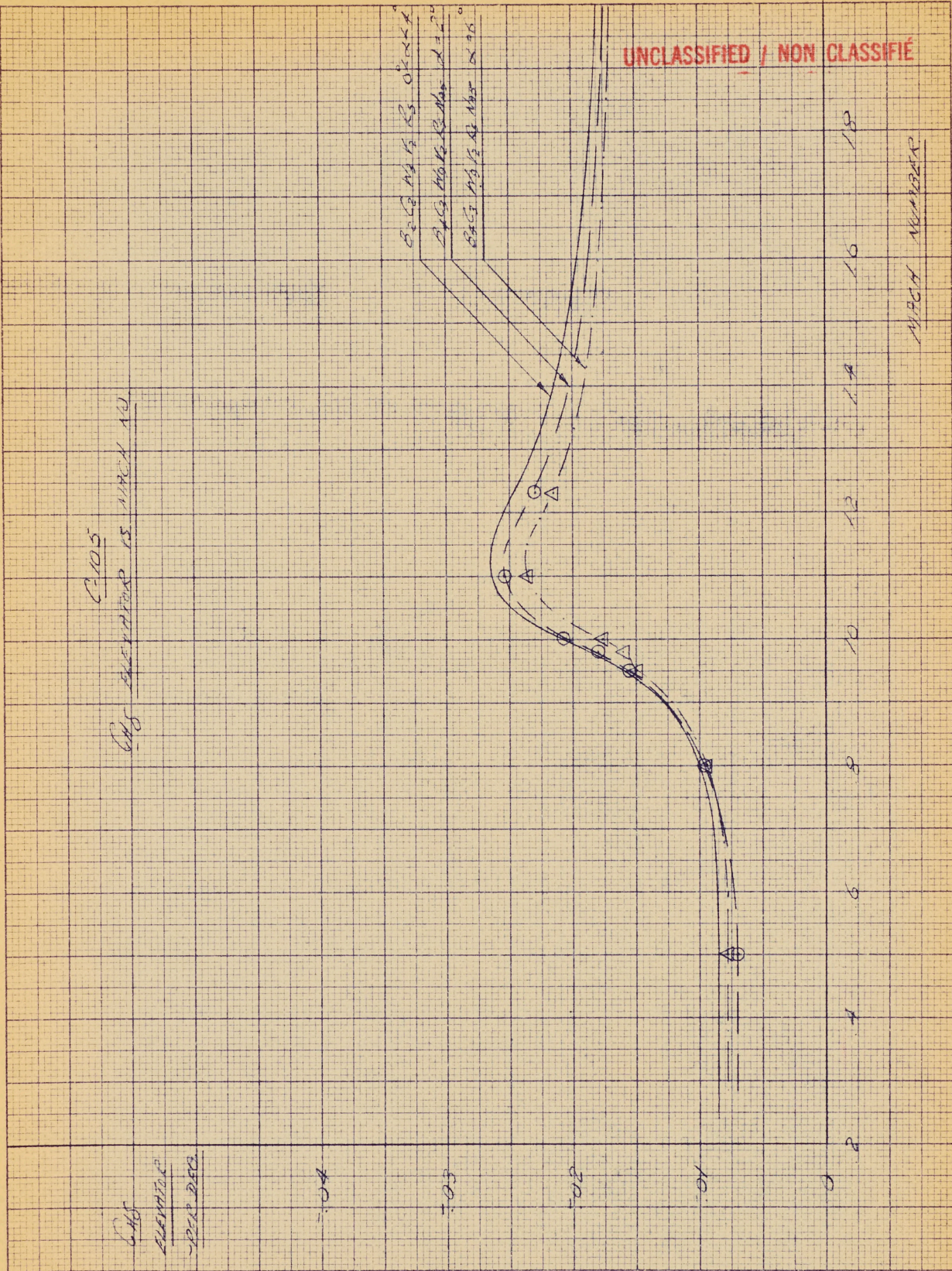
8

6

4

UNCLASSIFIED / NON CLASSIFIE





C-105
C-105

C-105
ELEMENT
-PER DEC

04

03

02

01

0

UNCLASSIFIED / NON CLASSIFIE

MARCH NUMBER

R.I. P/W.T./51
NR58 CLARK.

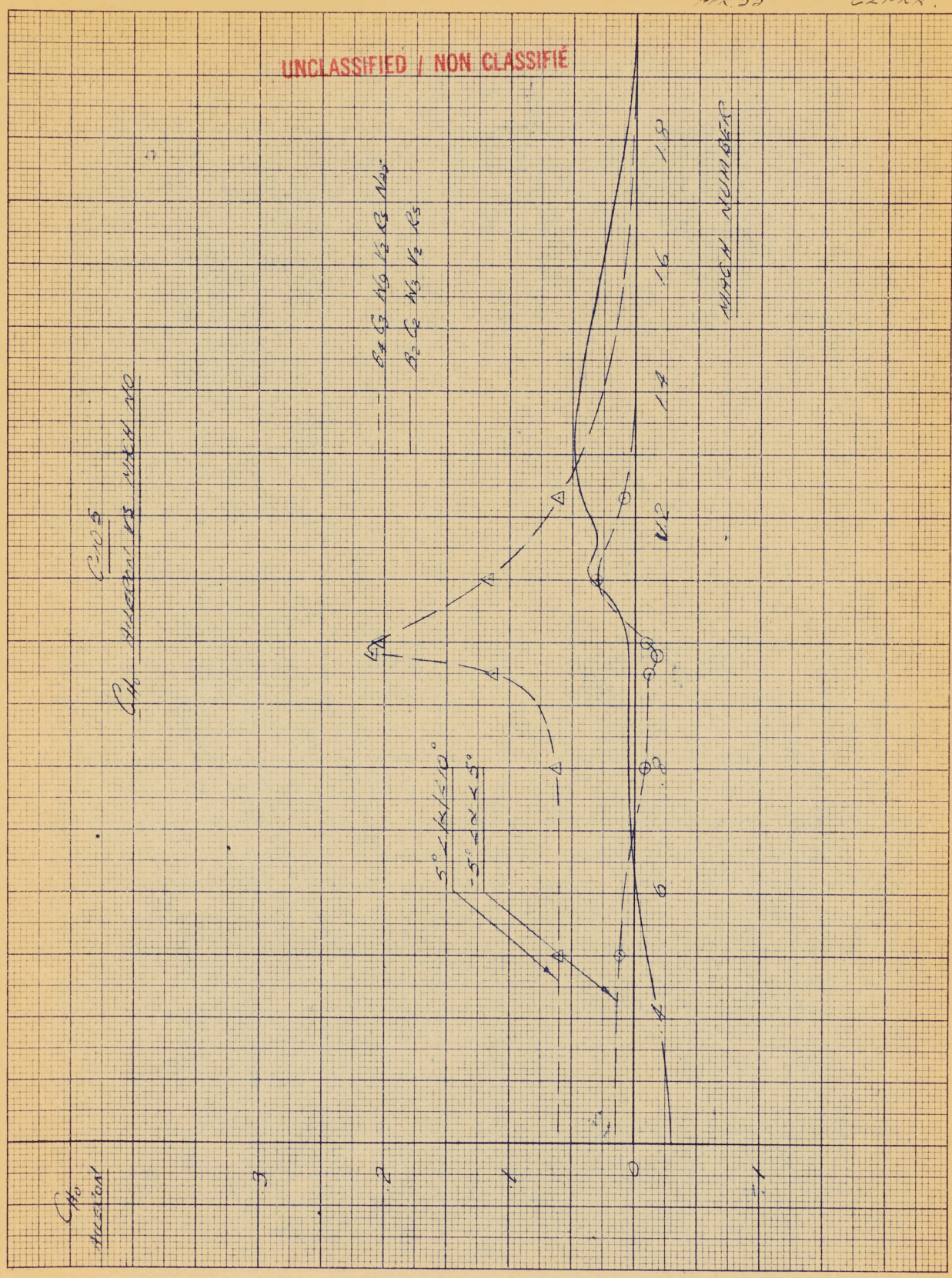
UNCLASSIFIED / NON CLASSIFIED

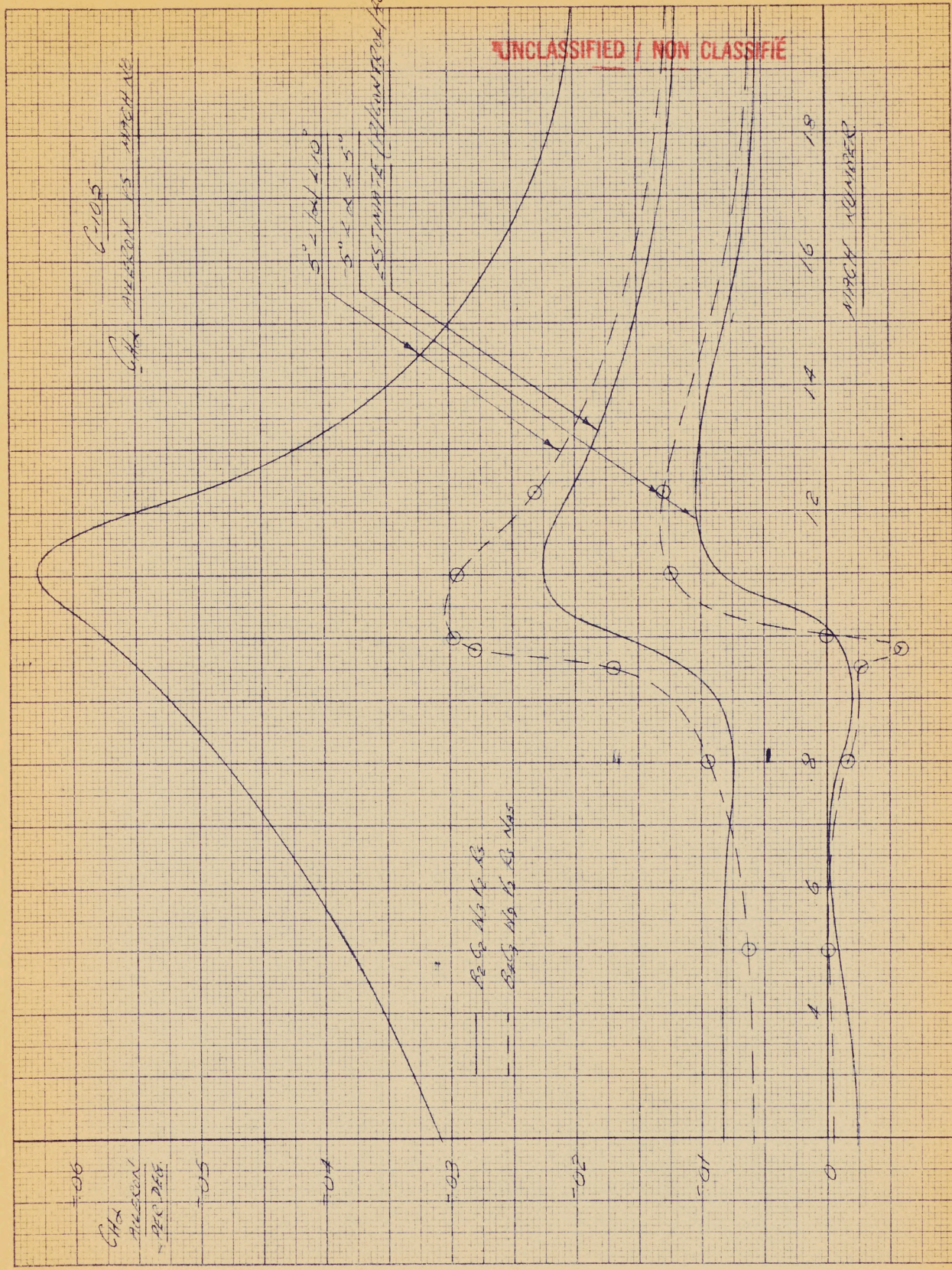
CH₀
Actual

CH₀ Subsequent to NR58

--- B₁ G₁ H₁ I₁ K₁ M₁ P₁
— B₂ G₂ H₂ I₂ K₂ M₂ P₂

MARK NUMBER





C-102
CLARK AUSTON IS APPROXIMATE

5" = 1/2" x 10"
5" = 1" x 5"
= ESTIMATE (W/ UNIFORM AG)

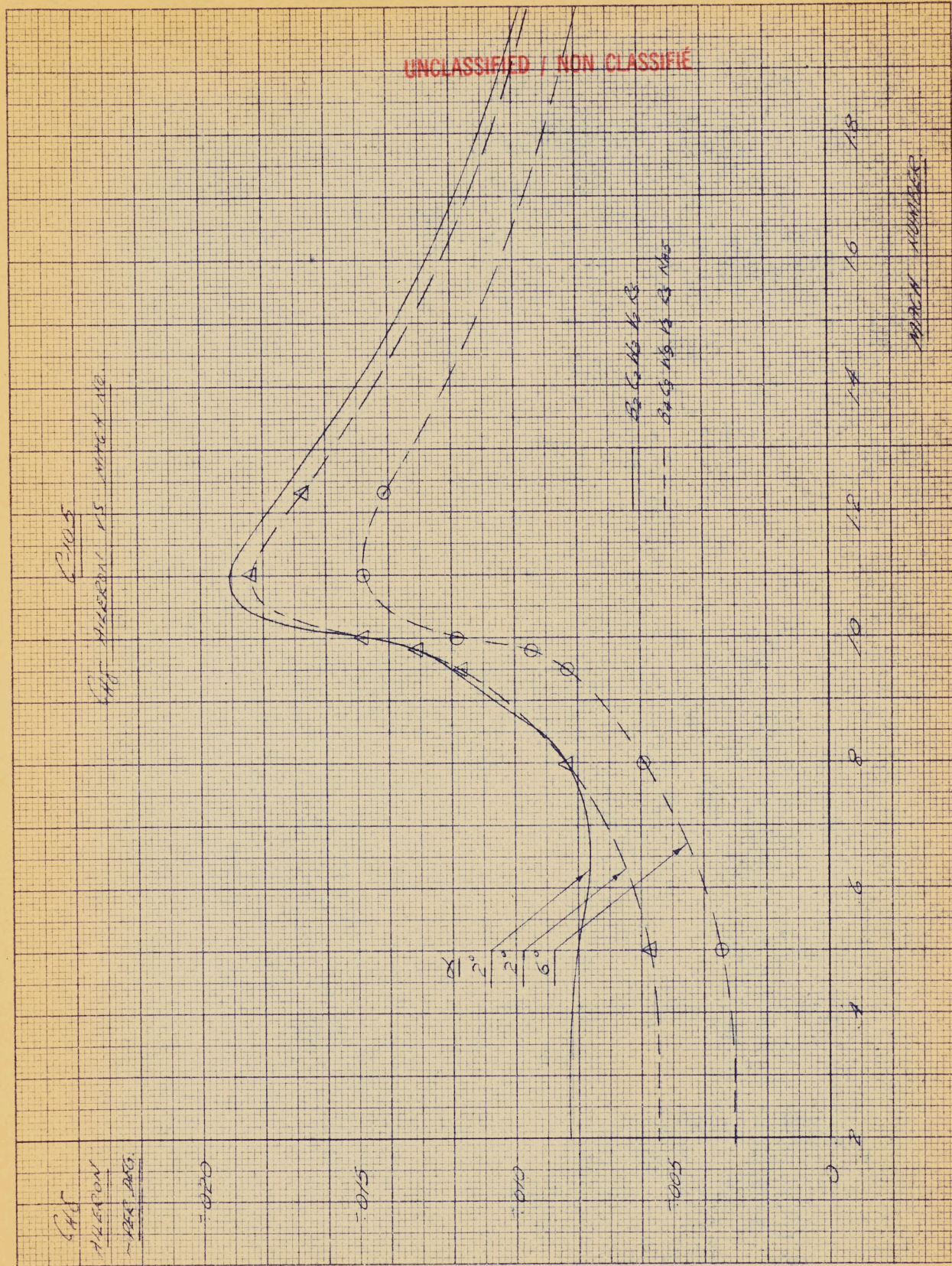
MARCH NUMBER

06
CLARK AUSTON
- REC. DEF.

--- AG 1/2 x 10
--- BACK AG 1/2 x 10

05
04
03
02
01
0

18
16
14
12
10
8
6
4
2
0



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