QCX
Avro
CF105
P-WT-49

C-105 ~~SECRET~~ P/WT/49

...ssification cancelled / Changed to UNCLAS

...thority of: C.A.L. WIND TUNNEL TESTS AVRO

ANALYZED CORRECTED PLOTS

...ature

OCT. 1954 ...Rank / Appointment AVRO Copy 1

INDEX

(October 1954 C.A.L. Tests)

N.B. Configuration Includes C_3 V_2 R_5 In All Cases

SHEET	1	2	3	4	5	6	7	8	9	10
RUNS	1066, 1077,-1082,	1067, 1069-1075	1065, 1084, 1086-1091	1036, 1038-1043	1064, 1053, 1046-1051	1061, 1063, 1054-1059	1024-1030	1094, 1095, 1097-1104	1107-1116	1128, 1121,-1126
δe	10	0	-5	-10	-20	-30	-10	0	0	0
δAR	0	0	0	0	0	0	0	0	0	0
α°	VAR	→					→	0	2	4
β°	0	→					→	-12 to +12	→	→
Configuration	$B_4 W_9 N_{A5}$	→				→	B_4 W_9	$B_4 W_9 N_{A5}$	→	→
Section	← LONGITUDINAL STABILITY →							← DIRECTIONAL STABILIT		
1 C_M vs C_L	X	X	X	X	X	X				
2 C_D vs C_L	X	X	X	X	X	X				
3 C_D vs C_L^2	X	X	X	X	X	X				
4 C_L	X	X	X	X	X	X				
5 C_M	X	X	X	X	X	X				
6 C_D										
7 C_N								X	X	X
8 C_Y								X	X	X
9 C_l		X						X	X	X
10 C_{Nf}								X	X	X
11 C_{MfLE}										
12 C_{MfR}										
13 C_{HAL}										
14 C_{HAR}		X								
15 C_{HE}	X	X	X	X	X	X				
16 C_{HR}										
17 C_{MfR} vs C_{Nf}								X	X	X
18 C_{MfLE} vs C_{Nf}								X	X	X

FORM 1544

A. V. ROE CANADA LIM

MALTON, ONTARIO

ENGINEERING DIVISION — AIRCRAF

AIRCRAFT - - c 105

WEIGHT - -

C. G. POSITION - 28 %

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
-	1128, 1121,- 1126	1129, 1131- 1139	1140, 1142, 1144- 1152	1155, 1203, 1158- 1166	1204 1167 1176	1205, 1177- 1186	1189, 1190	1191, 1192	1209, 1210	1211, 1213	1194,	1195	1196	1197	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	-5	-10	-15	0	0	0	0	0	0	0	0	
	4	6	10	VAR	→	→	2	→	→	→	0	2	4	6	
	→	→	→	0	→	→	-12 to +12	→	- 8 to + 8	→	→	→	→	→	
	→	→	→	→	→	→	B_2 W_9 N_{A5}	B_2 W_9	B_4 W_3 N_{A8}	B_4 W_3 B_4 W_9 N_{A5T}	→	→	→	→ B_4	
NAL STABILITY	→	→	← AILERON C.	→	←	→	←	EFFECTS OF NOTCHES AND FUSELAGE	→	←	HIGH REYNOLD'S NO. RUNS				
				X	X	X									
				X	X	X									
	X	X	X				See P/WT/52				←		See	P/WT/52	
	X	X	X				See P/WT/52				X	See	Sheet	8.20	
	X	X	X	X	X	X	See P/WT/52				X	See	Sheet	9.20	
	X	X	X								X	See	Sheet	10.20	
				X	X	X									
	X	X	X								X	See	Sheet	17.20	
	X	X	X								X	See	Sheet	18.20	

A. V. ROE CANADA LIMITED

MALTON, ONTARIO

ENGINEERING DIVISION — AIRCRAFT

AIRCRAFT - - c 105

WEIGHT - -

C. G. POSITION - 28 %

REPORT NO. P/WIND TUNNEL/49

SHEET Tentative i

17	18	19	20	21	22	23	24	25	26	27	28	29
1191, 1192	1209, 1210	1211, 1213	1194,	1195	1196	1197	1201	1200	1199	1198		
0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0		
→	→	→	0	2	4	6	0	2	4	6		
→	- 8 to + 8	→								→		
A5	$B_2 W_9$	$B_4 W_3 N_{A8}$	$B_4 W_3 B_4 W_9$ NA5T	→	→	→	→	$B_4 W_9$ NA5	→	→		
	EFFECTS OF NOTCHES AND FUSELAGE →	→	→	HIGH REYNOLD'S NO. RUNS	→	→	→	→	→	→		
/WT/52	→	→	→	→	See	P/WT/52	→	→	→	→		
/WT/52	→	→	X	See	Sheet	8.20	X	See	Sheet	8.24		
/WT/52	→	→	X	See	Sheet	9.20	X	See	Sheet	9.24		
	→	→	X	See	Sheet	10.20	X	See	Sheet	10.24		
	→	→	X	See	Sheet	17.20	X	See	sheet	17.24		
	→	→	X	See	Sheet	18.20	X	See	sheet	18.24		

C-105

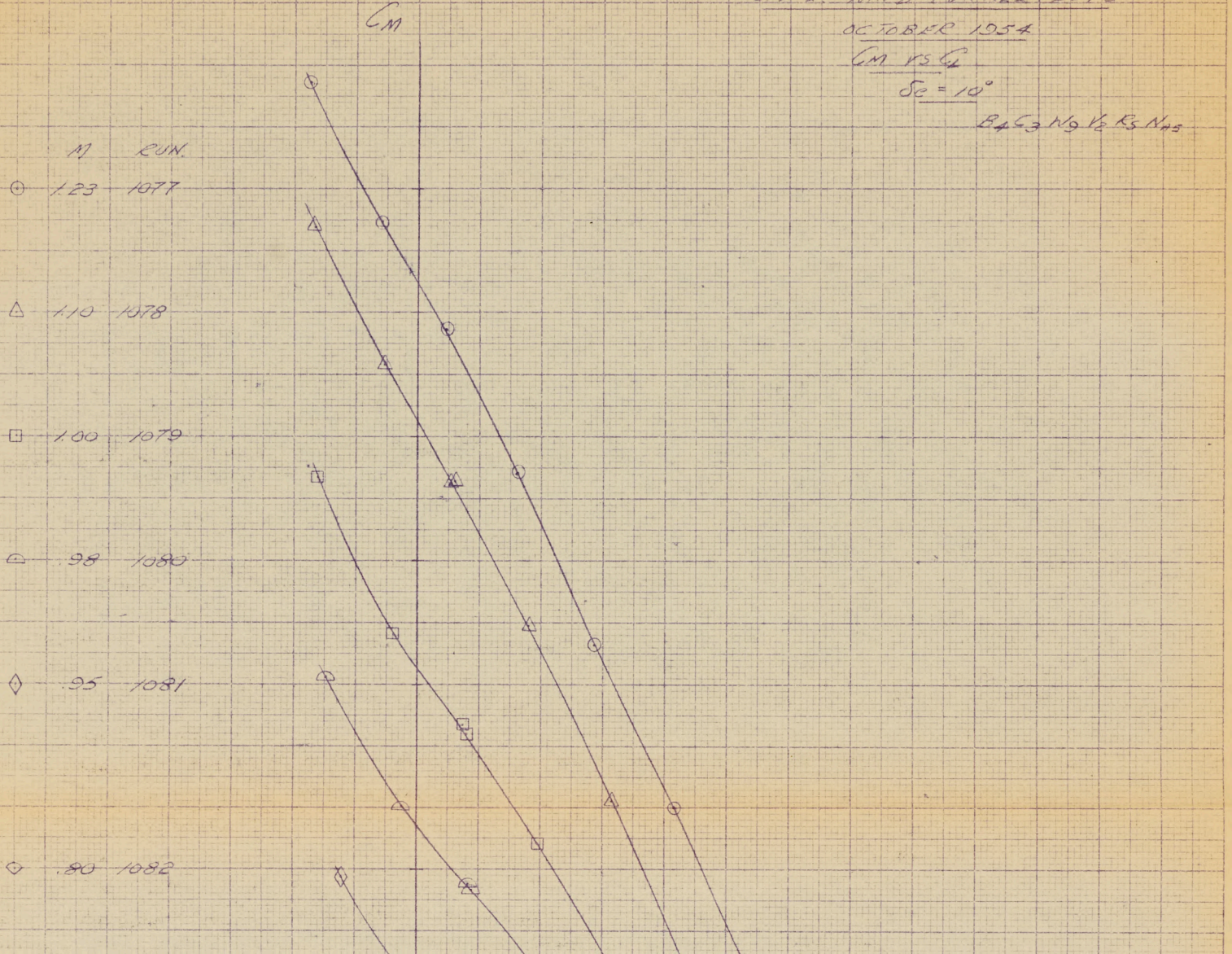
CAL. WIND TUNNEL TESTS

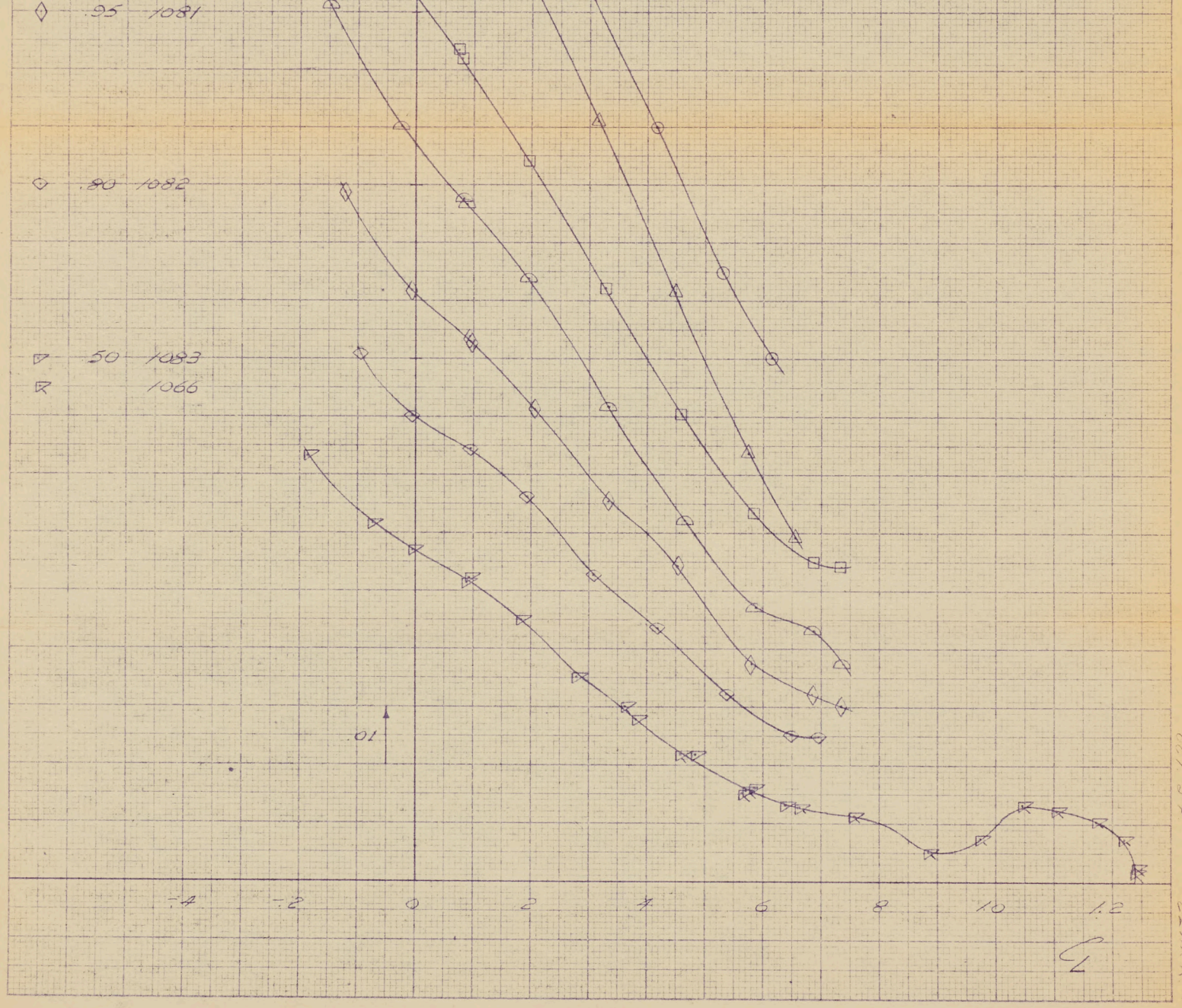
OCTOBER 1954

C_M VS C_L

$\delta_e = 10°$

$B_4 C_3 N_9 V_2 F_3 N_{25}$




.95 1081
.90 1082
.50 1083
1066
.01
-4
-2
0
2
4
6
8
10
12

C-105

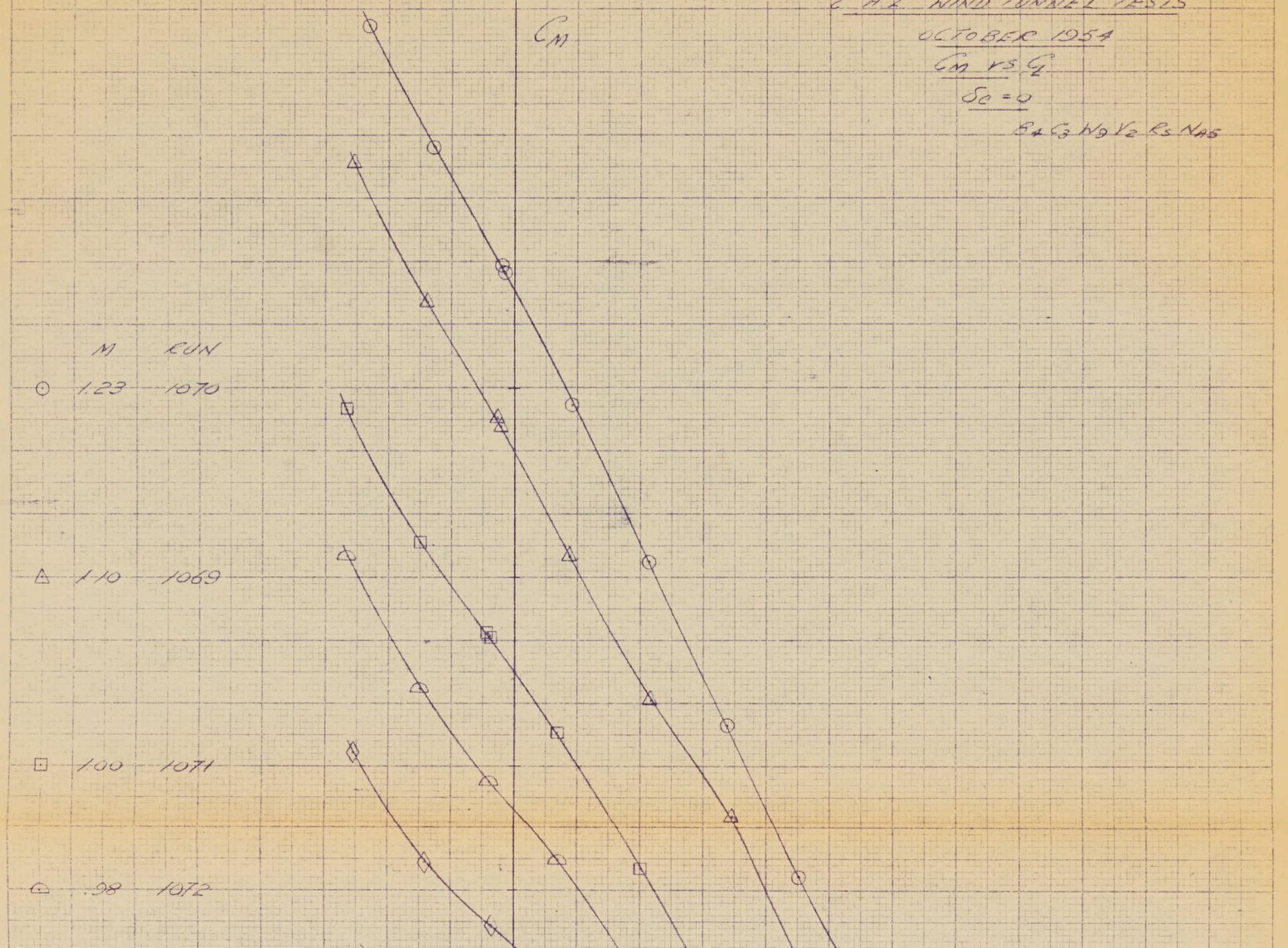
C.A.L. WIND TUNNEL TESTS

OCTOBER 1954

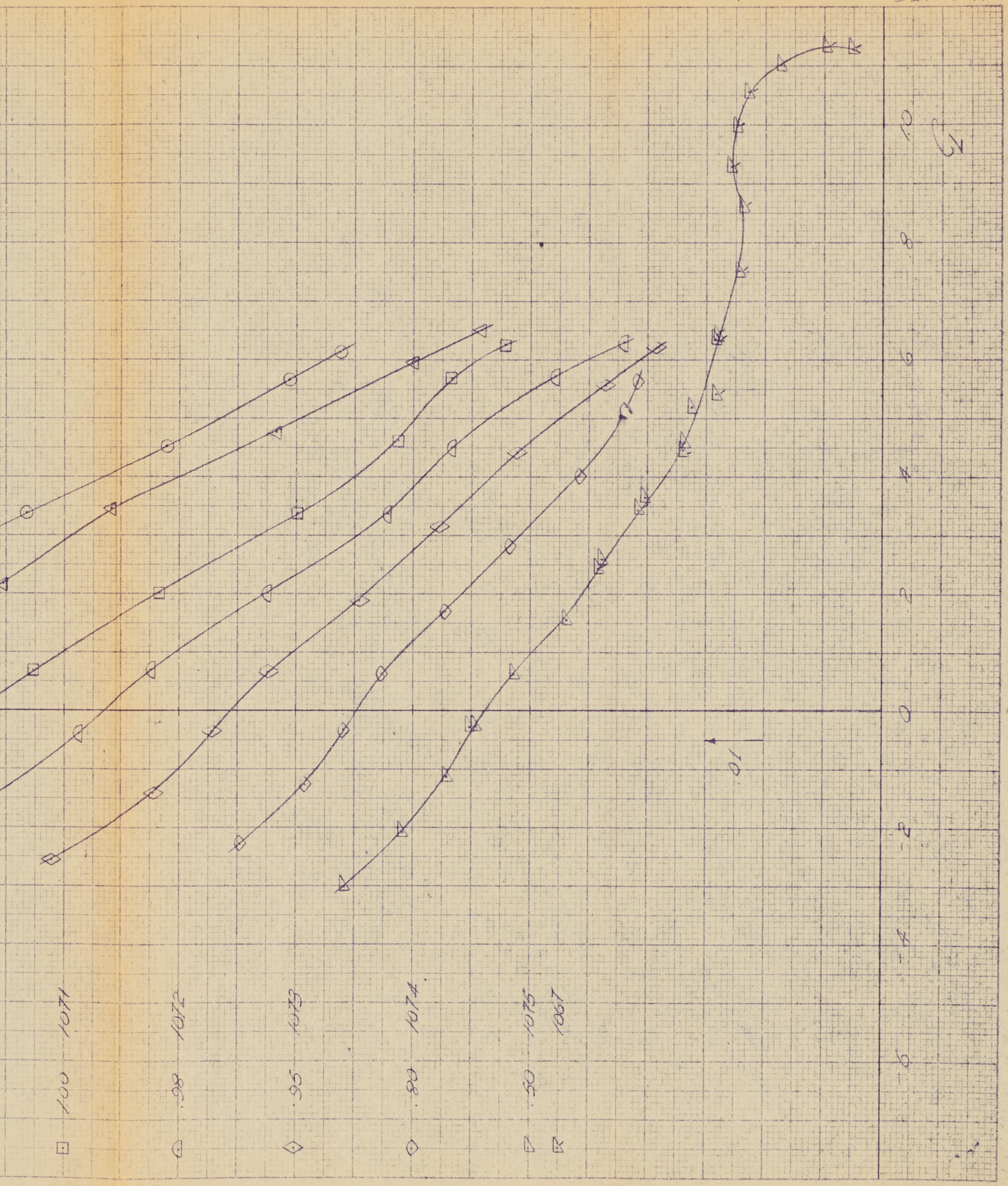
C_M VS C_L

$\delta_e = 0$

$B_4 C_3 W_9 V_2 R_5 N_{45}$



1.2 P/W.T./49
OCT. 54 CLARK



C-105

CAL WIND TUNNEL TESTS

OCTOBER 1954

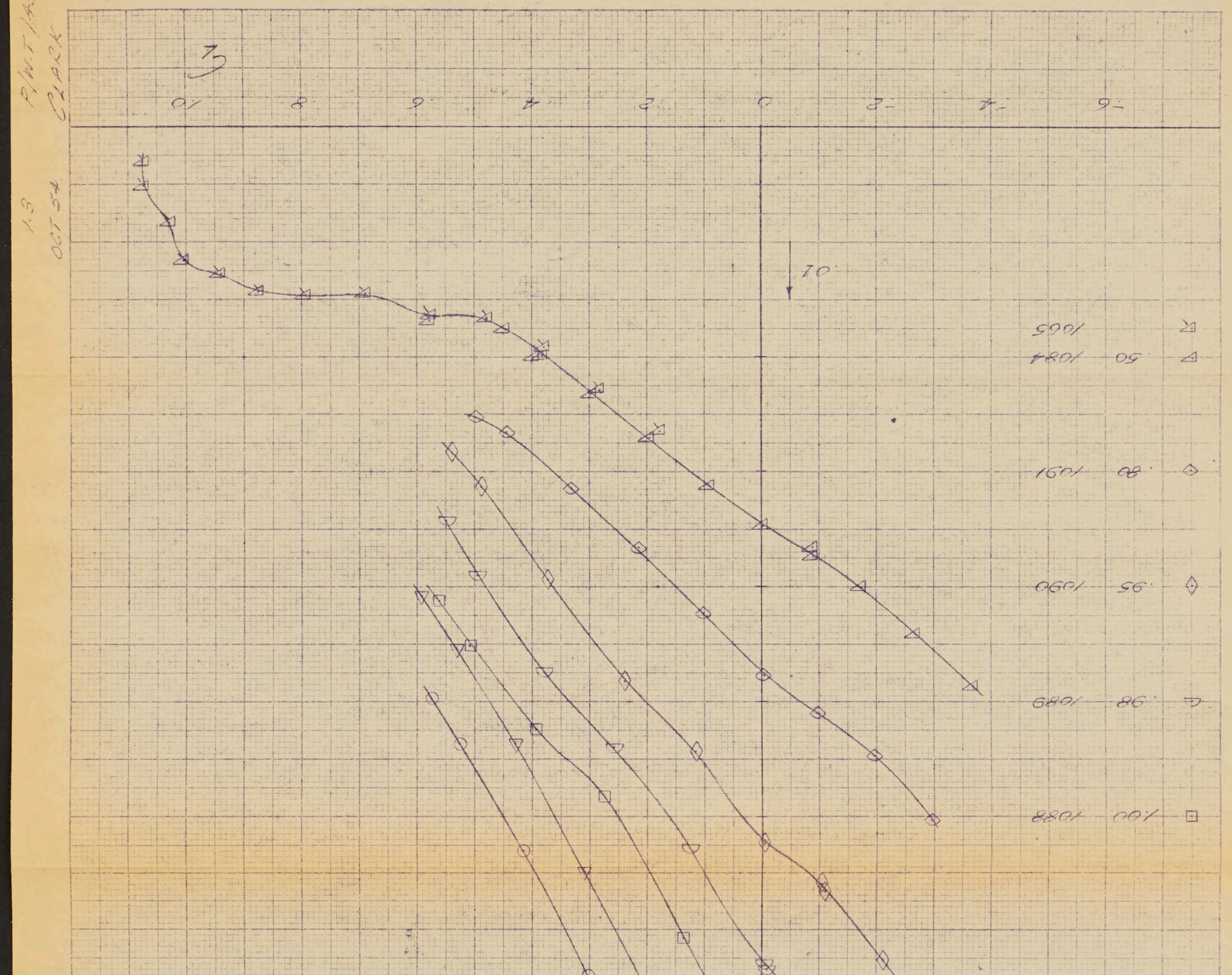
C_M vs C_L

$\delta_e = -5$

$B_4 C_9 W_9 V_6 R_3 N_{A6}$

C_M

M	RUN
⊙ 1.23	1086
△ 1.10	1087
⊡ 1.00	1088


P&WT/AD
CLARK
1.3
OCT 54
3
10
8
6
4
2
0
-2
-4
-6
10
100 1088
98 1089
95 1090
80 1091
50 1084
1065

C-105

C.A.L. WIND TUNNEL TESTS

OCTOBER 1954

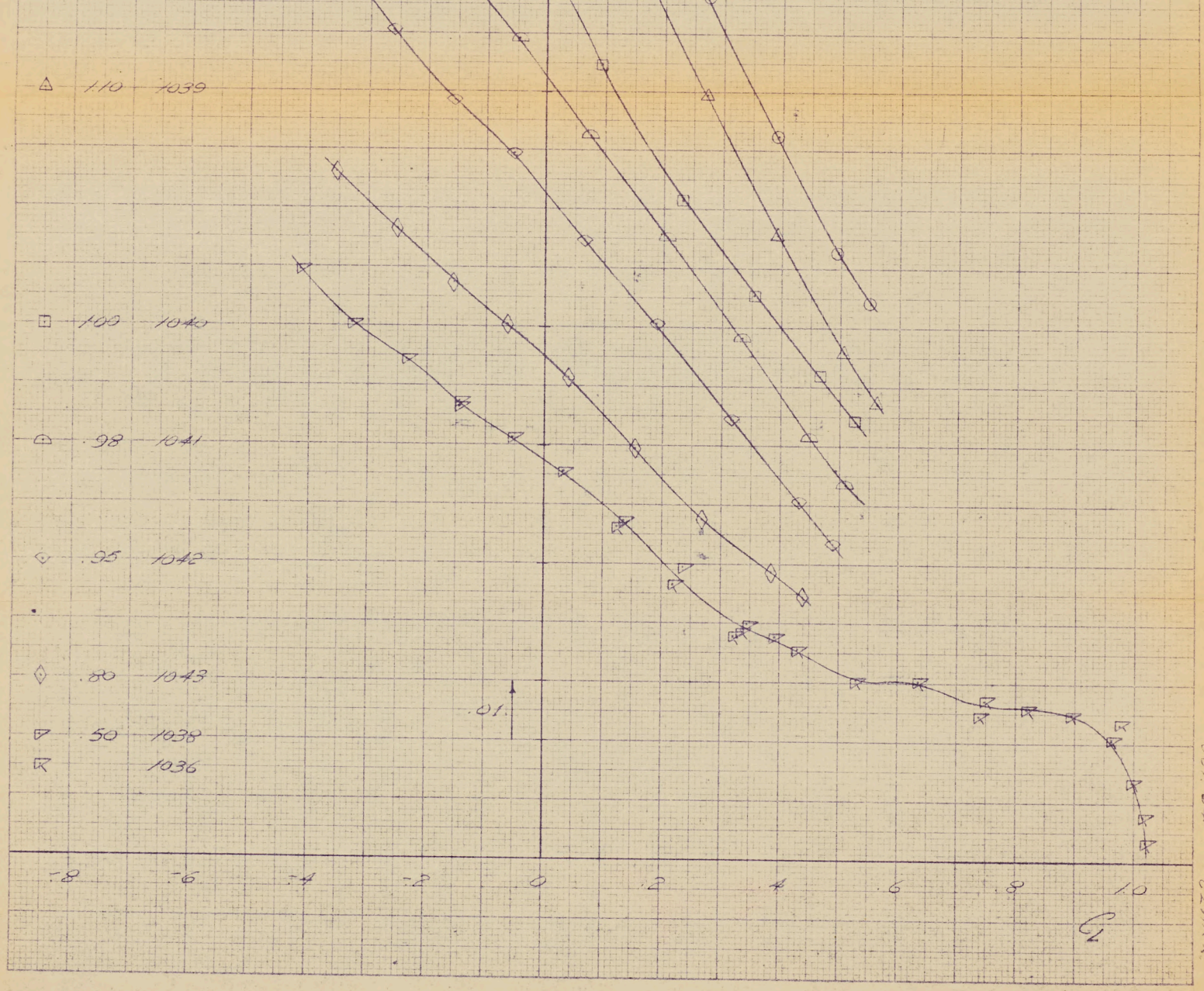
C_M vs C_L

$\delta_e = -10°$

B_4 C_3 H_0 V_2 R_3 N_{45}

C_M

M	RUN
⊙ .123	1045
△ .110	1039


△ 1.10 1039
□ 1.00 1040
⌓ .98 1041
◇ .95 1042
◇ .80 1043
▽ .50 1038
1036
.01
-8
-6
-4
-2
0
.2
.4
.6
.8
1.0
CL

C-105

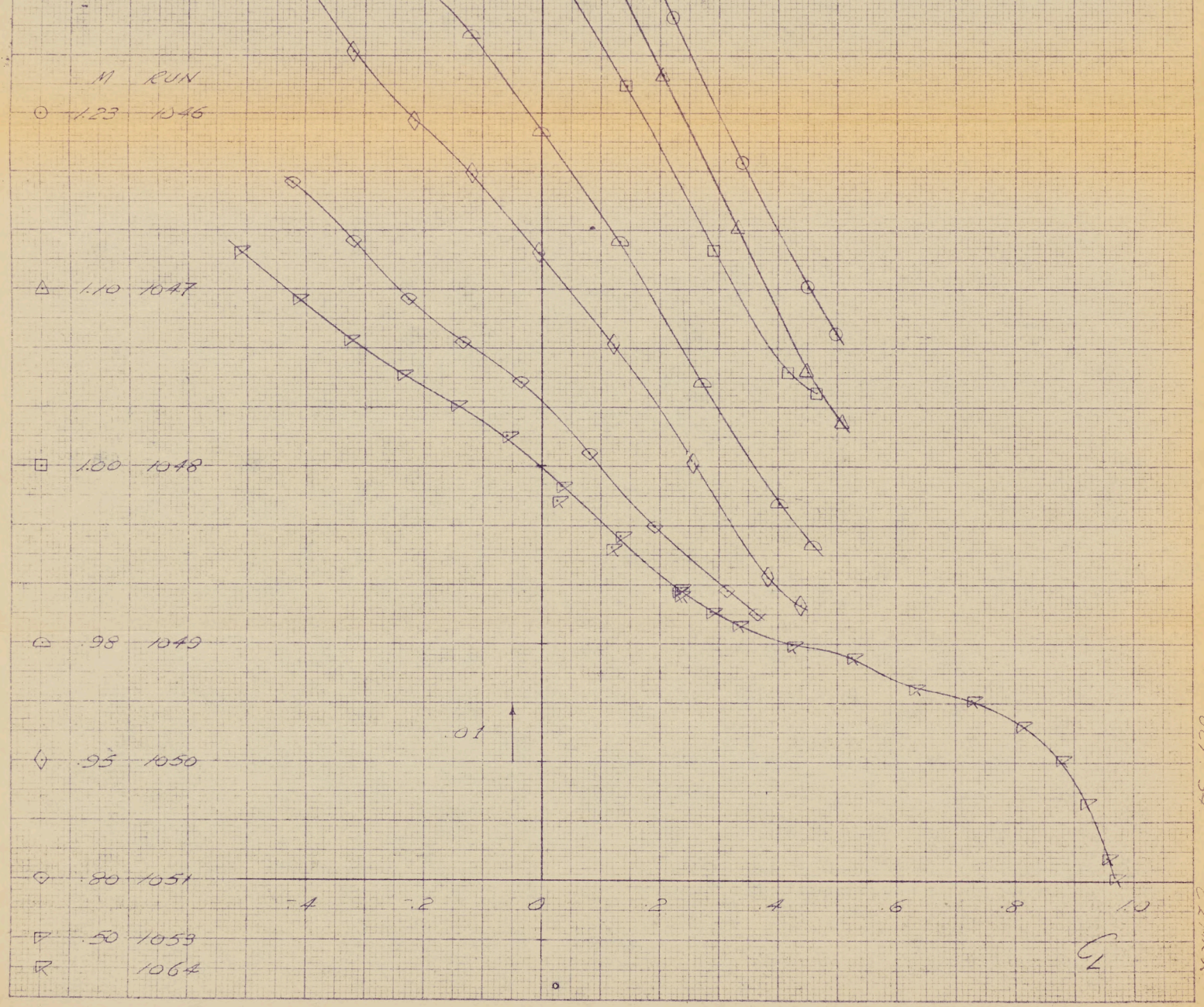
CAL WIND TUNNEL TESTS

OCTOBER 1954

C_M VS C_L

$\delta_e = -20°$

Ba Ca N9 V2 F3 Vas


M RUN
1.23 1046
1.10 1047
1.00 1048
.98 1049
.95 1050
.80 1051
.50 1053
1064
.01
-.4
-.2
0
.2
.4
.6
.8
1.0
CL

C-105

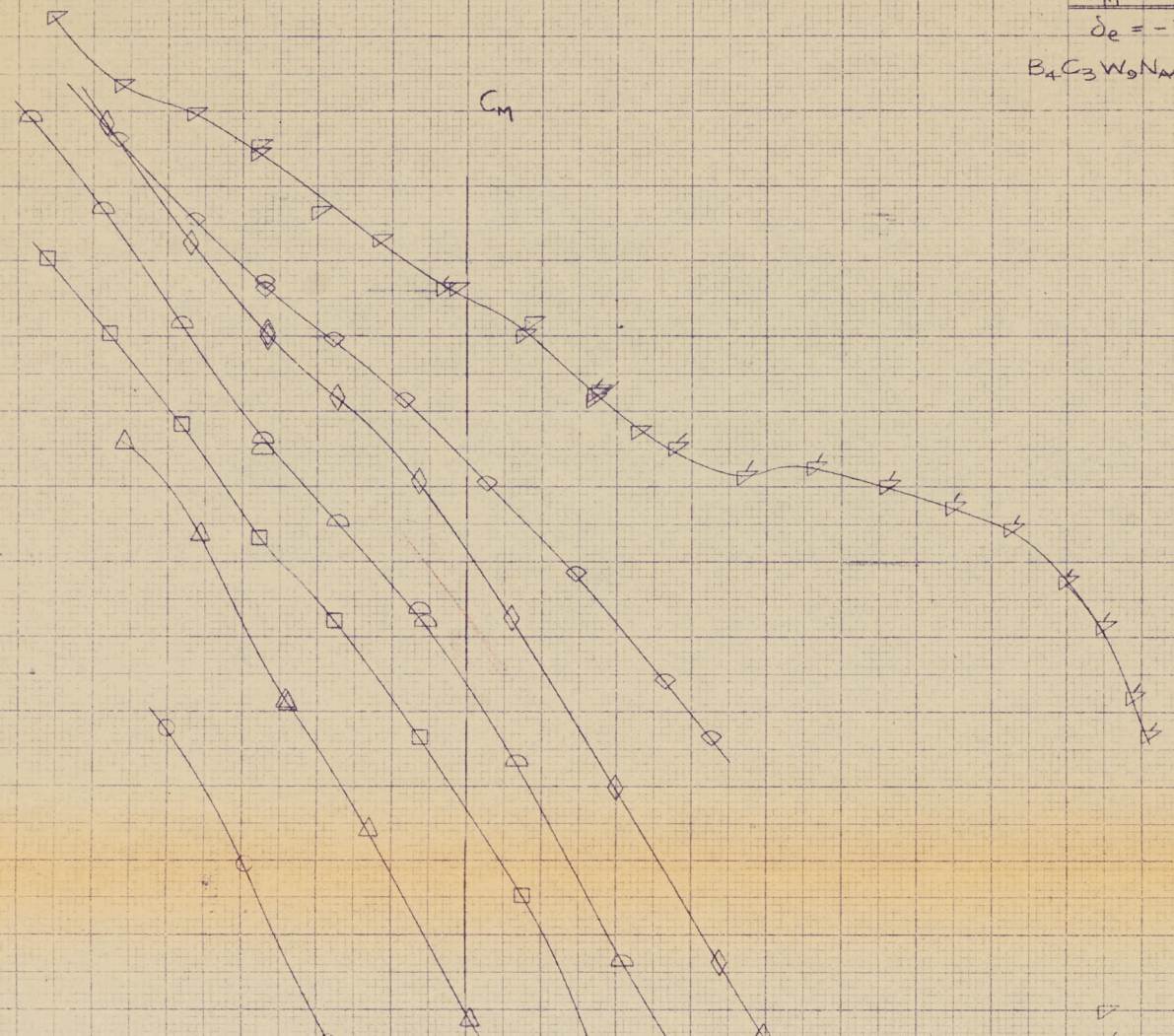
CAL WIND-TUNNEL TESTS

OCTOBER/54

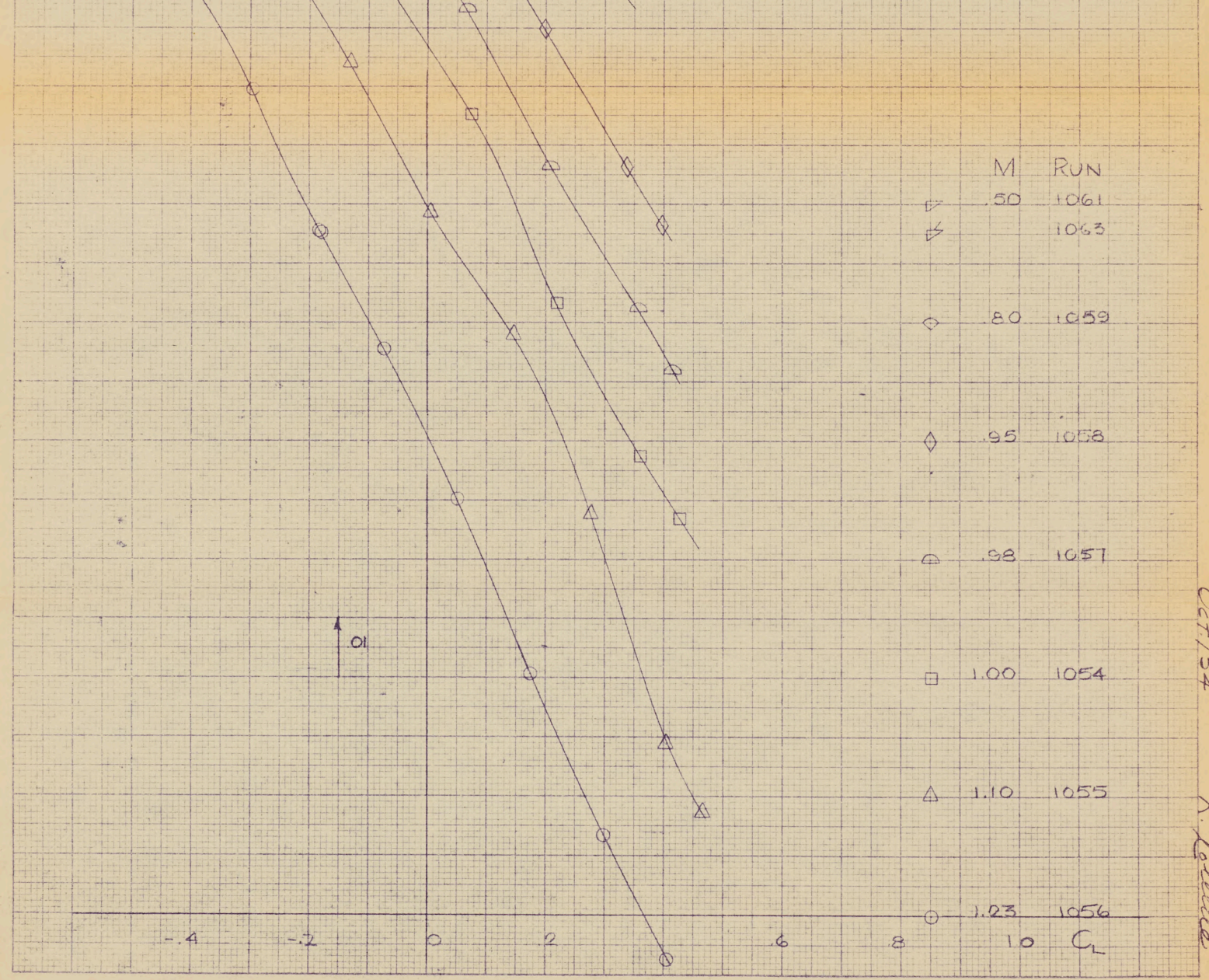
$C_M \sim C_L$

$\delta_e = -30°$

$B_4C_3W_9N_{A5}V_2R_5$



	M	RUN
▽	.50	1061



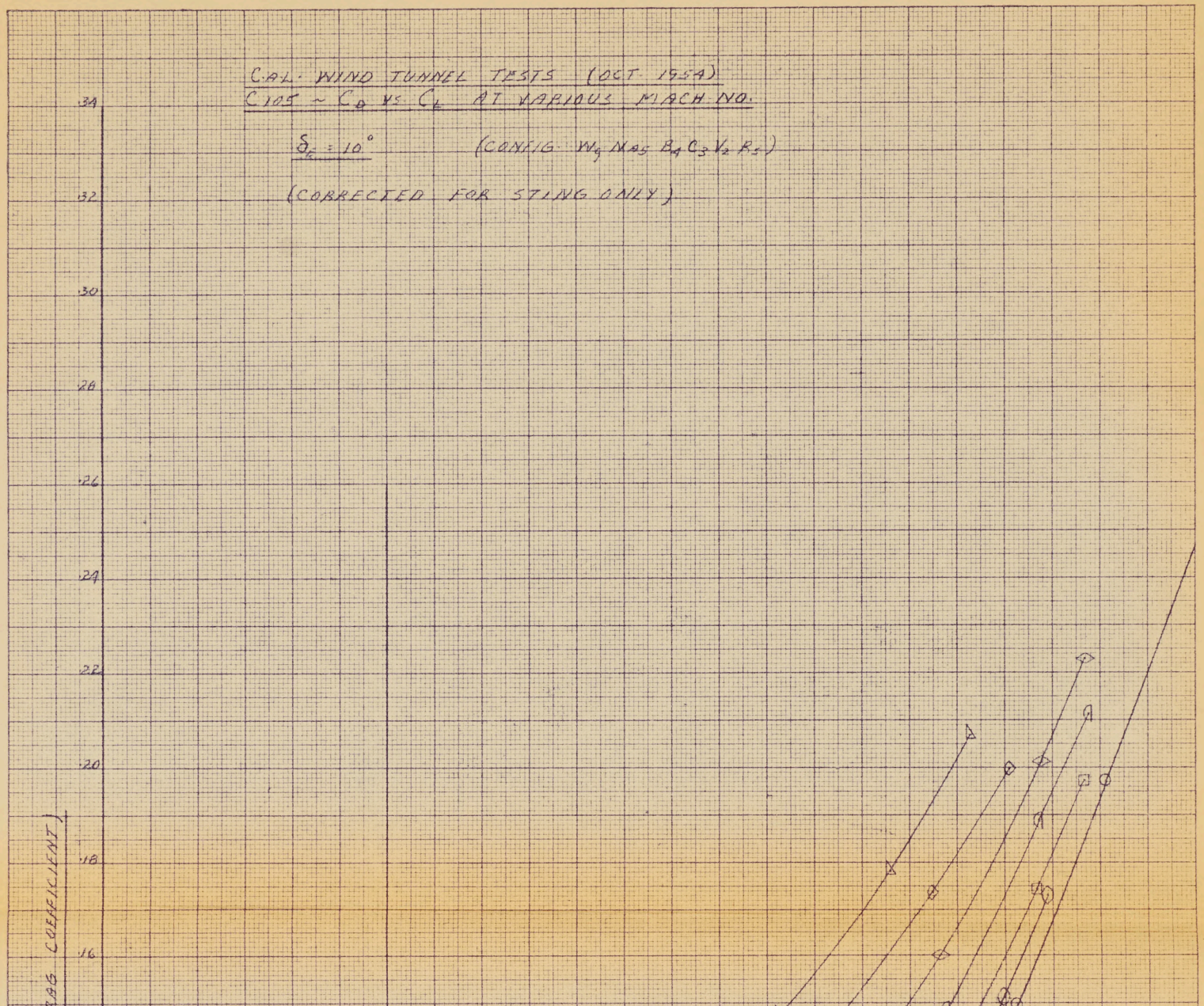
1.6
OCT/54
P/W.T/49
R. Collette

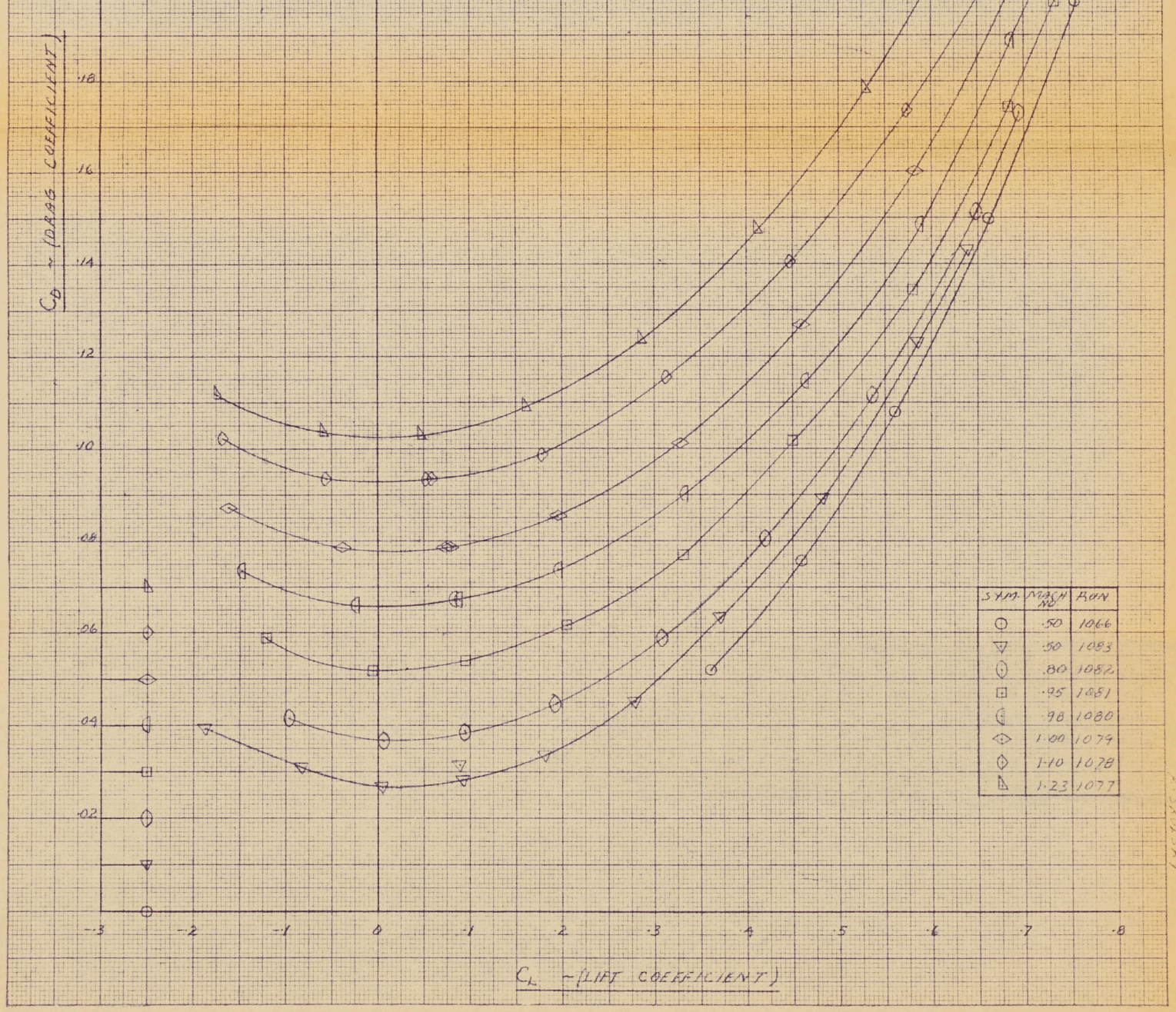
C.A.L. WIND TUNNEL TESTS (OCT 1954)

$C_{105} \sim C_D$ VS C_L AT VARIOUS MACH NO.

$\delta_E = 10°$ (CONFIG W_6 N_{05} B_4 C_3 V_2 R_5)

(CORRECTED FOR STING ONLY)





SHT 2-1

P/WT./46

2-SKYHSKY

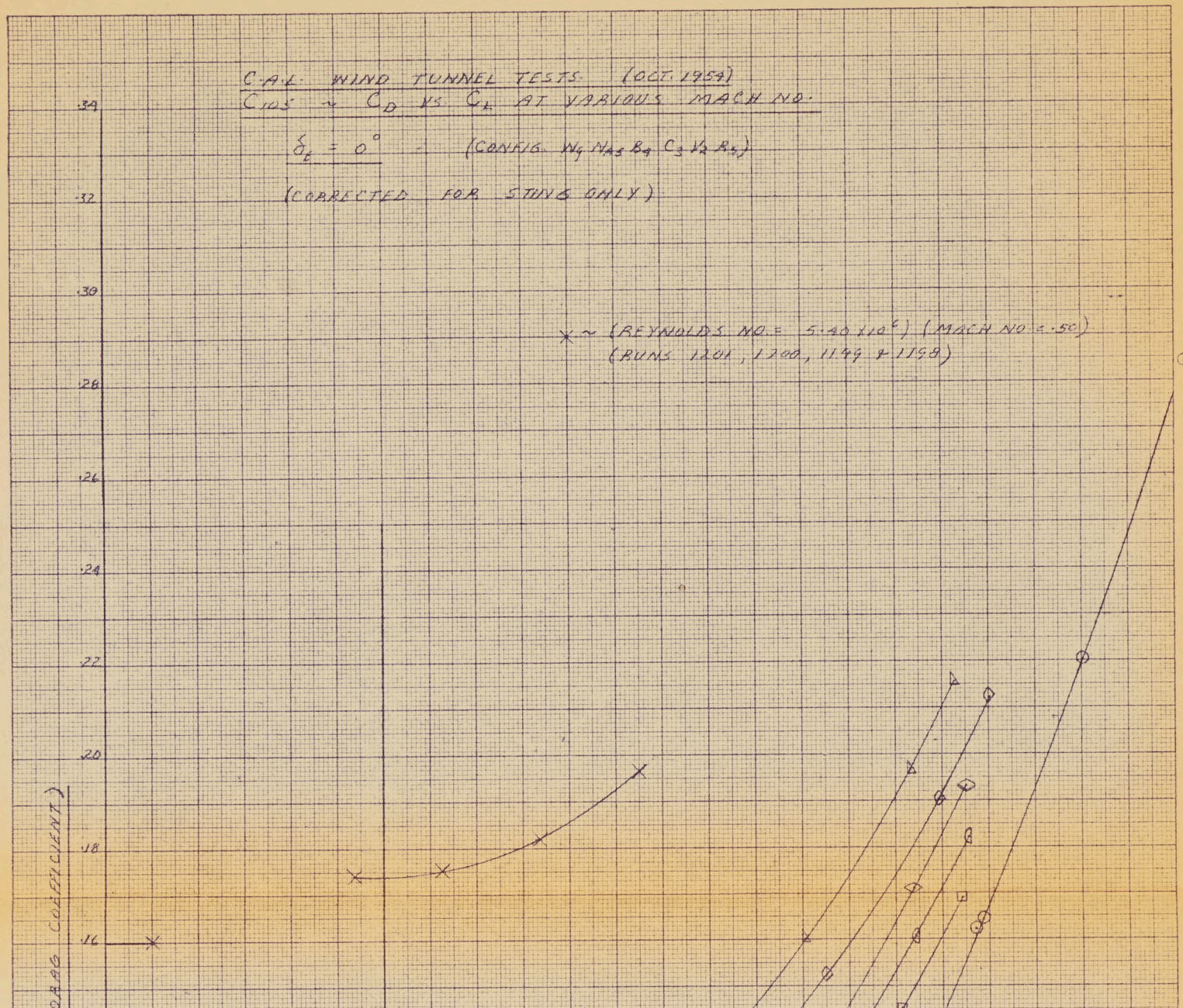
C.A.L. WIND TUNNEL TESTS (OCT. 1954)

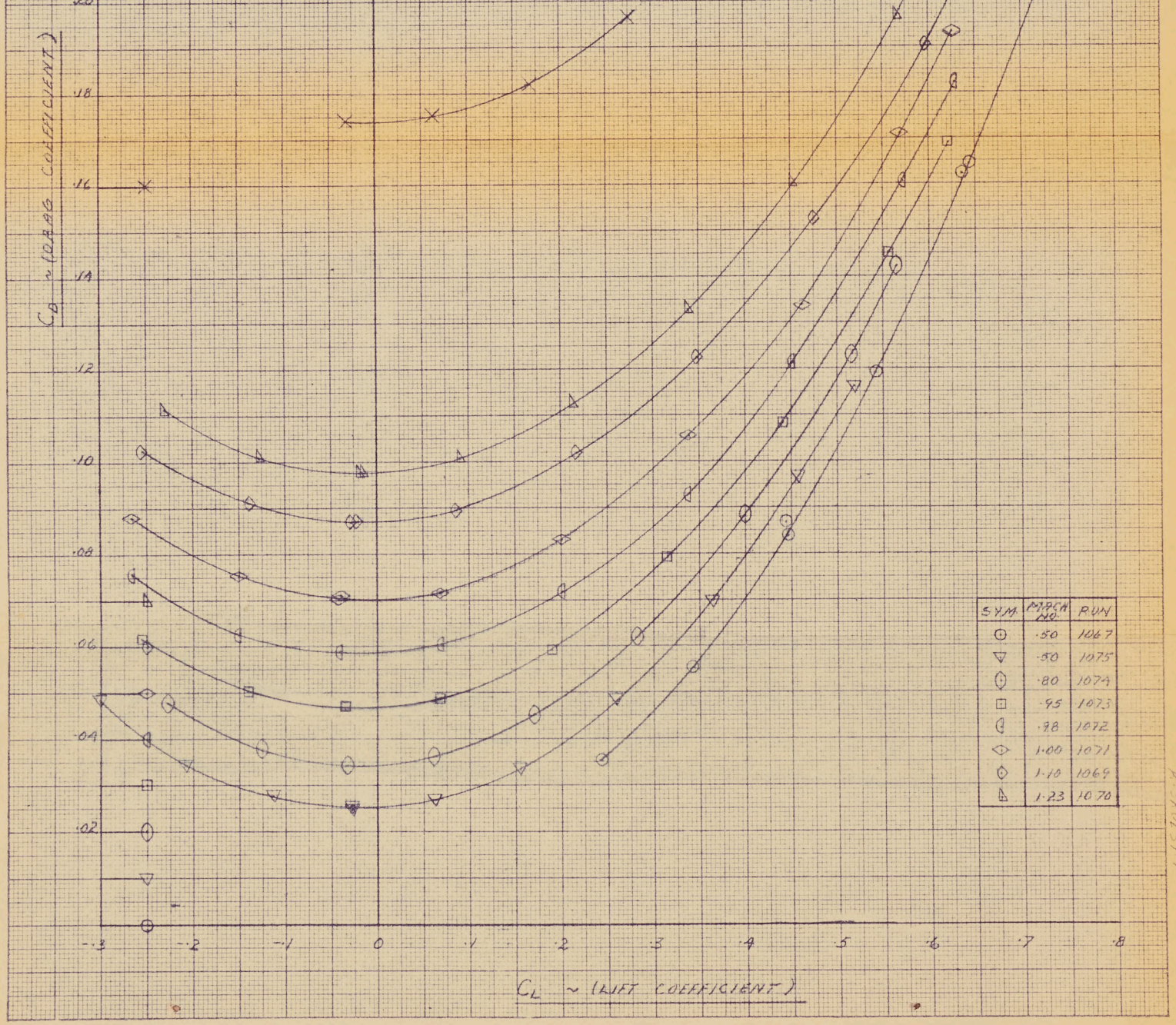
C_{105} vs C_D vs C_L AT VARIOUS MACH NO.

$\delta_E = 0°$ - (CONFIG. $W_4 N_{45} B_4 C_3 V_2 B_5$)

(CORRECTED FOR STING ONLY)

× ~ (REYNOLDS NO. = 5.40×10^6) (MACH NO. = .50)
(RUNS 1201, 1200, 1149 & 1158)





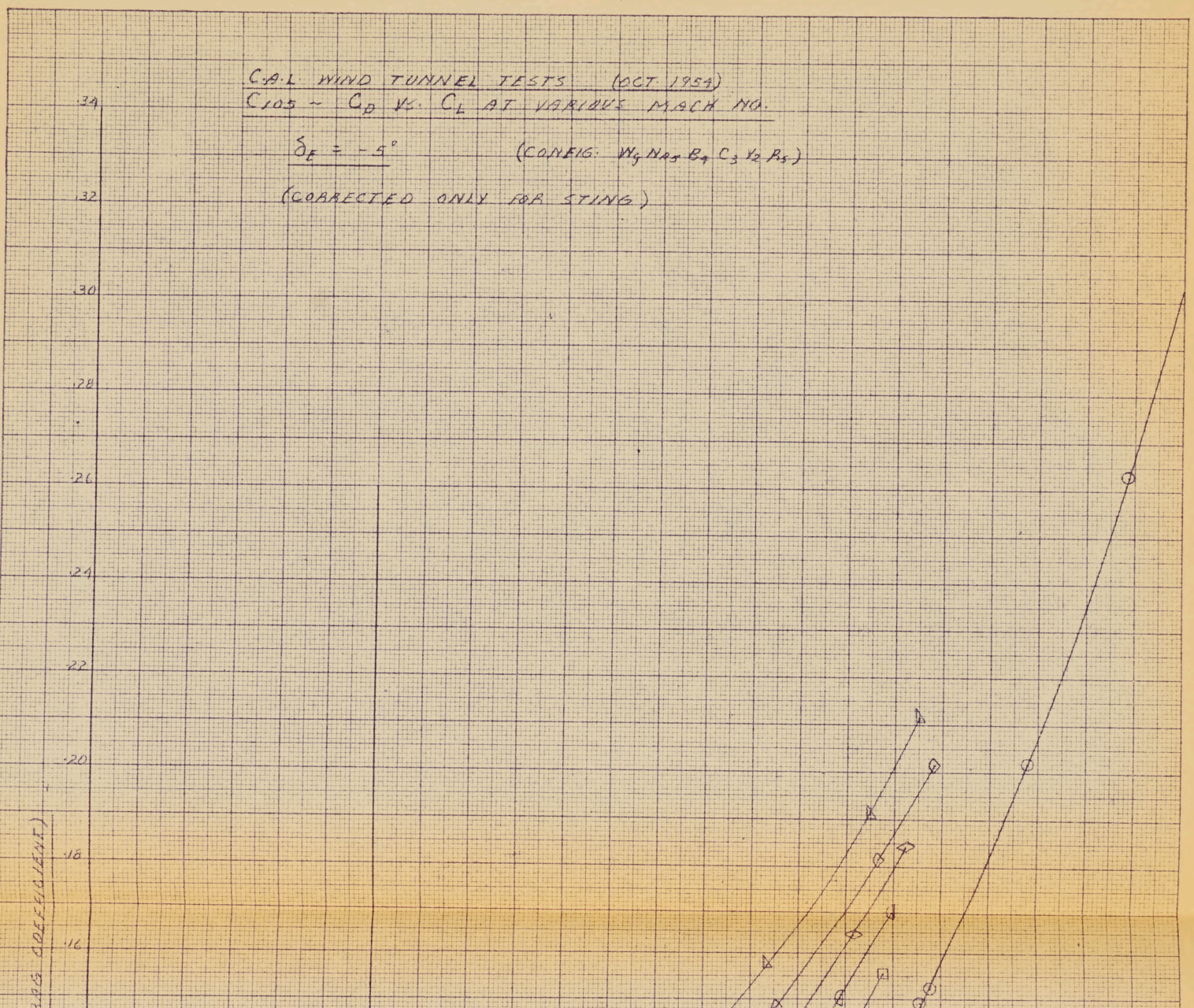
SHT 2-2
P/NT/49
R.SKULSKY

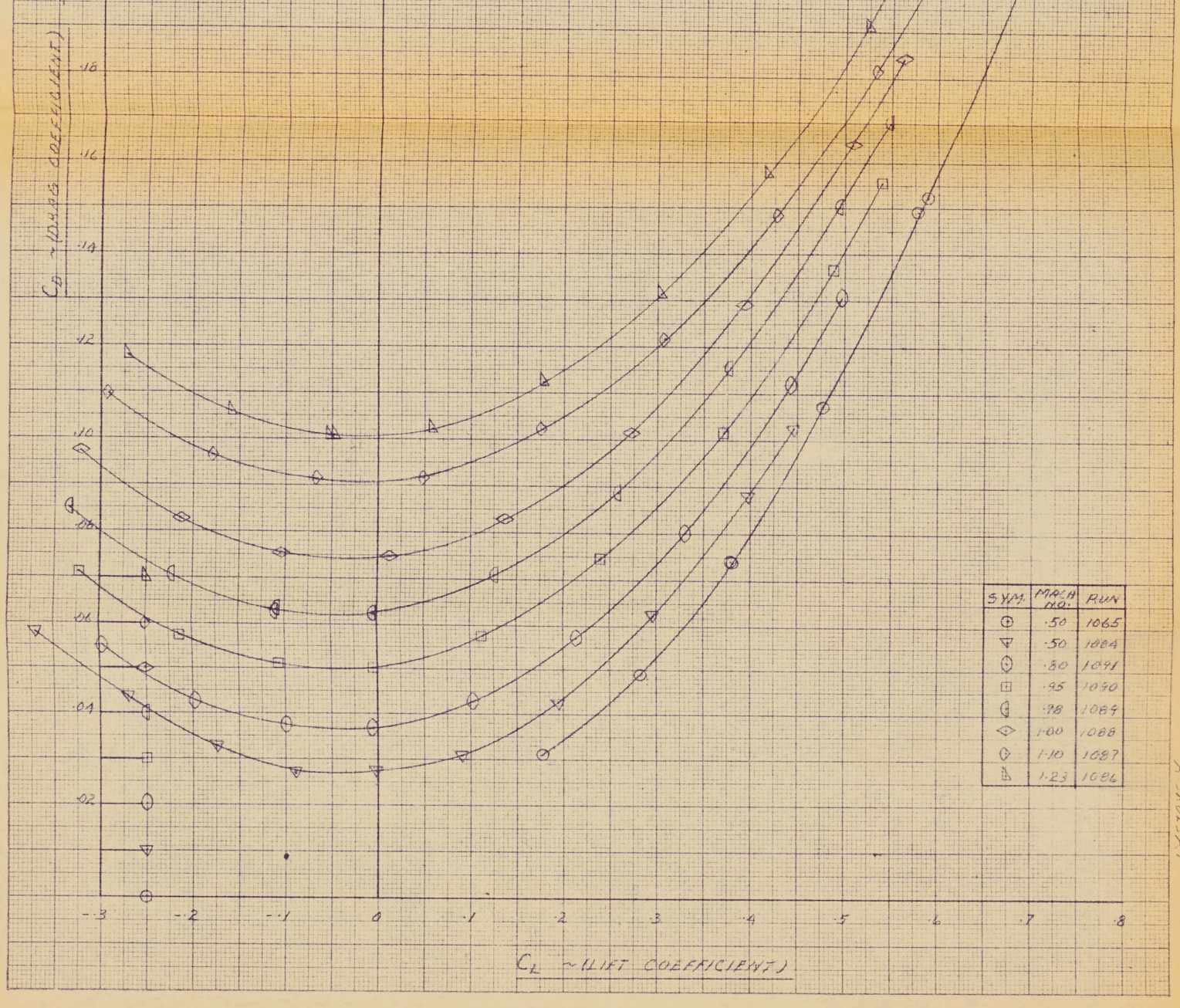
C.A.L. WIND TUNNEL TESTS (OCT. 1954)

C_{105} ~ C_D VS. C_L AT VARIOUS MACH NO.

$\delta_E = -5°$ (CONFIG. $W_5 N_{A5} B_4 C_3 V_2 P_5$)

(CORRECTED ONLY FOR STING)





SHT 2-3

P/WT/AF

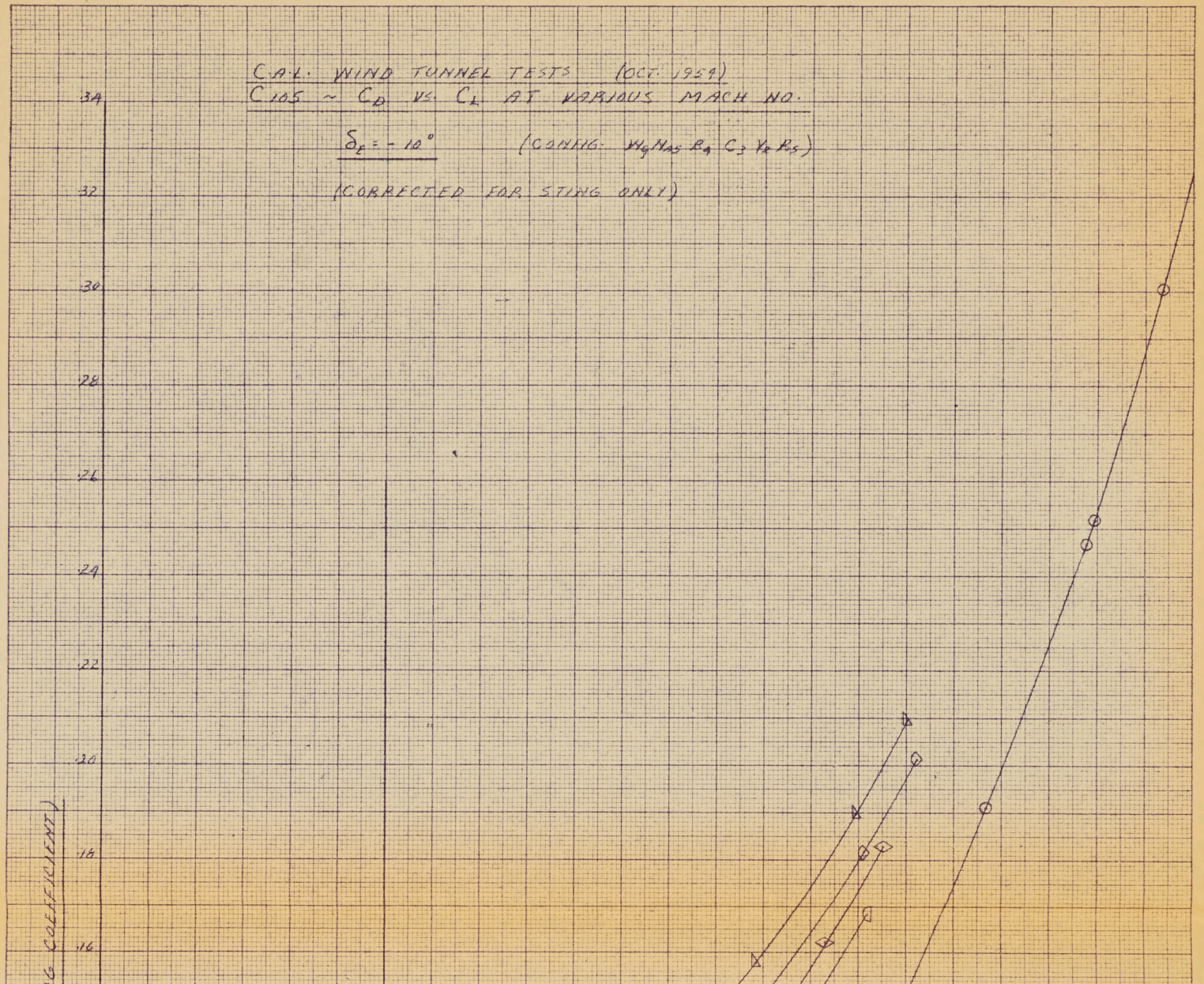
R SMULSKI

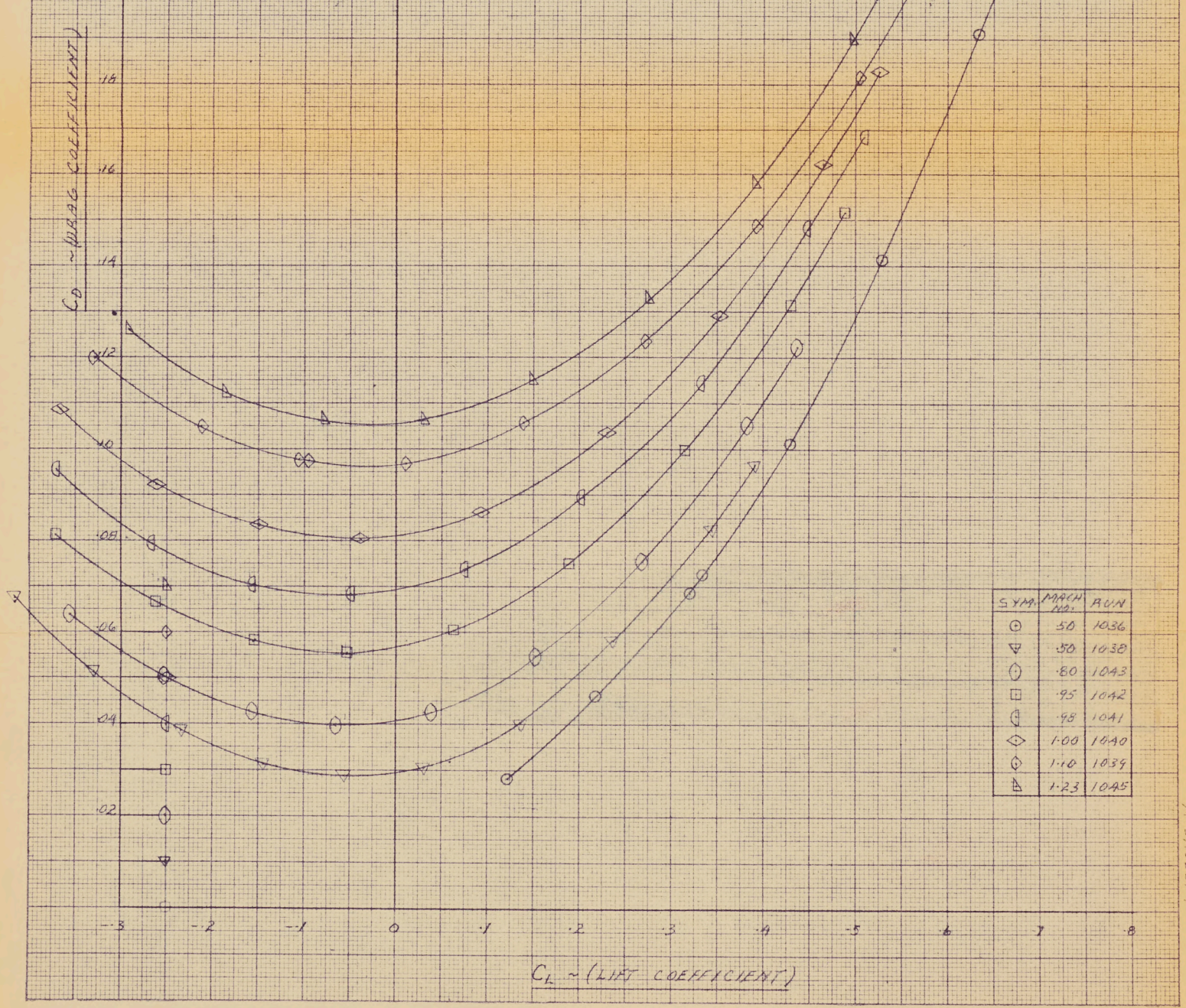
C.A.L. WIND TUNNEL TESTS (OCT. 1954)

C_{105} ~ C_D VS. C_L AT VARIOUS MACH NO.

$\delta_E = -10°$ (CONFIG: $W_6 N_{45} R_4 C_3 V_2 P_5$)

(CORRECTED FOR STING ONLY)





SHT. 2-4

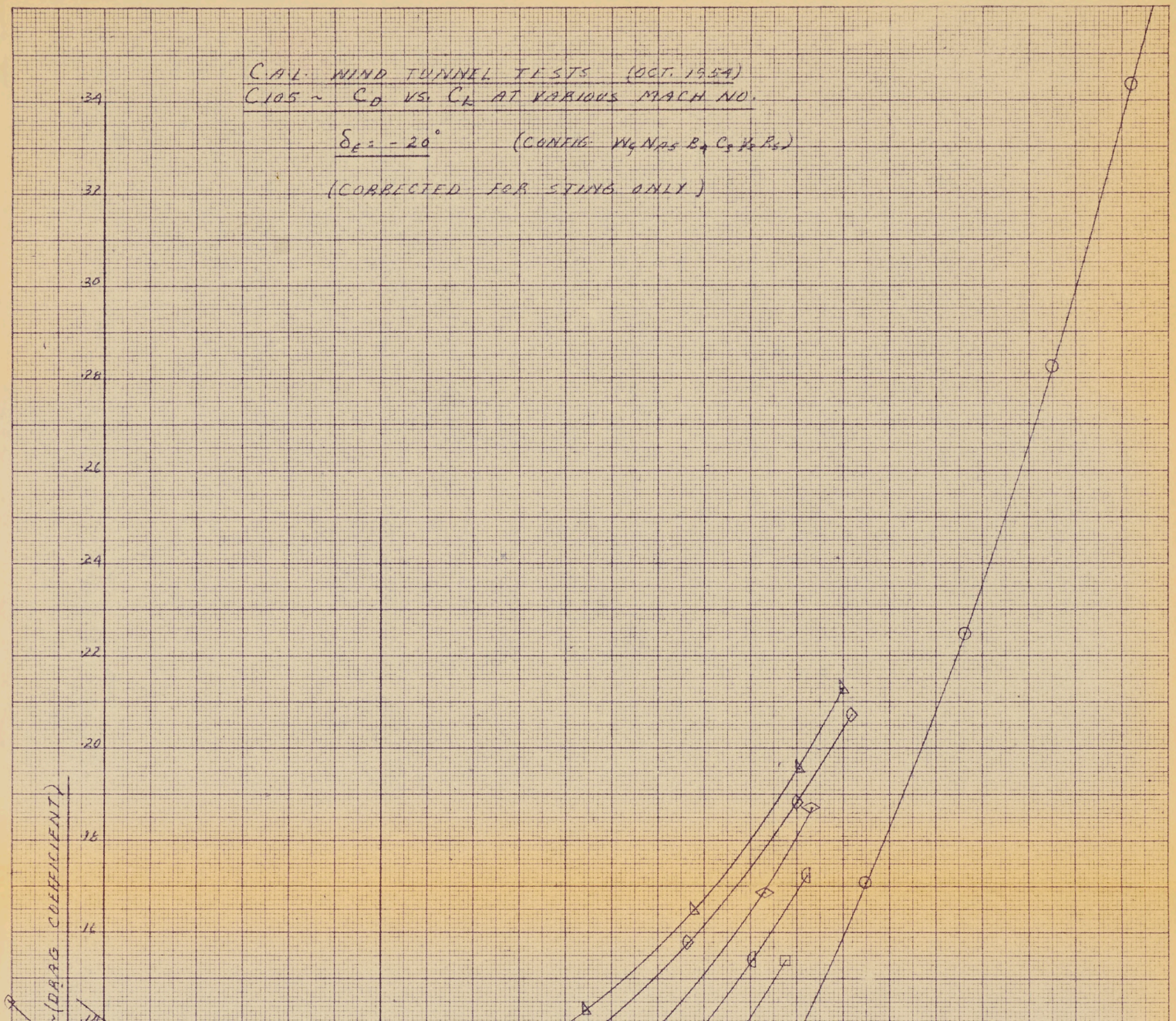
P/WT. /A9

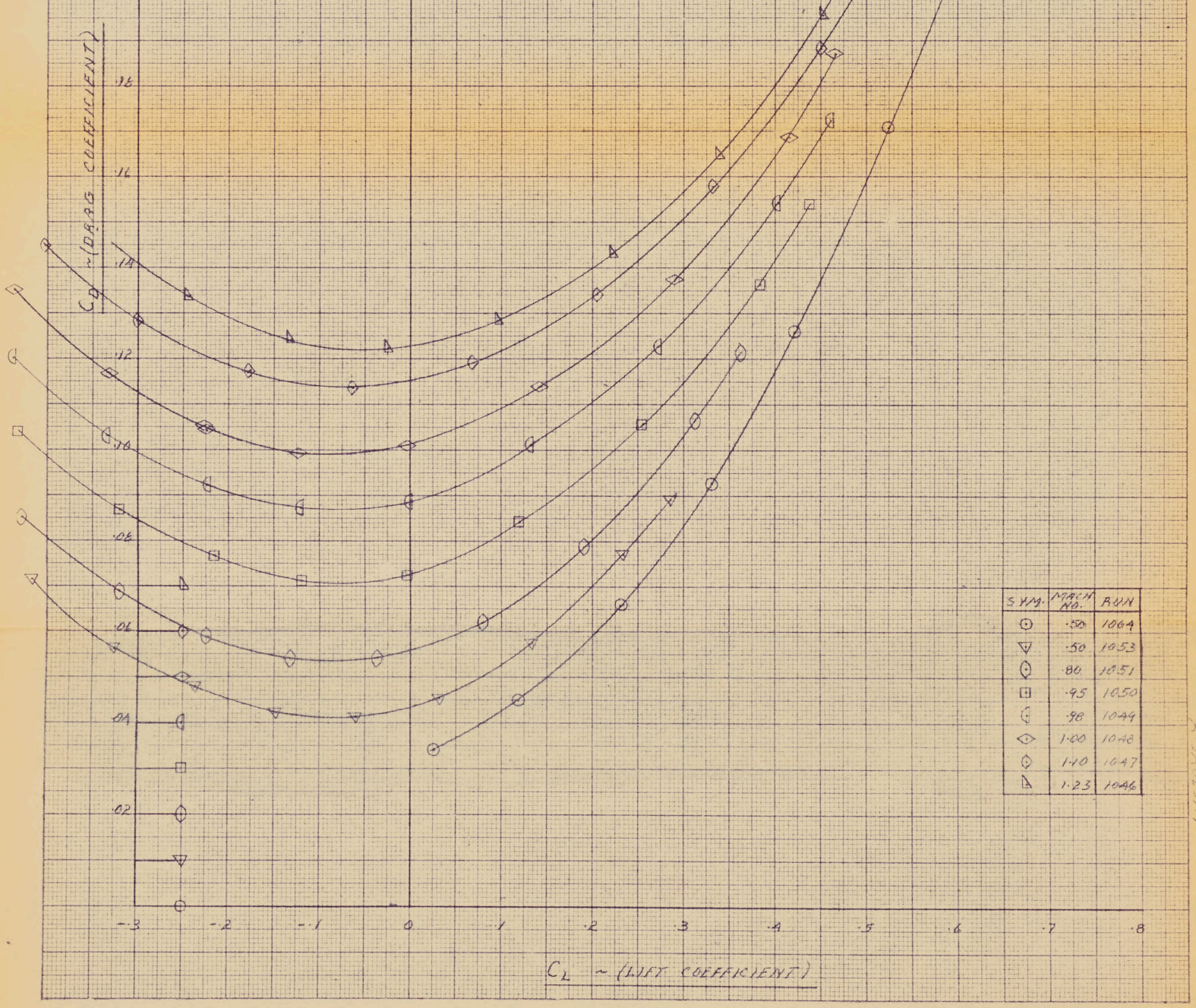
R. SHULSKY

CAL. WIND TUNNEL TESTS (OCT. 1954)
C105 ~ C_D VS. C_L AT VARIOUS MACH NO.

$\delta_E = -20°$ (CONFIG. $W_6 N_{105} B_4 C_5 H_6 P_{51}$)

(CORRECTED FOR STING ONLY)





SHT. 2-6

P/AM/T/49

R. SKULSKY

C.A.L. WIND TUNNEL TESTS (OCT. 1954)

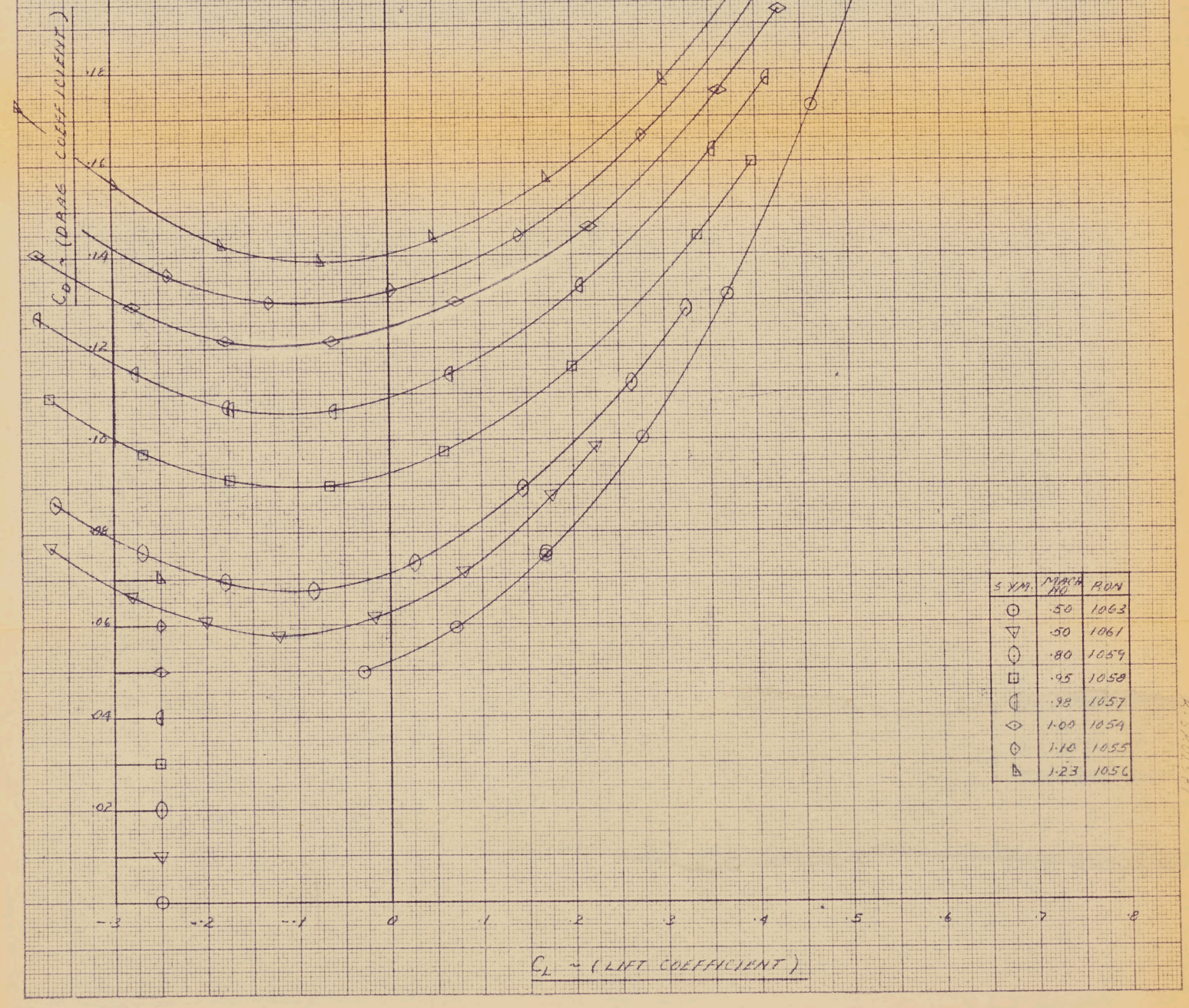
C105 ~ C_D Vs. C_L AT VARIOUS MACH NO.

$\delta_E = -30°$ (CONFIG. W_4 N_{A5} R_4 C_3 V_2 P_5)

(CORRECTED FOR STING ONLY)

.34
.32
.30
.28
.26
.24
.22
.20
.16
.16

DRAG COEFFICIENT (C_D)



SHT. 2-6

PINT/49

K. SKULSKI

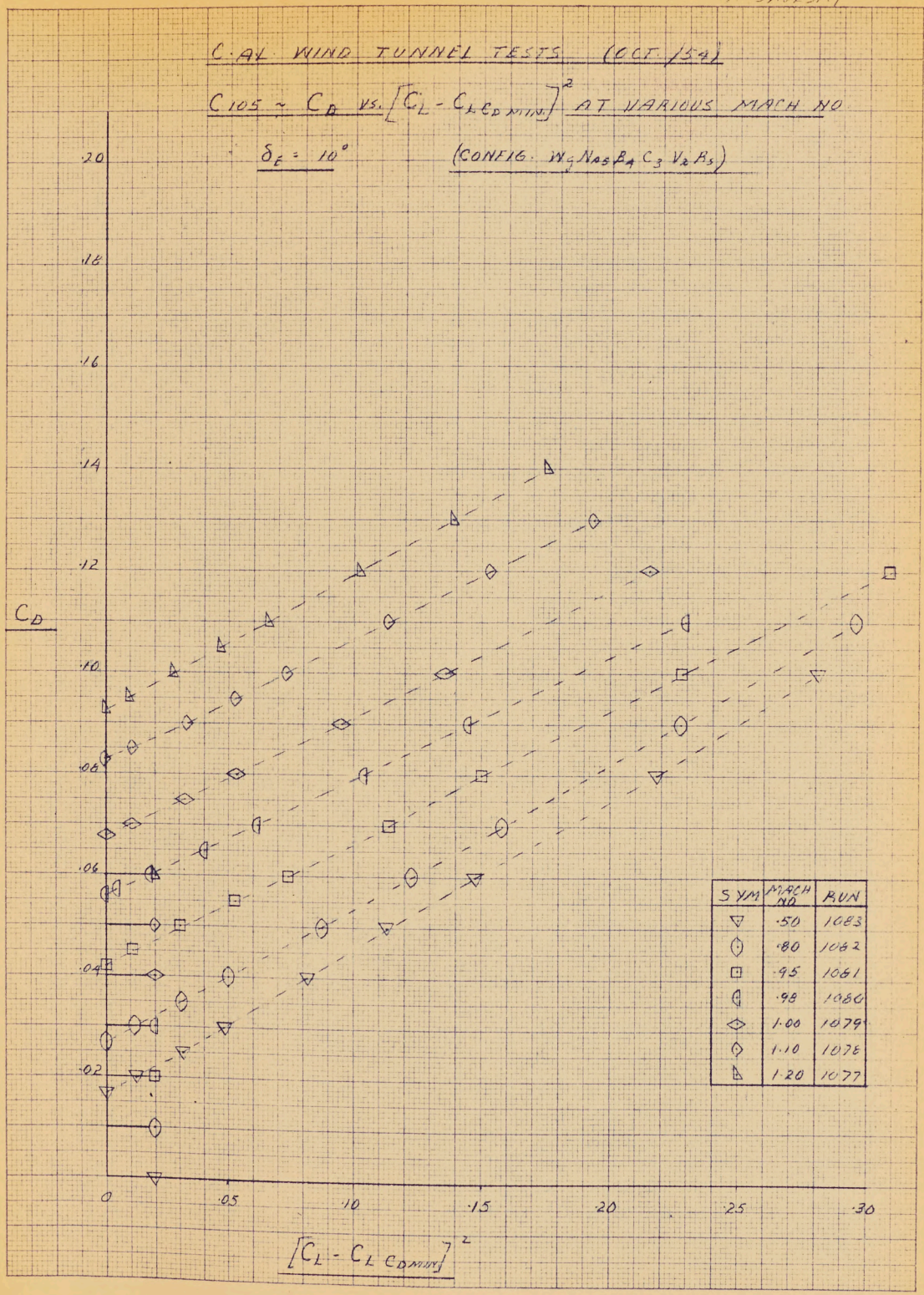
SHT 3-1 P/WT./49

R. SKULSKY

C-AY WIND TUNNEL TESTS (OCT./54)

$C_{105} \sim C_D$ VS. $[C_L - C_{L\,C_{D\,MIN}}]^2$ AT VARIOUS MACH NO

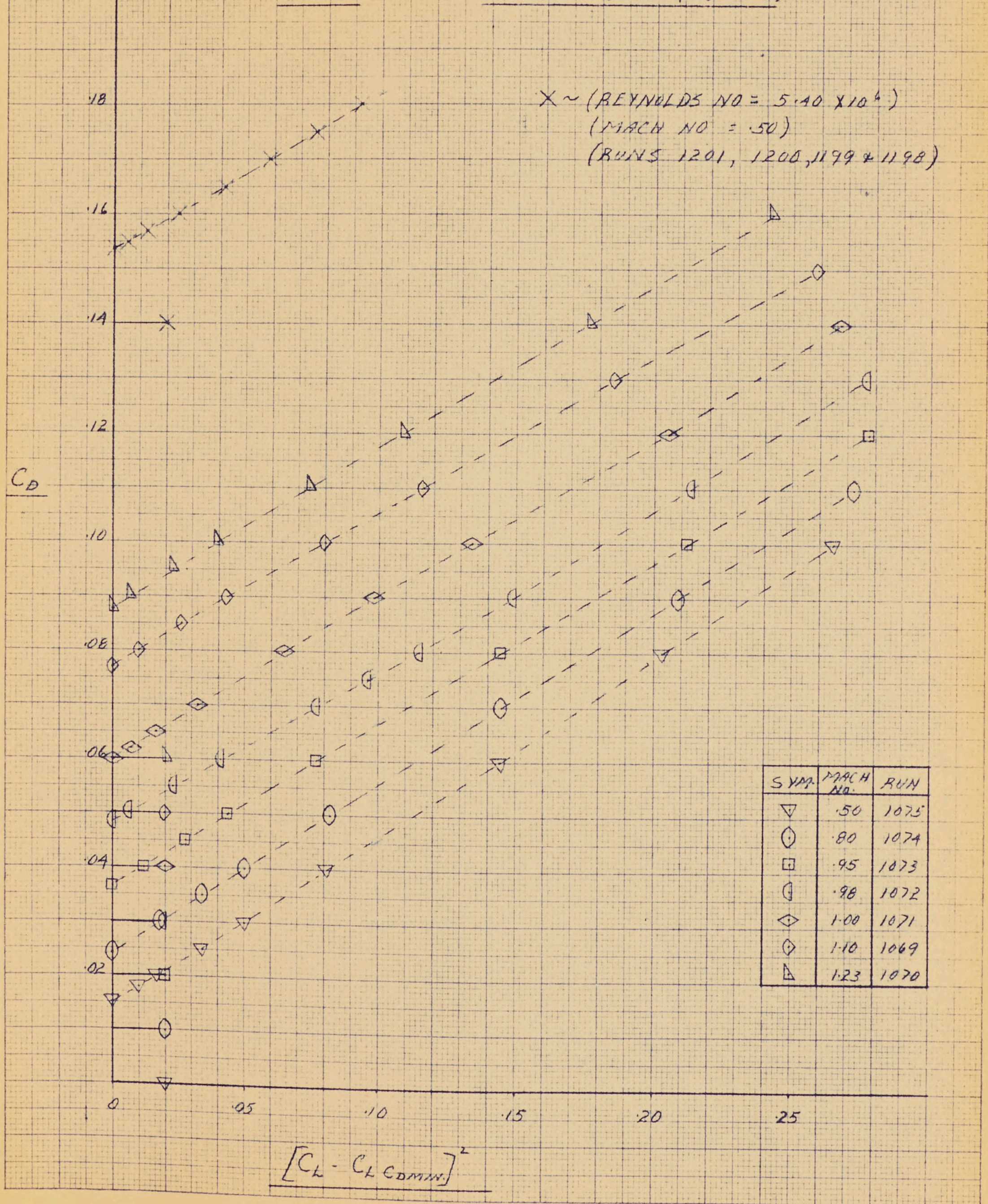
$\delta_E = 10°$ (CONFIG. $W_5 N_{05} B_4 C_3 V_2 B_5$)



C.A.L. WIND TUNNEL TESTS (OCT 1954)

C105 ~ C_D vs. $[C_L - C_{L_{C_{D MIN}}}]^2$ AT VARIOUS MACH NO

$\delta_E = 0°$ (CONFIG. $W_9 N_{A5} B_4 C_3 V_2 P_5$)



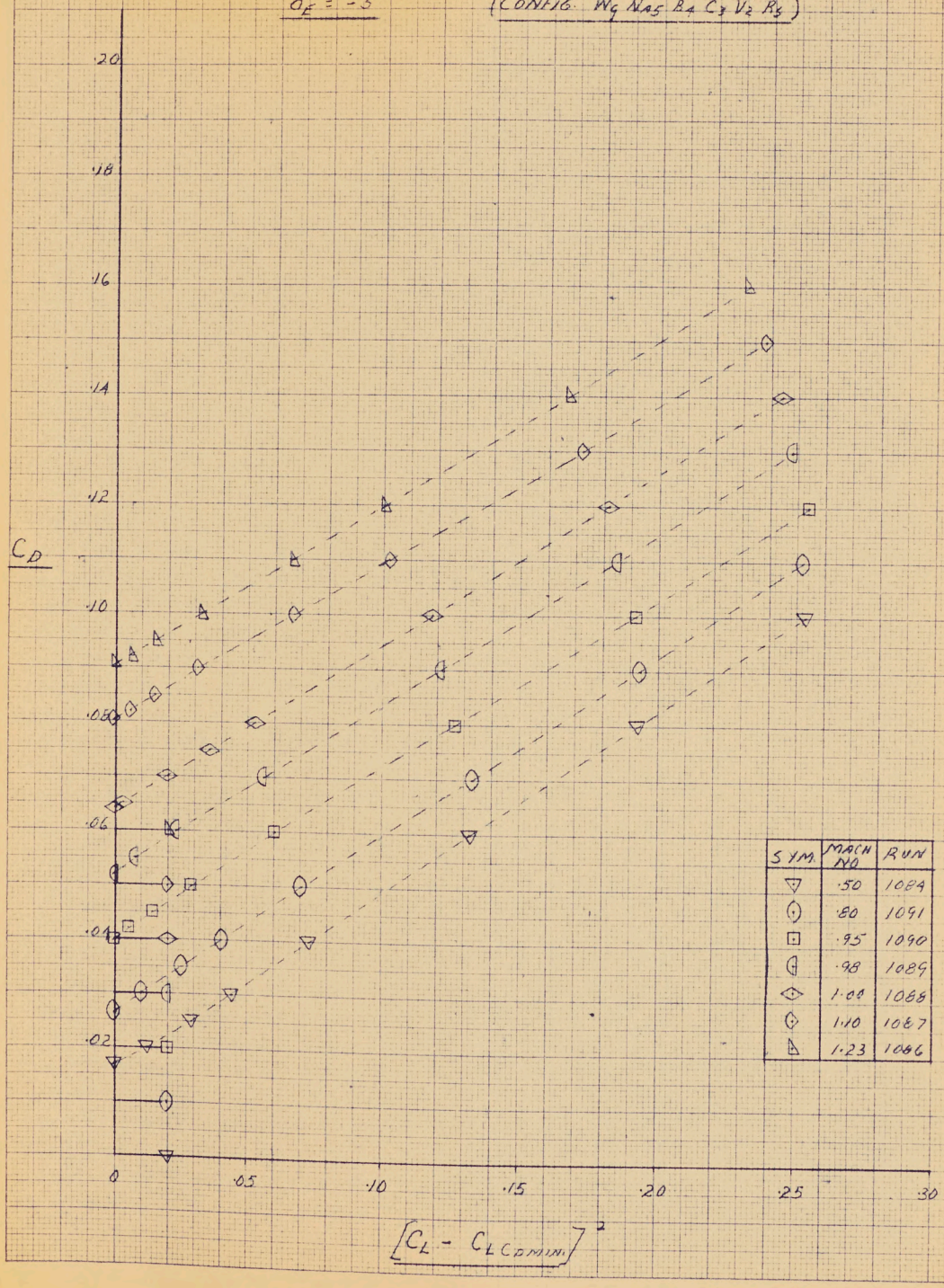
SHT. 3-3 P/W.T./49

R. SKULSKY

C.A.L. WIND TUNNEL TESTS (OCT. 1954)

$C_{105} \sim C_D$ VS. $[C_L - C_{L\,COMMIN}]^2$ AT VARIOUS MACH NO.

$\delta_E = -5°$ (CONFIG. W_6 N_{A5} B_4 C_3 V_2 B_5)



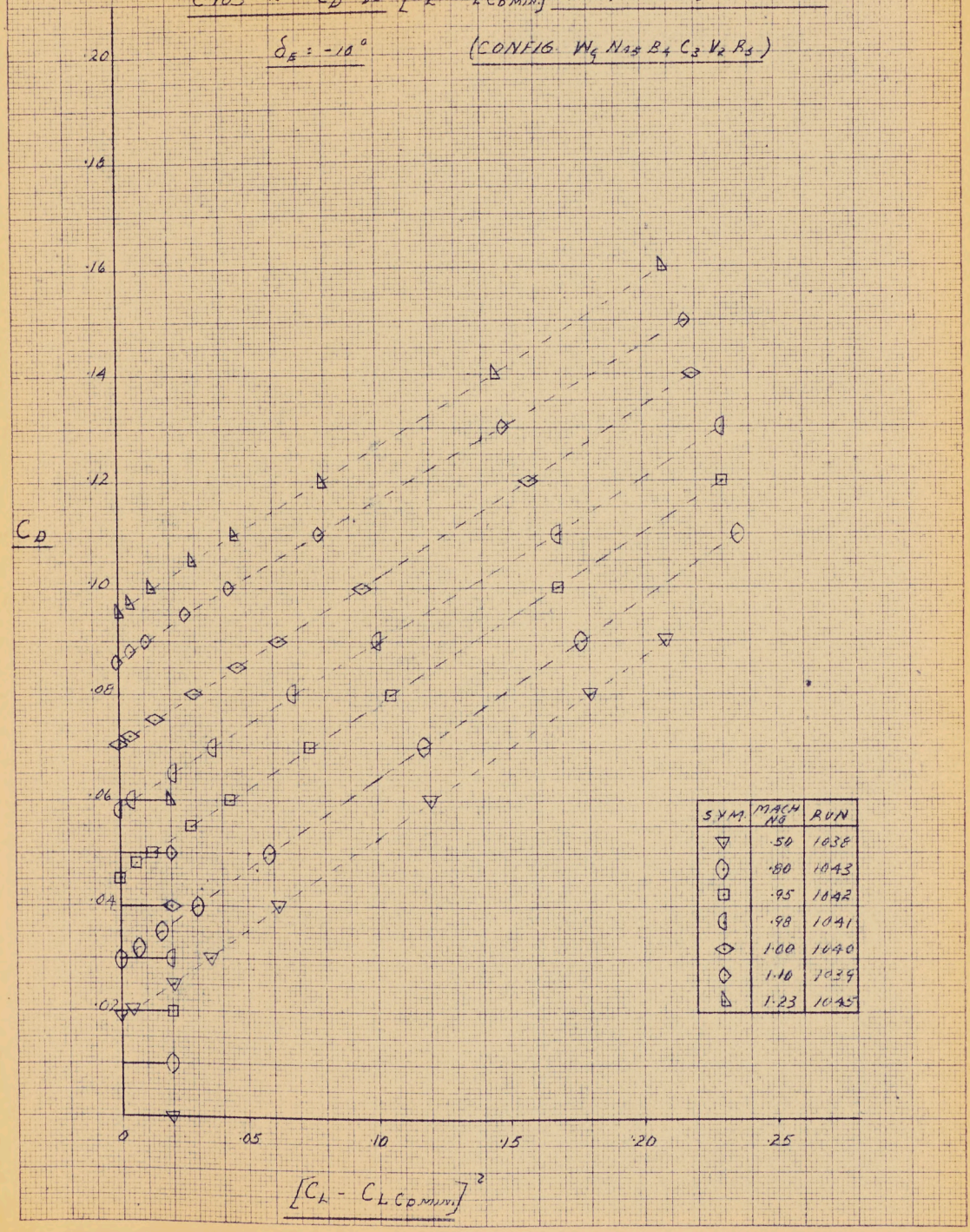
SHT. 3-4 P/W.T./49

P. SKOLSKY

C.A.L. WIND TUNNEL TESTS (OCT/54)

$C_{105} \sim C_D$ VS. $[C_L - C_{L C_{D MIN}}]^2$ AT VARIOUS MACH NO

$\delta_E = -10°$ (CONFIG. $W_6 N_{13} B_4 C_3 V_2 B_3$)



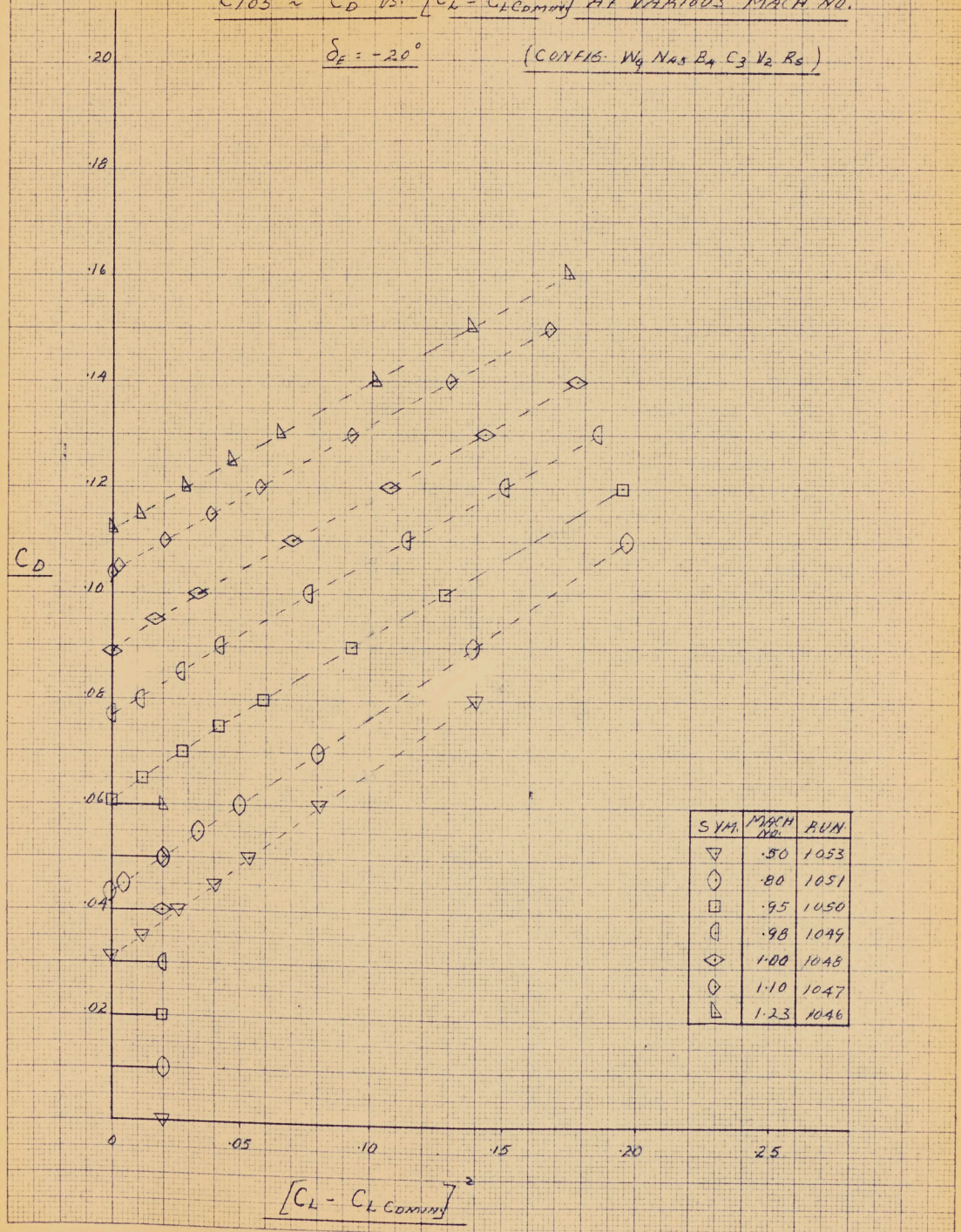
SHT 3-5 P/W.T./49

R. SKULSKY

CAL. WIND TUNNEL TESTS (OCT. 1951)

$C_{L\,05} \sim C_D$ VS. $[C_L - C_{L\,COMMON}]^2$ AT VARIOUS MACH NO.

$\delta_E = -2.0°$ (CONFIG. $W_9\ N_{45}\ B_4\ C_3\ V_2\ R_8$)



SYM.	MACH NO.	RUN
▽	.50	1053
◇	.80	1051
□	.95	1050
◁	.98	1049
◇	1.00	1048
◇	1.10	1047
△	1.23	1046

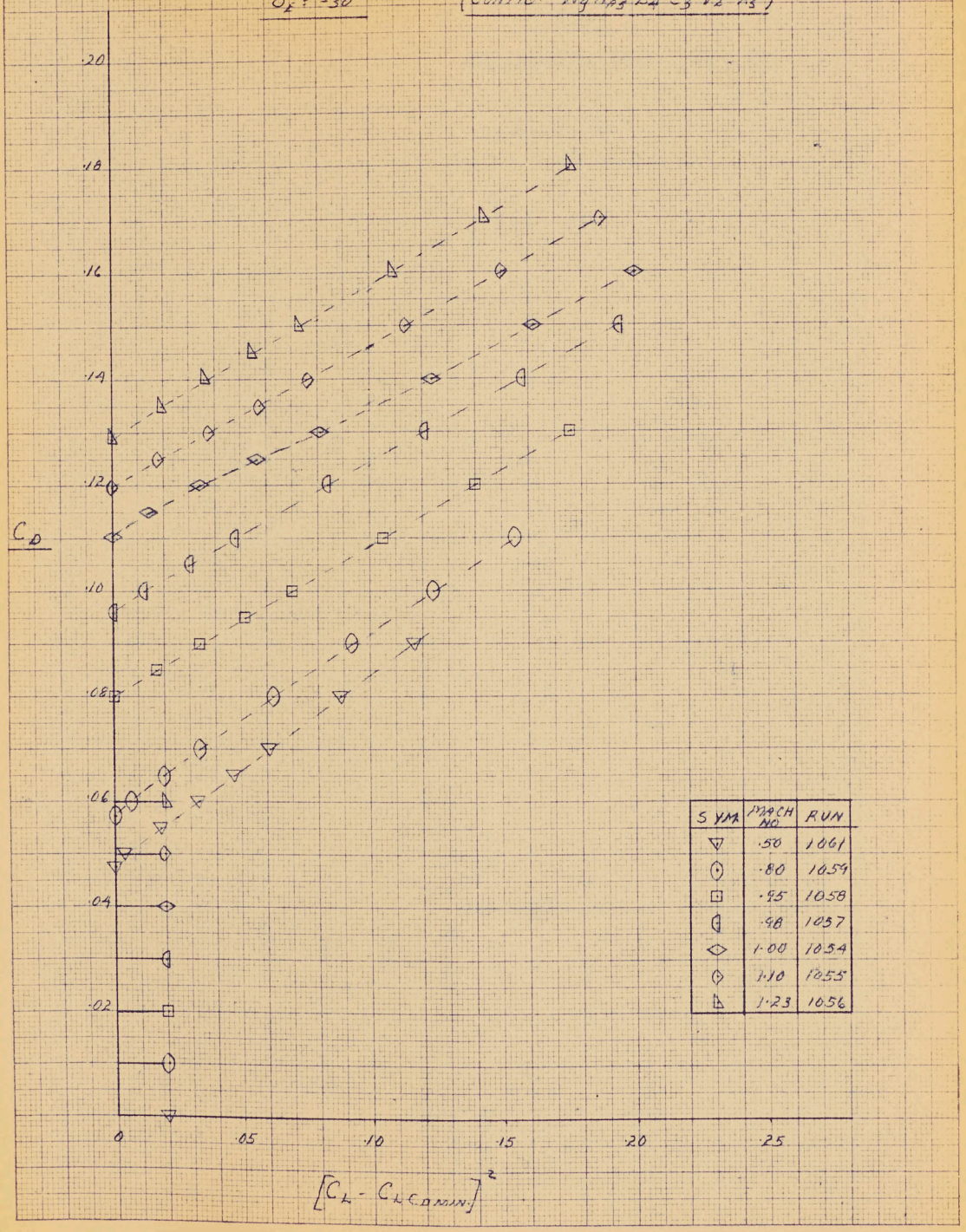
SHT. 3-6 P/W.T./49

R. SKOLSKY

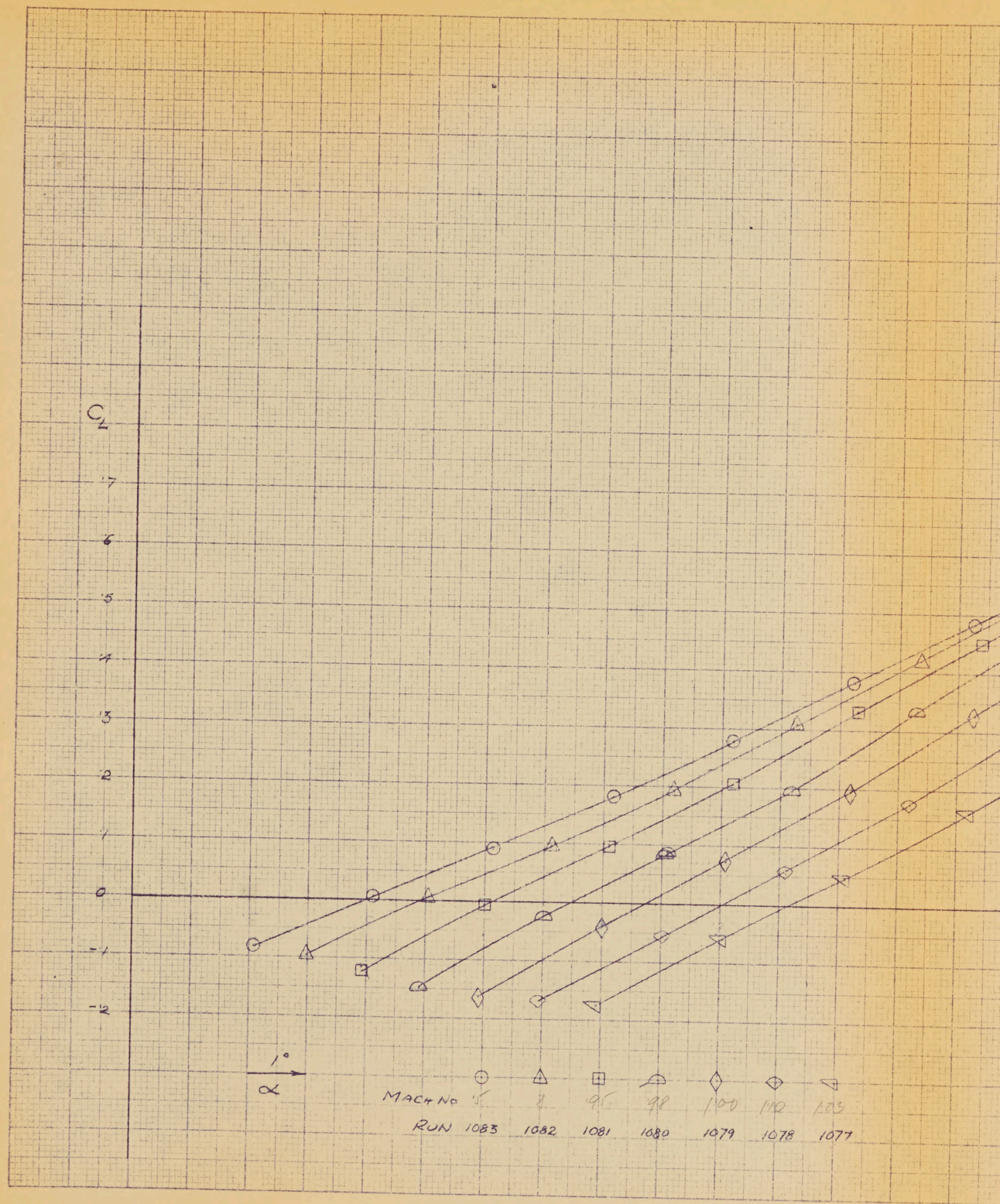
C.A.L. WIND TUNNEL TESTS ~ (OCT 1954)

$C_{105} \sim C_D$ VS $[C_L - C_{L_{C_{D_{MIN}}}}]$ AT VARIOUS MACH NO.

$\delta_E = -30°$ (CONFIG. $W_9 N_{A3} B_4 C_3 V_2 P_5$)



SYM	MACH NO.	RUN
▽	.50	1061
⊙	.80	1059
⊡	.95	1058
◐	.98	1057
◇	1.00	1054
⊙	1.10	1055
◺	1.23	1056



4.1 P/WT/49
Oct/54 J. Kwakkenbush

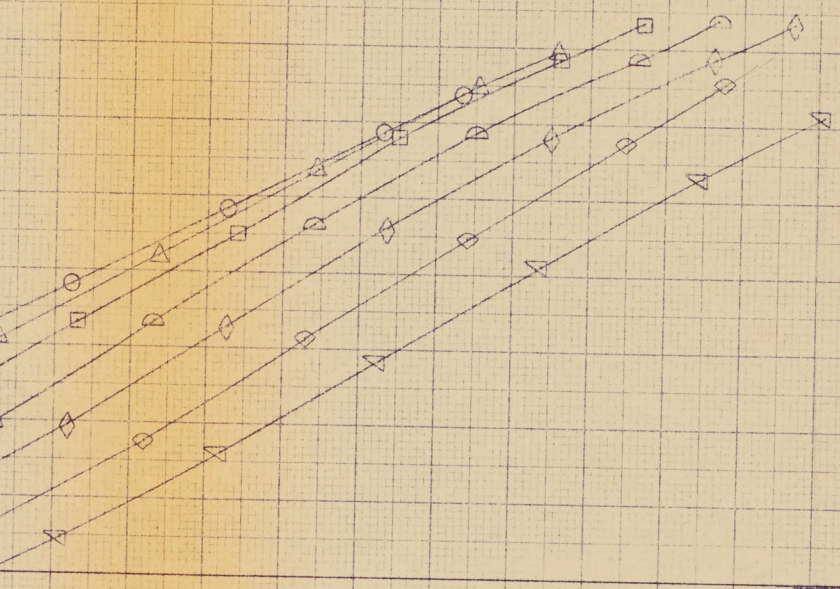
C105

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

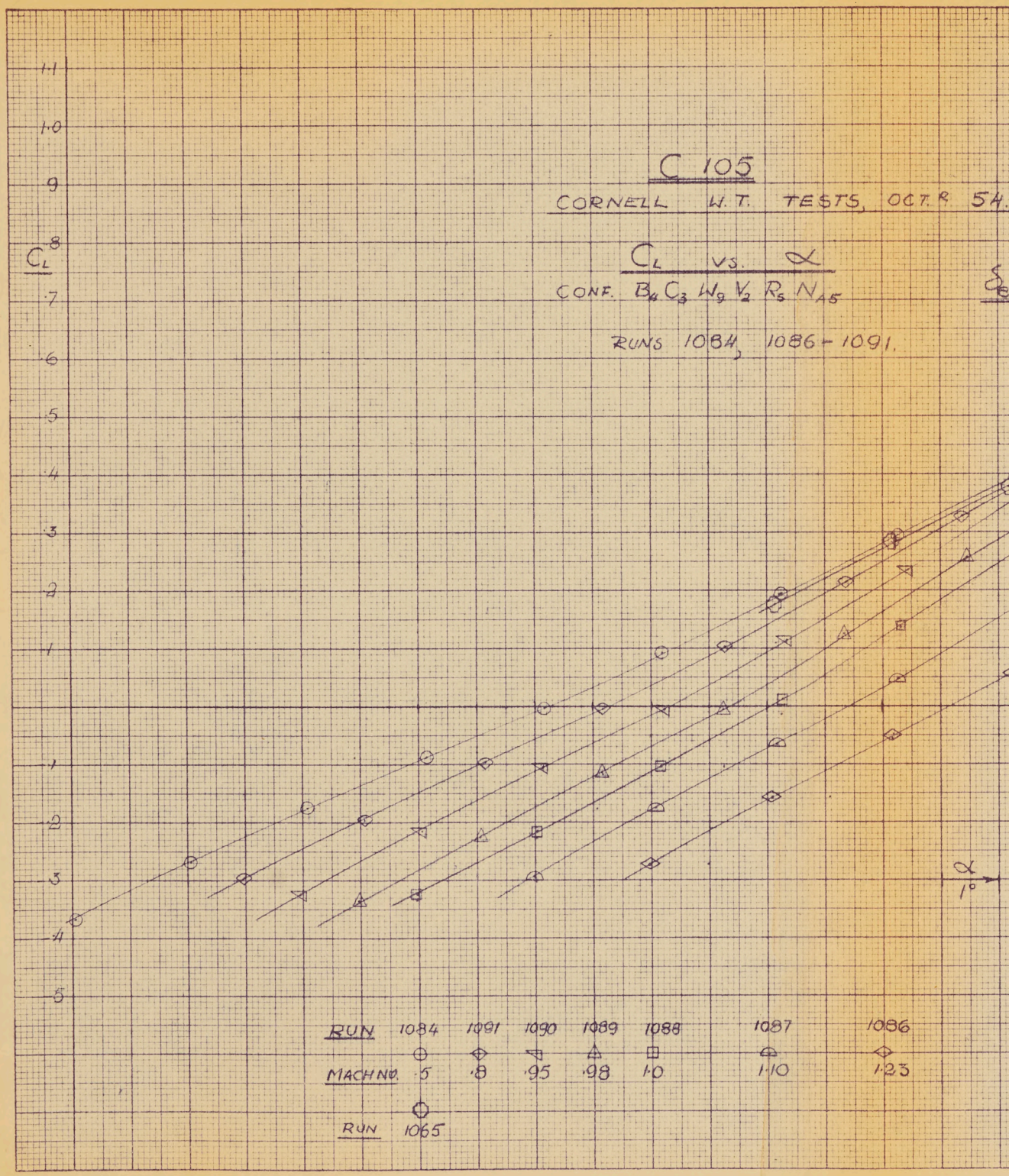
C_L vs α

$B_4 C_3 W_9 V_2 R_3 N_4$

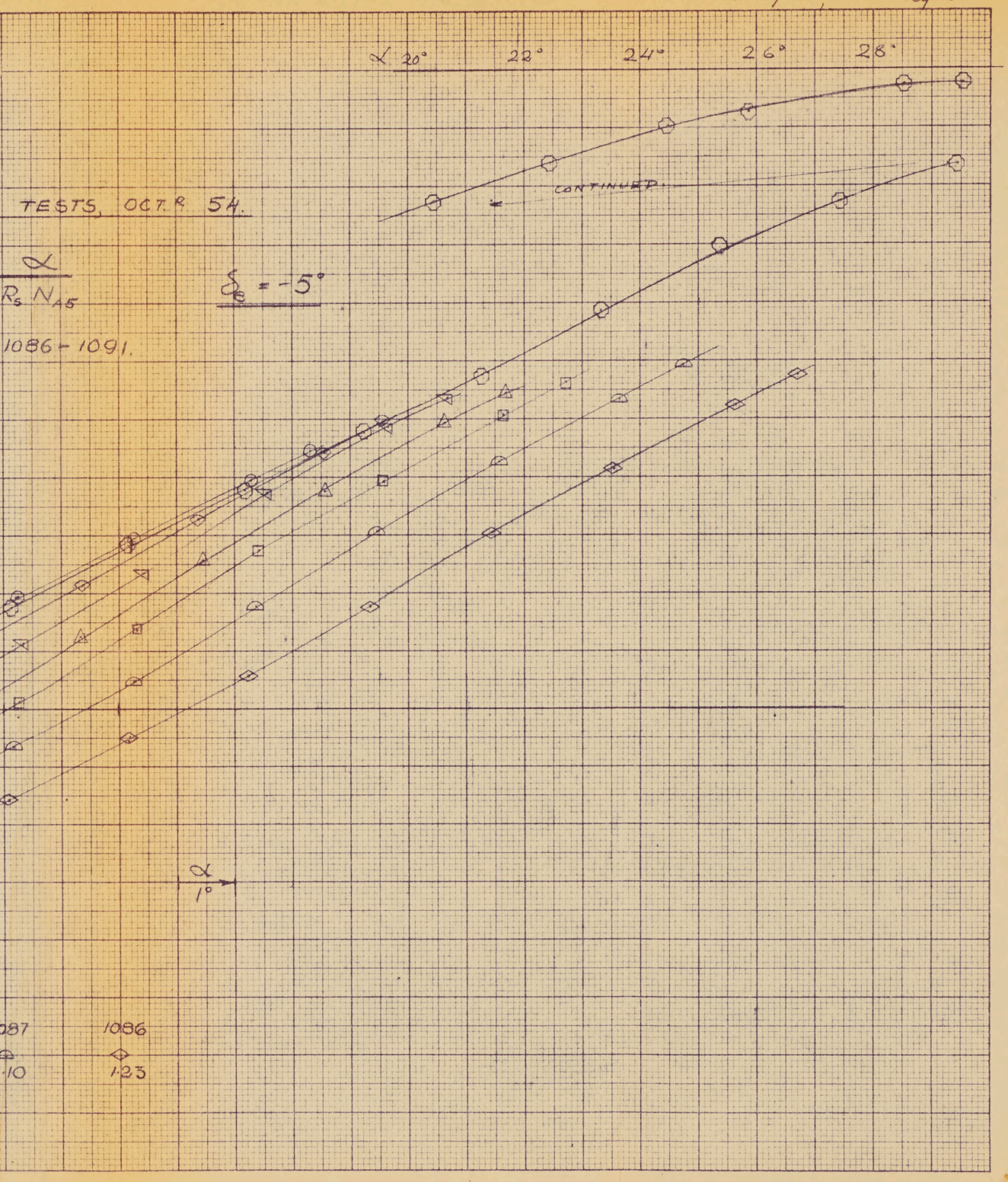
$\delta_e = 10°$

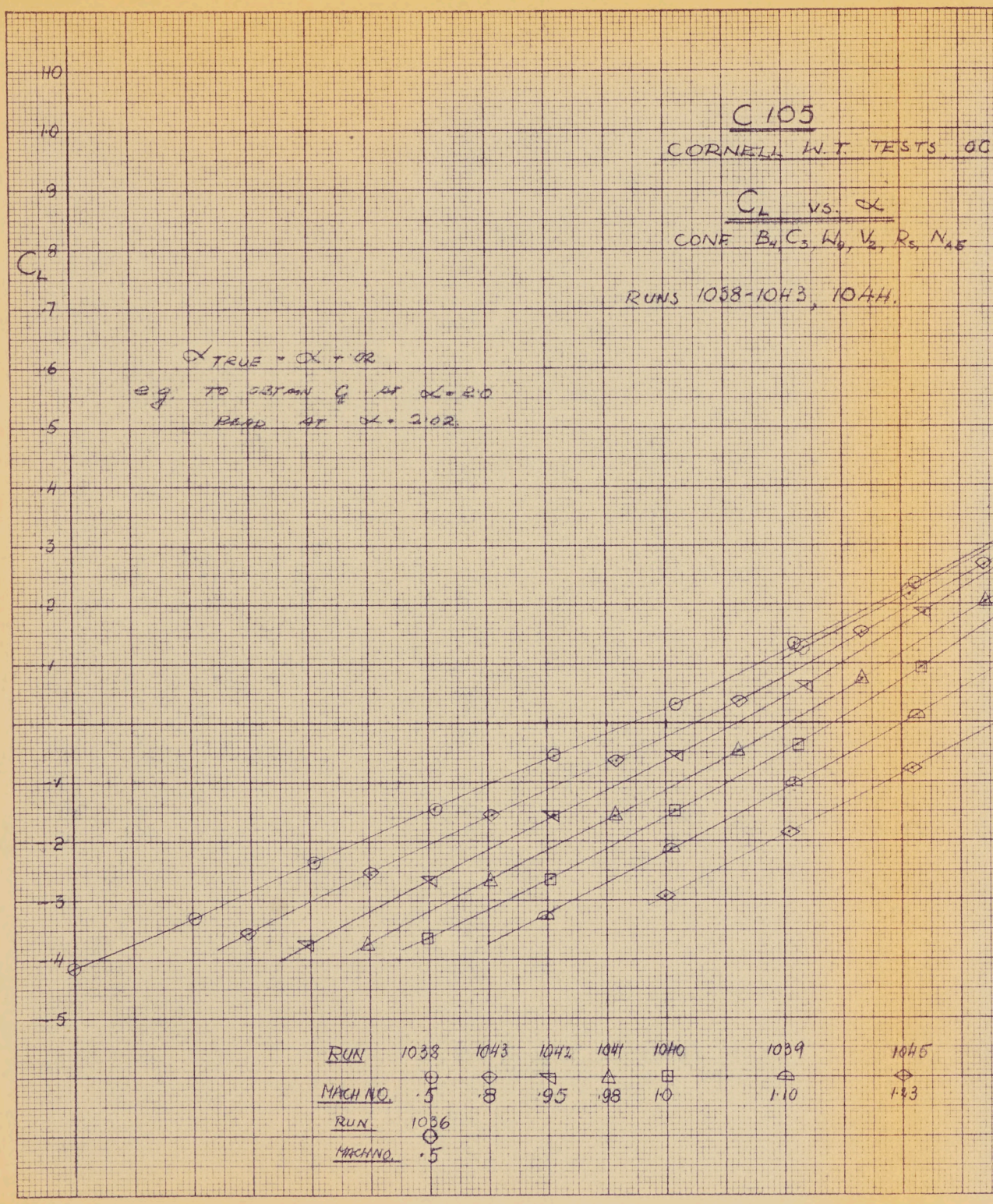


4
A213
1077



October 1954, T. Papis.





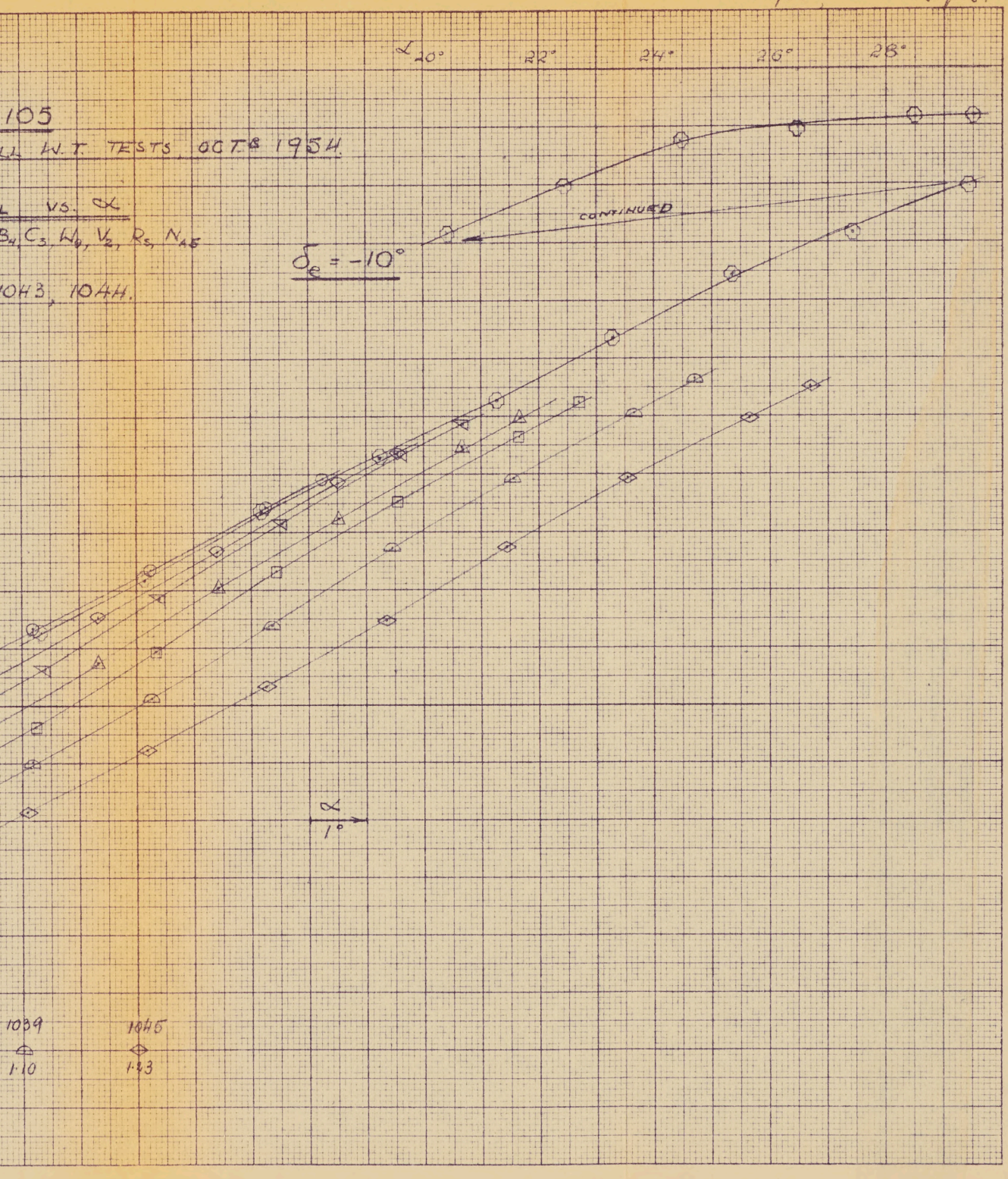
105

W.T. TESTS OCT.& 1954.

L VS. α

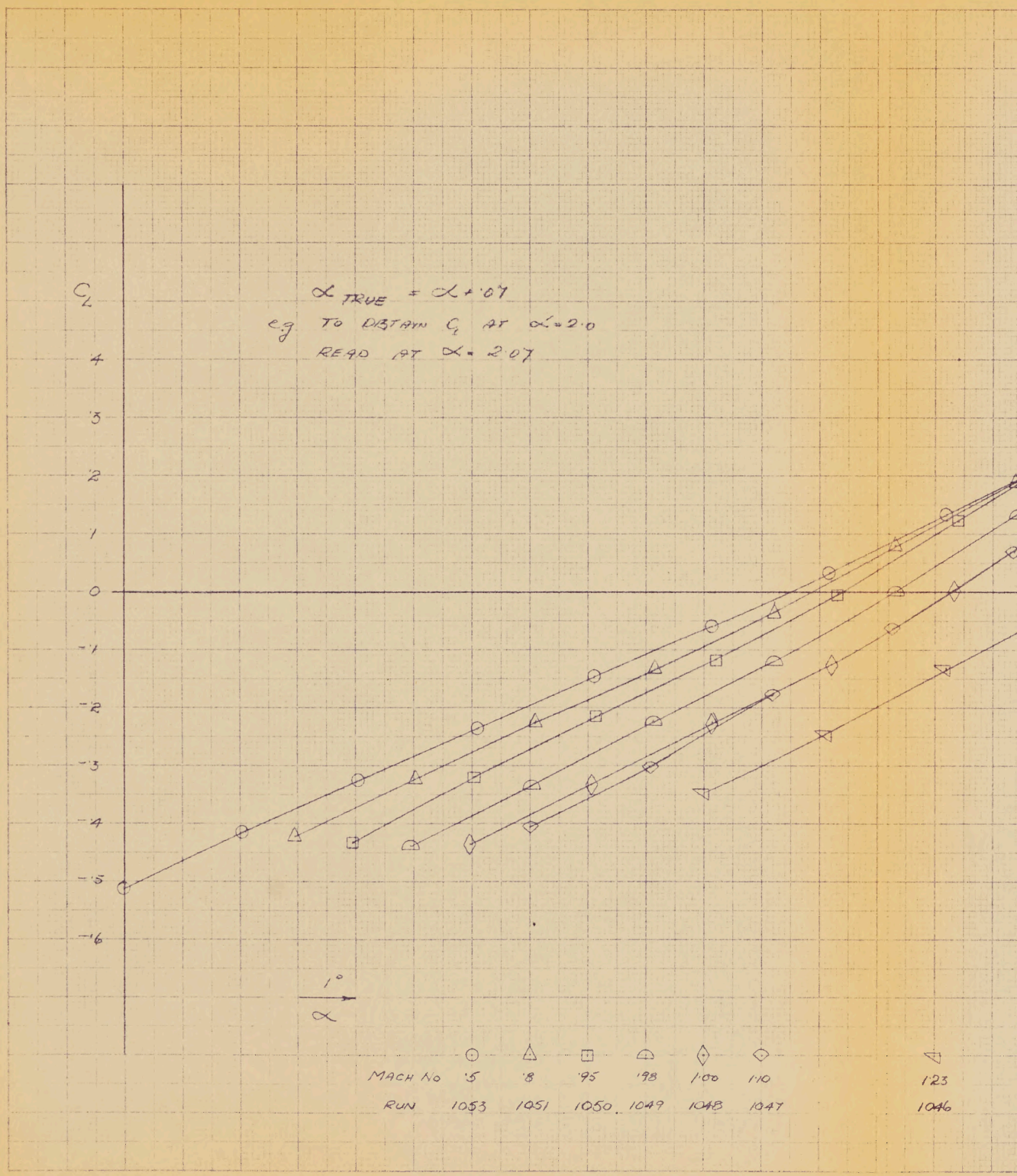
$B_4, C_3, H_0, V_2, R_5, N_{45}$

10H3, 10AH.



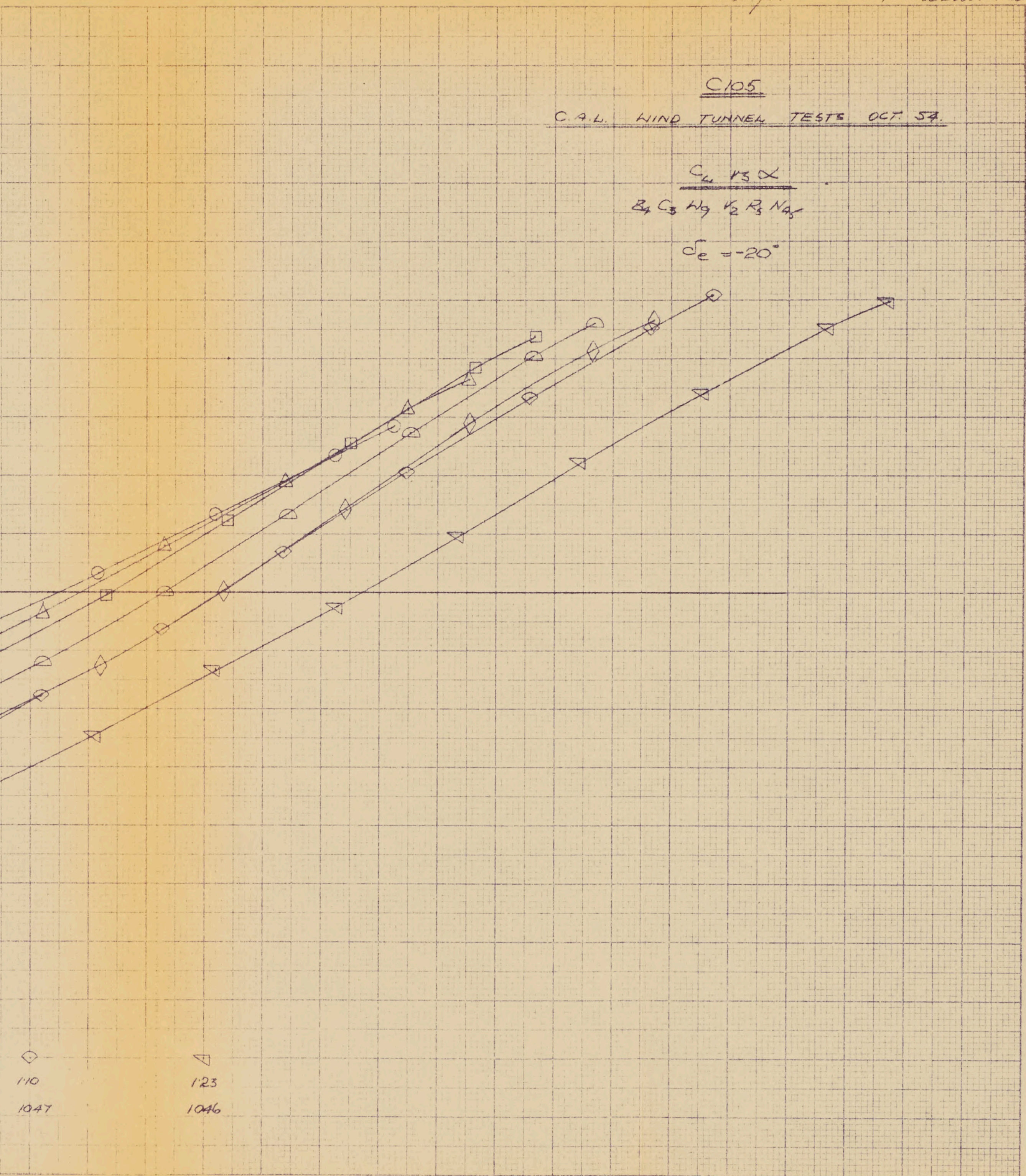
1039 1045

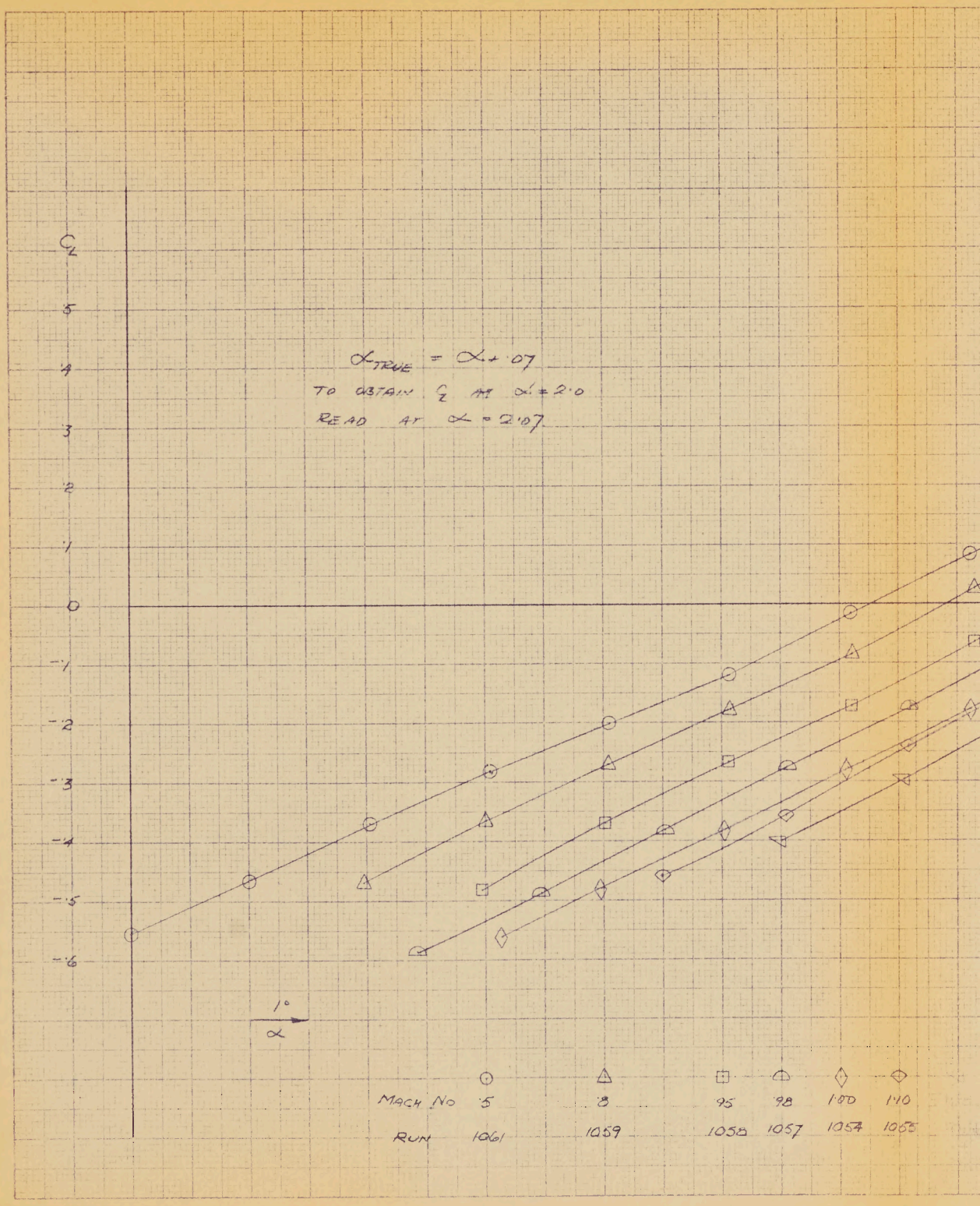
1·10 1·43


C_L
4
3
2
1
0
-1
-2
-3
-4
-5
-6
α TRUE = α + ·07
e.g. TO OBTAIN C_L AT α = 2·0
READ AT α = 2·07
1°
α
MACH No ·5 ·8 ·95 ·98 1·00 1·10 1·23
RUN 1053 1051 1050 1049 1048 1047 1046

4.5. P/WT/49

Oct./54 J. Kurathowski





4.6. P/VT 149

Oct 54. J. Kwiatkowski

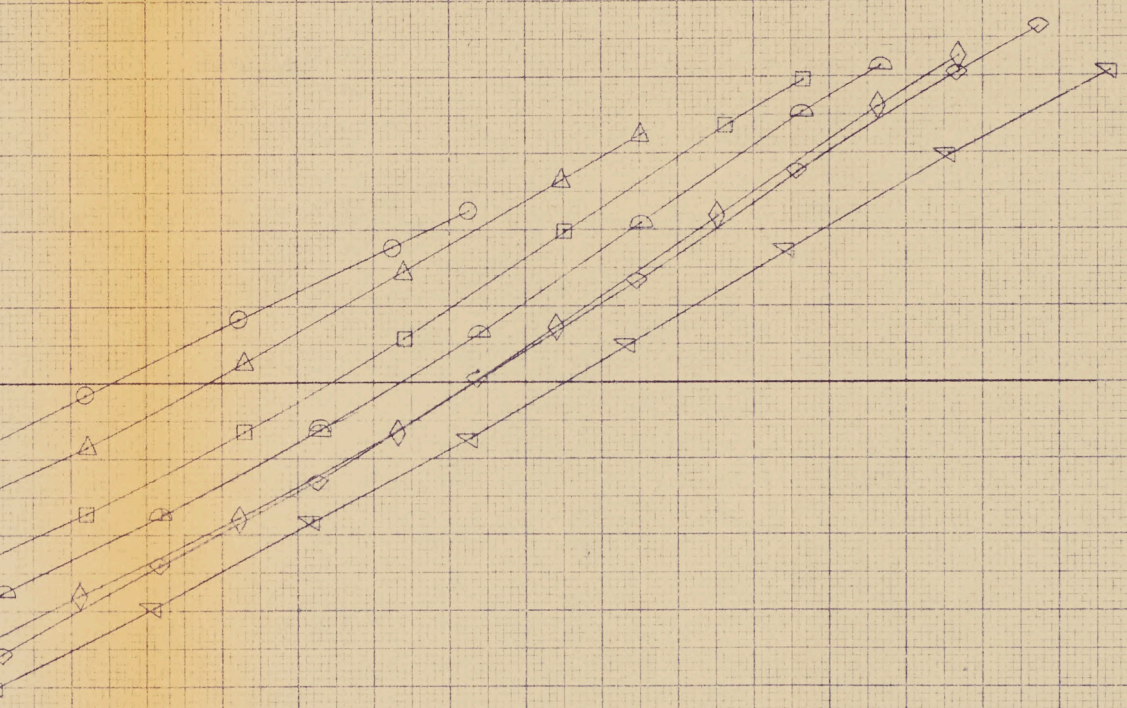
C105

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

C_L vs α

$B_4\ C_3\ H_7\ H_2\ R_4\ H_{45}$

$\delta_e = -30°$



B	1·00	1·10	1·23
57	1054	1065	1056

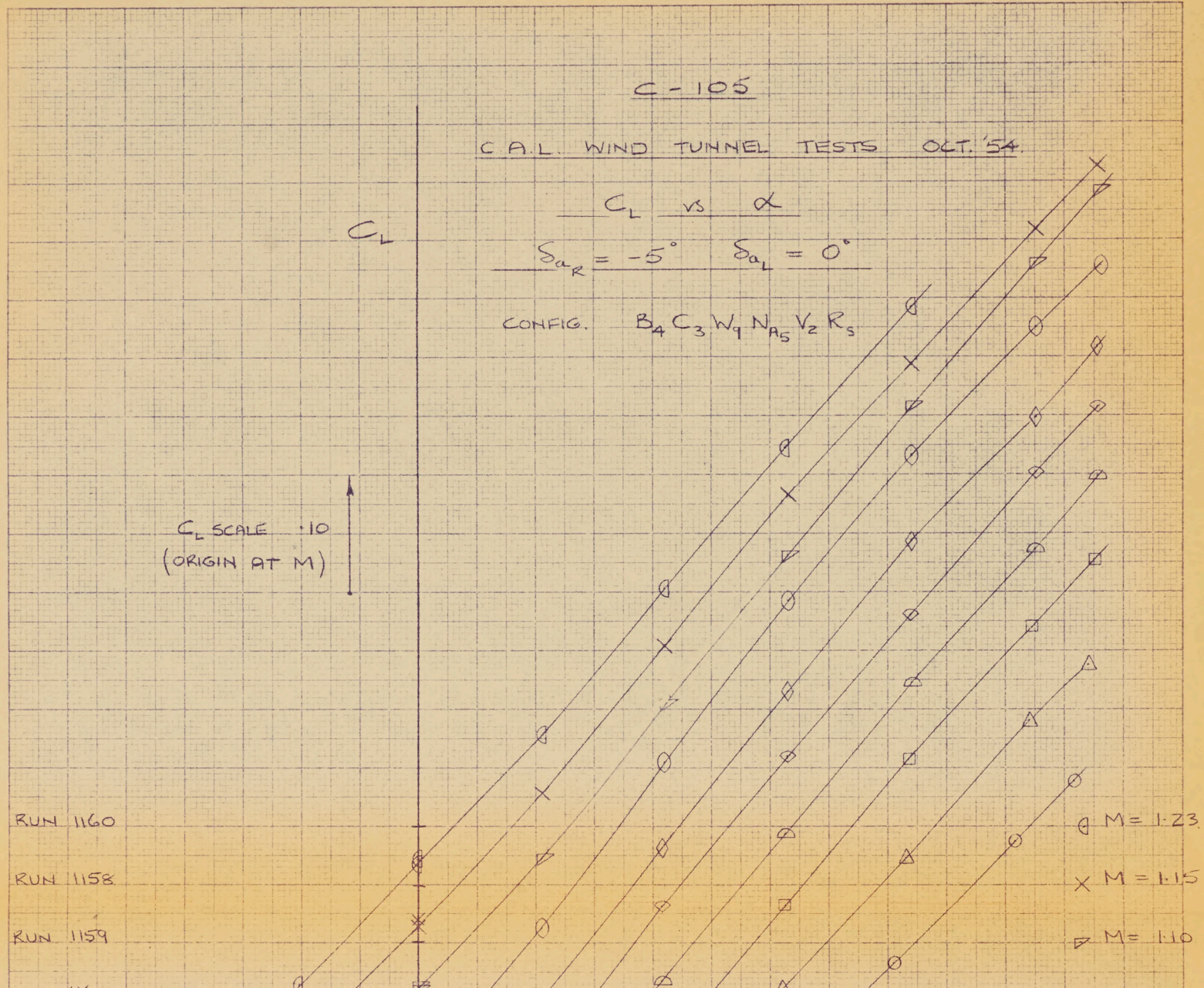
C-105

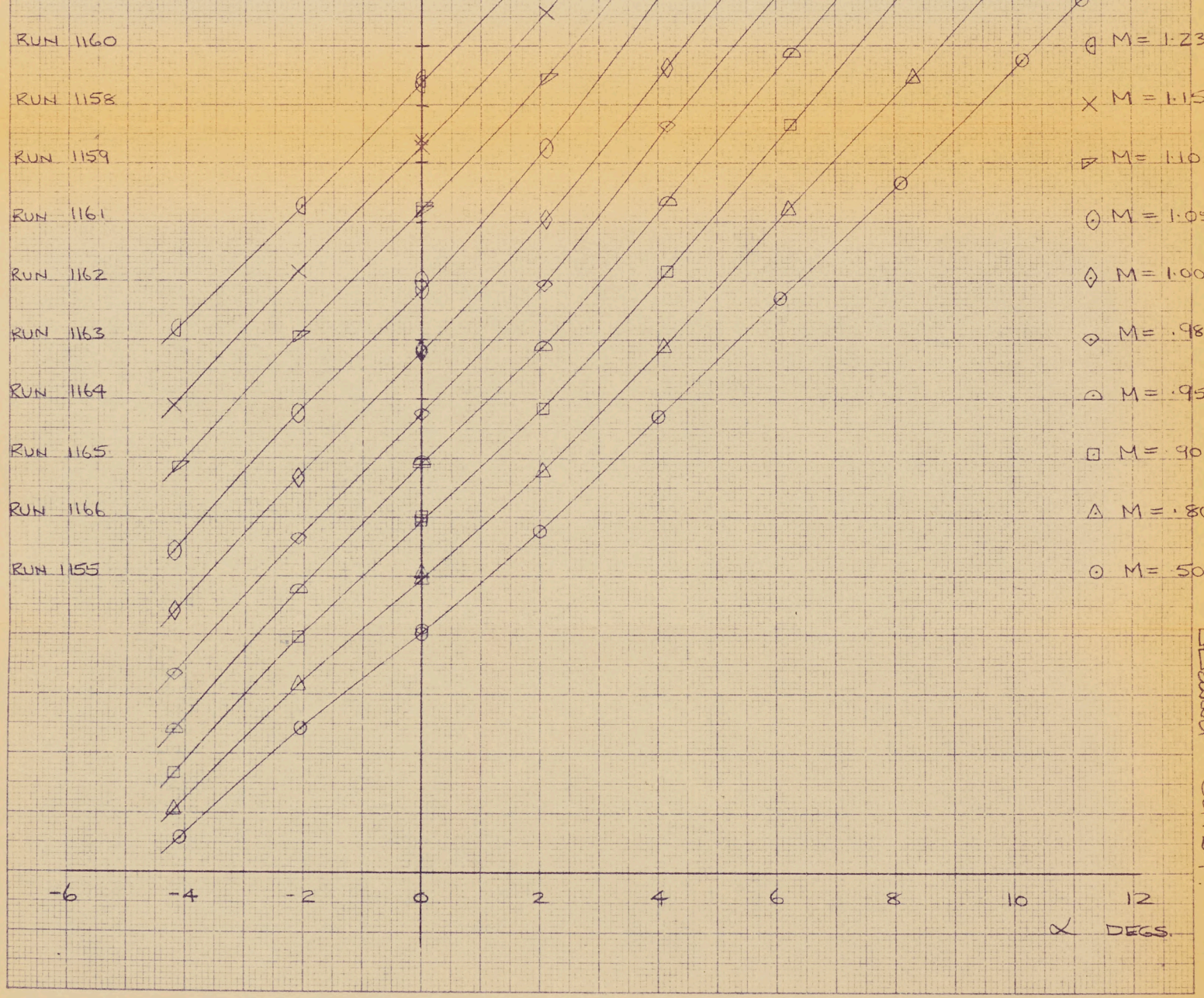
C.A.L. WIND TUNNEL TESTS OCT. '54

C_L vs α

$\delta_{a_R} = -5°$ $\delta_{a_L} = 0°$

CONFIG. $B_4 C_3 W_9 N_{A_5} V_2 R_S$





P/WT/49 SHEET 4.13
Stewart Oct. 54.

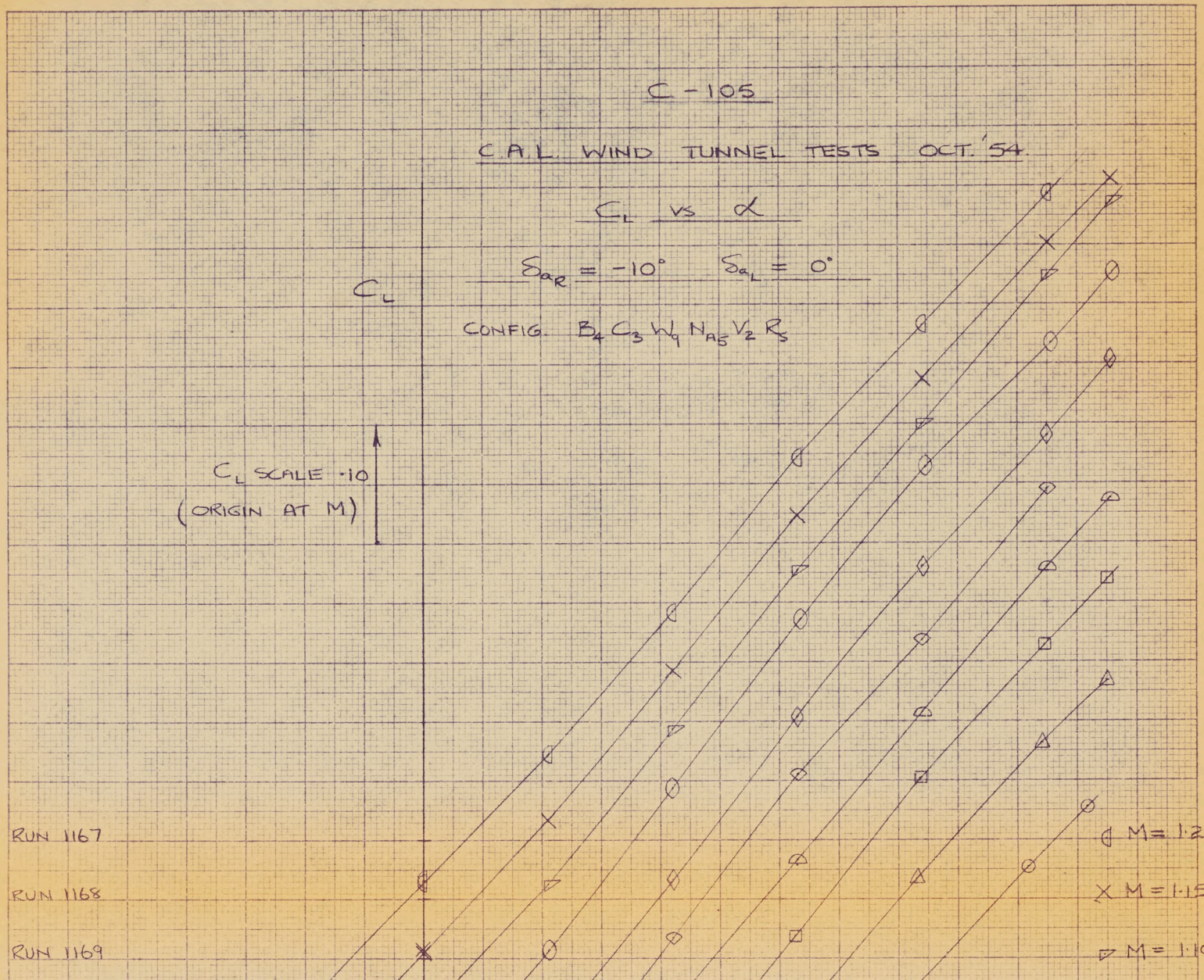
C-105

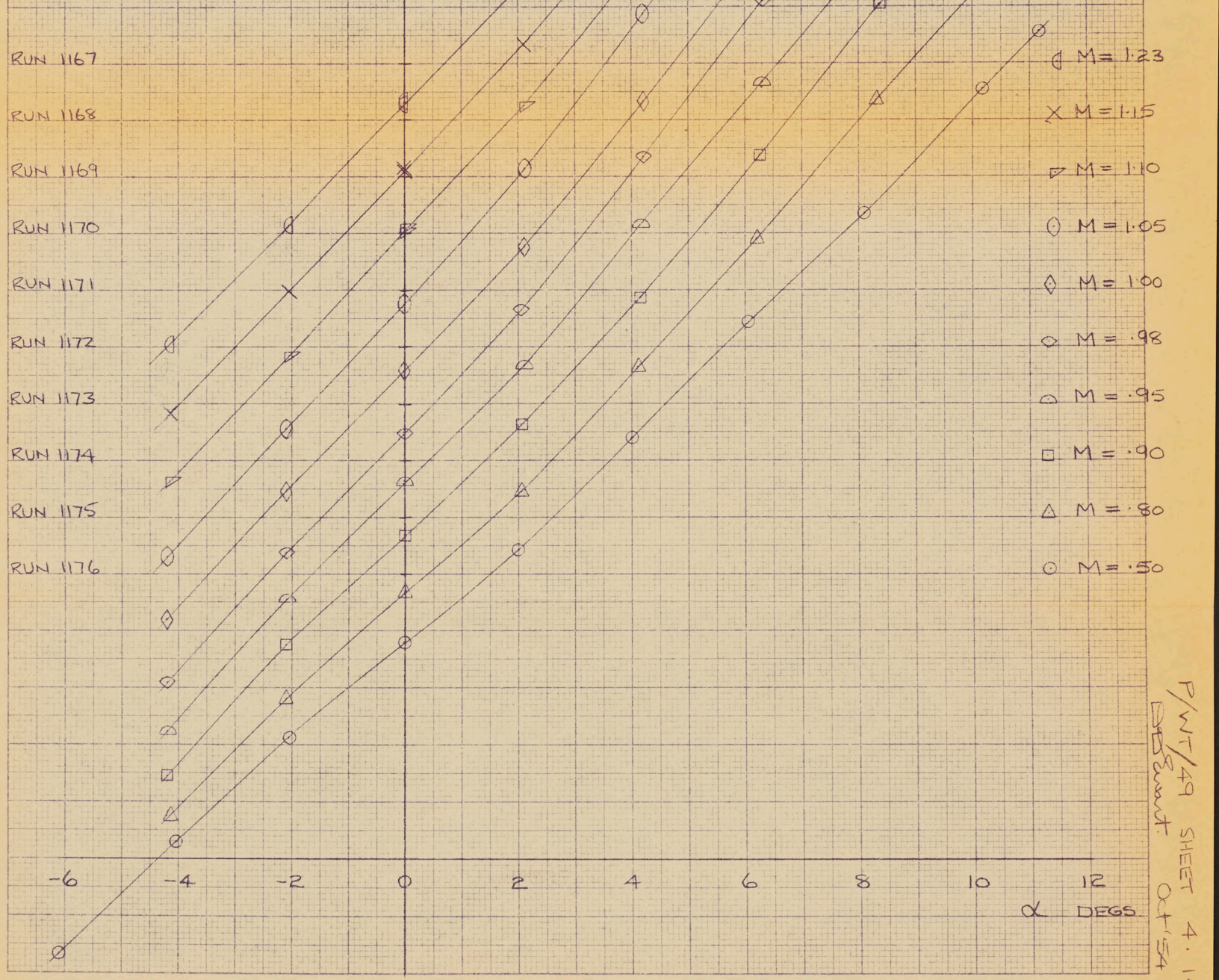
C.A.L. WIND TUNNEL TESTS OCT. '54.

C_L vs α

$\delta_{a_R} = -10°$ $\delta_{a_L} = 0°$

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





P/WT/49 SHEET 4.14
DES Estmt. Oct '54.

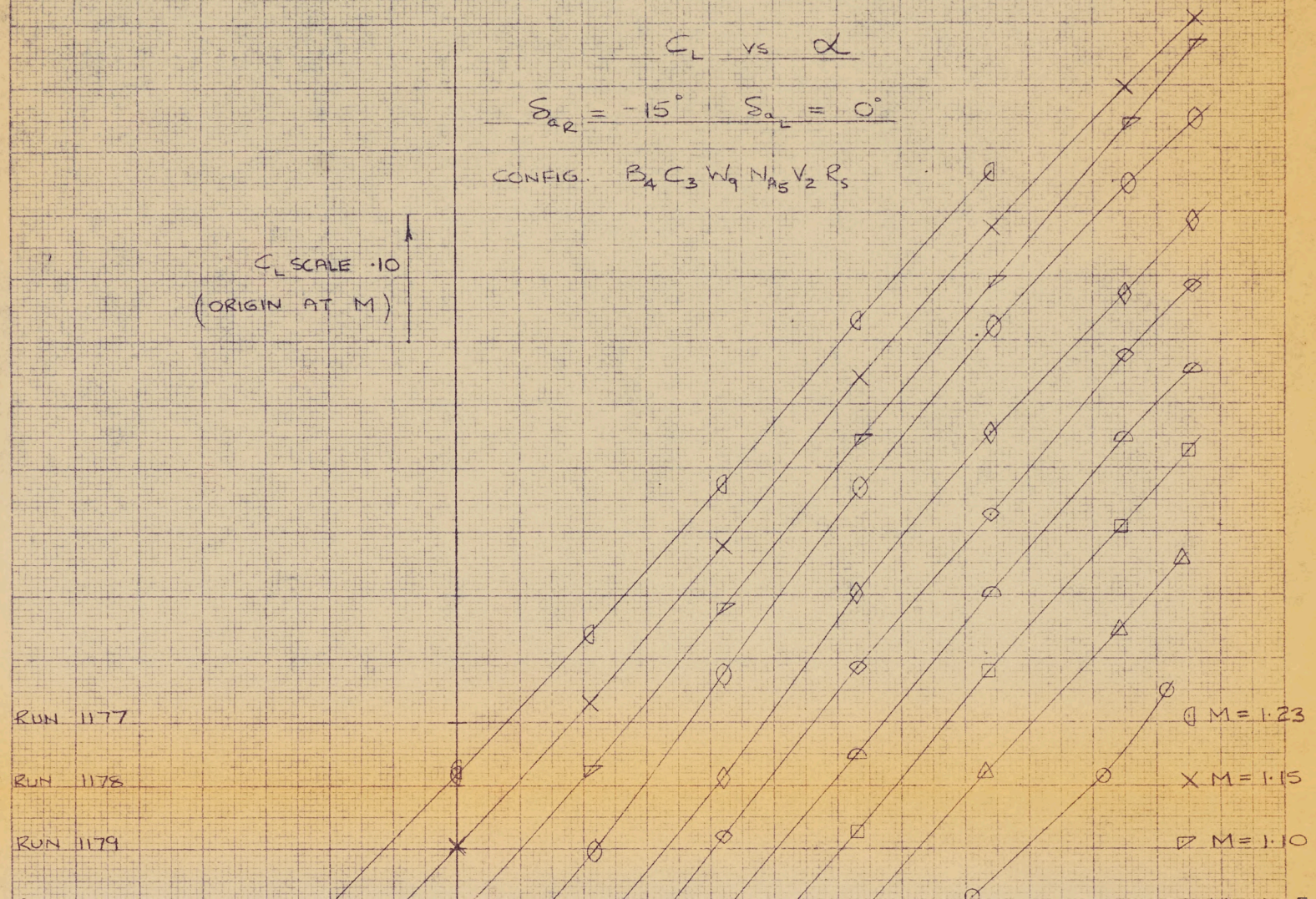
C-105

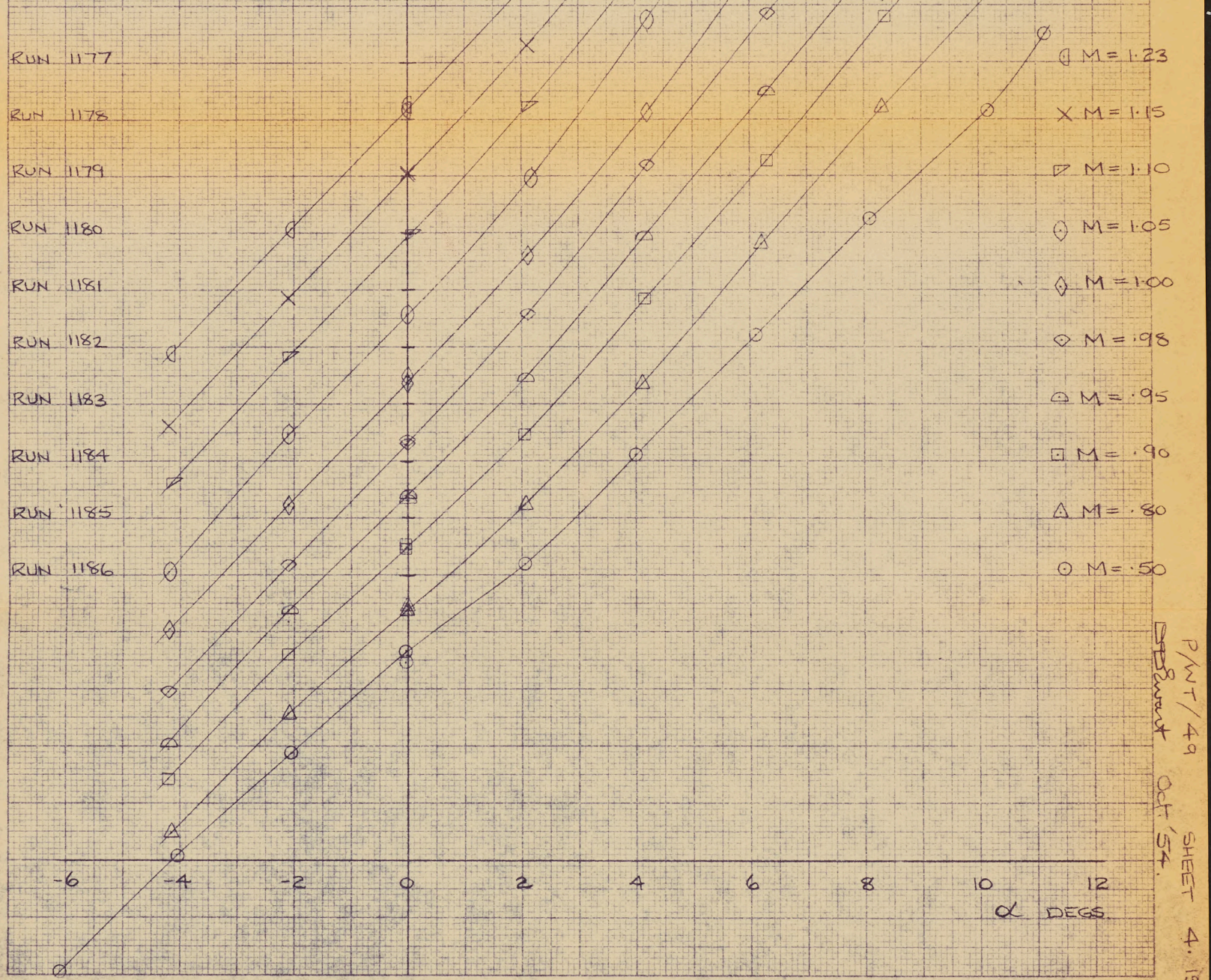
C.A.L. WIND TUNNEL TESTS OCT. '54.

C_L vs α

$\delta_{a_R} = -15°$ $\delta_{a_L} = 0°$

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





P/WT/49
Sheet 4.15
Oct '54.

C-105

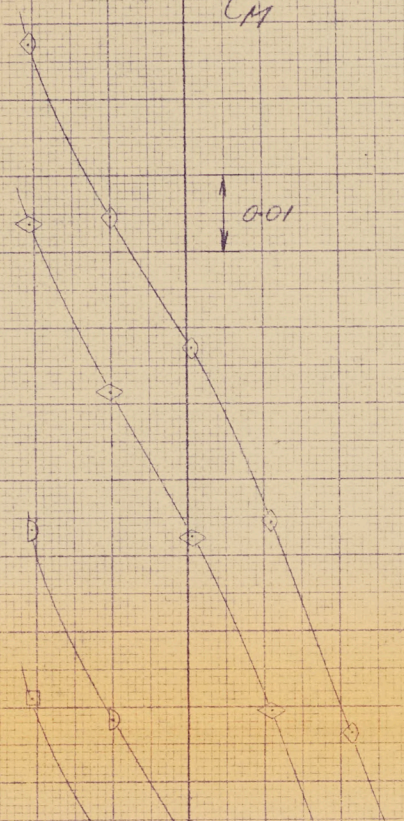
C-A-L- Wind Tunnel Tests Oct 1954

C_M vs α

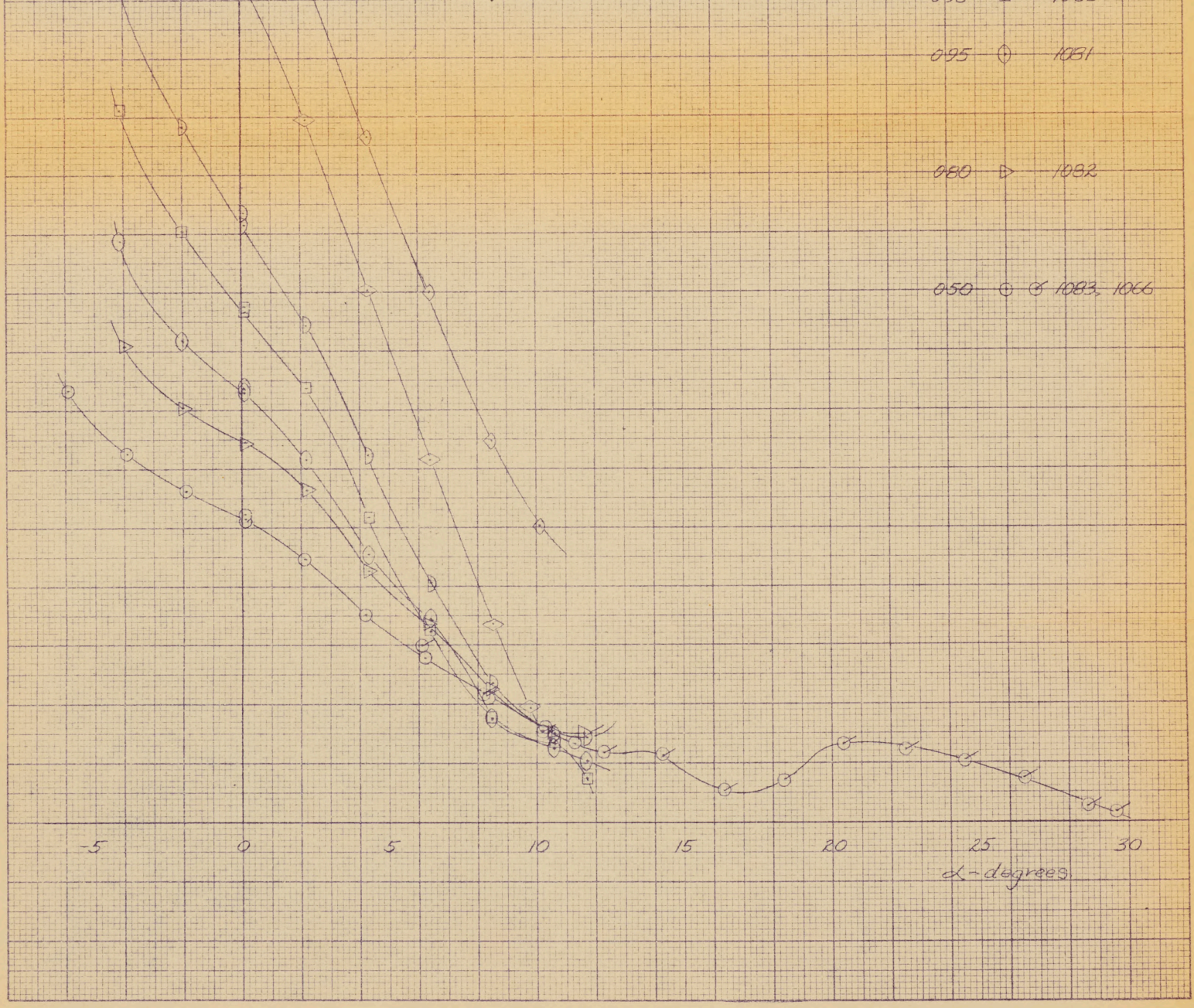
$\delta_e = 10^\circ$ $\delta_{in} = \delta_e = 0$

Configuration $B_4 G W_6 V_2 R_5 N_{A5}$

Runs 1077 to 1083 and 1066



Mach No.		Run No.
1·23	◇	1077
1·10	◈	1078
1·00	▷	1079
0·98	□	1080
0·95	◊	1081
0·80	▷	1082



P&WT 749
C.A. Ford
12 Nov 54
5.1

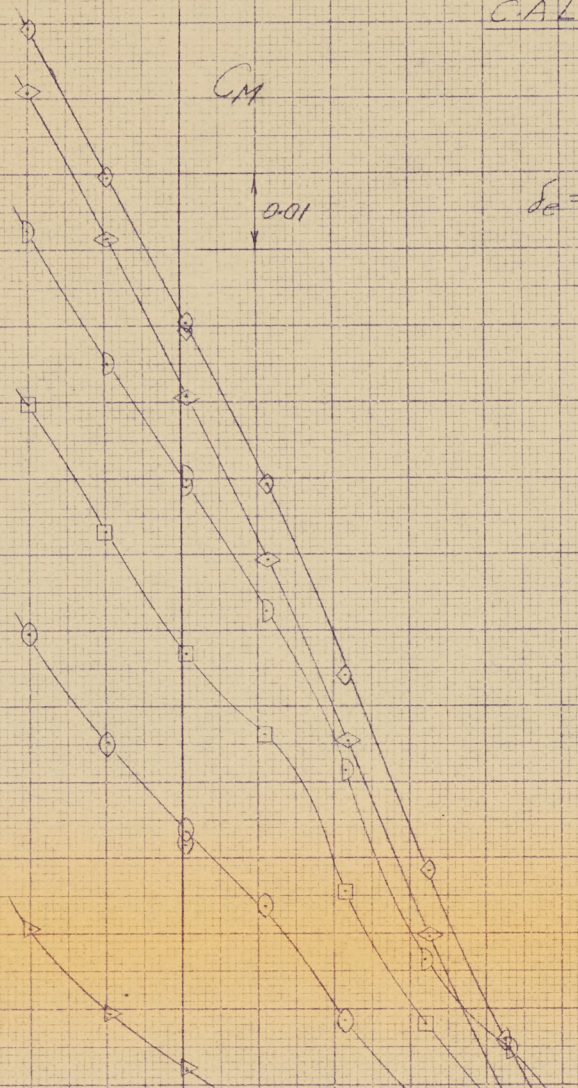
C-105

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

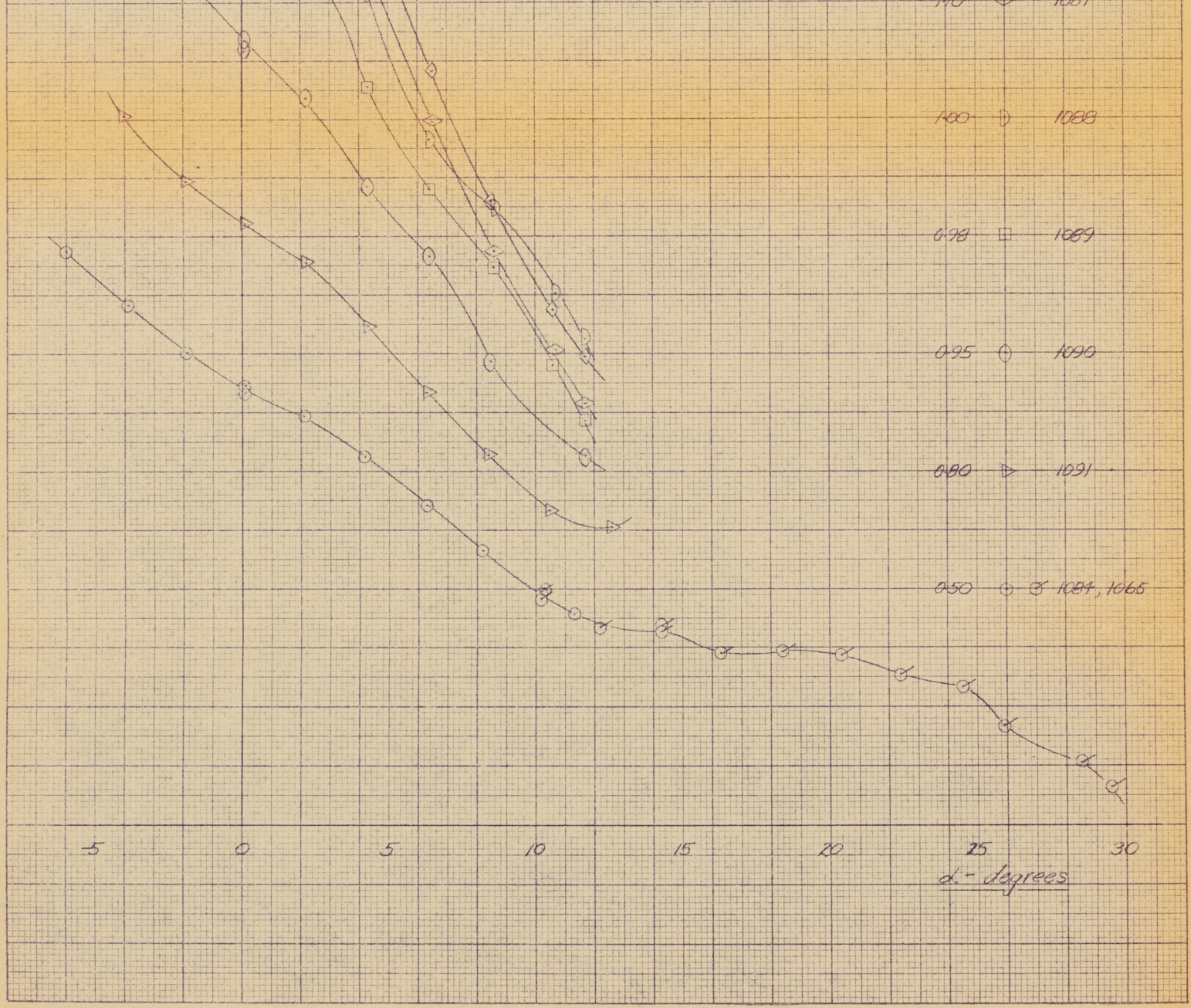
C_M vs α

$\delta_e = -5°$ $\delta_a = \delta_r = 0$

Configuration $B_4C_3W_5V_2R_5N_{45}$
Runs 1084 to 1091 and 1065
(1085 Void)



Mach No.		Run No.
1.23	◇	1086
1.10	◇	1087
1.00	▷	1088
0.90	□	1089
0.80	○	1090
0.70	△	1091
0.60	▽	1065



PWT 149
C.A. Ford

5.3
15 Nov. 1954

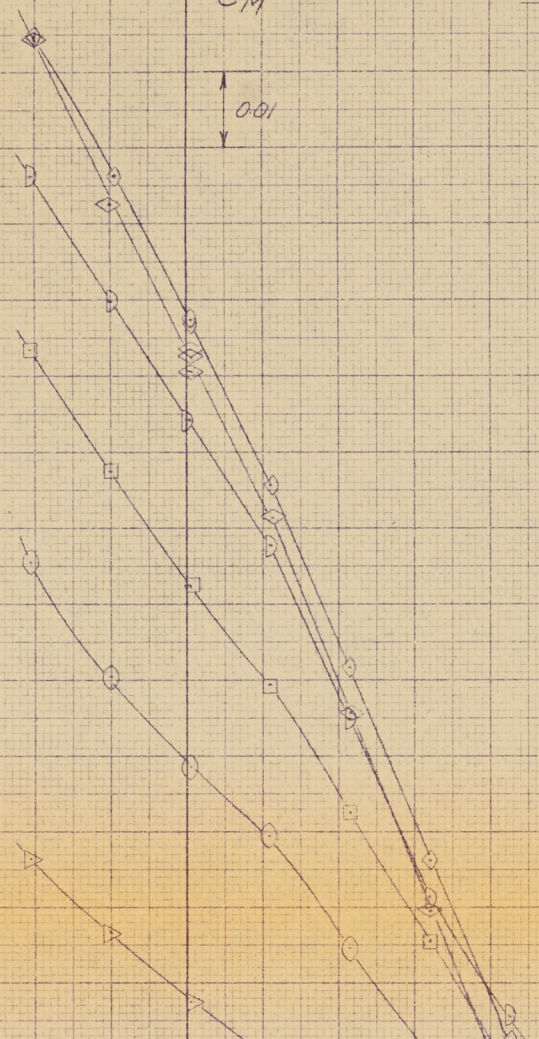
C-105

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

C_M vs α

$\delta_e = -10°$ $\delta_a = \delta_r = 0$

Configuration $B_4 C_3 W_9 V_2 R_5 N_{A5}$
Runs 1036 to 1045
(1037 & 1044 Void)



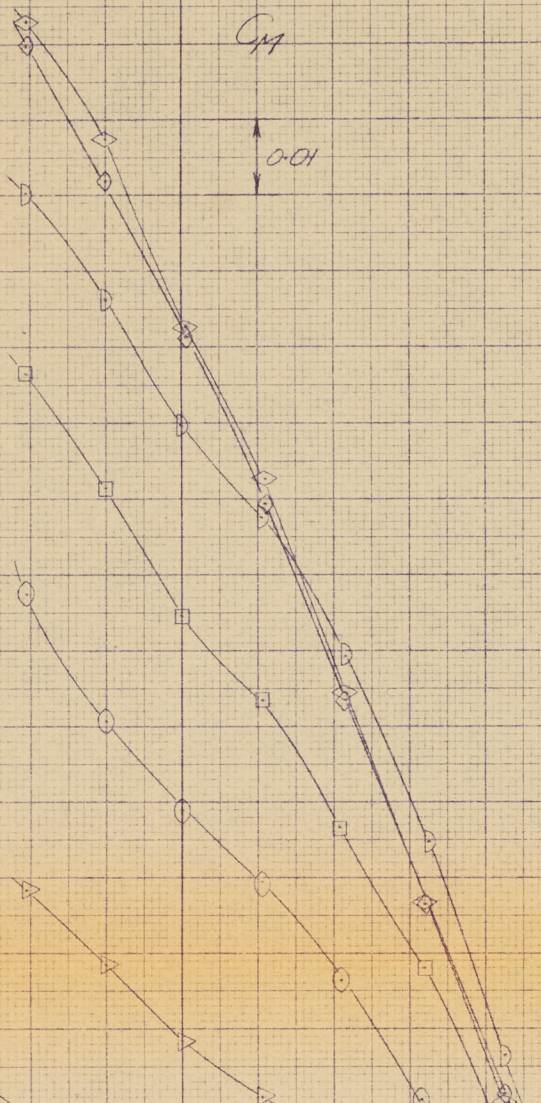
Mach No.		Run No.
1.23	◇	1045
1.40	◇	1039

P/WT/49
C.A.Ford

5.4
15 Nov 1954

C-105

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



C_M vs α

$\delta_e = -20°$

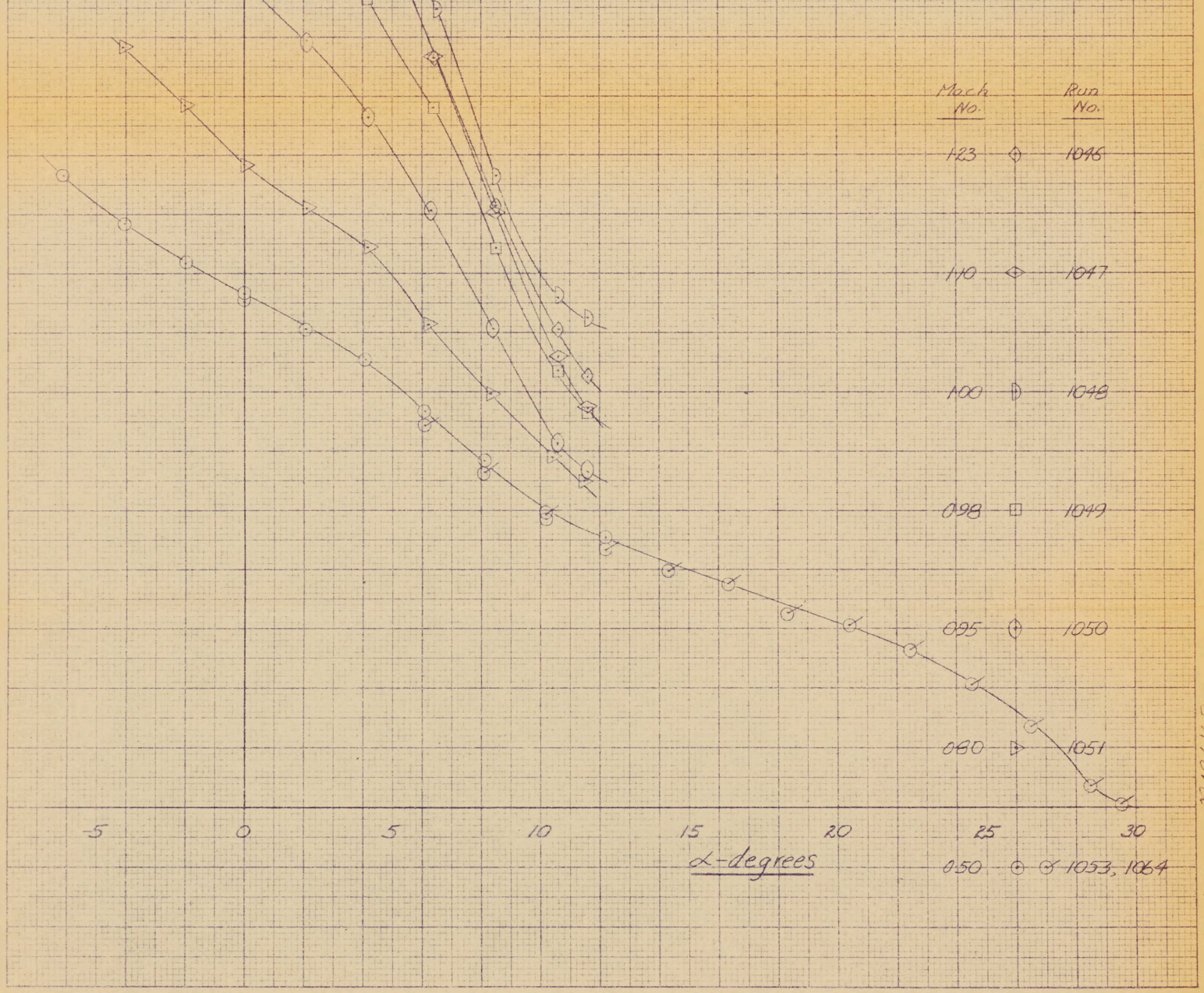
$\delta_a = \delta_r = 0$

Configuration $B_4 C_3 W_4 V_2 R_3 N_{45}$

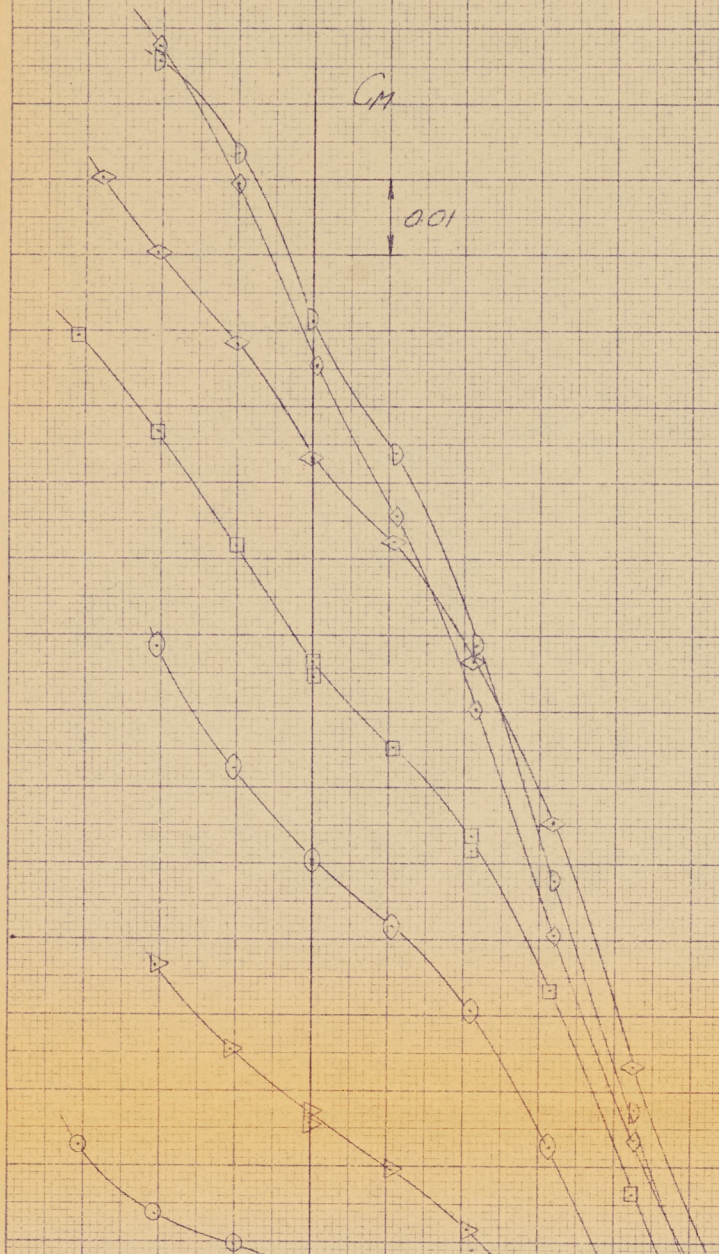
Runs 1046 to 1053 and 1064

(1052 Void)

Mach No.		Run No.
1.23	◇	1046



PLOTTED
SCALED
16 Nov. 1954
5-5



C-105

CAL Wind Tunnel Tests – Oct 1954

C_M vs α

$\delta_E = -30°$

$\delta_A = \delta_R = 0$

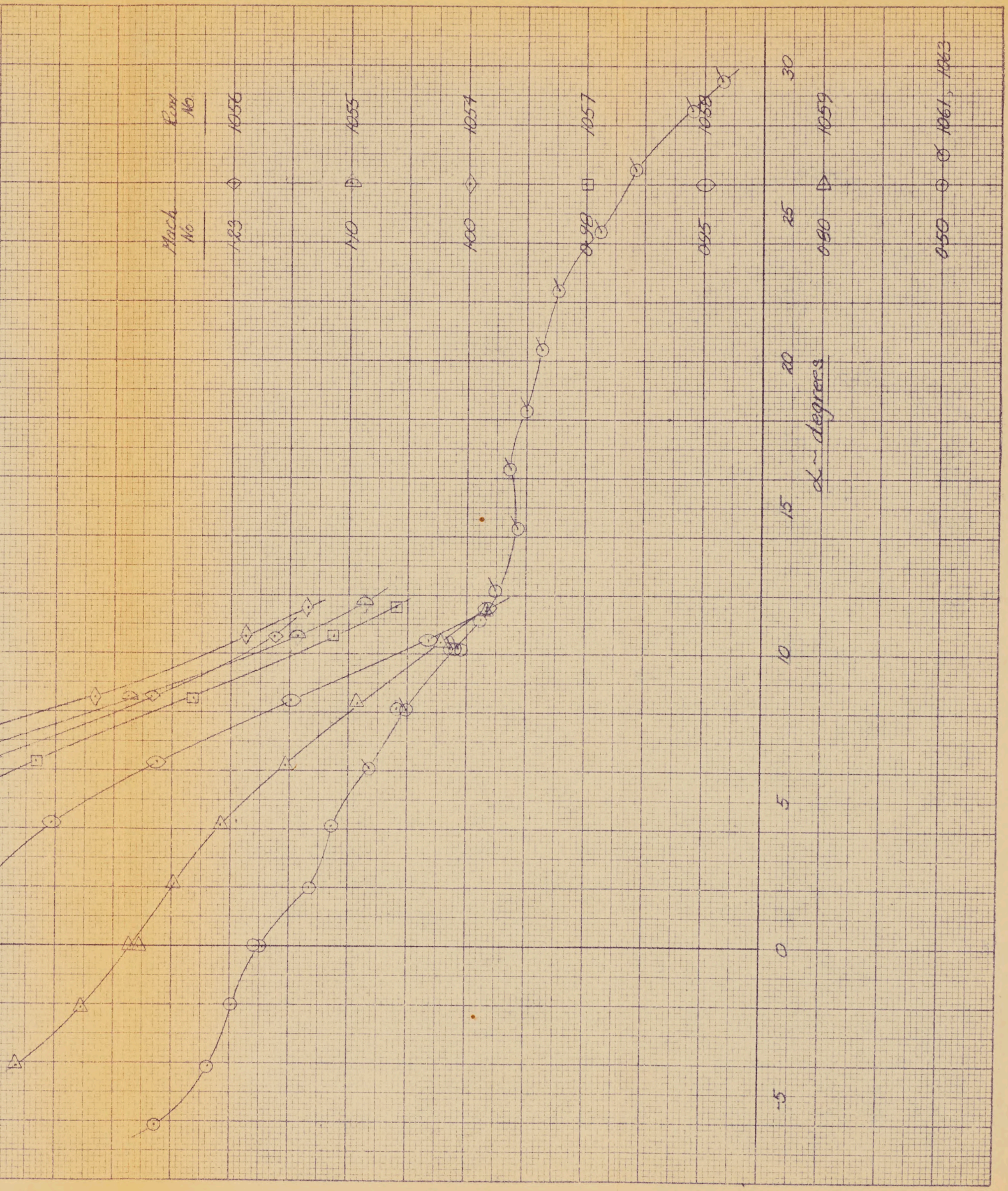
Configuration $B_4 C_3 W_{19} V_2 R_2 N_{A3}$

Runs 1054 to 1063

(1060 and 1062 Void)

Mach No	Run No.
.483	1056
.600	1055
.700	1054
.800	1057
.900	1058
.950	1059
1.000	1061
1.100	1063

P/WT/49 5·6
C A Ford. 16 Nov 1954



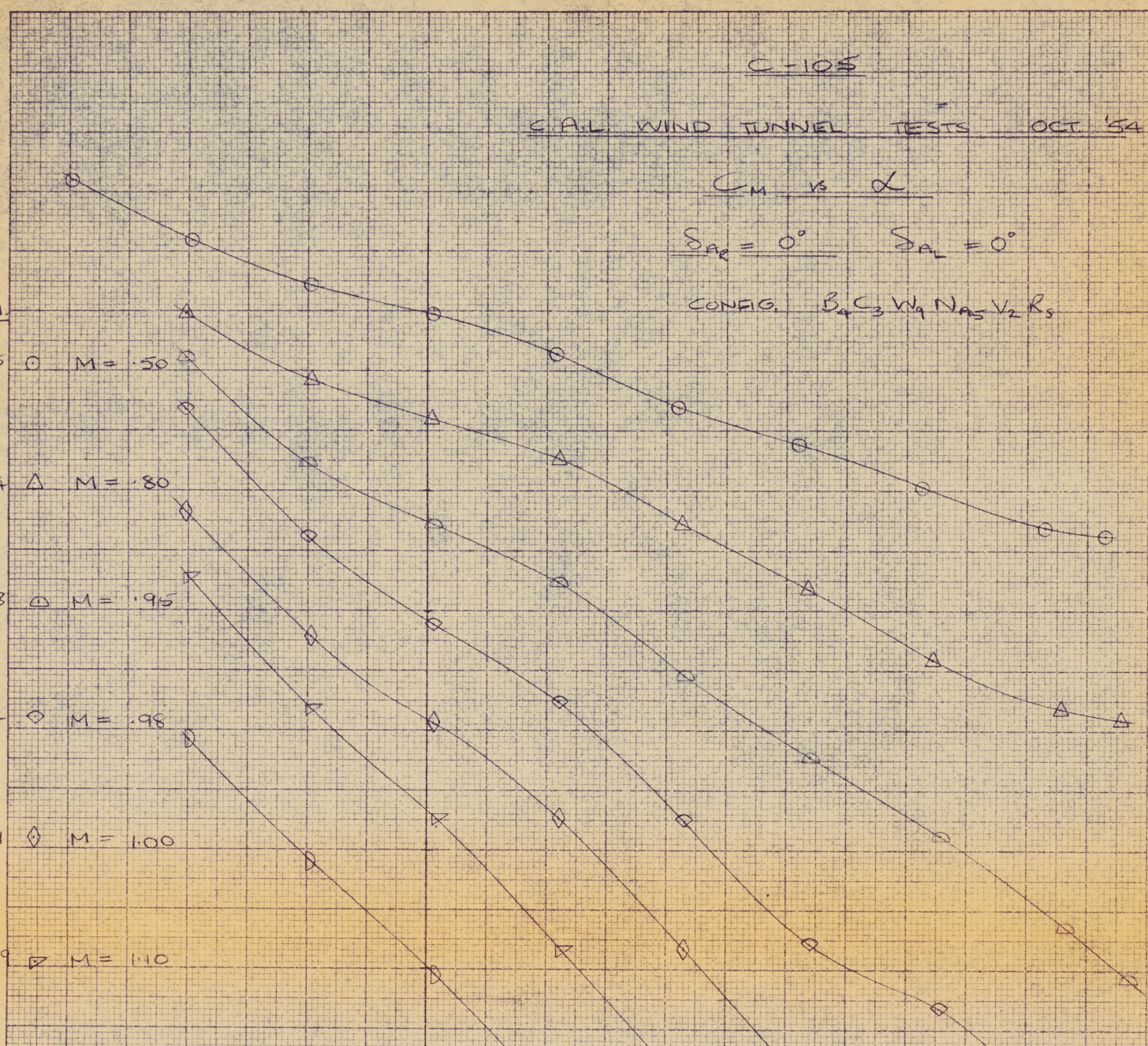
C-105

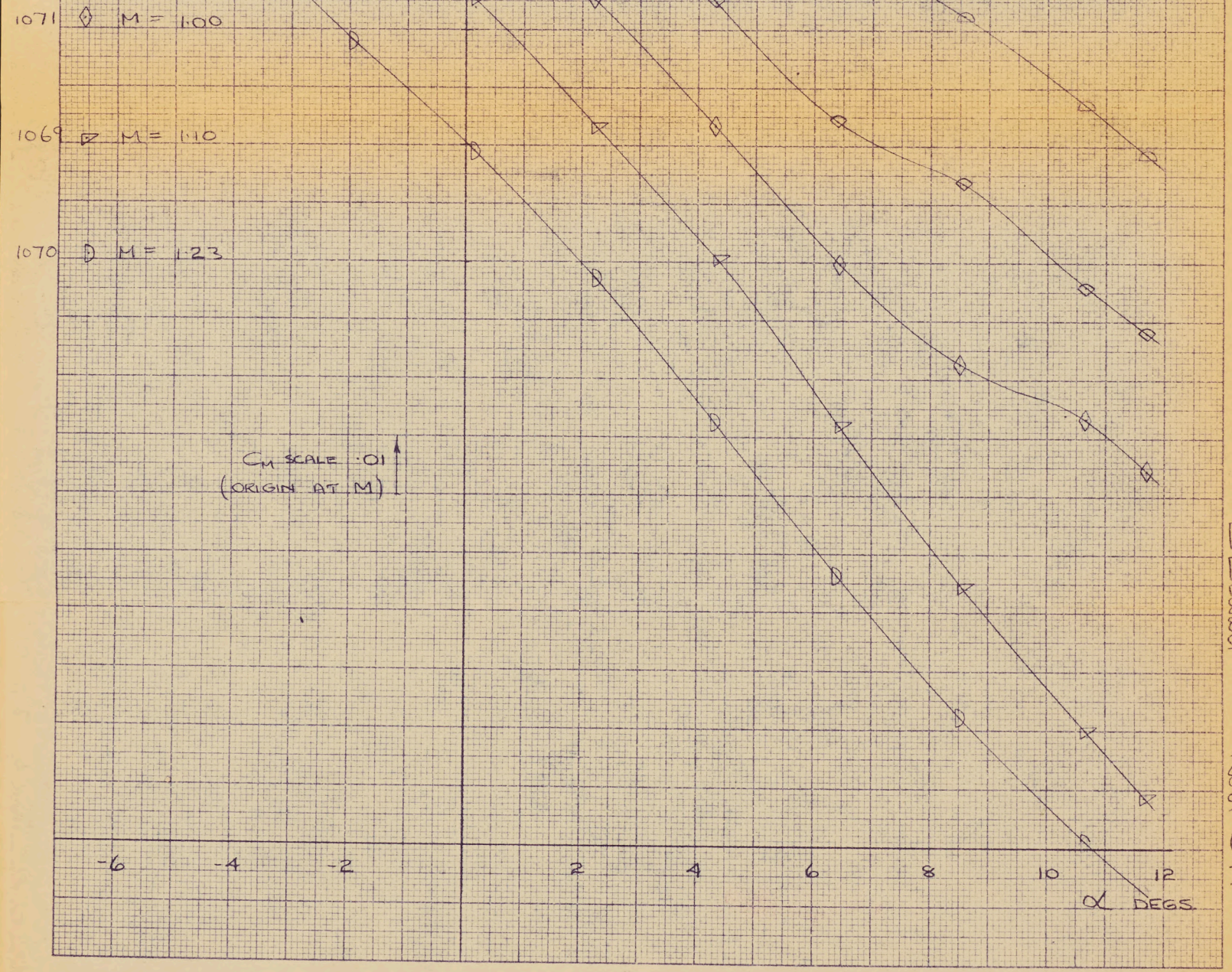
C.A.L. WIND TUNNEL TESTS OCT. '54

C_M vs α

$\delta_{A_R} = 0°$ $\delta_{A_L} = 0°$

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





P/WT/49 SHEET 5.1

BBEwart Nov. '54.

C-105

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

C_M vs α

$\delta_{H_R} = -5°$ $\delta_{A_L} = 0°$

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

C_M SCALE -01
(ORIGIN AT M)

RUN

1155 ⊙ M = .50

1166 △ M = .80

1165 □ M = .90

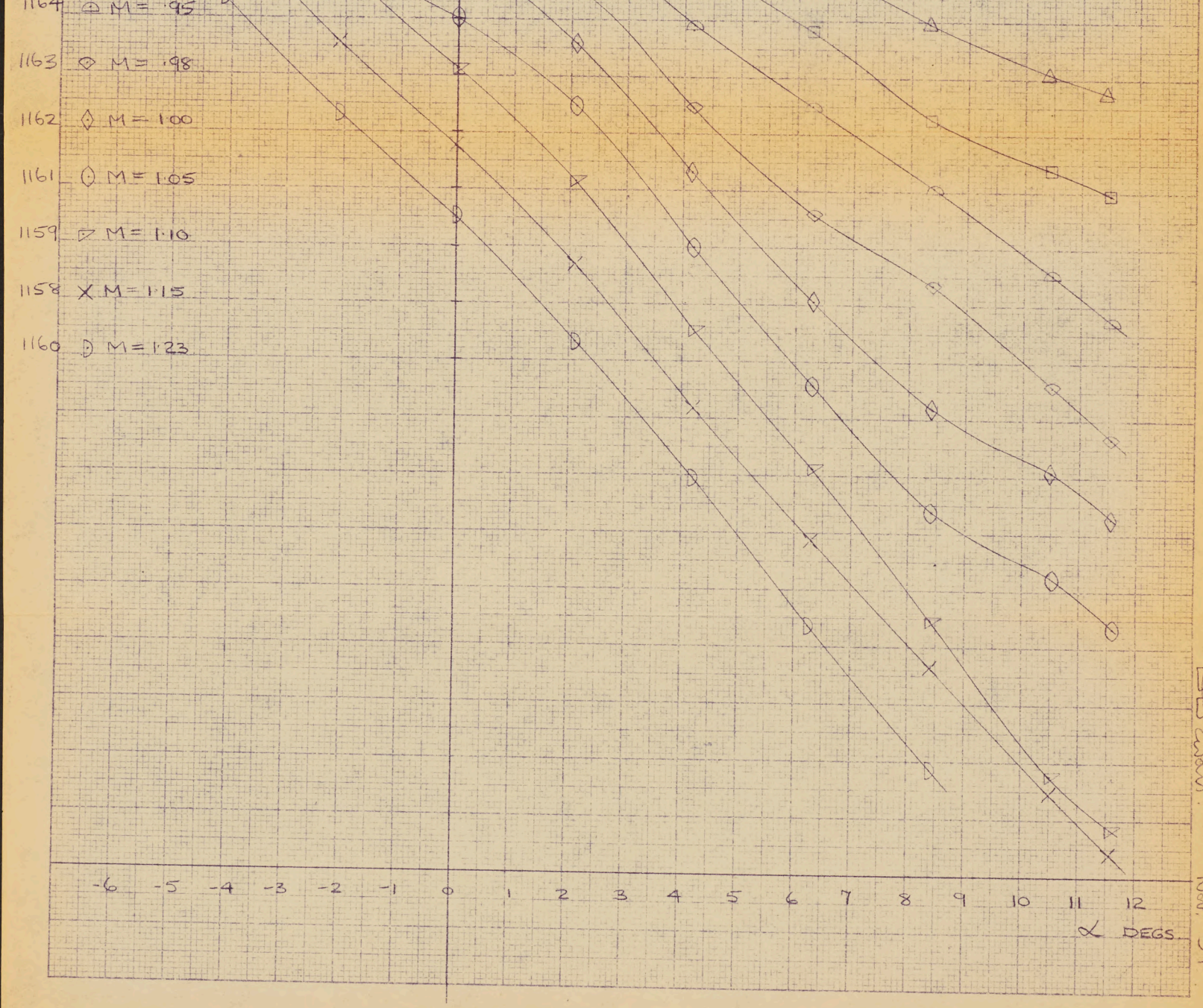
1164 ⊖ M = .95

1163 ◇ M = .98

1162 ◈ M = 1.00

1161 ⊙ M = 1.05

1159 ▽ M = 1.10



P/WT/49
SHEET 5. 13
Nov '54.

C-105

CAL. WIND TUNNEL TESTS OCT '54

C_M vs. α

$\delta_{A_R} = -10°$ $\delta_{A_L} = 0°$

CONFIG. $B_4 C_3 W_9 N_{A_5} V_2 R_5$

C_M SCALE .01
(ORIGIN AT M)

RUN

1176 ○ M = .50
1175 △ M = .80
1174 □ M = .90
1173 ⌓ M = .95
1172 ◇ M = .98
1171 ◇ M = 1.00
1170 ⊙ M = 1.05
1169 ▽ M = 1.10
1168 X M = 1.15
1167 D M = 1.23.

P/WT/49 SHEET 5.14

Ewart. Nov '54

C-105

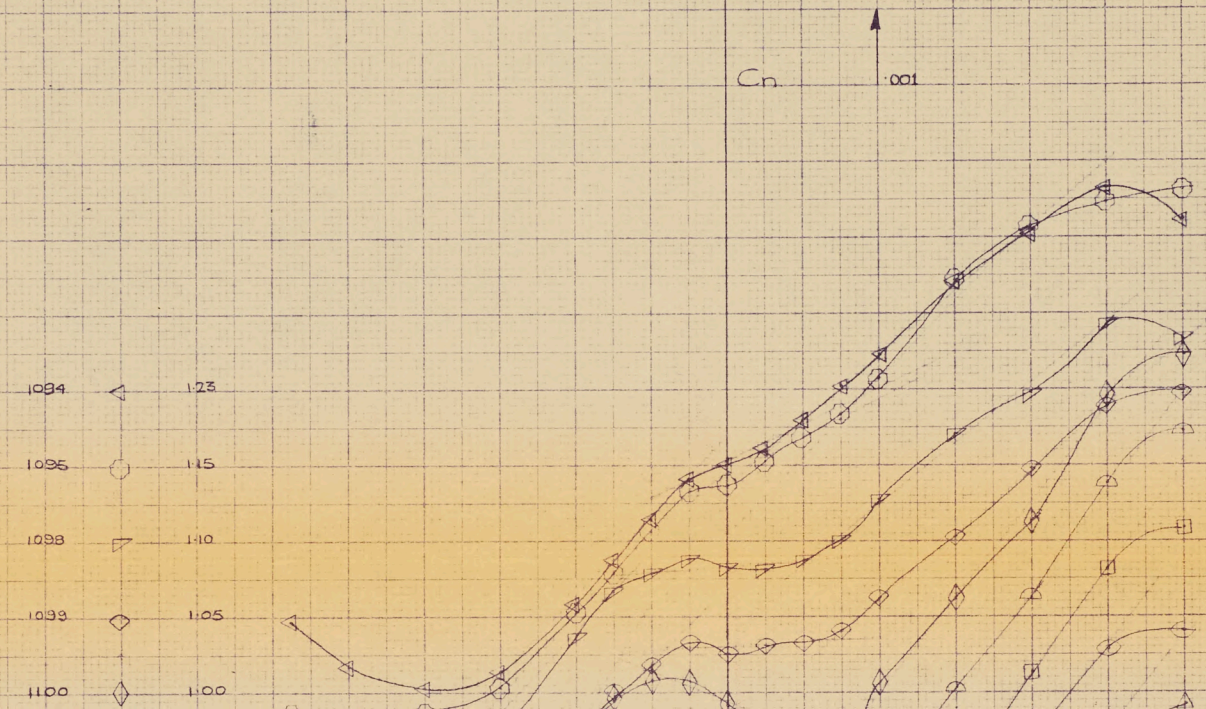
C.A.L. WIND TUNNEL TESTS

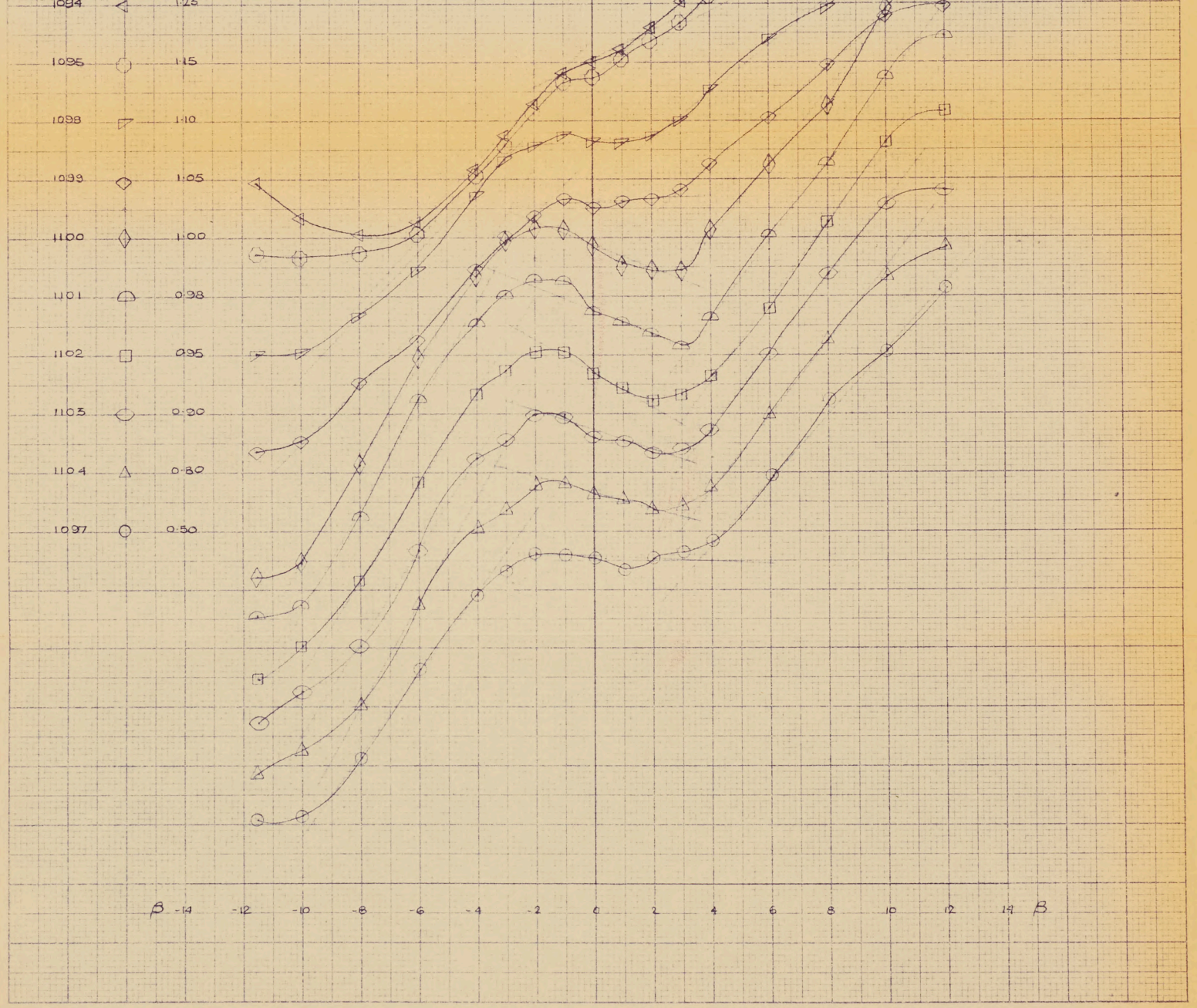
OCTOBER 58

C_n vs β

$\alpha = 0$

Body Config. $W_4 B_4 C_3 R_5 V_2 N_{A_5}$




1094 1.25
1095 1.15
1098 1.10
1093 1.05
1100 1.00
1101 0.98
1102 0.95
1103 0.90
1104 0.80
1097 0.50
β -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 β

78. P/NT/49

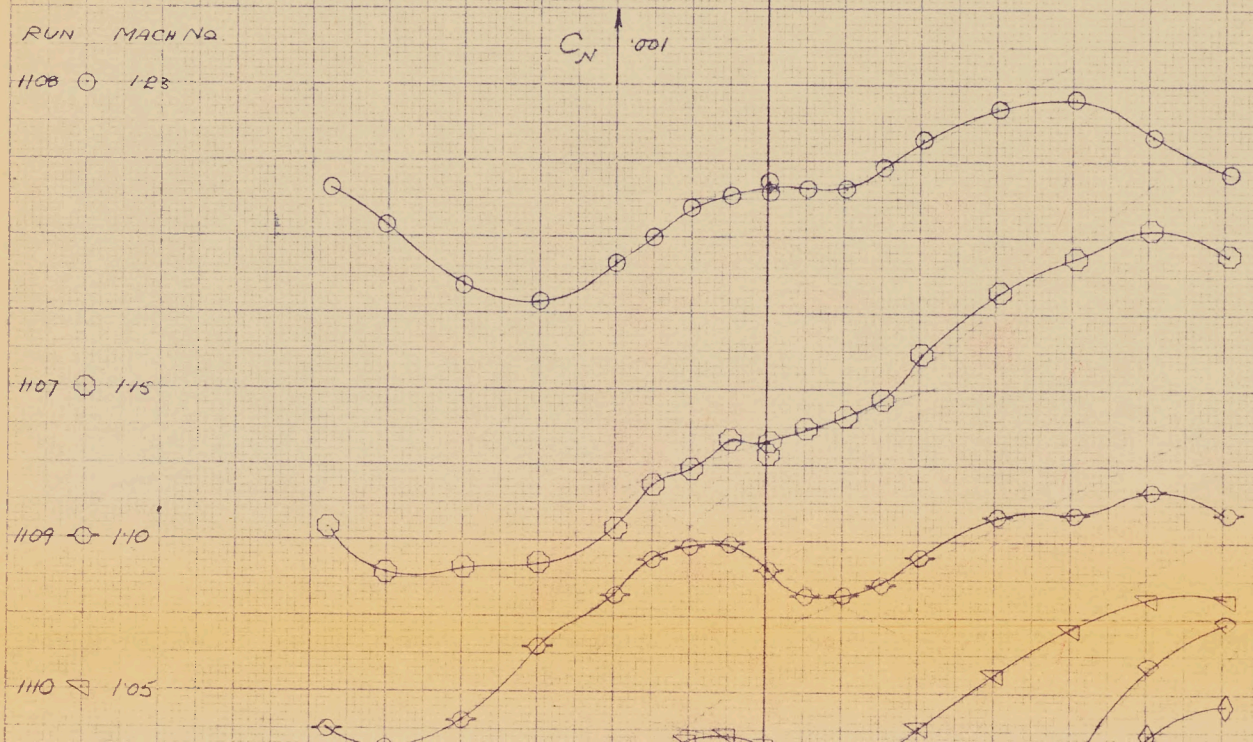
C105

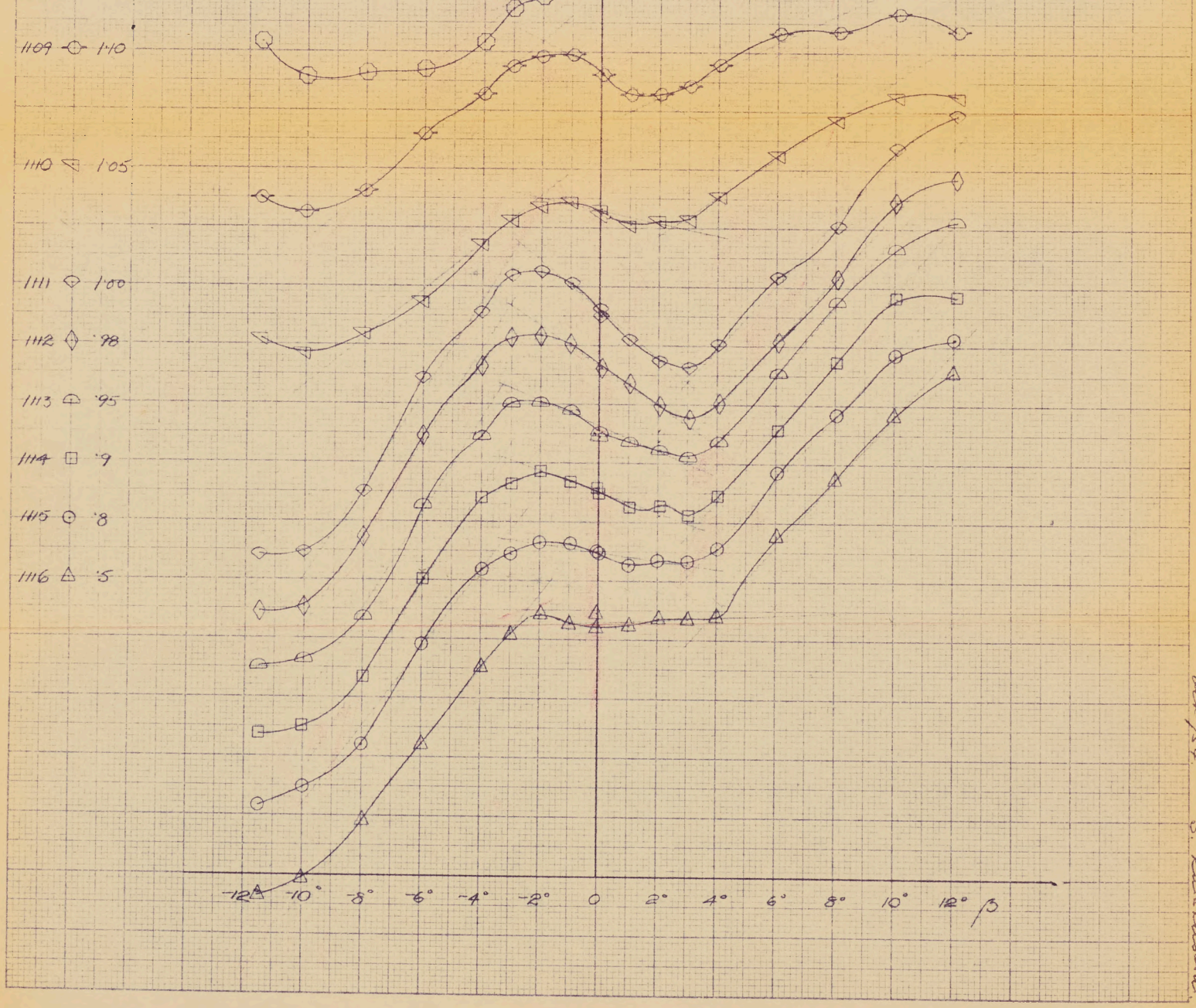
C.A.L. WIND TUNNEL TESTS OCT. 54.

C_N vs β

$\alpha = 2°$

$B_4 C_3 W_9 R_3 V_2 N_{A5}$





79.

P/W.T/49.

Oct 15th S. Kuwabara.

C105

C.A.L. WIND TUNNEL TESTS OCT 54

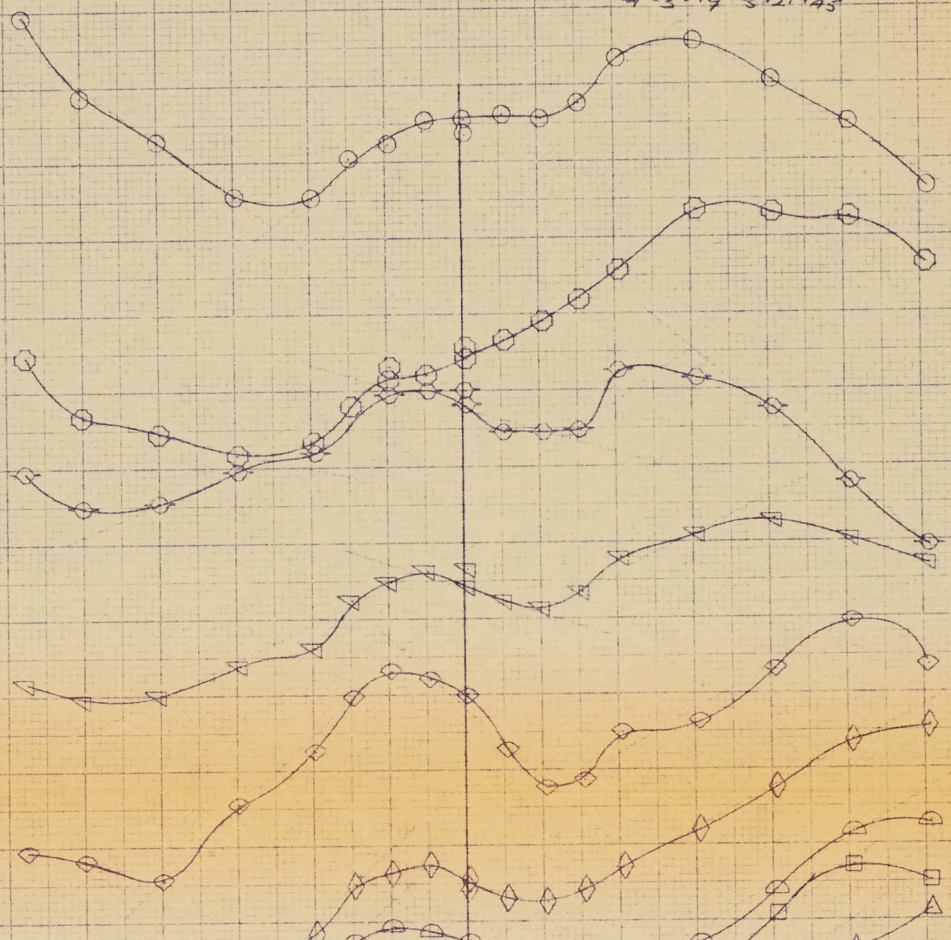
C_N vs β

$\alpha = 4°$

$B_4 C_3 H_9 R_5 V_2 N_{45}$

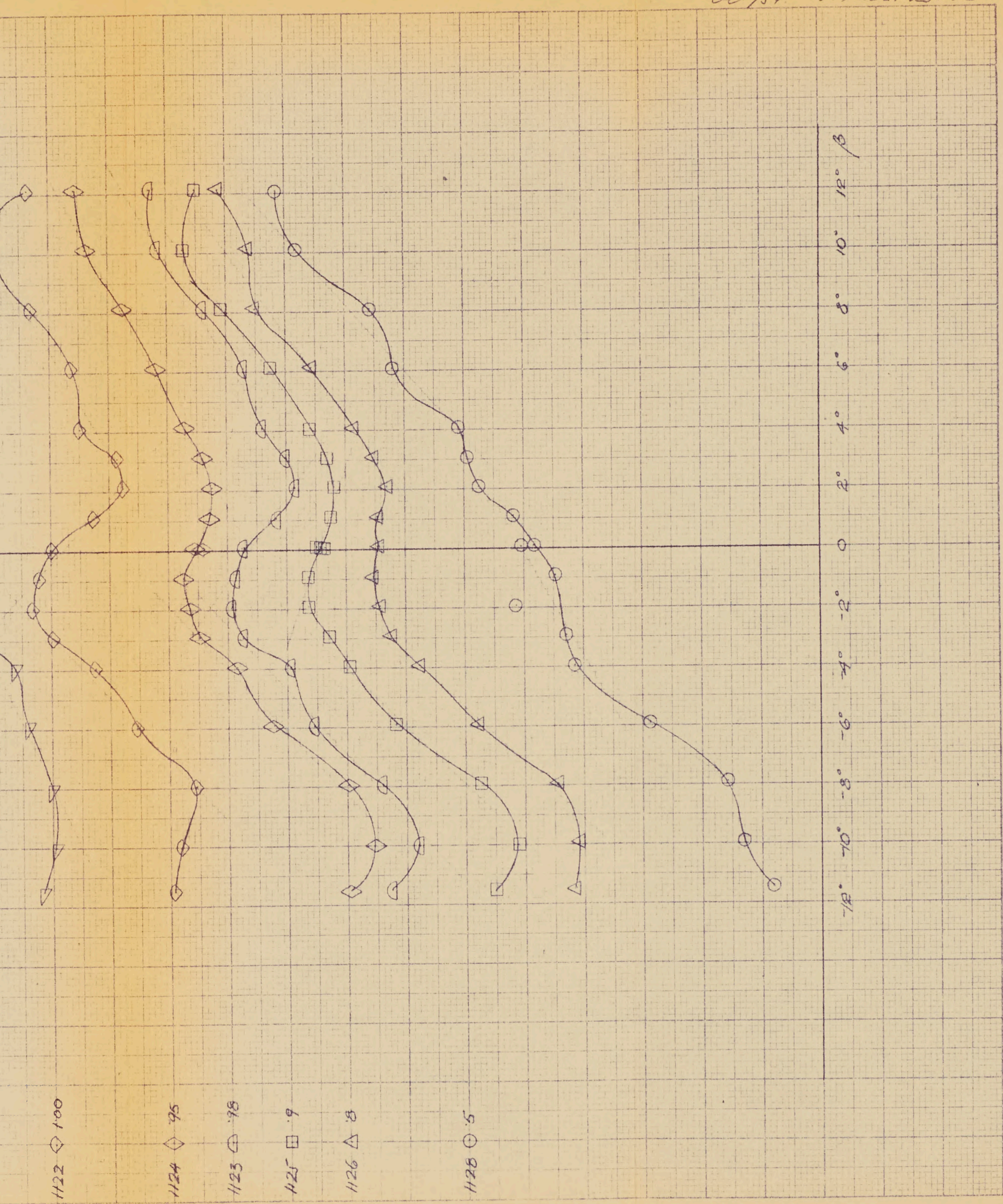
RUN	MACH No
1119	1·23
1118	1·15
1120	1·10
1121	1·05
1122	1·00
1124	·95
1123	·98

C_N ·001



7.10. P/WT/49

Oct/54 S. Kwiatkowski



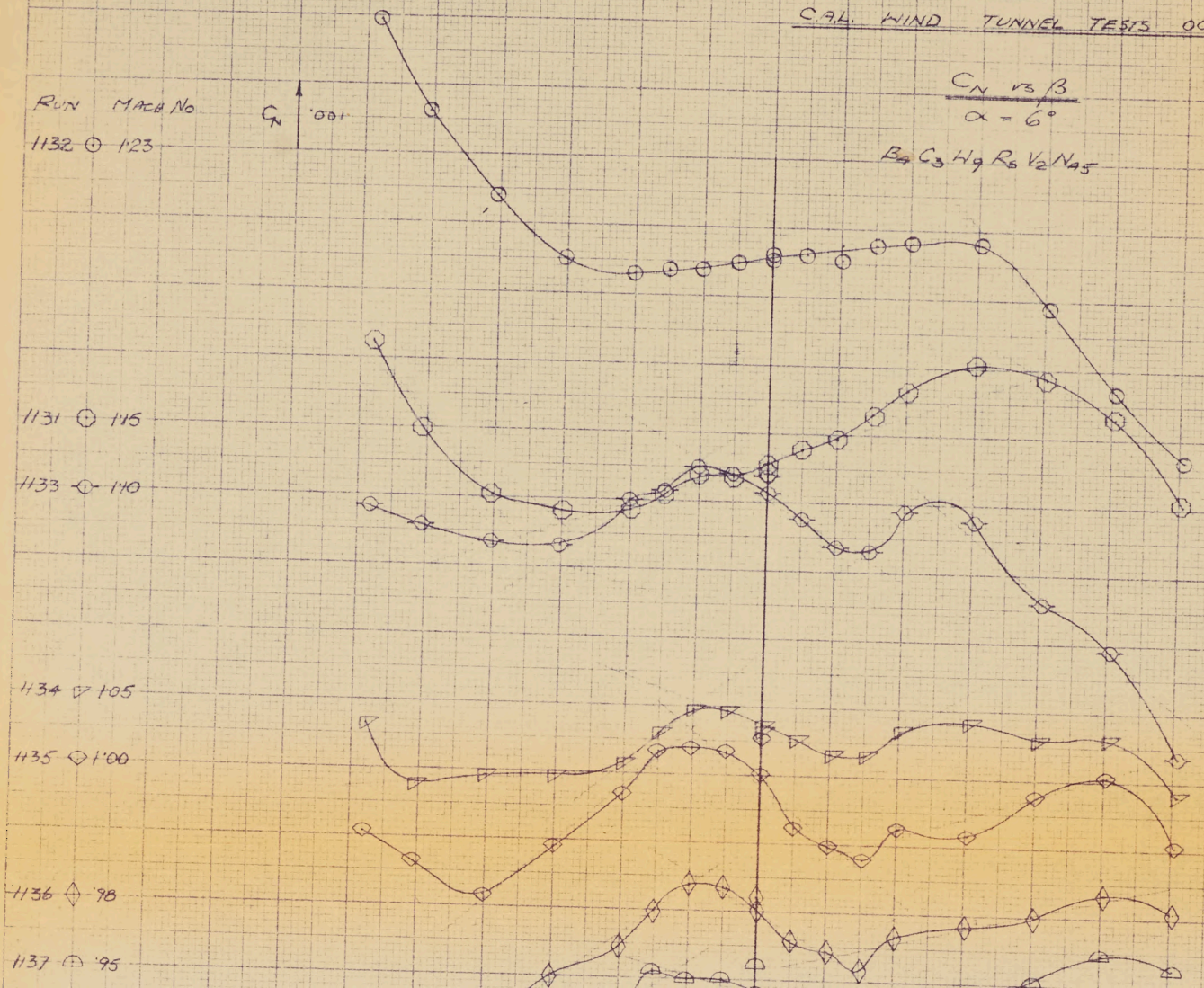
C105

C.A.L. WIND TUNNEL TESTS OCT 54

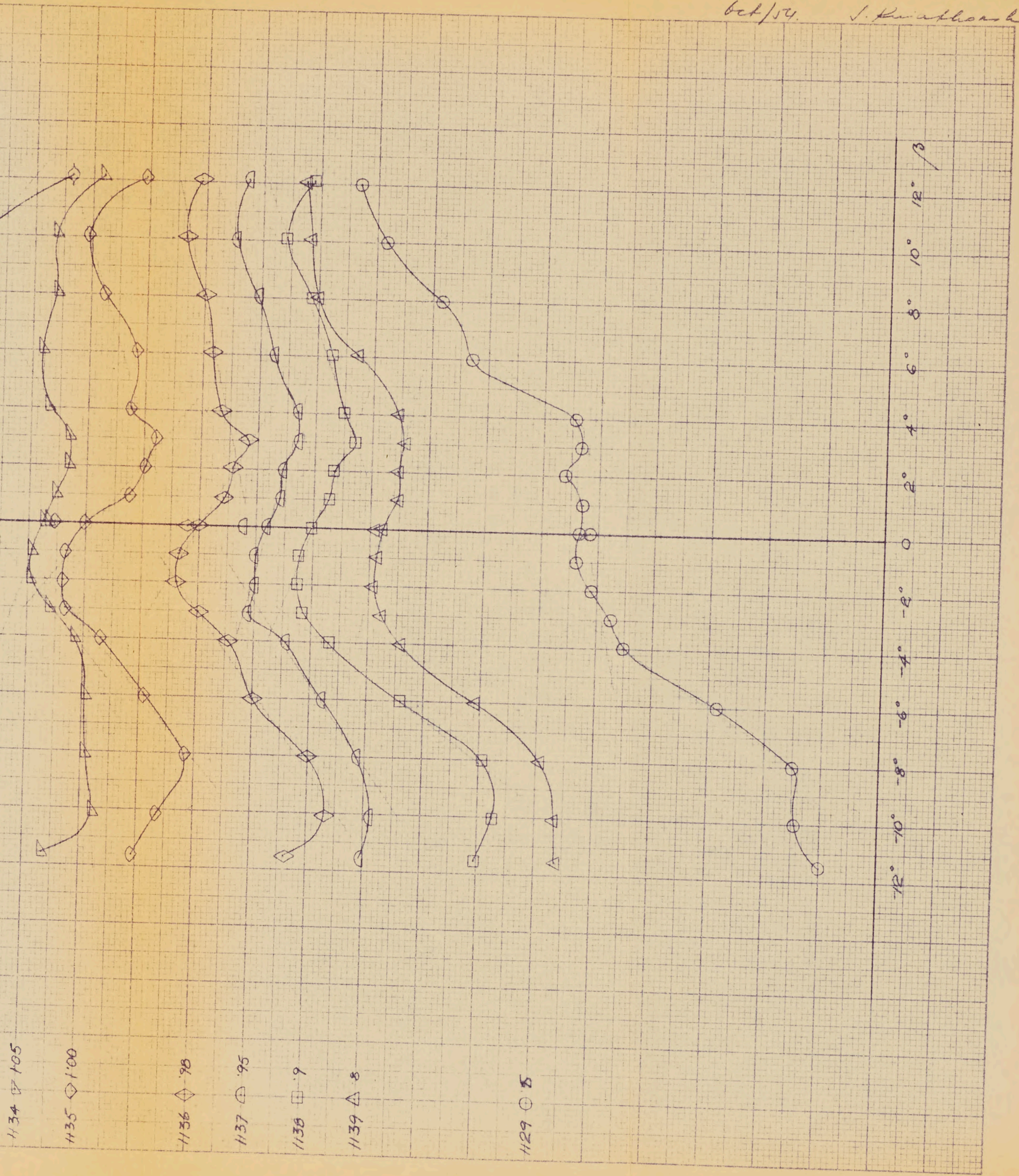
C_N vs β

$\alpha = 6°$

$B_4 C_3 H_9 R_6 V_2 N_{45}$



7.11. P/WT/49
Oct/54. J. [illegible]



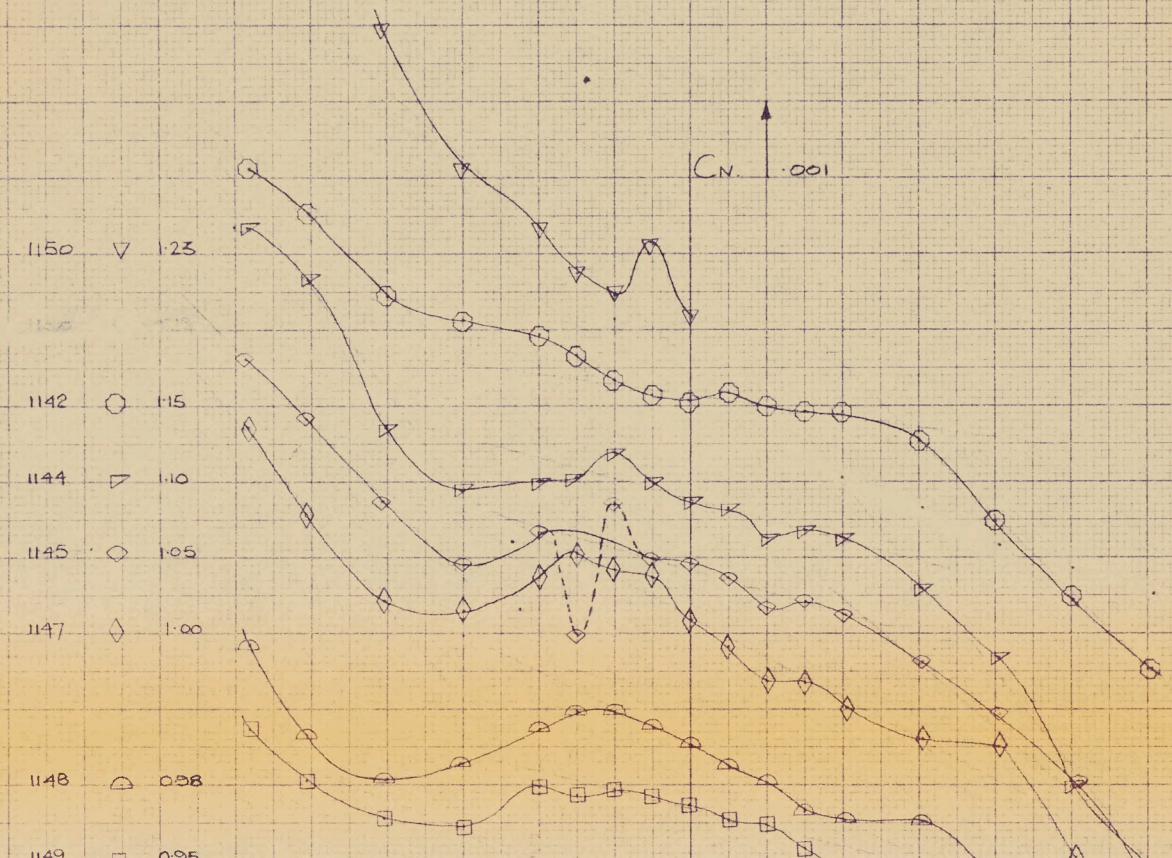
C 105

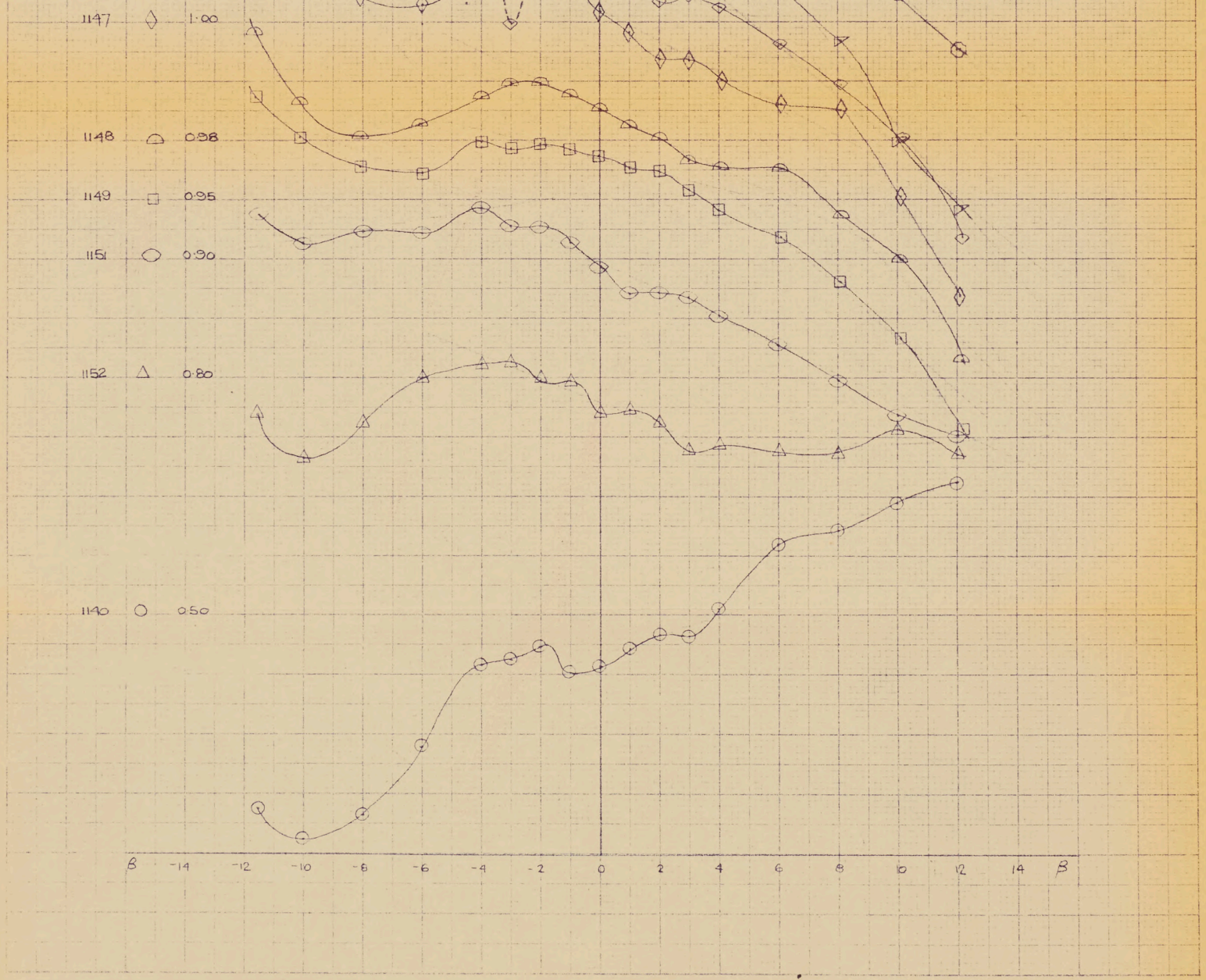
C.A.L. WIND TUNNEL TESTS Oct. 1954.

Cn vs β.

Config. $B_4 C_3 V_2 R_5 N_{50A}$

$\alpha = 10°$





712. PLATE 147

7.16a
7.17.

P/WT/49.

Oct/54. S. Kurkowski

C105

CAL WIND TUNNEL TESTS OCT 54

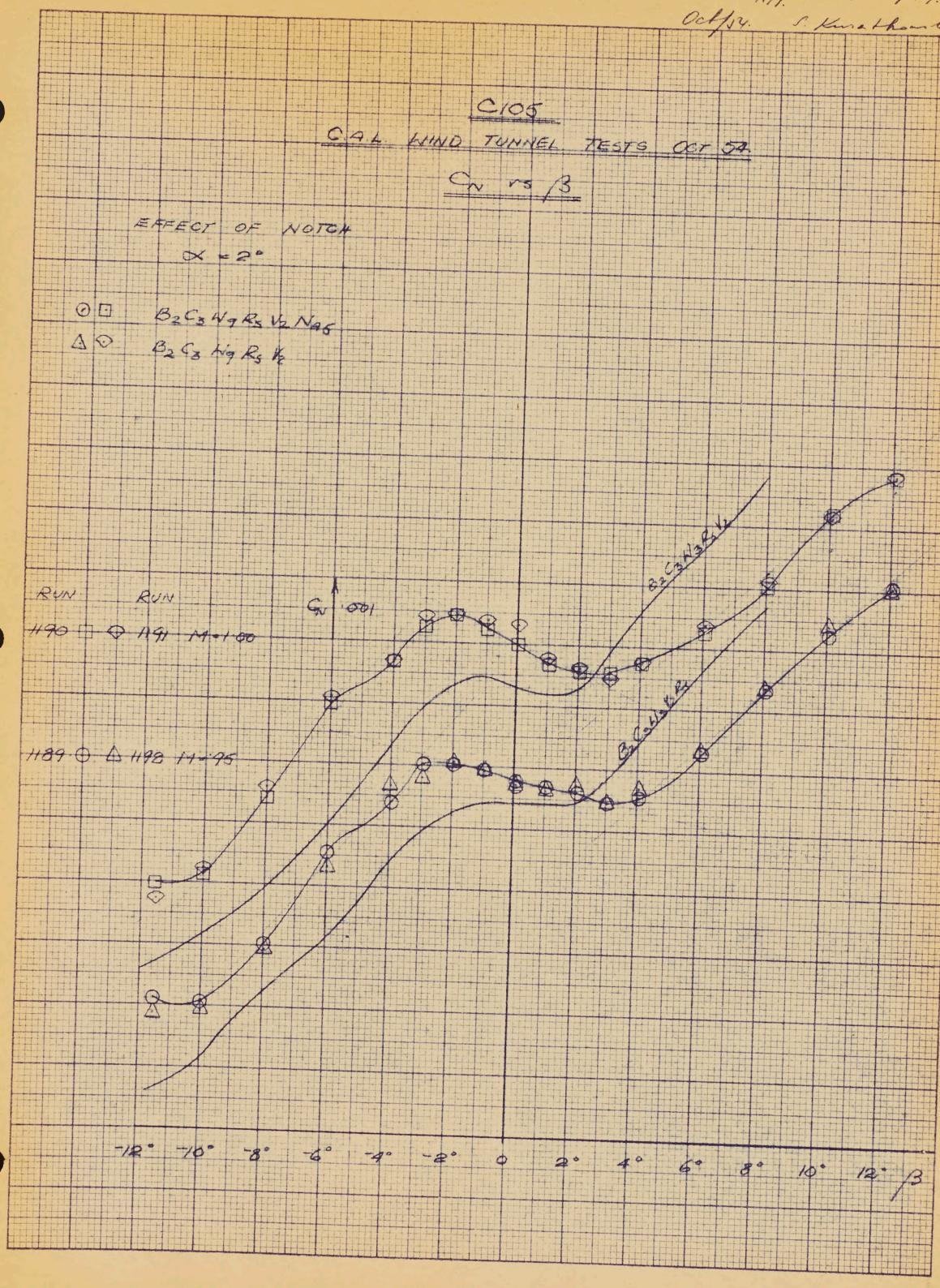
C_N vs β

EFFECT OF NOTCH

$\alpha = 2°$

⊙ □ $B_2 C_3 N_9 R_5 V_2 N_{96}$

△ ◇ $B_2 C_3 N_9 R_5 V_2$



C-105

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

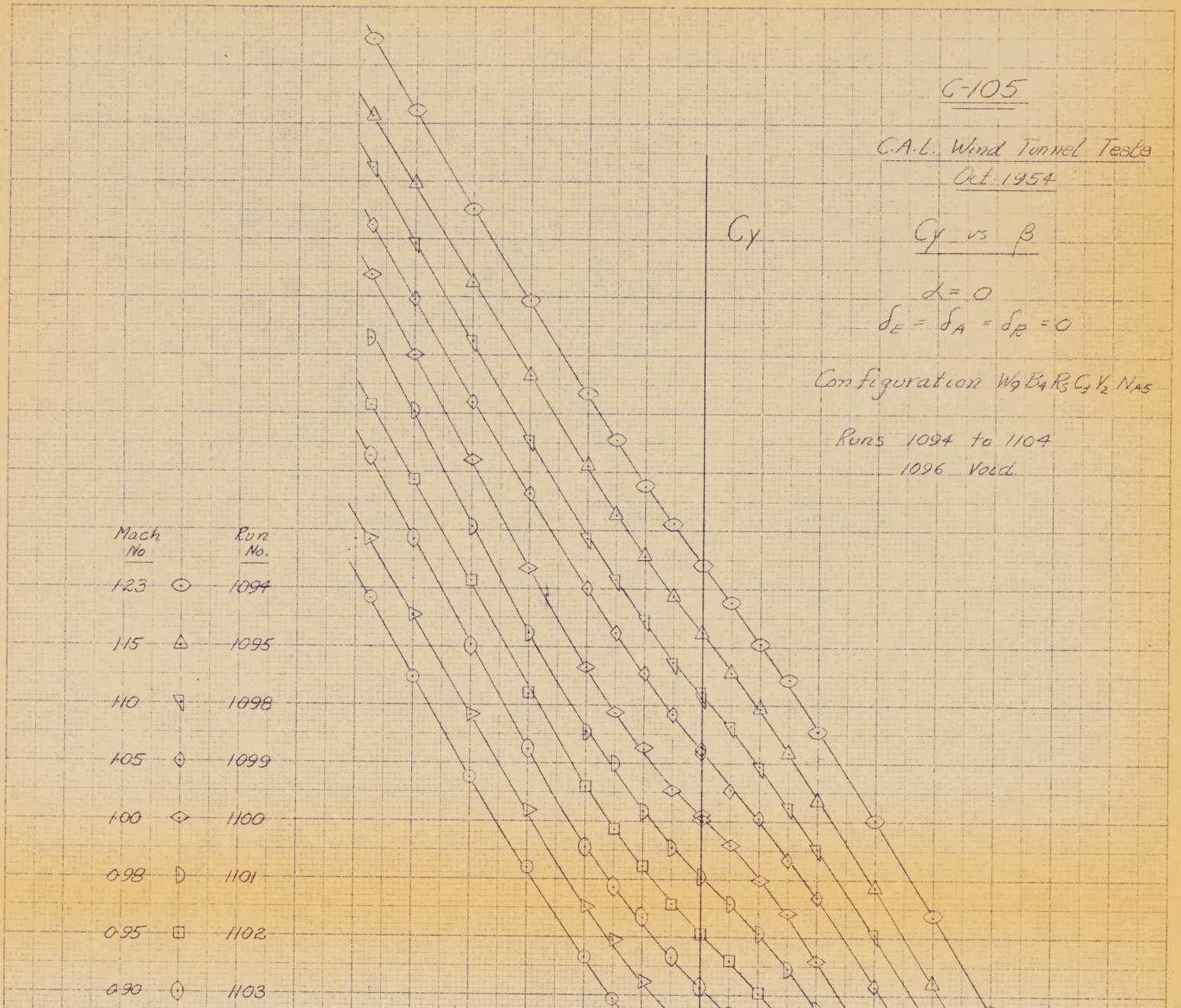
C_y vs β

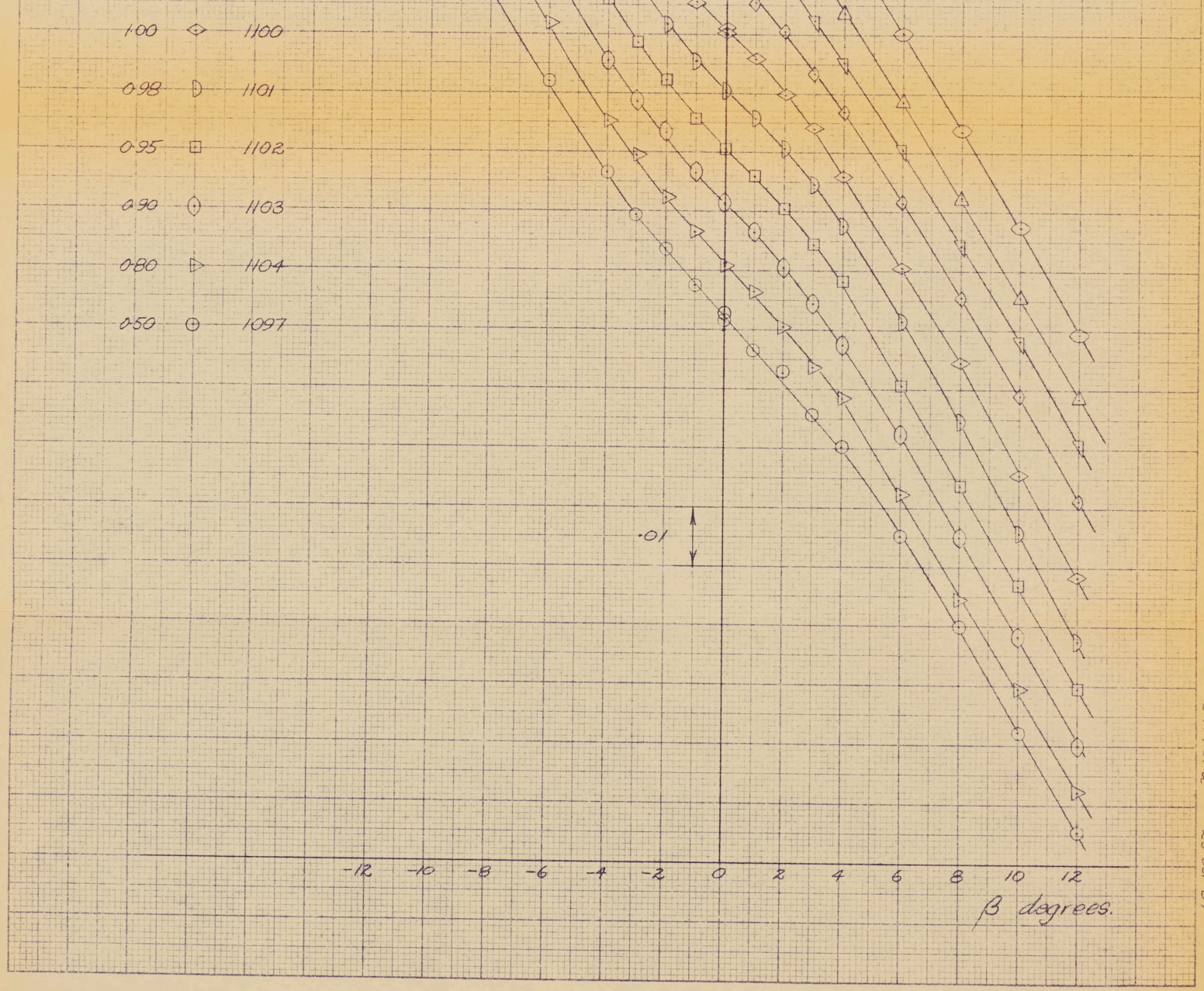
$\alpha = 0$

$\delta_E = \delta_A = \delta_R = 0$

Configuration $W_9 B_4 R_3 C_3 V_2 N_{A5}$

Runs 1094 to 1104
1096 Void





P/WT/49
C.A. Field 25 Oct 54
8.8

C-105

C_y

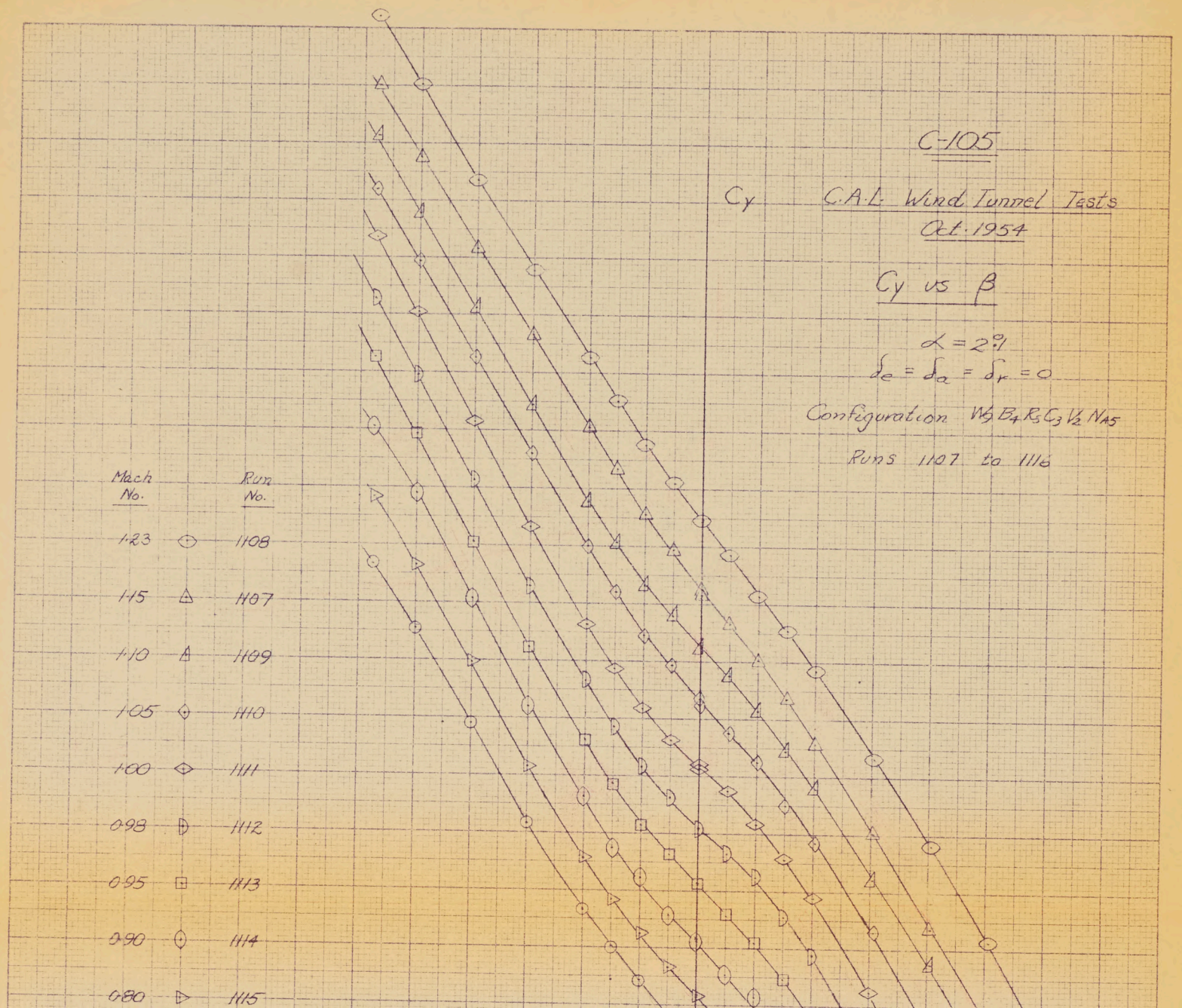
C.A.L. Wind Tunnel Tests
Oct. 1954

C_y vs β

$\alpha = 2°$
$\delta_e = \delta_a = \delta_r = 0$

Configuration $W_5 B_4 R_5 C_3 V_2 N_{A5}$

Runs 1107 to 1116



P/WT/49 8.9
C.A. Ford 26 Oct 54

C-105

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

C_y

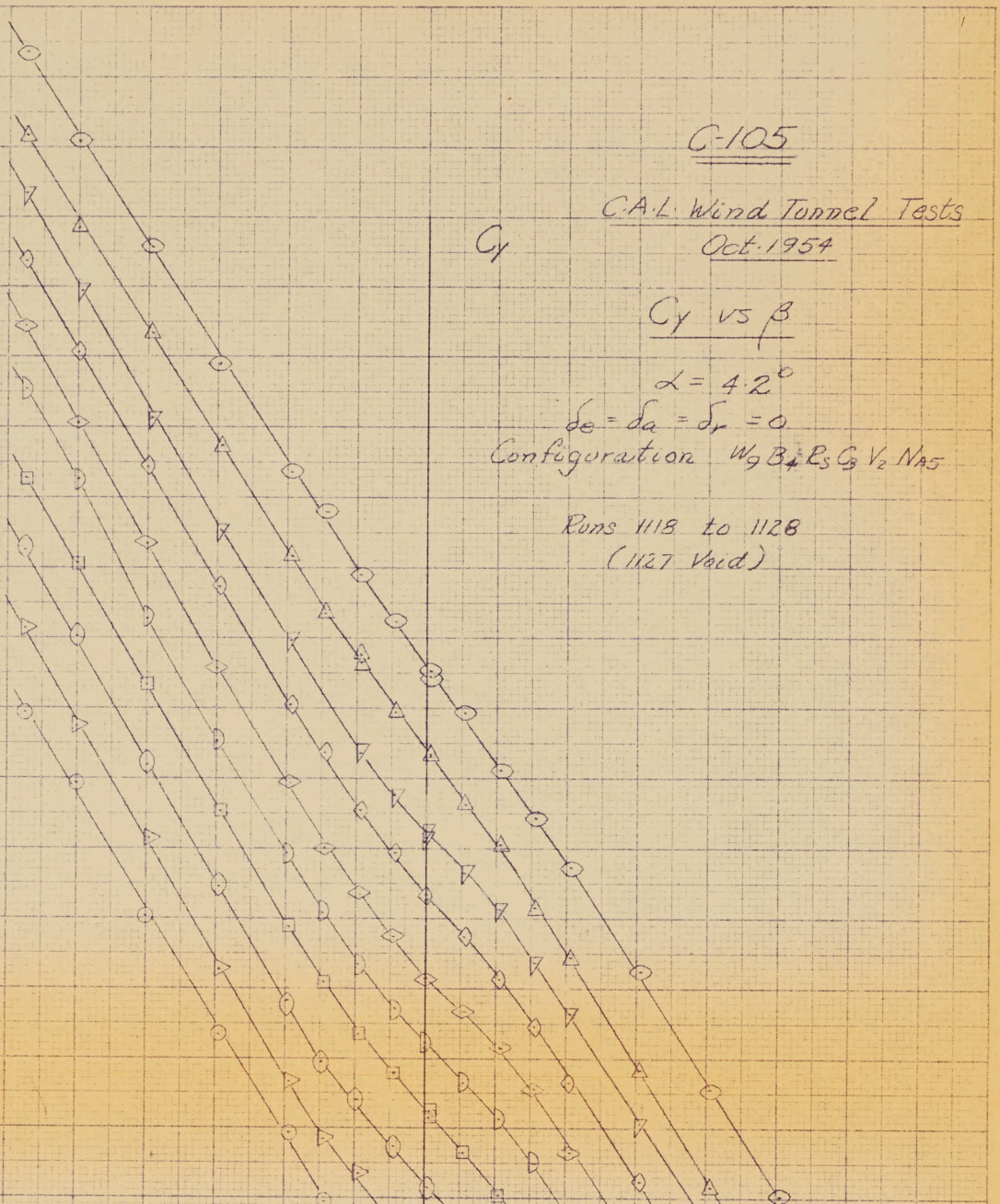
C_y vs β

$\alpha = 4.2°$

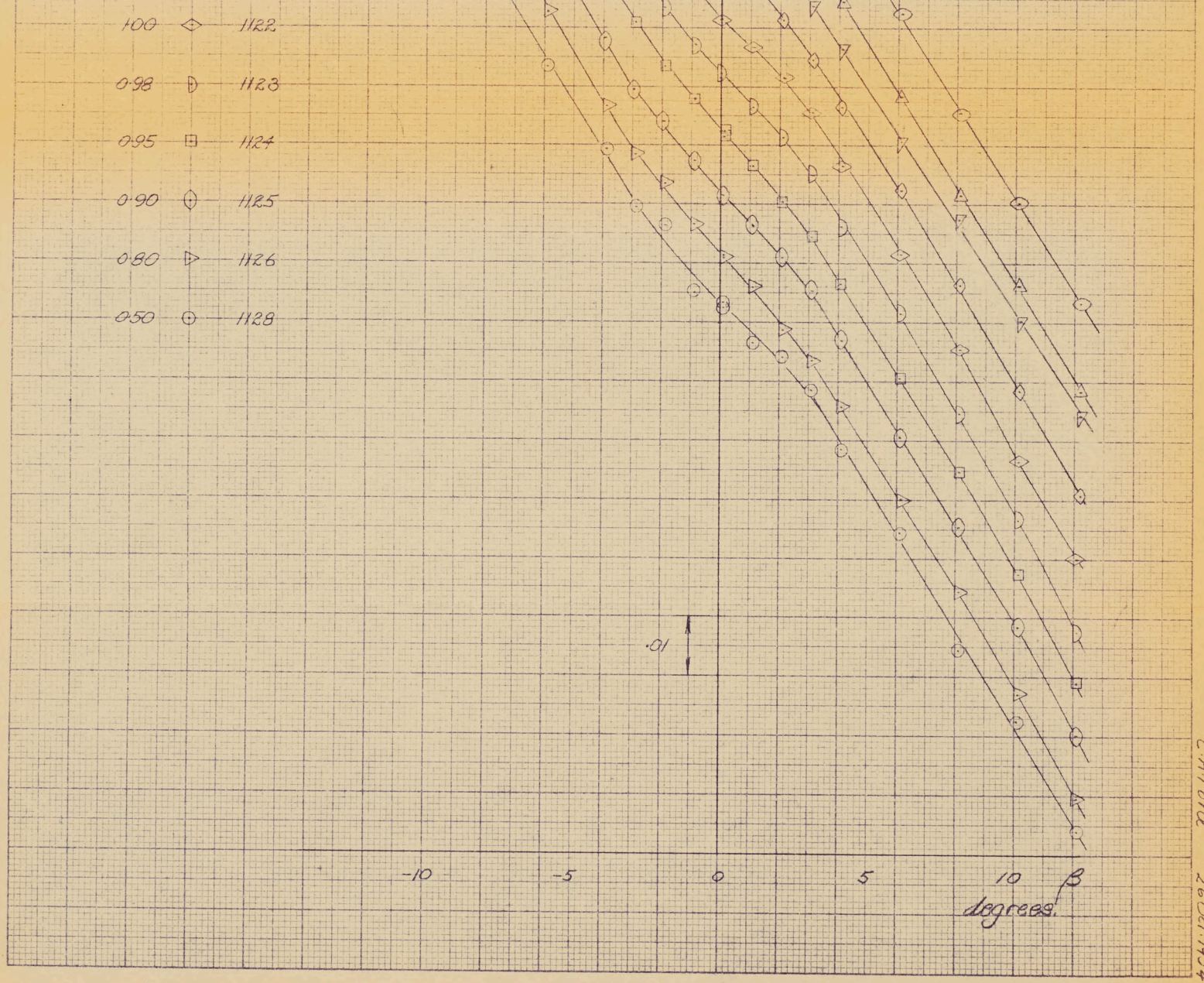
$\delta_e = \delta_a = \delta_r = 0$

Configuration $W_9 B_4 P_5 C_3 V_2 N_{A5}$

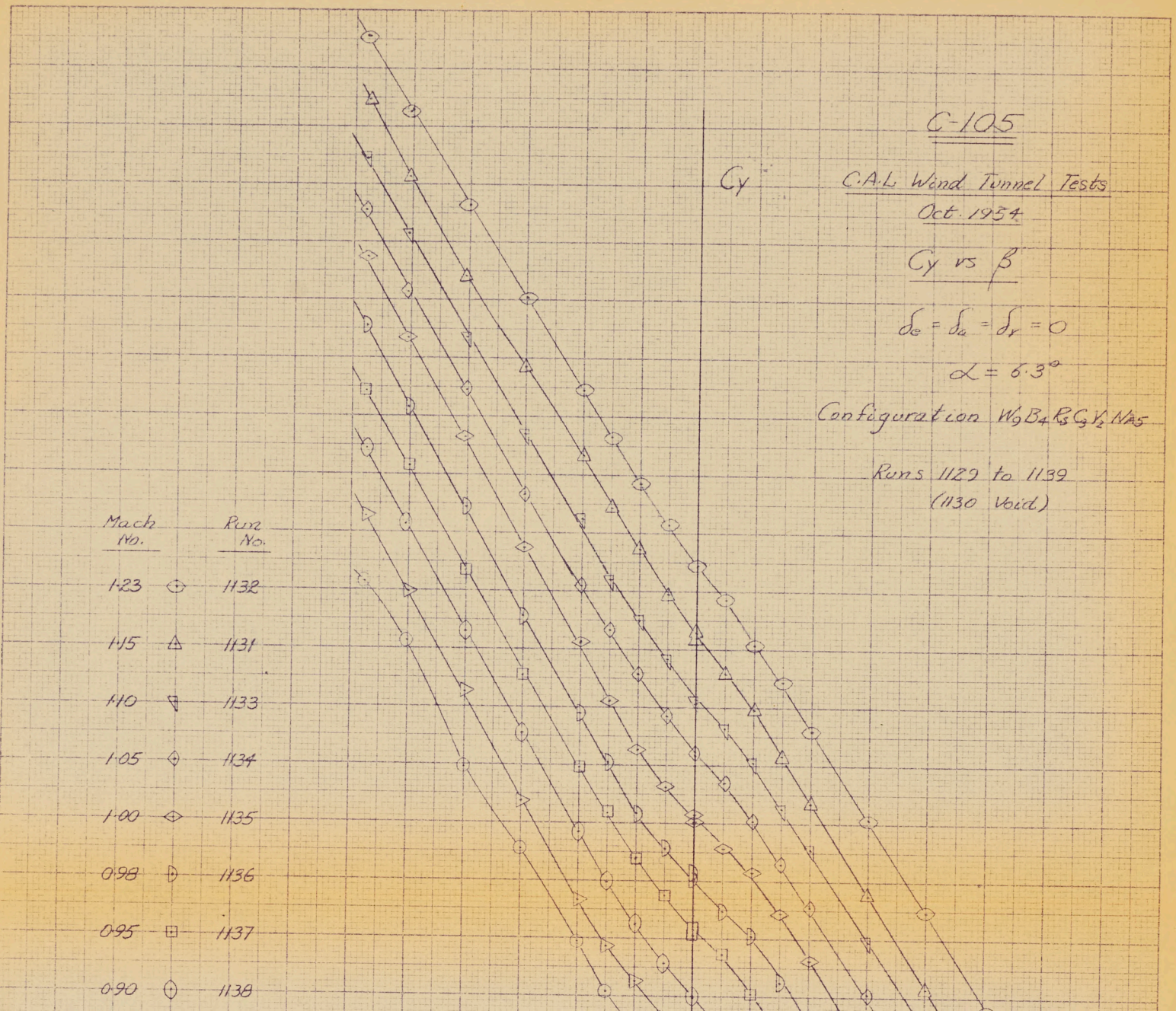
Runs 1118 to 1128
(1127 Void)



Mach No.	Run No.
1.23	1119
1.15	1118
1.10	1120
1.05	1121
1.00	1122
0.98	1123
0.95	1124
0.90	1125



P/WT/49 8.10
C.A. Ford 26 Oct. 1954



C-105

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

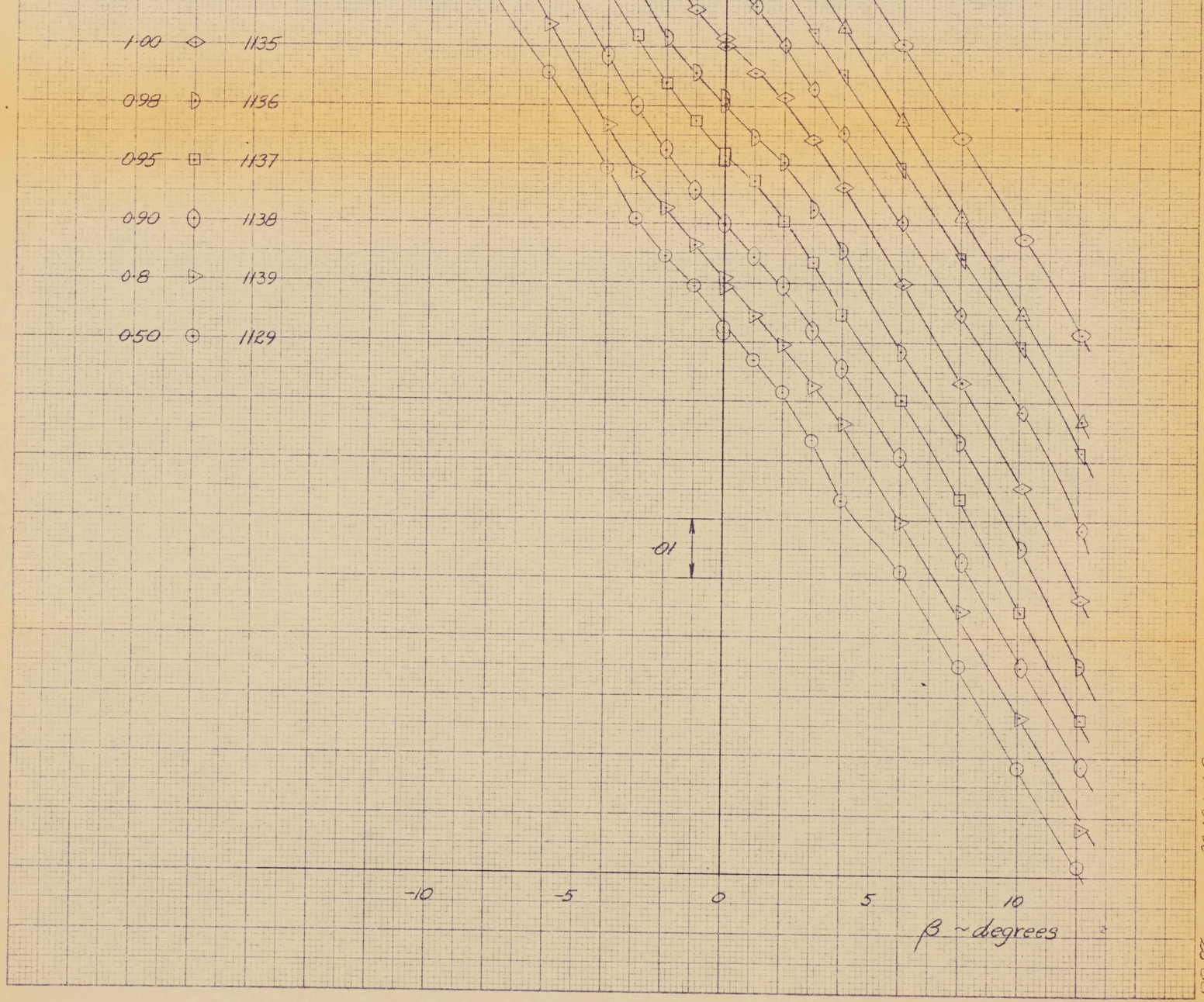
C_y vs β

$\delta_e = \delta_a = \delta_r = 0$

$\alpha = 6.3°$

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

Runs 1129 to 1139
(1130 Void)



PIWT/49 8.11
C.A.Ford
28 Oct 1954

C-105

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

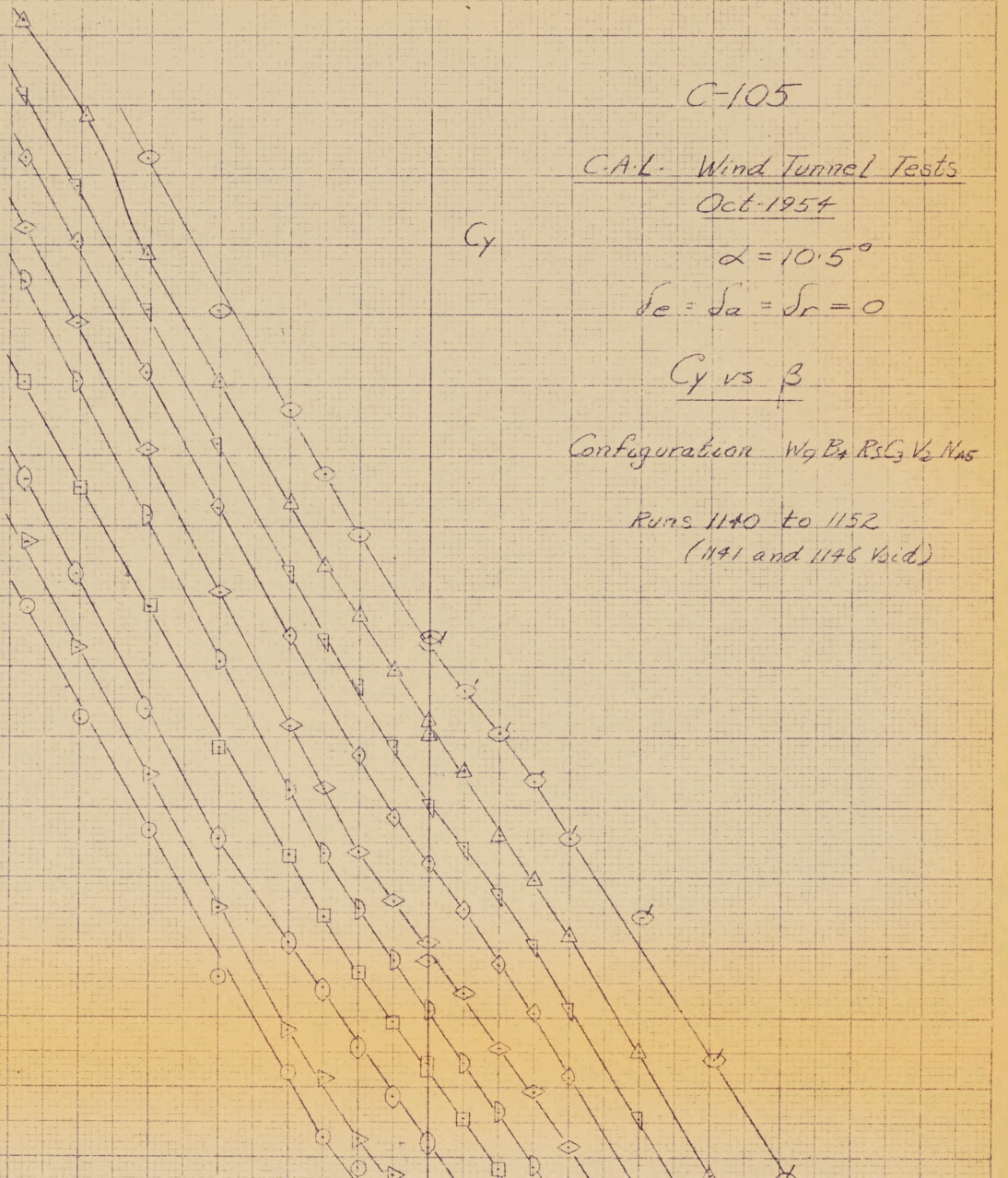
$\alpha = 10.5°$

$\delta_e = \delta_a = \delta_r = 0$

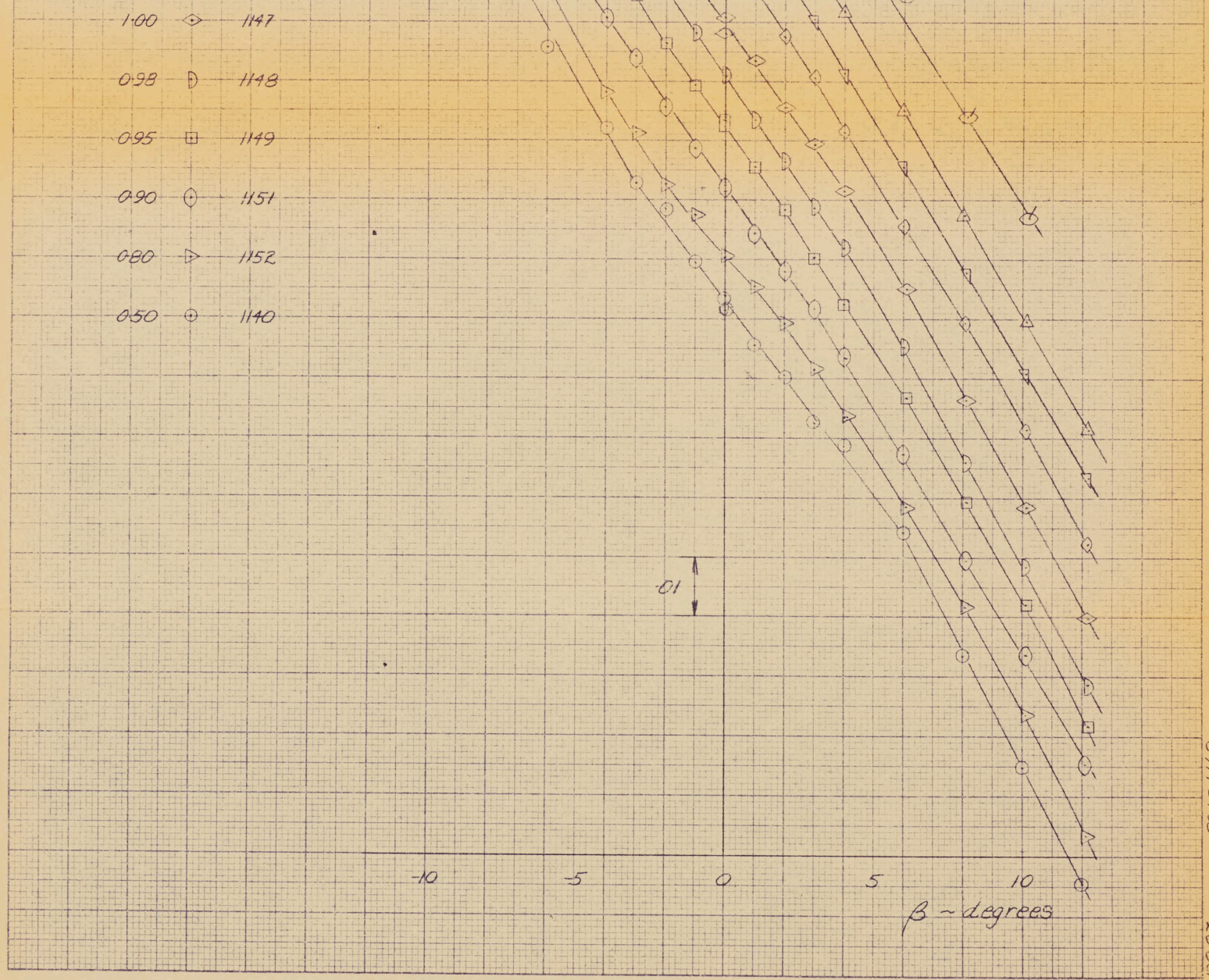
C_y vs β

Configuration $W_9 B_4 R_3 S_3 V_2 N_{45}$

Runs 1140 to 1152
(1141 and 1146 Void)



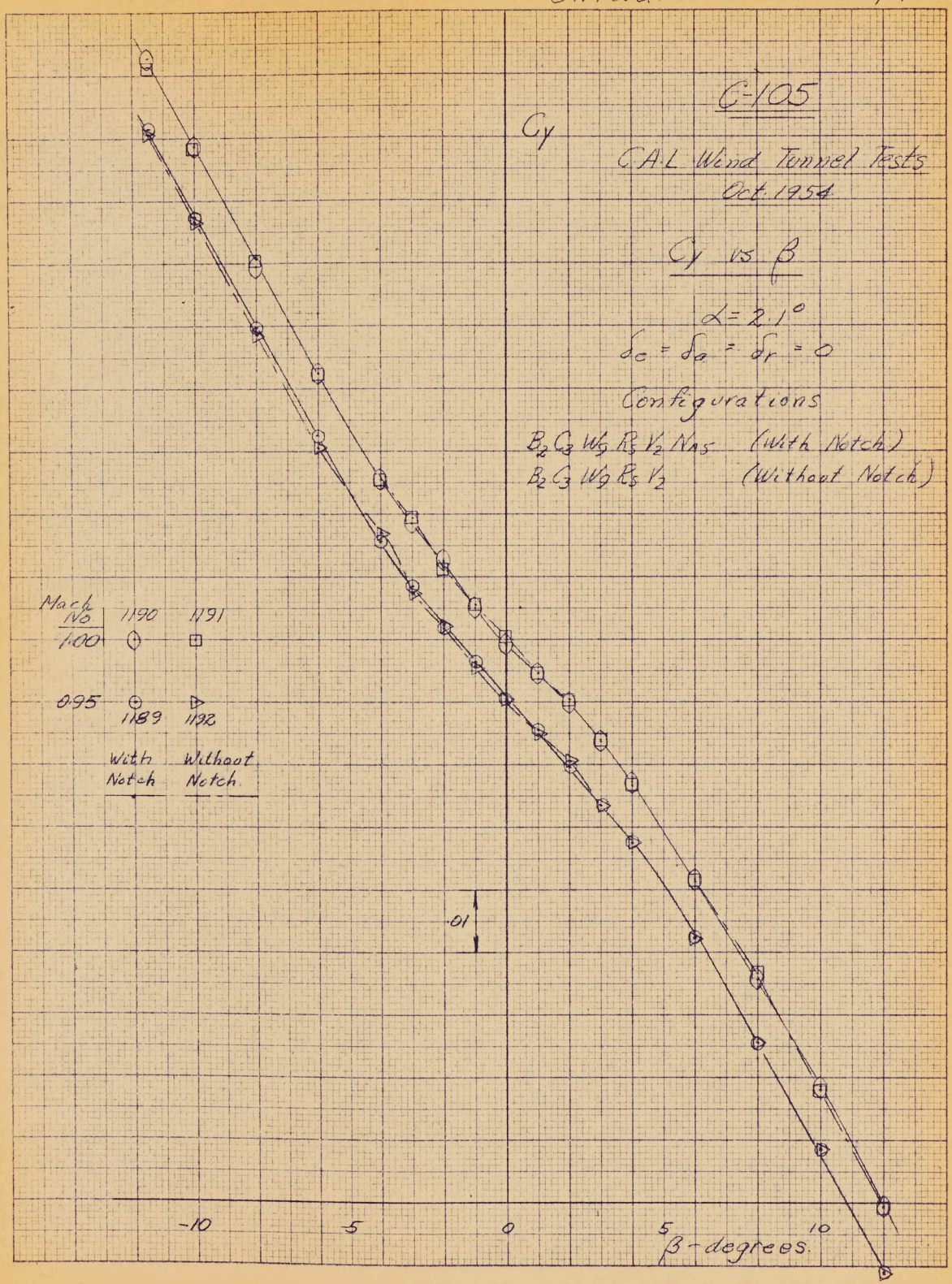
Mach No.		Run No.
	◇	1143
1.23	⊙	1150
1.15	△	1142
1.10	▽	1144
1.05	◈	1145
1.00	◈	1147
0.98	▷	1148
0.95	⊞	1149
0.90	⊙	1151



P/WT/49 8.12
C.A.Ford
26 Oct 1954

1 Nov. 1954
C.A. Ford

P/WT/49
8.16/17



820. P/WT/49

Nov/54 Knathoush

C105

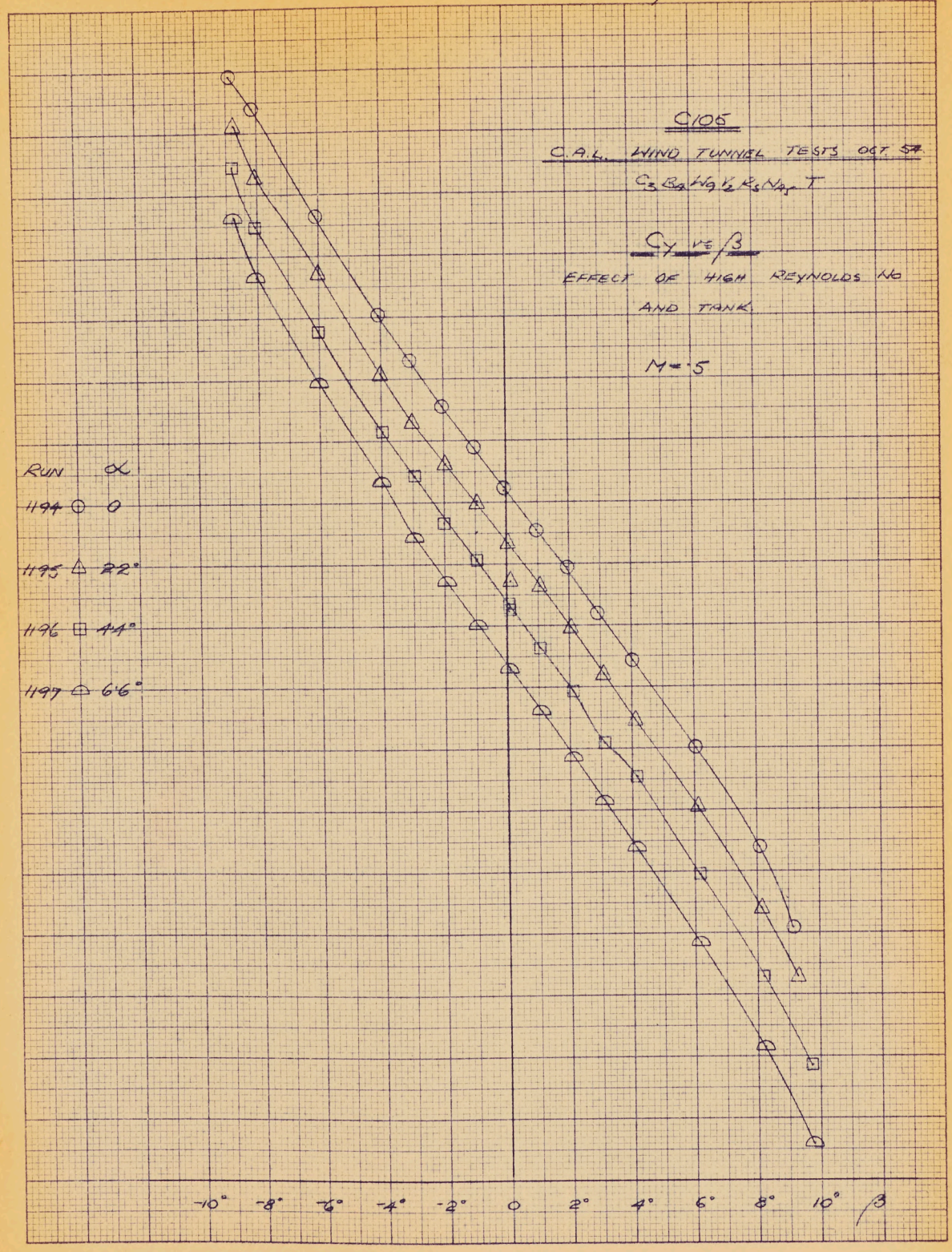
C.A.L. WIND TUNNEL TESTS OCT 54

$C_3 B_2 W_9 \frac{1}{2} R_5 N_{2F}$ T

C_Y vs β

EFFECT OF HIGH REYNOLDS NO AND TANK

M = .5



8.24. P/WT/29
Nov/54. Kuethe

C105

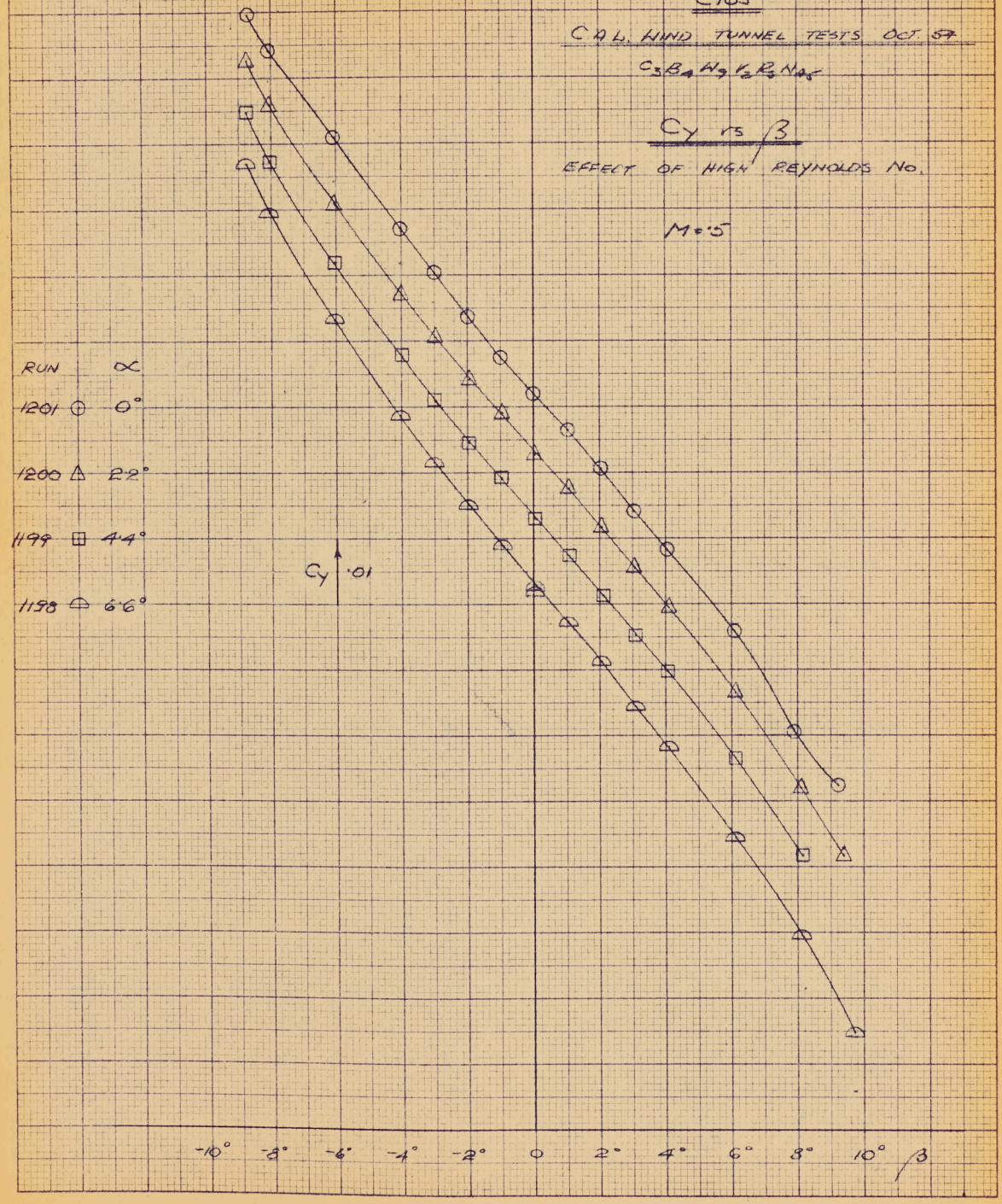
C.A.L. WIND TUNNEL TESTS OCT. 54

$C_3B_4W_3V_2R_5N_{0.5}$

C_y vs β

EFFECT OF HIGH REYNOLDS NO.

M=.5



C-105

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

C_l

C_l vs α

$\delta_{AR} = 0°$ $\delta_{AL} = 0°$

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

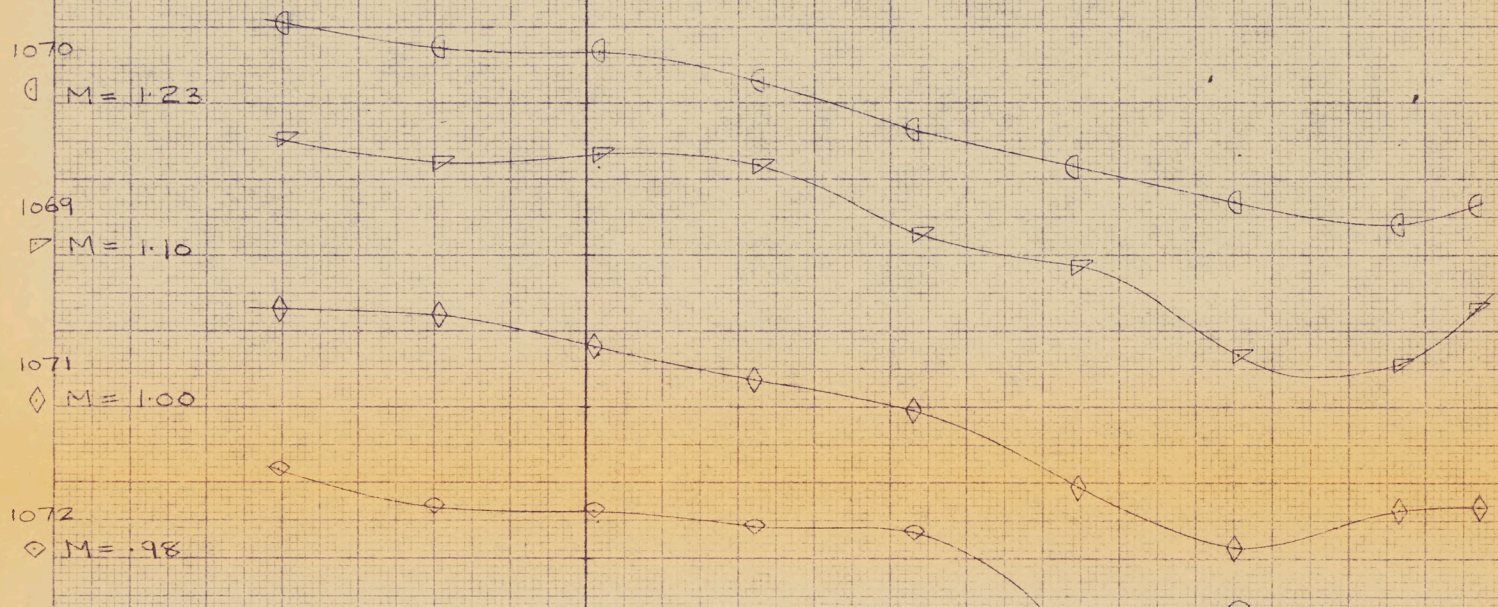
C_l SCALE .001
(ORIGIN AT M)

1070 ◁ M = 1.23

1069 ▽ M = 1.10

1071 ◇ M = 1.00

1072 ◇ M = .98



P/WT/49 SHEET 9.1

DB Ewart. Oct. '54.

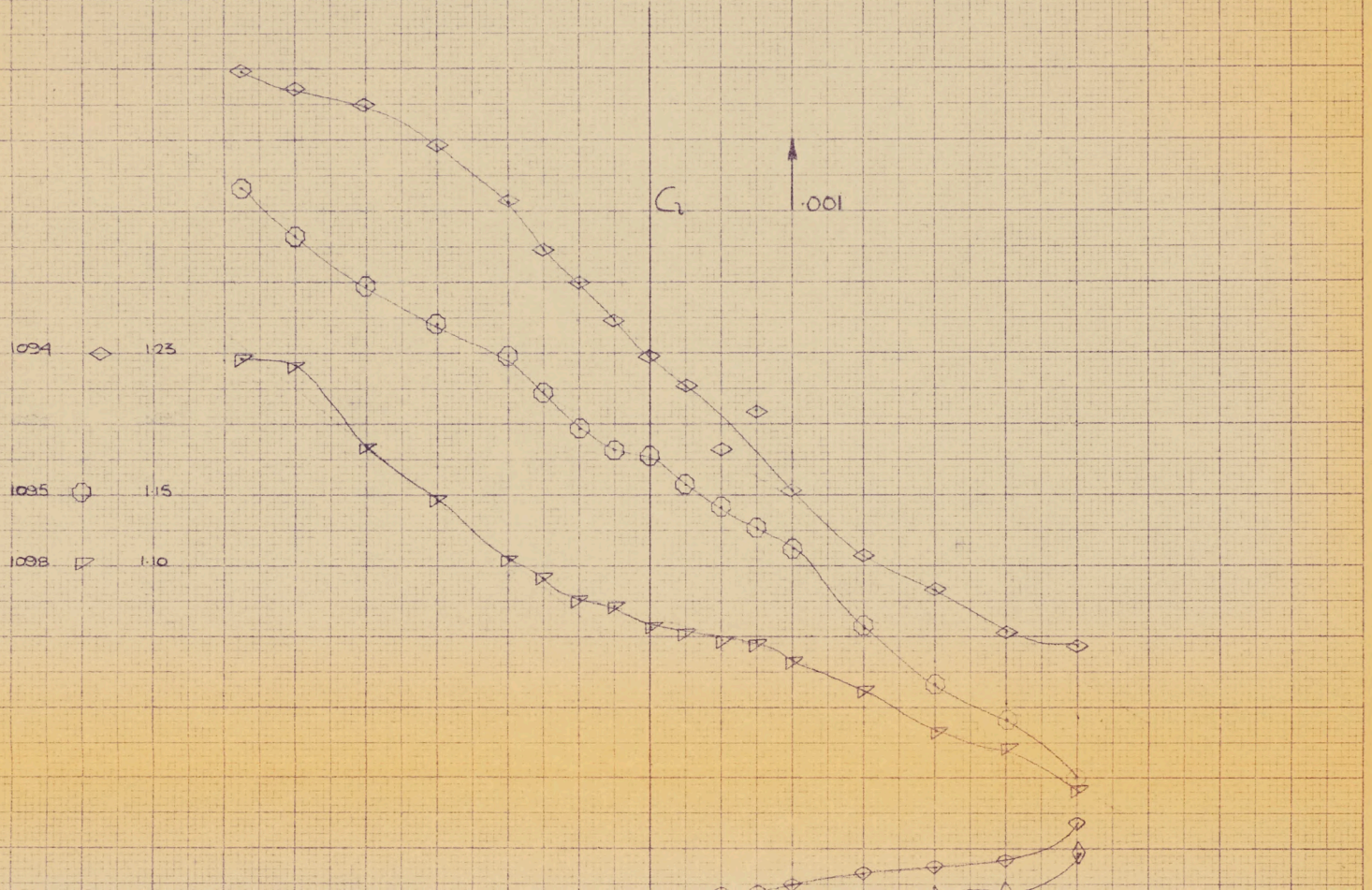
C-105

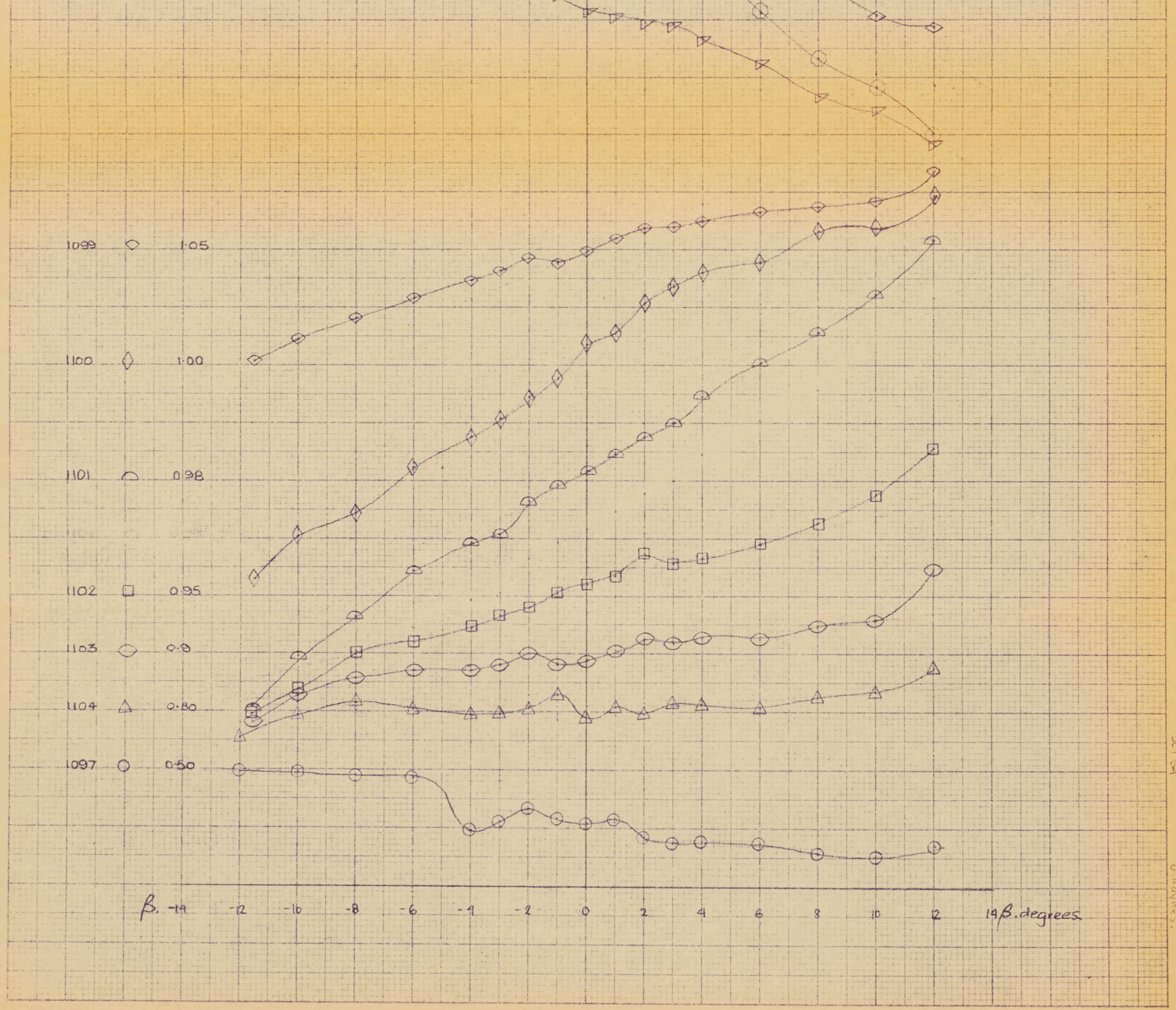
C.A.L. W/T TESTS. Oct. 54

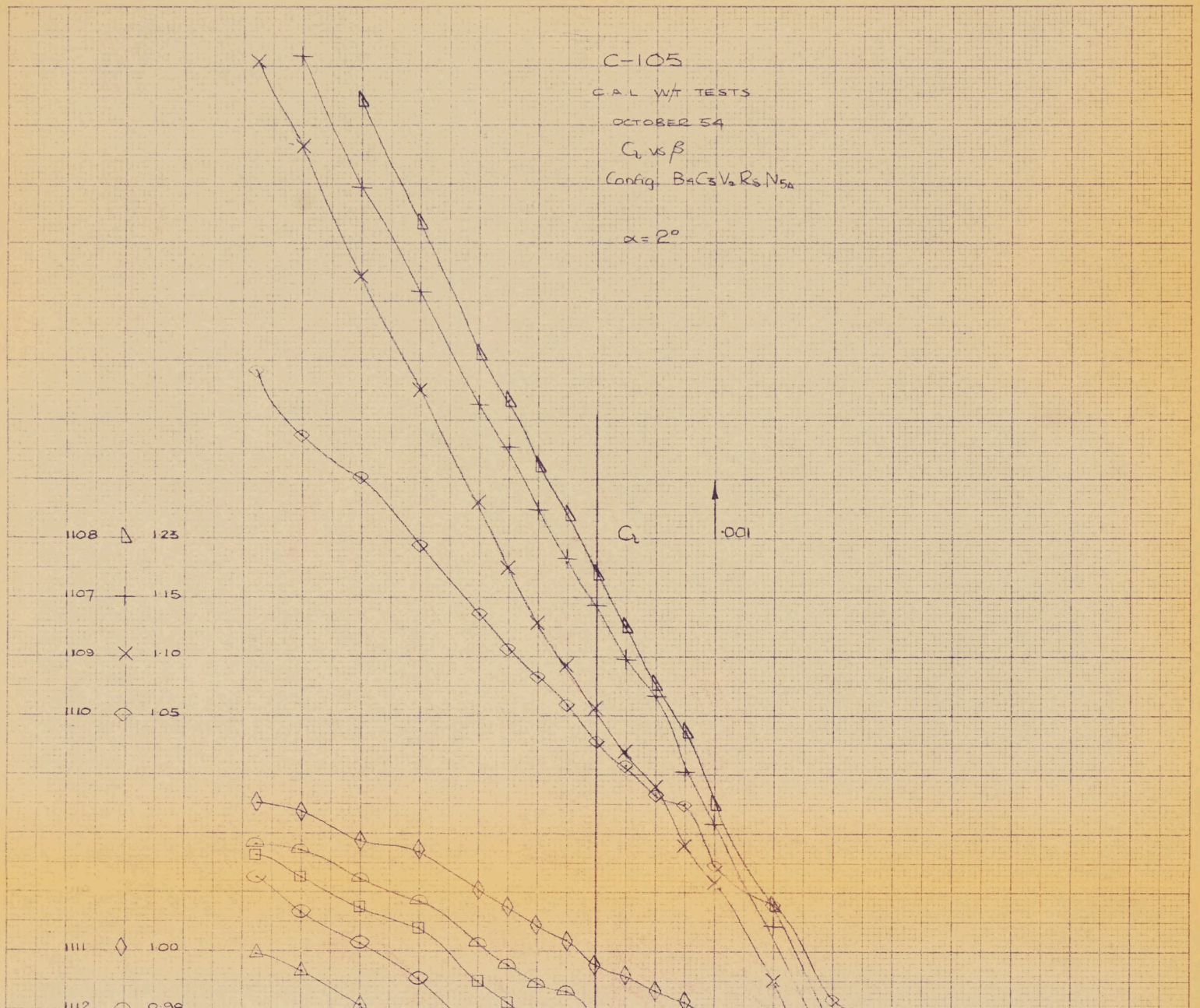
C_L vs β

Config. $B_4 C_3 V_2 B_5 N_{S4}$

$\alpha = 0°$

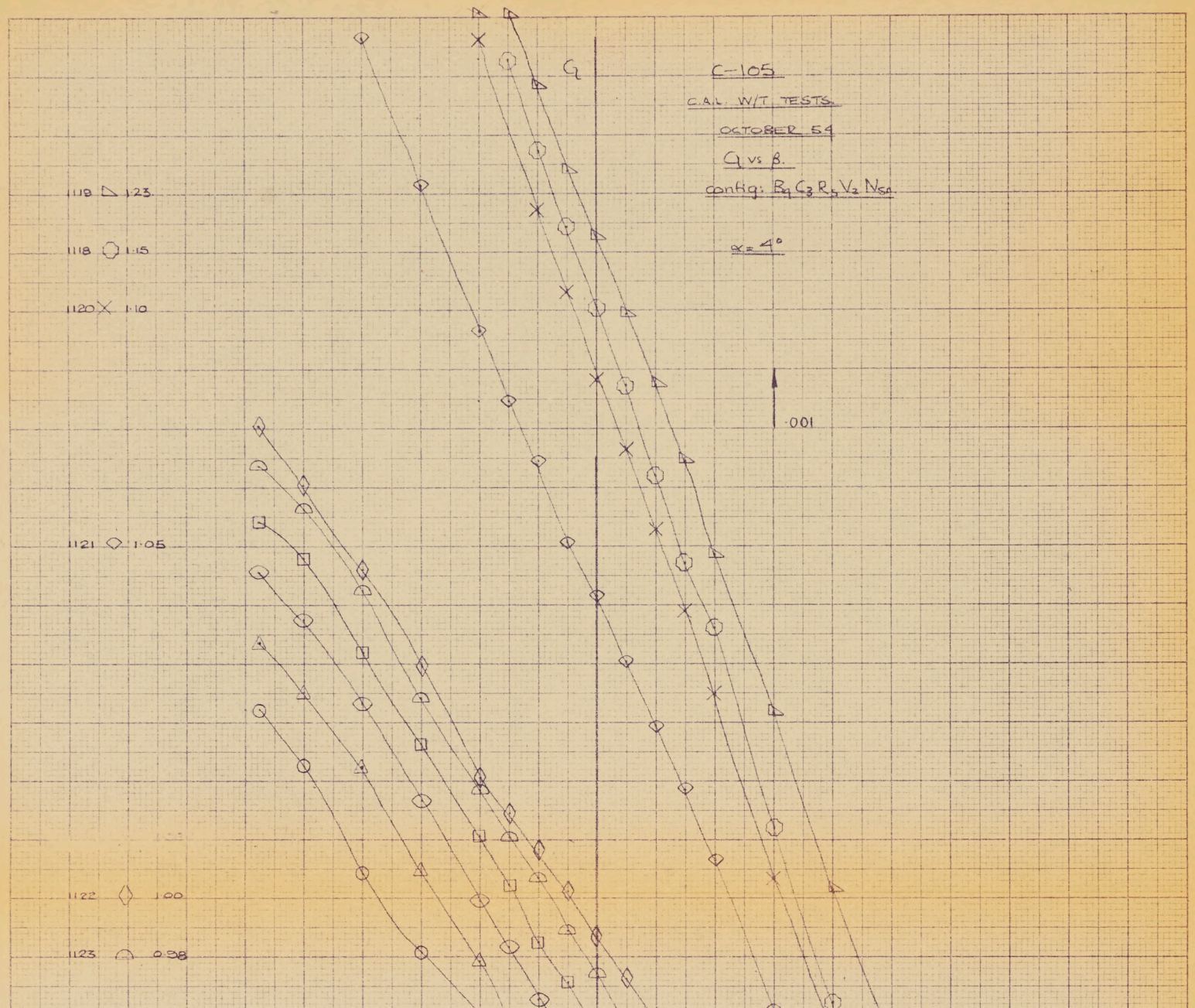



1099 1·05
1100 1·00
1101 0·98
1102 0·95
1103 0·9
1104 0·80
1097 0·50
β. -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 β. degrees



P/W T/49 9·9

oct 54 B Haynes.



P/W T/47 9.10
Oct 54 G. Haynes.

C-105

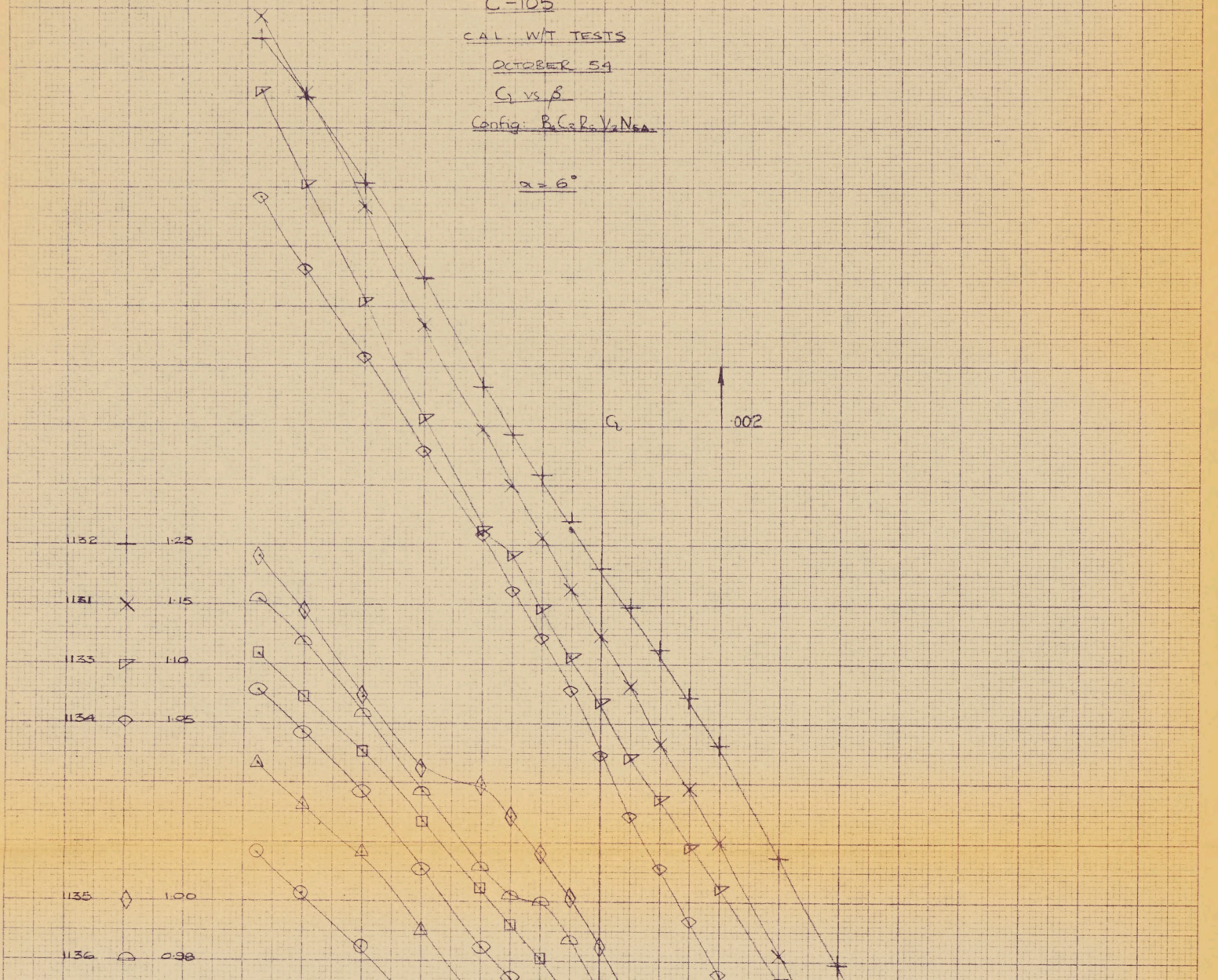
CAL. W/T TESTS

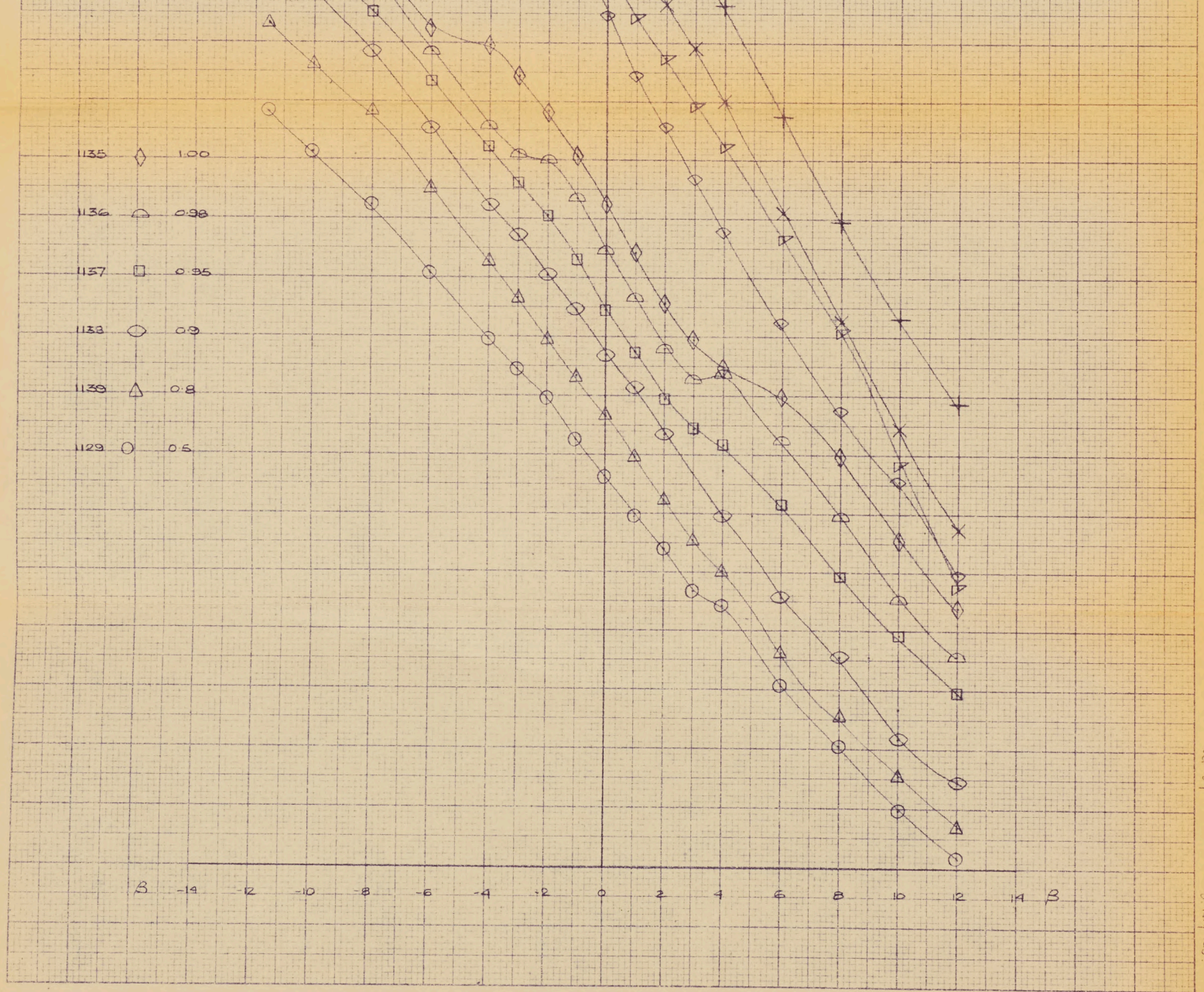
OCTOBER 54

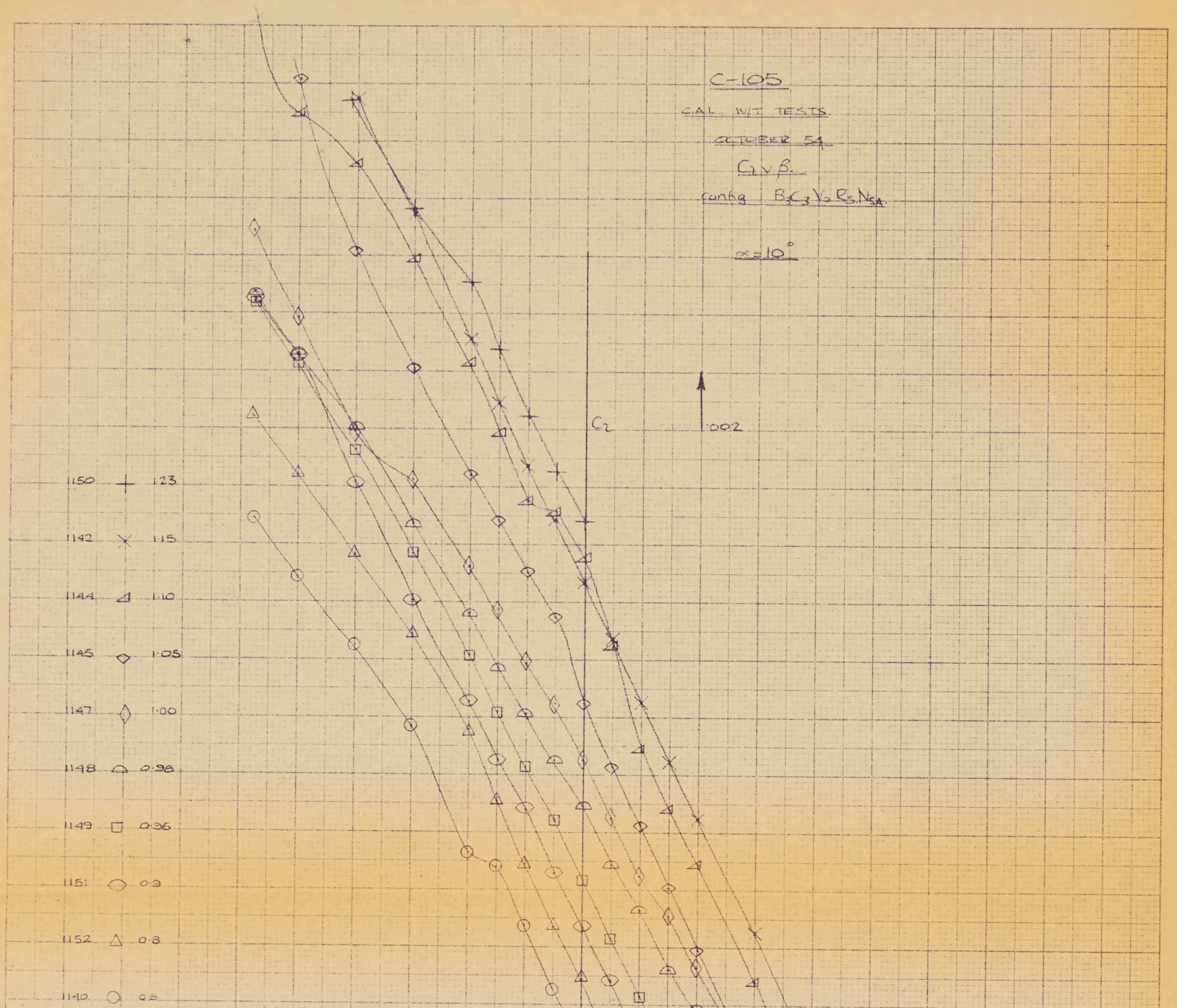
C_l vs β

Config: $B_4 C_2 R_5 V_2 N_{SA}$

$\alpha = 6°$

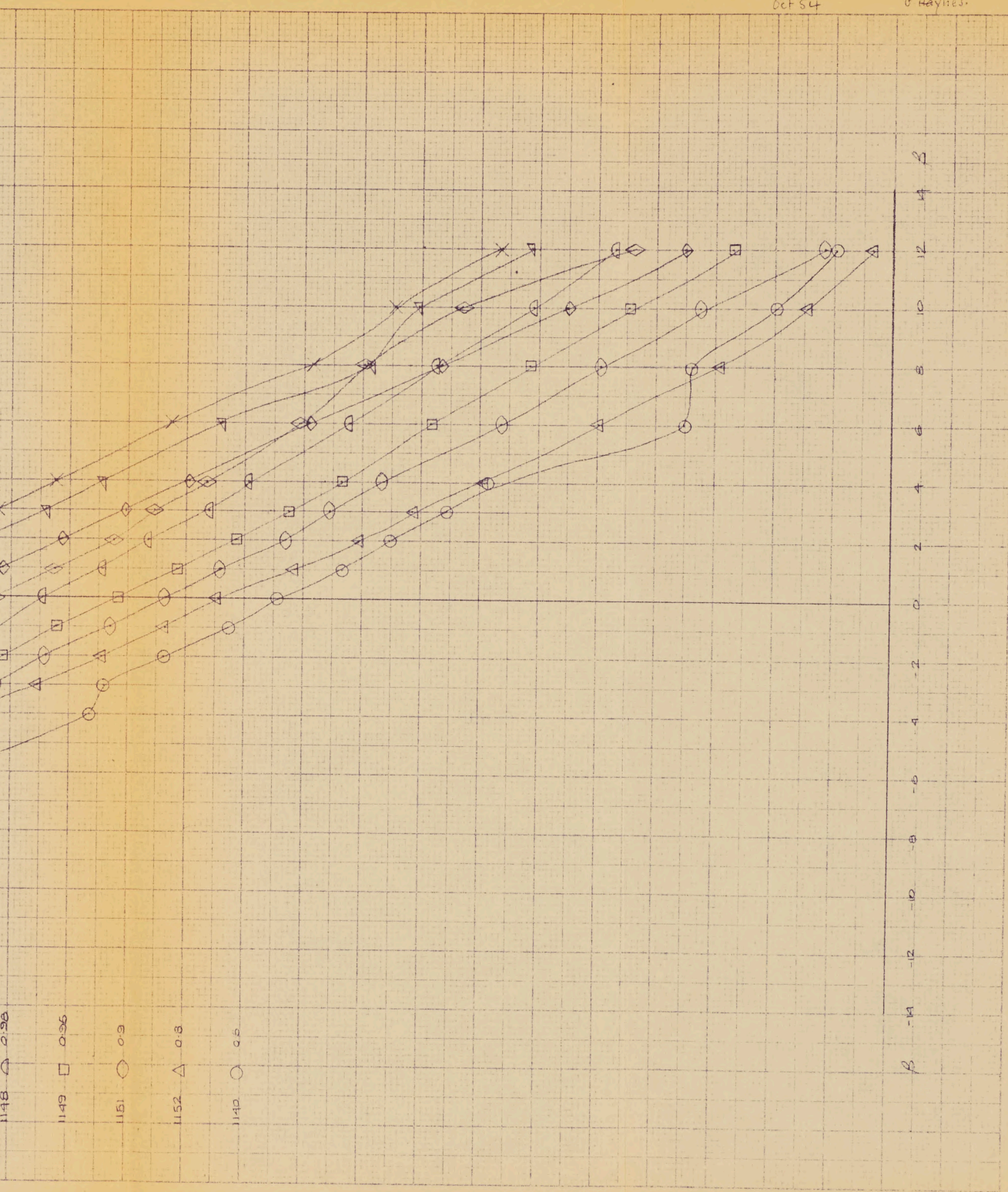






D/WT/49 9.12

Oct 54 G Haynes.



C-105

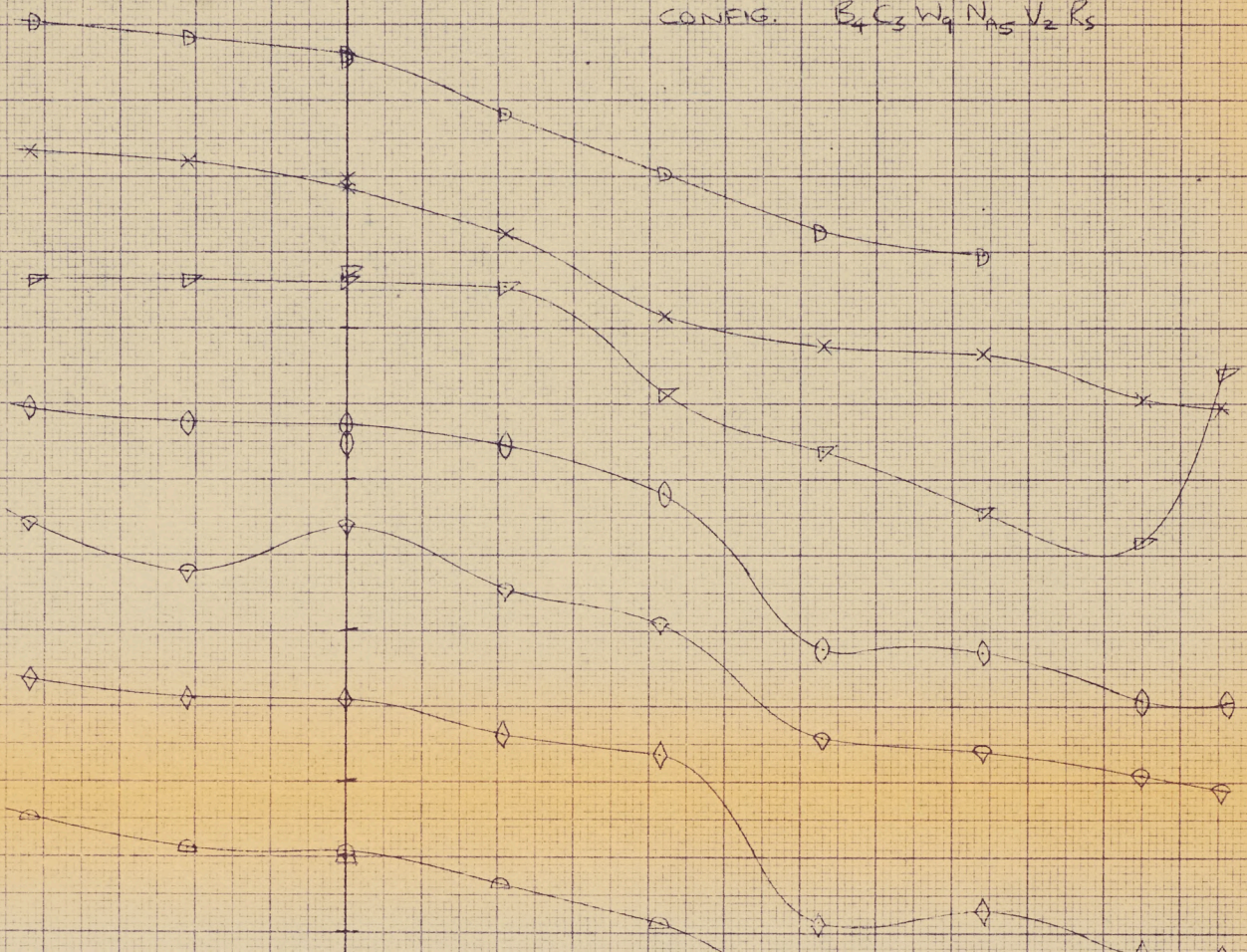
C.A.L. WIND TUNNEL TESTS OCT. '54.

C_l vs α

$\delta_{TR} = -5°$ $\delta_{AL} = 0°$

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

C_l SCALE .001
(ORIGIN AT M)



RUN.

1160 D M = 1.23

1158 X M = 1.15

1159 ▽ M = 1.10

1161 ◇ M = 1.05

1162 ◇ M = 1.00

P/WT/49. SHEET 9·13

D.E.Ewart. Oct. '54.

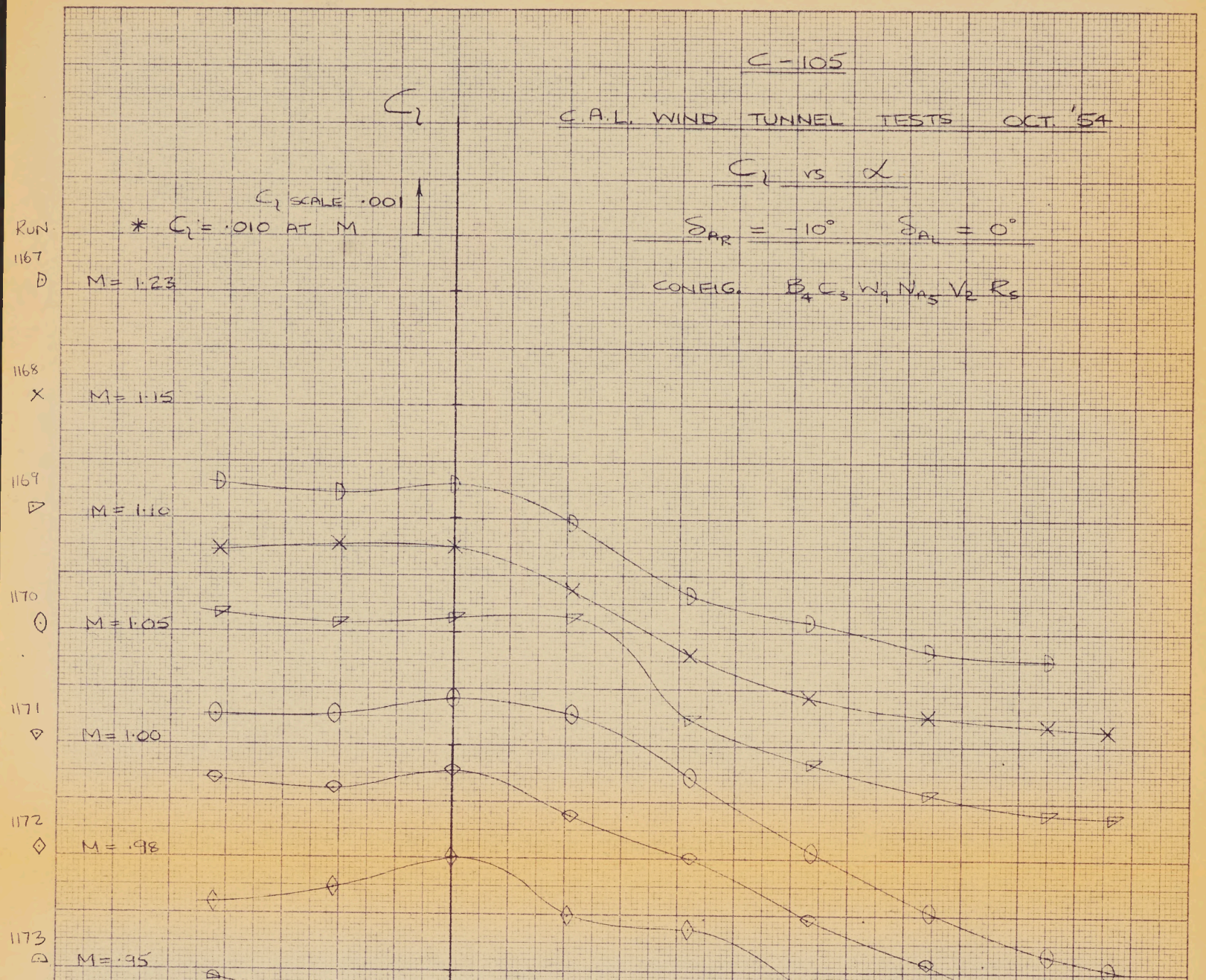
C-105

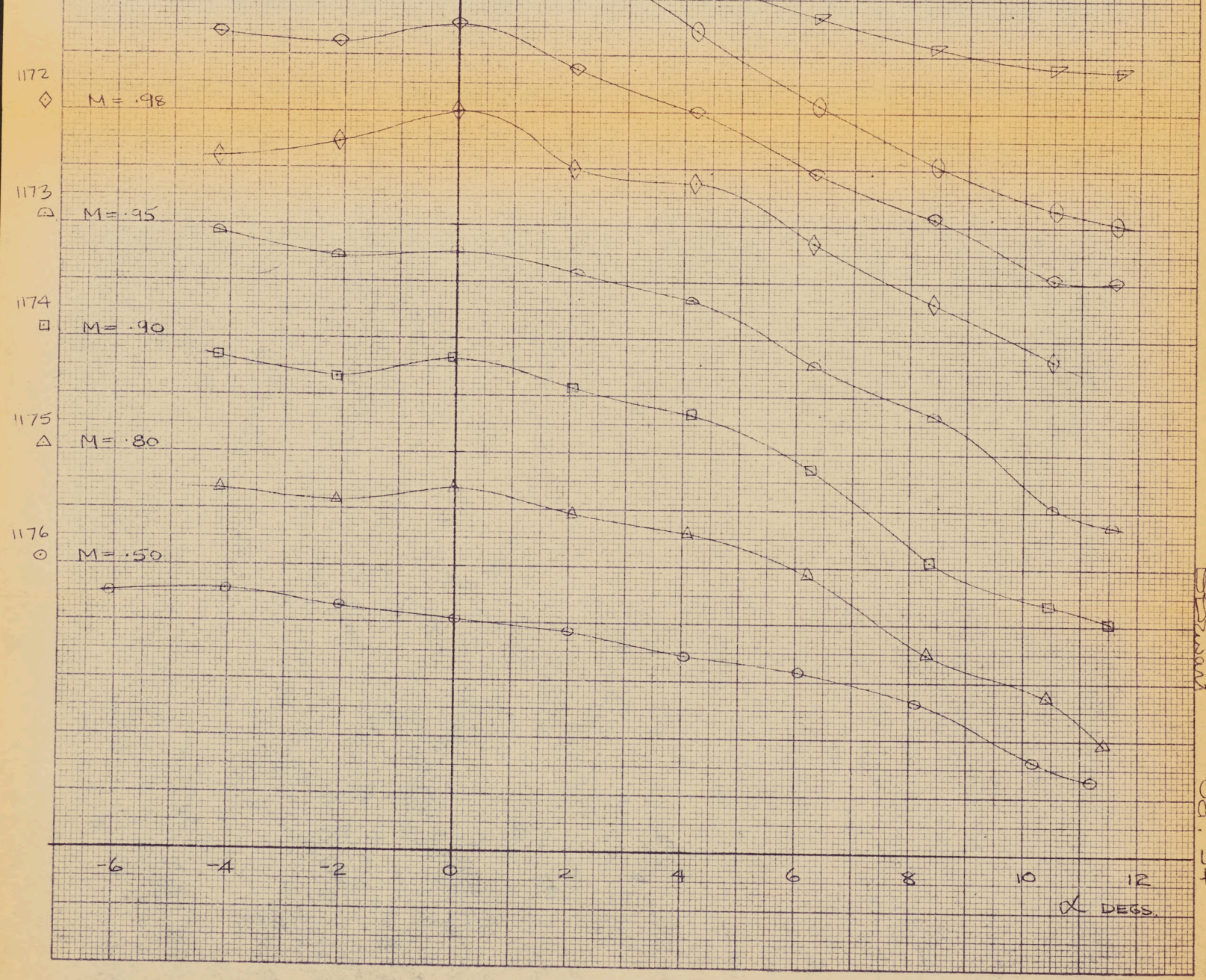
C.A.L. WIND TUNNEL TESTS OCT. '54.

C_l vs α

$\delta_{AR} = -10°$ $\delta_{AL} = 0°$

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





P/WT/49
SHEET 9.14
Oct. '54

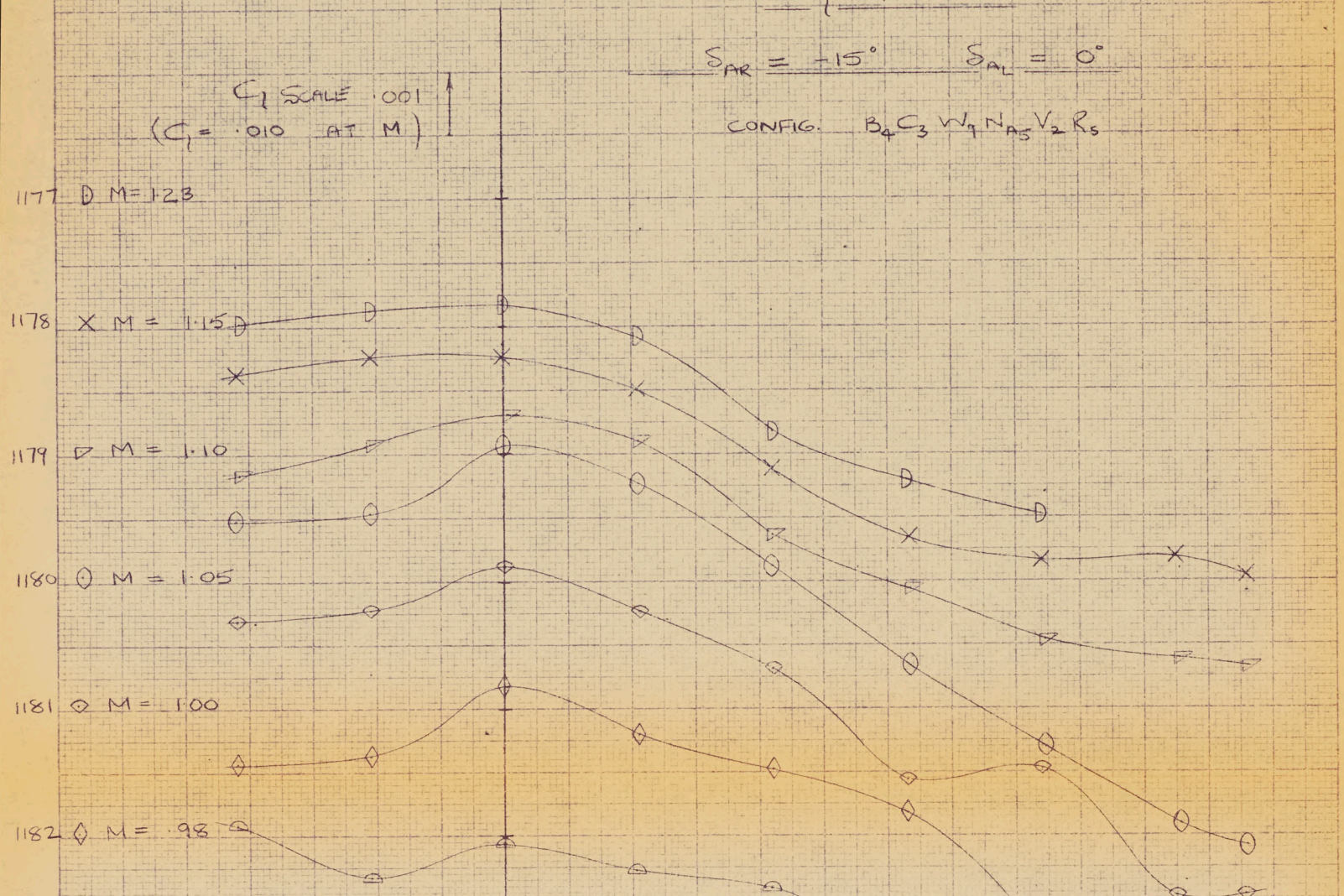
C-105

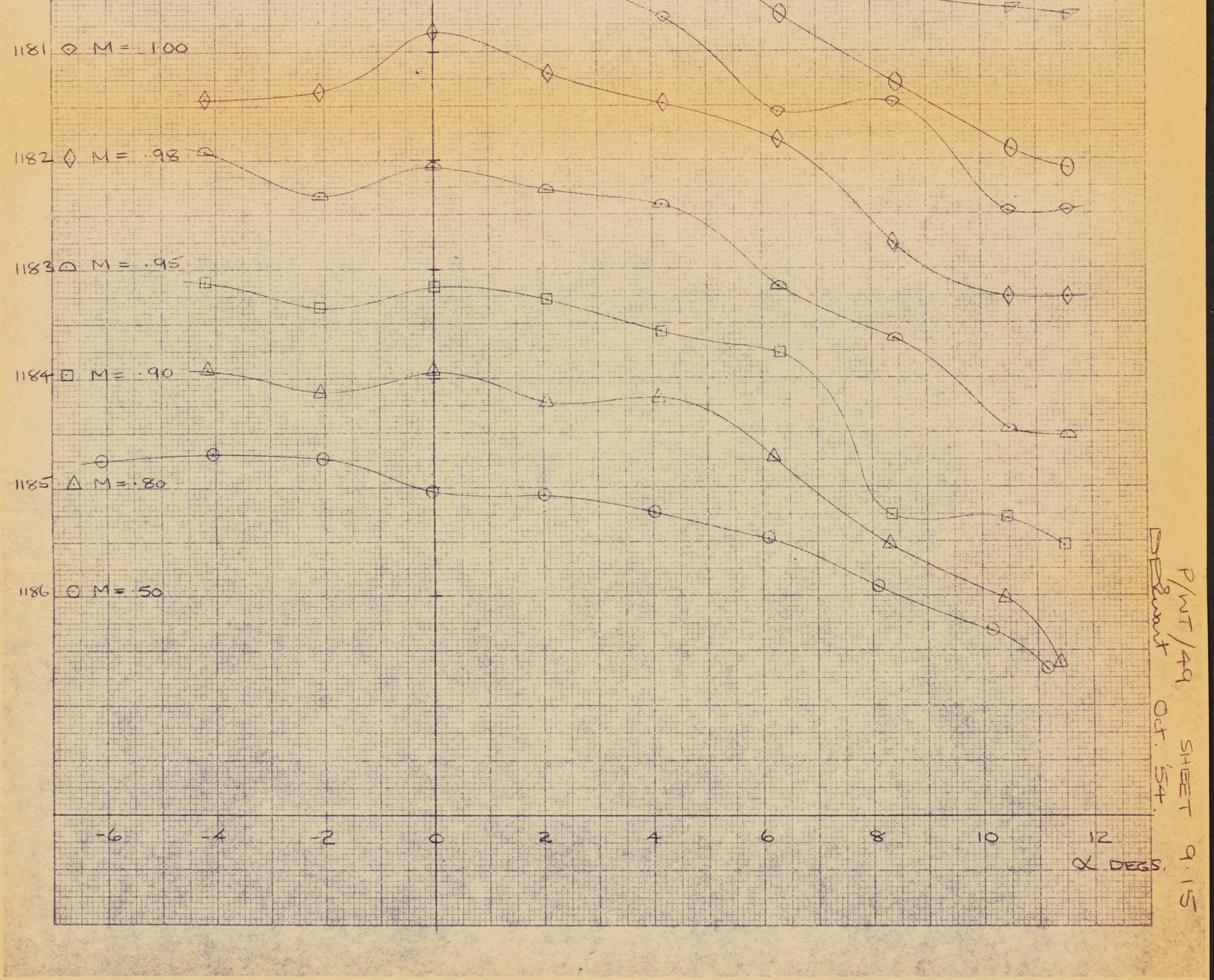
C.A.L. WIND TUNNEL TESTS OCT. '54

C_l vs α

$\delta_{AR} = -15°$ $\delta_{AL} = 0°$

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





P/WT/49 SHEET 9.15
Oct. '54.

9.16 P/WT 149
9.17.
Oct/54 S. Kwiatkowski

C105

C.A.L. WIND TUNNEL TESTS OCT. 57

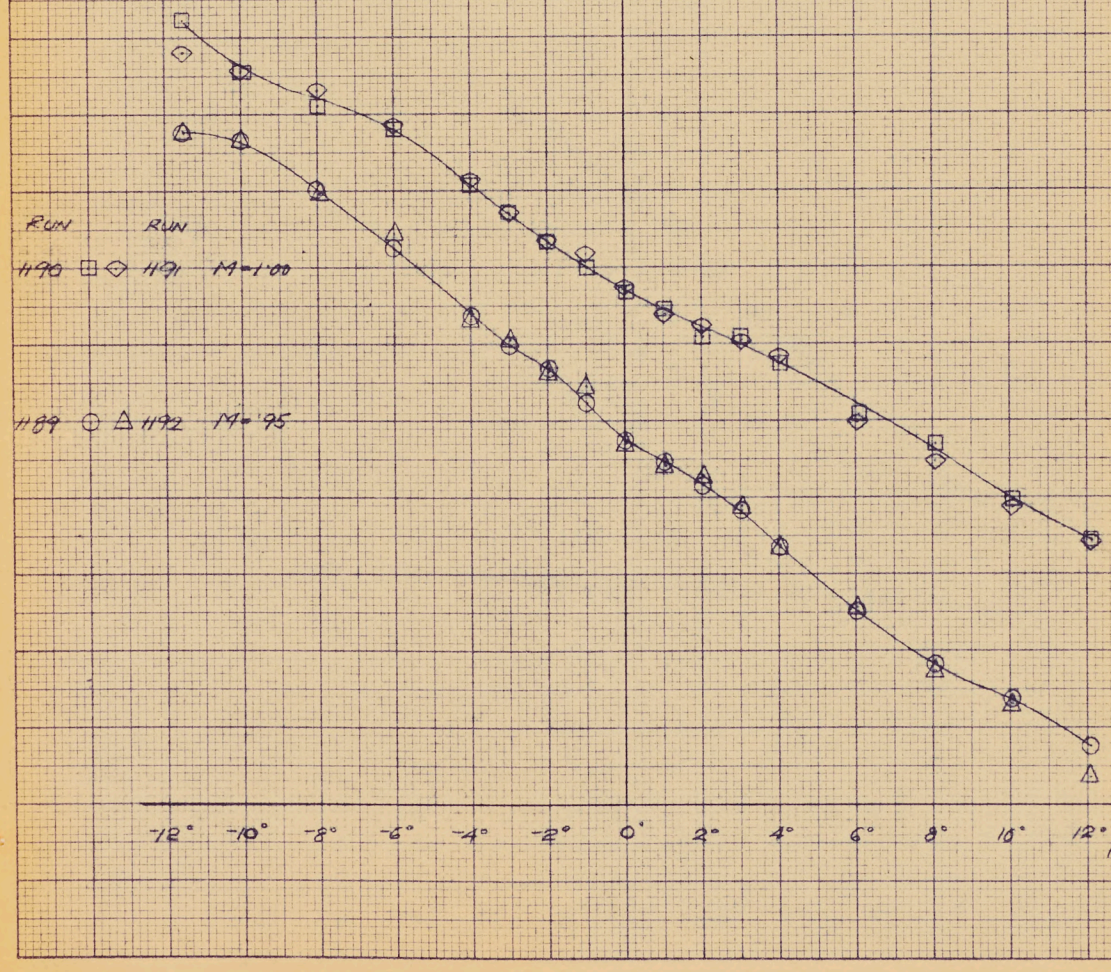
C_l vs β

EFFECT OF NOTCH

$\alpha = 2°$

○ □ $B_2 C_3 W_9 R_3 V_4 N_{95}$

△ ◇ $B_2 C_3 W_9 R_3 V_2$



9.20 P/NT/49

N64/54 Kwakkenbush

C105

C.A.L. WIND TUNNEL TESTS OCT 54

C_3 B_4 N_9 V_2 R_5 N_{45} T

C_l vs β

EFFECT OF HIGH REYNOLDS NO AND TANK

M = .5

RUN α

1197 ⊙ 66°

1196 □ 44°

1195 △ 22°

1194 ⊖ 0°

C_l .002

-10° -8° -6° -4° -2° 0 2° 4° 6° 8° 10° β

10 X 10 TO THE ½ INCH 359-12
KEUFFEL & ESSER CO. MADE IN U.S.A.

9.24. P/WT/149

Nov/54. Kuiathowski

C105

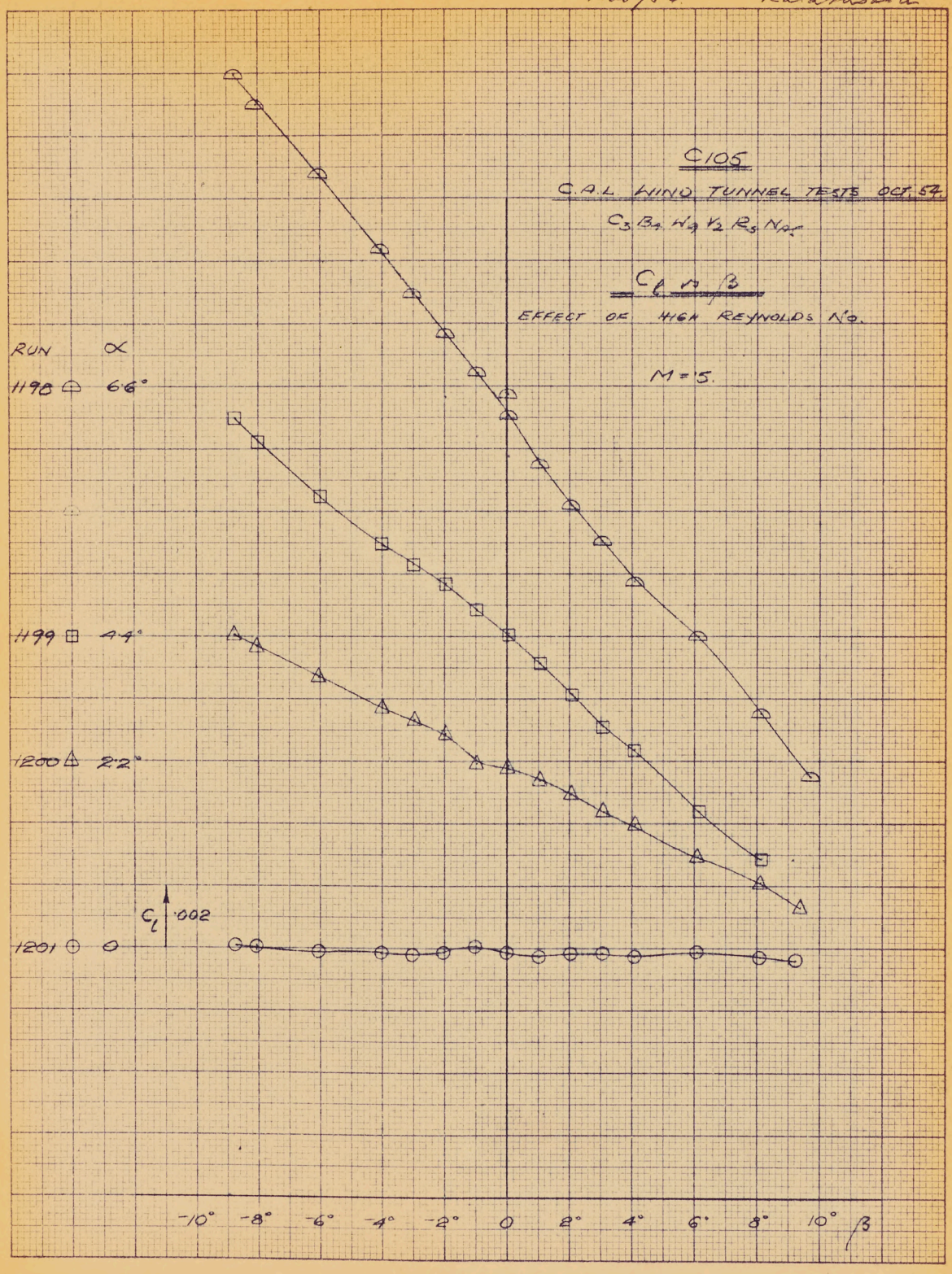
C.A.L. WIND TUNNEL TESTS OCT. 54.

$C_3 B_4 W_9 V_2 R_3 N_{4r}$

C_l vs β

EFFECT OF HIGH REYNOLDS No.

M = 1.5.



C-105

C_{Nf}

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

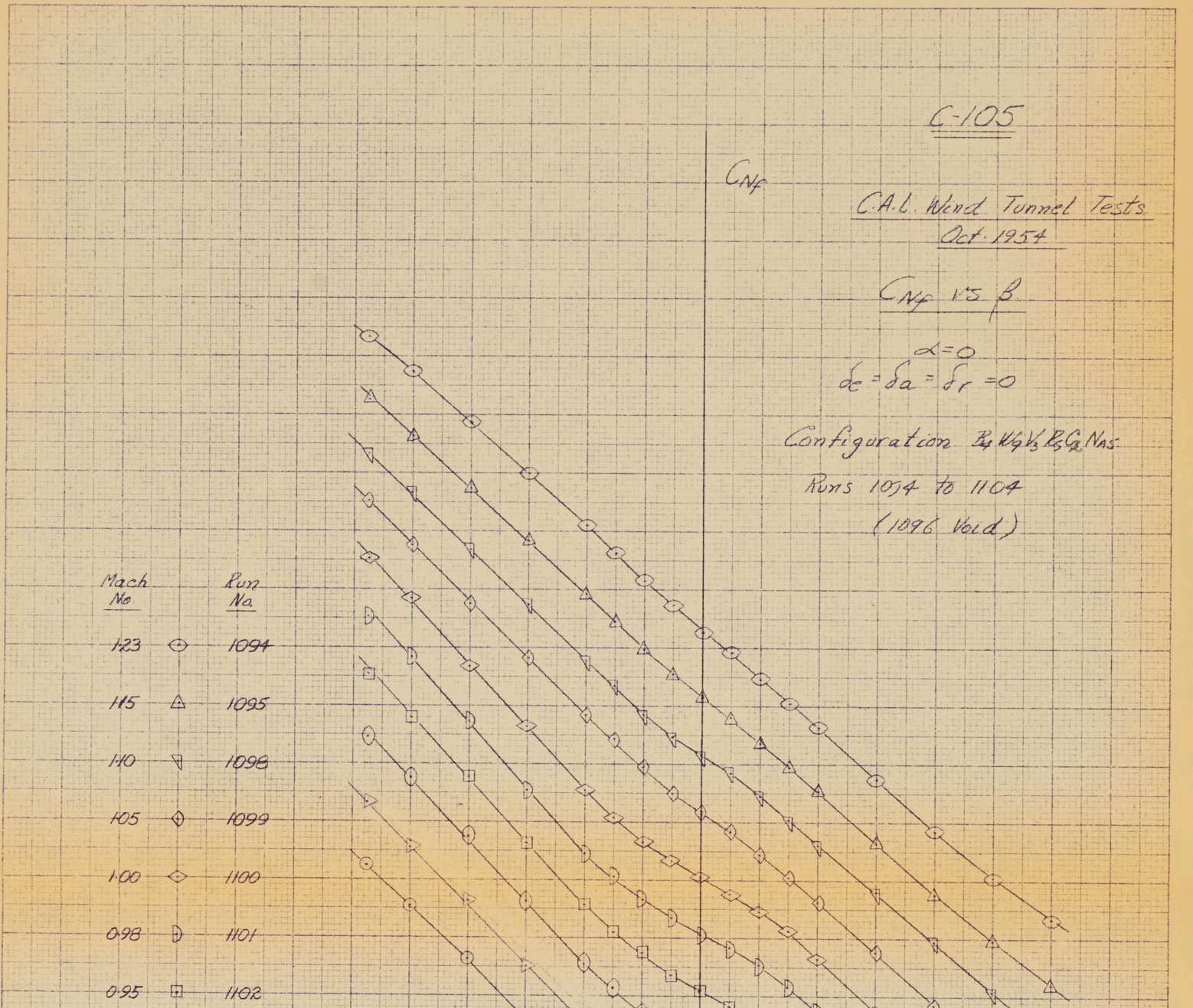
C_{Nf} vs β

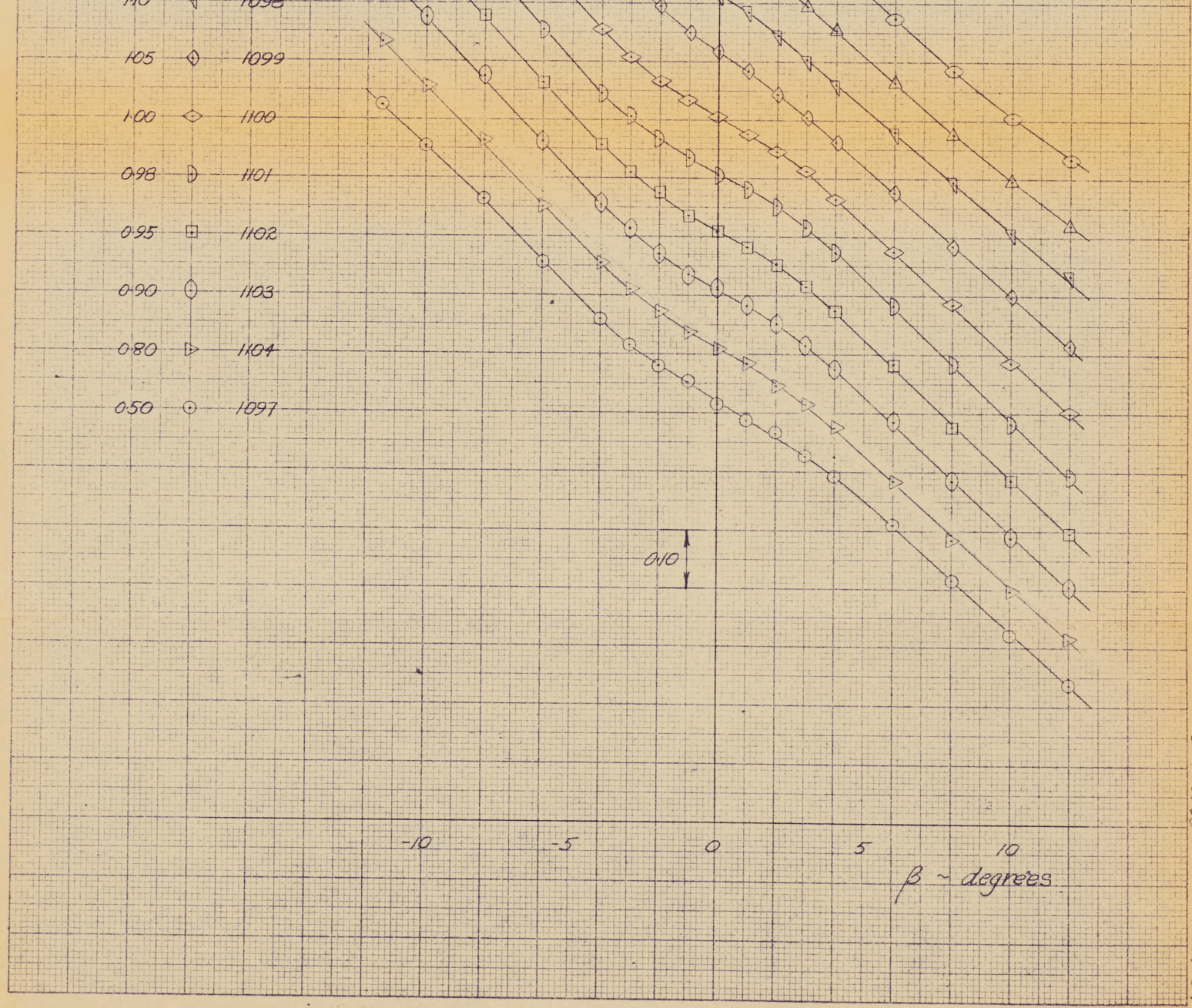
$\alpha = 0$

$\delta_e = \delta_a = \delta_r = 0$

Configuration $B_4 W_9 V_3 B_5 C_2 N_{A5}$

Runs 1094 to 1104
(1096 Void)





PLOTTED C.A.Ford 10.8 1 Nov. 54

C-105

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

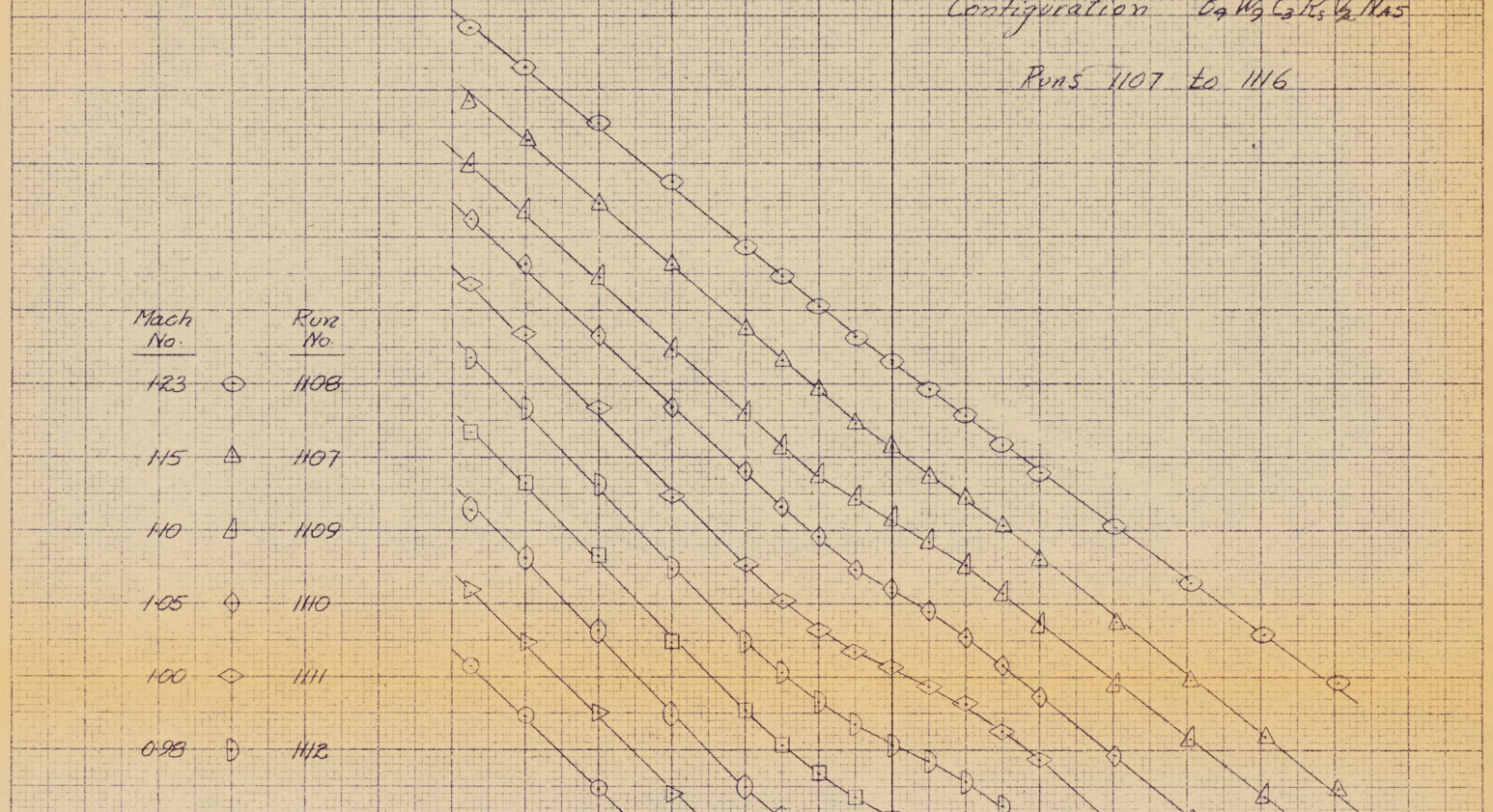
C_{Nf} C_{Nf} vs β

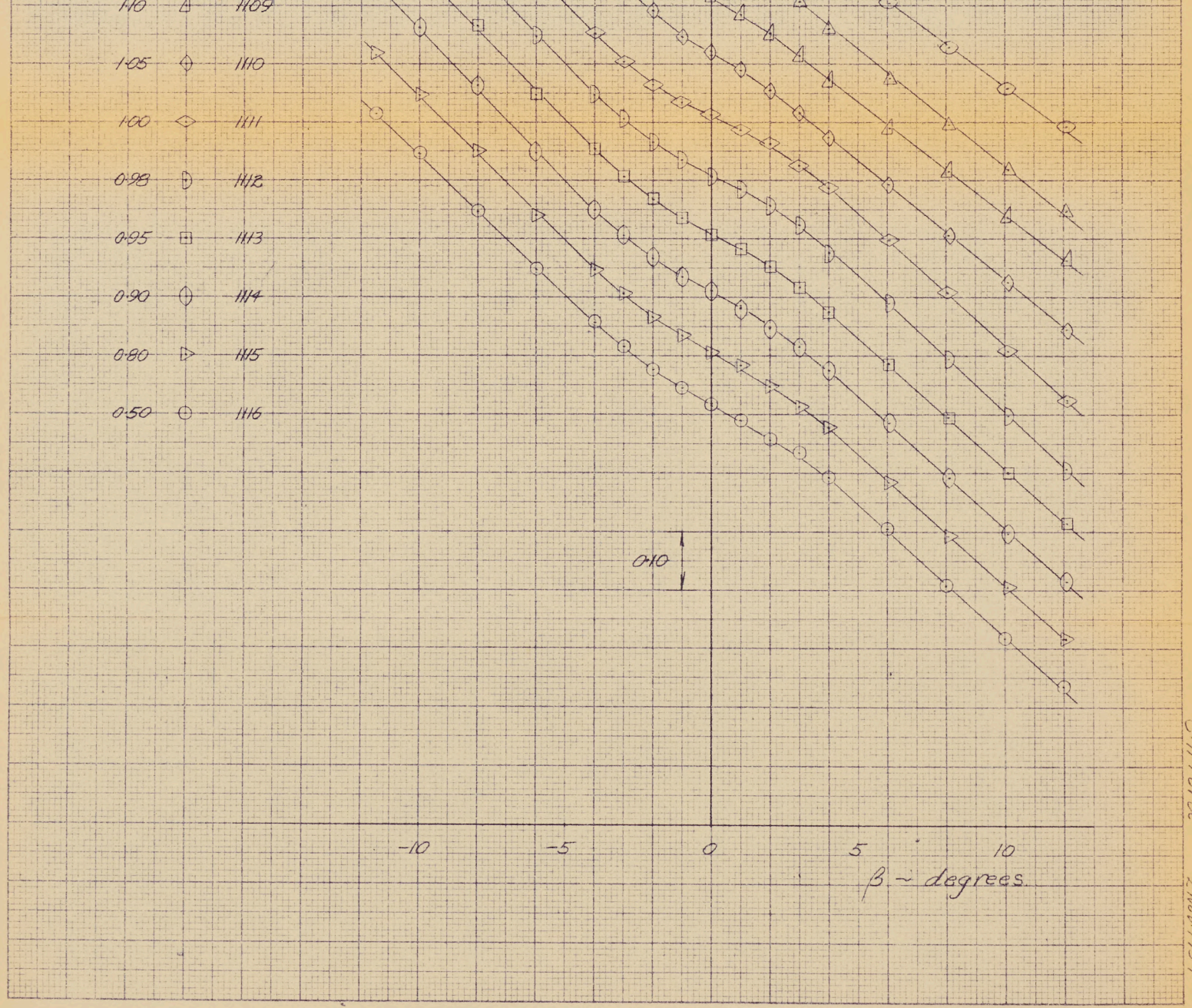
$\alpha = 2.1^{\circ}$

$\delta_e = \delta_a = \delta_r = 0$

Configuration $B_4 W_2 C_3 R_5 V_2 N_{A5}$

Runs 1107 to 1116





RAE/T/49 10.9
C.A.Ferd 2 Nov 1954

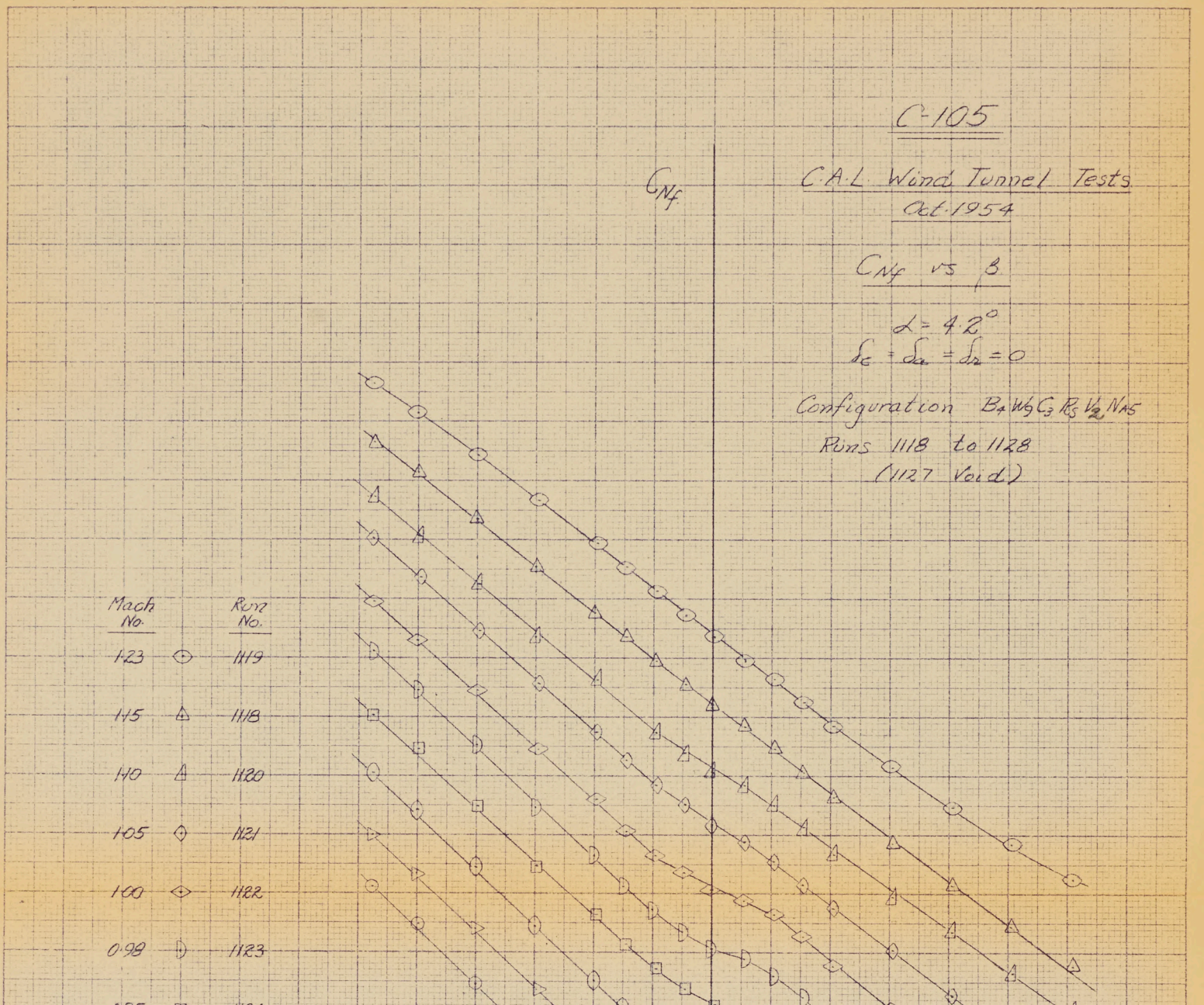
C-105

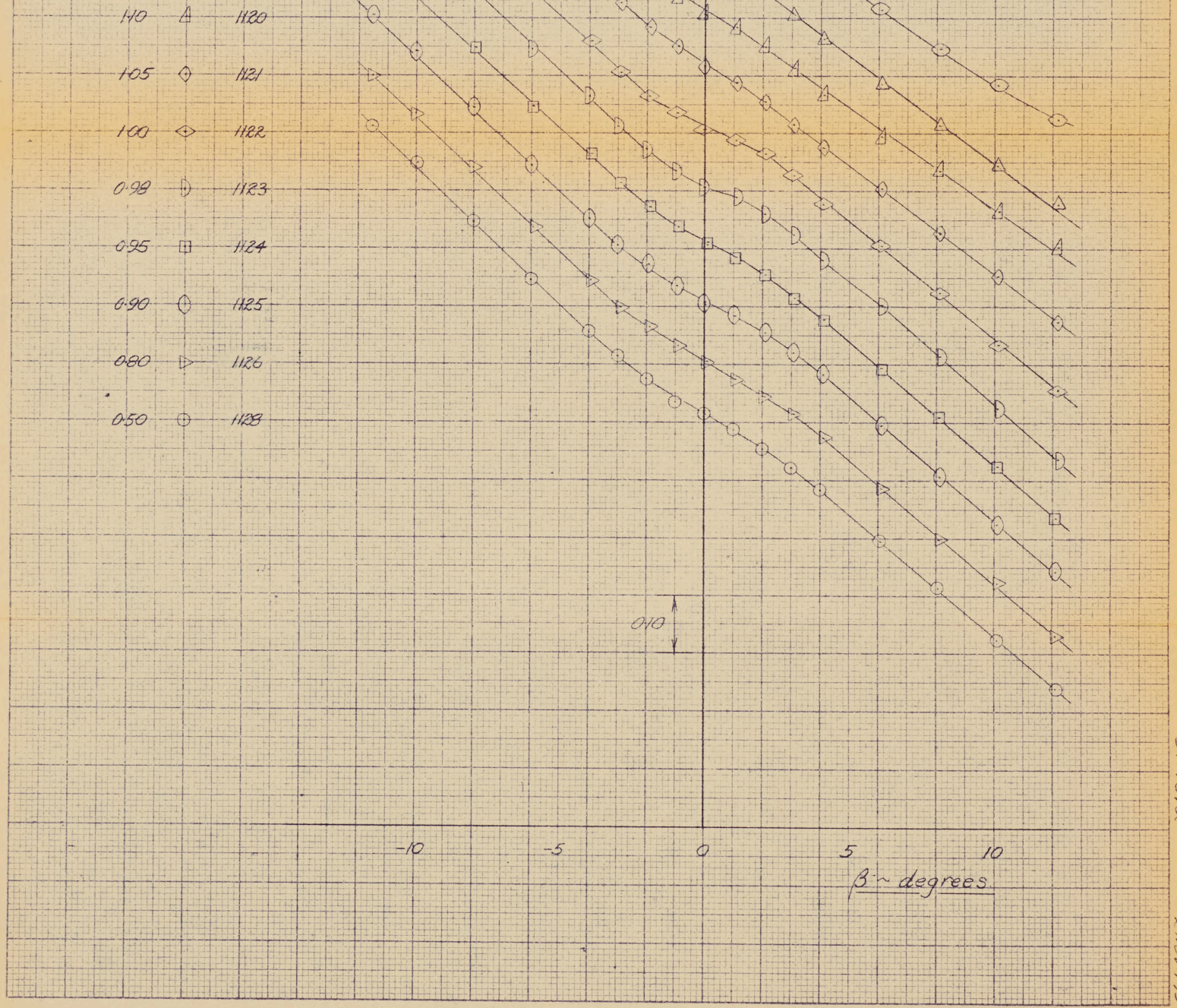
C.A.L Wind Tunnel Tests
Oct. 1954

C_{Nf} vs β

$\alpha = 4.2°$
$\delta_c = \delta_{a_1} = \delta_{a_2} = 0$

Configuration $B_4 W_6 C_3 R_5 V_2 N_{A5}$
Runs 1118 to 1128
(1127 Void)





P/WT/49 10.10
C.A. Ford 2 Nov 1954

C-105

C-A-L Wind Tunnel Tests
Oct. 1954

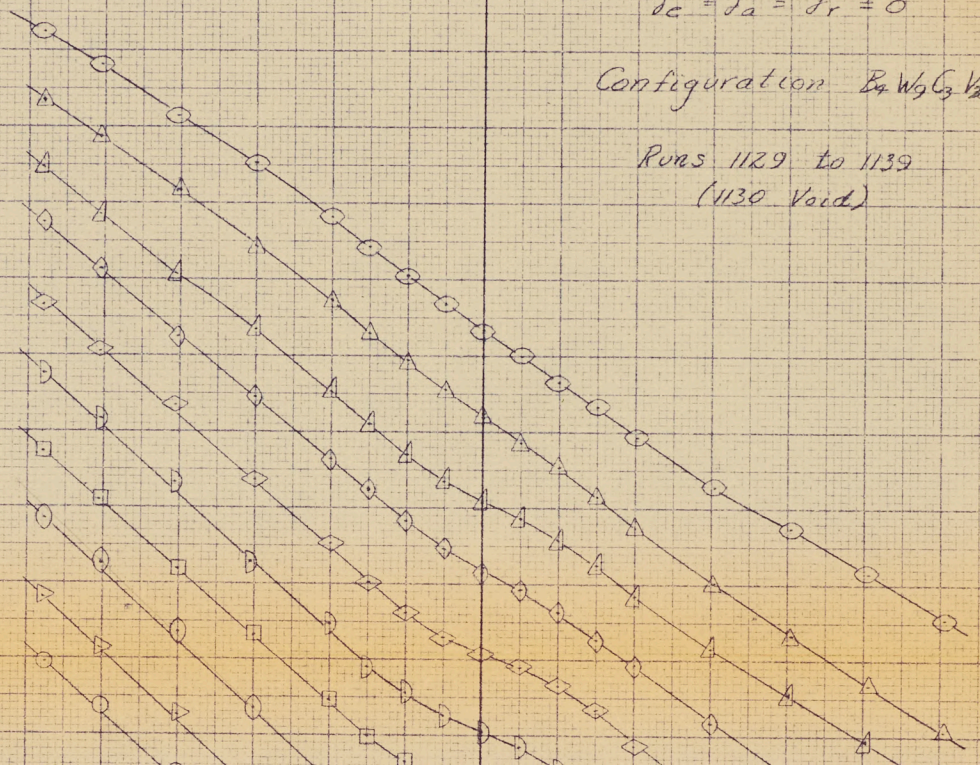
C_{N_f}

C_{N_f} vs β

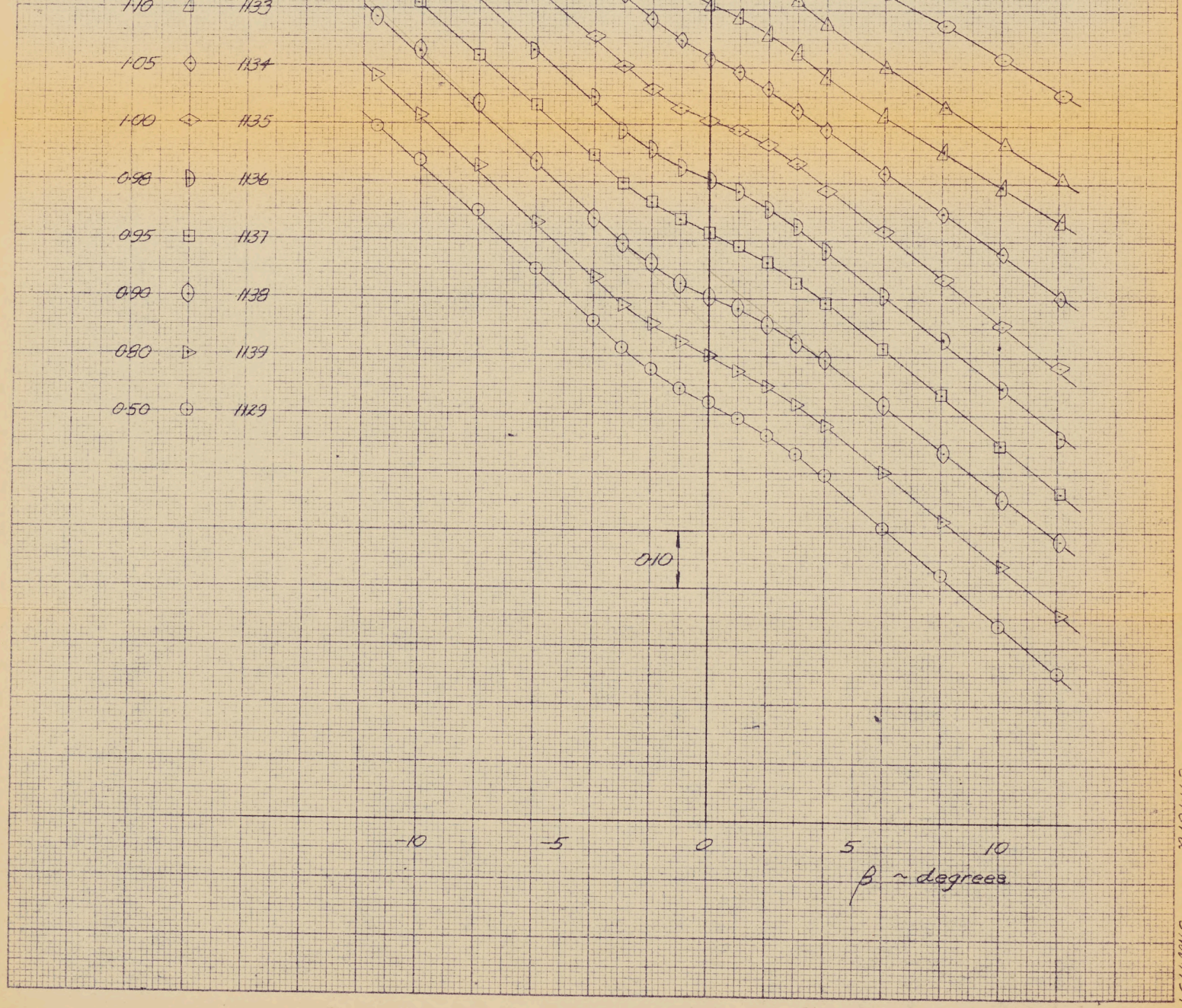
$\alpha = 6.3°$
$\delta_e = \delta_a = \delta_r = 0$

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

Runs 1129 to 1139
(1130 Void)



Mach No.		Run No.
1.23	⊙	1132
1.15	△	1131
1.10	△	1133
1.05	◇	1134
1.00	◇	1135
0.98	◫	1136



P/WT/49
C.A. Ford
3 Nov. 1954
10.11

C-105

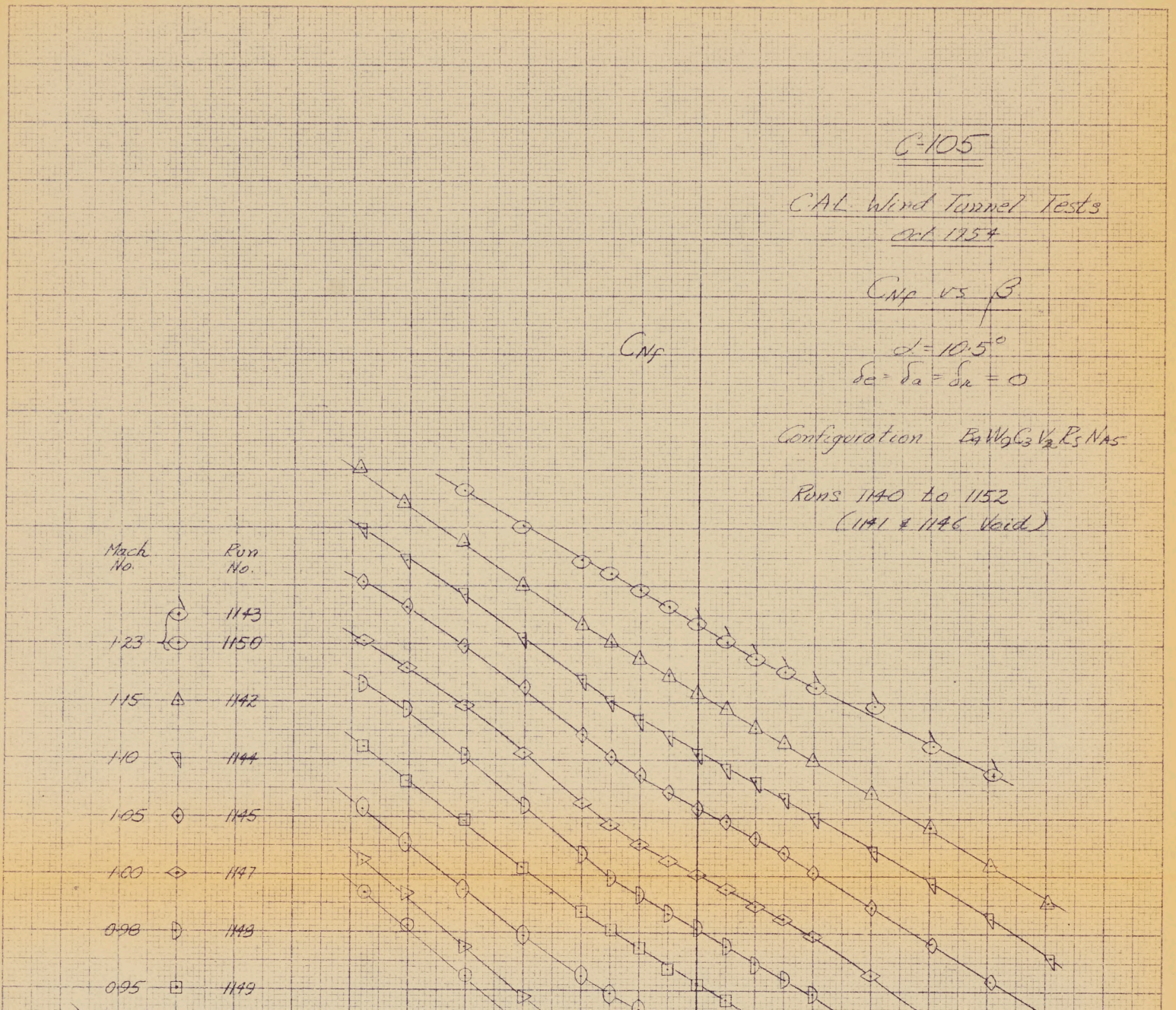
CAL Wind Tunnel Tests
Oct 1957

C_{Nf} vs β

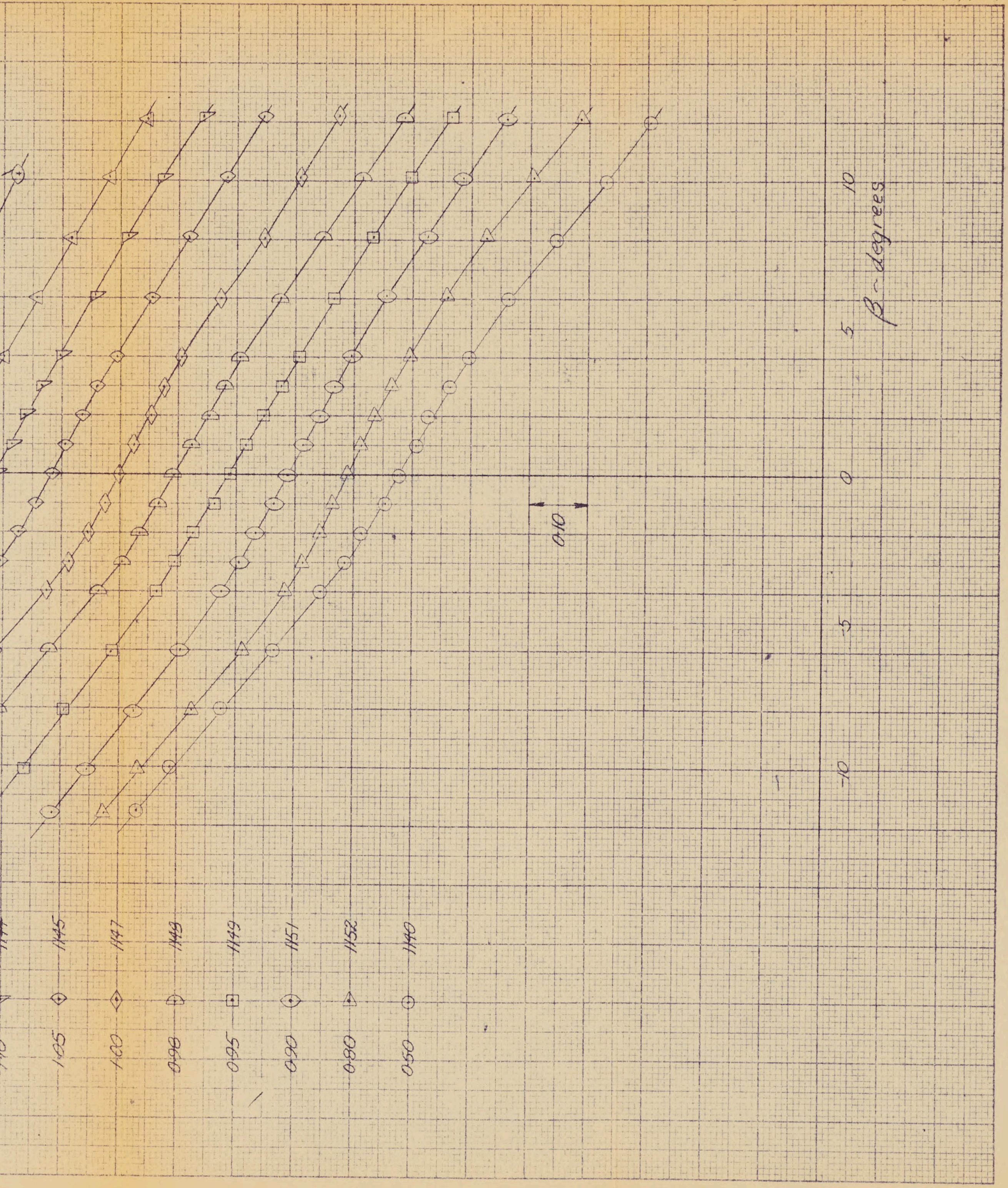
$\alpha = 10.5°$
$\delta_e = \delta_a = \delta_r = 0$

Configuration $B_4 W_9 C_3 V_2 P_5 N_{A5}$

Runs 1140 to 1152
(1141 & 1146 Void)



P/WT/49 10.12
C A Ford 3 Nov 1954



10.20. P/INT /49
Nov/54.

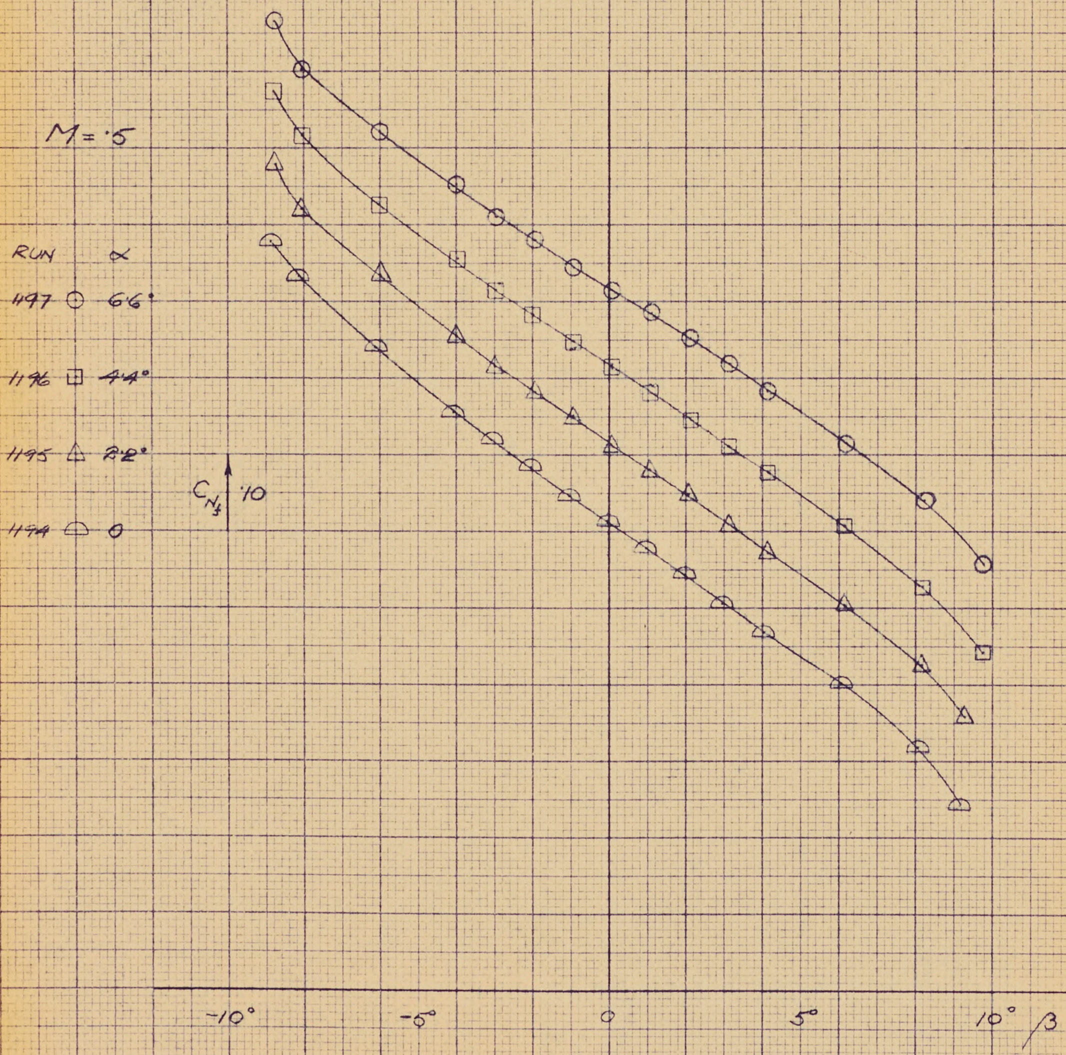
C105

C.A.L. WIND TUNNEL TESTS OCT 57.

$C_3 B_4 N_9 V_2 R_3 N_{75} T$

C_{N_ψ} vs β

EFFECT OF HIGH REYNOLDS No
AND TANK.



G=10.5

CAL. WIND TUNNEL TESTS (OAT 54)

C_{mf} vs β

M = .50 HIGH R_N's

CONFIG: B4 G2 N6 N8 K2 K3

RUN	$\gamma°$
1201	0
1200	2
1199	4
1198	6

C_{mf}

.10

$\frac{1}{4}$

-10 -5 0 5 10

β ~ DEGREES

10.24. NOW ST. RUNS.

C-105

C.A.L. Wind Tunnel Tests – Oct. 1954

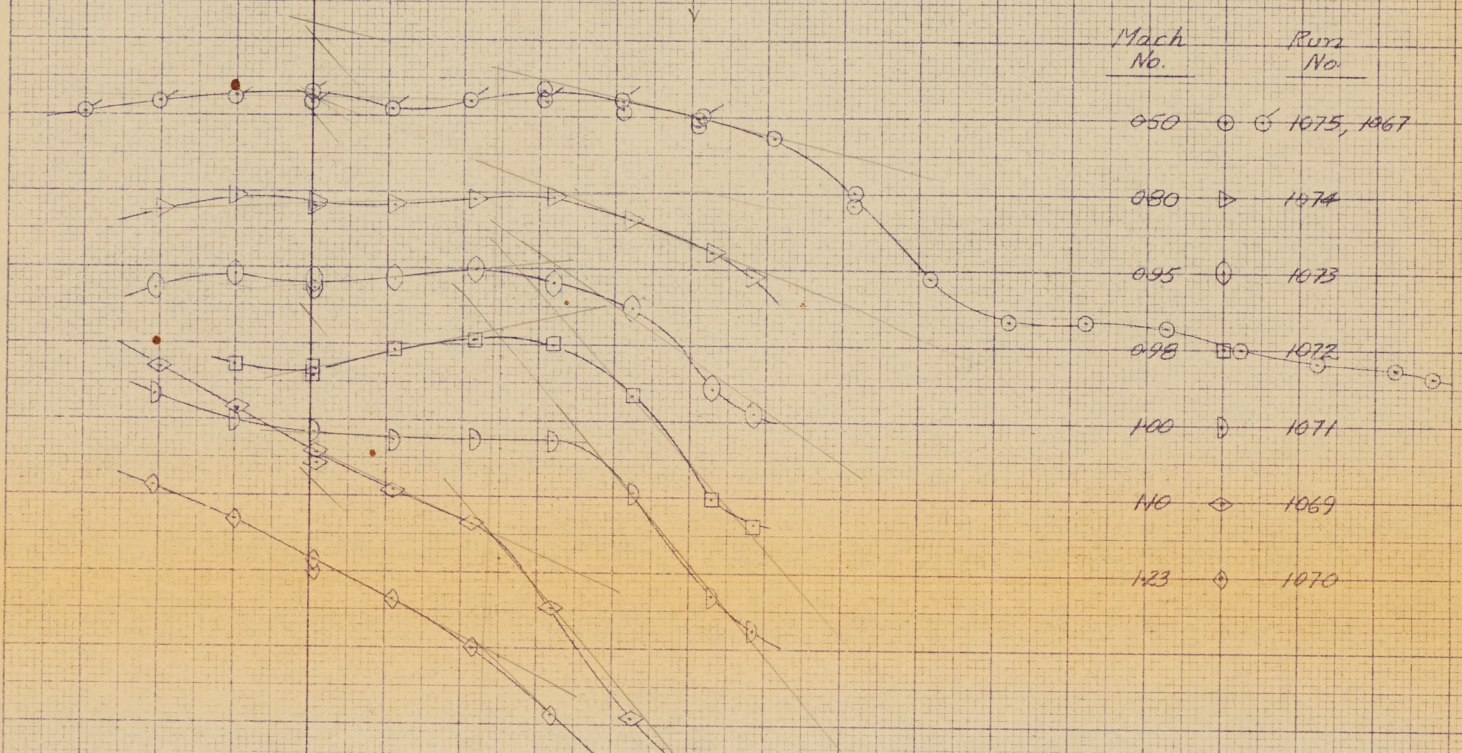
C_{HAR} vs α

$\delta_{AR} = \delta_{AL} = 0$

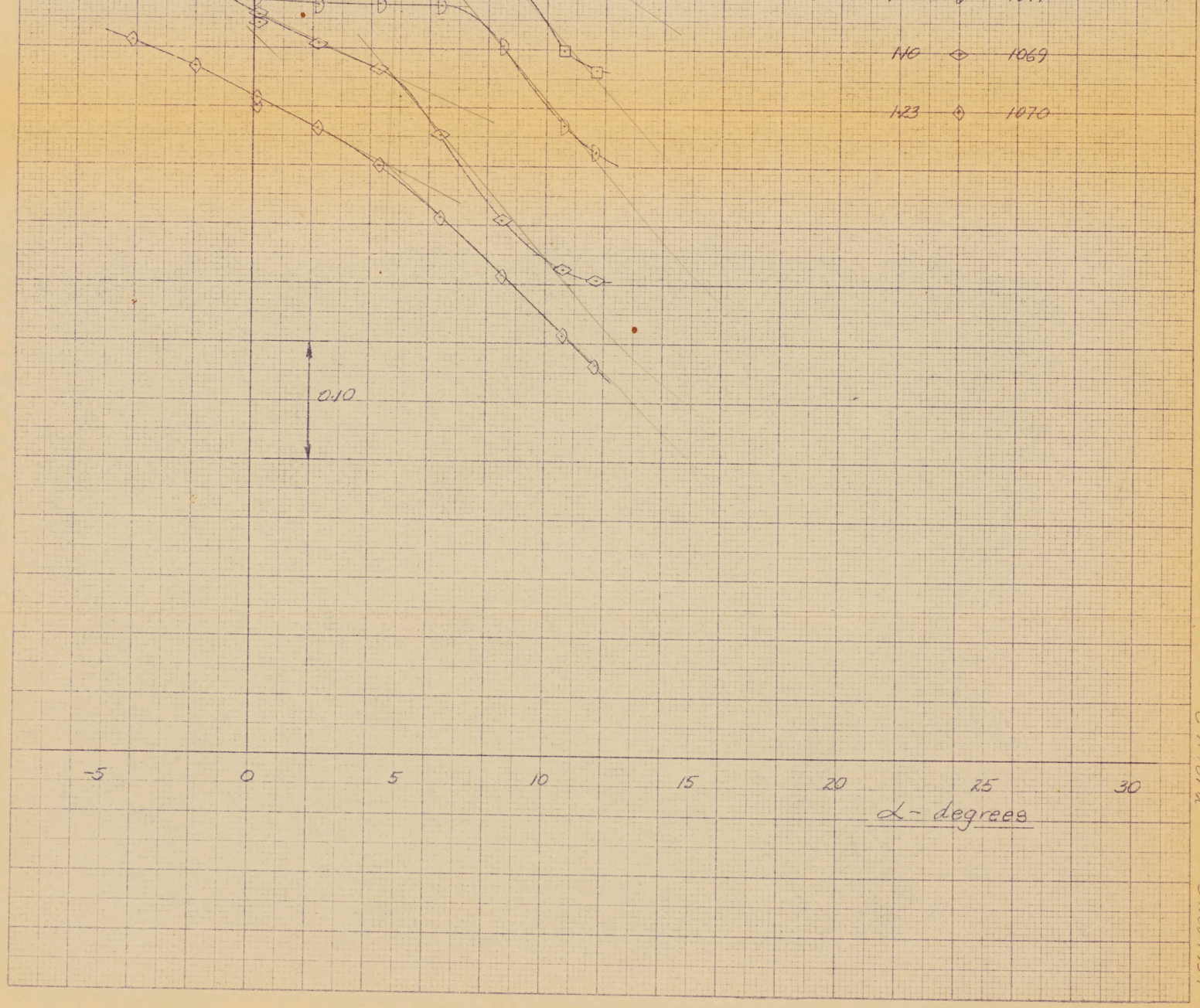
$\delta_e = \delta_r = 0$

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

Runs 1067 to 1075
(1068 Void)



Mach No.		Run No
.950	⊙	1075, 1067
.980	▷	1074
.995	◇	1073
.998	□	1072
1.00	▷	1071
1.10	◇	1069
1.23	◇	1070



PIUTT/49
C A Ford
14-2
SNOW 1954

C-105

CAL Wind Tunnel Tests ~ Oct 1954

C_{hAR} vs α

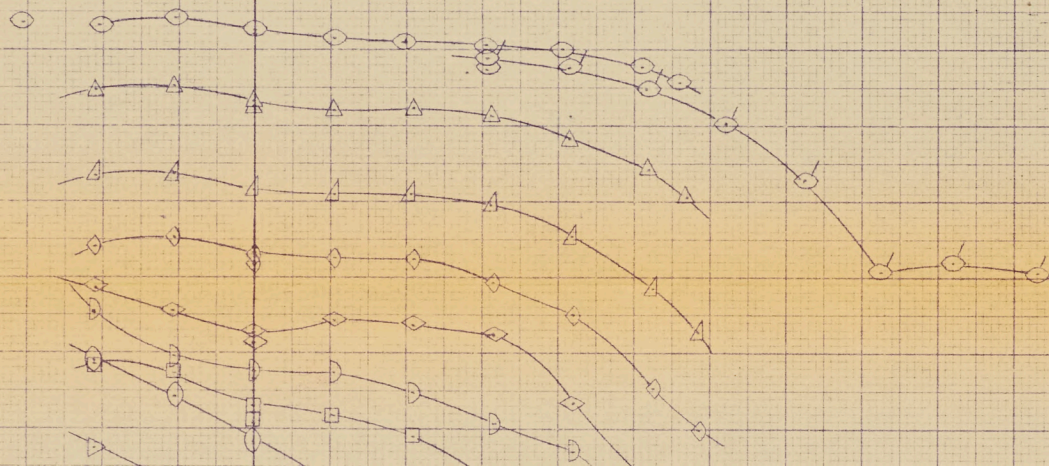
$\delta_{a_R} = -5°$ $\delta_{a_L} = 0$

$\delta_e = \delta_r = 0$

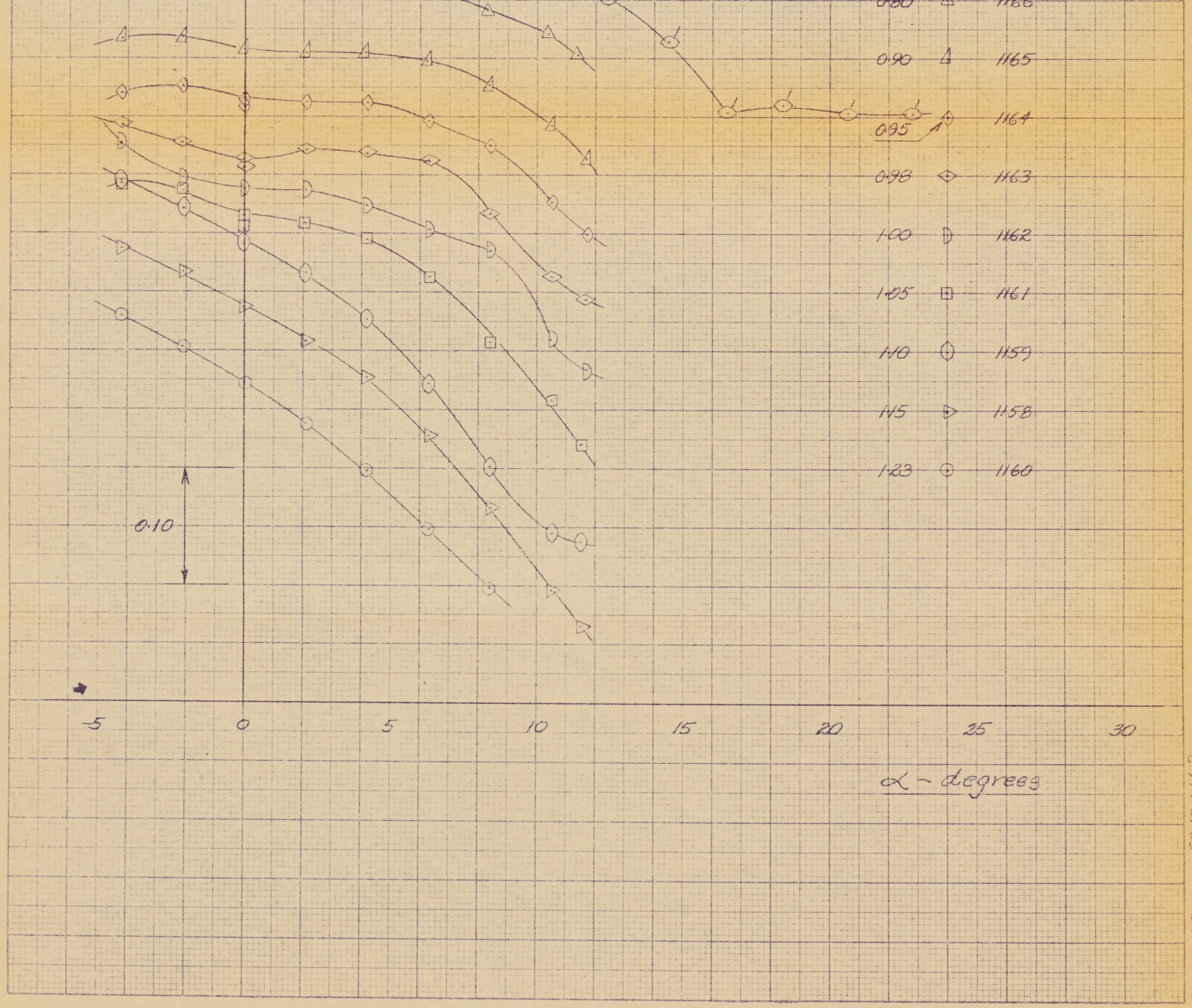
Configuration
$B_4 C_3 W_3 V_2 R_5 N_{A5}$

Runs
1155, 1158 to 1166,
and 1203

C_{hAR}



Mach No.	Run No.
0.50	1155, 1203
0.80	1166
0.90	1165
0.95	1164
0.98	1163
1.00	1162



PRINTED C.A.F. Ltd 5 NOV. 1954 145

C-105

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

C_{hAR} vs α

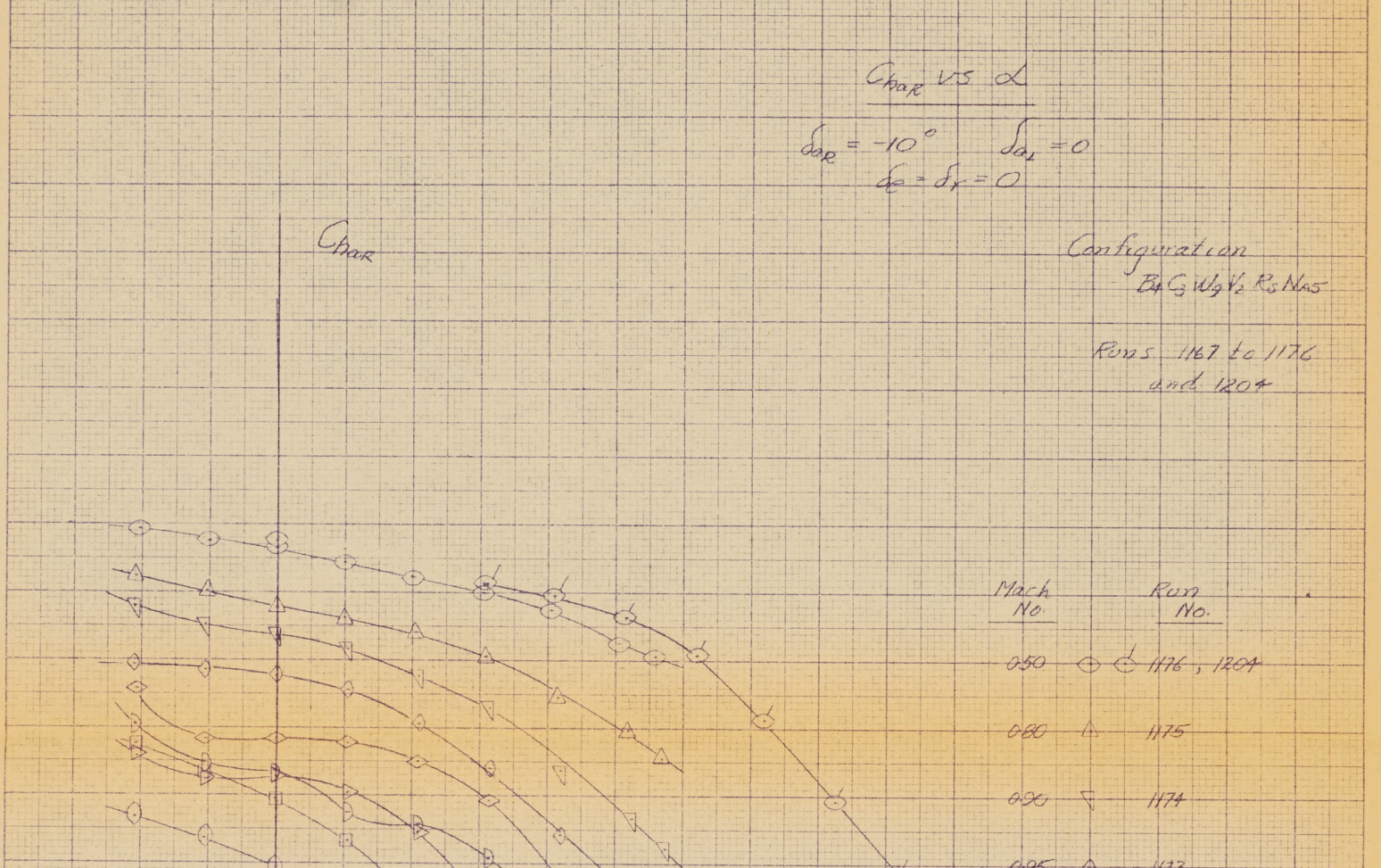
$\delta_{aR} = -10°$ $\delta_{aL} = 0$

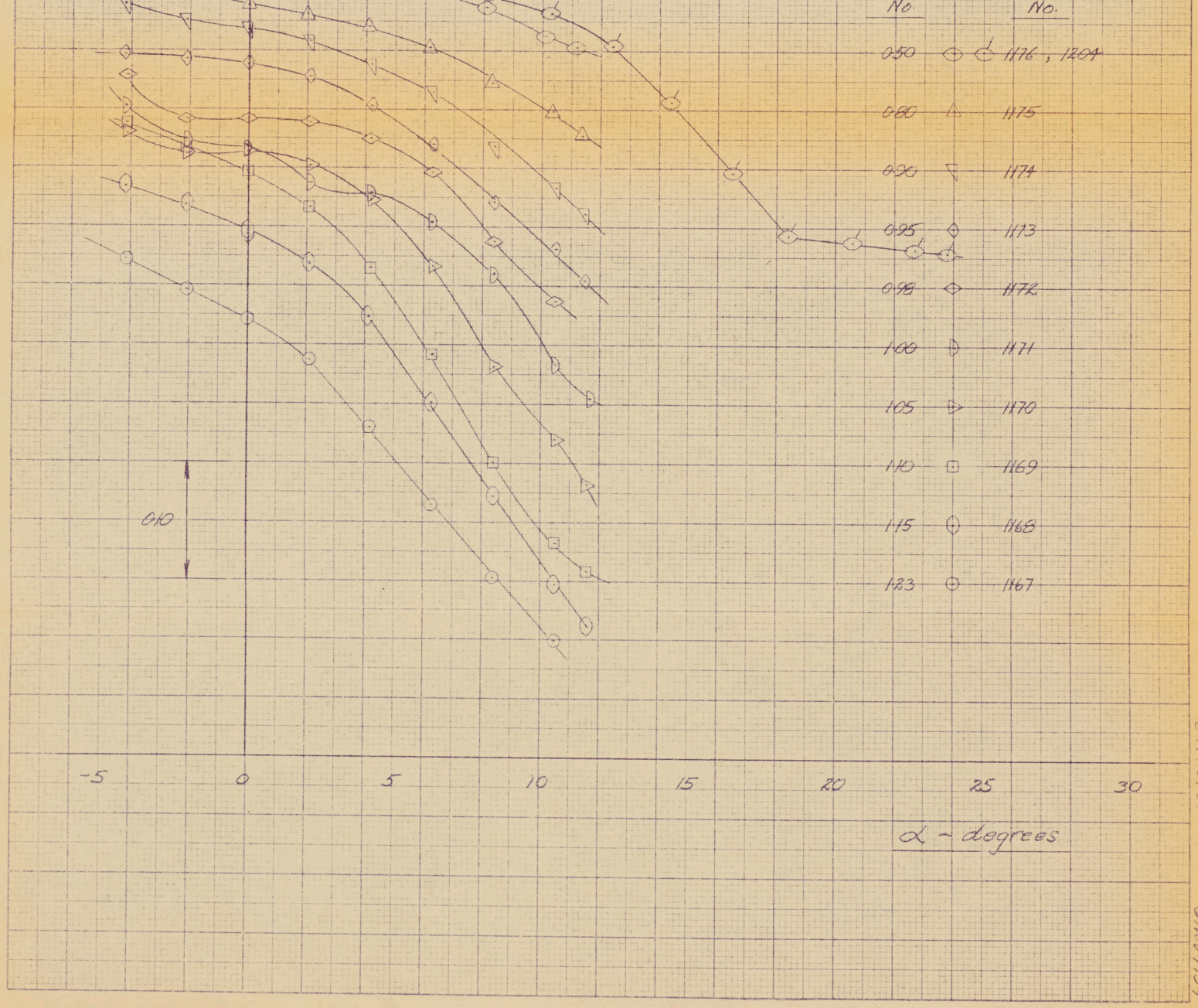
$\delta_e = \delta_r = 0$

Configuration

B4 C3 W9 V2 R5 NA5

Runs 1167 to 1176 and 1204





PWT/49
CA/EA
14.14
8 Nov 1934

C-105

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

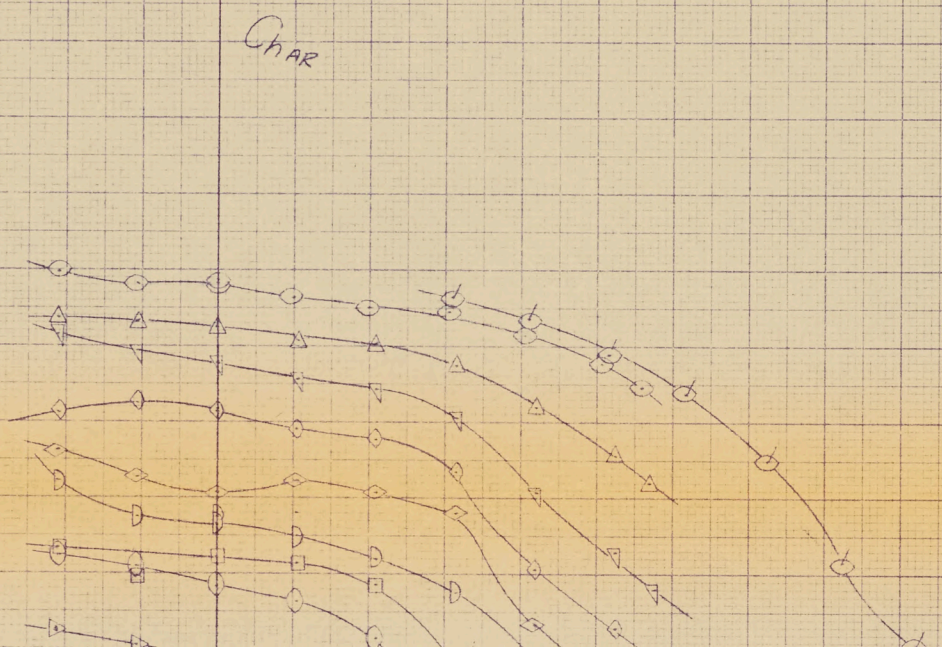
C_{hAR} vs α

$\delta_{aR} = -15°$ $\delta_{aL} = 0$

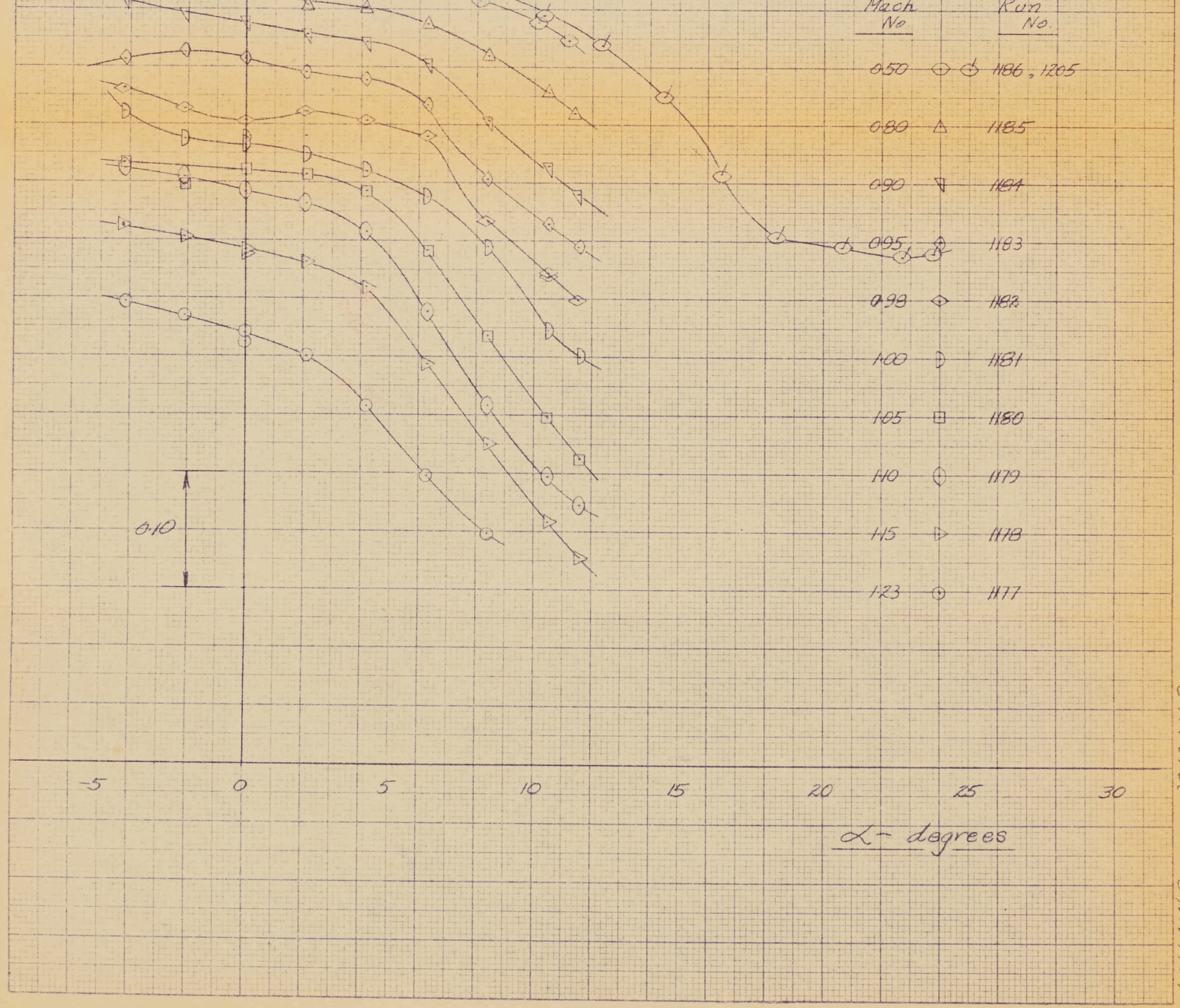
$\delta_e = \delta_r = 0$

Configuration
$B_4 C_3 W_9 V_2 R_3 N_{45}$

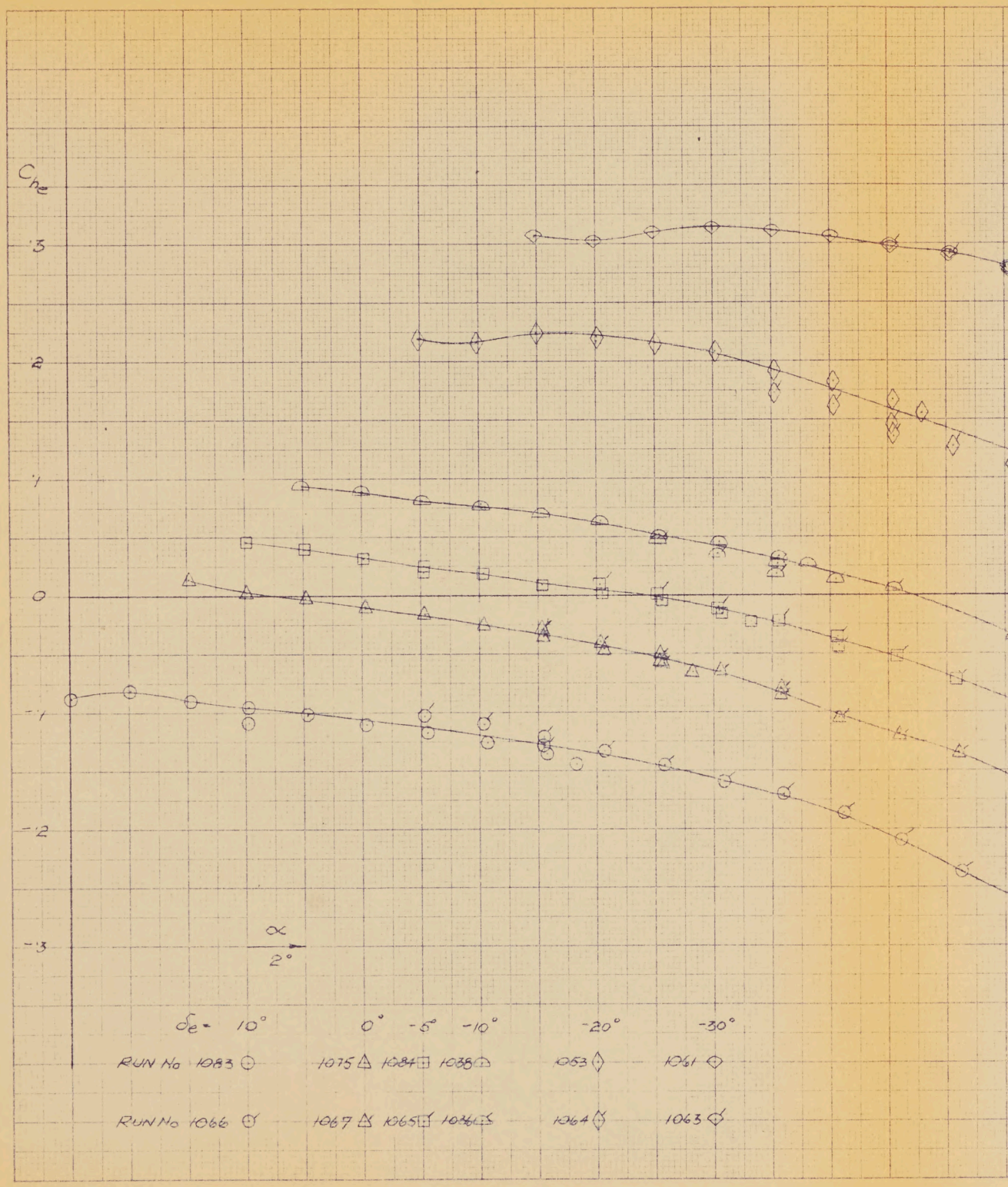
Runs 1177 to 1186
and 1205



Mach No.		Run No.
.050	○ ⏢	1186, 1205
.080	△	1185
.090	▽	1184

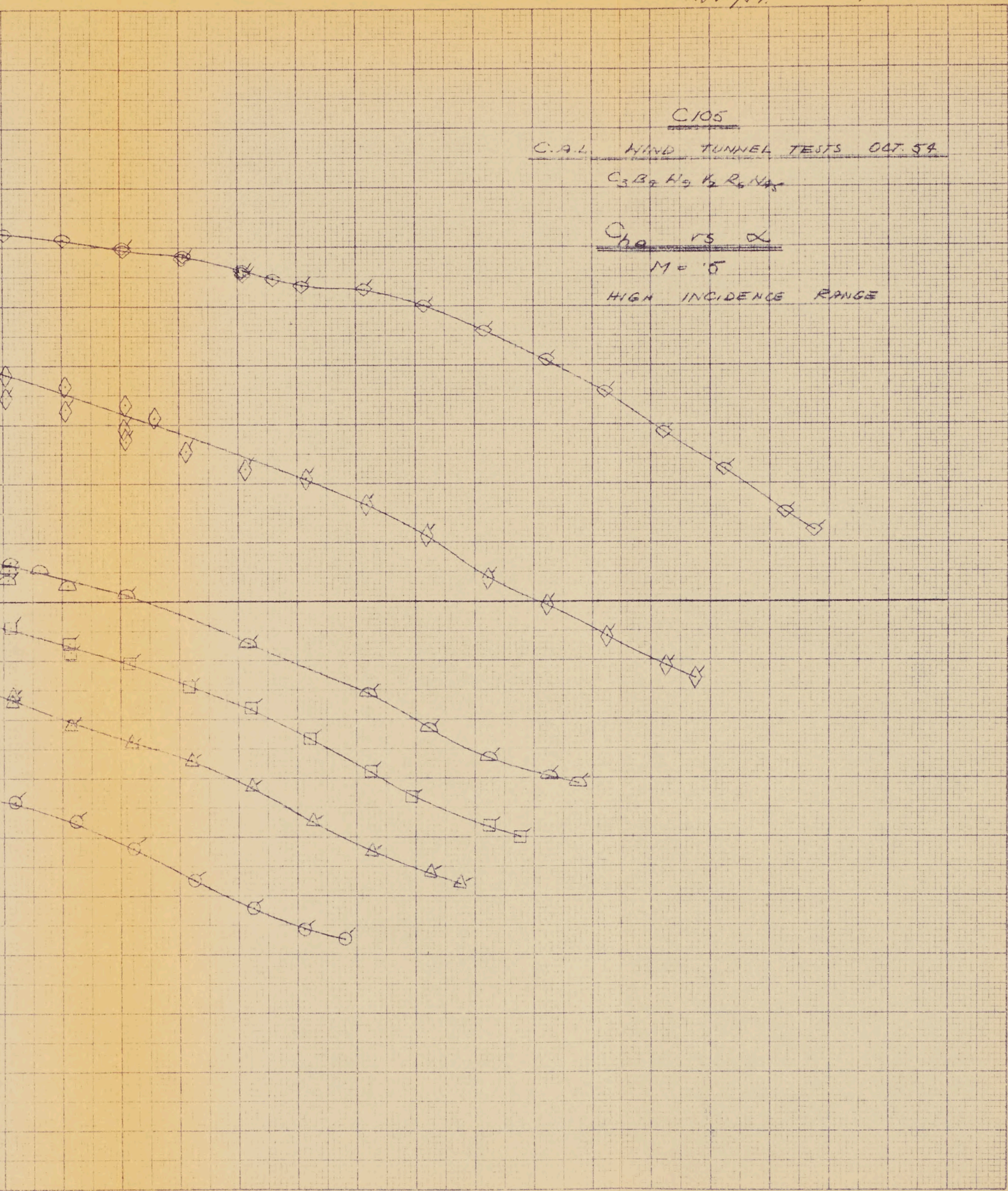


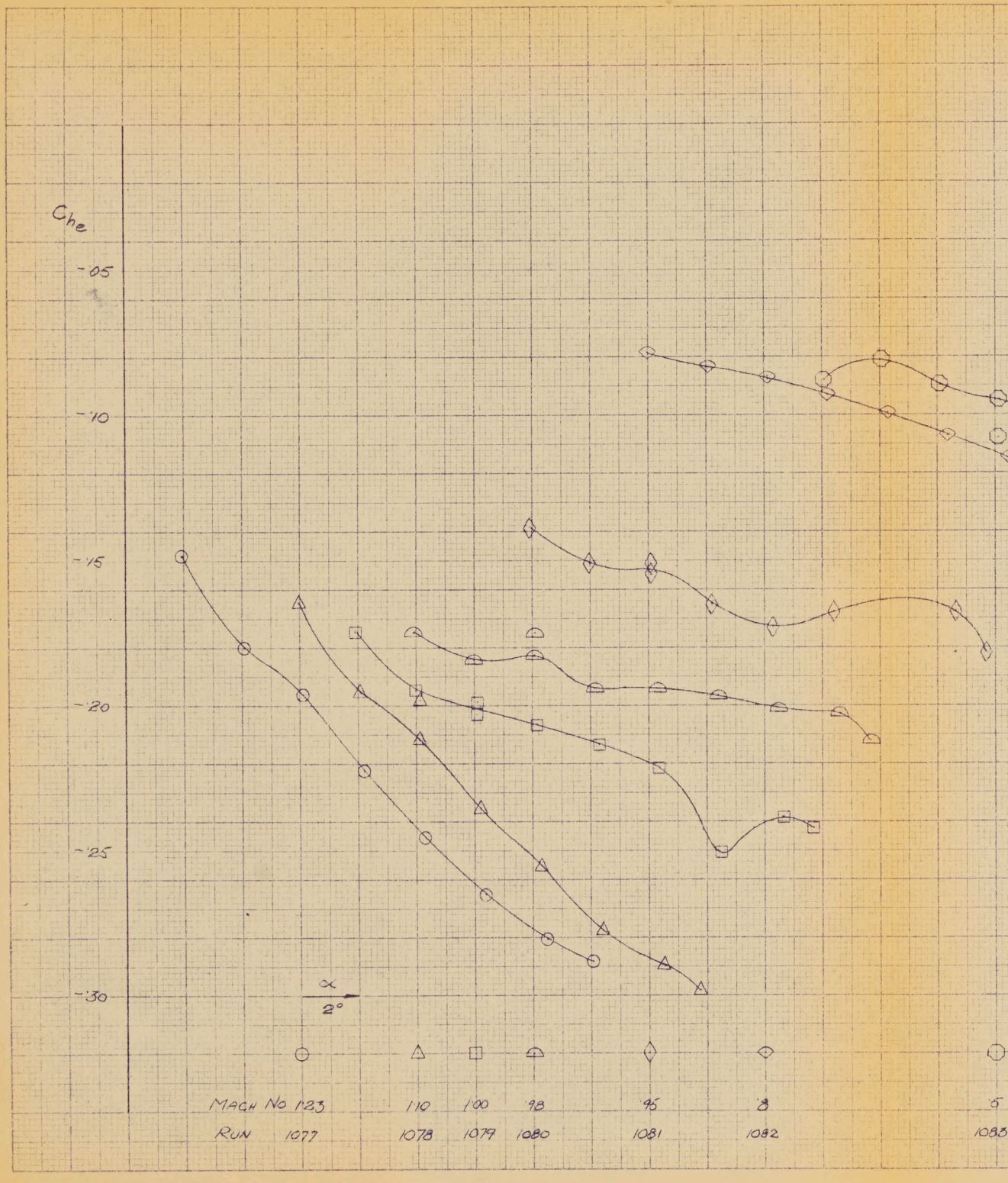
A.P.W.T./49
C.A.Ford
8 Nov 1954
R.13


C_{h_e}
.3
.2
.1
0
-.1
-.2
-.3
$\frac{\alpha}{2°}$
δ_e = 10° 0° -5° -10° -20° -30°
RUN No 1083 1075 1084 1038 1053 1061
RUN No 1066 1067 1065 1046 1064 1063

15.0. P/WT/149.

Nov /57.





15.1.
1104/54.

P/WT/49
Kwakhsouth

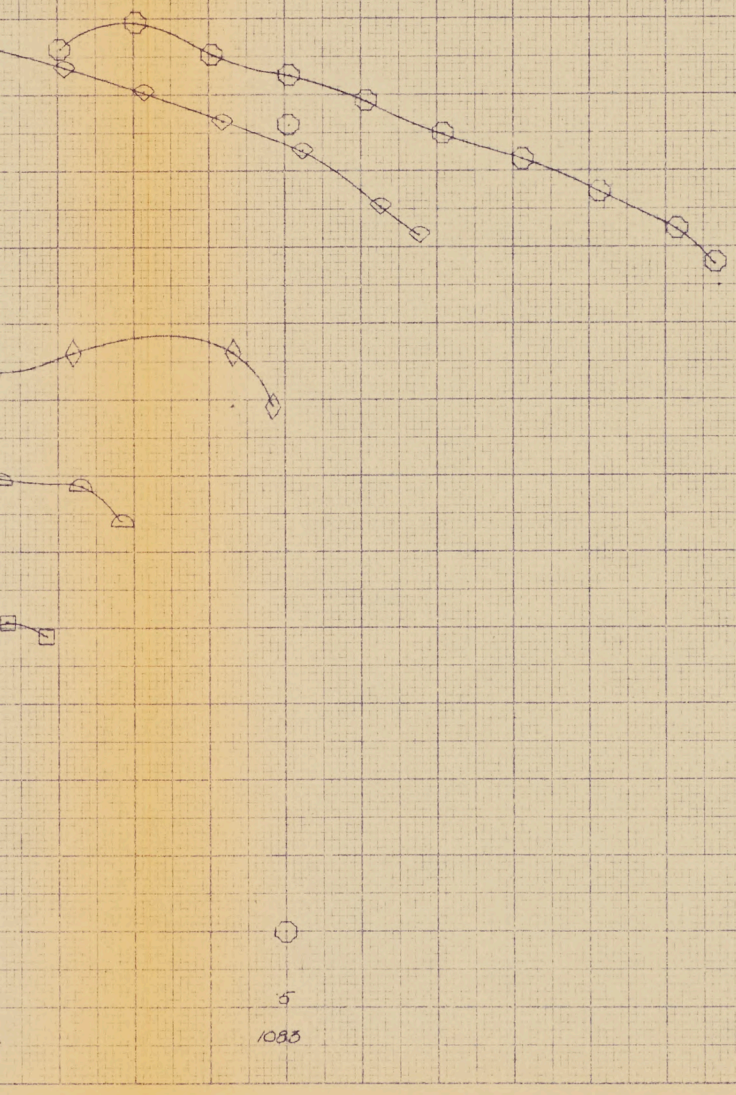
C105

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

C_3 B_4 H_9 V_2 R_3 N_{A_3}

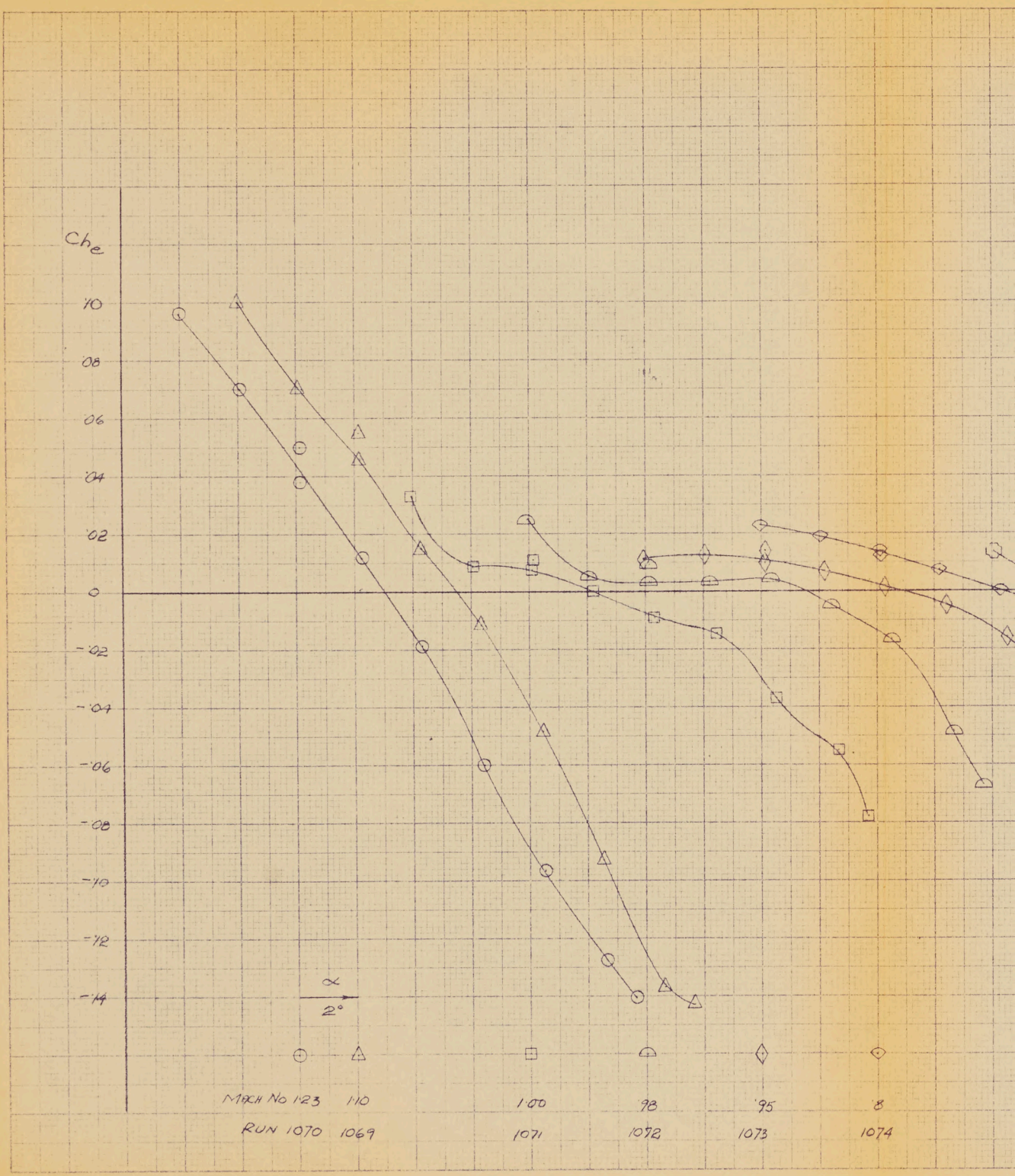
C_{h_2} vs α

$\delta_e = +10°$



5

1083


C_{h_e}
.10
.08
.06
.04
.02
0
-.02
-.04
-.06
-.08
-.10
-.12
-.14
α
2°
MACH NO 1.23 1.10 1.00 .98 .95 .8
RUN 1070 1069 1071 1072 1073 1074

15.2.
Nov/54

P/WT/49
Kuethe

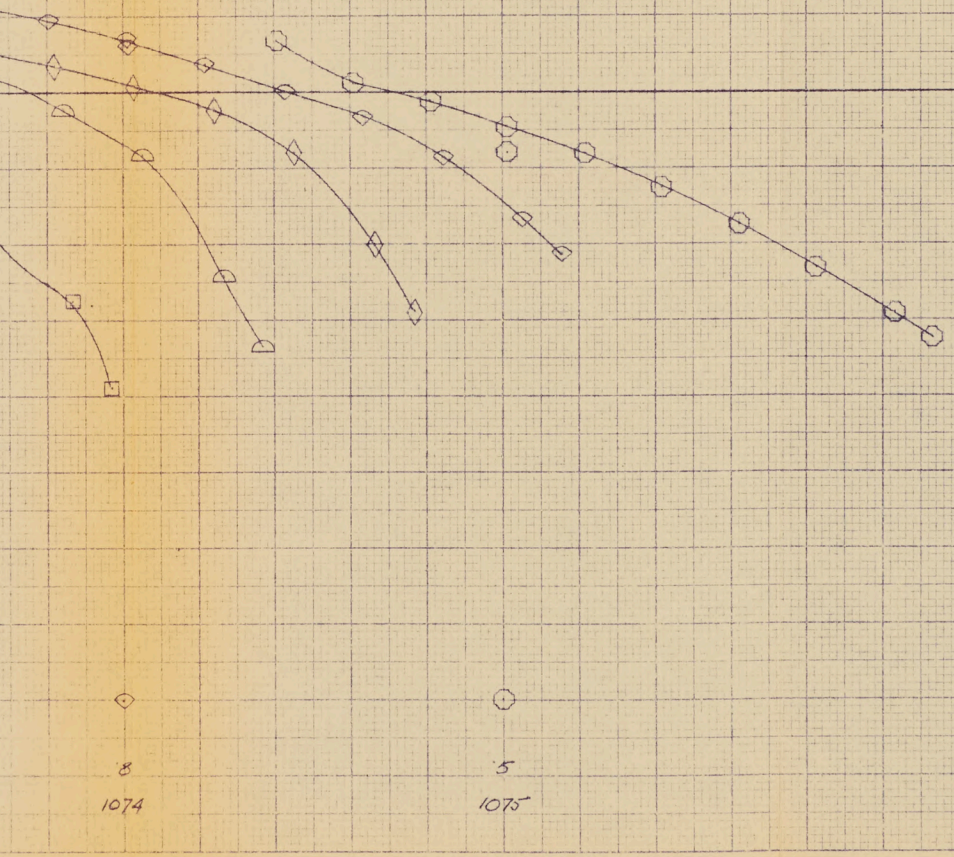
C105

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

$C_3 B_4 N_9 V_2 R_3 N_{47}$

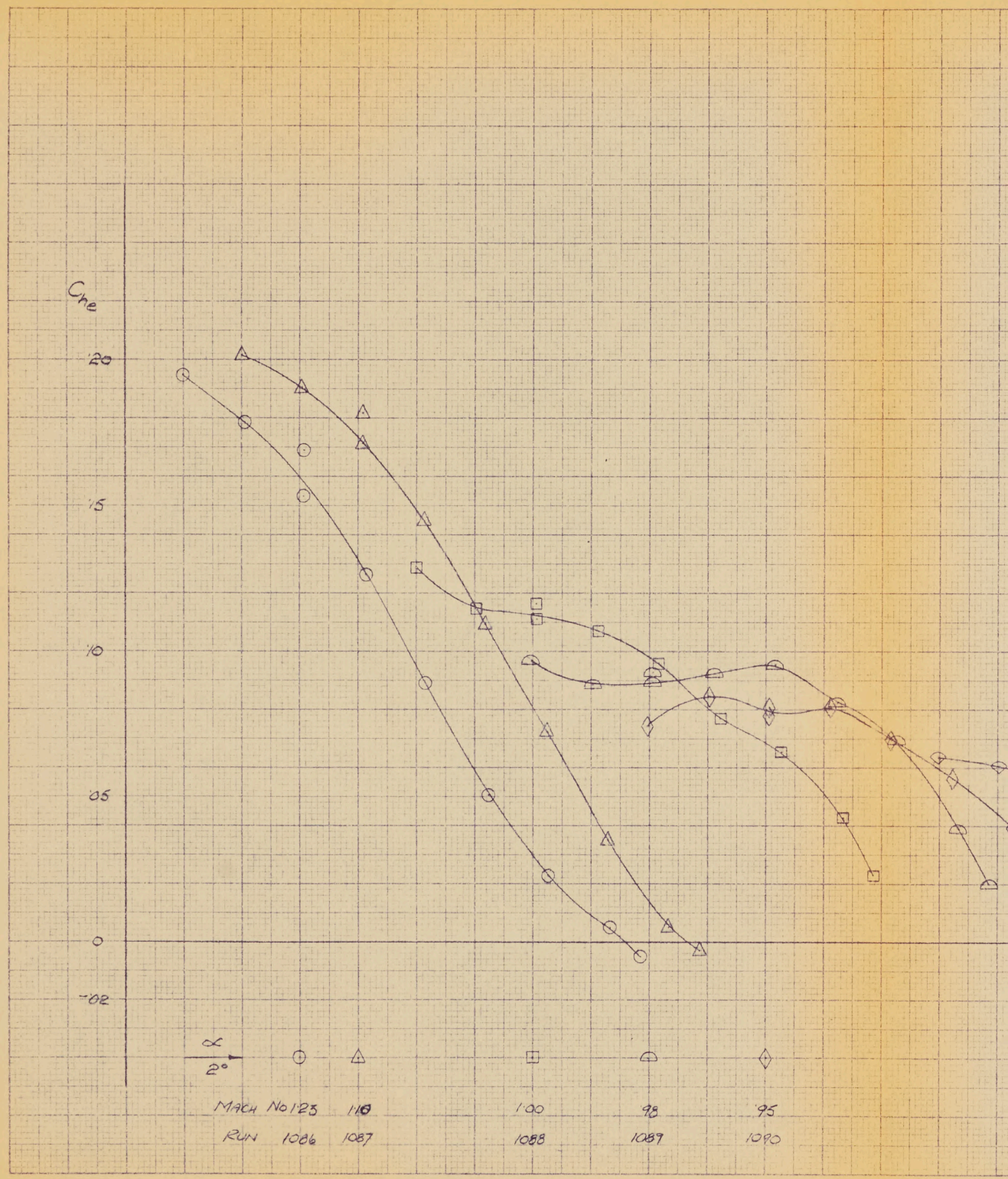
C_{he} vs α

$\delta_e = 0°$



8
1074

5
1075



15.3. P/WT/49
Nov/52 Kwiatkowski

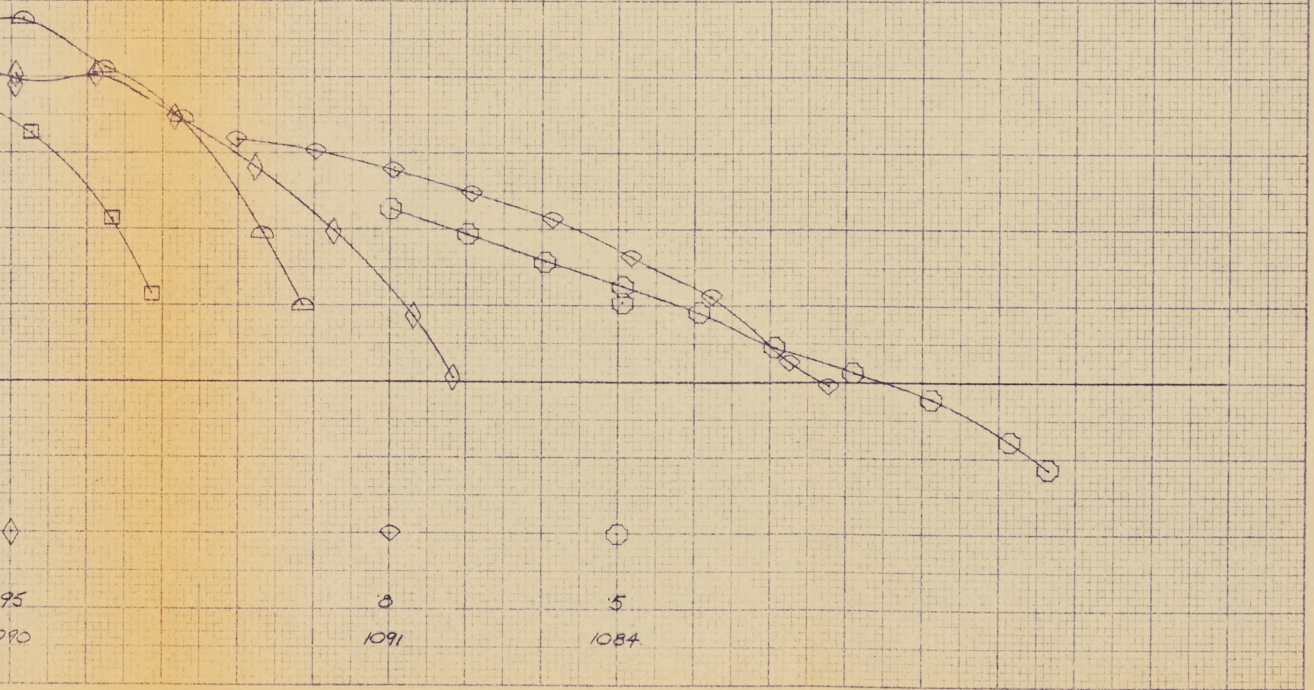
C 105

C.A.L. WIND TUNNEL TESTS OCT. 52.

C_3 B_4 W_9 V_2 R_5 M_{A5}

C_{he} vs α_L

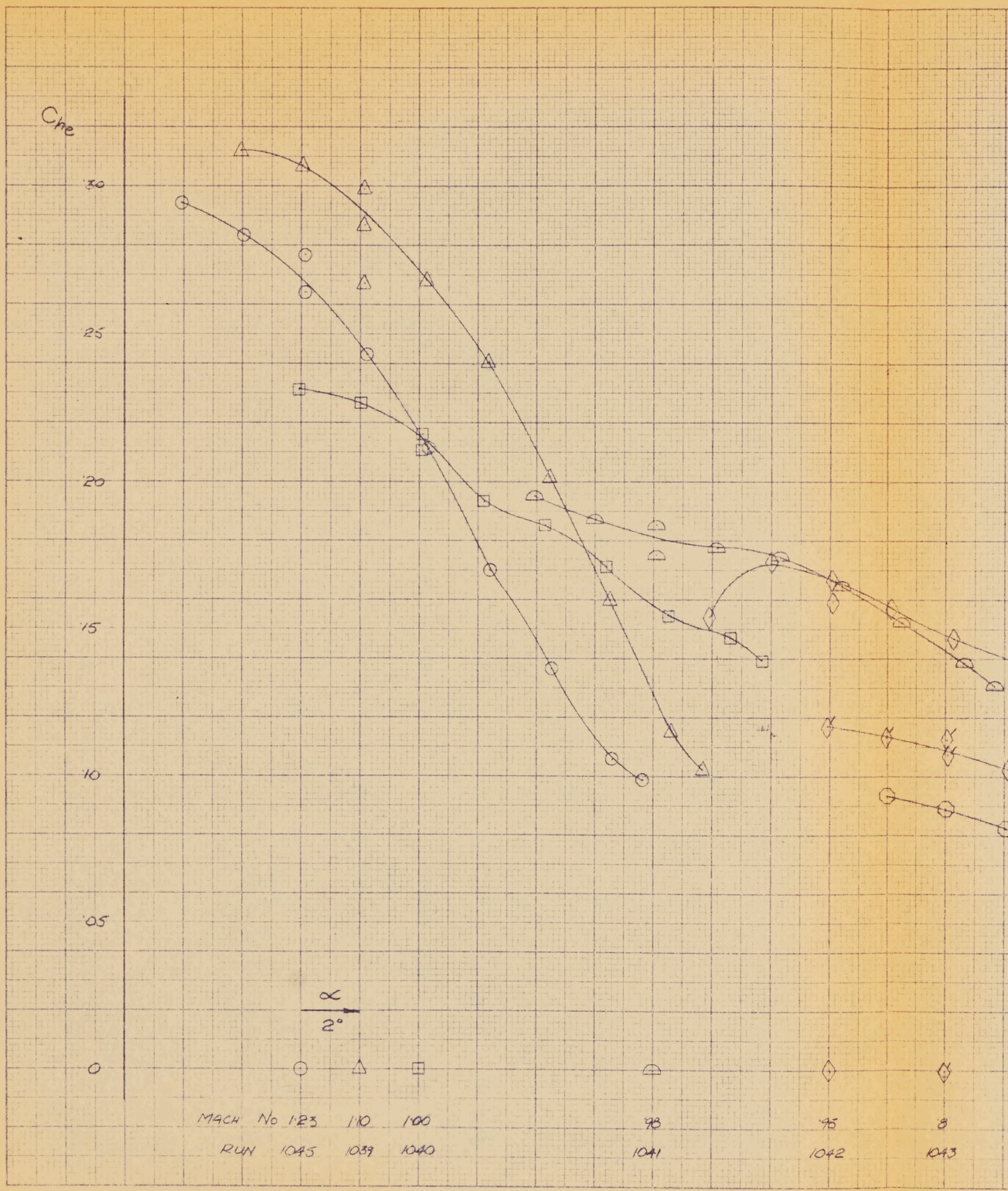
$\delta_E = -5°$



95
990

8
1091

5
1084


C_{he}
.30
.25
.20
.15
.10
.05
0
$\frac{\alpha}{2°}$
MACH No 1.23 1.10 1.00 .98 .95 .8
RUN 1045 1039 1040 1041 1042 1043

15.4. P/WT/49

N57 9/54 Kuichiwanshi

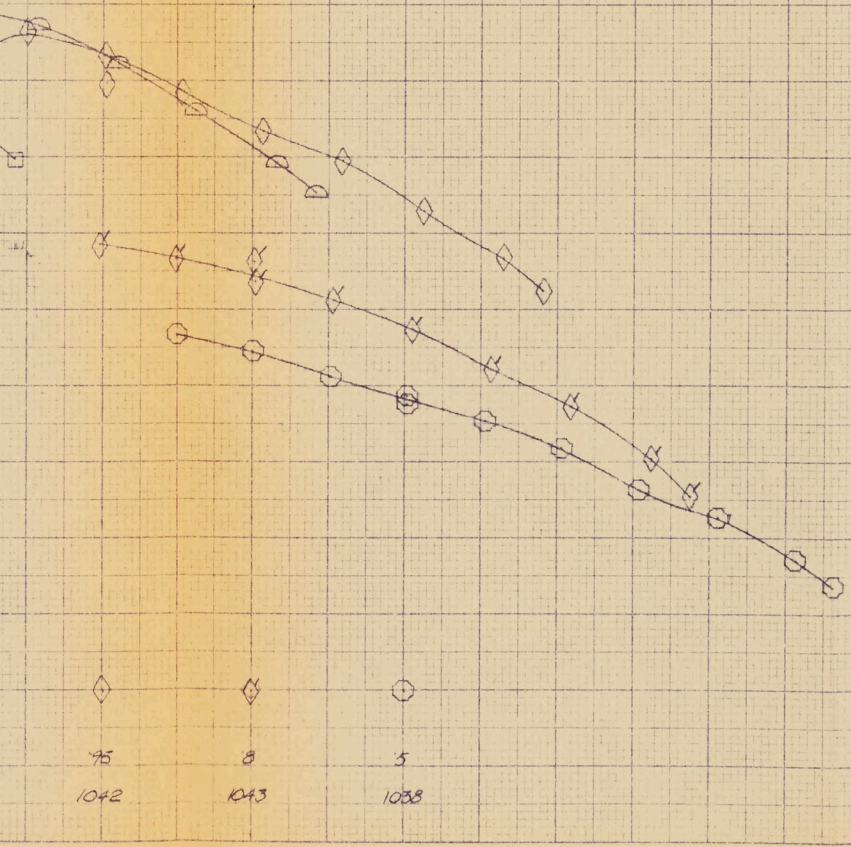
C105

C.A.L. WIND TUNNEL TESTS OCT. 57

C_3 B_4 H_9 V_2 R_5 N_{87}

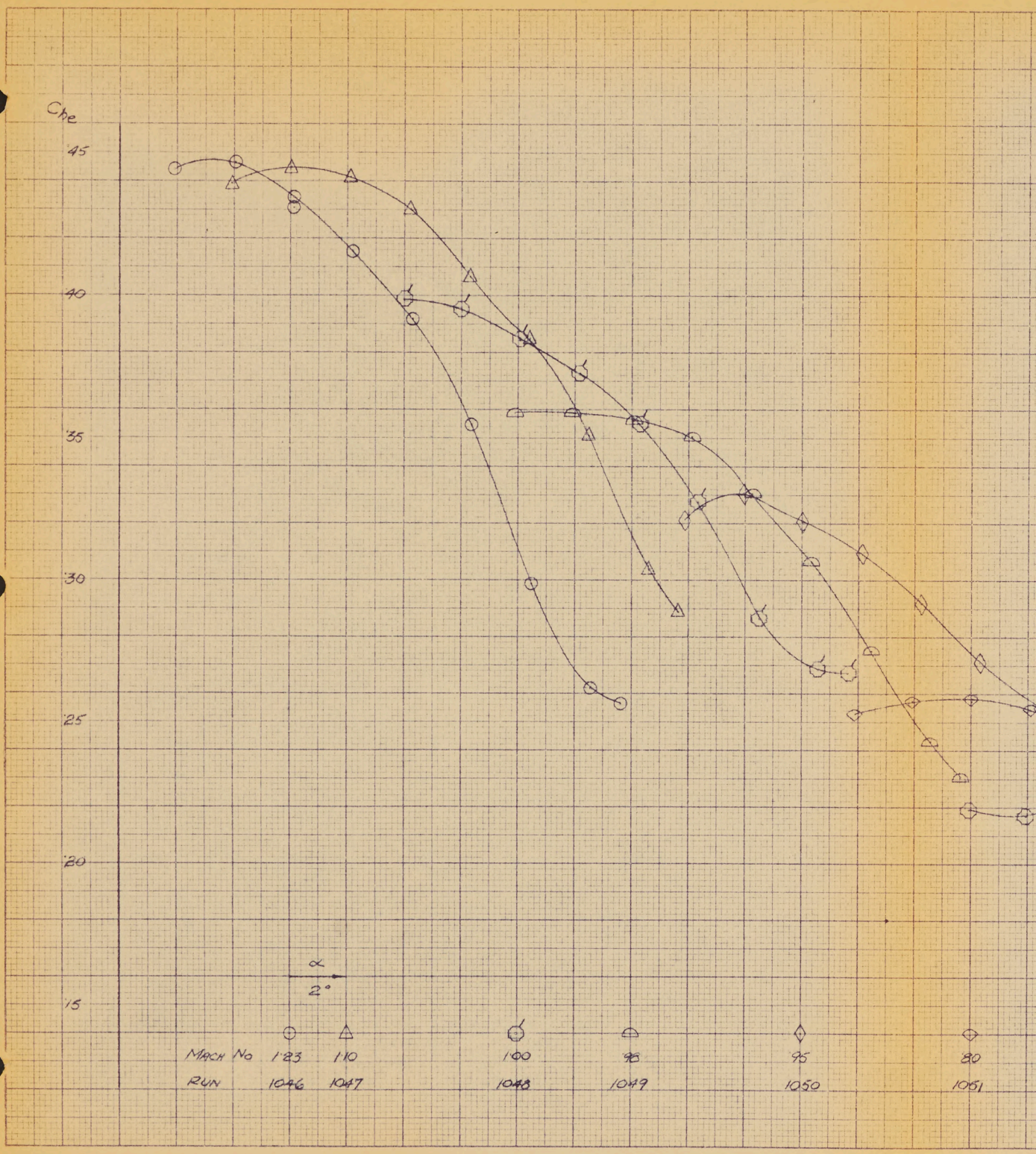
C_{he} vs α_e

$\delta_e = -10°$



75 8 5

1042 1043 1038


Che
.45
.40
.35
.30
.25
.20
.15
α
2°
MACH No 1·23 1·10 1·00 ·95 ·95 ·80
RUN 1046 1047 1048 1049 1050 1051

15.5. P/WT 149

Nov 9/14 Kuethe

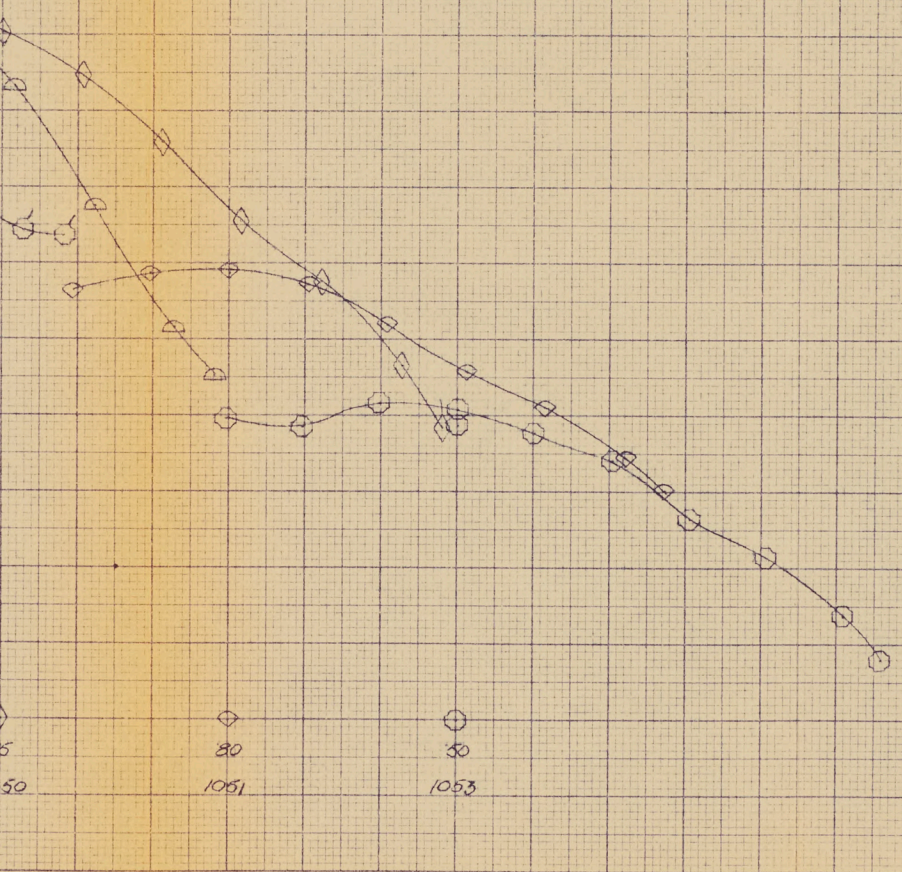
C105

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

$C_3 B_4 H_9 V_2 R_5 H_{45}$

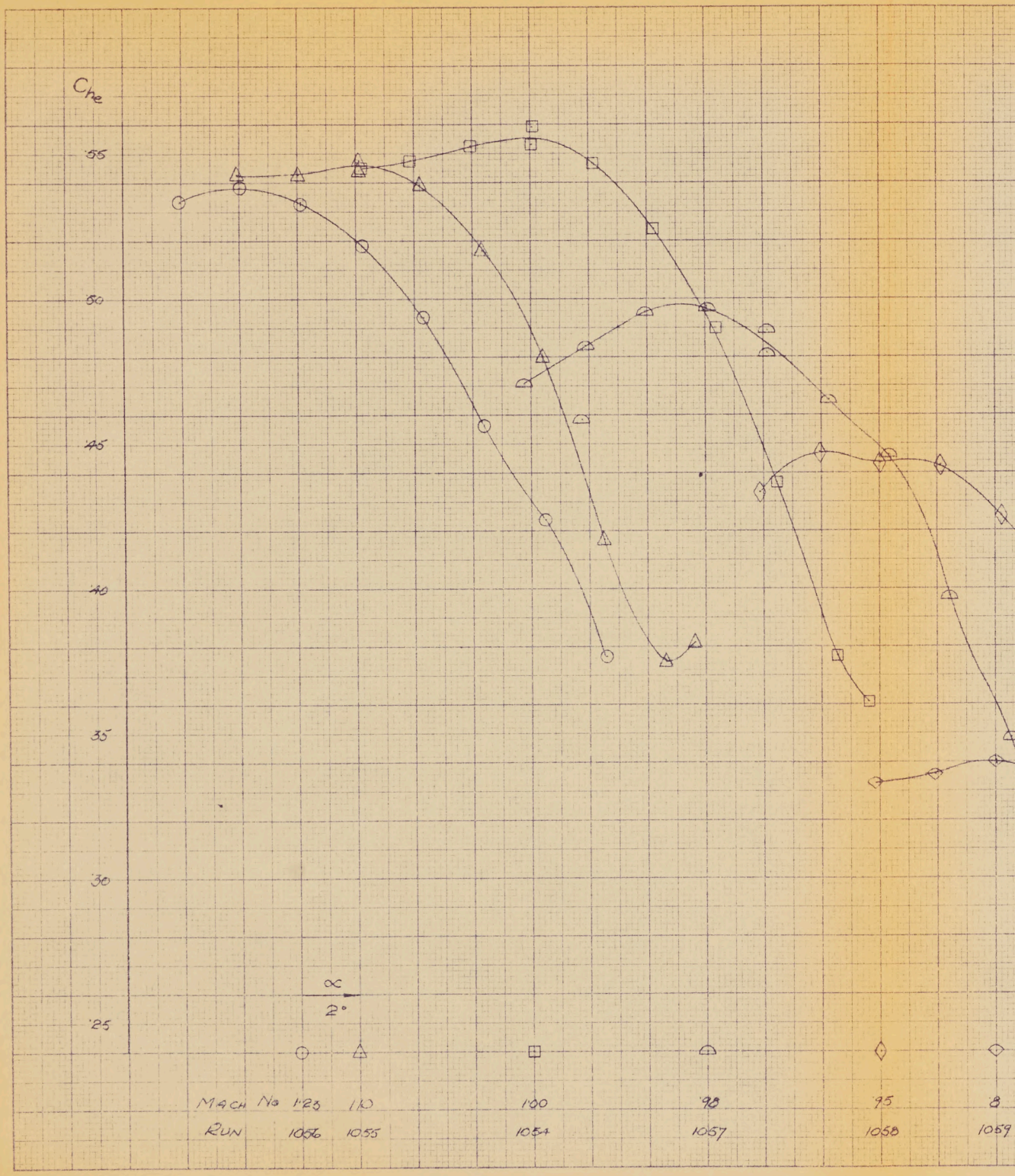
C_{he} vs α_e

$\delta_e = -20°$



80
1051

50
1053


C_{he}
.55
.50
.45
.40
.35
.30
.25
$\frac{\alpha}{2°}$
MACH No 1.23 1.10 1.00 .98 .95 .8
RUN 1056 1055 1054 1057 1058 1059

15.6. P/HT/49

Nov 9/54. Kwiatkowski

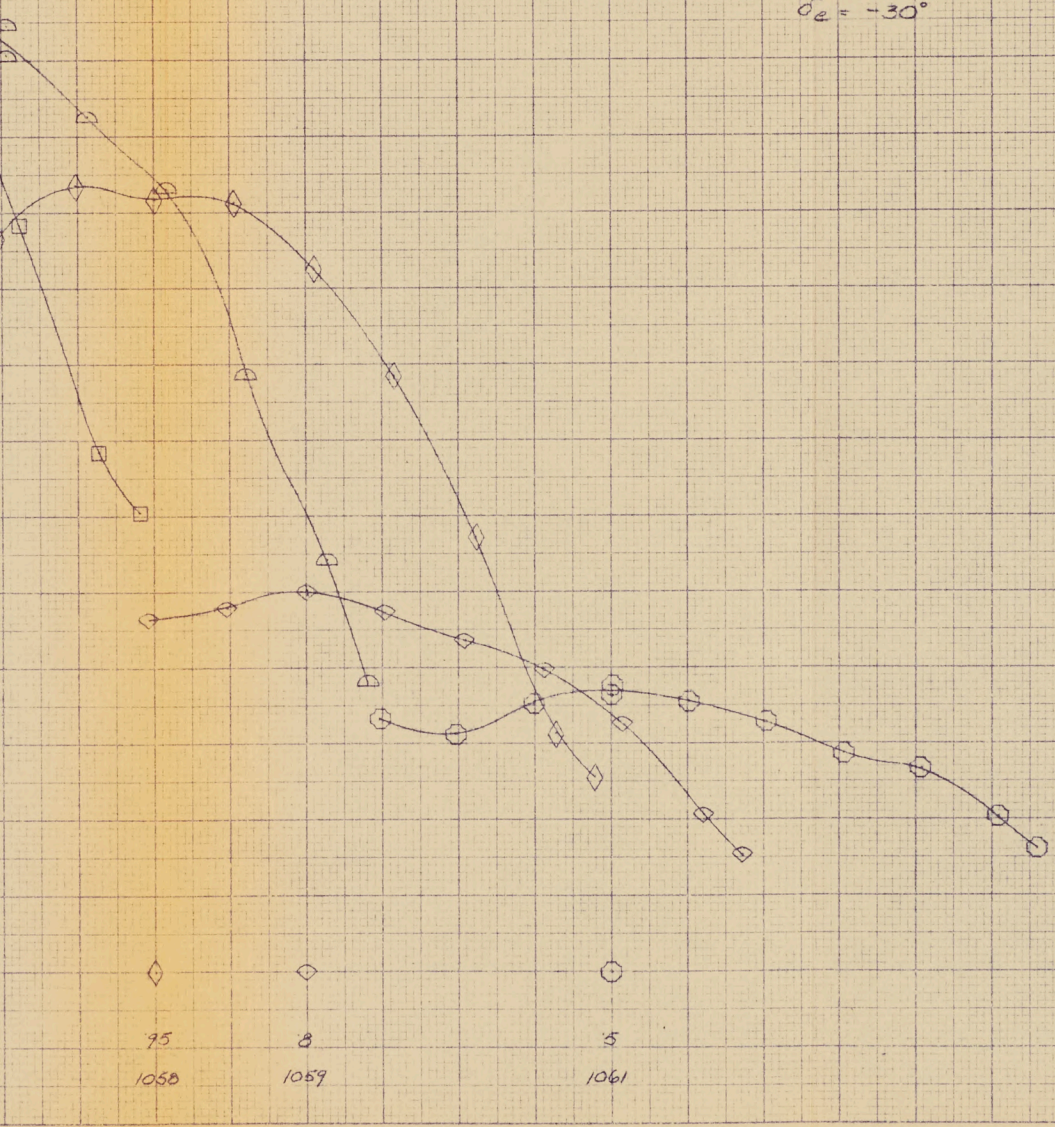
C105

C.A.L. WIND TUNNEL TESTS OCT 57

C_3 B_4 H_1 V_2 R_1 $M_{.85}$

$C_{m_{ac}}$ vs ~~δ_e~~ α

$\delta_e = -30°$



95 8 5

1058 1059 1061

C-105

C.A.L. Wind Tunnel Tests

Oct. 1954

$\alpha = 0°$

$-12° < \beta < 12°$

$\delta_e = \delta_a = \delta_r = 0$

$C_{M_{f_R}}$ vs C_{N_f}

Configuration

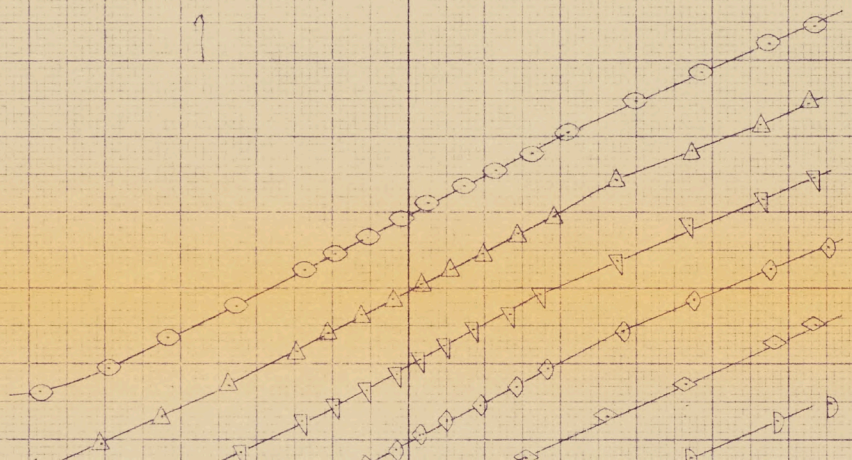
$B_4 C_3 W_9 V_2 R_5 N_{A5}$

Runs 1094 to 1104

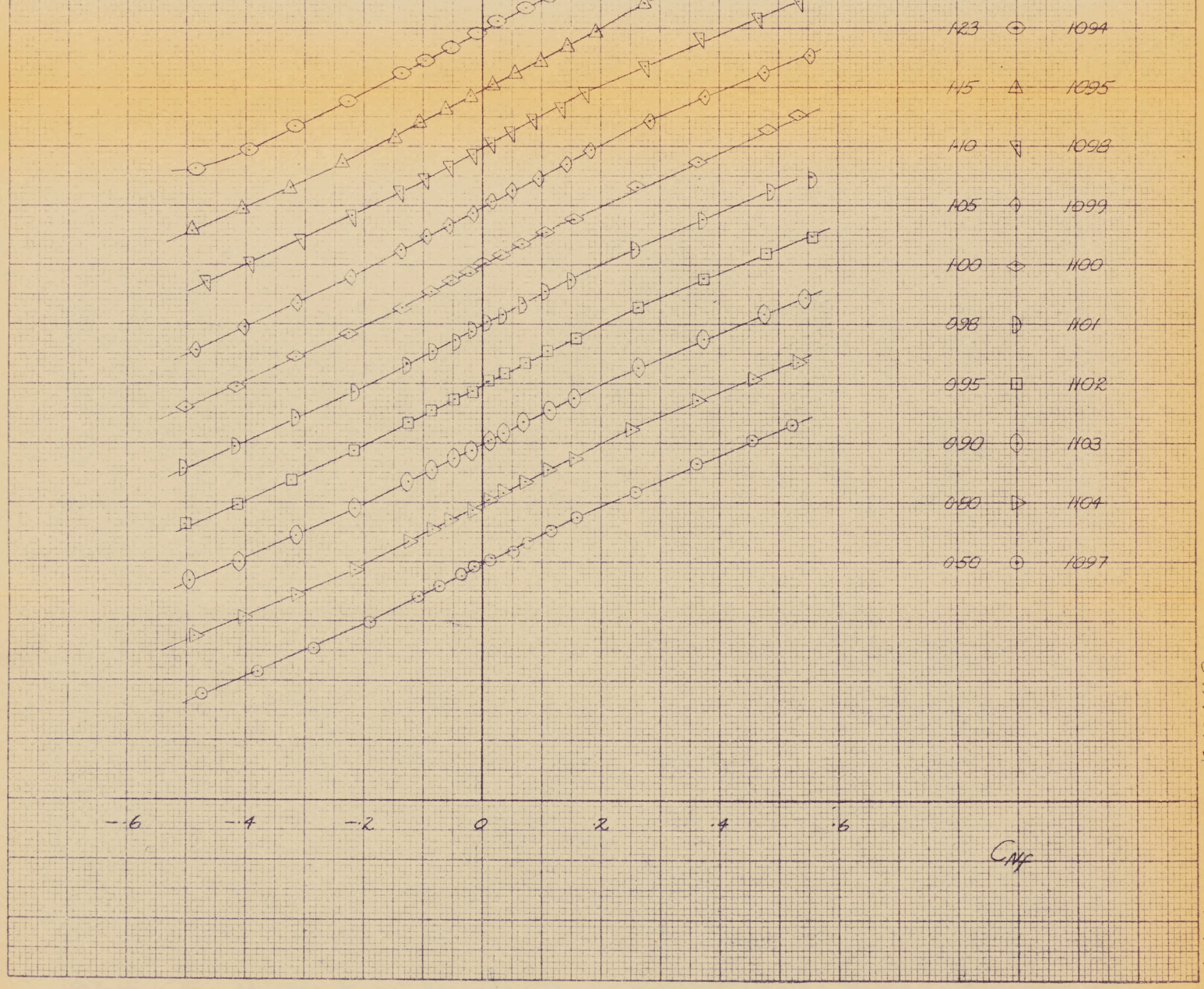
(1096 Void)

$C_{M_{f_R}}$

0.10



Mach No.		Run No.
A23	○	1094
1.15	△	1095
A10	▽	1098
1.05	◇	1099



PWIT/49
CNAford
9 Nov 1954
178

C-105

C.A.L. Wind Tunnel Tests

Oct 1954

$\alpha = 2.1°$
$-12° < \beta < 12°$
$\delta_e = \delta_a = \delta_r = 0$

$C_{M_{fR}}$ vs C_{N_f}

Configuration
$B_4 C_3 W_9 V_2 R_3 N_{A5}$

Runs 1107 to 1116

$C_{M_{fR}}$

0.10

Mach No.		Run No.
1.23	○	1108
1.15	△	1107
1.10	▽	1109

P/WT/42 17·9
C.A Ford 10 Nov 1954

Model No.	Run No.
123	1108
115	1107
110	1109
105	1110
100	1111
098	1112
095	1113
090	1114
080	1115
059	1116

8 6 4 2 0 -2 -4 -6

CNS

C-105

C.A.L. Wind Tunnel Tests

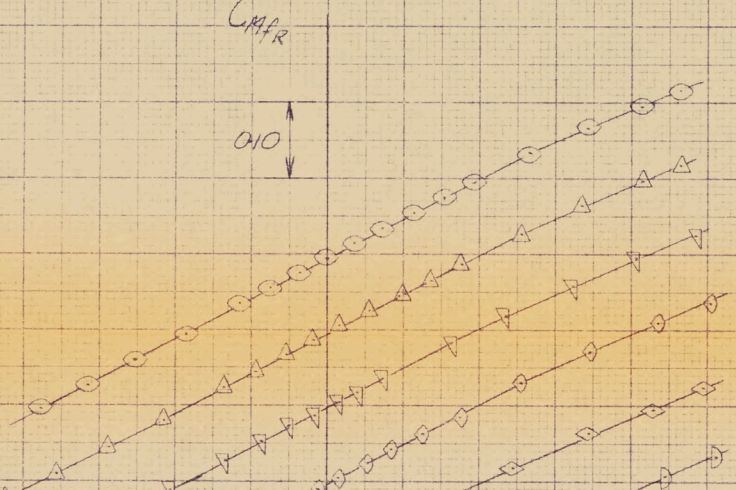
Oct 1954

$\alpha = 4.2°$
$-12° < \beta < 12°$
$\delta_e = \delta_a = \delta_r = 0$

$C_{M_{fR}}$ vs C_{N_f}

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

Runs 1118 to 1128
(427 rod)



Mach No.		Run No.
A23	○	1119
A15	△	1118
1.10	▽	1120
1.05	◇	1121

P/WT/49
CAFord

1710
10/Nov/1954

Run No.		Plate No.
123	○	1119
115	△	1118
119	▽	1120
105	◇	1121
120	◇	1122
096	⊕	1123
095	□	1124
090	◇	1125
080	△	1126
050	⊕	1128

Cmy

8 6 4 2 0 -2 -4 -6

C-105

CAL Wind Tunnel Tests

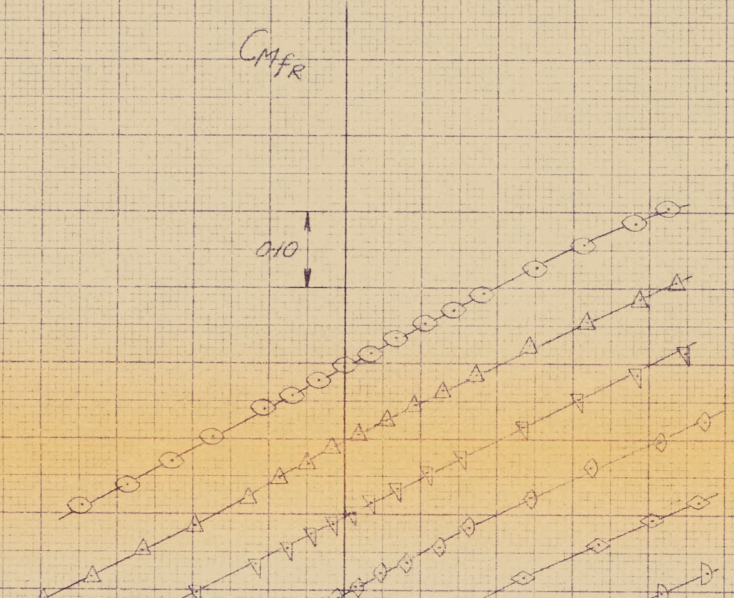
Oct 1954

$C_{M_{fR}}$ vs C_{N_f}

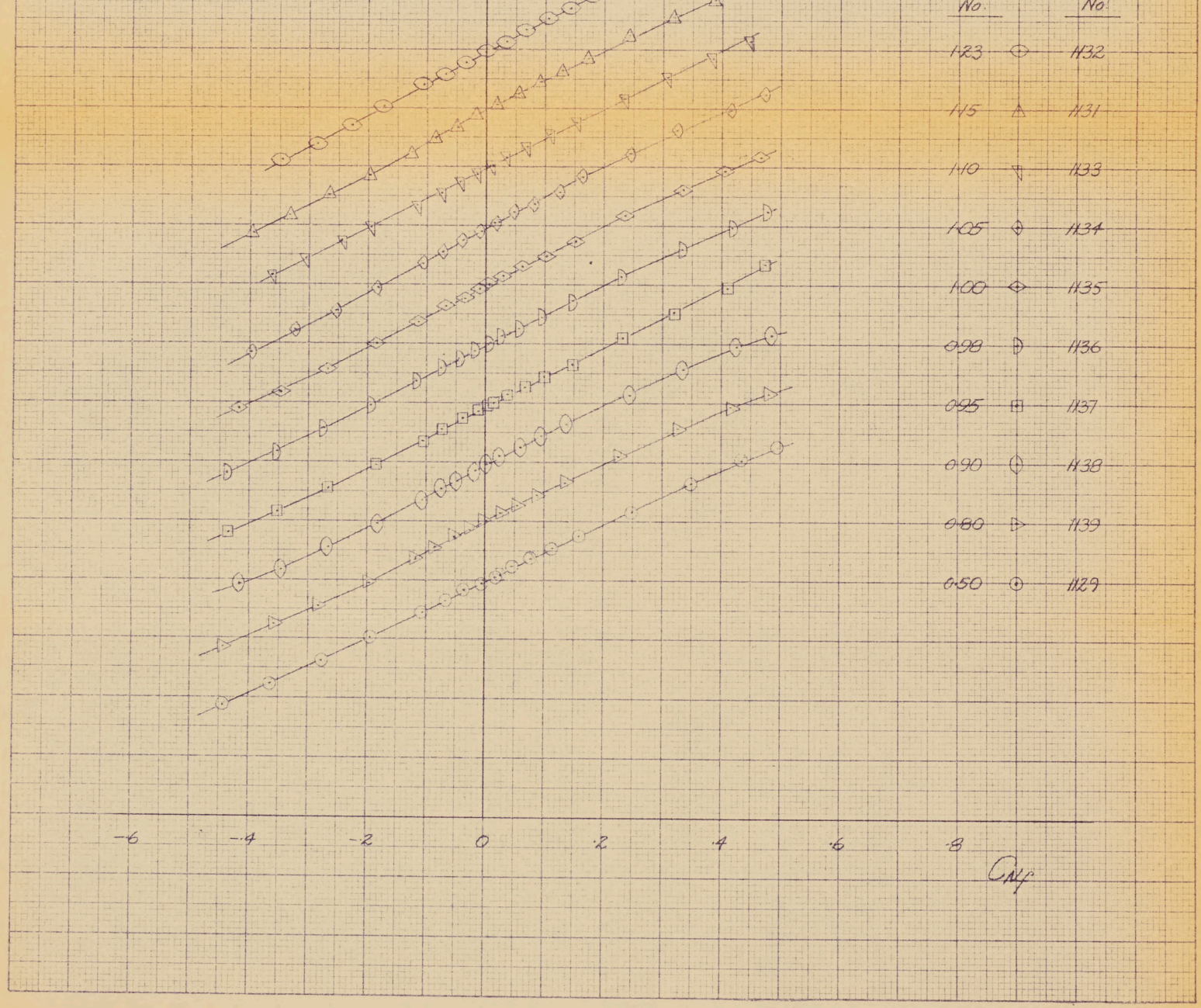
$\alpha = 6.3°$
$-12 \leq \beta \leq 12°$
$\delta_e = \delta_a = \delta_r = 0$

Configuration
$B_4 C_3 W_3 V_2 P_2 N_{A5}$

Runs 1127 to 1132
(1130 Void)



Mach No.		Run No.
1.23	○	1132
1.15	△	1131
1.10	▽	1133
1.05	◇	1134



PLOTTED C.A. Ford 17.11 10 Nov 54

C-105

C.A.L. Wind Tunnel Tests

Oct. 1954

$\alpha = 10.5°$

$-12° \leq \beta \leq 12°$

$\delta_e = \delta_a = \delta_r = 0$

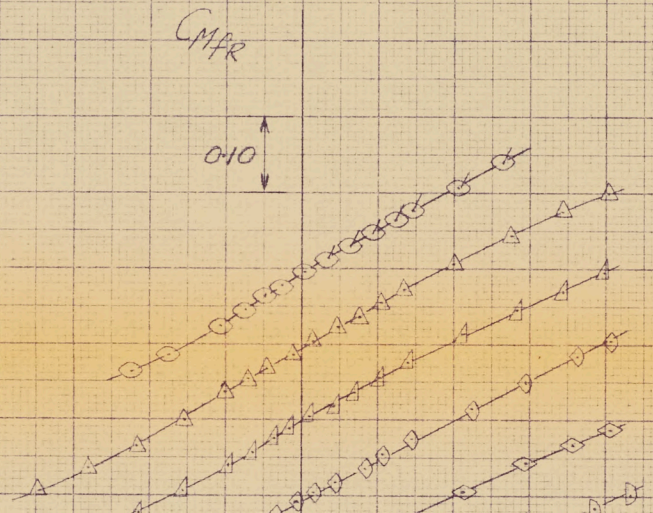
$C_{M_{fR}}$ vs C_{N_f}

Configuration

$B_4 C_3 W_9 V_2 R_5 N_{A5}$

Runs 1140 to 1152

(1141 and 1146 Void)



Mach No		Run No.
1.23	⊙ ⊘	1143, 1150
1.15	△	1142
1.10	⊿	1144
1.05	◇	1145

P/WT/49
C.A. Ford

17·12
10 Nov. 1954

No.	No.
123	1143, 1150
115	1142
110	1144
105	1145
100	1147
095	1149
090	1151
085	1152
080	1140

8 6 4 2 0 −2 −4 −6

CWS

C105

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

C_3 R_4 H_9 $\frac{1}{2}$ R_5 N_4 T

$C_{M_{1/2}}$ vs C_{N_1}

$M = 1.5$

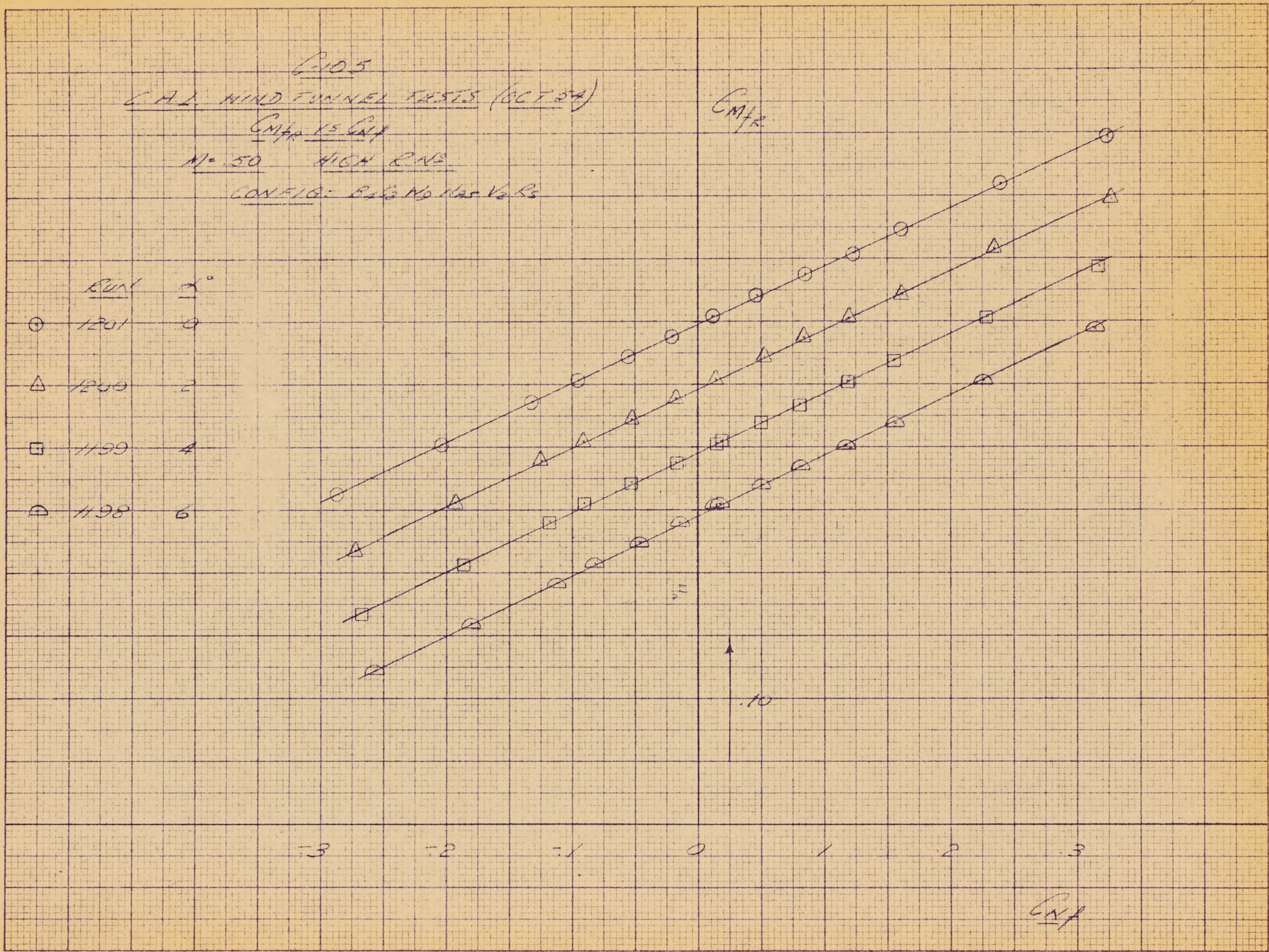
EFFECT OF HIGH REYNOLDS NO AND TANK

RUN	α
○ 1194	0
△ 1195	22°
□ 1196	44°
◠ 1197	66°

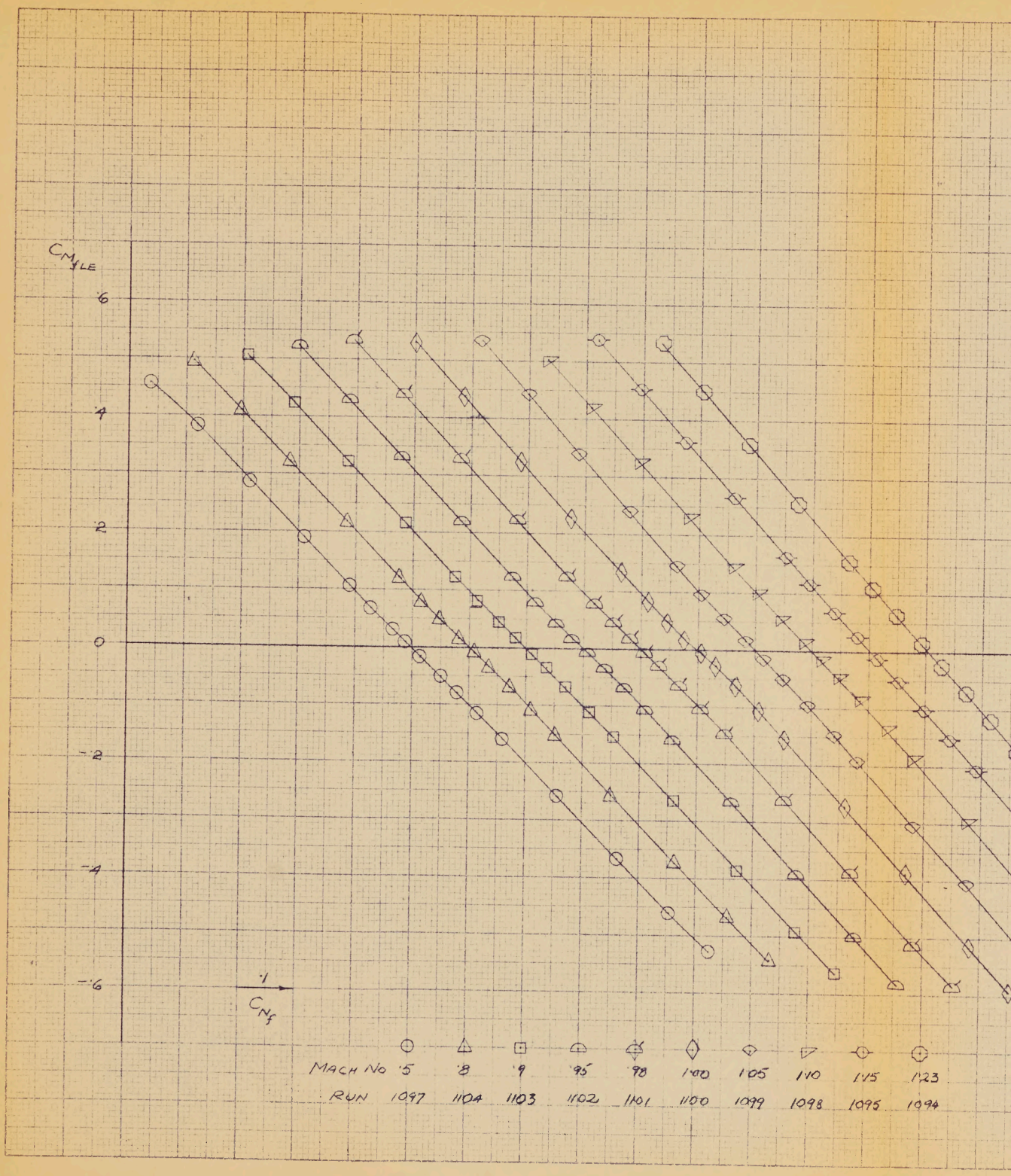
$C_{M_{1/2}} \times 10$

-3 -2 -1 0 1 2 3 C_{N_1}

1720. P/WT/49 Kuethe



17.24.
NOV. 54.
P/N.T /49
CLARK.



18.8.
Oct 54.

P/NT/149
S Kwathoudi

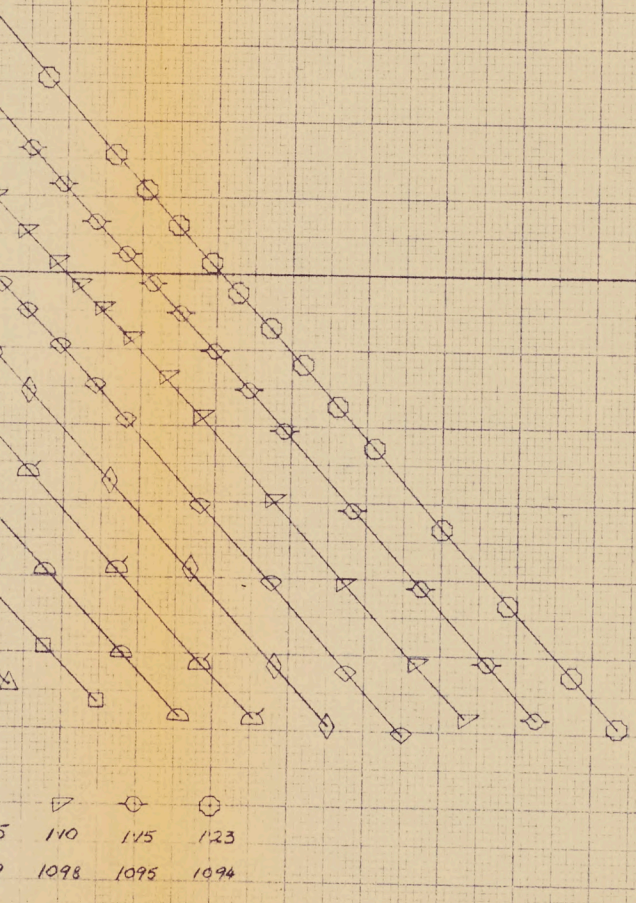
C105

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

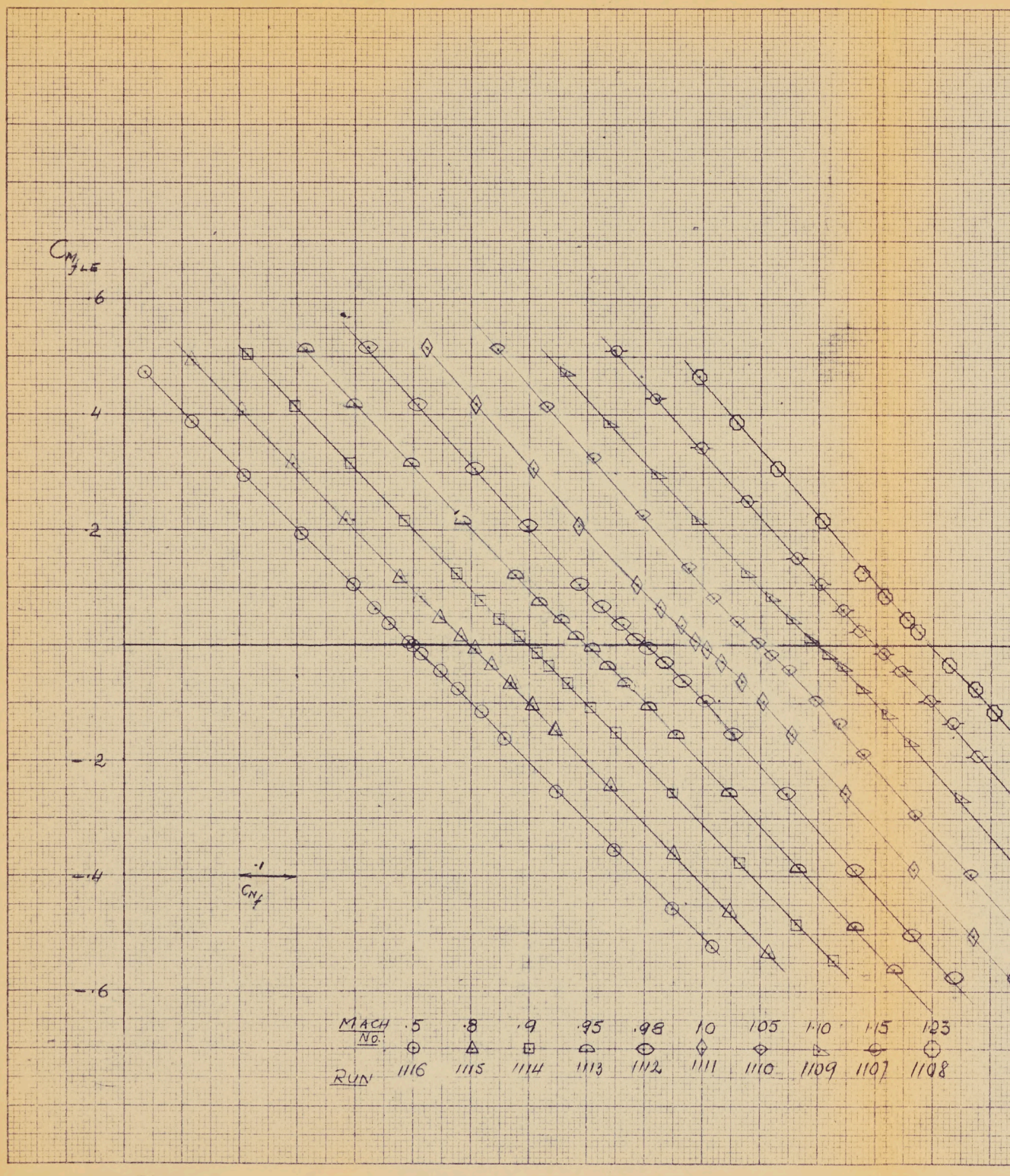
$C_{M_{1/4}}$ vs C_{N_2}

$\alpha = 0$

$B_4 C_3 H_9 K_2 R_5 M_{2.5}$



1.10 1.15 1.23
1098 1095 1094



SHT. 18.9. P/WT/49

J. Papis Nov. 1954

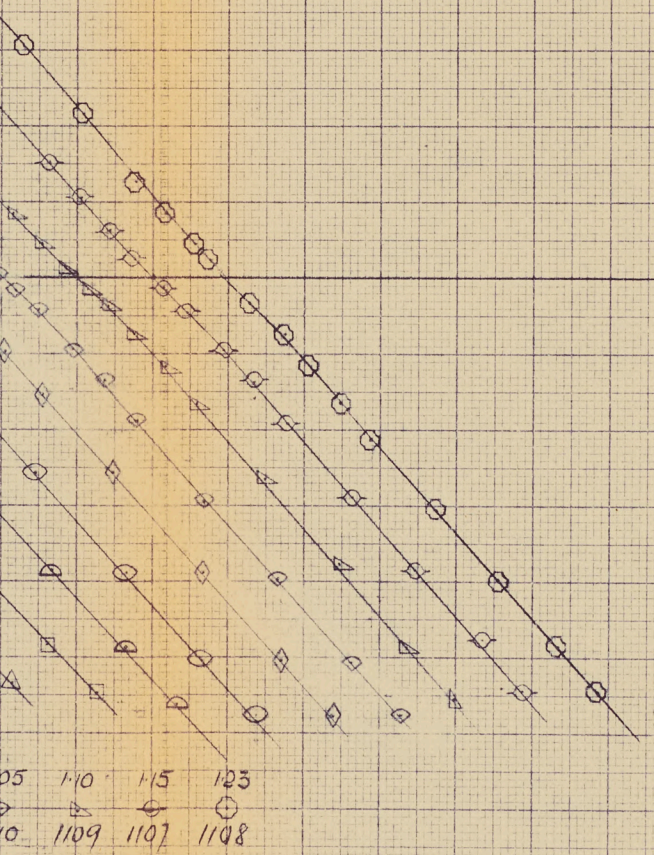
C105

CAL. WIND TUNNEL TESTS - OCTOBER 154

$C_{M_{LE}}$ VS. C_{N_f}

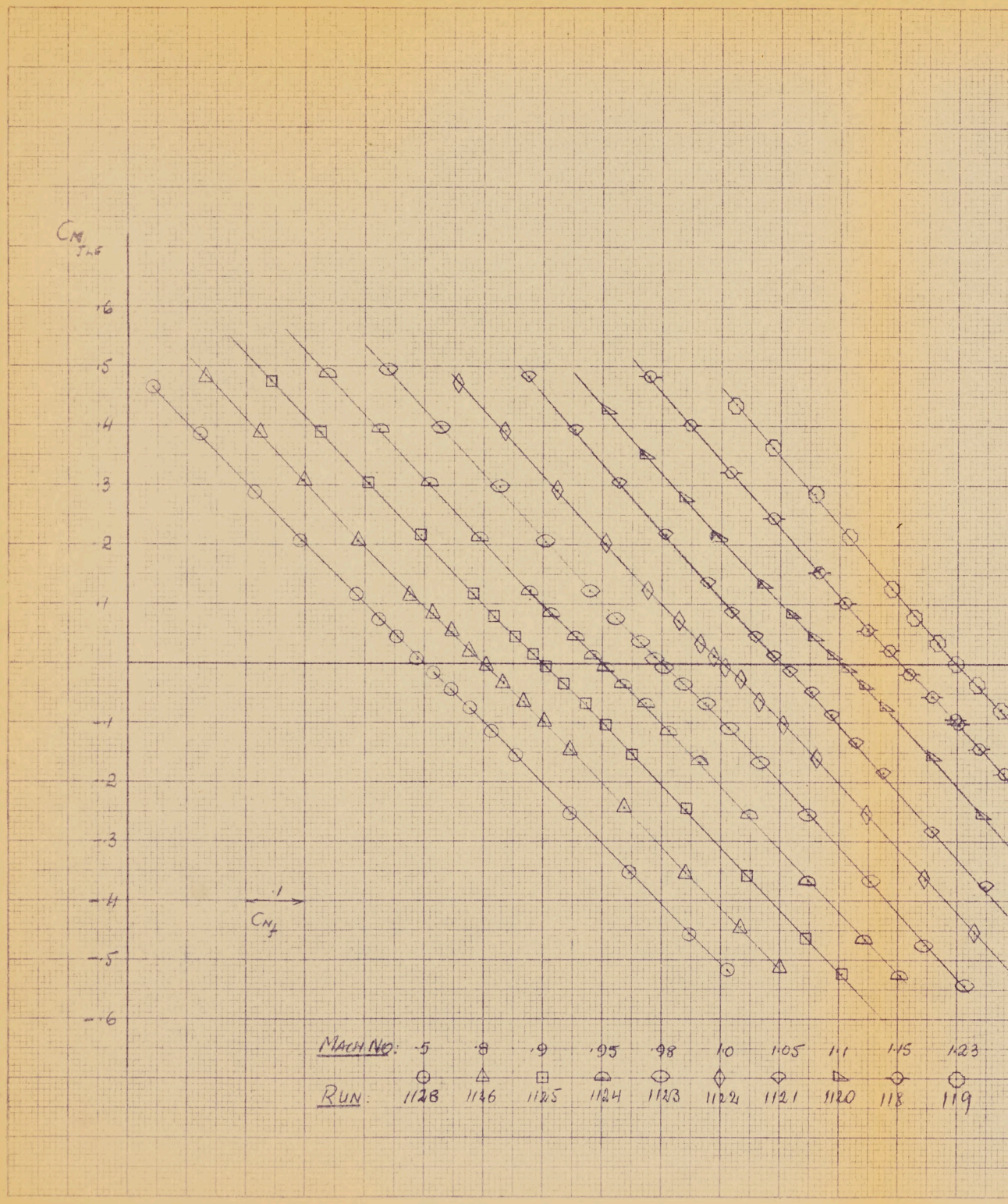
$\alpha = 2$

B_4 C_3 W_9 V_2 R_5 NAS



05 110 115 123

0 1109 1107 1108


$C_{M_{T.E.}}$
.6
.5
.4
.3
.2
.1
-.1
-.2
-.3
-.4
-.5
-.6
1
C_{N_f}
MACH NO: .5 .8 .9 .95 .98 1.0 1.05 1.1 1.15 1.23
RUN: 1128 1126 1125 1124 1123 1122 1121 1120 118 119

SHT 18.10. P/WT/149

J. Sayers. Nov. 1954

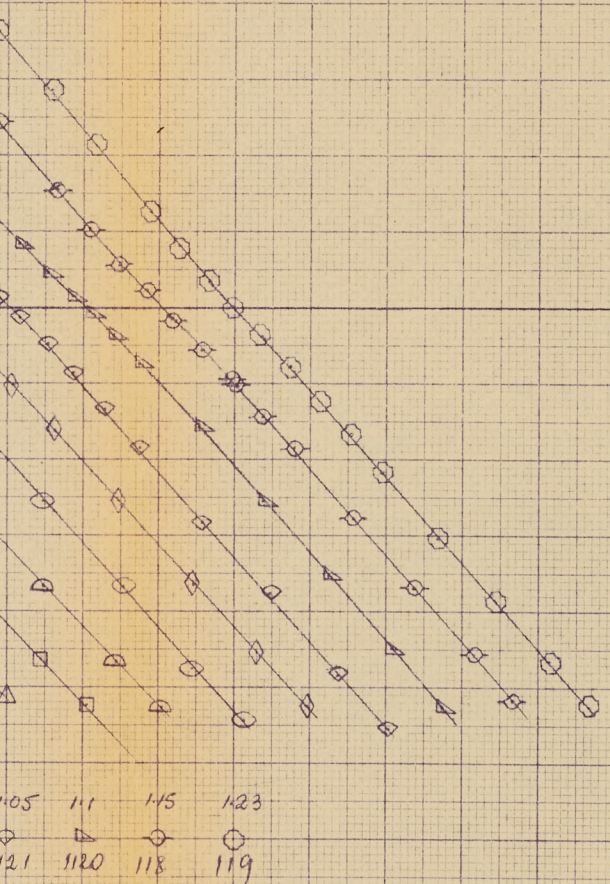
C 105

CAL. WIND TUNNEL TESTS - OCTOBER '54

$C_{l_{T/LE}}$ vs. C_{N_T}

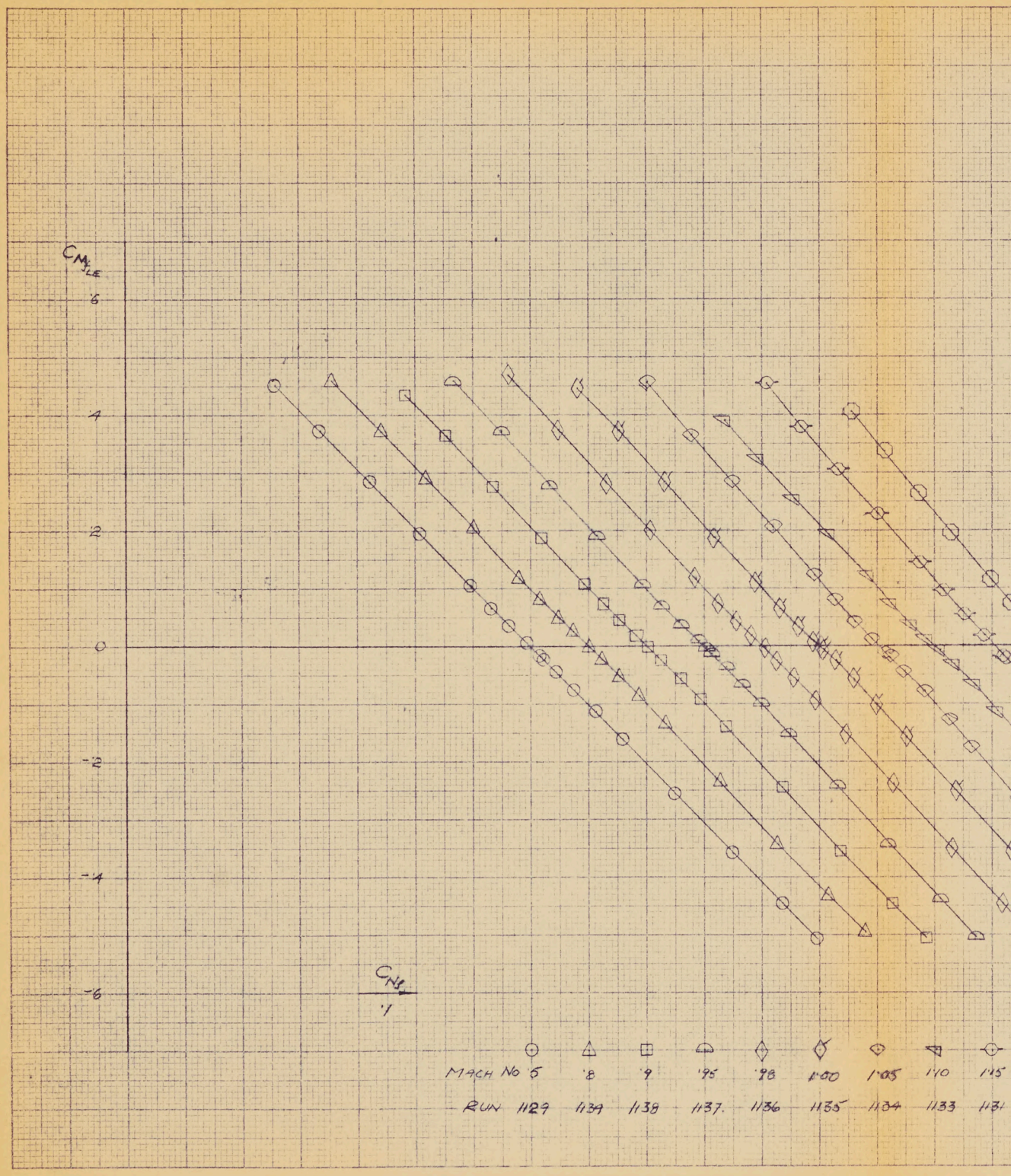
B_H C_3 N_9 V_2 R_1 N_{AS}

$\alpha = 4°$



105 111 115 123

121 1120 118 119



18.11
Oct 57

P/HT 149
I. Kwathoumi

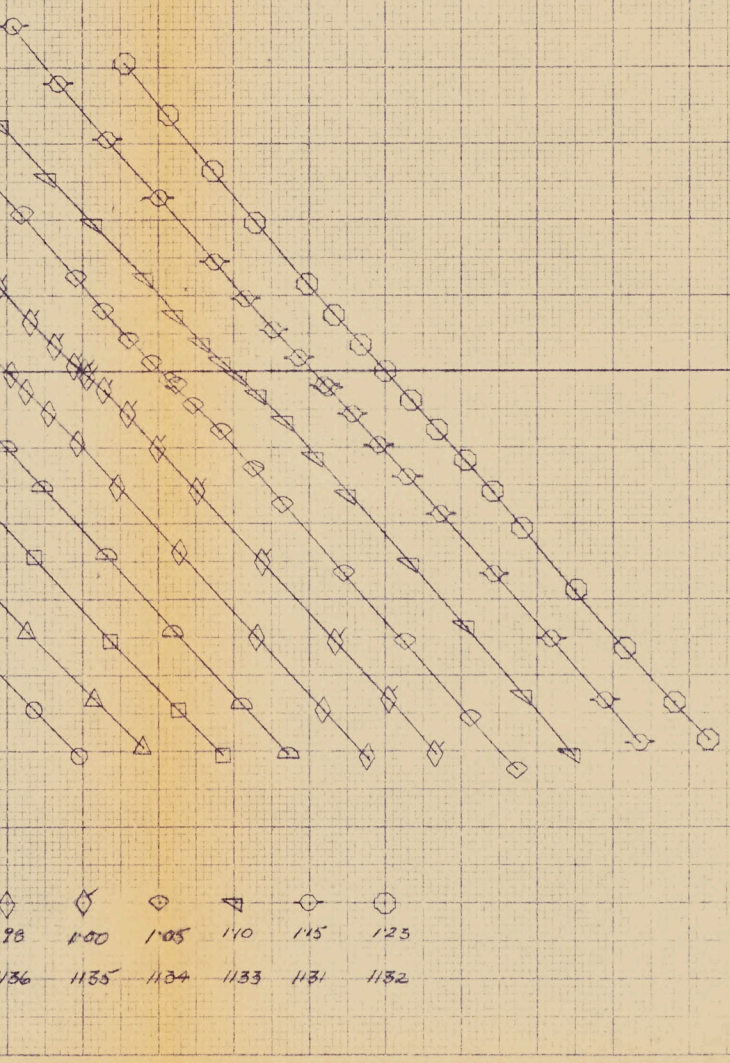
C105

C.A.L. WIND TUNNEL TESTS OCT 57

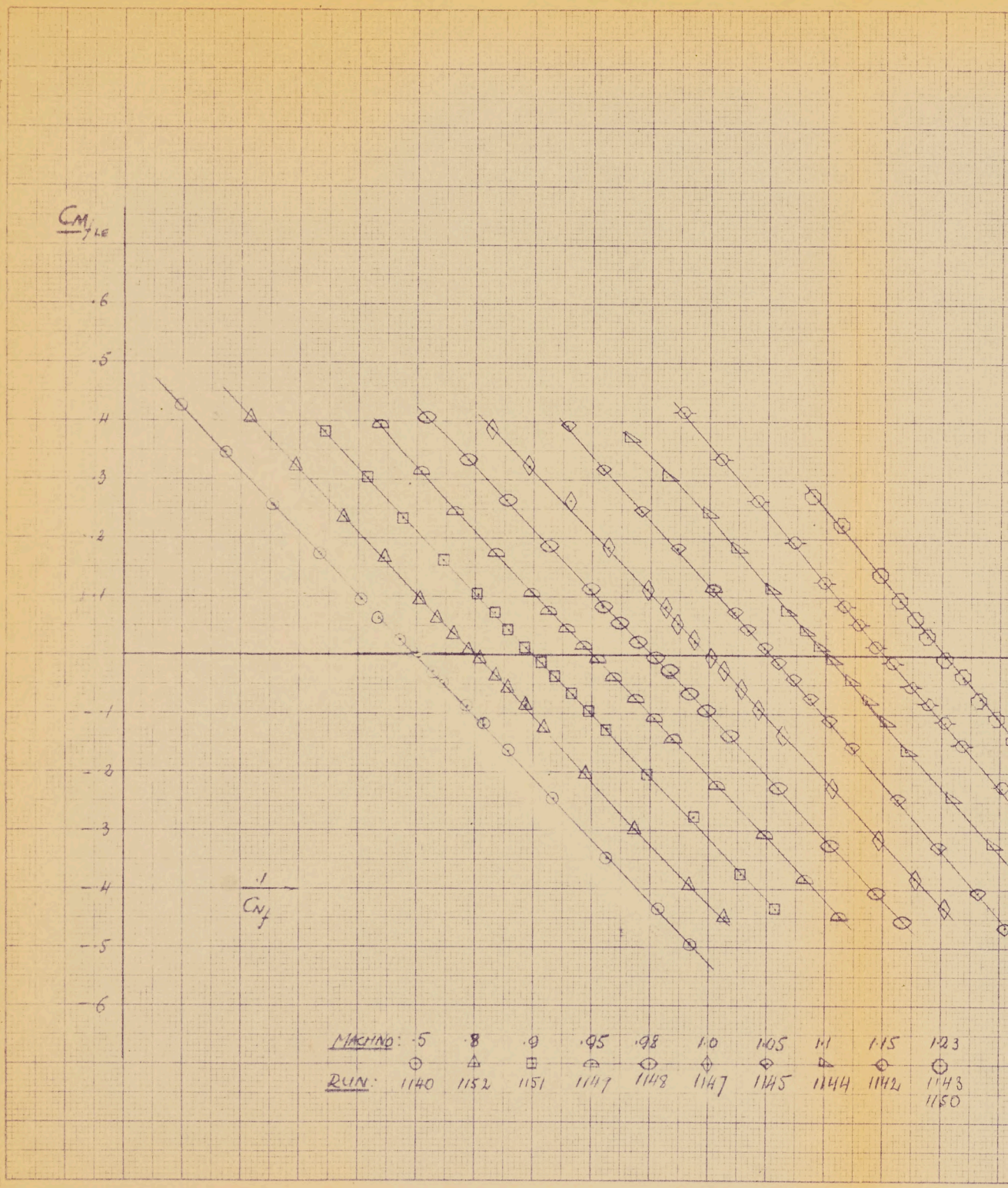
$C_{M_{1/4}}$ vs C_{N_f}

$\alpha = 6°$

$B_4 C_3 H_9 V_2 R_3 N_{45}$



.98	1.00	1.05	1.10	1.15	1.23
1136	1135	1134	1133	1131	1132


$C_{M_{f,LE}}$
.6
.5
.4
.3
.2
.1
-.1
-.2
-.3
-.4
-.5
-.6
$\frac{.1}{C_{N_f}}$
MACH NO: .5 .8 .9 .95 .98 1.0 1.05 1.1 1.15 1.23
RUN: 1140 1152 1151 1147 1148 1147 1145 1144 1142 1143 1150

SHT. 18.12. P/WT/49
J. Sapir. Nov. 1954

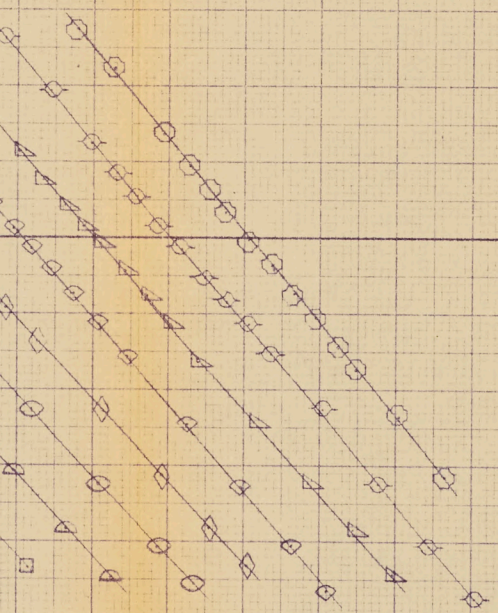
C105

C.AL WIND TUNNEL TESTS - OCTOBER 1954

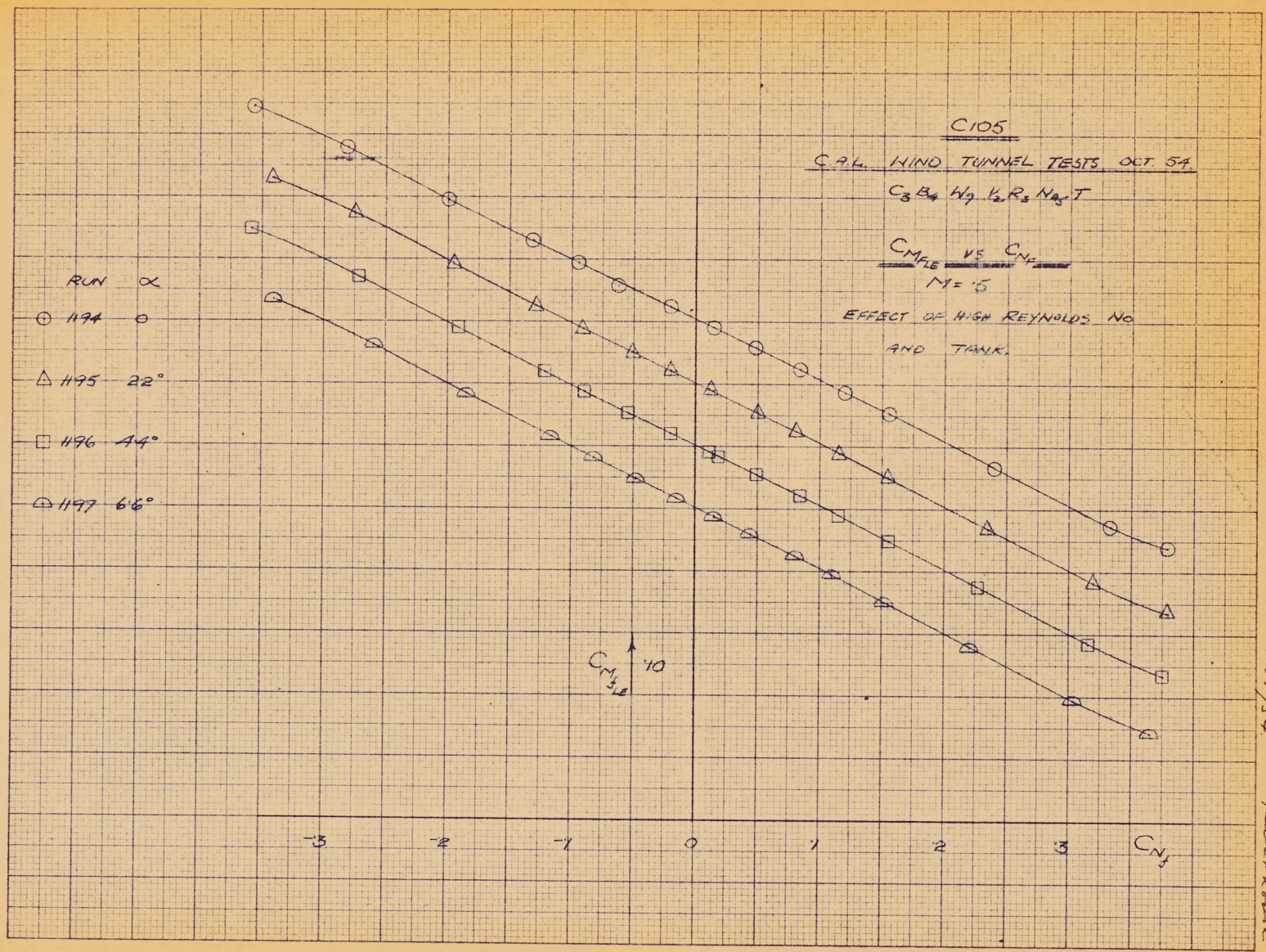
$C_{M_{FLE}}$ VS C_{N_f}

B_M C_3 W_9 V_2 R_5 NAS

$\alpha = 10°$



1.05	1.1	1.15	1.23
1145	1144	1142	1143
			1150



18.20. P/NT/49
Nov/54. Kuchemann