Copy No. 4

SECRET AND CONFIDENTIAL

Prologue

Tom Dugelby

Productions

PRELIMINARY BROCHURE
PROPOSED LONG-RANGE ALL-WEATHER FIGHTER

December, 1949

A.V. Roe Canada Limited
MALTON, Ontario

INDEX

UNLIMITED

INTRODUCTION

It was thought worth while to investigate the potentialities of the long-range, all-weather Fighter which could be expected to be realized, utilizing recent aerodynamic developments and the anticipated engine developments. For this purpose the specification on which the CF-100 is based has been used as a starting off point. This was on the assumption that the basic requirements against which this aircraft was designed will meet Canadian conditions for some time to come.

In order to make a worth while advance on the CF-100, the high-altitude, high-speed, long-range bomber which can be expected in the next four or five years was taken as the tactical datum and an endeavour was made to design a Fighter which would be able to attack such a bomber effectively. It has been assumed that suitable ground to air, and air to air, search radar will be available in conjunction with appropriate aircraft armament.

GENERAL DESCRIPTION

This study describes a long-range, high altitude, all-weather, search Fighter of advanced design. Alternative arrangements are illustrated on Sheets 4, 5, and 6. From these drawings it can be seen that the aircraft is a two-place, mid-wing monoplane, powered by twin gas turbines, each of 8,000 lbs. static thrust.

The wing is of swept back plan form having a quarter chord sweep back of 43° and an aspect ratio of 2.76. A similar swept back tailplane has been retained on this aircraft as it is felt that this is desirable in order to achieve adequate manoeuvrability.

In addition to the gas turbine engines, rocket motors are also provided in the tail for providing up to 6,000 lbs. of additional thrust under high altitude combat conditions.

The armament may be either four 30 m.m. cannon or, probably later on, long-range, large-calibre guns firing shells with proximity fuses.

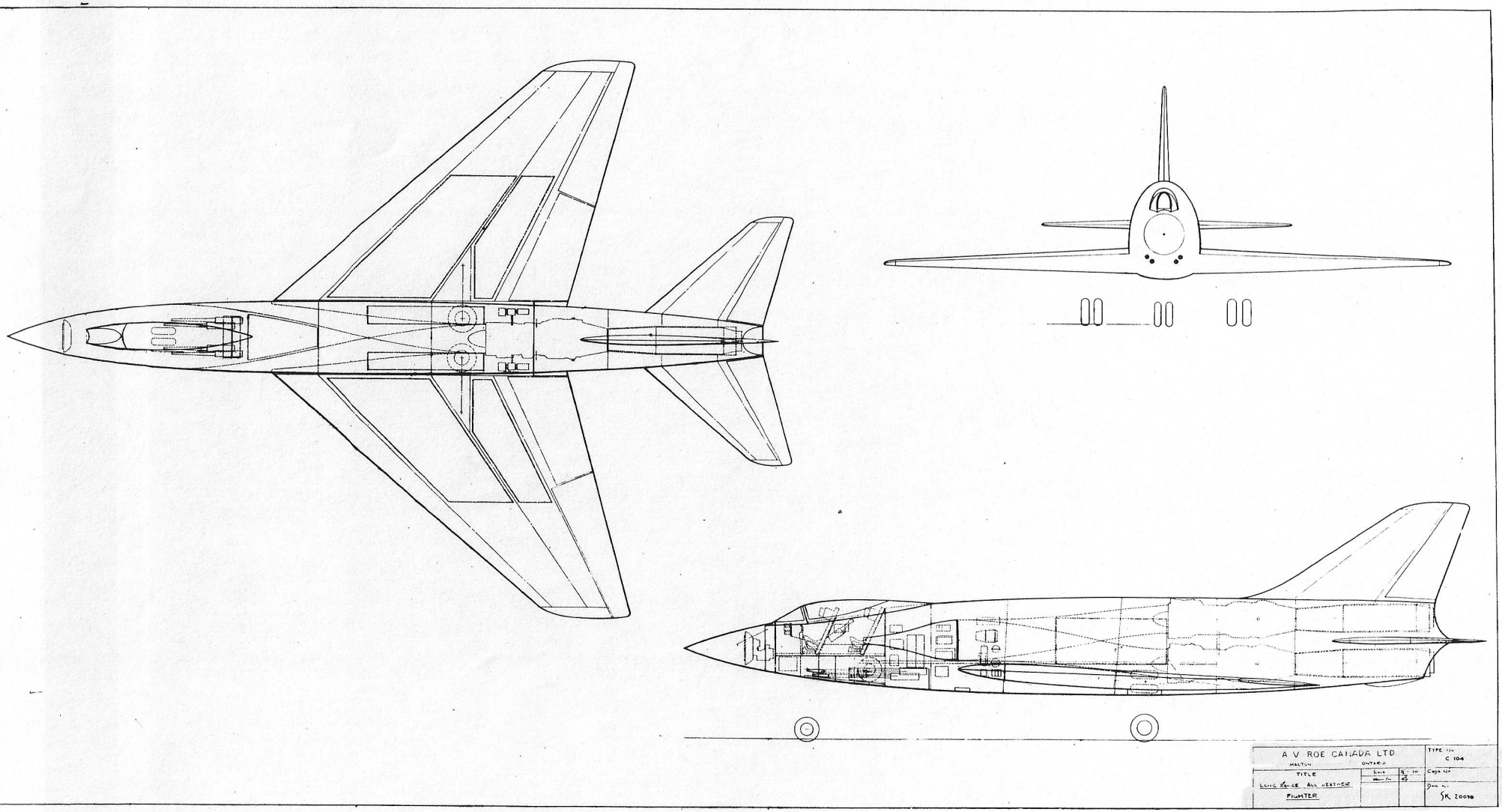
The tankage of the airplane will enable a normal range of over 1,500 miles to be achieved while ultimately additional tankage can be provided for the second rocket motor fuel. This will enable the aircraft to be developed for flight at super-sonic speeds.

In addition, after-burners are provided for the gas turbine engines to assist in take-off and climb and in combat.

With the provisions described the aircraft can, therefore, climb to the approximate height of the bomber, say 45,000 ft. at which height it can patrol at a moderately high cruising speed. On making contact by radar with the bomber it can go into the attack using the rocket engines which will give the aircraft a short duration performance substantially superior to that of the bomber. The rocket engines will enable the aircraft to climb to 60,000 or 70,000 ft., if necessary, with a speed differential of at least 200 m.p.h. This should give ample margin for manoeuvrability and getting into position for the attack.

It is felt that the study as outlined suggests an aircraft which basically is of normal design but which has considerable potential development in it, in so far as it can utilize its supersonic possibilities by the addition of the rocket engines, in due course, when this superior performance is required operationally.

Under short range conditions the aircraft would be an extremely effective Interceptor Fighter having a sea level rate of climb with reheat of say 24,000 ft. a minute, with ample manoeuvrability.



A V ROE CANADA LTD MALTON ONTARIO			TYPE No. C 104
TITLE LONG RANGE ALL WEATHER FIGHTER	SCALE 1/8" = 1'-0"	DWG. No. SK 20030	CODE NO.

DIMENSIONS AND DATA

GENERAL	
Span, ft.	49.5
Length, ft.	64.0
Height over Canopy, ft.	12.5
Height over Fin, ft.	20.0
Track, ft.	13.0
Tread, ft.	24.0
Engine Fuel, Total Internal, gals.	1735
WING	
Area, sq. ft.	888
Span, ft.	49.5
Aspect Ratio	2.76
Taper Ratio	.246
Sweep (1/4 chord), degrees	43
Root Chord, ft.	28.83
Tip Chord, ft.	7.1
Aerofoil Section (Parallel to Fuse.)	NACA .0006.58
HORIZONTAL TAIL	
Area, sq. ft.	177.3
Span, ft.	22.07
Aspect Ratio	2.76
Taper Ratio	.246
Sweep (1/4 Chord), degrees	43
Root Chord, ft.	12.87
Tip Chord, ft.	3.2
Aerofoil Section (Parallel to Fuse.)	NACA .0006.58
VERTICAL TAIL	
Area, sq. ft.	96
Sweep (1/4 Chord), degrees	50
Root Chord, ft.	16.0
Tip Chord, ft.	5.3
Aerofoil Section (Parallel to Fuse.)	NACA .0006.58

WEIGHT SUMMARY

Dec. 5, 1949

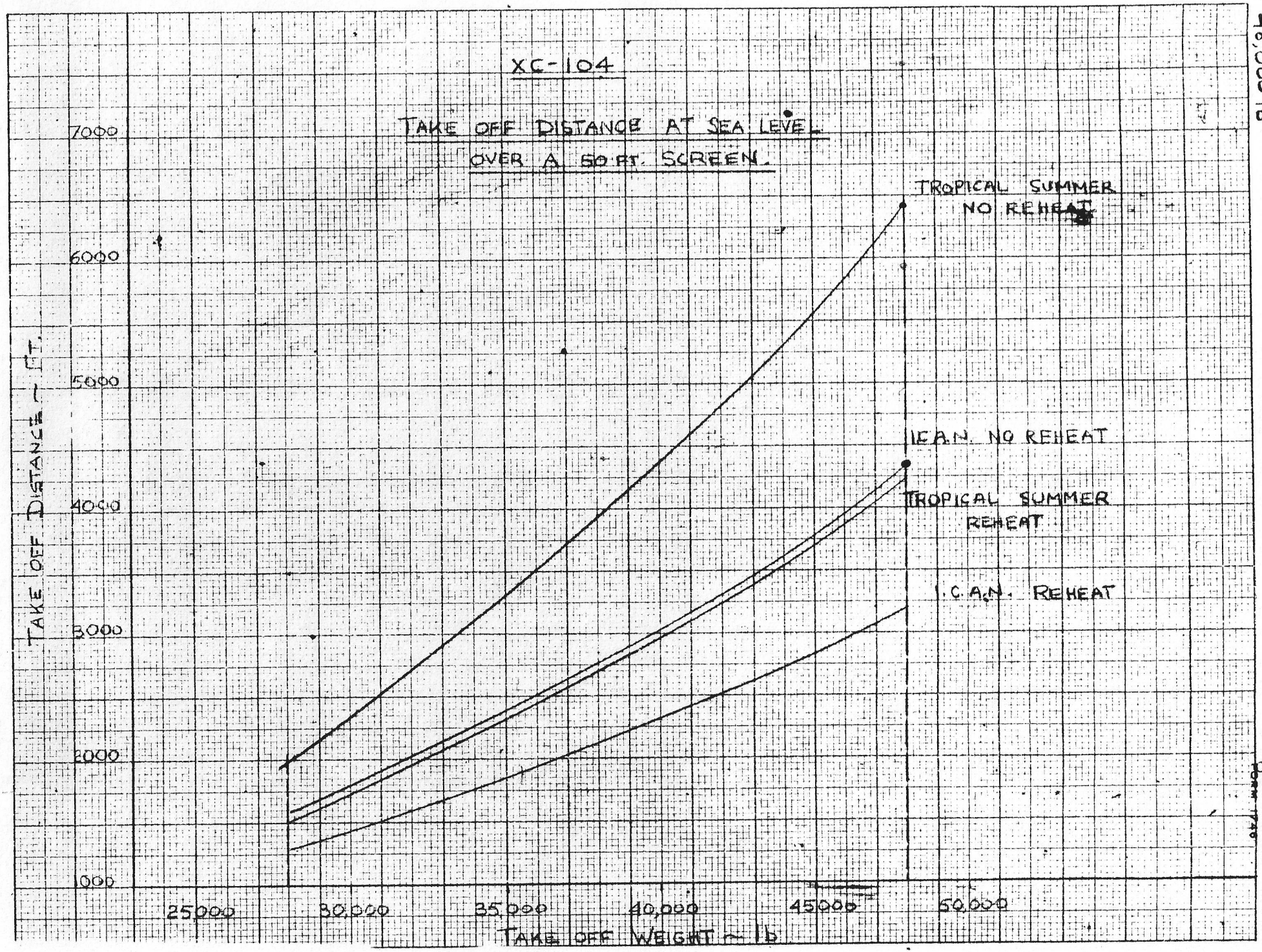
STRUCTURE GROUP		
Wings	7,200	
Fuselage	3,180	
Tailplane & Elevators	1,030	
Fin and Rudder	326	11,736
LANDING GEAR GROUP		
Main Undercarriage (down)	1,300	
Nosewheel Undercarriage (down)	350	
Tail Bumper	20	1,670
POWER PLANT GROUP		
2 'Orenda' Engines (bare)	6,009	
Accessory Gearboxes & Drives	100	
Generators, Pumps, Blowers, etc.	250	
After-Burners	1,000	
Air-Intake Ducts	200	
Engine Controls	20	
Engine Mountings	90	
2 Rockets	1,000	8,669
EQUIPMENT GROUP		
Radar	600	
Radio	150	
Fire Extinguisher System	138	
Air Conditioning System	100	
Electrical System	850	
Hydraulic System	500	
Oxygen System	50	
De-Icing System	100	
Flying Controls	200	
Fuel System and Tanks	285	
Instruments	70	
Auto-Pilot	60	
Crew Seats	264	
Armament	1,025	
Miscellaneous	88	4,480
CREW C/W PARACHUTES & G-SUITS	414	414
BASIC OPERATIONAL WEIGHT		26,969
AMMUNITION	1,000	1,000
OPERATIONAL WEIGHT EMPTY		27,969
FUEL AND OIL		
Engine Fuel (1735 Gal.)	14,000	
Oil	31	
Rocket Fuel	6,000	20,031
GROSS WEIGHT		48,000

AIRCRAFT A.U.W. 48,000 lb COMPONENT

SHEET DATE REPORT NO PREP BY John C. Walsh

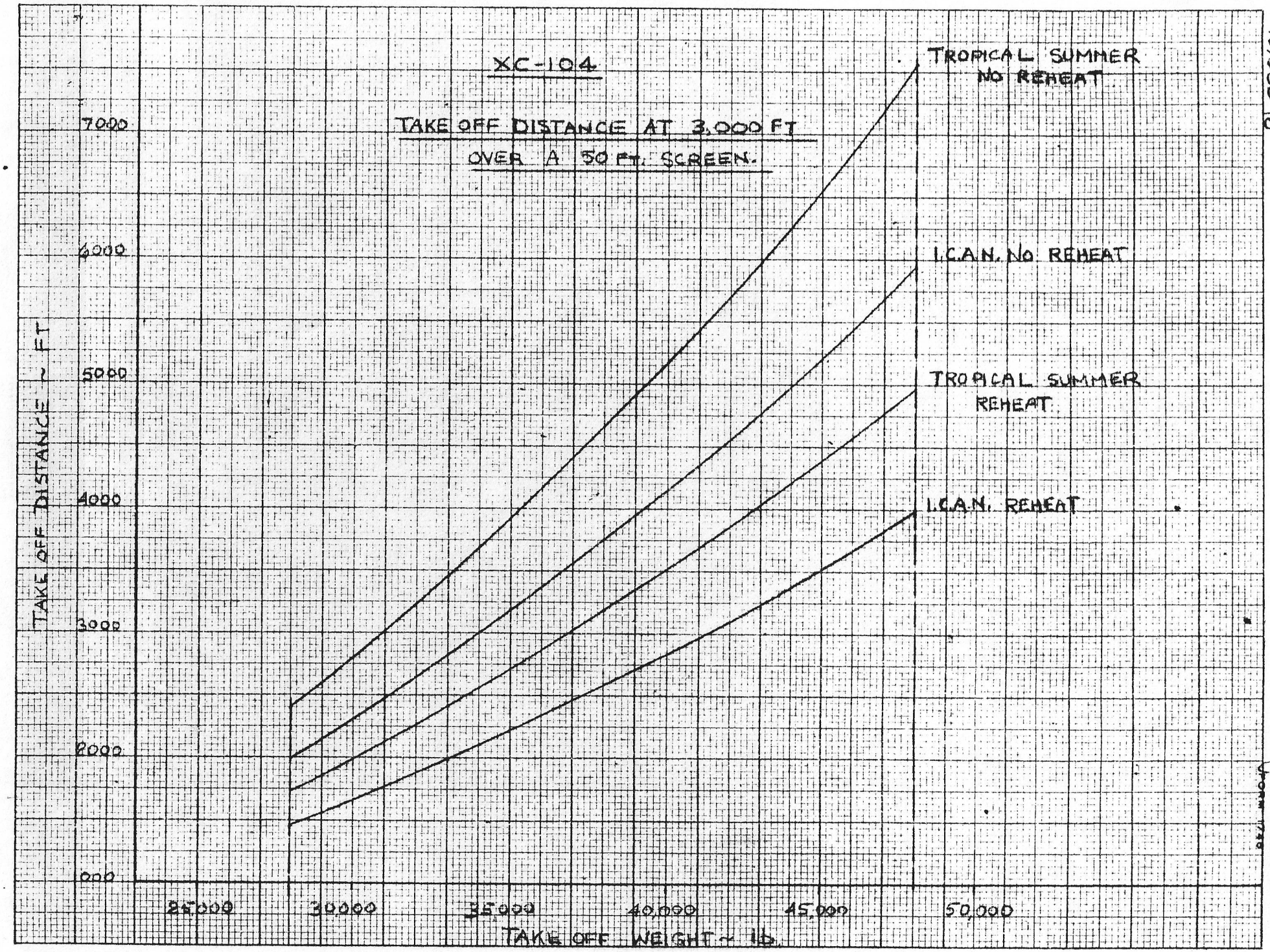
XC-104

TAKE OFF DISTANCE AT SEA LEVEL OVER A 50 FT. SCREEN.



FORM 1740

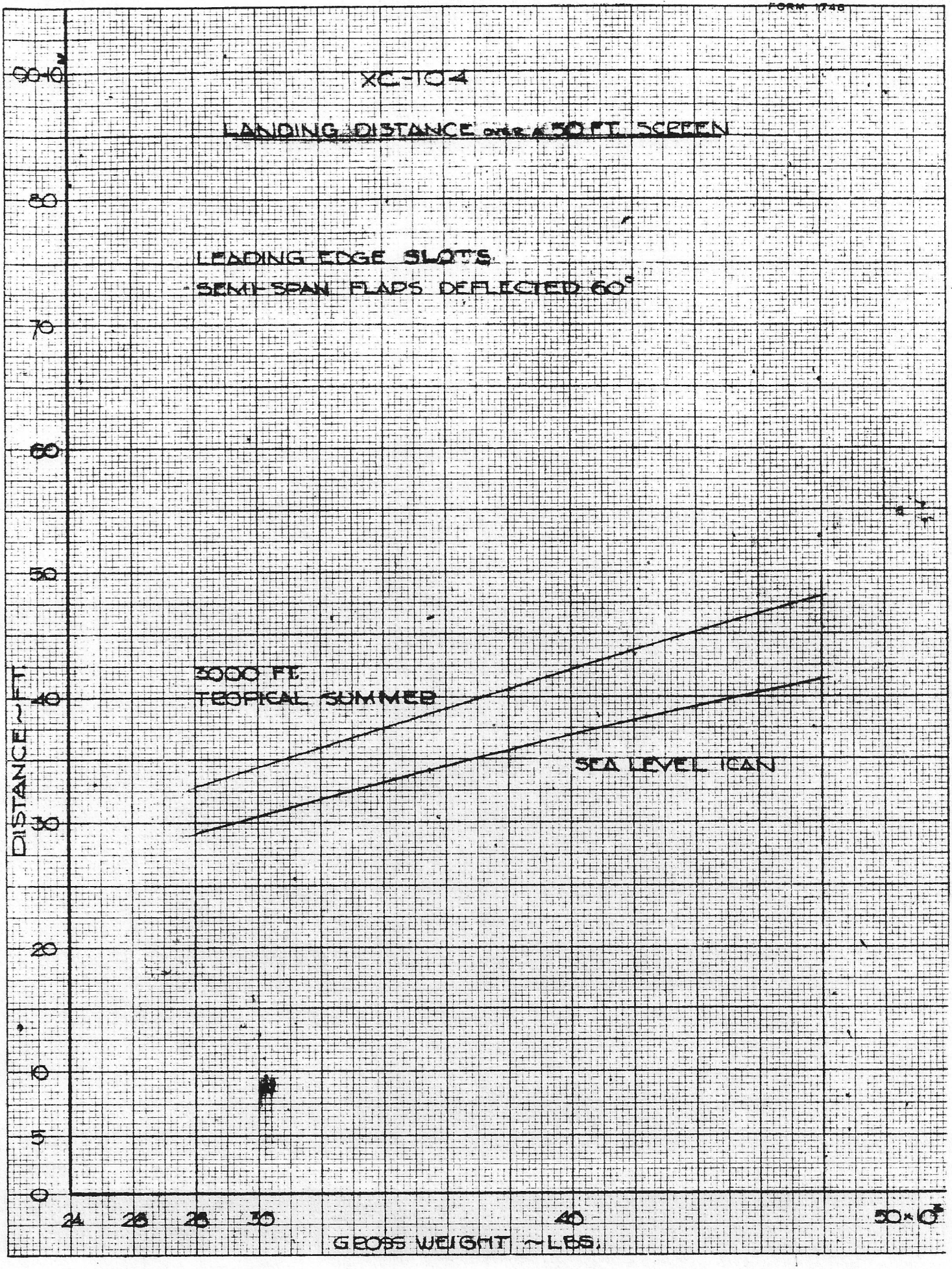
AIRCRAFT
A.U.W. 48,000 lb
COMPONENT
SHEET NO
DATE
REPORT NO
PREP. BY



AIRCRAFT COMPONENT SHEET NO. REPORT NO.

A.U.W. 48000 LBS. DATE PREP BY W.B. McCarter

FORM 1748

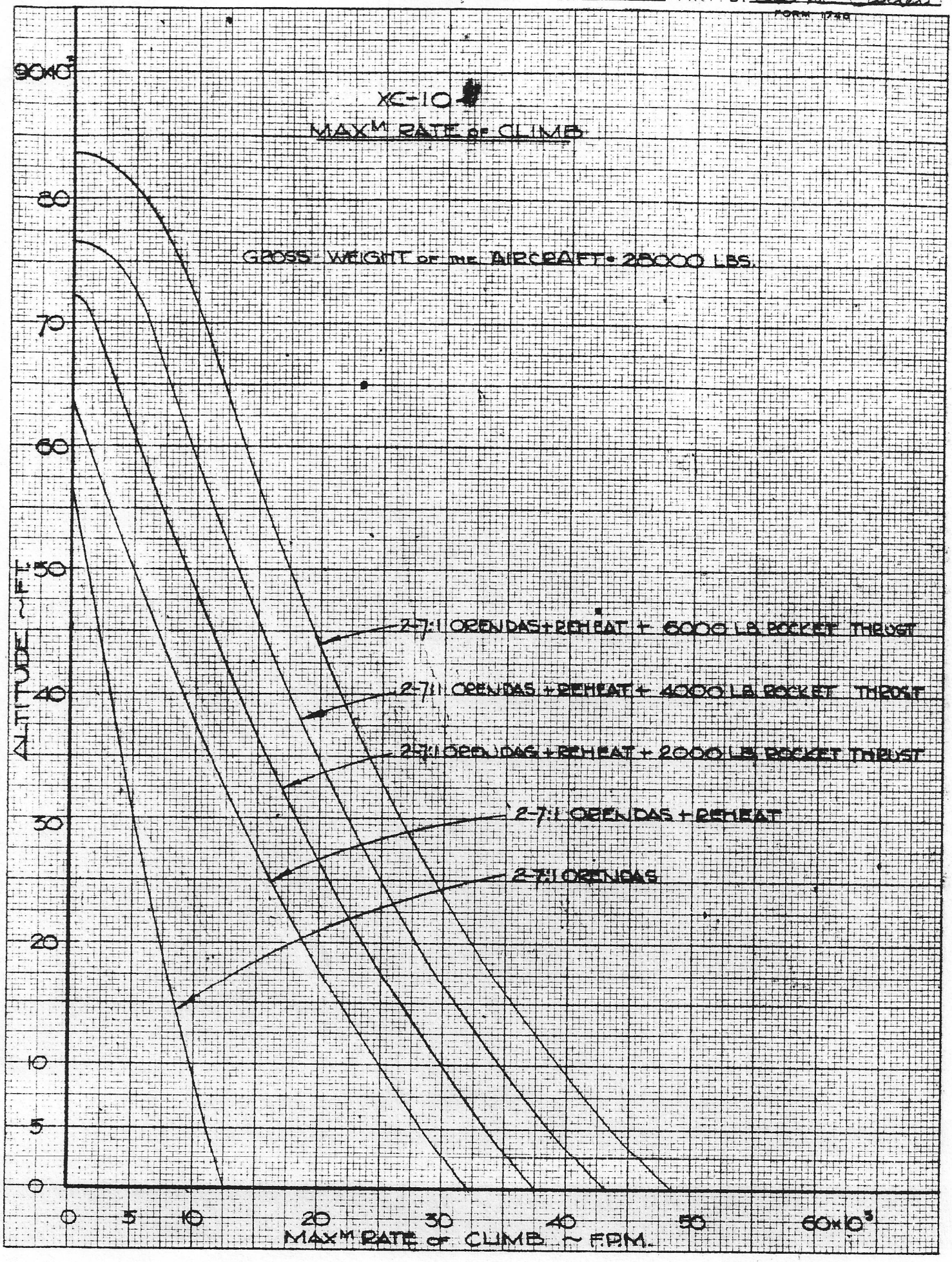


KEUFFEL & ESSER CO., N NO. 359-12
10 x ½ inch ha
MADE IN U.S.A.

AIRCRAFT COMPONENT SHEET No. 12 REPORT No.

A.U.W. 48000 LBS. DATE PREP. BY C.B. McCarter

FORM 1748

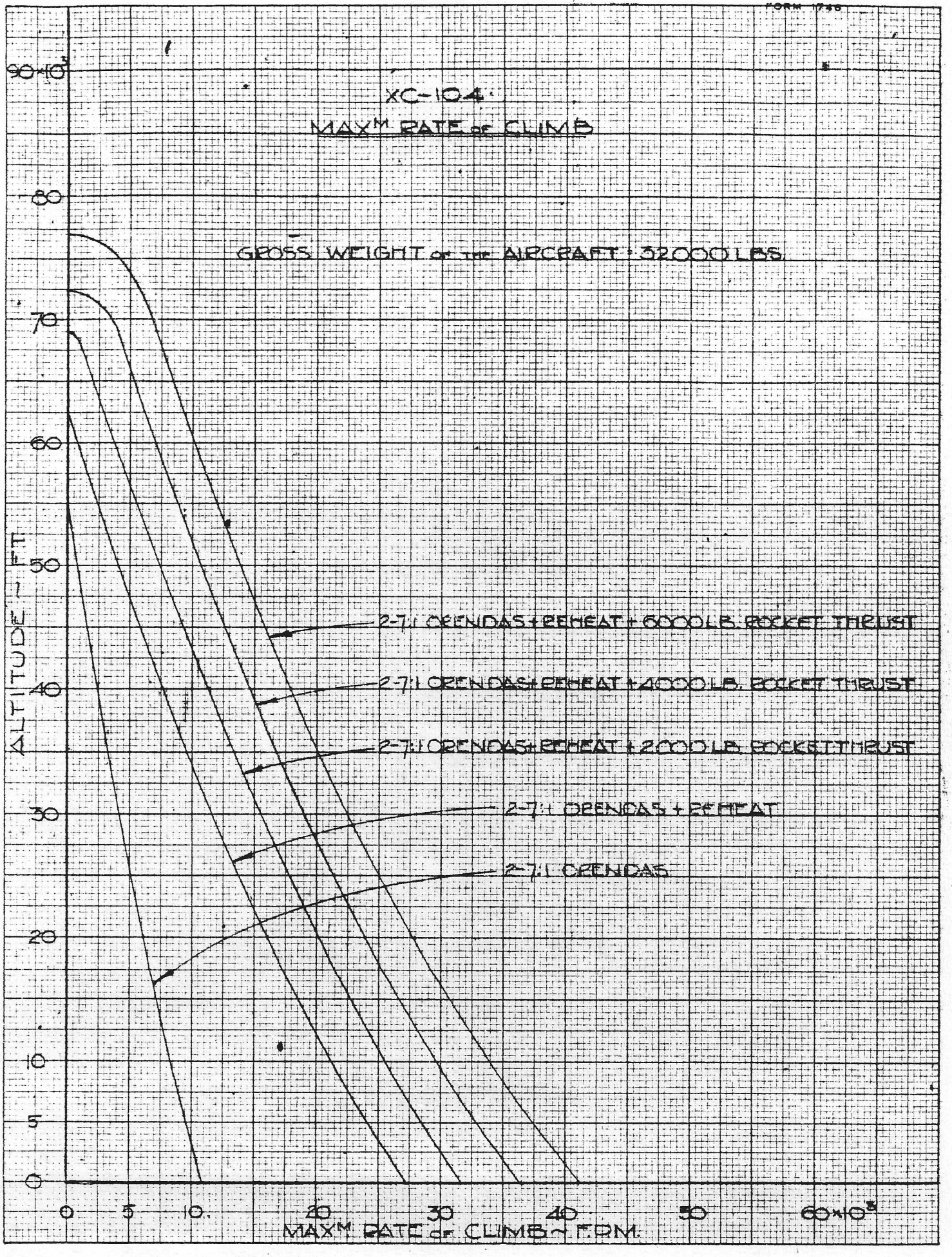


KEUFFEL & ESSER CO., N. Y. NO. 359-12
10 X 10 to the inch, 5 divisions accented.
CAUTION U.S.A.

AIRCRAFT COMPONENT SHEET No. 15 REPORT No.

A.U.W. 48000 LBS. DATE PREP. BY L. B. Carter

FORM 1746



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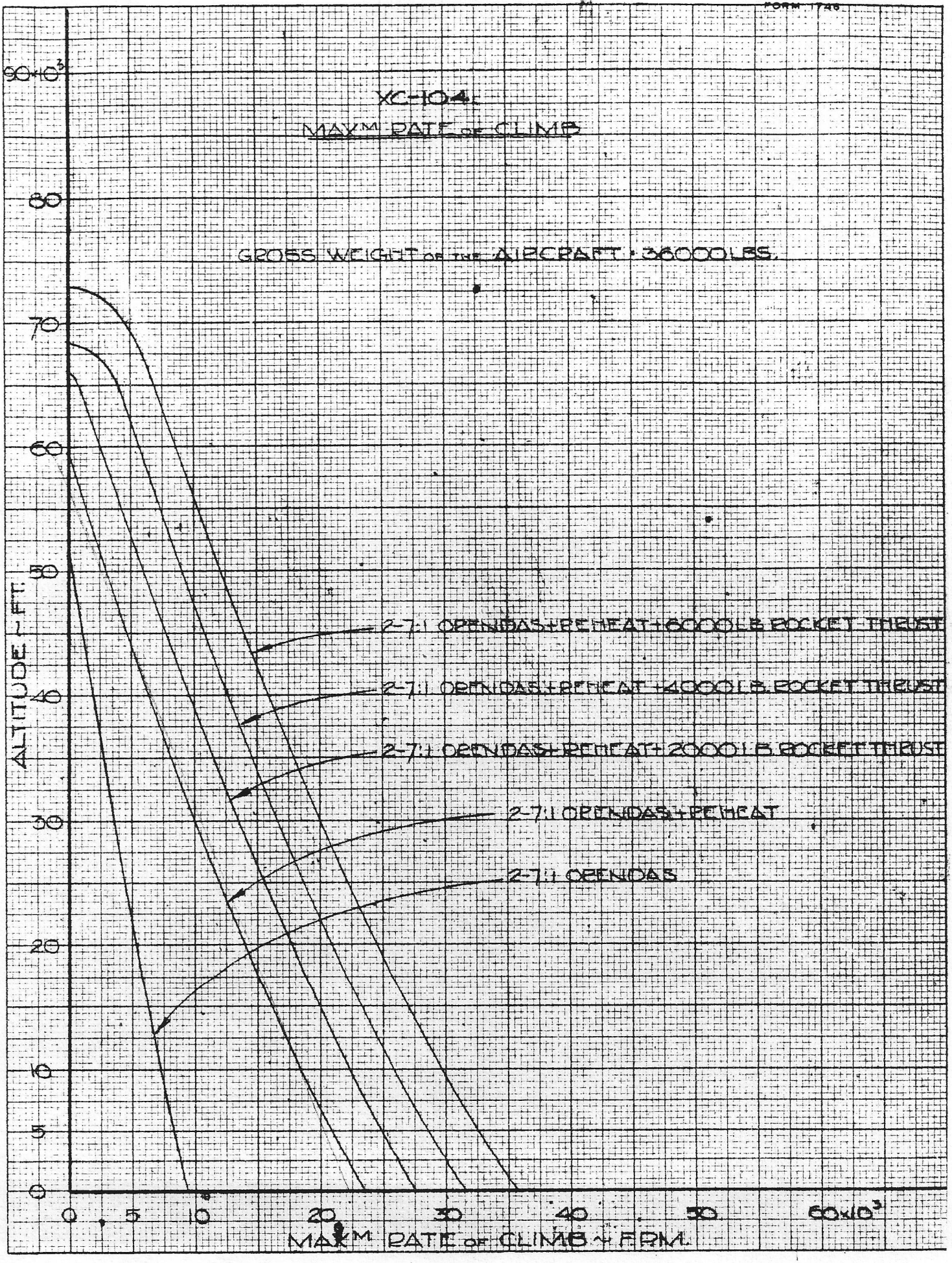
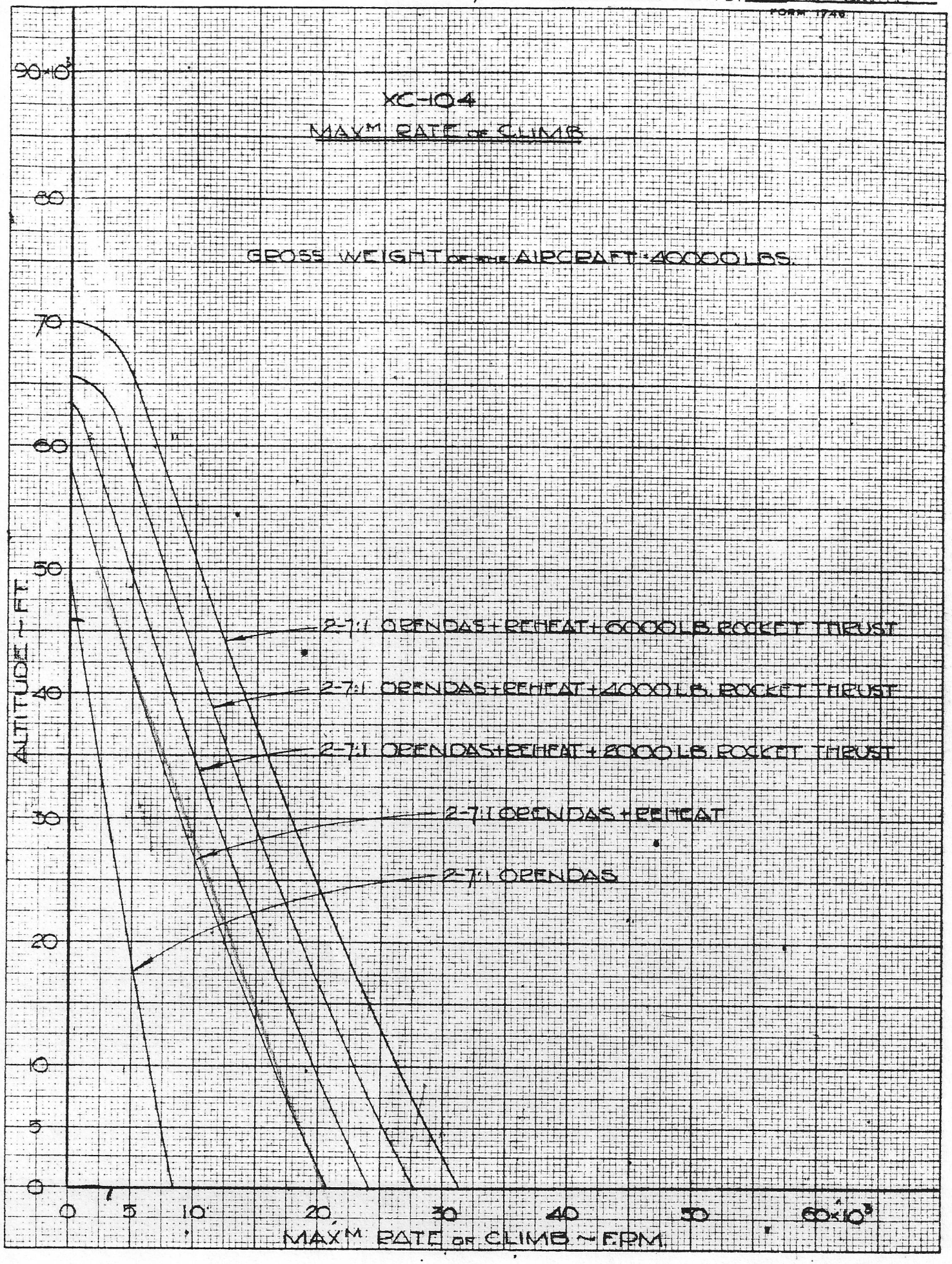
FORM 1746



AIRCRAFT COMPONENT SHEET NO. 12 REPORT NO.

A.U.W. 48000 LBS. DATE PREP. BY B. W. Carter

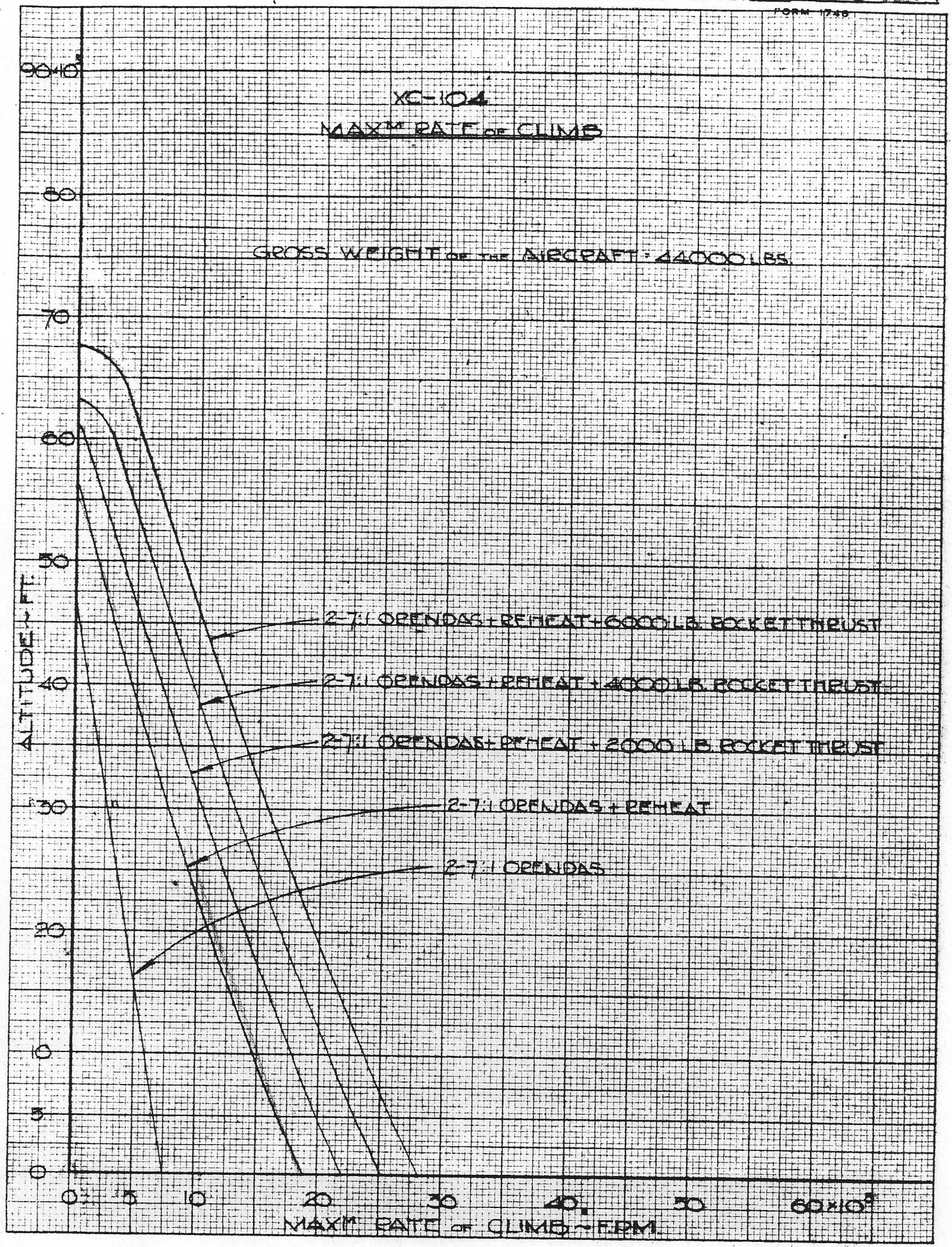
FORM 1748



KEUFFEL & ESSER CO., N. Y. NO. 359-12
10 × 10 to the inch, 5th
Ruled in U.S.A.

AIRCRAFT A.U.W. 48000 LBS. COMPONENT SHEET NO. 16 REPORT NO. DATE PREP. BY

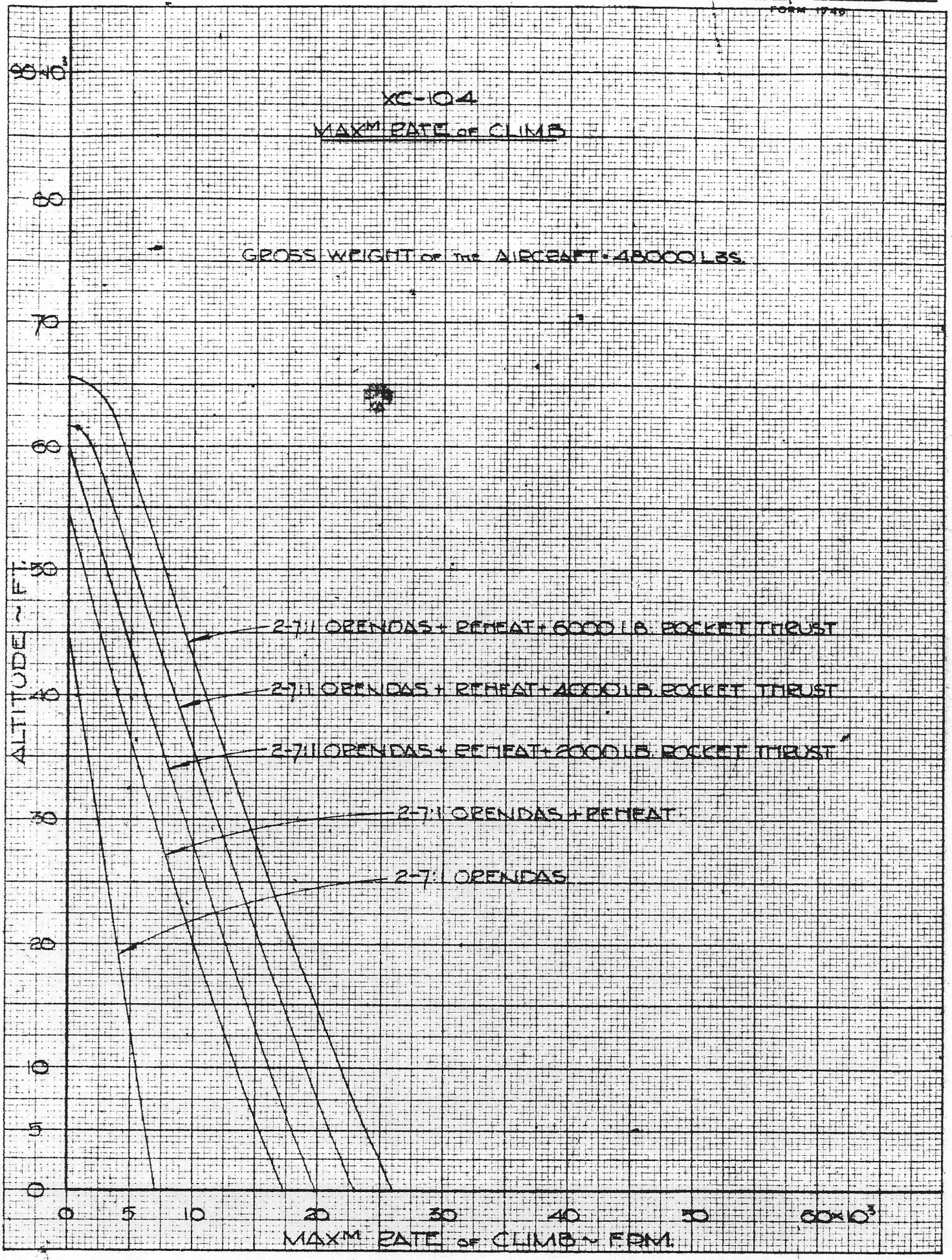
FORM 1249



AIRCRAFT COMPONENT SHEET NO. 17 REPORT NO.

A.U.W. 48000 LBS. DATE PREP. BY L B McCarter

FORM 1749



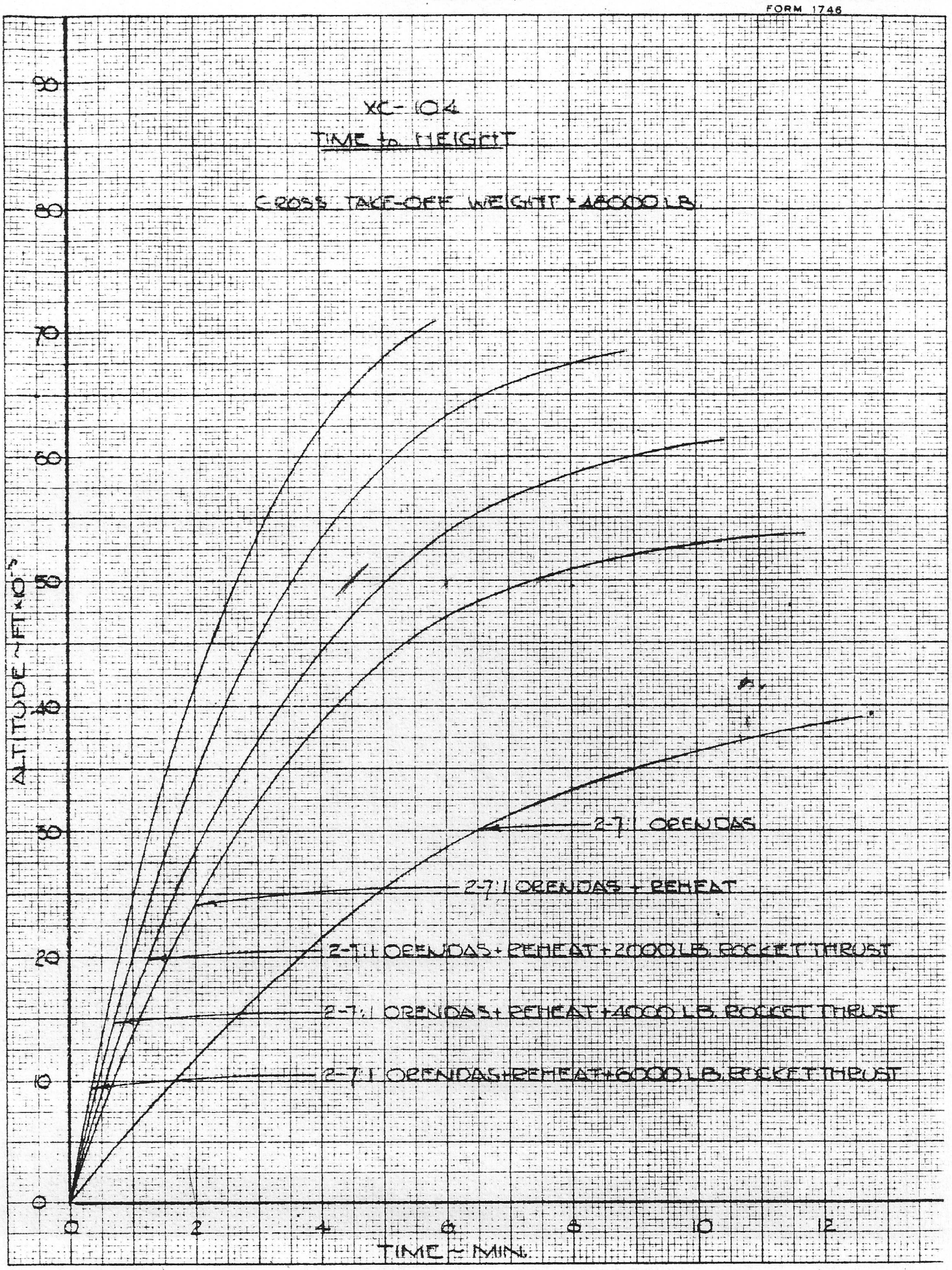
AIRCRAFT
A. U. W.

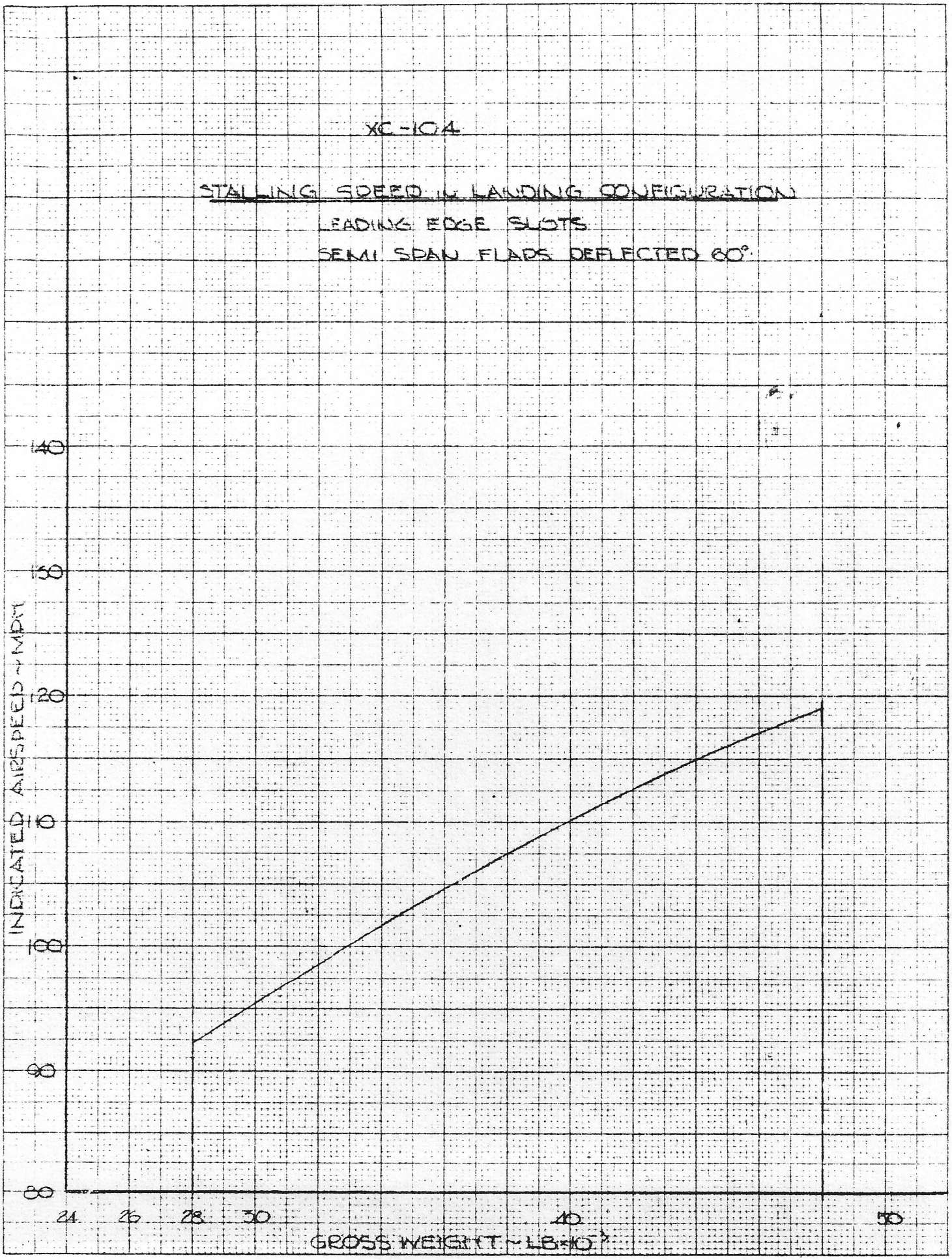
COMPONENT

SHEET No 18 REPORT No

DATE DEC 1949 PREP. BY C. B. W. Carter

FORM 1746




XC-10A
STALLING SPEED IN LANDING CONFIGURATION
LEADING EDGE SLOTS
SEMI SPAN FLAPS DEFLECTED 60°
INDICATED AIRSPEED ~ MPH
140
130
120
110
100
90
80
24
26
28
30
40
50
GROSS WEIGHT ~ LB×10³

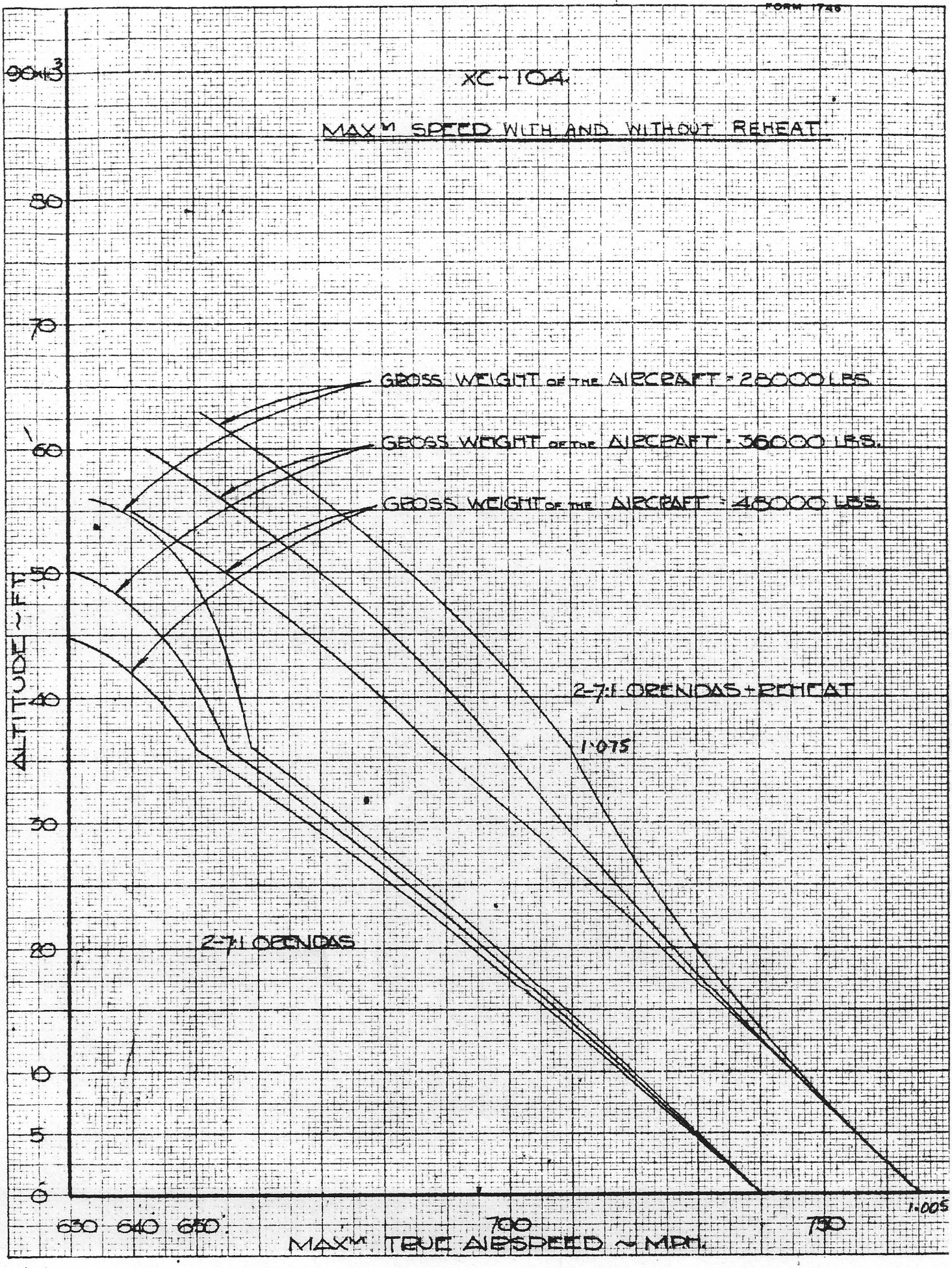
AIRCRAFT COMPONENT

A.U.W. 48000 LBS.

SHEET No. _____ REPORT No _____

DATE _____ PREP. BY A-ROSE.

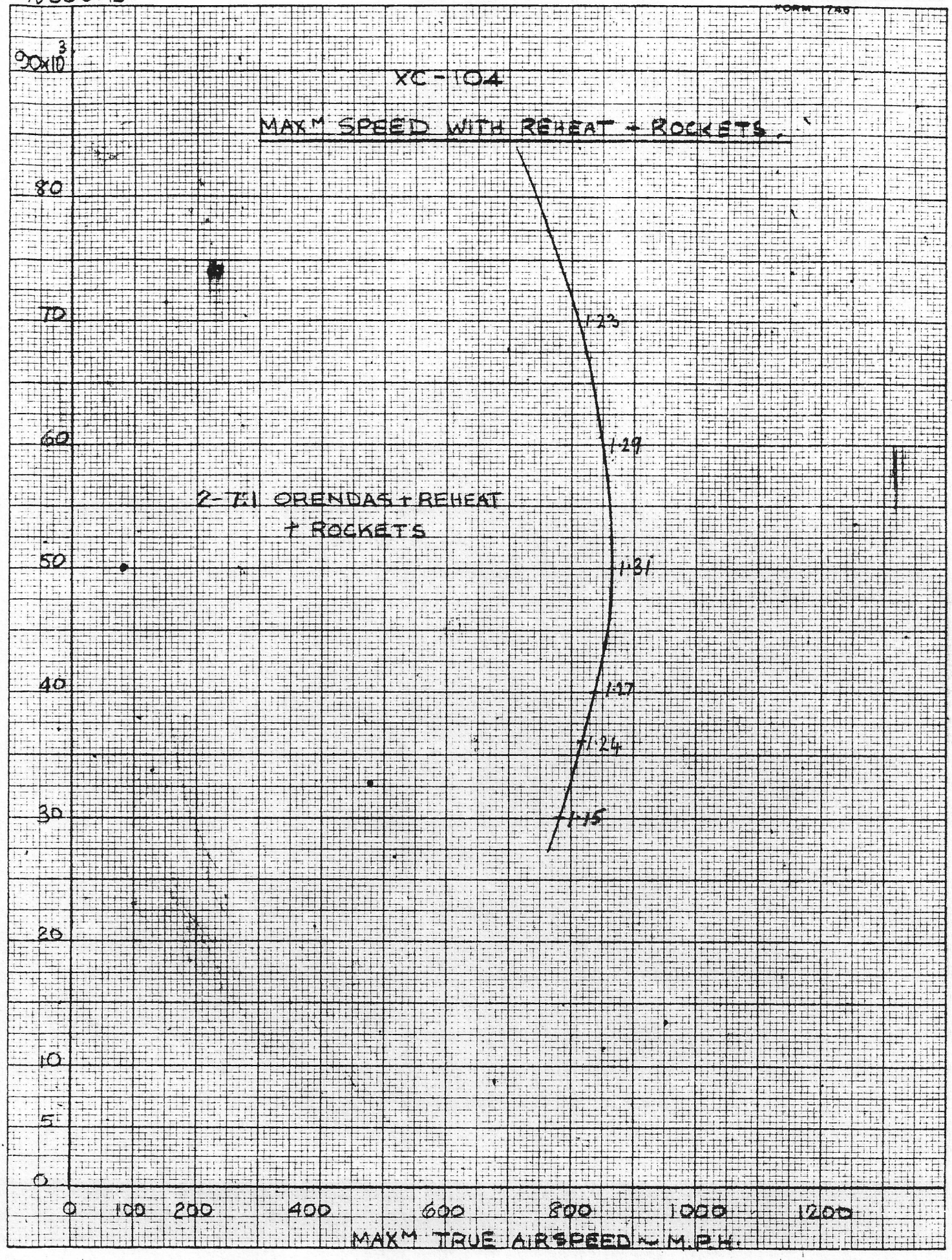
FORM 1748



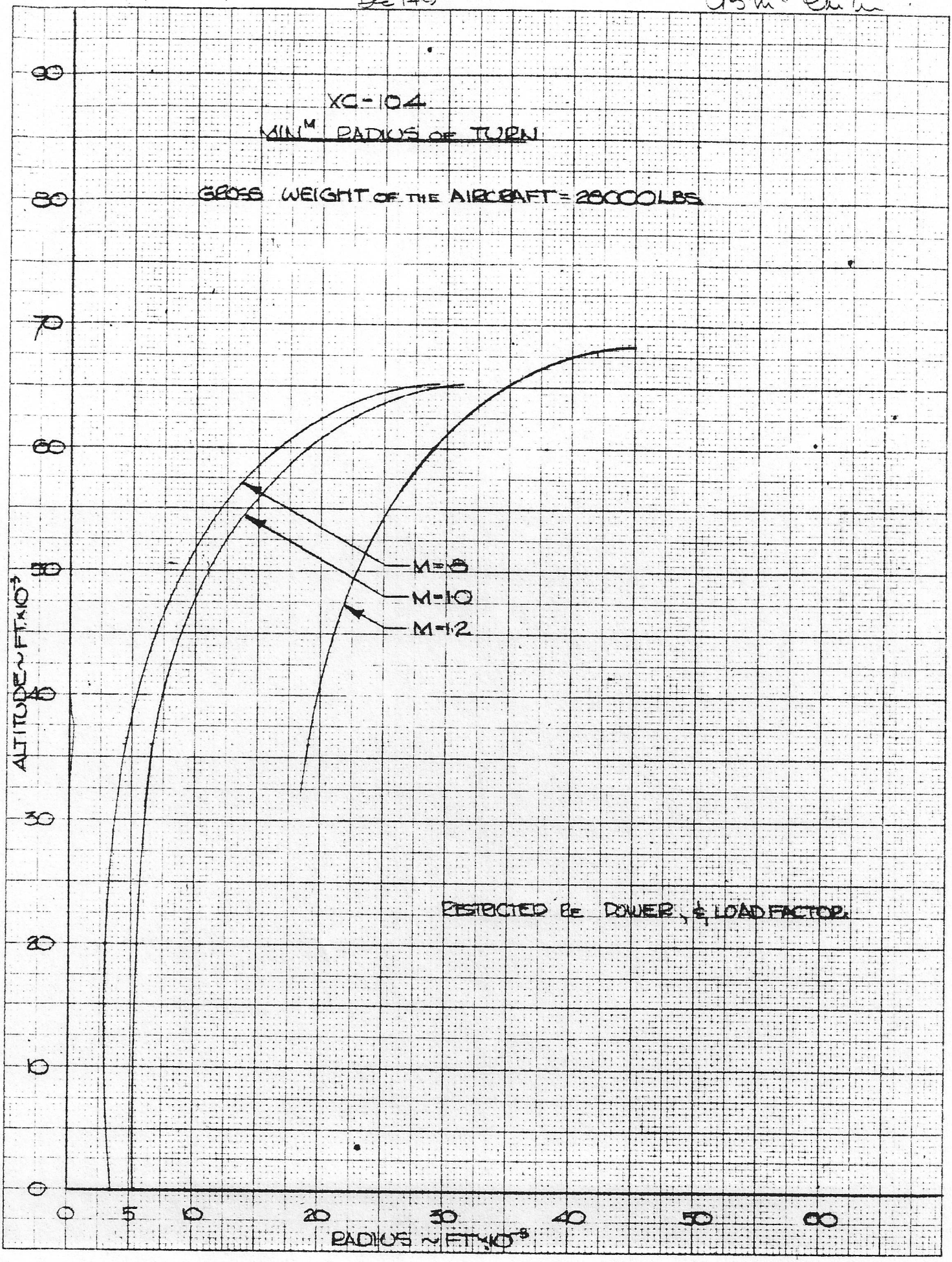
AIRCRAFT · COMPONENT SHEET No. REPORT No.

A.U.W. 48000 lb DATE PREP. BY A. Rose

FORM 240

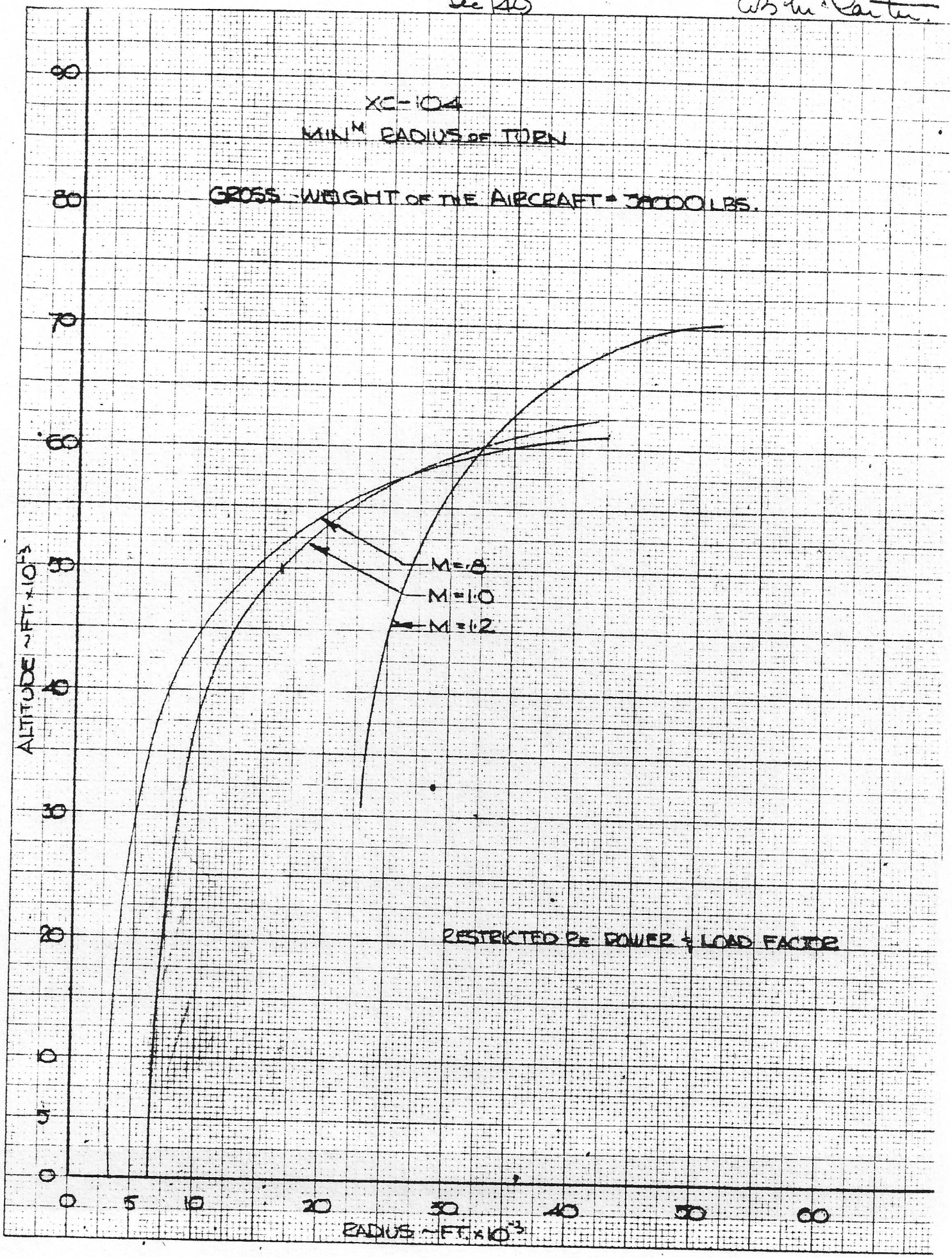


Dec 140


XC-104
MIN^M RADIUS OF TURN
GROSS WEIGHT OF THE AIRCRAFT = 280000 LBS.
M=.9
M=1.0
M=1.2
RESTRICTED BY POWER, & LOAD FACTOR.
ALTITUDE ~ FT. x 10^3
RADIUS ~ FT. x 10^3
0
10
20
30
40
50
60
70
80
90
0
5
10
20
30
40
50
60

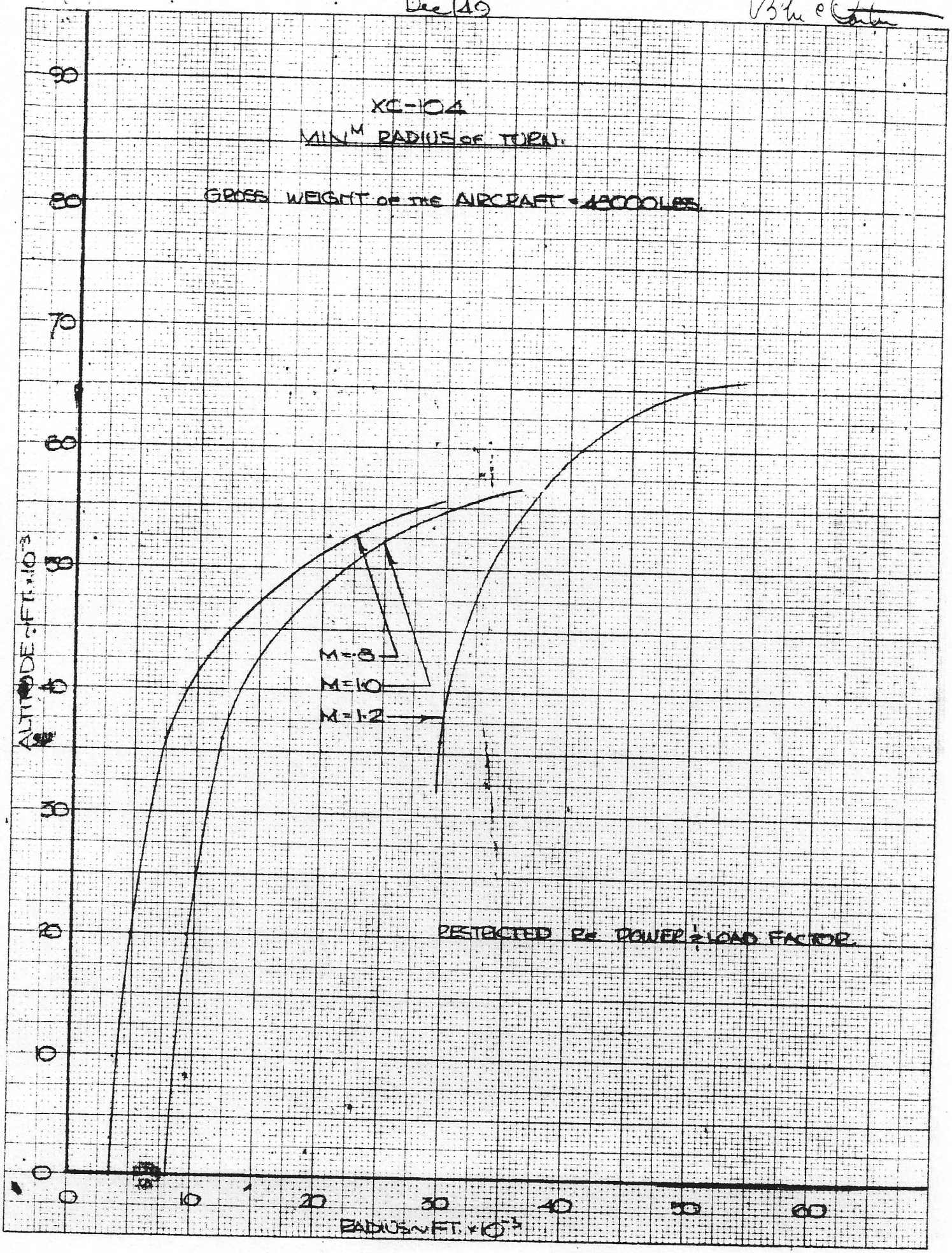
Dec 40

W. B. Hu - Carter.



Dec 49

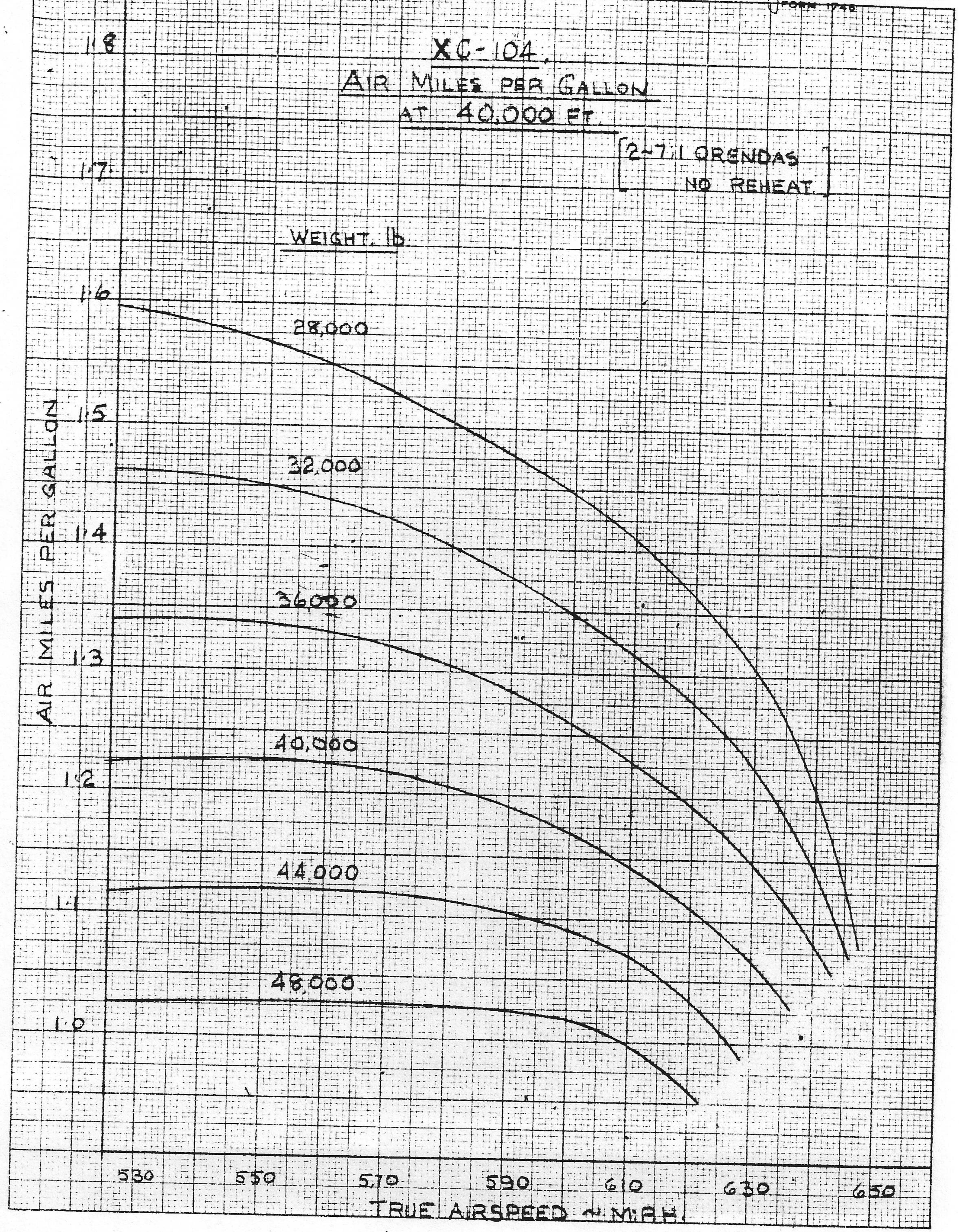
V B'h e Center



AIRCRAFT COMPONENT SHEET No. 25 REPORT No.

A.U.W. 48000 lb. DATE PREP. BY Jno. McCulloch.

FORM 1746

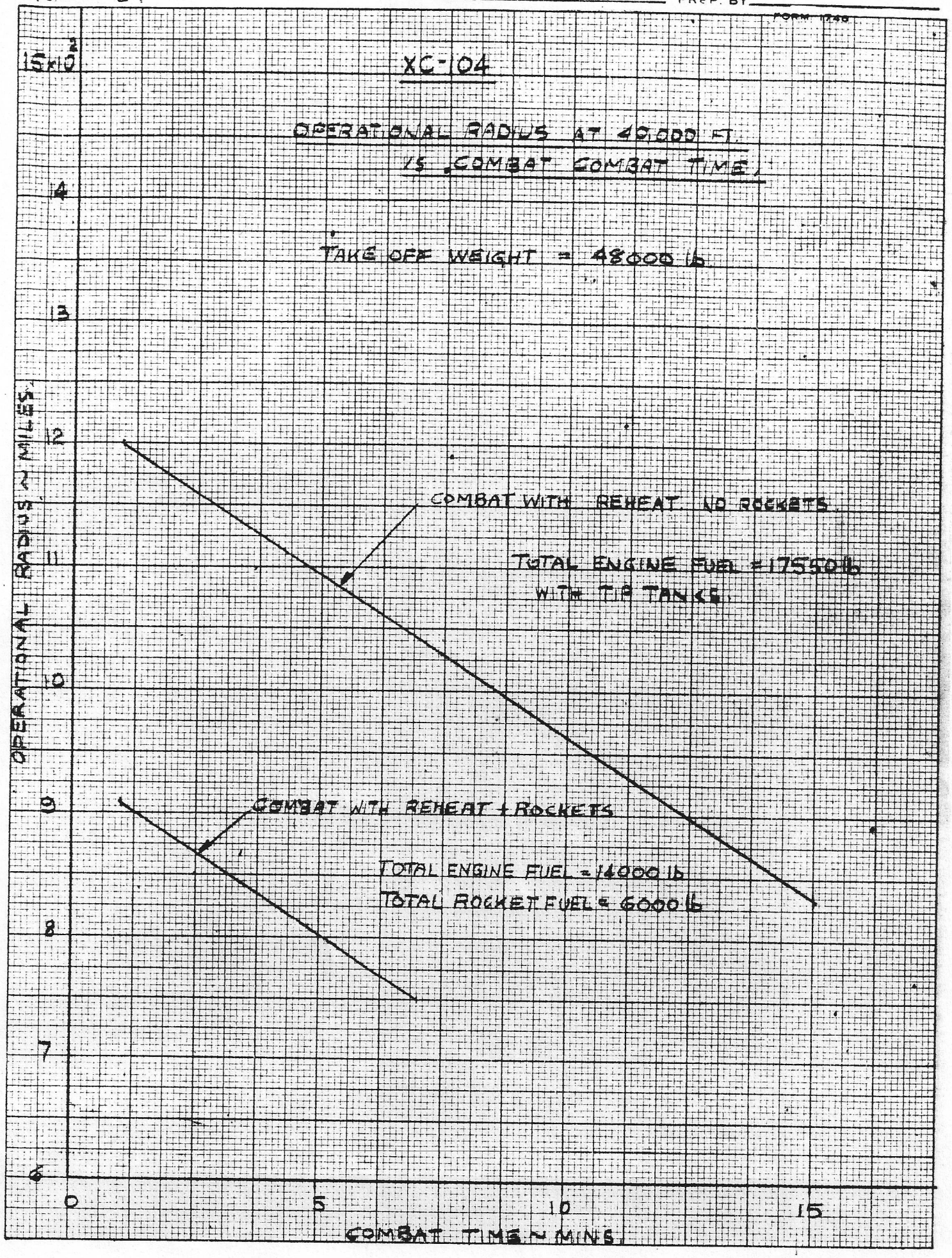


KEUFFEL & ESSER CO., N. Y. NO. 359-12
10 X ... to ½ inch, ... Made in U.S.A.

AIRCRAFT COMPONENT SHEET NO. 20 REPORT NO.

A.U.W. 48,000 lb. DATE PREP. BY

FORM 1248



AIRCRAFT COMPONENT SHEET NO. 27 REPORT NO

A.U.W. 48,000 DATE PREP. BY

FORM 1748

XC-104.

OPERATIONAL RADIUS AT 40000 FT
Vs REHEAT TIME

TAKE OFF WEIGHT = 48,000 lb

COMBAT WITH REHEAT + ROCKETS.

TOTAL ENGINE FUEL = 14000 lb
TOTAL ROCKET FUEL = 6000 lb.