QC
AVRO
C-105
PPR
10

CF-105

ANALYZED

PERIODIC PERFORMANCE REPORT

NO. 10

Dec. 1956

UNLIMITED
SECRET

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Report no.: QC Avro CF105 PPR-10

has been ☐ downgraded to: _____

☒ de-classified

by (Name): J.M.D. Henrie

(Dept.): DND Coordinator - Access to Information

Date: AUG 04 1992

Signature

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CF-105 PERIODIC PERFORMANCE REPORT - 10

Introduction

This is the tenth of a series of periodic performance reports for internal usage to be issued from the Aerodynamics Department, and is also the first performance report detailing predicted performance with the Iroquois engine with re-matched compressors (no model number has yet been furnished) and with the appropriate changes to the nozzle configuration.

The pertinent changes are noted in their appropriate sections. For more detailed discussion of the engine changes, see "Effect of N.A.C.A. Wind Tunnel and Free Flight Tests on the Estimated Performance of the CF-105".

As in the past, successive reports will present the latest data, with the alterations from the previous report noted. The report is divided into three major sections:

1) CF-105 Performance

2) CF-105 Drag

3) Propulsion

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PERFORMANCE
DRAG
PROPULSION

1: CF-105 PERFORMANCE WITH ORENDA IROQUOIS ENGINES

(C.G. at 29.5% M.A.C.)

This estimate is the first to be prepared for the CF-105 Mk. 2 with the Iroquois engines with re-matched compressors (model number not available) and with the appropriate airframe nozzle changes.

As will be seen no significant change in performance at speeds up to M = 1.5 is predicted, but at speeds between M = 1.5 and M = 2.0 appreciable gains are made.

DRAG

PROPULSION

LOADING AND PERFORMANCE - 10

December, 1956.

Performance Under I.C.A.O. Standard Atmospheric Conditions

To R.C.A.F. Specification AIR 7-4

With Two Iroquois Engines

WEIGHT:

Take-Off Weight with 15,672 Lbs. Fuel (78.9% Max)	Lb.	59,336
Operation Weight Empty	Lb.	43,664
Combat Weight	Lb.	51,500
Normal Design Landing Gross Weight AIR 7-4 - MIL-S-5701	Lb.	45,854
Wing Loading at Normal Take-Off Weight	Lb/Sq.Ft.	48.4
Power Loading at Normal Take-Off Weight	Lb/Lb. Thrust	1.34

SPEED:

True Airspeed in Level Flight at Sea Level at Combat Weight		
Maximum Thrust A/B Lit	Kts.	700 *
Maximum Thrust A/B not Lit	Kts.	671
True Airspeed in Level Flight at 50,000 Ft. at Combat Weight		
Maximum Thrust A/B Lit	Kts.	1147 *

CEILING:

Combat Ceiling at Combat Weight, Rate of Climb = 500 F.P.M.		
Maximum Thrust at 2.0 M.N. A/B Lit	Ft.	63,300

RATE OF CLIMB:

Steady Rate of Climb at Sea Level, Combat Weight		
Maximum Thrust at M.N. = .92 A/B Lit	F.P.M.	60,600
Maximum Thrust at 527 Kts. A/B not Lit	F.P.M.	27,200
Steady Rate of Climb at 50,000 Ft., Combat Weight		
Maximum Thrust at M.N. = 2.0 A/B Lit	F.P.M.	14,500

TIME TO HEIGHT:

Time to 50,000 Ft. M.N. = 1.5 from Engine Start at Take-Off Weight		
Maximum Thrust A/B Lit	Mins.	4.33

MANOEUVRABILITY:

Combat Load Factor at Combat Weight	
Maximum Thrust at M.N. = 1.50 at 50,000 Ft. A/B Lit	1.63
Maximum Thrust at M.N. = 2.00 at 50,000 Ft. A/B Lit	1.96

* AIR 7-4 Placard Speed

TAKE-OFF DISTANCE:

Take-Off Distance over 50 Ft. Obstacle at Sea Level at
Take-Off Weight = 59,336 Lbs.

Maximum Thrust A/B Lit	Ft.	2,850
Maximum Thrust A/B not Lit	Ft.	4,430
Maximum Thrust Hot Day A/B Lit	Ft.	3,460

LANDING DISTANCE:

Landing Distance over 50 Ft. Obstacle at Sea Level at
Normal Design Landing Gross Weight ..... Ft. 4,810

STALLING SPEED:

True Stalling Speed in Landing Configuration at Combat Weight
at Sea Level ..... Kts. 111.5

RANGE:

Combat Radius of Action at 50,000 Ft. Climb at 527 Kts. T.A.S., Accel. to M = 1.5 @ 30,000', Climb @ M = 1.5 to 50,000', Cruise-out at M.N. = 1.5, Combat for 5 Mins. at M.N. = 1.50, Cruise-back at M.N. = .92, 15 Min. Stack at 40,000 Ft., 5 Min. Fuel Reserve on Landing

High Speed Mission with 15,672 Lbs. Fuel	N.M.	200.0
High Speed Mission with Full Internal Fuel (SG = 0.78)	N.M.	302.0

Combat Radius of Action at 50,000' Mission as above except
Cruise-out at M.N. = .92

Maximum Range Mission with 15,744 Lbs. Fuel	N.M.	300.0
Maximum Range Mission with Full Internal Fuel (SG = 0.78)	N.M.	450.0

Ferry Range Mission at Economical Cruise Speed (Cruise climb from 36,500' to 41,500' at M = .92) including 15 Mins. Stacking at 40,000 Ft., 5 Min. Fuel Reserve on Landing

Range with Full Internal Fuel and 500 Gal. - External Tank
(SG = 0.78) ..... N.M. 1460.0

DRAG

PROPULSION

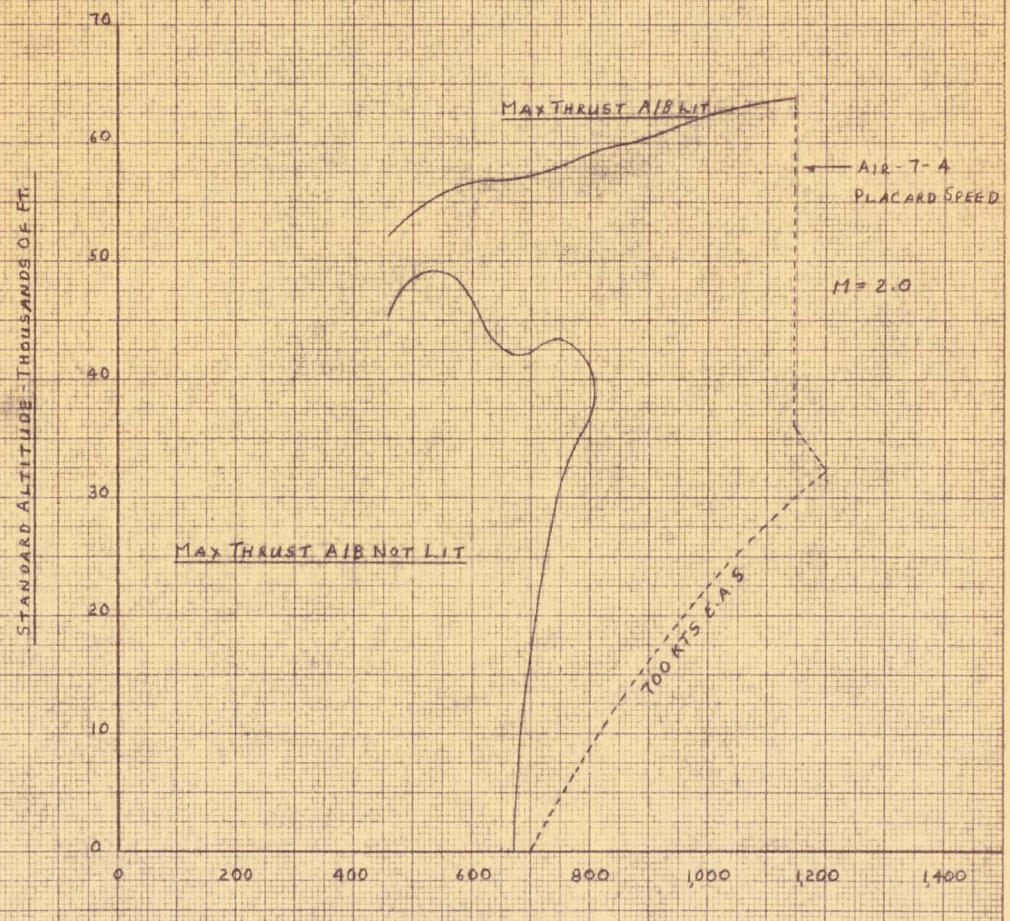
REPORT NO. P/PERF/122

CF 105

MAX LEVEL SPEED

IROQUOIS ENGINES

COMBAT WEIGHT



Dec/56

DRAG

PROPULSION

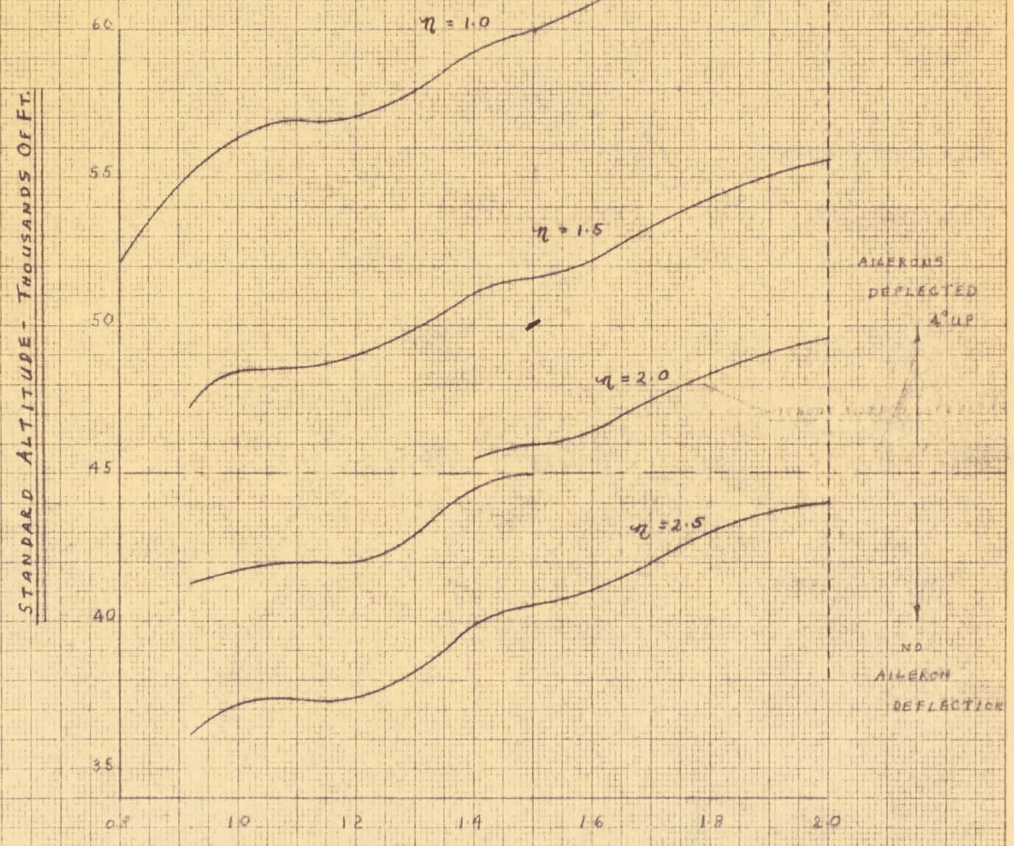
K&E 10 X 10 TO THE CM. 359-14 KEUFFEL & ESSER CO. U.S.A.

CF105 MANOEUVRABILITY

REPORT NO. P/PERF/122

AVAILABLE STEADY g's AT COMBAT WEIGHT

IROQUOIS ENGINES WITH AFTERBURNERS LIT



Nov/56

K+E 10 X 10 TO THE CM. 359-14 KEUFFEL & ESSER CO. MADE IN U.S.A.

DRAG

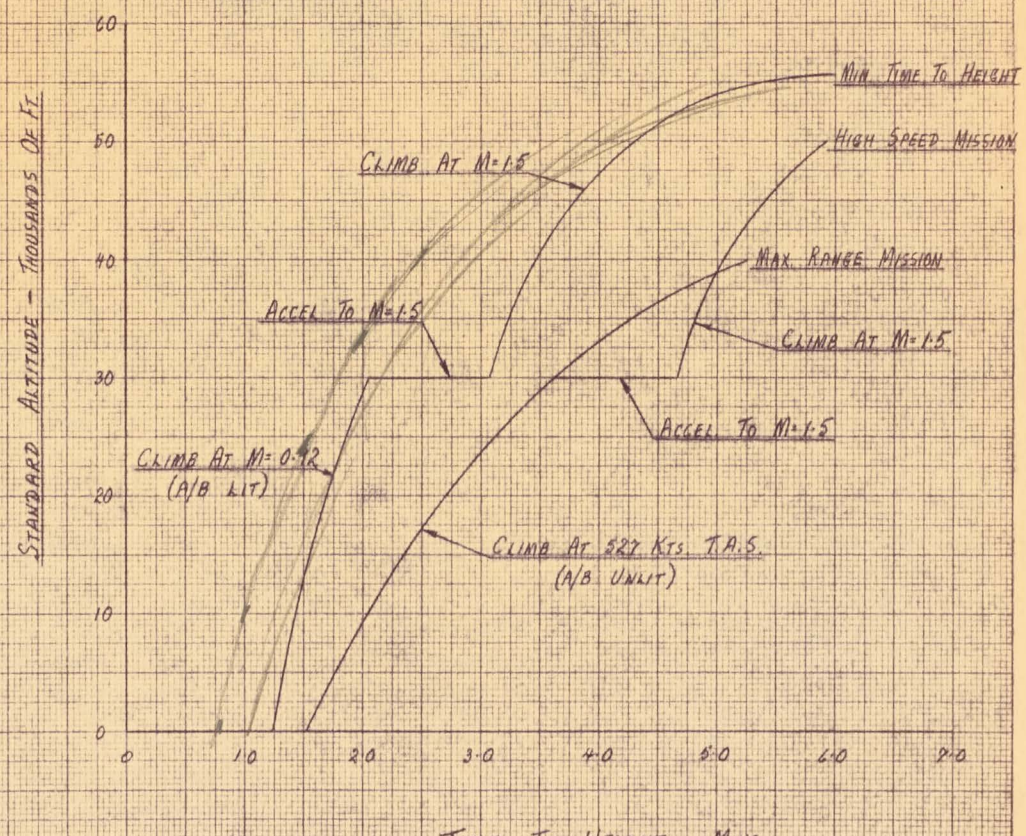
PROPULSION

CF105 TIME TO HEIGHT

IROQUOIS ENGINES

NOTE - 1/2 MIN. ALLOWED FROM ENGINE START TO MAX. THRUST

ACCELERATION TO M=1.5 AND CLIMB
AT M=1.5 WITH A/B LIT.



Nov. 1956

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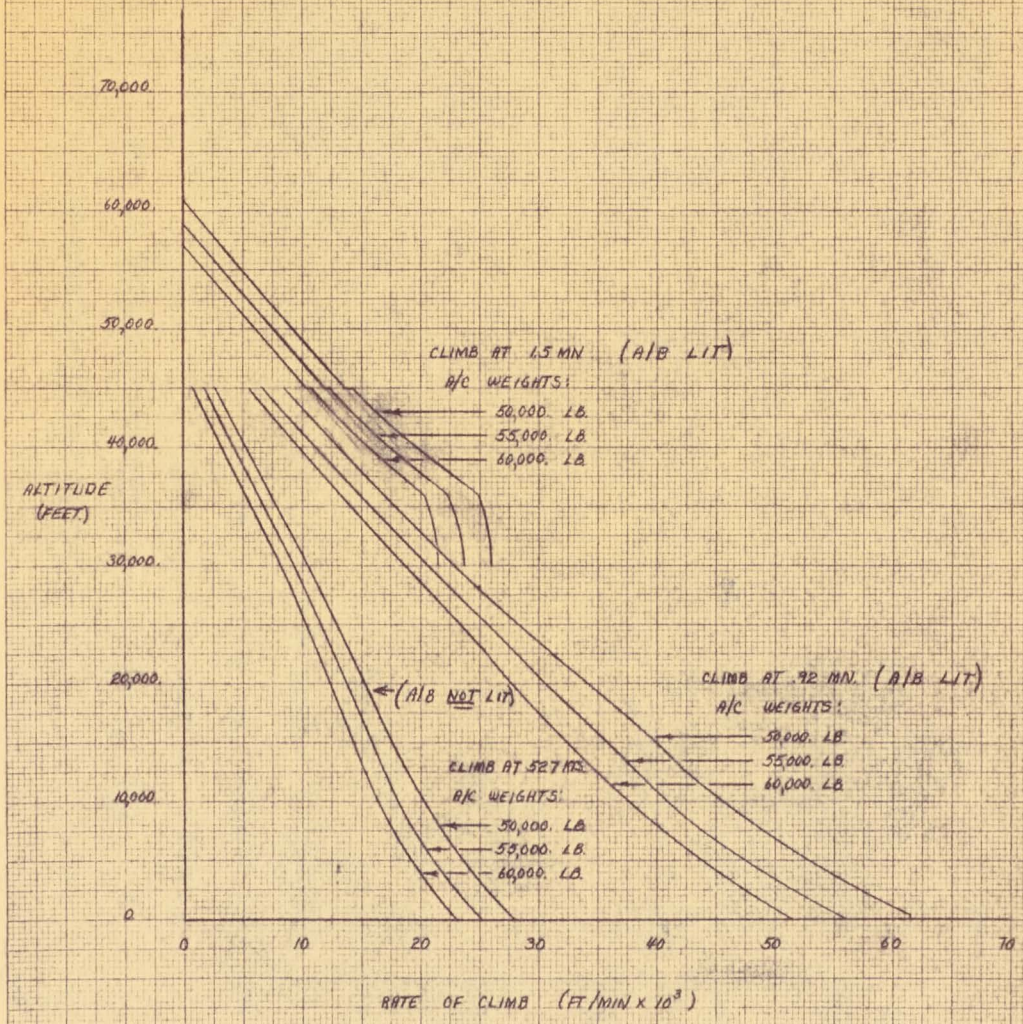
CF105

IROQUOIS ENGINE

RATE OF CLIMB (STEADY STATE)



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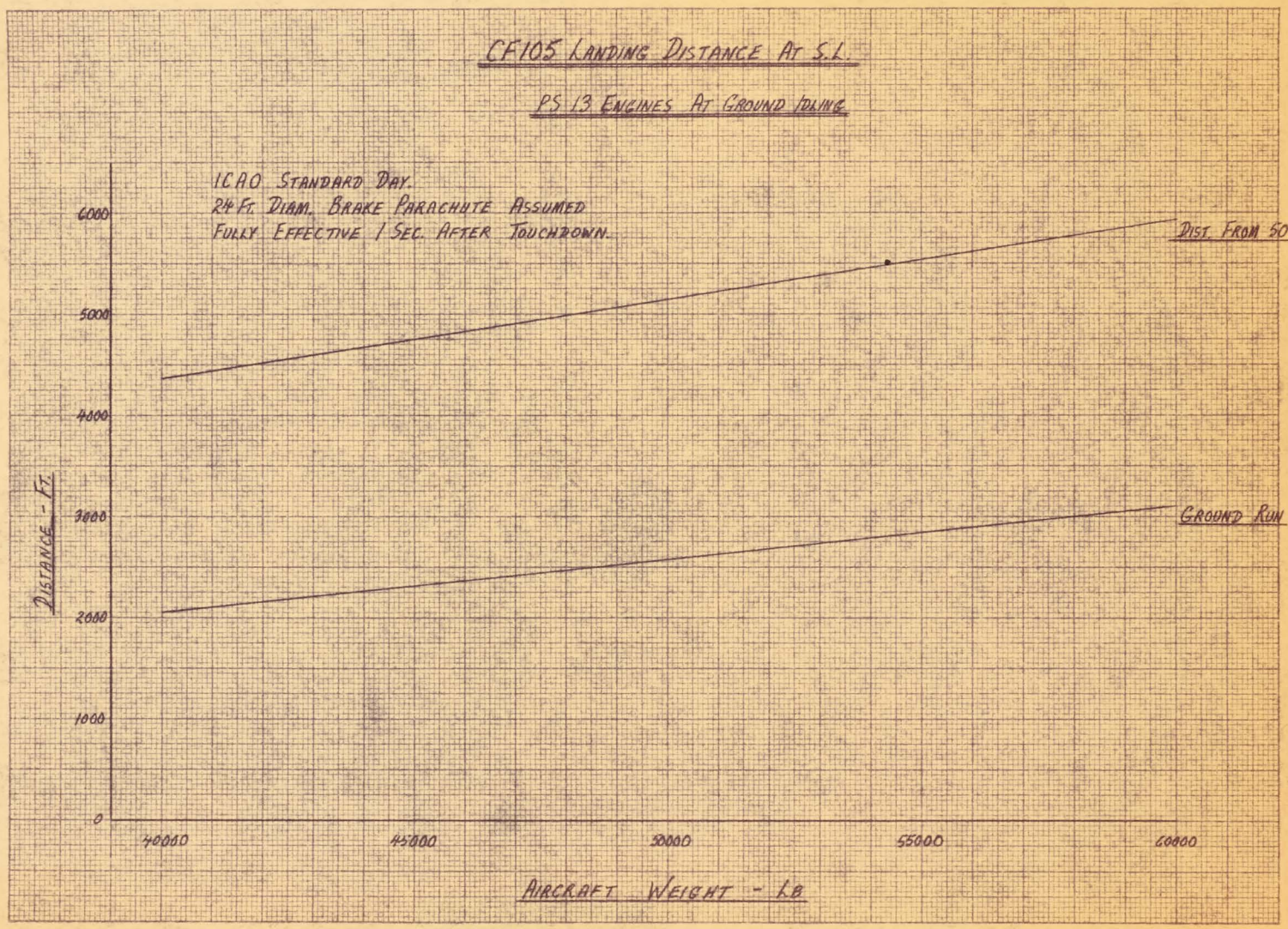
K+E 10 X 10 TO THE CM. 359-14
KEUFFEL & ESSER CO. MADE IN U.S.A.



OCT. 1956

REPORT NO P/PERF/122

PROPULSION

DRAG

2: CF-105 DRAG DATA

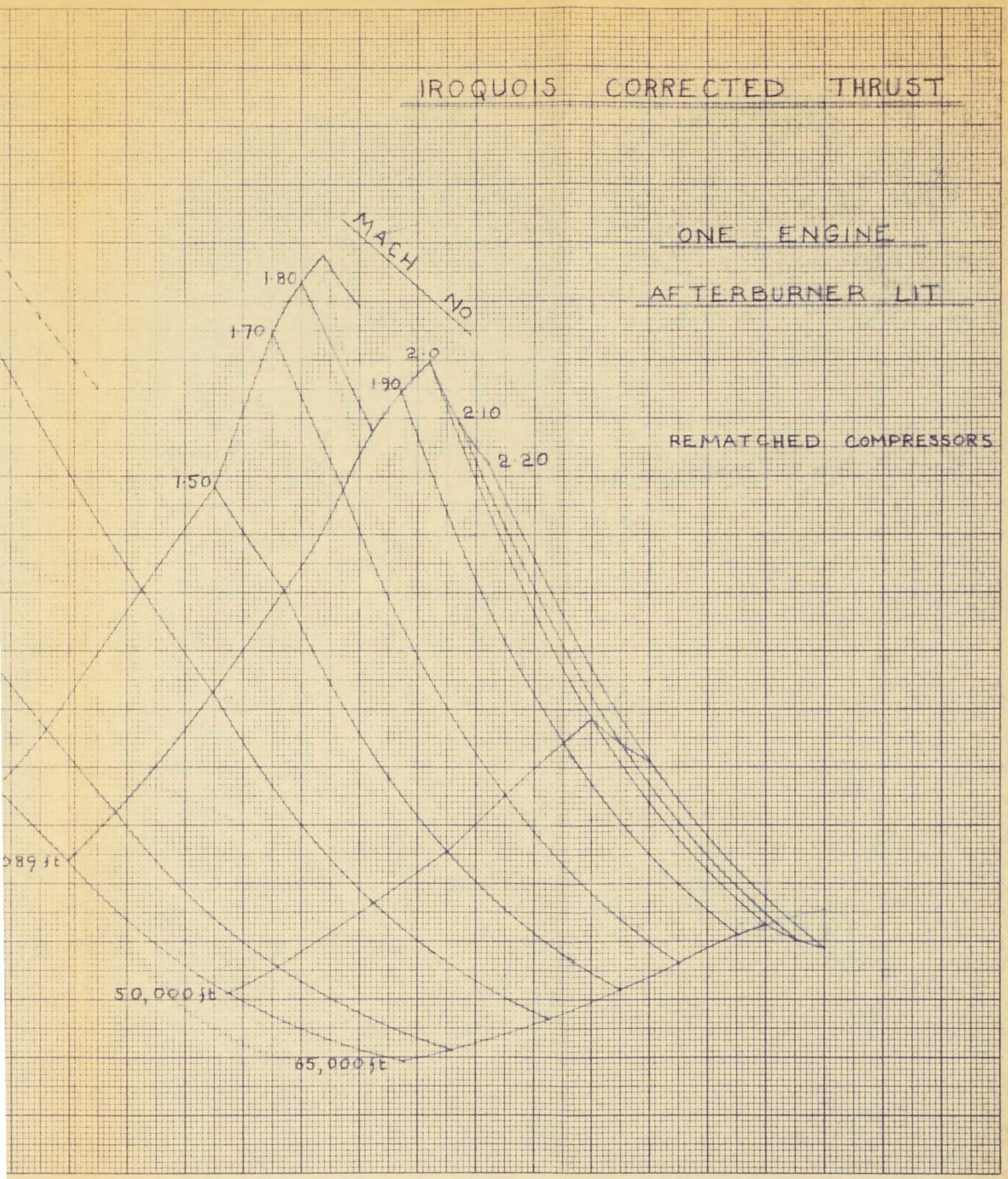
No drag revision has been made since periodic report No. 9

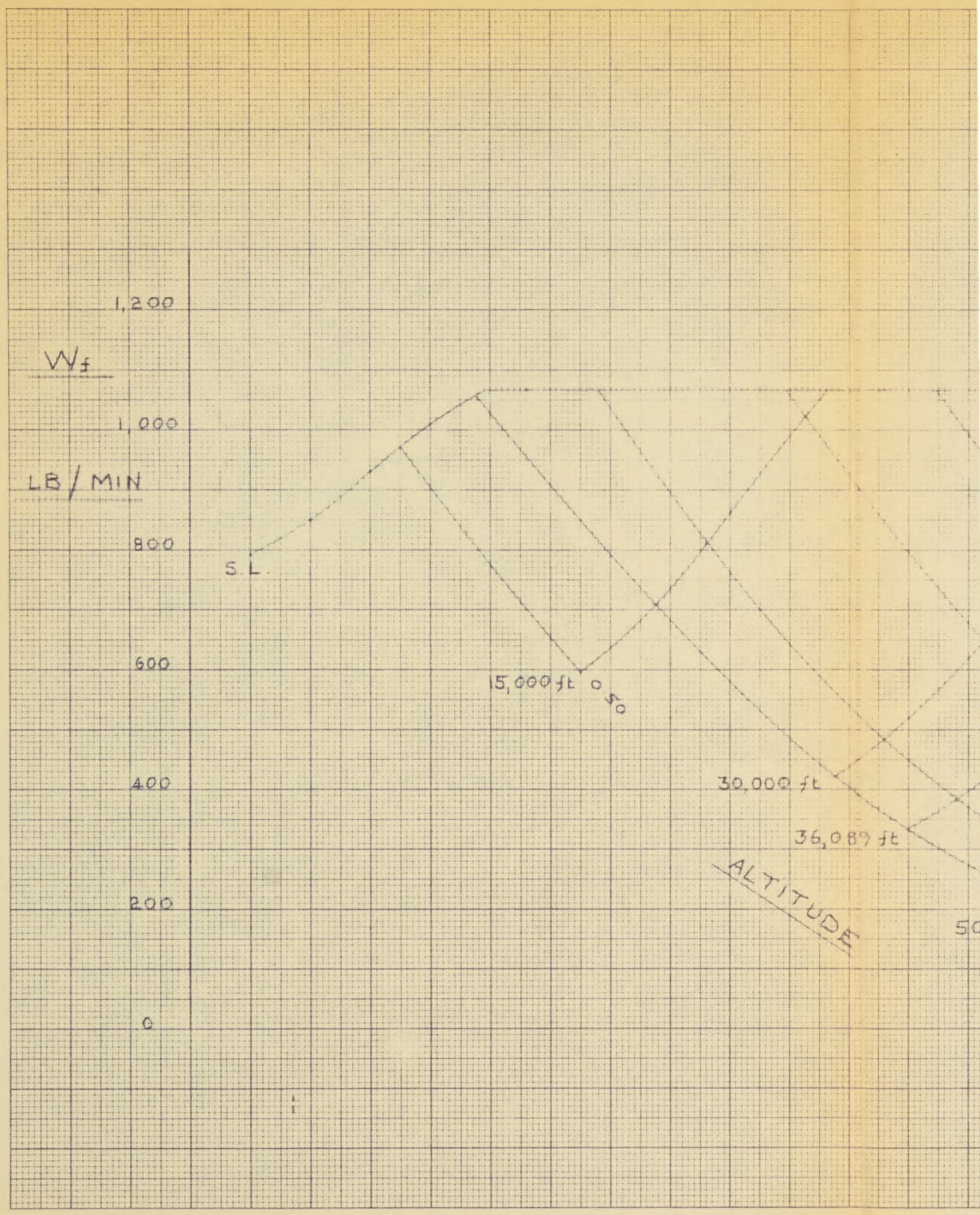
PROPULSION

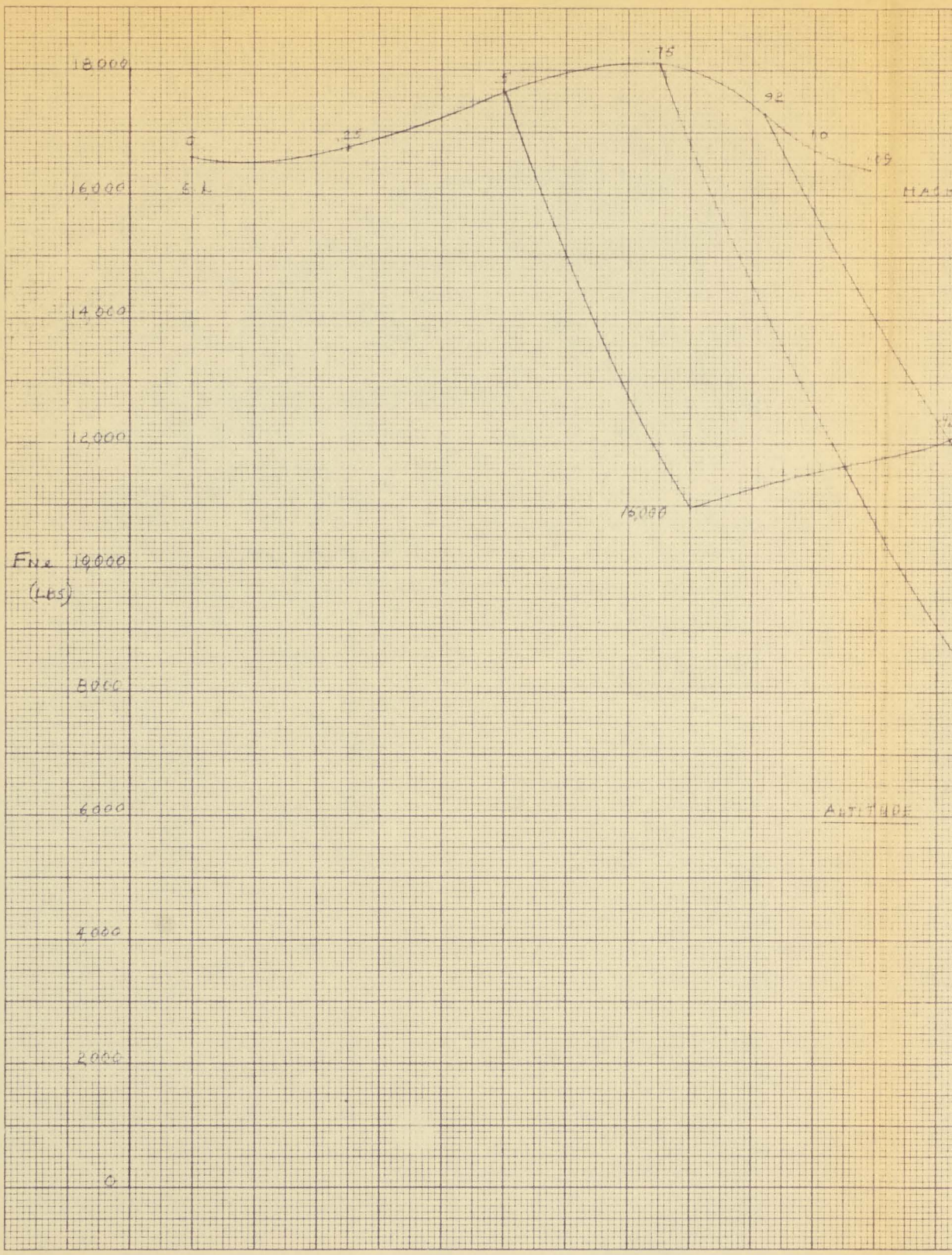
3. CF-105 PROPULSION DATA

This section is revised since Report No. 9 to give engine performance for the installed Iroquois with re-matched compressors and appropriate airframe nozzle changes.

Since Orenda Engines Ltd. have not yet issued any formal data on this model of the engine, the information in this section should be treated as preliminary.

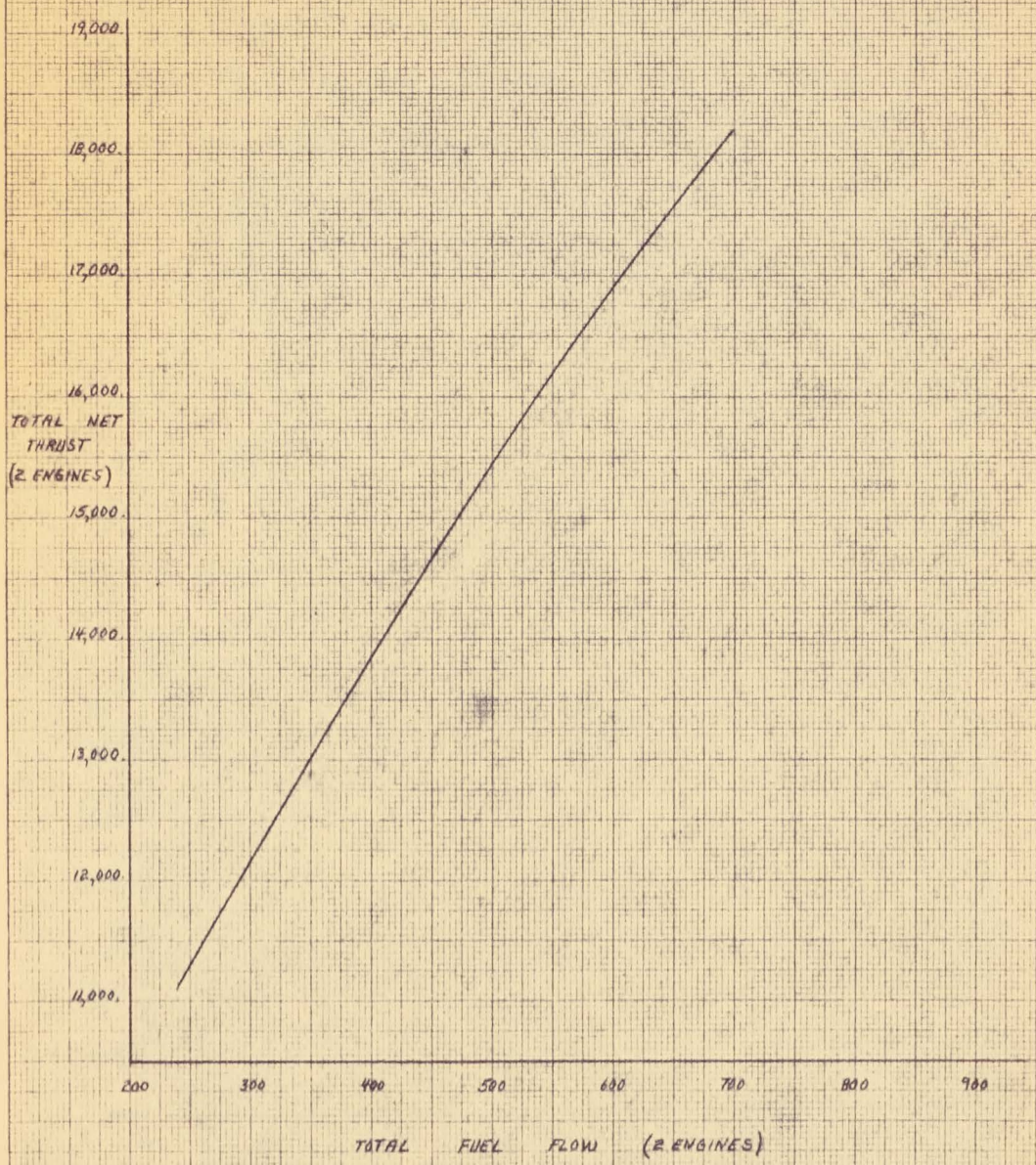

IROQUOIS CORRECTED THRUST
ONE ENGINE
AFTERBURNER LIT
REMATCHED COMPRESSORS
MACH NO
1·80
1·70
1·50
2·0
1·90
2·10
2·20
50,000 ft
65,000 ft


1,200
W_f
1,000
LB / MIN
800
S.L.
600
15,000 ft
400
30,000 ft
36,089 ft
ALTITUDE
200
0


18,000
16,000
14,000
12,000
10,000
8000
6000
4000
2000
0
FNE
(LBS)
.75
.92
1.0
1.15
16,000
ALTITUDE

IROQUOIS AIRCRAFT
PARTIAL AFTERBURNING
1.5 MN AT 50,000. FT.

TOTAL NET THRUST VS. TOTAL FUEL FLOW



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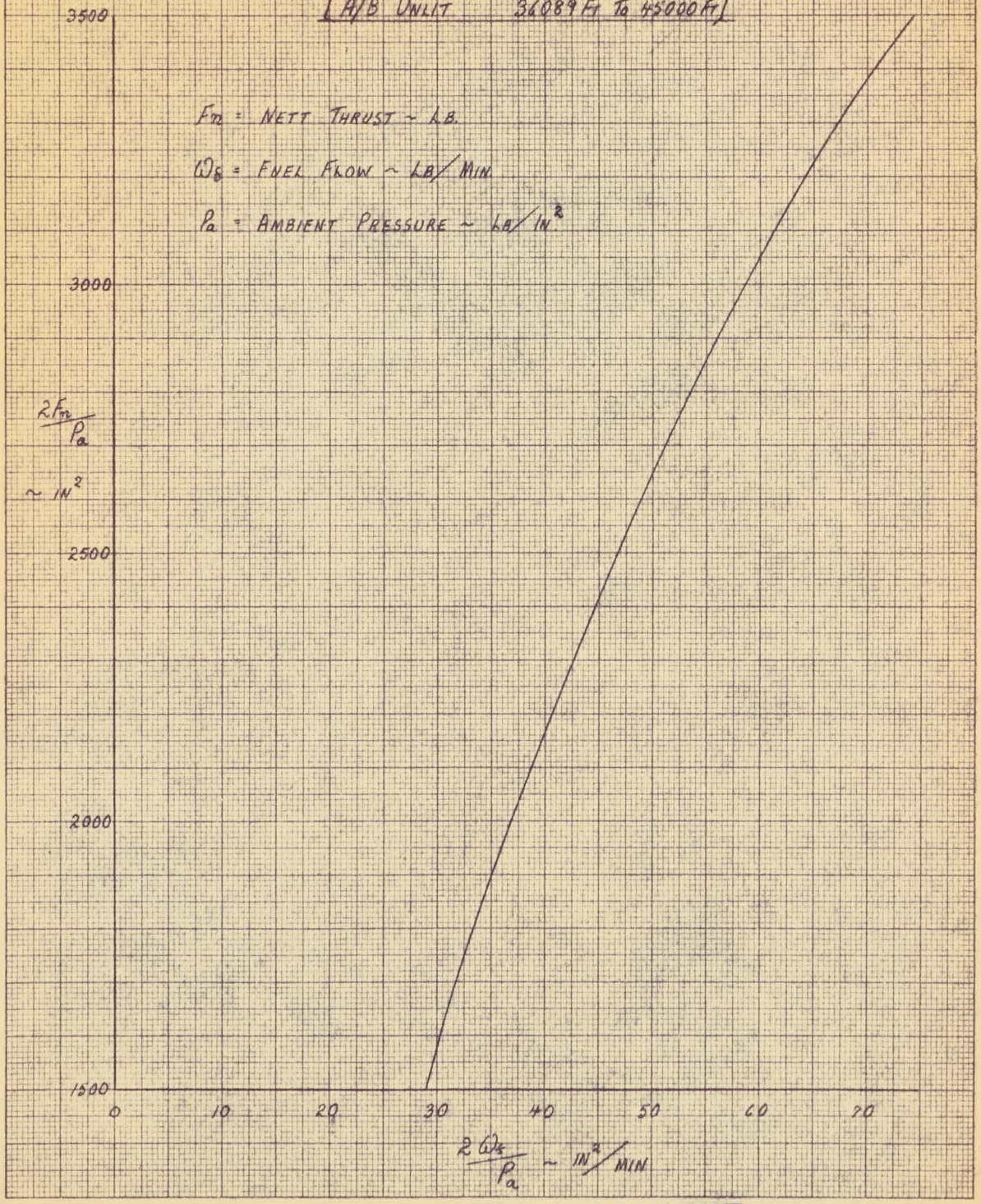
CF 105

IROQUOIS PARTIAL THRUST AT M = 0·92

[A/B UNLIT 36089 FT TO 45000 FT]



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