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CF-105

MONTHLY PERFORMANCE REPORT

SECRET

NO. 6

March, 1956.

A. V. ROE CANADA LIMITED
MALTON - ONTARIO

TECHNICAL DEPARTMENT (Aircraft)

SECRET

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CF-105 MONTHLY PERFORMANCE REPORT

(Issued Mid-Monthly)

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FORM 1316A

PERFORMANCE

DRAG

March, 1956.

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CF-105 MONTHLY PERFORMANCE REPORT - 6.

PERFORMANCE

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INTRODUCTION

This is the sixth of a series of monthly performance reports for internal usage, to be issued from the Aerodynamics Department. It should be noted that Monthly Performance Report 5 is to be taken the same as Report 4.

Only the performance with Pratt & Whitney J.75 engines has been revised since the last report. The Orenda P.S. 13 data is being revised at the present time.

The pertinent changes are noted in their appropriate sections.

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. Engine Data

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1A: CF-105 PERFORMANCE WITH PRATT AND WHITNEY (J.75) JT4A-25 ENGINES

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

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The following CF-105 - (J-75) JT4A-25 performance estimate is based on the wind tunnel configuration designated $B_2 W_1 W_1 E_{10} N_5 D_{8-4}$ (except that the nose cone angle has been reduced to 30°). The particular feature of this configuration is the extended, notched and cambered leading edge of the wing.

The drag of this configuration has been summarized (extract P/Perf/112) and is presented in Section 2 of the previous monthly report. However, this has been revised slightly because of shifting the c.g. from 29% MAC to 29.5% MAC. This is in accordance with the planned fuel sequencing to give a c.g. position of 31% MAC on firing the Sparrow II missiles.

The CF-105 operational weight empty has increased approximately 1,400 lbs. since the previous report due to Sparrow II missile installation in place of Falcons.

No revision has been made to the installed engine data other than the extension required to revise the mission profiles.

The overall effect is one of only slightly degraded performance.

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LOADING AND PERFORMANCE - 6

March 1956.

Performance Under N.A.C.A. Standard Atmospheric Conditions

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

(With 2 J-75 Engines)

WEIGHT:

Take-Off Weight with 15,673 Lb. Fuel (78.9% Max.)	Lb.	60,927
Operational Weight Empty	Lb.	45,254
Combat Weight (1/2 Fuel)	Lb.	53,090
Landing Weight (With Reserve Fuel + Missiles)	Lb.	45,224
Wing Loading at Normal Take-Off Weight	Lb./sq /Ft.	48.5
Power Loading at Normal Take-Off Weight	Lb./Lb. Thrust	1.64

SPEED

True Air Speed in Level Flight At Sea Level at Combat Weight		
Maximum Thrust	Kts.	V 800
Military Thrust	Kts.	640
True Air Speed in Level Flight At 50,000 Ft. at Combat Weight		
Maximum Thrust	Kts.	1,075

CEILING

Combat Ceiling at Combat Weight, Rate of Climb = 500 F.P.M. Maximum Thrust at 1.5 M.N.	Ft.	56,400

RATE OF CLIMB

Steady Rate of Climb at Sea Level, Combat Weight		
Maximum Thrust at M.N. = .92	F.P.M.	46,500
Military Thrust at 530 Kts.	F.P.M.	15,500
Steady Rate of Climb at 50,000 Ft., Combat Weight		
Maximum Thrust at M.N. = 1.5	F.P.M.	5,900

TIME TO HEIGHT

Time to 50,000 Ft. M.N. = 1.5 from Engine Start at Take-Off Weight		
Maximum Thrust	Mins.	5.1

MANOEUVRABILITY

Combat Load Factor at Combat Weight Maximum Thrust at M.N. = 1.50 at 50,000 Ft.	1.46

V Placard Speed = 720 Kts. E.A.S.

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TAKE-OFF DISTANCE

Take-Off Distance over 50 Ft. Obstacle at Sea Level Take-Off Weight

Maximum Thrust	Ft.	3,500
Military Thrust	Ft.	6,400
Maximum Thrust, Hot Day	Ft.	4,900

LANDING DISTANCE

Landing Distance over 50 Ft. Obstacle at Sea Level at Combat Wt. Ft. 5,400

STALLING SPEED

True Stalling Speed in Landing Configuration at Combat Weight at Sea Level ..... Kts. 112

RANGE

Combat Radius of Action at 50,000 Ft., Climb at M.N. = .92, 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 15,673 Lb. Fuel	N.M.	200
High Speed Mission with Full Internal Fuel	N.M.	295

Combat Radius of Action at 50,000 Ft., Mission as above except climb at 530 Kts. and cruise out at M.N. = .92

Maximum Range Mission with 15,673 Lb. Fuel	N.M.	380
Maximum Range Mission with Full Internal Fuel	N.M.	545

Ferry Range Mission at Economical Cruise Speed (M = .92 and Height, including 15 Mins. Stacking at 40,000 Ft., 5 Min. Fuel Reserve on Landing

Range with Full Internal Fuel and 500 Gal. - External Tank	N.M.	1,678
Range with Full Internal Fuel	N.M.	1,444

DRAG

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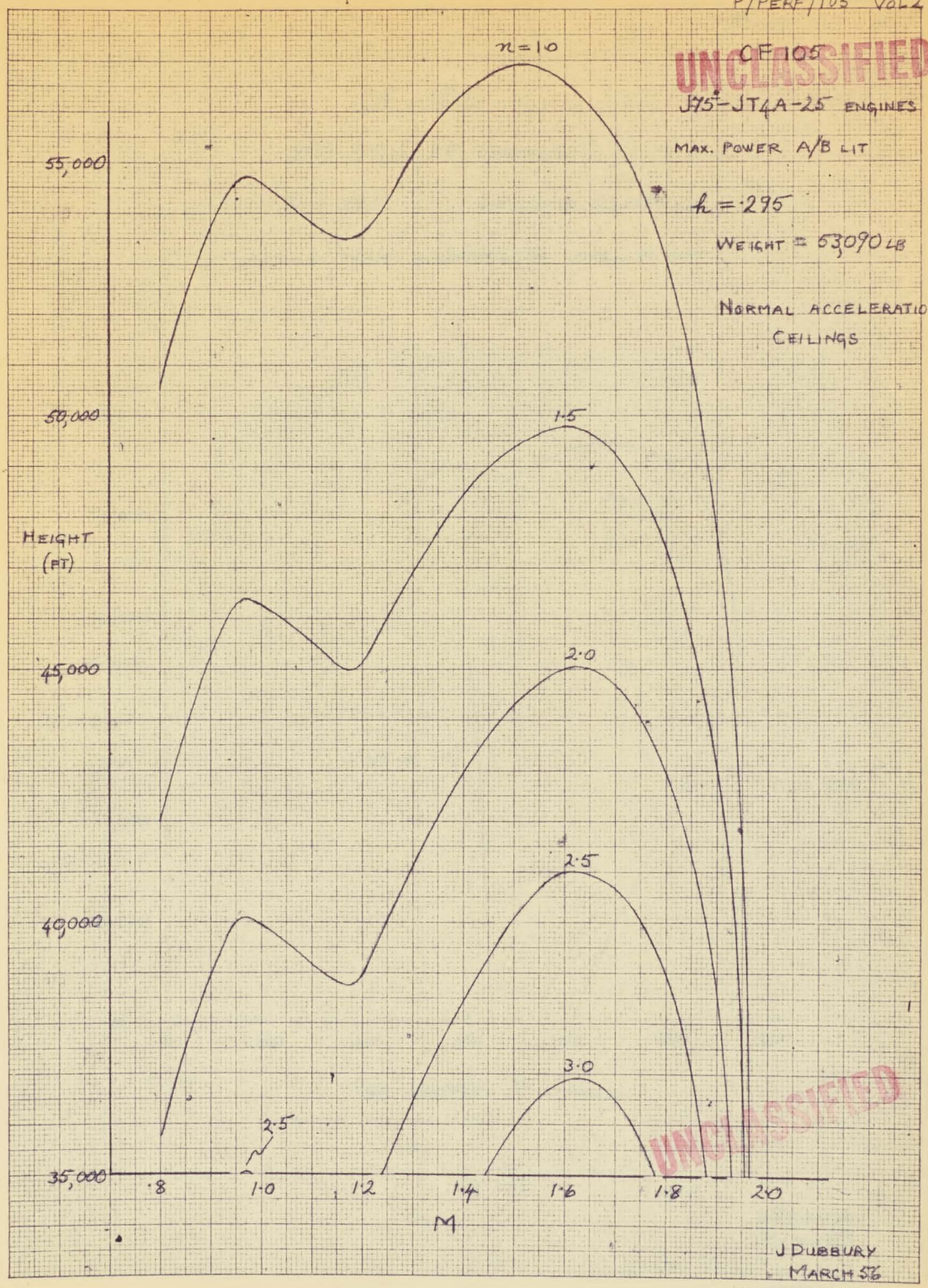
P/PERF/105 VOL 2



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JT5-JT4A-25 ENGINES

MAX. POWER A/B LIT

$h = 295$

WEIGHT = 53090 LB

NORMAL ACCELERATION CEILINGS

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P/PERF/105 VOL 2

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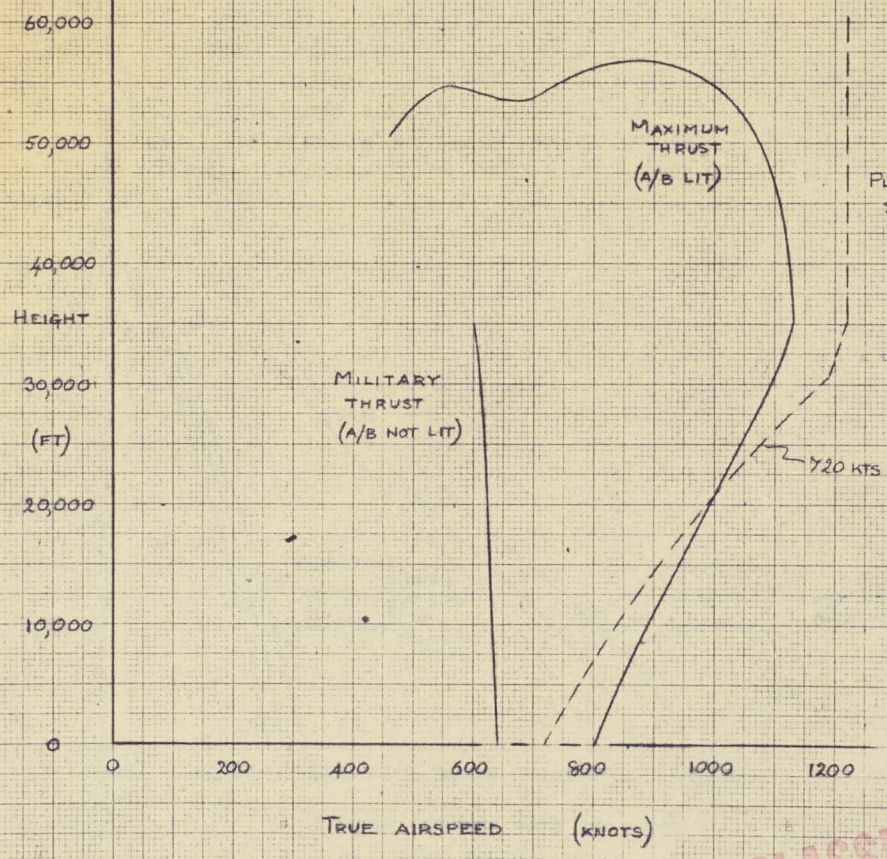
JY5 - JT4A-25 ENGINES

$h = .295$ WEIGHT # 53,090 LB.

MAXIMUM TRUE AIRSPEED IN LEVEL FLIGHT



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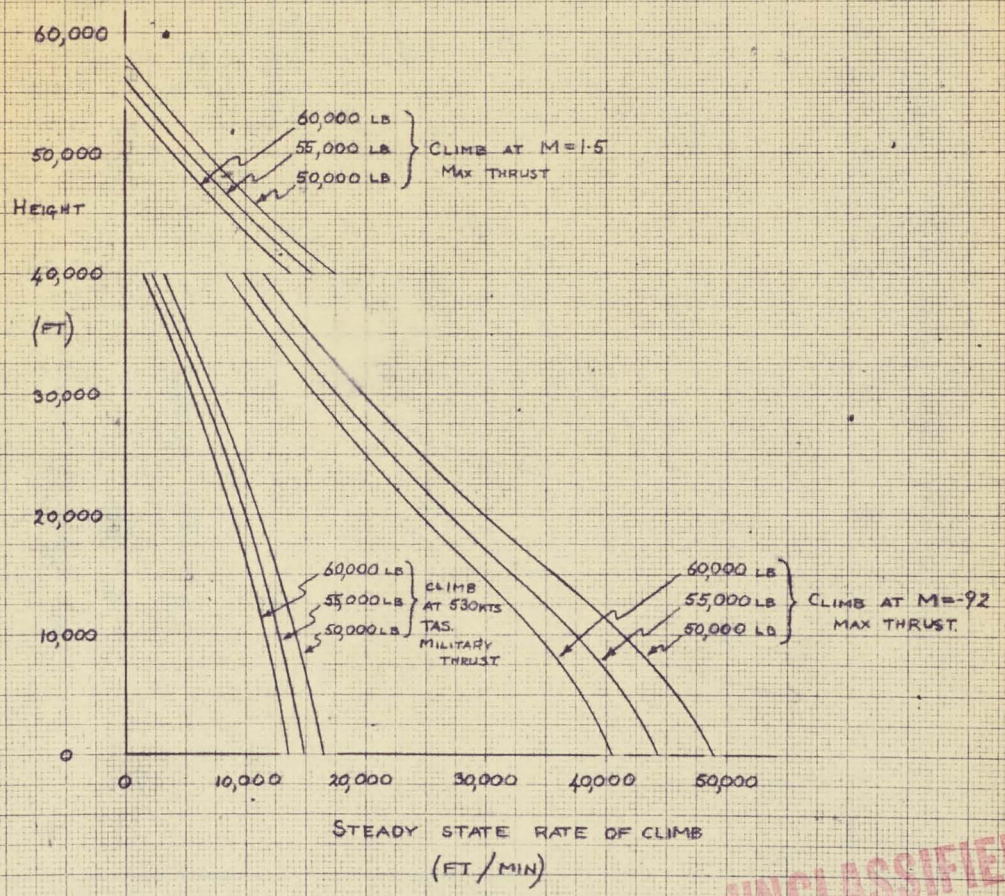
J75 - JT4A - 25 ENGINES

$h = \cdot 295$

STEADY STATE RATE OF CLIMB

BASED ON FORMULA

$$R/C = 60 Ma \left(\frac{F-D}{W}\right) \text{ FT/MIN}$$



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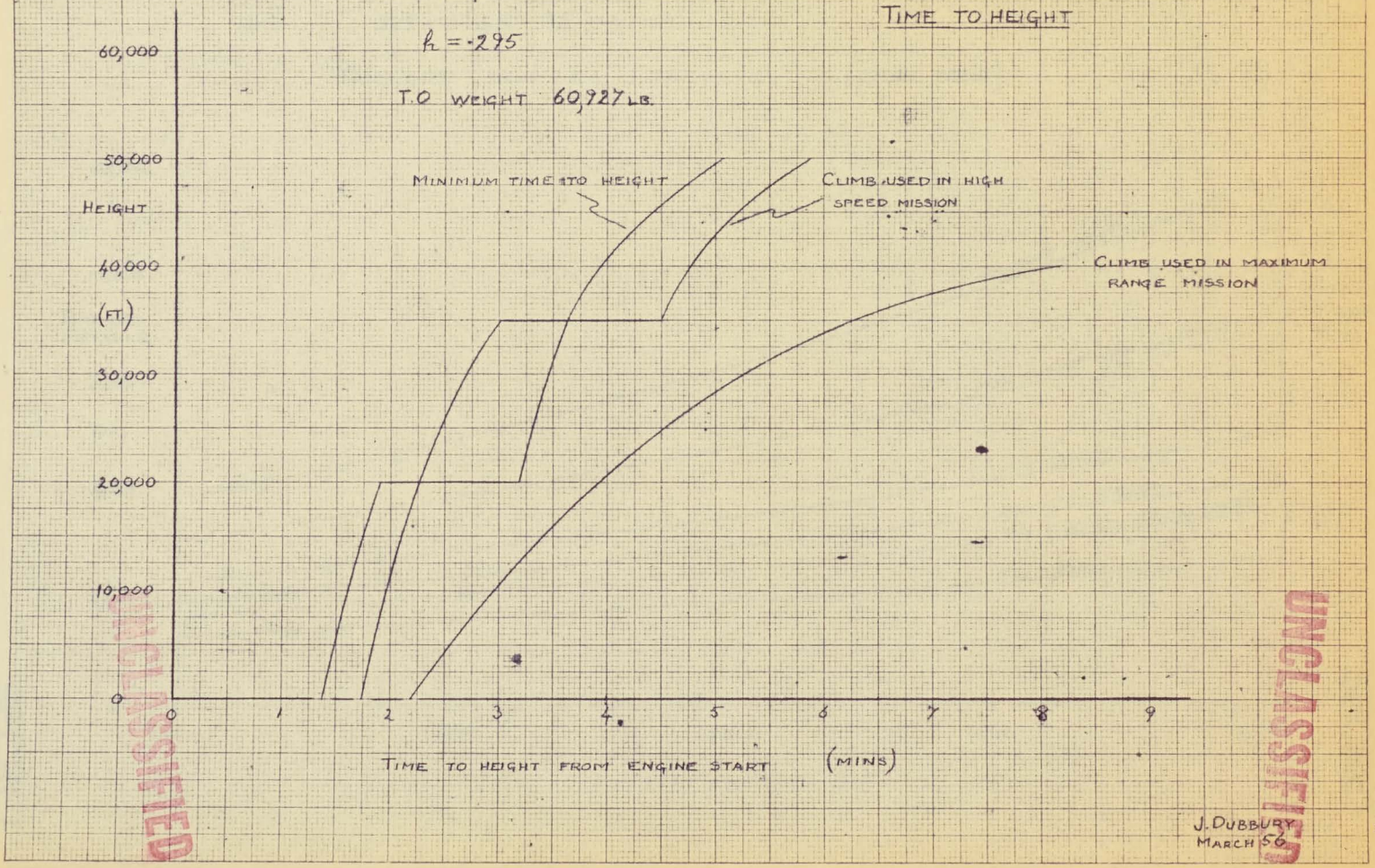
CF 105

J75-JT4A-25 ENGINES

$k = .275$

T.O WEIGHT 60,927 LB.

TIME TO HEIGHT



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P/PERF/105 VOL 2.

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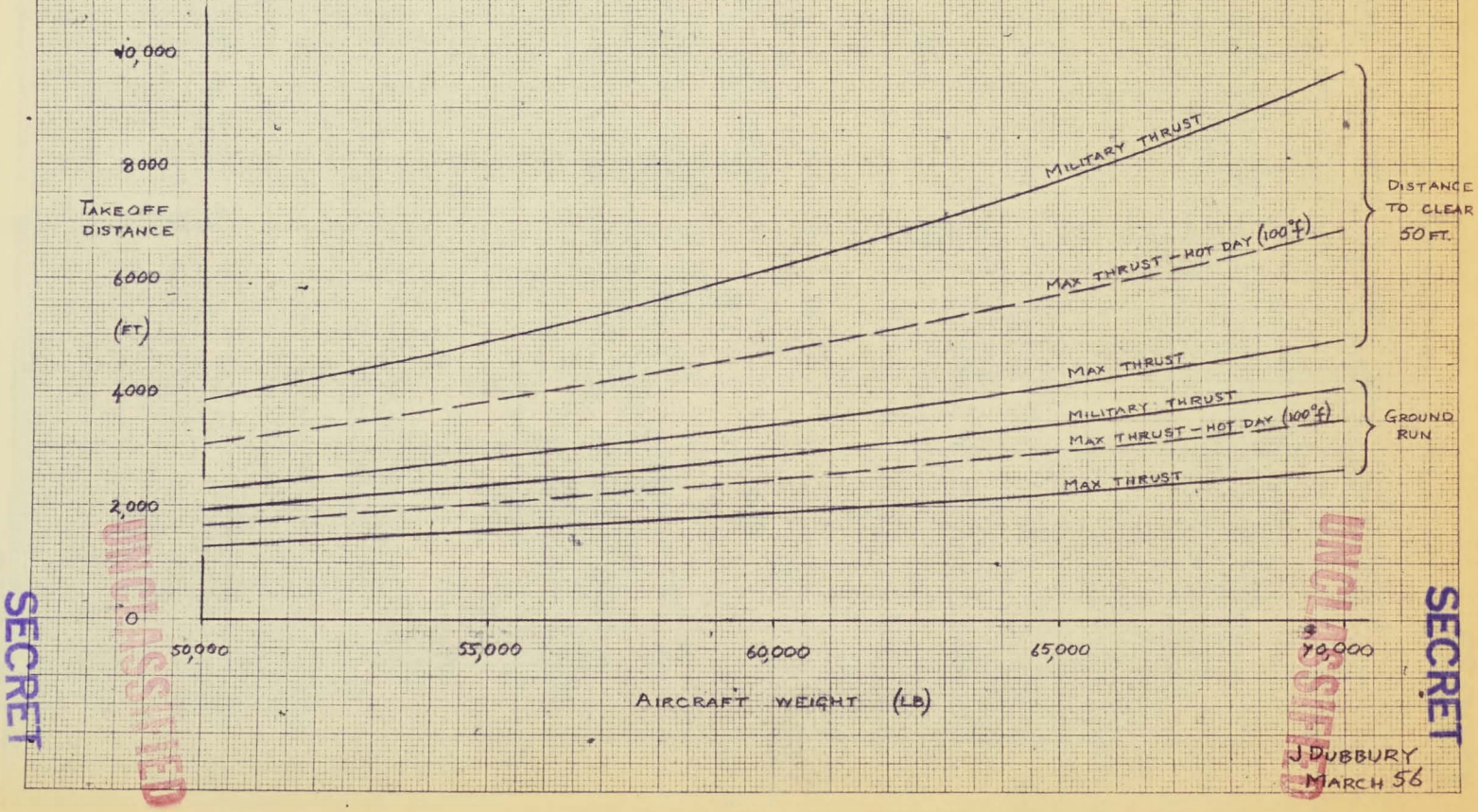
J75-JT4A-25 ENGINES.

TAKEOFF RUN AT SEA LEVEL (ZERO WIND)



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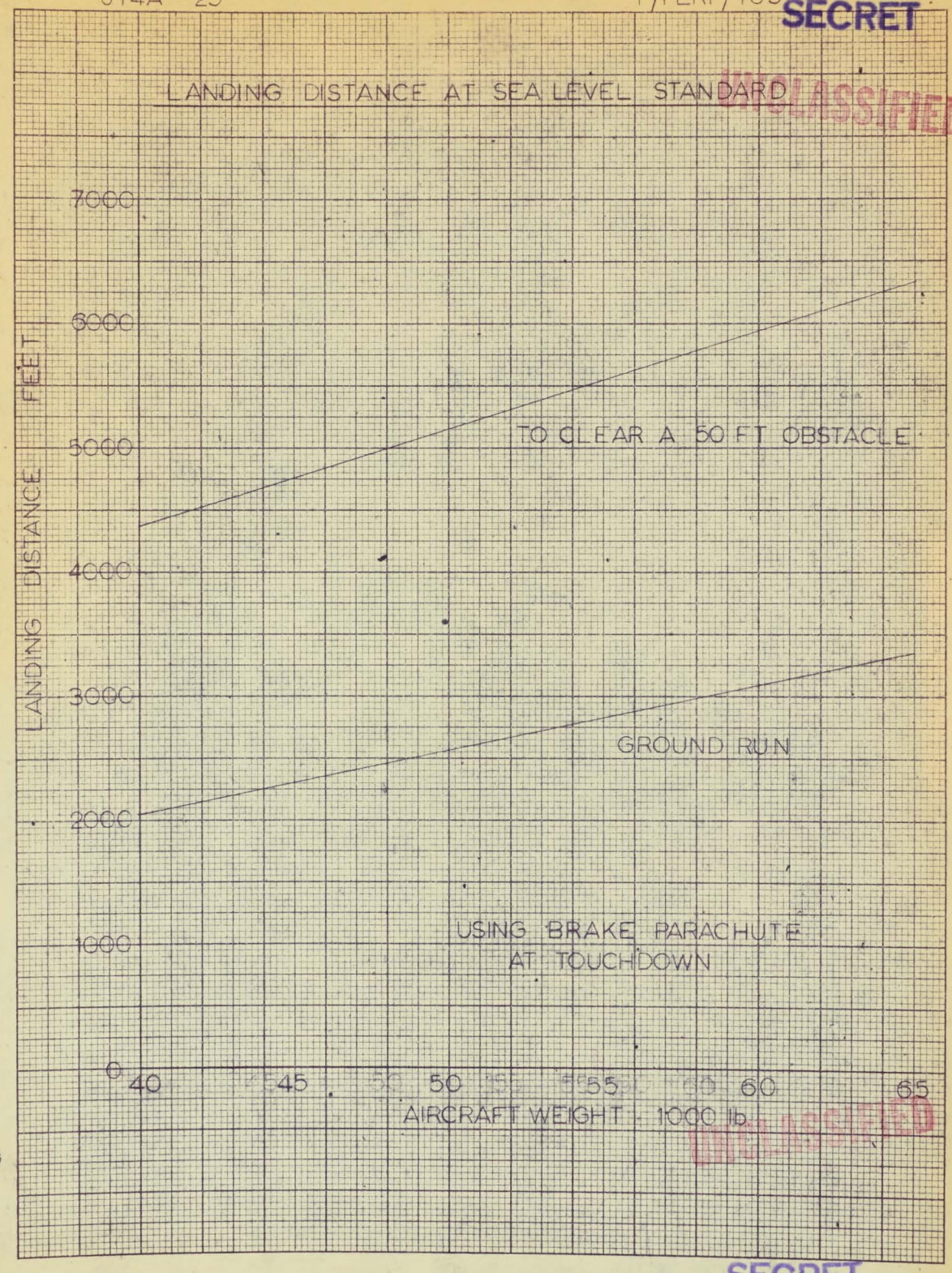

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DRAG

2. CF-105 DRAG NOTE

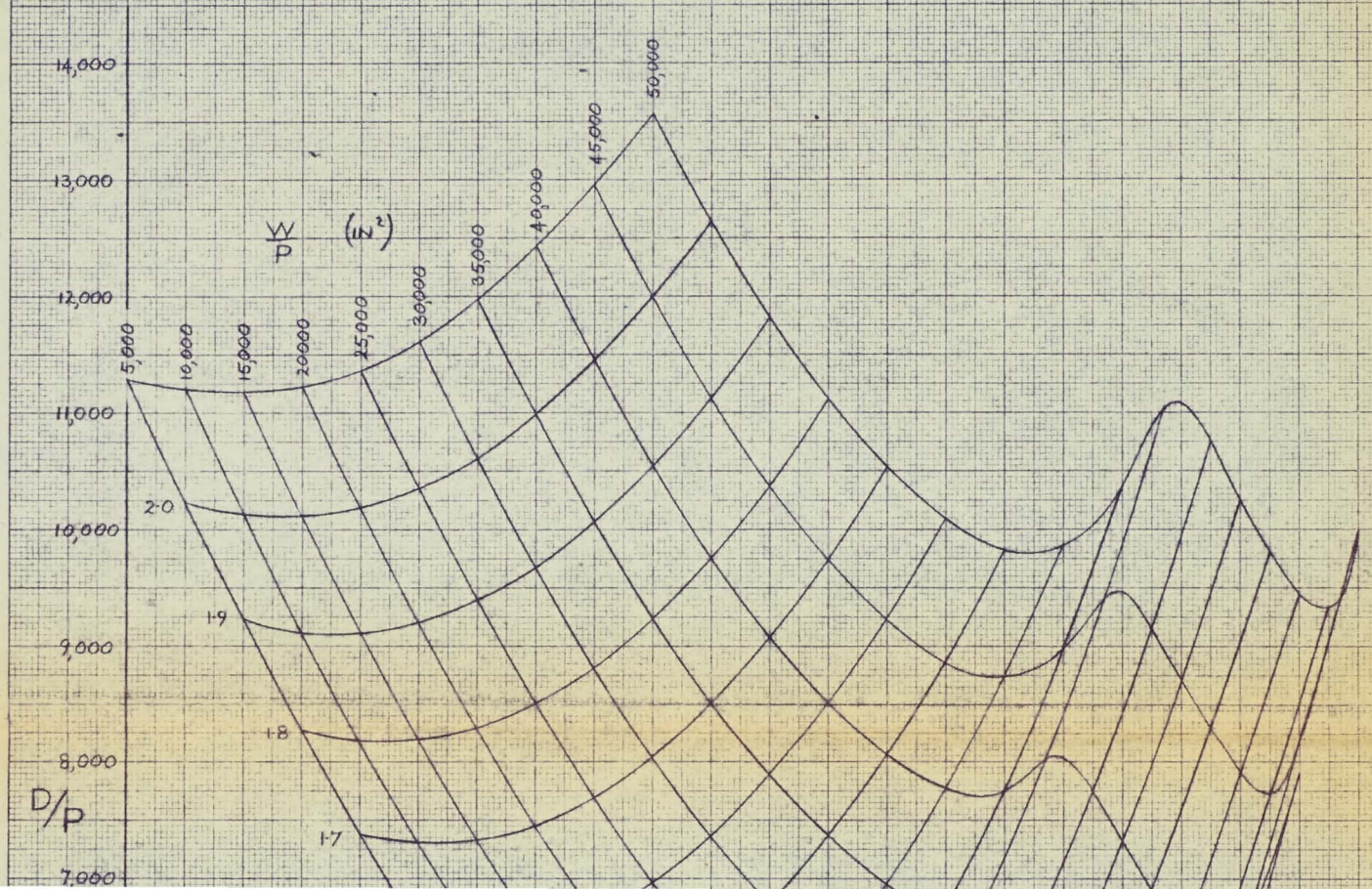
The only revision from the previous monthly report drag note is the shift in c.g. position. The c.g. position is now taken at 29.5% MAC instead of 29% MAC, and is in accordance with fuel sequencing to give a 31% MAC c.g. position on launching all the Sparrow II missiles. This gives animproved drag at high C_L due to reduced elevator angle to trim.

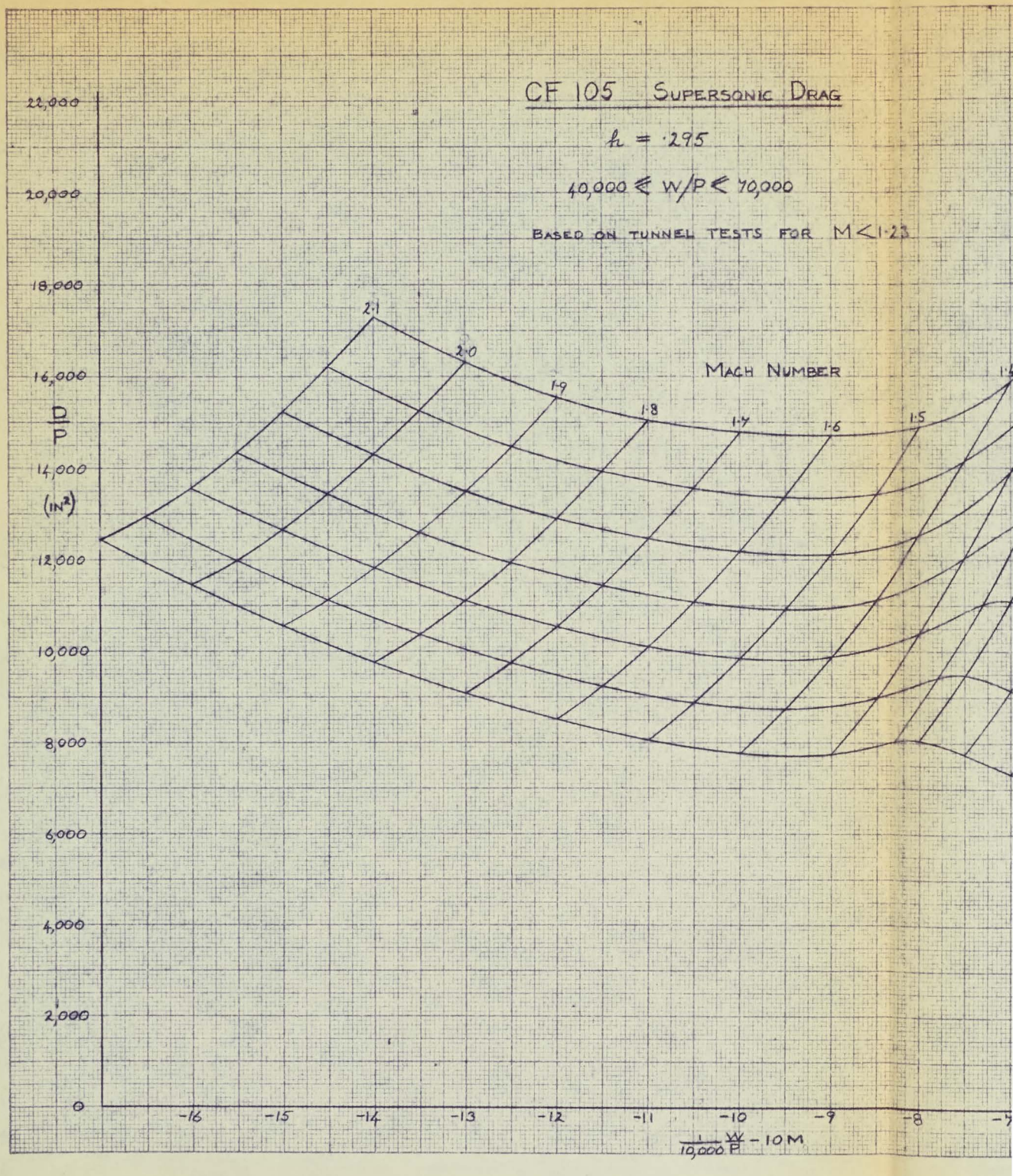
CF 105 Supersonic and Transonic Drag

$k = .295$

$5{,}000 \leq W/P \leq 50{,}000$

Based on tunnel tests for $M < 1.23$





ENGINE

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3. CF-105 UNSTALLED ENGINE DATA

No further revisions have been made to the Pratt & Whitney (J.75) JT4A-25 engine. However, the maximum thrust curve is given again along with the necessary curves for sub and supersonic cruise.

The Orenda P.S. 13 is undergoing revision.

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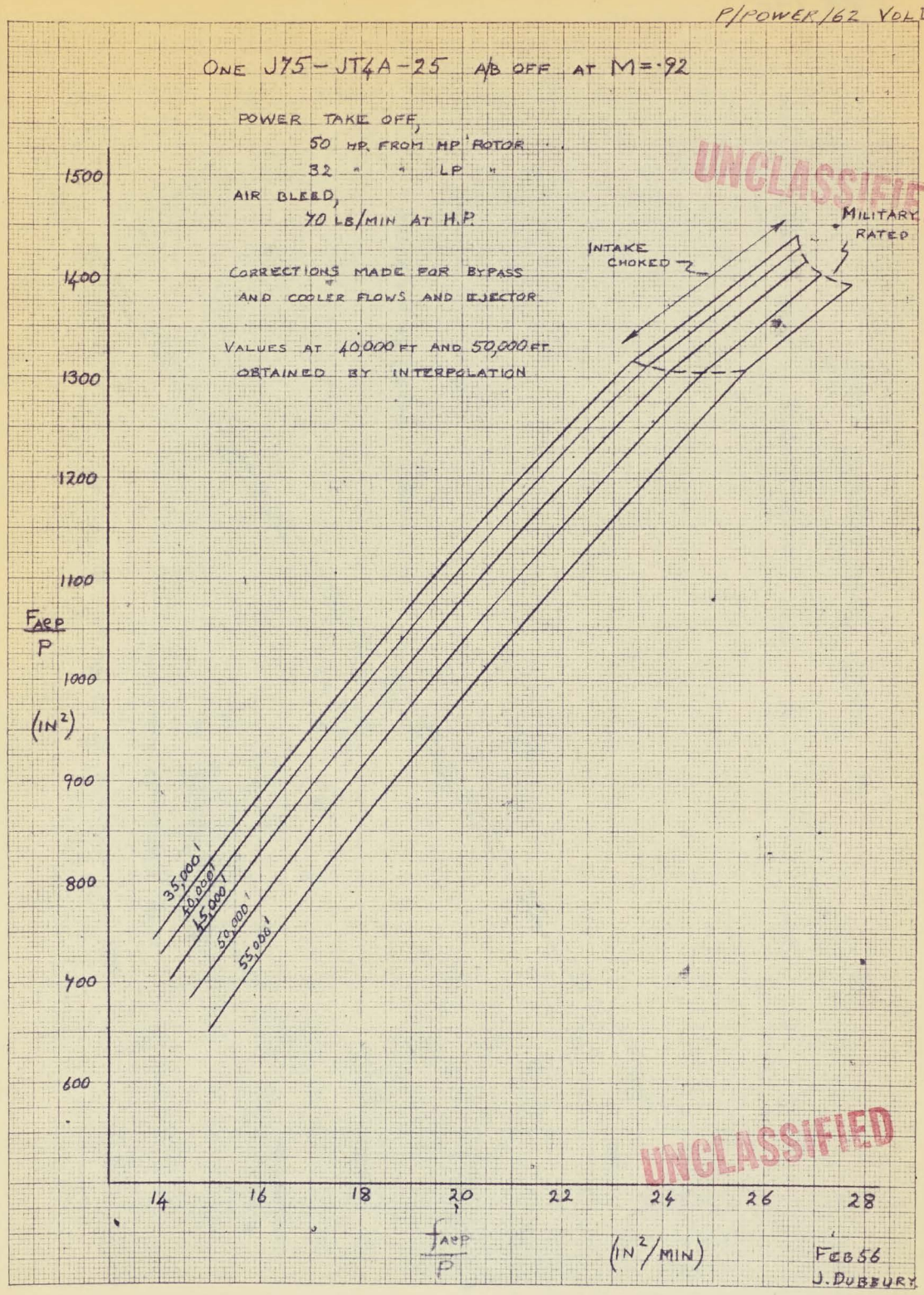
P/POWER/62 VOL II



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