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Technical Memorandum

C1007

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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 1-28-97
Authority: ☐ ADC ☒ ADD
Name: W. Layne
2nd Review Date: 2-21-97
Authority: ADD
Name: R.D. Green
Determination (Circle Number):
1 Classification Retained
2 Classification Changed to: U
3 Contains No DOE Classified Information
4 Coordinate With:
5 Contains UCAI?
6 Comments:

SCTM- 50-55-51

PRELIMINARY DATA FROM A. L. DUCOFFE'S AERODYNAMIC STUDY

R. F. Brodsky, 5141

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
U
Emelda Selph 3/3/97
Carmela M Gallegos 3/11/97
PERSON VERIFYING MARKING & DATE
Bruce Green
97SN380
DATED: 2-21-97

ABSTRACT

F-101 velocity performance is plotted vs aircraft gross weight for a variety of store sizes and numbers for military and maximum power conditions. Store sizes considered are 11-1/2" and 16". Stores carried on the aircraft vary from none up to and including three. The airplane is studied both with and without to 300 gallon externally carried gas tanks. Altitudes considered vary from sea level to 55,000 feet.

[redacted]

Case No. 409.04

March 17, 1955

INVENTORIED
DATE 3-8-67
UNCLASSIFIED
JUL 17 '68 JJJ
A-1323

[redacted]

DISTRIBUTION:
Dr. A. L. Ducoffe, Georgia Institute of Technology (2)
Commanding General, FC/AFSWP, Sandia, Attn: Major L. A. Barnes (4)
Commander, AFSWC, KAFB, Attn: Col. Wm. B. Kieffer, Dev. Dir. (4)
R. E. Poole, 1000
W. A. MacNair, 5000
R. W. Henderson, 1200
L. A. Hopkins, Jr., 1300
S. C. Hight, 5100
C. H. DeSelm, 1210
E. H. Draper, 1240
W. J. Howard, 1330
J. P. Cody, 1320
R. W. Shephard, 5120
K. W. Erickson, 5130
G. E. Hansche, 5140
R. S. Wilson, 1215
W. A. Gardner, 1283 [redacted]
S. A. Moore, 1322
W. M. Wells, 1332
A. Y. Pope, 5142
R. K. Smeltzer, 1922-2
M. K. Linn, 1923 (6)

INTRODUCTION

During the summer of 1954 Dr. A. L. Ducoffe, Associate Professor of Aeronautical Engineering at Georgia Institute of Technology, worked with the Aerodynamics group at Sandia Corporation. He was assigned the problem of determining the effects of various size external stores on the performance of the F-101 and F-102 aircraft as they performed typical interception missions. To perform the work, he was given access to contractor reports on clean aircraft performance. Using available aerodynamic reports from NACA and aircraft companies, he was able to determine curves of interference drag vs Mach number. Using these estimations, he could then determine the effect of the stores considered on airplane velocity, range, and time to complete mission.

The store diameters he is to consider are 8", 11-1/2", 16", and 22". He is to consider the airplane to carry up to five of the smaller stores and as many as three of the larger stores. Store weights vary from 350 lbs to 2400 lbs. The missions considered are of the point intercept and area intercept type.

Since Dr. Ducoffe could not complete the work during the summer of 1954, facilities were made available such that he could continue the work at Georgia Tech. The attached curves present some of the results which have evolved from his study. It is expected that a final report will be available during the summer of 1955.

DATA PRESENTED

The data presented is for the F-101 airplane only. Curves are drawn for (a) clean airplane, (b) clean airplane, plus two 300-gallon tip tanks, (c) clean airplane, plus two 300-gallon tip tanks, plus various store sizes and numbers. All stores are of a fineness ratio of approximately 7.5. Data are presented for a, b, and c above at altitudes of 0, 15,000, 35,000, 45,000, and 55,000 feet. An additional set of data needed for the range calculations are presented at 40,000 feet, as is the case of the clean airplane, plus various store sizes and numbers. Data at 40,000 feet does not include the tip tanks since these would be dropped after the aircraft reached 40,000 feet. Attachment 1 contains these data for military power conditions, while Attachment 2 contains the data for maximum (after-burner) power. Note that the data are preliminary in nature and are subject to revision.

R. F. BRODSKY - 5141

Case No. 409.04
March 17, 1955

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ATTACHMENT 1

PERFORMANCE WITH MILITARY POWER

[redacted]

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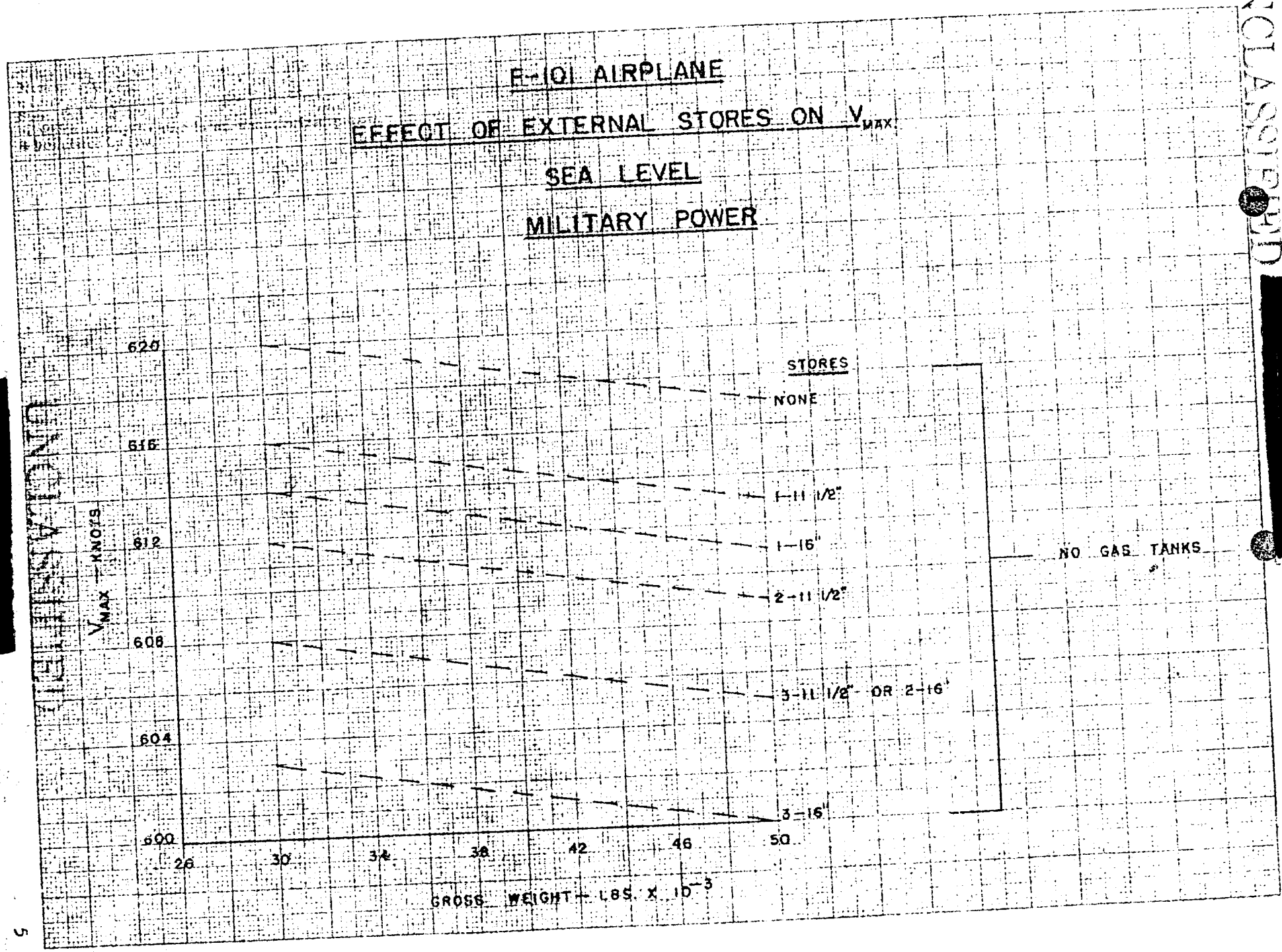

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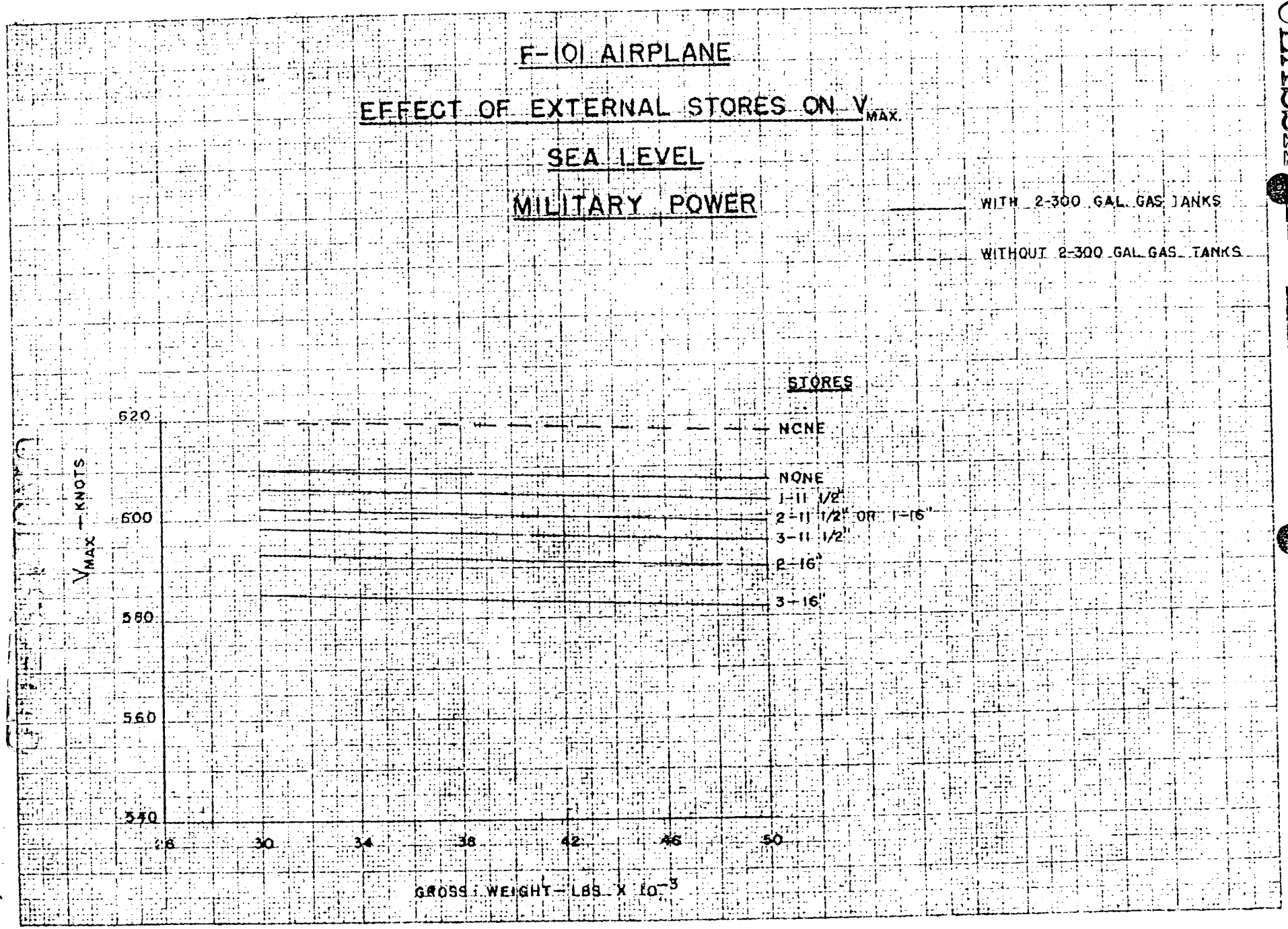
F-101 AIRPLANE

EFFECT OF EXTERNAL STORES ON $V_{MAX.}$

SEA LEVEL

MILITARY POWER



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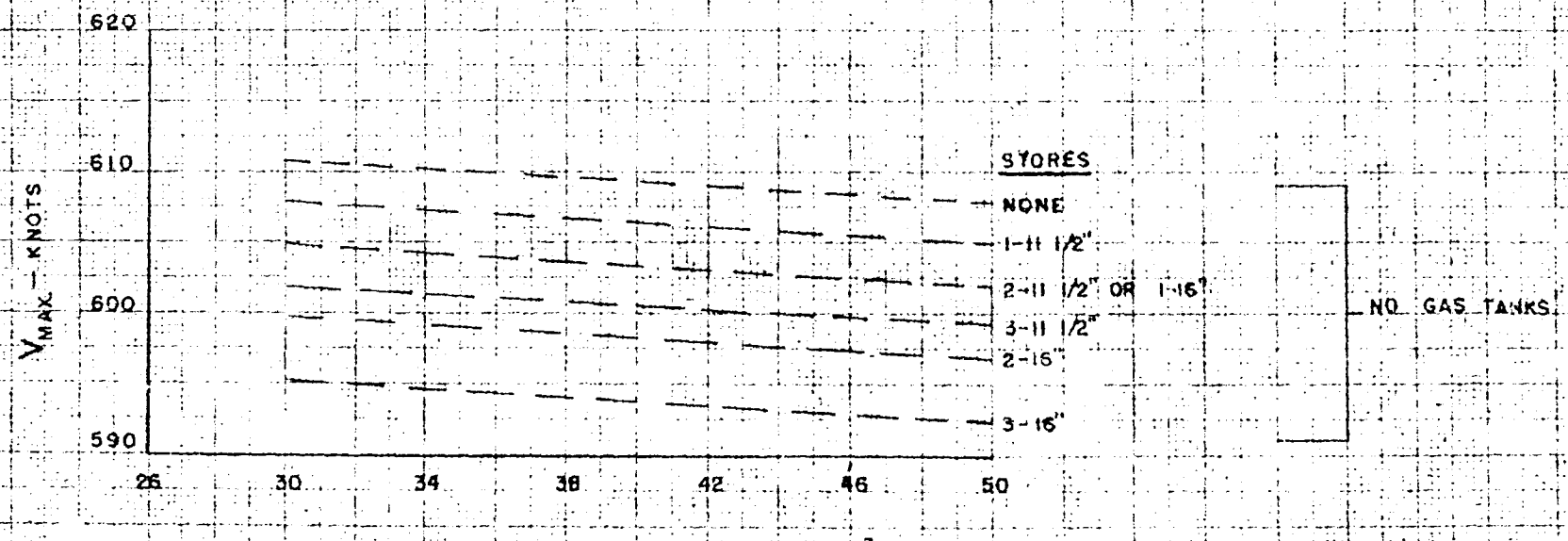
F-101 AIRPLANE

EFFECT OF EXTERNAL STORES ON V_{MAX}

15,000 FT.

MILITARY POWER



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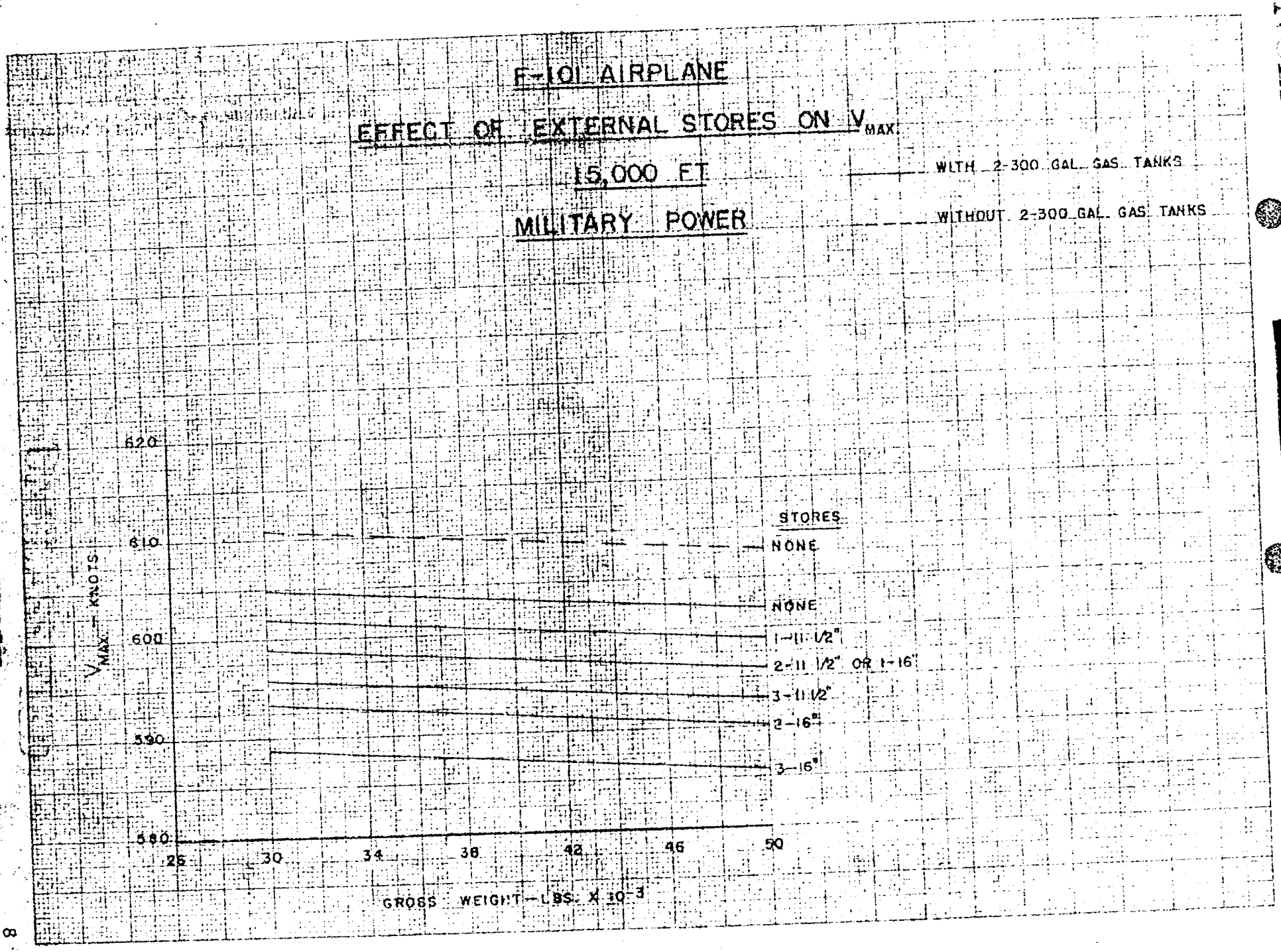

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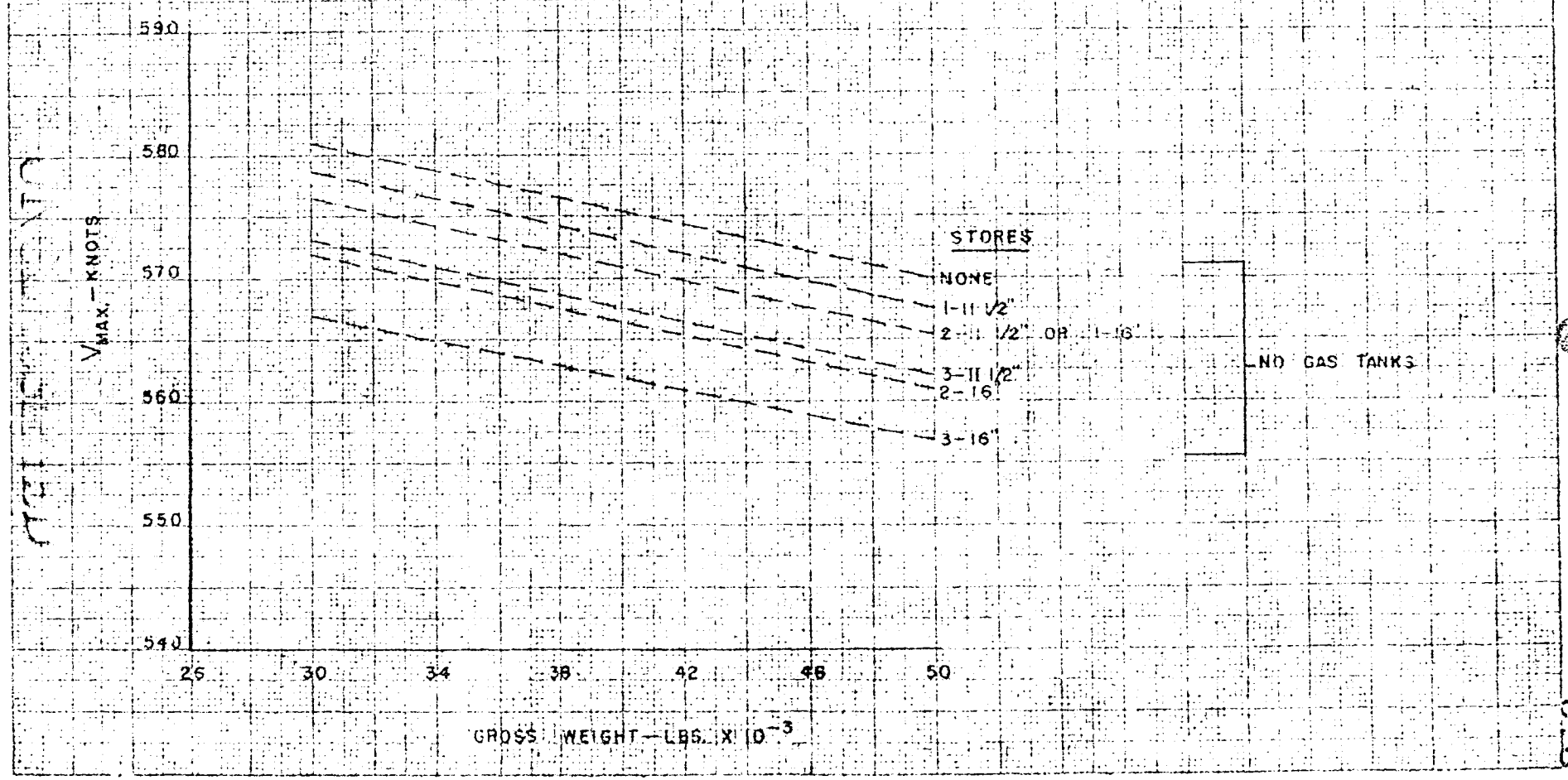
F-101 AIRPLANE

EFFECT OF EXTERNAL STORES ON $V_{MAX.}$

35,000 FT.

MILITARY POWER



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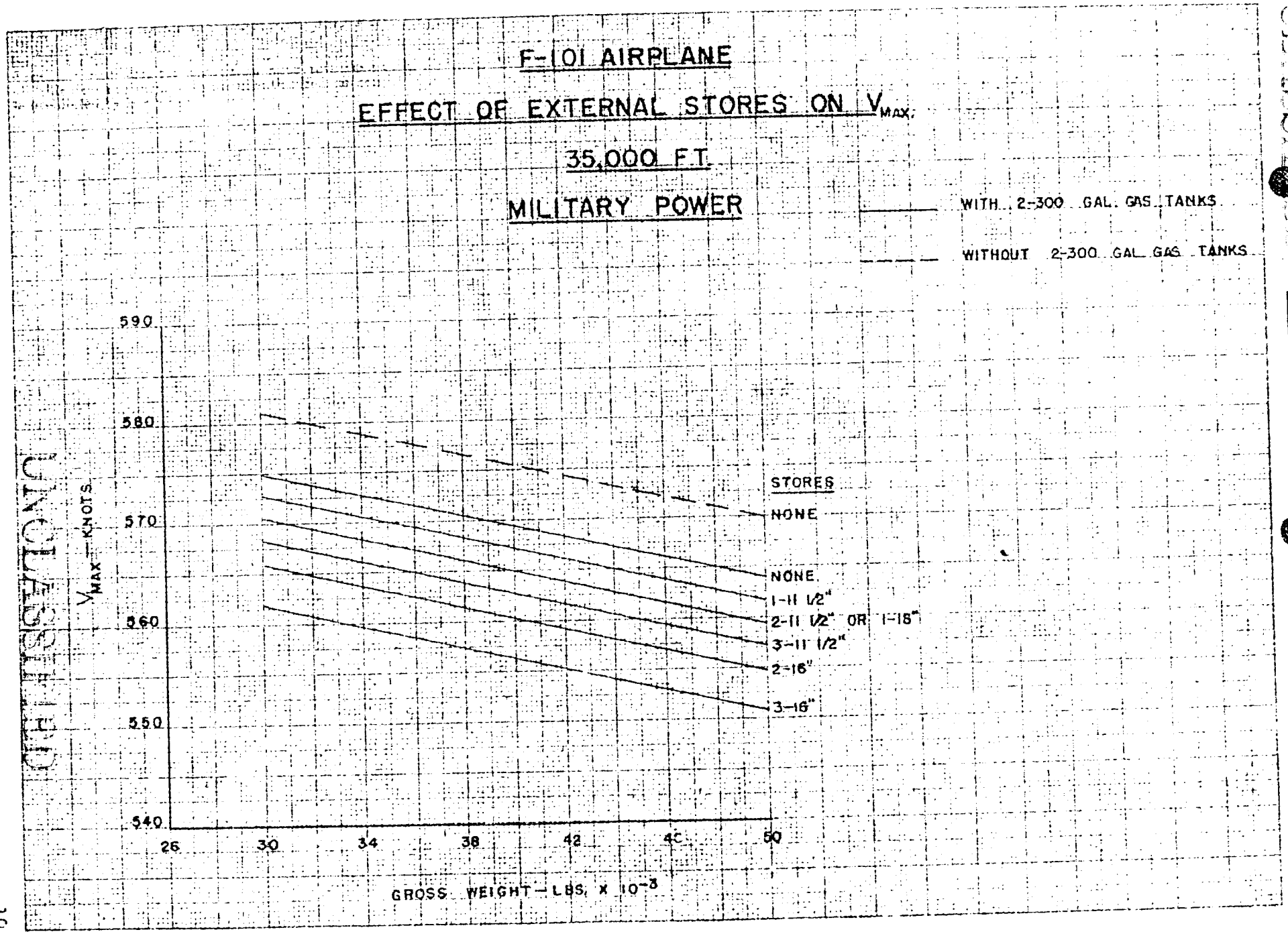

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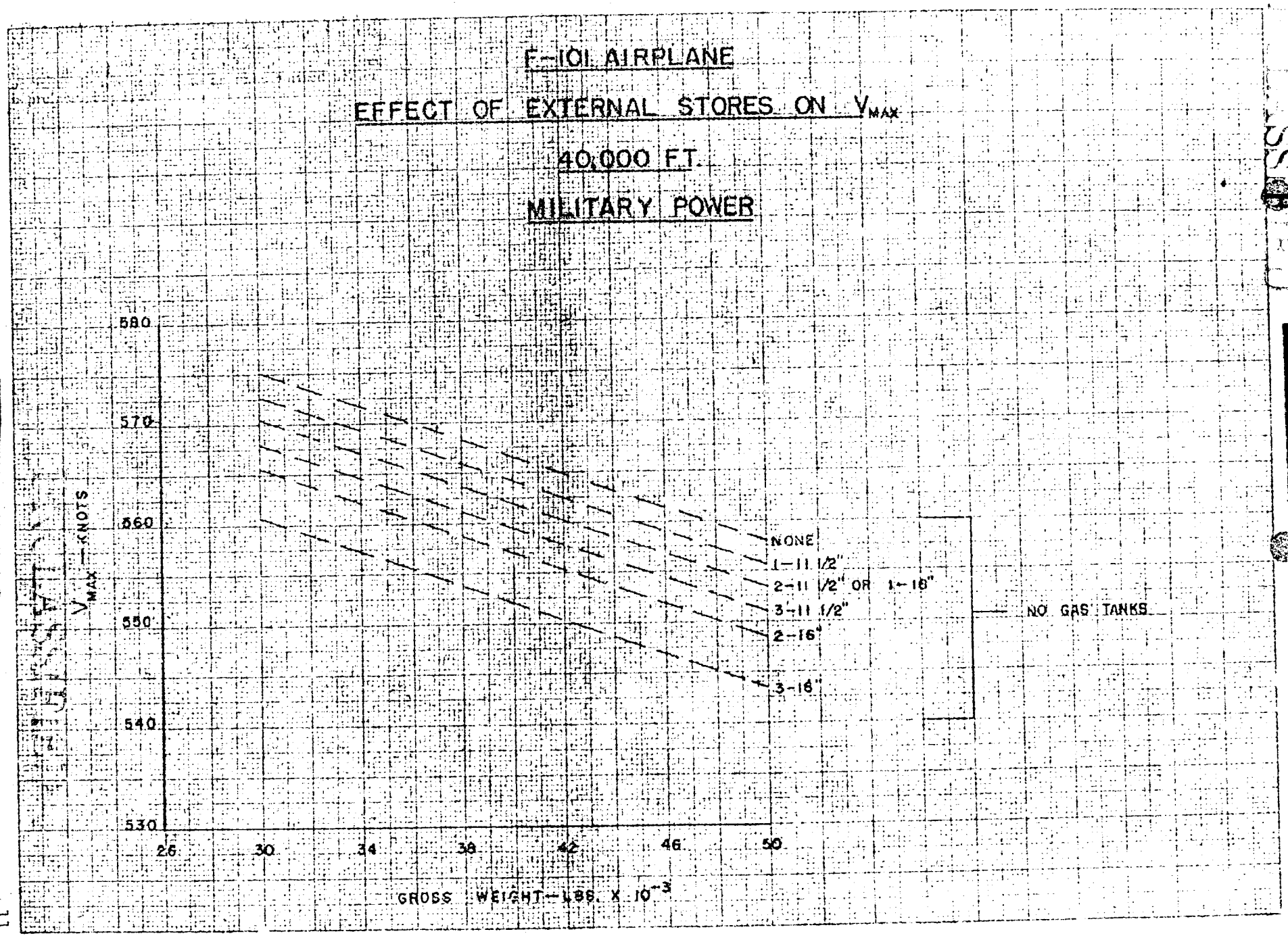

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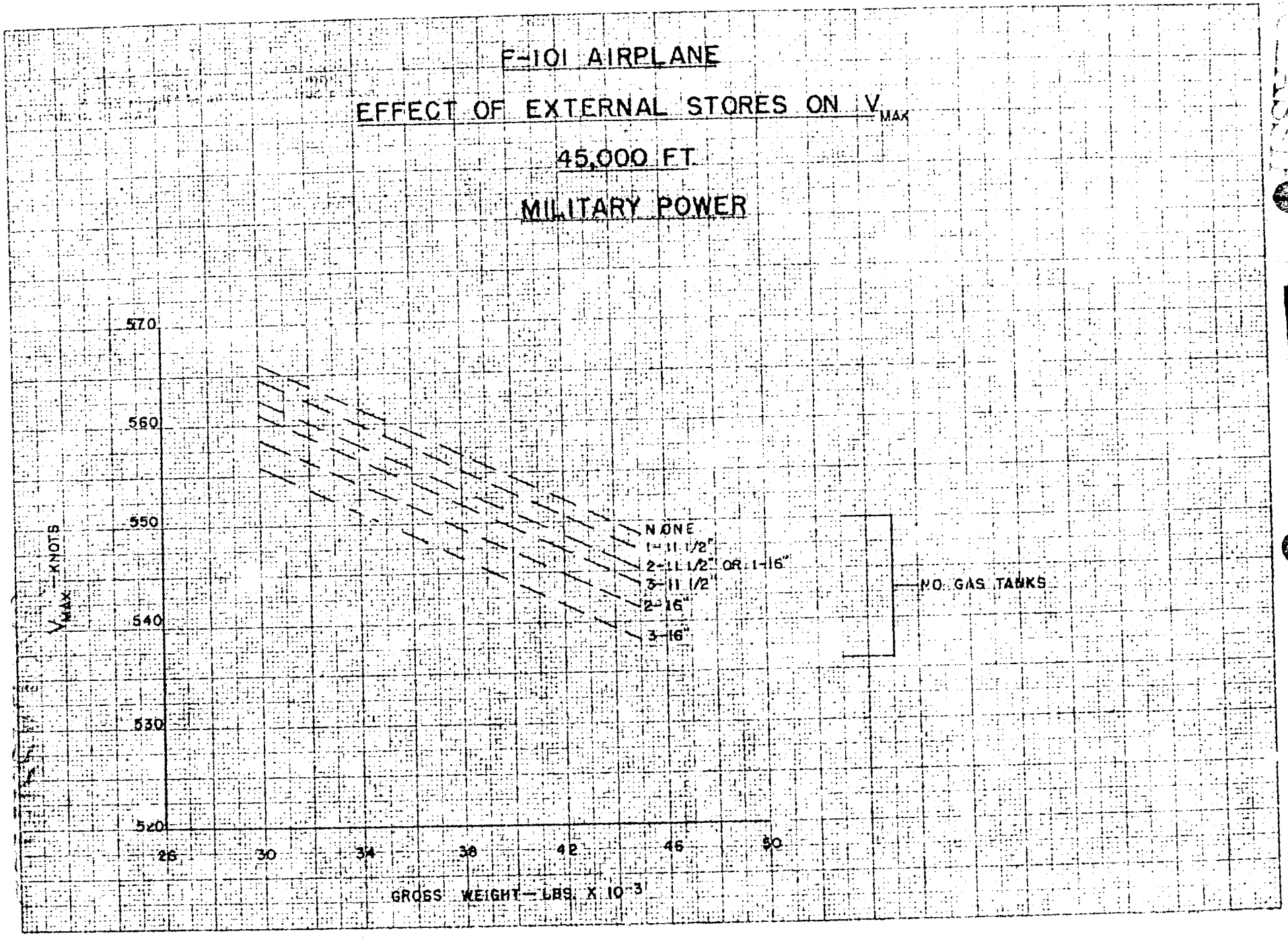

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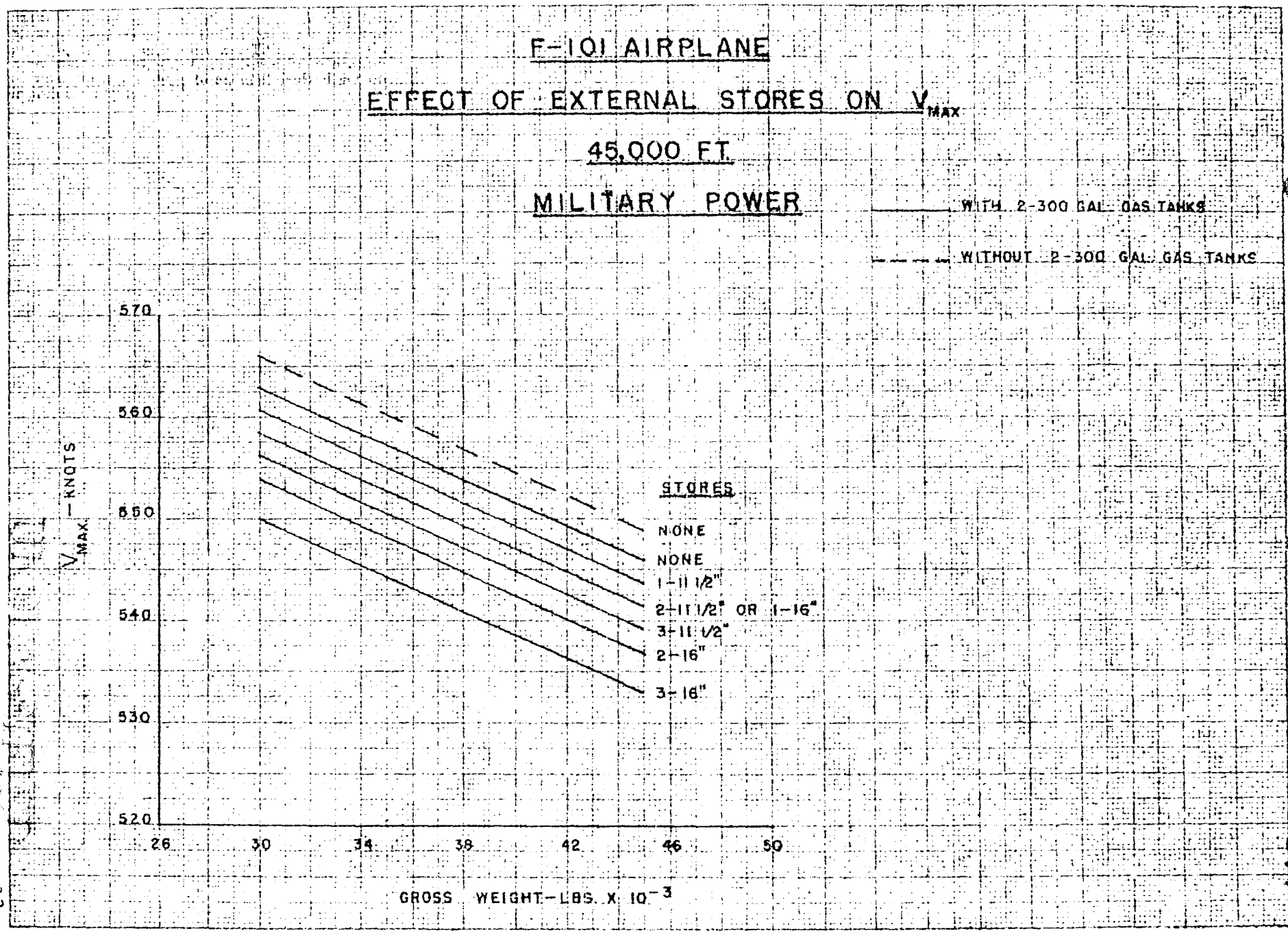

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ATTACHMENT 2

PERFORMANCE WITH MAXIMUM POWER

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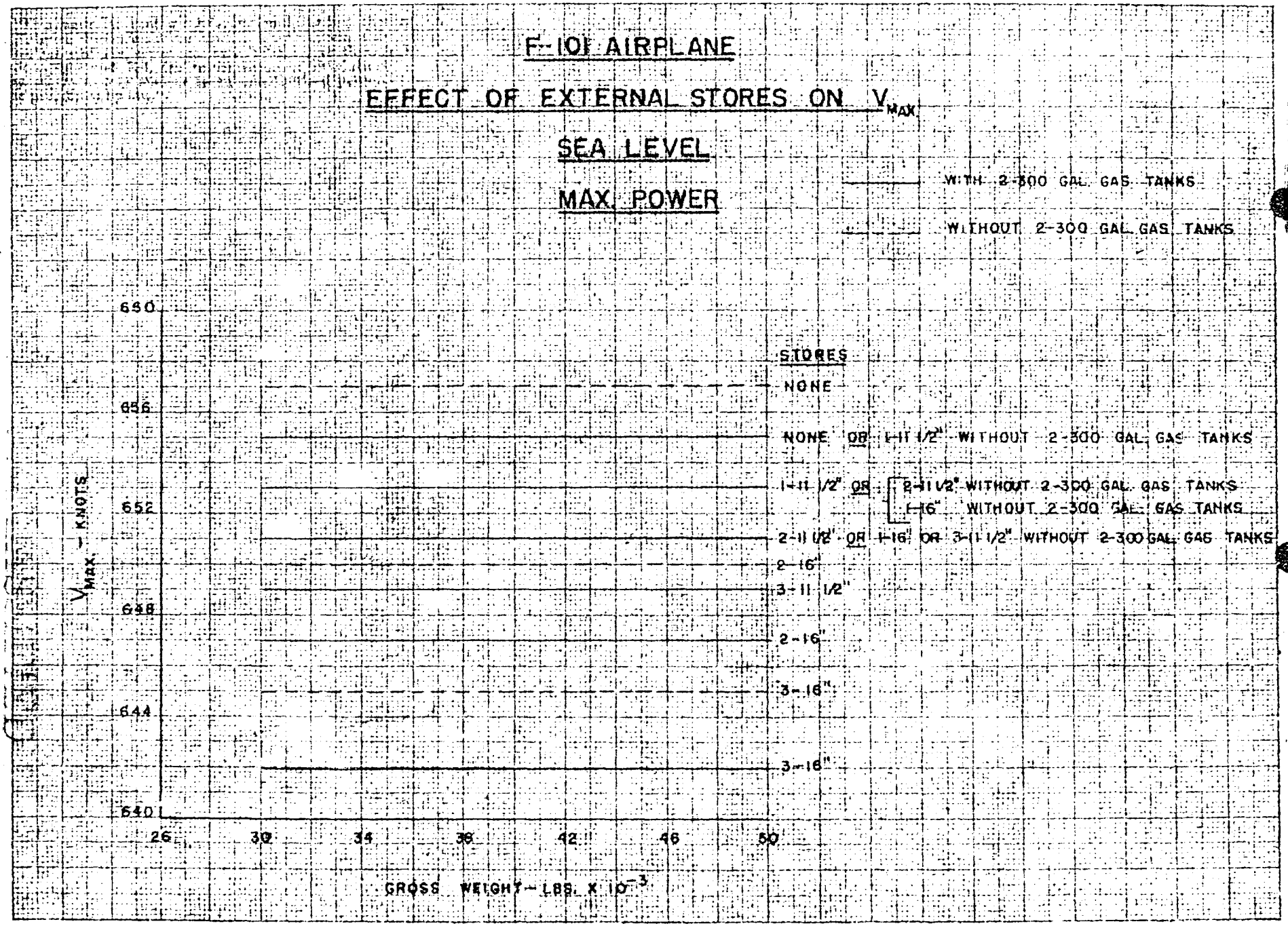
DECLASSIFIED



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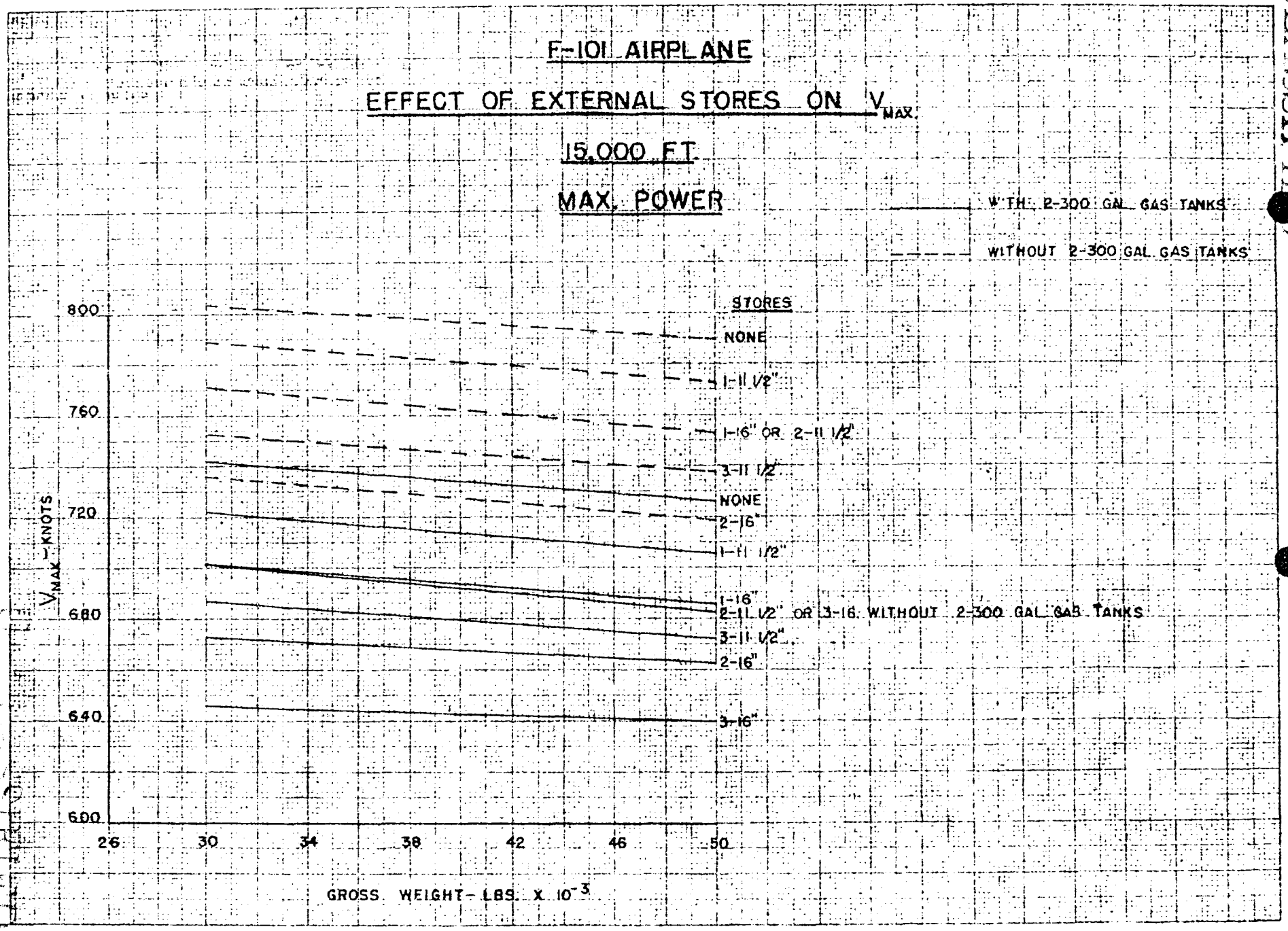
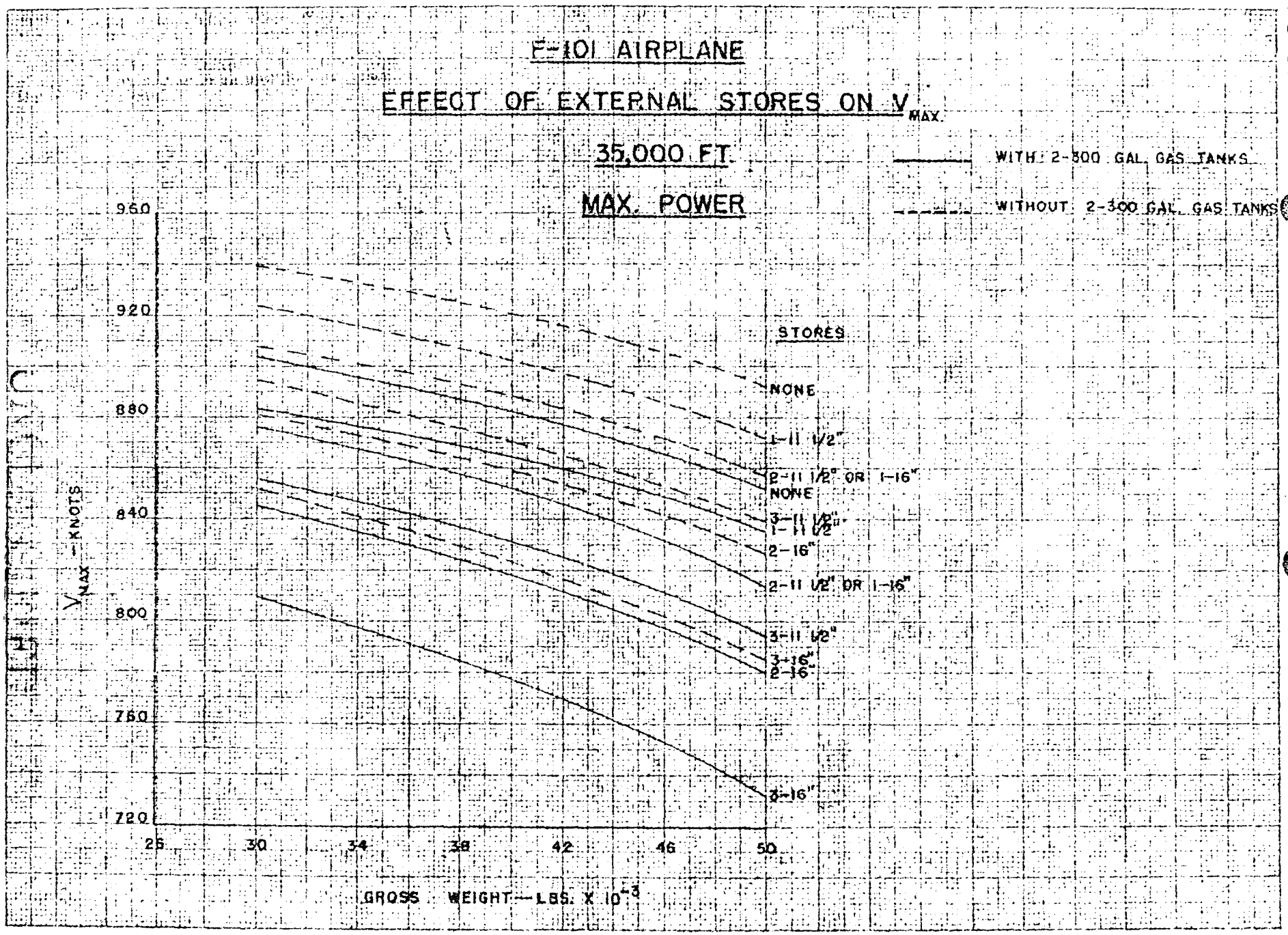
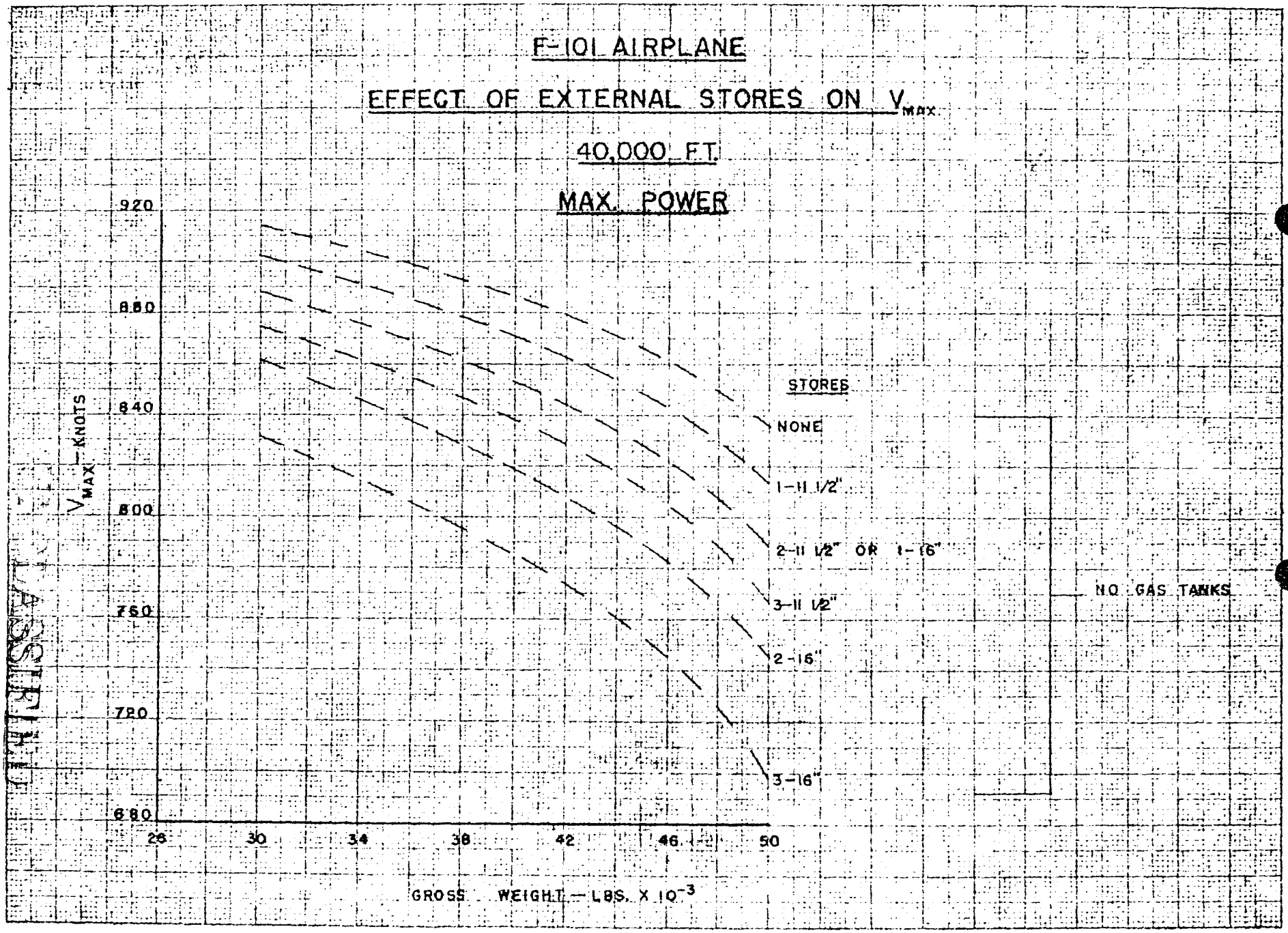


KEUFFEL & ESSER CO.




F-101 AIRPLANE
EFFECT OF EXTERNAL STORES ON V_{MAX}
40,000 FT.
MAX. POWER
V_{MAX} — KNOTS
920
880
840
800
760
720
680
26
30
34
38
42
46
50
GROSS WEIGHT — LBS. X 10^{-3}
STORES
NONE
1-11 1/2"
2-11 1/2" OR 1-16"
3-11 1/2"
2-16"
3-16"
NO GAS TANKS

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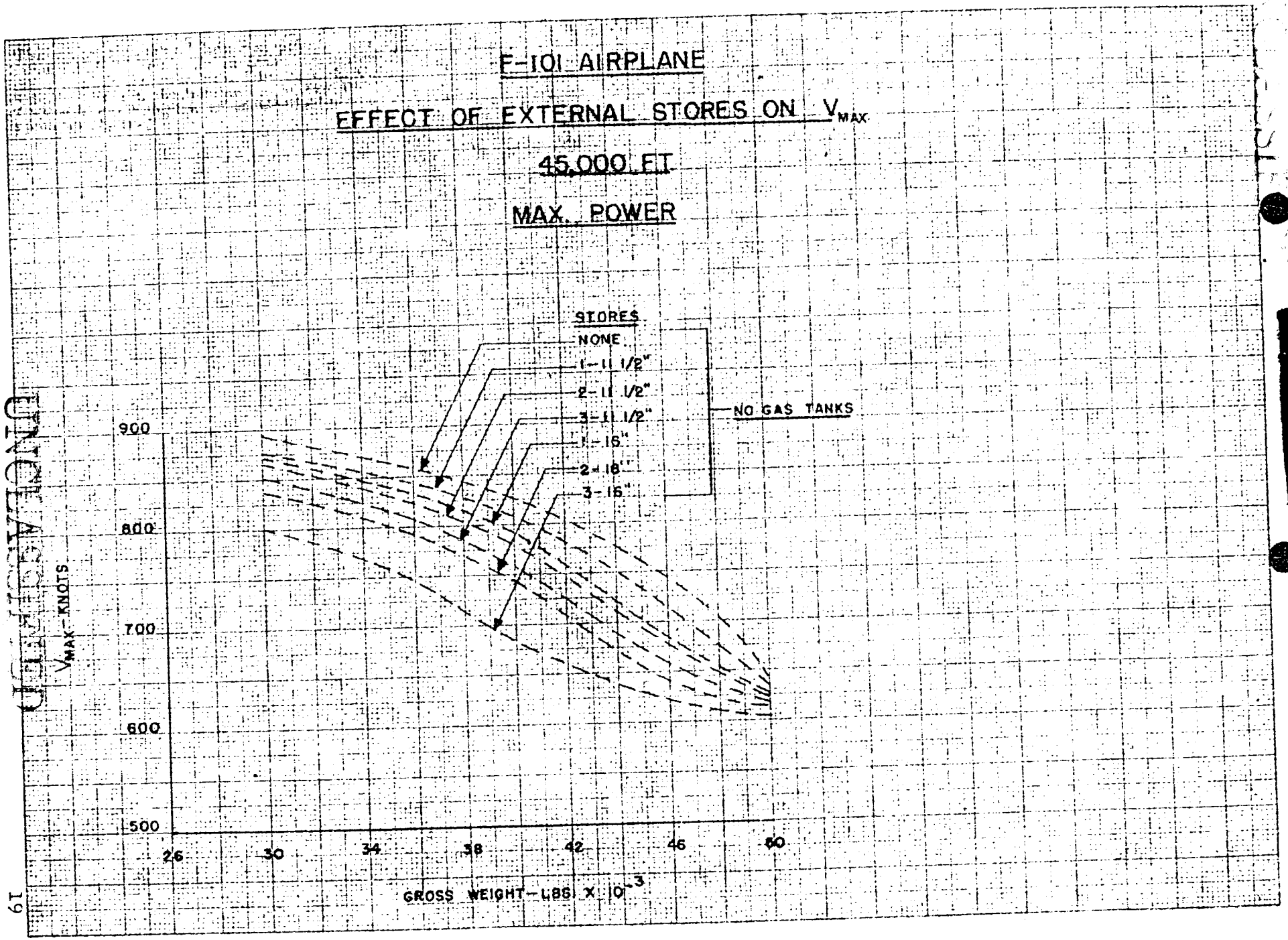

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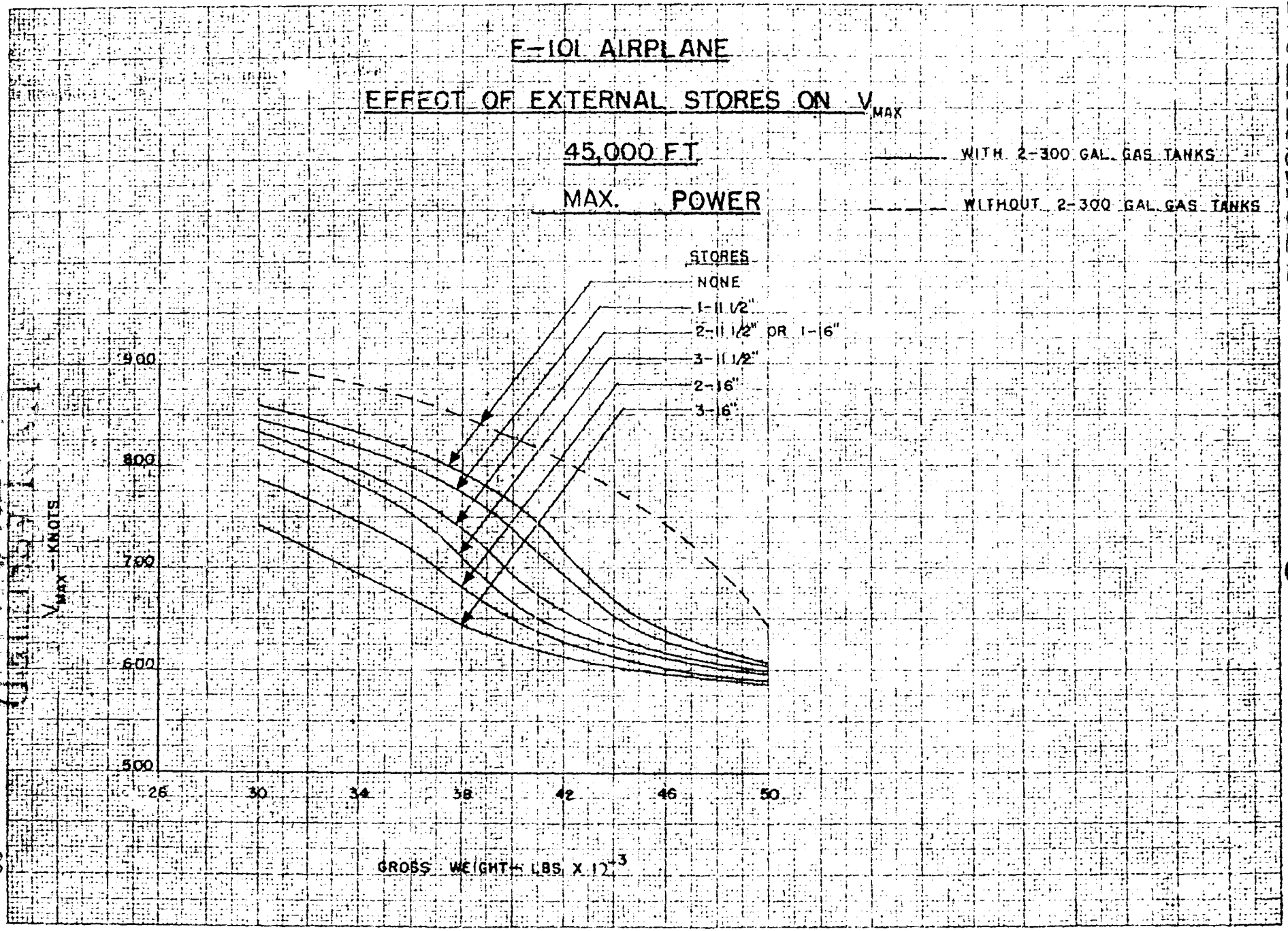

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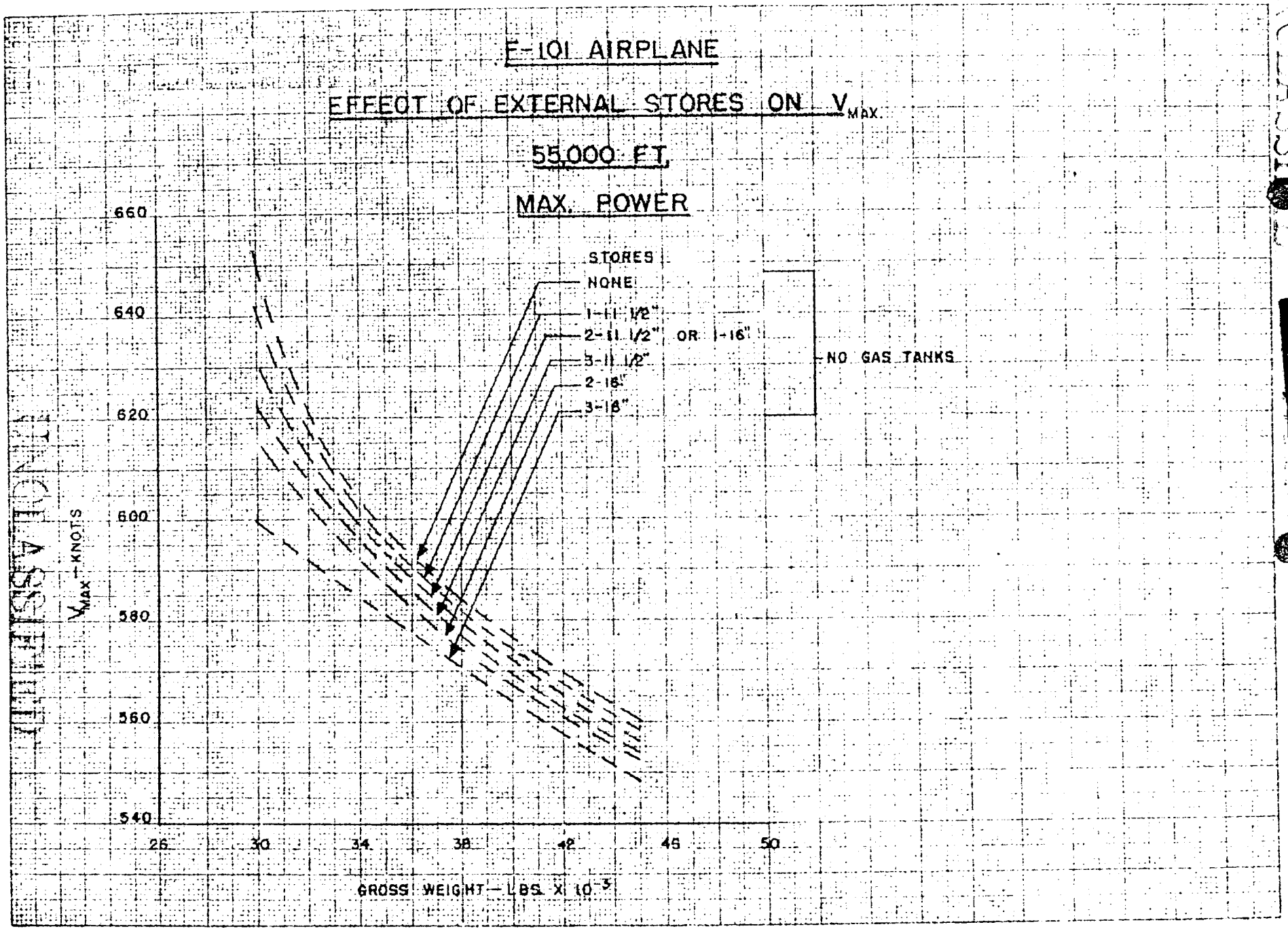

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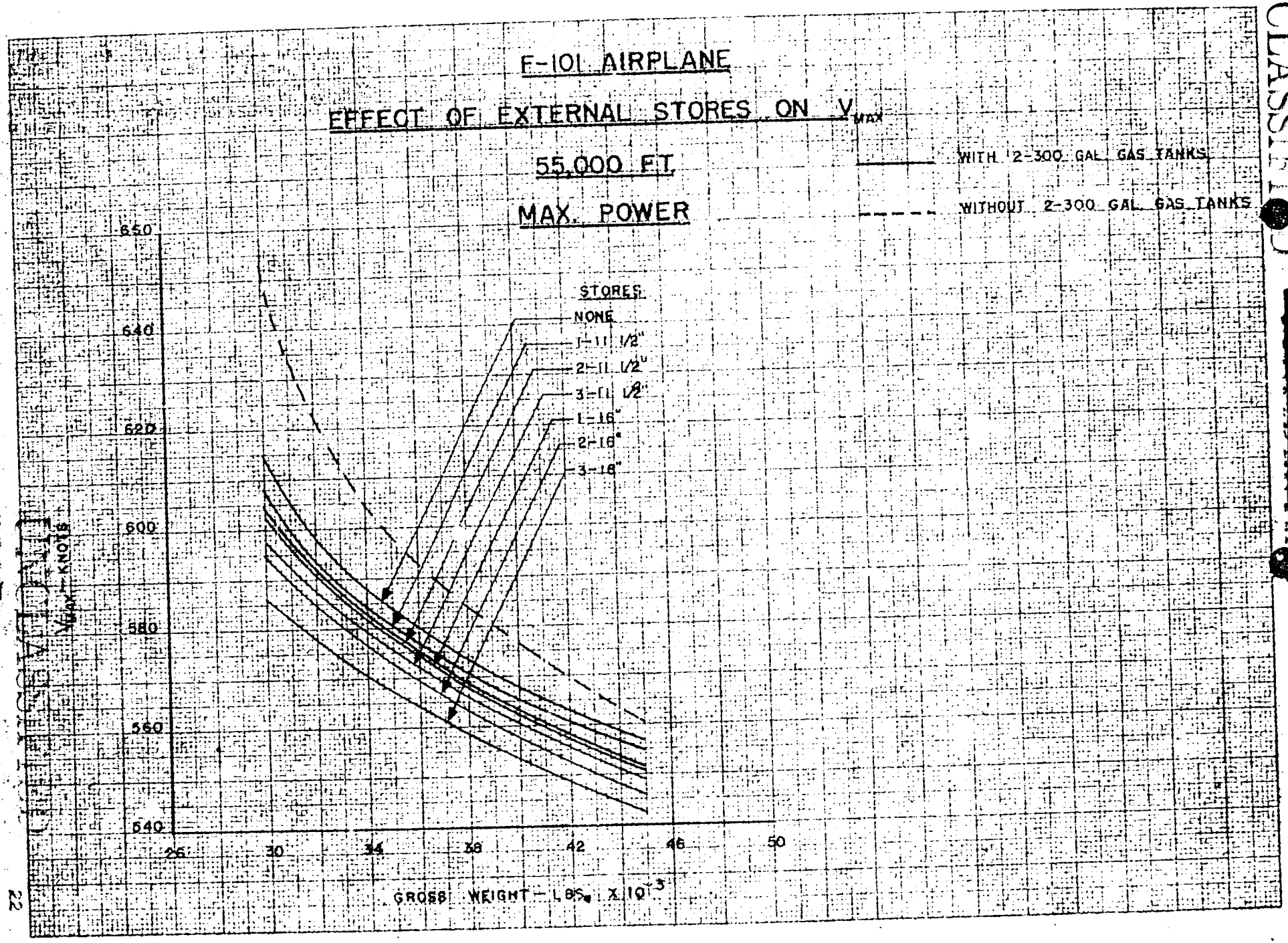
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