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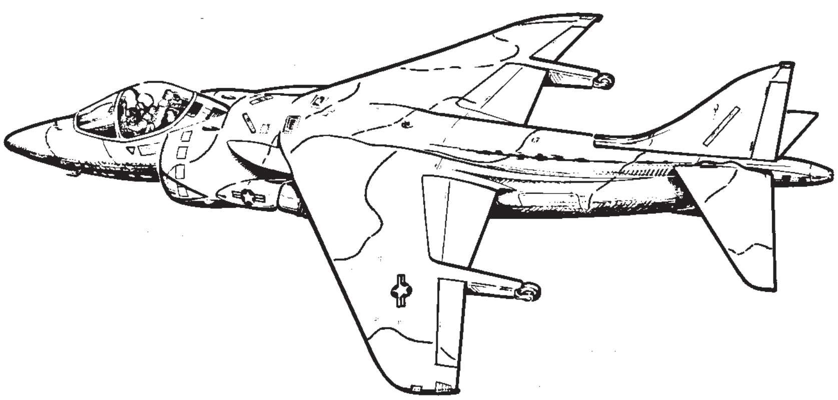
A1-AV8BB-NFM-400

# NATOPS FLIGHT MANUAL PERFORMANCE CHARTS NAVY MODEL AV-8B/TAV-8B AIRCRAFT 161573 AND UP

THIS PUBLICATION IS INCOMPLETE WITHOUT A1-AV8BB-NFM-000



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15 NOVEMBER 1991

CHANGE 5 — 1 FEBRUARY 2003

# NATOPS Flight Manual

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**To Be Supplied When Available.**



**To Be Supplied When Available.**

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# RECORD OF CHANGES

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# INTERIM CHANGE SUMMARY

*The following Interim Changes have been cancelled or previously incorporated in this manual:*

| INTERIM CHANGE NUMBER(S) | REMARKS/PURPOSE |
|---|---|
| 1 | Previously incorporated in manual. |
| | |

*The following Interim Changes have been incorporated in this Change/Revision:*

| INTERIM CHANGE NUMBER | REMARKS/PURPOSE |
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*Interim Changes Outstanding - To be maintained by the custodian of this manual:*

| INTERIM CHANGE NUMBER | ORIGINATOR/DATE (or DATE/TIME GROUP) | PAGES AFFECTED | REMARKS/ PURPOSE |
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# SUMMARY OF APPLICABLE TECHNICAL DIRECTIVES

Information relating to the following recent technical directives has been incorporated in this manual.

| Change Number | ECP Number | Description | Visual Identification | Effectivity |
|---|---|---|---|---|
| — | 200R1 | Production incorporation of AN/APG-65 radar and wiring provisions for smart weapons. | Radar switch on miscellaneous switch panel. | AV-8B (P)164549 and up |

# PREFACE

## SCOPE

The NATOPS Flight Manual is issued by the authority of the Chief of Naval Operations and under the direction of Commander, Naval Air Systems Command in conjunction with the naval air training and operating procedures standardization (NATOPS) Program. This manual contains information on all aircraft systems, performance data, and operating procedures required for safe and effective operations. However, it is not a substitute for sound judgement. Compound emergencies, available facilities, adverse weather or terrain, or considerations affecting the lives and property of others may require modification of the procedures contained herein. Read this manual from cover to cover. It's your responsibility to have a complete knowledge of its contents.

## APPLICABLE PUBLICATIONS

The following applicable publications complement this manual:

A1-AV8BB-NFM-500 (NATOPS Pocket Checklist)
A1-AV8BB-NFM-600 (Servicing Checklist)
A1-AV8BB-NFM-700 (Functional Checkflight Checklist)
A1-AV8BB-TAC-000 and A1-AV8BB-TAC-010 (Tactical Manual Volume I)
A1-AV8BB-TAC-050/(C) (Tactical Manual Volume II)
A1-AV8BB-TAC-100/(S) (Tactical Manual Volume III)
A1-AV8BB-TAC-300 (Tactical Manual Pocket Guide)
A1-AV8BB-NFM-000 (NATOPS Flight Manual)

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To ensure that the manual contains the latest procedures and information, NATOPS review conferences are held in accordance with the current OPNAVINST 3l710.7

## CHANGE RECOMMENDATIONS

Recommended changes to this manual or other NATOPS publications may be submitted by anyone in accordance with the current OPNAVINST 3710.7

Routine change and recommendations are submitted directly to the model manager on OPNAV 3710/6 (4-90) shown herein. The address of the model manager for this aircraft is:

Commanding Officer
VMAT 203
U.S. Marine Corps Air Station
Cherry Point, NC 28533-6023
Attn: AV8B Model Manager
Autovon: 582-2638
Commercial: (919) 466-2638

Change recommendations of URGENT nature (safety of flight, etc.) should be submitted directly to the NATOPS advisory group member in the chain of command by priority message.

## YOUR RESPONSIBILITY

NATOPS flight manuals are kept current through an active manual change program. Any corrections, additions, or constructive suggestions for improvement of its content should be submitted by routine or urgent change recommendation, as appropriate, at once.

## NATOPS FLIGHT MANUAL INTERIM CHANGES

Flight manual interim changes are changes or corrections to the NATOPS flight manuals promulgated by CNO or NAVAIRSYSCOM. Interim changes are issued either as printed pages or as a naval message. The interim change summary is provided as a record of all interim changes. Upon receipt of a change or revision, the custodian of the manual should check the updated interim change summary to ascertain that all outstanding interim changes have been either incorporated or cancelled; those not incorporated shall be recorded as outstanding in the section provided.

## CHANGE SYMBOLS

Revised text is indicated by a black vertical line in either margin of the page, adjacent to the affected text, like the one printed next to this paragraph. The change symbol identifies the addition of either new information, a changed procedure, the correction of an error, or a rephrasing of the previous material.

## WARNINGS, CAUTIONS, AND NOTES

The following definitions apply to “WARNINGS”, “CAUTIONS”, and “NOTES” found through the manual.

**WARNING**

An operating procedure, practice, or condition, etc., that may result in injury or death, if not carefully observed or followed.

**CAUTION**

An operating procedure, practice, or condition, etc., that may result in damage to equipment if not carefully observed or followed.

**NOTE**

An operating procedure, practice, or condition, etc., that is essential to emphasize.

NATOPS/TACTICAL CHANGE RECOMMENDATION
OPNAV 3710/6 (4-90) S/N 0107-LF-009-7900 DATE

TO BE FILLED IN BY ORIGINATOR AND FORWARDED TO MODEL MANAGER

| | | | | | |
|---|---|---|---|---|---|
| FROM (originator) | | Unit | | | |
| TO (Model Manager) | | Unit | | | |
| Complete Name of Manual/Checklist | Revision Date | Change Date | Section/Chapter | Page | Paragraph |

Recommendation (be specific)

CHECK IF CONTINUED ON BACK

Justification

| | | |
|---|---|---|
| Signature | Rank | Title |

Address of Unit of Command

TO BE FILLED IN BY MODEL MANAGER (Return to Originator)

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|---|---|
| FROM | Date |
| TO | |

Reference
(a) Your change Recommendation Dated ______________

Your change recommendation dated ______________ is acknowledged. It will be held for action of the review conference planned for ______________ to be held at ______________

Your change recommendation is reclassified URGENT and forwarded for approval to ______________ by my DTG ______________

/s/______________ MODEL MANAGER | ______________ AIRCRAFT

## WORDING

The concept of word usage and intended meaning which has been adhered to in preparing this Manual is as follows:

"Shall" has been used only when application of a procedure is mandatory.

"Should" has been used only when application of a procedure is recommended.

"May" and "need not" have been used only when application of a procedure is optional.

"Will" has been used only to indicate futurity, never to indicate any degree of requirement for application of a procedure.

## AIRSPEED

All airspeeds in this manual are in knots calibrated airspeed (KCAS) unless stated in other terms.

## MANUAL DEVELOPMENT

This NATOPS Flight Manual was prepared using a concept that provides the aircrew with information for operation of the aircraft, but detailed operation and interaction is not provided. This concept was selected for a number of reasons: reader interest increases as the size of a technical publication decreases, comprehension increases as the technical complexity decreases, and accidents decrease as reader interest and comprehension increase.

To implement this streamlined concept, observance of the following rules was attempted:

1. The pilot shall be considered to have above average intelligence and normal (average) common sense.

2. No values (pressure, temperature, quantity, etc.) which cannot be read in the cockpit are stated, except where such use provides the pilot with a value judgement.

3. Only the information required to fly the airplane is provided.

4. Notes, Cautions, and Warnings are held to an absolute minimum, since, almost everything in the manual could be considered a subject for a Note, Caution, or Warning.

5. No Cautions or Warnings or procedural data are contained in the Descriptive Section, and no abnormal procedures (Hot Starts, etc.) are contained in the Normal Procedures Section.

6. Notes, Cautions and Warnings will not be used to emphasize new data.

7. Multiple failures (emergencies) are not covered.

8. Simple words in preference to more complex or quasi-technical words are used and unnecessary and/or confusing word modifiers are avoided.

# PART XI

# PERFORMANCE DATA

# CHAPTER 1

# Introduction

## 1.1 INTRODUCTION

This part is divided into eleven chapters (1 through 11) and presents performance data in proper sequence for preflight planning. Two concepts of data presentation are utilized to show drag effects on aircraft performance; i.e., specific configuration charts and drag index charts. The drag index concept presents climb data, nautical miles per pound for cruise/endurance, and descents. All other data are presented as a specific-configuration per chart. All performance data is based on flight tests or the contractor's estimate, U.S. standard day, 1962 conditions and/or provisions to correct for nonstandard temperatures, and the F402-RR-406A (includes F402-RR-406B), F402-RR-408 series (includes F402-RR-408 and F402-RR-408A) engine, as noted under remarks on the charts, using JP-5 fuel.

## 1.2 GLOSSARY OF TERMS

**1.2.1 Indicated Airspeed.** Indicated airspeed (IAS) is the pitot static airspeed indicator reading, as installed in the aircraft, without correction for system errors.

**1.2.2 Calibrated Airspeed.** Calibrated airspeed (CAS) is indicated airspeed corrected for static source error.

**1.2.3 Equivalent Airspeed.** Equivalent airspeed (EAS) is calibrated airspeed corrected for adiabatic compressible flow for the particular altitude. EAS is equal to CAS at sea level in standard air.

**1.2.4 True Airspeed.** True Airspeed (TAS) is the aircraft speed over the ground in no-wind conditions. True airspeed is EAS corrected for density altitude.

**1.2.5 Pressure Altitude.** Pressure Altitude is the vertical distance from the standard datum. This is a theoretical plane where air pressure (corrected to 15°C) is equal to 29.92 inches of mercury (Hg). The indicated pressure altitude may not be the actual height above sea level due to variations in temperature, lapse rate, atmospheric pressure, and errors on the sensed pressure.

**1.2.6 Density Altitude.** Density altitude is pressure altitude corrected for temperature. When conditions are standard, pressure altitude and density altitude are the same. Consequently, if the temperature is above standard, the density altitude will be higher than the pressure altitude. If the temperature is below standard, the density altitude will be lower than the pressure altitude.

**1.2.7 Optimum Cruise Altitude.** The altitude/Mach number combination which yields maximum cruise capability, that is, maximum nautical miles per pound of fuel.

**1.2.8 Maximum Endurance Altitude.** The altitude which yields maximum time/minimum fuel flow.

**1.2.9 Initial Gross Weight.** The aircraft gross weight at the beginning of a climb or descent.

**1.2.10 Average Gross Weight.** The mean average aircraft gross weight during cruise or endurance (that is, the gross weight at the beginning of the cruise or endurance, plus the end gross weight, divided by 2).

**1.2.11 Effective Gross Weight.** The average gross weight multiplied by the number of g's the aircraft experiences normal to its flightpath.

**1.2.12 Cruise Ceiling.** The altitude where the rate of climb is 300 feet per minute at normal rated power.

**1.2.13 Service Ceiling.** The altitude where the rate of climb is 100 feet per minute at maximum thrust.

**1.2.14 Combat Ceiling.** The altitude where the rate of climb is 500 feet per minute at maximum combat thrust.

## 1.3 ABBREVIATIONS

| | |
|---|---|
| °C | Degrees Celsius |
| °F | Degrees Fahrenheit |
| AMPS | Avionics Mission Planning System |
| AOA | Angle of Attack |
| CAS | Calibrated Airspeed |
| cg | Center of Gravity |
| EAS | Equivalent Airspeed |
| FNT | Front Nozzle Trim |
| Ft | Feet |
| In | Inch |
| Hg | Mercury |
| JPT | Jet Pipe Temperature |
| JPTL | Jet Pipe Temperature Limiter |
| KCAS | Knots Calibrated Airspeed |
| KIAS | Knots Indicated Airspeed |
| Kt | Knot |
| KTAS | Knots True Airspeed |
| Lb | Pound |
| MAC | Mean Aerodynamic Chord |
| Min | Minute/Minimum |
| nm | Nautical Mile |
| NMPP | Nautical Miles Per Pound |
| RJPT | Relative Jet Pipe Temperature |
| RVL | Rolling Vertical Landing |
| STOL | Short Takeoff and Landing |
| TAS | True Airspeed |
| VL | Vertical Landing |

# CHAPTER 2

# Standard Data

## 2.1 DRAG INDEX SYSTEM

Most of the charts utilize the drag index system to effectively present the many combinations of weight/drag effects on performance. Charts applicable for all loads and configurations are labeled ALL DRAG INDEXES. Charts labeled INDIVIDUAL DRAG INDEXES contain data for a range of drag numbers; i.e., individual curves/columns for a specific drag number.

The AV-8B day attack aircraft is the baseline used to develop the performance charts applicable to the AV-8B aircraft. When using these charts the following basic drag indexes apply:

| AV-8B | Basic Drag Index |
|---|---|
| Day attack aircraft | 0 |
| Night attack aircraft | 1.4 |
| Radar aircraft | 2.4 |

The Aircraft Loading chart (Figure 2-1) lists the individual weight, drag index, and station location of the various external stores and suspension equipment for the AV-8B and TAV-8B aircraft. The store configurations listed DO NOT constitute authorization for carriage and employment. Refer to the Tactical Manual, Volume II, A1-AV8BB-TAC-050, Chapter 5 for External Stores Limitations.

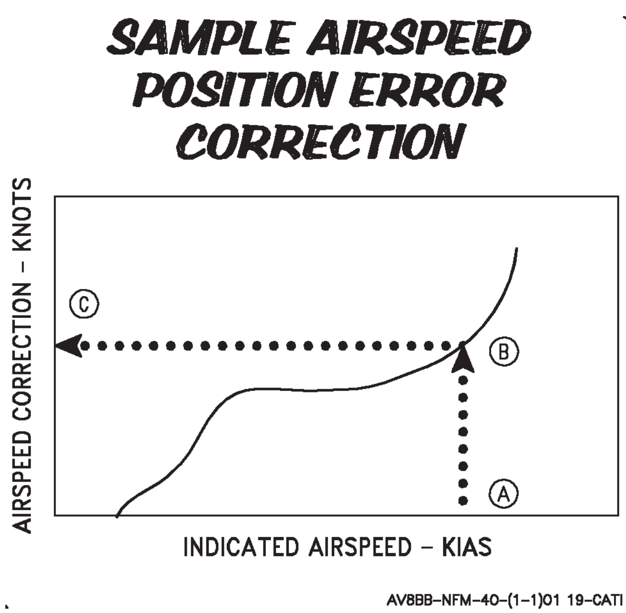
## 2.2 AIRSPEED CONVERSION

The Airspeed Conversion chart (Figure 2-3) provides a means of converting calibrated airspeed to true Mach number and true airspeed.

## 2.3 AIRSPEED POSITION ERROR CORRECTION CHART

Under normal conditions, the air data computer corrects airspeed for static source position error. The corrected airspeed is displayed on the head-up display (HUD). If an air data computer malfunction occurs, the HUD airspeed becomes inoperative and airspeed is read from the standby airspeed indicator. The indicated airspeed read on this indicator may be corrected to calibrated airspeed by using the Airspeed Position Error Correction chart (Figure 2-4).

**2.3.1 Use.** Enter the chart with the indicated airspeed read from the standby indicator and project vertically up to the appropriate altitude reflector curve. From this point, project horizontally left to read the airspeed correction.




### 2.3.2 Sample Problem

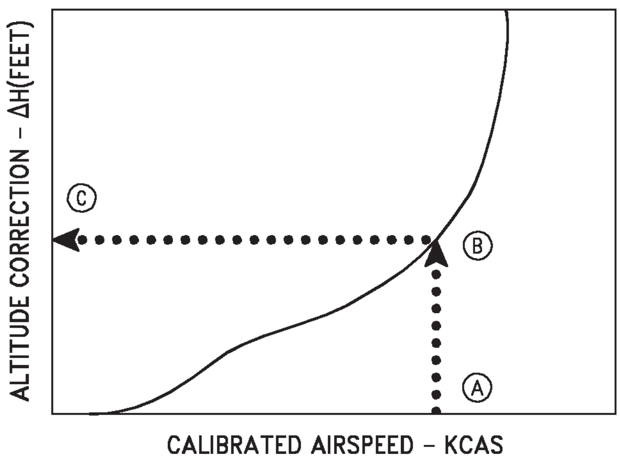
| | | |
|---|---|---|
| A. | Indicated airspeed | 325 Kt |
| B. | Altitude reflector curve | 20,000 Ft |
| C. | Airspeed correction | 5 Kt |
| D. | Calibrated airspeed (A + C) | 330 Kt |

## 2.4 ALTIMETER POSITION ERROR CORRECTION CHART

Under normal conditions the air data computer corrects altitude for static source position error. The corrected altitude is displayed on the head-up display (HUD). If an air data computer malfunction occurs, the HUD altitude indicator becomes inoperative and altitude is read from the standby altimeter. The Altimeter Position Error Correction chart (Figure 2-5) is used to correct assigned altitude to the altitude read on the standby altimeter required to fly assigned altitude.

**2.4.1 Use.** Enter the chart with calibrated airspeed derived from the airspeed position error correction chart and project vertically up to the assigned altitude. From this point, project horizontally left to read the ΔH altitude correction. Apply the ΔH altitude correction to the assigned altitude to obtain the indicated altitude required to fly assigned altitude.

## SAMPLE ALTIMETER POSITION ERROR CORRECTION

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### 2.4.2 Sample Problem

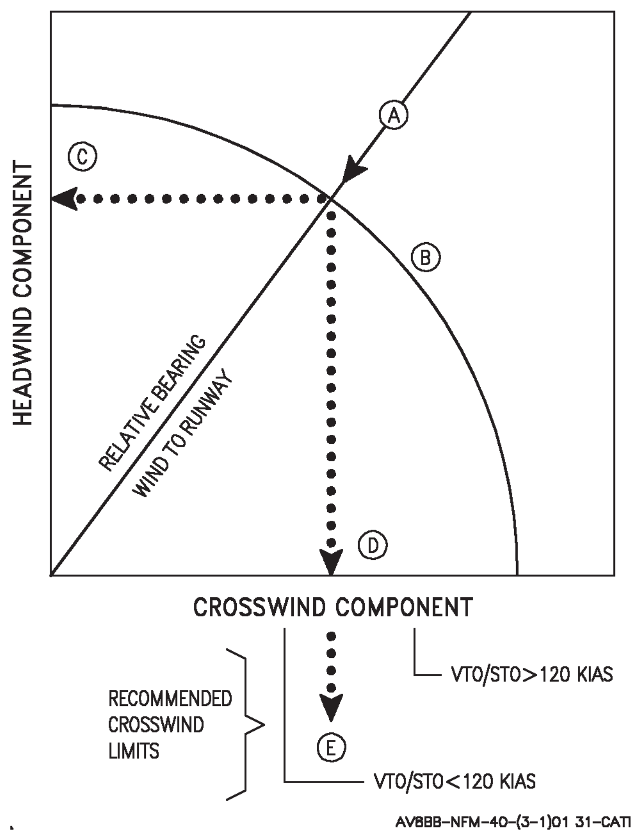
| | |
|---|---|
| A. Calibrated airspeed | 330 Kt |
| B. Assigned altitude | 20,000 Ft |
| C. ΔH correction | 300 Ft |
| D. Indicated altitude necessary to maintain assigned altitude (B – C) | 19,700 Ft |

## 2.5 WIND COMPONENTS-CROSSWIND LIMITS CHART

A Wind Components-Crosswind Limits chart (Figure 2-6) is included. It is used primarily for breaking a forecast wind down into crosswind and headwind components for takeoff computations. The crosswind component is compared with the crosswind limits for the type takeoff or landing planned.

**2.5.1 Use.** Determine the effective wind velocity by adding one-half the gust velocity (incremental wind factor) to the steady state velocity; e.g., reported wind 050/20 G30, effective wind is 050/25. Reduce the reported wind direction to a relative bearing by determining the wind direction and runway heading. Enter the chart with the relative bearing. Move along the relative bearing to intercept the effective wind speed arc. From this point, project horizontally left to read headwind component. From the intersection of the bearing and wind speed, descend vertically down to read the crosswind component. Continue this line down and compare the forecast crosswind component with the recommended limit for the type takeoff or landing planned.

**SAMPLE WIND COMPONENTS-CROSSWIND LIMITS**




### 2.5.2 Sample Problem

Reported wind 050/35, runway heading 030.

| | |
|---|---|
| A. Relative bearing | 20° |
| B. Intersect windspeed arc | 35 Kt |
| C. Headwind component | 33 Kt |
| D. Crosswind component | 12 Kt |
| E. Crosswind component within limits | YES |

## 2.6 ANGLE OF ATTACK CONVERSION CHART

This chart (Figure 2-7) presents the corresponding angle of attack in degrees for various combinations of calibrated airspeed and gross weight. The data are based on stabilized 1g level flight conditions.

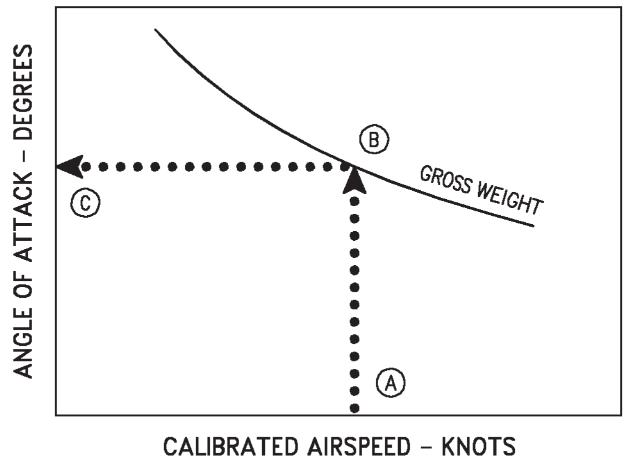
**2.6.1 Use.** Enter the applicable plot at the airspeed scale and project vertically up to intersect the appropriate aircraft gross weight curve. From this intersection, project horizontally left to read the corresponding angle of attack for the specified flight condition/configuration.

### 2.6.2 Sample Problem

Configuration: Gear Up, Flaps Auto, Nozzles Aft

| | |
|---|---|
| A. Calibrated airspeed | 200 Kt |
| B. Gross weight | 15,000 Lb |
| C. Corresponding angle of attack | 7.3° |

SAMPLE ANGLE OF ATTACK CONVERSION

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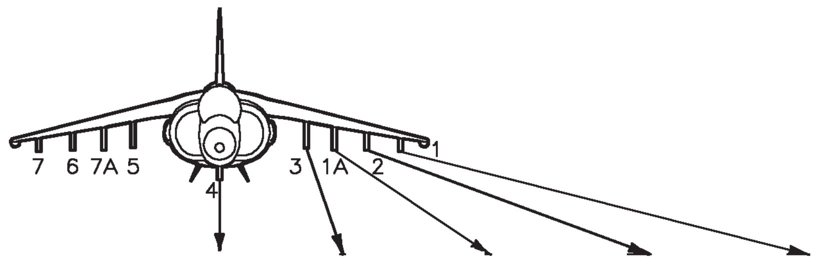
## AIRCRAFT LOADING, AV-8B

**WARNING**

For precise aircraft basic weight, external store and attachment information refer to charts C and E of the weight and balance handbook (AN-01-1B-40) for the particular aircraft.



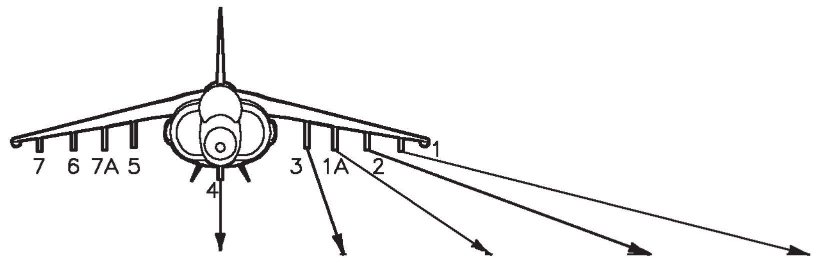

| STORES | UNIT WEIGHT (LB) | UNIT DRAG | CENTER PYLON | INBOARD PYLON | OUTRIGGER PYLON [6] | INTERMEDIATE PYLON | OUTBOARD PYLON |
|---|---|---|---|---|---|---|---|
| Missiles: | | | | | | | |
| AIM-9L/M Sidewinder | 189 | 2.25 | — | — | — | 1 | 1 |
| AGM-45A/B Shrike [6] [7] | 420 | 2.60 | — | — | — | — | — |
| AGM-65E Laser Guided Maverick | 634 | 3.25 | — | 1 | — | 1 | — |
| AGM-65F IR Maverick [6] [7] | 677 | 3.20 | — | 1 | — | 1 | — |
| AGM-122 Sidearm [8] | 218 | 2.25 | — | — | — | 1 | 1 |
| TACTS Pod | 122 | 2.00 | — | — | — | 1 | 1 |
| General Purpose Bombs: | | | | | | | |
| Mk 81 (STD), Conical Fin | 260 | 1.00 | — | 2 | — | 3 | 1 |
| Mk 81 (STD), Mk 14 Fin | 296 | 2.00 | — | 2 | — | 3 | 1 |
| Mk 82 (STD), Conical Fin | 510 | 1.35 | — | 2 | — | [1] 3 | 1 |
| Mk 82 (TP), Conical Fin | 524 | 1.35 | — | 2 | — | [1] 3 | 1 |
| Mk 82 (STD), Mk-15 Fin | 550 | 2.75 | — | 2 | — | [1] 3 | 1 |
| Mk 82 (TP), Mk-15 Fin | 564 | 2.75 | — | 2 | — | [1] 3 | 1 |
| Mk 82 (STD), BSU-33 Fin | 532 | 1.50 | — | 3 | — | 3 | 1 |
| Mk 82 (TP), BSU-33 Fin | 545 | 1.50 | — | 3 | — | 3 | 1 |
| Mk 82 (STD), BSU-86 Fin | 544 | 1.50 | — | 2 | — | 3 | 1 |
| Mk 82 (TP), BSU-86 Fin | 556 | 1.50 | — | 2 | — | 3 | 1 |
| Mk 83 (STD), Conical Fin | 985 | 2.25 | — | 2 | — | 1 | — |
| Mk 83 (TP), Conical Fin | 1006 | 2.25 | — | 2 | — | 1 | — |
| Mk 83 (STD), BSU-85 Fin | 1023 | 2.25 | — | 1 | — | 1 | — |
| Mk 83 (TP), BSU-85 Fin | 1043 | 2.25 | — | 1 | — | 1 | — |
| Destructors: [7] | | | | | | | |
| Mk 36, Mk 82 (STD), BSU-86 Fin | 538 | 2.70 | — | — | — | — | — |
| Mk 36, Mk 82 (TP), BSU-86 Fin | 560 | 2.70 | — | — | — | — | — |
| Mk 36, Mk 82 (STD), Mk 15 Fin | 538 | 2.70 | — | — | — | — | — |
| Mk 36, Mk 82 (TP), Mk 15 Fin | 560 | 2.70 | — | — | — | — | — |
| Mk 40, Mk 83 (STD), MAU-91 Fin | 1061 | 4.50 | — | — | — | — | — |
| Mk 40, Mk 83 (TP), MAU-91 Fin | 1082 | 4.50 | — | — | — | — | — |
| Laser Guided Bombs: | | | | | | | |
| GBU-12B/B (Mk 82 LGB) | 612 | 3.25 | — | 1 | — | [1] 1 | — |
| GBU-16/B (Mk 83 LGB) | 1092 | 5.50 | — | 1 | — | 1 | — |
| Pratice Bombs on Improved Triple Ejector Racks (ITER): | | | | | | | |
| Mk 76 | 26 | 0.75 | — | 3 | — | 3 | — |
| Mk 106 | 6 | 1.50 | — | — | — | 3 | — |
| BDU-33 | 25 | 0.75 | — | 3 | — | 3 | — |
| BDU-48/B | 10 | 1.50 | — | — | — | 3 | — |

**Figure 2-1. Aircraft Loading (Sheet 1 of 7)**

## AIRCRAFT LOADING, AV-8B

**WARNING**

For precise aircraft basic weight, external store and attachment information refer to charts C and E of the weight and balance handbook (AN-01-1B-40) for the particular aircraft.



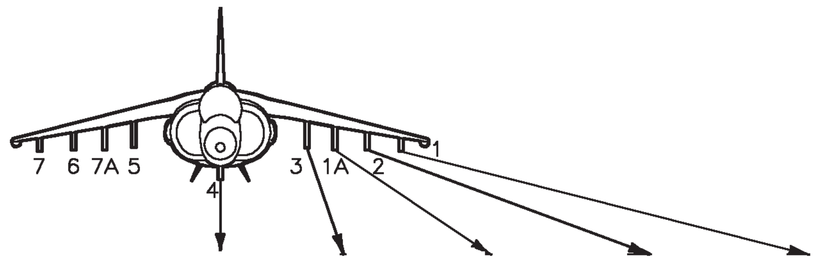

| STORES | UNIT WEIGHT (LB) | UNIT DRAG | CENTER PYLON | INBOARD PYLON | OUTRIGGER PYLON [6] | INTERMEDIATE PYLON | OUTBOARD PYLON |
|---|---|---|---|---|---|---|---|
| Cluster Bombs: | | | | | | | |
| CBU-59A/B APAM [7] | 760 | 4.50 | — | — | — | — | — |
| CBU-72/B FAE | 522 | 5.25 | — | 1 | — | 1 | — |
| CBU-78/B Gator | 494 | 4.50 | — | — | — | 1 | 1 |
| CBU-88/B Smokeye [7] | 522 | 5.25 | — | — | — | — | — |
| Mk 20 Rockeye Mod 9,10,11,12 CBU-99/100 | 505 | 4.50 | — | — | — | 1 | 1 |
| Fire Bombs: | | | | | | | |
| Mk 77 Mod 4, 5 | 500 | 4.00 | — | 1 | — | 1 | — |
| Chemical Bombs: | | | | | | | |
| Mk 116 Weteye [7] | 560 | 5.00 | — | — | — | — | — |
| Underwater Mines: [7] | | | | | | | |
| Mk 62 Quickstrike (STD), BSU-86 Fin | 538 | 2.70 | — | — | — | — | — |
| Mk 62 Quickstrike (TP), BSU-86 Fin | 560 | 2.70 | — | — | — | — | — |
| Mk 62 Quickstrike (STD), Mk 15 Fin | 538 | 2.70 | — | — | — | — | — |
| Mk 62 Quickstrike (TP), Mk 15 Fin | 560 | 2.70 | — | — | — | — | — |
| Rockets: | | | | | | | |
| 5-inch ZUNI | | | | | | | |
| (Mk 63, Mk 71 Mod 1, Mk 93) | 138 | 0.75 | — | — | — | — | — |
| (Mk 24, Mk 71 Mod 1, Mk 188) | 128 | 0.75 | — | — | — | — | — |
| 2.75-inch FFAR | | | | | | | |
| (Mk 1, Mk 4, Any) | 18 | 0.25 | — | — | — | — | — |
| (M151, Mk 4, M427) | 21 | 0.25 | — | — | — | — | — |
| (M151, Mk 66, M427) | 23 | 0.25 | — | — | — | — | — |
| Rocket Launchers: | | | | | | | |
| LAU-10D/A with 5-inch ZUNI (Mk 63, Mk 71 Mod 1, Mk 93) | | | | | | | |
| Full with fairings | 708 | 3.40 | — | 1 | — | [1] 1 | — |
| Full without fairings | 698 | 7.91* | — | 1 | — | [1] 1 | — |
| Empty | 146 | 5.50 | — | 1 | — | [1] 1 | — |
| LAU-10D/A with 5-inch ZUNI (Mk 24, Mk 71 Mod 1, Mk 188) | | | | | | | |
| Full with fairings | 668 | 3.40 | — | 1 | — | [1] 1 | — |
| Full without fairings | 658 | 7.91* | — | 1 | — | [1] 1 | — |
| Empty | 146 | 5.50 | — | 1 | — | [1] 1 | — |
| LAU-61C/A with 2.75-inch FFAR (Mk 1, Mk 4, Any) | | | | | | | |
| Full with fairings | 512 | 5.30* | — | 1 | — | 1 | — |
| Full without fairings | 497 | 13.65* | — | 1 | — | 1 | — |
| Empty | 155 | 10.25 | — | 1 | — | 1 | — |

**Figure 2-1. Aircraft Loading (Sheet 2 of 7)**

## AIRCRAFT LOADING, AV-8B

**WARNING**

For precise aircraft basic weight, external store and attachment information refer to charts C and E of the weight and balance handbook (AN-01-1B-40) for the particular aircraft.



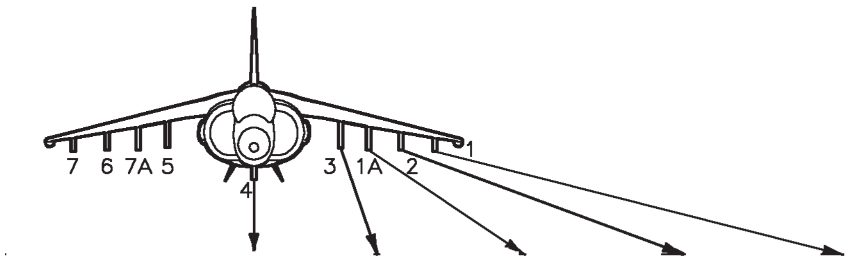

| STORES | UNIT WEIGHT (LB) | UNIT DRAG | CENTER PYLON | INBOARD PYLON | OUTRIGGER PYLON 6 | INTERMEDIATE PYLON | OUTBOARD PYLON |
|---|---|---|---|---|---|---|---|
| LAU-61C/A with 2.75-inch FFAR (M151, Mk 4, M427) | | | | | | | |
| Full with fairings | 569 | 5.30* | — | 1 | — | 1 | — |
| Full without fairings | 554 | 13.65* | — | 1 | — | 1 | — |
| Empty | 155 | 10.25 | — | 1 | — | 1 | — |
| LAU-61C/A with 2.75-inch FFAR (M151, Mk 66, M427) | | | | | | | |
| Full with fairings | 607 | 5.30* | — | 3 | — | 2 | — |
| Full without fairings | 592 | 13.65* | — | 3 | — | 2 | — |
| Empty | 155 | 10.25 | — | 3 | — | 2 | — |
| LAU-68D/A with 2.75-inch FFAR (Mk 1, Mk 4, Any) | | | | | | | |
| Full with fairings | 221 | 1.70 | — | 3 | — | 2 | — |
| Full without fairings | 211 | 5.15* | — | 3 | — | 2 | — |
| Empty | 85 | 3.25 | — | 3 | — | 2 | — |
| LAU-68D/A with 2.75-inch FFAR (M151, Mk 4, M427) | | | | | | | |
| Full with fairings | 242 | 1.70 | — | 3 | — | 2 | — |
| Full without fairings | 232 | 5.15* | — | 3 | — | 2 | — |
| Empty | 85 | 3.25 | — | 3 | — | 2 | — |
| LAU-68D/A with 2.75-inch FFAR (M151, Mk 66, M427) | | | | | | | |
| Full with fairings | 256 | 1.70 | — | 3 | — | 2 | — |
| Full without fairings | 246 | 5.15* | — | 3 | — | 2 | — |
| Empty | 85 | 3.25 | — | 3 | — | 2 | — |
| Dispensers: | | | | | | | |
| SUU-25F/A with LUU-2B/B Flares | 486 | 4.25 | — | 2 | — | 2 | 1 |
| SUU-44/A 7 | — | — | — | — | — | — | — |
| Flares: | | | | | | | |
| LUU-2B/B Flare | 28 | 2.80 | — | — | — | — | — |
| LUU-2B/B Flares on ITER | 213 | — | — | 3 | — | 3 | — |
| Electronic Countermeasures: | | | | | | | |
| AN/ALQ-164 DECM Pod | 415 | 9.00 | 1 | — | — | — | — |
| Sonobouys: 7 | | | | | | | |
| SSQ-23/A | 18 | — | — | — | — | — | — |
| SSQ-50/A | 40 | — | — | — | — | — | — |
| Seismic Sensors: | | | | | | | |
| ADSID V 7 | 5.9 | 1.5 | — | — | — | — | — |

**Figure 2-1. Aircraft Loading (Sheet 3 of 7)**

## AIRCRAFT LOADING, AV-8B

**WARNING**

For precise aircraft basic weight, external store and attachment information refer to charts C and E of the weight and balance handbook (AN-01-1B-40) for the particular aircraft.



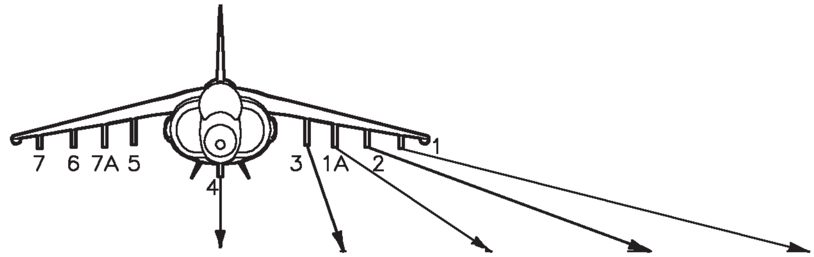

| STORES | UNIT WEIGHT (LB) | UNIT DRAG | CENTER PYLON | INBOARD PYLON | OUTRIGGER PYLON [6] | INTERMEDIATE PYLON | OUTBOARD PYLON |
|---|---|---|---|---|---|---|---|
| Targeting Pod: | | | | | | | |
| AN/AAQ-28 Litening II | 440 | | — | [9] 1 | — | — | — |
| Open | | 4.0 | | | | | |
| Standby | | 2.0 | | | | | |
| External Fuel Tank: | | | | | | | |
| 300 Gallon External Tank | 198 | 7.75 | — | 1 | — | [1] 1 | — |
| Gun System: | | | | | | | |
| GAU-12/U 25mm Gun Pods (Set) with 300 Rounds Ammo | 1314 | 6.70 | — | — | — | — | — |
| Gun Pak Set with No Gun and No Ammo | 300 | 6.70 | — | — | — | — | — |
| Baggage Container MXU-648: | | | | | | | |
| Fixed Tail Cone | | | | | | | |
| Full [3] | 398 | 5.5* | — | [2] 1 | — | [2] 1 | — |
| Full [4] | 248 | 5.5* | — | [2] 1 | — | [2] 1 | — |
| Empty | 98 | 5.5* | — | [2] 1 | — | [2] 1 | — |
| Removable Tail Cone | | | | | | | |
| Full [3] | 430 | 5.5* | — | [2] 1 | — | [2] 1 | — |
| Full [4] | 280 | 5.5* | — | [2] 1 | — | [2] 1 | — |
| Empty | 125 | 5.5* | — | [2] 1 | — | [2] 1 | — |
| Suspension Hardware: | | | | | | | |
| BRU-42/A (ITER) | 127 | 4.10 | — | 1 | — | 1 | — |
| ADU-299A/A Adapter (Sidewinder) | 24 | [5] | — | — | — | 1 | — |
| LAU-7/A-5 Launcher (Sidewinder) | 90 | 1.40 | — | — | — | 1 | 1 |
| LAU-117A Launcher (Maverick) | 130 | 1.10 | — | 1 | — | 1 | — |
| LAU-118(V)1/A (Shrike) | 100 | 1.20 | — | — | — | — | — |
| Centerline Pylon | 86 | 1.50 | 1 | — | — | — | — |
| Inboard Pylon | 143 | 1.80 | — | 1 | — | — | — |
| Intermediate Pylon | 131 | 2.55 | — | — | — | 1 | — |
| Outboard Pylon with BRU-36A/A | 96 | 1.40 | — | — | — | — | 1 |
| Outboard Pylon without BRU-36A/A | 67 | 1.40 | — | — | — | — | 1 |
| Outrigger Pylon | 68.5 | 1.40 | — | — | 1 | — | — |
| Miscellaneous: | | | | | | | |
| Deep Fuselage Strakes (Set) | 96 | 1.00 | — | — | — | — | — |
| LERX (Set removed, fairings installed) | 34 | 3.00 | — | — | — | — | — |
| In-flight Refueling Probe | 107 | 2.30 | — | — | — | — | — |
| Inboard Pylon Hole Cover Fairing | 11 | 0.00 | — | 1 | — | — | — |
| Intermediate Pylon Hole Cover Fairing | 5 | 0.00 | — | — | — | 1 | — |
| Outboard Pylon Hole Cover Fairing | 0.5 | 0.00 | — | — | — | — | 1 |

**Figure 2-1. Aircraft Loading (Sheet 4 of 7)**

## AIRCRAFT LOADING, AV-8B

**WARNING**

For precise aircraft basic weight, external store and attachment information refer to charts C and E of the weight and balance handbook (AN-01-1B-40) for the particular aircraft.




| STORES | UNIT WEIGHT (LB) | UNIT DRAG | CENTER PYLON | INBOARD PYLON | OUTRIGGER PYLON 6 | INTERMEDIATE PYLON | OUTBOARD PYLON |
|---|---|---|---|---|---|---|---|

NOTES:

Interference Drag

Intermediate ITER with one (1) to three (3) stores next to inboard ITER with (1) to three (3) stores has interference DI of 1.75 per ITER. Inboard/ intermediate ITER with one (1) to three (3) stores next to anything but a ITER with one (1) to three (3) stores has no interference drag.

(STD)-Standard

(TP)-Thermal protection

* - Estimated

1 Carriage at reduced load factor.

2 Emergency jettison only.

3 Conventional and short takeoff/landing maximum weight.

4 Vertical landing maximum weight.

5 The drag of the adapter is included in the LAU-7A-5 launcher drag index.

6 Night Attack only

7 Software provisions only

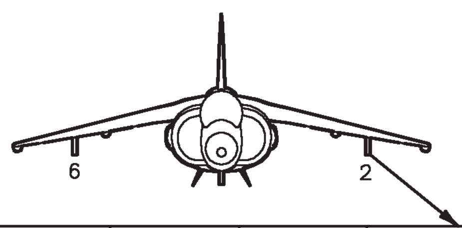
8 Authorized for carriage only

9 Station 5 only

## AIRCRAFT LOADING, TAV-8B

**WARNING**

For precise aircraft basic weight, external store and attachment information refer to charts C and E of the weight and balance handbook (AN-01-1B-40) for the particular aircraft.



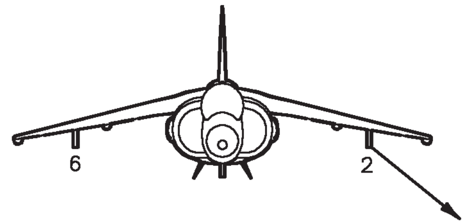

| STORES | UNIT WEIGHT (LB) | UNIT DRAG | CENTER PYLON | INBOARD PYLON | INTERMEDIATE PYLON | OUTBOARD PYLON |
|---|---|---|---|---|---|---|
| Practice Bombs on Improved Triple Ejector Racks (ITER): | | | | | | |
| Mk 76 | 26 | 0.75 | — | — | 3 | — |
| Mk 106 | 6 | 1.50 | — | — | 3 | — |
| BDU-33 | 25 | 0.75 | — | — | 3 | — |
| BDU-48/B | 10 | 1.50 | — | — | 3 | — |

**Figure 2-1. Aircraft Loading (Sheet 5 of 7)**

## AIRCRAFT LOADING, TAV-8B

**WARNING**

For precise aircraft basic weight, external store and attachment information refer to charts C and E of the weight and balance handbook (AN-01-1B-40) for the particular aircraft.



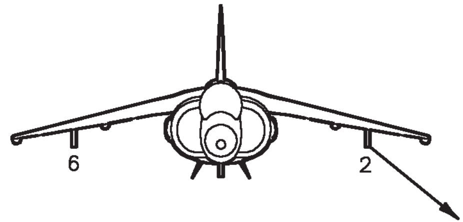

| STORES | UNIT WEIGHT (LB) | UNIT DRAG | CENTER PYLON | INBOARD PYLON | INTERMEDIATE PYLON | OUTBOARD PYLON |
|---|---|---|---|---|---|---|
| Rockets: | | | | | | |
| 5-inch ZUNI | | | | | | |
| (Mk 63, Mk 71 Mod 1, Mk 93) | 138 | 0.75 | — | — | — | — |
| (Mk 24, Mk 71 Mod 1, Mk 188) | 128 | 0.75 | — | — | — | — |
| 2.75-inch FFAR | | | | | | |
| (Mk 1, Mk 4, Any) | 18 | 0.25 | — | — | — | — |
| (M151, Mk 4, M427) | 21 | 0.25 | — | — | — | — |
| (M 151, Mk 66, M427) | 23 | 0.25 | — | — | — | — |
| Rocket Launchers: | | | | | | |
| LAU-10D/A with 5-inch ZUNI | | | | | | |
| (Mk 63, Mk 71 Mod 1, Mk 93) | | | | | | |
| Full with fairings | 708 | 3.40 | — | — | [1] 1 | — |
| Full without fairings | 698 | 7.91* | — | — | [1] 1 | — |
| Empty | 146 | 5.50 | — | — | [1] 1 | — |
| LAU-10D/A with 5-inch ZUNI | | | | | | |
| (Mk 24,Mk 71 Mod 1, Mk 188) | | | | | | |
| Full with fairings | 668 | 3.40 | — | — | [1] 1 | — |
| Full without fairings | 658 | 7.91* | — | — | [1] 1 | — |
| Empty | 146 | 5.50 | — | — | [1] 1 | — |
| LAU-61C/A with 2.75-inch FFAR | | | | | | |
| (Mk 1, Mk 4, Any) | | | | | | |
| Full with fairings | 512 | 5.30* | — | — | 1 | — |
| Full without fairings | 497 | 13.65* | — | — | 1 | — |
| Empty | 155 | 10.25 | — | — | 1 | — |
| LAU-61C/A with 2.75-inch FFAR | | | | | | |
| (M151, Mk 4, M427) | | | | | | |
| Full with fairings | 569 | 5.30* | — | — | 1 | — |
| Full without fairings | 554 | 13.65* | — | — | 1 | — |
| Empty | 155 | 10.25 | — | — | 1 | — |
| LAU-61C/A with 2.75-inch FFAR | | | | | | |
| (M151, Mk 66, M427) | | | | | | |
| Full with fairings | 607 | 5.30* | — | — | 1 | — |
| Full without fairings | 592 | 13.65* | — | — | 1 | — |
| Empty | 155 | 10.25 | — | — | 1 | — |
| LAU-68D/A with 2.75-inch FFAR | | | | | | |
| (Mk 1, Mk 4, Any) | | | | | | |
| Full with fairings | 221 | 1.70 | — | — | 1 | — |
| Full without fairings | 211 | 5.15* | — | — | 1 | — |
| Empty | 85 | 3.25 | — | — | 1 | — |

**Figure 2-1. Aircraft Loading (Sheet 6 of 7)**

## AIRCRAFT LOADING, TAV-8B

**WARNING**

For precise aircraft basic weight, external store and attachment information refer to charts C and E of the weight and balance handbook (AN-01-1B-40) for the particular aircraft.

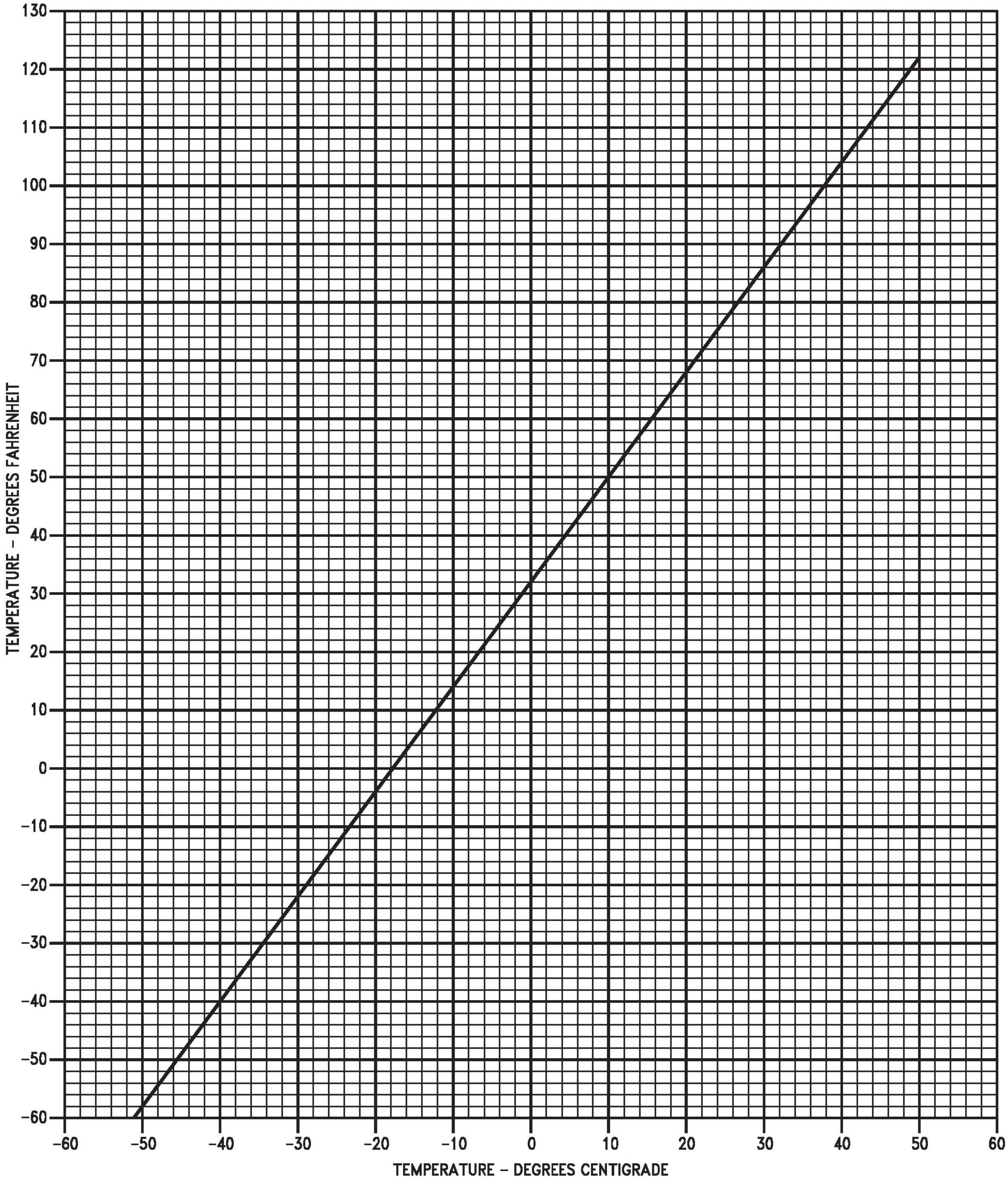



| STORES | UNIT WEIGHT (LB) | UNIT DRAG | CENTER PYLON | INBOARD PYLON | INTERMEDIATE PYLON | OUTBOARD PYLON |
|---|---|---|---|---|---|---|
| LAU-68D/A with 2.75-inch FFAR (M151, Mk 4, M427) | | | | | | |
| Full with fairings | 242 | 1.70 | — | — | 1 | — |
| Full without fairings | 232 | 5.15* | — | — | 1 | — |
| Empty | 85 | 3.25 | — | — | 1 | — |
| LAU-68D/A with 2.75-inch FFAR (M151, Mk 66, M427) | | | | | | |
| Full with fairings | 256 | 1.70 | — | — | 1 | — |
| Full without fairings | 246 | 5.15* | — | — | 1 | — |
| Empty | 85 | 3.25 | — | — | 1 | — |
| Dispensers: | | | | | | |
| SUU-25F/A with LUU-2B/B Flares | 486 | 4.25 | — | — | 1 | — |
| SUU-44/A | — | — | — | — | — | — |
| External Fuel Tank: | | | | | | |
| 300 Gallon External Tank | 198 | 7.75 | — | — | [1] 1 | — |
| Baggage Container MXU-648: | | | | | | |
| Fixed Tail Cone | | | | | | |
| Full [3] | 398 | 5.5* | — | — | [2] 1 | — |
| Full [4] | 248 | 5.5* | — | — | [2] 1 | — |
| Empty | 98 | 5.5* | — | — | [2] 1 | — |
| Removable Tail Cone | | | | | | |
| Full [3] | 430 | 5.5* | — | — | [2] 1 | — |
| Full [4] | 280 | 5.5* | — | — | [2] 1 | — |
| Empty | 125 | 5.5* | — | — | [2] 1 | — |
| Suspension Hardware: | | | | | | |
| BRU-42/A (ITER) | 127 | 4.10 | — | — | 1 | — |
| Intermediate Pylon | 131 | 2.55 | — | — | 1 | — |

NOTES:
*-Estimated
[1] Carriage at reduced load factor
[2] Emergency jettison only
[3] Conventional and short takeoff/ landing maximum weight
[4] Vertical landing maximum weight

**Figure 2-1. Aircraft Loading (Sheet 7 of 7)**

# TEMPERATURE CONVERSION




AV8BB−NFM−40−(7−1)01−CATI

Figure 2-2. Temperature Conversion

# AIRSPEED CONVERSION

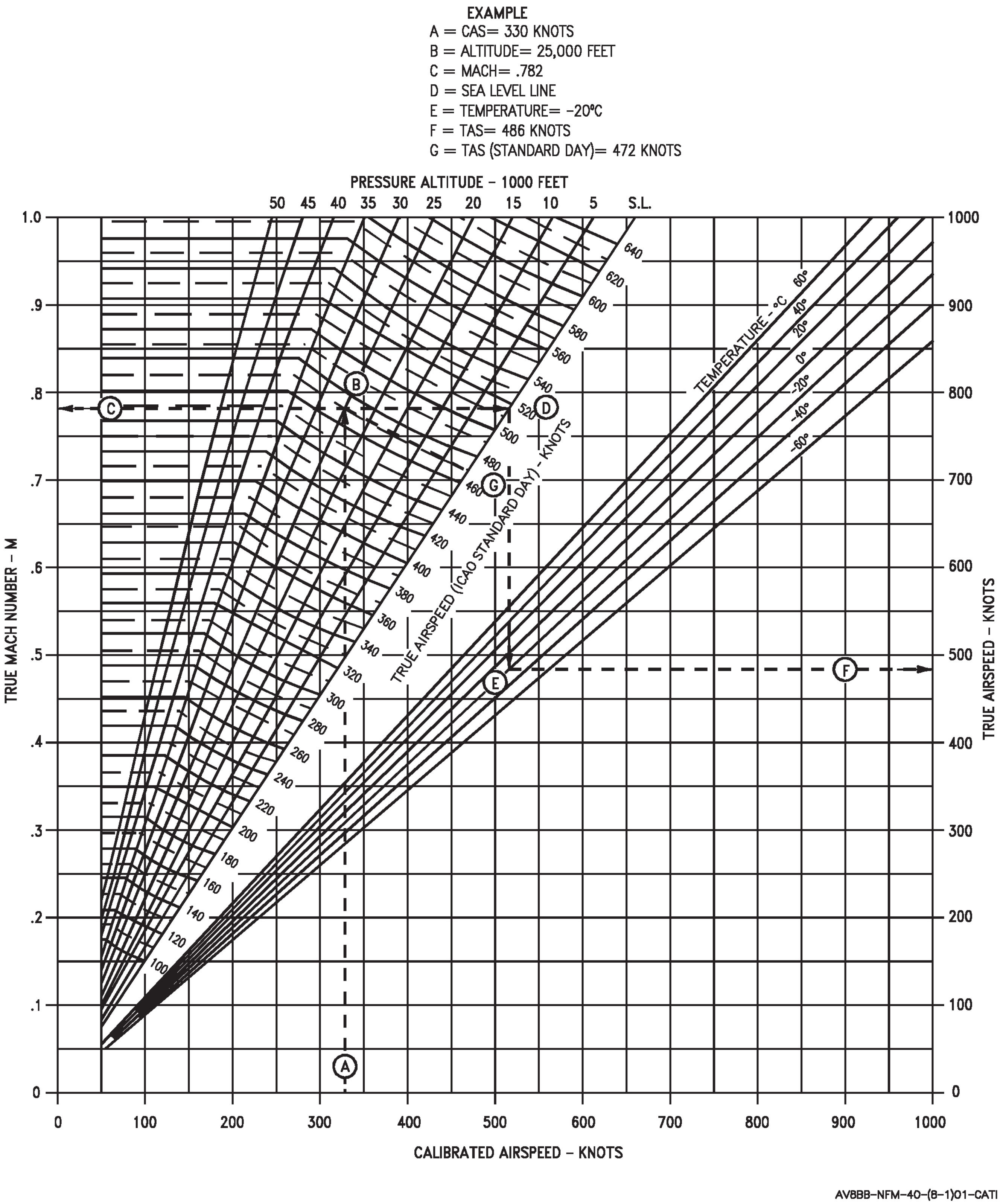
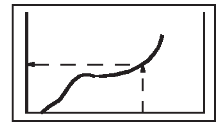



Figure 2-3. Airspeed Conversion

# AIRSPEED POSITION ERROR CORRECTION

## STANDBY AIRSPEED INDICATOR ONLY
## 1G FLIGHT

GUIDE



**AIRCRAFT CONFIGURATION**
ALL DRAG INDEXES

**REMARKS**
U.S. STANDARD DAY, 1962

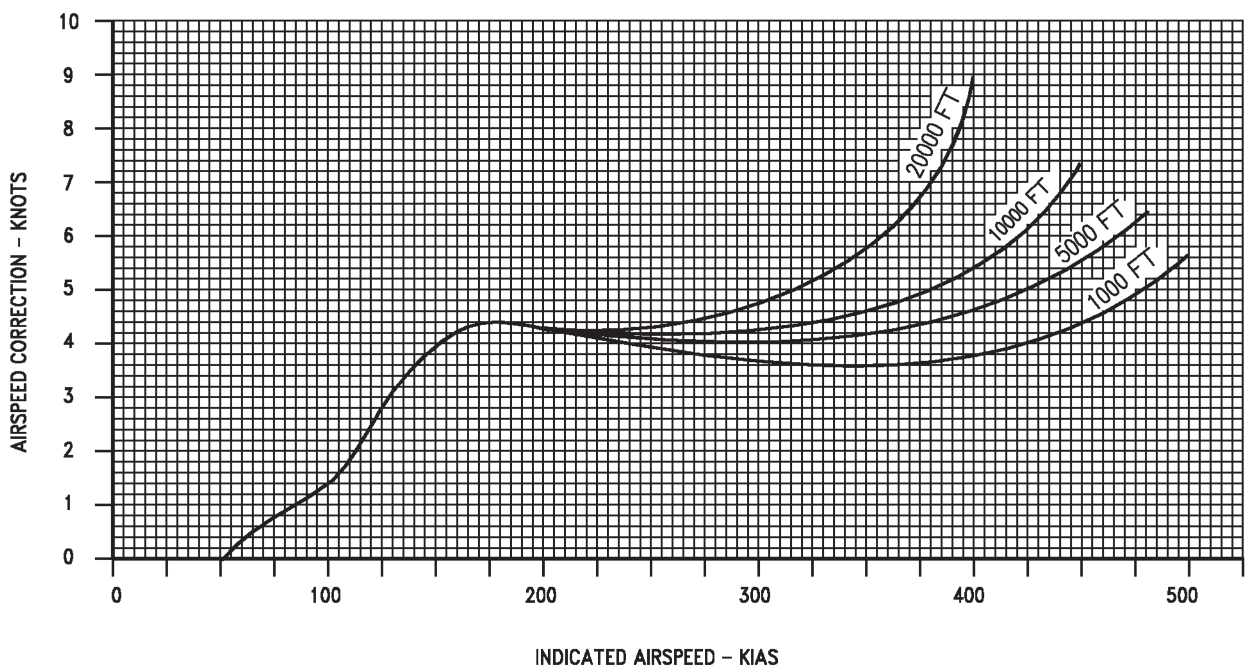
DATE: JUNE 1983
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

**NOTE**

AIRSPEED CORRECTION TOLERANCES (KNOTS)

| AIRSPEED | TOLERANCE |
|---|---|
| 100 | ±6 |
| 200 | ±10 |
| 300 | ±20 |
| 400 | ±25 |
| 500 | ±30 |




AV8BB–NFM–40–(9–1)01–CATI

Figure 2-4. Airspeed Position Error Correction

# ALTIMETER POSITION ERROR CORRECTION

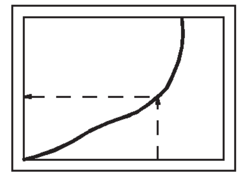
STANDBY ALTIMETER ONLY
1G FLIGHT

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES

REMARKS
U.S. STANDARD DAY, 1962

NOTE
FLY ASSIGNED ALTITUDE–ΔH

GUIDE

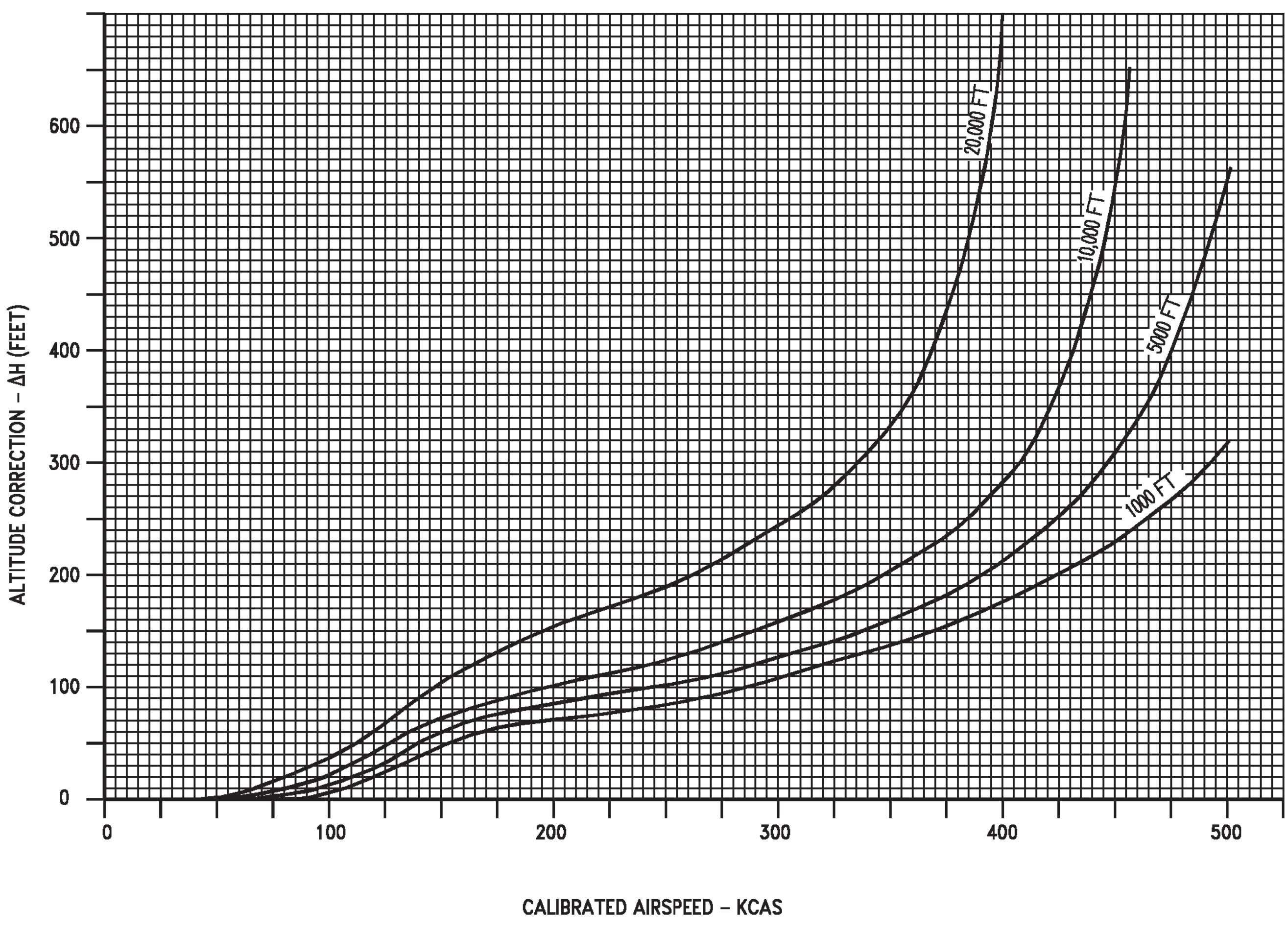


DATE: JUNE 1983
DATA BASIS: **FLIGHT TEST**

NOTE
ALTITUDE CORRECTION TOLERANCES (FEET)

| ALTITUDE | TOLERANCE |
|---|---|
| 1000 | ±45 |
| 5000 | ±54 |
| 10000 | ±92 |
| 20000 | ±146 |

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL



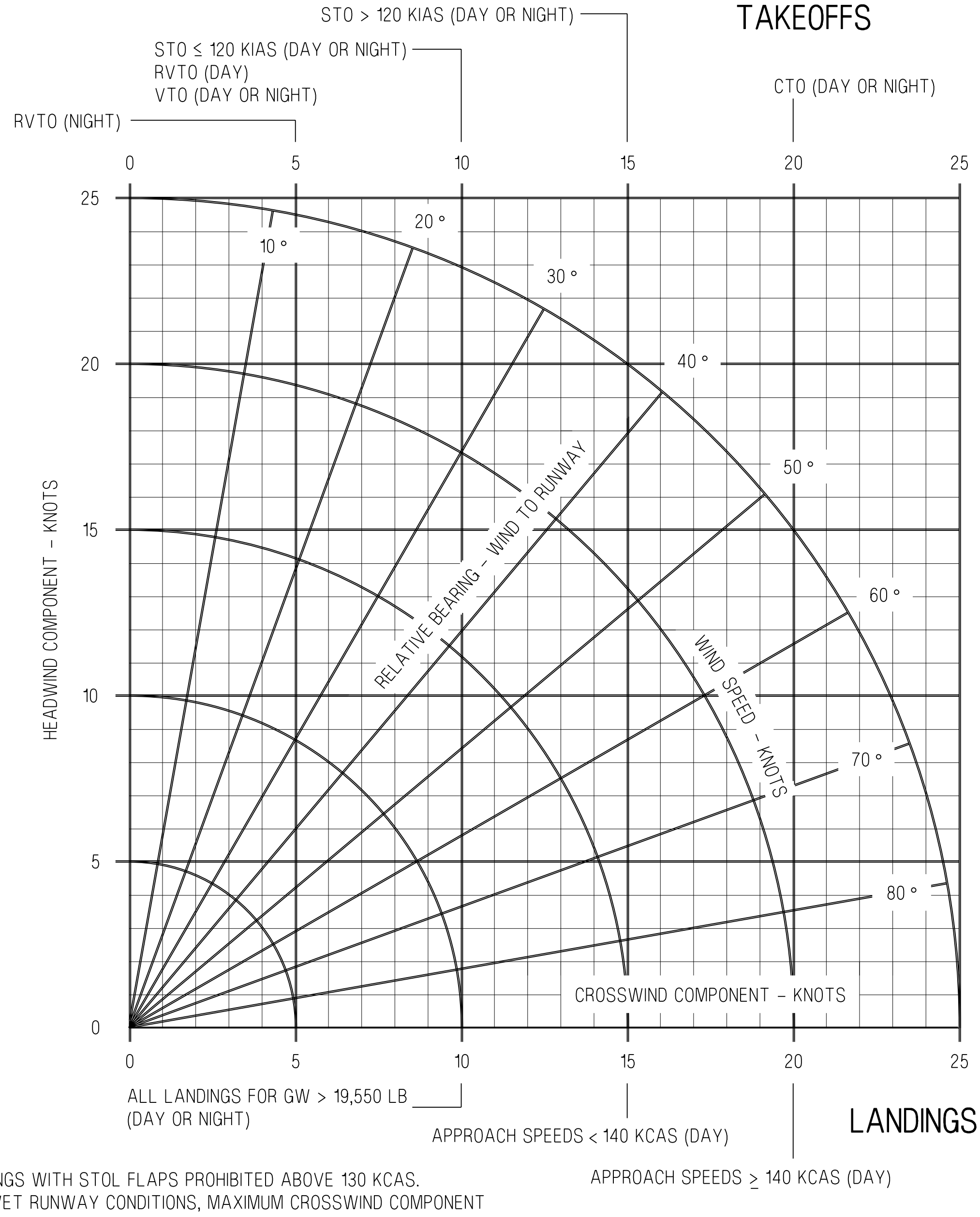

AV8BB–NFM–40–(10–1)01–CATI

**Figure 2-5. Altimeter Position Error Correction**

# WIND COMPONENT-CROSSWIND LIMITS

INSTRUCTIONS

ENTER THE CHART WITH THE RELATIVE BEARING. MOVE ALONG THE RELATIVE BEARING TO INTERCEPT THE WIND ARC. FROM THIS POINT, DESCEND VERTICALLY TO READ THE CROSSWIND COMPONENT. FROM THE INTERSECTION OF BEARING AND WIND SPEED, PROJECT HORIZONTALLY TO THE LEFT TO READ HEADWIND COMPONENT.




NOTES

1. LANDINGS WITH STOL FLAPS PROHIBITED ABOVE 130 KCAS.
2. FOR WET RUNWAY CONDITIONS, MAXIMUM CROSSWIND COMPONENT SHALL BE REDUCED BY 5 KNOTS.
3. FOR NIGHT OPERATIONS LANDING CROSSWIND COMPONENT SHALL BE REDUCED BY 5 KNOTS.
4. MAXIMUM CRAB ANGLE AT TOUCHDOWN SHALL BE LESS THAN 10 °.
5. LATERAL DRIFT AT TOUCHDOWN SHALL BE MINIMIZED.
6. MAXIMUM ROLL ANGLE AT TOUCHDOWN SHALL BE LESS THAN 3.5 °.
7. LIMITS SPECIFIED ARE FOR SMOOTH, PREPARED, HARD SURFACES (MINIMUM WIDTH 100 FEET).

AHR853–11–1–008

**Figure 2-6. Wind Components - Crosswind Limits**

# ANGLE OF ATTACK CONVERSION

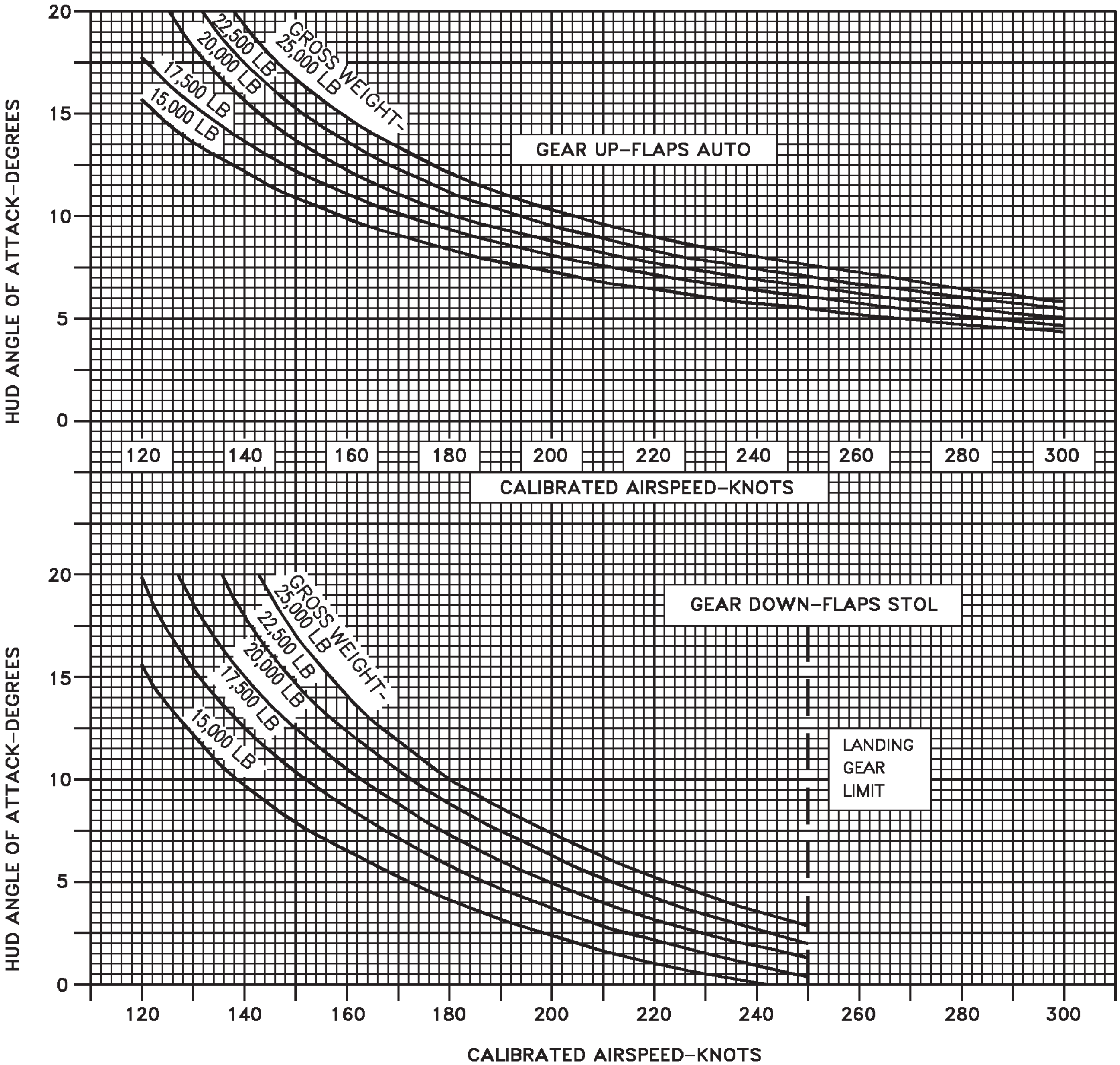
## STABILIZED 1G LEVEL FLIGHT

**AIRCRAFT CONFIGURATION**
GEAR UP, FLAPS AUTO
GEAR DOWN, FLAPS STOL
NOZZLES AFT

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962
SEA LEVEL

DATE: 17 DECEMBER 1985
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(12-1)01-CATI

**Figure 2-7. Angle of Attack Conversion**

# CHAPTER 3

# Takeoff

**NOTE**

The basis for VSTOL performance is established from individual aircraft hover performance, functional checkflight and engine maintenance checks. The engine performance status shall be available from the operations officer.

3.1 Paragraph deleted by change 2.

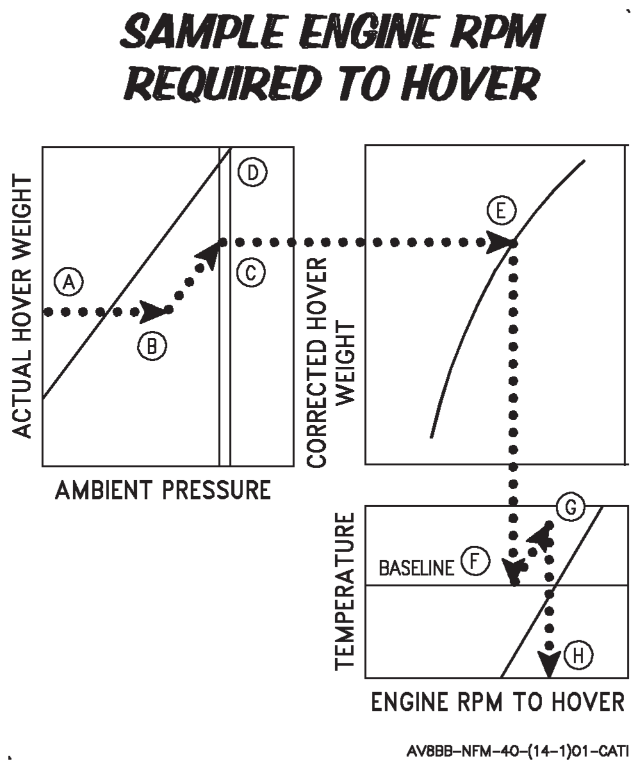
3.1.1 Paragraph deleted by change 2.

3.1.2 Paragraph deleted by change 2.

## 3.2 ENGINE RPM REQUIRED TO HOVER

This chart (Figure 3-3 or 3-4) presents the corresponding engine rpm required to hover for all gross weights and considers the variables of ambient pressure and temperature for 0% datum and non-0% datum engine operation.

**3.2.1 Use.** Enter the chart with the planned aircraft weight and project horizontally right to intercept the appropriate ambient pressure or pressure altitude line. From this intersection parallel the pressure guidelines to the pressure baseline (29.92), then project horizontally right to read corrected hover weight. From this point, continue to project horizontally right to the appropriate relative hover reflector line, then vertically down to the ambient temperature baseline (15 °C). From this point, parallel the temperature guidelines to the appropriate temperature line, then project vertically down to read the engine rpm required to hover.




**3.2.2 Sample Problem** (Use Figure 3-3)

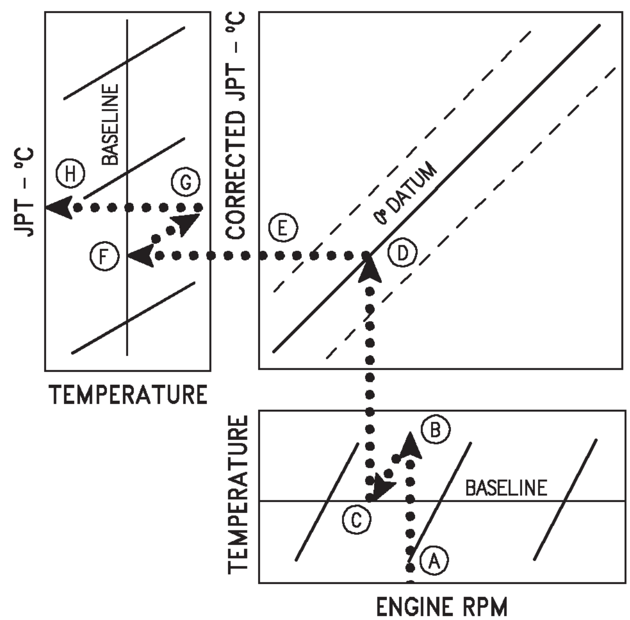
| | |
|---|---|
| A. Aircraft weight | 16,000 Lb |
| B. Ambient pressure | 29.50 In. Hg |
| C. Pressure baseline | 29.92 In. Hg |
| D. Corrected hover weight | 16,230 Lb |
| E. Relative hover reflector line | 0% datum |
| F. Temperature baseline | 15 °C |
| G. Temperature | 25 °C |
| H. Engine RPM required to hover | 98.0% RPM |

### 3.3 JPT IN HOVER

This chart (Figure 3-5 or 3-6) provides approximate engine jet pipe temperatures during hover operations for conditions of engine rpm and ambient air temperature for 0 datum and non-0 datum engine operation.

**3.3.1 Use.** Enter the chart with engine RPM from the appropriate engine RPM required to hover chart, and proceed vertically up to the appropriate ambient temperature line. From this point parallel the temperature guidelines to the temperature baseline, then project vertically up to intercept the appropriate relative JPT reflector line (use relative JPT with bleed compensation determined in A1-AV8BB-NFM-000, Figure 10-5 or 10-6 as applicable). From this intersection project horizontally left to read corrected JPT in degrees centigrade. Continue to project horizontally left to the ambient temperature baseline (15 °C), then parallel the temperature guidelines to the appropriate ambient temperature line. From this point, project further horizontally left to read JPT in degrees centigrade.

SAMPLE JET IN HOVER




AV8BB–NFM–40–(15–1)01–CATI

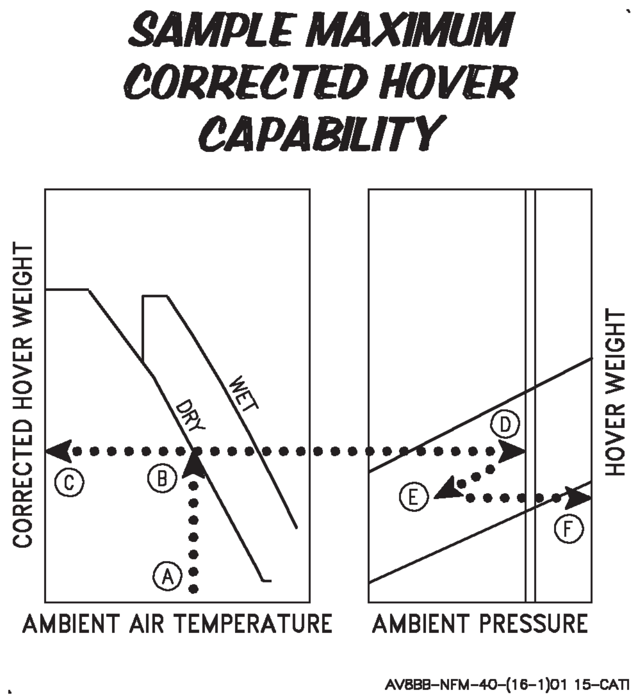
**3.3.2 Sample Problem** (Use Figure 3-5)

| | |
|---|---|
| A. Engine fan speed | 98 % |
| B. Ambient air temperature | 20 °C |
| C. Temperature baseline | 15 °C |
| D. Relative JPT reflector line | –7 °C |
| E. Corrected JPT | 664 °C |
| F. Temperature baseline | 15 °C |
| G. Ambient air temperature | 20 °C |
| H. JPT | 680 °C |

## 3.4 MAXIMUM CORRECTED HOVER CAPABILITY

This chart (Figure 3-7 or 3-8) provides maximum hover gross weights for 0 datum wet and dry engine operation. Variables of ambient pressure and air temperature are taken into consideration.

**3.4.1 Use.** Enter the chart with the ambient air temperature and project vertically up to the appropriate engine operation reflector line, then horizontally left to read corrected hover weight. Return to the point of intersection of the temperature line and the engine reflector line and project horizontally right to the pressure baseline (29.92) then parallel the pressure guidelines to the appropriate ambient pressure. From this point project horizontally right to read maximum hover weight.



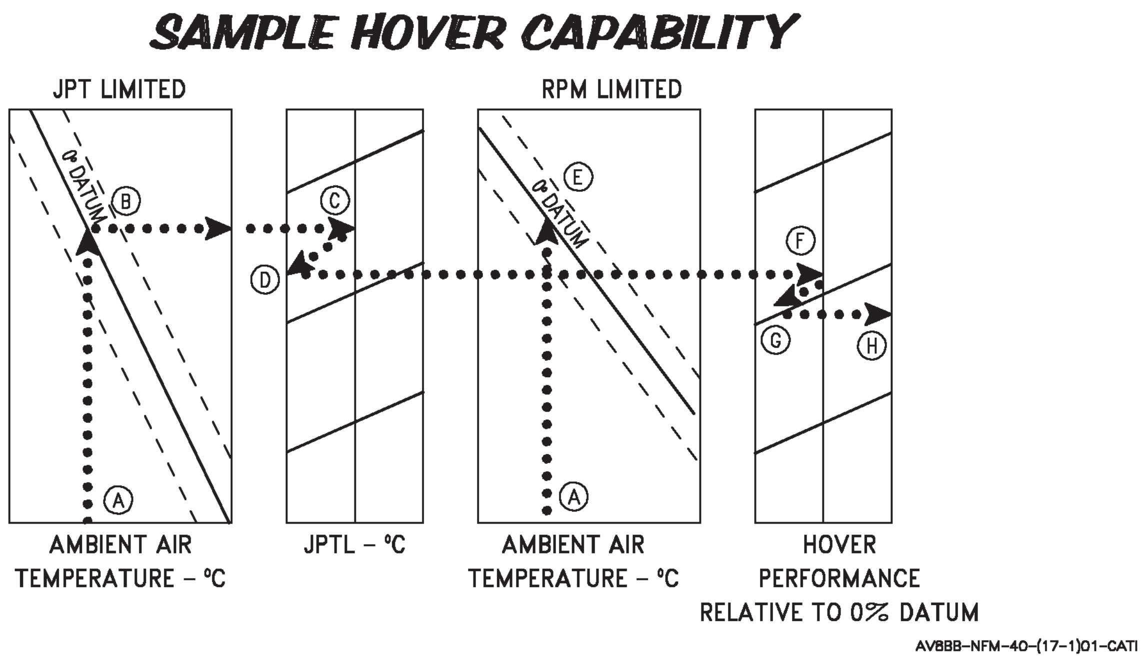

**3.4.2 Sample Problem** (Use Figure 3-7)

| | |
|---|---|
| A. Ambient temperature | 20 °C |
| B. Dry reflector | |
| C. Corrected hover weight | 16,950 Lb |
| D. Pressure baseline | 29.92 In. Hg |
| E. Ambient pressure | 29.50 In. Hg |
| F. Maximum hover weight | 16,710 Lb |

## 3.5 HOVER CAPABILITY

These charts (Figures 3-9 and 3-10) provide the corrected hover weight capabilities at wet and dry short lift ratings and are to be used for the determination of vertical, rolling vertical, short, and conventional takeoff capabilities. The variables of ambient pressure and air temperature for 0 datum and non-0 datum engines are taken into consideration.

**3.5.1 Use.** Enter the chart with the ambient air temperature and project up to the appropriate JPT reflector and project up to the appropriate relative JPT reflector line (use relative JPT with bleed compensation determined in A1-AV8BB-NFM-000, Figure 10-5 or 10-6 as applicable). From this point, project horizontally right to the JPTL baseline, then parallel the JPTL guidelines to the appropriate JPTL setting. The appropriate JPTL setting is a maintenance provided value. Again enter the chart with the ambient air temperature and project vertically up to the appropriate RPM reflector line. Project horizontally right, from whichever is the lower between the intersection of the JPTL line and the intersection of the appropriate RPM reflector line, to the hover performance relative to 0 datum baseline. From this point parallel the guidelines to the appropriate hover performance relative to 0 datum, then project horizontally right to read corrected hover weight.




**3.5.2 Sample Problem** (Use Figure 3-9)

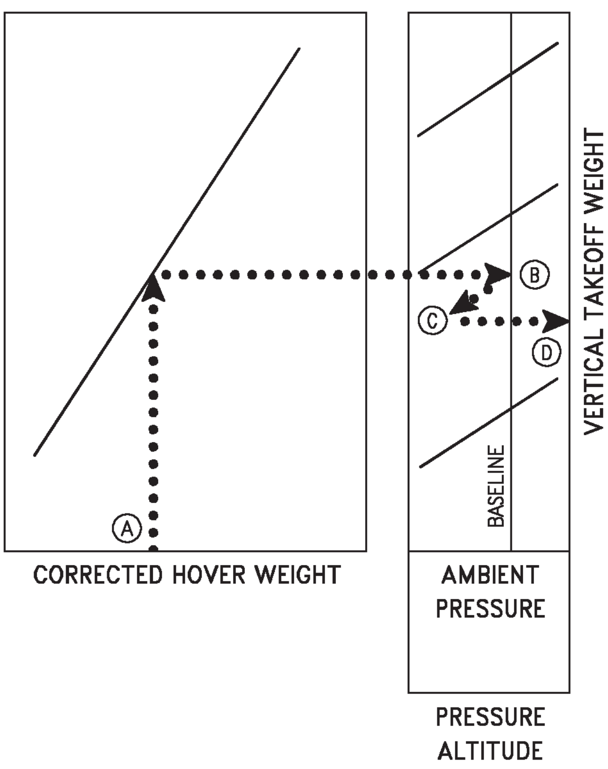
| | |
|---|---|
| Dry engine operation | |
| A. Ambient air temperature | 20 °C |
| B. Relative JPT reflector line | 0 °C |
| C. JPTL baseline | 703 °C |
| D. JPTL setting line | 700 °C |
| E. RPM reflector line (0% datum) | |
| F. Hover performance relative to 0% datum baseline | |
| G. Hover performance relative to 0% datum | –3% |
| H. Corrected hover weight | 16,400 Lb |

### 3.6 VERTICAL TAKEOFF CAPABILITY

This chart (Figure 3-11 or 3-12) presents the vertical takeoff weight capability for wet and dry short lift ratings. The effect of ambient pressure is taken into account.

**3.6.1 Use.** Enter the chart with corrected hover weight, obtained from the appropriate hover capability chart, and project vertically up to the reflector line. From this point, project horizontally right to the ambient pressure base-line (29.92), then parallel the ambient pressure guidelines to the appropriate ambient pressure line. From this point project horizontally right to read vertical takeoff weight.

**SAMPLE VERTICAL TAKEOFF CAPABILITY**




AV8BB-NFM-40-(18-1)01 30-CATI

### 3.6.2 Sample Problem (Use Figure 3-11)

Short lift dry engine rating - 82° Nozzles

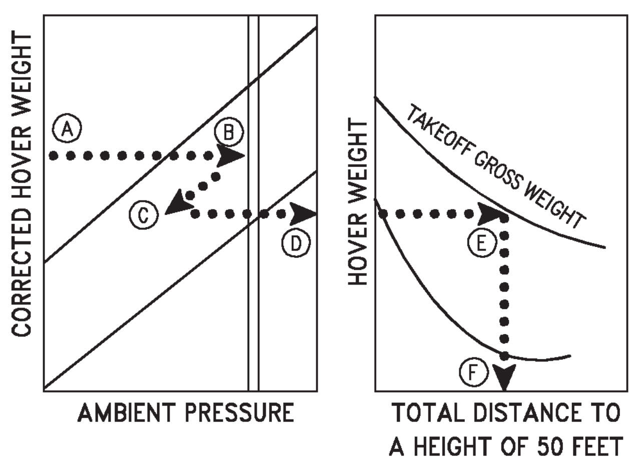
| | |
|---|---|
| A. Corrected hover weight | 16,400 Lb |
| B. Reflector line | |
| C. Pressure baseline | 29.92 In. Hg |
| D. Ambient pressure | 29.50 In. Hg |
| E. Vertical takeoff weight | 15,680 Lb |

### 3.7 ROLLING VERTICAL TAKEOFF CAPABILITY

This chart (Figure 3-13) provides the total distance traveled to a height of 50 feet during a rolling vertical takeoff. The variables considered in these calculations are corrected hover weight for short lift ratings, takeoff gross weight and ambient pressure.

**3.7.1 Use** Enter the chart with the previously determined corrected hover weight (Figure 3-9 or 3-10 as applicable) and proceed horizontally right to the ambient pressure baseline. Parallel the pressure guidelines to the ambient pressure, then project horizontally right to read hover weight. From this point continue to project horizontally right to intersect the appropriate take-off gross weight curve. From this intersection project vertically down to read the total distance to a height of 50 feet.

**SAMPLE ROLLING VERTICAL TAKEOFF CAPABILITY**




AV8BB-NFM-40-(19-1)01-CATI

### 3.7.2 Sample Problem

| | |
|---|---|
| A. Corrected hover weight (from hover capability chart) | 17,000 Lb |
| B. Pressure baseline | 29.92 In. Hg |
| C. Ambient pressure | 29.50 In. Hg |
| D. Hover weight | 16,750 Lb |
| E. Takeoff gross weight | 16,000 Lb |
| F. Total distance to a height of 50 feet | 235 Ft |

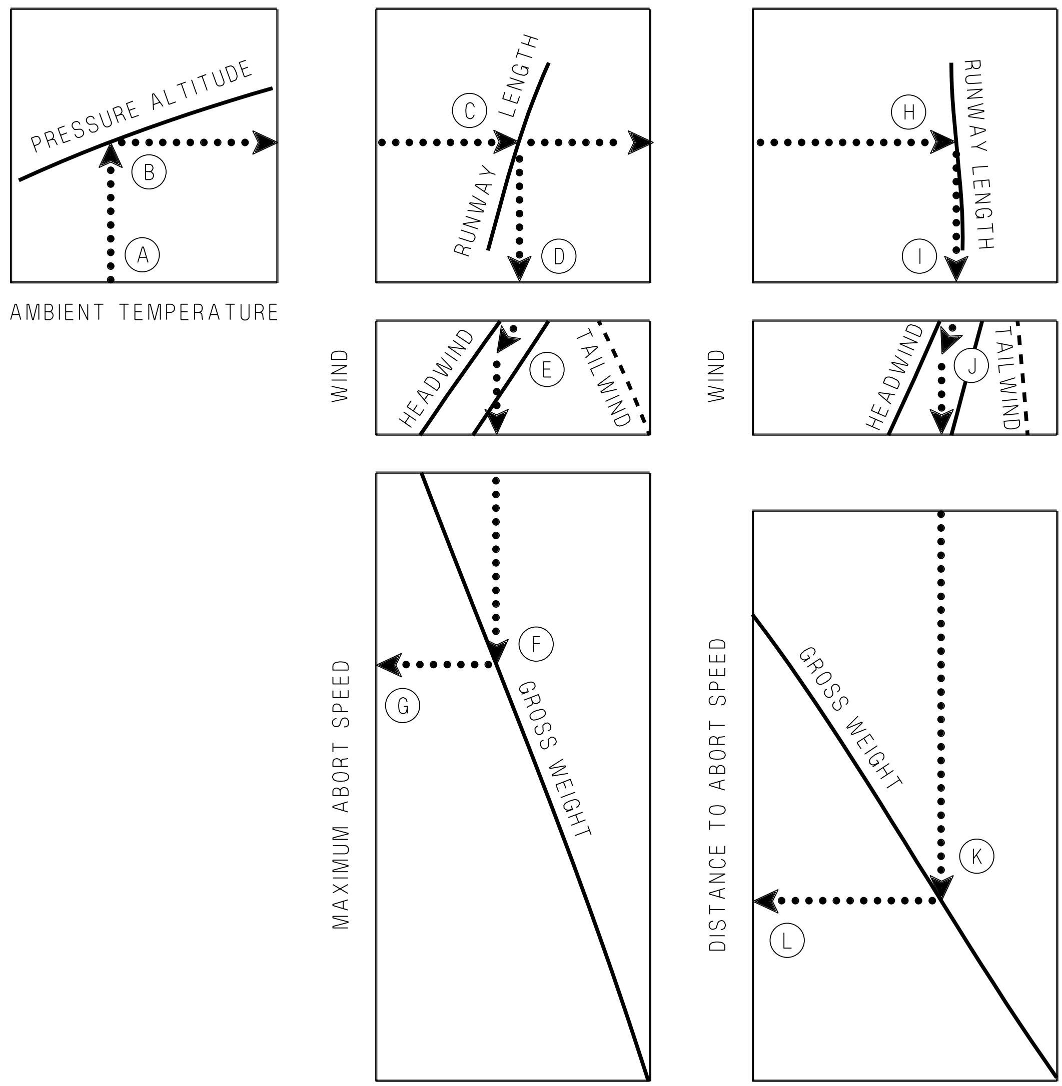
## 3.7A MAXIMUM ROLLING TAKEOFF ABORT SPEED

Figures 3-13A, sheet 1 (-408A series engine) and 3-13A, sheet 2 (-406A engine) present the maximum speed at which a STO or CTO can be successfully aborted for a given ambient temperature, pressure altitude, runway length, and takeoff gross weight. These charts were calculated for short lift dry STOs but are also acceptable for use with short lift wet STOs and CTOs. These charts assume normal engine and anti-skid operation. In case of abnormal or intermittent anti-skid operation, deselect anti-skid and apply minimum required brake pressure.

**3.7A.1 Use.** Enter the chart at the ambient air temperature and project vertically up to the appropriate pressure altitude reflector line. To calculate the maximum abort speed, project horizontally right to the first set of reflector lines. From the available runway length reflector line project vertically down to the wind baseline. Parallel the wind guidelines to the effective wind (headwind or tailwind). From this point, project vertically down to the gross weight reflector line. Project horizontally left to read the maximum abort speed. If the runway is wet, subtract 400 feet from the available runway length before projecting down to the wind baseline.

To calculate the distance to accelerate to the maximum abort speed, enter the chart at the ambient air temperature and project vertically up to the appropriated pressure altitude reflector line. Project horizontally right to the second set of runway length reflector lines. From the available runway length reflector line project vertically down to the wind baseline. Parallel the wind guidelines to the effective wind. From this point project vertically down to the gross weight reflector line. Project horizontally left to read the distance to accelerate to the abort speed. If the runway is wet, subtract 400 feet from the available runway length before projecting down to the wind baseline.

# SAMPLE MAXIMUM ROLLING TAKEOFF ABORT SPEED




**3.7A.2 Sample Problem** (Use Figure 3-13A, sheet 1)

-408A engine, Headwind = 5 knots, Dry runway

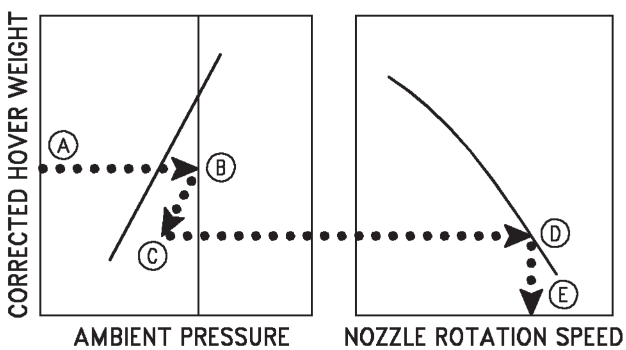
| | |
|---|---|
| A. Ambient air temperature | 32.2°C |
| B. Pressure altitude | Sea Level |
| C. Available runway length | 5,000 feet |
| D. Wind baseline | |
| E. Effective wind | 5 kt Headwind |
| F. Takeoff gross weight | 28,000 lbs. |
| G. Maximum abort speed | 106 KCAS |
| H. Available runway length | 5,000 ft |
| I. Wind baseline | |
| J. Effective wind | 5 kt Headwind |
| K. Takeoff gross weight | 28,000 lbs. |
| L. Distance to accelerate to the abort speed. | 920 ft |

### 3.8 SHORT TAKEOFF ROTATION SPEED

These charts (Figure 3-14 and 3-15) provide the short takeoff rotation speed for short lift ratings and the variables of ambient pressure for 0-datum and non 0-datum engine operation are taken into consideration. Separate charts are provided for both STOL and AUTO flaps configurations.

**3.8.1 Use.** Enter the appropriate chart with the previously determined corrected hover weight (Figure 3-9 or 3-10 as applicable) and project horizontally right to the pressure baseline (29.92), then parallel the pressure guidelines to the appropriate ambient pressure line. From this intersection project horizontally right to aircraft takeoff gross weight. At this point project vertically down to read the nozzle rotation speed.

SAMPLE SHORT TAKEOFF ROTATION SPEED




AV8BB-NFM-40-(20-1)01-CATI

**3.8.2 Sample Problem.** (Use Figure 3-14)

STOL flaps

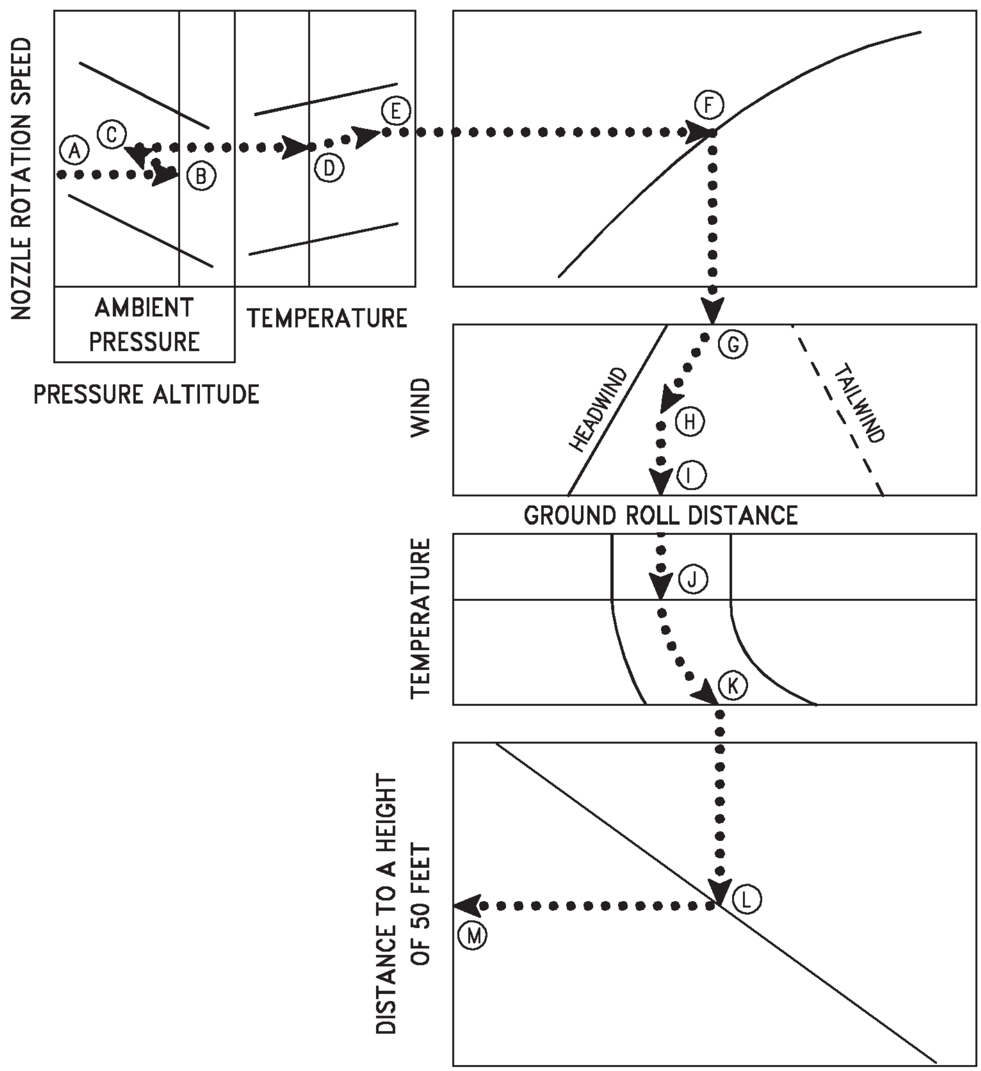
| | |
|---|---|
| A. Corrected hover weight (from hover capability chart) | 17,750 Lb |
| B. Pressure baseline | 29.92 In. Hg |
| C. Ambient pressure | 29.50 In. Hg |
| D. Takeoff gross weight | 20,000 Lb |
| E. Nozzle rotation speed | 63 Kt |

### 3.9 SHORT TAKEOFF DISTANCE

These charts (Figure 3-16 and 3-17) provide the ground roll distance and total distance traveled to a height of 50 feet during a short takeoff with variables of ambient pressure and temperature and wind effects applied. Separate charts are provided for both STOL and AUTO flaps configurations.

**3.9.1 Use.** Enter the appropriate chart with the previously determined nozzle rotation speed and project horizontally right to the pressure baseline (29.92), then parallel the guidelines to the appropriate ambient pressure. From this point, project further horizontally right to the temperature baseline (15 °C), then parallel the guidelines to the appropriate ambient temperature, then project horizontally right to intersect the reflector curve. From this point, descend vertically to the wind baseline, then parallel the wind guidelines to the effective wind velocity (headwind or tailwind). From this point, project vertically down to read ground roll distance. Continue vertically down to intersect the temperature reflector curve baseline (15 °C), then parallel the guidelines to the appropriate ambient temperature. Continue vertically down to intersect the reflector curve. From this point project horizontally left to read the total distance from start of takeoff roll to a height of 50 feet.

# SAMPLE SHORT TAKEOFF DISTANCE




AV8BB-NFM-40-(21-1)01-CATI

## 3.9.2 Sample Problem (Use Figure 3-16)

STOL flaps

| | |
|---|---|
| A. Nozzle rotation speed | 63 Kt |
| B. Pressure baseline | 29.92 |
| C. Ambient pressure | 29.50 |
| D. Temperature baseline | 15 °C |
| E. Ambient temperature | 20 °C |
| F. Reflector curve | |
| G. Wind baseline | |
| H. Headwind | 20 Kt |
| I. Ground roll distance | 185 Ft |
| J. Reflector line - Temperature baseline | 15 °C |
| K. Ambient temperature | 20 °C |
| L. Reflector line | |
| M. Total distance to a height of 50 feet | 800 Ft |

## 3.10 CONVENTIONAL TAKEOFF DISTANCE

This chart (Figure 3-18) is used to determine ground roll and airborne distance to attain an altitude of 50 feet during a conventional takeoff. Ambient pressure and temperature, winds, takeoff gross weight and short lift ratings are considered in the takeoff distance determination.

**3.10.1 Use.** Enter the chart with the previously determined corrected hover weight (Figure 3-9 or 3-10 as applicable) and project horizontally right to the ambient pressure baseline (29.92), then parallel the pressure guidelines to the appropriate ambient pressure. From this point, project horizontally right to read hover weight. Enter both right hand charts with this hover weight and project horizontally right to intercept the takeoff gross weight curves. From the upper gross weight intersection read the liftoff speed and then project vertically down to the wind baseline. Parallel the wind guidelines to the effective wind (headwind or tailwind). From this point, project vertically down to read ground roll. Continue vertically down to intersect the temperature curve baseline (15 °C), then parallel the guidelines to the appropriate ambient temperature. Continue vertically down to intersect the reflector curve. From this point project horizontally left to read the total distance from start of takeoff roll to a height of 50 feet.

### 3.10.2 Sample Problem

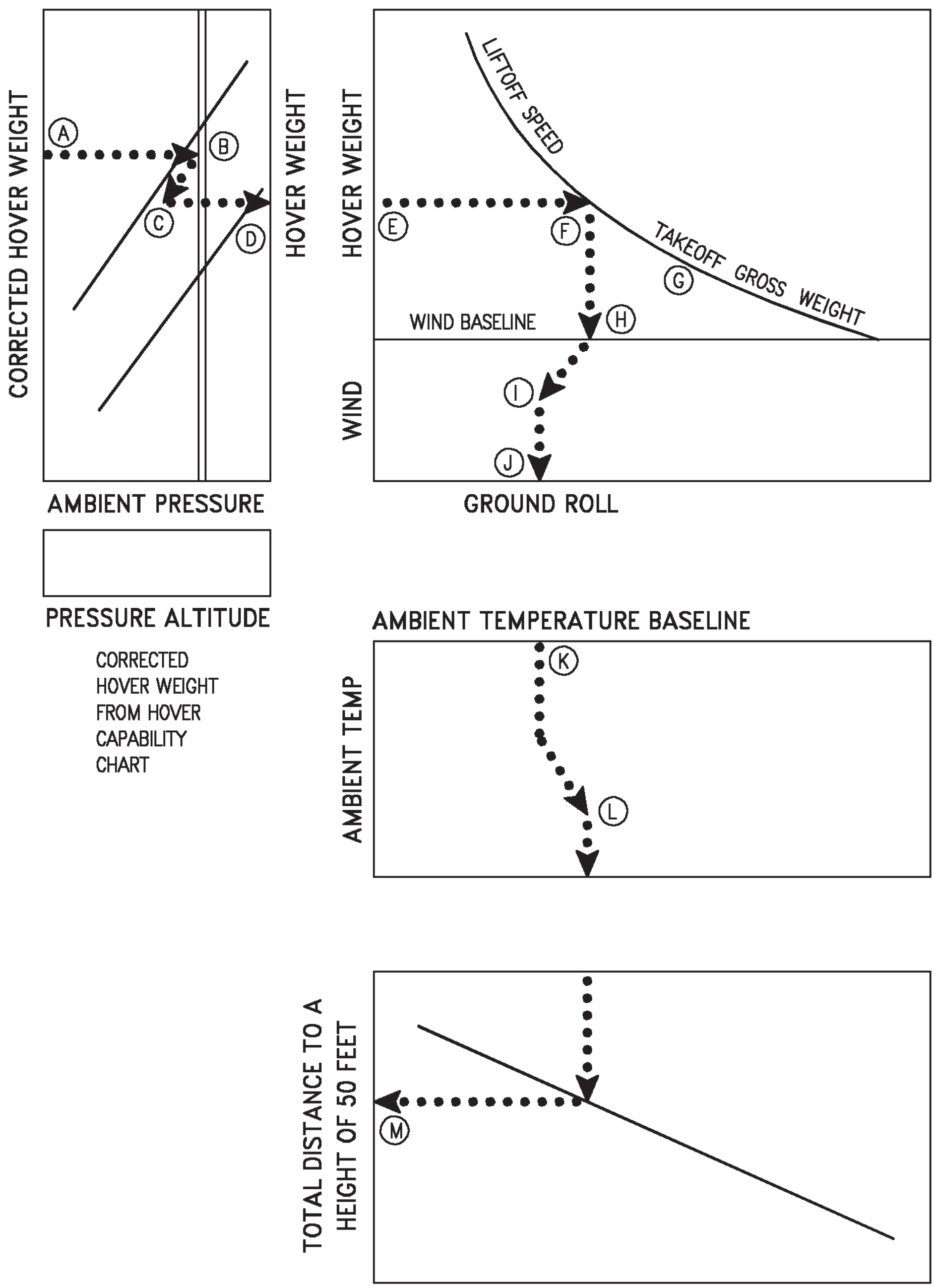
Takeoff ground roll distance -

| | |
|---|---|
| A. Corrected hover weight (from hover capability chart) | 18,000 Lb |
| B. Pressure baseline | 29.92 In. Hg |
| C. Ambient pressure | 29.50 In. Hg |
| D. Hover weight | 17,750 Lb |
| E. Hover weight | 17,750 Lb |
| F. Gross weight | 24,000 Lb |
| G. Liftoff speed | 142 Kt |
| H. Wind baseline | |
| I. Effective headwind | 10 Kt |
| J. Ground roll | 1240 Ft |

Total distance to a height of 50 feet -

| | |
|---|---|
| K. Ambient temperature baseline | |
| L. Ambient temperature | 30 °C |
| M. Distance to a height of 50 feet | 2800 Ft |

# SAMPLE CONVENTIONAL TAKEOFF DISTANCE




AV8BB-NFM-00-(22-1)01-CATI

FIGURES 3-1 AND 3-2 DELETED BY CHANGE 2

# ENGINE RPM REQUIRED TO HOVER

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
FULL FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-406A

NOTES
- NOZZLES IN HOVER STOP.
- DATA SHOWN IS DRY OPERATION. FOR WET OPERATION ADD 55 POUNDS TO CORRECTED HOVER WEIGHT.

DATE: 7 JANUARY 1985
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

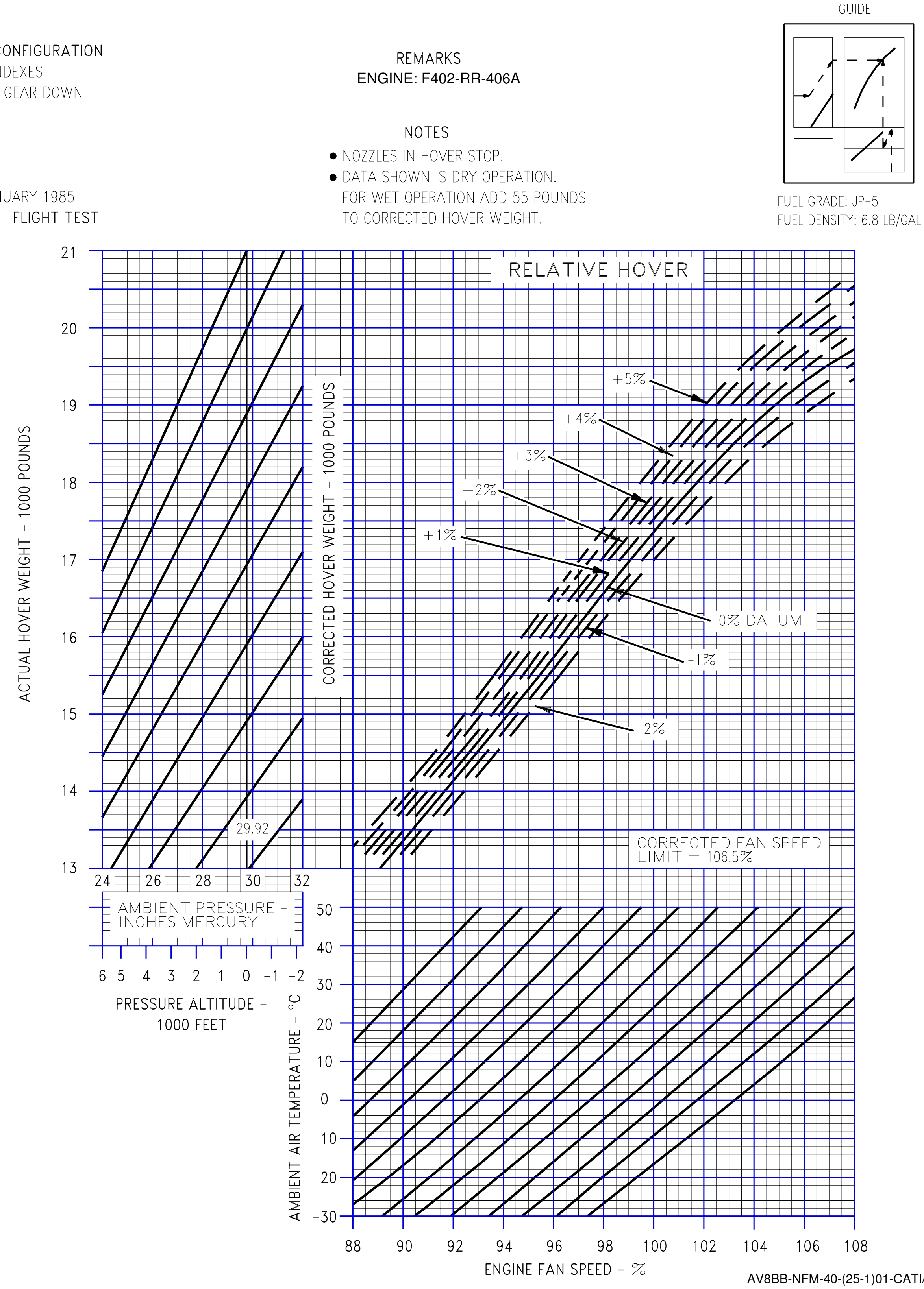



Figure 3-3. Engine RPM Required to Hover, F402-RR-406A Engine



PAGES XI-3-13 AND XI-3-14 DELETED BY CHANGE 2

# ENGINE RPM REQUIRED TO HOVER

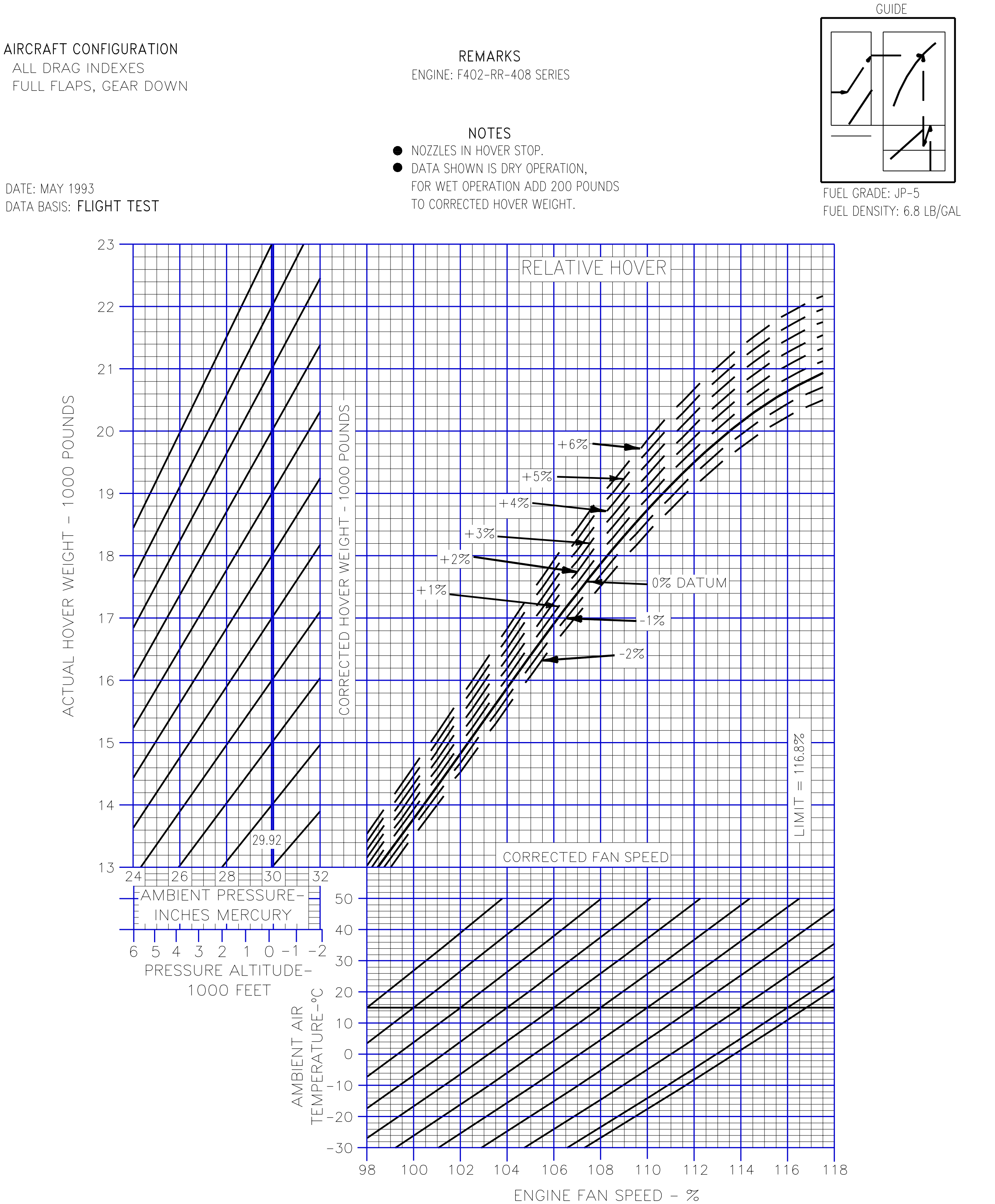
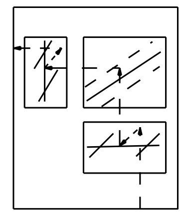



Figure 3-4. Engine RPM Required to Hover, F402-RR-408 Series Engine

# JPT IN HOVER

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

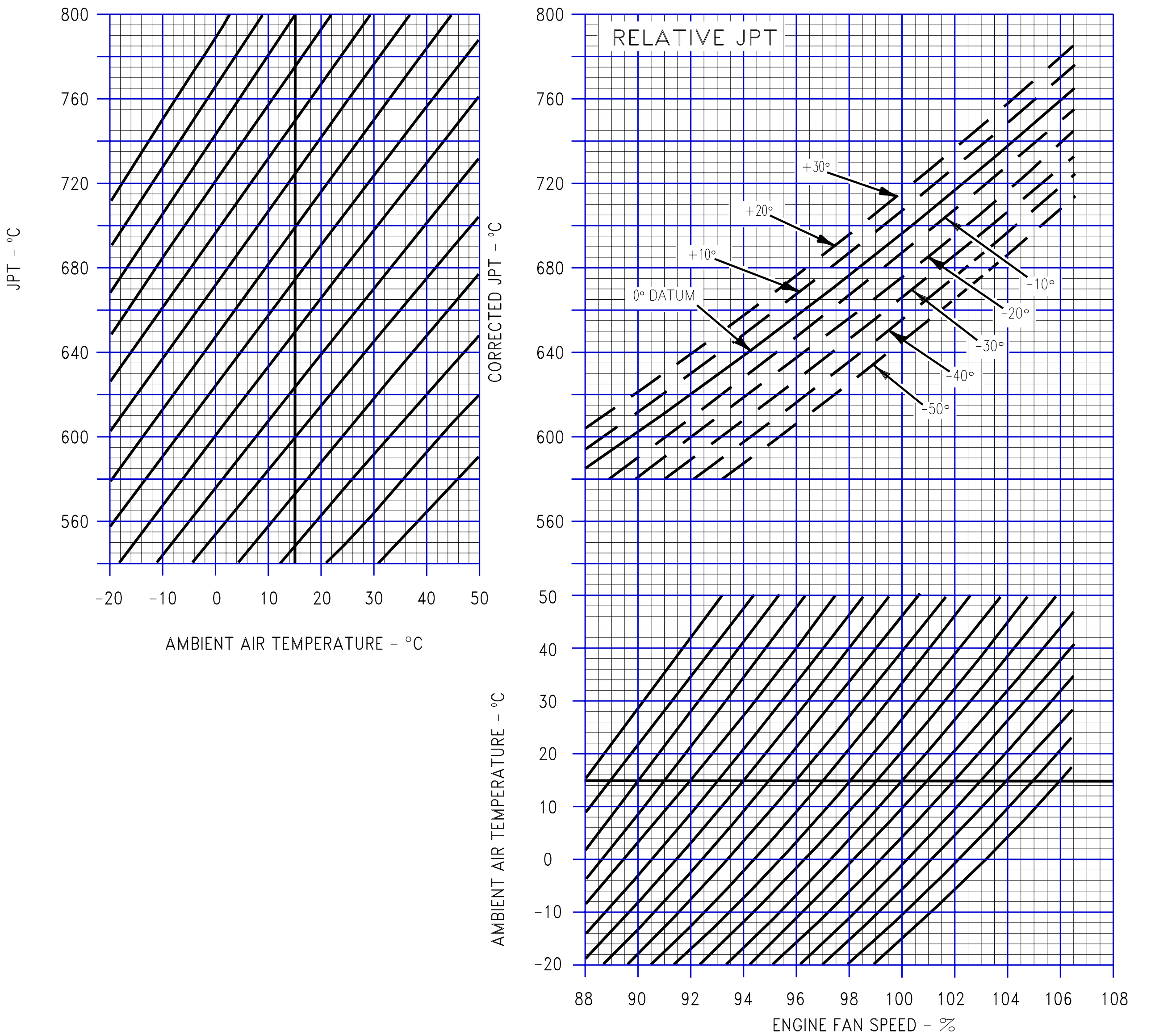
DATE: 7 JANUARY 1985
DATA BASIS: FLIGHT TEST

REMARKS
ENGINE: F402-RR-406A

NOTE
JPT SHOWN IS FOR DRY OPERATION.
WITH WATER FLOWING CORRECTED
JPT IS REDUCED 35°C.

JPTL OPERATION:

SHORT LIFT WET-727°C
SHORT LIFT DRY-703°C




AV8BB-NFM-40-(27-1)01-CATI

**Figure 3-5. JPT in Hover, F402-RR-406A Engine**

# JPT IN HOVER

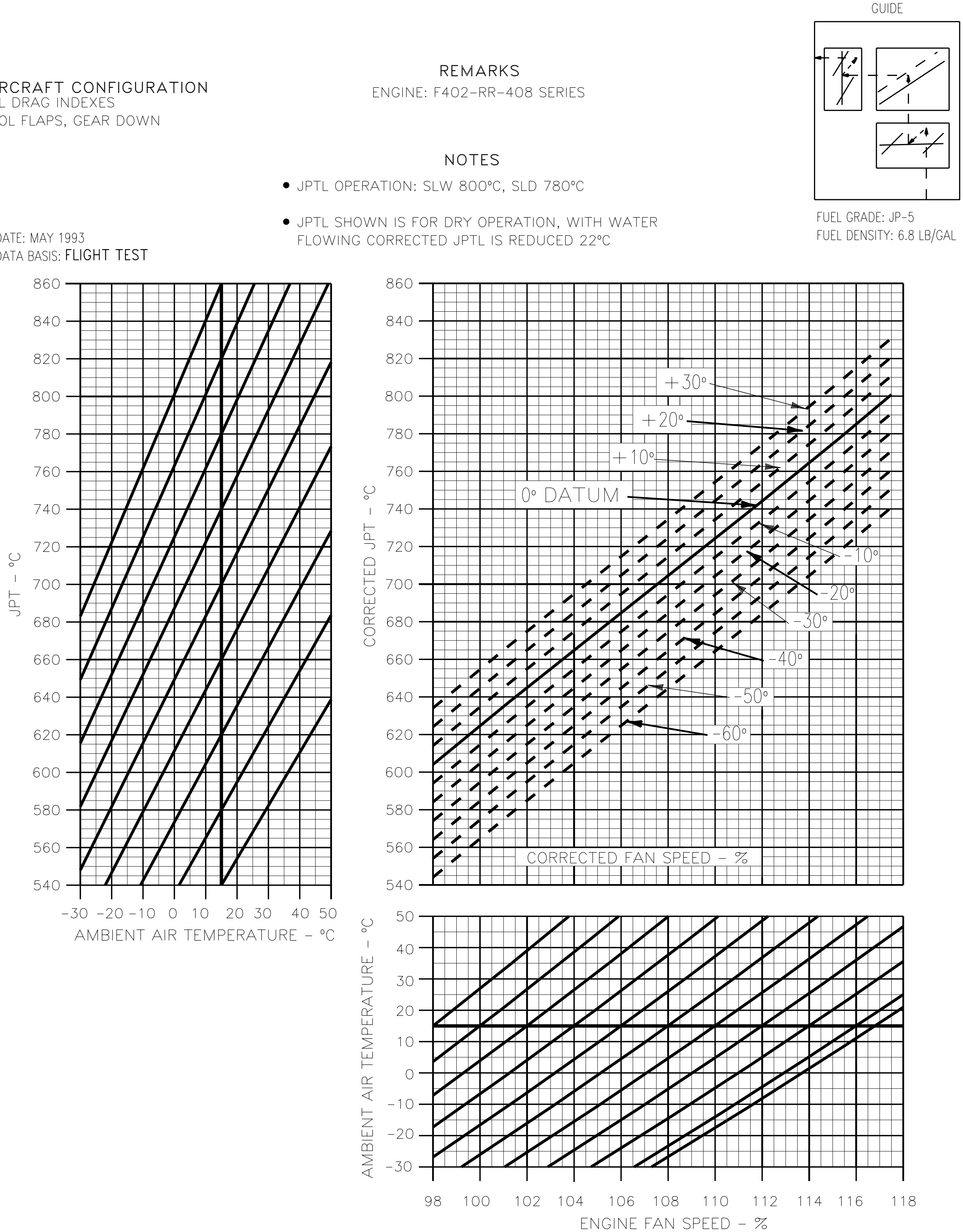
AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-408 SERIES

NOTES
- JPTL OPERATION: SLW 800°C, SLD 780°C
- JPTL SHOWN IS FOR DRY OPERATION, WITH WATER FLOWING CORRECTED JPTL IS REDUCED 22°C

DATE: MAY 1993
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



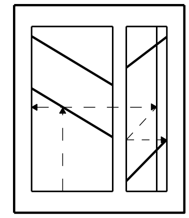

AV8BB-NFM-40-(28-1)04-CATI/ACS

Figure 3-6. JPT in Hover, F402-RR-408 Series Engine

# MAXIMUM CORRECTED HOVER CAPABILITY

## 0 DATUM ENGINE

GUIDE



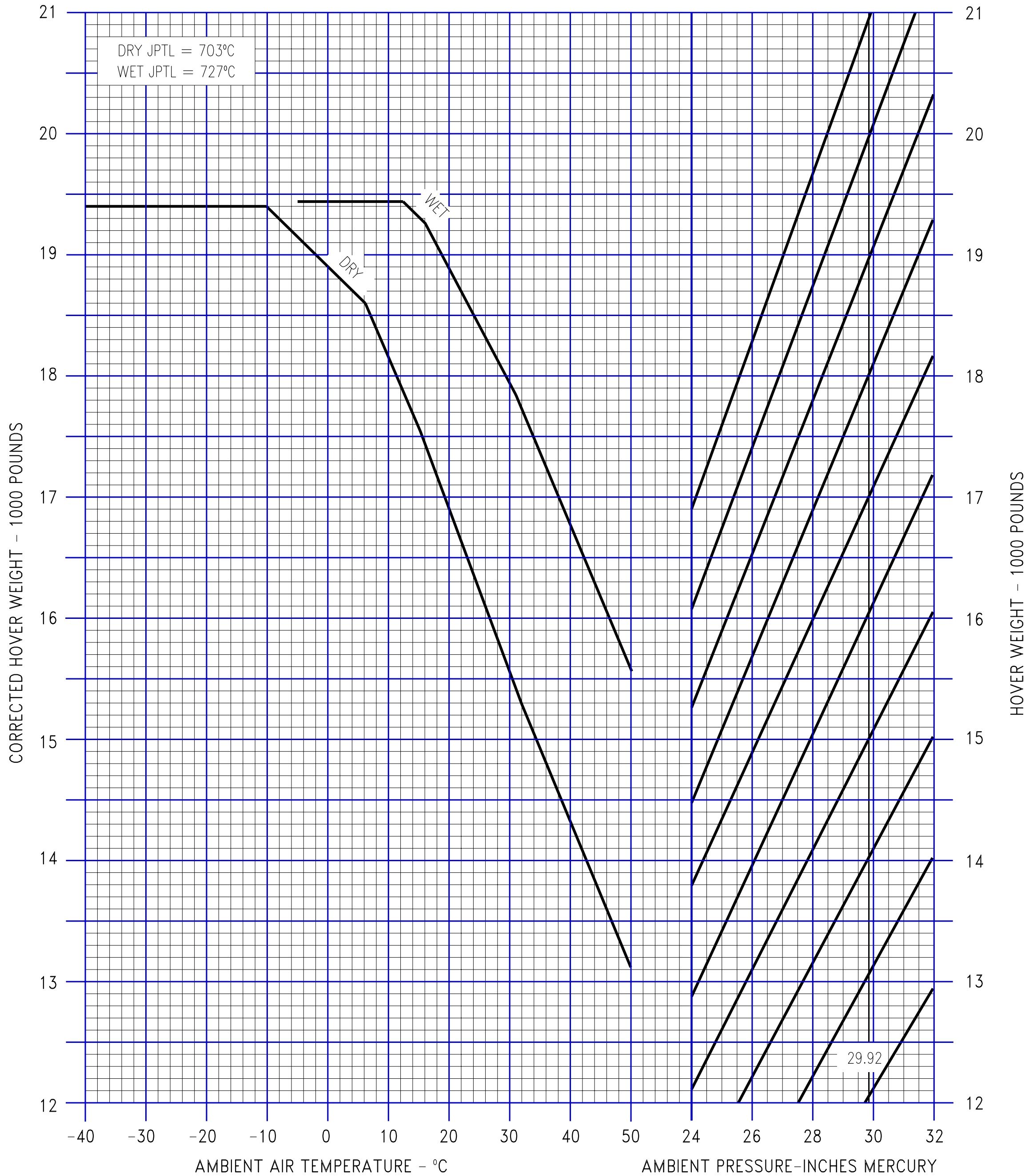
AIRCRAFT CONFIGURATION
STOL FLAPS, GEAR DOWN
ALL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A

NOTES
- SHORT LIFT RATING
- 82° NOZZLES
- 0 DATUM RPM, JPT AND HOVER PERFORMANCE

DATE: 7 JANUARY 1985
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(29-1)01-CATI

**Figure 3-7. Maximum Corrected Hover Capability, F402-RR-406A Engine**



**PAGES XI-03-19 AND XI-03-20 DELETED BY CHANGE 2.**

# MAXIMUM CORRECTED HOVER CAPABILITY

O DATUM ENGINE

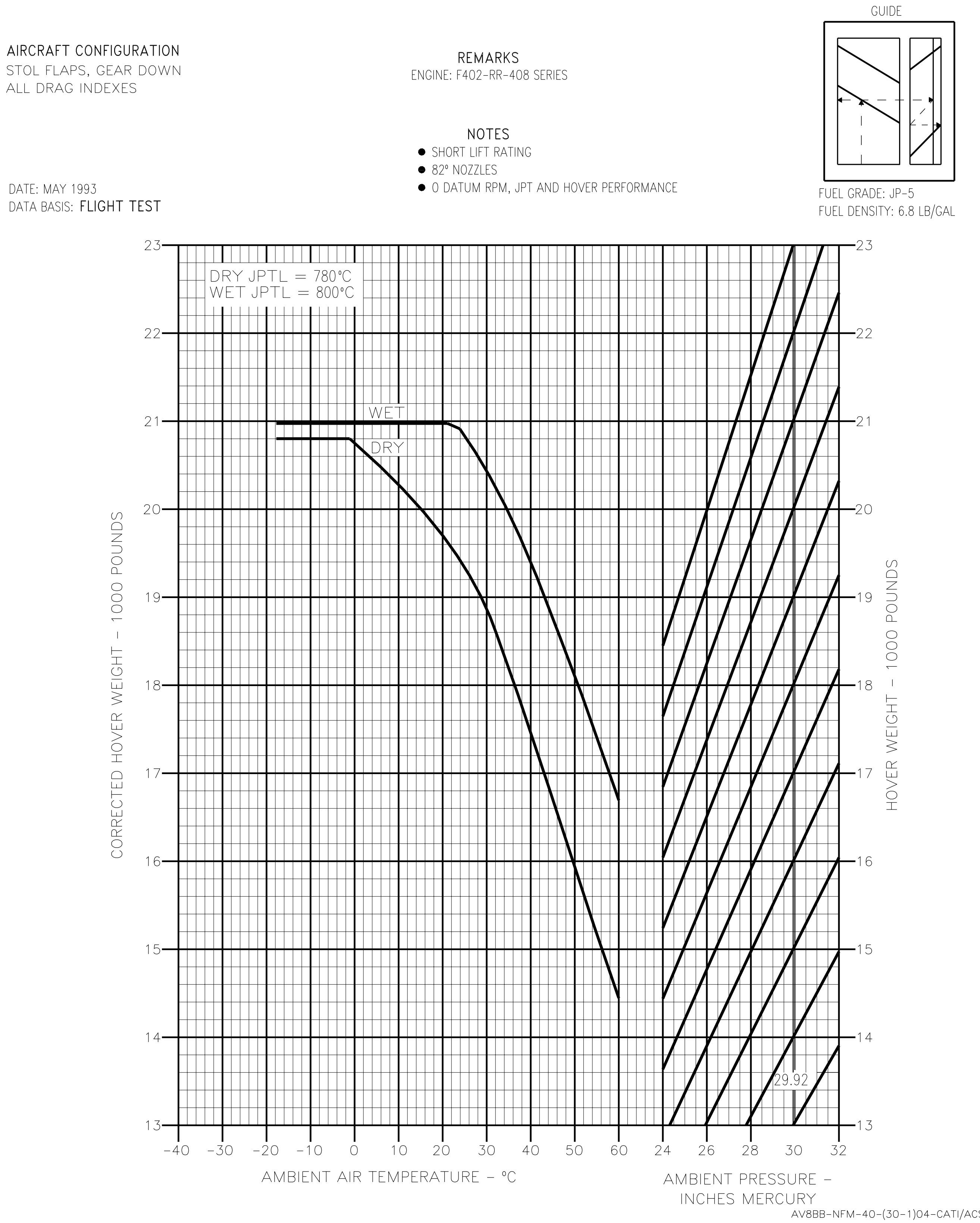
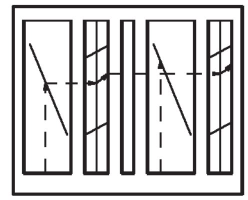



**Figure 3-8. Maximum corrected Hover Capability, F402-RR-408 Series Engine**

# HOVER CAPABILITY

WET




FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

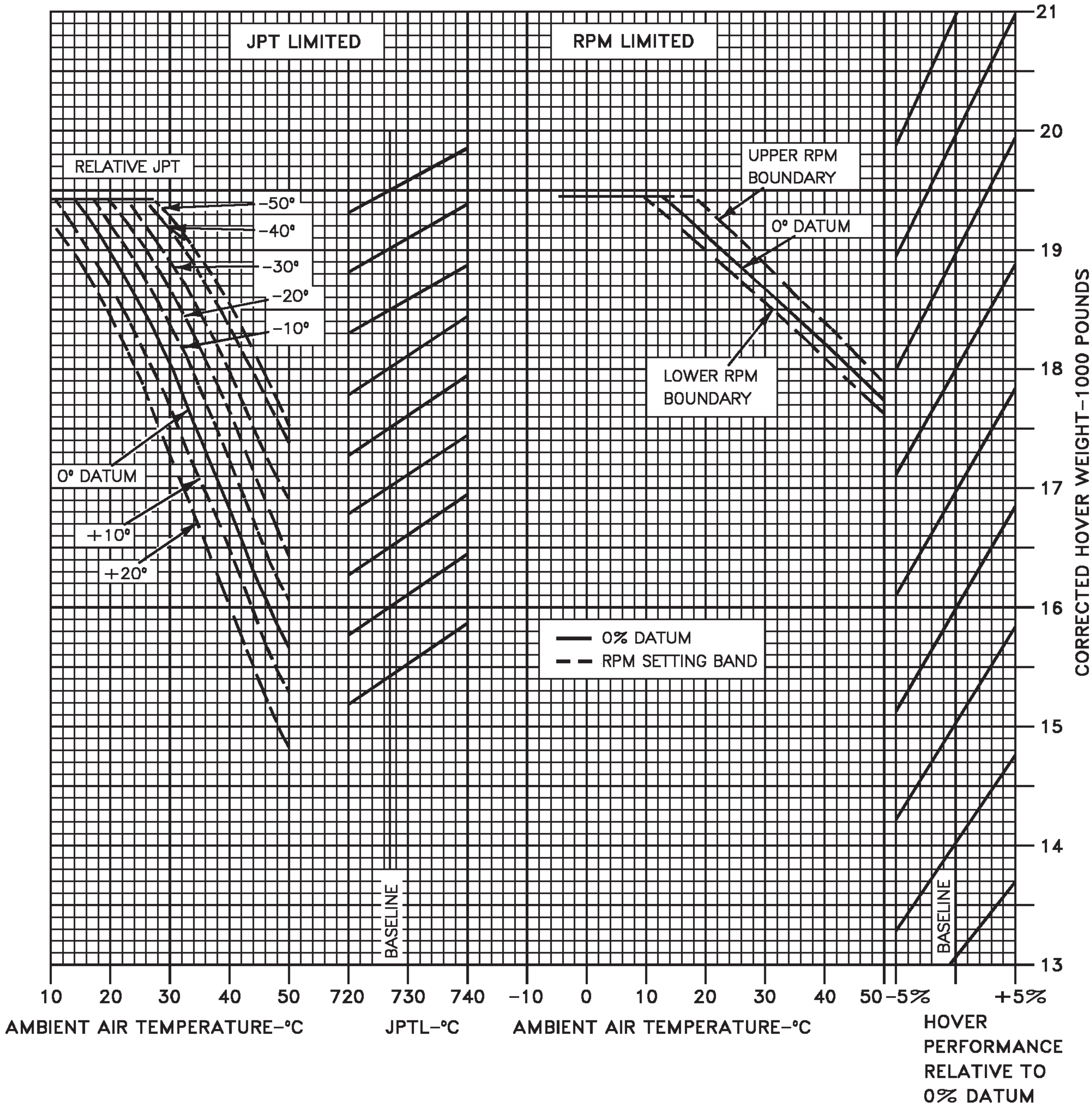
**AIRCRAFT CONFIGURATION**
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

**REMARKS**
ENGINE: F402-RR-406A

**NOTES**

- SHORT LIFT WET RATING
- JPTL AT 727°C
- TO BE USED FOR DETERMINATION OF VERTICAL, ROLLING VERTICAL, SHORT AND CONVENTIONAL TAKEOFF CAPABILITIES




AV8BB-NFM-40-(31-1)01-CATI

**Figure 3-9. Hover Capability, F402-RR-406A Engine (Sheet 1 of 2)**

# HOVER CAPABILITY

## DRY

**AIRCRAFT CONFIGURATION**
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

**REMARKS**
ENGINE: F402-RR-406A

**NOTES**
- SHORT LIFT DRY RATING
- JPTL AT 703°C
- TO BE USED FOR DETERMINATION OF VERTICAL, ROLLING VERTICAL, SHORT AND CONVENTIONAL TAKEOFF CAPABILITIES

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

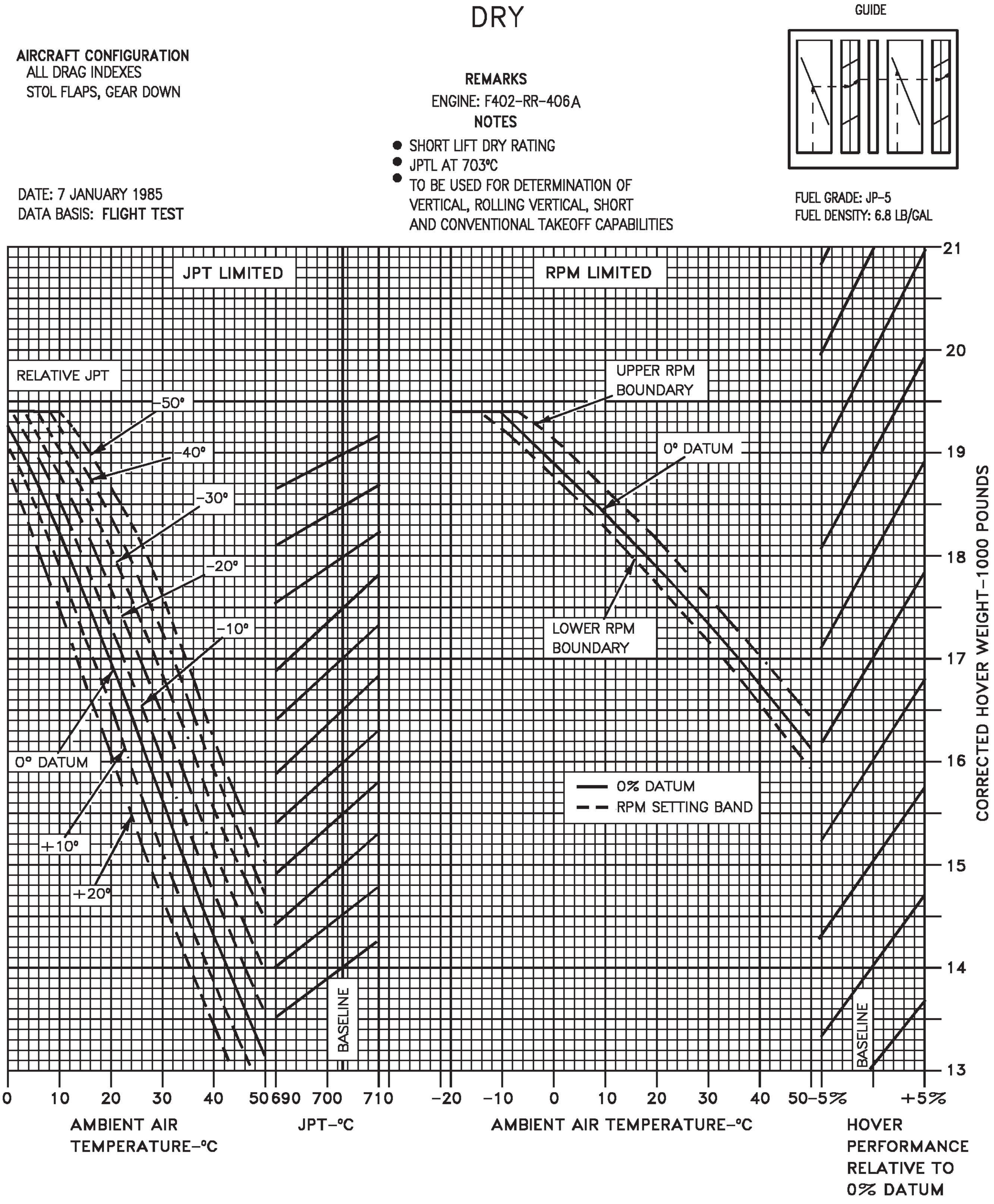



**Figure 3-9. Hover Capability, F402-RR-406A Engine (Sheet 2 of 2)**

# HOVER CAPABILITY
WET

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-408 SERIES

NOTES
- SHORT LIFT WET RATING
- JPTL AT 800°C
- TO BE USED FOR DETERMINATION OF VERTICAL, ROLLING VERTICAL, SHORT AND CONVENTIONAL TAKEOFF CAPABILITIES

DATE: MAY 1993
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

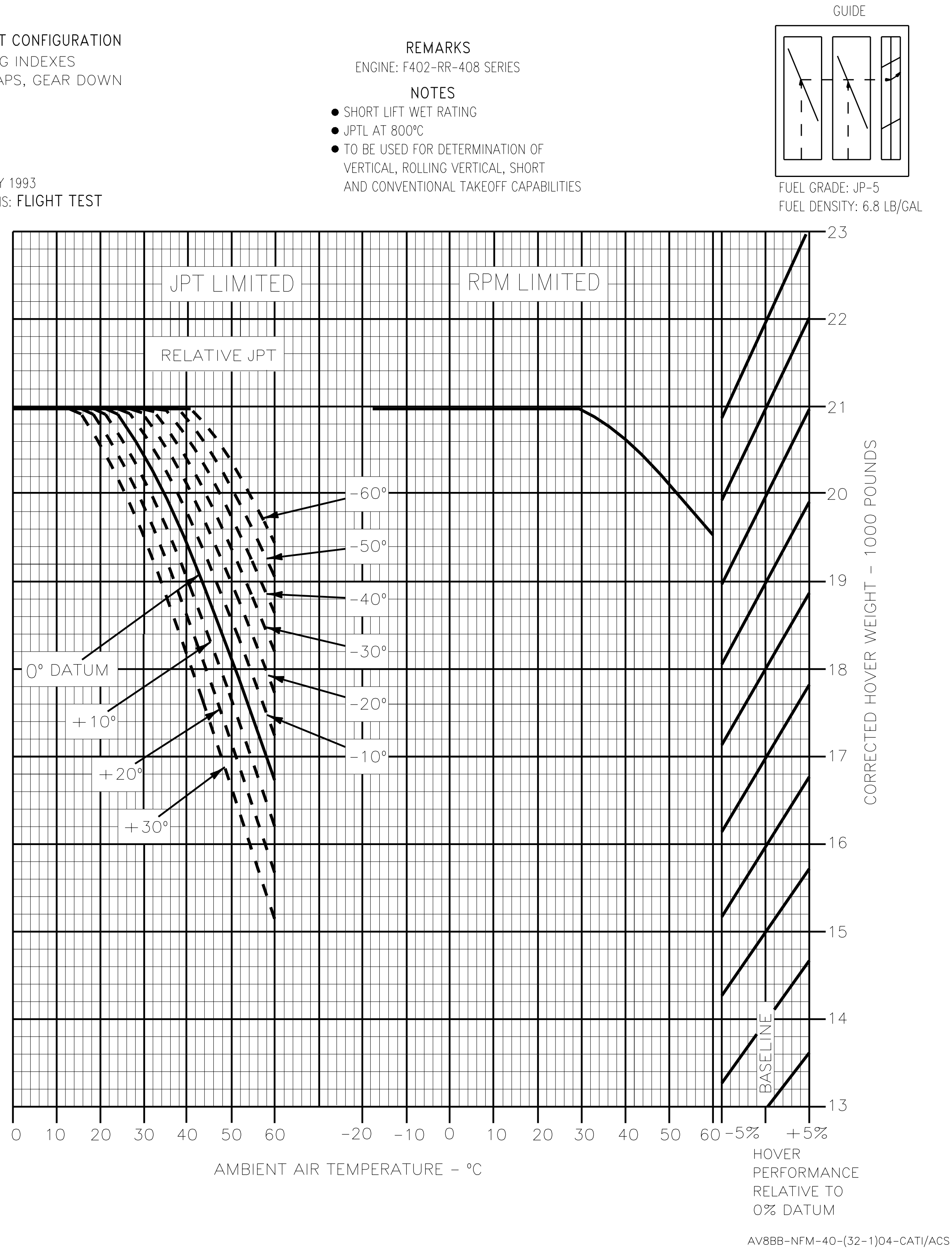



**Figure 3-10. Hover Capability, F402-RR-408 Series Engine (Sheet 1 of 2)**

# HOVER CAPABILITY
DRY

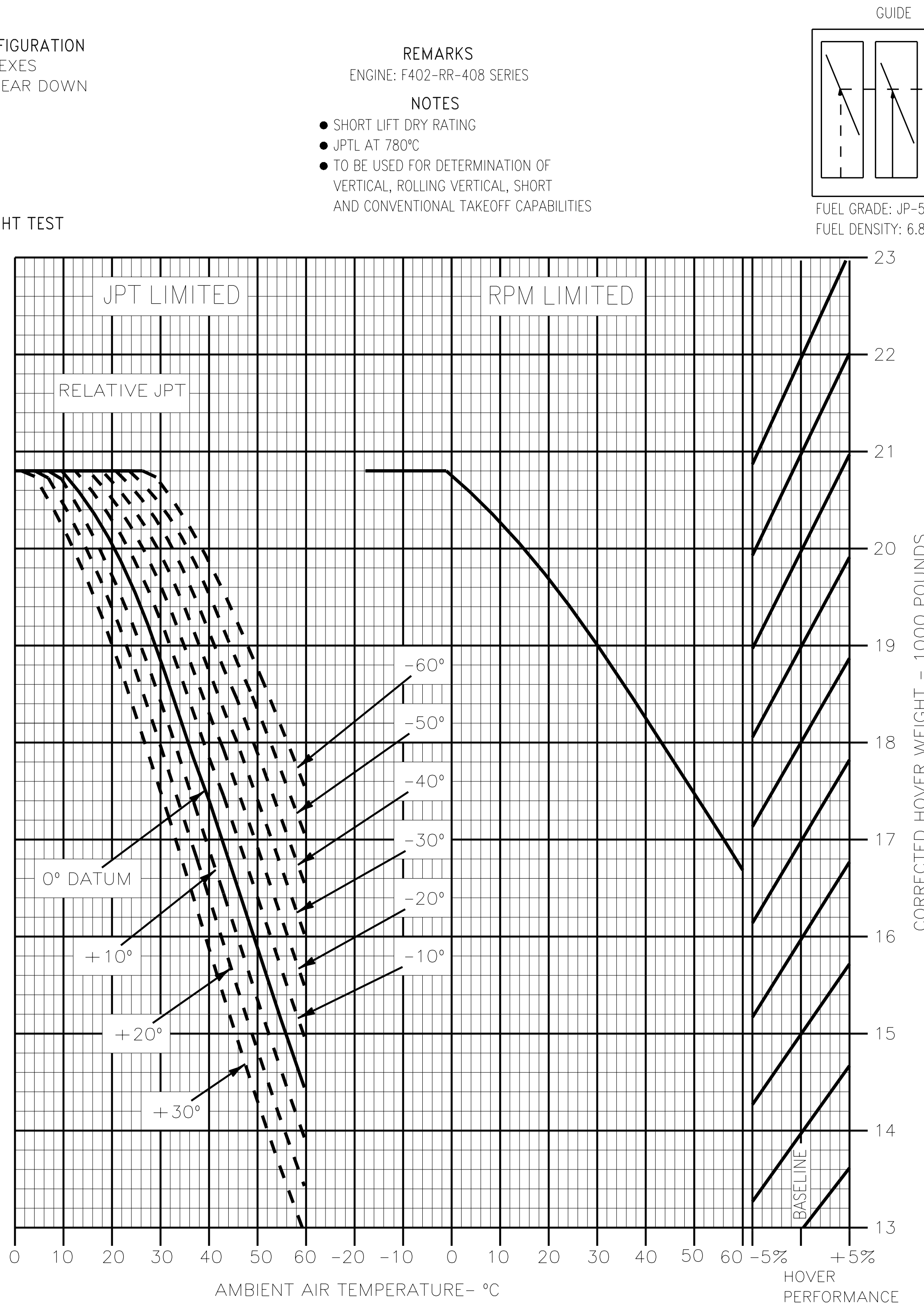
AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-408 SERIES

NOTES
- SHORT LIFT DRY RATING
- JPTL AT 780°C
- TO BE USED FOR DETERMINATION OF VERTICAL, ROLLING VERTICAL, SHORT AND CONVENTIONAL TAKEOFF CAPABILITIES

DATE: MAY 1993
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(32-2)04-CATI/ACS

**Figure 3-10. Hover Capability, F402-RR-408 Series Engine (Sheet 2 of 2)**



**PAGES XI-03-27 AND XI-03-28 DELETED BY CHANGE 3**

# VERTICAL TAKEOFF CAPABILITY

## SHORT LIFT RATING WET AND DRY – 82° NOZZLES

**AIRCRAFT CONFIGURATION**
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

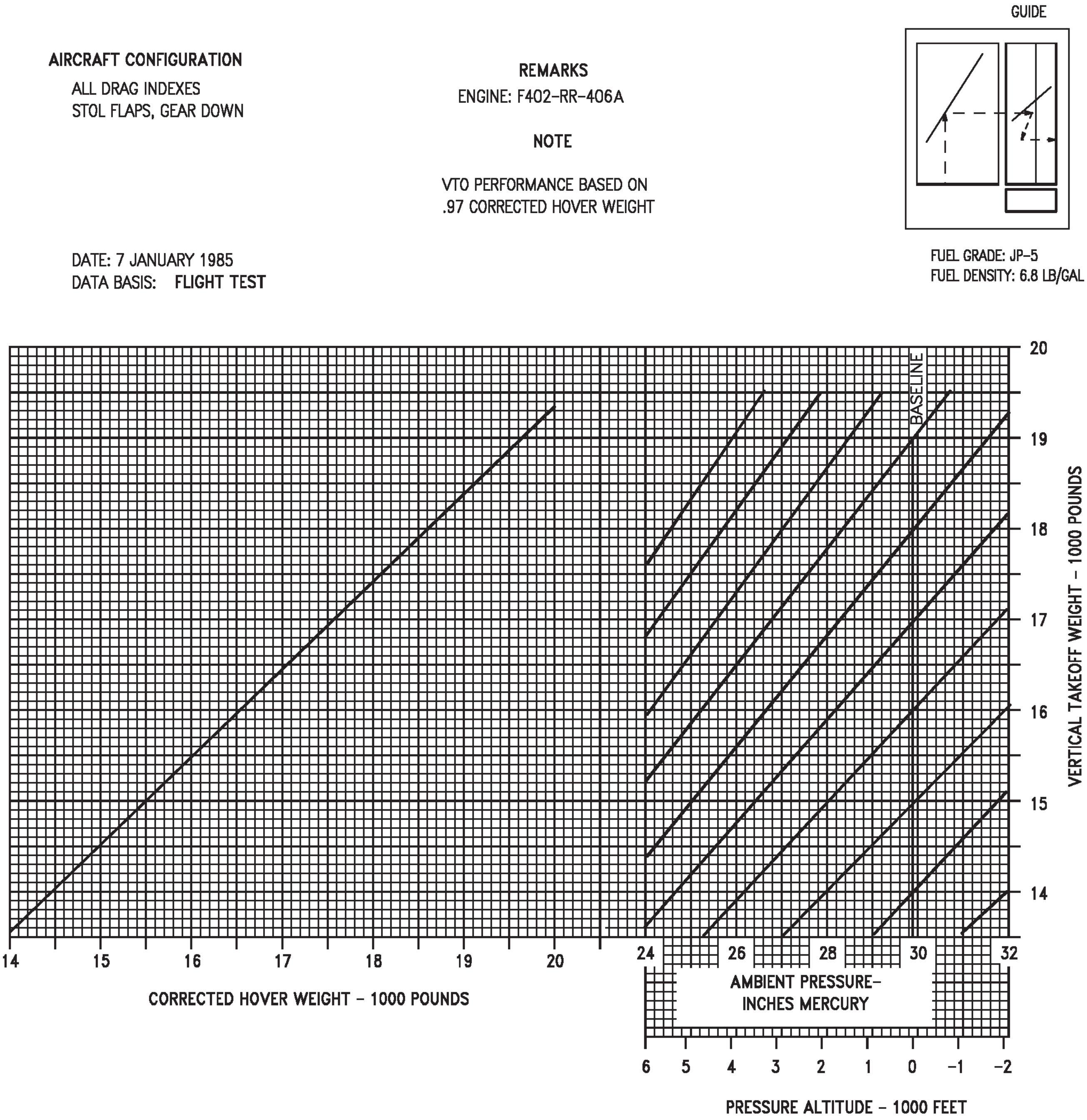
**REMARKS**
ENGINE: F402-RR-406A

**NOTE**

VTO PERFORMANCE BASED ON
.97 CORRECTED HOVER WEIGHT

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(33-1)01-CATI

**Figure 3-11. Vertical Takeoff Capability, F402-RR-406A Engine**

# VERTICAL TAKEOFF CAPABILITY

SHORT LIFT RATING WET AND DRY - 82° NOZZLES

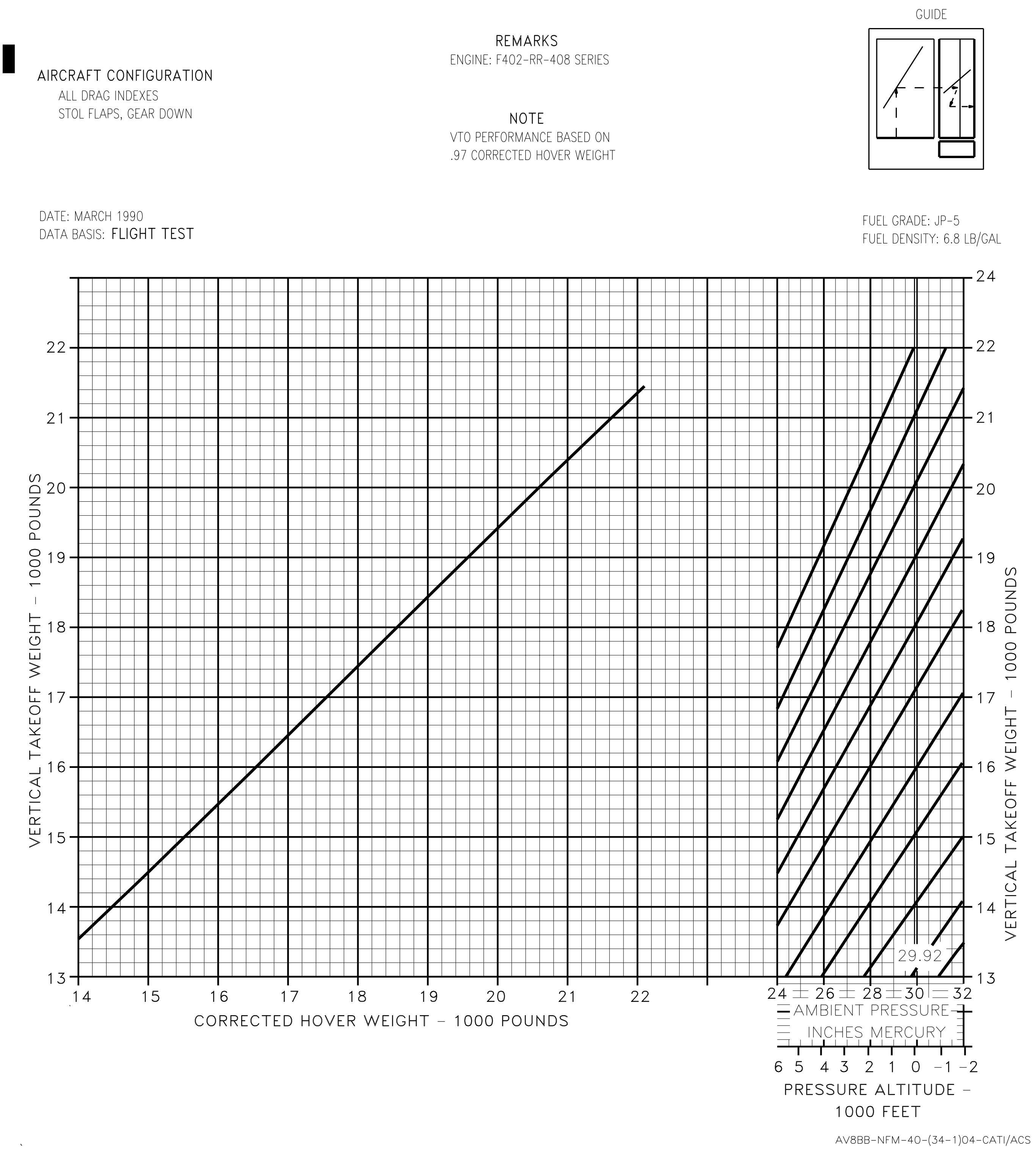



**Figure 3-12. Vertical Takeoff Capability, F402-RR-408 Series Engine**

# ROLLING VERTICAL TAKEOFF

SHORT LIFT RATING

AIRCRAFT CONFIGURATION
STOL FLAPS, GEAR DOWN
ALL DRAG INDEXES

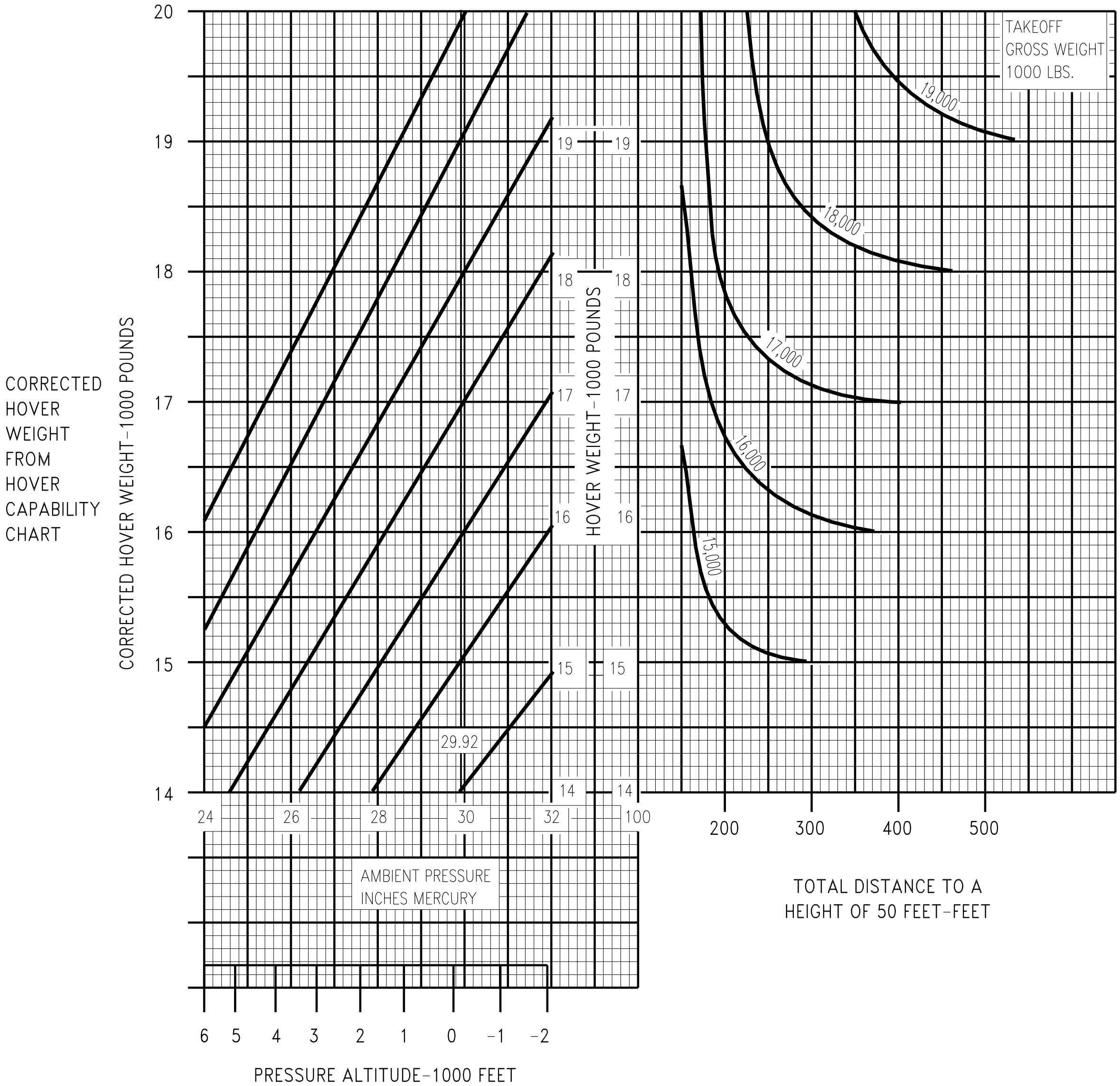
REMARKS
ENGINE: F402-RR-406A

NOTE
CHART ALSO APPLICABLE TO
F402-RR-408 SERIES ENGINE.

DATE: 18 DECEMBER 1985
DATA BASIS: FLIGHT TEST

GUIDE

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

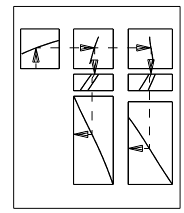



AV8BB-NFM-40-(35-1)04-CATI/ACS

Figure 3-13. Rolling Vertical Takeoff

# MAXIMUM ROLLING TAKEOFF ABORT SPEED

GUIDE



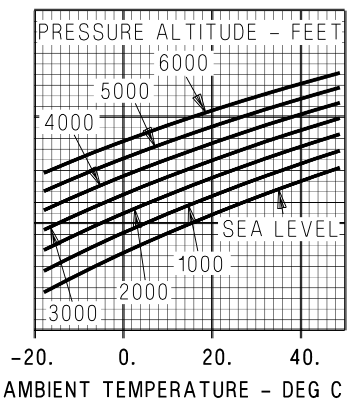
**AIRCRAFT CONFIGURATION**
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

**REMARKS**
ENGINE: F402-RR-408 SERIES
VALID ONLY FOR ASPHALT/CONCRETE RUNWAYS
VALID FOR SHORT LIFT WET AND DRY SHORT TAKEOFFS

**NOTE**
90% RPM POWERED NOZZLE BRAKING TO
60 KNOTS GROUND SPEED, WHEEL BRAKING
60 KNOTS GROUND SPEED TO 0 KNOTS

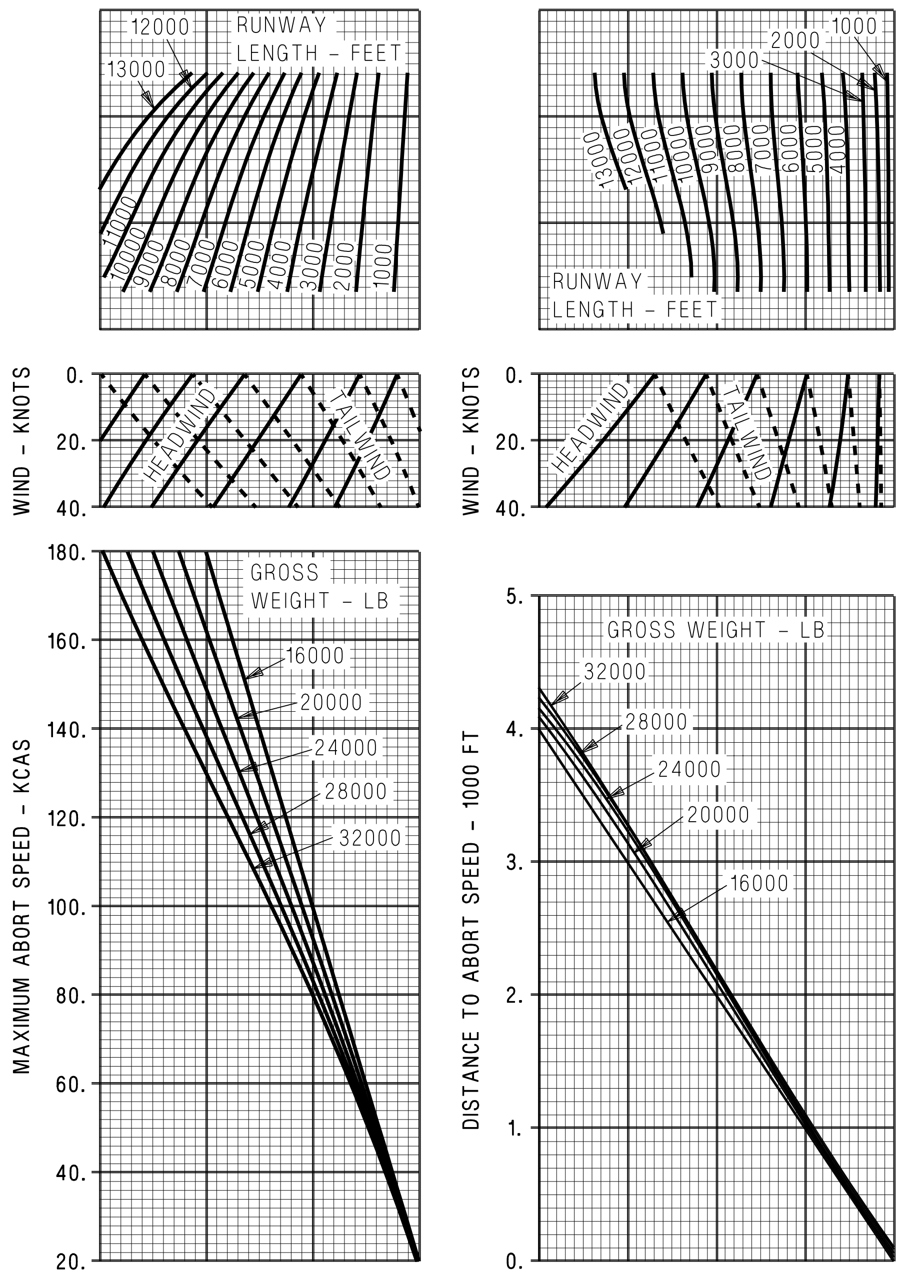
DATE: JUNE 1995
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LBS/GAL




**SPECIAL INSTRUCTIONS:**

- IN THE CASE OF A WET RUNWAY, SUBTRACT 400 FT FROM THE RUNWAY LENGTH TO DETERMINE ABORT SPEED AND DISTANCE TO THE ABORT SPEED.




AV8BB-NFM-40_110-1-04

Figure 3-13A. Maximum Rolling Takeoff Abort Speed (Sheet 1 of 2)

# MAXIMUM ROLLING TAKEOFF ABORT SPEED

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-406A
VALID ONLY FOR ASPHALT/CONCRETE RUNWAYS
VALID FOR SHORT LIFT WET AND DRY SHORT TAKEOFFS

NOTE
80% RPM POWERED NOZZLE BRAKING TO 60 KNOTS GROUND SPEED, WHEEL BRAKING 60 KNOTS GROUND SPEED TO 0 KNOTS

DATE: JUNE 1995
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LBS/GAL

SPECIAL INSTRUCTIONS:
- IN THE CASE OF A WET RUNWAY, SUBTRACT 400 FT FROM THE RUNWAY LENGTH TO DETERMINE ABORT SPEED AND DISTANCE TO THE ABORT SPEED.

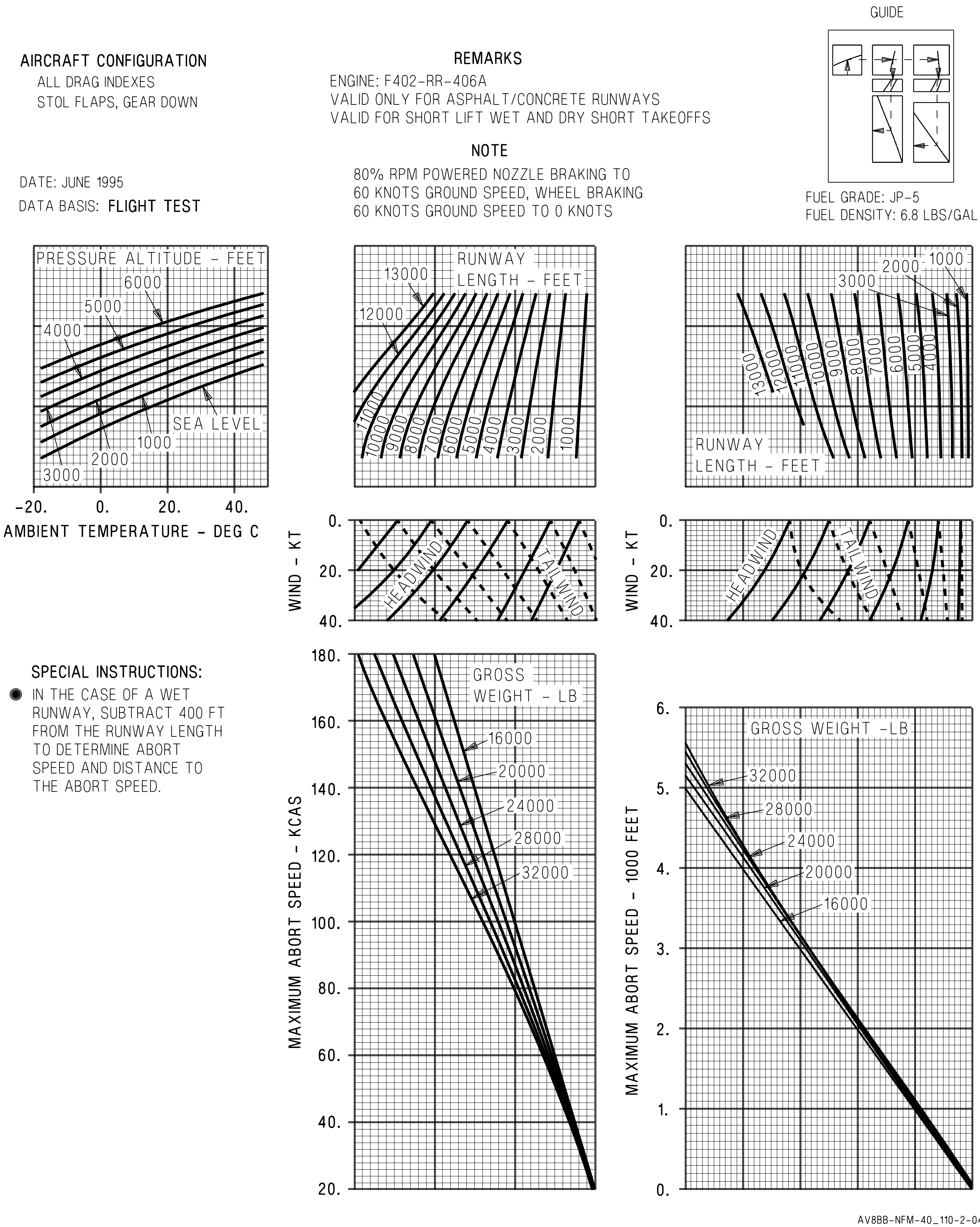
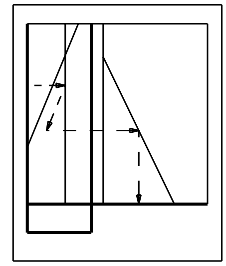



Figure 3-13A. Maximum Rolling Takeoff Abort Speed (Sheet 2 of 2)

# SHORT TAKEOFF
## ROTATION SPEED
## STOL FLAPS

GUIDE



AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

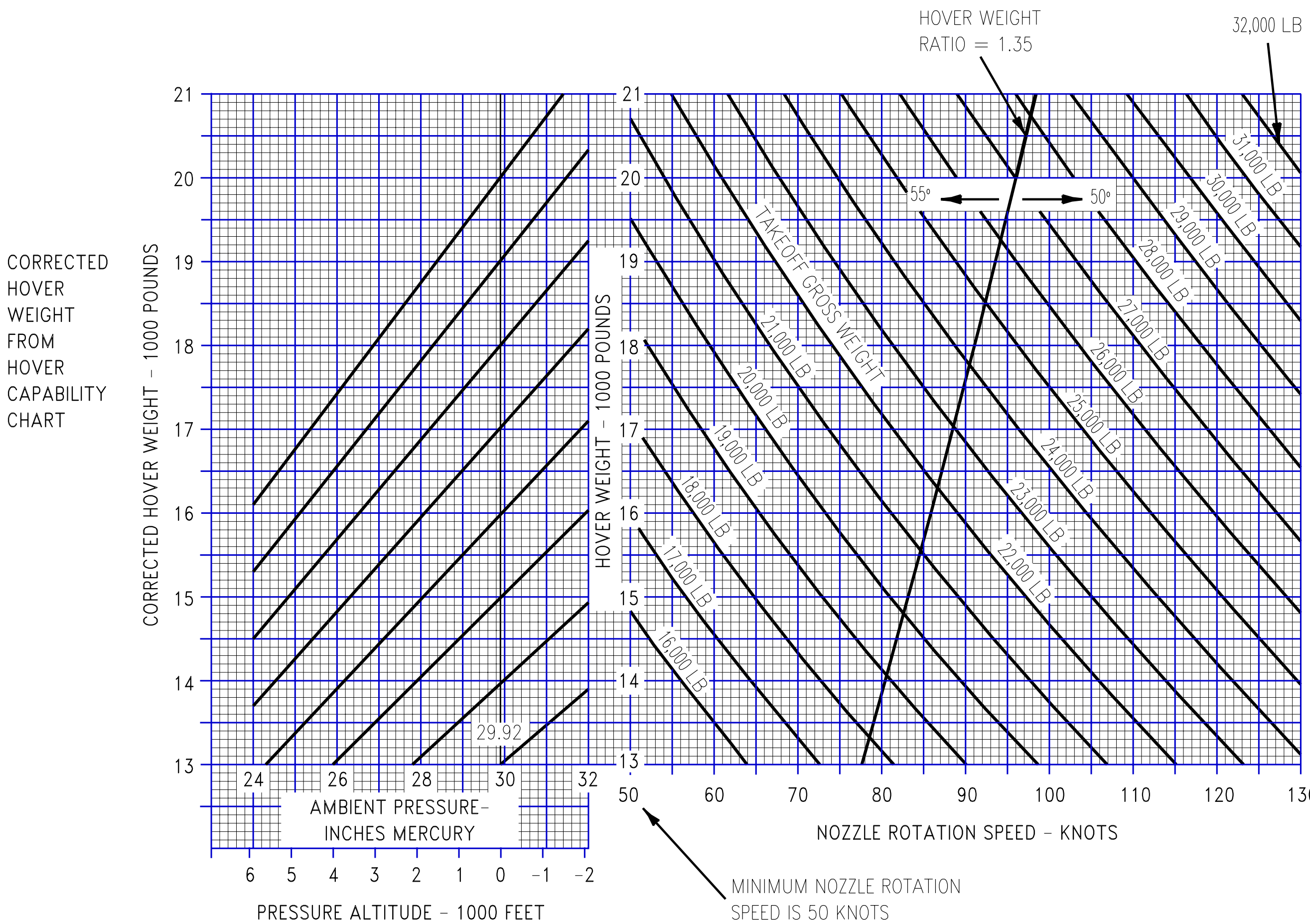
DATE: 18 MARCH 1985
DATA BASIS: FLIGHT TEST

REMARKS
ENGINE: F402-RR-406A

NOTES

- NOZZLES: 10° DURING GROUND ROLL, ROTATE TO 55° FOR HOVER WEIGHT RATIOS LESS THAN 1.35 AND 50° FOR HOVER WEIGHT RATIOS GREATER THAN 1.35 FOR TAKEOFF.
- FOR STO WITH GROSS WEIGHTS OF 27,000 POUNDS OR HEAVIER AND TEMPERATURES GREATER THAN 35 °C, ADD 5 KNOTS TO THE CALCULATED ROTATION SPEED.
- FOR STO WITH 300 GALLON FUEL TANKS ON INBOARD PYLONS ADD 10 KNOTS TO CALCULATED ROTATION SPEED AND ROTATE NOZZLES TO 50° FOR TAKEOFF.
- FOR LARGE LATERAL STORE ASYMMETRIES ADD 10 KNOTS TO CALCULATED ROTATION SPEED AND ROTATE NOZZLES TO 50° FOR TAKEOFF.

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(36-1)04-CATI/ACS

**Figure 3-14. Short Takeoff Rotation Speed, STOL Flaps (Sheet 1 of 2)**

# SHORT TAKEOFF

## ROTATION SPEED
## STOL FLAPS

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-408 SERIES

NOTE

- NOZZLES: 10° DURING GROUND ROLL. FOR TAKEOFF ROTATE TO 60° FOR HOVER WEIGHT RATIOS LESS THAN 1.32; 55° FOR HOVER WEIGHT RATIOS GREATER THAN OR EQUAL TO 1.32 AND LESS THAN 1.48; AND 50° FOR HOVER WEIGHT RATIOS GREATER THAN OR EQUAL TO 1.48.
- FOR STO WITH GROSS WEIGHTS OF 27,000 POUNDS OR HEAVIER AND TEMPERATURES GREATER THAN 35°C, ADD 5 KNOTS TO THE CALCULATED ROTATION SPEED.
- FOR STO AT A HOVER WEIGHT RATIO GREATER THAN 1.48 ADD 5 KNOTS TO CALCULATED ROTATION SPEED.
- FOR LATERAL STORE ASYMMETRIES ABOVE 20,000 IN-LBS ADD 10 KNOTS TO CALCULATED ROTATION SPEED.

DATE: 4 JANUARY 1991
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

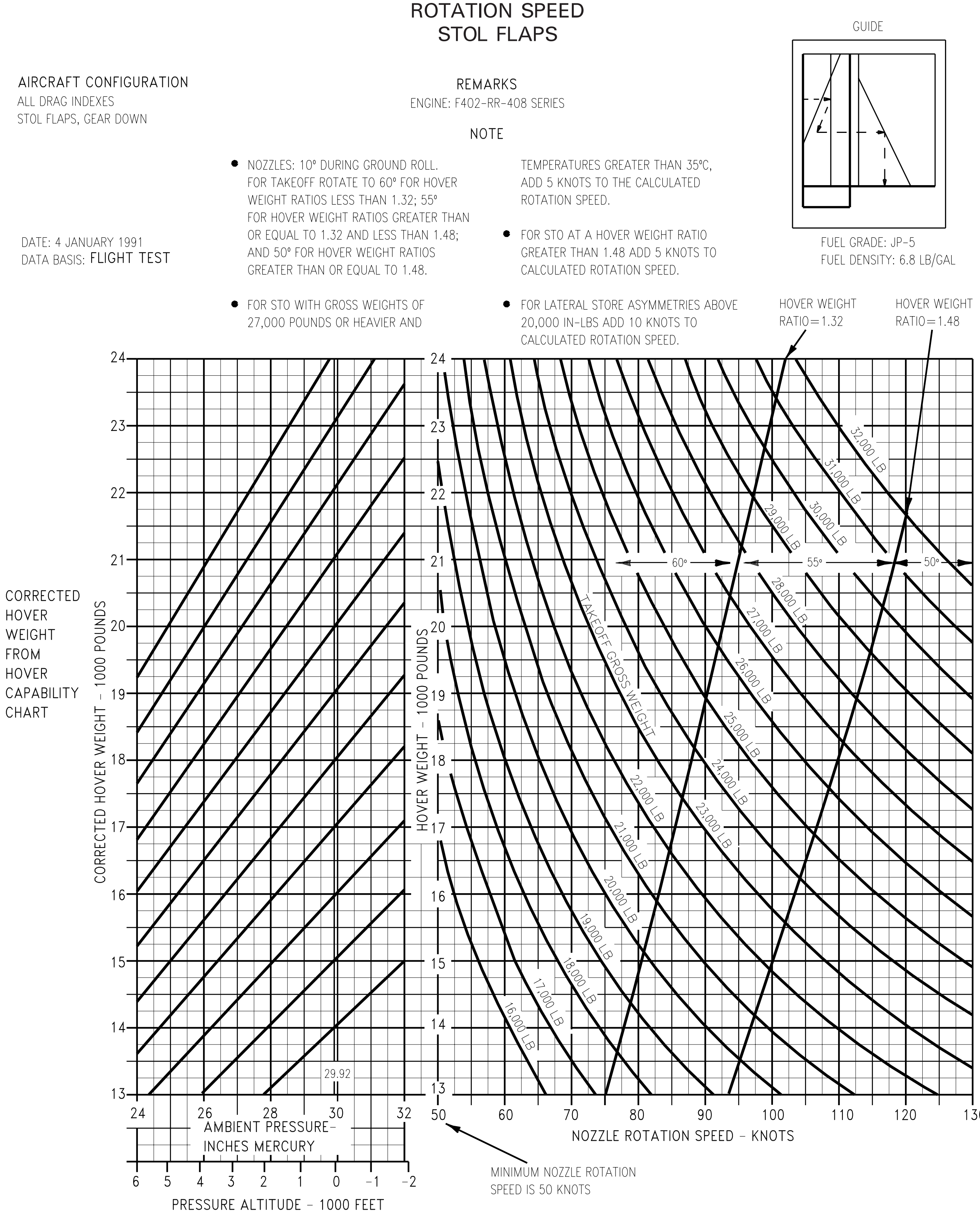
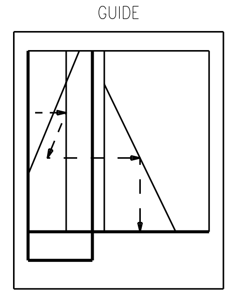



**Figure 3-14. Short Takeoff Rotation Speed, STOL Flaps (Sheet 2 of 2)**

# SHORT TAKEOFF
## ROTATION SPEED
## AUTO FLAPS




FUEL GRADE: JP-5
FULL DENSITY: 6.8 LB/GAL

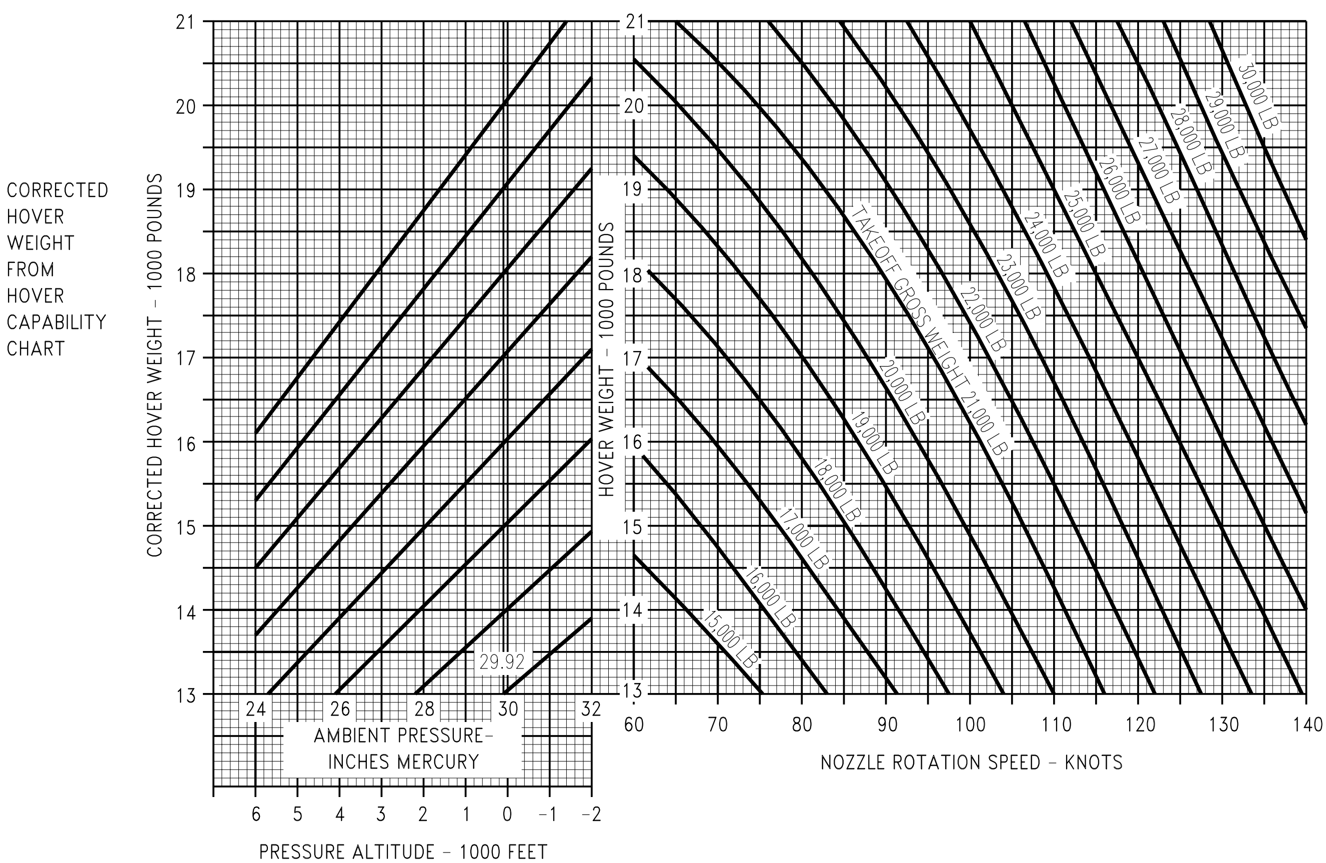
AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
AUTO FLAPS, GEAR DOWN

DATE: 24 OCTOBER 1985
DATA BASIS: FLIGHT TEST

REMARKS
ENGINE: F402-RR-406A

NOTES

- NOZZLES: 10° DURING GROUND ROLL, ROTATE TO 55° FOR TAKEOFF.
- FOR STO WITH GROSS WEIGHTS OF 27,000 POUNDS OR HEAVIER AND TEMPERATURES GREATER THAN 35°C, ADD 5 KNOTS TO THE CALCULATED ROTATION SPEED.
- FOR STO WITH 300 GALLON FUEL TANKS ON INBOARD PYLONS ADD 10 KNOTS TO CALCULATED ROTATION SPEED AND ROTATE NOZZLES TO 50° FOR TAKEOFF.
- FOR LARGE LATERAL STORE ASYMMETRIES ADD 10 KNOTS TO CALCULATED ROTATION SPEED AND ROTATE NOZZLES TO 50° FOR TAKEOFF.
- CHART ALSO APPLICABLE TO F402-RR-408 SERIES ENGINE.



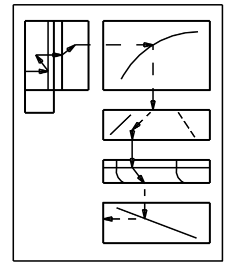

AV8BB-NFM-40-(37-1)04-CATI/ACS

Figure 3-15. Short Takeoff Rotation Speed, AUTO Flaps

# SHORT TAKEOFF DISTANCE

SHORT LIFT RATING

10° NOZZLES IN GROUND ROLL - STOL FLAPS




AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

DATE: 18 MARCH 1985
DATA BASIS: FLIGHT TEST

REMARKS
ENGINE: F402-RR-406A

NOTES

- NOZZLES: 10° DURING GROUND ROLL. ROTATE TO 55° FOR HOVER WEIGHT RATIOS LESS THAN 1.35 AND 50° FOR HOVER WEIGHT RATIOS GREATER THAN 1.35 FOR TAKEOFF.
- FOR STO WITH GROSS WEIGHTS OF 27,000 POUNDS OR HEAVIER AND TEMPERATURES GREATER THAN 35 °C, ADD 5 KNOTS TO THE CALCULATED ROTATION SPEED.

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

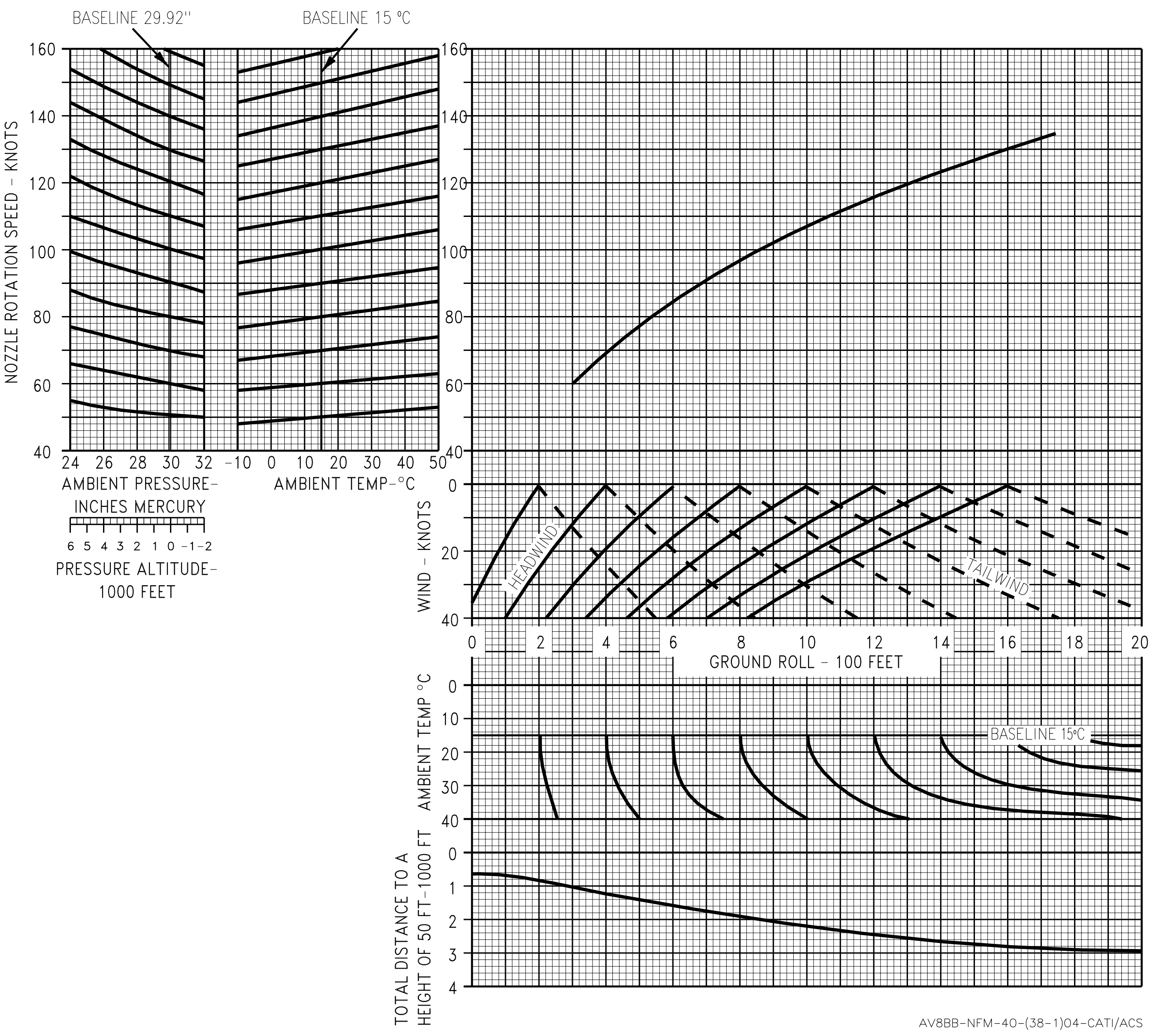



Figure 3-16. Short Takeoff Distance, F402-RR-406A Engine (Sheet 1 of 2)

# SHORT TAKEOFF DISTANCE

SHORT LIFT RATING

10° NOZZLES IN GROUND ROLL - AUTO FLAPS

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
AUTO FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-406A

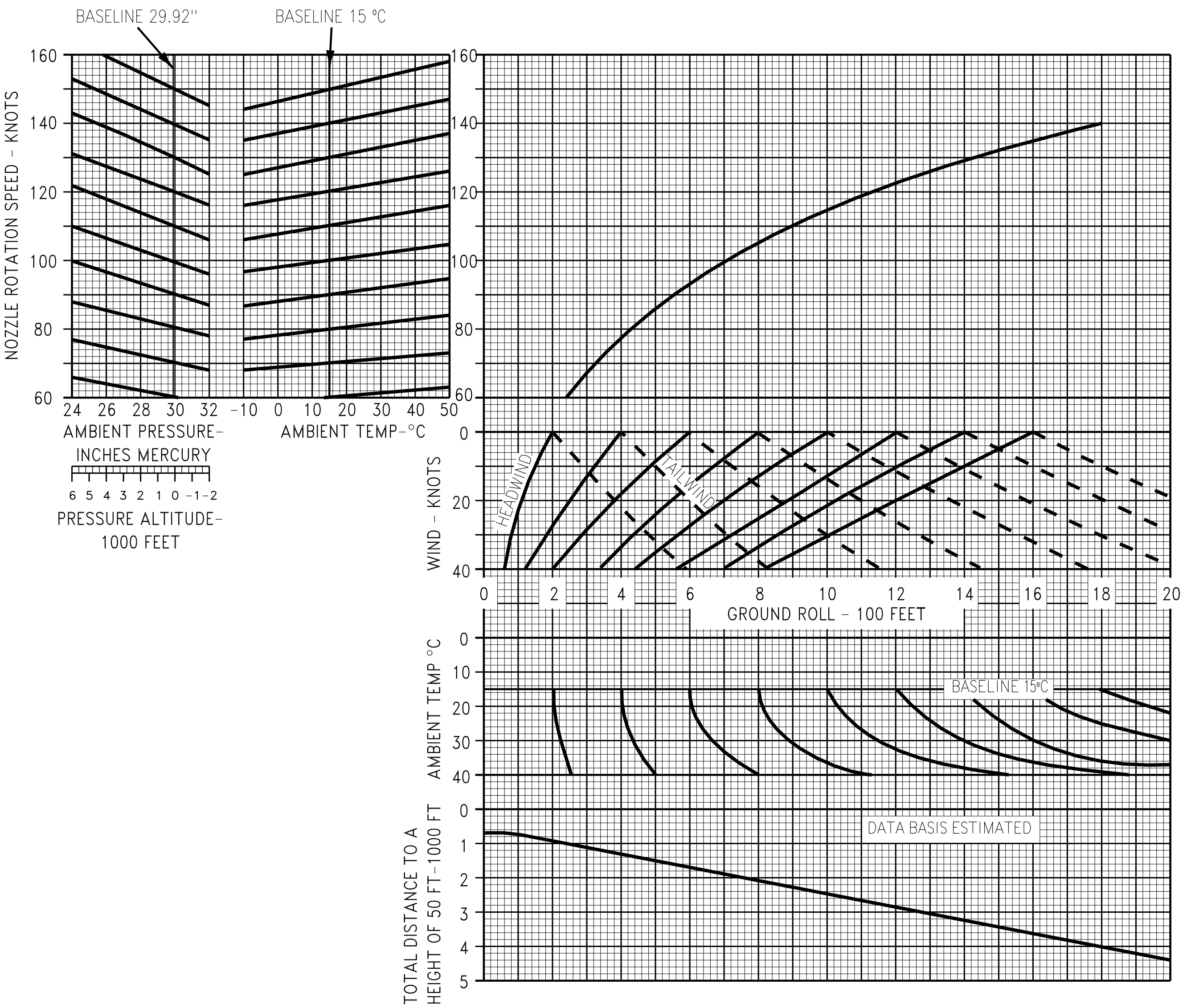
NOTES

- NOZZLES: 10° DURING GROUND ROLL, ROTATE TO 55° FOR TAKEOFF.
- FOR STO WITH GROSS WEIGHTS OF 27,000 POUNDS OR HEAVIER AND TEMPERATURES GREATER THAN 35 °C, ADD 5 KNOTS TO THE CALCULATED ROTATION SPEED.

DATE: 16 DECEMBER 1985
DATA BASIS: FLIGHT TEST

GUIDE

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(38-2)04-CATI/ACS

Figure 3-16. Short Takeoff Distance, F402-RR-406A Engine (Sheet 2 of 2)

# SHORT TAKEOFF DISTANCE

SHORT LIFT RATING

10° NOZZLES IN GROUND ROLL - STOL FLAPS

REMARKS

ENGINE: F402-RR-408 SERIES

AIRCRAFT CONFIGURATION

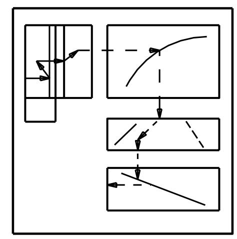
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

DATE: 4 JANUARY 1991
DATA BASIS: FLIGHT TEST

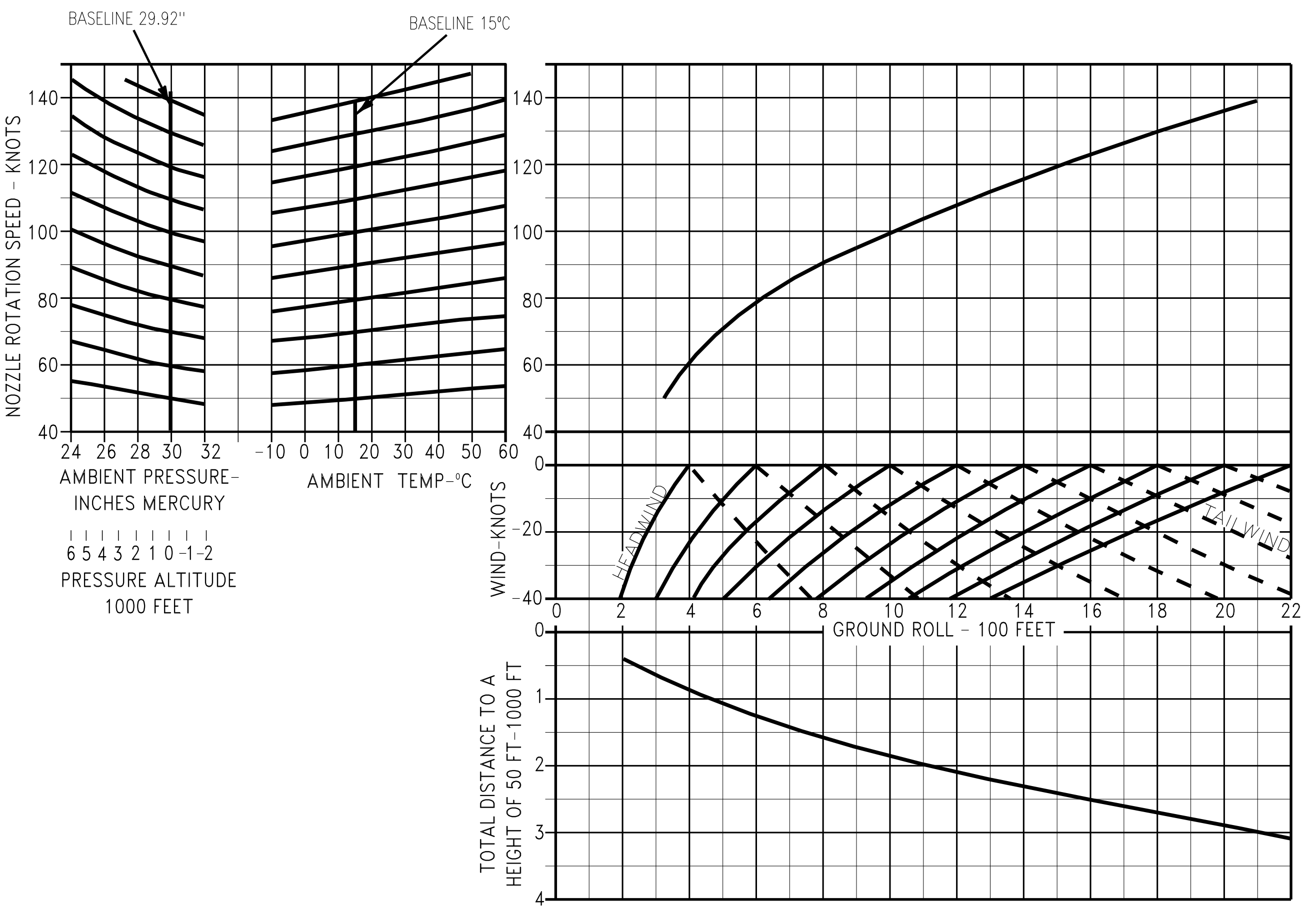
NOTES

- NOZZLES: 10° DURING GROUND ROLL. FOR TAKEOFF ROTATE TO 60° FOR HOVER WEIGHT RATIOS LESS THAN 1.32; 55° FOR HOVER WEIGHT RATIOS GREATER THAN OR EQUAL TO 1.32 AND LESS THAN 1.48; AND 50° FOR HOVER WEIGHT RATIOS GREATER THAN OR EQUAL TO 1.48.
- FOR STO WITH GROSS WEIGHTS OF 27,000 POUNDS OR HEAVIER AND TEMPERATURES GREATER THAN 35°C, ADD 5 KNOTS TO THE CALCULATED ROTATION SPEED.

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(39-1)04-CATI/ACS

Figure 3-17. Short Takeoff Distance, F402-RR-408 Series Engine

# CONVENTIONAL TAKEOFF DISTANCE

SHORT LIFT RATING
10° NOZZLES

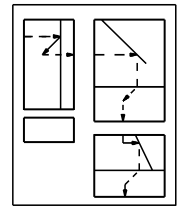
AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
AUTO FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-406A

NOTE
CHART ALSO APPLICABLE
TO F402-RR-408 SERIES ENGINE

DATE: 17 DECEMBER 1985
DATA BASIS: FLIGHT TEST

GUIDE



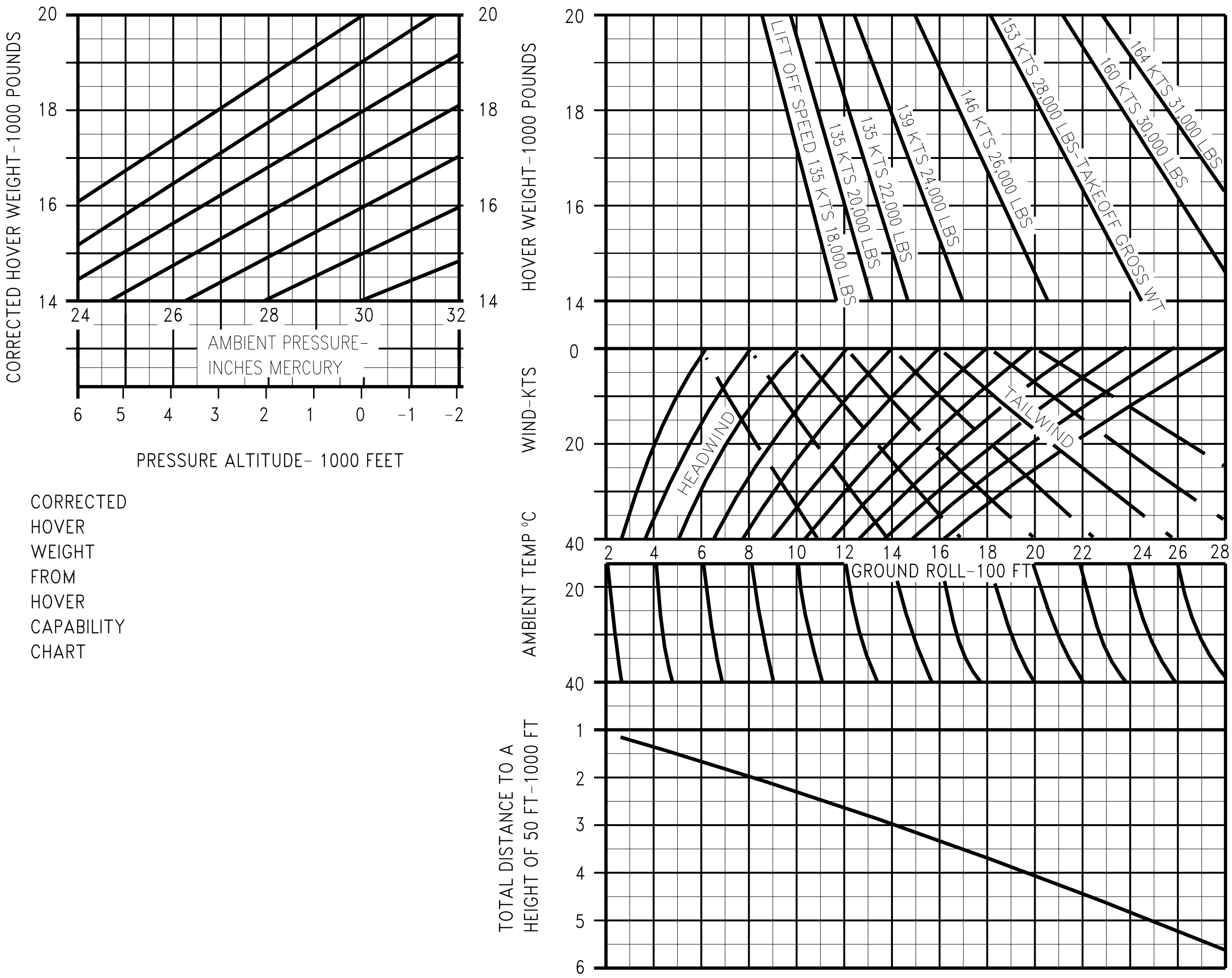



Figure 3-18. Conventional Takeoff Distance

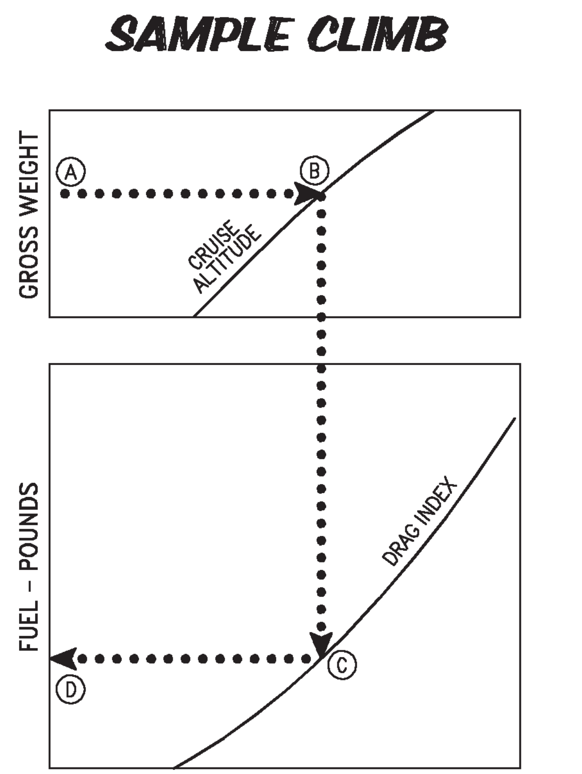
# CHAPTER 4

# CLIMB

## 4.1 CLIMB CHARTS

A series of charts are presented for a maximum thrust climb schedule. The series (Figure 4-1 thru 4-12) includes charts for determining time, fuel used, and distance covered by an AV-8B or a TAV-8B while in the climb. The AV-8B charts present data for simplified climb schedules of 300 and 350 KCAS until interception of a specified Mach number and then maintaining this Mach to cruise altitude. The other AV-8B charts provided are based on climb at a constant 400 KTAS and 450 KTAS. The TAV-8B charts present data for the simplified climb schedule of 300 KCAS and climbs at constant 400 KTAS and 450 KTAS. The charts may be used to obtain climb data from start of climb to cruise altitude or incrementally between altitudes.

**4.1.1 Use.** The method of presenting data on the time, distance, and fuel charts is identical, and the use of one chart will be undertaken here. Enter the charts with the initial climb gross weight. Project horizontally right and intersect the assigned cruise altitude, or the optimum cruise altitude for the appropriate drag index. Project vertically down to intersect the applicable drag index line, then horizontally left to read the planning data.




AV8BB–NFM–40–(41–1)01 26–CATI

**4.1.2 Sample Problem** (Use Figure 4-1)

Fuel Required, 300 KCAS maximum thrust climb

Configuration: (5) Pylons +19″ Fuselage Strakes +(4) 300 Gal Tanks

| | |
|---|---|
| A. Initial gross weight | 22,000 Lb |
| B. Cruise altitude | 30,000 Ft |
| C. Drag index | 42.2 |
| D. Fuel required to climb | 708 Lb |

# TIME TO CLIMB, AV-8B

MAXIMUM THRUST AT 300 KCAS

GUIDE

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

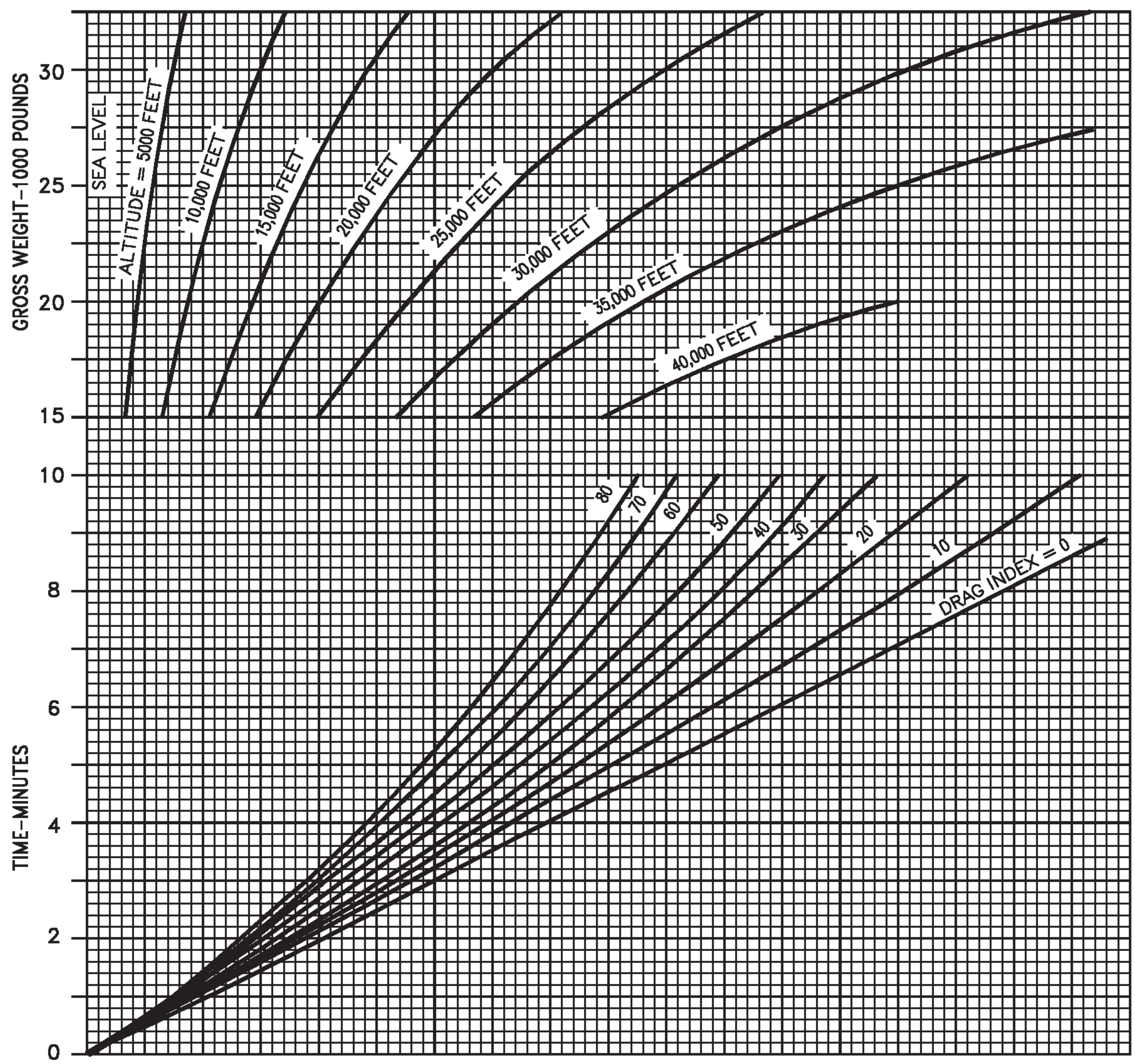
**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(42-1)01-CATI

**Figure 4-1. Maximum Thrust Climb at 300 KCAS, F402-RR-406A Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, AV-8B

## MAXIMUM THRUST AT 300 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**

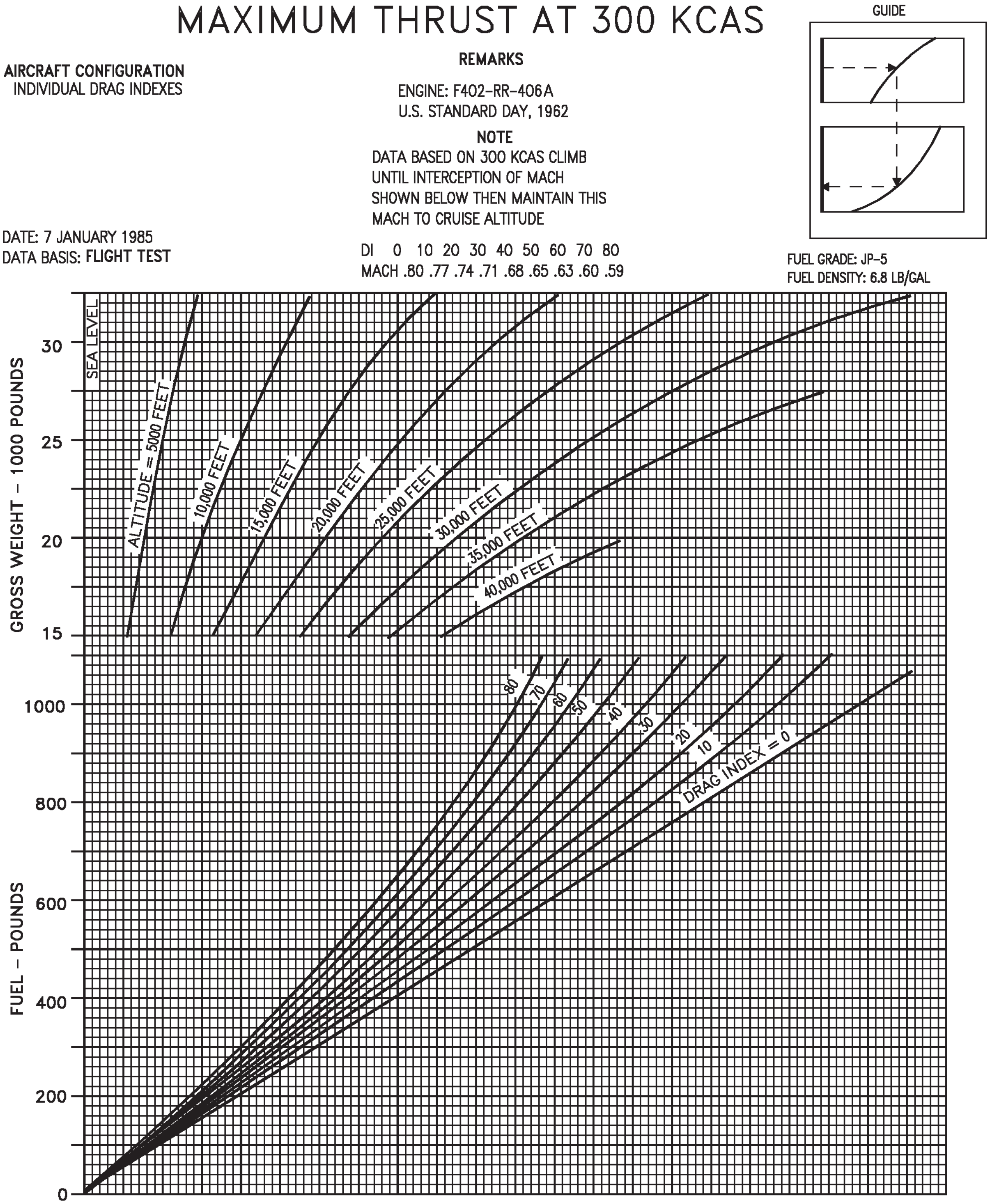
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP-5
FUEL DENSITY: **6.8 LB/GAL**




AV8BB-NFM-40-(42-2)01-CATI

**Figure 4-1. Maximum Thrust Climb at 300 KCAS, F402-RR-406A Engine (Sheet 2 of 3)**

# DISTANCE REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT 300 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE.

| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

DATE: 7 JANUARY 1985
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

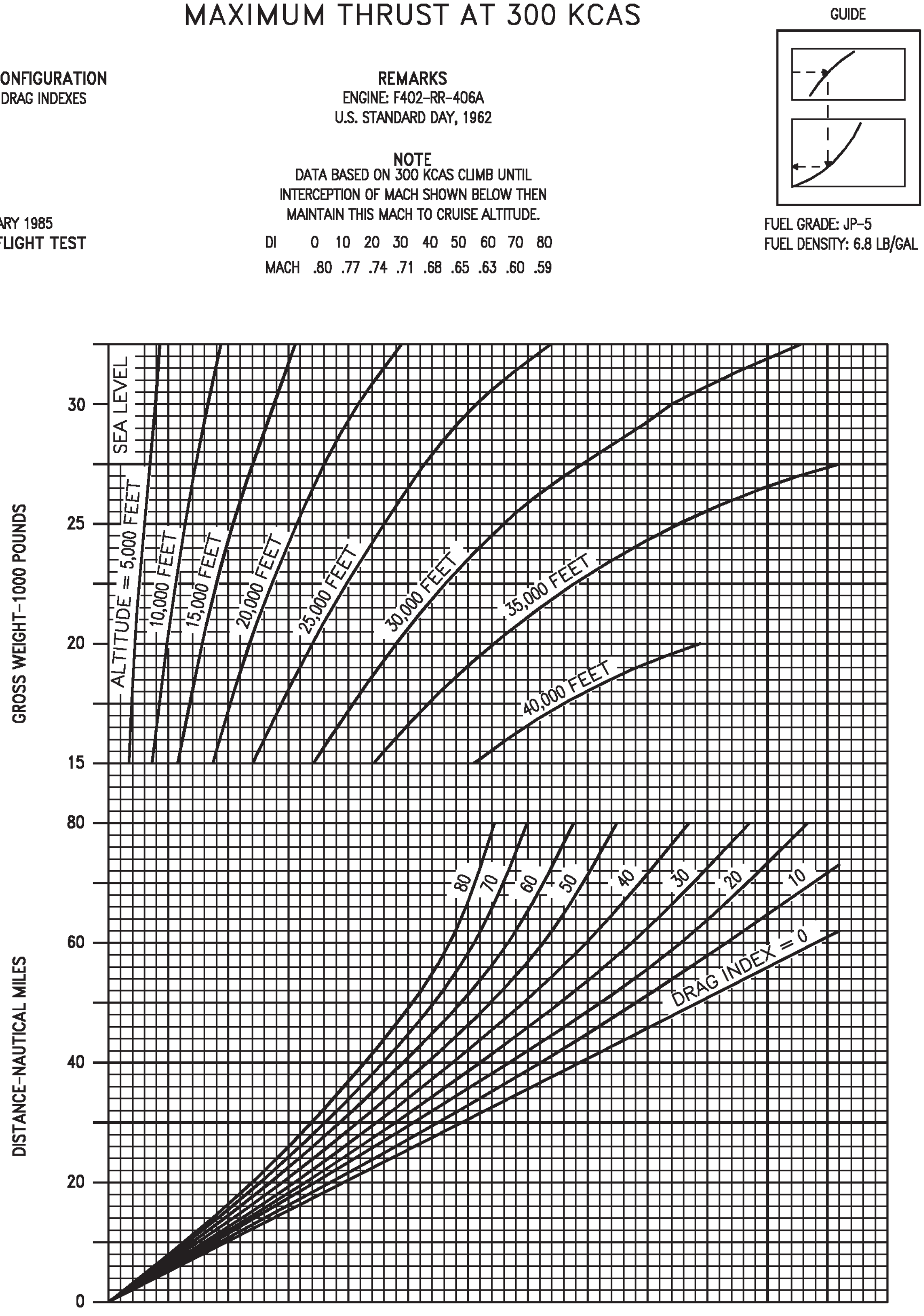



Figure 4-1. Maximum Thrust Climb at 300 KCAS, F402-RR-406A Engine (Sheet 3 of 3)

# TIME TO CLIMB, AV-8B

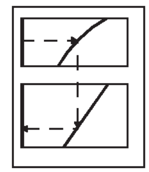
## MAXIMUM THRUST AT CONSTANT 350 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**

ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

GUIDE



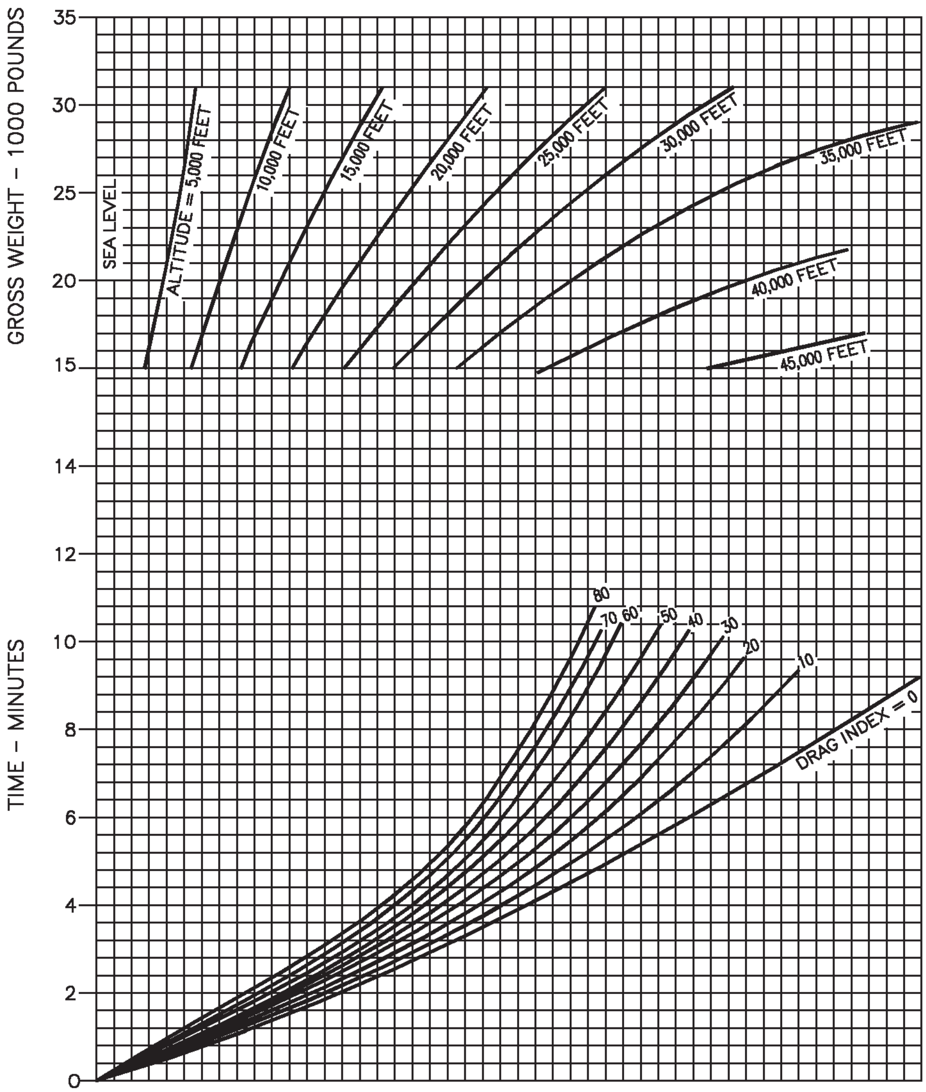
**NOTE**

DATA BASED ON 350 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

DATE: 17 NOVEMBER 1993
DATA BASIS: **ESTIMATED**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DI– | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| MACH– | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(109-1)02-CATI

**Figure 4-1A. Maximum Thrust Climb at 350 KCAS, F402-RR-406A Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 350 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

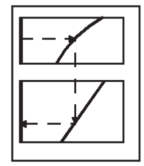
**REMARKS**

ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTE**

DATA BASED ON 350 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

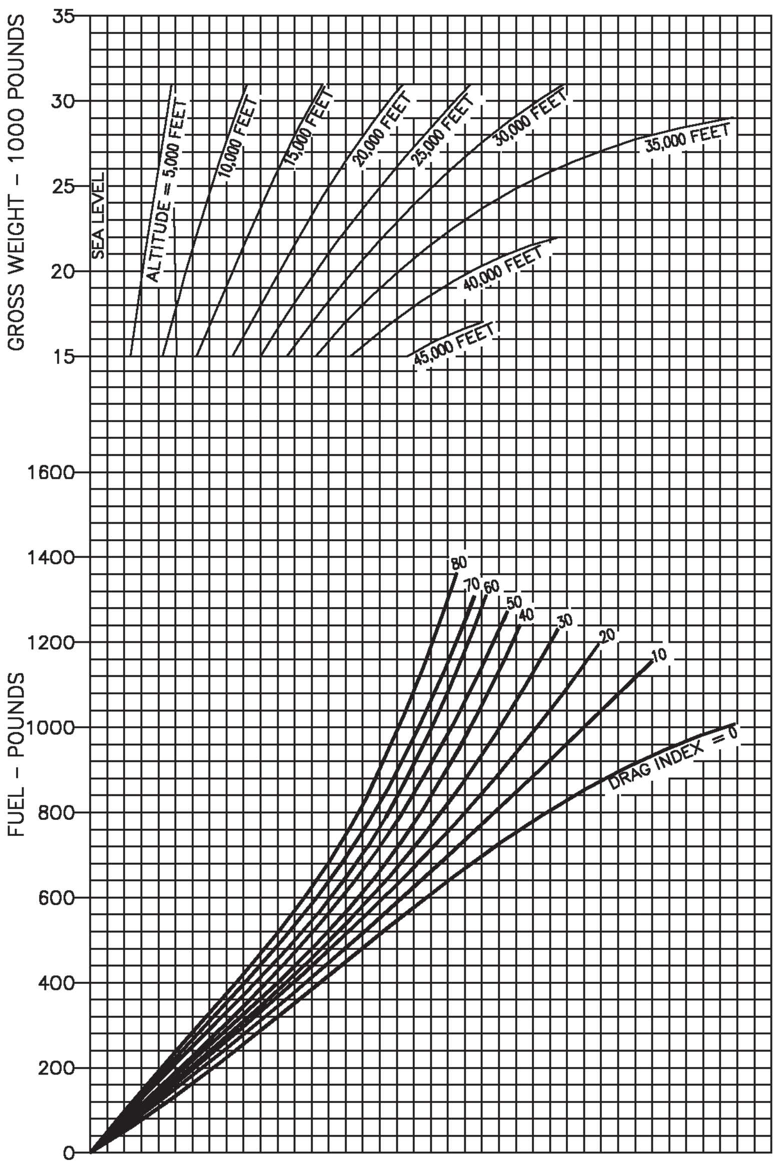
GUIDE



DATE: 17 NOVEMBER 1993
DATA BASIS: **ESTIMATED**

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(109-2)02-CATI

**Figure 4-1A. Maximum Thrust Climb at 350 KCAS, F402-RR-406A Engine (Sheet 2 of 3)**

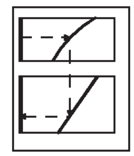
# DISTANCE REQUIRED TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 350 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

GUIDE

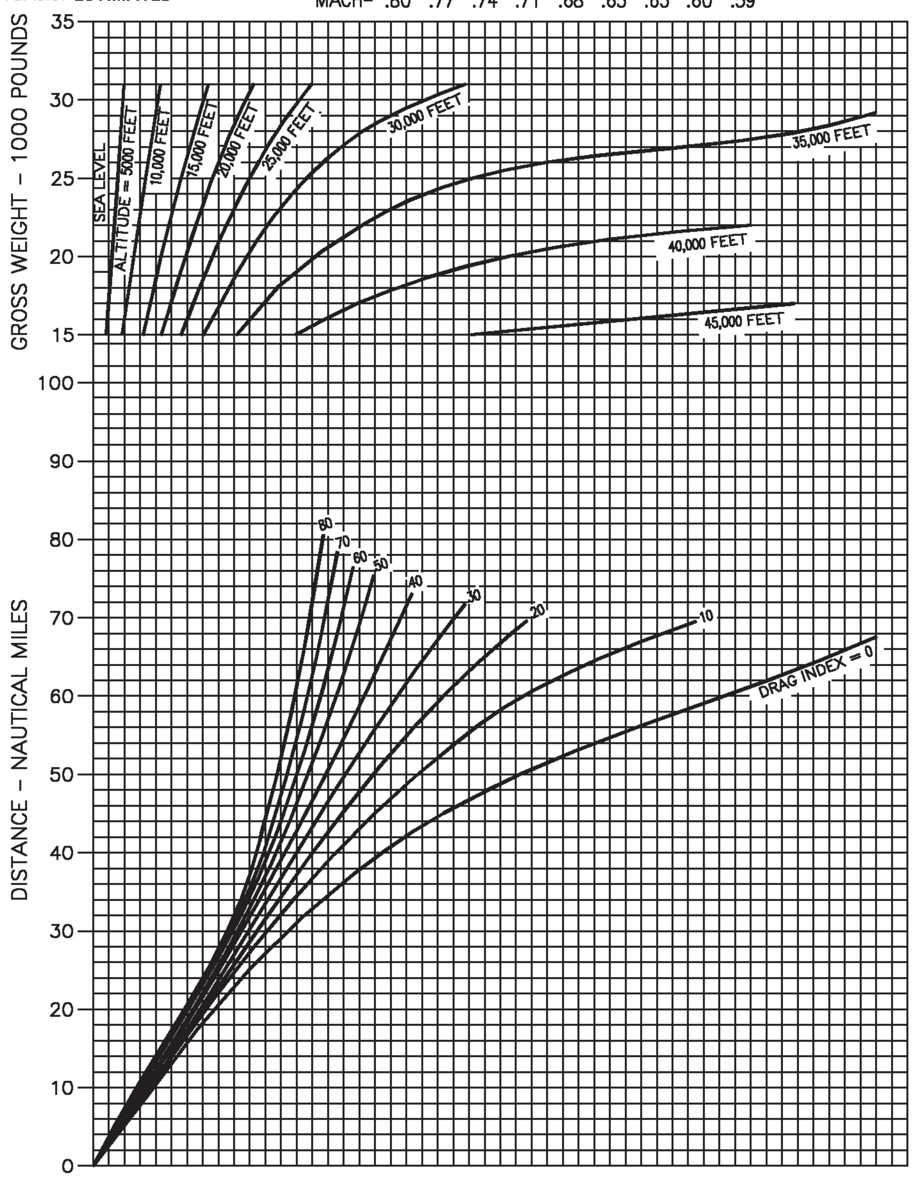


**NOTE**
DATA BASED ON 350 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

DATE: 17 NOVEMBER 1993
DATA BASIS: **ESTIMATED**

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(109-3)02-CATI

Figure 4-1A. Maximum Thrust Climb at 350 KCAS, F402-RR-406A Engine (Sheet 3 of 3)

# TIME TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 400 KTAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 17 DECEMBER 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

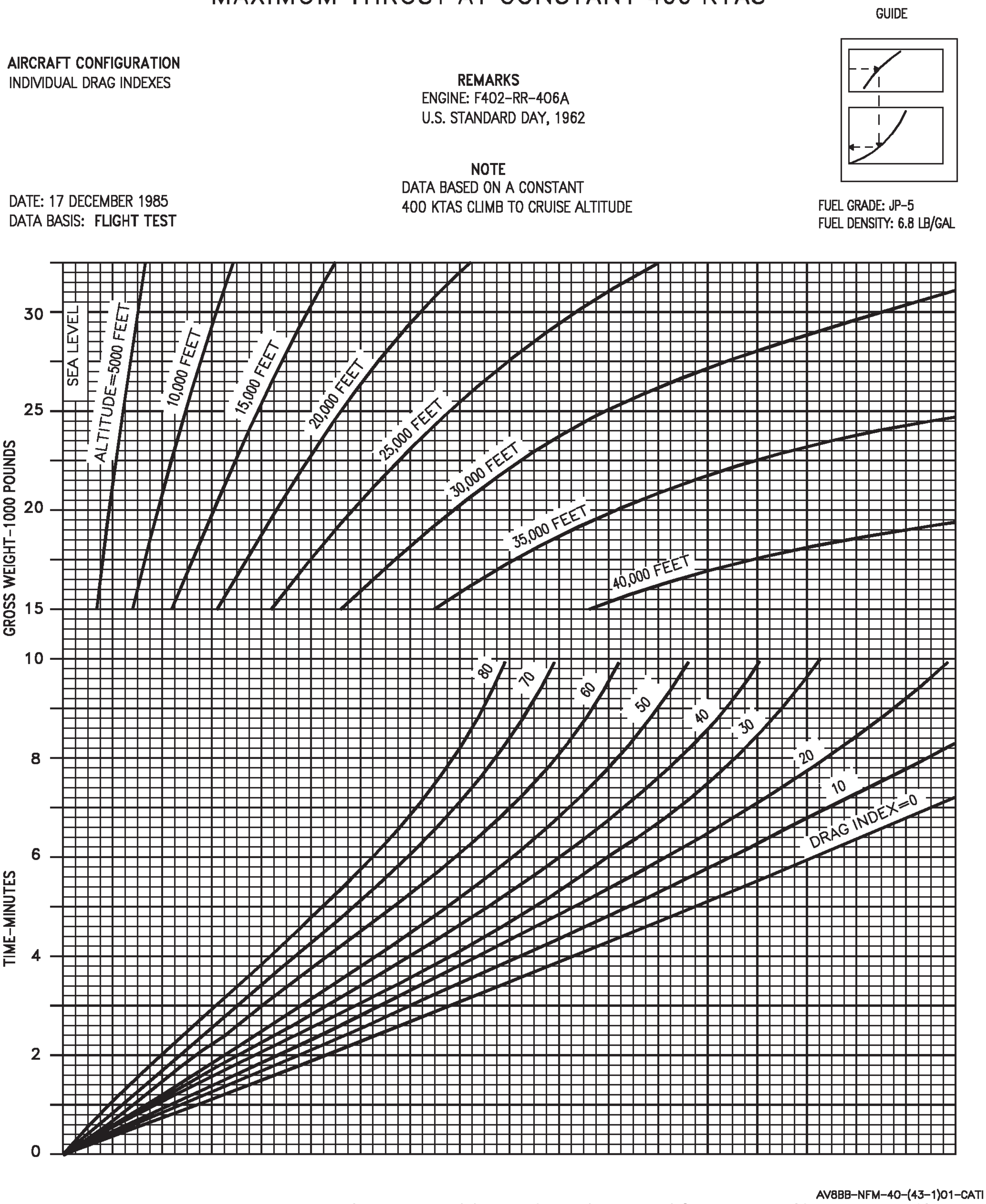



**Figure 4-2. Maximum Thrust Climb at 400 KTAS, F402-RR-406A Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 400 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 17 DECEMBER 1985
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

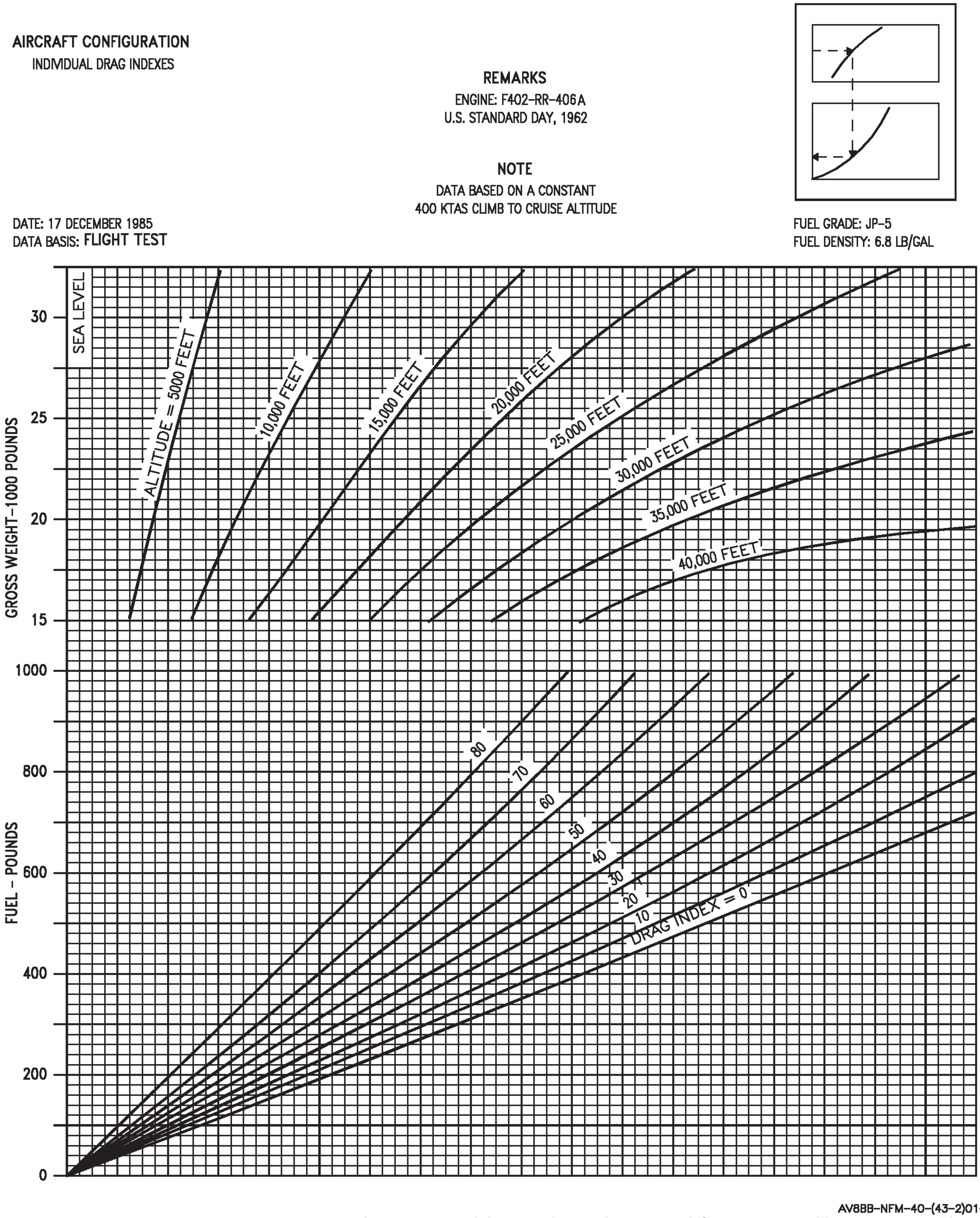



Figure 4-2. Maximum Thrust Climb at 400 KTAS, F402-RR-406A Engine (Sheet 2 of 3)

# DISTANCE REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT CONSTANT 400 KTAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

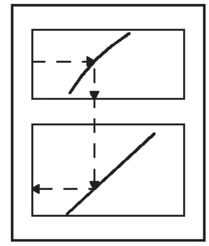
**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTE**

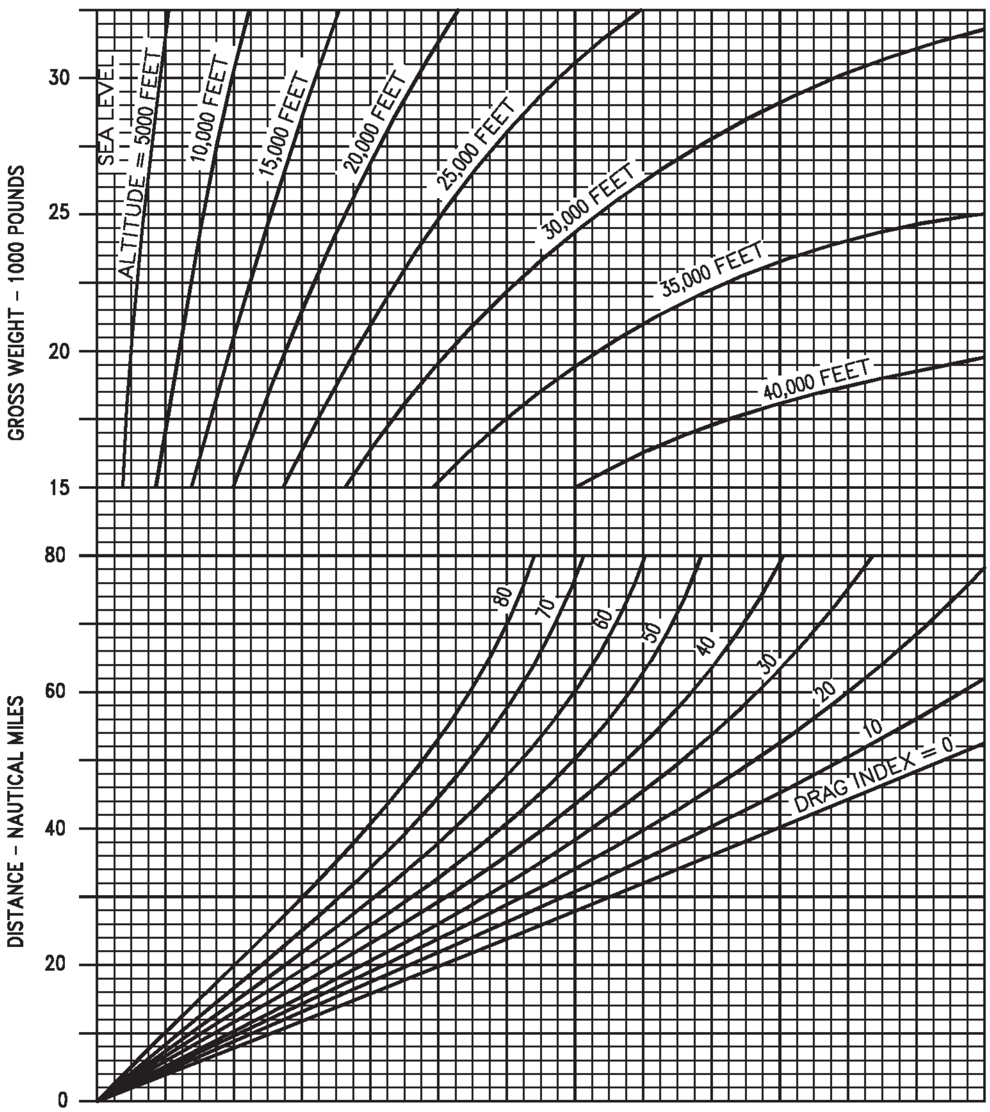
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 17 DECEMBER 1985
DATA BASIS: **FLIGHT TEST**

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(43-3)01-CATI

Figure 4-2. Maximum Thrust Climb at 400 KTAS, F402-RR-406A Engine (Sheet 3 of 3)

# TIME TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 450 KTAS

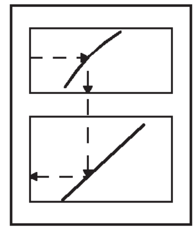
**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

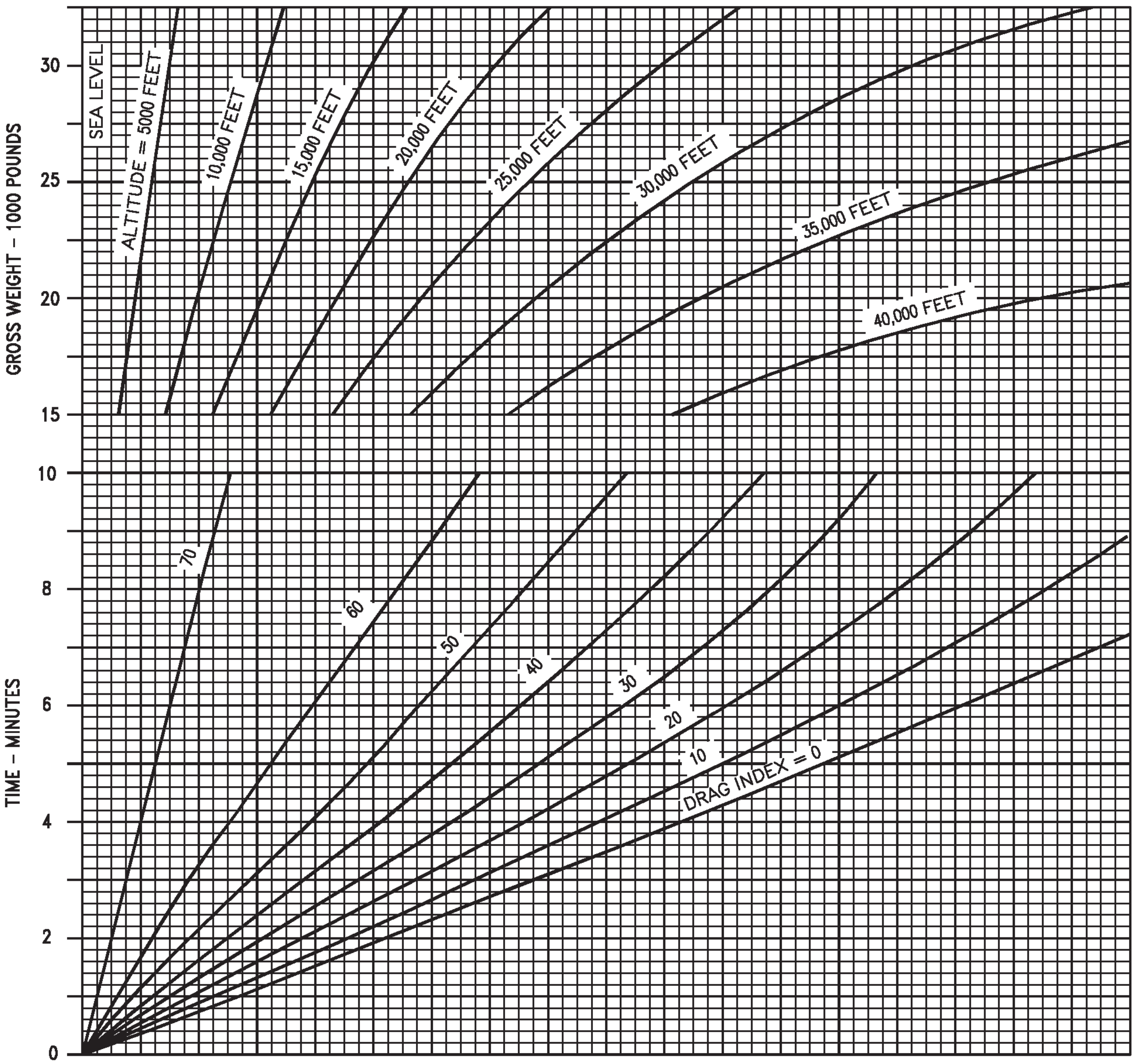
**NOTE**
DATA BASED ON A CONSTANT
450 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 17 DECEMBER 1985
DATA BASIS: **FLIGHT TEST**

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(44-1)01-CATI

**Figure 4-3. Maximum Thrust Climb at 450 KTAS, F402-RR-406A Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 450 KTAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON A CONSTANT 450 KTAS
CLIMB TO CRUISE ALTITUDE

DATE: 17 DECEMBER 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

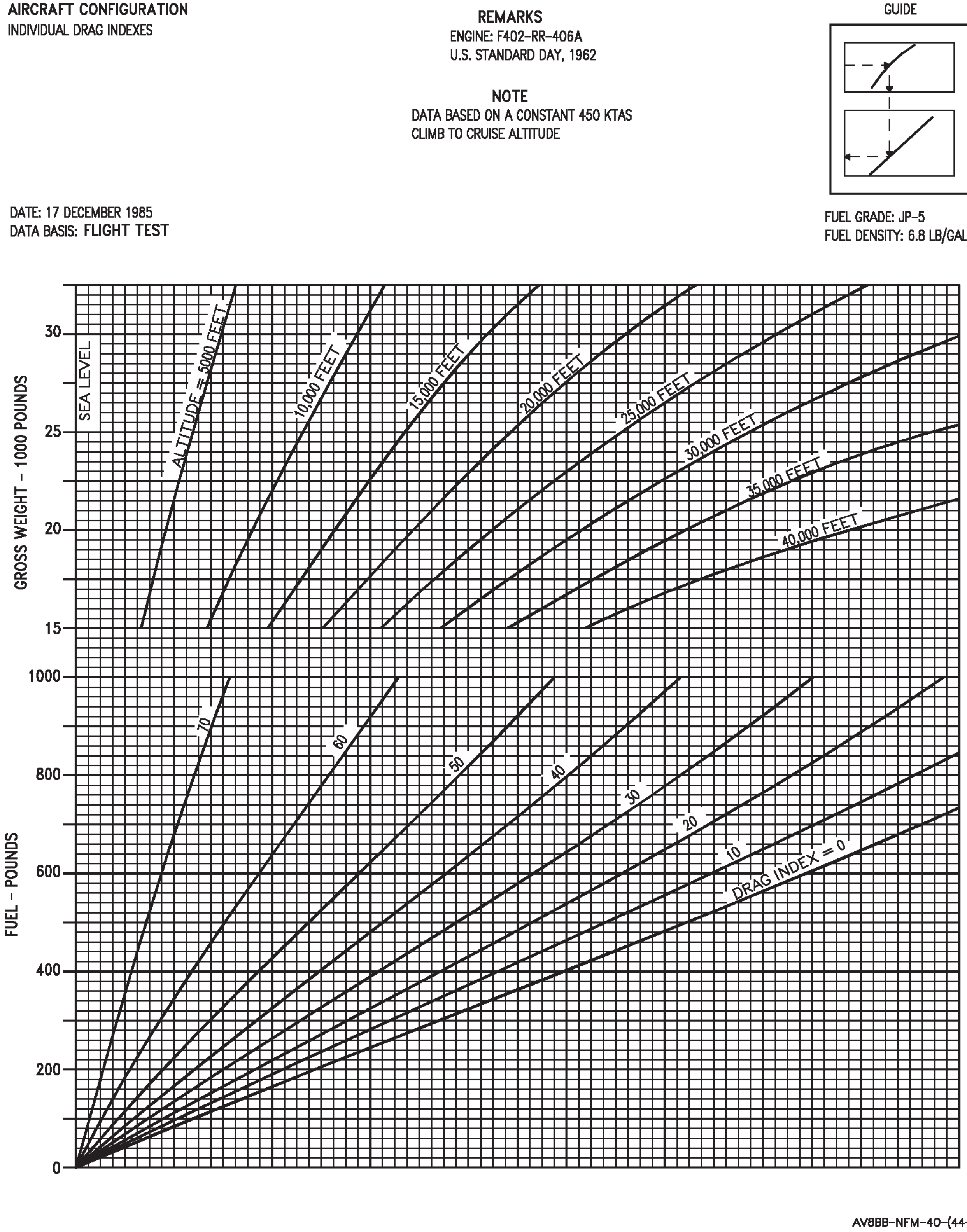



Figure 4-3. Maximum Thrust Climb at 450 KTAS, F402-RR-406A Engine (Sheet 2 of 3)

# DISTANCE REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT CONSTANT 450 KTAS

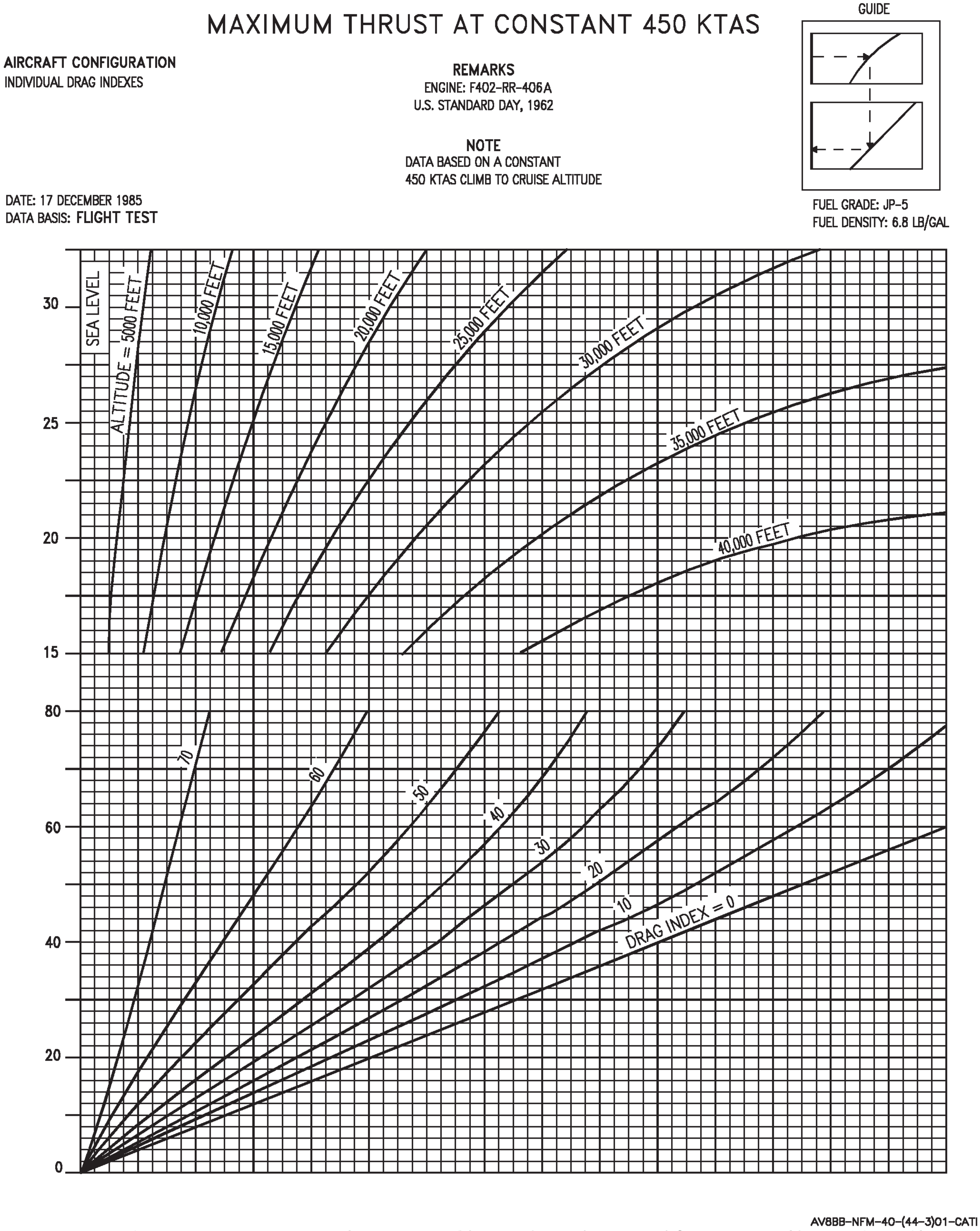
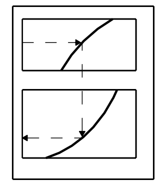



Figure 4-3. Maximum Thrust Climb at 450 KTAS, F402-RR-406A Engine (Sheet 3 of 3)

# TIME TO CLIMB, AV-8B

MAXIMUM THRUST AT 300 KCAS

GUIDE



AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

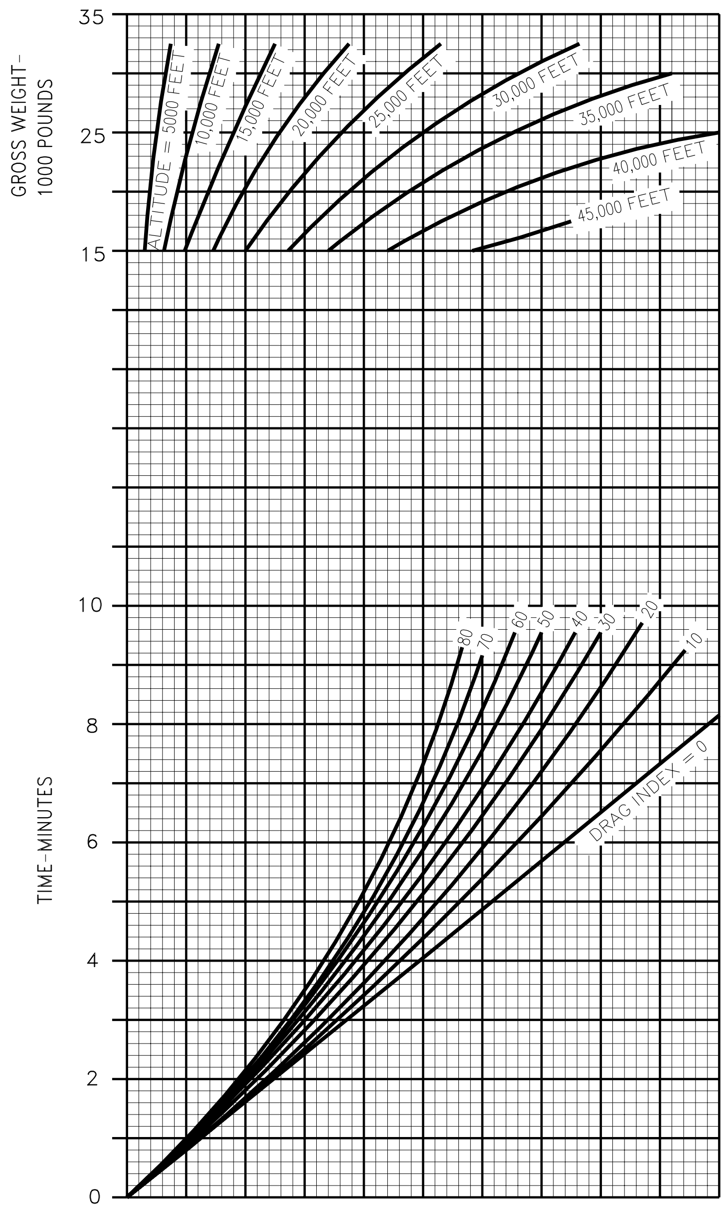
NOTE

DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |




AV8BB-NFM-40-(45-1)04-CATI/ACS

**Figure 4-4. Maximum Thrust Climb at 300 KCAS, F402-RR-408 Series Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT 300 KCAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

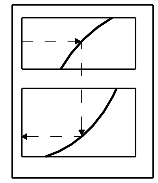
REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE

DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

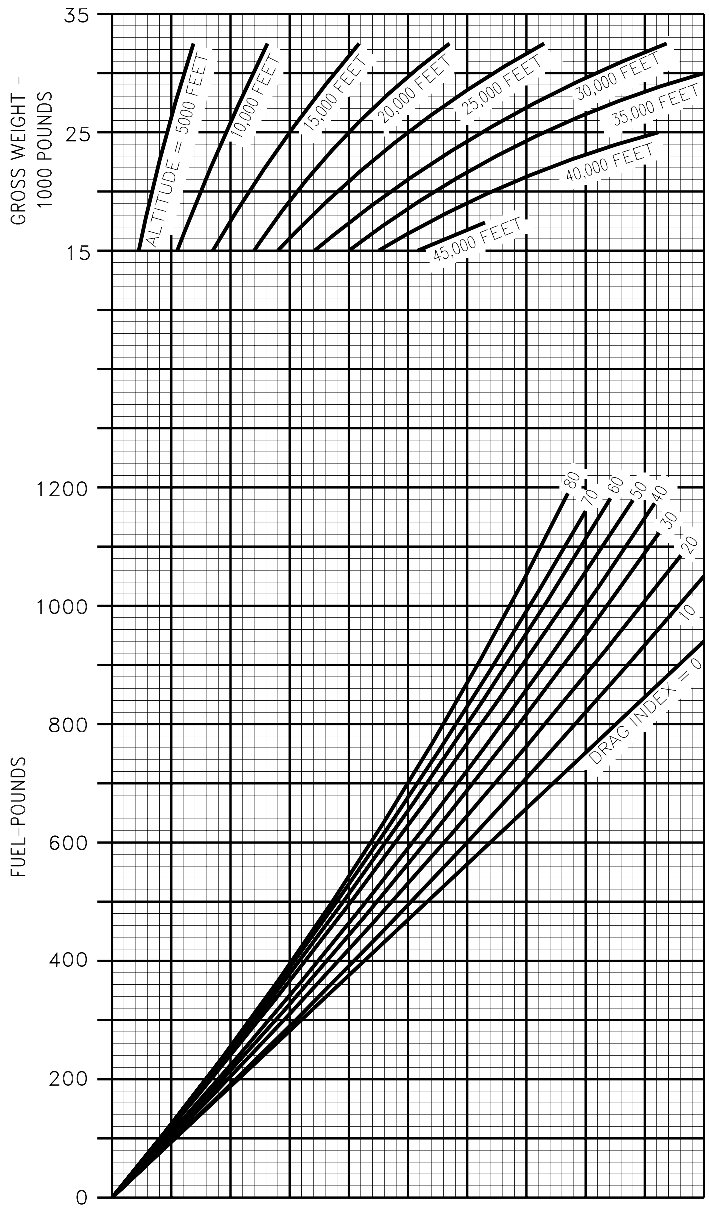
GUIDE



DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |




AV8BB-NFM-40-(45-2)04-CATI/ACS

**Figure 4-4. Maximum Thrust Climb at 300 KCAS, F402-RR-408 Series Engine (Sheet 2 of 3)**

# DISTANCE REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT 300 KCAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

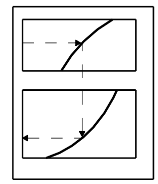
REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE

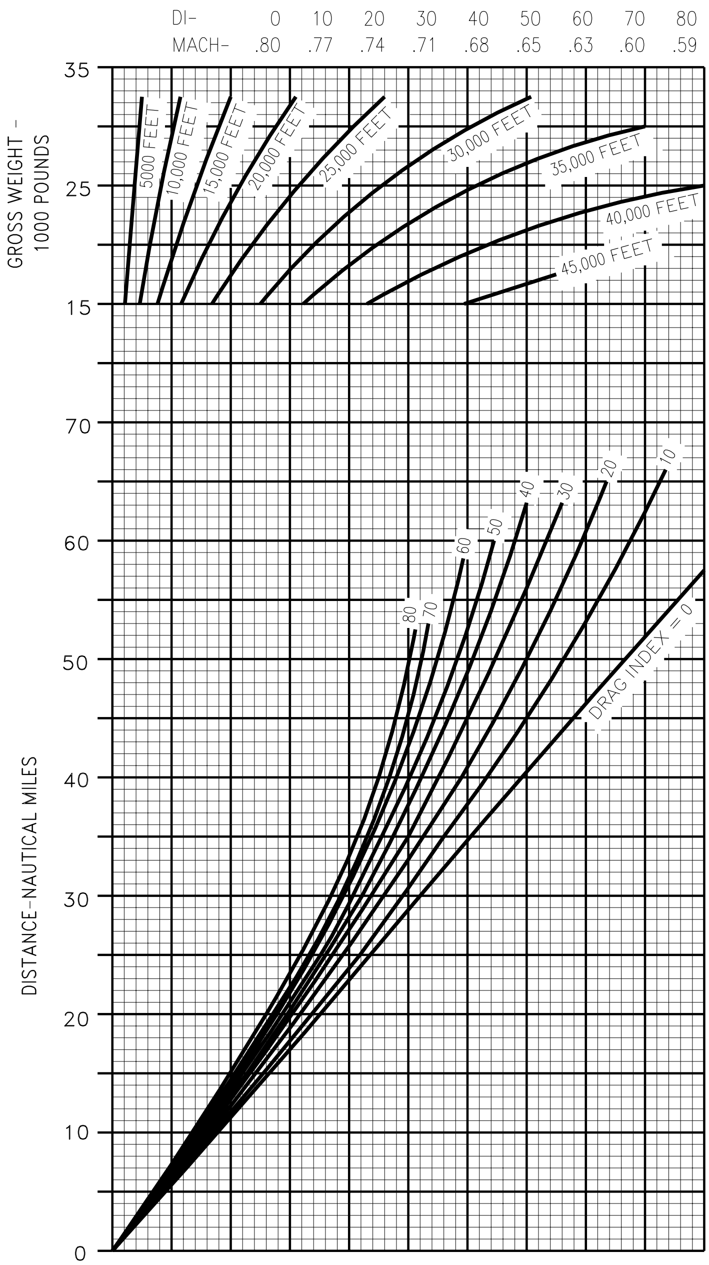
DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

GUIDE



DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(45-3)04-CATI/ACS

**Figure 4-4. Maximum Thrust Climb at 300 KCAS, F402-RR-408 Series Engine (Sheet 3 of 3)**

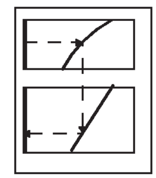
# TIME TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 350 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

GUIDE



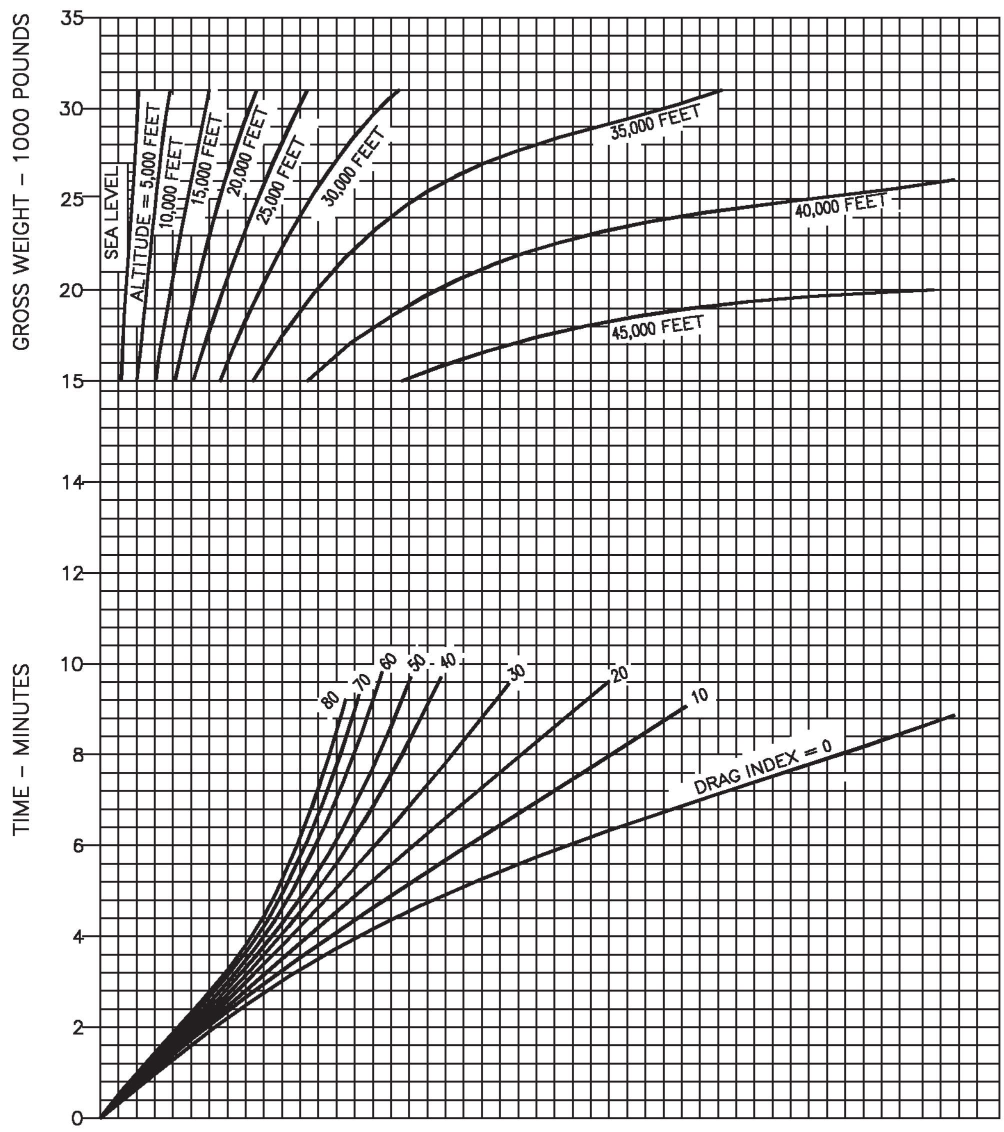
**NOTES**

DATA BASED ON 350 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

DATE: 17 NOVEMBER 1993
DATA BASIS: **ESTIMATED**

| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(108-1)02-CATI

Figure 4-4A. Maximum Thrust Climb at 350 KCAS, F402-RR-408 Series Engine (Sheet 1 of 3)

# FUEL REQUIRED TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 350 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**

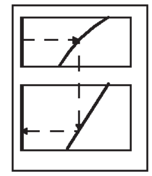
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

**NOTE**

DATA BASED ON 350 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

| DI– | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH– | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

GUIDE



DATE: 17 NOVEMBER 1993
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

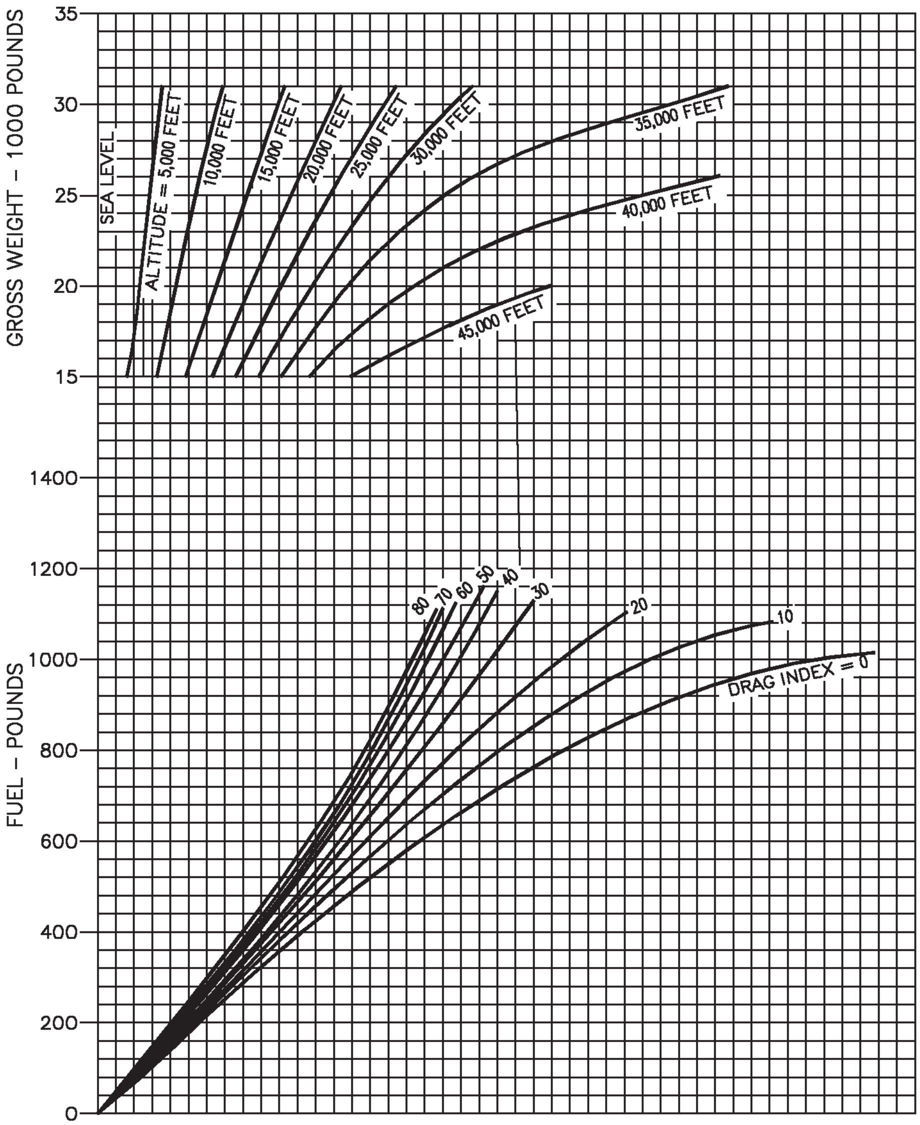



**Figure 4-4A. Maximum Thrust Climb at 350 KCAS, F402-RR-408 Series Engine (Sheet 2 of 3)**

AV8BB-NFM-40-(108-2)02-CATI

# DISTANCE REQUIRED TO CLIMB, AV-8B

## MAXIMUM THRUST AT CONSTANT 350 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

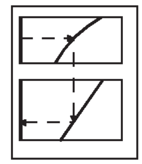
**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

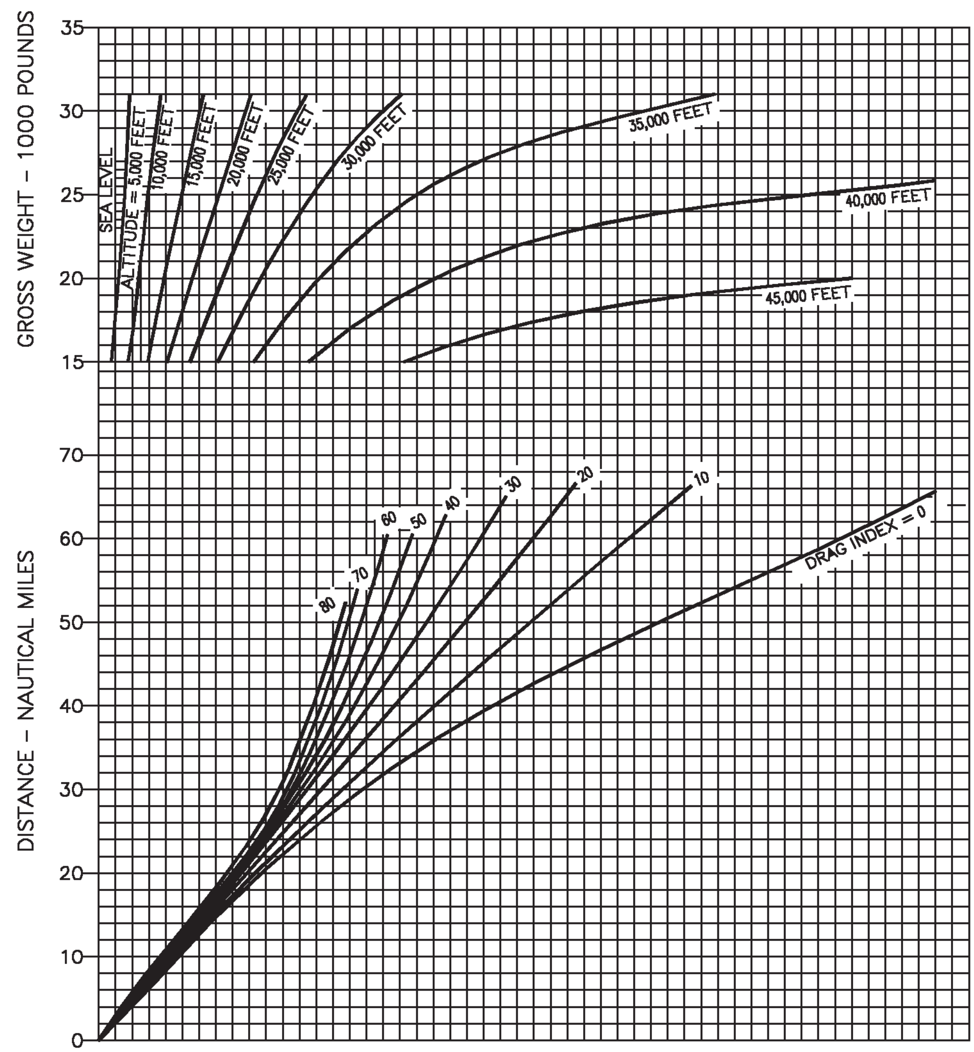
**NOTE**
DATA BASED ON 350 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

DATE: 17 NOVEMBER 1993
DATA BASIS: **ESTIMATED**

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(108-3)02-CATI

Figure 4-4A. Maximum Thrust Climb at 350 KCAS, F402-RR-408 Series Engine (Sheet 3 of 3)

# TIME TO CLIMB, AV-8B

MAXIMUM THRUST AT CONSTANT 400 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

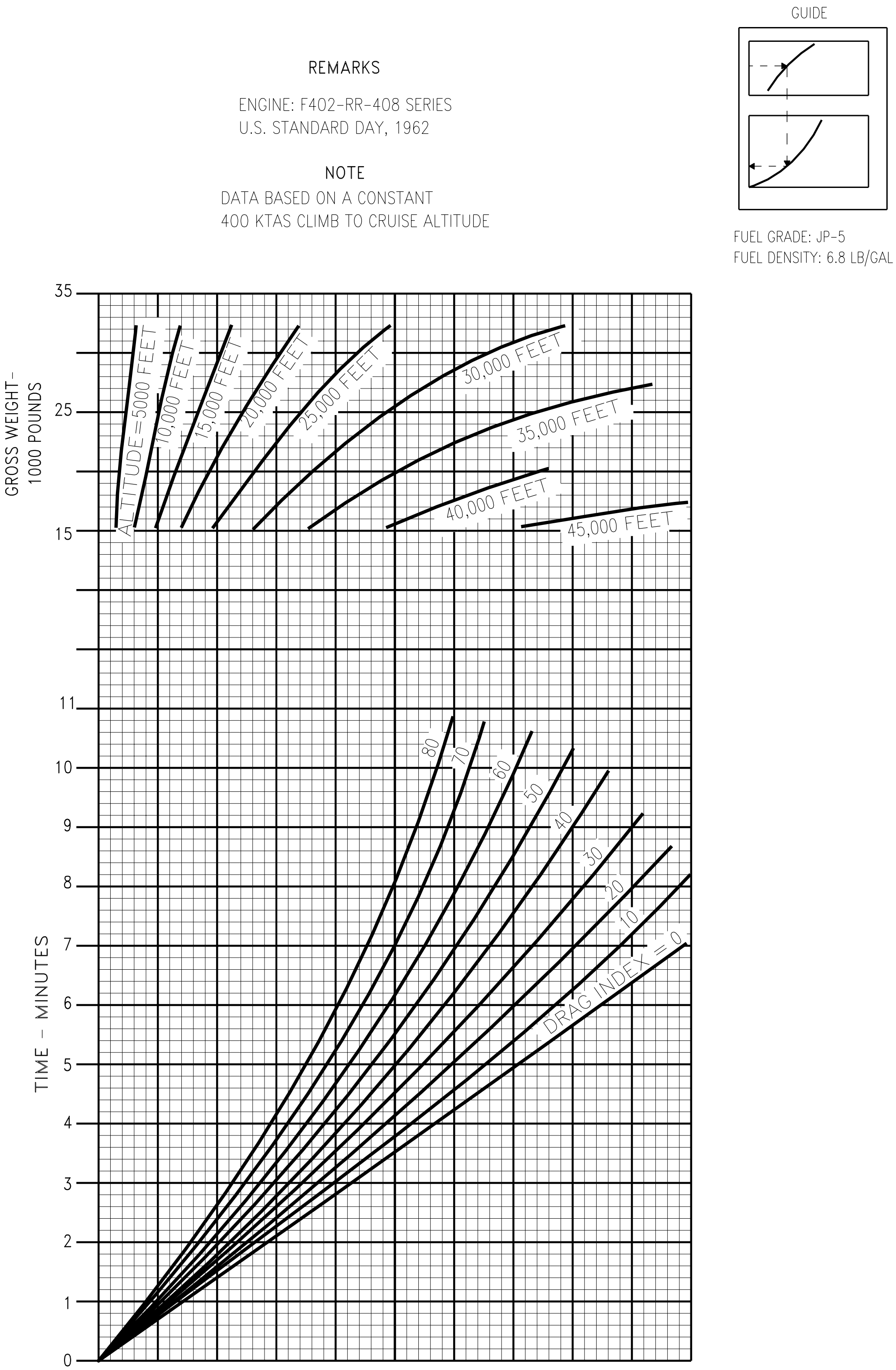
REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(46-1)04-CATI/ACS

**Figure 4-5. Maximum Thrust Climb at 400 KTAS, F402-RR-408 Series Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT CONSTANT 400 KTAS

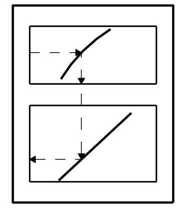
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

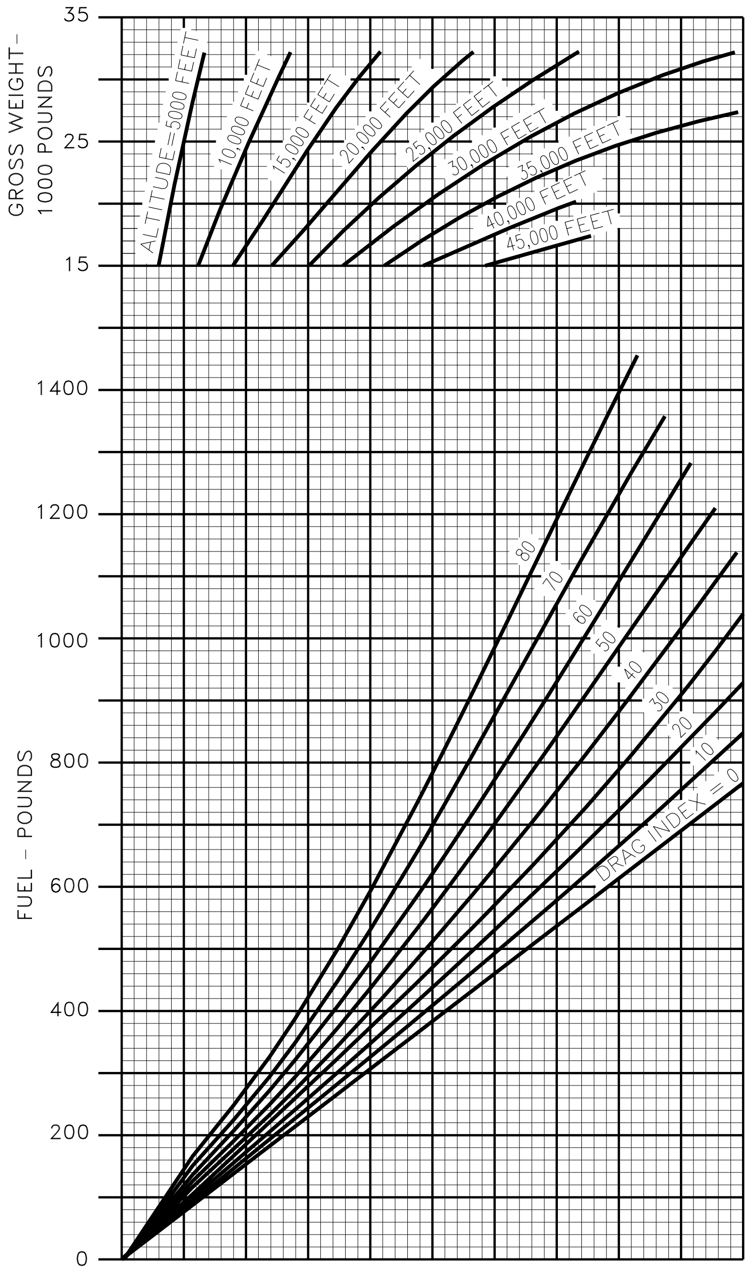
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED




FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



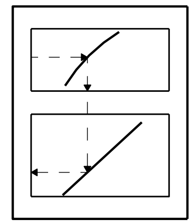

AV8BB-NFM-40-(46-2)04-CATI/ACS

**Figure 4-5. Maximum Thrust Climb at 400 KTAS, F402-RR-408 Series Engine (Sheet 2 of 3)**

# DISTANCE REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT CONSTANT 400 KTAS

GUIDE



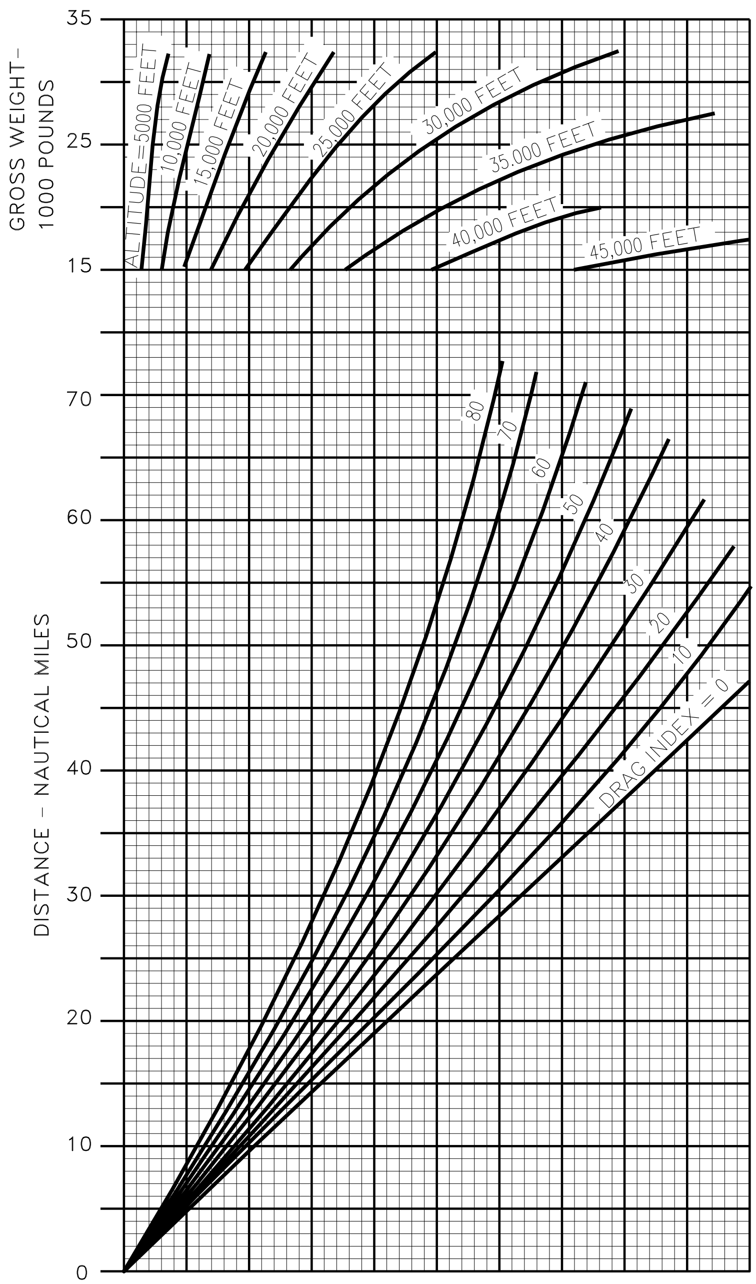
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(46-3)04-CATI/ACS

**Figure 4-5. Maximum Thrust Climb at 400 KTAS, F402-RR-408 Series Engine (Sheet 3 of 3)**

# TIME TO CLIMB, AV-8B

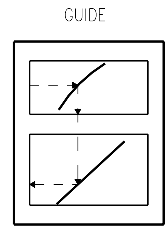
MAXIMUM THRUST AT CONSTANT 450 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

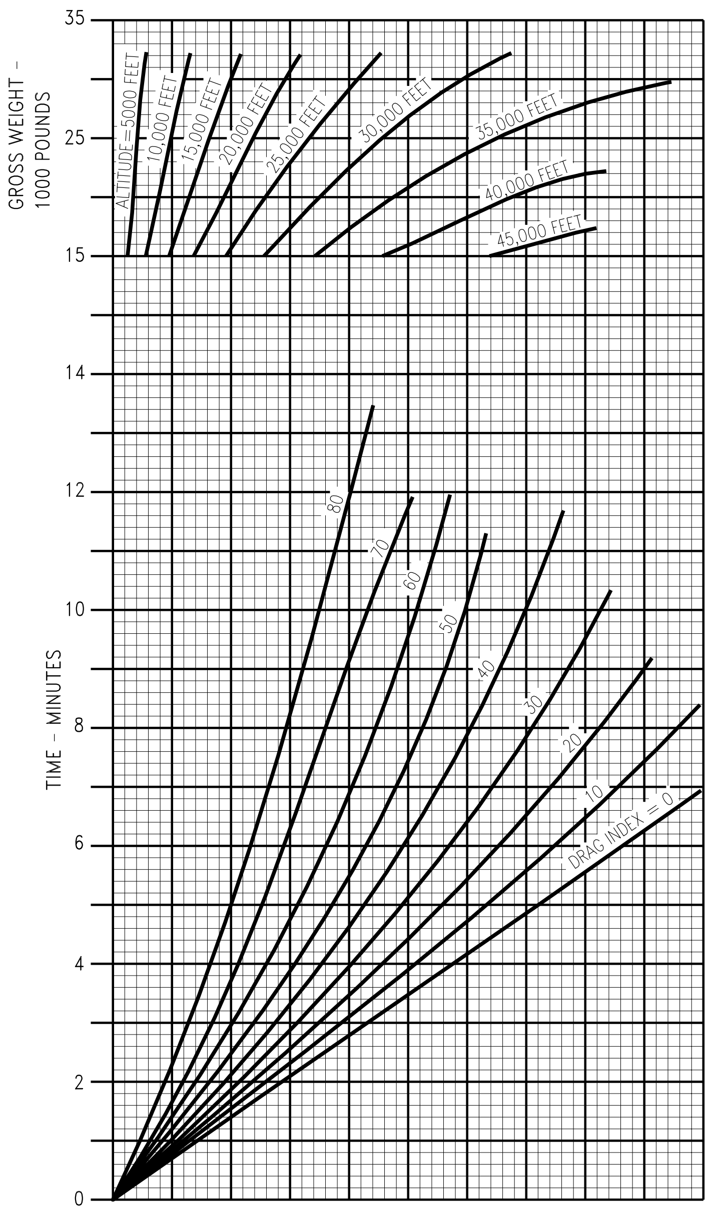
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA IS BASED ON A CONSTANT
450 KTAS CLIMB TO CRUISE ALTITUDE




FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED




AV8BB-NFM-40-(47-1)04-CATI/ACS

Figure 4-6. Maximum Thrust Climb at 450 KTAS, F402-RR-408 Series Engine (Sheet 1 of 3)

# FUEL REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT CONSTANT 450 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

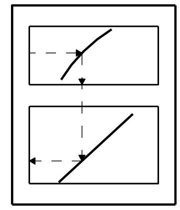
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE

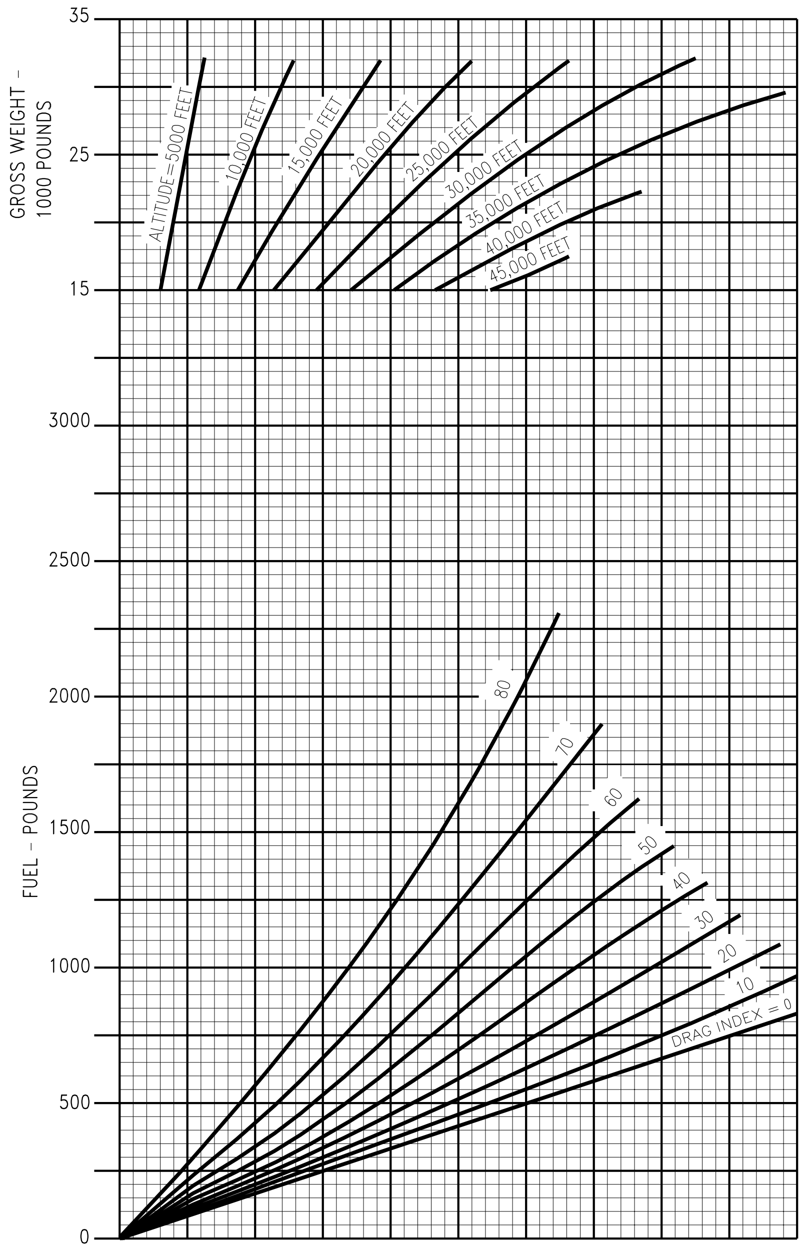
DATA BASED ON A CONSTANT 450 KTAS
CLIMB TO CRUISE ALTITUDE

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(47-2)04-CATI/ACS

Figure 4-6. Maximum Thrust Climb at 450 KTAS, F402-RR-408 Series Engine (Sheet 2 of 3)

# DISTANCE REQUIRED TO CLIMB, AV-8B

MAXIMUM THRUST AT CONSTANT 450 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

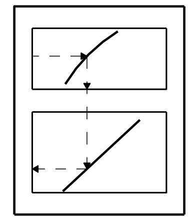
REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

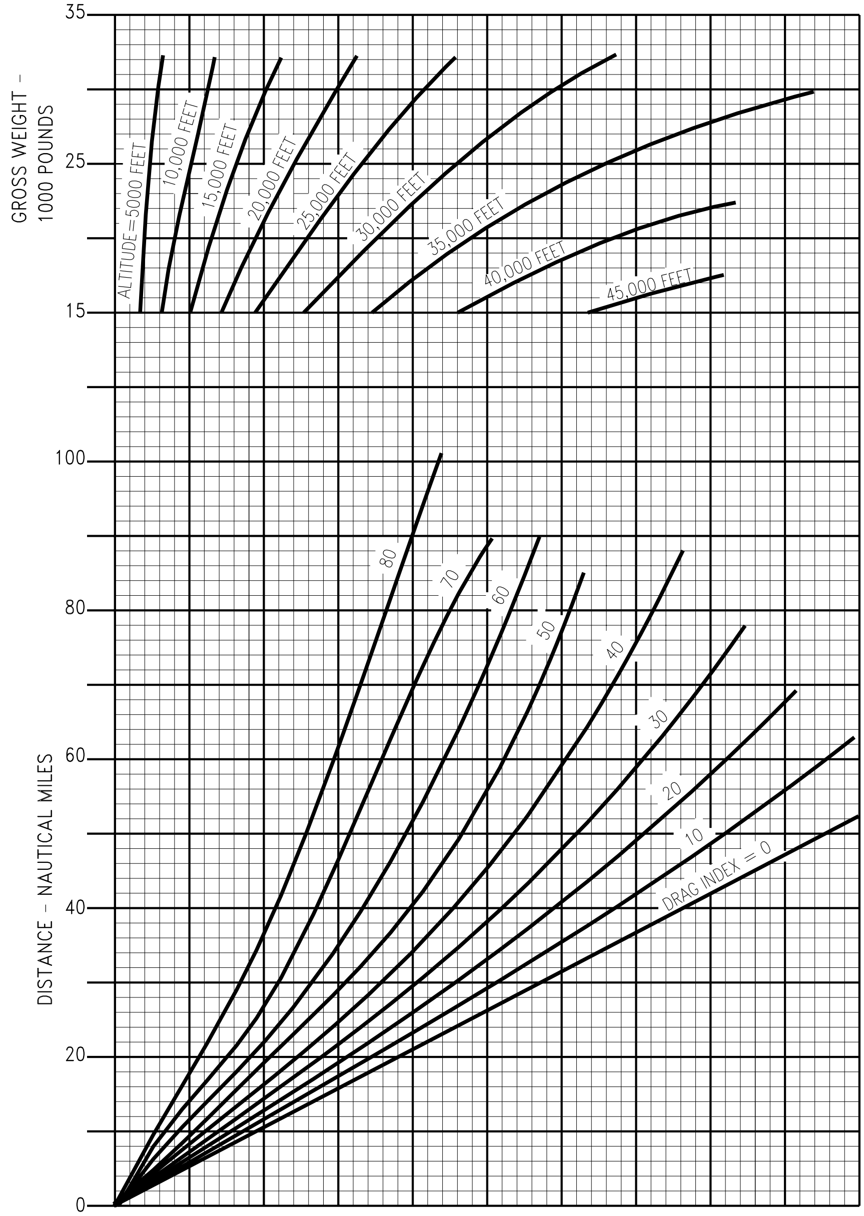
NOTE

DATA BASED ON A CONSTANT 450 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED




FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



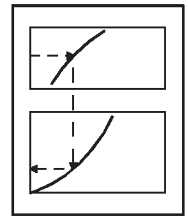

AV8BB-NFM-40-(47-3)04-CATI/ACS

**Figure 4-6. Maximum Thrust Climb at 450 KTAS, F402-RR-408 Series Engine (Sheet 3 of 3)**

# TIME TO CLIMB, TAV-8B

## MAXIMUM THRUST AT 300 KCAS

GUIDE



AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

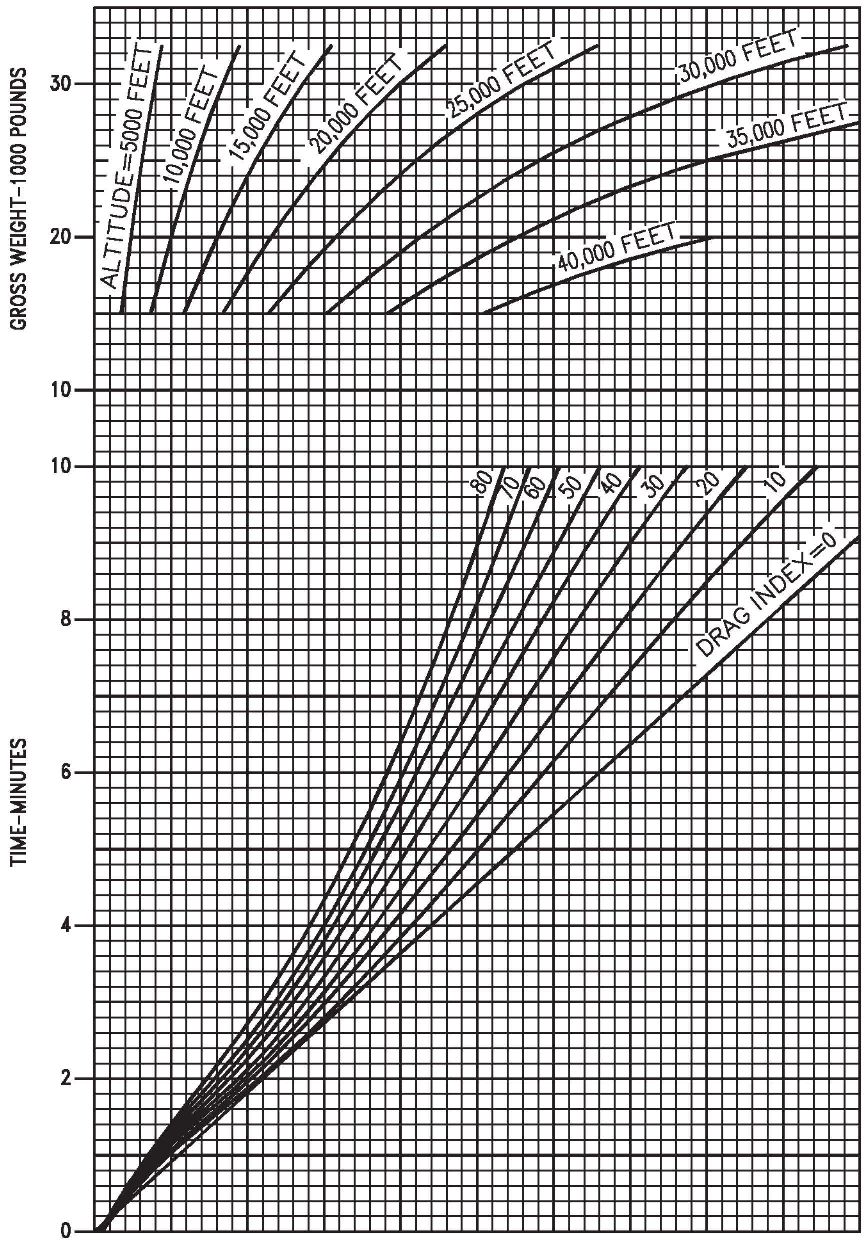
REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

NOTES
DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(48-1)01-CATI

**Figure 4-7. Maximum Thrust Climb at 300 KCAS, F402-RR-406A Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, TAV-8B

## MAXIMUM THRUST AT 300 KCAS

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

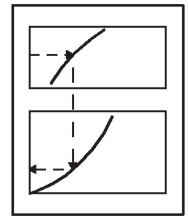
DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

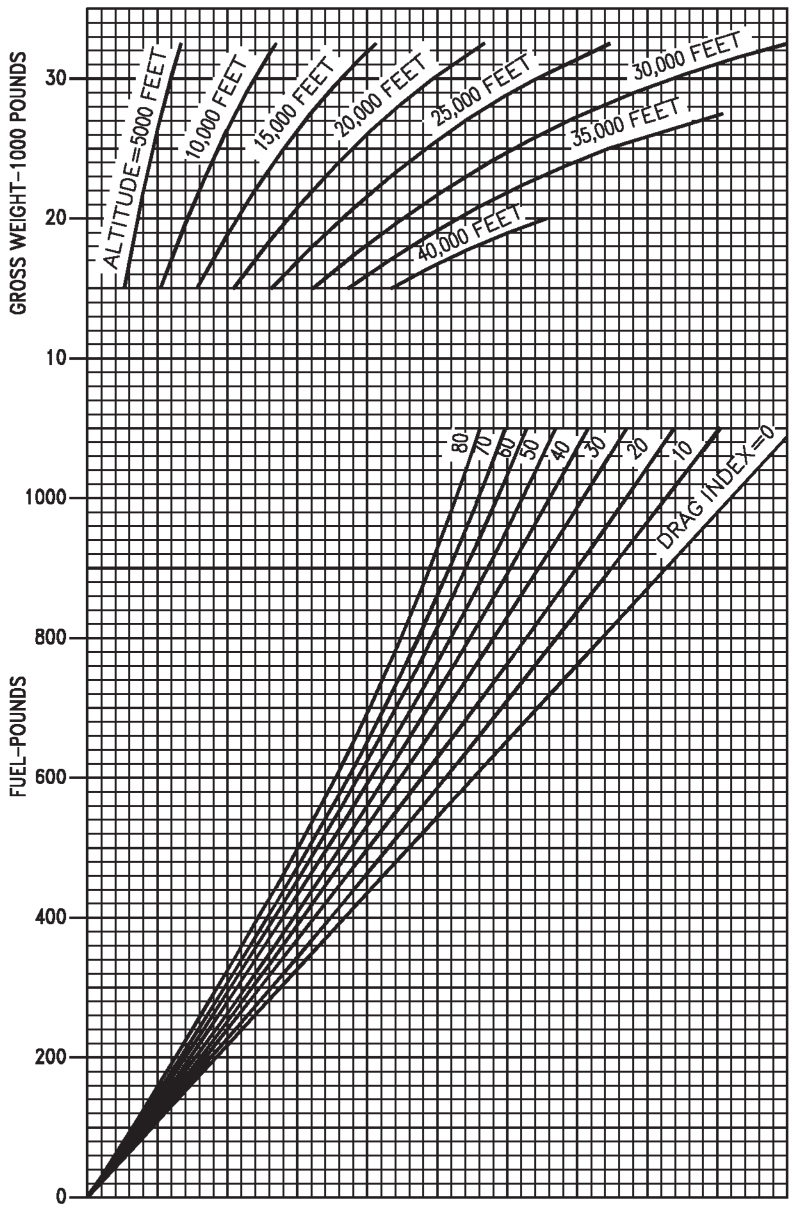
**NOTES**
DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(48-2)01-CATI

**Figure 4-7. Maximum Thrust Climb at 300 KCAS, F402-RR-406A Engine (Sheet 2 of 3)**

# DISTANCE REQUIRED TO CLIMB, TAV-8B

MAXIMUM THRUST AT 300 KCAS

GUIDE

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

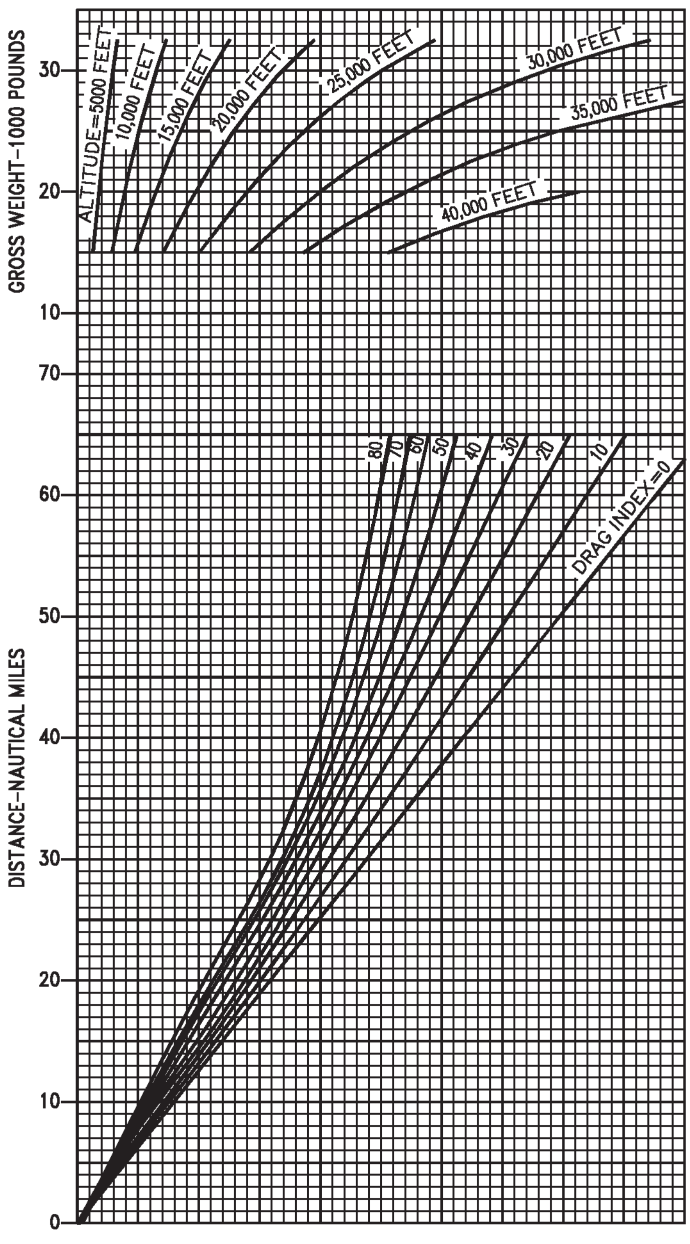
REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

NOTES
DATA BASED ON 300 KCAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 10 AUGUST 1987
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(48-3)01-CATI

Figure 4-7. Maximum Thrust Climb at 300 KCAS, F402-RR-406A Engine (Sheet 3 of 3)

# TIME TO CLIMB, TAV-8B

## MAXIMUM THRUST AT CONSTANT 400 KTAS

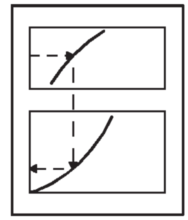
**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

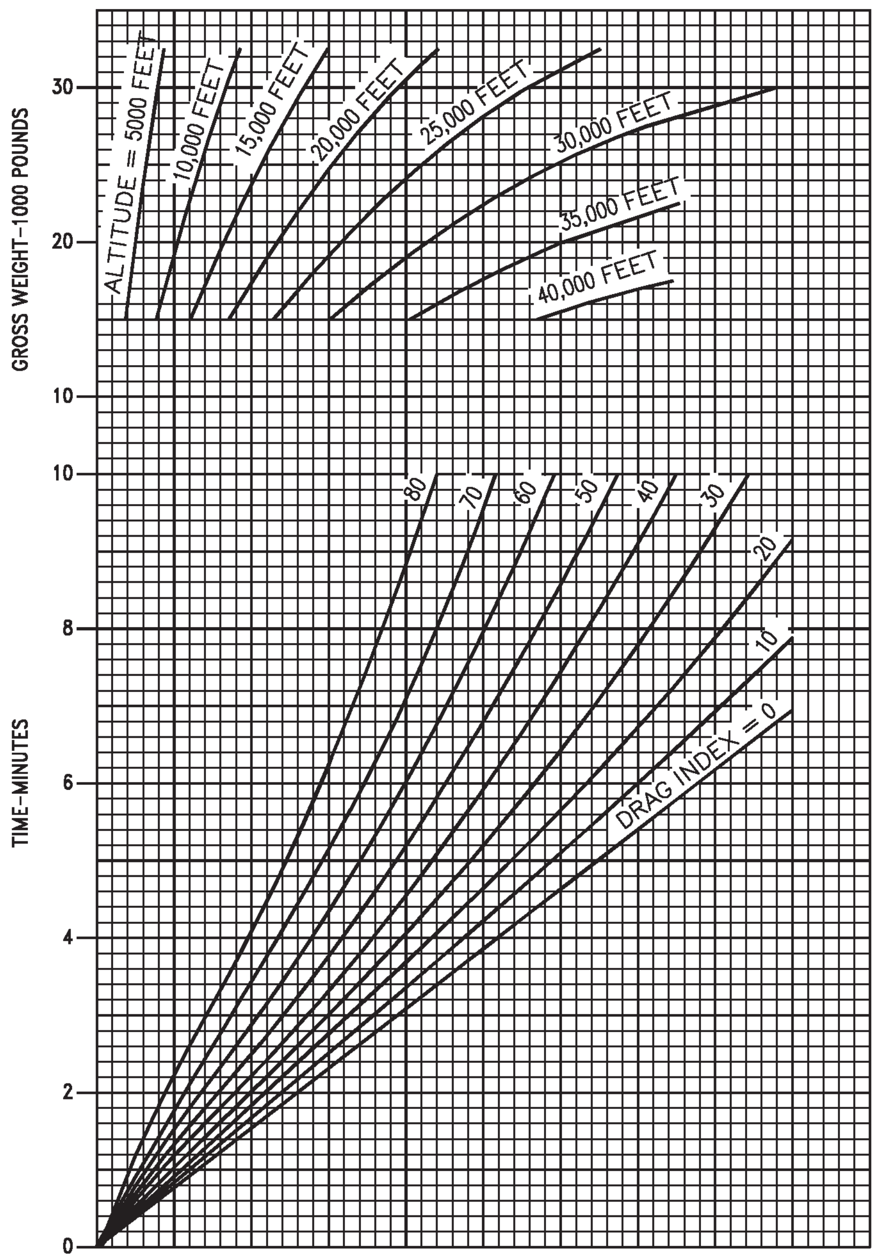
**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



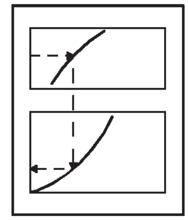




AV8BB-NFM-40-(49-1)01-CATI

**Figure 4-8. Maximum Thrust Climb at 400 KTAS, F402-RR-406A Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, TAV-8B

## MAXIMUM THRUST AT CONSTANT 400 KTAS



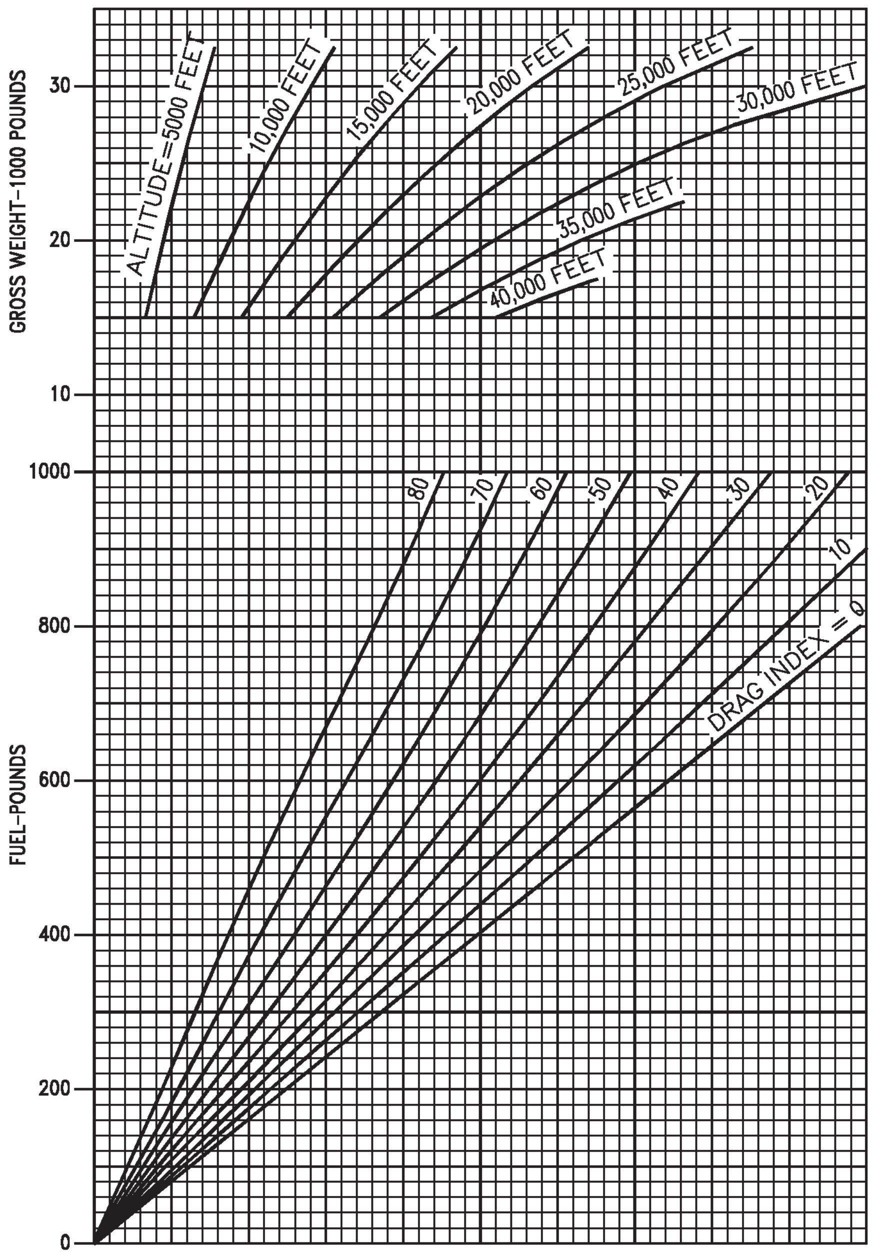

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



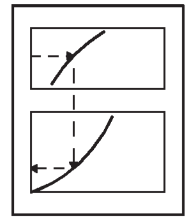

AV8BB–NFM–40–(49–2)01–CATI

**Figure 4-8. Maximum Thrust Climb at 400 KTAS, F402-RR-406A Engine (Sheet 2 of 3)**

# DISTANCE REQUIRED TO CLIMB, TAV-8B

## MAXIMUM THRUST AT CONSTANT 400 KTAS

GUIDE



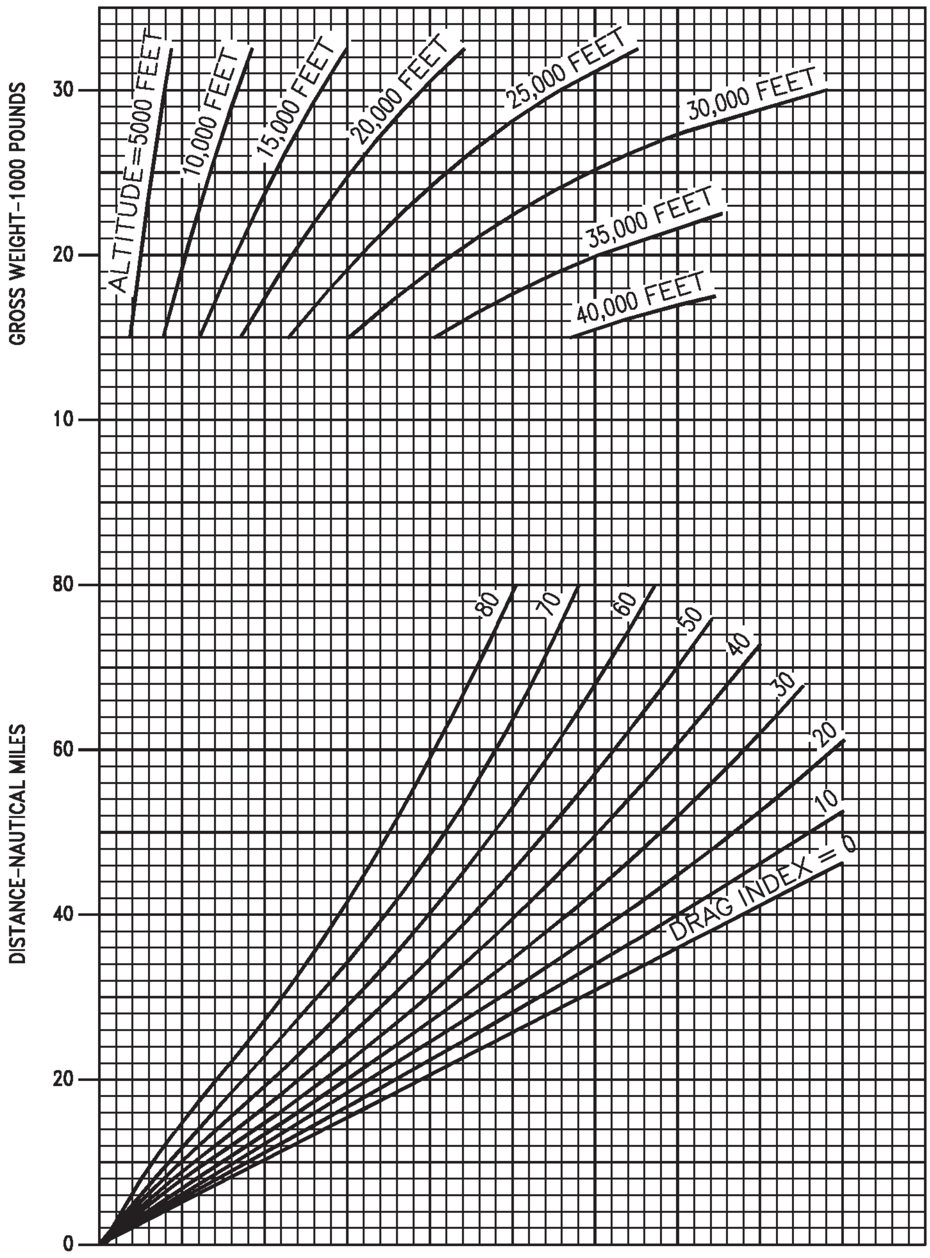
**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A CONSTANT
400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(49-3)01-CATI

**Figure 4-8. Maximum Thrust Climb at 400 KTAS, F402-RR-406A Engine (Sheet 3 of 3)**

# TIME TO CLIMB, TAV-8B

## MAXIMUM THRUST AT CONSTANT 450 KTAS

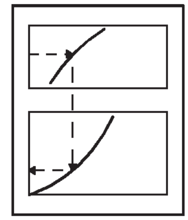
**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

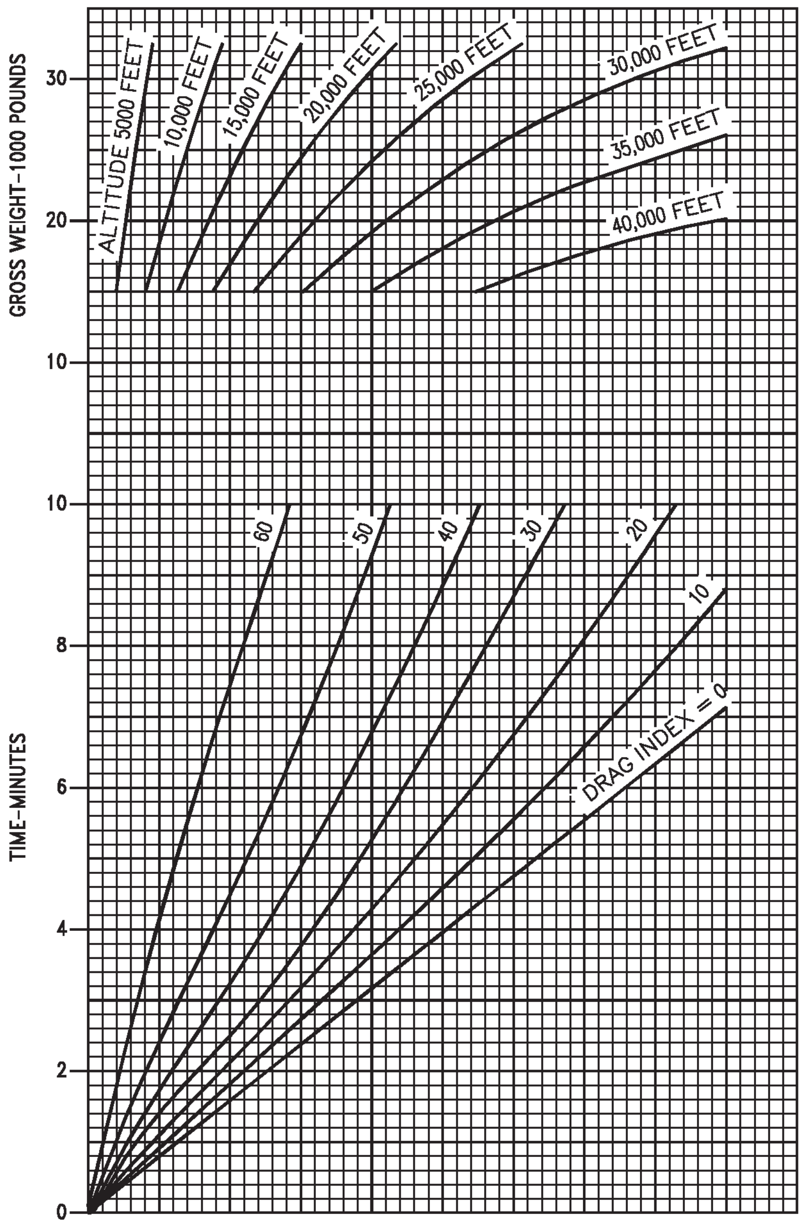
**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A CONSTANT
450 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



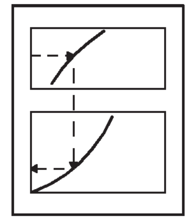




AV8BB-NFM-40-(50-1)01-CATI

**Figure 4-9. Maximum Thrust Climb at 450 KTAS, F402-RR-406A Engine (Sheet 1 of 3)**

# FUEL REQUIRED TO CLIMB, TAV-8B

## MAXIMUM THRUST AT CONSTANT 450 KTAS




**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A CONSTANT
450 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

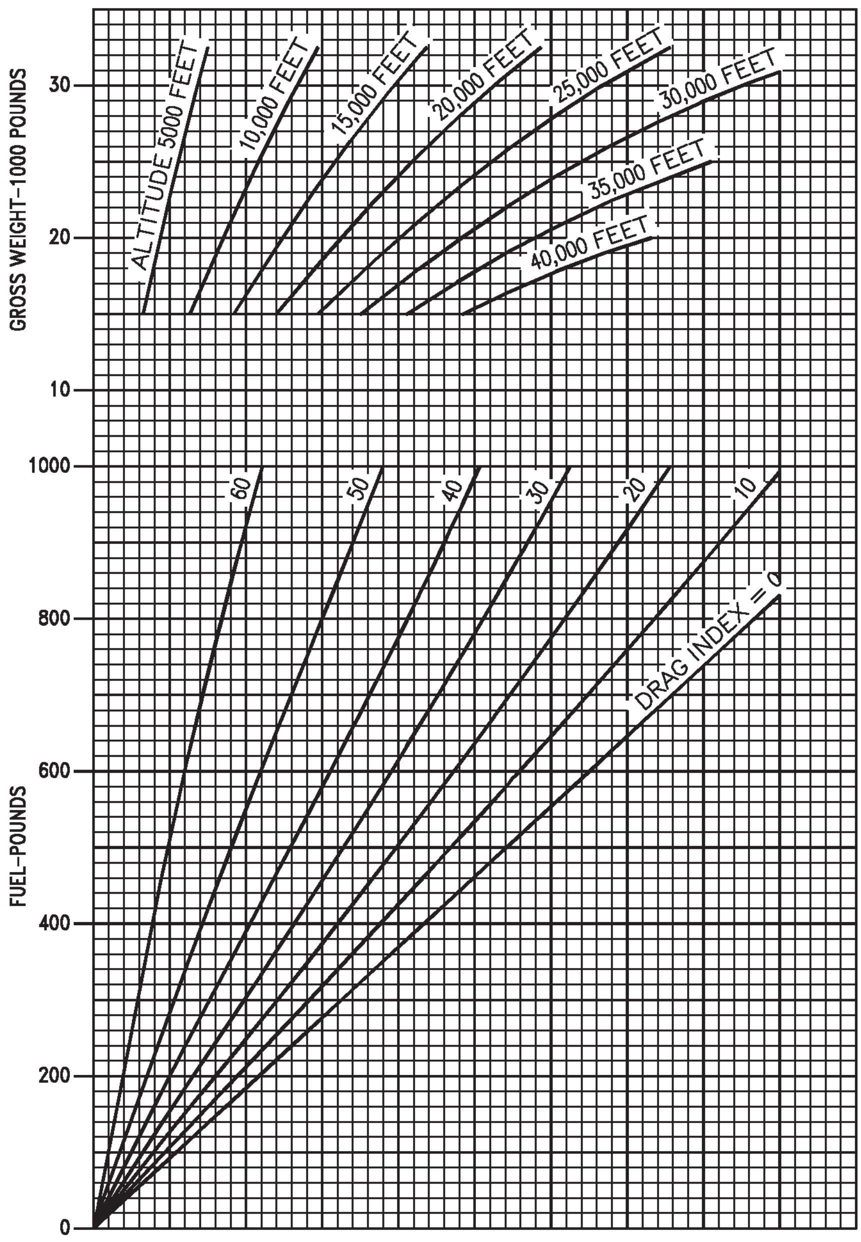



Figure 4-9. Maximum Thrust Climb at 450 KTAS, F402-RR-406A Engine (Sheet 2 of 3)

# DISTANCE REQUIRED TO CLIMB, TAV-8B

MAXIMUM THRUST AT CONSTANT 450 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

NOTES
DATA BASED ON A CONSTANT
450 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

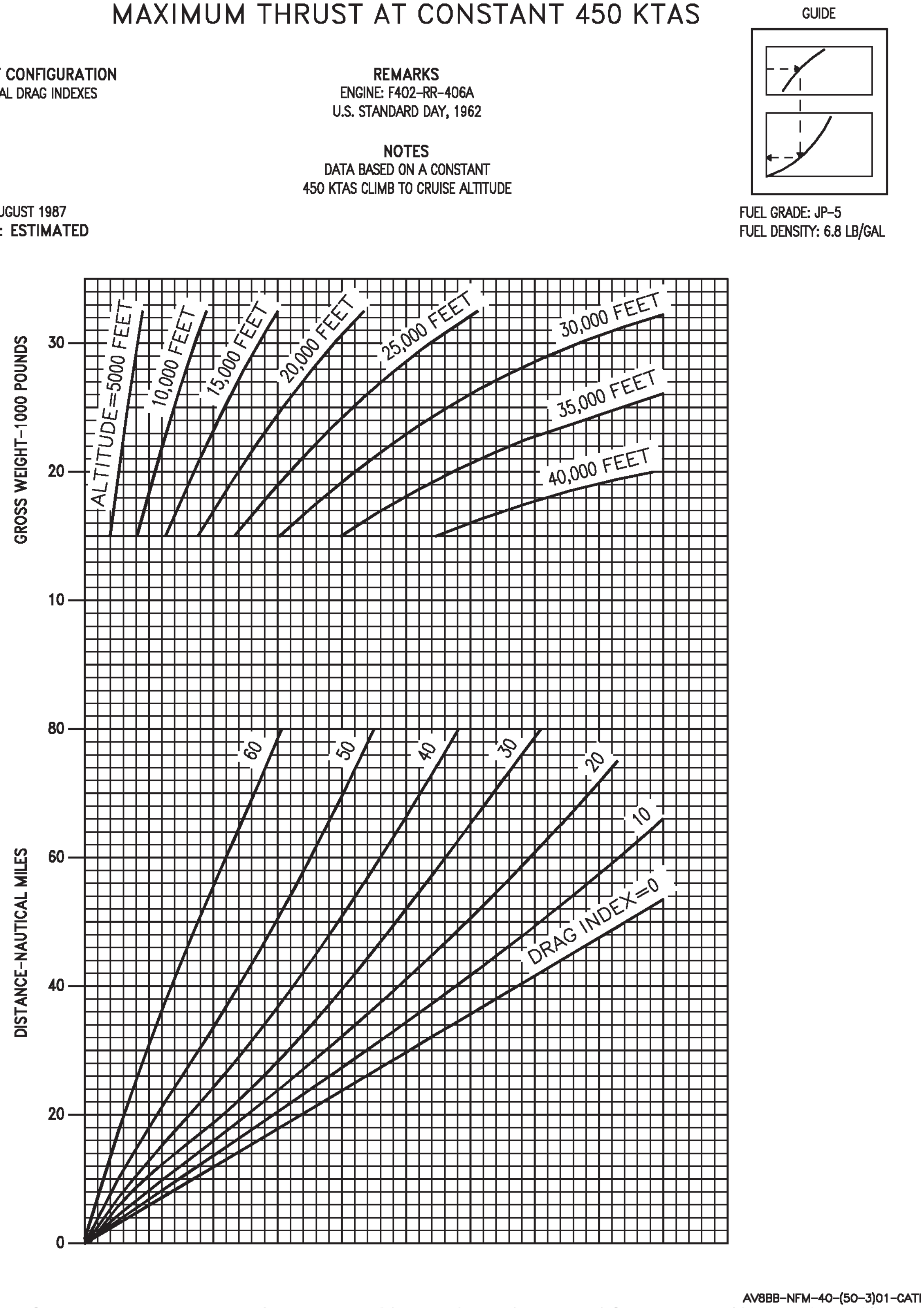



Figure 4-9. Maximum Thrust Climb at 450 KTAS, F402-RR-406A Engine (Sheet 3 of 3)

# TIME TO CLIMB, TAV-8B

## MAXIMUM THRUST AT 300 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON 300 KTAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

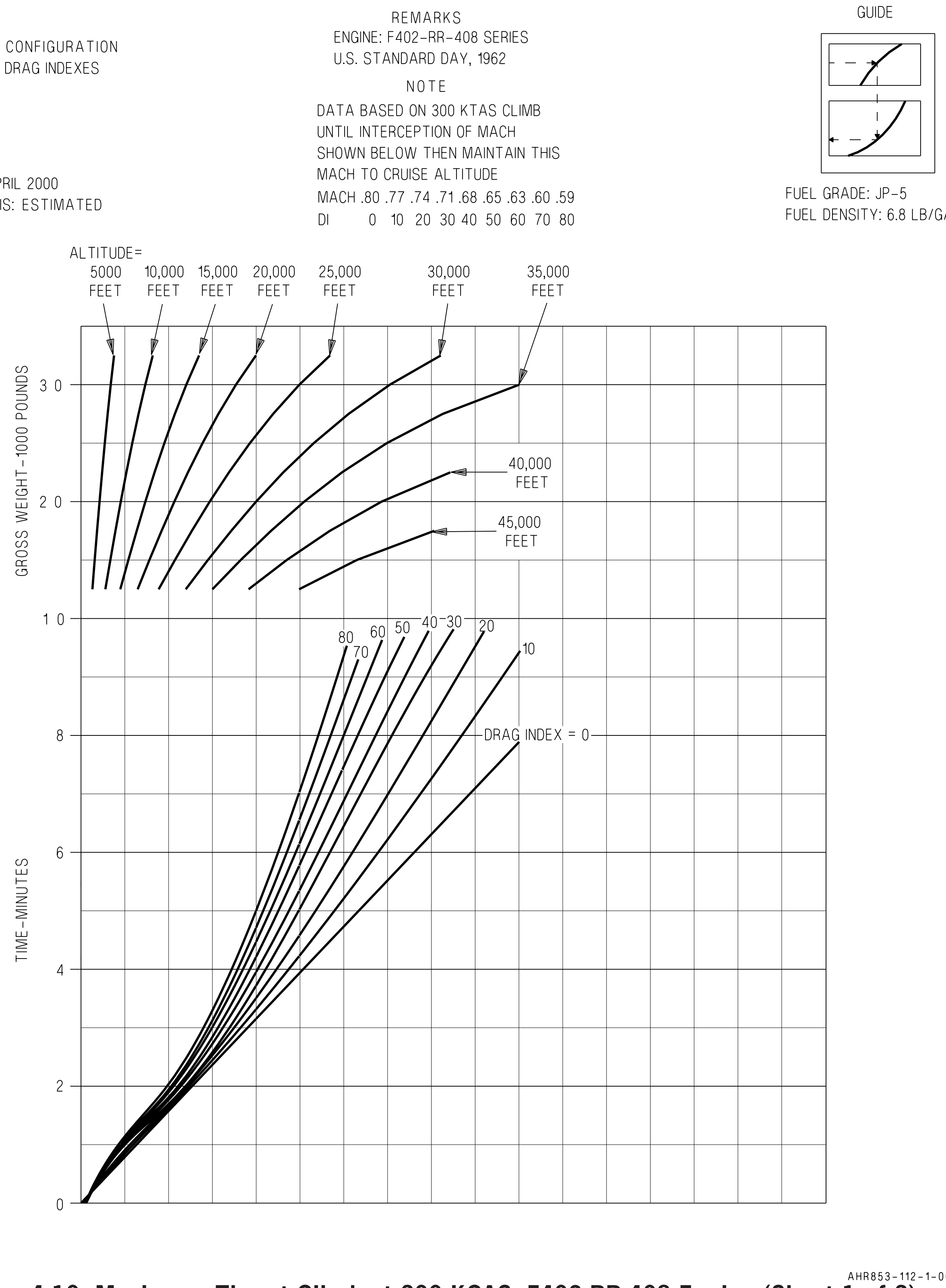



**Figure 4-10. Maximum Thrust Climb at 300 KCAS, F402-RR-408 Engine (Sheet 1 of 3)**

# FUEL TO CLIMB, TAV-8B

## MAXIMUM THRUST AT 300 KTAS

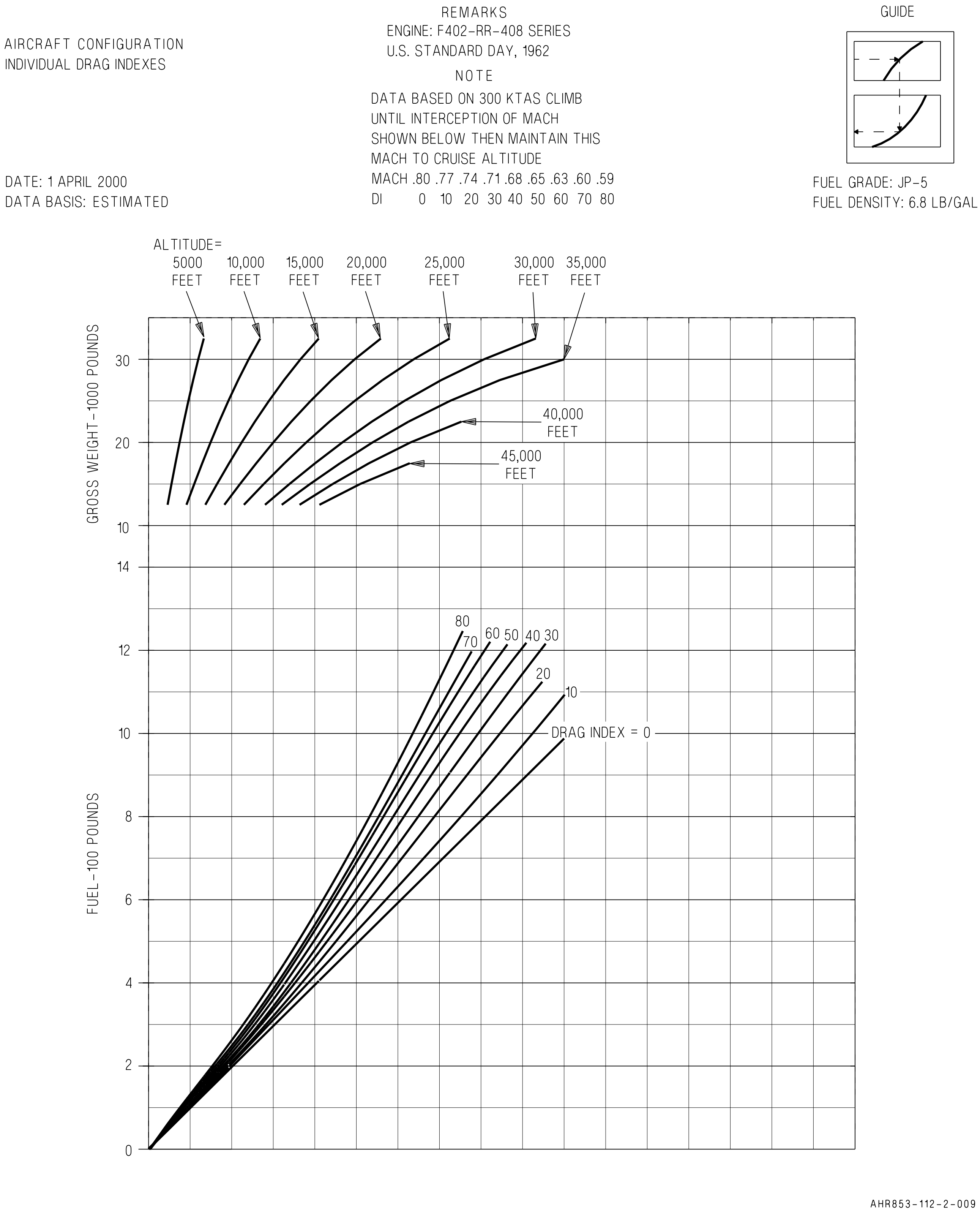



Figure 4-10. Maximum Thrust Climb at 300 KCAS, F402-RR-408 Engine (Sheet 2 of 3)

# DISTANCE TO CLIMB, TAV-8B

## MAXIMUM THRUST AT 300 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

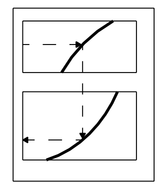
REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

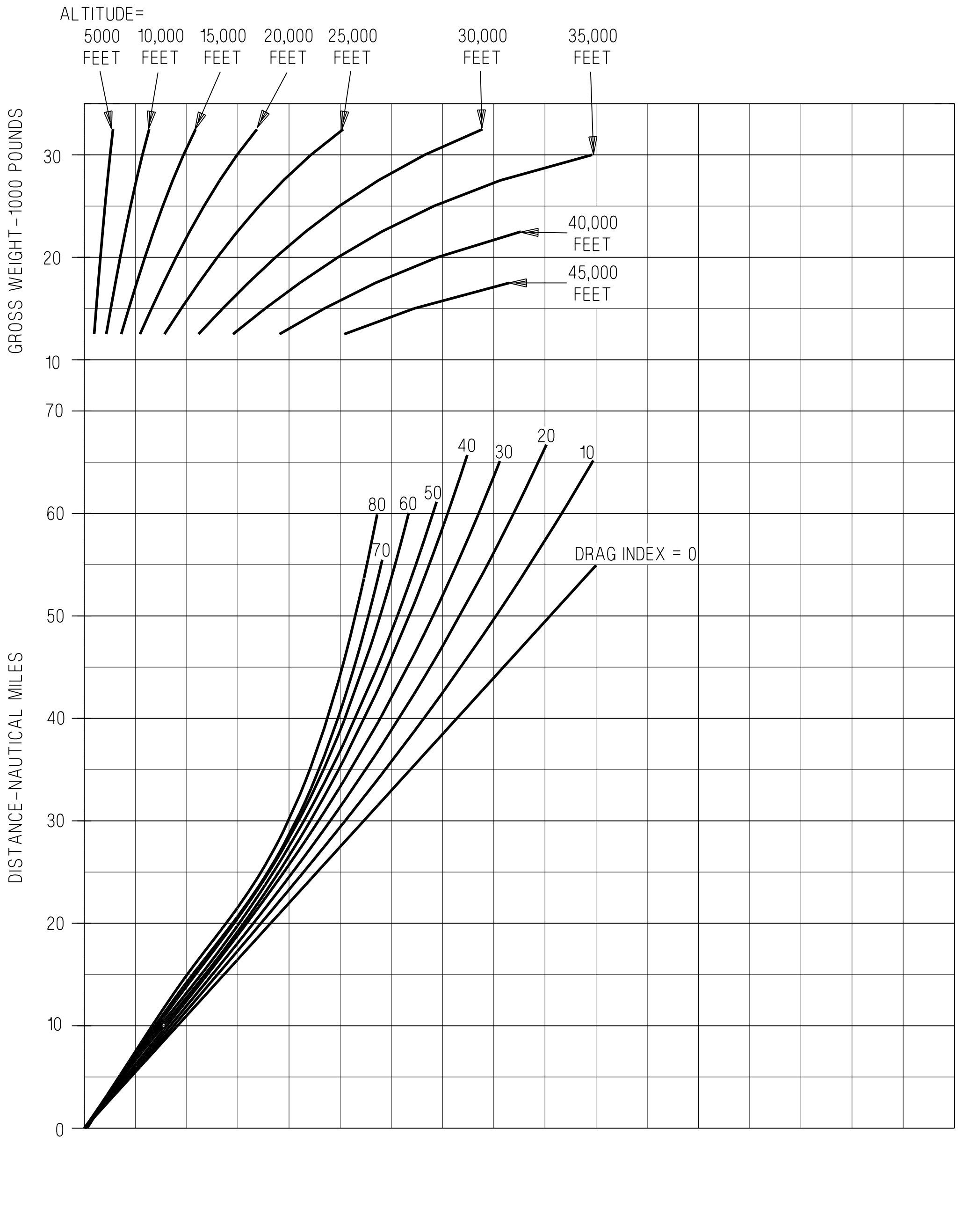
NOTE
DATA BASED ON 300 KTAS CLIMB UNTIL INTERCEPTION OF MACH SHOWN BELOW THEN MAINTAIN THIS MACH TO CRUISE ALTITUDE

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AHR853-112-3-009

Figure 4-10. Maximum Thrust Climb at 300 KCAS, F402-RR-408 Engine (Sheet 3 of 3)

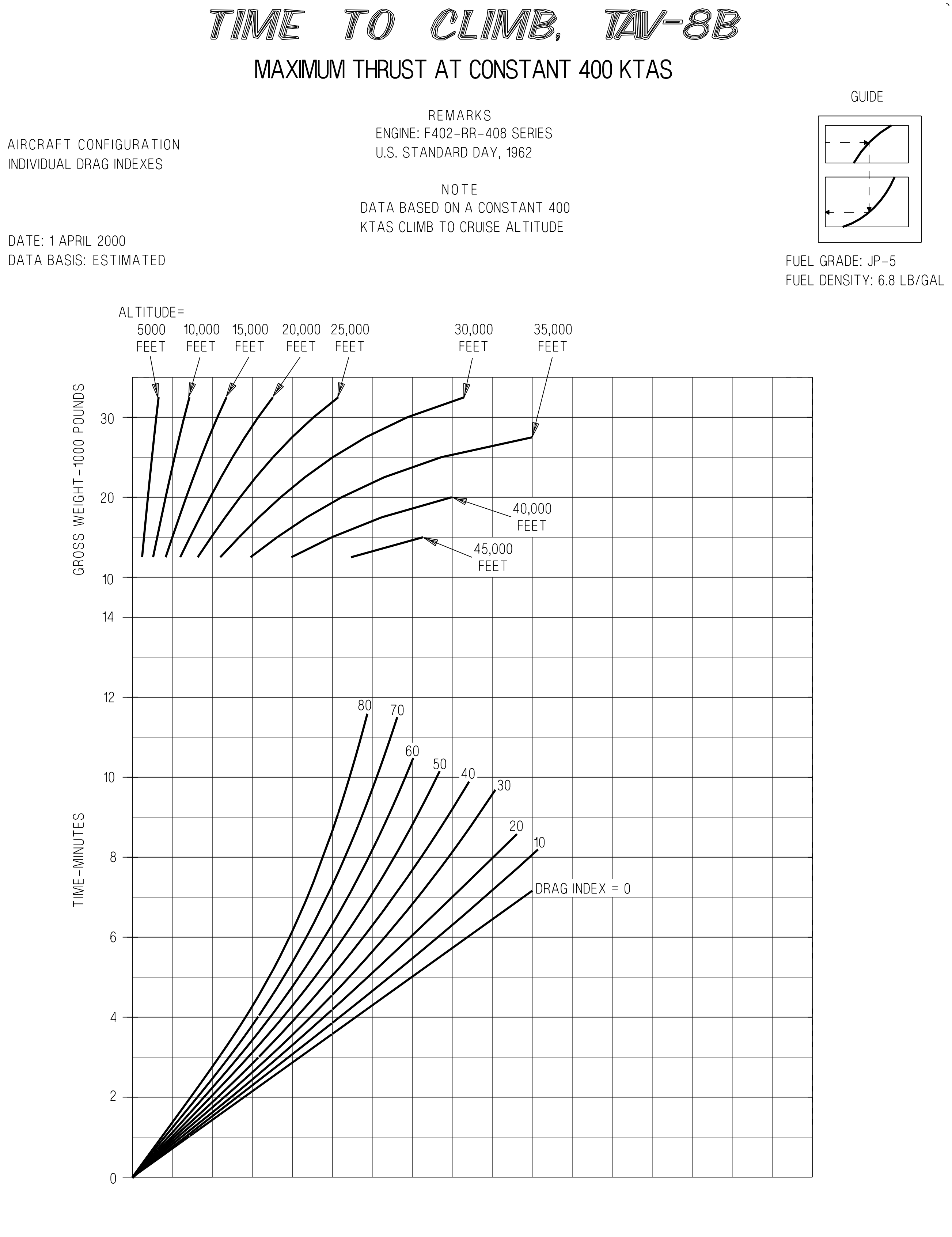



Figure 4-11. Maximum Thrust Climb at 400 KTAS, F402-RR-408 Engine (Sheet 1 of 3)

# FUEL TO CLIMB, TAV-8B

## MAXIMUM THRUST AT CONSTANT 400 KTAS

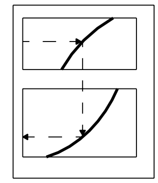
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

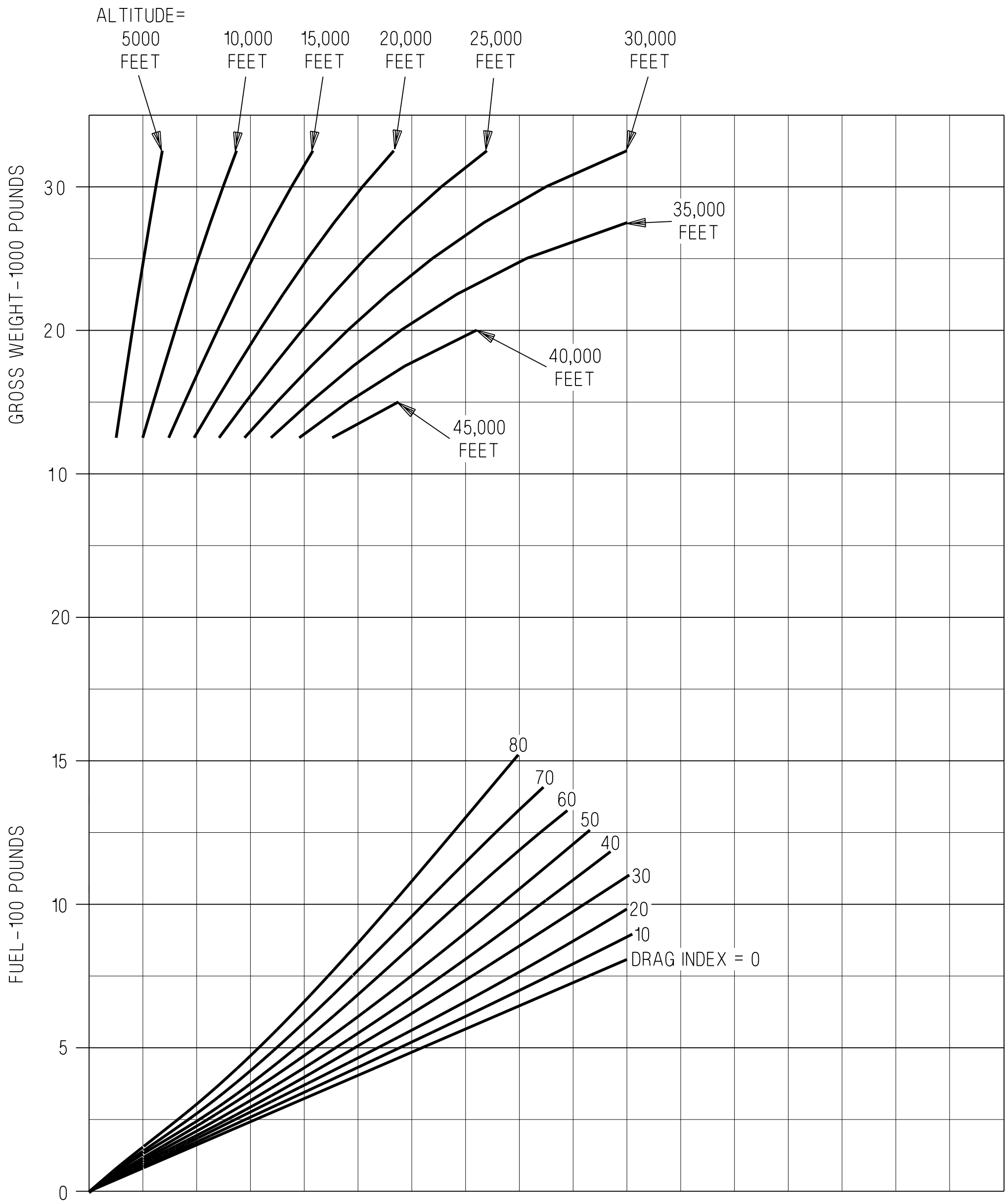
NOTE
DATA BASED ON A CONSTANT 400 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AHR853-113-2-009

Figure 4-11. Maximum Thrust Climb at 400 KTAS, F402-RR-408 Engine (Sheet 2 of 3)

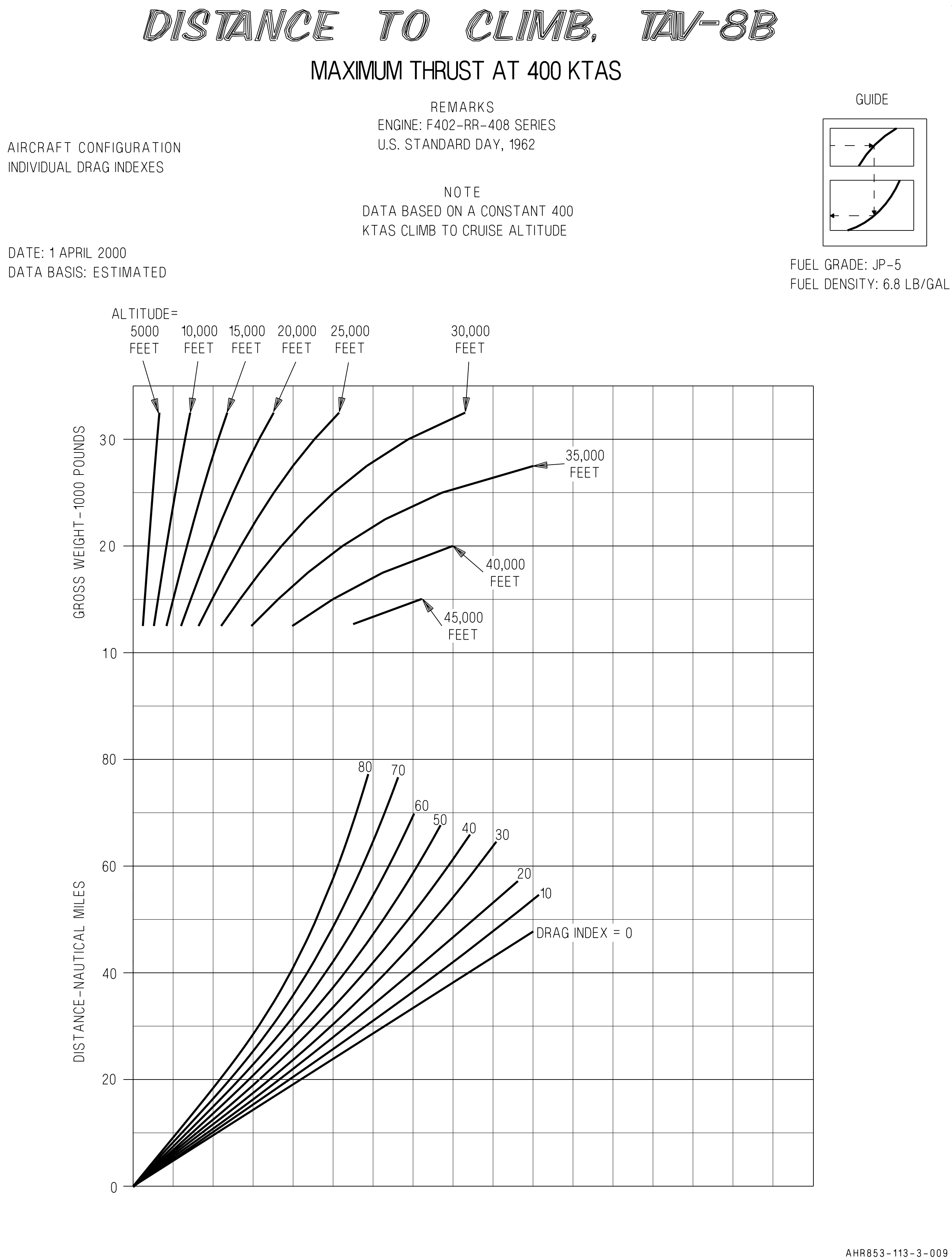



**Figure 4-11. Maximum Thrust Climb at 400 KTAS, F402-RR-408 Engine (Sheet 3 of 3)**

# TIME TO CLIMB, TAV-8B

## MAXIMUM THRUST AT CONSTANT 450 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON A CONSTANT
450 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

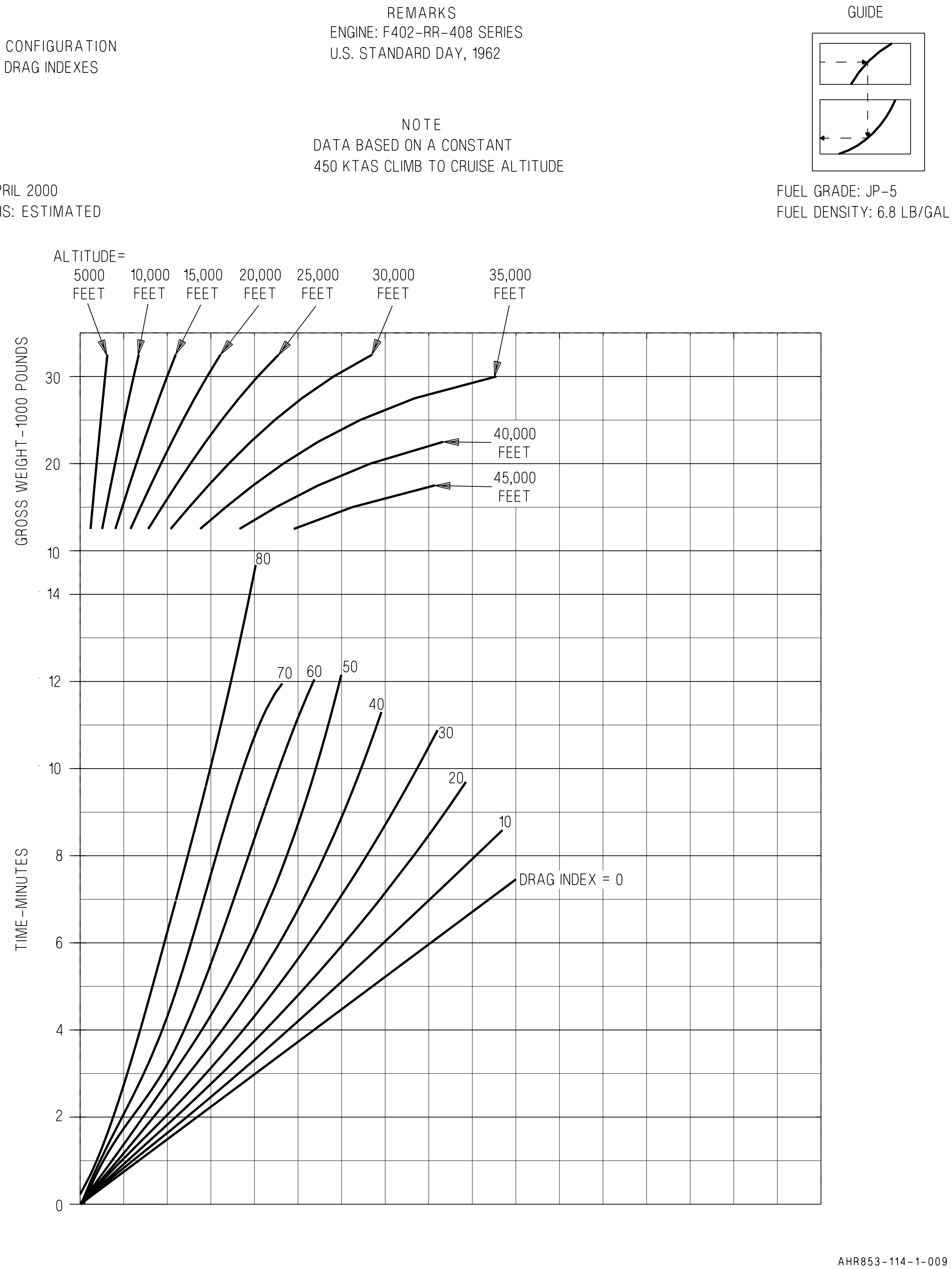



Figure 4-12. Maximum Thrust Climb at 450 KTAS, F402-RR-408 Engine (Sheet 1 of 3)

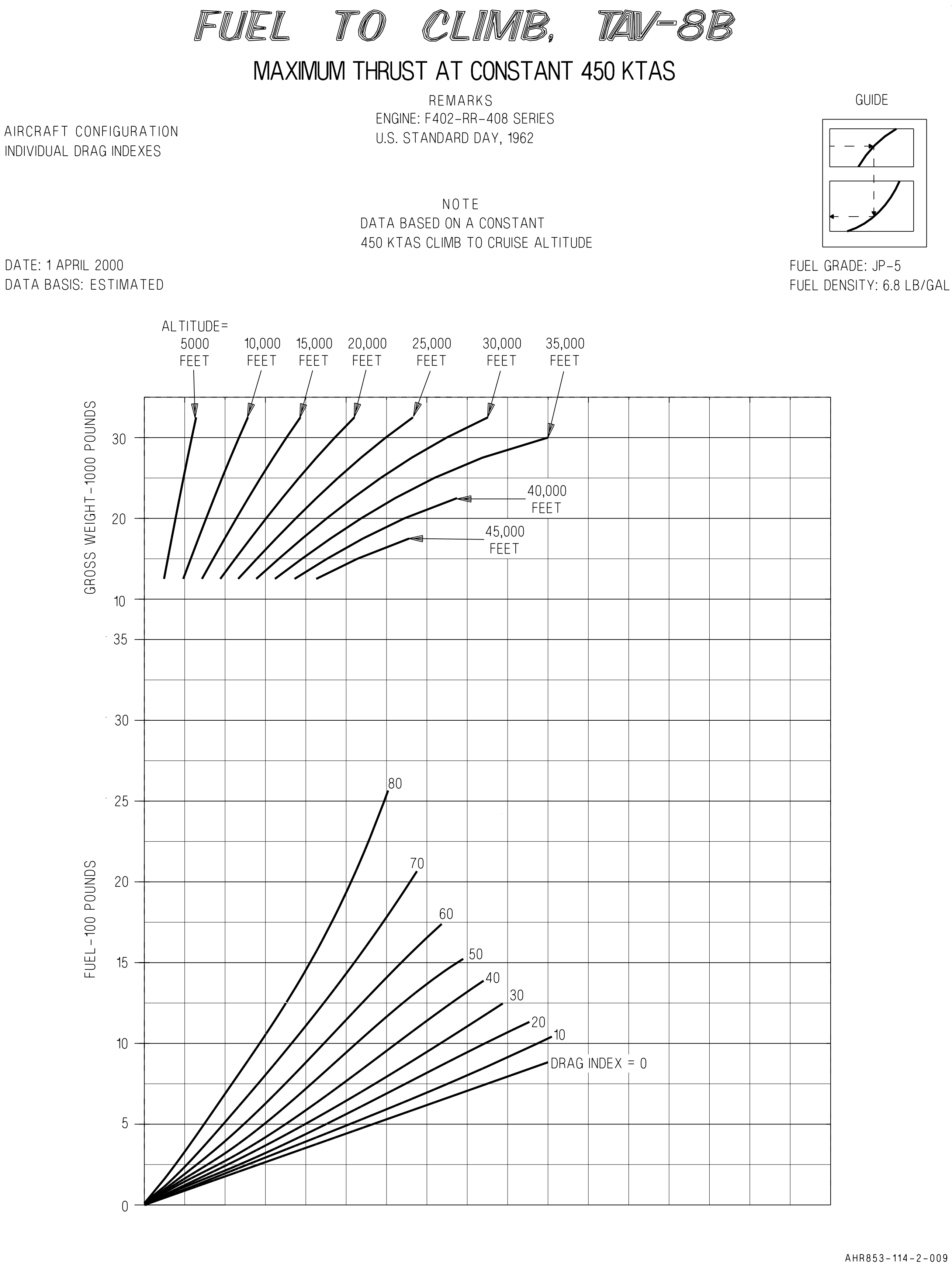



**Figure 4-12. Maximum Thrust Climb at 450 KTAS, F402-RR-408 Engine (Sheet 2 of 3)**

# DISTANCE TO CLIMB, TAV-8B

## MAXIMUM THRUST AT CONSTANT 450 KTAS

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON A CONSTANT
450 KTAS CLIMB TO CRUISE ALTITUDE

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

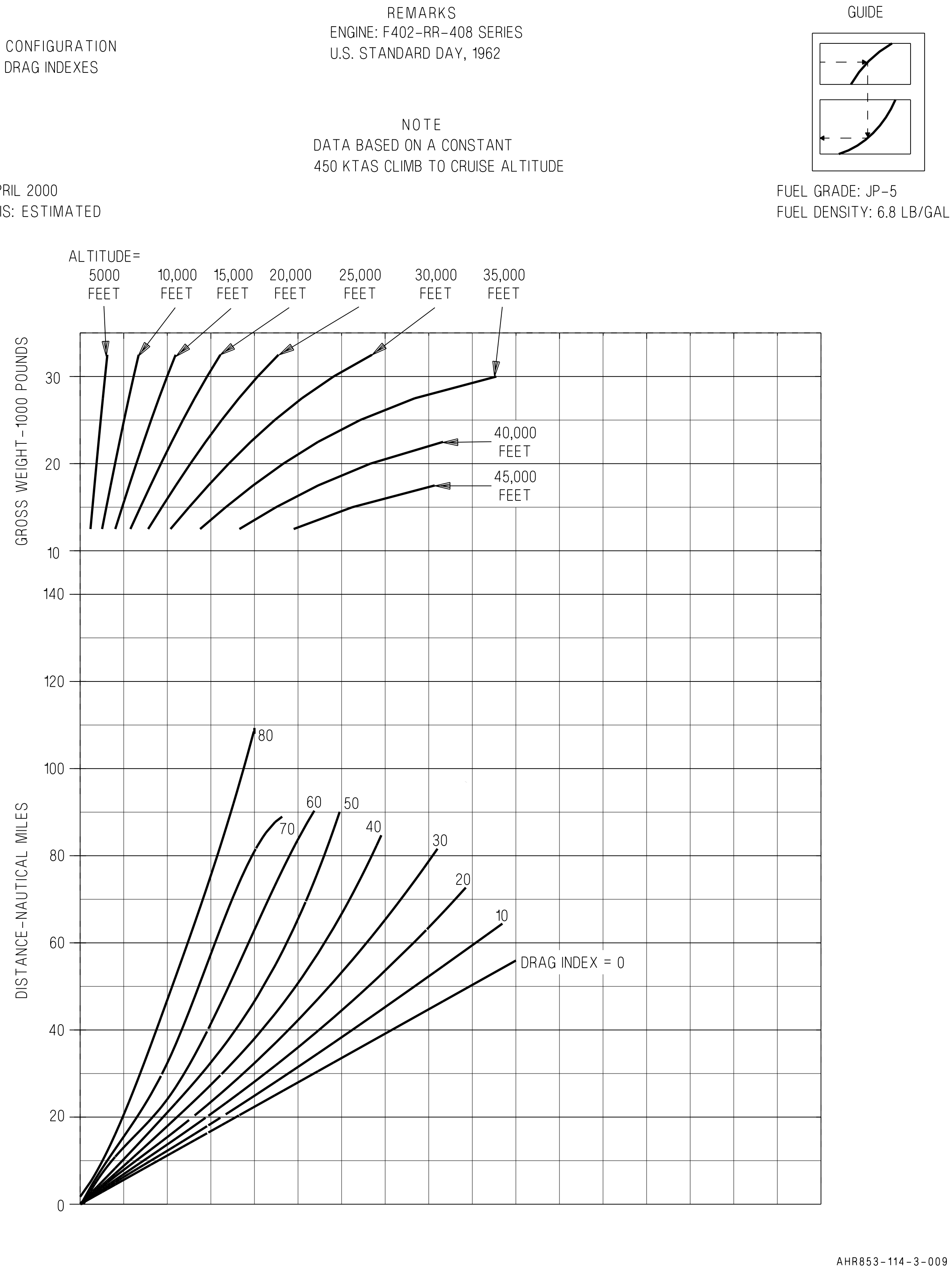



Figure 4-12. Maximum Thrust Climb at 450 KTAS, F402-RR-408 Engine (Sheet 3 of 3)

# CHAPTER 5

# Range

NOTE

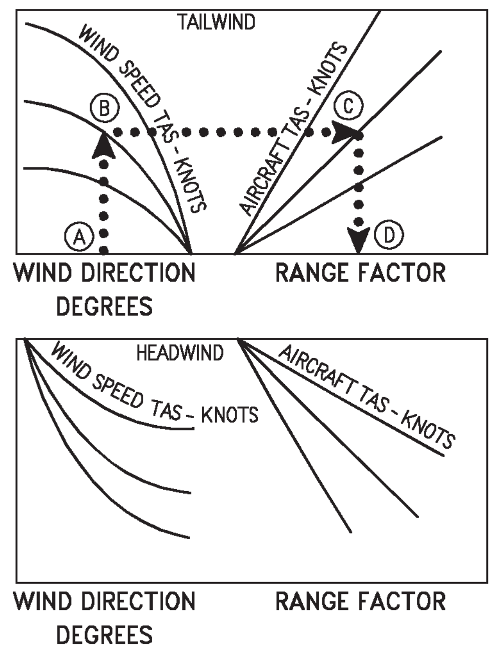
All cruise charts are based on a flaps up, gear up, nozzles aft configurations.

## 5.1 RANGEWIND CORRECTION CHART

This chart (Figure 5-1) provides a means of correcting computed range (specific or total) for existing wind effects. The presented range factors consider wind speeds up to 150 knots from any relative wind direction for aircraft speeds of 200 to 800 knots (TAS).

**5.1.1 Use.** Determine the relative wind direction by subtracting the aircraft heading from the forecast wind direction. If the aircraft heading is greater than forecast wind direction, add 360° to the wind direction and then perform the subtraction. Enter the chart with relative wind direction and proceed vertically to the interpolated wind speed. From this point, project horizontally to intersect the aircraft true airspeed and reflect to the lower scale to read the range factor. Multiply computed range by this range factor to find range as affected by wind.

SAMPLE RANGEWIND CORRECTION




AV8BB-NFM-40-(60-1)01 27-CATI

### 5.1.2 Sample Problem

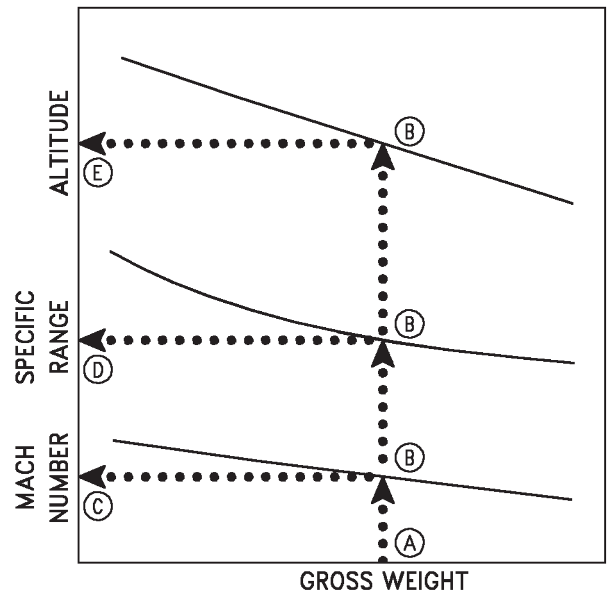
| | |
|---|---|
| A. Relative wind direction | 150° |
| B. Wind speed | 125 Kt |
| C. Aircraft speed (TAS) | 400 Kt |
| D. Range factor | 1.25 |

## 5.2 OPTIMUM CRUISE FLIGHT CONDITIONS

These charts (Figures 5-2, 5-7, 5-12, and 5-16) present optimum cruise Mach numbers, specific range (nautical miles per pound of fuel), and optimum altitude at various combinations of gross weight and drag index.

**5.2.1 Use.** Enter the chart with the estimated gross weight at end of climb. Project vertically up to intersect applicable drag index. From this point project horizontally left to read optimum cruise Mach number, specific range and altitude.

### SAMPLE OPTIMUM CRUISE FLIGHT CONDITIONS




AV8BB-NFM-40-(61-1)01-CATI

**5.2.2 Sample Problem** (Use Figure 5-2)

| | |
|---|---|
| A. Gross weight | 20,000 Lb |
| B. Drag index | 8.0 |
| C. Optimum cruise Mach no. | 0.78 |
| D. Specific range | 0.1773 NMPP |
| E. Optimum altitude | 39,040 Ft |

## 5.3 LOW ALTITUDE CRUISE TABLES

These tables (Figure 5-3 or 5-8) present total fuel flow values for various combinations of cruise airspeed and drag index at altitudes of Sea Level, 4000, 8000 and 12,000 feet. Also included for each altitude are the total fuel flow values for maximum continuous, maximum, and combat power. Separate tables are provided for several gross weights. Fuel flow values are tabulated for ICAO Standard Day; however, correction factors are given for non-standard temperatures.

**5.3.1 Use.** After selecting the applicable table for gross weight and altitude, enter the table with the desired indicated airspeed and project horizontally to the applicable drag index column and read total fuel flow for a standard day. To obtain the total fuel flow at the desired indicated airspeed, multiply the total fuel flow for a standard day by the nonstandard day temperature correction factor.

### 5.3.2 Sample Problem (Use Figure 5-3)

Gross weight 14,000 Lb, Sea Level (15 °C)

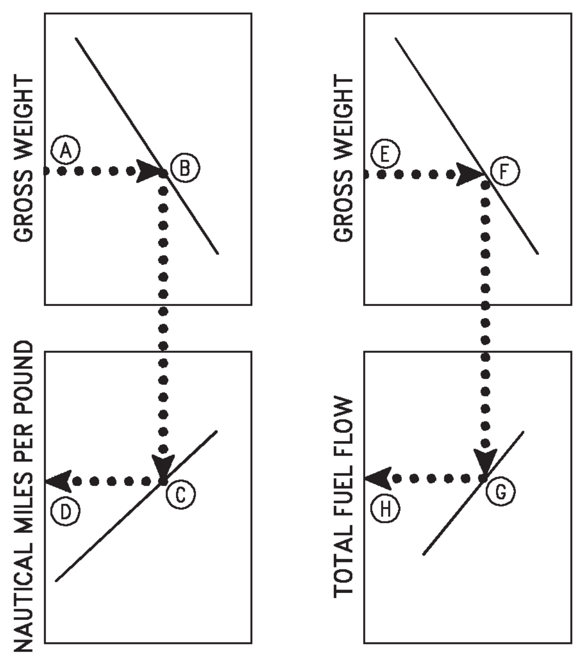
| | |
|---|---|
| A. Desired airspeed | 510 KIAS |
| B. Drag Index | 20 |
| C. Nonstandard day temperature | –20 °C |
| D. Correction factor | 0.9373 |
| E. Standard day total fuel flow | 188 LB/MIN |
| F. Total fuel flow at desired airspeed (E x D) | 176 LB/MIN true |

## 5.4 CONSTANT MACH/ALTITUDE CRUISE

These charts (Figures 5-4, 5-9, 5-13, and 5-17) present specific range (nautical miles per pound) and fuel flow (pounds per minute) for various combinations of Mach number, gross weight, altitude, and drag index. This data is based on cruise at a constant Mach number and a constant altitude.

**5.4.1 Use.** After selecting the desired cruise Mach, enter the top left chart with the estimated gross weight at end of climb. Project horizontally right to intersect the desired cruise altitude, then vertically down to intersect the applicable drag index. From this point, project horizontally left and read nautical miles per pound. Repeat these steps with the right hand charts to derive fuel flow in pounds per minute. These values are computed for standard day temperatures.

**SAMPLE CONSTANT MACH/ALTITUDE CRUISE**




AV8BB-NFM-40-(62-1)01 27-CATI

### 5.4.2 Sample Problem (Use Figure 5-4)

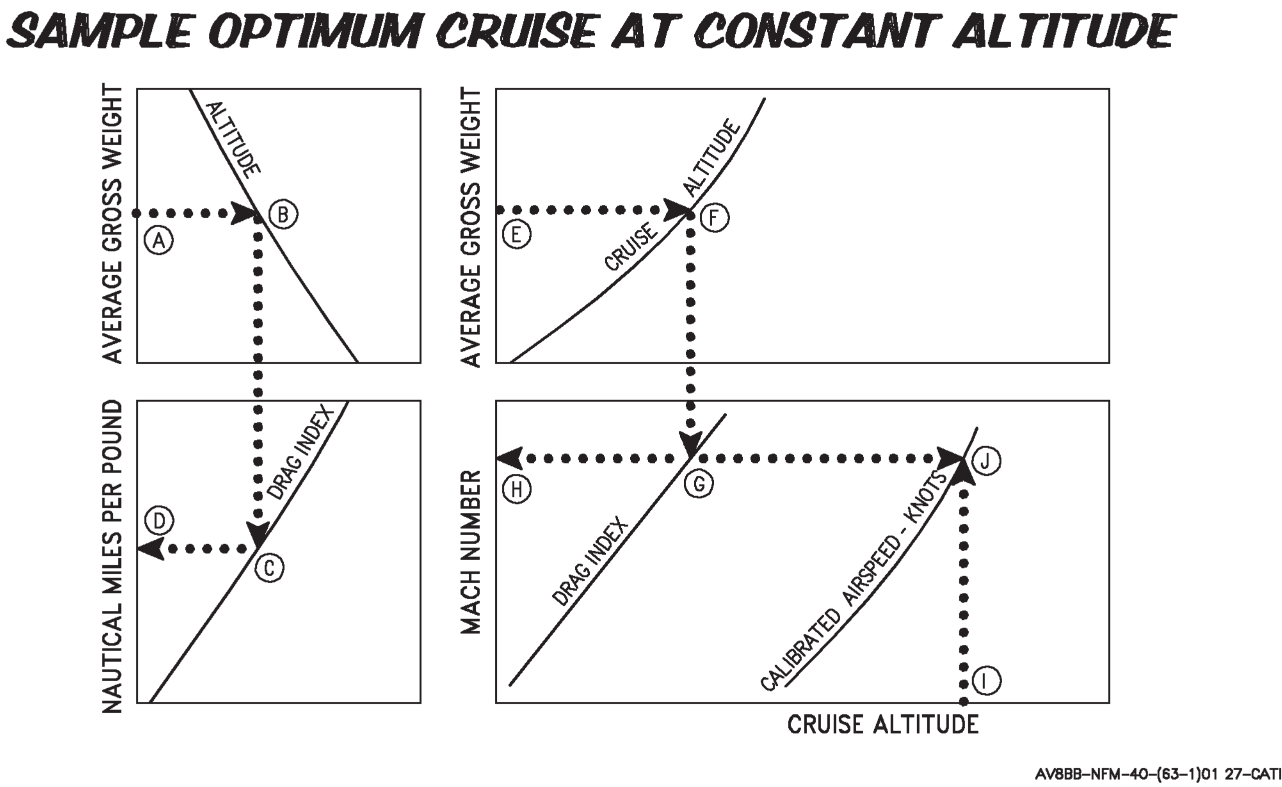
Cruise Mach number 0.65

| | |
|---|---|
| A. Gross weight | 20,000 Lb |
| B. Altitude | 25,000 Ft |
| C. Drag index | 8.0 |
| D. Specific range | 0.142 NMPP |
| E. Gross weight | 20,000 Lb |
| F. Altitude | 25,000 Ft |
| G. Drag index | 8.0 |
| H. Fuel flow | 46 PPM |

## 5.5 OPTIMUM CRUISE AT CONSTANT ALTITUDE

These charts (Figures 5-5, 5-10, 5-14, and 5-18) present the necessary planning data to set up optimum cruise schedules at a constant altitude. The recommended procedure is to use an average gross weight for a given leg of the mission. One way to find the average gross weight is to divide the mission into weight segments. With this method, readjust the cruise schedule each time a given amount of fuel is used. Subtract one-half of the fuel weight allotted for the first leg from the initial cruise gross weight. The remainder is the average gross weight for the leg. It is possible to obtain instantaneous data if desired.

**5.5.1 Use.** Enter the left side of sheet 1 with the average gross weight. Project horizontally right to intersect desired cruise altitude, then vertically down to the computed drag index, then horizontally left to obtain specific range (nautical miles per pound). Enter sheet 2 with the average gross weight. Project horizontally right to intersect the desired cruise altitude, then vertically down to the computed drag index. From this intersection project horizontally left and right. At the left projection obtain the Mach number. Enter the bottom of the lower chart with the cruise altitude and project vertically up to intersect the right extension of the drag index projection. This intersection provides the calibrated airspeed for optimum cruise.




### 5.5.2 Sample Problem (Use Figure 5-5)

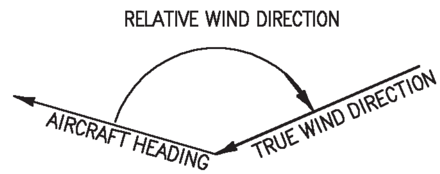
| | |
|---|---|
| A. Average gross weight for first leg | 20,000 Lb |
| B. Cruise altitude | 20,000 Ft |
| C. Drag index | 8.0 |
| D. Specific range | 0.128 NMPP |
| E. Gross weight | 20,000 Lb |
| F. Computed altitude | 20,000 Ft |
| G. Drag index | 8.0 |
| H. Indicated Mach number | 0.56 |
| I. Cruise altitude | 20,000 Ft |
| J. Indicated airspeed | 253 Kt |

### 5.6 BINGO CHART

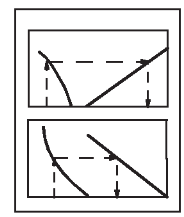
These charts (Figures 5-6, 5-11, 5-15, and 5-19) show the distance, optimum altitude and Mach number to travel for a given fuel load using a combination of climb speed schedule, optimum range cruise and optimum range descent. Also shown are the distances for remaining at sea level. The drag index for the AV-8B is based on six empty wing pylons plus the GAU-12/U gun pods and the air refueling probe. The drag index for the TAV-8B is based on two empty wing pylons. The chart covers two configurations: gear up and gear down with auto flaps.

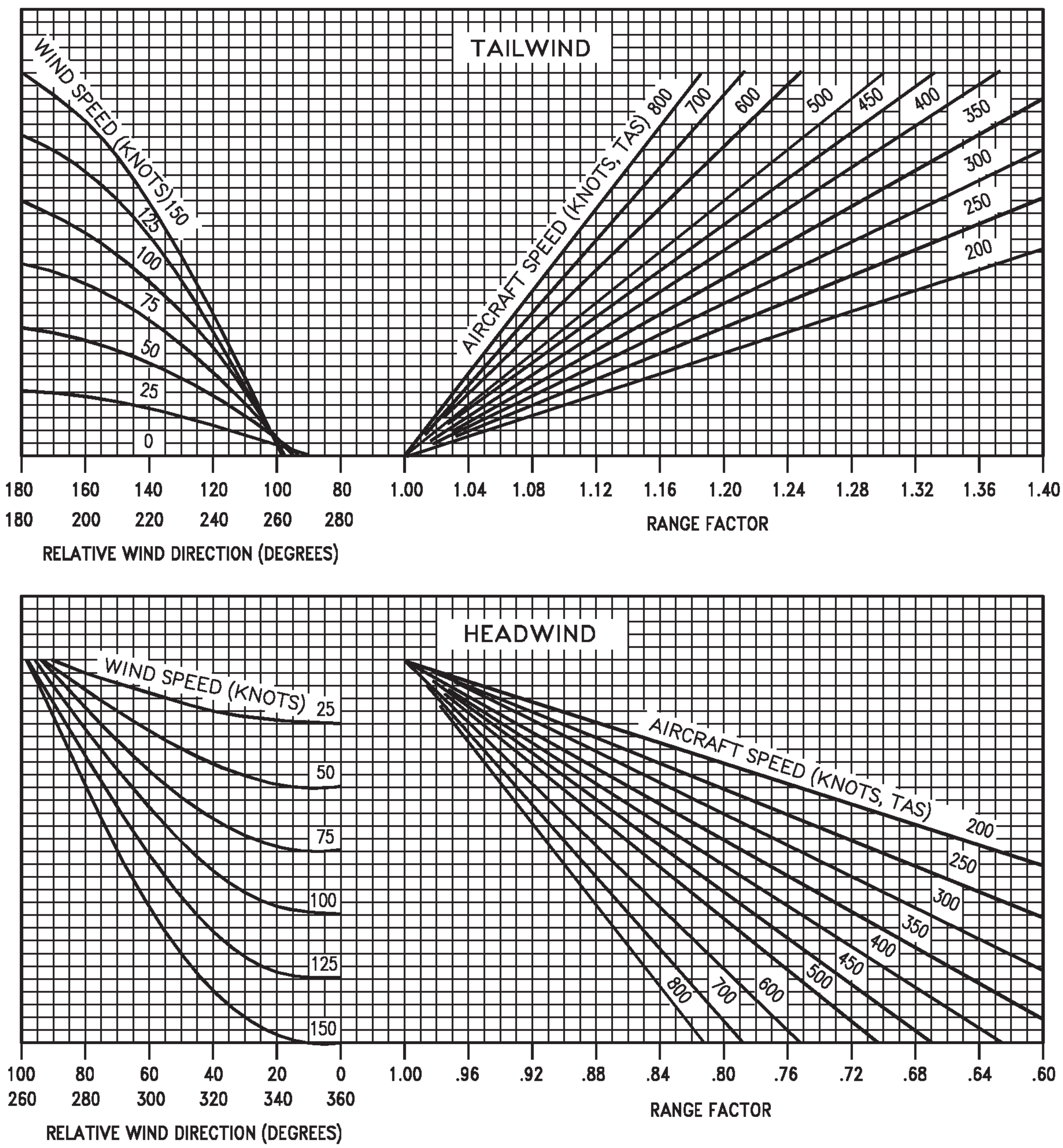
# RANGEWIND CORRECTION

**AIRCRAFT CONFIGURATION**
ALL DRAG INDEXES




NOTE: RELATIVE WIND DIRECTION = ANGULAR DIFFERENCE MEASURED CLOCKWISE, BETWEEN AIRCRAFT HEADING AND TRUE WIND DIRECTION




AV8BB-NFM-40-(64-1)01-CATI

**Figure 5-1. Rangewind Correction**

# OPTIMUM CRUISE FLIGHT CONDITIONS, AV-8B

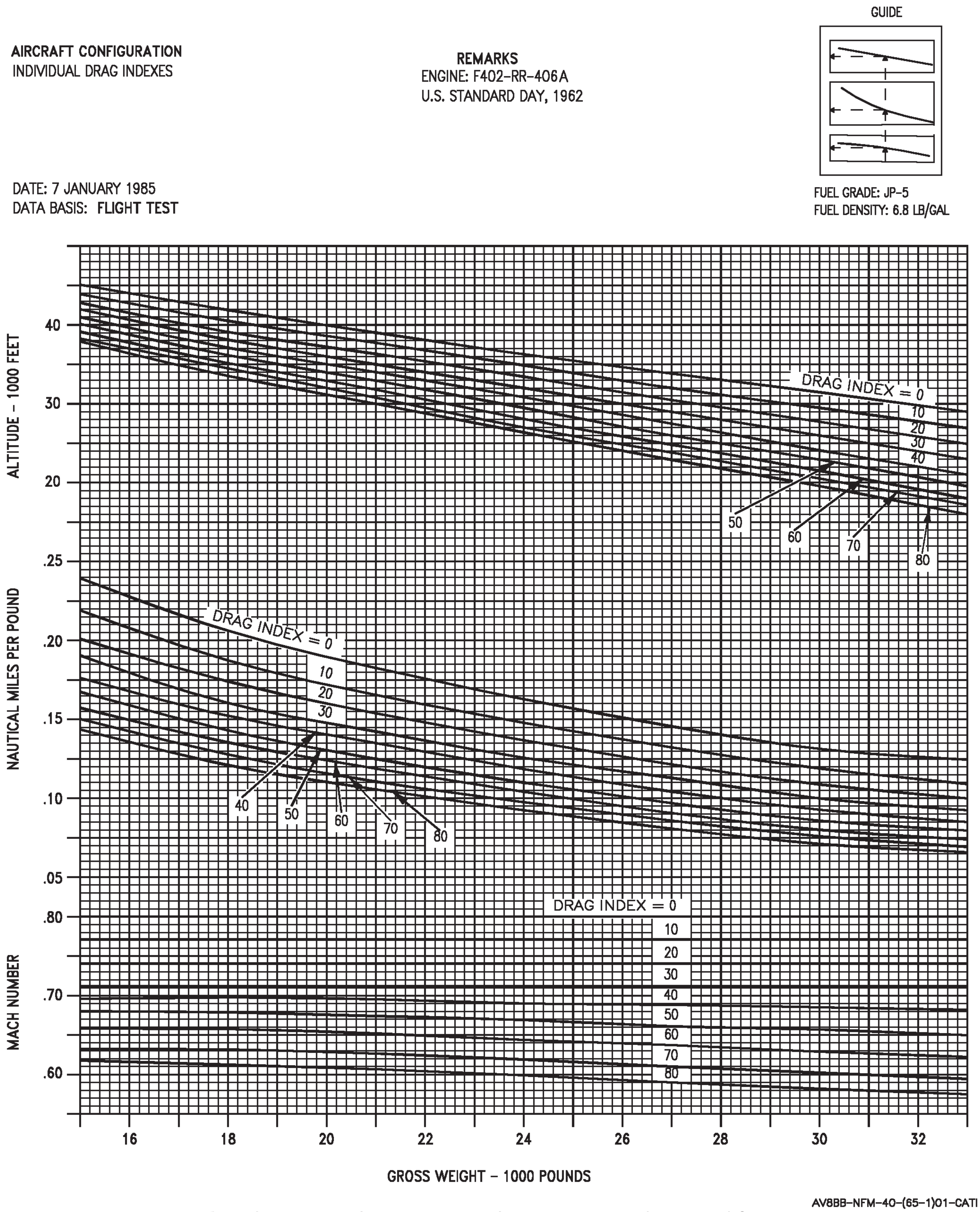



Figure 5-2. Optimum Cruise Flight Conditions, F402-RR-406A Engine

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 14,000 POUNDS

**REMARKS**
ENGINE: F402-RR-406A
ICAO STANDARD DAY

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 57 | 61 | 65 | 69 | 73 | 77 | 81 | 85 | 89 | SEA LEVEL (15 °C) | | |
| | 330 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | | −40 | 0.8995 |
| | 360 | 75 | 81 | 87 | 94 | 100 | 106 | 112 | 118 | 125 | | −20 | 0.9373 |
| | 390 | 86 | 94 | 101 | 109 | 117 | 124 | 132 | 140 | 147 | | 0 | 0.9736 |
| | 420 | 99 | 108 | 117 | 126 | 136 | 145 | 154 | 164 | 174 | | 20 | 1.0086 |
| | 450 | 113 | 124 | 135 | 146 | 158 | 169 | 181 | 193 | | | 40 | 1.0424 |
| | 480 | 130 | 144 | 158 | 172 | 187 | 202 | | | | | | |
| | 510 | 151 | 169 | 187 | 206 | | | | | | | | |
| | 540 | 180 | 203 | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | MAX CONT. | 188 | 186 | 183 | 181 | 179 | 178 | 176 | 175 | 174 | | | |
| | MAX | 223 | 220 | 217 | 214 | 212 | 210 | 208 | 207 | 205 | | | |
| | COMBAT | 249 | 247 | 243 | 240 | 237 | 235 | 233 | 231 | 229 | | | |
| | | | | | | | | | | | | | |
| 4,000 FEET | 300 | 54 | 58 | 62 | 66 | 70 | 74 | 78 | 82 | 86 | 4,000 FEET (7 °C) | | |
| | 330 | 63 | 68 | 72 | 77 | 82 | 87 | 93 | 98 | 103 | | −40 | 0.9121 |
| | 360 | 73 | 79 | 85 | 91 | 97 | 104 | 110 | 116 | 123 | | −20 | 0.9505 |
| | 390 | 84 | 91 | 99 | 107 | 114 | 122 | 130 | 138 | 146 | | 0 | 0.9873 |
| | 420 | 96 | 105 | 114 | 124 | 134 | 143 | 153 | 163 | 173 | | 20 | 1.0228 |
| | 450 | 111 | 123 | 135 | 147 | 159 | 172 | 185 | | | | 40 | 1.0571 |
| | 480 | 130 | 146 | 161 | 177 | | | | | | | | |
| | 510 | 158 | 178 | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | MAX CONT. | 172 | 170 | 168 | 166 | 164 | 162 | 161 | 160 | 159 | | | |
| | MAX | 203 | 201 | 198 | 196 | 193 | 192 | 190 | 188 | 187 | | | |
| | COMBAT | 226 | 224 | 222 | 219 | 216 | 214 | 212 | 210 | 208 | | | |
| | | | | | | | | | | | | | |
| 8,000 FEET | 300 | 52 | 56 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 8,000 FEET (−1 °C) | | |
| | 330 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 96 | 101 | | −40 | 0.9253 |
| | 360 | 70 | 76 | 82 | 89 | 95 | 101 | 108 | 114 | 121 | | −20 | 0.9642 |
| | 390 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 137 | 146 | | 0 | 1.0016 |
| | 420 | 94 | 104 | 115 | 125 | 135 | 146 | 157 | 168 | | | 20 | 1.0376 |
| | 450 | 111 | 124 | 138 | 151 | 166 | | | | | | 40 | 1.0724 |
| | 480 | 136 | 154 | 172 | | | | | | | | | |
| | | | | | | | | | | | | | |
| | MAX CONT. | 157 | 155 | 153 | 150 | 148 | 146 | 145 | 143 | 142 | | | |
| | MAX | 185 | 182 | 180 | 178 | 176 | 174 | 172 | 171 | 169 | | | |
| | COMBAT | 204 | 203 | 201 | 198 | 196 | 194 | 192 | 190 | 189 | | | |
| | | | | | | | | | | | | | |
| 12,000 FEET | 300 | 50 | 54 | 58 | 62 | 66 | 70 | 74 | 78 | 82 | 12,000 FEET (−9 °C) | | |
| | 330 | 58 | 63 | 68 | 73 | 78 | 84 | 89 | 94 | 99 | | −40 | 0.9391 |
| | 360 | 68 | 74 | 81 | 87 | 94 | 100 | 107 | 114 | 121 | | −20 | 0.9785 |
| | 390 | 79 | 88 | 96 | 105 | 113 | 122 | 131 | 141 | 150 | | 0 | 1.0165 |
| | 420 | 94 | 105 | 116 | 128 | 140 | 153 | | | | | 20 | 1.0530 |
| | 450 | 117 | 132 | 148 | | | | | | | | 40 | 1.0883 |
| | | | | | | | | | | | | | |
| | MAX CONT. | 141 | 139 | 137 | 134 | 132 | 131 | 129 | 127 | 126 | | | |
| | MAX | 166 | 165 | 163 | 161 | 159 | 157 | 156 | 154 | 153 | | | |
| | COMBAT | 184 | 183 | 181 | 179 | 177 | 175 | 173 | 171 | 170 | | | |

Figure 5-3. Low Altitude Cruise, F402-RR-406A Engine (Sheet 1 of 7)

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 16,000 POUNDS

**REMARKS**
ENGINE: F402-RR-406A
ICAO STANDARD DAY

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS / DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 58 | 62 | 66 | 70 | 74 | 78 | 82 | 86 | 90 | SEA LEVEL (15 °C) | | |
| | 330 | 66 | 71 | 76 | 81 | 86 | 91 | 96 | 101 | 106 | | −40 | 0.8995 |
| | 360 | 76 | 82 | 88 | 94 | 100 | 106 | 113 | 119 | 125 | | −20 | 0.9373 |
| | 390 | 87 | 94 | 102 | 109 | 117 | 125 | 132 | 140 | 148 | | 0 | 0.9736 |
| | 420 | 99 | 108 | 118 | 127 | 136 | 145 | 155 | 164 | 174 | | 20 | 1.0086 |
| | 450 | 113 | 124 | 135 | 146 | 158 | 169 | 181 | 193 | | | 40 | 1.0424 |
| | 480 | 130 | 144 | 158 | 172 | 187 | 202 | | | | | | |
| | 510 | 151 | 169 | 187 | 206 | | | | | | | | |
| | 540 | 179 | 202 | | | | | | | | | | |
| | MAX CONT. | 189 | 186 | 183 | 181 | 179 | 178 | 176 | 175 | 174 | | | |
| | MAX | 223 | 220 | 217 | 214 | 212 | 210 | 208 | 207 | 205 | | | |
| | COMBAT | 249 | 247 | 243 | 240 | 237 | 235 | 233 | 231 | 229 | | | |
| 4,000 FEET | 300 | 55 | 59 | 63 | 67 | 71 | 75 | 79 | 83 | 87 | 4,000 FEET (7 °C) | | |
| | 330 | 63 | 68 | 73 | 78 | 83 | 88 | 93 | 98 | 103 | | −40 | 0.9121 |
| | 360 | 73 | 79 | 85 | 91 | 98 | 104 | 110 | 117 | 123 | | −20 | 0.9505 |
| | 390 | 84 | 92 | 99 | 107 | 115 | 122 | 130 | 138 | 146 | | 0 | 0.9873 |
| | 420 | 96 | 105 | 115 | 124 | 134 | 144 | 154 | 163 | 174 | | 20 | 1.0228 |
| | 450 | 111 | 123 | 135 | 147 | 159 | 172 | 185 | | | | 40 | 1.0571 |
| | 480 | 130 | 145 | 161 | 177 | | | | | | | | |
| | 510 | 157 | 177 | | | | | | | | | | |
| | MAX CONT. | 173 | 170 | 168 | 166 | 164 | 162 | 161 | 160 | 159 | | | |
| | MAX | 203 | 201 | 198 | 196 | 193 | 192 | 190 | 188 | 187 | | | |
| | COMBAT | 226 | 224 | 222 | 219 | 216 | 214 | 212 | 210 | 208 | | | |
| 8,000 FEET | 300 | 53 | 57 | 61 | 65 | 69 | 73 | 77 | 81 | 85 | 8,000 FEET (−1 °C) | | |
| | 330 | 61 | 66 | 71 | 76 | 81 | 86 | 91 | 96 | 101 | | −40 | 0.9253 |
| | 360 | 70 | 77 | 83 | 89 | 95 | 102 | 108 | 115 | 121 | | −20 | 0.9642 |
| | 390 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 137 | 146 | | 0 | 1.0016 |
| | 420 | 95 | 104 | 115 | 125 | 135 | 146 | 157 | 168 | | | 20 | 1.0376 |
| | 450 | 111 | 124 | 137 | 151 | 165 | | | | | | 40 | 1.0724 |
| | 480 | 136 | 153 | 172 | | | | | | | | | |
| | MAX CONT. | 157 | 155 | 153 | 150 | 148 | 146 | 145 | 143 | 142 | | | |
| | MAX | 185 | 182 | 180 | 178 | 176 | 174 | 172 | 171 | 169 | | | |
| | COMBAT | 205 | 203 | 201 | 198 | 196 | 194 | 192 | 190 | 189 | | | |
| 12,000 FEET | 300 | 51 | 55 | 59 | 63 | 67 | 71 | 75 | 79 | 83 | 12,000 FEET (−9 °C) | | |
| | 330 | 59 | 64 | 69 | 74 | 79 | 84 | 89 | 95 | 100 | | −40 | 0.9391 |
| | 360 | 68 | 75 | 81 | 88 | 94 | 101 | 107 | 114 | 121 | | −20 | 0.9785 |
| | 390 | 80 | 88 | 96 | 105 | 114 | 122 | 132 | 141 | 150 | | 0 | 1.0165 |
| | 420 | 94 | 105 | 116 | 128 | 140 | 153 | | | | | 20 | 1.0530 |
| | 450 | 116 | 132 | 148 | | | | | | | | 40 | 1.0883 |
| | MAX CONT. | 141 | 139 | 137 | 134 | 132 | 130 | 129 | 127 | 126 | | | |
| | MAX | 166 | 165 | 163 | 161 | 159 | 157 | 156 | 154 | 153 | | | |
| | COMBAT | 184 | 183 | 181 | 179 | 177 | 175 | 173 | 171 | 170 | | | |

**Figure 5-3. Low Altitude Cruise, F402-RR-406A Engine (Sheet 2 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT – 18,000 POUNDS

**REMARKS**
ENGINE: F402-RR-406A
ICAO STANDARD DAY

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

TOTAL FUEL FLOW - LB/MIN

| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL | 300 | 59 | 63 | 67 | 71 | 75 | 79 | 83 | 87 | 91 |
| | 330 | 67 | 72 | 76 | 81 | 86 | 91 | 97 | 102 | 107 |
| | 360 | 76 | 82 | 88 | 94 | 101 | 107 | 113 | 119 | 126 |
| | 390 | 87 | 94 | 102 | 110 | 117 | 125 | 133 | 140 | 148 |
| | 420 | 100 | 109 | 118 | 127 | 136 | 146 | 155 | 165 | 174 |
| | 450 | 113 | 124 | 135 | 147 | 158 | 170 | 181 | 193 | |
| | 480 | 130 | 144 | 158 | 172 | 187 | 202 | | | |
| | 510 | 151 | 169 | 187 | 205 | | | | | |
| | 540 | 179 | 202 | | | | | | | |
| | | | | | | | | | | |
| | MAX CONT. | 189 | 186 | 183 | 181 | 179 | 178 | 176 | 175 | 174 |
| | MAX | 223 | 220 | 217 | 214 | 212 | 210 | 208 | 207 | 205 |
| | COMBAT | 249 | 247 | 243 | 240 | 237 | 235 | 233 | 231 | 229 |
| | | | | | | | | | | |
| 4,000 FEET | 300 | 56 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 88 |
| | 330 | 64 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 104 |
| | 360 | 74 | 80 | 86 | 92 | 98 | 105 | 111 | 117 | 124 |
| | 390 | 84 | 92 | 100 | 107 | 115 | 123 | 131 | 138 | 147 |
| | 420 | 96 | 106 | 115 | 125 | 134 | 144 | 154 | 164 | 174 |
| | 450 | 111 | 123 | 135 | 147 | 160 | 172 | 185 | | |
| | 480 | 130 | 145 | 161 | 177 | | | | | |
| | 510 | 157 | 177 | | | | | | | |
| | | | | | | | | | | |
| | MAX CONT. | 173 | 170 | 168 | 166 | 164 | 162 | 161 | 160 | 159 |
| | MAX | 203 | 201 | 198 | 196 | 194 | 192 | 190 | 188 | 187 |
| | COMBAT | 226 | 224 | 222 | 219 | 216 | 214 | 212 | 210 | 208 |
| | | | | | | | | | | |
| 8,000 FEET | 300 | 54 | 58 | 62 | 66 | 70 | 74 | 78 | 82 | 86 |
| | 330 | 62 | 67 | 72 | 77 | 82 | 87 | 92 | 97 | 102 |
| | 360 | 71 | 77 | 83 | 90 | 96 | 102 | 109 | 115 | 122 |
| | 390 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 138 | 146 |
| | 420 | 95 | 105 | 115 | 125 | 136 | 146 | 157 | 168 | |
| | 450 | 111 | 124 | 137 | 151 | 165 | | | | |
| | 480 | 135 | 153 | 171 | | | | | | |
| | | | | | | | | | | |
| | MAX CONT. | 157 | 155 | 153 | 150 | 148 | 146 | 145 | 143 | 142 |
| | MAX | 185 | 183 | 180 | 178 | 176 | 174 | 172 | 171 | 169 |
| | COMBAT | 205 | 203 | 201 | 199 | 196 | 194 | 192 | 190 | 189 |
| | | | | | | | | | | |
| 12,000 FEET | 300 | 52 | 56 | 60 | 64 | 68 | 72 | 76 | 80 | 84 |
| | 330 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 96 | 101 |
| | 360 | 69 | 75 | 82 | 88 | 95 | 101 | 108 | 115 | 122 |
| | 390 | 80 | 88 | 97 | 105 | 114 | 123 | 132 | 141 | 151 |
| | 420 | 94 | 105 | 116 | 128 | 140 | 153 | | | |
| | 450 | 116 | 131 | 147 | | | | | | |
| | | | | | | | | | | |
| | MAX CONT. | 141 | 139 | 137 | 134 | 132 | 130 | 129 | 127 | 126 |
| | MAX | 166 | 165 | 163 | 161 | 159 | 157 | 156 | 154 | 153 |
| | COMBAT | 184 | 183 | 181 | 179 | 177 | 175 | 173 | 171 | 170 |

TEMPERATURE EFFECTS ON FUEL FLOW

| | °C | CRUISE |
|---|---|---|
| SEA LEVEL (15 °C) | −40 | 0.8995 |
| | −20 | 0.9373 |
| | 0 | 0.9736 |
| | 20 | 1.0086 |
| | 40 | 1.0424 |
| 4,000 FEET (7 °C) | −40 | 0.9121 |
| | −20 | 0.9505 |
| | 0 | 0.9873 |
| | 20 | 1.0228 |
| | 40 | 1.0571 |
| 8,000 FEET (−1 °C) | −40 | 0.9253 |
| | −20 | 0.9642 |
| | 0 | 1.0016 |
| | 20 | 1.0376 |
| | 40 | 1.0724 |
| 12,000 FEET (−9 °C) | −40 | 0.9391 |
| | −20 | 0.9785 |
| | 0 | 1.0165 |
| | 20 | 1.0530 |
| | 40 | 1.0883 |

**Figure 5-3. Low Altitude Cruise, F402-RR-406A Engine (Sheet 3 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 20,000 POUNDS

**REMARKS**
ENGINE: F402-RR-406A
ICAO STANDARD DAY

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

TOTAL FUEL FLOW - LB/MIN

| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL | 300 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 |
| | 330 | 68 | 73 | 78 | 82 | 87 | 93 | 98 | 103 | 108 |
| | 360 | 77 | 83 | 89 | 95 | 101 | 108 | 114 | 120 | 126 |
| | 390 | 88 | 95 | 103 | 110 | 118 | 125 | 133 | 141 | 149 |
| | 420 | 100 | 109 | 118 | 127 | 137 | 146 | 155 | 165 | 175 |
| | 450 | 113 | 125 | 136 | 147 | 159 | 170 | 182 | 194 | |
| | 480 | 130 | 144 | 158 | 173 | 187 | 202 | | | |
| | 510 | 151 | 168 | 187 | 205 | | | | | |
| | 540 | 178 | 201 | | | | | | | |
| | | | | | | | | | | |
| | MAX CONT. | 189 | 186 | 183 | 181 | 179 | 178 | 176 | 175 | 174 |
| | MAX | 223 | 220 | 217 | 215 | 212 | 210 | 208 | 207 | 205 |
| | COMBAT | 249 | 247 | 243 | 240 | 237 | 235 | 233 | 231 | 229 |
| | | | | | | | | | | |
| 4,000 FEET | 300 | 57 | 61 | 65 | 69 | 73 | 77 | 81 | 85 | 89 |
| | 330 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 |
| | 360 | 74 | 80 | 86 | 93 | 99 | 105 | 112 | 118 | 124 |
| | 390 | 85 | 93 | 100 | 108 | 116 | 123 | 131 | 139 | 147 |
| | 420 | 97 | 106 | 115 | 125 | 135 | 144 | 154 | 164 | 174 |
| | 450 | 112 | 123 | 135 | 148 | 160 | 172 | 185 | | |
| | 480 | 130 | 145 | 161 | 177 | | | | | |
| | 510 | 156 | 177 | | | | | | | |
| | | | | | | | | | | |
| | MAX CONT. | 173 | 170 | 168 | 166 | 164 | 162 | 161 | 160 | 159 |
| | MAX | 203 | 201 | 198 | 196 | 194 | 192 | 190 | 188 | 187 |
| | COMBAT | 226 | 224 | 222 | 219 | 216 | 214 | 212 | 210 | 208 |
| | | | | | | | | | | |
| 8,000 FEET | 300 | 55 | 59 | 63 | 67 | 71 | 75 | 79 | 83 | 87 |
| | 330 | 63 | 68 | 73 | 78 | 83 | 88 | 93 | 98 | 103 |
| | 360 | 72 | 78 | 84 | 90 | 97 | 103 | 109 | 116 | 123 |
| | 390 | 82 | 90 | 98 | 106 | 114 | 122 | 130 | 138 | 147 |
| | 420 | 95 | 105 | 115 | 125 | 136 | 146 | 157 | 168 | |
| | 450 | 111 | 124 | 137 | 151 | 165 | | | | |
| | 480 | 135 | 152 | 171 | | | | | | |
| | | | | | | | | | | |
| | MAX CONT. | 157 | 155 | 153 | 150 | 148 | 146 | 145 | 143 | 142 |
| | MAX | 185 | 183 | 180 | 178 | 176 | 174 | 172 | 171 | 169 |
| | COMBAT | 205 | 203 | 201 | 199 | 196 | 194 | 192 | 190 | 189 |
| | | | | | | | | | | |
| 12,000 FEET | 300 | 53 | 57 | 61 | 65 | 69 | 73 | 77 | 81 | 85 |
| | 330 | 61 | 66 | 71 | 76 | 81 | 86 | 91 | 97 | 102 |
| | 360 | 69 | 76 | 82 | 89 | 95 | 102 | 109 | 116 | 123 |
| | 390 | 81 | 89 | 97 | 106 | 115 | 123 | 133 | 142 | 151 |
| | 420 | 94 | 105 | 117 | 128 | 140 | 153 | | | |
| | 450 | 116 | 131 | 147 | | | | | | |
| | | | | | | | | | | |
| | MAX CONT. | 141 | 139 | 137 | 134 | 132 | 130 | 129 | 127 | 126 |
| | MAX | 166 | 165 | 163 | 161 | 159 | 157 | 156 | 154 | 153 |
| | COMBAT | 184 | 183 | 181 | 179 | 177 | 175 | 173 | 171 | 170 |

TEMPERATURE EFFECTS ON FUEL FLOW

| | °C | CRUISE |
|---|---|---|
| SEA LEVEL (15 °C) | −40 | 0.8995 |
| | −20 | 0.9373 |
| | 0 | 0.9736 |
| | 20 | 1.0086 |
| | 40 | 1.0424 |
| 4,000 FEET (7 °C) | −40 | 0.9121 |
| | −20 | 0.9505 |
| | 0 | 0.9873 |
| | 20 | 1.0228 |
| | 40 | 1.0571 |
| 8,000 FEET (−1 °C) | −40 | 0.9253 |
| | −20 | 0.9642 |
| | 0 | 1.0016 |
| | 20 | 1.0376 |
| | 40 | 1.0724 |
| 12,000 FEET (−9 °C) | −40 | 0.9391 |
| | −20 | 0.9785 |
| | 0 | 1.0165 |
| | 20 | 1.0530 |
| | 40 | 1.0883 |

Figure 5-3. Low Altitude Cruise, F402-RR-406A Engine (Sheet 4 of 7)

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 22,000 POUNDS

**REMARKS**
ENGINE: F402-RR-406A
ICAO STANDARD DAY

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 61 | 65 | 69 | 73 | 77 | 81 | 85 | 89 | 94 | SEA LEVEL (15 °C) | | |
| | 330 | 69 | 74 | 79 | 83 | 88 | 94 | 99 | 104 | 109 | | −40 | 0.8995 |
| | 360 | 78 | 84 | 90 | 96 | 102 | 108 | 115 | 121 | 127 | | −20 | 0.9373 |
| | 390 | 88 | 96 | 103 | 111 | 118 | 126 | 134 | 141 | 149 | | 0 | 0.9736 |
| | 420 | 100 | 109 | 119 | 128 | 137 | 146 | 156 | 165 | 175 | | 20 | 1.0086 |
| | 450 | 114 | 125 | 136 | 147 | 159 | 170 | 182 | 194 | | | 40 | 1.0424 |
| | 480 | 131 | 144 | 159 | 173 | 187 | 202 | | | | | | |
| | 510 | 150 | 168 | 186 | 205 | | | | | | | | |
| | 540 | 178 | 201 | | | | | | | | | | |
| | MAX CONT. | 189 | 186 | 183 | 181 | 179 | 178 | 176 | 175 | 174 | | | |
| | MAX | 223 | 220 | 217 | 215 | 212 | 210 | 208 | 207 | 205 | | | |
| | COMBAT | 249 | 247 | 244 | 240 | 237 | 235 | 233 | 231 | 229 | | | |
| 4,000 FEET | 300 | 59 | 63 | 66 | 70 | 74 | 79 | 83 | 87 | 91 | 4,000 FEET (7 °C) | | |
| | 330 | 66 | 71 | 76 | 81 | 86 | 91 | 96 | 101 | 106 | | −40 | 0.9121 |
| | 360 | 75 | 81 | 87 | 94 | 100 | 106 | 112 | 119 | 125 | | −20 | 0.9505 |
| | 390 | 86 | 93 | 101 | 108 | 116 | 124 | 132 | 140 | 148 | | 0 | 0.9873 |
| | 420 | 97 | 106 | 116 | 125 | 135 | 145 | 155 | 165 | 175 | | 20 | 1.0228 |
| | 450 | 112 | 124 | 136 | 148 | 160 | 173 | 186 | | | | 40 | 1.0571 |
| | 480 | 129 | 145 | 161 | 177 | | | | | | | | |
| | 510 | 156 | 176 | | | | | | | | | | |
| | MAX CONT. | 173 | 170 | 168 | 166 | 164 | 162 | 161 | 160 | 159 | | | |
| | MAX | 203 | 201 | 198 | 196 | 194 | 192 | 190 | 188 | 187 | | | |
| | COMBAT | 227 | 224 | 222 | 219 | 216 | 214 | 212 | 210 | 208 | | | |
| 8,000 FEET | 300 | 56 | 60 | 64 | 68 | 72 | 76 | 80 | 85 | 89 | 8,000 FEET (−1 °C) | | |
| | 330 | 64 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 104 | | −40 | 0.9253 |
| | 360 | 73 | 79 | 85 | 91 | 98 | 104 | 110 | 117 | 124 | | −20 | 0.9642 |
| | 390 | 83 | 91 | 98 | 106 | 114 | 123 | 131 | 139 | 148 | | 0 | 1.0016 |
| | 420 | 95 | 105 | 116 | 126 | 136 | 147 | 158 | 169 | | | 20 | 1.0376 |
| | 450 | 111 | 124 | 138 | 151 | 165 | | | | | | 40 | 1.0724 |
| | 480 | 134 | 152 | 170 | | | | | | | | | |
| | MAX CONT. | 157 | 155 | 153 | 150 | 148 | 146 | 145 | 143 | 142 | | | |
| | MAX | 185 | 183 | 180 | 178 | 176 | 174 | 172 | 171 | 169 | | | |
| | COMBAT | 205 | 203 | 201 | 199 | 196 | 194 | 192 | 190 | 188 | | | |
| 12,000 FEET | 300 | 55 | 58 | 62 | 66 | 70 | 75 | 79 | 83 | 87 | 12,000 FEET (−9 °C) | | |
| | 330 | 62 | 67 | 72 | 77 | 82 | 87 | 93 | 98 | 103 | | −40 | 0.9391 |
| | 360 | 71 | 77 | 83 | 90 | 97 | 103 | 110 | 117 | 124 | | −20 | 0.9785 |
| | 390 | 81 | 89 | 98 | 106 | 115 | 124 | 133 | 142 | 152 | | 0 | 1.0165 |
| | 420 | 94 | 106 | 117 | 129 | 141 | 153 | | | | | 20 | 1.0530 |
| | 450 | 116 | 131 | 147 | | | | | | | | 40 | 1.0883 |
| | MAX CONT. | 141 | 139 | 137 | 134 | 132 | 130 | 129 | 127 | 126 | | | |
| | MAX | 166 | 165 | 163 | 161 | 159 | 157 | 156 | 154 | 153 | | | |
| | COMBAT | 184 | 183 | 181 | 179 | 177 | 175 | 173 | 171 | 169 | | | |

**Figure 5-3. Low Altitude Cruise, F402-RR-406A Engine (Sheet 5 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 24,000 POUNDS

**REMARKS**
ENGINE: F402-RR-406A
ICAO STANDARD DAY

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 63 | 67 | 71 | 75 | 79 | 83 | 87 | 91 | 95 | SEA LEVEL (15 °C) | | |
| | 330 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | | −40 | 0.8995 |
| | 360 | 79 | 85 | 91 | 97 | 103 | 110 | 116 | 122 | 128 | | −20 | 0.9373 |
| | 390 | 89 | 96 | 104 | 112 | 119 | 127 | 134 | 142 | 150 | | 0 | 0.9736 |
| | 420 | 101 | 110 | 119 | 128 | 138 | 147 | 156 | 166 | 176 | | 20 | 1.0086 |
| | 450 | 114 | 125 | 136 | 148 | 159 | 171 | 182 | 194 | | | 40 | 1.0424 |
| | 480 | 131 | 145 | 159 | 173 | 188 | 202 | | | | | | |
| | 510 | 150 | 168 | 186 | 205 | | | | | | | | |
| | 540 | 178 | 201 | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | MAX CONT. | 189 | 186 | 183 | 181 | 179 | 177 | 176 | 175 | 174 | | | |
| | MAX | 223 | 220 | 217 | 215 | 212 | 210 | 208 | 207 | 205 | | | |
| | COMBAT | 250 | 247 | 244 | 240 | 237 | 235 | 233 | 231 | 229 | | | |
| | | | | | | | | | | | | | |
| 4,000 FEET | 300 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | 4,000 FEET (7 °C) | | |
| | 330 | 67 | 72 | 77 | 82 | 87 | 92 | 97 | 103 | 108 | | −40 | 0.9121 |
| | 360 | 76 | 82 | 88 | 95 | 101 | 107 | 114 | 120 | 126 | | −20 | 0.9505 |
| | 390 | 86 | 94 | 101 | 109 | 117 | 125 | 132 | 140 | 149 | | 0 | 0.9873 |
| | 420 | 98 | 107 | 117 | 126 | 136 | 145 | 155 | 165 | 176 | | 20 | 1.0228 |
| | 450 | 112 | 124 | 136 | 148 | 160 | 173 | 186 | | | | 40 | 1.0571 |
| | 480 | 130 | 145 | 161 | 177 | | | | | | | | |
| | 510 | 156 | 176 | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | MAX CONT. | 173 | 170 | 168 | 166 | 164 | 162 | 161 | 160 | 159 | | | |
| | MAX | 203 | 201 | 198 | 196 | 194 | 192 | 190 | 188 | 187 | | | |
| | COMBAT | 227 | 224 | 222 | 219 | 216 | 214 | 212 | 210 | 208 | | | |
| | | | | | | | | | | | | | |
| 8,000 FEET | 300 | 58 | 62 | 66 | 70 | 74 | 78 | 82 | 86 | 90 | 8,000 FEET (−1 °C) | | |
| | 330 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 106 | | −40 | 0.9253 |
| | 360 | 74 | 80 | 86 | 92 | 99 | 105 | 112 | 118 | 125 | | −20 | 0.9642 |
| | 390 | 83 | 91 | 99 | 107 | 115 | 123 | 131 | 140 | 148 | | 0 | 1.0016 |
| | 420 | 96 | 106 | 116 | 127 | 137 | 148 | 159 | 170 | | | 20 | 1.0376 |
| | 450 | 111 | 124 | 138 | 151 | 166 | | | | | | 40 | 1.0724 |
| | 480 | 134 | 152 | 170 | | | | | | | | | |
| | | | | | | | | | | | | | |
| | MAX CONT. | 157 | 155 | 153 | 150 | 148 | 146 | 144 | 143 | 142 | | | |
| | MAX | 185 | 183 | 180 | 178 | 176 | 174 | 172 | 171 | 169 | | | |
| | COMBAT | 205 | 203 | 201 | 199 | 196 | 194 | 192 | 190 | 188 | | | |
| | | | | | | | | | | | | | |
| 12,000 FEET | 300 | 56 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 89 | 12,000 FEET (−9 °C) | | |
| | 330 | 63 | 68 | 73 | 78 | 83 | 89 | 94 | 99 | 105 | | −40 | 0.9391 |
| | 360 | 72 | 78 | 85 | 91 | 98 | 104 | 111 | 118 | 125 | | −20 | 0.9785 |
| | 390 | 82 | 90 | 99 | 107 | 116 | 125 | 134 | 143 | | | 0 | 1.0165 |
| | 420 | 95 | 106 | 117 | 129 | 141 | 154 | | | | | 20 | 1.0530 |
| | 450 | 116 | 131 | 147 | | | | | | | | 40 | 1.0883 |
| | | | | | | | | | | | | | |
| | MAX CONT. | 141 | 139 | 137 | 134 | 132 | 130 | 128 | 127 | 125 | | | |
| | MAX | 167 | 165 | 163 | 161 | 159 | 157 | 156 | 154 | 153 | | | |
| | COMBAT | 184 | 183 | 181 | 179 | 177 | 175 | 173 | 171 | 169 | | | |

**Figure 5-3. Low Altitude Cruise, F402-RR-406A Engine (Sheet 6 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 26,000 POUNDS

**REMARKS**
ENGINE: F402-RR-406A
ICAO STANDARD DAY

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

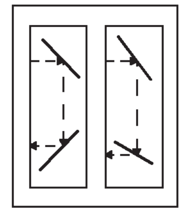
FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 65 | 69 | 73 | 77 | 81 | 85 | 89 | 93 | 97 | SEA LEVEL (15 °C) | | |
| | 330 | 71 | 76 | 81 | 86 | 91 | 96 | 101 | 106 | 111 | | −40 | 0.8995 |
| | 360 | 80 | 86 | 92 | 98 | 105 | 111 | 117 | 123 | 130 | | −20 | 0.9373 |
| | 390 | 90 | 97 | 105 | 112 | 120 | 128 | 135 | 143 | 151 | | 0 | 0.9736 |
| | 420 | 102 | 111 | 120 | 129 | 138 | 148 | 157 | 167 | 176 | | 20 | 1.0086 |
| | 450 | 115 | 126 | 137 | 148 | 160 | 171 | 183 | 195 | | | 40 | 1.0424 |
| | 480 | 131 | 145 | 159 | 173 | 188 | 203 | | | | | | |
| | 510 | 150 | 168 | 186 | 205 | | | | | | | | |
| | 540 | 177 | 200 | | | | | | | | | | |
| | MAX CONT. | 189 | 186 | 183 | 181 | 179 | 177 | 176 | 175 | 174 | | | |
| | MAX | 223 | 220 | 217 | 215 | 212 | 210 | 208 | 206 | 205 | | | |
| | COMBAT | 250 | 247 | 244 | 240 | 237 | 235 | 233 | 231 | 229 | | | |
| 4,000 FEET | 300 | 62 | 66 | 70 | 74 | 78 | 82 | 86 | 90 | 94 | 4,000 FEET (7 °C) | | |
| | 330 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 104 | 109 | | −40 | 0.9121 |
| | 360 | 77 | 83 | 90 | 96 | 102 | 108 | 115 | 121 | 127 | | −20 | 0.9505 |
| | 390 | 87 | 95 | 103 | 110 | 118 | 126 | 134 | 142 | 150 | | 0 | 0.9873 |
| | 420 | 98 | 108 | 117 | 127 | 136 | 146 | 156 | 166 | 176 | | 20 | 1.0228 |
| | 450 | 113 | 124 | 136 | 149 | 161 | 173 | 186 | | | | 40 | 1.0571 |
| | 480 | 130 | 145 | 161 | 177 | | | | | | | | |
| | 510 | 155 | 176 | | | | | | | | | | |
| | MAX CONT. | 173 | 170 | 168 | 166 | 164 | 162 | 161 | 159 | 158 | | | |
| | MAX | 204 | 201 | 199 | 196 | 193 | 191 | 190 | 188 | 186 | | | |
| | COMBAT | 227 | 224 | 222 | 219 | 216 | 214 | 212 | 210 | 208 | | | |
| 8,000 FEET | 300 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | 8,000 FEET (−1 °C) | | |
| | 330 | 66 | 71 | 76 | 81 | 86 | 92 | 97 | 102 | 107 | | −40 | 0.9253 |
| | 360 | 75 | 81 | 87 | 94 | 100 | 106 | 113 | 119 | 126 | | −20 | 0.9642 |
| | 390 | 85 | 92 | 100 | 108 | 116 | 124 | 133 | 141 | 150 | | 0 | 1.0016 |
| | 420 | 97 | 107 | 117 | 127 | 138 | 148 | 159 | 170 | | | 20 | 1.0376 |
| | 450 | 111 | 125 | 138 | 152 | 166 | | | | | | 40 | 1.0724 |
| | 480 | 134 | 152 | 170 | | | | | | | | | |
| | MAX CONT. | 157 | 155 | 153 | 150 | 148 | 146 | 144 | 143 | 142 | | | |
| | MAX | 185 | 183 | 180 | 178 | 176 | 174 | 172 | 171 | 169 | | | |
| | COMBAT | 205 | 203 | 201 | 199 | 196 | 194 | 192 | 190 | 188 | | | |
| 12,000 FEET | 300 | 58 | 62 | 66 | 70 | 74 | 78 | 82 | 86 | 90 | 12,000 FEET (−9 °C) | | |
| | 330 | 64 | 70 | 75 | 80 | 85 | 90 | 95 | 101 | 106 | | −40 | 0.9391 |
| | 360 | 73 | 79 | 86 | 92 | 99 | 106 | 112 | 119 | 126 | | −20 | 0.9785 |
| | 390 | 83 | 91 | 100 | 108 | 117 | 126 | 135 | 145 | | | 0 | 1.0165 |
| | 420 | 95 | 107 | 118 | 129 | 142 | 154 | | | | | 20 | 1.0530 |
| | 450 | 116 | 131 | 147 | | | | | | | | 40 | 1.0883 |
| | MAX CONT. | 141 | 139 | 137 | 134 | 132 | 130 | 128 | 127 | 125 | | | |
| | MAX | 167 | 165 | 163 | 161 | 159 | 157 | 155 | 154 | 153 | | | |
| | COMBAT | 184 | 183 | 181 | 179 | 177 | 175 | 173 | 171 | 169 | | | |

**Figure 5-3. Low Altitude Cruise, F402-RR-406A Engine (Sheet 7 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

## 0.50 MACH

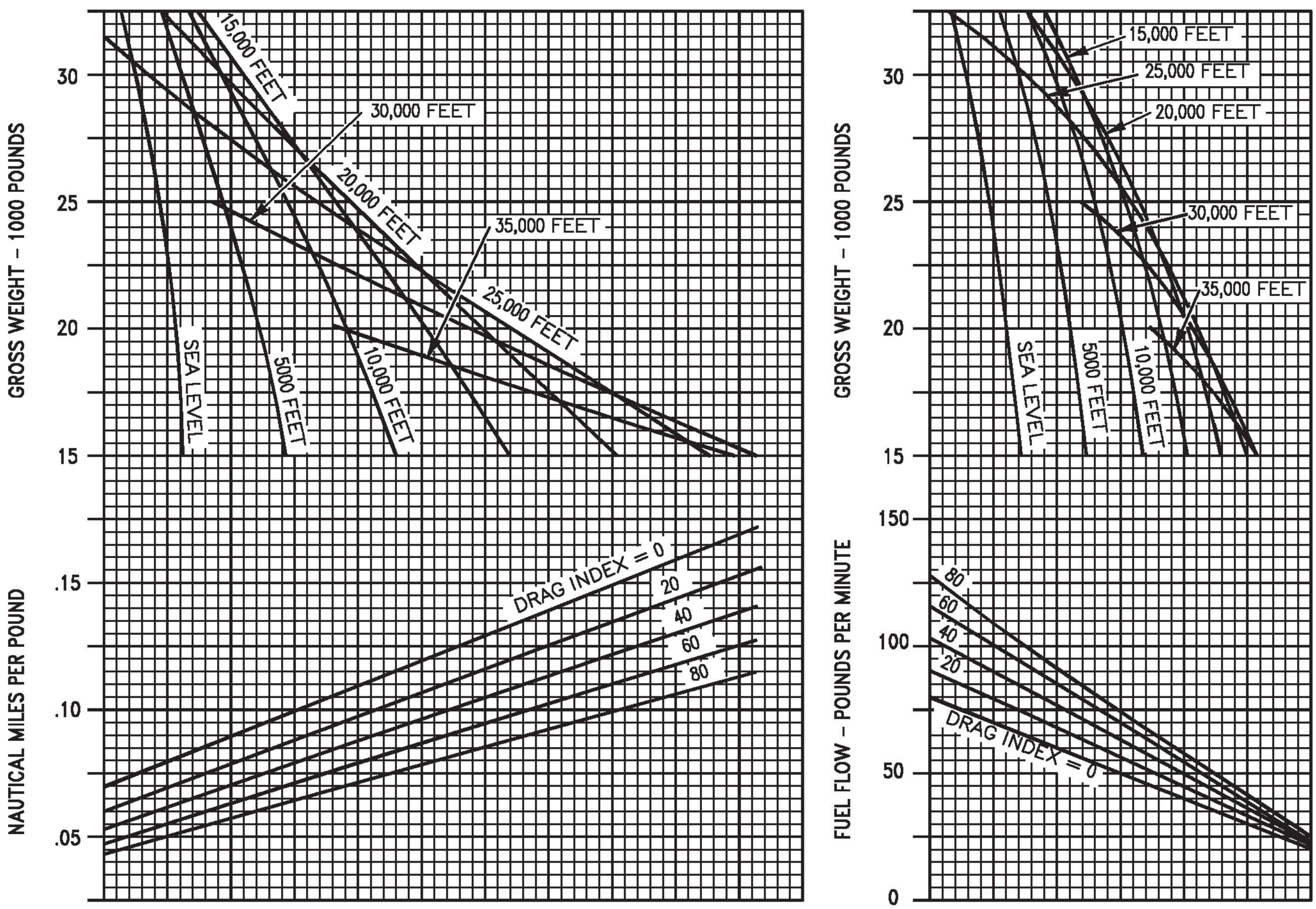



**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(67-1)01-CATI

**Figure 5-4. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 1 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

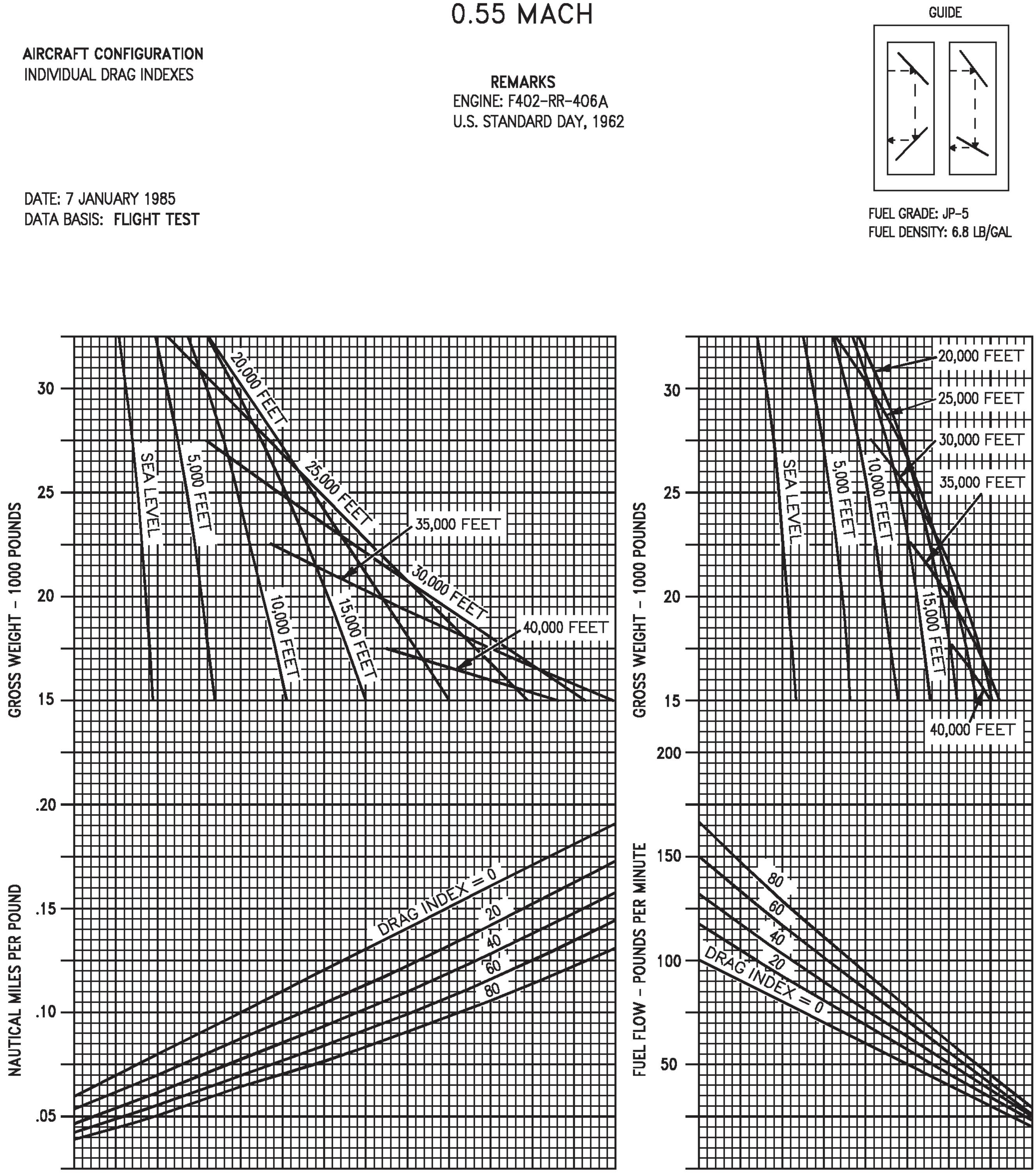
0.55 MACH

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(67-2)01-CATI

**Figure 5-4. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 2 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

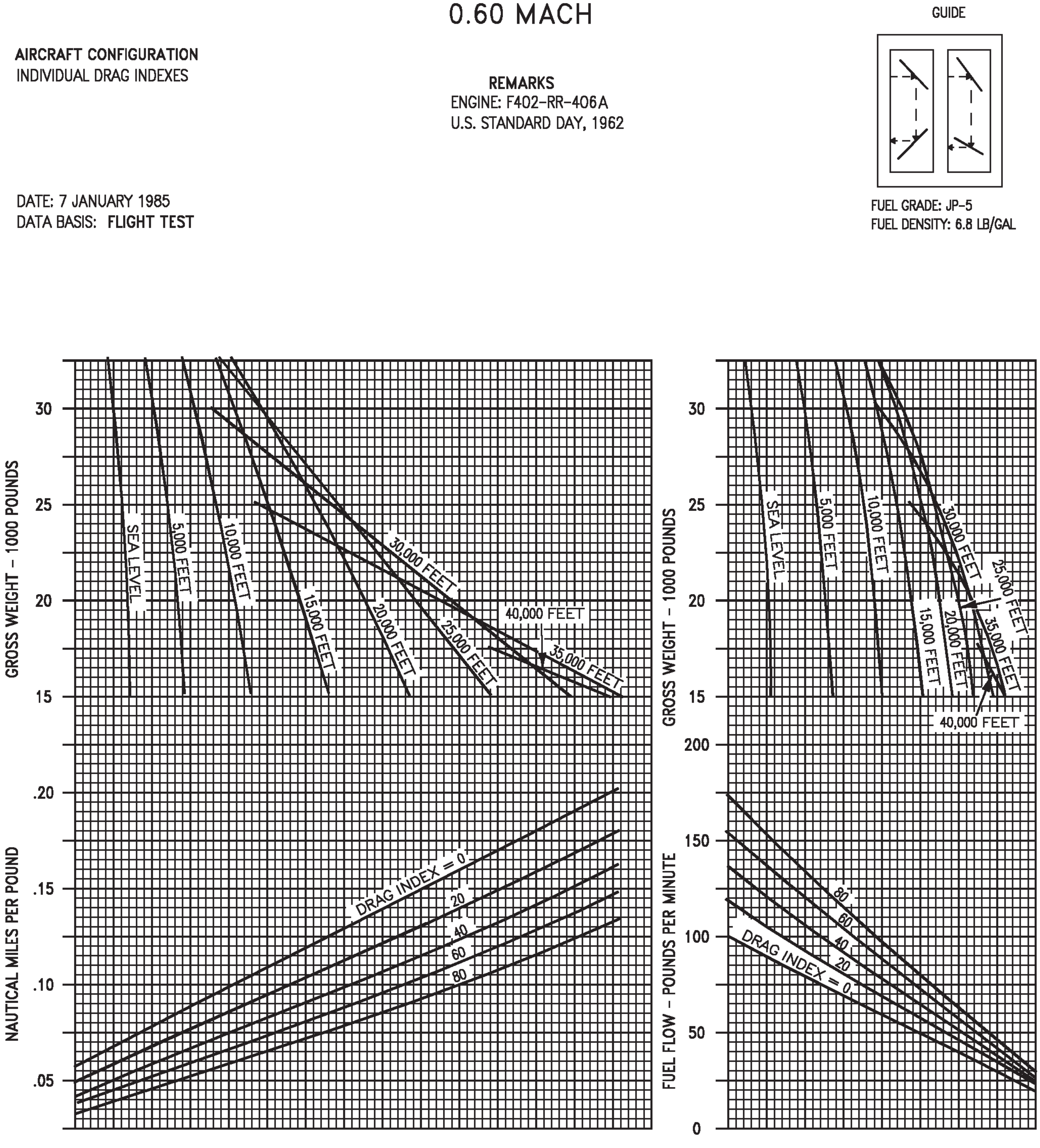
## 0.60 MACH

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(67-3)01-CATI

**Figure 5-4. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 3 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

0.65 MACH

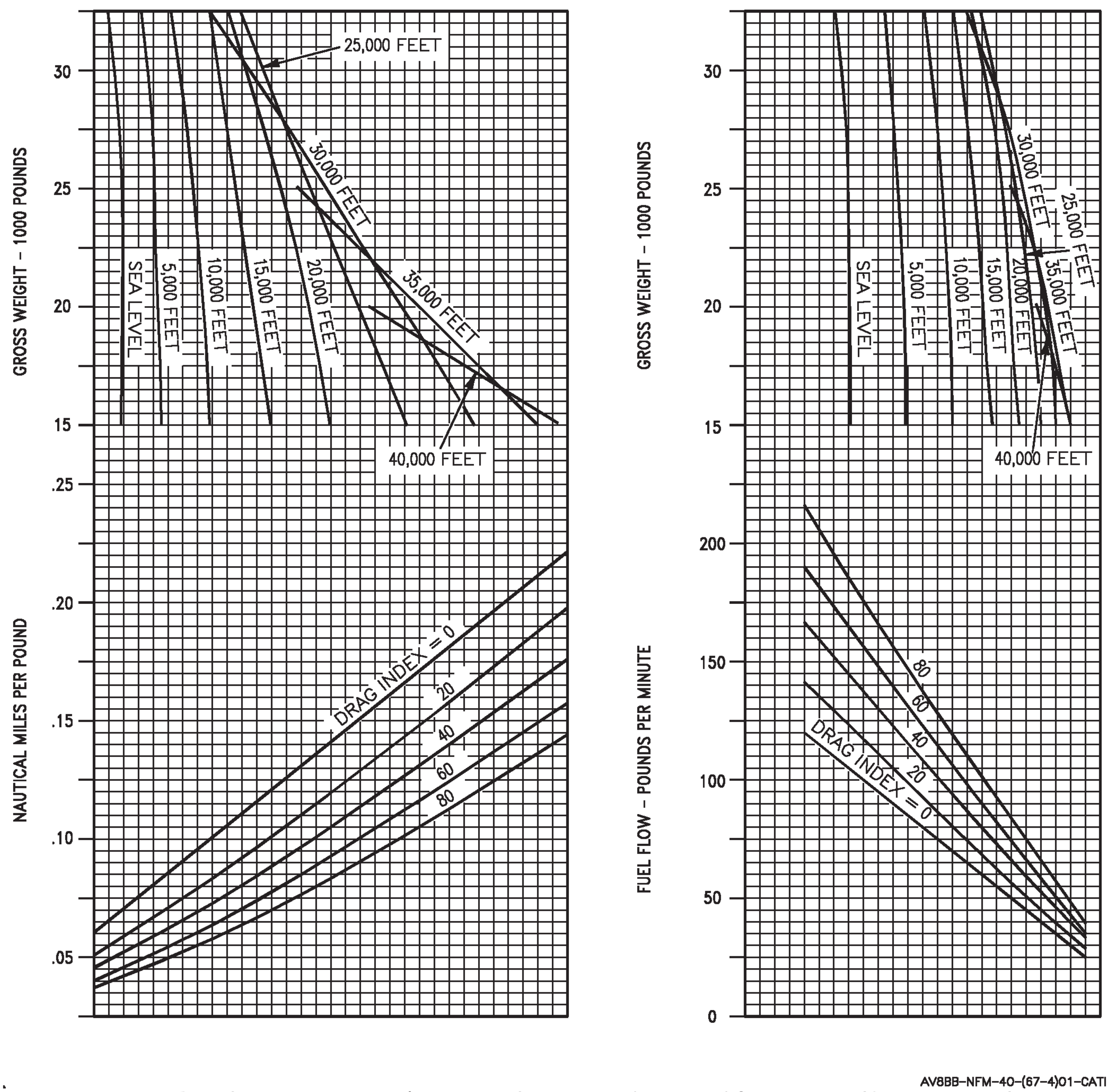
**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

GUIDE

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(67-4)01-CATI

**Figure 5-4. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 4 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

0.70 MACH

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

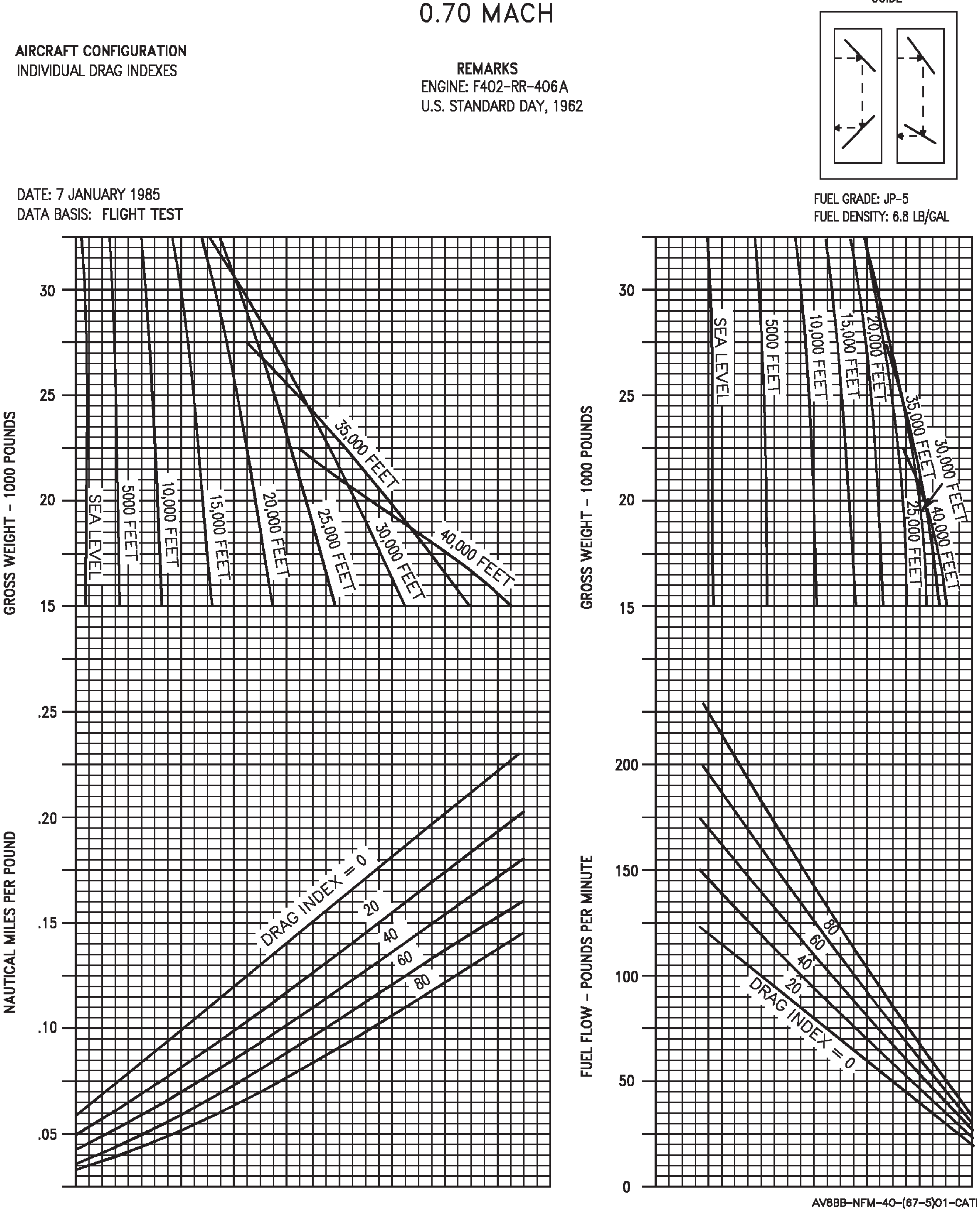



Figure 5-4. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 5 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

0.75 MACH

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

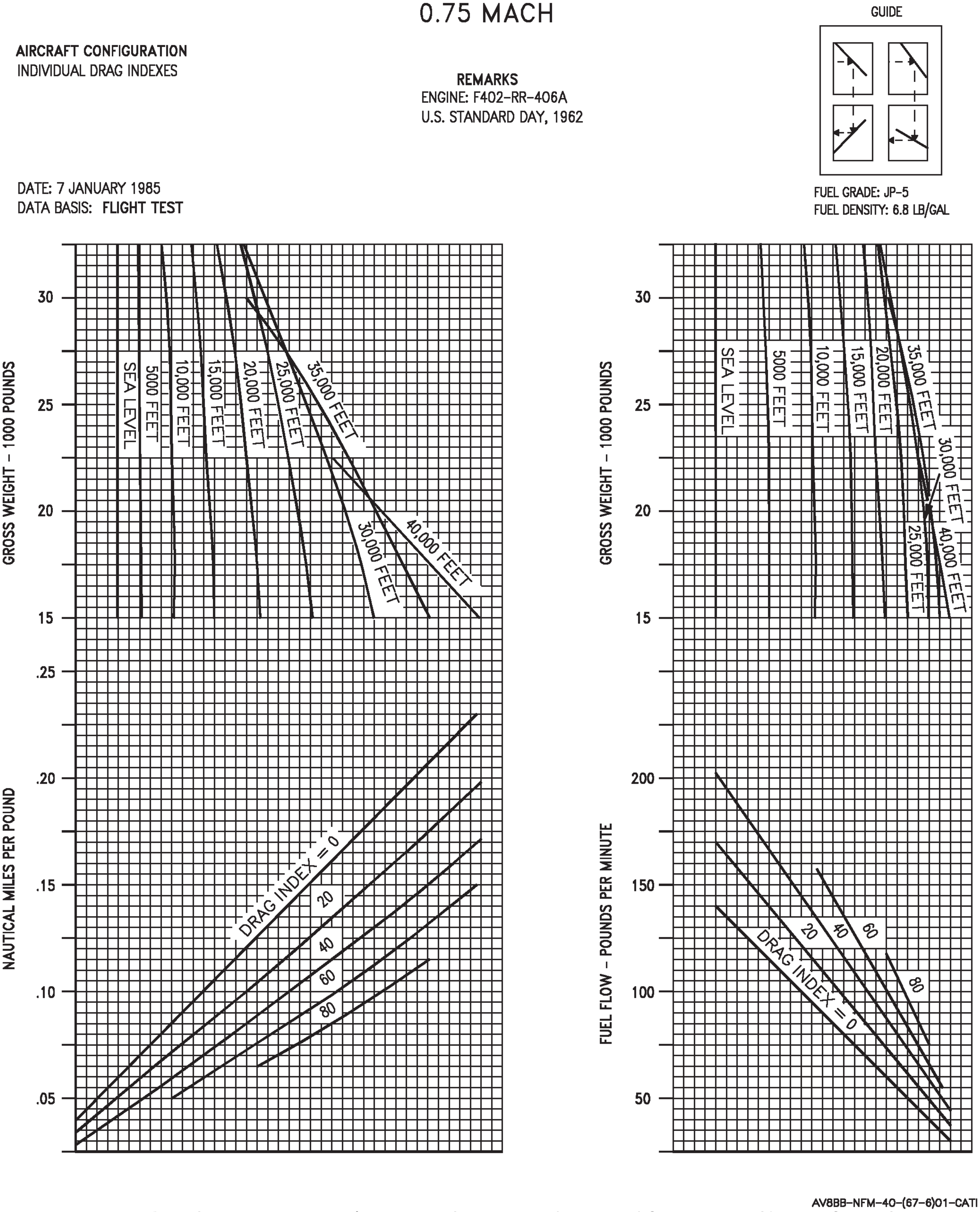



Figure 5-4. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 6 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

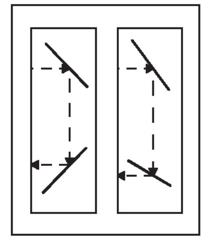
## 0.80 MACH

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

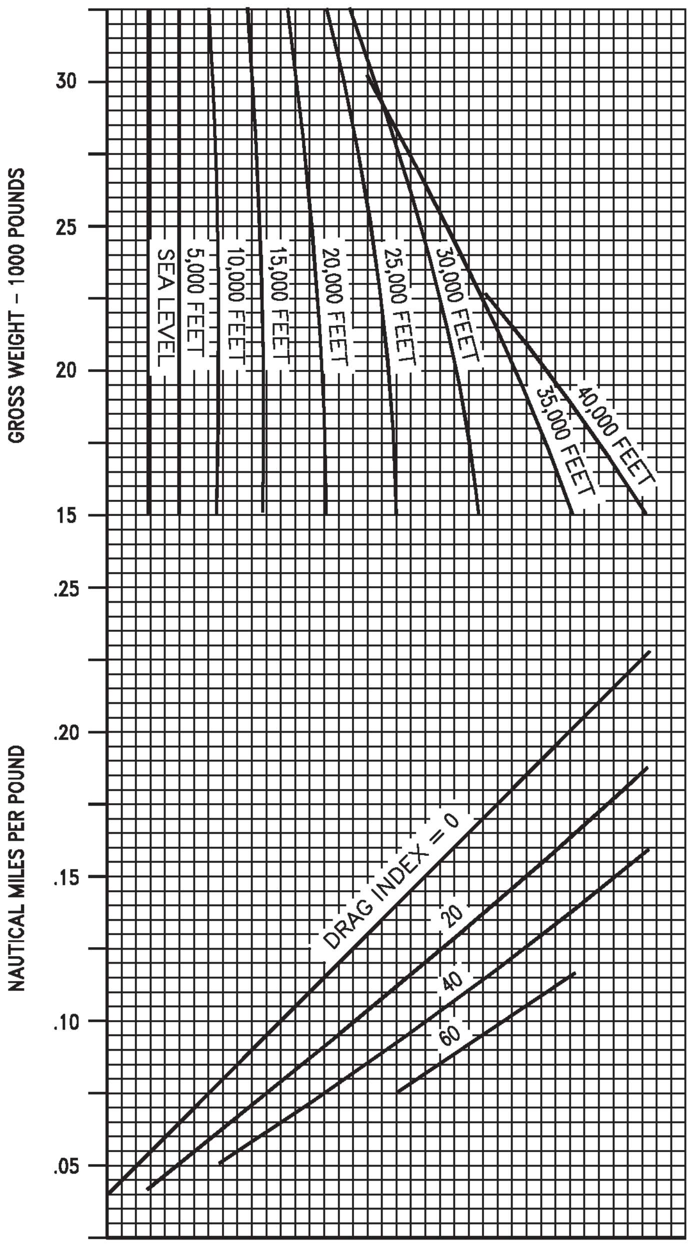
**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

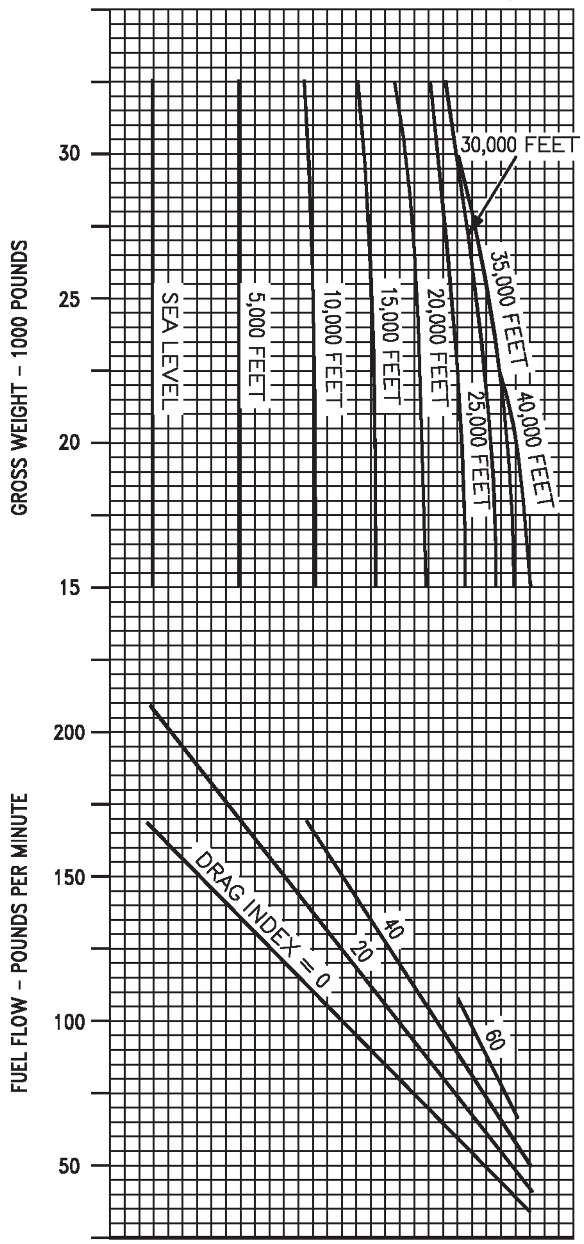
DATE: 7 JANUARY 1985
DATA BASIS: FLIGHT TEST

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



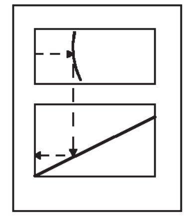

AV8BB-NFM-40-(67-7)01-CATI

**Figure 5-4. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 7 of 7)**

# OPTIMUM CRUISE AT CONSTANT ALTITUDE, AV-8B

## NAUTICAL MILES PER POUND

GUIDE

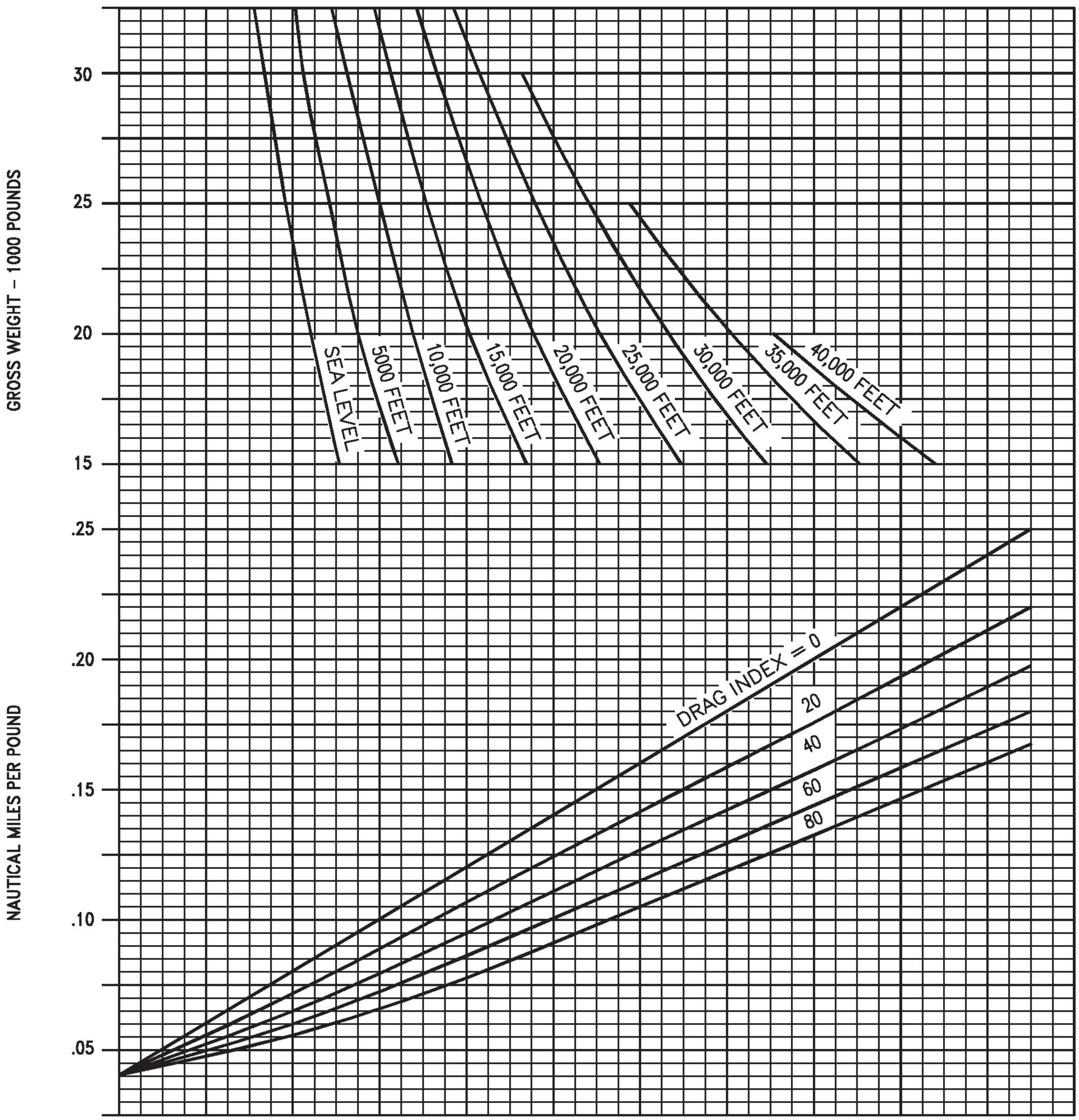


**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(68-1)01-CATI

**Figure 5-5. Optimum Cruise at Constant Altitude, F402-RR-406A Engine (Sheet 1 of 2)**

# OPTIMUM CRUISE AT CONSTANT ALTITUDE, AV-8B

## MACH NUMBER AND AIRSPEED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

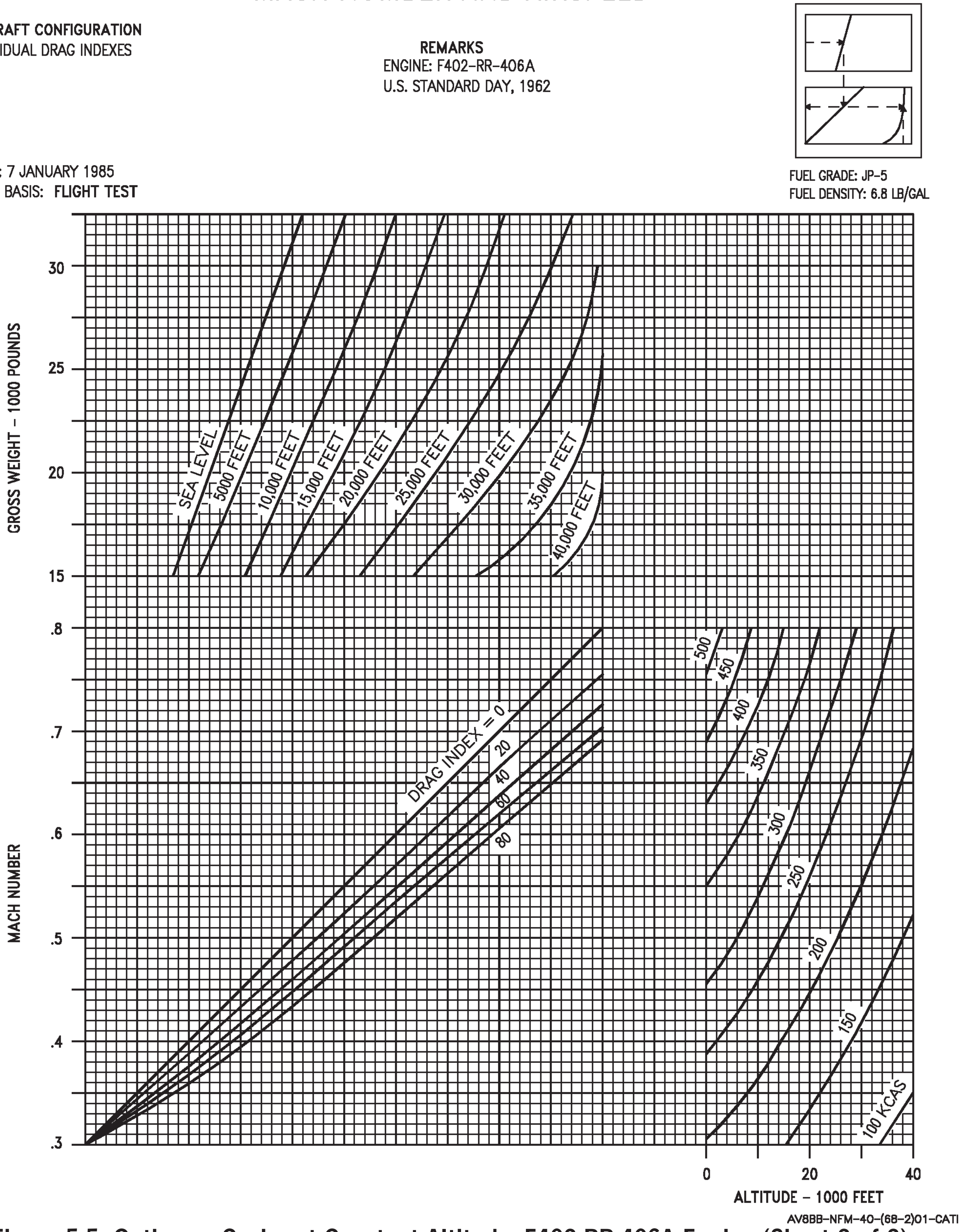



Figure 5-5. Optimum Cruise at Constant Altitude, F402-RR-406A Engine (Sheet 2 of 2)

# BINGO, AV-8B

DAY ATTACK AIRCRAFT
GEAR UP - FLAPS AUTO
DI = 20.5

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 03 JULY 1990
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE-1000 FEET | CRUISE MACH | CRUISE FUEL FLOW-LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE-NAUTICAL MILES 250 KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 18 | 5 | 0.39 | 46.6 | 6 | 16 |
| 1.5 | 87 | 30 | 0.60 | 36.4 | 43 | 56 |
| 2.0 | 180 | 41.8 | 0.73 | 36.6 | 66 | 95 |
| 2.5 | 272 | 41.6 | 0.73 | 37.0 | 66 | 135 |
| 3.0 | 362 | 41.3 | 0.73 | 37.0 | 66 | 173 |
| 3.5 | 450 | 41.0 | 0.73 | 37.5 | 66 | 212 |
| 4.0 | 535 | 40.8 | 0.73 | 38.0 | 66 | 250 |
| 4.5 | 618 | 40.5 | 0.73 | 38.5 | 66 | 288 |
| 5.0 | 699 | 40.2 | 0.73 | 39.0 | 66 | 326 |
| 5.5 | 780 | 40.0 | 0.73 | 39.4 | 66 | 363 |
| 6.0 | 859 | 39.8 | 0.73 | 39.8 | 66 | 401 |
| 6.5 | 936 | 39.5 | 0.73 | 40.3 | 66 | 438 |
| 7.0 | 1012 | 39.1 | 0.73 | 40.8 | 66 | 474 |

Data based on:

1. Maximum thrust climb at 300 knots/0.74 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-6. BINGO, AV-8B Day Attack Aircraft (Sheet 1 of 2)**

# BINGO, AV-8B

DAY ATTACK AIRCRAFT
GEAR DOWN - FLAPS AUTO
DI = 20.5

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 03 JULY 1990
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE- 1000 FEET | CRUISE MACH | CRUISE FUEL FLOW- LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE- NAUTICAL MILES 250KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 10 | 5 | 0.29 | 58.1 | 3 | 10 |
| 1.5 | 43 | 20 | 0.39 | 51.6 | 12 | 34 |
| 2.0 | 85 | 32.8 | 0.47 | 46.2 | 21 | 58 |
| 2.5 | 132 | 32.5 | 0.47 | 46.9 | 21 | 81 |
| 3.0 | 177 | 32.3 | 0.47 | 47.6 | 21 | 105 |
| 3.5 | 221 | 32.0 | 0.47 | 48.2 | 21 | 128 |
| 4.0 | 264 | 31.7 | 0.47 | 49.0 | 21 | 151 |
| 4.5 | 306 | 31.4 | 0.47 | 49.7 | 21 | 174 |
| 5.0 | 346 | 31.1 | 0.47 | 50.4 | 21 | 196 |
| 5.5 | 386 | 30.8 | 0.47 | 51.1 | 21 | 218 |
| 6.0 | 425 | 30.5 | 0.47 | 51.8 | 21 | 240 |
| 6.5 | 463 | 30.2 | 0.47 | 52.6 | 21 | 262 |
| 7.0 | 501 | 29.8 | 0.47 | 53.3 | 21 | 284 |

Data based on:

1. Maximum thrust climb at 200 knots/0.48 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-6. BINGO, AV-8B Day Attack Aircraft (Sheet 2 of 2)**

# OPTIMUM CRUISE FLIGHT CONDITIONS, AV-8B

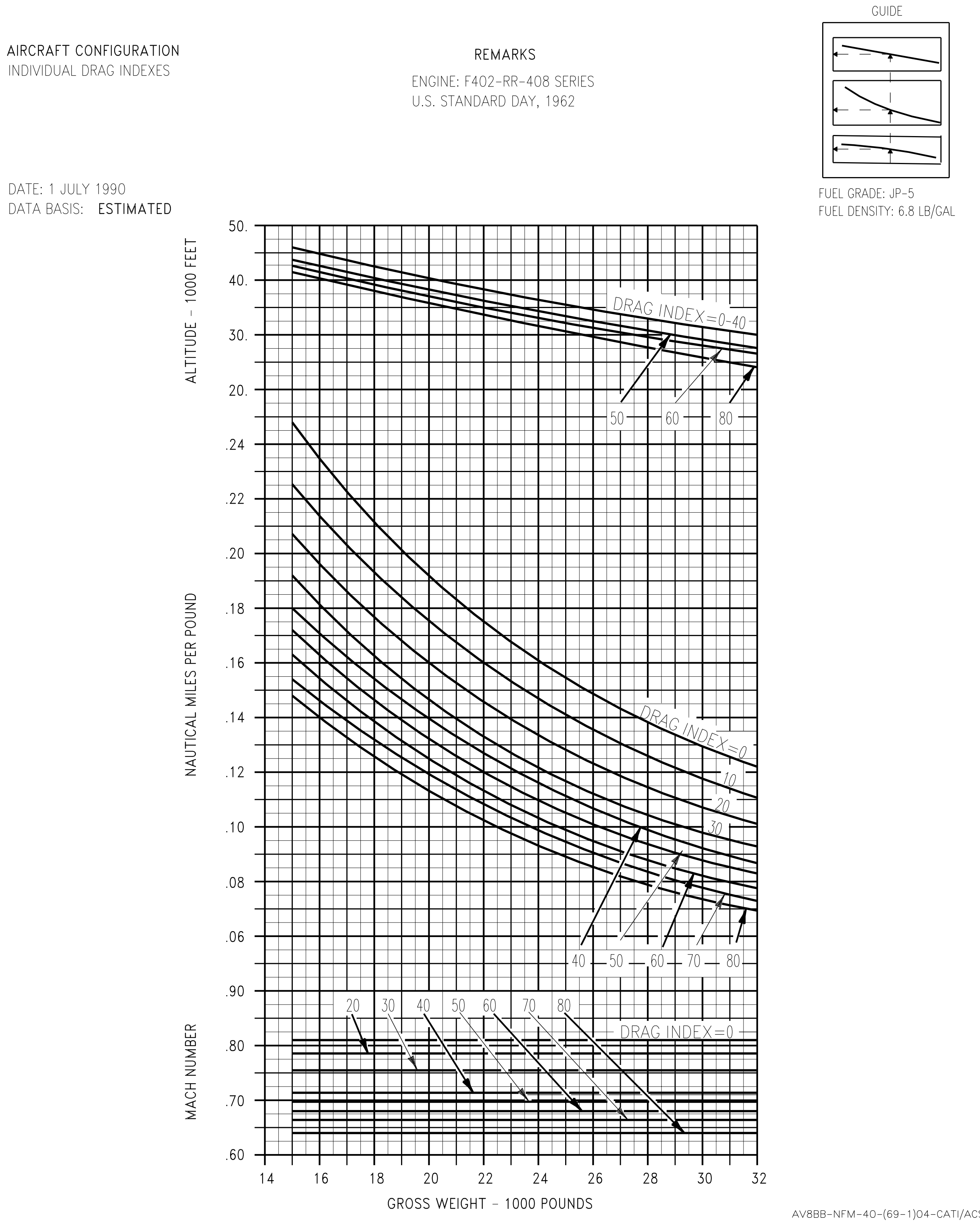



**Figure 5-7. Optimum Cruise Flight Conditions, F402-RR-408 Series Engine**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 14,000 POUNDS

**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

TOTAL FUEL FLOW - LB/MIN

| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL | 300 | 63 | 67 | 71 | 75 | 79 | 83 | 88 | 92 | 96 |
| | 330 | 72 | 77 | 82 | 87 | 92 | 97 | 102 | 107 | 112 |
| | 360 | 82 | 89 | 95 | 101 | 107 | 113 | 119 | 125 | 131 |
| | 390 | 94 | 101 | 109 | 116 | 123 | 131 | 138 | 146 | 154 |
| | 420 | 107 | 116 | 125 | 134 | 143 | 153 | 162 | 172 | 182 |
| | 450 | 121 | 132 | 144 | 155 | 167 | 179 | 192 | 204 | 217 |
| | 480 | 139 | 153 | 168 | 183 | 198 | 214 | 230 | 247 | 264 |
| | 510 | 158 | 177 | 196 | 216 | 237 | 258 | 280 | | |
| | 540 | 183 | 207 | 233 | 260 | 287 | | | | |
| | 570 | 233 | 267 | 293 | | | | | | |
| | MAX CONT. | 215 | 213 | 210 | 207 | 205 | 204 | 202 | 201 | 199 |
| | MAX | 289 | 287 | 284 | 281 | 278 | 275 | 272 | 269 | 267 |
| | COMBAT | 310 | 309 | 308 | 306 | 305 | 303 | 300 | 297 | 293 |
| 4,000 FEET | 300 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 |
| | 330 | 69 | 74 | 79 | 84 | 89 | 93 | 98 | 103 | 108 |
| | 360 | 79 | 85 | 91 | 97 | 103 | 109 | 116 | 122 | 128 |
| | 390 | 90 | 98 | 105 | 113 | 121 | 128 | 137 | 145 | 153 |
| | 420 | 103 | 112 | 121 | 131 | 141 | 151 | 162 | 172 | 183 |
| | 450 | 118 | 130 | 142 | 155 | 168 | 181 | 195 | 210 | 225 |
| | 480 | 135 | 151 | 168 | 185 | 203 | 222 | 241 | 261 | |
| | 510 | 159 | 180 | 203 | 227 | 252 | | | | |
| | 540 | 208 | 238 | 270 | | | | | | |
| | MAX CONT. | 195 | 193 | 191 | 188 | 186 | 185 | 183 | 182 | 181 |
| | MAX | 263 | 261 | 258 | 255 | 252 | 248 | 245 | 243 | 240 |
| | COMBAT | 288 | 285 | 283 | 280 | 276 | 273 | 269 | 265 | 262 |
| 8,000 FEET | 300 | 57 | 61 | 65 | 69 | 73 | 77 | 81 | 85 | 89 |
| | 330 | 66 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 |
| | 360 | 75 | 82 | 88 | 94 | 100 | 106 | 113 | 120 | 127 |
| | 390 | 87 | 94 | 102 | 110 | 119 | 127 | 136 | 145 | 154 |
| | 420 | 100 | 110 | 121 | 132 | 143 | 154 | 166 | 178 | 191 |
| | 450 | 115 | 129 | 144 | 158 | 173 | 190 | 207 | 224 | |
| | 480 | 137 | 156 | 175 | 196 | 218 | 241 | | | |
| | 510 | 185 | 212 | 240 | | | | | | |
| | MAX CONT. | 177 | 175 | 173 | 171 | 169 | 167 | 166 | 165 | 164 |
| | MAX | 237 | 235 | 233 | 230 | 227 | 224 | 221 | 218 | 216 |
| | COMBAT | 260 | 257 | 254 | 251 | 248 | 244 | 240 | 237 | 234 |
| 12,000 FEET | 300 | 54 | 58 | 62 | 66 | 70 | 74 | 78 | 82 | 86 |
| | 330 | 63 | 68 | 73 | 78 | 83 | 88 | 93 | 98 | 104 |
| | 360 | 72 | 79 | 85 | 92 | 99 | 106 | 113 | 120 | 127 |
| | 390 | 84 | 93 | 101 | 110 | 120 | 129 | 138 | 148 | 159 |
| | 420 | 98 | 109 | 122 | 134 | 147 | 160 | 175 | 190 | |
| | 450 | 118 | 134 | 151 | 169 | 188 | 206 | | | |
| | 480 | 166 | 191 | 210 | | | | | | |
| | MAX CONT. | 159 | 158 | 156 | 154 | 152 | 151 | 150 | 148 | 147 |
| | MAX | 212 | 210 | 208 | 206 | 203 | 200 | 197 | 194 | 192 |
| | COMBAT | 230 | 227 | 225 | 223 | 220 | 217 | 214 | 211 | 208 |

TEMPERATURE EFFECTS ON FUEL FLOW

| | °C | CRUISE |
|---|---|---|
| SEA LEVEL (15 °C) | −40 | 0.8995 |
| | −20 | 0.9373 |
| | 0 | 0.9736 |
| | 20 | 1.0086 |
| | 40 | 1.0424 |
| 4,000 FEET (7 °C) | −40 | 0.9121 |
| | −20 | 0.9505 |
| | 0 | 0.9873 |
| | 20 | 1.0228 |
| | 40 | 1.0571 |
| 8,000 FEET (−1 °C) | −40 | 0.9253 |
| | −20 | 0.9642 |
| | 0 | 1.0016 |
| | 20 | 1.0376 |
| | 40 | 1.0724 |
| 12,000 FEET (−9 °C) | −40 | 0.9391 |
| | −20 | 0.9785 |
| | 0 | 1.0165 |
| | 20 | 1.0530 |
| | 40 | 1.0883 |

**Figure 5-8. Low Altitude Cruise, F402-RR-408 Series Engine (Sheet 1 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 16,000 POUNDS

**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 63 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | 96 | | | |
| | 330 | 72 | 77 | 82 | 87 | 92 | 97 | 102 | 107 | 112 | SEA LEVEL (15 °C) | −40 | 0.8995 |
| | 360 | 83 | 89 | 95 | 101 | 107 | 113 | 119 | 125 | 131 | | −20 | 0.9373 |
| | 390 | 94 | 101 | 109 | 116 | 123 | 131 | 138 | 146 | 154 | | 0 | 0.9736 |
| | 420 | 107 | 116 | 125 | 134 | 143 | 152 | 162 | 172 | 182 | | 20 | 1.0086 |
| | 450 | 121 | 132 | 143 | 155 | 167 | 179 | 191 | 203 | 217 | | 40 | 1.0424 |
| | 480 | 138 | 152 | 167 | 182 | 197 | 213 | 230 | 246 | 263 | | | |
| | 510 | 157 | 176 | 195 | 215 | 236 | 257 | 279 | | | | | |
| | 540 | 182 | 206 | 232 | 259 | 287 | | | | | | | |
| | 570 | 232 | 265 | 292 | | | | | | | | | |
| | MAX CONT. | 215 | 213 | 210 | 208 | 205 | 204 | 202 | 201 | 200 | | | |
| | MAX | 289 | 287 | 284 | 281 | 278 | 275 | 272 | 269 | 267 | | | |
| | COMBAT | 310 | 309 | 308 | 306 | 305 | 303 | 300 | 297 | 293 | | | |
| | | | | | | | | | | | | | |
| 4,000 FEET | 300 | 60 | 64 | 69 | 73 | 77 | 81 | 85 | 88 | 92 | | | |
| | 330 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 104 | 109 | 4,000 FEET (7 °C) | −40 | 0.9121 |
| | 360 | 79 | 85 | 91 | 97 | 103 | 110 | 116 | 122 | 129 | | −20 | 0.9505 |
| | 390 | 90 | 98 | 105 | 113 | 120 | 128 | 136 | 145 | 153 | | 0 | 0.9873 |
| | 420 | 103 | 112 | 121 | 131 | 141 | 151 | 162 | 172 | 183 | | 20 | 1.0228 |
| | 450 | 117 | 129 | 142 | 155 | 168 | 181 | 195 | 209 | 224 | | 40 | 1.0571 |
| | 480 | 135 | 151 | 167 | 184 | 202 | 221 | 240 | 260 | | | | |
| | 510 | 158 | 179 | 202 | 226 | 251 | | | | | | | |
| | 540 | 206 | 236 | 268 | | | | | | | | | |
| | MAX CONT. | 195 | 193 | 191 | 188 | 186 | 185 | 183 | 182 | 181 | | | |
| | MAX3 | 267 | 261 | 258 | 255 | 252 | 248 | 245 | 243 | 240 | | | |
| | COMBAT | 288 | 285 | 283 | 280 | 276 | 273 | 269 | 265 | 262 | | | |
| | | | | | | | | | | | | | |
| 8,000 FEET | 300 | 58 | 62 | 65 | 69 | 73 | 77 | 81 | 85 | 89 | | | |
| | 330 | 66 | 71 | 76 | 81 | 86 | 91 | 96 | 101 | 106 | 8,000 FEET (−1 °C) | −40 | 0.9253 |
| | 360 | 76 | 82 | 88 | 94 | 100 | 107 | 113 | 120 | 127 | | −20 | 0.9642 |
| | 390 | 87 | 94 | 102 | 110 | 119 | 127 | 136 | 145 | 154 | | 0 | 1.0016 |
| | 420 | 100 | 110 | 120 | 131 | 143 | 154 | 165 | 178 | 190 | | 20 | 1.0376 |
| | 450 | 115 | 129 | 143 | 158 | 173 | 189 | 206 | 223 | | | 40 | 1.0724 |
| | 480 | 136 | 155 | 174 | 195 | 218 | 240 | | | | | | |
| | 510 | 184 | 211 | 239 | | | | | | | | | |
| | MAX CONT. | 177 | 175 | 173 | 171 | 169 | 167 | 166 | 165 | 164 | | | |
| | MAX | 238 | 235 | 233 | 230 | 227 | 224 | 221 | 218 | 216 | | | |
| | COMBAT | 260 | 257 | 254 | 251 | 248 | 244 | 240 | 237 | 234 | | | |
| | | | | | | | | | | | | | |
| 12,000 FEET | 300 | 55 | 59 | 63 | 66 | 70 | 74 | 78 | 82 | 86 | | | |
| | 330 | 63 | 68 | 73 | 78 | 83 | 88 | 93 | 99 | 104 | 12,000 FEET (−9 °C) | −40 | 0.9391 |
| | 360 | 73 | 79 | 85 | 92 | 99 | 106 | 113 | 120 | 127 | | −20 | 0.9785 |
| | 390 | 84 | 93 | 101 | 110 | 120 | 129 | 138 | 148 | 159 | | 0 | 1.0165 |
| | 420 | 98 | 109 | 121 | 134 | 147 | 160 | 175 | 190 | | | 20 | 1.0530 |
| | 450 | 117 | 133 | 150 | 168 | 187 | 206 | | | | | 40 | 1.0883 |
| | 480 | 165 | 190 | 209 | | | | | | | | | |
| | MAX CONT. | 160 | 158 | 156 | 154 | 153 | 151 | 150 | 148 | 147 | | | |
| | MAX | 212 | 210 | 208 | 206 | 203 | 200 | 197 | 194 | 192 | | | |
| | COMBAT | 230 | 228 | 225 | 223 | 220 | 217 | 214 | 211 | 208 | | | |

**Figure 5-8. Low Altitude Cruise, F402-RR-408 Series Engine (Sheet 2 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 18,000 POUNDS

**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

TOTAL FUEL FLOW - LB/MIN

| ALTITUDE | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL | 300 | 64 | 69 | 73 | 77 | 81 | 85 | 89 | 93 | 97 |
| | 330 | 73 | 78 | 83 | 88 | 93 | 98 | 103 | 107 | 112 |
| | 360 | 83 | 89 | 95 | 101 | 107 | 113 | 119 | 125 | 131 |
| | 390 | 94 | 101 | 109 | 116 | 123 | 131 | 138 | 146 | 154 |
| | 420 | 107 | 116 | 125 | 134 | 143 | 152 | 162 | 172 | 182 |
| | 450 | 121 | 132 | 143 | 154 | 166 | 178 | 191 | 203 | 216 |
| | 480 | 138 | 152 | 166 | 182 | 197 | 213 | 229 | 246 | 263 |
| | 510 | 157 | 175 | 194 | 214 | 235 | 256 | 278 | | |
| | 540 | 181 | 205 | 231 | 258 | 286 | | | | |
| | 570 | 230 | 264 | 291 | | | | | | |
| | MAX CONT. | 216 | 213 | 210 | 208 | 205 | 204 | 202 | 201 | 200 |
| | MAX | 289 | 287 | 284 | 281 | 278 | 275 | 272 | 269 | 267 |
| | COMBAT | 310 | 309 | 308 | 306 | 305 | 304 | 301 | 297 | 294 |
| | | | | | | | | | | |
| 4,000 FEET | 300 | 61 | 65 | 69 | 73 | 77 | 81 | 85 | 89 | 93 |
| | 330 | 70 | 75 | 80 | 84 | 89 | 94 | 99 | 104 | 109 |
| | 360 | 79 | 85 | 92 | 98 | 104 | 110 | 116 | 122 | 129 |
| | 390 | 90 | 98 | 105 | 113 | 121 | 128 | 137 | 145 | 153 |
| | 420 | 102 | 112 | 121 | 131 | 141 | 151 | 161 | 172 | 183 |
| | 450 | 117 | 129 | 141 | 154 | 167 | 181 | 195 | 209 | 224 |
| | 480 | 134 | 150 | 167 | 184 | 202 | 220 | 240 | 260 | |
| | 510 | 157 | 179 | 201 | 225 | 250 | | | | |
| | 540 | 205 | 235 | 267 | | | | | | |
| | MAX CONT. | 195 | 193 | 191 | 188 | 187 | 185 | 183 | 182 | 181 |
| | MAX | 263 | 261 | 258 | 255 | 252 | 249 | 246 | 243 | 241 |
| | COMBAT | 288 | 286 | 283 | 280 | 277 | 273 | 269 | 266 | 262 |
| | | | | | | | | | | |
| 8,000 FEET | 300 | 59 | 62 | 66 | 70 | 74 | 78 | 82 | 86 | 90 |
| | 330 | 66 | 71 | 76 | 81 | 86 | 91 | 96 | 101 | 106 |
| | 360 | 76 | 82 | 88 | 94 | 101 | 107 | 114 | 120 | 127 |
| | 390 | 87 | 95 | 102 | 110 | 119 | 127 | 136 | 145 | 154 |
| | 420 | 100 | 110 | 120 | 131 | 142 | 154 | 165 | 177 | 190 |
| | 450 | 115 | 128 | 143 | 157 | 173 | 189 | 206 | 223 | |
| | 480 | 136 | 154 | 174 | 195 | 217 | 239 | | | |
| | 510 | 183 | 210 | 238 | | | | | | |
| | MAX CONT. | 177 | 175 | 173 | 171 | 169 | 167 | 166 | 165 | 164 |
| | MAX | 238 | 235 | 233 | 230 | 227 | 224 | 221 | 218 | 216 |
| | COMBAT | 260 | 257 | 254 | 251 | 248 | 244 | 241 | 237 | 234 |
| | | | | | | | | | | |
| 12,000 FEET | 300 | 56 | 60 | 63 | 67 | 71 | 75 | 79 | 83 | 87 |
| | 330 | 63 | 68 | 73 | 78 | 84 | 89 | 94 | 99 | 105 |
| | 360 | 73 | 79 | 86 | 92 | 99 | 106 | 113 | 120 | 128 |
| | 390 | 84 | 93 | 101 | 110 | 120 | 129 | 139 | 149 | 159 |
| | 420 | 97 | 109 | 121 | 134 | 146 | 160 | 175 | 189 | |
| | 450 | 117 | 133 | 150 | 168 | 187 | 205 | | | |
| | 480 | 164 | 189 | 208 | | | | | | |
| | MAX CONT. | 160 | 158 | 156 | 154 | 153 | 151 | 150 | 148 | 147 |
| | MAX | 213 | 210 | 208 | 206 | 203 | 200 | 197 | 194 | 192 |
| | COMBAT | 230 | 228 | 225 | 223 | 220 | 217 | 214 | 211 | 208 |

TEMPERATURE EFFECTS ON FUEL FLOW

| ALTITUDE | °C | CRUISE |
|---|---|---|
| SEA LEVEL (15 °C) | −40 | 0.8995 |
| | −20 | 0.9373 |
| | 0 | 0.9736 |
| | 20 | 1.0086 |
| | 40 | 1.0424 |
| 4,000 FEET (7 °C) | −40 | 0.9121 |
| | −20 | 0.9505 |
| | 0 | 0.9873 |
| | 20 | 1.0228 |
| | 40 | 1.0571 |
| 8,000 FEET (−1 °C) | −40 | 0.9253 |
| | −20 | 0.9642 |
| | 0 | 1.0016 |
| | 20 | 1.0376 |
| | 40 | 1.0724 |
| 12,000 FEET (−9 °C) | −40 | 0.9391 |
| | −20 | 0.9785 |
| | 0 | 1.0165 |
| | 20 | 1.0530 |
| | 40 | 1.0883 |

**Figure 5-8. Low Altitude Cruise, F402-RR-408 Series Engine (Sheet 3 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 20,000 POUNDS

**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 66 | 70 | 74 | 78 | 82 | 86 | 90 | 94 | 98 | SEA LEVEL (15 °C) | | |
| | 330 | 73 | 79 | 83 | 88 | 93 | 98 | 103 | 108 | 113 | | −40 | 0.8995 |
| | 360 | 83 | 89 | 95 | 101 | 107 | 113 | 119 | 126 | 132 | | −20 | 0.9373 |
| | 390 | 94 | 102 | 109 | 116 | 124 | 131 | 138 | 146 | 154 | | 0 | 0.9736 |
| | 420 | 107 | 116 | 125 | 134 | 143 | 152 | 162 | 172 | 182 | | 20 | 1.0086 |
| | 450 | 121 | 131 | 143 | 154 | 166 | 178 | 190 | 203 | 216 | | 40 | 1.0424 |
| | 480 | 137 | 151 | 166 | 181 | 196 | 212 | 229 | 245 | 262 | | | |
| | 510 | 156 | 175 | 194 | 214 | 234 | 256 | 277 | | | | | |
| | 540 | 180 | 205 | 231 | 257 | 285 | | | | | | | |
| | 570 | 229 | 263 | 290 | | | | | | | | | |
| | MAX CONT. | 216 | 213 | 210 | 208 | 206 | 204 | 202 | 201 | 200 | | | |
| | MAX | 289 | 287 | 285 | 282 | 278 | 275 | 272 | 269 | 267 | | | |
| | COMBAT | 310 | 309 | 308 | 307 | 305 | 304 | 301 | 297 | 294 | | | |
| | | | | | | | | | | | | | |
| 4,000 FEET | 300 | 63 | 67 | 71 | 75 | 79 | 83 | 87 | 91 | 94 | 4,000 FEET (7 °C) | | |
| | 330 | 71 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | | −40 | 0.9121 |
| | 360 | 80 | 86 | 92 | 98 | 104 | 110 | 116 | 123 | 129 | | −20 | 0.9505 |
| | 390 | 91 | 98 | 106 | 113 | 121 | 129 | 137 | 145 | 153 | | 0 | 0.9873 |
| | 420 | 103 | 112 | 121 | 131 | 141 | 151 | 161 | 172 | 183 | | 20 | 1.0228 |
| | 450 | 117 | 129 | 141 | 154 | 167 | 180 | 194 | 209 | 224 | | 40 | 1.0571 |
| | 480 | 134 | 150 | 167 | 183 | 201 | 220 | 239 | 259 | | | | |
| | 510 | 157 | 178 | 201 | 225 | 249 | | | | | | | |
| | 540 | 204 | 234 | 266 | | | | | | | | | |
| | MAX CONT. | 195 | 193 | 191 | 188 | 187 | 185 | 183 | 182 | 181 | | | |
| | MAX | 263 | 261 | 258 | 256 | 252 | 249 | 246 | 243 | 241 | | | |
| | COMBAT | 288 | 286 | 283 | 280 | 277 | 273 | 269 | 266 | 262 | | | |
| | | | | | | | | | | | | | |
| 8,000 FEET | 300 | 60 | 64 | 68 | 71 | 75 | 79 | 83 | 87 | 91 | 8,000 FEET (−1 °C) | | |
| | 330 | 67 | 72 | 76 | 82 | 87 | 92 | 97 | 102 | 107 | | −40 | 0.9253 |
| | 360 | 76 | 82 | 88 | 95 | 101 | 107 | 114 | 121 | 128 | | −20 | 0.9642 |
| | 390 | 87 | 95 | 103 | 111 | 119 | 128 | 136 | 145 | 154 | | 0 | 1.0016 |
| | 420 | 100 | 110 | 120 | 131 | 143 | 154 | 165 | 178 | 190 | | 20 | 1.0376 |
| | 450 | 115 | 128 | 143 | 157 | 172 | 189 | 206 | 223 | | | 40 | 1.0724 |
| | 480 | 135 | 154 | 173 | 194 | 216 | 239 | | | | | | |
| | 510 | 182 | 209 | 237 | | | | | | | | | |
| | MAX CONT. | 177 | 175 | 173 | 171 | 169 | 167 | 166 | 165 | 164 | | | |
| | MAX | 238 | 235 | 233 | 231 | 227 | 224 | 221 | 218 | 216 | | | |
| | COMBAT | 260 | 257 | 254 | 252 | 249 | 244 | 241 | 237 | 234 | | | |
| | | | | | | | | | | | | | |
| 12,000 FEET | 300 | 57 | 61 | 65 | 69 | 73 | 76 | 80 | 84 | 89 | 12,000 FEET (−9 °C) | | |
| | 330 | 64 | 69 | 74 | 79 | 84 | 89 | 95 | 100 | 106 | | −40 | 0.9391 |
| | 360 | 73 | 80 | 86 | 93 | 100 | 107 | 114 | 121 | 128 | | −20 | 0.9785 |
| | 390 | 84 | 93 | 102 | 111 | 120 | 129 | 139 | 149 | 159 | | 0 | 1.0165 |
| | 420 | 98 | 109 | 121 | 134 | 147 | 160 | 175 | 190 | | | 20 | 1.0530 |
| | 450 | 116 | 133 | 149 | 167 | 187 | 205 | | | | | 40 | 1.0883 |
| | 480 | 164 | 188 | 208 | | | | | | | | | |
| | MAX CONT. | 160 | 158 | 156 | 154 | 153 | 151 | 149 | 148 | 147 | | | |
| | MAX | 213 | 210 | 208 | 206 | 203 | 200 | 197 | 194 | 192 | | | |
| | COMBAT | 231 | 228 | 225 | 223 | 220 | 217 | 214 | 211 | 208 | | | |

**Figure 5-8. Low Altitude Cruise, F402-RR-408 Series Engine (Sheet 4 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 22,000 POUNDS

**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 67 | 71 | 75 | 79 | 83 | 87 | 92 | 96 | 100 | SEA LEVEL (15 °C) | | |
| | 330 | 74 | 80 | 84 | 89 | 94 | 99 | 104 | 109 | 114 | | −40 | 0.8995 |
| | 360 | 84 | 90 | 96 | 102 | 108 | 114 | 120 | 126 | 132 | | −20 | 0.9373 |
| | 390 | 95 | 102 | 109 | 117 | 124 | 131 | 139 | 147 | 155 | | 0 | 0.9736 |
| | 420 | 107 | 116 | 125 | 134 | 143 | 152 | 162 | 172 | 182 | | 20 | 1.0086 |
| | 450 | 121 | 131 | 143 | 154 | 166 | 178 | 190 | 203 | 216 | | 40 | 1.0424 |
| | 480 | 137 | 151 | 166 | 181 | 196 | 212 | 228 | 245 | 262 | | | |
| | 510 | 156 | 174 | 193 | 213 | 234 | 255 | 277 | | | | | |
| | 540 | 180 | 204 | 230 | 257 | 284 | | | | | | | |
| | 570 | 228 | 261 | 290 | | | | | | | | | |
| | MAX CONT. | 216 | 213 | 210 | 208 | 206 | 204 | 202 | 201 | 200 | | | |
| | MAX | 289 | 287 | 285 | 282 | 278 | 275 | 272 | 269 | 267 | | | |
| | COMBAT | 310 | 309 | 308 | 307 | 305 | 304 | 301 | 297 | 294 | | | |
| | | | | | | | | | | | | | |
| 4,000 FEET | 300 | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | 96 | 4,000 FEET (7 °C) | | |
| | 330 | 71 | 76 | 81 | 86 | 91 | 96 | 101 | 106 | 111 | | -40 | 0.9121 |
| | 360 | 80 | 86 | 93 | 99 | 105 | 111 | 117 | 123 | 130 | | -20 | 0.9505 |
| | 390 | 91 | 98 | 106 | 114 | 121 | 129 | 137 | 145 | 154 | | 0 | 0.9873 |
| | 420 | 103 | 112 | 121 | 131 | 141 | 151 | 162 | 172 | 183 | | 20 | 1.0228 |
| | 450 | 117 | 129 | 141 | 154 | 167 | 180 | 194 | 209 | 224 | | 40 | 1.0571 |
| | 480 | 134 | 150 | 166 | 183 | 201 | 220 | 239 | 259 | | | | |
| | 510 | 157 | 178 | 200 | 224 | 249 | | | | | | | |
| | 540 | 203 | 233 | 265 | | | | | | | | | |
| | MAX CONT. | 196 | 193 | 191 | 188 | 187 | 185 | 183 | 182 | 181 | | | |
| | MAX | 263 | 261 | 258 | 256 | 252 | 249 | 246 | 243 | 241 | | | |
| | COMBAT | 288 | 286 | 283 | 280 | 277 | 273 | 269 | 266 | 262 | | | |
| | | | | | | | | | | | | | |
| 8,000 FEET | 300 | 61 | 65 | 69 | 73 | 77 | 81 | 85 | 89 | 93 | 8,000 FEET (−1 °C) | | |
| | 330 | 68 | 73 | 78 | 83 | 88 | 93 | 98 | 103 | 108 | | −40 | 0.9253 |
| | 360 | 77 | 83 | 89 | 95 | 102 | 108 | 115 | 121 | 128 | | −20 | 0.9642 |
| | 390 | 87 | 95 | 103 | 111 | 119 | 128 | 137 | 145 | 154 | | 0 | 1.0016 |
| | 420 | 100 | 110 | 121 | 132 | 143 | 154 | 166 | 178 | 191 | | 20 | 1.0376 |
| | 450 | 115 | 128 | 143 | 157 | 173 | 189 | 206 | 223 | | | 40 | 1.0724 |
| | 480 | 135 | 154 | 173 | 194 | 216 | 238 | | | | | | |
| | 510 | 181 | 208 | 236 | | | | | | | | | |
| | MAX CONT. | 177 | 175 | 173 | 171 | 169 | 167 | 166 | 165 | 163 | | | |
| | MAX | 238 | 235 | 233 | 231 | 227 | 224 | 221 | 218 | 216 | | | |
| | COMBAT | 260 | 257 | 254 | 252 | 249 | 245 | 241 | 237 | 234 | | | |
| | | | | | | | | | | | | | |
| 12,000 FEET | 300 | 58 | 62 | 66 | 70 | 74 | 78 | 82 | 86 | 90 | 12,000 FEET (−9 °C) | | |
| | 330 | 65 | 70 | 75 | 80 | 85 | 91 | 96 | 101 | 107 | | −40 | 0.9391 |
| | 360 | 74 | 80 | 87 | 94 | 100 | 107 | 114 | 122 | 129 | | −20 | 0.9785 |
| | 390 | 85 | 93 | 102 | 111 | 120 | 130 | 139 | 149 | 160 | | 0 | 1.0165 |
| | 420 | 98 | 109 | 122 | 134 | 147 | 160 | 175 | 190 | | | 20 | 1.0530 |
| | 450 | 116 | 133 | 149 | 167 | 187 | 205 | | | | | 40 | 1.0883 |
| | 480 | 163 | 188 | 207 | | | | | | | | | |
| | MAX CONT. | 160 | 158 | 157 | 154 | 153 | 151 | 149 | 148 | 147 | | | |
| | MAX | 213 | 210 | 208 | 206 | 203 | 200 | 197 | 194 | 192 | | | |
| | COMBAT | 231 | 228 | 225 | 223 | 220 | 217 | 214 | 211 | 208 | | | |

**Figure 5-8. Low Altitude Cruise, F402-RR-408 Series Engine (Sheet 5 of 7)**

# *LOW ALTITUDE CRUISE*

GROSS WEIGHT - 24,000 POUNDS

**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 69 | 73 | 77 | 81 | 85 | 89 | 93 | 97 | 101 | SEA LEVEL (15 °C) | | |
| | 330 | 76 | 81 | 86 | 91 | 96 | 100 | 105 | 110 | 115 | | −40 | 0.8995 |
| | 360 | 85 | 91 | 97 | 103 | 109 | 115 | 121 | 127 | 133 | | −20 | 0.9373 |
| | 390 | 95 | 102 | 110 | 117 | 124 | 132 | 139 | 147 | 155 | | 0 | 0.9736 |
| | 420 | 107 | 116 | 125 | 134 | 143 | 153 | 163 | 172 | 182 | | 20 | 1.0086 |
| | 450 | 121 | 132 | 143 | 154 | 166 | 178 | 191 | 203 | 216 | | 40 | 1.0424 |
| | 480 | 137 | 151 | 166 | 181 | 196 | 212 | 228 | 245 | 262 | | | |
| | 510 | 155 | 174 | 193 | 213 | 234 | 255 | 277 | | | | | |
| | 540 | 179 | 204 | 229 | 256 | 284 | | | | | | | |
| | 570 | 227 | 260 | 289 | | | | | | | | | |
| | MAX CONT. | 216 | 213 | 210 | 208 | 206 | 204 | 202 | 201 | 200 | | | |
| | MAX | 289 | 287 | 285 | 282 | 279 | 275 | 272 | 269 | 267 | | | |
| | COMBAT | 310 | 309 | 308 | 307 | 305 | 304 | 301 | 297 | 294 | | | |
| | | | | | | | | | | | | | |
| 4,000 FEET | 300 | 66 | 70 | 74 | 78 | 82 | 86 | 90 | 94 | 98 | 4,000 FEET (7 °C) | | |
| | 330 | 73 | 78 | 82 | 87 | 92 | 97 | 102 | 107 | 112 | | −40 | 0.9121 |
| | 360 | 81 | 87 | 93 | 99 | 106 | 112 | 118 | 124 | 131 | | −20 | 0.9505 |
| | 390 | 92 | 99 | 106 | 114 | 122 | 129 | 138 | 146 | 154 | | 0 | 0.9873 |
| | 420 | 103 | 112 | 122 | 131 | 141 | 152 | 162 | 172 | 183 | | 20 | 1.0228 |
| | 450 | 117 | 129 | 141 | 154 | 167 | 181 | 195 | 209 | 224 | | 40 | 1.0571 |
| | 480 | 134 | 150 | 166 | 183 | 201 | 220 | 239 | 259 | | | | |
| | 510 | 156 | 178 | 200 | 224 | 249 | | | | | | | |
| | 540 | 202 | 232 | 264 | | | | | | | | | |
| | MAX CONT. | 196 | 194 | 191 | 189 | 187 | 185 | 183 | 182 | 181 | | | |
| | MAX | 263 | 261 | 259 | 256 | 252 | 249 | 246 | 243 | 241 | | | |
| | COMBAT | 288 | 286 | 283 | 280 | 277 | 273 | 269 | 266 | 262 | | | |
| | | | | | | | | | | | | | |
| 8,000 FEET | 300 | 63 | 67 | 71 | 75 | 79 | 82 | 86 | 90 | 95 | 8,000 FEET (-1 °C) | | |
| | 330 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 104 | 109 | | -40 | 0.9253 |
| | 360 | 78 | 84 | 90 | 96 | 103 | 109 | 116 | 122 | 129 | | -20 | 0.9642 |
| | 390 | 88 | 96 | 104 | 112 | 120 | 128 | 137 | 146 | 155 | | 0 | 1.0016 |
| | 420 | 100 | 111 | 121 | 132 | 143 | 154 | 166 | 178 | 191 | | 20 | 1.0376 |
| | 450 | 115 | 129 | 143 | 157 | 173 | 189 | 206 | 223 | | | 40 | 1.0724 |
| | 480 | 135 | 154 | 173 | 194 | 216 | 238 | | | | | | |
| | 510 | 181 | 208 | 235 | | | | | | | | | |
| | MAX CONT. | 177 | 175 | 173 | 171 | 169 | 167 | 166 | 165 | 163 | | | |
| | MAX | 238 | 235 | 233 | 231 | 227 | 224 | 221 | 218 | 216 | | | |
| | COMBAT | 260 | 257 | 254 | 252 | 249 | 245 | 241 | 237 | 234 | | | |
| | | | | | | | | | | | | | |
| 12,000 FEET | 300 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | 12,000 FEET (−9 °C) | | |
| | 330 | 66 | 71 | 76 | 81 | 87 | 92 | 97 | 103 | 108 | | −40 | 0.9391 |
| | 360 | 75 | 81 | 88 | 94 | 101 | 108 | 115 | 123 | 130 | | −20 | 0.9785 |
| | 390 | 85 | 94 | 103 | 112 | 121 | 130 | 140 | 150 | 160 | | 0 | 1.0165 |
| | 420 | 98 | 110 | 122 | 134 | 147 | 161 | 175 | 190 | | | 20 | 1.0530 |
| | 450 | 116 | 133 | 149 | 167 | 187 | 205 | | | | | 40 | 1.0883 |
| | 480 | 163 | 187 | 207 | | | | | | | | | |
| | MAX CONT. | 160 | 158 | 157 | 154 | 152 | 151 | 149 | 148 | 147 | | | |
| | MAX | 213 | 210 | 208 | 206 | 203 | 200 | 197 | 194 | 192 | | | |
| | COMBAT | 231 | 228 | 225 | 223 | 220 | 217 | 214 | 211 | 208 | | | |

**Figure 5-8. Low Altitude Cruise, F402-RR-408 Series Engine (Sheet 6 of 7)**

# LOW ALTITUDE CRUISE

GROSS WEIGHT - 26,000 POUNDS

**REMARKS**
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 17 NOVEMBER 1993
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| | TOTAL FUEL FLOW - LB/MIN | | | | | | | | | | TEMPERATURE EFFECTS ON FUEL FLOW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KCAS \ DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | °C | CRUISE |
| SEA LEVEL | 300 | 71 | 75 | 79 | 83 | 87 | 91 | 95 | 99 | 103 | SEA LEVEL (15 °C) | | |
| | 330 | 77 | 82 | 87 | 92 | 97 | 102 | 107 | 112 | 117 | | −40 | 0.8995 |
| | 360 | 86 | 92 | 98 | 104 | 110 | 116 | 122 | 128 | 134 | | −20 | 0.9373 |
| | 390 | 96 | 103 | 110 | 118 | 125 | 132 | 140 | 148 | 156 | | 0 | 0.9736 |
| | 420 | 108 | 117 | 125 | 135 | 144 | 153 | 163 | 173 | 183 | | 20 | 1.0086 |
| | 450 | 121 | 132 | 143 | 155 | 167 | 179 | 191 | 203 | 217 | | 40 | 1.0424 |
| | 480 | 137 | 151 | 166 | 181 | 196 | 212 | 228 | 245 | 262 | | | |
| | 510 | 155 | 174 | 193 | 213 | 234 | 255 | 277 | | | | | |
| | 540 | 179 | 203 | 229 | 256 | 283 | | | | | | | |
| | 570 | 226 | 260 | 288 | | | | | | | | | |
| | MAX CONT. | 216 | 213 | 210 | 208 | 206 | 204 | 202 | 201 | 200 | | | |
| | MAX | 289 | 287 | 285 | 282 | 279 | 275 | 272 | 270 | 267 | | | |
| | COMBAT | 310 | 309 | 308 | 307 | 305 | 304 | 301 | 297 | 294 | | | |
| | | | | | | | | | | | | | |
| 4,000 FEET | 300 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | 96 | 100 | 4,000 FEET (7 °C) | | |
| | 330 | 74 | 79 | 84 | 89 | 94 | 99 | 103 | 108 | 113 | | −40 | 0.9121 |
| | 360 | 82 | 88 | 94 | 100 | 107 | 113 | 119 | 125 | 132 | | −20 | 0.9505 |
| | 390 | 92 | 100 | 107 | 115 | 122 | 130 | 138 | 147 | 155 | | 0 | 0.9873 |
| | 420 | 103 | 113 | 122 | 132 | 142 | 152 | 162 | 173 | 184 | | 20 | 1.0228 |
| | 450 | 117 | 129 | 142 | 155 | 168 | 181 | 195 | 209 | 224 | | 40 | 1.0571 |
| | 480 | 134 | 150 | 166 | 183 | 201 | 220 | 239 | 259 | | | | |
| | 510 | 156 | 177 | 200 | 224 | 248 | | | | | | | |
| | 540 | 202 | 232 | 263 | | | | | | | | | |
| | MAX CONT. | 196 | 194 | 191 | 188 | 187 | 185 | 183 | 182 | 181 | | | |
| | MAX | 264 | 261 | 259 | 256 | 252 | 249 | 246 | 243 | 241 | | | |
| | COMBAT | 288 | 286 | 283 | 280 | 277 | 273 | 269 | 266 | 262 | | | |
| | | | | | | | | | | | | | |
| 8,000 FEET | 300 | 65 | 69 | 73 | 77 | 81 | 84 | 88 | 92 | 96 | 8,000 FEET (−1 °C) | | |
| | 330 | 71 | 76 | 81 | 85 | 90 | 95 | 100 | 106 | 111 | | −40 | 0.9253 |
| | 360 | 79 | 85 | 91 | 97 | 104 | 110 | 117 | 123 | 130 | | −20 | 0.9642 |
| | 390 | 89 | 96 | 104 | 112 | 121 | 129 | 138 | 147 | 156 | | 0 | 1.0016 |
| | 420 | 101 | 111 | 121 | 132 | 143 | 155 | 166 | 179 | 191 | | 20 | 1.0376 |
| | 450 | 115 | 129 | 143 | 158 | 173 | 189 | 206 | 223 | | | 40 | 1.0724 |
| | 480 | 135 | 154 | 173 | 194 | 216 | 238 | | | | | | |
| | 510 | 180 | 207 | 235 | | | | | | | | | |
| | MAX CONT. | 177 | 175 | 173 | 171 | 169 | 167 | 166 | 165 | 163 | | | |
| | MAX | 238 | 235 | 233 | 231 | 227 | 224 | 221 | 218 | 216 | | | |
| | COMBAT | 260 | 257 | 255 | 252 | 249 | 245 | 241 | 237 | 234 | | | |
| | | | | | | | | | | | | | |
| 12,000 FEET | 300 | 62 | 66 | 70 | 74 | 78 | 82 | 86 | 90 | 94 | 12,000 FEET (−9 °C) | | |
| | 330 | 68 | 73 | 78 | 83 | 88 | 93 | 99 | 104 | 110 | | −40 | 0.9391 |
| | 360 | 76 | 82 | 89 | 96 | 102 | 109 | 117 | 124 | 131 | | −20 | 0.9785 |
| | 390 | 86 | 95 | 103 | 113 | 122 | 131 | 141 | 151 | 161 | | 0 | 1.0165 |
| | 420 | 98 | 110 | 122 | 135 | 148 | 161 | 176 | 191 | | | 20 | 1.0530 |
| | 450 | 117 | 133 | 149 | 167 | 187 | 205 | | | | | 40 | 1.0883 |
| | 480 | 162 | 187 | 207 | | | | | | | | | |
| | MAX CONT. | 160 | 158 | 157 | 154 | 152 | 151 | 149 | 148 | 147 | | | |
| | MAX | 213 | 210 | 208 | 206 | 203 | 200 | 197 | 194 | 191 | | | |
| | COMBAT | 231 | 228 | 225 | 223 | 220 | 217 | 214 | 211 | 208 | | | |

Figure 5-8. Low Altitude Cruise, F402-RR-408 Series Engine (Sheet 7 of 7)

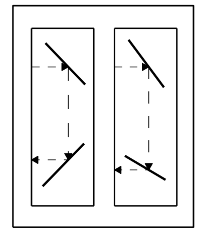
# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

0.50 MACH

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962




DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

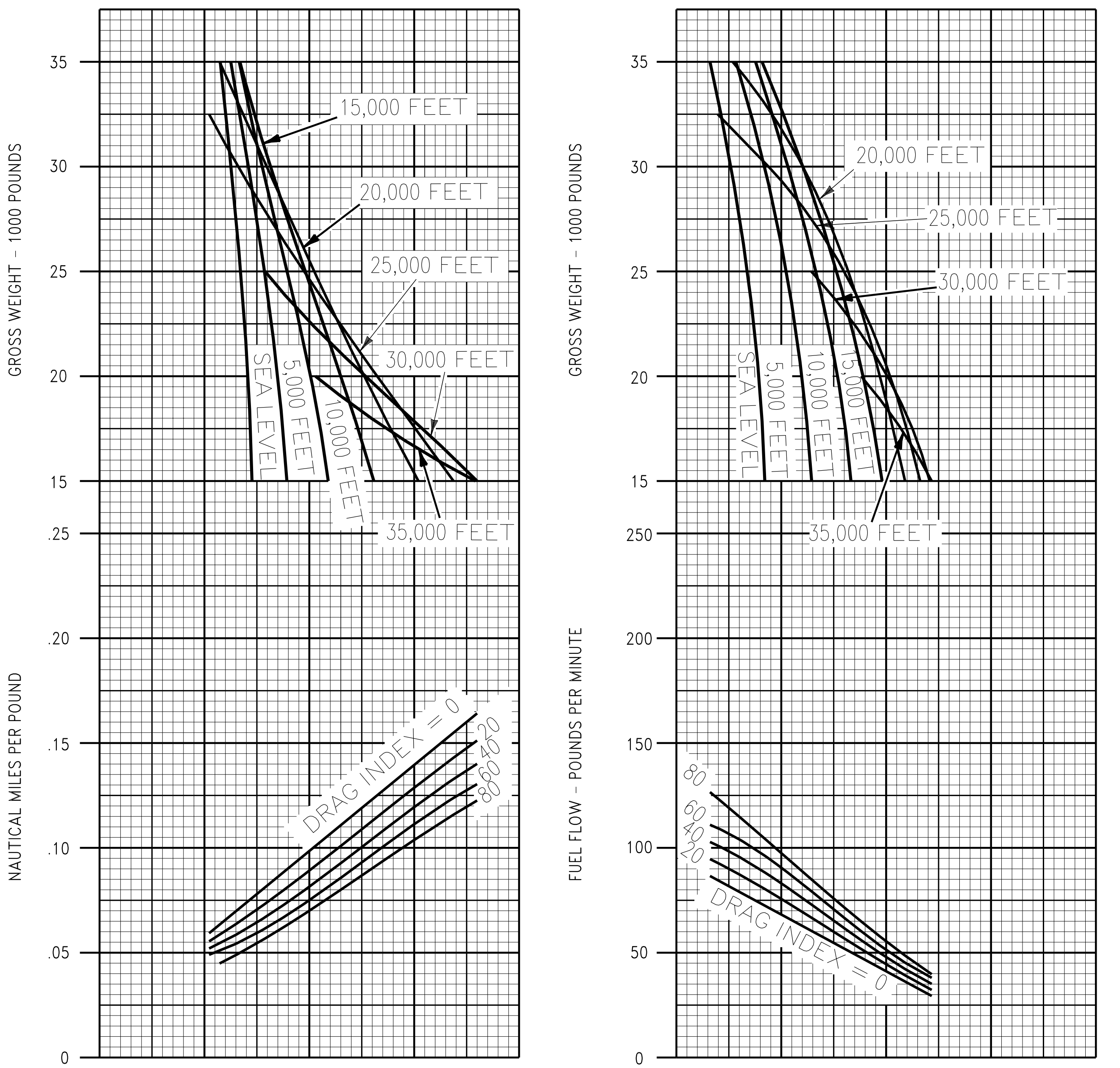



**Figure 5-9. Constant Mach/Altitude Cruise, F402-RR-408 Series Engine (Sheet 1 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

0.55 MACH

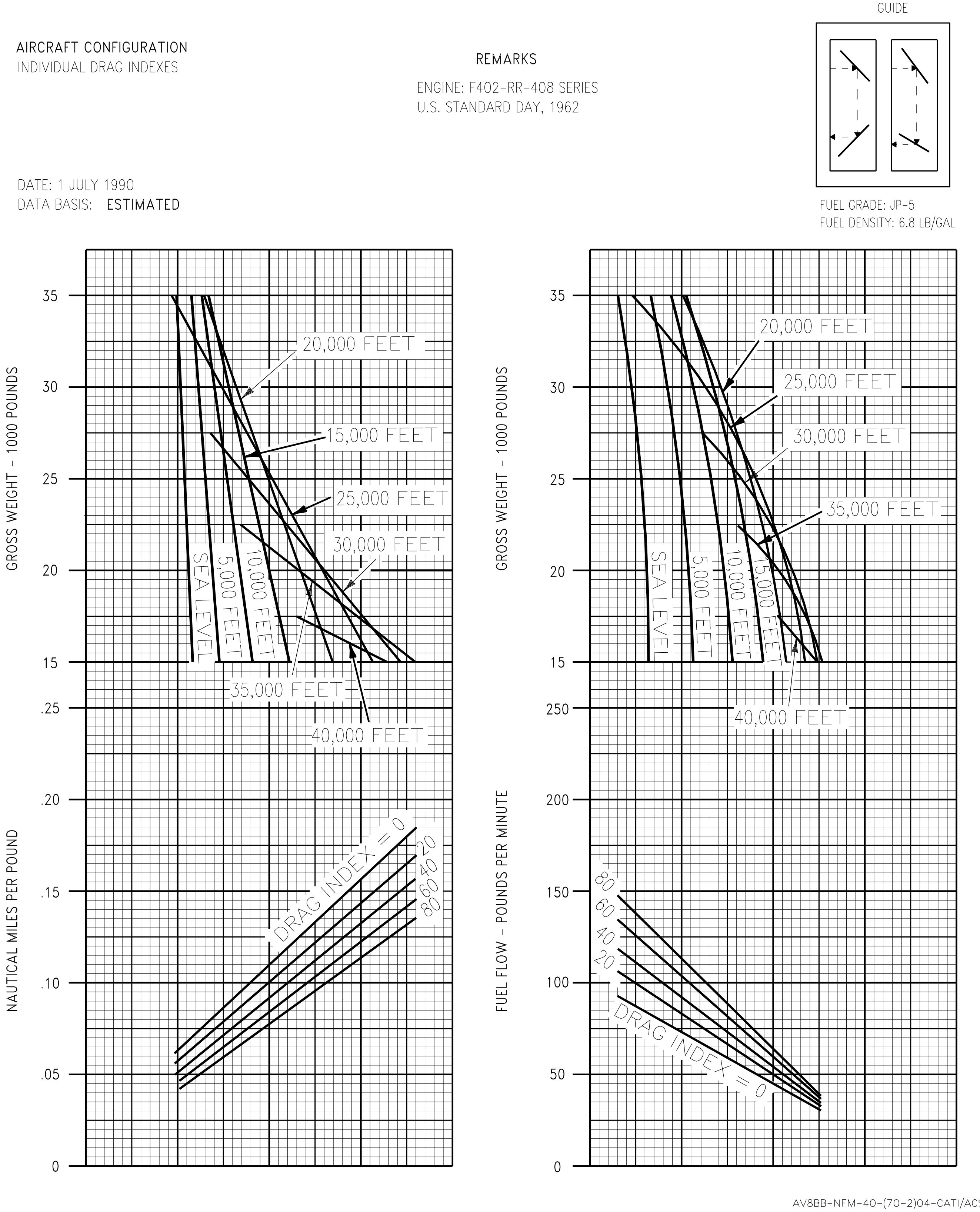



Figure 5-9. Constant Mach/Altitude Cruise, F402-RR-408 Series Engine (Sheet 2 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

O.6O MACH

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

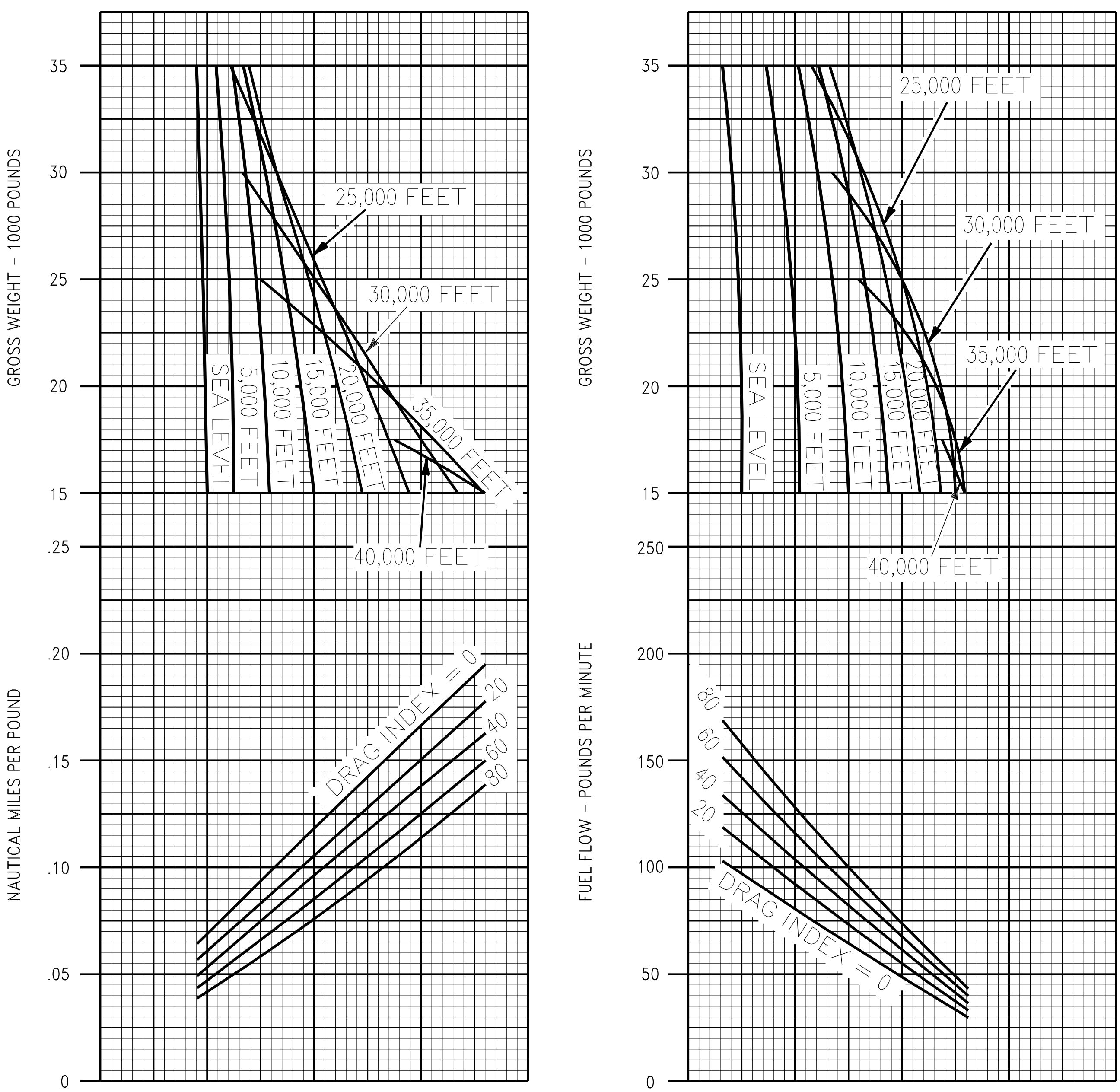
REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

GUIDE

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(70-3)04-CATI/ACS

**Figure 5-9. Constant Mach/Altitude Cruise, F402-RR-408 Series Engine (Sheet 3 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

0.65 MACH

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

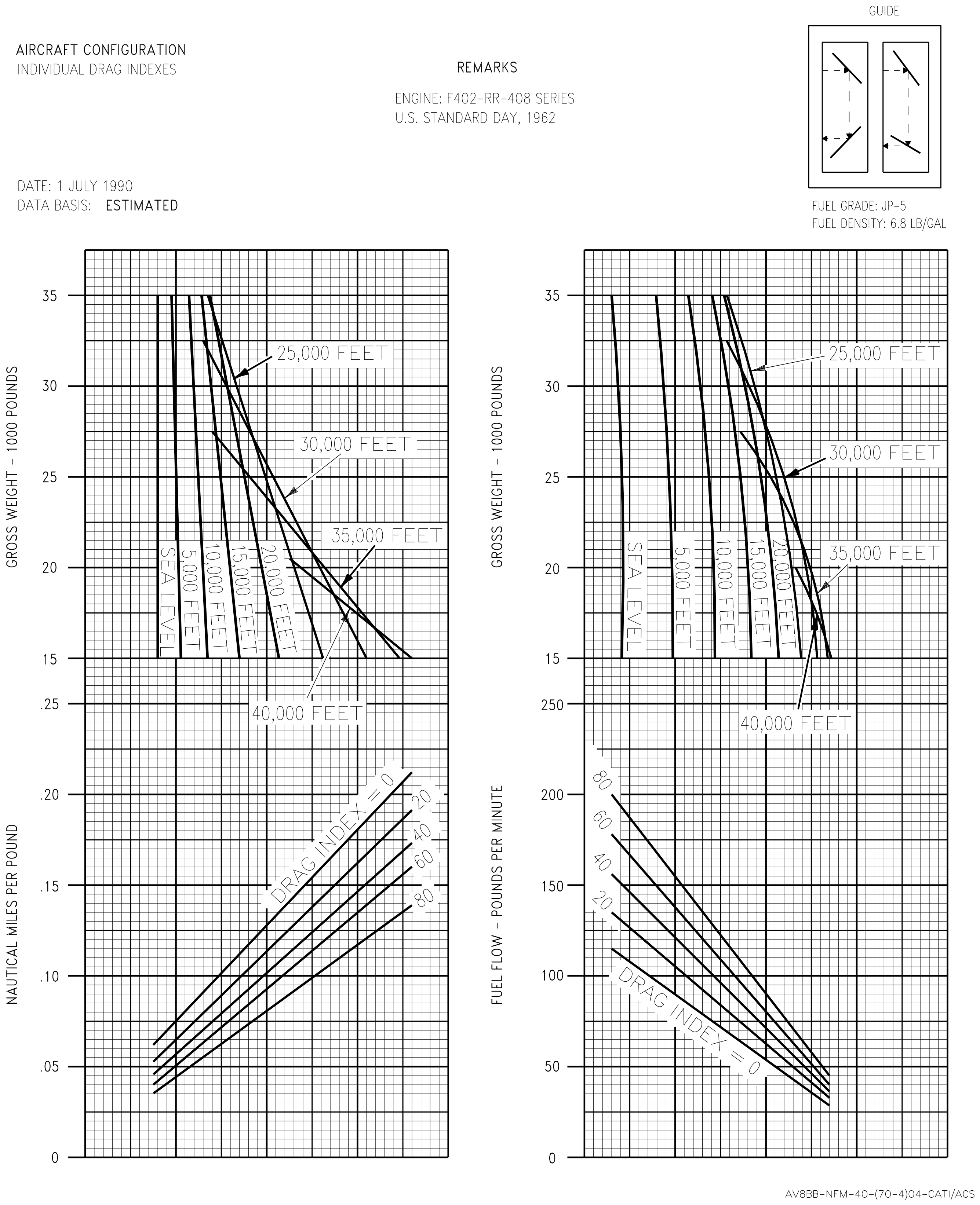



Figure 5-9. Constant Mach/Altitude Cruise, F402-RR-408 Series Engine (Sheet 4 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

O.70 MACH

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

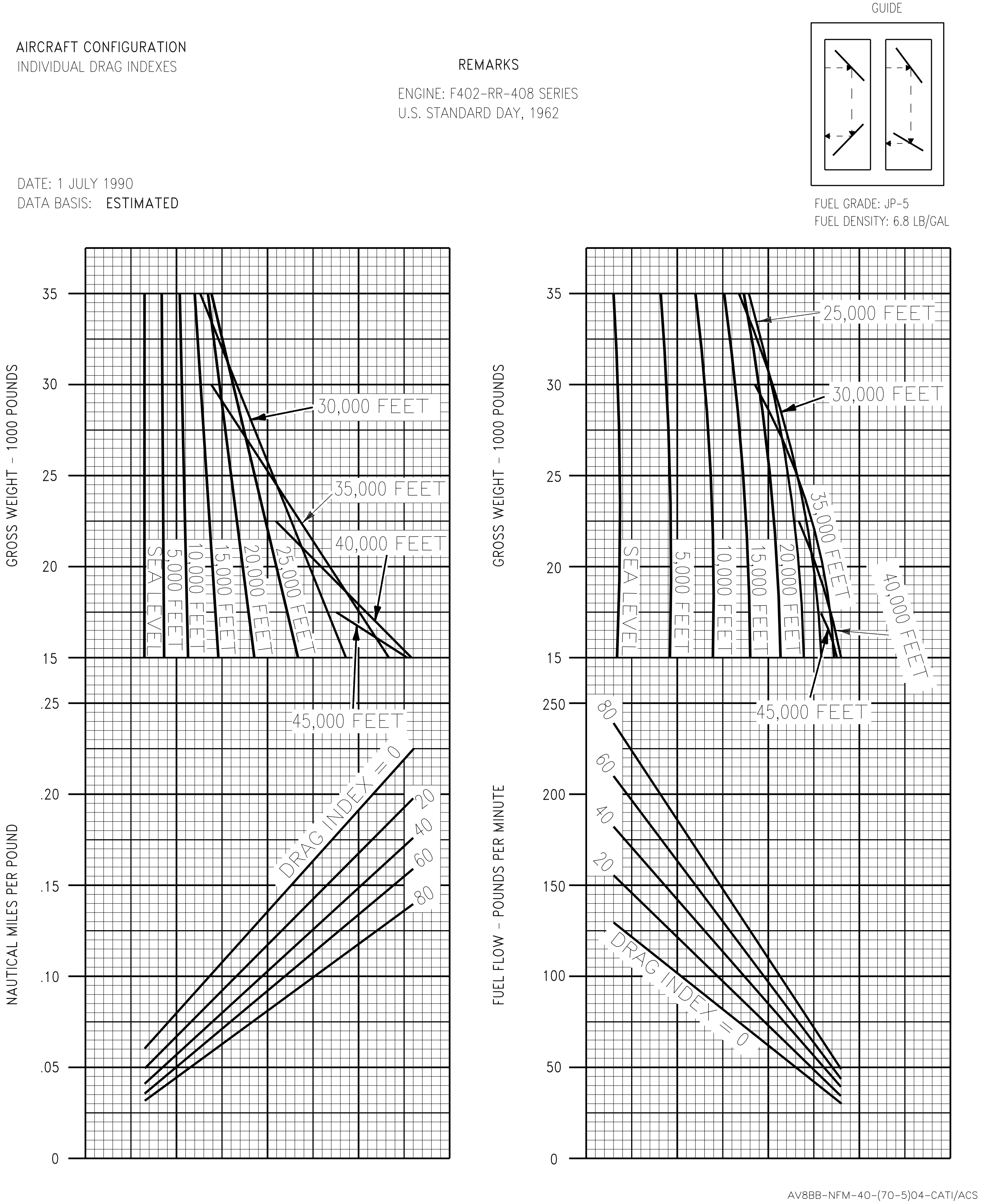



Figure 5-9. Constant Mach/Altitude Cruise, F402-RR-408 Series Engine (Sheet 5 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

0.75 MACH

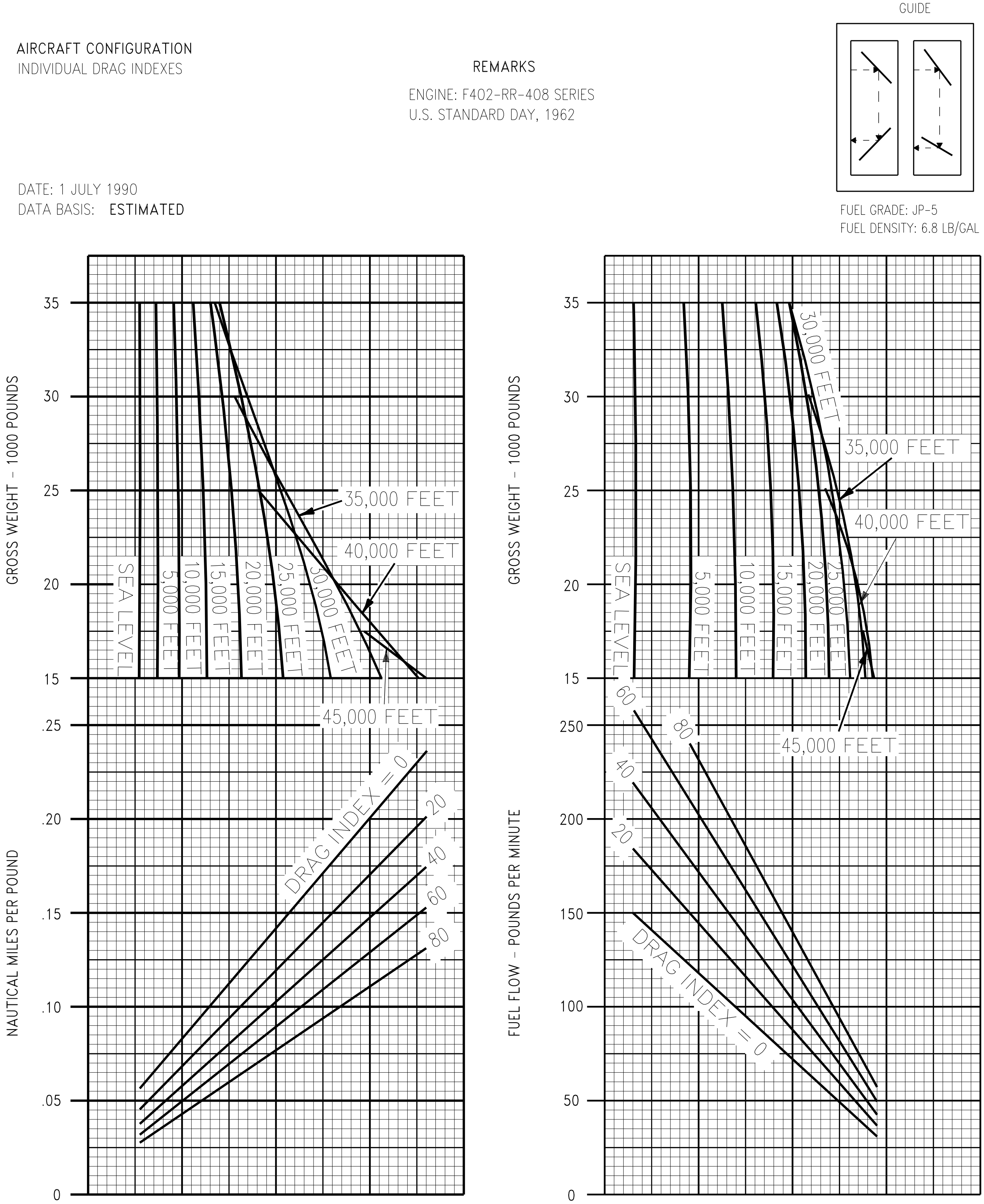
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-04-(70-6)04-CATI/ACS

Figure 5-9. Constant Mach/Altitude Cruise, F402-RR-408 Series Engine (Sheet 6 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, AV-8B

0.80 MACH

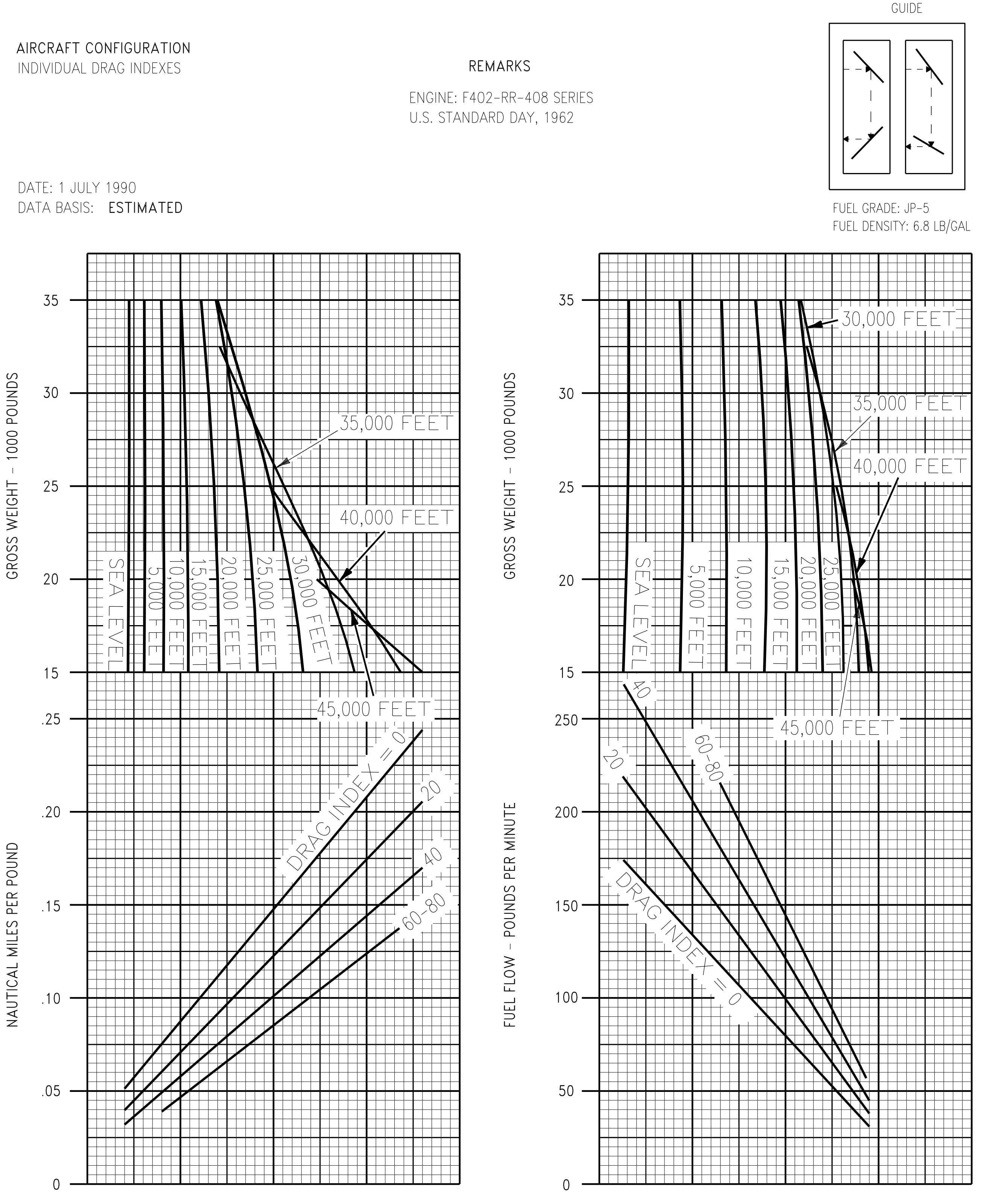



**Figure 5-9. Constant Mach/Altitude Cruise, F402-RR-408 Series Engine (Sheet 7 of 7)**

# OPTIMUM CRUISE AT CONSTANT ALTITUDE, AV-8B

NAUTICAL MILES PER POUND

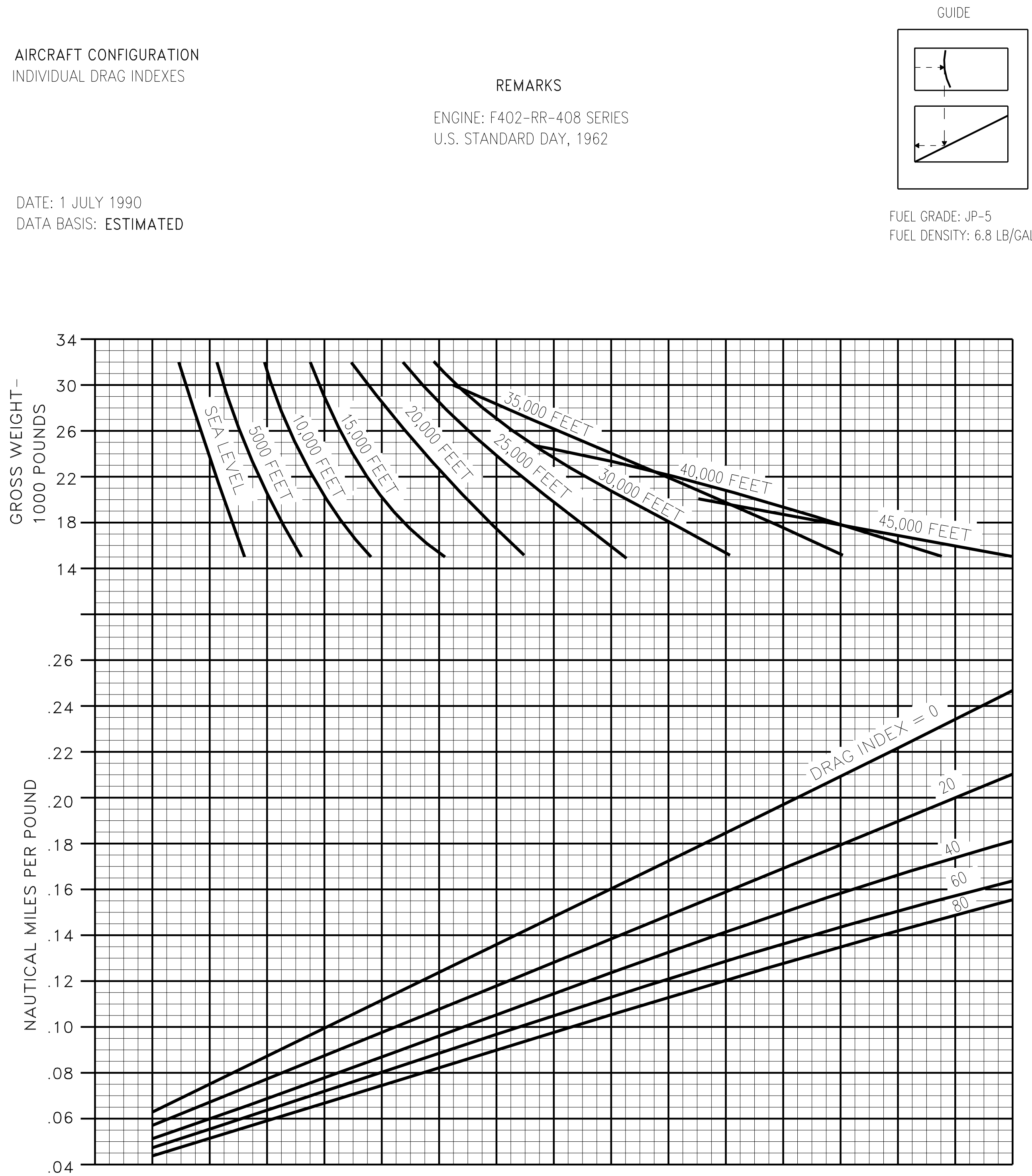
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(71-1)04-CATI/ACS

Figure 5-10. Optimum Cruise at Constant Altitude, F402-RR-408 Series Engine (Sheet 1 of 2)

# OPTIMUM CRUISE AT CONSTANT ALTITUDE, AV-8B

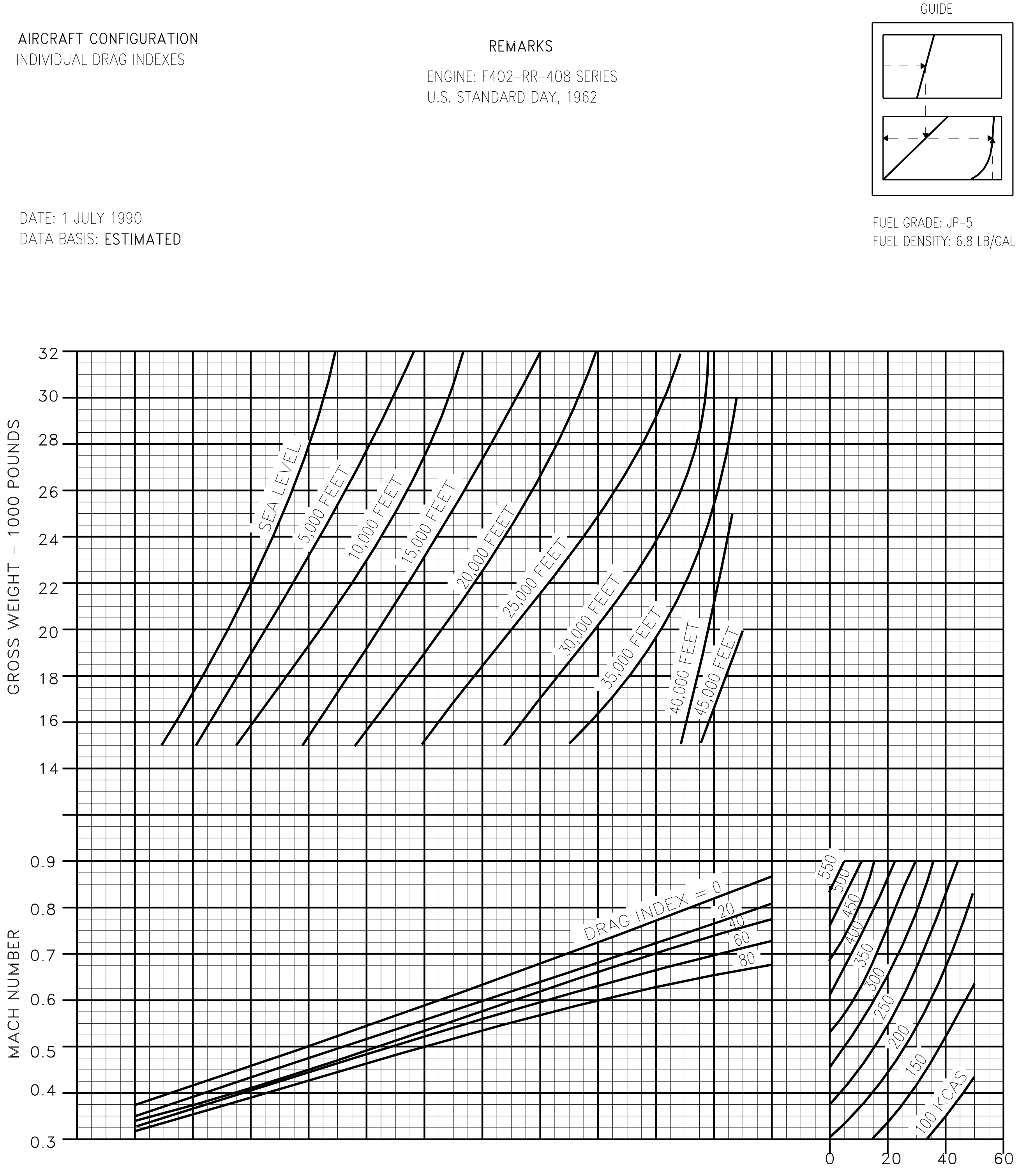
MACH NUMBER AND AIRSPEED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(71-2)04-CATI/ACS

Figure 5-10. Optimum Cruise at Constant Altitude, F402-RR-408 Series Engine (Sheet 2 of 2)

# BINGO, AV-8B

NIGHT ATTACK AIRCRAFT
GEAR UP - FLAPS AUTO
DI = 21.9

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 20 JULY 1990
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE-1000 FEET | CRUISE MACH | CRUISE FUEL FLOW-LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE-NAUTICAL MILES 250 KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 17 | 5 | 0.40 | 53.4 | 6 | 14 |
| 1.5 | 84 | 30 | 0.62 | 38.5 | 43 | 50 |
| 2.0 | 178 | 44.9 | 0.78 | 39.2 | 78 | 85 |
| 2.5 | 269 | 44.5 | 0.78 | 39.7 | 78 | 120 |
| 3.0 | 357 | 44.3 | 0.78 | 40.3 | 78 | 155 |
| 3.5 | 443 | 44.0 | 0.78 | 40.9 | 78 | 190 |
| 4.0 | 526 | 43.7 | 0.78 | 41.6 | 78 | 224 |
| 4.5 | 606 | 43.4 | 0.78 | 42.2 | 78 | 258 |
| 5.0 | 686 | 43.1 | 0.78 | 42.8 | 78 | 291 |
| 5.5 | 764 | 42.9 | 0.78 | 43.3 | 78 | 325 |
| 6.0 | 840 | 42.6 | 0.78 | 43.8 | 78 | 358 |
| 6.5 | 915 | 42.4 | 0.79 | 44.3 | 78 | 390 |
| 7.0 | 988 | 42.1 | 0.79 | 44.8 | 78 | 422 |

Data based on:

1. Maximum thrust climb at 300 knots/0.74 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-11. BINGO, AV-8B Night Attack Aircraft (Sheet 1 of 2)**

# BINGO, AV-8B

NIGHT ATTACK AIRCRAFT
GEAR DOWN - FLAPS AUTO
DI = 21.9

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 20 JULY 1990
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE- 1000 FEET | CRUISE MACH | CRUISE FUEL FLOW- LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE- NAUTICAL MILES 250KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 9 | 5 | 0.33 | 76.4 | 3 | 8 |
| 1.5 | 41 | 20 | 0.41 | 58.3 | 11 | 29 |
| 2.0 | 88 | 35.8 | 0.50 | 48.4 | 23 | 49 |
| 2.5 | 134 | 35.4 | 0.50 | 49.7 | 23 | 70 |
| 3.0 | 179 | 35.1 | 0.50 | 50.9 | 23 | 90 |
| 3.5 | 233 | 34.7 | 0.51 | 52.3 | 23 | 110 |
| 4.0 | 265 | 34.4 | 0.51 | 53.6 | 23 | 130 |
| 4.5 | 305 | 34.0 | 0.52 | 55.0 | 23 | 150 |
| 5.0 | 345 | 33.6 | 0.52 | 56.4 | 23 | 170 |
| 5.5 | 384 | 33.2 | 0.52 | 57.1 | 23 | 190 |
| 6.0 | 422 | 32.8 | 0.52 | 57.9 | 23 | 209 |
| 6.5 | 459 | 32.5 | 0.52 | 58.6 | 23 | 229 |
| 7.0 | 495 | 32.3 | 0.52 | 58.9 | 23 | 248 |

Data based on:

1. Maximum thrust climb at 200 knots/0.48 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-11. BINGO, AV-8B Night Attack Aircraft (Sheet 2 of 2)**

# BINGO, AV-8B

RADAR AIRCRAFT
GEAR UP - FLAPS AUTO
DI = 22.9

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 23 APRIL 1993
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE- 1000 FEET | CRUISE MACH | CRUISE FUEL FLOW- LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE- NAUTICAL MILES 250 KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 16 | 5 | 0.42 | 57.2 | 6 | 14 |
| 1.5 | 77 | 30 | 0.65 | 43.0 | 44 | 48 |
| 2.0 | 162 | 42.5 | 0.78 | 43.7 | 73 | 82 |
| 2.5 | 243 | 42.2 | 0.78 | 44.3 | 73 | 116 |
| 3.0 | 323 | 42.0 | 0.78 | 44.9 | 73 | 150 |
| 3.5 | 401 | 41.7 | 0.79 | 45.5 | 73 | 183 |
| 4.0 | 478 | 41.4 | 0.79 | 46.0 | 73 | 216 |
| 4.5 | 552 | 41.2 | 0.79 | 46.6 | 73 | 249 |
| 5.0 | 624 | 41.0 | 0.79 | 47.3 | 73 | 281 |
| 5.5 | 695 | 40.7 | 0.79 | 47.9 | 73 | 313 |
| 6.0 | 764 | 40.5 | 0.79 | 48.5 | 73 | 344 |
| 6.5 | 832 | 40.3 | 0.79 | 49.0 | 73 | 375 |
| 7.0 | 902 | 40.0 | 0.78 | 49.1 | 73 | 406 |

Data based on:

1. Maximum thrust climb at 300 knots/0.73 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-11A. BINGO, AV-8B Radar Aircraft (Sheet 1 of 2)**

# BINGO, AV-8B

RADAR AIRCRAFT
GEAR DOWN - FLAPS AUTO
DI = 22.9

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 23 APRIL 1993
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE- 1000 FEET | CRUISE MACH | CRUISE FUEL FLOW- LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE- NAUTICAL MILES 250KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 9 | 5 | 0.33 | 76.4 | 3 | 9 |
| 1.5 | 39 | 20 | 0.41 | 62.9 | 12 | 28 |
| 2.0 | 80 | 33.1 | 0.52 | 57.4 | 22 | 48 |
| 2.5 | 121 | 32.8 | 0.52 | 58.1 | 22 | 68 |
| 3.0 | 161 | 32.4 | 0.51 | 59.0 | 22 | 88 |
| 3.5 | 200 | 32.0 | 0.51 | 59.8 | 22 | 108 |
| 4.0 | 239 | 31.6 | 0.51 | 60.6 | 22 | 127 |
| 4.5 | 276 | 31.3 | 0.51 | 61.4 | 22 | 147 |
| 5.0 | 311 | 31.0 | 0.51 | 62.3 | 22 | 166 |
| 5.5 | 346 | 30.8 | 0.51 | 63.2 | 22 | 186 |
| 6.0 | 379 | 30.6 | 0.51 | 64.1 | 22 | 205 |
| 6.5 | 412 | 30.4 | 0.51 | 64.7 | 22 | 224 |
| 7.0 | 448 | 30.0 | 0.50 | 64.0 | 22 | 243 |

Data based on:

1. Maximum thrust climb at 200 knots/0.48 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-11A. BINGO, AV-8B Radar Aircraft (Sheet 2 of 2)**

# OPTIMUM CRUISE FLIGHT CONDITIONS, TAV-8B

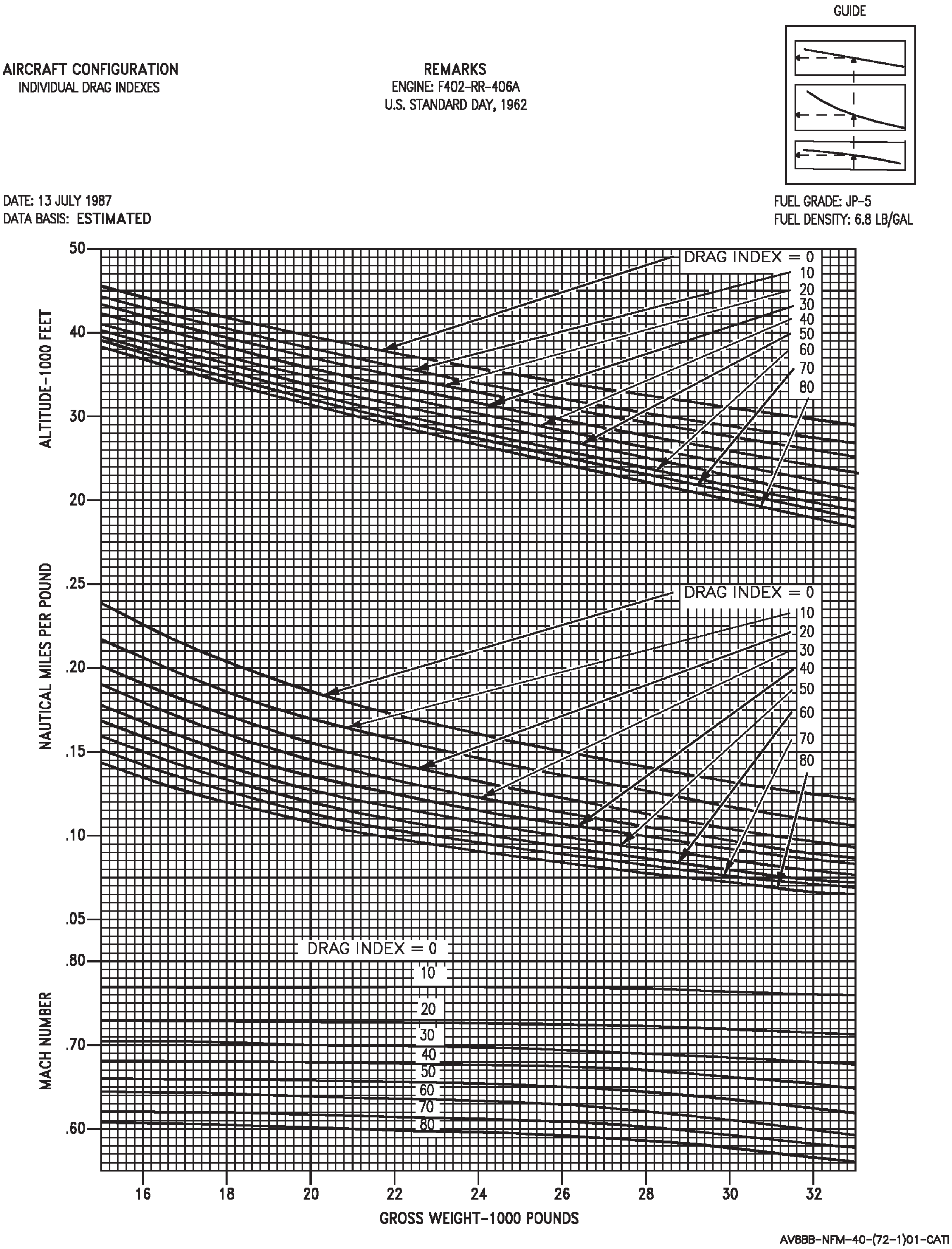



Figure 5-12. Optimum Cruise Flight Conditions, F402-RR-406A Engine

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

## 0.50 MACH

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

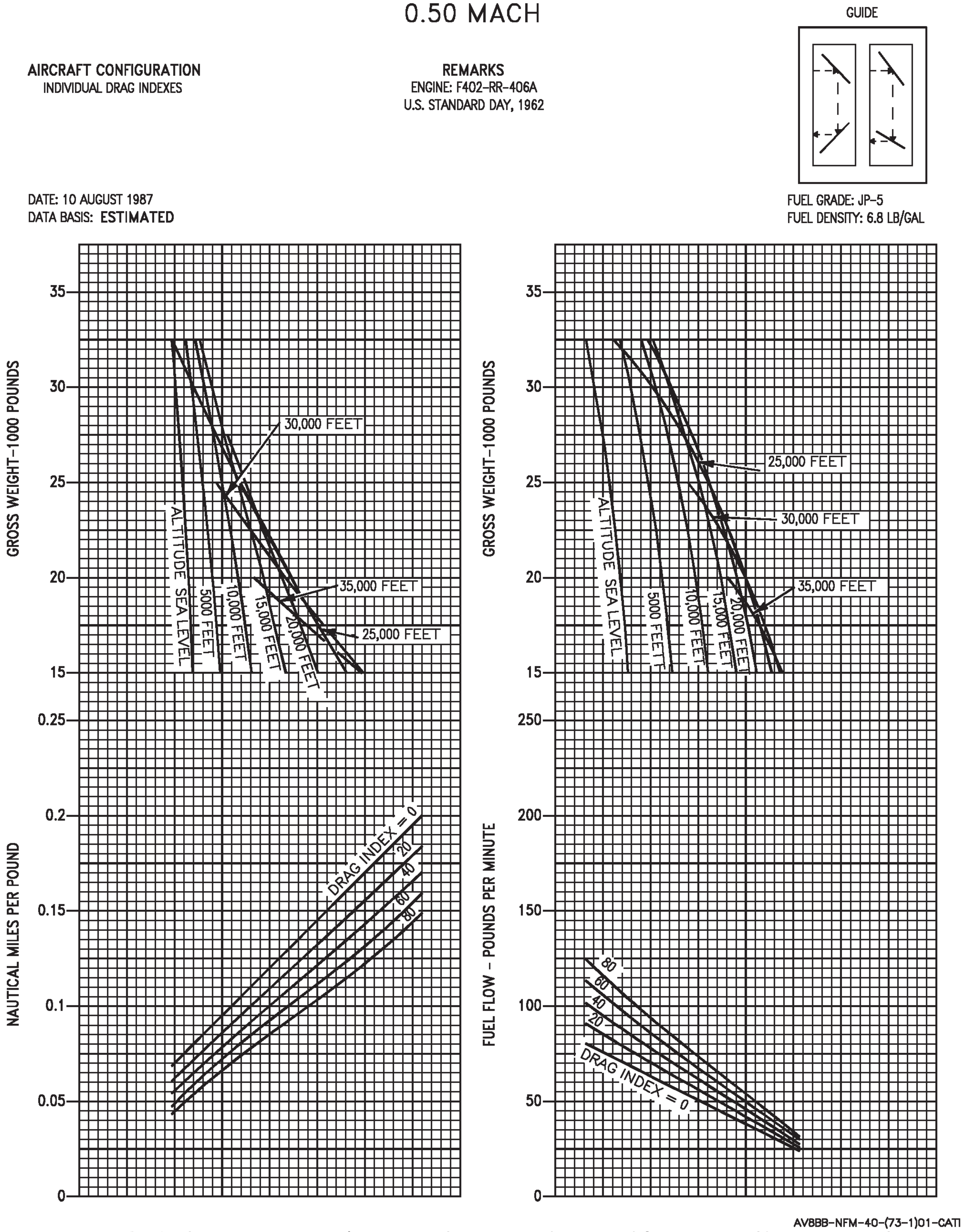



Figure 5-13. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 1 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

## 0.55 MACH

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

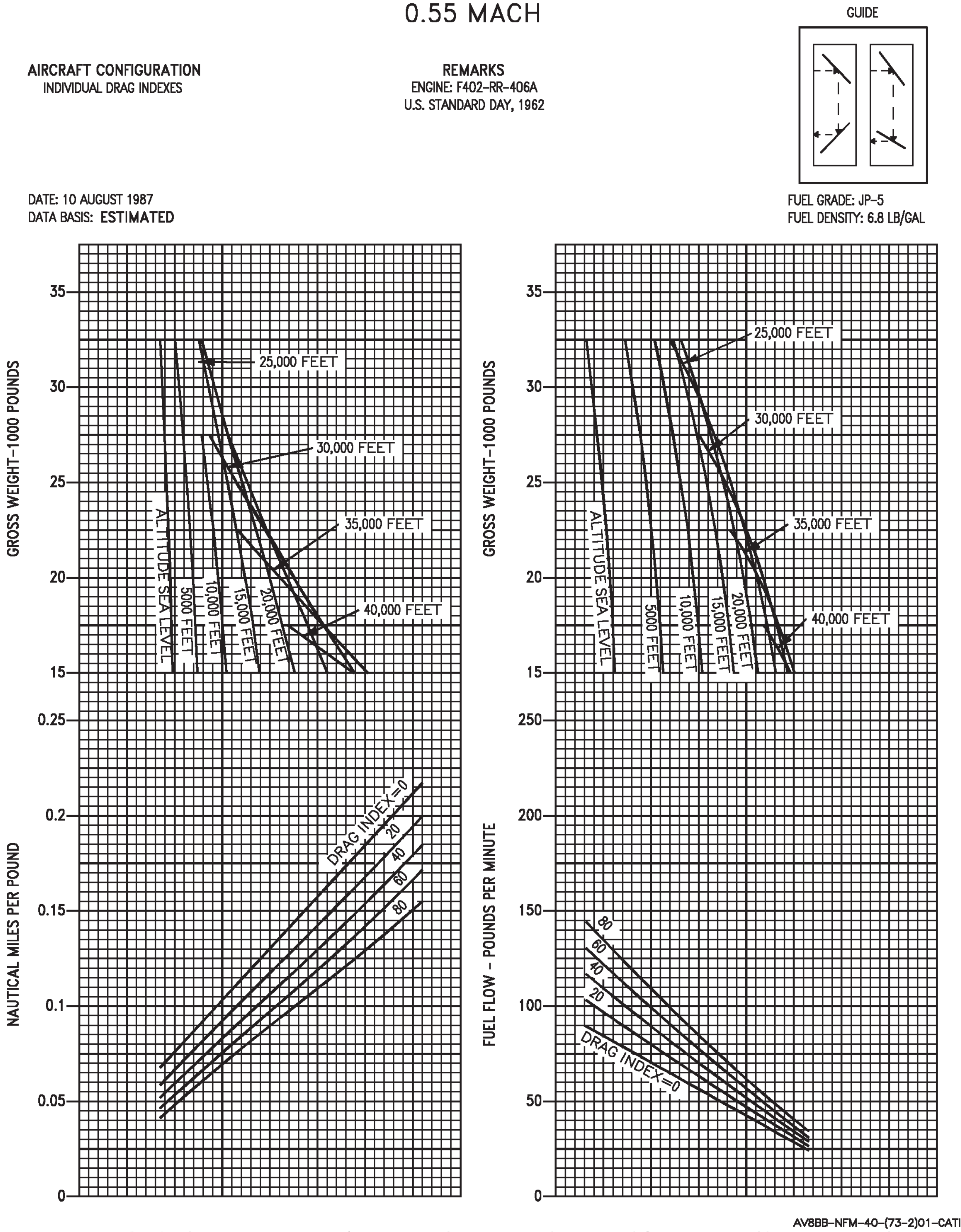



**Figure 5-13. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 2 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

0.60 MACH

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

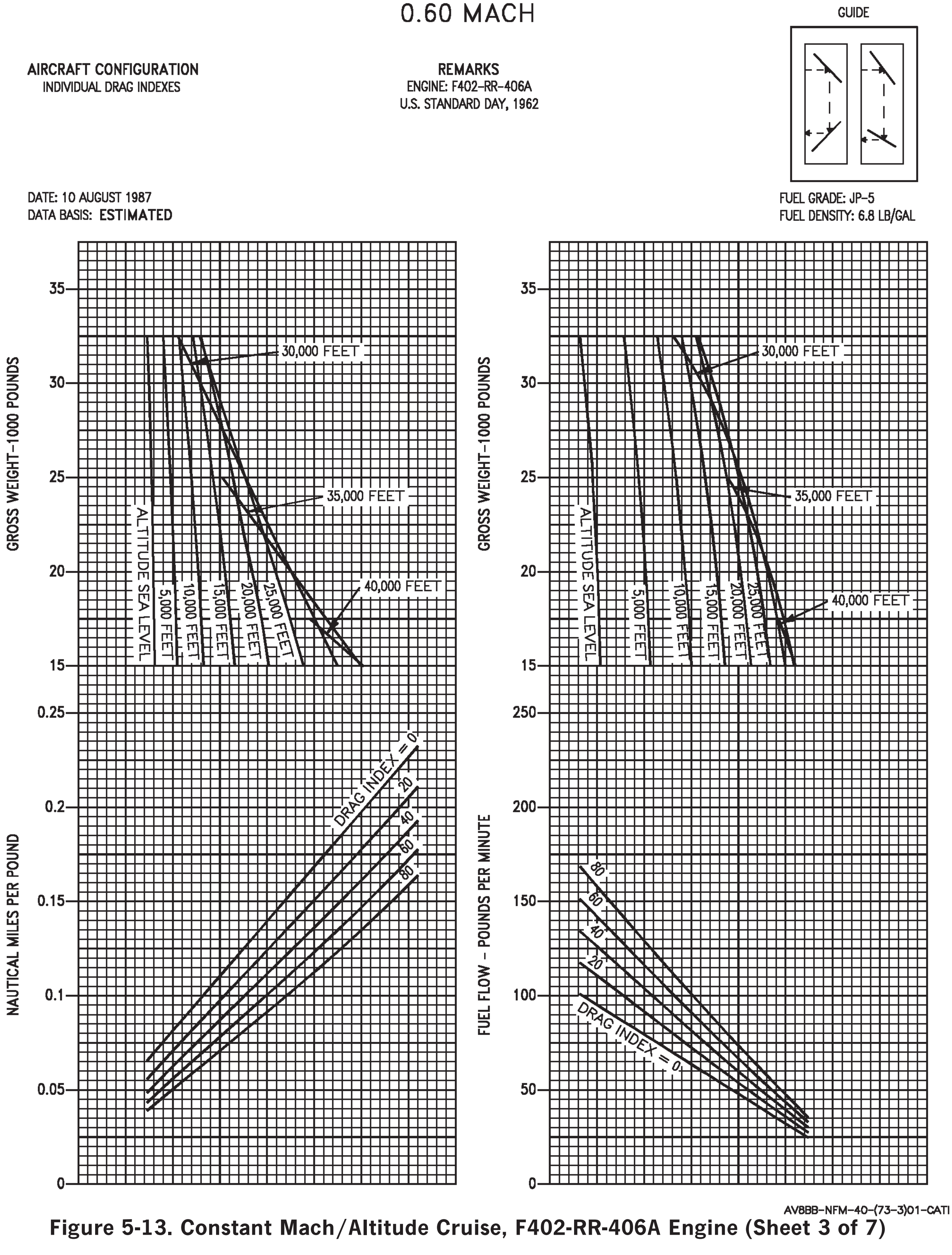



**Figure 5-13. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 3 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

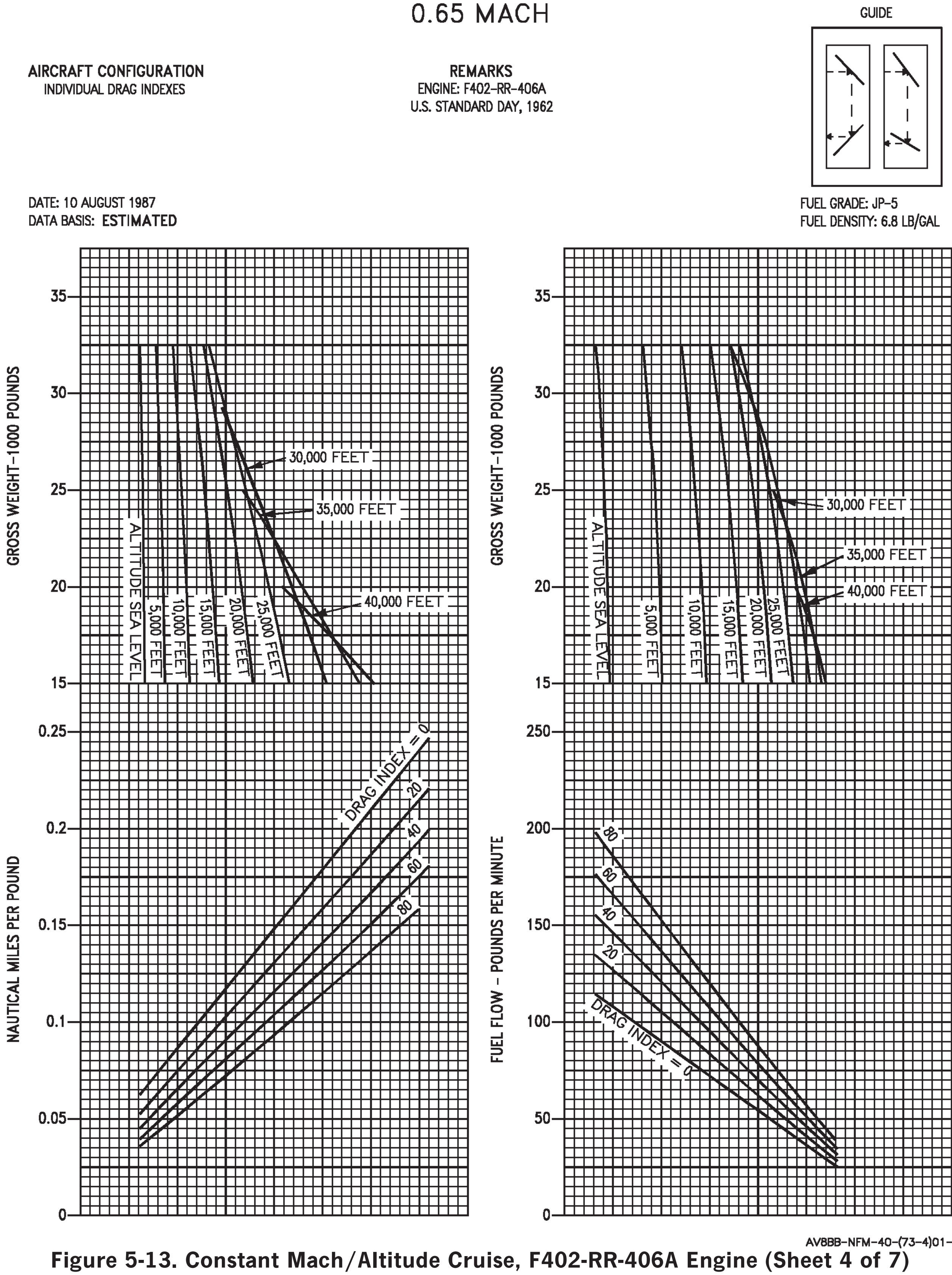
0.65 MACH

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 10 AUGUST 1987
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



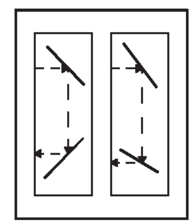

AV8BB-NFM-40-(73-4)01-CATI

Figure 5-13. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 4 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

0.70 MACH

GUIDE

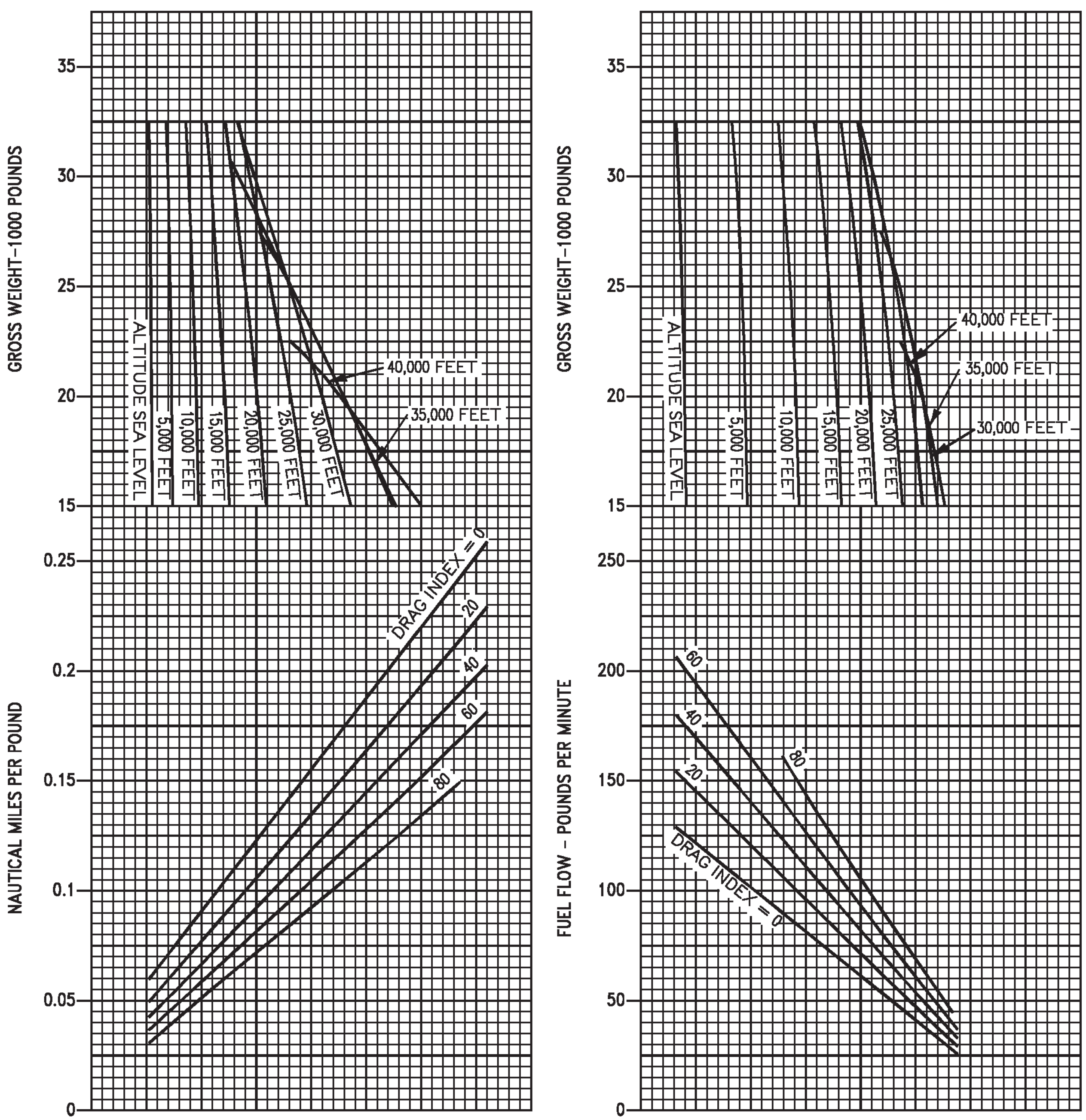


**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(73-5)01-CATI

**Figure 5-13. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 5 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

0.75 MACH

AIRPLANE CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

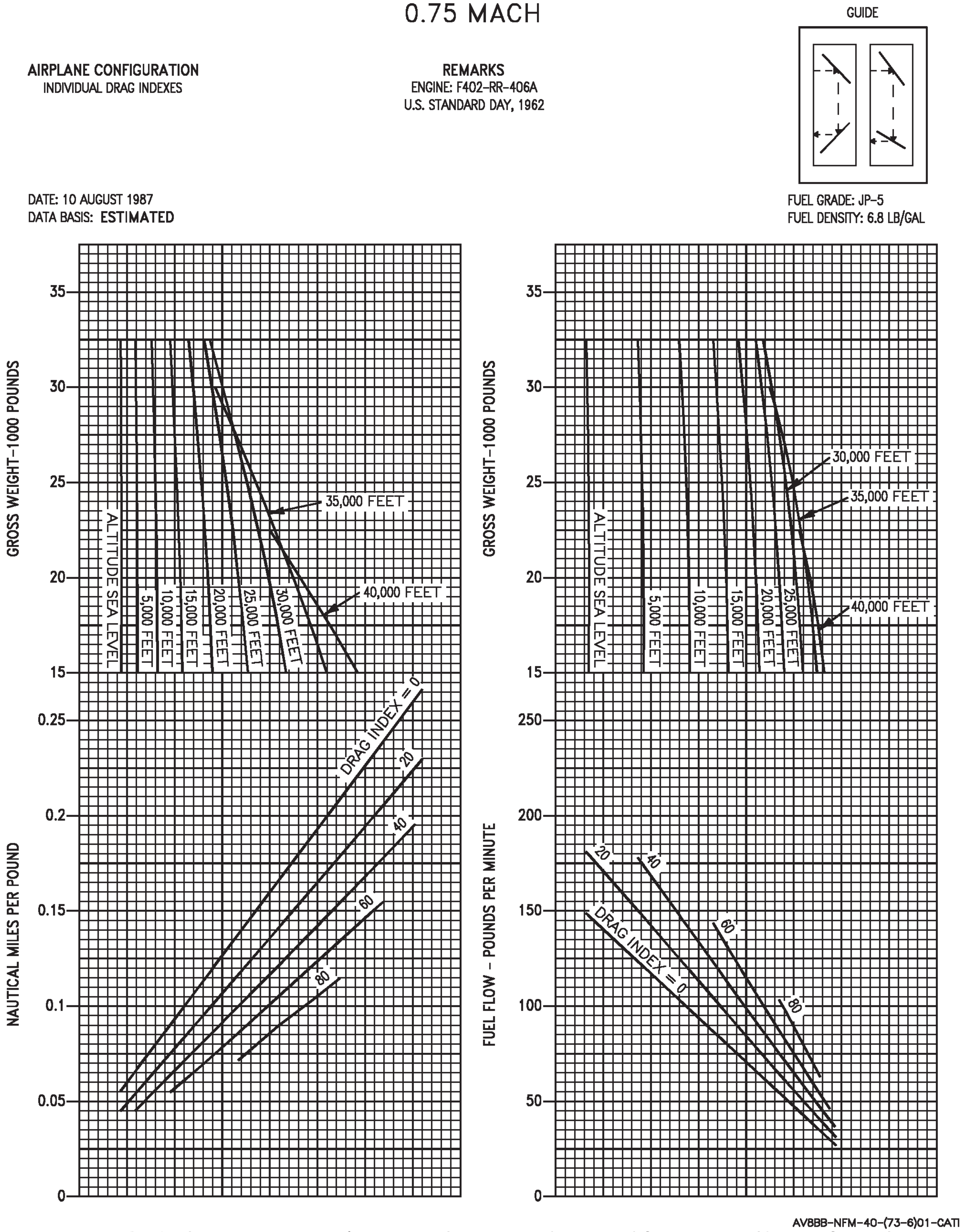



Figure 5-13. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 6 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

0.80 MACH

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 10 AUGUST 1987
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

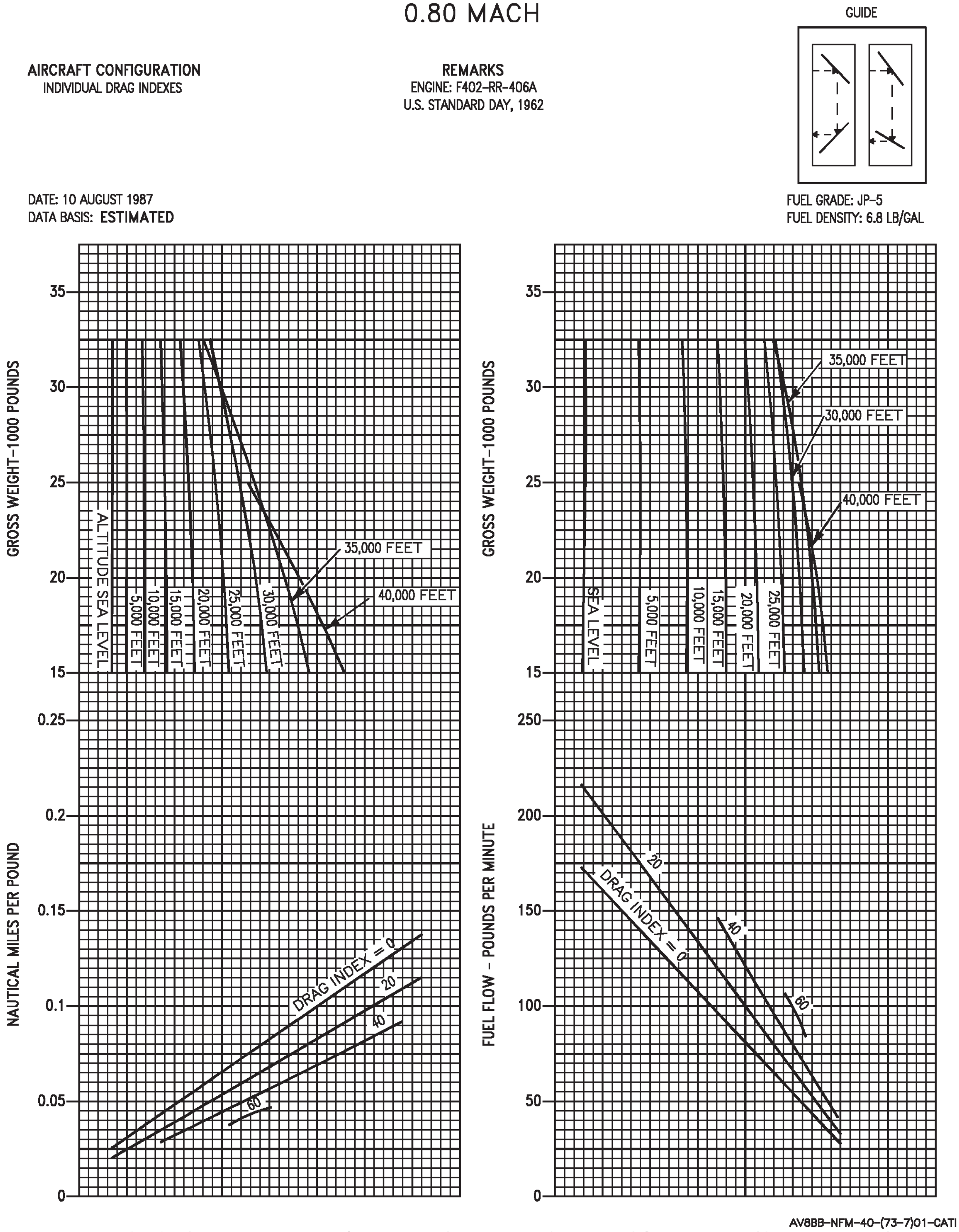


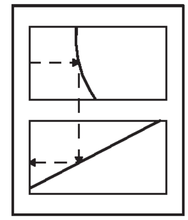

Figure 5-13. Constant Mach/Altitude Cruise, F402-RR-406A Engine (Sheet 7 of 7)

# OPTIMUM CRUISE AT CONSTANT ALTITUDE, TAV-8B

NAUTICAL MILES PER POUND

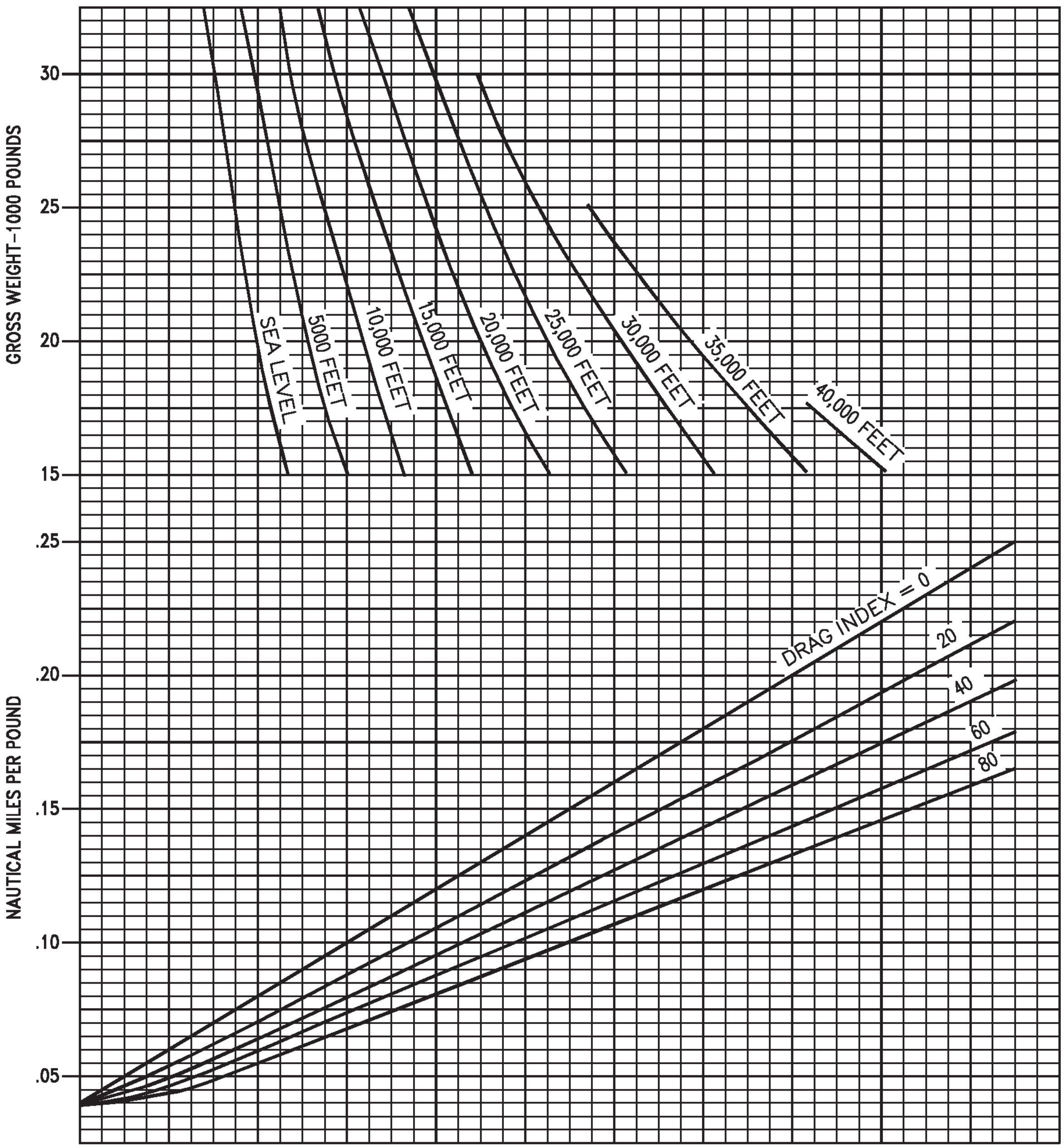
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402–RR–406A
U.S. STANDARD DAY, 1962




DATE: 13 JULY 1987
DATA BASIS: ESTIMATED

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL




AV8BB–NFM–40–(74–1)01–CATI

**Figure 5-14. Optimum Cruise at Constant Altitude, F402-RR-406A Engine (Sheet 1 of 2)**

# OPTIMUM CRUISE AT CONSTANT ALTITUDE, TAV-8B

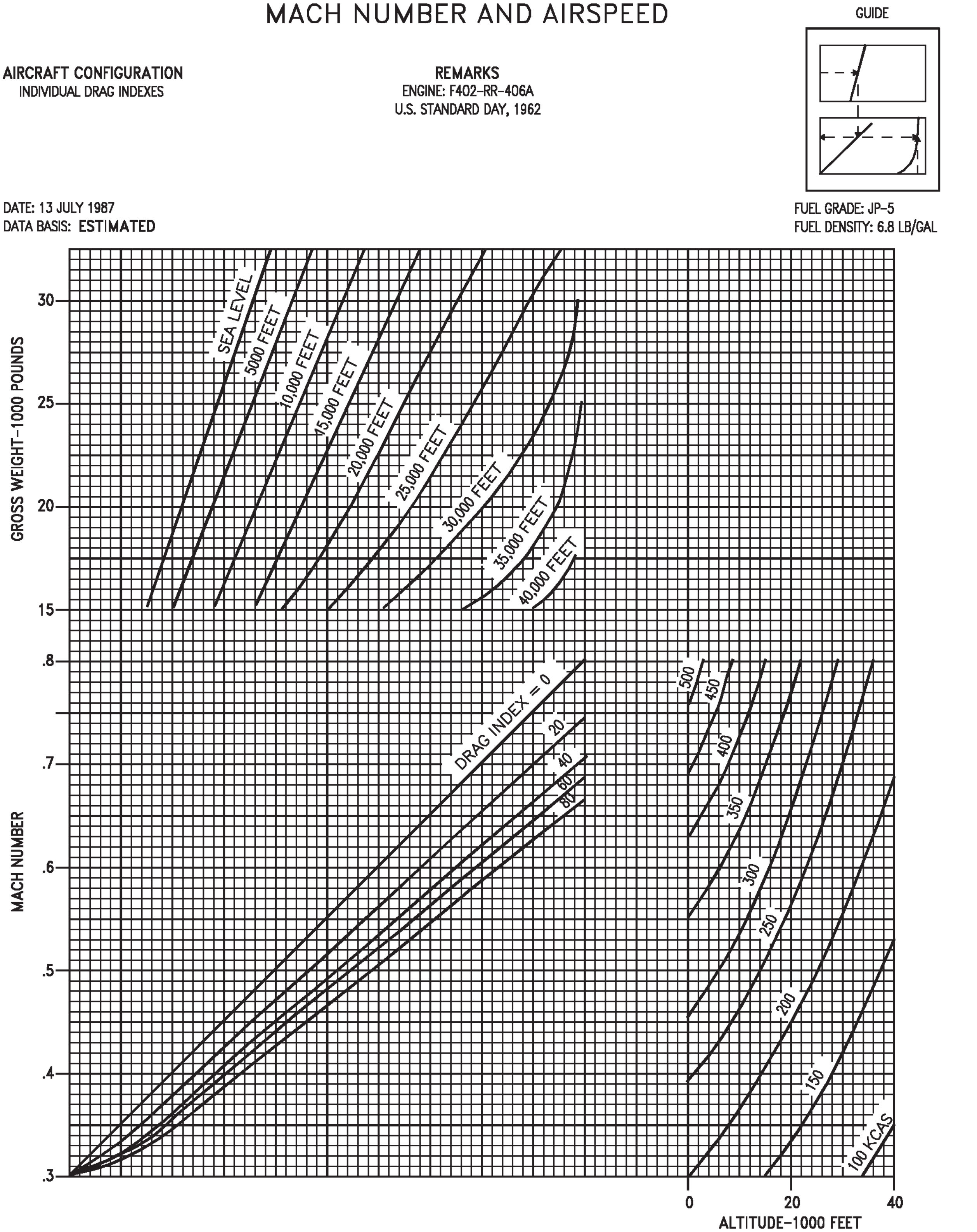
## MACH NUMBER AND AIRSPEED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 13 JULY 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(74-2)01-CATI

**Figure 5-14. Optimum Cruise at Constant Altitude, F402-RR-406A Engine (Sheet 2 of 2)**

# BINGO TAV-8B

GEAR UP - FLAPS AUTO
DI = 6.1

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 9 JULY 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE-1000 FEET | CRUISE MACH | CRUISE FUEL FLOW-LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE-NAUTICAL MILES 250 KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 19 | 5 | 0.40 | 44.8 | 6 | 17 |
| 1.5 | 98 | 35 | 0.68 | 34.1 | 56 | 58 |
| 2.0 | 199 | 43.5 | 0.78 | 34.7 | 75 | 99 |
| 2.5 | 302 | 43.2 | 0.78 | 35.0 | 75 | 140 |
| 3.0 | 402 | 42.9 | 0.78 | 35.4 | 75 | 180 |
| 3.5 | 500 | 42.6 | 0.78 | 35.8 | 75 | 221 |
| 4.0 | 595 | 42.4 | 0.78 | 36.3 | 75 | 261 |
| 4.5 | 688 | 42.1 | 0.78 | 36.7 | 75 | 300 |
| 5.0 | 778 | 41.9 | 0.78 | 37.2 | 75 | 340 |
| 5.5 | 866 | 41.6 | 0.78 | 37.5 | 75 | 379 |
| 6.0 | 953 | 41.4 | 0.78 | 38.1 | 75 | 417 |
| 6.5 | 1039 | 41.2 | 0.78 | 38.4 | 75 | 455 |
| 7.0 | 1127 | 40.9 | 0.78 | 38.7 | 75 | 493 |

Data based on:

1. Maximum thrust climb at 300 knots/0.77 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-15. BINGO, TAV-8B Aircraft, F402-RR-406A Engine (Sheet 1 of 2)**

# *BINGO TAV-8B*

GEAR DOWN - FLAPS AUTO

DI = 6.1

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 10 JULY 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE- 1000 FEET | CRUISE MACH | CRUISE FUEL FLOW- LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE- NAUTICAL MILES 250KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 10 | 5 | 0.30 | 58.8 | 3 | 10 |
| 1.5 | 43 | 20 | 0.39 | 51.6 | 11 | 34 |
| 2.0 | 88 | 33.6 | 0.48 | 45.2 | 21 | 58 |
| 2.5 | 136 | 33.2 | 0.48 | 46.0 | 21 | 82 |
| 3.0 | 183 | 32.9 | 0.48 | 46.7 | 21 | 105 |
| 3.5 | 228 | 32.6 | 0.48 | 47.5 | 21 | 129 |
| 4.0 | 272 | 32.4 | 0.48 | 48.2 | 21 | 152 |
| 4.5 | 315 | 32.1 | 0.48 | 49.0 | 21 | 175 |
| 5.0 | 357 | 32.3 | 0.48 | 49.8 | 21 | 197 |
| 5.5 | 397 | 31.5 | 0.48 | 50.7 | 21 | 220 |
| 6.0 | 436 | 31.2 | 0.48 | 51.6 | 21 | 242 |
| 6.5 | 475 | 30.9 | 0.48 | 52.3 | 21 | 263 |
| 7.0 | 515 | 30.5 | 0.48 | 52.7 | 21 | 285 |

Data based on:

1. Maximum thrust climb at 200 knots/0.48 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-15. BINGO, TAV-8B Aircraft, F402-RR-406A Engine (Sheet 2 of 2)**

# OPTIMUM CRUISE FLIGHT CONDITIONS, TAV-8B

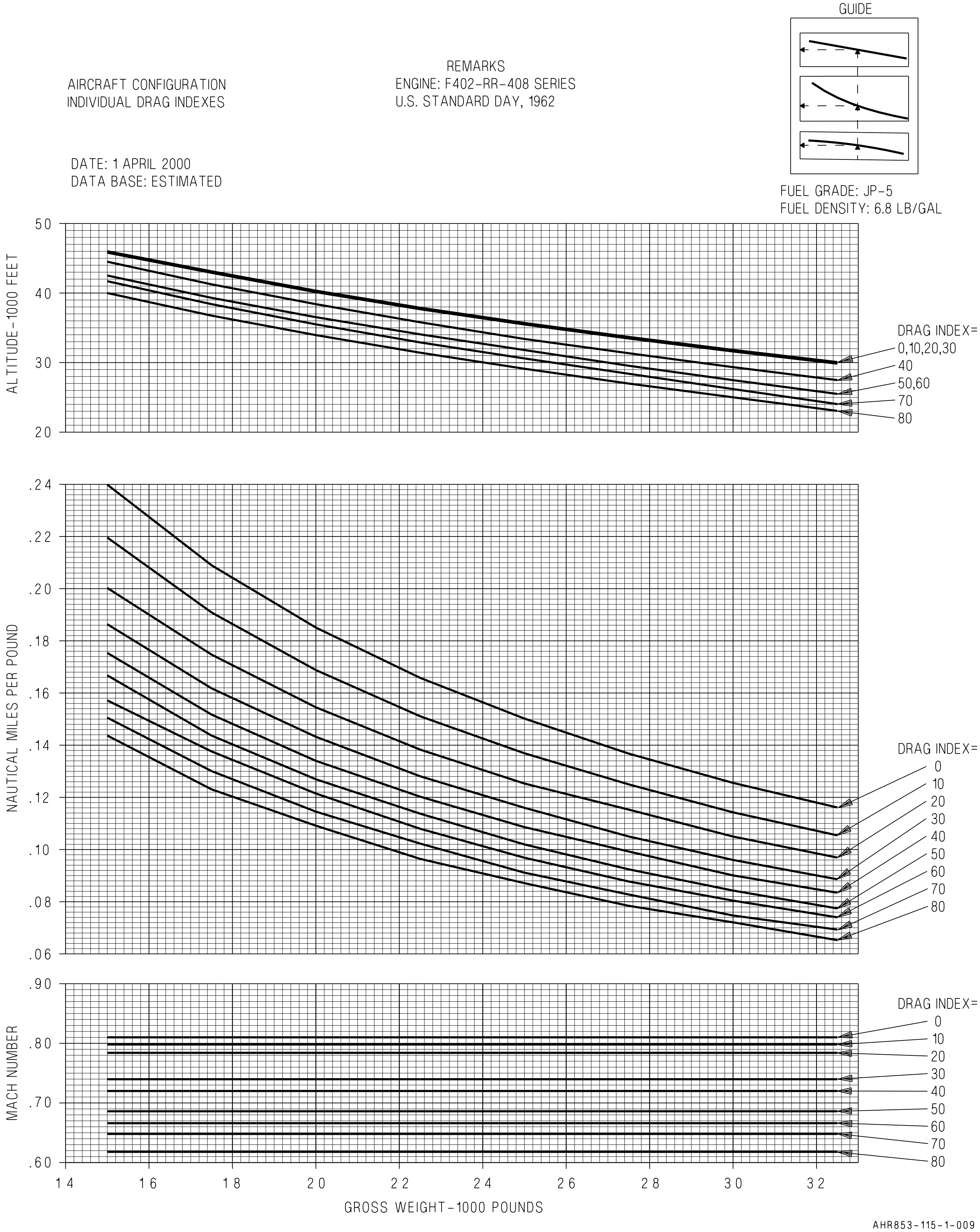



Figure 5-16. Optimum Cruise Flight Conditions, F402-RR-408 Engine

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

## 0.50 MACH

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

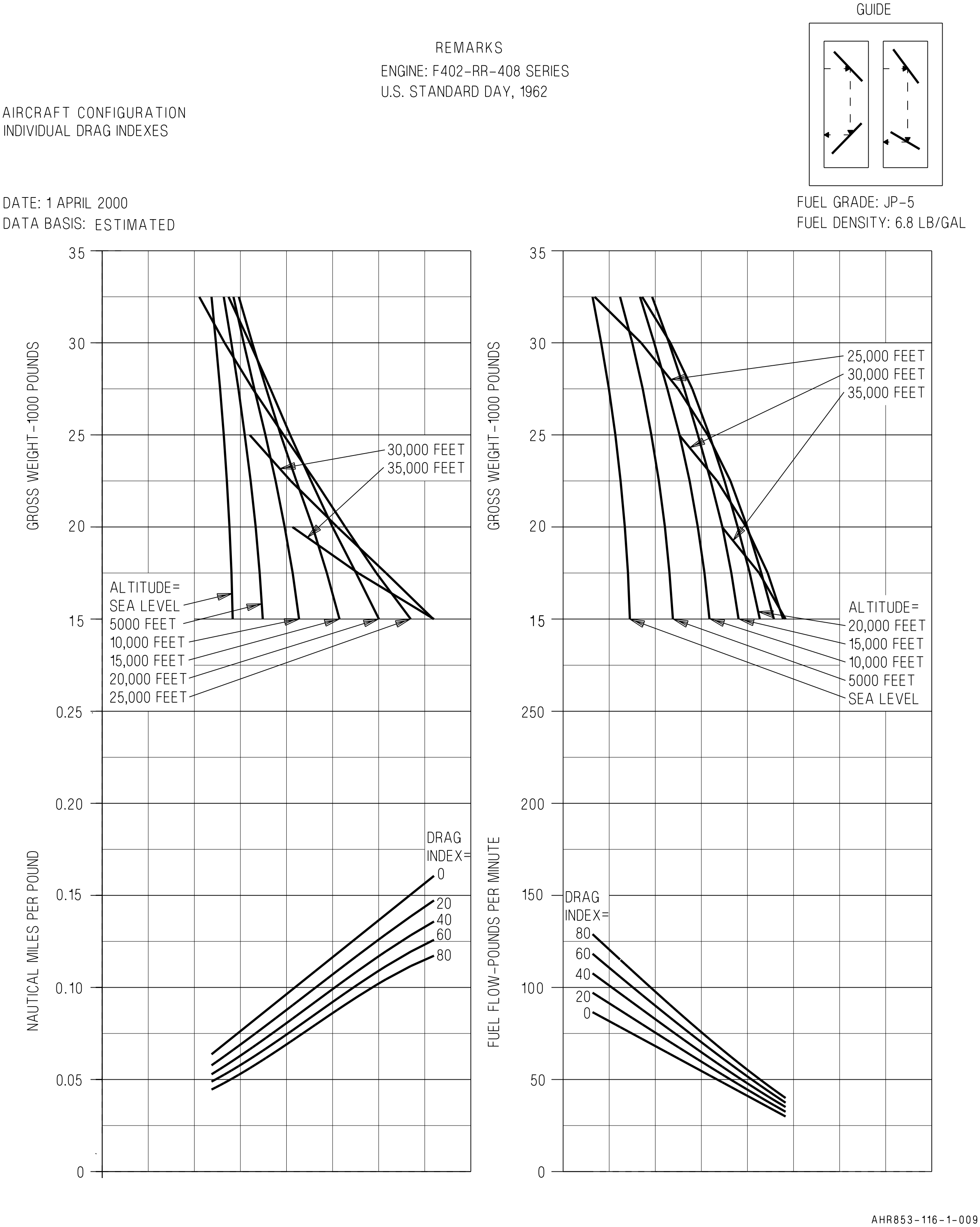



Figure 5-17. Constant Mach/Altitude Cruise, F402-RR-408 Engine (Sheet 1 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

## 0.55 MACH

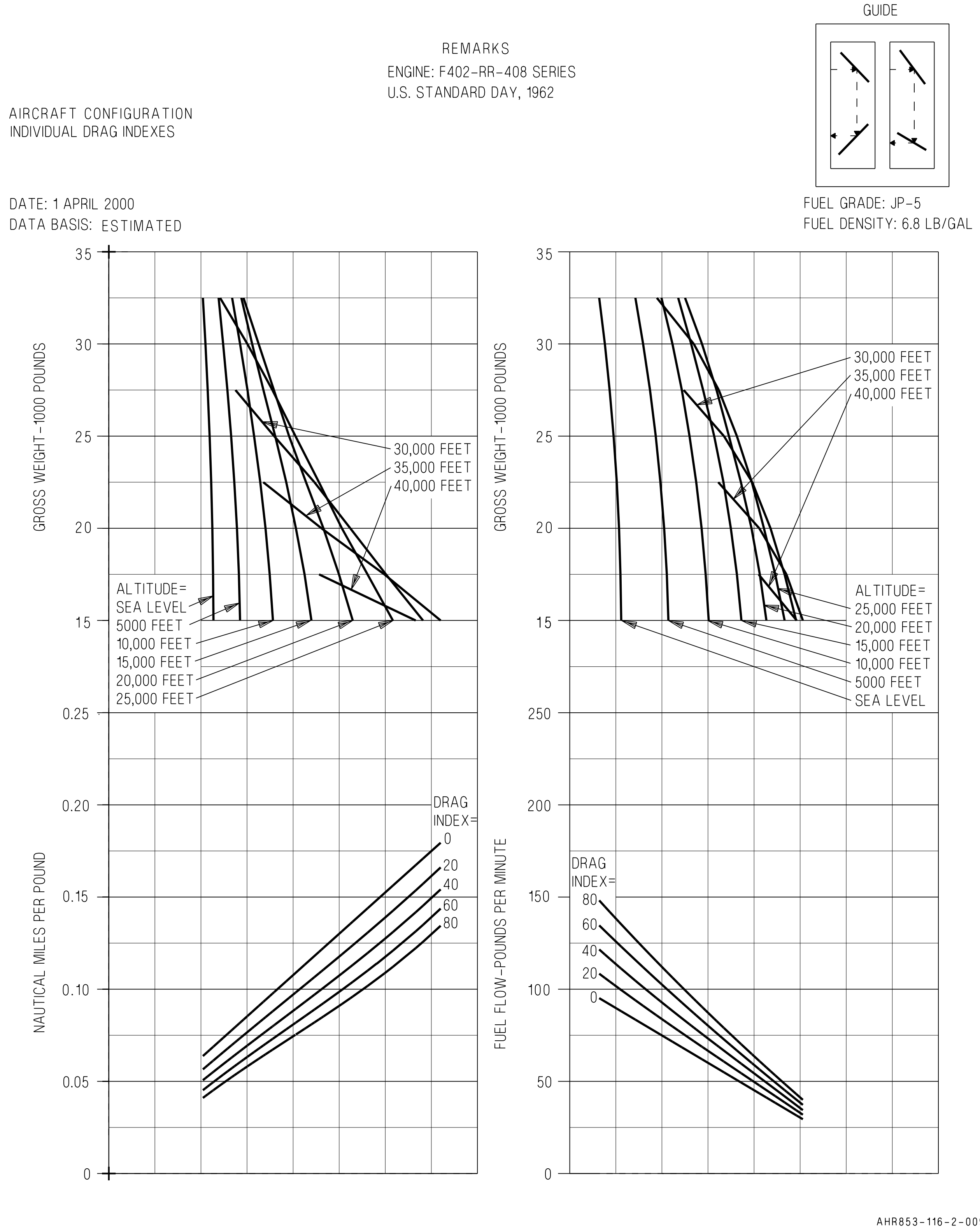



**Figure 5-17. Constant Mach/Altitude Cruise, F402-RR-408 Engine (Sheet 2 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

0.60 MACH

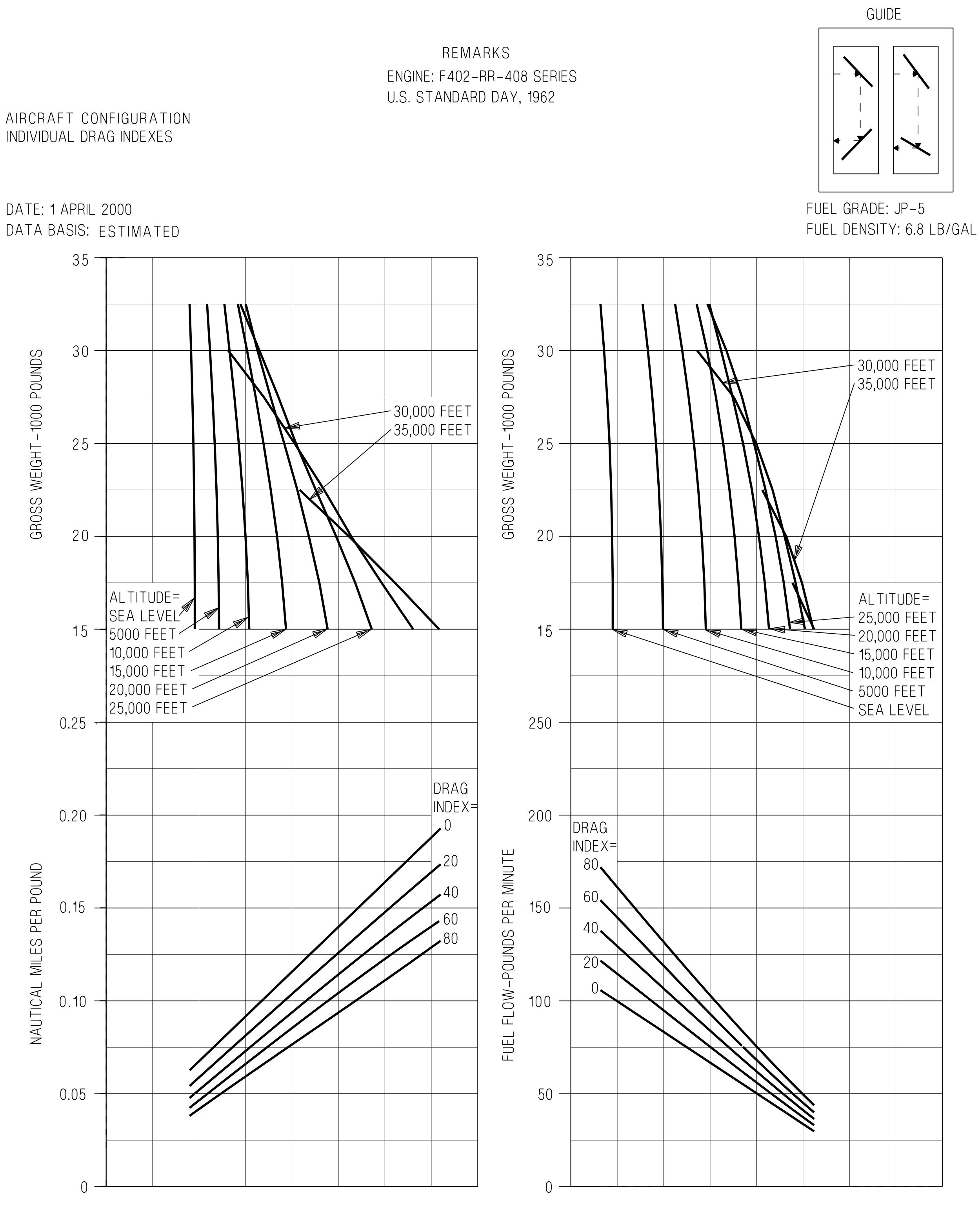
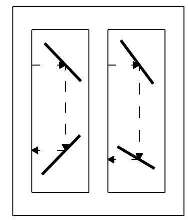



**Figure 5-17. Constant Mach/Altitude Cruise, F402-RR-408 Engine (Sheet 3 of 7)**

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

## 0.65 MACH

GUIDE



REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

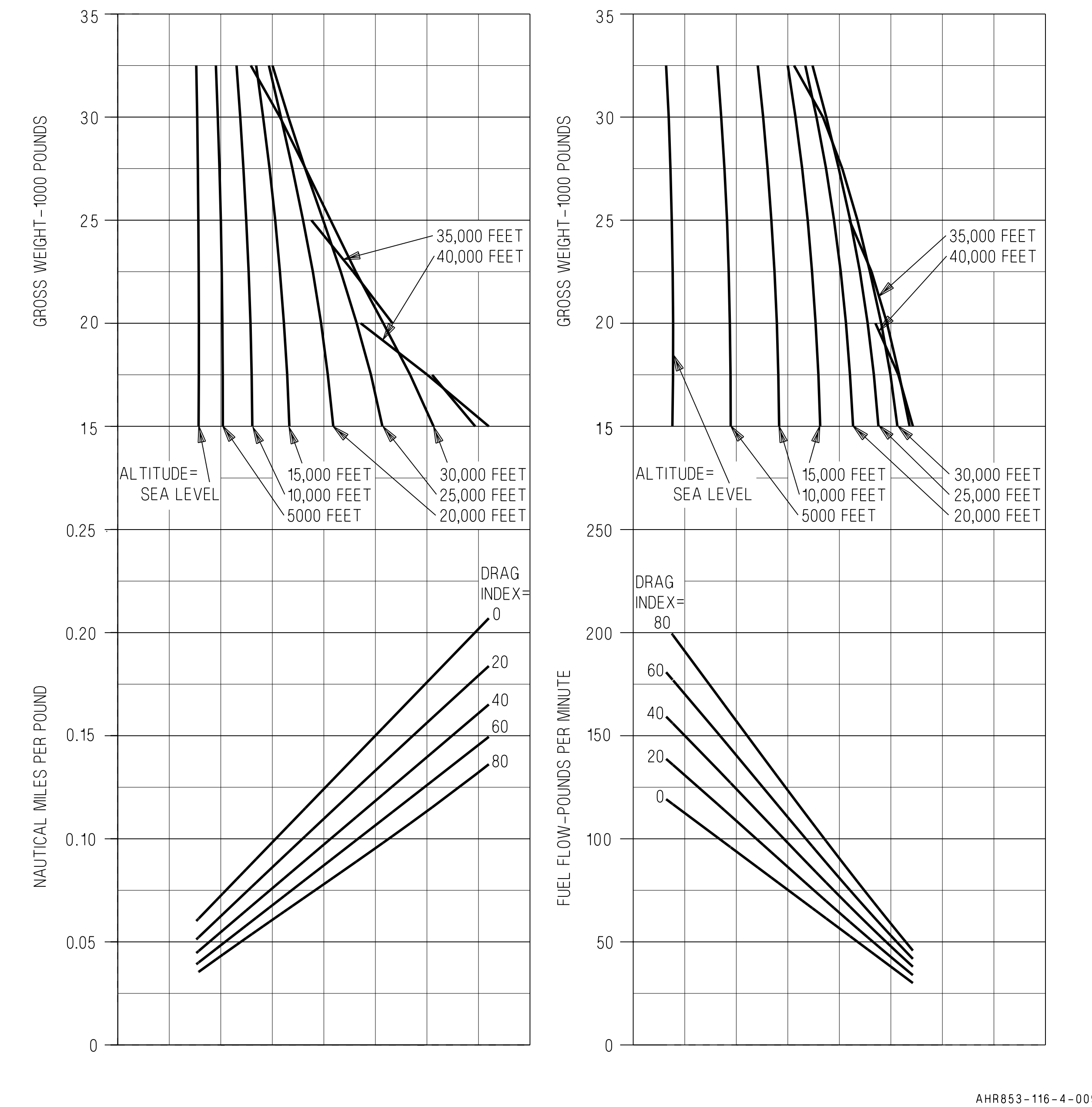



Figure 5-17. Constant Mach/Altitude Cruise, F402-RR-408 Engine (Sheet 4 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

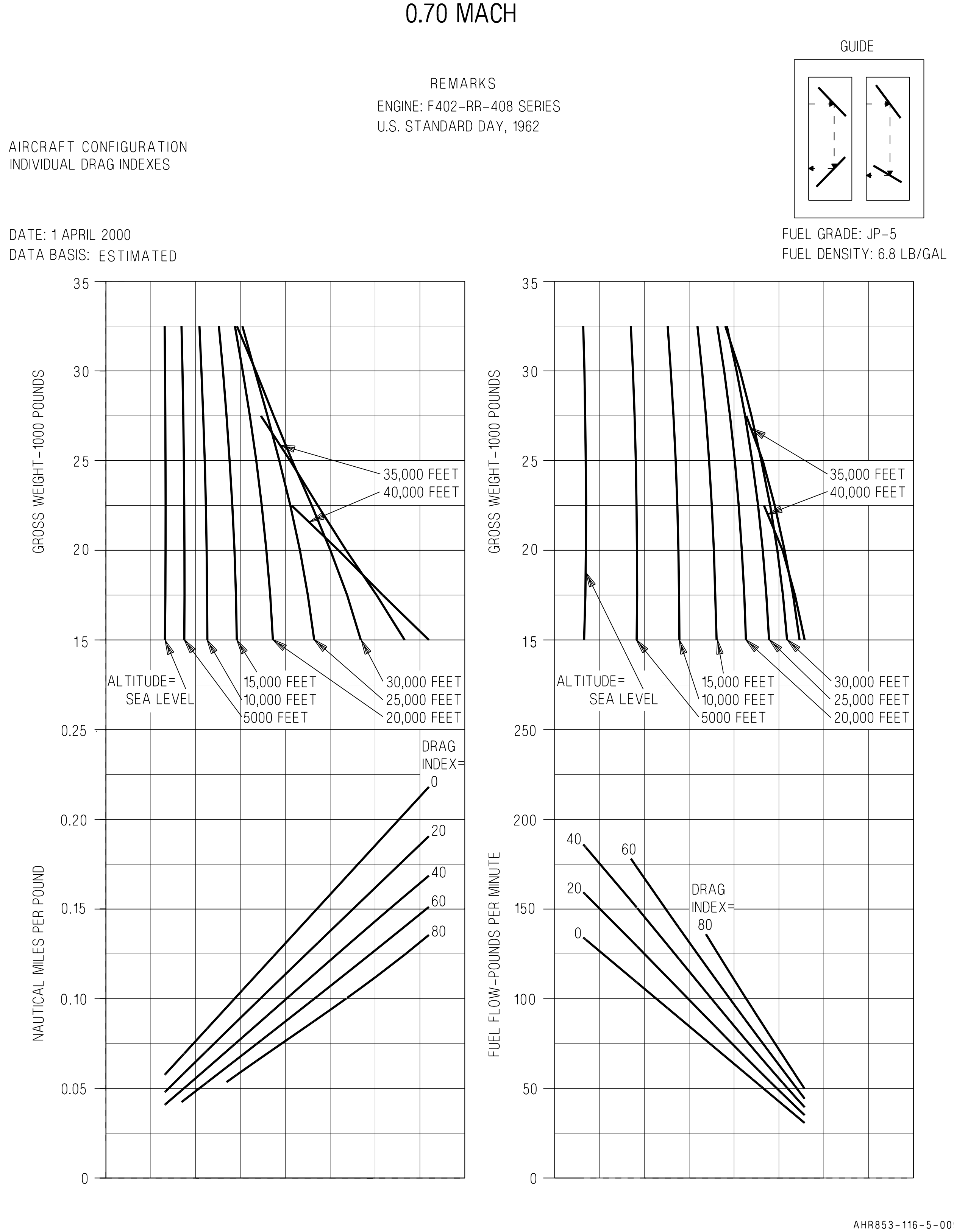



Figure 5-17. Constant Mach/Altitude Cruise, F402-RR-408 Engine (Sheet 5 of 7)

# CONSTANT MACH/ALTITUDE CRUISE, TAV-8B

## 0.75 MACH

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

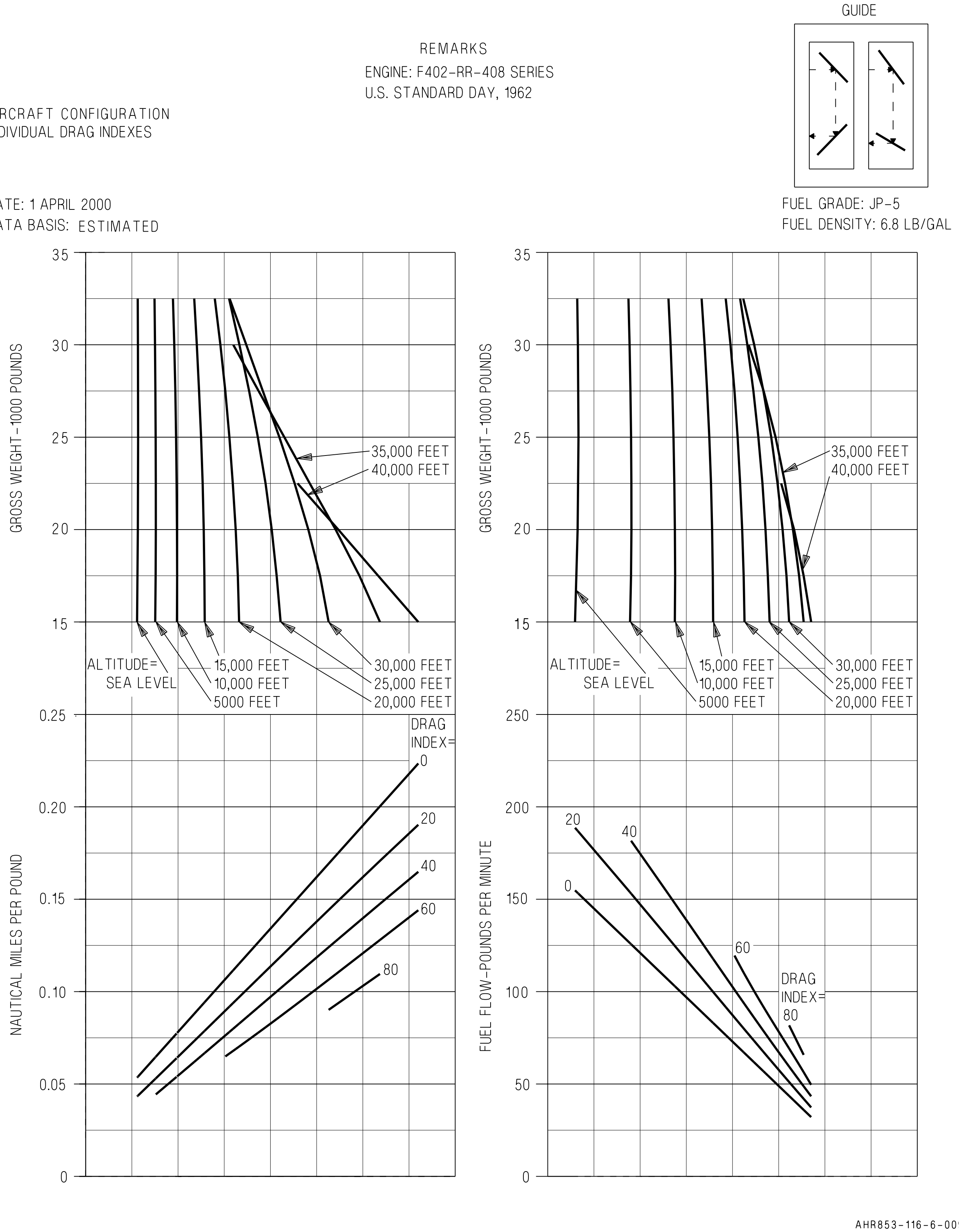



**Figure 5-17. Constant Mach/Altitude Cruise, F402-RR-408 Engine (Sheet 6 of 7)**

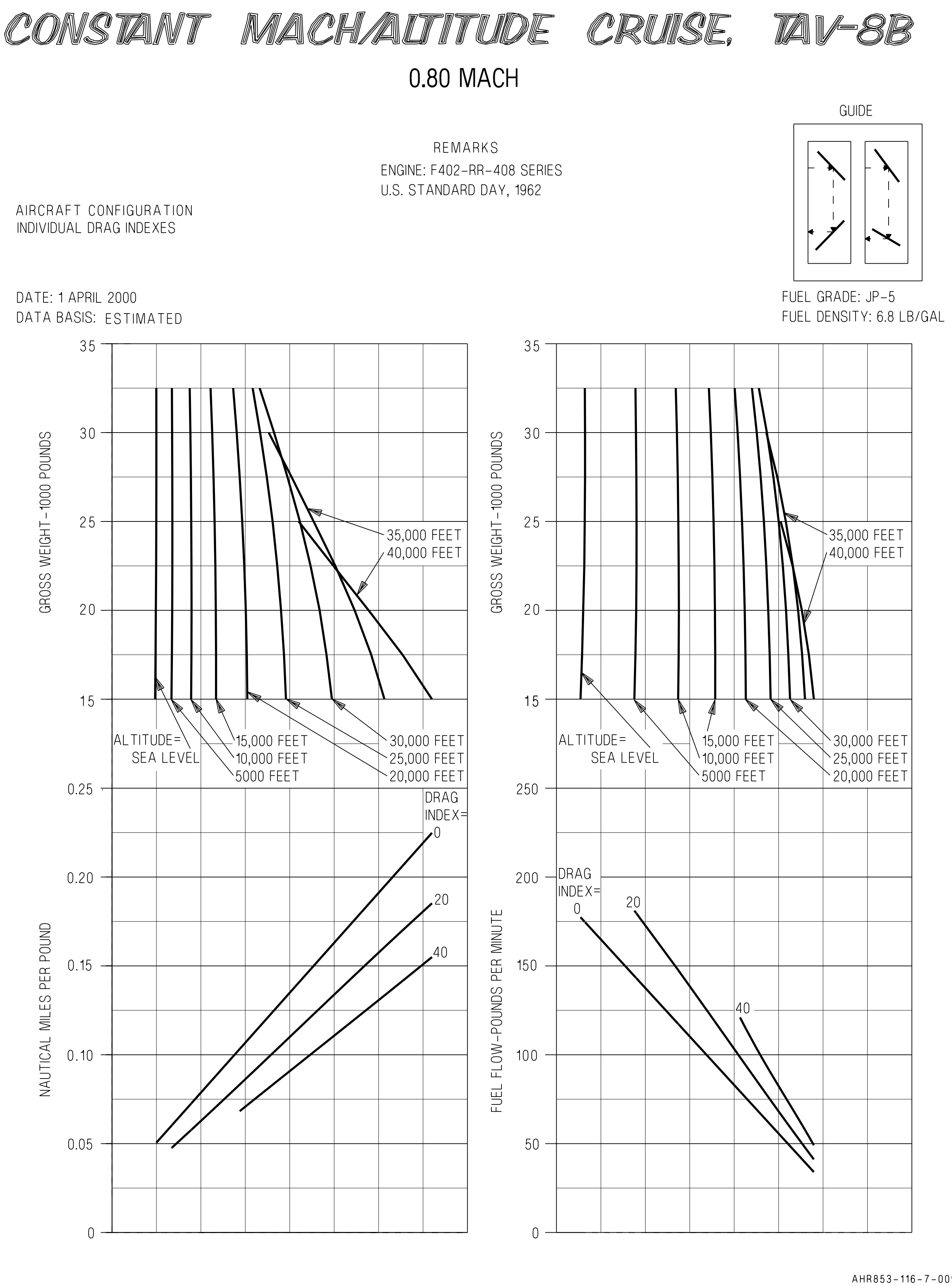



**Figure 5-17. Constant Mach/Altitude Cruise, F402-RR-408 Engine (Sheet 7 of 7)**

# OPTIMUM CRUISE AT CONSTANT ALTITUDE, TAV-8B

## NAUTICAL MILES PER POUND

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 APRIL 2000
DATA BASE: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

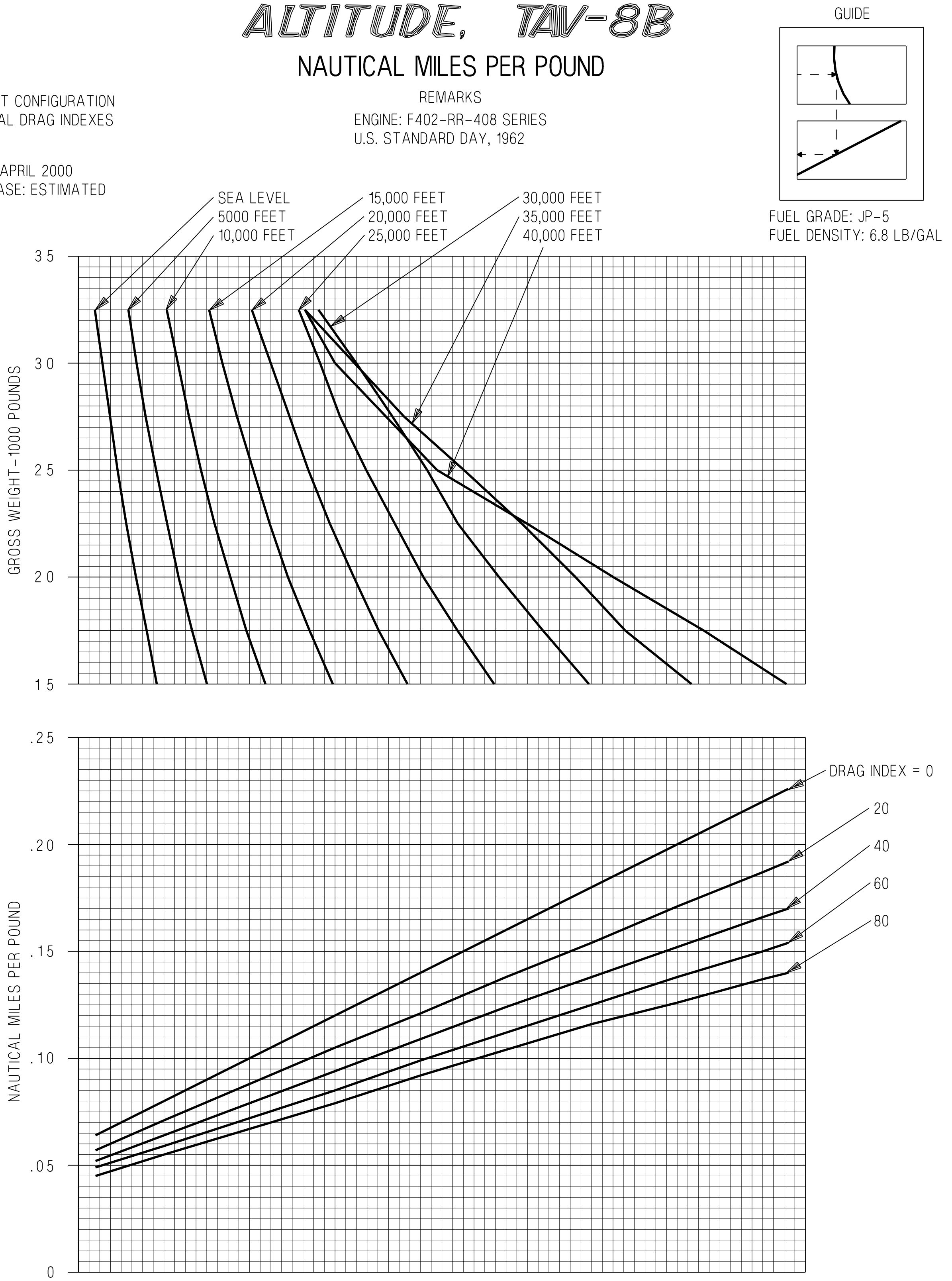



Figure 5-18. Optimum Cruise at Constant Altitude, F402-RR-408 Engine (Sheet 1 of 2)

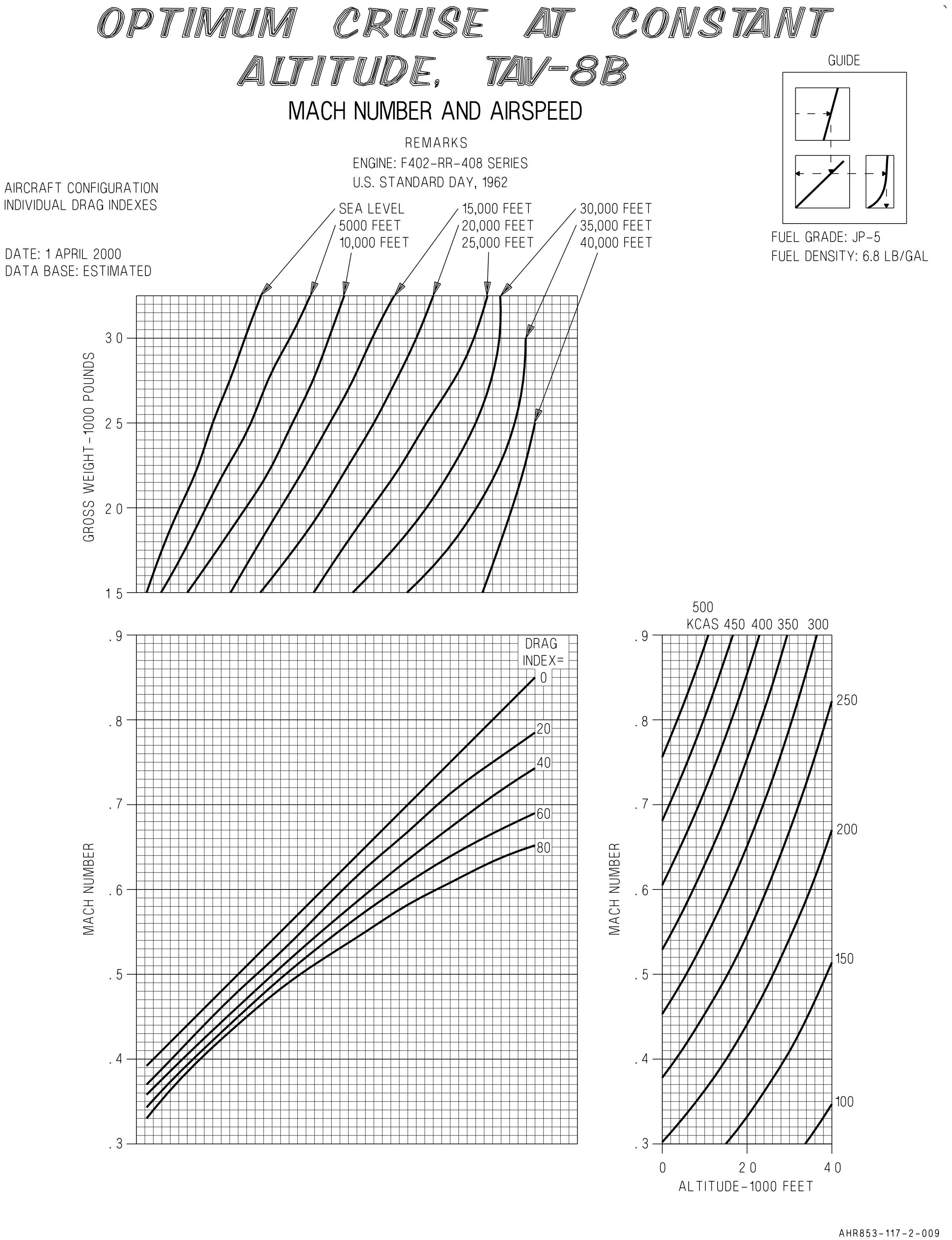



Figure 5-18. Optimum Cruise at Constant Altitude, F402-RR-408 Engine (Sheet 2 of 2)

# BINGO TAV-8B

GEAR UP - FLAPS AUTO
DI = 6.1

REMARKS
ENGINE: F402-RR-408
U.S. STANDARD DAY, 1962

DATE: 1 APRIL 2000
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE-1000 FEET | CRUISE MACH | CRUISE FUEL FLOW-LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE-NAUTICAL MILES 250 KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 18 | 10.0 | 0.46 | 50.0 | 13 | 15 |
| 1.5 | 88 | 35.0 | 0.71 | 37.0 | 60 | 52 |
| 2.0 | 189 | 43.1 | 0.80 | 37.6 | 85 | 88 |
| 2.5 | 286 | 42.8 | 0.80 | 38.1 | 85 | 124 |
| 3.0 | 381 | 42.6 | 0.80 | 38.7 | 85 | 160 |
| 3.5 | 474 | 42.3 | 0.80 | 39.1 | 85 | 195 |
| 4.0 | 565 | 42.0 | 0.80 | 39.6 | 85 | 231 |
| 4.5 | 654 | 41.7 | 0.80 | 40.1 | 85 | 265 |
| 5.0 | 740 | 41.5 | 0.80 | 40.5 | 85 | 300 |
| 5.5 | 825 | 41.2 | 0.80 | 41.0 | 85 | 334 |
| 6.0 | 907 | 41.0 | 0.80 | 41.5 | 85 | 368 |
| 6.5 | 987 | 40.7 | 0.80 | 42.0 | 85 | 401 |
| 7.0 | 1068 | 40.6 | 0.80 | 42.4 | 85 | 434 |

Data based on:

1. Maximum thrust climb at 300 knots/0.77 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-19. BINGO, TAV-8B Aircraft, F402-RR-408 Engine (Sheet 1 of 2)**

# BINGO TAV-8B

GEAR DOWN - FLAPS AUTO
DI = 6.1

REMARKS
ENGINE: F402-RR-408
U.S. STANDARD DAY, 1962

DATE: 15 APRIL 2000
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| FUEL 1000 LB | RANGE NAUTICAL MILES | ALTITUDE- 1000 FEET | CRUISE MACH | CRUISE FUEL FLOW- LB/MIN | DESCENT TO SEA LEVEL-NAUTICAL MILES | SEA LEVEL RANGE- NAUTICAL MILES 250KIAS |
|---|---|---|---|---|---|---|
| 1.0 | 9 | 5 | 0.32 | 71.1 | 3 | 9 |
| 1.5 | 42 | 25.5 | 0.43 | 54.9 | 15 | 30 |
| 2.0 | 86 | 34.5 | 0.53 | 53.3 | 23 | 51 |
| 2.5 | 131 | 34.2 | 0.53 | 54.4 | 23 | 72 |
| 3.0 | 175 | 33.9 | 0.53 | 55.5 | 23 | 93 |
| 3.5 | 217 | 33.7 | 0.54 | 56.6 | 23 | 114 |
| 4.0 | 259 | 33.4 | 0.54 | 57.3 | 23 | 134 |
| 4.5 | 299 | 33.1 | 0.53 | 57.9 | 23 | 154 |
| 5.0 | 339 | 32.8 | 0.53 | 58.6 | 23 | 174 |
| 5.5 | 377 | 32.5 | 0.53 | 59.2 | 23 | 194 |
| 6.0 | 414 | 32.3 | 0.53 | 59.9 | 23 | 214 |
| 6.5 | 449 | 32.0 | 0.53 | 60.6 | 23 | 233 |
| 7.0 | 485 | 32.1 | 0.53 | 58.2 | 23 | 252 |

Data based on:

1. Maximum thrust climb at 200 knots/0.48 Mach from sea level to cruise altitude.
2. Fuel includes 200 pounds allowance for vertical landing and 600 pounds for reserve.
3. Descent at idle thrust and 230 knots (no speedbrake).
4. Range includes climb, cruise and descent distances.

**Figure 5-19. BINGO, TAV-8B Aircraft, F402-RR-408 Engine (Sheet 2 of 2)**

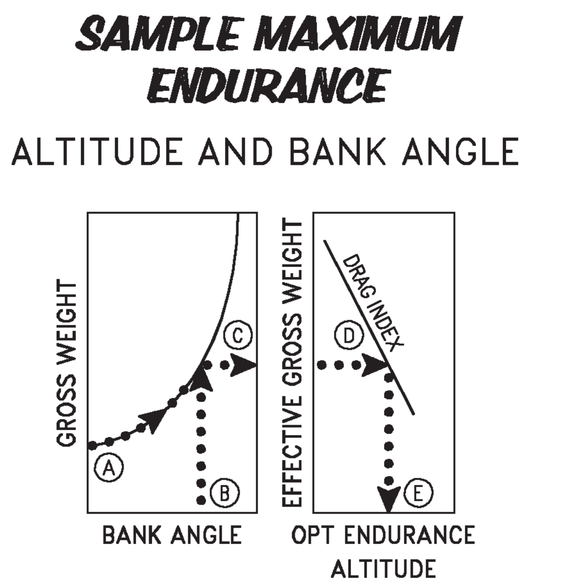
# CHAPTER 6

# Endurance

## 6.1 MAXIMUM ENDURANCE CHARTS

These charts (Figure 6-1 thru 6-12) present optimum endurance altitude and maximum endurance specifics (fuel flow and Mach number) for all combinations of effective gross weight and altitude.

**6.1.1 Use.** Enter the Altitude and Bank Angle chart with the average gross weight. If bank angles are to be considered, follow the gross weight curve until it intersects the bank angle to be used, then horizontally right to obtain effective gross weight. (If bank angles are not to be considered, enter the chart at the effective gross weight scale). From this point project horizontally right and intersect the appropriate drag index, then project vertically down and read the optimum endurance altitude. Enter the Mach number plots with the effective gross weight, and project horizontally right to intersect the optimum endurance altitude, then project vertically down to intersect the appropriate drag index. From this point, project horizontally left and right to read the indicated Mach number and indicated airspeed respectively. Enter the fuel flow plots with the effective gross weight and project horizontally right to intersect the optimum endurance altitude. From this point, project vertically down to the appropriate drag index, then horizontally left to read fuel flow.

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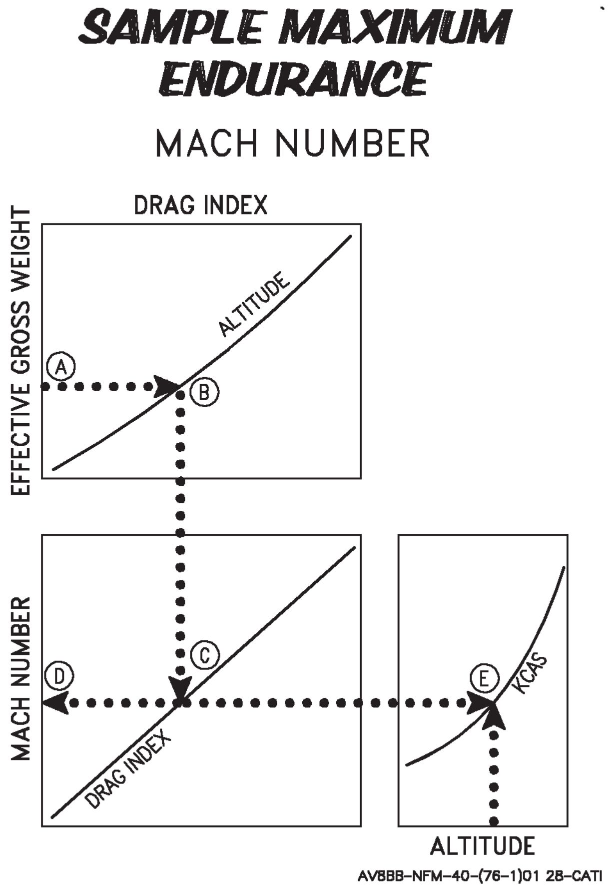


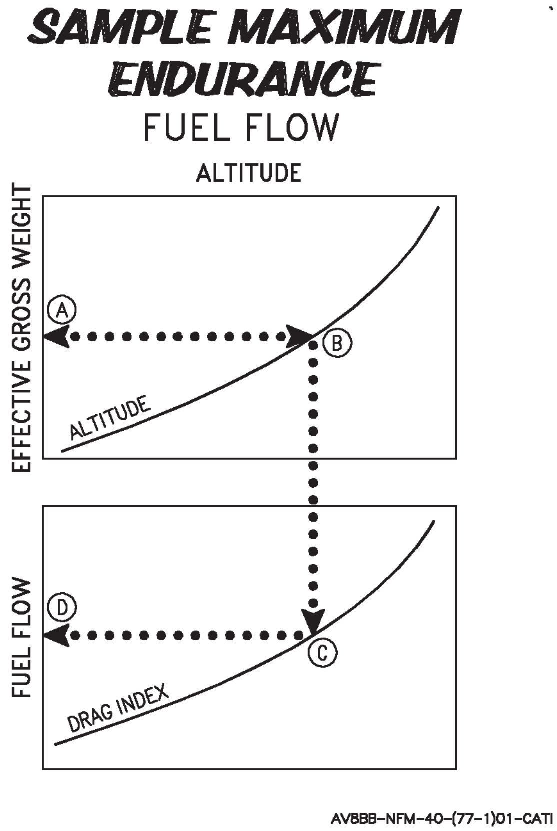

### 6.1.2 Sample Problem

(Use Figures 6-1, 6-2 and 6-3)

Altitude and Bank Angle

Configuration: (5) Pylons +19″ Fuselage Strakes

| | |
|---|---|
| A. Gross weight | 18,000 Lb |
| B. Bank angle | 30° |
| C. Effective gross weight | 20,800 Lb |
| D. Drag index reflector | 80 |
| E. Optimum endurance altitude | 30,840 Ft |




Mach Number

| | |
|---|---|
| A. Effective gross weight | 20,800 Lb |
| B. Endurance altitude | 30,840 Ft |
| C. Drag index reflector | 80 |
| D. Mach number | 0.58 |
| E. Airspeed (KCAS) | 213 Kt |

Fuel Flow

| | |
|---|---|
| A. Effective gross weight | 20,800 Lb |
| B. Endurance altitude | 30,840 Ft |
| C. Drag index reflector | 80 |
| D. Fuel flow | 39 PPM |

# MAXIMUM ENDURANCE, AV-8B

## ALTITUDE & BANK ANGLE

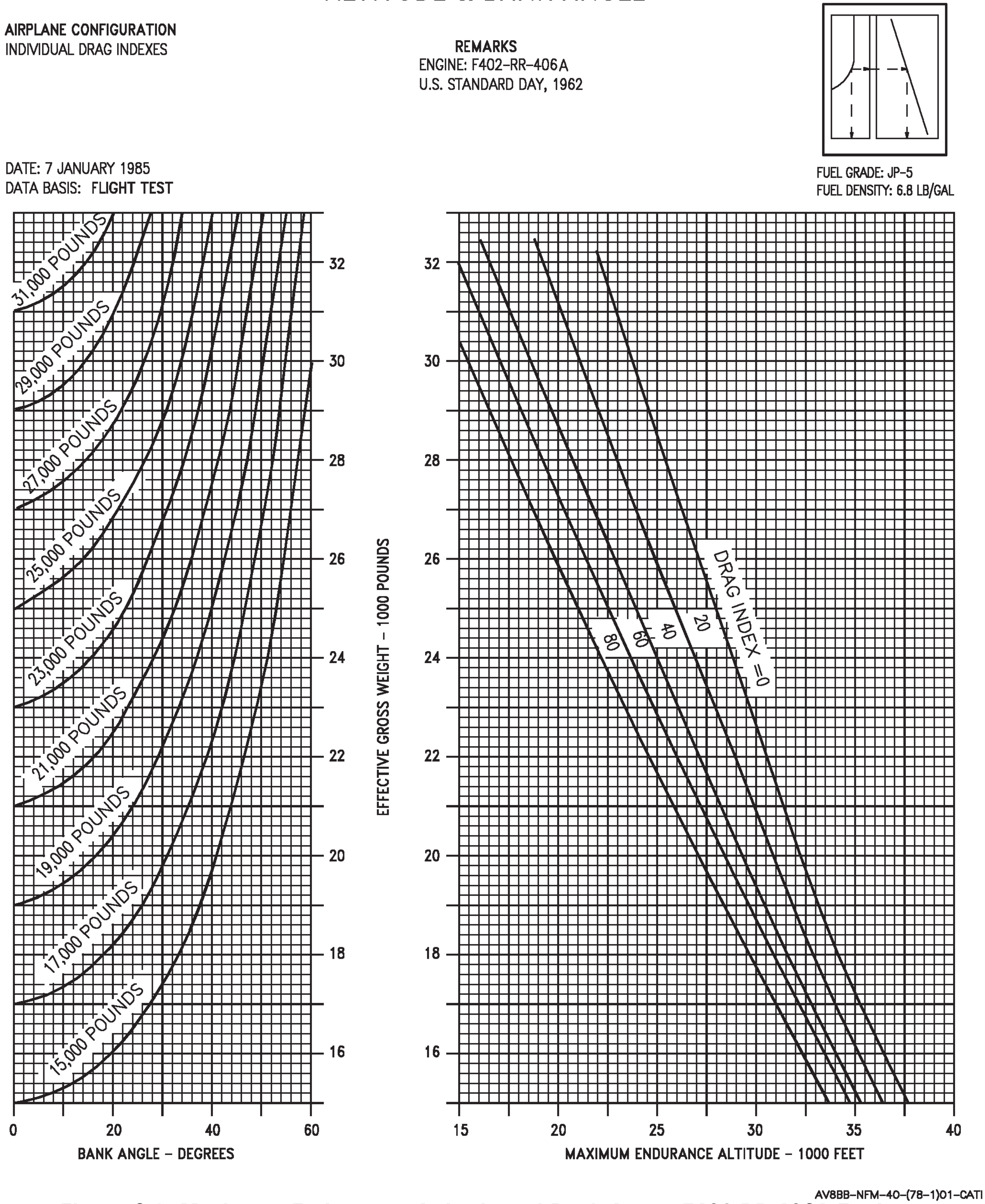



**Figure 6-1. Maximum Endurance, Altitude and Bank Angle, F402-RR-406A Engine**

# MAXIMUM ENDURANCE, AV-8B

## MACH NUMBER AND AIRSPEED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

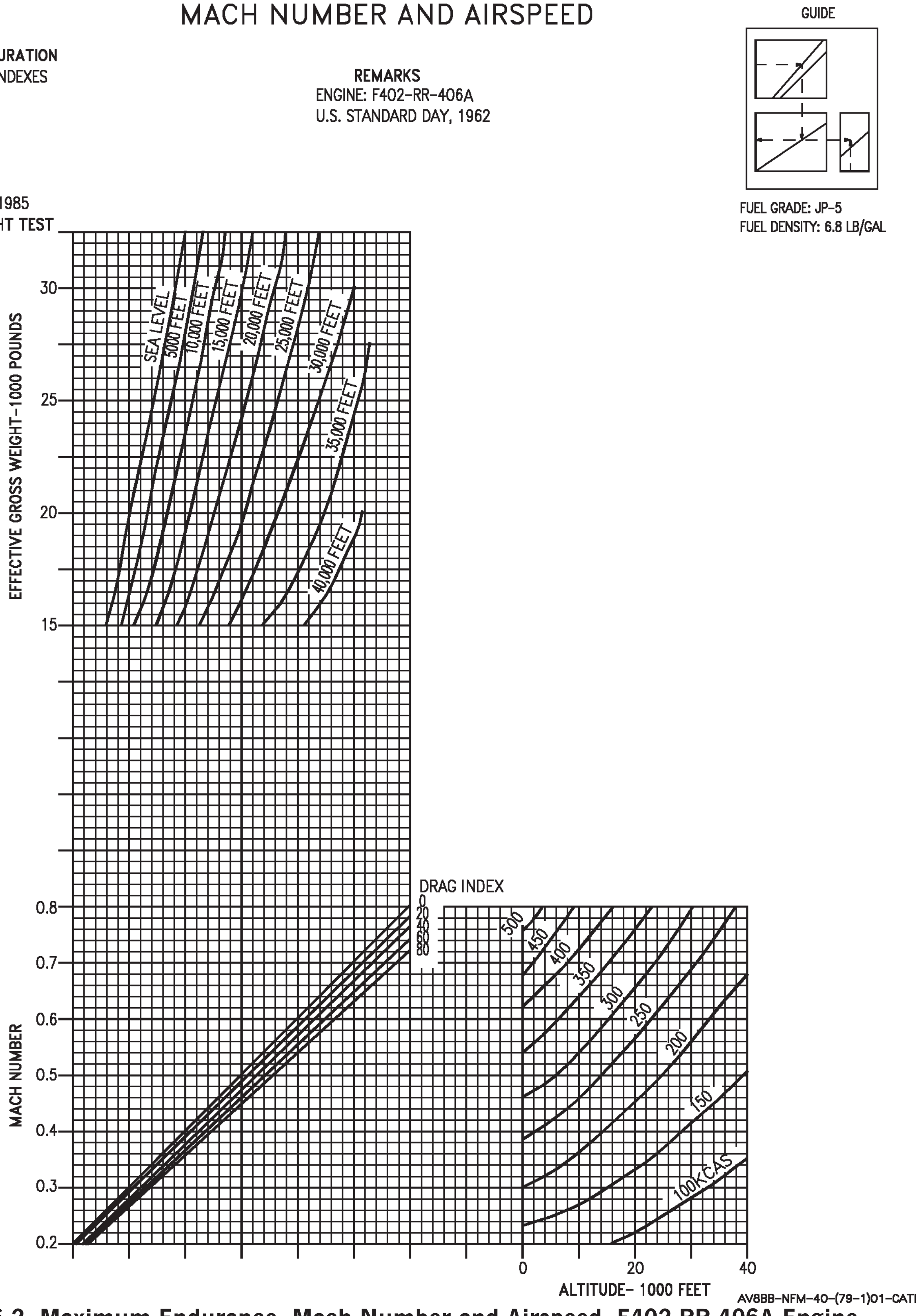
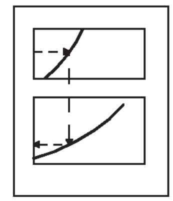



Figure 6-2. Maximum Endurance, Mach Number and Airspeed, F402-RR-406A Engine

# MAXIMUM ENDURANCE, AV-8B

## FUEL FLOW

GUIDE

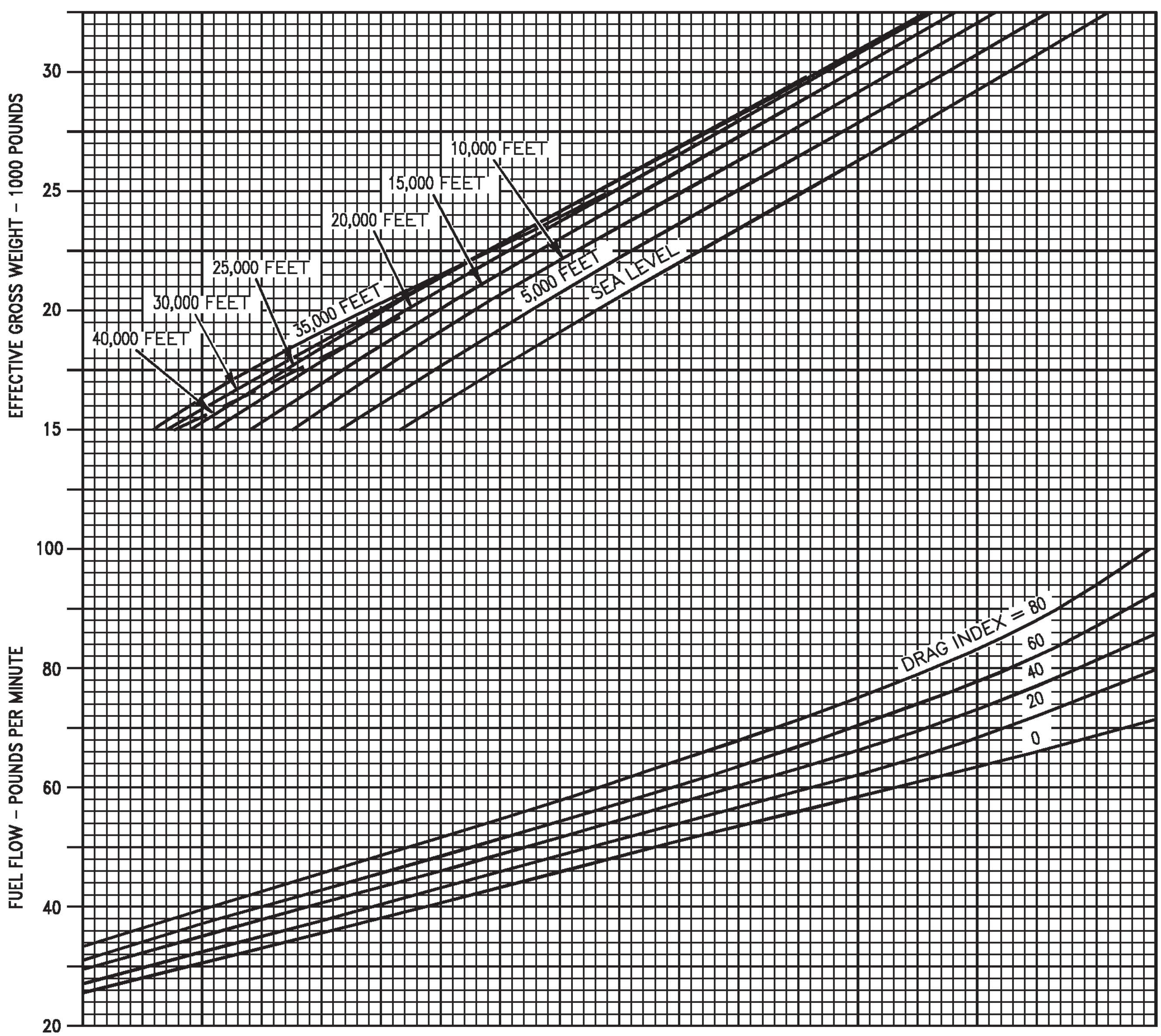


**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



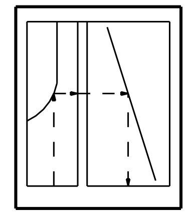

AV8BB-NFM-40-(80-1)01-CATI

**Figure 6-3. Maximum Endurance, Fuel Flow, F402-RR-406A Engine**

# MAXIMUM ENDURANCE, AV-8B

## ALTITUDE AND BANK ANGLE

GUIDE

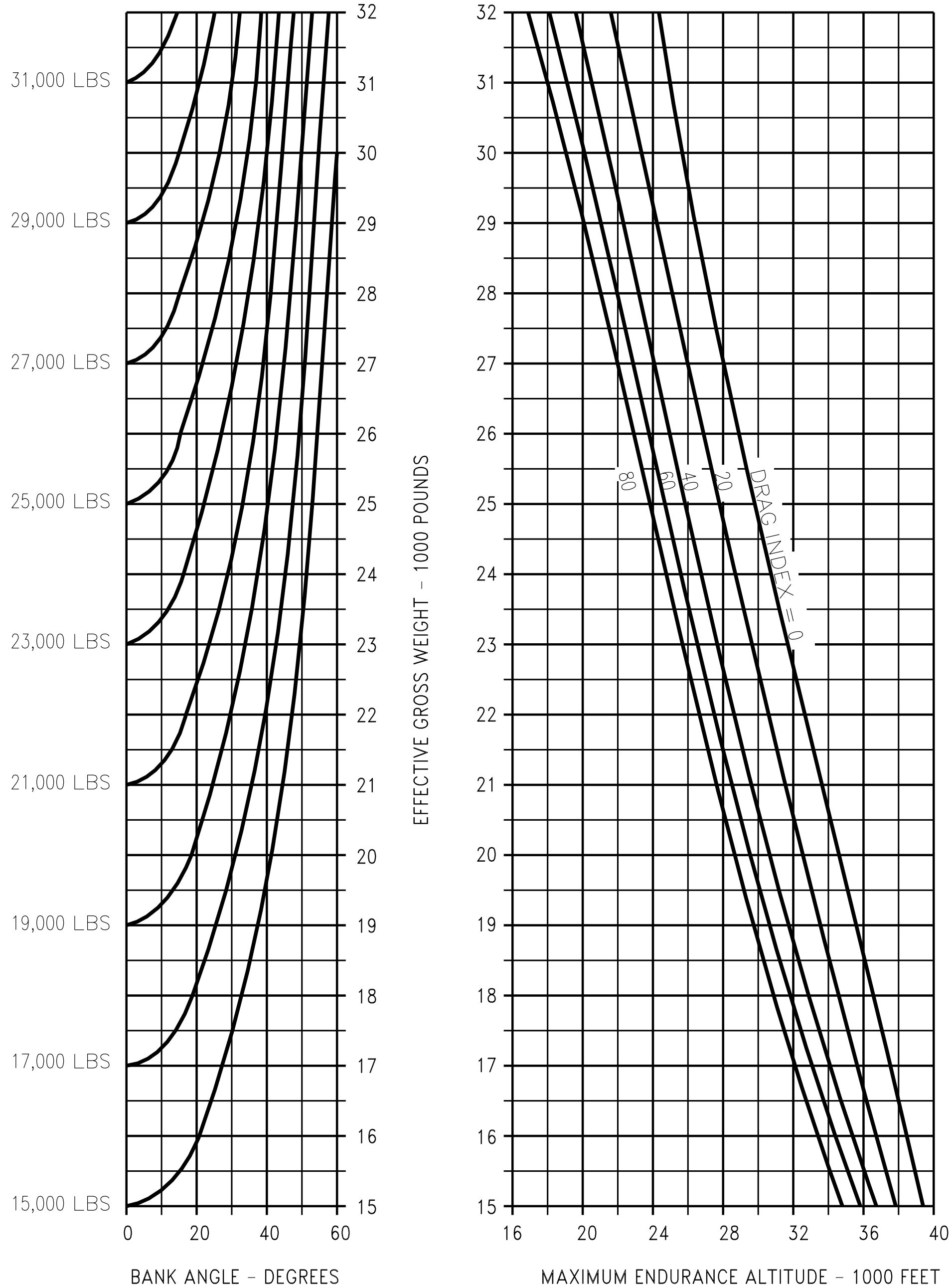


AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(81-1)04-CATI/ACS

**Figure 6-4. Maximum Endurance, Altitude and Bank Angle, F402-RR-408 Series Engine**

# MAXIMUM ENDURANCE, AV-8B

MACH NUMBER AND AIRSPEED

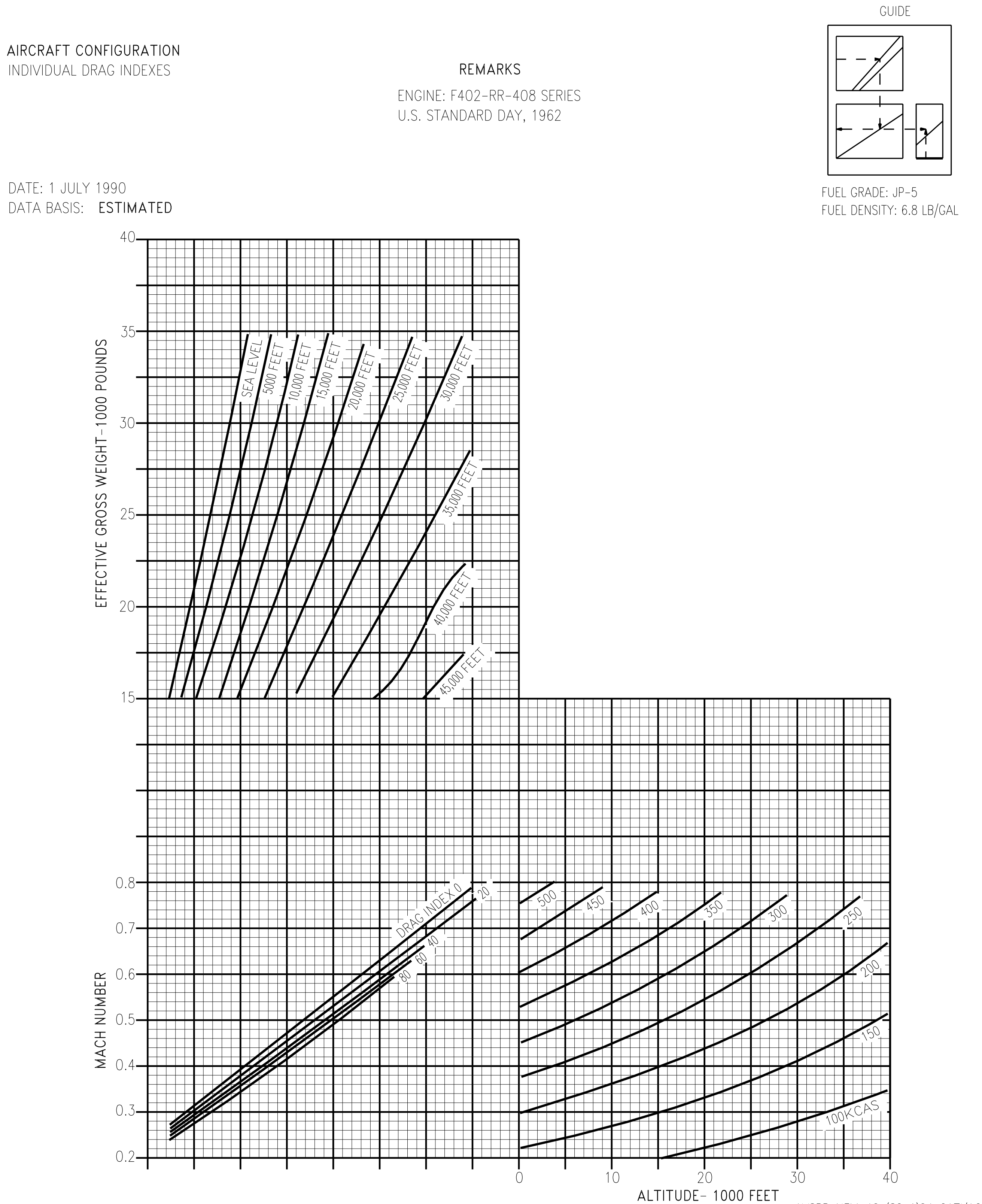



**Figure 6-5. Maximum Endurance, Mach Number and Airspeed, F402-RR-408 Series Engine**

# MAXIMUM ENDURANCE, AV-8B

FUEL FLOW

GUIDE

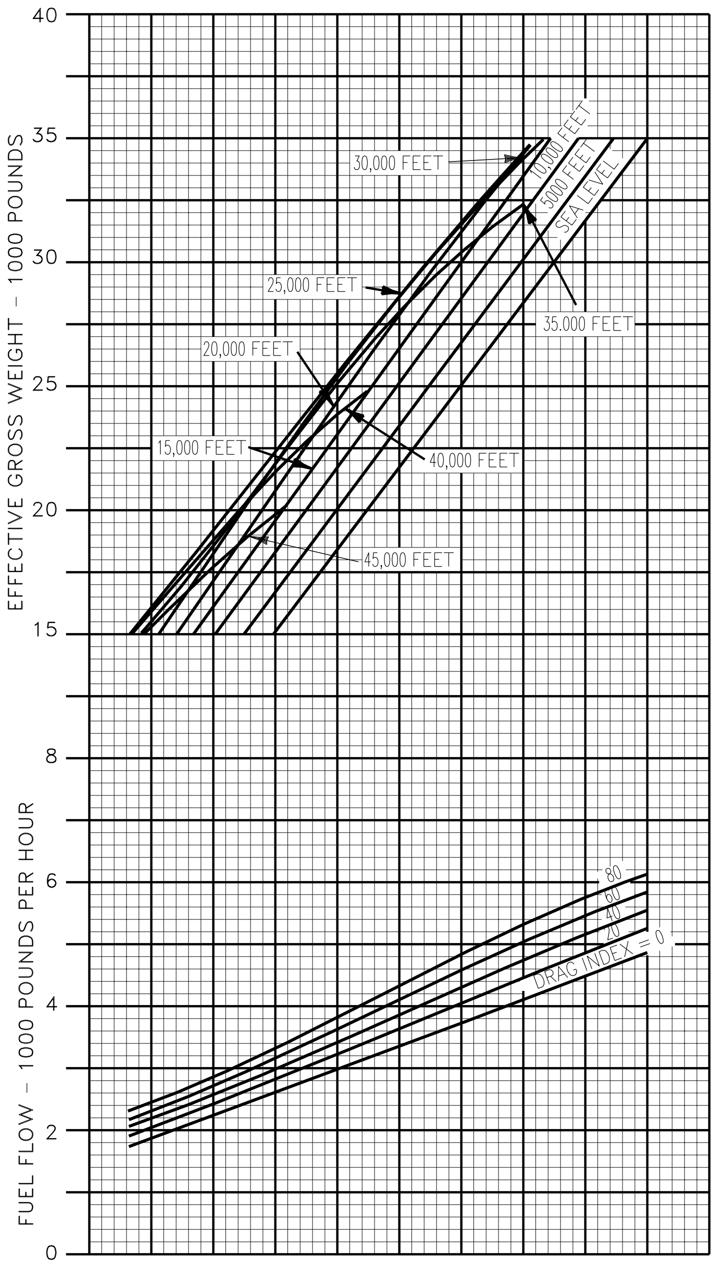
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(83-1)04-CATI/ACS

Figure 6-6. Maximum Endurance, Fuel Flow, F402-RR-408 Series Engine

# MAXIMUM ENDURANCE, TAV-8B

## ALTITUDE & BANK ANGLE

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 13 JULY 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

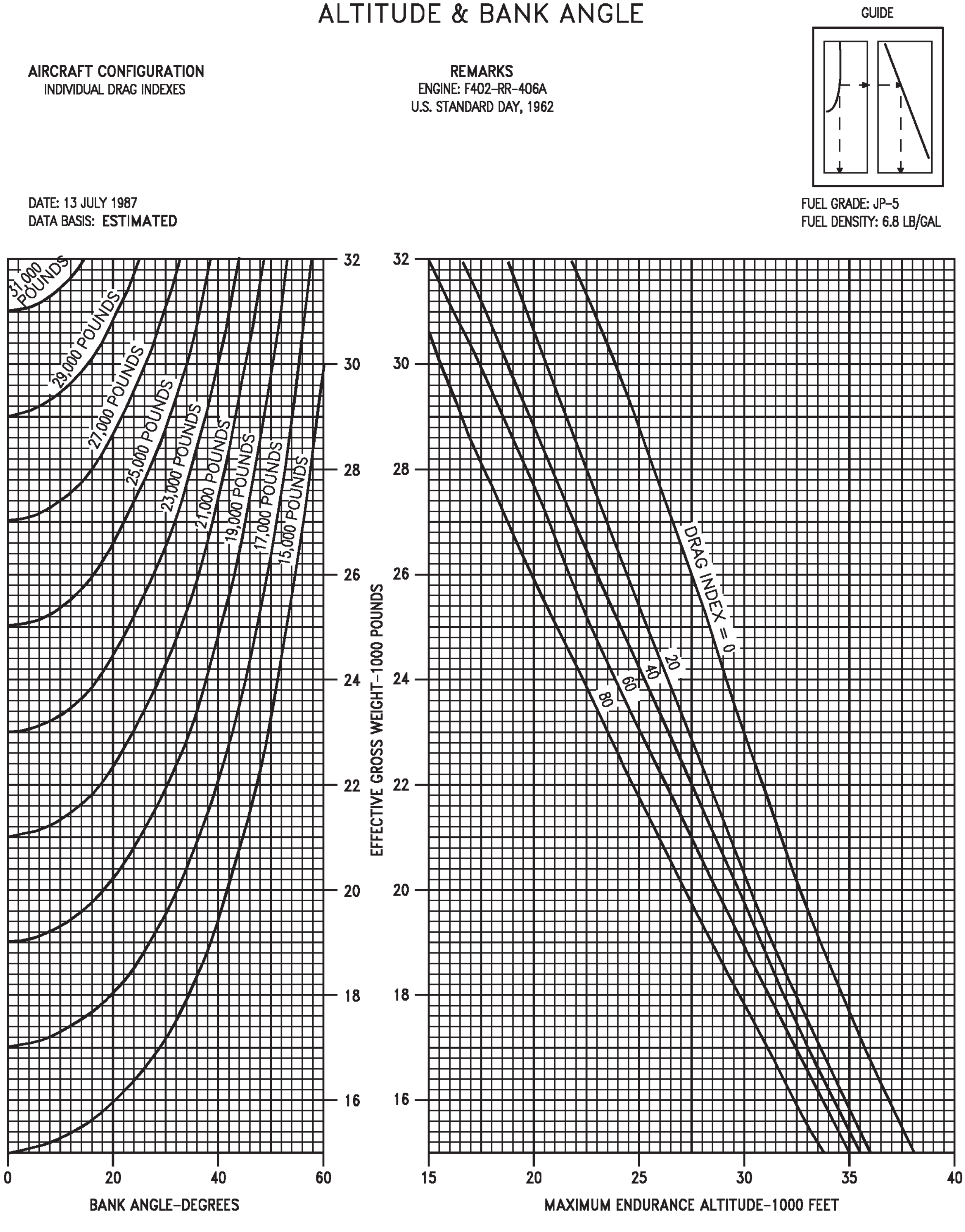



**Figure 6-7. Maximum Endurance, Altitude and Bank Angle, F402-RR-406A Engine**

# MAXIMUM ENDURANCE, TAV-8B

## MACH NUMBER AND AIRSPEED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 9 JULY 1987
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

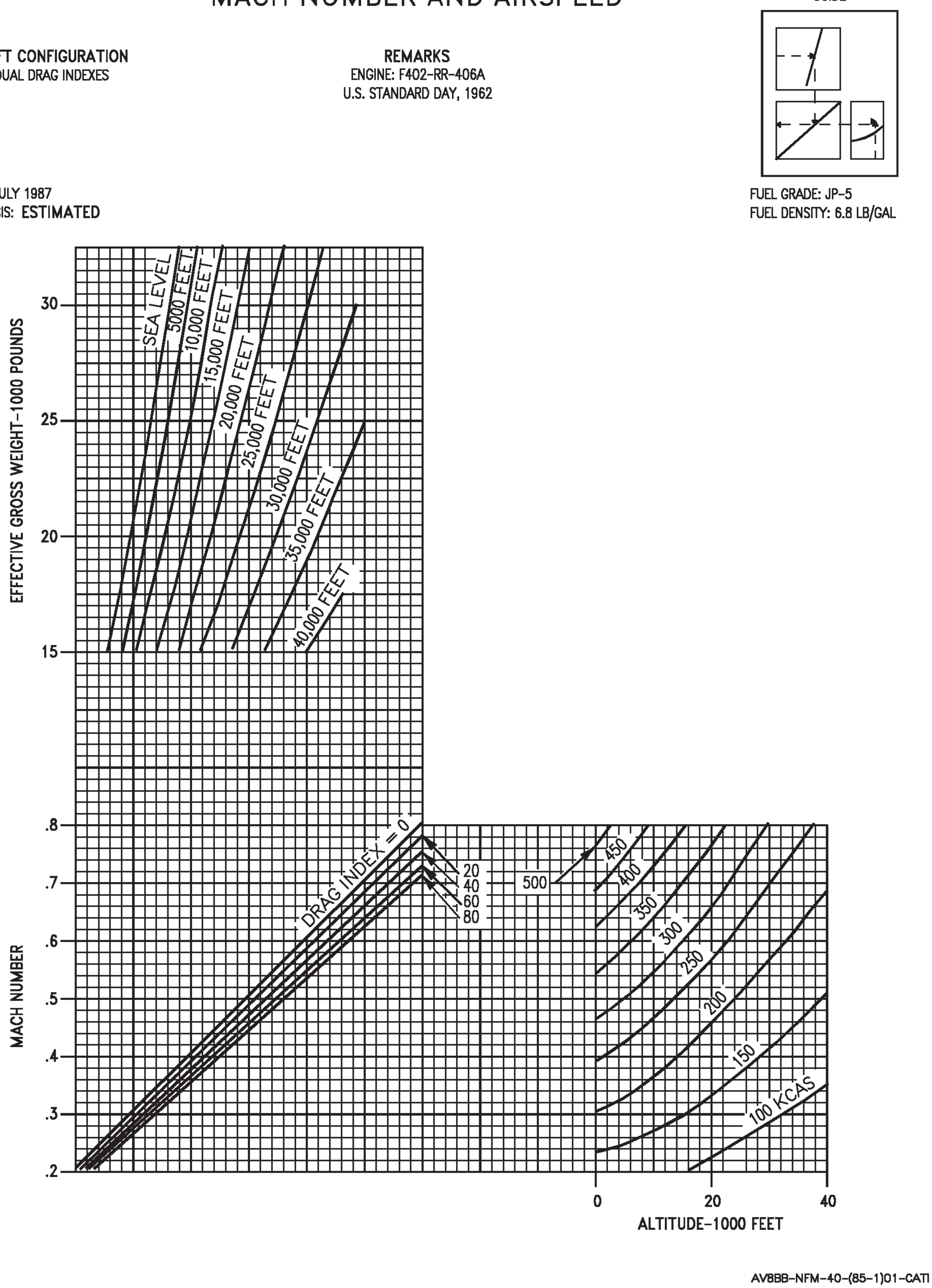



Figure 6-8. Maximum Endurance, Mach Number and Airspeed, F402-RR-406A Engine

# MAXIMUM ENDURANCE, TAV-8B

## FUEL FLOW

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

DATE: 9 JULY 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

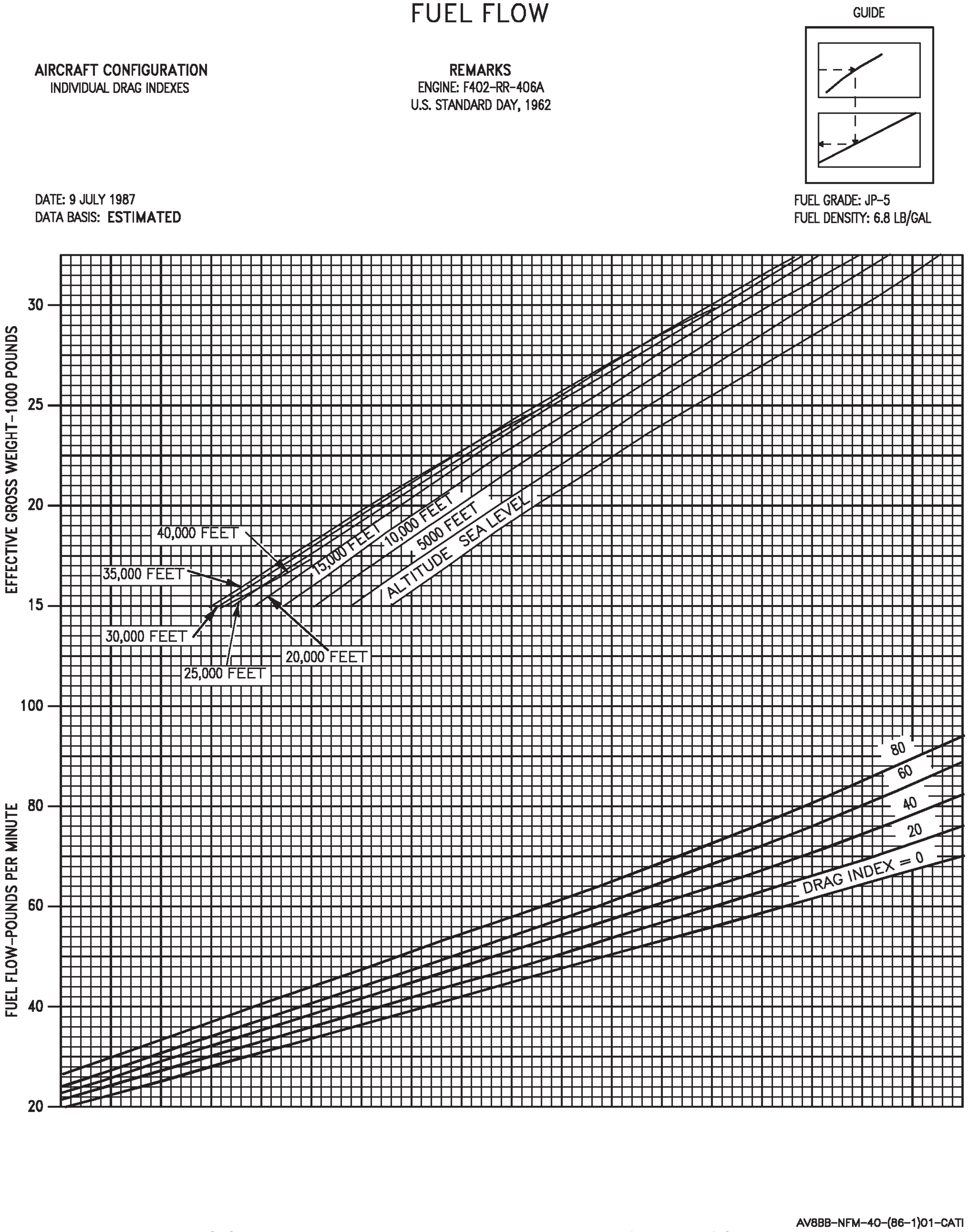



**Figure 6-9. Maximum Endurance, Fuel Flow, F402-RR-406A Engine**

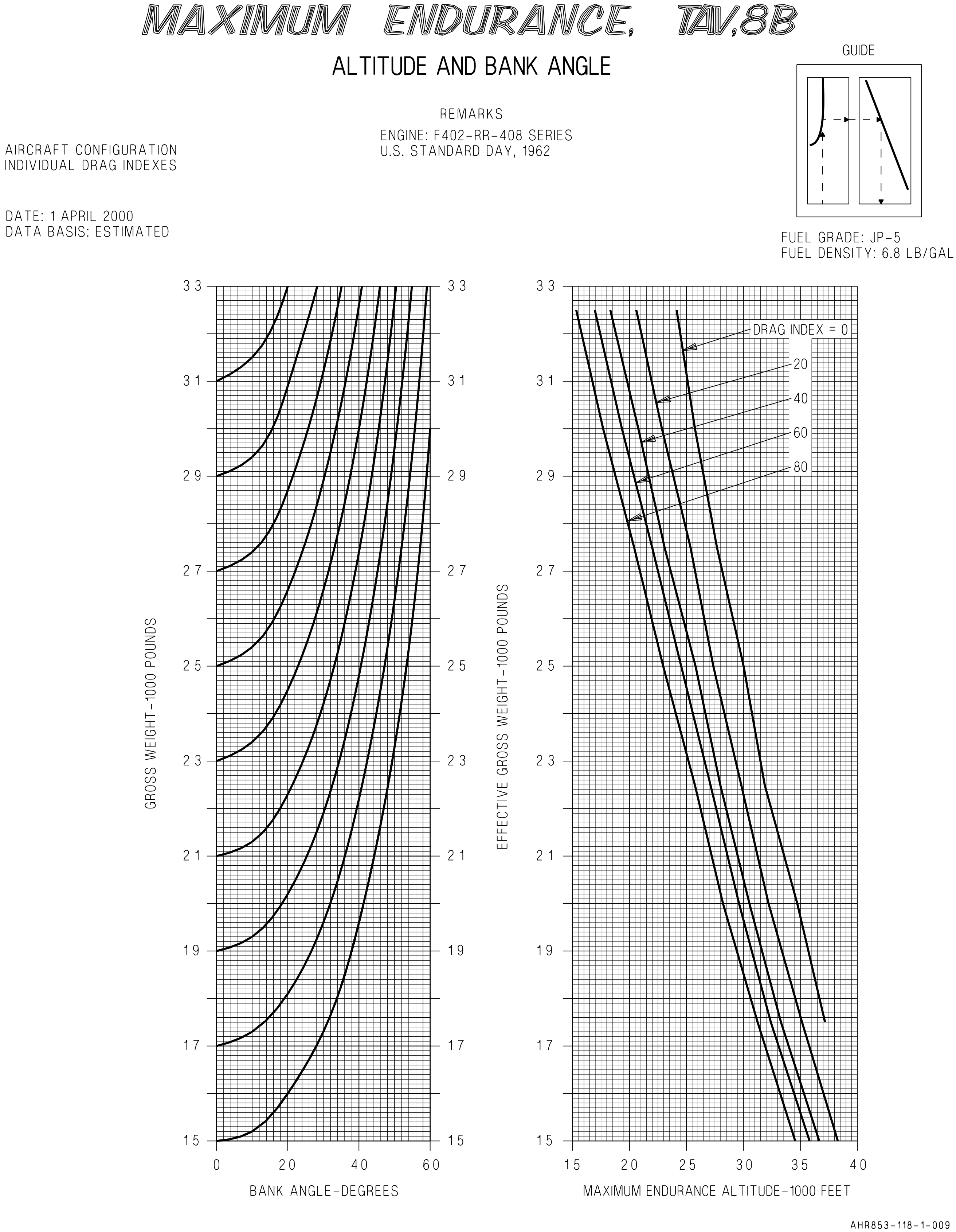



**Figure 6-10. Maximum Endurance, Altitude and Bank Angle, F402-RR-408 Engine**

# MAXIMUM ENDURANCE, TAV-8B

## MACH NUMBER AND AIRSPEED

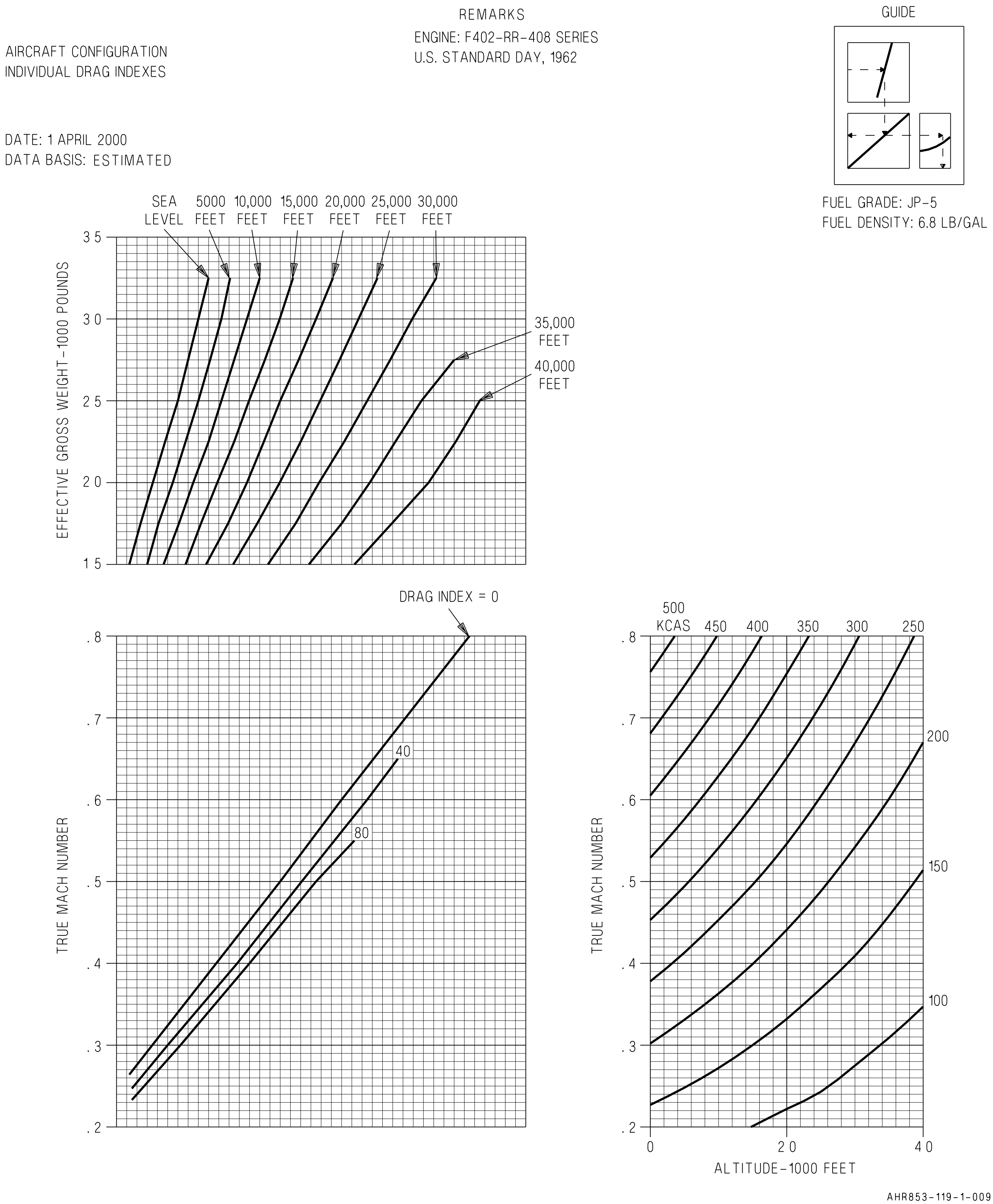



**Figure 6-11. Maximum Endurance, Mach Number and Airspeed, F402-RR-408 Engine**

# MAXIMUM ENDURANCE, TAV-8B

## FUEL FLOW

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 1 APRIL 2000
DATA BASE: ESTIMATED

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

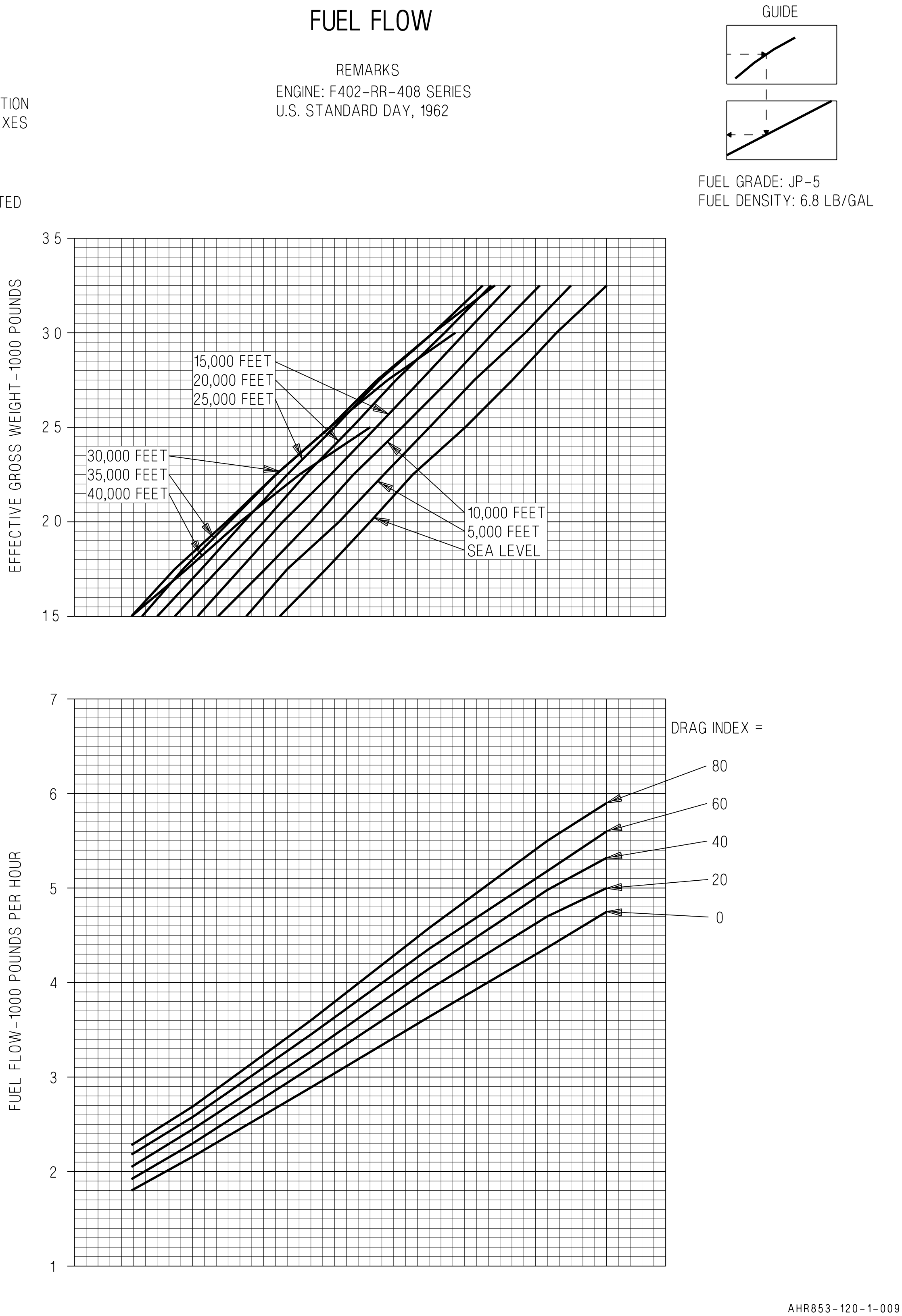



Figure 6-12. Maximum Endurance, Fuel Flow, F402-RR-408 Engine

# CHAPTER 7

# Inflight Refueling

To Be Supplied When Available.

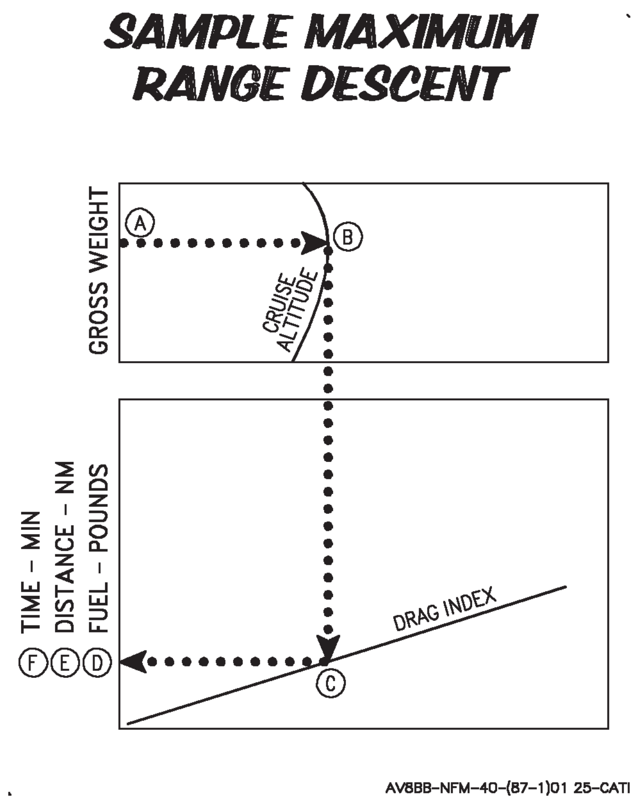
# CHAPTER 8

# Descent

## 8.1 MAXIMUM RANGE DESCENT CHARTS

A series of charts (Figures 8-1, 8-3, 8-5, and 8-7) is presented for an idle thrust maximum range descent schedule. The series includes charts for determining time, distance covered and fuel used while in the descent. The charts are based on a simplified descent schedule of maintaining a specified Mach schedule or 230 KCAS, whichever is less. Incremental data may be obtained for distance, time and fuel by subtracting data corresponding to level-off altitude from the data for the original cruising altitude.

**8.1.1 Use.** The method of presenting data on the time, distance, and fuel charts is identical, and the use of one chart will be undertaken here. Enter the charts with the initial descent gross weight. Project horizontally right and intersect the assigned cruise altitude, or the optimum cruise altitude for the appropriate drag index. Project vertically down to intersect the applicable drag index line, then horizontally left to read the the planning data.




**8.1.2 Sample Problem** (Use Figure 8-1)

Maximum Range Descent: 230 KIAS, idle thrust, flaps auto and speed brake retracted.

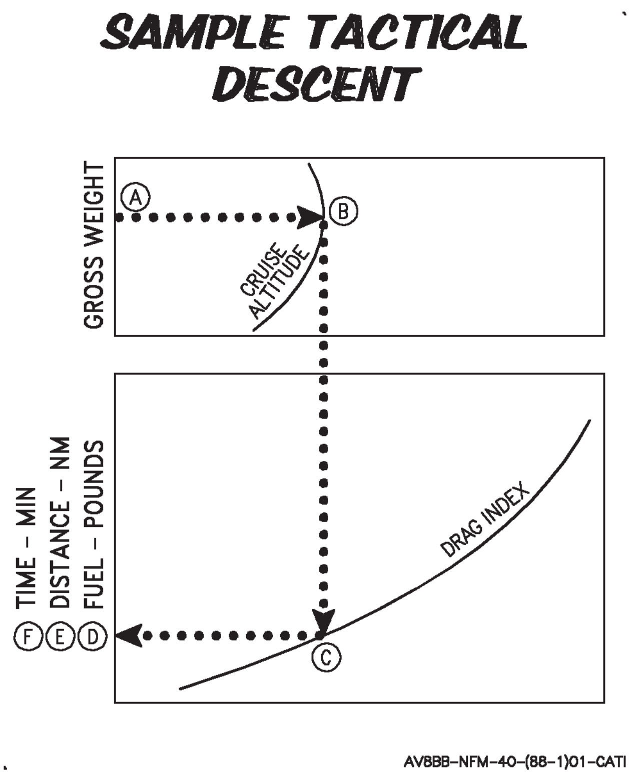
Configuration: (5) Pylons +19″ Fuselage Strakes +(4) 300 Gal Tanks

| | |
|---|---|
| A. Initial gross weight | 22,000 Lb |
| B. Cruise altitude | 30,000 Ft |
| C. Drag index | 42.2 |
| D. Fuel required to descend | 147 Lb |
| E. Distance required to descend | 42.5 nm |
| F. Time required to descend | 7.2 Min |

## 8.2 TACTICAL DESCENT CHARTS

A series of charts (Figures 8-2, 8-4, 8-6, and 8-8) is presented for a 65% rpm descent schedule. The series includes charts for determining time, distance covered and fuel used while in the descent. The charts are based on a simplified descent schedule of maintaining a specified Mach schedule or 350 KCAS, whichever is less. Incremental data may be obtained for distance, time and fuel by subtracting data corresponding to level-off altitude from the data for the original cruising altitude.

**8.2.1 Use.** The method of presenting data on the time, distance, and fuel charts is identical, and the use of one chart will be undertaken here. Enter the charts with the initial descent gross weight. Project horizontally right and intersect the assigned cruise altitude, or the optimum cruise altitude for the appropriate drag index. Project vertically down to intersect the applicable drag index line, then horizontally left to read the planning data.




**8.2.2 Sample Problem** (Use Figure 8-2)

Tactical Descent: 350 KIAS, 65% RPM, flaps auto and speed brake retracted.

Configuration: (5) Pylons +19″ Fuselage Strakes +(4) 300 Gal Tanks

| | |
|---|---|
| A. Initial gross weight | 22,000 Lb |
| B. Cruise altitude | 30,000 Ft |
| C. Drag index | 42.2 |
| D. Fuel required to descend | 238 Lb |
| E. Distance required to descend | 36 nm |
| F. Time required to descend | 5.5 Min |

# MAXIMUM RANGE DESCENT, AV-8B

## TIME REQUIRED TO DESCEND IDLE THRUST–FLAPS AUTO–SPEED BRAKE RETRACTED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402–RR–406A
U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

| DI– | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH– | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL

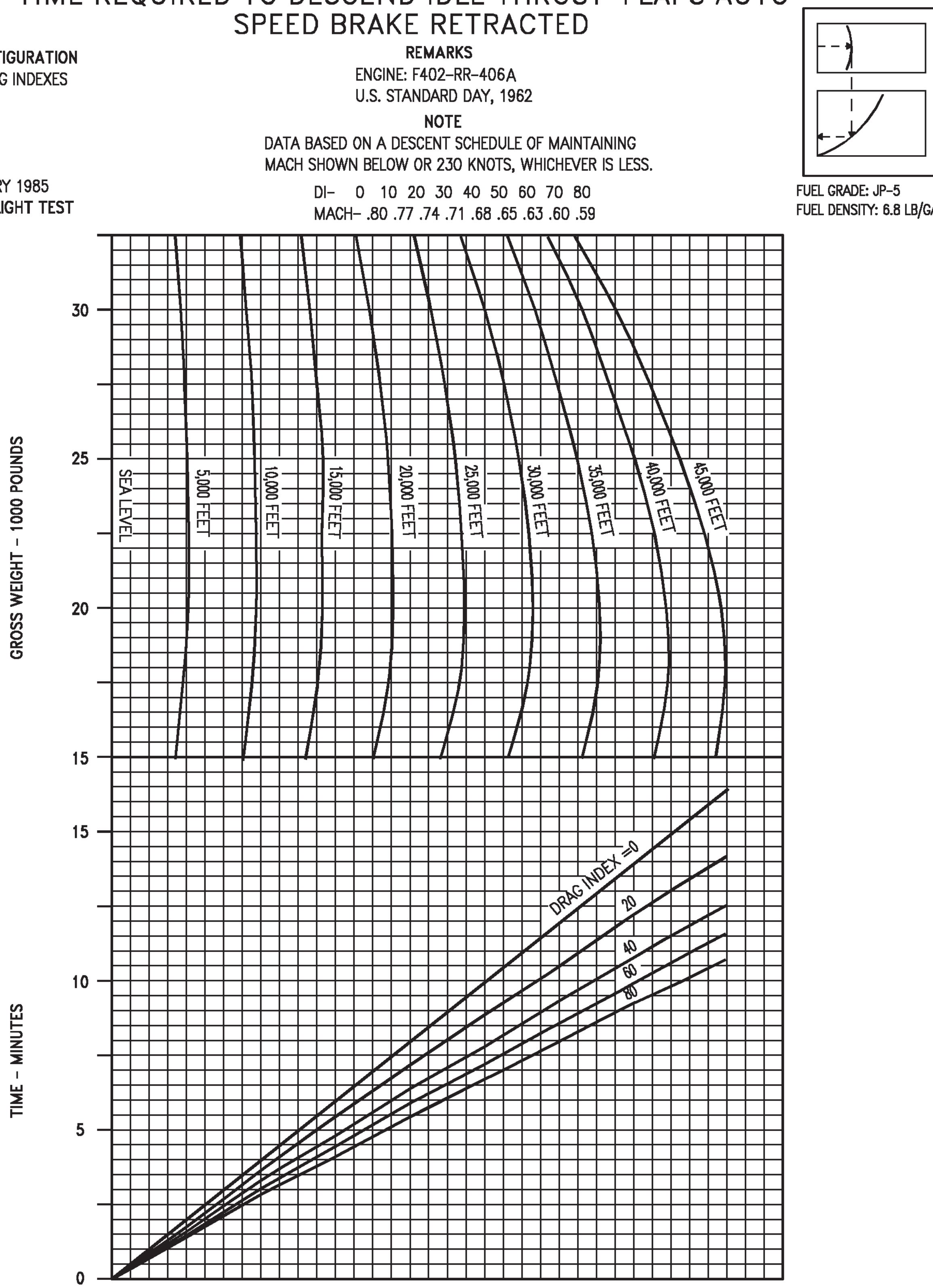



Figure 8-1. Maximum Range Descent, F402-RR-406A Engine (Sheet 1 of 3)

# MAXIMUM RANGE DESCENT, AV-8B

## FUEL REQUIRED TO DESCEND IDLE THRUST–FLAPS AUTO–SPEED BRAKE RETRACTED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

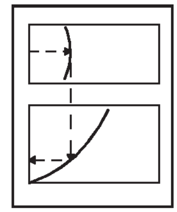
**REMARKS**
ENGINE: F402–RR–406A
U.S. STANDARD DAY, 1962

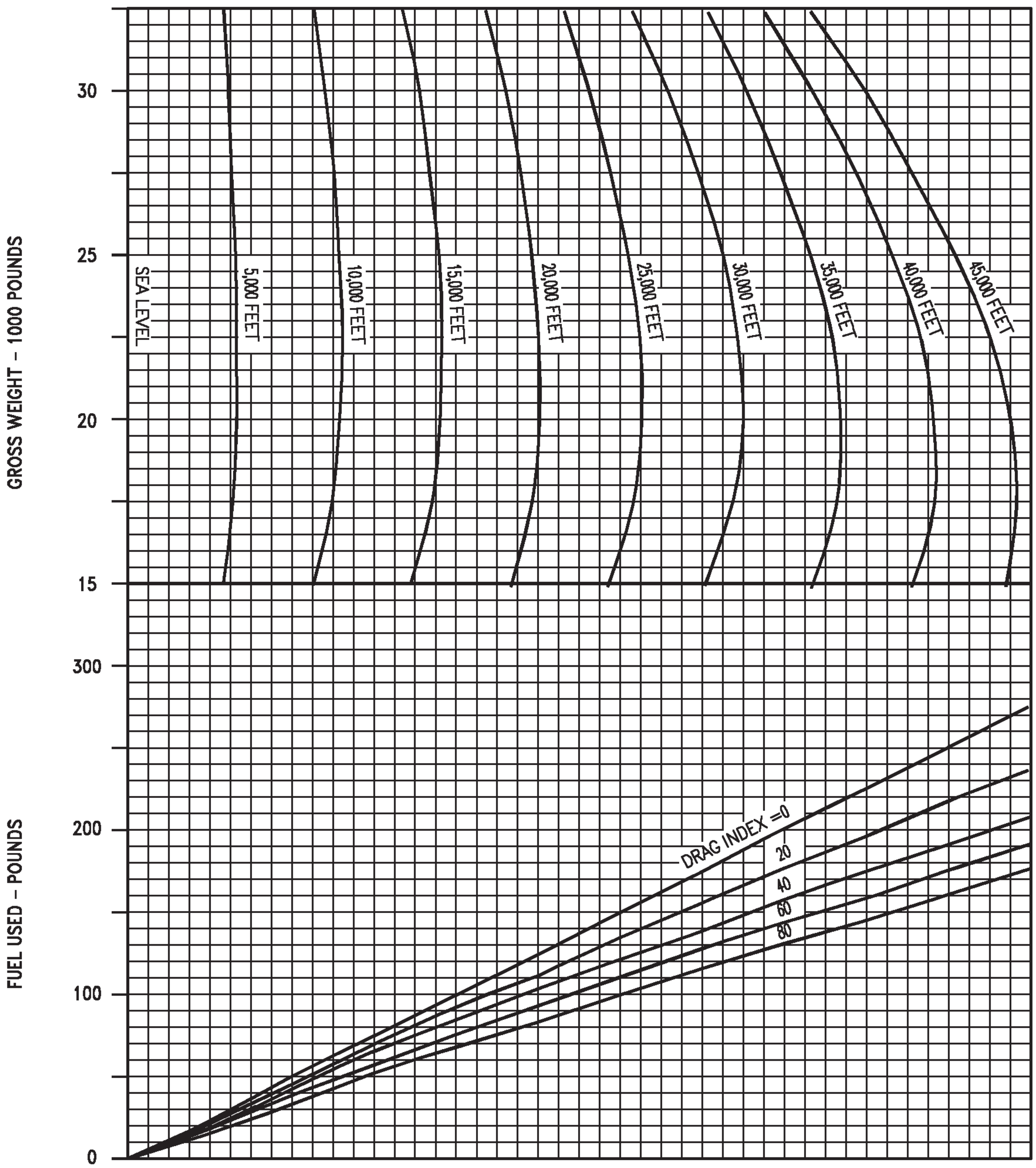
**NOTE**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

| DI– | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH– | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL




AV8BB–NFM–40–(89–2)01–CATI

**Figure 8-1. Maximum Range Descent, F402-RR-406A Engine (Sheet 2 of 3)**

# MAXIMUM RANGE DESCENT, AV-8B

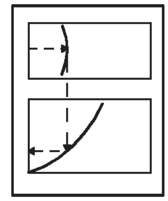
## DISTANCE REQUIRED TO DESCEND IDLE THRUST–FLAPS AUTO–SPEED BRAKE RETRACTED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402–RR–406A
U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

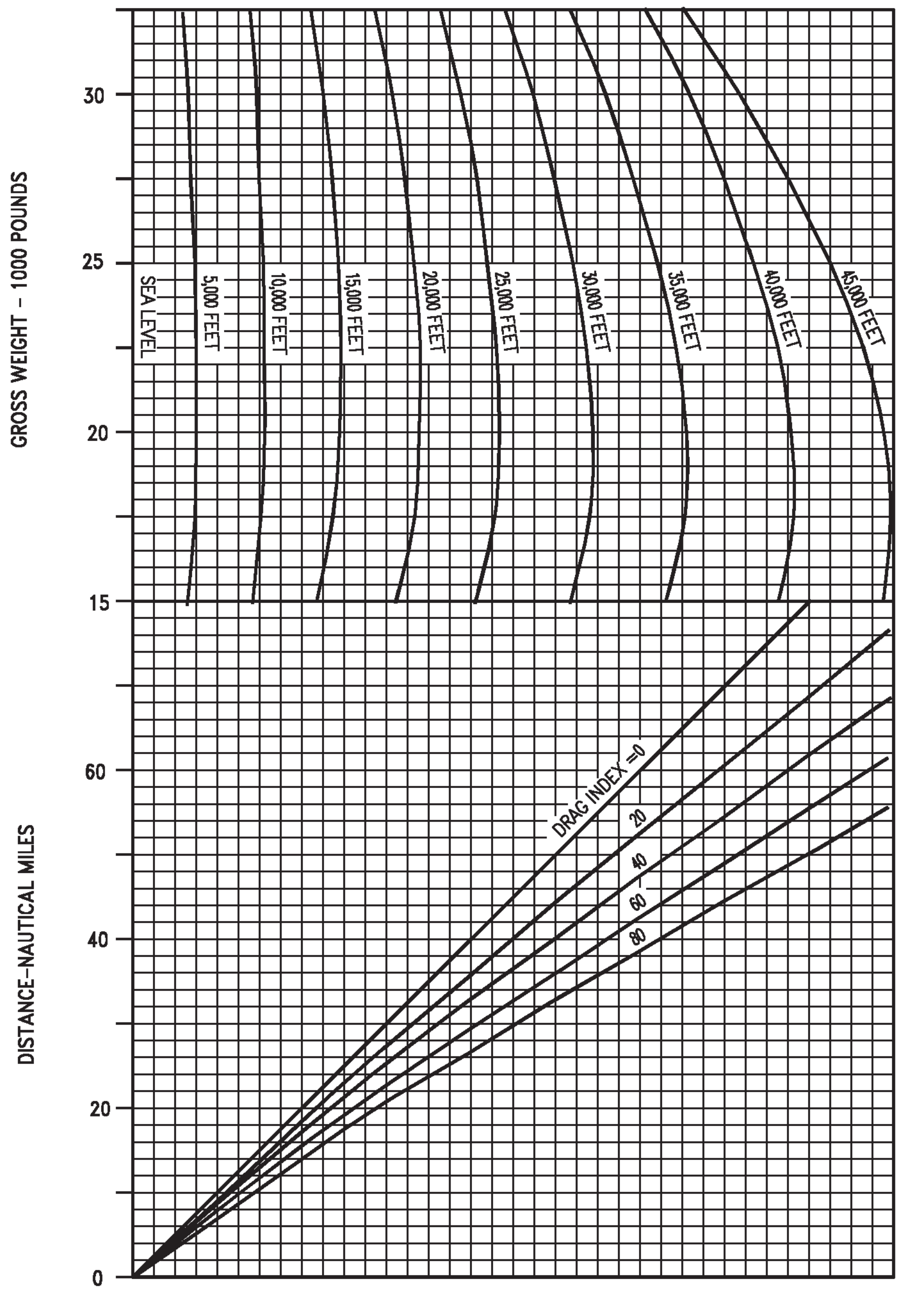
GUIDE



DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

| DI– | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH– | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP–5
FUEL DENSITY: **6.8 LB/GAL**




AV8BB–NFM–40–(89–3)01–CATI

**Figure 8-1. Maximum Range Descent, F402-RR-406A Engine (Sheet 3 of 3)**

# TACTICAL DESCENT, AV-8B

## TIME REQUIRED TO DESCEND
## 65% RPM–FLAPS AUTO–SPEEDBRAKE RETRACTED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

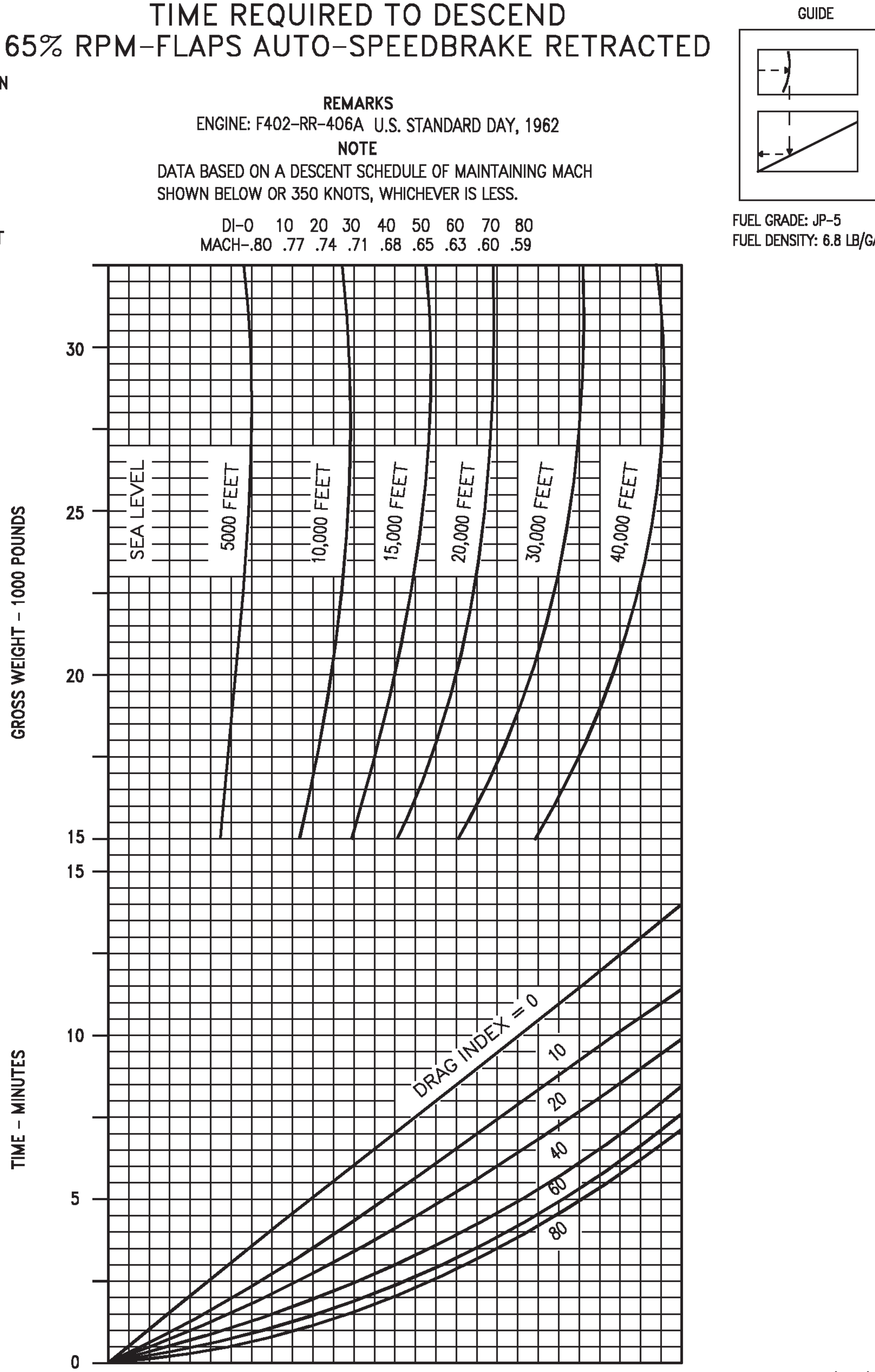
**REMARKS**
ENGINE: F402–RR–406A U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL

| DI– | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH– | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |



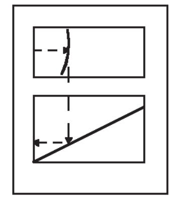

AV8BB–NFM–40–(90–1)01–CATI

Figure 8-2. Tactical Descent, F402-RR-406A Engine (Sheet 1 of 3)

# TACTICAL DESCENT, AV-8B

## FUEL REQUIRED TO DESCEND
## 65% RPM–FLAPS AUTO–SPEEDBRAKE RETRACTED

GUIDE



**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

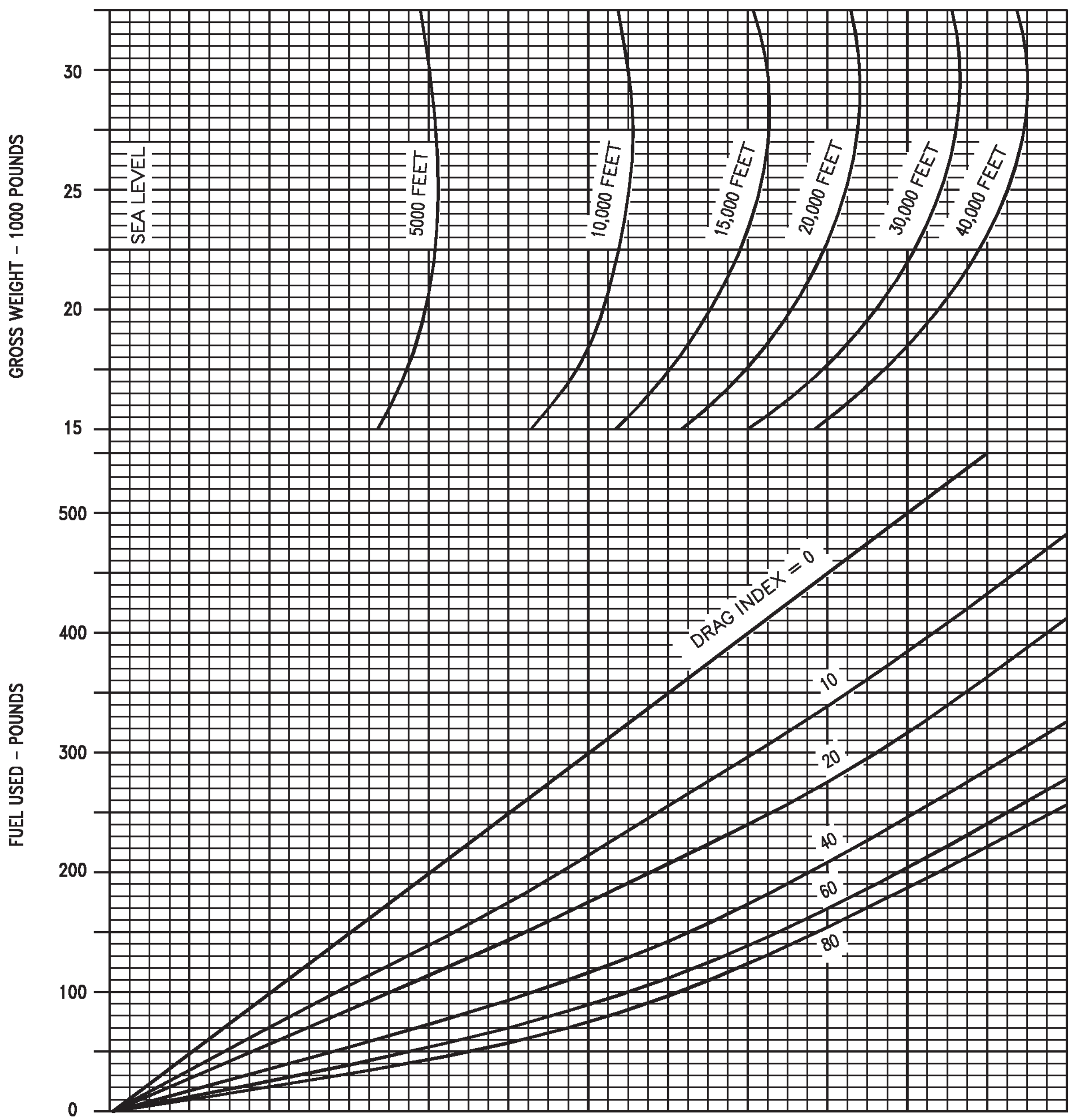
**REMARKS**
ENGINE: F402-RR-406A U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

| DI– | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH– | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(90-2)01-CATI

**Figure 8-2. Tactical Descent, F402-RR-406A Engine (Sheet 2 of 3)**

# TACTICAL DESCENT, AV-8B

## DISTANCE REQUIRED TO DESCEND
## 65% RPM–FLAPS AUTO–SPEEDBRAKE RETRACTED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

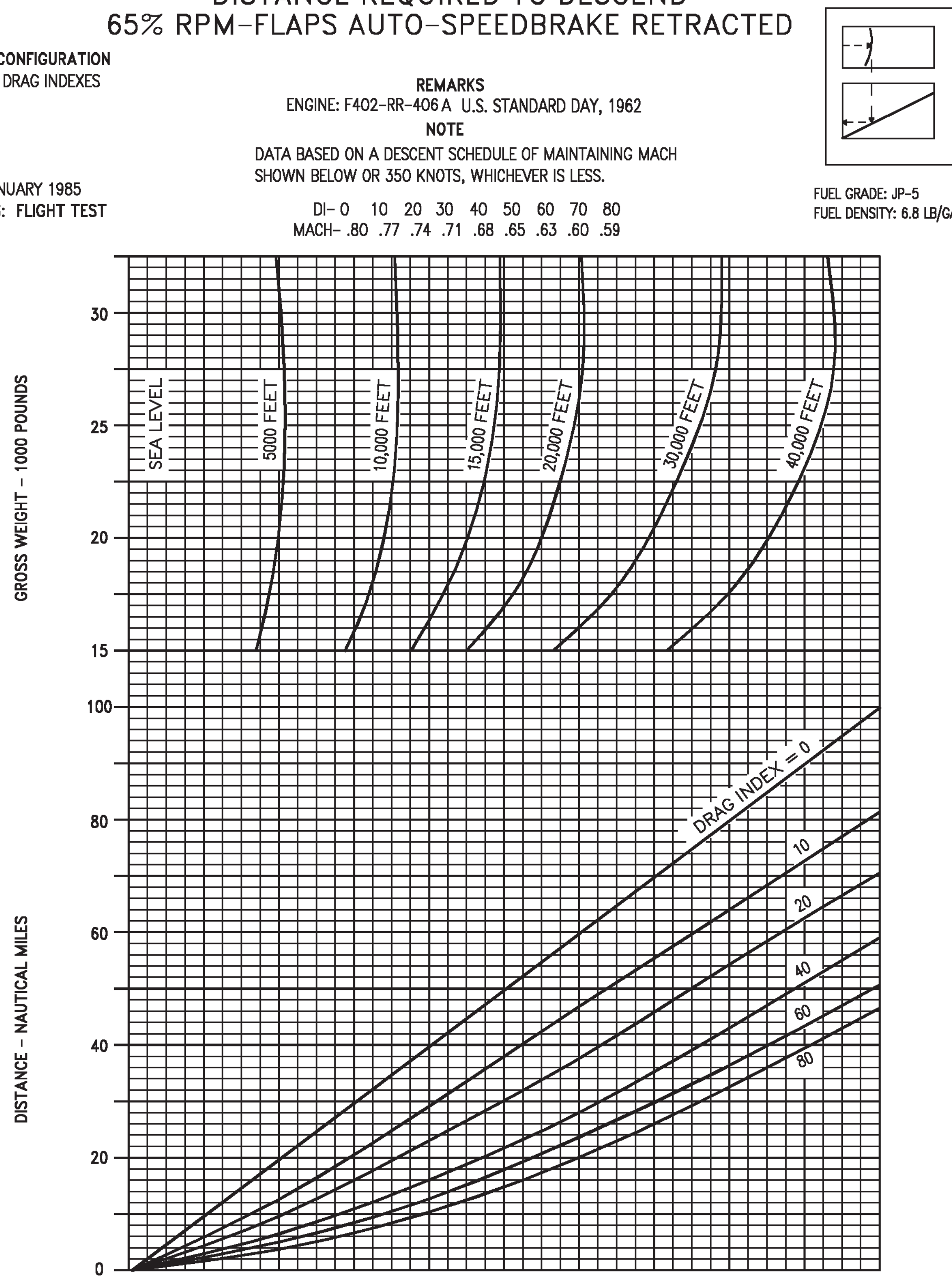
**REMARKS**
ENGINE: F402–RR–406 A U.S. STANDARD DAY, 1962

**NOTE**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

DATE: 7 JANUARY 1985
DATA BASIS: **FLIGHT TEST**

| DI– | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH– | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL




AV8BB–NFM–40–(90–3)01–CATI

**Figure 8-2. Tactical Descent, F402-RR-406A Engine (Sheet 3 of 3)**

# MAXIMUM RANGE DESCENT, AV-8B

TIME REQUIRED TO DESCEND
IDLE THRUST - FLAPS AUTO - SPEEDBRAKE RETRACTED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

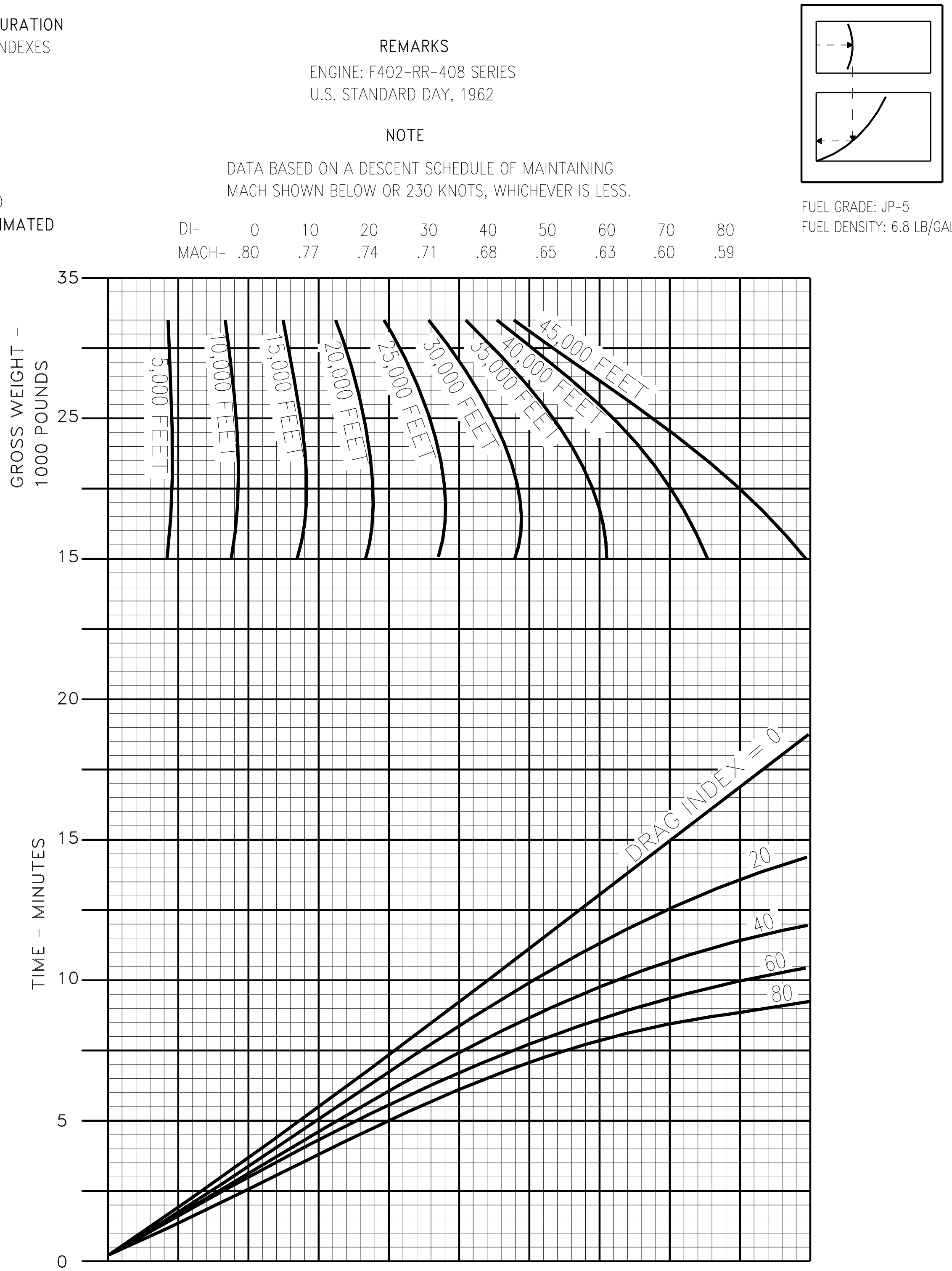
NOTE

DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |




AV8BB-NFM-04-(91-1)04-CATI/ACS

Figure 8-3. Maximum Range Descent, F402-RR-408 Series Engine (Sheet 1 of 3)

# MAXIMUM RANGE DESCENT, AV-8B

FUEL REQUIRED TO DESCEND

IDLE THRUST - FLAPS AUTO - SPEEDBRAKE RETRACTED

AIRCRAFT CONFIGURATION

INDIVIDUAL DRAG INDEXES

REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

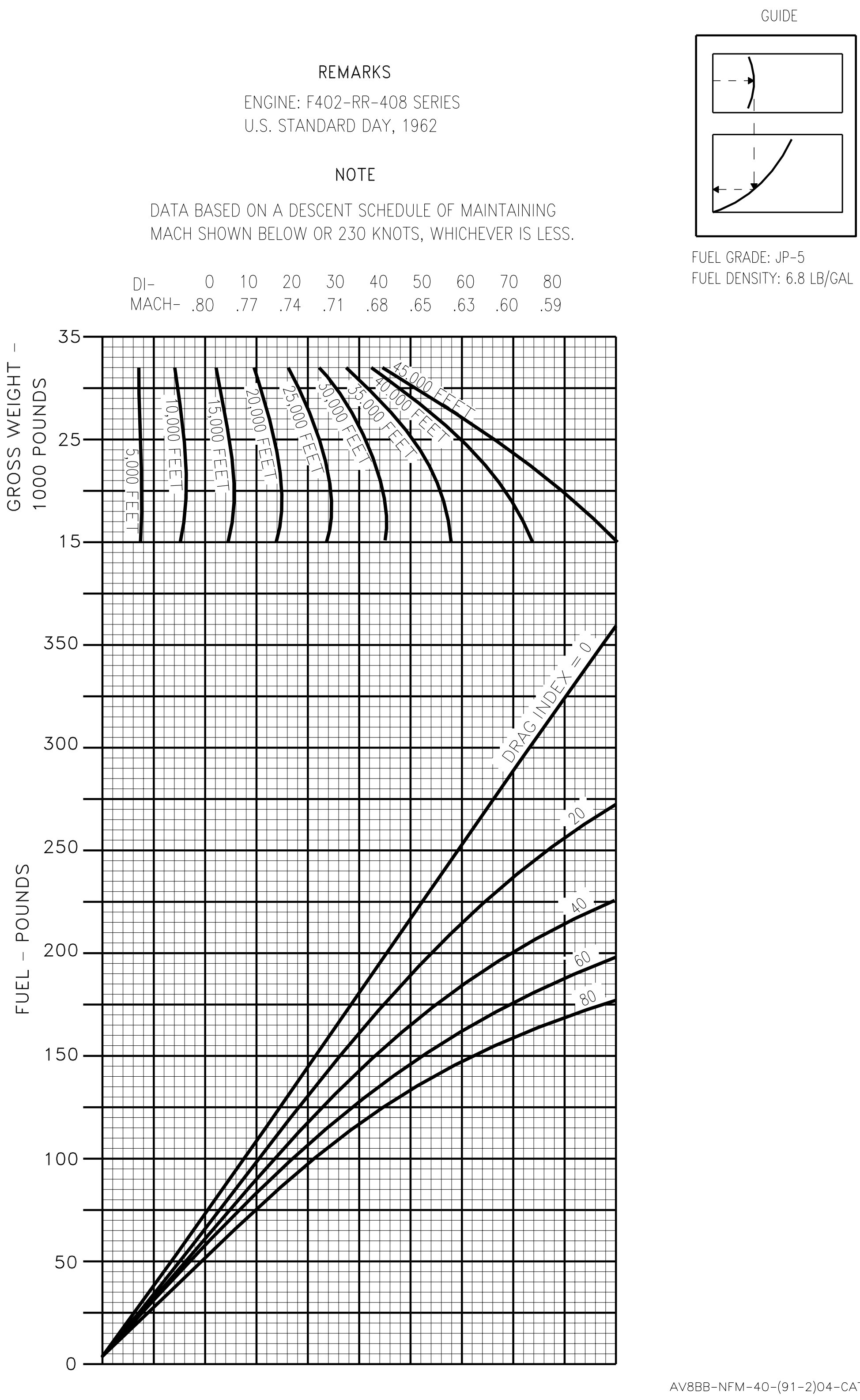
NOTE

DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |




AV8BB-NFM-40-(91-2)04-CATI/ACS

Figure 8-3. Maximum Range Descent, F402-RR-408 Series Engine (Sheet 2 of 3)

# MAXIMUM RANGE DESCENT, AV-8B

DISTANCE REQUIRED TO DESCEND
IDLE THRUST - FLAPS AUTO - SPEEDBRAKE RETRACTED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

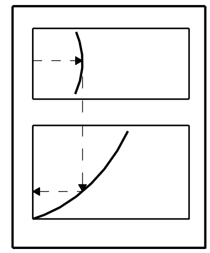
REMARKS

ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE

DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

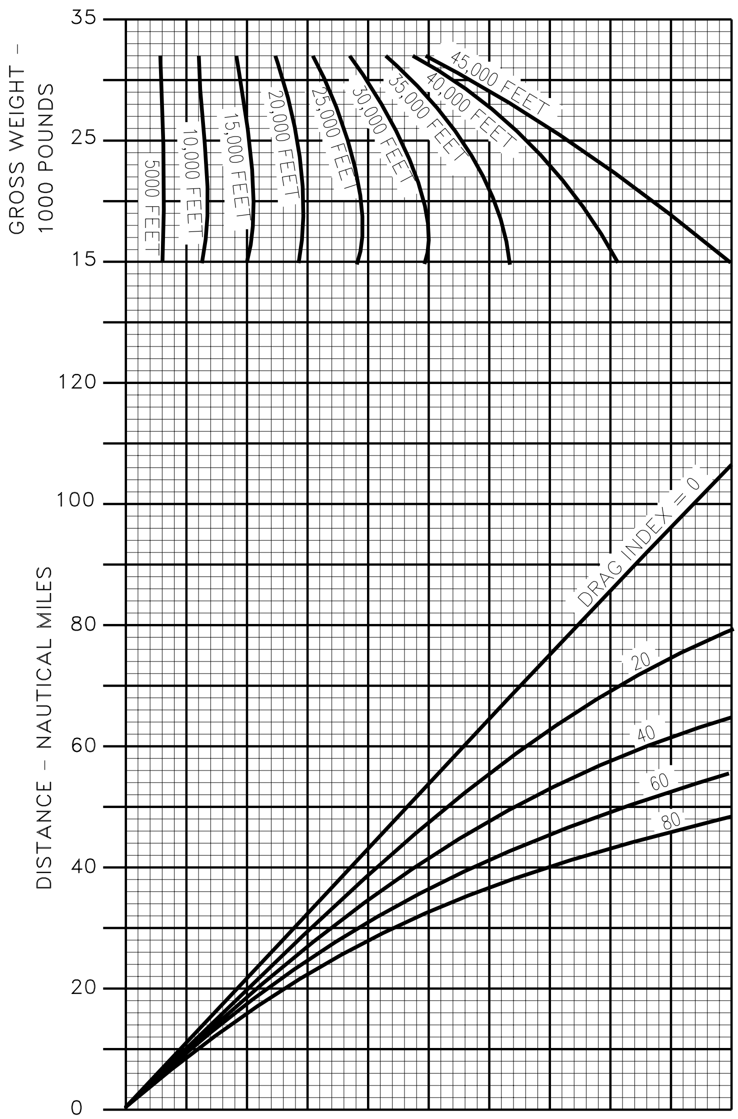
GUIDE



DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL



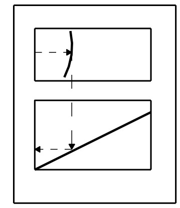

AV8BB-NFM-40-(91-3)04-CATI/ACS

**Figure 8-3. Maximum Range Descent, F402-RR-408 Series Engine (Sheet 3 of 3)**

# TACTICAL DESCENT, AV-8B

## TIME REQUIRED TO DESCEND
## 65% RPM - FLAPS AUTO - SPEEDBRAKE RETRACTED

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

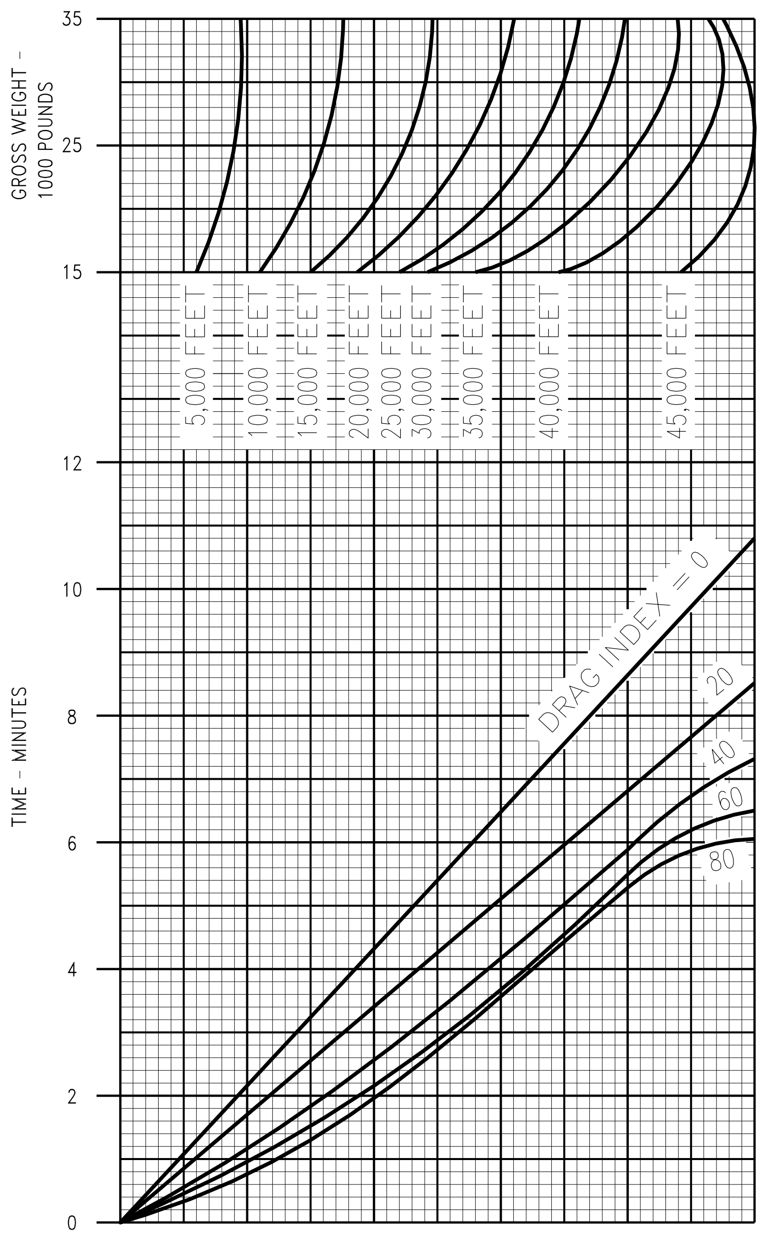
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |




AV8BB-NFM-40-(92-1)04-CATI/ACS

**Figure 8-4. Tactical Descent, F402-RR-408 Series Engine (Sheet 1 of 3)**

# TACTICAL DESCENT, AV-8B

FUEL REQUIRED TO DESCEND
65% RPM - FLAPS AUTO - SPEEDBRAKE RETRACTED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

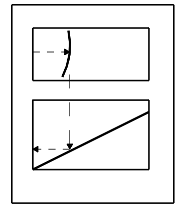
DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

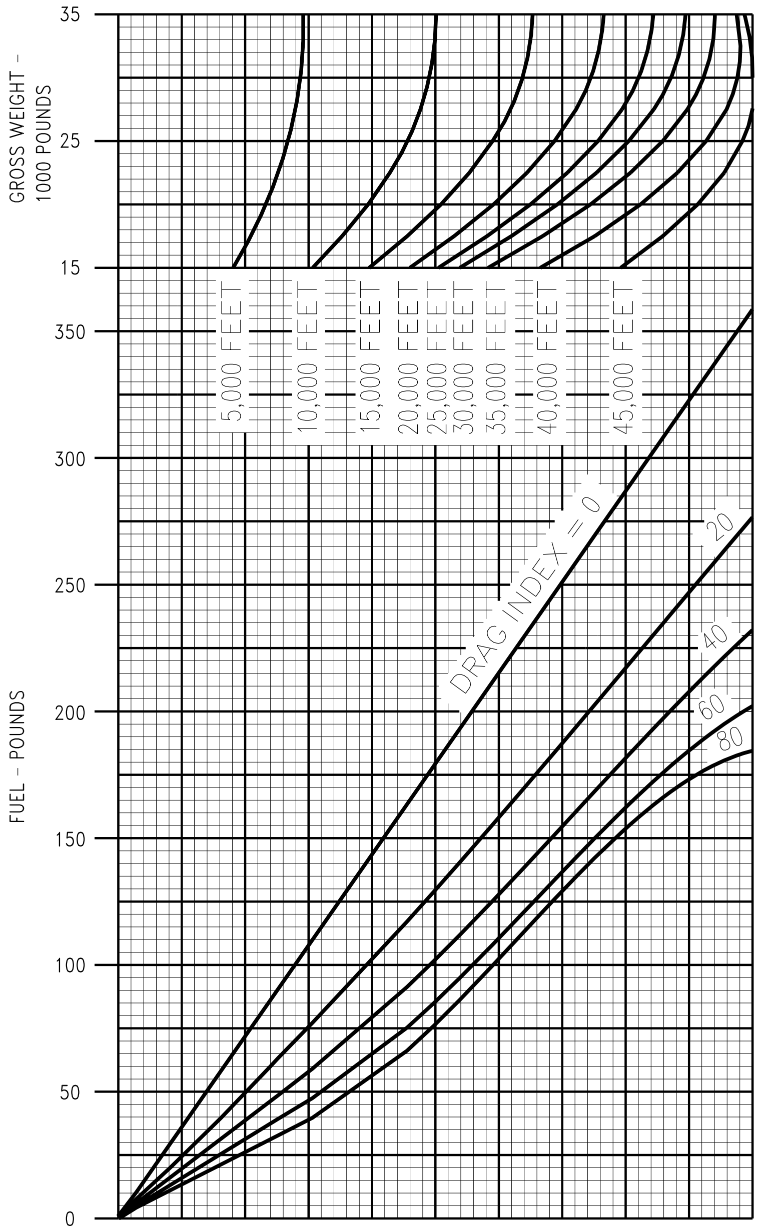
NOTE
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(92-2)04-CATI/ACS

Figure 8-4. Tactical Descent, F402-RR-408 Series Engine (Sheet 2 of 3)

# TACTICAL DESCENT, AV-8B

DISTANCE REQUIRED TO DESCEND

65% RPM - FLAPS AUTO - SPEEDBRAKE RETRACTED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

DATE: 1 JULY 1990
DATA BASIS: ESTIMATED

REMARKS

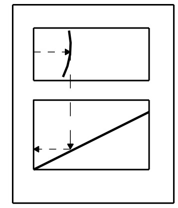
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE

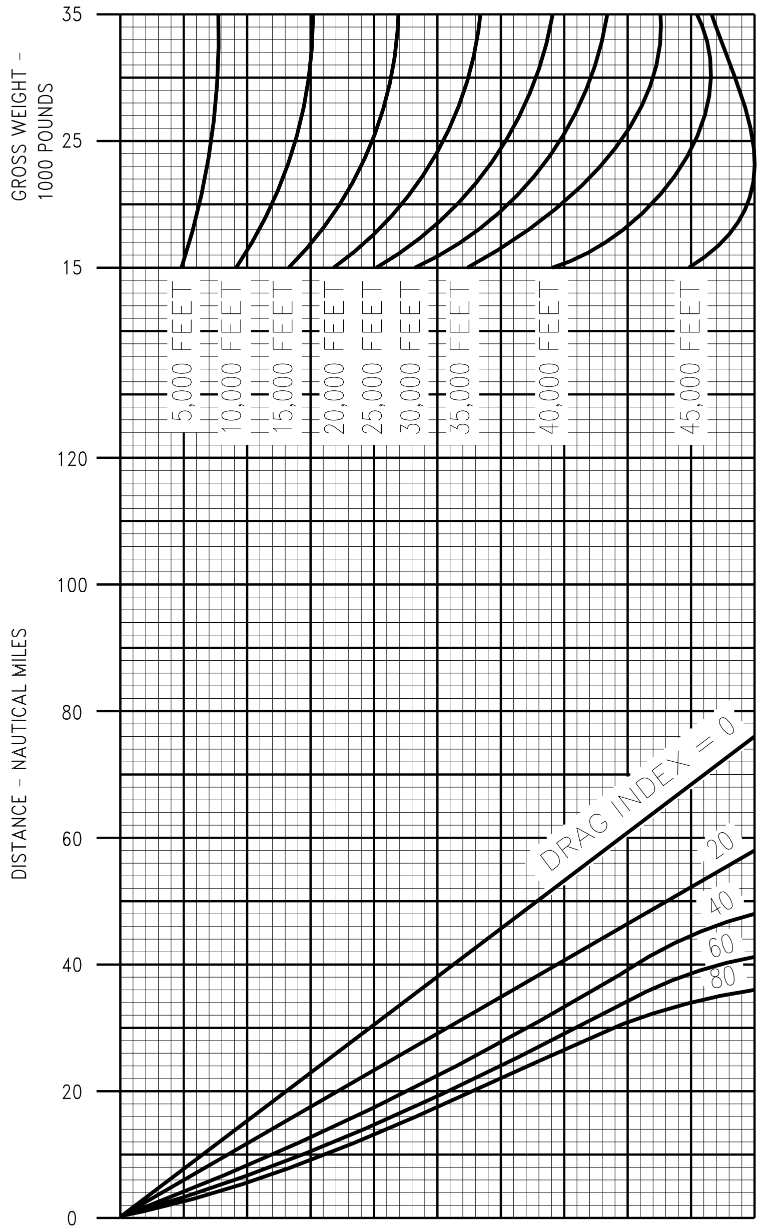
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

| DI- | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| MACH- | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

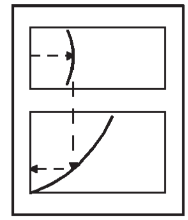



AV8BB-NFM-40-(92-3)04-CATI/ACS

Figure 8-4. Tactical Descent, F402-RR-408 Series Engine (Sheet 3 of 3)

# MAXIMUM RANGE DESCENT, TAV-8B

TIME REQUIRED TO DESCEND IDLE THRUST–FLAPS
AUTO–SPEED BRAKE RETRACTED




**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

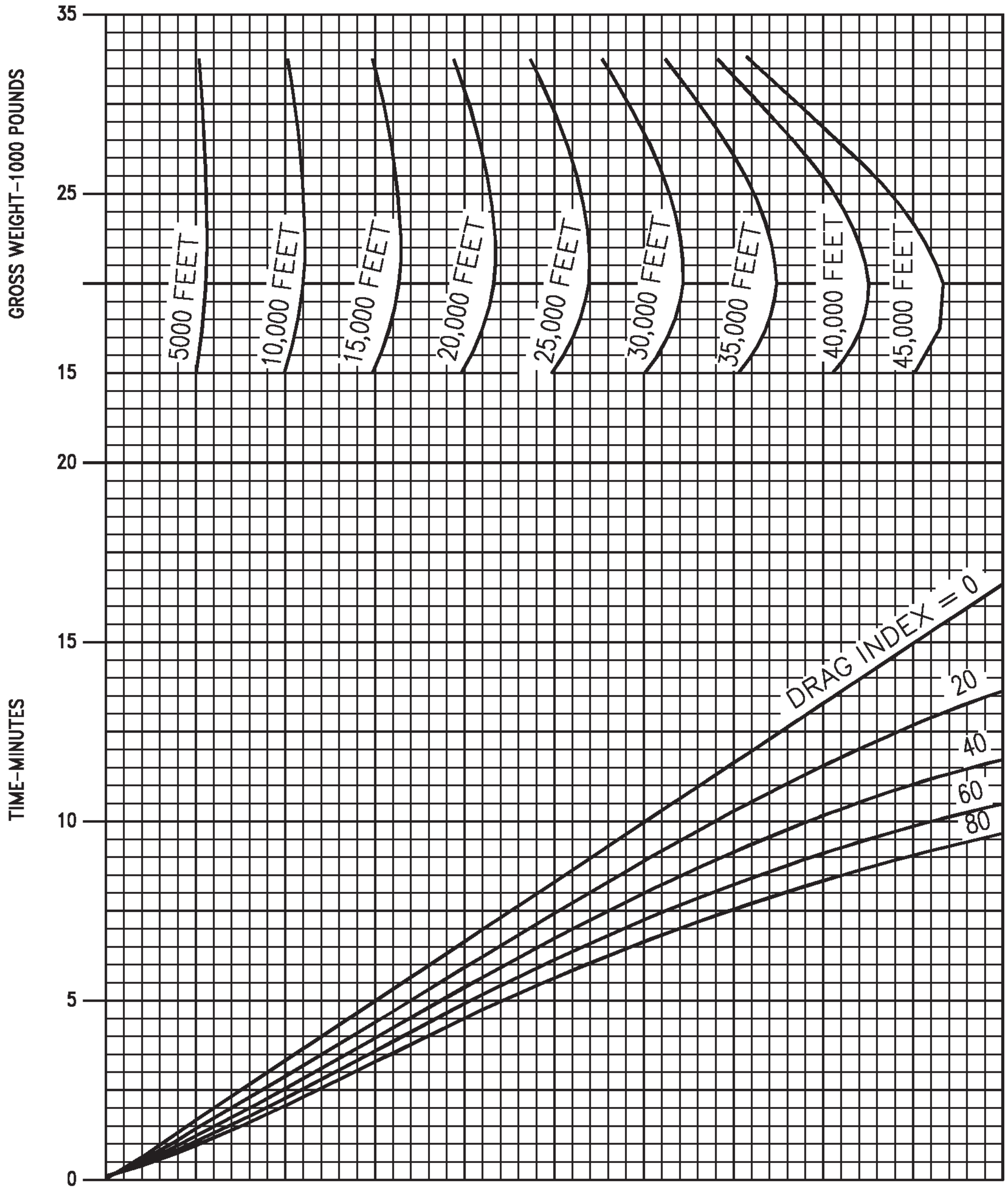
**REMARKS**
ENGINE: F402–RR–406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING
MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL



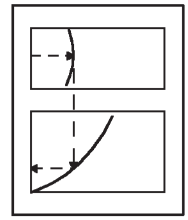

AV8BB–NFM–40–(93–1)01–CATI

Figure 8-5. Maximum Range Descent, F402-RR-406A Engine (Sheet 1 of 3)

# MAXIMUM RANGE DESCENT, TAV-8B

## FUEL REQUIRED TO DESCEND

GUIDE



**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

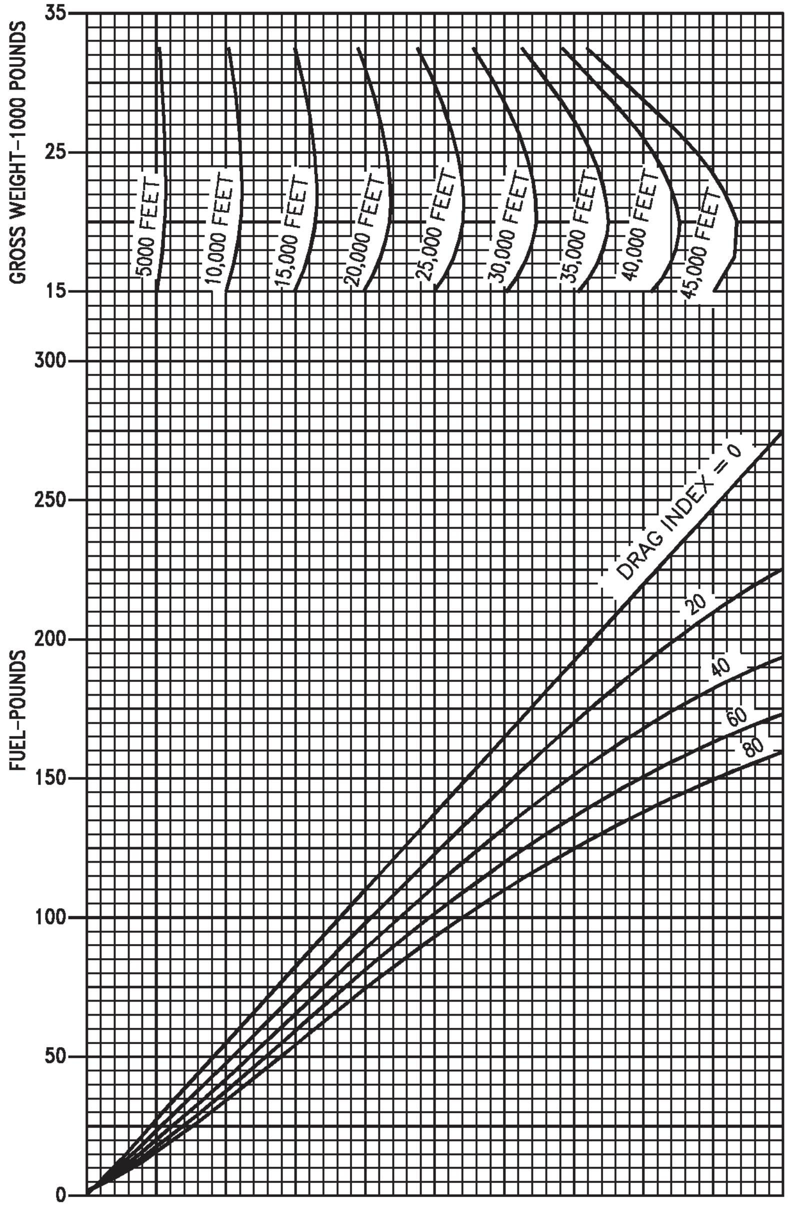
**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
|---|---|---|---|---|---|---|---|---|---|
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(93-2)01-CATI

**Figure 8-5. Maximum Range Descent, F402-RR-406A Engine (Sheet 2 of 3)**

# MAXIMUM RANGE DESCENT, TAV-8B

## DISTANCE REQUIRED TO DESCEND

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

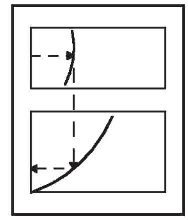
**REMARKS**
ENGINE: F402-RR-406A
U.S. STANDARD DAY, 1962

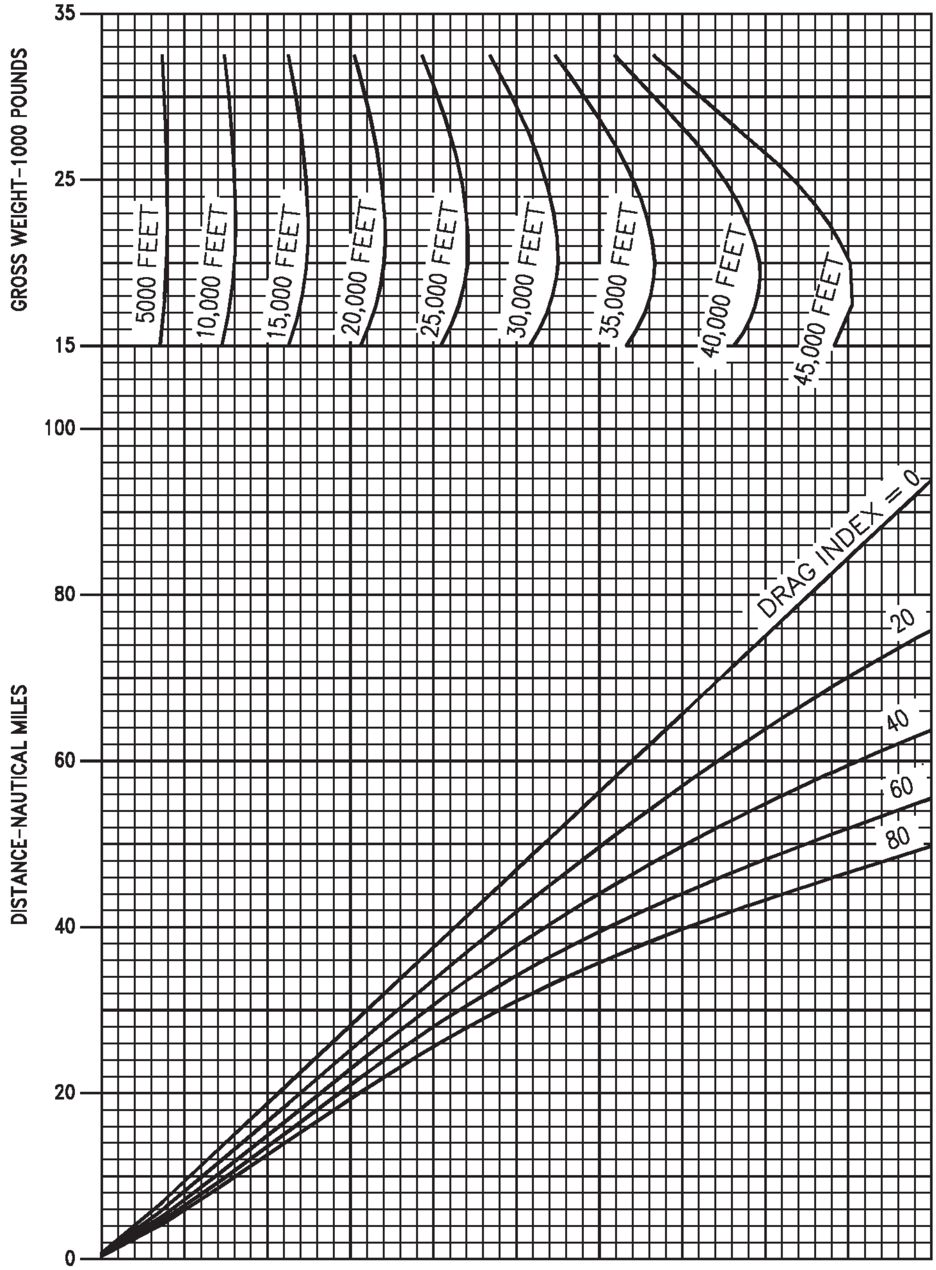
**NOTES**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB–NFM–40–(93–3)01–CATI

**Figure 8-5. Maximum Range Descent, F402-RR-406A Engine (Sheet 3 of 3)**

# TACTICAL DESCENT, TAV-8B

## TIME REQUIRED TO DESCEND
## 65% RPM–FLAPS AUTO–SPEEDBRAKE RETRACTED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402–RR–406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
|---|---|---|---|---|---|---|---|---|---|
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL

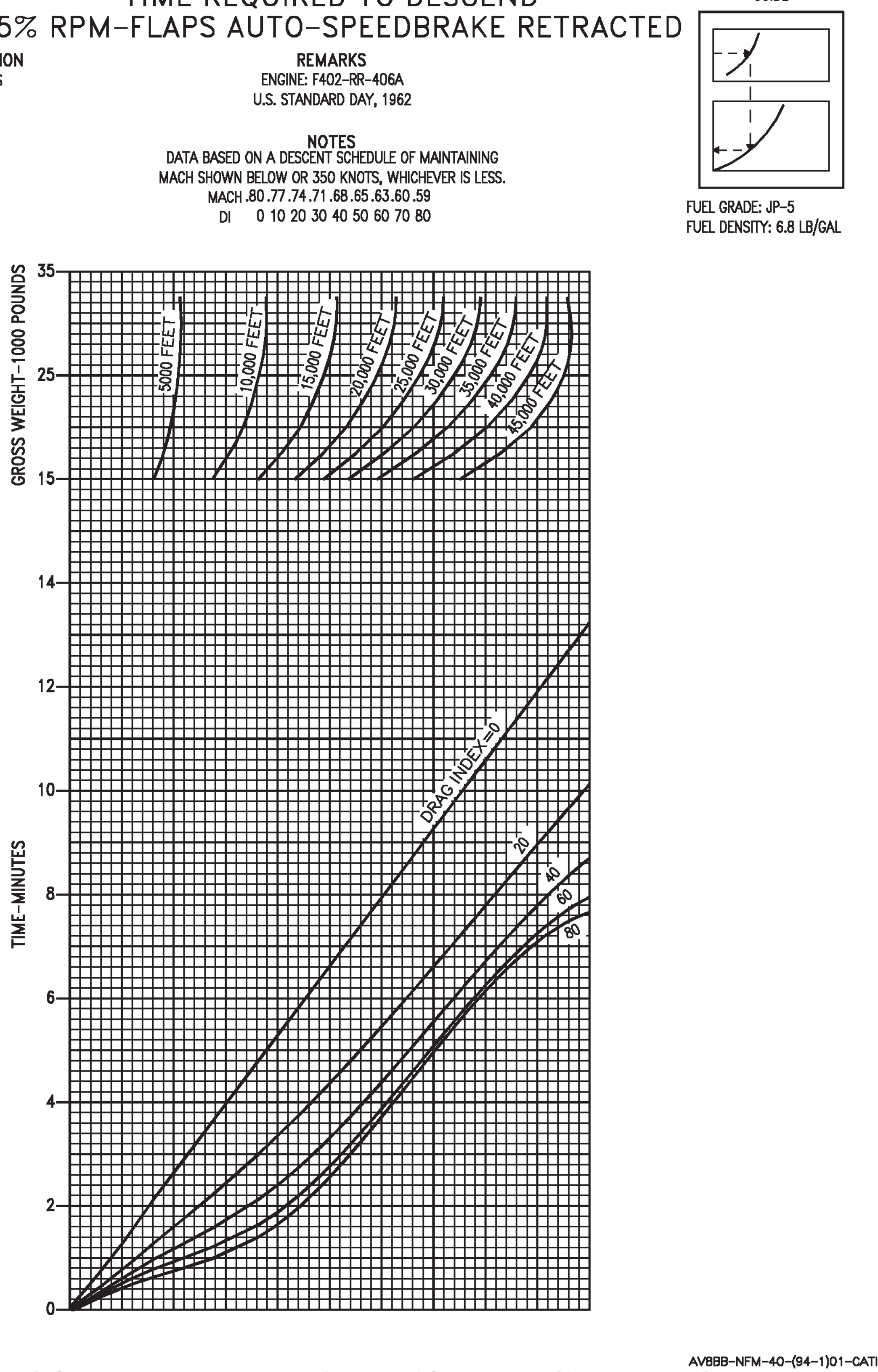



**Figure 8-6. Tactical Descent, F402-RR-406A Engine (Sheet 1 of 3)**

# TACTICAL DESCENT, TAV-8B

## FUEL REQUIRED TO DESCEND
## 65% RPM–FLAPS AUTO–SPEEDBRAKE RETRACTED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402–RR–406A
U.S. STANDARD DAY, 1962

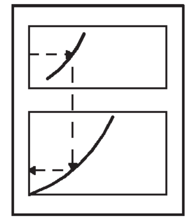
**NOTES**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

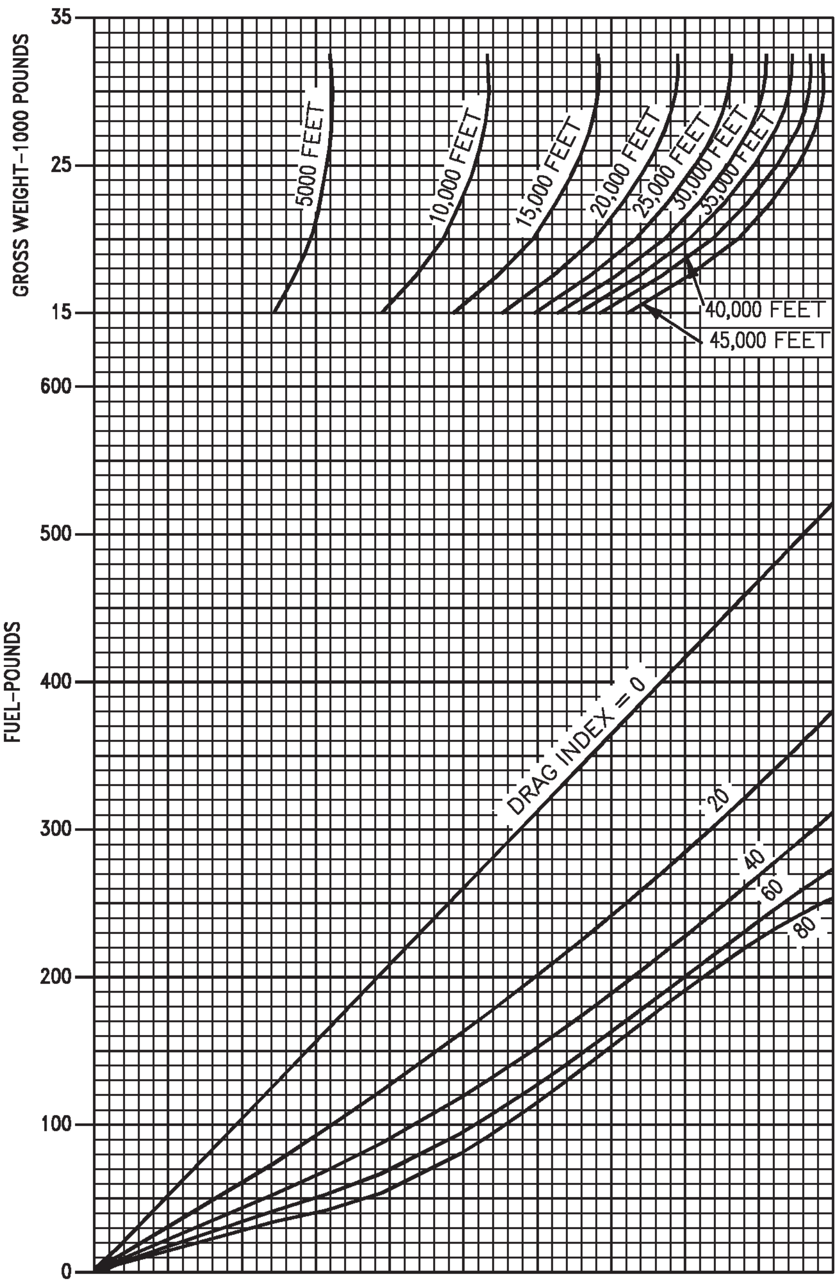
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
|---|---|---|---|---|---|---|---|---|---|
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL

GUIDE






AV8BB–NFM–40–(94–2)01–CATI

**Figure 8-6. Tactical Descent, F402-RR-406A Engine (Sheet 2 of 3)**

# TACTICAL DESCENT, TAV-8B

## DISTANCE REQUIRED TO DESCEND
## 65% RPM–FLAPS AUTO–SPEEDBRAKE RETRACTED

**AIRCRAFT CONFIGURATION**
INDIVIDUAL DRAG INDEXES

**REMARKS**
ENGINE: F402–RR–406A
U.S. STANDARD DAY, 1962

**NOTES**
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 10 AUGUST 1987
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP–5
FUEL DENSITY: 6.8 LB/GAL

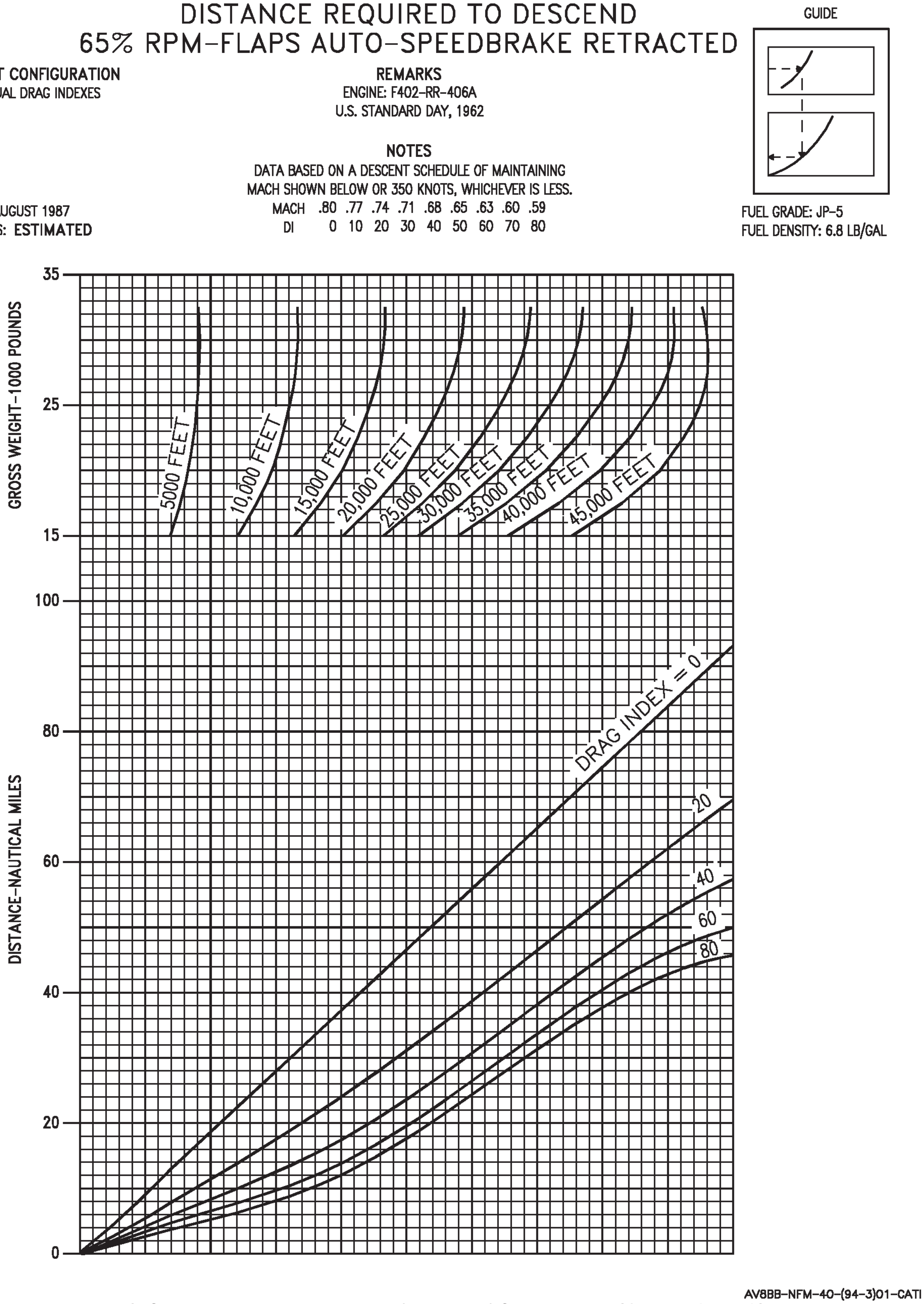



Figure 8-6. Tactical Descent, F402-RR-406A Engine (Sheet 3 of 3)

# MAXIMUM RANGE DESCENT, TAV-8B

## TIME REQUIRED TO DESCEND
## IDLE THRUST - FLAPS AUTO - SPEEDBRAKE RETRACTED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

NOTE
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
|---|---|---|---|---|---|---|---|---|---|
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

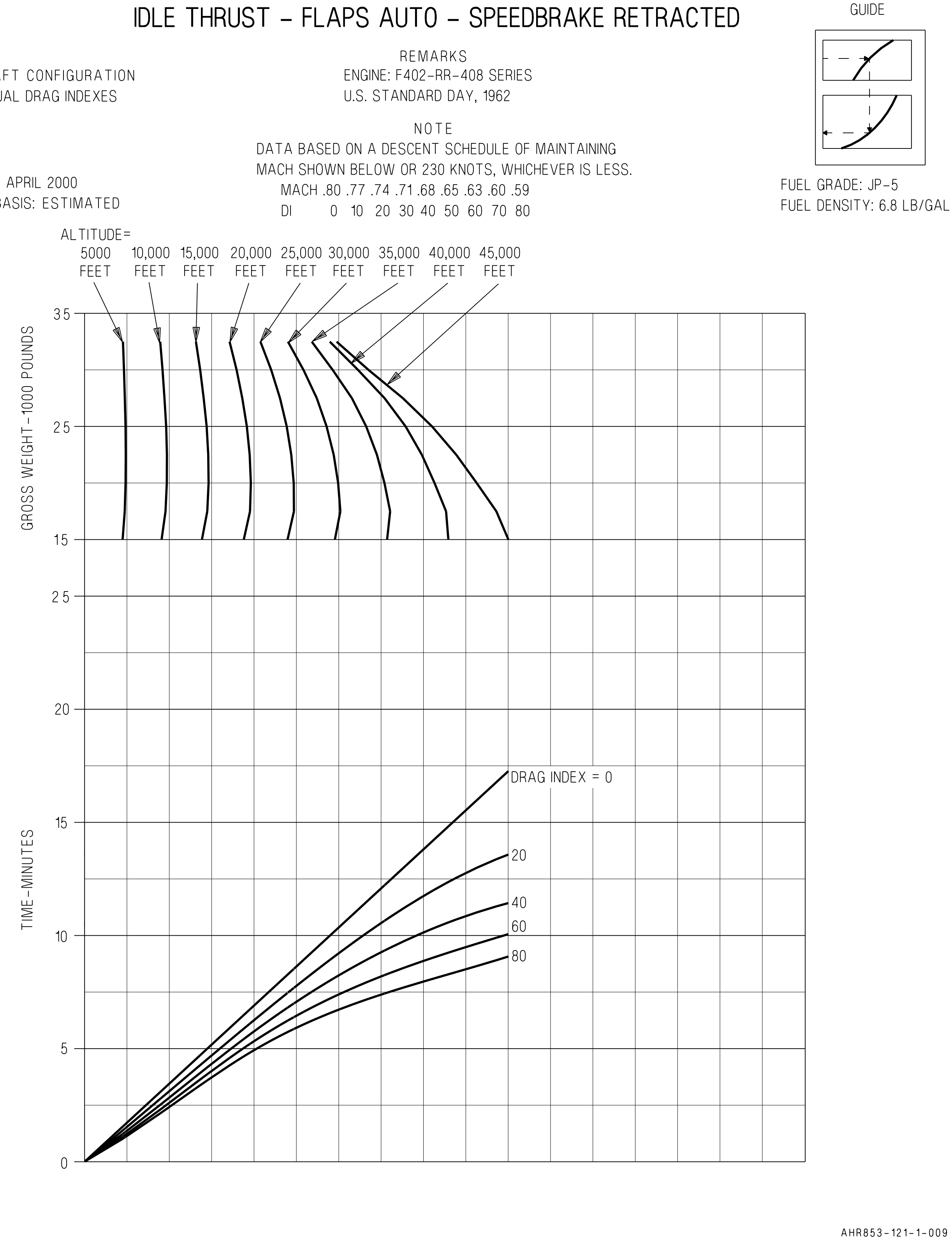



Figure 8-7. Maximum Range Descent, F402-RR-408 Engine (Sheet 1 of 3)

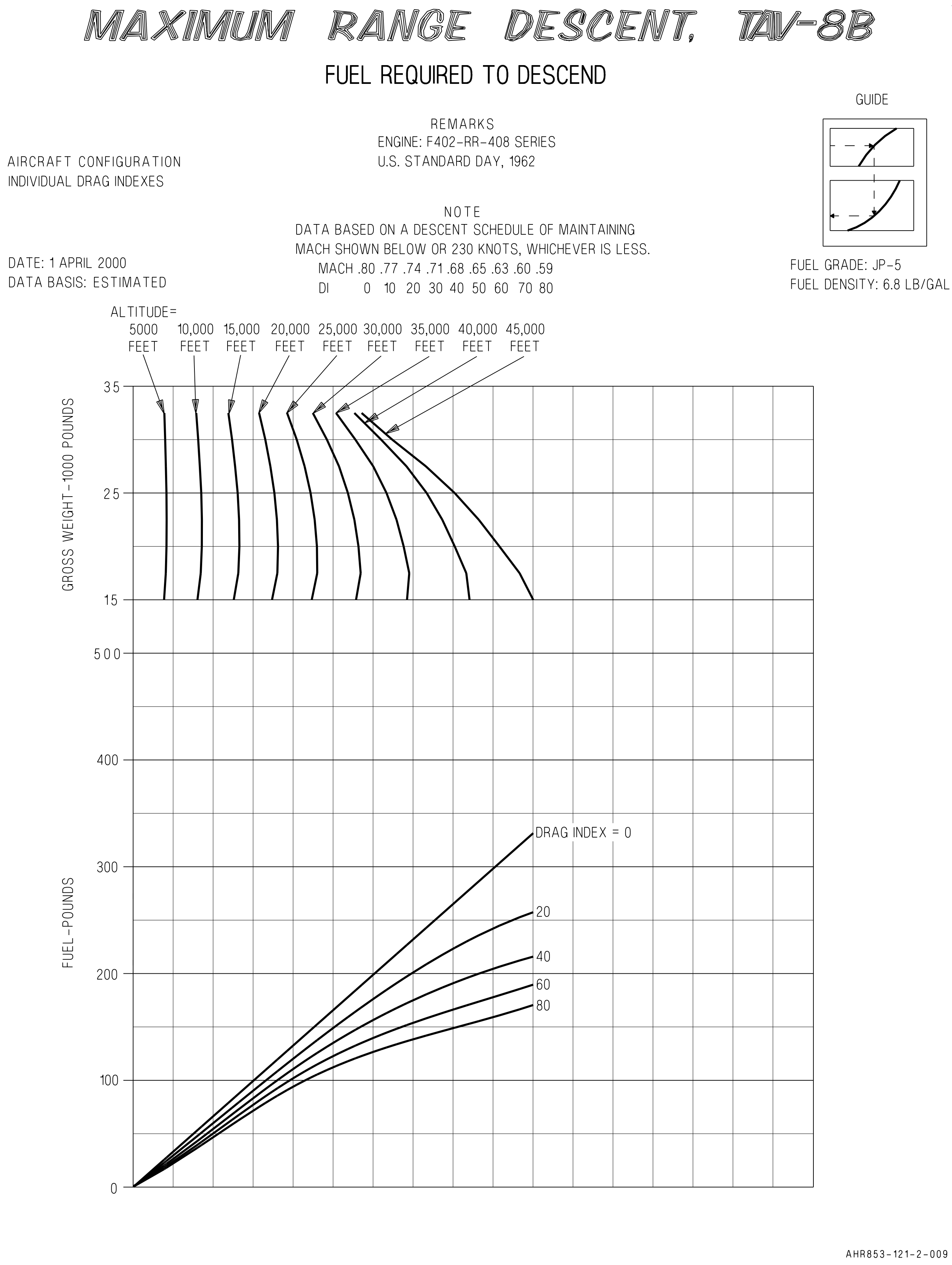
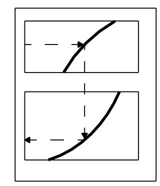



**Figure 8-7. Maximum Range Descent, F402-RR-408 Engine (Sheet 2 of 3)**

# MAXIMUM RANGE DESCENT, TAV-8B

## DISTANCE REQUIRED TO DESCEND

GUIDE



REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

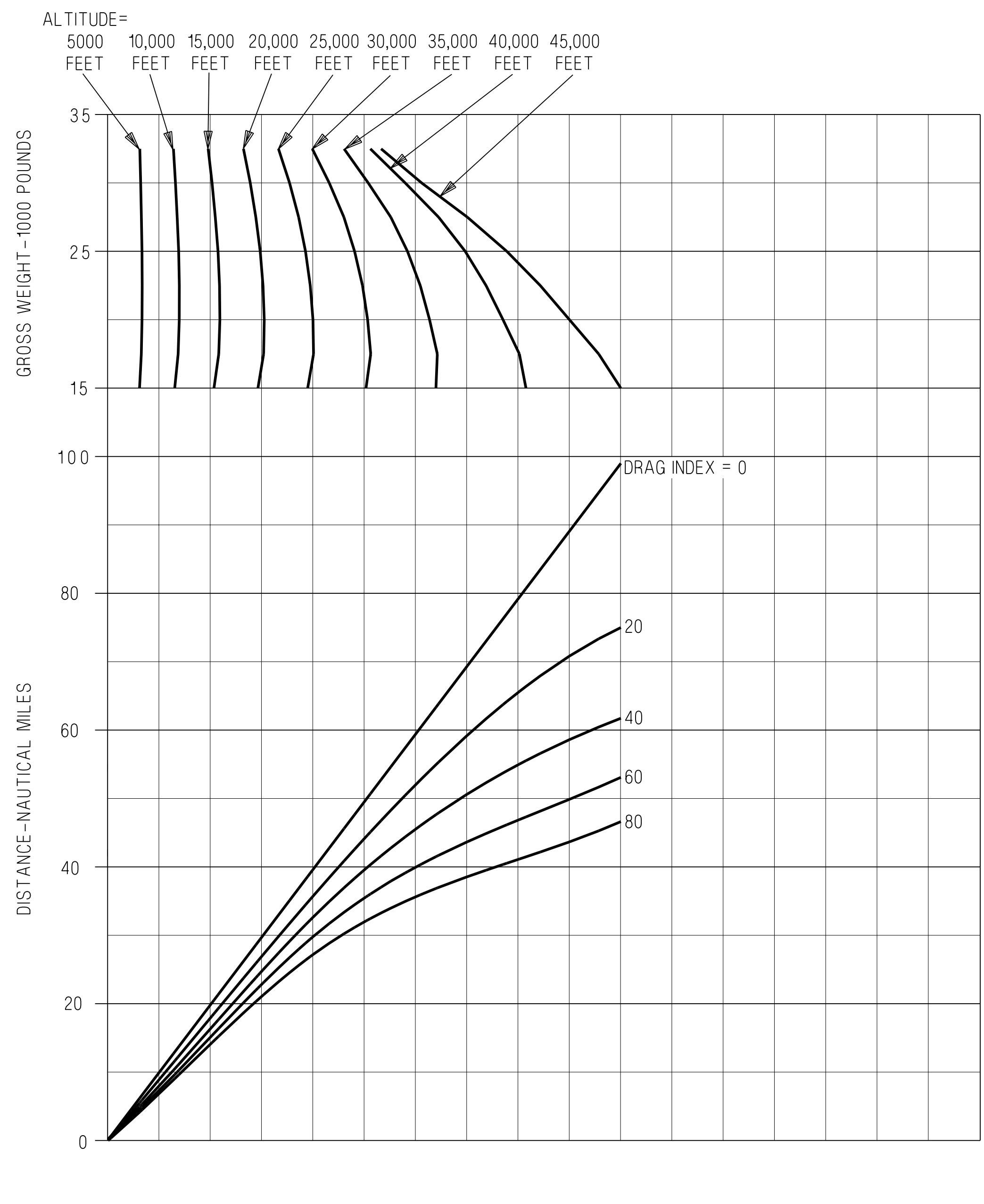
AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

NOTE
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 230 KNOTS, WHICHEVER IS LESS.

| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
|---|---|---|---|---|---|---|---|---|---|
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AHR853-121-3-009

**Figure 8-7. Maximum Range Descent, F402-RR-408 Engine (Sheet 3 of 3)**

# TACTICAL DESCENT, TAV-8B

## TIME REQUIRED TO DESCEND
## 65% RPM – FLAPS AUTO – SPEEDBRAKE RETRACTED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

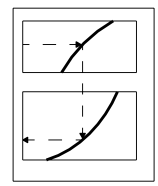
REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

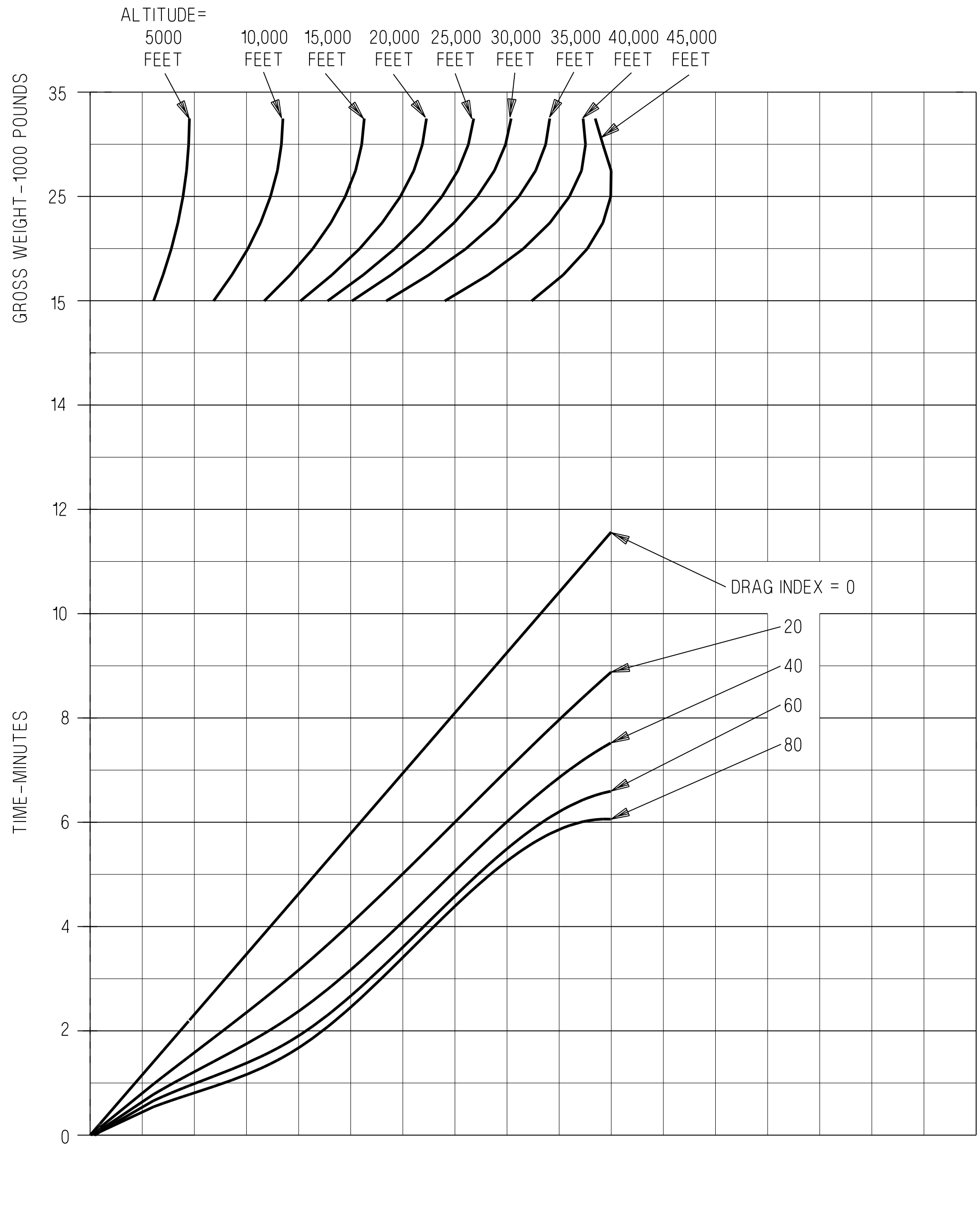
NOTE
DATA BASED ON A DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AHR853-122-1-009

**Figure 8-8. Tactical Descent, F402-RR-408 Engine (Sheet 1 of 3)**

# TIME TO CLIMB, TAV-8B

## FUEL REQUIRED TO DESCEND
## 65% RPM – FLAPS AUTO – SPEEDBRAKE RETRACTED

AIRCRAFT CONFIGURATION
INDIVIDUAL DRAG INDEXES

REMARKS
ENGINE: F402-RR-408 SERIES
U.S. STANDARD DAY, 1962

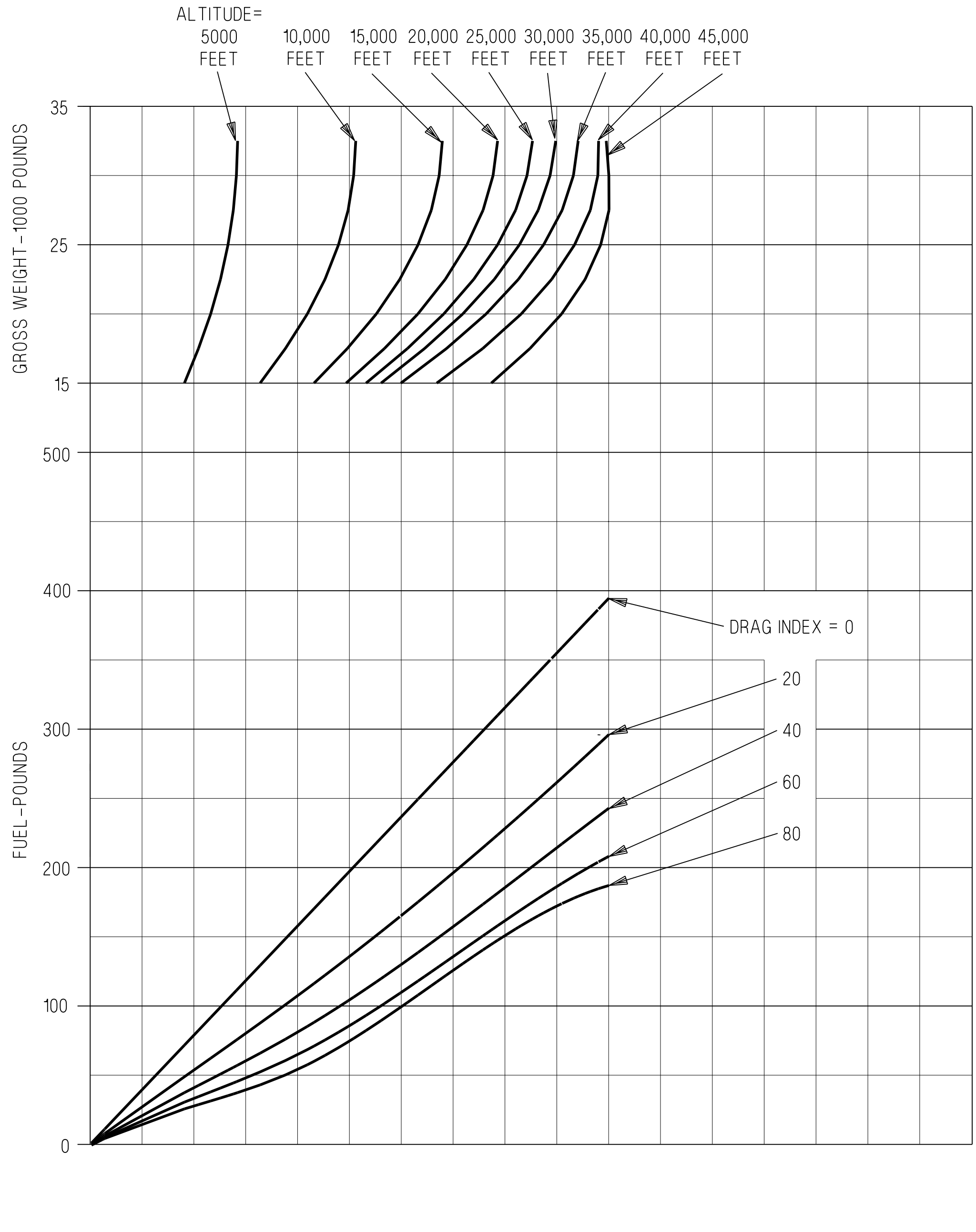
NOTE
DATA BASED ON DESCENT SCHEDULE OF MAINTAINING MACH SHOWN BELOW OR 350 KNOTS, WHICHEVER IS LESS.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MACH | .80 | .77 | .74 | .71 | .68 | .65 | .63 | .60 | .59 |
| DI | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

GUIDE

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL

DATE: 1 APRIL 2000
DATA BASIS: ESTIMATED




AHR853-122-2-009

**Figure 8-8. Tactical Descent, F402-RR-408 Engine (Sheet 2 of 3)**

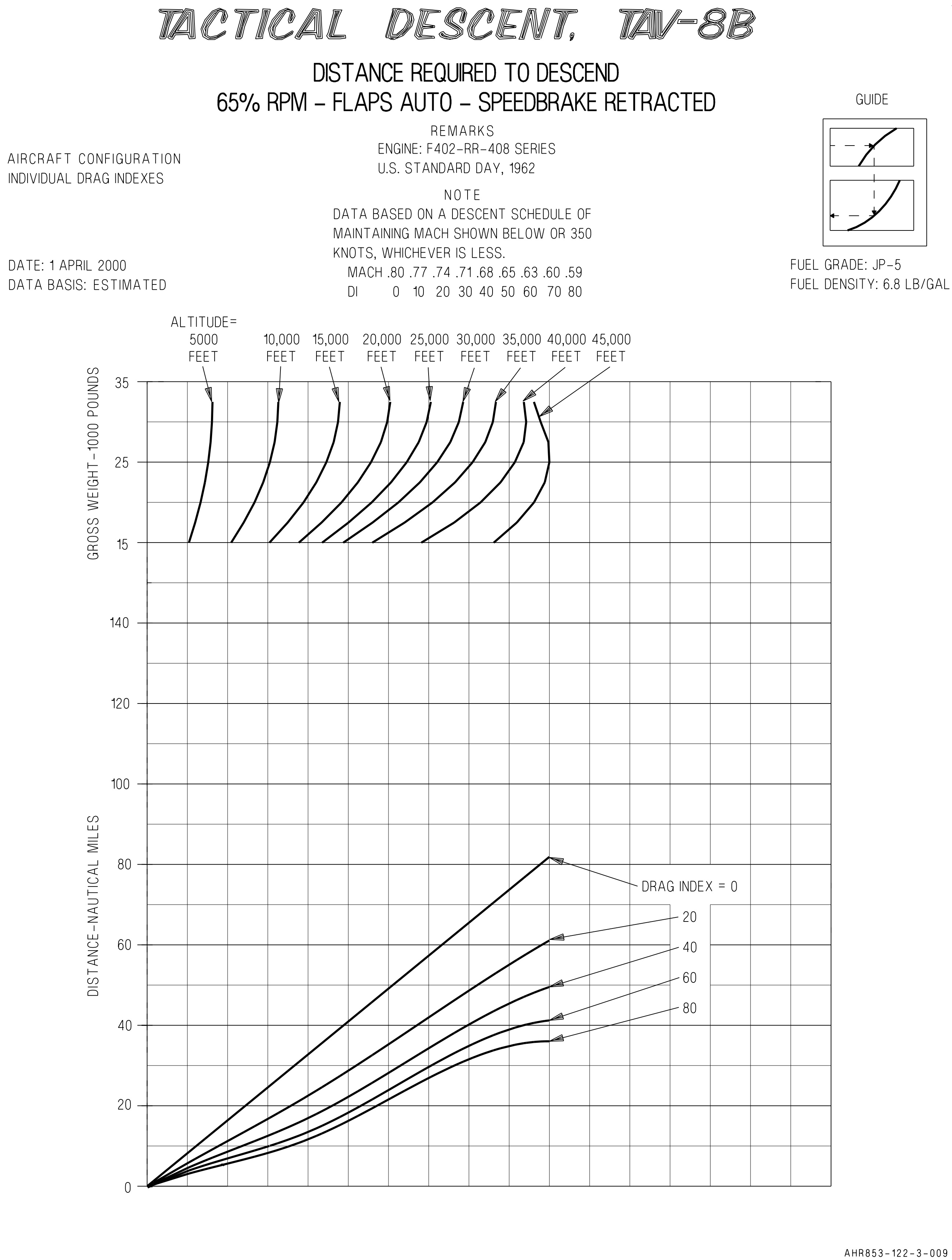



**Figure 8-8. Tactical Descent, F402-RR-408 Engine (Sheet 3 of 3)**

# CHAPTER 9

# Landing

## 9.1 RJPT CORRECTION FOR CHANGES IN CG

This chart (Figure 9-1) provides an RJPT correction to be applied to the engine RJPT to account for forward shifts of the cg at lower gross weights. This chart is required to account for the increased JPT due to engine bleed usage as the cg moves forward. This is particularly evident in the TAV-8B below 1200 pounds of fuel.

Figure 9-1 illustrates the RJPT correction as fuel is used in the TAV-8B.

**CAUTION**

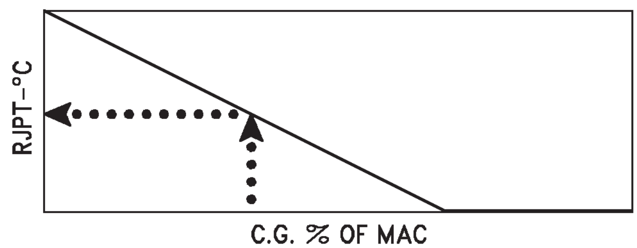
- Figure 9-1 is a representative example of RJPT corrections for changes in cg for the following aircraft only:

| | |
|---|---|
| BAW | 15,000 |
| Pylons | Sta. 2 and 6 |
| Strakes | |
| 2 pilots | 225 lbs/pilot |

- Figure 9-1 should be used during preflight preparation to determine the RJPT correction. The cg for each aircraft is dependent upon aircraft configuration and Basic Aircraft Weight.

**9.1.1 Use.** Obtain the cg percent of Mean Aerodynamic Cord (MAC) for the landing configuration using the weight and balance handbook, NAVAIR 01-1B-40 or the AMPS computer. Enter the chart (Figure 9-1) on the bottom and project up until it intersects the RJPT line. From the intersection, project left to obtain the correction to be added to RJPT. The corrected RJPT will then be used in Figure 9-3 or 9-4 as applicable (Vertical Landing Capability) and Figure 9-5 (Rolling Vertical Landing Capability) to determine the aircraft performance capabilities.

SAMPLE
RJPT CORRECTION
FOR CHANGES IN C.G.




AV8BB-NFM-40-(95-1)01-CATI

### 9.1.2 Sample Problem

| | |
|---|---|
| ENGINE | -406A |
| RJPT CORRECTION | 20 °C |
| CG % MAC | 5% |
| RJPT CORRECTION | 20 °C |

RJPT required for V/STOL performance calculations

| | |
|---|---|
| RJPT corrected = | –40 °C + 20 °C |
| RJPT corrected = | –20 °C |

The corrected RJPT value will then be used to calculate the V/STOL landing performance capability.

## 9.2 VERTICAL LANDING CAPABILITY

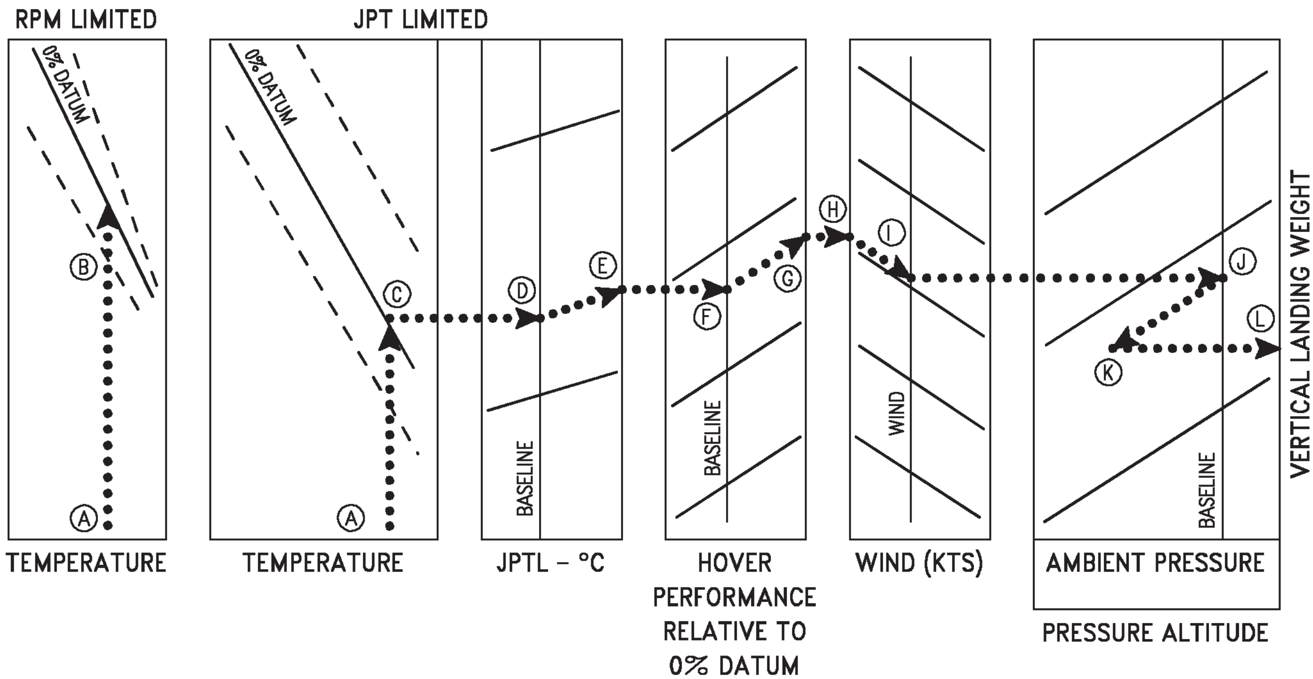
These charts (Figures 9-3 and 9-4) provide vertical landing capability for wet and dry lift ratings. The variables of temperature and ambient pressure for 0 datum and non-0 datum engine operation are taken into consideration.

**9.2.1 Use.** Enter the applicable chart with the ambient air temperature and project vertically up to the appropriate RPM limited reflector line. Again enter the chart with the ambient air temperature and project vertically up to the appropriate relative JPT reflector line (use relative JPT with bleed compensation determined in A1-AV8BB-NFM-000, Figure 10-5 or 10-6 as applicable) . From this point project horizontally right to the JPTL baseline, then parallel the guidelines to the appropriate JPTL setting, a maintenance provided value. From whichever is the lower between the intersection of the RPM reflector line and the intersection of the JPTL setting, project horizontally right to the hover performance relative to 0 % datum baseline, then parallel the guidelines to the appropriate hover performance relative to 0 % datum. From the wind baseline (≦ 15 knots) parallel the guidelines to the actual wind line. From this point, project horizontally right to the ambient pressure baseline (29.92), then parallel the ambient pressure guidelines to the appropriate ambient pressure line. From this point project horizontally right to read vertical landing weight.

**CAUTION**

**MAXIMUM PERFORMANCE** VL's at high ambient temperatures (greater than 80 °F) should be conducted with an additional power margin available. A reduction of 300 to 500 pounds of VL capability may be experienced at higher ambient temperatures due to bleed use and pilot technique.

# SAMPLE VERTICAL LANDING CAPABILITY




AV8BB-NFM-40-(96-1)01-CATI

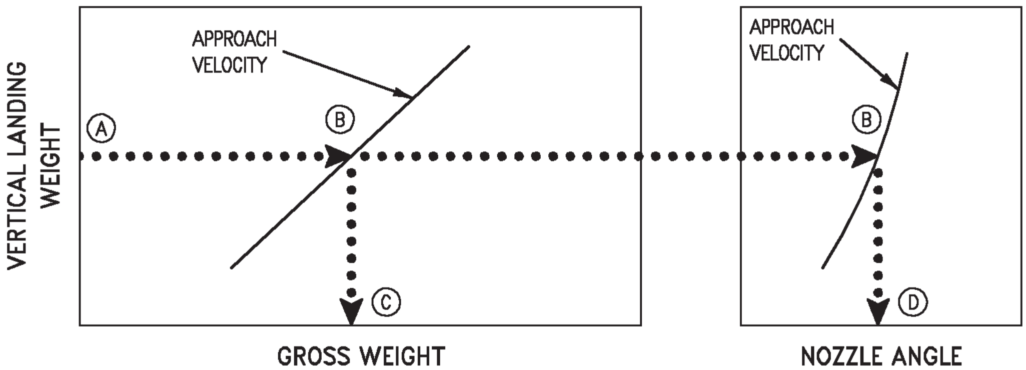
### 9.2.2 Sample Problem (Use Figure 9-3)

-406A Engine

Dry engine operation - 82° Nozzles

| | |
|---|---|
| A. Ambient temperature | 30 °C |
| B. Reflector line (RPM Limited) | 0 % |
| C. Reflector line (relative JPT) | 0 % |
| D. JPTL baseline | 703 °C |
| E. JPTL setting | 700 °C |
| F. Hover performance relative to 0 % datum baseline | |
| G. Hover performance relative to 0 % datum | +5 % |
| H. Wind baseline | ≦ 15 knots |
| I. Actual winds | 20 knots |
| J. Pressure baseline | 29.92 In. Hg |
| K. Ambient pressure | 29.50 In. Hg |
| L. Vertical landing weight | 14,600 Lb |

SAMPLE ROLLING VERTICAL LANDING CAPABILITY




AV8BB-NFM-40-(97-1)01 16-CATI

## 9.3 ROLLING VERTICAL LANDING

RVL capability is related to VL capability. The following relationships are based on 6° glide slope, 10° AOA, and nozzle angle as required to maintain touchdown speed:

| TOUCHDOWN SPEED (IAS) | RVL CAPABILITY- (All engines-wet/ dry) |
|---|---|
| 50 KTS | VL + 2300 pounds |
| 55 KTS | VL + 2700 pounds |
| 60 KTS | VL + 3100 pounds |
| 65 KTS | VL + 3500 pounds |
| 70 KTS | VL + 4000 pounds |

## 9.4 ROLLING VERTICAL LANDING CAPABILITY CHART

This chart (Figure 9-5) gives the gross weight and nozzle angle for a rolling vertical landing based on vertical landing weight capability and approach velocity. The approach angle of attack for the rolling vertical landing is 10° and the glide slope is 6°.

**9.4.1 Use.** Obtain the vertical landing weight from the appropriate vertical landing chart (wet or dry). Enter the chart on the left with this weight and project horizontally until it intersects the desired approach velocity on both plots. From these intersection points, project downward to get the rolling vertical landing weight and required nozzle angle.

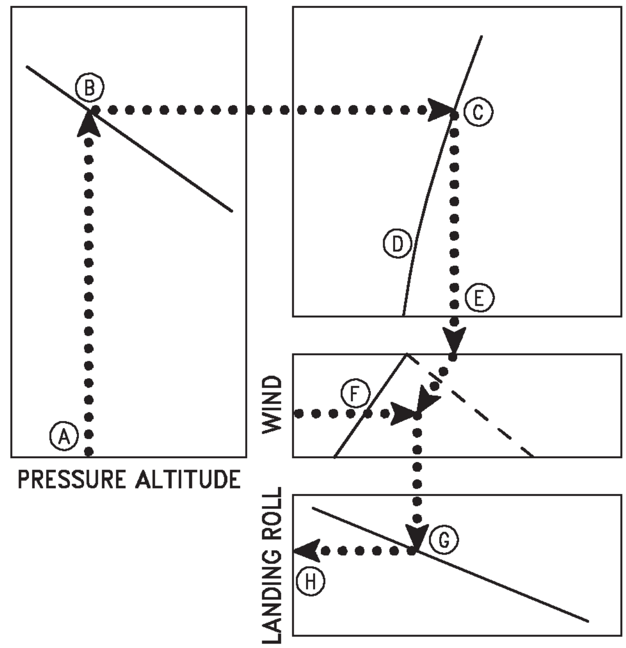
| | |
|---|---|
| A. Vertical landing weight | 16,300 Lb. |
| B. Approach Velocity | 85 KIAS |
| C. Landing gross weight | 21,980 Lb. |
| D. Nozzle angle | 72.7° |

## 9.5 SHORT LANDING MINIMUM DISTANCE CHART

This chart (Figure 9-6) provides landing roll distance information. The variables of gross weight, approach speed, and ambient temperature and pressure are taken into consideration.

**9.5.1 Use** Enter the chart at landing altitude and proceed vertically to the ambient air temperature. From this point project horizontally right to the appropriate gross weight. From this point project down to the wind baseline. Parallel the wind guidelines (headwind or tailwind) to the effective wind velocity, then project vertically down to the appropriate runway condition line. From this point project horizontally left to read the landing roll distance.

SAMPLE SHORT LANDING MINIMUM DISTANCE




AV8BB-NFM-40-(98-1)01 27-CATI

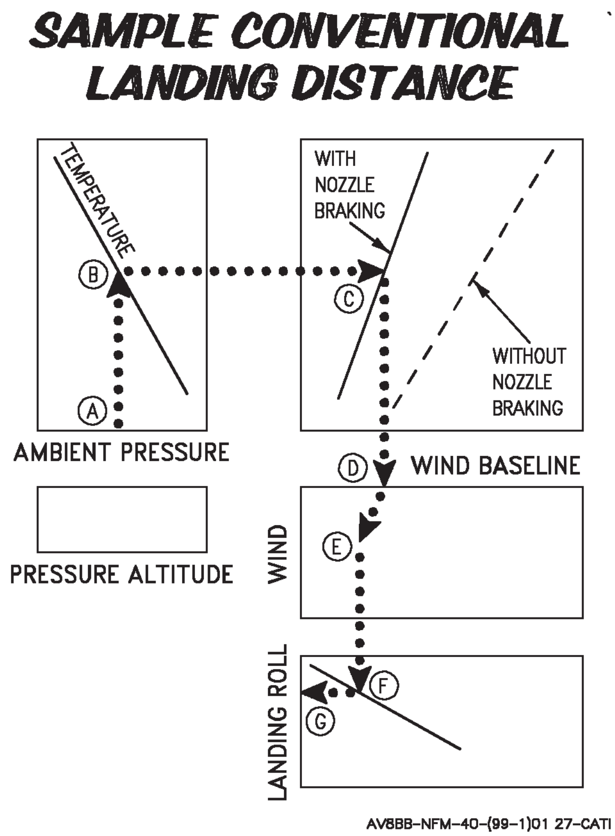
### 9.5.2 Sample Problem

| | |
|---|---|
| A. Pressure altitude | 1000 Ft |
| B. Ambient air temperature | 10 °C |
| C. Gross weight | 15,000 Lb |
| D. Approach speed | 92 Kt |
| E. Wind baseline | |
| F. Headwind | 10 Kt |
| G. Runway | Dry |
| H. Landing roll distance | 1290 Ft |

## 9.6 CONVENTIONAL LANDING DISTANCE CHART

This chart (Figure 9-7) provides landing distance information for various gross weights. The chart allows for landing with or without nozzle braking. The variables of temperature, ambient pressure, and effective landing wind are considered.

**9.6.1 Use.** Enter the chart with the ambient pressure or pressure altitude and project vertically up to the appropriate temperature line. From this point, project horizontally right to intersect the appropriate landing gross weight curve (with or without nozzle braking), then project vertically down to the wind baseline. From this point, parallel the wind guidelines (headwind or tailwind) to the effective wind velocity, then vertically down to the appropriate runway condition line. From this point project horizontally left to read the landing roll distance.




### 9.6.2 Sample Problem

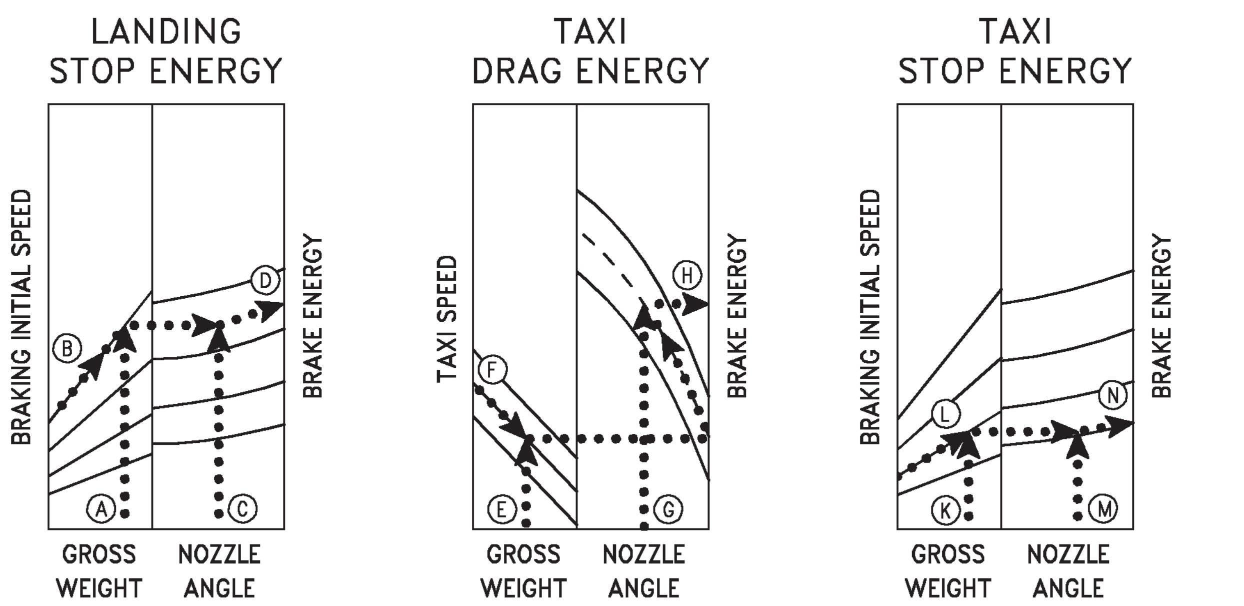
| | |
|---|---|
| A. Ambient pressure | 29.50 In. Hg |
| B. Temperature | 20 °C |
| C. Gross weight (with nozzle braking) | 16,000 Lb |
| D. Wind baseline | |
| E. Headwind | 8 Kt |
| F. Runway | DRY |
| G. Landing roll distance | 4250 Ft |

## 9.7 BRAKE ENERGY CHART

This chart (Figure 9-8) provides a means of determining braking energy requirements to stop and taxi the aircraft. The variables of aircraft gross weight, braking initial speed, nozzle angle, taxi speed maintained and miles taxied are considered. The chart can be used to determine if a planned braking requirement will exceed braking limitations.

**9.7.1 Use.** Enter the Stop Energy chart with the aircraft gross weight and project vertically up to the appropriate braking initial speed line. From this point project horizontally right to intersect the appropriate nozzle angle, then parallel guidelines to read brake energy. Enter the Taxi Drag Energy chart with the aircraft gross weight and project vertically up to the appropriate taxi speed maintained line. From this point project horizontally to chart right hand border, then parallel guidelines left to intersect the appropriate nozzle angle. Project horizontally right to read brake energy and multiply this value by the number of miles taxied. Add the brake energy value from the Stop Energy chart and the computed value from the Taxi Drag Energy chart, to determine the total brake energy used.

## SAMPLE BRAKE ENERGY




AV8BB-NFM-40-(100-1)01 25-CATI

### 9.7.2 Sample Problem

Landing stop energy

| | |
|---|---|
| A. Aircraft gross weight | 25,000 Lb |
| B. Braking initial speed | 60 Kt |
| C. Nozzle angle | 20° |
| D. Stop energy | $4.1x10^6$ Ft-lbs |

Taxi drag energy

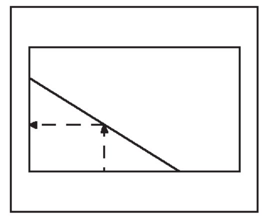
| | |
|---|---|
| E. Aircraft gross weight | 25,000 Lb |
| F. Taxi speed maintained | 20 Kt |
| G. Nozzle angle | 45° |
| H. Drag energy (1 mile taxi) | $0.3x10^6$ Ft-lbs |
| I. Miles taxied | 1.5 Mi |
| J. Taxi drag energy (H X I) | $0.45x10^6$ Ft-lbs |

Taxi stop energy

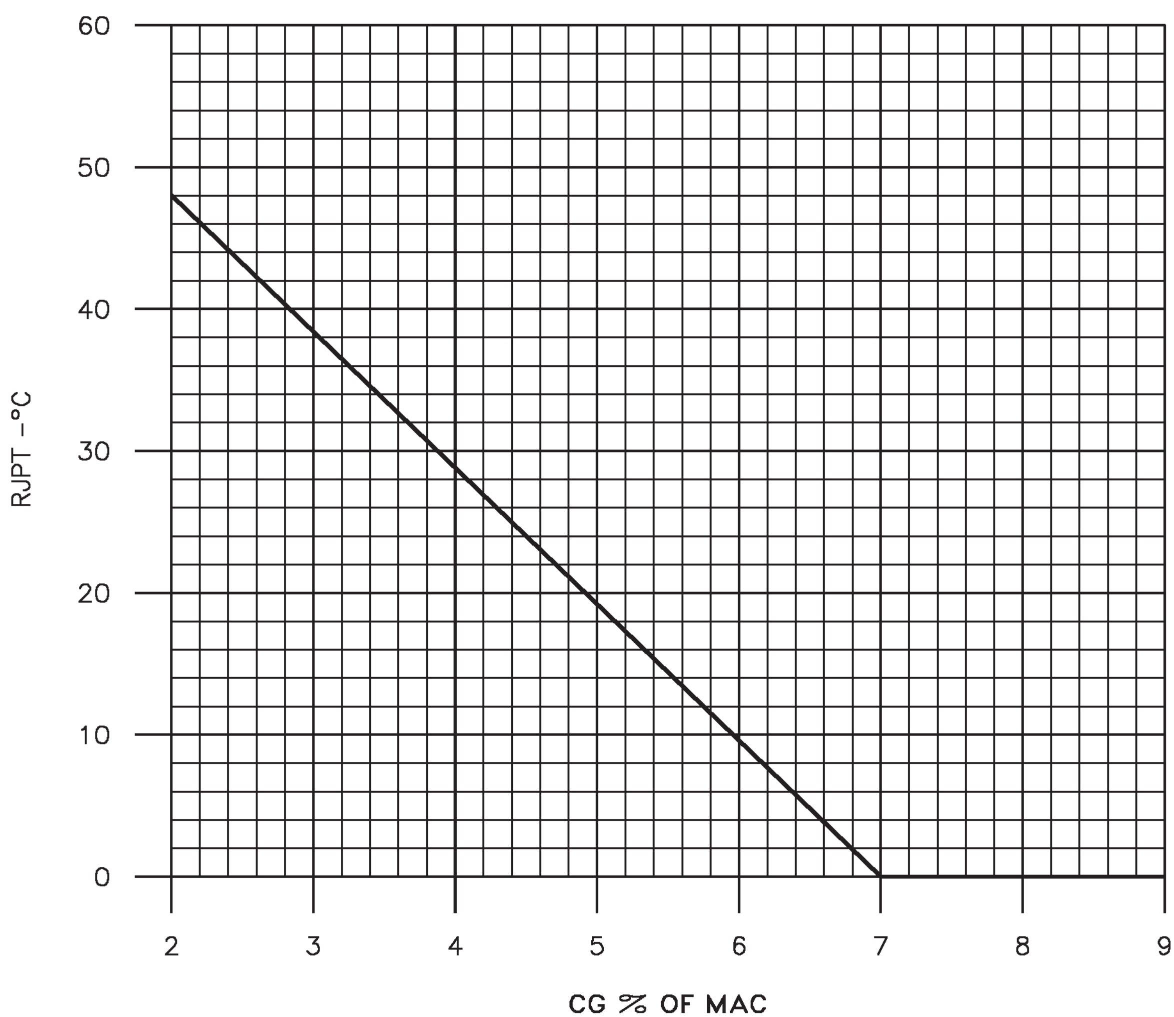
| | |
|---|---|
| K. Aircraft gross weight | 25,000 Lb |
| L. Braking initial speed | 20 Kt |
| M. Nozzle angle | 45° |
| N. Stop energy | $0.75x10^6$ Ft-lbs |

| | |
|---|---|
| Total brake energy (D + J + N) | $5.3x10^6$ Ft-lbs |

# RJPT Correction For Changes In C.G.




DATA BASIS: TAV-8B FLIGHT TEST




AV8BB-NFM-40-(101-1)01-CATI

**Figure 9-1. RJPT Correction for Changes in CG**

# RJPT CORRECTION FOR SHIFTS IN CG DUE TO FUEL

TAV-8B (Typical)
BAW 15,000
Pilot (2 at 225 lbs)

Pylons (Station 2 and 6)
Strakes

| FUEL REMAINING (LBS) | With 495 lbs. water | | Without 495 lbs. water | |
|---|---|---|---|---|
| | CG % of MAC | RJPT | CG % of MAC | RJPT |
| 2500 | 8.7 | 0 °C | 7.3 | 0 °C |
| 2000 | 8.1 | 0 °C | 6.6 | 3 °C |
| 1500 | 7.7 | 0 °C | 6.1 | 8 °C |
| 1000 | 6.8 | 2 °C | 5.1 | 19 °C |
| 900 | 6.2 | 8 °C | 4.5 | 24 °C |
| 800 | 5.7 | 12 °C | 3.9 | 30 °C |
| 700 | 5.1 | 19 °C | 3.3 | 35 °C |
| 600 | 4.7 | 23 °C | 3.0 | 38 °C |
| 500 | 4.7 | 23 °C | 3.0 | 38 °C |

**Figure 9-2. RJPT Correction for Shifts in CG Due to Fuel**

# VERTICAL LANDING CAPABILITY

WET ENGINE - 82° NOZZLES

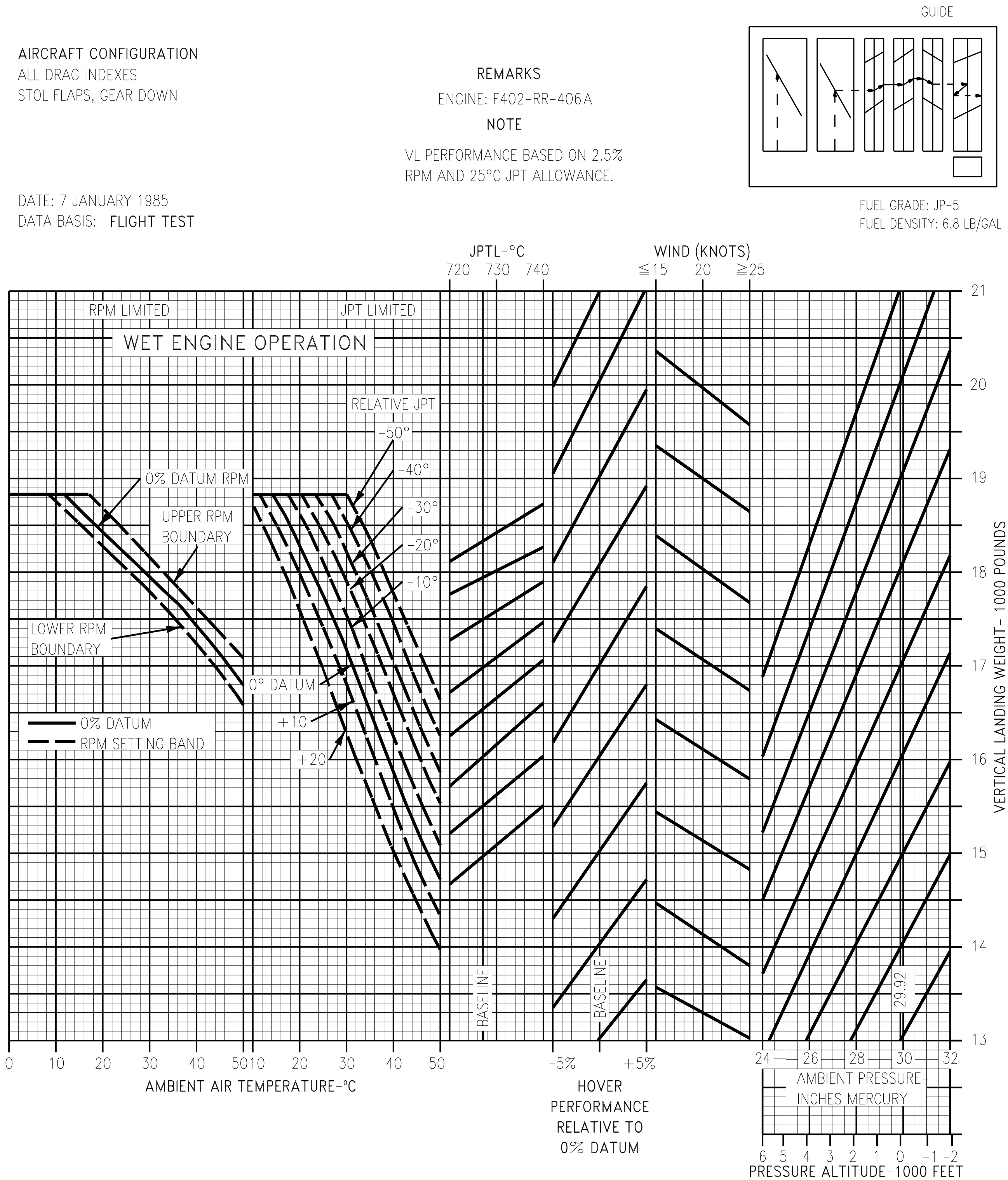



**Figure 9-3. Vertical Landing Capability, F402-RR-406A Engine (Sheet 1 of 2)**

# VERTICAL LANDING CAPABILITY

DRY ENGINE - 82° NOZZLES

AIRCRAFT CONFIGURATION

ALL DRAG INDEXES

STOL FLAPS, GEAR DOWN

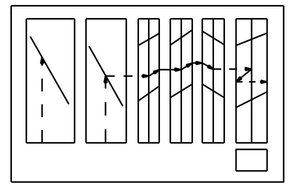
REMARKS

ENGINE: F402-RR-406A

NOTE

VL PERFORMANCE BASED ON 2.5% RPM AND 25°C JPT ALLOWANCE.

GUIDE



DATE: 7 JANUARY 1985

DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5

FUEL DENSITY: 6.8 LB/GAL

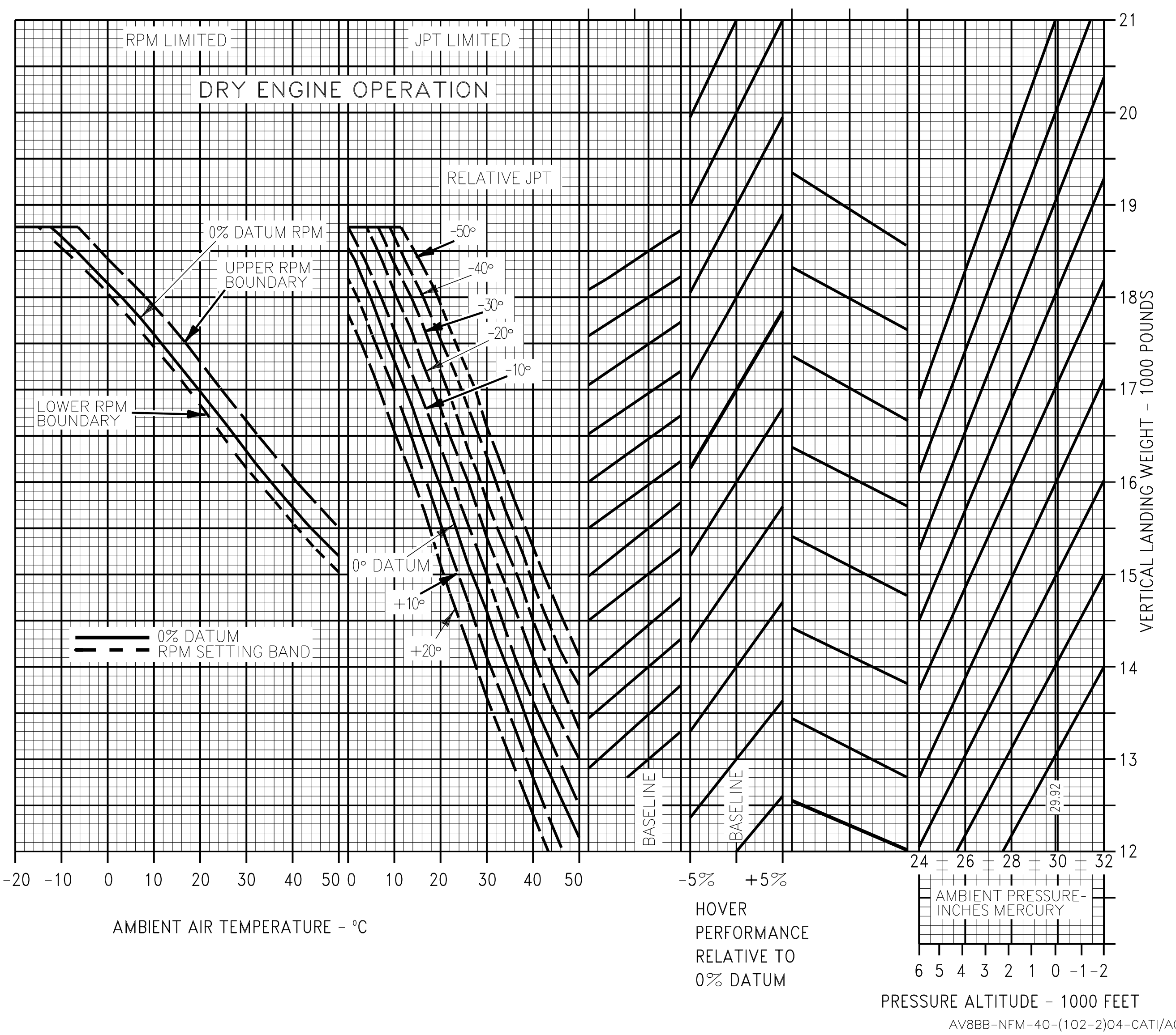



**Figure 9-3. Vertical Landing Capability, F402-RR-406A Engine (Sheet 2 of 2)**

# VERTICAL LANDING CAPABILITY

WET ENGINE - 82° NOZZLES

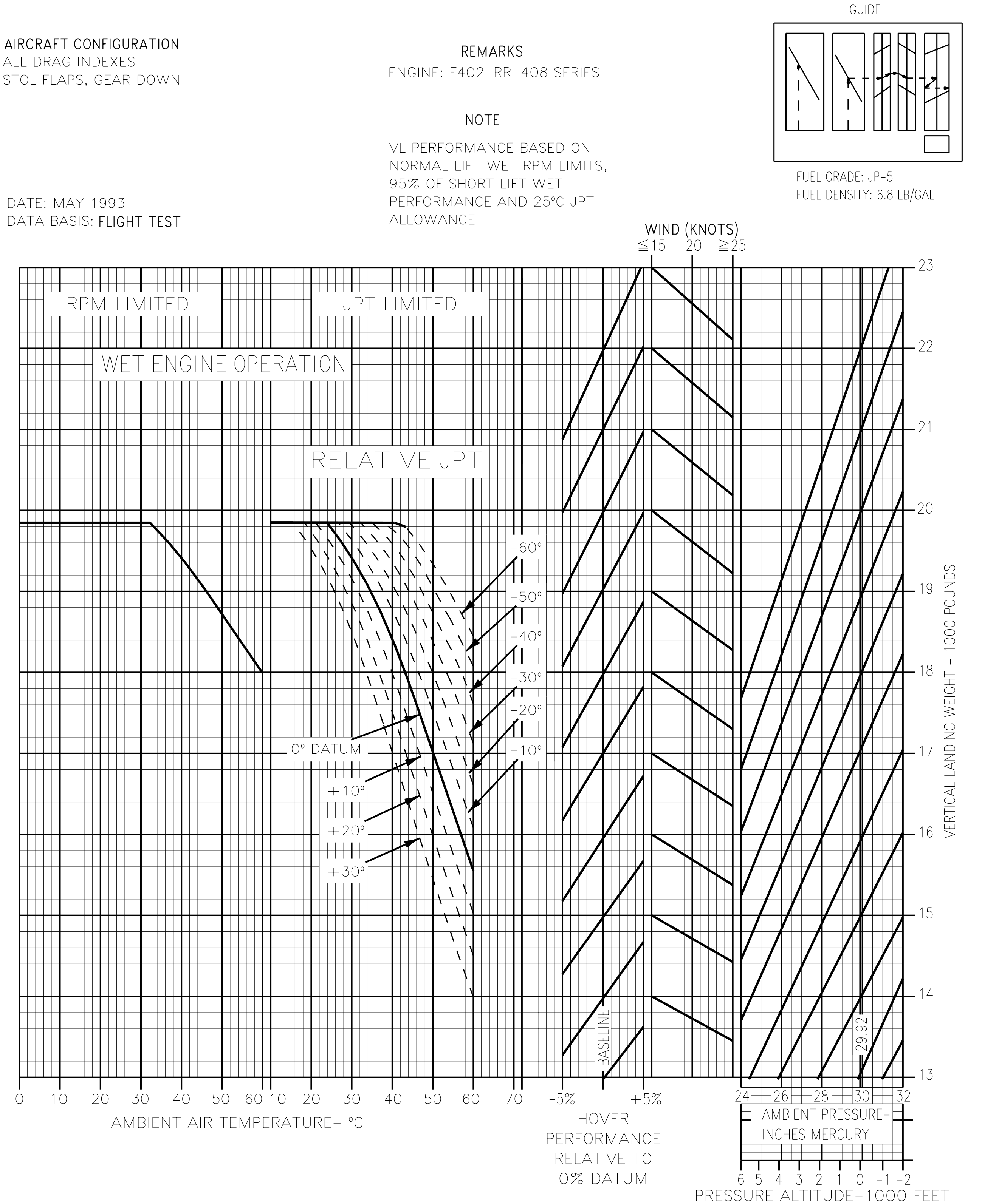
AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

REMARKS
ENGINE: F402-RR-408 SERIES

NOTE
VL PERFORMANCE BASED ON NORMAL LIFT WET RPM LIMITS, 95% OF SHORT LIFT WET PERFORMANCE AND 25°C JPT ALLOWANCE

DATE: MAY 1993
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(103-1)04-CATI/ACS

**Figure 9-4. Vertical Landing Capability, F402-RR-408 Series Engine (Sheet 1 of 2)**

# VERTICAL LANDING CAPABILITY

DRY ENGINE - 82° NOZZLES

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

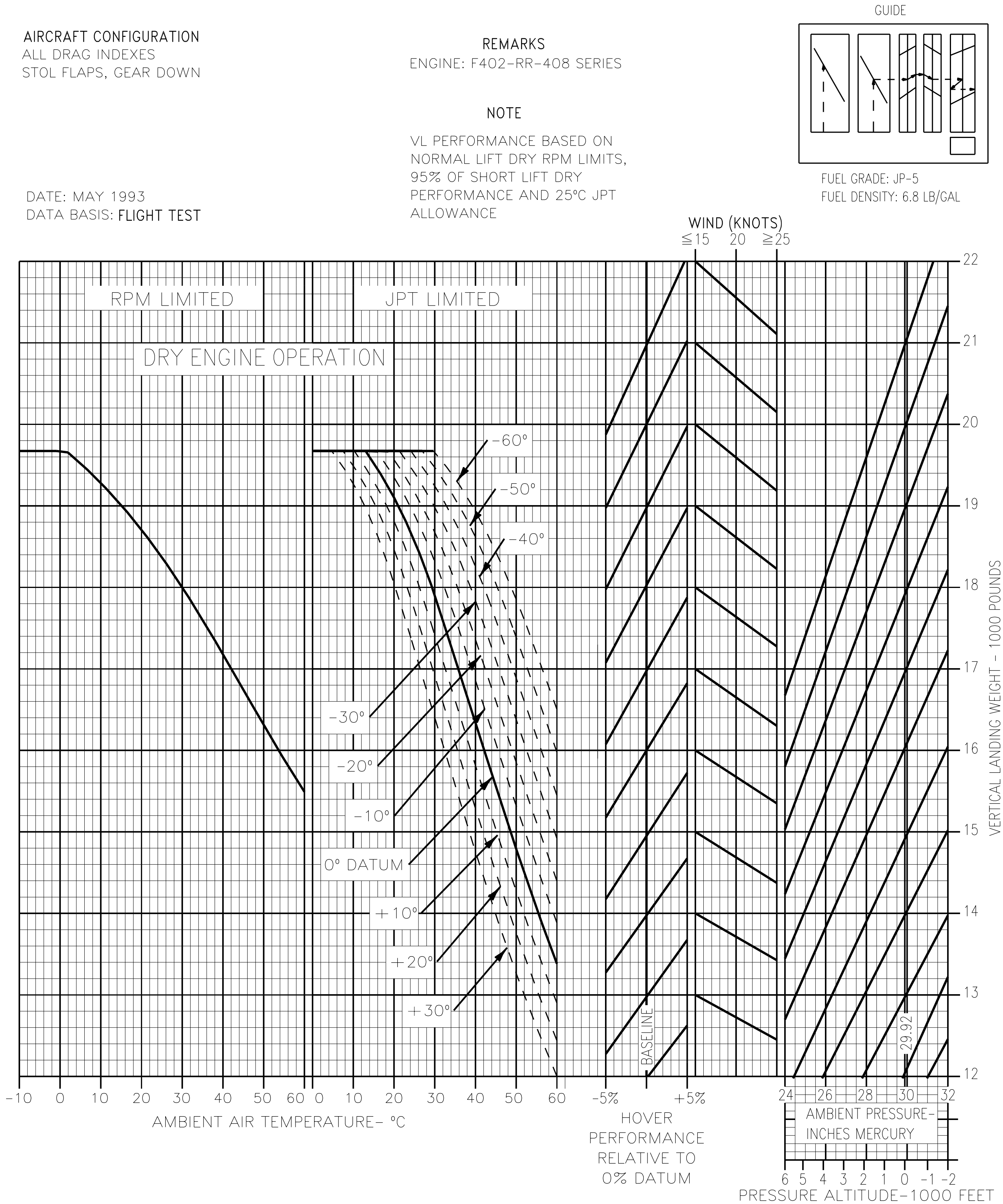
REMARKS
ENGINE: F402-RR-408 SERIES

NOTE

VL PERFORMANCE BASED ON NORMAL LIFT DRY RPM LIMITS, 95% OF SHORT LIFT DRY PERFORMANCE AND 25°C JPT ALLOWANCE

DATE: MAY 1993
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(103-2)04-CATI/ACS

**Figure 9-4. Vertical Landing Capability, F402-RR-408 Series Engine (Sheet 2 of 2)**



PAGES XI-09-14A AND XI-09-14B DELETED BY CHANGE 3

# ROLLING VERTICAL LANDING CAPABILITY

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

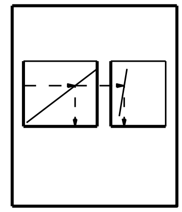
DATE: 25 AUGUST 1989
DATA BASIS: ESTIMATED

REMARKS
ENGINE: F402-RR-406A

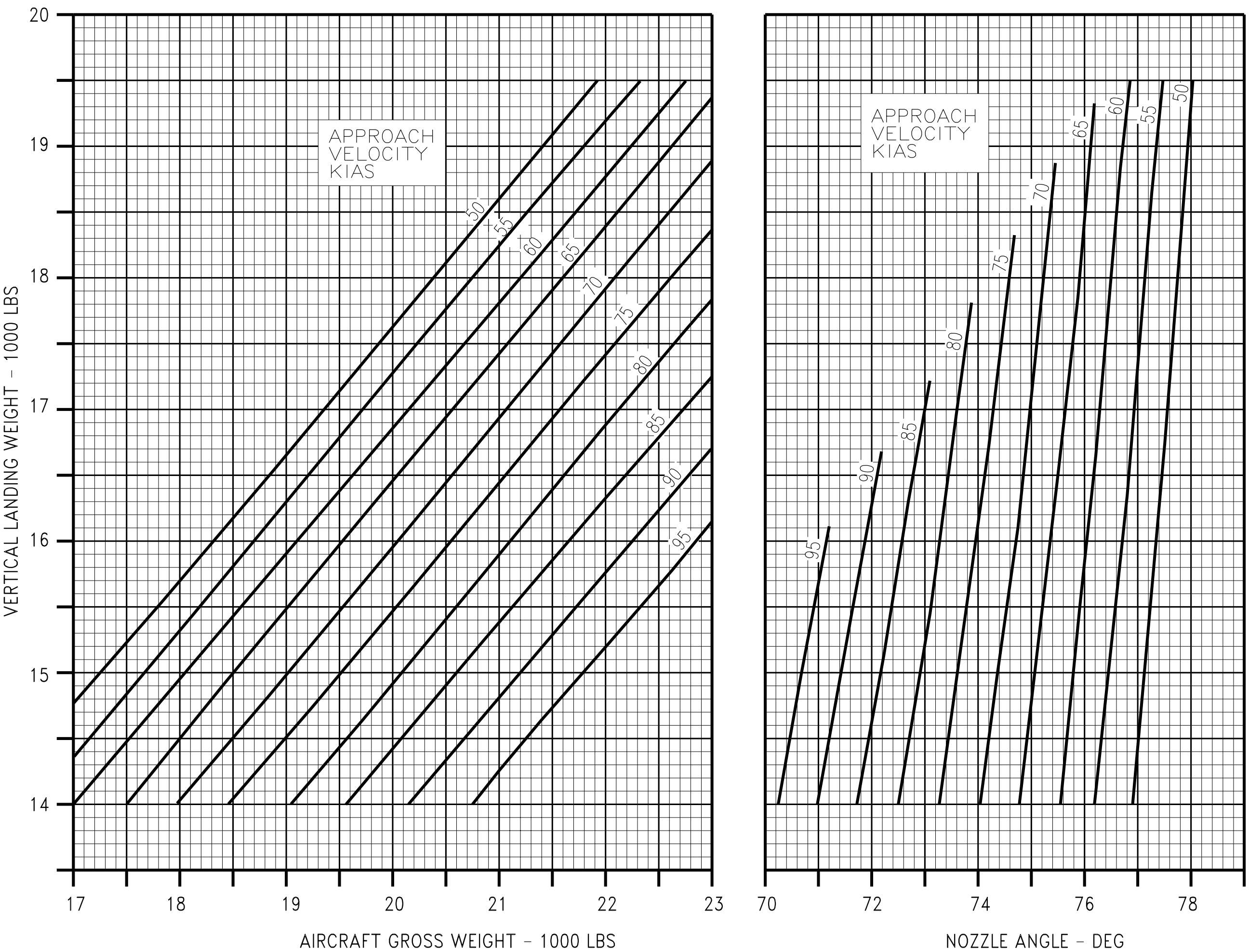
NOTES

- VERTICAL LANDING WEIGHT FROM VERTICAL LANDING CHART
- ANGLE OF ATTACK=10°
  GLIDE SLOPE=-6°
- CHART ALSO APPLICABLE TO F402-RR-408 SERIES ENGINE

GUIDE



FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(104-1)04-CATI/ACS

**Figure 9-5. Rolling Vertical Landing Capability**

# SHORT LANDING MINIMUM DISTANCE

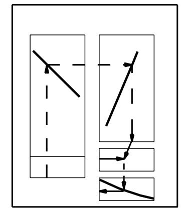
REMARKS
ENGINE: F402-RR-406A

NOTE

AIRCRAFT CONFIGURATION
ALL DRAG INDEXES
STOL FLAPS, GEAR DOWN

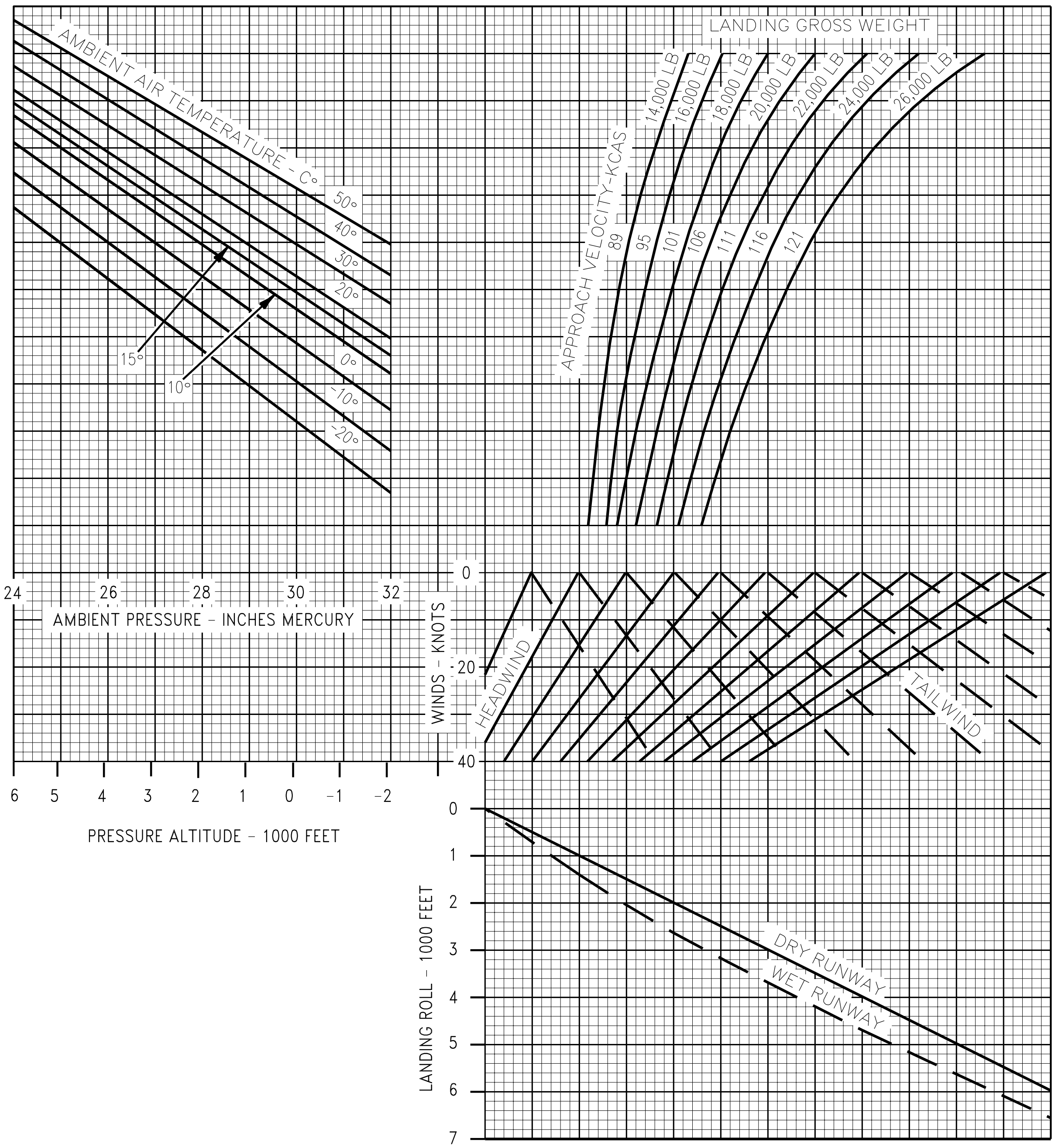
- DATA BASED ON APPROACH WITH 60° NOZZLE ANGLE, THROTTLE AS REQUIRED TO MAINTAIN -3° GLIDESLOPE. ANGLE OF ATTACK IS 11°.
- AIRBORNE DISTANCE FROM A HEIGHT OF 50 FEET IS APPROXIMATELY 1000 FEET.
- CHART ALSO APPLICABLE TO F402-RR-408 SERIES ENGINE.

GUIDE



DATE: 7 JANUARY 1985
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FUEL DENSITY: 6.8 LB/GAL




AV8BB-NFM-40-(105-1)04-CATI/ACS

**Figure 9-6. Short Landing Minimum Distance**

# CONVENTIONAL LANDING DISTANCE

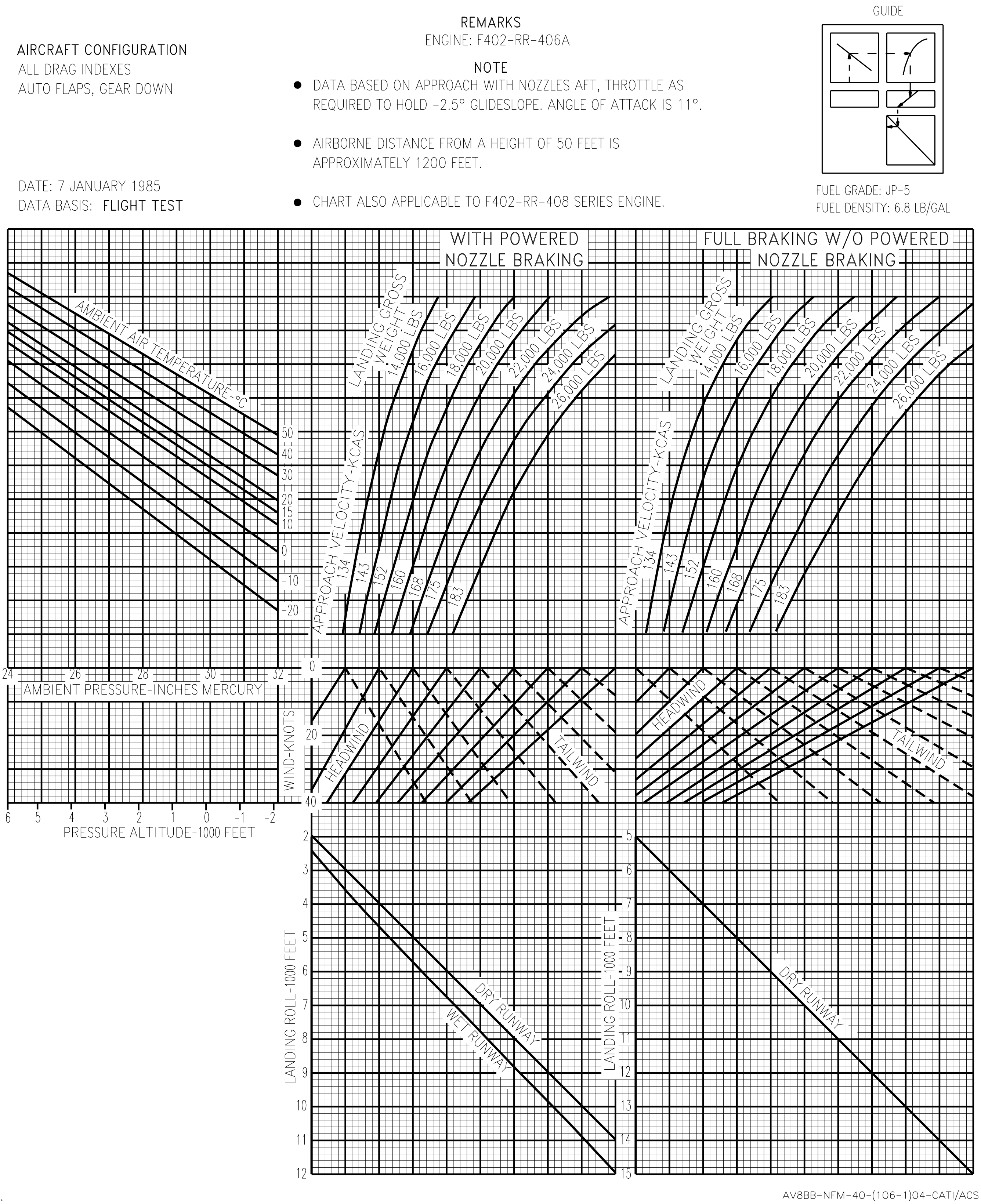
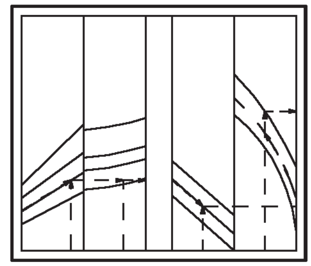



**Figure 9-7. Conventional Landing Distance**

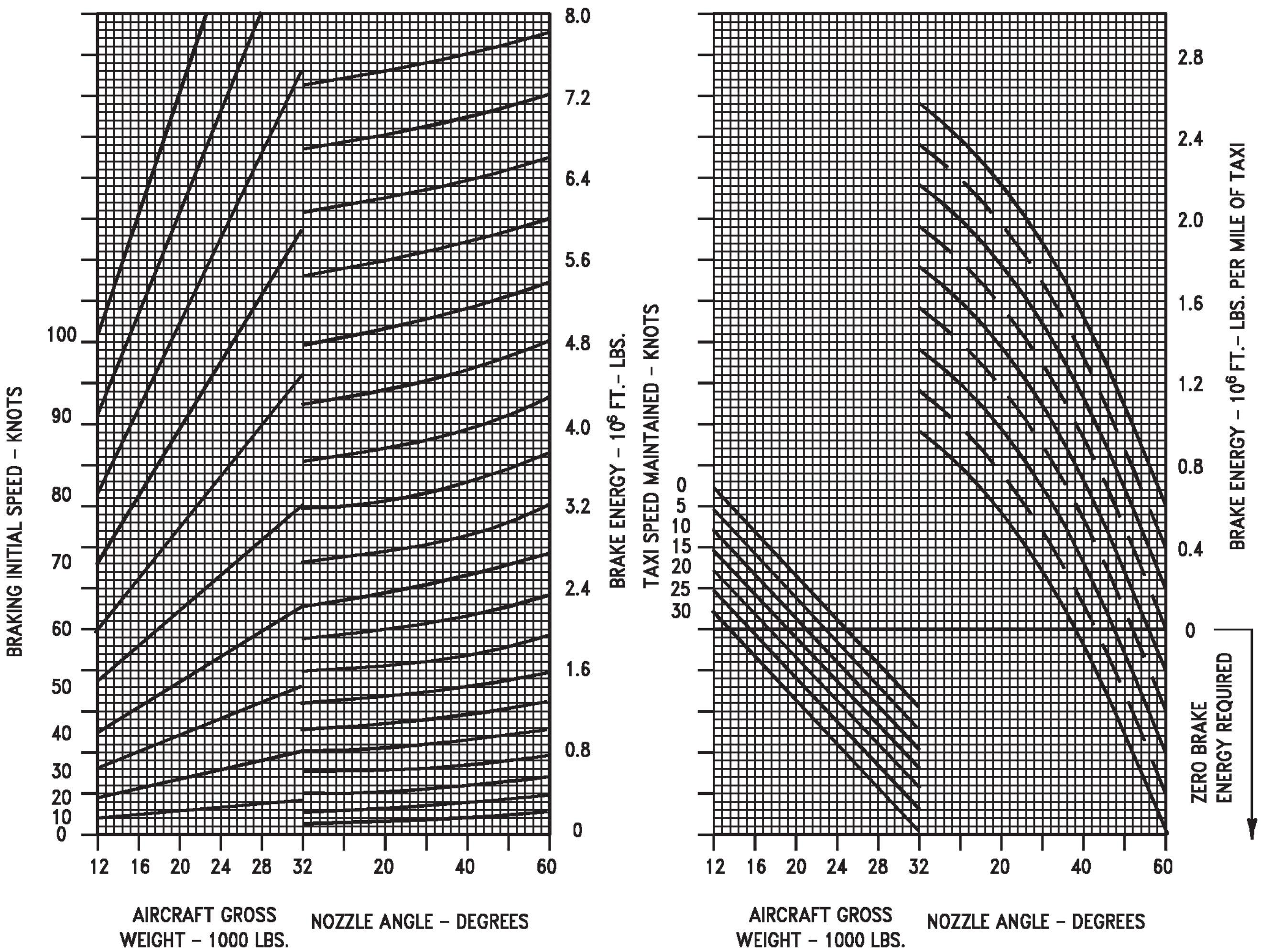
# BRAKE ENERGY

GUIDE



DATE: 15 NOVEMBER 1984
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-5
FULL DENSITY: 6.8 LB/GAL




STOP ENERGY

TAXI DRAG ENERGY
(PER MILE OF TAXI)

AV8BB-NFM-40-(107-1)01-CATI

Figure 9-8. Brake Energy

# CHAPTER 10

# Mission Planning

**To Be Supplied When Available.**

# CHAPTER 11

# Emergency Operation

**To Be Supplied When Available.**

# ALPHABETICAL INDEX

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## LIST OF EFFECTIVE PAGES

| Effective Pages | Page Numbers |
|---|---|
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| CHANGE 2 | XI-9-14A Thru XI-9-14B Deleted |
| CHANGE 3 | XI-9-15 Thru XI-9-17 |
| ORIGINAL | XI-9-18 |
| ORIGINAL | XI-10-1 (Reverse Blank) |
| ORIGINAL | XI-11-1 (Reverse Blank) |
| CHANGE 4 | Index-1 |
| CHANGE 2 | Index-2 |
| CHANGE 5 | LEP-1 (Reverse Blank) |
| CHANGE 5 | LEP-3 (Reverse Blank) |