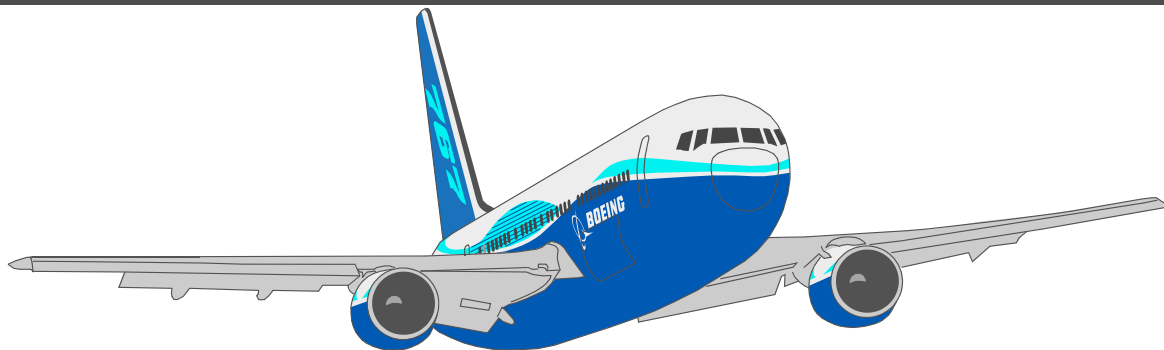




FLIGHT PLANNING AND PERFORMANCE MANUAL



767-300 PW4060 FAA/EU-OPS KG/°C/FT CATEGORY C BRAKES CATEGORY D BRAKES

OPTIONS
Derate TO1-10%
Derate TO2-20%
Tire Speed 225
Tire Speed 235
Slush/Slippery EI

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**PUBLISHED BY
FLIGHT OPERATIONS ENGINEERING
BOEING COMMERCIAL AIRPLANE GROUP
SEATTLE, WASHINGTON U.S.A**

BOEING DOCUMENT NUMBER: D632T003-VV718

Revision Number: 7

Revision Date: September 17, 2010

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Preface

Table of Contents

Chapter 0

Preface	0
Introduction	0.1
Revision Record	0.2
List of Effective Pages	0.3
Bulletin Record	0.4
TAKEOFF AND LANDING	1
FLIGHT PLANNING	2
ENROUTE	3
NON-STANDARD CONFIGURATION	4

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General

This Flight Planning and Performance Manual has been prepared by Boeing Commercial Airplanes, Commercial Aviation Services. The purpose of this manual is to provide a complete operational performance data reference including dispatch and inflight performance data applicable to a specific airframe, engine rating, and regulatory agency as identified on the cover page of the document.

This manual is suitable for use for any airplane configuration that meets the criteria identified on the cover page of the document.

Owners/operators are solely responsible for ensuring the performance documentation they are using is complete and matches the current configuration identified on the cover page of the document. This includes the accuracy and validity of all information furnished by the owner/operator or any other party.

The manual is periodically revised to incorporate pertinent flight planning and performance information. Items of a more critical nature will be incorporated in Flight Planning and Performance Manual Bulletins and will be distributed in a timely manner. In all cases, such revisions and changes must remain compatible with the approved AFM with which the operator must comply. In the event of conflict with the AFM, the AFM shall supersede.

This manual assumes the user is familiar with basic jet airplane performance and regulatory requirements common to airplanes of this type.

Any questions about the content or use of this manual can be directed to:

Commercial Aviation Services
Boeing Commercial Airplanes
P.O. Box 3707, M/C 20-88
Seattle, Washington 98124-2207 USA

Attention: Manager, Performance Data Flight Operations Engineering

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Preface
Revision Record

Chapter 0
Section 2

Revision Transmittal Letter

To: All holders of Flight Planning and Performance Manual, Boeing Document Number D632T003-VV718.

Subject: Flight Planning and Performance Manual Revision

This revision reflects the most current information available to The Boeing Company 45 days before the subject revision date. The following revision highlights explain changes in this revision. General information below explains the use of revision bars to identify new or revised information.

Revision Record

No.	Revision Date	Date Filed
0	April 2, 2004	
2	December 1, 2005	
4	December 15, 2008	
6	December 15, 2009	

No.	Revision Date	Date Filed
1	November 22, 2004	
3	December 6, 2006	
5	March 6, 2009	
7	September 17, 2010	

General

The Boeing Company issues Flight Planning and Performance Manual revisions to provide new or revised information. Formal revisions also incorporate appropriate information from previously issued Flight Planning and Performance Manual bulletins.

The revision date is the approximate date the manual is mailed to the customer.

Formal revisions include a new Revision Record, Revision Highlights, and a current List of Effective Pages. Use the information on the new Revision Record and List of Effective Pages to verify the Flight Planning and Performance Manual content.

Pages containing revised material have revision bars associated with the changed text or illustration.

The Revision Record should be completed by the person incorporating the revision into the manual.

Filing Instructions

Consult the List of Effective Pages (0.3.1). Pages identified with an asterisk (*) are either replacement pages or new (original) issue pages. Remove corresponding old pages and replace or add new pages. Remove pages marked DELETED; there are no replacement pages for deleted pages.

Be careful when inserting changes not to throw away pages from the manual that are not replaced. The List of Effective Pages determines the correct content of the manual.

Revision Highlights

This section (0.2) replaces the existing section 0.2 in your manual.

This manual is published from a database; the text and illustrations are marked with configuration information. Occasionally, because the editors rearrange the database markers, or mark items with configuration information due to the addition of new database content, some customers may receive revision bars on content that appears to be unchanged. Pages may also be republished without revision bars due to slight changes in the flow of the document.

Chapter 0 - Preface

Section 4 - Bulletin Record

0.4.2 - Added Thrust Shortfall Bulletin information that was inadvertently excluded last revision.

Chapter 1 - TAKEOFF AND LANDING

Section 4 - Landing

Landing Climb Limit Weight

1.4.7 - Corrected Derate Adjustments. Original Derate Adjustments were slightly off, due to a calculation error.

Preface

List of Effective Pages

Chapter 0

Section 3

Page	Date
FPPM	
Title Page	December 15, 2009
Copyright	December 15, 2009
Preface (tab)	
0.TOC.0.1-2	December 15, 2009
0.1.1-2	December 15, 2009
* 0.2.1-2	September 17, 2010
* 0.2.3-4	Deleted
List of Effective Pages	
* 0.3.1-2	September 17, 2010
Bulletins (tab)	
0.4.1	December 15, 2009
* 0.4.2	September 17, 2010
* 1.3.1-4	September 17, 2010
TAKEOFF AND LANDING (tab)	
1.TOC.0.1-2	December 15, 2009
1.1.1-6	December 15, 2009
1.2.1-20	December 15, 2009
1.3.1-6	December 15, 2009
1.4.1-6	December 15, 2009
* 1.4.7	September 17, 2010
1.4.8-14	December 15, 2009
FLIGHT PLANNING (tab)	
2.TOC.0.1-2	December 15, 2009
2.1.1-6	December 15, 2009
2.2.1-14	December 15, 2009
2.3.1-6	December 15, 2009
2.4.1-22	December 15, 2009
ENROUTE (tab)	
3.TOC.0.1-2	December 15, 2009
3.1.1-2	December 15, 2009
3.2.1-18	December 15, 2009
3.3.1-26	December 15, 2009

Page	Date
NON-STANDARD CONFIGURATION (tab)	
4.TOC.0.1-2	December 15, 2009
4.1.1-2	December 15, 2009
4.2.1-4	December 15, 2009
4.3.1-14	December 15, 2009
4.4.1-8	December 15, 2009
4.5.1-2	December 15, 2009
4.6.1-4	December 15, 2009
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General

The Boeing Company issues Flight Planning and Performance Manual Bulletins to provide important information prior to the next formal revision of the Flight Planning and Performance Manual.

Bulletins are dated and numbered sequentially. When appropriate, the next formal Flight Planning and Performance Manual revision will include an updated bulletin record page to reflect current bulletin status.

Bulletin status is defined as follows:

- In Effect (IE) – the bulletin contains pertinent information not otherwise covered in the Flight Planning and Performance Manual. The bulletin remains active and should be retained in the manual
- Incorporated (INC) – the bulletin operating information has been incorporated into the Flight Planning and Performance Manual. The bulletin remains active and should be retained in the manual
- Cancelled (CANC) – the bulletin is no longer active and should be removed from the Flight Planning and Performance Manual. All bulletins previously cancelled are no longer listed in the Bulletin Record.

The person filing a new or revised bulletin should amend the Bulletin Record as instructed in the Administrative Information section of the bulletin. When a bulletin includes replacement pages for the Flight Planning and Performance Manual, the included pages should be filed as instructed in the Flight Planning and Performance Manual Information section of the bulletin.

[illegible]



Flight Planning and Performance Manual Bulletin for The Boeing Company

The Boeing Company
Seattle, Washington 98124-2207



767

Number: VV718-1

Issue Date: February 2, 2001

Document Effectivity: D632T003-VV718

Subject: Performance Adjustments for Thrust Shortfall of PW4000 Series Powered Airplanes with FB2B and FB2T Fans Installed

Reason: To provide subject adjustments for Flight Planning and Performance Manual (FPPM) in accordance with 767 Airworthiness Directive AD 2001-01-10

Information in this bulletin is recommended by The Boeing Company, but may not be FAA approved at the time of writing. In the event of conflict with the FAA approved Airplane Flight Manual (AFM), the AFM shall supersede. The Boeing Company regards the information or procedures described herein as having a direct or indirect bearing on the safe operation of this model airplane.

THE FOLLOWING PROCEDURE AND/OR INFORMATION IS EFFECTIVE UPON RECEIPT

Background Information

This bulletin advises operators of revised performance information applicable to the 767-300 with Pratt & Whitney PW4000 engines equipped with FB2B or FB2T fans. Engines equipped with FB2B/FB2T (Phase 0/1) fans have been found to be subject to a shortfall in thrust at high EPR due to fan blade leading edge erosion which occurs normally in service. Engines equipped with FB2C (Phase 3) fans have been shown to be free from thrust degradation and have no shortfall in rated thrust. All PW4062 engines are equipped with FB2C (Phase 3) fans and therefore are not affected by this bulletin.

Engine Identification:

On each airplane, each engine's model designation must be established. Listed below are the model designations as they appear on the dataplate for engines with a hardware configuration that includes an FB2C (Phase 3) fan. Unless all engines on a particular airplane have been confirmed to have FB2C (Phase 3) fans, the performance adjustments will apply.

PW4000 Engine Dataplate Model Designations For Engines With FB2C (phase 3) Fans which are NOT Affected by the Thrust shortfall:

PW4052 (-3)	PW4052 (-1C)
PW4056 (-3)	PW4056 (-1C)
PW4060 (-3)	PW4060 (-1C)
PW4060A (-3)	PW4060A (-1C)
PW4060C (-3)	PW4060C (-1C)
PW4062 (-3)	PW4062 (-1C)



Flight Planning and Performance Manual

Operating Instructions

The following airplane performance adjustments apply when operating with any number of engines which are not equipped with FB2C (Phase 3) fans:

Reductions to the applicable performance limit weights (LB) are provided in the table below.

Takeoff speeds are not changed.

WEIGHT (LB)	FIELD (LB)	CLIMB (LB)	GEAR DOWN CLIMB (LB)	OBSTACLE (LB)	GEAR DOWN OBSTACLE (LB)	NET LEVEL OFF (LB)	APPROACH/ LANDING CLIMB (LB)
460000	7950	11750	12500	12400	12400	13800	11500
440000	7600	11200	11950	11800	11800	13200	10650
420000	7250	10650	11400	11200	11200	12650	9850
400000	6900	10100	10850	10600	10650	12050	9050
380000	6550	9550	10300	10000	10350	11450	8600
360000	6200	9000	9800	9400	10000	10800	8150
340000	5850	8450	9250	8850	9650	10200	7750
320000	5550	7900	8700	8400	9300	9600	7350
300000	5250	7350	8150	7950	8950	9050	7000
280000	4950	6800	7600	7500	8600	8450	6600
260000	4650	6300	7050	7000	8250	7900	6250
240000	4400	5750	6550	6550	7900	7350	5850
220000	4100	5300	6000	6100	7550	6750	
240000	3850	4900	5450	5650	7200	6200	
220000	3600	4500	4900	5200	6900	5600	

Reductions to the applicable performance limit weights (KG) are provided in the table below.

Takeoff speeds are not changed.

WEIGHT (KG)	FIELD (KG)	CLIMB (KG)	GEAR DOWN CLIMB (KG)	OBSTACLE (KG)	GEAR DOWN OBSTACLE (KG)	NET LEVEL OFF (KG)	APPROACH/ LANDING CLIMB (KG)
210000	3610	5350	5690	5650	5650	6300	
200000	3440	5080	5420	5350	5350	5980	4810
190000	3260	4810	5150	5050	5060	5720	4440
180000	3090	4530	4880	4750	4810	5410	4070
170000	2910	4260	4610	4460	4640	5110	3840
160000	2740	3990	4340	4140	4460	4800	3620
150000	2580	3720	4070	3910	4290	4500	3420
140000	2440	3440	3800	3680	4120	4210	3230
130000	2290	3170	3530	3450	3950	3920	3050
120000	2140	2900	3250	3220	3770	3630	2860
110000	2000	2620	2980	2990	3600	3350	2670
100000	1860	2410	2710	2770	3430	3060	2470
90000	1740	2200	2440	2540	3260	2780	
80000	1610	2000	2170	2310	3080	2490	

The following adjustments to the Altitude Capability and Fuel Requirements apply with any number of engines which are not equipped with FB2C (Phase 3) fans.

Reduce Long Range Cruise Maximum Operating Altitude by 800 ft.

Reduce Engine Inoperative Long Range Cruise Altitude Capability by 1500 ft.

Reduce Gear Down Long Range Cruise Altitude Capability by 1400 ft.

Reduce Engine Inoperative Gear Down Long Range Cruise Altitude Capability by 2000 ft.

Increase Driftdown/LRC Cruise Range Capability fuel required by 2%.

Area of Operation Decrement (NM)

WEIGHT (LB)	TIME (MINUTES)			
	60	120	180	200
.78/290	4	8	12	13
.80/310	4	8	13	15
.80/330	4	9	14	16
.80/350	5	11	16	18
LRC	5	10	15	17



ETOPS Net Level Off Weight Reduction (LB)

WEIGHT (LB)	CRUISE SPEED (KIAS)				
	LRC	290	310	330	350
440000	10700	13100	14800	16700	17200
420000	10600	13100	14800	16700	17200
400000	10500	13000	14800	16700	17200
380000	10500	13000	14800	16700	17200
360000	10400	12900	14800	16300	17200
340000	10300	12900	14800	15900	16800
320000	9600	12900	14400	15400	16400
300000	8800	12800	14000	15000	16000
280000	8000	12700	13500	14600	15600
260000	7200	12200	13100	14100	15100
240000	6400	11700	12700	13700	14700
220000	5600	11300	12200	13200	14300
200000	4800	10800	11800	12800	13900

ETOPS Net Level off Weight Reduction (KG)

WEIGHT (KG)	CRUISE SPEED (KIAS)				
	LRC	290	310	330	350
200000	4850	5950	6700	7550	7800
190000	4800	5900	6700	7550	7800
180000	4800	5900	6700	7550	7800
170000	4750	5900	6700	7550	7800
160000	4700	5850	6700	7300	7750
150000	4550	5850	6650	7100	7550
140000	4150	5850	6400	6900	7300
130000	3750	5750	6200	6650	7100
120000	3350	5600	6000	6450	6900
110000	2950	5350	5750	6250	6700
100000	2550	5100	5550	6000	6500
90000	2150	4900	5350	5800	6300



Administrative Information

Insert this bulletin behind the List of Effective Pages for your Flight Planning and Performance Manual (FPPM). The Boeing Company will be issuing a Bulletin Record page in the future. At that time you will be able to amend the Flight Planning and Performance Manual Bulletin Record to show bulletin VV718-1 "In Effect" (IE). This Flight Planning and Performance Manual Bulletin will remain in effect as long as 767-300 Airworthiness Directive AD 2001-01-10 is effective. Application of information contained herein may change if and when alternate means of compliance with the AD are granted.

Please send all correspondence regarding Flight Planning and Performance Manual Bulletin status to one of the following addresses:

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TAKEOFF AND LANDING

Table of Contents

Chapter 1

Text.....	1.1.1
Introduction	1.1.1
Takeoff.....	1.1.1
Takeoff Derates	1.1.4
Landing	1.1.4
Takeoff.....	1.2.1
Altimeter Setting to Station Pressure	1.2.1
Wind Component.....	1.2.2
Takeoff Field Limit	1.2.3
Takeoff Climb Limit	1.2.4
Obstacle Limit	1.2.7
Tire Speed Limit	1.2.10
Brake Energy Limits VMBE	1.2.12
Improved Climb.....	1.2.13
Slush/Standing Water Takeoff	1.2.14
Slippery Runway Takeoff	1.2.16
Takeoff Speeds	1.2.19
Clearway and Stopway V1 Adjustments	1.2.19
V1(MCG)	1.2.20
Takeoff EPR	1.2.20
Stab Trim Setting.....	1.2.20
Takeoff Derates.....	1.3.1
TO1 Takeoff Speeds	1.3.1
TO1 V1(MCG)	1.3.1
TO1 Takeoff/Landing Weight Adjustments	1.3.2
TO1 Takeoff EPR	1.3.3
TO1 Stab Trim Setting.....	1.3.3
TO2 Takeoff Speeds	1.3.4
TO2 V1(MCG)	1.3.4
TO2 Takeoff/Landing Weight Adjustments	1.3.5
TO2 Takeoff EPR	1.3.6
TO2 Stab Trim Setting.....	1.3.6
Landing	1.4.1
Landing Field Length Limit	1.4.1
Landing Climb Limit Weight	1.4.7

Go-around Climb Gradient	1.4.8
Quick Turnaround Limit.	1.4.9
Recommended Brake Cooling Schedule	1.4.11
Normal Configuration Landing Distance.	1.4.12

Introduction

This chapter contains data to determine takeoff and landing performance limitations, based on engine bleed effects for normal air conditioning operation and anti-ice off, i.e., two packs at normal flow, one pack bleed from each engine.

The data is presented in simplified form and is therefore conservative. In the event of any conflict between data presented in this section and those contained in the approved Airplane Flight Manual, the Flight Manual shall always take precedence.

Takeoff

The maximum brake release weight is the least of the field length, climb, obstacle, tire speed, brake energy and structural limit weights.

Altimeter Setting To Station Pressure

The determination of thrust setting and takeoff/landing performance generally requires station pressure altitude. If station pressure or station pressure altitude are not available, enter the chart with altimeter setting (QNH) and read the pressure altitude adjustment. Apply this correction to the station elevation to obtain station pressure altitude.

For boundary QNH values, read the midpoint between tabulated corrections to elevation, e.g., for QNH of 29.66 inches (1004 mb), the elevation adjustment is 250 ft.

If station pressure (QFE) is required, use conversion scale on left of chart for station pressure altitude versus QFE.

Alternatively, station pressure altitude may be determined by setting the cockpit altimeter to 29.92 inches (1013.2 mb); the altimeter will then read station pressure altitude.

Wind Component

The Wind Component chart provides crosswind and head/tail wind components, appropriate to the runway headings, reported wind velocity and direction. To use the chart, find the intersection between reported wind velocity in knots (circular lines) and the angle in degrees between reported wind direction and the runway (radial lines). Then read head/tail wind component to the left and crosswind component from the bottom scale.

Takeoff Field Limit

Maximum field length limited brake release weights are presented for the certified takeoff flap settings. The field length available is the amount of paved surface

which may be used to accelerate to the decision speed and either stop at the end of the runway or climb to 35 ft. These field limited weights do not account for clearway or stopway.

The reference takeoff condition is flap position 5 at zero slope and wind. To determine the field length limit brake release weight, enter the left portion of the chart with OAT, move vertically to airport pressure altitude and project a line horizontally to the field length reference line. Enter the right hand portion of the chart with field length available, adjust for slope, wind and flap position and continue vertically to intersect the OAT/altitude line projected along the guidelines from the field length reference line. At this intersection, read the field length limit weight to the right. Adjust the field length limit weight according to the notes below the chart.

Regulations require that the runway length be adjusted to account for alignment of the airplane prior to takeoff. The table below provides TORA, TODA and ASDA adjustments for both 90 degree taxiway entry and 180 degree turnaround. For the 180 degree turnaround case, adjustments are provided for a nominal 200 ft (60m) runway pavement width. These values may be used when obtaining takeoff weights from the AFM or a takeoff analysis program. When using line-up allowances with the Field Length Limit chart, the field length available must be reduced by the ASDA adjustment.

	90 DEGREE TAXIWAY ENTRY	180 DEGREE TURNAROUND
	MINIMUM LINE-UP DISTANCE - FT (M)	NOMINAL LINE-UP DISTANCE - FT (M)
TORA & TODA	74 (23)	148 (45)
ASDA	149 (45)	223 (68)

Takeoff Climb Limit

Maximum climb limited brake release weights are presented for the certified takeoff flap settings. The weights are limited by second segment climb performance and do not account for obstacles.

To determine the climb limit weight, enter with OAT, move vertically to airport pressure altitude and project a horizontal line to the flap position reference line. Adjust for flap position and read the climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart.

Obstacle Limit

Obstacle clearance charts are provided for each certified takeoff flap setting. The charts are intended for use only when an airport analysis is not available. Detailed analysis for the specific case from the Airplane Flight

Manual may result in a less restrictive weight. The data is not valid for takeoffs using improved climb technique.

To determine the obstacle limit weight, enter with obstacle height (measured from the lowest point on the runway) and move horizontally to the obstacle distance from brake release. Move vertically to the OAT reference line and follow the guidelines to adjust for OAT as necessary. Repeat this procedure to adjust for airport pressure altitude and wind, then continue vertically to read obstacle limit weight. Adjust the obstacle limit weight according to the notes below the chart.

When using line-up allowances with the Obstacle Limit chart, the obstacle distance from brake release must be reduced by the ASDA adjustment.

Tire Speed Limit

Maximum tire speed limited weights are presented for 225 MPH and 235 MPH tires. Tire speeds are not limiting unless Improved Climb Performance is used. To determine the tire speed limit weight, enter the chart with OAT, move vertically to airport pressure altitude and read the Flaps 5 tire speed limit weight to the left. Adjust the tire speed limit weight according to the notes below the chart to account for flap position and wind.

Brake Energy Limit VMBE

For normal takeoffs V1 will not generally be limited by maximum brake energy. Brake energy speed limits should be checked at hot/high airports, or when operating with tailwinds and/or improved climb where higher V1's are involved.

To determine if brake energy speed (VMBE) is limiting, enter the upper portion of the chart with brake release weight and airport pressure altitude. If inside the shaded area making a normal takeoff with no tailwind, brake energy will not be limiting and VMBE does not need to be checked. If outside the shaded area making a normal takeoff, brake energy may be limiting and VMBE must be checked. Always check VMBE when operating with a tailwind or when using improved climb performance. To check VMBE, move horizontally at the airport pressure altitude to the airport OAT, proceed vertically downwards to the brake release weight and read VMBE to the right. Adjust VMBE for slope, wind and brake configuration. If V1 exceeds VMBE for a normal takeoff, decrease brake release weight as indicated for each knot that V1 exceeds VMBE and determine normal takeoff speeds, V1, VR, and V2 for the lower brake release weight. If V1 exceeds VMBE for improved climb takeoff, decrease the climb weight

improvement by the amount indicated for each knot that V1 exceeds VMBE and determine new V1, VR, and V2 increments for the lower climb weight improvement.

Improved Climb Performance

If the maximum brake release weight is limited by climb, the climb performance limited weight may be increased by use of improved climb technique. This increase in climb weight is obtained by utilizing the excess runway available to accelerate to higher takeoff speeds thereby achieving higher gradient capability.

Charts are provided for determining the climb weight improvement available in terms of the difference between the climb limit weight and either the field or tire limit weight. For a given climb weight improvement the associated takeoff speed increments to be added to the normal V1, VR and V2's are also shown.

To determine the maximum allowable climb weight improvement and associated takeoff speed increments, enter the horizontal scale of each graph with the appropriate weight difference (field or tire limit minus climb limit), move vertically to intersect the line for the appropriate normal climb limit weight, and read climb weight improvement to the left and normal takeoff speed increments to the right adjusting VR and V2 for normal climb limit weight. The horizontal lines indicate the maximum climb weight improvement for normal climb limited weights. The improved climb weight is the normal climb weight plus the climb weight improvement. The maximum improved climb weight is the lower of the field limit and tire limit improved climb weights. Apply the associated takeoff speed increments to the normal speeds for the improved climb weight. Brake Energy Limits should be checked.

Slush/Standing Water Takeoff

Experience has shown that aircraft performance may deteriorate significantly on runways covered with snow, slush, standing water or ice. Therefore, reductions in runway/obstacle limited takeoff weight and revised takeoff speeds are necessary. The tables are intended for guidance in accordance with advisory material and assumes an engine failure at the critical point during the takeoff.

The entire runway is assumed to be completely covered by a contaminant of uniform thickness and density. Therefore this information is conservative when operating under typical colder weather conditions where patches of slush exist and some degree of sanding is common. Takeoffs in slush depths greater than 13 mm (0.5 inches) are not recommended because of possible airplane damage as a result of slush impingement on the airplane structure. The use of assumed temperature for

reduced thrust is not allowed on contaminated runways. Interpolation for slush/standing water depths between the values shown is permitted.

Takeoff weight is determined as follows:

1. Determine the field/obstacle limit weight for the takeoff flap setting.
2. Enter the Weight Adjustment table with the field/obstacle limit weight to obtain the weight reduction for the slush/standing water depth and airport pressure altitude.
3. Adjust field length available for temperature by amount shown on chart.
4. Enter the V1(MCG) Limit Weight table with the adjusted field length and pressure altitude to obtain the slush/standing water limit weight with respect to minimum field length required for V1(MCG) speed.

The maximum allowable takeoff weight in slush/standing water is the lesser of the limit weights found in steps 2 and 4.

Takeoff speed determination:

1. Determine takeoff speeds V1, VR and V2 for actual brake release weight using the Takeoff Speeds table in this section.
2. If V1(MCG) limited, set $V1 = V1(MCG)$. If not limited by V1(MCG) considerations, enter the V1 Adjustment table with actual brake release weight to determine the V1 reduction to apply to V1 speed. If the adjusted V1 is less than V1(MCG), set $V1 = V1(MCG)$.

Slippery Runway Takeoff

Airplane braking action is reported as good, medium or poor, depending on existing runway conditions. If braking action is reported as good, conditions should not be expected to be as good as on clean, dry runways. The value “good” is comparative and is intended to mean that airplanes should not experience braking or directional control difficulties when stopping. Good reported braking action denotes wet runway conditions or runways covered by compact snow. Similarly, poor braking action denotes runways covered with wet ice. Performance is based on reversers operating and a 15 ft. screen height at the end of the runway. The tables provided are used in the same manner as the Slush/ Standing Water tables.

Takeoff Speeds

The speeds presented in the Takeoff Speeds table can be used for all performance conditions except where adjustments must be made to V1 for clearway, stopway, anti-skid inoperative, brakes deactivated, improved climb, contaminated runway situations, brake energy

limits or obstacle clearance with unbalanced V1. These speeds may be used for weights less than or equal to the performance limited weight.

Normal takeoff speeds, V1, VR, and V2, with anti-skid on and all brakes operative, are read from the table by entering with takeoff flap setting, brake release weight and appropriate column. The appropriate column is obtained by entering the Column Reference chart with the airport pressure altitude and the actual temperature or assumed temperature for reduced thrust takeoffs. Slope and wind adjustments to V1 are obtained by entering the V1 Adjustment chart. Adjusted V1 must not exceed VR. These takeoff speeds are not valid when the brake release weight is based on clearway, stopway, improved climb or is limited by tire speed or brake energy.

If takeoffs are scheduled using these simplified speeds in conjunction with airport analyses that include clearway and/or stopway credits, adjustments to V1 speed are required.

Adjust V1 by the amount shown in the Clearway/ Stopway table. The adjusted V1 must not exceed VR.

The maximum allowable clearway limits shown are provided for guidance when more precise data is unavailable.

V1(MCG)

Regulations prohibit scheduling takeoff with a V1 less than minimum V1 for control on the ground, V1(MCG). Therefore compare the adjusted V1 to the V1(MCG). To find V1(MCG) enter the V1(MCG) table with the airport pressure altitude and actual OAT. If the adjusted V1 is less than V1(MCG), set V1 equal to V1(MCG). If VR is less than V1(MCG), set VR equal to V1(MCG), and determine a new V2 by adding the difference between the normal VR and V1(MCG) to the normal V2. No takeoff weight adjustment is necessary provided that the actual field length exceeds the minimum field length.

Anti-Skid Inoperative

When operating with anti-skid inoperative, the field limit weight and V1 must be reduced to account for the effect on accelerate-stop performance. A simplified method which conservatively accounts for the effects of

anti-skid inoperative is to reduce the normal runway/obstacle limited weight and the V1 associated with the reduced weight by the amount shown in the table below.

ANTI-SKID INOPERATIVE ADJUSTMENT		
FIELD LENGTH (FT)	WEIGHT (1000 KG)	V1 ADJUSTMENT (KTS)
8000	-59.7	-40
8100	-59.7	-40
8900	-44.6	-38
10000	-32.2	-35
12000	-24.3	-31
14000	-24.3	-27

If the resulting V1 is less than V1(MCG), takeoff is permitted with V1 set equal to V1(MCG) provided the accelerate-stop distance adjusted for wind and slope exceeds approximately 8100 ft.

Detailed analysis for the specific case from the Airplane Flight Manual may yield a less restrictive penalty.

Brakes Deactivated

When operating with brakes deactivated, the field and brake energy limit weights and the V1 and VMBE must be reduced to allow for reduced braking capability. A simplified method which conservatively accounts for the reduced braking capability of one brake deactivated is to reduce the normal runway/obstacle limited weight by 2900 kg and the V1 associated with the reduced weight by the amount shown in the table below.

ONE BRAKE DEACTIVATED SPEED ADJUSTMENT	
FIELD LENGTH (FT)	V1 ADJUSTMENT (KTS)
4000	-4
6000	-3
8000	-3
10000	-2
12000	-2
14000	-2

If the resulting V1 is less than V1(MCG), takeoff is permitted with V1 set equal to V1(MCG) provided the accelerate-stop distance exceeds approximately 3800 ft for one brake deactivated.

For one brake deactivated, reduce VMBE by the amount shown on the Brake Energy Limit VMBE chart. If the resulting VMBE is less than V1 the brake release weight must be reduced according to the instructions on the Brake Energy Limit VMBE chart. The resulting V1 must not be less than minimum V1(MCG). Determine VR and V2 for the actual weight

Detailed analysis for the specific case for the Airplane Flight Manual may yield a less restrictive penalty.

Takeoff EPR

To find Max Takeoff EPR based on normal engine bleed for air conditioning, 2 bleeds/2 packs, enter Takeoff EPR table with airport pressure altitude and airport OAT and read EPR. EPR adjustments are shown for packs off operation.

Assumed Temperature Reduced Thrust

Regulations permit the use of up to 25% takeoff thrust reduction for operation with assumed temperature reduced thrust. Use of reduced thrust is not allowed on runways contaminated with water, ice, slush or snow. Use of assumed temperature reduced thrust is not recommended if potential windshear conditions exist. The assumed temperature reduced takeoff EPR is read from the Max Takeoff EPR table at the assumed temperature. The minimum allowable EPR for reduced thrust, based on 25% takeoff thrust reduction, is shown below. It is not recommended to set takeoff EPR lower than the scheduled climb EPR.

MINIMUM ALLOWABLE EPR FOR REDUCED THRUST	
MAX TAKEOFF EPR FOR ACTUAL OAT	MIN TAKEOFF EPR ALLOWED
1.75	1.44
1.70	1.42
1.65	1.40
1.60	1.38
1.55	1.35
1.50	1.33
1.45	1.30
1.40	1.27
1.35	1.24
1.31	1.21
1.25	1.21

Stab Trim Setting

To find takeoff stabilizer trim setting, enter the appropriate Stab Trim Setting table with anticipated brake release weight and center of gravity (C.G. % MAC) and read required stabilizer trim units.

Takeoff Derates

Takeoff performance adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. Derate takeoff speeds, V1(MCG), thrust setting and stab trim are provided. Weight adjustments for derate operation are provided for takeoff field, climb, obstacle, tire speed and landing climb limits.

Landing

Charts are provided for determining the maximum landing weight as limited by field length or climb requirements for flap positions 25 and 30. Maximum performance landing weight is the smaller of the field length limit weight and climb limit weight; do not exceed maximum structural landing weight.

Landing Field Length Limit

To determine the field length limit landing weight, enter the appropriate Landing Field Length Limit chart with field length available and adjust for runway condition, and flap setting. Proceed vertically to the airport pressure altitude for either anti-skid operating or inoperative and read the field length limited weight at the right.

Landing Climb Limit Weight

To determine climb limit weight, enter the climb limit chart with airport OAT, move vertically to airport pressure altitude and read the flaps 30 climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate landing and engine bleed configuration. Make the appropriate ice correction when operating in icing conditions during any part of the flight when the forecast landing temperature is below the limit shown on the chart.

Go-around Climb Gradient

To determine Go-around climb gradient, enter the chart with airport OAT, proceed horizontally to airport pressure altitude and then vertically downwards adjusting for airplane weight and airspeed. The airspeed is presented in terms of deviation from VREF. Make the adjustments shown for engine bleed configuration and operation in icing conditions.

Quick Turnaround Limit

Maximum quick turnaround weights are presented for flap positions 25 and 30. If landing weight exceeds the maximum quick turnaround weight for the airport OAT and pressure altitude shown in the table, adjusted for slope and wind, wait the specified time and check that the wheel thermal plugs have not melted before executing a subsequent takeoff or ensure the brake temperature is within limits using the alternate procedure described on the page.

Recommended Brake Cooling Schedule

The Recommended Brake Cooling Schedule chart is advisory information intended to assist the operator in avoiding problems associated with hot brakes. The Maximum Quick Turnaround Limit table takes precedence over the recommended brake cooling schedule in case of conflict.

For normal operations most landings are at weights below the quick turnaround limit. Application of the recommended cooling procedures shown will avoid brake overheat and fuse plug problems that could result from repeated landings at short time intervals or a rejected takeoff. The chart shows the brake energy per brake added by a single stop. Total brake energy is assumed to be equally distributed among the operating brakes. Total brake energy is the sum of the residual energy from previous stops plus the energy added.

To determine the brake energy added by a single stop enter the top of the chart with weight, proceed horizontally to the brakes on indicated airspeed, adjusted for wind, then vertically downwards adjusting

for airport pressure altitude and OAT. If the ground speed at brakes on is known from the ADI or IRU displays, use ground speed and ignore the wind, airport pressure altitude, and OAT adjustments.

The chart is based on a rejected takeoff with maximum manual braking effort. Make the adjustments shown for braking during normal landing using either maximum manual braking effort or a preselected autobrake setting. Increase the brake energy per brake by one million foot pounds for every mile of taxi distance. Continue vertically downwards at the brake energy per brake to determine the recommended cooling procedures.

In general, the brakes on indicated airspeed during landing will be 5-7 knots lower than approach speed when recommended braking procedures are followed due to deceleration in the flare to touchdown. To conservatively account for wind gusts, adjust the brakes on speed by subtracting one-half the headwind or adding 1.5 times the tailwind.

If brake temperature monitor indication on EICAS is available, the hottest brake indication 10 to 15 minutes after the airplane has come to a complete stop, or inflight with gear retracted, may be used to determine the recommended cooling schedule by entering at the bottom of the chart. The brake temperature light illuminates when the hottest brake is registering 5 on the EICAS indication and extinguishes as the hottest brake cools with an EICAS indication of 4.

CAT III Automatic Landing

The CAT III Autoland field length information is advisory information provided to assist operators in determining landing field length corrections with CAT III Autoland. This guidance information may be used to comply with FAA Advisory Circular 120-28D.

If anti-skid systems are operative and the landing runway surface braking action is expected to be medium or better, CAT III Autoland field lengths can be obtained by entering the Landing Field Length Limit chart, for the selected flap, with field length available divided by 1.15. If either of these conditions are not met, then CAT III Autoland field lengths can be obtained by entering the Landing Field Length Limits chart with field length available divided by 1.3, unless it has been demonstrated to the regulatory authority that a factor less than 1.3 is acceptable.

Normal Configuration Landing Distance

Tables are provided as advisory information for normal configuration landing distances on dry runways and slippery runways with good, medium, and poor reported braking action. Landing distances for slippery runways are 115% of the actual landing distances.

To use these tables, determine the reference landing distance for the selected braking configuration. Then adjust the reference distance for landing weight, altitude, wind, slope, temperature, approach speed, and the number of operative thrust reversers to obtain the actual landing distance.

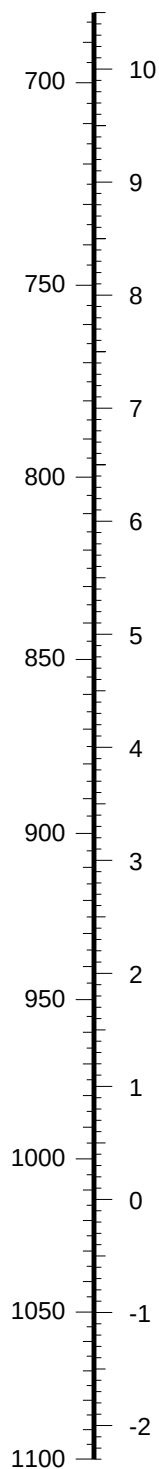
When landing on slippery runways or runways contaminated with ice, snow, slush, or standing water, the reported braking action must be considered. If the surface is affected by water, snow, or ice, and the braking action is reported as "good", conditions should not be expected to be as good as on clean, dry runways. The value "good" is comparative and is intended to mean that airplanes should not experience braking or directional control difficulties when landing. The performance level used to calculate the "good" data is consistent with wet runway testing done on early Boeing jets. The performance level used to calculate "poor" data reflects runways covered with wet ice.

Use of the autobrake system commands the airplane to a constant deceleration rate. In some conditions, such as a runway with "poor" braking action, the airplane may not be able to achieve these deceleration rates. In these cases, runway slope and inoperative reversers influence the stopping distance. Since it cannot be determined quickly when this becomes a factor, it is appropriate to add the effects of slope and inoperative reversers when using the autobrake system.

Altimeter Setting to Station Pressure

QFE Station Pressure

MBS 1000 FT

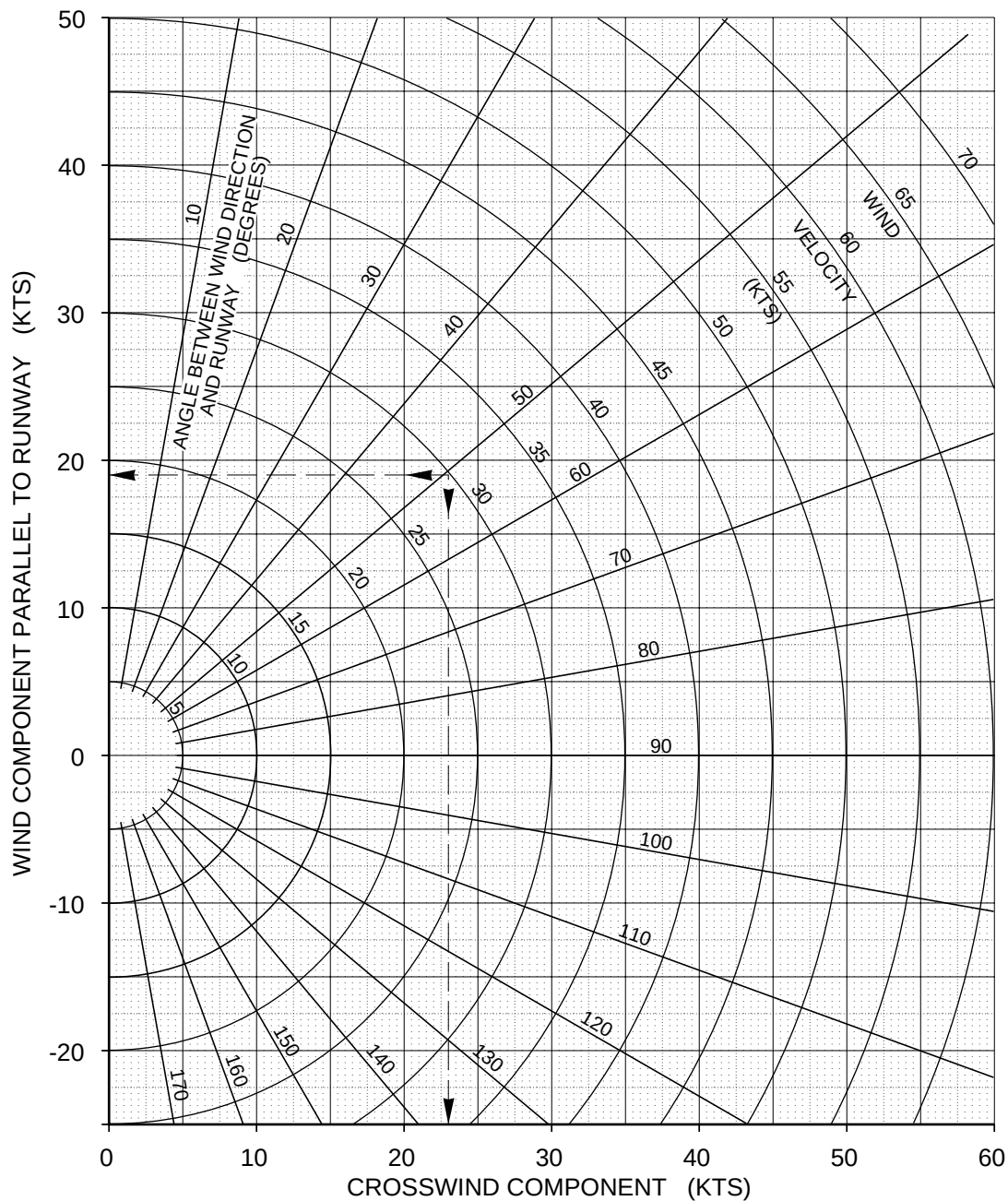


QNH to Pressure Altitude

QNH (IN. HG.)		CORRECTION TO ELEVATION FOR PRESS ALT (FT)		QNH (MILLIBARS)	
28.81	to 28.91	1000		976	to 979
28.91	to 29.02	900		979	to 983
29.02	to 29.12	800		983	to 986
29.12	to 29.23	700		986	to 990
29.23	to 29.34	600		990	to 994
29.34	to 29.44	500		994	to 997
29.44	to 29.55	400		997	to 1001
29.55	to 29.66	300		1001	to 1004
29.66	to 29.76	200		1004	to 1008
29.76	to 29.87	100		1008	to 1012
29.87	to 29.97	0		1012	to 1015
29.97	to 30.08	-100		1015	to 1019
30.08	to 30.19	-200		1019	to 1022
30.19	to 30.30	-300		1022	to 1026
30.30	to 30.41	-400		1026	to 1030
30.41	to 30.52	-500		1030	to 1034
30.52	to 30.63	-600		1034	to 1037
30.63	to 30.74	-700		1037	to 1041
30.74	to 30.85	-800		1041	to 1045
30.85	to 30.96	-900		1045	to 1048
30.96	to 31.07	-1000		1048	to 1052

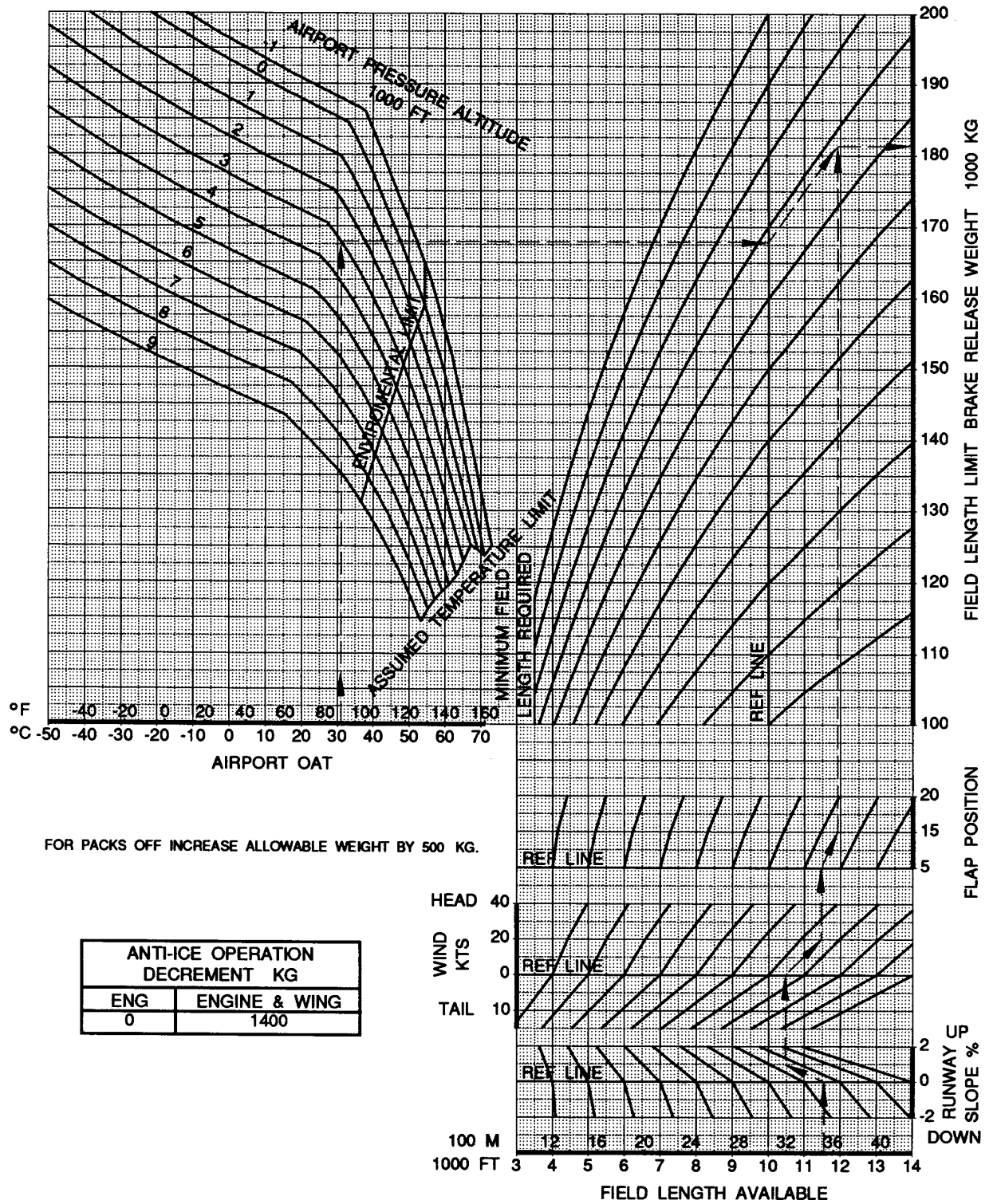
Example: Elevation = 2500 FT
QNH = 29.48 IN. HG.
Correction = 400 FT
Press Alt = 2900 FT

Wind Component



Takeoff Field Limit

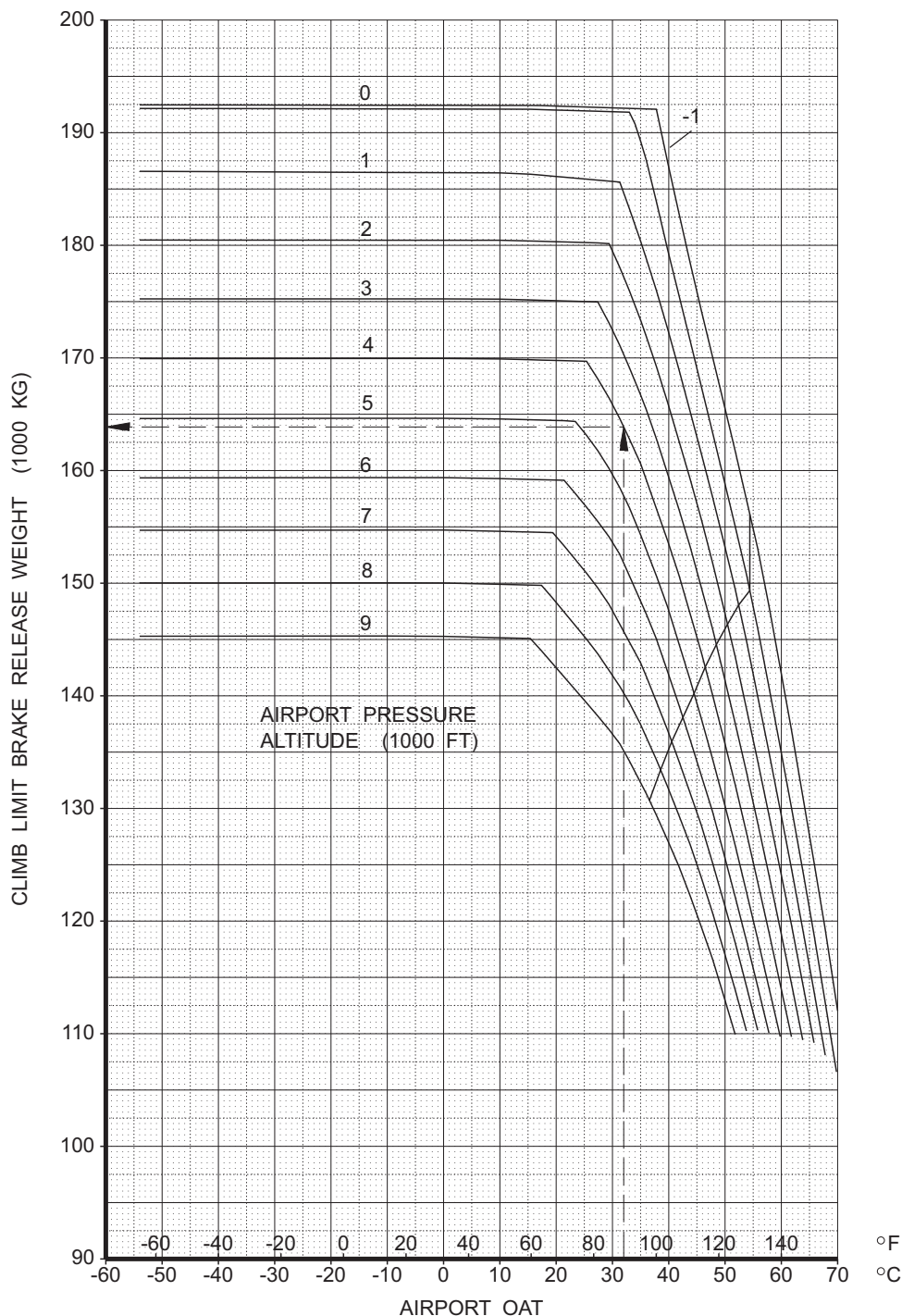
Based on engine bleed for packs on and anti-ice off



Takeoff Climb Limit

Flaps 5

Based on engine bleed for packs on and anti-ice off



With engine bleed for packs off, increase weight by 1150 kg.

With engine anti-ice on, decrease weight by 250 kg.

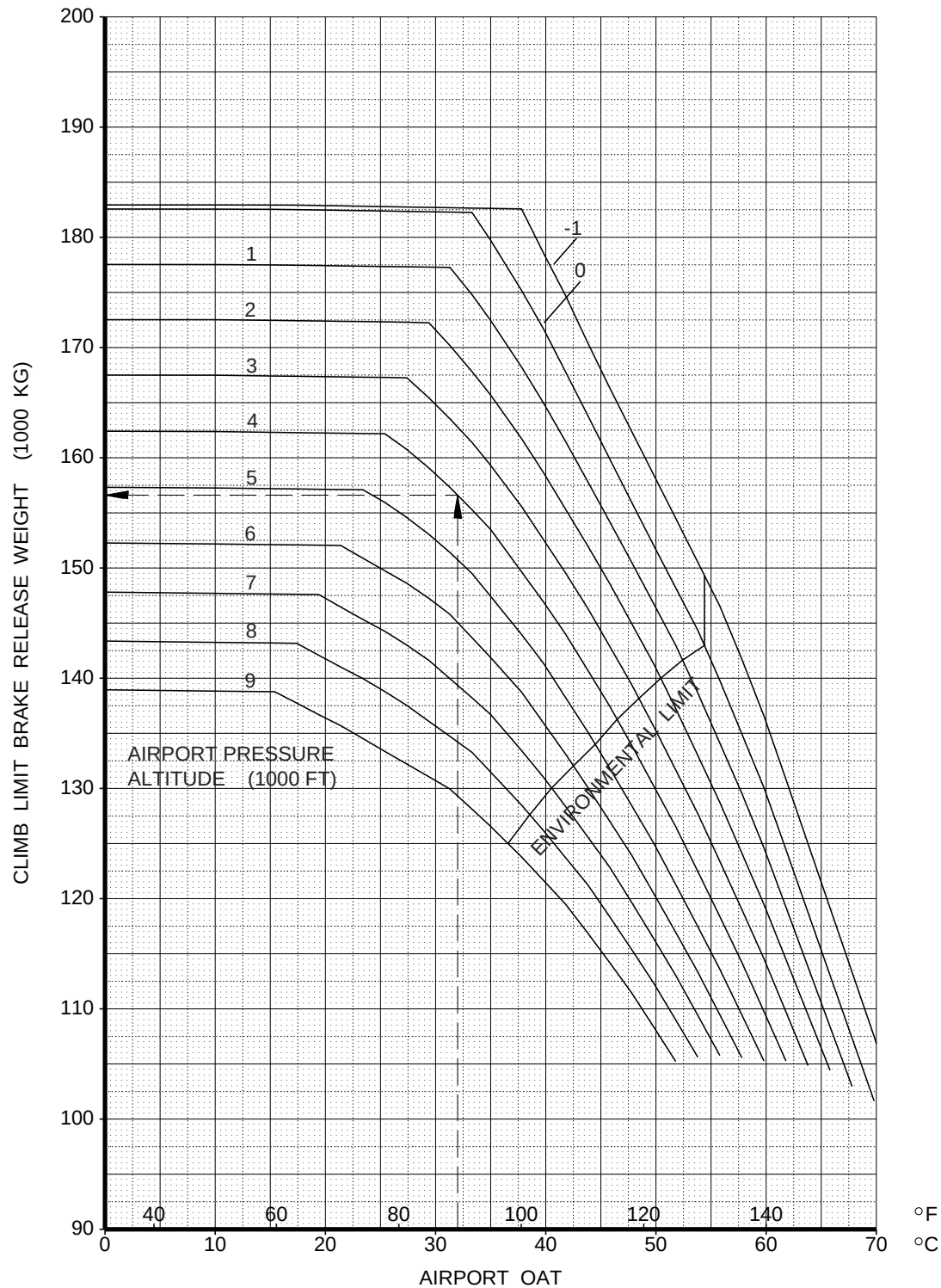
With engine and wing anti-ice on, decrease weight by 1900 kg for engine anti-ice off weight of 185500 kg and below.

With engine and wing anti-ice on, decrease weight by 3350 kg for engine anti-ice off weight greater than 185500 kg.

Takeoff Climb Limit

Flaps 15

Based on engine bleed for packs on and anti-ice off

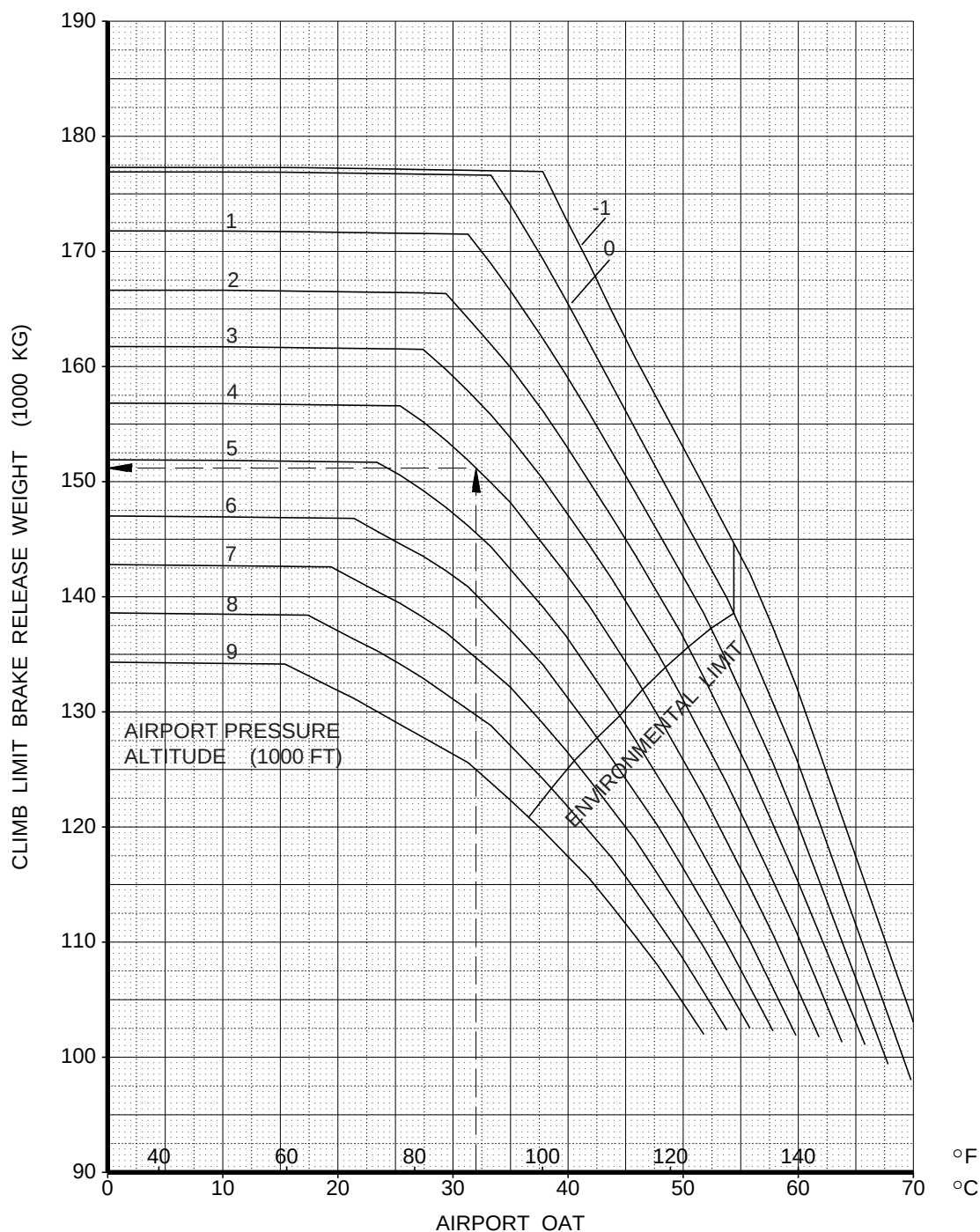


With engine bleed for packs off, increase weight by 1150 kg.
 With engine anti-ice on, decrease weight by 150 kg.
 With engine and wing anti-ice on, decrease weight by 1850 kg.

Takeoff Climb Limit

Flaps 20

Based on engine bleed for packs on and anti-ice off



With engine bleed for packs off, increase weight by 1150 kg.

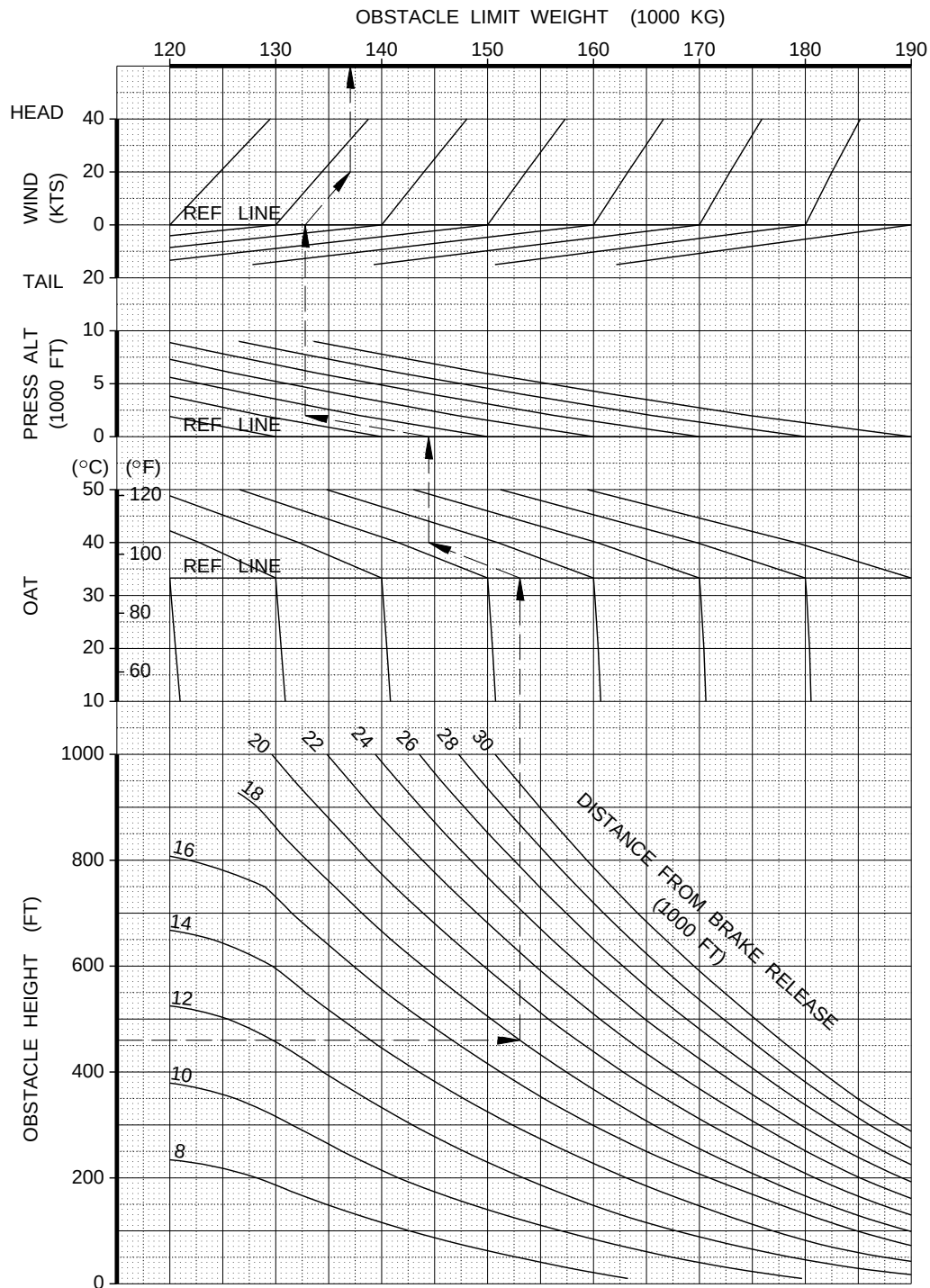
With engine anti-ice on, decrease weight by 150 kg.

With engine and wing anti-ice on, decrease weight by 1800 kg.

Obstacle Limit

Flaps 5

Based on engine bleed for packs on and anti-ice off

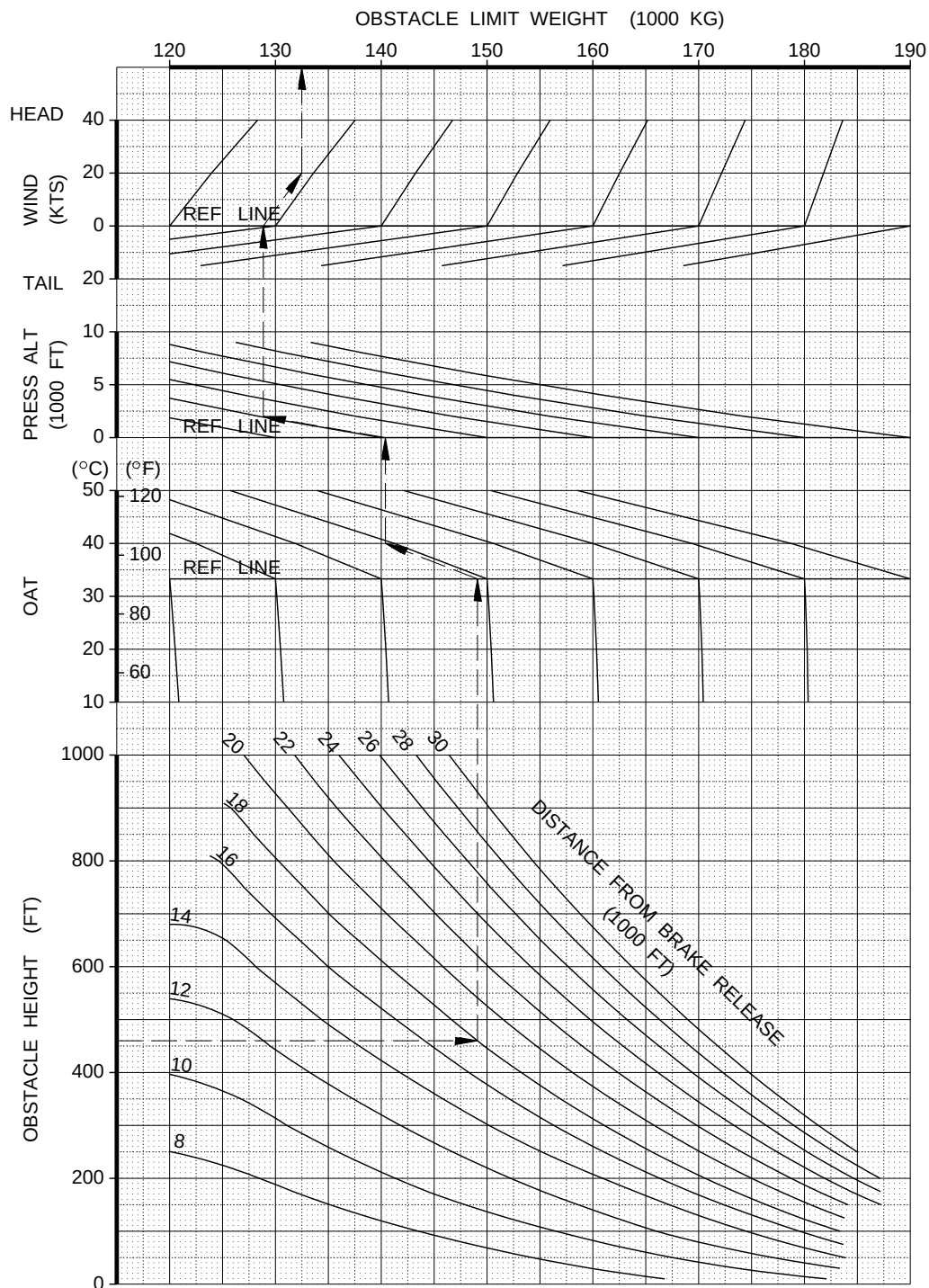


Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.
With engine bleed for packs off, increase weight by 400 kg.
With engine and wing anti-ice on, decrease weight by 2500 kg.

Obstacle Limit

Flaps 15

Based on engine bleed for packs on and anti-ice off



Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.

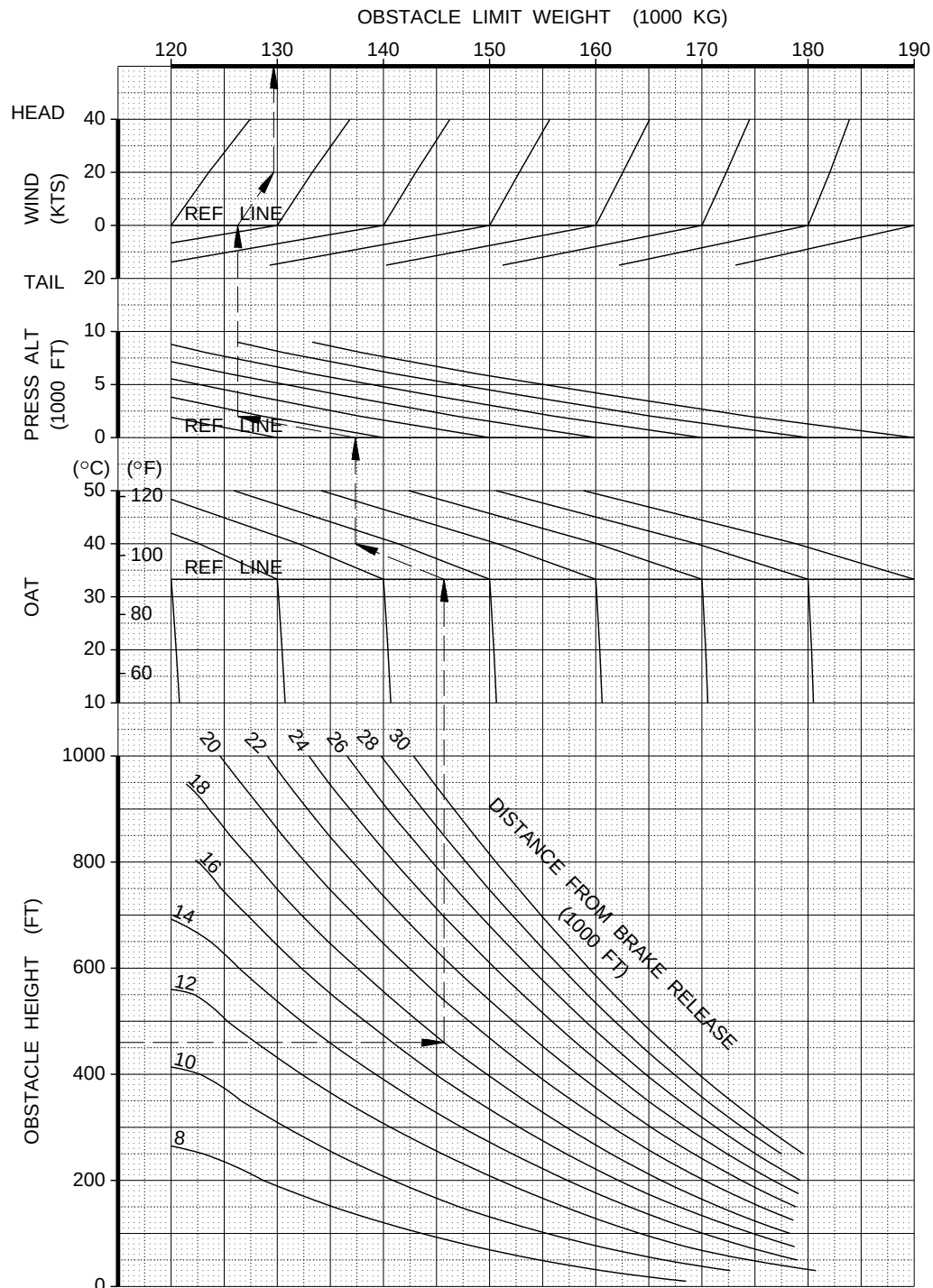
With engine bleed for packs off, increase weight by 400 kg.

With engine and wing anti-ice on, decrease weight by 2500 kg.

Obstacle Limit

Flaps 20

Based on engine bleed for packs on and anti-ice off



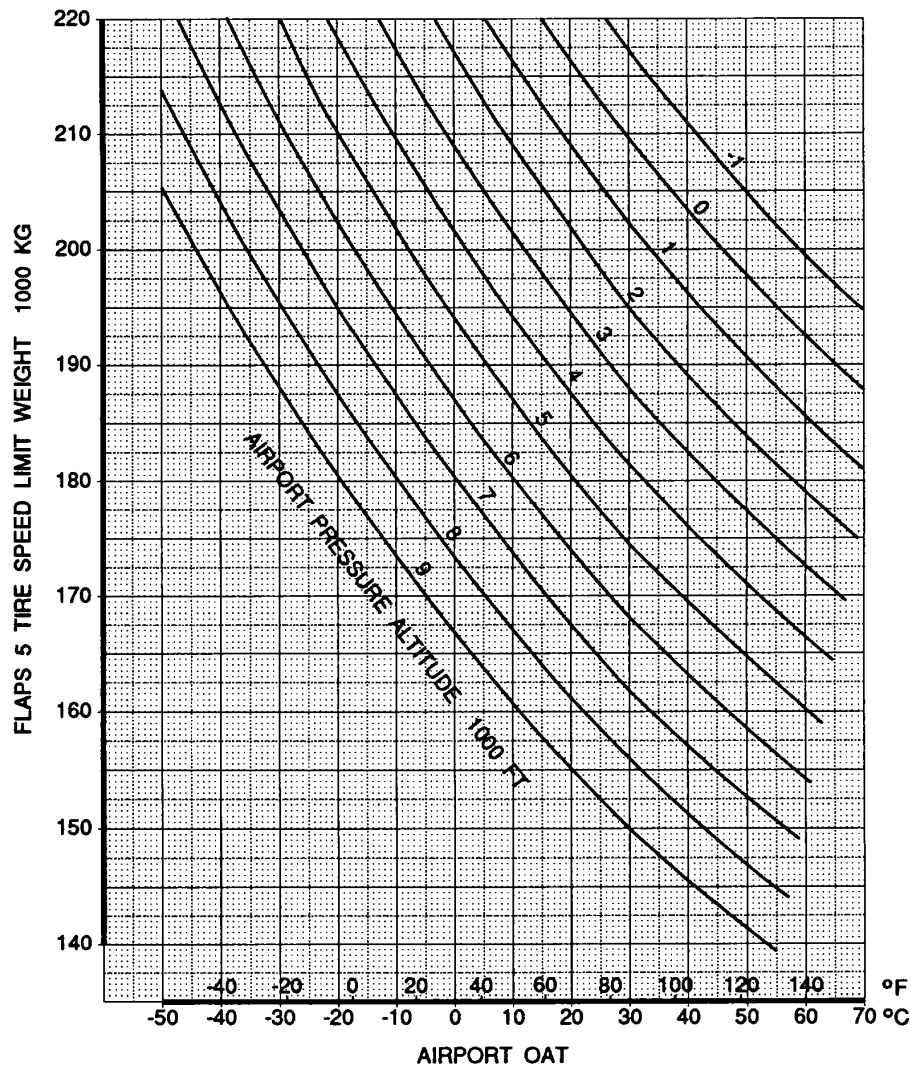
Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.

With engine bleed for packs off, increase weight by 400 kg.

With engine and wing anti-ice on, decrease weight by 2500 kg.

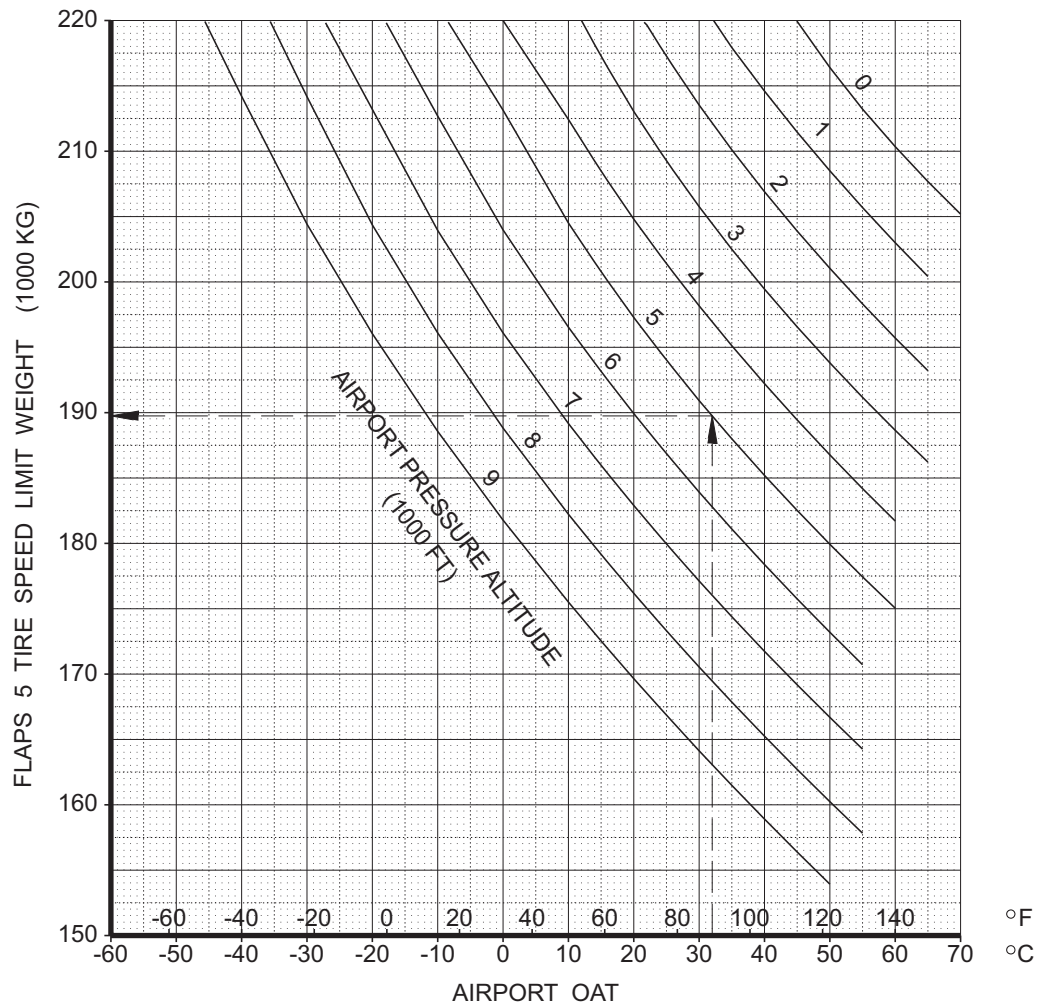
Tire Speed Limit

225 MPH Tires



INCREASE FLAPS 5 TIRE SPEED LIMIT WEIGHT BY 12000 KG FOR FLAPS 15.
INCREASE FLAPS 5 TIRE SPEED LIMIT WEIGHT BY 22800 KG FOR FLAPS 20.
INCREASE TIRE SPEED LIMIT WEIGHT BY 1200 KG PER KNOT HEADWIND.
DECREASE TIRE SPEED LIMIT WEIGHT BY 1950 KG PER KNOT TAILWIND.
INCREASE TIRE SPEED LIMIT WEIGHT BY 14000 KG FOR 235 MPH TIRES.

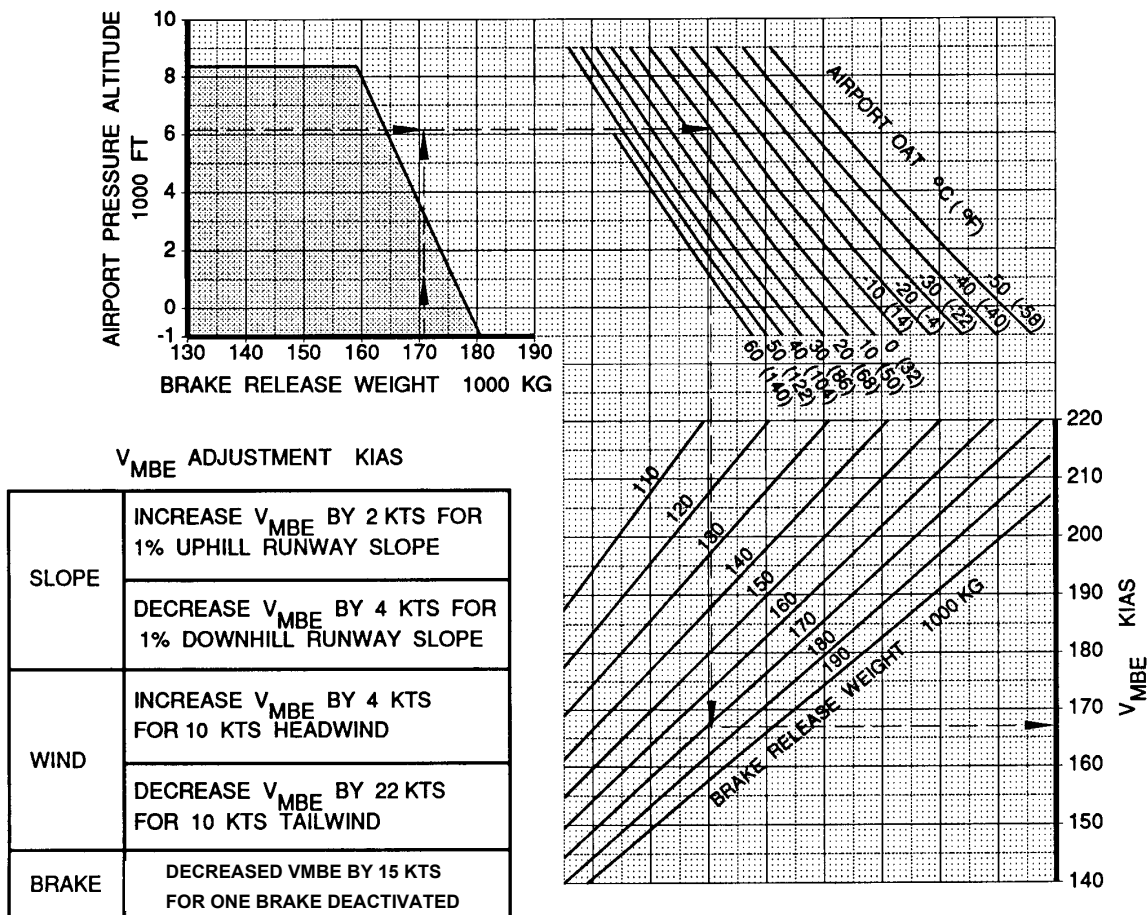
Tire Speed Limit 235 MPH Tires



Increase flaps 5 tire speed limit weight by 13650 kg for flaps 15.
Increase flaps 5 tire speed limit weight by 22200 kg for flaps 20.
Increase tire speed limit weight by 1350 kg per knot headwind.
Decrease tire speed limit weight by 1950 kg per knot tailwind.

Brake Energy Limits V_{MBE}

CHECK V_{MBE} WHEN OUTSIDE SHADED AREA OR WHEN OPERATING WITH TAILWIND OR IMPROVED CLIMB.

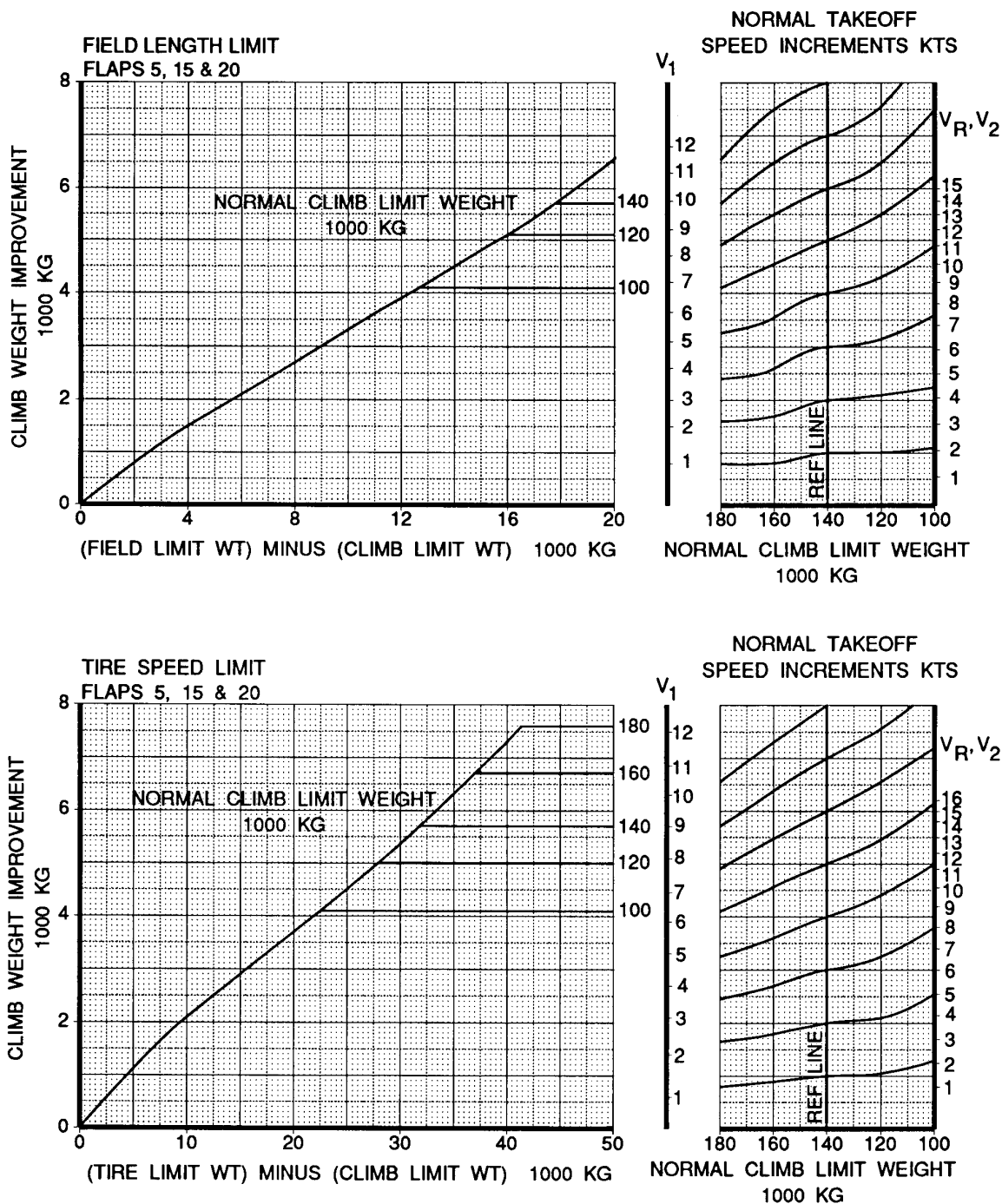


ADJUST V_{MBE} FOR SLOPE, WIND AND BRAKE CONFIGURATION.

NORMAL TAKEOFF: DECREASE BRAKE RELEASE WEIGHT BY 800 KG FOR EACH KNOT V_1 EXCEEDS V_{MBE} . DETERMINE NORMAL V_1 , V_R , V_2 SPEEDS FOR LOWER BRAKE RELEASE WEIGHT.

IMPROVED CLIMB TAKEOFF: DECREASE CLIMB WEIGHT IMPROVEMENT BY 350 KG FOR EACH KNOT V_1 EXCEEDS V_{MBE} . DETERMINE V_1 , V_R , V_2 SPEED INCREMENTS FOR THE LOWER CLIMB WEIGHT IMPROVEMENT.

Improved Climb



USE SMALLER OF IMPROVED CLIMB WT (FIELD LENGTH LIMIT) OR (TIRE SPEED LIMIT).
APPLY SPEED INCREMENTS TO NORMAL V_1 , V_R , V_2 FOR ACTUAL TAKEOFF WT.
CHECK BRAKE ENERGY LIMITS.

ADVISORY INFORMATION

Slush/Standing Water Takeoff

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	0.08 INCHES (2 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
200	-21.7	-26.1	-30.4	-25.3	-29.7	-34.0	-34.0	-38.3	-42.7
190	-20.7	-25.0	-29.4	-24.0	-28.3	-32.7	-31.7	-36.0	-40.4
180	-19.8	-24.1	-28.5	-22.7	-27.1	-31.5	-29.5	-33.9	-38.2
170	-18.6	-23.0	-27.3	-21.2	-25.6	-29.9	-27.1	-31.5	-35.8
160	-17.2	-21.6	-25.9	-19.5	-23.8	-28.2	-24.5	-28.9	-33.2
150	-15.6	-19.9	-24.3	-17.5	-21.9	-26.2	-21.7	-26.1	-30.5
140	-13.8	-18.1	-22.5	-15.4	-19.7	-24.1	-18.8	-23.2	-27.5
130	-11.7	-16.1	-20.5	-13.0	-17.4	-21.7	-15.7	-20.1	-24.4
120	-9.6	-13.9	-18.3	-10.5	-14.9	-19.2	-12.5	-16.9	-21.2
110	-7.2	-11.6	-15.9	-7.9	-12.2	-16.6	-9.1	-13.5	-17.8
100	-4.7	-9.1	-13.4	-5.1	-9.5	-13.8	-5.6	-10.0	-14.3
90	-2.1	-6.5	-10.9	-2.3	-6.6	-11.0	-1.9	-6.3	-10.6

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (FT)	SLUSH/STANDING WATER DEPTH								
	0.08 INCHES (2 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
4600							79.3		
5000	74.3			83.4			99.7		
5400	95.7			104.6	72.8		120.7	89.5	
5800	117.6	85.0		126.7	94.0		142.8	110.1	79.3
6200	140.7	106.5	74.3	150.0	115.5	83.4	166.0	131.6	99.7
6600	165.5	129.0	95.7	174.8	138.1	104.6	190.5	154.2	120.7
7000	191.8	152.9	117.6	200.7	162.2	126.7	215.2	178.2	142.8
7400	218.5	178.5	140.7		187.7	150.0		202.9	166.0
7800		205.2	165.5		213.7	174.8			190.5
8200			191.8			200.7			215.2
8600			218.5						

1. Enter Weight Adjustment table with slush/standing water depth and field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -135 ft/+ 135 ft for every 5°C above/below 4°C.
3. Find V1(MCG) limit weight for adjusted field length and pressure altitude.
4. Max allowable slush/standing water limited weight is lesser of weights from 1 and 3.

V1 Adjustment (KIAS)

WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	0.08 INCHES (2 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
190	-20	-20	-20	-15	-15	-15	-6	-6	-6
180	-21	-21	-21	-16	-16	-16	-6	-6	-6
170	-22	-22	-22	-16	-16	-16	-6	-6	-6
160	-22	-22	-22	-17	-17	-17	-6	-6	-6
150	-23	-23	-23	-18	-18	-18	-7	-7	-7
140	-24	-24	-24	-19	-19	-19	-8	-8	-8
130	-24	-24	-24	-20	-20	-20	-9	-9	-9
120	-25	-25	-25	-21	-21	-21	-11	-11	-11
110	-26	-26	-26	-22	-22	-22	-13	-13	-13
100	-26	-26	-26	-23	-23	-23	-15	-15	-15
90	-27	-27	-27	-24	-24	-24	-18	-18	-18

1. Obtain V1, VR and V2 for the actual weight.
2. If V1(MCG) limited, set V1 = V1(MCG). If not V1(MCG) limited, enter V1 Adjustment table with the actual weight to obtain V1 speed adjustment. If adjusted V1 is less than V1(MCG), set V1 = V1(MCG).

ADVISORY INFORMATION

Slush/Standing Water Takeoff

Slush/Standing Water Takeoff

No Reverse Thrust

Weight Adjustment (1000 KG)

FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	.12 INCHES (3 mm)			0.25 INCHES (6 mm)			0.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
200	-27.1	-30.5	-34.0	-30.9	-34.3	-37.8	-39.8	-43.3	-46.7
190	-25.5	-28.9	-32.4	-29.0	-32.4	-35.9	-36.9	-40.4	-43.8
180	-23.8	-27.3	-30.7	-26.9	-30.4	-33.8	-34.0	-37.5	-40.9
170	-22.1	-25.5	-29.0	-24.8	-28.3	-31.7	-31.0	-34.5	-37.9
160	-20.3	-23.7	-27.2	-22.7	-26.1	-29.5	-28.0	-31.4	-34.9
150	-18.3	-21.8	-25.2	-20.4	-23.8	-27.3	-24.9	-28.3	-31.8
140	-16.3	-19.8	-23.2	-18.0	-21.5	-24.9	-21.7	-25.1	-28.6
130	-14.2	-17.7	-21.1	-15.6	-19.0	-22.5	-18.5	-21.9	-25.4
120	-12.0	-15.5	-18.9	-13.1	-16.5	-20.0	-15.2	-18.6	-22.1
110	-9.8	-13.2	-16.7	-10.5	-13.9	-17.4	-11.8	-15.3	-18.7
100	-7.4	-10.9	-14.3	-7.8	-11.2	-14.7	-8.4	-11.9	-15.3
90	-5.0	-8.5	-11.9	-5.1	-8.5	-12.0	-5.0	-8.5	-11.9

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (FT)	SLUSH/STANDING WATER DEPTH								
	.12 INCHES (3 mm)			.25 INCHES (6 mm)			.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
5800				74.9			85.8		
6200							109.6		
6600	77.6			101.9			134.2	90.5	
7000	107.2			129.4	80.3		160.2	114.4	71.6
7400	137.6	83.5		158.0	107.3		187.7	139.3	95.3
7800	169.4	113.2		187.9	135.0	85.7	216.9	165.6	119.3
8200	202.8	143.8	89.4	219.1	163.9	112.7		193.5	144.4
8600		175.9	119.2		194.1	140.7			171.0
9000		209.7	150.1			169.8			199.3
9400			182.6			200.3			
9800			216.5						

1. Enter Weight Adjustment table with slush/standing water depth and field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -150 ft/+ 150 ft for every 5°C above/below 4°C.
3. Find V1(MCG) limit weight for adjusted field length and pressure altitude.
4. Max allowable slush/standing water limited weight is lesser of weights from 1 and 3.

V1 Adjustment (KIAS)

WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	.12 INCHES (3 mm)			.25 INCHES (6 mm)			.50 INCHES (13 mm)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
200	-26	-26	-26	-21	-21	-21	-12	-12	-12
190	-27	-27	-27	-21	-21	-21	-10	-10	-10
180	-28	-28	-28	-22	-22	-22	-10	-10	-10
170	-29	-29	-29	-23	-23	-23	-10	-10	-10
160	-30	-30	-30	-24	-24	-24	-11	-11	-11
150	-31	-31	-31	-26	-26	-26	-13	-13	-13
140	-31	-31	-31	-27	-27	-27	-16	-16	-16
130	-32	-32	-32	-28	-28	-28	-18	-18	-18
120	-32	-32	-32	-29	-29	-29	-21	-21	-21
110	-32	-32	-32	-30	-30	-30	-23	-23	-23
100	-32	-32	-32	-30	-30	-30	-25	-25	-25
90	-31	-31	-31	-30	-30	-30	-27	-27	-27

1. Obtain V1, VR and V2 for the actual weight.
2. If V1(MCG) limited, set V1 = V1(MCG). If not V1(MCG) limited, enter V1 Adjustment table with the actual weight to obtain V1 speed adjustment. If adjusted V1 is less than V1(MCG), set V1 = V1(MCG).

ADVISORY INFORMATION

Slippery Runway Takeoff
Maximum Reverse Thrust
Weight Adjustment (1000 KG)

FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	REPORTED BRAKING ACTION								
	GOOD			MEDIUM			POOR		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
190	-2.9	-2.9	-2.9	-13.4	-13.4	-13.4	-21.9	-21.9	-21.9
180	-3.5	-3.5	-3.5	-13.3	-13.3	-13.3	-21.2	-21.2	-21.2
170	-3.8	-3.8	-3.8	-13.1	-13.1	-13.1	-20.3	-20.3	-20.3
160	-3.9	-3.9	-3.9	-12.6	-12.6	-12.6	-19.2	-19.2	-19.2
150	-3.9	-3.9	-3.9	-11.9	-11.9	-11.9	-17.9	-17.9	-17.9
140	-3.6	-3.6	-3.6	-11.0	-11.0	-11.0	-16.4	-16.4	-16.4
130	-3.1	-3.1	-3.1	-9.9	-9.9	-9.9	-14.7	-14.7	-14.7
120	-2.6	-2.6	-2.6	-8.6	-8.6	-8.6	-12.8	-12.8	-12.8
110	-1.6	-1.6	-1.6	-7.1	-7.1	-7.1	-10.7	-10.7	-10.7
100	-0.5	-0.5	-0.5	-5.3	-5.3	-5.3	-8.4	-8.4	-8.4
90	0.0	0.0	0.0	-3.6	-3.6	-3.6	-6.1	-6.1	-6.1

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (FT)	REPORTED BRAKING ACTION								
	GOOD			MEDIUM			POOR		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
4000	118								
4400	159	106							
4800	198	147	93						
5200		187	135	103					
5600			175	132	95				
6000			214	162	123				
6400				194	153	115			
6800					184	144	101		
7200					217	175	118		
7600						207	136	103	
8000							155	120	
8400							175	138	105
8800							196	157	122
9200								177	140
9600								199	159
10000									179
10400									201

1. Enter Weight Adjustment table with reported braking action and field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -80 ft/+ 80 ft for every 5°C above/below 4°C.
Adjust "Medium" field length available by -80 ft/+ 80 ft for every 5°C above/below 4°C.
Adjust "Poor" field length available by -135 ft/+135 ft for every 5°C above/below 4°C.
3. Find V1(MCG) limit weight for adjusted field length and pressure altitude.
4. Max allowable slippery runway limited weight is lesser of weights from 1 and 3.

V1 Adjustment (KIAS)

WEIGHT (1000 KG)	REPORTED BRAKING ACTION								
	GOOD			MEDIUM			POOR		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
190	-7	-7	-7	-17	-17	-17	-29	-29	-29
180	-8	-8	-8	-18	-18	-18	-31	-31	-31
170	-9	-9	-9	-19	-19	-19	-32	-32	-32
160	-10	-10	-10	-21	-21	-21	-34	-34	-34
150	-11	-11	-11	-22	-22	-22	-35	-35	-35
140	-11	-11	-11	-23	-23	-23	-37	-37	-37
130	-12	-12	-12	-24	-24	-24	-38	-38	-38
120	-12	-12	-12	-25	-25	-25	-40	-40	-40
110	-13	-13	-13	-26	-26	-26	-41	-41	-41
100	-13	-13	-13	-27	-27	-27	-42	-42	-42
90	-13	-13	-13	-28	-28	-28	-43	-43	-43

1. Obtain V1, VR and V2 for the actual weight.
2. If V1(MCG) limited, set V1 = V1(MCG). If not V1(MCG) limited, enter V1 Adjustment table with the actual weight to obtain V1 speed adjustment. If adjusted V1 is less than V1(MCG), set V1 = V1(MCG).



Flight Planning and Performance Manual

ADVISORY INFORMATION

Slippery Runway Takeoff
No Reverse Thrust
Weight Adjustment (1000 KG)

FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	REPORTED BRAKING ACTION								
	GOOD			MEDIUM			POOR		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
200	-4.6	-5.3	-6.0	-17.2	-18.0	-18.7	-27.7	-28.4	-29.1
190	-5.2	-5.9	-6.6	-17.1	-17.9	-18.6	-26.8	-27.5	-28.2
180	-5.6	-6.3	-7.0	-16.9	-17.6	-18.3	-25.7	-26.4	-27.1
170	-5.8	-6.5	-7.2	-16.4	-17.1	-17.8	-24.4	-25.2	-25.9
160	-5.8	-6.5	-7.3	-15.7	-16.4	-17.1	-23.0	-23.8	-24.5
150	-5.7	-6.4	-7.1	-14.8	-15.6	-16.3	-21.4	-22.2	-22.9
140	-5.3	-6.1	-6.8	-13.8	-14.5	-15.2	-19.7	-20.4	-21.1
130	-4.8	-5.5	-6.3	-12.5	-13.2	-14.0	-17.7	-18.5	-19.2
120	-4.1	-4.8	-5.6	-11.1	-11.8	-12.5	-15.6	-16.4	-17.1
110	-3.2	-4.0	-4.7	-9.4	-10.2	-10.9	-13.4	-14.1	-14.8
100	-2.2	-2.9	-3.6	-7.6	-8.3	-9.0	-10.9	-11.7	-12.4
90	-1.0	-1.8	-2.5	-5.7	-6.4	-7.2	-8.5	-9.2	-9.9

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (FT)	REPORTED BRAKING ACTION								
	GOOD			MEDIUM			POOR		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
4200	100.7								
4600	153.9	94.7							
5000	198.3	149.1	88.8						
5400		194.2	144.1						
5800			189.9						
6200				95.7					
6600				141.7	91.0				
7000				184.6	137.2	86.2			
7400					180.5	132.7			
7800						176.3			
8200						217.3			
9000							72.2		
9400							99.5		
9800							126.9	80.4	
10200							154.7	107.6	
10600							183.0	135.2	88.5
11000							211.6	163.1	115.9
11400								191.5	143.5
11800									171.6
12200									200.1

1. Enter Weight Adjustment table with reported braking action and field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -100 ft/+100 ft for every 5°C above/below 4°C.
Adjust "Medium" field length available by -100 ft/+100 ft for every 5°C above/below 4°C.
Adjust "Poor" field length available by -160 ft/+160 ft for every 5°C above/below 4°C.
3. Find V1(MCG) limit weight for adjusted field length and pressure altitude.
4. Max allowable slippery runway limited weight is lesser of weights from 1 and 3.



ADVISORY INFORMATION

Slippery Runway Takeoff

No Reverse Thrust

V1 Adjustment (KIAS)

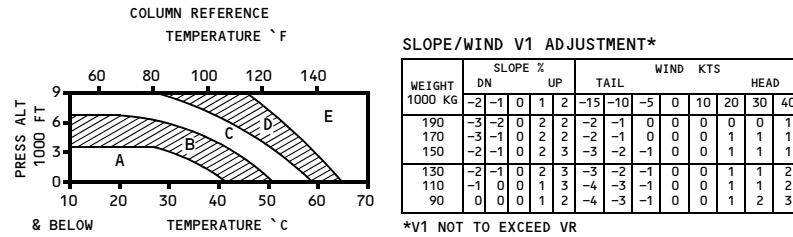
WEIGHT (1000 KG)	REPORTED BRAKING ACTION								
	GOOD			MEDIUM			POOR		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
200	-7	-7	-7	-19	-19	-19	-36	-36	-36
190	-8	-8	-8	-21	-21	-21	-39	-39	-39
180	-9	-9	-9	-23	-23	-23	-41	-41	-41
170	-11	-11	-11	-24	-24	-24	-43	-43	-43
160	-12	-12	-12	-26	-26	-26	-45	-45	-45
150	-13	-13	-13	-28	-28	-28	-47	-47	-47
140	-14	-14	-14	-29	-29	-29	-49	-49	-49
130	-15	-15	-15	-30	-30	-30	-50	-50	-50
120	-15	-15	-15	-32	-32	-32	-52	-52	-52
110	-16	-16	-16	-33	-33	-33	-53	-53	-53
100	-17	-17	-17	-34	-34	-34	-54	-54	-54
90	-18	-18	-18	-35	-35	-35	-55	-55	-55

1. Obtain V1, VR and V2 for the actual weight.

2. If V1(MCG) limited, set V1 = V1(MCG). If not V1(MCG) limited, enter V1 Adjustment table with the actual weight to obtain V1 speed adjustment. If adjusted V1 is less than V1(MCG), set V1 = V1(MCG).

Flight Planning and Performance Manual

Takeoff Speeds Max Takeoff Thrust



FLAPS	WT 1000 KG	A			B			C			D			E		
		V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂
5	190	166	170	175	169	172	176									
	180	161	165	171	163	166	171									
	170	155	160	166	158	161	166	160	163	166						
	160	149	154	161	152	156	161	154	157	161						
	150	143	148	156	145	150	156	148	151	156	151	153	156			
	140	136	142	151	139	144	151	141	145	151	145	147	151	147	148	151
	130	129	136	145	132	137	145	135	139	145	138	141	145	141	142	145
	120	122	129	140	125	131	140	128	133	139	131	134	139	134	136	139
	110	115	122	134	118	124	134	121	126	134	124	128	133	127	129	133
	100	108	115	127	110	117	127	113	119	127	116	120	127	119	122	127
	90	101	108	121	104	109	121	106	111	121	108	113	121	112	115	121
15	190	161	163	168												
	180	156	158	164	158	159	164									
	170	150	153	159	153	154	159	154	156	160						
	160	144	147	154	147	149	154	149	150	155						
	150	138	142	149	141	143	149	143	145	149	146	146	150			
	140	132	136	144	134	138	144	137	139	144	140	141	145			
	130	125	130	139	128	132	139	130	133	139	134	135	139	136	136	140
	120	119	124	134	121	125	134	124	127	134	127	129	134	130	130	134
	110	112	117	128	114	119	128	117	120	128	120	122	128	123	124	128
	100	106	110	122	107	112	122	110	113	122	113	115	122	116	117	122
	90	99	102	116	100	104	116	103	106	116	105	108	116	108	110	116
20	190	159	159	165												
	180	153	154	160	154	155	160									
	170	147	148	154	149	149	155									
	160	141	142	149	143	144	149	145	145	150						
	150	135	137	144	137	138	144	140	140	145						
	140	129	131	140	131	133	140	134	134	140	135	136	140			
	130	122	125	135	125	127	135	127	128	134	130	130	135	132	132	135
	120	116	119	129	118	121	129	121	122	129	124	124	129	126	126	130
	110	109	113	124	111	114	124	114	116	124	117	118	124	119	120	124
	100	102	106	118	104	108	118	107	109	118	110	111	118	113	113	118
	90	93	98	112	96	100	112	99	102	112	102	104	112	106	106	112

CHECK V1(MCG) IN BOXED AREA

Clearway and Stopway V1 Adjustments

NORMAL V1 (KIAS)	CLEARWAY MINUS STOPWAY (FT)								
	800	600	400	200	0	-200	-400	-600	-800
120	-5	-3	-2	-1	0	1	2	3	5
140	-3	-2	-1	-1	0	1	1	2	3
160	-2	-2	-1	-1	0	1	1	2	2

Maximum Allowable Clearway

FIELD LENGTH (FT)	4000	6000	8000	10000	12000	14000
MAX ALLOWABLE CLEARWAY (FT)	350	450	550	650	750	800

V1(MCG)**Max Takeoff Thrust**

ACTUAL OAT		PRESSURE ALTITUDE (FT)						
°C	°F	-1000	0	2000	4000	6000	8000	9000
55	131	99	97	93				
50	122	103	100	96	93			
45	113	106	103	99	95	92		
40	104	109	106	102	98	94	90	89
35	95	110	109	104	100	96	92	90
30	86	111	110	106	102	98	94	92
25	77	111	110	106	103	99	95	93
20	68	111	110	106	103	100	96	94
15	59	111	110	106	103	100	96	95
-50	-58	111	111	107	104	100	97	95

Takeoff EPR**Max Takeoff Thrust****Based on engine bleed for packs on and anti-ice on or off**

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)					
°C	°F	-1000	0	2000	4000	6000	8000
70	158	1.24	1.23	1.25	1.25	1.25	1.25
65	149	1.29	1.28	1.27	1.27	1.27	1.27
60	140	1.34	1.33	1.33	1.32	1.32	1.32
55	131	1.39	1.38	1.38	1.37	1.37	1.37
50	122	1.43	1.42	1.42	1.42	1.42	1.42
45	113	1.46	1.46	1.46	1.46	1.46	1.46
40	104	1.51	1.51	1.51	1.51	1.50	1.51
35	95	1.53	1.55	1.55	1.54	1.54	1.54
30	86	1.53	1.56	1.58	1.58	1.58	1.58
25	77	1.53	1.56	1.58	1.60	1.60	1.60
20	68	1.53	1.56	1.58	1.60	1.61	1.62
15	59	1.53	1.56	1.58	1.60	1.61	1.64
10 & BELOW	50 & BELOW	1.53	1.56	1.58	1.60	1.61	1.64

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)							
	-1000	0	2000	4000	4500	4501	6000	8000
PACKS OFF	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02

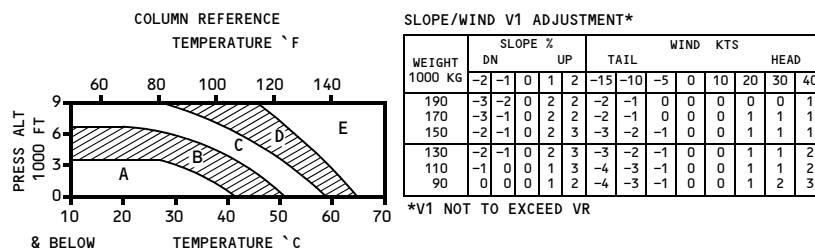
Stab Trim Setting**Max Takeoff Thrust**

WEIGHT (1000 KG)	C.G. %MAC						
	12	16	20	24	28	32	36
190	7	6 1/2	5 1/2	4 1/2	4	3	2
180	7	6	5 1/2	4 1/2	3 1/2	3	2
160	6 1/2	5 1/2	5	4	3	2 1/2	1 1/2
140	5 1/2	4 1/2	4	3	2	1 1/2	1/2
120	4	3 1/2	2 1/2	2	1	1/2	1/2
100	3 1/2	2 1/2	2	1	1/2	1/2	1/2

Flight Planning and Performance Manual

TO1 Takeoff Speeds

10% Thrust Reduction



FLAPS	WT 1000 KG	A			B			C			D			E		
		V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂
5	190	169	172	176	172	173	177	169	169	172						
	180	163	166	171	166	168	171	162	164	167						
	170	158	161	167	160	163	167	156	158	162	159	159	162			
	160	152	155	162	154	157	162	150	153	157	154	154	157			
	150	145	150	157	148	151	157	143	147	151	147	148	151	149	149	151
	140	138	144	151	141	145	151	137	141	146	141	142	146	144	144	146
	130	132	137	146	135	139	146	130	134	140	133	135	140	136	137	140
	120	124	130	140	128	132	140	123	127	134	126	129	134	130	131	134
	110	118	124	134	121	126	134	115	120	128	118	122	128	122	124	128
	100	110	116	128	113	118	128	107	114	123	110	116	123	114	118	123
15	190	164	165	169	166	167	169	157	158	161						
	180	158	159	164	160	161	164	151	152	155						
	170	152	155	160	155	156	160	146	147	150	148	148	151			
	160	146	149	155	149	150	155	139	141	145	142	142	145	143	143	147
	150	141	144	150	143	145	150	136	140	145	136	136	140	138	138	140
	140	134	138	145	136	140	145	126	128	134	129	130	134	131	132	134
	130	128	132	140	131	133	140	119	122	129	122	124	129	125	126	129
	120	121	125	134	123	126	134	112	115	122	115	117	122	118	119	122
	110	115	119	129	117	120	129	105	109	116	108	111	116	111	113	116
	100	108	111	123	110	113	123									
20	190	161	161	166	156	156	160	152	152	156						
	180	155	155	160	151	151	155	146	146	150						
	170	149	150	155	151	151	155	141	141	145	143	143	146			
	160	143	144	150	145	145	150	135	136	140	137	137	140			
	150	138	139	145	140	140	145	129	130	135	132	132	135	133	133	136
	140	131	133	140	133	134	140	125	125	129	125	125	129	127	127	130
	130	125	127	135	127	129	135	116	118	125	119	120	124	121	121	125
	120	118	120	130	120	122	130	112	113	118	112	113	118	114	114	118
	110	111	114	125	114	116	125	105	107	112	105	107	112	107	108	112
	100	103	107	119	106	109	118									

CHECK V1(MCG) IN BOXED AREA

TO1 V1(MCG)

10% Thrust Reduction

ACTUAL OAT		PRESSURE ALTITUDE (FT)					
°C	°F	-1000	0	2000	4000	6000	8000
49	120	98	96	93			
38	100	105	102	98	94	90	87
26	80	105	105	101	98	94	90
15	60	105	105	101	98	95	92
-51	-60	106	105	102	99	95	92



TO1 Takeoff/Landing Weight Adjustments

10% Thrust Reduction

PERFORMANCE LIMIT	TO1 WEIGHT ADJUSTMENT (1000 KG)								
	FULL RATED LIMIT WEIGHT (1000 KG)								
	110	120	130	140	150	160	170	180	190
TAKEOFF FIELD	-7.2	-8.0	-8.8	-9.5	-10.2	-10.9	-11.5	-12.1	-12.6
TAKEOFF CLIMB	-11.5	-14.0	-15.0	-16.4	-17.5	-18.9	-20.3	-21.6	-23.0
TAKEOFF OBSTACLE	-11.5	-14.0	-15.0	-16.4	-17.5	-18.4	-19.9	-21.0	-22.5
LANDING CLIMB		-13.2	-14.1	-15.1	-16.0	-17.0	-17.9	-18.9	-19.8



Flight Planning and Performance Manual

TO1 Takeoff EPR

10% Thrust Reduction

Based on engine bleed for packs on and anti-ice on or off

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)					
°C	°F	-1000	0	2000	4000	6000	8000
70	158	1.22	1.21	1.22	1.22	1.22	1.22
65	149	1.25	1.24	1.23	1.23	1.23	1.23
60	140	1.29	1.29	1.29	1.28	1.28	1.28
55	131	1.34	1.33	1.33	1.32	1.32	1.32
50	122	1.37	1.36	1.36	1.36	1.36	1.36
45	113	1.39	1.39	1.39	1.39	1.39	1.39
40	104	1.43	1.43	1.43	1.43	1.42	1.43
35	95	1.45	1.46	1.46	1.45	1.45	1.45
30	86	1.45	1.47	1.48	1.48	1.48	1.48
25	77	1.45	1.47	1.48	1.50	1.50	1.50
20	68	1.45	1.47	1.48	1.50	1.51	1.51
15	59	1.45	1.47	1.48	1.50	1.51	1.53
10 & BELOW	50 & BELOW	1.45	1.47	1.48	1.50	1.51	1.53

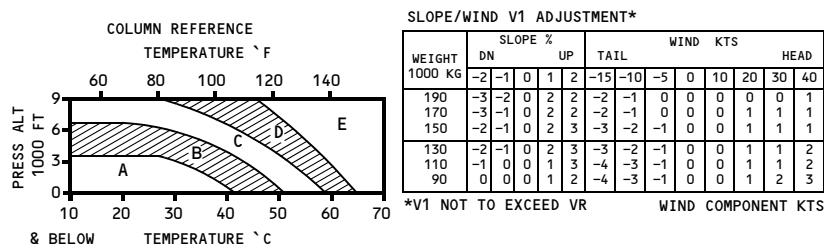
EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)							
	-1000	0	2000	4000	4500	4501	6000	8000
PACKS OFF	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02

TO1 Stab Trim Setting

10% Thrust Reduction

WEIGHT (1000 KG)	C.G. %MAC						
	12	16	20	24	28	32	36
190	7	7	6	5	4 1/2	3 1/2	2 1/2
180	7	6 1/2	6	5	4	3 1/2	2 1/2
160	7	6	5 1/2	4 1/2	3 1/2	3	2
140	6	5	4 1/2	3 1/2	2 1/2	2	1
120	4 1/2	4	3	2 1/2	1 1/2	1	1
100	4	3	2 1/2	1 1/2	1	1	1

TO2 Takeoff Speeds
20% Thrust Reduction

FLAPS	WT 1000 KG	A			B			C			D			E		
		V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂	V ₁	V _R	V ₂
5	190	172	174	176	175	175	177	171	171	172						
	180	166	168	171	169	169	171									
	170	160	163	167	163	164	167	165	166	167						
	160	154	157	162	157	158	162	159	160	162	161	161	162			
	150	148	151	157	151	153	157	153	154	157	156	156	157			
	140	141	145	151	144	147	151	146	148	151	149	150	151	151	152	153
	130	135	139	146	138	141	146	140	142	146	143	144	146	145	145	146
	120	127	132	140	130	134	140	133	135	140	136	137	140	139	139	140
	110	120	125	134	123	127	134	126	129	134	129	131	134	132	133	134
	100	113	118	128	115	119	128	118	121	128	121	123	128	124	125	127
15	90	106	112	123	107	111	123	110	113	123	113	115	123	116	117	121
	190	166	166	169	168	168	169									
	180	161	161	164	162	162	164									
	170	155	156	160	157	157	160	159	159	161						
	160	149	150	155	152	152	155	153	153	155						
	150	143	145	150	146	147	150	148	148	150	149	149	151			
	140	137	139	145	139	141	145	141	142	145	143	143	145	145	145	147
	130	131	133	140	133	135	140	135	136	140	138	138	140	140	140	140
	120	124	126	134	126	128	134	128	130	134	131	131	134	133	133	134
	110	118	120	129	120	122	129	122	124	129	125	125	129	127	127	129
20	100	110	113	123	112	114	123	114	116	122	117	118	122	120	120	122
	90	102	107	118	104	106	118	106	108	116	109	112	116	113	114	116
	190	162	162	166												
	180	156	156	160	157	157	160									
	170	151	151	155	152	152	155	154	154	156						
	160	145	145	150	146	146	150	148	148	150						
	150	140	140	145	141	141	145	143	143	145	144	144	146			
	140	133	134	140	135	135	140	137	137	140	138	138	140			
	130	127	128	135	130	130	135	132	132	135	133	133	135	135	135	136
	120	120	122	130	123	123	130	124	125	130	127	127	129	128	128	130
20	110	114	116	125	116	117	125	119	119	125	121	121	124	123	123	125
	100	106	109	119	108	110	118	111	112	118	114	114	118	116	116	118
	90	98	103	114	100	104	112	103	106	112	107	108	113	109	110	112

CHECK V1(MCG) IN BOXED AREA

TO2 V1(MCG)
20% Thrust Reduction

ACTUAL OAT		PRESSURE ALTITUDE (FT)					
°C	°F	-1000	0	2000	4000	6000	8000
49	120	93	90	87	84		
38	100	99	96	92	88	85	82
26	80	99	98	95	92	88	85
15	60	99	98	95	92	89	86
-51	-60	99	99	96	93	90	87

TO2 Takeoff/Landing Weight Adjustments

20% Thrust Reduction

PERFORMANCE LIMIT	TO2 WEIGHT ADJUSTMENTS (1000 KG)								
	FULL RATED LIMIT WEIGHT (1000 KG)								
	110	120	130	140	150	160	170	180	190
TAKEOFF FIELD	-14.0	-16.0	-17.7	-19.2	-20.6	-21.9	-23.1	-24.3	-25.3
TAKEOFF CLIMB	-22.5	-25.7	-27.8	-30.4	-32.4	-35.0	-37.4	-39.7	-42.0
TAKEOFF OBSTACLE	-22.5	-25.0	-27.3	-29.8	-32.0	-34.3	-36.9	-39.0	-42.0
LANDING CLIMB		-26.1	-28.0	-30.0	-31.9	-33.9	-35.8	-37.8	-39.8



TO2 Takeoff EPR

20% Thrust Reduction

Based on engine bleed for packs on and anti-ice on or off

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)					
°C	°F	-1000	0	2000	4000	6000	8000
70	158	1.21	1.21	1.21	1.21	1.21	1.21
65	149	1.22	1.21	1.21	1.21	1.21	1.21
60	140	1.25	1.24	1.24	1.24	1.24	1.24
55	131	1.28	1.28	1.28	1.27	1.27	1.27
50	122	1.31	1.30	1.30	1.30	1.30	1.30
45	113	1.33	1.33	1.33	1.33	1.33	1.33
40	104	1.36	1.36	1.36	1.36	1.36	1.36
35	95	1.37	1.39	1.39	1.38	1.38	1.38
30	86	1.37	1.39	1.40	1.40	1.40	1.40
25	77	1.37	1.39	1.40	1.41	1.41	1.41
20	68	1.37	1.39	1.40	1.41	1.42	1.43
15	59	1.37	1.39	1.40	1.41	1.42	1.44
10 & BELOW	50 & BELOW	1.37	1.39	1.40	1.41	1.42	1.44

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)							
	-1000	0	2000	4000	4500	4501	6000	8000
PACKS OFF	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02

TO2 Stab Trim Setting

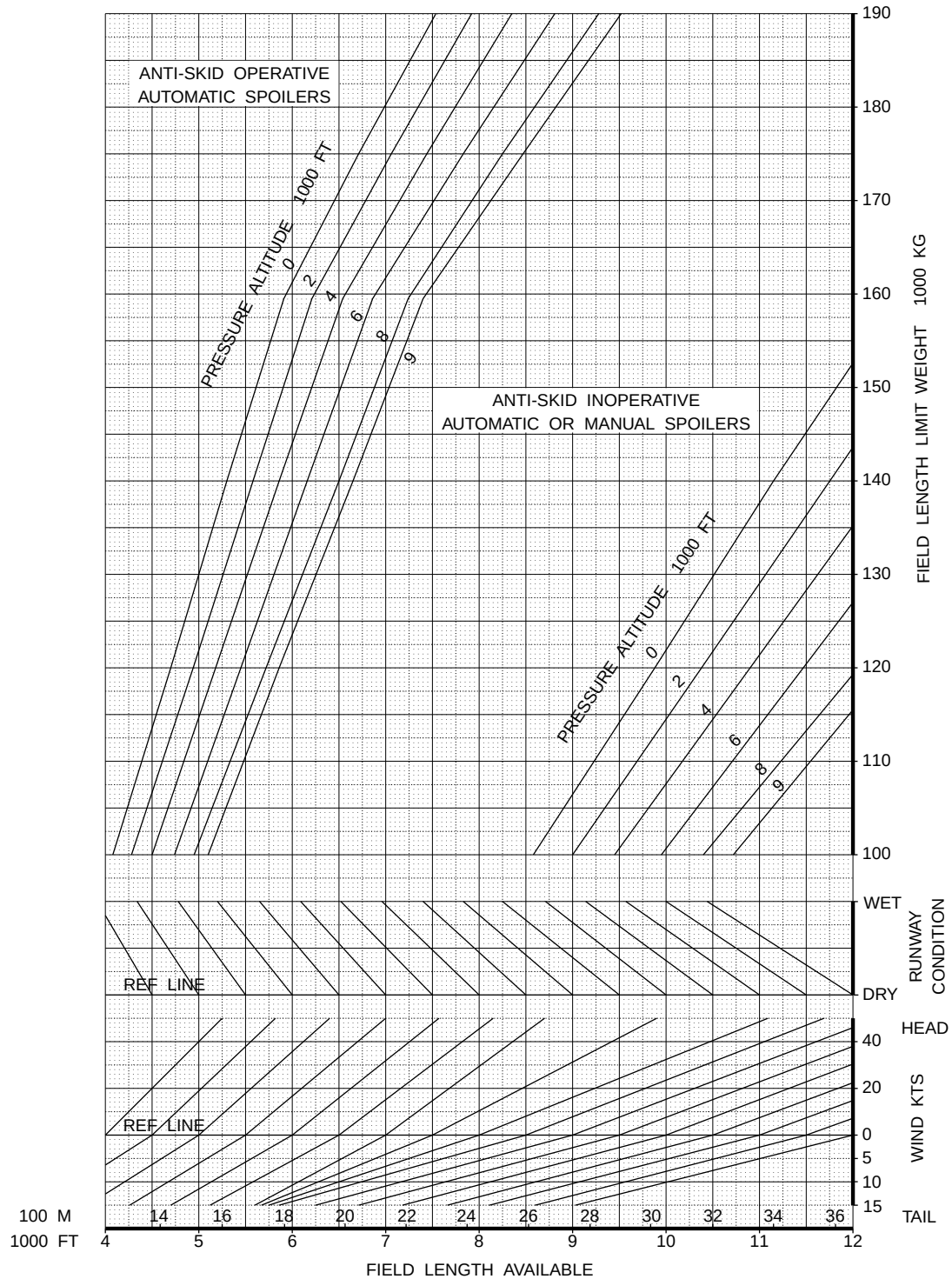
20% Thrust Reduction

WEIGHT (1000 KG)	C.G. %MAC						
	12	16	20	24	28	32	36
190	7	7	6 1/2	5 1/2	5	4	3
180	7	7	6 1/2	5 1/2	4 1/2	4	3
160	7	6 1/2	6	5	4	3 1/2	2 1/2
140	6 1/2	5 1/2	5	4	3	2 1/2	1 1/2
120	5	4 1/2	3 1/2	3	2	1 1/2	1 1/2
100	4 1/2	3 1/2	3	2	1 1/2	1 1/2	1 1/2

Landing Field Length Limit

Flaps 25

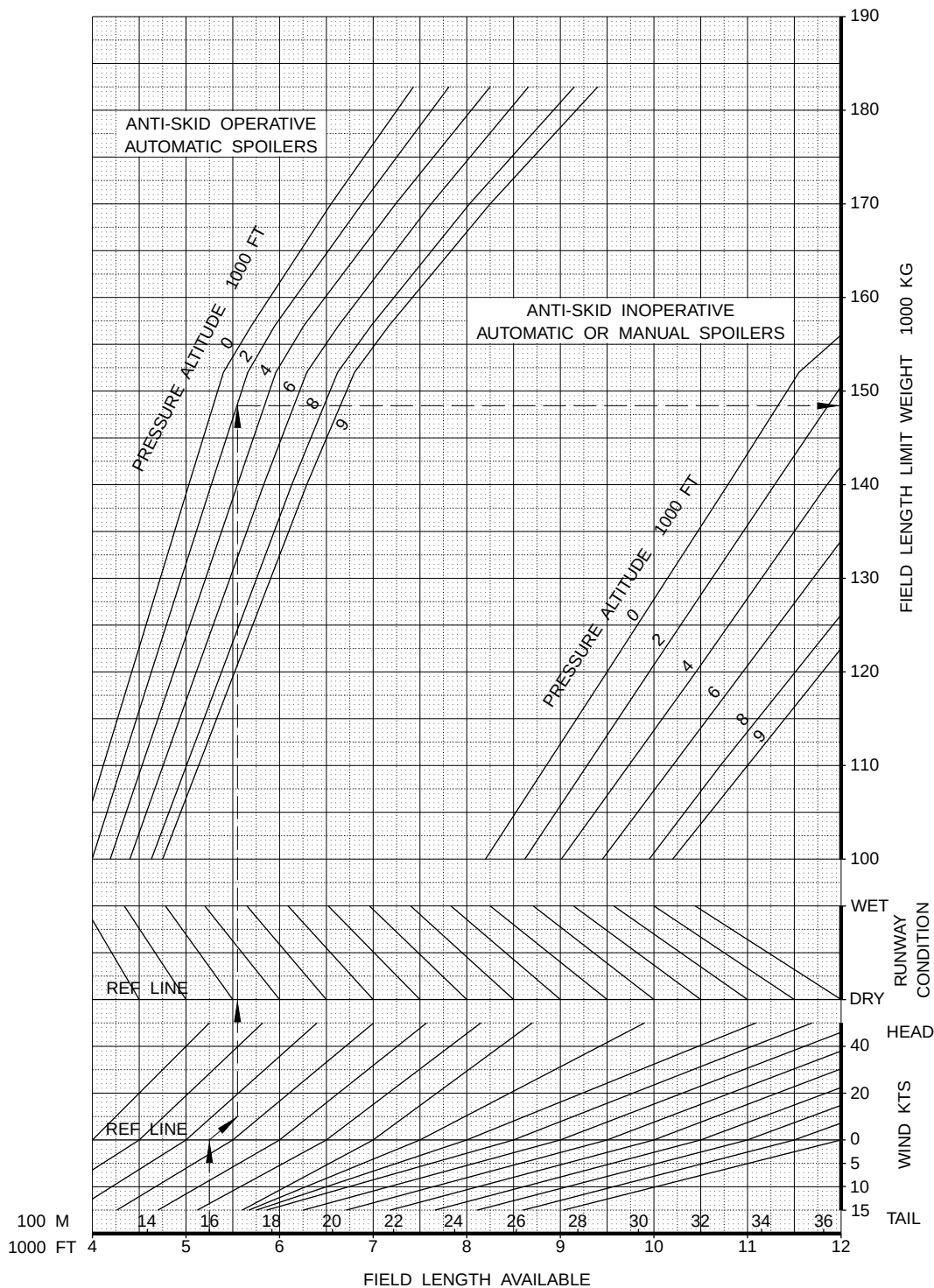
Category "C" Brakes



Landing Field Length Limit

Flaps 30

Category "C" Brakes



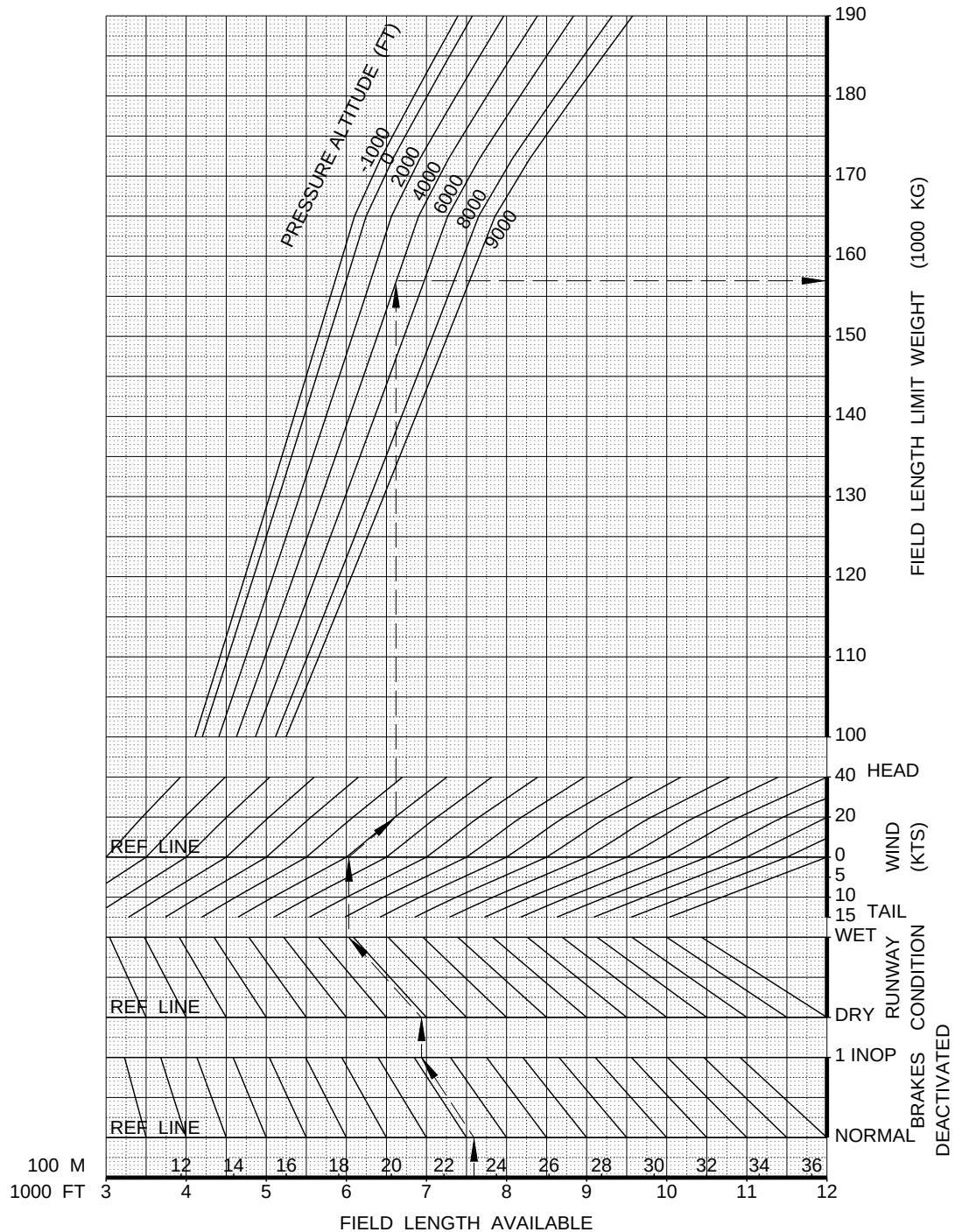
For manual spoilers, anti-skid operative decrease field length available by 850 ft.
For one brake deactivated, anti-skid operative, decrease field length available by 800 ft.

Landing Field Length Limit

Flaps 25

Anti-skid Operative

Category "D" Brakes



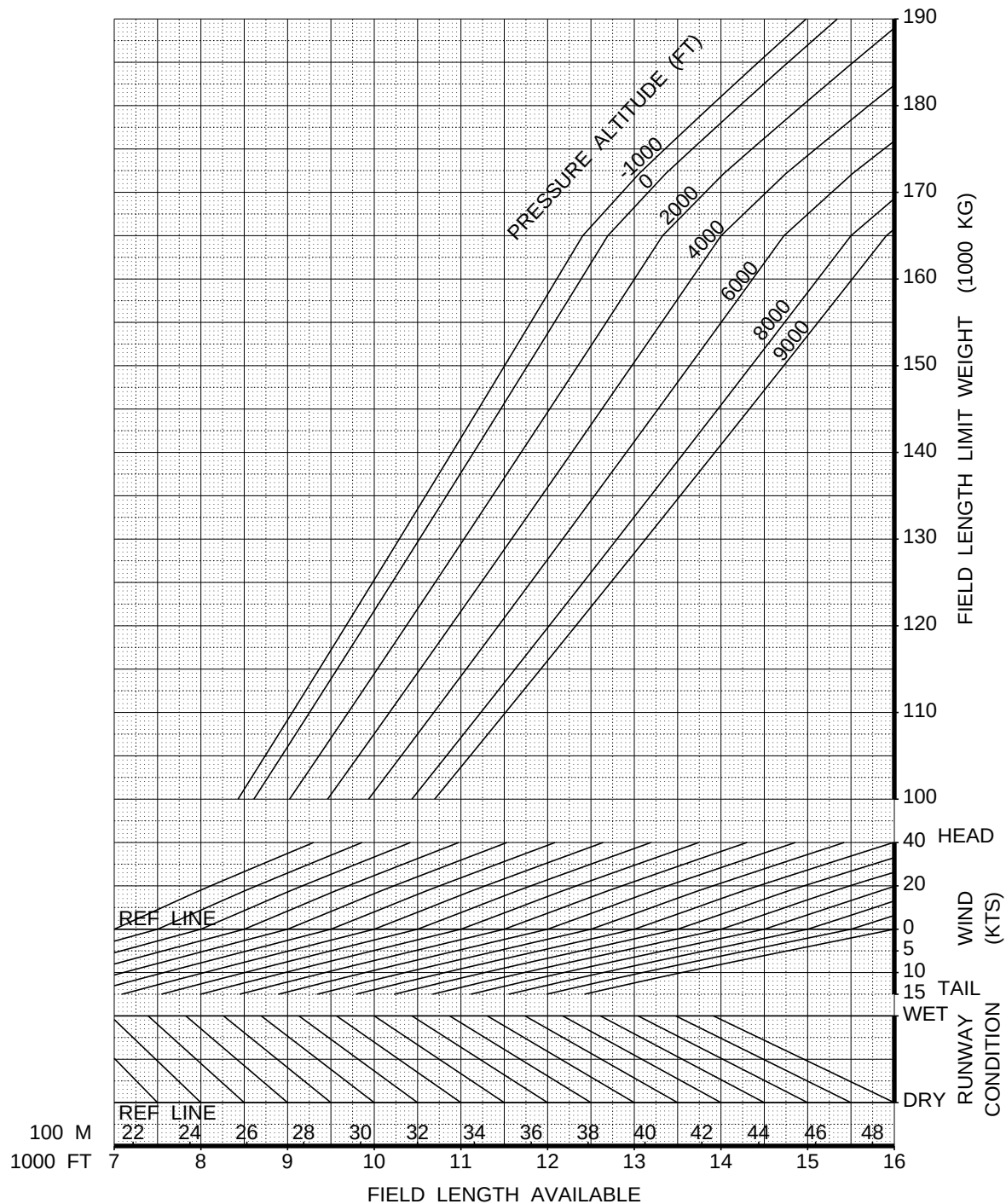
With manual speedbrakes, decrease field limit weight by 25400 kg.

Landing Field Length Limit

Flaps 25

Anti-skid Inoperative

Category "D" Brakes

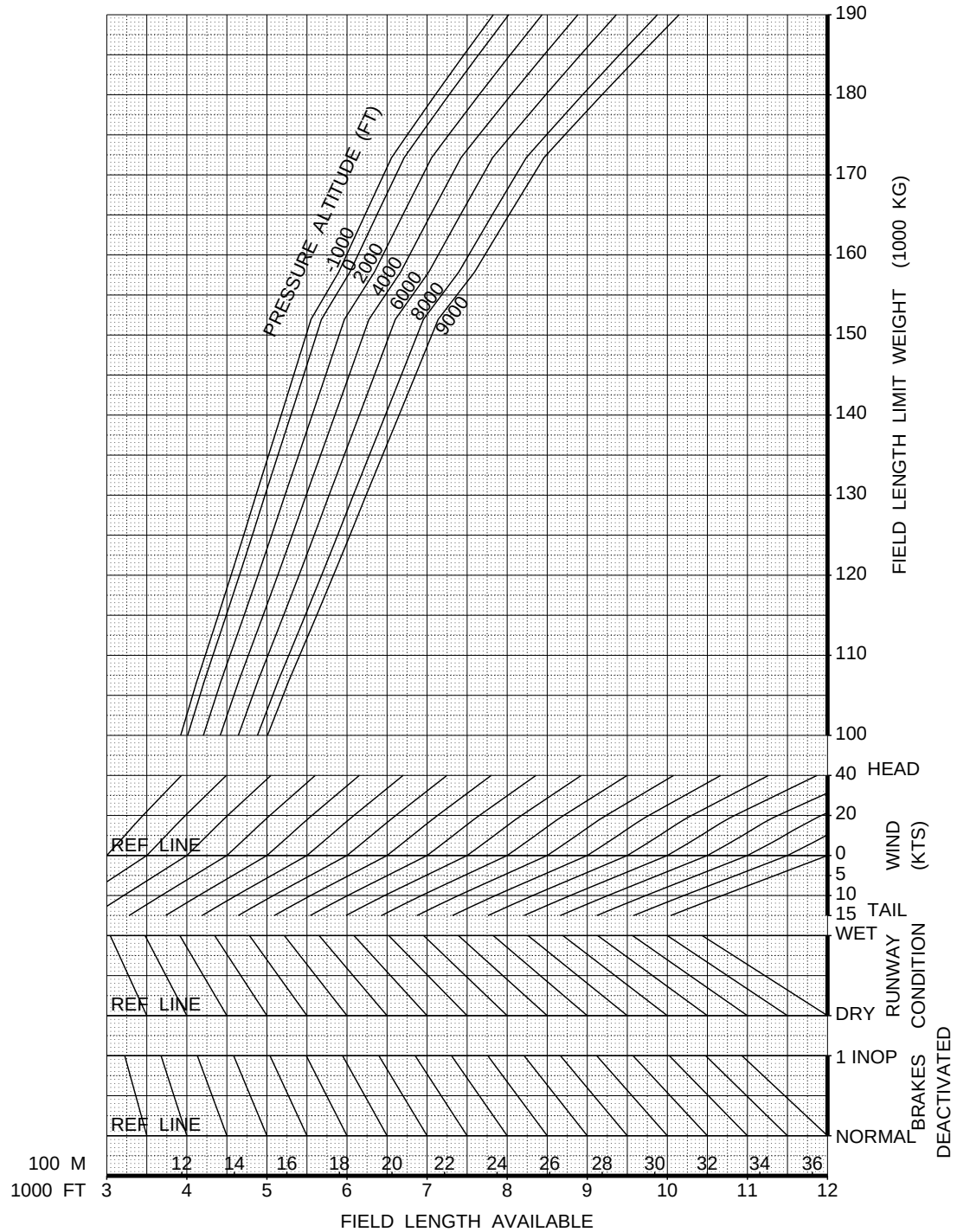


Landing Field Length Limit

Flaps 30

Anti-skid Operative

Category "D" Brakes



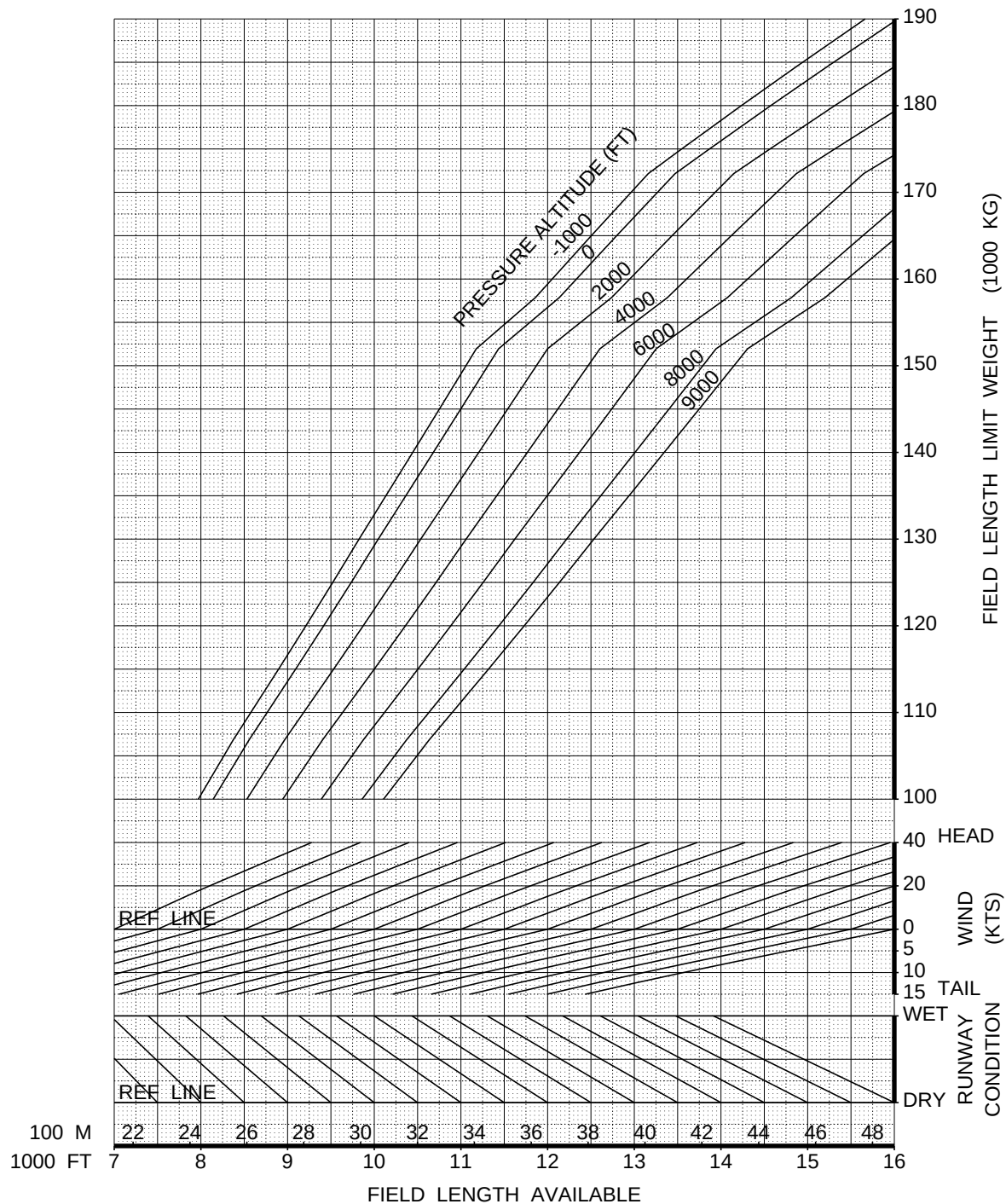
With manual speedbrakes, decrease field limit weight by 25400 kg.

Landing Field Length Limit

Flaps 30

Anti-skid Inoperative

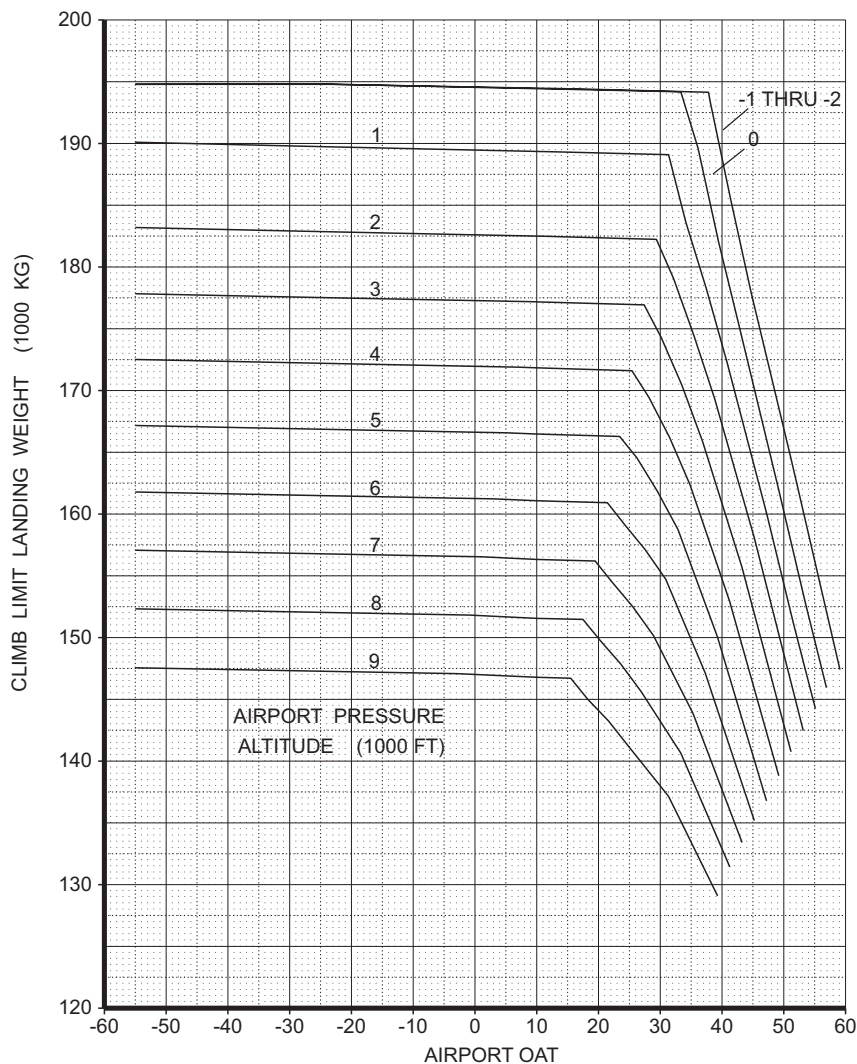
Category "D" Brakes



Landing Climb Limit Weight

Based on engine bleed for packs on and APU off

Valid for approach with flaps 20 and landing with flaps 25 or 30



For engine bleed for packs off, increase weight by 1250 kg.

With engine and wing anti-ice on, decrease weight by 3050 kg.

When operating in icing conditions during any part of the flight with forecast landing temperatures below 10 °C (50°F), decrease weight by 17200 kg.

Derate Climb Limit Weight

FULL RATED CLIMB LIMIT WEIGHT (KG)	CLIMB LIMIT WEIGHT DECREMENT (KG)	
	TO1 (10% DERATE)	TO2 (20% DERATE)
200000	23000	44050
190000	21650	41600
180000	20300	39200
170000	18900	36800
160000	17550	34400
150000	16200	31950
140000	14800	29500
130000	13450	27100

Enter A/C packs on full rated climb limit weight uncorrected for anti-ice or ice accumulation.

With A/C packs off, increase weight by 1500 kg for TO1 and 1800 kg for TO2.

With engine and wing anti-ice on, decrease weight by 3900 kg for TO1 and 4850 kg for TO2.

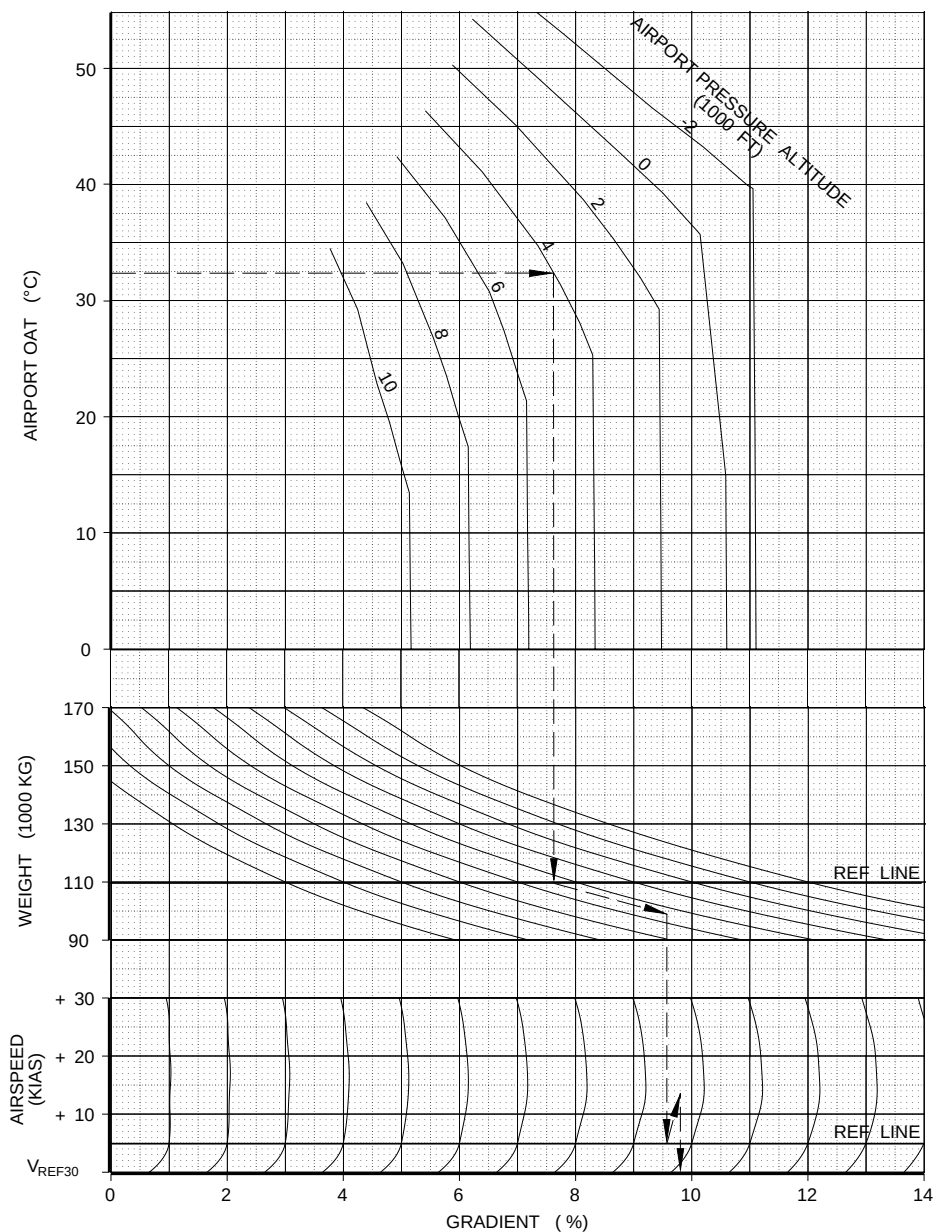
When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 12300 kg.

ENGINE INOP GO-AROUND THRUST

Go-around Climb Gradient

Flaps 20

Based on engine bleed for one pack on and APU on or off



With engine bleed for packs off, increase gradient by 0.1%.

With engine anti-ice on, decrease gradient by 0.0%.

With engine and wing anti-ice on, decrease gradient by 0.3%.

Decrease gradient by 0.9% for ice accumulation when operating in icing conditions during any part of the flight with forecast landing temperature below 10°C.

Quick Turnaround Limit

Category "C" Brakes

Flaps 25 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)										
°C	°F	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
50	122	141	139	136	133	131						
40	104	143	141	138	136	133	131	128	126	123	121	
30	86	146	143	141	138	135	133	130	128	125	123	121
20	68	148	146	143	140	138	135	133	130	128	125	123
10	50	151	148	146	143	140	138	135	132	130	127	125
0	32	153	151	148	146	143	140	138	135	132	130	127
-10	14	156	153	151	148	146	143	140	138	135	132	130
-20	-4	159	156	153	151	148	145	143	140	137	135	132
-30	-22	162	159	156	153	151	148	145	143	140	137	135
-40	-40	165	162	159	156	153	151	148	145	142	140	137
-50	-58	168	165	162	159	156	153	151	148	145	142	140

Flaps 30 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)										
°C	°C	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
50	122	144	142	140	137	134	132					
40	104	147	144	142	139	136	134	131	129	127	124	
30	86	149	147	144	141	139	136	134	131	129	126	124
20	68	151	149	147	144	141	138	136	133	131	128	126
10	50	153	151	149	146	143	141	138	136	133	131	128
0	32	155	153	151	149	146	143	141	138	135	133	130
-10	14	157	155	153	151	149	146	143	141	138	135	133
-20	-4	160	157	155	153	152	149	146	143	141	138	135
-30	-22	162	159	157	155	153	151	148	146	143	141	138
-40	-40	165	162	160	157	155	153	151	149	146	143	141
-50	-58	167	165	162	159	157	155	153	151	148	146	143

Increase weight by 1300 kg per 1% uphill slope. Decrease weight by 2300 kg per 1% downhill slope.

Increase weight by 3300 kg per 10 knots headwind. Decrease weight by 17500 kg per 10 knots tailwind.

Decrease weight by 11150 kg when one brake is deactivated.

After landing at weights exceeding those shown above, adjusted for slope and wind, wait at least 75 minutes and check that wheel thermal plugs have not melted before executing a takeoff.

If a Brake Temperature Monitoring System (BTMS) is installed:

No sooner than 10 and no later than 15 minutes after parking check the brake temperature display digits on the EICAS status page and the BRAKE TEMP light. If all the brake temperature values are within a range of 1 through 4 and the BRAKE TEMP light is not on, no further ground waiting period is required. If any brake temperature value is 5 or higher, or the BRAKE TEMP light is on, a minimum ground waiting period of 75 minutes is required. Before making a subsequent takeoff, check that the wheel thermal plugs have not melted.

Note: If the brake temperature display for any brake on the Landing Gear Synoptic Display is blank or indicates 0, then this method cannot be used.

Quick Turnaround Limit

Category "D" Brakes

Flaps 25 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)										
°C	°F	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
50	122	141	139	136	134	131	129	126	124	122	119	117
40	104	143	141	138	136	133	131	128	126	124	121	119
30	86	146	143	141	138	136	133	131	128	126	123	121
20	68	148	146	143	140	138	135	133	130	128	125	123
10	50	151	148	146	143	140	138	135	133	130	128	125
0	32	154	151	148	146	143	140	138	135	132	130	127
-10	14	156	154	151	148	146	143	140	138	135	132	130
-20	-4	159	156	154	151	148	146	143	140	138	135	132
-30	-22	162	159	156	153	151	148	145	143	140	138	135
-40	-40	165	162	159	156	153	151	148	145	143	140	137
-50	-58	168	165	162	159	156	154	151	148	145	143	140

Flaps 30 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)										
°C	°F	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
50	122	145	142	140	137	135	132	130	128	125	123	120
40	104	147	145	142	140	137	135	132	130	127	125	122
30	86	150	147	144	142	139	137	134	132	129	127	125
20	68	152	150	147	144	142	139	136	134	132	129	127
10	50	154	152	150	147	144	141	139	136	134	131	129
0	32	156	154	152	150	147	144	141	139	136	134	131
-10	14	158	156	154	152	150	147	144	141	139	136	134
-20	-4	160	158	156	154	152	149	147	144	141	139	136
-30	-22	162	160	157	155	154	152	149	147	144	141	139
-40	-40	164	162	160	158	155	154	152	149	146	144	141
-50	-58	167	165	162	160	158	156	154	152	149	146	144

Increase weight by 1500 kg per 1% uphill slope. Decrease weight by 2500 kg per 1% downhill slope.

Increase weight by 3500 kg per 10 knots headwind. Decrease weight by 19000 kg per 10 knots tailwind.

Decrease weight by 10650 kg when one brake is deactivated.

After landing at weights exceeding those shown above, adjusted for slope and wind, wait at least 75 minutes and check that wheel thermal plugs have not melted before executing a takeoff.

If a Brake Temperature Monitoring System (BTMS) is installed:

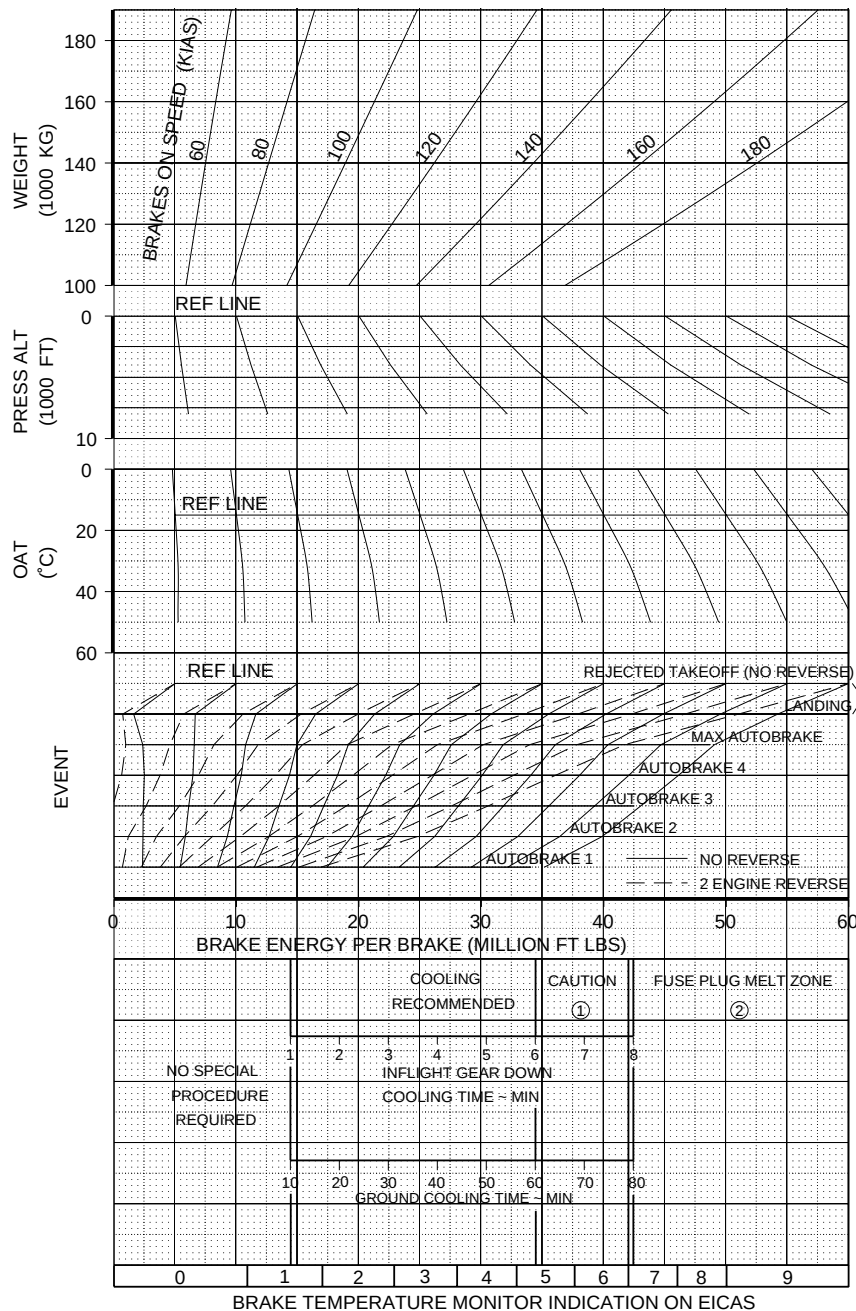
No sooner than 10 and no later than 15 minutes after parking check the brake temperature display digits on the EICAS status page and the BRAKE TEMP light. If all the brake temperature values are within a range of 1 through 4 and the BRAKE TEMP light is not on, no further ground waiting period is required. If any brake temperature value is 5 or higher, or the BRAKE TEMP light is on, a minimum ground waiting period of 75 minutes is required. Before making a subsequent takeoff, check that the wheel thermal plugs have not melted.

Note: If the brake temperature display for any brake on the Landing Gear Synoptic Display is blank or indicates 0, then this method cannot be used.

ADVISORY INFORMATION

Recommended Brake Cooling Schedule

Category "C" or "D" Brakes



Observe Maximum Quick Turnaround Limitation.

To correct for wind, enter chart with brakes on speed minus one half the headwind or plus 1.5 times the tailwind.

Chart shows energy per brake added by a single stop with all brakes operating. Energy is assumed to be equally distributed among the operating brakes. Total energy is the sum of residual energy plus energy added.

Add 1.0 million foot pounds
per brake for each taxi mile.

For one brake deactivated increase
brake energy per brake by 15 percent

If ground speed is used for brakes on speed, ignore wind, altitude, and OAT effects.

MAX
MANUAL
BRAKING ①

Wheel fuse plugs may melt. Delay takeoff and inspect after one hour. If overheating occurs after takeoff, extend gear soon for at least 6 minutes.

Clear runway immediately. Unless required, do not set parking brake. Do not approach gear or attempt to taxi for one hour. Tire, wheel and brake replacement may be required. If overheating occurs after takeoff, extend gear soon for at least 10 minutes.

Brake Temperature Monitor Indication (BTMS) may be used 10 to 15 minutes after the airplane has come to a complete stop, or inflight with gear retracted to determine recommended cooling schedule.

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 25

Dry Runway

BRAKING CONFIGURATION	LANDING DISTANCE AND ADJUSTMENT (FT)											
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		APP SPD ADJ	REVERSE THRUST ADJ	
	150000 KG LANDING WEIGHT	PER 5000 KG ABOVE/ BELOW 150000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABOVE ISA	BELOW ISA	PER 10 KTS ABOVE VREF25	ONE REV	NO REV
MAX MANUAL	3220	110/-70	80	-130	440	50	-40	80	-80	250	70	140
MAX AUTO	5370	130/-130	150	-250	840	0	0	160	-160	600	0	0
AUTOBRAKE 4	5540	140/-140	160	-260	880	0	0	160	-160	630	0	0
AUTOBRAKE 3	6370	160/-160	190	-300	1040	0	0	190	-190	740	0	0
AUTOBRAKE 2	7150	190/-190	220	-350	1190	30	-110	230	-210	660	60	60
AUTOBRAKE 1	7840	220/-220	260	-400	1370	170	-220	270	-230	580	430	520

Good Reported Braking Action

MAX MANUAL	5120	120/-120	140	-240	850	140	-120	150	-140	400	270	590
MAX AUTO	6190	150/-150	180	-290	990	20	-10	180	-180	700	20	90
AUTOBRAKE 4	6380	160/-160	180	-300	1020	20	0	190	-190	720	10	60
AUTOBRAKE 3	7320	190/-190	220	-350	1190	0	0	220	-220	850	0	0

Medium Reported Braking Action

MAX MANUAL	7070	190/-190	230	-380	1400	360	-280	240	-210	510	740	1780
MAX AUTO	7070	190/-190	230	-380	1400	340	-190	240	-210	650	700	1740
AUTOBRAKE 4	7110	190/-190	230	-390	1410	300	-170	240	-220	710	630	1670
AUTOBRAKE 3	7720	210/-200	240	-410	1480	200	-110	250	-240	850	410	1240

Poor Reported Braking Action

MAX MANUAL	9200	270/-260	320	-570	2200	830	-530	350	-290	600	1610	4250
MAX AUTO	9200	270/-260	320	-570	2190	830	-530	350	-290	590	1620	4260
AUTOBRAKE 4	9200	270/-260	320	-570	2190	830	-530	350	-290	590	1620	4260
AUTOBRAKE 3	9220	270/-260	320	-570	2200	790	-430	350	-300	790	1540	4180

Reference distance assumes sea level, standard day, no wind or slope, VREF25 approach speed and 2 engine reverse thrust.

Reference distance for manual braking is applicable for auto spoilers only, for manual spoilers operation increase landing distance by 460 ft.

Reference distance for auto braking is applicable for auto or manual spoilers.

Includes distance from 50 ft above threshold (1000 ft of air distance).

Distances for GOOD, MEDIUM, and POOR are increased by 15%.



Flight Planning and Performance Manual

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 30

Dry Runway

BRAKING CONFIGURATION	LANDING DISTANCE AND ADJUSTMENT (FT)											
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		APP SPD ADJ	REVERSE THRUST ADJ	
	150000 KG LANDING WEIGHT	PER 5000 KG ABOVE/ BELOW 150000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABOVE ISA	BELOW ISA	PER 10 KTS ABOVE VREF30	ONE REV	NO REV
MAX MANUAL	3170	140/-70	80	-130	440	50	-50	80	-80	260	60	130
MAX AUTO	5220	210/-140	150	-240	830	0	0	150	-150	600	0	0
AUTOBRAKE 4	5380	220/-140	150	-250	870	0	0	160	-160	620	0	0
AUTOBRAKE 3	6180	260/-170	180	-300	1020	0	0	190	-190	730	0	0
AUTOBRAKE 2	6970	280/-200	210	-350	1180	10	-100	220	-210	670	30	30
AUTOBRAKE 1	7690	300/-220	250	-400	1360	160	-210	260	-230	580	350	440

Good Reported Braking Action

MAX MANUAL	5060	180/-130	140	-240	850	150	-130	150	-140	410	250	550
MAX AUTO	6020	250/-160	170	-280	980	20	-10	180	-180	690	20	90
AUTOBRAKE 4	6200	260/-170	180	-290	1010	20	0	180	-180	710	10	60
AUTOBRAKE 3	7110	300/-200	210	-340	1180	0	0	210	-210	840	0	0

Medium Reported Braking Action

MAX MANUAL	6980	260/-190	220	-380	1400	360	-280	240	-210	520	690	1640
MAX AUTO	6980	280/-190	220	-380	1400	360	-210	240	-210	630	680	1640
AUTOBRAKE 4	6990	290/-200	220	-380	1400	330	-180	240	-210	700	630	1580
AUTOBRAKE 3	7530	320/-210	240	-410	1470	210	-120	250	-240	840	410	1190

Poor Reported Braking Action

MAX MANUAL	9110	360/-270	320	-570	2200	840	-540	350	-290	600	1520	3930
MAX AUTO	9110	360/-270	320	-570	2200	840	-540	350	-290	600	1520	3940
AUTOBRAKE 4	9110	360/-270	320	-570	2200	840	-540	350	-290	600	1520	3940
AUTOBRAKE 3	9110	380/-270	320	-570	2200	820	-440	340	-300	770	1480	3900

Reference distance assumes sea level, standard day, no wind or slope, VREF30 approach speed and 2 engine reverse thrust.

Reference distance for manual braking is applicable for auto spoilers only, for manual spoilers operation increase landing distance by 460 ft.

Reference distance for auto braking is applicable for both auto and manual spoilers.

Includes distance from 50 ft above threshold (1000 ft of air distance).

Distances for GOOD, MEDIUM, and POOR are increased by 15%.

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FLIGHT PLANNING

Table of Contents

Chapter 2

Text.....	2.1.1
Introduction	2.1.1
Simplified Flight Planning.....	2.1.1
Oxygen Requirements	2.1.2
Driftdown.....	2.1.3
ETOPS.....	2.1.4
Simplified Flight Planning.....	2.2.1
Optimum Altitude	2.2.1
Short Trip Cruise Altitude	2.2.1
Long Range Cruise Trip Fuel and Time	2.2.2
.80M Trip Fuel and Time	2.2.4
Long Range Cruise Step Climb Trip Fuel and Time	2.2.6
Long Range Cruise Short Trip Fuel and Time.....	2.2.7
Holding Planning.....	2.2.8
Fuel Tankering	2.2.9
Oxygen Requirements	2.2.11
Driftdown.....	2.3.1
Net Level Off Weight	2.3.1
Driftdown Profiles Net Flight Path.....	2.3.2
Driftdown/LRC Cruise Range Capability	2.3.6
ETOPS.....	2.4.1
Area of Operation	2.4.1
Decompression Critical Fuel Reserves - LRC Cruise	2.4.2
Decompression Critical Fuel Reserves - LRC Cruise	2.4.3
Driftdown Critical Fuel Reserves - LRC Driftdown/Cruise	2.4.4
Decompression Critical Fuel Reserves - 290 KIAS Cruise	2.4.5
Driftdown Critical Fuel Reserves - .78M/290 KIAS Driftdown/Cruise	2.4.6
Decompression Critical Fuel Reserves - 310 KIAS Cruise	2.4.7
Driftdown Critical Fuel Reserves - .80M/310 KIAS Driftdown/Cruise	2.4.8
Decompression Critical Fuel Reserves - 330 KIAS Cruise	2.4.9
Driftdown Critical Fuel Reserves - .80M/330 KIAS Driftdown/Cruise	2.4.10
Decompression Critical Fuel Reserves - 350 KIAS Cruise	2.4.11
Driftdown Critical Fuel Reserves - .80M/350 KIAS Driftdown/Cruise	2.4.12
Long Range Cruise Net Level Off Weight	2.4.13
290 KIAS Cruise Net Level Off Weight	2.4.14



310 KIAS Cruise Net Level Off Weight	2.4.15
330 KIAS Cruise Net Level Off Weight	2.4.16
350 KIAS Cruise Net Level Off Weight	2.4.17
Long Range Cruise Driftdown/Cruise Range Capability	2.4.18
.78M/290 KIAS Driftdown/Cruise Range Capability	2.4.19
.80M/310 KIAS Driftdown/Cruise Range Capability	2.4.20
.80M/330 KIAS Driftdown/Cruise Range Capability	2.4.21

Introduction

This chapter contains flight planning data to determine trip fuel/time, reserve fuel and enroute terrain clearance capability. The data includes engine bleed effects for normal air conditioning operation, i.e. two packs at normal flow, one pack bleeding each engine.

Simplified Flight Planning

Flight Planning Allowances

Simplified Flight Planning charts enable rapid determination of estimated trip time and fuel from brake release to landing. Additional flight planning information including maneuver allowances is summarized below.

Ground Operations

Fuel can be saved by minimizing APU utilization. Average APU fuel flow rates under normal operation are 115 kg per hour on the ground.

Taxi fuel allowance is approximately 22 kg per minute.

APU Operation During Flight

For APU operation during flight, increase fuel flow according to the following table. These increments include the APU fuel flow and the effect of increased drag from the APU door.

PRESSURE ALTITUDE (1000 FT)	APU FUEL FLOW PENALTY (KG/HR)					
	GROSS WEIGHT (1000 KG)					
	190	170	150	130	110	90
43					60	55
39				65	60	60
35		75	70	70	65	65
31	75	75	75	75	70	65
27	85	80	80	75	75	70
25	85	85	85	80	75	70
20	95	90	90	85	80	75
15	105	105	95	95	90	85
10	115	115	105	105	100	95
5	125	125	120	115	110	105

Climb

Trip Fuel and Time charts are based on 290/.78 climb speed. Local ATC may require that 250 KIAS not be exceeded below 10000 ft. Approximately 90 kg of additional fuel is burned when this restriction is imposed.

Altitude Selection

Best fuel mileage for a given speed schedule is achieved at optimum altitude. Fuel mileage penalties for operation at off-optimum altitudes are shown in the following table.

OFF-OPTIMUM CONDITION	FUEL MILEAGE PENALTY %	
	LRC	.80M
2000 FT ABOVE OPTIMUM ALTITUDE	2	2
2000 FT BELOW	0	0
4000 FT BELOW	1	1
8000 FT BELOW	3	4
12000 FT BELOW	8	12
	14	21

Cruise

Long Range Cruise is recommended as an approximation for minimum trip fuel. Long Range Cruise is the speed which gives 99% of the maximum fuel mileage at zero wind. For cruise within 2000 ft of optimum altitude Long Range Cruise may be approximated by a constant .80M schedule.

Increase total fuel flow during cruise approximately 90 kg/hr for engine anti-ice on or 160 kg/hr for engine and wing anti-ice on.

Every 450 kg reduction in landing weight decreases trip fuel at optimum altitude by approximately 0.35%.

Descent

Optimum descent speeds for minimum trip fuel are a function of weight. Trip Fuel and Time charts are based on .78/290/250 descent speed, and include straight in approach allowances only. Each additional minute of flaps down maneuvering consumes approximately 90 kg of additional fuel.

Optimum Altitude

Optimum altitude for best fuel mileage is presented for LRC/.80M speed schedule. Fuel mileage penalties for flying off-optimum altitude are tabulated under Flight Planning Allowances.

Short Trip Cruise Altitude

Short range operation may be limited by the distance required to perform the climb and descent. The Short Trip Cruise Altitude chart shows the maximum altitude at which it is possible to cruise for at least one minute in level flight.

Missed Approach

Approximately 255 kg of additional fuel is burned during the missed approach maneuver, based on applying go-around power from the final approach configuration, retracting flaps and gear while climbing to 1500 ft and accelerating to 250 KIAS.

Trip Fuel and Time

Trip Fuel and Time charts are provided for Long Range Cruise and .80M at constant altitude to determine trip fuel and time from brake release to touchdown. APU usage, taxi, inflight flaps down maneuvering (other than straight in approach) and reserve fuel should be added to the trip fuel obtained from the Trip Fuel and Time charts to obtain the total fuel required. These fuel allowances are presented under Flight Planning Allowances. Additional fuel for extended inflight traffic delays should be determined from the holding table.

To determine trip fuel and time enter the appropriate chart with trip ground distance, adjust for the anticipated wind condition, and proceed vertically to cruise pressure altitude. Trip fuel is read to the right from the lower set of altitude lines by going to the reference landing weight and adjusting to the planned landing weight using the guidelines. Trip time is read to the left from the upper altitude lines, adjusting for ISA deviation as necessary.

For winds greater than those shown, enter chart directly with adjusted ground distance and ignore wind adjustment guidelines. Adjusted ground distance is ground distance multiplied by the ratio Average TAS / (Average TAS + Wind Component), where headwind is negative and tailwind is positive.

Step Climb Trip Fuel and Time

Best fuel mileage is obtained if the flight is planned at optimum altitude for the cruise weight and speed schedule. Since optimum altitude increases as the airplane weight decreases, a step climb procedure bracketing optimum altitude is necessary.

The Step Climb Planning chart provides trip fuel and time for LRC or .80M from brake release to touchdown, similar to the constant altitude Trip Fuel and Time charts. The chart is based on 4000 ft step climbs to 2000 ft above optimum altitude.

Short Trip Fuel and Time

The Short Trip Fuel and Time charts include fuel and time to climb to cruise altitude, cruise, descent and straight in approach. The chart is based on the altitude that yields the minimum fuel for trip distances up to 500 nm. For distances greater than 500 nm, or other altitudes, use the Trip Fuel and Time charts.

To determine fuel and time, enter with ground distance, adjust for wind and proceed vertically to the planned landing weight. Trip fuel is read to the right from the

lower set of landing weight curves. Trip time is read to the left from the upper curve and is valid for all landing weights.

Holding Planning

This table provides total fuel flow information necessary for planning holding and reserve fuel requirements. The chart is based on the higher of the maximum endurance speed and the maneuvering speed for the selected flap setting.

The fuel flow is based upon flight in a racetrack holding pattern. For holding in straight and level flight reduce the table values by 5%.

Fuel Tankering

Fuel Tankering charts are provided for LRC/.80M cruise schedules. When a fuel price differential exists between two stations, these charts may be used to determine if fuel may be economically transported for a subsequent flight sector.

The Fuel Tankering charts present the percent burnoff of transported (tankered) fuel using a known trip distance and altitude. This value represents the additional fuel required to complete the trip at the same altitude and the higher weight resulting from transporting additional fuel. These charts should be used only if the airplane altitude capability is not adversely affected by tankering. If ambient conditions are such that tankering forces the airplane to operate at a less efficient altitude than normally, the true percent fuel burnoff can be computed only by comparing separate flight plans at different weights and altitudes.

To justify tanker operation, economically, the fuel price at destination must be greater than the break-even fuel price. The Fuel Price Differential chart presents the destination fuel price required to break-even for any percent surplus fuel burnoff and departure fuel price.

Oxygen Requirements

Passenger Oxygen System - Passenger Airplanes Only

This airplane is equipped with a 12 minute or optional 22 minute chemical passenger oxygen system. The altitude envelopes provided show the maximum altitude that the airplane may be flown during a cabin depressurization event and still support the physiological requirements of the passengers using the oxygen system installed. The envelopes are intended to assist in terrain clearance planning.

The maximum altitude envelopes assume an immediate descent is made to 10000 ft or the lowest safe altitude whichever is higher as stipulated in the Emergency Descent procedure of the Quick Reference Handbook.

Should the presence of terrain necessitate a level-off at an altitude higher than 10000 ft, the required terrain clearance descent profile should at no time exceed the maximum altitude capability of the passenger oxygen system shown by the envelope. Once terrain is cleared, the descent to 10000 ft should be completed.

Regulations allow the first 30 minutes the airplane is flown at altitudes at or below 14000 ft but above 10000 ft to be without additional supplemental passenger oxygen

Flight Crew Oxygen System - Passenger Airplanes Only

Regulations require that sufficient oxygen be provided to the flight crew to account for the greater of supplemental breathing oxygen in the event of a cabin depressurization or protective breathing in the event of smoke or harmful fumes in the flight deck.

This airplane model is equipped with a 12 minute or optional 22 minute chemical passenger oxygen system which limits the extent to which the airplane can be operated at altitudes above 10000 ft following depressurization. As a result the flight crew supplemental oxygen quantity requirement is determined using the fixed maximum cabin altitude envelope allowed by the passenger oxygen system. Consideration must also be given to protective breathing oxygen, which is the quantity of oxygen necessary for 15 minutes of pressurized 100% oxygen flow (Emergency setting) for each flight crew member in a fully pressurized cabin (8000 ft cabin pressure altitude). The greater quantity of either the supplemental or protective breathing requirements is used to determine the minimum dispatch cylinder pressures provided. An additional 10% of oxygen quantity is supplied by the values provided in the tables to account for normal system leakage, ancillary crew usage, and other contingencies.

To determine the minimum dispatch oxygen cylinder pressure enter the flight crew oxygen table with the number of crew plus observers using oxygen and read the minimum cylinder pressure required for the appropriate cylinder temperature.

Flight Crew Oxygen System - Freighter Airplanes Only

Regulations require that sufficient oxygen be provided to the flight crew to account for adequate crew oxygen in case of a main deck cargo fire, which requires depressurization, intermediate level off at 25000 ft altitude and landing at the nearest suitable airport.

To determine the required cylinder pressure for the 767 Freighter dual 114 cubic ft cylinder crew oxygen system, enter the first table "Minimum Dispatch Pressure for Normal Oxygen Flow" with the number of

crew plus observers using oxygen and the maximum diversion time from the intended route to the nearest suitable alternate and determine normal flow dispatch pressure requirement. To account for 100% oxygen flow, enter the second table "Additional Pressure Required for 100% Oxygen" with the number of persons using 100% oxygen and maximum diversion time and read additional dispatch pressure requirement. At 100% oxygen, the dispatch pressure required is the sum of the normal flow dispatch pressure requirement and the additional pressure required for 100% oxygen.

For ambient temperatures above or below 21°C adjust the required dispatch pressure by the appropriate correction from the third table "Temperature Corrections".

Driftdown

Net Level Off Weight

This chart is used to determine the maximum weight for terrain clearance based on the approved Airplane Flight Manual net engine inoperative performance at the speed for optimum climb gradient. Regulations require terrain clearance flight planning based on net performance which is the gross (or actual) gradient performance degraded by 1.1%.

The net level off pressure altitude must clear the terrain by 1000 ft. Enter the chart to determine the maximum weight for terrain clearance, enter with net level off pressure altitude, proceed to the ISA deviation and read weight. Adjust weight for engine bleed configuration with the weight adjustments shown below the chart.

Driftdown Profiles Net Flight Path

These charts are provided to determine the time, fuel and distance from engine failure at any point during driftdown for legal enroute terrain clearance. Data is based on net performance, max continuous thrust following engine failure and level flight deceleration to optimum driftdown speed (speed for optimum climb gradient).

To determine driftdown time, fuel and distance, enter the appropriate chart with pressure altitude for terrain clearance (terrain height plus 2000 ft), move horizontally to equivalent weight at engine failure (corrected for ISA deviation and anti-ice operation as indicated) and read fuel burned from the point of engine failure by interpolating between dashed lines. Read time and ground distance from point of engine failure by moving vertically downward from equivalent weight, adjusting distance for wind.

Driftdown/LRC Cruise Range Capability

This chart shows the range capability from the start of driftdown/cruise based on level off following driftdown and targeting the one engine inoperative Long Range Cruise speed. The cruise segment is at a level off altitude which is based on 100 ft/min residual rate of climb.

To determine the fuel required, enter the chart with the desired ground distance, adjust for the anticipated wind, and proceed vertically to the start of driftdown weight and read the fuel required to the right. The time required is read to the left from the single weight line on top. The chart may be used in reverse to determine the range capability knowing the fuel remaining from the start of driftdown.

ETOPS

ETOPS regulations require that flight conducted over a route that contains a point further than one hour's time at "normal one-engine inoperative speed" from an adequate airport comply with rules specific to extended operations for airplanes with two or more engines. If the airplane meets these requirements, the approved Airplane Flight Manual (AFM) will contain a statement to this effect. This section provides the planning and inflight performance information necessary to conduct operations under these regulations.

Information is presented for several different descent/cruise speed schedules and is based on emergency descent to 10000 ft, or driftdown to thrust limited level-off height, and level flight cruise. Operators may select any one of these speed schedules, dependent on their route requirements, or may opt to use a speed not contained in this section that better meets their operational requirements.

Information provided includes Area of Operation, Critical Fuel Reserves, Net Level-Off Weight and Driftdown/Cruise Range Capability. Data are included for five speed schedules (Long Range Cruise (LRC), .78/290, .80/310, .80/330 and .80/350) throughout this section to allow operators to evaluate use of various speeds.

Area of Operation (Diversion Distance)

The maximum diversion distance used to establish the Area of Operation may be obtained from this chart. The Area of Operation is defined as the region within which the operator is authorized to conduct extended operations. The distance to a diversion airport from any point along the intended route must be covered within the approved time at the one-engine-inoperative cruise

speed selected by the operator. Data are based on driftdown and level cruise in still air and ISA conditions at the speed schedules previously noted.

To determine maximum diversion distance, enter the chart with weight, speed schedule, and diversion time selected and read maximum diversion distance

Critical Fuel Reserves

ETOPS Regulations require reserve planning to include a "Critical Fuel Scenario" calculation. The information shown is the fuel required to satisfy the flight profile described on the charts. This information is shown for all engines operating at LRC and for one engine inoperative at the speed schedules previously noted. There are two engine-inoperative scenarios, a decompression scenario and a driftdown scenario. The decompression scenario assumes an engine failure, loss of pressurization, emergency descent, and subsequent cruise at 10000 ft. The driftdown scenario assumes an engine failure without loss of pressurization, where the airplane "drifts down" to thrust limited level-off altitude for the remainder of the diversion.

The ETOPS critical fuel required is the greater of all-engine fuel at LRC or engine-inoperative fuel for the speed schedule selected. The ETOPS critical fuel required is compared to the amount of fuel that is predicted to be onboard the airplane at the critical point. If the fuel required by the ETOPS critical fuel reserves of the route exceeds the amount of fuel predicted, the fuel load must be adjusted accordingly. The data does not include an allowance for performance deterioration. However, regulations require a 5% allowance for performance deterioration unless a value has been established by the operator for in-service deterioration.

To determine the ETOPS critical fuel required, enter the appropriate chart with diversion distance, adjust for forecast wind (factored if applicable), proceed vertically to weight at the critical point, and read fuel required to the right. When using a wind forecasting model acceptable to the FAA (such as the World Area Forecast System, WAFS), regulations allow the wind factor applied in this step to be 5% of the forecast wind (increase headwinds, decrease tailwinds), as indicated in the note below the chart. However, if an FAA-acceptable wind forecasting model is not used, the ETOPS critical fuel must be increased by 5%, instead of factoring the forecast winds. Adjustments for non-standard conditions are shown below each chart.

Net Level Off Weight

The Net Level Off Weight charts are used to determine maximum weight for terrain clearance based on net one-engine-inoperative performance for the speed schedules

previously noted. ETOPS regulations require terrain clearance flight planning based on net one-engine-inoperative performance, which is gross gradient performance reduced by 1.1%.

To determine the net level-off weight, enter the appropriate chart from the left with required level off pressure altitude. Proceed horizontally to the right to the appropriate ISA deviation line, then vertically down to read weight. Correct weight for anti-ice configuration as required. The chart can be used in reverse order to obtain net level-off altitude when the desired level-off weight is known

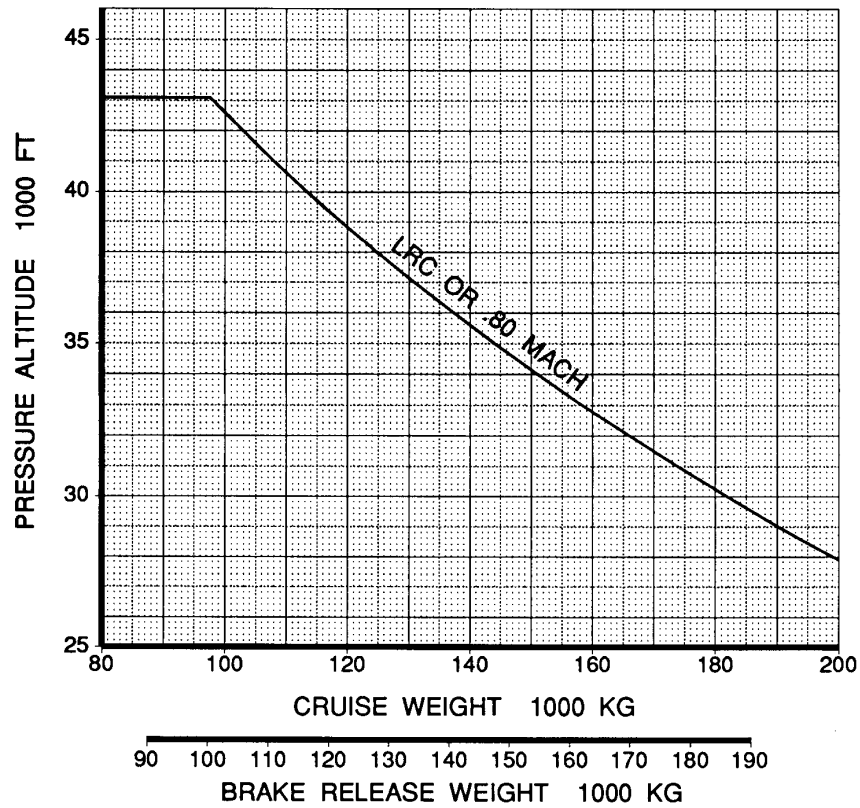
Driftdown/Cruise Range Capability

These charts show range capability from the start of driftdown/cruise when the driftdown/cruise procedure outlined in this section is followed. Charts are shown for each of the speed schedules discussed previously

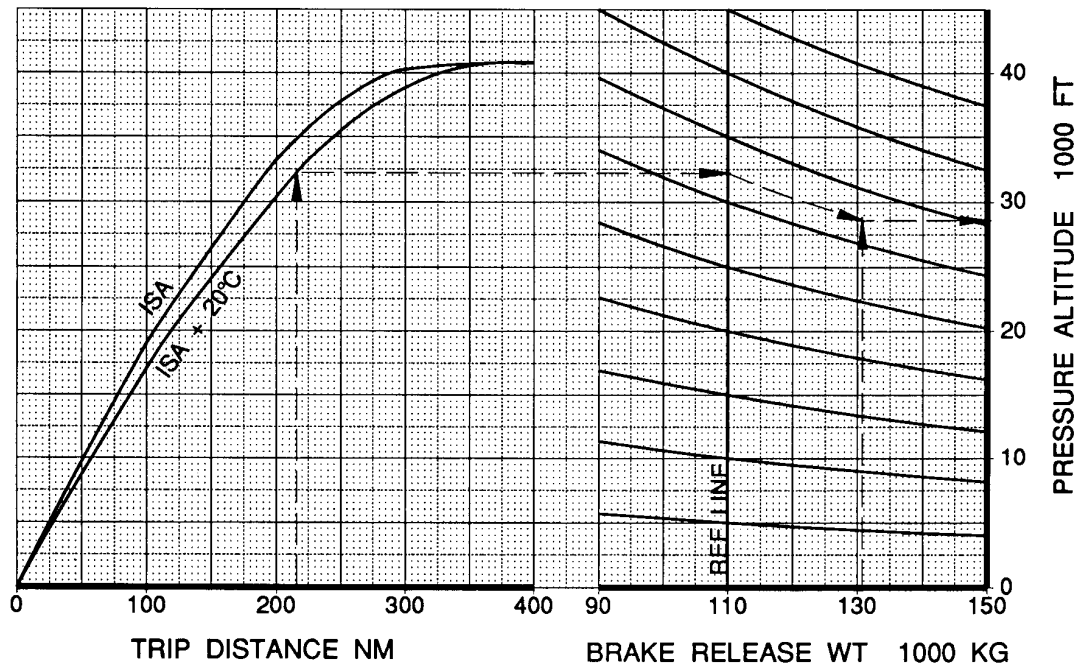
To determine fuel required, enter the appropriate chart with desired ground distance, adjust for the anticipated wind, and proceed vertically to the start of driftdown weight and read fuel required to the right. The time required is read to the left from the single weight line on top. The chart may be used in reverse to determine range capability, if fuel remaining from the start of driftdown is known.

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Optimum Altitude



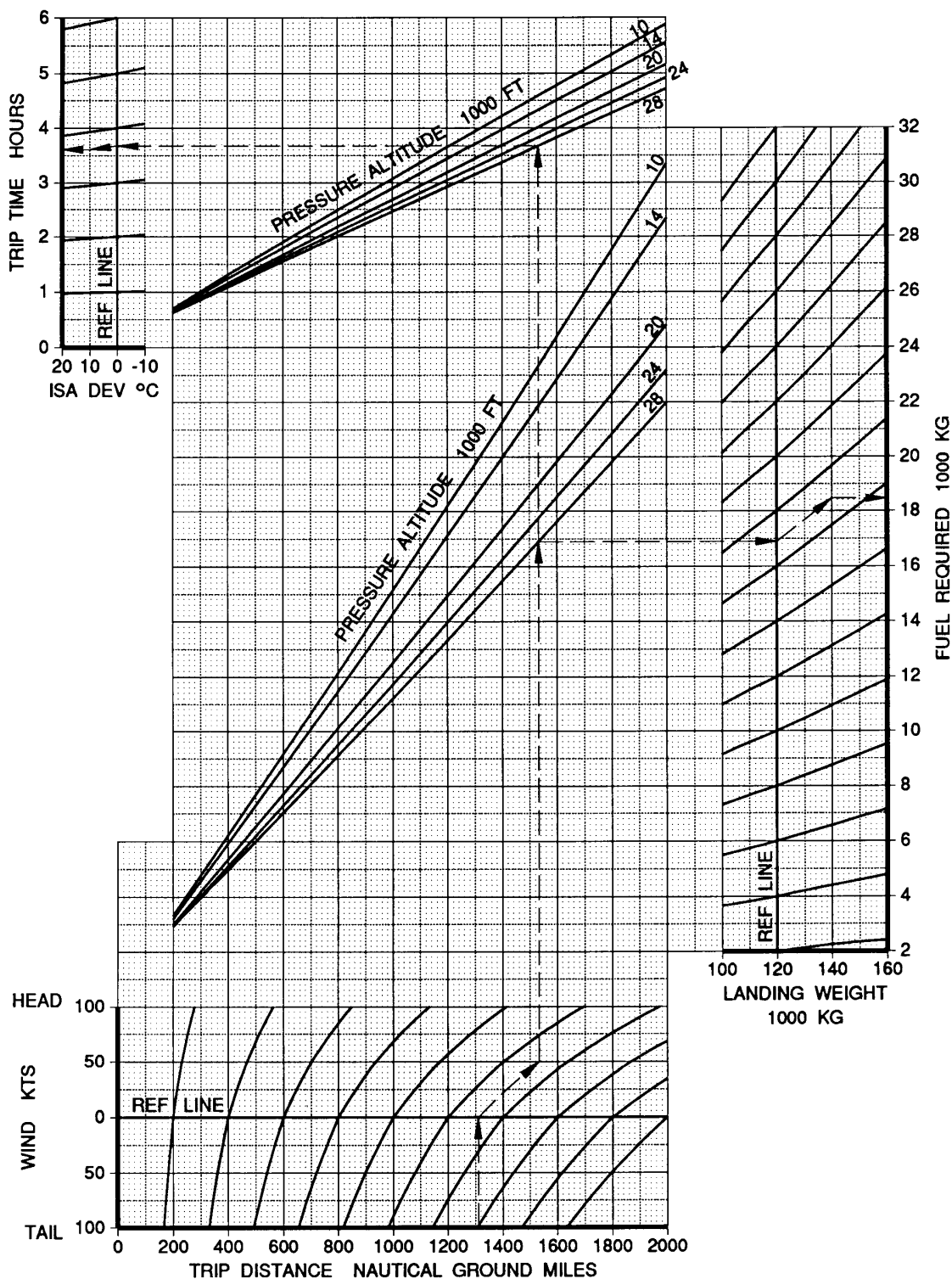
Short Trip Cruise Altitude



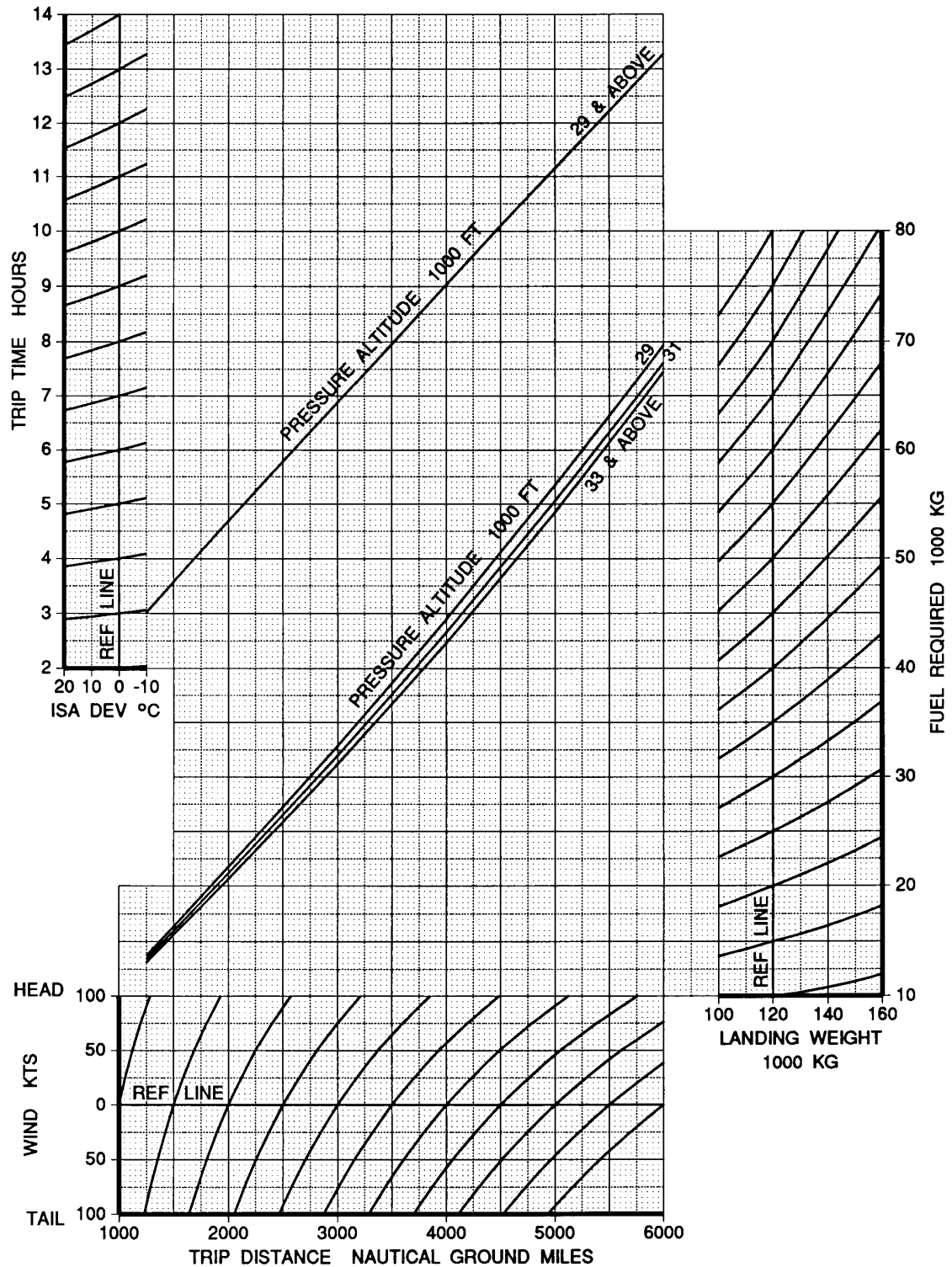
Long Range Cruise Trip Fuel and Time

0 to 2000 NM Distance

Based on 290/.78 climb and .78/290/250 descent



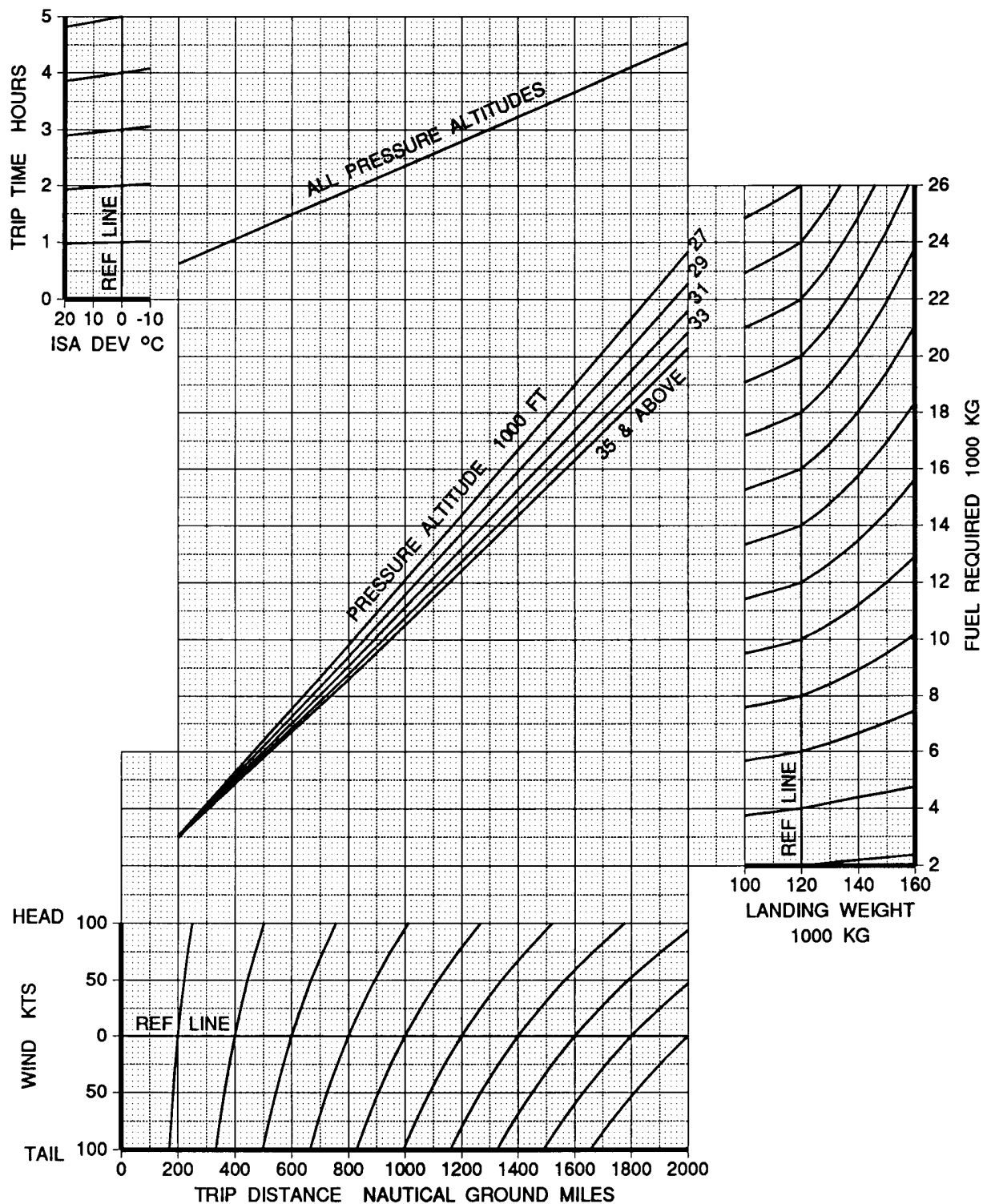
Long Range Cruise Trip Fuel and Time 1000 to 6000 NM Distance Based on 290/.78 climb and .78/290/250 descent



.80M Trip Fuel and Time

0 to 2000 NM Distance

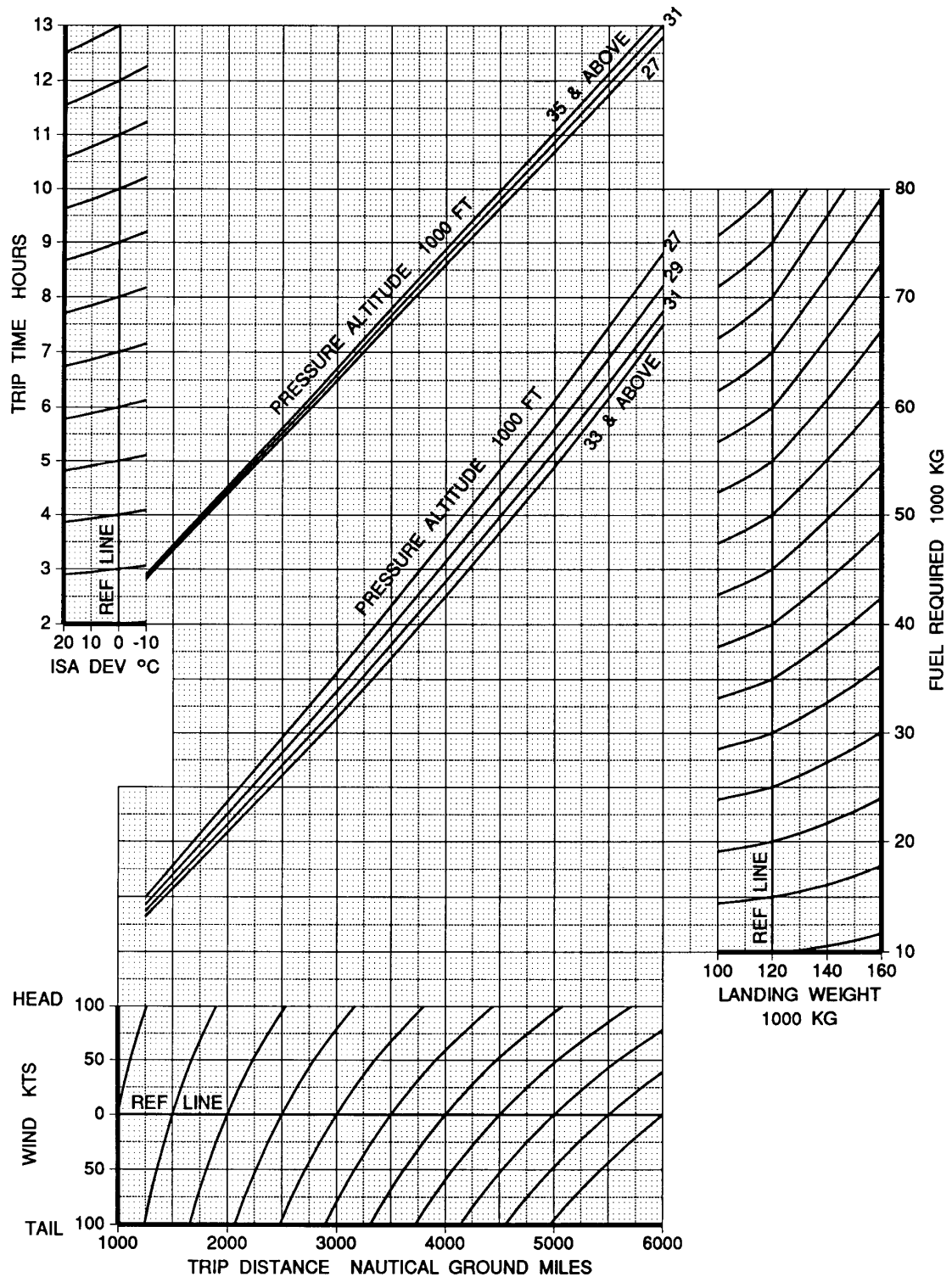
Based on 290/.78 climb and .78/290/250 descent



.80M Trip Fuel and Time

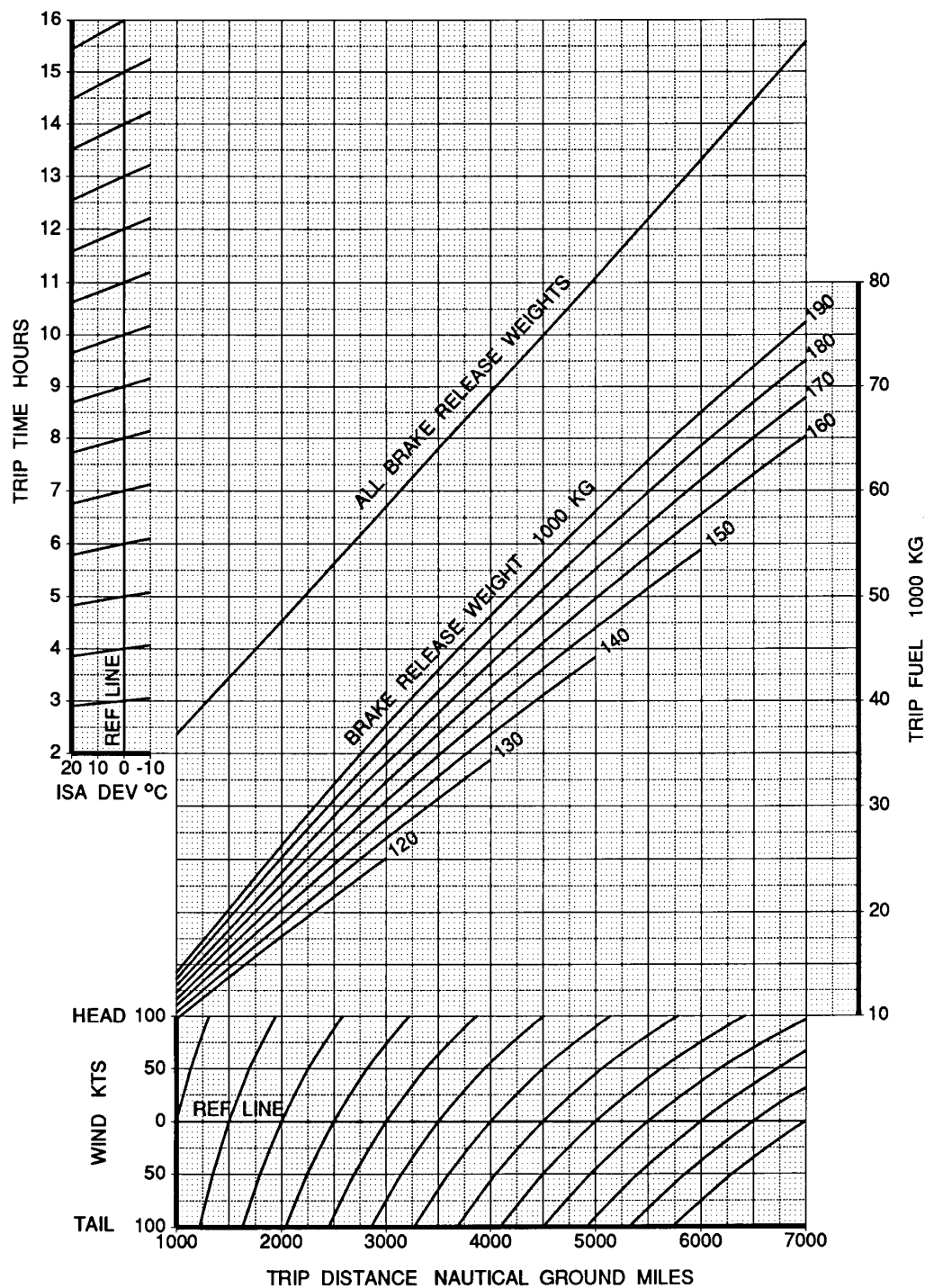
1000 to 6000 NM Distance

Based on 290/.78 climb and .78/290/250 descent



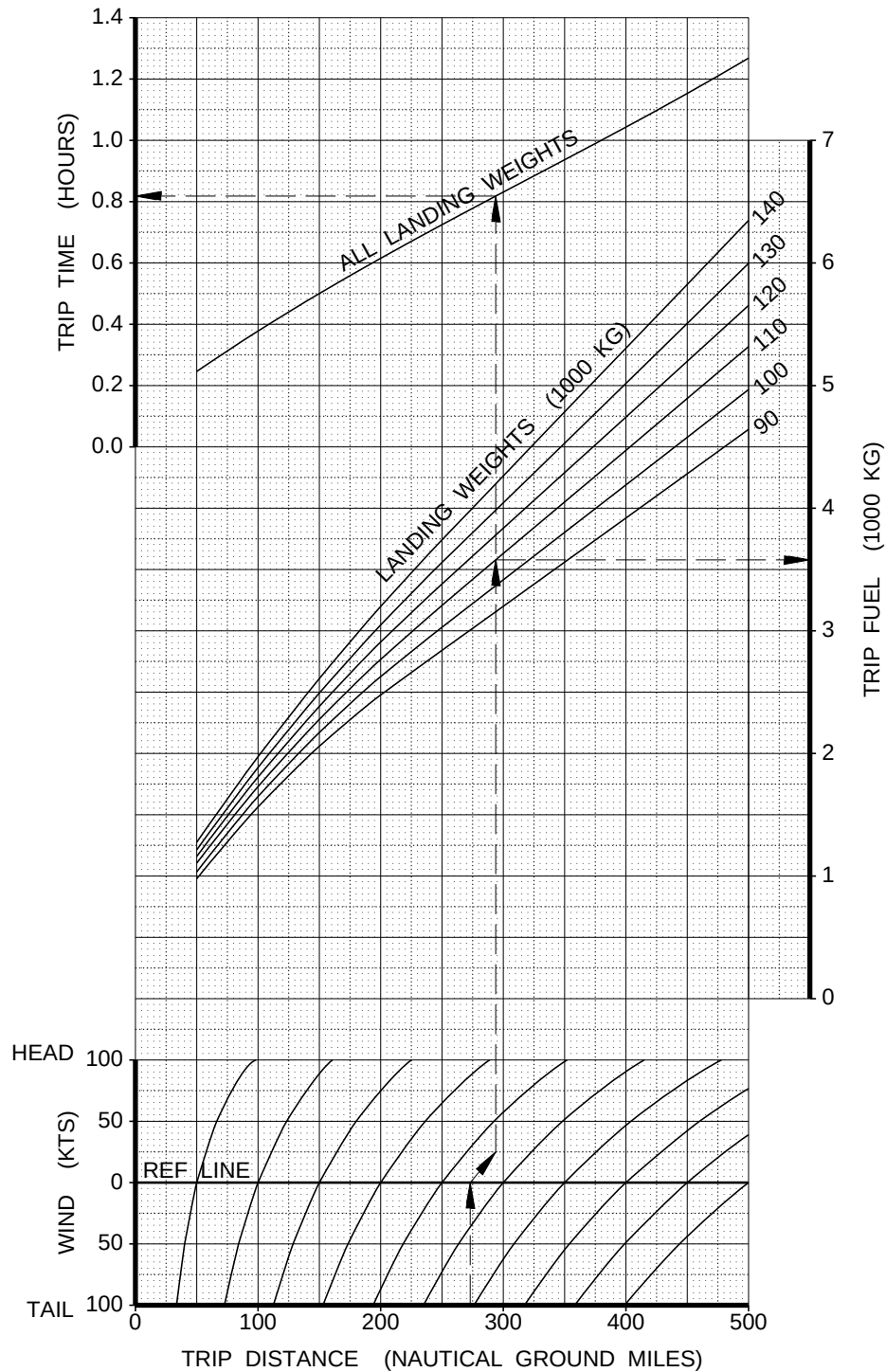
Long Range Cruise Step Climb Trip Fuel and Time

Based on .290/.78 climb, LRC or .80M cruise and .78/290/250 descent



Long Range Cruise Short Trip Fuel and Time

Based on 290/.78 climb, short trip cruise altitude and .78/290/250 descent



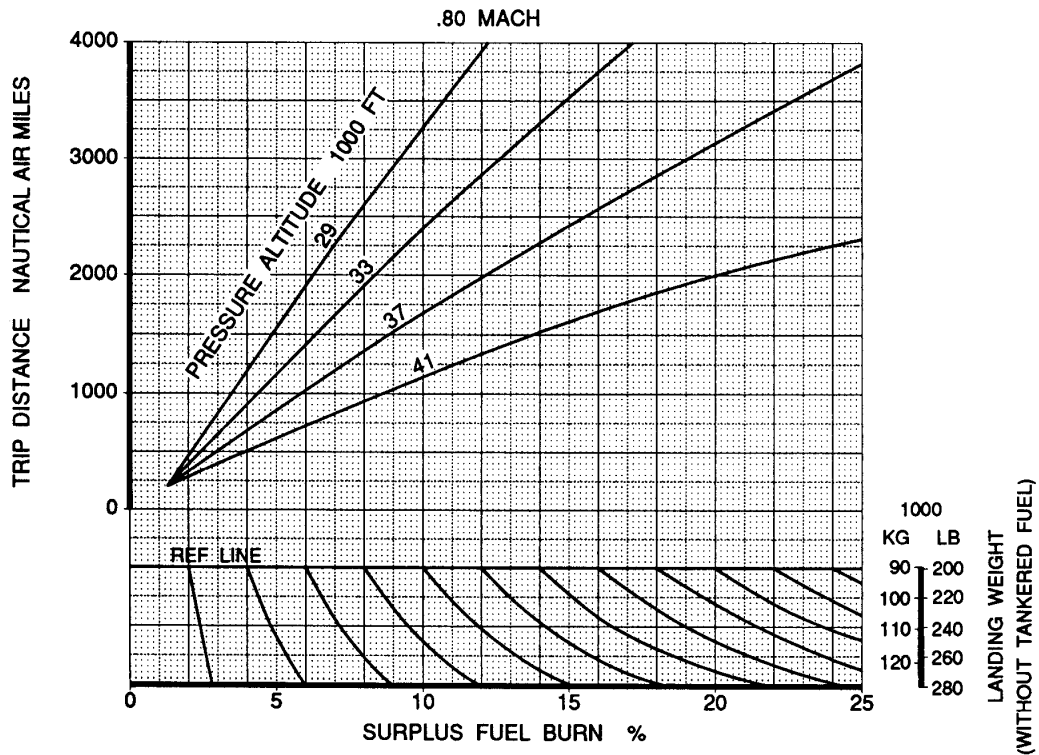
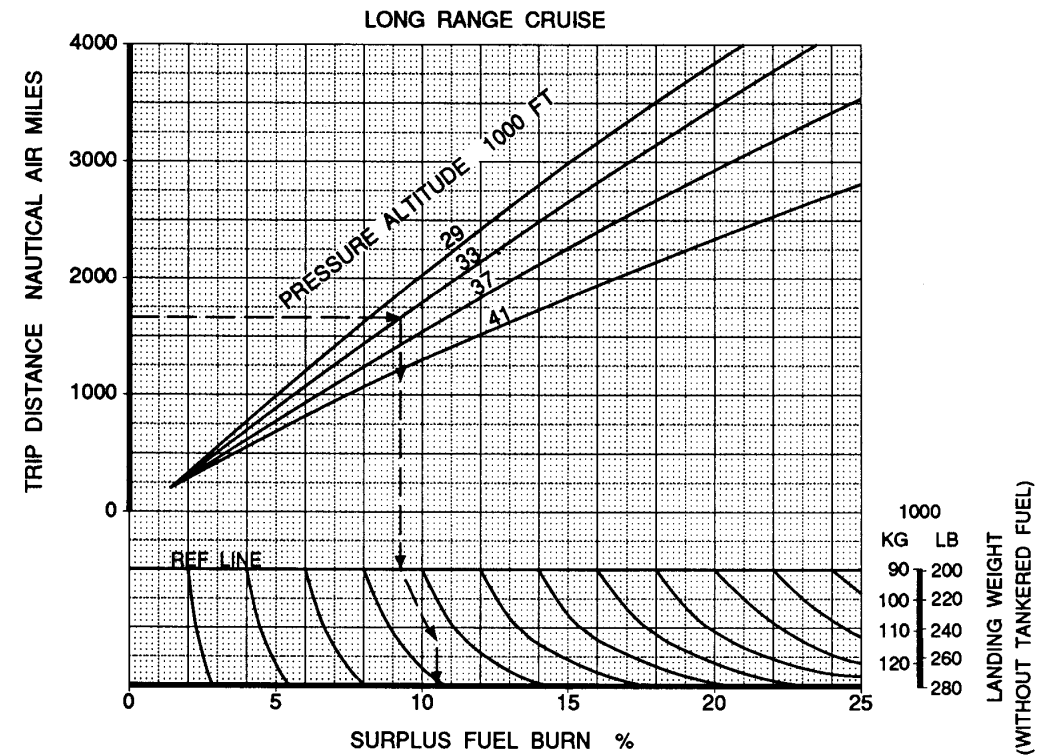
Holding Planning

Flaps Up

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)									
	WEIGHT (1000 KG)									
	190	180	170	160	150	140	130	120	110	100
40000							4360	3870	3500	3190
35000			5730	5170	4730	4370	4010	3670	3370	3080
30000	6050	5670	5300	4950	4600	4250	3940	3660	3390	3110
25000	5880	5530	5190	4860	4540	4240	3970	3700	3430	3140
20000	5800	5480	5180	4880	4570	4270	3980	3690	3400	3130
15000	5960	5640	5330	5030	4720	4410	4110	3820	3540	3270
10000	6060	5730	5400	5080	4770	4470	4180	3890	3620	3360
5000	6100	5760	5440	5120	4810	4520	4230	3940	3670	3400
1500	6130	5810	5500	5200	4900	4610	4320	4040	3760	3480

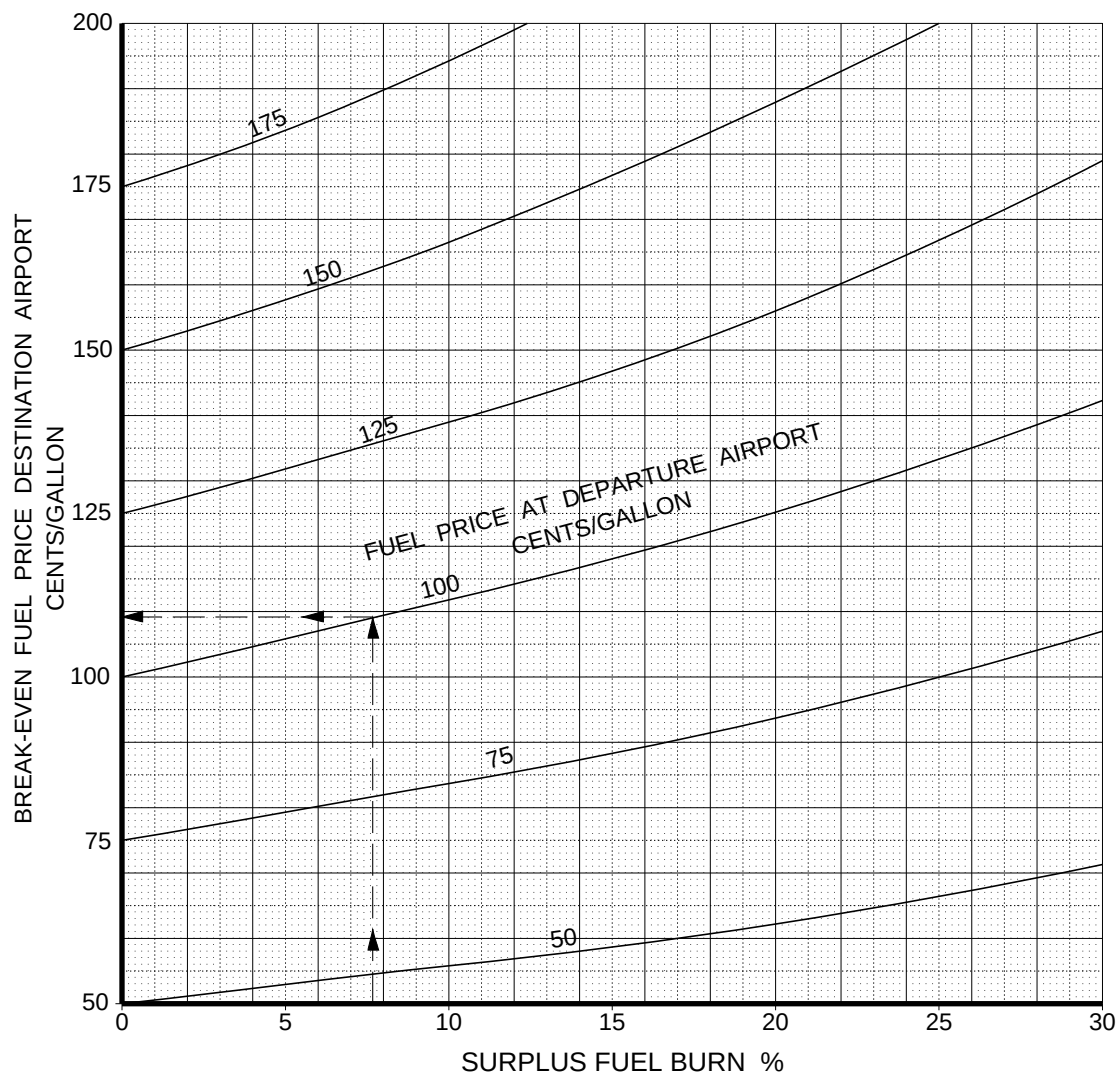
This table includes 5% additional fuel for holding in a racetrack pattern.

Fuel Tankering LRC/.80M



Fuel Tankering

Fuel Price Differential



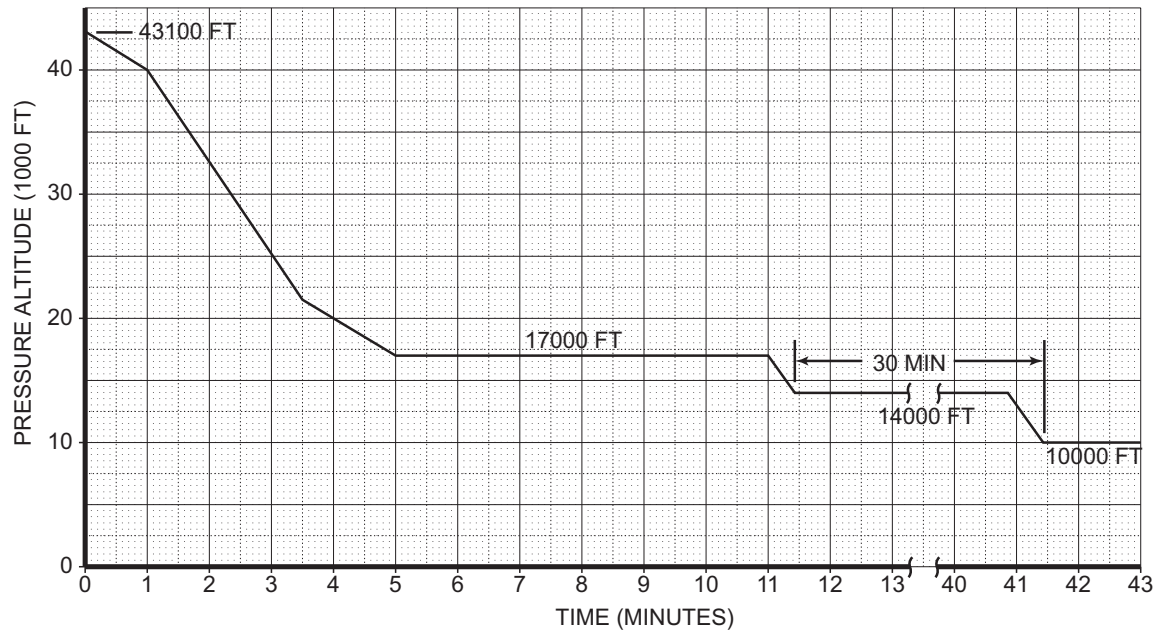
Oxygen Requirements

Passenger Oxygen System

Passenger Airplanes Only

Maximum Altitude Envelope

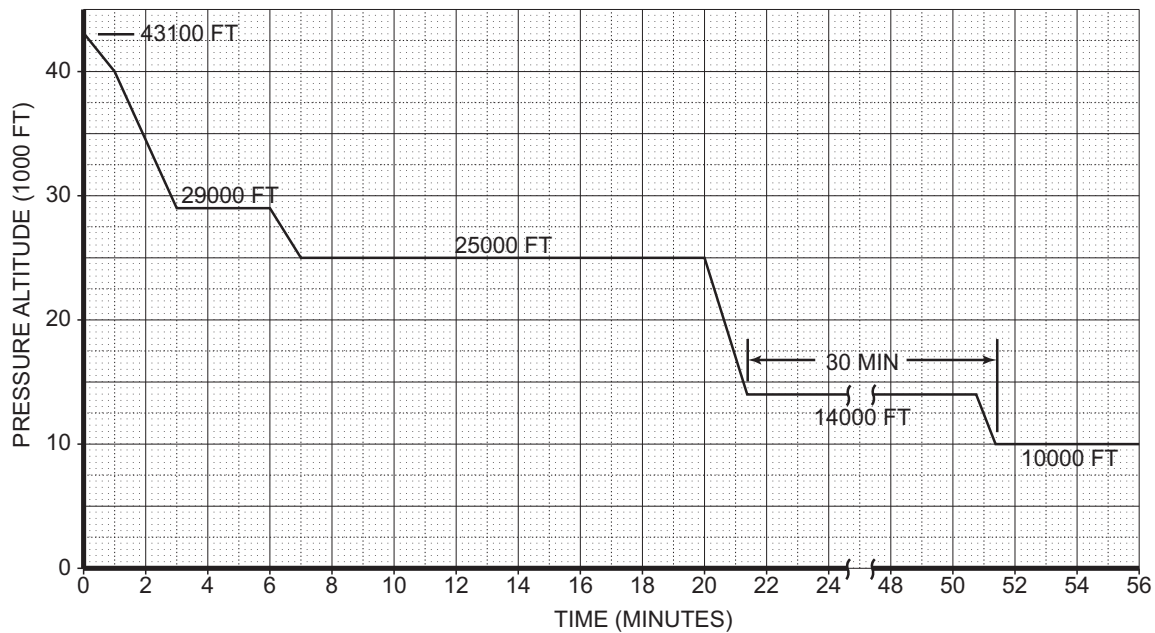
Based on 12 Minute Chemical System



The passenger oxygen system will provide sufficient supplemental breathing oxygen for altitudes at or below this envelope.

Maximum Altitude Envelope

Based on 22 Minute Chemical System



The passenger oxygen system will provide sufficient supplemental breathing oxygen for altitudes at or below this envelope.

Oxygen Requirements

Flight Crew System

Passenger Airplanes Only

MINIMUM DISPATCH PRESSURE
(PSI) FOR 76 FT³ BOTTLE

BOTTLE TEMPERATURE		NUMBER OF CREW USING OXYGEN			
°C	°F	2	3	4	5
-10	14	600	860	1110	1370
-5	23	610	875	1130	1395
0	32	620	890	1150	1420
5	41	635	910	1175	1445
10	50	645	925	1195	1475
15	59	655	940	1215	1500
20	68	670	960	1240	1530
25	77	680	975	1255	1550
30	86	690	990	1280	1580
35	95	700	1005	1300	1600
40	104	715	1020	1320	1630
45	113	725	1040	1340	1655
50	122	735	1055	1360	1680

MINIMUM DISPATCH PRESSURE
(PSI) FOR 114 FT³ BOTTLE

BOTTLE TEMPERATURE		NUMBER OF CREW USING OXYGEN			
°C	°F	2	3	4	5
-10	14	430	600	770	940
-5	23	440	610	785	960
0	32	445	620	800	975
5	41	455	635	815	995
10	50	460	645	830	1010
15	59	470	655	840	1030
20	68	480	670	860	1050
25	77	485	680	870	1065
30	86	495	690	885	1080
35	95	505	700	900	1100
40	104	510	715	915	1120
45	113	520	725	930	1135
50	122	530	735	945	1155

Oxygen Requirements

Flight Crew Oxygen

Freighter Airplanes Only

Minimum Dispatch Pressure for Normal Oxygen Flow

2 114 Cubic Ft. Cylinders

NUMBER OF CREW USING OXYGEN	CYLINDER PRESSURE (PSI)					
	TOTAL TIME ON DILUTED OXYGEN (MINUTES)					
	30	60	90	120	150	180
2	290	290	365	445	525	610
3	385	385	495	620	740	860
4	480	480	630	790	950	1110
5	575	575	760	960	1165	1365
6	670	670	890	1135	1375	1620

Additional Pressure Required for 100% Oxygen

NUMBER OF CREW USING OXYGEN	CYLINDER PRESSURE (PSI)					
	TOTAL TIME ON 100% OXYGEN (MINUTES)					
	30	60	90	120	150	180
2	0	40	80	110	150	175
3	0	60	120	170	220	270
4	0	75	155	225	290	360
5	0	95	200	285	365	450
6	0	115	240	335	440	540

Temperature Corrections

CYLINDER PRESSURE REQUIRED AT AMBIENT TEMPERATURE OF 21°C (PSI)	PRESSURE CORRECTION PER 5°C ABOVE/BELOW 21°C (PSI)*
200	+4/-4
400	+7/-7
600	+11/-11
800	+14/-14
1000	+17/-17
1200	+21/-21
1400	+24/-24
1600	+28/-28
1800	+31/-31
2000	+34/-34

*Max cylinder pressure 1850 PSI.

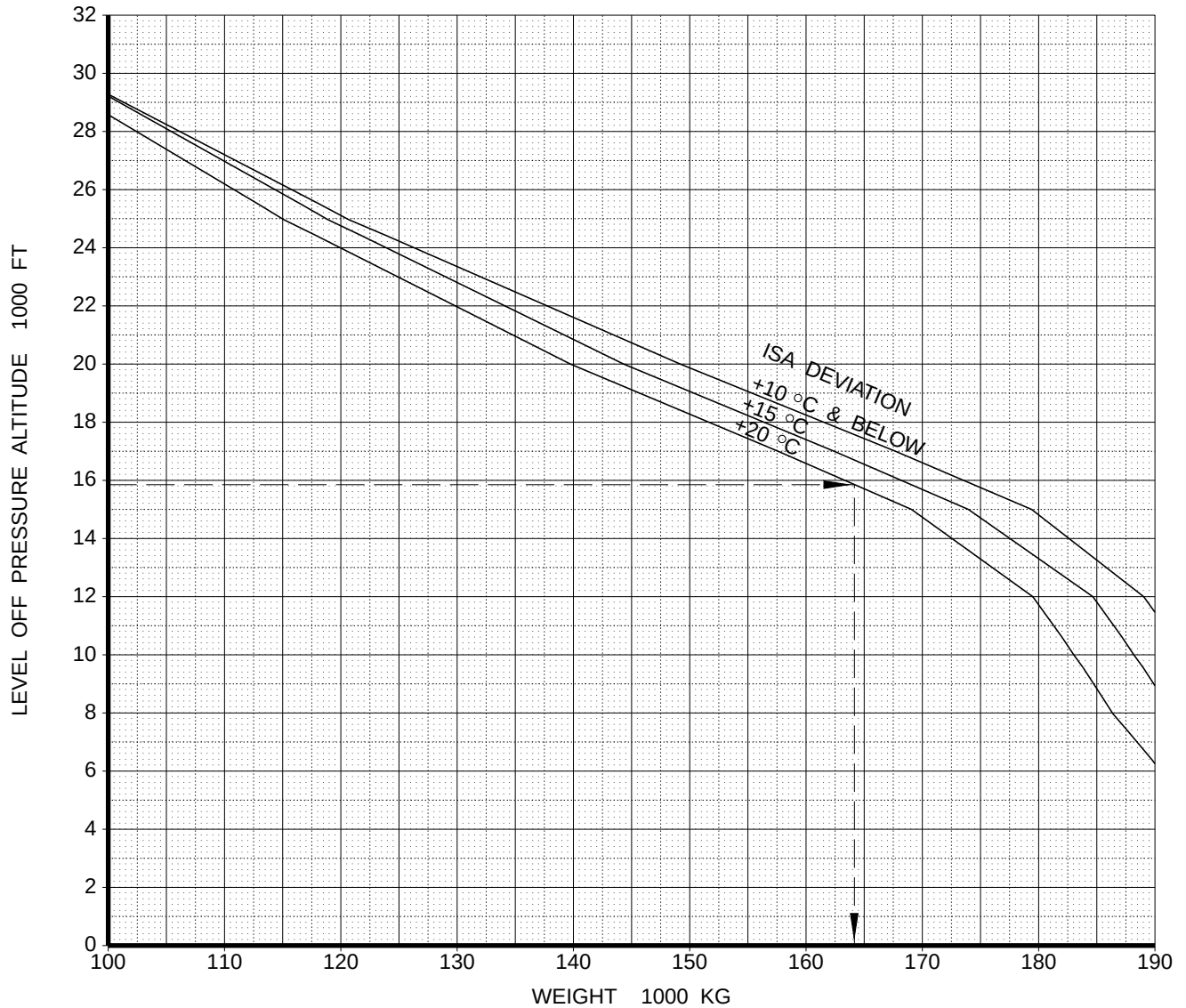
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ENGINE INOP

MAX CONTINUOUS THRUST

Net Level Off Weight

Based on engine bleed for packs on or off, APU on or off and anti-ice off



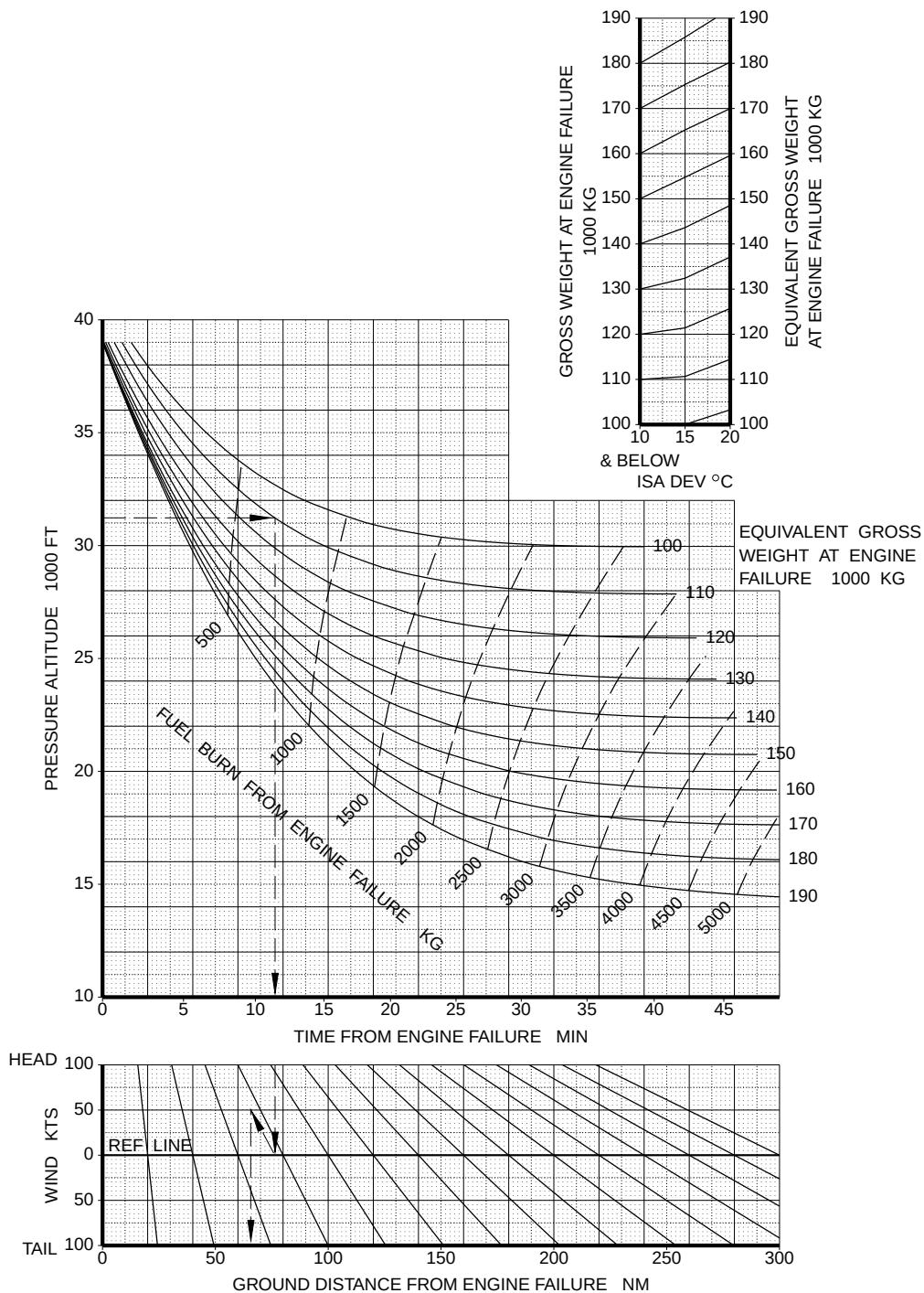
With engine anti-ice on, decrease allowable weight by 6000 kg.

With engine and wing anti-ice on, decrease allowable weight by 14500 kg.

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path

Based on engine bleed for packs on or off, APU on or off and anti-ice off
39000 FT & Above

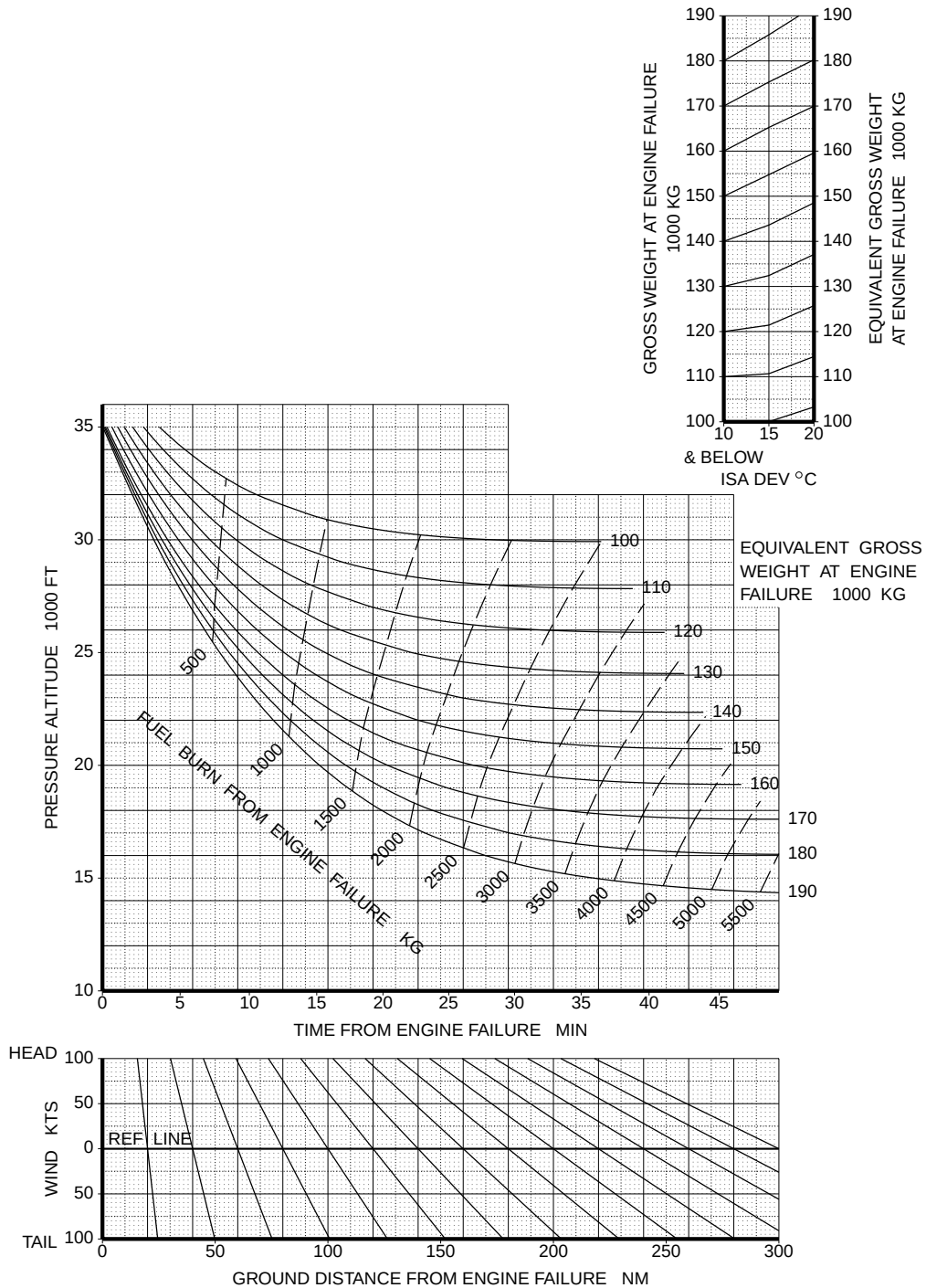


With engine anti-ice on, increase allowable weight by 6000 kg.
With engine and wing anti-ice on, increase allowable weight by 14500 kg.

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path

Based on engine bleed for packs on or off, APU on or off and anti-ice off
35000 FT to 37000 FT

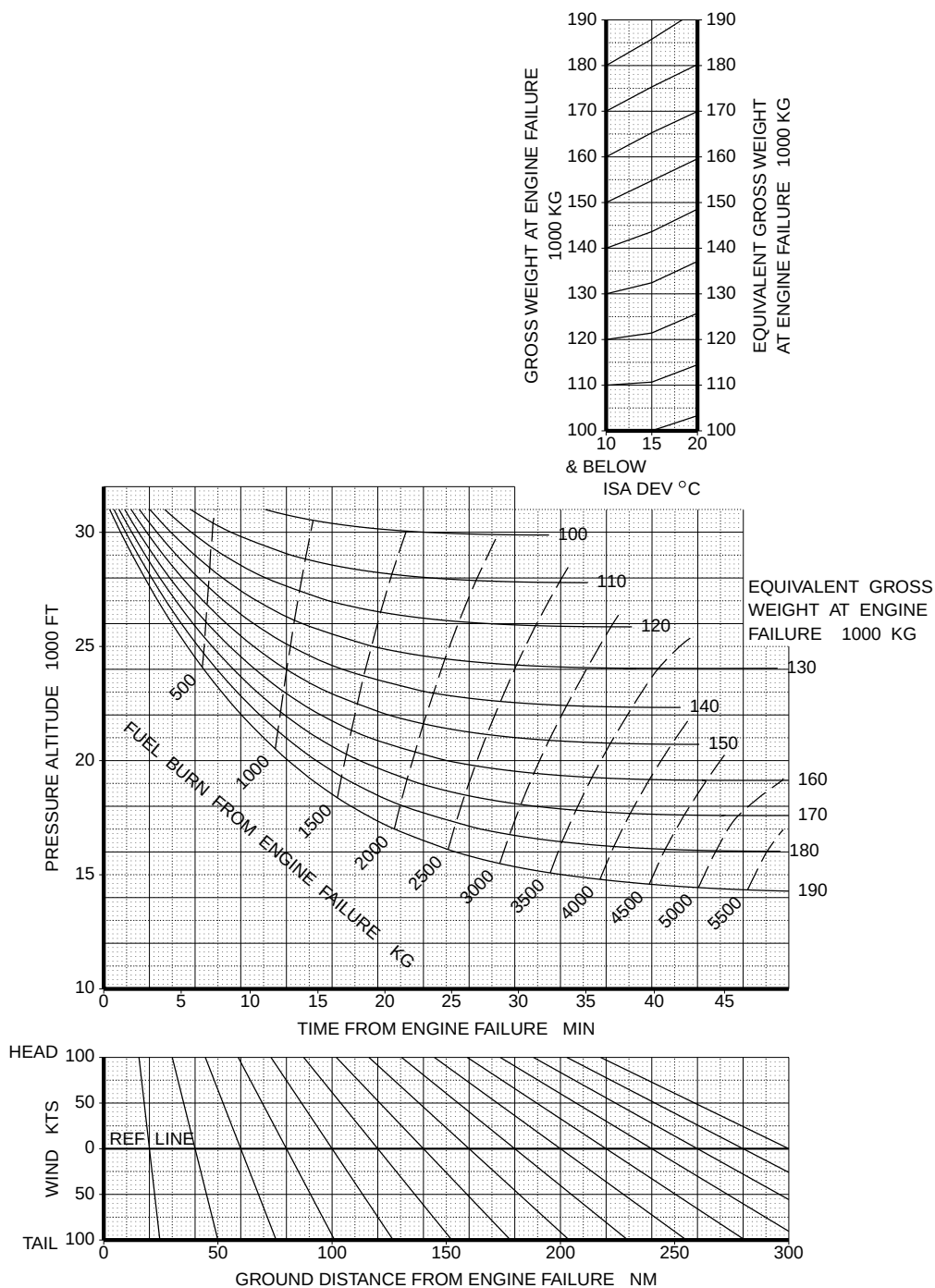


With engine anti-ice on, increase allowable weight by 6000 kg.
With engine and wing anti-ice on, increase allowable weight by 14500 kg.

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path

Based on engine bleed for packs on or off, APU on or off and anti-ice off
31000 FT to 33000 FT



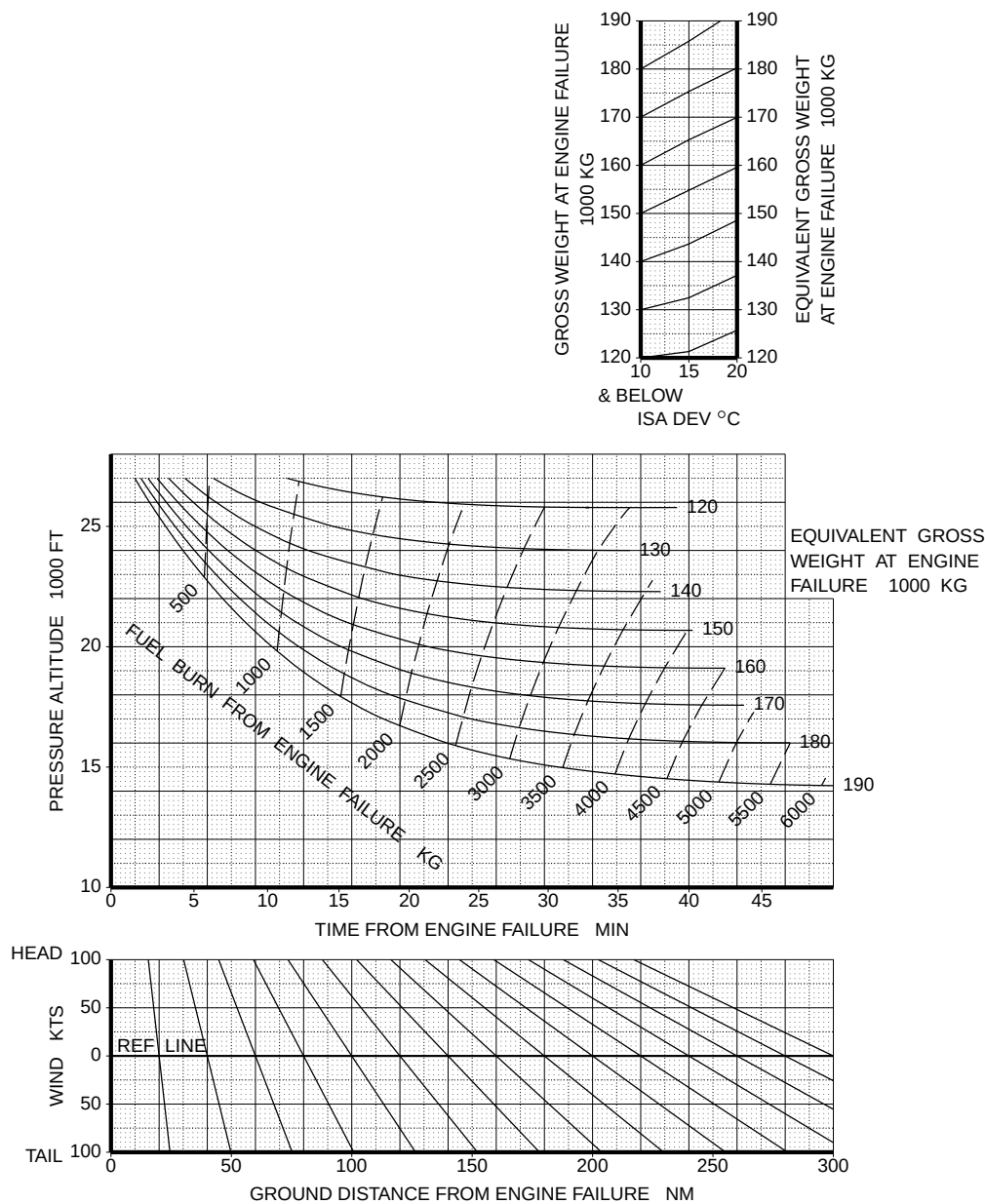
With engine anti-ice on, increase allowable weight by 6000 kg.
With engine and wing anti-ice on, increase allowable weight by 14500 kg.

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path

Based on engine bleed for packs on or off, APU on or off and anti-ice off
 27000 FT to 29000 FT



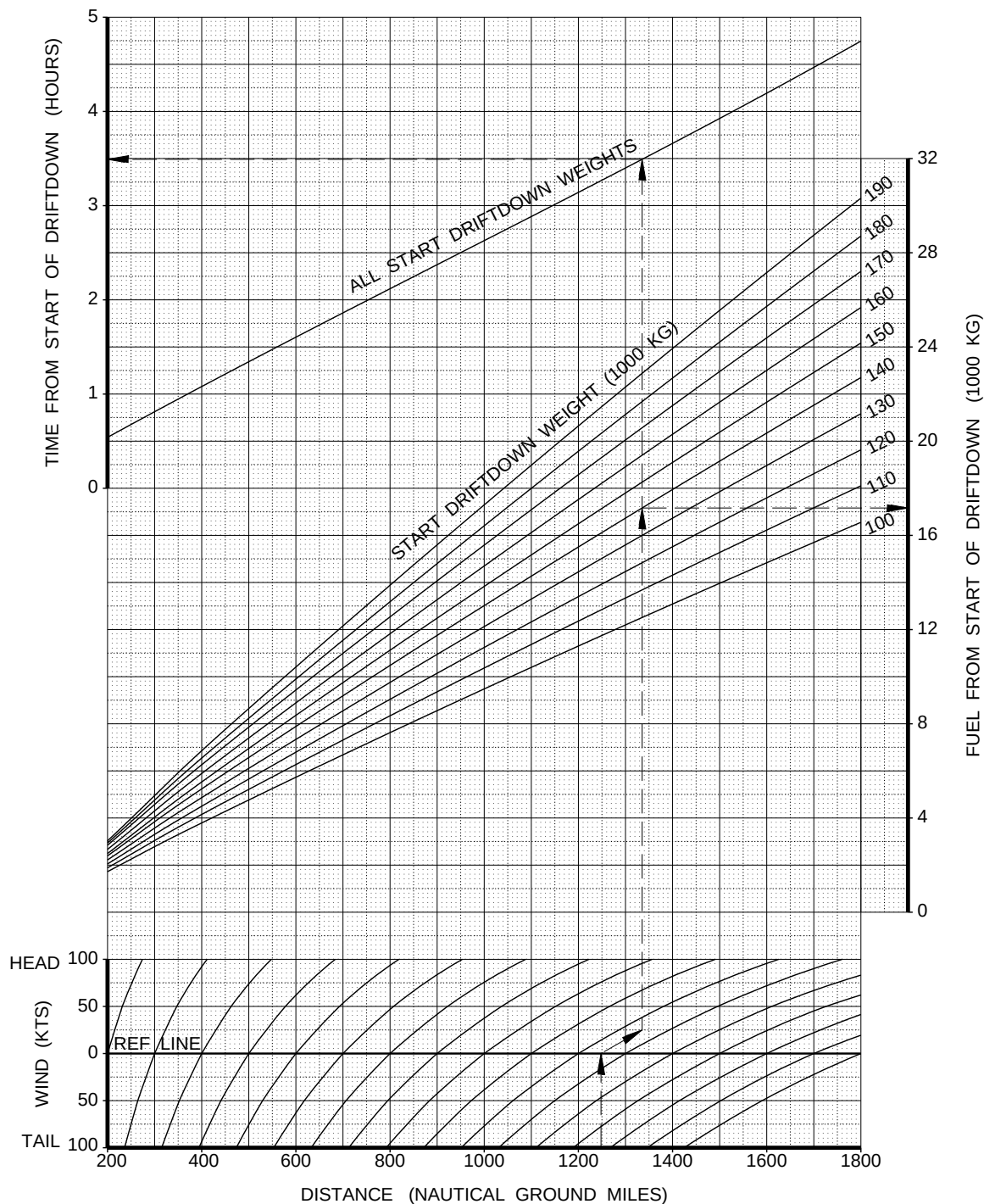
With engine anti-ice on, increase allowable weight by 6000 kg.
 With engine and wing anti-ice on, increase allowable weight by 14500 kg.

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown/LRC Cruise Range Capability

Includes APU fuel burn

Driftdown at optimum speed and cruise at Long Range Cruise speed



ENGINE INOP

MAX CONTINUOUS THRUST

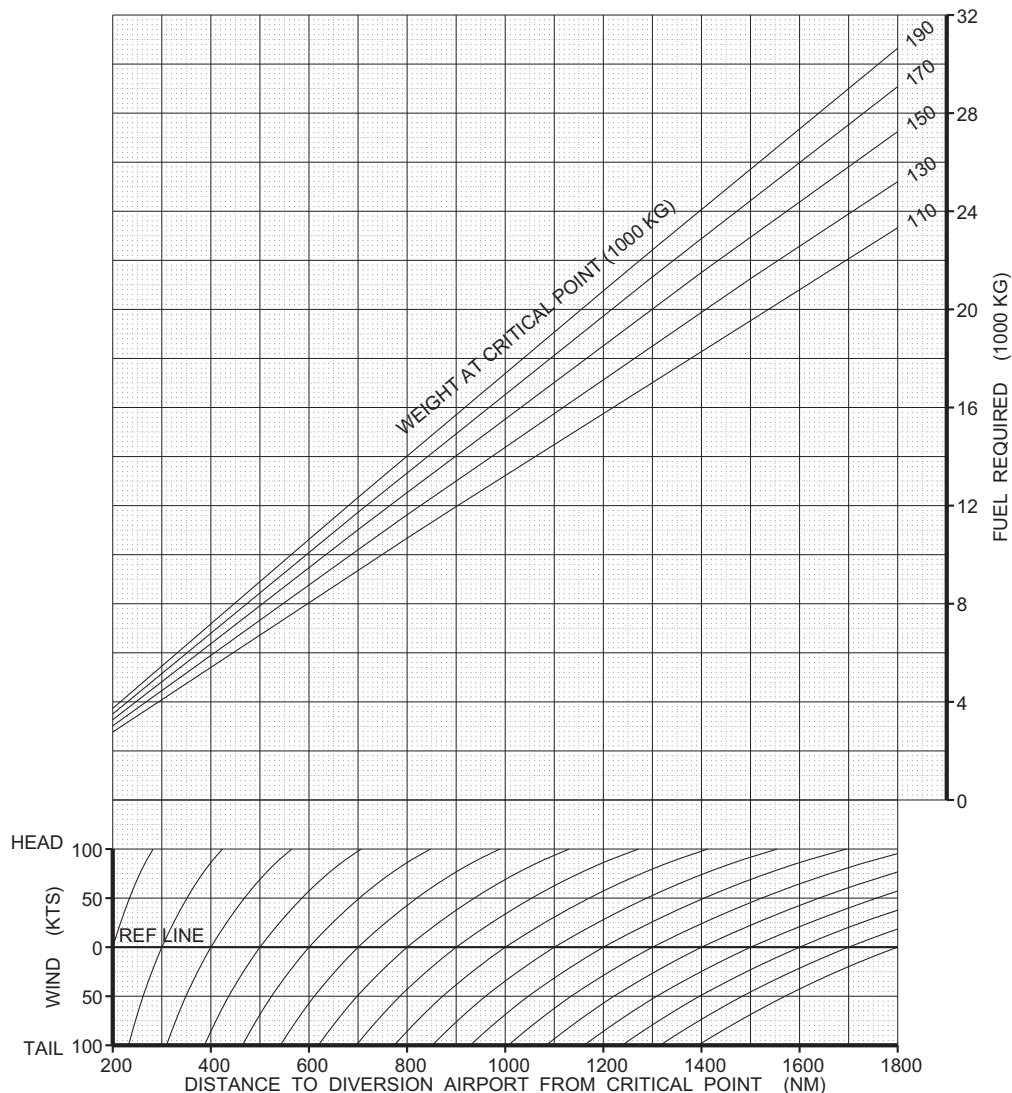
Area of Operation

Based on standard day and driftdown starting at or near optimum altitude

SPEED M/KIAS	WEIGHT AT DIVERSION 1000 KG	TIME MINUTES															
		60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	
.78/290	110	434	505	576	647	718	789	860	931	1002	1073	1144	1215	1286	1357	1428	
	120	431	501	572	642	712	782	853	923	993	1064	1134	1204	1275	1345	1415	
	130	427	497	566	636	705	775	845	914	984	1053	1123	1192	1262	1332	1401	
	140	422	491	560	629	697	766	835	904	972	1041	1110	1179	1247	1316	1385	
	150	418	486	554	622	690	758	826	893	961	1029	1097	1165	1233	1301	1369	
	160	412	479	546	613	680	747	814	881	948	1015	1082	1149	1216	1283	1349	
	170	406	472	538	604	670	736	802	868	934	1000	1066	1132	1198	1264	1330	
	180	402	467	532	597	662	727	792	857	922	987	1052	1117	1182	1247	1312	
	190	395	459	523	587	651	715	779	843	907	971	1036	1100	1164	1228	1292	
.80/310	110	447	520	593	666	739	812	885	957	1030	1103	1176	1249	1322	1395	1468	
	120	444	516	589	661	733	806	878	951	1023	1095	1168	1240	1313	1385	1457	
	130	441	512	584	656	728	799	871	943	1015	1087	1158	1230	1302	1374	1445	
	140	437	508	579	650	722	793	864	935	1006	1077	1148	1219	1291	1362	1433	
	150	434	504	575	645	716	786	856	927	997	1068	1138	1209	1279	1350	1420	
	160	430	500	569	639	709	778	848	918	988	1057	1127	1197	1266	1336	1406	
	170	425	494	563	632	701	769	838	907	976	1045	1114	1183	1252	1321	1390	
	180	420	489	557	625	693	761	829	897	965	1033	1101	1169	1238	1306	1374	
	190	415	482	549	616	684	751	818	885	952	1019	1087	1154	1221	1288	1355	
.80/330	110	454	529	603	677	751	826	900	974	1048	1123	1197	1271	1346	1420	1494	
	120	452	526	600	674	748	822	896	970	1044	1118	1192	1266	1340	1413	1487	
	130	451	524	598	671	745	818	892	965	1039	1112	1186	1259	1333	1406	1480	
	140	448	521	594	667	740	813	886	959	1032	1105	1178	1251	1324	1397	1470	
	150	446	518	591	663	736	808	880	953	1025	1098	1170	1242	1315	1387	1460	
	160	442	514	586	657	729	801	873	945	1016	1088	1160	1232	1303	1375	1447	
	170	439	510	581	652	723	794	865	936	1008	1079	1150	1221	1292	1363	1434	
	180	435	506	576	647	717	788	858	928	999	1069	1140	1210	1281	1351	1421	
	190	431	501	570	640	710	779	849	919	988	1058	1128	1198	1267	1337	1407	
.80/350	110	460	535	610	685	760	835	911	986	1061	1136	1211	1286	1361	1436	1511	
	120	459	533	608	683	758	833	908	983	1057	1132	1207	1282	1357	1432	1506	
	130	457	532	606	681	756	830	905	979	1054	1128	1203	1277	1352	1426	1501	
	140	455	530	604	678	752	826	900	975	1049	1123	1197	1271	1346	1420	1494	
	150	454	528	601	675	749	823	896	970	1044	1117	1191	1265	1339	1412	1486	
	160	452	525	598	671	745	818	891	964	1037	1111	1184	1257	1330	1403	1477	
	170	449	521	594	667	739	812	885	957	1030	1102	1175	1248	1320	1393	1465	
	180	446	518	590	662	734	806	878	950	1022	1094	1166	1238	1311	1383	1455	
	190	442	513	585	656	727	798	870	941	1012	1083	1154	1226	1297	1368	1439	
LRC	110	400	464	527	590	653	716	778	840	902	964	1025	1086	1147	1207	1268	
	120	404	468	533	596	660	723	786	849	912	974	1036	1098	1159	1220	1281	
	130	407	472	537	602	666	730	794	857	920	983	1045	1108	1170	1232	1293	
	140	411	477	542	607	672	737	801	865	928	992	1055	1118	1180	1243	1305	
	150	415	481	547	613	678	743	808	872	936	1000	1064	1127	1190	1253	1315	
	160	417	484	550	616	682	747	812	877	941	1006	1069	1133	1196	1260	1322	
	170	419	486	552	619	684	750	816	881	945	1010	1074	1138	1202	1265	1328	
	180	422	489	556	622	689	755	820	886	951	1015	1080	1144	1208	1271	1335	
	190	422	489	556	623	689	755	821	886	951	1016	1081	1145	1209	1273	1336	

ALL ENGINES

Decompression Critical Fuel Reserves - LRC Cruise



Based on: Emergency descent to 10000 ft, level cruise at 10000 ft, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land.
Allowance for performance deterioration not included.

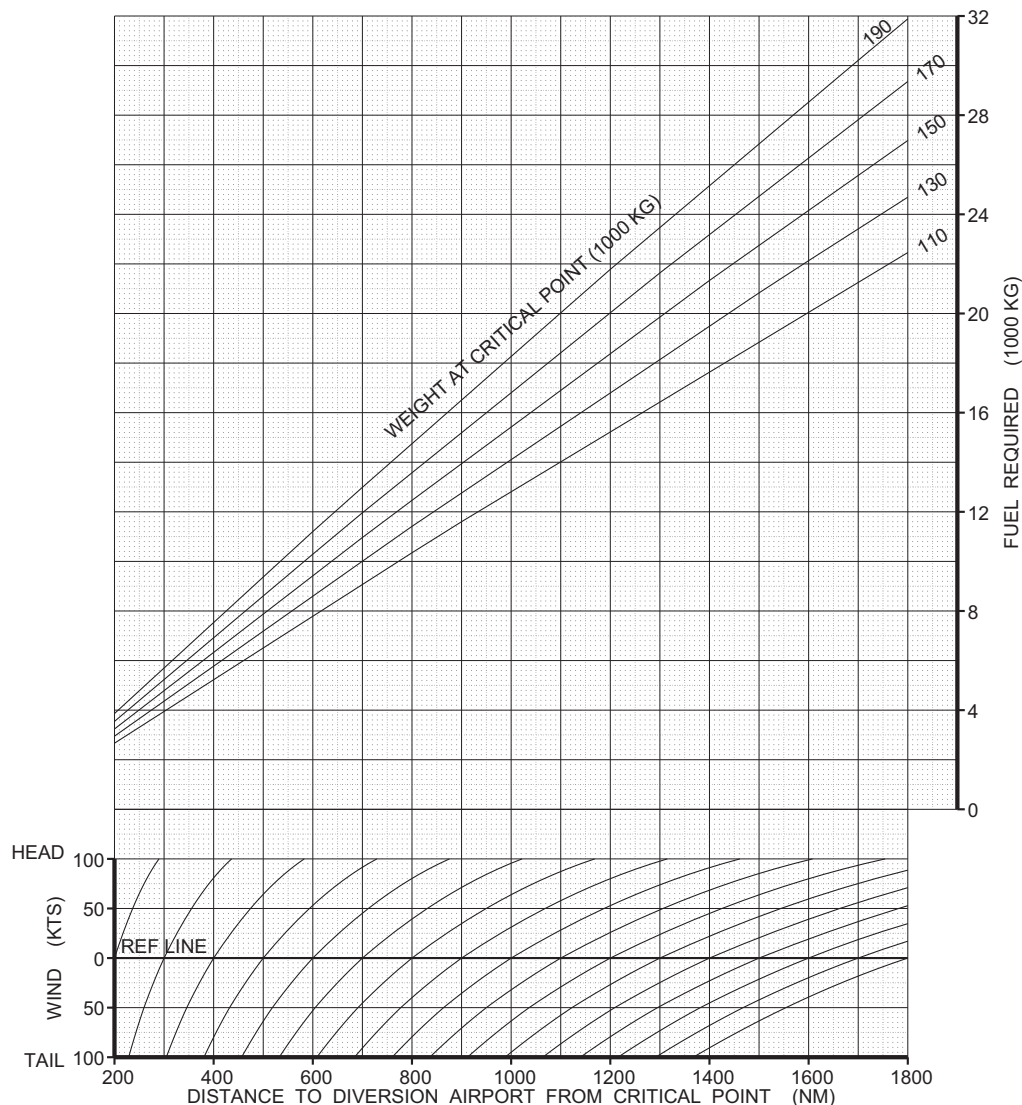
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (6%) for the total forecast time or engine and wing anti-ice on and ice drag (10%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Decompression Critical Fuel Reserves - LRC Cruise



Based on: Emergency descent to 10000 ft, level cruise at 10000 ft, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land.
Allowance for performance deterioration not included. Includes APU fuel burn.

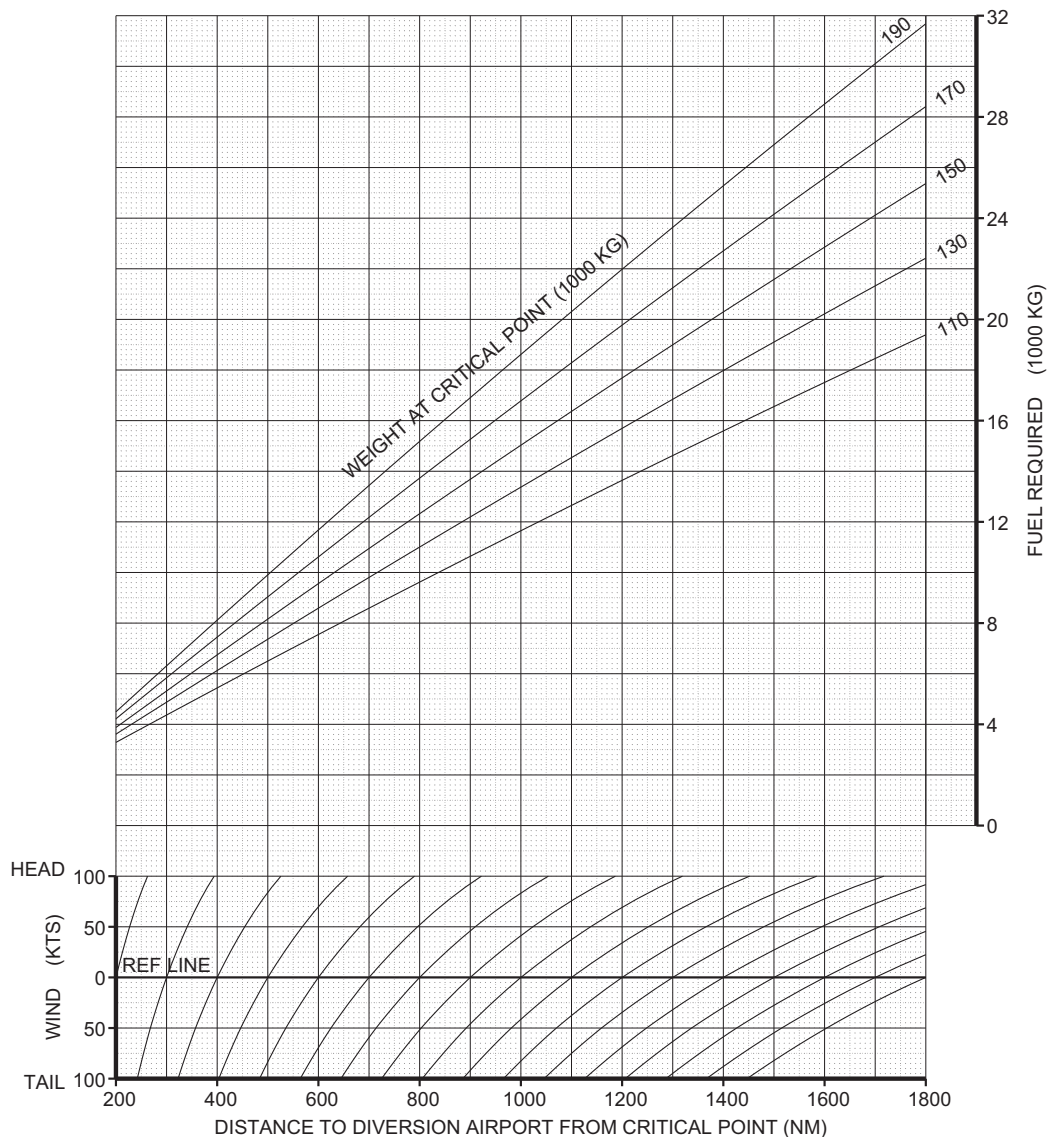
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (3%) for the total forecast time or engine and wing anti-ice on and ice drag (11%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Driftdown Critical Fuel Reserves - LRC Driftdown/Cruise



Based on: Driftdown to and cruise at level off altitude, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land. Allowance for performance deterioration not included. Includes APU fuel burn.

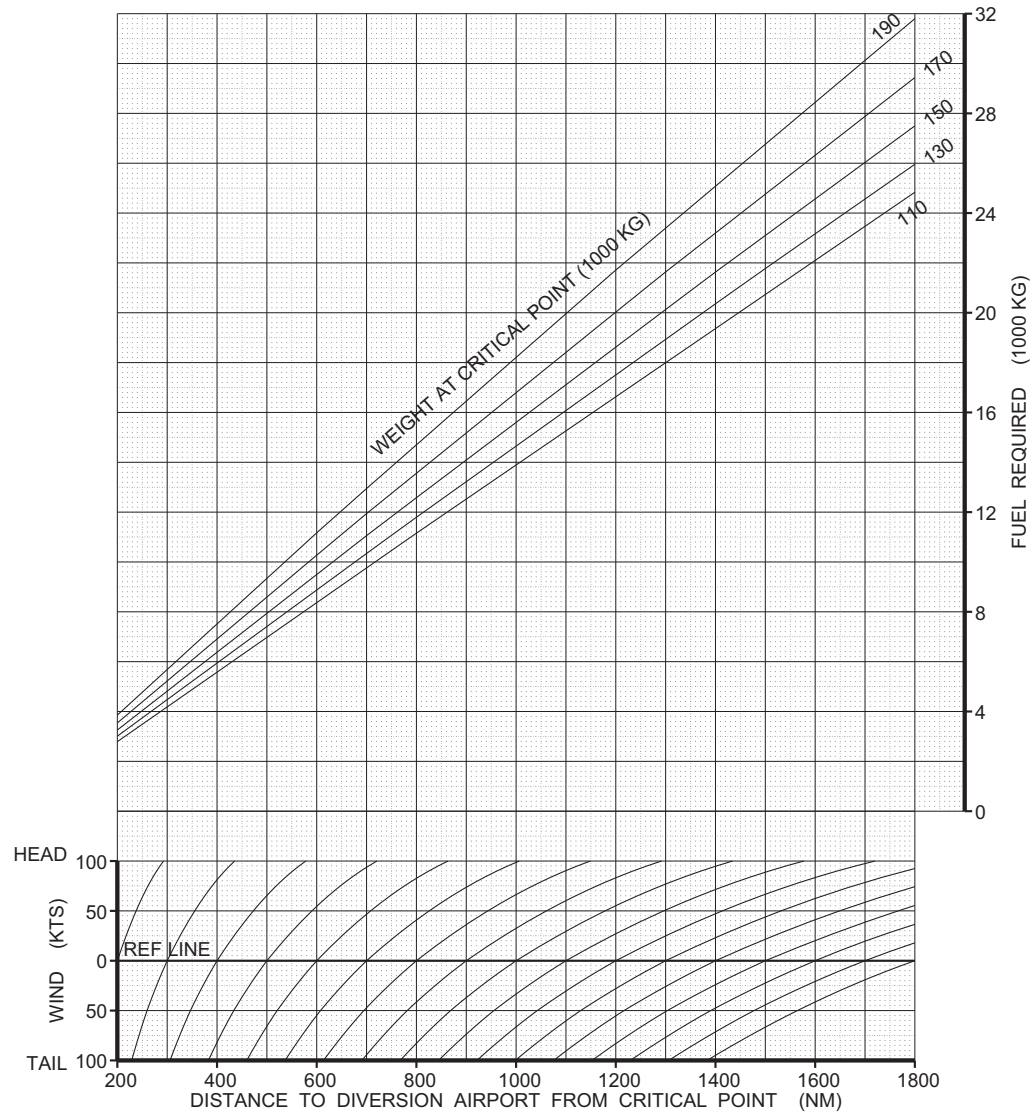
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (5%) for the total forecast time or engine and wing anti-ice on and ice drag (13%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Decompression Critical Fuel Reserves - 290 KIAS Cruise



Based on: Emergency descent to 10000 ft, level cruise at 10000 ft, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land.
Allowance for performance deterioration not included. Includes APU fuel burn.

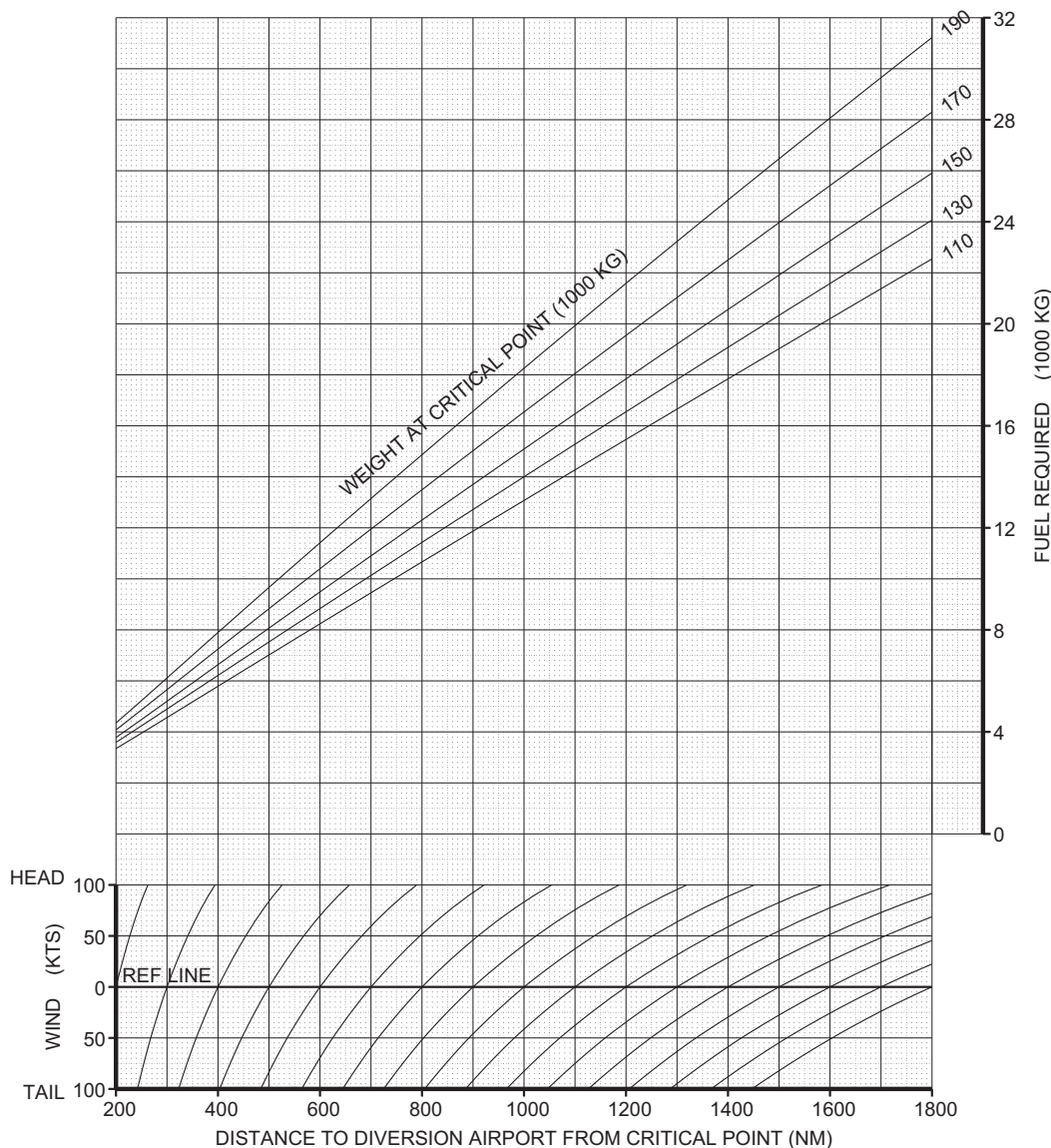
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (3%) for the total forecast time or engine and wing anti-ice on and ice drag (11%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Driftdown Critical Fuel Reserves - .78M/290 KIAS Driftdown/Cruise



Based on: Driftdown to and cruise at level off altitude, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land. Allowance for performance deterioration not included. Includes APU fuel burn.

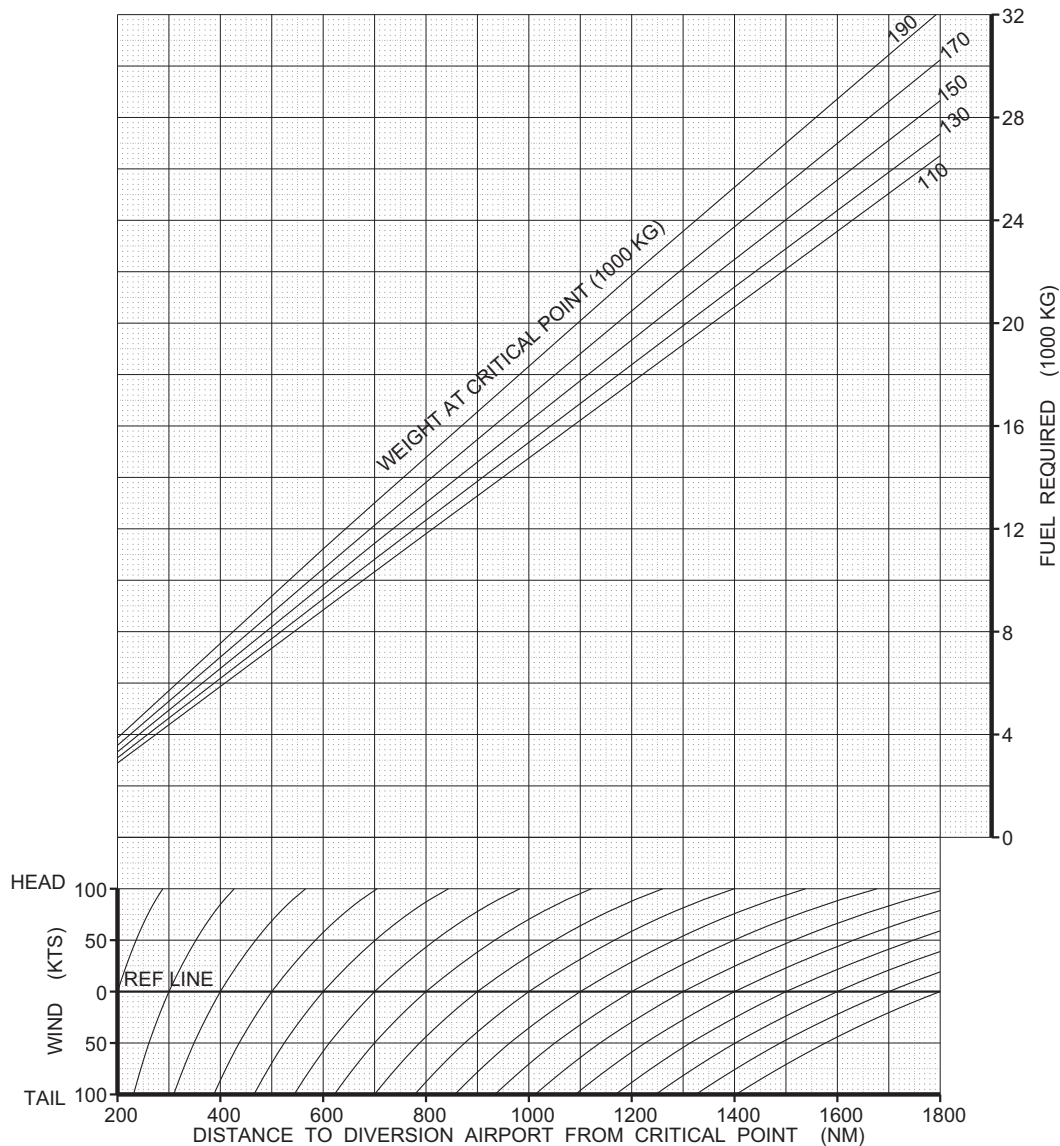
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (5%) for the total forecast time or engine and wing anti-ice on and ice drag (14%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Decompression Critical Fuel Reserves - 310 KIAS Cruise



Based on: Emergency descent to 10000 ft, level cruise at 10000 ft, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land.
Allowance for performance deterioration not included. Includes APU fuel burn.

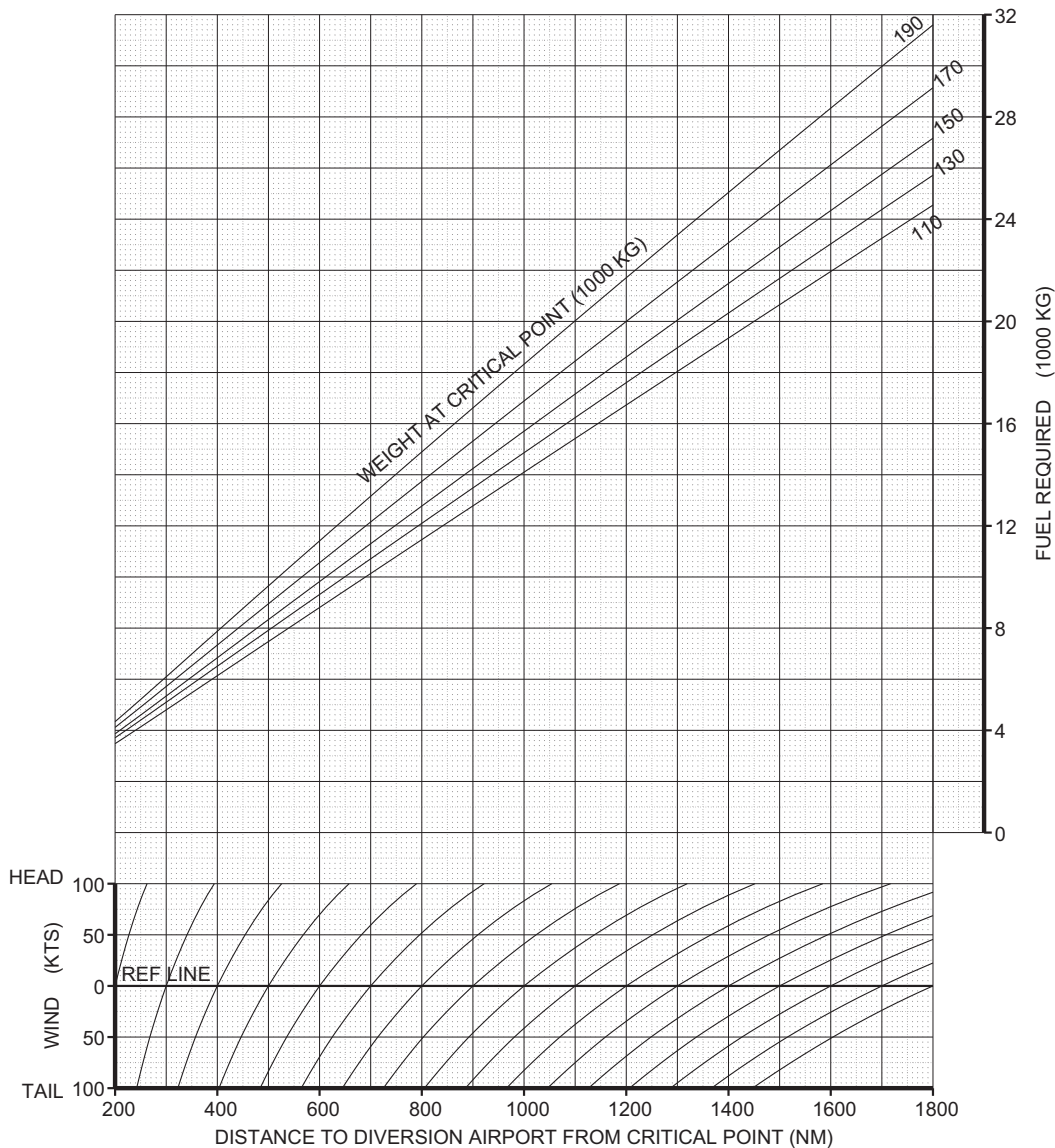
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (3%) for the total forecast time or engine and wing anti-ice on and ice drag (11%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Driftdown Critical Fuel Reserves - .80M/310 KIAS Driftdown/Cruise



Based on: Driftdown to and cruise at level off altitude, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land. Allowance for performance deterioration not included. Includes APU fuel burn.

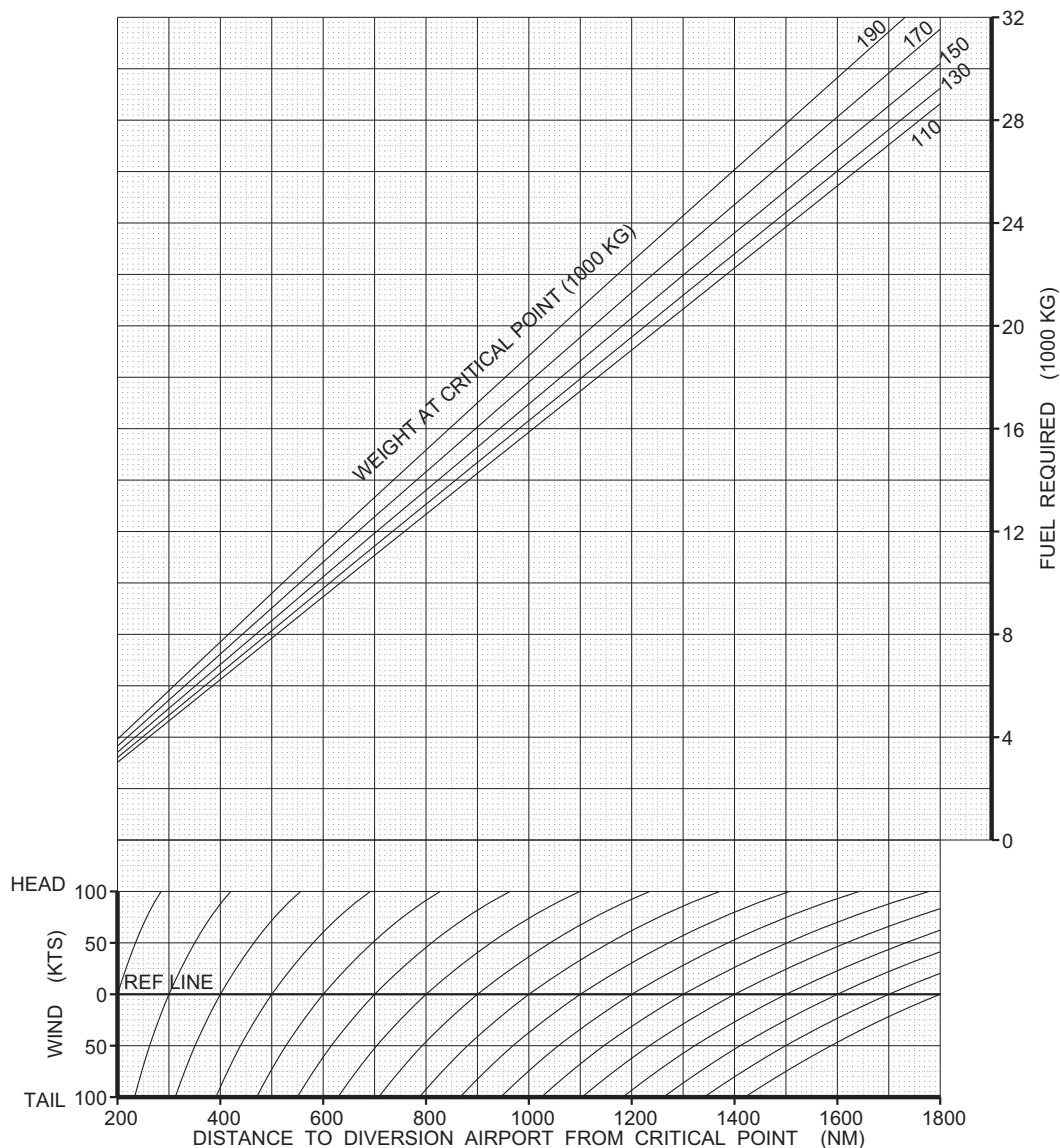
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (5%) for the total forecast time or engine and wing anti-ice on and ice drag (15%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Decompression Critical Fuel Reserves - 330 KIAS Cruise



Based on: Emergency descent to 10000 ft, level cruise at 10000 ft, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land.
Allowance for performance deterioration not included. Includes APU fuel burn.

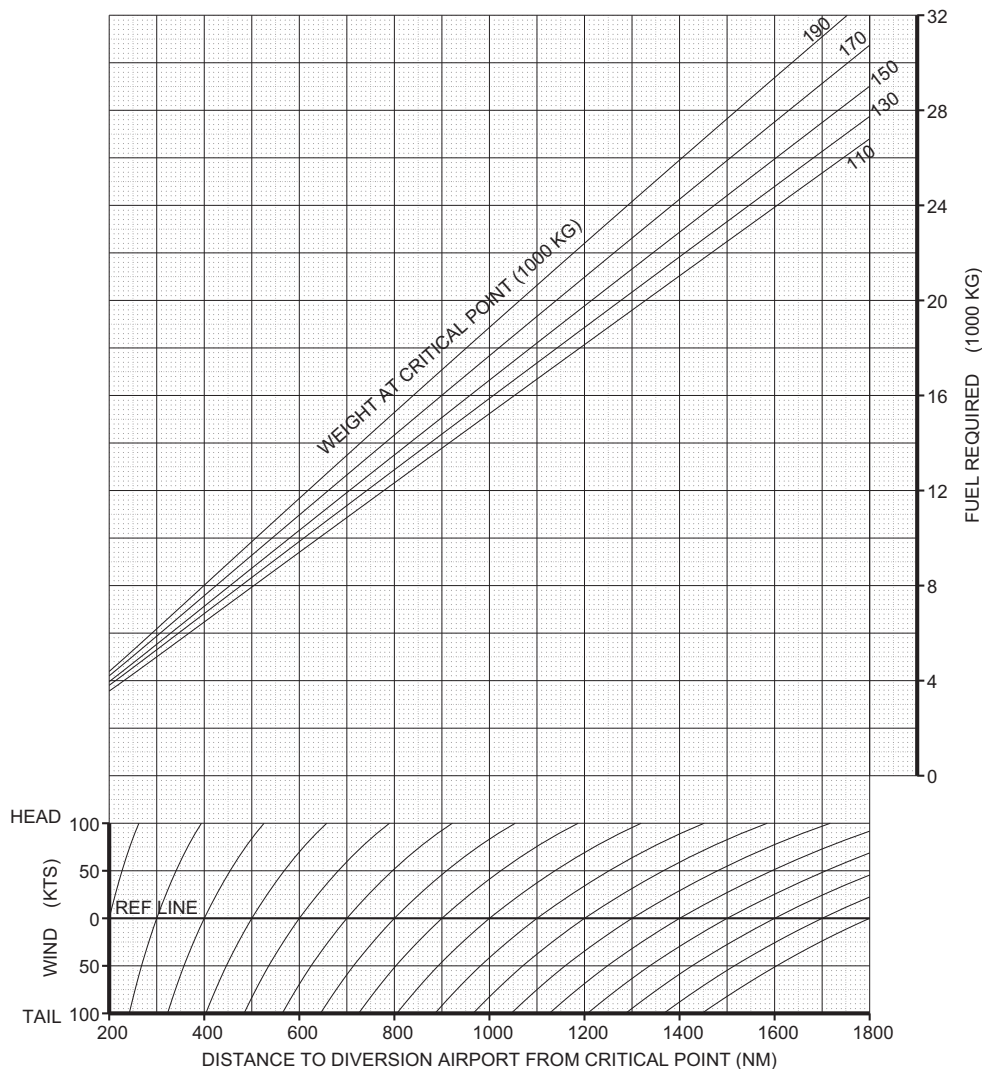
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (3%) for the total forecast time or engine and wing anti-ice on and ice drag (12%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Driftdown Critical Fuel Reserves - .80M/330 KIAS Driftdown/Cruise



Based on: Driftdown to and cruise at level off altitude, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land. Allowance for performance deterioration not included. Includes APU fuel burn.

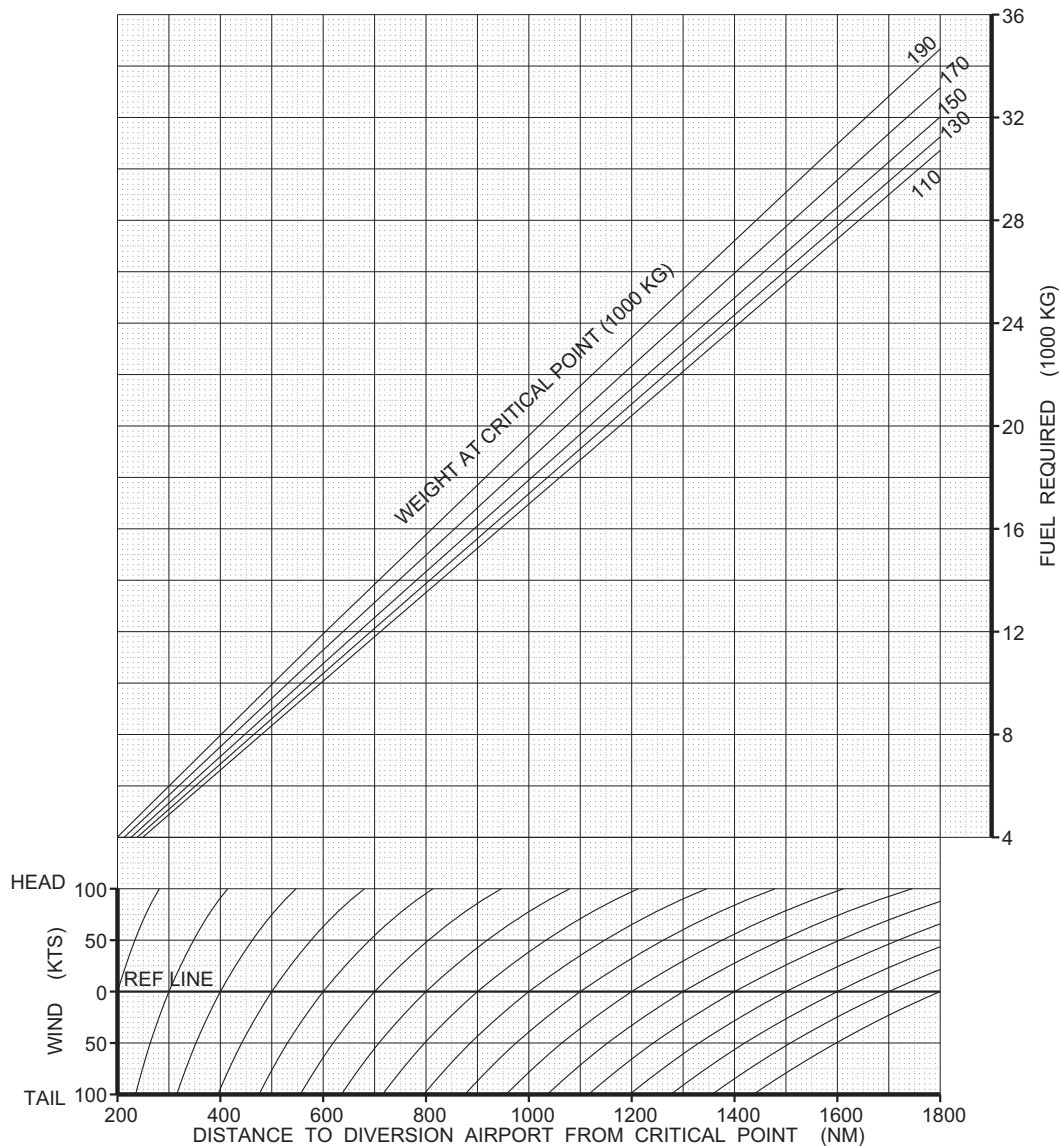
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (5%) for the total forecast time or engine and wing anti-ice on and ice drag (15%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Decompression Critical Fuel Reserves - 350 KIAS Cruise



Based on: Emergency descent to 10000 ft, level cruise at 10000 ft, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land.
Allowance for performance deterioration not included. Includes APU fuel burn.

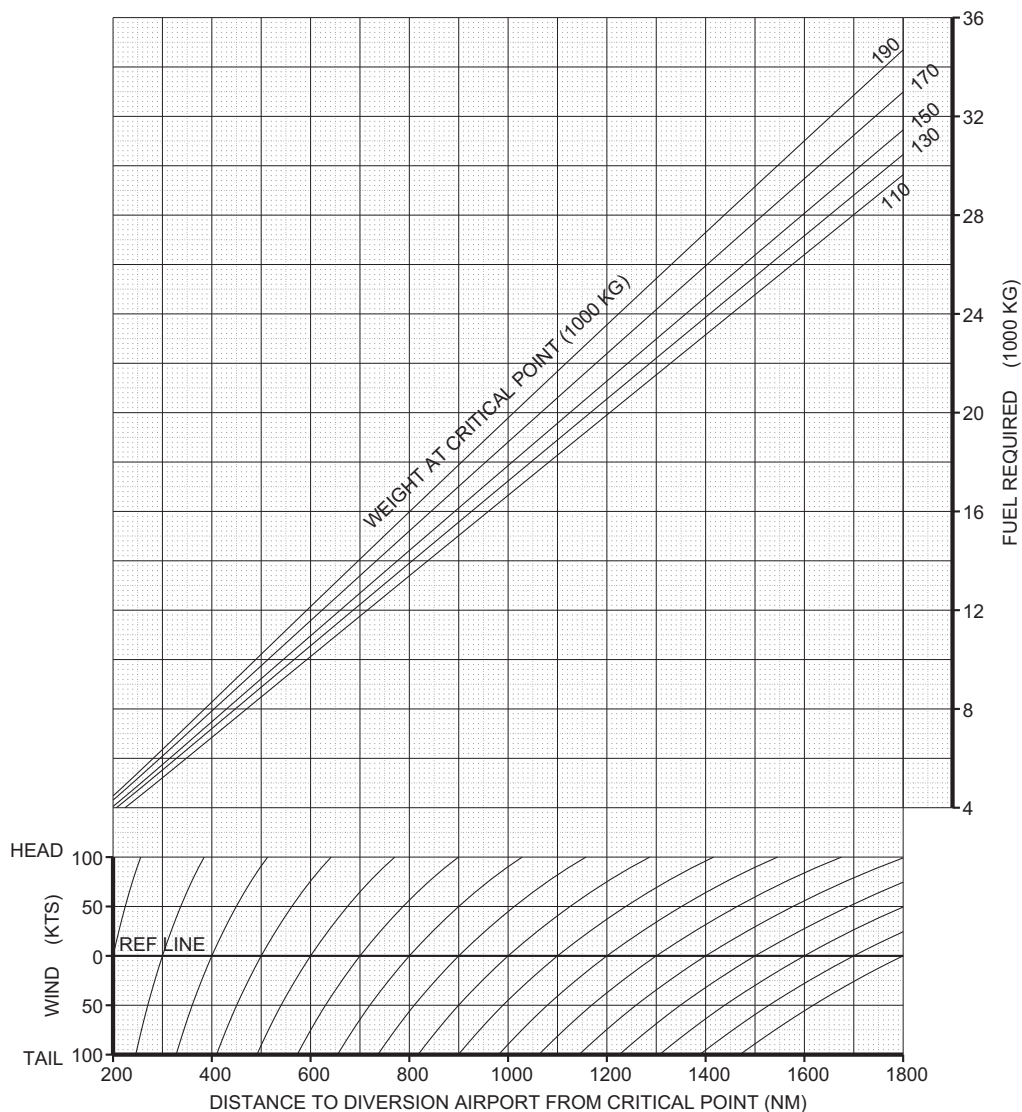
Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (3%) for the total forecast time or engine and wing anti-ice on and ice drag (12%) for 10% of the forecast time.

Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

Driftdown Critical Fuel Reserves - .80M/350 KIAS Driftdown/Cruise



Based on: Driftdown to and cruise at level off altitude, 250 KIAS descent to 1500 ft, 15 minutes hold at 1500 ft, approach and land. Allowance for performance deterioration not included. Includes APU fuel burn.

Adjustments:

- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (5%) for the total forecast time or engine and wing anti-ice on and ice drag (16%) for 10% of the forecast time.

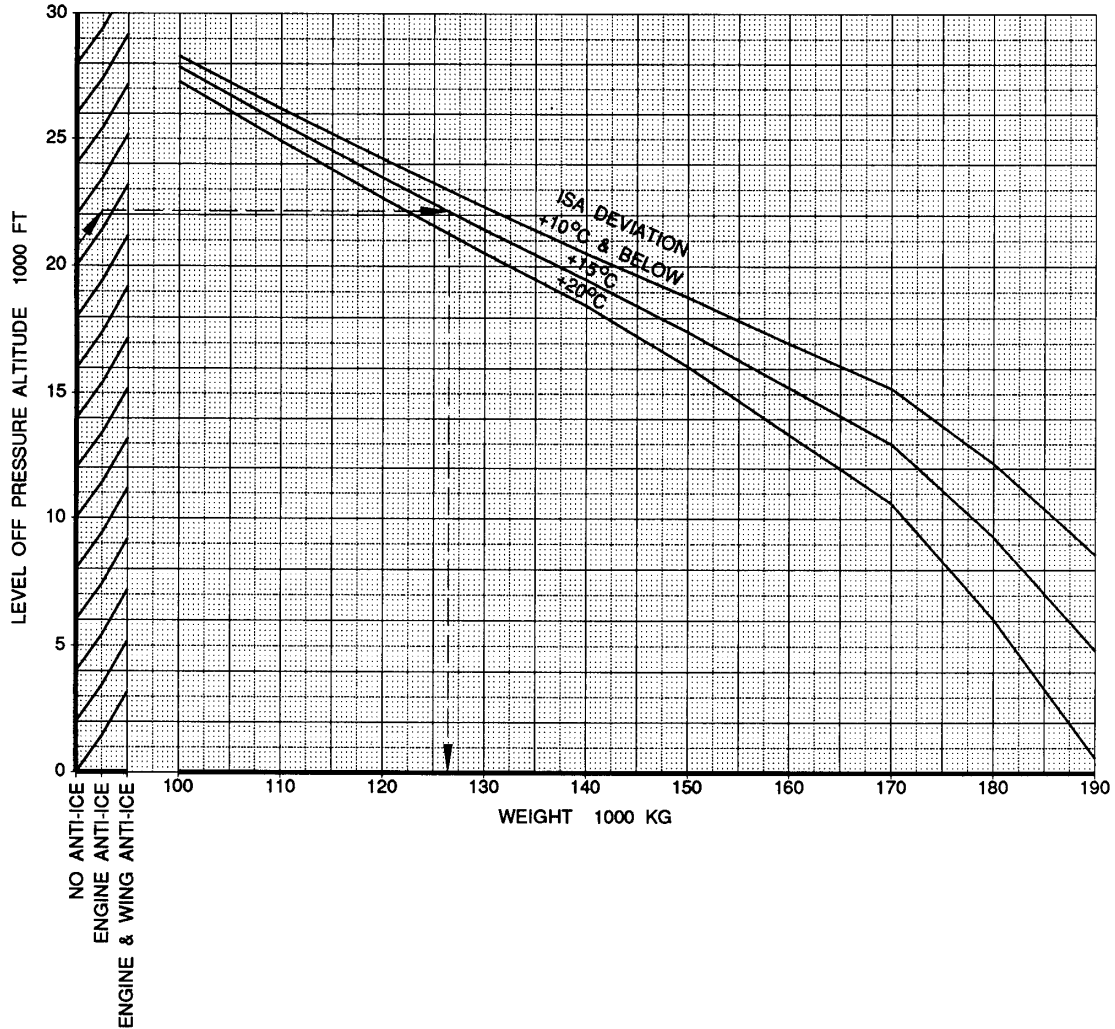
Compare the critical fuel reserves required for all engines cruise, engine inoperative cruise, and engine inoperative driftdown and use the higher of the three.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Net Level Off Weight

Based on engine bleed for packs on or off and APU on or off

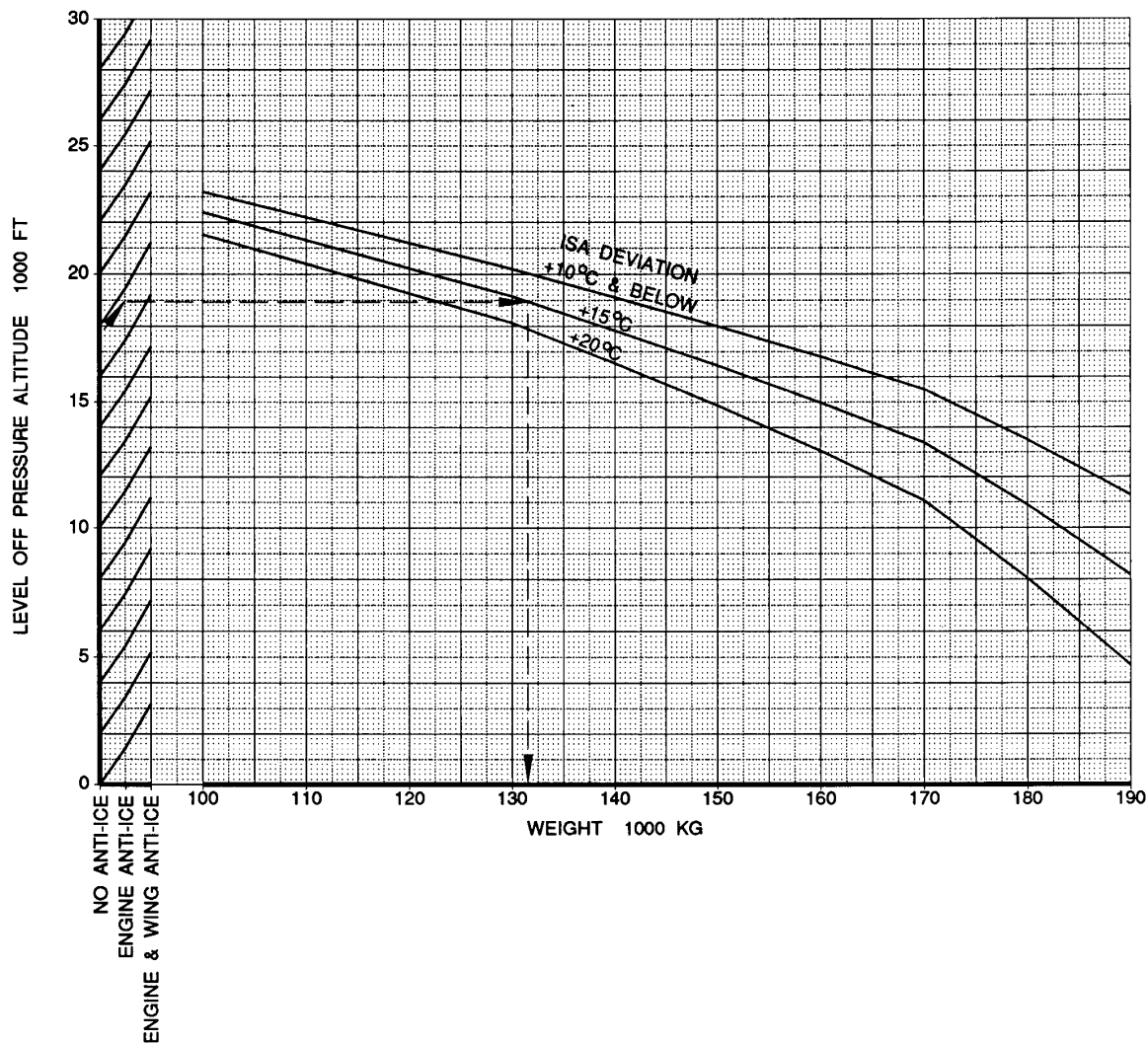


ENGINE INOP

MAX CONTINUOUS THRUST

290 KIAS Cruise Net Level Off Weight

Based on engine bleed for packs on or off and APU on or off

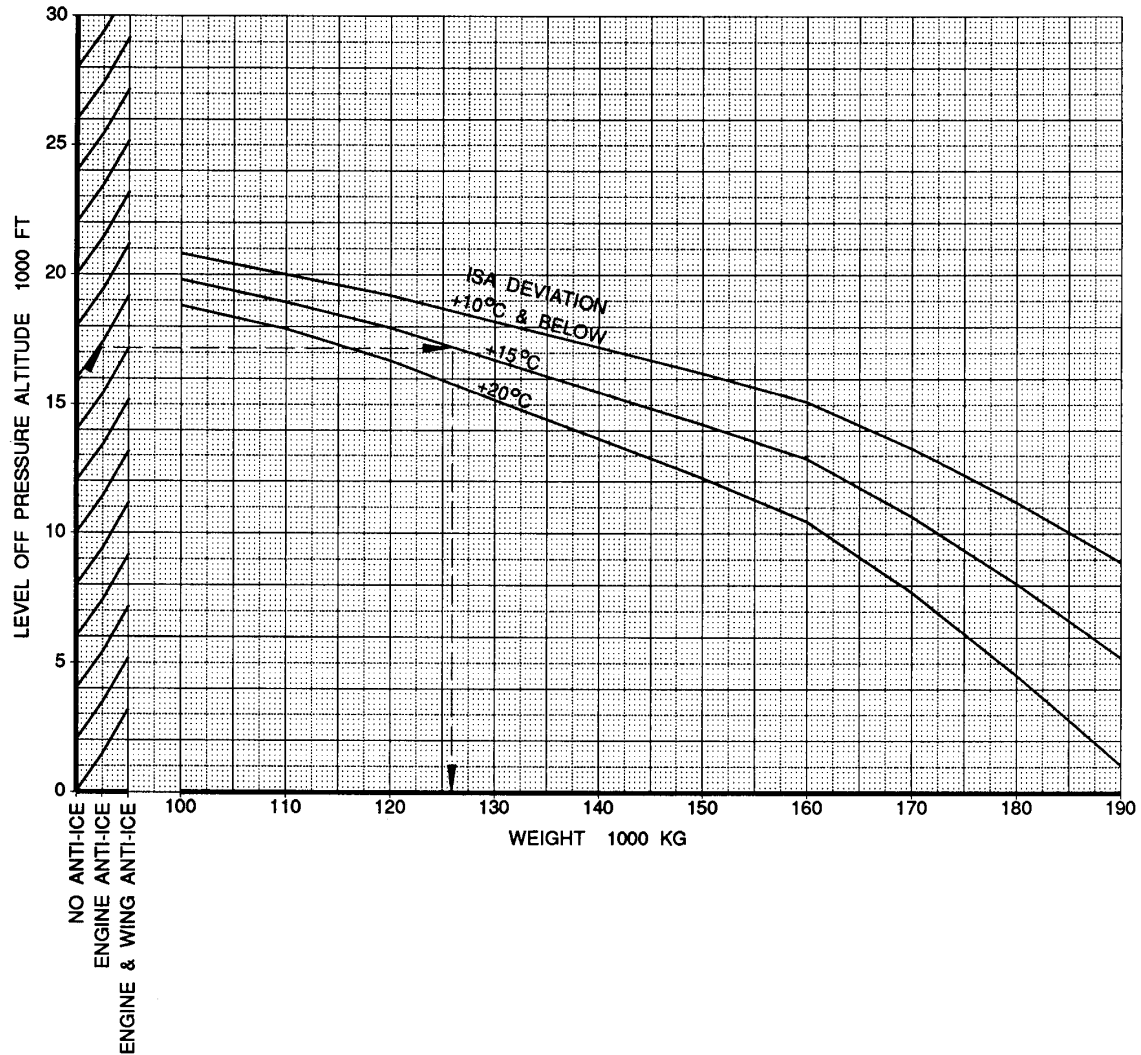


ENGINE INOP

MAX CONTINUOUS THRUST

310 KIAS Cruise Net Level Off Weight

Based on engine bleed for packs on or off and APU on or off

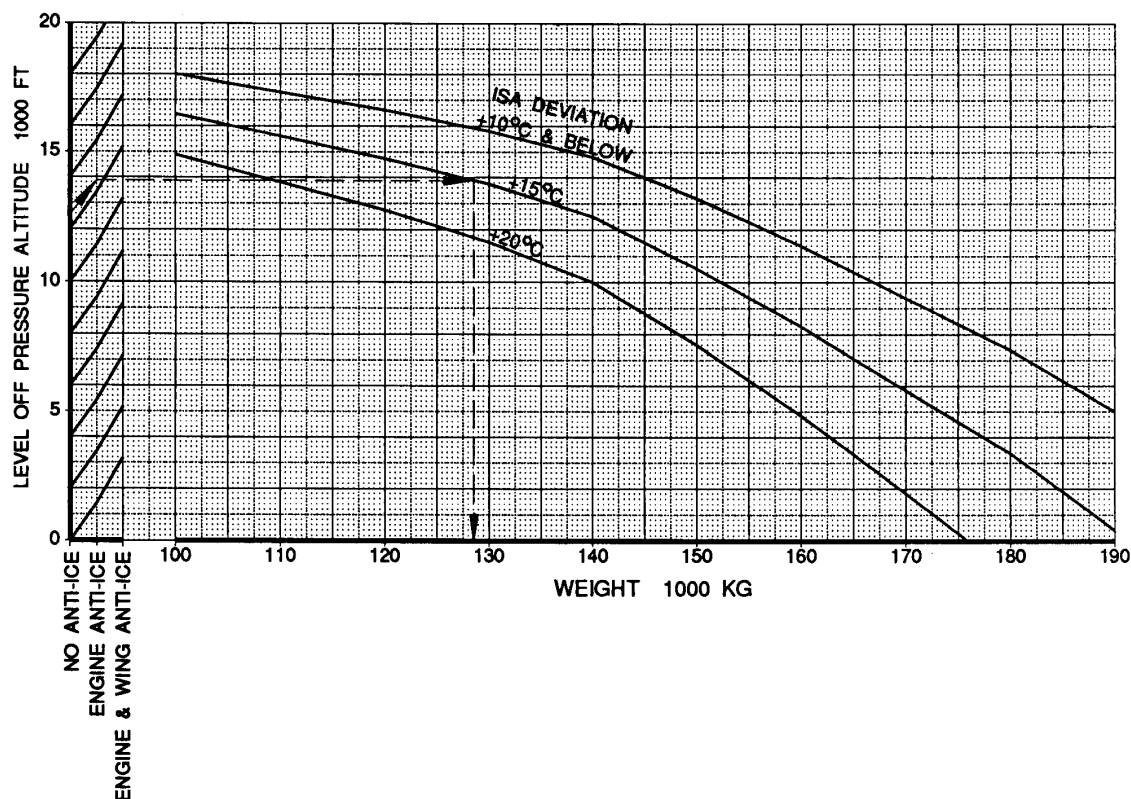


ENGINE INOP

MAX CONTINUOUS THRUST

330 KIAS Cruise Net Level Off Weight

Based on engine bleed for packs on or off and APU on or off

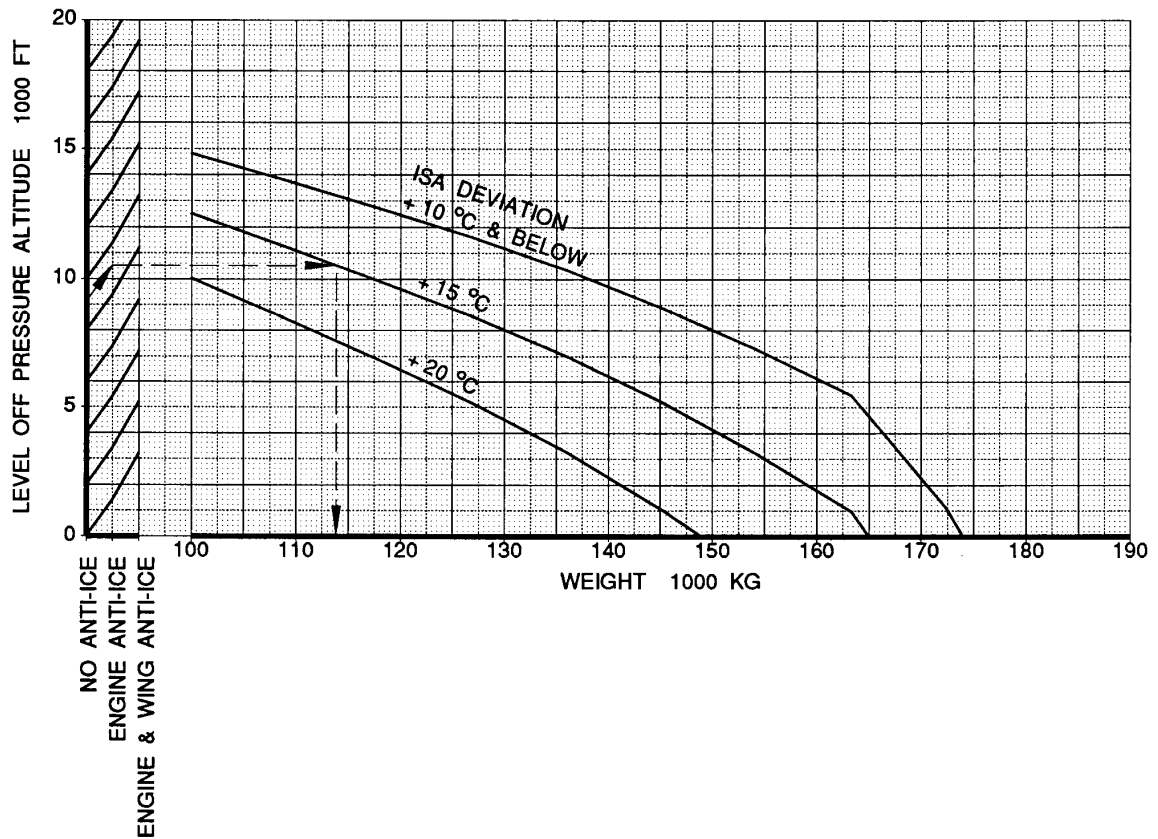


ENGINE INOP

MAX CONTINUOUS THRUST

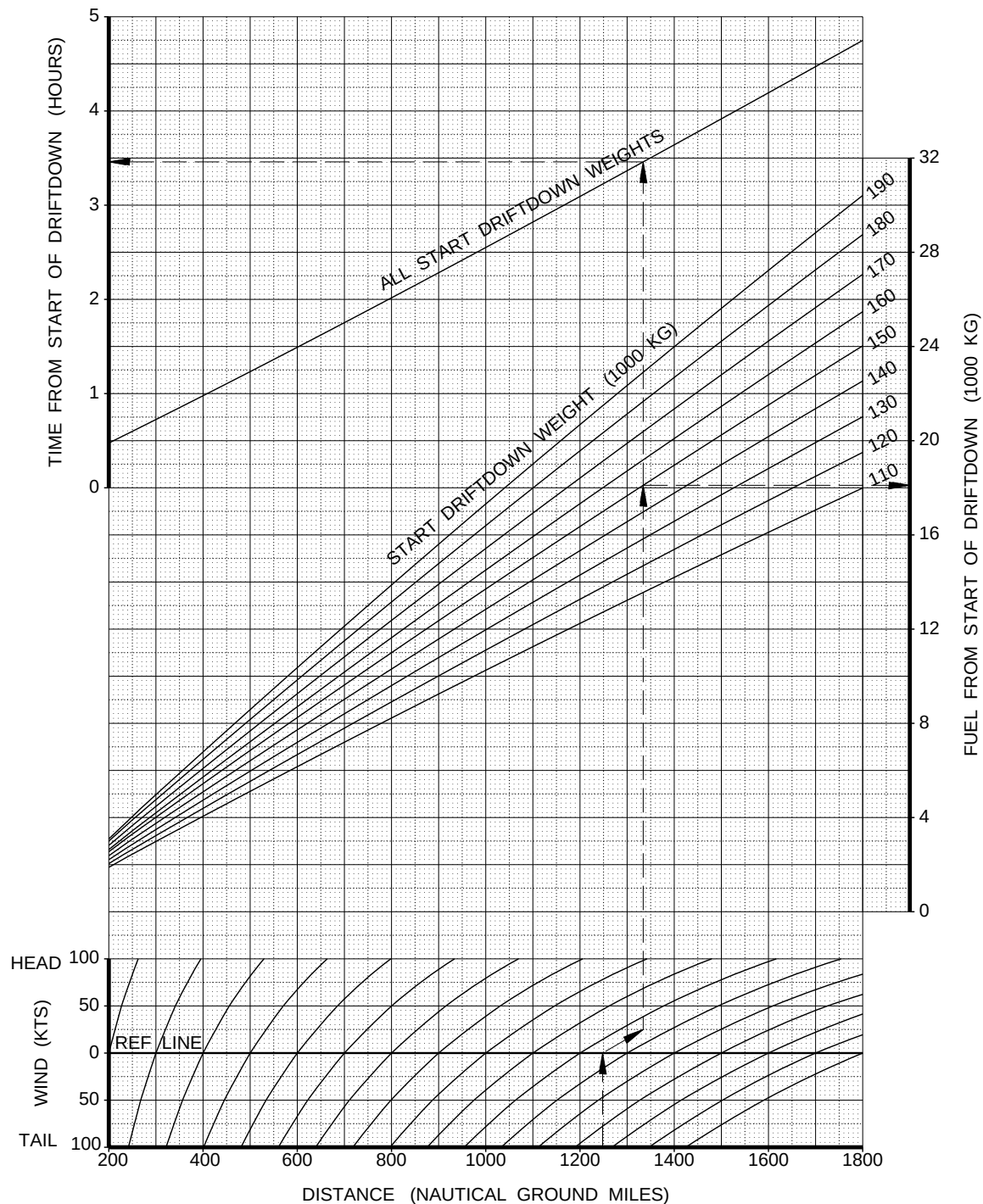
350 KIAS Cruise Net Level Off Weight

Based on engine bleed for packs on or off and APU on or off



ENGINE INOP MAX CONTINUOUS THRUST

Long Range Cruise Driftdown/Cruise Range Capability Includes APU fuel burn

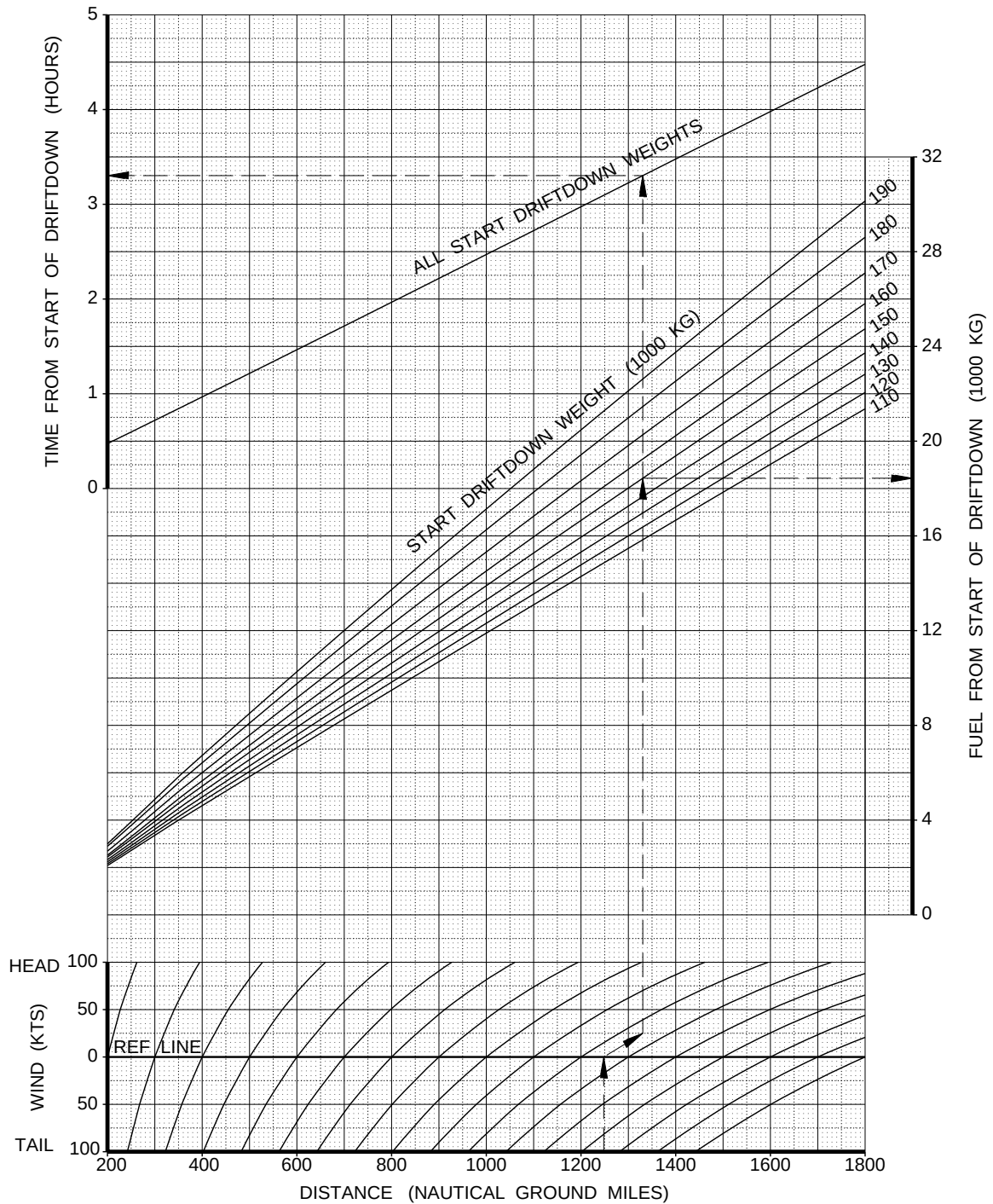


ENGINE INOP

MAX CONTINUOUS THRUST

.78M/290 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn

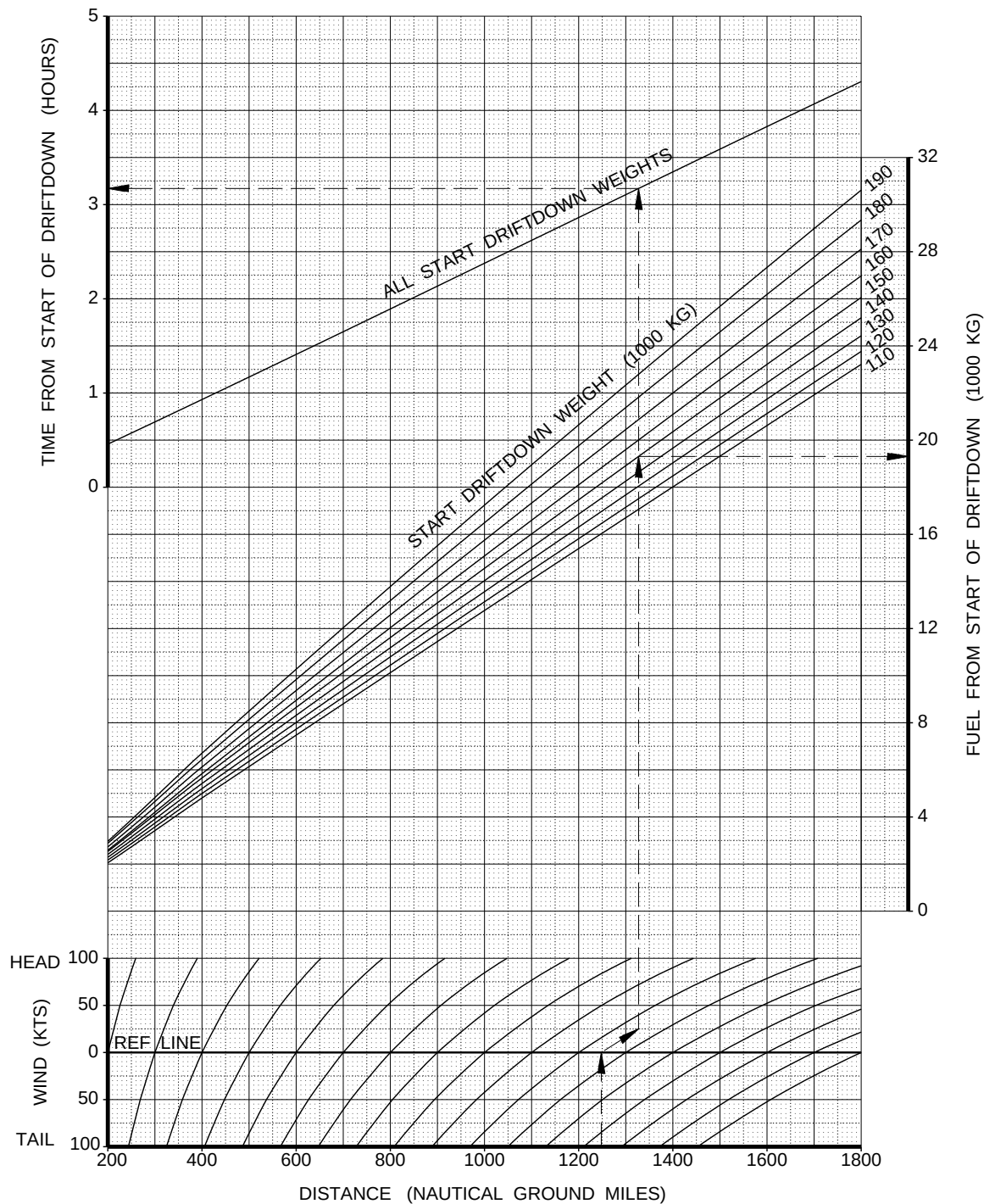


ENGINE INOP

MAX CONTINUOUS THRUST

.80M/310 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn

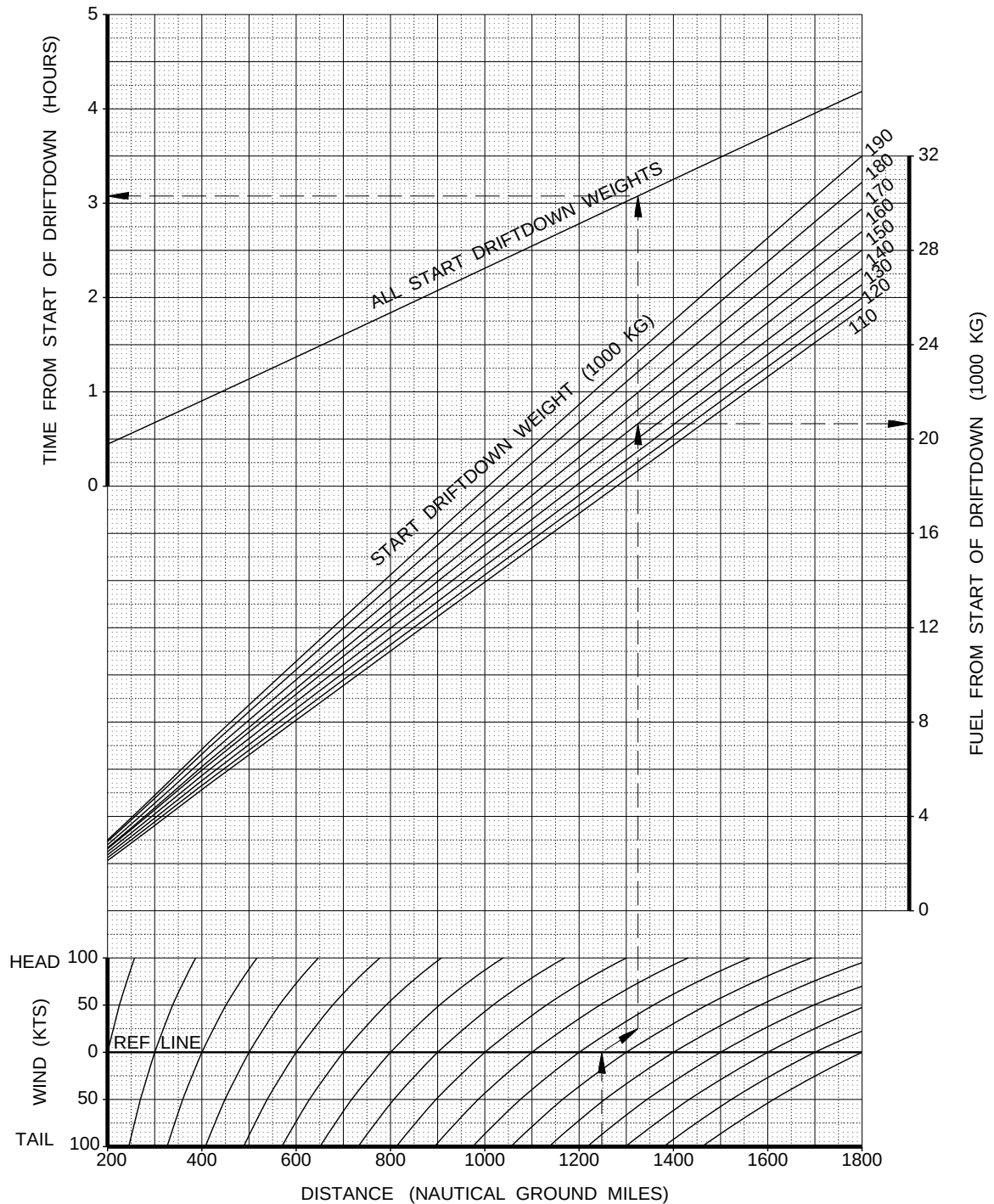


ENGINE INOP

MAX CONTINUOUS THRUST

.80M/330 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn



Intentionally
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ENROUTE

Table of Contents

Chapter 3

Text.....	3.1.1
Introduction	3.1.1
All Engines	3.1.1
Engine Inoperative.....	3.1.1
All Engine	3.2.1
Long Range Cruise Maximum Operating Altitude.....	3.2.1
290/.78 Enroute Climb.....	3.2.2
Long Range Cruise Enroute Fuel and Time.....	3.2.6
Long Range Cruise Table.....	3.2.8
.80M Cruise Table	3.2.14
Wind-Altitude Trade	3.2.16
Descent	3.2.17
Holding	3.2.17
Engine Inoperative	3.3.1
Speed Capability	3.3.1
Long Range Cruise Altitude Capability	3.3.2
290 KIAS Altitude Capability	3.3.3
310 KIAS Altitude Capability	3.3.4
330 KIAS Altitude Capability	3.3.5
Long Range Cruise Table.....	3.3.6
290 KIAS Cruise Table	3.3.10
310 KIAS Cruise Table	3.3.14
330 KIAS Cruise Table	3.3.18
Long Range Cruise Diversion Fuel and Time	3.3.22
290 KIAS Diversion Fuel and Time	3.3.23
310 KIAS Diversion Fuel and Time	3.3.24
330 KIAS Diversion Fuel and Time	3.3.25
Holding	3.3.26

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Introduction

This chapter contains inflight data for use as general reference in airplane performance monitoring, flight planning studies and as a supplement to information provided in the Operations Manual.

All Engines

Long Range Cruise Maximum Operating Altitude

These tables provide the maximum operating altitude in the same manner as the FMC. Maximum altitudes are shown for a given cruise weight and maneuver capability. Note that these tables consider both thrust and buffet limits, providing the more limiting of the two. Any data that is thrust limited is denoted by an asterisk and represents only a thrust limited condition in level flight with maximum cruise thrust at 0 ft/min residual rate of climb or maximum climb thrust at 100 ft/min residual rate of climb. Flying above these altitudes with sustained banks in excess of approximately 12° may cause the airplane to lose speed and/or altitude.

Note that optimum altitudes shown in the tables result in buffet related maneuver margins of 1.5g (48° bank) or more. The altitudes shown in the tables are limited to the maximum certified altitude of 43100 ft.

Enroute Climb

The Enroute Climb charts are based on 290/.78 climb speed. Local ATC may require that 250 KIAS not be exceeded below 10000 ft. See Flight Planning Allowances in Chapter 2 for additional fuel burn when this restriction is imposed.

Long Range Cruise Enroute Fuel and Time

These charts are provided to determine if the fuel remaining is sufficient to complete the trip at Long Range Cruise and to approximate the time remaining. The charts also enable rapid determination of fuel and time required to proceed to an alternate airfield.

Fuel and time are read in a similar manner to the Long Range Cruise trip fuel and time charts in Chapter 2 with distance to destination replacing total trip distance; i.e., climb phase is excluded.

Cruise Tables

Cruise tabulations are provided for Long Range Cruise and .80M speed schedules with both engines operating assuming normal engine bleed for air conditioning (2 bleeds/2 packs on). These tables are similar to the cruise control tables presented in the Performance Inflight chapter of the QRH and are expanded to include true airspeed and Max Cruise Thrust setting information.

To account for APU fuel burn, refer to the APU Operations During Flight table in the chapter 2 text.

Wind-Altitude Trade

Wind is a factor which may justify operations considerably above or below optimum altitude. For example, a favorable wind component may have an effect on ground speed which more than compensates for the loss in air range.

Using the applicable table, it is possible to determine the break-even wind (advantage necessary or disadvantage that can be tolerated) to maintain the same range at another altitude. Tables are provided for Long Range Cruise and .80M. The tables make no allowance for climb or descent time, fuel or distance, and are based on comparing ground fuel mileage.

Descent

Time, fuel, and distance for descent are shown for a .78/290/250 speed schedule. This data includes the effect of a 250 KIAS speed restriction below 10000 ft and includes a straight in approach with flaps down at the outer marker.

Holding

EPR required, indicated airspeed and fuel flow information are tabulated for holding at flaps up based on the recommended holding speeds. Small variations in airspeed will not appreciably affect the overall endurance time. The fuel flow is based on a racetrack holding pattern. For holding in straight and level flight, these values may be reduced by 5%.

Engine Inoperative

Speed Capability

This chart provides engine inoperative cruise speed capability at maximum continuous thrust. Enter the chart with airplane weight and pressure altitude, and read the cruise speed capability directly.

Altitude Capability

Similar to the All Engines Maximum Operating Altitude tables, the Engine Inoperative Altitude Capability tables provide the maximum pressure altitude at which it is possible to make a maneuver of given magnitude ('g' loading or bank angle capability) and still retain a 100 ft/min residual rate of climb. For the engine inoperative case, however, buffet capability is not considered limiting. Tables are shown for Long Range Cruise and several constant speeds (KIAS) for both Max Continuous and Max Cruise Thrust. Adjust the table values as shown in the notes below the tables.

Cruise Tables

Cruise tabulations for engine inoperative are based on use of Max Continuous Thrust. A heavy line is shown to denote the approximate Max Cruise Thrust limits. Tables are provided for Long Range Cruise and several constant speeds (KIAS). The fuel flow values in these tables reflect only the engine fuel burn.

To account for APU fuel burn, refer to the APU Operations During Flight table in the chapter 2 text.

Diversion Fuel and Time

These charts enable rapid determination of fuel and time required to proceed to an alternate airfield (or continue to destination) with one engine inoperative. Data is shown for Long Range Cruise and several constant speeds (KIAS). The fuel required is based on cruise plus descent with straight in approach to touchdown. Diversion fuel and time are determined in a manner similar to the All Engine Long Range Cruise Enroute Fuel and Time chart.

Holding

EPR required, indicated airspeed and fuel flow are shown for one engine inoperative holding based on the recommended speeds described earlier in this chapter. The fuel flow is based on a racetrack holding pattern and may be reduced by 5% for holding in straight and level flight.

Long Range Cruise Maximum Operating Altitude

ISA + 10°C and Below

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)				
			1.20 (33°)	1.25 (36°)	1.30 (39°)	1.40 (44°)	1.50 (48°)
190	29000	-2	34000*	33600	32700	30900	29400
185	29600	-3	34600*	34200	33300	31500	30000
180	30200	-4	35100*	34800	33800	32100	30600
175	30800	-6	35700*	35400	34400	32700	31200
170	31500	-7	36200*	36000	35000	33300	31800
165	32100	-8	36800*	36600	35700	34000	32500
160	32800	-10	37400*	37200	36300	34600	33100
155	33400	-11	38100*	37900	37000	35300	33800
150	34100	-13	38700*	38600	37700	36000	34500
145	34900	-15	39400*	39300	38400	36700	35200
140	35600	-16	40100*	40000	39100	37400	36000
135	36400	-17	40800*	40800	39900	38200	36700
130	37100	-17	41600*	41600	40600	38900	37500
125	38000	-17	42400*	42400	41500	39800	38300
120	38800	-17	43100	43100	42300	40600	39200
115	39700	-17	43100	43100	43100	41500	40100
110	40600	-17	43100	43100	43100	42400	41000

ISA + 15°C

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)				
			1.20 (33°)	1.25 (36°)	1.30 (39°)	1.40 (44°)	1.50 (48°)
190	29000	4	34000*	33600	32700	30900	29400
185	29600	3	34500*	34200	33300	31500	30000
180	30200	1	35100*	34800	33800	32100	30600
175	30800	0	35600*	35400	34400	32700	31200
170	31500	-1	36200*	36000	35000	33300	31800
165	32100	-3	36800*	36600	35700	34000	32500
160	32800	-4	37400*	37200	36300	34600	33100
155	33400	-6	38100*	37900	37000	35300	33800
150	34100	-7	38700*	38600	37700	36000	34500
145	34900	-9	39400*	39300	38400	36700	35200
140	35600	-11	40100*	40000	39100	37400	36000
135	36400	-12	40800*	40800	39900	38200	36700
130	37100	-12	41600*	41600	40600	38900	37500
125	38000	-12	42300*	42300*	41500	39800	38300
120	38800	-12	43100	43100	42300	40600	39200
115	39700	-12	43100	43100	43100	41500	40100
110	40600	-12	43100	43100	43100	42400	41000

ISA + 20°C

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)				
			1.20 (33°)	1.25 (36°)	1.30 (39°)	1.40 (44°)	1.50 (48°)
190	29000	10	33400*	33400*	32700	30900	29400
185	29600	8	34000*	34000*	33300	31500	30000
180	30200	7	34500*	34500*	33800	32100	30600
175	30800	6	35100*	35100*	34400	32700	31200
170	31500	4	35700*	35700*	35000	33300	31800
165	32100	3	36300*	36300*	35700	34000	32500
160	32800	1	36900*	36900*	36300	34600	33100
155	33400	0	37500*	37500*	37000	35300	33800
150	34100	-2	38200*	38200*	37700	36000	34500
145	34900	-3	38800*	38800*	38400	36700	35200
140	35600	-5	39500*	39500*	39100	37400	36000
135	36400	-6	40200*	40200*	39900	38200	36700
130	37100	-6	41000*	41000*	40600	38900	37500
125	38000	-6	41800*	41800*	41500	39800	38300
120	38800	-6	42600*	42600*	42300	40600	39200
115	39700	-6	43100	43100	43100	41500	40100
110	40600	-6	43100	43100	43100	42400	41000

*Denotes altitude thrust limited in level flight.

290/.78 Enroute Climb
ISA & Below

PRESSURE ALTITUDE FT	UNITS MIN/KG NAM/KNOTS	BRAKE RELEASE WEIGHT KG										
		190000	180000	170000	160000	150000	140000	130000	120000	110000	100000	90000
43000	TIME/FUEL DIST/TAS								21/ 3100 132/417	17/ 2650 107/414	15/ 2300 90/411	13/ 2000 77/410
42000	TIME/FUEL DIST/TAS							23/ 3450 147/418	19/ 2900 116/413	16/ 2550 98/411	14/ 2250 84/409	12/ 1950 72/407
41000	TIME/FUEL DIST/TAS						26/ 3900 170/419	20/ 3200 126/413	17/ 2800 105/410	15/ 2450 90/408	13/ 2150 78/406	11/ 1900 67/405
40000	TIME/FUEL DIST/TAS						22/ 3500 135/413	18/ 3050 112/409	16/ 2700 96/407	14/ 2350 83/405	12/ 2100 73/404	11/ 1850 63/402
39000	TIME/FUEL DIST/TAS					23/ 3800 146/412	20/ 3300 119/408	17/ 2900 102/406	15/ 2600 89/404	13/ 2300 78/402	12/ 2050 68/401	10/ 1800 60/400
38000	TIME/FUEL DIST/TAS				25/ 4100 156/411	21/ 3550 126/407	18/ 3150 108/404	16/ 2800 94/402	14/ 2500 83/401	13/ 2250 73/400	11/ 2000 64/399	10/ 1750 56/397
37000	TIME/FUEL DIST/TAS			27/ 4450 169/411	22/ 3800 132/406	19/ 3350 113/403	17/ 3000 99/401	15/ 2700 87/399	13/ 2450 77/398	12/ 2200 68/397	11/ 1950 60/396	10/ 1750 53/395
36000	TIME/FUEL DIST/TAS		28/ 4750 174/410	23/ 4050 138/404	20/ 3600 118/401	18/ 3250 103/399	16/ 2900 91/398	14/ 2600 81/396	13/ 2350 72/395	11/ 2100 64/394	10/ 1900 57/393	9/ 1700 50/392
35000	TIME/FUEL DIST/TAS	29/ 5050 184/409	24/ 4300 145/403	21/ 3800 124/400	19/ 3450 109/398	17/ 3100 96/396	15/ 2850 86/395	14/ 2550 77/394	12/ 2300 69/393	11/ 2050 61/392	10/ 1850 54/391	9/ 1650 48/390
34000	TIME/FUEL DIST/TAS	25/ 4550 153/401	22/ 4050 130/398	20/ 3650 114/396	18/ 3350 101/394	16/ 3050 90/393	15/ 2750 81/392	13/ 2500 73/391	12/ 2250 65/390	11/ 2000 58/389	10/ 1800 52/388	9/ 1600 45/387
33000	TIME/FUEL DIST/TAS	23/ 4300 138/396	21/ 3900 120/394	19/ 3550 107/392	17/ 3250 95/391	15/ 2950 85/390	14/ 2700 77/389	13/ 2450 69/388	11/ 2200 62/387	10/ 2000 55/386	9/ 1750 49/385	8/ 1600 43/385
32000	TIME/FUEL DIST/TAS	22/ 4150 127/392	20/ 3750 112/390	18/ 3400 100/389	16/ 3150 90/388	15/ 2850 81/387	13/ 2600 73/386	12/ 2350 65/385	11/ 2150 59/384	10/ 1950 53/383	9/ 1750 47/383	8/ 1550 41/382
31000	TIME/FUEL DIST/TAS	21/ 4000 119/388	19/ 3600 105/387	17/ 3300 95/385	16/ 3050 85/384	14/ 2800 77/383	13/ 2550 69/383	12/ 2300 62/382	11/ 2100 56/381	10/ 1900 50/381	9/ 1700 45/380	8/ 1500 39/379
30000	TIME/FUEL DIST/TAS	19/ 3800 109/383	18/ 3450 97/382	16/ 3200 87/381	15/ 2950 79/380	14/ 2700 71/379	12/ 2450 64/378	11/ 2250 58/378	10/ 2000 52/377	9/ 1850 47/376	8/ 1650 42/376	7/ 1450 37/375
29000	TIME/FUEL DIST/TAS	18/ 3600 100/378	17/ 3300 90/377	15/ 3050 81/376	14/ 2800 73/375	13/ 2600 66/375	12/ 2350 60/374	11/ 2150 54/373	10/ 1950 49/373	9/ 1750 44/372	8/ 1600 39/371	7/ 1400 35/370
28000	TIME/FUEL DIST/TAS	17/ 3450 92/373	16/ 3200 83/372	14/ 2950 75/372	13/ 2700 68/371	12/ 2500 62/370	11/ 2300 56/370	10/ 2100 50/369	9/ 1900 46/369	8/ 1700 41/368	8/ 1550 36/367	7/ 1350 32/366
27000	TIME/FUEL DIST/TAS	16/ 3300 84/369	15/ 3050 76/368	14/ 2850 69/368	13/ 2600 63/367	12/ 2400 57/366	11/ 2200 52/366	10/ 2000 47/365	9/ 1850 42/365	8/ 1650 38/364	7/ 1500 34/363	6/ 1350 30/362
26000	TIME/FUEL DIST/TAS	15/ 3150 78/365	14/ 2950 71/364	13/ 2700 64/364	12/ 2500 58/363	11/ 2300 53/362	10/ 2150 48/362	9/ 1950 44/361	8/ 1750 40/361	8/ 1600 36/360	7/ 1450 32/359	6/ 1300 28/358
25000	TIME/FUEL DIST/TAS	14/ 3050 72/361	13/ 2800 65/360	12/ 2600 60/360	11/ 2400 54/359	10/ 2250 49/359	9/ 2050 45/358	8/ 1850 41/358	8/ 1700 37/357	7/ 1550 33/356	7/ 1400 30/356	6/ 1250 26/355
24000	TIME/FUEL DIST/TAS	13/ 2900 66/357	13/ 2700 61/356	12/ 2500 55/356	11/ 2350 50/355	10/ 2150 46/355	9/ 2000 42/355	8/ 1800 38/354	8/ 1650 34/354	7/ 1500 31/353	6/ 1350 28/352	6/ 1200 24/351
23000	TIME/FUEL DIST/TAS	13/ 2800 61/353	12/ 2600 56/353	11/ 2400 51/352	10/ 2250 47/352	10/ 2100 43/351	9/ 1900 39/351	8/ 1750 35/351	7/ 1600 32/350	7/ 1450 29/349	6/ 1300 26/349	5/ 1150 23/348
22000	TIME/FUEL DIST/TAS	12/ 2650 57/350	11/ 2500 52/349	10/ 2300 47/349	10/ 2150 43/348	9/ 2000 39/348	8/ 1850 36/348	8/ 1700 33/347	7/ 1550 30/347	6/ 1400 27/346	6/ 1250 24/345	5/ 1100 21/344
21000	TIME/FUEL DIST/TAS	11/ 2550 52/346	11/ 2400 48/346	10/ 2200 44/345	9/ 2050 40/345	9/ 1900 37/345	8/ 1750 33/344	7/ 1600 30/344	7/ 1450 27/343	6/ 1350 25/343	5/ 1200 22/342	5/ 1100 20/341
20000	TIME/FUEL DIST/TAS	11/ 2450 48/343	10/ 2300 44/342	9/ 2150 40/342	9/ 2000 37/342	8/ 1850 34/341	8/ 1700 31/341	7/ 1550 28/341	6/ 1400 25/340	6/ 1300 23/339	5/ 1150 20/339	5/ 1050 18/337
18000	TIME/FUEL DIST/TAS	10/ 2200 40/336	9/ 2100 37/336	8/ 1950 34/336	8/ 1800 31/335	7/ 1700 29/335	7/ 1550 26/335	6/ 1450 24/334	6/ 1300 22/334	5/ 1200 19/333	5/ 1050 17/332	4/ 950 15/331
16000	TIME/FUEL DIST/TAS	8/ 2000 34/330	8/ 1900 31/330	8/ 1750 28/330	7/ 1650 26/330	7/ 1550 24/329	6/ 1450 22/329	6/ 1300 20/328	5/ 1200 18/328	5/ 1100 16/327	4/ 1000 15/326	4/ 900 13/325
14000	TIME/FUEL DIST/TAS	7/ 1800 28/325	7/ 1700 25/324	7/ 1600 23/324	6/ 1500 21/324	6/ 1400 20/324	5/ 1300 18/323	5/ 1200 16/323	5/ 1100 15/322	4/ 1000 13/321	4/ 900 12/321	3/ 800 11/319
10000	TIME/FUEL DIST/TAS	6/ 1400 17/314	5/ 1300 16/314	5/ 1250 15/314	5/ 1200 13/313	5/ 1100 12/313	4/ 1050 11/313	4/ 950 10/312	4/ 850 9/312	3/ 800 8/311	3/ 700 8/310	3/ 650 7/308
1500	TIME/FUEL	2/ 600	2/ 550	2/ 550	2/ 550	2/ 550	2/ 500	2/ 450	2/ 400	2/ 400	2/ 350	1/ 300

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS	AIRPORT ELEVATION	2000	4000	6000	8000	10000	12000
EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	FUEL ADJUSTMENT	-150	-250	-400	-500	-650	-750

SHADED AREA APPROXIMATES OPTIMUM ALTITUDE



Flight Planning and Performance Manual

290/.78 Enroute Climb
ISA + 10°C

PRESSURE ALTITUDE FT	UNITS MIN/KG NAM/KNOTS	BRAKE RELEASE WEIGHT KG										
		190000	180000	170000	160000	150000	140000	130000	120000	110000	100000	90000
43000	TIME/FUEL DIST/TAS								21/ 3200 139/426	18/ 2750 112/423	15/ 2400 95/420	13/ 2100 81/419
42000	TIME/FUEL DIST/TAS							24/ 3600 155/427	19/ 3050 122/422	16/ 2650 102/420	14/ 2350 88/418	12/ 2050 75/416
41000	TIME/FUEL DIST/TAS						27/ 4100 179/428	21/ 3350 132/422	18/ 2900 110/419	15/ 2550 94/417	13/ 2250 82/415	12/ 2000 71/414
40000	TIME/FUEL DIST/TAS						22/ 3650 142/421	19/ 3150 117/418	16/ 2800 101/416	14/ 2500 87/414	13/ 2200 76/412	11/ 1950 66/411
39000	TIME/FUEL DIST/TAS					24/ 3950 153/421	20/ 3450 125/417	17/ 3050 107/414	15/ 2700 93/413	14/ 2400 82/411	12/ 2150 71/410	11/ 1900 62/408
38000	TIME/FUEL DIST/TAS				26/ 4300 166/421	21/ 3700 132/416	18/ 3250 113/413	16/ 2900 98/411	14/ 2600 87/410	13/ 2350 76/408	11/ 2100 67/407	10/ 1850 59/406
37000	TIME/FUEL DIST/TAS			28/ 4650 177/420	22/ 3950 139/414	20/ 3500 118/411	17/ 3150 104/409	15/ 2800 91/408	14/ 2550 81/407	12/ 2250 72/405	11/ 2050 63/404	10/ 1800 56/403
36000	TIME/FUEL DIST/TAS		29/ 5000 188/419	23/ 4200 145/413	20/ 3750 124/410	18/ 3350 108/408	16/ 3050 96/406	15/ 2750 85/405	13/ 2450 76/404	12/ 2200 67/403	10/ 1950 60/402	9/ 1750 53/400
35000	TIME/FUEL DIST/TAS	31/ 5400 199/419	25/ 4500 152/411	21/ 4000 130/408	19/ 3600 114/406	17/ 3250 101/404	15/ 2950 90/403	14/ 2650 80/402	13/ 2400 72/401	11/ 2150 64/400	10/ 1900 57/399	9/ 1700 50/398
34000	TIME/FUEL DIST/TAS	26/ 4800 160/410	23/ 4250 137/406	20/ 3800 120/404	18/ 3450 106/402	16/ 3150 95/401	15/ 2850 85/400	13/ 2600 76/399	12/ 2350 68/398	11/ 2100 61/397	10/ 1900 54/396	9/ 1700 48/395
33000	TIME/FUEL DIST/TAS	24/ 4500 145/405	21/ 4050 126/402	19/ 3700 112/400	17/ 3350 100/399	16/ 3050 89/398	14/ 2800 80/397	13/ 2500 72/396	12/ 2300 65/395	10/ 2050 58/394	9/ 1850 51/393	8/ 1650 45/392
32000	TIME/FUEL DIST/TAS	22/ 4300 133/400	20/ 3900 118/398	18/ 3550 105/397	17/ 3250 94/396	15/ 3000 85/395	14/ 2700 76/394	12/ 2450 69/393	11/ 2250 62/392	10/ 2000 55/391	9/ 1800 49/391	8/ 1600 43/390
31000	TIME/FUEL DIST/TAS	21/ 4150 124/396	19/ 3800 110/395	17/ 3450 99/393	16/ 3150 89/392	15/ 2900 80/391	13/ 2650 72/391	12/ 2400 65/390	11/ 2150 59/389	10/ 1950 52/388	9/ 1750 47/387	8/ 1550 41/386
30000	TIME/FUEL DIST/TAS	20/ 3950 114/391	18/ 3600 102/390	16/ 3300 91/388	15/ 3050 83/388	14/ 2800 75/387	13/ 2550 67/386	11/ 2300 61/385	10/ 2100 55/385	9/ 1900 49/384	8/ 1700 44/383	8/ 1500 39/382
29000	TIME/FUEL DIST/TAS	19/ 3750 104/386	17/ 3450 94/385	16/ 3200 85/384	14/ 2950 76/383	13/ 2700 69/382	12/ 2450 63/382	11/ 2250 57/381	10/ 2050 51/380	9/ 1850 46/380	8/ 1650 41/379	7/ 1450 36/378
28000	TIME/FUEL DIST/TAS	17/ 3600 96/381	16/ 3300 86/380	15/ 3050 78/379	14/ 2800 71/379	12/ 2600 64/378	11/ 2350 58/377	10/ 2150 53/377	9/ 1950 48/376	8/ 1750 43/375	8/ 1600 38/375	7/ 1400 34/374
27000	TIME/FUEL DIST/TAS	16/ 3450 88/376	15/ 3200 80/376	14/ 2950 72/375	13/ 2700 66/374	12/ 2500 60/374	11/ 2300 54/373	10/ 2100 49/373	9/ 1900 44/372	8/ 1700 40/371	7/ 1550 36/370	7/ 1350 31/369
26000	TIME/FUEL DIST/TAS	15/ 3300 81/372	14/ 3050 74/371	13/ 2800 67/371	12/ 2600 61/370	11/ 2400 56/370	10/ 2200 50/369	9/ 2000 46/369	8/ 1850 41/368	7/ 1650 37/367	7/ 1500 33/367	6/ 1350 29/366
25000	TIME/FUEL DIST/TAS	15/ 3150 75/368	14/ 2900 68/367	13/ 2700 62/367	12/ 2500 57/366	11/ 2300 52/366	10/ 2150 47/365	9/ 1950 43/365	8/ 1750 38/364	7/ 1600 35/363	7/ 1450 31/363	6/ 1300 27/362
24000	TIME/FUEL DIST/TAS	14/ 3000 69/364	13/ 2800 63/363	12/ 2600 58/363	11/ 2400 53/362	10/ 2250 48/362	9/ 2050 44/361	8/ 1850 40/361	7/ 1650 36/360	6/ 1450 32/360	6/ 1300 29/359	6/ 1250 25/358
23000	TIME/FUEL DIST/TAS	13/ 2900 64/360	12/ 2700 58/359	11/ 2500 53/359	10/ 2300 49/359	9/ 2050 44/358	8/ 1850 40/358	7/ 1650 37/357	6/ 1450 33/357	6/ 1300 30/356	6/ 1150 27/355	5/ 1200 24/354
22000	TIME/FUEL DIST/TAS	12/ 2750 59/356	11/ 2550 54/356	10/ 2400 49/355	9/ 2250 45/355	8/ 2050 41/355	7/ 1850 37/354	6/ 1650 34/354	5/ 1450 31/353	5/ 1300 28/353	5/ 1150 25/352	5/ 1100 22/351
21000	TIME/FUEL DIST/TAS	12/ 2650 54/353	11/ 2450 50/352	10/ 2300 45/352	9/ 2150 42/352	8/ 1950 38/351	7/ 1750 35/351	6/ 1550 32/350	5/ 1350 29/350	5/ 1200 26/349	5/ 1050 23/348	5/ 1000 20/347
20000	TIME/FUEL DIST/TAS	11/ 2500 50/349	10/ 2350 46/349	9/ 2200 42/349	8/ 2050 38/348	7/ 1850 35/348	6/ 1650 32/347	5/ 1450 29/347	4/ 1250 26/346	4/ 1100 24/346	4/ 950 21/345	4/ 900 19/344
18000	TIME/FUEL DIST/TAS	10/ 2300 42/343	9/ 2150 39/342	8/ 2000 35/342	7/ 1850 32/342	6/ 1650 30/341	5/ 1450 27/341	4/ 1250 25/341	3/ 1050 22/340	3/ 900 20/339	3/ 750 18/338	3/ 700 16/337
16000	TIME/FUEL DIST/TAS	9/ 2050 35/336	8/ 1950 32/336	7/ 1800 30/336	6/ 1650 27/336	5/ 1450 25/335	4/ 1250 23/335	3/ 1050 21/334	2/ 850 19/334	2/ 700 17/333	2/ 550 15/332	2/ 500 13/331
14000	TIME/FUEL DIST/TAS	8/ 1850 29/331	7/ 1750 26/330	6/ 1650 24/330	5/ 1500 22/330	4/ 1350 21/329	3/ 1150 19/329	2/ 950 17/329	1/ 750 16/328	1/ 600 14/327	1/ 450 13/326	1/ 400 11/325
10000	TIME/FUEL DIST/TAS	6/ 1400 18/320	5/ 1350 16/320	4/ 1300 15/319	3/ 1200 14/319	2/ 1150 13/319	1/ 1050 12/318	1/ 900 11/318	1/ 750 10/317	1/ 600 9/316	1/ 450 8/315	1/ 400 7/314
1500	TIME/FUEL	2/ 600	2/ 550	2/ 550	2/ 550	2/ 550	2/ 500	2/ 450	2/ 400	2/ 400	2/ 350	1/ 300

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS	AIRPORT ELEVATION	2000	4000	6000	8000	10000	12000
EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	FUEL ADJUSTMENT	-150	-250	-400	-550	-650	-800

SHADED AREA APPROXIMATES OPTIMUM ALTITUDE

290/.78 Enroute Climb
ISA + 15°C

PRESSURE ALTITUDE FT	UNITS MIN/KG NAM/KNOTS	BRAKE RELEASE WEIGHT KG										
		190000	180000	170000	160000	150000	140000	130000	120000	110000	100000	90000
43000	TIME/FUEL DIST/TAS								22/ 3300 142/431	18/ 2800 115/427	15/ 2450 97/425	13/ 2150 83/423
42000	TIME/FUEL DIST/TAS							24/ 3650 159/431	19/ 3100 125/427	16/ 2700 105/424	14/ 2400 90/422	12/ 2100 77/422
41000	TIME/FUEL DIST/TAS						28/ 4200 184/433	21/ 3400 135/426	18/ 2950 113/423	15/ 2600 97/421	14/ 2300 84/419	12/ 2050 72/418
40000	TIME/FUEL DIST/TAS						23/ 3750 146/426	19/ 3250 120/422	17/ 2850 103/420	15/ 2550 90/418	13/ 2250 78/417	11/ 2000 68/415
39000	TIME/FUEL DIST/TAS					24/ 4050 157/425	20/ 3500 128/421	18/ 3100 109/419	16/ 2750 95/417	14/ 2450 84/415	12/ 2200 73/414	11/ 1950 64/413
38000	TIME/FUEL DIST/TAS				26/ 4400 170/425	22/ 3800 135/420	19/ 3350 116/417	16/ 3000 101/415	15/ 2650 89/414	13/ 2400 78/412	12/ 2100 69/411	10/ 1900 60/410
37000	TIME/FUEL DIST/TAS			28/ 4800 182/425	23/ 4050 142/419	20/ 3600 121/416	17/ 3200 106/414	16/ 2900 94/412	14/ 2600 83/411	12/ 2300 73/410	11/ 2050 65/408	10/ 1850 57/407
36000	TIME/FUEL DIST/TAS		30/ 5150 193/424	24/ 4300 149/417	21/ 3800 127/414	18/ 3450 111/412	16/ 3100 98/410	15/ 2800 87/409	13/ 2500 78/408	12/ 2250 69/407	11/ 2000 61/406	9/ 1800 54/405
35000	TIME/FUEL DIST/TAS	31/ 5500 204/423	25/ 4600 156/416	22/ 4050 133/412	19/ 3650 117/410	17/ 3300 103/408	16/ 3000 92/407	14/ 2700 82/406	13/ 2450 73/405	11/ 2200 65/404	10/ 1950 58/403	9/ 1750 51/402
34000	TIME/FUEL DIST/TAS	26/ 4900 164/414	23/ 4350 140/410	20/ 3900 123/408	18/ 3550 109/407	17/ 3200 97/405	15/ 2900 87/404	14/ 2650 78/403	12/ 2400 70/402	11/ 2150 62/401	10/ 1900 55/400	9/ 1700 49/399
33000	TIME/FUEL DIST/TAS	24/ 4600 148/409	21/ 4150 129/406	19/ 3750 114/405	18/ 3450 102/403	16/ 3100 92/402	14/ 2850 82/401	13/ 2550 74/400	12/ 2350 66/399	11/ 2100 59/398	9/ 1900 53/397	8/ 1650 46/396
32000	TIME/FUEL DIST/TAS	23/ 4400 136/404	20/ 4000 121/402	18/ 3650 107/401	17/ 3350 96/400	15/ 3050 87/399	14/ 2750 78/398	13/ 2500 70/397	11/ 2250 63/396	10/ 2050 56/395	9/ 1850 50/394	8/ 1650 44/393
31000	TIME/FUEL DIST/TAS	21/ 4250 127/400	19/ 3850 113/398	18/ 3500 101/397	16/ 3250 91/396	15/ 2950 82/395	13/ 2700 74/394	12/ 2450 67/394	11/ 2200 60/393	10/ 2000 54/392	9/ 1800 48/391	8/ 1600 42/390
30000	TIME/FUEL DIST/TAS	20/ 4050 116/395	18/ 3700 104/393	17/ 3400 94/392	15/ 3100 84/391	14/ 2850 76/391	13/ 2600 69/390	12/ 2350 62/389	10/ 2150 56/388	9/ 1950 50/388	8/ 1750 45/387	8/ 1550 39/386
29000	TIME/FUEL DIST/TAS	19/ 3850 106/389	17/ 3550 96/388	16/ 3250 86/387	14/ 3000 78/387	13/ 2750 71/386	12/ 2500 64/385	11/ 2300 58/385	10/ 2050 52/384	9/ 1850 47/383	8/ 1650 42/382	7/ 1500 37/381
28000	TIME/FUEL DIST/TAS	18/ 3650 98/384	16/ 3400 88/384	15/ 3100 80/383	14/ 2850 72/382	13/ 2650 66/382	11/ 2400 60/381	10/ 2200 54/380	9/ 2000 49/380	9/ 1800 44/379	8/ 1600 39/378	7/ 1450 34/377
27000	TIME/FUEL DIST/TAS	17/ 3500 90/380	15/ 3250 82/379	14/ 3000 74/378	13/ 2750 67/378	12/ 2550 61/377	11/ 2350 55/377	10/ 2100 50/376	9/ 1950 45/375	8/ 1750 41/375	7/ 1550 36/374	7/ 1400 32/373
26000	TIME/FUEL DIST/TAS	16/ 3350 83/375	14/ 3100 75/375	13/ 2900 69/374	12/ 2650 62/374	11/ 2450 57/373	10/ 2250 52/373	9/ 2050 47/372	9/ 1850 42/371	8/ 1700 38/371	7/ 1500 34/370	6/ 1350 30/369
25000	TIME/FUEL DIST/TAS	15/ 3200 77/371	14/ 3000 70/371	13/ 2750 64/370	12/ 2550 58/370	11/ 2350 53/369	10/ 2150 48/369	9/ 1950 43/368	8/ 1800 39/368	7/ 1600 35/367	7/ 1450 32/366	6/ 1300 28/365
24000	TIME/FUEL DIST/TAS	14/ 3100 71/367	13/ 2850 64/367	12/ 2650 59/366	11/ 2450 54/366	10/ 2250 49/365	9/ 2100 44/365	9/ 1900 40/364	8/ 1750 37/364	7/ 1550 33/363	6/ 1400 29/362	6/ 1250 26/361
23000	TIME/FUEL DIST/TAS	13/ 2950 65/363	12/ 2750 60/363	11/ 2550 54/362	11/ 2350 50/362	10/ 2200 45/362	9/ 2000 41/361	8/ 1850 38/361	7/ 1650 34/360	7/ 1500 31/359	6/ 1350 27/359	6/ 1200 24/358
22000	TIME/FUEL DIST/TAS	12/ 2800 60/360	12/ 2600 55/359	11/ 2450 50/359	10/ 2250 46/358	9/ 2100 42/358	9/ 1950 38/358	8/ 1750 35/357	7/ 1600 31/356	6/ 1450 28/356	6/ 1300 25/355	5/ 1150 22/354
21000	TIME/FUEL DIST/TAS	12/ 2700 55/356	11/ 2500 51/356	10/ 2350 46/355	10/ 2200 42/355	9/ 2000 39/354	8/ 1850 35/354	7/ 1700 32/354	7/ 1550 29/353	6/ 1400 26/352	6/ 1250 23/352	5/ 1150 21/350
20000	TIME/FUEL DIST/TAS	11/ 2550 51/352	10/ 2400 47/352	10/ 2250 43/352	9/ 2100 39/351	8/ 1950 36/351	8/ 1800 33/351	7/ 1650 30/350	6/ 1500 27/350	6/ 1350 24/349	5/ 1200 22/348	5/ 1100 19/347
18000	TIME/FUEL DIST/TAS	10/ 2350 43/346	9/ 2200 39/345	9/ 2050 36/345	8/ 1900 33/345	8/ 1750 30/344	7/ 1650 28/344	6/ 1500 25/344	6/ 1350 23/343	5/ 1250 21/342	5/ 1100 18/342	4/ 1000 16/340
16000	TIME/FUEL DIST/TAS	9/ 2100 36/339	8/ 1950 33/339	8/ 1850 30/339	7/ 1750 28/339	7/ 1600 25/338	6/ 1500 23/338	6/ 1350 21/337	5/ 1250 19/337	5/ 1150 17/336	4/ 1000 16/335	4/ 900 14/334
14000	TIME/FUEL DIST/TAS	8/ 1850 29/334	7/ 1750 27/333	7/ 1650 25/333	6/ 1550 23/333	6/ 1450 21/332	6/ 1350 19/332	5/ 1250 17/332	5/ 1150 16/331	4/ 1000 14/330	4/ 900 13/329	4/ 850 11/328
10000	TIME/FUEL DIST/TAS	6/ 1450 18/323	5/ 1350 17/322	5/ 1300 15/322	5/ 1250 14/322	5/ 1150 13/322	4/ 1050 12/321	4/ 1000 11/321	4/ 900 10/320	3/ 800 9/319	3/ 750 8/318	3/ 650 7/317
1500	TIME/FUEL	2/ 600	2/ 550	2/ 550	2/ 550	2/ 550	2/ 500	2/ 450	2/ 400	2/ 400	2/ 350	1/ 300

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS	AIRPORT ELEVATION	2000	4000	6000	8000	10000	12000
EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	FUEL ADJUSTMENT	-150	-250	-400	-550	-700	-800

SHADED AREA APPROXIMATES OPTIMUM ALTITUDE



Flight Planning and Performance Manual

290/.78 Enroute Climb
ISA + 20°C

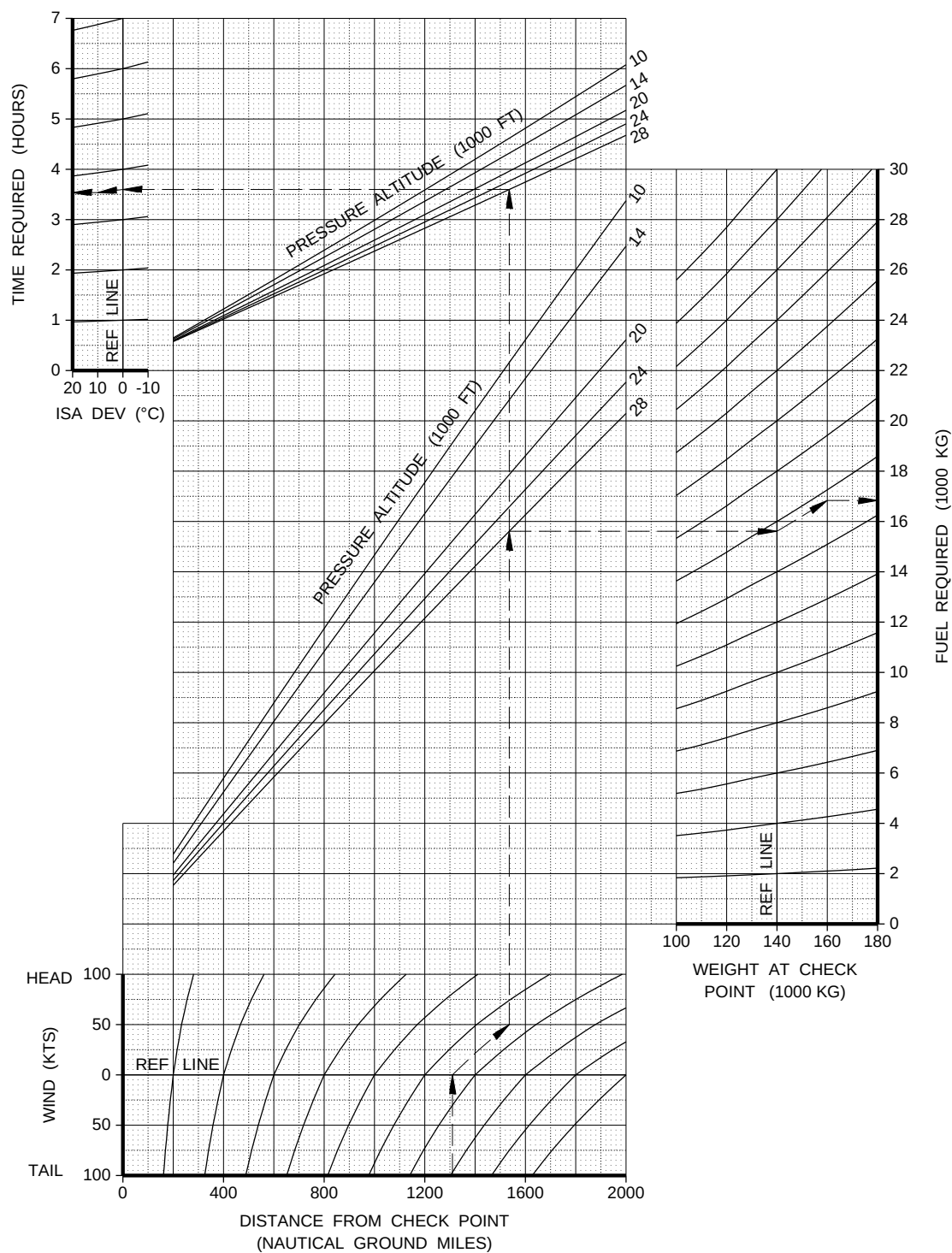
PRESSURE ALTITUDE FT	UNITS MIN/KG NAM/KNOTS	BRAKE RELEASE WEIGHT KG										
		190000	180000	170000	160000	150000	140000	130000	120000	110000	100000	90000
43000	TIME/FUEL DIST/TAS								25/ 3550 167/437	20/ 2950 131/433	17/ 2550 109/430	14/ 2250 92/428
42000	TIME/FUEL DIST/TAS							29/ 4050 196/439	22/ 3300 143/433	18/ 2850 118/430	16/ 2500 100/427	14/ 2150 86/426
41000	TIME/FUEL DIST/TAS							24/ 3650 157/433	20/ 3100 128/429	17/ 2750 108/426	15/ 2400 93/425	13/ 2100 80/423
40000	TIME/FUEL DIST/TAS						26/ 4050 173/433	21/ 3400 137/428	18/ 3000 116/425	16/ 2650 100/423	14/ 2350 87/422	12/ 2050 75/420
39000	TIME/FUEL DIST/TAS					29/ 4450 190/433	23/ 3700 146/427	19/ 3250 123/424	17/ 2900 107/422	15/ 2550 93/420	13/ 2250 81/419	12/ 2000 71/418
38000	TIME/FUEL DIST/TAS				32/ 4950 211/434	24/ 4050 156/426	21/ 3550 131/423	18/ 3150 113/421	16/ 2800 99/419	14/ 2500 87/417	13/ 2200 76/416	11/ 1950 66/415
37000	TIME/FUEL DIST/TAS				26/ 4350 165/425	22/ 3800 138/421	19/ 3350 119/419	17/ 3000 104/417	15/ 2700 92/416	13/ 2400 81/414	12/ 2150 72/413	11/ 1900 63/412
36000	TIME/FUEL DIST/TAS			27/ 4650 173/424	23/ 4050 144/420	20/ 3600 125/417	18/ 3250 110/415	16/ 2900 97/414	14/ 2600 86/413	13/ 2350 76/411	11/ 2100 67/410	10/ 1850 59/409
35000	TIME/FUEL DIST/TAS		28/ 4950 183/422	24/ 4350 152/418	21/ 3850 132/415	19/ 3500 116/414	17/ 3150 103/412	15/ 2850 91/411	14/ 2550 81/410	12/ 2300 72/409	11/ 2050 64/408	10/ 1800 56/407
34000	TIME/FUEL DIST/TAS	30/ 5300 194/421	26/ 4650 161/416	23/ 4150 139/414	20/ 3750 122/412	18/ 3350 108/410	16/ 3050 97/409	15/ 2750 86/408	13/ 2500 77/407	12/ 2250 69/406	11/ 2000 61/405	9/ 1750 53/404
33000	TIME/FUEL DIST/TAS	27/ 4950 171/415	24/ 4400 147/412	21/ 3950 129/410	19/ 3600 114/408	17/ 3250 102/407	16/ 2950 91/406	14/ 2700 82/405	13/ 2400 73/404	11/ 2150 65/403	10/ 1950 58/402	9/ 1750 51/401
32000	TIME/FUEL DIST/TAS	25/ 4700 156/410	22/ 4250 137/408	20/ 3850 121/406	18/ 3500 108/405	17/ 3150 96/403	15/ 2900 86/402	14/ 2600 78/401	12/ 2350 69/401	11/ 2100 62/400	10/ 1900 55/399	9/ 1700 49/398
31000	TIME/FUEL DIST/TAS	24/ 4500 145/405	21/ 4050 127/403	19/ 3700 113/402	18/ 3400 102/401	16/ 3100 91/400	14/ 2800 82/399	13/ 2550 74/398	12/ 2300 66/397	11/ 2050 59/397	10/ 1850 52/396	8/ 1650 46/395
30000	TIME/FUEL DIST/TAS	22/ 4250 131/399	20/ 3900 117/398	18/ 3550 105/397	17/ 3250 94/396	15/ 2950 85/395	14/ 2700 76/394	12/ 2450 69/393	11/ 2200 62/393	10/ 2000 55/392	9/ 1800 49/391	8/ 1600 43/390
29000	TIME/FUEL DIST/TAS	21/ 4050 120/394	19/ 3700 107/393	17/ 3400 96/392	16/ 3100 87/391	14/ 2850 78/390	13/ 2600 71/389	12/ 2350 64/389	11/ 2150 57/388	10/ 1950 51/387	9/ 1750 46/387	8/ 1550 40/386
28000	TIME/FUEL DIST/TAS	19/ 3850 110/389	18/ 3550 99/388	16/ 3250 89/387	15/ 3000 80/386	14/ 2750 73/386	12/ 2500 66/385	11/ 2300 59/384	10/ 2050 53/384	9/ 1850 48/383	8/ 1650 43/382	7/ 1500 38/381
27000	TIME/FUEL DIST/TAS	18/ 3700 101/384	17/ 3400 91/383	15/ 3100 82/383	14/ 2900 74/382	13/ 2650 67/381	12/ 2400 61/381	11/ 2200 55/380	10/ 2000 50/379	9/ 1800 45/379	8/ 1600 40/378	7/ 1450 35/377
26000	TIME/FUEL DIST/TAS	17/ 3550 93/380	16/ 3250 84/379	14/ 3000 76/378	13/ 2750 69/378	12/ 2550 63/377	11/ 2350 57/376	10/ 2100 51/376	9/ 1900 46/375	8/ 1750 41/375	7/ 1550 37/374	7/ 1400 33/373
25000	TIME/FUEL DIST/TAS	16/ 3350 86/375	15/ 3100 77/375	14/ 2850 70/374	13/ 2650 64/373	12/ 2450 58/373	11/ 2250 53/372	10/ 2050 48/372	9/ 1850 43/371	8/ 1650 39/371	7/ 1500 34/370	6/ 1350 30/369
24000	TIME/FUEL DIST/TAS	15/ 3200 79/371	14/ 3000 71/370	13/ 2750 65/370	12/ 2550 59/369	11/ 2350 54/369	10/ 2150 49/369	9/ 1950 44/368	8/ 1800 40/368	8/ 1600 36/367	7/ 1450 32/366	6/ 1300 28/365
23000	TIME/FUEL DIST/TAS	14/ 3100 73/367	13/ 2850 66/367	12/ 2650 60/366	11/ 2450 55/366	10/ 2250 50/365	10/ 2050 45/365	9/ 1900 41/364	8/ 1700 37/364	7/ 1550 33/363	6/ 1400 30/362	6/ 1250 26/362
22000	TIME/FUEL DIST/TAS	13/ 2950 67/363	12/ 2700 61/363	12/ 2550 55/362	11/ 2350 51/362	10/ 2150 46/362	9/ 2000 42/361	8/ 1800 38/361	8/ 1650 34/360	7/ 1500 31/360	6/ 1350 28/359	6/ 1200 24/358
21000	TIME/FUEL DIST/TAS	13/ 2800 61/359	12/ 2600 56/359	11/ 2400 51/359	10/ 2250 47/358	9/ 2100 43/358	9/ 1900 39/358	8/ 1750 35/357	7/ 1600 32/357	7/ 1450 29/356	6/ 1300 26/355	5/ 1150 23/354
20000	TIME/FUEL DIST/TAS	12/ 2650 56/356	11/ 2500 52/356	10/ 2300 47/355	10/ 2150 43/355	9/ 2000 39/355	8/ 1850 36/354	7/ 1650 33/354	7/ 1500 29/353	6/ 1400 27/353	6/ 1250 24/352	5/ 1100 21/351
18000	TIME/FUEL DIST/TAS	10/ 2400 47/349	10/ 2250 43/349	9/ 2100 40/348	9/ 1950 36/348	8/ 1800 33/348	7/ 1700 30/347	7/ 1550 28/347	6/ 1400 25/347	6/ 1250 23/346	5/ 1150 20/345	5/ 1000 18/344
16000	TIME/FUEL DIST/TAS	9/ 2150 39/343	9/ 2050 36/342	8/ 1900 33/342	8/ 1800 30/342	7/ 1650 28/342	7/ 1550 25/341	6/ 1400 23/341	5/ 1250 21/340	5/ 1150 19/340	5/ 1050 17/339	4/ 950 15/338
14000	TIME/FUEL DIST/TAS	8/ 1950 32/337	8/ 1800 30/336	7/ 1700 27/336	7/ 1600 25/336	6/ 1500 23/336	6/ 1400 21/335	5/ 1250 19/335	5/ 1150 17/334	4/ 1050 16/334	4/ 950 14/333	4/ 850 12/332
10000	TIME/FUEL DIST/TAS	6/ 1500 20/326	6/ 1400 18/325	5/ 1350 17/325	5/ 1250 16/325	5/ 1200 14/325	5/ 1100 13/324	4/ 1000 12/324	4/ 900 11/323	3/ 850 10/323	3/ 750 9/322	3/ 700 8/320
1500	TIME/FUEL	2/ 600	2/ 550	2/ 550	2/ 550	2/ 550	2/ 500	2/ 450	2/ 400	2/ 400	2/ 350	1/ 300
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS						AIRPORT ELEVATION						
EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE						FUEL ADJUSTMENT						
						2000	4000	6000	8000	10000	12000	
						-150	-300	-400	-550	-700	-850	

SHADED AREA APPROXIMATES OPTIMUM ALTITUDE

Long Range Cruise Enroute Fuel and Time

0 to 2000 NM Distance

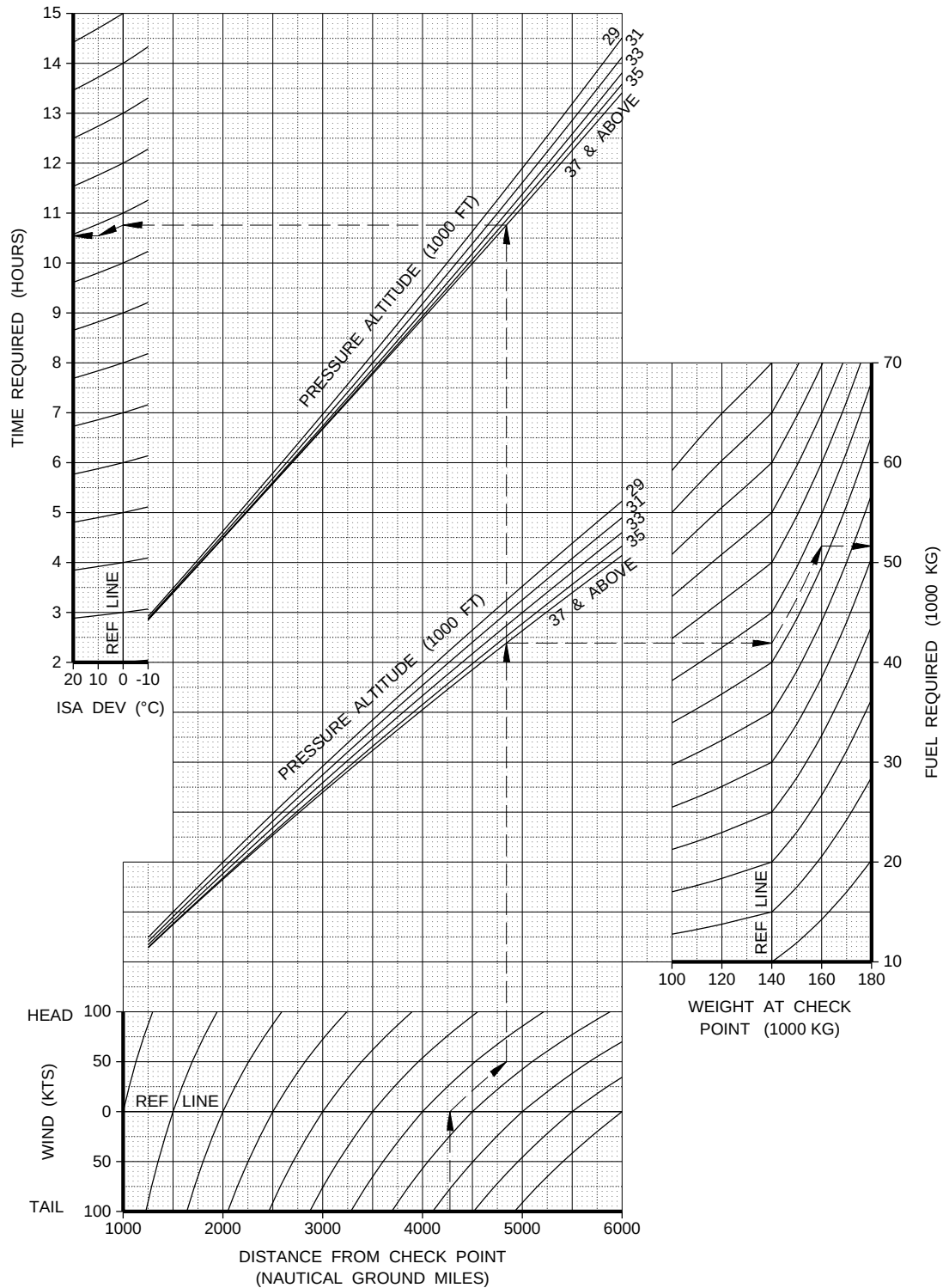
Based on .78/290/250 descent



Long Range Cruise Enroute Fuel and Time

1000 to 6000 NM Distance

Based on .78/290/250 descent





Long Range Cruise Table

43100 FT to 38000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
43 (-29)	EPR								1.52	1.39	1.29
	MAX TAT								-11	3	
	KIAS								224	226	226
	MACH								0.794	0.801	0.802
	FF/ENG								2163	1899	1709
	KTAS								456	459	460
42 (-29)	EPR								1.44	1.33	1.26
	MAX TAT								-2		
	KIAS								231	232	231
	MACH								0.798	0.802	0.801
	FF/ENG								2092	1876	1711
	KTAS								458	460	459
41 (-29)	EPR							1.48	1.37	1.29	1.22
	MAX TAT							-7			
	KIAS							235	237	237	236
	MACH							0.796	0.801	0.802	0.798
	FF/ENG							2293	2050	1865	1716
	KTAS							456	459	460	458
40 (-29)	EPR						1.53	1.41	1.32	1.25	1.20
	MAX TAT						-12	1			
	KIAS						240	242	243	242	241
	MACH						0.793	0.799	0.802	0.801	0.796
	FF/ENG						2515	2231	2027	1865	1727
	KTAS						455	458	460	459	456
39 (-29)	EPR						1.44	1.35	1.28	1.22	1.18
	MAX TAT						-2				
	KIAS						247	249	249	247	245
	MACH						0.798	0.802	0.802	0.798	0.791
	FF/ENG						2416	2193	2016	1868	1735
	KTAS						457	460	460	458	454
38 (-29)	EPR					1.47	1.38	1.30	1.24	1.20	1.16
	MAX TAT					-5					
	KIAS					252	254	254	254	252	248
	MACH					0.796	0.801	0.802	0.800	0.796	0.784
	FF/ENG					2603	2361	2169	2013	1876	1738
	KTAS					456	459	460	459	456	450

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Shaded area approximates optimum altitude.

Max Cruise EPR

PRESS ALT (1000 FT)	38	39	40	41	42	43
LIMIT EPR	1.57	1.57	1.57	1.57	1.56	1.56
MAX TAT (°C)	-11	-11	-11	-11	-11	-11

Decrease limit EPR by 0.10 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.02.

With engine and wing anti-ice on, decrease limit EPR by 0.07.



Flight Planning and Performance Manual

Long Range Cruise Table
37000 FT to 32000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
37 (-29)	EPR				1.50	1.40	1.32	1.26	1.21	1.17	1.14
	MAX TAT				-8	3					
	KIAS				258	259	260	260	259	256	251
	MACH				0.794	0.799	0.802	0.801	0.798	0.791	0.775
	FF/ENG KTAS				2798 456	2532 458	2326 460	2159 460	2012 457	1881 454	1738 445
36 (-29)	EPR			1.52	1.42	1.34	1.27	1.22	1.19	1.15	1.12
	MAX TAT			-10	1						
	KIAS			263	265	266	266	265	264	260	253
	MACH			0.793	0.798	0.802	0.802	0.799	0.795	0.784	0.765
	FF/ENG KTAS			2995 455	2707 458	2486 460	2308 460	2154 459	2021 456	1886 450	1737 439
35 (-27)	EPR		1.54	1.44	1.36	1.29	1.24	1.20	1.17	1.14	1.11
	MAX TAT		-9	2							
	KIAS		269	271	272	273	272	271	268	263	255
	MACH		0.792	0.797	0.801	0.802	0.801	0.797	0.790	0.775	0.754
	FF/ENG KTAS		3208 456	2897 460	2665 462	2477 462	2317 462	2173 459	2041 455	1899 447	1751 435
34 (-25)	EPR	1.55	1.45	1.37	1.30	1.25	1.21	1.18	1.15	1.12	1.10
	MAX TAT	-8	3								
	KIAS	275	277	278	279	279	277	276	271	265	257
	MACH	0.791	0.797	0.800	0.802	0.801	0.798	0.794	0.783	0.765	0.743
	FF/ENG KTAS	3419 458	3086 461	2846 463	2650 464	2482 464	2328 462	2197 459	2060 453	1911 443	1761 430
33 (-23)	EPR	1.46	1.38	1.31	1.26	1.22	1.19	1.16	1.13	1.11	1.08
	MAX TAT	4									
	KIAS	283	284	285	285	284	283	280	274	267	258
	MACH	0.796	0.800	0.802	0.802	0.799	0.796	0.788	0.774	0.755	0.731
	FF/ENG KTAS	3275 463	3029 465	2823 467	2647 466	2490 465	2354 463	2219 458	2074 450	1925 439	1767 425
32 (-21)	EPR	1.39	1.32	1.27	1.23	1.20	1.17	1.14	1.11	1.09	1.07
	MAX TAT	12									
	KIAS	291	292	292	291	290	287	283	276	269	259
	MACH	0.799	0.802	0.802	0.800	0.797	0.791	0.780	0.764	0.744	0.719
	FF/ENG KTAS	3212 467	2998 468	2815 468	2656 468	2512 466	2379 462	2238 456	2087 446	1935 434	1777 420

Max TAT not shown where EPR can be set in ISA + 30°C conditions.
Increase/decrease fuel flow 3% per 10°C above/below standard TAT.
Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.
Shaded area approximates optimum altitude.

Max Cruise EPR

PRESS ALT (1000 FT)	32	33	34	35	36	37
LIMIT EPR	1.56	1.58	1.58	1.58	1.57	1.57
MAX TAT (°C)	-1	-4	-6	-8	-10	-11

Decrease limit EPR by 0.10 per 10°C TAT hotter than table value.
With engine anti-ice on, decrease limit EPR by 0.02.
With engine and wing anti-ice on, decrease limit EPR by 0.06.

Long Range Cruise Table
31000 FT to 26000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
31 (-19)	EPR	1.33	1.28	1.23	1.20	1.17	1.15	1.12	1.10	1.08	1.06
	MAX TAT										
	KIAS	298	298	298	296	295	291	286	278	270	260
	MACH	0.802	0.802	0.801	0.798	0.794	0.785	0.771	0.753	0.732	0.706
	FF/ENG	3175	2984	2823	2674	2541	2401	2251	2101	1945	1781
30 (-17)	KTAS	470	471	470	468	466	461	452	442	429	414
	EPR	1.28	1.24	1.21	1.18	1.15	1.13	1.11	1.09	1.07	1.05
	MAX TAT										
	KIAS	305	304	303	302	299	294	288	280	271	260
	MACH	0.802	0.801	0.799	0.796	0.788	0.777	0.761	0.742	0.720	0.694
29 (-16)	FF/ENG	3156	2991	2838	2704	2564	2419	2265	2115	1949	1784
	KTAS	473	472	471	469	465	458	448	438	424	409
	EPR	1.25	1.21	1.19	1.16	1.14	1.12	1.10	1.08	1.06	1.04
	MAX TAT										
	KIAS	311	310	309	307	303	297	290	281	272	261
28 (-14)	MACH	0.802	0.799	0.796	0.791	0.781	0.767	0.751	0.731	0.707	0.682
	FF/ENG	3162	3006	2867	2729	2585	2432	2282	2122	1949	1798
	KTAS	474	473	471	468	462	454	444	433	419	403
	EPR	1.22	1.19	1.16	1.14	1.12	1.10	1.08	1.07	1.05	1.04
	MAX TAT										
27 (-12)	KIAS	317	316	314	311	305	299	291	282	272	262
	MACH	0.800	0.797	0.793	0.785	0.773	0.757	0.740	0.719	0.695	0.669
	FF/ENG	3178	3032	2894	2752	2602	2449	2295	2124	1956	1810
	KTAS	475	474	471	466	459	450	440	427	413	398
	EPR	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.06	1.04	1.03
26 (-11)	MAX TAT										
	KIAS	323	321	318	314	308	301	293	283	273	262
	MACH	0.797	0.794	0.787	0.777	0.763	0.747	0.728	0.707	0.683	0.657
	FF/ENG	3201	3061	2918	2773	2619	2465	2301	2127	1968	1818
	KTAS	476	474	470	464	455	446	435	422	408	392
26 (-11)	EPR	1.17	1.15	1.13	1.11	1.09	1.08	1.06	1.05	1.03	1.02
	MAX TAT										
	KIAS	328	326	322	316	310	302	294	284	274	262
	MACH	0.795	0.789	0.780	0.767	0.753	0.736	0.716	0.695	0.671	0.644
	FF/ENG	3230	3087	2944	2790	2636	2476	2305	2134	1977	1829
26 (-11)	KTAS	477	473	467	460	451	441	429	416	402	386

Max TAT not shown where EPR can be set in ISA + 30°C conditions.**Increase/decrease fuel flow 3% per 10°C above/below standard TAT.****Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.****Shaded area approximates optimum altitude.****Max Cruise EPR**

PRESS ALT (1000 FT)	26	27	28	29	30	31
LIMIT EPR	1.45	1.47	1.49	1.51	1.52	1.54
MAX TAT (°C)	9	7	5	3	3	1

Decrease limit EPR by 0.11 per 10°C TAT hotter than table value.**With engine anti-ice on, decrease limit EPR by 0.02.****With engine and wing anti-ice on, decrease limit EPR by 0.05.**



Flight Planning and Performance Manual

Long Range Cruise Table 25000 FT to 20000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
25 (-9)	EPR	1.15	1.13	1.11	1.10	1.08	1.07	1.05	1.04	1.03	1.02
	MAX TAT										
	KIAS	333	329	324	318	312	303	294	285	274	263
	MACH	0.790	0.782	0.771	0.758	0.743	0.725	0.704	0.683	0.659	0.633
	FF/ENG	3258	3115	2962	2807	2650	2482	2308	2142	1986	1844
24 (-8)	KTAS	476	471	464	456	447	436	424	411	397	381
	EPR	1.13	1.12	1.10	1.09	1.07	1.06	1.04	1.03	1.02	1.02
	MAX TAT										
	KIAS	337	332	327	320	313	304	295	285	274	263
	MACH	0.784	0.774	0.761	0.748	0.731	0.713	0.693	0.671	0.647	0.621
23 (-6)	FF/ENG	3286	3135	2977	2821	2657	2484	2311	2149	1999	1860
	KTAS	474	468	460	452	442	431	419	406	391	375
	EPR	1.12	1.10	1.09	1.08	1.06	1.05	1.04	1.03	1.02	1.01
	MAX TAT										
	KIAS	340	335	329	322	314	305	296	286	275	263
22 (-5)	MACH	0.776	0.764	0.752	0.737	0.720	0.701	0.681	0.659	0.635	0.609
	FF/ENG	3306	3146	2991	2831	2660	2483	2315	2157	2014	1871
	KTAS	471	464	456	447	437	425	413	400	385	370
	EPR	1.11	1.09	1.08	1.07	1.05	1.04	1.03	1.02	1.02	1.01
	MAX TAT										
21 (-4)	KIAS	343	337	331	323	315	306	297	286	275	263
	MACH	0.767	0.755	0.742	0.726	0.708	0.690	0.669	0.647	0.624	0.598
	FF/ENG	3318	3162	3005	2837	2660	2486	2322	2170	2029	1878
	KTAS	467	460	452	442	432	420	408	394	380	364
	EPR	1.09	1.08	1.07	1.06	1.04	1.03	1.03	1.02	1.01	1.01
20 (-2)	MAX TAT										
	KIAS	345	339	332	324	316	307	297	286	276	263
	MACH	0.758	0.745	0.731	0.714	0.697	0.678	0.657	0.635	0.612	0.586
	FF/ENG	3337	3181	3016	2840	2662	2494	2335	2189	2042	1883
	KTAS	464	456	447	437	426	415	402	389	375	358
	EPR	1.08	1.07	1.06	1.05	1.04	1.03	1.02	1.01	1.01	1.00
	MAX TAT										
	KIAS	347	341	333	325	317	307	297	287	276	263
	MACH	0.748	0.734	0.719	0.703	0.685	0.666	0.646	0.624	0.601	0.574
	FF/ENG	3363	3200	3026	2846	2674	2510	2357	2211	2057	1891
	KTAS	460	451	442	432	421	409	397	383	369	353

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Cruise EPR

PRESS ALT (1000 FT)	20	21	22	23	24	25
LIMIT EPR	1.37	1.38	1.39	1.40	1.41	1.43
MAX TAT (°C)	19	17	16	14	13	11

Decrease limit EPR by 0.09 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.02.

With engine and wing anti-ice on, decrease limit EPR by 0.05.

Long Range Cruise Table

19000 FT to 14000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
19 (-1)	EPR	1.07	1.06	1.05	1.04	1.03	1.02	1.02	1.01	1.01	1.00
	MAX TAT										
	KIAS	349	342	334	326	317	308	298	287	275	262
	MACH	0.738	0.723	0.708	0.691	0.674	0.655	0.634	0.613	0.589	0.562
	FF/ENG	3391	3219	3039	2863	2696	2536	2386	2237	2077	1903
18 (1)	KTAS	455	446	437	426	416	404	391	378	363	347
	EPR	1.06	1.05	1.04	1.03	1.02	1.02	1.01	1.01	1.00	1.00
	MAX TAT										
	KIAS	350	343	335	327	318	308	298	287	275	262
	MACH	0.727	0.712	0.697	0.680	0.662	0.643	0.623	0.602	0.577	0.550
17 (2)	FF/ENG	3416	3236	3058	2889	2724	2568	2420	2264	2098	1914
	KTAS	450	441	431	421	410	398	386	373	357	340
	EPR	1.05	1.04	1.03	1.03	1.02	1.01	1.01	1.00	1.00	0.99
	MAX TAT										
	KIAS	351	344	336	327	318	308	298	287	275	261
16 (3)	MACH	0.716	0.701	0.686	0.669	0.651	0.632	0.612	0.590	0.566	0.538
	FF/ENG	3434	3255	3085	2918	2755	2602	2450	2289	2113	1920
	KTAS	445	436	426	416	405	393	381	367	352	334
	EPR	1.04	1.03	1.03	1.02	1.02	1.01	1.01	1.00	1.00	0.99
	MAX TAT										
15 (5)	KIAS	352	345	337	328	318	309	298	287	274	260
	MACH	0.705	0.690	0.675	0.658	0.640	0.621	0.601	0.579	0.554	0.526
	FF/ENG	3452	3282	3116	2949	2787	2635	2478	2309	2123	1924
	KTAS	440	431	421	410	399	388	375	361	346	328
	EPR	1.04	1.03	1.02	1.02	1.01	1.01	1.00	1.00	0.99	0.99
14 (6)	MAX TAT										
	KIAS	353	345	337	328	319	309	298	287	273	259
	MACH	0.694	0.679	0.663	0.646	0.629	0.610	0.590	0.567	0.542	0.514
	FF/ENG	3479	3313	3145	2977	2820	2665	2502	2323	2128	1928
	KTAS	435	425	416	405	394	382	370	355	339	322
14 (6)	EPR	1.03	1.02	1.02	1.01	1.01	1.00	1.00	1.00	0.99	0.99
	MAX TAT										
	KIAS	354	346	337	328	319	309	298	286	272	258
	MACH	0.683	0.668	0.652	0.635	0.618	0.599	0.579	0.556	0.530	0.503
	FF/ENG	3510	3340	3168	3006	2851	2691	2519	2331	2130	1931
14 (6)	KTAS	429	420	410	400	389	377	364	349	333	317

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Cruise EPR

PRESS ALT (1000 FT)	14	15	16	17	18	19
LIMIT EPR	1.32	1.32	1.33	1.34	1.35	1.36
MAX TAT (°C)	27	25	24	23	21	20

Decrease limit EPR by 0.08 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.02.

With engine and wing anti-ice on, decrease limit EPR by 0.05.



Flight Planning and Performance Manual

Long Range Cruise Table

13000 FT to 8000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
13 (8)	EPR	1.02	1.02	1.01	1.01	1.01	1.00	1.00	0.99	0.99	0.99
	MAX TAT										
	KIAS	355	346	338	329	319	309	298	285	272	258
	MACH	0.672	0.657	0.641	0.625	0.607	0.588	0.567	0.544	0.519	0.493
	FF/ENG	3532	3359	3193	3036	2877	2710	2530	2333	2130	1931
12 (9)	KTAS	424	415	405	394	383	371	358	343	327	311
	EPR	1.02	1.01	1.01	1.01	1.00	1.00	0.99	0.99	0.99	0.99
	MAX TAT										
	KIAS	355	347	338	329	319	309	297	284	271	257
	MACH	0.661	0.646	0.630	0.614	0.596	0.577	0.556	0.532	0.508	0.483
11 (11)	FF/ENG	3545	3378	3219	3061	2897	2721	2531	2328	2124	1928
	KTAS	419	409	399	389	378	366	352	337	322	306
	EPR	1.01	1.01	1.01	1.00	1.00	1.00	0.99	0.99	0.99	0.98
	MAX TAT										
	KIAS	355	347	339	329	319	308	296	283	270	257
10 (12)	MACH	0.650	0.635	0.620	0.603	0.586	0.566	0.544	0.521	0.497	0.473
	FF/ENG	3559	3399	3242	3079	2906	2722	2523	2317	2115	1923
	KTAS	413	404	394	384	372	360	346	331	316	301
	EPR	1.01	1.01	1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.98
	MAX TAT										
9 (14)	KIAS	356	348	339	329	319	308	295	283	270	257
	MACH	0.639	0.625	0.609	0.593	0.575	0.555	0.533	0.510	0.487	0.464
	FF/ENG	3581	3424	3262	3092	2911	2717	2512	2306	2107	1921
	KTAS	408	399	389	378	367	354	340	326	311	296
	EPR	1.01	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.98	0.98
8 (15)	MAX TAT										
	KIAS	356	348	339	329	318	307	294	282	269	256
	MACH	0.629	0.615	0.599	0.582	0.563	0.543	0.522	0.500	0.477	0.455
	FF/ENG	3608	3449	3281	3104	2916	2714	2507	2302	2107	1926
	KTAS	403	394	384	373	361	348	334	320	306	292
	EPR	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.98	0.98
	MAX TAT										
	KIAS	357	348	339	329	318	306	294	281	269	256
	MACH	0.619	0.604	0.588	0.571	0.552	0.532	0.511	0.490	0.468	0.447
	FF/ENG	3637	3473	3299	3116	2920	2714	2507	2304	2113	1934
	KTAS	398	388	378	367	355	342	329	315	301	287

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Cruise EPR

PRESS ALT (1000 FT)	8	9	10	11	12	13
LIMIT EPR	1.27	1.28	1.29	1.29	1.30	1.31
MAX TAT (°C)	35	34	32	31	30	28

Decrease limit EPR by 0.07 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.01.

With engine and wing anti-ice on, decrease limit EPR by 0.03.

.80M Cruise Table

43100 FT to 34000 FT

EPR

MAX TAT

FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
43	226 -29 459											1.52 -11 2189	1.45 -4 2028	1.39 3 1896	1.34 1789	1.29 1703
42	231 -29 459										1.51 -9 2255	1.44 -2 2100	1.38 1973	1.33 1867	1.29 1781	1.26 1709
41	237 -29 459									1.49 -7 2317	1.43 0 2169	1.37 2046	1.33 1944	1.29 1859	1.25 1786	1.22 1723
40	242 -29 459							1.53 -12 2549	1.47 -5 2375	1.41 1 2235	1.36 2117	1.32 2018	1.28 1935	1.25 1863	1.22 1800	1.20 1742
39	248 -29 459						1.51 -9 2588	1.45 -2 2430	1.39 4 2298	1.35 2186	1.31 2090	1.27 2009	1.24 1938	1.22 1876	1.20 1818	1.18 1766
38	254 -29 459					1.48 -6 2630	1.42 0 2484	1.38 2359	1.33 2251	1.30 2160	1.27 2082	1.24 2012	1.22 1949	1.20 1892	1.18 1841	1.16 1793
37	260 -29 459				1.50 -8 2830	1.40 3 2535	1.36 2417	1.32 2315	1.29 2228	1.26 2153	1.23 2083	1.21 2022	1.19 1965	1.18 1915	1.16 1868	1.15 1826
36	266 -29 459			1.53 -10 3037	1.42 1 2717	1.34 2478	1.30 2382	1.27 2299	1.25 2226	1.22 2157	1.21 2096	1.19 2041	1.17 1991	1.16 1945	1.14 1904	1.13 1865
35	272 -26 461		1.55 -10 3263	1.44 2 2915	1.35 2660	1.29 2467	1.26 2387	1.24 2314	1.22 2246	1.20 2186	1.18 2132	1.17 2082	1.16 2036	1.14 1995	1.13 1956	1.12 1921
34	278 -24 463		1.45 2 3112	1.37 2844	1.30 2638	1.25 2475	1.23 2403	1.21 2337	1.19 2278	1.18 2225	1.17 2176	1.15 2130	1.14 2089	1.13 2050	1.12 2014	1.11 1981

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
 INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
 INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

TURBULENT AIR PENETRATION

TARGET SPEED IAS / MACH	PRESS ALT 1000 FT	WEIGHT 1000 KG									
		190	180	170	160	150	140	130	120	110	100
		EPR REQUIRED									
290/.78	41										
	37										
	33										
	29	1.45	1.37	1.31	1.26	1.22	1.18	1.16	1.13	1.11	1.09
	25	1.24	1.21	1.18	1.16	1.13	1.11	1.10	1.08	1.07	1.05
	20	1.16	1.14	1.12	1.10	1.08	1.07	1.05	1.04	1.03	1.02
	15	1.10	1.09	1.07	1.06	1.04	1.03	1.02	1.01	1.00	1.00
	10	1.06	1.05	1.04	1.03	1.02	1.01	1.00	1.00	0.99	0.99
		1.04	1.03	1.02	1.01	1.00	1.00	0.99	0.99	0.98	0.98

MAX CRUISE EPR

PRESS ALT 1000 FT	34	35	36	37	38	39	40	41	42	43
EPR LIMIT	1.58	1.58	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
TAT DEG C AND COLDER	-6	-8	-11	-11	-11	-11	-11	-11	-11	-11

REDUCE EPR BY 0.10 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.06



Flight Planning and Performance Manual

.80M Cruise Table

33000 FT to 24000 FT

EPR

MAX TAT

FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
33	284 -22 465	1.46 3306	1.38 3030	1.31 2810	1.26 2638	1.22 2494	1.20 2431	1.19 2373	1.17 2322	1.16 2273	1.15 2227	1.14 2186	1.13 2147	1.12 2111	1.11 2078	1.10 2047
32	291 -20 467	1.39 3216	1.32 2986	1.27 2804	1.23 2654	1.20 2527	1.18 2472	1.17 2420	1.16 2372	1.14 2327	1.13 2285	1.13 2246	1.12 2211	1.11 2177	1.10 2146	1.09 2118
31	297 -17 469	1.33 3163	1.28 2972	1.23 2817	1.20 2685	1.18 2572	1.16 2521	1.15 2473	1.14 2429	1.13 2387	1.12 2349	1.11 2313	1.11 2280	1.10 2249	1.09 2220	1.09 2194
30	304 -15 471	1.28 3143	1.24 2983	1.21 2846	1.18 2728	1.16 2624	1.15 2577	1.14 2533	1.13 2492	1.12 2454	1.11 2419	1.10 2385	1.10 2354	1.09 2325	1.09 2299	1.08 2274
29	311 -13 473	1.24 3153	1.21 3011	1.19 2887	1.16 2779	1.14 2683	1.13 2640	1.12 2599	1.12 2562	1.11 2527	1.10 2494	1.10 2462	1.09 2434	1.08 2407	1.08 2381	1.07 2357
28	317 -11 476	1.22 3179	1.19 3050	1.17 2937	1.15 2836	1.13 2749	1.12 2709	1.11 2672	1.11 2638	1.10 2605	1.09 2574	1.09 2545	1.08 2518	1.08 2493	1.07 2468	1.07 2445
27	324 -8 478	1.19 3217	1.17 3099	1.15 2994	1.13 2903	1.12 2823	1.11 2786	1.10 2752	1.10 2719	1.09 2688	1.09 2660	1.08 2633	1.08 2607	1.07 2583	1.07 2559	1.06 2537
26	331 -6 480	1.17 3264	1.15 3156	1.14 3061	1.12 2978	1.11 2904	1.10 2870	1.09 2837	1.09 2807	1.08 2778	1.08 2751	1.07 2725	1.07 2700	1.07 2677	1.06 2655	1.06 2634
25	338 -4 482	1.15 3322	1.14 3224	1.12 3138	1.11 3061	1.10 2991	1.09 2959	1.09 2928	1.08 2900	1.08 2872	1.07 2847	1.07 2822	1.06 2798	1.06 2775	1.06 2754	1.05 2735
24	345 -2 484	1.14 3391	1.12 3302	1.11 3222	1.10 3149	1.09 3083	1.08 3052	1.08 3024	1.07 2996	1.07 2970	1.07 2945	1.06 2921	1.06 2899	1.06 2877	1.05 2858	1.05 2840

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

TURBULENT AIR PENETRATION

TARGET SPEED IAS / MACH	PRESS ALT 1000 FT	WEIGHT 1000 KG									
		190	180	170	160	150	140	130	120	110	100
		EPR REQUIRED									
290/.78	41										
	37				1.49	1.39	1.31	1.25	1.21	1.17	1.14
	33	1.45	1.37	1.31	1.26	1.22	1.18	1.16	1.13	1.11	1.09
	29	1.24	1.21	1.18	1.16	1.13	1.11	1.10	1.08	1.07	1.05
	25	1.16	1.14	1.12	1.10	1.08	1.07	1.05	1.04	1.03	1.02
	20	1.10	1.09	1.07	1.06	1.04	1.03	1.02	1.01	1.00	1.00
	15	1.06	1.05	1.04	1.03	1.02	1.01	1.00	1.00	0.99	0.99
	10	1.04	1.03	1.02	1.01	1.00	1.00	0.99	0.99	0.98	0.98

MAX CRUISE EPR

PRESS ALT 1000 FT	24	25	26	27	28	29	30	31	32	33
EPR LIMIT	1.40	1.42	1.44	1.47	1.49	1.51	1.52	1.54	1.56	1.58
TAT DEG C AND COLDER	14	12	10	7	5	3	3	1	-2	-4

REDUCE EPR BY 0.11 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.05

**Wind-Altitude Trade****LRC**

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)										
	190	180	170	160	150	140	130	120	110	100	90
43								37	12	1	2
41							31	10	1	2	11
39					50	24	7	0	2	10	24
37				36	16	4	0	2	10	22	39
35		46	24	10	2	0	3	11	22	37	55
33	30	15	5	0	1	5	13	23	37	53	70
31	7	2	0	2	7	15	25	38	52	68	85
29	0	1	4	10	18	28	40	53	67	83	99
27	2	7	13	21	31	42	55	68	82	96	111
25	10	17	25	35	45	57	69	82	95	109	122

.80M

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)										
	190	180	170	160	150	140	130	120	110	100	90
43								38	14	1	1
41							32	12	1	1	13
39					49	26	9	1	1	12	34
37				37	19	6	0	2	12	32	62
35		45	27	12	3	0	3	13	32	59	96
33	32	17	7	1	0	5	16	34	59	92	133
31	9	3	0	1	8	19	37	60	91	128	172
29	0	0	4	12	24	41	64	92	126	166	212
27	2	7	17	30	47	69	96	127	163	205	
25	13	23	37	54	76	101	130	164	202		

Above wind factor tables are for calculation of wind required to maintain present range capability at new pressure altitude, i.e. break-even wind.

Method:

1. Read wind factors for present and new altitudes from table.
2. Determine difference (new altitude wind factor minus present altitude wind factor); this difference may be positive or negative.
3. Break-even wind at new altitude is present altitude wind plus difference from step 2.

Example: LRC at 33000 ft, 120000 kg, present wind -20 knots (headwind)

To find break-even wind for

- A) Climb to 37000 ft
B) Descent to 29000 ft

A) Wind factors from LRC table at 120000 kg are 23 (33000 ft) and 2 (37000 ft). Difference is -21 so break-even wind is -20 plus -21, i.e. -41 knots (headwind).

B) Similarly, wind factors are 23 (33000 ft) and 53 (29000 ft). Difference is +30 so break-even wind is -20 plus (+30), i.e. +10 knots (tailwind).



Flight Planning and Performance Manual

Descent

.78/290/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)				
			LANDING WEIGHT (1000 KG)				
			100	110	120	130	140
43100	26	490	123	129	133	137	139
41000	26	470	116	122	127	131	134
39000	25	460	110	116	121	125	128
37000	24	450	104	110	115	119	122
35000	23	440	99	104	109	113	116
33000	23	430	94	100	104	108	111
31000	22	430	90	95	100	103	106
29000	21	420	85	90	94	97	100
27000	20	410	80	84	88	91	93
25000	19	400	75	78	82	84	87
23000	18	390	70	73	76	79	81
21000	17	370	65	68	70	73	74
19000	17	360	60	62	65	67	68
17000	16	350	55	57	59	61	62
15000	15	340	50	52	54	55	56
10000	12	300	38	39	40	41	42
5000	8	230	20	20	21	21	21
1500	5	180	10	10	10	10	10

Allowances for a straight-in approach are included.

Holding

Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
40000	EPR							1.40	1.33	1.27	1.22
	KIAS							222	214	205	199
	FF/ENG							2180	1940	1750	1600
35000	EPR			1.43	1.36	1.31	1.27	1.23	1.20	1.17	1.14
	KIAS			254	246	238	229	220	211	205	199
	FF/ENG			2870	2580	2370	2180	2010	1830	1680	1540
30000	EPR	1.30	1.27	1.24	1.22	1.20	1.18	1.15	1.13	1.11	1.08
	KIAS	267	259	251	243	235	226	218	211	205	199
	FF/ENG	3030	2830	2650	2470	2300	2130	1970	1830	1700	1560
25000	EPR	1.20	1.18	1.16	1.15	1.13	1.11	1.10	1.08	1.07	1.05
	KIAS	264	256	248	241	233	225	217	211	205	199
	FF/ENG	2940	2760	2590	2430	2270	2120	1980	1850	1710	1570
20000	EPR	1.13	1.12	1.11	1.10	1.09	1.08	1.06	1.05	1.04	1.03
	KIAS	261	254	246	239	231	223	217	211	205	199
	FF/ENG	2900	2740	2590	2440	2290	2140	1990	1840	1700	1570
15000	EPR	1.09	1.08	1.07	1.06	1.06	1.05	1.04	1.04	1.03	1.02
	KIAS	259	252	245	238	230	222	217	211	205	199
	FF/ENG	2980	2820	2670	2510	2360	2200	2060	1910	1770	1640
10000	EPR	1.06	1.05	1.05	1.05	1.04	1.04	1.03	1.02	1.02	1.01
	KIAS	259	251	244	236	229	222	217	211	205	199
	FF/ENG	3030	2860	2700	2540	2380	2230	2090	1950	1810	1680
5000	EPR	1.04	1.04	1.04	1.03	1.03	1.02	1.02	1.01	1.01	1.01
	KIAS	259	251	244	236	228	222	217	211	205	199
	FF/ENG	3050	2880	2720	2560	2410	2260	2110	1970	1830	1700
1500	EPR	1.03	1.03	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.00
	KIAS	259	251	244	236	228	222	217	211	205	199
	FF/ENG	3060	2900	2750	2600	2450	2300	2160	2020	1880	1740

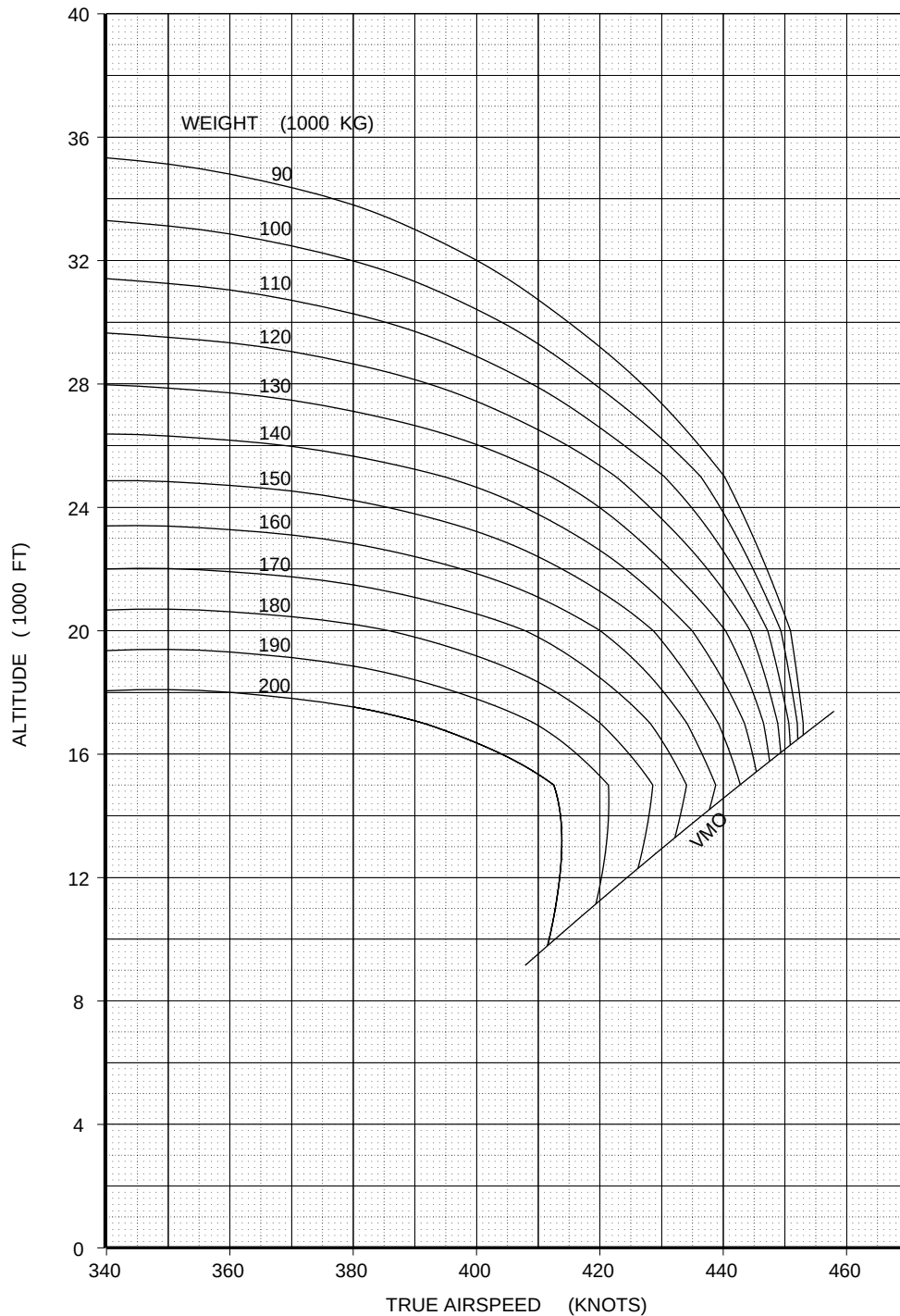
This table includes 5% additional fuel for holding in a racetrack pattern.

Intentionally
Blank

ENGINE INOP

Speed Capability

Max Continuous Thrust, standard day with A/C on



ENGINE INOP

Long Range Cruise Altitude Capability

Max Continuous Thrust, 100 ft/min residual rate of climb and APU on

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	15700	14700	13500
185	16500	15600	14700
180	17300	16400	15600
175	18000	17200	16400
170	18800	17900	17200
165	19600	18700	18000
160	20300	19500	18800
155	21100	20400	19600
150	21900	21200	20400
145	22700	22100	21300
140	23500	23000	22200
135	24300	23900	23100
130	25200	24900	24000
125	26000	25800	25000
120	26900	26700	25900
115	27800	27600	26900
110	28700	28600	27900
105	29700	29700	29000
100	30700	30700	30000

With engine anti-ice on, decrease altitude capability by 1400 ft.

With engine and wing anti-ice on, decrease altitude capability by 3200 ft.

Max Cruise Thrust, 100 ft/min residual rate of climb and APU on

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	5500	5400	
185	7000	6900	3100
180	8500	8300	5200
175	9800	9700	6700
170	11200	11100	8200
165	12500	12400	9700
160	13800	13700	11200
155	15100	15000	12600
150	16300	16200	14100
145	17500	17400	15500
140	18800	18700	16900
135	20000	19900	18200
130	21100	21100	19600
125	22300	22300	20900
120	23500	23500	22100
115	24800	24700	23400
110	26000	25900	24800
105	27200	27200	26100
100	28500	28500	27400

With engine anti-ice on, decrease altitude capability by 1400 ft.

With engine and wing anti-ice on, decrease altitude capability by 3200 ft.

ENGINE INOP

290 KIAS Altitude Capability

Max Continuous Thrust, 100 ft/min residual rate of climb and APU on

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	17500	16400	15500
185	18100	17000	16100
180	18600	17600	16700
175	19200	18100	17200
170	19700	18700	17800
165	20200	19200	18300
160	20800	19800	18900
155	21200	20300	19400
150	21700	20900	19900
145	22200	21400	20400
140	22600	21800	20800
135	23000	22300	21300
130	23500	22800	21800
125	23900	23300	22200
120	24300	23700	22700
115	24700	24200	23100
110	25000	24600	23500
105	25400	25000	23900
100	25700	25300	24300

With engine anti-ice on, decrease altitude capability by 1400 ft.

With engine and wing anti-ice on, decrease altitude capability by 3200 ft.

Max Cruise Thrust, 100 ft/min residual rate of climb and APU on

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	8500	8400	6200
185	9400	9300	7000
180	10200	10100	7800
175	10900	10900	8700
170	11700	11600	9500
165	12500	12500	10300
160	13300	13300	11100
155	14100	14000	11900
150	14800	14700	12600
145	15400	15400	13300
140	16000	15900	14000
135	16600	16500	14600
130	17200	17100	15200
125	17800	17700	15800
120	18300	18200	16300
115	18900	18800	16900
110	19400	19300	17400
105	19900	19800	17900
100	20300	20200	18400

With engine anti-ice on, decrease altitude capability by 1400 ft.

With engine and wing anti-ice on, decrease altitude capability by 3200 ft.

ENGINE INOP

310 KIAS Altitude Capability

Max Continuous Thrust, 100 ft/min residual rate of climb and APU on

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	16400	15300	13800
185	17000	15800	14800
180	17500	16400	15400
175	17900	16900	15900
170	18400	17300	16400
165	18800	17800	16900
160	19300	18200	17300
155	19700	18600	17600
150	20100	19000	18000
145	20500	19400	18400
140	20800	19800	18800
135	21200	20200	19200
130	21500	20600	19600
125	21800	20900	19900
120	22100	21300	20300
115	22400	21600	20600
110	22700	21900	20900
105	23000	22200	21200
100	23200	22500	21400

With engine anti-ice on, decrease altitude capability by 1400 ft.

With engine and wing anti-ice on, decrease altitude capability by 3200 ft.

Max Cruise Thrust, 100 ft/min residual rate of climb and APU on

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	6300	6200	3500
185	7100	7000	4500
180	7900	7800	5400
175	8600	8500	6200
170	9300	9200	6900
165	9900	9800	7500
160	10500	10400	8200
155	11100	11000	8800
150	11700	11600	9300
145	12200	12100	9900
140	12800	12700	10500
135	13300	13200	11000
130	13800	13700	11500
125	14300	14200	12000
120	14700	14600	12500
115	15100	15000	12900
110	15500	15400	13300
105	15900	15800	13700
100	16200	16100	14000

With engine anti-ice on, decrease altitude capability by 1400 ft.

With engine and wing anti-ice on, decrease altitude capability by 3200 ft.

ENGINE INOP

330 KIAS Altitude Capability

Max Continuous Thrust, 100 ft/min residual rate of climb and APU on

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	14700	12700	10800
185	15300	13400	11600
180	15700	14100	12300
175	16100	14800	13000
170	16500	15300	13700
165	16900	15700	14500
160	17300	16100	15100
155	17600	16500	15500
150	17900	16800	15800
145	18300	17200	16200
140	18600	17500	16500
135	18900	17800	16800
130	19200	18100	17100
125	19500	18300	17400
120	19700	18600	17600
115	20000	18800	17900
110	20200	19000	18100
105	20300	19200	18200
100	20500	19400	18400

With engine anti-ice on, decrease altitude capability by 1400 ft.

With engine and wing anti-ice on, decrease altitude capability by 3200 ft.

Max Cruise Thrust, 100 ft/min residual rate of climb and APU on

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	3000	2800	
185	3800	3700	
180	4600	4400	1200
175	5200	5100	2000
170	5800	5700	2800
165	6400	6300	3600
160	6900	6800	4300
155	7500	7400	5000
150	8000	7900	5500
145	8400	8300	6000
140	8900	8800	6400
135	9300	9200	6900
130	9700	9600	7300
125	10100	10000	7700
120	10400	10300	8000
115	10700	10600	8300
110	11000	10900	8500
105	11200	11100	8800
100	11500	11300	9000

With engine anti-ice on, decrease altitude capability by 1400 ft.

With engine and wing anti-ice on, decrease altitude capability by 3200 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 30000 FT to 25000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
30 (-27)	EPR										1.58
	MAX TAT										3
	KIAS										232
	MACH										0.623
	FF/ENG KTAS										3646 367
29 (-24)	EPR									1.64	1.52
	MAX TAT									-2	
	KIAS									246	230
	MACH									0.645	0.605
	FF/ENG KTAS									4158 382	3552 358
28 (-23)	EPR									1.58	1.47
	MAX TAT									6	
	KIAS									243	228
	MACH									0.625	0.589
	FF/ENG KTAS									4031 372	3470 350
27 (-21)	EPR								1.63	1.52	1.43
	MAX TAT								2		
	KIAS								257	241	228
	MACH								0.644	0.607	0.575
	FF/ENG KTAS								4534 384	3929 362	3405 343
26 (-19)	EPR							1.68	1.57	1.47	1.39
	MAX TAT							-1	11		
	KIAS							269	254	239	228
	MACH							0.661	0.624	0.591	0.563
	FF/ENG KTAS							5053 396	4401 374	3841 354	3348 338
25 (-18)	EPR							1.62	1.52	1.43	1.36
	MAX TAT							8			
	KIAS							266	251	239	228
	MACH							0.640	0.607	0.577	0.554
	FF/ENG KTAS							4891 386	4292 365	3771 347	3305 333

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Heavy line approximates Max Cruise Thrust limit.

Max Continuous EPR

PRESS ALT (1000 FT)	25	26	27	28	29	30
LIMIT EPR	1.73	1.72	1.73	1.74	1.73	1.74
MAX TAT (°C)	0	-1	-4	-7	-6	-9

Decrease limit EPR by 0.10 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.02.

With engine and wing anti-ice on, decrease limit EPR by 0.05.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 24000 FT to 19000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
24 (-15)	EPR						1.66	1.56	1.47	1.39	1.33
	MAX TAT						5	15			
	KIAS						278	263	250	238	229
	MACH						0.655	0.621	0.591	0.565	0.545
	FF/ENG KTAS						5399 396	4760 376	4200 357	3705 342	3278 330
23 (-14)	EPR						1.60	1.51	1.42	1.36	1.31
	MAX TAT						13				
	KIAS						275	261	249	239	231
	MACH						0.635	0.604	0.577	0.555	0.538
	FF/ENG KTAS						5237 385	4637 367	4119 350	3655 337	3261 326
22 (-12)	EPR					1.63	1.54	1.46	1.39	1.33	1.28
	MAX TAT					10	20				
	KIAS					286	272	259	249	240	233
	MACH					0.647	0.616	0.589	0.566	0.547	0.531
	FF/ENG KTAS					5727 394	5094 376	4541 359	4049 345	3623 333	3258 323
21 (-10)	EPR				1.65	1.57	1.49	1.42	1.36	1.31	1.26
	MAX TAT				8	18					
	KIAS				297	283	270	258	249	241	234
	MACH				0.657	0.628	0.600	0.576	0.556	0.539	0.523
	FF/ENG KTAS				6219 402	5573 384	4977 367	4460 352	4005 340	3606 330	3262 320
20 (-8)	EPR				1.60	1.52	1.44	1.38	1.33	1.29	1.25
	MAX TAT				16						
	KIAS				293	280	268	258	250	243	236
	MACH				0.638	0.610	0.586	0.565	0.547	0.532	0.516
	FF/ENG KTAS				6065 392	5432 375	4889 360	4403 347	3981 336	3610 327	3273 317
19 (-6)	EPR			1.62	1.54	1.47	1.40	1.35	1.31	1.27	1.23
	MAX TAT			15	24						
	KIAS			304	290	278	268	259	252	245	237
	MACH			0.646	0.620	0.595	0.573	0.555	0.540	0.525	0.509
	FF/ENG KTAS			6567 399	5922 382	5335 367	4825 353	4374 342	3978 333	3626 324	3293 314

Max TAT not shown where EPR can be set in ISA + 30°C conditions.
Increase/decrease fuel flow 3% per 10°C above/below standard TAT.
Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.
Heavy line approximates Max Cruise Thrust limit.

Max Continuous EPR

PRESS ALT (1000 FT)	19	20	21	22	23	24
LIMIT EPR	1.71	1.73	1.72	1.72	1.74	1.73
MAX TAT (°C)	9	6	6	5	2	1

Decrease limit EPR by 0.09 per 10°C TAT hotter than table value.
With engine anti-ice on, decrease limit EPR by 0.02.
With engine and wing anti-ice on, decrease limit EPR by 0.05.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 18000 FT to 13000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
18 (-4)	EPR		1.64	1.56	1.49	1.43	1.37	1.33	1.29	1.25	1.21
	MAX TAT		13	23							
	KIAS		313	300	288	277	268	260	253	246	238
	MACH		0.654	0.628	0.603	0.581	0.562	0.547	0.533	0.518	0.502
	FF/ENG		7071	6427	5795	5265	4784	4366	3996	3646	3318
17 (-3)	KTAS		405	389	373	360	348	339	330	321	311
	EPR		1.58	1.51	1.45	1.39	1.34	1.30	1.27	1.23	1.20
	MAX TAT		22								
	KIAS		310	298	286	277	269	262	255	248	240
	MACH		0.635	0.611	0.589	0.569	0.553	0.540	0.526	0.511	0.495
16 (-1)	FF/ENG		6931	6284	5714	5208	4761	4372	4012	3669	3344
	KTAS		395	380	366	354	344	335	327	318	308
	EPR	1.59	1.53	1.47	1.41	1.36	1.32	1.28	1.25	1.22	1.19
	MAX TAT	21	30								
	KIAS	319	307	296	286	277	270	264	257	249	241
15 (1)	MACH	0.641	0.617	0.595	0.576	0.559	0.545	0.533	0.519	0.504	0.489
	FF/ENG	7441	6796	6181	5643	5172	4759	4387	4031	3691	3374
	KTAS	400	385	372	359	349	340	332	324	315	305
	EPR	1.54	1.48	1.42	1.38	1.33	1.30	1.26	1.23	1.20	1.17
	MAX TAT	29									
14 (2)	KIAS	316	304	294	285	278	272	265	258	250	243
	MACH	0.623	0.601	0.582	0.565	0.551	0.538	0.526	0.512	0.497	0.483
	FF/ENG	7289	6659	6080	5588	5153	4764	4404	4051	3718	3411
	KTAS	390	377	365	354	345	337	329	321	312	302
	EPR	1.49	1.44	1.39	1.35	1.31	1.28	1.25	1.22	1.19	1.16
13 (4)	MAX TAT	34									
	KIAS	313	303	294	286	279	273	267	259	252	244
	MACH	0.607	0.588	0.570	0.556	0.543	0.532	0.519	0.505	0.491	0.477
	FF/ENG	7115	6515	5999	5547	5145	4780	4427	4078	3754	3456
	KTAS	382	369	359	349	342	334	326	318	309	300
13 (4)	EPR	1.45	1.40	1.36	1.32	1.29	1.26	1.23	1.20	1.18	1.15
	MAX TAT										
	KIAS	311	302	294	287	281	275	268	261	254	246
	MACH	0.592	0.575	0.560	0.548	0.537	0.525	0.512	0.499	0.485	0.470
	FF/ENG	6947	6408	5939	5526	5151	4803	4453	4109	3795	3495
13 (4)	KTAS	374	363	354	346	339	331	323	315	306	297

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Heavy line approximates Max Cruise Thrust limit.

Max Continuous EPR

PRESS ALT (1000 FT)	13	14	15	16	17	18
LIMIT EPR	1.64	1.66	1.69	1.69	1.70	1.70
MAX TAT (°C)	18	17	16	15	13	12

Decrease limit EPR by 0.08 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.02.

With engine and wing anti-ice on, decrease limit EPR by 0.05.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 12000 FT to 7000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
12 (6)	EPR	1.41	1.37	1.33	1.30	1.27	1.24	1.22	1.19	1.17	1.14
	MAX TAT										
	KIAS	310	302	295	289	283	277	270	262	255	247
	MACH	0.580	0.565	0.552	0.541	0.530	0.518	0.505	0.492	0.479	0.463
	FF/ENG	6824	6334	5905	5519	5166	4818	4467	4135	3831	3515
11 (7)	KTAS	367	358	350	343	336	328	320	312	304	294
	EPR	1.38	1.34	1.31	1.28	1.25	1.23	1.20	1.18	1.16	1.13
	MAX TAT										
	KIAS	310	303	296	291	285	278	271	264	257	247
	MACH	0.568	0.556	0.545	0.534	0.523	0.511	0.499	0.486	0.473	0.456
10 (9)	FF/ENG	6733	6285	5885	5521	5169	4818	4476	4156	3853	3518
	KTAS	362	353	346	340	333	325	317	309	301	290
	EPR	1.35	1.32	1.29	1.26	1.24	1.21	1.19	1.17	1.15	1.13
	MAX TAT										
	KIAS	310	304	298	292	286	279	273	266	258	248
9 (11)	MACH	0.559	0.548	0.538	0.528	0.517	0.505	0.493	0.480	0.466	0.448
	FF/ENG	6670	6254	5879	5521	5167	4822	4492	4178	3866	3508
	KTAS	357	350	343	337	330	322	314	307	298	286
	EPR	1.32	1.30	1.27	1.24	1.22	1.20	1.18	1.16	1.14	1.12
	MAX TAT										
8 (13)	KIAS	311	305	300	294	288	281	274	267	259	247
	MACH	0.551	0.541	0.531	0.521	0.510	0.498	0.487	0.475	0.460	0.438
	FF/ENG	6630	6244	5882	5524	5175	4837	4514	4207	3879	3483
	KTAS	353	347	340	334	327	319	312	304	294	281
	EPR	1.30	1.28	1.25	1.23	1.21	1.19	1.17	1.15	1.13	1.11
7 (14)	MAX TAT										
	KIAS	313	307	302	296	289	283	276	269	259	246
	MACH	0.544	0.534	0.525	0.514	0.503	0.492	0.481	0.468	0.452	0.428
	FF/ENG	6614	6246	5885	5533	5188	4858	4542	4230	3879	3450
	KTAS	350	344	338	331	324	316	309	301	291	275
	EPR	1.28	1.26	1.24	1.22	1.19	1.17	1.16	1.14	1.12	1.10
	MAX TAT										
	KIAS	314	309	303	297	291	284	278	270	259	244
	MACH	0.537	0.528	0.518	0.508	0.497	0.486	0.475	0.461	0.443	0.418
	FF/ENG	6611	6251	5894	5545	5207	4883	4578	4248	3861	3414
	KTAS	347	341	335	328	321	314	307	298	286	270

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Heavy line approximates Max Cruise Thrust limit.

Max Continuous EPR

PRESS ALT (1000 FT)	7	8	9	10	11	12
LIMIT EPR	1.48	1.51	1.53	1.56	1.59	1.61
MAX TAT (°C)	27	26	24	23	21	20

Decrease limit EPR by 0.07 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.01.

With engine and wing anti-ice on, decrease limit EPR by 0.03.

ENGINE INOP

MAX CONTINUOUS THRUST

290 KIAS Cruise Table
30000 FT to 25000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
30																
29																
28																
27																
26	290 -13 425														1.65 2 5148	1.64 5 5065
25	290 -12 418											1.66 4 5342	1.64 6 5248	1.62 8 5159	1.60 10 5072	1.59 12 4989

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	25	26				
EPR LIMIT	1.70	1.70				
TAT DEG C AND COLDER	4	3				

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.05

REDUCE EPR BY 0.10 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

ENGINE INOP

MAX CONTINUOUS THRUST

290 KIAS Cruise Table
24000 FT to 19000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
24	290 -10 412								1.67 3 5595	1.65 6 5480	1.63 8 5370	1.61 11 5267	1.59 13 5170	1.57 15 5080	1.55 17 4997	1.54 18 4921
23	290 -9 405						1.66 4 5769	1.64 8 5641	1.62 10 5522	1.60 13 5409	1.58 15 5300	1.56 17 5198	1.54 19 5104	1.52 21 5016	1.51 21 4935	1.49 21 4860
22	290 -8 399					1.64 9 5827	1.61 12 5692	1.59 14 5569	1.57 17 5455	1.55 19 5346	1.53 22 5238	1.51 24 5133	1.49 24 5038	1.48 24 4953	1.47 24 4878	1.45 24 4811
21	290 -6 393				1.64 10 6055	1.59 16 5753	1.56 19 5621	1.54 21 5501	1.52 24 5387	1.50 24 5279	1.49 24 5176	1.47 24 5079	1.45 24 4990	1.44 24 4910	1.43 24 4837	1.42 24 4772
20	290 -5 387			1.64 11 6317	1.59 17 5983	1.54 23 5679	1.52 26 5548	1.50 26 5435	1.48 26 5331	1.46 26 5231	1.45 26 5133	1.43 26 5039	1.42 26 4953	1.40 26 4875	1.39 26 4805	1.38 26 4741
19	290 -3 382		1.65 11 6601	1.59 18 6249	1.54 25 5912	1.49 25 5615	1.47 25 5496	1.46 25 5390	1.44 25 5291	1.43 25 5194	1.41 25 5099	1.40 25 5008	1.38 25 4923	1.37 25 4846	1.36 25 4775	1.35 25 4711

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

HEAVY LINE APPROXIMATES MAX CRUISE THRUST LIMIT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	19	20	21	22	23	24
EPR LIMIT	1.73	1.73	1.73	1.71	1.72	1.71
TAT DEG C AND COLDER	7	6	5	5	4	3

REDUCE EPR BY 0.09 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.05

ENGINE INOP

MAX CONTINUOUS THRUST

290 KIAS Cruise Table

18000 FT to 13000 FT

EPR

MAX TAT

FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
18	290 -2 376	1.65 12 6908	1.60 19 6529	1.54 26 6178	1.49 33 5841	1.45 40 5572	1.44 45 5458	1.42 50 5355	1.40 55 5257	1.39 60 5160	1.38 65 5065	1.37 70 4975	1.35 75 4892	1.34 80 4817	1.33 85 4748	1.32 90 4687
17	290 -1 370	1.60 20 6824	1.55 27 6449	1.50 34 6100	1.45 41 5795	1.41 48 5529	1.40 53 5416	1.39 58 5313	1.37 63 5216	1.36 68 5121	1.35 73 5029	1.34 78 4943	1.33 83 4864	1.32 88 4794	1.31 93 4730	1.30 98 4672
16	290 1 365	1.55 28 6740	1.50 35 6374	1.46 42 6048	1.41 49 5744	1.38 54 5484	1.37 59 5374	1.36 64 5274	1.34 69 5180	1.33 74 5089	1.32 79 5003	1.31 84 4922	1.30 89 4848	1.29 94 4780	1.28 99 4718	1.28 104 4662
15	290 2 359	1.50 35 6645	1.46 42 6292	1.42 49 5981	1.38 54 5690	1.35 60 5439	1.34 65 5334	1.33 70 5239	1.32 75 5149	1.31 80 5061	1.30 85 4978	1.29 90 4900	1.28 95 4829	1.27 100 4764	1.26 105 4704	1.26 110 4649
14	290 4 354	1.46 42 6527	1.42 49 6205	1.39 56 5914	1.35 62 5634	1.32 68 5395	1.31 73 5294	1.30 78 5202	1.29 83 5116	1.28 88 5033	1.27 93 4954	1.26 98 4880	1.26 103 4811	1.25 108 4747	1.24 113 4688	1.24 118 4633
13	290 5 349	1.42 48 6428	1.39 55 6128	1.36 62 5851	1.32 68 5585	1.30 74 5357	1.29 79 5262	1.28 84 5174	1.27 89 5092	1.26 94 5012	1.25 99 4936	1.24 104 4863	1.24 109 4795	1.23 114 4732	1.22 119 4672	1.22 124 4618

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA +30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

HEAVY LINE APPROXIMATES MAX CRUISE THRUST LIMIT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	13	14	15	16	17	18
EPR LIMIT	1.66	1.69	1.72	1.72	1.73	1.73
TAT DEG C AND COLDER	16	14	13	12	10	9

REDUCE EPR BY 0.09 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.05

ENGINE INOP

MAX CONTINUOUS THRUST

290 KIAS Cruise Table
12000 FT to 7000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
12	290	1.39	1.36	1.33	1.30	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20
	7 344	6349	6063	5799	5544	5329	5237	5151	5069	4990	4913	4841	4773	4710	4651	4598
11	290	1.36	1.33	1.30	1.28	1.26	1.25	1.24	1.23	1.22	1.22	1.21	1.20	1.20	1.19	1.19
	8 339	6275	6001	5747	5507	5296	5203	5116	5033	4954	4879	4809	4743	4682	4625	4574
10	290	1.33	1.31	1.28	1.26	1.24	1.23	1.22	1.22	1.21	1.20	1.20	1.19	1.18	1.18	1.17
	10 334	6206	5945	5702	5466	5258	5166	5079	4998	4921	4850	4783	4720	4660	4605	4555
9	290	1.31	1.29	1.26	1.24	1.22	1.22	1.21	1.20	1.19	1.19	1.18	1.18	1.17	1.17	1.16
	11 329	6150	5899	5659	5431	5230	5139	5054	4974	4900	4830	4765	4704	4645	4591	4542
8	290	1.29	1.27	1.24	1.23	1.21	1.20	1.19	1.19	1.18	1.17	1.17	1.16	1.16	1.15	1.15
	13 325	6102	5856	5623	5404	5209	5119	5035	4956	4883	4815	4752	4693	4637	4585	4538
7	290	1.27	1.25	1.23	1.21	1.19	1.19	1.18	1.17	1.17	1.16	1.16	1.15	1.15	1.14	1.14
	15 320	6061	5821	5595	5382	5190	5102	5019	4942	4871	4807	4748	4691	4637	4585	4539

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

HEAVY LINE APPROXIMATES MAX CRUISE THRUST LIMIT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	7	8	9	10	11	12
EPR LIMIT	1.50	1.53	1.55	1.58	1.61	1.63
TAT DEG C AND COLDER	25	24	22	20	19	17

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.01
ENGINE AND WING	.03

REDUCE EPR BY 0.07 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

ENGINE INOP

MAX CONTINUOUS THRUST

310 KIAS Cruise Table
30000 FT to 25000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		180	170	160	150	145	140	135	130	125	120	115	110	105	100	95

PERFORMANCE THRUST LIMITED

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT						
EPR LIMIT						
TAT DEG C AND COLDER						

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	
ENGINE AND WING	

ENGINE INOP

MAX CONTINUOUS THRUST

310 KIAS Cruise Table
24000 FT to 19000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
24	310 -7 438															1.65 5 5743
23	310 -6 432											1.65 6 5937	1.64 8 5856	1.62 10 5781	1.61 11 5714	1.60 12 5656
22	310 -5 425								1.65 7 6117	1.63 9 6027	1.62 11 5941	1.60 13 5856	1.59 15 5775	1.58 17 5700	1.56 18 5634	1.55 19 5578
21	310 -3 419					1.65 8 6352	1.63 10 6244	1.62 12 6143	1.60 14 6047	1.58 16 5956	1.57 18 5869	1.56 20 5785	1.54 22 5706	1.53 23 5633	1.52 25 5569	1.51 26 5515
20	310 -2 413				1.64 10 6531	1.60 15 6303	1.59 17 6194	1.57 19 6090	1.55 21 5990	1.54 23 5896	1.52 25 5807	1.51 27 5722	1.50 29 5645	1.49 22 5576	1.48 23 5516	1.47 24 5467
19	310 -1 407			1.63 12 6740	1.59 17 6490	1.56 22 6263	1.54 24 6152	1.52 26 6043	1.51 28 5939	1.49 30 5844	1.48 31 5757	1.47 32 5677	1.46 33 5605	1.45 34 5540	1.44 35 5485	1.43 36 5440

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	19	20	21	22	23	24
EPR LIMIT	1.70	1.70	1.70	1.69	1.69	1.70
TAT DEG C AND COLDER	10	9	7	8	7	6

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.05

REDUCE EPR BY 0.09 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

ENGINE INOP MAX CONTINUOUS THRUST

310 KIAS Cruise Table

18000 FT to 13000 FT

EPR

MAX TAT

FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
18	310 0 401		1.63 14 6986	1.58 20 6696	1.55 25 6448	1.51 29 6219	1.50 31 6105	1.48 33 5996	1.47 35 5896	1.45 37 5804	1.44 39 5722	1.43 41 5648	1.42 43 5583	1.41 45 5525	1.40 47 5476	1.40 49 5434
17	310 2 395	1.63 16 7260	1.58 22 6937	1.54 28 6646	1.50 32 6394	1.47 34 6170	1.46 36 6064	1.44 38 5962	1.43 40 5868	1.42 42 5783	1.41 44 5706	1.39 46 5635	1.39 48 5569	1.38 50 5511	1.37 52 5460	1.37 54 5418
16	310 3 389	1.58 23 7210	1.53 29 6885	1.49 31 6591	1.46 33 6350	1.43 35 6133	1.42 37 6030	1.41 39 5933	1.39 41 5841	1.38 43 5757	1.37 45 5680	1.36 47 5608	1.36 49 5543	1.35 51 5485	1.34 53 5435	1.34 55 5394
15	310 5 383	1.53 31 7138	1.49 33 6812	1.45 35 6521	1.42 37 6285	1.40 39 6080	1.39 41 5983	1.38 43 5889	1.37 45 5800	1.36 47 5719	1.35 49 5644	1.34 51 5575	1.33 53 5513	1.32 55 5457	1.32 57 5410	1.31 59 5371
14	310 6 378	1.49 35 7031	1.45 37 6706	1.42 39 6435	1.39 41 6216	1.37 43 6020	1.36 45 5926	1.35 47 5837	1.34 49 5754	1.33 51 5677	1.32 53 5606	1.31 55 5540	1.30 57 5480	1.30 59 5427	1.29 61 5381	1.29 63 5344
13	310 8 372	1.45 37 6915	1.41 39 6612	1.38 41 6356	1.36 43 6148	1.34 45 5963	1.33 47 5875	1.32 49 5791	1.31 51 5712	1.30 53 5639	1.30 55 5570	1.29 57 5506	1.28 59 5449	1.28 61 5398	1.27 63 5354	1.27 65 5319

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE/DECREASE FUEL FLOW 3% PER 10°C ABOVE/BELOW STANDARD TAT
INCREASE/DECREASE TAS BY 1 KT PER 1°C ABOVE/BELOW STANDARD TAT

HEAVY LINE APPROXIMATES MAX CRUISE THRUST LIMIT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	13	14	15	16	17	18
EPR LIMIT	1.64	1.67	1.69	1.70	1.70	1.70
TAT DEG C AND COLDER	18	17	15	14	13	11

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.05

REDUCE EPR BY 0.08 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

ENGINE INOP

MAX CONTINUOUS THRUST

310 KIAS Cruise Table
12000 FT to 7000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
12	310 9 367	1.41 6820	1.38 6530	1.35 6290	1.33 6094	1.31 5916	1.30 5831	1.30 5750	1.29 5674	1.28 5604	1.27 5538	1.27 5478	1.26 5422	1.26 5373	1.25 5331	1.25 5296
11	310 10 362	1.38 6739	1.35 6462	1.33 6232	1.31 6043	1.29 5871	1.28 5790	1.27 5713	1.27 5640	1.26 5571	1.25 5507	1.25 5446	1.24 5390	1.24 5341	1.23 5299	1.23 5264
10	310 12 357	1.35 6667	1.32 6400	1.30 6182	1.29 6001	1.27 5833	1.26 5752	1.25 5675	1.25 5601	1.24 5533	1.23 5468	1.23 5408	1.22 5353	1.22 5304	1.22 5263	1.21 5229
9	310 13 352	1.32 6604	1.30 6352	1.28 6142	1.26 5962	1.25 5792	1.24 5712	1.24 5636	1.23 5565	1.22 5498	1.22 5435	1.21 5377	1.21 5324	1.20 5277	1.20 5238	1.20 5205
8	310 15 347	1.30 6551	1.28 6311	1.26 6103	1.25 5922	1.23 5756	1.23 5678	1.22 5605	1.21 5536	1.21 5472	1.20 5411	1.20 5354	1.19 5303	1.19 5257	1.19 5219	1.18 5187
7	310 17 342	1.28 6505	1.26 6271	1.24 6067	1.23 5888	1.22 5727	1.21 5652	1.20 5582	1.20 5515	1.19 5452	1.19 5392	1.18 5337	1.18 5286	1.18 5241	1.17 5204	1.17 5173

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA +30°C CONDITIONS
INCREASE/DECREASE FUEL FLOW 3% PER 10°C ABOVE/BELOW STANDARD TAT
INCREASE/DECREASE TAS BY 1 KT PER 1°C ABOVE/BELOW STANDARD TAT

HEAVY LINE APPROXIMATES MAX CRUISE THRUST LIMIT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	7	8	9	10	11	12
EPR LIMIT	1.48	1.51	1.53	1.56	1.59	1.61
TAT DEG C AND COLDER	27	26	24	23	21	20

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.01
ENGINE AND WING	.03

REDUCE EPR BY 0.07 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

ENGINE INOP

MAX CONTINUOUS THRUST

330 KIAS Cruise Table
30000 FT to 25000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
30																
29																
28		PERFORMANCE THRUST LIMITED														
27																
26																
25																

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT						
EPR LIMIT						
TAT DEG C AND COLDER						

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	
ENGINE AND WING	

ENGINE INOP

MAX CONTINUOUS THRUST

330 KIAS Cruise Table
24000 FT to 19000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
24																
23																
22																
21	330 -1 444													1.64 10 6518	1.63 11 6472	1.63 11 6432
20	330 1 438									1.63 12 6699	1.62 13 6627	1.61 14 6563	1.60 15 6506	1.59 16 6456	1.58 17 6412	1.58 18 6373
19	330 2 432					1.63 12 6984	1.62 14 6898	1.61 15 6814	1.59 17 6732	1.58 18 6654	1.57 20 6582	1.56 21 6517	1.55 22 6461	1.54 24 6412	1.54 24 6368	1.53 25 6330

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	19	20	21			
EPR LIMIT	1.68	1.68	1.68			
TAT DEG C AND COLDER	13	12	10			

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.05

REDUCE EPR BY 0.09 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

ENGINE INOP

MAX CONTINUOUS THRUST

330 KIAS Cruise Table

18000 FT to 13000 FT

EPR

MAX TAT

FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
18	330 3 425				1.62 15 7131	1.59 19 6945	1.57 21 6858	1.56 22 6773	1.55 24 6691	1.54 26 6613	1.53 27 6542	1.52 28 6478	1.51 30 6423	1.50 31 6375	1.49 31 6333	1.49 32 6295
17	330 4 419		1.63 15 7540	1.60 18 7315	1.57 22 7105	1.54 26 6912	1.53 28 6823	1.52 30 6737	1.50 32 6655	1.49 33 6577	1.48 35 6506	1.48 36 6444	1.47 36 6390	1.46 37 6344	1.46 37 6303	1.45 38 6265
16	330 6 413	1.62 17 7768	1.59 21 7527	1.55 25 7303	1.52 29 7088	1.50 33 6886	1.49 35 6794	1.47 37 6707	1.46 38 6626	1.46 39 6550	1.45 40 6480	1.44 41 6419	1.43 42 6368	1.43 43 6325	1.42 44 6288	1.42 45 6254
15	330 7 407	1.57 23 7726	1.54 28 7490	1.51 32 7267	1.48 37 7047	1.46 40 6841	1.45 42 6747	1.44 44 6659	1.43 46 6579	1.42 48 6506	1.41 50 6442	1.40 52 6386	1.40 54 6339	1.39 56 6299	1.39 58 6264	1.38 60 6231
14	330 8 401	1.53 28 7641	1.50 32 7409	1.47 37 7186	1.45 40 6963	1.42 44 6761	1.41 46 6673	1.40 48 6592	1.39 50 6517	1.39 52 6449	1.38 54 6389	1.37 56 6336	1.37 58 6291	1.36 60 6253	1.36 62 6219	1.36 64 6188
13	330 10 396	1.49 33 7534	1.46 37 7304	1.43 41 7086	1.41 44 6875	1.39 48 6686	1.38 50 6602	1.37 52 6525	1.36 54 6453	1.36 56 6389	1.35 58 6331	1.35 60 6282	1.34 62 6240	1.34 64 6205	1.33 66 6173	1.33 68 6144

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	13	14	15	16	17	18
EPR LIMIT	1.62	1.64	1.66	1.67	1.67	1.67
TAT DEG C AND COLDER	21	19	18	17	15	14

AI BLEED CORRECTION	REDUCE EPR
ENGINE	.02
ENGINE AND WING	.05

REDUCE EPR BY 0.08 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

ENGINE INOP

MAX CONTINUOUS THRUST

330 KIAS Cruise Table
12000 FT to 7000 FT
EPR
MAX TAT
FF/ENG

PRESS ALT 1000 FT	IAS STD TAT TAS	WEIGHT 1000 KG														
		190	180	170	160	150	145	140	135	130	125	120	115	110	105	100
12	330 11 390	1.45 37 7432	1.42 41 7209	1.40	1.38	1.36	1.35	1.34	1.34	1.33	1.32	1.32	1.31	1.31	1.31	1.30
11	330 13 385	1.41 41 7338	1.39	1.37	1.35	1.33	1.33	1.32	1.31	1.31	1.30	1.30	1.29	1.29	1.29	1.28
10	330 14 379	1.38 45 7244	1.36	1.34	1.32	1.31	1.30	1.30	1.29	1.28	1.28	1.27	1.27	1.27	1.27	1.26
9	330 16 374	1.35	1.33	1.32	1.30	1.29	1.28	1.27	1.27	1.26	1.26	1.25	1.25	1.25	1.25	1.24
8	330 17 369	1.33	1.31	1.29	1.28	1.27	1.26	1.25	1.25	1.24	1.24	1.24	1.23	1.23	1.23	1.23
7	330 19 363	1.30	1.29	1.27	1.26	1.25	1.24	1.23	1.23	1.23	1.22	1.22	1.22	1.21	1.21	1.21
		7050	6869	6699	6539	6392	6325	6261	6201	6146	6098	6056	6020	5990	5961	5934

MAX TAT NOT SHOWN WHERE EPR CAN BE SET IN ISA + 30°C CONDITIONS
 INCREASE / DECREASE FUEL FLOW 3% PER 10°C ABOVE / BELOW STANDARD TAT
 INCREASE / DECREASE TAS BY 1 KT PER 1°C ABOVE / BELOW STANDARD TAT

HEAVY LINE APPROXIMATES MAX CRUISE THRUST LIMIT

MAX CONTINUOUS EPR

PRESS ALT 1000 FT	7	8	9	10	11	12
EPR LIMIT	1.47	1.49	1.52	1.54	1.57	1.59
TAT DEG C AND COLDER	29	28	26	25	23	22

A/I BLEED CORRECTION	REDUCE EPR
ENGINE	.01
ENGINE AND WING	.03

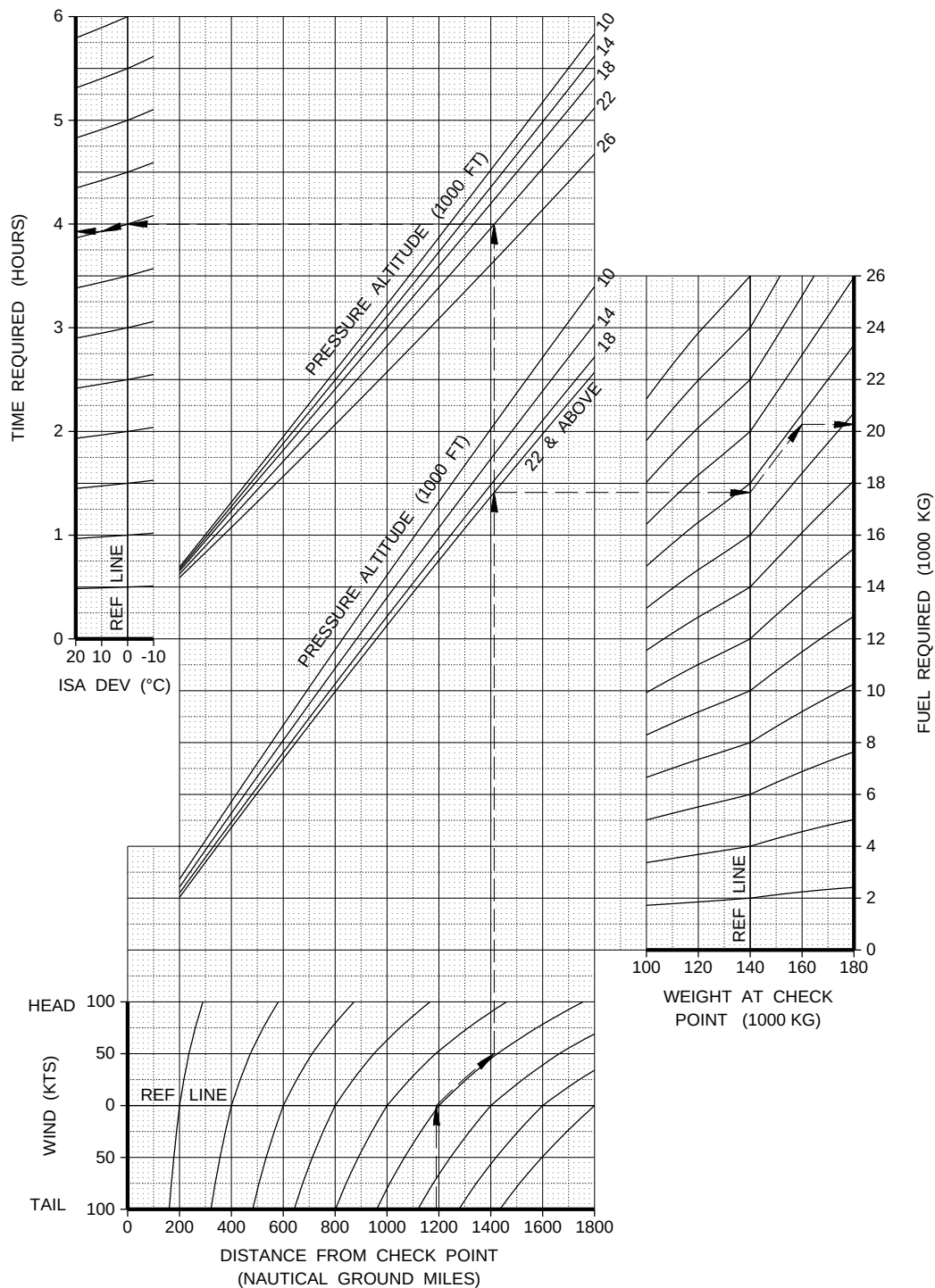
REDUCE EPR BY 0.07 PER 10 DEGREES C TAT HOTTER THAN TABLE VALUE

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on .78/290/250 descent and includes APU fuel burn

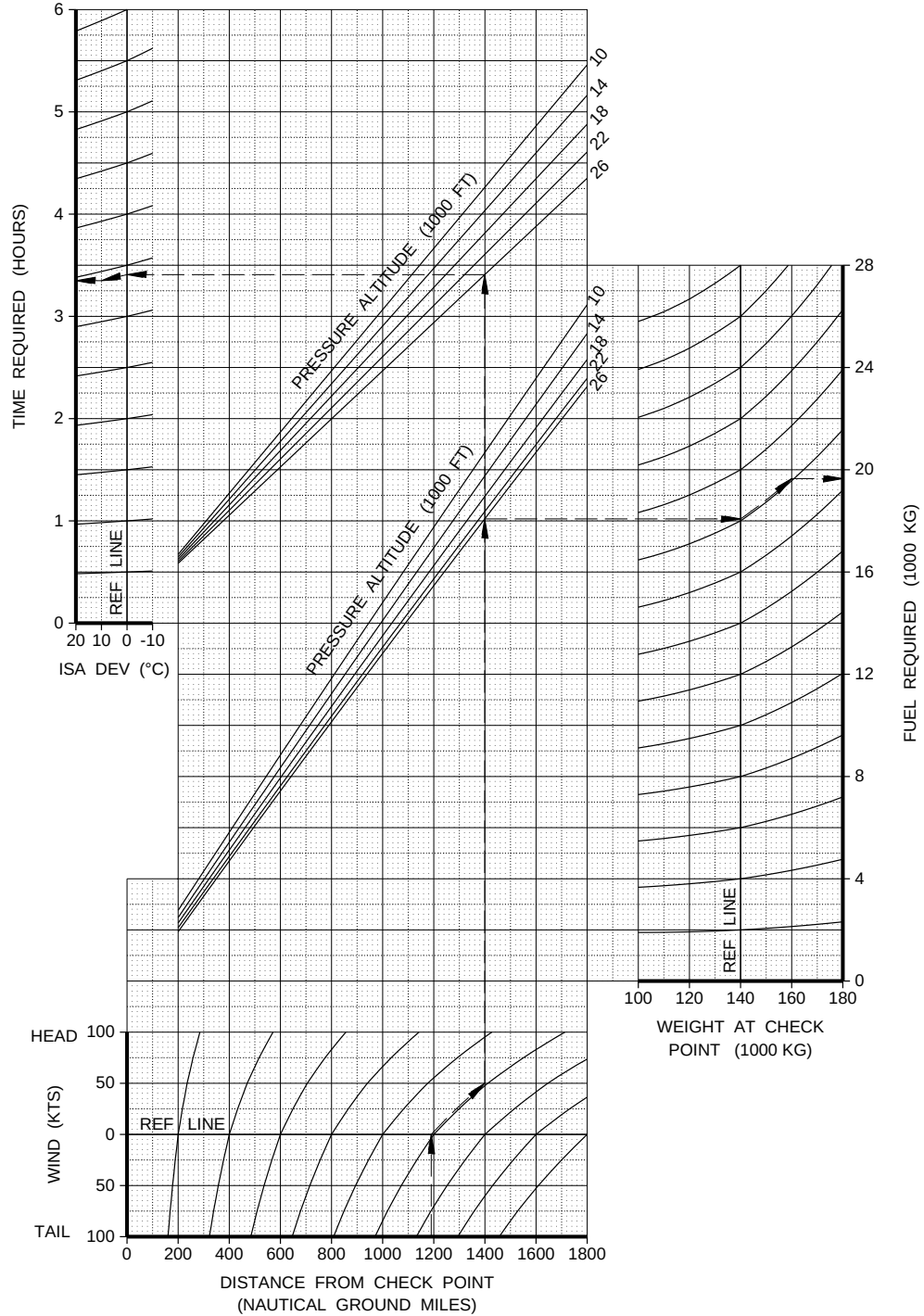


ENGINE INOP

MAX CONTINUOUS THRUST

290 KIAS Diversion Fuel and Time

Based on .78/290/250 descent and includes APU fuel burn

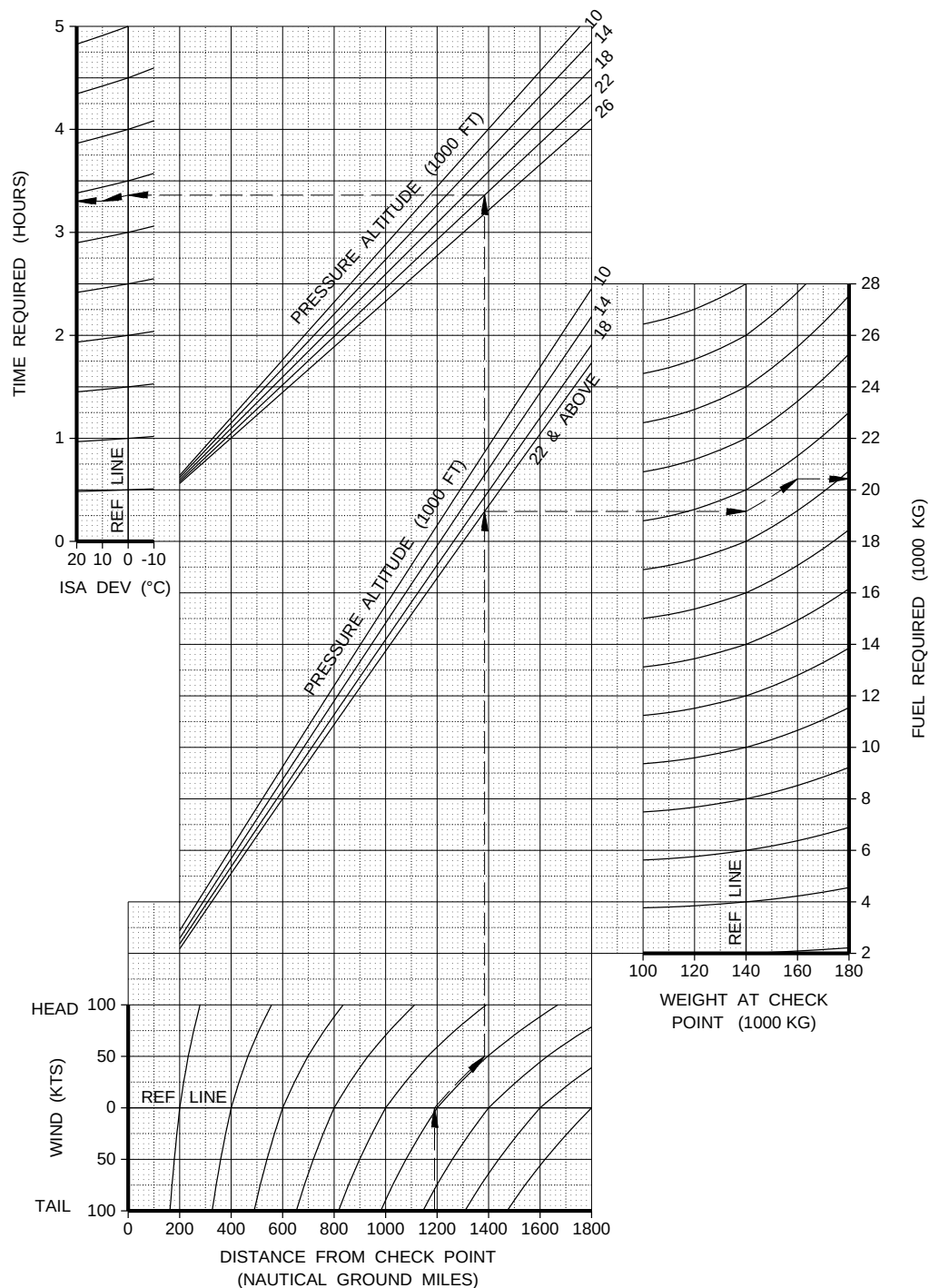


ENGINE INOP

MAX CONTINUOUS THRUST

310 KIAS Diversion Fuel and Time

Based on 310/250 descent and includes APU fuel burn



ENGINE INOP
MAX CONTINUOUS THRUST**Holding**
Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
30000	EPR									1.63	1.52
	KIAS									205	199
	FF/ENG									3790	3320
25000	EPR						1.65	1.55	1.47	1.39	1.33
	KIAS						225	217	211	205	199
	FF/ENG						4850	4340	3870	3430	3030
20000	EPR		1.69	1.61	1.53	1.47	1.41	1.35	1.30	1.26	1.22
	KIAS		254	246	239	231	223	217	211	205	199
	FF/ENG		6490	5900	5370	4870	4400	3960	3560	3230	2920
15000	EPR	1.49	1.44	1.39	1.35	1.31	1.28	1.24	1.21	1.19	1.16
	KIAS	259	252	245	238	230	222	217	211	205	199
	FF/ENG	6480	5980	5490	5030	4600	4220	3870	3560	3270	2980
10000	EPR	1.33	1.30	1.27	1.25	1.22	1.20	1.18	1.16	1.14	1.12
	KIAS	259	251	244	236	229	222	217	211	205	199
	FF/ENG	6040	5630	5240	4870	4530	4200	3890	3590	3290	3000
5000	EPR	1.24	1.22	1.20	1.18	1.16	1.15	1.13	1.11	1.10	1.09
	KIAS	259	251	244	236	228	222	217	211	205	199
	FF/ENG	5860	5500	5160	4820	4500	4180	3880	3580	3290	2990
1500	EPR	1.19	1.18	1.16	1.15	1.13	1.12	1.11	1.09	1.08	1.07
	KIAS	259	251	244	236	228	222	217	211	205	199
	FF/ENG	5820	5490	5160	4830	4510	4200	3900	3600	3300	3010

This table includes 5% additional fuel for holding in a racetrack pattern.

NON-STANDARD CONFIGURATION

Table of Contents

Chapter 4

Text.....	4.1.1
Gear Down.....	4.1.1
Alternate EEC Mode	4.1.2
Gear Down, Planning	4.2.1
Takeoff/Landing Climb Limit	4.2.1
Net Level Off Weight	4.2.2
Long Range Cruise Trip Fuel and Time	4.2.3
Gear Down, All Engine.....	4.3.1
Long Range Cruise Altitude Capability	4.3.1
VREF30 + 70 Enroute Climb	4.3.2
200 KIAS Max Climb EPR	4.3.6
Long Range Cruise Table.....	4.3.7
Long Range Cruise Enroute Fuel and Time.....	4.3.12
Descent	4.3.13
Holding	4.3.13
Gear Down, Engine Inoperative	4.4.1
Driftdown/LRC Cruise Range Capability	4.4.1
Long Range Cruise Altitude Capability	4.4.2
Long Range Cruise Diversion Fuel and Time	4.4.3
Long Range Cruise Table.....	4.4.4
Holding	4.4.7
Alternate EEC Mode	4.5.1
Takeoff Performance	4.5.1
Takeoff Speeds Adjustment	4.5.1
Landing Performance	4.5.1
Takeoff EPR	4.5.1
Go-around EPR	4.5.2
Go-around %N1	4.5.2
Alternate EEC Mode, Engine Inoperative	4.6.1
Initial Max Continuous %N1	4.6.1
Max Continuous %N1	4.6.2

Intentionally
Blank

Gear Down

Introduction

This section contains performance data for airplane operation with landing gear extended. The data includes engine bleed effects for normal air conditioning operation; i.e., two packs on at normal flow with all engines operating, and one pack at normal flow with engine inoperative.

NOTE: The Flight Management Computer System (FMCS) does not contain special provisions for operation with landing gear extended. As a result, the FMCS will generate inaccurate enroute speed schedules, display non-conservative predictions of fuel burn, estimated time of arrival (ETA), maximum altitude, and compute overly shallow descent path. To obtain accurate ETA predictions, gear down cruise speed and altitude should be entered on the CLB and CRZ pages. Gear down cruise speed should also be entered on the DES page and a STEP SIZE of zero should be entered on the PERF INIT or CRZ page. Use of the VNAV during descent under these circumstances is not recommended.

Planning

Takeoff/Landing Climb Limit

Runway limited takeoff and landing weights are unchanged from those shown in Chapter 1. The climb limited takeoff and landing weights are tabulated in this section as a function of airport OAT and pressure altitude, with adjustments for packs off and anti-ice operation. The landing climb limit weight is further restricted when operating in icing conditions during any part of the flight when the forecast landing temperature is below the value presented on the chart.

Maximum allowable takeoff and landing weights are the lesser of the normal runway limit weight and the corresponding climb limit weight with gear down.

Takeoff and landing speeds are unchanged from those shown in Chapter 1.

Net Level Off Weight

This chart is used to determine the dispatch maximum weight for terrain clearance based on the approved Airplane Flight Manual net one engine inoperative, gear down performance at the speed for optimum climb gradient. Refer to Chapter 2 text for description of Net Level Off Weight chart.

Long Range Cruise Trip Fuel and Time

A Long Range Cruise Trip Time and Fuel chart is provided at constant altitude to determine trip fuel and time from brake release to touchdown. Refer to Chapter 2 text for description of chart usage.

Enroute - All Engines

Long Range Cruise Altitude Capability

Long Range Cruise Altitude Capability is provided at the limiting altitude for Maximum Cruise thrust at 0 ft/min residual rate of climb and Maximum climb thrust at 100 ft/min residual rate of climb

Enroute Climb

The Enroute Climb charts are based on VREF30 + 70 climb speed.

Max Climb EPR

Max Climb EPR based on normal air conditioning bleed is shown for a 200 KIAS climb schedule which approximates economy climb and turbulent air penetration speed, VREF30 + 70 KIAS with the landing gear extended. Max Climb EPR may be read directly from the table for the desired pressure altitude and TAT.

Long Range Cruise Table

Long Range Cruise tabulations are provided in the same format as the gear up cruise control tables in Chapter 3.

Long Range Cruise Enroute Fuel and Time

This chart is provided to determine fuel and time required to proceed to an alternate airfield or to complete the scheduled trip at Long Range Cruise. The chart is used in a similar manner to the Trip Fuel and Time chart with distance to destination replacing total trip distance.

Descent

Time, distance and fuel information is shown based on flight idle thrust at VREF30 + 70 KIAS and straight in approach.

Holding

EPR required, IAS and fuel flow with gear down are shown as described in Chapter 3 with a minimum maneuver speed of VREF30 + 70 KIAS.

Enroute - Engine Inoperative

Driftdown/LRC Cruise Range Capability

Engine inoperative range capability is provided to determine the time and fuel required for a specified distance when the recommended driftdown procedure is followed.

Long Range Cruise Altitude Capability

Long Range Cruise altitude capability is provided at Max Continuous Thrust with 100 ft/min residual rate of climb.

Long Range Cruise Diversion Fuel and Time

This chart enables rapid determination of fuel and time required to proceed to an alternate airfield (or continue to destination) at Long Range Cruise with an engine inoperative. Diversion fuel and time are determined in a manner similar to the enroute fuel and time.

Long Range Cruise Tables

Long Range Cruise tabulations for engine inoperative are based on use of Max Continuous Thrust limits.

Holding

Engine inoperative holding data is provided at VREF30 + 70 KIAS.

Alternate EEC Mode

Introduction

This section contains performance data for airplane operation using with the Electronic Engine Controls (EEC) in the ALTERNATE Mode. The data includes engine bleed effects for normal air conditioning operation; i.e., two packs on at normal flow all engines operating, and one pack on at normal flow with engine inoperative.

Takeoff thrust setting with EEC's in ALTERNATE Mode is achieved by advancing both throttles together and setting the target EPR on the engine with EPR available. During takeoff roll, minor adjustments to the non-EPR engine throttle may be made prior to 80 kts to match %N1 to the %N1 on the engine set to EPR.

Takeoff Performance

A simplified method which conservatively accounts for the effects of EEC in the ALTERNATE Mode is to reduce the normal limit weights. The Takeoff Performance table provides takeoff field, climb and obstacle limit weight adjustments. To determine limit weight for operations enter the table with airport OAT and apply the weight reduction to the normal full rate limit weight. The most limiting of the takeoff weights must be used.

Improved climb performance procedure and reduced thrust operation using assumed temperature method is not permitted. Derate 1 and Derate 2 operation is not permitted. Use of autothrottle is not permitted.

Takeoff Speeds

Takeoff speeds for the reduced weights should be adjusted by the amount shown in the Takeoff Speeds table. The adjusted V1 should not exceed the adjusted VR.

NOTE: The FMC does not incorporate Alternate EEC Mode performance in its takeoff speeds calculations.

Landing Performance

The Landing Performance table provides the weight adjustment that must be applied to the Approach/Landing Climb limit weight. Enter the table with airport OAT and apply the weight reduction to the normal full rate limit weight. The ALTERNATE Mode EEC Approach/Landing Climb limit must be compared to the Landing Field Length limit and the most limiting of the two be used as the landing limit weight.

Takeoff EPR/Go-around EPR/Go-around %N1

Takeoff and Go-around power setting are presented for normal air conditioning bleed. Max Takeoff or Go-around EPR may be read directly from the tables for the desired pressure altitude and airport OAT. Go-around %N1 is provided in the event that EPR becomes unavailable during the flight.

Thrust protection is not provided in the Alternate EEC Mode and maximum rated thrust is reached at a thrust lever position less than full forward. As a result, thrust overboost can occur at full forward thrust lever positions.

Alternate EEC Mode, Engine Inoperative

Initial Max Continuous %N1

The Initial Max Continuous %N1 setting, with normal engine bleed for packs on and anti-ice off, following engine failure in cruise is shown for a range of altitudes and TAT.

Max Continuous %N1

Max Continuous %N1 which can be set during engine out cruise conditions is presented. Enter the appropriate table with pressure altitude, TAT, and KIAS to obtain Maximum Continuous %N1. Intermediate airspeeds may be interpolated. Appropriate bleed adjustments are shown.

GEAR DOWN

Takeoff/Landing Climb Limit

Based on engine bleed for packs on, APU on or off and anti-ice off

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE FT										
		-1000	S.L.	1000	2000	3000	4000	5000	6000	7000	8000	9000
°C	°F	CLIMB LIMIT WEIGHT 1000 KG										
55	131	111	111	109								
50	122	117	117	114	109	104						
45	113	123	122	119	114	109	105	100	95			
40	104	129	128	125	120	115	109	105	100	95	91	
35	95	137	136	132	126	121	115	110	105	101	96	91
30	86	144	142	138	132	127	121	116	111	106	101	97
25	77	148	149	145	139	133	128	122	117	112	107	102
20	68	148	149	148	145	140	134	128	123	117	112	107
15	59	148	149	148	145	141	138	134	128	122	117	112
10	50	148	149	148	145	141	138	134	131	127	123	117
-40	-40	148	149	148	145	141	138	134	130	127	124	120
*ICING CONDITION		153	152	148	144	140	135	131	126	122	118	114

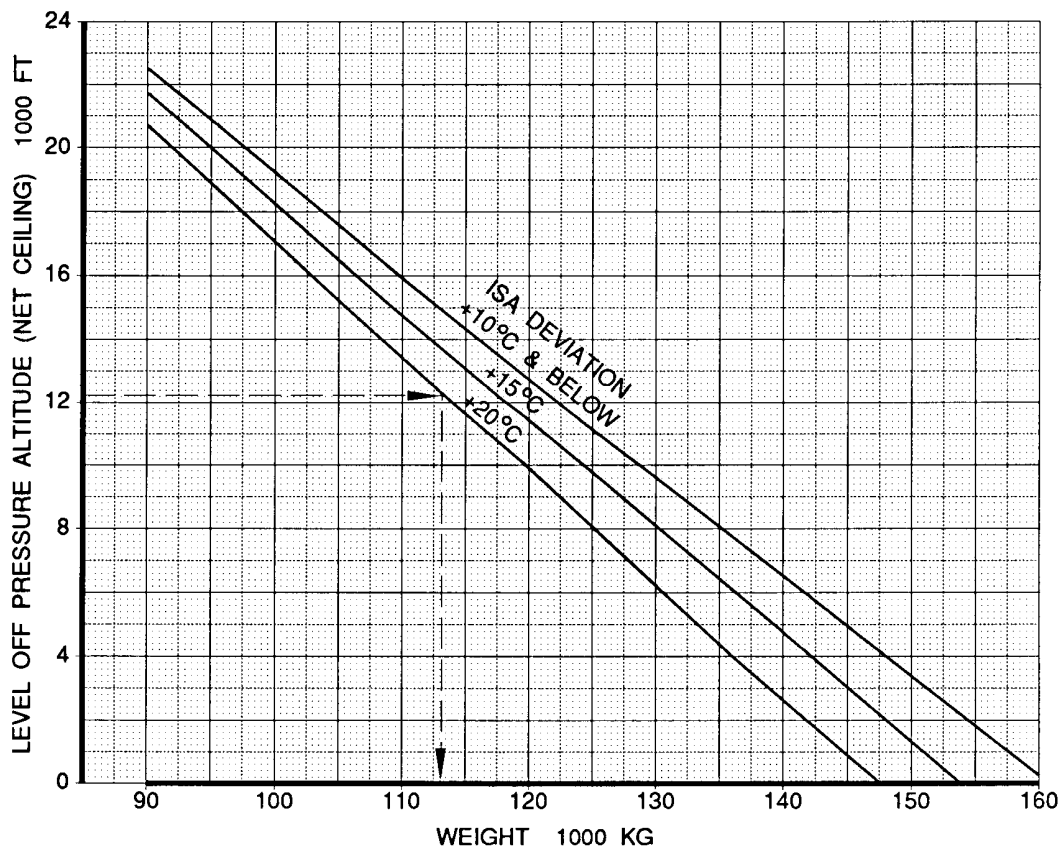
*LANDING CLIMB LIMIT WEIGHT WHEN OPERATING IN ICING CONDITIONS DURING ANY PART OF THE FLIGHT WHEN FORECAST LANDING TEMPERATURE IS BELOW 8°C (46°F).

BLEED CORRECTIONS KG		
A/I CONFIGURATION	A/C PACKS ON	A/C PACKS OFF
A/I OFF	0	+1340
ENGINE A/I ON	-3310	-1200
ENGINE AND WING A/I ON	-8210	-5560

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Net Level Off Weight

Based on engine bleed for packs on, APU on or off and anti-ice off

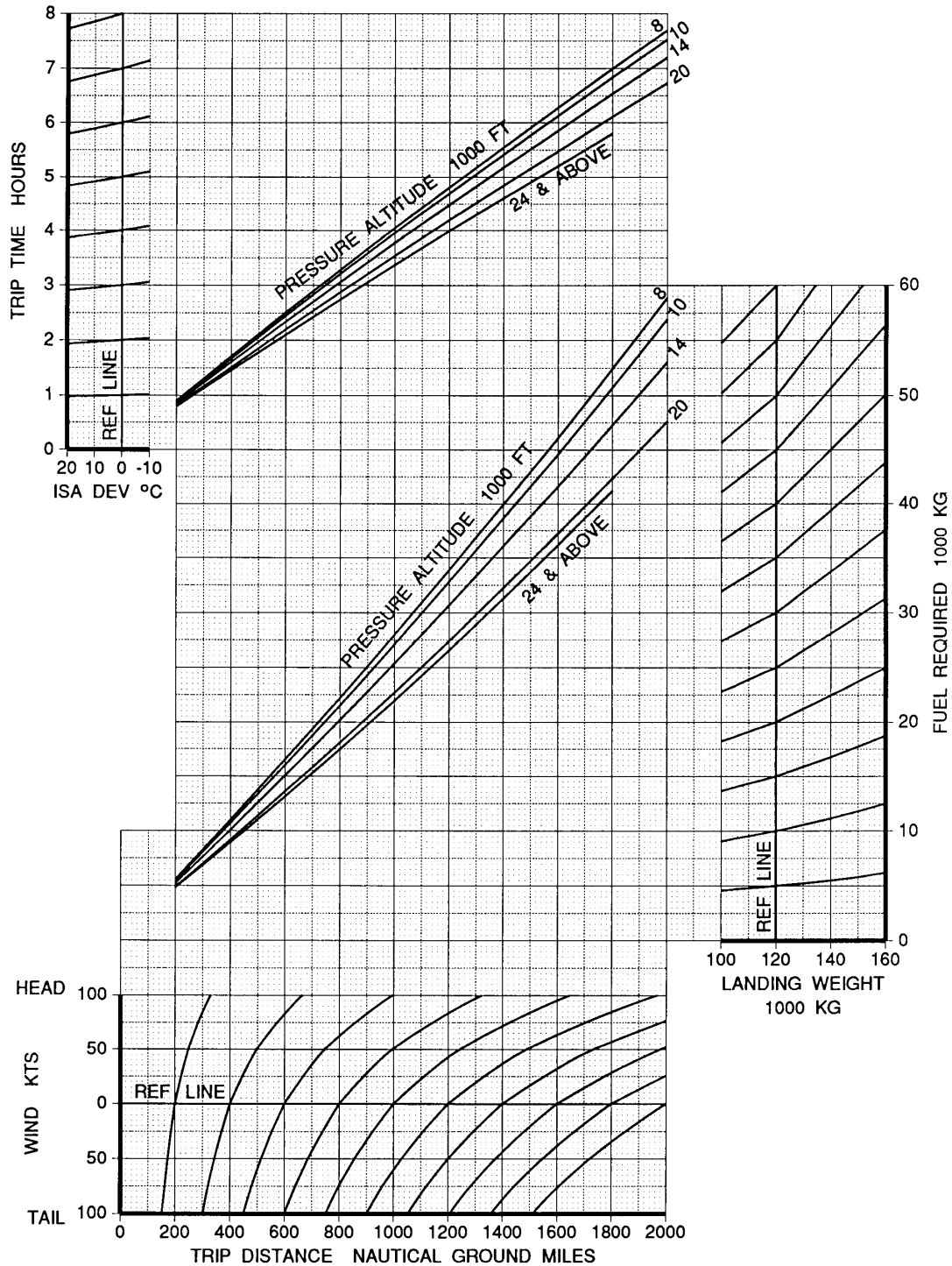


BLEED CONFIGURATION	WEIGHT ADJUSTMENT KG
ENGINE A/I ON	-3350
ENGINE AND WING A/I ON	-7700

GEAR DOWN

Long Range Cruise Trip Fuel and Time

Based on VREF30 + 70 climb/descent



Intentionally
Blank

GEAR DOWN

Long Range Cruise Altitude Capability

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
190	18500	18500	16600
185	19500	19500	17600
180	20500	20400	18700
175	21300	21300	19700
170	22200	22200	20700
165	23200	23100	21700
160	24100	24100	22700
155	25100	25000	23700
150	26000	25900	24700
145	26900	26900	25700
140	27900	27900	26700
135	28900	28900	27700
130	29800	29800	28600
125	30700	30600	29600
120	31600	31600	30600
115	32700	32700	31600
110	33600	33500	32800
105	34400	34400	33700
100	35200	35200	34600
95	36000	36000	35400
90	36800	36800	36300



GEAR DOWN

VREF30 + 70 Enroute Climb ISA and Below

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)											
		190	180	170	160	150	140	130	120	110	100	90	
33000	TIME/FUEL DIST/SPD								23/3850 106/289	18/3100 78/276	15/2550 60/264	12/2100 48/253	
32000	TIME/FUEL DIST/SPD							27/4500 125/296	20/3500 89/282	16/2900 68/271	14/2400 54/260	11/2000 43/249	
31000	TIME/FUEL DIST/SPD						32/5350 152/303	23/4000 103/289	18/3250 78/277	15/2700 61/266	13/2300 49/255	11/1900 40/245	
30000	TIME/FUEL DIST/SPD						26/4600 121/295	20/3650 89/283	17/3050 69/272	14/2550 55/261	12/2150 45/251	10/1850 36/242	
29000	TIME/FUEL DIST/SPD					30/5400 144/300	23/4150 101/288	18/3400 78/277	15/2850 62/267	13/2450 50/257	11/2050 41/248	9/1750 33/238	
28000	TIME/FUEL DIST/SPD					26/4750 117/293	20/3800 88/282	17/3200 69/273	14/2700 56/263	12/2300 46/254	10/2000 37/244	9/1700 31/235	
27000	TIME/FUEL DIST/SPD				30/5600 144/303	22/4250 99/287	18/3550 77/277	15/3000 62/268	13/2550 51/259	11/2200 42/250	10/1900 34/241	8/1600 28/232	
26000	TIME/FUEL DIST/SPD				26/4900 117/296	20/3900 86/282	17/3300 69/273	14/2800 56/265	12/2450 46/256	10/2100 38/247	9/1800 32/238	8/1550 26/229	
25000	TIME/FUEL DIST/SPD			30/5800 143/305	22/4450 100/291	18/3650 76/278	15/3100 62/269	13/2650 51/261	11/2300 42/252	10/2000 35/244	9/1750 29/235	7/1500 24/226	
24000	TIME/FUEL DIST/SPD		37/7200 186/315	26/5100 118/299	20/4050 87/286	17/3400 68/274	14/2900 56/266	12/2500 46/258	11/2200 39/249	9/1900 32/241	8/1650 27/232	7/1400 22/223	
23000	TIME/FUEL DIST/SPD		30/5950 142/307	22/4550 100/294	18/3750 76/282	15/3150 61/270	13/2750 50/262	11/2400 42/255	10/2100 35/246	9/1800 30/238	8/1600 25/230	7/1350 21/221	
22000	TIME/FUEL DIST/SPD	37/7350 182/316	25/5200 117/301	20/4150 87/289	16/3450 68/278	14/2950 55/266	12/2600 46/259	11/2250 38/252	9/2000 32/244	8/1750 27/235	7/1500 23/227	6/1300 19/218	
21000	TIME/FUEL DIST/SPD	29/6100 140/309	22/4650 99/296	18/3800 76/285	15/3250 61/274	13/2800 49/263	11/2450 42/256	10/2150 35/249	9/1900 30/241	8/1650 25/233	7/1450 21/225	6/1250 18/216	
20000	TIME/FUEL DIST/SPD	25/5300 115/303	20/4200 85/292	16/3550 67/281	14/3000 54/271	12/2600 45/260	10/2300 38/253	9/2050 32/246	8/1800 27/238	7/1550 23/230	6/1350 19/222	6/1150 16/214	
18000	TIME/FUEL DIST/SPD	19/4250 84/294	16/3550 66/284	14/3050 53/275	12/2650 44/265	10/2300 36/254	9/2050 31/248	8/1800 27/241	7/1600 23/233	6/1400 19/226	6/1250 16/218	5/1050 14/209	
16000	TIME/FUEL DIST/SPD	15/3500 63/287	13/3000 51/278	11/2600 42/269	10/2300 35/259	9/2050 30/249	8/1800 26/243	7/1600 22/236	6/1450 19/229	6/1250 16/221	5/1100 14/213	4/950 12/205	
14000	TIME/FUEL DIST/SPD	12/2950 49/281	11/2550 40/272	10/2250 34/263	8/2000 28/254	8/1750 24/245	7/1600 21/238	6/1400 18/232	5/1250 15/224	5/1100 13/217	4/1000 11/209	4/850 9/201	
10000	TIME/FUEL DIST/SPD	8/2000 28/271	7/1800 23/262	7/1600 20/254	6/1450 17/245	5/1300 15/236	5/1150 13/230	4/1050 11/224	4/950 9/217	4/850 8/209	3/750 7/202	3/600 6/194	
1500	TIME/FUEL	2/500	2/500	2/450	2/450	2/400	2/400	1/350	1/300	1/250	1/250	1/200	
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE						AIRPORT ELEVATION		2000	4000	6000	8000	10000	12000
						FUEL ADJUSTMENT		-200	-350	-550	-750	-950	-1150



Flight Planning and Performance Manual

GEAR DOWN

**VREF30 + 70 Enroute Climb
ISA + 10°C**

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)											
		190	180	170	160	150	140	130	120	110	100	90	
33000	TIME/FUEL DIST/SPD								24/4050 111/296	18/3200 81/282	15/2650 63/270	13/2200 50/259	
32000	TIME/FUEL DIST/SPD							27/4700 132/303	21/3650 93/288	17/3000 72/276	14/2500 56/265	12/2100 45/254	
31000	TIME/FUEL DIST/SPD						32/5600 159/309	23/4200 108/295	19/3400 81/282	15/2800 64/271	13/2400 51/261	11/2000 41/250	
30000	TIME/FUEL DIST/SPD						27/4850 126/301	21/3850 93/288	17/3150 72/277	14/2650 58/267	12/2250 47/257	10/1900 38/246	
29000	TIME/FUEL DIST/SPD					31/5650 151/307	23/4350 106/294	19/3550 81/283	15/3000 65/273	13/2550 52/263	11/2150 43/253	10/1850 35/243	
28000	TIME/FUEL DIST/SPD					26/4950 122/299	21/3950 92/288	17/3300 72/278	14/2800 58/268	12/2400 48/259	10/2050 39/249	9/1750 32/240	
27000	TIME/FUEL DIST/SPD				31/5900 151/309	23/4450 103/293	19/3700 81/283	16/3100 65/274	13/2650 53/264	11/2300 43/255	10/1950 36/246	9/1700 30/236	
26000	TIME/FUEL DIST/SPD				26/5150 123/302	20/4100 90/288	17/3450 72/279	14/2950 58/270	12/2500 48/261	11/2200 40/252	9/1900 33/243	8/1600 27/233	
25000	TIME/FUEL DIST/SPD			31/6050 150/311	23/4600 104/296	18/3800 79/283	16/3200 64/275	13/2750 53/266	12/2400 44/257	10/2100 37/249	9/1800 30/240	8/1550 25/231	
24000	TIME/FUEL DIST/SPD			26/5300 123/305	20/4200 91/291	17/3500 71/279	14/3000 58/271	12/2600 48/263	11/2300 40/254	9/2000 34/246	8/1700 28/237	7/1450 23/228	
23000	TIME/FUEL DIST/SPD		31/6250 149/313	23/4750 105/299	18/3900 80/287	15/3300 63/275	13/2850 52/267	12/2500 44/259	10/2150 37/251	9/1900 31/243	8/1650 26/234	7/1400 22/225	
22000	TIME/FUEL DIST/SPD		26/5450 122/307	20/4350 90/295	17/3600 71/283	14/3100 57/272	12/2700 48/264	11/2350 40/256	9/2050 34/248	8/1800 28/240	7/1550 24/231	6/1350 20/223	
21000	TIME/FUEL DIST/SPD	30/6350 147/315	23/4850 103/302	18/4000 79/290	15/3350 63/279	13/2900 51/268	11/2550 43/261	10/2200 37/253	9/1950 31/245	8/1700 26/237	7/1500 22/229	6/1300 18/220	
20000	TIME/FUEL DIST/SPD	25/5550 120/309	20/4400 89/297	17/3650 70/287	14/3150 57/276	12/2700 46/265	11/2400 39/258	9/2100 33/251	8/1850 28/243	7/1600 24/235	6/1400 20/226	6/1200 17/218	
18000	TIME/FUEL DIST/SPD	19/4450 87/300	16/3700 68/290	14/3150 55/280	12/2750 46/270	10/2400 38/259	9/2100 32/252	8/1900 28/245	7/1650 24/238	6/1450 20/230	6/1300 17/222	5/1100 14/213	
16000	TIME/FUEL DIST/SPD	16/3650 66/292	13/3100 53/283	12/2700 44/274	10/2400 37/264	9/2100 31/254	8/1850 27/247	7/1650 23/240	6/1500 20/233	6/1300 17/225	5/1150 14/217	4/1000 12/209	
14000	TIME/FUEL DIST/SPD	13/3050 51/286	11/2650 42/277	10/2300 35/268	9/2050 29/259	8/1850 25/249	7/1650 21/243	6/1450 19/236	5/1300 16/229	5/1150 14/221	4/1000 12/213	4/850 10/205	
10000	TIME/FUEL DIST/SPD	8/2050 29/276	7/1850 24/267	7/1650 21/259	6/1500 18/250	5/1350 15/240	5/1200 13/234	4/1100 11/228	4/950 10/220	4/850 8/213	3/750 7/205	3/650 6/197	
1500	TIME/FUEL	2/500	2/500	2/450	2/450	2/400	2/400	1/350	1/300	1/250	1/250	1/200	
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE						AIRPORT ELEVATION FUEL ADJUSTMENT		2000 -200	4000 -400	6000 -600	8000 -800	10000 -1000	12000 -1200

GEAR DOWN

VREF30 + 70 Enroute Climb ISA + 15°C

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)											
		190	180	170	160	150	140	130	120	110	100	90	
33000	TIME/FUEL DIST/SPD								24/4150 114/299	19/3300 83/285	15/2700 64/273	13/2250 51/261	
32000	TIME/FUEL DIST/SPD							28/4850 135/306	21/3750 95/291	17/3050 73/279	14/2550 58/268	12/2150 46/257	
31000	TIME/FUEL DIST/SPD						33/5700 163/312	24/4300 111/298	19/3450 83/285	15/2900 65/274	13/2450 52/263	11/2050 42/253	
30000	TIME/FUEL DIST/SPD						27/4950 129/304	21/3900 95/291	17/3250 74/280	14/2700 59/269	12/2300 48/259	10/1950 39/249	
29000	TIME/FUEL DIST/SPD					32/5800 154/310	24/4450 109/297	19/3650 83/286	16/3050 66/275	13/2600 53/265	11/2200 43/255	10/1850 36/245	
28000	TIME/FUEL DIST/SPD					26/5050 125/302	21/4050 94/291	17/3400 74/281	14/2850 59/271	12/2450 49/261	11/2100 40/252	9/1800 33/242	
27000	TIME/FUEL DIST/SPD				31/6000 155/312	23/4550 106/296	19/3750 82/286	16/3150 66/276	13/2700 54/267	11/2350 44/258	10/2000 37/248	9/1700 30/239	
26000	TIME/FUEL DIST/SPD				26/5250 125/305	21/4150 92/290	17/3500 73/281	15/3000 60/272	12/2550 49/263	11/2200 41/254	9/1900 34/245	8/1650 28/236	
25000	TIME/FUEL DIST/SPD			31/6200 154/314	23/4700 107/299	19/3850 81/286	16/3300 66/277	13/2800 54/269	12/2450 45/260	10/2100 37/251	9/1850 31/242	8/1550 26/233	
24000	TIME/FUEL DIST/SPD			26/5400 126/308	21/4300 92/294	17/3600 72/281	15/3100 59/273	13/2650 49/265	11/2300 41/257	9/2000 34/248	8/1750 29/239	7/1500 24/230	
23000	TIME/FUEL DIST/SPD		31/6400 153/316	23/4850 107/302	19/3950 81/290	16/3350 65/278	13/2900 54/270	12/2500 45/262	10/2200 38/253	9/1900 32/245	8/1650 26/236	7/1450 22/227	
22000	TIME/FUEL DIST/SPD		26/5550 125/310	21/4400 92/297	17/3700 72/286	14/3150 58/274	12/2750 49/266	11/2400 41/259	10/2100 34/251	8/1850 29/242	7/1600 24/234	6/1350 20/225	
21000	TIME/FUEL DIST/SPD	30/6500 150/318	23/4950 106/305	18/4050 81/293	16/3450 64/282	13/2950 52/271	12/2600 44/263	10/2250 37/256	9/2000 32/248	8/1750 27/239	7/1500 22/231	6/1300 19/222	
20000	TIME/FUEL DIST/SPD	26/5650 123/312	20/4500 91/300	17/3750 71/289	14/3200 58/278	12/2750 47/267	11/2450 40/260	9/2150 34/253	8/1900 29/245	7/1650 24/237	6/1450 21/228	6/1250 17/220	
18000	TIME/FUEL DIST/SPD	20/4500 89/302	16/3750 70/292	14/3200 57/282	12/2800 47/272	11/2450 39/262	9/2150 33/255	8/1900 28/248	7/1700 24/240	6/1500 20/232	6/1300 17/224	5/1100 15/215	
16000	TIME/FUEL DIST/SPD	16/3700 67/295	13/3150 55/286	12/2750 45/276	10/2400 37/266	9/2150 31/256	8/1900 27/250	7/1700 23/243	6/1500 20/235	6/1350 17/227	5/1150 14/219	4/1000 12/211	
14000	TIME/FUEL DIST/SPD	13/3100 52/289	11/2700 43/280	10/2350 36/271	9/2100 30/261	8/1850 25/251	7/1650 22/245	6/1500 19/238	5/1300 16/231	5/1150 14/223	4/1050 12/215	4/900 10/207	
10000	TIME/FUEL DIST/SPD	8/2100 29/278	7/1850 25/269	7/1700 21/261	6/1500 18/252	5/1350 15/242	5/1200 13/236	4/1100 12/230	4/1000 10/222	4/850 9/215	3/750 7/207	3/650 6/199	
1500	TIME/FUEL	2/500	2/500	2/450	2/450	2/400	2/400	1/350	1/300	1/250	1/250	1/200	
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE						AIRPORT ELEVATION		2000	4000	6000	8000	10000	12000
						FUEL ADJUSTMENT		-200	-400	-600	-800	-1000	-1250



Flight Planning and Performance Manual

GEAR DOWN

**VREF30 + 70 Enroute Climb
ISA + 20°C**

PRESSURE ALTITUDE(F T)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)											
		190	180	170	160	150	140	130	120	110	100	90	
33000	TIME/FUEL DIST/SPD								28/4600 138/305	21/3500 95/289	17/2850 72/276	14/2350 56/264	
32000	TIME/FUEL DIST/SPD							35/5600 174/313	24/4100 112/296	19/3250 83/283	15/2650 64/271	13/2200 51/260	
31000	TIME/FUEL DIST/SPD							28/4750 133/303	21/3700 95/289	17/3050 73/277	14/2550 58/266	12/2100 46/256	
30000	TIME/FUEL DIST/SPD						33/5700 164/310	24/4250 111/296	19/3450 84/284	16/2850 66/273	13/2400 52/262	11/2000 42/252	
29000	TIME/FUEL DIST/SPD						28/4950 131/302	21/3900 96/290	17/3200 74/279	14/2700 59/268	12/2300 48/258	10/1900 39/248	
28000	TIME/FUEL DIST/SPD					32/5800 157/308	24/4450 110/295	19/3600 84/285	16/3000 67/274	13/2550 54/264	11/2200 44/254	10/1850 36/245	
27000	TIME/FUEL DIST/SPD					27/5050 127/301	21/4050 95/290	17/3350 75/280	15/2850 60/270	12/2450 49/260	11/2100 40/251	9/1750 33/241	
26000	TIME/FUEL DIST/SPD				33/6100 160/311	24/4550 108/295	19/3750 84/285	16/3150 67/276	14/2700 55/266	12/2300 45/257	10/2000 37/248	9/1700 30/238	
25000	TIME/FUEL DIST/SPD				27/5350 130/304	21/4200 94/289	18/3500 75/280	15/3000 61/272	13/2550 50/263	11/2200 41/254	9/1900 34/245	8/1600 28/235	
24000	TIME/FUEL DIST/SPD			33/6400 163/314	24/4800 111/298	19/3850 83/285	16/3250 67/276	14/2800 55/268	12/2400 45/259	10/2100 38/251	9/1800 31/242	8/1550 26/232	
23000	TIME/FUEL DIST/SPD			28/5550 132/307	21/4350 96/293	17/3600 74/281	15/3050 60/273	13/2650 50/265	11/2300 42/256	10/2000 35/248	8/1700 29/239	7/1450 24/230	
22000	TIME/FUEL DIST/SPD		33/6700 164/316	24/4950 112/302	19/4000 84/289	16/3350 66/277	14/2900 55/269	12/2500 46/261	10/2200 38/253	9/1900 32/245	8/1650 27/236	7/1400 22/227	
21000	TIME/FUEL DIST/SPD		28/5750 133/309	21/4500 96/297	17/3700 75/285	15/3150 60/274	13/2700 50/266	11/2350 41/258	10/2050 35/250	8/1800 29/242	7/1550 25/233	6/1350 20/225	
20000	TIME/FUEL DIST/SPD	33/6950 165/317	24/5100 112/304	19/4100 84/293	16/3450 66/282	14/2950 54/270	12/2550 45/263	10/2250 38/256	9/1950 32/247	8/1700 27/239	7/1500 23/231	6/1250 19/222	
18000	TIME/FUEL DIST/SPD	24/5200 111/307	19/4150 83/296	16/3500 66/285	13/3000 53/275	12/2600 44/264	10/2250 37/257	9/2000 31/250	8/1750 27/242	7/1550 22/234	6/1350 19/226	5/1150 16/217	
16000	TIME/FUEL DIST/SPD	18/4200 82/298	15/3450 64/289	13/2950 52/279	11/2550 43/269	10/2250 35/259	9/2000 30/252	8/1750 26/245	7/1550 22/237	6/1350 19/230	5/1200 16/222	5/1000 13/213	
14000	TIME/FUEL DIST/SPD	15/3400 62/292	12/2900 50/282	11/2500 41/273	10/2200 34/264	8/1950 28/254	7/1750 24/247	7/1550 21/240	6/1350 18/233	5/1200 15/225	5/1050 13/217	4/900 11/209	
10000	TIME/FUEL DIST/SPD	9/2250 34/281	8/2000 28/272	7/1750 24/263	7/1600 20/254	6/1400 17/245	5/1250 15/238	5/1150 13/232	4/1000 11/225	4/900 9/217	3/800 8/209	3/650 7/201	
1500	TIME/FUEL	2/500	2/500	2/450	2/450	2/400	2/400	1/350	1/300	1/250	1/250	1/200	
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE						AIRPORT ELEVATION		2000	4000	6000	8000	10000	12000
						FUEL ADJUSTMENT		-200	-400	-600	-850	-1050	-1300



GEAR DOWN

200 KIAS Max Climb EPR

Based on engine bleed for packs on and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT)														
	0	5	10	12	14	16	18	20	22	24	26	28	30	32	34
55	1.27														
50	1.29	1.31													
45	1.31	1.33	1.33												
40	1.34	1.36	1.35	1.35	1.35										
35	1.36	1.38	1.38	1.38	1.38	1.38									
30	1.36	1.42	1.41	1.41	1.41	1.41	1.41								
25	1.36	1.44	1.45	1.45	1.45	1.45	1.44	1.44	1.44						
20	1.36	1.44	1.49	1.49	1.49	1.49	1.48	1.48	1.48	1.48					
15	1.36	1.44	1.51	1.53	1.53	1.53	1.53	1.52	1.52	1.52	1.51				
10	1.36	1.44	1.51	1.54	1.57	1.57	1.57	1.57	1.57	1.57	1.56	1.55			
5	1.36	1.44	1.51	1.54	1.57	1.60	1.62	1.62	1.61	1.61	1.61	1.60	1.59	1.57	
0	1.36	1.44	1.51	1.54	1.57	1.60	1.63	1.66	1.66	1.66	1.65	1.64	1.63	1.62	1.59
-5	1.36	1.44	1.51	1.54	1.57	1.60	1.63	1.66	1.69	1.70	1.70	1.69	1.68	1.66	1.64
-10	1.36	1.44	1.51	1.54	1.57	1.60	1.63	1.66	1.69	1.71	1.73	1.73	1.72	1.71	1.68
-15	1.36	1.44	1.51	1.54	1.57	1.60	1.63	1.66	1.69	1.71	1.73	1.75	1.76	1.75	1.72
-20	1.36	1.44	1.51	1.54	1.57	1.60	1.63	1.66	1.69	1.71	1.73	1.75	1.76	1.76	1.75

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)													
	0	5	10	12	14	18	20	22	24	26	28	30	34	
PACKS OFF	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	
ENGINE ANTI-ICE ON	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	
ENGINE & WING ANTI-ICE ON	-0.02	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.06	-0.07	-0.07	

GEAR DOWN

Long Range Cruise Table 35000 FT to 30000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
35 (-40)	EPR										1.56
	MAX TAT										-13
	KIAS										190
	MACH										0.573
	FF/ENG KTAS										2646 331
34 (-38)	EPR									1.61	1.51
	MAX TAT									-20	
	KIAS									198	190
	MACH									0.585	0.561
	FF/ENG KTAS									2971 339	2604 325
33 (-36)	EPR									1.56	1.46
	MAX TAT									-11	
	KIAS									199	190
	MACH									0.574	0.549
	FF/ENG KTAS									2929 334	2571 319
32 (-34)	EPR								1.60	1.51	1.42
	MAX TAT								-17	-5	
	KIAS								207	199	190
	MACH								0.584	0.561	0.538
	FF/ENG KTAS								3254 341	2885 328	2535 314
31 (-33)	EPR								1.55	1.46	1.39
	MAX TAT								-11		
	KIAS								207	199	190
	MACH								0.572	0.550	0.527
	FF/ENG KTAS								3209 336	2848 323	2497 309
30 (-31)	EPR							1.59	1.50	1.42	1.36
	MAX TAT							-14	-4		
	KIAS							216	207	199	190
	MACH							0.581	0.560	0.539	0.515
	FF/ENG KTAS							3531 342	3162 330	2808 318	2458 304

Max TAT not shown where EPR can be set in ISA + 30°C conditions.
Increase/decrease fuel flow 3% per 10°C above/below standard TAT.
Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Cruise EPR

PRESS ALT (1000 FT)	30	31	32	33	34	35
LIMIT EPR	1.61	1.62	1.64	1.66	1.66	1.67
MAX TAT (°C)	-12	-15	-16	-19	-20	-23

Decrease limit EPR by 0.08 per 10°C TAT hotter than table value.
With engine anti-ice on, decrease limit EPR by 0.02.
With engine and wing anti-ice on, decrease limit EPR by 0.05.

GEAR DOWN

Long Range Cruise Table 29000 FT to 24000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
29 (-29)	EPR							1.53	1.46	1.39	1.33
	MAX TAT							-8	2		
	KIAS							216	208	199	190
	MACH							0.569	0.549	0.528	0.505
	FF/ENG KTAS							3483 337	3120 325	2767 312	2435 299
28 (-28)	EPR							1.49	1.42	1.36	1.30
	MAX TAT							-2			
	KIAS							216	208	199	191
	MACH							0.557	0.538	0.516	0.496
	FF/ENG KTAS							3433 331	3078 320	2725 307	2421 295
27 (-25)	EPR						1.51	1.45	1.39	1.33	1.28
	MAX TAT						-4	4			
	KIAS						223	216	208	199	191
	MACH						0.565	0.547	0.527	0.506	0.486
	FF/ENG KTAS						3746 337	3390 326	3034 315	2699 302	2410 290
26 (-23)	EPR					1.54	1.47	1.41	1.36	1.31	1.26
	MAX TAT					-6	2				
	KIAS					231	224	216	208	200	191
	MACH					0.572	0.554	0.536	0.516	0.497	0.476
	FF/ENG KTAS					4066 343	3700 332	3345 321	2991 309	2683 298	2405 285
25 (-22)	EPR					1.49	1.43	1.38	1.33	1.29	1.24
	MAX TAT					0	7				
	KIAS					231	224	216	208	200	191
	MACH					0.560	0.543	0.525	0.506	0.487	0.467
	FF/ENG KTAS					4007 337	3655 327	3299 316	2964 305	2669 293	2406 281
24 (-20)	EPR				1.51	1.45	1.40	1.35	1.31	1.26	1.23
	MAX TAT				-2	5					
	KIAS				238	231	224	216	208	200	192
	MACH				0.566	0.549	0.533	0.514	0.497	0.478	0.459
	FF/ENG KTAS				4317 342	3961 332	3606 322	3254 311	2943 300	2661 289	2413 277

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Cruise EPR

PRESS ALT (1000 FT)	24	25	26	27	28	29
LIMIT EPR	1.54	1.56	1.57	1.58	1.59	1.60
MAX TAT (°C)	0	-3	-4	-6	-9	-10

Decrease limit EPR by 0.09 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.02.

With engine and wing anti-ice on, decrease limit EPR by 0.05.

GEAR DOWN

Long Range Cruise Table 23000 FT to 18000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
23 (-18)	EPR				1.47	1.42	1.37	1.32	1.28	1.25	1.21
	MAX TAT				4	10					
	KIAS				239	232	224	216	209	200	193
	MACH				0.555	0.539	0.522	0.505	0.487	0.469	0.451
	FF/ENG KTAS				4261 337	3907 327	3555 317	3221 306	2926 296	2658 285	2421 274
22 (-16)	EPR			1.49	1.43	1.39	1.34	1.30	1.26	1.23	1.20
	MAX TAT			3	9	15					
	KIAS			246	239	232	224	217	209	201	193
	MACH			0.559	0.544	0.529	0.512	0.496	0.478	0.461	0.444
	FF/ENG KTAS			4562 341	4208 332	3858 322	3509 312	3199 302	2918 291	2663 281	2430 270
21 (-15)	EPR			1.45	1.40	1.36	1.32	1.28	1.25	1.22	1.19
	MAX TAT			8	14						
	KIAS			246	239	231	224	217	209	202	194
	MACH			0.549	0.534	0.518	0.503	0.486	0.469	0.453	0.436
	FF/ENG KTAS			4512 336	4162 327	3809 317	3481 308	3188 297	2917 287	2674 277	2444 267
20 (-13)	EPR		1.46	1.41	1.37	1.33	1.30	1.26	1.23	1.20	1.18
	MAX TAT		7	13	18						
	KIAS		253	246	239	232	225	217	210	202	194
	MACH		0.552	0.539	0.524	0.508	0.493	0.477	0.461	0.446	0.428
	FF/ENG KTAS		4822 339	4470 331	4122 322	3776 312	3470 303	3187 293	2928 283	2690 274	2457 263
19 (-11)	EPR		1.42	1.38	1.34	1.31	1.28	1.24	1.22	1.19	1.17
	MAX TAT		12	17							
	KIAS		253	246	239	232	225	217	210	203	194
	MACH		0.542	0.528	0.513	0.499	0.484	0.468	0.454	0.438	0.420
	FF/ENG KTAS		4789 334	4439 326	4087 317	3769 308	3471 299	3198 289	2951 280	2713 270	2471 259
18 (-9)	EPR	1.43	1.39	1.35	1.32	1.29	1.26	1.23	1.20	1.18	1.16
	MAX TAT	11	16	21							
	KIAS	259	253	246	239	232	225	218	211	203	194
	MACH	0.545	0.532	0.518	0.504	0.490	0.475	0.461	0.446	0.430	0.412
	FF/ENG KTAS	5116 338	4762 330	4405 321	4079 312	3769 304	3480 294	3221 285	2975 276	2736 266	2488 255

Max TAT not shown where EPR can be set in ISA + 30°C conditions.
Increase/decrease fuel flow 3% per 10°C above/below standard TAT.
Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Cruise EPR

PRESS ALT (1000 FT)	18	19	20	21	22	23
LIMIT EPR	1.47	1.49	1.50	1.51	1.52	1.53
MAX TAT (°C)	9	7	5	5	4	1

Decrease limit EPR by 0.09 per 10°C TAT hotter than table value.
With engine anti-ice on, decrease limit EPR by 0.02.
With engine and wing anti-ice on, decrease limit EPR by 0.05.

GEAR DOWN

Long Range Cruise Table 17000 FT to 12000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
17 (-7)	EPR	1.40	1.36	1.33	1.30	1.27	1.24	1.22	1.19	1.17	1.15
	MAX TAT	15	20	25							
	KIAS	260	253	246	240	233	226	219	212	204	195
	MACH	0.535	0.522	0.508	0.495	0.481	0.467	0.453	0.439	0.422	0.404
	FF/ENG	5086	4728	4390	4075	3770	3496	3245	3001	2755	2508
16 (-6)	KTAS	333	324	316	308	299	290	282	273	262	251
	EPR	1.37	1.34	1.31	1.28	1.25	1.23	1.20	1.18	1.16	1.14
	MAX TAT	19	24								
	KIAS	260	253	247	240	233	226	220	212	204	195
	MACH	0.525	0.512	0.500	0.486	0.473	0.459	0.446	0.431	0.414	0.398
15 (-4)	FF/ENG	5054	4703	4385	4072	3780	3517	3270	3026	2769	2532
	KTAS	328	319	312	303	295	287	278	269	258	248
	EPR	1.35	1.32	1.29	1.26	1.24	1.21	1.19	1.17	1.15	1.13
	MAX TAT	23	28								
	KIAS	260	253	247	240	233	227	220	212	204	196
14 (-2)	MACH	0.515	0.503	0.491	0.478	0.464	0.452	0.439	0.423	0.407	0.391
	FF/ENG	5018	4695	4380	4077	3796	3545	3299	3045	2790	2554
	KTAS	323	315	307	299	291	283	275	265	255	245
	EPR	1.32	1.30	1.27	1.24	1.22	1.20	1.18	1.16	1.14	1.12
	MAX TAT	27									
13 (0)	KIAS	260	254	247	240	234	228	221	212	204	196
	MACH	0.506	0.495	0.482	0.469	0.457	0.445	0.431	0.415	0.400	0.383
	FF/ENG	5001	4690	4386	4093	3827	3576	3327	3061	2814	2569
	KTAS	318	311	303	295	287	280	271	261	252	241
	EPR	1.30	1.28	1.25	1.23	1.21	1.19	1.17	1.15	1.13	1.12
12 (1)	MAX TAT	31									
	KIAS	260	254	247	241	235	228	221	213	205	196
	MACH	0.498	0.486	0.473	0.462	0.450	0.438	0.423	0.408	0.394	0.376
	FF/ENG	4997	4695	4401	4120	3861	3609	3347	3081	2837	2578
	KTAS	314	307	299	291	284	276	267	258	248	237
	EPR	1.28	1.26	1.24	1.22	1.20	1.18	1.16	1.14	1.13	1.11
	MAX TAT										
	KIAS	261	254	248	242	236	229	221	213	205	195
	MACH	0.489	0.477	0.465	0.454	0.443	0.430	0.415	0.401	0.386	0.368
	FF/ENG	4992	4697	4408	4140	3882	3626	3353	3097	2847	2583
	KTAS	310	302	295	288	281	273	263	254	245	233

Max TAT not shown where EPR can be set in ISA + 30°C conditions.

Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Cruise EPR

PRESS ALT (1000 FT)	12	13	14	15	16	17
LIMIT EPR	1.41	1.42	1.43	1.44	1.45	1.46
MAX TAT (°C)	19	17	15	14	12	11

Decrease limit EPR by 0.09 per 10°C TAT hotter than table value.

With engine anti-ice on, decrease limit EPR by 0.02.

With engine and wing anti-ice on, decrease limit EPR by 0.05.

GEAR DOWN

Long Range Cruise Table 11000 FT to 6000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
11 (3)	EPR	1.26	1.24	1.22	1.20	1.18	1.17	1.15	1.14	1.12	1.10
	MAX TAT										
	KIAS	261	255	249	243	236	229	221	214	205	196
	MACH	0.480	0.469	0.458	0.447	0.436	0.422	0.408	0.395	0.379	0.362
	FF/ENG	4977	4684	4411	4150	3894	3626	3358	3112	2850	2591
10 (5)	KTAS	306	298	291	285	277	269	260	251	241	230
	EPR	1.25	1.23	1.21	1.19	1.17	1.16	1.14	1.13	1.11	1.10
	MAX TAT										
	KIAS	261	255	249	243	237	229	222	214	205	196
	MACH	0.472	0.462	0.451	0.440	0.428	0.415	0.402	0.388	0.371	0.356
9 (6)	FF/ENG	4961	4683	4420	4159	3896	3623	3368	3117	2850	2600
	KTAS	301	295	288	281	273	265	256	248	237	227
	EPR	1.23	1.21	1.20	1.18	1.16	1.15	1.14	1.12	1.10	1.09
	MAX TAT										
	KIAS	262	256	250	244	237	229	222	214	205	197
8 (8)	MACH	0.464	0.455	0.444	0.433	0.421	0.408	0.395	0.381	0.365	0.350
	FF/ENG	4961	4694	4431	4170	3899	3632	3384	3122	2857	2612
	KTAS	298	291	285	278	270	261	253	244	234	224
	EPR	1.22	1.20	1.19	1.17	1.16	1.14	1.13	1.11	1.10	1.09
	MAX TAT										
7 (10)	KIAS	262	257	251	244	237	230	222	214	205	197
	MACH	0.457	0.448	0.438	0.426	0.413	0.401	0.388	0.373	0.359	0.344
	FF/ENG	4971	4707	4445	4177	3902	3645	3393	3124	2866	2624
	KTAS	294	288	281	274	266	258	250	240	231	222
	EPR	1.21	1.19	1.18	1.16	1.15	1.13	1.12	1.11	1.09	1.08
6 (12)	MAX TAT										
	KIAS	263	258	251	244	237	231	222	214	206	198
	MACH	0.451	0.441	0.430	0.418	0.406	0.395	0.381	0.367	0.353	0.339
	FF/ENG	4986	4721	4456	4180	3913	3664	3399	3128	2877	2636
	KTAS	291	285	278	270	262	255	246	237	228	219
	EPR	1.19	1.18	1.17	1.15	1.14	1.13	1.11	1.10	1.09	1.08
	MAX TAT										
	KIAS	264	258	251	244	238	231	222	214	206	198
	MACH	0.444	0.434	0.423	0.411	0.400	0.388	0.374	0.360	0.347	0.334
	FF/ENG	4999	4737	4464	4186	3928	3674	3401	3138	2891	2650
	KTAS	287	281	274	266	259	251	242	233	225	216

Max TAT not shown where EPR can be set in ISA + 30°C conditions.
Increase/decrease fuel flow 3% per 10°C above/below standard TAT.
Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Cruise EPR

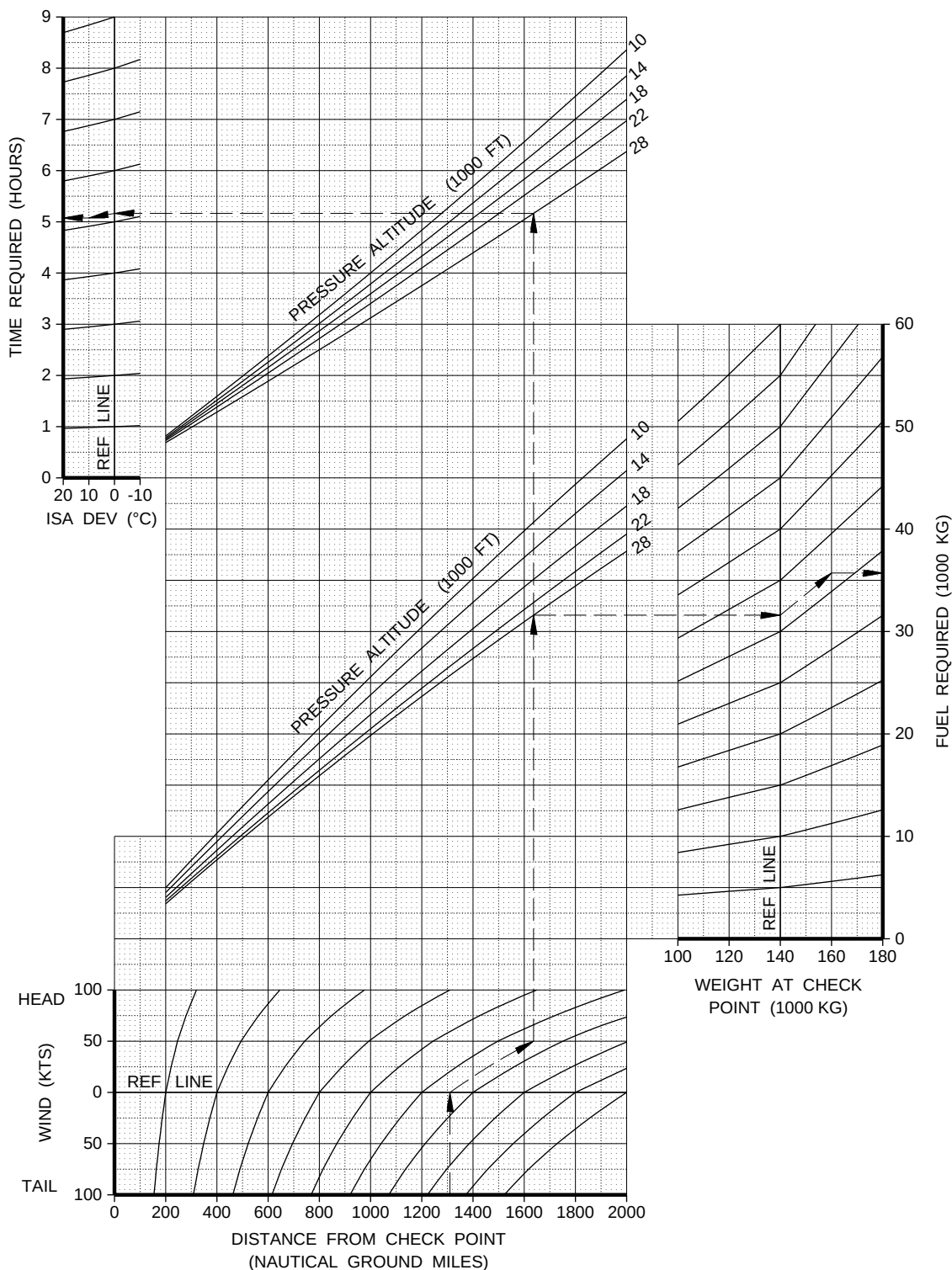
PRESS ALT (1000 FT)	6	7	8	9	10	11
LIMIT EPR	1.35	1.36	1.37	1.38	1.39	1.40
MAX TAT (°C)	29	27	25	23	22	20

Decrease limit EPR by 0.07 per 10°C TAT hotter than table value.
With engine anti-ice on, decrease limit EPR by 0.01.
With engine and wing anti-ice on, decrease limit EPR by 0.03.

GEAR DOWN

Long Range Cruise Enroute Fuel and Time

Based on VREF30 + 70 descent





Flight Planning and Performance Manual

GEAR DOWN

Descent

VREF30 + 70

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)
35000	20	420	76
33000	20	410	72
31000	19	400	68
29000	18	390	65
27000	17	380	60
25000	17	360	56
23000	16	350	52
21000	15	340	48
19000	14	330	44
17000	13	320	40
15000	12	300	36
10000	10	260	26
5000	7	220	16
1500	5	180	10

Allowances for a straight-in approach are included.

Holding

Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
30000	EPR							1.55	1.48	1.41	1.35
	KIAS							207	201	195	189
	FF/ENG							3520	3190	2860	2560
25000	EPR				1.52	1.46	1.41	1.36	1.32	1.28	1.24
	KIAS				226	218	212	207	201	195	189
	FF/ENG				4300	3910	3580	3270	2970	2720	2490
20000	EPR		1.43	1.39	1.35	1.31	1.28	1.25	1.22	1.19	1.17
	KIAS		241	234	226	218	212	207	201	195	189
	FF/ENG		4770	4390	4020	3660	3400	3160	2920	2700	2500
15000	EPR	1.33	1.30	1.27	1.24	1.22	1.20	1.18	1.16	1.14	1.13
	KIAS	249	241	234	226	218	212	207	201	195	189
	FF/ENG	4980	4630	4300	3980	3680	3450	3230	3000	2780	2570
10000	EPR	1.24	1.22	1.20	1.18	1.16	1.15	1.13	1.12	1.11	1.09
	KIAS	249	241	234	226	218	212	207	201	195	189
	FF/ENG	4910	4600	4300	4010	3730	3500	3280	3050	2830	2610
5000	EPR	1.17	1.16	1.15	1.13	1.12	1.11	1.10	1.09	1.08	1.07
	KIAS	249	241	234	226	218	212	207	201	195	189
	FF/ENG	4890	4600	4320	4040	3750	3530	3300	3070	2840	2630
1500	EPR	1.14	1.13	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06
	KIAS	249	241	234	226	218	212	207	201	195	189
	FF/ENG	4930	4640	4360	4080	3790	3560	3320	3100	2880	2670

This table includes 5% additional fuel for holding in a racetrack pattern.

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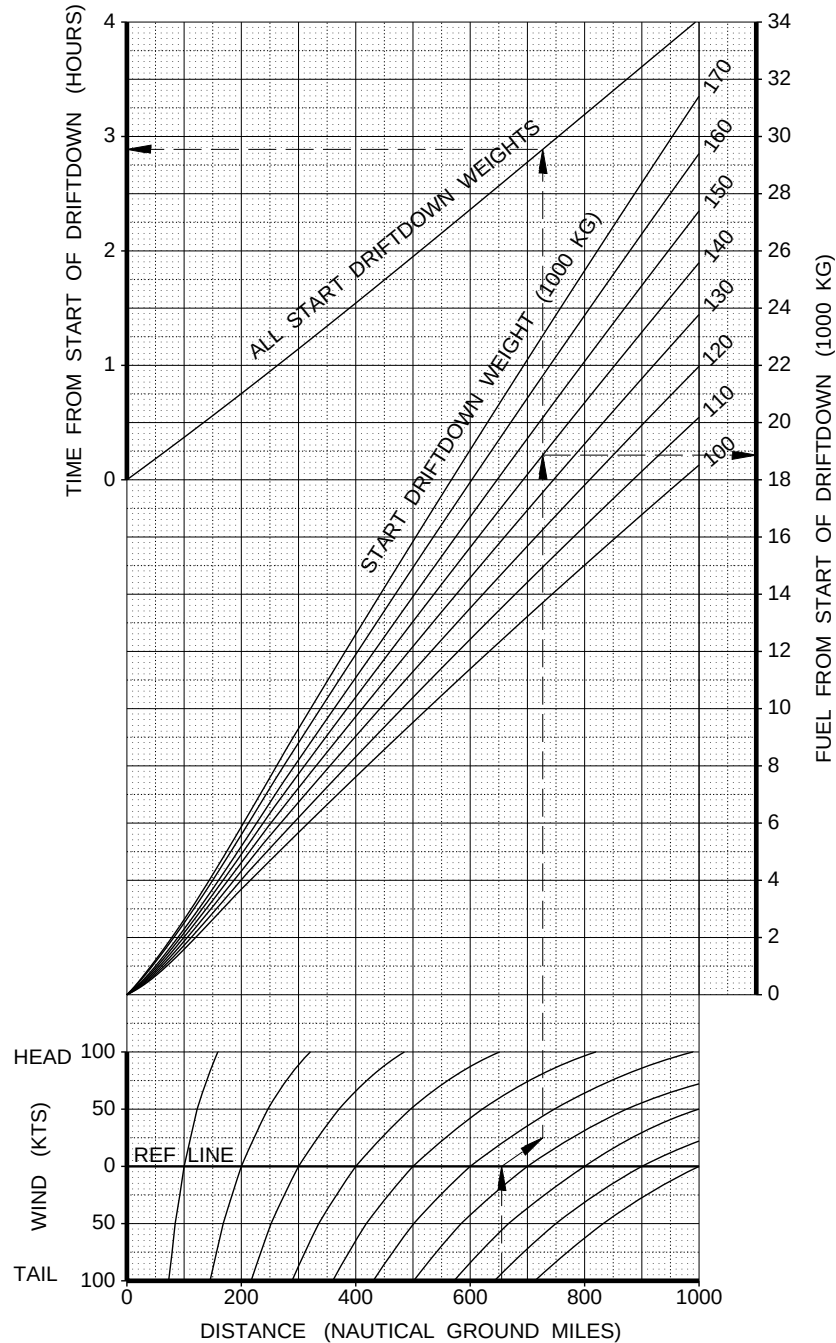
GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown/LRC Cruise Range Capability

Includes APU fuel burn

Driftdown at optimum speed and cruise at Long Range Cruise speed





GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

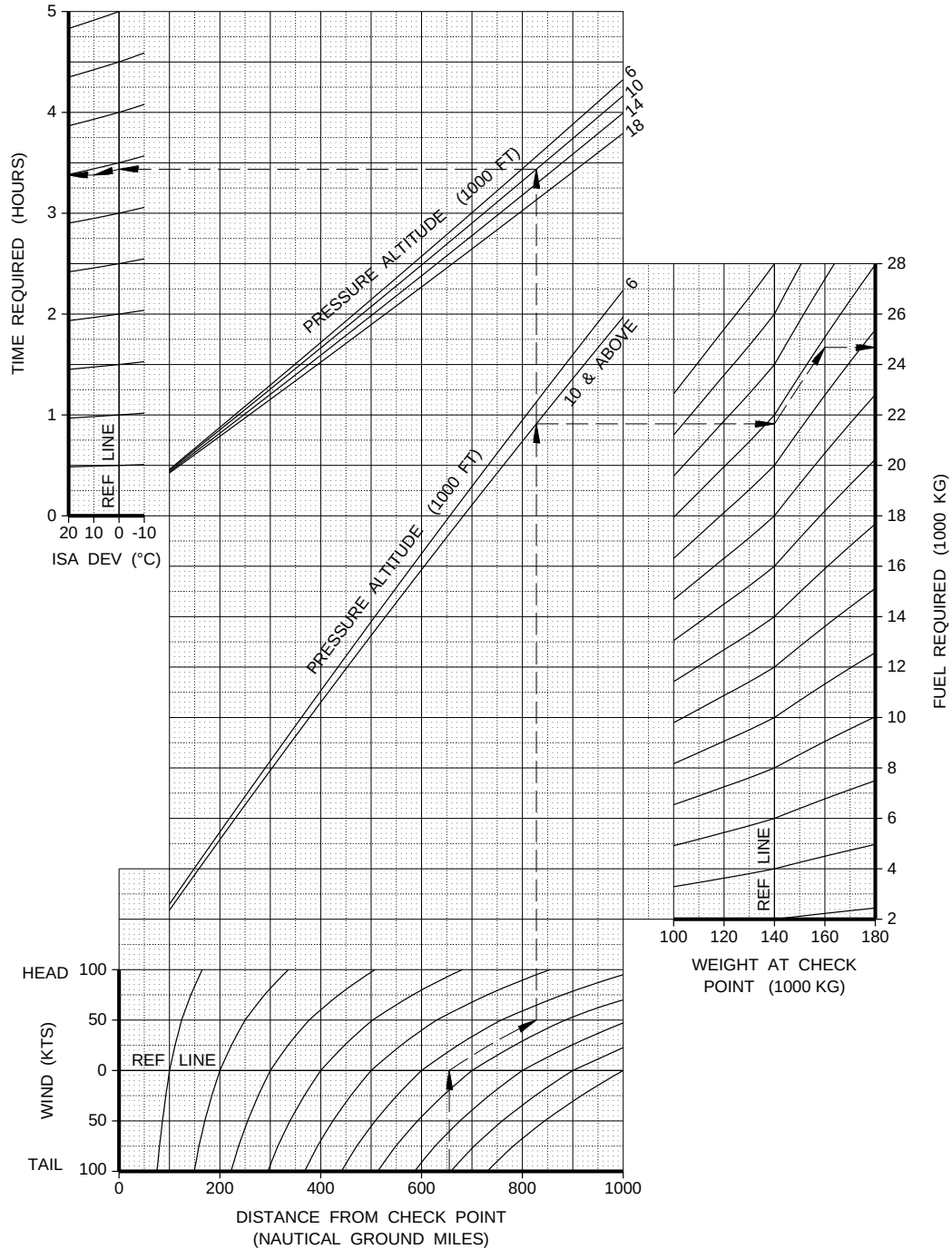
WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
155	3000		
150	4700		
145	6400	3800	
140	8100	5700	3000
135	9800	7500	5000
130	11400	9400	7000
125	12900	11200	8900
120	14400	12900	10800
115	16000	14600	12800
110	17500	16000	14600
105	18800	17500	16100
100	20100	19000	17600
95	21200	20400	19200
90	22300	21700	20700

GEAR DOWN ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on VREF30 + 70 descent and includes APU fuel burn



GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
20000 FT to 15000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
20 (-16)	EPR										1.64
	MAX TAT										1
	KIAS										189
	MACH										0.417
	FF/ENG KTAS										5244 256
19 (-14)	EPR										1.59
	MAX TAT										7
	KIAS										189
	MACH										0.408
	FF/ENG KTAS										5137 252
18 (-12)	EPR									1.64	1.54
	MAX TAT									2	12
	KIAS									195	189
	MACH									0.413	0.400
	FF/ENG KTAS									5742 256	5043 248
17 (-11)	EPR									1.58	1.49
	MAX TAT									7	17
	KIAS									195	189
	MACH									0.405	0.392
	FF/ENG KTAS									5632 252	4973 244
16 (-9)	EPR								1.63	1.53	1.45
	MAX TAT								2	12	
	KIAS								201	195	189
	MACH								0.409	0.397	0.385
	FF/ENG KTAS								6250 255	5541 248	4919 240
15 (-7)	EPR								1.58	1.49	1.42
	MAX TAT								7	17	
	KIAS								201	195	189
	MACH								0.402	0.389	0.377
	FF/ENG KTAS								6154 252	5459 244	4870 236

Max TAT not shown where EPR can be set in ISA + 30°C conditions.
Increase/decrease fuel flow 3% per 10°C above/below standard TAT.
Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Continuous EPR

PRESS ALT (1000 FT)	15	16	17	18	19	20
LIMIT EPR	1.63	1.66	1.68	1.70	1.71	1.73
MAX TAT (°C)	4	2	0	-2	-4	-6

Decrease limit EPR by 0.09 per 10°C TAT hotter than table value.
With engine anti-ice on, decrease limit EPR by 0.02.
With engine and wing anti-ice on, decrease limit EPR by 0.05.

GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table
14000 FT to 9000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
14 (-5)	EPR								1.53	1.45	1.39
	MAX TAT								12	22	
	KIAS								202	196	190
	MACH								0.395	0.383	0.371
	FF/ENG KTAS								6046 248	5416 241	4858 234
13 (-3)	EPR							1.57	1.49	1.43	1.37
	MAX TAT							7	17	26	
	KIAS							209	203	197	191
	MACH							0.402	0.389	0.378	0.366
	FF/ENG KTAS							6720 254	5991 246	5416 239	4874 231
12 (-1)	EPR							1.53	1.46	1.40	1.35
	MAX TAT							12	21		
	KIAS							210	204	198	192
	MACH							0.395	0.384	0.373	0.361
	FF/ENG KTAS							6590 250	5966 243	5408 237	4890 229
11 (1)	EPR							1.49	1.43	1.38	1.33
	MAX TAT							17	25		
	KIAS							211	205	199	192
	MACH							0.389	0.379	0.368	0.356
	FF/ENG KTAS							6529 247	5953 241	5402 234	4894 226
10 (3)	EPR						1.52	1.46	1.41	1.36	1.32
	MAX TAT						13	21	29		
	KIAS						217	212	207	200	193
	MACH						0.394	0.384	0.375	0.363	0.350
	FF/ENG KTAS						7128 252	6489 245	5931 239	5405 232	4900 224
9 (5)	EPR						1.49	1.43	1.38	1.34	1.30
	MAX TAT						18	25	33		
	KIAS						218	213	208	201	194
	MACH						0.389	0.380	0.370	0.358	0.345
	FF/ENG KTAS						7060 249	6482 243	5924 237	5412 230	4911 221

Max TAT not shown where EPR can be set in ISA + 30°C conditions.
Increase/decrease fuel flow 3% per 10°C above/below standard TAT.
Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Continuous EPR

PRESS ALT (1000 FT)	9	10	11	12	13	14
LIMIT EPR	1.52	1.54	1.56	1.58	1.59	1.61
MAX TAT (°C)	16	14	12	10	8	6

Decrease limit EPR by 0.08 per 10°C TAT hotter than table value.
With engine anti-ice on, decrease limit EPR by 0.01.
With engine and wing anti-ice on, decrease limit EPR by 0.03.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
8000 FT to 5000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)									
		190	180	170	160	150	140	130	120	110	100
8 (6)	EPR						1.45	1.41	1.36	1.32	1.28
	MAX TAT						22	29			
	KIAS						220	215	209	202	194
	MACH						0.384	0.375	0.365	0.353	0.339
	FF/ENG KTAS						7032 247	6465 241	5930 235	5422 227	4921 218
7 (8)	EPR					1.48	1.43	1.39	1.34	1.31	1.27
	MAX TAT					19	26	33			
	KIAS					226	221	216	210	203	195
	MACH					0.388	0.380	0.370	0.360	0.348	0.334
	FF/ENG KTAS					7605 250	7025 245	6459 239	5940 232	5434 224	4930 216
6 (10)	EPR					1.45	1.40	1.37	1.33	1.29	1.25
	MAX TAT					23	30	37			
	KIAS					228	223	217	211	203	195
	MACH					0.383	0.375	0.365	0.354	0.342	0.328
	FF/ENG KTAS					7577 248	7003 243	6464 237	5951 230	5446 222	4937 213
5 (12)	EPR					1.42	1.38	1.35	1.31	1.27	1.24
	MAX TAT					27	33	40			
	KIAS					229	224	218	211	204	195
	MACH					0.379	0.370	0.360	0.349	0.337	0.323
	FF/ENG KTAS					7553 246	6995 240	6475 234	5965 227	5457 219	4945 210

Max TAT not shown where EPR can be set in ISA + 30°C conditions.
Increase/decrease fuel flow 3% per 10°C above/below standard TAT.
Increase/decrease KTAS by 1 knot per 1°C above/below standard TAT.

Max Continuous EPR

PRESS ALT (1000 FT)	5	6	7	8
LIMIT EPR	1.46	1.48	1.49	1.51
MAX TAT (°C)	23	22	20	17

Decrease limit EPR by 0.07 per 10°C TAT hotter than table value.
With engine anti-ice on, decrease limit EPR by 0.01.
With engine and wing anti-ice on, decrease limit EPR by 0.03.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Holding
Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)							
		170	160	150	140	130	120	110	100
20000	EPR								1.64
	KIAS								189
	FF/ENG								5510
15000	EPR						1.57	1.49	1.42
	KIAS						201	195	189
	FF/ENG						6440	5730	5110
10000	EPR				1.50	1.44	1.39	1.35	1.31
	KIAS				212	207	201	195	189
	FF/ENG				7260	6610	6010	5480	5000
5000	EPR		1.44	1.40	1.36	1.32	1.29	1.26	1.23
	KIAS		226	218	212	207	201	195	189
	FF/ENG		8190	7460	6910	6400	5900	5430	4980
1500	EPR	1.40	1.36	1.32	1.29	1.27	1.24	1.21	1.19
	KIAS	234	226	218	212	207	201	195	189
	FF/ENG	8600	7960	7350	6850	6370	5900	5440	5000

This table includes 5% additional fuel for holding in a racetrack pattern.

Intentionally
Blank

ALTERNATE EEC MODE

Takeoff Performance

PERFORMANCE LIMIT	WEIGHT ADJUSTMENT (1000 KG)					
	AIRPORT OAT					
	°C	15 & BELOW	20	25	30	33 & ABOVE
	°F	59 & BELOW	68	77	86	91 & ABOVE
FIELD		-12.5	-14.7	-17.1	-19.5	-20.5
CLIMB		-20.0	-21.2	-26.7	-30.2	-31.2
OBSTACLE		-20.2	-23.6	-27.5	-31.4	-33.5

Takeoff Speeds Adjustment

TAKEOFF SPEEDS	TAKEOFF SPEEDS ADJUSTMENTS (KTS)			
	AIRPORT OAT			
	°C	10 & BELOW	20	30 & ABOVE
	°F	50 & BELOW	68	86 & ABOVE
V1 (FLAPS 5)		3	4	5
V1 (FLAPS 15)		3	4	5
V1 (FLAPS 20)		2	3	4
VR		2	2	2
V2		1	1	1

Landing Performance

PERFORMANCE LIMIT	WEIGHT ADJUSTMENT (1000 KG)					
	AIRPORT OAT					
	°C	15 & BELOW	20	25	30	33 & ABOVE
	°F	59 & BELOW	68	77	86	91 & ABOVE
LANDING CLIMB		-19.5	-23.1	-27.4	-31.3	-33.1

Takeoff EPR

Based on engine bleed for packs on, engine anti-ice on or off and wing anti-ice off

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)					
°C	°F	-1000	0	2000	4000	6000	8000
55	131	1.37	1.37	1.36	1.36	1.35	1.36
50	122	1.41	1.41	1.41	1.40	1.40	1.40
45	113	1.43	1.43	1.43	1.43	1.43	1.43
40	104	1.46	1.46	1.46	1.46	1.46	1.46
35	95	1.49	1.49	1.48	1.48	1.48	1.48
30	86	1.51	1.51	1.51	1.51	1.51	1.51
25	77	1.53	1.54	1.54	1.53	1.53	1.54
20	68	1.53	1.56	1.57	1.56	1.56	1.56
15	59	1.53	1.56	1.58	1.59	1.59	1.59
10	50	1.53	1.56	1.58	1.60	1.62	1.62
5	41	1.53	1.56	1.58	1.60	1.62	1.64
0	32	1.53	1.56	1.58	1.60	1.62	1.64

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)					
	-1000	0	2000	4000	6000	8000
PACKS OFF	0.01	0.01	0.01	0.01	0.01	0.01
WING ANTI-ICE ON	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01

ALTERNATE EEC MODE

Go-around EPR

Based on engine bleed for packs on, engine anti-ice on or off and wing anti-ice off

AIRPORT OAT		TAT	AIRPORT PRESSURE ALTITUDE (FT)					
°C	°F	(°C)	-1000	0	2000	4000	6000	8000
55	131	58	1.37	1.36	1.35	1.35	1.35	1.35
50	122	53	1.41	1.40	1.40	1.40	1.40	1.40
45	113	48	1.43	1.43	1.43	1.43	1.43	1.43
40	104	43	1.46	1.46	1.46	1.46	1.46	1.46
35	95	38	1.49	1.49	1.48	1.48	1.48	1.48
30	86	33	1.52	1.52	1.51	1.51	1.51	1.51
25	77	28	1.54	1.55	1.54	1.54	1.54	1.54
20	68	23	1.54	1.57	1.57	1.57	1.57	1.57
15	59	18	1.54	1.57	1.60	1.61	1.60	1.60
10	50	13	1.54	1.57	1.60	1.62	1.63	1.63
5	41	8	1.54	1.57	1.60	1.62	1.63	1.66
0 & BELOW	32 & BELOW	3	1.54	1.57	1.60	1.62	1.63	1.66

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)					
	-1000	0	2000	4000	6000	8000
PACKS OFF	0.01	0.01	0.01	0.01	0.02	0.02
WING ANTI-ICE ON	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02

Go-around %N1

No EPR Available

Based on engine bleed for packs on, engine anti-ice on or off and wing anti-ice off

AIRPORT OAT		TAT	AIRPORT PRESSURE ALTITUDE (FT)					
°C	°F	(°C)	-1000	0	2000	4000	6000	8000
55	131	58	94.6	94.6	94.5	94.5	94.4	94.4
50	122	53	96.3	96.3	96.2	96.1	96.1	96.0
45	113	48	97.2	97.1	97.0	97.0	96.9	96.9
40	104	43	97.8	97.8	97.7	97.6	97.6	97.5
35	95	38	98.4	98.3	98.2	98.2	98.1	98.1
30	86	33	99.0	98.9	98.8	98.8	98.7	98.7
25	77	28	99.3	99.5	99.4	99.4	99.3	99.3
20	68	23	98.2	100.1	100.0	100.0	99.9	99.9
15	59	18	97.4	99.2	100.4	100.8	100.5	100.5
10	50	13	96.6	98.4	99.4	100.5	101.1	101.1
5	41	8	95.7	97.5	98.6	99.5	100.2	101.5
0	32	3	94.9	96.6	97.7	98.6	99.3	100.4
-5	23	-2	94.0	95.7	96.8	97.7	98.4	99.5
-10	14	-7	93.1	94.8	95.9	96.8	97.5	98.6
-15	5	-13	92.1	93.8	94.8	95.7	96.4	97.4
-20	-4	-18	91.2	92.9	93.9	94.7	95.4	96.5
-25	-13	-23	90.3	91.9	92.9	93.8	94.5	95.5
-30	-22	-28	89.4	91.0	92.0	92.9	93.6	94.6
-35	-31	-33	88.5	90.1	91.1	91.9	92.6	93.6
-40	-40	-38	87.5	89.2	90.1	90.9	91.7	92.6
-45	-49	-43	86.6	88.1	89.1	90.0	90.7	91.6
-50	-58	-48	85.7	87.2	88.2	89.0	89.7	90.6

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)					
	-1000	0	2000	4000	6000	8000
PACKS OFF	0.5	0.5	0.6	0.6	0.7	0.7
WING ANTI-ICE ON	-0.5	-0.5	-0.6	-0.6	-0.7	-0.7



ALTERNATE EEC MODE ENGINE INOP

Initial Max Continuous %N1

No EPR Available

Based on engine bleed for one pack on and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT)								
	27	29	31	33	35	37	39	41	43
20	101.3	99.7	98.2	96.6	95.0	94.9	94.8	94.8	94.7
15	102.6	101.1	99.6	98.0	96.4	96.4	96.3	96.2	96.1
10	104.2	102.5	100.9	99.4	97.8	97.8	97.7	97.6	97.5
5	104.7	104.0	102.3	100.7	99.2	99.1	99.0	99.0	98.9
0	103.5	103.7	103.6	102.0	100.5	100.4	100.3	100.3	100.2
-5	102.6	102.6	102.7	102.8	101.4	101.3	101.2	101.1	101.1
-10	101.6	101.6	101.8	101.9	102.1	102.1	102.0	102.0	101.9
-15	100.7	100.6	100.8	100.9	101.0	101.1	101.0	101.0	100.9
-20	99.7	99.7	99.8	99.9	100.0	100.1	100.1	100.0	99.9
-25	98.7	98.7	98.8	98.9	99.0	99.1	99.1	99.0	98.9
-30	97.7	97.7	97.8	97.9	98.0	98.1	98.1	98.0	97.9
-35	96.7	96.7	96.8	96.9	97.0	97.1	97.0	97.0	96.9
-40	95.7	95.6	95.8	95.9	96.0	96.1	96.0	96.0	95.9

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)								
	27	29	31	33	35	37	39	41	43
PACKS OFF	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1.0	1.1
ENGINE ANTI-ICE ON	-1.2	-1.2	-1.3	-1.3	-1.3	-1.4	-1.4	-1.5	-1.6
ENGINE & WING ANTI-ICE ON	-2.9	-2.9	-3.1	-3.1	-3.1	-3.3	-3.4	-3.6	-3.9



ALTERNATE EEC MODE ENGINE INOP

Max Continuous %N1

No EPR Available

Based on engine bleed for one pack on and anti-ice off

37000 FT to 16000 FT Pressure Altitudes

37000 FT PRESS ALT		TAT (°C)											
KIAS	M	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
200	.63	97.3	98.3	99.4	100.4	101.5	101.6	100.6	99.2	98.1	97.0	95.9	94.6
220	.69	96.3	97.3	98.3	99.3	100.3	101.3	100.6	99.8	98.9	97.8	96.7	95.2
240	.75	96.1	97.1	98.1	99.1	100.1	101.3	101.5	100.6	99.6	98.5	97.3	95.8
260	.80	96.1	97.1	98.1	99.1	100.1	101.1	102.1	101.3	100.4	99.1	97.8	96.4
33000 FT PRESS ALT		TAT (°C)											
KIAS	M	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
200	.58	98.1	99.2	100.2	101.2	102.2	102.5	101.4	99.6	98.5	97.4	96.4	95.3
220	.63	97.4	98.4	99.5	100.5	101.5	102.6	102.0	100.4	99.3	98.3	97.2	95.9
240	.68	96.5	97.5	98.5	99.5	100.5	101.6	102.2	101.1	100.2	99.1	98.0	96.6
260	.74	96.2	97.2	98.2	99.2	100.2	101.2	102.3	102.1	101.0	99.9	98.7	97.3
29000 FT PRESS ALT		TAT (°C)											
KIAS	M	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
200	.53	97.8	98.9	99.9	100.9	101.9	103.1	102.1	100.7	99.7	98.7	97.8	97.0
220	.58	98.0	99.1	100.1	101.1	102.1	103.3	103.6	101.8	100.7	99.6	98.6	97.5
240	.63	97.3	98.4	99.4	100.4	101.4	102.4	103.6	102.9	101.6	100.6	99.5	98.3
260	.68	96.6	97.7	98.7	99.7	100.7	101.7	102.7	103.6	102.6	101.6	100.5	99.1
25000 FT PRESS ALT		TAT (°C)											
KIAS	M	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
200	.49	96.5	97.6	98.6	99.6	100.6	101.6	102.5	101.4	100.5	99.6	98.7	98.0
220	.53	96.8	97.8	98.9	99.9	100.9	101.9	103.1	102.9	101.7	100.8	99.8	99.0
240	.58	96.9	97.9	99.0	100.0	101.0	102.0	102.9	103.9	102.8	101.8	100.7	99.7
260	.63	96.8	97.8	98.8	99.9	100.9	101.9	102.8	104.0	104.1	102.9	101.8	100.6
22000 FT PRESS ALT		TAT (°C)											
KIAS	M	-15	-10	-5	0	5	10	15	20	25	30	35	
200	.46	101.0	102.1	102.4	101.3	100.3	99.4	98.5	97.6	96.7	95.9	95.1	
240	.55	101.6	102.6	103.7	103.8	102.6	101.7	100.8	100.0	99.2	98.4	97.7	
280	.63	101.3	102.3	103.3	104.4	104.5	103.3	102.1	101.0	100.2	99.4	98.7	
20000 FT PRESS ALT		TAT (°C)											
KIAS	M	-15	-10	-5	0	5	10	15	20	25	30	35	
200	.44	101.0	101.9	103.0	102.1	101.1	100.2	99.2	98.2	97.3	96.4	95.6	
240	.53	101.5	102.5	103.5	104.4	103.4	102.5	101.7	101.0	100.2	99.4	98.7	
280	.61	101.1	102.1	103.1	104.0	104.9	103.7	102.6	101.7	100.8	100.0	99.3	
18000 FT PRESS ALT		TAT (°C)											
KIAS	M	-15	-10	-5	0	5	10	15	20	25	30	35	
200	.42	100.2	101.1	102.3	102.7	101.6	100.6	99.6	98.5	97.5	96.6	95.8	
240	.51	101.4	102.4	103.4	104.5	104.7	103.6	103.0	102.3	101.6	100.9	100.1	
280	.59	100.7	101.7	102.7	103.6	104.8	104.7	103.5	102.6	101.8	100.9	100.3	
16000 FT PRESS ALT		TAT (°C)											
KIAS	M	-15	-10	-5	0	5	10	15	20	25	30	35	
200	.41	98.7	99.6	100.6	101.7	101.6	100.3	99.2	98.0	97.0	96.1	95.3	
240	.49	100.4	101.3	102.3	103.2	104.3	103.8	103.0	102.3	101.5	100.8	100.0	

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)							
	16	18	20	22	25	29	33	37
PACKS OFF	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.8
ENGINE ANTI-ICE ON	-1.1	-1.2	-1.2	-1.2	-1.2	-1.2	-1.3	-1.4
ENGINE & WING ANTI-ICE ON	-2.6	-2.8	-2.9	-2.9	-2.9	-2.9	-3.1	-3.3

ALTERNATE EEC MODE ENGINE INOP

Max Continuous %N1

No EPR Available

Based on engine bleed for one pack on and anti-ice off

14000 FT to Sea Level Pressure Altitudes

14000 FT PRESS ALT		TAT (°C)										
KIAS	M	-15	-10	-5	0	5	10	15	20	25	30	35
200	.39	97.2	98.1	99.0	99.9	100.9	100.0	98.9	97.6	96.6	95.7	94.9
240	.47	98.0	99.0	99.9	100.8	101.7	102.5	101.6	100.7	99.9	99.1	98.3
280	.54	99.0	99.9	100.9	101.8	102.7	103.8	104.2	103.2	102.5	101.7	100.9
12000 FT PRESS ALT		TAT (°C)										
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40
200	.38	96.7	97.6	98.5	99.5	100.1	98.8	97.6	96.5	95.6	94.8	94.2
240	.45	96.8	97.7	98.6	99.5	100.6	100.6	99.4	98.5	97.7	96.9	96.2
10000 FT PRESS ALT		TAT (°C)										
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40
200	.36	95.3	96.2	97.1	98.0	99.1	98.9	97.6	96.5	95.6	94.8	94.1
240	.43	94.9	95.8	96.7	97.5	98.4	99.4	98.5	97.5	96.7	95.9	95.2
8000 FT PRESS ALT		TAT (°C)										
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40
200	.35	93.9	94.8	95.6	96.5	97.4	98.4	97.6	96.4	95.5	94.7	94.0
240	.42	93.1	94.0	94.8	95.7	96.6	97.5	98.0	96.9	96.0	95.2	94.5
6000 FT PRESS ALT		TAT (°C)										
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40
200	.34	92.5	93.4	94.2	95.1	95.9	96.8	97.5	96.4	95.5	94.6	93.9
240	.40	91.6	92.5	93.3	94.2	95.0	95.9	96.9	96.8	95.6	94.9	94.2
4000 FT PRESS ALT		TAT (°C)										
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40
200	.32	91.2	92.0	92.9	93.7	94.6	95.4	96.4	96.6	95.4	94.6	93.9
240	.39	90.4	91.2	92.1	92.9	93.7	94.6	95.4	96.3	95.6	94.8	94.2
2000 FT PRESS ALT		TAT (°C)										
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40
200	.31	89.9	90.8	91.6	92.5	93.3	94.1	94.9	95.9	95.6	94.5	93.8
240	.38	89.2	90.1	90.9	91.8	92.6	93.4	94.2	95.0	95.7	94.8	94.1
0 FT PRESS ALT		TAT (°C)										
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40
200	.30	87.4	88.2	89.1	89.9	90.7	91.5	92.3	93.1	93.9	93.1	92.4
240	.36	86.9	87.7	88.5	89.3	90.1	90.9	91.7	92.5	93.4	93.5	92.6

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)							
	0	2	4	6	8	10	12	14
PACKS OFF	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ENGINE ANTI-ICE ON	-0.6	-0.7	-0.8	-0.9	-0.9	-0.9	-1.0	-1.0
ENGINE & WING ANTI-ICE ON	-1.5	-1.7	-1.9	-2.0	-2.1	-2.1	-2.3	-2.4

Intentionally
Blank