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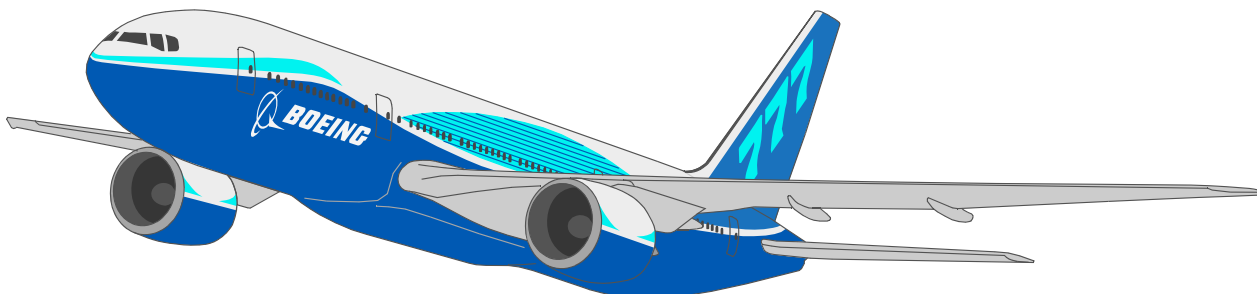
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BMS FPPM REVO



FLIGHT PLANNING AND PERFORMANCE MANUAL



777-200ER

GE90-94B

FAA

KG/°C/M

OPTIONS

Crew Oxygen / 2 Bottles

Derate TO1-10%

Derate TO2-20%

Gear Down Dispatch

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FLIGHT OPERATIONS ENGINEERING

BOEING COMMERCIAL AIRPLANE GROUP

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Preface

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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 D632W005-WY084.

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	December 19, 2008	
2	December 10, 2010	

No.	Revision Date	Date Filed
1	December 11, 2009	

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.

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Preface

List of Effective Pages

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FPPM	
* Title Page	December 10, 2010
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* 0.TOC.0.1-2	December 10, 2010
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* 4.3.1-14	December 10, 2010
* 4.4.1-6	December 10, 2010
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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.

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TAKEOFF AND LANDING

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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 correction. 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 correction 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.

Field Length 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 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 for a given flap position is zero slope and wind. To determine the field length limit brake release weight, enter the appropriate chart for the desired flap position at 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, correct for slope and wind, then 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 to account for the appropriate engine bleed configuration.

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 the appropriate flap position chart with OAT, move vertically to airport pressure altitude and read the climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate engine bleed configuration.

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 correct for OAT as necessary. Repeat this procedure to correct 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 to account for the appropriate engine bleed configuration.

Tire Speed Limit

Maximum tire speed limited weights for 235MPH tires are not limiting. Therefore, no data is presented.

Brake Energy Limit

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 field 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. 235 MPH tire speed data with improved climb is not limiting. Therefore, no data is presented.

To determine the maximum allowable climb weight improvement and associated takeoff speed increments, enter the appropriate chart for the desired flap position and runway condition at the left horizontal scale with the weight difference (field 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 for normal climb limit weight. The horizontal lines indicate the maximum climb weight improvement for normal climb limited weights. These values are based on the maximum allowable improved climb for each flap position. The improved climb weight is the normal climb weight plus the climb weight improvement. Apply the associated takeoff speed increments to the normal speeds for the improved climb weight. Brake Energy Limits should be checked.

Slush/Standing Water

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 assume 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 Determination:

1. Determine the dry field/obstacle limit weight for the takeoff flap setting.
2. Enter the Weight Adjustment table with the dry 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. 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 the “poor” data reflects a runway 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 as well as FMC computed takeoff speeds can be used for all performance conditions except where adjustments must be made to V1 for clearway, stopway, brake deactivation, improved climb, contaminated runway situations, unbalanced for brake energy or obstacle clearance with unbalanced V1. These speeds may be used for weights less than or equal to the performance limited weight.

The FMC will protect for minimum control speeds by increasing V1, VR and V2 as required. However, the FMC will not compute takeoff speeds for weights where the required speed increase exceeds the maximum certified speed increase. This typically occurs at full rated thrust and light weights. In this case, the message "V SPEEDS UNAVAILABLE" will appear on the FMC scratchpad and the takeoff speed entries will be blank. Takeoff is not permitted in this condition as certified limits have been exceeded. The options are to select a smaller flap setting, select derate thrust and/or add weight (fuel). Selecting derate thrust is the preferred method as this will reduce the minimum control speeds. Note that the assumed temperature method may not help

this condition as the minimum control speeds are determined at the actual temperature and therefore are not reduced.

Normal takeoff speeds, V1, VR, and V2 are read from the table by entering with takeoff flap setting and brake release weight. Use the tables provided to correct takeoff speeds for altitude and actual temperature or assumed temperature for reduced thrust takeoffs. Slope and wind corrections to V1 are obtained by entering the Slope and Wind V1 Adjustment Table.

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 on the takeoff speeds page are provided for guidance when more precise data is unavailable.

Minimum Control Speeds

Regulations prohibit scheduling takeoff with a V1 less than the minimum V1 for control on the ground, V1(MCG). It is therefore necessary to compare the adjusted V1 to V1(MCG). To find V1(MCG), enter the V1(MCG) table with airport pressure altitude and actual OAT. If the adjusted V1 is less than V1(MCG), set V1 equal to V1(MCG). If the adjusted 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 weight adjustment is required provided that the field length available exceeds the minimum field length required shown on the Field Length Limit charts.

Minimum V2

Minimum takeoff safety speeds (V2) are provided for each certified takeoff flap setting. The speeds presented in this table can be used to ensure an adequate margin between the normal operating speed and the in-air minimum control speed is maintained for directional control with high thrust asymmetry during a light weight takeoff.

Data are presented as a function of airport pressure altitude and are valid for all temperatures. To obtain the proper V2 speed for takeoff, first determine the normal takeoff V2 using the takeoff speeds tables provided, adjusted for pressure altitude, temperature, and VR correction (if applicable). Compare this V2 with the minimum V2 determined by entering the table with airport pressure altitude and takeoff flaps setting. If the

calculated V2 is less than the minimum V2, set V2 equal to minimum V2 and determine a new VR by adding the difference between calculated V2 and minimum V2 to the original VR obtained from the V1, VR, V2 Adjustments table or Minimum VR table (if applicable).

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 limited weight by 5400 kg and the V1 associated with the reduced weight by two knots. With two brakes deactivated, reduce the normal runway limited weight by 9150 kg and the V1 associated with the reduced weight by four knots for a dry runway. If the resulting V1 is less than minimum V1, takeoff is permitted with V1 set equal to V1(MCG) provided the dry accelerate stop distance corrected for wind and slope exceeds approximately 1790m for one brake deactivated or 1890m for two brakes deactivated.

For brake(s) 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 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 from the Airplane Flight Manual may yield a less restrictive penalty.

Takeoff %N1

To find Max Takeoff %N1 based on normal engine bleed for air conditioning (2 bleeds/2 packs) enter Max Takeoff %N1 Table with airport pressure altitude and airport OAT and read %N1. For packs off or wing anti-ice operation, apply the %N1 correction shown below the table. No takeoff %N1 correction is required for engine anti-ice.

Stab Trim Setting

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

Takeoff Derates

This section contains tabulated takeoff weight penalties, thrust setting, takeoff speeds and stabilizer trim setting for takeoff at derated engine ratings. Derate 1 (TO1) and Derate 2 (TO2).

Takeoff Performance (TO1 and TO2)

Takeoff limit weights are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. Weights are shown for takeoff field, takeoff climb and takeoff obstacle weights. Each full rated thrust limiting weight must be adjusted for derate operation and then the most restrictive weight used for planning.

Slush/Standing Water

Slush/standing water runway limit weight and V1 speed adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. The procedures for determining contaminated runway limit weight and speeds are the same as those discussed for full rated thrust. Adjustments are applied to the derated thrust dry runway limits.

Slippery Runway

Slippery runway limit weight and V1 speed adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. The procedures for determining slippery runway limit weight and speeds are the same as those discussed for full rated thrust. Adjustments are applied to the derated thrust dry runway limits.

Takeoff Speeds

Balanced takeoff speeds V1, VR and V2 reflecting the FMC display are presented for TO1 or TO2 derated thrust. Speeds may require correction for the effects of minimum control speeds.

Minimum Control Speeds, Stab Trim

Tables of minimum control speed V1(MCG) and stabilizer trim setting are provided for TO1 or TO2 thrust levels as appropriate.

Brakes Deactivated

Takeoff field length/obstacle weight and V1 speed adjustments are the same as those shown previously in this chapter for full rated takeoff.

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 field limit chart with field length available, correct for runway condition and wind. Proceed vertically to the airport pressure altitude and read the field length

limit weight at the right. Adjust the field length limit weight according to the notes below the chart to account for the appropriate brake configuration.

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 climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate engine bleed configuration. When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, make the appropriate ice correction as shown on the chart.

Go-Around Climb Gradient

To determine go-around climb gradient, enter the chart with airport OAT and pressure altitude and then proceed vertically to find airplane weight. Continue down the chart to the proper airspeed in terms of deviation from VREF, following the reference lines as appropriate. Read the go-around climb gradient directly from the chart and then apply the necessary corrections for A/C and icing conditions as noted. Note that data is for one engine inoperative.

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. For brakes deactivated, reduce the maximum quick turnaround weight by the amount shown on the chart. As an alternate procedure, if the BRAKE TEMP advisory message on EICAS is not displayed 10 to 15 minutes after parking, then no waiting period is required.

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 Weight table takes precedence over the 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. If operating with one brake

deactivated increase the brake energy per brake by 10 percent. If operating with two brakes deactivated increase the brake energy per brake by 20 percent. 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, corrected for wind, then vertically downwards correcting 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 wind, airport pressure altitude and OAT corrections.

The chart is based on a rejected takeoff with maximum manual braking effort. Make the corrections 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. An EICAS advisory message, BRAKE TEMP, will appear when any brake registers 5.0 or higher on the EICAS indication and disappear as the hottest brake cools with an EICAS indication of 3.5. Note that even without an EICAS advisory message, brake cooling is recommended.

CAT III Automatic Landing

The following advisory information is presented 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. These values are actual landing distances and do not include the 1.67 regulatory factor. Therefore, they cannot be used to determine the dispatch required landing field length.

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.

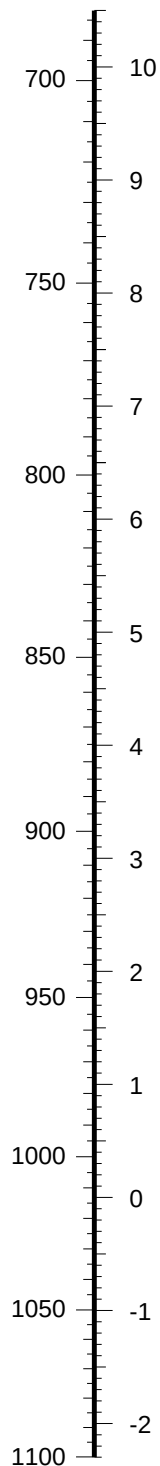
When landing on slippery runways or runways contaminated with ice, snow, slush, or standing water, the reported braking action must be considered. If the surface is affected by water, snow, or ice, and the braking action is reported as "good", conditions should not be expected to be as good as on clean, 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

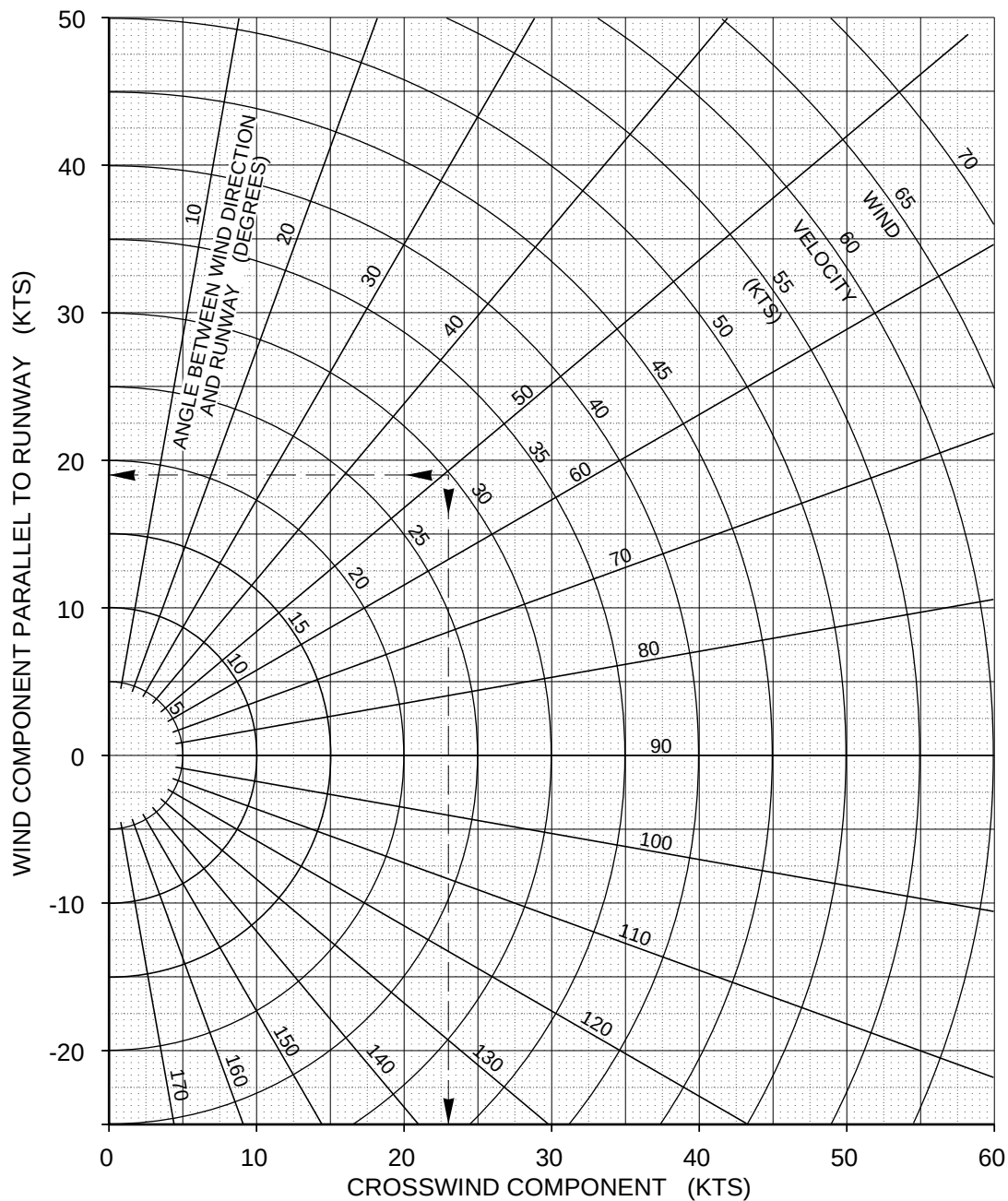


QNH to Pressure Altitude

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

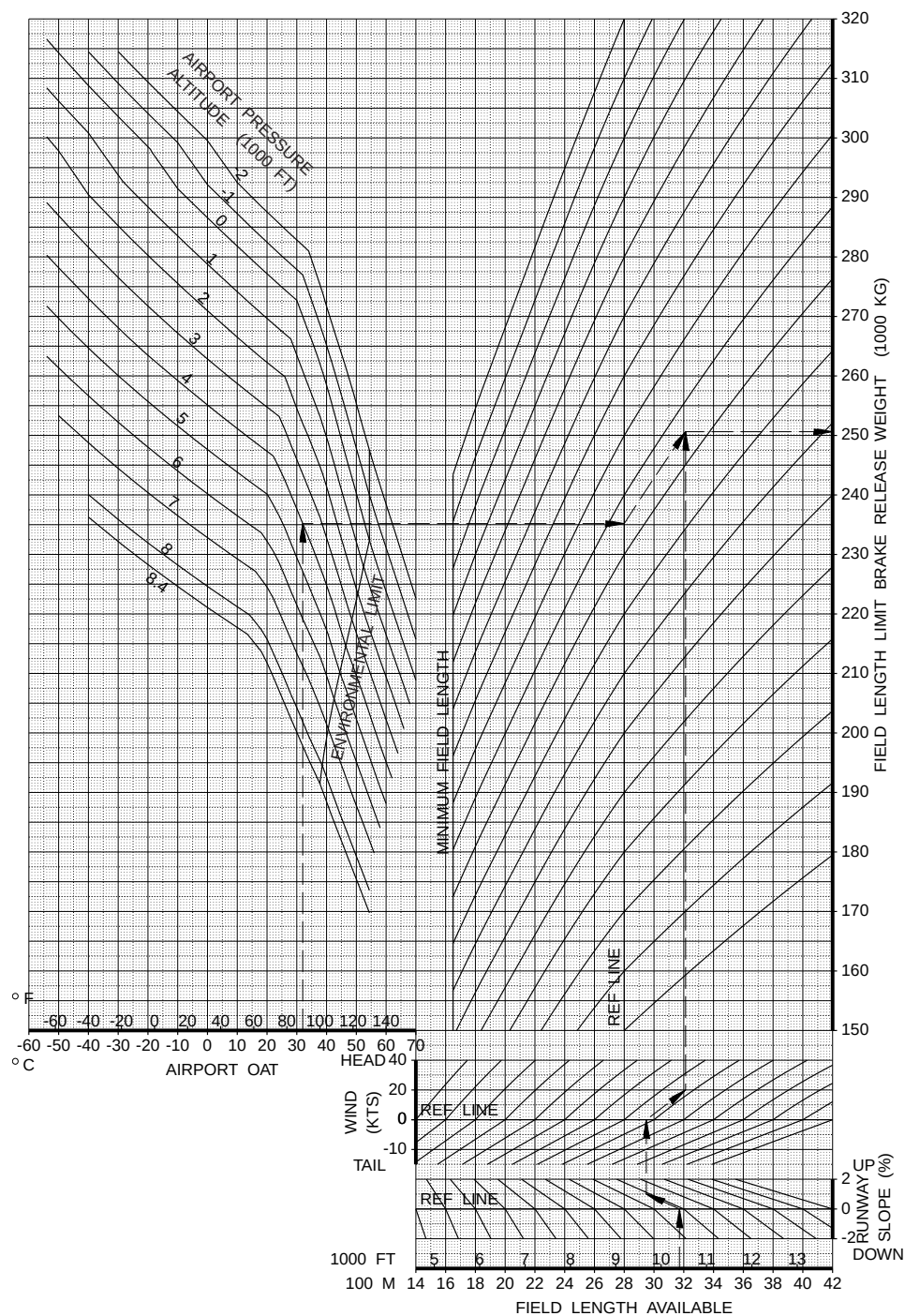
Wind Component



Takeoff Field Limit

Flaps 5

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

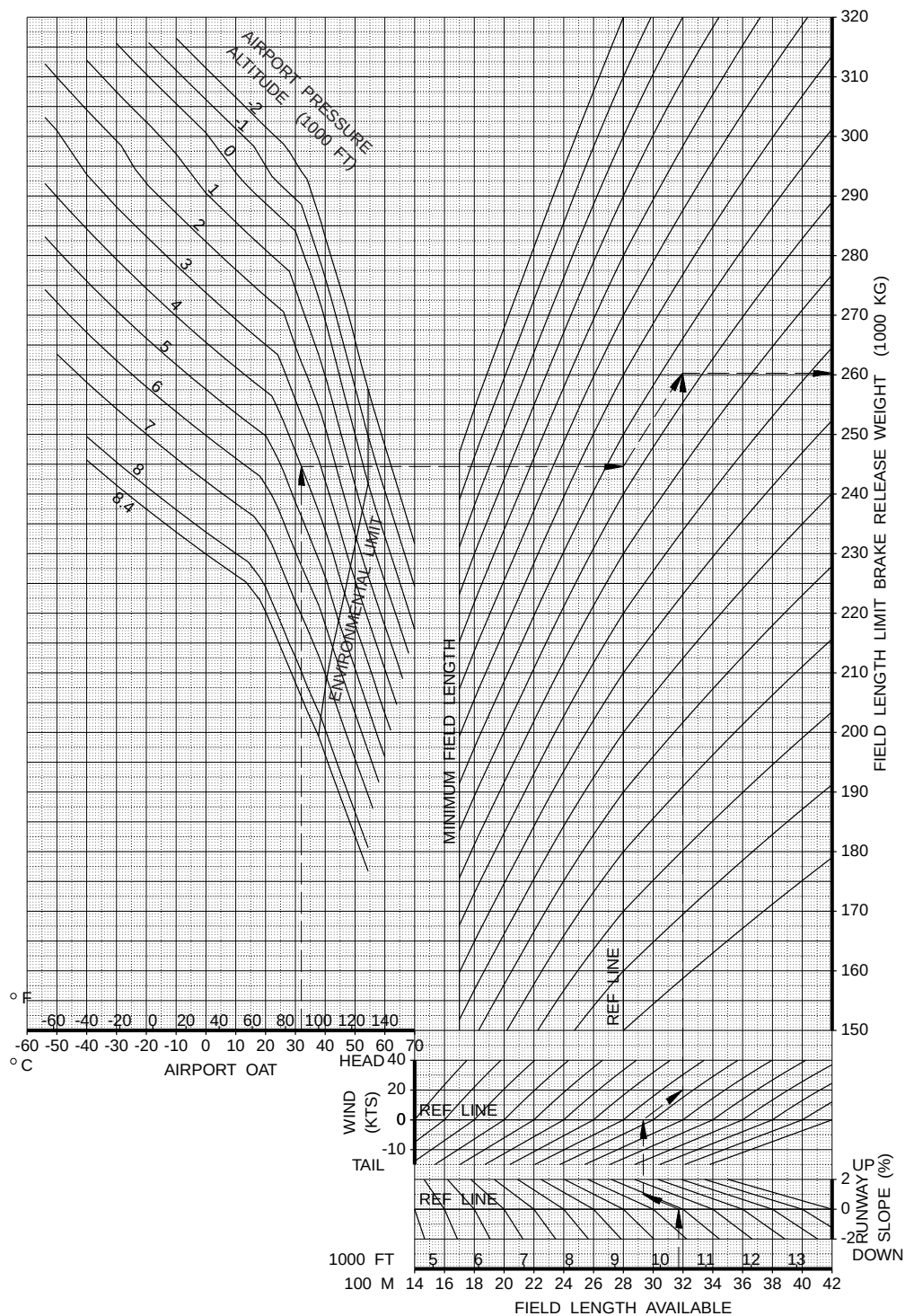


With engine bleed for packs off, increase weight by 800 kg.
With engine and wing anti-ice on, decrease weight by 1000 kg.

Takeoff Field Limit

Flaps 15

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

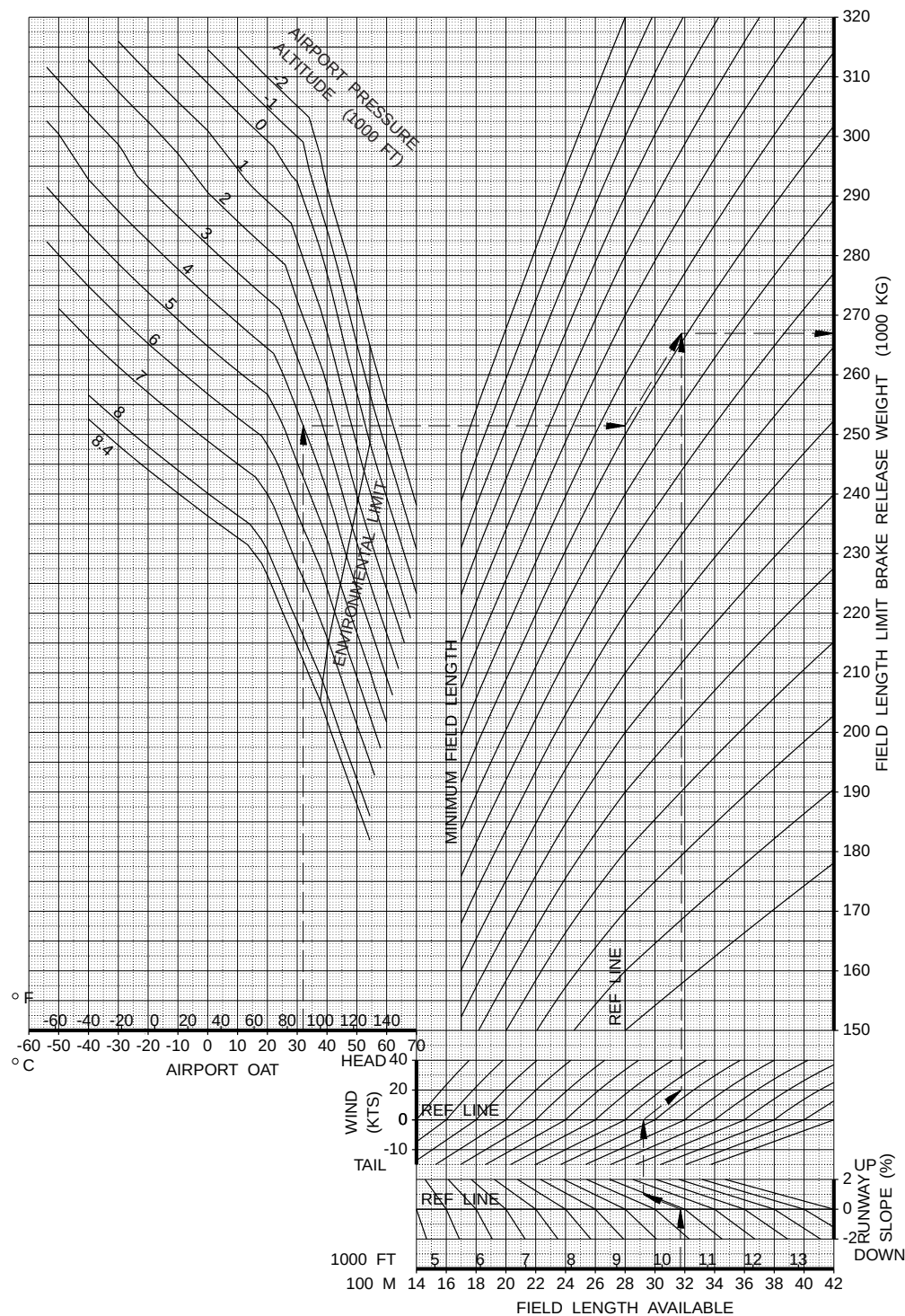


With engine bleed for packs off, increase weight by 800 kg.
With engine and wing anti-ice on, decrease weight by 1000 kg.

Takeoff Field Limit

Flaps 20

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

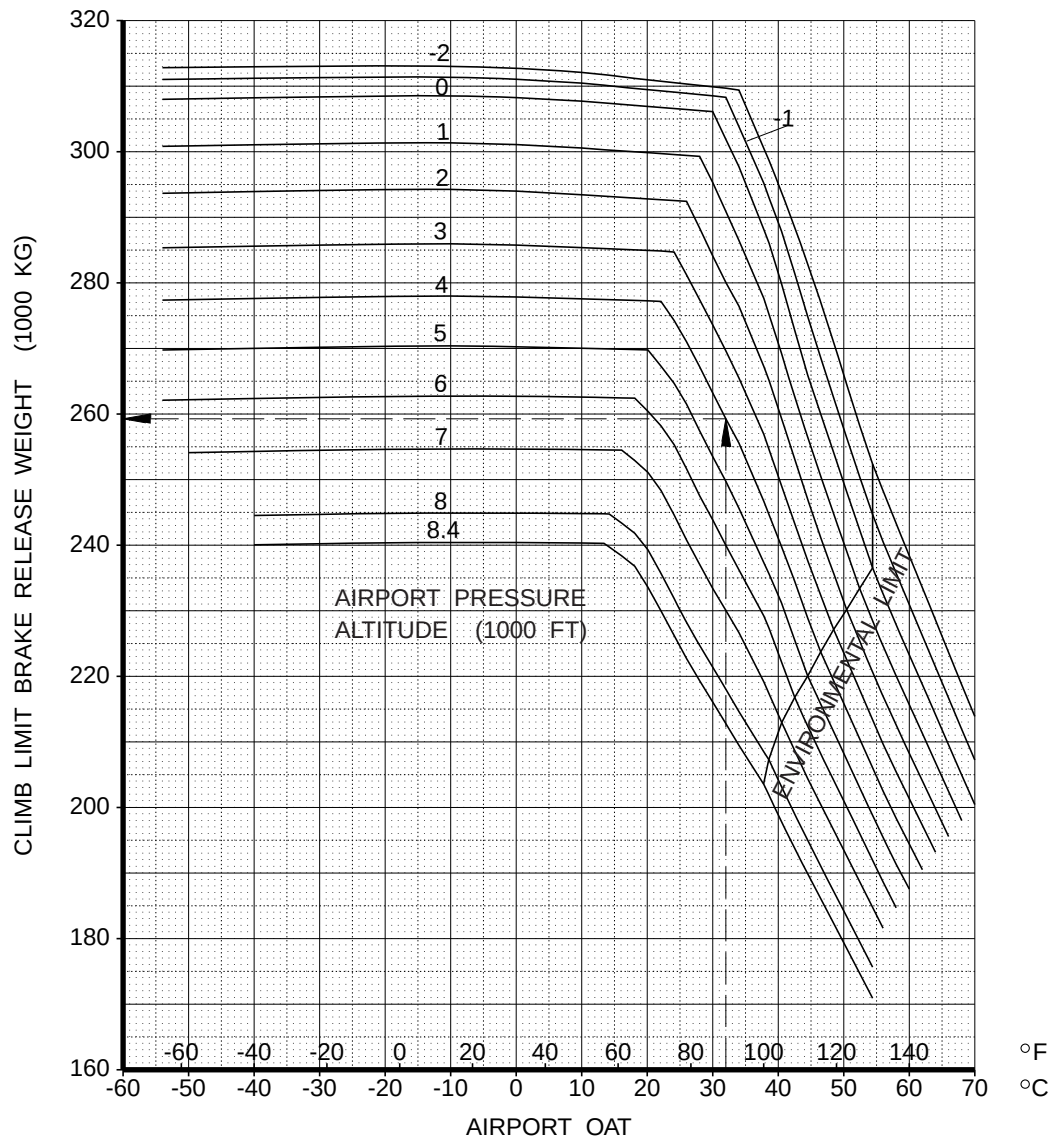


With engine bleed for packs off, increase weight by 800 kg.
With engine and wing anti-ice on, decrease weight by 1000 kg.

Takeoff Climb Limit

Flaps 5

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

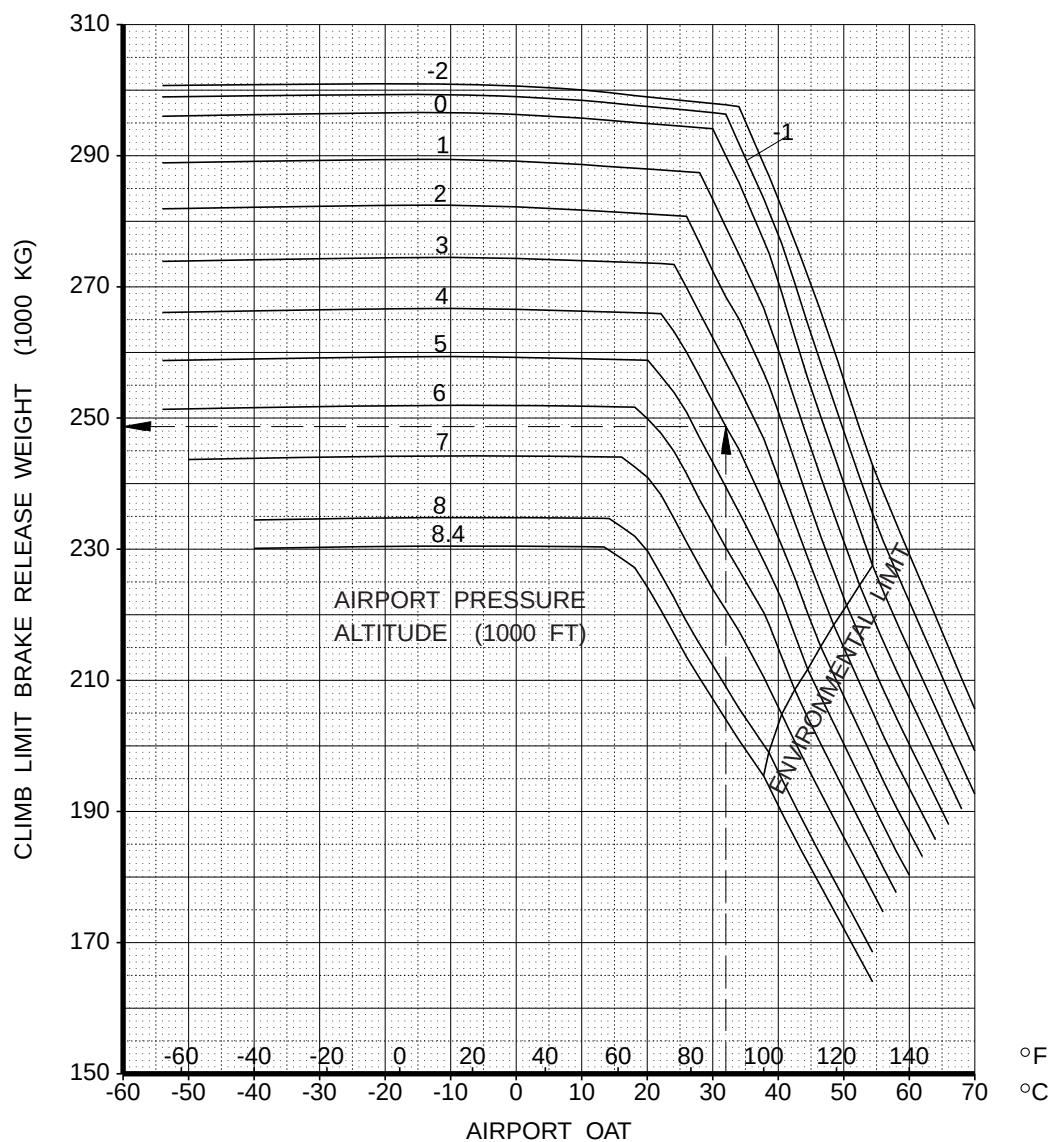


With engine bleed for packs off, increase weight by 2200 kg.
With engine and wing anti-ice on, decrease weight by 2100 kg.

Takeoff Climb Limit

Flaps 15

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

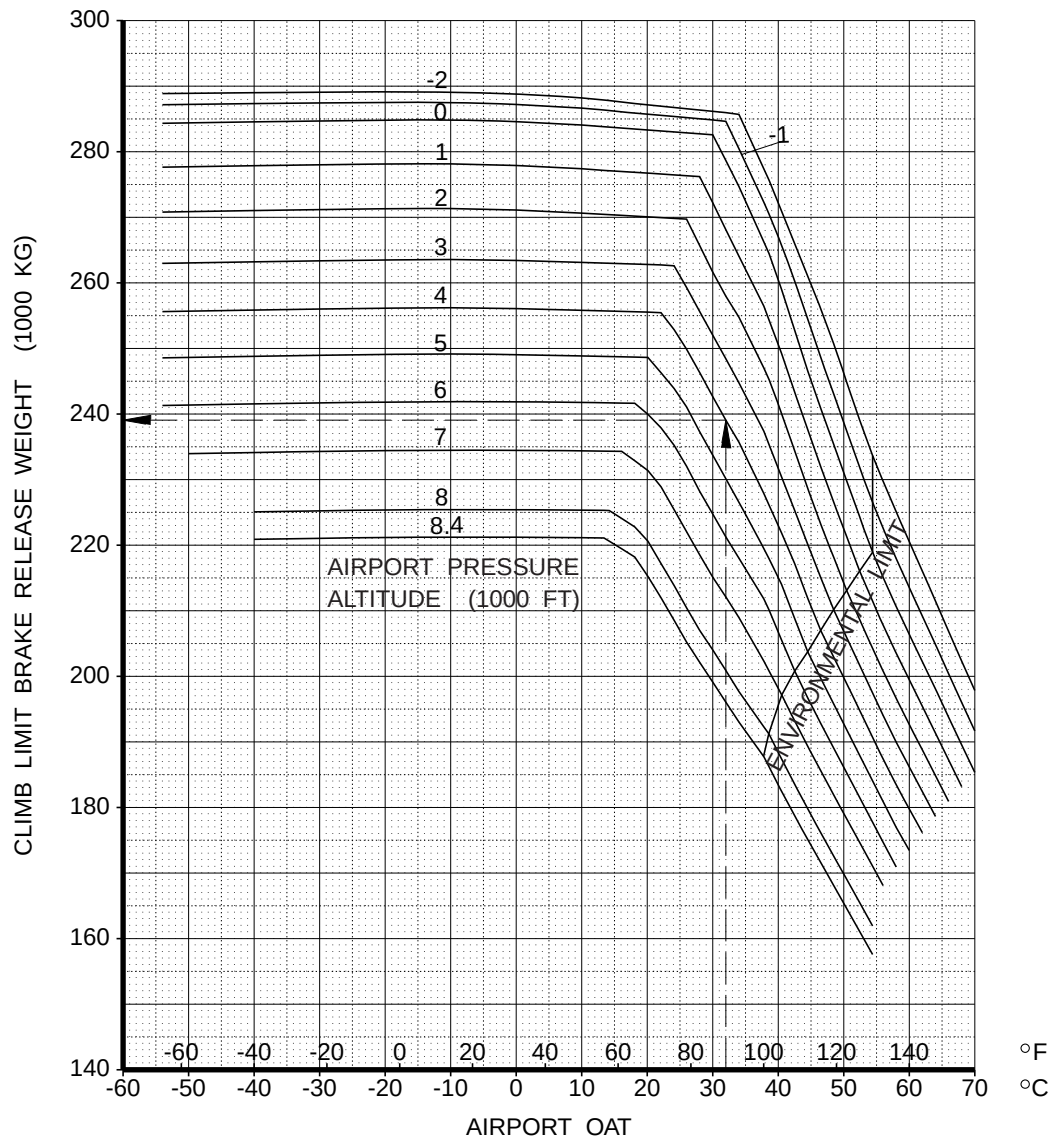


With engine bleed for packs off, increase weight by 2100 kg.
With engine and wing anti-ice on, decrease weight by 2050 kg.

Takeoff Climb Limit

Flaps 20

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

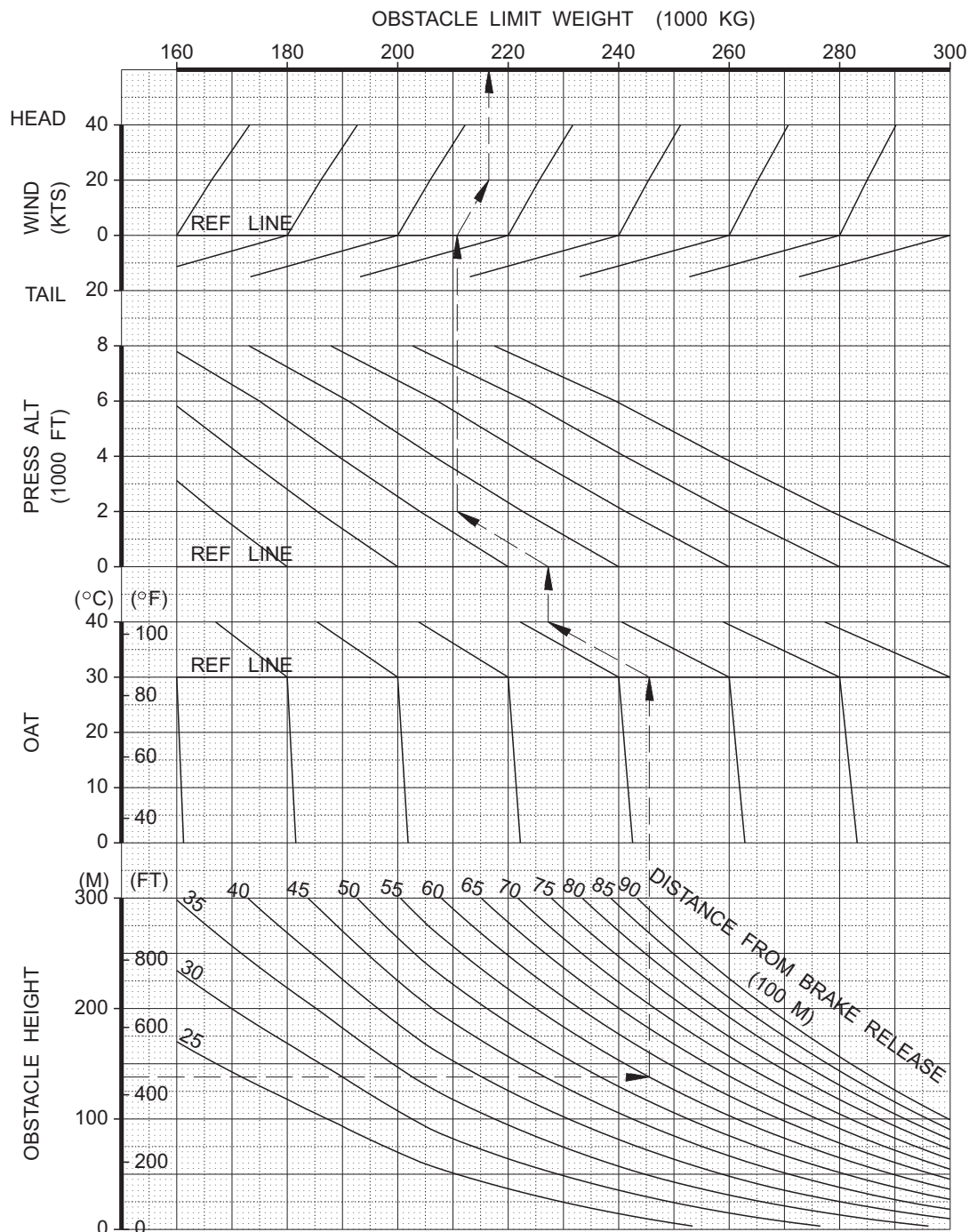


With engine bleed for packs off, increase weight by 2000 kg.
With engine and wing anti-ice on, decrease weight by 1900 kg.

Obstacle Limit

Flaps 5

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



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

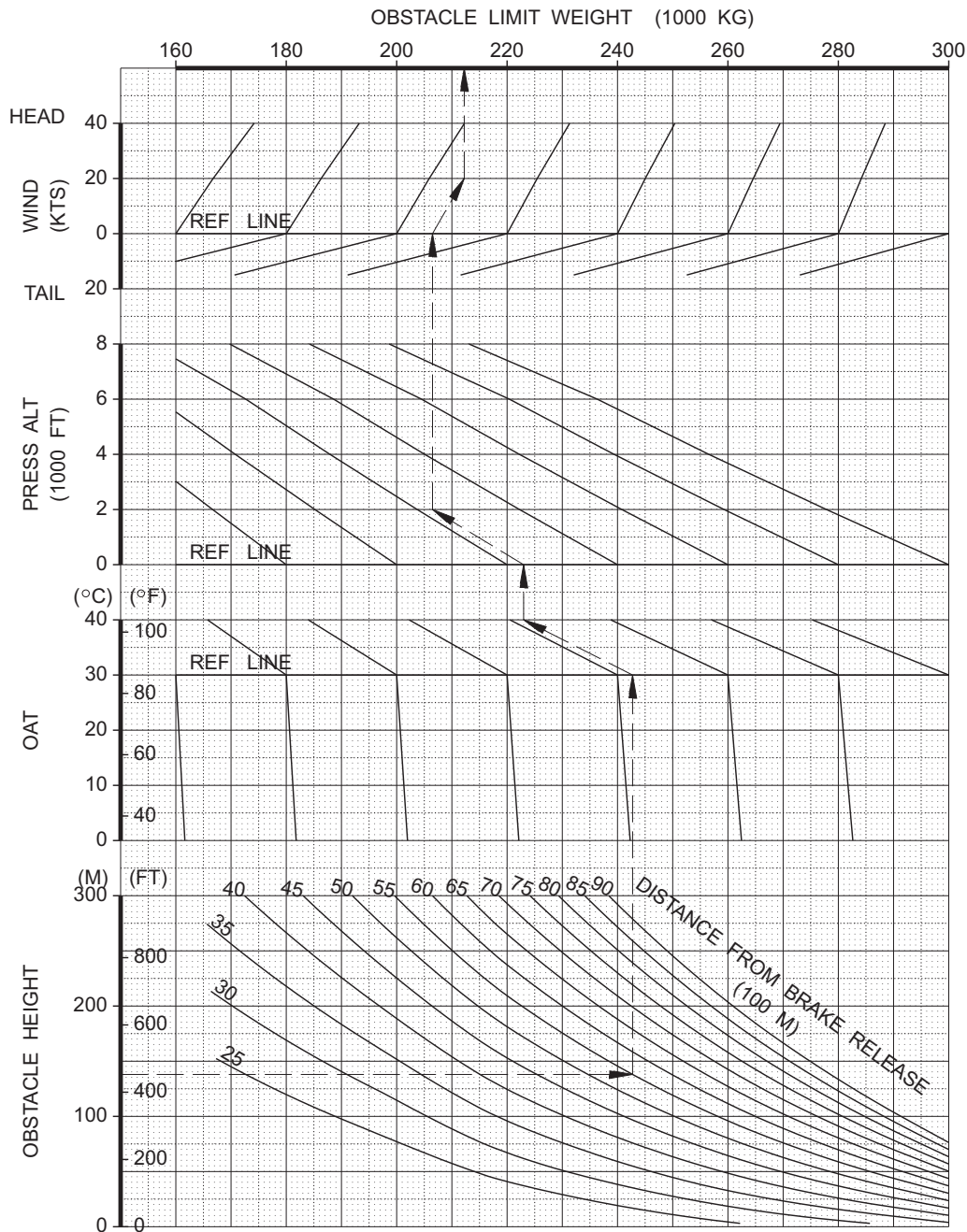
With engine bleed for packs off, increase weight by 1050 kg.

With engine and wing anti-ice on, decrease weight by 2150 kg.

Obstacle Limit

Flaps 15

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



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

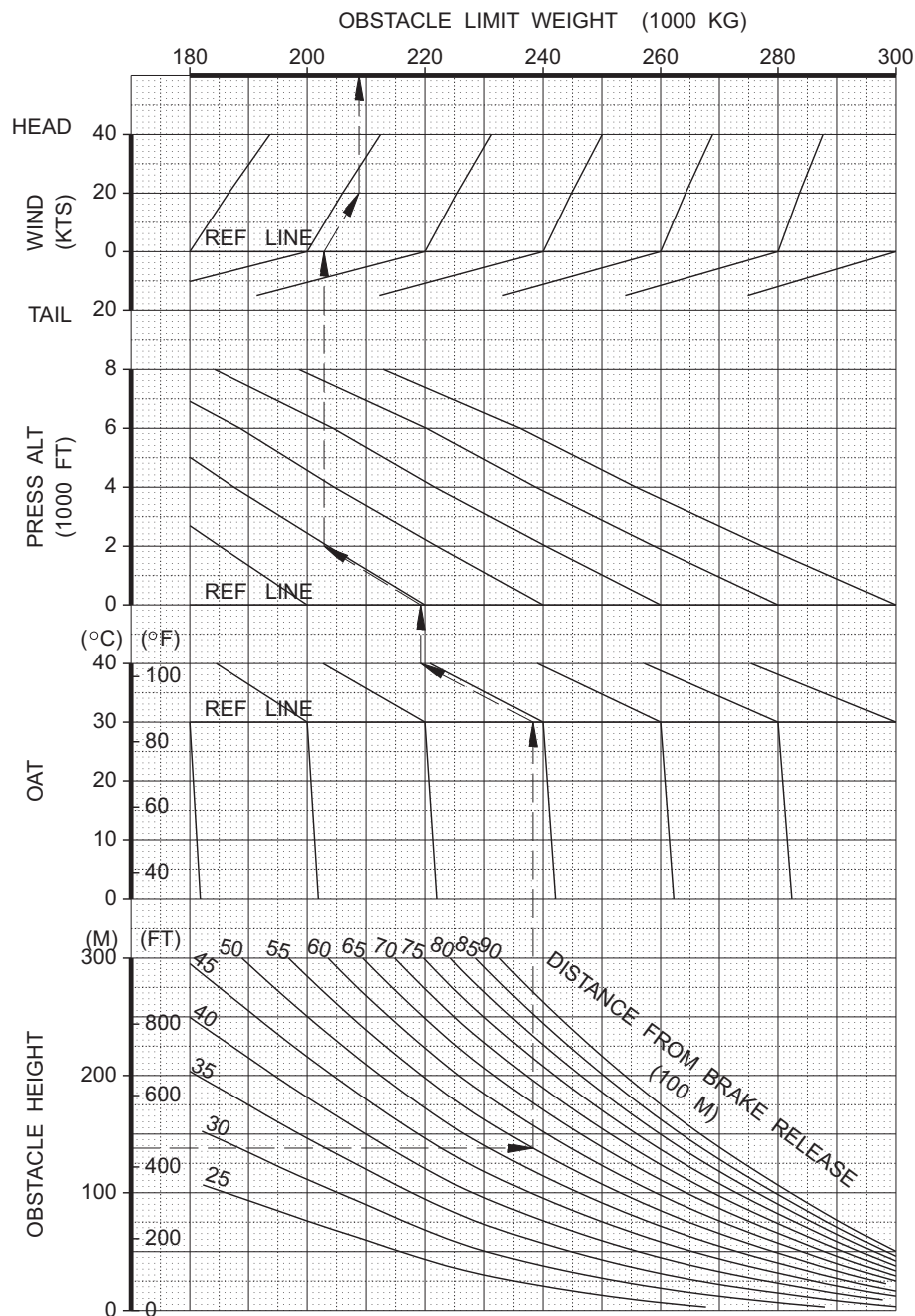
With engine bleed for packs off, increase weight by 1050 kg.

With engine and wing anti-ice on, decrease weight by 2150 kg.

Obstacle Limit

Flaps 20

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

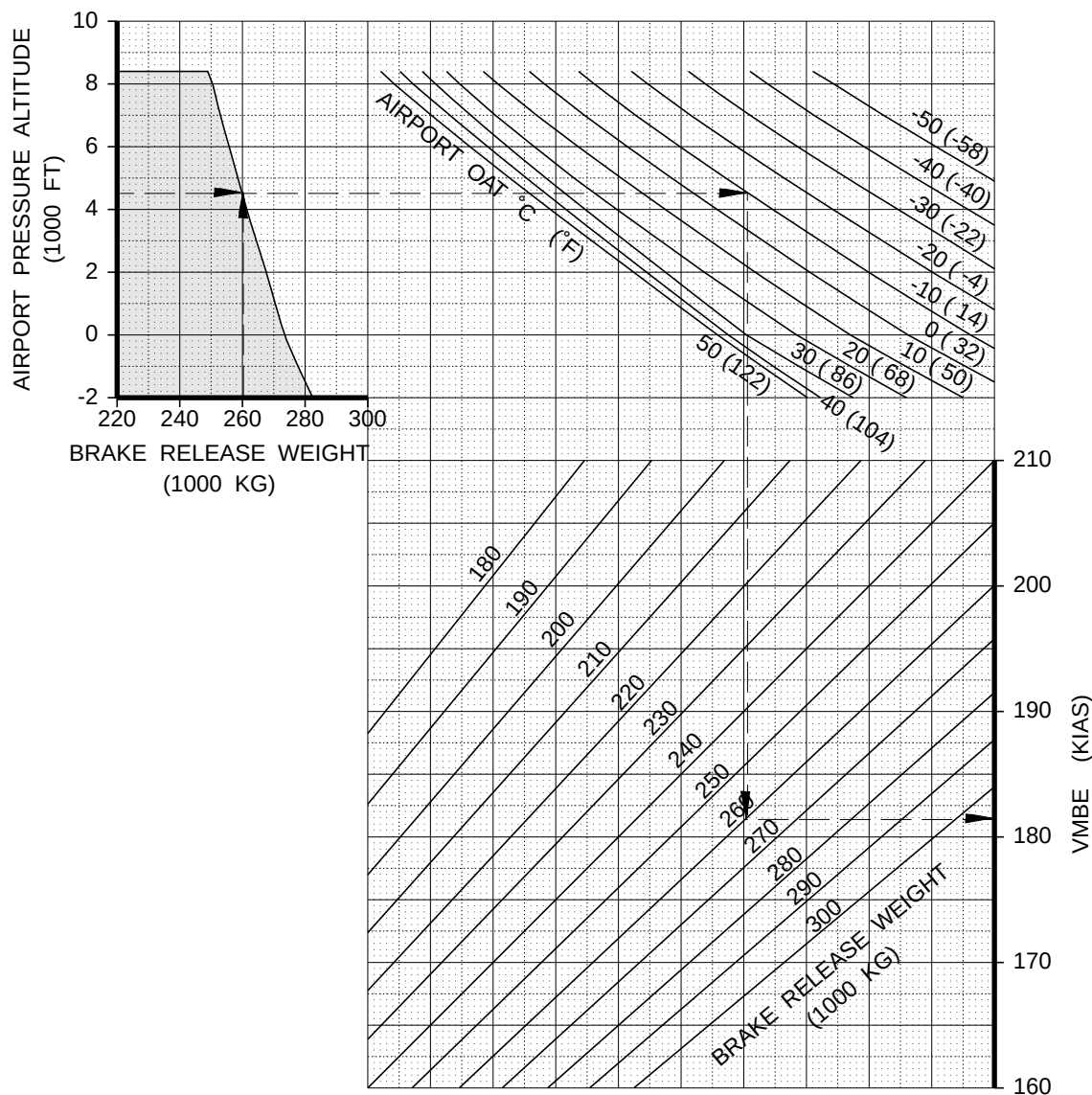


Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.

With engine bleed for packs off, increase weight by 1050 kg.

With engine and wing anti-ice on, decrease weight by 2150 kg.

Brake Energy Limit VMBE



Check VMBE when outside shaded area, operating with tailwind, or using improved climb.

Adjust VMBE for slope, wind and brake configuration.

Increase VMBE by 3 knots for 1% uphill runway slope. Decrease VMBE by 5 knots for 1% downhill runway slope.

Increase VMBE by 5 knots for 10 knots headwind. Decrease VMBE by 21 knots for 10 knots tailwind.

Decrease VMBE by 11 knots for one brake deactivated and 22 knots for two brakes deactivated.

Normal takeoff:

Decrease brake release weight by 1800 kg for each knot V1 exceeds VMBE.

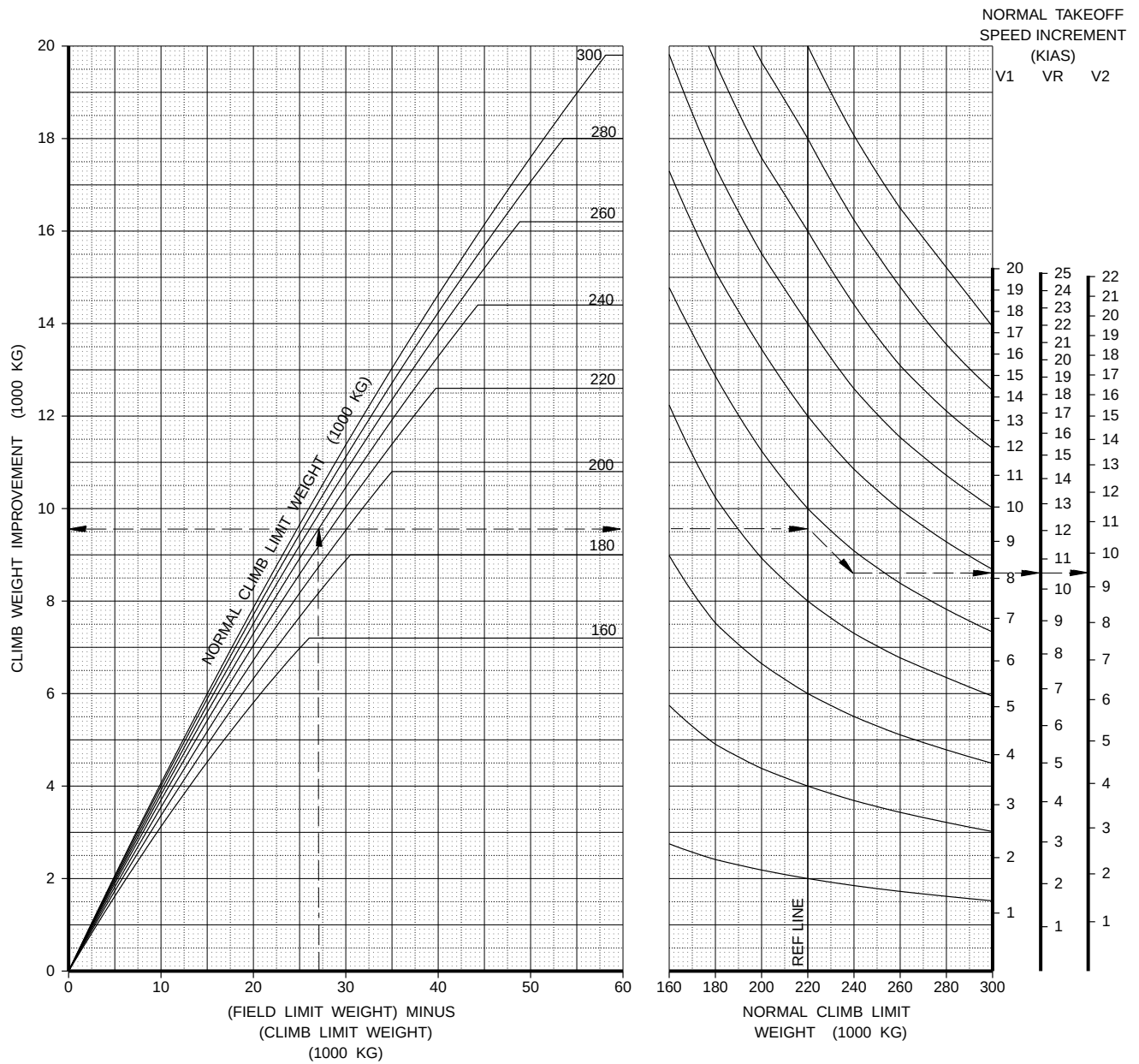
Determine normal V1, VR, V2 speeds for lower brake release weight.

Improved climb takeoff:

Decrease climb weight improvement by 700 kg for each knot V1 exceeds VMBE.

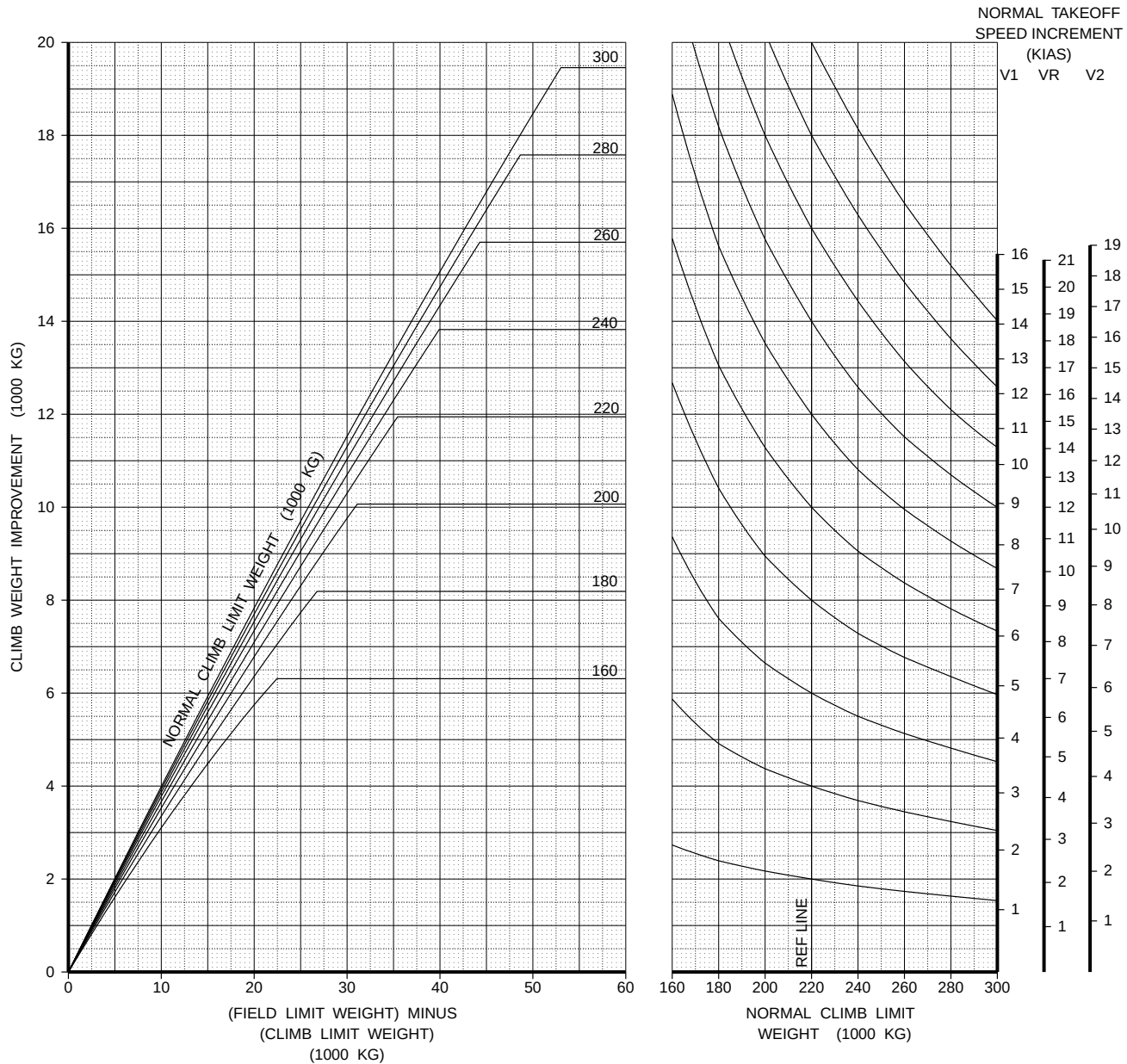
Determine V1, VR, V2 speed increments for the lower climb weight improvement.

Improved Climb Flaps 5



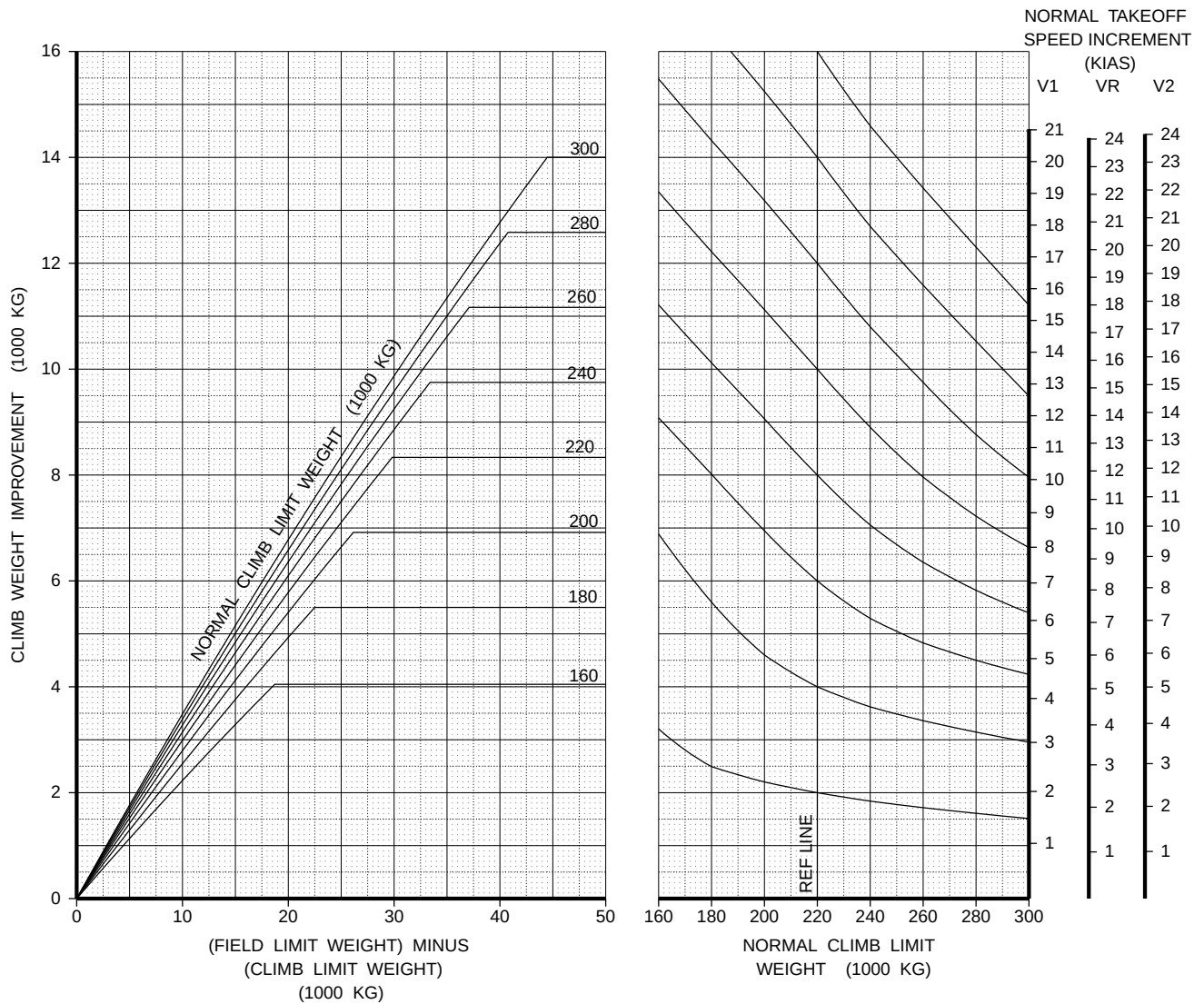
235 mph tire speeds are not limiting.

Improved Climb Flaps 15



235 mph tire speeds are not limiting.

Improved Climb Flaps 20



235 mph tire speeds are not limiting.

ADVISORY INFORMATION

Slush/Standing Water Takeoff

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
380	-48.3	-53.6	-58.9	-57.4	-62.7	-67.9	-75.5	-80.8	-86.0
360	-44.1	-49.4	-54.6	-52.1	-57.3	-62.6	-68.1	-73.4	-78.7
340	-39.9	-45.1	-50.4	-46.8	-52.0	-57.3	-60.8	-66.1	-71.3
320	-35.6	-40.9	-46.2	-41.4	-46.7	-51.9	-53.5	-58.7	-64.0
300	-31.5	-36.8	-42.1	-36.3	-41.5	-46.8	-46.4	-51.6	-56.9
280	-27.9	-33.2	-38.4	-31.8	-37.0	-42.3	-40.1	-45.4	-50.6
260	-24.7	-30.0	-35.3	-27.9	-33.2	-38.4	-34.7	-40.0	-45.2
240	-22.1	-27.3	-32.6	-24.7	-30.0	-35.2	-30.2	-35.5	-40.7
220	-19.9	-25.1	-30.4	-22.2	-27.4	-32.7	-26.5	-31.8	-37.1
200	-18.1	-23.4	-28.6	-20.3	-25.5	-30.8	-23.7	-29.0	-34.3
180	-16.9	-22.1	-27.4	-19.0	-24.3	-29.5	-21.8	-27.1	-32.3
160	-16.1	-21.4	-26.6	-18.4	-23.7	-28.9	-20.8	-26.0	-31.3

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2200							142.5		
2400	132.4			148.3			175.6	133.3	
2600	167.1	122.7		183.2	138.6		209.8	166.3	124.0
2800	202.1	157.4		218.6	173.4	128.9	245.7	200.1	157.0
3000	237.8	192.3	147.6	254.6	208.6	163.6	283.2	235.5	190.5
3200	274.1	227.7	182.4	291.3	244.5	198.7	322.9	272.5	225.4
3400	311.1	263.9	217.7	328.6	281.0	234.4	363.2	311.6	262.0
3600	348.5	300.7	253.7	366.1	318.1	270.7	403.6	351.9	300.4
3800	386.0	338.0	290.3	403.6	355.6	307.7		392.3	340.6
4000		375.5	327.6		393.1	345.1			381.0

1. Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -45 m/+40 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
320	-22	-20	-18	-17	-15	-13	-7	-5	-3
300	-23	-21	-19	-18	-16	-14	-8	-6	-4
280	-24	-22	-20	-20	-18	-16	-10	-8	-6
260	-26	-24	-22	-21	-19	-17	-12	-10	-8
240	-27	-25	-23	-24	-22	-20	-15	-13	-11
220	-29	-27	-25	-26	-24	-22	-19	-17	-15
200	-30	-28	-26	-28	-26	-24	-22	-20	-18
180	-31	-29	-27	-29	-27	-25	-24	-22	-20
160	-33	-31	-29	-30	-28	-26	-24	-22	-20

- 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). V1 not to exceed VR.

ADVISORY INFORMATION

Slush/Standing Water Takeoff No Reverse Thrust Weight Adjustment (1000 KG)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
320	-49.1	-55.3	-61.5	-55.7	-61.8	-68.0	-70.0	-76.2	-82.3
300	-42.5	-48.7	-54.8	-47.5	-53.7	-59.8	-58.1	-64.3	-70.5
280	-37.5	-43.6	-49.8	-41.4	-47.6	-53.7	-49.6	-55.8	-61.9
260	-34.1	-40.2	-46.4	-37.4	-43.5	-49.7	-44.4	-50.6	-56.7
240	-32.3	-38.4	-44.6	-35.4	-41.6	-47.8	-42.5	-48.7	-54.9
220	-32.1	-38.3	-44.4	-35.5	-41.7	-47.9	-44.0	-50.1	-56.3
200	-33.6	-39.7	-45.9	-37.7	-43.9	-50.1	-48.8	-55.0	-61.1
180	-36.6	-42.8	-49.0	-42.0	-48.2	-54.3	-56.9	-63.1	-69.3
160	-41.3	-47.5	-53.7	-48.4	-54.5	-60.7	-68.4	-74.6	-80.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
3200							152.6		
3400							192.7		
3600				152.1			234.2	124.6	
3800	138.2			195.3			277.3	204.8	136.3
4000	182.7			238.6	154.2		322.2	246.7	176.1
4200	227.1	128.5		281.8	197.5		367.8	290.3	217.0
4400	271.6	173.0		325.1	240.7	156.4	413.4	335.6	259.4
4600	316.1	217.5		368.3	284.0	199.7		381.2	303.5
4800	360.5	261.9	163.3	411.5	327.2	242.9			349.0
5000	405.0	306.4	207.8		370.5	286.1			394.6
5200		350.8	252.2		413.7	329.4			
5400		395.3	296.7			372.6			
5600			341.1			415.8			
5800			385.6						

1. Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust 3 mm depth field length available by -100 m/+95 m for every 5°C above/below 4°C.
Adjust 6 mm depth field length available by -90 m/+85 m for every 5°C above/below 4°C.
Adjust 13 mm depth field length available by -75 m/+70 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
300	-37	-33	-29	-30	-26	-22	-15	-11	-7
280	-38	-34	-30	-33	-29	-25	-19	-15	-11
260	-40	-36	-32	-35	-31	-27	-23	-19	-15
240	-42	-38	-34	-38	-34	-30	-28	-24	-20
220	-45	-41	-37	-41	-37	-33	-33	-29	-25
200	-47	-43	-39	-44	-40	-36	-37	-33	-29
180	-49	-45	-41	-47	-43	-39	-40	-36	-32
160	-52	-48	-44	-49	-45	-41	-42	-38	-34

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). V1 not to exceed VR.

ADVISORY INFORMATION

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

DRY 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
380	0.0	-1.3	-2.5	-13.1	-14.3	-15.6	-40.4	-41.7	-42.9
360	0.0	-1.3	-2.5	-14.0	-15.2	-16.5	-38.5	-39.8	-41.0
340	0.0	-1.3	-2.5	-14.9	-16.1	-17.4	-36.6	-37.9	-39.2
320	0.0	-1.3	-2.5	-15.8	-17.0	-18.3	-34.7	-36.0	-37.3
300	0.0	-1.3	-2.5	-16.6	-17.8	-19.1	-32.8	-34.1	-35.3
280	0.0	-1.3	-2.5	-16.9	-18.2	-19.4	-30.8	-32.1	-33.3
260	-0.9	-2.1	-3.4	-16.8	-18.1	-19.3	-28.7	-30.0	-31.3
240	-2.1	-3.4	-4.7	-16.2	-17.5	-18.7	-26.5	-27.8	-29.1
220	-2.9	-4.2	-5.5	-15.2	-16.4	-17.7	-24.3	-25.6	-26.8
200	-3.3	-4.6	-5.8	-13.7	-15.0	-16.2	-21.9	-23.2	-24.5
180	-3.2	-4.5	-5.8	-11.7	-13.0	-14.3	-19.5	-20.8	-22.1
160	-2.7	-4.0	-5.2	-9.3	-10.6	-11.9	-17.0	-18.3	-19.5

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1600	122.9								
1800	199.1	129.5							
2000	271.1	205.4	136.0						
2200	339.4	277.1	211.7	137.7					
2400	406.9	345.2	283.1	191.0	122.8				
2600		412.7	351.0	244.9	176.0				
2800			418.4	299.6	229.7	161.1	122.5		
3000				354.8	284.2	214.6	156.6		
3200				410.1	339.3	268.8	191.0	124.2	
3400					394.6	323.8	226.2	158.3	
3600						379.1	262.3	192.7	125.8
3800							299.4	227.9	160.0
4000							337.4	264.1	194.4

1. Enter Weight Adjustment table with reported braking action and dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -45 m/+40 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+60 m 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
320	-4	-2	0	-15	-13	-11	-30	-28	-26
300	-5	-3	-1	-17	-15	-13	-33	-31	-29
280	-7	-5	-3	-19	-17	-15	-36	-34	-32
260	-8	-6	-4	-22	-20	-18	-39	-37	-35
240	-10	-8	-6	-24	-22	-20	-42	-40	-38
220	-11	-9	-7	-26	-24	-22	-45	-43	-41
200	-13	-11	-9	-29	-27	-25	-48	-46	-44
180	-15	-13	-11	-31	-29	-27	-51	-49	-47
160	-16	-14	-12	-34	-32	-30	-55	-53	-51

- 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). V1 not to exceed VR.



Flight Planning and Performance Manual

ADVISORY INFORMATION

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

DRY 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
320	-4.1	-5.2	-6.3	-29.9	-31.0	-32.1	-50.3	-51.4	-52.5
300	-4.5	-5.6	-6.7	-27.8	-28.9	-29.9	-44.9	-46.0	-47.1
280	-5.4	-6.5	-7.6	-26.4	-27.5	-28.6	-41.1	-42.2	-43.2
260	-6.8	-7.8	-8.9	-25.8	-26.8	-27.9	-38.6	-39.7	-40.8
240	-8.6	-9.7	-10.7	-25.9	-27.0	-28.1	-37.7	-38.8	-39.9
220	-10.8	-11.9	-13.0	-26.8	-27.8	-28.9	-38.2	-39.3	-40.3
200	-13.6	-14.6	-15.7	-28.4	-29.5	-30.5	-40.1	-41.2	-42.3
180	-16.7	-17.8	-18.9	-30.7	-31.8	-32.9	-43.5	-44.6	-45.7
160	-20.4	-21.5	-22.6	-33.9	-35.0	-36.0	-48.4	-49.5	-50.6

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
2000	118.1								
2200	259.0	155.5							
2400	343.4	278.7	189.8						
2600		359.7	297.0						
2800			375.9						
3200				231.9					
3400				320.1	211.9				
3600				391.4	308.6	187.5			
3800					380.1	296.5			
4000						368.8			
5000							219.1		
5200							307.7		
5400							366.5		
5600								277.3	
5800								340.9	
6000								399.3	235.8

1. Enter Weight Adjustment table with reported braking action and dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -35 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -55 m/+50 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+85 m 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
300	-9	-5	-1	-26	-22	-18	-52	-48	-44
280	-11	-7	-3	-29	-25	-21	-56	-52	-48
260	-13	-9	-5	-33	-29	-25	-61	-57	-53
240	-15	-11	-7	-36	-32	-28	-66	-62	-58
220	-18	-14	-10	-40	-36	-32	-72	-68	-64
200	-20	-16	-12	-44	-40	-36	-77	-73	-69
180	-22	-18	-14	-48	-44	-40	-83	-79	-75
160	-24	-20	-16	-53	-49	-45	-88	-84	-80

- 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). V1 not to exceed VR.

Takeoff Speeds**V1, VR, V2 for Max Takeoff Thrust**

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
300	159	167	172	152	159	165	148	154	161
290	156	164	171	150	157	164	145	152	159
280	154	162	169	147	155	162	143	150	157
270	151	159	166	144	152	159	140	147	155
260	147	156	164	141	149	157	137	144	152
250	144	152	161	138	145	154	133	141	150
240	141	149	158	134	142	151	130	137	147
230	137	145	155	131	138	148	127	134	144
220	133	141	151	127	135	145	123	130	141
210	129	137	148	123	131	142	119	127	138
200	125	133	145	119	127	139	115	123	135
190	120	129	142	114	123	136	110	119	132
180	114	125	138	109	119	133	105	115	129
160	104	116	131	99	111	126	96	107	122
140	93	107	123	89	102	118	86	98	115

Check V1(MCG) and Minimum V2.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	13	14					6	7					-2	-2				
60	140	8	10	13	15			4	5	6	8			-2	-2	-2	-2		
50	122	5	6	9	11	13	16	2	3	4	6	7	9	-1	-1	-1	-2	-2	-2
40	104	2	3	5	8	10	13	1	2	3	4	5	7	0	-1	-1	-1	-1	-2
30	86	0	0	2	5	7	10	0	0	1	3	4	6	0	0	0	-1	-1	-1
20	68	0	0	2	3	5	8	0	0	1	2	3	4	0	0	0	0	-1	-1
-60	-76	0	0	2	3	5	7	0	0	1	2	3	4	0	0	0	0	-1	-1

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
300	-5	-2	0	3	5	-3	-2	-1	0	1	1	2	2	
280	-5	-2	0	2	4	-3	-2	-1	0	1	1	2	2	
260	-4	-2	0	2	4	-2	-1	-1	0	1	1	2	2	
240	-4	-2	0	2	4	-2	-1	0	0	1	1	2	2	
220	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	
200	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	
180	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	
160	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	
140	-3	-1	0	2	3	-2	-1	0	0	1	2	2	3	

Max Allowable Clearway for V1 Adjustment

FIELD LENGTH (M)	1500	2000	2500	3000	3500	4000	4500
MAX ALLOWABLE CLEARWAY (M)	160	200	260	300	340	390	440

Clearway and Stopway V1 Adjustments*

NORMAL V1 (KIAS)	CLEARWAY MINUS STOPWAY (M)					
	300	200	100	0	-100	-200
100	-3	-3	-1	0	3	5
120	-3	-3	-1	0	3	5
140	-4	-3	-1	0	2	4
160	-4	-3	-1	0	1	3

*V1 not to exceed VR



Flight Planning and Performance Manual

Takeoff Speeds

V1(MCG)

Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)					
°C	°F	-2000	0	2000	4000	6000	8000
60	140	118	114	113	111		
50	122	121	117	113	111	110	107
40	104	127	125	120	115	111	107
30	86	130	129	125	120	116	110
20	68	130	130	127	123	119	114
-60	-76	132	131	128	124	120	116

Minimum V2

Max Takeoff Thrust

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	128	126	124	122	120	118
15	126	124	122	120	118	116
20	125	122	120	117	114	112

Takeoff %N1

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

Max Takeoff Thrust

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)												
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
70	158	95.0	95.2	95.4	95.4	95.5	95.5	95.6	95.6	95.7	95.6	94.7	93.5	92.9
60	140	97.9	98.1	98.3	98.3	98.3	98.4	98.5	98.5	98.6	98.5	97.6	96.4	95.2
55	131	99.3	99.5	99.7	99.7	99.7	99.8	99.8	99.9	100.0	99.8	99.0	97.8	96.7
50	122	100.5	100.9	101.2	101.2	101.1	101.1	101.2	101.3	101.4	101.2	100.4	99.2	98.0
45	113	101.3	102.2	102.7	102.6	102.6	102.7	102.6	102.6	102.7	102.5	101.7	100.5	99.4
40	104	102.2	103.0	103.9	103.8	103.8	103.7	103.8	104.0	103.9	103.7	103.0	101.8	100.7
35	95	102.8	103.6	104.4	104.5	104.4	104.5	104.5	104.6	104.6	104.4	103.7	102.9	101.9
30	86	102.3	103.7	105.0	105.1	105.1	105.1	105.2	105.3	105.3	105.1	104.5	103.5	102.6
25	77	101.4	102.8	104.2	104.9	105.6	106.0	106.1	106.4	106.6	106.4	105.6	104.3	103.2
20	68	100.6	101.9	103.3	104.0	104.7	105.4	106.2	107.1	107.4	107.7	107.0	105.6	104.3
15	59	99.7	101.1	102.4	103.1	103.8	104.5	105.3	106.2	107.0	107.8	107.5	106.4	105.4
10	50	98.9	100.2	101.5	102.2	102.9	103.6	104.4	105.2	106.1	106.8	106.8	106.1	105.4
5	41	98.0	99.3	100.6	101.3	102.0	102.7	103.4	104.3	105.2	105.9	105.8	105.2	104.5
0	32	97.1	98.4	99.7	100.4	101.1	101.8	102.5	103.4	104.2	104.9	104.9	104.2	103.6
-10	14	95.3	96.6	97.9	98.5	99.2	99.9	100.6	101.5	102.3	103.0	102.9	102.3	101.7
-20	-4	93.5	94.7	96.0	96.6	97.3	98.0	98.7	99.5	100.3	101.0	100.9	100.3	99.7
-30	-22	91.6	92.8	94.1	94.7	95.4	96.0	96.7	97.5	98.3	99.0	98.9	98.3	97.7
-40	-40	89.7	90.9	92.1	92.8	93.4	94.0	94.7	95.5	96.3	96.9	96.9	96.3	95.7
-50	-58	87.8	88.9	90.1	90.7	91.4	92.0	92.7	93.4	94.2	94.8	94.8	94.2	93.6

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)												
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
PACKS OFF	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5
1 PACK ON	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5
WING ANTI-ICE ON	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3

Stab Trim Setting

Max Takeoff Thrust

Flaps 5

WEIGHT (1000 KG)	C.G. %MAC								
	14	16	19	24	29	34	39	42	44
300	7 1/2	7 1/2	6 3/4	5 1/2	4 1/4	3	2 3/4	2 1/4	2
280	7 1/2	7 1/2	6 3/4	5 1/2	4	2 3/4	2 1/4	2	1 3/4
260	7 1/2	7 1/2	6 3/4	5 1/4	4	2 3/4	2	1 3/4	1 1/2
240	7 1/4	7 1/4	6 1/2	5	3 1/2	2 1/2	1 3/4	1 1/2	1 1/4
220	6 3/4	6 3/4	6	4 1/2	3 1/4	2 1/4	1 3/4	1 1/4	1 1/4
200	6 1/2	6 1/2	5 1/2	4 1/4	2 3/4	1 3/4	1 1/4	1	1
180	6	6	5	3 3/4	2 1/4	1	1	1	1
160	4 1/2	4 1/4	3 3/4	2 3/4	2	1	1	1	1
140	3 1/4	3	2 3/4	2 1/4	1 1/2	1	1	1	1
135	3	2 3/4	2 1/2	2	1 1/2	1	1	1	1

Flaps 15 and 20

WEIGHT (1000 KG)	C.G. %MAC							
	14	16	19	24	29	34	39	44
300	10	9 1/4	8 1/2	7	5 1/2	4	2 3/4	2 1/4
280	10	9 1/4	8 1/4	6 3/4	5	3 1/2	2 1/4	2
260	9 1/2	9	8	6 1/2	4 3/4	3 1/4	2 1/4	2
240	8 3/4	8 1/4	7 1/4	5 3/4	4 1/4	2 3/4	2	1 3/4
220	7 3/4	7 1/4	6 1/4	5	3 1/2	2 1/4	1 3/4	1 1/4
200	6 3/4	6 1/4	5 1/2	4 1/4	3	2	1 1/2	1
180	6	5 1/2	4 3/4	3 1/2	2 1/4	1 1/2	1 1/4	1
160	4 1/2	4 1/4	3 3/4	2 3/4	1 3/4	1 1/4	1	1
140	3 1/4	3	2 3/4	2 1/4	1 1/2	1	1	1
135	3	2 3/4	2 1/2	2	1 1/2	1	1	1

TO1 Takeoff Weights

10% Thrust Reduction

Takeoff Field Limit

FULL RATED LIMIT WEIGHT (1000 KG)	320	300	280	260	240	220	200	180	160	140
TO1 FIELD LIMIT WEIGHT (1000 KG)	299.4	280.0	260.6	241.1	221.7	202.3	182.9	163.4	144.0	124.6

If the takeoff is limited by minimum control speeds, V1 may be increased to be equal to V1(MCG) provided the dry accelerate stop distance corrected for wind and slope exceeds approximately 1550 m for normal operations, 1600 m with one brake deactivated and 1700 m with two brakes deactivated.

Takeoff Climb Limit

FULL RATED LIMIT WEIGHT (1000 KG)	320	300	280	260	240	220	200	180	160	140
TO1 CLIMB LIMIT WEIGHT (1000 KG)	275.1	259.0	242.9	226.7	210.6	194.5	178.4	162.3	146.1	130.0

Takeoff Obstacle Limit

FULL RATED LIMIT WEIGHT (1000 KG)	320	300	280	260	240	220	200	180	160	140
TO1 OBSTACLE LIMIT WEIGHT (1000 KG)	285.8	268.1	250.4	232.7	215.0	197.3	179.6	161.9	144.2	126.5

ADVISORY INFORMATION

TO1 Slush/Standing Water Takeoff

10% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
380	-47.2	-51.6	-56.0	-56.6	-61.0	-65.3	-75.0	-79.3	-83.7
360	-43.0	-47.4	-51.7	-51.3	-55.6	-60.0	-67.6	-72.0	-76.5
340	-38.8	-43.1	-47.5	-46.0	-50.3	-54.7	-60.5	-65.0	-69.5
320	-34.6	-39.0	-43.5	-40.8	-45.3	-49.8	-53.6	-58.2	-62.8
300	-30.8	-35.4	-40.0	-36.0	-40.6	-45.3	-47.0	-51.7	-56.4
280	-27.4	-32.1	-36.9	-31.7	-36.4	-41.2	-40.8	-45.6	-50.4
260	-24.6	-29.4	-34.2	-28.0	-32.9	-37.7	-35.5	-40.4	-45.3
240	-22.1	-27.1	-32.0	-25.0	-29.9	-34.9	-31.0	-36.0	-41.1
220	-20.1	-25.2	-30.3	-22.5	-27.6	-32.8	-27.4	-32.6	-37.7
200	-18.6	-23.8	-29.0	-20.8	-26.0	-31.2	-24.7	-29.9	-35.2
180	-17.5	-22.8	-28.2	-19.6	-25.0	-30.3	-22.8	-28.2	-33.6
160	-16.8	-22.2	-27.6	-19.1	-24.5	-29.8	-21.7	-27.1	-32.5

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2000				100.3			129.9		
2200	123.1			139.1			166.7	119.6	
2400	161.9	112.3		178.0	128.2		204.7	156.3	109.3
2600	201.2	151.1	101.5	217.7	167.0	117.3	244.7	193.9	146.0
2800	241.4	190.1	140.2	258.2	206.5	156.1	287.1	233.3	183.2
3000	282.5	230.0	179.1	299.7	246.8	195.3	332.0	275.0	222.0
3200	324.5	270.9	218.8	342.1	288.0	235.4	377.7	319.3	263.0
3400	366.9	312.6	259.3	384.6	330.2	276.4		364.9	306.6
3600	409.4	355.0	300.8		372.7	318.3		410.7	352.1
3800		397.5	343.2		415.2	360.8			397.8

1. Enter Weight Adjustment table with slush/standing water depth and TO1 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -45 m/+40 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
320	-18	-16	-14	-13	-10	-8	-2	0	2
300	-20	-17	-15	-14	-12	-10	-3	-1	1
280	-21	-19	-17	-16	-14	-12	-5	-3	-1
260	-22	-20	-18	-18	-16	-14	-8	-6	-3
240	-24	-22	-20	-20	-18	-16	-11	-9	-7
220	-26	-24	-22	-23	-21	-18	-15	-13	-11
200	-28	-25	-23	-25	-23	-20	-18	-16	-14
180	-29	-27	-25	-26	-24	-22	-20	-18	-16
160	-30	-28	-26	-27	-25	-23	-21	-19	-17

- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slush/Standing Water Takeoff

10% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
320	-51.4	-57.5	-63.7	-59.0	-65.2	-71.3	-76.3	-82.5	-88.6
300	-44.3	-50.5	-56.6	-50.3	-56.5	-62.6	-63.6	-69.8	-75.9
280	-37.5	-43.7	-49.9	-42.0	-48.2	-54.3	-51.5	-57.7	-63.9
260	-32.5	-38.7	-44.9	-35.9	-42.1	-48.2	-43.0	-49.1	-55.3
240	-29.4	-35.5	-41.7	-32.2	-38.4	-44.5	-38.3	-44.5	-50.6
220	-28.0	-34.2	-40.4	-30.8	-37.0	-43.2	-37.4	-43.5	-49.7
200	-28.5	-34.7	-40.9	-31.8	-38.0	-44.2	-40.2	-46.4	-52.5
180	-30.9	-37.1	-43.3	-35.2	-41.4	-47.6	-47.0	-53.2	-59.3
160	-35.2	-41.4	-47.5	-41.0	-47.2	-53.4	-57.5	-63.7	-69.9

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
3000							157.1		
3200							202.8		
3400				169.2			251.1	125.8	
3600	163.4			219.8	121.9		302.5	216.7	138.8
3800	216.3			271.3	171.7		356.7	265.9	183.7
4000	270.2	152.0		323.7	222.3	124.3	411.9	318.2	230.8
4200	325.1	204.6		377.1	273.9	174.2		372.8	280.9
4400	381.0	258.4	140.5		326.3	224.9			334.2
4600		313.0	193.1		379.8	276.5			389.0
4800		368.8	246.5			328.9			
5000			301.0			382.4			
5200			356.5						
5400			412.7						

1. Enter Weight Adjustment table with slush/standing water depth and TO1 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust 3 mm depth field length available by -100 m/+95 m for every 5°C above/below 4°C.
Adjust 6 mm depth field length available by -90 m/+85 m for every 5°C above/below 4°C.
Adjust 13 mm depth field length available by -75 m/+70 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
300	-32	-28	-24	-24	-20	-16	-5	-1	0
280	-34	-30	-26	-27	-23	-19	-9	-5	-1
260	-37	-33	-29	-31	-27	-23	-15	-11	-7
240	-39	-35	-31	-34	-30	-26	-21	-17	-13
220	-42	-38	-34	-38	-34	-30	-27	-23	-19
200	-45	-41	-37	-41	-37	-33	-32	-28	-24
180	-48	-44	-40	-44	-40	-36	-36	-32	-28
160	-51	-47	-43	-47	-43	-39	-39	-35	-31

- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slippery Runway Takeoff**10% Thrust Reduction****Maximum Reverse Thrust****Weight Adjustment (1000 KG)**

TO1 DRY 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
340	0.0	-1.1	-2.2	-11.7	-12.8	-13.9	-33.7	-34.8	-35.9
320	0.0	-1.1	-2.2	-12.6	-13.7	-14.8	-31.9	-33.0	-34.1
300	0.0	-1.1	-2.2	-13.5	-14.7	-15.8	-30.4	-31.5	-32.6
280	0.0	-1.1	-2.2	-14.7	-15.8	-17.0	-29.1	-30.3	-31.5
260	0.0	-1.2	-2.3	-15.4	-16.5	-17.7	-27.8	-29.0	-30.2
240	-1.2	-2.4	-3.5	-15.5	-16.7	-17.9	-26.3	-27.5	-28.7
220	-2.3	-3.5	-4.8	-15.1	-16.3	-17.6	-24.6	-25.8	-27.1
200	-3.0	-4.3	-5.5	-14.2	-15.4	-16.7	-22.8	-24.0	-25.3
180	-3.3	-4.6	-5.8	-12.8	-14.0	-15.3	-20.8	-22.1	-23.4
160	-3.1	-4.4	-5.6	-10.8	-12.1	-13.4	-18.6	-19.9	-21.2

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1600	159.0								
1800	237.3	165.4							
2000	310.9	243.4	171.9						
2200		316.5	249.4	171.3					
2400			322.2	227.9	155.6				
2600				285.4	212.0	139.9			
2800				343.6	269.2	196.1	149.7		
3000					327.3	253.1	185.9		
3200						310.9	223.0	151.1	
3400						369.3	261.1	187.4	
3600							300.4	224.5	152.6
3800							340.7	262.7	188.8
4000								302.0	226.0

1. Enter Weight Adjustment table with reported braking action and TO1 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -45 m/+40 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+60 m 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
320	-4	-2	0	-14	-12	-10	-27	-25	-23
300	-5	-3	-2	-15	-14	-12	-29	-28	-26
280	-6	-5	-3	-17	-16	-14	-32	-30	-28
260	-8	-6	-4	-19	-18	-16	-35	-33	-31
240	-9	-7	-5	-21	-20	-18	-38	-36	-34
220	-10	-8	-7	-24	-22	-20	-40	-39	-37
200	-12	-10	-8	-26	-24	-22	-44	-42	-40
180	-13	-11	-10	-28	-26	-24	-47	-45	-43
160	-15	-13	-11	-31	-29	-27	-50	-48	-46

- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slippery Runway Takeoff

10% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY 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
320	-3.3	-4.4	-5.5	-29.2	-30.3	-31.4	-51.4	-52.4	-53.5
300	-3.6	-4.7	-5.8	-27.0	-28.1	-29.2	-45.9	-46.9	-48.0
280	-4.0	-5.1	-6.2	-25.0	-26.1	-27.2	-40.7	-41.8	-42.9
260	-5.0	-6.1	-7.1	-23.9	-25.0	-26.0	-37.1	-38.2	-39.3
240	-6.4	-7.5	-8.6	-23.5	-24.6	-25.7	-35.2	-36.3	-37.4
220	-8.4	-9.5	-10.6	-24.0	-25.1	-26.2	-34.9	-35.9	-37.0
200	-10.9	-12.0	-13.1	-25.4	-26.4	-27.5	-36.1	-37.2	-38.3
180	-13.9	-15.0	-16.1	-27.5	-28.6	-29.7	-38.9	-40.0	-41.1
160	-17.4	-18.5	-19.6	-30.4	-31.4	-32.5	-43.1	-44.2	-45.3

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
2000	222.5								
2200	322.6								
2400		247.4	125.1						
		340.0	269.6						
2600			357.3						
3000				231.0					
3200				323.8	209.5				
3400					311.7	182.5			
3600						299.1			
3800						375.4			
4800							269.6		
5000							337.8		
5200								220.3	
5400								310.9	
5600								372.0	
5800									279.9
6000									345.4

1. Enter Weight Adjustment table with reported braking action and TO1 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -35 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -55 m/+50 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+85 m 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
300	-8	-4	0	-24	-20	-16	-49	-45	-41
280	-10	-6	-2	-27	-23	-19	-53	-49	-45
260	-12	-8	-4	-30	-26	-22	-57	-53	-49
240	-14	-10	-6	-34	-30	-26	-62	-58	-54
220	-16	-12	-8	-37	-33	-29	-68	-64	-60
200	-18	-14	-10	-41	-37	-33	-73	-69	-65
180	-21	-17	-13	-45	-41	-37	-79	-75	-71
160	-23	-19	-15	-49	-45	-41	-84	-80	-76

- 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). V1 not to exceed VR.

Flight Planning and Performance Manual

TO1 Takeoff Speeds

10% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
300	163	168	172						
290	161	166	170	154	159	164			
280	158	163	168	151	156	161			
270	155	161	166	148	153	159	144	148	154
260	152	157	163	145	150	156	141	145	152
250	148	154	160	142	147	154	137	142	149
240	145	151	157	138	144	151	134	139	147
230	141	147	154	135	140	148	130	136	144
220	137	143	151	131	137	145	127	132	141
210	133	139	148	127	133	142	123	129	138
200	129	136	145	123	129	139	118	125	135
190	124	132	141	118	126	136	114	121	132
180	119	127	138	113	121	132	109	117	129
170	113	123	134	108	117	129	104	113	125
160	108	119	131	103	113	126	99	109	122
150	102	114	127	98	109	122	94	105	119
140	97	109	123	92	104	118	89	101	115

Check V1(MCG) and Minimum V2.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
60	140	7	10	12	14			3	4	5	6			-2	-2	-2	-3		
50	122	4	6	8	10	12	15	2	3	4	5	6	7	-1	-1	-2	-2	-2	-3
40	104	1	3	5	7	9	12	1	1	2	3	4	6	0	-1	-1	-1	-2	-2
30	86	0	0	2	5	7	10	0	0	1	2	3	5	0	0	-1	-1	-1	-2
20	68	0	0	2	4	6	8	0	0	1	2	3	4	0	0	0	-1	-1	-2
-60	-76	0	0	2	4	6	8	0	0	1	2	3	4	0	0	0	-1	-1	-1

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
300	-5	-3	0	2	4	-2	-2	-1	0	0	1	1	1	
280	-5	-2	0	2	4	-2	-1	-1	0	0	1	1	2	
260	-4	-2	0	2	4	-2	-1	-1	0	0	1	1	2	
240	-4	-2	0	2	3	-2	-1	0	0	0	1	1	2	
220	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	
200	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	
180	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	
160	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	
140	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2	

*V1 not to exceed VR.

TO1 V1(MCG)

TEMP		PRESSURE ALTITUDE (FT)					
		-2000	0	2000	4000	6000	8000
60	140	113	109	108	106		
50	122	115	112	108	106	105	102
40	104	121	118	114	110	106	102
30	86	123	122	118	114	110	105
20	68	123	122	119	116	112	108
-60	-76	125	124	120	117	113	109

TO1 Minimum V2

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	128	126	124	122	120	118
15	126	124	122	120	118	116
20	125	122	120	117	114	112

TO1 Takeoff %N1

10% Thrust Reduction

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

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)												
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
70	158	91.4	91.6	91.8	91.8	91.9	91.9	92.0	92.0	92.1	92.0	91.1	90.0	89.5
60	140	94.3	94.5	94.7	94.7	94.7	94.8	94.8	94.9	95.0	94.8	94.0	92.8	91.6
55	131	95.7	95.9	96.1	96.1	96.1	96.1	96.2	96.3	96.4	96.2	95.4	94.2	93.1
50	122	96.9	97.3	97.6	97.6	97.5	97.5	97.6	97.7	97.7	97.6	96.7	95.6	94.4
45	113	97.7	98.6	99.0	98.9	98.9	99.0	98.9	98.9	99.0	98.8	98.1	96.9	95.8
40	104	98.5	99.2	100.0	100.0	100.0	99.9	100.0	100.1	100.0	99.9	99.2	98.2	97.1
35	95	99.1	99.8	100.5	100.5	100.5	100.5	100.6	100.6	100.7	100.5	99.8	99.0	98.2
30	86	98.5	99.7	100.8	100.8	100.8	100.8	100.9	100.9	100.9	100.8	100.4	99.6	98.7
25	77	97.7	98.9	99.9	100.4	100.9	101.1	101.1	101.3	101.3	101.3	100.8	100.0	99.3
20	68	96.9	98.1	99.1	99.6	100.0	100.4	100.8	101.1	101.3	101.3	101.1	100.4	99.7
15	59	96.0	97.2	98.2	98.7	99.2	99.5	99.9	100.3	100.6	100.8	100.7	100.3	99.9
10	50	95.2	96.4	97.4	97.9	98.3	98.7	99.0	99.4	99.7	99.9	99.9	99.6	99.4
5	41	94.4	95.5	96.5	97.0	97.5	97.8	98.1	98.5	98.8	99.0	99.0	98.8	98.5
0	32	93.5	94.7	95.7	96.1	96.6	96.9	97.3	97.6	97.9	98.1	98.1	97.9	97.6
-10	14	91.8	92.9	93.9	94.3	94.8	95.1	95.5	95.8	96.1	96.3	96.3	96.1	95.8
-20	-4	90.0	91.1	92.1	92.5	93.0	93.3	93.6	94.0	94.3	94.5	94.4	94.2	94.0
-30	-22	88.2	89.3	90.3	90.7	91.1	91.4	91.8	92.1	92.4	92.6	92.6	92.3	92.1
-40	-40	86.4	87.5	88.4	88.8	89.2	89.5	89.9	90.2	90.5	90.7	90.6	90.4	90.2
-50	-58	84.5	85.6	86.5	86.9	87.3	87.6	87.9	88.2	88.5	88.7	88.7	88.5	88.3

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
PACKS OFF	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5
1 PACK ON	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5
WING ANTI-ICE ON	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3

TO1 Stab Trim Setting

10% Thrust Reduction

Flaps 5

WEIGHT (1000 KG)	C.G. (%MAC)								
	14	16	19	24	29	34	39	42	44
300	7 1/2	7 1/2	6 3/4	5 1/2	4 1/4	3	2 3/4	2 1/4	2
280	7 1/2	7 1/2	6 3/4	5 1/2	4	2 3/4	2 1/4	2	1 3/4
260	7 1/2	7 1/2	6 3/4	5 1/4	4	2 3/4	2	1 3/4	1 1/2
240	7 1/4	7 1/4	6 1/2	5	3 1/2	2 1/2	1 3/4	1 1/2	1 1/4
220	6 3/4	6 3/4	6	4 1/2	3 1/4	2 1/4	1 3/4	1 1/4	1 1/4
200	6 1/2	6 1/2	5 1/2	4 1/4	2 3/4	1 3/4	1 1/4	1	1
180	6	6	5	3 3/4	2 1/4	1	1	1	1
160	4 1/2	4 1/4	3 3/4	2 3/4	2	1	1	1	1
140	3 1/4	3	2 3/4	2 1/4	1 1/2	1	1	1	1

Flaps 15 and 20

WEIGHT (1000 KG)	C.G. (%MAC)							
	14	16	19	24	29	34	39	44
300	10	9 1/4	8 1/2	7	5 1/2	4	2 3/4	2 1/4
280	10	9 1/4	8 1/4	6 3/4	5	3 1/2	2 1/4	2
260	9 1/2	9	8	6 1/2	4 3/4	3 1/4	2 1/4	2
240	8 3/4	8 1/4	7 1/4	5 3/4	4 1/4	2 3/4	2	1 3/4
220	7 3/4	7 1/4	6 1/4	5	3 1/2	2 1/4	1 3/4	1 1/4
200	6 3/4	6 1/4	5 1/2	4 1/4	3	2	1 1/2	1
180	6	5 1/2	4 3/4	3 1/2	2 1/4	1 1/2	1 1/4	1
160	4 1/2	4 1/4	3 3/4	2 3/4	1 3/4	1 1/4	1	1
140	3 1/4	3	2 3/4	2 1/4	1 1/2	1	1	1



TO2 Takeoff Weights

20% Thrust Reduction

Takeoff Field Limit

FULL RATED LIMIT WEIGHT (1000 KG)	320	300	280	260	240	220	200	180	160	140
TO2 FIELD LIMIT WEIGHT (1000 KG)	280.7	262.5	244.4	226.3	208.2	190.0	171.9	153.8	135.7	117.6

If the takeoff is limited by minimum control speeds, V1 may be increased to be equal to V1(MCG) provided the dry accelerate stop distance corrected for wind and slope exceeds approximately 1400 m for normal operations, 1500 m with one brake deactivated and 1550 m with two brakes deactivated.

Takeoff Climb Limit

FULL RATED LIMIT WEIGHT (1000 KG)	320	300	280	260	240	220	200	180	160	140
TO2 CLIMB LIMIT WEIGHT (1000 KG)	253.8	237.9	222.0	206.1	190.2	174.3	158.4	142.5	126.6	110.7

Takeoff Obstacle Limit

FULL RATED LIMIT WEIGHT (1000 KG)	320	300	280	260	240	220	200	180	160	140
TO2 OBSTACLE LIMIT WEIGHT (1000 KG)	256.9	241.2	225.5	209.8	194.1	178.3	162.6	146.9	131.2	115.5

ADVISORY INFORMATION

TO2 Slush/Standing Water Takeoff

20% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
380	-47.7	-53.0	-58.2	-57.5	-62.8	-68.1	-76.7	-81.9	-87.2
360	-43.5	-48.7	-54.0	-52.2	-57.5	-62.7	-69.3	-74.6	-79.9
340	-39.2	-44.5	-49.8	-46.9	-52.2	-57.4	-62.0	-67.3	-72.5
320	-35.0	-40.3	-45.5	-41.6	-46.8	-52.1	-54.8	-60.0	-65.3
300	-30.8	-36.1	-41.3	-36.4	-41.7	-46.9	-48.0	-53.3	-58.6
280	-27.2	-32.5	-37.7	-31.9	-37.2	-42.4	-41.9	-47.1	-52.4
260	-24.3	-29.6	-34.9	-28.1	-33.4	-38.6	-36.3	-41.5	-46.8
240	-21.9	-27.2	-32.4	-24.9	-30.2	-35.5	-31.5	-36.8	-42.1
220	-19.9	-25.2	-30.4	-22.4	-27.7	-32.9	-27.7	-33.0	-38.3
200	-18.3	-23.6	-28.9	-20.5	-25.8	-31.0	-24.8	-30.1	-35.3
180	-17.2	-22.5	-27.7	-19.3	-24.5	-29.8	-22.7	-28.0	-33.2
160	-16.5	-21.8	-27.0	-18.6	-23.9	-29.2	-21.5	-26.7	-32.0

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2000				127.3			155.5		
2200	155.4			171.4			198.2	143.9	
2400	200.1	143.1		216.5	159.0		243.5	186.0	132.2
2600	246.0	187.4	130.7	262.9	203.7	146.7	292.0	230.5	174.0
2800	293.3	233.0	174.9	310.7	249.8	191.1	344.0	278.1	217.8
3000	342.0	279.9	220.1	359.6	297.2	236.7	396.6	329.3	264.4
3200	391.0	328.3	266.6	408.7	345.9	283.8		381.8	314.6
3400		377.3	314.6		394.9	332.2			367.1
3600			363.6			381.2			419.9
3800			412.6						

1. Enter Weight Adjustment table with slush/standing water depth and TO2 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -45 m/+40 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
300	-16	-14	-12	-10	-8	-6	0	0	0
280	-17	-15	-13	-12	-10	-8	0	0	0
260	-19	-17	-15	-14	-12	-10	-3	-1	0
240	-21	-19	-17	-17	-15	-13	-6	-4	-2
220	-23	-21	-19	-19	-17	-15	-11	-9	-7
200	-25	-23	-21	-22	-20	-18	-15	-13	-11
180	-26	-24	-22	-23	-21	-19	-17	-15	-13
160	-28	-26	-24	-24	-22	-20	-18	-16	-14

- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slush/Standing Water Takeoff

20% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
380	-75.5	-81.7	-87.8	-89.1	-95.3	-101.5	-121.4	-127.6	-133.7
360	-68.4	-74.6	-80.8	-80.5	-86.6	-92.8	-108.7	-114.8	-121.0
340	-61.4	-67.6	-73.7	-71.8	-77.9	-84.1	-96.0	-102.1	-108.3
320	-54.3	-60.5	-66.7	-63.1	-69.2	-75.4	-83.3	-89.4	-95.6
300	-47.3	-53.4	-59.6	-54.4	-60.6	-66.7	-70.6	-76.7	-82.9
280	-40.2	-46.4	-52.6	-45.7	-51.9	-58.0	-57.9	-64.0	-70.2
260	-33.5	-39.6	-45.8	-37.4	-43.6	-49.7	-45.8	-52.0	-58.1
240	-28.7	-34.9	-41.0	-31.6	-37.8	-44.0	-37.8	-43.9	-50.1
220	-25.9	-32.1	-38.3	-28.4	-34.6	-40.7	-33.9	-40.0	-46.2
200	-25.2	-31.4	-37.6	-27.9	-34.1	-40.2	-34.3	-40.5	-46.6
180	-26.6	-32.7	-38.9	-29.9	-36.1	-42.3	-38.9	-45.0	-51.2
160	-30.0	-36.2	-42.3	-34.7	-40.8	-47.0	-47.7	-53.9	-60.1

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2800							162.9		
3000				133.5			216.3	127.3	
3200	135.8			193.0			275.0	178.1	
3400	200.1			255.5	136.5		340.0	233.0	142.1
3600	267.9	122.3		321.5	196.0		409.6	293.4	193.8
3800	340.0	185.8		391.6	258.7	139.4		360.1	250.1
4000	416.0	252.8			324.8	199.1			312.4
4200		324.0	171.6		395.2	261.9			380.4
4400		399.4	237.8			328.2			
4600			308.0			398.9			

1. Enter Weight Adjustment table with slush/standing water depth and TO2 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust 3 mm depth field length available by -100 m/+95 m for every 5°C above/below 4°C.
Adjust 6 mm depth field length available by -90 m/+85 m for every 5°C above/below 4°C.
Adjust 9 mm depth field length available by -75 m/+70 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
300	-27	-23	-19	-17	-13	-9	0	0	0
280	-29	-25	-21	-21	-17	-13	-1	0	0
260	-32	-28	-24	-25	-21	-17	-7	-3	0
240	-35	-31	-27	-29	-25	-21	-14	-10	-6
220	-38	-34	-30	-33	-29	-25	-21	-17	-13
200	-42	-38	-34	-37	-33	-29	-27	-23	-19
180	-45	-41	-37	-41	-37	-33	-32	-28	-24
160	-48	-44	-40	-44	-40	-36	-35	-31	-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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slippery Runway Takeoff

20% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY 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
340	0.0	-1.3	-2.5	-9.8	-11.1	-12.4	-33.2	-34.4	-35.7
320	0.0	-1.3	-2.5	-10.7	-12.0	-13.3	-31.3	-32.5	-33.8
300	0.0	-1.3	-2.5	-11.7	-12.9	-14.2	-29.4	-30.7	-32.0
280	0.0	-1.3	-2.5	-12.6	-13.9	-15.2	-28.0	-29.3	-30.5
260	0.0	-1.3	-2.5	-13.8	-15.1	-16.3	-26.9	-28.2	-29.4
240	0.0	-1.3	-2.6	-14.4	-15.7	-17.0	-25.6	-26.9	-28.2
220	-1.5	-2.8	-4.1	-14.4	-15.7	-17.0	-24.1	-25.4	-26.7
200	-2.5	-3.8	-5.0	-13.9	-15.2	-16.5	-22.5	-23.7	-25.0
180	-3.0	-4.3	-5.6	-12.8	-14.1	-15.4	-20.7	-21.9	-23.2
160	-3.1	-4.3	-5.6	-11.2	-12.5	-13.7	-18.7	-20.0	-21.2

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1600	197.8								
1800	278.3	205.0	127.3						
2000	354.3	285.0	212.1	149.5					
2200		360.8	291.6	209.2	132.8				
2400			367.3	269.8	192.4				
2600				331.4	252.8	175.7	142.1		
2800				393.2	314.1	235.8	180.4		
3000					375.9	296.8	219.5	144.1	
3200						358.6	259.7	182.3	
3400							301.1	221.4	146.0
3600							343.6	261.7	184.2
3800							386.1	303.2	223.4
4000								345.7	263.8
4200								388.2	305.3

1. Enter Weight Adjustment table with reported braking action and TO2 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -45 m/+40 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+60 m 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
300	-5	-3	-1	-14	-12	-10	-26	-24	-22
280	-6	-4	-2	-16	-14	-12	-29	-27	-25
260	-7	-5	-3	-17	-15	-13	-31	-29	-27
240	-8	-6	-4	-19	-17	-15	-34	-32	-30
220	-9	-7	-5	-21	-19	-17	-36	-34	-32
200	-11	-9	-7	-23	-21	-19	-39	-37	-35
180	-12	-10	-8	-25	-23	-21	-42	-40	-38
160	-13	-11	-9	-27	-25	-23	-45	-43	-41

- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slippery Runway Takeoff**20% Thrust Reduction****No Reverse Thrust****Weight Adjustment (1000 KG)**

TO2 DRY 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
340	-2.8	-3.9	-4.9	-33.6	-34.7	-35.7	-61.9	-63.0	-64.1
320	-3.1	-4.2	-5.2	-31.2	-32.3	-33.4	-56.1	-57.2	-58.3
300	-3.4	-4.5	-5.5	-28.9	-30.0	-31.1	-50.3	-51.4	-52.5
280	-3.7	-4.8	-5.8	-26.5	-27.6	-28.7	-44.3	-45.4	-46.5
260	-4.1	-5.2	-6.2	-24.1	-25.2	-26.3	-38.7	-39.8	-40.9
240	-5.0	-6.1	-7.2	-22.6	-23.7	-24.8	-34.8	-35.9	-36.9
220	-6.4	-7.5	-8.6	-22.0	-23.1	-24.2	-32.4	-33.5	-34.6
200	-8.3	-9.4	-10.5	-22.2	-23.3	-24.4	-31.8	-32.9	-34.0
180	-10.8	-11.9	-12.9	-23.3	-24.4	-25.4	-32.8	-33.9	-35.0
160	-13.7	-14.8	-15.9	-25.2	-26.3	-27.4	-35.7	-36.8	-37.9

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1800	165.9								
2000	297.4	202.5							
2200	388.0	316.8	232.2						
2400		406.6	335.5						
2800				230.2					
3000				328.1	206.9				
3200				408.2	315.4	176.9			
3400					395.6	302.2			
3600						382.9			
4400							193.3		
4600							305.0		
4800							368.9		
5000								270.8	
5200								341.1	

1. Enter Weight Adjustment table with reported braking action and TO2 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -35 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -55 m/+50 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+85 m 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
300	-8	-4	0	-22	-18	-14	-45	-41	-37
280	-10	-6	-2	-25	-21	-17	-49	-45	-41
260	-12	-8	-4	-28	-24	-20	-53	-49	-45
240	-13	-9	-5	-31	-27	-23	-58	-54	-50
220	-15	-11	-7	-34	-30	-26	-63	-59	-55
200	-17	-13	-9	-38	-34	-30	-68	-64	-60
180	-19	-15	-11	-41	-37	-33	-73	-69	-65
160	-21	-17	-13	-46	-42	-38	-79	-75	-71

- 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). V1 not to exceed VR.

TO2 Takeoff Speeds

20% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
280	162	164	168						
270	159	162	165						
260	156	159	162	149	152	156			
250	152	155	159	145	148	153	141	143	149
240	149	152	157	142	145	150	138	140	146
230	145	148	154	139	142	147	134	137	143
220	141	145	150	135	138	144	131	134	140
210	137	141	147	131	135	141	127	130	137
200	133	137	144	127	131	138	122	127	134
190	128	133	141	122	127	135	118	123	131
180	123	129	137	117	123	132	113	119	128
170	118	125	134	112	119	128	108	115	125
160	112	120	130	107	115	125	103	111	121
150	106	116	126	101	111	121	98	107	118
140	100	111	123	95	106	117	92	102	114

Check V1(MCG) and Minimum V2.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (FT)						PRESSURE ALTITUDE (FT)						PRESSURE ALTITUDE (FT)					
°C	°F	-2000	0	2000	4000	6000	8000	-2000	0	2000	4000	6000	8000	-2000	0	2000	4000	6000	8000
60	140	7	9	11	14			3	4	5	6			-2	-2	-2	-3		
50	122	4	5	8	10	12	15	2	2	3	4	5	6	-1	-1	-2	-2	-2	-3
40	104	1	2	4	7	9	12	1	1	2	3	4	5	0	-1	-1	-1	-2	-2
30	86	0	0	2	5	7	9	0	0	1	2	3	4	0	0	0	-1	-1	-2
20	68	0	0	1	3	5	8	0	0	1	2	3	4	0	0	0	-1	-1	-1
-60	-76	0	0	1	3	5	7	0	0	1	2	2	3	0	0	0	-1	-1	-1

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)							
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40
300	-5	-2	0	2	3	-2	-1	-1	0	0	1	1	2
280	-4	-2	0	2	3	-2	-1	-1	0	0	1	1	1
260	-4	-2	0	2	3	-2	-1	-1	0	0	1	1	1
240	-4	-2	0	2	3	-2	-1	-1	0	0	1	1	1
220	-3	-2	0	2	3	-2	-1	-1	0	0	1	1	2
200	-3	-1	0	2	3	-2	-1	-1	0	0	1	1	2
180	-3	-1	0	2	3	-2	-1	0	0	0	1	1	2
160	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2
140	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3

*V1 not to exceed VR.

TO2 V1(MCG)

TEMP		PRESSURE ALTITUDE (FT)					
		-2000	0	2000	4000	6000	8000
60	140	107	104	103	101		
50	122	110	107	103	101	100	97
40	104	115	113	109	105	101	97
30	86	117	116	112	108	105	100
20	68	118	117	114	110	107	103
-60	-76	119	118	115	111	108	104

TO2 Minimum V2

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	128	126	124	122	120	118
15	126	124	122	120	118	116
20	125	122	120	117	114	112

TO2 Takeoff %N1**20% Thrust Reduction****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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
70	158	87.7	87.9	88.1	88.1	88.1	88.1	88.2	88.3	88.3	88.2	87.4	86.3	85.8
60	140	90.4	90.6	90.8	90.8	90.8	90.9	90.9	91.0	91.1	90.9	90.1	89.0	87.9
55	131	91.8	91.9	92.1	92.1	92.1	92.2	92.2	92.3	92.4	92.2	91.4	90.3	89.2
50	122	92.9	93.3	93.6	93.5	93.4	93.5	93.5	93.6	93.7	93.5	92.7	91.6	90.5
45	113	93.7	94.5	94.9	94.9	94.8	94.9	94.8	94.8	94.9	94.7	94.0	92.9	91.8
40	104	94.4	95.1	95.9	95.9	95.9	95.8	95.9	96.0	95.9	95.8	95.1	94.1	93.1
35	95	95.0	95.7	96.4	96.4	96.4	96.4	96.5	96.5	96.6	96.4	95.8	95.0	94.2
30	86	94.5	95.7	96.7	96.7	96.7	96.7	96.8	96.8	96.8	96.7	96.3	95.5	94.7
25	77	93.7	94.9	95.9	96.4	96.8	97.0	97.2	97.2	97.2	97.1	96.7	95.9	95.2
20	68	92.9	94.1	95.1	95.5	96.0	96.3	96.6	97.0	97.1	97.2	96.9	96.3	95.7
15	59	92.1	93.3	94.3	94.7	95.2	95.5	95.8	96.2	96.4	96.6	96.5	96.2	95.8
10	50	91.3	92.5	93.4	93.9	94.3	94.6	95.0	95.3	95.6	95.8	95.7	95.5	95.3
5	41	90.5	91.7	92.6	93.1	93.5	93.8	94.1	94.5	94.7	94.9	94.9	94.7	94.5
0	32	89.7	90.8	91.8	92.2	92.6	93.0	93.3	93.6	93.9	94.1	94.0	93.8	93.6
-10	14	88.0	89.2	90.1	90.5	90.9	91.2	91.6	91.9	92.1	92.3	92.3	92.1	91.9
-20	-4	86.3	87.4	88.4	88.8	89.2	89.5	89.8	90.1	90.4	90.6	90.5	90.3	90.1
-30	-22	84.6	85.7	86.6	87.0	87.4	87.7	88.0	88.3	88.6	88.7	88.7	88.5	88.3
-40	-40	82.9	83.9	84.8	85.2	85.6	85.9	86.2	86.5	86.7	86.9	86.9	86.7	86.5
-50	-58	81.1	82.1	83.0	83.4	83.7	84.0	84.3	84.6	84.8	85.0	85.0	84.8	84.6

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)													
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	
PACKS OFF	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	
1 PACK ON	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5	
WING ANTI-ICE ON	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	

TO2 Stab Trim Setting**20% Thrust Reduction****Flaps 5**

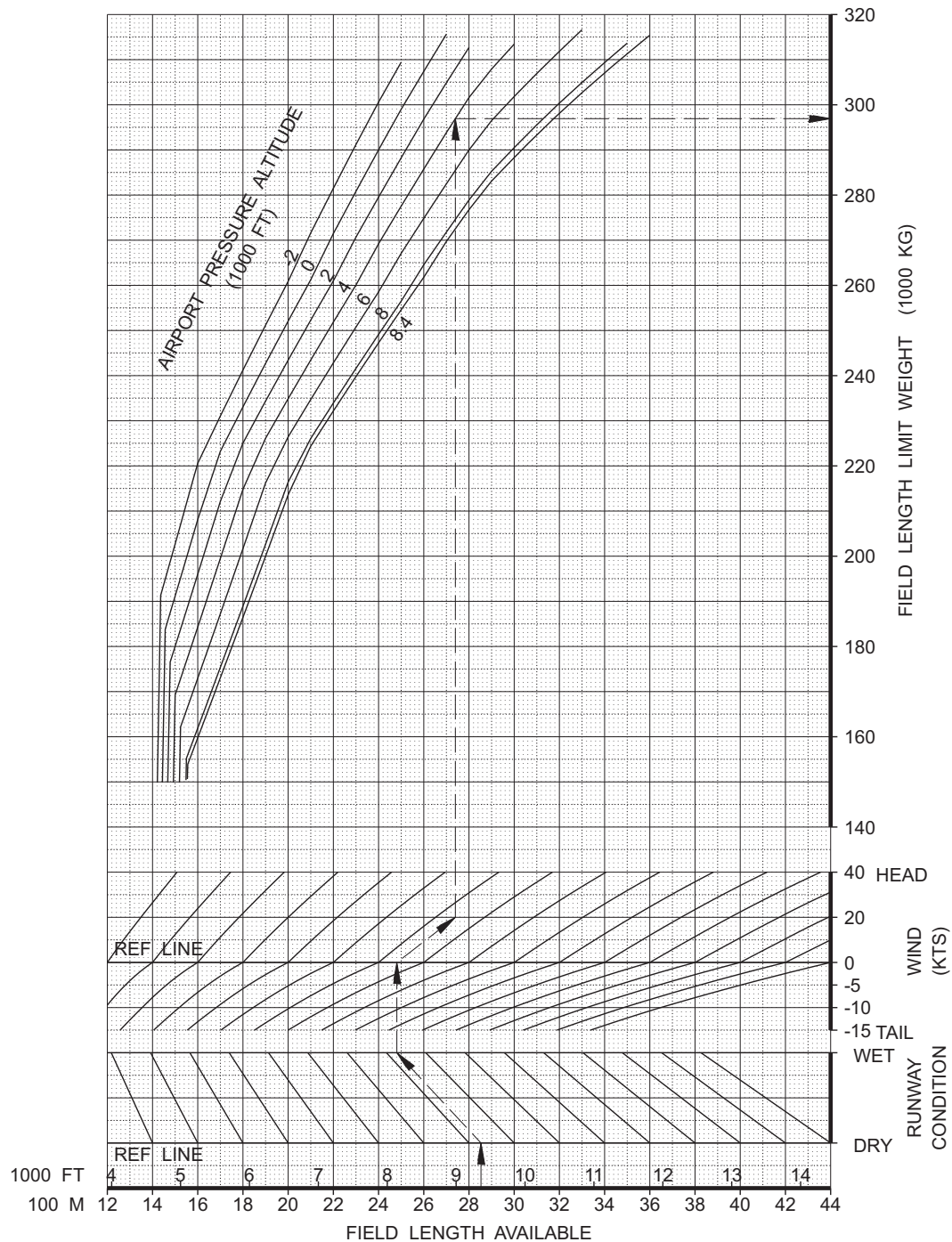
WEIGHT (1000 KG)	C.G. (%MAC)							
	14	16	19	24	29	34	39	44
300	8 1/2	8 1/2	7 3/4	6 1/2	5 1/4	4	3 3/4	3
280	8 1/2	8 1/2	7 3/4	6 1/2	5	3 3/4	3 1/4	2 3/4
260	8 1/2	8 1/2	7 3/4	6 1/4	5	3 3/4	3	2 1/2
240	8 1/4	8 1/4	7 1/2	6	4 1/2	3 1/4	2 3/4	2 1/4
220	7 3/4	7 3/4	7	5 3/4	4 1/4	3 1/4	2 3/4	2 1/4
200	7 1/2	7 1/2	6 1/2	5 1/4	3 3/4	3	2 1/2	2
180	7	7	6	4 3/4	3 1/4	2 1/2	2	1 1/2
160	5 1/2	5 1/4	4 3/4	3 3/4	3	2	1 1/2	1 1/2
140	4 1/4	4	3 3/4	3 1/4	2 1/2	2	1 1/2	1 1/2

Flaps 15 and 20

WEIGHT (1000 KG)	C.G. (%MAC)							
	14	16	19	24	29	34	39	44
300	11	10 1/4	9 1/2	8	6 1/2	5	3 3/4	3 1/4
280	11	10 1/4	9 1/2	7 3/4	6 1/4	4 1/2	3 1/2	3
260	10 1/2	10	9	7 1/2	5 3/4	4 1/4	3 1/4	3
240	9 3/4	9 1/4	8 1/4	6 3/4	5 1/4	3 3/4	3	2 3/4
220	8 1/4	8 1/4	7 1/4	6 1/2	4 1/2	3 1/4	2 3/4	2 1/4
200	7 3/4	7 1/4	6 1/2	5 1/4	4	3	2 1/2	2
180	7	6 1/2	5 3/4	4 1/2	3 1/4	2 1/2	2 1/4	1 1/2
160	5 1/2	5 1/4	4 3/4	3 3/4	2 1/4	2 1/4	2	1 1/2
140	4 1/4	4	3 3/4	3 1/4	2 1/2	2	1 1/2	1 1/2

Landing Field Length Limit

Flaps 30
Based on automatic speedbrakes

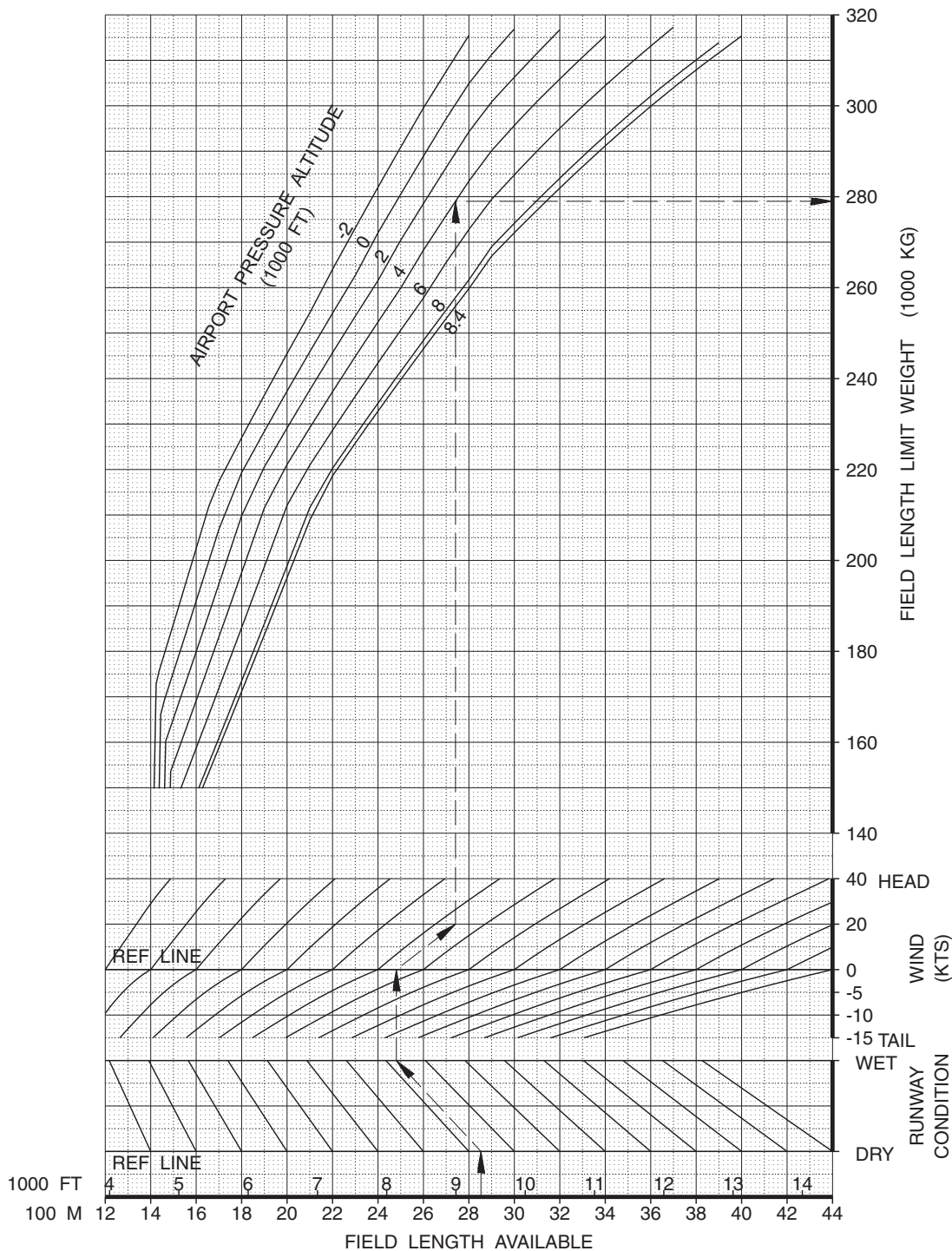


With manual speedbrakes, decrease weight by 39200 kg.
With 1 brake deactivated, decrease weight by 17000 kg.
With 2 brakes deactivated, decrease weight by 56150 kg.

Landing Field Length Limit

Flaps 25

Based on automatic speedbrakes



With manual speedbrakes, decrease weight by 31500 kg.

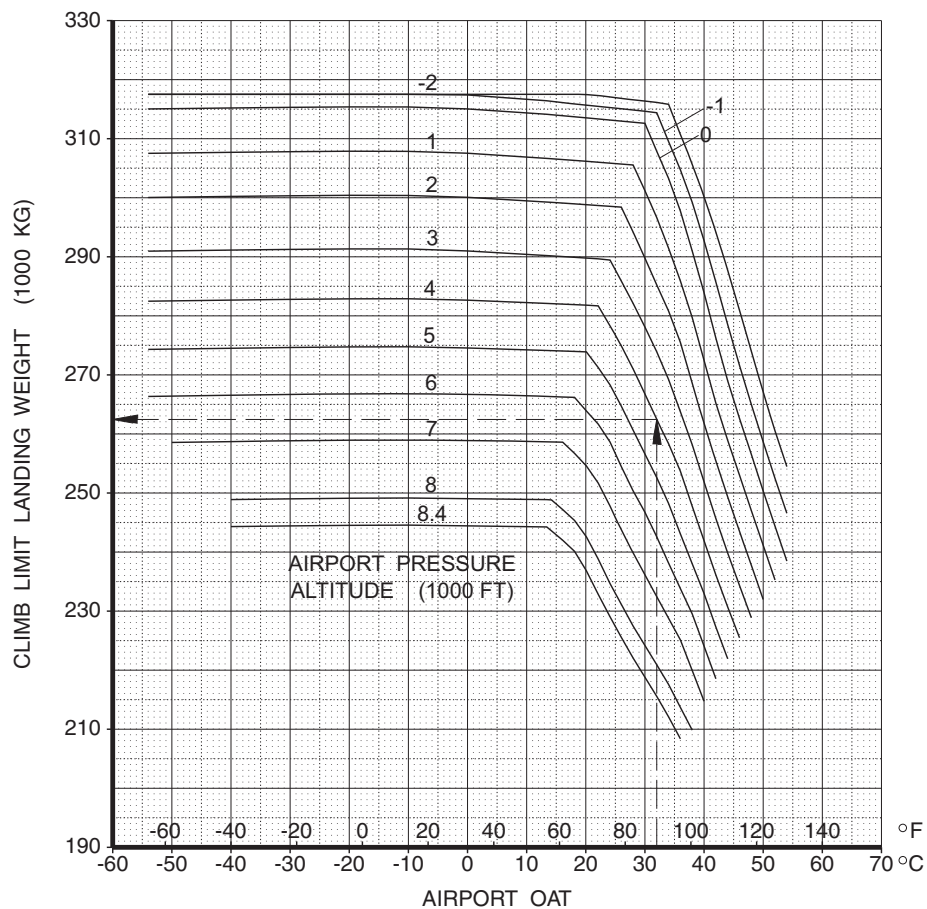
With 1 brake deactivated, decrease weight by 32400 kg.

With 2 brakes deactivated, decrease weight by 50000 kg.

Landing Climb Limit Weight

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

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



With engine bleed for packs off, increase weight by 2450 kg.

With engine and wing anti-ice on, decrease weight by 2200 kg.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 20100 kg.

ENGINE INOP

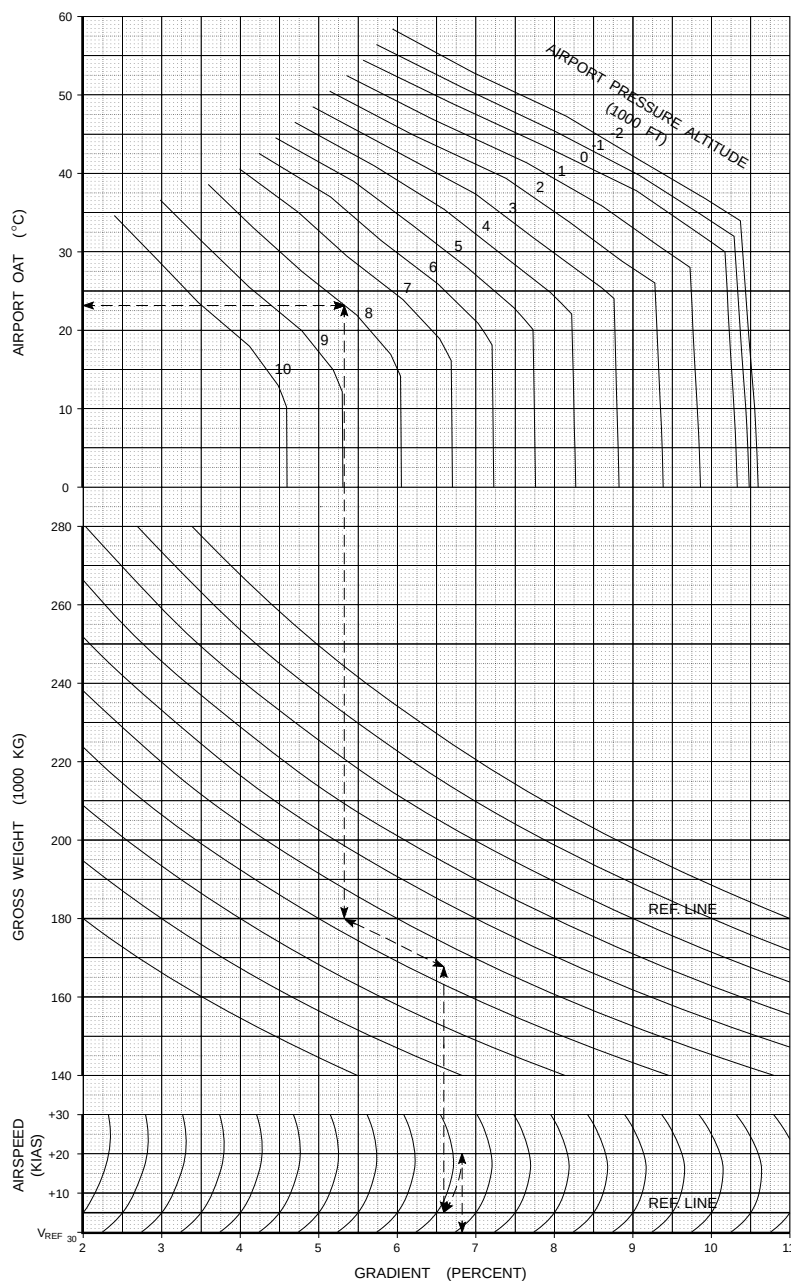
ADVISORY INFORMATION

GO-AROUND THRUST

Go-Around Climb Gradient

Flaps 20, Gear Up

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



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

With engine anti-ice on, decrease gradient by 0.1%.

With engine and wing anti-ice on, decrease gradient by 0.2%.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease gradient by 0.7%.

Quick Turnaround Limit Flaps 30 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	242.3	237.8	233.3									
50	122	243.9	239.4	234.9	230.4	226.0							
45	113	246.0	241.4	236.8	232.4	227.9	223.5	219.1					
40	104	248.2	243.5	238.9	234.4	229.9	225.4	221.0	216.7	212.6	208.4		
35	95	250.4	245.6	241.0	236.4	231.9	227.4	222.9	218.5	214.3	210.1	206.0	204.3
30	86	252.7	247.8	243.1	238.5	233.9	229.4	224.9	220.3	216.1	211.9	207.7	206.1
25	77	254.9	250.1	245.3	240.6	236.0	231.4	226.9	222.3	218.0	213.7	209.5	207.8
20	68	257.3	252.5	247.6	242.8	238.2	233.5	229.0	224.4	219.9	215.6	211.4	209.7
15	59	259.7	254.8	250.0	245.1	240.4	235.7	231.1	226.5	221.9	217.5	213.3	211.5
10	50	262.1	257.2	252.4	247.5	242.7	237.9	233.3	228.6	224.0	219.5	215.2	213.5
5	41	265.4	259.7	254.8	249.9	245.0	240.2	235.5	230.8	226.2	221.5	217.1	215.4
0	32	268.1	262.2	257.3	252.4	247.5	242.6	237.8	233.1	228.4	223.7	219.2	217.4
-5	23	271.0	265.6	259.9	255.0	250.0	245.0	240.2	235.4	230.7	226.0	221.3	219.5
-10	14	273.9	268.5	262.5	257.6	252.6	247.6	242.7	237.8	233.0	228.3	223.6	221.7
-15	5	276.9	271.4	266.0	260.2	255.2	250.2	245.2	240.3	235.5	230.7	225.9	224.0
-20	-4	280.1	274.5	269.0	263.0	257.9	252.9	247.9	242.8	237.9	233.1	228.3	226.4
-30	-22	286.4	280.8	275.3	269.7	264.3	258.5	253.4	248.2	243.2	238.2	233.3	231.4
-40	-40	292.9	287.3	281.7	276.2	270.6	265.1	259.2	254.0	248.8	243.7	238.6	236.6
-50	-58	299.8	293.9	288.1	282.5	277.0	271.5	266.0	260.0	254.9	249.6	244.3	242.0
-54	-65	302.5	296.7	290.8	285.1	279.6	274.0	268.5	262.3	257.2	252.0	246.5	244.2

Flaps 25 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	229.5	225.3	221.0									
50	122	231.0	226.8	222.5	218.3	214.1							
45	113	233.0	228.7	224.4	220.1	215.9	211.8	207.9					
40	104	235.0	230.6	226.3	222.0	217.7	213.6	209.6	205.6	201.6	197.7		
35	95	237.0	232.6	228.2	224.0	219.6	215.4	211.3	207.3	203.3	199.3	195.4	193.8
30	86	239.1	234.7	230.2	225.9	221.6	217.3	213.1	209.0	205.0	201.0	197.0	195.5
25	77	241.3	236.8	232.3	227.9	223.6	219.2	214.9	210.8	206.8	202.7	198.7	197.1
20	68	243.6	238.9	234.4	230.0	225.6	221.2	216.9	212.6	208.6	204.5	200.5	198.9
15	59	245.9	241.2	236.6	232.1	227.7	223.3	218.9	214.5	210.4	206.3	202.3	200.6
10	50	248.2	243.5	238.9	234.3	229.8	225.4	221.0	216.6	212.3	208.2	204.1	202.5
5	41	250.6	245.9	241.2	236.6	232.0	227.6	223.1	218.6	214.3	210.1	206.0	204.3
0	32	253.1	248.4	243.6	238.9	234.3	229.8	225.3	220.8	216.4	212.1	207.9	206.3
-5	23	255.6	250.8	246.1	241.4	236.7	232.1	227.5	223.0	218.5	214.1	209.9	208.2
-10	14	258.2	253.4	248.6	243.9	239.1	234.4	229.8	225.3	220.8	216.2	211.9	210.3
-15	5	260.9	256.0	251.2	246.5	241.6	236.9	232.2	227.6	223.1	218.5	214.0	212.3
-20	-4	264.4	258.7	253.9	249.1	244.2	239.4	234.7	230.0	225.4	220.8	216.3	214.5
-30	-22	270.3	265.1	259.4	254.5	249.6	244.7	239.9	235.0	230.3	225.7	221.0	219.2
-40	-40	276.5	271.2	265.9	260.2	255.3	250.4	245.5	240.4	235.6	230.8	226.1	224.2
-50	-58	282.9	277.4	272.0	266.7	260.9	256.0	251.2	246.3	241.3	236.3	231.3	229.4
-54	-65	285.6	280.0	274.5	269.2	263.7	258.3	253.4	248.5	243.6	238.5	233.4	231.6

Increase weight by 2250 kg per 1% uphill slope. Decrease weight by 5250 kg per 1% downhill slope.

Increase weight by 5850 kg per 10 knots headwind. Decrease weight by 35350 kg per 10 knots tailwind.

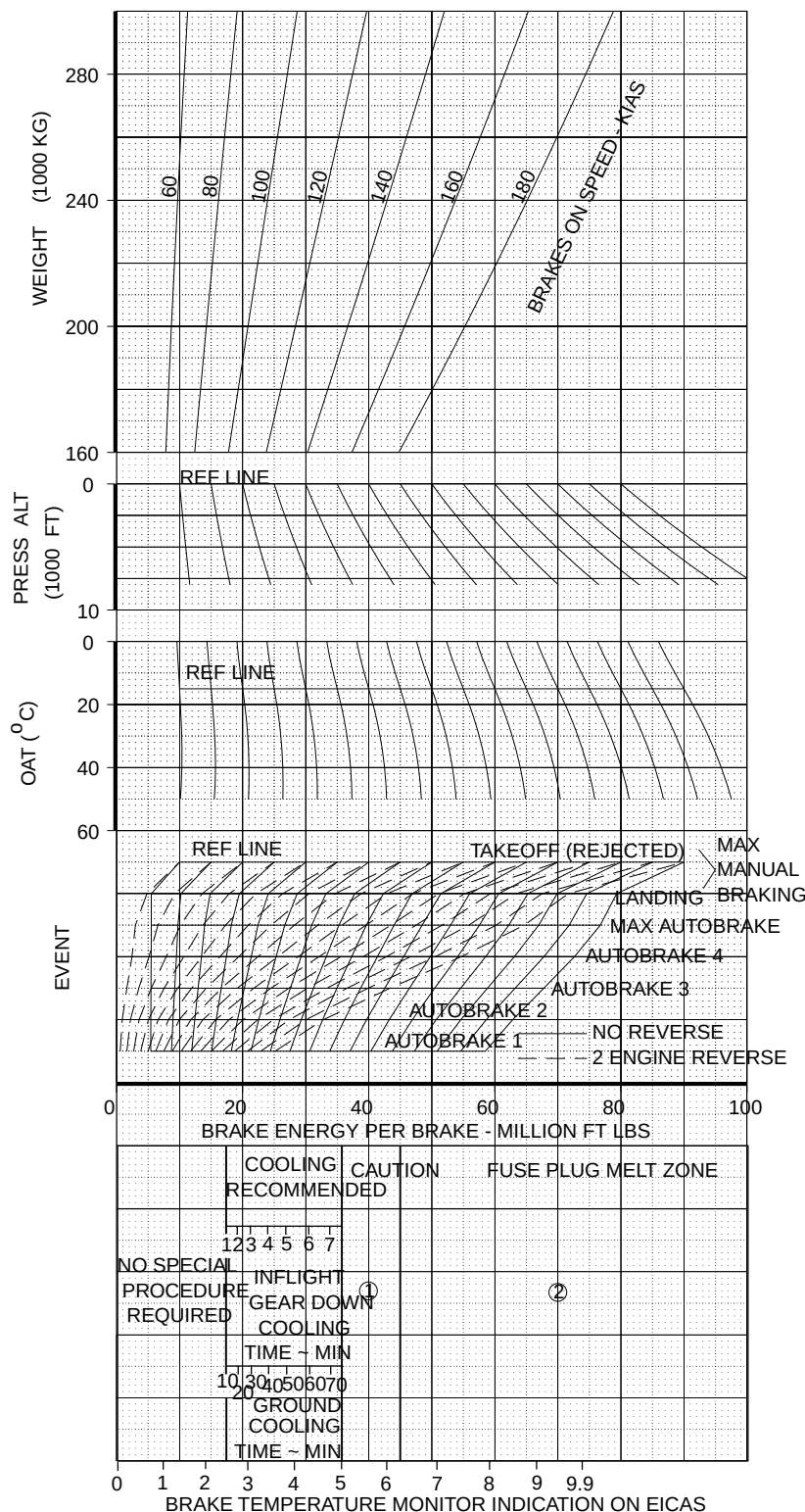
Decrease weight by 13700 kg when one brake is deactivated. Decrease weight by 27950 kg when two brakes are deactivated.

After landing at weights exceeding those shown above, adjusted for slope and wind, wait at least 65 minutes and check that wheel thermal plugs have not melted before executing a takeoff.

As an alternate procedure, no waiting period is required if the BRAKE TEMP advisory message on EICAS is not displayed 10 to 15 minutes after parking.

ADVISORY INFORMATION

Recommended Brake Cooling Schedule



GUIDANCE INFORMATION ONLY

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 10 PERCENT

FOR TWO BRAKES DEACTIVATED
INCREASE BRAKE ENERGY PER
BRAKE BY 20 PERCENT

IF GROUND SPEED IS USED FOR
BRAKES ON SPEED, IGNORE WIND,
ALTITUDE, AND OAT EFFECTS

① WHEEL FUSE PLUGS MAY MELT.
DELAY TAKEOFF AND INSPECT
AFTER ONE HOUR. IF OVERHEAT
OCCURS AFTER TAKEOFF,
EXTEND GEAR SOON FOR AT
LEAST 8 MINUTES.

② CLEAR RUNWAY IMMEDIATELY. UNLESS
REQUIRED, DO NOT SET PARKING
BRAKE. DO NOT APPROACH GEAR OR
ATTEMPT TAXI FOR ONE HOUR. TIRE,
WHEEL AND BRAKE REPLACEMENT MAY
BE REQUIRED. IF OVERHEAT OCCURS
AFTER TAKEOFF, EXTEND GEAR SOON
FOR AT LEAST 12 MINUTES.

BRAKE TEMPERATURE MONITOR
INDICATION MAY BE USED 12 TO 15
MINUTES AFTER AIRPLANE HAS COME
TO A COMPLETE STOP, OR INFLIGHT
WITH GEAR RETRACTED TO DETERMINE
RECOMMENDED COOLING SCHEDULE.

ADVISORY INFORMATION

Normal Configuration Landing Distance Flaps 30

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	200000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 200000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF30	ONE REV	NO REV

Dry Runway

MAX MANUAL	880	+25/-5	20	-35/+125	+10/-10	+20/-20	35	15	40
AUTOBRAKE MAX	1180	+20/-5	25	-50/+175	0/0	+30/-30	65	0	0
AUTOBRAKE 4	1455	+25/-10	40	-70/+245	0/-5	+40/-40	80	0	0
AUTOBRAKE 3	1740	+30/-10	45	-90/+305	+10/-10	+50/-50	95	0	0
AUTOBRAKE 2	1935	+40/-20	55	-100/+350	+20/-35	+55/-55	85	20	20
AUTOBRAKE 1	2060	+45/-25	65	-115/+395	+45/-50	+60/-60	90	120	120

Good Reported Braking Action

MAX MANUAL	1210	+20/-10	30	-60/+215	+30/-25	+30/-30	50	70	170
AUTOBRAKE MAX	1290	+25/-10	35	-60/+220	+25/-20	+30/-30	60	75	175
AUTOBRAKE 4	1460	+25/-5	40	-70/+250	+5/-5	+40/-40	80	10	45
AUTOBRAKE 3	1740	+30/-10	45	-90/+305	+10/-10	+50/-50	95	0	0
AUTOBRAKE 2	1935	+40/-20	55	-100/+350	+20/-35	+55/-55	85	20	20
AUTOBRAKE 1	2060	+45/-25	65	-115/+395	+45/-50	+60/-60	90	120	120

Medium Reported Braking Action

MAX MANUAL	1620	+35/-20	50	-95/+345	+70/-60	+40/-40	60	205	530
MAX AUTO	1635	+35/-15	50	-95/+350	+70/-55	+40/-45	70	200	525
AUTOBRAKE 4	1660	+35/-15	50	-95/+350	+70/-50	+45/-45	75	205	540
AUTOBRAKE 3	1825	+35/-15	50	-100/+375	+50/-35	+50/-50	95	110	405
AUTOBRAKE 2	1980	+40/-20	55	-110/+395	+50/-50	+55/-55	85	85	300
AUTOBRAKE 1	2085	+45/-25	65	-115/+420	+65/-60	+60/-60	90	160	300

Poor Reported Braking Action

MAX MANUAL	2070	+45/-30	70	-135/+535	+165/-110	+55/-55	70	460	1410
AUTOBRAKE MAX	2075	+50/-30	70	-135/+540	+170/-115	+55/-55	70	465	1415
AUTOBRAKE 4	2090	+50/-30	70	-140/+540	+165/-115	+55/-60	70	465	1425
AUTOBRAKE 3	2120	+45/-25	70	-140/+545	+160/-95	+55/-60	90	445	1410
AUTOBRAKE 2	2205	+50/-30	70	-145/+555	+150/-105	+60/-60	85	375	1320
AUTOBRAKE 1	2260	+50/-30	75	-145/+565	+155/-105	+60/-65	85	405	1265

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

For Max Manual braking and manual speedbrakes, increase reference landing distance by 60 m.

For autobrake and manual speedbrakes, increase reference landing distance by 50 m.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 25

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	200000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 200000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF25	ONE REV	NO REV

Dry Runway

MAX MANUAL	925	+25/-10	20	-35/+130	+10/-10	+20/-20	35	20	45
MAX AUTO	1260	+20/-15	30	-55/+180	0/0	+30/-30	65	0	0
AUTOBRAKE 4	1570	+30/-20	40	-75/+255	0/-5	+40/-40	85	0	0
AUTOBRAKE 3	1880	+35/-25	50	-95/+320	+10/-15	+55/-55	95	0	0
AUTOBRAKE 2	2070	+45/-35	60	-105/+365	+30/-45	+60/-60	85	50	50
AUTOBRAKE 1	2190	+50/-40	70	-115/+405	+50/-55	+60/-60	90	170	180

Good Reported Braking Action

MAX MANUAL	1275	+25/-15	35	-60/+220	+30/-25	+30/-30	50	80	195
AUTOBRAKE MAX	1360	+25/-15	35	-65/+225	+25/-20	+30/-35	60	85	205
AUTOBRAKE 4	1570	+30/-20	40	-75/+260	+5/-5	+40/-40	85	10	45
AUTOBRAKE 3	1880	+35/-25	50	-95/+320	+10/-15	+55/-55	95	0	0
AUTOBRAKE 2	2070	+45/-35	60	-105/+365	+30/-45	+60/-60	85	50	50
AUTOBRAKE 1	2190	+50/-40	70	-115/+405	+50/-55	+60/-60	90	170	180

Medium Reported Braking Action

MAX MANUAL	1705	+35/-30	50	-95/+355	+75/-60	+45/-45	60	230	605
AUTOBRAKE MAX	1720	+35/-25	50	-95/+355	+75/-55	+45/-45	70	225	595
AUTOBRAKE 4	1760	+35/-25	50	-100/+360	+65/-45	+45/-50	80	215	600
AUTOBRAKE 3	1965	+40/-30	55	-105/+385	+45/-40	+55/-55	95	110	430
AUTOBRAKE 2	2115	+45/-35	65	-115/+410	+55/-60	+60/-60	85	115	345
AUTOBRAKE 1	2215	+50/-40	70	-120/+430	+75/-70	+60/-65	90	210	370

Poor Reported Braking Action

MAX MANUAL	2170	+50/-40	75	-140/+545	+165/-115	+55/-60	70	510	1595
AUTOBRAKE MAX	2180	+50/-40	75	-140/+545	+170/-115	+55/-60	75	510	1600
AUTOBRAKE 4	2195	+50/-40	75	-140/+550	+165/-115	+55/-60	70	515	1610
AUTOBRAKE 3	2255	+50/-40	75	-145/+555	+155/d-100	+60/-65	90	465	1565
AUTOBRAKE 2	2335	+55/-40	75	-145/+565	+155/-110	+60/-65	80	415	1480
AUTOBRAKE 1	2390	+55/-45	80	-150/+575	+160/-110	+65/-70	85	465	1430

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

For Max Manual braking and manual speedbrakes, increase reference landing distance by 60 m.

For autobrake and manual speedbrakes, increase reference landing distance by 55 m.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).



Flight Planning and Performance Manual

ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 20

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	200000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 200000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF20	ONE REV	NO REV

Dry Runway

MAX MANUAL	960	+30/-15	20	-40/+130	+10/-10	+20/-20	35	25	50
AUTOBRAKE MAX	1320	+20/-20	30	-55/+185	0/0	+30/-30	65	0	0
AUTOBRAKE 4	1655	+30/-30	45	-75/+260	0/0	+45/-45	90	0	0
AUTOBRAKE 3	2000	+40/-35	55	-95/+330	+5/-15	+55/-55	100	0	0
AUTOBRAKE 2	2200	+45/-45	65	-110/+380	+25/-45	+60/-60	95	50	50
AUTOBRAKE 1	2335	+55/-50	75	-120/+420	+50/-60	+65/-65	95	180	180

Good Reported Braking Action

MAX MANUAL	1340	+25/-20	35	-65/+225	+35/-30	+30/-35	50	95	220
AUTOBRAKE MAX	1420	+25/-25	40	-65/+230	+30/-20	+35/-35	65	95	230
AUTOBRAKE 4	1655	+30/-30	45	-80/+265	+5/-5	+45/-45	90	10	50
AUTOBRAKE 3	2000	+40/-35	55	-95/+330	+5/-15	+55/-55	100	0	0
AUTOBRAKE 2	2200	+45/-45	65	-110/+380	+25/-45	+60/-60	95	50	50
AUTOBRAKE 1	2335	+55/-50	75	-120/+420	+50/-60	+65/-65	95	180	180

Medium Reported Braking Action

MAX MANUAL	1805	+40/-35	55	-100/+365	+80/-65	+45/-50	65	260	700
AUTOBRAKE MAX	1815	+40/-35	55	-100/+365	+80/-60	+45/-50	70	255	690
AUTOBRAKE 4	1855	+40/-35	55	-100/+370	+70/-45	+50/-50	85	245	695
AUTOBRAKE 3	2080	+40/-40	60	-110/+395	+45/-40	+55/-60	100	125	510
AUTOBRAKE 2	2250	+45/-45	70	-120/+425	+55/-60	+65/-65	95	115	395
AUTOBRAKE 1	2355	+55/-50	75	-125/+445	+75/-70	+65/-70	95	220	400

Poor Reported Braking Action

MAX MANUAL	2305	+55/-50	80	-145/+560	+180/-120	+60/-65	75	580	1860
AUTOBRAKE MAX	2310	+55/-50	80	-145/+560	+180/-125	+60/-65	75	580	1865
AUTOBRAKE 4	2325	+55/-50	80	-145/+565	+175/-120	+60/-65	80	585	1870
AUTOBRAKE 3	2390	+55/-50	80	-150/+570	+160/-105	+65/-70	95	535	1835
AUTOBRAKE 2	2485	+55/-50	80	-150/+580	+160/-115	+65/-70	90	460	1730
AUTOBRAKE 1	2540	+60/-55	85	-155/+595	+170/-115	+70/-70	90	505	1660

Reference distance is for sea level, standard day, no wind or slope, VREF20 approach speed, 2 engine reverse thrust, and auto speedbrakes.

For Max Manual braking and manual speedbrakes, increase reference landing distance by 65 m.

For autobrake and manual speedbrakes, increase reference landing distance by 55 m.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).

Intentionally
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FLIGHT PLANNING

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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 rate for normal operation is 240 kg per hour on the ground.

Taxi fuel allowance is approximately 33 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)				
	300	260	220	180	140
43				160	140
39			180	160	145
35		200	190	170	140
31	230	220	195	165	140
25	230	220	195	175	155
20	235	230	205	185	165
15	235	235	215	200	185
10	240	240	230	220	200
5	270	270	255	240	220

Climb

Trip Fuel and Time charts are based on 310/.84 climb speed. Local ATC may require that 250 KIAS not be exceeded below 10000 ft. Approximately 40 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	.84M	CI 180
2000 FT ABOVE OPTIMUM ALTITUDE	3	3	3
2000 FT BELOW	0	0	0
4000 FT BELOW	1	1	2
6000 FT BELOW	3	4	5
8000 FT BELOW	5	8	9
10000 FT BELOW	8	12	13
12000 FT BELOW	12	16	17
	15	20	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 LRC may be approximated by a constant .84M or Cost Index 180.

Increase total fuel flow during cruise approximately 150 kg/hr for engine and wing anti-ice on.

Every 500 kg reduction in landing weight decreases trip fuel at optimum altitude by approximately 0.17%.

Descent

Optimum descent speeds for minimum trip fuel are a function of weight. Trip Fuel and Time charts are based on .84/310/250 descent speed, and include straight in approach allowances only. Each additional minute of flaps down maneuvering consumes approximately 100 kg of additional fuel with the gear retracted and 120 kg with the gear extended.

Missed Approach

Approximately 400 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.

Optimum Altitude/Short Trip Cruise Altitude

Optimum altitude for best fuel mileage is presented for LRC/.84M speed schedule. Fuel mileage penalties for flying off-optimum altitude are tabulated under Altitude Selection.

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.

Trip Fuel and Time

Trip Fuel and Time charts are provided for Long Range Cruise and .84M at constant altitude to determine trip fuel and time from brake release to touchdown. A similar chart for a cost index of 180 (which approximates Long Range Cruise) is also shown. APU usage, taxi, inflight flaps down maneuvering (other than straight in approach) and reserve fuel should be added to the 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 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 correction guidelines. Adjusted ground distance is ground distance multiplied by the ratio $\text{Average TAS} / (\text{Average TAS} + \text{Wind Component})$, where headwind is negative and tailwind is positive.

Step Climb 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 continually increases as the airplane weight decreases, a step climb procedure bracketing optimum altitude is necessary.

The Step Climb Planning charts provide trip fuel and time for Long Range Cruise, .84M or Cost Index 180 from brake release to touchdown, similar to the constant altitude Trip Fuel and Time charts. The charts are based on 4000 ft step climbs to 2000 ft above optimum altitude.

Short Trip Fuel and Time

Short Trip Fuel and Time charts include fuel and time for climb to cruise altitude, cruise, descent and straight in approach. The charts are 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, adjusted 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

These tables provide total fuel flow information necessary for planning holding and reserve fuel requirements. The tables are 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 table values by 5%.

Fuel Tankering

The Fuel Tankering table below is provided for LRC/.84M cruise schedule based on a step climb procedure to bracket optimum altitude. When a fuel price differential exists between two stations, this table may be used to determine if fuel may be economically transported for a subsequent flight sector.

Enter the table with the trip distance to read the break-even fuel price ratio. As noted, the break-even fuel price is the fuel price at departure multiplied by the break-even fuel price ratio. To justify tanker operation, economically, the fuel price at destination must be greater than the break-even fuel price.

TRIP DISTANCE (NM)	BREAK-EVEN PRICE RATIO
200	1.013
400	1.023
600	1.033
800	1.043
1000	1.054
2000	1.110
3000	1.173
4000	1.239
5000	1.309
6000	1.383

Oxygen Requirements

Passenger Oxygen System - Chemical

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. 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.

Flight Crew System

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. The oxygen quantity associated with these requirements is achieved with the minimum dispatch oxygen cylinder pressure. Enter the Flight Crew System oxygen table with the number of crew plus observers using oxygen and read the minimum cylinder pressure required for the appropriate bottle temperature.

An additional quantity of oxygen is required when flight altitudes above 41000 ft are planned. Regulations require that one active duty pilot must don the oxygen mask and breathe diluted oxygen for the duration of the flight above 41000 ft. The additional quantity of oxygen required is 2.05 liters/person/minute (0.6 psi/person/minute for the dual cylinder system), or 13 liters/person/minute (4 psi/person/minute) if 100% oxygen is selected during normal usage.

Driftdown

Net Level Off Weight

This chart is used to determine the maximum weight for terrain clearance based on the Approved Flight Manual net engine inoperative performance at 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. 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 anti-ice operation with the weight adjustment shown on 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 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 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.

To determine fuel required, enter with the desired ground distance, correct 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

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 diversion airport comply with rules set up specifically for extended range operation with two engine airplanes. 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 driftdown/cruise speed schedules. The information is based on drifting down using Max Continuous thrust at the Mach number shown until reaching the corresponding airspeed and maintaining that airspeed throughout the remainder of the driftdown and level cruise. Based on route requirements, operators may select any one of these speeds for their operation, or may elect to use an entirely different speed which is not contained in this section.

Flight Planning

The following information is shown for flight planning purposes and is intended for use mainly by ground personnel.

Data is included for five basic schedules (Long Range Cruise, .84/260, .84/280, .84/300 and .84/320) throughout this section to allow the operator to evaluate the effect of using speeds up to 320 KIAS (VMO -10).

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 range operation. The distance to the diversion airport from any point along the intended route must be covered within the approved time using the single engine cruise speed (assuming still air and ISA conditions) selected by the operator.

Enter the chart with the appropriate weight using the speed schedule and time selected and read the 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 flight profiles as described on the charts. This information is shown for All-Engines operation at Long Range Cruise, as well as Engine-Inop operation at Long Range Cruise, 260, 280, 300 and 320 KIAS. There are two separate Engine-Inop scenarios; one assumes a loss of pressurization and subsequent cruise at 10000 ft, the other assumes only an engine failure with the airplane drifting down to an applicable level-off altitude for the remainder of the diversion. The ETOPS Critical Fuel required is the greater of All-Engine fuel or Engine-Inop fuel for the speed schedule selected. This fuel is compared to the amount of fuel normally onboard the airplane at that point in the route. If the fuel required by critical fuel reserves exceeds the amount of fuel normally expected, fuel load must be adjusted accordingly.

To determine the fuel required, enter the appropriate chart with desired diversion distance, adjust for forecast wind (factored if applicable), proceed vertically to the weight at critical point and read the fuel required to the right. If the operator is 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 at the bottom of the chart. If the operator is not using an acceptable wind forecasting model, the calculated diversion fuel is to be increased by 5% instead of factoring the forecast wind values. Adjustments for non-standard conditions are shown at the bottom of the page.

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.

Net Level Off Weight

These charts are used to determine the maximum weight for terrain clearance based on net engine inoperative performance for the speed schedules shown and is for planning purposes only. Regulations require terrain clearance flight planning based on net performance which is the gross (or actual) gradient performance degraded by 1.1%.

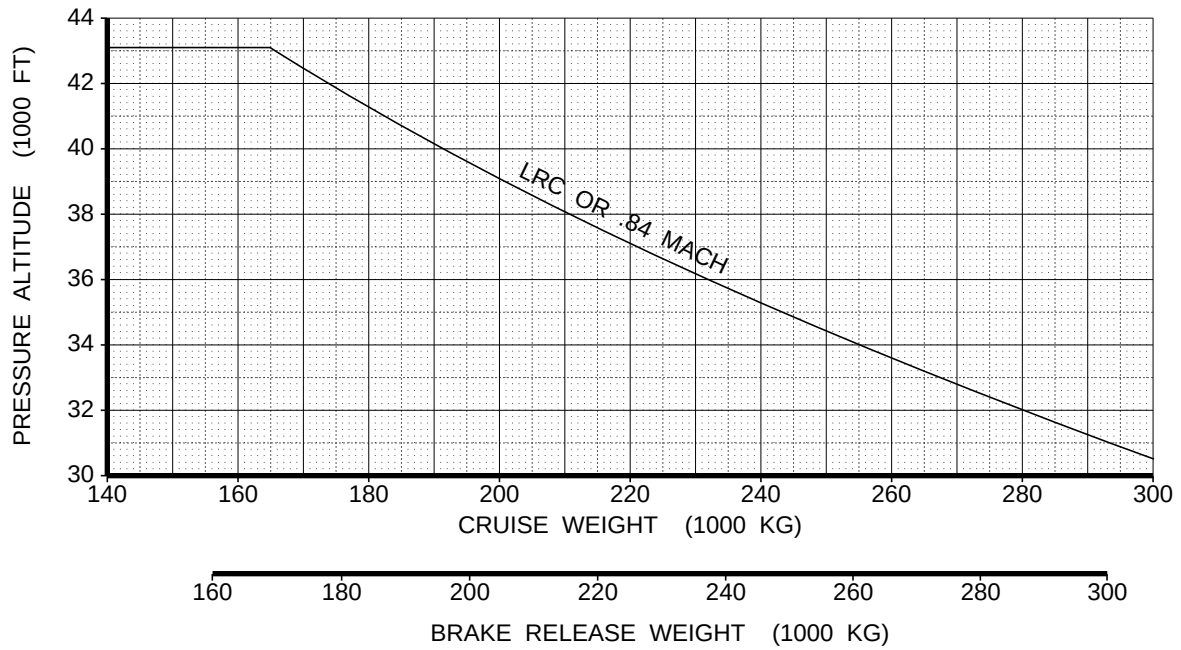
Net level off weight is determined by entering the appropriate chart at the left with the desired level off pressure altitude, correcting for anti-ice as shown, proceeding across to the correct ISA deviation line and reading the allowable weight at the bottom. The net level off altitude may be obtained by entering the chart with weight and proceeding up to the correct ISA deviation line and reading across to the altitude on the left.

Driftdown/Cruise Range Capability

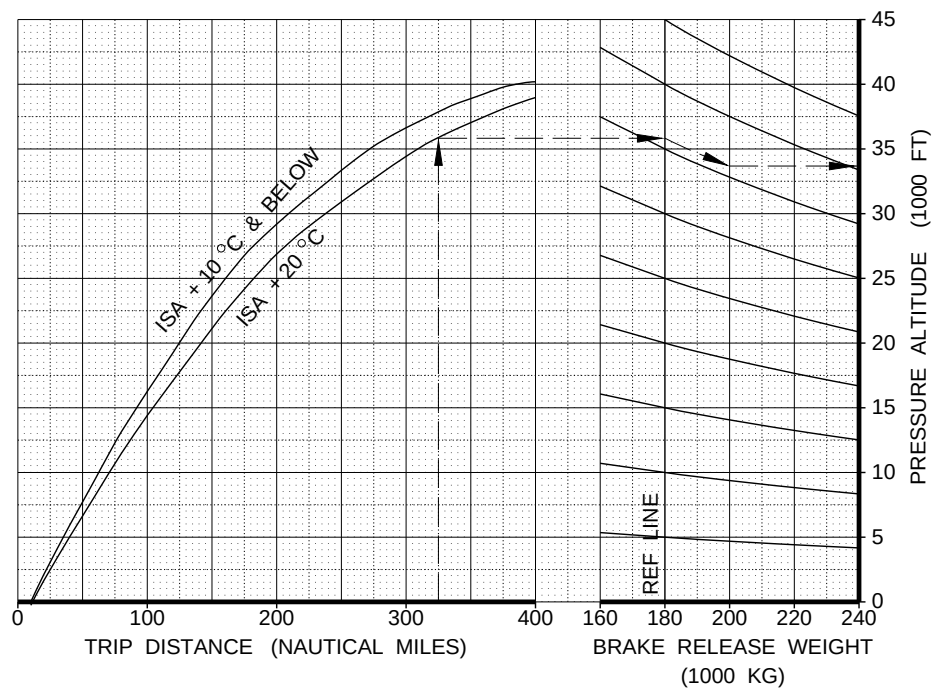
These charts show range capability from the start of driftdown/cruise when the driftdown/cruise procedure outlined in this section is followed. Charts are shown for each of the speed schedules discussed previously.

To determine the fuel required, enter 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.

Optimum Altitude



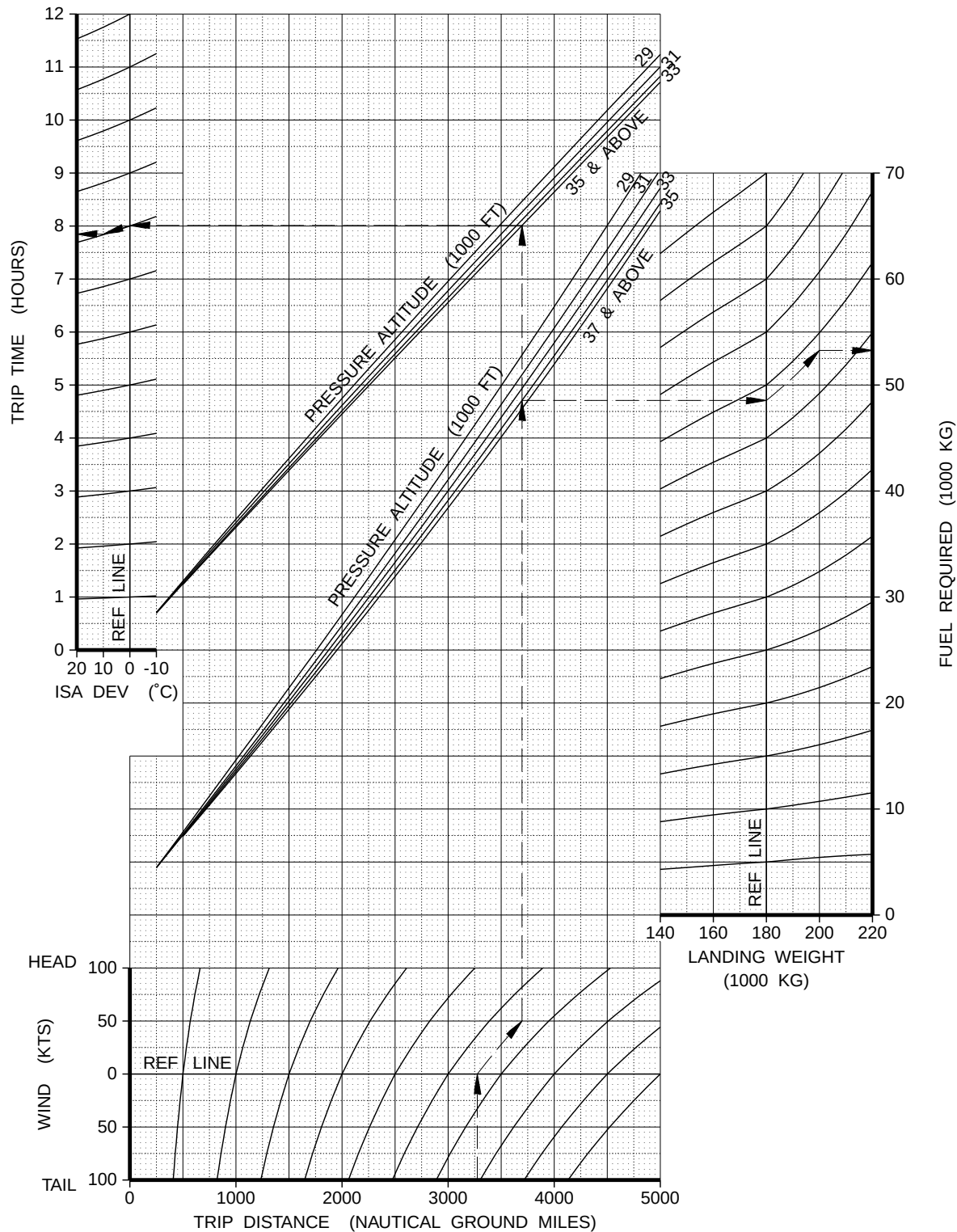
Short Trip Cruise Altitude



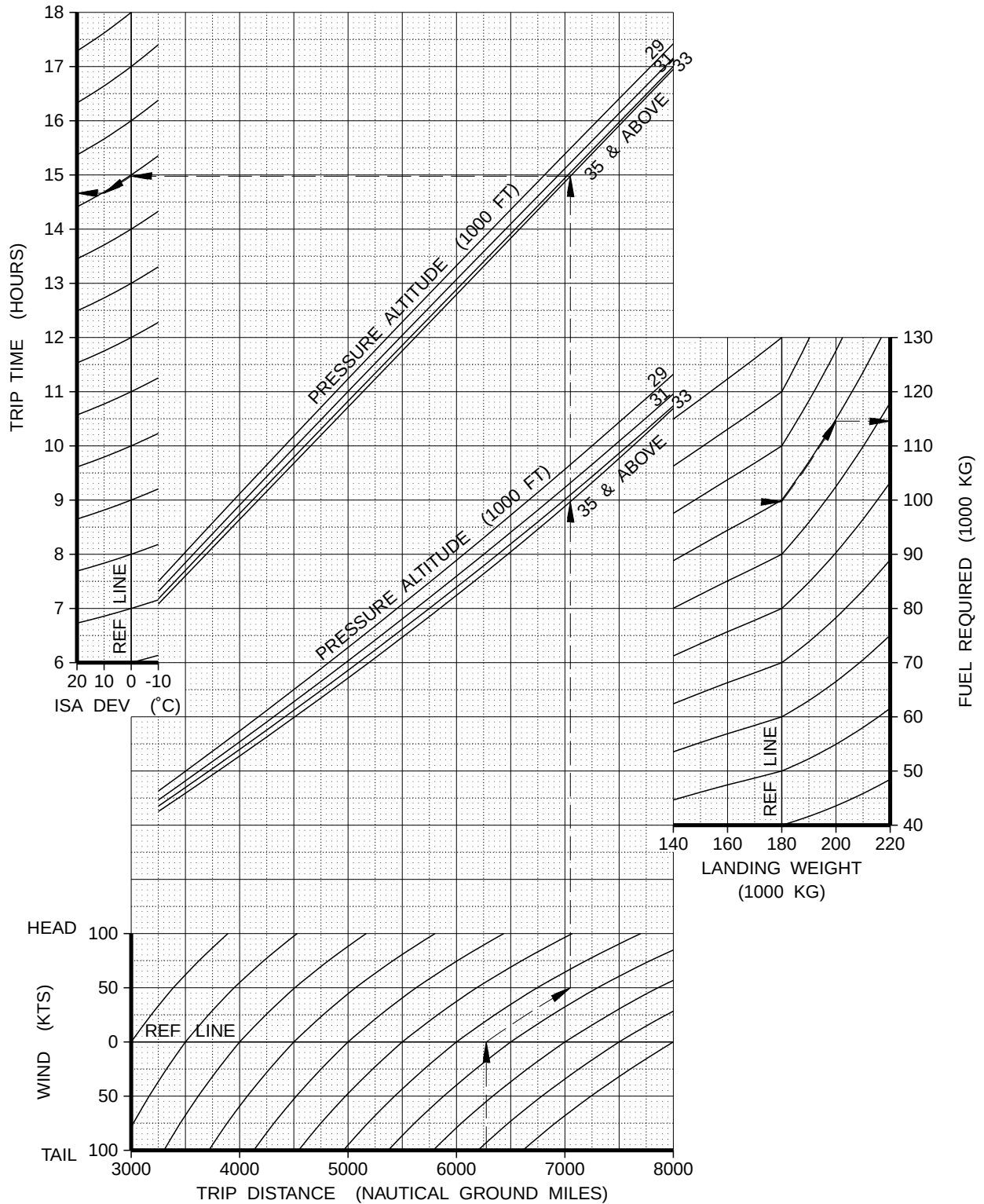
Long Range Cruise Trip Fuel and Time

0 to 5000 NM Trip Distance

Based on 310/.84 climb and .84/310/250 descent



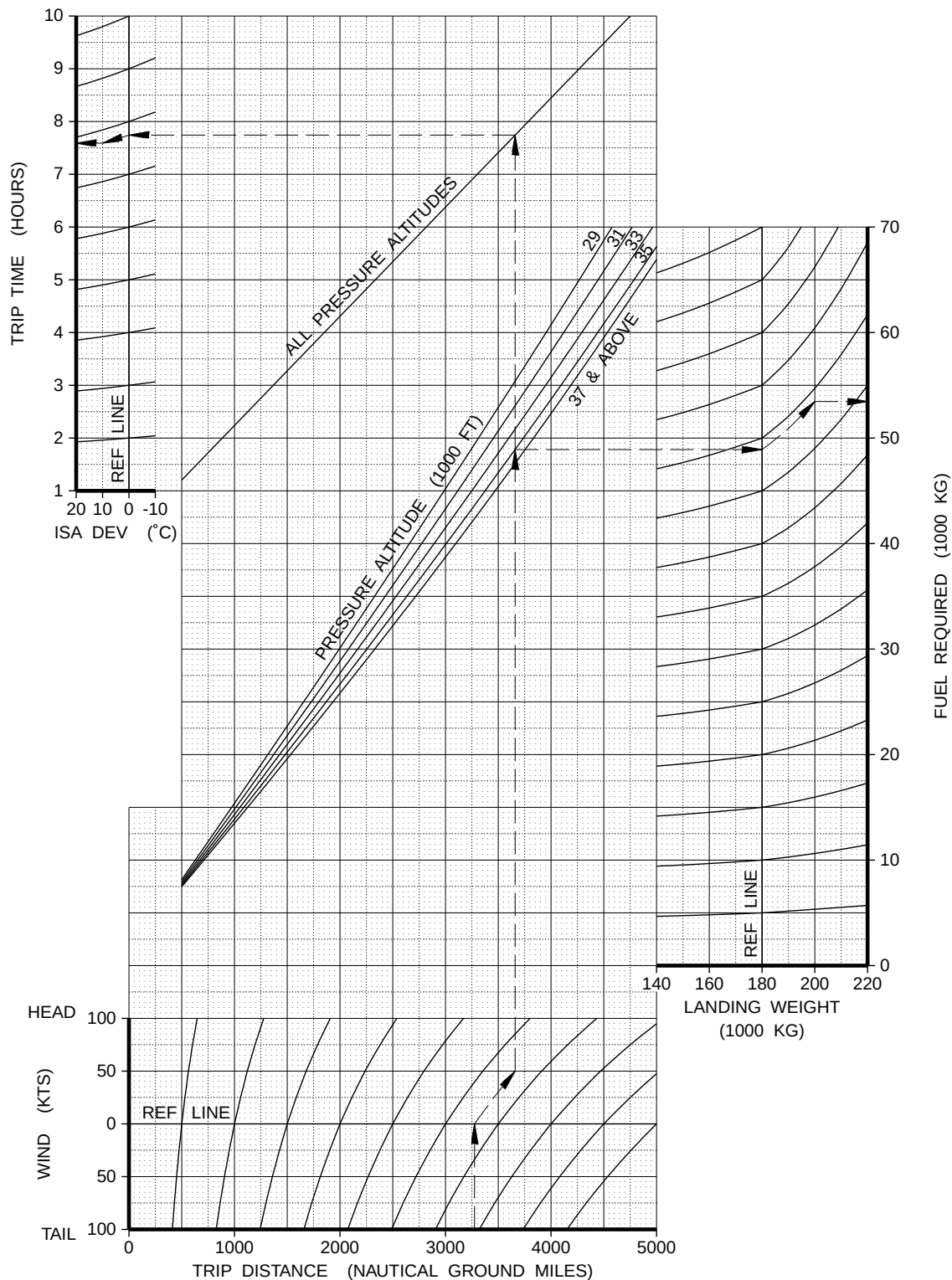
Long Range Cruise Trip Fuel and Time 3000 to 8000 NM Trip Distance Based on 310/.84 climb and .84/310/250 descent



.84M Trip Fuel and Time

0 to 5000 NM Trip Distance

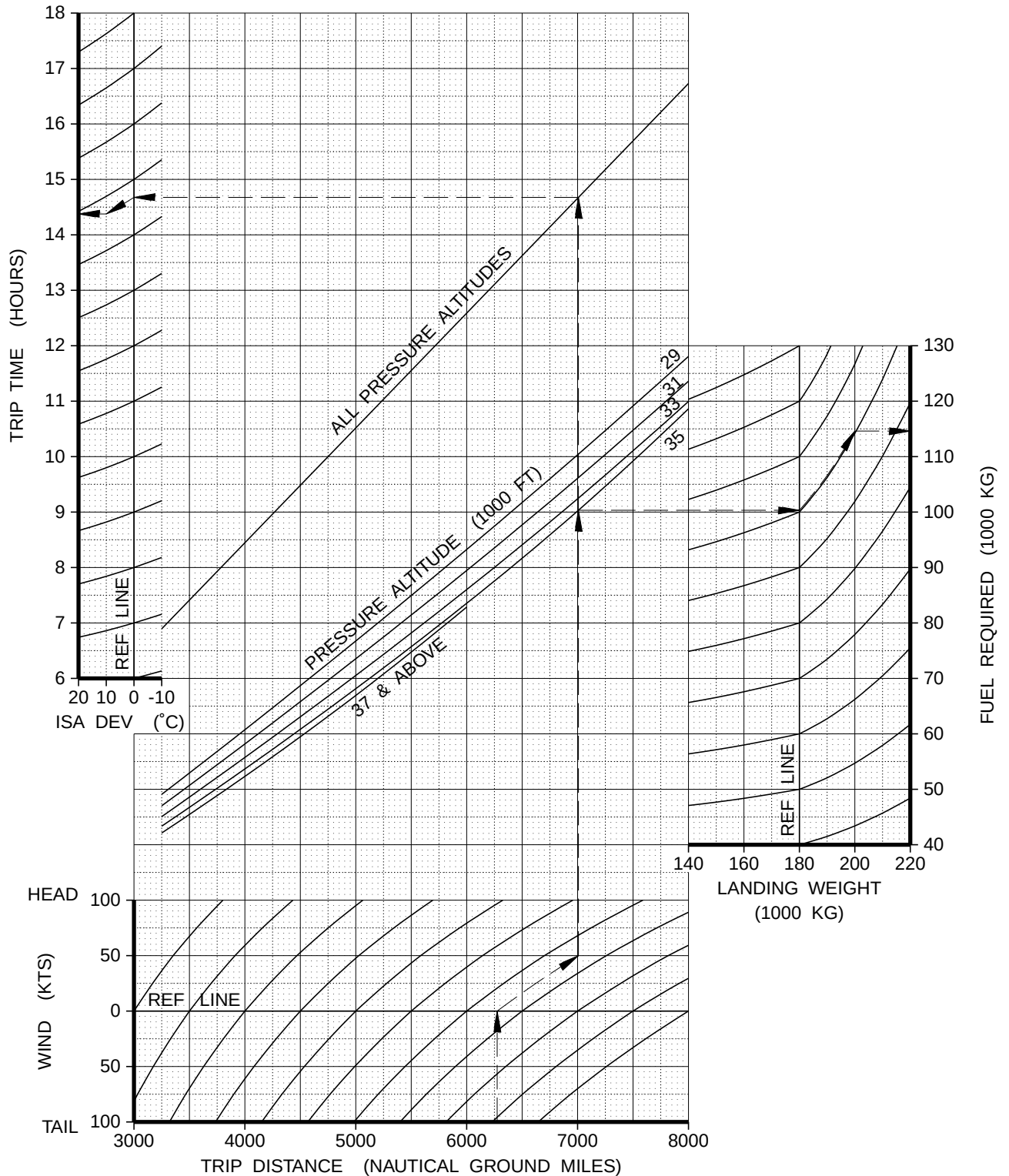
Based on .310/.84 climb and .84/310/250 descent



.84M Trip Fuel and Time

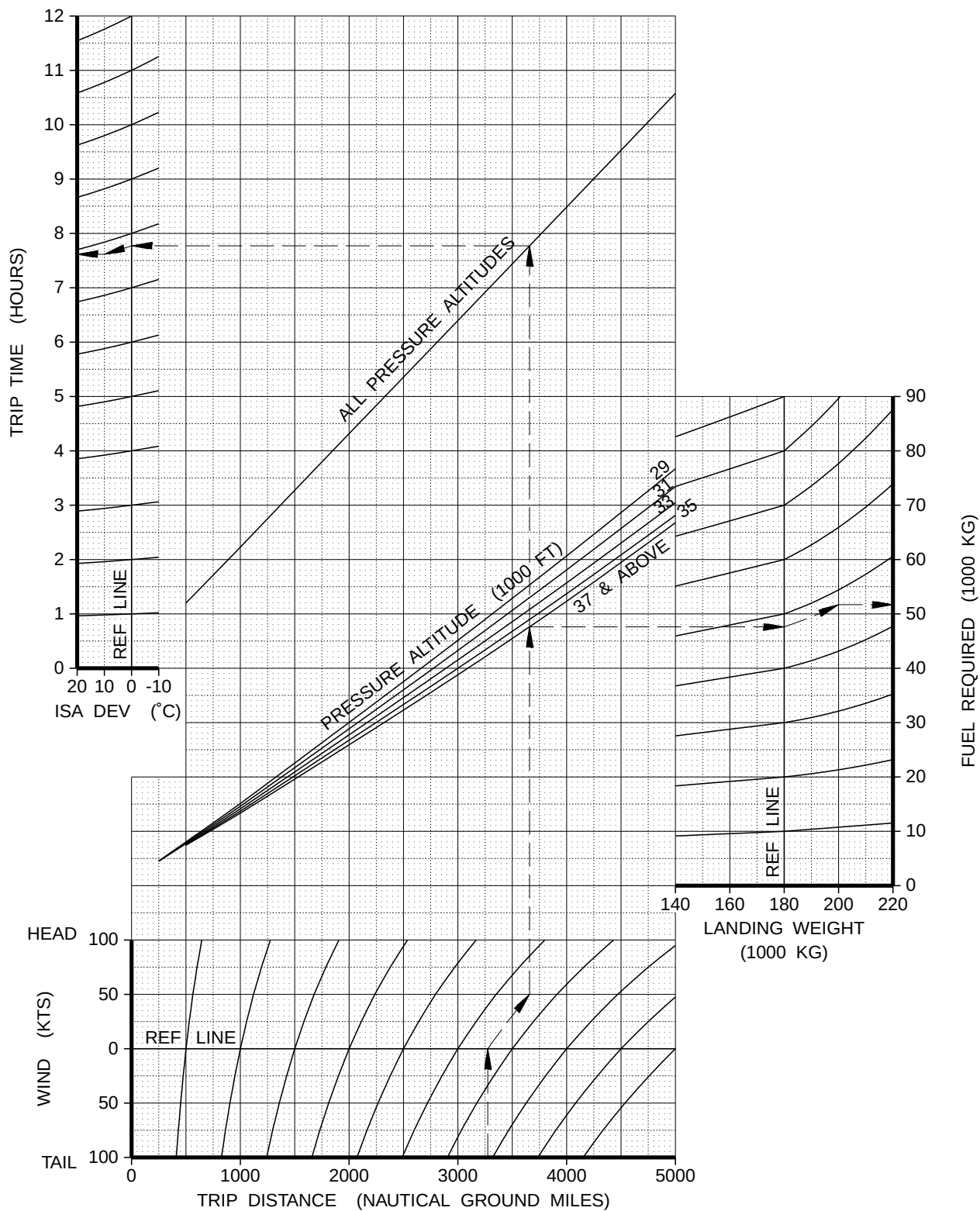
3000 to 8000 NM Trip Distance

Based on .310/.84 climb and .84/.310/250 descent

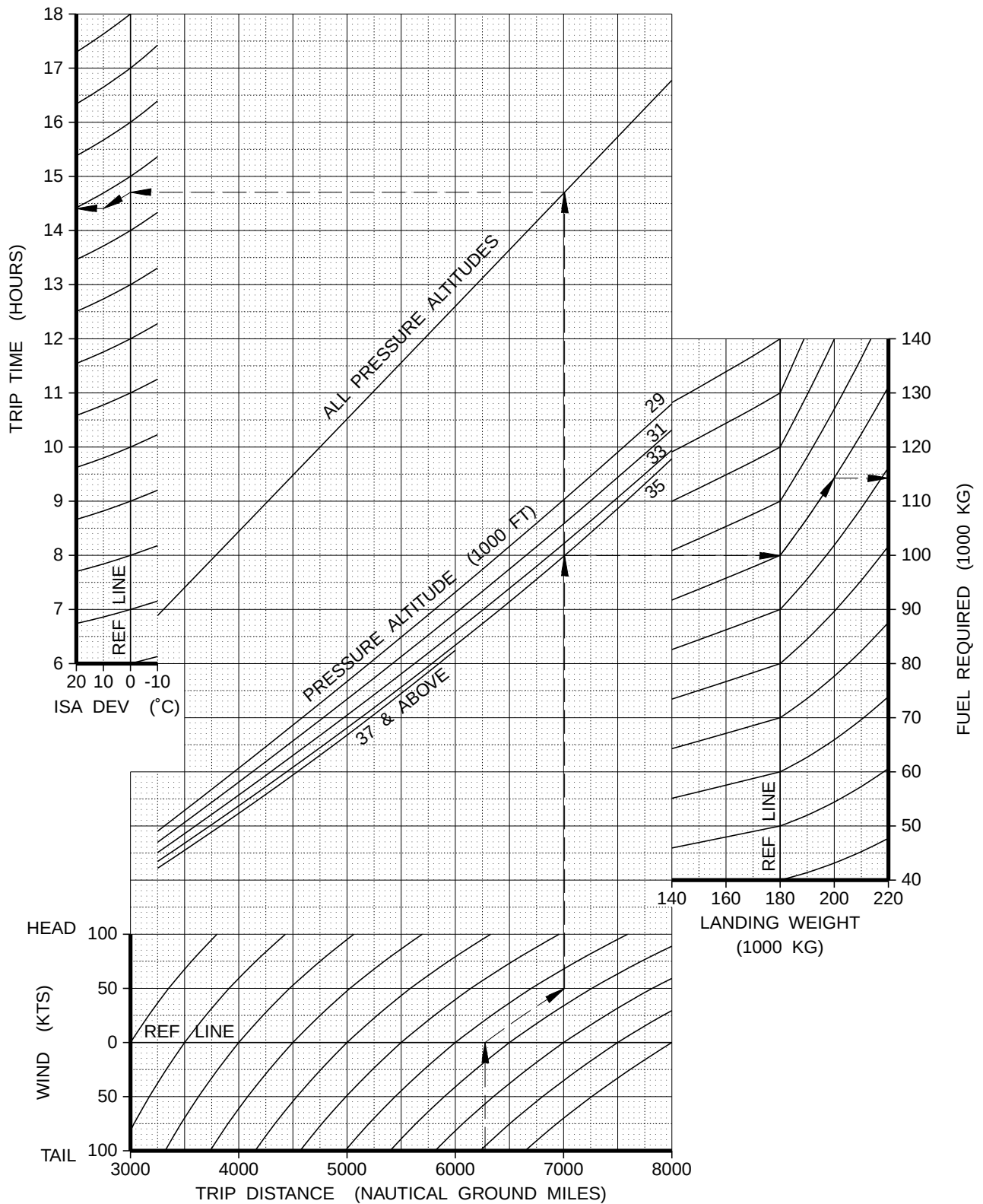


Cost Index 180 Trip Fuel and Time

0 to 5000 NM Trip Distance

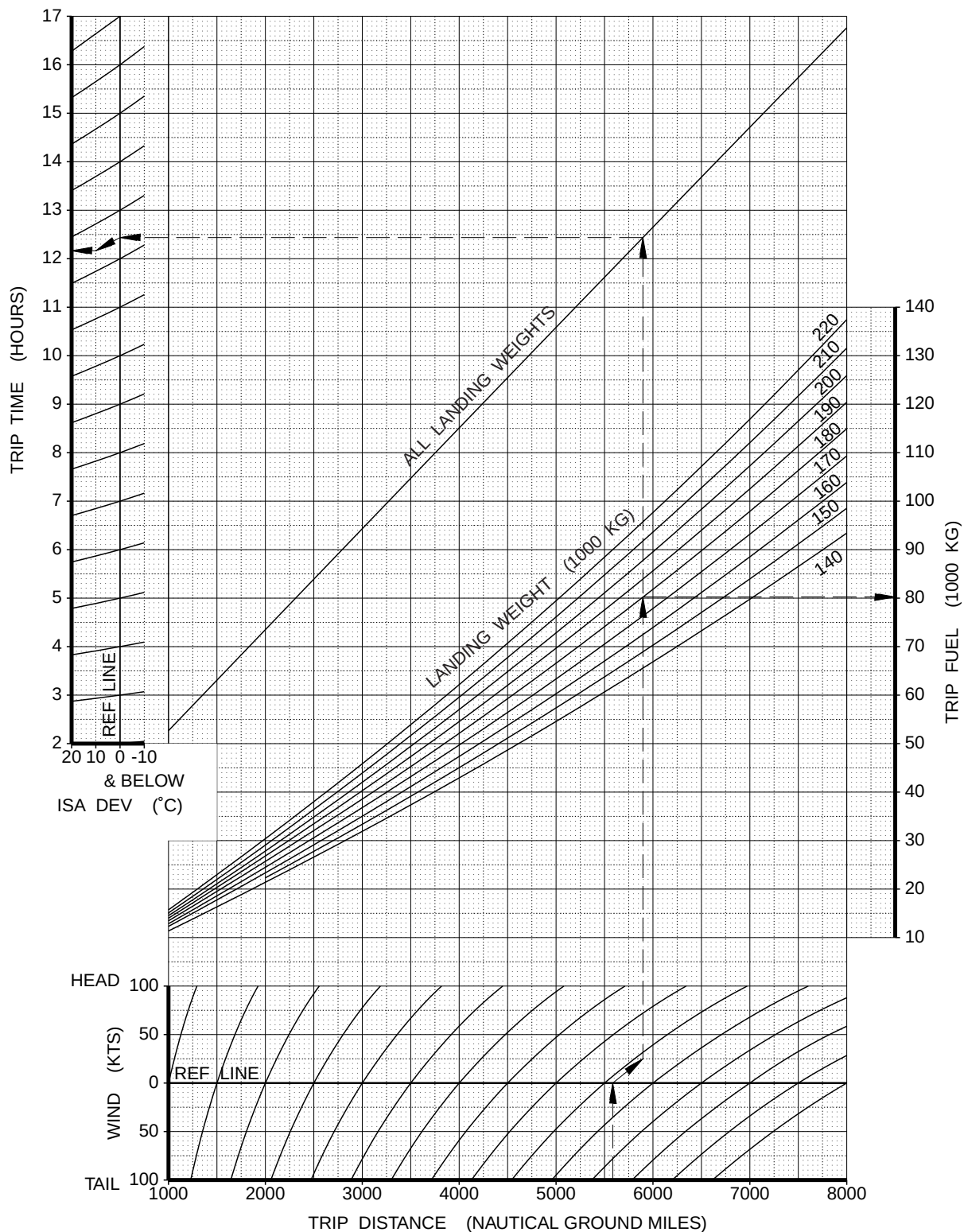


Cost Index 180 Trip Fuel and Time 3000 to 8000 NM Trip Distance



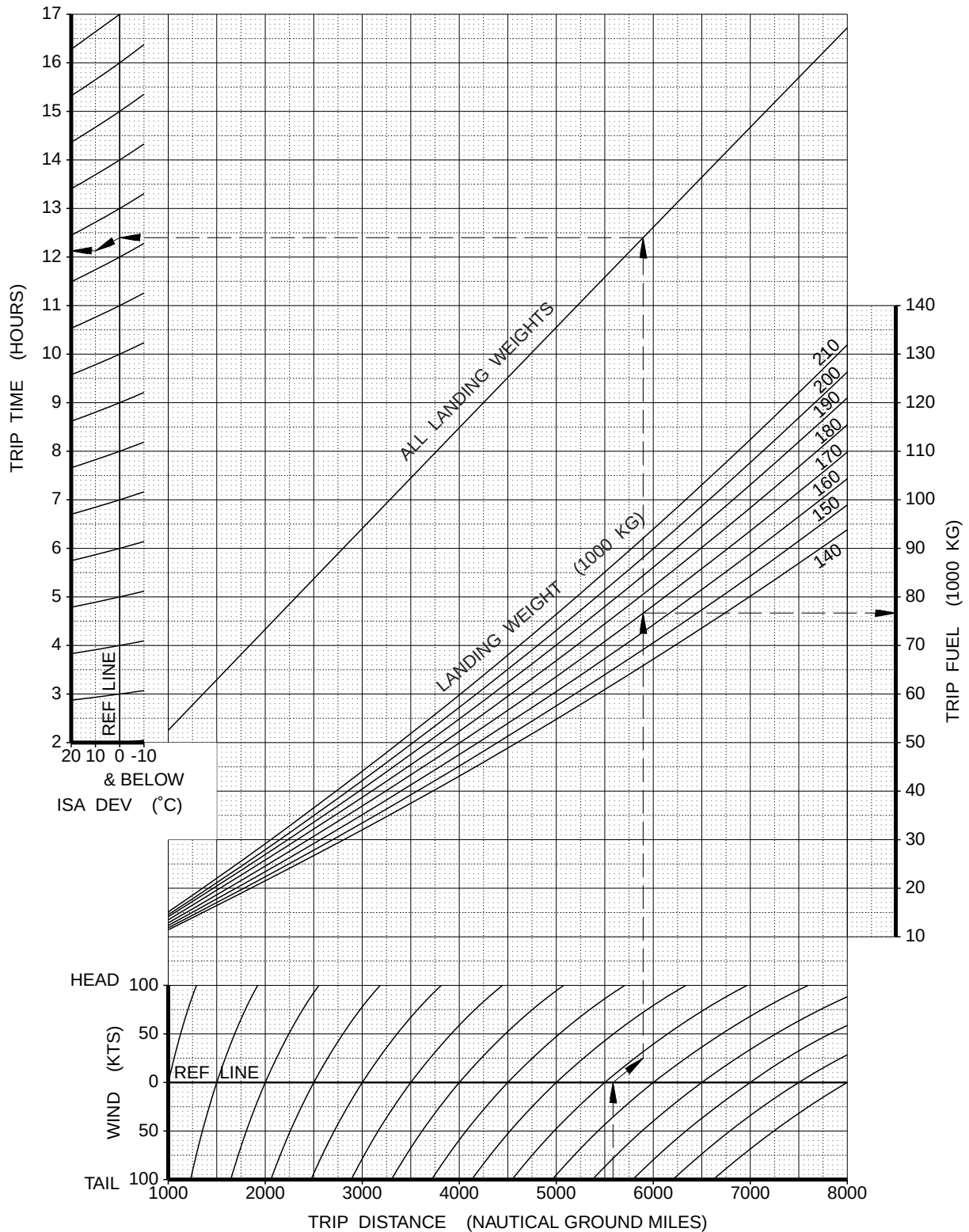
Long Range Cruise Step Climb Trip Fuel and Time

Based on 310/.84 climb and .84/310/250 descent

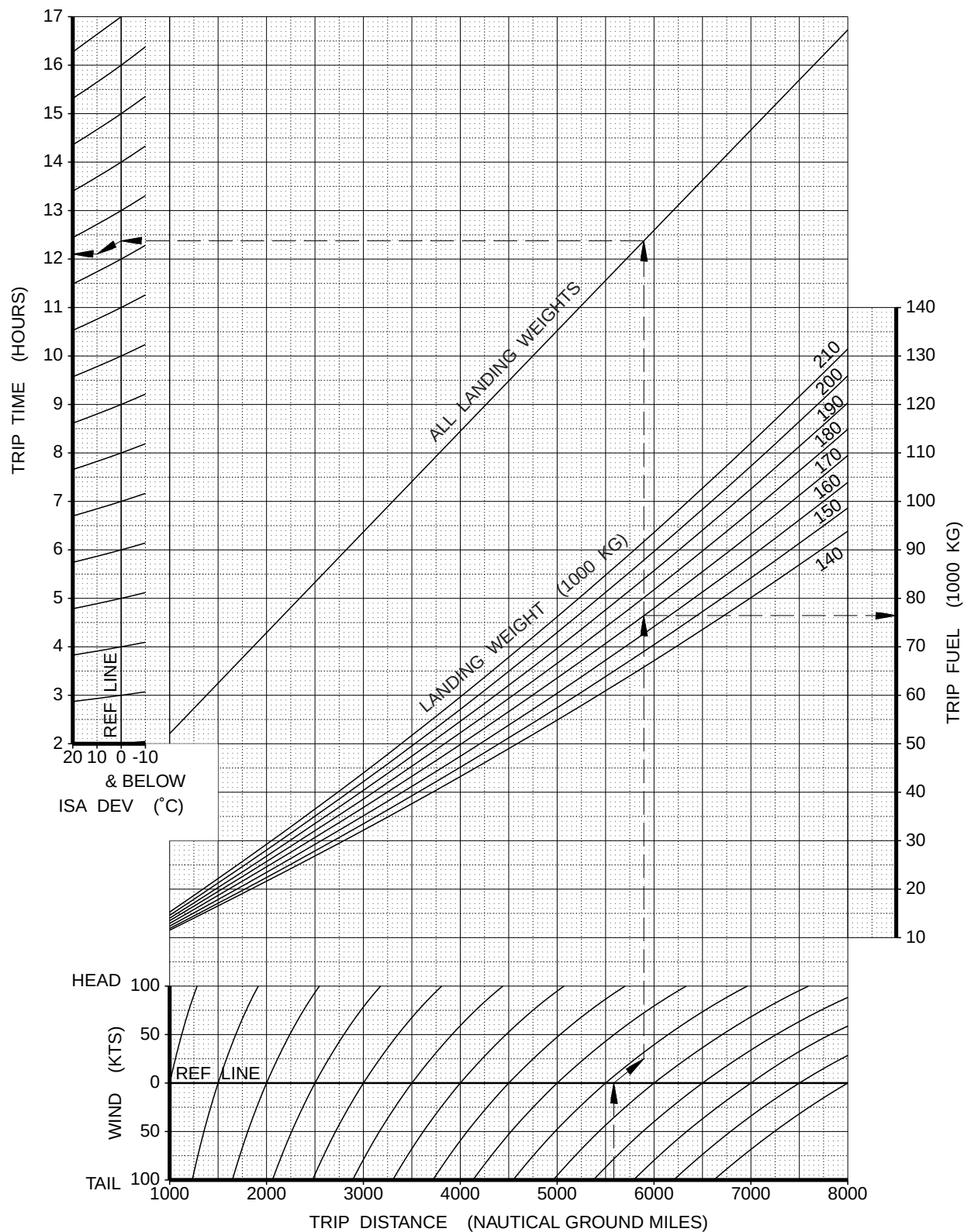


.84M Step Climb Trip Fuel and Time

Based on 310/.84 climb and .84/310/250 descent

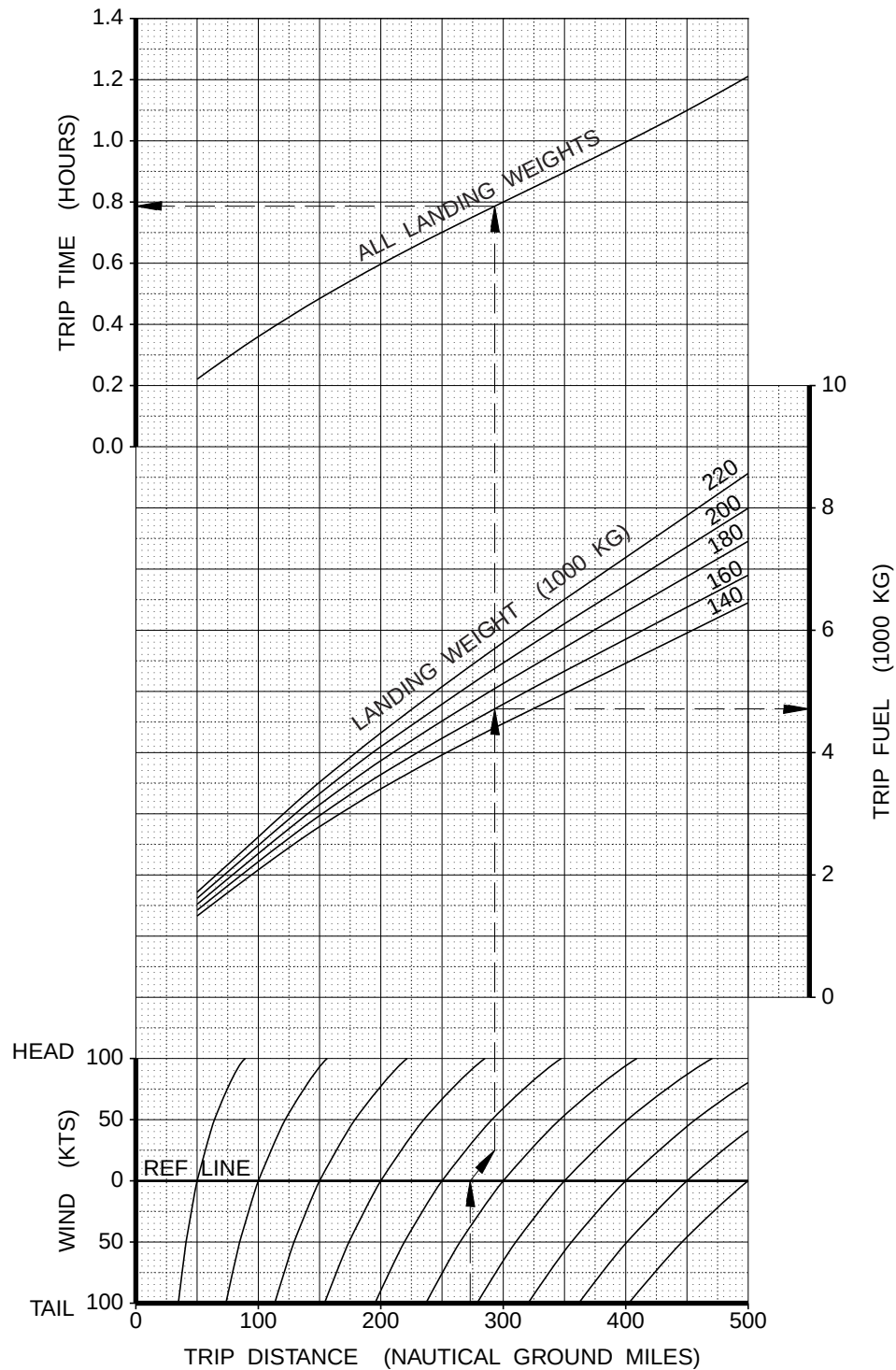


Cost Index 180 Step Climb Trip Fuel and Time

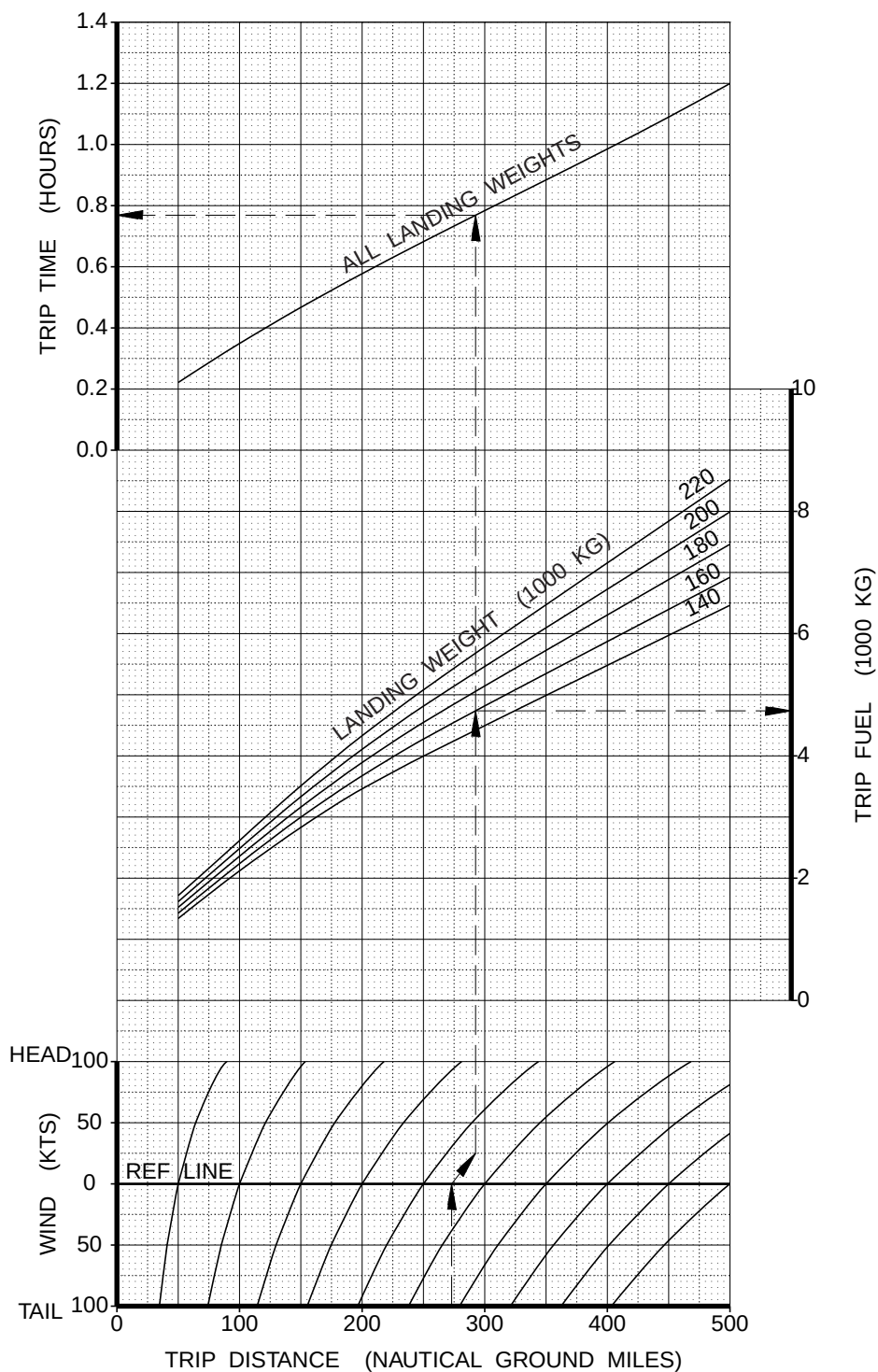


Long Range Cruise Short Trip Fuel and Time

Based on .310/.84 climb and .84/.310/250 descent at short trip cruise altitude



Cost Index 180 Short Trip Fuel and Time



Holding Planning

Flaps Up

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)								
	WEIGHT (1000 KG)								
	300	280	260	240	220	200	180	160	140
43000						6880	5650	4940	4230
40000					6980	6100	5300	4730	4080
35000		8740	7830	7010	6270	5610	4970	4460	3920
30000	8820	8090	7390	6710	6070	5460	4890	4280	3920
25000	8500	7870	7240	6750	5980	5310	4740	4310	3940
20000	8360	7760	7030	6390	5790	5260	4770	4370	4040
15000	7860	7420	6860	6320	5790	5280	4810	4410	4070
10000	8020	7510	6980	6460	5940	5440	4980	4580	4240
5000	8260	7730	7190	6630	6070	5560	5100	4710	4360
1500	8270	7740	7220	6690	6170	5680	5220	4830	4480

Flaps 1

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)								
	WEIGHT (1000 KG)								
	300	280	260	240	220	200	180	160	140
20000	8550	8020	7360	6730	6110	5520	4960	4490	4110
15000	8470	7940	7310	6700	6120	5550	4990	4520	4150
10000	8500	8020	7420	6840	6270	5690	5130	4660	4290
5000	8640	8190	7570	6960	6360	5760	5200	4740	4380
1500	8690	8220	7600	7010	6420	5850	5300	4850	4490

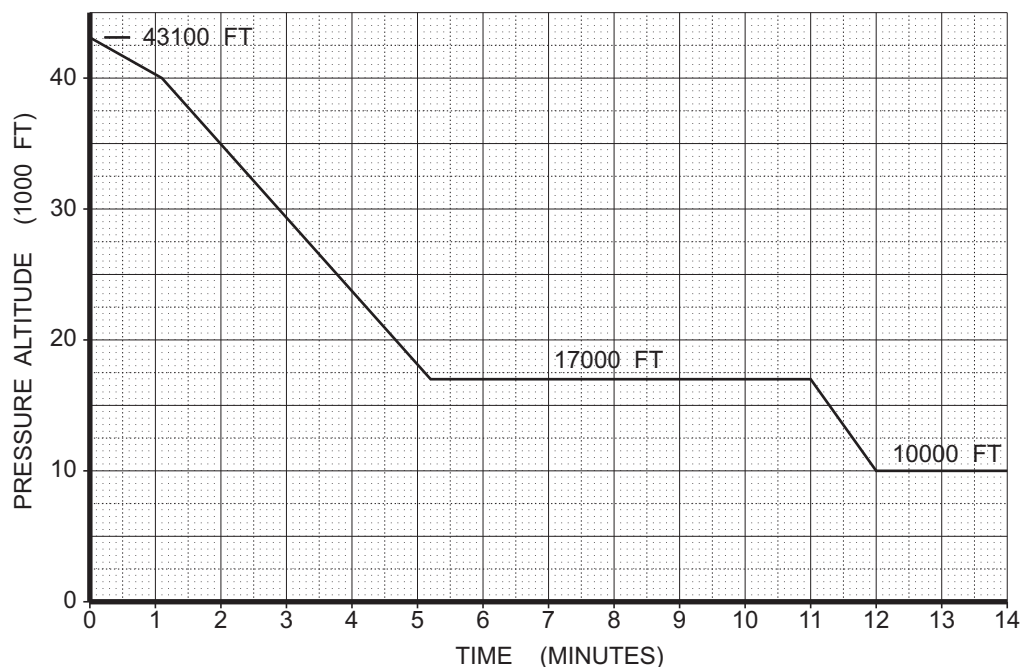
This table includes 5% additional fuel for holding in a racetrack pattern.

Oxygen Requirements

Passenger Oxygen System - Chemical

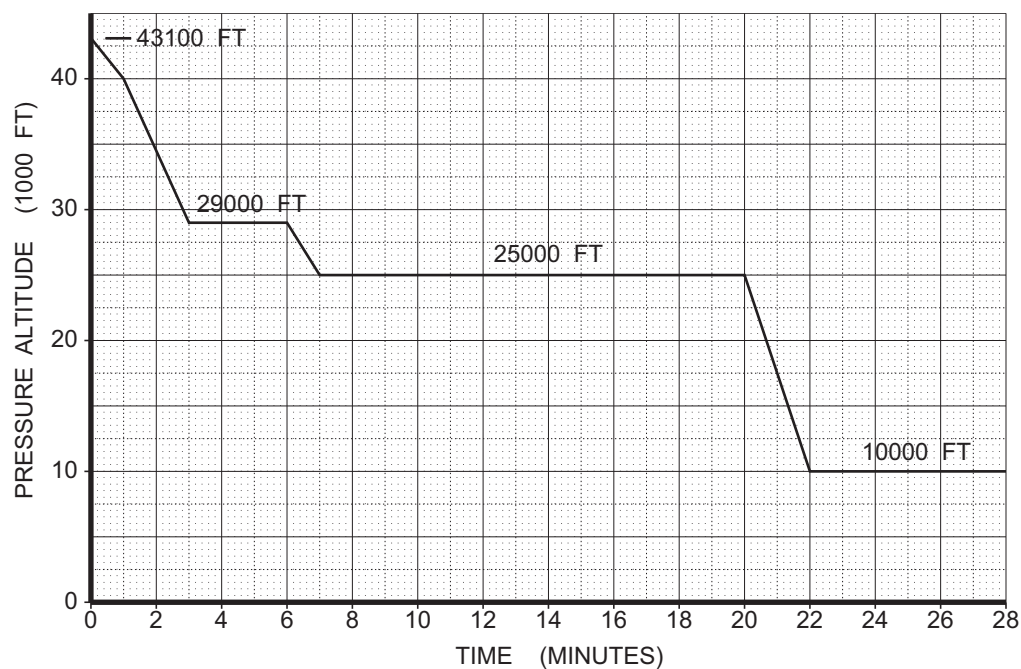
Maximum Altitude Envelope

Based on 12 Minute System



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

Based on 22 Minute System



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

Oxygen Requirements

Flight Crew System

Required Pressure (PSI) for Two 114/115 Cubic Ft. Cylinders

BOTTLE TEMPERATURE		NUMBER OF CREW USING OXYGEN		
°C	°F	2	3	4
50	122	325	435	545
45	113	320	430	540
40	104	315	420	530
35	95	310	415	520
30	86	305	410	510
25	77	300	400	505
20	68	295	395	495
15	59	290	390	485
10	50	285	380	480
5	41	280	375	470
0	32	275	370	460
-5	23	270	360	455
-10	14	265	355	445

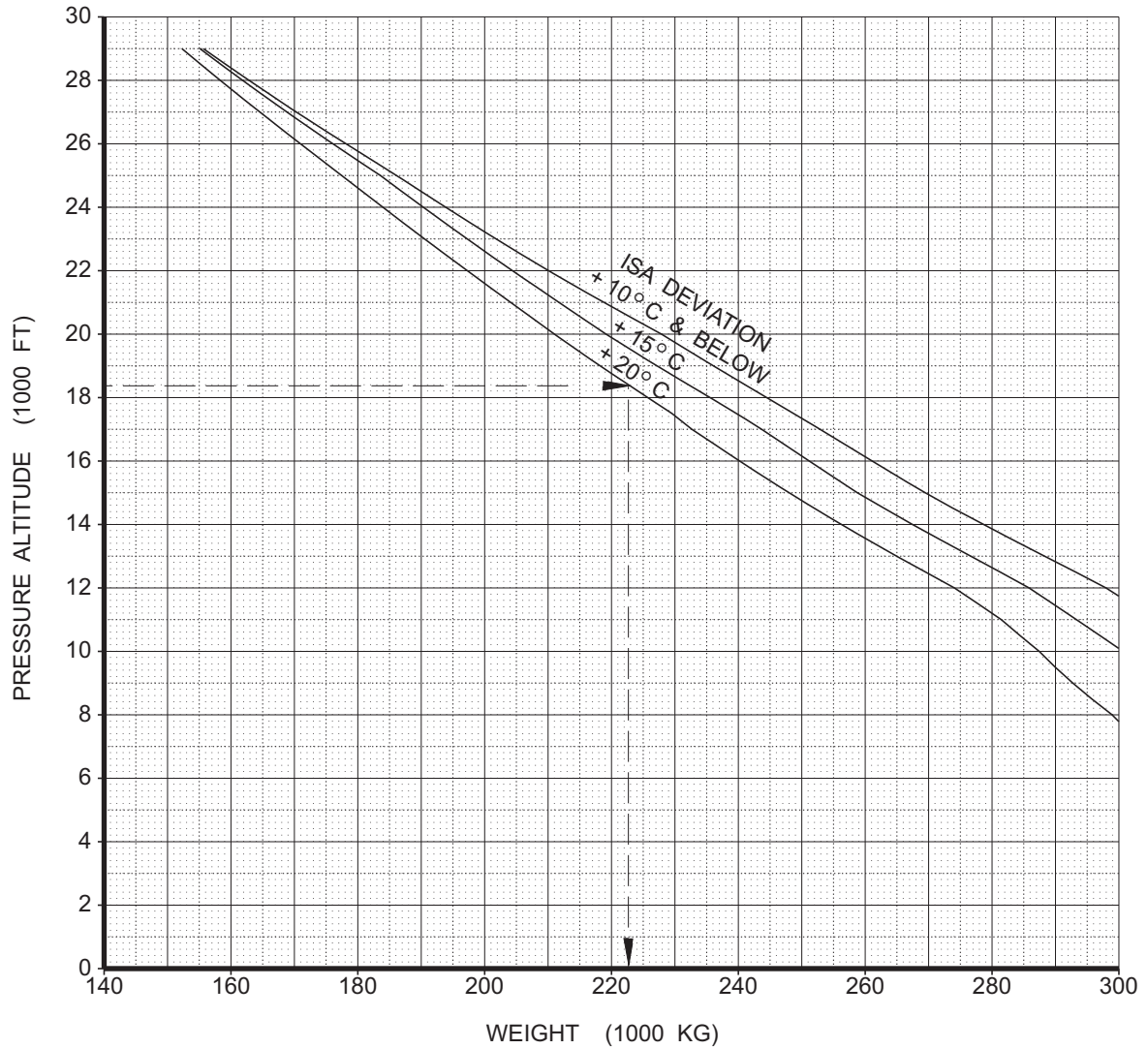
For more extensive than normal crew usage, add 0.6 psi/person/minute.

Intentionally
Blank

ENGINE INOP

MAX CONTINUOUS THRUST

Net Level Off Weight

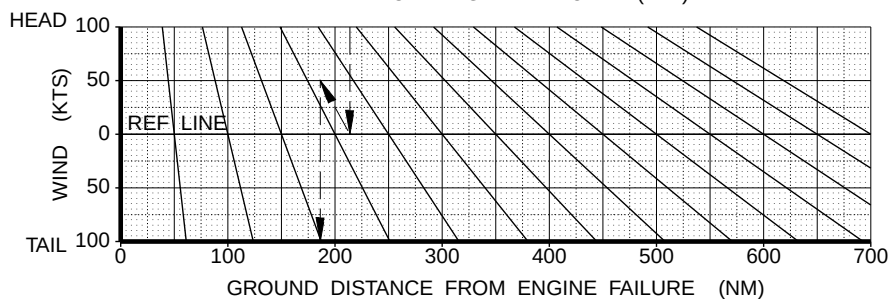
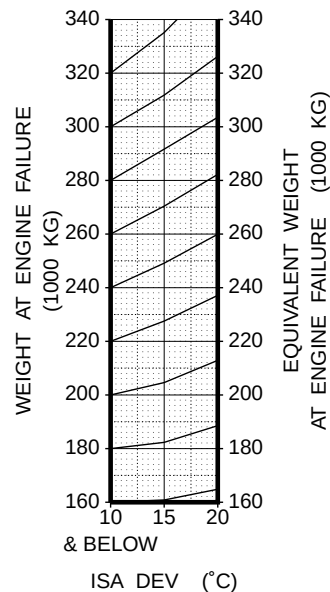
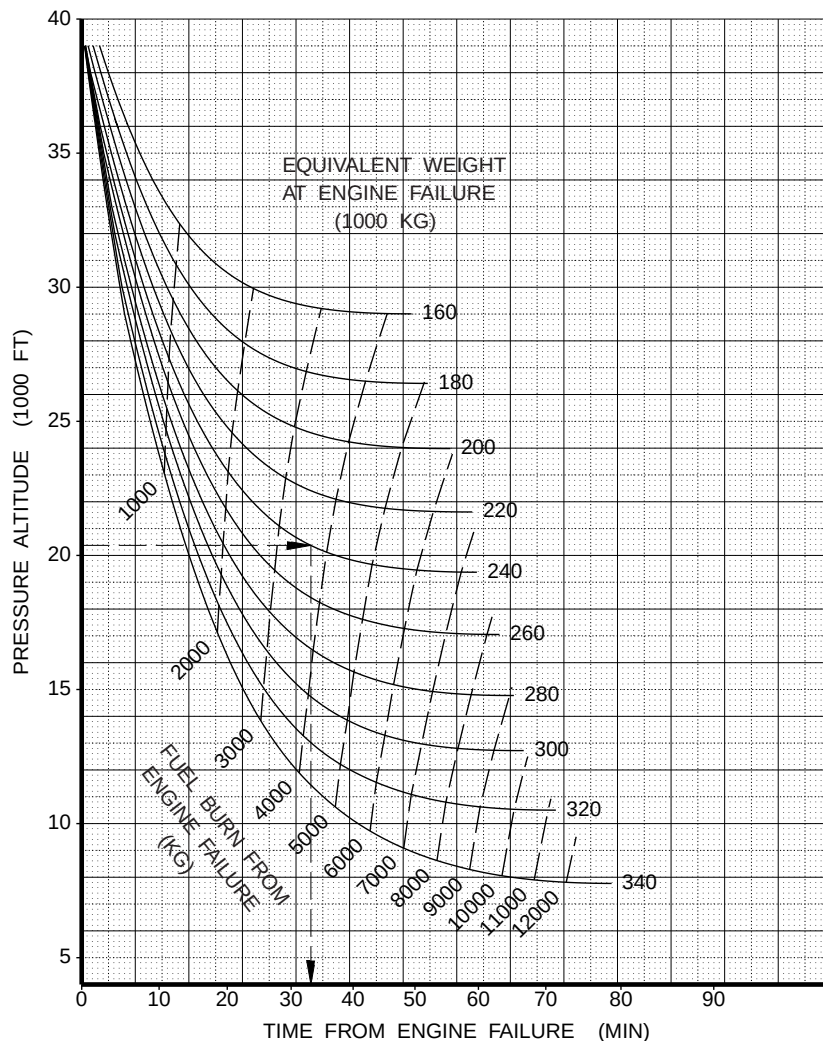


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)									
	PRESSURE ALTITUDE (1000 FT)									
	10	12	14	16	18	20	22	24	26	28
ENGINE ONLY	-1.0	-1.0	-0.8	-0.6	-0.6	-0.5	-0.7	-0.7	-0.7	-0.5
ENGINE AND WING	-2.8	-2.7	-2.4	-2.3	-2.2	-2.0	-2.2	-2.2	-2.0	-1.8

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 39000 FT and Above

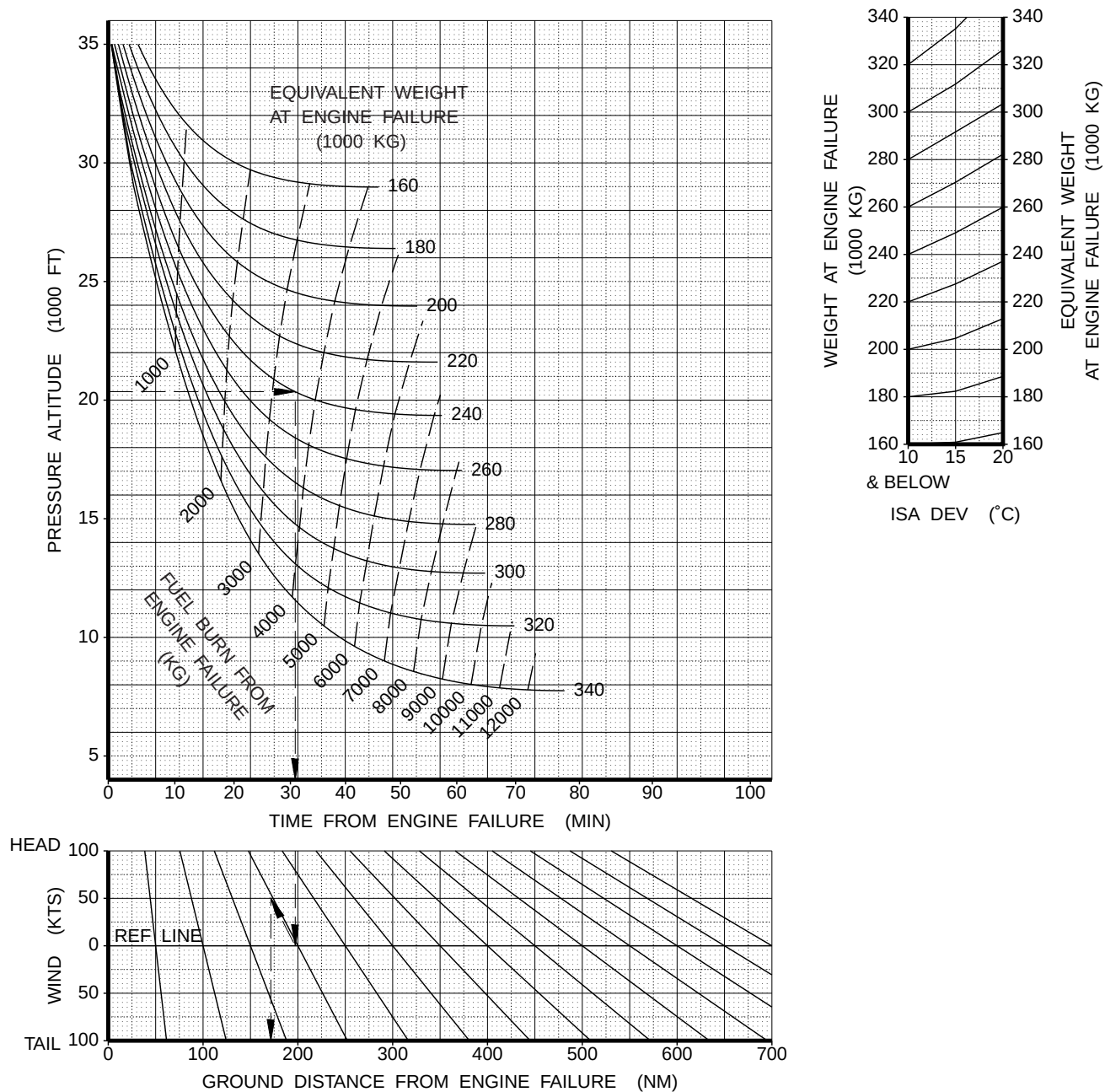


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)									
	PRESSURE ALTITUDE (1000 FT)									
	10	12	14	16	18	20	22	24	26	28
ENGINE ONLY	1.0	1.0	0.8	0.6	0.6	0.5	0.7	0.7	0.7	0.5
ENGINE AND WING	2.8	2.7	2.4	2.3	2.2	2.0	2.2	2.2	2.0	1.8

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 35000 FT to 37000 FT

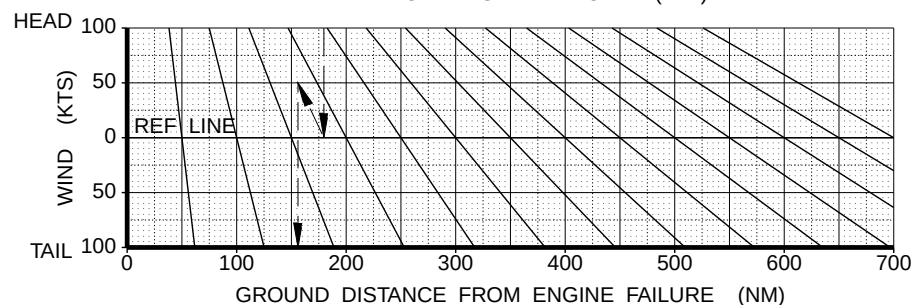
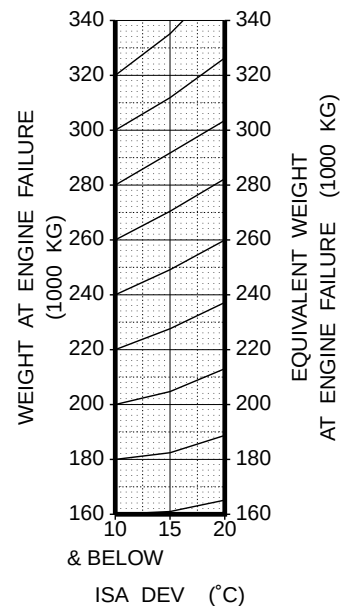
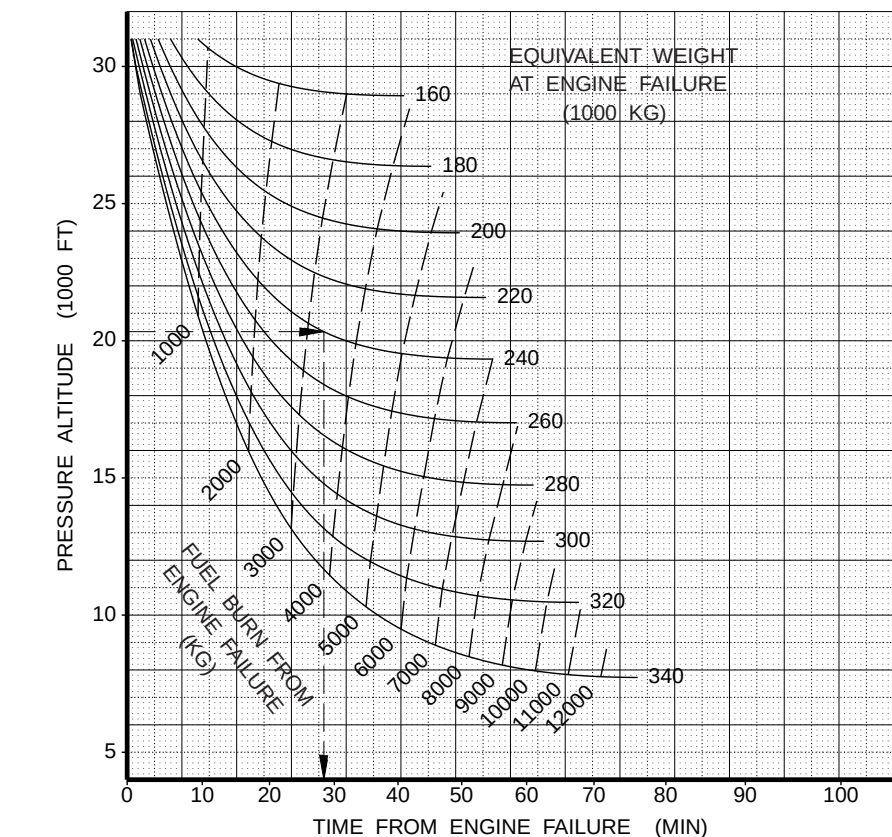


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)									
	PRESSURE ALTITUDE (1000 FT)									
	10	12	14	16	18	20	22	24	26	28
ENGINE ONLY	1.0	1.0	0.8	0.6	0.6	0.5	0.7	0.7	0.7	0.5
ENGINE AND WING	2.8	2.7	2.4	2.3	2.2	2.0	2.2	2.2	2.0	1.8

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 31000 FT to 33000 FT

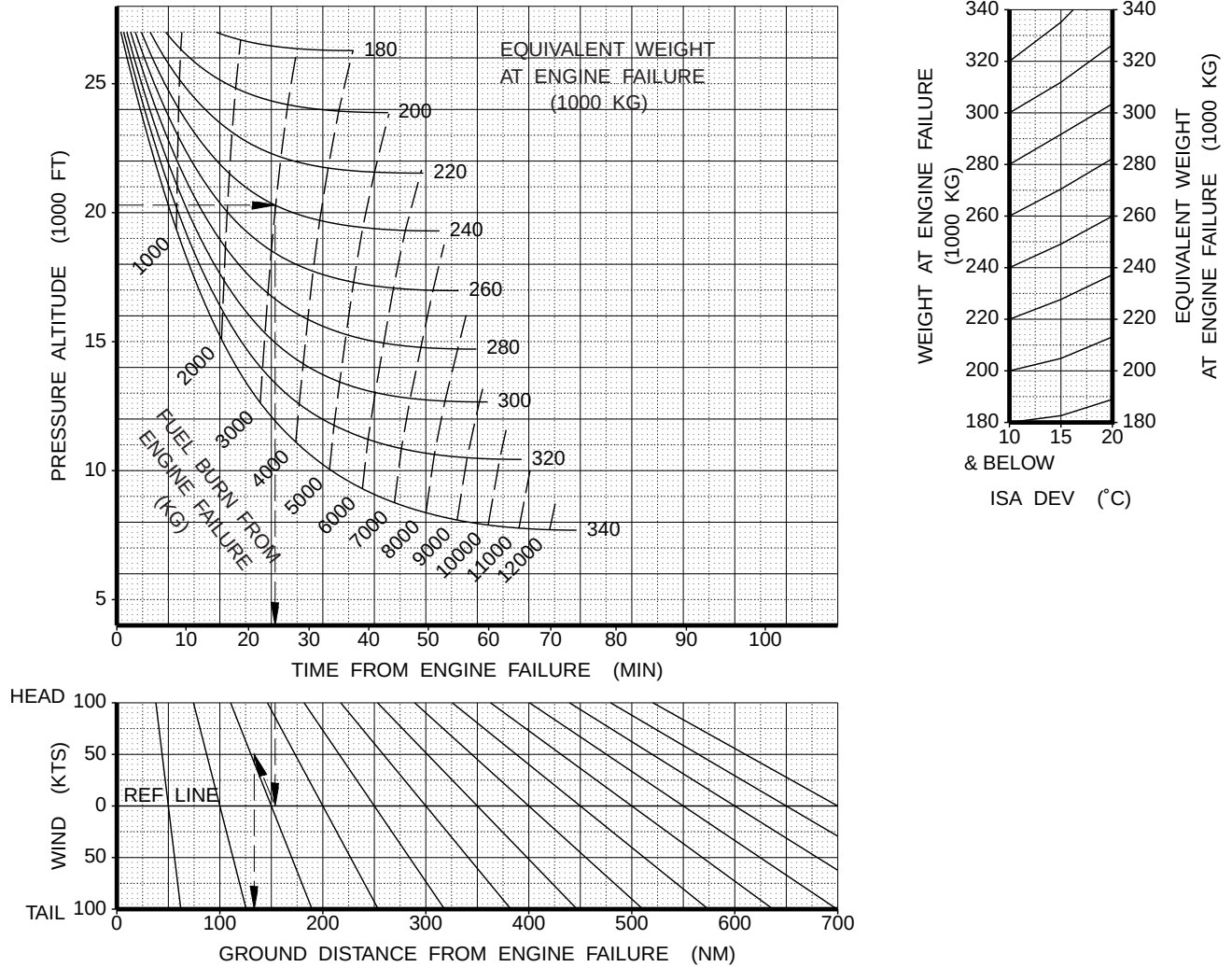


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)									
	PRESSURE ALTITUDE (1000 FT)									
	10	12	14	16	18	20	22	24	26	28
ENGINE ONLY	1.0	1.0	0.8	0.6	0.6	0.5	0.7	0.7	0.7	0.5
ENGINE AND WING	2.8	2.7	2.4	2.3	2.2	2.0	2.2	2.2	2.0	1.8

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 27000 FT to 29000 FT



Anti-Ice Adjustments

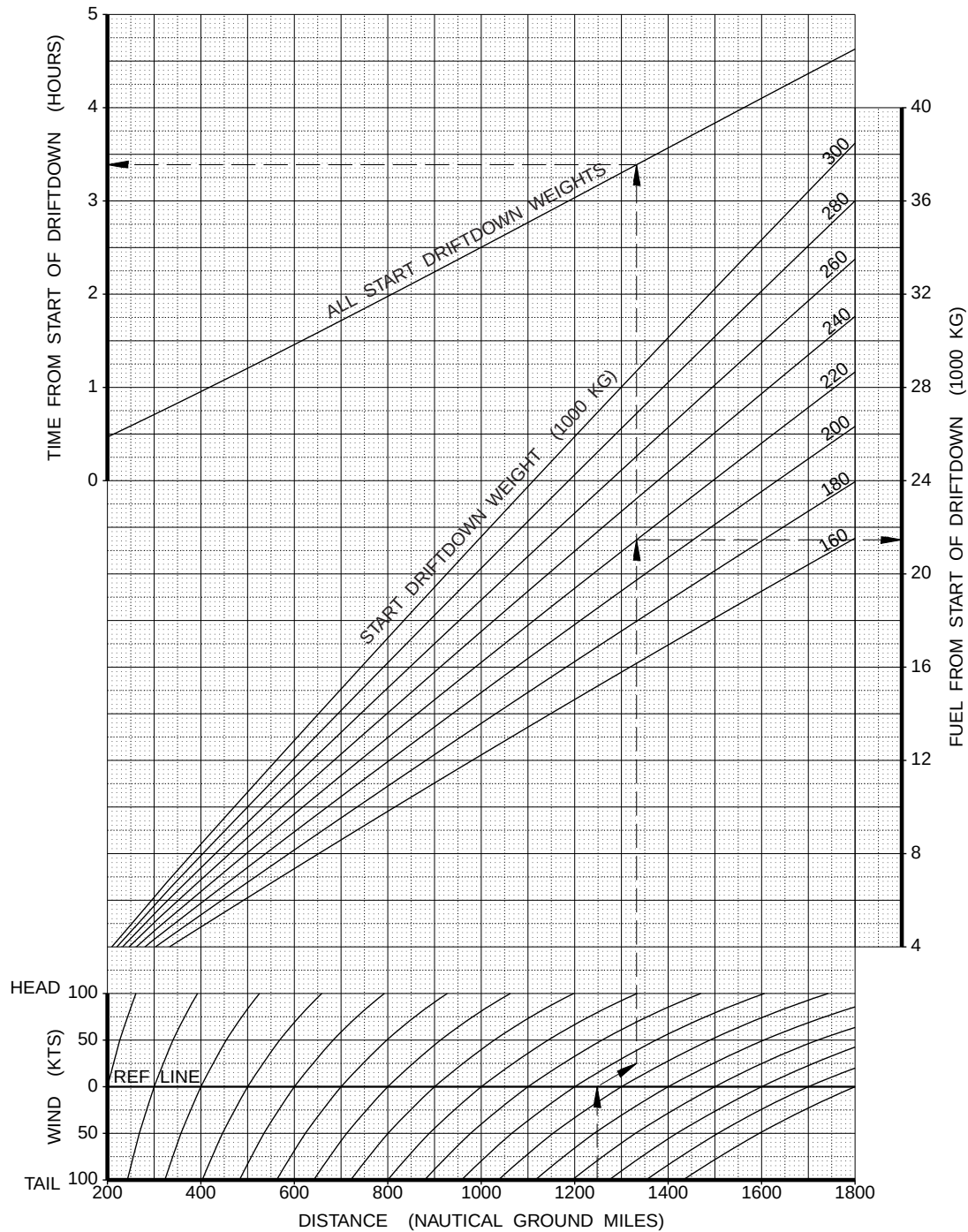
ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)									
	PRESSURE ALTITUDE (1000 FT)									
	10	12	14	16	18	20	22	24	26	28
ENGINE ONLY	1.0	1.0	0.8	0.6	0.6	0.5	0.7	0.7	0.7	0.5
ENGINE AND WING	2.8	2.7	2.4	2.3	2.2	2.0	2.2	2.2	2.0	1.8

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

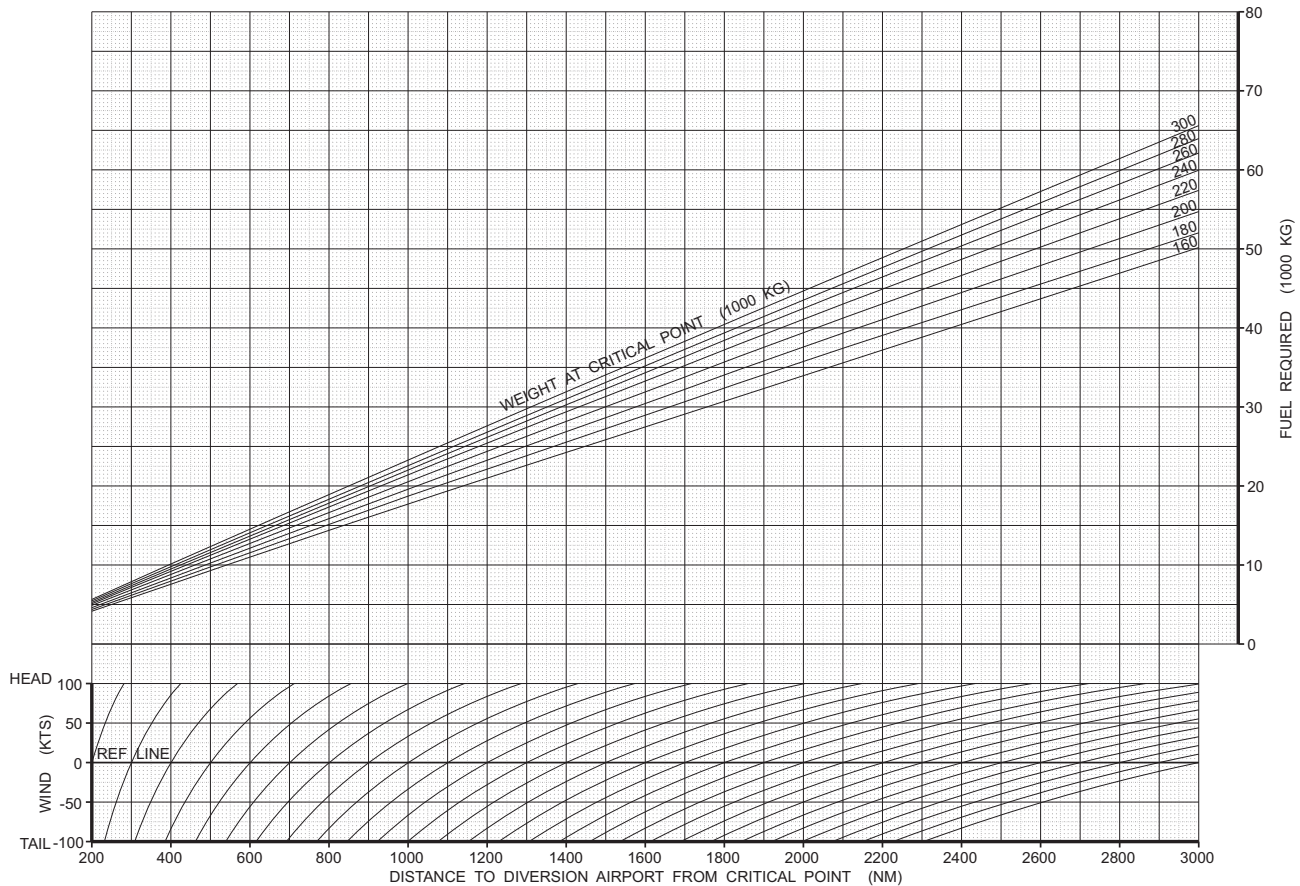
MAX CONTINUOUS THRUST

Area of Operation

SPEED (M/KIAS)	WEIGHT AT DIVERSION (1000 KG)	DIVERSION DISTANCE (NM)										
		TIME (MINUTES)										
		60	75	90	120	138	180	207	240	270	300	330
.82/260	300	362	448	534	705	808	1049	1203	1392	1564	1736	1907
	280	372	460	548	725	831	1078	1237	1432	1608	1785	1962
	260	380	471	562	744	853	1108	1271	1471	1653	1835	2017
	240	391	484	578	766	878	1140	1309	1515	1703	1890	2078
	220	401	497	593	785	901	1170	1343	1555	1747	1939	2132
	200	411	509	608	805	923	1199	1376	1593	1790	1987	2184
	180	420	521	622	824	945	1228	1409	1632	1833	2035	2237
	160	428	532	635	842	966	1256	1442	1670	1877	2084	2291
.84/280	300	387	478	570	754	864	1122	1287	1489	1673	1857	2040
	280	396	490	584	772	885	1149	1319	1526	1714	1903	2091
	260	403	499	596	788	904	1174	1348	1560	1753	1946	2139
	240	412	511	610	807	926	1202	1380	1598	1795	1993	2191
	220	421	522	623	825	946	1230	1411	1634	1836	2038	2241
	200	429	532	635	842	965	1254	1440	1667	1874	2080	2286
	180	437	542	647	858	984	1279	1468	1700	1910	2121	2331
	160	444	551	658	872	1001	1301	1494	1730	1944	2159	2373
.84/300	300	407	504	601	795	911	1183	1357	1571	1764	1958	2152
	280	415	514	613	811	929	1206	1384	1602	1800	1997	2195
	260	421	522	623	825	946	1228	1410	1632	1833	2035	2237
	240	429	532	635	841	964	1252	1438	1664	1870	2076	2281
	220	437	542	647	857	982	1276	1465	1696	1906	2116	2326
	200	443	550	657	871	999	1298	1491	1726	1940	2153	2367
	180	449	558	666	883	1014	1318	1513	1752	1969	2186	2403
	160	454	564	674	893	1025	1333	1531	1772	1992	2212	2432
.84/320	300	424	525	626	828	949	1232	1414	1636	1838	2039	2241
	280	432	534	637	842	966	1253	1438	1664	1869	2075	2280
	260	436	540	645	854	979	1272	1460	1690	1899	2108	2317
	240	443	549	656	868	996	1294	1485	1719	1931	2144	2357
	220	449	557	665	881	1011	1314	1508	1746	1962	2178	2394
	200	454	564	673	892	1024	1330	1527	1768	1987	2206	2425
	180	458	569	680	901	1034	1344	1543	1787	2008	2230	2451
	160	461	573	685	908	1042	1355	1556	1801	2025	2248	2471
LRC	300	426	528	628	828	947	1222	1397	1609	1801	1992	2181
	280	428	529	629	829	947	1222	1397	1608	1800	1990	2179
	260	425	526	626	825	944	1218	1393	1604	1795	1984	2172
	240	425	526	626	825	944	1218	1392	1603	1793	1982	2170
	220	424	525	625	824	943	1217	1391	1601	1791	1979	2166
	200	421	521	621	819	937	1209	1382	1592	1780	1967	2153
	180	418	517	616	813	930	1200	1372	1579	1767	1952	2136
	160	412	511	609	803	919	1186	1356	1561	1746	1930	2112

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:

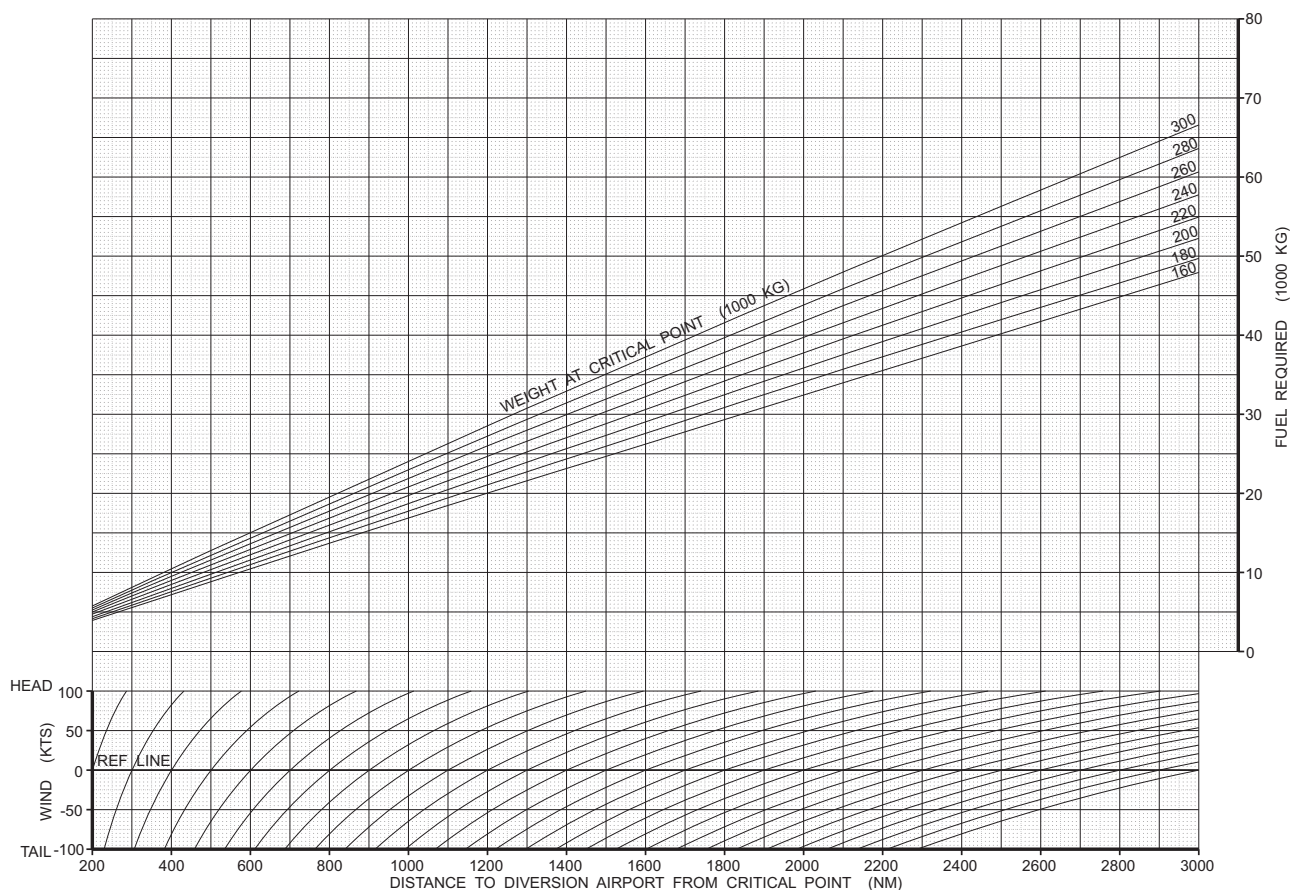
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (3%) for the total forecast time or engine and wing anti-ice on and ice drag (6%) 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

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:

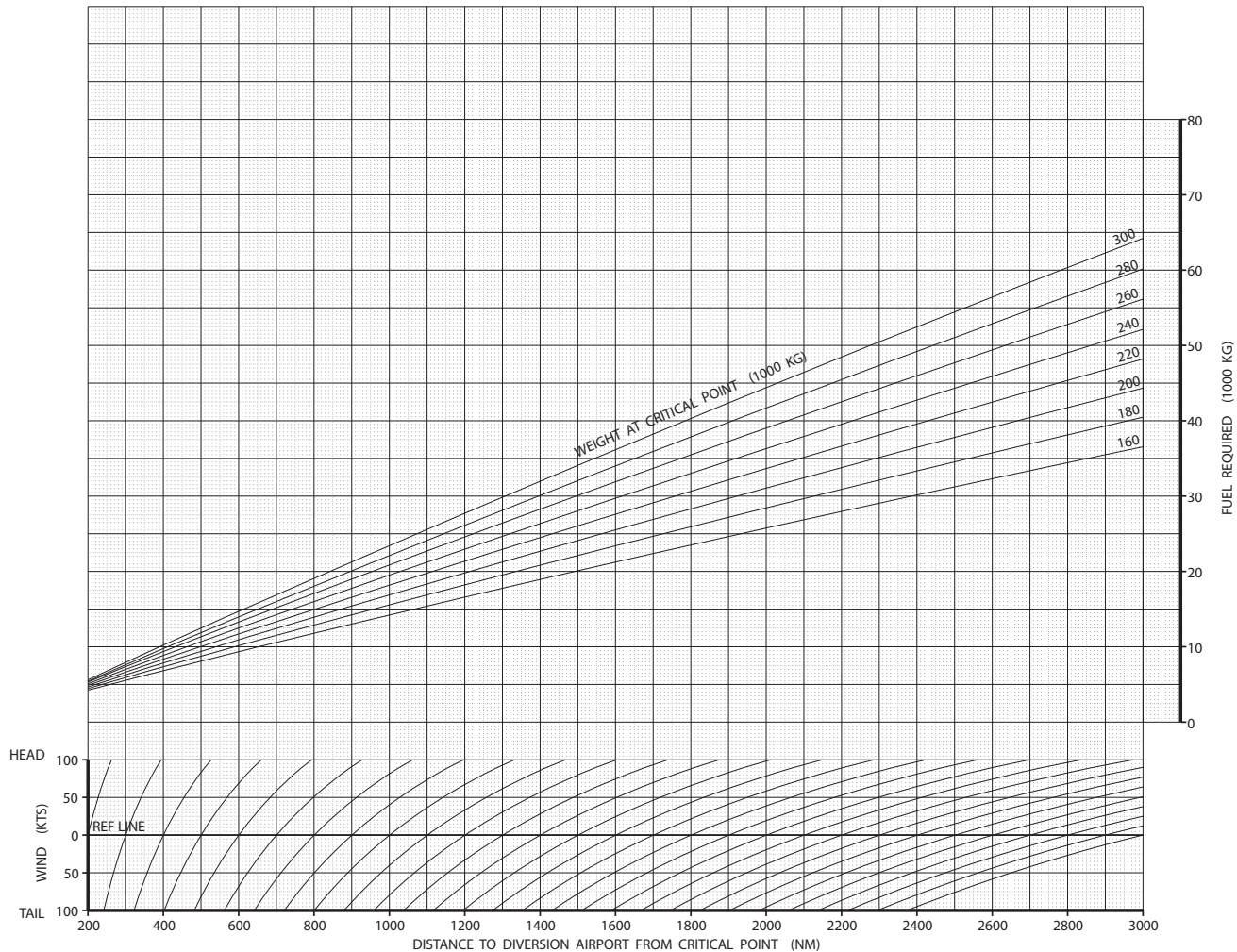
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (7%) 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

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:

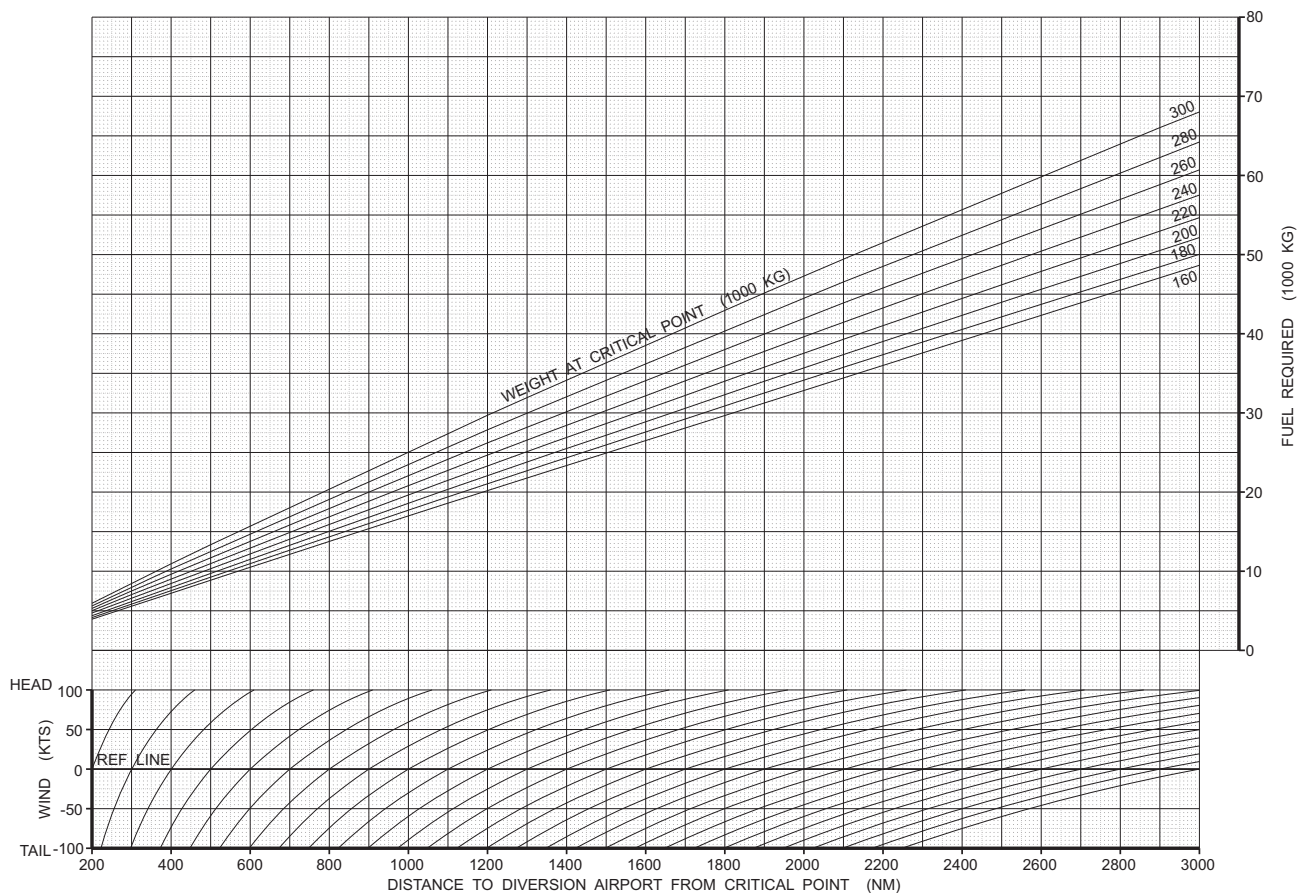
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (9%) 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

Decompression Critical Fuel Reserves - 260 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:

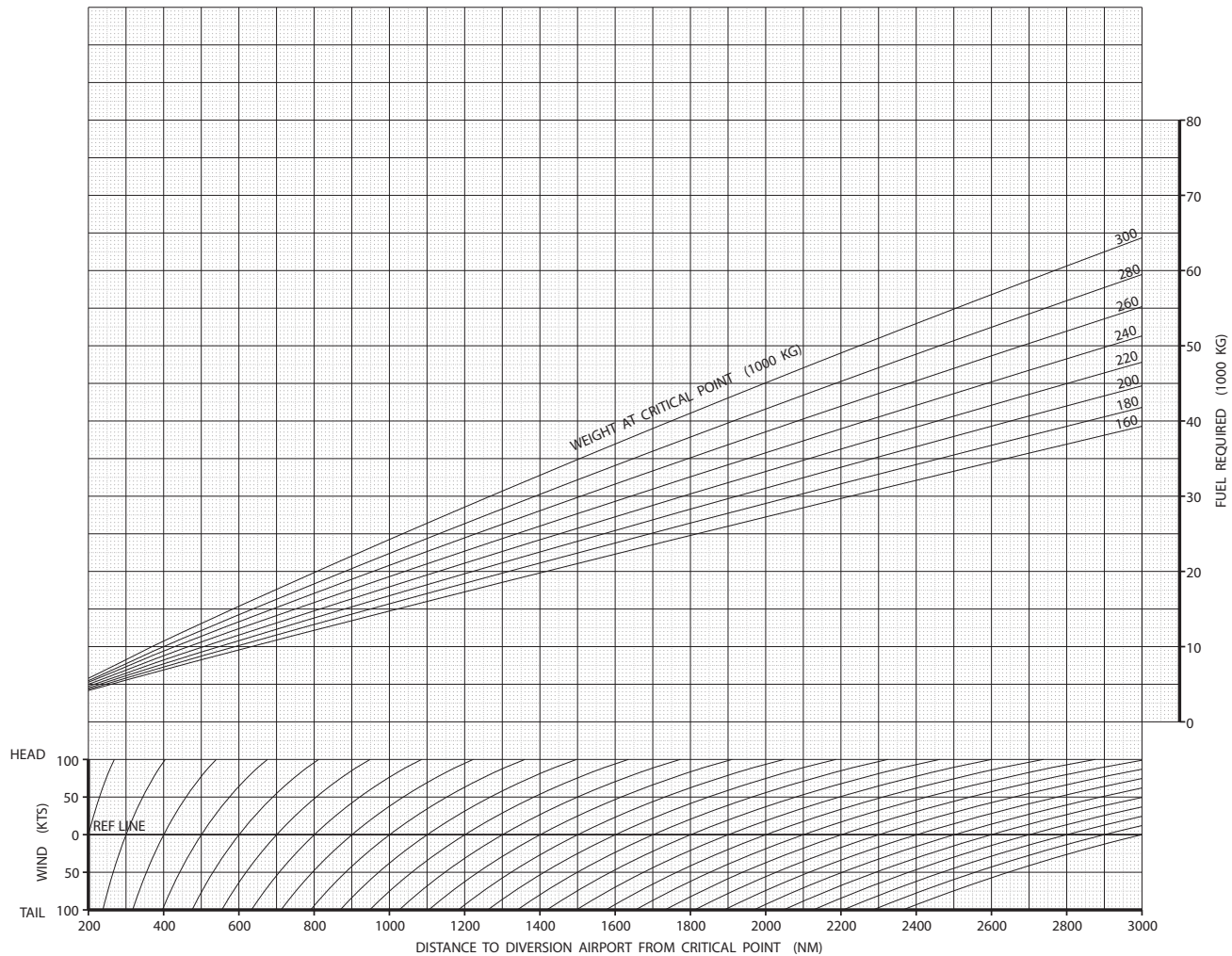
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (7%) 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

Driftdown Critical Fuel Reserves - .82M/260 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:

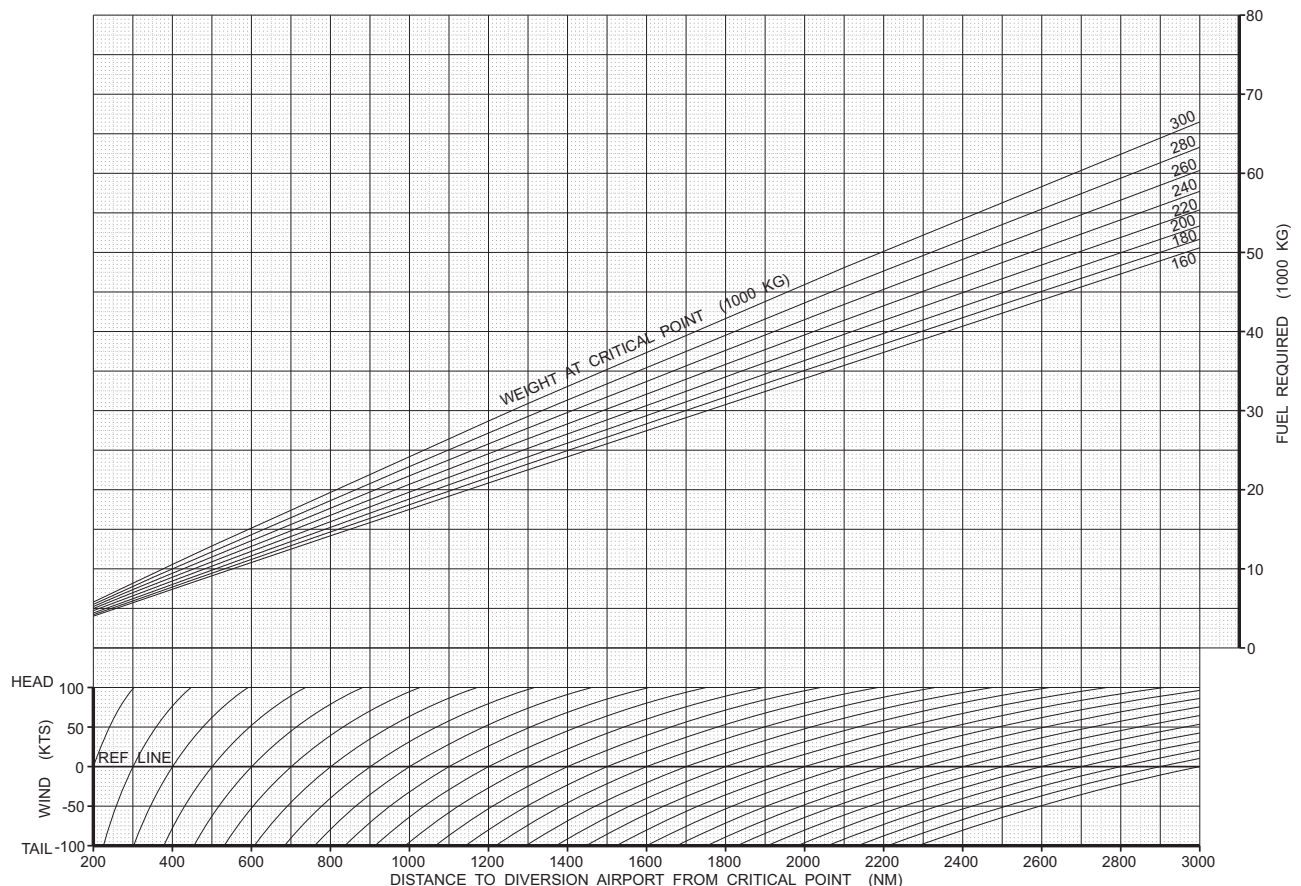
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 280 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:

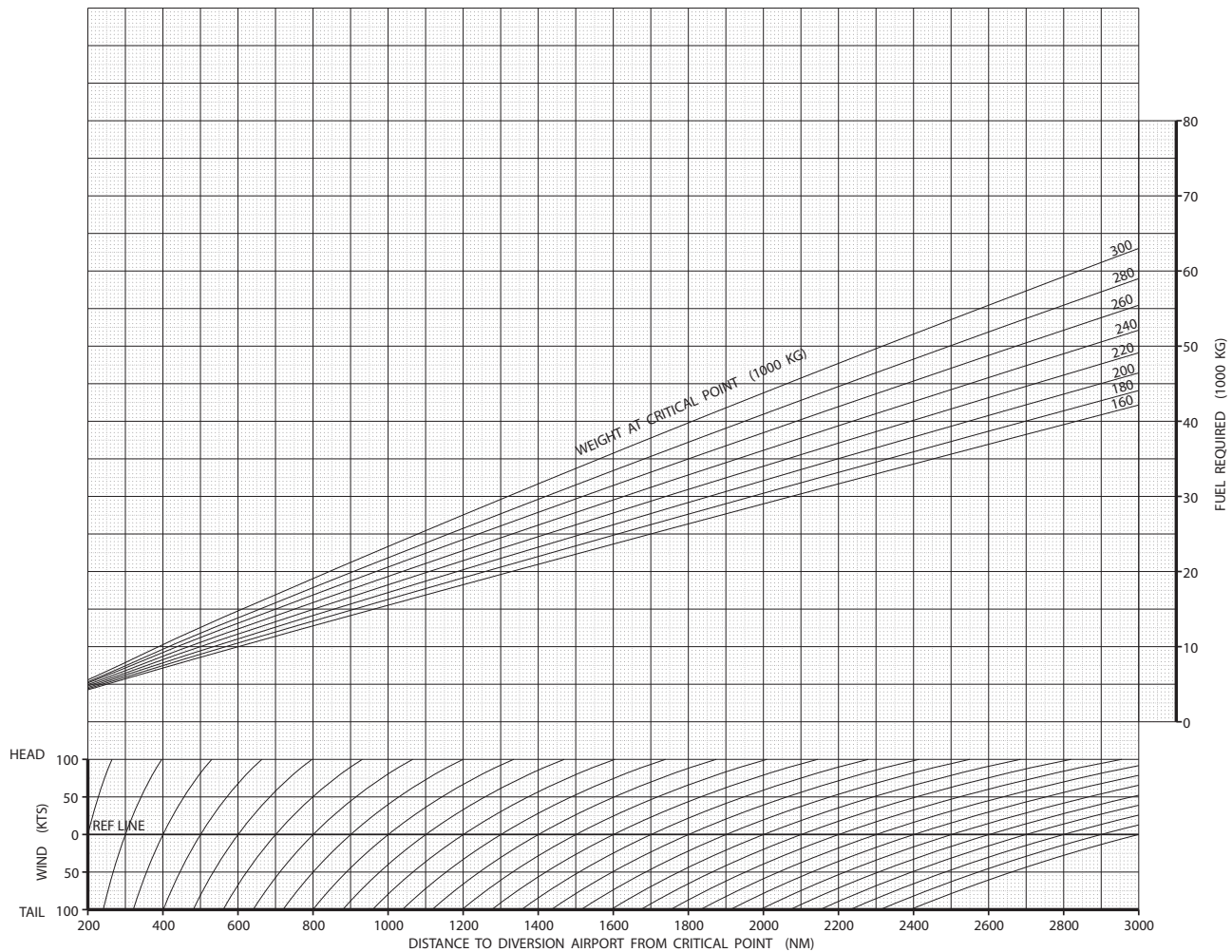
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (7%) 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

Driftdown Critical Fuel Reserves - .84M/280 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:

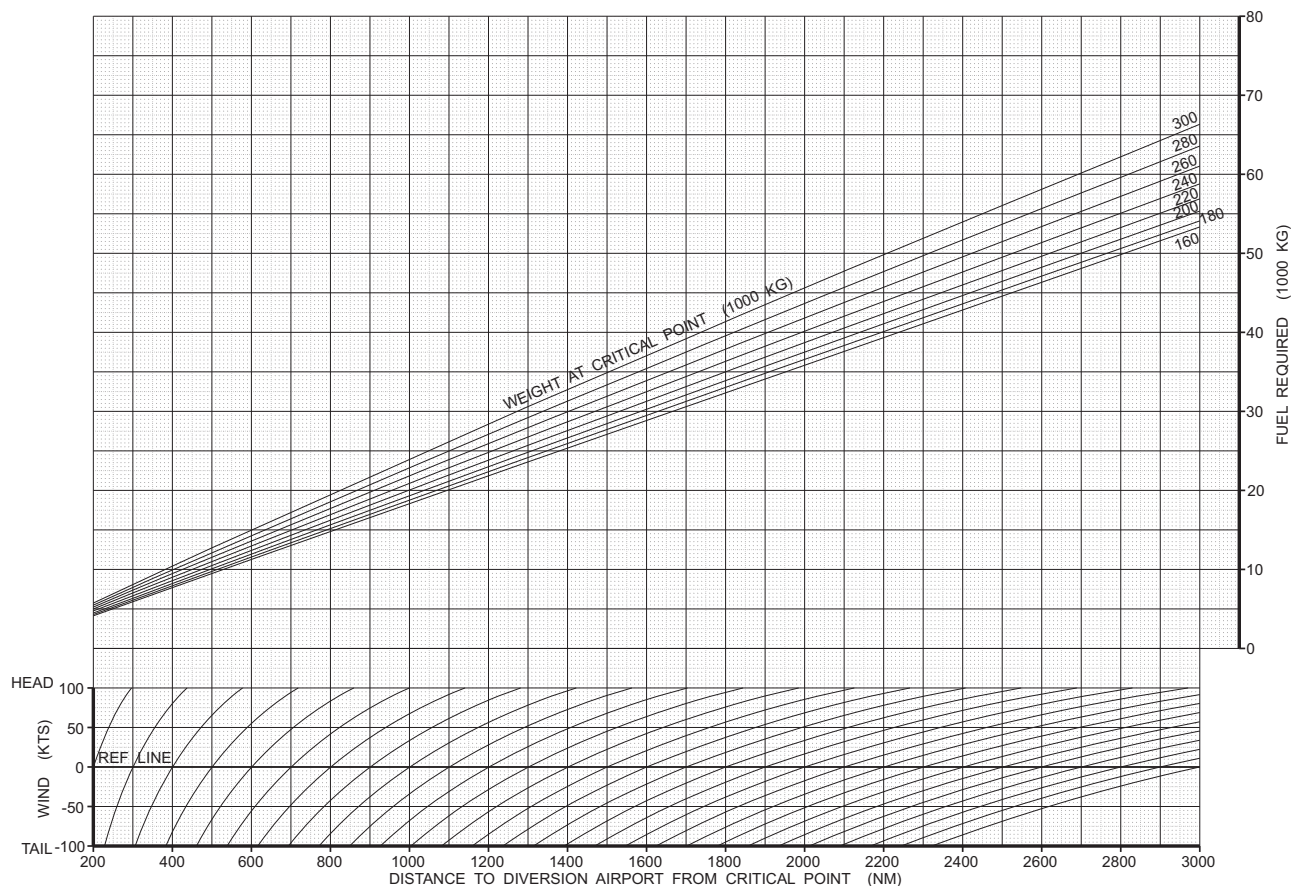
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 300 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:

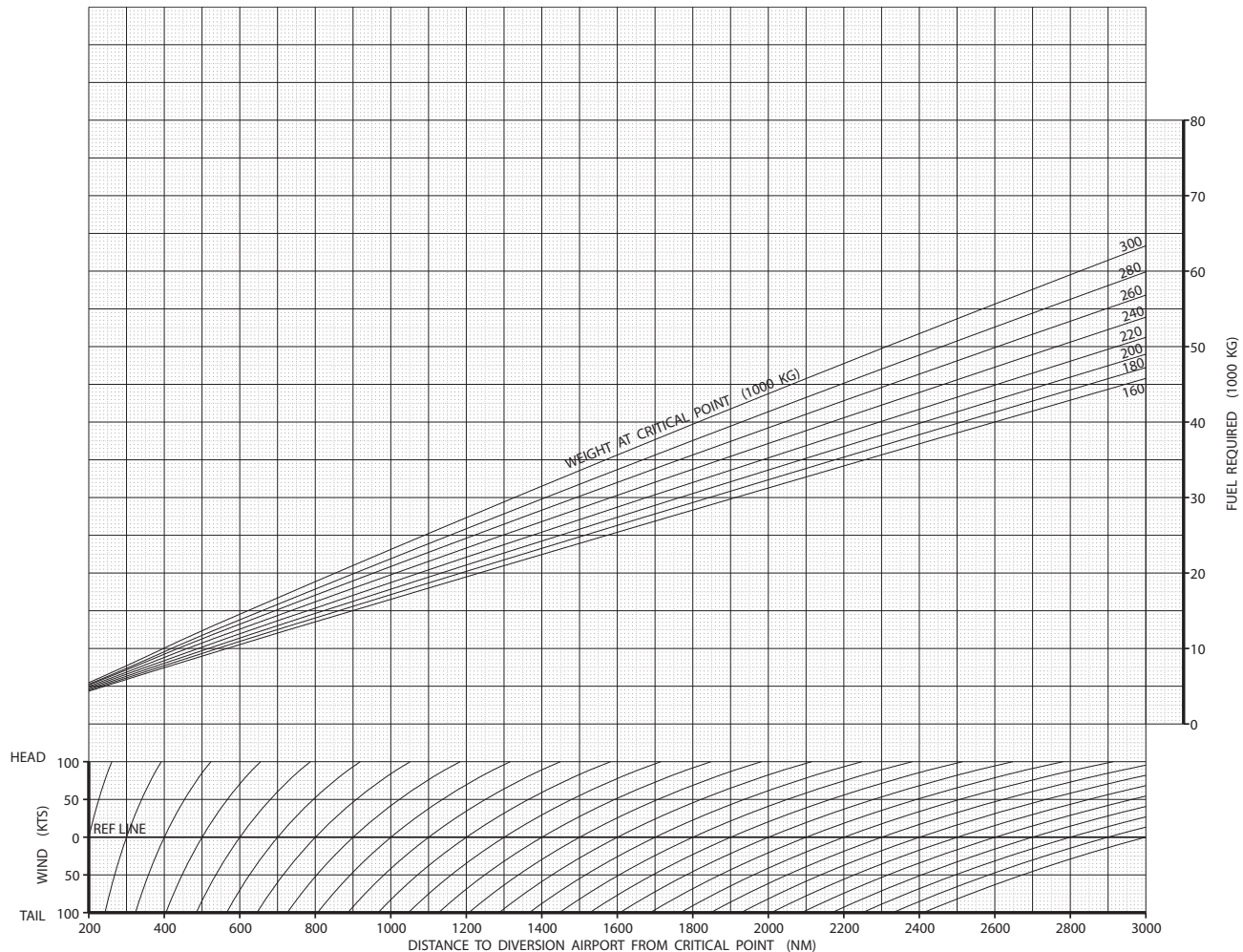
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (8%) 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

Driftdown Critical Fuel Reserves - .84M/300 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:

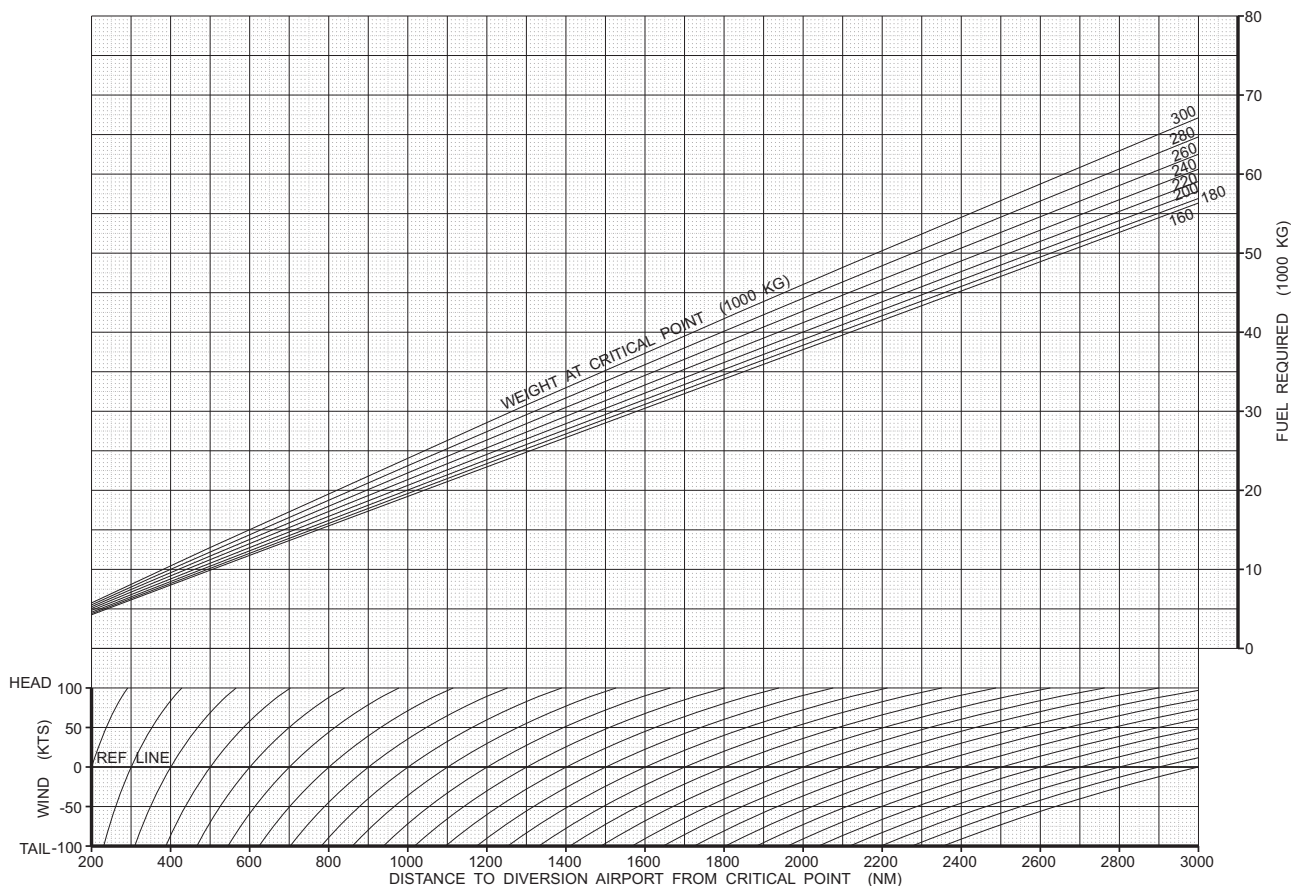
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 320 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:

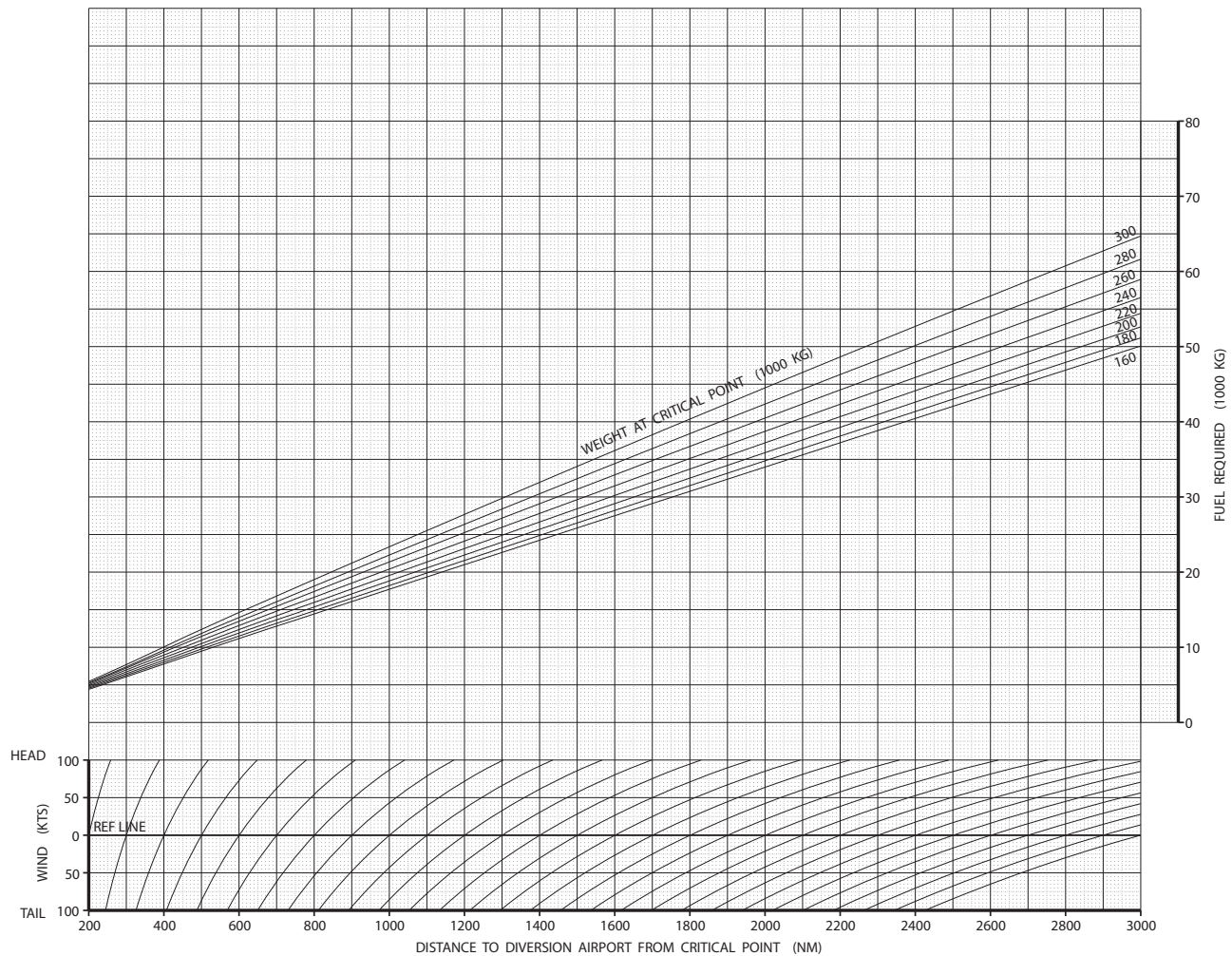
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (8%) 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

Driftdown Critical Fuel Reserves - .84M/320 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:

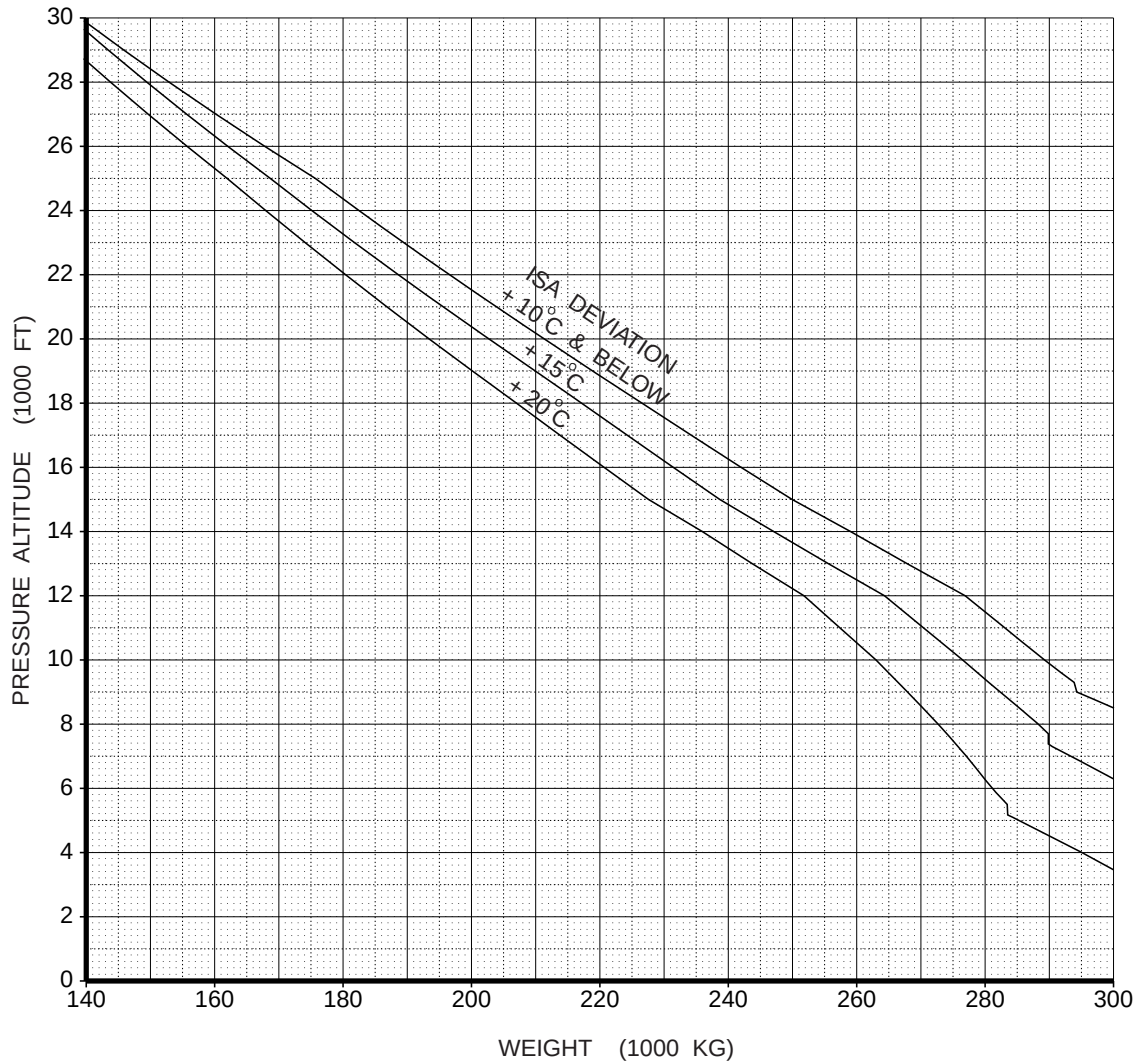
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Long Range Cruise Net Level Off Weight



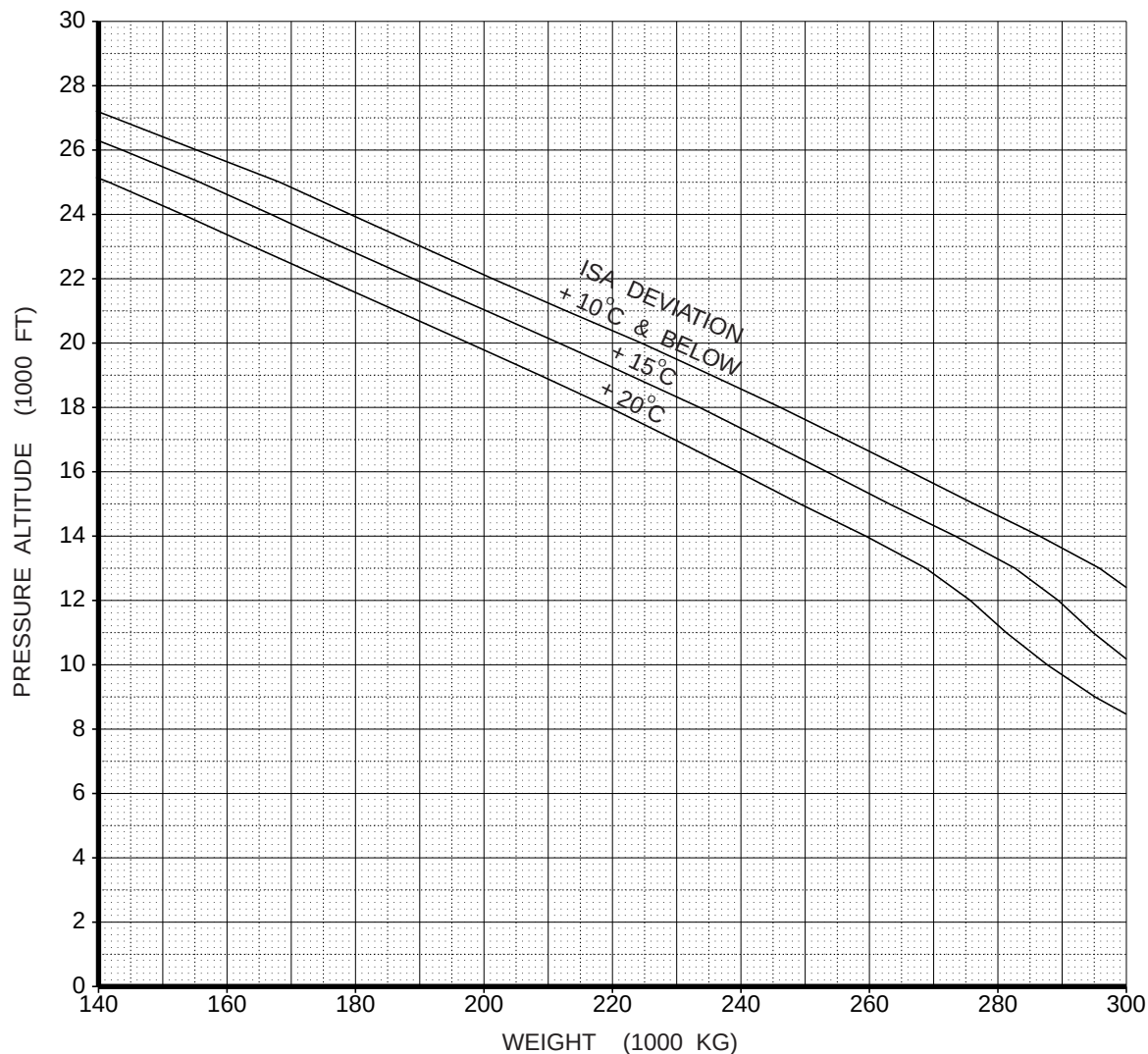
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)											
	PRESSURE ALTITUDE (1000 FT)											
	8	10	12	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.0	0.0	-0.1	0.0	0.0	0.0	-0.2	-0.3	-0.3	-0.3	-0.2	-0.1
ENGINE AND WING	-3.1	-1.8	-2.2	-1.6	-1.4	-1.7	-1.8	-1.8	-1.8	-1.7	-1.6	-1.5

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Net Level Off Weight



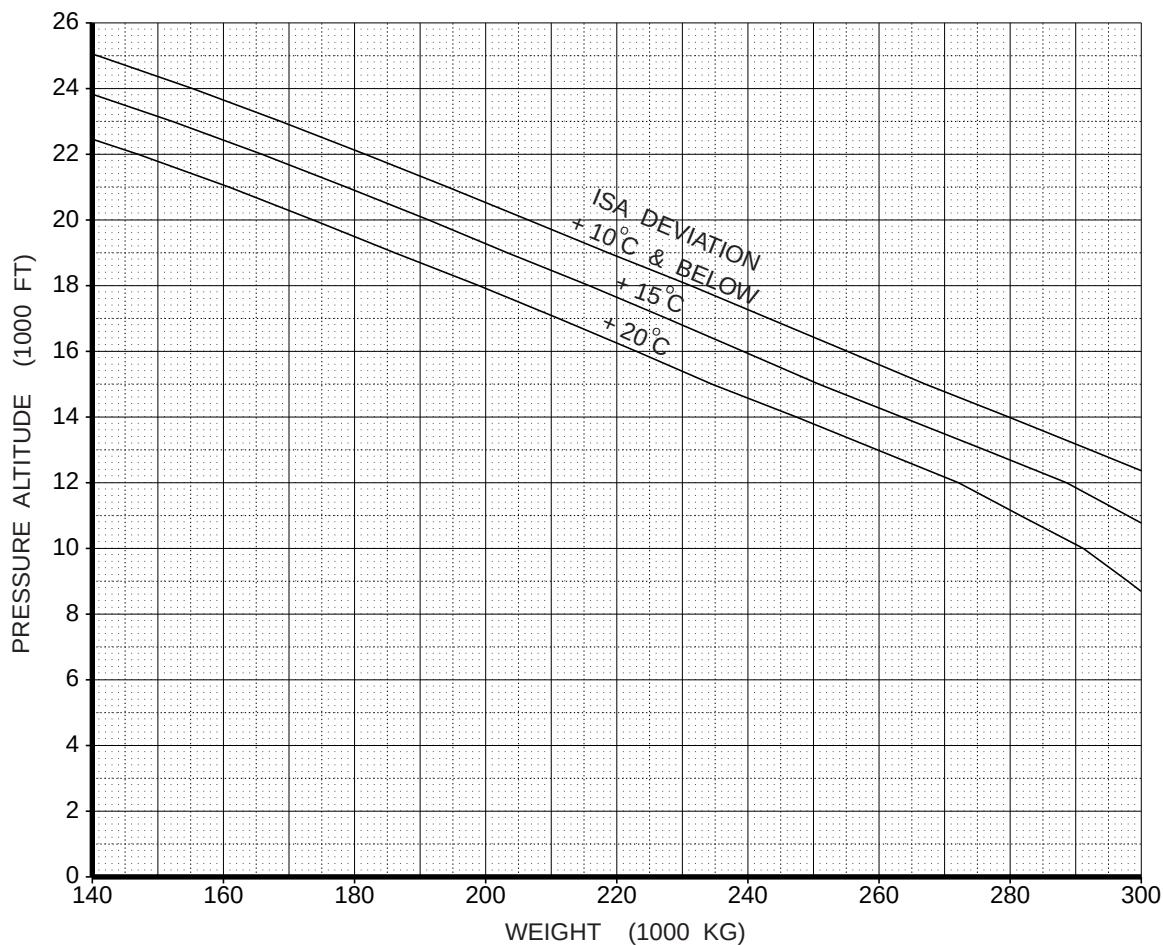
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)						
	PRESSURE ALTITUDE (1000 FT)						
	14	16	18	20	22	24	26
ENGINE ONLY	0.0	-0.1	0.0	-0.2	-0.6	-0.8	-0.9
ENGINE AND WING	-1.7	-2.5	-2.4	-2.8	-3.5	-3.8	-4.4

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Net Level Off Weight



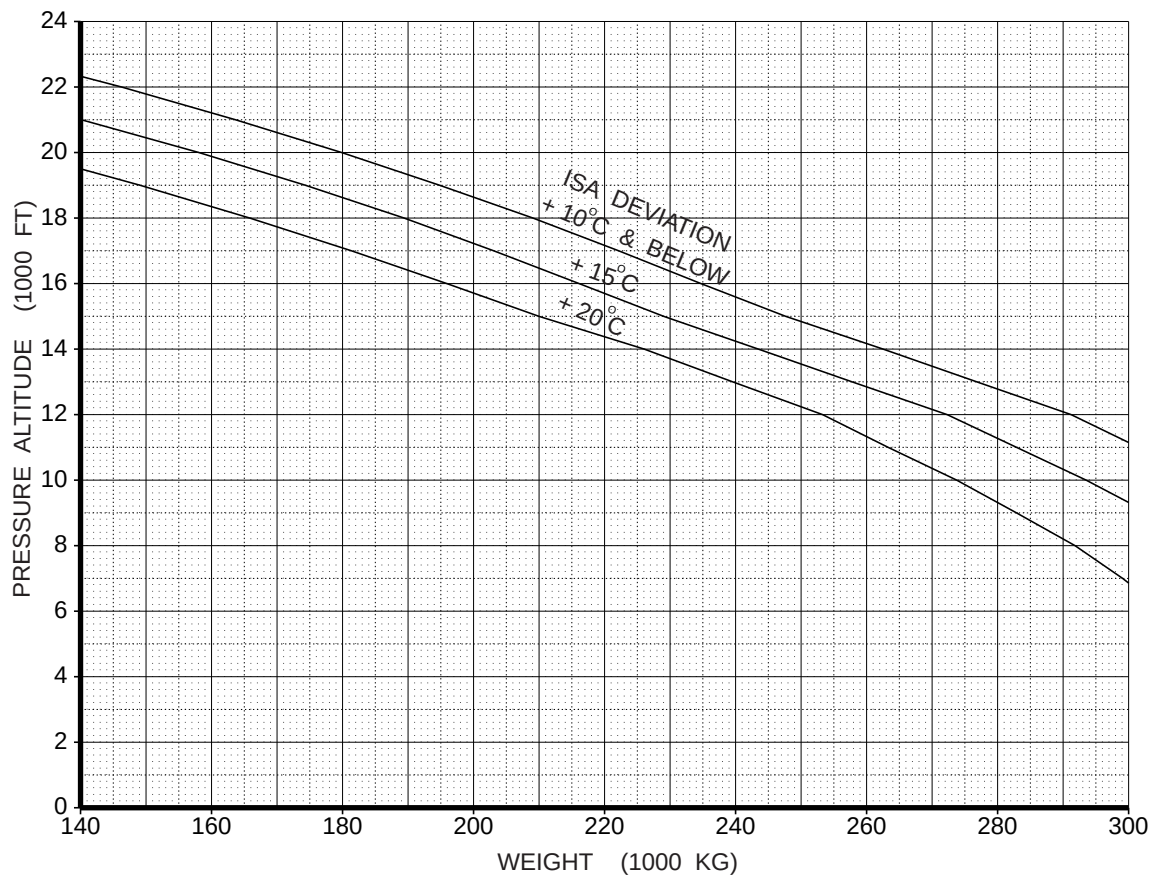
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)					
	PRESSURE ALTITUDE (1000 FT)					
	14	16	18	20	22	24
ENGINE ONLY	0.0	0.0	0.0	-0.4	-0.6	-0.8
ENGINE AND WING	-2.2	-2.2	-2.9	-3.5	-4.0	-5.0

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Net Level Off Weight



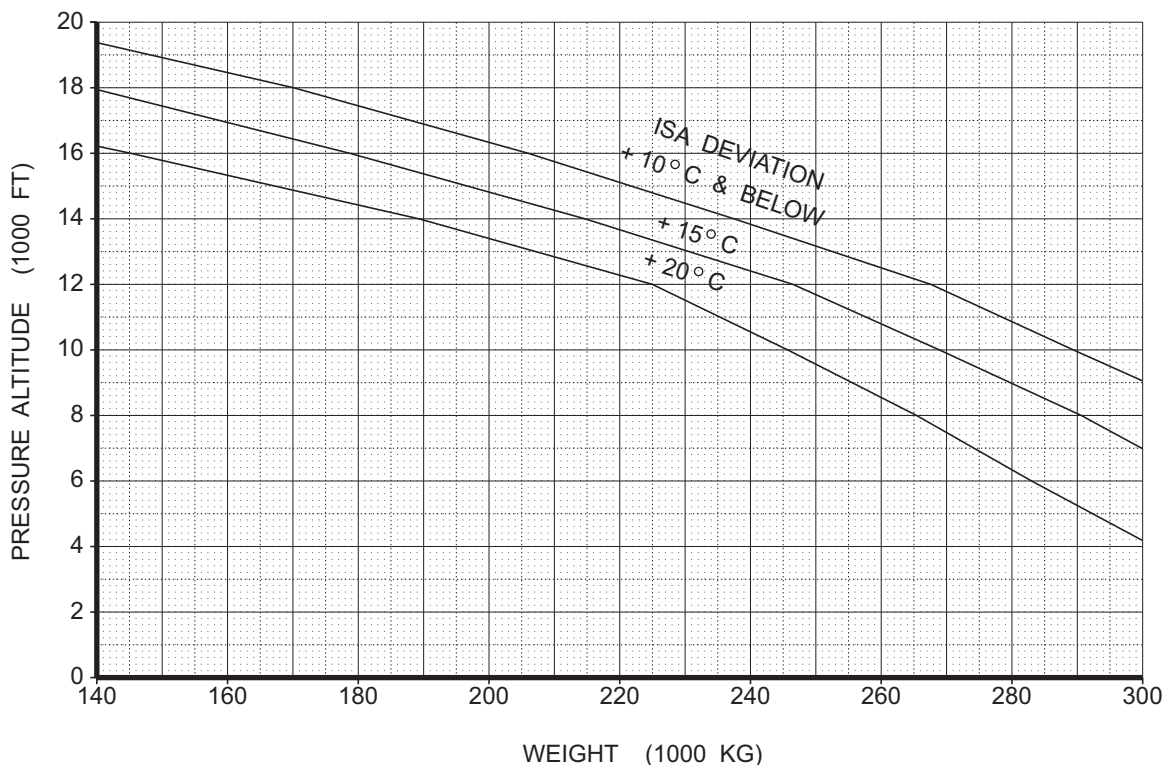
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)					
	PRESSURE ALTITUDE (1000 FT)					
	12	14	16	18	20	22
ENGINE ONLY	-0.1	0.0	0.0	-0.2	-0.1	-0.2
ENGINE AND WING	-3.1	-2.6	-2.5	-3.7	-4.1	-5.2

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Net Level Off Weight

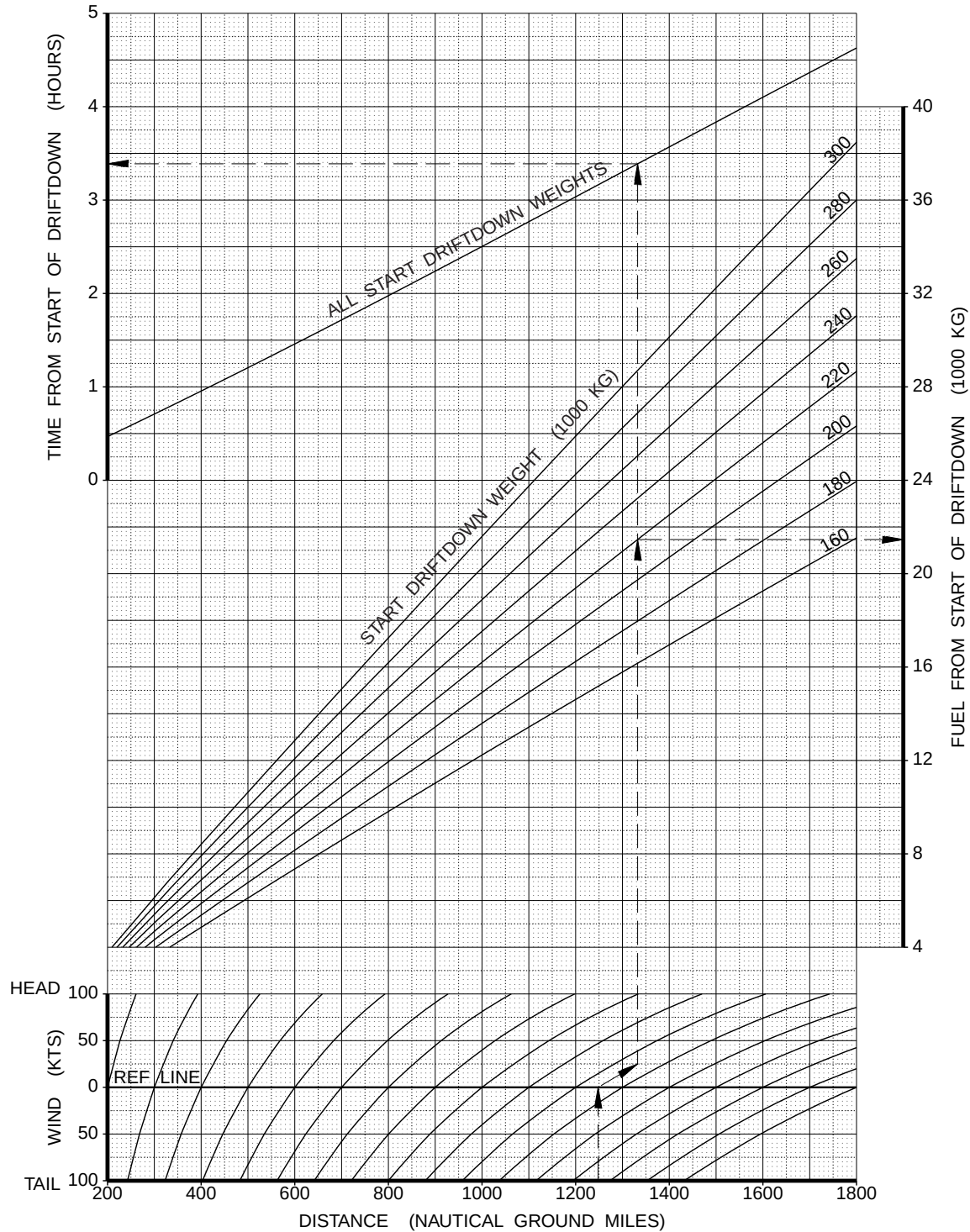


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)				
	PRESSURE ALTITUDE (1000 FT)				
	10	12	14	16	18
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.9	-2.4	-3.0	-3.5	-3.7

ENGINE INOP
MAX CONTINUOUS THRUST

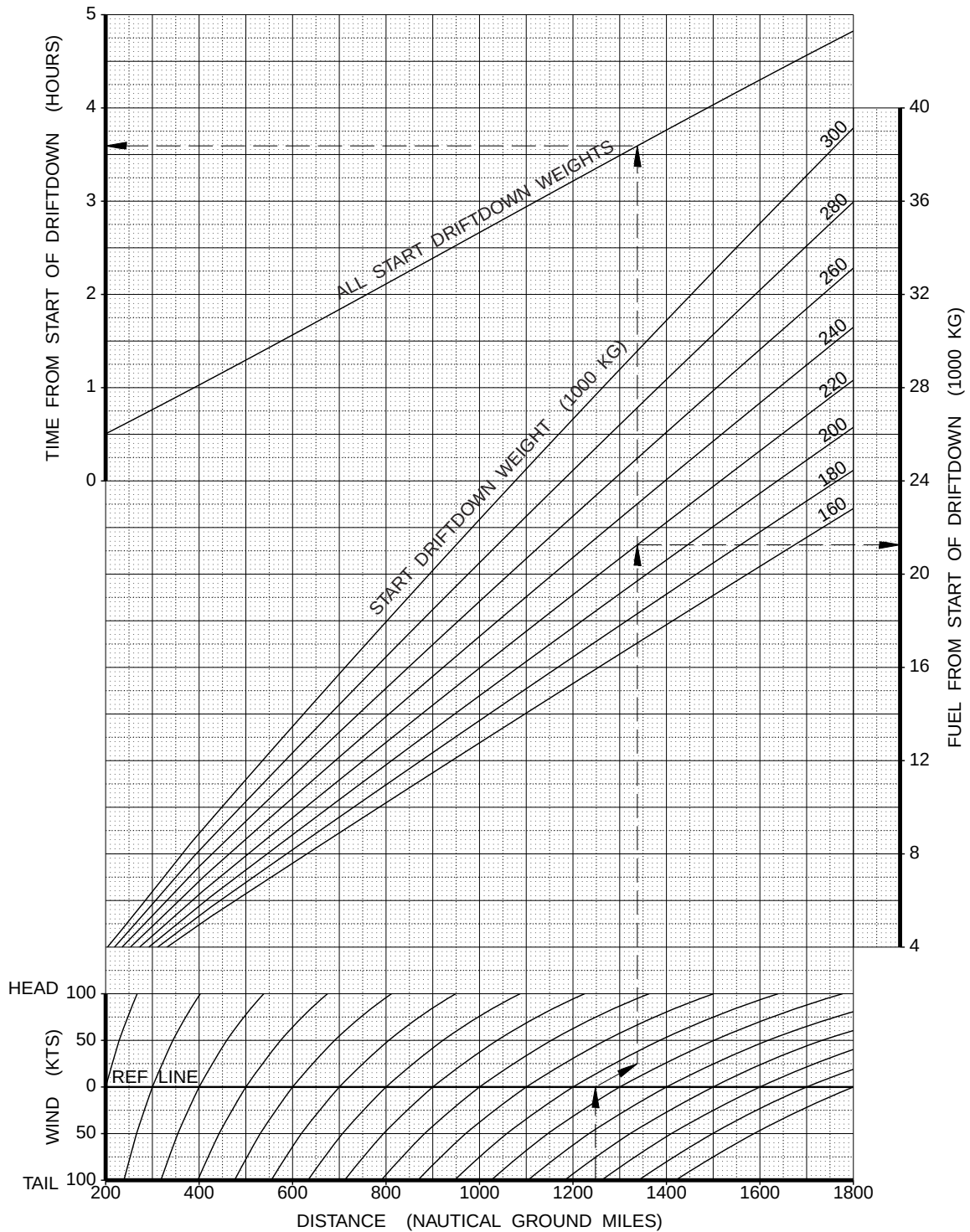
Long Range Cruise Driftdown/Cruise Range Capability
Includes APU fuel burn



ENGINE INOP
MAX CONTINUOUS THRUST

.84M/260 KIAS Driftdown/Cruise Range Capability

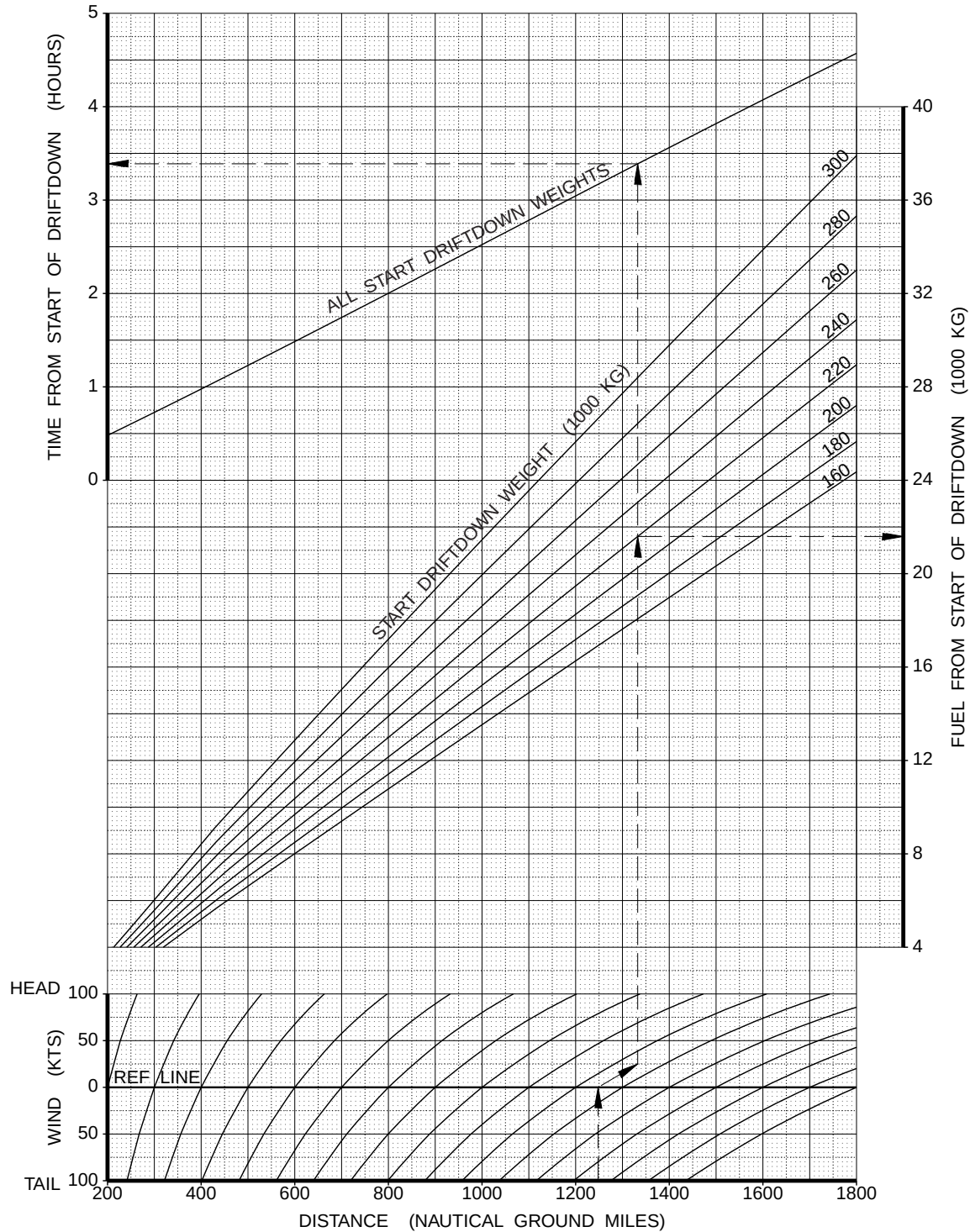
Includes APU fuel burn



ENGINE INOP
MAX CONTINUOUS THRUST

.84M/280 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn

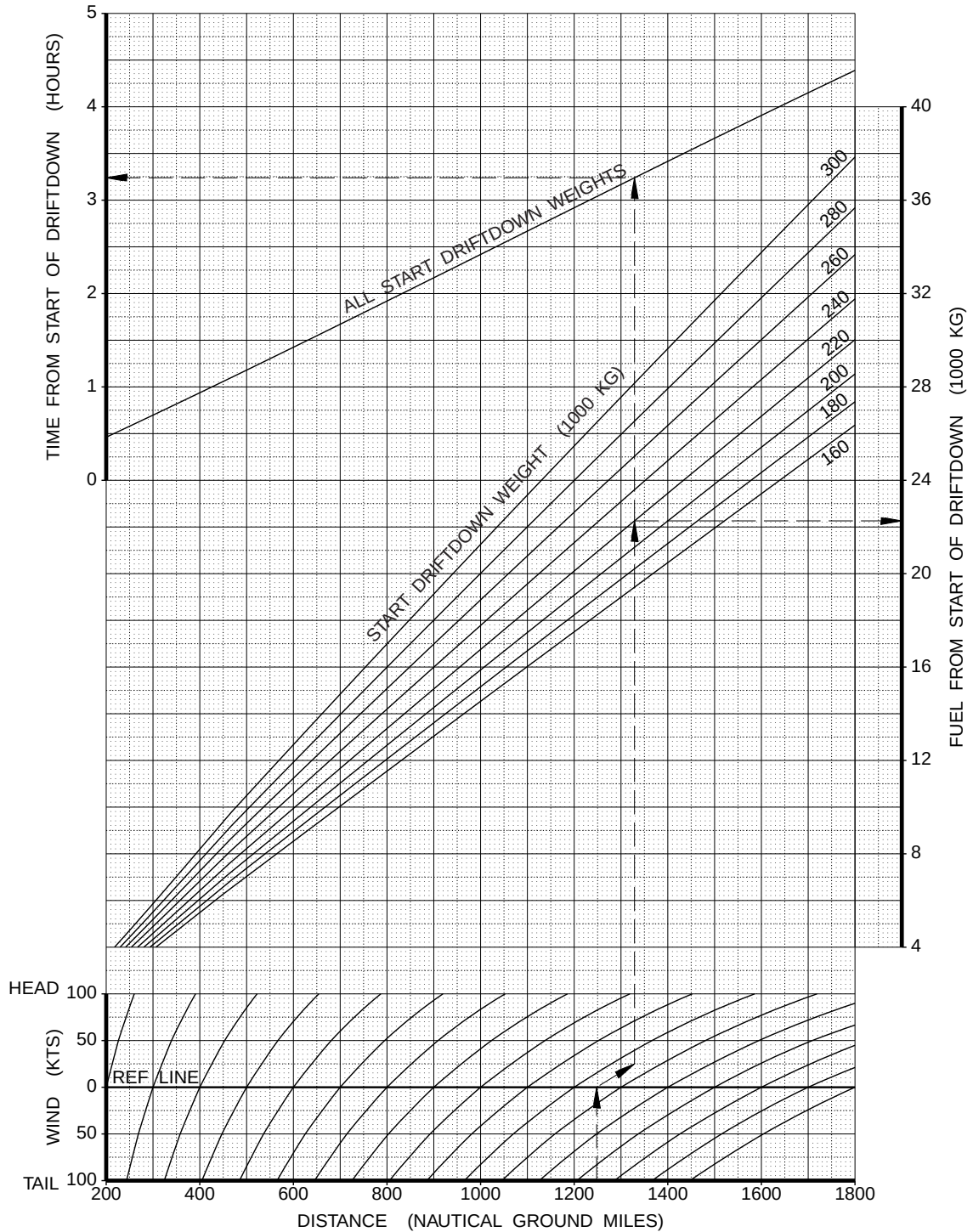


ENGINE INOP

MAX CONTINUOUS THRUST

.84M/300 KIAS Driftdown/Cruise Range Capability

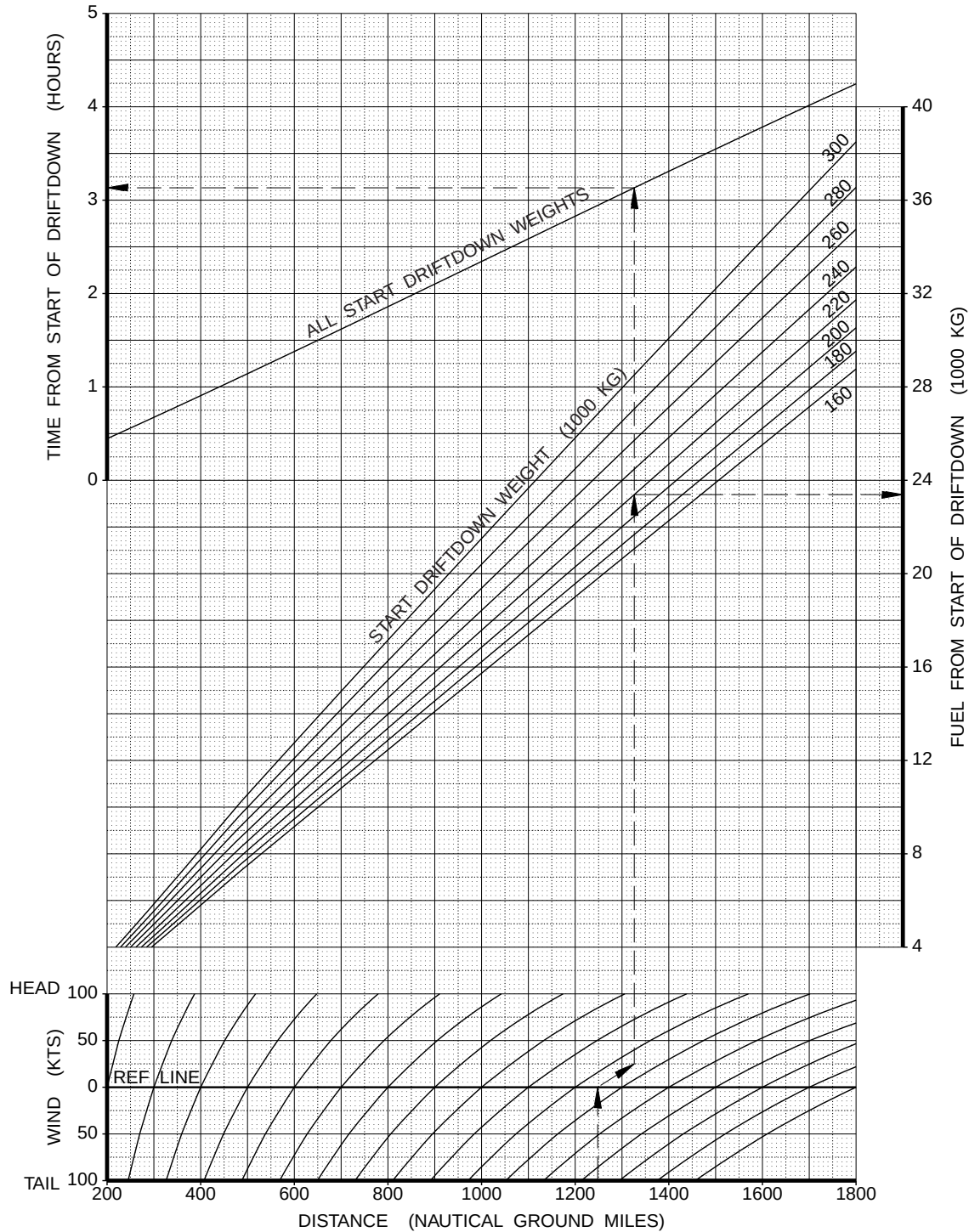
Includes APU fuel burn



ENGINE INOP
MAX CONTINUOUS THRUST

.84M/320 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn



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Intentionally
Blank

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 300 ft/min residual rate of climb. Flying above these altitudes with sustained banks in excess of approximately 21° 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 table are limited to the maximum certified altitude of 43100 ft.

Enroute Climb

The Enroute Climb tables are based on 310/.84 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 tables are provided for Long Range Cruise and .84M 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 QRH and are expanded to include true airspeed and Max Cruise thrust setting information.

To account for APU fuel burn, refer to the APU Operation 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 .84M. 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 three descent speed schedules. 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

%N1, indicated airspeed and fuel flow information are tabulated for holding at flaps up and flaps 1 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

Altitude Capability

The Engine Inoperative Altitude Capability tables are based on the thrust limited capability with 100 ft/min residual rate of climb. For the engine inoperative case, buffet capability is not considered limiting. Tables are shown for Long Range Cruise and constant speeds of 260, 280, 300, and 320 KIAS for both Max Continuous and Max Cruise Thrust. Adjust the table values for thermal anti-ice operation as shown 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 constant speeds of 260, 280, 300 and 320 KIAS. The fuel flow values in these tables reflect only the engine fuel burn. To conservatively account for APU fuel burn, refer to the APU Operation 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 are shown for Long Range Cruise and constant speeds of 260, 280, 300 and 320 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

%N1 required, ISA 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

Max Climb Thrust

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°)
300	30500	-2	34400*	34400*	34400*	33400	31900
290	31200	-4	35200*	35200*	35200*	34100	32600
280	32000	-5	35900*	35900*	35900*	34800	33400
270	32800	-7	36500*	36500*	36500*	35600	34200
260	33600	-9	37300*	37300*	37300*	36400	35000
250	34400	-11	38100*	38100*	38100*	37200	35800
240	35300	-13	38900*	38900*	38900*	38100	36600
230	36200	-15	39800*	39800*	39800*	38900	37500
220	37100	-15	40700*	40700*	40700*	39900	38400
210	38100	-15	41600*	41600*	41600*	40800	39400
200	39100	-15	42600*	42600*	42600*	41900	40400
190	40100	-15	43100	43100	43100	42900	41500
180	41300	-15	43100	43100	43100	43100	42600
170	42500	-15	43100	43100	43100	43100	43100
160	43100	-15	43100	43100	43100	43100	43100
150	43100	-15	43100	43100	43100	43100	43100

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°)
300	30500	4	33700*	33700*	33700*	33400	31900
290	31200	2	34700*	34700*	34700*	34100	32600
280	32000	0	35500*	35500*	35500*	34800	33400
270	32800	-2	36100*	36100*	36100*	35600	34200
260	33600	-3	36900*	36900*	36900*	36400	35000
250	34400	-5	37700*	37700*	37700*	37200	35800
240	35300	-7	38500*	38500*	38500*	38100	36600
230	36200	-9	39400*	39400*	39400*	38900	37500
220	37100	-9	40300*	40300*	40300*	39900	38400
210	38100	-9	41200*	41200*	41200*	40800	39400
200	39100	-9	42100*	42100*	42100*	41900	40400
190	40100	-9	43100	43100	43100	42900	41500
180	41300	-9	43100	43100	43100	43100	42600
170	42500	-9	43100	43100	43100	43100	43100
160	43100	-9	43100	43100	43100	43100	43100
150	43100	-9	43100	43100	43100	43100	43100

*Denotes altitude thrust limited in level flight, 300 fpm residual rate of climb.

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°)
300	30500	9	32400*	32400*	32400*	32400*	31900
290	31200	8	33600*	33600*	33600*	33600*	32600
280	32000	6	34800*	34800*	34800*	34800	33400
270	32800	4	35600*	35600*	35600*	35600	34200
260	33600	2	36200*	36200*	36200*	36200*	35000
250	34400	0	37000*	37000*	37000*	37000*	35800
240	35300	-1	37900*	37900*	37900*	37900*	36600
230	36200	-3	38700*	38700*	38700*	38700*	37500
220	37100	-3	39600*	39600*	39600*	39600*	38400
210	38100	-3	40500*	40500*	40500*	40500*	39400
200	39100	-3	41400*	41400*	41400*	41400*	40400
190	40100	-3	42400*	42400*	42400*	42400*	41500
180	41300	-3	43100	43100	43100	43100	42600
170	42500	-3	43100	43100	43100	43100	43100
160	43100	-3	43100	43100	43100	43100	43100
150	43100	-3	43100	43100	43100	43100	43100

*Denotes altitude thrust limited in level flight, 300 fpm residual rate of climb.

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310/.84 Enroute Climb
ISA and Below - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
43000	TIME/FUEL DIST/SPD									
42000	TIME/FUEL DIST/SPD									30/6050 205/448
41000	TIME/FUEL DIST/SPD								29/6150 200/445	25/5350 164/440
40000	TIME/FUEL DIST/SPD							29/6200 193/442	25/5550 165/438	23/5050 147/436
39000	TIME/FUEL DIST/SPD						29/6300 190/439	25/5700 165/436	23/5200 148/434	21/4850 135/432
38000	TIME/FUEL DIST/SPD					28/6450 186/436	25/5850 165/433	23/5400 149/431	21/5000 136/430	20/4650 125/429
37000	TIME/FUEL DIST/SPD			33/7400 218/438	28/6550 184/433	26/6000 165/431	24/5550 150/429	22/5150 138/428	20/4800 127/427	19/4500 118/426
36000	TIME/FUEL DIST/SPD		32/7350 207/434	28/6650 182/430	26/6150 165/428	24/5700 151/427	22/5350 139/426	21/5000 129/424	19/4650 119/424	18/4350 101/423
35000	TIME/FUEL DIST/SPD	32/7500 207/431	29/6850 184/428	26/6350 167/426	25/5900 154/425	23/5500 142/424	21/5150 131/423	20/4850 122/422	19/4550 114/421	17/4250 106/420
34000	TIME/FUEL DIST/SPD	29/7050 187/426	27/6550 170/424	25/6100 156/423	23/5700 144/421	22/5350 134/420	20/5000 125/420	19/4700 116/419	18/4450 108/418	17/4150 101/418
33000	TIME/FUEL DIST/SPD	28/6750 173/422	26/6300 159/420	24/5900 147/419	22/5500 136/418	21/5200 127/417	20/4900 118/417	18/4600 111/416	17/4300 103/415	16/4050 96/415
32000	TIME/FUEL DIST/SPD	26/6450 162/418	25/6050 150/417	23/5700 139/416	22/5350 129/415	20/5050 121/414	19/4750 113/413	18/4450 105/413	17/4200 98/412	16/3950 92/412
31000	TIME/FUEL DIST/SPD	25/6200 150/413	23/5800 139/412	22/5500 130/411	21/5150 121/411	19/4850 113/410	18/4600 106/409	17/4300 99/409	16/4050 93/408	15/3800 87/408
30000	TIME/FUEL DIST/SPD	23/5900 138/408	22/5550 129/407	21/5250 120/406	19/4950 112/406	18/4650 105/405	17/4400 98/405	16/4150 92/404	15/3900 86/404	14/3700 81/403
29000	TIME/FUEL DIST/SPD	22/5650 127/403	21/5300 119/402	20/5000 111/402	18/4750 104/401	17/4500 98/401	16/4250 92/400	15/4000 86/400	15/3750 80/399	14/3550 75/399
28000	TIME/FUEL DIST/SPD	21/5400 118/398	20/5100 110/398	19/4800 103/397	17/4550 97/397	17/4300 91/396	16/4050 85/396	15/3850 80/395	14/3600 75/395	13/3400 70/395
27000	TIME/FUEL DIST/SPD	20/5150 109/394	19/4850 102/393	18/4600 96/393	17/4350 90/392	16/4150 84/392	15/3900 79/392	14/3700 75/391	13/3500 70/391	12/3300 66/391
26000	TIME/FUEL DIST/SPD	19/4900 100/390	18/4650 94/389	17/4400 89/389	16/4200 83/388	15/4000 78/388	14/3750 74/388	13/3550 69/387	13/3350 65/387	12/3150 61/387
25000	TIME/FUEL DIST/SPD	17/4700 93/385	17/4450 87/385	16/4250 82/385	15/4000 77/384	14/3800 73/384	13/3600 69/384	13/3400 64/383	12/3250 61/383	11/3050 57/383
24000	TIME/FUEL DIST/SPD	17/4500 86/381	16/4250 81/381	15/4050 76/381	14/3850 72/380	13/3650 67/380	13/3450 64/380	12/3300 60/379	11/3100 56/379	11/2950 53/379
23000	TIME/FUEL DIST/SPD	16/4300 79/377	15/4100 74/377	14/3900 70/377	13/3700 66/376	13/3500 62/376	12/3350 59/376	11/3150 56/376	11/3000 52/375	10/2800 49/375
22000	TIME/FUEL DIST/SPD	15/4100 73/374	14/3900 69/373	13/3700 65/373	13/3550 61/373	12/3350 58/373	11/3200 55/372	11/3050 51/372	10/2850 48/372	10/2700 46/372
21000	TIME/FUEL DIST/SPD	14/3900 67/370	13/3750 63/370	13/3550 60/369	12/3400 56/369	11/3250 53/369	11/3050 50/369	10/2900 48/369	10/2750 45/368	9/2600 42/368
20000	TIME/FUEL DIST/SPD	13/3750 61/366	13/3550 58/366	12/3400 55/366	11/3250 52/366	11/3100 49/366	10/2950 46/365	10/2800 44/365	9/2650 41/365	9/2500 39/365
18000	TIME/FUEL DIST/SPD	12/3400 52/360	11/3250 49/359	11/3100 46/359	10/2950 44/359	10/2800 42/359	9/2700 39/359	9/2550 37/359	8/2400 35/358	8/2300 33/358
16000	TIME/FUEL DIST/SPD	10/3050 43/353	10/2950 41/353	9/2800 39/353	9/2700 37/353	9/2550 35/353	8/2450 33/353	8/2350 31/352	7/2200 29/352	7/2100 28/352
14000	TIME/FUEL DIST/SPD	9/2750 35/347	9/2650 33/347	8/2550 32/347	8/2450 30/347	8/2300 29/347	7/2200 27/347	7/2100 26/346	7/2000 24/346	6/1900 23/346
10000	TIME/FUEL DIST/SPD	7/2150 22/336	7/2100 21/336	6/2000 20/336	6/1950 19/336	6/1850 18/336	6/1750 17/336	5/1700 16/335	5/1600 15/335	5/1500 14/335
1500	TIME/FUEL	3/1000	3/950	3/950	3/900	3/900	3/850	3/800	2/750	2/750

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT) FUEL ADJUSTMENT (KG)	2000 -200	4000 -450	6000 -700	8000 -900	10000 -1150	12000 -1400

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb ISA and Below - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
43000	TIME/FUEL		30/5850	24/5000	21/4500	19/4100	18/3800	16/3500	15/3200	13/2950
	DIST/SPD		207/450	163/444	142/442	128/440	116/439	105/437	96/437	88/436
42000	TIME/FUEL	30/6050	24/5200	22/4700	20/4300	18/3950	17/3650	15/3400	14/3100	13/2850
	DIST/SPD	205/448	164/442	144/440	130/438	118/437	108/436	99/435	91/434	83/433
41000	TIME/FUEL	25/5350	22/4900	20/4500	19/4150	17/3850	16/3550	15/3300	13/3050	12/2800
	DIST/SPD	164/440	146/438	132/436	120/435	110/434	101/433	93/432	86/432	79/431
40000	TIME/FUEL	23/5050	21/4650	19/4300	18/4000	16/3700	15/3450	14/3200	13/2950	12/2700
	DIST/SPD	147/436	133/434	122/433	112/432	104/431	96/430	88/430	81/429	74/428
39000	TIME/FUEL	21/4850	19/4500	18/4200	17/3900	15/3600	14/3350	13/3100	12/2900	11/2650
	DIST/SPD	135/432	124/431	114/430	106/429	98/429	90/428	83/427	77/427	71/426
38000	TIME/FUEL	20/4650	18/4350	17/4050	16/3800	15/3500	14/3250	13/3050	12/2800	11/2600
	DIST/SPD	125/429	116/428	107/427	100/427	92/426	86/425	79/425	73/424	67/423
37000	TIME/FUEL	19/4500	18/4200	16/3950	15/3650	14/3450	13/3200	12/2950	11/2750	10/2500
	DIST/SPD	118/426	109/425	102/424	94/424	88/423	81/423	75/422	70/421	64/421
36000	TIME/FUEL	18/4350	17/4100	16/3850	15/3600	14/3350	13/3100	12/2900	11/2650	10/2450
	DIST/SPD	111/423	103/422	96/422	90/421	83/421	77/420	72/419	66/419	61/418
35000	TIME/FUEL	17/4250	16/4000	15/3750	14/3500	13/3250	12/3050	11/2800	11/2600	10/2400
	DIST/SPD	106/420	99/420	92/419	86/419	80/418	74/418	69/417	64/417	59/416
34000	TIME/FUEL	17/4150	16/3900	15/3650	14/3400	13/3200	12/2950	11/2750	10/2550	10/2350
	DIST/SPD	101/418	94/417	88/417	82/416	76/416	71/415	66/415	61/414	56/414
33000	TIME/FUEL	16/4050	15/3800	14/3550	13/3350	12/3100	12/2900	11/2700	10/2500	9/2300
	DIST/SPD	96/415	90/414	84/414	78/413	73/413	68/412	63/412	58/411	54/411
32000	TIME/FUEL	16/3950	15/3700	14/3450	13/3250	12/3050	11/2850	10/2650	10/2450	9/2250
	DIST/SPD	92/412	86/411	80/411	75/410	70/410	65/409	60/409	56/409	52/408
31000	TIME/FUEL	15/3800	14/3600	13/3350	12/3150	12/2950	11/2750	10/2550	9/2350	9/2200
	DIST/SPD	87/408	81/407	76/407	71/406	66/406	61/406	57/405	53/405	49/404
30000	TIME/FUEL	14/3700	13/3450	13/3250	12/3050	11/2850	10/2650	10/2450	9/2300	8/2100
	DIST/SPD	81/403	76/403	71/402	66/402	62/402	57/401	53/401	50/400	46/400
29000	TIME/FUEL	14/3550	13/3350	12/3150	11/2950	11/2750	10/2550	9/2400	8/2200	8/2050
	DIST/SPD	75/399	71/399	66/398	62/398	58/397	54/397	50/397	46/396	43/396
28000	TIME/FUEL	13/3400	12/3200	11/3000	11/2850	10/2650	9/2450	9/2300	8/2150	8/1950
	DIST/SPD	70/395	66/394	62/394	58/394	54/393	50/393	47/392	43/392	40/392
27000	TIME/FUEL	12/3300	12/3100	11/2900	10/2750	10/2550	9/2400	8/2200	8/2050	7/1900
	DIST/SPD	66/391	62/390	58/390	54/390	50/389	47/389	44/388	41/388	38/388
26000	TIME/FUEL	12/3150	11/3000	10/2800	10/2650	9/2450	9/2300	8/2150	7/2000	7/1850
	DIST/SPD	61/387	57/386	54/386	50/386	47/385	44/385	41/385	38/384	35/384
25000	TIME/FUEL	11/3050	11/2850	10/2700	9/2550	9/2350	8/2200	8/2050	7/1900	7/1750
	DIST/SPD	57/383	53/382	50/382	47/382	44/381	41/381	38/381	36/380	33/380
24000	TIME/FUEL	11/2950	10/2750	9/2600	9/2450	8/2300	8/2150	7/2000	7/1850	6/1700
	DIST/SPD	53/379	50/379	47/378	44/378	41/378	38/377	36/377	33/377	31/376
23000	TIME/FUEL	10/2800	10/2650	9/2500	8/2350	8/2200	7/2050	7/1900	6/1800	6/1650
	DIST/SPD	49/375	46/375	43/375	41/374	38/374	36/374	33/373	31/373	29/373
22000	TIME/FUEL	10/2700	9/2550	9/2400	8/2250	8/2100	7/2000	7/1850	6/1700	6/1600
	DIST/SPD	46/372	43/371	40/371	38/371	35/371	33/370	31/370	29/369	27/369
21000	TIME/FUEL	9/2600	9/2450	8/2300	8/2150	7/2050	7/1900	6/1750	6/1650	5/1500
	DIST/SPD	42/368	40/368	37/368	35/367	33/367	31/367	29/366	27/366	25/365
20000	TIME/FUEL	9/2500	8/2350	8/2200	7/2100	7/1950	6/1800	6/1700	6/1600	5/1450
	DIST/SPD	39/365	37/364	35/364	32/364	30/364	28/363	27/363	25/363	23/362
18000	TIME/FUEL	8/2300	7/2150	7/2050	7/1900	6/1800	6/1700	5/1550	5/1450	5/1350
	DIST/SPD	33/358	31/358	29/358	28/357	26/357	24/357	23/356	21/356	19/356
16000	TIME/FUEL	7/2100	7/1950	6/1850	6/1750	6/1650	5/1550	5/1450	4/1300	4/1200
	DIST/SPD	28/352	26/352	25/352	23/351	22/351	20/351	19/350	18/350	16/349
14000	TIME/FUEL	6/1900	6/1800	6/1700	5/1600	5/1500	5/1400	4/1300	4/1200	4/1100
	DIST/SPD	23/346	22/346	20/346	19/345	18/345	17/345	16/344	15/344	14/343
10000	TIME/FUEL	5/1500	5/1450	4/1350	4/1250	4/1200	4/1100	3/1050	3/950	3/900
	DIST/SPD	14/335	13/335	13/335	12/334	11/334	11/334	10/333	9/333	8/332
1500	TIME/FUEL	2/750	2/700	2/650	2/600	2/600	2/550	2/500	1/450	1/400

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-150	-300	-450	-600	-750	-850

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 10°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
43000	TIME/FUEL DIST/SPD									
42000	TIME/FUEL DIST/SPD									30/6300 215/458
41000	TIME/FUEL DIST/SPD								30/6450 210/455	25/5600 172/450
40000	TIME/FUEL DIST/SPD							30/6550 205/452	26/5800 173/447	23/5300 154/445
39000	TIME/FUEL DIST/SPD						29/6600 199/449	26/5950 173/445	23/5450 155/443	22/5050 141/441
38000	TIME/FUEL DIST/SPD					29/6700 195/445	26/6100 173/442	24/5650 156/440	22/5200 143/439	20/4850 131/438
37000	TIME/FUEL DIST/SPD			34/7750 229/447	29/6850 193/442	26/6250 173/440	24/5800 157/438	22/5400 144/437	21/5050 133/436	19/4700 123/435
36000	TIME/FUEL DIST/SPD		32/7650 217/443	29/6950 191/439	27/6400 173/437	25/5950 158/436	23/5550 146/434	21/5200 135/433	20/4850 125/432	18/4550 106/432
35000	TIME/FUEL DIST/SPD	33/7800 217/440	29/7150 193/437	27/6600 175/435	25/6150 161/434	23/5750 148/432	22/5400 138/431	20/5050 128/430	19/4750 119/430	18/4450 111/429
34000	TIME/FUEL DIST/SPD	30/7350 196/435	28/6800 178/433	26/6350 164/431	24/5950 151/430	22/5600 140/429	21/5250 131/428	20/4900 122/427	18/4600 113/427	17/4300 106/426
33000	TIME/FUEL DIST/SPD	28/7000 181/430	26/6550 167/429	25/6150 154/428	23/5750 143/427	22/5400 133/426	20/5100 124/425	19/4800 116/424	18/4500 108/424	17/4200 101/423
32000	TIME/FUEL DIST/SPD	27/6750 170/426	25/6300 157/425	23/5950 145/424	22/5600 135/423	21/5250 126/422	19/4950 118/422	18/4650 110/421	17/4350 103/421	16/4100 96/420
31000	TIME/FUEL DIST/SPD	25/6450 157/421	24/6050 146/420	22/5700 136/419	21/5400 127/419	20/5050 118/418	19/4750 111/418	17/4500 104/417	16/4250 97/416	15/3950 91/416
30000	TIME/FUEL DIST/SPD	24/6150 145/416	22/5800 115/415	21/5450 126/414	20/5150 117/414	19/4850 110/413	18/4600 103/413	17/4300 96/412	16/4050 90/412	15/3800 85/411
29000	TIME/FUEL DIST/SPD	23/5850 133/411	21/5550 124/410	20/5200 116/410	19/4950 109/409	18/4650 102/409	17/4400 96/408	16/4150 90/408	15/3900 84/407	14/3700 79/407
28000	TIME/FUEL DIST/SPD	21/5600 123/406	20/5300 115/406	19/5000 108/405	18/4750 101/405	17/4500 95/404	16/4250 89/404	15/4000 84/403	14/3750 78/403	13/3550 74/402
27000	TIME/FUEL DIST/SPD	20/5350 114/402	19/5050 107/401	18/4800 100/401	17/4550 94/400	16/4300 88/400	15/4050 83/399	14/3850 78/399	13/3600 73/399	13/3400 69/398
26000	TIME/FUEL DIST/SPD	19/5100 105/397	18/4850 99/397	17/4600 93/396	16/4350 87/396	15/4150 82/395	14/3900 77/395	14/3700 72/395	13/3500 68/394	12/3300 64/394
25000	TIME/FUEL DIST/SPD	18/4900 97/393	17/4650 91/392	16/4400 86/392	15/4150 81/392	14/3950 76/391	14/3750 72/391	13/3550 67/391	12/3350 63/390	11/3150 60/390
24000	TIME/FUEL DIST/SPD	17/4650 89/389	16/4450 84/388	15/4200 79/388	14/4000 75/388	14/3800 70/387	13/3600 66/387	12/3400 63/387	12/3200 59/386	11/3050 55/386
23000	TIME/FUEL DIST/SPD	16/4450 82/385	15/4250 78/384	14/4050 73/384	14/3850 69/384	13/3650 65/383	12/3450 62/383	12/3250 58/383	11/3100 55/383	10/2900 51/382
22000	TIME/FUEL DIST/SPD	15/4250 76/381	14/4050 72/380	14/3850 68/380	13/3650 64/380	12/3500 60/380	12/3300 57/379	11/3150 54/379	10/2950 51/379	10/2800 48/379
21000	TIME/FUEL DIST/SPD	14/4050 70/377	14/3850 66/377	13/3700 62/376	12/3500 59/376	12/3350 56/376	11/3150 53/376	10/3000 50/376	10/2850 47/375	9/2700 44/375
20000	TIME/FUEL DIST/SPD	13/3850 64/373	13/3700 61/373	12/3500 57/373	12/3350 54/373	11/3200 51/372	10/3050 49/372	10/2900 46/372	9/2700 43/372	9/2550 41/372
18000	TIME/FUEL DIST/SPD	12/3500 54/366	11/3350 51/366	11/3200 48/366	10/3050 46/366	10/2900 43/366	9/2750 41/365	9/2650 39/365	8/2500 37/365	8/2350 35/365
16000	TIME/FUEL DIST/SPD	11/3150 45/360	10/3050 43/360	10/2900 40/359	9/2800 38/359	9/2650 36/359	8/2500 34/359	8/2400 33/359	8/2250 31/359	7/2150 29/359
14000	TIME/FUEL DIST/SPD	9/2850 37/354	9/2750 35/353	9/2600 33/353	8/2500 31/353	8/2400 30/353	7/2300 28/353	7/2150 27/353	7/2050 25/353	6/1950 24/352
10000	TIME/FUEL DIST/SPD	7/2200 23/342	7/2150 22/342	7/2050 21/342	6/1950 20/342	6/1900 19/342	6/1800 18/342	5/1700 17/341	5/1650 16/341	5/1550 15/341
1500	TIME/FUEL	3/1000	3/950	3/950	3/900	3/900	3/850	3/800	2/750	2/750

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT) FUEL ADJUSTMENT (KG)	2000 -250	4000 -450	6000 -700	8000 -950	10000 -1200	12000 -1450

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 10°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
43000	TIME/FUEL		31/6150	25/5200	22/4700	20/4300	18/3950	16/3650	15/3350	14/3050
	DIST/SPD		217/460	170/454	149/451	134/449	121/448	110/447	101/446	92/445
42000	TIME/FUEL	30/6300	25/5400	22/4900	20/4500	18/4150	17/3850	16/3550	14/3250	13/3000
	DIST/SPD	215/458	172/452	151/449	136/448	124/446	113/445	104/444	95/443	87/442
41000	TIME/FUEL	25/5600	23/5100	21/4700	19/4350	17/4000	16/3700	15/3450	14/3150	13/2900
	DIST/SPD	172/450	153/447	138/446	126/444	116/443	106/442	98/441	90/441	82/440
40000	TIME/FUEL	23/5300	21/4850	19/4500	18/4200	17/3900	15/3600	14/3350	13/3100	12/2850
	DIST/SPD	154/445	140/443	128/442	118/441	109/440	100/440	92/439	85/438	78/437
39000	TIME/FUEL	22/5050	20/4700	18/4350	17/4050	16/3750	15/3500	14/3250	13/3000	12/2750
	DIST/SPD	141/441	130/440	120/439	111/438	102/438	95/437	87/436	81/435	74/435
38000	TIME/FUEL	20/4850	19/4550	18/4250	16/3950	15/3650	14/3400	13/3150	12/2950	11/2700
	DIST/SPD	131/438	121/437	113/436	104/435	97/435	90/434	83/433	77/433	70/432
37000	TIME/FUEL	19/4700	18/4400	17/4100	16/3850	15/3550	14/3300	13/3100	12/2850	11/2650
	DIST/SPD	123/435	114/434	106/433	99/433	92/432	85/431	79/431	73/430	67/430
36000	TIME/FUEL	18/4550	17/4250	16/4000	15/3750	14/3500	13/3250	12/3000	11/2800	10/2550
	DIST/SPD	116/432	108/431	101/430	94/430	87/429	81/429	75/428	69/428	64/427
35000	TIME/FUEL	18/4450	17/4150	16/3900	15/3650	14/3400	13/3150	12/2950	11/2700	10/2500
	DIST/SPD	111/429	103/428	96/428	90/427	83/427	78/426	72/426	67/425	61/425
34000	TIME/FUEL	17/4300	16/4050	15/3800	14/3550	13/3300	12/3100	11/2850	11/2650	10/2450
	DIST/SPD	106/426	99/426	92/425	86/425	80/424	74/424	69/423	64/423	59/422
33000	TIME/FUEL	17/4200	16/3950	15/3700	14/3450	13/3250	12/3000	11/2800	10/2600	9/2400
	DIST/SPD	101/423	94/423	88/422	82/422	76/421	71/421	66/420	61/420	56/419
32000	TIME/FUEL	16/4100	15/3850	14/3600	13/3400	12/3150	11/2950	11/2750	10/2550	9/2350
	DIST/SPD	96/420	90/420	84/419	78/419	73/418	68/418	63/417	59/417	54/416
31000	TIME/FUEL	15/3950	14/3750	14/3500	13/3250	12/3050	11/2850	10/2650	10/2450	9/2250
	DIST/SPD	91/416	85/416	79/415	74/415	69/414	64/414	60/413	55/413	51/412
30000	TIME/FUEL	15/3800	14/3600	13/3350	12/3150	11/2950	11/2750	10/2550	9/2350	8/2200
	DIST/SPD	85/411	79/411	74/410	69/410	65/410	60/409	56/409	52/408	48/408
29000	TIME/FUEL	14/3700	13/3450	12/3250	12/3050	11/2850	10/2650	9/2450	9/2300	8/2100
	DIST/SPD	79/407	74/406	69/406	65/406	60/405	56/405	52/404	49/404	45/404
28000	TIME/FUEL	13/3550	12/3350	12/3150	11/2950	10/2750	10/2550	9/2400	8/2200	8/2050
	DIST/SPD	74/402	69/402	65/402	60/401	56/401	53/401	49/400	45/400	42/399
27000	TIME/FUEL	13/3400	12/3200	11/3000	10/2850	10/2650	9/2450	9/2300	8/2150	7/1950
	DIST/SPD	69/398	64/398	60/397	56/397	53/397	49/396	46/396	43/396	39/395
26000	TIME/FUEL	12/3300	11/3100	11/2900	10/2700	9/2550	9/2400	8/2200	8/2050	7/1900
	DIST/SPD	64/394	60/394	56/393	53/393	49/393	46/392	43/392	40/392	37/391
25000	TIME/FUEL	11/3150	11/2950	10/2800	10/2600	9/2450	8/2300	8/2150	7/2000	7/1850
	DIST/SPD	60/390	56/390	52/389	49/389	46/389	43/388	40/388	37/388	34/387
24000	TIME/FUEL	11/3050	10/2850	10/2700	9/2500	8/2350	8/2200	7/2050	7/1900	6/1750
	DIST/SPD	55/386	52/386	49/386	46/385	43/385	40/385	37/384	35/384	32/383
23000	TIME/FUEL	10/2900	10/2750	9/2600	9/2450	8/2250	8/2150	7/2000	7/1850	6/1700
	DIST/SPD	51/382	48/382	45/382	43/382	40/381	37/381	35/380	32/380	30/380
22000	TIME/FUEL	10/2800	9/2650	9/2500	8/2350	8/2200	7/2050	7/1900	6/1750	6/1650
	DIST/SPD	48/379	45/378	42/378	39/378	37/378	35/377	32/377	30/376	28/376
21000	TIME/FUEL	9/2700	9/2550	8/2400	8/2250	7/2100	7/1950	6/1850	6/1700	5/1550
	DIST/SPD	44/375	41/375	39/375	37/374	34/374	32/374	30/373	28/373	26/372
20000	TIME/FUEL	9/2550	8/2450	8/2300	7/2150	7/2000	7/1900	6/1750	6/1650	5/1500
	DIST/SPD	41/372	38/371	36/371	34/371	32/371	30/370	28/370	26/369	24/369
18000	TIME/FUEL	8/2350	8/2250	7/2100	7/1950	6/1850	6/1750	5/1600	5/1500	5/1400
	DIST/SPD	35/365	33/365	31/364	29/364	27/364	25/364	24/363	22/363	20/362
16000	TIME/FUEL	7/2150	7/2050	6/1900	6/1800	6/1700	5/1600	5/1450	5/1350	4/1250
	DIST/SPD	29/359	27/358	26/358	24/358	23/358	21/357	20/357	18/356	17/356
14000	TIME/FUEL	6/1950	6/1850	6/1750	5/1650	5/1550	5/1450	4/1350	4/1250	4/1150
	DIST/SPD	24/352	23/352	21/352	20/352	19/351	18/351	16/351	15/350	14/350
10000	TIME/FUEL	5/1550	5/1450	4/1400	4/1300	4/1200	4/1150	3/1050	3/1000	3/900
	DIST/SPD	15/341	14/341	13/341	13/340	12/340	11/340	10/339	10/339	9/338
1500	TIME/FUEL	2/750	2/700	2/650	2/600	2/600	2/550	2/500	1/450	1/400

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-150	-300	-450	-600	-750	-900

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 15°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
43000	TIME/FUEL DIST/SPD									
42000	TIME/FUEL DIST/SPD									
41000	TIME/FUEL DIST/SPD									29/6050 202/456
40000	TIME/FUEL DIST/SPD								29/6250 202/453	26/5650 178/450
39000	TIME/FUEL DIST/SPD						35/7350 243/456	29/6450 202/451	27/5850 180/448	24/5400 163/446
38000	TIME/FUEL DIST/SPD					34/7450 236/452	30/6650 203/448	27/6050 182/446	25/5600 165/444	23/5200 151/443
37000	TIME/FUEL DIST/SPD				34/7550 233/449	30/6800 204/446	28/6250 184/443	25/5800 168/442	23/5400 154/441	22/5000 142/440
36000	TIME/FUEL DIST/SPD		39/8700 271/451	34/7650 230/446	31/7000 205/443	28/6450 186/441	26/6000 170/440	24/5600 157/438	22/5200 145/437	21/4850 134/437
35000	TIME/FUEL DIST/SPD	39/8850 271/448	35/7900 234/444	31/7250 210/441	29/6700 191/439	27/6250 175/438	25/5800 161/437	23/5400 149/436	21/5050 138/435	20/4750 128/434
34000	TIME/FUEL DIST/SPD	36/8200 241/442	32/7500 215/439	30/6950 195/437	27/6450 179/436	26/6050 165/435	24/5650 153/434	22/5250 141/433	21/4950 131/432	19/4600 122/431
33000	TIME/FUEL DIST/SPD	33/7800 221/437	31/7200 200/435	28/6700 183/433	26/6250 169/432	24/5850 156/431	23/5450 145/430	21/5100 135/430	20/4800 125/429	19/4500 117/428
32000	TIME/FUEL DIST/SPD	31/7450 205/432	29/6900 187/431	27/6450 172/430	25/6050 159/429	24/5650 148/428	22/5300 138/427	21/4950 128/426	19/4650 119/426	18/4350 111/425
31000	TIME/FUEL DIST/SPD	29/7050 188/427	27/6600 173/426	26/6200 160/425	24/5800 149/424	22/5450 138/423	21/5100 129/422	20/4800 120/422	18/4500 112/421	17/4200 104/421
30000	TIME/FUEL DIST/SPD	28/6700 146/411	26/6300 135/420	24/5900 126/410	23/5550 118/409	21/5200 108/418	20/4900 120/418	19/4600 112/417	17/4300 104/416	16/4050 97/416
29000	TIME/FUEL DIST/SPD	26/6400 158/416	24/6000 147/415	23/5650 137/415	21/5300 127/414	20/5000 119/413	19/4700 111/413	18/4400 104/412	17/4150 97/412	16/3900 91/411
28000	TIME/FUEL DIST/SPD	24/6050 146/411	23/5700 135/410	21/5400 126/410	20/5050 118/409	19/4800 110/409	18/4500 103/408	17/4250 97/408	16/4000 90/407	15/3750 84/407
27000	TIME/FUEL DIST/SPD	23/5800 134/406	21/5450 125/406	20/5150 117/405	19/4850 109/405	18/4600 102/404	17/4300 96/404	16/4050 90/403	15/3850 84/403	14/3600 79/403
26000	TIME/FUEL DIST/SPD	21/5500 124/402	20/5200 115/401	19/4900 108/401	18/4650 101/400	17/4400 95/400	16/4150 89/399	15/3900 83/399	14/3700 78/399	13/3450 73/398
25000	TIME/FUEL DIST/SPD	20/5250 114/397	19/4950 107/397	18/4700 100/396	17/4450 94/396	16/4200 88/396	15/4000 83/395	14/3750 78/395	13/3550 73/395	13/3350 68/394
24000	TIME/FUEL DIST/SPD	19/5000 105/393	18/4750 98/393	17/4500 92/392	16/4250 87/392	15/4050 81/392	14/3800 77/391	14/3600 72/391	13/3400 68/391	12/3200 63/390
23000	TIME/FUEL DIST/SPD	18/4750 97/389	17/4500 91/388	16/4300 85/388	15/4050 80/388	14/3850 75/388	14/3650 71/387	13/3450 67/387	12/3250 63/387	11/3050 59/387
22000	TIME/FUEL DIST/SPD	17/4550 89/385	16/4300 84/385	15/4100 79/384	14/3900 74/384	14/3700 70/384	13/3500 66/384	12/3300 62/383	12/3100 58/383	11/2950 55/383
21000	TIME/FUEL DIST/SPD	16/4350 82/381	15/4100 77/381	14/3900 72/381	14/3700 68/380	13/3550 64/380	12/3350 61/380	12/3150 57/380	11/3000 54/379	10/2800 50/379
20000	TIME/FUEL DIST/SPD	15/4100 75/377	14/3900 71/377	14/3750 67/377	13/3550 63/377	12/3350 59/376	12/3200 56/376	11/3050 53/376	10/2850 50/376	10/2700 47/376
18000	TIME/FUEL DIST/SPD	13/3700 63/370	13/3550 59/370	12/3400 56/370	11/3200 53/370	11/3050 50/370	10/2900 47/369	10/2750 44/369	9/2600 42/369	9/2450 39/369
16000	TIME/FUEL DIST/SPD	12/3350 52/364	11/3200 49/363	11/3050 46/363	10/2900 44/363	10/2750 42/363	9/2650 39/363	9/2500 37/363	8/2350 35/362	8/2250 33/362
14000	TIME/FUEL DIST/SPD	10/3000 42/357	10/2850 40/357	9/2750 38/357	9/2600 36/357	8/2500 34/357	8/2350 32/357	8/2250 30/356	7/2150 29/356	7/2000 27/356
10000	TIME/FUEL DIST/SPD	8/2300 26/345	7/2200 24/345	7/2150 23/345	7/2050 22/345	6/1950 21/345	6/1850 20/345	6/1750 19/345	6/1700 18/345	5/1600 17/344
1500	TIME/FUEL	3/1000	3/950	3/950	3/900	3/900	3/850	3/800	2/750	2/750

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT) FUEL ADJUSTMENT (KG)	2000 -250	4000 -500	6000 -750	8000 -1000	10000 -1250	12000 -1550

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 15°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
43000	TIME/FUEL DIST/SPD			28/5700 202/460	25/5050 173/457	22/4600 153/455	20/4200 138/453	18/3850 125/452	17/3550 114/451	15/3250 104/450
42000	TIME/FUEL DIST/SPD		29/5900 203/458	25/5250 175/455	23/4800 156/453	21/4400 141/451	19/4050 129/450	17/3750 117/449	16/3450 107/448	15/3150 98/447
41000	TIME/FUEL DIST/SPD	29/6050 202/456	26/5450 177/453	23/5000 158/451	21/4600 144/449	19/4250 131/448	18/3950 120/447	16/3650 111/446	15/3350 101/445	14/3050 93/445
40000	TIME/FUEL DIST/SPD	26/5650 178/450	24/5200 161/448	22/4800 146/447	20/4450 134/446	18/4100 123/445	17/3800 114/444	16/3500 104/443	14/3250 96/443	13/3000 88/442
39000	TIME/FUEL DIST/SPD	24/5400 163/446	22/5000 149/445	21/4650 137/444	19/4300 126/443	18/4000 116/442	16/3700 107/441	15/3450 99/441	14/3150 91/440	13/2900 84/439
38000	TIME/FUEL DIST/SPD	23/5200 151/443	21/4850 139/442	20/4500 129/441	18/4200 119/440	17/3900 110/439	16/3600 102/439	14/3350 94/438	13/3100 87/438	12/2850 80/437
37000	TIME/FUEL DIST/SPD	22/5000 142/440	20/4650 131/439	19/4350 122/438	17/4050 113/437	16/3800 105/437	15/3500 97/436	14/3250 90/436	13/3000 83/435	12/2750 76/434
36000	TIME/FUEL DIST/SPD	21/4850 134/437	19/4550 125/436	18/4250 116/435	17/3950 107/435	16/3700 100/434	14/3400 92/433	13/3150 85/433	12/2950 79/432	11/2700 73/432
35000	TIME/FUEL DIST/SPD	20/4750 128/434	19/4400 119/433	17/4150 111/433	16/3850 103/432	15/3600 95/432	14/3350 88/431	13/3100 82/430	12/2850 76/430	11/2650 70/429
34000	TIME/FUEL DIST/SPD	19/4600 122/431	18/4300 114/431	17/4050 106/430	16/3750 98/429	15/3500 91/429	14/3250 85/428	13/3000 78/428	12/2800 73/427	11/2600 67/427
33000	TIME/FUEL DIST/SPD	19/4500 117/428	17/4200 109/428	16/3950 101/427	15/3650 94/427	14/3400 87/426	13/3200 81/426	12/2950 75/425	11/2750 70/425	10/2500 64/424
32000	TIME/FUEL DIST/SPD	18/4350 111/425	17/4100 104/425	16/3800 96/424	15/3550 90/423	14/3350 83/423	13/3100 78/422	12/2900 72/422	11/2650 67/422	10/2450 62/421
31000	TIME/FUEL DIST/SPD	17/4200 104/421	16/3950 97/420	15/3700 91/420	14/3450 85/419	13/3250 79/419	12/3000 73/418	11/2800 68/418	11/2600 63/418	10/2400 58/417
30000	TIME/FUEL DIST/SPD	16/4050 97/416	15/3800 91/415	14/3550 85/415	13/3350 79/415	12/3100 74/414	12/2900 68/414	11/2700 64/413	10/2500 59/413	9/2300 54/413
29000	TIME/FUEL DIST/SPD	16/3900 91/411	15/3650 85/411	14/3450 79/410	13/3200 74/410	12/3000 69/410	11/2800 64/409	10/2600 59/409	10/2400 55/409	9/2200 51/408
28000	TIME/FUEL DIST/SPD	15/3750 84/407	14/3500 79/406	13/3300 74/406	12/3100 69/406	11/2900 64/405	11/2700 60/405	10/2500 56/405	9/2300 52/404	8/2150 48/404
27000	TIME/FUEL DIST/SPD	14/3600 79/403	13/3400 74/402	12/3150 69/402	12/2950 64/401	11/2800 60/401	10/2600 56/401	9/2400 52/400	9/2250 48/400	8/2050 45/400
26000	TIME/FUEL DIST/SPD	13/3450 73/398	13/3250 69/398	12/3050 64/398	11/2850 60/397	10/2700 56/397	10/2500 52/397	9/2300 49/396	8/2150 45/396	8/2000 42/396
25000	TIME/FUEL DIST/SPD	13/3350 68/394	12/3150 64/394	11/2950 60/394	10/2750 56/393	10/2600 52/393	9/2400 49/393	9/2250 45/392	8/2100 42/392	7/1900 39/392
24000	TIME/FUEL DIST/SPD	12/3200 63/390	11/3000 59/390	11/2800 56/390	10/2650 52/389	9/2500 49/389	9/2300 45/389	8/2150 42/389	8/2000 39/388	7/1850 36/388
23000	TIME/FUEL DIST/SPD	11/3050 59/387	11/2900 55/386	10/2700 52/386	9/2550 48/386	9/2400 45/385	8/2200 42/385	8/2050 39/385	7/1900 37/384	7/1750 34/384
22000	TIME/FUEL DIST/SPD	11/2950 55/383	10/2750 51/383	10/2600 48/382	9/2450 45/382	8/2300 42/382	8/2150 39/381	7/2000 37/381	7/1850 34/381	6/1700 31/380
21000	TIME/FUEL DIST/SPD	10/2800 50/379	10/2650 47/379	9/2500 44/379	9/2350 42/378	8/2200 39/378	7/2050 36/378	7/1900 34/377	6/1750 32/377	6/1650 29/377
20000	TIME/FUEL DIST/SPD	10/2700 47/376	9/2550 44/375	9/2400 41/375	8/2250 39/375	8/2100 36/375	7/1950 34/374	7/1850 31/374	6/1700 29/374	6/1550 27/373
18000	TIME/FUEL DIST/SPD	9/2450 39/369	8/2300 37/369	8/2200 35/368	7/2050 33/368	7/1950 31/368	6/1800 29/368	6/1700 27/367	6/1550 25/367	5/1450 23/366
16000	TIME/FUEL DIST/SPD	8/2250 33/362	7/2100 31/362	7/2000 29/362	6/1850 27/362	6/1750 26/361	6/1650 24/361	5/1550 22/361	5/1400 21/360	5/1300 19/360
14000	TIME/FUEL DIST/SPD	7/2000 27/356	6/1900 25/356	6/1800 24/356	6/1700 23/355	5/1600 21/355	5/1500 20/355	5/1400 18/355	4/1300 17/354	4/1200 16/354
10000	TIME/FUEL DIST/SPD	5/1600 17/344	5/1500 16/344	5/1400 15/344	4/1350 14/344	4/1250 13/344	4/1150 12/343	4/1100 11/343	3/1000 11/342	3/950 10/342
1500	TIME/FUEL	2/750	2/700	2/650	2/600	2/600	2/550	2/500	1/450	1/400

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT) FUEL ADJUSTMENT (KG)	2000 -150	4000 -300	6000 -500	8000 -650	10000 -800	12000 -950

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 20°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
43000	TIME/FUEL DIST/SPD									
42000	TIME/FUEL DIST/SPD									
41000	TIME/FUEL DIST/SPD									35/6900 256/464
40000	TIME/FUEL DIST/SPD								35/7050 252/461	30/6250 214/457
39000	TIME/FUEL DIST/SPD							35/7250 251/458	31/6450 216/454	28/5900 193/452
38000	TIME/FUEL DIST/SPD						36/7450 251/455	32/6700 219/452	29/6100 196/450	26/5650 179/449
37000	TIME/FUEL DIST/SPD				42/8750 299/458	36/7650 251/453	32/6950 222/450	29/6350 200/448	27/5850 182/446	25/5450 167/445
36000	TIME/FUEL DIST/SPD			41/8800 292/454	36/7850 252/450	33/7150 225/448	30/6600 204/446	28/6100 186/444	26/5650 171/443	24/5250 158/442
35000	TIME/FUEL DIST/SPD		43/9100 298/452	38/8200 260/448	34/7450 232/446	31/6850 210/444	29/6350 192/443	27/5900 176/441	25/5500 163/440	23/5100 150/439
34000	TIME/FUEL DIST/SPD	44/9500 308/450	39/8550 268/447	35/7800 240/444	32/7150 217/442	30/6650 198/441	27/6150 182/439	25/5750 168/438	24/5350 155/437	22/4950 143/437
33000	TIME/FUEL DIST/SPD	40/8900 278/445	37/8100 247/442	33/7450 224/440	31/6900 204/438	28/6400 187/437	26/5950 172/436	25/5550 159/435	23/5200 147/434	21/4850 137/434
32000	TIME/FUEL DIST/SPD	38/8450 255/440	35/7750 230/438	32/7150 210/436	29/6650 192/435	27/6200 177/434	25/5800 164/433	24/5400 151/432	22/5050 140/431	20/4700 130/430
31000	TIME/FUEL DIST/SPD	35/7950 233/434	32/7350 212/432	30/6850 194/431	28/6350 179/430	26/5950 165/429	24/5550 153/428	22/5200 142/427	21/4850 132/427	20/4550 122/426
30000	TIME/FUEL DIST/SPD	33/7500 212/428	30/6950 163/427	28/6500 178/425	26/6050 165/425	24/5700 153/424	23/5300 142/423	21/4950 132/422	20/4650 122/422	19/4350 114/421
29000	TIME/FUEL DIST/SPD	31/7100 194/422	28/6600 178/421	26/6200 164/420	25/5800 152/419	23/5400 141/419	21/5100 131/418	20/4750 122/417	19/4450 114/417	18/4200 106/416
28000	TIME/FUEL DIST/SPD	29/6750 177/417	27/6300 163/416	25/5900 151/415	23/5500 140/415	22/5200 131/414	20/4850 122/413	19/4550 113/413	18/4300 106/412	17/4000 98/412
27000	TIME/FUEL DIST/SPD	27/6400 162/412	25/6000 150/411	23/5600 139/410	22/5250 130/410	20/4950 121/409	19/4650 113/409	18/4350 105/408	17/4100 98/408	16/3850 91/407
26000	TIME/FUEL DIST/SPD	25/6050 149/407	23/5700 138/406	22/5350 128/406	21/5050 120/405	19/4750 112/405	18/4450 104/404	17/4200 97/404	16/3950 91/403	15/3700 85/403
25000	TIME/FUEL DIST/SPD	23/5750 136/402	22/5400 127/402	21/5100 118/401	19/4800 110/401	18/4500 103/400	17/4250 97/400	16/4000 90/400	15/3750 84/399	14/3550 79/399
24000	TIME/FUEL DIST/SPD	22/5450 125/398	21/5150 116/397	19/4850 109/397	18/4600 102/397	17/4300 95/396	16/4100 89/396	15/3850 84/395	14/3600 78/395	13/3400 73/395
23000	TIME/FUEL DIST/SPD	20/5200 114/394	19/4900 107/393	18/4600 100/393	17/4350 94/392	16/4150 88/392	15/3900 82/392	14/3650 77/391	14/3450 72/391	13/3250 68/391
22000	TIME/FUEL DIST/SPD	19/4900 105/389	18/4650 98/389	17/4400 92/389	16/4150 86/388	15/3950 81/388	14/3700 76/388	14/3500 71/388	13/3300 67/387	12/3100 63/387
21000	TIME/FUEL DIST/SPD	18/4650 96/385	17/4400 90/385	16/4200 84/385	15/3950 79/384	14/3750 75/384	14/3550 70/384	13/3350 66/384	12/3150 62/383	11/2950 58/383
20000	TIME/FUEL DIST/SPD	17/4400 88/382	16/4200 82/381	15/4000 77/381	14/3750 73/381	14/3600 68/380	13/3400 64/380	12/3200 61/380	11/3000 57/380	11/2850 53/380
18000	TIME/FUEL DIST/SPD	15/3950 73/374	14/3800 69/374	13/3600 65/374	13/3400 61/374	12/3250 57/373	11/3050 54/373	11/2900 51/373	10/2750 48/373	10/2600 45/373
16000	TIME/FUEL DIST/SPD	13/3550 60/367	12/3400 57/367	12/3200 53/367	11/3050 50/367	11/2900 48/367	10/2750 45/366	9/2600 42/366	9/2500 40/366	8/2350 37/366
14000	TIME/FUEL DIST/SPD	11/3150 49/361	11/3000 46/360	10/2850 43/360	10/2750 41/360	9/2600 39/360	9/2500 37/360	8/2350 34/360	8/2200 32/360	7/2100 31/360
10000	TIME/FUEL DIST/SPD	8/2400 29/349	8/2300 28/348	7/2200 26/348	7/2100 25/348	7/2050 24/348	7/1950 22/348	6/1850 21/348	6/1750 20/348	6/1650 19/348
1500	TIME/FUEL	3/1000	3/950	3/950	3/900	3/900	3/850	3/800	2/750	2/750

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT) FUEL ADJUSTMENT (KG)	2000 -250	4000 -550	6000 -800	8000 -1050	10000 -1350	12000 -1650

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 20°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
43000	TIME/FUEL				29/5550	25/4950	23/4500	21/4150	19/3800	17/3450
	DIST/SPD				207/463	181/461	161/459	146/457	132/456	120/455
42000	TIME/FUEL		36/6700	29/5800	26/5200	24/4750	21/4350	20/4000	18/3650	16/3350
	DIST/SPD		259/467	210/461	184/459	165/457	149/455	136/454	124/453	113/453
41000	TIME/FUEL	35/6900	30/6000	27/5450	24/4950	22/4550	20/4200	19/3900	17/3550	16/3250
	DIST/SPD	256/464	212/459	187/457	168/455	153/454	140/452	128/452	117/451	107/450
40000	TIME/FUEL	30/6250	27/5650	25/5200	23/4800	21/4400	19/4100	18/3750	16/3450	15/3200
	DIST/SPD	214/457	190/454	172/453	157/452	143/450	131/450	121/449	111/448	101/447
39000	TIME/FUEL	28/5900	25/5400	23/5000	22/4650	20/4300	18/3950	17/3650	16/3350	14/3100
	DIST/SPD	193/452	175/451	160/449	147/448	135/448	124/447	114/446	105/445	96/445
38000	TIME/FUEL	26/5650	24/5200	22/4850	21/4500	19/4150	18/3850	16/3550	15/3300	14/3000
	DIST/SPD	179/449	163/447	150/446	139/446	128/445	118/444	108/443	100/443	92/442
37000	TIME/FUEL	25/5450	23/5050	21/4700	20/4350	18/4050	17/3750	16/3450	14/3200	13/2950
	DIST/SPD	167/445	154/444	142/443	131/443	121/442	112/441	103/441	95/440	87/440
36000	TIME/FUEL	24/5250	22/4900	20/4550	19/4250	18/3950	16/3650	15/3400	14/3100	13/2850
	DIST/SPD	158/442	146/441	135/441	125/440	115/439	107/439	98/438	91/437	83/437
35000	TIME/FUEL	23/5100	21/4750	20/4450	18/4150	17/3850	16/3550	15/3300	13/3050	12/2800
	DIST/SPD	150/439	139/439	129/438	119/437	110/437	102/436	94/436	87/435	80/435
34000	TIME/FUEL	22/4950	20/4650	19/4300	18/4000	16/3750	15/3450	14/3200	13/3000	12/2750
	DIST/SPD	143/437	133/436	123/435	114/435	106/434	98/434	90/433	84/433	77/432
33000	TIME/FUEL	21/4850	20/4500	18/4200	17/3900	16/3650	15/3400	14/3150	13/2900	12/2700
	DIST/SPD	137/434	127/433	118/432	109/432	101/431	94/431	87/430	80/430	74/429
32000	TIME/FUEL	20/4700	19/4400	18/4100	17/3800	15/3550	14/3300	13/3050	12/2850	11/2600
	DIST/SPD	130/430	121/430	112/429	104/429	97/428	90/428	83/427	77/427	71/426
31000	TIME/FUEL	20/4550	18/4250	17/3950	16/3700	15/3450	14/3200	13/2950	12/2750	11/2550
	DIST/SPD	122/426	114/425	106/425	98/424	91/424	84/423	78/423	72/423	67/422
30000	TIME/FUEL	19/4350	17/4050	16/3800	15/3550	14/3300	13/3100	12/2850	11/2650	10/2450
	DIST/SPD	114/421	106/421	98/420	91/420	85/419	79/419	73/418	68/418	63/418
29000	TIME/FUEL	18/4200	16/3900	15/3650	14/3400	13/3200	12/2950	11/2750	11/2550	10/2350
	DIST/SPD	106/416	98/416	92/415	85/415	79/415	74/414	68/414	63/413	58/413
28000	TIME/FUEL	17/4000	16/3750	15/3500	14/3300	13/3050	12/2850	11/2650	10/2450	9/2250
	DIST/SPD	98/412	92/411	85/411	80/411	74/410	69/410	64/409	59/409	55/409
27000	TIME/FUEL	16/3850	15/3600	14/3400	13/3150	12/2950	11/2750	10/2550	10/2350	9/2200
	DIST/SPD	91/407	85/407	80/407	74/406	69/406	64/405	60/405	55/405	51/404
26000	TIME/FUEL	15/3700	14/3450	13/3250	12/3050	11/2850	11/2650	10/2450	9/2250	8/2100
	DIST/SPD	85/403	79/403	74/402	69/402	64/402	60/401	56/401	52/401	48/400
25000	TIME/FUEL	14/3550	13/3300	12/3100	12/2900	11/2700	10/2550	9/2350	9/2200	8/2000
	DIST/SPD	79/399	74/399	69/398	64/398	60/398	56/397	52/397	48/397	44/396
24000	TIME/FUEL	13/3400	13/3200	12/3000	11/2800	10/2600	10/2450	9/2250	8/2100	8/1950
	DIST/SPD	73/395	68/394	64/394	60/394	56/394	52/393	48/393	45/393	41/392
23000	TIME/FUEL	13/3250	12/3050	11/2850	10/2700	10/2500	9/2350	9/2200	8/2000	7/1850
	DIST/SPD	68/391	63/391	59/390	55/390	52/390	48/389	45/389	42/389	39/388
22000	TIME/FUEL	12/3100	11/2900	11/2750	10/2550	9/2400	9/2250	8/2100	7/1950	7/1800
	DIST/SPD	63/387	59/387	55/386	51/386	48/386	45/386	42/385	39/385	36/385
21000	TIME/FUEL	11/2950	11/2800	10/2650	9/2450	9/2300	8/2150	8/2000	7/1850	7/1700
	DIST/SPD	58/383	54/383	51/383	48/382	44/382	41/382	39/382	36/381	33/381
20000	TIME/FUEL	11/2850	10/2650	9/2500	9/2350	8/2200	8/2050	7/1900	7/1800	6/1650
	DIST/SPD	53/380	50/379	47/379	44/379	41/379	38/378	36/378	33/378	31/377
18000	TIME/FUEL	10/2600	9/2450	8/2300	8/2150	7/2000	7/1900	6/1750	6/1600	6/1500
	DIST/SPD	45/373	42/372	40/372	37/372	35/372	32/371	30/371	28/371	26/371
16000	TIME/FUEL	8/2350	8/2200	7/2100	7/1950	7/1850	6/1700	6/1600	5/1450	5/1350
	DIST/SPD	37/366	35/366	33/366	31/365	29/365	27/365	25/365	23/364	22/364
14000	TIME/FUEL	7/2100	7/2000	7/1850	6/1750	6/1650	5/1550	5/1450	5/1350	4/1200
	DIST/SPD	31/360	29/359	27/359	25/359	24/359	22/359	21/358	19/358	18/357
10000	TIME/FUEL	6/1650	5/1550	5/1450	5/1400	4/1300	4/1200	4/1100	4/1050	3/950
	DIST/SPD	19/348	18/348	17/347	16/347	15/347	14/347	13/346	12/346	11/346
1500	TIME/FUEL	2/750	2/700	2/650	2/600	2/600	2/550	2/500	1/450	1/400

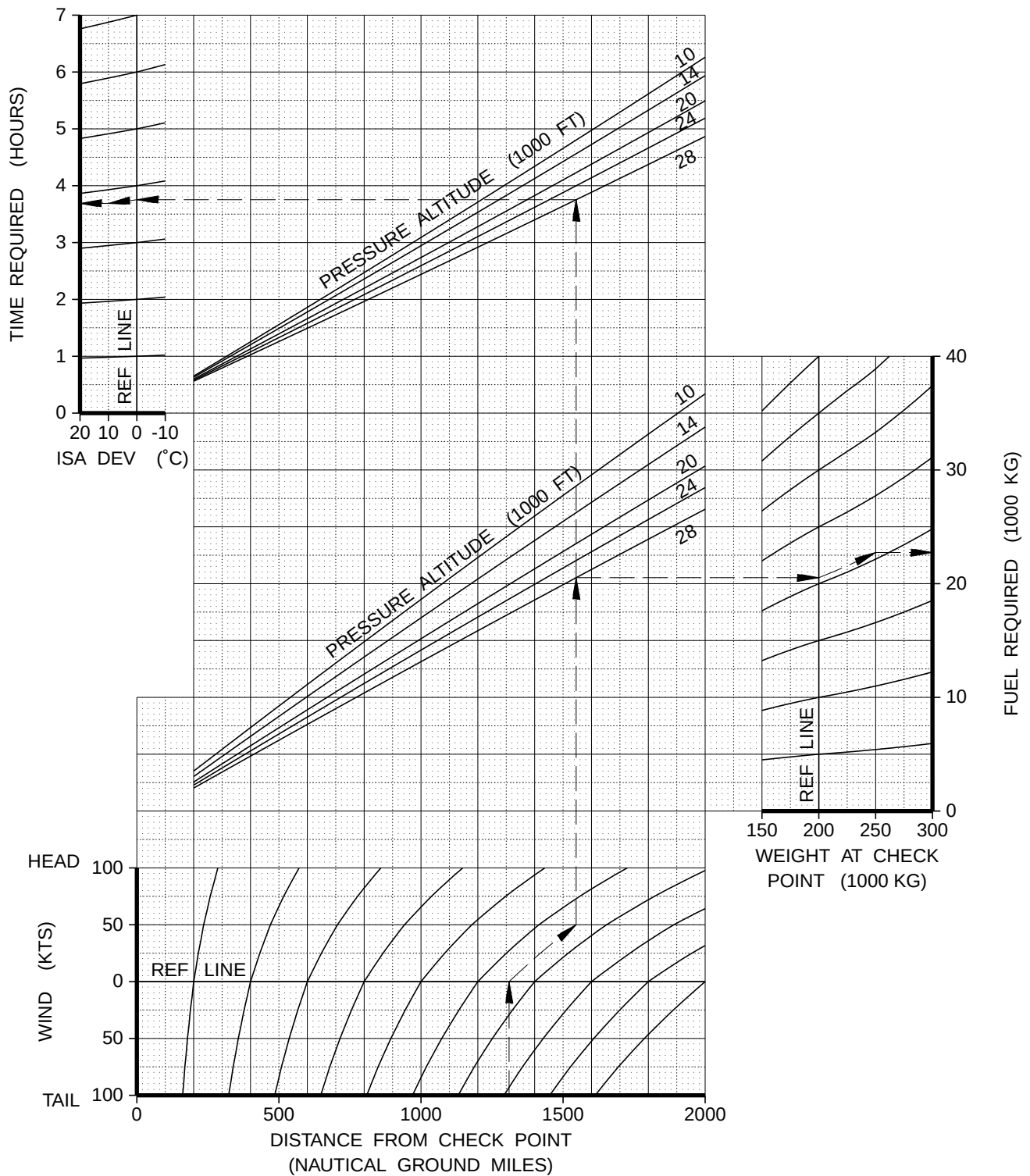
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-150	-350	-500	-650	-850	-1000

Shaded area approximates optimum altitude at LRC/.84.

Long Range Cruise Enroute Fuel and Time

0 to 2000 NM Distance

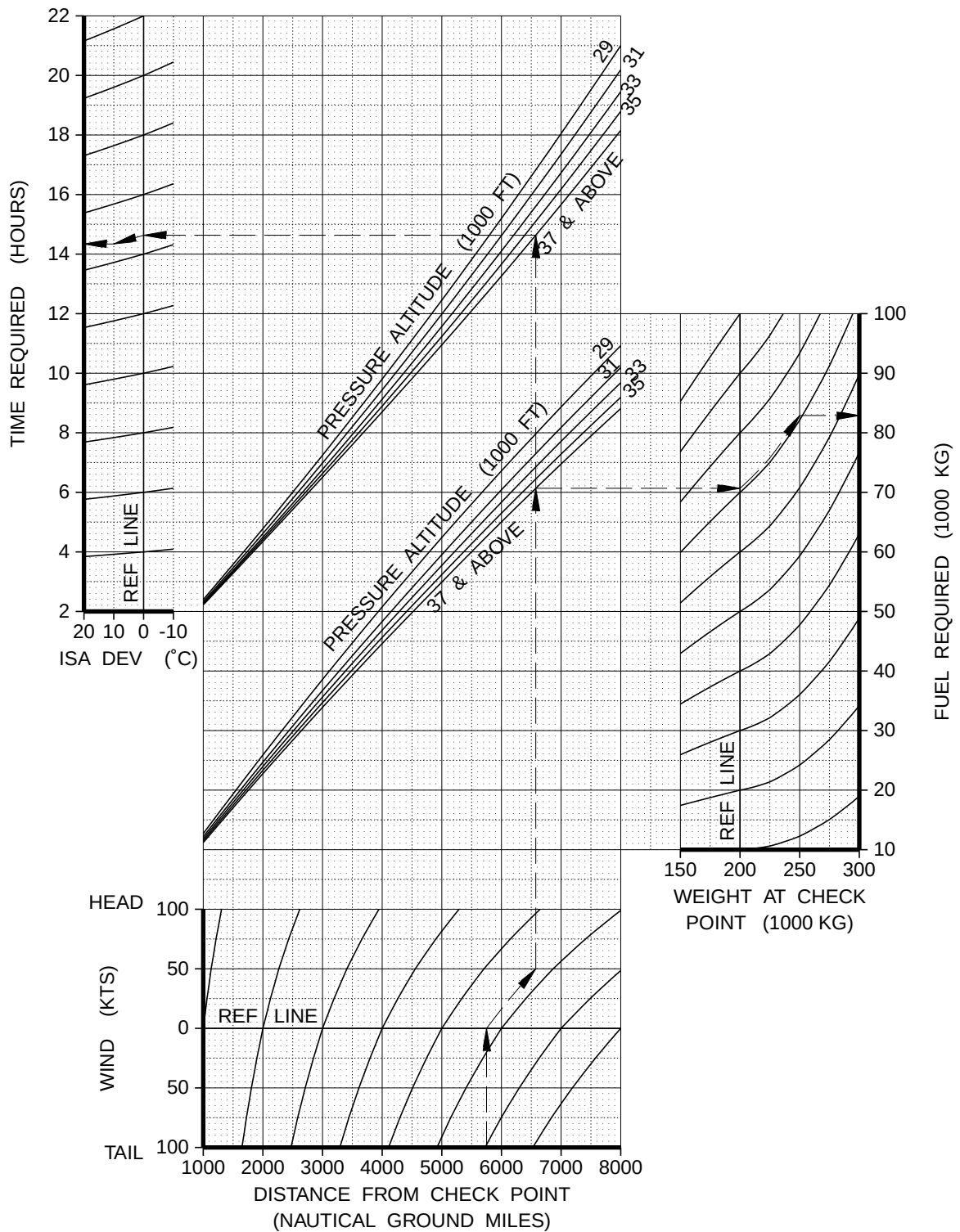
Based on .84/310/250 descent



Long Range Cruise Enroute Fuel and Time

1000 to 8000 NM Distance

Based on .84/310/250 descent



Long Range Cruise Table

43000 FT to 37000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
43	%N1									
	MAX TAT									
	KIAS									
	MACH									
	FF/ENG									
42	KTAS									
	%N1									
	MAX TAT									
	KIAS									
	MACH									
41 (-26)	FF/ENG									
	KTAS									98.5
	%N1									-14
	MAX TAT									249
	KIAS									.837
40 (-26)	MACH									3602
	FF/ENG									480
	KTAS									
	%N1								98.1	95.0
	MAX TAT								-12	-3
39 (-26)	KIAS								255	255
	MACH								.837	.837
	FF/ENG								3722	3378
	KTAS								480	480
	%N1							97.5	94.7	92.9
38 (-26)	MAX TAT							-10	-1	5
	KIAS							261	261	261
	MACH							.837	.837	.837
	FF/ENG							3831	3499	3263
	KTAS							480	480	480
37 (-26)	%N1						96.9	94.4	92.7	91.4
	MAX TAT						-8	0	6	
	KIAS						267	267	267	267
	MACH						.837	.837	.837	.837
	FF/ENG						3931	3616	3388	3206
36 (-26)	KTAS						480	480	480	480
	%N1					96.1	94.0	92.4	91.2	90.1
	MAX TAT					-6	1	6		
	KIAS					273	273	273	273	274
	MACH					.837	.837	.837	.837	.838
35 (-26)	FF/ENG					4021	3729	3514	3335	3185
	KTAS					480	480	480	480	481

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5
41	91.9	92.9	94.0	95.1	96.1	97.1	98.2	99.2	100.2	101.0	100.6	99.7	99.1	98.6
40	91.9	93.0	94.0	95.1	96.1	97.2	98.2	99.2	100.3	101.1	100.8	99.8	99.1	98.6
39	91.9	93.0	94.1	95.1	96.2	97.2	98.2	99.3	100.3	101.2	100.8	99.9	99.2	98.6
38	91.9	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.3	100.7	99.8	99.1	98.5
37	91.9	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.2	100.7	99.7	98.9	98.4

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

Long Range Cruise Table
43000 FT to 37000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
43 (-26)	%N1			98.9	95.2	93.1	91.5	90.2	88.9	87.7
	MAX TAT			-15	-5	3				
	KIAS			238	238	238	238	238	237	233
	MACH			.837	.837	.837	.837	.838	.834	.822
	FF/ENG			3335	2975	2736	2559	2423	2339	2208
42 (-26)	KTAS			480	480	480	480	481	479	472
	%N1		98.8	95.3	93.1	91.6	90.3	89.2	88.0	86.7
	MAX TAT		-15	-5	3					
	KIAS		243	243	243	243	244	243	240	235
	MACH		.837	.837	.837	.837	.838	.836	.826	.813
41 (-27)	FF/ENG		3474	3116	2871	2692	2550	2422	2339	2208
	KTAS		480	480	480	480	481	480	474	466
	%N1	98.5	95.2	93.1	91.6	90.4	89.3	88.2	87.0	85.7
	MAX TAT	-14	-4	4						
	KIAS	249	249	249	249	249	249	246	242	238
40 (-27)	MACH	.837	.837	.837	.837	.838	.838	.829	.817	.803
	FF/ENG	3602	3252	3004	2823	2678	2552	2419	2339	2211
	KTAS	480	480	480	480	481	480	476	468	461
	%N1	95.0	93.1	91.6	90.4	89.4	88.3	87.2	86.0	84.7
	MAX TAT	-3	4							
39 (-27)	KIAS	255	255	255	255	255	253	249	245	240
	MACH	.837	.837	.837	.838	.838	.832	.820	.807	.793
	FF/ENG	3378	3134	2951	2805	2682	2550	2422	2342	2210
	KTAS	480	480	480	481	481	477	470	463	455
	%N1	92.9	91.5	90.4	89.4	88.3	87.3	86.2	85.0	83.5
38 (-28)	MAX TAT	5								
	KIAS	261	261	261	261	259	256	252	247	242
	MACH	.837	.837	.838	.838	.833	.823	.811	.798	.782
	FF/ENG	3263	3079	2932	2810	2679	2552	2422	2292	2202
	KTAS	480	480	481	481	478	472	465	458	448
37 (-28)	%N1	91.4	90.3	89.3	88.3	87.3	86.3	85.1	83.8	82.3
	MAX TAT									
	KIAS	267	267	267	266	262	258	254	249	242
	MACH	.837	.838	.838	.834	.824	.813	.801	.787	.768
	FF/ENG	3206	3058	2934	2802	2674	2543	2415	2285	2187
37 (-28)	KTAS	480	481	481	478	473	466	459	451	440
	%N1	90.1	89.2	88.2	87.3	86.3	85.2	84.0	82.6	81.0
	MAX TAT									
	KIAS	274	274	272	269	265	261	256	250	242
	MACH	.838	.838	.834	.826	.815	.804	.791	.774	.752
37 (-28)	FF/ENG	3185	3059	2923	2794	2663	2537	2410	2272	2167
	KTAS	481	481	479	474	467	461	454	444	431

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5
43	91.8	92.9	94.0	95.0	96.1	97.1	98.1	99.2	100.2	101.0	100.3	99.5	98.9	98.4
42	91.8	92.9	94.0	95.0	96.1	97.1	98.2	99.2	100.2	100.9	100.5	99.7	99.0	98.5
41	91.9	92.9	94.0	95.1	96.1	97.1	98.2	99.2	100.2	101.0	100.6	99.7	99.1	98.6
40	91.9	93.0	94.0	95.1	96.1	97.2	98.2	99.2	100.3	101.1	100.8	99.8	99.1	98.6
39	91.9	93.0	94.1	95.1	96.2	97.2	98.2	99.3	100.3	101.2	100.8	99.9	99.2	98.6
38	91.9	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.3	100.7	99.8	99.1	98.5
37	91.9	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.3	100.7	99.7	98.9	98.4

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.3.

Long Range Cruise Table

36000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
36 (-26)	%N1			98.1	95.4	93.5	92.2	91.0	90.0	89.1
	MAX TAT			-12	-4	2				
	KIAS			280	279	279	279	280	280	280
	MACH			.837	.837	.837	.837	.837	.838	.838
	FF/ENG			4448	4110	3849	3644	3469	3320	3191
35 (-24)	KTAS			480	480	480	480	480	481	481
	%N1		97.3	95.0	93.5	92.2	91.2	90.2	89.4	88.4
	MAX TAT		-6	1	6					
	KIAS		286	286	286	286	286	286	286	285
	MACH		.837	.837	.837	.837	.837	.838	.838	.834
34 (-22)	FF/ENG		4539	4232	3987	3791	3622	3477	3347	3204
	KTAS		483	482	482	482	483	483	483	481
	%N1	96.6	94.8	93.4	92.3	91.3	90.4	89.6	88.7	87.8
	MAX TAT	-4	2	7	11					
	KIAS	292	292	292	293	293	293	293	291	288
33 (-19)	MACH	.837	.837	.837	.837	.838	.838	.838	.834	.826
	FF/ENG	4627	4347	4123	3936	3772	3632	3503	3358	3221
	KTAS	485	485	485	485	485	485	485	483	478
	%N1	94.5	93.3	92.3	91.4	90.6	89.8	88.9	88.1	87.2
	MAX TAT	4	8	12						
32 (-17)	KIAS	299	299	299	299	300	299	298	295	291
	MACH	.837	.837	.837	.838	.838	.838	.833	.826	.817
	FF/ENG	4469	4260	4080	3923	3788	3659	3513	3373	3232
	KTAS	487	487	487	487	488	487	485	480	475
	%N1	93.2	92.3	91.5	90.7	89.9	89.1	88.3	87.5	86.6
31 (-16)	MAX TAT	10	13	16						
	KIAS	306	306	306	306	306	304	301	297	294
	MACH	.837	.837	.838	.838	.837	.832	.825	.816	.808
	FF/ENG	4400	4226	4076	3946	3812	3668	3527	3382	3246
	KTAS	489	489	490	490	489	486	482	477	472
30 (-14)	%N1	92.3	91.5	90.8	90.0	89.3	88.5	87.7	86.8	86.0
	MAX TAT	14	17							
	KIAS	313	313	313	312	310	307	304	300	297
	MACH	.838	.838	.838	.836	.831	.824	.816	.807	.799
	FF/ENG	4376	4232	4104	3965	3822	3680	3536	3396	3261
30 (-14)	KTAS	491	492	492	491	488	483	479	474	469
	%N1	91.6	90.9	90.2	89.4	88.7	87.9	87.1	86.2	85.3
	MAX TAT	18	20							
	KIAS	320	320	319	316	313	310	307	303	299
	MACH	.838	.838	.835	.830	.823	.815	.807	.798	.789
30 (-14)	FF/ENG	4390	4262	4118	3978	3836	3693	3554	3416	3283
	KTAS	494	494	492	489	485	480	476	470	465

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
36	94.1	95.2	96.2	97.3	98.3	99.3	100.4	101.0	100.7	99.6	98.9	98.3	97.9	97.6
35	94.1	95.2	96.3	97.3	98.3	99.4	100.4	101.4	101.6	100.3	99.4	98.8	98.4	98.1
34	93.2	94.3	95.3	96.3	97.4	98.4	99.4	100.4	101.0	100.0	99.1	98.6	98.2	97.8
33	92.3	93.3	94.4	95.4	96.4	97.4	98.4	99.4	100.4	99.7	98.8	98.3	97.9	97.5
32	91.4	92.5	93.5	94.5	95.5	96.5	97.5	98.5	99.5	99.4	98.6	98.1	97.6	97.2
31	90.4	91.5	92.5	93.5	94.5	95.4	96.4	97.4	98.3	99.2	98.3	97.8	97.4	96.8
30	89.5	90.5	91.5	92.5	93.5	94.4	95.4	96.4	97.3	98.2	98.1	97.5	97.1	96.5

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

Long Range Cruise Table
36000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
36 (-29)	%N1	89.1	88.2	87.3	86.3	85.3	84.2	82.9	81.4	79.6
	MAX TAT									
	KIAS	280	279	276	272	268	263	258	251	242
	MACH	.838	.834	.826	.816	.805	.794	.779	.759	.734
	FF/ENG	3191	3052	2922	2791	2665	2538	2403	2257	2142
35 (-27)	KTAS	481	479	474	468	462	456	447	435	421
	%N1	88.4	87.6	86.6	85.7	84.6	83.4	82.0	80.4	78.6
	MAX TAT									
	KIAS	285	282	278	274	270	265	259	250	241
	MACH	.834	.827	.817	.807	.796	.782	.765	.742	.717
34 (-26)	FF/ENG	3204	3070	2936	2809	2680	2544	2396	2240	2130
	KTAS	481	476	471	465	459	451	441	428	413
	%N1	87.8	86.9	86.0	85.0	83.9	82.6	81.1	79.4	77.6
	MAX TAT									
	KIAS	288	285	281	277	272	266	258	250	240
33 (-24)	MACH	.826	.817	.807	.797	.785	.769	.748	.725	.700
	FF/ENG	3221	3083	2953	2824	2690	2545	2389	2233	2126
	KTAS	478	473	468	462	454	445	433	420	405
	%N1	87.2	86.3	85.4	84.3	83.1	81.7	80.1	78.4	76.7
	MAX TAT									
32 (-23)	KIAS	291	288	284	279	273	266	258	249	240
	MACH	.817	.808	.798	.787	.772	.753	.731	.707	.684
	FF/ENG	3232	3099	2969	2838	2696	2543	2384	2229	2126
	KTAS	475	470	464	458	449	438	425	411	398
	%N1	86.6	85.7	84.7	83.5	82.2	80.7	79.1	77.5	75.8
31 (-22)	MAX TAT									
	KIAS	294	290	286	281	274	266	257	248	240
	MACH	.808	.799	.788	.774	.757	.736	.714	.692	.669
	FF/ENG	3246	3113	2982	2844	2696	2537	2381	2227	2126
	KTAS	472	466	460	452	442	430	417	404	391
30 (-21)	%N1	86.0	85.0	83.9	82.6	81.3	79.7	78.2	76.5	74.9
	MAX TAT									
	KIAS	297	293	287	281	273	265	256	248	240
	MACH	.799	.789	.776	.759	.740	.719	.698	.677	.656
	FF/ENG	3261	3130	2993	2848	2691	2534	2378	2226	2126
30 (-21)	KTAS	469	463	455	446	434	422	409	397	385
	%N1	85.3	84.2	83.0	81.7	80.3	78.8	77.2	75.7	74.0
	MAX TAT									
	KIAS	299	294	288	280	272	264	256	248	240
	MACH	.789	.776	.761	.743	.723	.703	.683	.662	.642
30 (-21)	FF/ENG	3283	3145	3000	2843	2687	2530	2432	2278	2129
	KTAS	465	458	449	438	426	414	402	390	379

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
36	93.0	94.1	95.2	96.2	97.3	98.3	99.3	100.4	101.0	100.7	99.6	98.9	98.3	97.9
35	93.1	94.1	95.2	96.3	97.3	98.3	99.4	100.4	101.4	101.6	100.3	99.4	98.8	98.4
34	92.1	93.2	94.3	95.3	96.3	97.4	98.4	99.4	100.4	101.0	100.0	99.1	98.6	98.2
33	91.2	92.3	93.3	94.4	95.4	96.4	97.4	98.4	99.4	100.4	99.7	98.8	98.3	97.9
32	90.4	91.4	92.5	93.5	94.5	95.5	96.5	97.5	98.5	99.5	99.4	98.6	98.1	97.6
31	89.4	90.4	91.5	92.5	93.5	94.5	95.4	96.4	97.4	98.3	99.2	98.3	97.8	97.4
30	88.5	89.5	90.5	91.5	92.5	93.5	94.4	95.4	96.4	97.3	98.2	98.1	97.5	97.1

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.

Long Range Cruise Table

29000 FT to 23000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
29 (-12)	%N1	90.9	90.3	89.6	88.9	88.1	87.3	86.5	85.6	84.5
	MAX TAT	21								
	KIAS	325	325	323	319	316	313	310	306	301
	MACH	.834	.834	.828	.821	.814	.806	.798	.789	.777
	FF/ENG	4380	4273	4135	3992	3852	3714	3578	3442	3300
28 (-11)	KTAS	494	494	490	486	481	477	472	467	460
	%N1	90.2	89.6	88.9	88.3	87.5	86.7	85.8	84.8	83.6
	MAX TAT									
	KIAS	325	325	325	322	319	316	312	307	301
	MACH	.818	.818	.818	.812	.805	.797	.788	.777	.763
27 (-9)	FF/ENG	4325	4230	4141	4012	3876	3742	3605	3461	3312
	KTAS	486	486	486	483	478	474	468	462	454
	%N1	89.5	88.8	88.2	87.6	86.9	86.0	85.0	83.9	82.7
	MAX TAT									
	KIAS	325	325	325	325	322	318	313	308	301
26 (-8)	MACH	.802	.802	.802	.802	.796	.787	.776	.763	.747
	FF/ENG	4294	4200	4113	4032	3908	3773	3628	3476	3314
	KTAS	479	479	479	479	475	470	463	455	446
	%N1	88.7	88.1	87.5	86.8	86.2	85.2	84.1	83.0	81.7
	MAX TAT									
25 (-6)	KIAS	325	325	325	325	324	320	314	307	300
	MACH	.787	.787	.787	.787	.786	.775	.762	.748	.731
	FF/ENG	4277	4186	4103	4025	3942	3799	3645	3480	3315
	KTAS	472	472	472	472	471	465	457	448	438
	%N1	88.0	87.3	86.7	86.0	85.3	84.3	83.2	82.0	80.8
24 (-5)	MAX TAT									
	KIAS	325	325	325	325	325	320	313	306	299
	MACH	.758	.758	.758	.758	.758	.746	.731	.716	.700
	FF/ENG	4276	4192	4112	4036	3963	3812	3642	3472	3306
	KTAS	458	458	458	458	458	451	442	433	423
23 (-4)	%N1	86.3	85.6	84.9	84.2	83.5	82.5	81.3	80.2	79.0
	MAX TAT									
	KIAS	325	325	325	325	325	319	312	305	298
	MACH	.743	.743	.743	.743	.743	.730	.716	.700	.686
	FF/ENG	4281	4198	4118	4041	3965	3803	3631	3454	3289
	KTAS	451	451	451	451	451	443	434	425	416

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
29	90.7	91.7	92.7	93.6	94.6	95.5	96.5	97.4	97.8	97.3	96.8	96.2	95.6	94.9
28	90.3	91.2	92.2	93.2	94.1	95.0	96.0	96.9	97.6	97.0	96.5	95.9	95.2	94.5
27	89.8	90.8	91.8	92.7	93.7	94.6	95.5	96.4	97.3	96.8	96.2	95.6	94.9	94.1
26	89.4	90.3	91.3	92.2	93.2	94.1	95.0	95.9	96.8	96.6	95.9	95.2	94.5	93.7
25	88.9	89.9	90.8	91.7	92.7	93.6	94.5	95.4	96.3	96.3	95.6	94.9	94.1	93.2
24	88.5	89.5	90.4	91.4	92.3	93.2	94.1	95.0	95.9	96.3	95.6	94.8	94.0	93.2
23	88.2	89.1	90.1	91.0	91.9	92.8	93.7	94.6	95.5	96.2	95.5	94.7	93.9	93.1

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

Long Range Cruise Table
29000 FT to 23000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
29 (-19)	%N1	84.5	83.3	82.1	80.7	79.3	77.8	76.3	74.8	73.2
	MAX TAT									
	KIAS	301	295	287	280	272	264	256	248	240
	MACH	.777	.763	.745	.727	.707	.688	.668	.649	.630
	FF/ENG	3300	3154	2996	2902	2744	2587	2433	2283	2136
28 (-18)	KTAS	460	451	441	430	418	407	396	384	373
	%N1	83.6	82.4	81.1	79.7	78.4	76.9	75.5	74.0	72.4
	MAX TAT									
	KIAS	301	294	287	279	271	263	256	248	240
	MACH	.763	.747	.729	.710	.692	.673	.655	.636	.618
27 (-17)	FF/ENG	3312	3219	3059	2900	2744	2589	2438	2290	2145
	KTAS	454	444	433	422	411	400	389	378	367
	%N1	82.7	81.4	80.1	78.8	77.4	76.1	74.7	73.2	71.7
	MAX TAT									
	KIAS	301	294	286	278	271	263	256	248	241
26 (-16)	MACH	.747	.731	.713	.695	.677	.660	.642	.624	.606
	FF/ENG	3314	3221	3059	2901	2745	2593	2444	2298	2155
	KTAS	446	436	425	415	404	394	383	373	362
	%N1	81.7	80.5	79.2	77.9	76.6	75.2	73.8	72.4	70.8
	MAX TAT									
25 (-14)	KIAS	300	293	285	278	270	263	256	249	241
	MACH	.731	.714	.697	.680	.663	.647	.630	.612	.595
	FF/ENG	3315	3221	3059	2902	2749	2599	2453	2309	2167
	KTAS	438	428	418	408	398	388	377	367	357
	%N1	80.8	79.6	78.3	77.0	75.8	74.4	73.1	71.6	70.0
24 (-13)	MAX TAT									
	KIAS	299	292	285	278	271	263	256	249	242
	MACH	.715	.699	.683	.667	.650	.634	.618	.601	.585
	FF/ENG	3312	3218	3059	2904	2753	2606	2462	2319	2179
	KTAS	431	421	411	401	392	382	372	362	352
23 (-11)	%N1	79.9	78.7	77.5	76.2	75.0	73.6	72.3	70.8	69.2
	MAX TAT									
	KIAS	299	291	285	278	271	264	257	249	242
	MACH	.700	.684	.669	.654	.638	.622	.607	.591	.574
	FF/ENG	3376	3214	3057	2905	2757	2612	2468	2328	2190
23 (-11)	KTAS	423	414	404	395	386	376	367	357	347
	%N1	79.0	77.8	76.6	75.4	74.2	72.9	71.5	69.9	68.3
	MAX TAT									
	KIAS	298	291	284	278	271	264	257	250	243
	MACH	.686	.671	.656	.641	.626	.611	.596	.580	.565
23 (-11)	FF/ENG	3369	3210	3056	2906	2760	2616	2476	2338	2202
	KTAS	416	407	398	389	380	371	362	352	343

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
29	88.7	89.7	90.7	91.7	92.7	93.6	94.6	95.5	96.5	97.4	97.8	97.3	96.8	96.2
28	88.3	89.3	90.3	91.2	92.2	93.2	94.1	95.0	96.0	96.9	97.6	97.0	96.5	95.9
27	87.9	88.9	89.8	90.8	91.8	92.7	93.7	94.6	95.5	96.4	97.3	96.8	96.2	95.6
26	87.4	88.4	89.4	90.3	91.3	92.2	93.2	94.1	95.0	95.9	96.8	96.6	95.9	95.2
25	86.9	87.9	88.9	89.9	90.8	91.7	92.7	93.6	94.5	95.4	96.3	96.3	95.6	94.9
24	86.6	87.6	88.5	89.5	90.4	91.4	92.3	93.2	94.1	95.0	95.9	96.3	95.6	94.8
23	86.3	87.2	88.2	89.1	90.1	91.0	91.9	92.8	93.7	94.6	95.5	96.2	95.5	94.7

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.

Long Range Cruise Table

22000 FT to 16000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
22 (-3)	%N1	85.4	84.7	84.0	83.3	82.6	81.6	80.5	79.3	78.2
	MAX TAT									
	KIAS	325	325	325	325	325	318	311	304	298
	MACH	.730	.730	.730	.730	.729	.715	.700	.686	.672
	FF/ENG	4283	4198	4116	4037	3958	3787	3693	3526	3364
21 (-1)	KTAS	445	445	445	445	444	436	427	418	409
	%N1	84.5	83.8	83.1	82.4	81.7	80.7	79.6	78.5	77.4
	MAX TAT									
	KIAS	325	325	325	325	324	317	311	304	298
	MACH	.716	.716	.716	.716	.714	.700	.686	.673	.659
20 (0)	FF/ENG	4274	4188	4107	4029	3939	3772	3684	3520	3360
	KTAS	438	438	438	438	437	428	420	412	403
	%N1	83.7	83.0	82.3	81.7	80.9	79.9	78.8	77.8	76.7
	MAX TAT									
	KIAS	325	325	325	325	323	317	310	304	298
19 (1)	MACH	.703	.703	.703	.703	.699	.686	.673	.660	.647
	FF/ENG	4263	4180	4100	4025	3925	3762	3677	3515	3359
	KTAS	432	432	432	432	429	421	413	405	397
	%N1	82.7	82.0	81.4	80.7	80.0	79.0	78.0	76.9	75.9
	MAX TAT									
18 (2)	KIAS	325	325	325	325	323	316	310	304	298
	MACH	.690	.690	.690	.690	.685	.672	.660	.647	.635
	FF/ENG	4254	4172	4094	4021	3915	3754	3673	3516	3362
	KTAS	425	425	425	425	422	415	407	399	392
	%N1	81.7	81.1	80.4	79.8	79.1	78.1	77.2	76.1	75.1
17 (3)	MAX TAT									
	KIAS	325	325	325	325	322	316	310	304	298
	MACH	.677	.677	.677	.677	.672	.660	.648	.636	.624
	FF/ENG	4242	4162	4087	4016	3908	3752	3676	3522	3370
	KTAS	419	419	419	419	416	409	401	394	386
16 (5)	%N1	80.8	80.2	79.6	79.0	78.3	77.3	76.4	75.4	74.3
	MAX TAT									
	KIAS	325	325	325	325	322	316	311	305	299
	MACH	.665	.665	.665	.665	.659	.648	.636	.625	.613
	FF/ENG	4233	4156	4084	4016	3908	3756	3684	3531	3381
15 (7)	KTAS	413	413	413	413	410	403	395	388	381
	%N1	80.0	79.4	78.8	78.2	77.5	76.6	75.6	74.6	73.5
	MAX TAT									
	KIAS	325	325	325	325	322	317	311	305	299
	MACH	.652	.652	.652	.652	.647	.636	.625	.614	.602
14 (9)	FF/ENG	4230	4156	4086	4019	3914	3763	3692	3540	3392
	KTAS	407	407	407	407	404	397	390	383	376

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
22	89.7	90.6	91.5	92.4	93.3	94.2	95.1	96.0	95.4	94.7	93.8	92.9	92.1	91.2
21	89.3	90.2	91.1	92.0	92.9	93.8	94.7	95.6	95.4	94.6	93.7	92.7	92.0	91.1
20	88.9	89.8	90.7	91.6	92.5	93.4	94.2	95.1	95.3	94.6	93.6	92.6	91.8	90.9
19	88.5	89.4	90.3	91.2	92.1	93.0	93.9	94.7	95.3	94.5	93.5	92.6	91.6	90.9
18	88.1	89.1	89.9	90.8	91.7	92.6	93.5	94.3	95.2	94.4	93.4	92.4	91.5	90.8
17	87.8	88.7	89.6	90.5	91.4	92.2	93.1	93.9	94.8	94.4	93.4	92.4	91.4	90.6
16	87.4	88.3	89.2	90.1	91.0	91.8	92.7	93.5	94.4	94.4	93.4	92.3	91.4	90.4

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

Long Range Cruise Table
22000 FT to 16000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
22 (-10)	%N1	78.2	77.0	75.9	74.7	73.4	72.1	70.7	69.2	67.6
	MAX TAT									
	KIAS	298	291	285	278	271	264	258	251	244
	MACH	.672	.658	.644	.629	.615	.600	.586	.571	.555
	FF/ENG	3364	3208	3056	2908	2764	2623	2486	2351	2216
21 (-9)	KTAS	409	401	392	384	375	366	357	348	338
	%N1	77.4	76.3	75.1	73.9	72.7	71.3	69.9	68.4	66.9
	MAX TAT									
	KIAS	298	291	285	278	272	265	258	252	244
	MACH	.659	.645	.632	.618	.604	.590	.576	.561	.546
20 (-7)	FF/ENG	3360	3206	3057	2912	2770	2633	2498	2365	2233
	KTAS	403	395	387	378	370	361	352	343	334
	%N1	76.7	75.6	74.4	73.2	71.9	70.6	69.1	67.7	66.1
	MAX TAT									
	KIAS	298	291	285	279	272	266	259	252	245
19 (-6)	MACH	.647	.634	.620	.607	.593	.580	.566	.551	.536
	FF/ENG	3359	3207	3060	2918	2780	2646	2514	2382	2252
	KTAS	397	389	381	373	365	356	348	339	329
	%N1	75.9	74.8	73.7	72.4	71.2	69.8	68.4	67.0	65.4
	MAX TAT									
18 (-4)	KIAS	298	292	285	279	273	266	260	253	246
	MACH	.635	.622	.609	.596	.584	.570	.557	.542	.527
	FF/ENG	3362	3213	3069	2929	2794	2661	2529	2398	2268
	KTAS	392	384	376	368	360	352	343	334	325
	%N1	75.1	74.0	72.9	71.7	70.4	69.1	67.7	66.3	64.8
17 (-2)	MAX TAT									
	KIAS	298	292	286	280	274	267	260	254	246
	MACH	.624	.611	.599	.587	.574	.561	.547	.533	.518
	FF/ENG	3370	3223	3081	2943	2809	2676	2543	2411	2277
	KTAS	386	379	371	363	355	347	339	330	321
16 (-1)	%N1	74.3	73.3	72.1	70.9	69.6	68.3	67.0	65.5	64.0
	MAX TAT									
	KIAS	299	293	287	281	274	268	261	254	247
	MACH	.613	.601	.589	.577	.565	.552	.538	.524	.509
	FF/ENG	3381	3235	3095	2959	2824	2688	2554	2419	2281
16 (-1)	KTAS	381	374	366	359	351	343	335	326	316
	%N1	73.5	72.4	71.2	70.0	68.8	67.5	66.1	64.7	63.1
	MAX TAT									
	KIAS	299	293	287	281	275	269	262	255	247
	MACH	.602	.591	.579	.568	.555	.543	.529	.515	.500
16 (-1)	FF/ENG	3392	3249	3110	2973	2836	2699	2562	2423	2281
	KTAS	376	369	362	354	347	339	330	322	312

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
22	87.8	88.8	89.7	90.6	91.5	92.4	93.3	94.2	95.1	96.0	95.4	94.7	93.8	92.9
21	87.4	88.4	89.3	90.2	91.1	92.0	92.9	93.8	94.7	95.6	95.4	94.6	93.7	92.7
20	87.0	87.9	88.9	89.8	90.7	91.6	92.5	93.4	94.2	95.1	95.3	94.6	93.6	92.6
19	86.7	87.6	88.5	89.4	90.3	91.2	92.1	93.0	93.9	94.7	95.3	94.5	93.5	92.6
18	86.3	87.2	88.1	89.1	89.9	90.8	91.7	92.6	93.5	94.3	95.2	94.4	93.4	92.4
17	86.0	86.9	87.8	88.7	89.6	90.5	91.4	92.2	93.1	93.9	94.8	94.4	93.4	92.4
16	85.6	86.5	87.4	88.3	89.2	90.1	91.0	91.8	92.7	93.5	94.4	94.4	93.4	92.3

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

Long Range Cruise Table

15000 FT to 6000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
15 (6)	%N1	79.1	78.5	78.0	77.4	76.7	75.8	74.8	73.8	72.7
	MAX TAT									
	KIAS	325	325	325	325	323	317	311	305	300
	MACH	.641	.641	.641	.641	.636	.625	.614	.603	.592
	FF/ENG	4230	4156	4087	4021	3918	3767	3698	3549	3404
14 (8)	KTAS	401	401	401	401	398	392	385	378	371
	%N1	78.3	77.8	77.2	76.7	76.0	75.1	74.0	73.0	71.8
	MAX TAT									
	KIAS	325	325	325	325	323	317	312	306	300
	MACH	.629	.629	.629	.629	.625	.614	.604	.593	.583
13 (9)	FF/ENG	4225	4152	4082	4016	3917	3769	3705	3560	3420
	KTAS	396	396	396	396	393	386	380	373	366
	%N1	77.5	77.0	76.4	75.9	75.2	74.3	73.2	72.1	71.0
	MAX TAT									
	KIAS	325	325	325	325	323	318	312	307	301
12 (11)	MACH	.618	.618	.618	.618	.614	.604	.594	.584	.574
	FF/ENG	4214	4141	4073	4007	3917	3775	3717	3578	3442
	KTAS	390	390	390	390	388	381	375	369	362
	%N1	76.8	76.2	75.7	75.1	74.5	73.5	72.4	71.4	70.3
	MAX TAT									
10 (14)	KIAS	325	325	325	325	324	318	313	307	302
	MACH	.607	.607	.607	.607	.604	.594	.585	.575	.565
	FF/ENG	4202	4132	4066	4004	3925	3791	3739	3605	3471
	KTAS	384	384	384	384	383	377	370	364	358
	%N1	75.2	74.6	74.1	73.6	73.1	72.1	71.1	70.0	68.9
8 (17)	MAX TAT									
	KIAS	325	325	325	325	325	320	314	309	303
	MACH	.585	.585	.585	.585	.585	.576	.567	.557	.547
	FF/ENG	4213	4151	4092	4035	3978	3852	3723	3668	3530
	KTAS	374	374	374	374	373	368	362	356	349
6 (20)	%N1	73.6	73.1	72.5	72.0	71.6	70.8	69.7	68.7	67.7
	MAX TAT									
	KIAS	325	325	325	325	325	321	316	311	305
	MACH	.565	.565	.565	.565	.565	.558	.549	.540	.530
	FF/ENG	4270	4206	4144	4083	4023	3912	3775	3715	3572
	KTAS	363	363	363	363	363	359	353	347	341
	%N1	72.1	71.6	71.1	70.6	70.1	69.5	68.5	67.5	66.5
	MAX TAT									
	KIAS	325	325	325	325	325	323	317	312	306
	MACH	.545	.545	.545	.545	.545	.542	.533	.523	.514
	FF/ENG	4315	4246	4179	4114	4050	3957	3818	3755	3610
	KTAS	353	353	353	353	353	351	345	339	333

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
15	88.8	89.7	90.5	91.4	92.2	93.1	93.9	94.4	93.4	92.2	91.3	90.3	89.4	88.5
14	88.4	89.3	90.1	91.0	91.8	92.7	93.5	94.3	93.4	92.2	91.2	90.2	89.2	88.2
13	88.0	88.8	89.7	90.5	91.4	92.2	93.0	93.8	93.6	92.5	91.4	90.2	89.1	88.0
12	87.5	88.4	89.3	90.1	90.9	91.8	92.6	93.4	93.9	93.0	91.8	90.4	89.1	87.9
10	86.6	87.4	88.3	89.1	89.9	90.7	91.6	92.4	93.1	93.2	92.2	90.6	89.3	88.1
8	85.6	86.4	87.2	88.1	88.9	89.7	90.5	91.3	92.0	92.8	92.6	91.2	89.4	88.2
6	84.6	85.4	86.3	87.1	87.9	88.7	89.5	90.2	91.0	91.8	92.5	90.9	89.4	88.2

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

Long Range Cruise Table
15000 FT to 6000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
15 (1)	%N1	72.7	71.5	70.4	69.2	67.9	66.6	65.2	63.8	62.3
	MAX TAT									
	KIAS	300	294	288	282	276	269	262	255	247
	MACH	.592	.581	.570	.558	.546	.534	.521	.506	.492
	FF/ENG	3404	3264	3125	2988	2850	2712	2571	2429	2286
14 (2)	KTAS	371	364	357	350	342	334	326	317	308
	%N1	71.8	70.7	69.6	68.4	67.1	65.9	64.5	63.0	61.6
	MAX TAT									
	KIAS	300	295	289	283	276	270	263	255	248
	MACH	.583	.572	.561	.549	.538	.525	.512	.498	.483
13 (4)	FF/ENG	3420	3282	3144	3007	2869	2729	2585	2441	2299
	KTAS	366	360	353	346	338	330	322	313	304
	%N1	71.0	69.9	68.8	67.6	66.4	65.1	63.7	62.4	60.9
	MAX TAT									
	KIAS	301	295	290	283	277	270	263	256	248
12 (5)	MACH	.574	.563	.552	.541	.529	.516	.503	.489	.475
	FF/ENG	3442	3306	3169	3031	2892	2749	2603	2459	2315
	KTAS	362	355	348	341	334	326	318	309	300
	%N1	70.3	69.2	68.0	66.9	65.7	64.4	63.1	61.7	60.1
	MAX TAT									
10 (9)	KIAS	302	296	290	284	278	271	264	256	248
	MACH	.565	.554	.543	.532	.520	.508	.495	.481	.466
	FF/ENG	3471	3334	3197	3058	2916	2770	2624	2478	2333
	KTAS	358	351	344	337	330	322	313	305	296
	%N1	68.9	67.9	66.7	65.6	64.4	63.1	61.7	60.1	58.5
8 (12)	MAX TAT									
	KIAS	303	298	292	285	279	272	264	257	249
	MACH	.547	.537	.526	.515	.503	.491	.478	.465	.451
	FF/ENG	3530	3390	3248	3104	2958	2810	2661	2514	2371
	KTAS	349	343	336	329	321	313	305	297	288
6 (15)	%N1	67.7	66.6	65.5	64.4	63.2	61.8	60.3	58.9	57.3
	MAX TAT									
	KIAS	305	299	293	286	279	272	265	258	250
	MACH	.530	.520	.509	.498	.487	.474	.462	.449	.436
	FF/ENG	3572	3429	3284	3138	2992	2846	2701	2558	2420
	KTAS	341	334	327	320	313	305	297	289	280
	%N1	66.5	65.4	64.3	63.1	61.8	60.5	59.2	57.7	56.1
	MAX TAT									
	KIAS	306	300	293	287	280	273	266	258	251
	MACH	.514	.503	.493	.482	.471	.459	.447	.434	.422
	FF/ENG	3610	3465	3322	3179	3036	2893	2751	2611	2473
	KTAS	333	326	319	312	305	297	289	281	273

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
15	87.9	88.8	89.7	90.5	91.4	92.2	93.1	93.9	94.4	93.4	92.2	91.3	90.3	89.4
14	87.5	88.4	89.3	90.1	91.0	91.8	92.7	93.5	94.3	93.4	92.2	91.2	90.2	89.2
13	87.1	88.0	88.8	89.7	90.5	91.4	92.2	93.0	93.8	93.6	92.5	91.4	90.2	89.1
12	86.7	87.5	88.4	89.3	90.1	90.9	91.8	92.6	93.4	93.9	93.0	91.8	90.4	89.1
10	85.7	86.6	87.4	88.3	89.1	89.9	90.7	91.6	92.4	93.1	93.2	92.2	90.6	89.3
8	84.7	85.6	86.4	87.2	88.1	88.9	89.7	90.5	91.3	92.0	92.8	92.6	91.2	89.4
6	83.8	84.6	85.4	86.3	87.1	87.9	88.7	89.5	90.2	91.0	91.8	92.5	90.9	89.4

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

.84M Cruise Table**43000 FT to 30000 FT - High Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			300	290	280	270	260	250	240	230	220
43											
42											
41											
40	256 -26 482	%N1 MAX TAT FF/ENG								98.6 -14 3782	95.3 -4 3424
39	262 -26 482	%N1 MAX TAT FF/ENG							98.0 -12 3893	95.0 -2 3546	93.1 5 3299
38	268 -26 482	%N1 MAX TAT FF/ENG						97.3 -9 3993	94.7 -1 3664	92.9 5 3424	91.5 3234
37	274 -26 482	%N1 MAX TAT FF/ENG					96.5 -7 4082	94.2 0 3777	92.6 6 3551	91.3 3363	90.2 3202
36	281 -26 482	%N1 MAX TAT FF/ENG			98.7 -13 4519	95.7 -5 4168	93.8 2 3897	92.4 7 3681	91.1 3497	90.1 3337	89.2 3205
35	287 -23 484	%N1 MAX TAT FF/ENG		97.8 -7 4605	95.4 0 4289	93.7 5 4034	92.4 3829	91.3 3649	90.3 3494	89.4 3362	88.6 3245
34	294 -21 486	%N1 MAX TAT FF/ENG	97.0 -5 4693	95.0 1 4403	93.6 7 4169	92.5 11 3973	91.4 3798	90.5 3650	89.7 3520	88.9 3403	88.3 3308
33	300 -19 489	%N1 MAX TAT FF/ENG	94.7 3 4523	93.5 8 4305	92.5 12 4116	91.5 3947	90.7 3805	89.9 3679	89.2 3564	88.5 3469	88.0 3385
32	307 -17 491	%N1 MAX TAT FF/ENG	93.4 9 4444	92.4 13 4260	91.5 16 4099	90.8 3963	90.0 3838	89.4 3727	88.8 3633	88.2 3547	87.7 3470
31	314 -14 493	%N1 MAX TAT FF/ENG	92.4 14 4407	91.6 17 4254	90.9 12 4121	90.2 3999	89.6 3891	89.0 3800	88.5 3716	88.0 3636	87.5 3560
30	321 -12 495	%N1 MAX TAT FF/ENG	91.6 17 4411	91.0 20 4282	90.3 12 4162	89.8 4060	89.2 3972	88.8 3890	88.3 3811	87.8 3734	87.3 3660

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
40	92.9	94.0	95.1	96.1	97.2	98.2	99.2	100.2	101.2	100.8	100.0	99.4	98.8	98.4
39	93.0	94.0	95.1	96.2	97.2	98.2	99.2	100.3	101.3	101.0	100.2	99.5	98.9	98.4
38	93.0	94.1	95.1	96.2	97.2	98.2	99.3	100.3	101.3	100.9	100.1	99.4	98.8	98.4
37	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.3	100.9	100.1	99.3	98.8	98.3
36	93.0	94.1	95.2	96.2	97.3	98.3	99.3	100.4	101.4	101.0	100.1	99.3	98.7	98.3
35	93.0	94.1	95.2	96.2	97.3	98.3	99.4	100.4	101.4	101.7	100.9	100.0	99.3	98.8
34	92.1	93.2	94.2	95.3	96.3	97.3	98.4	99.4	100.4	101.4	100.6	99.7	99.1	98.5
33	91.2	92.3	93.3	94.4	95.4	96.4	97.4	98.4	99.4	100.4	100.3	99.5	98.9	98.3
32	90.4	91.4	92.4	93.5	94.5	95.5	96.5	97.5	98.5	99.4	100.3	99.2	98.6	98.1
31	89.4	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.3	98.3	99.3	99.1	98.4	97.9

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



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.84M Cruise Table
43000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
43	239	%N1				95.6	93.3	91.6	90.3	89.1	88.3
	-26	MAX TAT				-6	2				
	482	FF/ENG				3017	2765	2578	2434	2367	2284
42	244	%N1			95.6	93.4	91.7	90.4	89.3	88.4	87.6
	-26	MAX TAT			-5	3					
	482	FF/ENG			3160	2903	2713	2563	2443	2352	2330
41	250	%N1		95.5	93.3	91.8	90.5	89.4	88.5	87.8	87.1
	-26	MAX TAT		-5	3						
	482	FF/ENG		3297	3037	2846	2691	2568	2470	2397	2333
40	256	%N1	95.3	93.3	91.8	90.5	89.5	88.5	87.8	87.1	86.5
	-26	MAX TAT	-4	4							
	482	FF/ENG	3424	3169	2976	2820	2695	2593	2516	2450	2386
39	262	%N1	93.1	91.7	90.5	89.5	88.6	87.8	87.2	86.5	85.9
	-26	MAX TAT	5								
	482	FF/ENG	3299	3105	2947	2823	2718	2637	2568	2502	2438
38	268	%N1	91.5	90.4	89.4	88.5	87.8	87.2	86.5	85.9	85.3
	-26	MAX TAT									
	482	FF/ENG	3234	3074	2946	2838	2755	2684	2618	2554	2490
37	274	%N1	90.2	89.3	88.4	87.7	87.1	86.5	85.9	85.3	84.7
	-26	MAX TAT									
	482	FF/ENG	3202	3072	2960	2874	2802	2736	2671	2608	2546
36	281	%N1	89.2	88.3	87.7	87.1	86.5	85.9	85.4	84.8	84.2
	-26	MAX TAT									
	482	FF/ENG	3205	3091	3002	2929	2862	2798	2734	2671	2612
35	287	%N1	88.6	88.0	87.4	86.8	86.3	85.8	85.2	84.7	84.2
	-23	MAX TAT									
	484	FF/ENG	3245	3153	3077	3009	2943	2879	2814	2753	2698
34	294	%N1	88.3	87.7	87.1	86.6	86.1	85.6	85.1	84.6	84.1
	-21	MAX TAT									
	486	FF/ENG	3308	3228	3157	3090	3025	2961	2899	2842	2793
33	300	%N1	88.0	87.4	86.9	86.5	85.9	85.4	85.0	84.5	84.1
	-19	MAX TAT									
	489	FF/ENG	3385	3311	3241	3175	3111	3048	2992	2941	2898
32	307	%N1	87.7	87.2	86.7	86.3	85.8	85.3	84.9	84.5	84.2
	-17	MAX TAT									
	491	FF/ENG	3470	3397	3329	3264	3201	3143	3092	3047	3011
31	314	%N1	87.5	87.0	86.5	86.1	85.6	85.2	84.8	84.5	84.2
	-14	MAX TAT									
	493	FF/ENG	3560	3489	3422	3358	3301	3248	3203	3165	3135
30	321	%N1	87.3	86.9	86.4	86.0	85.5	85.2	84.8	84.5	84.3
	-12	MAX TAT									
	495	FF/ENG	3660	3592	3526	3468	3415	3368	3328	3296	3270

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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.

.84M Cruise Table**43000 FT to 30000 FT - Low Weights****Max Cruise %N1**

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
43	92.9	94.0	95.0	96.1	97.1	98.1	99.1	100.2	101.2	100.3	99.6	99.0	98.5	98.1
42	92.9	94.0	95.0	96.1	97.1	98.1	99.2	100.2	101.2	100.5	99.7	99.1	98.6	98.2
41	92.9	94.0	95.0	96.1	97.1	98.2	99.2	100.2	101.2	100.6	99.9	99.2	98.7	98.3
40	92.9	94.0	95.1	96.1	97.2	98.2	99.2	100.2	101.2	100.8	100.0	99.4	98.8	98.4
39	93.0	94.0	95.1	96.2	97.2	98.2	99.2	100.3	101.3	101.0	100.2	99.5	98.9	98.4
38	93.0	94.1	95.1	96.2	97.2	98.2	99.3	100.3	101.3	100.9	100.1	99.4	98.8	98.4
37	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.3	100.9	100.1	99.3	98.8	98.3
36	93.0	94.1	95.2	96.2	97.3	98.3	99.3	100.4	101.4	101.0	100.1	99.3	98.7	98.3
35	93.0	94.1	95.2	96.2	97.3	98.3	99.4	100.4	101.4	101.7	100.9	100.0	99.3	98.8
34	92.1	93.2	94.2	95.3	96.3	97.3	98.4	99.4	100.4	101.4	100.6	99.7	99.1	98.5
33	91.2	92.3	93.3	94.4	95.4	96.4	97.4	98.4	99.4	100.4	100.3	99.5	98.9	98.3
32	90.4	91.4	92.4	93.5	94.5	95.5	96.5	97.5	98.5	99.4	100.3	99.2	98.6	98.1
31	89.4	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.3	98.3	99.3	99.1	98.4	97.9

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.

Wind-Altitude Trade**LRC**

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)								
	300	280	260	240	220	200	180	160	140
43						57	13	0	6
41					57	16	0	2	20
39				51	15	0	0	14	36
37			43	13	0	0	11	30	54
35	71	33	9	0	0	9	26	47	71
33	23	6	0	0	9	24	43	64	87
31	2	0	1	10	23	40	60	80	101
29	0	3	12	24	40	57	76	94	113
27	5	14	26	40	56	73	90	107	123
25	17	28	42	56	72	87	103	118	131

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PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)								
	300	280	260	240	220	200	180	160	140
43						55	13	0	10
41					54	16	0	5	27
39				49	15	1	3	20	49
37			41	13	1	2	16	40	73
35	68	32	10	0	2	14	35	64	98
33	22	6	0	3	14	33	58	88	122
31	3	0	4	15	32	55	81	112	145
29	0	6	17	33	54	78	105	135	167
27	9	20	35	54	76	101	128	156	187
25	24	38	56	76	99	123	149	177	205

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, 220000 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 220000 kg are 9 (33000 ft) and 0 (37000 ft). Difference is -9 so break-even wind is -20 plus -9, i.e. -29 knots (headwind).

B) Similarly, wind factors are 9 (33000 ft) and 40 (29000 ft). Difference is +31 so break-even wind is -20 plus (+31), i.e. +11 knots (tailwind).



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Descent

.84/280/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			150	180	210
43000	29	850	140	153	162
41000	28	840	134	147	156
39000	27	830	129	142	151
37000	27	820	124	136	145
35000	26	810	118	130	138
33000	25	790	112	123	130
31000	24	780	106	116	123
29000	23	760	99	109	115
27000	22	740	93	102	108
25000	20	720	87	95	100
23000	19	690	80	88	93
21000	18	670	74	81	85
19000	17	640	68	74	78
17000	16	610	62	67	71
15000	15	580	56	60	63
10000	11	470	39	41	42
5000	7	350	23	23	24
1500	4	250	11	11	11

.84/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			150	180	210
43000	32	910	153	165	170
41000	31	900	148	159	165
39000	30	890	140	151	156
37000	29	870	132	142	148
35000	28	860	125	134	139
33000	27	840	118	127	131
31000	25	820	110	119	124
29000	24	800	103	111	116
27000	23	770	96	104	108
25000	22	750	89	96	100
23000	20	720	82	88	92
21000	19	690	75	81	84
19000	18	650	69	74	77
17000	16	620	62	66	69
15000	15	580	55	59	61
10000	11	470	39	41	42
5000	7	350	23	23	24
1500	4	250	11	11	11

**Descent**
.84/310/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			150	180	210
43000	27	800	129	143	152
41000	26	790	123	137	147
39000	25	780	118	131	141
37000	24	770	113	126	135
35000	24	760	109	121	130
33000	23	750	104	116	125
31000	22	740	100	111	120
29000	22	730	95	105	113
27000	21	710	89	99	106
25000	20	690	84	92	99
23000	19	670	78	86	92
21000	18	650	73	80	85
19000	17	630	67	74	78
17000	16	610	62	68	72
15000	15	580	57	62	65
10000	11	470	39	41	42
5000	7	350	23	23	24
1500	4	250	11	11	11

Allowances for a straight-in approach are included.



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Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)								
		300	280	260	240	220	200	180	160	140
43000	%N1						98.4	92.8	89.6	86.3
	KIAS						235	235	227	211
	FF/ENG						3440	2830	2470	2120
40000	%N1					94.7	91.4	88.7	85.7	82.2
	KIAS					252	252	240	225	209
	FF/ENG					3490	3050	2650	2370	2040
35000	%N1		94.7	92.0	89.8	87.6	85.1	82.3	79.0	75.6
	KIAS		283	283	276	263	250	236	221	209
	FF/ENG		4370	3920	3500	3130	2800	2490	2230	1960
30000	%N1	91.1	89.4	87.4	85.2	82.7	80.0	76.9	73.5	71.0
	KIAS	307	296	284	272	260	247	227	209	209
	FF/ENG	4410	4050	3700	3360	3040	2730	2450	2140	1960
25000	%N1	86.6	84.6	82.5	80.1	77.3	74.3	71.3	68.6	66.3
	KIAS	303	292	280	269	247	225	209	209	209
	FF/ENG	4250	3930	3620	3370	2990	2650	2370	2150	1970
20000	%N1	81.7	79.6	77.1	74.5	71.9	69.2	66.5	64.1	62.0
	KIAS	299	282	262	242	224	215	209	209	209
	FF/ENG	4180	3880	3520	3190	2890	2630	2390	2190	2020
15000	%N1	76.2	74.2	72.2	70.0	67.6	65.1	62.7	60.4	58.3
	KIAS	272	256	240	229	221	215	209	209	209
	FF/ENG	3930	3710	3430	3160	2900	2640	2410	2210	2030
10000	%N1	71.5	69.5	67.3	65.1	62.8	60.4	57.9	55.7	53.6
	KIAS	255	247	238	228	221	215	209	209	209
	FF/ENG	4010	3750	3490	3230	2970	2720	2490	2290	2120
5000	%N1	67.5	65.7	63.7	61.5	59.2	56.9	54.6	52.6	50.6
	KIAS	254	246	237	228	221	215	209	209	209
	FF/ENG	4130	3870	3590	3310	3040	2780	2550	2350	2180
1500	%N1	64.8	62.9	60.9	58.9	56.7	54.5	52.4	50.4	48.4
	KIAS	254	245	236	228	221	215	209	209	209
	FF/ENG	4130	3870	3610	3350	3090	2840	2610	2420	2240

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

Flaps 1

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB)								
		300	280	260	240	220	200	180	160	140
20000	%N1	83.8	81.3	78.8	76.3	73.7	70.8	67.7	64.9	62.5
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	4270	4010	3680	3360	3060	2760	2480	2250	2060
15000	%N1	78.8	76.6	74.2	71.8	69.3	66.5	63.6	61.0	58.7
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	4230	3970	3650	3350	3060	2770	2500	2260	2080
10000	%N1	73.8	71.5	69.1	66.7	64.2	61.6	58.7	56.1	53.9
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	4250	4010	3710	3420	3130	2850	2570	2330	2150
5000	%N1	69.5	67.4	65.1	62.8	60.4	57.8	55.1	52.7	50.7
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	4320	4090	3780	3480	3180	2880	2600	2370	2190
1500	%N1	66.7	64.5	62.3	60.1	57.7	55.3	52.7	50.5	48.4
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	4340	4110	3800	3500	3210	2920	2650	2420	2240

These tables include 5% additional fuel for holding in a racetrack pattern.

Intentionally
Blank

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	13900	12400	10300
290	14700	13300	11800
280	15700	14300	12900
270	16800	15400	14000
260	17900	16600	15000
250	19000	17800	16300
240	20200	19000	17600
230	21300	20300	18900
220	22600	21500	20200
210	23800	22800	21600
200	25100	24100	22900
190	26200	25400	24300
180	27500	26700	25800
170	28800	28100	27200
160	30100	29600	28700
150	31500	31100	30300
140	32900	32600	31900

With engine anti-ice on, decrease altitude capability by 200 ft.

With engine and wing anti-ice on, decrease altitude capability by 500 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	2400		
290	3300	300	
280	4300	1300	
270	6200	3100	
260	8300	5100	1300
250	10600	7000	3700
240	12700	9000	6200
230	14800	11300	8300
220	16900	13700	10300
210	18800	16000	12400
200	20600	18100	14900
190	22600	20400	17500
180	24500	22500	20100
170	26600	24600	22600
160	28600	27300	25000
150	30700	29800	28000
140	32300	32000	30800

With engine anti-ice on, decrease altitude capability by 600 ft.

With engine and wing anti-ice on, decrease altitude capability by 1000 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	16500	15200	13800
290	17600	16300	14900
280	18600	17400	15900
270	19600	18400	17000
260	20500	19300	18000
250	21400	20300	19000
240	22400	21300	20000
230	23400	22200	20900
220	24300	23200	21900
210	25200	24100	22800
200	26000	25000	23700
190	26700	25800	24600
180	27500	26600	25400
170	28300	27400	26200
160	29100	28200	27000
150	29900	29000	27800
140	30700	29700	28500

With engine anti-ice on, decrease altitude capability by 100 ft.

With engine and wing anti-ice on, decrease altitude capability by 400 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	8900	7800	1800
290	9800	8500	3700
280	11100	9200	6400
270	12600	10100	8500
260	14100	11500	9400
250	15600	12800	10500
240	17000	14300	11700
230	18300	15800	12900
220	19400	17200	14400
210	20500	18400	15800
200	21700	19600	17200
190	22800	20800	18500
180	23900	21900	19800
170	25100	23000	21000
160	26300	24200	22200
150	27500	25400	23300
140	28700	26700	24300

With engine anti-ice on, decrease altitude capability by 500 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	16400	15000	13700
290	17300	15900	14500
280	18100	16800	15300
270	18900	17600	16200
260	19700	18400	17000
250	20500	19200	17800
240	21400	20100	18600
230	22200	20900	19500
220	23000	21700	20300
210	23800	22500	21100
200	24500	23300	21900
190	25300	24000	22700
180	25900	24800	23400
170	26600	25400	24100
160	27200	26100	24700
150	27800	26600	25300
140	28300	27200	25800

With engine anti-ice on, decrease altitude capability by 100 ft.

With engine and wing anti-ice on, decrease altitude capability by 400 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	7800	6000	1200
290	8700	6900	2800
280	9900	7800	4200
270	11200	8500	6300
260	12500	9400	7600
250	13700	10800	8500
240	14900	12100	9300
230	16100	13300	10500
220	17200	14500	11600
210	18300	15700	12800
200	19200	16700	13900
190	20100	17700	15000
180	21100	18700	16100
170	22000	19800	17100
160	22900	20700	18100
150	23800	21500	19000
140	24500	22200	19900

With engine anti-ice on, decrease altitude capability by 500 ft.

With engine and wing anti-ice on, decrease altitude capability by 800 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Altitude Capability**Max Continuous Thrust, 100 ft/min residual rate of climb**

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	15500	14100	12800
290	16200	14800	13500
280	17000	15400	14100
270	17700	16200	14700
260	18400	16900	15400
250	19100	17700	16100
240	19900	18500	16900
230	20600	19200	17700
220	21300	20000	18400
210	22000	20600	19100
200	22600	21300	19800
190	23200	21900	20400
180	23800	22500	21000
170	24300	23000	21500
160	24800	23500	22000
150	25300	23900	22400
140	25600	24300	22800

With engine anti-ice on, decrease altitude capability by 200 ft.

With engine and wing anti-ice on, decrease altitude capability by 500 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	5400	3000	
290	6500	4200	800
280	7700	5200	2100
270	8900	6000	3200
260	10000	7000	4400
250	11100	8000	5500
240	12100	9100	6700
230	13200	10200	7700
220	14100	11300	8700
210	15000	12300	9500
200	16000	13200	10400
190	16800	14000	11100
180	17600	14800	11800
170	18300	15500	12500
160	18900	16100	13100
150	19500	16700	13700
140	20000	17200	14200

With engine anti-ice on, decrease altitude capability by 600 ft.

With engine and wing anti-ice on, decrease altitude capability by 900 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	14200	12800	11000
290	14800	13300	11900
280	15400	13900	12500
270	16100	14500	13100
260	16700	15100	13700
250	17400	15800	14300
240	18000	16500	14800
230	18700	17100	15400
220	19300	17800	16100
210	19800	18300	16600
200	20300	18900	17200
190	20800	19300	17600
180	21200	19800	18100
170	21600	20100	18500
160	22000	20500	18800
150	22300	20800	19200
140	22600	21100	19500

With engine anti-ice on, decrease altitude capability by 200 ft.

With engine and wing anti-ice on, decrease altitude capability by 500 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	3000	100	
290	4000	1100	
280	4900	2200	
270	5900	3100	
260	6800	4100	900
250	7700	5100	2000
240	8700	6000	2900
230	9600	6800	3800
220	10500	7600	4800
210	11300	8300	5700
200	12000	8900	6400
190	12600	9500	7000
180	13100	10000	7500
170	13700	10600	8000
160	14100	11000	8500
150	14600	11500	8900
140	15000	11900	9300

With engine anti-ice on, decrease altitude capability by 600 ft.

With engine and wing anti-ice on, decrease altitude capability by 800 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table

30000 FT to 25000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
30 (-26)	%N1						100.9	97.1	94.2	92.1
	MAX TAT						-13	-4	3	
	KIAS						255	244	234	226
	MACH						.680	.653	.628	.608
	FF/ENG						5462	4895	4399	4009
29 (-24)	KTAS						401	385	370	358
	%N1						98.2	95.2	93.0	91.1
	MAX TAT						-4	3		
	KIAS						252	242	234	226
	MACH						.660	.635	.614	.596
28 (-22)	FF/ENG						5267	4744	4327	3974
	KTAS						390	376	363	353
	%N1					99.1	96.1	93.9	92.1	90.2
	MAX TAT					-4	3			
	KIAS					260	250	241	234	227
27 (-20)	MACH					.665	.641	.620	.602	.585
	FF/ENG					5633	5093	4649	4280	3956
	KTAS					395	381	368	358	348
	%N1				99.9	96.9	94.7	92.9	91.1	89.2
	MAX TAT				-4	3	9			
26 (-19)	KIAS				267	257	248	241	234	228
	MACH				.669	.646	.625	.607	.591	.575
	FF/ENG				5991	5441	4973	4589	4249	3951
	KTAS				400	385	373	362	353	343
	%N1			100.5	97.6	95.4	93.6	91.9	90.1	88.3
25 (-17)	MAX TAT			-3	3	9				
	KIAS			274	265	256	248	241	235	229
	MACH			.673	.650	.629	.612	.596	.581	.566
	FF/ENG			6337	5786	5299	4900	4548	4236	3943
	KTAS			403	390	377	367	357	348	339
25 (-17)	%N1		101.0	98.2	96.0	94.2	92.6	90.9	89.2	87.4
	MAX TAT		-2	4	9	15				
	KIAS		281	272	263	255	248	242	236	230
	MACH		.675	.653	.632	.615	.600	.585	.571	.557
	FF/ENG		6680	6122	5623	5212	4853	4527	4230	3935
25 (-17)	KTAS		406	393	381	370	361	352	344	335

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
30	94.3	95.4	96.4	97.5	98.6	99.6	100.7	101.7	102.7	102.8	101.7	100.5	99.7	99.1
29	94.1	95.2	96.2	97.3	98.4	99.4	100.4	101.5	102.5	103.0	102.1	100.9	99.9	99.3
28	93.7	94.8	95.9	97.0	98.0	99.1	100.1	101.1	102.1	103.1	102.4	101.3	100.2	99.6
27	93.4	94.4	95.5	96.6	97.6	98.7	99.7	100.7	101.7	102.7	102.8	101.7	100.6	99.9
26	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.3	102.3	103.3	102.2	101.0	100.1
25	92.6	93.7	94.7	95.8	96.8	97.9	98.9	99.9	100.9	101.9	102.9	102.6	101.4	100.4

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 24000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
24	%N1 MAX TAT KIAS MACH FF/ENG KTAS									
23 (-10)	%N1 MAX TAT KIAS MACH FF/ENG KTAS									99.3 5 285 .657 6782 399
22 (-8)	%N1 MAX TAT KIAS MACH FF/ENG KTAS								99.7 6 291 .658 7116 401	97.5 11 282 .639 6578 389
21 (-6)	%N1 MAX TAT KIAS MACH FF/ENG KTAS							100.1 7 297 .658 7453 402	98.0 12 289 .640 6901 391	96.3 17 281 .624 6449 382
20 (-5)	%N1 MAX TAT KIAS MACH FF/ENG KTAS						100.4 9 303 .657 7779 404	98.3 13 295 .640 7224 393	96.7 18 287 .625 6761 384	95.3 23 281 .612 6381 376
19 (-3)	%N1 MAX TAT KIAS MACH FF/ENG KTAS					100.4 10 308 .656 8085 405	98.6 15 300 .640 7536 394	97.0 19 293 .625 7077 386	95.7 23 287 .612 6693 378	94.4 281 .601 6340 371

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
23	95.2	96.2	97.2	98.3	99.3	100.3	101.2	102.2	103.2	102.1	101.1	100.3	99.7	99.3
22	94.7	95.7	96.8	97.8	98.8	99.8	100.7	101.7	102.7	102.5	101.4	100.6	100.0	99.5
21	94.3	95.3	96.3	97.3	98.3	99.3	100.3	101.2	102.2	102.9	101.7	100.9	100.2	99.7
20	93.8	94.9	95.9	96.9	97.8	98.8	99.8	100.8	101.7	102.7	102.1	101.2	100.5	99.9
19	93.3	94.3	95.3	96.3	97.3	98.3	99.2	100.2	101.2	102.1	102.5	101.4	100.6	99.9

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.3.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table

24000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
24 (-15)	%N1		98.8	96.6	94.8	93.3	91.7	90.1	88.4	86.6
	MAX TAT		5	10	15					
	KIAS		278	269	262	255	249	243	237	231
	MACH		.655	.635	.618	.604	.589	.576	.562	.548
	FF/ENG		6454	5941	5523	5162	4826	4521	4224	3935
	KTAS		396	384	374	365	356	348	340	331
23 (-13)	%N1	99.3	97.1	95.4	93.9	92.4	90.8	89.2	87.5	85.8
	MAX TAT	5	11	16						
	KIAS	285	276	268	262	256	250	244	238	232
	MACH	.657	.638	.621	.607	.593	.580	.566	.553	.539
	FF/ENG	6782	6259	5832	5471	5130	4816	4516	4225	3944
	KTAS	399	387	377	368	360	352	344	336	327
22 (-12)	%N1	97.5	95.8	94.4	93.0	91.5	90.0	88.3	86.7	84.9
	MAX TAT	11	16							
	KIAS	282	275	268	262	256	251	245	239	233
	MACH	.639	.623	.609	.596	.583	.570	.558	.545	.531
	FF/ENG	6578	6141	5774	5432	5113	4811	4517	4234	3961
	KTAS	389	380	371	363	355	348	340	332	323
21 (-10)	%N1	96.3	94.9	93.5	92.1	90.6	89.1	87.5	85.9	84.0
	MAX TAT	17	22							
	KIAS	281	275	269	263	257	252	246	240	233
	MACH	.624	.611	.598	.585	.574	.561	.549	.536	.522
	FF/ENG	6449	6076	5731	5411	5109	4812	4526	4251	3984
	KTAS	382	374	366	358	351	343	336	328	319
20 (-9)	%N1	95.3	94.0	92.6	91.2	89.8	88.2	86.7	85.0	83.1
	MAX TAT	23								
	KIAS	281	275	269	264	258	253	247	241	234
	MACH	.612	.600	.588	.576	.564	.553	.541	.527	.513
	FF/ENG	6381	6033	5708	5406	5108	4819	4542	4273	4010
	KTAS	376	368	361	354	347	340	332	324	315
19 (-7)	%N1	94.4	93.1	91.7	90.3	88.9	87.4	85.8	84.1	82.3
	MAX TAT									
	KIAS	281	276	270	265	259	254	248	242	235
	MACH	.601	.589	.578	.567	.556	.544	.532	.519	.505
	FF/ENG	6340	6009	5702	5403	5111	4832	4562	4296	4033
	KTAS	371	363	357	350	343	336	328	320	311

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
24	94.7	95.7	96.7	97.8	98.8	99.8	100.8	101.8	102.8	103.0	101.8	100.8	100.1	99.5
23	94.1	95.2	96.2	97.2	98.3	99.3	100.3	101.2	102.2	103.2	102.1	101.1	100.3	99.7
22	93.7	94.7	95.7	96.8	97.8	98.8	99.8	100.7	101.7	102.7	102.5	101.4	100.6	100.0
21	93.2	94.3	95.3	96.3	97.3	98.3	99.3	100.3	101.2	102.2	102.9	101.7	100.9	100.2
20	92.8	93.8	94.9	95.9	96.9	97.8	98.8	99.8	100.8	101.7	102.7	102.1	101.2	100.5
19	92.3	93.3	94.3	95.3	96.3	97.3	98.3	99.2	100.2	101.2	102.1	102.5	101.4	100.6

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
18000 FT to 13000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
18 (-1)	%N1				100.5	98.7	97.3	96.0	94.8	93.5
	MAX TAT				12	16	20	24	28	
	KIAS				314	306	299	293	287	282
	MACH				.654	.639	.625	.613	.602	.590
	FF/ENG				8375	7838	7389	7009	6652	6315
	KTAS				405	396	387	379	372	366
17 (1)	%N1			100.4	98.8	97.5	96.3	95.1	93.9	92.6
	MAX TAT			14	17	21	25	29		
	KIAS			319	311	304	299	293	288	283
	MACH			.652	.637	.624	.613	.602	.591	.581
	FF/ENG			8651	8133	7698	7323	6968	6625	6304
	KTAS			406	396	388	381	374	368	361
16 (2)	%N1		100.4	98.9	97.7	96.6	95.5	94.3	93.0	91.8
	MAX TAT		15	19	23	26	29			
	KIAS		324	316	310	304	299	294	289	284
	MACH		.650	.636	.623	.612	.602	.592	.582	.572
	FF/ENG		8922	8422	8002	7634	7283	6939	6611	6296
	KTAS		406	397	389	382	376	369	363	357
15 (4)	%N1	100.0	99.0	97.9	96.8	95.8	94.6	93.4	92.2	90.9
	MAX TAT	18	21	24	27	31	34			
	KIAS	325	321	315	310	305	299	294	290	285
	MACH	.641	.634	.622	.612	.602	.592	.582	.573	.563
	FF/ENG	9064	8712	8304	7941	7592	7250	6922	6602	6292
	KTAS	401	397	390	383	377	371	365	359	353
14 (6)	%N1	98.9	98.0	97.0	96.0	94.8	93.7	92.5	91.3	90.0
	MAX TAT	23	26	29	32	35				
	KIAS	325	320	315	310	305	300	295	291	286
	MACH	.629	.621	.611	.601	.592	.582	.574	.564	.555
	FF/ENG	8953	8602	8241	7893	7554	7229	6910	6596	6295
	KTAS	396	390	384	378	372	366	361	355	349
13 (7)	%N1	98.0	97.1	96.1	95.0	93.9	92.8	91.6	90.4	89.1
	MAX TAT	28	31	34	37					
	KIAS	325	320	315	311	306	301	296	292	287
	MACH	.618	.609	.600	.591	.582	.574	.565	.556	.547
	FF/ENG	8875	8534	8187	7851	7528	7214	6902	6598	6306
	KTAS	390	385	379	373	368	362	357	351	345

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	94.8	95.8	96.8	97.8	98.7	99.7	100.6	101.6	102.5	101.7	100.8	100.0	99.3	98.6
17	94.3	95.3	96.3	97.3	98.2	99.2	100.1	101.0	102.0	101.7	100.7	99.9	99.1	98.5
16	93.9	94.9	95.9	96.8	97.8	98.7	99.6	100.6	101.5	101.5	100.5	99.7	98.9	98.1
15	93.7	94.6	95.6	96.6	97.5	98.4	99.4	100.3	101.2	101.0	100.2	99.4	98.5	97.6
14	93.6	94.5	95.5	96.4	97.4	98.3	99.3	100.2	101.1	101.0	100.2	99.5	98.6	97.7
13	93.4	94.4	95.3	96.3	97.2	98.2	99.1	100.0	100.9	101.1	100.3	99.6	98.7	97.8

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 18000 FT to 13000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
18 (-6)	%N1	93.5	92.2	90.8	89.5	88.1	86.6	84.9	83.2	81.5
	MAX TAT									
	KIAS	282	276	271	266	261	255	249	242	236
	MACH	.590	.580	.569	.558	.548	.536	.524	.510	.497
	FF/ENG	6315	6001	5698	5403	5121	4850	4583	4317	4055
17 (-4)	KTAS	366	359	352	346	339	332	324	316	308
	%N1	92.6	91.3	90.0	88.6	87.2	85.7	84.0	82.4	80.7
	MAX TAT									
	KIAS	283	277	272	267	262	256	250	243	237
	MACH	.581	.571	.561	.550	.539	.528	.515	.502	.490
16 (-2)	FF/ENG	6304	5995	5695	5411	5138	4871	4604	4334	4076
	KTAS	361	355	348	342	335	328	320	312	305
	%N1	91.8	90.5	89.1	87.8	86.3	84.8	83.2	81.6	80.0
	MAX TAT									
	KIAS	284	279	273	268	263	257	250	244	239
15 (-1)	MACH	.572	.562	.552	.542	.531	.519	.507	.495	.484
	FF/ENG	6296	5991	5701	5426	5159	4891	4619	4351	4098
	KTAS	357	351	345	338	331	324	316	309	302
	%N1	90.9	89.6	88.3	86.9	85.4	83.9	82.4	80.9	79.4
	MAX TAT									
14 (1)	KIAS	285	280	275	269	263	257	251	246	240
	MACH	.563	.554	.544	.534	.523	.511	.499	.488	.477
	FF/ENG	6292	5997	5716	5447	5180	4907	4633	4372	4128
	KTAS	353	347	341	334	327	320	313	306	299
	%N1	90.0	88.7	87.4	86.0	84.5	83.0	81.5	80.1	78.6
13 (3)	MAX TAT									
	KIAS	286	281	276	270	264	258	253	247	242
	MACH	.555	.546	.536	.526	.514	.503	.492	.482	.471
	FF/ENG	6295	6009	5736	5467	5194	4919	4653	4402	4168
	KTAS	349	343	337	330	323	316	310	303	296
13 (3)	%N1	89.1	87.8	86.4	85.0	83.5	82.1	80.7	79.4	77.9
	MAX TAT									
	KIAS	287	282	277	271	265	259	254	249	243
	MACH	.547	.538	.528	.517	.506	.496	.486	.476	.466
	FF/ENG	6306	6027	5753	5481	5207	4939	4683	4443	4214
	KTAS	345	340	333	327	320	313	307	300	294

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
18	93.8	94.8	95.8	96.8	97.8	98.7	99.7	100.6	101.6	102.5	101.7	100.8	100.0	99.3
17	93.4	94.3	95.3	96.3	97.3	98.2	99.2	100.1	101.0	102.0	101.7	100.7	99.9	99.1
16	92.9	93.9	94.9	95.9	96.8	97.8	98.7	99.6	100.6	101.5	101.5	100.5	99.7	98.9
15	92.7	93.7	94.6	95.6	96.6	97.5	98.4	99.4	100.3	101.2	101.0	100.2	99.4	98.5
14	92.6	93.6	94.5	95.5	96.4	97.4	98.3	99.3	100.2	101.1	101.0	100.2	99.5	98.6
13	92.4	93.4	94.4	95.3	96.3	97.2	98.2	99.1	100.0	100.9	101.1	100.3	99.6	98.7

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 12000 FT to 7000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
12 (9)	%N1	97.1	96.2	95.2	94.1	93.1	91.9	90.7	89.5	88.3
	MAX TAT	33	36	39						
	KIAS	325	321	316	311	307	302	298	293	288
	MACH	.607	.599	.590	.582	.574	.565	.557	.548	.539
	FF/ENG	8806	8480	8145	7826	7515	7207	6904	6609	6322
	KTAS	384	379	374	369	363	358	353	347	342
11 (10)	%N1	96.2	95.3	94.3	93.3	92.2	91.1	89.9	88.7	87.4
	MAX TAT	37	39	42						
	KIAS	325	321	317	312	308	303	299	294	289
	MACH	.596	.589	.581	.573	.565	.557	.549	.540	.531
	FF/ENG	8745	8445	8128	7819	7513	7213	6918	6626	6339
	KTAS	379	375	370	365	359	354	349	344	338
10 (12)	%N1	95.3	94.5	93.5	92.4	91.4	90.3	89.1	87.9	86.6
	MAX TAT	40	43							
	KIAS	325	322	318	314	309	305	300	295	290
	MACH	.585	.580	.573	.565	.557	.549	.541	.532	.523
	FF/ENG	8702	8439	8130	7825	7526	7232	6938	6646	6358
	KTAS	374	371	366	361	356	351	345	340	334
9 (13)	%N1	94.3	93.6	92.6	91.6	90.6	89.5	88.2	87.0	85.7
	MAX TAT	44								
	KIAS	325	323	319	315	310	306	301	296	291
	MACH	.575	.572	.564	.557	.549	.542	.533	.524	.515
	FF/ENG	8682	8457	8148	7848	7552	7258	6963	6669	6381
	KTAS	368	366	362	357	352	347	342	336	330
8 (15)	%N1	93.4	92.8	91.8	90.8	89.7	88.6	87.3	86.1	84.8
	MAX TAT									
	KIAS	325	324	320	316	312	307	302	297	292
	MACH	.565	.564	.557	.549	.542	.534	.525	.516	.508
	FF/ENG	8669	8483	8177	7879	7583	7287	6988	6691	6402
	KTAS	363	363	358	353	348	343	338	332	326
7 (17)	%N1	92.4	91.9	90.9	89.9	88.8	87.7	86.5	85.2	84.1
	MAX TAT									
	KIAS	325	325	322	317	313	308	303	298	293
	MACH	.555	.555	.549	.542	.534	.526	.517	.509	.500
	FF/ENG	8651	8486	8208	7910	7612	7311	7008	6710	6423
	KTAS	358	358	354	350	345	339	334	328	323

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
12	95.2	96.1	97.1	98.0	98.9	99.8	100.7	101.3	100.4	99.7	98.9	98.0	97.0	96.2
11	94.5	95.5	96.4	97.3	98.2	99.2	100.0	100.9	100.5	99.8	99.0	98.1	97.1	96.3
10	94.0	95.0	95.9	96.8	97.7	98.6	99.5	100.4	100.7	100.0	99.2	98.4	97.4	96.6
9	93.6	94.5	95.5	96.4	97.3	98.2	99.1	99.9	100.8	100.4	99.7	98.9	98.0	97.0
8	93.2	94.1	95.0	95.9	96.8	97.7	98.6	99.5	100.3	100.8	100.2	99.3	98.5	97.5
7	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.8	100.6	100.2	99.5	98.6	97.7

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 12000 FT to 7000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
12 (4)	%N1	88.3	86.9	85.5	84.1	82.7	81.4	80.1	78.7	77.3
	MAX TAT									
	KIAS	288	283	277	272	266	261	256	250	245
	MACH	.539	.530	.520	.509	.499	.489	.480	.470	.460
	FF/ENG	6322	6043	5767	5495	5228	4969	4724	4491	4266
11 (6)	KTAS	342	336	329	323	316	310	304	298	291
	%N1	87.4	86.1	84.7	83.4	82.1	80.8	79.4	78.1	76.7
	MAX TAT									
	KIAS	289	284	278	273	267	262	257	252	247
	MACH	.531	.522	.512	.502	.492	.483	.474	.464	.455
10 (8)	FF/ENG	6339	6059	5784	5517	5258	5008	4770	4542	4322
	KTAS	338	332	325	319	313	307	301	295	289
	%N1	86.6	85.3	83.9	82.7	81.4	80.1	78.8	77.5	76.1
	MAX TAT									
	KIAS	290	285	279	274	269	264	259	254	248
9 (10)	MACH	.523	.514	.504	.495	.486	.477	.468	.459	.449
	FF/ENG	6358	6079	5808	5547	5294	5051	4818	4594	4379
	KTAS	334	328	322	316	310	304	299	293	287
	%N1	85.7	84.4	83.2	82.0	80.7	79.5	78.2	76.9	75.6
	MAX TAT									
8 (11)	KIAS	291	285	280	275	270	265	260	255	250
	MACH	.515	.506	.497	.488	.480	.471	.462	.453	.444
	FF/ENG	6381	6102	5835	5578	5330	5092	4862	4641	4429
	KTAS	330	324	318	313	307	302	296	290	285
	%N1	84.8	83.6	82.5	81.3	80.1	78.9	77.7	76.4	75.1
7 (13)	MAX TAT									
	KIAS	292	287	282	277	272	267	262	257	252
	MACH	.508	.499	.491	.482	.474	.466	.457	.448	.440
	FF/ENG	6402	6126	5862	5609	5364	5128	4900	4683	4478
	KTAS	326	321	315	310	305	299	294	288	283
	%N1	84.1	82.9	81.8	80.6	79.5	78.3	77.1	75.9	74.6
	MAX TAT									
	KIAS	293	288	283	278	274	269	264	259	254
	MACH	.500	.492	.484	.476	.468	.460	.452	.443	.435
	FF/ENG	6423	6151	5891	5641	5399	5163	4939	4729	4534
	KTAS	323	318	313	307	302	297	292	286	281

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
12	94.2	95.2	96.1	97.1	98.0	98.9	99.8	100.7	101.3	100.4	99.7	98.9	98.0	97.0
11	93.6	94.5	95.5	96.4	97.3	98.2	99.2	100.0	100.9	100.5	99.8	99.0	98.1	97.1
10	93.1	94.0	95.0	95.9	96.8	97.7	98.6	99.5	100.4	100.7	100.0	99.2	98.4	97.4
9	92.7	93.6	94.5	95.5	96.4	97.3	98.2	99.1	99.9	100.8	100.4	99.7	98.9	98.0
8	92.2	93.2	94.1	95.0	95.9	96.8	97.7	98.6	99.5	100.3	100.8	100.2	99.3	98.5
7	91.8	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.8	100.6	100.2	99.5	98.6

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS	WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
29										
28										
27										
26										
25	260 -16 377									99.9 -1 6316
24	260 -14 371								99.8 0 6484	98.1 5 6174
23	260 -13 366							99.8 2 6666	98.0 6 6337	96.7 10 6053
22	260 -12 360					101.9 -2 7241	99.7 3 6858	98.0 8 6514	96.6 12 6214	95.5 16 5963
21	260 -10 354				101.9 0 7458	99.8 5 7056	98.0 9 6696	96.6 14 6386	95.4 18 6124	94.4 5898
20	260 -9 349			101.9 2 7682	99.8 7 7261	98.1 11 6888	96.7 15 6571	95.5 20 6303	94.4 6066	93.4 5848
19	260 -7 344		102.0 4 7919	99.8 8 7479	98.1 13 7096	96.7 17 6771	95.5 21 6498	94.4 6251	93.4 6020	92.4 5811

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
25	95.8	96.9	97.9	99.0	100.0	101.0	102.1	103.1	104.1	102.8	101.6	100.7	100.0	99.6
24	95.6	96.6	97.7	98.7	99.8	100.8	101.8	102.8	103.8	103.1	101.9	101.0	100.3	99.8
23	95.3	96.4	97.4	98.5	99.5	100.5	101.5	102.5	103.5	103.5	102.2	101.3	100.6	100.1
22	95.0	96.1	97.1	98.2	99.2	100.2	101.2	102.2	103.2	103.8	102.6	101.6	100.8	100.3
21	94.9	96.0	97.0	98.0	99.1	100.1	101.1	102.1	103.1	104.1	103.0	101.9	101.1	100.5
20	94.9	95.9	97.0	98.0	99.0	100.0	101.0	102.0	103.0	104.0	103.5	102.2	101.3	100.7
19	94.7	95.7	96.8	97.8	98.8	99.8	100.8	101.8	102.8	103.8	104.0	102.6	101.5	100.8

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.3.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table**29000 FT to 19000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
29	260	%N1						99.6	98.0	96.6	95.6
	-21	MAX TAT						-7	-3	1	4
	402	FF/ENG						5516	5293	5095	4921
28	260	%N1				100.9	99.2	97.6	96.3	95.2	94.4
	-20	MAX TAT				-9	-4	0	3	6	9
	396	FF/ENG				5886	5637	5405	5195	5011	4852
27	260	%N1			100.5	98.8	97.3	96.1	95.0	94.1	93.4
	-19	MAX TAT			-6	-2	2	6	9	12	
	389	FF/ENG			6016	5760	5524	5307	5113	4945	4800
26	260	%N1		100.2	98.4	97.0	95.9	94.9	94.0	93.2	92.5
	-17	MAX TAT		-4	1	4	8	11			
	383	FF/ENG		6159	5888	5647	5427	5227	5049	4893	4756
25	260	%N1	99.9	98.2	96.8	95.7	94.7	93.8	93.0	92.3	91.6
	-16	MAX TAT	-1	3	7	10	13				
	377	FF/ENG	6316	6026	5772	5548	5347	5163	4997	4849	4722
24	260	%N1	98.1	96.7	95.6	94.7	93.8	92.9	92.1	91.4	90.7
	-14	MAX TAT	5	9	12	15					
	371	FF/ENG	6174	5906	5674	5472	5288	5114	4957	4819	4696
23	260	%N1	96.7	95.6	94.6	93.7	92.9	92.0	91.3	90.5	89.8
	-13	MAX TAT	10	14	18						
	366	FF/ENG	6053	5813	5606	5419	5242	5078	4927	4793	4672
22	260	%N1	95.5	94.5	93.6	92.8	91.9	91.1	90.3	89.6	88.9
	-12	MAX TAT	16								
	360	FF/ENG	5963	5747	5552	5372	5204	5046	4900	4769	4653
21	260	%N1	94.4	93.5	92.6	91.8	90.9	90.1	89.3	88.6	87.9
	-10	MAX TAT									
	354	FF/ENG	5898	5693	5506	5335	5174	5021	4878	4751	4638
20	260	%N1	93.4	92.5	91.6	90.8	89.9	89.1	88.3	87.6	87.0
	-9	MAX TAT									
	349	FF/ENG	5848	5652	5474	5308	5149	4998	4860	4737	4630
19	260	%N1	92.4	91.5	90.6	89.8	89.0	88.1	87.4	86.7	86.0
	-7	MAX TAT									
	344	FF/ENG	5811	5622	5446	5281	5125	4979	4848	4733	4633

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	96.1	97.2	98.2	99.3	100.3	101.3	102.3	103.3	102.4	101.3	100.3	99.6	99.2	98.8
28	95.9	97.0	98.0	99.0	100.1	101.1	102.1	103.1	102.7	101.6	100.6	99.8	99.4	99.0
27	95.8	96.8	97.9	98.9	100.0	101.0	102.0	103.0	103.0	102.0	100.9	100.1	99.6	99.2
26	95.8	96.8	97.9	98.9	99.9	101.0	102.0	103.0	103.4	102.4	101.3	100.4	99.8	99.4
25	95.8	96.9	97.9	99.0	100.0	101.0	102.1	103.1	104.1	102.8	101.6	100.7	100.0	99.6
24	95.6	96.6	97.7	98.7	99.8	100.8	101.8	102.8	103.8	103.1	101.9	101.0	100.3	99.8
23	95.3	96.4	97.4	98.5	99.5	100.5	101.5	102.5	103.5	103.5	102.2	101.3	100.6	100.1
22	95.0	96.1	97.1	98.2	99.2	100.2	101.2	102.2	103.2	103.8	102.6	101.6	100.8	100.3
21	94.9	96.0	97.0	98.0	99.1	100.1	101.1	102.1	103.1	104.1	103.0	101.9	101.1	100.5
20	94.9	95.9	97.0	98.0	99.0	100.0	101.0	102.0	103.0	104.0	103.5	102.2	101.3	100.7
19	94.7	95.7	96.8	97.8	98.8	99.8	100.8	101.8	102.8	103.8	104.0	102.6	101.5	100.8

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

260 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			300	290	280	270	260	250	240	230	220
18	260	%N1	102.1	99.8	98.1	96.7	95.5	94.4	93.4	92.4	91.5
	-6	MAX TAT	5	10	14	18	22				
	338	FF/ENG	8172	7714	7318	6985	6703	6446	6205	5983	5780
17	260	%N1	99.9	98.2	96.8	95.6	94.5	93.4	92.4	91.4	90.5
	-4	MAX TAT	11	15	20	23					
	333	FF/ENG	7966	7557	7211	6916	6649	6399	6166	5949	5748
16	260	%N1	98.3	96.9	95.7	94.5	93.5	92.5	91.5	90.5	89.5
	-3	MAX TAT	17	21	25						
	328	FF/ENG	7811	7449	7139	6858	6598	6357	6130	5917	5720
15	260	%N1	97.0	95.8	94.6	93.6	92.5	91.5	90.5	89.5	88.6
	-1	MAX TAT	22	26	30						
	323	FF/ENG	7700	7374	7078	6807	6557	6323	6100	5892	5701
14	260	%N1	95.9	94.7	93.6	92.5	91.5	90.5	89.5	88.5	87.5
	1	MAX TAT	28								
	318	FF/ENG	7622	7310	7026	6766	6523	6295	6078	5876	5694
13	260	%N1	94.8	93.7	92.6	91.5	90.5	89.5	88.5	87.5	86.4
	2	MAX TAT	32								
	314	FF/ENG	7555	7256	6984	6732	6496	6273	6063	5868	5690
12	260	%N1	93.8	92.7	91.6	90.6	89.5	88.5	87.5	86.4	85.4
	4	MAX TAT									
	309	FF/ENG	7495	7210	6948	6703	6472	6254	6049	5858	5681
11	260	%N1	92.9	91.8	90.7	89.7	88.6	87.6	86.5	85.5	84.5
	5	MAX TAT									
	305	FF/ENG	7444	7170	6914	6674	6448	6235	6034	5847	5673
10	260	%N1	91.9	90.8	89.8	88.7	87.7	86.6	85.5	84.5	83.6
	7	MAX TAT									
	300	FF/ENG	7401	7133	6882	6648	6427	6220	6026	5843	5671
9	260	%N1	90.9	89.9	88.8	87.7	86.6	85.6	84.5	83.6	82.6
	9	MAX TAT									
	296	FF/ENG	7361	7099	6854	6626	6414	6214	6023	5840	5666
8	260	%N1	90.0	88.9	87.8	86.7	85.6	84.6	83.6	82.7	81.8
	10	MAX TAT									
	291	FF/ENG	7324	7069	6834	6614	6408	6209	6016	5828	5652

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	97.7	98.7	99.7	100.7	101.7	102.7	103.7	104.6	103.1	101.8	101.0	100.2	99.5	98.9
17	97.4	98.4	99.4	100.4	101.4	102.4	103.3	104.3	103.5	102.1	101.2	100.4	99.7	98.9
16	97.0	98.0	99.0	100.0	101.0	101.9	102.9	103.9	103.8	102.4	101.4	100.7	99.8	99.0
15	96.6	97.6	98.6	99.6	100.6	101.5	102.5	103.4	104.1	102.7	101.7	100.9	100.1	99.1
14	96.2	97.2	98.2	99.2	100.2	101.1	102.1	103.0	103.9	103.0	101.9	101.1	100.5	99.5
13	95.6	96.6	97.6	98.6	99.6	100.5	101.5	102.4	103.3	103.2	102.1	101.2	100.5	99.7
12	94.9	95.9	96.8	97.8	98.8	99.7	100.6	101.6	102.5	103.1	101.9	101.1	100.4	99.6
11	94.0	95.0	95.9	96.9	97.8	98.8	99.7	100.6	101.5	102.4	101.7	100.9	100.2	99.4
10	93.3	94.3	95.2	96.2	97.1	98.0	99.0	99.9	100.8	101.6	101.6	100.8	100.1	99.3
9	92.7	93.6	94.6	95.5	96.4	97.4	98.3	99.2	100.1	100.9	101.5	100.8	100.1	99.3
8	92.3	93.2	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.5	101.3	100.9	100.3	99.5

With engine anti-ice on, decrease limit %N1 by 0.3.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table

18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
18	260	%N1	91.5	90.5	89.7	88.8	88.0	87.2	86.4	85.7	85.1
	-6	MAX TAT									
	338	FF/ENG	5780	5592	5418	5257	5107	4969	4846	4737	4640
17	260	%N1	90.5	89.6	88.7	87.8	87.0	86.2	85.4	84.7	84.1
	-4	MAX TAT									
	333	FF/ENG	5748	5563	5394	5239	5098	4968	4850	4741	4643
16	260	%N1	89.5	88.6	87.7	86.9	86.0	85.2	84.5	83.8	83.1
	-3	MAX TAT									
	328	FF/ENG	5720	5541	5379	5234	5099	4971	4852	4740	4638
15	260	%N1	88.6	87.7	86.7	85.9	85.0	84.3	83.5	82.8	82.2
	-1	MAX TAT									
	323	FF/ENG	5701	5530	5377	5236	5101	4970	4846	4731	4628
14	260	%N1	87.5	86.6	85.7	84.8	84.0	83.2	82.5	81.8	81.3
	1	MAX TAT									
	318	FF/ENG	5694	5530	5378	5235	5095	4961	4836	4723	4622
13	260	%N1	86.4	85.5	84.6	83.7	82.9	82.2	81.5	80.9	80.3
	2	MAX TAT									
	314	FF/ENG	5690	5526	5372	5225	5085	4952	4830	4720	4624
12	260	%N1	85.4	84.5	83.6	82.8	82.0	81.3	80.6	80.0	79.5
	4	MAX TAT									
	309	FF/ENG	5681	5517	5362	5217	5079	4950	4832	4726	4632
11	260	%N1	84.5	83.6	82.7	81.9	81.2	80.5	79.8	79.2	78.7
	5	MAX TAT									
	305	FF/ENG	5673	5511	5357	5214	5079	4953	4839	4736	4644
10	260	%N1	83.6	82.7	81.8	81.1	80.3	79.6	79.0	78.4	77.9
	7	MAX TAT									
	300	FF/ENG	5671	5509	5356	5214	5082	4959	4848	4747	4658
9	260	%N1	82.6	81.8	81.0	80.2	79.5	78.8	78.2	77.6	77.1
	9	MAX TAT									
	296	FF/ENG	5666	5502	5350	5210	5080	4960	4852	4754	4667
8	260	%N1	81.8	80.9	80.1	79.4	78.6	78.0	77.4	76.8	76.3
	10	MAX TAT									
	291	FF/ENG	5652	5488	5337	5198	5070	4953	4847	4752	4669

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	97.7	98.7	99.7	100.7	101.7	102.7	103.7	104.6	103.1	101.8	101.0	100.2	99.5	98.9
17	97.4	98.4	99.4	100.4	101.4	102.4	103.3	104.3	103.5	102.1	101.2	100.4	99.7	98.9
16	97.0	98.0	99.0	100.0	101.0	101.9	102.9	103.9	103.8	102.4	101.4	100.7	99.8	99.0
15	96.6	97.6	98.6	99.6	100.6	101.5	102.5	103.4	104.1	102.7	101.7	100.9	100.1	99.1
14	96.2	97.2	98.2	99.2	100.2	101.1	102.1	103.0	103.9	103.0	101.9	101.1	100.5	99.5
13	95.6	96.6	97.6	98.6	99.6	100.5	101.5	102.4	103.3	103.2	102.1	101.2	100.5	99.7
12	94.9	95.9	96.8	97.8	98.8	99.7	100.6	101.6	102.5	103.1	101.9	101.1	100.4	99.6
11	94.0	95.0	95.9	96.9	97.8	98.8	99.7	100.6	101.5	102.4	101.7	100.9	100.2	99.4
10	93.3	94.3	95.2	96.2	97.1	98.0	99.0	99.9	100.8	101.6	101.6	100.8	100.1	99.3
9	92.7	93.6	94.6	95.5	96.4	97.4	98.3	99.2	100.1	100.9	101.5	100.8	100.1	99.3
8	92.3	93.2	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.5	101.3	100.9	100.3	99.5

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			300	290	280	270	260	250	240	230	220
29											
28											
27											
26											
25											
24	280 -12 398	%N1 MAX TAT FF/ENG								100.4 1 6756	
23	280 -10 392	%N1 MAX TAT FF/ENG							100.0 3 6881	98.6 7 6620	
22	280 -9 386	%N1 MAX TAT FF/ENG						101.2 2 7311	99.7 5 7018	98.4 9 6746	97.3 12 6503
21	280 -8 380	%N1 MAX TAT FF/ENG					100.9 4 7459	99.4 8 7156	98.2 11 6878	97.1 14 6630	96.2 17 6415
20	280 -6 375	%N1 MAX TAT FF/ENG				100.7 6 7605	99.2 10 7291	98.0 13 7010	97.0 16 6765	96.0 20 6549	95.2 23 6354
19	280 -5 369	%N1 MAX TAT FF/ENG			100.4 8 7756	98.9 12 7435	97.8 15 7155	96.8 18 6913	95.9 22 6697	95.1 25 6496	94.3 6305

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
24	95.6	96.7	97.7	98.7	99.7	100.7	101.7	102.7	103.3	102.2	101.2	100.5	100.0	99.5
23	95.4	96.5	97.5	98.5	99.5	100.5	101.5	102.5	103.4	102.5	101.5	100.7	100.2	99.7
22	95.2	96.3	97.3	98.3	99.3	100.3	101.3	102.3	103.2	102.8	101.7	101.0	100.4	100.0
21	95.1	96.1	97.1	98.1	99.1	100.1	101.1	102.1	103.1	103.2	102.0	101.2	100.6	100.2
20	94.9	96.0	97.0	98.0	99.0	100.0	101.0	101.9	102.9	103.7	102.4	101.4	100.8	100.4
19	94.7	95.7	96.7	97.7	98.7	99.7	100.7	101.7	102.6	103.6	102.7	101.7	100.9	100.4

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.3.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table**29000 FT to 19000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
29	280	%N1									99.9
	-18	MAX TAT									-5
	431	FF/ENG									5735
28	280	%N1							100.1	99.0	98.0
	-17	MAX TAT							-4	-2	1
	424	FF/ENG							5937	5772	5632
27	280	%N1					100.7	99.4	98.2	97.4	96.6
	-16	MAX TAT					-4	-1	2	4	6
	417	FF/ENG					6206	6005	5825	5671	5541
26	280	%N1				100.0	98.7	97.7	96.8	96.1	95.5
	-14	MAX TAT				-1	2	5	7	10	12
	411	FF/ENG				6296	6086	5897	5730	5588	5471
25	280	%N1		100.8	99.4	98.2	97.2	96.4	95.6	95.0	94.5
	-13	MAX TAT		-2	2	5	8	10	13	15	17
	404	FF/ENG		6638	6398	6178	5981	5805	5653	5526	5420
24	280	%N1	100.4	99.0	97.8	96.9	96.0	95.3	94.7	94.1	93.7
	-12	MAX TAT	1	4	7	10	13	16	18		
	398	FF/ENG	6756	6506	6276	6071	5890	5733	5596	5479	5380
23	280	%N1	98.6	97.5	96.6	95.7	95.0	94.4	93.8	93.3	92.8
	-10	MAX TAT	7	10	13	16	18	21			
	392	FF/ENG	6620	6383	6173	5990	5829	5685	5555	5443	5348
22	280	%N1	97.3	96.4	95.5	94.8	94.1	93.5	92.9	92.4	92.0
	-9	MAX TAT	12	15	18	21					
	386	FF/ENG	6503	6290	6104	5937	5785	5644	5518	5411	5321
21	280	%N1	96.2	95.4	94.6	93.9	93.2	92.6	92.1	91.6	91.1
	-8	MAX TAT	17	21	24						
	380	FF/ENG	6415	6226	6051	5889	5742	5608	5489	5387	5300
20	280	%N1	95.2	94.5	93.7	93.0	92.4	91.8	91.2	90.7	90.3
	-6	MAX TAT	23								
	375	FF/ENG	6354	6173	6003	5849	5709	5580	5465	5365	5278
19	280	%N1	94.3	93.5	92.8	92.1	91.5	90.8	90.3	89.8	89.3
	-5	MAX TAT									
	369	FF/ENG	6305	6130	5968	5819	5681	5553	5439	5341	5257

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	95.3	96.3	97.4	98.4	99.4	100.5	101.5	102.5	102.6	101.6	100.6	99.8	99.3	98.9
28	95.2	96.2	97.3	98.3	99.3	100.4	101.4	102.4	103.0	101.9	100.9	100.1	99.5	99.1
27	95.1	96.1	97.2	98.2	99.2	100.2	101.2	102.2	103.2	102.3	101.2	100.4	99.8	99.4
26	94.9	95.9	97.0	98.0	99.0	100.0	101.0	102.0	103.0	102.6	101.5	100.7	100.1	99.6
25	94.8	95.8	96.9	97.9	98.9	100.0	101.0	102.0	102.9	103.0	101.9	101.0	100.3	99.8
24	94.6	95.6	96.7	97.7	98.7	99.7	100.7	101.7	102.7	103.3	102.2	101.2	100.5	100.0
23	94.4	95.4	96.5	97.5	98.5	99.5	100.5	101.5	102.5	103.4	102.5	101.5	100.7	100.2
22	94.2	95.2	96.3	97.3	98.3	99.3	100.3	101.3	102.3	103.2	102.8	101.7	101.0	100.4
21	94.0	95.1	96.1	97.1	98.1	99.1	100.1	101.1	102.1	103.1	103.2	102.0	101.2	100.6
20	93.9	94.9	96.0	97.0	98.0	99.0	100.0	101.0	101.9	102.9	103.7	102.4	101.4	100.8
20	93.6	94.7	95.7	96.7	97.7	98.7	99.7	100.7	101.7	102.6	103.6	102.7	101.7	100.9

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

280 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			300	290	280	270	260	250	240	230	220
18	280	%N1	101.7	100.0	98.7	97.6	96.6	95.7	94.9	94.1	93.3
	-3	MAX TAT	7	11	14	17	20	24	27		
	363	FF/ENG	8287	7919	7595	7315	7074	6857	6650	6451	6267
17	280	%N1	99.7	98.4	97.4	96.4	95.6	94.7	93.9	93.1	92.3
	-2	MAX TAT	13	16	19	23	26	28			
	358	FF/ENG	8098	7771	7490	7246	7022	6809	6606	6414	6233
16	280	%N1	98.3	97.2	96.3	95.4	94.6	93.8	93.0	92.2	91.4
	0	MAX TAT	18	21	25	27	30				
	353	FF/ENG	7960	7674	7423	7191	6971	6763	6566	6376	6197
15	280	%N1	97.1	96.2	95.3	94.5	93.6	92.8	92.0	91.2	90.4
	1	MAX TAT	23	27	29	32					
	347	FF/ENG	7866	7605	7363	7136	6923	6721	6526	6340	6166
14	280	%N1	96.0	95.2	94.3	93.5	92.6	91.8	91.0	90.2	89.4
	3	MAX TAT	29	32							
	342	FF/ENG	7792	7540	7305	7086	6879	6681	6491	6310	6141
13	280	%N1	95.0	94.1	93.3	92.4	91.6	90.8	90.0	89.2	88.4
	4	MAX TAT	34								
	337	FF/ENG	7724	7481	7255	7042	6841	6648	6463	6287	6125
12	280	%N1	94.0	93.2	92.3	91.5	90.6	89.8	89.0	88.2	87.4
	6	MAX TAT									
	332	FF/ENG	7669	7435	7216	7009	6811	6623	6443	6273	6114
11	280	%N1	93.1	92.3	91.4	90.6	89.7	88.9	88.1	87.2	86.4
	7	MAX TAT									
	328	FF/ENG	7627	7400	7185	6982	6789	6605	6428	6262	6107
10	280	%N1	92.2	91.4	90.5	89.7	88.9	88.0	87.1	86.3	85.5
	9	MAX TAT									
	323	FF/ENG	7594	7371	7160	6960	6771	6589	6418	6255	6103
9	280	%N1	91.3	90.4	89.6	88.7	87.8	87.0	86.1	85.3	84.5
	10	MAX TAT									
	318	FF/ENG	7560	7341	7135	6939	6754	6579	6411	6251	6100
8	280	%N1	90.3	89.4	88.6	87.7	86.8	85.9	85.1	84.3	83.6
	12	MAX TAT									
	314	FF/ENG	7523	7310	7109	6919	6740	6568	6401	6240	6088

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.5	97.5	98.5	99.5	100.5	101.5	102.4	103.4	103.1	101.9	101.1	100.5	99.8	99.1
17	96.2	97.2	98.2	99.2	100.2	101.1	102.1	103.0	103.4	102.2	101.3	100.6	99.9	99.1
16	95.9	96.9	97.9	98.9	99.8	100.8	101.7	102.7	103.6	102.4	101.5	100.8	100.1	99.3
15	95.6	96.6	97.5	98.5	99.5	100.4	101.4	102.3	103.2	102.7	101.8	101.0	100.3	99.4
14	95.3	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.1	102.1	101.3	100.6	99.8
13	95.0	96.0	97.0	98.0	98.9	99.9	100.8	101.8	102.7	103.5	102.4	101.6	100.9	100.1
12	94.8	95.8	96.8	97.7	98.7	99.6	100.6	101.5	102.4	103.3	102.7	101.9	101.2	100.4
11	94.3	95.3	96.3	97.2	98.2	99.1	100.0	101.0	101.9	102.8	102.8	102.0	101.3	100.5
10	93.9	94.9	95.8	96.8	97.7	98.7	99.6	100.5	101.4	102.3	103.0	102.1	101.4	100.7
9	93.1	94.1	95.0	96.0	96.9	97.8	98.8	99.7	100.6	101.4	102.3	101.9	101.2	100.5
8	92.3	93.3	94.2	95.1	96.1	97.0	97.9	98.8	99.7	100.5	101.4	101.5	100.9	100.2

With engine anti-ice on, decrease limit %N1 by 0.3.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table

18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
18	280	%N1	93.3	92.5	91.8	91.1	90.5	89.9	89.3	88.8	88.4
	-3	MAX TAT									
	363	FF/ENG	6267	6097	5937	5789	5653	5528	5417	5323	5244
17	280	%N1	92.3	91.6	90.9	90.2	89.5	88.9	88.4	87.9	87.5
	-2	MAX TAT									
	358	FF/ENG	6233	6064	5905	5760	5629	5509	5404	5315	5240
16	280	%N1	91.4	90.6	89.9	89.2	88.6	88.0	87.4	86.9	86.5
	0	MAX TAT									
	353	FF/ENG	6197	6031	5878	5738	5613	5499	5399	5315	5241
15	280	%N1	90.4	89.6	88.9	88.3	87.6	87.0	86.4	85.9	85.5
	1	MAX TAT									
	347	FF/ENG	6166	6005	5857	5725	5606	5497	5400	5316	5242
14	280	%N1	89.4	88.6	87.9	87.2	86.6	86.0	85.4	84.9	84.5
	3	MAX TAT									
	342	FF/ENG	6141	5987	5846	5720	5603	5496	5400	5315	5240
13	280	%N1	88.4	87.6	86.9	86.2	85.5	84.9	84.4	83.9	83.5
	4	MAX TAT									
	337	FF/ENG	6125	5976	5840	5716	5600	5493	5397	5312	5237
12	280	%N1	87.4	86.6	85.8	85.2	84.5	84.0	83.4	83.0	82.6
	6	MAX TAT									
	332	FF/ENG	6114	5969	5835	5712	5597	5491	5395	5311	5237
11	280	%N1	86.4	85.6	84.9	84.3	83.7	83.1	82.6	82.2	81.8
	7	MAX TAT									
	328	FF/ENG	6107	5964	5831	5710	5597	5491	5397	5313	5240
10	280	%N1	85.5	84.7	84.0	83.4	82.8	82.3	81.8	81.4	81.0
	9	MAX TAT									
	323	FF/ENG	6103	5962	5830	5710	5596	5492	5398	5315	5243
9	280	%N1	84.5	83.8	83.1	82.5	82.0	81.5	81.0	80.6	80.2
	10	MAX TAT									
	318	FF/ENG	6100	5958	5826	5705	5593	5490	5398	5317	5245
8	280	%N1	83.6	82.9	82.3	81.7	81.1	80.6	80.2	79.8	79.4
	12	MAX TAT									
	314	FF/ENG	6088	5946	5815	5696	5586	5487	5397	5318	5249

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.5	97.5	98.5	99.5	100.5	101.5	102.4	103.4	103.1	101.9	101.1	100.5	99.8	99.1
17	96.2	97.2	98.2	99.2	100.2	101.1	102.1	103.0	103.4	102.2	101.3	100.6	99.9	99.1
16	95.9	96.9	97.9	98.9	99.8	100.8	101.7	102.7	103.6	102.4	101.5	100.8	100.1	99.3
15	95.6	96.6	97.5	98.5	99.5	100.4	101.4	102.3	103.2	102.7	101.8	101.0	100.3	99.4
14	95.3	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.1	102.1	101.3	100.6	99.8
13	95.0	96.0	97.0	98.0	98.9	99.9	100.8	101.8	102.7	103.5	102.4	101.6	100.9	100.1
12	94.8	95.8	96.8	97.7	98.7	99.6	100.6	101.5	102.4	103.3	102.7	101.9	101.2	100.4
11	94.3	95.3	96.3	97.2	98.2	99.1	100.0	101.0	101.9	102.8	102.8	102.0	101.3	100.5
10	93.9	94.9	95.8	96.8	97.7	98.7	99.6	100.5	101.4	102.3	103.0	102.1	101.4	100.7
9	93.1	94.1	95.0	96.0	96.9	97.8	98.8	99.7	100.6	101.4	102.3	101.9	101.2	100.5
8	92.3	93.3	94.2	95.1	96.1	97.0	97.9	98.8	99.7	100.5	101.4	101.5	100.9	100.2

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS	WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
29										
28										
27										
26										
25										
24										
23										
22	300 -6 412	%N1 MAX TAT FF/ENG							101.0 4 7438	99.7 7 7194
21	300 -5 406	%N1 MAX TAT FF/ENG						100.4 7 7560	99.3 10 7307	98.3 13 7077
20	300 -4 400	%N1 MAX TAT FF/ENG					100.0 9 7672	98.9 12 7420	97.9 15 7187	97.1 18 6983
19	300 -2 394	%N1 MAX TAT FF/ENG				100.6 9 8036	99.5 12 7773	98.5 15 7527	97.7 17 7302	96.8 20 7098
									96.1 23 6916	

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
22	95.3	96.4	97.4	98.4	99.3	100.3	101.3	102.3	103.1	102.0	101.2	100.6	100.1	99.6
21	95.2	96.2	97.2	98.2	99.2	100.1	101.1	102.1	103.0	102.3	101.4	100.7	100.2	99.8
20	95.0	96.0	97.0	98.0	99.0	99.9	100.9	101.9	102.8	102.6	101.6	100.9	100.4	100.0
19	94.7	95.7	96.7	97.7	98.7	99.7	100.6	101.6	102.5	102.9	101.8	101.0	100.5	100.0

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table**29000 FT to 19000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
29											
28											
28											
26	300 -11 438	%N1 MAX TAT FF/ENG								100.0 1 6489	99.4 2 6386
25	300 -10 432	%N1 MAX TAT FF/ENG					100.6 1 6785	99.8 3 6631	99.0 5 6497	98.5 6 6382	98.0 8 6286
24	300 -9 425	%N1 MAX TAT FF/ENG				99.9 4 6836	99.1 6 6667	98.3 8 6521	97.8 10 6395	97.3 11 6289	96.9 13 6200
23	300 -7 419	%N1 MAX TAT FF/ENG		100.3 4 7099	99.3 7 6896	98.4 9 6716	97.7 11 6558	97.1 13 6424	96.6 15 6313	96.2 17 6219	95.9 18 6142
22	300 -6 412	%N1 MAX TAT FF/ENG	99.7 7 7194	98.7 10 6976	97.9 12 6786	97.2 15 6623	96.6 17 6484	96.1 18 6369	95.7 20 6270	95.3 22 6186	95.0 23 6114
21	300 -5 406	%N1 MAX TAT FF/ENG	98.3 13 7077	97.5 15 6879	96.8 18 6711	96.2 20 6568	95.6 22 6443	95.2 24 6335	94.8 25 6241	94.5 27 6158	94.2 28 6086
20	300 -4 400	%N1 MAX TAT FF/ENG	97.1 18 6983	96.4 20 6810	95.8 23 6658	95.3 25 6523	94.8 27 6402	94.3 28 6296	94.0 29 6204	93.6 30 6125	93.4 31 6058
19	300 -2 394	%N1 MAX TAT FF/ENG	96.1 23 6916	95.5 25 6753	94.9 27 6605	94.4 28 6473	93.9 29 6357	93.5 30 6257	93.2 31 6170	92.8 32 6093	92.5 33 6028

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
26	94.9	95.9	96.9	97.9	98.9	99.9	100.9	101.9	102.8	101.8	100.9	100.3	99.8	99.3
25	94.8	95.8	96.9	97.9	98.9	99.9	100.8	101.8	102.8	102.1	101.2	100.6	100.0	99.6
24	94.7	95.7	96.7	97.8	98.8	99.7	100.7	101.7	102.7	102.4	101.5	100.8	100.2	99.8
23	94.5	95.5	96.6	97.6	98.6	99.6	100.5	101.5	102.5	102.8	101.7	101.0	100.4	99.9
22	94.3	95.3	96.4	97.4	98.4	99.3	100.3	101.3	102.3	103.1	102.0	101.2	100.6	100.1
21	94.1	95.2	96.2	97.2	98.2	99.2	100.1	101.1	102.1	103.0	102.3	101.4	100.7	100.2
20	94.0	95.0	96.0	97.0	98.0	99.0	99.9	100.9	101.9	102.8	102.6	101.6	100.9	100.4
19	93.7	94.7	95.7	96.7	97.7	98.7	99.7	100.6	101.6	102.5	102.9	101.8	101.0	100.5

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

300 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			300	290	280	270	260	250	240	230	220
18	300	%N1			100.1	99.1	98.2	97.4	96.6	95.9	95.3
	-1	MAX TAT			12	14	17	20	22	25	27
	388	FF/ENG			8137	7877	7640	7425	7226	7038	6861
17	300	%N1	100.8	99.7	98.7	97.9	97.1	96.4	95.7	95.1	94.4
	1	MAX TAT	11	14	17	19	22	25	27	29	32
	383	FF/ENG	8539	8254	7997	7768	7561	7365	7175	6988	6816
16	300	%N1	99.3	98.4	97.6	96.9	96.3	95.6	94.9	94.2	93.5
	2	MAX TAT	16	19	22	24	27	29	31		
	377	FF/ENG	8389	8134	7909	7704	7509	7316	7129	6948	6781
15	300	%N1	98.1	97.4	96.7	96.0	95.4	94.7	94.0	93.3	92.6
	3	MAX TAT	22	24	27	29	31	34			
	371	FF/ENG	8284	8058	7849	7650	7457	7269	7087	6911	6747
14	300	%N1	97.1	96.4	95.7	95.0	94.4	93.7	93.0	92.3	91.6
	5	MAX TAT	27	30	32	34					
	366	FF/ENG	8208	7992	7787	7592	7405	7223	7045	6872	6713
13	300	%N1	96.1	95.4	94.7	94.0	93.4	92.7	92.0	91.3	90.6
	6	MAX TAT	32	35	37						
	361	FF/ENG	8136	7925	7726	7538	7355	7178	7004	6837	6682
12	300	%N1	95.1	94.4	93.7	93.1	92.4	91.7	91.0	90.3	89.7
	8	MAX TAT	37								
	356	FF/ENG	8071	7868	7676	7492	7314	7141	6972	6810	6660
11	300	%N1	94.2	93.5	92.8	92.1	91.4	90.7	90.1	89.4	88.7
	9	MAX TAT									
	350	FF/ENG	8022	7824	7637	7457	7284	7115	6950	6792	6647
10	300	%N1	93.3	92.6	91.9	91.2	90.5	89.8	89.1	88.4	87.8
	11	MAX TAT									
	345	FF/ENG	7986	7793	7609	7433	7262	7097	6937	6783	6643
9	300	%N1	92.3	91.6	90.9	90.2	89.6	88.8	88.1	87.4	86.8
	12	MAX TAT									
	340	FF/ENG	7957	7768	7587	7414	7248	7087	6931	6783	6646
8	300	%N1	91.4	90.7	90.0	89.3	88.5	87.8	87.1	86.5	85.8
	14	MAX TAT									
	336	FF/ENG	7929	7743	7567	7398	7236	7081	6929	6784	6649

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	96.5	97.5	98.4	99.4	100.4	101.3	102.3	103.2	102.1	101.2	100.6	100.0	99.3	98.7
17	96.2	97.2	98.2	99.1	100.1	101.0	102.0	102.9	102.3	101.4	100.8	100.2	99.4	98.7
16	95.9	96.9	97.9	98.8	99.8	100.7	101.7	102.6	102.5	101.7	101.0	100.4	99.6	98.8
15	95.6	96.6	97.6	98.5	99.5	100.4	101.3	102.2	102.8	101.9	101.2	100.6	99.8	98.9
14	95.5	96.5	97.4	98.4	99.3	100.3	101.2	102.1	103.0	102.2	101.6	100.9	100.1	99.2
13	95.2	96.2	97.2	98.1	99.1	100.0	100.9	101.8	102.7	102.5	101.8	101.1	100.4	99.5
12	95.0	96.0	96.9	97.9	98.8	99.8	100.7	101.6	102.5	102.8	102.0	101.4	100.7	99.8
11	94.5	95.4	96.4	97.3	98.2	99.2	100.1	101.0	101.9	102.7	102.0	101.4	100.7	99.8
10	94.0	95.0	95.9	96.8	97.8	98.7	99.6	100.5	101.4	102.2	102.0	101.4	100.7	99.9
9	93.5	94.4	95.3	96.3	97.2	98.1	99.0	99.9	100.8	101.6	101.9	101.3	100.6	99.8
8	92.9	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.2	101.0	101.7	101.2	100.5	99.7

With engine anti-ice on, decrease limit %N1 by 0.3.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
18	300	%N1	95.3	94.6	94.1	93.6	93.1	92.7	92.3	92.0	91.7
	-1	MAX TAT	27	30							
	388	FF/ENG	6861	6701	6559	6433	6321	6223	6138	6062	5997
17	300	%N1	94.4	93.8	93.2	92.7	92.2	91.8	91.5	91.1	90.8
	1	MAX TAT	32								
	383	FF/ENG	6816	6663	6524	6400	6290	6194	6109	6035	5972
16	300	%N1	93.5	92.9	92.4	91.8	91.4	90.9	90.6	90.2	89.9
	2	MAX TAT									
	377	FF/ENG	6781	6630	6493	6371	6264	6171	6089	6018	5957
15	300	%N1	92.6	92.0	91.4	90.9	90.4	90.0	89.6	89.3	89.0
	3	MAX TAT									
	371	FF/ENG	6747	6599	6466	6348	6244	6154	6075	6007	5948
14	300	%N1	91.6	91.0	90.4	89.9	89.5	89.1	88.7	88.4	88.1
	5	MAX TAT									
	366	FF/ENG	6713	6570	6441	6327	6227	6140	6064	5997	5940
13	300	%N1	90.6	90.0	89.5	89.0	88.5	88.1	87.7	87.4	87.1
	6	MAX TAT									
	361	FF/ENG	6682	6544	6419	6310	6213	6130	6056	5991	5935
12	300	%N1	89.7	89.1	88.5	88.0	87.5	87.1	86.7	86.4	86.1
	8	MAX TAT									
	356	FF/ENG	6660	6526	6406	6300	6207	6126	6055	5991	5936
11	300	%N1	88.7	88.1	87.5	87.0	86.5	86.1	85.8	85.4	85.1
	9	MAX TAT									
	350	FF/ENG	6647	6517	6401	6299	6209	6130	6060	5997	5942
10	300	%N1	87.8	87.1	86.6	86.1	85.6	85.2	84.9	84.5	84.3
	11	MAX TAT									
	345	FF/ENG	6643	6517	6405	6305	6217	6139	6069	6006	5951
9	300	%N1	86.8	86.2	85.6	85.1	84.7	84.3	84.0	83.7	83.4
	12	MAX TAT									
	340	FF/ENG	6646	6524	6413	6315	6226	6148	6077	6013	5957
8	300	%N1	85.8	85.2	84.7	84.2	83.8	83.5	83.1	82.8	82.6
	14	MAX TAT									
	336	FF/ENG	6649	6528	6417	6318	6230	6151	6079	6015	5960

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	96.5	97.5	98.4	99.4	100.4	101.3	102.3	103.2	102.1	101.2	100.6	100.0	99.3	98.7
17	96.2	97.2	98.2	99.1	100.1	101.0	102.0	102.9	102.3	101.4	100.8	100.2	99.4	98.7
16	95.9	96.9	97.9	98.8	99.8	100.7	101.7	102.6	102.5	101.7	101.0	100.4	99.6	98.8
15	95.6	96.6	97.6	98.5	99.5	100.4	101.3	102.2	102.8	101.9	101.2	100.6	99.8	98.9
14	95.5	96.5	97.4	98.4	99.3	100.3	101.2	102.1	103.0	102.2	101.6	100.9	100.1	99.2
13	95.2	96.2	97.2	98.1	99.1	100.0	100.9	101.8	102.7	102.5	101.8	101.1	100.4	99.5
12	95.0	96.0	96.9	97.9	98.8	99.8	100.7	101.6	102.5	102.8	102.0	101.4	100.7	99.8
11	94.5	95.4	96.4	97.3	98.2	99.2	100.1	101.0	101.9	102.7	102.0	101.4	100.7	99.8
10	94.0	95.0	95.9	96.8	97.8	98.7	99.6	100.5	101.4	102.2	102.0	101.4	100.7	99.9
9	93.5	94.4	95.3	96.3	97.2	98.1	99.0	99.9	100.8	101.6	101.9	101.3	100.6	99.8
8	92.9	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.2	101.0	101.7	101.2	100.5	99.7

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			300	290	280	270	260	250	240	230	220
29											
28											
27											
26											
25											
24											
23											
22											
21											
20	320 -1 425	%N1 MAX TAT FF/ENG								100.6 10 7999	99.7 12 7794
19	320 0 419	%N1 MAX TAT FF/ENG							99.9 13 8078	99.1 15 7865	98.4 17 7677

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
20	94.1	95.1	96.1	97.1	98.1	99.0	100.0	100.9	101.9	102.8	101.8	101.1	100.6	100.1
19	93.8	94.8	95.8	96.8	97.7	98.7	99.7	100.6	101.5	102.5	102.0	101.3	100.7	100.1

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table**29000 FT to 19000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
29											
28											
27											
26											
25											
24											
23	320 -5 445	%N1 MAX TAT FF/ENG							100.4 6 7307	100.0 7 7221	99.6 8 7150
22	320 -3 438	%N1 MAX TAT FF/ENG				100.5 7 7532	99.9 9 7402	99.4 10 7289	99.0 11 7192	98.6 13 7112	98.3 13 7047
21	320 -2 432	%N1 MAX TAT FF/ENG		100.4 9 7727	99.7 11 7563	99.1 12 7425	98.6 14 7306	98.2 15 7203	97.8 16 7116	97.5 17 7045	97.3 18 6987
20	320 -1 425	%N1 MAX TAT FF/ENG	99.7 12 7794	99.0 14 7616	98.4 16 7466	97.9 18 7342	97.5 19 7237	97.1 20 7147	96.8 21 7071	96.6 22 7008	96.4 23 6954
19	320 0 419	%N1 MAX TAT FF/ENG	98.4 17 7677	97.8 19 7517	97.3 21 7385	96.9 22 7276	96.6 23 7181	96.3 25 7097	96.0 26 7026	95.8 26 6964	95.6 27 6912

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
23	94.6	95.6	96.6	97.6	98.5	99.5	100.5	101.4	102.4	102.0	101.2	100.6	100.1	99.7
22	94.4	95.4	96.4	97.4	98.4	99.3	100.3	101.2	102.2	102.3	101.4	100.8	100.3	99.8
21	94.3	95.3	96.3	97.2	98.2	99.2	100.1	101.1	102.0	102.5	101.6	100.9	100.4	99.9
20	94.1	95.1	96.1	97.1	98.1	99.0	100.0	100.9	101.9	102.8	101.8	101.1	100.6	100.1
19	93.8	94.8	95.8	96.8	97.7	98.7	99.7	100.6	101.5	102.5	102.0	101.3	100.7	100.1

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table 18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			300	290	280	270	260	250	240	230	220
18	320	%N1					100.2	99.4	98.6	98.0	97.4
	2	MAX TAT					13	15	18	20	22
	413	FF/ENG					8384	8153	7941	7749	7582
17	320	%N1			100.6	99.7	98.9	98.3	97.6	97.1	96.5
	3	MAX TAT			13	16	18	20	22	24	26
	407	FF/ENG			8698	8460	8235	8028	7840	7667	7511
16	320	%N1		100.0	99.3	98.6	97.9	97.3	96.8	96.2	95.7
	4	MAX TAT		16	18	21	23	25	27	29	31
	401	FF/ENG		8783	8551	8336	8137	7951	7776	7609	7456
15	320	%N1	99.6	98.9	98.2	97.6	97.1	96.5	95.9	95.4	94.9
	6	MAX TAT	19	21	23	25	27	30	32	33	35
	395	FF/ENG	8888	8663	8457	8264	8079	7900	7729	7567	7421
14	320	%N1	98.5	97.9	97.4	96.8	96.2	95.6	95.1	94.5	94.0
	7	MAX TAT	24	26	29	31	32	34	36	38	
	390	FF/ENG	8789	8586	8395	8209	8028	7855	7690	7534	7391
13	320	%N1	97.7	97.1	96.5	95.9	95.3	94.8	94.2	93.6	93.1
	9	MAX TAT	29	31	33	35	37	39			
	384	FF/ENG	8714	8520	8332	8152	7977	7810	7650	7497	7358
12	320	%N1	96.8	96.2	95.6	95.0	94.4	93.9	93.3	92.7	92.2
	10	MAX TAT	34	36	38	40					
	379	FF/ENG	8644	8454	8273	8098	7929	7767	7612	7463	7328
11	320	%N1	95.8	95.2	94.6	94.0	93.5	92.9	92.3	91.8	91.2
	12	MAX TAT	38	40	41						
	373	FF/ENG	8584	8401	8226	8056	7892	7734	7582	7438	7308
10	320	%N1	94.8	94.3	93.7	93.1	92.5	91.9	91.4	90.8	90.3
	13	MAX TAT	41	43							
	368	FF/ENG	8543	8365	8194	8028	7868	7714	7567	7427	7300
9	320	%N1	93.9	93.3	92.7	92.1	91.5	91.0	90.4	89.9	89.4
	14	MAX TAT	45								
	363	FF/ENG	8521	8346	8179	8016	7860	7710	7567	7431	7307
8	320	%N1	92.9	92.3	91.8	91.2	90.6	90.0	89.5	88.9	88.4
	16	MAX TAT									
	358	FF/ENG	8504	8333	8169	8010	7858	7714	7574	7442	7323

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.5	96.5	97.5	98.4	99.4	100.3	101.3	102.2	102.2	101.4	100.8	100.2	99.6	98.9
17	95.3	96.2	97.2	98.2	99.1	100.0	101.0	101.9	102.4	101.6	100.9	100.4	99.7	99.0
16	95.0	96.0	97.0	97.9	98.8	99.8	100.7	101.6	102.5	101.8	101.1	100.5	99.8	99.0
15	94.8	95.8	96.7	97.7	98.6	99.6	100.5	101.4	102.3	102.0	101.3	100.7	100.0	99.2
14	94.7	95.7	96.6	97.6	98.5	99.5	100.4	101.3	102.2	102.3	101.6	101.1	100.3	99.5
13	94.6	95.5	96.5	97.4	98.4	99.3	100.2	101.1	102.0	102.7	101.9	101.4	100.7	99.8
12	94.4	95.3	96.3	97.2	98.2	99.1	100.0	100.9	101.8	102.7	102.2	101.7	101.0	100.2
11	93.8	94.7	95.6	96.6	97.5	98.4	99.3	100.2	101.1	102.0	102.0	101.5	100.9	100.0
10	93.2	94.2	95.1	96.0	97.0	97.9	98.8	99.7	100.5	101.4	101.9	101.4	100.8	100.0
9	92.8	93.8	94.7	95.6	96.5	97.4	98.3	99.2	100.1	100.9	101.8	101.3	100.7	99.9
8	92.4	93.3	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.4	101.3	101.2	100.6	99.8

With engine anti-ice on, decrease limit %N1 by 0.3.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)								
			220	210	200	190	180	170	160	150	140
18	320	%N1	97.4	96.9	96.5	96.1	95.8	95.5	95.2	95.0	94.8
	2	MAX TAT	22	24	25	27	28	29	30	31	31
	413	FF/ENG	7582	7438	7316	7213	7121	7039	6968	6909	6858
17	320	%N1	96.5	96.0	95.6	95.3	95.0	94.7	94.4	94.2	94.0
	3	MAX TAT	26	28	30	31	32	33	34	35	35
	407	FF/ENG	7511	7373	7253	7153	7065	6987	6920	6863	6815
16	320	%N1	95.7	95.2	94.8	94.5	94.1	93.9	93.6	93.4	93.2
	4	MAX TAT	31	32	34	35	36				
	401	FF/ENG	7456	7323	7209	7113	7029	6953	6888	6832	6783
15	320	%N1	94.9	94.4	94.0	93.6	93.3	93.0	92.8	92.5	92.4
	6	MAX TAT	35	36							
	395	FF/ENG	7421	7293	7182	7089	7006	6931	6867	6812	6764
14	320	%N1	94.0	93.5	93.1	92.8	92.4	92.2	91.9	91.7	91.5
	7	MAX TAT									
	390	FF/ENG	7391	7266	7159	7067	6986	6914	6853	6799	6752
13	320	%N1	93.1	92.7	92.2	91.9	91.6	91.3	91.0	90.8	90.6
	9	MAX TAT									
	384	FF/ENG	7358	7237	7133	7045	6966	6897	6837	6784	6738
12	320	%N1	92.2	91.7	91.3	91.0	90.7	90.4	90.2	89.9	89.7
	10	MAX TAT									
	379	FF/ENG	7328	7211	7110	7025	6949	6881	6823	6772	6726
11	320	%N1	91.2	90.8	90.4	90.1	89.7	89.5	89.2	89.0	88.8
	12	MAX TAT									
	373	FF/ENG	7308	7193	7096	7013	6940	6874	6817	6767	6722
10	320	%N1	90.3	89.9	89.5	89.1	88.8	88.5	88.3	88.0	87.8
	13	MAX TAT									
	368	FF/ENG	7300	7189	7094	7014	6943	6879	6824	6775	6731
9	320	%N1	89.4	88.9	88.5	88.1	87.8	87.5	87.3	87.0	86.8
	14	MAX TAT									
	363	FF/ENG	7307	7200	7109	7031	6962	6899	6845	6797	6753
8	320	%N1	88.4	87.9	87.5	87.2	86.9	86.6	86.3	86.1	85.9
	16	MAX TAT									
	358	FF/ENG	7323	7219	7130	7053	6984	6922	6868	6819	6776

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.5	96.5	97.5	98.4	99.4	100.3	101.3	102.2	102.2	101.4	100.8	100.2	99.6	98.9
17	95.3	96.2	97.2	98.2	99.1	100.0	101.0	101.9	102.4	101.6	100.9	100.4	99.7	99.0
16	95.0	96.0	97.0	97.9	98.8	99.8	100.7	101.6	102.5	101.8	101.1	100.5	99.8	99.0
15	94.8	95.8	96.7	97.7	98.6	99.6	100.5	101.4	102.3	102.0	101.3	100.7	100.0	99.2
14	94.7	95.7	96.6	97.6	98.5	99.5	100.4	101.3	102.2	102.3	101.6	101.1	100.3	99.5
13	94.6	95.5	96.5	97.4	98.4	99.3	100.2	101.1	102.0	102.7	101.9	101.4	100.7	99.8
12	94.4	95.3	96.3	97.2	98.2	99.1	100.0	100.9	101.8	102.7	102.2	101.7	101.0	100.2
11	93.8	94.7	95.6	96.6	97.5	98.4	99.3	100.2	101.1	102.0	102.0	101.5	100.9	100.0
10	93.2	94.2	95.1	96.0	97.0	97.9	98.8	99.7	100.5	101.4	101.9	101.4	100.8	100.0
9	92.8	93.8	94.7	95.6	96.5	97.4	98.3	99.2	100.1	100.9	101.8	101.3	100.7	99.9
8	92.4	93.3	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.4	101.3	101.2	100.6	99.8

With engine anti-ice on, decrease limit %N1 by 0.3.

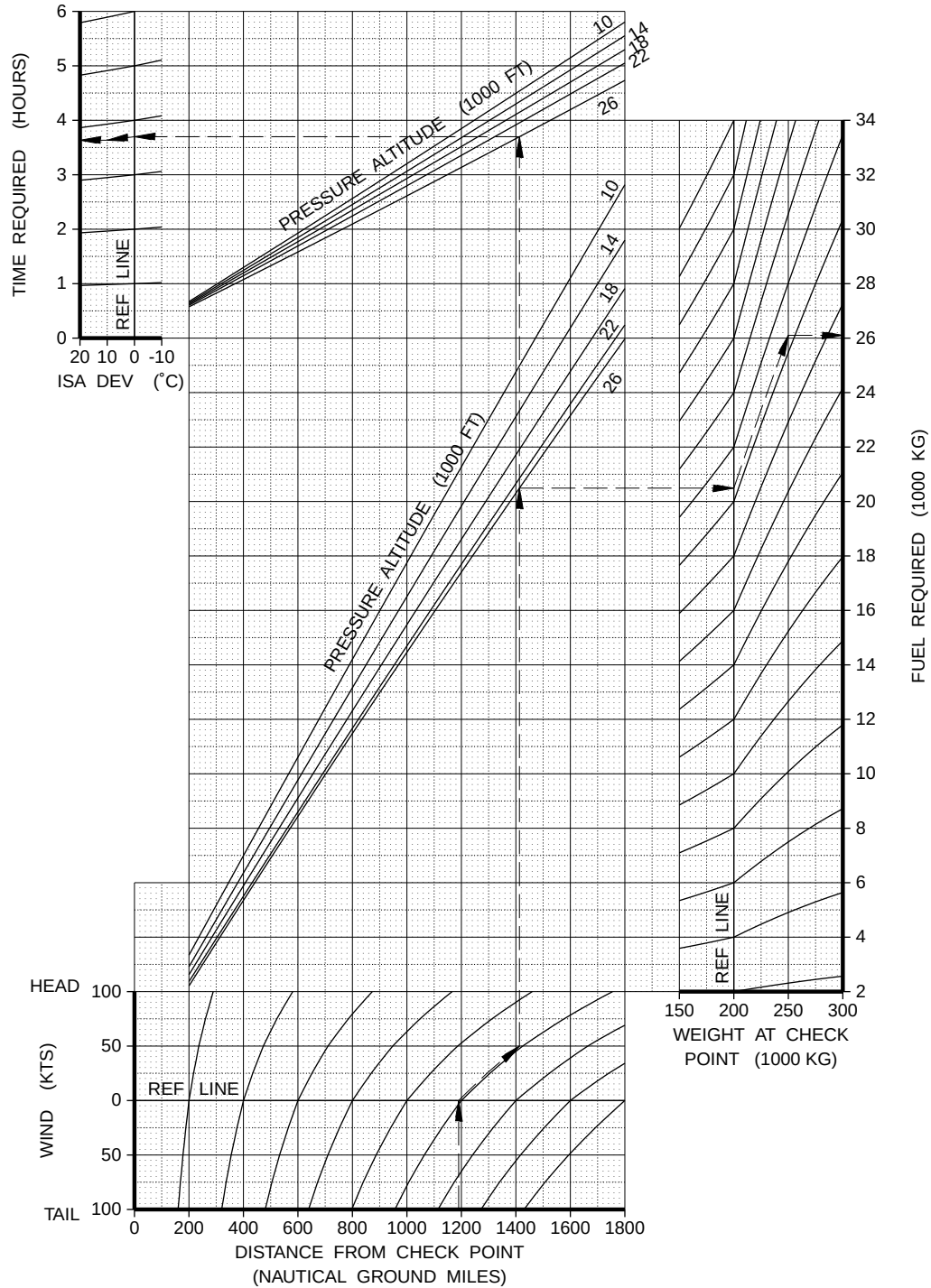
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on 310/250 descent and includes APU fuel burn

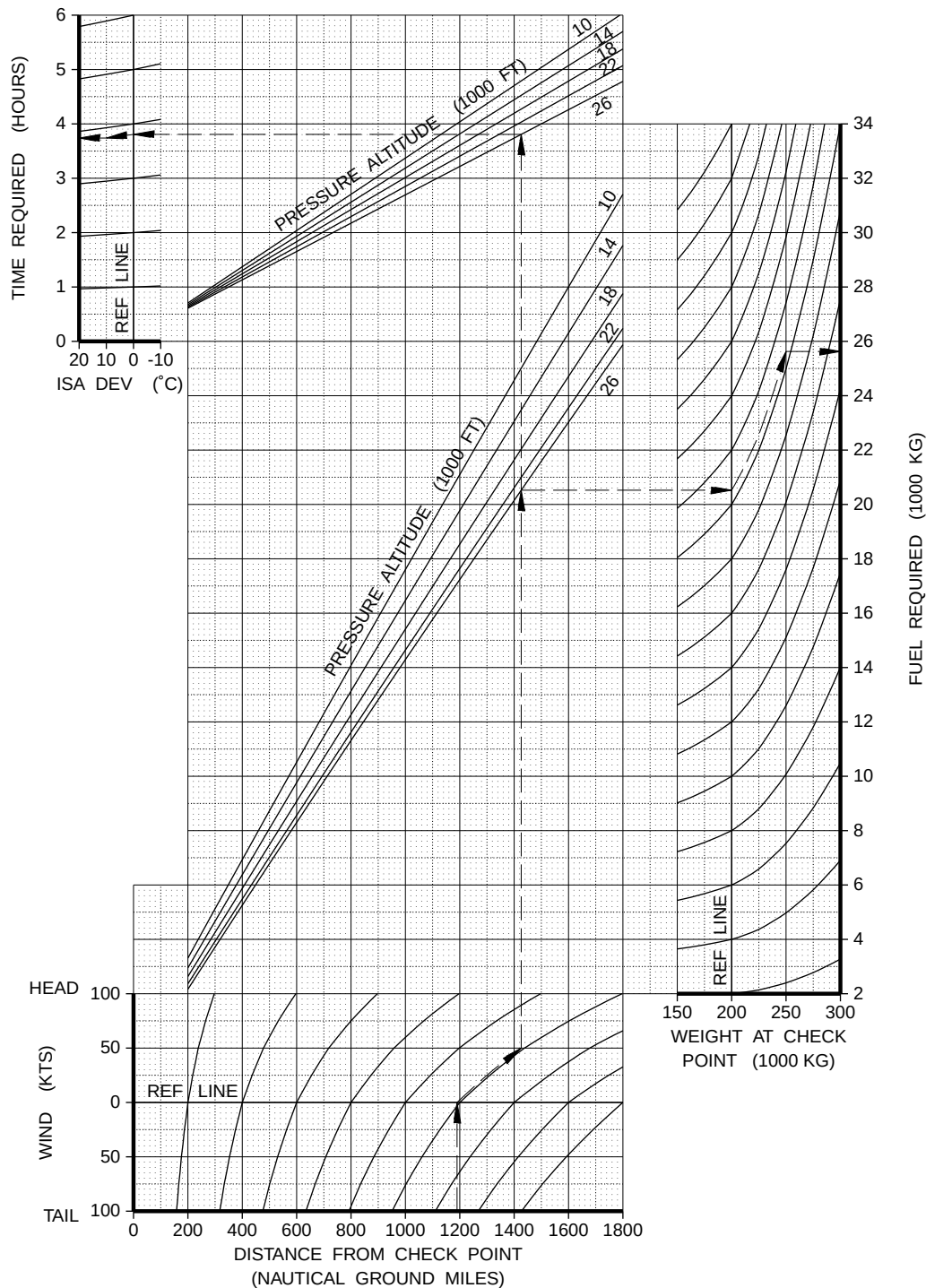


ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Diversion Fuel and Time

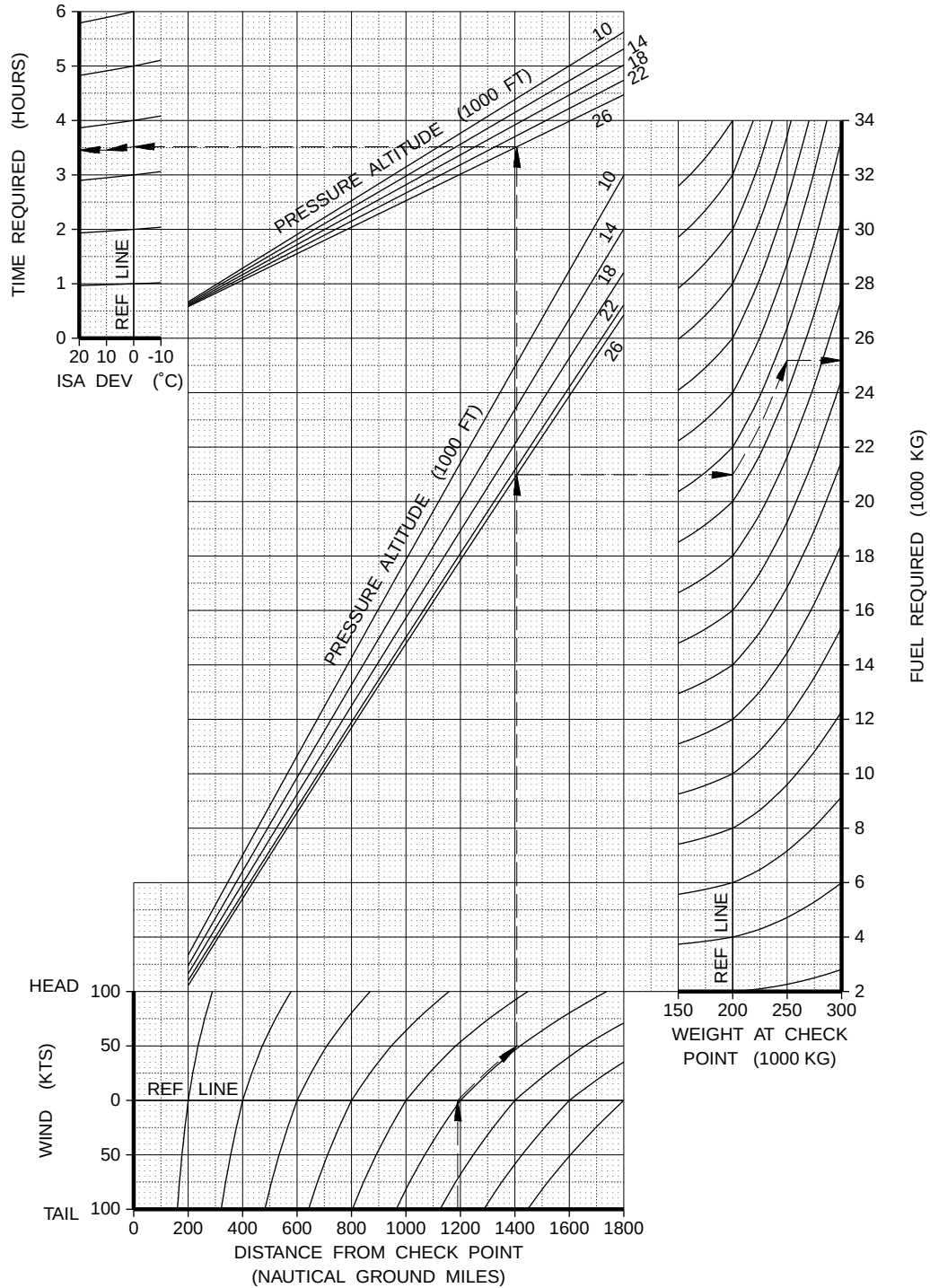
Based on 260/250 descent and includes APU fuel burn



ENGINE INOP MAX CONTINUOUS THRUST

280 KIAS Diversion Fuel and Time

Based on 280/250 descent and includes APU fuel burn

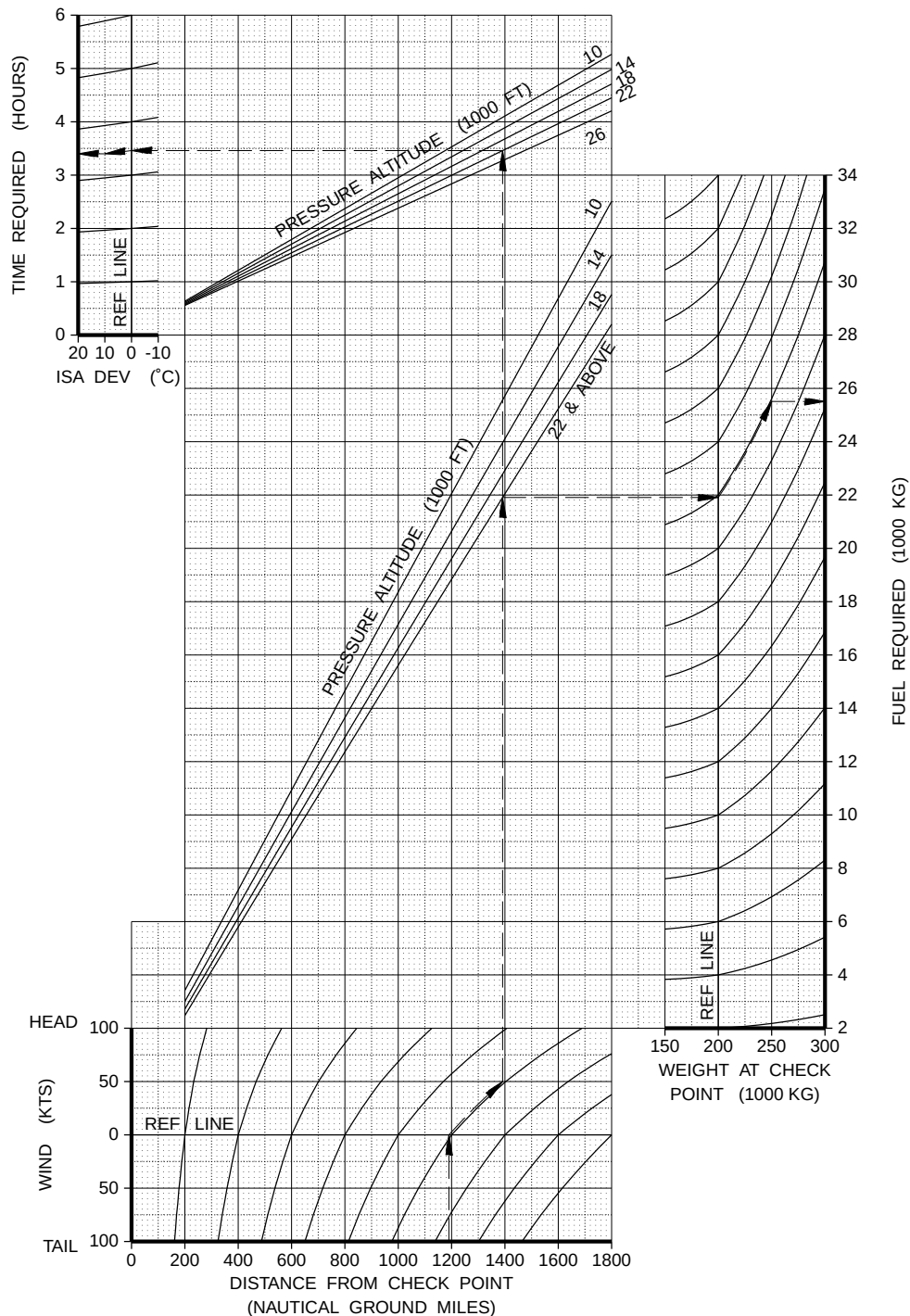


ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Diversion Fuel and Time

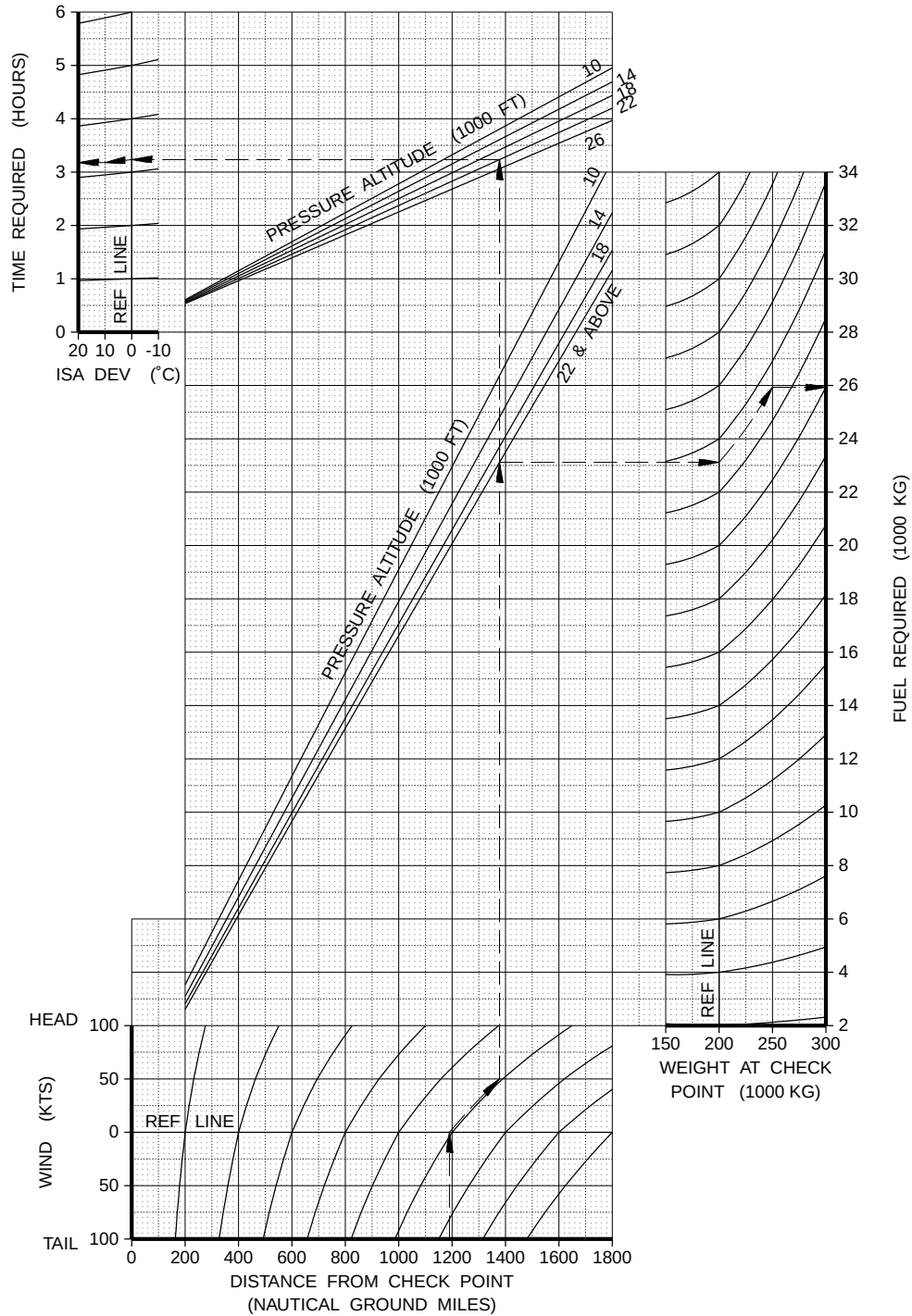
Based on 300/250 descent and includes APU fuel burn



ENGINE INOP MAX CONTINUOUS THRUST

320 KIAS Diversion Fuel and Time

Based on 320/250 descent and includes APU fuel burn





ENGINE INOP

MAX CONTINUOUS THRUST

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)								
		300	280	260	240	220	200	180	160	140
30000	%N1							99.2	93.3	90.2
	KIAS							227	209	209
	FF/ENG							5280	4330	3850
25000	%N1					99.0	94.3	90.9	87.8	85.1
	KIAS					247	225	209	209	209
	FF/ENG					6350	5340	4610	4140	3730
20000	%N1			98.1	94.8	92.0	89.0	85.9	82.8	80.1
	KIAS			262	242	224	215	209	209	209
	FF/ENG			7260	6380	5660	5060	4510	4180	3830
15000	%N1	96.9	94.6	92.3	89.8	87.0	84.0	81.0	78.3	75.8
	KIAS	272	256	240	229	221	215	209	209	209
	FF/ENG	8150	7410	6760	6150	5570	5050	4560	4130	3840
10000	%N1	92.0	89.8	87.4	84.7	82.0	79.2	76.4	73.6	71.0
	KIAS	255	247	238	228	221	215	209	209	209
	FF/ENG	7760	7170	6620	6090	5550	5060	4610	4210	3940
5000	%N1	87.0	84.8	82.6	80.2	77.7	75.1	72.3	69.6	67.2
	KIAS	254	246	237	228	221	215	209	209	209
	FF/ENG	7710	7180	6640	6100	5580	5110	4680	4330	4070
1500	%N1	83.8	81.8	79.7	77.4	74.9	72.3	69.6	67.0	64.6
	KIAS	254	245	236	228	221	215	209	209	209
	FF/ENG	7940	7370	6830	6310	5770	5240	4730	4320	4050

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

NON-STANDARD CONFIGURATION

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Intentionally
Blank

Gear Down

Introduction

This section contains performance data for airplane operation with landing gear extended for all phases of flight. 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 10°C.

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.

Obstacle Limit

Obstacle clearance charts are provided for each certified takeoff flap setting based on normal air conditioning operation. 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 and can account for air conditioning packs off. 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 correct for OAT as necessary. Repeat this procedure to correct for airport pressure altitude and wind, then continue vertically to read obstacle limit weight.

Net Level Off Weight

This chart is used to determine the dispatch maximum weight for terrain clearance based on the Approved Flight Manual net engine inoperative, gear down performance at speed for optimum climb gradient. Refer to Chapter 2 text for description of net level off weight 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 enroute terrain clearance. Data is based on gear down net performance, Max Continuous thrust following engine failure and level flight deceleration to optimum driftdown speed (speed for optimum climb gradient). Refer to Chapter 2 for description of chart usage.

Long Range Cruise Trip Fuel and Time

A Long Range Cruise Trip Fuel and Time 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.

All Engines

Long Range Cruise Altitude Capability

Long Range Cruise altitude capability is provided at Max Climb thrust with 300 ft/min residual rate of climb.

220 KIAS Max Climb %N1

Max Climb %N1 based on normal air conditioning bleed is shown for a 220 KIAS climb schedule which approximates economy climb and turbulent air penetration speed, VREF 30+80 KIAS with the landing gear extended. Max Climb %N1 may be read directly from the table for the desired pressure altitude and TAT.

Long Range Cruise Table

LRC 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

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 VREF 30+80 KIAS and straight in approach.

Holding

%N1 required, ISA and fuel flow with gear down are shown as described in Chapter 3 with a minimum maneuver speed of VREF30+80 KIAS for Flaps Up and VREF30+60 for Flaps 1.

Engine Inoperative

Driftdown/LRC Cruise Range Capability

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

Long Range Cruise Altitude Capability

Altitude capability is provided in the same format as the gear up data shown in Chapter 3 for Max Climb Thrust and Long Range Cruise speed with 300 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+80 KIAS.

Alternate Mode EEC

No takeoff speed adjustments or other performance adjustments are required for operation of EEC in the ALTERNATE mode. Power setting adjustments, if required, are provided with the applicable power setting table.

GEAR DOWN

Takeoff Climb Limit

Flaps 5

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	203.1	200.6	192.3	187.3	183.2	179.3	175.8	172.1	164.9	154.9		
52	126	207.3	204.6	196.2	188.1	183.2	179.2	175.7	172.0	167.4	160.2	145.3	
50	122	211.6	208.7	200.2	191.9	184.0	179.2	175.7	172.0	167.4	162.2	151.4	145.3
48	118	215.9	212.9	204.3	195.8	187.7	180.0	175.6	171.9	167.3	162.1	155.5	151.3
46	115	220.2	217.4	208.8	200.3	191.8	183.9	176.6	171.9	167.2	162.0	155.4	152.4
44	111	224.6	222.0	213.3	204.7	196.2	188.0	180.5	172.8	167.2	161.9	155.4	152.3
42	108	229.2	226.6	218.0	209.1	200.6	192.3	184.5	176.6	168.2	161.9	155.3	152.2
40	104	234.0	231.5	222.6	213.8	204.9	196.5	188.6	180.4	171.9	162.8	155.2	152.1
38	100	239.0	236.6	227.2	218.2	209.4	200.8	192.7	184.4	175.6	166.5	156.2	152.0
36	97	243.9	241.3	231.8	222.7	213.7	205.0	196.8	188.4	179.4	170.1	159.8	155.7
34	93	248.9	245.8	236.3	227.0	218.0	209.3	200.8	192.4	183.2	173.8	163.4	159.3
32	90	254.0	250.8	241.0	231.7	222.5	213.6	205.2	196.4	187.2	177.4	167.0	162.8
30	86	259.2	255.8	246.0	236.3	227.0	218.0	209.4	200.6	191.2	181.4	170.5	166.3
28	82	262.2	260.8	250.5	240.9	231.3	222.2	213.4	204.5	195.2	185.3	174.4	170.1
26	79	262.4	263.6	255.1	245.2	235.6	226.2	217.3	208.2	198.8	189.0	178.1	173.9
24	75	262.6	263.7	257.5	249.4	239.5	230.2	221.0	211.9	202.3	192.4	181.6	177.4
22	72	262.8	263.9	257.6	251.5	243.4	234.0	224.7	215.4	205.9	195.7	185.0	180.8
20	68	263.0	264.0	257.7	251.6	245.3	237.8	228.6	219.0	209.5	199.2	188.2	183.9
18	64	263.3	264.1	257.8	251.7	245.4	239.6	232.5	223.0	213.1	202.7	191.5	187.2
16	61	263.7	264.2	257.8	251.7	245.4	239.7	234.3	226.8	217.0	206.2	195.0	190.6
14	57	263.9	264.4	257.9	251.8	245.5	239.7	234.3	228.5	220.9	210.2	198.3	194.0
12	54	264.1	264.5	258.0	251.9	245.5	239.7	234.4	228.5	222.6	214.1	202.3	197.7
10	50	264.3	264.6	258.1	252.0	245.6	239.8	234.4	228.5	222.6	215.7	206.2	201.6
-40	-40	265.6	262.9	256.8	250.5	244.1	238.1	232.7	226.8	220.9	214.0	204.5	199.9

With engine bleed for packs off, increase weight by 700 kg.

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

With engine and wing anti-ice on, decrease weight by 3100 kg.

Flaps 15

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	203.1	200.6	192.3	187.4	183.3	179.3	175.8	170.7	164.8	155.0		
52	126	207.3	204.6	196.2	188.1	183.2	179.3	175.8	172.1	167.5	160.2	145.4	
50	122	211.6	208.8	200.2	192.0	184.0	179.2	175.7	172.0	167.4	162.2	151.5	145.4
48	118	215.9	212.9	204.3	195.9	187.8	180.0	175.7	171.9	167.3	162.1	155.5	151.3
46	115	220.2	217.5	208.8	200.3	191.9	184.0	176.6	171.9	167.3	162.1	155.5	152.5
44	111	224.6	222.0	213.3	204.7	196.3	188.0	180.5	172.8	167.2	162.0	155.4	152.4
42	108	229.3	226.6	218.0	209.2	200.6	192.3	184.5	176.6	168.2	161.9	155.3	152.3
40	104	234.0	231.6	222.6	213.8	204.9	196.6	188.7	180.5	171.9	162.9	155.3	152.2
38	100	239.0	236.6	227.2	218.3	209.4	200.8	192.7	184.5	175.6	166.5	156.2	152.1
36	97	244.0	241.3	231.9	222.7	213.8	205.1	196.8	188.4	179.4	170.1	159.8	155.8
34	93	248.9	245.8	236.3	227.1	218.0	209.3	200.9	192.4	183.2	173.8	163.4	159.3
32	90	254.1	250.9	241.1	231.7	222.5	213.6	205.2	196.5	187.3	177.4	167.0	162.9
30	86	259.3	255.9	246.0	236.4	227.0	218.0	209.4	200.7	191.3	181.4	170.6	166.4
28	82	262.2	260.9	250.6	241.0	231.3	222.2	213.5	204.5	195.2	185.3	174.4	170.1
26	79	262.4	262.7	255.2	245.2	235.7	226.2	217.3	208.3	198.9	189.0	178.1	173.9
24	75	262.6	262.8	257.6	249.5	239.6	230.3	221.0	211.9	202.3	192.5	181.7	177.4
22	72	262.8	263.0	257.6	251.6	243.5	234.1	224.8	215.5	205.9	195.8	185.0	180.8
20	68	263.0	263.1	257.7	251.7	245.4	237.9	228.7	219.1	209.5	199.2	188.2	184.0
18	64	263.3	263.3	257.8	251.7	245.5	239.7	232.6	223.0	213.1	202.7	191.6	187.2
16	61	263.7	263.5	257.9	251.8	245.5	239.7	234.4	226.9	217.1	206.2	195.0	190.6
14	57	264.0	263.7	258.0	251.8	245.5	239.8	234.4	228.6	220.9	210.3	198.4	194.0
12	54	264.2	263.8	258.1	251.9	245.6	239.8	234.4	228.6	222.6	214.2	202.4	197.7
10	50	264.4	264.0	258.2	252.0	245.6	239.8	234.4	228.6	222.6	215.7	206.3	201.7
-40	-40	265.6	263.0	256.9	250.5	244.1	238.3	232.9	227.1	221.1	214.2	204.8	200.2

With engine bleed for packs off, increase weight by 700 kg.

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

With engine and wing anti-ice on, decrease weight by 3100 kg.

GEAR DOWN

Takeoff Climb Limit

Flaps 20

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	203.1	200.6	192.3	187.4	183.3	179.4	175.7	169.6	163.8	155.0		
52	126	207.3	204.6	196.2	188.1	183.2	179.3	175.8	172.1	167.3	160.2	145.4	
50	122	211.7	208.8	200.2	192.0	184.0	179.2	175.7	172.0	167.4	162.2	151.5	145.4
48	118	215.9	213.0	204.3	195.9	187.8	180.1	175.7	172.0	167.4	162.2	155.6	151.4
46	115	220.3	217.5	208.8	200.3	191.9	184.0	176.6	171.9	167.3	162.1	155.5	152.5
44	111	224.6	222.0	213.4	204.8	196.3	188.1	180.6	172.8	167.2	162.0	155.4	152.4
42	108	229.3	226.7	218.0	209.2	200.6	192.4	184.5	176.6	168.2	161.9	155.3	152.3
40	104	234.0	231.6	222.6	213.8	205.0	196.6	188.7	180.5	171.9	162.9	155.3	152.2
38	100	239.0	236.6	227.2	218.3	209.4	200.8	192.8	184.5	175.6	166.5	156.2	152.1
36	97	244.0	241.4	231.9	222.7	213.8	205.1	196.8	188.4	179.5	170.2	159.8	155.8
34	93	248.9	245.9	236.4	227.1	218.0	209.3	200.9	192.4	183.2	173.8	163.4	159.3
32	90	254.1	250.9	241.1	231.8	222.5	213.7	205.2	196.5	187.3	177.5	167.0	162.9
30	86	259.3	255.9	246.0	236.4	227.1	218.1	209.4	200.7	191.3	181.5	170.6	166.4
28	82	261.7	260.6	250.6	241.0	231.4	222.3	213.5	204.6	195.2	185.3	174.4	170.2
26	79	261.9	260.7	255.2	245.3	235.7	226.3	217.3	208.3	198.9	189.0	178.1	173.9
24	75	262.1	260.9	257.6	249.5	239.6	230.3	221.1	212.0	202.4	192.5	181.7	177.4
22	72	262.3	261.0	257.7	251.6	243.5	234.1	224.8	215.5	205.9	195.8	185.0	180.8
20	68	262.4	261.2	257.8	251.7	245.4	237.9	228.7	219.1	209.5	199.2	188.2	184.0
18	64	262.6	261.3	257.9	251.8	245.5	239.7	232.6	223.1	213.1	202.7	191.6	187.2
16	61	262.9	261.5	257.9	251.8	245.5	239.8	234.2	226.9	217.1	206.3	195.0	190.6
14	57	263.1	261.7	258.0	251.9	245.6	239.8	234.2	227.9	221.0	210.3	198.4	194.0
12	54	263.2	261.9	258.2	252.0	245.6	239.8	234.3	227.9	221.4	214.2	202.4	197.7
10	50	263.4	262.0	258.2	252.1	245.7	239.9	234.3	227.9	221.4	214.6	206.3	201.7
-40	-40	264.1	262.6	256.9	250.6	244.2	238.4	232.8	226.4	219.9	213.1	204.8	200.2

With engine bleed for packs off, increase weight by 700 kg.

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

With engine and wing anti-ice on, decrease weight by 3100 kg.

Landing Climb Limit

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

AIRPORT OAT		LANDING CLIMB LIMIT WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	221.2	214.5	207.4									
52	126	226.6	219.6	212.6	204.7								
50	122	232.2	225.0	217.7	209.7	201.9							
48	118	237.8	230.4	223.1	214.8	206.8	199.3						
46	115	243.3	235.8	228.3	220.0	211.7	203.9	196.4					
44	111	248.6	241.3	233.6	225.1	216.8	208.5	200.8	193.2				
42	108	253.4	247.2	239.6	230.7	222.2	213.6	205.6	197.9	190.4			
40	104	258.2	252.6	245.9	236.4	227.8	218.8	210.3	202.7	195.1	187.1		
38	100	262.8	257.5	251.3	242.0	233.0	224.0	215.0	206.7	199.7	191.3	182.5	
36	97	267.3	262.1	256.4	246.8	238.2	228.5	219.8	210.8	203.1	195.4	185.4	181.0
34	93	271.9	266.3	260.9	250.9	242.2	232.6	223.7	214.9	206.5	198.5	188.4	183.9
32	90	272.1	270.6	264.8	255.0	245.5	236.3	227.0	218.5	209.9	201.4	191.4	186.8
30	86	272.3	270.8	268.9	258.8	249.1	239.7	230.5	221.9	213.4	204.4	194.2	189.6
28	82	272.6	271.0	269.1	262.4	252.7	243.0	233.9	225.3	216.5	207.6	197.0	192.4
26	79	272.8	271.2	269.2	262.5	256.2	246.2	237.1	228.8	220.1	210.7	200.1	195.3
24	75	273.0	271.4	269.4	262.7	256.3	249.1	240.1	231.8	223.7	214.4	203.3	198.4
22	72	273.2	271.6	269.6	262.8	256.4	249.3	242.7	234.1	226.1	217.6	206.6	201.6
20	68	273.4	271.8	269.7	262.9	256.5	249.4	242.8	236.1	228.1	220.0	209.7	204.8
18	64	273.6	272.0	269.9	263.1	256.7	249.5	242.8	236.2	229.9	221.7	212.0	207.5
16	61	273.9	272.2	270.0	263.2	256.8	249.6	242.9	236.2	229.9	223.1	213.4	209.0
14	57	274.1	272.4	270.2	263.3	256.9	249.7	243.0	236.3	230.0	223.1	214.7	210.3
12	54	274.3	272.6	270.4	263.5	257.0	249.7	243.0	236.3	230.0	223.1	214.7	210.7
10	50	274.5	272.7	270.5	263.6	257.1	249.8	243.1	236.4	230.0	223.1	214.7	210.8
-40	-40	275.5	273.6	271.2	264.2	257.7	250.3	243.3	236.6	230.1	223.1	214.7	210.8

With engine bleed for packs off, increase weight 1900 kg.

With engine and wing anti-ice on, decrease weight by 1900 kg.

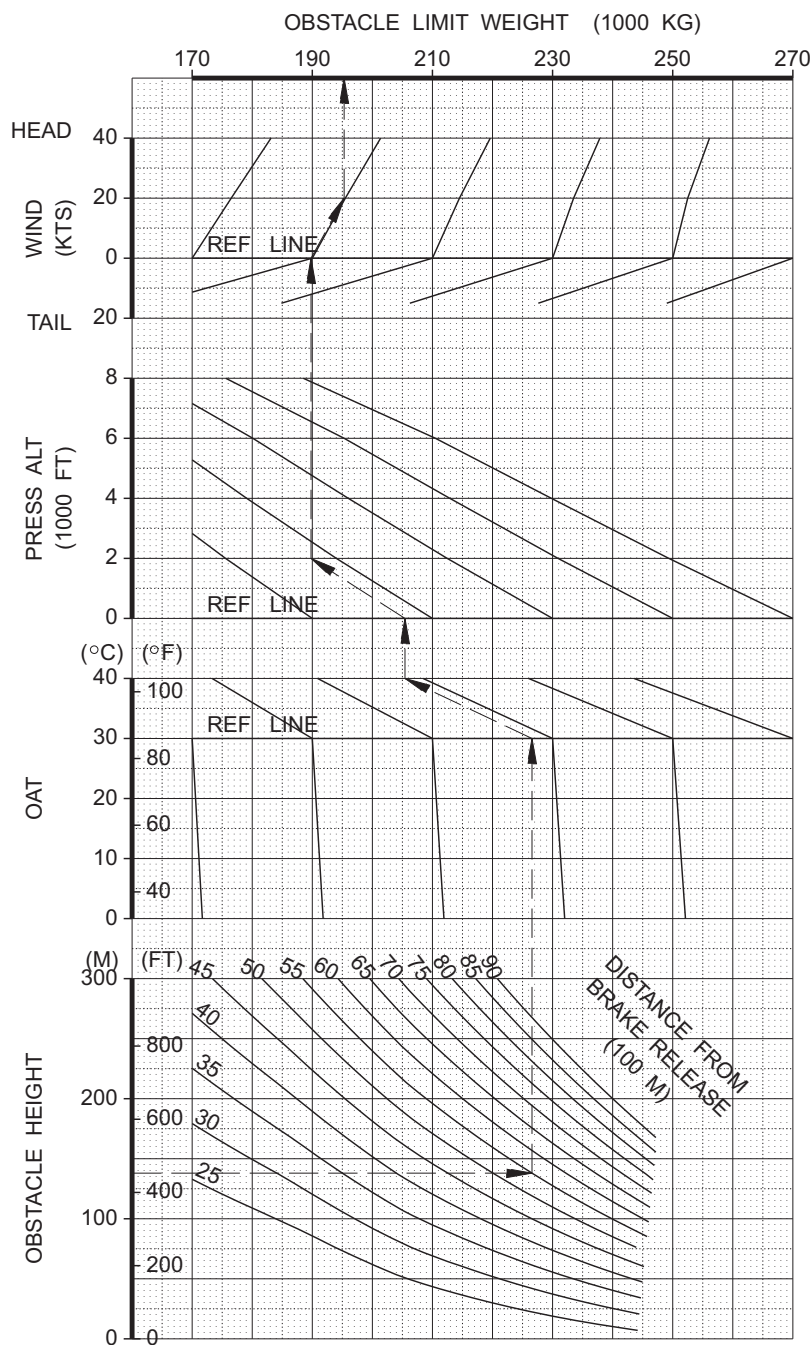
When operating in icing conditions during any part of the flight when forecast landing temperature is below 10°C, decrease weight by 27450 kg.

GEAR DOWN

Obstacle Limit

Flaps 5

Based on engine bleed for packs on, engine anti-ice off, and wing 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 650 kg

With engine anti-ice on, decrease weight by 2000 kg.

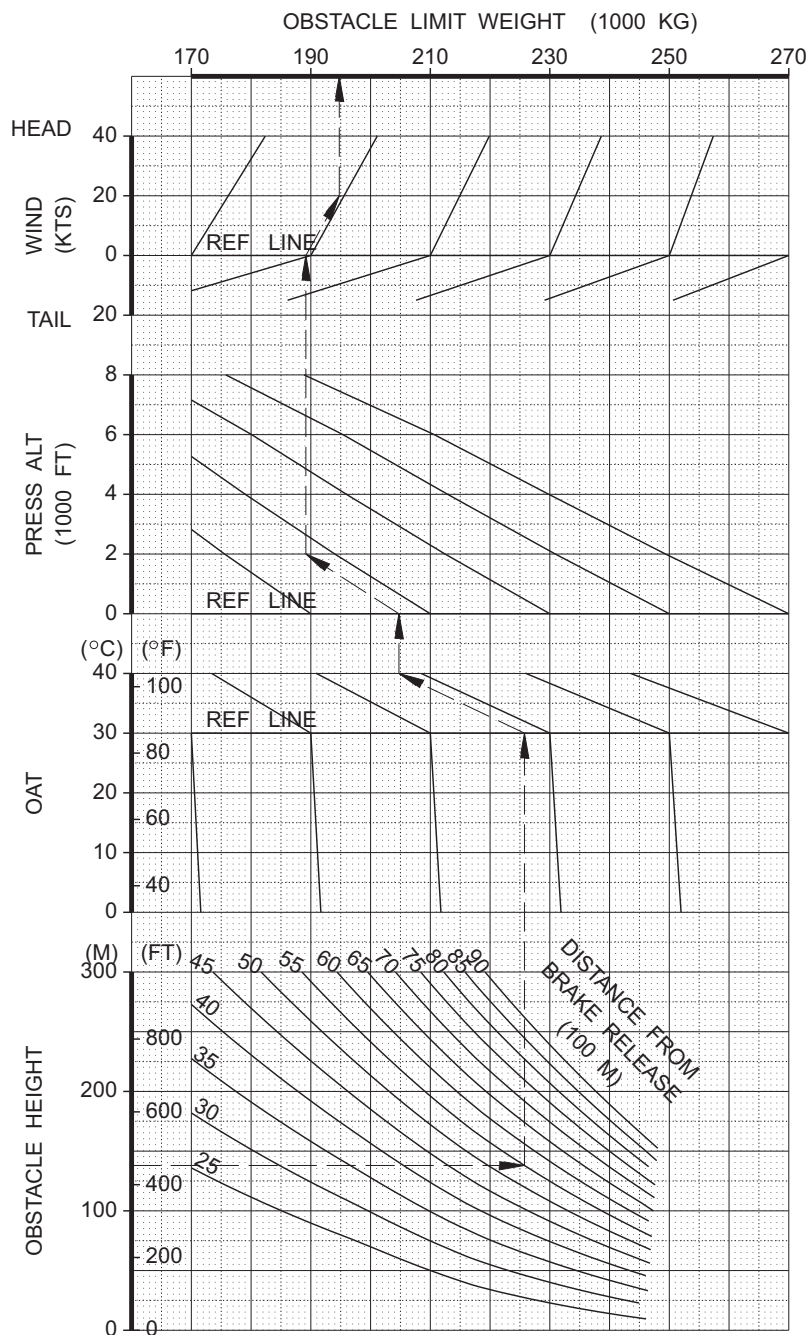
With engine and wing anti-ice on, decrease weight by 3150 kg.

GEAR DOWN

Obstacle Limit

Flaps 15

Based on engine bleed for packs on, engine anti-ice on or off, and wing 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 650 kg

With engine anti-ice on, decrease weight by 2000 kg.

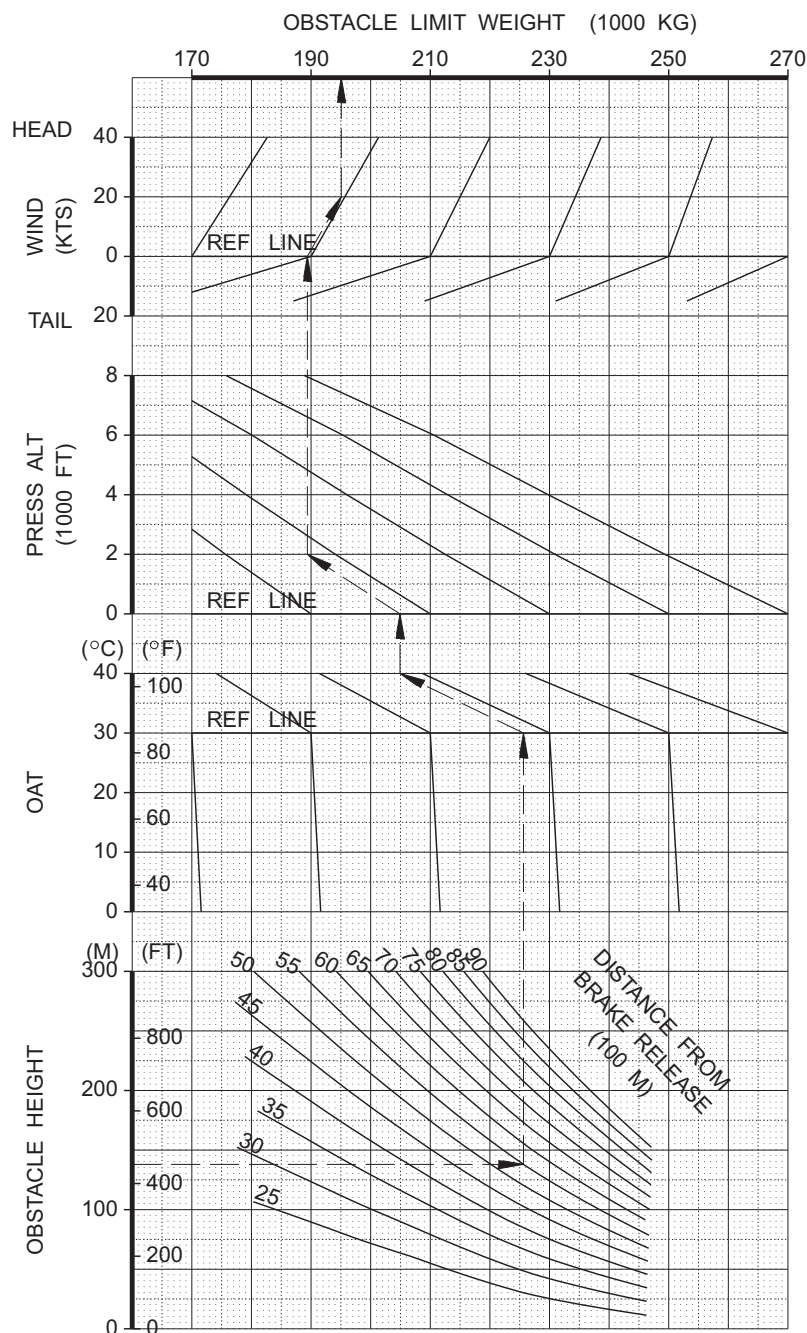
With engine and wing anti-ice on, decrease weight by 3150 kg.

GEAR DOWN

Obstacle Limit

Flaps 20

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



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

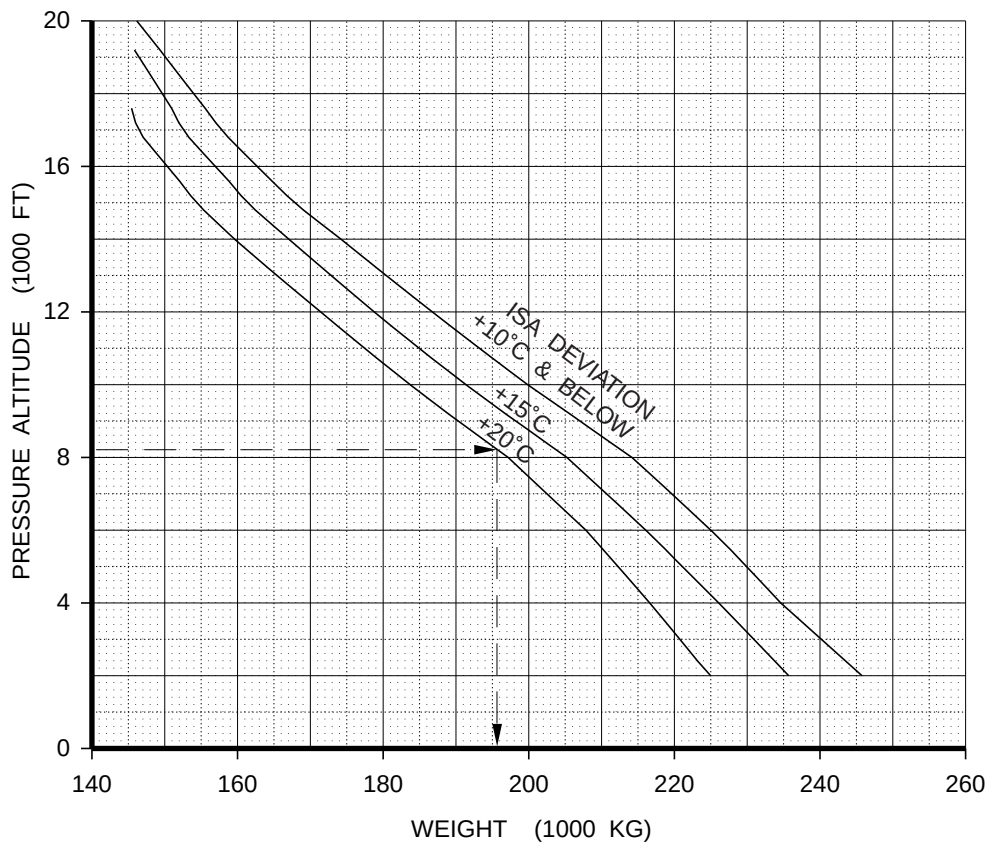
With engine bleed for packs off, increase weight by 650 kg

With engine anti-ice on, decrease weight by 2000 kg.

With engine and wing anti-ice on, decrease weight by 3150 kg.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Net Level Off Weight

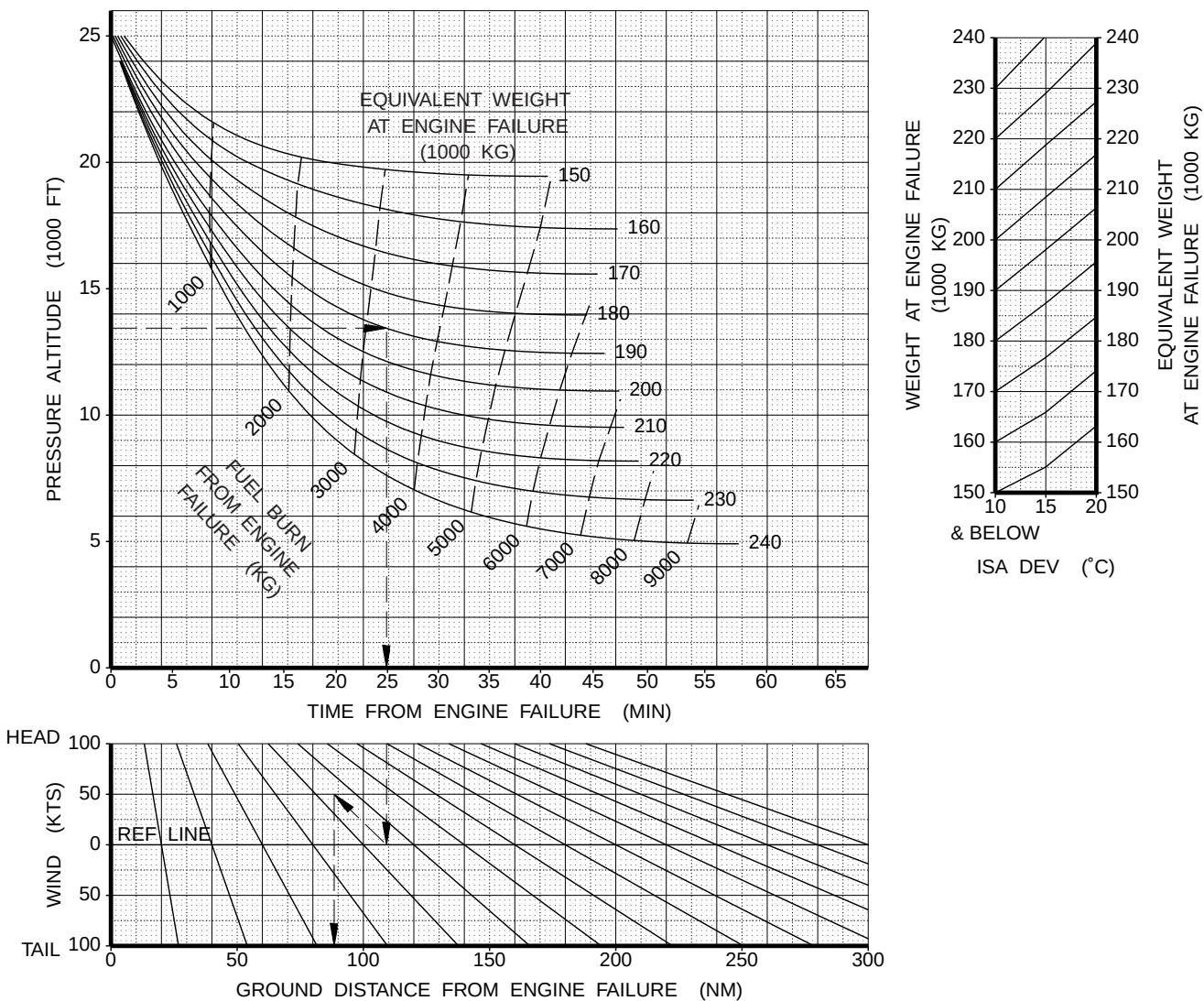


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
	4	6	8	10	12	14	16	18
ENGINE ONLY	-1.5	-1.2	-0.9	-0.6	-0.4	-0.5	-0.5	0.0
ENGINE AND WING	-2.8	-2.4	-2.2	-1.7	-1.5	-1.5	-1.4	-1.1

**GEAR DOWN
ENGINE INOP**
MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path
25000 FT and Above

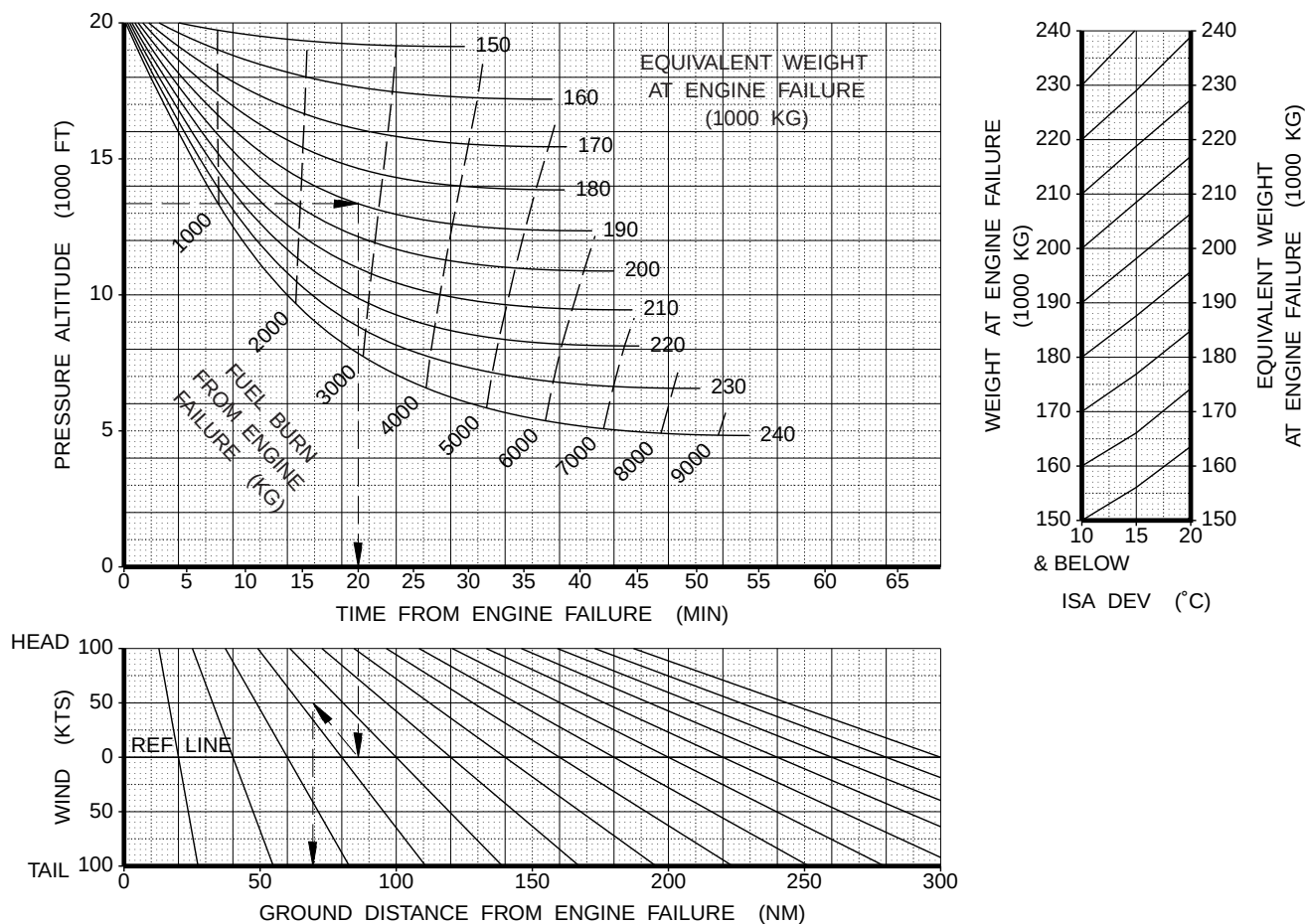


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
	4	6	8	10	12	14	16	18
ENGINE ONLY	1.5	1.2	0.9	0.6	0.4	0.5	0.5	0.0
ENGINE AND WING	2.8	2.4	2.2	1.7	1.5	1.5	1.4	1.1

**GEAR DOWN
ENGINE INOP**
MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path
Below 25000 FT

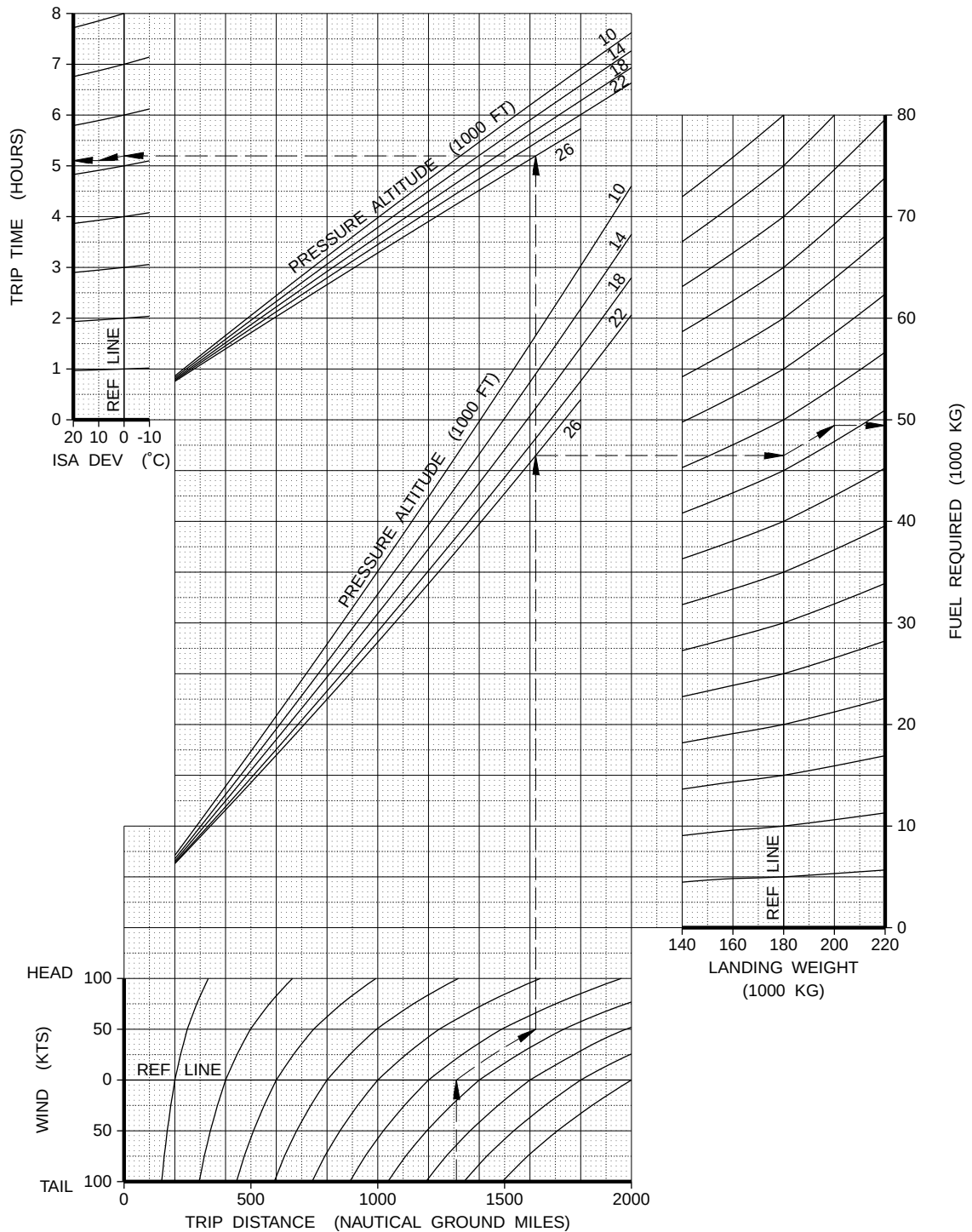


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
ENGINE ONLY	4	6	8	10	12	14	16	18
ENGINE AND WING	1.5	1.2	0.9	0.6	0.4	0.5	0.5	0.0
ENGINE AND WING	2.8	2.4	2.2	1.7	1.5	1.5	1.4	1.1

GEAR DOWN

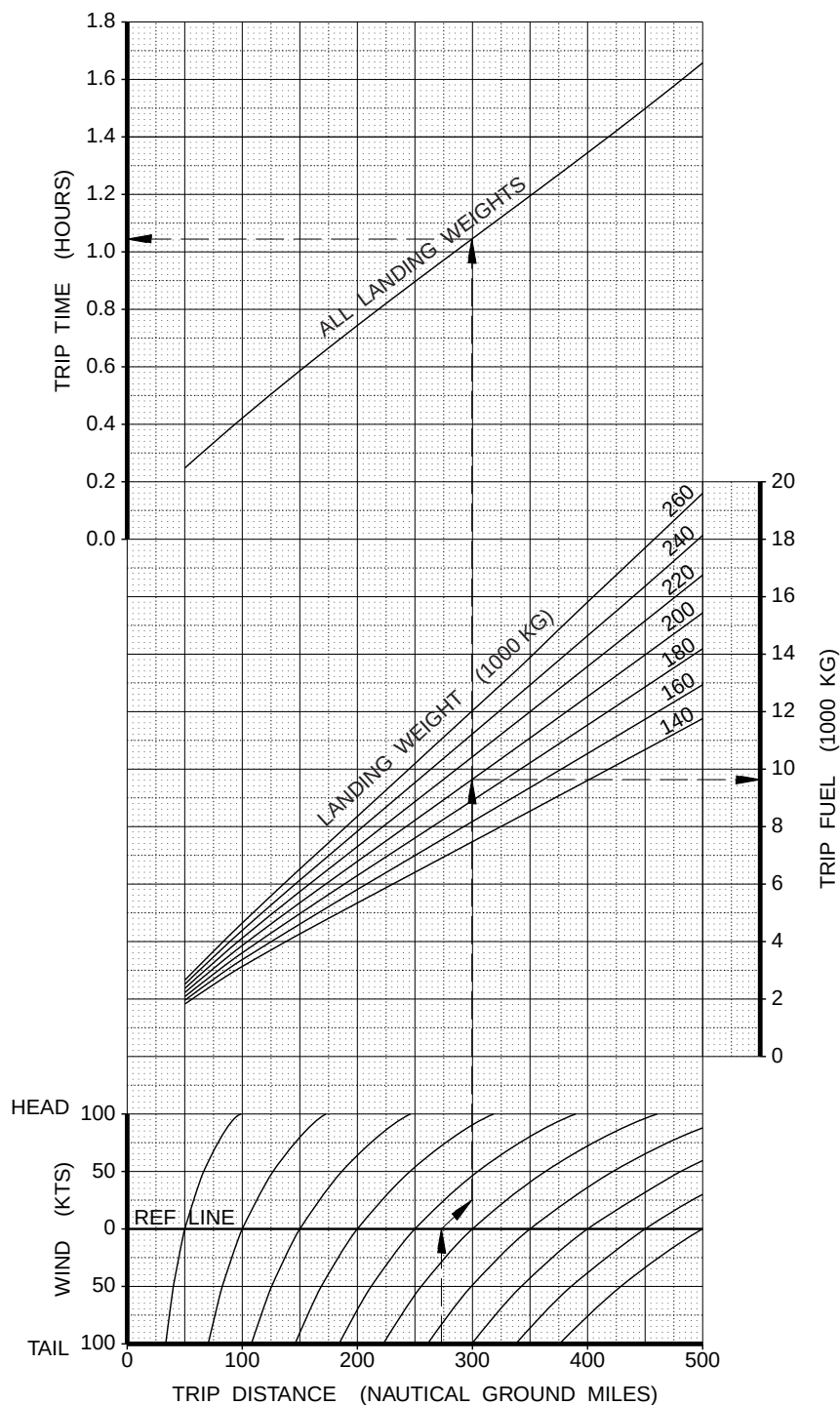
Long Range Cruise Trip Fuel and Time Based on VREF30+80 climb and descent



GEAR DOWN

Long Range Cruise Short Trip Fuel and Time

Based on VREF30+80 climb and descent at short trip cruise altitude





Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Altitude Capability
Max Climb Thrust, 300 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
300	15100	11400	9100
290	16600	13100	10400
280	18100	15000	12000
270	19400	16900	13500
260	20800	18700	15200
250	22400	20300	17300
240	24000	22000	19400
230	25400	23700	21400
220	26900	25400	23400
210	28300	27300	25400
200	29800	29100	27600
190	31300	31000	29800
180	32400	32300	31700
170	33500	33500	33200
160	34700	34600	34600
150	35900	35900	35900
140	37000	37100	37500

220 KIAS Max Climb %N1

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	89.5	89.9	92.2	93.3	94.7	95.5	97.0	98.3	99.5	100.8	102.2	103.9	105.5	107.0	108.1
50	90.3	90.0	91.5	92.6	94.0	95.1	96.2	97.6	98.7	100.0	101.5	103.1	104.7	106.2	107.3
45	91.4	91.0	90.8	91.9	93.3	94.3	95.5	96.8	98.0	99.2	100.7	102.3	103.9	105.3	106.4
40	92.5	92.1	92.5	91.6	92.5	93.6	94.7	96.0	97.2	98.5	99.9	101.5	103.1	104.5	105.6
35	93.5	93.3	93.2	92.9	92.7	92.8	94.0	95.3	96.4	97.7	99.1	100.7	102.2	103.7	104.7
30	93.9	95.0	94.3	94.3	93.7	93.7	93.7	94.5	95.6	96.9	98.3	99.8	101.4	102.8	103.9
25	93.1	96.5	95.4	95.8	94.7	94.6	94.7	94.9	94.9	96.1	97.5	99.0	100.6	102.0	103.0
20	92.3	96.6	96.3	96.6	95.8	95.6	95.6	95.8	95.9	96.0	96.6	98.2	99.7	101.1	102.2
15	91.5	95.7	97.2	97.2	96.8	96.7	96.6	96.7	96.8	96.9	97.3	97.8	98.9	100.2	101.3
10	90.7	94.9	96.7	97.7	97.8	97.6	97.5	97.4	97.5	97.6	98.0	98.5	99.1	99.7	100.4
5	89.9	94.1	95.8	96.8	97.9	98.5	98.3	98.1	98.2	98.3	98.7	99.1	99.6	100.2	100.7
0	89.1	93.2	94.9	96.0	97.0	98.0	98.9	98.8	98.8	98.9	99.4	99.9	100.2	100.7	101.5
-5	88.3	92.3	94.1	95.1	96.1	97.1	98.0	98.7	99.6	99.8	100.2	101.0	101.2	101.9	102.5
-10	87.5	91.5	93.2	94.2	95.2	96.2	97.0	97.7	98.9	100.5	101.0	101.8	102.5	103.0	103.4
-15	86.6	90.6	92.3	93.3	94.3	95.3	96.1	96.8	98.0	99.5	100.7	102.2	103.3	103.8	103.5
-20	85.8	89.7	91.4	92.4	93.4	94.3	95.2	95.9	97.0	98.5	99.7	101.2	103.1	103.1	103.0

Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	PRESSURE ALTITUDE (1000 FT)									
	0	5	10	15	20	25	30	35	40	43
ENGINE ONLY	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
ENGINE AND WING*	-0.3	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
ENGINE AND WING**	-0.3	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.4	-0.4	-0.4

*Dual bleed source and packs on or off.

**Single bleed source and both packs off.



GEAR DOWN

Long Range Cruise Table 35000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
35	%N1 MAX TAT KIAS MACH FF/ENG KTAS									
34	%N1 MAX TAT KIAS MACH FF/ENG KTAS									
33	%N1 MAX TAT KIAS MACH FF/ENG KTAS		PERFORMANCE THRUST LIMITED							
32	%N1 MAX TAT KIAS MACH FF/ENG KTAS									
31	%N1 MAX TAT KIAS MACH FF/ENG KTAS									
30	%N1 MAX TAT KIAS MACH FF/ENG KTAS									

GEAR DOWN

Long Range Cruise Table 35000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
35 (-39)	%N1								95.7	93.4
	MAX TAT								-12	
	KIAS								198	195
	MACH								.596	.587
	FF/ENG KTAS								3716 344	3460 339
34 (-37)	%N1							96.1	93.7	91.9
	MAX TAT							-15	-8	
	KIAS							201	198	195
	MACH							.592	.583	.575
	FF/ENG KTAS							3897 343	3625 338	3386 333
33 (-36)	%N1						96.5	94.0	92.2	90.7
	MAX TAT						-16	-8		
	KIAS						205	201	198	195
	MACH						.589	.579	.571	.562
	FF/ENG KTAS						4102 343	3798 337	3547 332	3329 327
32 (-34)	%N1					97.0	94.5	92.5	91.0	89.6
	MAX TAT					-15	-8	-3		
	KIAS					208	205	201	198	195
	MACH					.587	.577	.567	.558	.550
	FF/ENG KTAS					4318 343	4004 337	3722 331	3495 326	3294 321
31 (-32)	%N1				97.3	94.9	92.9	91.3	89.9	88.5
	MAX TAT				-15	-9	-4			
	KIAS				212	208	205	201	198	195
	MACH				.584	.574	.565	.555	.547	.539
	FF/ENG KTAS				4527 342	4214 337	3922 331	3669 326	3460 321	3270 316
30 (-30)	%N1			97.5	95.2	93.3	91.7	90.2	88.8	87.5
	MAX TAT			-18	-10	-4				
	KIAS			215	212	208	205	201	198	195
	MACH			.580	.571	.562	.553	.543	.535	.527
	FF/ENG KTAS			4724 342	4413 337	4126 331	3866 326	3630 320	3432 315	3253 311

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
35	90.8	91.9	93.0	94.1	95.1	96.2	97.2	98.2	99.3	100.3	101.2	100.8	99.5	98.7
34	90.8	91.9	92.9	94.0	95.1	96.1	97.2	98.2	99.2	100.1	100.6	100.5	99.3	98.5
33	90.7	91.8	92.9	94.0	95.1	96.1	97.1	98.2	99.2	100.2	100.4	100.1	99.0	98.3
32	90.9	92.0	93.0	94.1	95.2	96.2	97.3	98.3	99.3	100.4	100.6	100.0	98.9	98.1
31	90.9	92.0	93.0	94.1	95.2	96.2	97.3	98.3	99.3	100.2	100.4	99.8	98.7	97.9
30	90.1	91.2	92.2	93.3	94.4	95.4	96.4	97.5	98.5	99.5	99.8	99.4	98.6	97.7

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



GEAR DOWN

Long Range Cruise Table

29000 FT to 24000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
29	%N1									
	MAX TAT									
	KIAS									
	MACH									
	FF/ENG									
28	KTAS									
	%N1									
	MAX TAT									
	KIAS									
	MACH									
27 (-24)	FF/ENG									
	KTAS									
	%N1									95.8
	MAX TAT									-12
	KIAS									222
26 (-22)	MACH									.562
	FF/ENG									5006
	KTAS									335
	%N1								96.1	94.4
	MAX TAT								-11	-6
25 (-20)	KIAS								227	223
	MACH								.561	.552
	FF/ENG								5240	4929
	KTAS								336	331
	%N1								94.7	93.3
24 (-18)	MAX TAT								-7	-2
	KIAS								228	224
	MACH								.552	.543
	FF/ENG								5167	4879
	KTAS								332	327
24 (-18)	%N1							95.1	93.7	92.3
	MAX TAT							-6	-2	2
	KIAS							232	228	224
	MACH							.552	.543	.534
	FF/ENG							5408	5119	4844
24 (-18)	KTAS							333	328	323

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
27	90.2	91.2	92.2	93.2	94.3	95.3	96.2	97.2	98.2	98.2	97.6	97.0	96.2	95.4
26	89.5	90.5	91.6	92.6	93.6	94.6	95.5	96.5	97.5	98.1	97.3	96.7	96.0	95.1
25	89.1	90.1	91.2	92.2	93.2	94.1	95.1	96.1	97.0	98.0	97.2	96.4	95.7	94.9
24	88.4	89.5	90.5	91.5	92.4	93.4	94.4	95.3	96.3	97.2	97.2	96.4	95.7	94.8

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
29000 FT to 24000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
29 (-29)	%N1			95.4	93.6	92.1	90.6	89.1	87.8	86.4
	MAX TAT			-10	-5	0				
	KIAS			215	212	208	205	201	198	195
	MACH			.568	.560	.551	.541	.532	.524	.516
	FF/ENG KTAS			4609 336	4327 331	4066 326	3821 320	3600 315	3414 310	3237 305
28 (-27)	%N1		95.6	93.9	92.4	91.0	89.5	88.1	86.7	85.4
	MAX TAT		-11	-5	-1					
	KIAS		219	215	212	208	205	201	198	195
	MACH		.565	.557	.548	.539	.530	.521	.513	.505
	FF/ENG KTAS		4809 336	4526 331	4261 326	4015 321	3787 315	3580 310	3451 305	3273 300
27 (-25)	%N1	95.8	94.1	92.6	91.3	89.9	88.5	87.1	85.7	84.4
	MAX TAT	-12	-6	-1	3					
	KIAS	222	219	215	212	208	205	201	198	195
	MACH	.562	.554	.545	.537	.528	.519	.510	.502	.495
	FF/ENG KTAS	5006 335	4721 330	4452 325	4204 320	3977 315	3764 310	3558 304	3429 300	3256 295
26 (-24)	%N1	94.4	92.9	91.5	90.2	88.8	87.4	86.0	84.8	83.5
	MAX TAT	-6	-1	3	7					
	KIAS	223	219	215	212	208	205	201	198	195
	MACH	.552	.542	.534	.526	.517	.508	.499	.492	.485
	FF/ENG KTAS	4929 331	4644 325	4393 320	4163 315	3949 310	3739 305	3533 299	3412 295	3249 290
25 (-22)	%N1	93.3	91.8	90.4	89.1	87.8	86.4	85.1	83.8	82.5
	MAX TAT	-2	2	7						
	KIAS	224	220	215	212	208	205	201	198	195
	MACH	.543	.533	.523	.515	.507	.498	.489	.482	.475
	FF/ENG KTAS	4879 327	4607 321	4350 315	4133 310	3924 305	3714 300	3516 294	3406 290	3255 286
24 (-21)	%N1	92.3	90.9	89.5	88.1	86.8	85.5	84.2	82.8	81.5
	MAX TAT	2	6	10						
	KIAS	224	220	216	212	208	205	201	198	195
	MACH	.534	.524	.514	.505	.497	.488	.479	.472	.465
	FF/ENG KTAS	4844 323	4584 317	4339 311	4107 305	3900 300	3696 295	3569 290	3412 285	3268 281

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
29	91.5	92.5	93.6	94.6	95.6	96.7	97.7	98.7	99.2	98.9	98.3	97.4	96.7	96.2
28	90.8	91.9	92.9	93.9	94.9	95.9	96.9	97.9	98.9	98.5	97.9	97.2	96.5	95.8
27	90.2	91.2	92.2	93.2	94.3	95.3	96.2	97.2	98.2	98.2	97.6	97.0	96.2	95.4
26	89.5	90.5	91.6	92.6	93.6	94.6	95.5	96.5	97.5	98.1	97.3	96.7	96.0	95.1
25	89.1	90.1	91.2	92.2	93.2	94.1	95.1	96.1	97.0	98.0	97.2	96.4	95.7	94.9
24	88.4	89.5	90.5	91.5	92.4	93.4	94.4	95.3	96.3	97.2	97.2	96.4	95.7	94.8

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.3.



GEAR DOWN

Long Range Cruise Table

23000 FT to 18000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
23 (-17)	%N1						95.4	94.0	92.7	91.4
	MAX TAT						-6	-2	2	6
	KIAS						237	233	229	225
	MACH						.551	.543	.534	.525
	FF/ENG						5647	5359	5084	4821
	KTAS						335	329	324	319
22 (-15)	%N1						94.3	93.1	91.8	90.4
	MAX TAT						-2	2	6	10
	KIAS						238	234	230	226
	MACH						.542	.534	.525	.516
	FF/ENG						5600	5328	5063	4811
	KTAS						331	325	320	315
21 (-13)	%N1					94.6	93.4	92.1	90.9	89.6
	MAX TAT					-1	3	6	10	14
	KIAS					243	239	235	231	227
	MACH					.542	.534	.525	.517	.508
	FF/ENG					5842	5574	5310	5055	4808
	KTAS					331	327	321	316	311
20 (-11)	%N1					93.6	92.4	91.3	90.0	88.7
	MAX TAT					3	6	10	14	17
	KIAS					243	240	236	232	228
	MACH					.533	.525	.517	.508	.500
	FF/ENG					5819	5557	5302	5052	4809
	KTAS					327	323	318	312	307
19 (-9)	%N1				93.8	92.7	91.5	90.4	89.1	87.8
	MAX TAT				4	7	10	13	17	
	KIAS				248	244	241	237	233	228
	MACH				.532	.525	.517	.508	.500	.491
	FF/ENG				6062	5801	5546	5295	5050	4815
	KTAS				328	324	319	314	308	303
18 (-8)	%N1			93.9	92.9	91.8	90.7	89.4	88.2	86.9
	MAX TAT			5	8	11	14	17	20	
	KIAS			253	249	245	241	237	233	229
	MACH			.531	.524	.516	.508	.500	.492	.483
	FF/ENG			6303	6042	5786	5536	5291	5055	4823
	KTAS			329	324	320	315	310	305	299

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
23	89.8	90.8	91.8	92.8	93.7	94.7	95.6	96.5	97.3	96.3	95.6	94.8	94.0	93.2
22	89.3	90.3	91.3	92.2	93.2	94.1	95.1	96.0	96.9	96.3	95.6	94.8	93.9	93.1
21	88.7	89.7	90.6	91.6	92.5	93.5	94.4	95.3	96.2	96.2	95.4	94.7	93.8	92.9
20	88.2	89.2	90.1	91.1	92.0	93.0	93.9	94.8	95.7	95.9	95.2	94.5	93.7	92.7
19	87.8	88.7	89.7	90.6	91.6	92.5	93.4	94.3	95.2	96.1	95.3	94.5	93.6	92.6
18	87.4	88.3	89.3	90.2	91.1	92.0	93.0	93.9	94.8	95.6	95.5	94.6	93.5	92.5

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
23000 FT to 18000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
23 (-19)	%N1	91.4	90.0	88.6	87.2	85.9	84.6	83.1	81.8	80.5
	MAX TAT	6	10							
	KIAS	225	221	217	212	208	205	201	198	195
	MACH	.525	.516	.506	.496	.487	.478	.470	.462	.456
	FF/ENG	4821	4572	4332	4096	3881	3751	3575	3427	3285
	KTAS	319	313	307	301	295	290	285	281	276
22 (-17)	%N1	90.4	89.1	87.7	86.3	84.9	83.5	82.1	80.8	79.5
	MAX TAT	10	14							
	KIAS	226	222	218	213	208	205	201	198	195
	MACH	.516	.507	.497	.487	.477	.469	.460	.453	.446
	FF/ENG	4811	4567	4329	4097	3940	3759	3592	3445	3298
	KTAS	315	309	303	297	291	286	280	276	272
21 (-16)	%N1	89.6	88.2	86.9	85.5	83.9	82.4	81.0	79.7	78.4
	MAX TAT	14								
	KIAS	227	223	218	214	209	205	201	198	195
	MACH	.508	.499	.489	.479	.468	.459	.451	.444	.437
	FF/ENG	4808	4568	4335	4109	3961	3776	3609	3455	3303
	KTAS	311	305	299	293	287	281	276	272	268
20 (-14)	%N1	88.7	87.4	86.0	84.5	82.9	81.3	79.9	78.6	77.3
	MAX TAT	17								
	KIAS	228	223	219	214	209	205	201	198	195
	MACH	.500	.490	.481	.471	.460	.450	.442	.435	.429
	FF/ENG	4809	4576	4347	4127	3986	3790	3616	3456	3302
	KTAS	307	301	295	289	283	276	272	267	263
19 (-12)	%N1	87.8	86.5	85.0	83.5	81.9	80.3	78.9	77.7	76.4
	MAX TAT									
	KIAS	228	224	219	215	210	205	201	198	195
	MACH	.491	.482	.473	.463	.452	.441	.433	.427	.420
	FF/ENG	4815	4585	4361	4146	4007	3795	3617	3455	3301
	KTAS	303	297	292	285	279	272	267	263	259
18 (-11)	%N1	86.9	85.5	84.1	82.6	81.0	79.4	78.0	76.8	75.5
	MAX TAT									
	KIAS	229	225	220	215	210	205	201	198	195
	MACH	.483	.474	.465	.454	.444	.433	.425	.418	.412
	FF/ENG	4823	4597	4379	4166	3950	3799	3616	3455	3302
	KTAS	299	294	288	281	275	268	263	259	255

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
23	89.8	90.8	91.8	92.8	93.7	94.7	95.6	96.5	97.3	96.3	95.6	94.8	94.0	93.2
22	89.3	90.3	91.3	92.2	93.2	94.1	95.1	96.0	96.9	96.3	95.6	94.8	93.9	93.1
21	88.7	89.7	90.6	91.6	92.5	93.5	94.4	95.3	96.2	96.2	95.4	94.7	93.8	92.9
20	88.2	89.2	90.1	91.1	92.0	93.0	93.9	94.8	95.7	95.9	95.2	94.5	93.7	92.7
19	87.8	88.7	89.7	90.6	91.6	92.5	93.4	94.3	95.2	96.1	95.3	94.5	93.6	92.6
18	87.4	88.3	89.3	90.2	91.1	92.0	93.0	93.9	94.8	95.6	95.5	94.6	93.5	92.5

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.3.



GEAR DOWN

Long Range Cruise Table

17000 FT to 12000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
17 (-6)	%N1		94.1	93.0	92.0	90.9	89.7	88.5	87.3	86.0
	MAX TAT		6	9	11	14	17	20	23	
	KIAS		257	253	250	246	242	238	234	230
	MACH		.530	.523	.516	.508	.500	.492	.484	.475
	FF/ENG		6542	6281	6025	5775	5531	5295	5062	4834
	KTAS		329	325	320	316	311	306	301	295
16 (-4)	%N1		93.2	92.1	91.1	90.0	88.9	87.7	86.4	85.1
	MAX TAT		10	12	15	18	20	23		
	KIAS		258	254	251	247	243	239	235	230
	MACH		.522	.515	.507	.500	.492	.484	.476	.467
	FF/ENG		6519	6264	6014	5770	5535	5302	5073	4850
	KTAS		326	321	317	312	307	302	297	292
15 (-2)	%N1	93.3	92.3	91.3	90.2	89.1	88.0	86.8	85.5	84.2
	MAX TAT	10	13	15	18	21	24	27		
	KIAS	262	259	255	251	248	244	240	235	231
	MACH	.520	.514	.507	.499	.492	.484	.476	.468	.459
	FF/ENG	6759	6502	6252	6009	5774	5542	5312	5087	4866
	KTAS	326	322	317	313	308	303	298	293	288
14 (-1)	%N1	92.4	91.4	90.4	89.3	88.2	87.0	85.8	84.5	83.2
	MAX TAT	14	16	19	21	24	27			
	KIAS	263	260	256	252	248	244	240	236	231
	MACH	.512	.506	.499	.491	.484	.476	.468	.460	.451
	FF/ENG	6741	6491	6248	6012	5779	5550	5324	5100	4877
	KTAS	322	318	314	309	304	300	295	289	284
13 (1)	%N1	91.4	90.4	89.4	88.4	87.2	86.0	84.8	83.5	82.2
	MAX TAT	17	20	22	25	28				
	KIAS	264	260	257	253	249	245	241	236	232
	MACH	.504	.498	.491	.484	.476	.469	.461	.452	.444
	FF/ENG	6728	6485	6248	6014	5783	5558	5334	5110	4884
	KTAS	318	314	310	305	301	296	291	285	280
12 (3)	%N1	90.6	89.6	88.5	87.5	86.3	85.1	83.8	82.6	81.3
	MAX TAT	21	23	26	29	32				
	KIAS	265	261	257	254	250	245	241	237	232
	MACH	.497	.490	.483	.476	.469	.461	.453	.445	.436
	FF/ENG	6722	6483	6247	6016	5790	5567	5344	5118	4890
	KTAS	315	310	306	302	297	292	287	282	276

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
17	88.7	89.7	90.6	91.5	92.4	93.3	94.2	95.1	95.5	94.6	93.6	92.5	91.4	90.5
16	88.3	89.2	90.2	91.1	92.0	92.9	93.7	94.6	95.5	94.6	93.6	92.4	91.4	90.4
15	87.8	88.7	89.6	90.5	91.4	92.3	93.2	94.1	94.9	94.6	93.6	92.4	91.3	90.3
14	87.2	88.1	89.1	90.0	90.8	91.7	92.6	93.4	94.3	94.7	93.7	92.5	91.4	90.4
13	86.7	87.6	88.5	89.4	90.2	91.1	92.0	92.8	93.7	94.5	94.0	93.0	91.8	90.5
12	86.1	87.0	87.9	88.8	89.7	90.5	91.4	92.3	93.1	93.9	94.2	93.3	92.2	90.9

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.3.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
17000 FT to 12000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
17 (-9)	%N1	86.0	84.6	83.1	81.6	80.1	78.6	77.2	75.9	74.7
	MAX TAT									
	KIAS	230	225	220	215	210	205	201	198	195
	MACH	.475	.466	.456	.446	.436	.425	.417	.410	.404
	FF/ENG	4834	4614	4398	4180	3958	3804	3615	3456	3304
16 (-7)	KTAS	295	290	284	278	271	264	259	255	251
	%N1	85.1	83.7	82.3	80.8	79.3	77.7	76.3	75.1	73.9
	MAX TAT									
	KIAS	230	226	221	216	211	205	201	198	195
	MACH	.467	.458	.448	.438	.428	.417	.408	.402	.396
15 (-6)	FF/ENG	4850	4631	4412	4189	3963	3809	3617	3460	3309
	KTAS	292	286	280	274	267	260	255	251	247
	%N1	84.2	82.8	81.4	80.0	78.5	77.0	75.5	74.3	73.0
	MAX TAT									
	KIAS	231	226	221	216	211	205	201	198	195
14 (-4)	MACH	.459	.450	.441	.431	.420	.410	.401	.394	.388
	FF/ENG	4866	4644	4419	4193	3967	3817	3621	3466	3317
	KTAS	288	282	276	270	263	257	251	247	243
	%N1	83.2	81.8	80.4	79.0	77.6	76.0	74.5	73.2	72.0
	MAX TAT									
13 (-2)	KIAS	231	226	222	216	211	206	201	198	195
	MACH	.451	.442	.433	.423	.413	.402	.393	.387	.381
	FF/ENG	4877	4651	4424	4198	3975	3828	3629	3476	3328
	KTAS	284	278	272	266	260	253	247	243	240
	%N1	82.2	80.9	79.5	78.1	76.6	75.0	73.5	72.2	70.9
12 (0)	MAX TAT									
	KIAS	232	227	222	217	211	206	201	198	195
	MACH	.444	.435	.425	.415	.405	.395	.385	.380	.374
	FF/ENG	4884	4656	4430	4208	3989	3844	3643	3491	3344
	KTAS	280	274	268	262	256	249	243	240	236
	%N1	81.3	79.9	78.6	77.2	75.7	74.1	72.5	71.2	69.9
	MAX TAT									
	KIAS	232	227	222	217	212	206	201	198	195
	MACH	.436	.427	.418	.408	.398	.388	.378	.372	.367
	FF/ENG	4890	4664	4441	4224	4007	3861	3660	3509	3362
	KTAS	276	271	265	259	252	246	240	236	232

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
17	88.7	89.7	90.6	91.5	92.4	93.3	94.2	95.1	95.5	94.6	93.6	92.5	91.4	90.5
16	88.3	89.2	90.2	91.1	92.0	92.9	93.7	94.6	95.5	94.6	93.6	92.4	91.4	90.4
15	87.8	88.7	89.6	90.5	91.4	92.3	93.2	94.1	94.9	94.6	93.6	92.4	91.3	90.3
14	87.2	88.1	89.1	90.0	90.8	91.7	92.6	93.4	94.3	94.7	93.7	92.5	91.4	90.4
13	86.7	87.6	88.5	89.4	90.2	91.1	92.0	92.8	93.7	94.5	94.0	93.0	91.8	90.5
12	86.1	87.0	87.9	88.8	89.7	90.5	91.4	92.3	93.1	93.9	94.2	93.3	92.2	90.9

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

GEAR DOWN

Long Range Cruise Table

11000 FT to 6000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		300	290	280	270	260	250	240	230	220
11 (4)	%N1	89.7	88.7	87.7	86.5	85.4	84.2	82.9	81.7	80.4
	MAX TAT	24	27	30	33					
	KIAS	266	262	258	254	250	246	241	237	232
	MACH	.489	.482	.475	.468	.461	.453	.445	.437	.428
	FF/ENG	6721	6483	6250	6023	5800	5578	5353	5125	4899
10 (6)	KTAS	311	307	302	298	293	288	283	278	272
	%N1	88.9	87.9	86.8	85.6	84.5	83.3	82.1	80.8	79.5
	MAX TAT	28	31	34	36					
	KIAS	266	263	259	255	251	246	242	237	232
	MACH	.481	.475	.468	.461	.453	.446	.438	.429	.421
9 (8)	FF/ENG	6723	6488	6260	6036	5814	5590	5362	5135	4910
	KTAS	307	303	299	294	289	284	279	274	269
	%N1	88.0	86.9	85.8	84.7	83.5	82.4	81.2	80.0	78.7
	MAX TAT	32	35	37						
	KIAS	267	263	259	255	251	247	242	237	233
8 (10)	MACH	.474	.467	.460	.453	.446	.438	.430	.422	.414
	FF/ENG	6729	6498	6271	6047	5822	5594	5366	5140	4918
	KTAS	304	299	295	290	286	281	276	270	265
	%N1	87.0	85.9	84.9	83.8	82.7	81.5	80.4	79.1	77.9
	MAX TAT	36	38	40						
7 (11)	KIAS	268	264	260	256	251	247	242	238	233
	MACH	.466	.460	.453	.446	.438	.431	.423	.415	.407
	FF/ENG	6736	6504	6276	6048	5820	5591	5364	5141	4923
	KTAS	300	295	291	286	282	277	272	267	261
	%N1	86.0	85.0	84.0	82.9	81.8	80.7	79.5	78.3	77.1
5 (15)	MAX TAT	39	41							
	KIAS	268	264	260	256	252	247	243	238	233
	MACH	.459	.452	.445	.438	.431	.423	.416	.408	.400
	FF/ENG	6740	6508	6277	6046	5817	5590	5366	5146	4932
	KTAS	296	292	287	283	278	273	268	263	258
	%N1	84.2	83.3	82.3	81.3	80.2	79.1	78.0	76.8	75.5
	MAX TAT	44								
	KIAS	269	265	261	257	252	248	243	238	233
	MACH	.444	.437	.431	.424	.416	.409	.402	.394	.386
	FF/ENG	6772	6538	6305	6076	5851	5630	5413	5197	4984
	KTAS	289	284	280	275	271	266	261	256	251

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
11	87.5	88.4	89.3	90.1	91.0	91.8	92.7	93.5	94.1	93.2	92.1	90.9	89.9	88.5
10	87.1	88.0	88.8	89.7	90.6	91.4	92.2	93.0	93.8	93.1	92.0	90.8	90.1	89.0
9	86.9	87.7	88.6	89.5	90.3	91.1	92.0	92.8	93.6	93.4	92.2	91.2	90.4	89.6
8	86.8	87.7	88.6	89.4	90.2	91.1	91.9	92.7	93.5	93.8	92.4	91.5	90.6	89.8
7	86.5	87.4	88.2	89.1	89.9	90.7	91.6	92.4	93.2	93.9	92.9	91.4	90.6	89.7
5	85.4	86.2	87.1	87.9	88.7	89.5	90.3	91.1	91.9	92.7	93.1	91.5	90.4	89.5

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
11000 FT to 6000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)								
		220	210	200	190	180	170	160	150	140
11 (1)	%N1	80.4	79.1	77.7	76.3	74.8	73.1	71.5	70.3	69.0
	MAX TAT									
	KIAS	232	227	222	217	212	206	201	198	195
	MACH	.428	.419	.410	.401	.391	.380	.371	.365	.360
	FF/ENG	4899	4676	4458	4242	4025	3878	3679	3529	3382
10 (3)	KTAS	272	267	261	255	249	242	236	232	229
	%N1	79.5	78.2	76.8	75.4	73.8	72.2	70.6	69.4	68.1
	MAX TAT									
	KIAS	232	228	223	217	212	206	201	198	195
	MACH	.421	.412	.403	.394	.384	.373	.364	.359	.353
9 (5)	FF/ENG	4910	4691	4475	4259	4041	3895	3698	3549	3403
	KTAS	269	263	257	251	245	238	232	229	225
	%N1	78.7	77.4	76.0	74.6	73.0	71.3	69.8	68.5	67.3
	MAX TAT									
	KIAS	233	228	223	217	212	206	201	198	195
8 (7)	MACH	.414	.405	.396	.387	.377	.366	.357	.352	.346
	FF/ENG	4918	4702	4487	4271	4054	3910	3717	3568	3423
	KTAS	265	260	254	248	241	235	229	225	222
	%N1	77.9	76.6	75.2	73.7	72.1	70.5	69.0	67.7	66.5
	MAX TAT									
7 (8)	KIAS	233	228	223	217	212	206	201	198	195
	MACH	.407	.398	.389	.380	.370	.359	.351	.345	.340
	FF/ENG	4923	4709	4495	4283	4069	3926	3738	3589	3443
	KTAS	261	256	250	244	238	231	226	222	219
	%N1	77.1	75.8	74.4	72.9	71.3	69.6	68.2	67.0	65.8
5 (12)	MAX TAT									
	KIAS	233	228	223	217	211	205	201	198	195
	MACH	.400	.391	.382	.372	.363	.352	.344	.339	.334
	FF/ENG	4932	4720	4509	4300	4087	3945	3761	3611	3463
	KTAS	258	252	246	240	234	227	222	219	215
	%N1	75.5	74.1	72.7	71.3	69.7	68.0	66.6	65.5	64.3
	MAX TAT									
	KIAS	233	228	223	217	211	205	201	198	195
	MACH	.386	.377	.368	.359	.349	.339	.332	.327	.322
	FF/ENG	4984	4773	4562	4347	4128	3982	3802	3647	3495
	KTAS	251	245	239	233	227	220	216	212	209

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

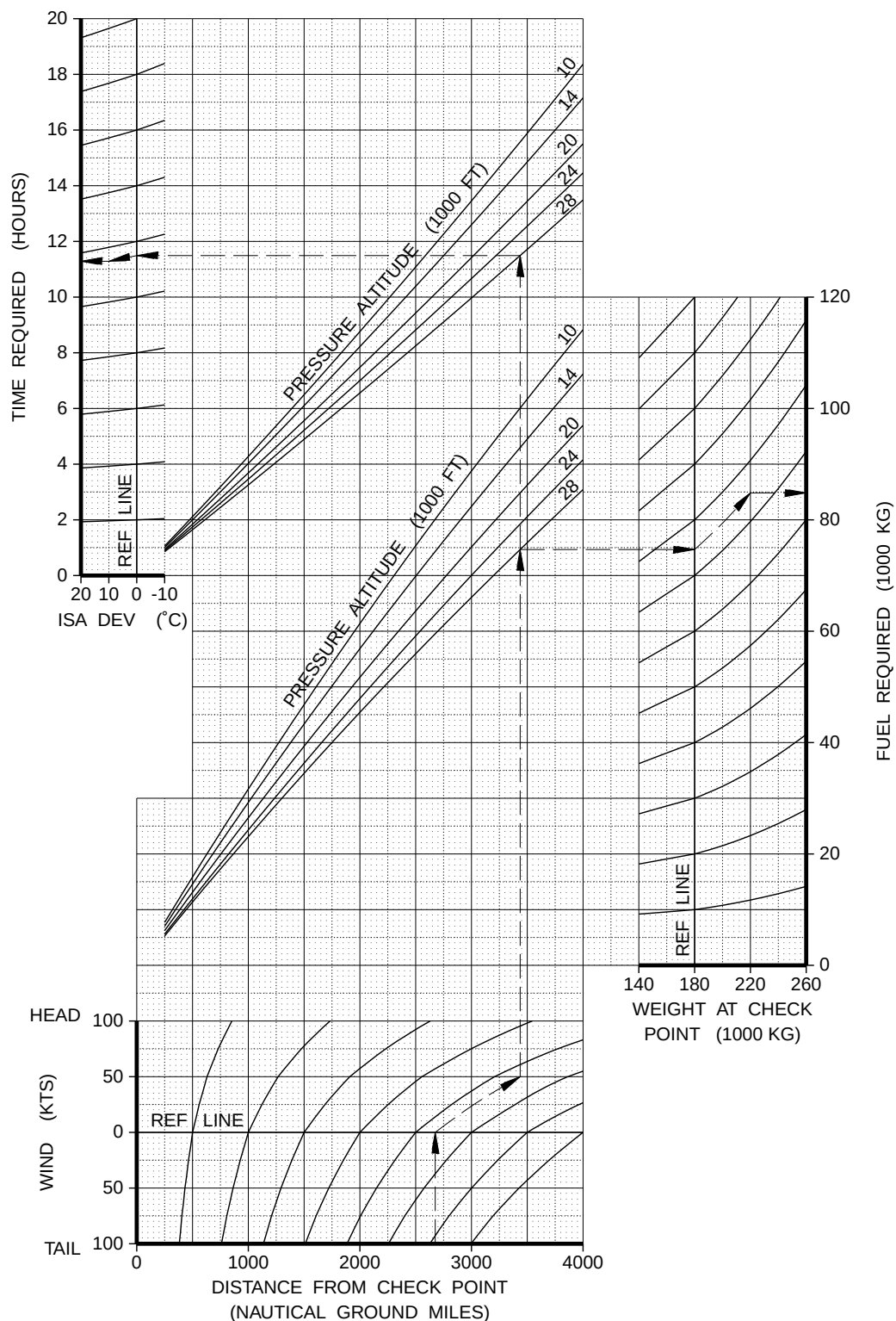
PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
11	87.5	88.4	89.3	90.1	91.0	91.8	92.7	93.5	94.1	93.2	92.1	90.9	89.9	88.5
10	87.1	88.0	88.8	89.7	90.6	91.4	92.2	93.0	93.8	93.1	92.0	90.8	90.1	89.0
9	86.9	87.7	88.6	89.5	90.3	91.1	92.0	92.8	93.6	93.4	92.2	91.2	90.4	89.6
8	86.8	87.7	88.6	89.4	90.2	91.1	91.9	92.7	93.5	93.8	92.4	91.5	90.6	89.8
7	86.5	87.4	88.2	89.1	89.9	90.7	91.6	92.4	93.2	93.9	92.9	91.4	90.6	89.7
5	85.4	86.2	87.1	87.9	88.7	89.5	90.3	91.1	91.9	92.7	93.1	91.5	90.4	89.5

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

GEAR DOWN

Long Range Cruise Enroute Fuel and Time

Based on VREF30+80 descent



GEAR DOWN

Descent

Based on VREF30 + 80

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)
35000	18	610	76
33000	17	600	72
31000	16	590	68
29000	16	570	64
27000	15	560	60
25000	14	540	56
23000	13	520	52
21000	13	510	48
19000	12	490	44
17000	11	460	40
15000	10	440	36
10000	8	380	27
5000	6	300	17
1500	4	250	11

Allowances for a straight-in approach are included.



GEAR DOWN

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)								
		300	280	260	240	220	200	180	160	140
30000	%N1						97.3	93.5	91.8	90.5
	KIAS						215	209	209	209
	FF/ENG						4940	4370	4090	3880
25000	%N1				95.9	93.0	90.3	88.0	86.6	85.4
	KIAS				228	221	215	209	209	209
	FF/ENG				5650	5050	4550	4150	3930	3760
20000	%N1			92.6	90.3	87.8	85.3	82.9	81.5	80.4
	KIAS			234	228	221	215	209	209	209
	FF/ENG			5840	5340	4880	4450	4190	4020	3870
15000	%N1		89.5	87.4	85.2	82.8	80.4	78.2	77.0	76.0
	KIAS		239	234	228	221	215	209	209	209
	FF/ENG		6110	5690	5270	4860	4470	4130	4020	3880
10000	%N1	86.2	84.2	82.3	80.1	77.9	75.6	73.4	72.2	71.1
	KIAS	243	239	234	228	221	215	209	209	209
	FF/ENG	6390	6030	5650	5250	4860	4500	4180	4100	3960
5000	%N1	81.3	79.6	77.8	75.9	73.7	71.4	69.4	68.2	67.2
	KIAS	243	239	234	228	221	215	209	209	209
	FF/ENG	6380	6010	5650	5290	4930	4590	4290	4210	4060
1500	%N1	78.4	76.8	75.0	73.0	70.9	68.7	66.7	65.6	64.5
	KIAS	243	239	234	228	221	215	209	209	209
	FF/ENG	6570	6200	5820	5430	5030	4660	4340	4170	4100

Flaps 1

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)								
		300	280	260	240	220	200	180	160	140
20000	%N1		93.8	91.5	89.1	86.4	83.6	80.8	79.1	77.7
	KIAS		219	214	208	201	195	189	189	189
	FF/ENG		6030	5550	5060	4590	4170	3890	3680	3510
15000	%N1	90.6	88.5	86.3	83.9	81.3	78.7	76.2	74.6	73.3
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	6320	5870	5450	5020	4590	4180	3890	3670	3510
10000	%N1	85.3	83.3	81.1	78.8	76.4	73.8	71.2	69.6	68.2
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	6200	5800	5390	4990	4600	4210	3940	3740	3580
5000	%N1	80.5	78.6	76.6	74.4	72.0	69.4	67.0	65.5	64.3
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	6160	5770	5390	5030	4670	4300	4040	3840	3670
1500	%N1	77.5	75.7	73.7	71.5	69.2	66.7	64.3	62.8	61.6
	KIAS	223	219	214	208	201	195	189	189	189
	FF/ENG	6340	5950	5540	5130	4720	4330	4060	3860	3700

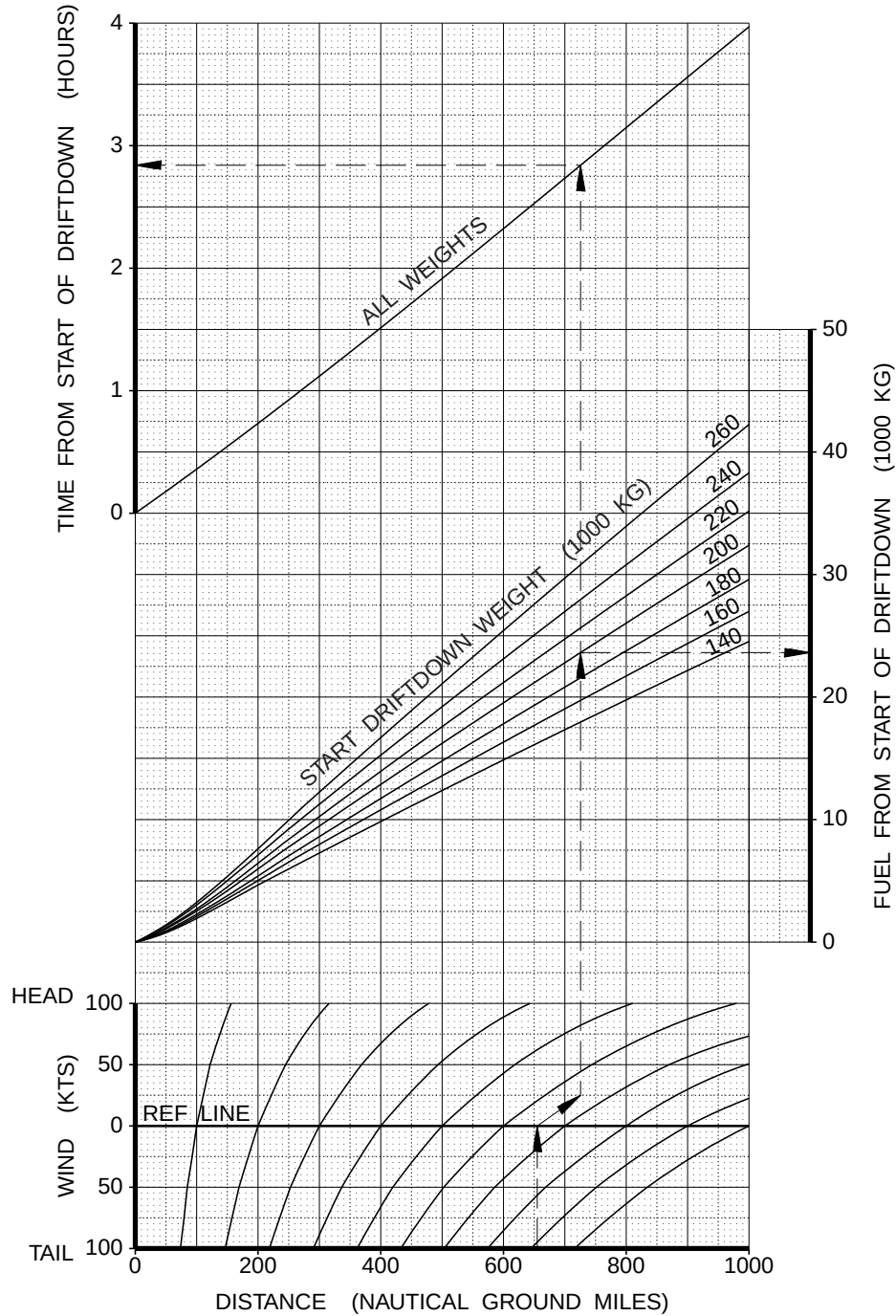
These tables include 5% additional fuel for holding in a racetrack pattern.

GEAR DOWN ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown/LRC Cruise Range Capability

Includes APU fuel burn



GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

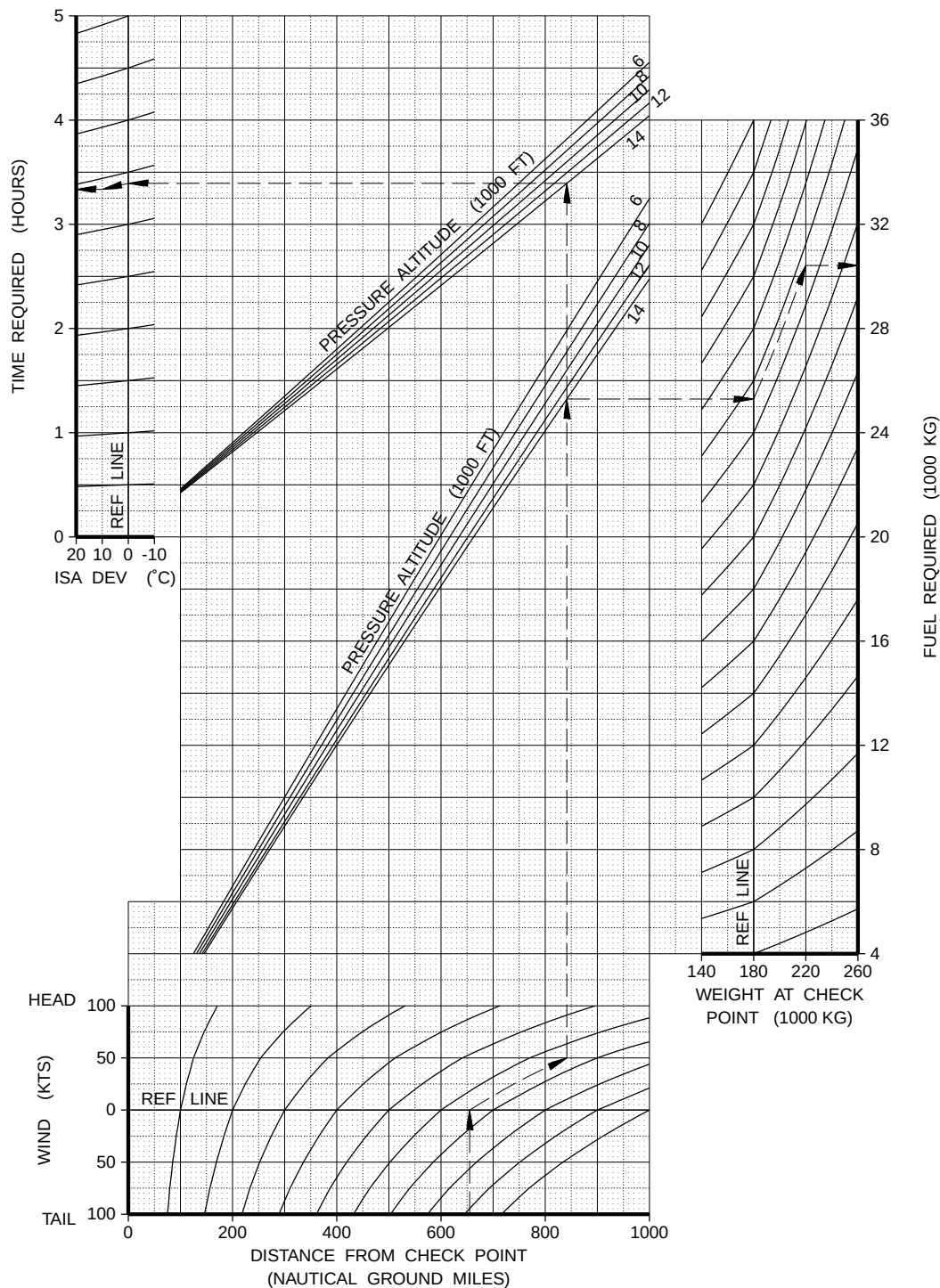
WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
250	2800		
240	5200	2200	
230	6700	4600	1700
220	8200	6500	4200
210	9300	8000	6400
200	10500	9200	7900
190	11700	10300	9100
180	12900	11600	10300
170	14200	12900	11600
160	15700	14300	13000
150	17600	15800	14200
140	19600	18000	15800

GEAR DOWN ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on VREF30 + 80 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)												
		260	250	240	230	220	210	200	190	180	170	160	150	140
20 (-15)	%N1													101.1
	MAX TAT													-2
	KIAS													195
	MACH													.429
	FF/ENG KTAS													6989 263
19 (-14)	%N1												101.7	98.9
	MAX TAT												-3	3
	KIAS												198	195
	MACH												.427	.420
	FF/ENG KTAS												7343 263	6824 259
18 (-12)	%N1												99.5	97.1
	MAX TAT												2	8
	KIAS												198	195
	MACH												.418	.412
	FF/ENG KTAS												7176 259	6705 255
17 (-10)	%N1											100.1	97.6	95.7
	MAX TAT											1	6	11
	KIAS											201	198	195
	MACH											.417	.410	.404
	FF/ENG KTAS											7545 259	7049 255	6627 251
16 (-8)	%N1											98.2	96.2	94.5
	MAX TAT											5	10	15
	KIAS											201	198	195
	MACH											.408	.402	.396
	FF/ENG KTAS											7406 255	6965 251	6575 247
15 (-7)	%N1										98.8	96.6	94.9	93.4
	MAX TAT										5	10	14	19
	KIAS										205	201	198	195
	MACH										.408	.401	.394	.388
	FF/ENG KTAS										7805 256	7311 251	6904 247	6543 243

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
20	96.6	97.7	98.8	99.8	100.9	101.9	102.9	103.9	104.9	103.8	102.5	101.1	100.2	99.6
19	95.6	96.7	97.7	98.8	99.8	100.8	101.9	102.9	103.9	103.4	102.1	100.9	99.9	99.2
18	94.5	95.6	96.6	97.6	98.7	99.7	100.7	101.7	102.7	102.9	101.7	100.5	99.5	98.7
17	93.5	94.5	95.6	96.6	97.6	98.6	99.6	100.5	101.5	102.5	101.2	100.1	99.2	98.4
16	92.7	93.7	94.7	95.7	96.7	97.7	98.7	99.7	100.6	101.5	100.9	99.9	99.0	98.2
15	91.8	92.8	93.8	94.8	95.8	96.7	97.7	98.7	99.6	100.5	100.9	99.8	98.8	98.1

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
14000 FT to 6000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)												
		260	250	240	230	220	210	200	190	180	170	160	150	140
14 (-5)	%N1									99.3	97.2	95.4	93.9	92.4
	MAX TAT									6	10	15	20	25
	KIAS									208	205	201	198	195
	MACH									.407	.400	.393	.387	.381
	FF/ENG KTAS									8204 256	7694 252	7241 247	6863 243	6515 240
13 (-3)	%N1									97.8	96.0	94.4	92.9	91.4
	MAX TAT									11	16	21	26	
	KIAS									208	205	201	198	195
	MACH									.400	.393	.385	.380	.374
	FF/ENG KTAS									8078 252	7613 248	7190 243	6830 240	6486 236
12 (-1)	%N1								98.2	96.6	95.0	93.4	91.9	90.4
	MAX TAT								12	17	22	27		
	KIAS								212	208	205	201	198	195
	MACH								.399	.392	.385	.378	.372	.367
	FF/ENG KTAS								8453 253	7991 248	7554 244	7155 240	6801 236	6462 232
10 (3)	%N1						99.0	97.4	95.9	94.5	93.0	91.4	89.9	88.4
	MAX TAT						15	19	24	29				
	KIAS						219	215	212	208	205	201	198	195
	MACH						.396	.390	.384	.378	.371	.364	.359	.353
	FF/ENG KTAS						9222 253	8743 249	8301 245	7894 241	7496 237	7108 232	6761 229	6431 225
8 (6)	%N1				99.5	98.0	96.6	95.3	93.9	92.5	90.9	89.4	87.9	86.4
	MAX TAT				18	22	27	31	35					
	KIAS				225	222	219	215	212	208	205	201	198	195
	MACH				.394	.388	.382	.376	.370	.364	.357	.351	.345	.340
	FF/ENG KTAS				10007 253	9516 249	9061 246	8635 242	8232 238	7839 234	7447 230	7066 226	6729 222	6409 219
6 (10)	%N1			98.5	97.2	95.9	94.6	93.3	91.9	90.4	88.9	87.3	85.8	84.3
	MAX TAT			23	28	32	36	40						
	KIAS			229	225	222	219	215	212	208	205	201	198	195
	MACH			.385	.379	.374	.368	.362	.357	.351	.344	.338	.333	.328
	FF/ENG KTAS			10339 249	9865 246	9419 242	8996 238	8586 235	8193 231	7807 227	7423 223	7052 219	6724 216	6412 212

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT DEG (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
14	94.5	95.5	96.5	97.4	98.4	99.3	100.2	101.1	100.3	99.3	98.5	97.7	96.8	95.9
13	94.3	95.3	96.2	97.2	98.1	99.1	100.0	100.9	100.8	99.8	99.0	98.2	97.3	96.4
12	94.0	95.0	96.0	96.9	97.9	98.8	99.7	100.6	101.3	100.2	99.4	98.7	97.8	96.9
10	93.5	94.4	95.4	96.3	97.3	98.2	99.1	100.0	100.9	101.1	100.2	99.5	98.8	97.8
8	92.9	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.3	101.2	101.1	100.4	99.7	98.9
6	91.9	92.8	93.8	94.7	95.6	96.5	97.4	98.3	99.2	100.0	100.9	100.5	99.9	99.1

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.



GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

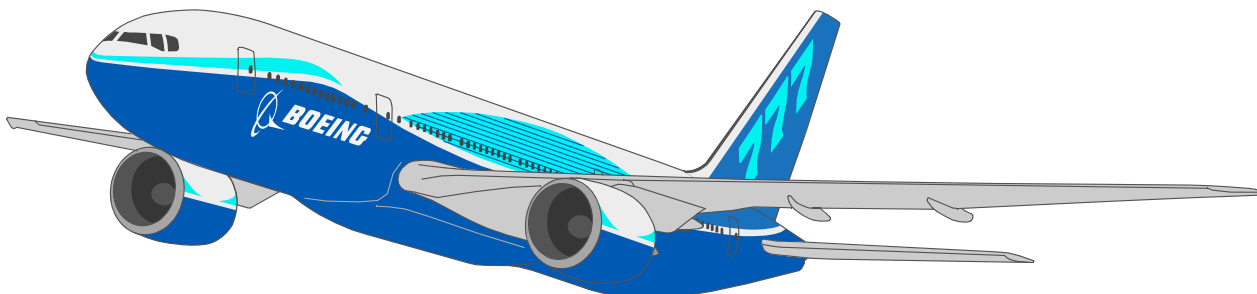
Holding
Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)						
		260	240	220	200	180	160	140
15000	%N1						99.0	97.0
	KIAS						209	209
	FF/ENG						8270	7820
10000	%N1				97.3	94.7	93.1	91.8
	KIAS				215	209	209	209
	FF/ENG				9140	8340	7930	7570
5000	%N1		97.4	94.8	92.2	89.6	88.1	86.7
	KIAS		228	221	215	209	209	209
	FF/ENG		10790	9840	8990	8260	7870	7540
1500	%N1	96.3	94.0	91.4	88.7	86.1	84.6	83.4
	KIAS	234	228	221	215	209	209	209
	FF/ENG	11890	10950	10010	9120	8370	7990	7660

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



FLIGHT PLANNING AND PERFORMANCE MANUAL



777-200LR
GE90-110B1L
FAA
KG/°C/M

OPTIONS

Crew Oxygen / 2 Bottles
Derate TO1-10%
Derate TO2-20%
Gear Down Dispatch

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Revision Number: 06

Revision Date: December 10, 2010

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Preface

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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 D632W005-WY062.

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
Init	January 19, 2006	
02	December 11, 2006	
4	December 19, 2008	
6	December 10, 2010	

No.	Revision Date	Date Filed
01	June 12, 2006	
03	December 20, 2007	
5	December 11, 2009	

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 1 - TAKEOFF AND LANDING

Section 2 - Takeoff

Takeoff Speeds - Dry Runway

1.2.37 - Revised table header information to include unit of measure.

Takeoff Speeds - Wet Runway

1.2.39 - Revised table header information to include unit of measure.

Section 4 - Landing

Quick Turnaround Limit

1.4.6 - Re-formatted footnote for better readability. No change in data.

Normal Configuration Landing Distance

1.4.9-11 - Updated data to reflect the incorporation of engine out loss of control speeds (VLOC), higher reference landing weight, and additional autobrake settings.

Chapter 3 - ENROUTE

Section 1 - Text

Introduction

3.1.1 - Revised text to correct buffet related maneuver margin information.

Chapter 4 - NON-STANDARD CONFIGURATION

Section 2 - Gear Down, Planning

Takeoff Climb Limit

4.2.1 - Added weight adjustment for engine anti-ice on. Revised weight adjustment for engine and wing anti-ice on.

Preface

List of Effective Pages

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Section 3

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* Copyright	December 10, 2010
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* 1.4.1-12	December 10, 2010
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* 3.3.1-34	December 10, 2010
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* 4.TOC.0.1-2	December 10, 2010
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* 4.5.1-2	December 10, 2010

Page	Date
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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]

TAKEOFF AND LANDING

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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 correction. 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 correction 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.

Minimum Takeoff Weight

Light weight takeoffs at the GE90-110B1L thrust rating may be limited by minimum takeoff weight in order to maintain airplane controllability during takeoff. For

takeoff at weights below the minimum takeoff weight, use of a lower thrust rating and/or the assumed temperature method of thrust reduction is required.

Field Length Limit

Maximum field length limited brake release weights are presented for the certified takeoff flap settings for dry and wet runways. 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 for a dry runway or 15 ft for a wet runway. These field limited weights do not account for clearway or stopway.

The reference takeoff condition for a given flap position is zero slope and wind. To determine the field length limit brake release weight, enter the appropriate chart for the desired flap position and runway condition at 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, correct for slope and wind, then 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 to account for the appropriate engine bleed configuration. When finding a maximum weight for a wet runway, the dry runway limit weight must also be found and the lower of the two weights used.

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 the appropriate flap position chart with OAT, move vertically to airport pressure altitude and read the climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate engine bleed configuration.

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 correct for OAT as necessary. Repeat this procedure to correct 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 to account for the appropriate engine bleed configuration.

Tire Speed Limit

Maximum tire speed limited weights are presented for 235 MPH tires. To determine the tire speed limit weight, enter the chart with OAT, move vertically to airport pressure altitude and read the tire speed limit weight to the left. Adjust the tire speed limit weight according to the notes below the chart to account for wind.

Brake Energy Limit

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 appropriate chart for the desired flap position and runway condition at the left horizontal scale with the 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 for normal climb limit weight. The horizontal lines indicate the maximum climb weight improvement for normal climb limited weights. These values are based on the maximum allowable improved climb for each flap position. 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

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 assume 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 Determination:

1. Determine the dry field/obstacle limit weight for the takeoff flap setting.
2. Enter the Weight Adjustment table with the dry 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. 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 the “poor” data reflects a runway 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 as well as FMC computed takeoff speeds can be used for all performance conditions except where adjustments must be made to V1 for clearway, stopway, brake deactivation, improved climb, contaminated runway situations, unbalanced for brake energy or obstacle clearance with unbalanced V1. These speeds may be used for weights less than or equal to the performance limited weight.

The FMC will protect for minimum control speeds by increasing V1, VR and V2 as required. However, the FMC will not compute takeoff speeds for weights where the required speed increase exceeds the maximum certified speed increase. In this case, the message "V SPEEDS UNAVAILABLE" will appear on the FMC scratchpad and the takeoff speed entries will be blank. Takeoff is not permitted in this condition as certified limits have been exceeded. This typically occurs at full rated thrust and light weights and is shown in the Minimum Takeoff Weight tables provided. The options are to select a smaller flaps setting, use reduced takeoff thrust and/or add weight (fuel). Selecting derate thrust is the preferred method of reduced takeoff thrust as this will reduce the minimum control speeds.

Normal takeoff speeds, V1, VR, and V2 are read from the table by entering with takeoff flap setting and brake release weight. Use the tables provided to correct takeoff speeds for altitude and actual temperature or assumed temperature for reduced thrust takeoffs. Slope and wind corrections to V1 are obtained by entering the Slope and Wind V1 Adjustment Table.

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 on the takeoff speeds page are provided for guidance when more precise data is unavailable.

Minimum Control Speeds

Regulations prohibit scheduling takeoff with a V1 less than the minimum V1 for control on the ground, V1(MCG). It is therefore necessary to compare the adjusted V1 to V1(MCG). To find V1(MCG), enter the V1(MCG) table with airport pressure altitude and actual OAT. If the adjusted V1 is less than V1(MCG), set V1 equal to V1(MCG). If the adjusted 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 weight adjustment is required provided that the field length available exceeds the minimum field length required shown on the Field Length Limit charts.

Minimum V2

Minimum takeoff safety speeds (V2) are provided for each certified takeoff flap setting. The speeds presented in this table can be used to ensure an adequate margin between the normal operating speed and the in-air

minimum control speed is maintained for directional control with high thrust asymmetry during a light weight takeoff.

Data are presented as a function of airport pressure altitude and are valid for all temperatures. To obtain the proper V2 speed for takeoff, first determine the normal takeoff V2 using the takeoff speeds tables provided, adjusted for pressure altitude, temperature, and VR correction (if applicable). Compare this V2 with the minimum V2 determined by entering the table with airport pressure altitude and takeoff flaps setting. If the calculated V2 is less than the minimum V2, set V2 equal to minimum V2 and determine a new VR by adding the difference between calculated V2 and minimum V2 to the original VR obtained from the V1, VR, V2 Adjustments table or Minimum VR table (if applicable).

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 limited weight by 3700 kg for a dry runway or 2200 kg for a wet runway and the V1 associated with the reduced weight by 2 knots. With two brakes deactivated, reduce the normal runway limited weight by 7250 kg for a dry runway or 4550 kg for a wet runway and the V1 associated with the reduced weight by 5 knots for a dry runway or 3 knots for a wet runway. If the resulting V1 is less than minimum V1, takeoff is permitted with V1 set equal to V1(MCG) provided the dry accelerate stop distance corrected for wind and slope exceeds approximately 1800m for one brake deactivated or 1900m for two brakes deactivated. For wet runways, the corrected accelerate stop distance should exceed approximately 2350m for one brake deactivated or 2450m for two brakes deactivated.

For brake(s) 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 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 from the Airplane Flight Manual may yield a less restrictive penalty.

One Thrust Reverser Inoperative

Wet runway takeoff performance presented for all brakes operating is based on the use of one thrust reverser during deceleration. When operating with a thrust reverser inoperative, the runway/obstacle limited

takeoff weight and V1 speed must be reduced to account for the reduced deceleration capability. A simplified method which conservatively accounts for this is to reduce the normal wet runway/obstacle limited weight by 6900 kg and the V1 associated with the reduced weight by 3 knots.

If the resulting V1 is less than minimum V1, takeoff is permitted with V1 set equal to V1(MCG) provided the accelerate stop distance available corrected for wind and slope exceeds approximately 2400 m.

Takeoff %N1

To find Max Takeoff %N1 based on normal engine bleed for air conditioning (2 bleeds/2 packs) enter Max Takeoff %N1 Table with airport pressure altitude and airport OAT and read %N1. For packs off or wing anti-ice operation, apply the %N1 correction shown below the table. No takeoff %N1 correction is required for engine anti-ice.

Stab Trim Setting

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

Takeoff Derates

This section contains tabulated takeoff weight penalties, thrust setting, takeoff speeds and stabilizer trim setting for takeoff at derated engine ratings. Derate 1 (TO1) and Derate 2 (TO2).

Takeoff Performance (TO1 and TO2)

Takeoff limit weights are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. Weights are shown for takeoff field, climb, obstacle, tire speed and brake energy limits. Each full rated thrust limiting weight must be adjusted for derate operation and then the most restrictive weight used for planning.

Slush/Standing Water

Slush/standing water runway limit weight and V1 speed adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. The procedures for determining contaminated runway limit weight and speeds are the same as those discussed for full rated thrust. Adjustments are applied to the derated thrust dry runway limits.

Slippery Runway

Slippery runway limit weight and V1 speed adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. The procedures for determining slippery

runway limit weight and speeds are the same as those discussed for full rated thrust. Adjustments are applied to the derated thrust dry runway limits.

Takeoff Speeds

Balanced takeoff speeds V1, VR and V2 reflecting the FMC display are presented for TO1 or TO2 derated thrust. Speeds may require correction for the effects of minimum control speeds.

Minimum Control Speeds, Stab Trim

Tables of minimum control speed V1(MCG) and stabilizer trim setting are provided for TO1 or TO2 thrust levels as appropriate.

Brakes Deactivated

Takeoff field length/obstacle weight and V1 speed adjustments are the same as those shown previously in this chapter for full rated takeoff.

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 field limit chart with field length available, correct for runway condition and wind. Proceed vertically to the airport pressure altitude and read the field length limit weight at the right. Adjust the field length limit weight according to the notes below the chart to account for the appropriate brake configuration.

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 climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate engine bleed configuration. When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, make the appropriate ice correction as shown on the chart.

Go-Around Climb Gradient

To determine go-around climb gradient, enter the chart with airport OAT and pressure altitude and then proceed vertically to find airplane weight. Continue down the chart to the proper airspeed in terms of deviation from VREF, following the reference lines as appropriate. Read the go-around climb gradient directly from the

chart and then apply the necessary corrections for A/C and icing conditions as noted. Note that data is for one engine inoperative.

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. For brakes deactivated, reduce the maximum quick turnaround weight by the amount shown on the chart. As an alternate procedure, if the BRAKE TEMP advisory message on EICAS is not displayed 10 to 15 minutes after parking, then no waiting period is required.

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 Weight table takes precedence over the 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. If operating with one brake deactivated increase the brake energy per brake by 10 percent. If operating with two brakes deactivated increase the brake energy per brake by 20 percent. 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, corrected for wind, then vertically downwards correcting 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 wind, airport pressure altitude and OAT corrections.

The chart is based on a rejected takeoff with maximum manual braking effort. Make the corrections 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 to the next page with 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. An EICAS advisory message, BRAKE TEMP, will appear when any brake registers 5.0 or higher on the EICAS indication and disappear as the hottest brake cools with an EICAS indication of 3.5. Note that even without an EICAS advisory message, brake cooling is recommended.

CAT III Automatic Landing

The following advisory information is presented 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. These values are actual landing distances and do not include the 1.67 regulatory factor. Therefore, they cannot be used to determine the dispatch required landing field length.

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.

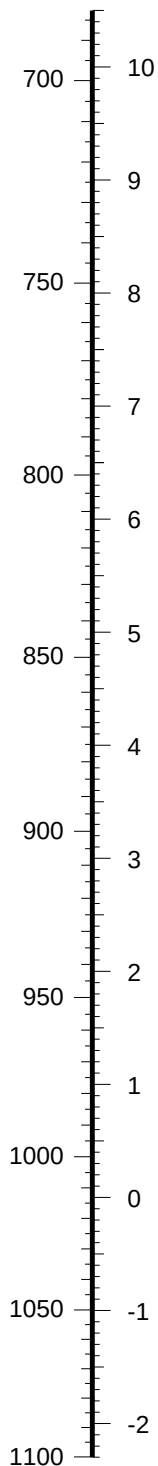
When landing on slippery runways or runways contaminated with ice, snow, slush, or standing water, the reported braking action must be considered. If the surface is affected by water, snow, or ice, and the braking action is reported as "good", conditions should not be expected to be as good as on clean, 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

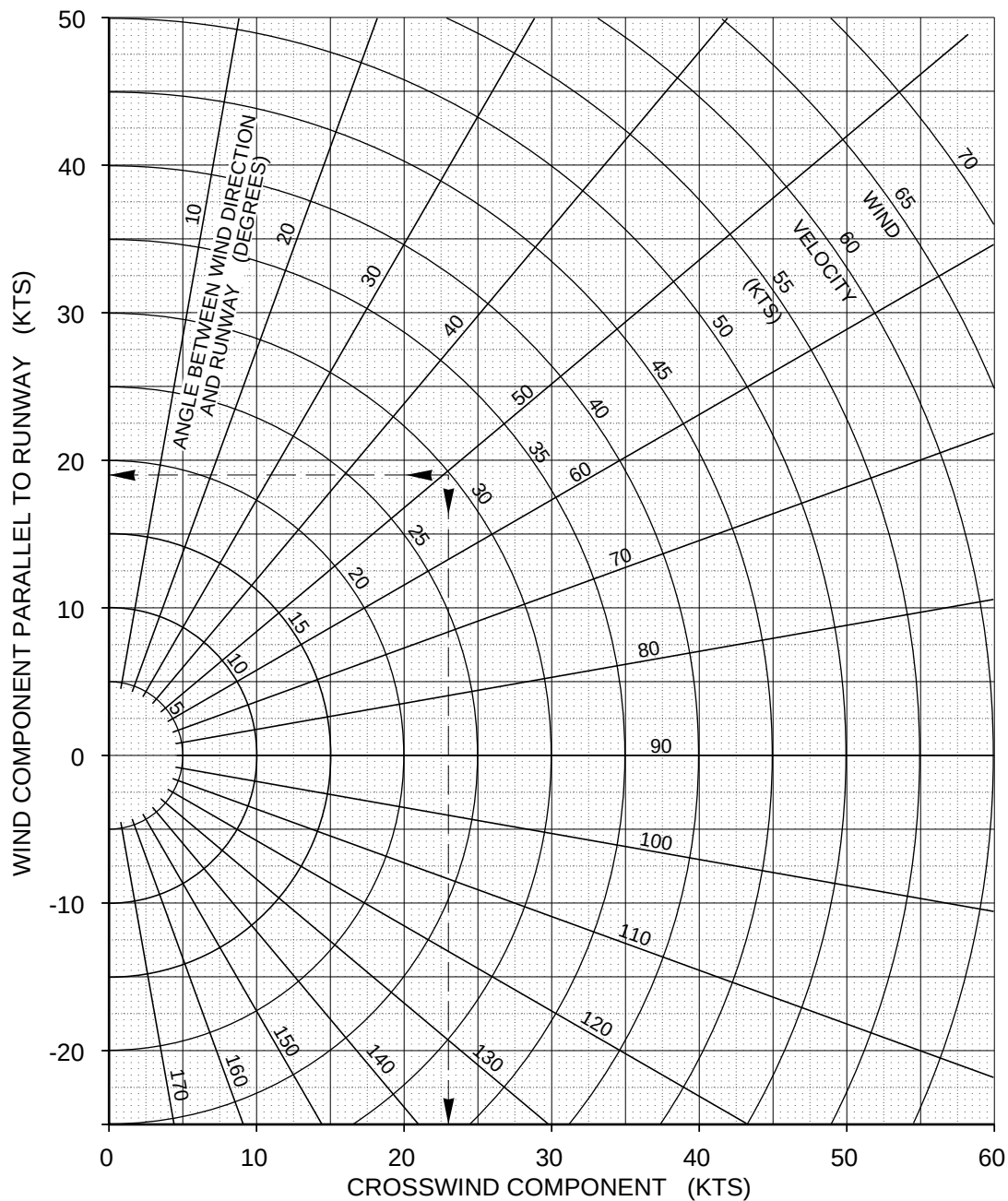


QNH to Pressure Altitude

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



Minimum Takeoff Weight

Weight Limit (1000 KG)

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

Flaps 5

OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50									
45	155.6								
40	164.3	157.9							
35	172.1	165.6	158.7						
30	174.4	170.9	164.9	158.5					
25	174.6	171.1	167.0	162.7	157.3				
20	174.8	171.2	167.1	162.9	158.6	154.4			
15	175.0	171.4	167.3	163.0	158.7	154.4			
10	175.3	171.5	167.5	163.1	158.8	154.5			
0 & BELOW	175.6	171.9	167.7	163.4	159.1	154.8			

Flaps 15

OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50	159.8								
45	169.6	162.9	155.7						
40	179.0	172.0	164.8	158.3					
35	187.6	180.4	172.9	166.2	159.6				
30	190.0	186.2	179.6	172.7	166.0	159.7			
25	190.2	186.4	182.0	177.3	171.4	165.7	158.3		
20	190.5	186.6	182.1	177.4	172.8	168.1	161.8	154.4	
15	190.7	186.7	182.3	177.6	172.9	168.3	162.8	156.3	
10	190.9	186.9	182.4	177.7	173.0	168.4	162.9	156.4	
0 & BELOW	191.2	187.2	182.7	178.0	173.3	168.6	163.1	156.5	

Flaps 20

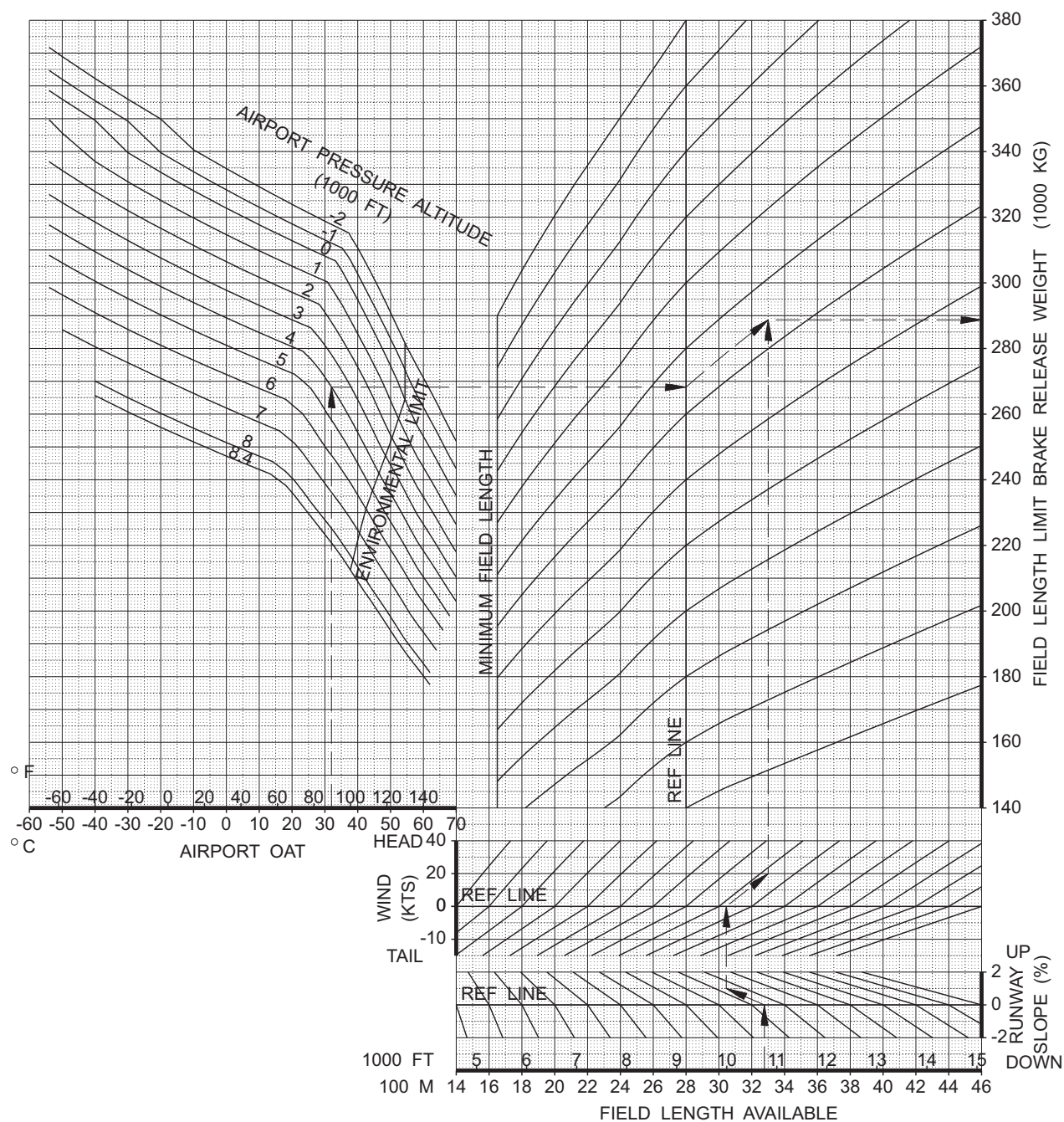
OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50	170.3	163.2	156.3						
45	180.8	173.7	166.0	159.5					
40	190.9	183.4	175.7	168.7	162.3	156.3			
35	200.0	192.4	184.4	177.2	170.2	163.7	156.8		
30	202.6	198.6	191.6	184.2	177.0	170.3	162.8		
25	202.8	198.8	194.0	189.1	182.8	176.8	168.8	160.0	
20	203.1	198.9	194.2	189.2	184.2	179.3	172.5	164.7	156.7
15	203.3	199.1	194.3	189.3	184.4	179.4	173.6	166.6	159.3
10	203.6	199.3	194.5	189.5	184.5	179.5	173.7	166.7	159.8
0 & BELOW	203.9	199.6	194.8	189.8	184.7	179.8	173.9	166.9	159.9

Light weight takeoffs at the GE90-110B1L thrust rating may be limited by minimum takeoff weight in order to maintain airplane controllability during takeoff. For takeoff at weights below the minimum takeoff weight, use of a lower thrust rating and/or the assumed temperature method of thrust reduction is required.

Takeoff Field Limit - Dry Runway

Flaps 5

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

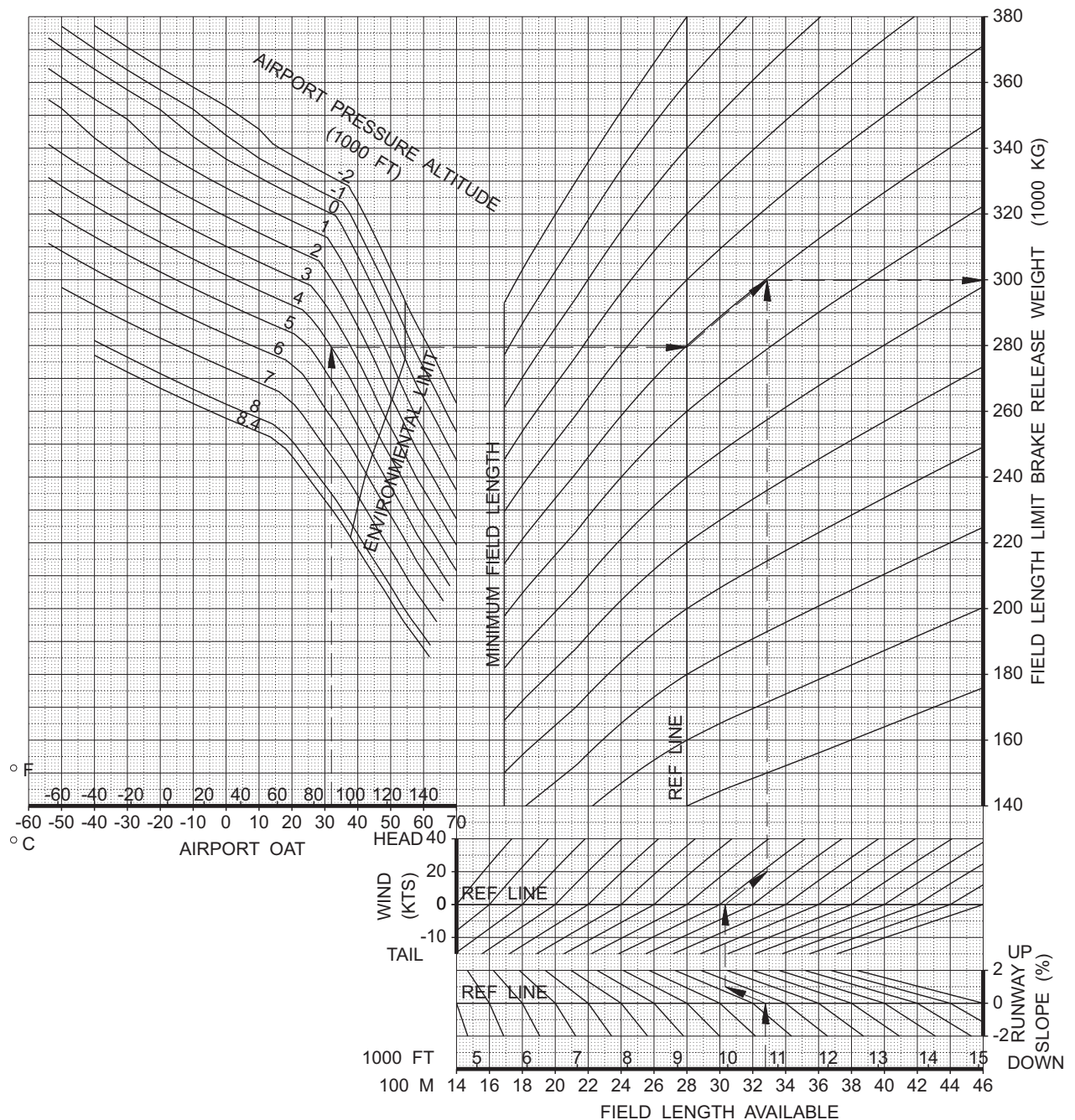


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 2000 kg.

Takeoff Field Limit - Dry Runway

Flaps 15

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

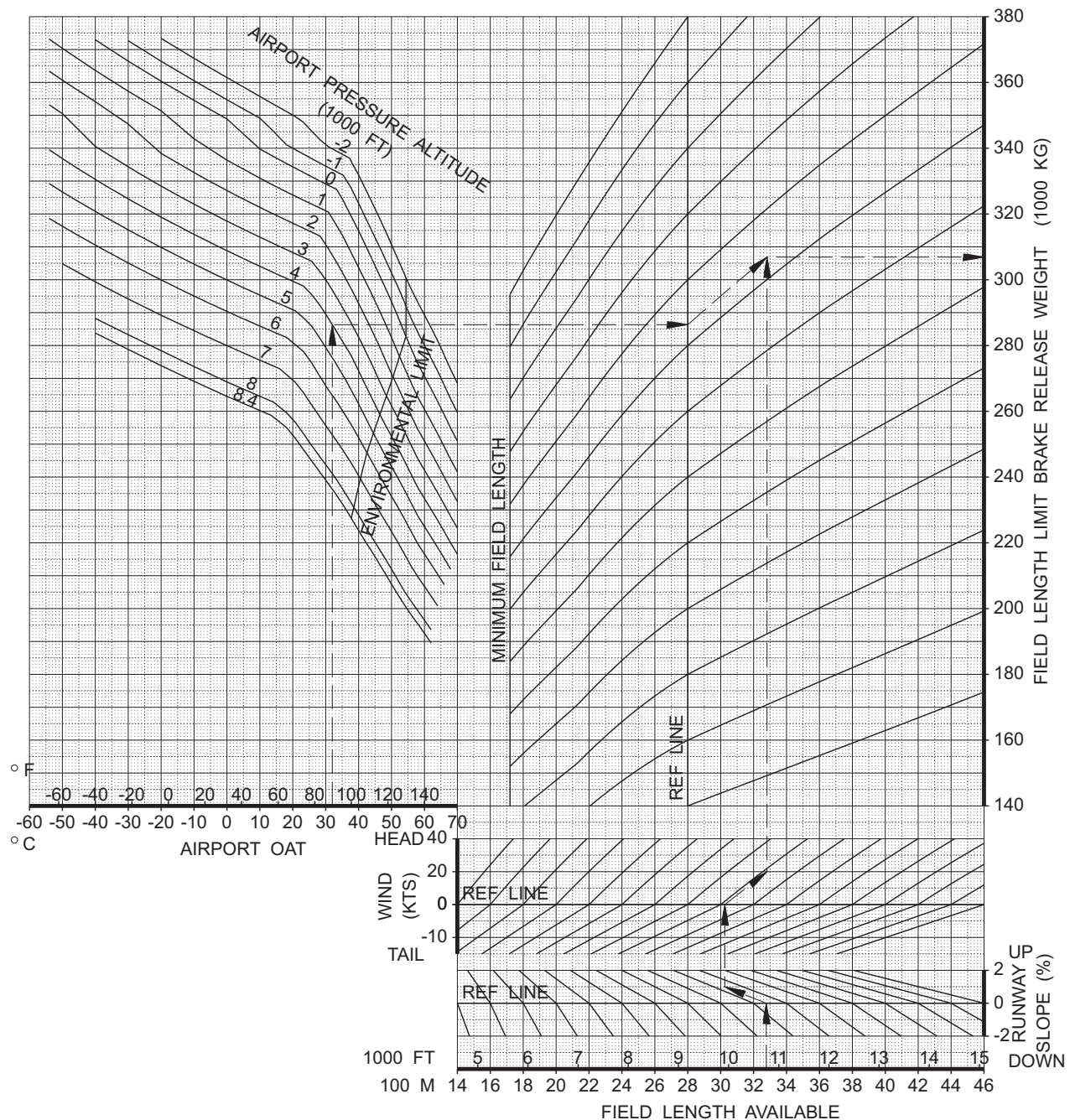


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 2050 kg.

Takeoff Field Limit - Dry Runway

Flaps 20

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

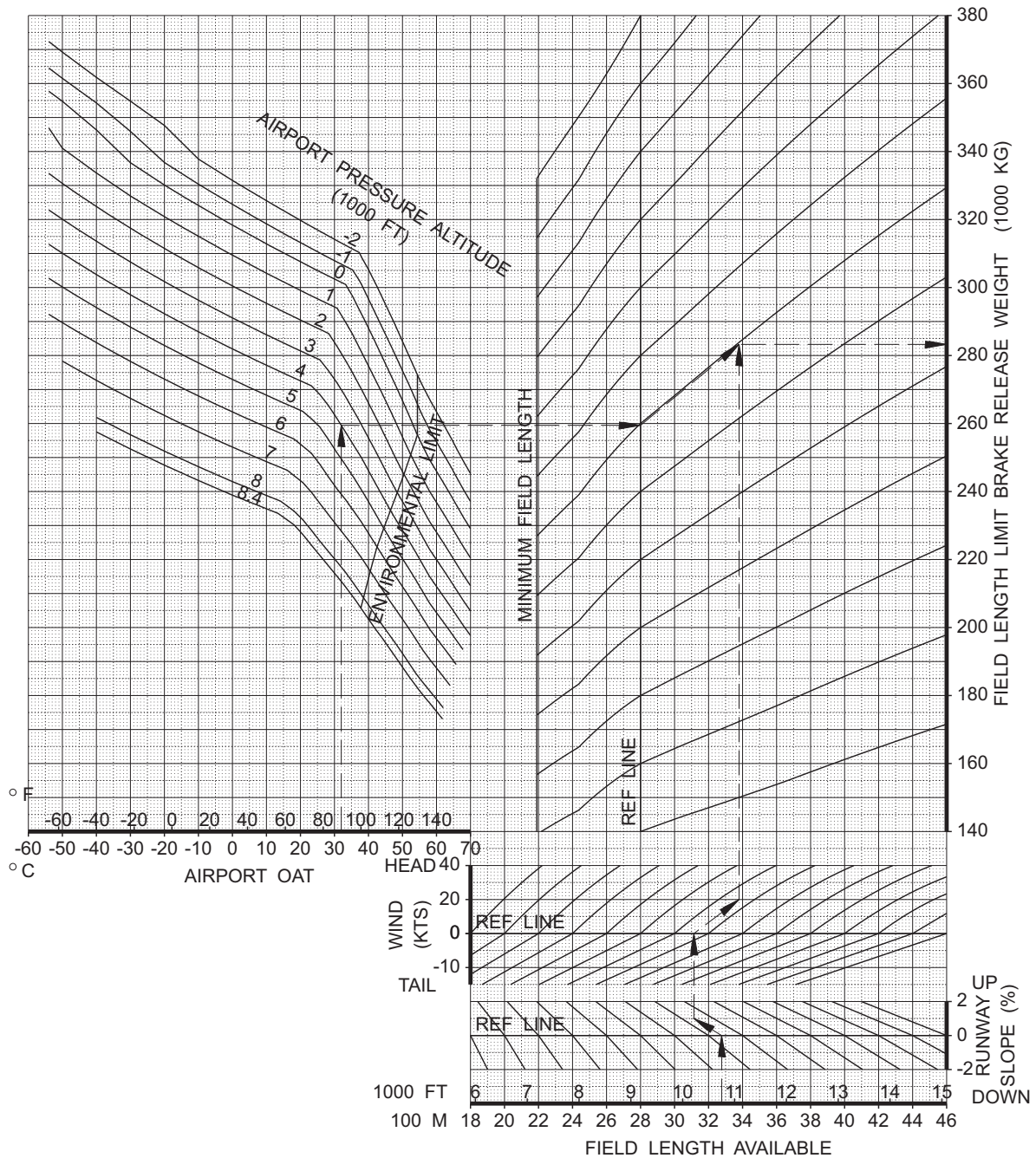


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 2050 kg.

Takeoff Field Limit - Wet Runway

Flaps 5

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

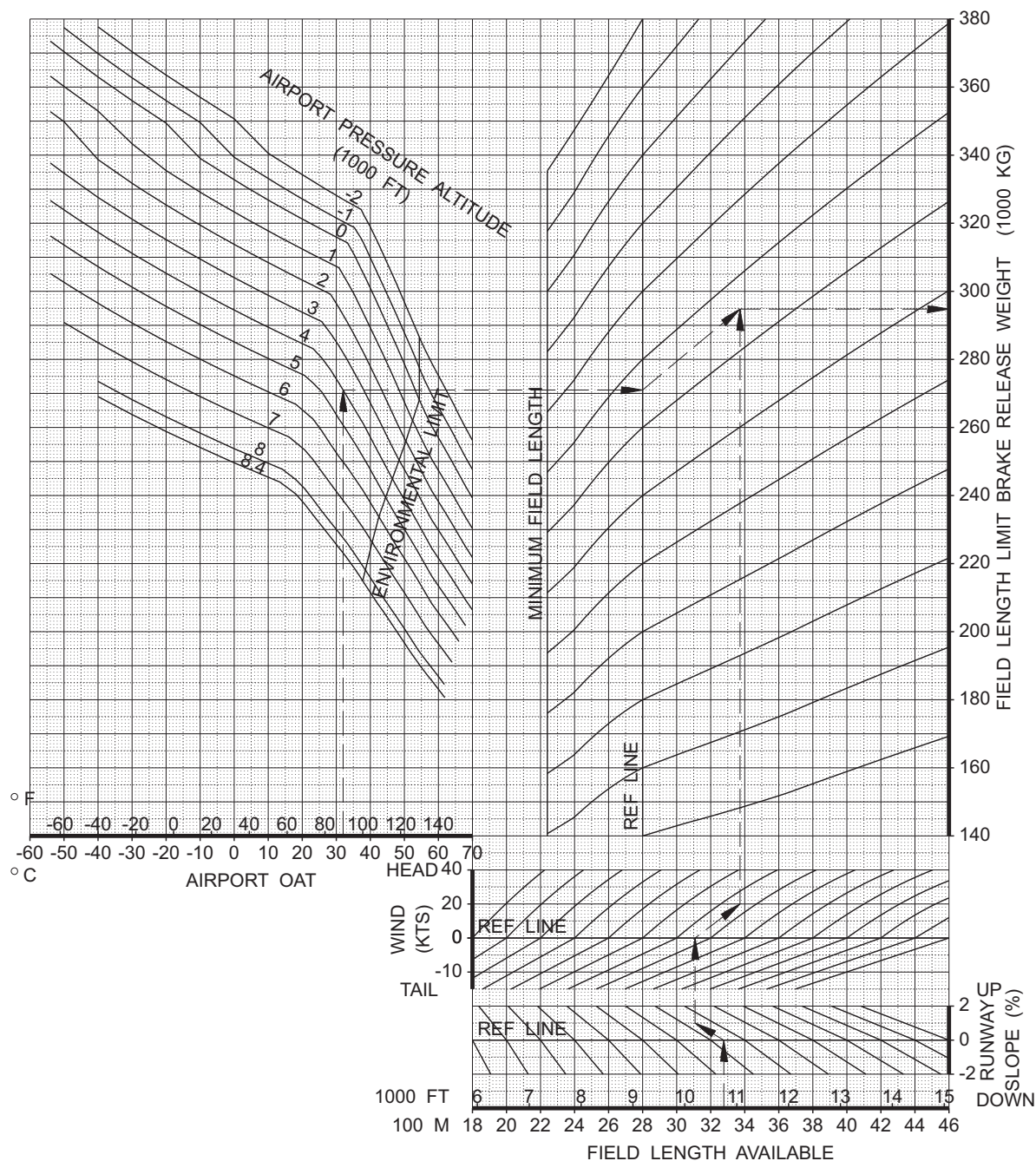


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 2200 kg.

Takeoff Field Limit - Wet Runway

Flaps 15

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

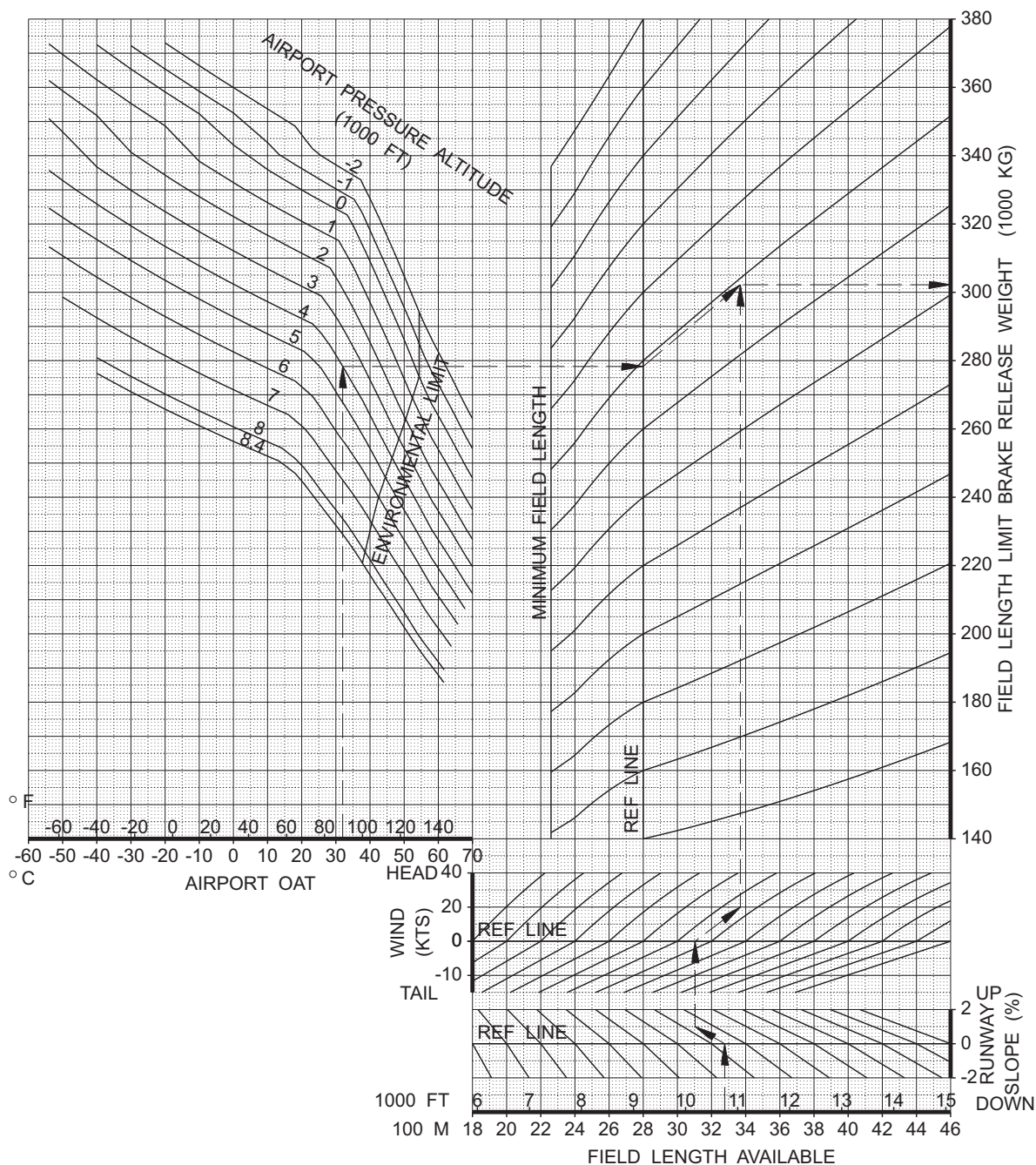


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 2200 kg.

Takeoff Field Limit - Wet Runway

Flaps 20

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

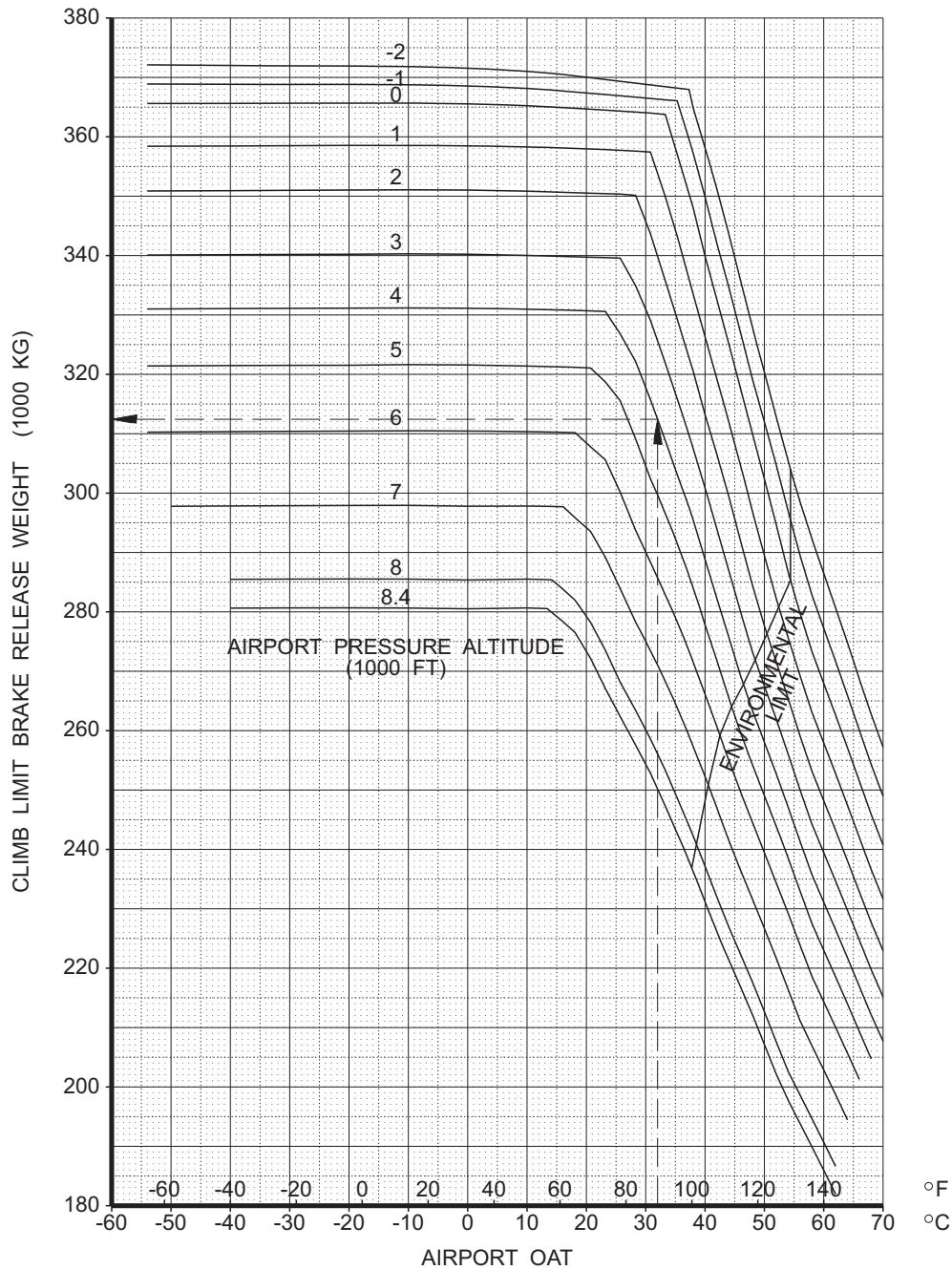


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 2450 kg.

Takeoff Climb Limit

Flaps 5

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

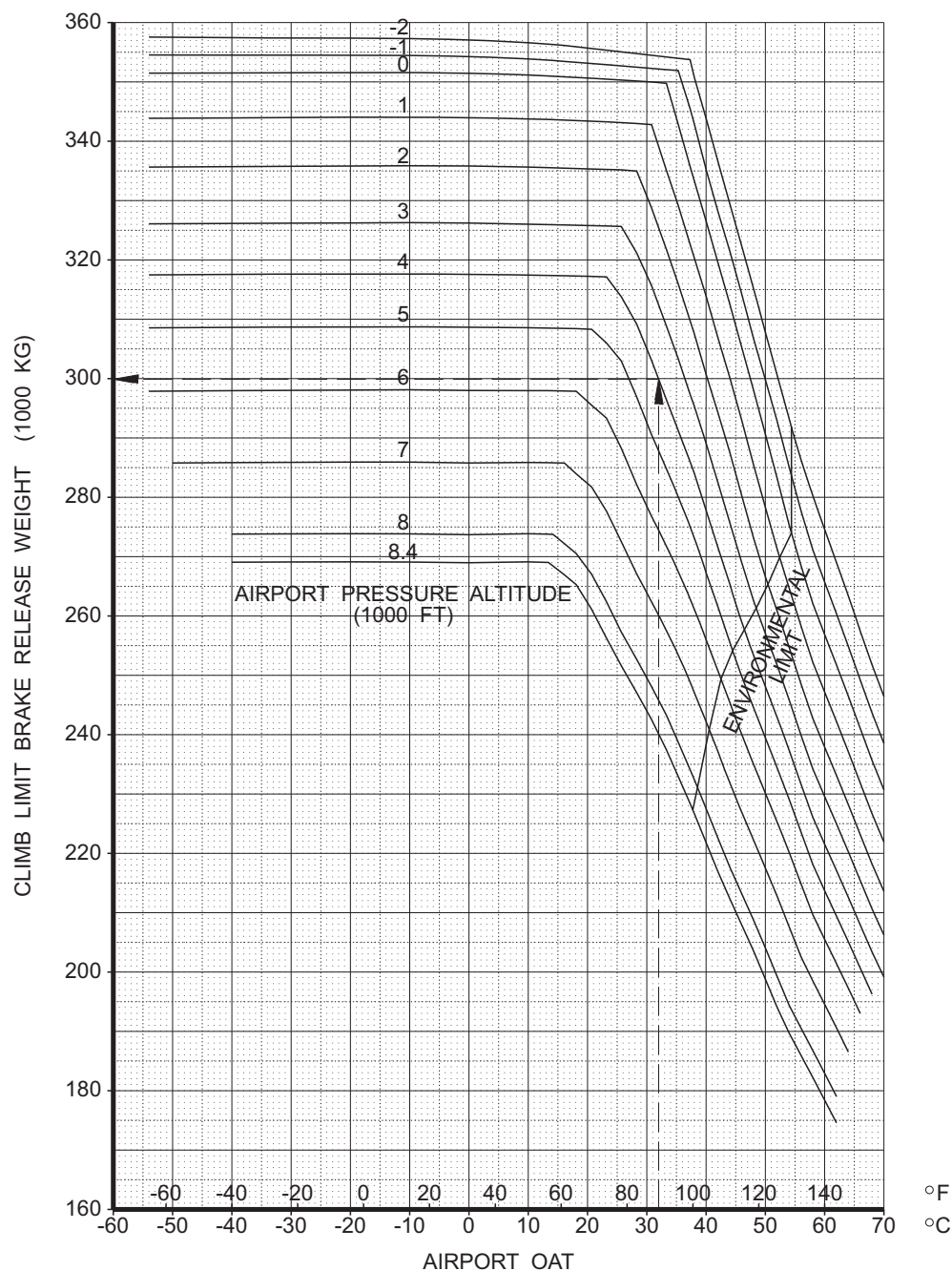


With engine bleed for packs off, increase weight by 1850 kg.
With engine and wing anti-ice on, decrease weight by 2250 kg.

Takeoff Climb Limit

Flaps 15

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

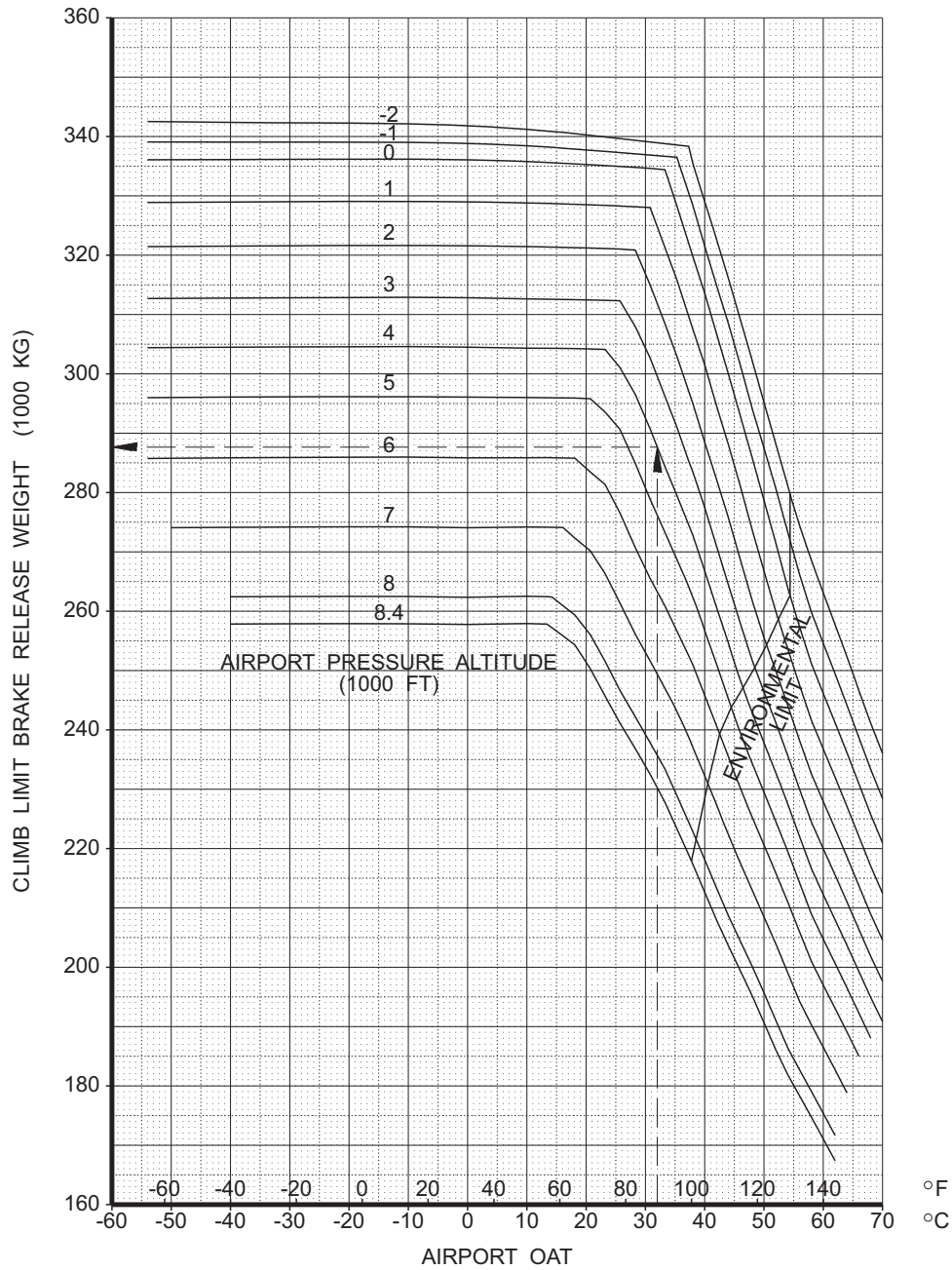


With engine bleed for packs off, increase weight by 1700 kg.
With engine and wing anti-ice on, decrease weight by 2100 kg.

Takeoff Climb Limit

Flaps 20

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

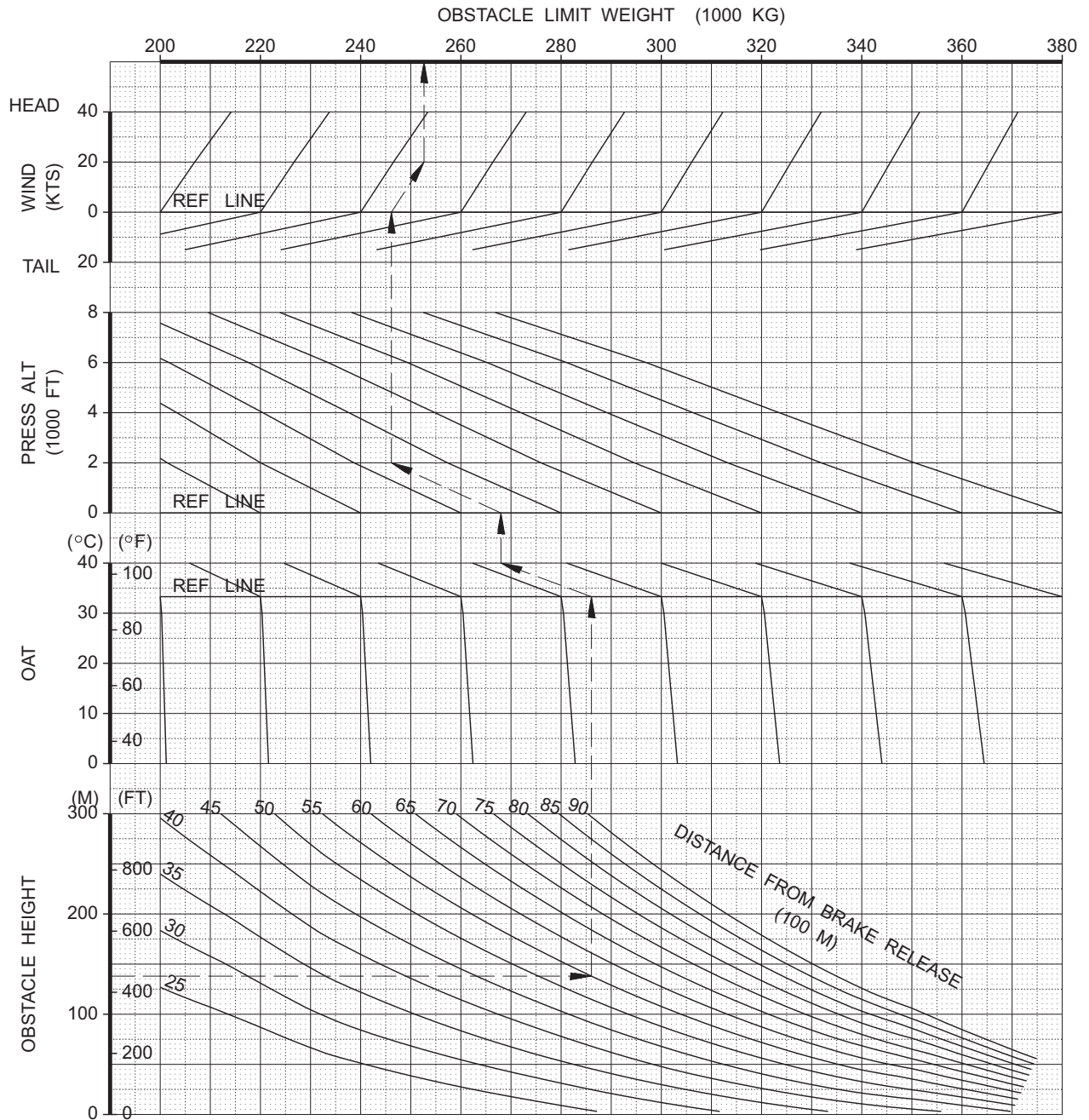


With engine bleed for packs off, increase weight by 1650 kg.
With engine and wing anti-ice on, decrease weight by 2100 kg.

Obstacle Limit

Flaps 5

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

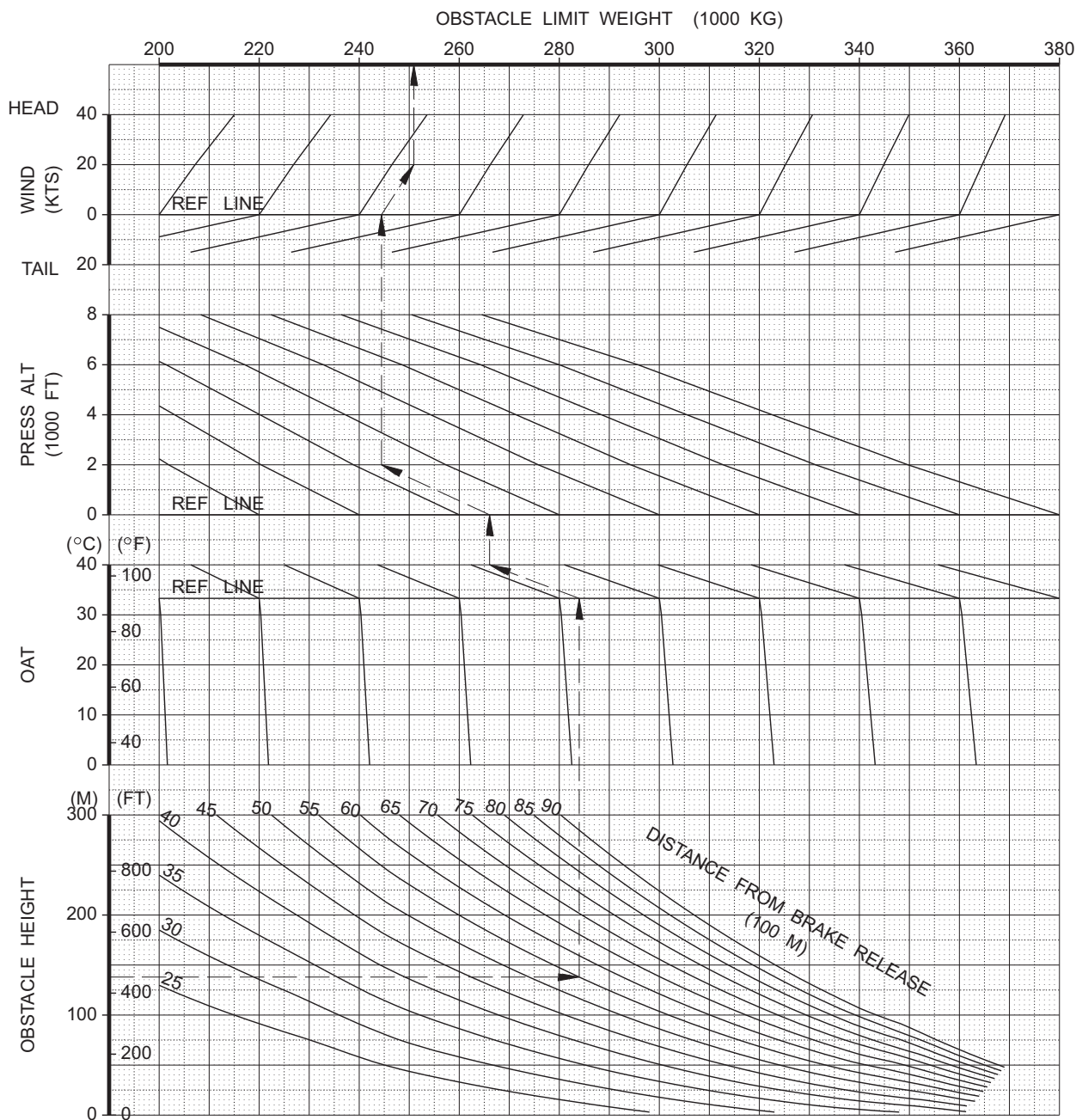


Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.
With engine bleed for packs off, increase weight by 900 kg.
With engine and wing anti-ice on, decrease weight by 2500 kg.

Obstacle Limit

Flaps 15

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



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

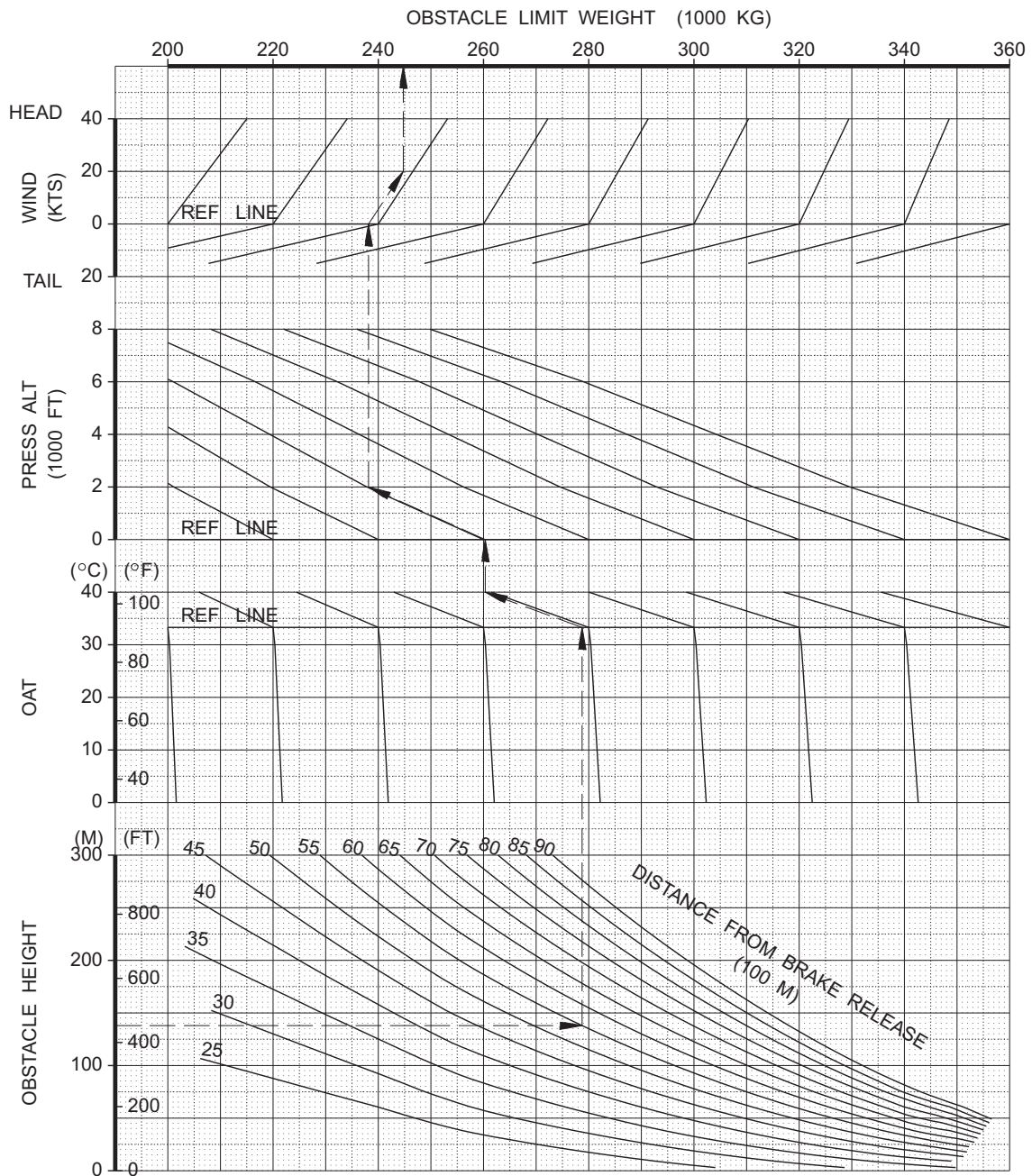
With engine bleed for packs off, increase weight by 900 kg.

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

Obstacle Limit

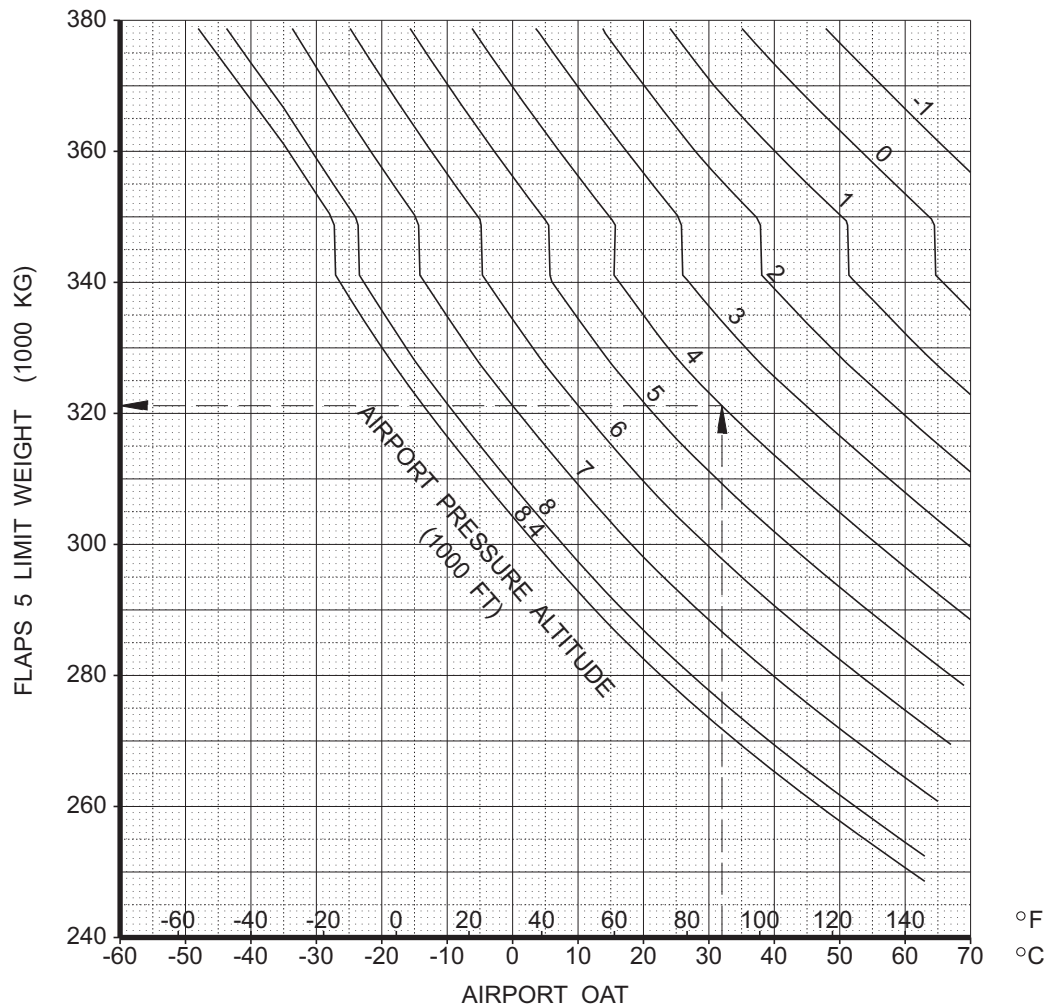
Flaps 20

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



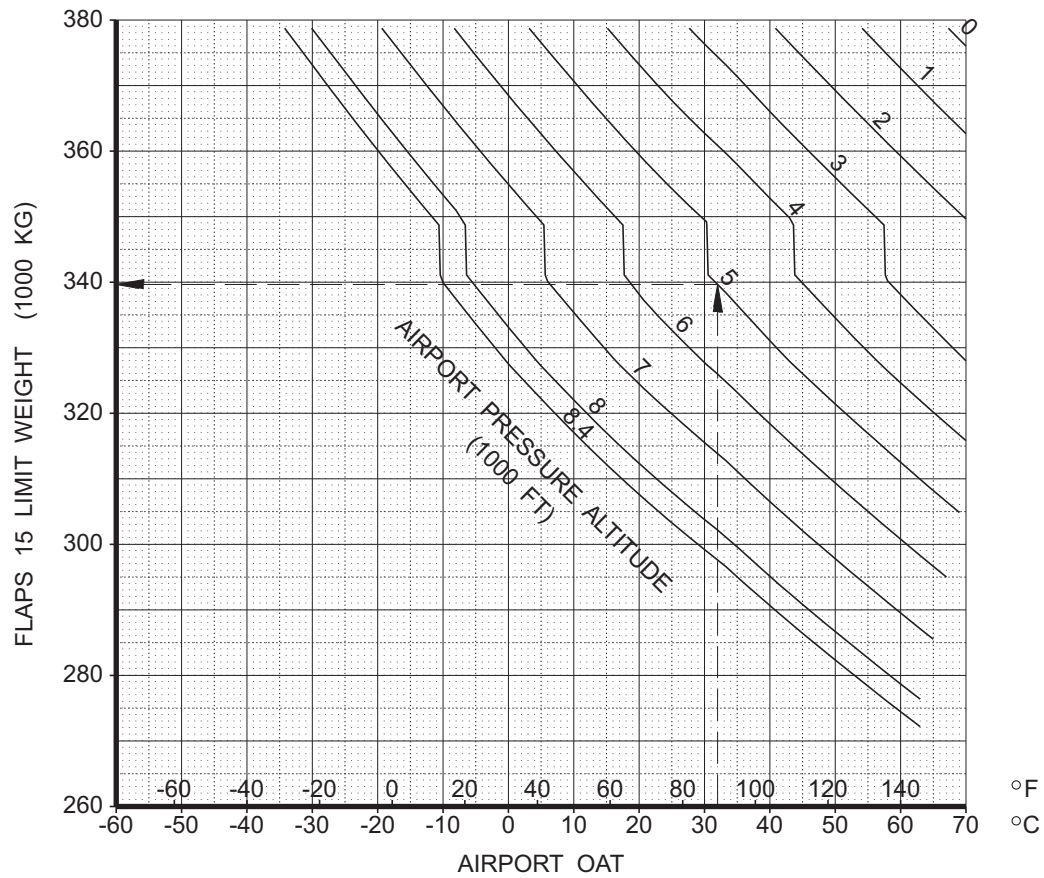
Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.
With engine bleed for packs off, increase weight by 900 kg.
With engine and wing anti-ice on, decrease weight by 2500 kg.

Tire Speed Limit Flaps 5



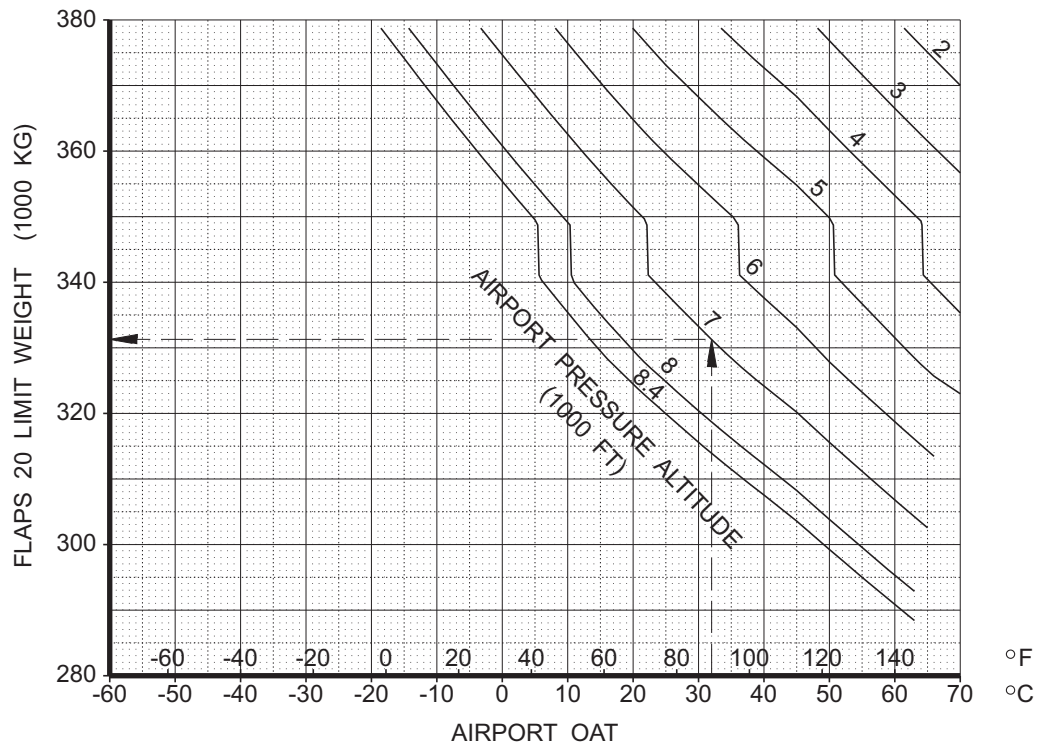
Increase tire speed limit weight by 2400 kg per knot headwind.
Decrease tire speed limit weight by 5650 kg per knot tailwind.

Tire Speed Limit Flaps 15

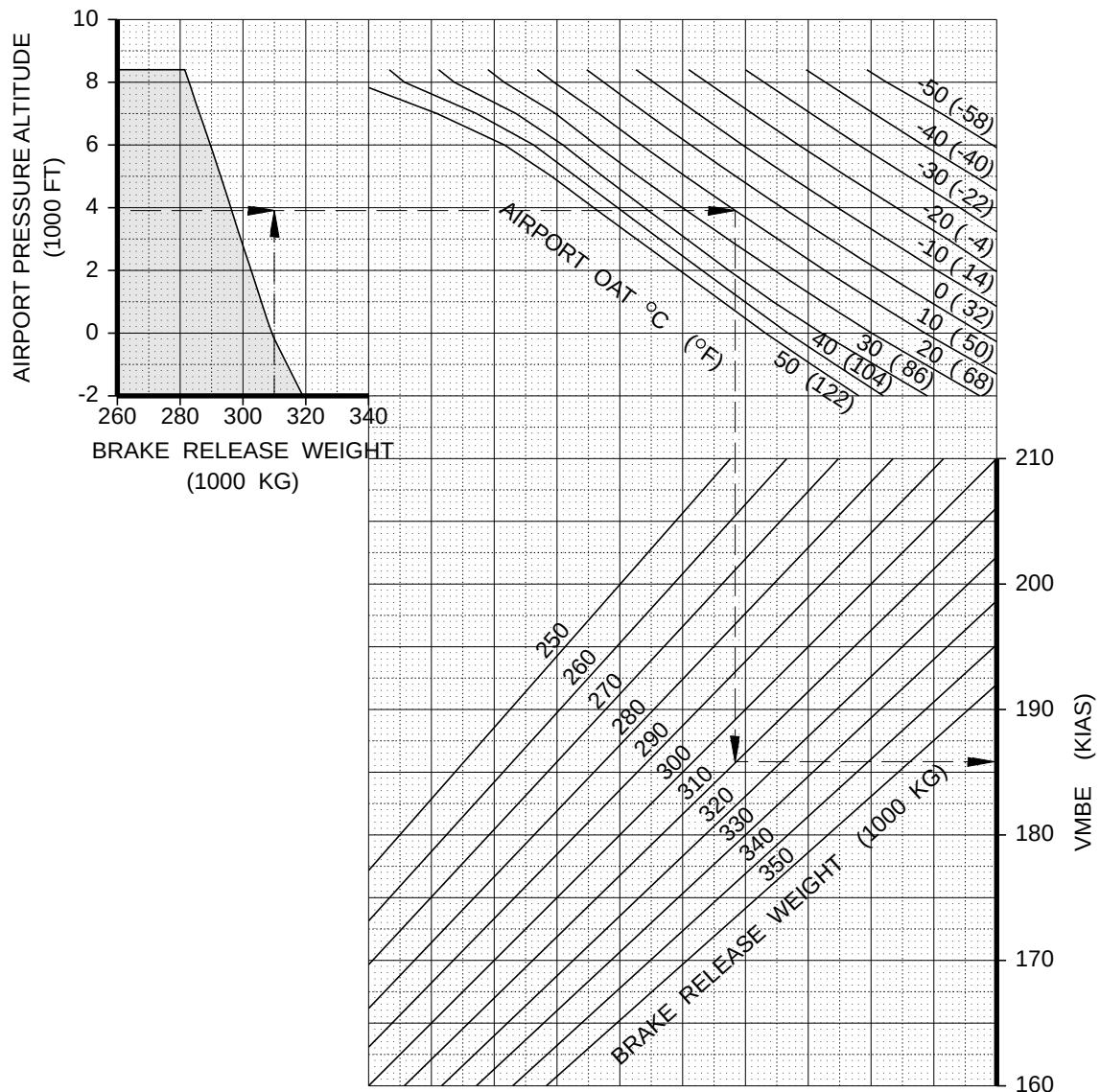


Increase tire speed limit weight by 2450 kg per knot headwind.
Decrease tire speed limit weight by 5600 kg per knot tailwind.

Tire Speed Limit Flaps 20



Brake Energy Limit VMBE



Check VMBE when outside shaded area, operating with tailwind, or using improved climb.

Adjust VMBE for slope, wind and brake configuration.

Increase VMBE by 2 knots for 1% uphill runway slope. Decrease VMBE by 5 knots for 1% downhill runway slope.

Increase VMBE by 4 knots for 10 knots headwind. Decrease VMBE by 20 knots for 10 knots tailwind.

Decrease VMBE by 10 knots for one brake deactivated and 21 knots for two brakes deactivated.

Normal takeoff:

Decrease brake release weight by 2050 kg for each knot V1 exceeds VMBE.

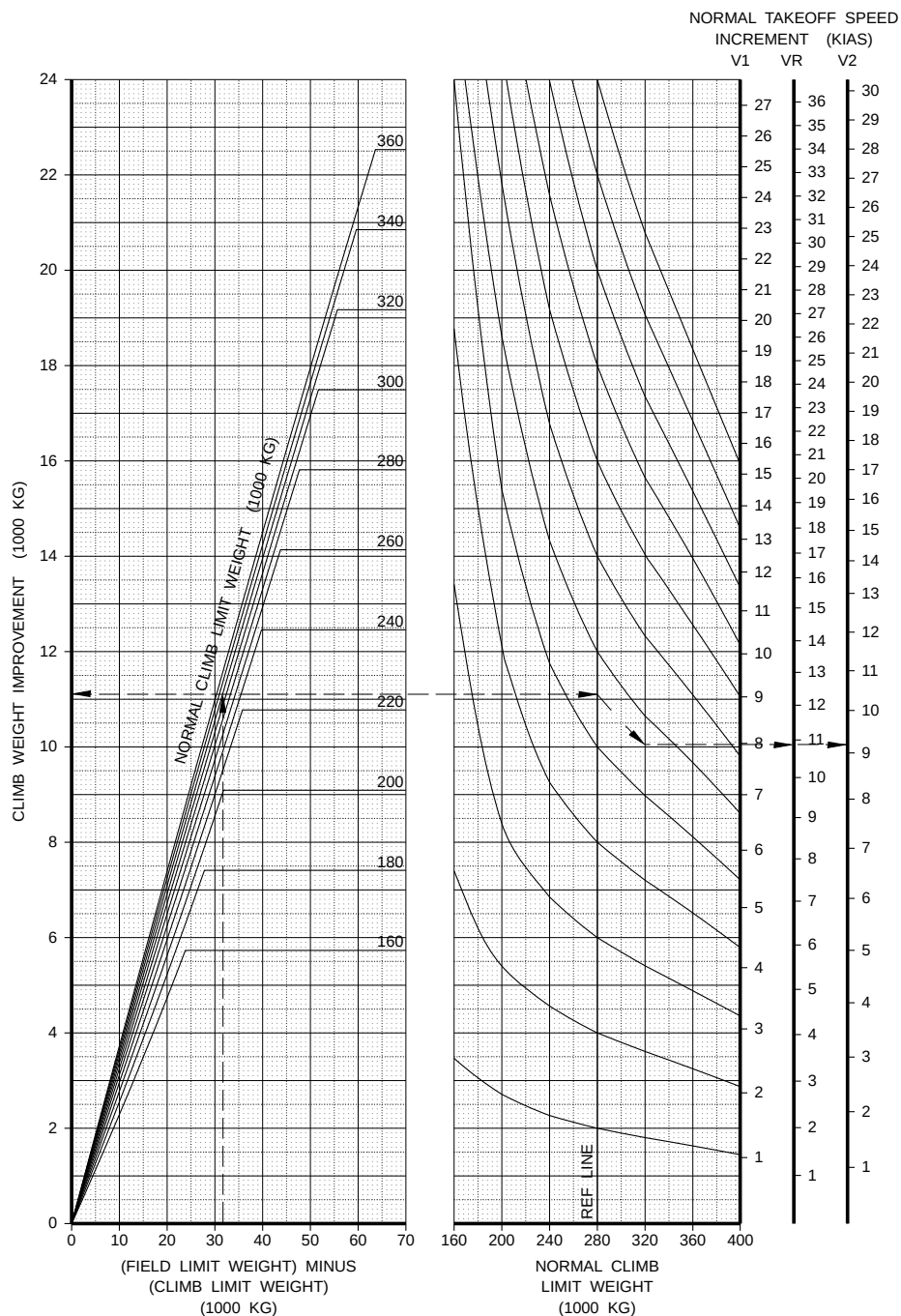
Determine normal V1, VR, V2 speeds for lower brake release weight.

Improved climb takeoff:

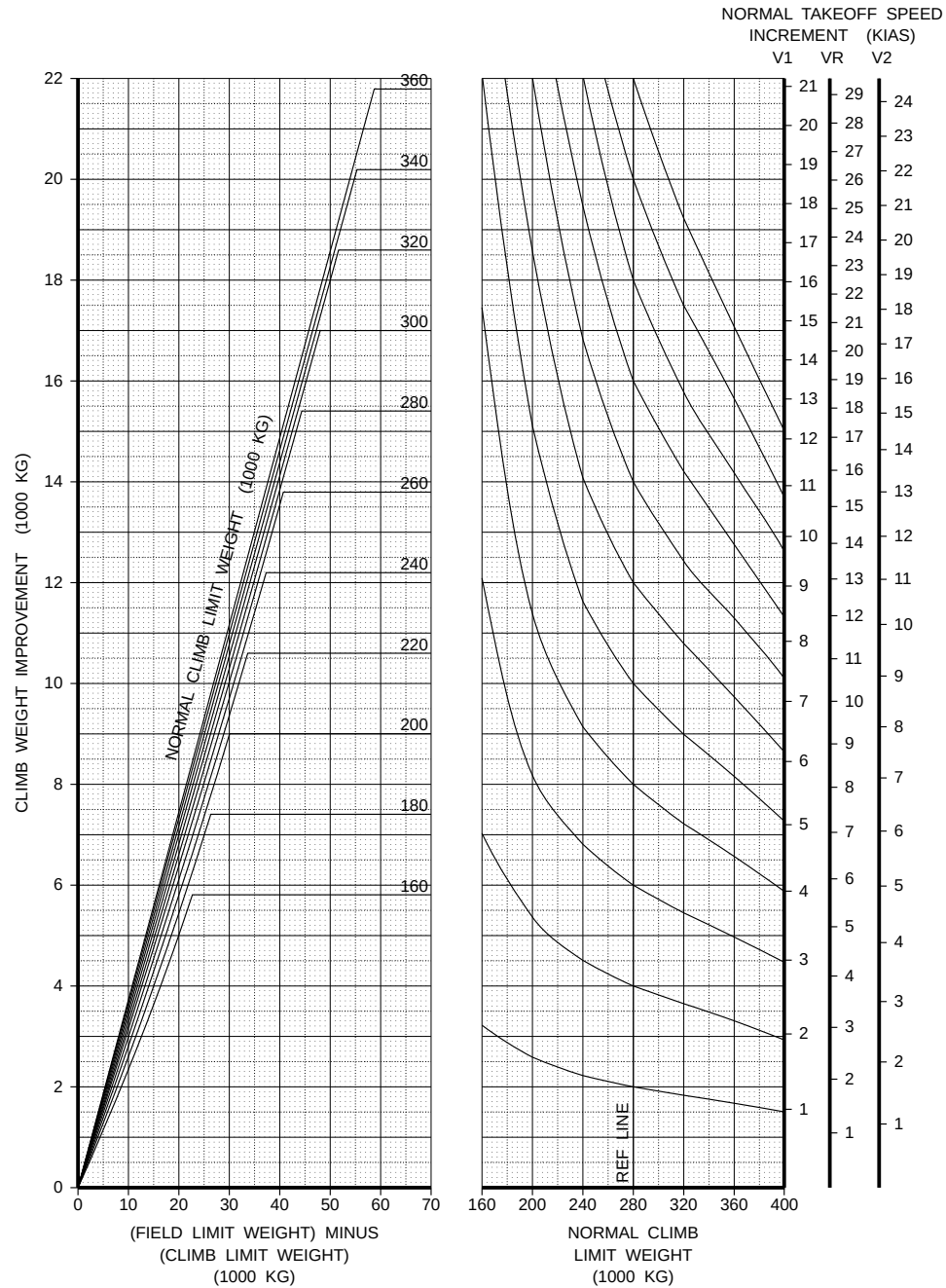
Decrease climb weight improvement by 800 kg for each knot V1 exceeds VMBE.

Determine V1, VR, V2 speed increments for the lower climb weight improvement.

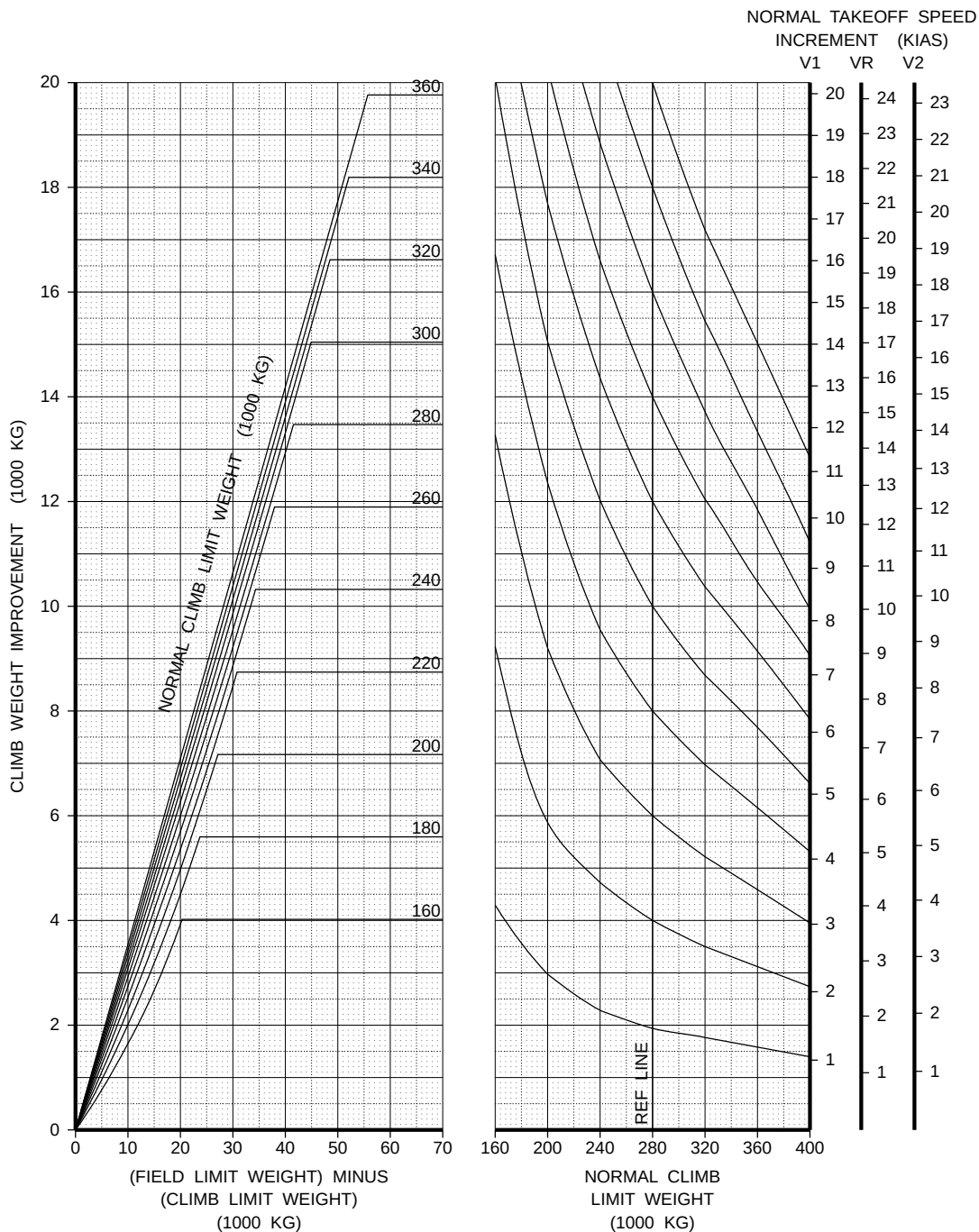
Improved Climb Field Length Limit - Dry Runway Flaps 5



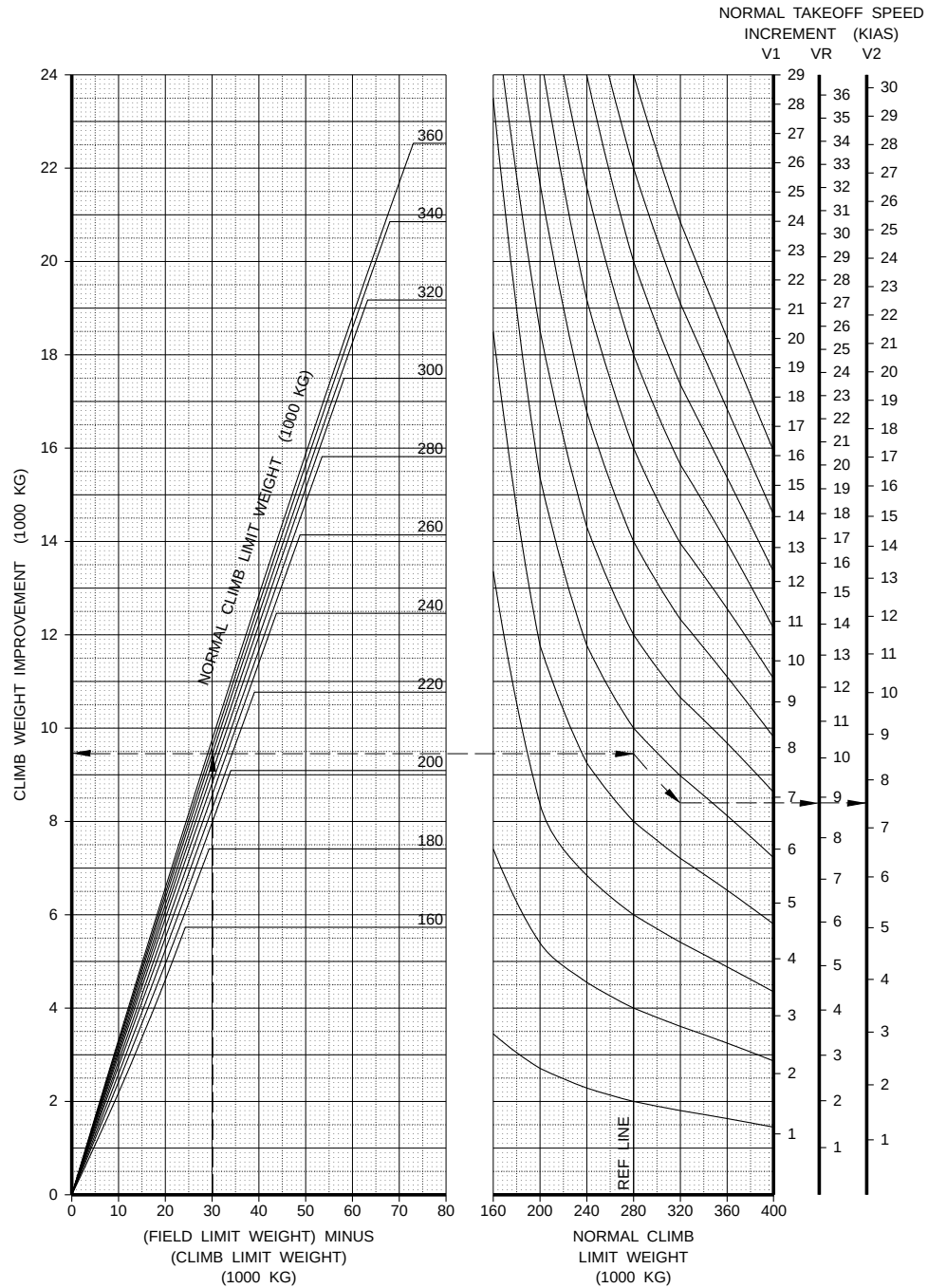
Improved Climb Field Length Limit - Dry Runway Flaps 15



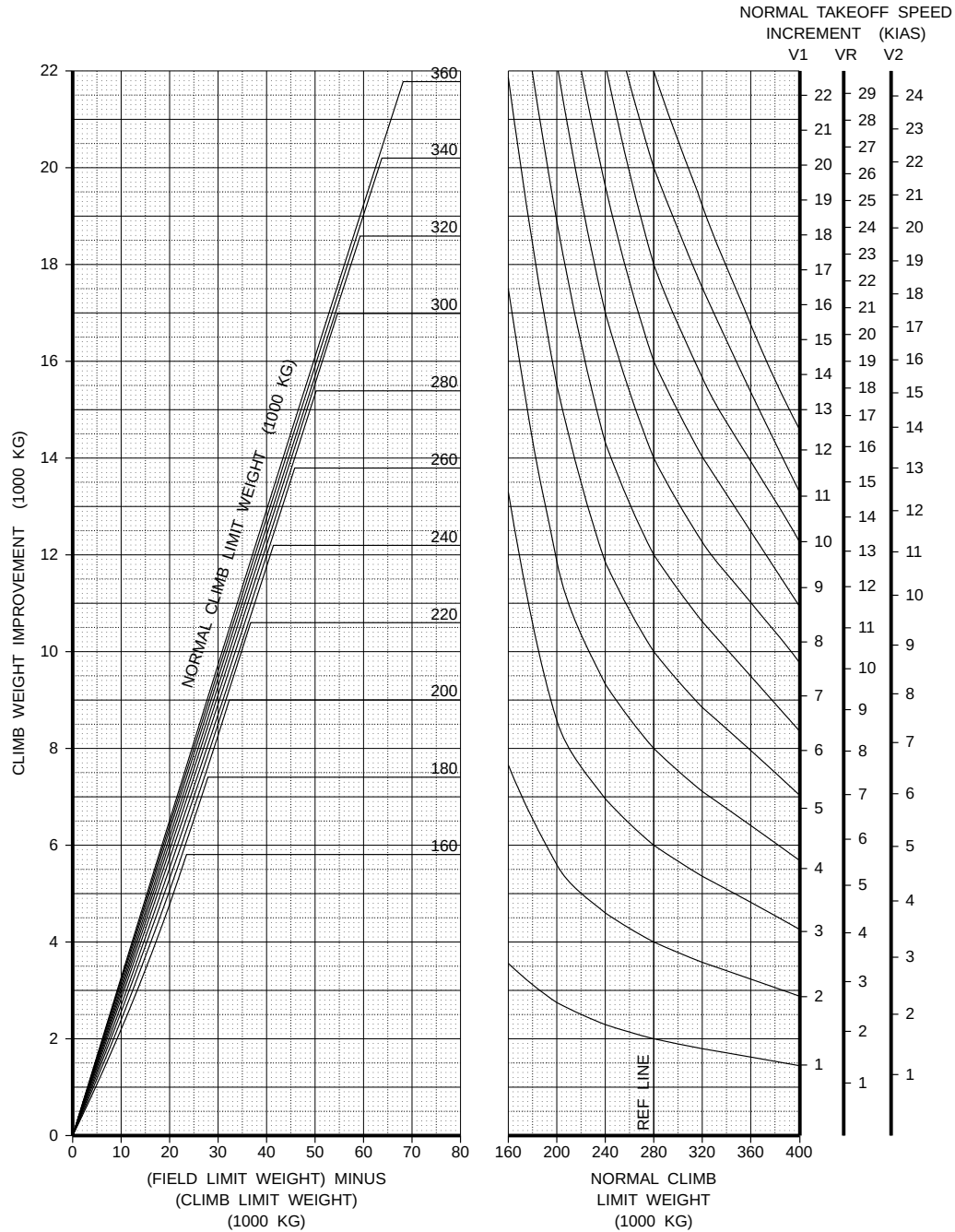
Improved Climb Field Length Limit - Dry Runway Flaps 20



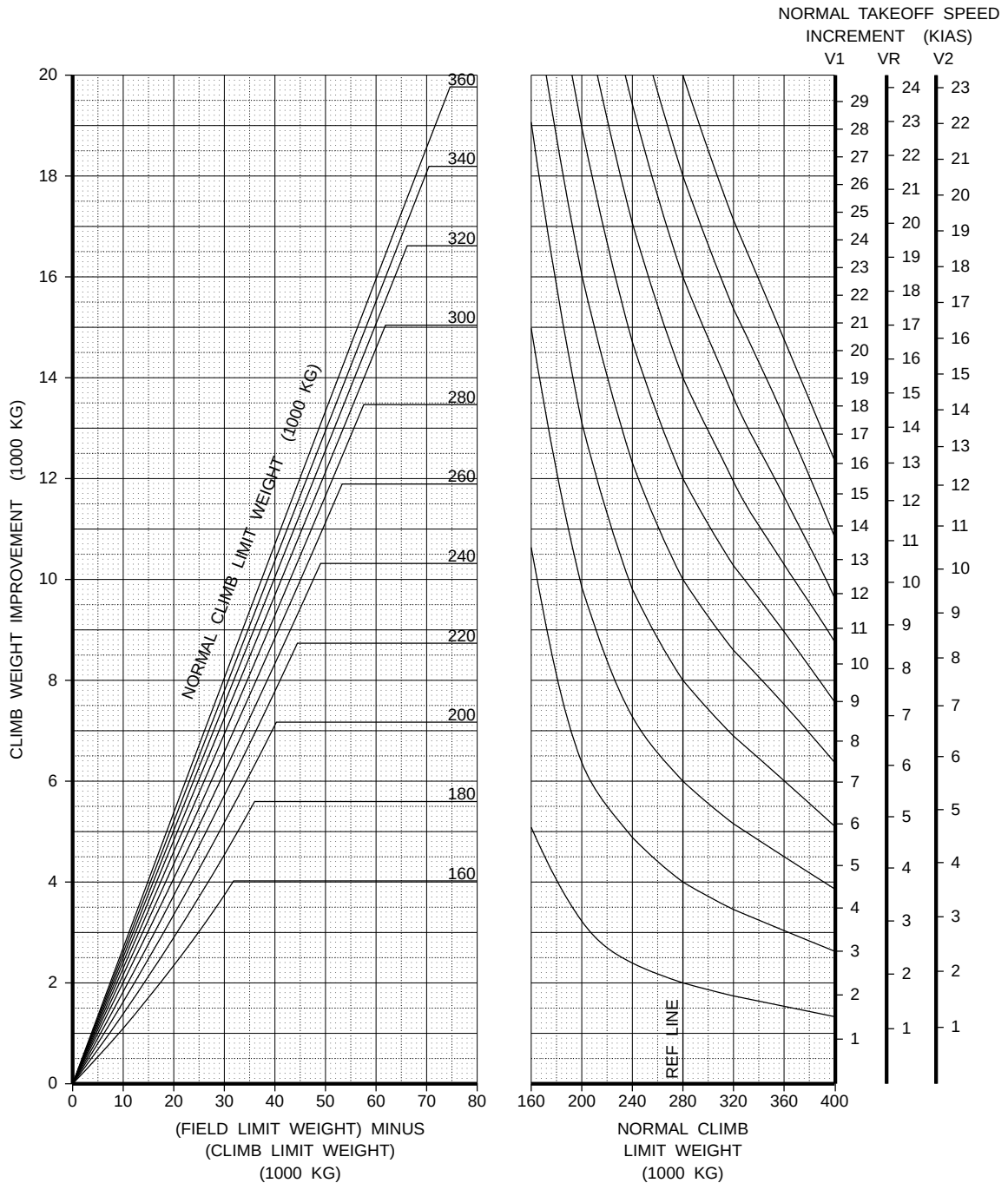
Improved Climb Field Length Limit - Wet Runway Flaps 5



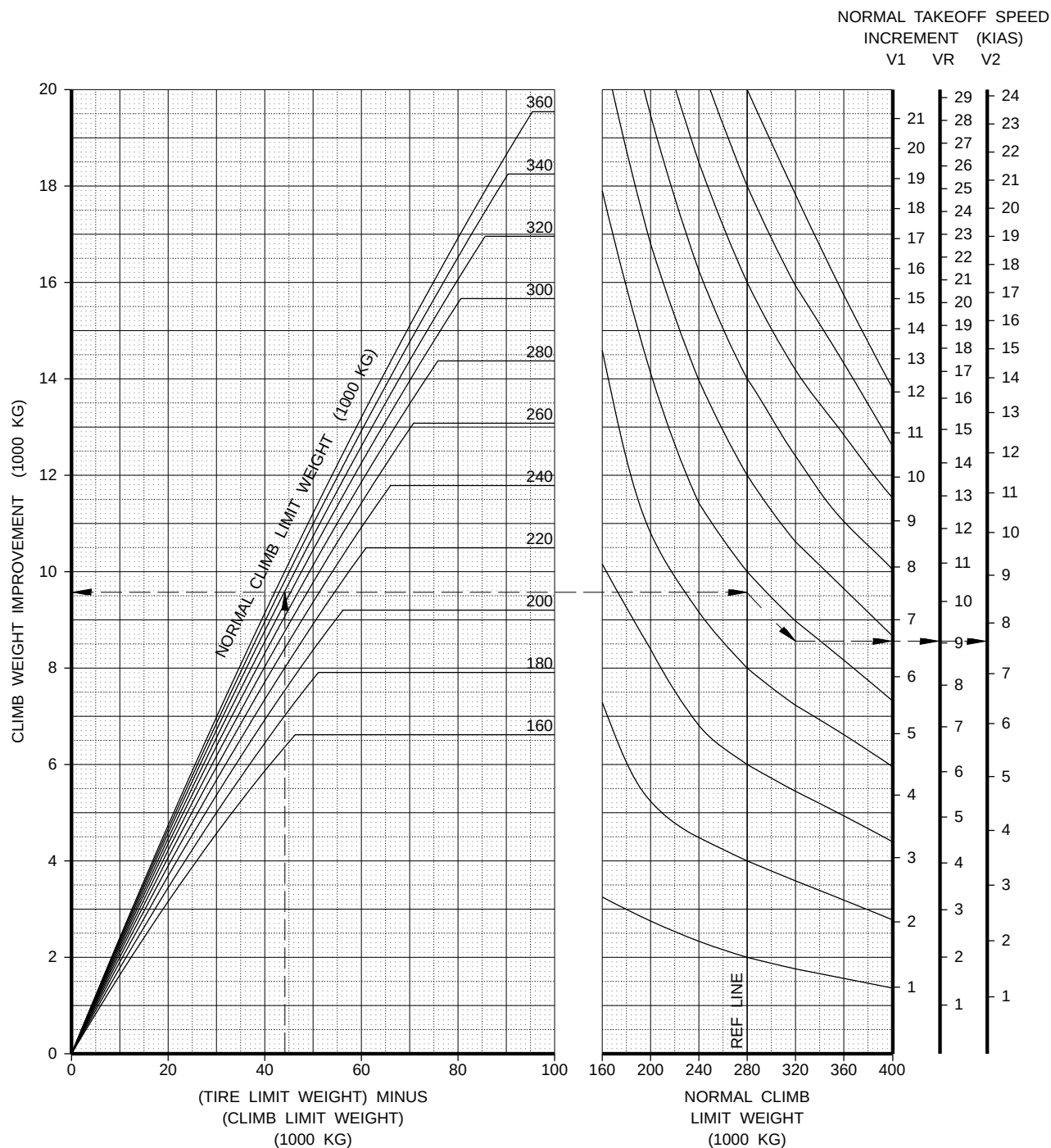
Improved Climb Field Length Limit - Wet Runway Flaps 15



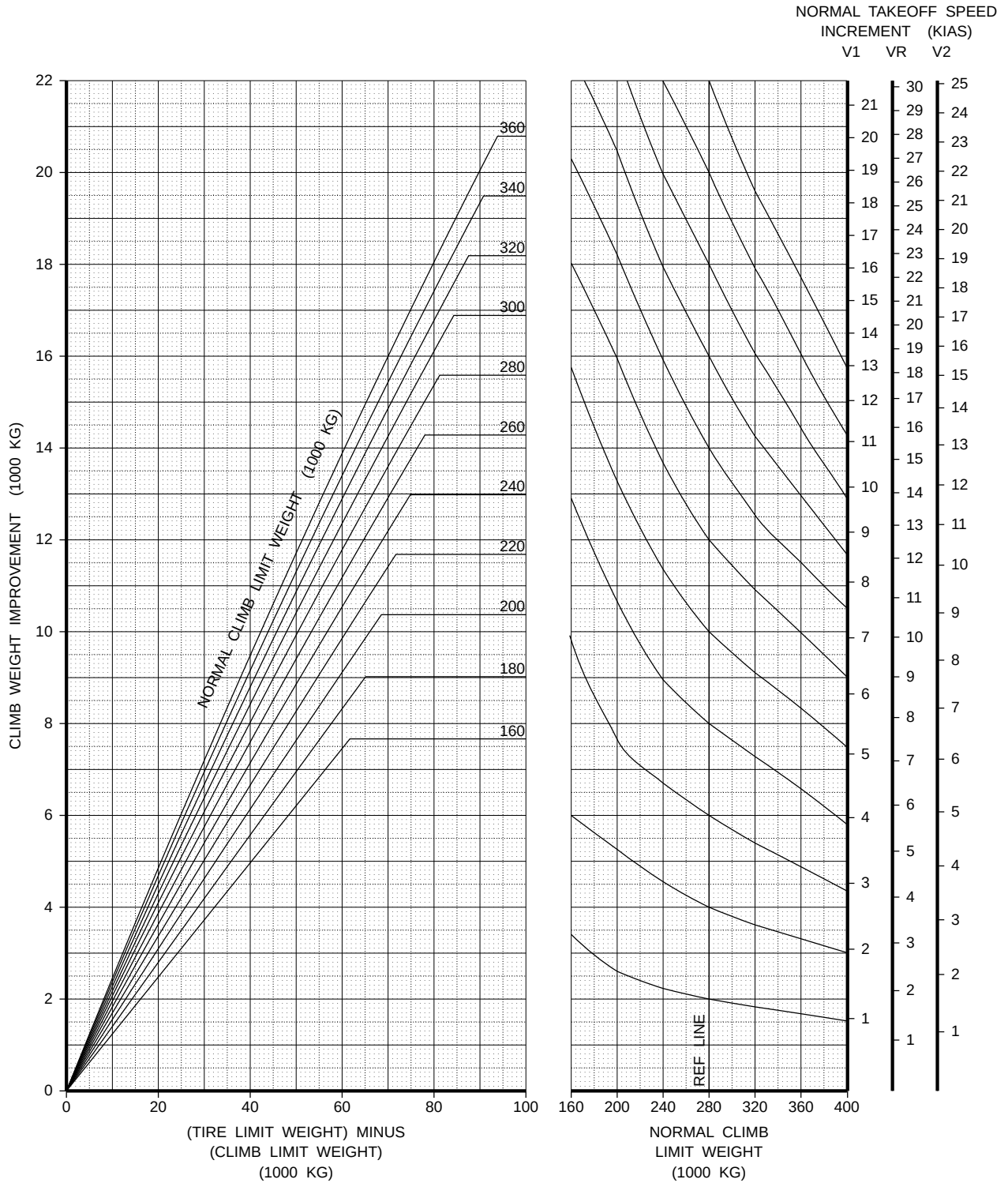
Improved Climb Field Length Limit - Wet Runway Flaps 20



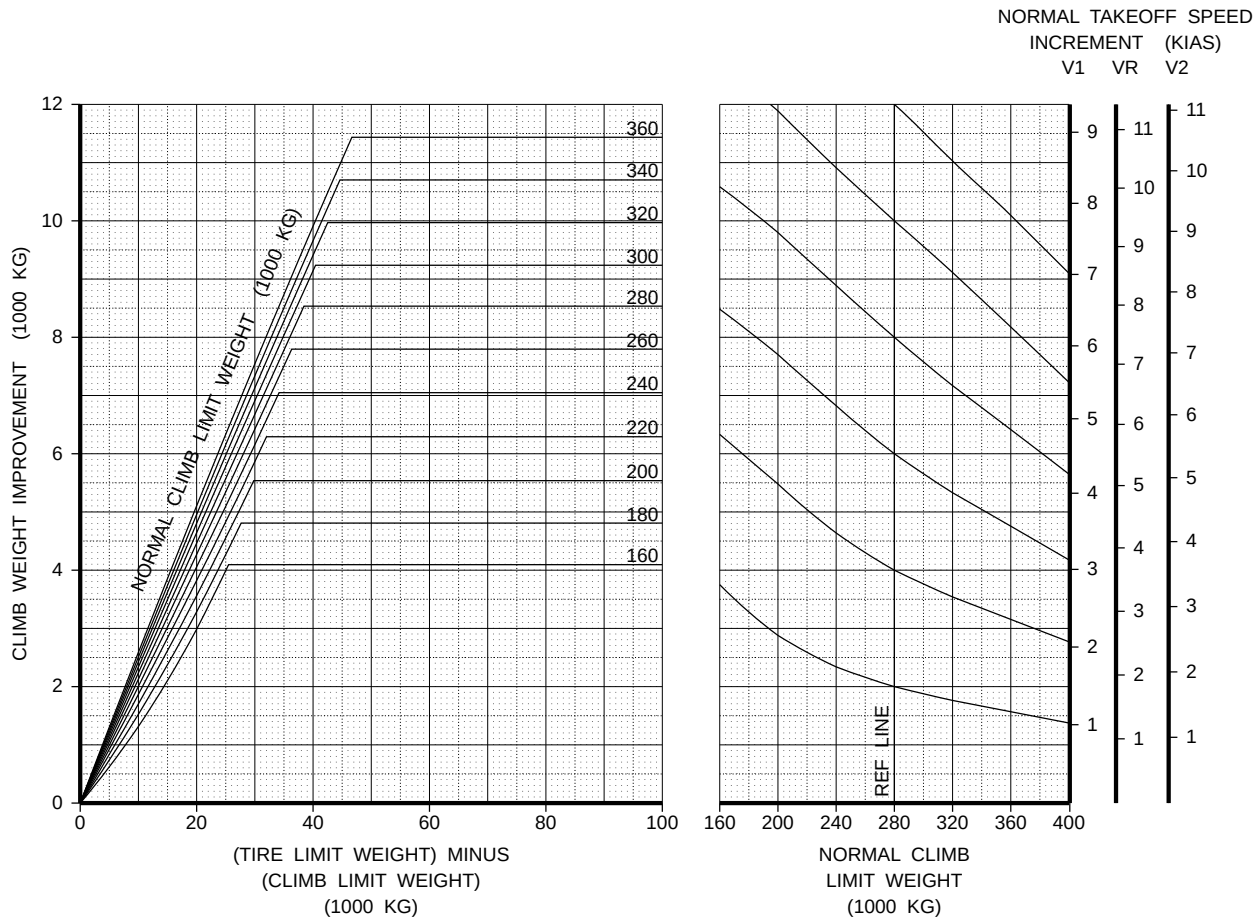
Improved Climb Tire Speed Limit - Dry Runway Flaps 5



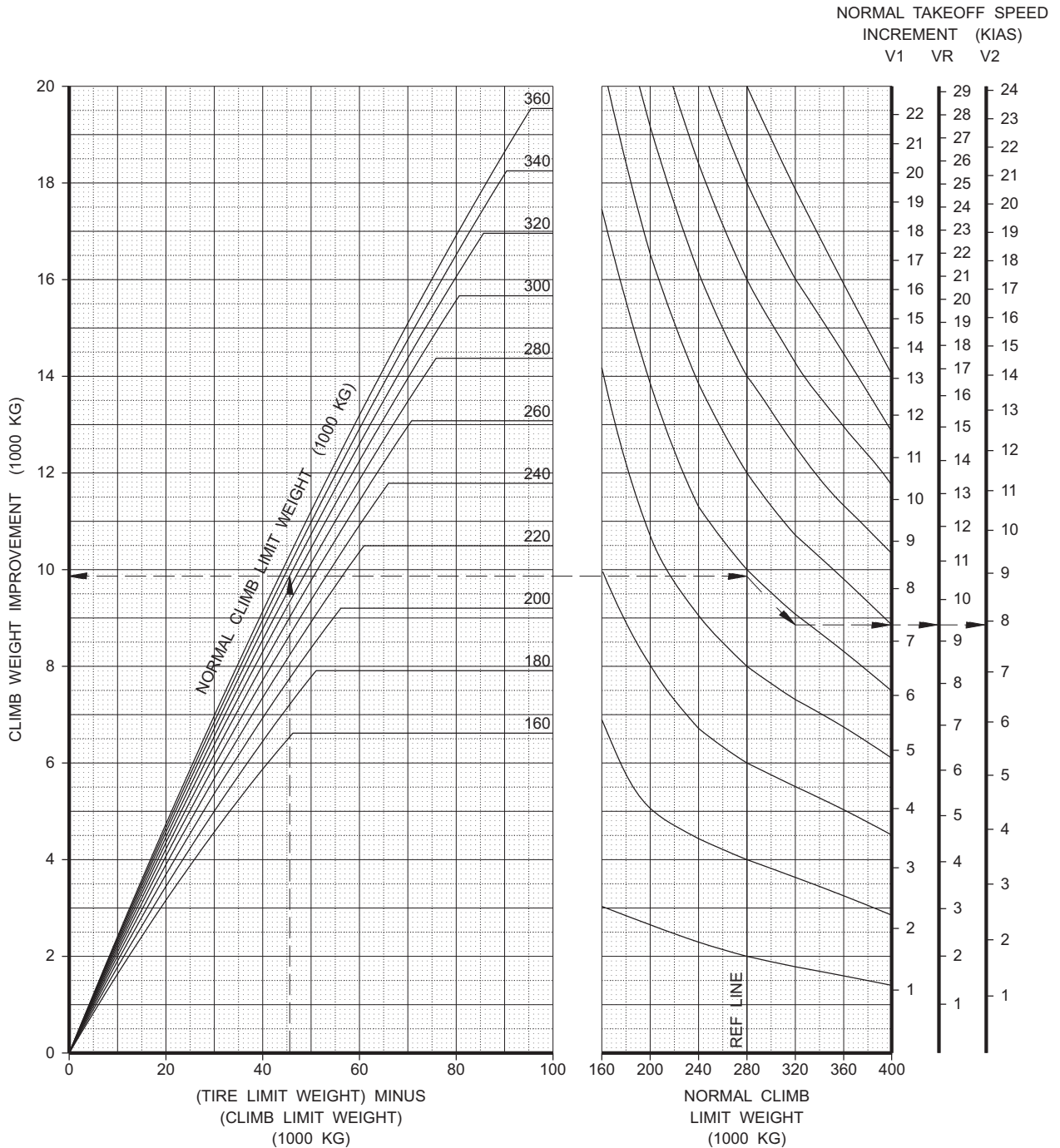
Improved Climb Tire Speed Limit - Dry Runway Flaps 15



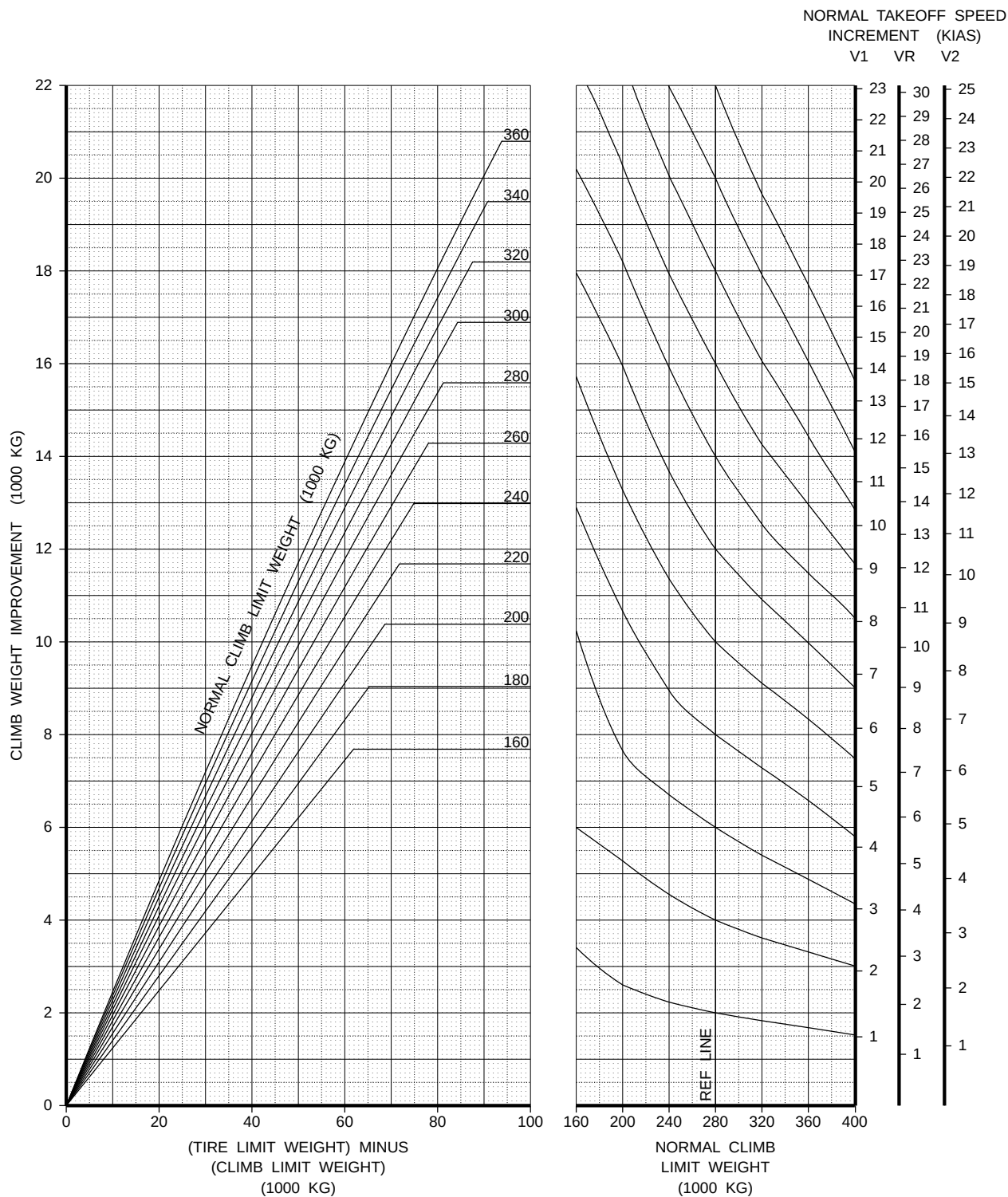
Improved Climb Tire Speed Limit - Dry Runway Flaps 20



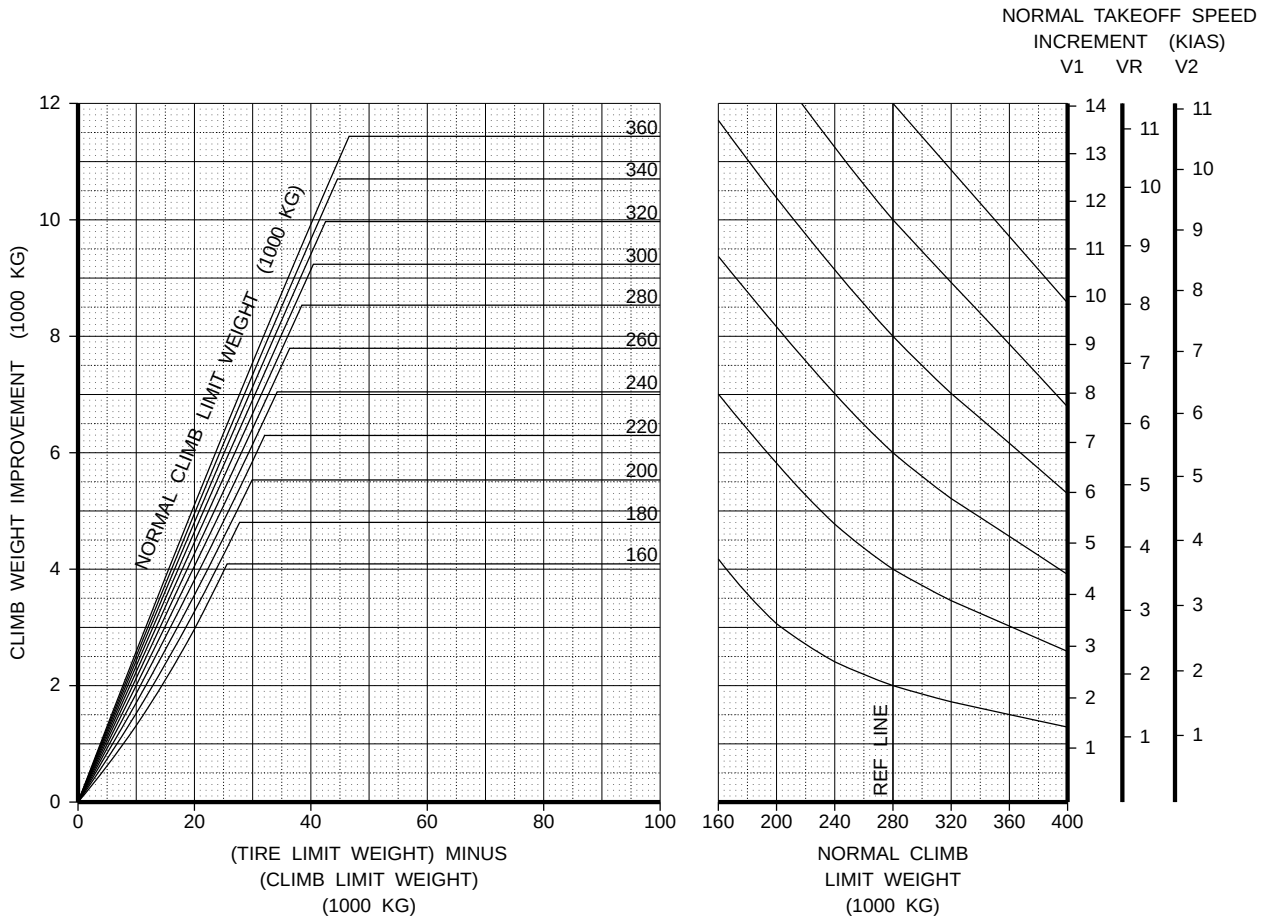
Improved Climb Tire Speed Limit - Wet Runway Flaps 5



Improved Climb Tire Speed Limit - Wet Runway Flaps 15



Improved Climb Tire Speed Limit - Wet Runway Flaps 20



ADVISORY INFORMATION

Slush/Standing Water Takeoff

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-36.7	-41.6	-46.5	-43.6	-48.5	-53.4	-55.0	-59.9	-64.8
340	-34.6	-39.5	-44.4	-40.8	-45.7	-50.6	-51.0	-55.9	-60.8
320	-32.3	-37.2	-42.1	-37.8	-42.7	-47.6	-46.8	-51.7	-56.6
300	-29.7	-34.6	-39.5	-34.5	-39.4	-44.3	-42.4	-47.3	-52.2
280	-26.8	-31.7	-36.6	-31.0	-35.9	-40.8	-37.8	-42.7	-47.6
260	-23.7	-28.6	-33.5	-27.3	-32.2	-37.1	-32.9	-37.8	-42.7
240	-20.4	-25.3	-30.2	-23.3	-28.2	-33.1	-27.9	-32.8	-37.7
220	-16.9	-21.7	-26.6	-19.1	-24.0	-28.9	-22.6	-27.5	-32.4
200	-13.0	-17.9	-22.8	-14.7	-19.6	-24.5	-17.1	-22.0	-26.9
180	-9.0	-13.9	-18.8	-10.0	-14.9	-19.8	-11.4	-16.3	-21.2
160	-4.9	-9.7	-14.6	-5.3	-10.2	-15.1	-5.6	-10.5	-15.4

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2200				134.1			155.7		
2400	155.7			168.7			190.4		
2600	190.1			203.4	137.9		225.3	159.5	
2800	224.7	159.5		238.4	172.5		260.5	194.2	128.6
3000	259.8	193.9	128.9	273.8	207.2	141.7	296.0	229.2	163.3
3200	295.3	228.6	163.3	309.5	242.3	176.3	331.8	264.4	198.0
3400	331.3	263.7	197.7	345.7	277.7	211.1	367.9	299.9	233.0
3600	367.8	299.3	232.4	382.2	313.5	246.1		335.8	268.3
3800		335.3	267.6		349.7	281.6		371.9	303.9
4000		371.8	303.2			317.4			339.7
4200			339.3			353.7			375.9
4400			375.8						

1. Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -65 m/+60 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-26	-24	-22	-22	-20	-18	-14	-12	-10
340	-28	-26	-24	-23	-21	-19	-15	-13	-11
320	-29	-27	-25	-25	-23	-21	-16	-14	-12
300	-30	-28	-26	-26	-24	-22	-18	-16	-14
280	-31	-29	-27	-27	-25	-23	-20	-18	-16
260	-31	-29	-27	-28	-26	-24	-21	-19	-17
240	-31	-29	-27	-29	-27	-25	-23	-21	-19
220	-31	-29	-27	-29	-27	-25	-24	-22	-20
200	-31	-29	-27	-29	-27	-25	-25	-23	-21
180	-30	-28	-26	-28	-26	-24	-25	-23	-21
160	-29	-27	-25	-28	-26	-24	-25	-23	-21

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

Slush/Standing Water Takeoff No Reverse Thrust Weight Adjustment (1000 KG)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-49.8	-54.9	-60.0	-57.7	-62.8	-67.9	-70.5	-75.6	-80.7
340	-46.7	-51.8	-56.8	-53.7	-58.8	-63.9	-64.9	-70.0	-75.1
320	-43.4	-48.4	-53.5	-49.6	-54.7	-59.8	-59.3	-64.3	-69.4
300	-39.9	-45.0	-50.0	-45.3	-50.4	-55.5	-53.6	-58.7	-63.8
280	-36.2	-41.3	-46.4	-40.9	-46.0	-51.1	-47.9	-53.0	-58.1
260	-32.4	-37.5	-42.6	-36.4	-41.4	-46.5	-42.2	-47.2	-52.3
240	-28.4	-33.5	-38.6	-31.7	-36.7	-41.8	-36.4	-41.5	-46.6
220	-24.3	-29.4	-34.4	-26.8	-31.9	-37.0	-30.6	-35.7	-40.8
200	-20.0	-25.0	-30.1	-21.8	-26.9	-32.0	-24.8	-29.9	-35.0
180	-15.5	-20.6	-25.7	-16.7	-21.8	-26.9	-19.0	-24.1	-29.1
160	-11.0	-16.0	-21.1	-11.5	-16.6	-21.7	-13.1	-18.2	-23.3

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
3200							128.5		
3400							177.1		
3600							223.7	125.0	
3800				165.6			266.2	173.6	
4000	132.1			221.2			305.4	220.5	121.5
4200	198.7			268.3	161.3		341.9	263.3	170.1
4400	253.1	127.2		309.7	217.5		376.6	302.6	217.3
4600	298.2	194.2		347.0	265.1	157.1		339.4	260.3
4800	337.4	249.6	122.4	382.0	306.8	213.7		374.2	299.9
5000	372.9	295.1	189.6		344.4	261.9			336.8
5200		334.7	246.0		379.5	304.0			371.7
5400		370.4	292.1			341.8			
5600			332.0			377.0			
5800			367.8						

1. Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -100 m/+95 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-42	-38	-34	-36	-32	-28	-23	-19	-15
340	-44	-40	-36	-38	-34	-30	-25	-21	-17
320	-45	-41	-37	-40	-36	-32	-27	-23	-19
300	-46	-42	-38	-41	-37	-33	-29	-25	-21
280	-47	-43	-39	-43	-39	-35	-32	-28	-24
260	-47	-43	-39	-44	-40	-36	-35	-31	-27
240	-48	-44	-40	-45	-41	-37	-37	-33	-29
220	-48	-44	-40	-45	-41	-37	-40	-36	-32
200	-48	-44	-40	-46	-42	-38	-41	-37	-33
180	-48	-44	-40	-46	-42	-38	-42	-38	-34
160	-48	-44	-40	-46	-42	-38	-43	-39	-35

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

ADVISORY INFORMATION

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

DRY 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
360	0.0	-1.5	-2.9	-21.4	-22.9	-24.3	-38.0	-39.5	-40.9
340	-1.6	-3.1	-4.5	-21.4	-22.8	-24.3	-36.4	-37.9	-39.3
320	-4.0	-5.5	-6.9	-21.3	-22.7	-24.2	-34.9	-36.3	-37.8
300	-5.4	-6.8	-8.3	-21.0	-22.5	-23.9	-33.3	-34.8	-36.2
280	-5.8	-7.3	-8.7	-20.5	-21.9	-23.4	-31.6	-33.1	-34.5
260	-5.8	-7.2	-8.7	-19.2	-20.7	-22.1	-29.1	-30.6	-32.0
240	-5.2	-6.7	-8.1	-17.2	-18.7	-20.1	-25.9	-27.3	-28.8
220	-4.2	-5.7	-7.2	-14.5	-15.9	-17.4	-21.9	-23.3	-24.8
200	-2.8	-4.2	-5.7	-11.0	-12.4	-13.9	-17.1	-18.5	-20.0
180	-0.8	-2.3	-3.7	-6.7	-8.2	-9.7	-11.5	-12.9	-14.4
160	0.0	-0.2	-1.6	-2.2	-3.7	-5.1	-5.6	-7.0	-8.5

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1600	143.2								
1800	210.7	144.9							
2000	277.9	212.3	146.5	121.3					
2200	344.9	279.5	213.9	169.0					
2400	411.7	346.5	281.1	217.0	152.7				
2600		413.3	348.1	266.5	200.4	136.4	140.9		
2800				317.9	249.4	184.0	172.2		
3000				371.1	300.1	232.4	203.7	140.5	
3200					352.7	282.5	236.1	171.8	
3400						334.5	269.6	203.3	140.2
3600						388.1	304.3	235.7	171.4
3800							340.2	269.2	202.9
4000							377.5	303.8	235.3
4200								339.8	268.8
4400								377.0	303.4
4600									339.4
4800									376.6

1. Enter Weight Adjustment table with reported braking action and dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -35 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -65 m/+60 m 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
360	-6	-4	-2	-18	-16	-14	-33	-31	-29
340	-9	-7	-5	-21	-19	-17	-36	-34	-32
320	-10	-8	-6	-23	-21	-19	-39	-37	-35
300	-12	-10	-8	-25	-23	-21	-41	-39	-37
280	-13	-11	-9	-27	-25	-23	-42	-40	-38
260	-14	-12	-10	-28	-26	-24	-44	-42	-40
240	-14	-12	-10	-29	-27	-25	-45	-43	-41
220	-15	-13	-11	-30	-28	-26	-45	-43	-41
200	-15	-13	-11	-30	-28	-26	-46	-44	-42
180	-16	-14	-12	-30	-28	-26	-46	-44	-42
160	-16	-14	-12	-30	-28	-26	-46	-44	-42

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

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

DRY 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
360	-6.0	-7.1	-8.2	-33.7	-34.8	-35.9	-54.8	-55.9	-56.9
340	-8.4	-9.5	-10.6	-32.9	-34.0	-35.1	-51.6	-52.7	-53.8
320	-10.2	-11.3	-12.4	-32.1	-33.2	-34.3	-48.9	-50.0	-51.0
300	-11.4	-12.5	-13.6	-31.5	-32.6	-33.6	-46.5	-47.6	-48.7
280	-12.0	-13.1	-14.1	-30.6	-31.7	-32.8	-44.2	-45.3	-46.3
260	-11.9	-13.0	-14.1	-28.8	-29.9	-31.0	-41.1	-42.2	-43.3
240	-11.1	-12.2	-13.3	-26.1	-27.2	-28.3	-37.3	-38.4	-39.5
220	-9.7	-10.8	-11.9	-22.5	-23.5	-24.6	-32.8	-33.9	-35.0
200	-7.6	-8.7	-9.8	-17.9	-19.0	-20.1	-27.5	-28.6	-29.7
180	-4.9	-6.0	-7.1	-12.4	-13.5	-14.6	-21.4	-22.5	-23.6
160	-1.9	-3.0	-4.1	-6.5	-7.6	-8.7	-15.1	-16.2	-17.3

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
2000	160.9								
2200	267.5	171.1							
2400	351.0	275.4	181.3						
2600		357.5	283.1						
2800			364.0						
3200				221.8					
3400				316.2	183.1				
3600				385.4	293.6	138.0			
3800					366.8	268.7			
4000						348.1			
4800							121.1		
5000							195.4		
5200							267.3	143.0	
5400							335.7	216.9	
5600								287.7	164.8
5800								355.3	238.1
6000									307.9

1. Enter Weight Adjustment table with reported braking action and dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -60 m/+55 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -95 m/+90 m 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
360	-10	-6	-2	-27	-23	-19	-54	-50	-46
340	-12	-8	-4	-31	-27	-23	-58	-54	-50
320	-14	-10	-6	-34	-30	-26	-62	-58	-54
300	-16	-12	-8	-37	-33	-29	-65	-61	-57
280	-18	-14	-10	-39	-35	-31	-68	-64	-60
260	-19	-15	-11	-41	-37	-33	-71	-67	-63
240	-21	-17	-13	-43	-39	-35	-73	-69	-65
220	-22	-18	-14	-45	-41	-37	-75	-71	-67
200	-23	-19	-15	-48	-44	-40	-77	-73	-69
180	-24	-20	-16	-50	-46	-42	-77	-73	-69
160	-25	-21	-17	-52	-48	-44	-78	-74	-70

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

Takeoff Speeds - Dry Runway**V1, VR, V2 for Max Takeoff Thrust**

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
360	175	184	186	167	174	178	164	170	175
340	171	180	183	164	170	176	159	165	171
320	166	174	179	158	165	171	154	159	167
300	160	167	174	152	158	166	148	153	162
280	153	160	168	146	152	161	142	147	157
260	146	153	163	138	145	156	134	140	152
240	138	146	157	130	138	151	126	133	146
220	129	138	151	122	131	145	118	126	141
200	120	129	145	113	123	139	110	118	135
180	110	120	138	103	114	132	99	110	128
160	99	111	131	93	105	125	88	101	121
140	88	102	123	82	96	118	76	91	114

Check V1(MCG), Minimum V2, and Minimum Takeoff Weight.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	12	15					6	7					-2	-3				
60	140	8	10	13	15			4	5	7	8			-2	-2	-2	-3		
50	122	4	6	8	11	14	17	2	3	5	6	7	9	-1	-1	-2	-2	-2	-3
40	104	1	2	5	7	10	14	1	1	3	4	6	8	0	-1	-1	-1	-2	-2
30	86	0	0	2	4	7	11	0	0	1	3	4	6	0	0	0	-1	-1	-2
20	68	0	0	1	3	5	9	0	0	1	2	3	5	0	0	0	-1	-1	-2
-60	-76	0	0	1	3	5	8	0	0	1	2	3	4	0	0	0	-1	-1	-1

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
360	-4	-2	0	3	6	-3	-2	0	0	1	2	3	4	
340	-4	-1	0	3	5	-3	-2	0	0	1	2	3	3	
320	-3	-1	0	3	5	-2	-1	0	0	1	2	3	3	
300	-3	-1	0	3	4	-2	-1	0	0	1	2	3	3	
280	-3	-1	0	3	4	-2	-1	0	0	1	2	2	3	
260	-2	-1	0	2	4	-2	-1	0	0	1	2	2	3	
240	-2	0	0	2	4	-1	-1	0	0	1	2	3	3	
220	-2	0	0	2	4	-1	0	0	0	1	2	3	3	
200	-2	0	0	3	4	-1	0	0	0	1	2	3	3	
180	-1	0	0	3	4	-1	0	1	0	1	3	3	4	
160	-1	0	0	3	4	-1	0	1	0	1	3	3	4	
140	-1	0	0	3	4	-1	0	1	0	1	3	4	4	

Max Allowable Clearway for V1 Adjustment

FIELD LENGTH (M)	1500	2000	2500	3000	3500	4000	4500
MAX ALLOWABLE CLEARWAY (M)	175	220	260	300	340	400	450

Clearway and Stopway V1 Adjustments*

NORMAL V1 (KIAS)	CLEARWAY MINUS STOPWAY (M)					
	300	200	100	0	-100	-300
100	-2	-2	-2	0	4	7
120	-3	-3	-2	0	4	6
140	-3	-3	-1	0	3	5
160	-3	-2	-1	0	2	5

*V1 not to exceed VR

Takeoff Speeds - Dry Runway

V1(MCG)

Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)					
°C	°F	-2000	0	2000	4000	6000	8000
60	140	125	121	119	117		
50	122	128	125	119	117	115	110
40	104	136	133	127	122	116	110
30	86	138	137	133	127	122	115
20	68	138	138	134	130	126	119
-60	-76	140	139	135	131	127	121

Minimum V2

Max Takeoff Thrust

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	137	135	133	130	128	126
15	135	133	131	128	126	123
20	134	131	128	125	123	120

Takeoff Speeds - Wet Runway**V1, VR, V2 for Max Takeoff Thrust**

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
360	168	184	186	159	174	178	156	170	175
340	163	180	183	155	170	176	150	165	171
320	156	174	179	148	165	171	144	159	167
300	149	167	174	141	158	166	137	153	162
280	141	160	168	134	152	161	130	147	157
260	133	153	163	126	145	156	122	140	152
240	125	146	157	118	138	151	114	133	146
220	116	138	151	110	131	145	106	126	141
200	108	129	145	100	123	139	99	118	135
180	97	121	138	92	114	132	89	110	128
160	87	111	131	81	105	125	78	101	121
140	78	102	123	71	96	118	67	91	114

Check V1(MCG), Minimum V2, and Minimum Takeoff Weight.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	14	17					6	7					-2	-3				
60	140	9	11	14	16			4	5	7	8			-2	-2	-2	-3		
50	122	5	7	9	12	14	18	2	3	5	6	7	9	-1	-1	-2	-2	-2	-3
40	104	1	2	5	8	11	15	1	1	3	4	6	8	0	-1	-1	-1	-2	-2
30	86	0	0	2	5	8	12	0	0	1	3	4	6	0	0	0	-1	-1	-2
20	68	0	0	1	3	6	9	0	0	1	2	3	5	0	0	0	-1	-1	-2
-60	-76	0	0	1	3	5	8	0	0	1	2	3	4	0	0	0	-1	-1	-1

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
360	-6	-3	0	3	6	-4	-3	-1	0	1	2	3	4	
340	-6	-3	0	3	6	-4	-3	-1	0	1	2	3	4	
320	-6	-3	0	3	6	-5	-3	-1	0	1	2	3	4	
300	-5	-3	0	3	5	-5	-3	-1	0	1	2	3	4	
280	-5	-2	0	3	5	-5	-3	-1	0	1	2	3	4	
260	-4	-2	0	3	5	-5	-3	-1	0	1	3	4	5	
240	-4	-2	0	3	5	-5	-3	-1	0	1	3	4	5	
220	-3	-1	0	3	5	-4	-2	-1	0	2	3	4	5	
200	-3	-1	0	3	5	-4	-2	0	0	2	4	5	6	
180	-2	0	0	4	6	-3	-1	0	0	2	4	5	6	
160	-1	1	0	4	6	-2	-1	1	0	2	5	6	7	
140	0	2	0	5	6	-2	0	2	0	3	5	6	7	

Stopway V1 Adjustments*

NORMAL V1 (KIAS)	STOPWAY (M)			
	0	100	200	300
100	0	3	5	7
120	0	2	4	6
140	0	2	4	5
160	0	1	3	4

Use of clearway not allowed on wet runways.

*V1 not to exceed VR

V1(MCG)**Max Takeoff Thrust**

TEMP		PRESSURE ALTITUDE (FT)					
		-2000	0	2000	4000	6000	8000
60	140	125	121	119	117		
50	122	128	125	119	117	115	110
40	104	136	133	127	122	116	110
30	86	138	137	133	127	122	115
20	68	138	138	134	130	126	119
-60	-76	140	139	135	131	127	121

Takeoff Speeds - Wet Runway

Minimum V2

Max Takeoff Thrust

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	137	135	133	130	128	126
15	135	133	131	128	126	123
20	134	131	128	125	123	120

Takeoff %N1

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

Max Takeoff Thrust

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
70	158	91.4	91.7	92.0	91.8	91.7	91.8	91.9	91.9	91.8	91.2	90.3	89.9
60	140	94.3	94.6	94.8	94.7	94.6	94.7	94.7	94.7	94.7	94.1	93.2	92.8
55	131	95.7	96.0	96.2	96.1	96.0	96.1	96.1	96.1	96.1	95.5	94.6	94.2
50	122	97.1	97.5	98.0	97.6	97.3	97.4	97.5	97.5	97.4	96.8	95.9	95.6
45	113	98.5	98.9	99.4	99.1	98.8	98.7	98.8	98.8	98.7	98.2	97.3	96.9
40	104	99.6	100.2	100.9	100.4	100.2	100.0	99.9	100.0	99.9	99.4	98.6	98.2
35	95	99.3	100.8	102.8	102.3	101.8	101.4	101.2	101.3	101.0	100.4	99.6	99.3
30	86	98.5	99.9	102.7	104.0	104.0	103.8	103.4	103.4	102.6	101.5	100.7	100.3
25	77	97.7	99.1	101.8	103.1	104.4	105.5	105.8	106.3	105.3	103.8	102.4	101.8
20	68	96.9	98.3	101.0	102.3	103.5	104.6	105.8	106.8	106.8	105.9	104.8	104.3
15	59	96.0	97.4	100.1	101.4	102.6	103.7	104.9	105.9	106.4	106.1	105.6	105.3
10	50	95.2	96.6	99.2	100.5	101.7	102.8	103.9	105.0	105.5	105.2	104.9	104.7
5	41	94.4	95.7	98.4	99.6	100.8	101.9	103.0	104.1	104.5	104.2	104.0	103.8
0	32	93.5	94.9	97.5	98.7	99.9	101.0	102.1	103.1	103.6	103.3	103.0	102.9
-10	14	91.8	93.1	95.7	96.9	98.1	99.1	100.2	101.2	101.7	101.4	101.1	101.0
-20	-4	90.0	91.3	93.8	95.0	96.2	97.2	98.3	99.3	99.7	99.4	99.2	99.0
-30	-22	88.2	89.5	92.0	93.1	94.3	95.3	96.3	97.3	97.7	97.5	97.2	97.1
-40	-40	86.4	87.6	90.1	91.2	92.3	93.3	94.3	95.3	95.7	95.4	95.2	95.1
-50	-58	84.5	85.7	88.1	89.2	90.3	91.3	92.3	93.2	93.6	93.4	93.1	93.0

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
1 PACK ON	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

Stab Trim Setting**Max Takeoff Thrust****Flaps 5**

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	9	7 3/4	6 1/2	5	3 1/2	2 3/4	2
340	9	7 3/4	6 1/4	4 3/4	3 1/2	2 1/2	2
320	8 3/4	7 1/2	6	4 1/2	3 1/4	2 1/2	2
300	8 1/2	7	5 3/4	4 1/4	3 1/4	2 1/2	1 3/4
280	8 1/4	6 3/4	5 1/4	3 3/4	3	2 1/4	1 3/4
260	7 3/4	6 1/4	5	3 1/2	2 3/4	2 1/4	1 3/4
240	7 1/4	5 3/4	4 1/2	3 1/4	2 1/2	2	1 1/2
220	6 1/4	5 1/4	4	3	2 1/2	2	1 1/2
200	5 1/4	4 1/4	3 1/4	2 1/2	2	1 3/4	1 1/4
180	4 1/4	3 1/2	2 3/4	2	1 3/4	1 1/4	3/4
160	3	2 1/2	2	1 3/4	1 1/4	1	1/2

Flaps 15

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	10 1/4	8 1/2	6 3/4	5	3 1/2	2 3/4	2 1/4
340	9 3/4	8	6 1/2	5	3 1/2	2 3/4	2
320	9 1/4	7 1/2	6 1/4	4 3/4	3 1/4	2 1/2	2
300	9	7 1/4	5 3/4	4 1/2	3 1/4	2 1/2	2
280	8 3/4	6 3/4	5 1/2	4	3	2 1/2	1 3/4
260	8	6 1/4	4 3/4	3 3/4	2 3/4	2 1/4	1 3/4
240	6 3/4	5 1/4	4	3 1/4	2 1/2	2	1 1/2
220	5 3/4	4 1/2	3 1/2	2 3/4	2 1/4	1 3/4	1 1/4
200	4 3/4	3 3/4	3	2 1/2	2	1 1/2	1 1/4
180	3 3/4	3 1/4	2 1/2	2	1 3/4	1 1/4	1
160	3	2 1/2	2	1 3/4	1 1/2	1 1/4	1

Flaps 20

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	11 1/4	9 1/4	7 1/2	6	4 1/4	3	2 1/4
340	11 1/4	9 1/4	7 1/2	5 3/4	4 1/4	2 3/4	2 1/4
320	10 3/4	9	7 1/4	5 1/2	4	2 3/4	2 1/4
300	10 1/4	8 1/2	7	5 1/4	3 3/4	2 3/4	2
280	9 3/4	8	6 1/2	4 3/4	3 1/2	2 1/2	1 3/4
260	8 3/4	7 1/4	5 1/2	4 1/4	3	2 1/4	1 3/4
240	7 3/4	6 1/4	4 3/4	3 3/4	2 3/4	2 1/4	1 1/2
220	6 1/2	5 1/4	4	3 1/4	2 1/2	2	1 1/2
200	5 1/4	4 1/4	3 1/4	2 3/4	2 1/4	1 3/4	1 1/4
180	4	3 1/2	3	2 1/4	2	1 3/4	1 1/4
160	3	2 3/4	2 1/2	2	1 3/4	1 1/2	1 1/4

TO1 Minimum Takeoff Weight

10% Thrust Reduction

Weight Limit (1000 KG)

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

Flaps 5

OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50									
45									
40									
35	155.5								
30	157.1								
25	157.4								
20	157.7	154.4							
15	158.0	154.7							
10	158.4	155.0							
0 & BELOW	158.9	155.5							

Flaps 15

OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50	155.9								
45	155.0								
40	161.9	155.4							
35	169.4	163.1	156.5						
30	171.1	167.6	161.7	155.5					
25	171.4	167.9	163.6	159.5	154.4				
20	171.8	168.2	163.9	159.7	155.8				
15	172.1	168.5	164.2	160.0	156.0				
10	172.5	168.8	164.5	160.2	156.2				
0 & BELOW	173.0	169.4	165.0	160.7	156.6				

Flaps 20

OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50	162.7	159.5	156.2						
45	164.1	159.1	155.8						
40	172.6	165.7	159.0						
35	180.7	173.9	166.9	159.9					
30	182.4	178.7	172.4	165.8	159.3				
25	182.8	179.0	174.5	170.0	164.6	159.1			
20	183.1	179.3	174.8	170.3	166.1	161.3	155.2		
15	183.5	179.6	175.1	170.6	166.3	161.5	156.2		
10	183.9	180.0	175.4	170.8	166.5	161.7	156.3		
0 & BELOW	184.4	180.5	175.9	171.3	166.9	162.0	156.7		

Light weight takeoffs at the GE90-110B1L TO1 thrust rating may be limited by minimum takeoff weight in order to maintain airplane controllability during takeoff. For takeoff at weights below the minimum takeoff weight, use of a lower thrust rating and/or the assumed temperature method of thrust reduction is required.

TO1 Takeoff Weights

10% Thrust Reduction

PERFORMANCE LIMIT	TO1 LIMIT WEIGHT (1000 KG)										
	FULL RATED LIMIT WEIGHT (1000 KG)										
	160	180	200	220	240	260	280	300	320	340	360
FIELD (Dry)*	142.8	162.0	181.3	200.6	219.9	239.1	258.4	277.7	297.0	316.2	335.5
FIELD (Wet)*	147.1	165.8	184.5	203.2	221.9	240.6	259.3	278.1	296.8	315.5	334.2
CLIMB	145.1	162.5	180.0	197.4	214.8	232.3	249.7	267.1	284.5	302.0	319.4
OBSTACLE	147.0	164.5	182.0	199.5	217.0	234.4	251.9	269.4	286.9	304.4	321.9
TIRE SPEED	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0
BRAKE ENERGY	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	314.7	334.6	354.6

* If the takeoff is limited by minimum control speeds, V1 may be increased to be equal to V1(MCG) provided the accelerate stop distance corrected for wind and slope exceeds approximately:

Dry runway: 1550 m for normal operation, 1600 m with one brake deactivated and 1700 m with two brakes deactivated

Wet runway: 2000 m for normal operation, 2100 m with one brake deactivated and 2150 m with two brakes deactivated

ADVISORY INFORMATION

TO1 Slush/Standing Water Takeoff

10% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-35.0	-39.9	-44.8	-42.0	-46.9	-51.8	-53.6	-58.5	-63.4
340	-33.2	-38.1	-43.0	-39.5	-44.4	-49.3	-50.1	-55.0	-59.9
320	-31.5	-36.4	-41.3	-37.2	-42.1	-46.9	-46.6	-51.5	-56.4
300	-29.4	-34.3	-39.2	-34.5	-39.4	-44.3	-42.8	-47.7	-52.6
280	-27.1	-32.0	-36.9	-31.5	-36.4	-41.3	-38.7	-43.6	-48.5
260	-24.4	-29.3	-34.2	-28.3	-33.2	-38.1	-34.4	-39.3	-44.2
240	-21.5	-26.4	-31.3	-24.7	-29.6	-34.5	-29.8	-34.7	-39.6
220	-18.3	-23.2	-28.1	-20.9	-25.8	-30.7	-24.8	-29.7	-34.6
200	-14.8	-19.7	-24.6	-16.7	-21.6	-26.5	-19.6	-24.5	-29.4
180	-11.0	-15.9	-20.8	-12.3	-17.2	-22.1	-14.2	-19.1	-24.0
160	-6.9	-11.7	-16.6	-7.6	-12.5	-17.4	-8.4	-13.3	-18.2

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2000				123.0			144.4		
2200	146.8			159.7			181.3		
2400	183.4			196.6	127.0		218.5	148.5	
2600	220.5	150.8		234.2	163.7		256.3	185.4	
2800	258.5	187.4		272.4	200.7	131.0	294.7	222.6	152.6
3000	297.3	224.7	154.8	311.5	238.4	167.8	333.8	260.5	189.4
3200	336.9	262.7	191.5	351.3	276.7	204.8	373.5	299.0	226.8
3400	377.4	301.6	228.8		315.8	242.5		338.1	264.7
3600		341.3	266.9		355.7	281.0		377.9	303.2
3800		381.8	305.9			320.2			342.5
4000			345.8			360.1			382.3
4200			386.3						

1. Enter Weight Adjustment table with slush/standing water depth and TO1 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -65 m/+60 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-24	-22	-20	-20	-18	-16	-11	-9	-7
340	-26	-24	-22	-21	-19	-17	-12	-10	-8
320	-28	-26	-24	-23	-21	-19	-13	-11	-9
300	-29	-27	-25	-25	-23	-21	-15	-13	-11
280	-30	-28	-26	-26	-24	-22	-17	-15	-13
260	-30	-28	-26	-27	-25	-23	-19	-17	-15
240	-30	-28	-26	-27	-25	-23	-21	-19	-17
220	-30	-28	-26	-27	-25	-23	-22	-20	-18
200	-29	-27	-25	-27	-25	-23	-23	-21	-19
180	-28	-26	-24	-27	-25	-23	-23	-21	-19
160	-28	-26	-24	-26	-24	-22	-23	-21	-19

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slush/Standing Water Takeoff

10% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-48.6	-53.7	-58.8	-56.8	-61.9	-67.0	-70.5	-75.6	-80.7
340	-45.8	-50.8	-55.9	-53.1	-58.2	-63.3	-65.2	-70.3	-75.3
320	-42.9	-48.0	-53.0	-49.5	-54.6	-59.6	-59.9	-65.0	-70.1
300	-39.8	-44.9	-50.0	-45.6	-50.7	-55.8	-54.6	-59.6	-64.7
280	-36.6	-41.6	-46.7	-41.6	-46.7	-51.8	-49.2	-54.2	-59.3
260	-33.1	-38.2	-43.3	-37.4	-42.5	-47.5	-43.7	-48.8	-53.9
240	-29.4	-34.5	-39.6	-33.0	-38.1	-43.1	-38.2	-43.3	-48.3
220	-25.5	-30.6	-35.7	-28.4	-33.5	-38.6	-32.6	-37.7	-42.7
200	-21.5	-26.5	-31.6	-23.6	-28.7	-33.8	-26.9	-32.0	-37.1
180	-17.2	-22.2	-27.3	-18.7	-23.8	-28.8	-21.2	-26.3	-31.4
160	-12.7	-17.7	-22.8	-13.5	-18.6	-23.7	-15.4	-20.4	-25.5

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
3000							139.9		
3200							194.3		
3400				135.9			245.1	136.0	
3600				202.7			291.9	190.4	
3800	187.8			260.6	131.0		335.8	241.6	132.1
4000	254.6			310.8	198.1		377.7	288.7	186.6
4200	308.8	182.1		356.1	256.8	126.2		332.7	238.0
4400	355.8	250.3			307.4	193.5		374.7	285.4
4600		305.1	176.3		353.0	252.8			329.6
4800		352.6	246.0			304.0			371.7
5000			301.5			349.9			
5200			349.3						

1. Enter Weight Adjustment table with slush/standing water depth and TO1 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -100 m/+95 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-39	-35	-31	-32	-28	-24	-17	-13	-9
340	-41	-37	-33	-34	-30	-26	-19	-15	-11
320	-42	-38	-34	-36	-32	-28	-21	-17	-13
300	-44	-40	-36	-38	-34	-30	-24	-20	-16
280	-44	-40	-36	-39	-35	-31	-27	-23	-19
260	-45	-41	-37	-41	-37	-33	-31	-27	-23
240	-45	-41	-37	-42	-38	-34	-33	-29	-25
220	-45	-41	-37	-42	-38	-34	-36	-32	-28
200	-45	-41	-37	-43	-39	-35	-38	-34	-30
180	-45	-41	-37	-43	-39	-35	-39	-35	-31
160	-46	-42	-38	-44	-40	-36	-40	-36	-32

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.



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ADVISORY INFORMATION

TO1 Slippery Runway Takeoff

10% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY 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
360	0.0	-1.5	-2.9	-19.0	-20.5	-21.9	-35.7	-37.1	-38.6
340	0.0	-1.5	-2.9	-19.1	-20.6	-22.0	-34.4	-35.8	-37.3
320	-1.5	-2.9	-4.4	-19.4	-20.9	-22.3	-33.2	-34.7	-36.1
300	-3.9	-5.3	-6.8	-19.5	-21.0	-22.4	-32.0	-33.5	-35.0
280	-5.1	-6.6	-8.0	-19.5	-21.0	-22.4	-30.9	-32.4	-33.8
260	-5.5	-6.9	-8.4	-19.1	-20.5	-22.0	-29.4	-30.8	-32.3
240	-5.4	-6.8	-8.3	-17.8	-19.3	-20.7	-27.0	-28.4	-29.9
220	-4.7	-6.2	-7.6	-15.7	-17.2	-18.6	-23.7	-25.2	-26.6
200	-3.6	-5.1	-6.5	-12.8	-14.3	-15.7	-19.6	-21.0	-22.5
180	-2.0	-3.4	-4.9	-9.1	-10.6	-12.1	-14.6	-16.0	-17.5
160	0.0	-1.4	-2.8	-4.7	-6.2	-7.6	-8.8	-10.3	-11.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1600	172.9								
1800	243.8	174.6							
2000	314.4	245.5	176.3	147.3					
2200	384.9	316.1	247.2	197.6	130.1				
2400		386.6	317.8	249.2	180.3		130.1		
2600			388.3	302.8	231.3	163.2	163.1		
2800				358.6	284.3	213.7	196.3	129.7	
3000					339.3	265.9	230.4	162.7	
3200					396.1	320.2	265.7	195.9	129.3
3400						376.6	302.3	230.0	162.3
3600							340.5	265.2	195.5
3800							380.0	301.9	229.5
4000								340.0	264.8
4200								379.6	301.4
4400									339.5
4600									379.1

1. Enter Weight Adjustment table with reported braking action and TO1 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -35 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -65 m/+60 m 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

TO1 Slippery Runway Takeoff

10% Thrust Reduction

Maximum 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
360	-7	-5	-3	-18	-16	-14	-31	-29	-27
340	-9	-7	-5	-20	-18	-16	-34	-32	-30
320	-11	-9	-7	-22	-20	-18	-36	-34	-32
300	-12	-10	-8	-24	-22	-20	-38	-36	-34
280	-13	-11	-9	-26	-24	-22	-40	-38	-36
260	-14	-12	-10	-27	-25	-23	-41	-39	-37
240	-14	-12	-10	-27	-25	-23	-42	-40	-38
220	-15	-13	-11	-28	-26	-24	-43	-41	-39
200	-15	-13	-11	-28	-26	-24	-43	-41	-39
180	-16	-14	-12	-29	-27	-25	-43	-41	-39
160	-16	-14	-12	-29	-27	-25	-44	-42	-40

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.



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TO1 Slippery Runway Takeoff

10% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY 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
360	-2.5	-3.5	-4.6	-31.1	-32.2	-33.3	-52.9	-54.0	-55.1
340	-5.1	-6.2	-7.3	-30.5	-31.6	-32.7	-50.0	-51.1	-52.2
320	-7.6	-8.7	-9.8	-30.0	-31.1	-32.2	-47.4	-48.5	-49.6
300	-9.5	-10.6	-11.7	-29.7	-30.7	-31.8	-45.1	-46.2	-47.3
280	-10.7	-11.8	-12.9	-29.3	-30.4	-31.5	-43.3	-44.4	-45.4
260	-11.3	-12.4	-13.5	-28.6	-29.7	-30.8	-41.2	-42.3	-43.4
240	-11.1	-12.2	-13.3	-26.8	-27.9	-29.0	-38.4	-39.4	-40.5
220	-10.3	-11.4	-12.4	-24.0	-25.1	-26.2	-34.6	-35.7	-36.8
200	-8.7	-9.8	-10.9	-20.2	-21.3	-22.4	-30.0	-31.1	-32.2
180	-6.4	-7.5	-8.6	-15.4	-16.5	-17.6	-24.6	-25.7	-26.8
160	-3.5	-4.6	-5.7	-9.6	-10.7	-11.8	-18.3	-19.4	-20.5

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
2000	232.8								
2200	329.7	242.2	130.8						
2400		337.0	251.3						
2600			344.3						
3000				230.6					
3200				328.5	190.7				
3400					305.1	141.9			
3600					382.1	279.1			
3800						361.8			
4600							183.2		
4800							262.8	125.4	
5000							338.3	207.1	
5200								285.4	149.5
5400								359.8	230.5
5600									307.7
5800									381.2

1. Enter Weight Adjustment table with reported braking action and TO1 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -60 m/+55 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -95 m/+90 m 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

TO1 Slippery Runway Takeoff

10% Thrust Reduction

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
360	-10	-6	-2	-26	-22	-18	-50	-46	-42
340	-12	-8	-4	-29	-25	-21	-54	-50	-46
320	-14	-10	-6	-31	-27	-23	-57	-53	-49
300	-16	-12	-8	-34	-30	-26	-61	-57	-53
280	-17	-13	-9	-36	-32	-28	-64	-60	-56
260	-18	-14	-10	-38	-34	-30	-66	-62	-58
240	-20	-16	-12	-40	-36	-32	-68	-64	-60
220	-21	-17	-13	-42	-38	-34	-70	-66	-62
200	-22	-18	-14	-44	-40	-36	-71	-67	-63
180	-23	-19	-15	-46	-42	-38	-72	-68	-64
160	-24	-20	-16	-48	-44	-40	-73	-69	-65

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

TO1 Takeoff Speeds - Dry Runway

10% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
320	171	175	178	163	166	171	157	161	166
300	165	169	173	157	160	166	152	155	161
280	158	162	168	150	154	161	146	149	156
260	151	155	162	143	147	155	139	142	151
240	143	148	157	135	140	150	131	136	146
220	134	140	151	127	133	144	123	128	140
200	125	132	145	118	125	138	114	121	134
180	115	124	138	108	117	132	104	113	128
160	103	115	131	97	109	125	93	105	122
140	91	106	124	85	99	119	81	96	116

Check V1(MCG), Minimum V2, and Minimum Takeoff Weight.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	11	14					5	6					-3	-3				
60	140	7	9	11	13			3	4	5	6			-2	-2	-3	-3		
50	122	3	5	7	10	12	15	2	3	4	5	6	7	-1	-1	-2	-3	-3	-4
40	104	1	2	4	7	9	12	0	1	2	4	5	6	0	-1	-1	-2	-2	-3
30	86	0	0	2	4	6	10	0	0	1	2	4	5	0	0	0	-1	-2	-3
20	68	0	0	1	3	5	8	0	0	1	2	3	4	0	0	0	-1	-1	-2
-60	-76	0	0	1	3	5	7	0	0	1	2	3	4	0	0	0	-1	-1	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)							
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40
320	-3	-1	0	3	3	-2	-1	0	0	1	2	2	2
300	-3	-1	0	2	3	-2	-1	0	0	1	1	2	2
280	-3	-1	0	2	3	-2	-1	-1	0	1	1	2	2
260	-3	-1	0	2	3	-2	-1	-1	0	1	1	2	2
240	-3	-1	0	2	3	-2	-1	-1	0	1	1	2	2
220	-3	-1	0	2	3	-2	-1	-1	0	1	1	2	2
200	-2	-1	0	2	3	-2	-1	0	0	1	1	2	2
180	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3
160	-2	0	0	2	3	-2	-1	0	0	1	2	3	3
140	-1	0	0	2	3	-2	-1	0	0	1	2	3	3

*V1 not to exceed VR.

TO1 V1(MCG)

TEMP		PRESSURE ALTITUDE (FT)					
		-2000	0	2000	4000	6000	8000
60	140	118	115	112	111		
50	122	122	118	113	111	109	105
40	104	129	126	120	115	110	105
30	86	130	130	126	120	115	109
20	68	130	130	127	123	119	113
-60	-76	132	132	128	124	120	115

TO1 Minimum V2

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	137	135	133	130	128	126
15	135	133	131	128	126	123
20	134	131	128	125	123	120

TO1 Takeoff Speeds - Wet Runway**10% Thrust Reduction****V1, VR, V2**

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
320	161	175	178	153	166	171	148	161	166
300	154	169	173	146	160	166	142	155	161
280	146	162	168	139	154	161	135	149	156
260	139	155	162	131	147	155	127	142	151
240	130	148	157	124	140	150	120	136	146
220	122	140	151	115	133	144	112	128	140
200	113	132	145	107	125	138	103	121	134
180	103	124	138	97	117	132	94	113	128
160	93	115	131	87	109	125	83	105	122
140	82	106	124	76	99	119	72	96	116

Check V1(MCG), Minimum V2, and Minimum Takeoff Weight.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	13	15					5	6					-3	-3				
60	140	8	10	12	14			3	4	5	6			-2	-2	-3	-3		
50	122	4	6	8	10	12	16	2	3	4	5	6	7	-1	-1	-2	-3	-3	-4
40	104	1	2	5	7	9	13	0	1	2	4	5	6	0	-1	-1	-2	-2	-3
30	86	0	0	2	4	7	10	0	0	1	2	4	5	0	0	0	-1	-2	-3
20	68	0	0	1	3	5	9	0	0	1	2	3	4	0	0	0	-1	-1	-2
-60	-76	0	0	1	3	5	8	0	0	1	2	3	4	0	0	0	-1	-1	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
320	-5	-3	0	3	6	-4	-3	-1	0	1	2	3	4	
300	-5	-3	0	3	5	-5	-3	-1	0	1	2	3	4	
280	-5	-2	0	2	5	-5	-3	-1	0	1	2	3	4	
260	-5	-2	0	2	5	-5	-3	-2	0	1	2	3	4	
240	-5	-2	0	2	4	-5	-3	-2	0	1	2	3	4	
220	-4	-2	0	2	4	-5	-3	-1	0	1	2	3	4	
200	-4	-2	0	2	4	-5	-3	-1	0	1	2	3	4	
180	-3	-1	0	2	4	-5	-3	-1	0	1	3	4	5	
160	-3	-1	0	3	4	-4	-2	-1	0	1	3	4	5	
140	-2	0	0	3	4	-4	-2	0	0	2	3	4	5	

*V1 not to exceed VR.

TO1 V1(MCG)

TEMP		PRESSURE ALTITUDE (FT)					
		-2000	0	2000	4000	6000	8000
60	140	118	115	112	111		
50	122	122	118	113	111	109	105
40	104	129	126	120	115	110	105
30	86	130	130	126	120	115	109
20	68	130	130	127	123	119	113
-60	-76	132	132	128	124	120	115

TO1 Minimum V2

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	137	135	133	130	128	126
15	135	133	131	128	126	123
20	134	131	128	125	123	120



Flight Planning and Performance Manual

TO1 Takeoff %N1

10% Thrust Reduction

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

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
70	158	87.7	87.9	88.2	88.0	87.9	88.0	88.1	88.1	88.0	87.4	86.6	86.2
60	140	90.4	90.7	90.9	90.7	90.6	90.7	90.8	90.8	90.7	90.2	89.3	89.0
55	131	91.9	92.3	92.5	92.3	92.2	92.4	92.4	92.4	92.3	91.7	90.7	90.3
50	122	93.4	93.7	94.1	93.8	93.5	93.6	93.7	93.7	93.6	93.1	92.3	91.9
45	113	94.6	95.0	95.4	95.1	94.9	94.8	94.8	94.8	94.8	94.2	93.4	93.1
40	104	95.7	96.1	96.7	96.3	96.1	96.0	95.9	95.9	95.9	95.4	94.6	94.3
35	95	95.3	96.5	97.6	97.4	97.2	97.0	96.8	96.9	96.7	96.1	95.5	95.3
30	86	94.5	95.7	97.2	97.6	97.6	97.6	97.4	97.4	97.1	96.7	96.2	96.0
25	77	93.8	94.9	96.4	96.8	97.3	97.7	97.8	98.0	97.6	97.1	96.6	96.4
20	68	93.0	94.1	95.5	96.0	96.4	96.9	97.4	97.8	97.8	97.4	97.0	96.8
15	59	92.2	93.3	94.7	95.2	95.6	96.0	96.5	97.0	97.2	97.1	96.9	96.7
10	50	91.4	92.5	93.9	94.3	94.8	95.2	95.7	96.1	96.4	96.2	96.1	96.1
5	41	90.6	91.6	93.1	93.5	93.9	94.4	94.8	95.3	95.5	95.4	95.3	95.2
0	32	89.7	90.8	92.2	92.7	93.1	93.5	94.0	94.4	94.7	94.5	94.4	94.3
-10	14	88.1	89.1	90.5	91.0	91.4	91.8	92.2	92.7	92.9	92.8	92.6	92.6
-20	-4	86.4	87.4	88.8	89.2	89.6	90.0	90.5	90.9	91.1	91.0	90.9	90.8
-30	-22	84.7	85.7	87.0	87.4	87.8	88.2	88.7	89.1	89.3	89.2	89.1	89.0
-40	-40	82.9	83.9	85.2	85.6	86.0	86.4	86.8	87.2	87.4	87.3	87.2	87.2
-50	-58	81.1	82.1	83.4	83.8	84.1	84.5	84.9	85.3	85.5	85.4	85.3	85.3

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
1 PACK ON	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

TO1 Stab Trim Setting

10% Thrust Reduction

Flaps 5

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	9	7 3/4	6 1/2	5	3 1/2	2 3/4	2
340	9	7 3/4	6 1/4	4 3/4	3 1/2	2 1/2	2
320	8 3/4	7 1/2	6	4 1/2	3 1/4	2 1/2	2
300	8 1/2	7	5 3/4	4 1/4	3 1/4	2 1/2	1 3/4
280	8 1/4	6 3/4	5 1/4	3 3/4	3	2 1/4	1 3/4
260	7 3/4	6 1/4	5	3 1/2	2 3/4	2 1/4	1 3/4
240	7 1/4	5 3/4	4 1/2	3 1/4	2 1/2	2	1 1/2
220	6 1/4	5 1/4	4	3	2 1/2	2	1 1/2
200	5 1/4	4 1/4	3 1/4	2 1/2	2	1 3/4	1 1/4
180	4 1/4	3 1/2	2 3/4	2	1 3/4	1 1/4	3/4
160	3	2 1/2	2	1 3/4	1 1/4	1	1/2

Flaps 15

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	10 1/4	8 1/2	6 3/4	5	3 1/2	2 3/4	2 1/4
340	9 3/4	8	6 1/2	5	3 1/2	2 3/4	2
320	9 1/4	7 1/2	6 1/4	4 3/4	3 1/4	2 1/2	2
300	9	7 1/4	5 3/4	4 1/2	3 1/4	2 1/2	2
280	8 3/4	6 3/4	5 1/2	4	3	2 1/2	1 3/4
260	8	6 1/4	4 3/4	3 3/4	2 3/4	2 1/4	1 3/4
240	6 3/4	5 1/4	4	3 1/4	2 1/2	2	1 1/2
220	5 3/4	4 1/2	3 1/2	2 3/4	2 1/4	1 3/4	1 1/4
200	4 3/4	3 3/4	3	2 1/2	2	1 1/2	1 1/4
180	3 3/4	3 1/4	2 1/2	2	1 3/4	1 1/4	1
160	3	2 1/2	2	1 3/4	1 1/2	1 1/4	1

Flaps 20

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	11 1/4	9 1/4	7 1/2	6	4 1/4	3	2 1/4
340	11 1/4	9 1/4	7 1/2	5 3/4	4 1/4	2 3/4	2 1/4
320	10 3/4	9	7 1/4	5 1/2	4	2 3/4	2 1/4
300	10 1/4	8 1/2	7	5 1/4	3 3/4	2 3/4	2
280	9 3/4	8	6 1/2	4 3/4	3 1/2	2 1/2	1 3/4
260	8 3/4	7 1/4	5 1/2	4 1/4	3	2 1/4	1 3/4
240	7 3/4	6 1/4	4 3/4	3 3/4	2 3/4	2 1/4	1 1/2
220	6 1/2	5 1/4	4	3 1/4	2 1/2	2	1 1/2
200	5 1/4	4 1/4	3 1/4	2 3/4	2 1/4	1 3/4	1 1/4
180	4	3 1/2	3	2 1/4	2	1 3/4	1 1/4
160	3	2 3/4	2 1/2	2	1 3/4	1 1/2	1 1/4

TO2 Minimum Takeoff Weight

20% Thrust Reduction

Weight Limit (1000 KG)

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

Flaps 5

OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50									
45									
40									
35									
30									
25									
20									
15									
10									
0 & BELOW									

Flaps 15

OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50	157.1	154.6							
45	156.4								
40	155.8								
35	155.2								
30	155.1								
25	155.1								
20	155.1								
15	155.0								
10	155.0								
0 & BELOW	155.4								

Flaps 20

OAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)								
	S.L. & BELOW	1000	2000	3000	4000	5000	6000	7000	8000 & ABOVE
50	163.3	160.0	156.7						
45	163.0	159.7	156.4						
40	162.7	159.4	156.1						
35	162.4	159.1	155.9						
30	163.7	160.0	155.7						
25	164.1	160.4	156.3						
20	164.4	160.7	156.6						
15	164.7	161.0	156.8						
10	165.1	161.3	157.1						
0 & BELOW	165.6	161.8	157.7						

Light weight takeoffs at the GE90-110B1L TO2 thrust rating may be limited by minimum takeoff weight in order to maintain airplane controllability during takeoff. For takeoff at weights below the minimum takeoff weight, use of the assumed temperature method of thrust reduction is required.

TO2 Takeoff Weights

20% Thrust Reduction

PERFORMANCE LIMIT	TO2 LIMIT WEIGHT (1000 KG)										
	FULL RATED LIMIT WEIGHT (1000 KG)										
	160	180	200	220	240	260	280	300	320	340	360
FIELD (Dry)*	125.6	144.4	163.2	182.1	200.9	219.8	238.6	257.4	276.3	295.1	313.9
FIELD (Wet)*	133.6	151.6	169.6	187.5	205.5	223.5	241.5	259.4	277.4	295.4	313.4
CLIMB	128.5	144.1	159.7	175.3	191.0	206.6	222.2	237.8	253.5	269.1	284.7
OBSTACLE	134.0	149.5	165.0	180.5	196.0	211.5	227.0	242.5	258.0	273.5	289.0
TIRE SPEED	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0
BRAKE ENERGY	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0

*If the takeoff is limited by minimum control speeds, V1 may be increased to be equal to V1(MCG) provided the accelerate stop distance corrected for wind and slope exceeds approximately:

Dry runway: 1400 m for normal operation, 1450 m with one brake deactivated and 1550 m with two brakes deactivated

Wet runway: 1800 m for normal operation, 1850 m with one brake deactivated and 1900 m with two brakes deactivated



Flight Planning and Performance Manual

ADVISORY INFORMATION

TO2 Slush/Standing Water Takeoff

20% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-33.8	-38.7	-43.6	-40.8	-45.7	-50.6	-52.6	-57.5	-62.4
340	-31.8	-36.7	-41.6	-38.1	-43.0	-47.9	-48.9	-53.8	-58.7
320	-30.0	-34.9	-39.8	-35.9	-40.8	-45.7	-45.6	-50.5	-55.4
300	-28.6	-33.5	-38.4	-33.8	-38.7	-43.6	-42.5	-47.4	-52.3
280	-26.8	-31.7	-36.6	-31.5	-36.4	-41.3	-39.1	-44.0	-48.9
260	-24.7	-29.6	-34.5	-28.7	-33.6	-38.5	-35.3	-40.2	-45.1
240	-22.2	-27.1	-32.0	-25.7	-30.6	-35.5	-31.2	-36.1	-41.0
220	-19.4	-24.3	-29.2	-22.2	-27.1	-32.0	-26.7	-31.6	-36.5
200	-16.2	-21.1	-26.0	-18.4	-23.3	-28.2	-21.8	-26.7	-31.6
180	-12.6	-17.5	-22.4	-14.3	-19.2	-24.1	-16.7	-21.6	-26.5
160	-8.7	-13.6	-18.5	-9.8	-14.6	-19.5	-11.1	-16.0	-20.9

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
1800							131.5		
2000	137.0			149.8			171.4		
2200	176.6			189.8			211.6	135.9	
2400	217.0	141.3		230.6	154.2		252.7	175.8	
2600	258.5	181.0		272.5	194.2		294.7	216.1	140.3
2800	301.3	221.5	145.7	315.5	235.2	158.6	337.8	257.3	180.2
3000	345.3	263.2	185.4	359.7	277.2	198.7	381.9	299.4	220.6
3200	390.5	306.1	226.0		320.3	239.7		342.6	261.9
3400		350.3	267.8		364.6	281.8		386.8	304.1
3600			310.9			325.1			347.4
3800			355.2			369.6			391.7

1. Enter Weight Adjustment table with slush/standing water depth and TO2 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -65 m/+60 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-21	-19	-17	-16	-14	-12	-6	-4	-2
340	-23	-21	-19	-18	-16	-14	-7	-5	-3
320	-25	-23	-21	-20	-18	-16	-9	-7	-5
300	-26	-24	-22	-21	-19	-17	-11	-9	-7
280	-27	-25	-23	-23	-21	-19	-13	-11	-9
260	-27	-25	-23	-24	-22	-20	-15	-13	-11
240	-27	-25	-23	-24	-22	-20	-17	-15	-13
220	-27	-25	-23	-24	-22	-20	-18	-16	-14
200	-26	-24	-22	-24	-22	-20	-19	-17	-15
180	-26	-24	-22	-24	-22	-20	-19	-17	-15
160	-25	-23	-21	-23	-21	-19	-19	-17	-15

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slush/Standing Water Takeoff**20% Thrust Reduction****No Reverse Thrust****Weight Adjustment (1000 KG)**

TO2 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-48.0	-53.1	-58.1	-56.4	-61.5	-66.6	-70.9	-76.0	-81.1
340	-45.0	-50.1	-55.1	-52.7	-57.7	-62.8	-65.6	-70.7	-75.8
320	-42.2	-47.2	-52.3	-49.1	-54.1	-59.2	-60.4	-65.5	-70.6
300	-39.5	-44.5	-49.6	-45.6	-50.7	-55.7	-55.3	-60.4	-65.5
280	-36.5	-41.6	-46.7	-41.9	-47.0	-52.0	-50.1	-55.2	-60.3
260	-33.4	-38.5	-43.6	-38.0	-43.1	-48.1	-44.9	-50.0	-55.0
240	-30.0	-35.1	-40.2	-33.9	-38.9	-44.0	-39.5	-44.6	-49.7
220	-26.4	-31.5	-36.5	-29.5	-34.6	-39.7	-34.1	-39.2	-44.3
200	-22.5	-27.6	-32.7	-25.0	-30.0	-35.1	-28.6	-33.7	-38.7
180	-18.4	-23.5	-28.6	-20.2	-25.3	-30.4	-23.0	-28.1	-33.1
160	-14.0	-19.1	-24.2	-15.2	-20.2	-25.3	-17.2	-22.3	-27.4

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2800							153.7		
3000							217.1		
3200				178.3			275.0	149.0	
3400	174.6			251.6			328.7	212.7	
3600	257.5			313.2	172.5		379.7	271.0	144.4
3800	322.4	167.6		368.2	246.8			324.9	208.2
4000	379.1	252.3			309.0	166.6		376.1	266.9
4200		318.1	160.7		364.3	242.0			321.2
4400		375.1	247.1			304.8			372.4
4600			313.8			360.5			
4800			371.1						

1. Enter Weight Adjustment table with slush/standing water depth and TO2 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -100 m/+95 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-34	-30	-26	-25	-21	-17	-7	-3	0
340	-36	-32	-28	-28	-24	-20	-10	-6	-2
320	-38	-34	-30	-30	-26	-22	-13	-9	-5
300	-39	-35	-31	-32	-28	-24	-16	-12	-8
280	-40	-36	-32	-34	-30	-26	-20	-16	-12
260	-41	-37	-33	-36	-32	-28	-24	-20	-16
240	-41	-37	-33	-37	-33	-29	-27	-23	-19
220	-41	-37	-33	-38	-34	-30	-30	-26	-22
200	-41	-37	-33	-39	-35	-31	-32	-28	-24
180	-41	-37	-33	-39	-35	-31	-34	-30	-26
160	-41	-37	-33	-39	-35	-31	-34	-30	-26

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.



Flight Planning and Performance Manual

ADVISORY INFORMATION

TO2 Slippery Runway Takeoff

20% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY 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
360	0.0	-1.5	-2.9	-17.6	-19.1	-20.5	-34.9	-36.3	-37.8
340	0.0	-1.5	-2.9	-17.6	-19.1	-20.6	-33.3	-34.7	-36.2
320	0.0	-1.5	-2.9	-17.8	-19.2	-20.7	-32.0	-33.4	-34.9
300	-1.5	-2.9	-4.4	-18.1	-19.5	-21.0	-30.9	-32.4	-33.8
280	-3.8	-5.2	-6.7	-18.3	-19.7	-21.2	-29.9	-31.3	-32.8
260	-4.9	-6.3	-7.8	-18.3	-19.7	-21.2	-28.8	-30.3	-31.7
240	-5.2	-6.6	-8.1	-17.7	-19.2	-20.6	-27.2	-28.6	-30.1
220	-4.9	-6.4	-7.8	-16.3	-17.7	-19.2	-24.6	-26.0	-27.5
200	-4.1	-5.6	-7.1	-14.0	-15.4	-16.9	-21.1	-22.5	-24.0
180	-2.8	-4.3	-5.7	-10.8	-12.2	-13.7	-16.7	-18.1	-19.6
160	-1.0	-2.4	-3.9	-6.7	-8.2	-9.6	-11.3	-12.7	-14.2

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1400	130.8								
1600	205.8	132.6							
1800	280.6	207.6	134.4	123.3					
2000	355.4	282.4	209.3	176.5					
2200		357.2	284.2	230.5	158.3				
2400			359.0	286.8	211.8	140.1	153.4		
2600				345.5	267.3	193.3	188.6		
2800					325.1	248.1	224.6	153.0	
3000					385.4	305.1	262.1	188.2	
3200						364.6	301.2	224.2	152.5
3400							342.0	261.7	187.7
3600							384.4	300.7	223.8
3800								341.5	261.2
4000								383.9	300.2
4200									341.0
4400									383.4

1. Enter Weight Adjustment table with reported braking action and TO2 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -35 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -65 m/+60 m 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

TO2 Slippery Runway Takeoff

20% Thrust Reduction

Maximum 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
360	-7	-5	-3	-16	-14	-12	-28	-26	-24
340	-9	-7	-5	-19	-17	-15	-31	-29	-27
320	-10	-8	-6	-20	-18	-16	-33	-31	-29
300	-11	-9	-7	-22	-20	-18	-35	-33	-31
280	-12	-10	-8	-23	-21	-19	-37	-35	-33
260	-13	-11	-9	-24	-22	-20	-38	-36	-34
240	-13	-11	-9	-25	-23	-21	-39	-37	-35
220	-14	-12	-10	-25	-23	-21	-39	-37	-35
200	-14	-12	-10	-26	-24	-22	-40	-38	-36
180	-14	-12	-10	-26	-24	-22	-40	-38	-36
160	-15	-13	-11	-26	-24	-22	-40	-38	-36

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slippery Runway Takeoff

20% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY 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
360	0.0	-0.4	-1.5	-29.9	-30.9	-32.0	-52.6	-53.7	-54.8
340	-2.0	-3.0	-4.1	-29.0	-30.1	-31.2	-49.6	-50.7	-51.8
320	-4.6	-5.7	-6.8	-28.4	-29.5	-30.6	-46.8	-47.8	-48.9
300	-7.1	-8.2	-9.3	-28.0	-29.1	-30.2	-44.2	-45.3	-46.4
280	-9.0	-10.1	-11.2	-27.7	-28.8	-29.9	-42.1	-43.2	-44.3
260	-10.2	-11.3	-12.4	-27.4	-28.5	-29.6	-40.3	-41.4	-42.5
240	-10.6	-11.7	-12.8	-26.6	-27.7	-28.7	-38.2	-39.3	-40.4
220	-10.3	-11.4	-12.5	-24.6	-25.7	-26.7	-35.2	-36.3	-37.4
200	-9.2	-10.3	-11.4	-21.5	-22.6	-23.7	-31.3	-32.3	-33.4
180	-7.4	-8.5	-9.6	-17.3	-18.4	-19.5	-26.4	-27.5	-28.6
160	-4.8	-5.9	-7.0	-12.0	-13.1	-14.2	-20.5	-21.6	-22.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1800	185.5								
2000	302.0	197.2							
2200	394.2	310.5	208.5						
2400			318.9						
2800				238.7					
3000				341.3	196.9				
3200					316.7	144.0			
3400					399.1	289.6			
3600						376.8			
4200							164.7		
4400							253.5		
4600							337.5	191.3	
4800								278.7	127.5
5000								361.3	217.6
5200									303.5
5400									385.1

1. Enter Weight Adjustment table with reported braking action and TO2 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -60 m/+55 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -95 m/+90 m 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

TO2 Slippery Runway Takeoff

20% Thrust Reduction

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
360	-9	-5	-1	-23	-19	-15	-45	-41	-37
340	-11	-7	-3	-26	-22	-18	-49	-45	-41
320	-13	-9	-5	-28	-24	-20	-52	-48	-44
300	-14	-10	-6	-30	-26	-22	-55	-51	-47
280	-16	-12	-8	-32	-28	-24	-58	-54	-50
260	-17	-13	-9	-34	-30	-26	-60	-56	-52
240	-18	-14	-10	-36	-32	-28	-62	-58	-54
220	-18	-14	-10	-38	-34	-30	-64	-60	-56
200	-19	-15	-11	-39	-35	-31	-65	-61	-57
180	-20	-16	-12	-41	-37	-33	-66	-62	-58
160	-21	-17	-13	-43	-39	-35	-66	-62	-58

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.



Flight Planning and Performance Manual

TO2 Takeoff Speeds - Dry Runway

20% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
320	175	177	177						
300	169	170	172	161	162	165	156	156	160
280	162	164	167	154	155	160	150	150	155
260	155	157	161	147	149	155	143	144	150
240	147	150	156	139	142	149	135	137	145
220	139	142	150	131	135	143	127	130	139
200	129	134	143	122	127	137	118	123	134
180	119	125	137	113	119	131	109	115	127
160	108	116	130	103	110	124	99	106	121
140	97	106	122	92	101	117	89	97	114

Check V1(MCG), Minimum V2, and Minimum Takeoff Weight.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	9	11					5	6					-2	-3				
60	140	6	8	10	12			3	4	5	6			-2	-2	-2	-3		
50	122	3	5	7	9	10	14	2	3	4	5	6	7	-1	-1	-2	-2	-3	-3
40	104	1	2	4	6	8	11	0	1	2	4	5	6	0	-1	-1	-2	-2	-3
30	86	0	0	2	4	6	9	0	0	1	2	4	5	0	0	0	-1	-1	-2
20	68	0	0	1	3	4	7	0	0	1	2	3	4	0	0	0	-1	-1	-2
-60	-76	0	0	1	3	4	7	0	0	1	2	3	4	0	0	0	-1	-1	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
320	-3	-1	0	1	0	-1	0	0	0	0	1	1	0	
300	-3	-1	0	1	0	-1	-1	0	0	0	1	1	1	
280	-3	-1	0	1	1	-2	-1	0	0	0	1	1	1	
260	-3	-2	0	1	1	-2	-1	-1	0	0	1	1	1	
240	-3	-2	0	1	1	-2	-1	-1	0	0	1	1	1	
220	-3	-2	0	1	2	-2	-2	-1	0	0	1	1	2	
200	-3	-1	0	1	2	-2	-2	-1	0	0	1	1	2	
180	-3	-1	0	1	2	-2	-1	-1	0	1	1	2	2	
160	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3	
140	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3	

*V1 not to exceed VR.

TO2 V1(MCG)

TEMP		PRESSURE ALTITUDE (FT)					
		-2000	0	2000	4000	6000	8000
60	140	112	108	106	104		
50	122	115	112	106	104	103	99
40	104	121	119	113	108	104	99
30	86	122	122	118	113	108	102
20	68	123	122	119	116	112	106
-60	-76	125	124	121	117	113	108

TO2 Minimum V2

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	137	135	133	130	128	126
15	135	133	131	128	126	123
20	134	131	128	125	123	120

TO2 Takeoff Speeds - Wet Runway**20% Thrust Reduction****V1, VR, V2**

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
320	166	177	177						
300	159	170	172	150	162	165	147	156	160
280	151	164	167	143	155	160	140	150	155
260	143	157	161	136	149	155	132	144	150
240	135	150	156	128	142	149	124	137	145
220	126	142	150	120	135	143	116	130	139
200	118	134	143	111	127	137	108	123	134
180	107	125	137	102	119	131	98	115	127
160	96	116	130	92	110	124	88	106	121
140	84	106	122	81	101	117	79	97	114

Check V1(MCG), Minimum V2, and Minimum Takeoff Weight.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	11	13					5	6					-2	-3				
60	140	7	9	11	13			3	4	5	6			-2	-2	-2	-3		
50	122	4	5	8	10	12	16	2	3	4	5	6	7	-1	-1	-2	-2	-3	-3
40	104	1	2	4	7	9	12	0	1	2	4	5	6	0	-1	-1	-2	-2	-3
30	86	0	0	2	4	7	10	0	0	1	2	4	5	0	0	0	-1	-1	-2
20	68	0	0	1	3	5	8	0	0	1	2	3	4	0	0	0	-1	-1	-2
-60	-76	0	0	1	3	5	7	0	0	1	2	3	4	0	0	0	-1	-1	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
320	-6	-3	0	3	5	-4	-3	-1	0	1	2	2	3	
300	-5	-3	0	2	5	-4	-3	-1	0	1	2	2	3	
280	-5	-3	0	2	5	-4	-3	-1	0	1	2	3	3	
260	-5	-2	0	2	4	-5	-3	-1	0	1	2	3	3	
240	-5	-2	0	2	4	-5	-3	-1	0	1	2	3	4	
220	-4	-2	0	2	4	-5	-3	-1	0	1	2	3	4	
200	-4	-2	0	2	4	-5	-3	-1	0	1	2	3	4	
180	-3	-1	0	2	4	-4	-3	-1	0	1	3	4	5	
160	-3	-1	0	3	4	-4	-2	-1	0	1	3	4	5	
140	-2	0	0	3	4	-4	-2	0	0	2	3	4	5	

*V1 not to exceed VR.

TO2 V1(MCG)

TEMP		PRESSURE ALTITUDE (FT)					
		-2000	0	2000	4000	6000	8000
60	140	112	108	106	104		
50	122	115	112	106	104	103	99
40	104	121	119	113	108	104	99
30	86	122	122	118	113	108	102
20	68	123	122	119	116	112	106
-60	-76	125	124	121	117	113	108

TO2 Minimum V2

FLAPS	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
5	137	135	133	130	128	126
15	135	133	131	128	126	123
20	134	131	128	125	123	120



Flight Planning and Performance Manual

TO2 Takeoff %N1

20% Thrust Reduction

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
70	158	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4
60	140	86.2	86.5	86.7	86.5	86.4	86.5	86.6	86.6	86.5	86.0	85.2	84.9
55	131	87.7	88.0	88.2	88.0	87.9	88.1	88.1	88.1	88.1	87.4	86.5	86.1
50	122	89.1	89.5	89.9	89.5	89.3	89.4	89.4	89.4	89.4	88.9	88.0	87.6
45	113	90.4	90.9	91.3	91.0	90.7	90.7	90.7	90.7	90.7	90.1	89.3	88.9
40	104	91.6	92.1	92.5	92.2	92.1	92.0	91.9	91.9	91.9	91.4	90.6	90.2
35	95	91.3	92.3	93.3	93.0	92.8	92.7	92.5	92.6	92.4	92.0	91.5	91.3
30	86	90.6	91.5	92.8	93.2	93.3	93.2	93.1	93.1	92.8	92.3	92.0	91.7
25	77	89.9	90.8	92.0	92.5	92.9	93.3	93.4	93.6	93.2	92.8	92.3	92.0
20	68	89.1	90.0	91.3	91.7	92.1	92.5	92.9	93.3	93.3	93.0	92.6	92.4
15	59	88.3	89.2	90.5	90.9	91.3	91.7	92.1	92.5	92.7	92.6	92.4	92.3
10	50	87.6	88.4	89.7	90.1	90.5	90.9	91.3	91.7	91.9	91.8	91.7	91.6
5	41	86.8	87.7	88.9	89.3	89.7	90.1	90.5	90.9	91.1	91.0	90.9	90.8
0	32	86.0	86.9	88.1	88.5	88.9	89.3	89.7	90.1	90.3	90.2	90.1	90.0
-10	14	84.4	85.3	86.5	86.9	87.3	87.6	88.0	88.4	88.6	88.5	88.4	88.3
-20	-4	82.8	83.6	84.8	85.2	85.6	86.0	86.4	86.7	86.9	86.8	86.7	86.7
-30	-22	81.1	82.0	83.1	83.5	83.9	84.2	84.6	85.0	85.2	85.1	85.0	84.9
-40	-40	79.5	80.3	81.4	81.8	82.1	82.5	82.9	83.2	83.4	83.3	83.2	83.2
-50	-58	77.7	78.5	79.6	80.0	80.4	80.7	81.1	81.4	81.6	81.5	81.4	81.4

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
1 PACK ON	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

TO2 Stab Trim Setting

20% Thrust Reduction

Flaps 5

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	10 3/4	9	7 1/2	6	4 3/4	3 1/4	2 3/4
340	10 1/4	8 3/4	7 1/4	6	4 1/2	3 1/4	2 3/4
320	9 3/4	8 1/2	7	5 1/2	4 1/4	3	2 3/4
300	9 3/4	8	6 3/4	5 1/4	3 3/4	2 3/4	2 1/2
280	9 1/4	7 3/4	6 1/4	4 3/4	3 1/2	2 3/4	2 1/4
260	8 3/4	7 1/4	6	4 1/2	3	2 1/2	2 1/4
240	8 1/4	6 3/4	5 1/4	4	2 3/4	2 1/2	2
220	7 1/2	6	4 3/4	3 1/2	2 3/4	2 1/4	2
200	6 1/2	5 1/4	4	3	2 1/2	2 1/4	2
180	5	4 1/4	3 1/4	2 3/4	2 1/2	2	1 3/4
160	4	3 1/4	2 3/4	2 1/4	2 1/4	1 3/4	1 1/2

Flaps 15

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	11 1/4	9 3/4	8 1/4	6 3/4	5 1/4	3 1/2	3
340	11	9 1/4	7 3/4	6 1/2	5	3 1/4	2 3/4
320	10 1/2	8 3/4	7 1/2	6 1/4	4 3/4	3 1/4	2 3/4
300	10	8 1/4	7	5 3/4	4 1/4	3	2 1/2
280	9 1/4	8	6 3/4	5 1/4	4	2 3/4	2 1/2
260	8 3/4	7 1/4	6	4 1/2	3 1/4	2 1/2	2 1/4
240	8	6 1/2	5 1/4	3 3/4	2 3/4	2 1/2	2
220	7 1/4	6	4 1/2	3 1/4	2 1/2	2 1/4	2
200	6 1/4	5 1/4	4	2 3/4	2 1/2	2	1 3/4
180	5 1/4	4 1/2	3 1/2	2 1/2	2 1/4	2	1 3/4
160	4 1/4	3 1/2	2 3/4	2 1/4	2	1 3/4	1 1/2

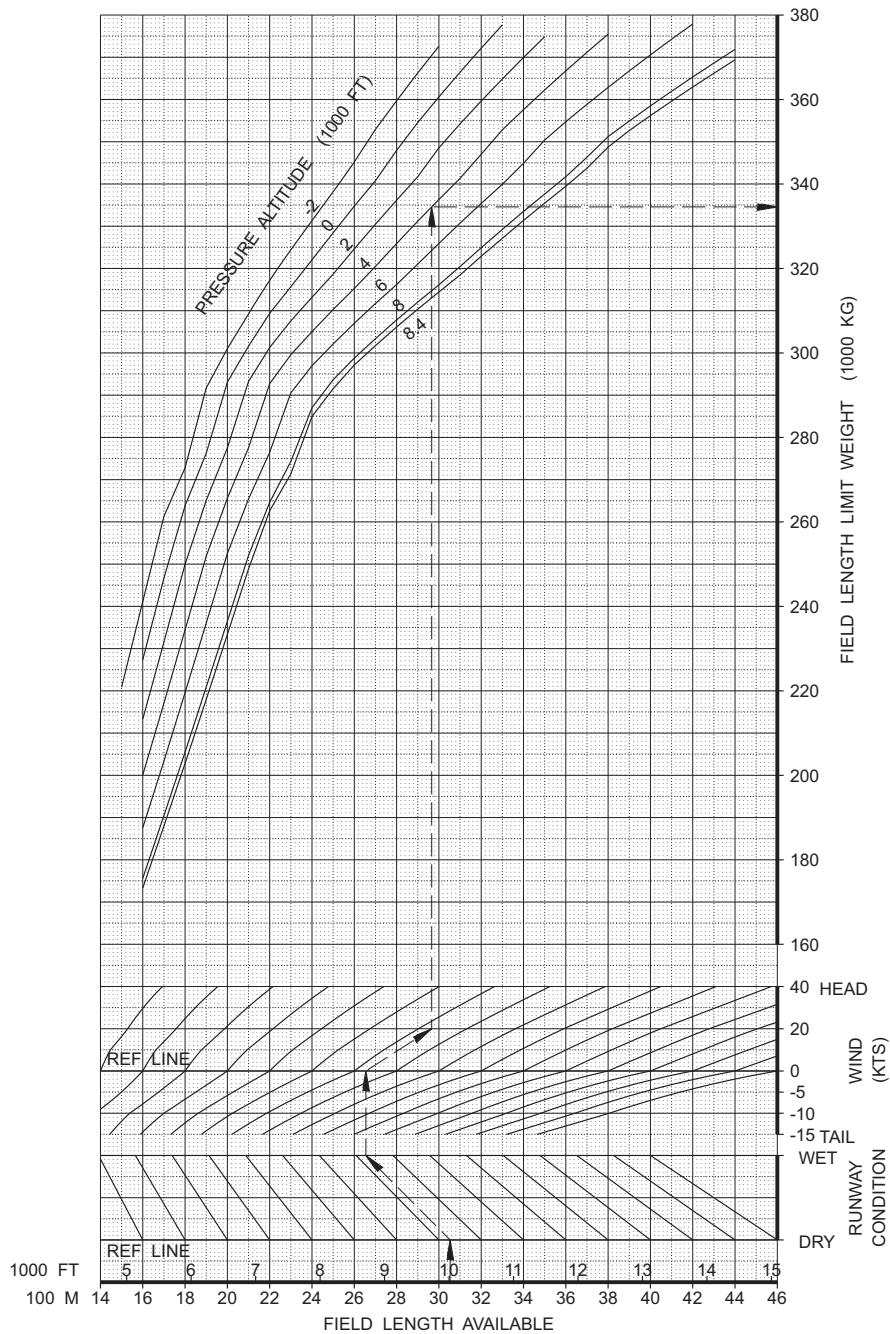
Flaps 20

WEIGHT (1000 KG)	C.G. (%MAC)						
	14	19	24	29	34	39	44
350	11 1/2	10 1/2	8 3/4	7 1/4	5 1/2	3 3/4	2 1/2
340	11 1/2	10 1/4	8 3/4	7	5 1/2	3 1/2	2 1/2
320	11 1/2	10 1/4	8 1/2	6 3/4	5 1/4	3 1/4	2 1/2
300	11 1/2	9 3/4	8 1/4	6 1/2	5	3	2 1/4
280	11	9 1/2	7 3/4	6	4 1/2	2 3/4	2
260	10 1/4	8 3/4	7	5 1/2	4	2 1/2	2
240	9 1/2	8	6 1/4	4 1/2	3 1/4	2 1/2	1 3/4
220	8 3/4	7	5 1/2	3 3/4	2 3/4	2 1/4	1 3/4
200	7 1/2	6	4 1/2	3	2 1/2	2 1/4	1 3/4
180	6	4 3/4	3 1/2	2 1/2	2 1/4	2	1 3/4
160	4 3/4	3 3/4	2 3/4	2 1/4	2	1 3/4	1 1/2

Landing Field Length Limit

Flaps 30

Based on automatic speedbrakes

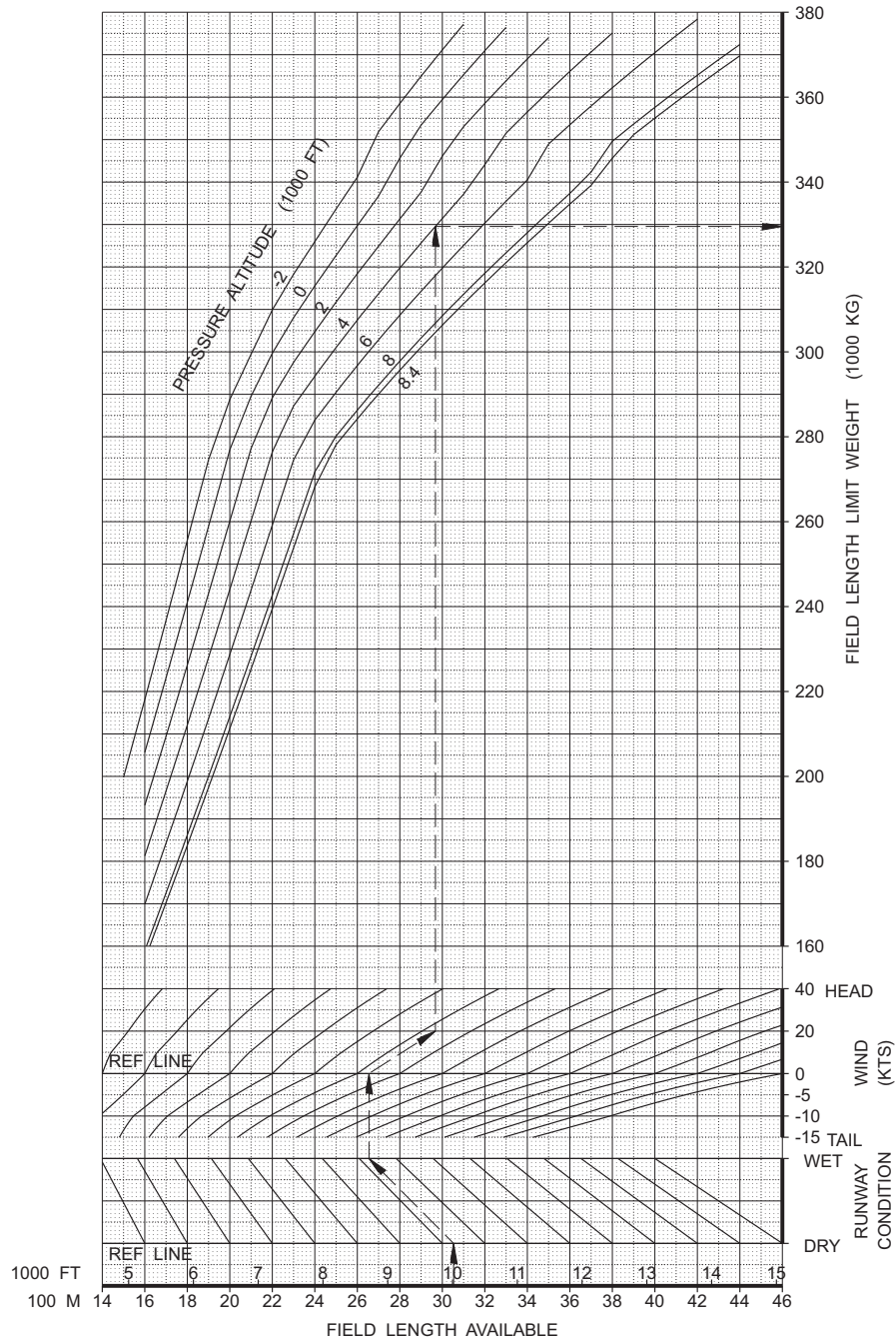


With manual speedbrakes, decrease weight by 21450 kg.
With 1 brake deactivated, decrease weight by 20600 kg.
With 2 brakes deactivated, decrease weight by 41900 kg.

Landing Field Length Limit

Flaps 25

Based on automatic speedbrakes

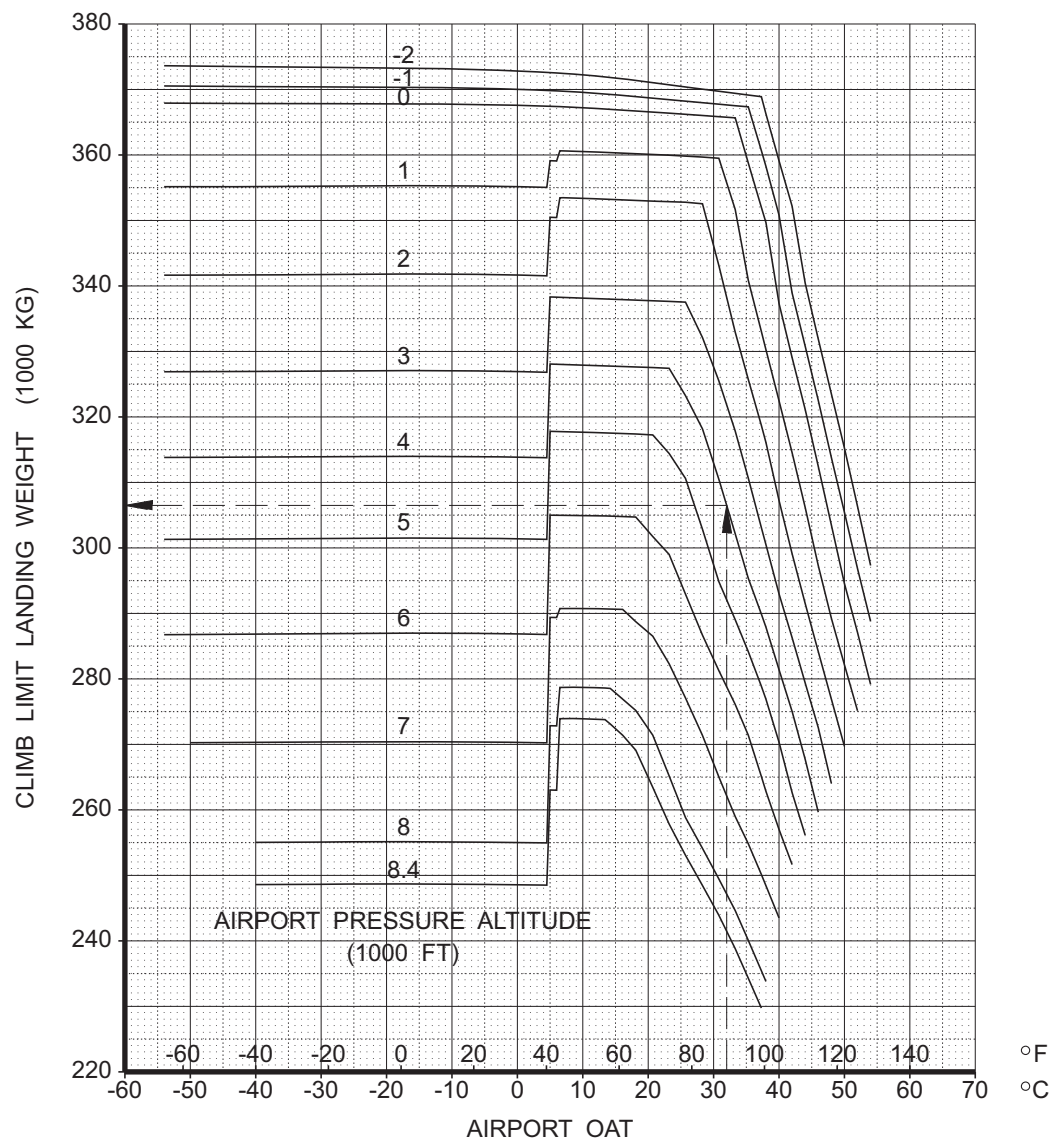


With manual speedbrakes, decrease weight by 21700 kg.
 With 1 brake deactivated, decrease weight by 21100 kg.
 With 2 brakes deactivated, decrease weight by 43500 kg.

Landing Climb Limit Weight

Valid for approach with flaps 20 and landing with flaps 30

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



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

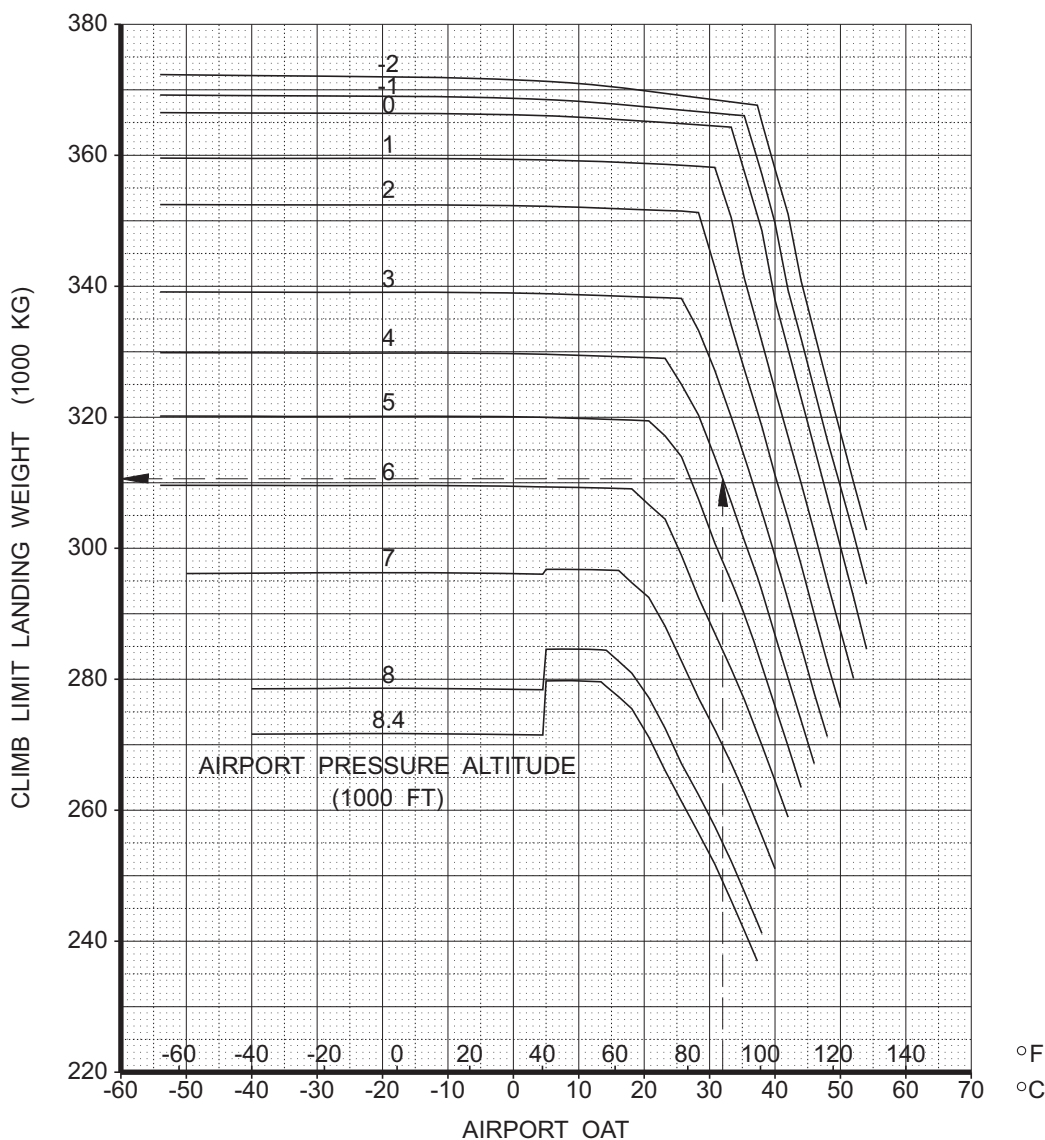
With engine and wing anti-ice on, decrease weight by 2350 kg.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 26950 kg.

Landing Climb Limit Weight

Valid for approach with flaps 20 and landing with flaps 25

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



With engine bleed for packs off, increase weight by 1400 kg.

With engine and wing anti-ice on, decrease weight by 2300 kg.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 24500 kg.

ENGINE INOP

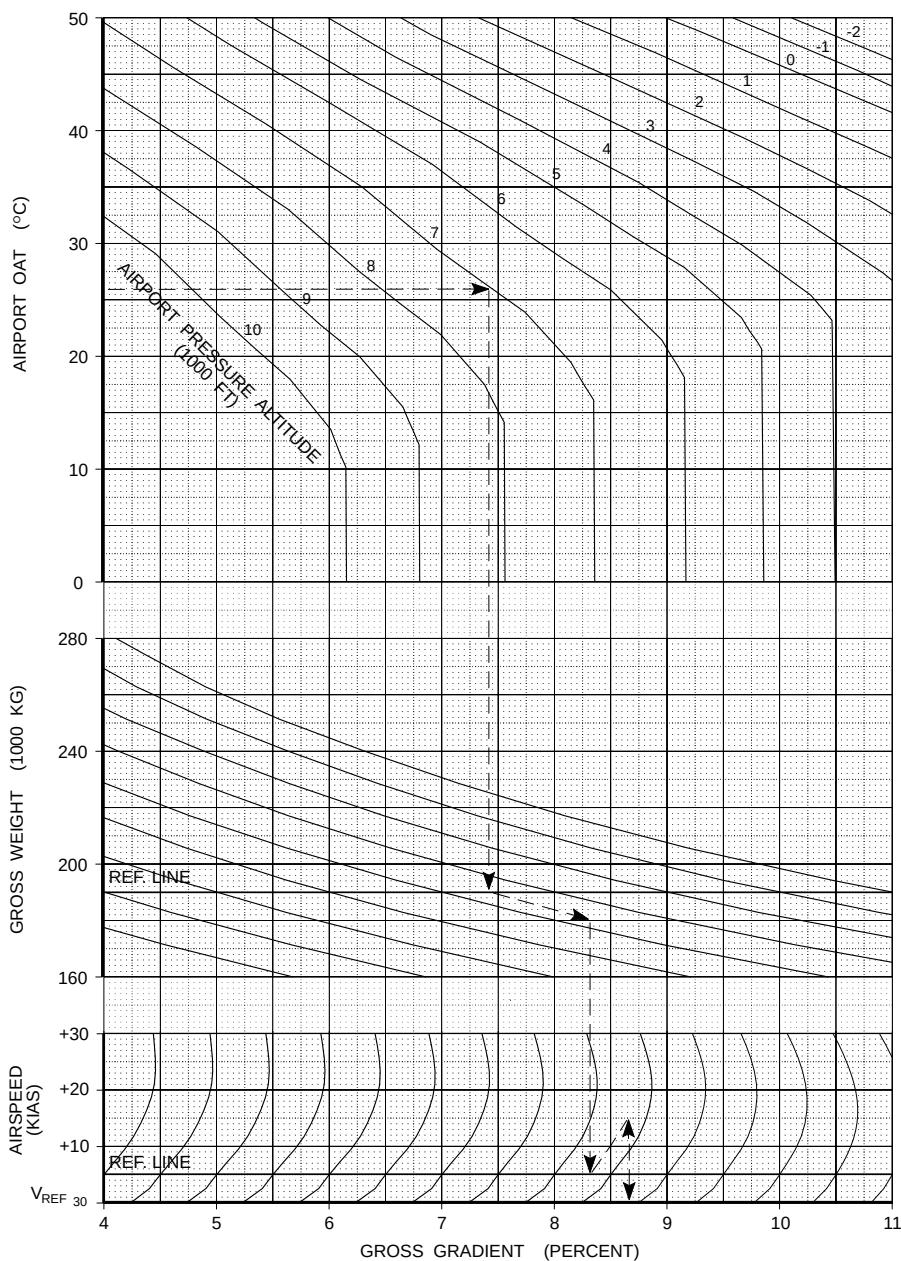
ADVISORY INFORMATION

GO-AROUND THRUST

Go-Around Climb Gradient

Flaps 20, Gear Up

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



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

With engine and wing anti-ice on, decrease gradient by 0.1%.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease gradient by 1.2%.

Quick Turnaround Limit
Flaps 30 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	243.9	239.7	235.5									
50	122	245.5	241.3	237.0	232.6	228.2							
45	113	247.5	243.2	239.0	234.5	230.0	225.7	221.4					
40	104	249.5	245.2	240.9	236.4	231.9	227.5	223.2	219.0	214.8	210.5		
35	95	251.6	247.2	242.9	238.4	233.9	229.4	225.1	220.8	216.6	212.3	208.1	206.5
30	86	253.7	249.3	245.0	240.4	235.9	231.4	227.0	222.7	218.4	214.2	209.9	208.2
25	77	256.0	251.5	247.1	242.5	237.9	233.4	228.9	224.6	220.3	216.0	211.7	210.0
20	68	258.2	253.7	249.2	244.6	240.0	235.5	231.0	226.5	222.2	217.9	213.6	211.9
15	59	260.6	256.0	251.5	246.8	242.2	237.6	233.0	228.6	224.1	219.8	215.6	213.8
10	50	262.4	258.3	253.8	249.0	244.4	239.8	235.2	230.6	226.2	221.8	217.5	215.8
5	41	264.2	260.8	256.2	251.3	246.6	242.0	237.4	232.8	228.3	223.8	219.5	217.8
0	32	266.0	262.6	258.6	253.7	248.9	244.2	239.6	235.0	230.4	225.9	221.5	219.8
-5	23	267.8	264.4	261.0	256.2	251.3	246.6	241.9	237.3	232.6	228.1	223.6	221.9
-10	14	269.7	266.3	262.9	258.7	253.8	249.0	244.2	239.6	234.9	230.3	225.8	224.0
-15	5	271.7	268.3	264.8	261.2	256.4	251.5	246.7	242.0	237.3	232.6	228.1	226.3
-20	-4	274.2	270.2	266.8	263.1	259.0	254.0	249.2	244.4	239.7	235.0	230.4	228.6
-30	-22	279.8	275.0	270.8	267.2	263.5	259.4	254.4	249.5	244.7	240.0	235.3	233.4
-40	-40	285.8	280.9	276.0	271.3	267.7	263.9	260.0	255.0	250.1	245.2	240.4	238.5
-50	-58	292.3	287.1	282.2	277.0	272.0	268.3	264.6	260.8	255.7	250.8	245.8	243.8
-54	-65	295.1	289.8	284.7	279.5	274.4	270.1	266.4	262.6	258.1	253.0	248.0	245.9

Flaps 25 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	230.0	226.0	222.1									
50	122	231.5	227.5	223.5	219.3	215.2							
45	113	233.4	229.3	225.3	221.1	216.9	212.9	208.9					
40	104	235.3	231.2	227.2	222.9	218.7	214.6	210.6	206.5	202.5	198.6		
35	95	237.2	233.2	229.1	224.8	220.5	216.4	212.3	208.3	204.2	200.2	196.3	194.8
30	86	239.2	235.1	231.0	226.7	222.4	218.2	214.1	210.0	206.0	201.9	198.0	196.4
25	77	241.3	237.1	233.0	228.7	224.3	220.1	215.9	211.8	207.7	203.7	199.7	198.1
20	68	243.4	239.2	235.1	230.7	226.3	222.0	217.8	213.7	209.6	205.5	201.4	199.8
15	59	245.6	241.4	237.1	232.8	228.4	224.0	219.7	215.5	211.4	207.3	203.2	201.6
10	50	247.9	243.6	239.3	234.9	230.4	226.1	221.7	217.5	213.3	209.2	205.1	203.5
5	41	250.2	245.8	241.5	237.0	232.6	228.2	223.8	219.5	215.3	211.2	207.0	205.4
0	32	252.6	248.2	243.8	239.2	234.8	230.3	225.9	221.6	217.3	213.1	208.9	207.3
-5	23	255.0	250.6	246.2	241.5	237.0	232.5	228.1	223.7	219.3	215.1	211.0	209.3
-10	14	257.6	253.1	248.6	243.9	239.3	234.8	230.3	225.9	221.5	217.2	213.0	211.4
-15	5	260.1	255.6	251.1	246.4	241.7	237.1	232.6	228.2	223.7	219.3	215.1	213.4
-20	-4	262.8	258.2	253.7	248.9	244.2	239.5	235.0	230.5	226.0	221.6	217.2	215.5
-30	-22	268.1	263.6	259.0	254.1	249.3	244.6	239.9	235.3	230.8	226.3	221.8	220.1
-40	-40	273.9	269.2	264.6	259.7	254.8	249.9	245.2	240.5	235.8	231.3	226.7	224.9
-50	-58	280.0	275.2	270.4	265.5	260.6	255.7	250.8	245.9	241.2	236.5	231.8	229.8
-54	-65	282.6	277.7	272.9	267.9	263.0	258.1	253.1	248.3	243.4	238.6	233.9	231.8

Increase weight by 2100 kg per 1% uphill slope. Decrease weight by 3450 kg per 1% downhill slope.

Increase weight by 6100 kg per 10 knots headwind. Decrease weight by 29450 kg per 10 knots tailwind.

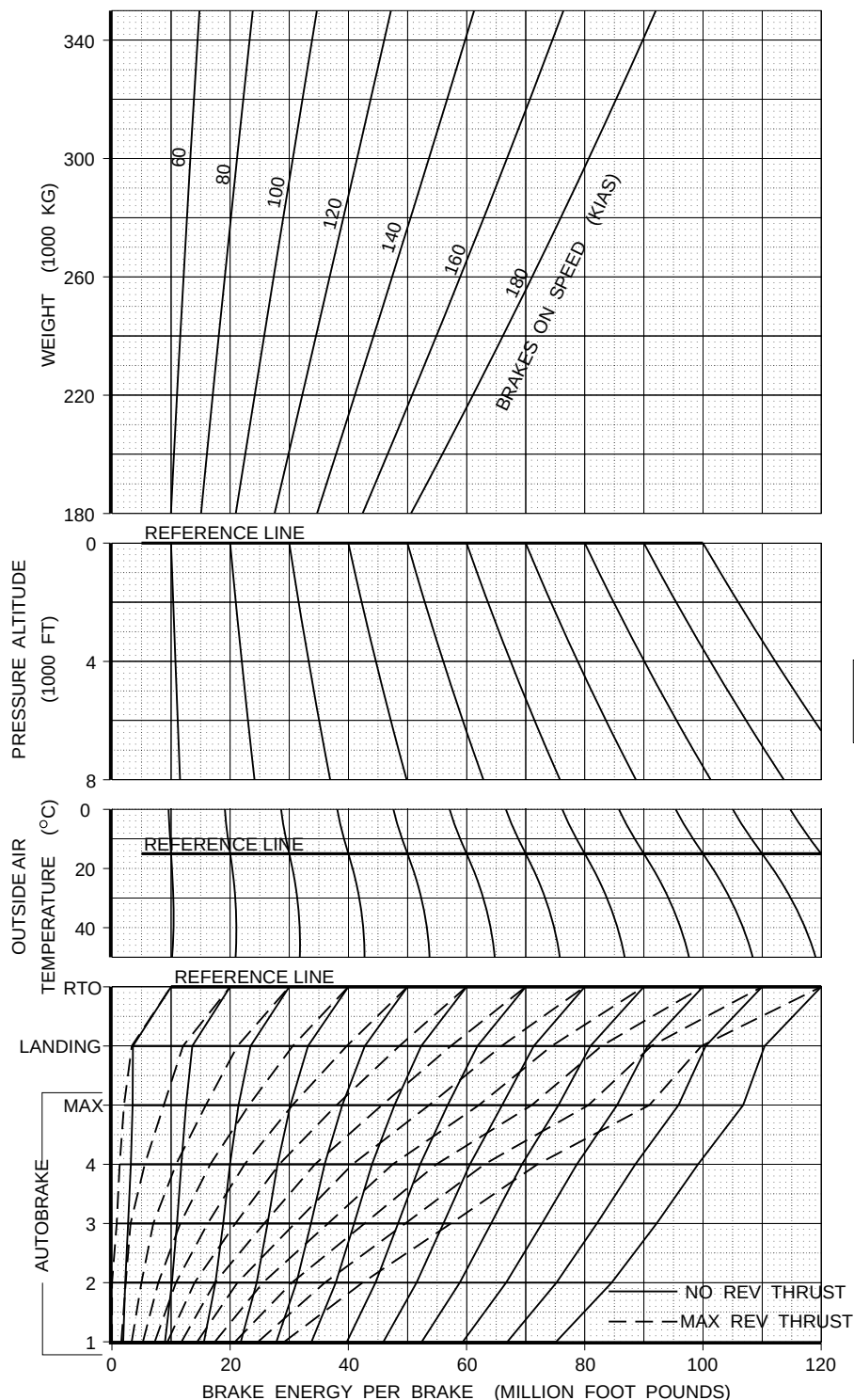
Decrease weight by 12600 kg when one brake is deactivated. Decrease weight by 24950 kg when two brakes are deactivated.

After landing at weights exceeding those shown above, adjusted for slope and wind, wait at least 65 minutes and check that wheel thermal plugs have not melted before executing a takeoff.

As an alternate procedure, no waiting period is required if the BRAKE TEMP advisory message on EICAS is not displayed 10 to 15 minutes after parking.

ADVISORY INFORMATION

Recommended Brake Cooling Schedule



GUIDANCE INFORMATION ONLY

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 10 PERCENT

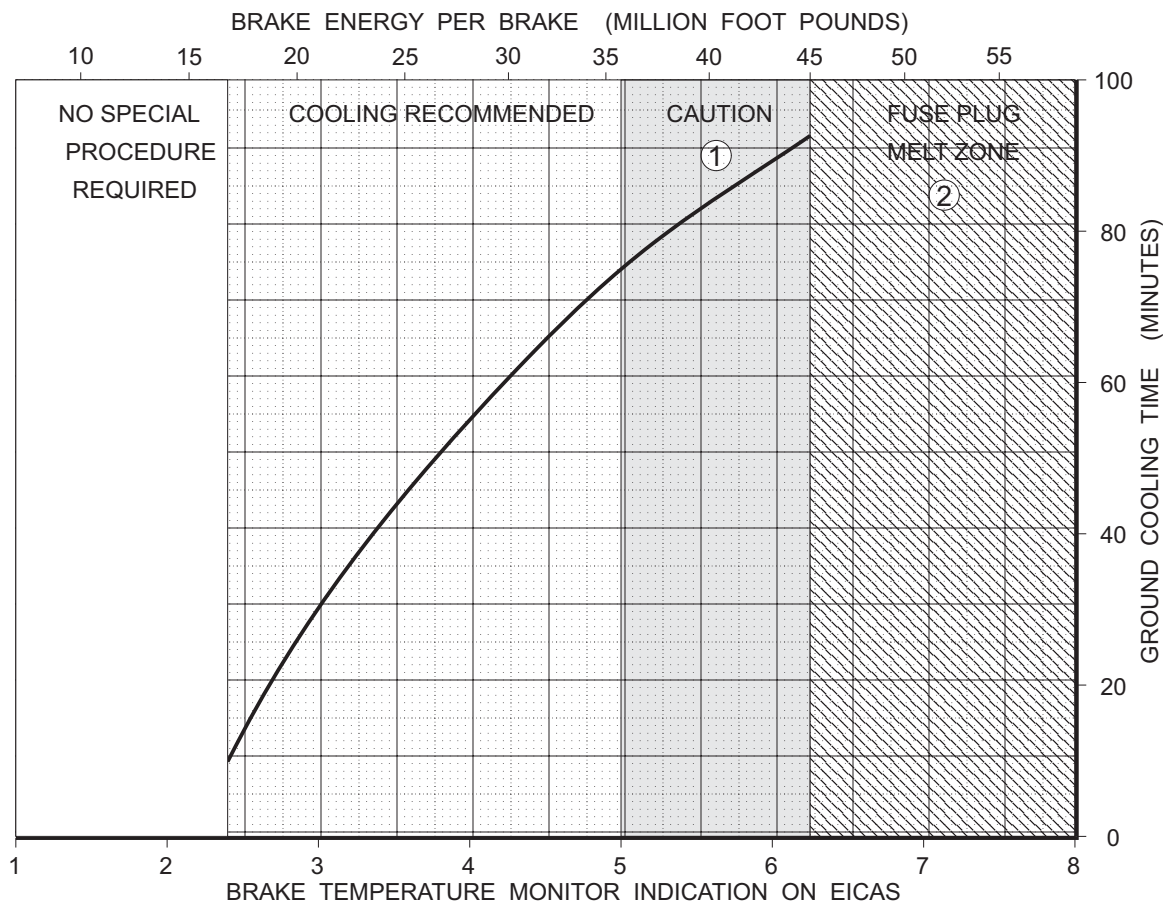
FOR TWO BRAKES DEACTIVATED
INCREASE BRAKE ENERGY PER
BRAKE BY 20 PERCENT

IF GROUND SPEED IS USED FOR
BRAKES ON SPEED, IGNORE WIND,
ALTITUDE, AND OAT EFFECTS

RTO AND LANDING BRAKE
ENERGY BASED ON MAXIMUM
MANUAL BRAKING

ADVISORY INFORMATION

Recommended Brake Cooling Schedule



OBSERVE MAXIMUM QUICK TURNAROUND LIMITATION

FOR INFLIGHT GEAR EXTENDED COOLING TIME, DIVIDE GROUND COOLING TIME BY 10.

- ① WHEEL FUSE PLUGS MAY MELT. DELAY TAKEOFF AND INSPECT AFTER ONE HOUR. IF OVERHEAT OCCURS AFTER TAKEOFF, EXTEND GEAR SOON FOR AT LEAST 8 MINUTES.
- ② CLEAR RUNWAY IMMEDIATELY. UNLESS REQUIRED, DO NOT SET PARKING BRAKE. DO NOT APPROACH GEAR OR ATTEMPT TAXI FOR ONE HOUR. TIRE WHEEL AND BRAKE REPLACEMENT MAY BE REQUIRED. IF OVERHEAT OCCURS AFTER TAKEOFF, EXTEND GEAR SOON FOR AT LEAST 12 MINUTES.

BRAKE TEMPERATURE MONITOR SYSTEM (BTMS) INDICATION ON EICAS MAY BE USED 10 TO 15 MINUTES AFTER AIRPLANE HAS COME TO A COMPLETE STOP, OR INFLIGHT WITH GEAR RETRACTED, TO DETERMINE RECOMMENDED COOLING SCHEDULE. (WHEN INFLIGHT WITH GEAR EXTENDED, THE BTMS INDICATION MAY VARY BETWEEN INDIVIDUAL BRAKES DUE TO AIRSTREAM EFFECTS.)



Flight Planning and Performance Manual

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 30

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	220000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 220000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF30	ONE REV	NO REV

Dry Runway

MAX MANUAL	910	+25/0	20	-35/+125	+10/-10	+20/-20	35	20	40
AUTOBRAKE MAX	1215	+25/0	25	-50/+180	0/0	+30/-30	65	0	0
AUTOBRAKE 4	1575	+35/0	40	-75/+255	0/0	+40/-40	90	0	0
AUTOBRAKE 3	1855	+45/-10	45	-90/+315	0/-10	+50/-50	100	0	0
AUTOBRAKE 2	2045	+50/-20	60	-105/+365	+25/-45	+55/-55	80	65	65
AUTOBRAKE 1	2205	+55/-25	70	-120/+420	+65/-70	+60/-60	80	250	305

Good Reported Braking Action

MAX MANUAL	1270	+25/-5	30	-60/+220	+30/-25	+30/-30	50	80	195
AUTOBRAKE MAX	1320	+25/-5	35	-65/+225	+30/-20	+30/-30	60	85	205
AUTOBRAKE 4	1580	+35/0	40	-75/+260	+10/-5	+40/-40	90	5	35
AUTOBRAKE 3	1855	+45/-10	45	-90/+315	+5/-10	+50/-50	100	0	0
AUTOBRAKE 2	2045	+50/-20	60	-105/+365	+25/-45	+55/-55	80	65	65
AUTOBRAKE 1	2205	+55/-25	70	-120/+420	+65/-70	+60/-60	80	250	305

Medium Reported Braking Action

MAX MANUAL	1695	+40/-15	50	-95/+350	+75/-60	+45/-45	60	215	575
AUTOBRAKE MAX	1695	+40/-15	50	-95/+350	+75/-60	+45/-45	65	210	570
AUTOBRAKE 4	1755	+40/-5	50	-100/+360	+60/-35	+50/-50	90	195	565
AUTOBRAKE 3	1955	+45/-10	50	-105/+385	+40/-35	+55/-55	100	85	390
AUTOBRAKE 2	2095	+50/-20	60	-115/+405	+55/-65	+60/-60	80	115	310
AUTOBRAKE 1	2210	+55/-25	70	-125/+435	+90/-70	+60/-65	80	275	415

Poor Reported Braking Action

MAX MANUAL	2145	+50/-25	70	-140/+540	+165/-110	+60/-60	70	445	1380
AUTOBRAKE MAX	2150	+55/-25	70	-140/+540	+170/-115	+60/-60	70	445	1385
AUTOBRAKE 4	2150	+55/-20	70	-140/+540	+170/-110	+60/-60	75	445	1385
AUTOBRAKE 3	2220	+55/-20	70	-140/+545	+140/-90	+65/-65	100	395	1340
AUTOBRAKE 2	2320	+55/-25	75	-145/+560	+145/-115	+65/-65	80	345	1265
AUTOBRAKE 1	2380	+60/-30	80	-150/+570	+170/-120	+70/-70	80	440	1220

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

For Max Manual braking and manual speedbrakes, increase reference landing distance by 65 m.

For autobrake and manual speedbrakes, increase reference landing distance by 50 m.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 25

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	220000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 220000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF25	ONE REV	NO REV

Dry Runway

MAX MANUAL	940	+20/-5	20	-35/+130	+10/-10	+20/-20	35	20	45
AUTOBRAKE MAX	1285	+20/-5	30	-55/+185	0/0	+30/-30	65	0	0
AUTOBRAKE 4	1670	+30/-10	45	-80/+265	0/0	+45/-45	95	0	0
AUTOBRAKE 3	1975	+35/-15	55	-95/+330	0/-15	+55/-55	100	5	5
AUTOBRAKE 2	2165	+40/-25	70	-110/+375	+30/-50	+60/-60	85	90	90
AUTOBRAKE 1	2330	+50/-30	80	-125/+435	+75/-75	+65/-65	80	295	365

Good Reported Braking Action

MAX MANUAL	1325	+20/-10	35	-65/+225	+30/-30	+35/-35	50	90	215
AUTOBRAKE MAX	1380	+25/-10	35	-65/+230	+30/-20	+35/-35	65	95	225
AUTOBRAKE 4	1680	+30/-10	45	-80/+270	+10/-5	+45/-45	95	5	35
AUTOBRAKE 3	1975	+35/-15	55	-95/+330	+5/-15	+55/-55	100	5	5
AUTOBRAKE 2	2165	+40/-25	70	-110/+375	+30/-50	+60/-60	85	90	90
AUTOBRAKE 1	2330	+50/-30	80	-125/+435	+75/-75	+65/-65	80	295	365

Medium Reported Braking Action

MAX MANUAL	1775	+35/-20	55	-100/+360	+75/-60	+50/-50	60	235	635
AUTOBRAKE MAX	1775	+35/-20	55	-100/+360	+80/-60	+50/-50	65	235	630
AUTOBRAKE 4	1855	+35/-10	55	-100/+370	+55/-35	+50/-50	95	195	610
AUTOBRAKE 3	2075	+35/-20	60	-110/+395	+40/-40	+60/-60	100	90	410
AUTOBRAKE 2	2220	+40/-25	70	-120/+420	+65/-70	+65/-65	85	145	350
AUTOBRAKE 1	2340	+50/-30	80	-125/+445	+95/-80	+65/-65	80	315	480

Poor Reported Braking Action

MAX MANUAL	2250	+45/-30	80	-145/+550	+170/-115	+65/-65	70	485	1535
AUTOBRAKE MAX	2255	+50/-30	80	-145/+550	+175/-120	+65/-65	70	490	1535
AUTOBRAKE 4	2255	+50/-30	80	-145/+550	+175/-110	+65/-65	80	490	1535
AUTOBRAKE 3	2350	+45/-25	80	-145/+560	+145/-95	+70/-70	100	415	1470
AUTOBRAKE 2	2445	+50/-35	85	-150/+575	+155/-120	+70/-70	80	390	1395
AUTOBRAKE 1	2510	+55/-35	90	-155/+585	+175/-125	+75/-75	80	490	1360

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

For Max Manual braking and manual speedbrakes, increase reference landing distance by 65 m.

For autobrake and manual speedbrakes, increase reference landing distance by 55 m.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).



Flight Planning and Performance Manual

ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 20

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	220000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 220000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF20	ONE REV	NO REV

Dry Runway

MAX MANUAL	1005	+25/-10	25	-40/+135	+10/-10	+20/-20	35	25	55
AUTOBRAKE MAX	1390	+20/-15	35	-60/+195	0/0	+35/-35	70	0	0
AUTOBRAKE 4	1820	+30/-20	50	-80/+280	0/0	+50/-50	100	0	0
AUTOBRAKE 3	2160	+40/-30	65	-100/+345	+5/-15	+60/-60	105	5	5
AUTOBRAKE 2	2370	+45/-40	75	-115/+395	+35/-55	+70/-70	90	105	105
AUTOBRAKE 1	2560	+55/-45	90	-135/+455	+80/-85	+75/-75	90	345	420

Good Reported Braking Action

MAX MANUAL	1430	+25/-20	40	-65/+230	+35/-30	+35/-35	50	105	250
AUTOBRAKE MAX	1485	+25/-20	40	-70/+240	+30/-20	+40/-40	65	105	265
AUTOBRAKE 4	1825	+30/-20	50	-85/+285	+10/0	+50/-50	100	10	40
AUTOBRAKE 3	2160	+40/-30	65	-100/+345	+5/-15	+60/-60	105	5	5
AUTOBRAKE 2	2370	+45/-40	75	-115/+395	+35/-55	+70/-70	90	105	105
AUTOBRAKE 1	2560	+55/-45	90	-135/+455	+80/-85	+75/-75	90	345	420

Medium Reported Braking Action

MAX MANUAL	1925	+35/-30	65	-105/+375	+85/-65	+55/-55	65	275	750
AUTOBRAKE MAX	1925	+40/-30	65	-105/+375	+85/-65	+55/-55	70	270	745
AUTOBRAKE 4	2010	+40/-25	65	-105/+385	+60/-40	+55/-60	100	225	710
AUTOBRAKE 3	2260	+40/-35	70	-115/+415	+45/-45	+65/-65	105	100	490
AUTOBRAKE 2	2425	+50/-40	80	-125/+440	+65/-75	+70/-70	90	160	410
AUTOBRAKE 1	2565	+55/-45	95	-135/+470	+100/-90	+75/-75	90	370	550

Poor Reported Braking Action

MAX MANUAL	2450	+55/-45	90	-150/+570	+185/-125	+70/-70	75	565	1815
AUTOBRAKE MAX	2455	+55/-45	90	-150/+570	+190/-130	+70/-70	75	565	1815
AUTOBRAKE 4	2455	+55/-40	90	-150/+570	+190/-120	+70/-70	80	565	1815
AUTOBRAKE 3	2550	+55/-40	90	-155/+580	+160/-100	+75/-75	105	480	1740
AUTOBRAKE 2	2665	+55/-45	95	-160/+595	+165/-125	+80/-80	90	445	1650
AUTOBRAKE 1	2745	+60/-50	100	-165/+610	+190/-140	+80/-80	85	565	1600

Reference distance is for sea level, standard day, no wind or slope, VREF20 approach speed, 2 engine reverse thrust, and auto speedbrakes.

For Max Manual braking and manual speedbrakes, increase reference landing distance by 70 m.

For autobrake and manual speedbrakes, increase reference landing distance by 55 m.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).

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FLIGHT PLANNING

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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 rate for normal operation is 240 kg per hour on the ground.

Taxi fuel allowance is approximately 33 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)				
	300	260	220	180	140
43				160	140
39			180	160	145
35		200	190	170	140
31	230	220	195	165	140
25	230	220	195	175	155
20	235	230	205	185	165
15	235	235	215	200	185
10	240	240	230	220	200
5	270	270	255	240	220

Climb

Trip Fuel and Time charts are based on 310/.84 climb speed. Local ATC may require that 250 KIAS not be exceeded below 10000 ft. Approximately 85 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	.84M	CI 180
2000 FT ABOVE	2	2	2
OPTIMUM ALTITUDE	0	0	0
2000 FT BELOW	2	3	3
4000 FT BELOW	5	7	6
6000 FT BELOW	7	11	9
8000 FT BELOW	10	15	13
10000 FT BELOW	12	20	16
12000 FT BELOW	14	25	20

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 LRC may be approximated by a constant .84M or Cost Index 180.

Increase total fuel flow during cruise approximately 25 kg/hr for engine anti-ice on or 120 kg/hr for engine and wing anti-ice on.

Every 500 kg reduction in landing weight decreases trip fuel at optimum altitude by approximately 0.16%.

Descent

Optimum descent speeds for minimum trip fuel are a function of weight. Trip Fuel and Time charts are based on .84/310/250 descent speed, and include straight in approach allowances only. Each additional minute of flaps down maneuvering consumes approximately 125 kg of additional fuel with the gear retracted and 140 kg with the gear extended.

Missed Approach

Approximately 390 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.

Optimum Altitude/Short Trip Cruise Altitude

Optimum altitude for best fuel mileage is presented for LRC/.84M speed schedule. Fuel mileage penalties for flying off-optimum altitude are tabulated under Altitude Selection.

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.

Trip Fuel and Time

Trip Fuel and Time charts are provided for Long Range Cruise and .84M at constant altitude to determine trip fuel and time from brake release to touchdown. A similar chart for a cost index of 180 (which approximates Long Range Cruise) is also shown. APU usage, taxi, inflight flaps down maneuvering (other than straight in approach) and reserve fuel should be added to the 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 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 correction guidelines. Adjusted ground distance is ground distance multiplied by the ratio $\text{Average TAS} / (\text{Average TAS} + \text{Wind Component})$, where headwind is negative and tailwind is positive.

Step Climb 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 continually increases as the airplane weight decreases, a step climb procedure bracketing optimum altitude is necessary.

The Step Climb Planning charts provide trip fuel and time for Long Range Cruise, .84M or Cost Index 180 from brake release to touchdown, similar to the constant altitude Trip Fuel and Time charts. The charts are based on 4000 ft step climbs to 2000 ft above optimum altitude.

Short Trip Fuel and Time

Short Trip Fuel and Time charts include fuel and time for climb to cruise altitude, cruise, descent and straight in approach. The charts are 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, adjusted 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

These tables provide total fuel flow information necessary for planning holding and reserve fuel requirements. The tables are 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 table values by 5%.

Fuel Tankering

The Fuel Tankering table below is provided for LRC/.84M cruise schedule based on a step climb procedure to bracket optimum altitude. When a fuel price differential exists between two stations, this table may be used to determine if fuel may be economically transported for a subsequent flight sector.

Enter the table with the trip distance to read the break-even fuel price ratio. As noted, the break-even fuel price is the fuel price at departure multiplied by the break-even fuel price ratio. To justify tanker operation, economically, the fuel price at destination must be greater than the break-even fuel price.

TRIP DISTANCE (NM)	BREAK-EVEN PRICE RATIO
200	1.010
400	1.022
600	1.033
800	1.044
1000	1.055
2000	1.113
3000	1.174
4000	1.248
5000	1.317
6000	1.390
7000	1.458
8000	1.542
9000	1.631
10000	1.725

Oxygen Requirements

Passenger Oxygen System - Chemical

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. 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.

Flight Crew System

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. The oxygen quantity associated with these requirements is achieved with the minimum dispatch oxygen cylinder pressure. Enter the Flight Crew System oxygen table with the number of crew plus observers using oxygen and read the minimum cylinder pressure required for the appropriate bottle temperature.

An additional quantity of oxygen is required when flight altitudes above 41000 ft are planned. Regulations require that one active duty pilot must don the oxygen mask and breathe diluted oxygen for the duration of the flight above 41000 ft. The additional quantity of oxygen required is 2.05 liters/person/minute (0.6 psi/person/minute for the dual cylinder system), or 13 liters/person/minute (4 psi/person/minute) if 100% oxygen is selected during normal usage.

Driftdown

Net Level Off Weight

This chart is used to determine the maximum weight for terrain clearance based on the Approved Flight Manual net engine inoperative performance at 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. 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 anti-ice operation with the weight adjustment shown on 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 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 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.

To determine fuel required, enter with the desired ground distance, correct 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

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 diversion airport comply with rules set up specifically for extended range operation with two engine airplanes. 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 driftdown/cruise speed schedules. The information is based on drifting down using Max Continuous thrust at the Mach number shown until reaching the corresponding airspeed and maintaining that airspeed throughout the remainder of the driftdown and level cruise. Based on route requirements, operators may select any one of these

speeds for their operation, or may elect to use an entirely different speed which is not contained in this section.

Flight Planning

The following information is shown for flight planning purposes and is intended for use mainly by ground personnel.

Data is included for five basic schedules (Long Range Cruise, .82/260, .84/280, .84/300 and .84/320) throughout this section to allow the operator to evaluate the effect of using speeds up to 320 KIAS.

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 range operation. The distance to the diversion airport from any point along the intended route must be covered within the approved time using the single engine cruise speed (assuming still air and ISA conditions) selected by the operator.

Enter the chart with the appropriate weight using the speed schedule and time selected and read the 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 flight profiles as described on the charts. This information is shown for All-Engines operation at Long Range Cruise, as well as Engine-Inop operation at Long Range Cruise, 260, 280, 300 and 320 KIAS. There are two separate Engine-Inop scenarios; one assumes a loss of pressurization and subsequent cruise at 10000 ft, the other assumes only an engine failure with the airplane drifting down to an applicable level-off altitude for the remainder of the diversion. The ETOPS Critical Fuel required is the greater of All-Engine fuel or Engine-Inop fuel for the speed schedule selected. This fuel is compared to the amount of fuel normally onboard the airplane at that point in the route. If the fuel required by critical fuel reserves exceeds the amount of fuel normally expected, fuel load must be adjusted accordingly.

To determine the fuel required, enter the appropriate chart with desired diversion distance, adjust for forecast wind (factored if applicable), proceed vertically to the weight at critical point and read the fuel required to the right. If the operator is 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 at the bottom of the chart. If the operator is not using an acceptable wind forecasting model, the calculated diversion fuel is to be increased by 5% instead of factoring the forecast wind values.

Adjustments for non-standard conditions are shown at the bottom of the page.

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.

Net Level Off Weight

These charts are used to determine the maximum weight for terrain clearance based on net engine inoperative performance for the speed schedules shown and is for planning purposes only. Regulations require terrain clearance flight planning based on net performance which is the gross (or actual) gradient performance degraded by 1.1%.

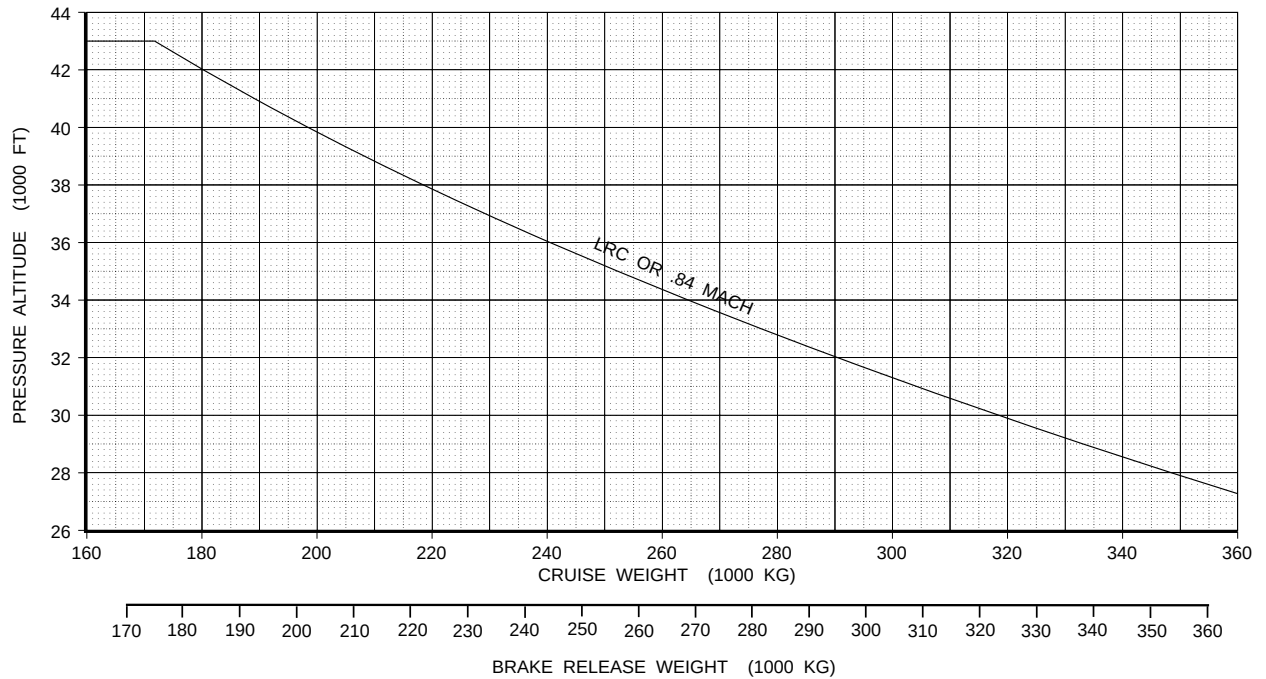
Net level off weight is determined by entering the appropriate chart at the left with the desired level off pressure altitude, correcting for anti-ice as shown, proceeding across to the correct ISA deviation line and reading the allowable weight at the bottom. The net level off altitude may be obtained by entering the chart with weight and proceeding up to the correct ISA deviation line and reading across to the altitude on the left.

Driftdown/Cruise Range Capability

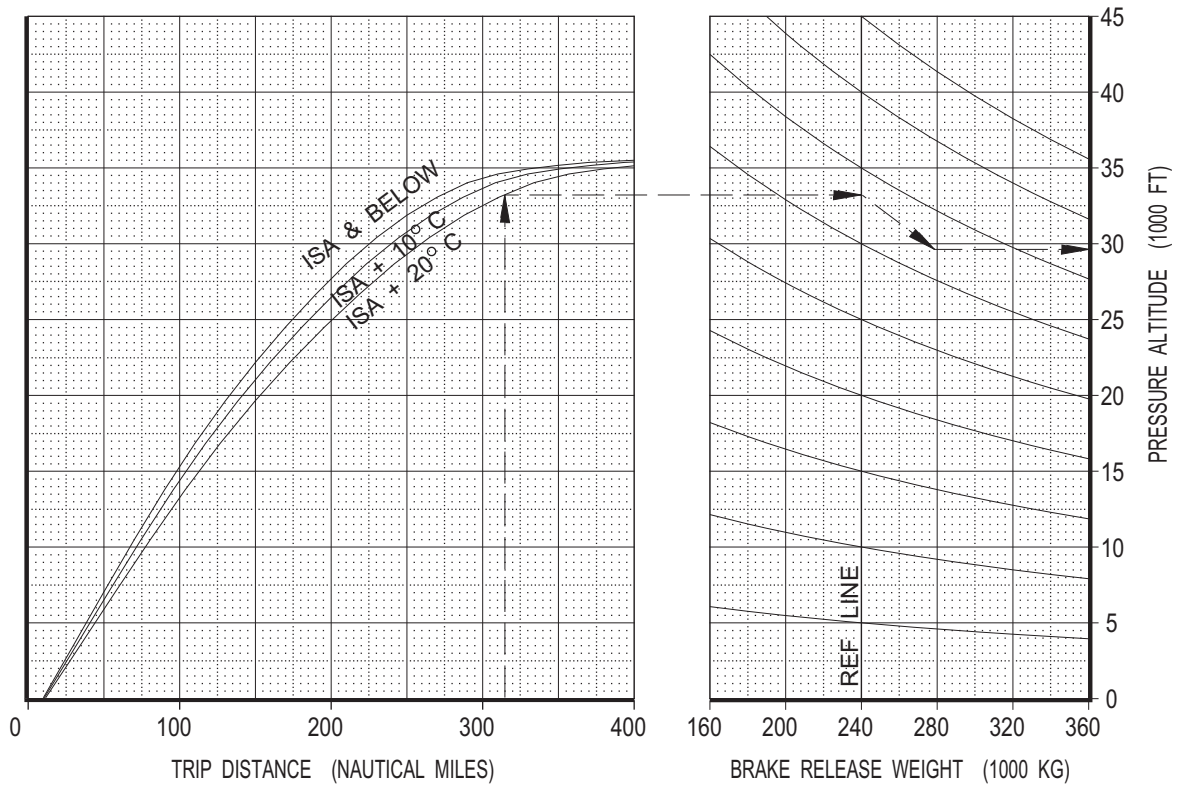
These charts show range capability from the start of driftdown/cruise when the driftdown/cruise procedure outlined in this section is followed. Charts are shown for each of the speed schedules discussed previously.

To determine the fuel required, enter 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.

Optimum Altitude



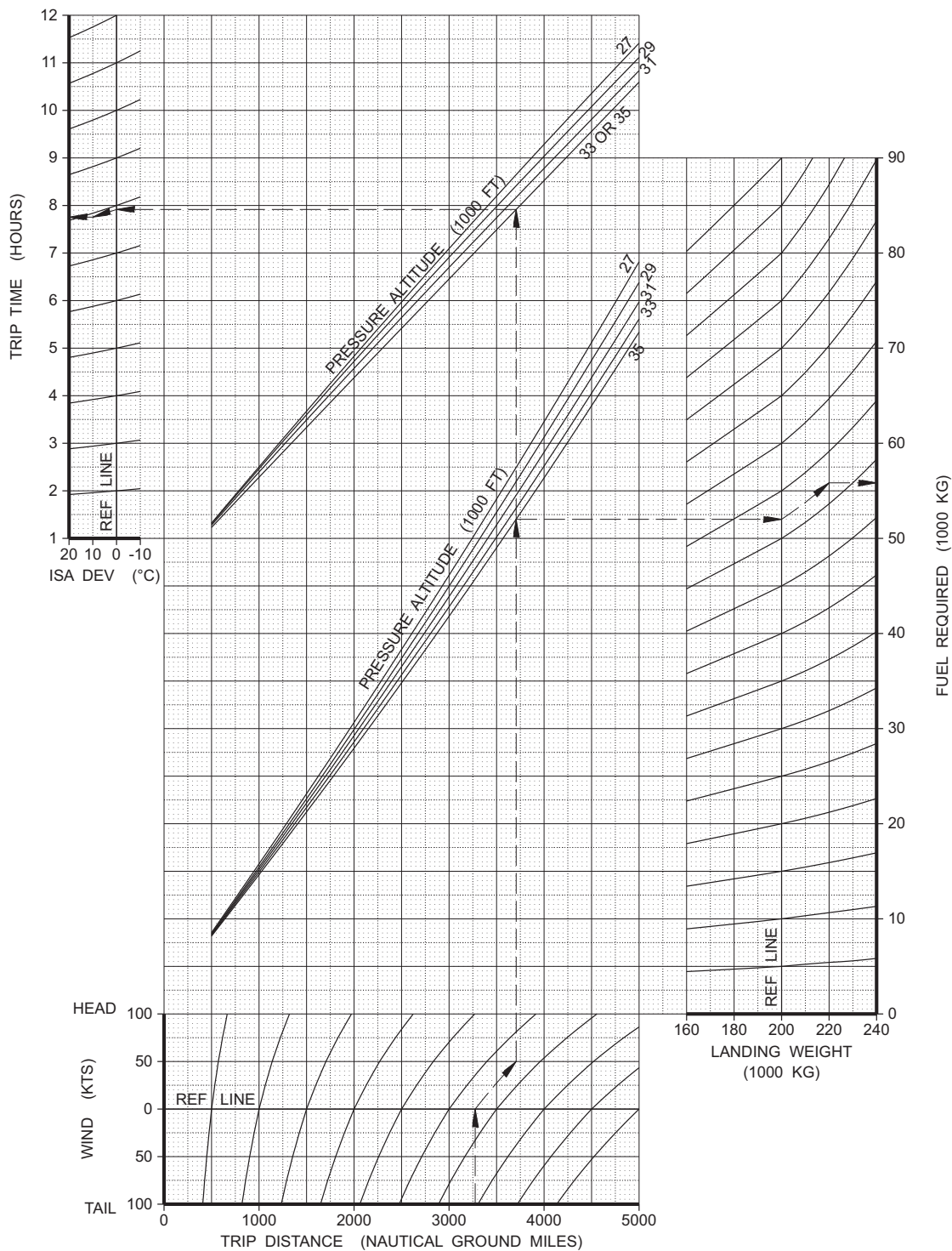
Short Trip Cruise Altitude



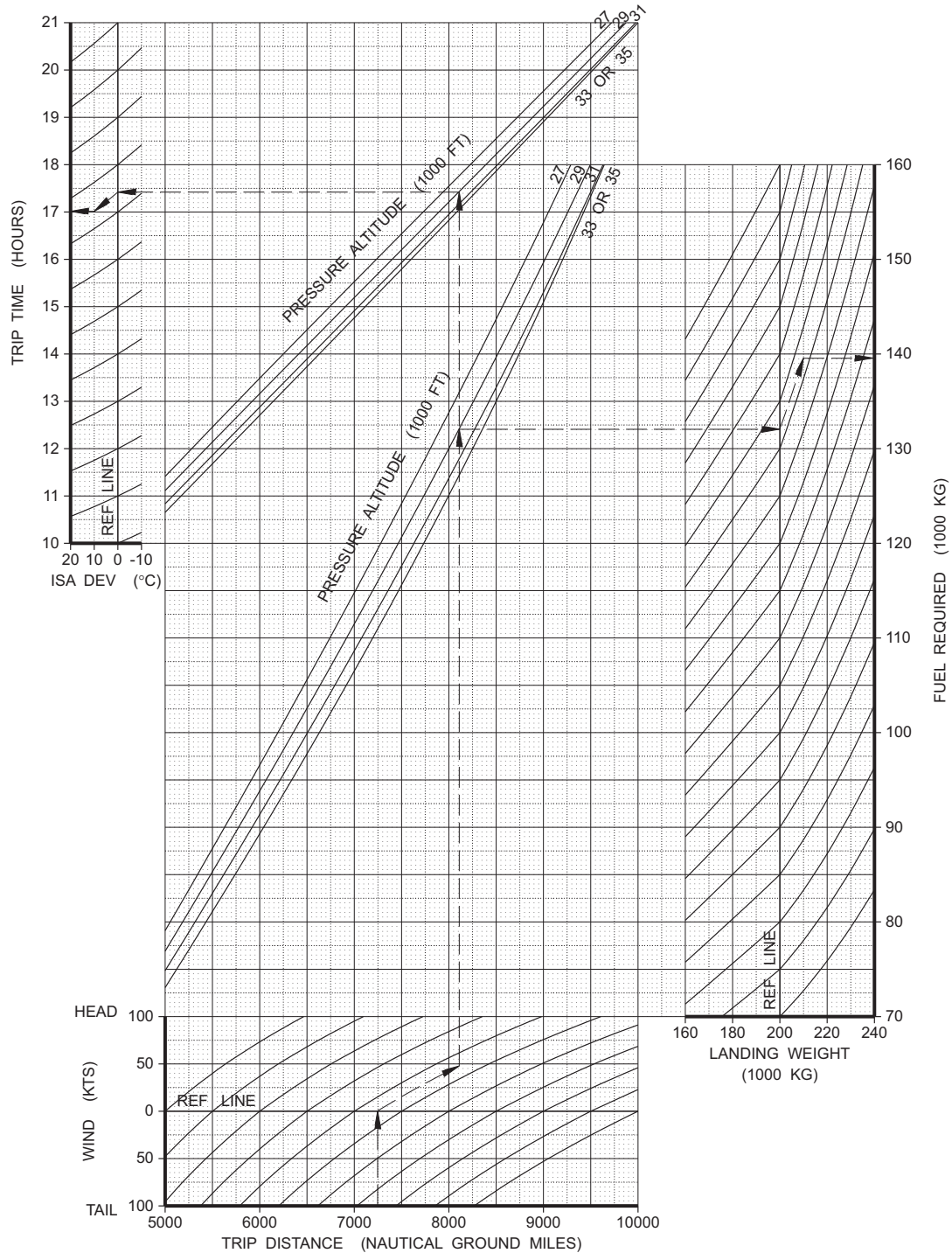
Long Range Cruise Trip Fuel and Time

0 to 5000 NM Trip Distance

Based on .310/.84 climb and .84/310/250 descent



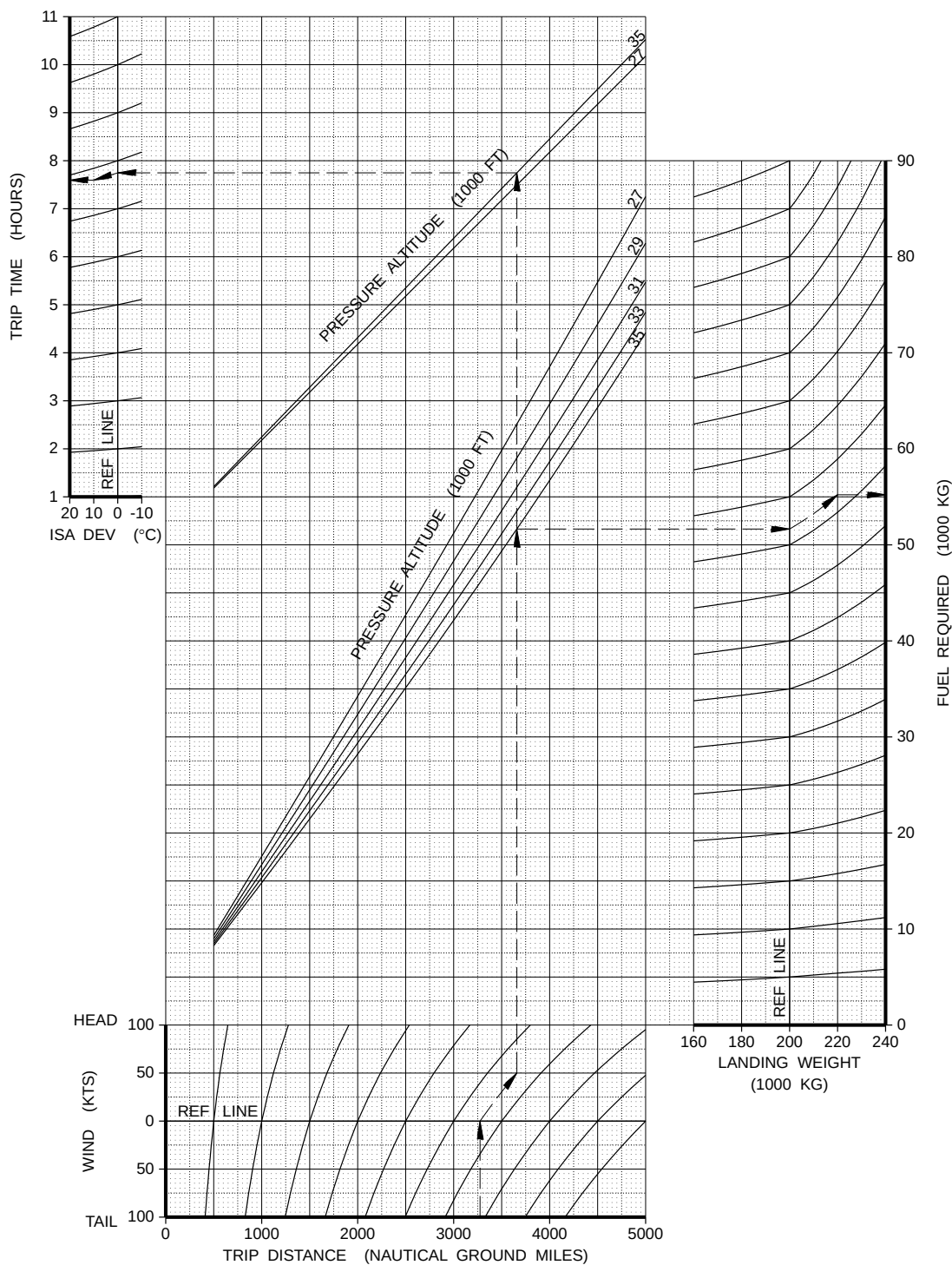
Long Range Cruise Trip Fuel and Time 5000 to 10000 NM Trip Distance Based on .31/.84 climb and .84/.310/250 descent



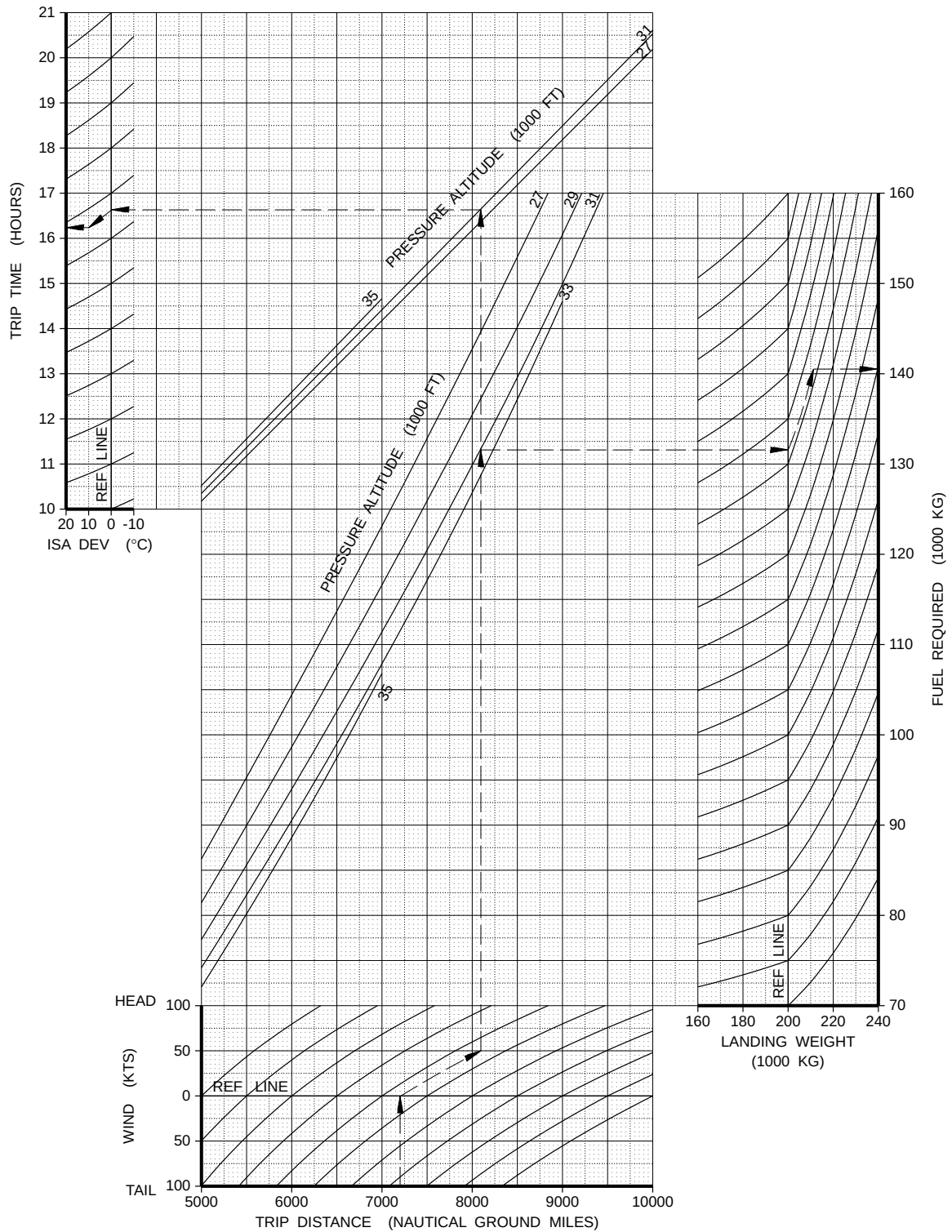
.84M Trip Fuel and Time

0 to 5000 NM Trip Distance

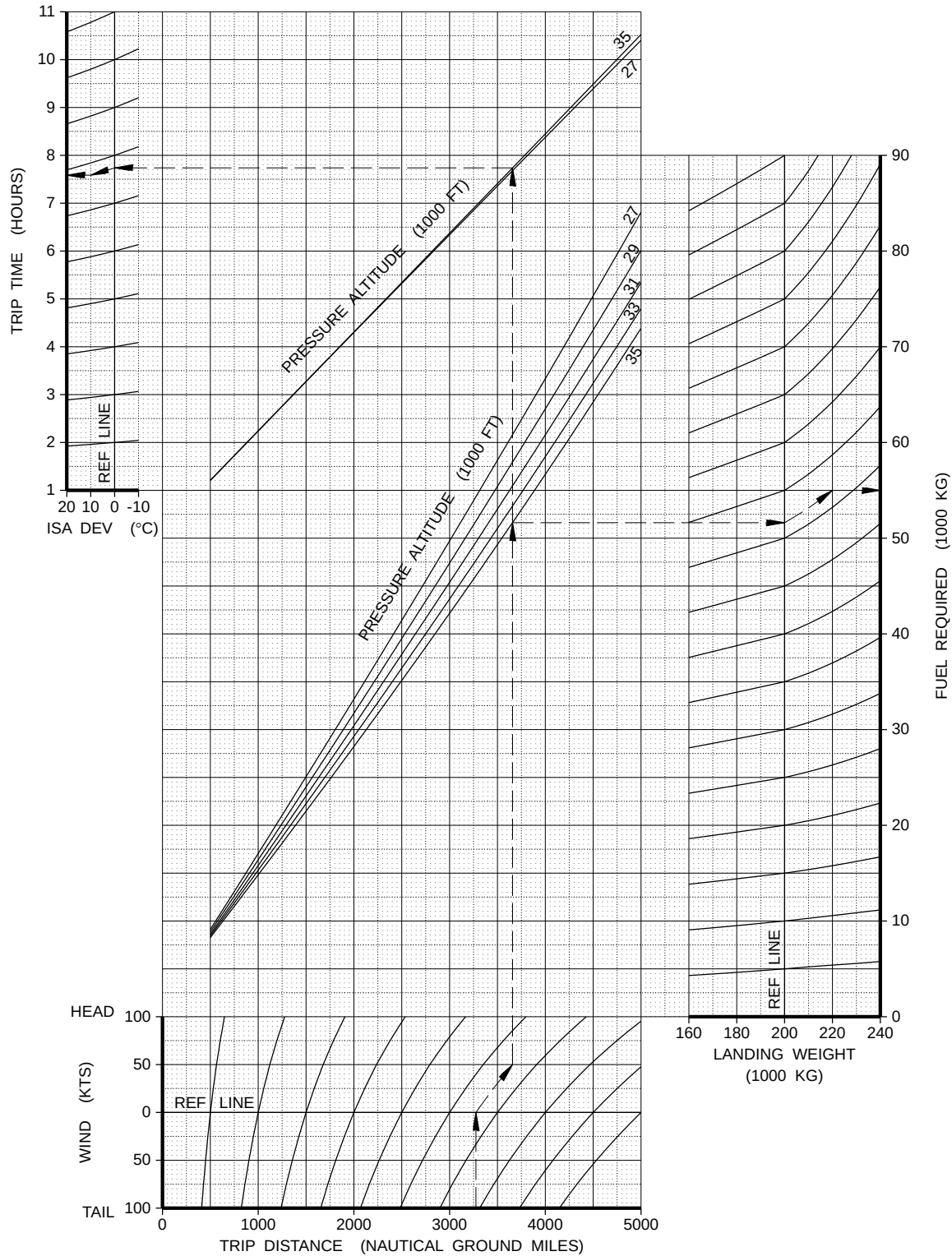
Based on .310/.84 climb and .84/310/250 descent



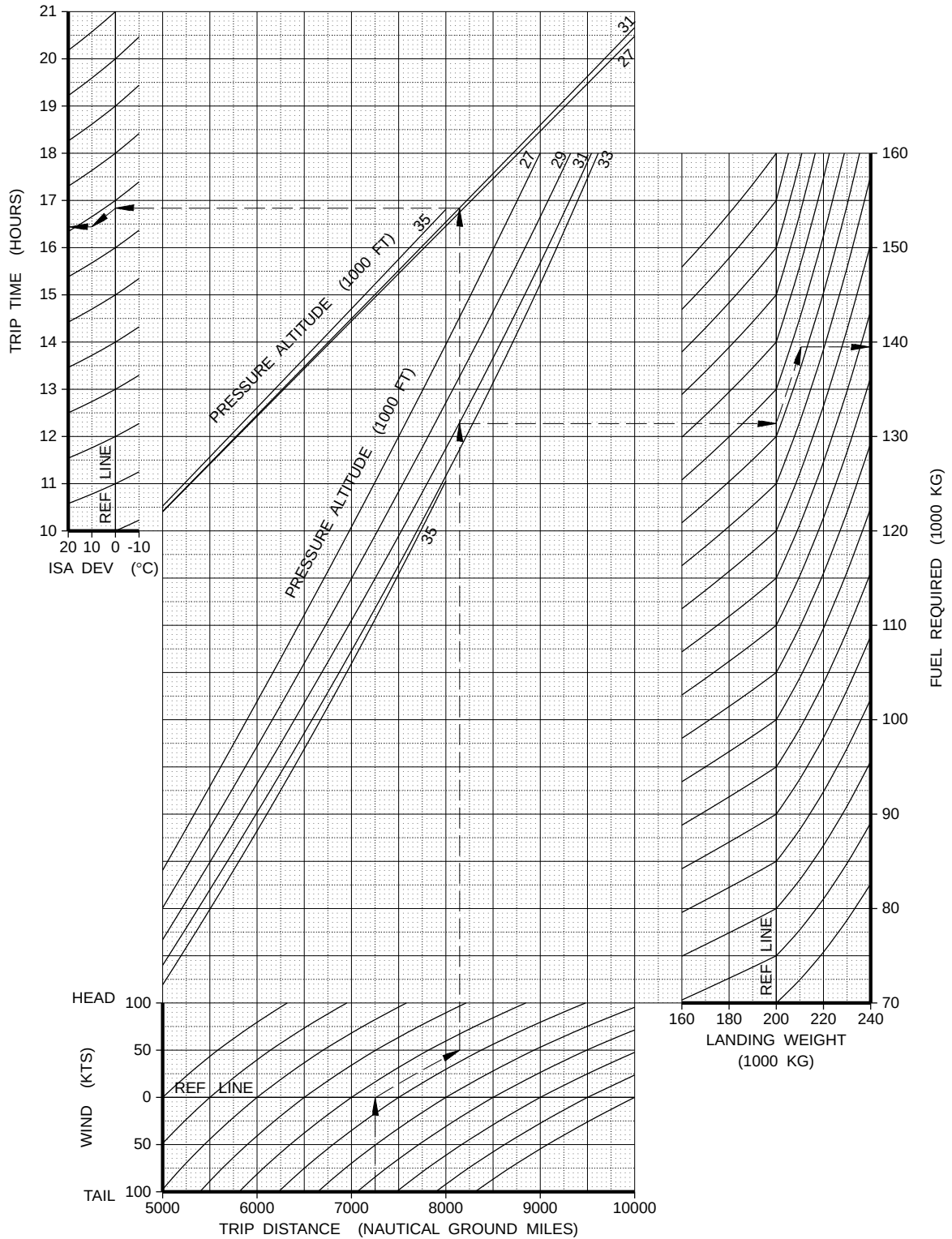
.84M Trip Fuel and Time
5000 to 10000 NM Trip Distance
Based on 310/.84 climb and .84/310/250 descent



Cost Index 180 Trip Fuel and Time 0 to 5000 NM Trip Distance

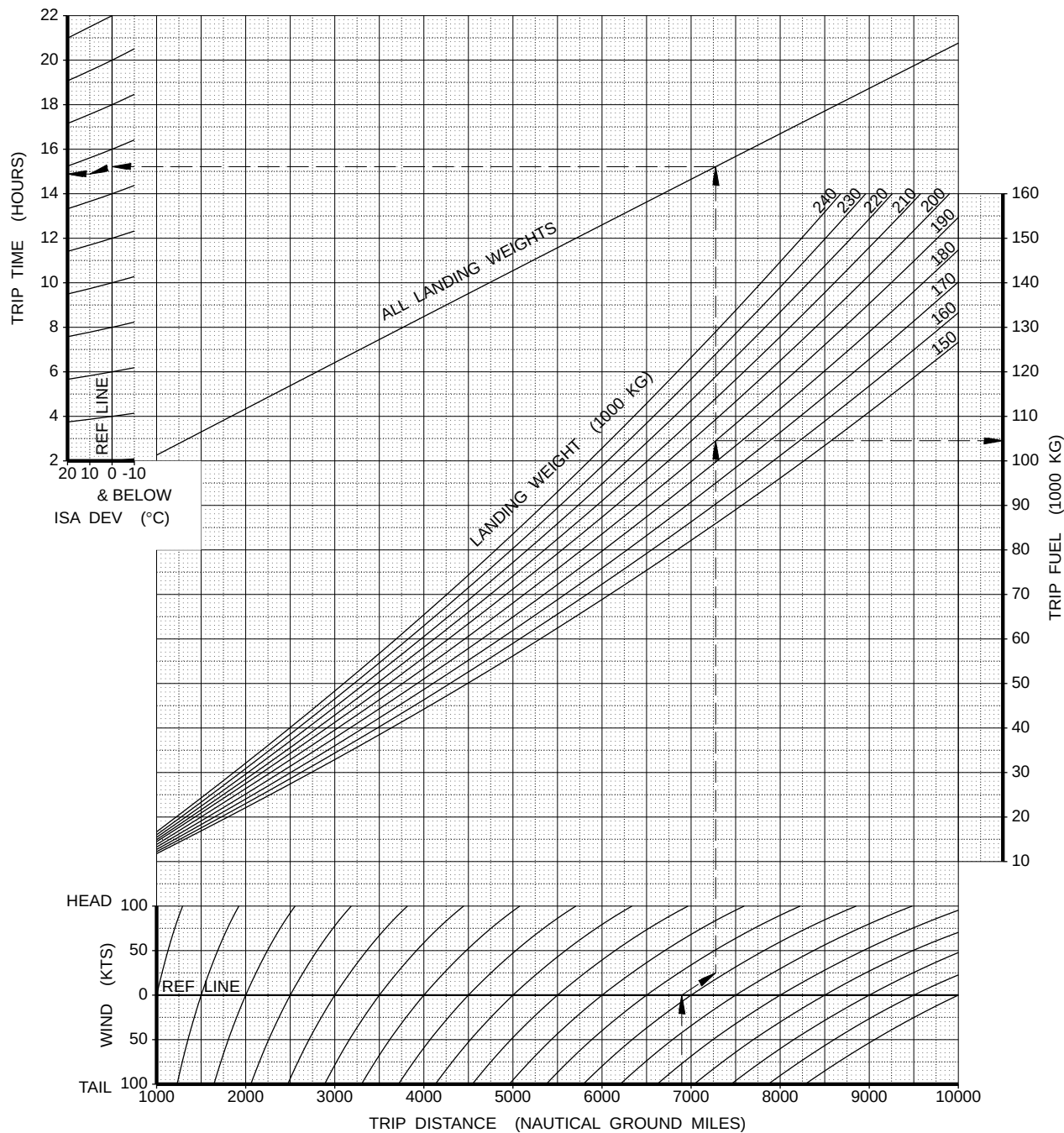


Cost Index 180 Trip Fuel and Time 5000 to 10000 NM Trip Distance



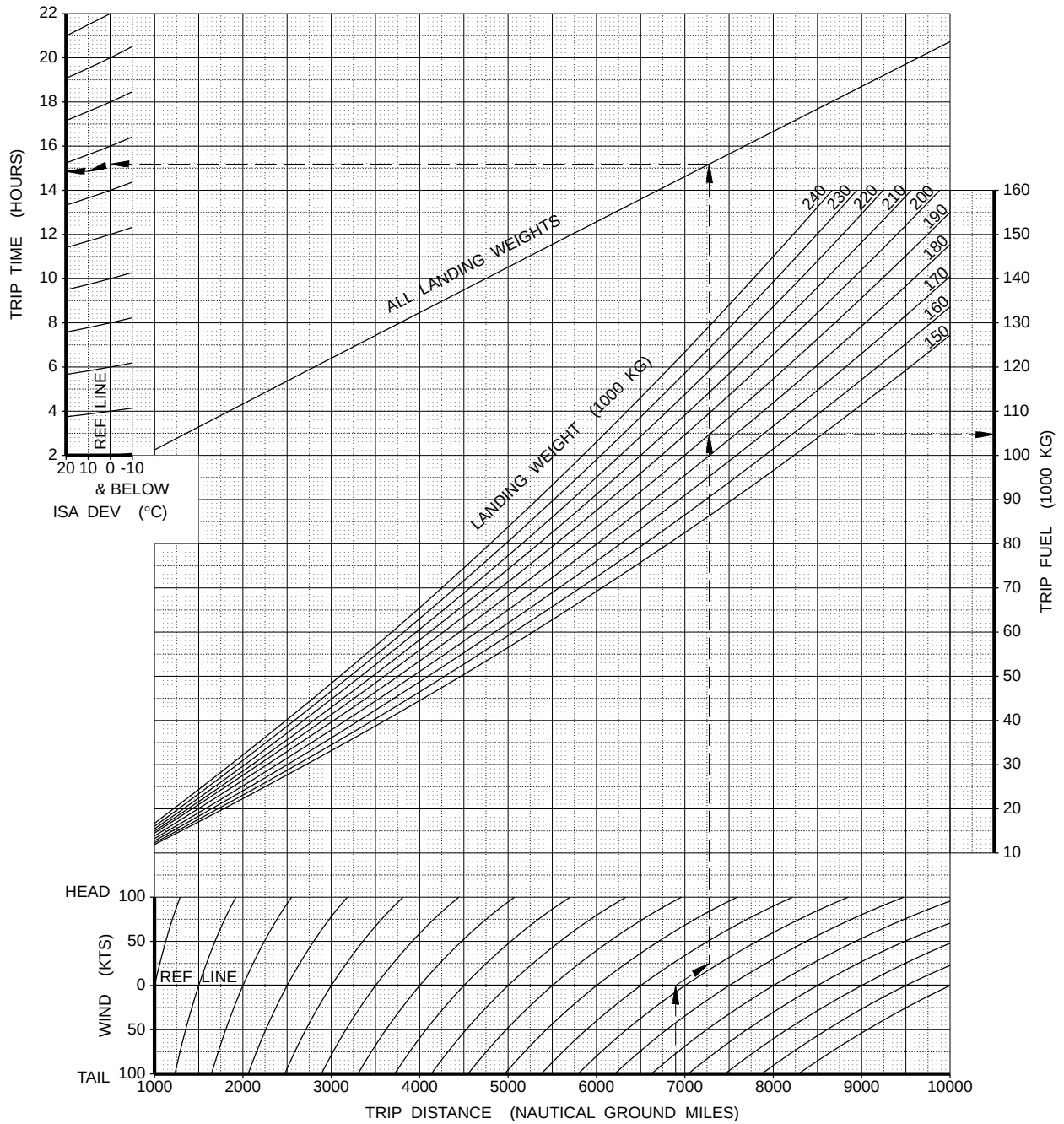
Long Range Cruise Step Climb Trip Fuel and Time

Based on 310/.84 climb and .84/310/250 descent

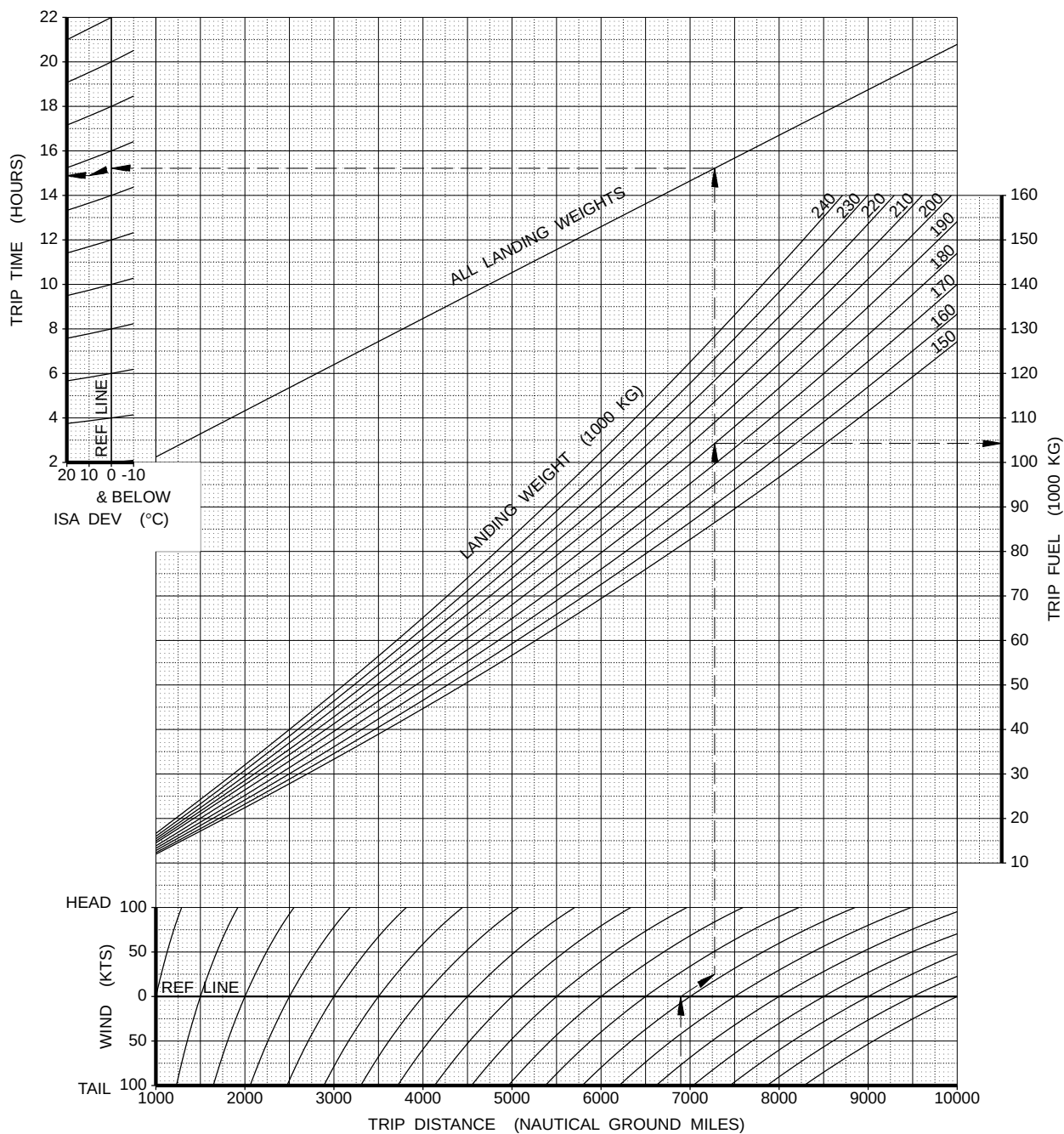


.84M Step Climb Trip Fuel and Time

Based on 310/.84 climb and .84/310/250 descent

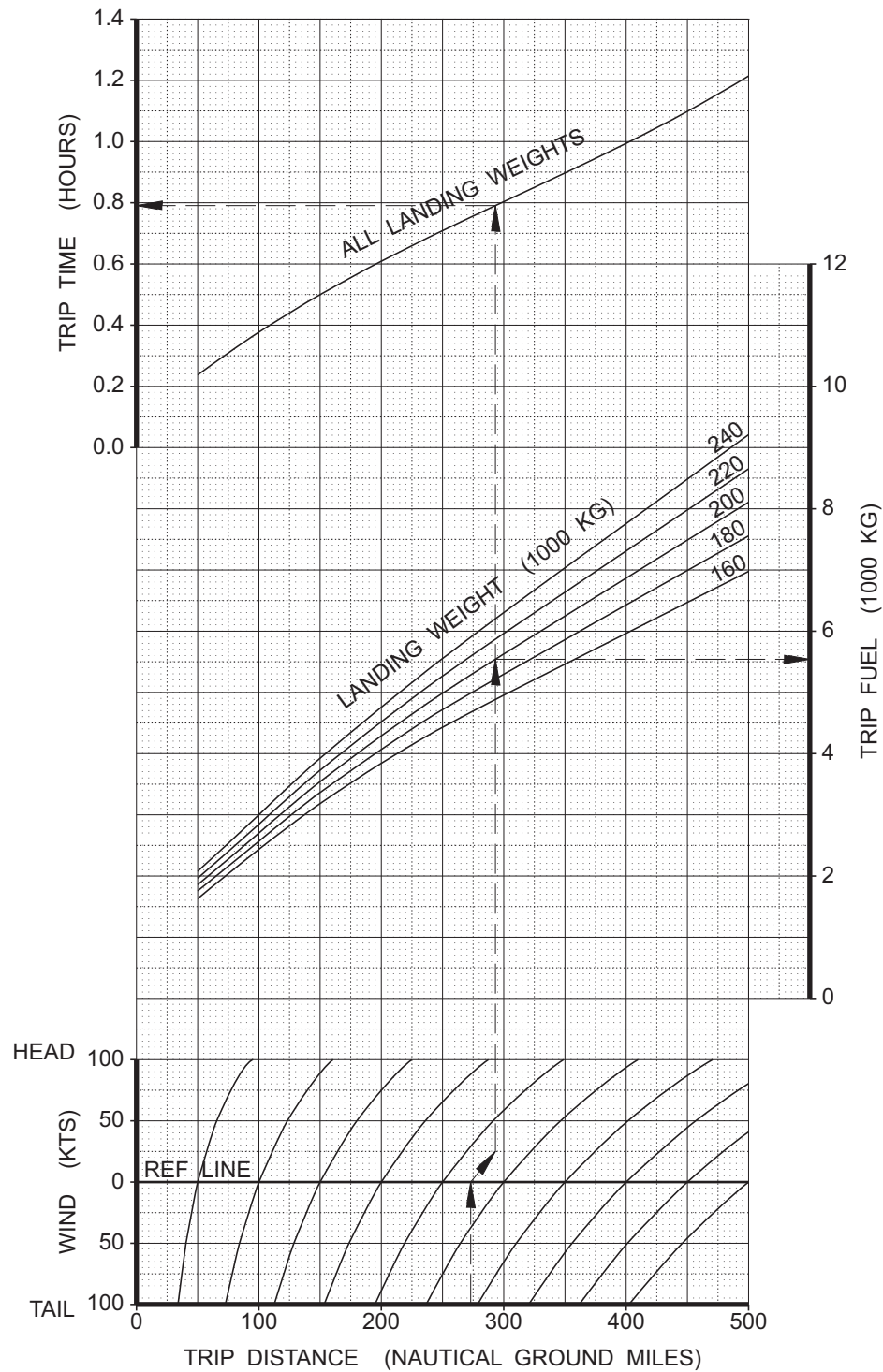


Cost Index 180 Step Climb Trip Fuel and Time

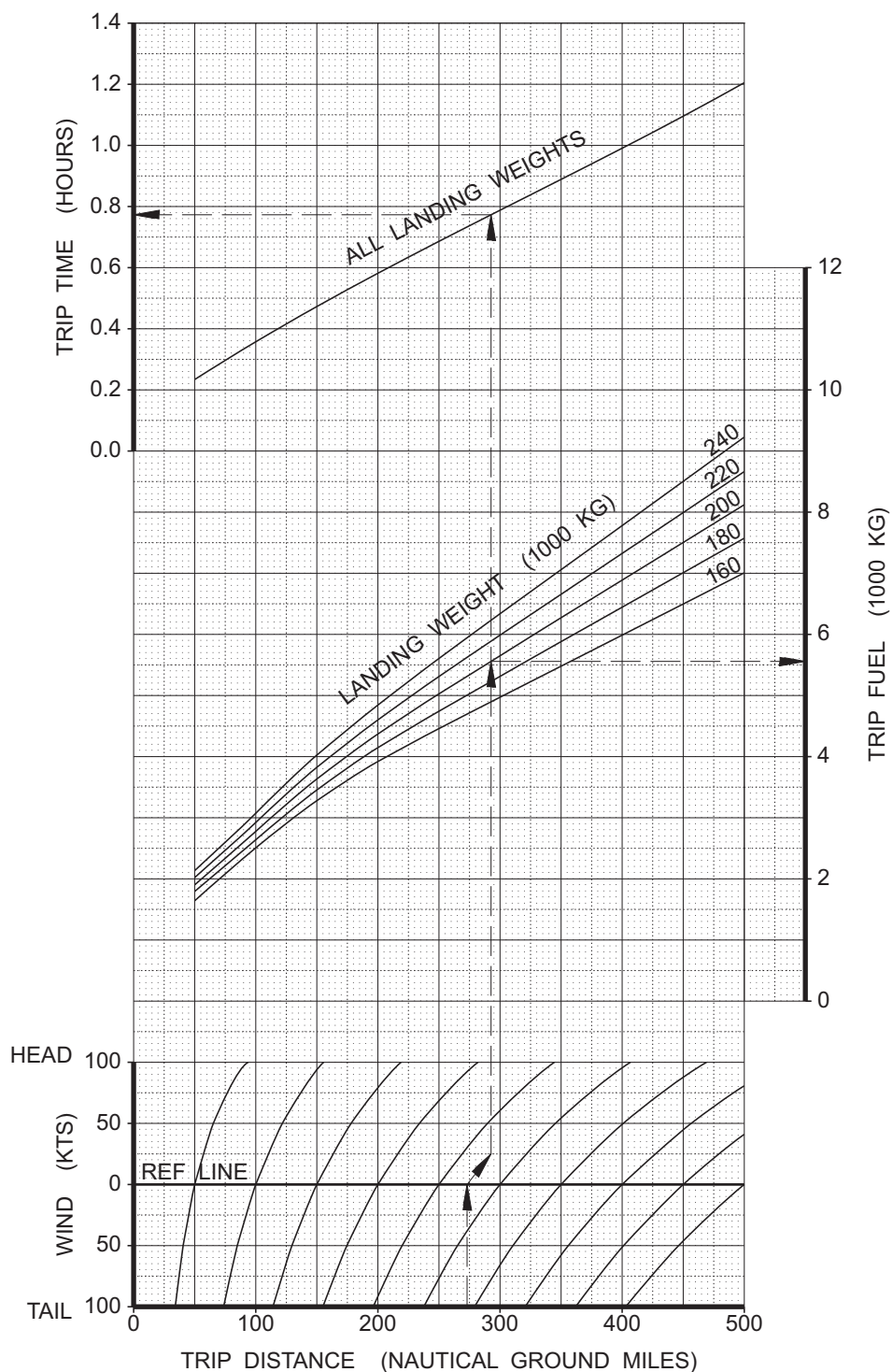


Long Range Cruise Short Trip Fuel and Time

Based on .310/.84 climb and .84/.310/250 descent at short trip cruise altitude



Cost Index 180 Short Trip Fuel and Time





Holding Planning

Flaps Up

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)										
	WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43000								7070	6020	5210	4560
40000						8510	7270	6450	5660	5000	4460
35000			9950	8850	8060	7250	6590	5960	5350	4750	4310
30000	10600	9780	8950	8260	7620	6990	6380	5770	5150	4650	4330
25000	10040	9360	8630	7980	7380	6800	6030	5490	5040	4760	4440
20000	9690	9080	8430	7600	7000	6470	5970	5490	5070	4710	4500
15000	9180	8620	8030	7480	6970	6470	5980	5530	5140	4800	4610
10000	9140	8620	8050	7510	7030	6530	6060	5610	5230	4900	4750
5000	9240	8730	8160	7630	7150	6670	6220	5790	5430	5100	4940
1500	9310	8810	8250	7720	7250	6790	6350	5940	5590	5270	5120

Flaps 1

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)										
	WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
20000	10530	9830	9160	8520	7860	7240	6620	6020	5430	4960	4660
15000	10300	9620	8980	8380	7770	7190	6600	6010	5470	5020	4760
10000	10210	9570	8960	8370	7770	7190	6630	6070	5550	5110	4860
5000	10260	9630	9030	8450	7870	7300	6740	6200	5720	5300	5080
1500	10290	9680	9080	8510	7940	7390	6860	6340	5880	5480	5260

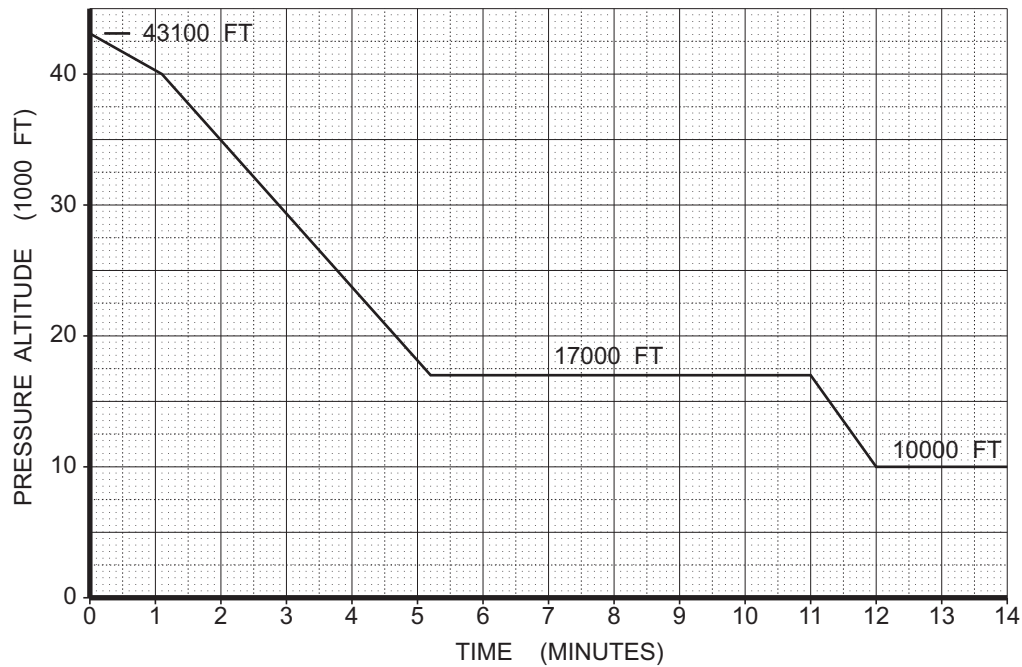
These tables include 5% additional fuel for holding in a racetrack pattern.

Oxygen Requirements

Passenger Oxygen System - Chemical

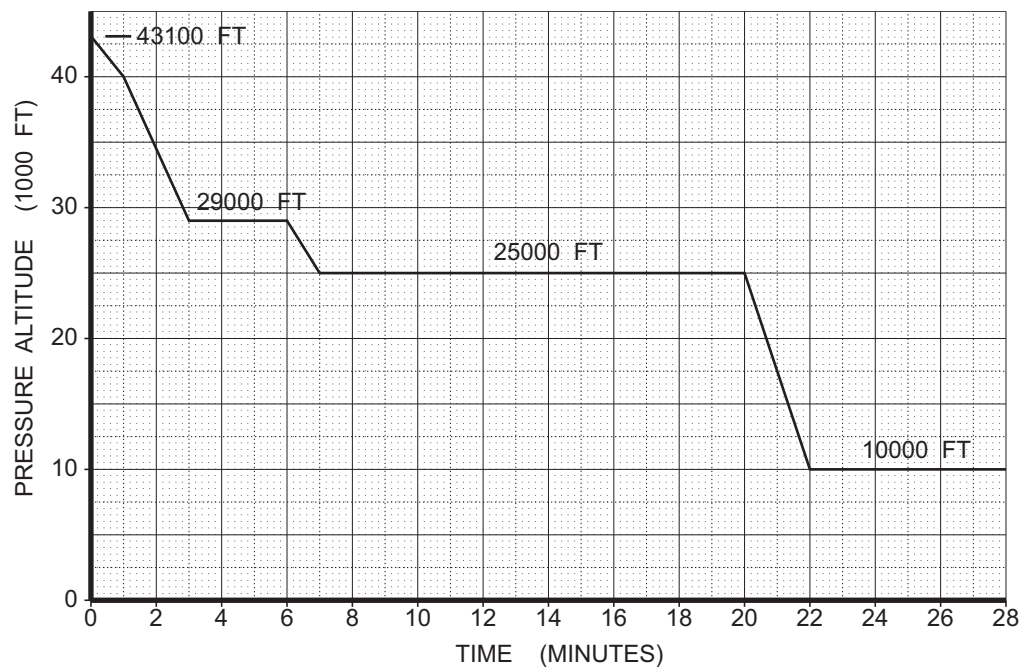
Maximum Altitude Envelope

Based on 12 Minute System



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

Based on 22 Minute System



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

Oxygen Requirements

Flight Crew System

Required Pressure (PSI) for Two 114/115 Cubic Ft. Cylinders

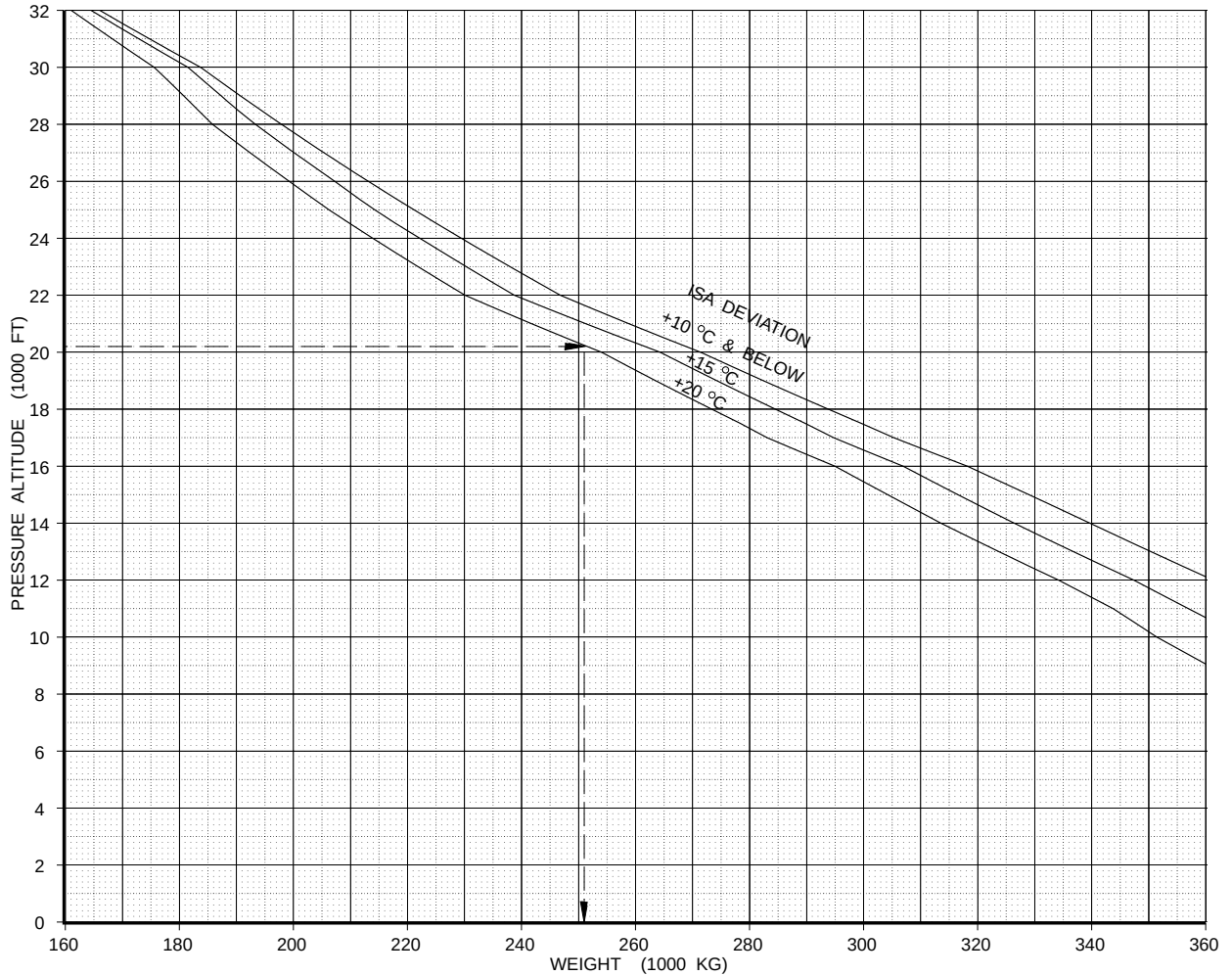
BOTTLE TEMPERATURE		NUMBER OF CREW USING OXYGEN		
°C	°F	2	3	4
50	122	325	435	545
45	113	320	430	540
40	104	315	420	530
35	95	310	415	520
30	86	305	410	510
25	77	300	400	505
20	68	295	395	495
15	59	290	390	485
10	50	285	380	480
5	41	280	375	470
0	32	275	370	460
-5	23	270	360	455
-10	14	265	355	445

For more extensive than normal crew usage, add 0.6 psi/person/minute.

Intentionally
Blank

ENGINE INOP MAX CONTINUOUS THRUST

Net Level Off Weight



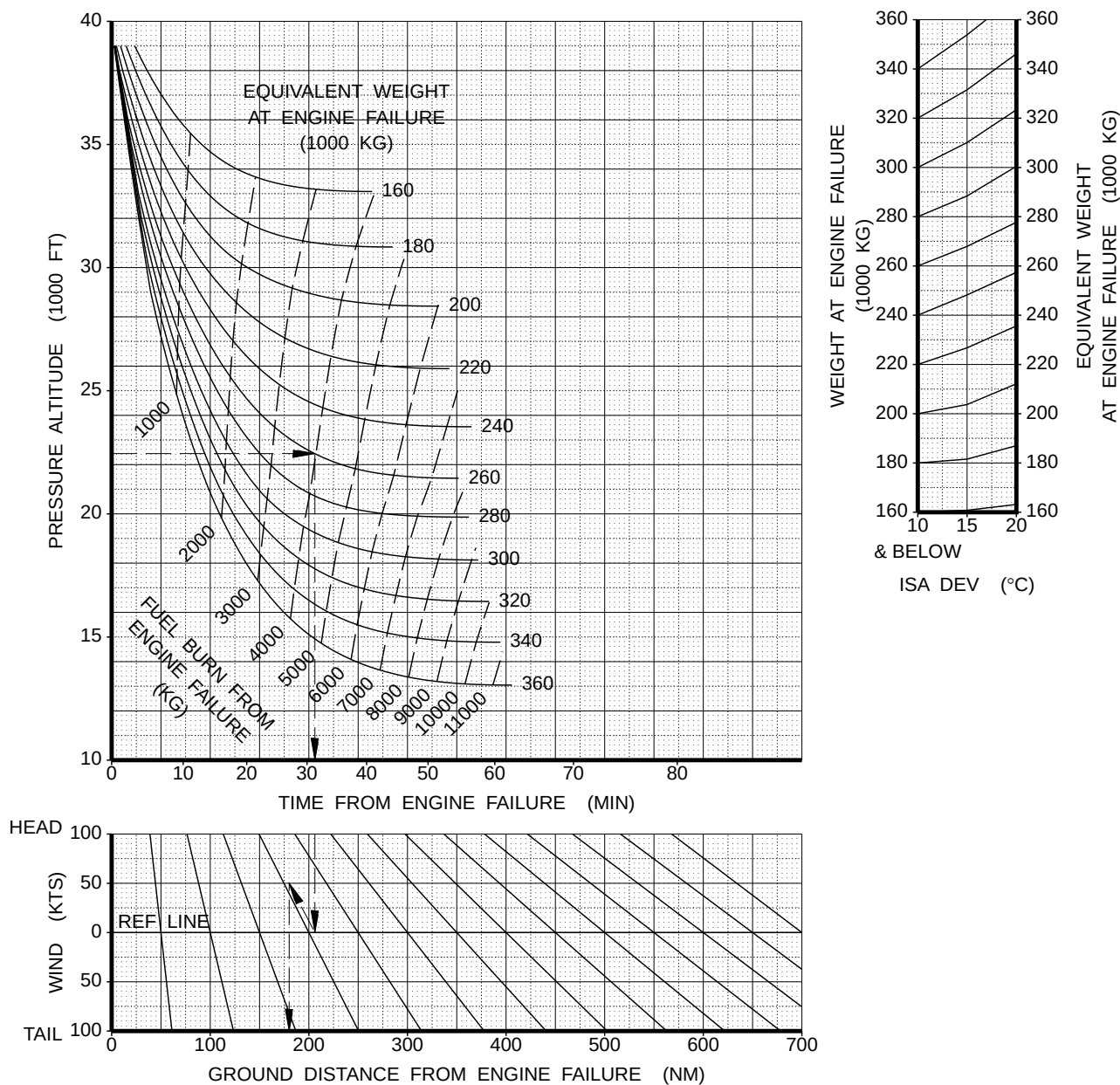
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	-0.7	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.7	-2.0	-1.6	-1.2	-1.3	-1.4	-1.5	-1.5	-1.5

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 39000 FT and Above



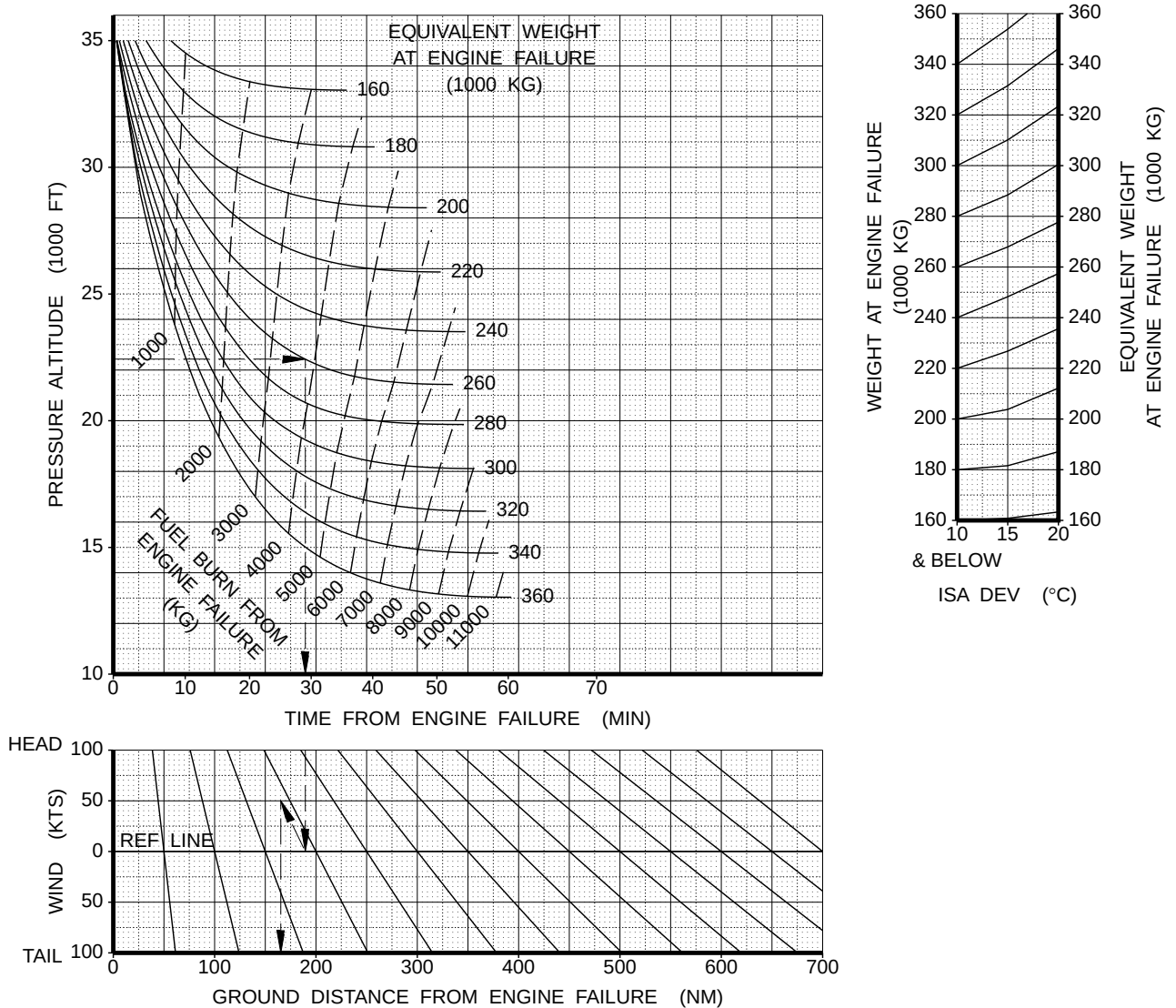
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.7	2.0	1.6	1.2	1.3	1.4	1.5	1.5	1.5

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 35000 FT to 37000 FT



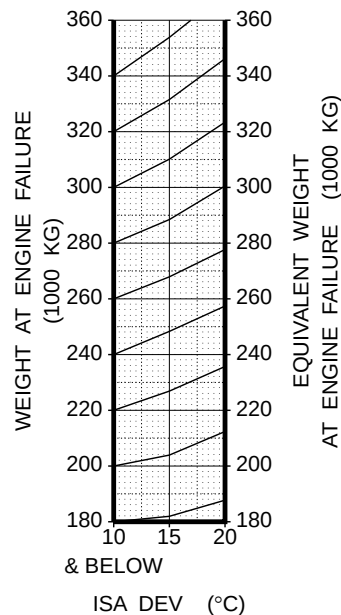
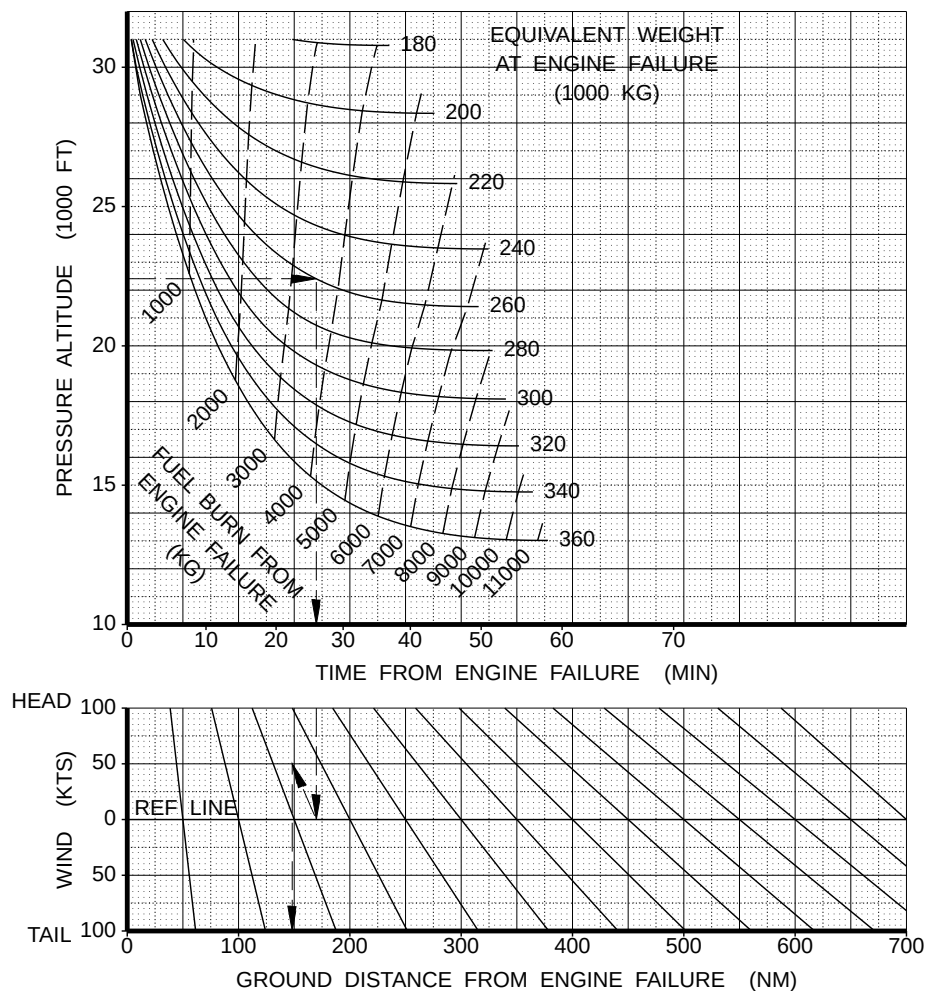
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.7	2.0	1.6	1.2	1.3	1.4	1.5	1.5	1.5

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 31000 FT to 33000 FT



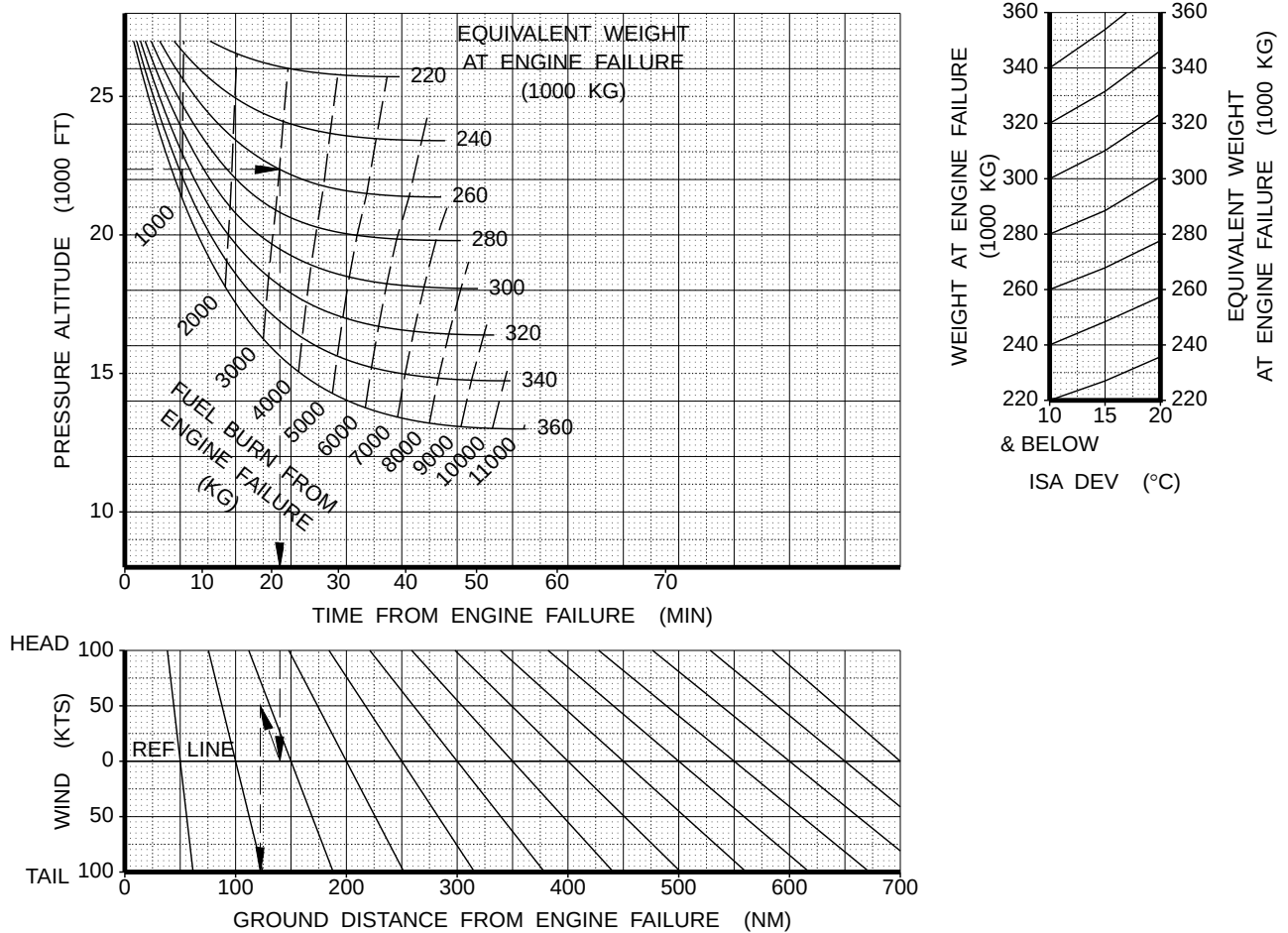
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.7	2.0	1.6	1.2	1.3	1.4	1.5	1.5	1.5

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 27000 FT to 29000 FT



Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.7	2.0	1.6	1.2	1.3	1.4	1.5	1.5	1.5

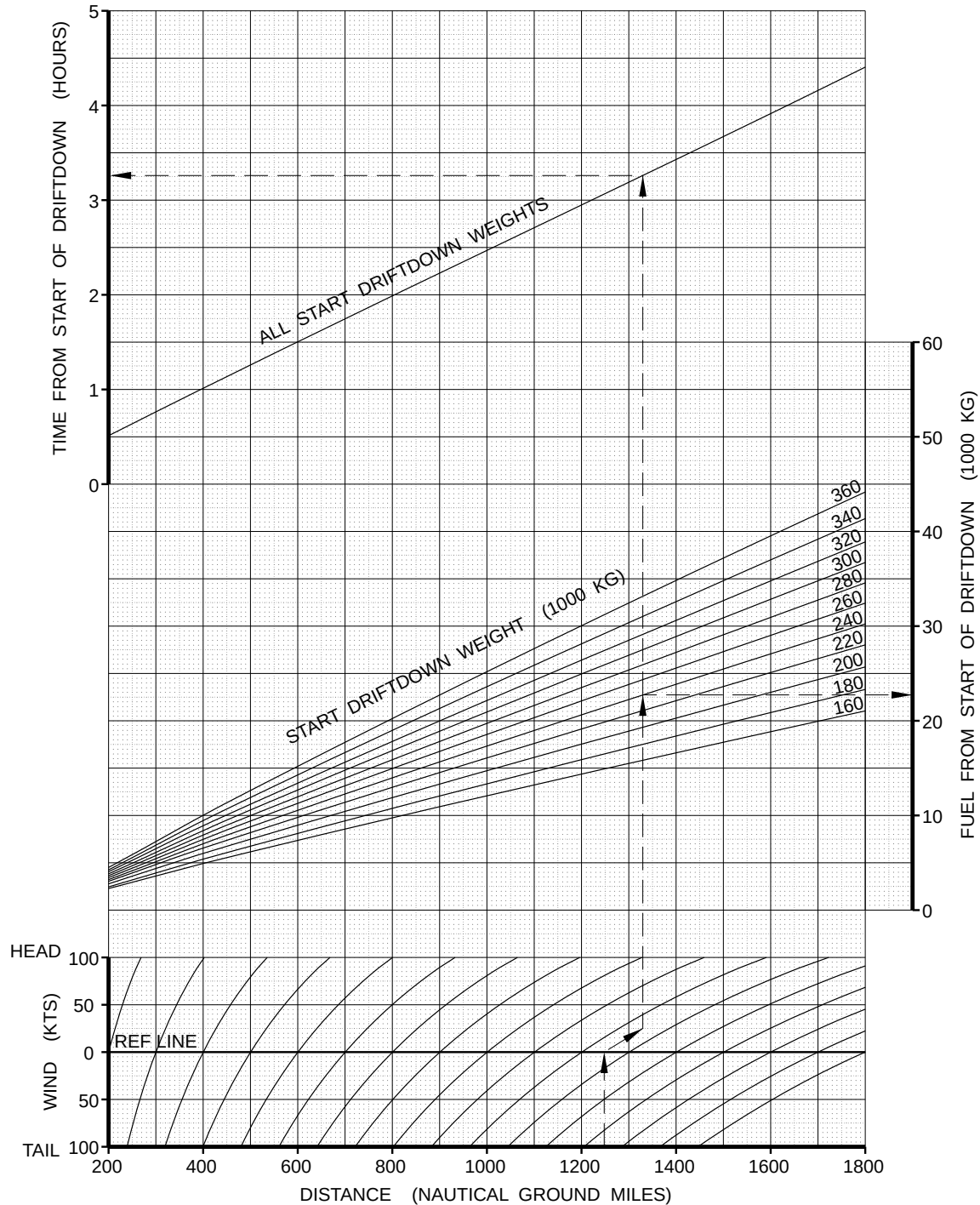
ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown/LRC Cruise Range Capability

Includes APU fuel burn

Driftdown at optimum speed and cruise at Long Range Cruise speed.



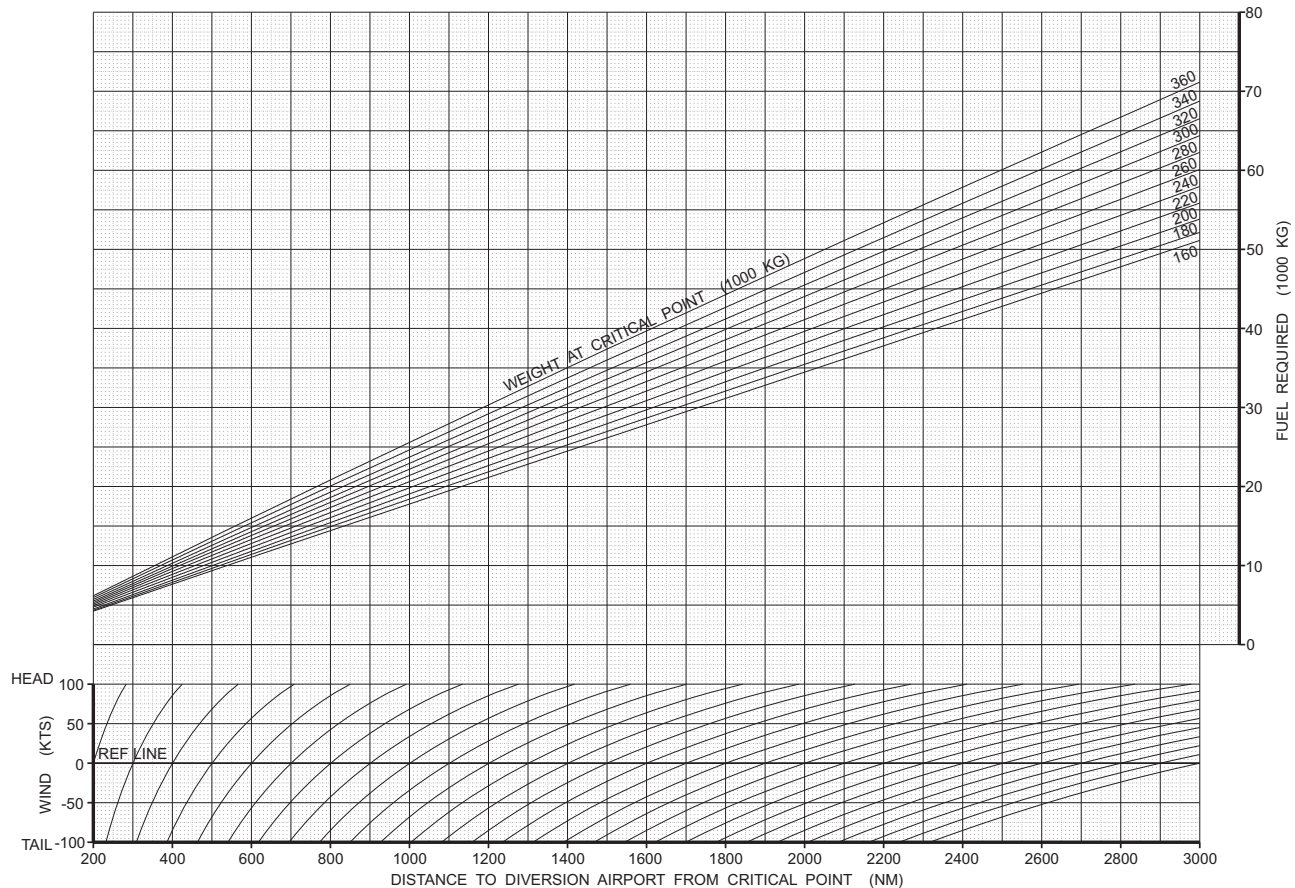
ENGINE INOP MAX CONTINUOUS THRUST

Area of Operation

SPEED (M/KIAS)	WEIGHT AT DIVERSION (1000 KG)	DIVERSION DISTANCE (NM)										
		TIME (MINUTES)										
		60	75	90	120	138	180	207	240	270	300	330
.82/260	360	363	449	536	708	811	1052	1206	1395	1567	1739	1911
	340	367	454	542	718	824	1070	1228	1422	1598	1774	1950
	320	376	466	556	737	845	1098	1260	1458	1639	1819	2000
	300	385	477	570	756	867	1127	1294	1498	1683	1869	2054
	280	394	489	585	776	890	1158	1330	1540	1731	1922	2113
	260	404	503	601	798	916	1192	1369	1586	1783	1980	2177
	240	415	517	619	822	944	1228	1411	1634	1838	2041	2244
	220	424	528	632	840	965	1256	1443	1672	1880	2088	2296
	200	434	540	647	859	987	1285	1476	1710	1923	2136	2348
	180	445	553	662	880	1010	1314	1510	1749	1966	2184	2401
	160	452	563	674	897	1030	1341	1541	1786	2008	2230	2453
.84/280	360	384	477	570	756	867	1128	1295	1499	1685	1871	2057
	340	391	486	581	770	884	1149	1320	1528	1718	1907	2097
	320	399	496	593	786	902	1173	1347	1560	1753	1947	2140
	300	408	507	606	804	923	1200	1378	1596	1794	1992	2190
	280	417	519	620	822	944	1227	1409	1632	1835	2037	2239
	260	428	532	636	845	969	1261	1448	1677	1885	2093	2301
	240	438	545	652	866	994	1294	1486	1722	1936	2149	2363
	220	446	555	665	883	1015	1321	1518	1758	1977	2196	2415
	200	454	565	677	899	1033	1345	1545	1790	2013	2235	2458
	180	462	576	689	916	1052	1369	1573	1822	2049	2275	2502
	160	468	583	698	928	1066	1389	1596	1849	2080	2310	2540
.84/300	360	407	506	605	804	923	1200	1378	1596	1794	1993	2191
	340	414	514	615	816	937	1219	1400	1622	1823	2025	2226
	320	421	523	625	830	953	1239	1424	1649	1854	2058	2263
	300	430	534	638	847	972	1264	1451	1680	1889	2097	2306
	280	438	544	651	863	990	1288	1479	1712	1925	2137	2349
	260	447	556	664	880	1010	1313	1508	1746	1963	2180	2396
	240	455	566	677	898	1031	1341	1540	1784	2005	2227	2448
	220	461	574	687	913	1049	1365	1568	1816	2042	2268	2494
	200	468	583	698	928	1066	1388	1595	1847	2077	2307	2537
	180	474	591	707	941	1081	1407	1617	1874	2107	2340	2574
	160	477	594	712	947	1088	1418	1629	1888	2123	2359	2594
.84/320	360	428	532	636	844	969	1261	1448	1677	1886	2094	2302
	340	435	541	647	859	986	1283	1473	1707	1918	2130	2342
	320	441	548	656	871	1000	1301	1494	1731	1946	2161	2376
	300	448	557	666	883	1014	1318	1514	1753	1971	2188	2406
	280	455	565	675	895	1028	1336	1534	1777	1997	2217	2438
	260	461	573	685	909	1043	1356	1557	1803	2027	2251	2474
	240	467	581	694	922	1058	1376	1580	1830	2058	2285	2512
	220	472	587	702	933	1071	1394	1601	1855	2085	2316	2546
	200	477	594	711	944	1084	1411	1621	1878	2112	2345	2579
	180	480	598	716	951	1093	1422	1634	1893	2129	2365	2600
	160	482	600	719	956	1099	1431	1644	1905	2142	2380	2617
LRC	360	443	550	658	871	999	1294	1483	1714	1922	2129	2335
	340	444	551	658	870	998	1292	1481	1710	1917	2124	2329
	320	441	548	655	867	993	1287	1475	1703	1910	2116	2320
	300	439	545	651	861	987	1278	1465	1691	1896	2100	2303
	280	438	544	649	859	984	1274	1460	1685	1889	2092	2294
	260	438	544	649	859	984	1274	1459	1683	1887	2089	2291
	240	438	545	650	861	986	1276	1462	1686	1889	2092	2293
	220	435	541	647	856	981	1271	1455	1679	1881	2082	2282
	200	431	536	640	848	971	1257	1440	1661	1861	2060	2258
	180	428	531	635	839	961	1244	1424	1643	1841	2038	2233
	160	422	524	626	829	950	1230	1408	1625	1821	2015	2210

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:

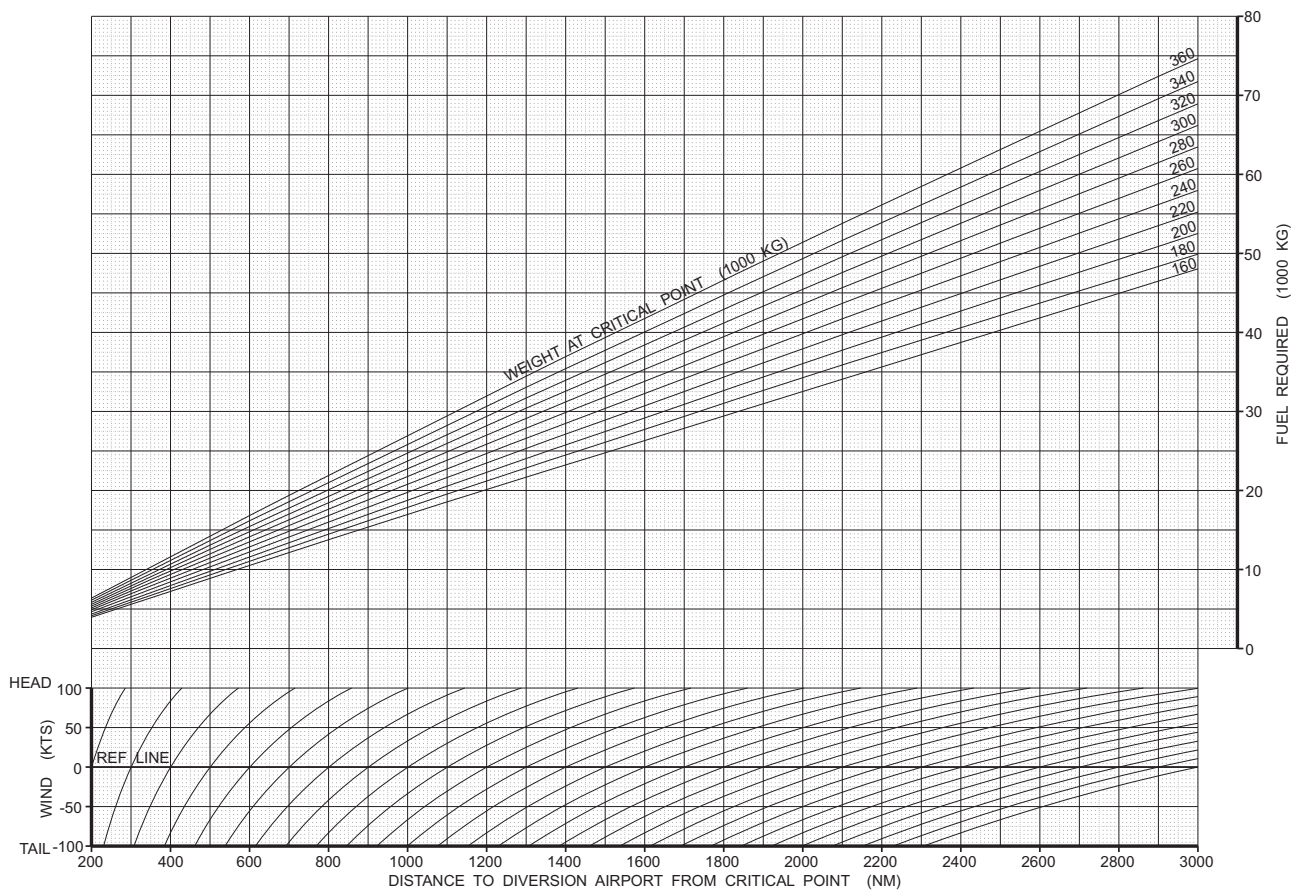
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (3%) for the total forecast time or engine and wing anti-ice on and ice drag (7%) 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

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:

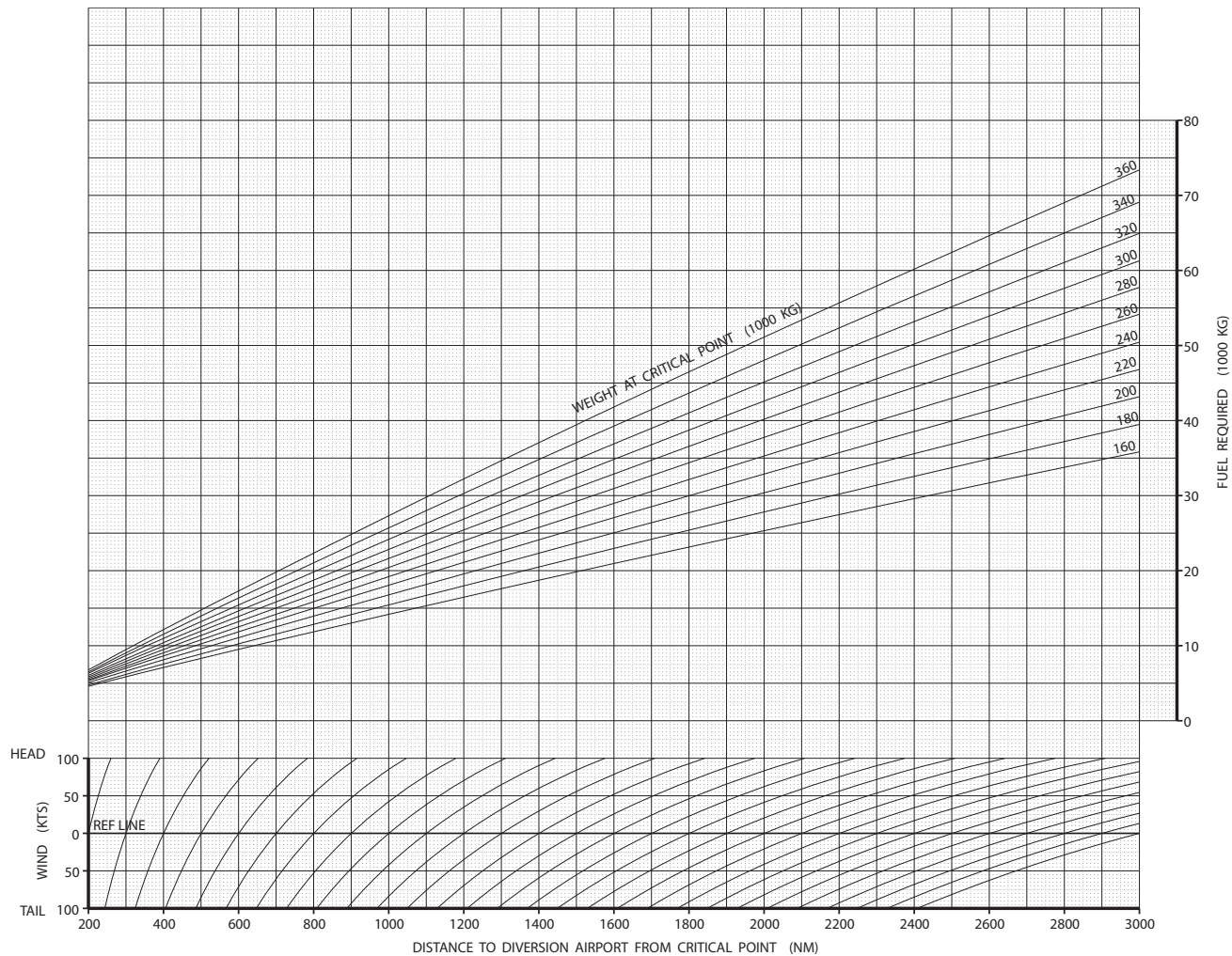
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (9%) 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

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:

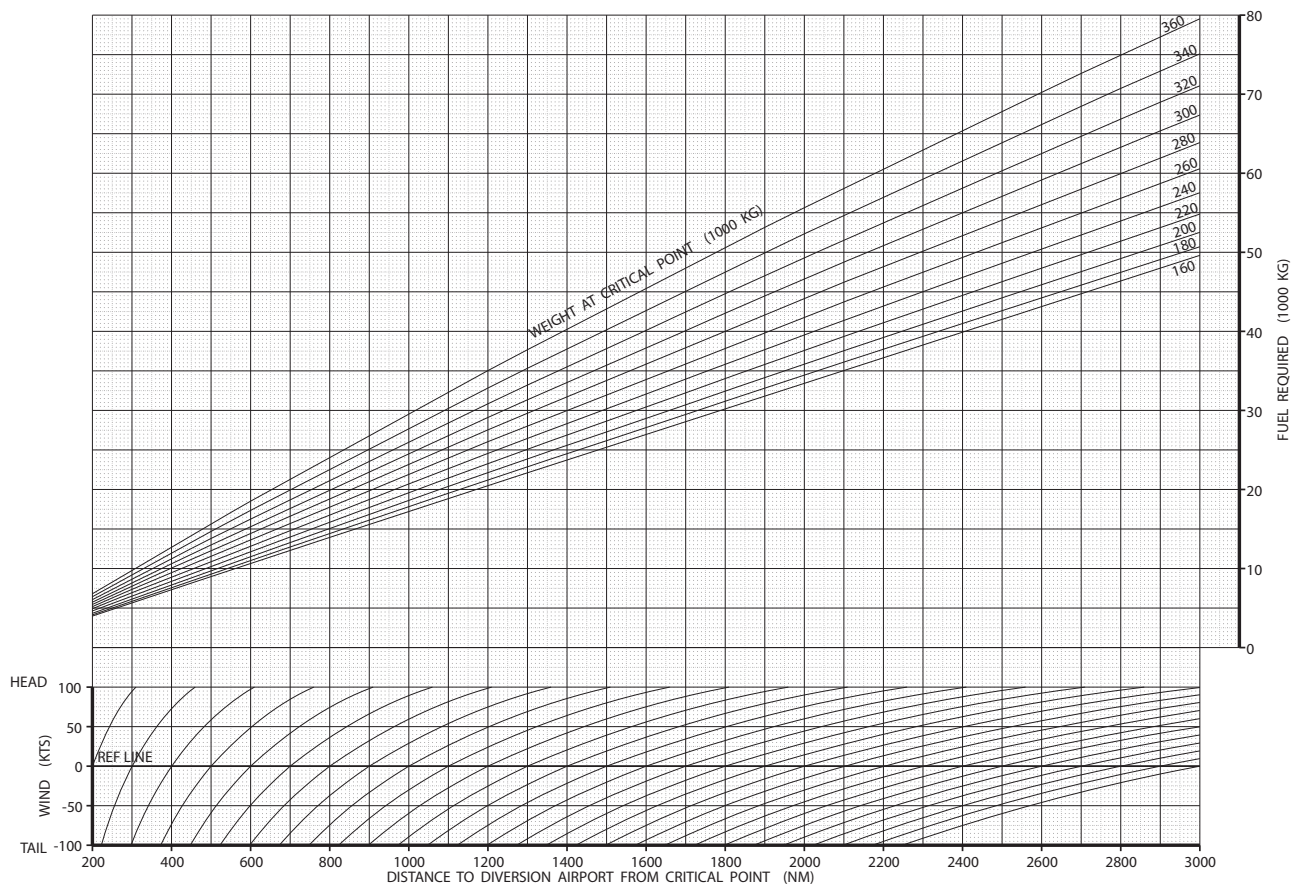
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 260 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:

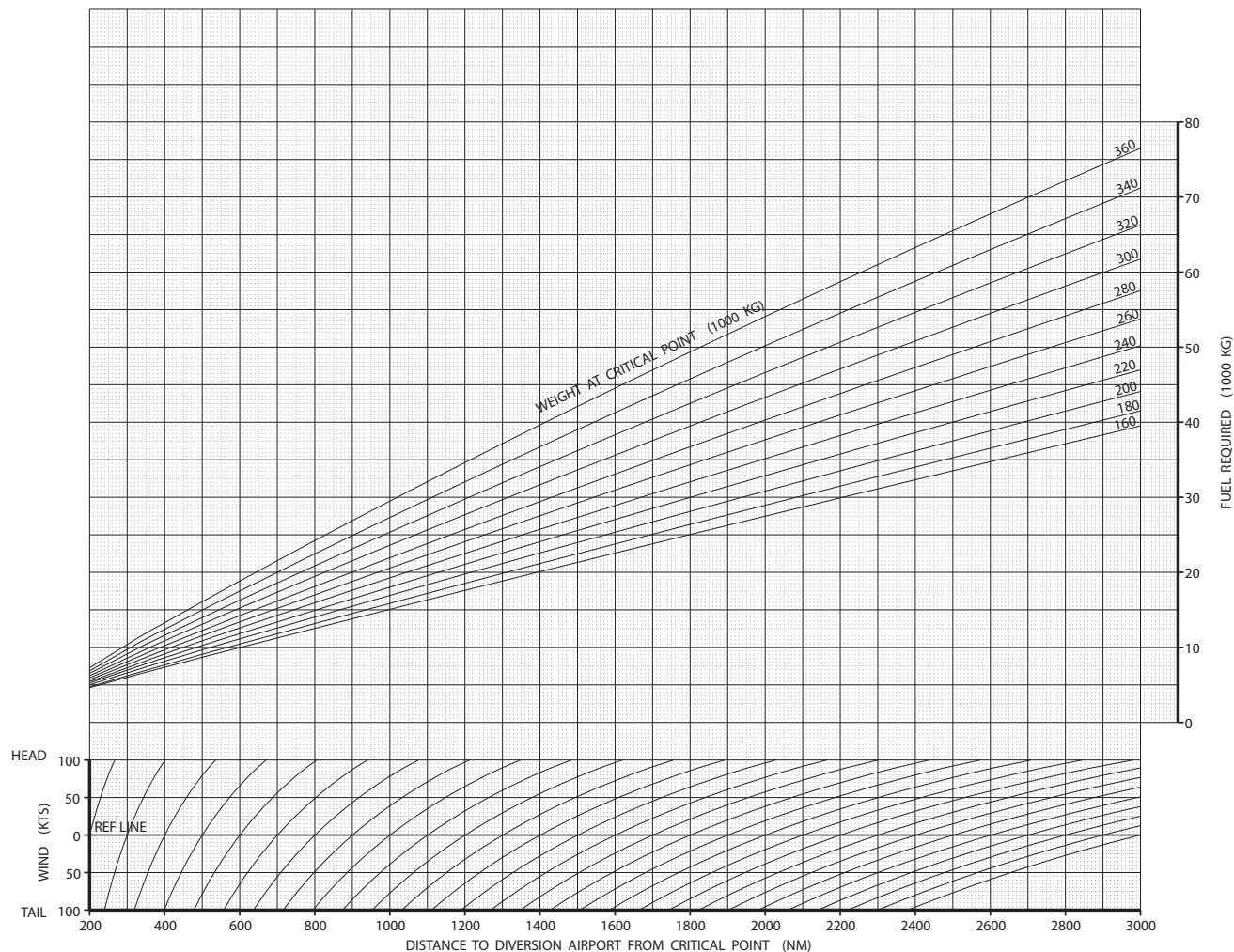
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (9%) 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

Driftdown Critical Fuel Reserves - .82M/260 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.

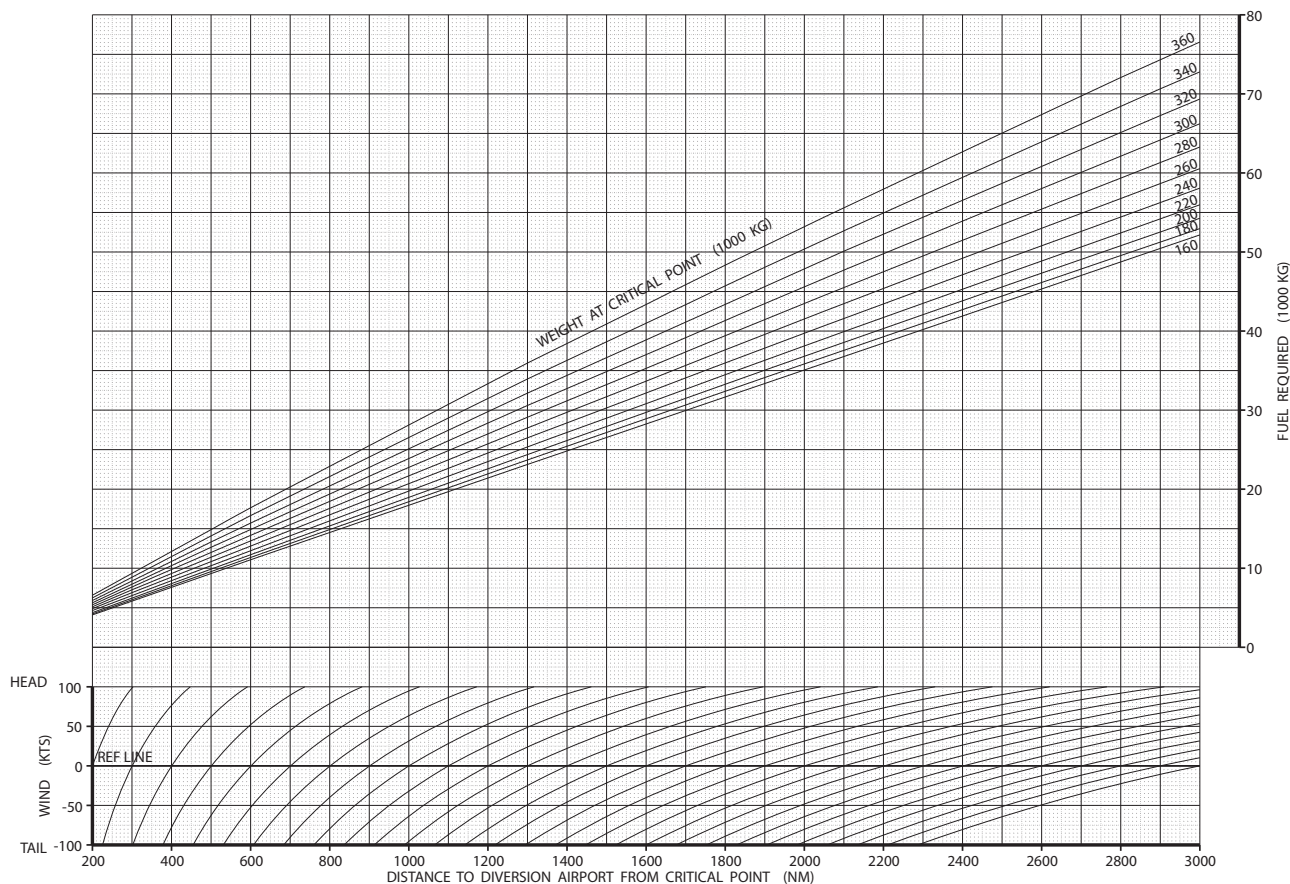
Adjustments:

- 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 (1%) 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 MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 280 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:

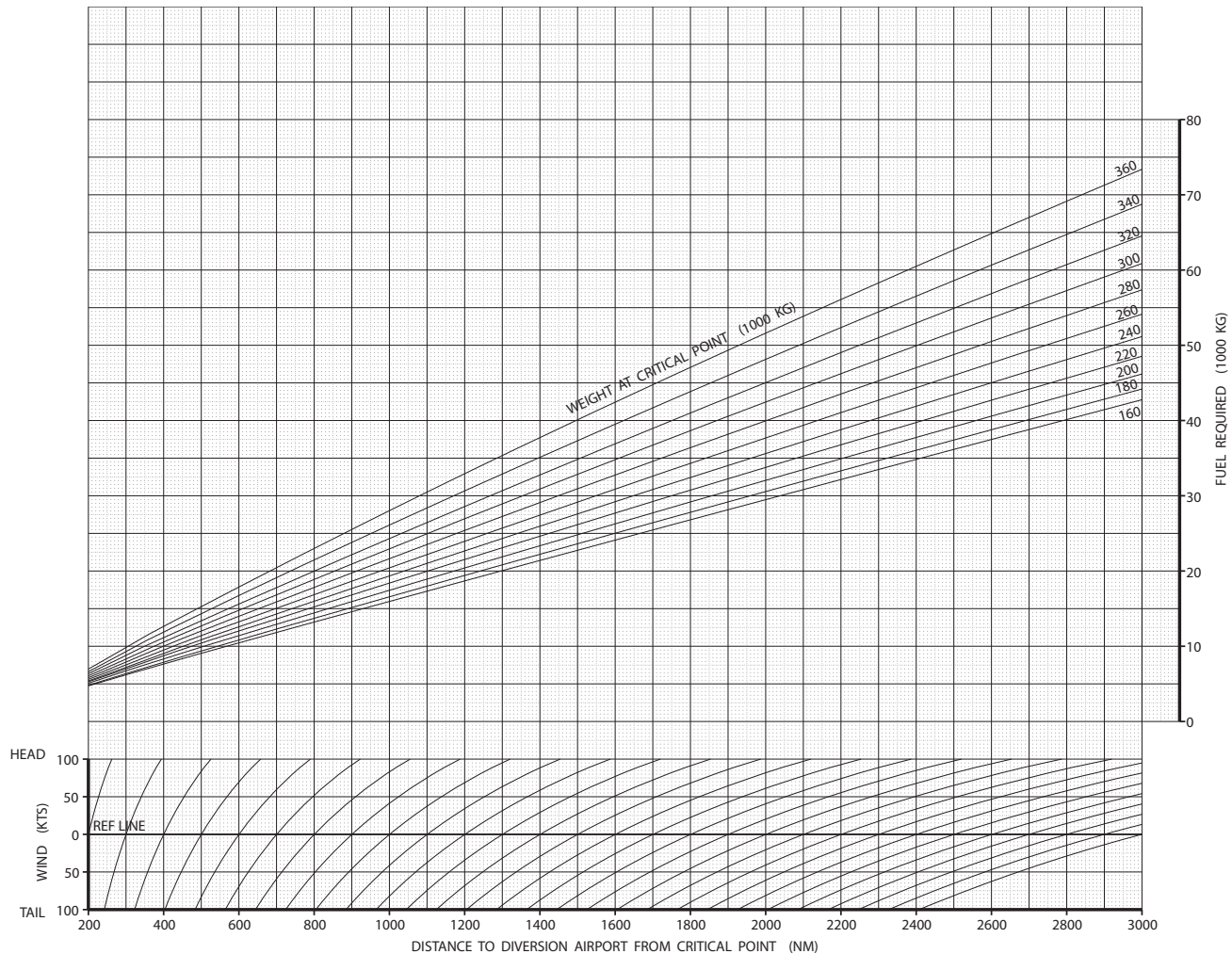
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (9%) 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

Driftdown Critical Fuel Reserves - .84M/280 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.

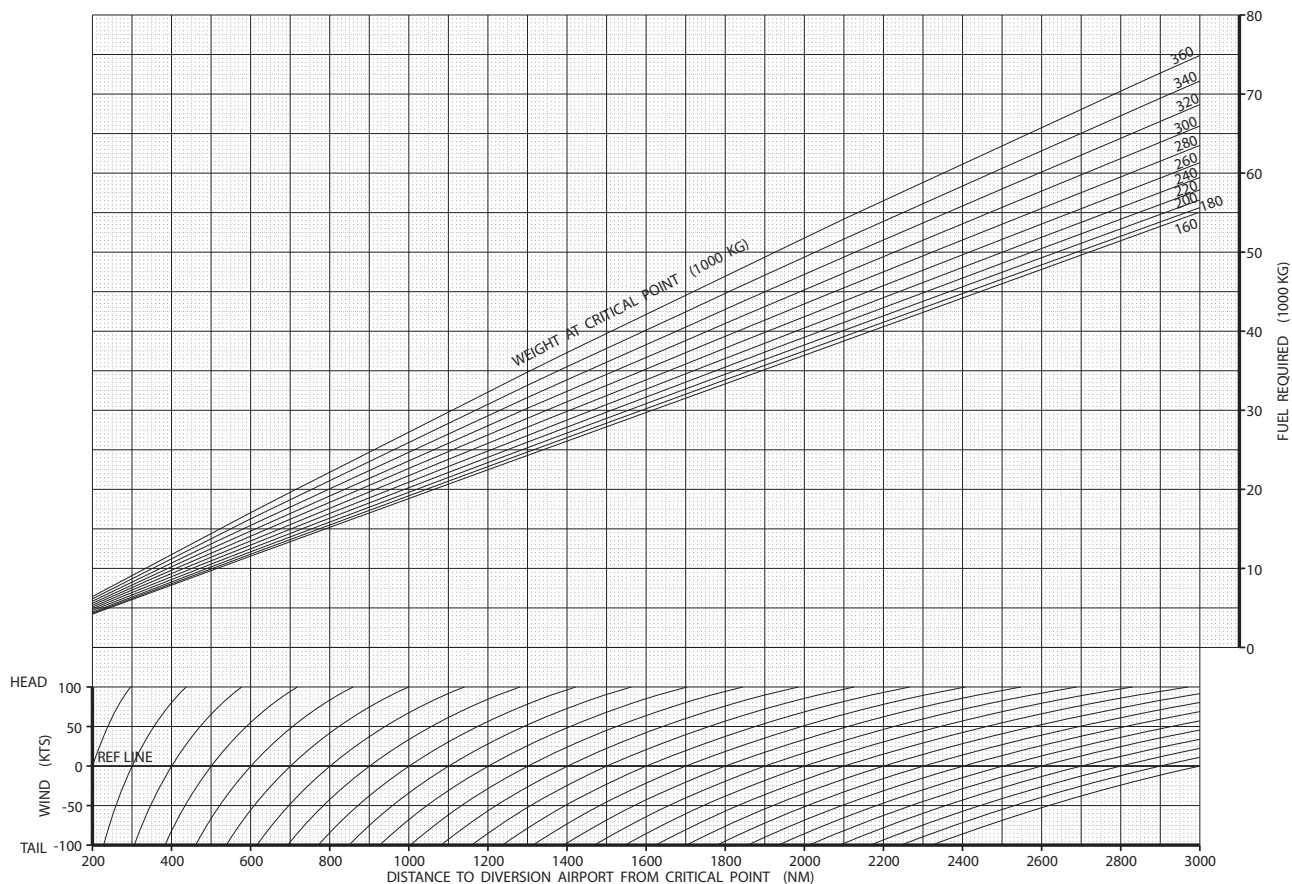
Adjustments:

- 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 (1%) 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 MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 300 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:

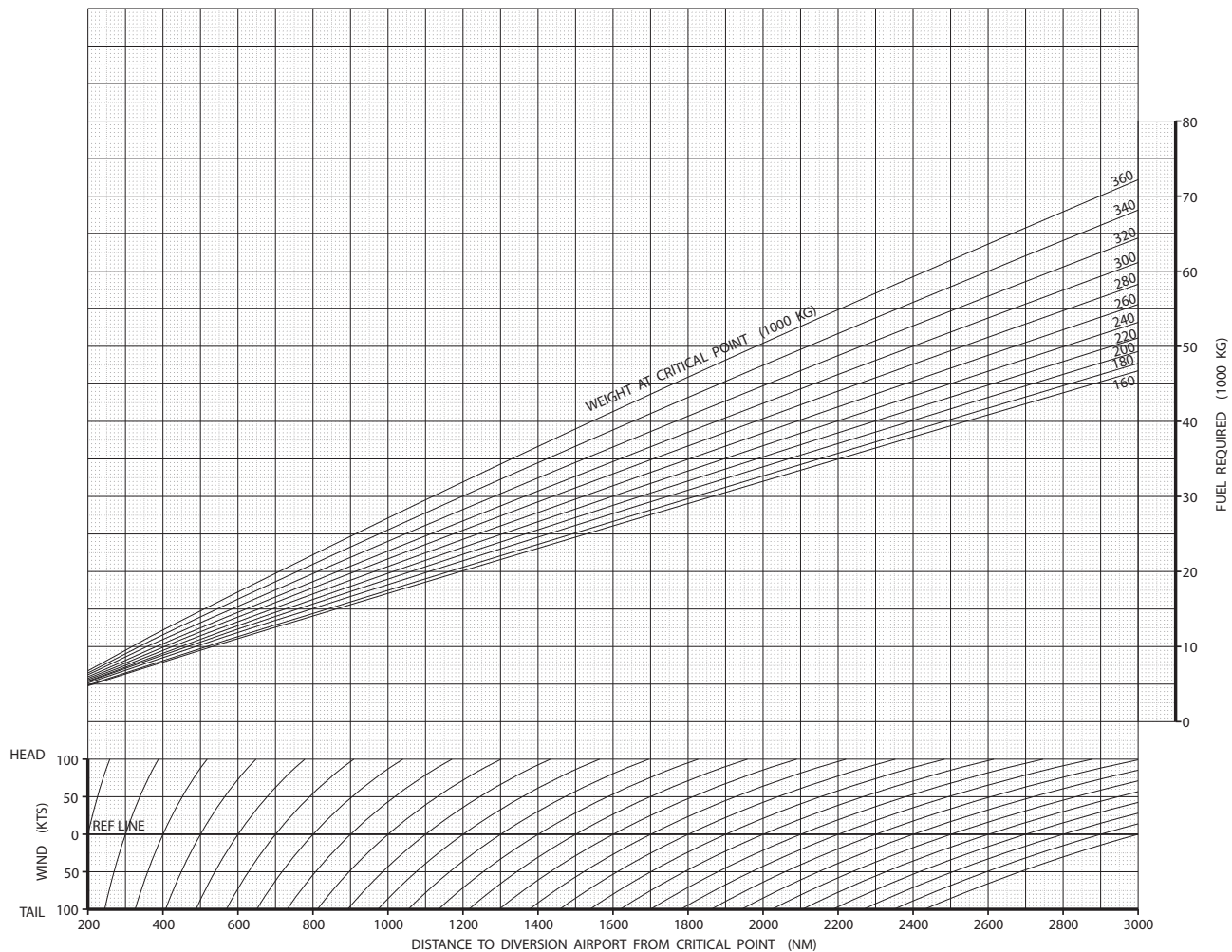
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (9%) 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

Driftdown Critical Fuel Reserves - .84M/300 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.

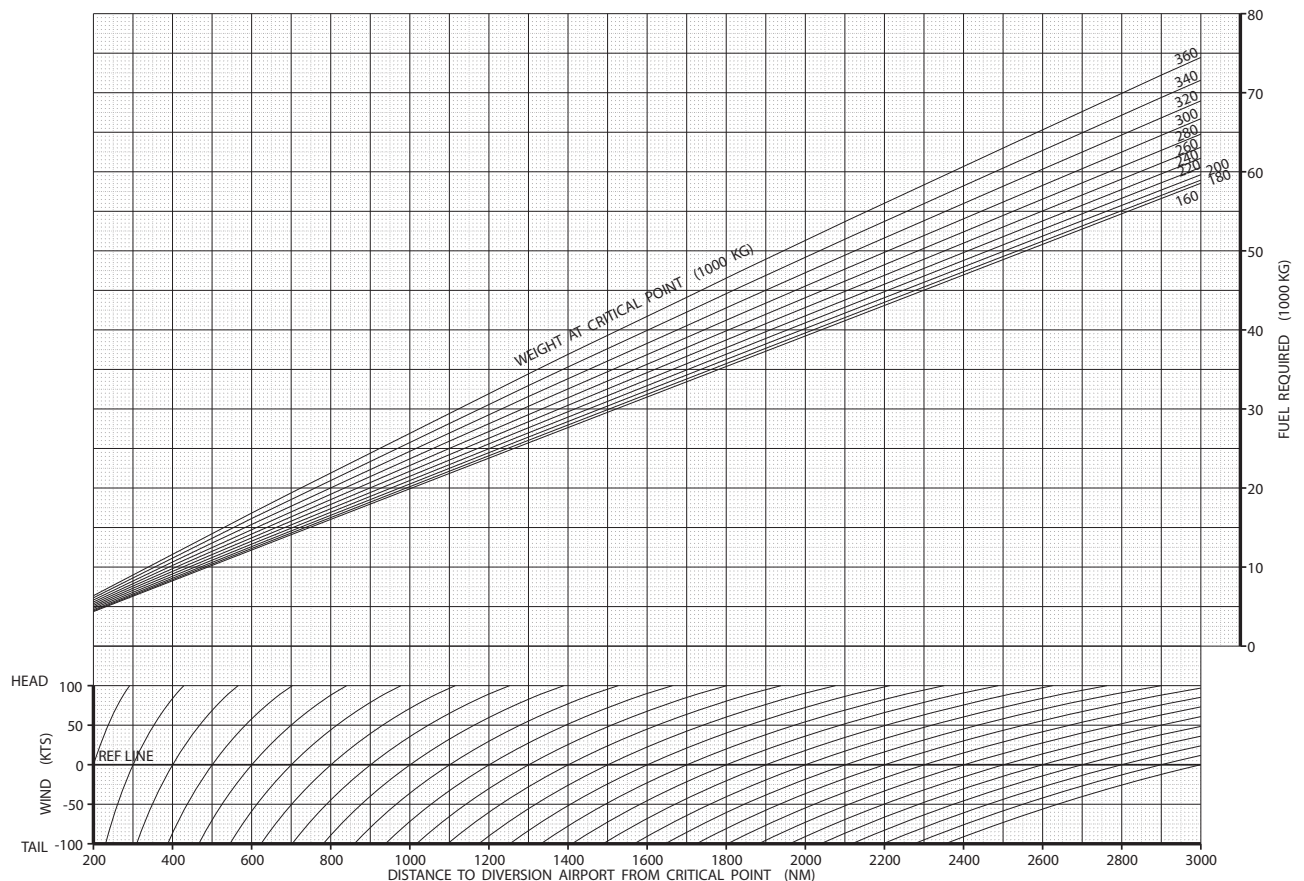
Adjustments:

- 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 (1%) 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 MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 320 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:

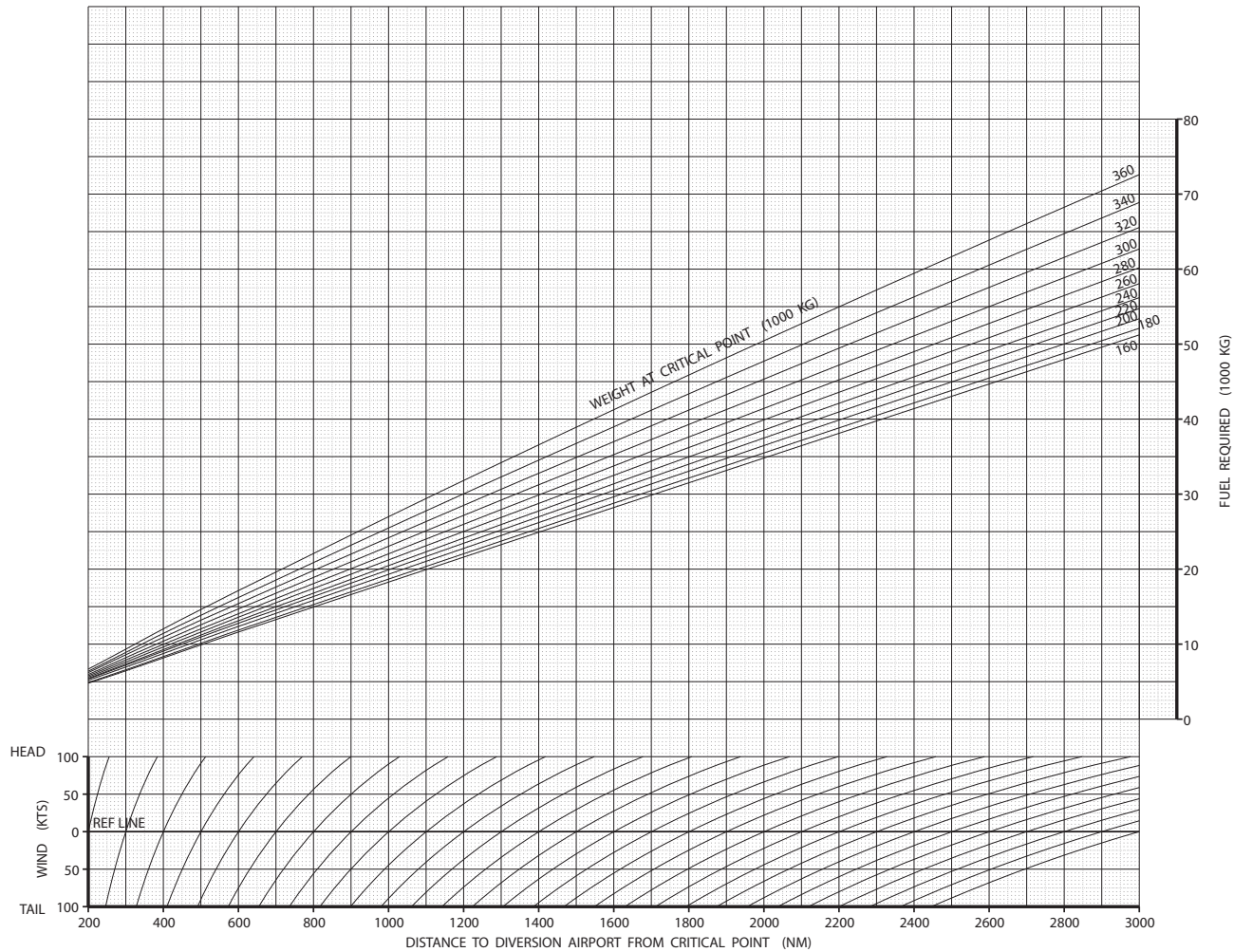
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) for the total forecast time or engine and wing anti-ice on and ice drag (9%) 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

Driftdown Critical Fuel Reserves - .84M/320 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:

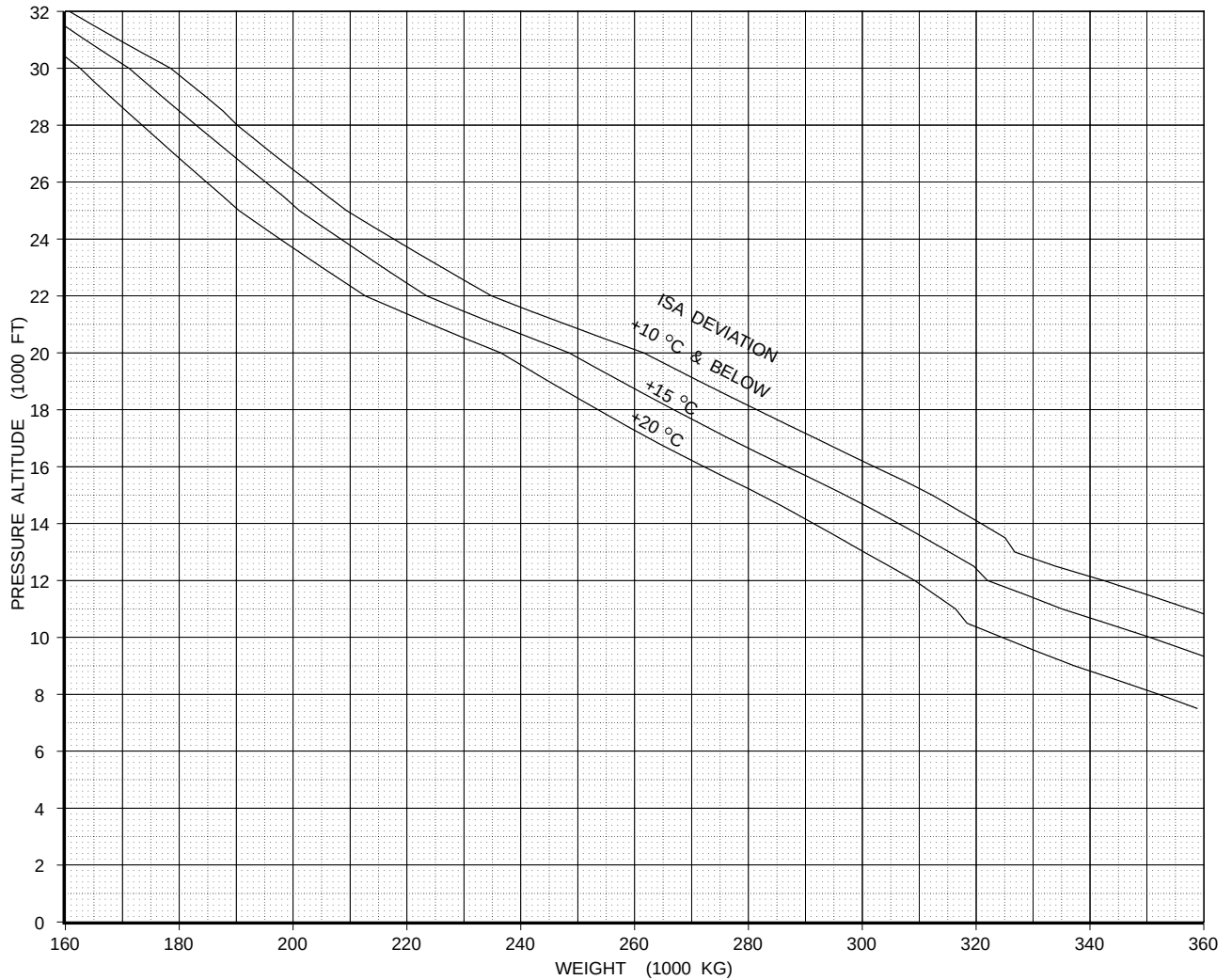
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.8% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Long Range Cruise Net Level Off Weight



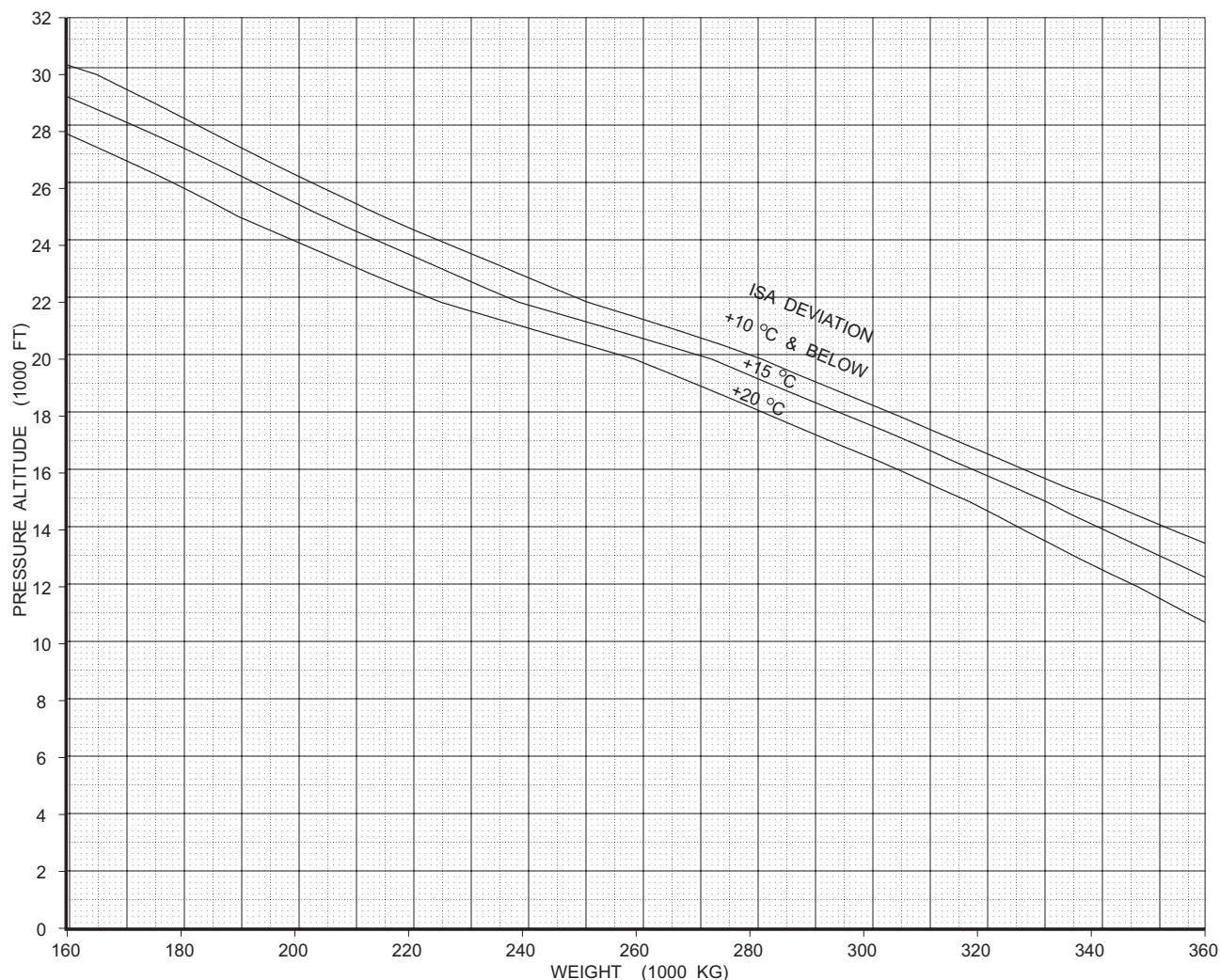
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)									
	PRESSURE ALTITUDE (1000 FT)									
	12	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.5	-2.1	-2.0	-1.6	-1.3	-1.5	-1.4	-1.5	-1.5	-1.7

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Net Level Off Weight



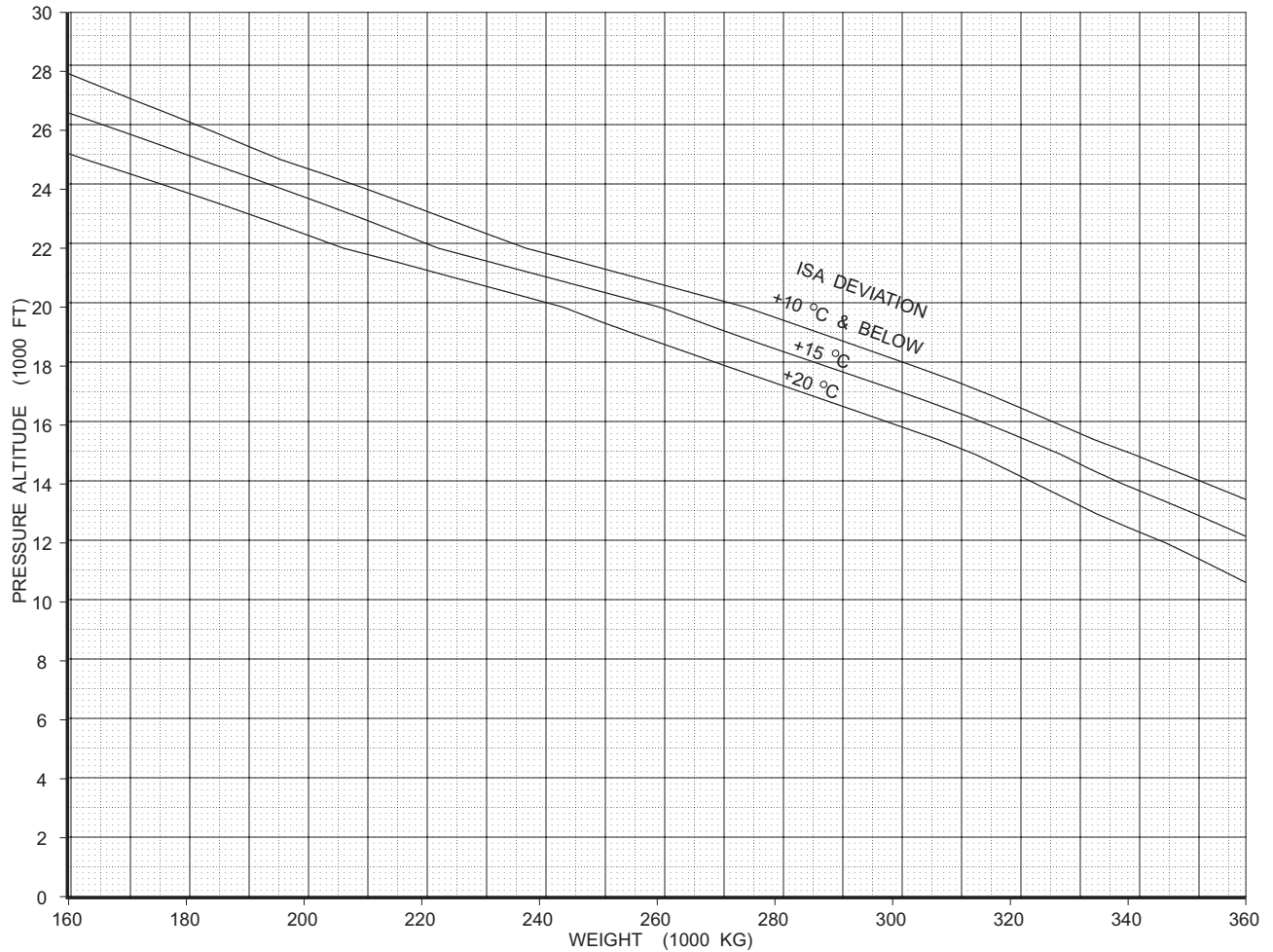
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)						
	PRESSURE ALTITUDE (1000 FT)						
	14	16	18	20	22	24	26
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.1	-1.9	-1.6	-1.4	-1.9	-2.0	-2.2

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Net Level Off Weight



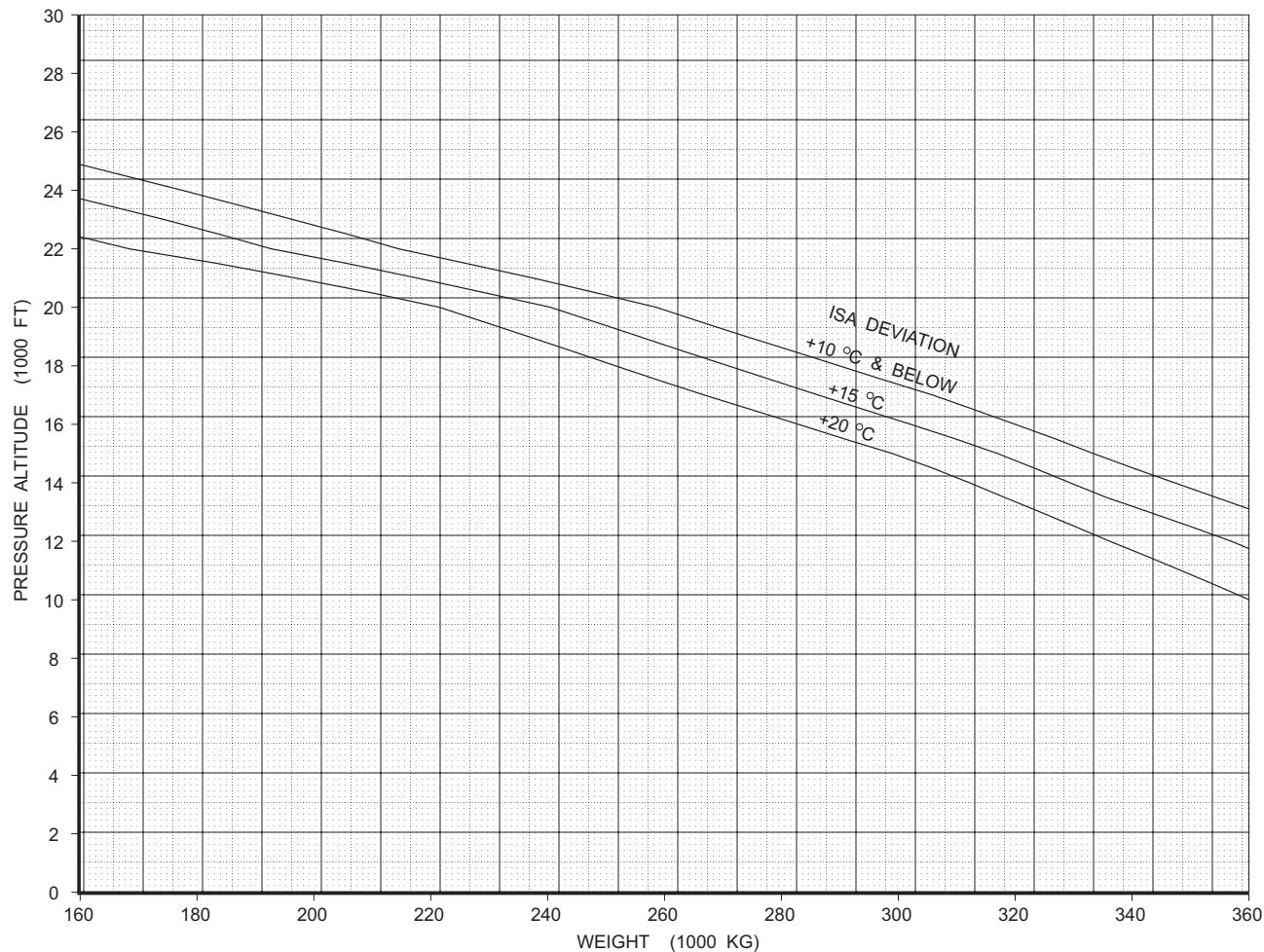
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)					
	PRESSURE ALTITUDE (1000 FT)					
	14	16	18	20	22	24
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.3	-1.8	-2.0	-1.7	-2.3	-2.9

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Net Level Off Weight



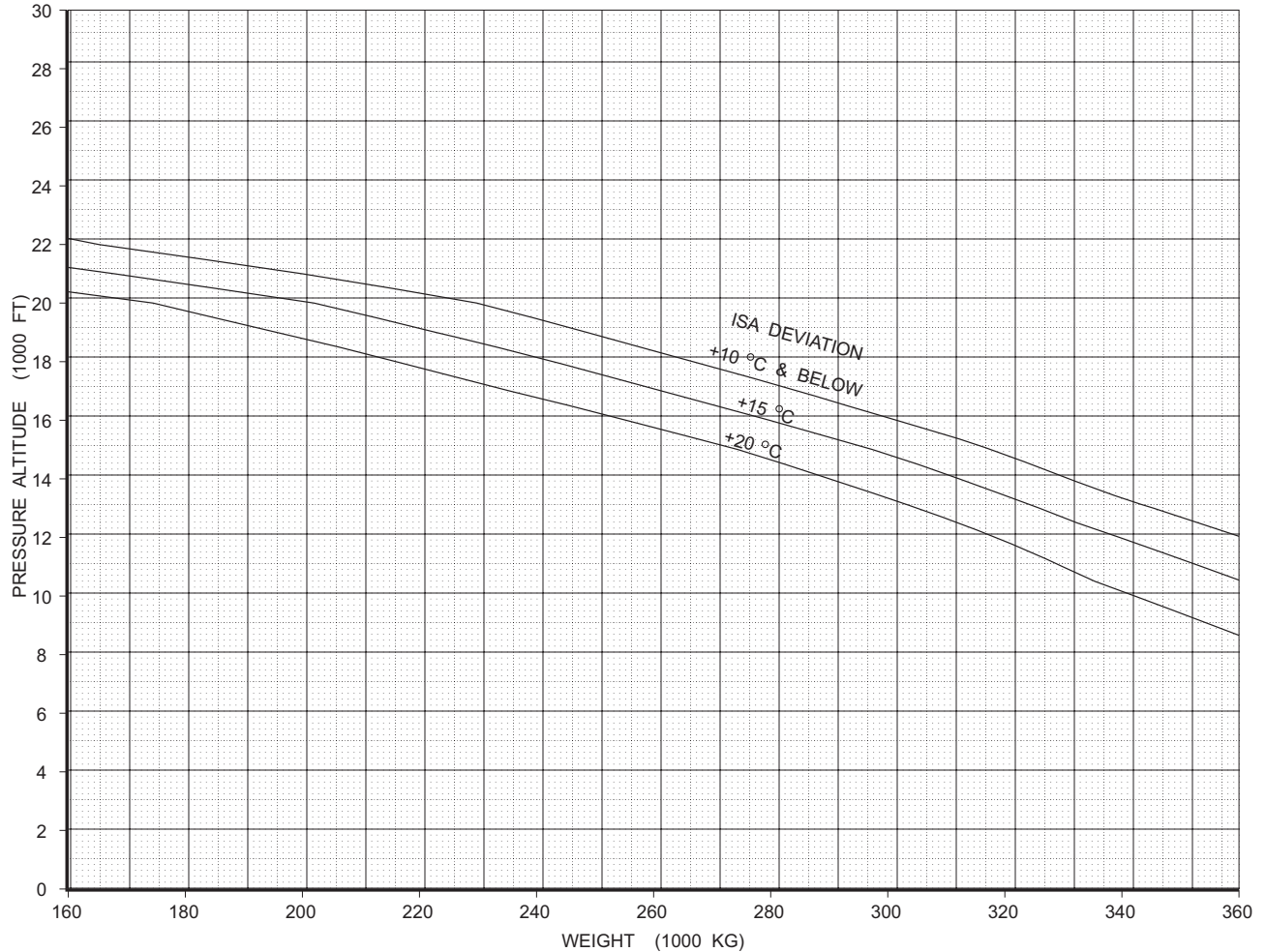
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)				
	PRESSURE ALTITUDE (1000 FT)				
	14	16	18	20	22
ENGINE ONLY	-0.1	-0.1	0.0	0.0	0.0
ENGINE AND WING	-2.7	-2.4	-2.2	-1.7	-2.9

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Net Level Off Weight



Anti-Ice Adjustments

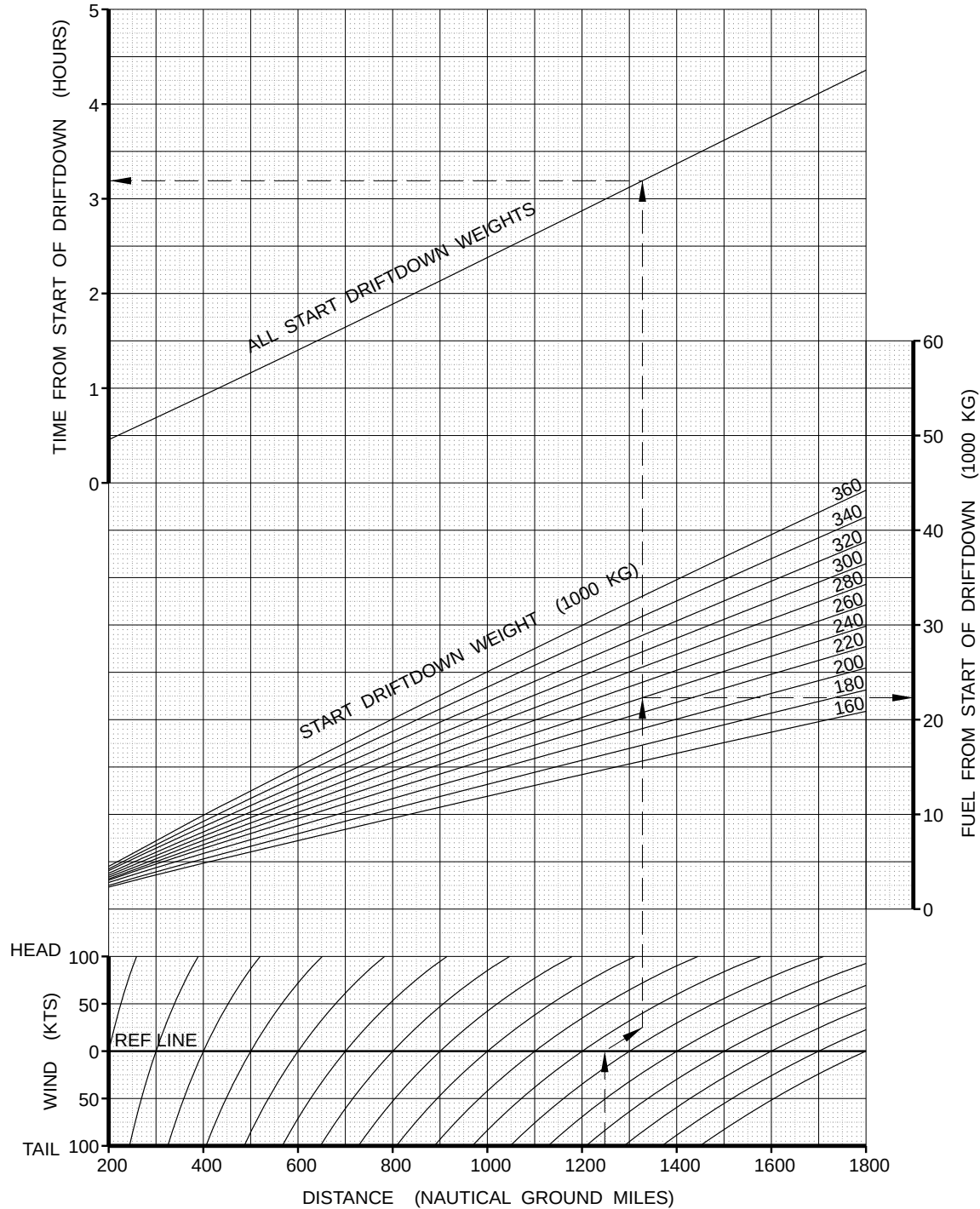
ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)			
	PRESSURE ALTITUDE (1000 FT)			
	14	16	18	20
ENGINE ONLY	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.4	-2.8	-2.6	-2.5

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Driftdown/Cruise Range Capability

Includes APU fuel burn

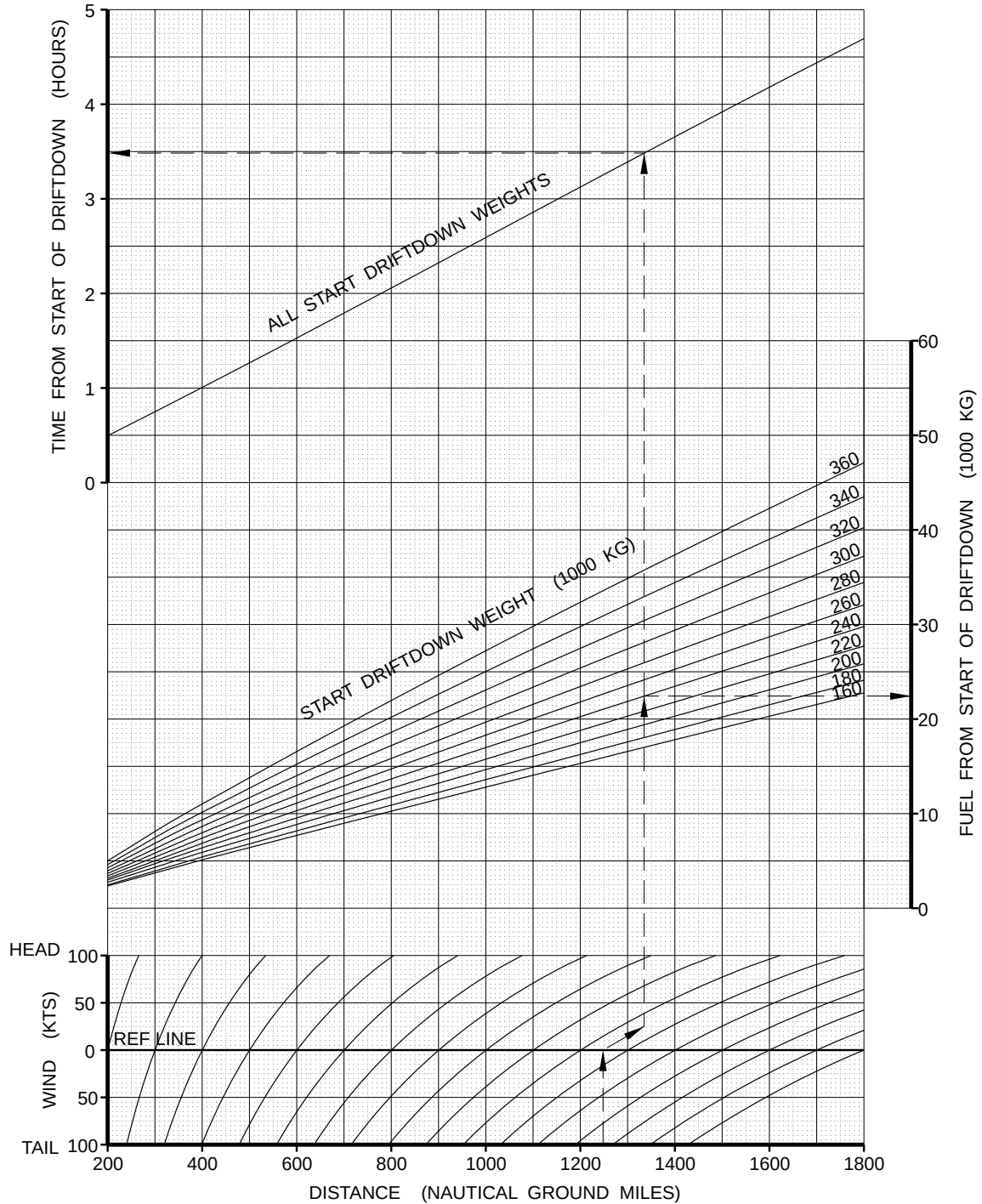


ENGINE INOP

MAX CONTINUOUS THRUST

.82M/260 KIAS Driftdown/Cruise Range Capability

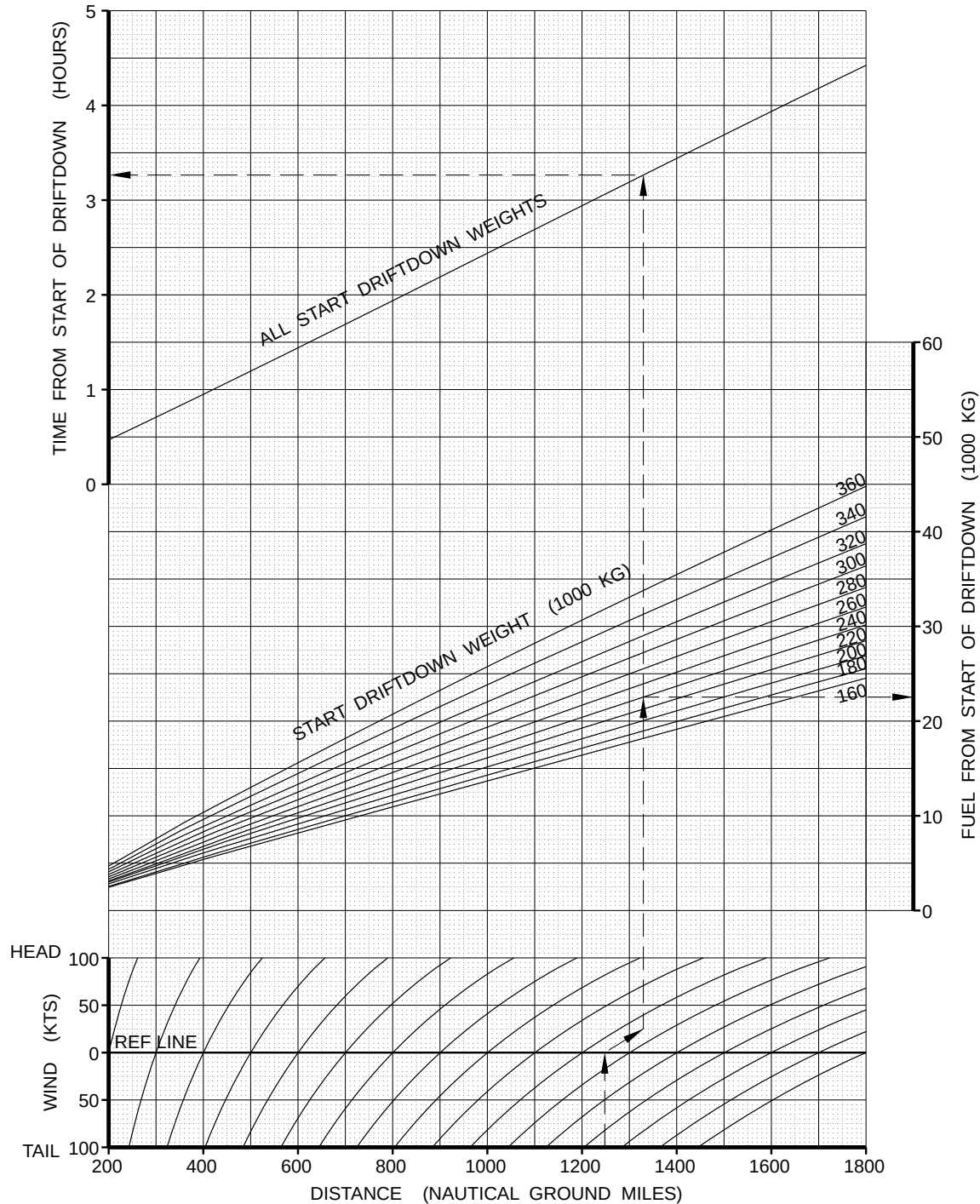
Includes APU fuel burn



ENGINE INOP
MAX CONTINUOUS THRUST

.84M/280 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn

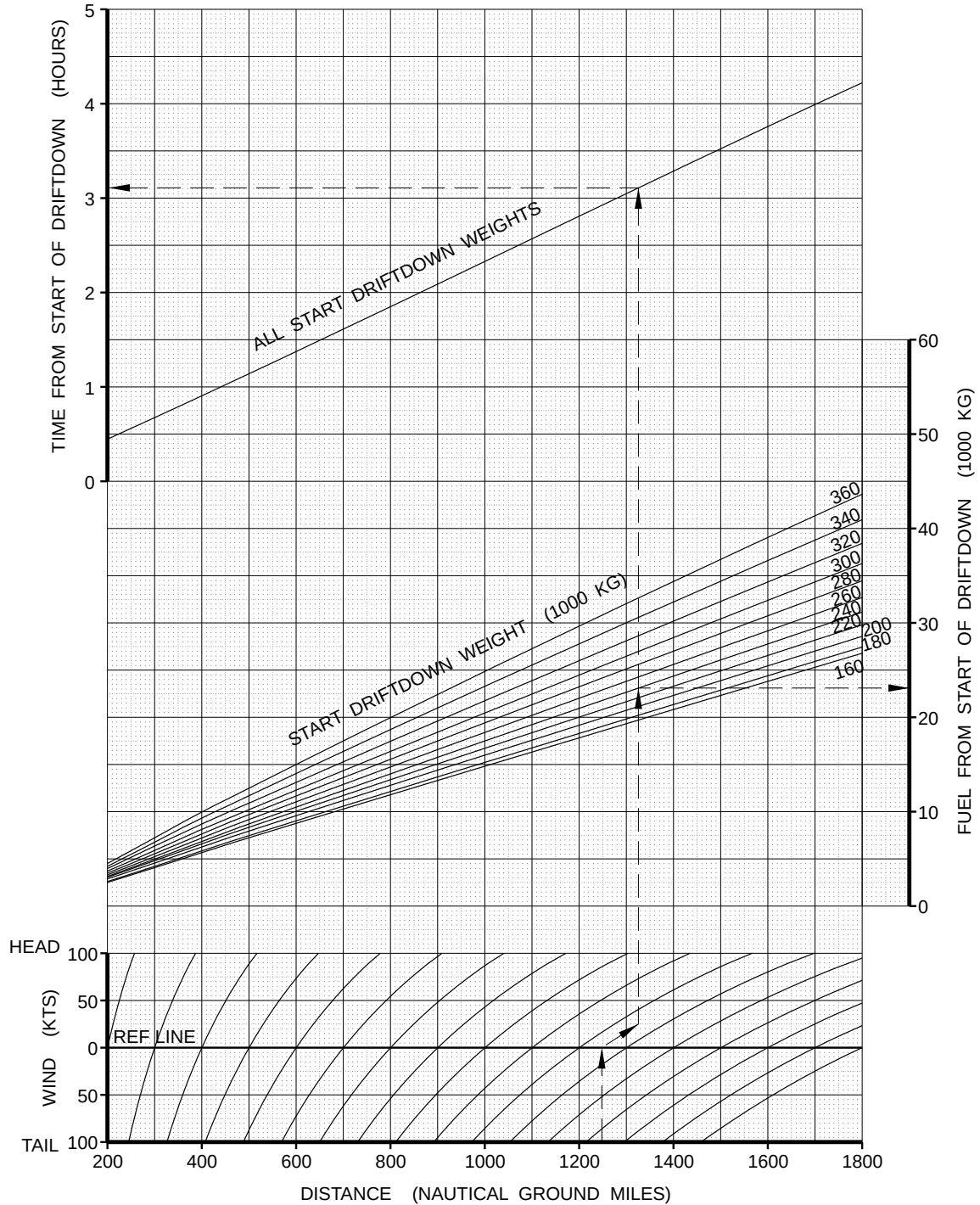


ENGINE INOP

MAX CONTINUOUS THRUST

.84M/300 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn

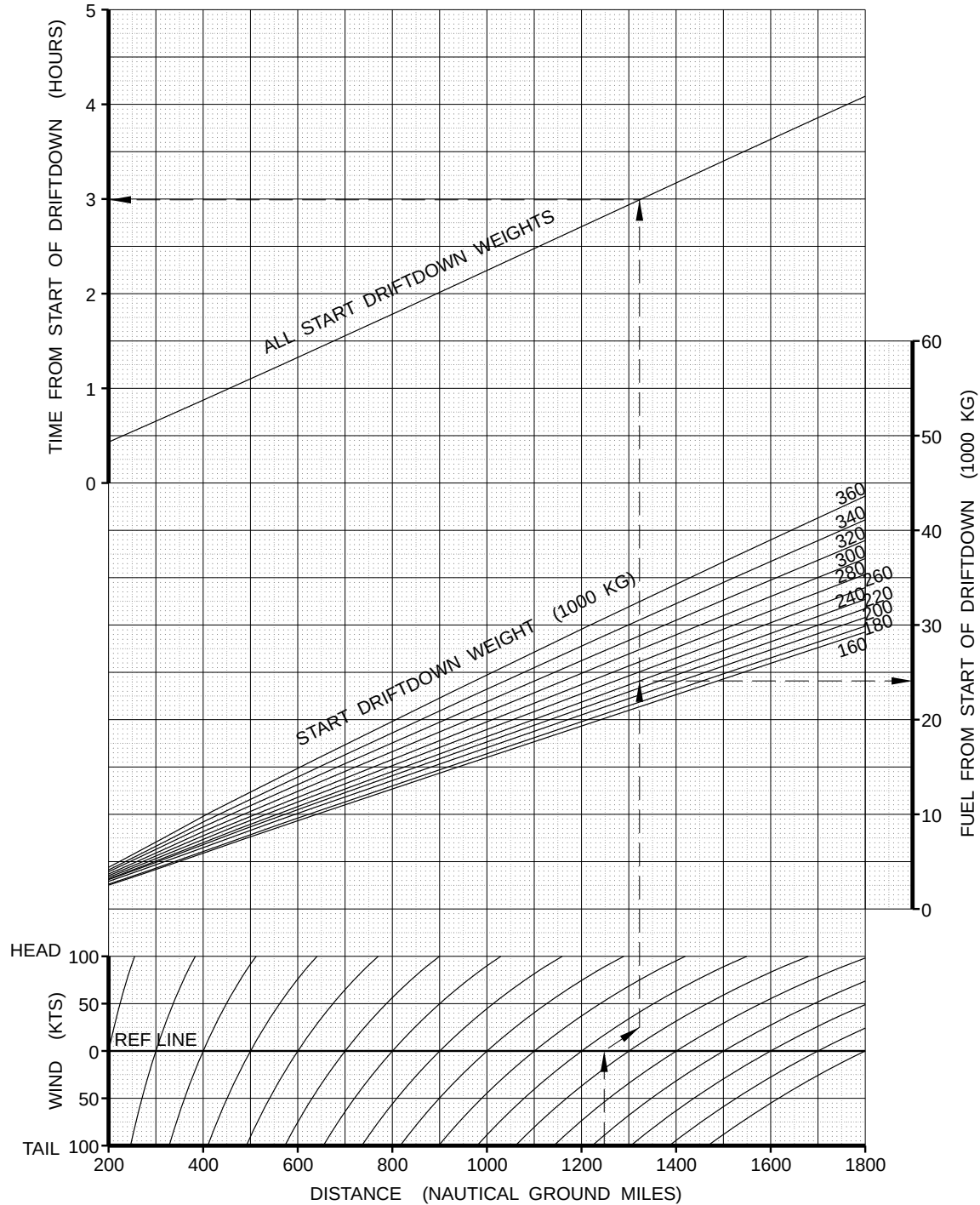


ENGINE INOP

MAX CONTINUOUS THRUST

.84M/320 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn



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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 300 ft/min residual rate of climb. Flying above these altitudes with sustained banks in excess of approximately 21° 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 approximately 1.3g (39° bank) or more. The altitudes shown in the table are limited to the maximum certified altitude of 43100 ft.

Enroute Climb

The Enroute Climb tables are based on 310/.84 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 tables are provided for Long Range Cruise and .84M 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 QRH and are expanded to include true airspeed and Max Cruise thrust setting information.

To account for APU fuel burn, refer to the APU Operation 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 .84M. 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 three descent speed schedules. 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

%N1, indicated airspeed and fuel flow information are tabulated for holding at flaps up and flaps 1 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

Altitude Capability

The Engine Inoperative Altitude Capability tables are based on the thrust limited capability with 100 ft/min residual rate of climb. For the engine inoperative case, buffet capability is not considered limiting. Tables are shown for Long Range Cruise and constant speeds of 260, 280, 300, and 320 KIAS for both Max Continuous and Max Cruise Thrust. Adjust the table values for thermal anti-ice operation as shown 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 constant speeds of 260, 280, 300 and 320 KIAS. The fuel flow values in these tables reflect only the engine fuel burn. To conservatively account for APU fuel burn, refer to the APU Operation 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 are shown for Long Range Cruise and constant speeds of 260, 280, 300 and 320 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

%N1 required, ISA 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.



Flight Planning and Performance Manual

Long Range Cruise Maximum Operating Altitude

Max Climb Thrust

ISA + 10°C and Below

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27300	5	30400	28800	27200
350	27900	4	31000	29400	27800
340	28500	3	31700	30000	28500
330	29200	1	32200	30500	29000
320	29900	0	32700	31000	29500
310	30600	-2	33200	31600	30000
300	31300	-4	33700	32100	30600
290	32000	-5	34300	32700	31200
280	32800	-7	34900	33300	31800
270	33600	-9	35500	33900	32400
260	34400	-11	36100	34500	33100
250	35200	-12	36800	35200	33800
240	36000	-14	37500	35900	34500
230	36900	-15	38200	36600	35200
220	37800	-15	39000	37400	36000
210	38800	-15	39800	38200	36800
200	39800	-15	40600	39000	37700
190	40900	-15	41500	39900	38600
180	42000	-15	42500	40900	39600
170	43100	-15	43100	42100	40800
160	43100	-15	43100	43100	42000

ISA + 15°C

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27300	11	30400	28800	27200
350	27900	10	31000	29400	27800
340	28500	8	31700	30000	28500
330	29200	7	32200	30500	29000
320	29900	5	32700	31000	29500
310	30600	4	33200	31600	30000
300	31300	2	33700	32100	30600
290	32000	0	34300	32700	31200
280	32800	-1	34900	33300	31800
270	33600	-3	35500	33900	32400
260	34400	-5	36100	34500	33100
250	35200	-7	36800	35200	33800
240	36000	-9	37500	35900	34500
230	36900	-9	38200	36600	35200
220	37800	-9	39000	37400	36000
210	38800	-9	39800	38200	36800
200	39800	-9	40600	39000	37700
190	40900	-9	41500	39900	38600
180	42000	-9	42500	40900	39600
170	43100	-9	43100	42100	40800
160	43100	-9	43100	43100	42000

Long Range Cruise Maximum Operating Altitude**Max Climb Thrust****ISA + 20°C**

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27300	17	30400	28800	27200
350	27900	15	31000	29400	27800
340	28500	14	31700	30000	28500
330	29200	12	32200	30500	29000
320	29900	11	32700	31000	29500
310	30600	9	33200	31600	30000
300	31300	8	33700	32100	30600
290	32000	6	34300	32700	31200
280	32800	4	34900	33300	31800
270	33600	3	35500	33900	32400
260	34400	1	36100	34500	33100
250	35200	-1	36800	35200	33800
240	36000	-3	37500	35900	34500
230	36900	-3	38200	36600	35200
220	37800	-3	39000	37400	36000
210	38800	-3	39800	38200	36800
200	39800	-3	40600	39000	37700
190	40900	-3	41500	39900	38600
180	42000	-3	42500	40900	39600
170	43100	-3	43100	42100	40800
160	43100	-3	43100	43100	42000



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310/.84 Enroute Climb ISA and Below - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD										27/6800 186/449	21/5800 144/442
39000	TIME/FUEL DIST/SPD									24/6550 164/443	21/5850 139/439	19/5350 124/436
38000	TIME/FUEL DIST/SPD								23/6500 154/439	21/5900 134/435	19/5450 121/433	17/5100 111/431
37000	TIME/FUEL DIST/SPD						26/7300 175/441	22/6500 146/435	20/5950 131/432	19/5550 119/430	17/5200 110/429	16/4900 102/427
36000	TIME/FUEL DIST/SPD					24/7150 160/435	22/6500 140/431	20/6050 127/429	19/5650 117/427	17/5300 109/426	16/5000 102/425	15/4750 95/424
35000	TIME/FUEL DIST/SPD			28/8100 183/437	24/7200 155/431	22/6600 138/428	20/6150 126/426	19/5800 116/425	17/5450 109/423	16/5150 102/422	16/4850 96/422	15/4600 90/421
34000	TIME/FUEL DIST/SPD		27/8000 173/432	24/7300 152/428	22/6750 137/425	20/6300 125/423	19/5900 116/422	18/5550 108/421	17/5250 102/420	16/5000 96/419	15/4750 90/418	14/4500 85/418
33000	TIME/FUEL DIST/SPD	26/8050 166/428	24/7400 149/424	22/6900 136/422	20/6450 125/420	19/6050 116/419	18/5700 108/418	17/5400 102/417	16/5100 96/416	15/4850 91/416	14/4600 86/415	14/4400 81/415
32000	TIME/FUEL DIST/SPD	24/7500 147/421	22/7000 135/419	21/6600 125/417	19/6200 116/416	18/5850 109/415	17/5550 96/413	16/5250 91/413	15/5000 86/412	15/4750 81/412	14/4500 77/411	13/4250 77/411
31000	TIME/FUEL DIST/SPD	22/7050 131/414	21/6650 123/413	19/6300 115/412	18/5950 108/411	17/5650 101/410	16/5350 95/409	15/5050 90/409	15/4800 85/408	14/4600 81/408	13/4350 76/408	12/4150 72/407
30000	TIME/FUEL DIST/SPD	20/6700 120/408	19/6350 113/407	18/6050 106/407	17/5700 99/406	16/5400 94/405	15/5150 88/405	15/4900 84/404	14/4650 79/404	13/4400 75/403	12/4200 71/403	12/4000 67/403
29000	TIME/FUEL DIST/SPD	19/6400 110/403	18/6100 104/402	17/5800 98/402	16/5500 92/401	15/5200 87/400	15/4950 82/400	14/4700 78/400	13/4450 74/399	13/4250 70/399	12/4050 66/398	11/3850 63/398
28000	TIME/FUEL DIST/SPD	18/6150 101/398	17/5850 96/398	16/5550 91/397	15/5250 85/397	15/5000 81/396	14/4750 76/396	13/4500 72/395	13/4300 69/395	12/4100 65/395	11/3900 62/394	11/3700 59/394
27000	TIME/FUEL DIST/SPD	17/5850 93/394	16/5600 88/393	15/5300 84/393	15/5050 79/392	14/4800 75/392	13/4550 71/391	13/4350 67/391	12/4150 64/391	11/3950 61/390	11/3750 58/390	10/3600 55/390
26000	TIME/FUEL DIST/SPD	16/5600 86/389	15/5350 82/389	15/5100 78/388	14/4850 73/388	13/4600 69/387	12/4400 66/387	12/4200 63/387	11/4000 60/387	11/3800 57/386	10/3650 54/386	10/3450 51/386
25000	TIME/FUEL DIST/SPD	15/5400 79/385	14/5150 75/384	14/4900 72/384	13/4650 68/384	12/4450 64/383	12/4250 61/383	11/4050 58/383	11/3850 55/383	10/3650 53/382	10/3500 50/382	9/3350 48/382
24000	TIME/FUEL DIST/SPD	14/5150 73/381	14/4950 70/380	13/4700 66/380	12/4500 63/380	12/4250 60/379	11/4050 57/379	11/3900 54/379	10/3700 51/379	10/3550 49/379	9/3350 47/378	9/3200 44/378
23000	TIME/FUEL DIST/SPD	14/4950 68/377	13/4750 64/376	12/4500 61/376	12/4300 58/376	11/4100 55/376	11/3900 52/375	10/3750 50/375	10/3550 48/375	9/3400 45/375	9/3250 43/375	8/3100 41/374
22000	TIME/FUEL DIST/SPD	13/4750 62/373	12/4550 59/373	12/4350 57/372	11/4150 54/372	11/3950 51/372	10/3750 49/372	10/3600 46/372	9/3450 44/371	9/3300 42/371	8/3100 40/371	8/3000 38/371
21000	TIME/FUEL DIST/SPD	12/4550 57/369	12/4350 55/369	11/4150 52/369	11/3950 50/369	10/3800 47/368	10/3600 45/368	9/3450 43/368	9/3300 41/368	8/3150 39/368	8/3000 37/367	8/2850 35/367
20000	TIME/FUEL DIST/SPD	11/4350 53/366	11/4150 50/366	10/4000 48/365	10/3800 46/365	10/3650 44/365	9/3450 41/365	9/3300 40/365	8/3150 38/364	8/3000 36/364	8/2900 34/364	7/2750 33/364
18000	TIME/FUEL DIST/SPD	10/4000 44/359	10/3800 42/359	9/3650 41/359	9/3500 39/359	9/3350 37/358	8/3200 35/358	8/3050 34/358	7/2900 32/358	7/2800 31/358	7/2650 29/358	6/2550 28/357
16000	TIME/FUEL DIST/SPD	9/3600 37/353	9/3450 35/353	8/3350 34/352	8/3200 32/352	8/3050 31/352	7/2900 29/352	7/2800 28/352	7/2650 27/352	6/2550 26/352	6/2450 24/351	6/2300 23/351
14000	TIME/FUEL DIST/SPD	8/3300 30/347	8/3150 29/347	7/3000 28/347	7/2900 27/346	7/2750 25/346	6/2650 24/346	6/2550 23/346	6/2400 22/346	6/2300 21/346	5/2200 20/346	5/2100 19/345
10000	TIME/FUEL DIST/SPD	6/2650 19/336	6/2550 18/336	6/2450 18/336	5/2350 17/336	5/2250 16/335	5/2150 15/335	5/2050 14/335	5/1950 13/335	4/1850 13/335	4/1800 13/335	4/1700 12/334
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-250	-500	-750	-1000	-1250	-1500

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA and Below - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL				23/5650	19/4950	17/4500	16/4150	14/3900	13/3600	12/3400	11/3150
	DIST/SPD				163/451	133/446	116/443	105/441	96/440	88/439	81/438	75/437
42000	TIME/FUEL			23/5700	19/5050	17/4650	16/4300	15/4000	14/3750	13/3500	12/3300	11/3050
	DIST/SPD			156/448	131/443	116/441	105/439	96/438	89/437	83/436	76/435	71/434
41000	TIME/FUEL		22/5750	19/5150	17/4750	16/4450	15/4150	14/3900	13/3650	12/3450	11/3200	10/3000
	DIST/SPD		150/445	128/441	115/439	105/437	97/436	90/435	83/434	77/433	72/432	67/432
40000	TIME/FUEL	21/5800	19/5250	17/4900	16/4550	15/4300	14/4000	13/3800	12/3550	11/3350	11/3150	10/2950
	DIST/SPD	144/442	126/439	114/436	104/435	97/434	90/433	84/432	78/431	73/430	68/430	63/429
39000	TIME/FUEL	19/5350	17/5000	16/4700	15/4400	14/4150	13/3900	12/3700	12/3450	11/3250	10/3050	10/2850
	DIST/SPD	124/436	113/434	104/432	97/431	90/430	84/430	79/429	74/428	69/428	64/427	60/427
38000	TIME/FUEL	17/5100	16/4800	15/4500	14/4250	13/4050	13/3800	12/3600	11/3400	10/3200	10/3000	9/2800
	DIST/SPD	111/431	103/430	96/429	90/428	84/427	79/427	74/426	70/426	65/425	61/425	57/424
37000	TIME/FUEL	16/4900	15/4650	14/4400	14/4150	13/3900	12/3700	11/3500	11/3300	10/3100	9/2900	9/2750
	DIST/SPD	102/427	96/426	90/426	85/425	80/424	75/424	70/423	66/423	62/422	58/422	54/421
36000	TIME/FUEL	15/4750	14/4500	14/4250	13/4050	12/3800	12/3600	11/3400	10/3200	10/3050	9/2850	8/2650
	DIST/SPD	95/424	90/423	85/423	80/422	75/422	71/421	67/421	62/420	59/420	55/419	51/419
35000	TIME/FUEL	15/4600	14/4350	13/4150	12/3950	12/3700	11/3500	10/3350	10/3150	9/2950	9/2800	8/2600
	DIST/SPD	90/421	85/420	80/420	76/419	71/419	67/418	63/418	60/417	56/417	52/417	49/416
34000	TIME/FUEL	14/4500	13/4250	13/4050	12/3850	11/3650	11/3450	10/3250	10/3100	9/2900	8/2750	8/2550
	DIST/SPD	85/418	81/417	76/417	72/416	68/416	64/416	60/415	57/415	53/414	50/414	47/413
33000	TIME/FUEL	14/4400	13/4150	12/3950	12/3750	11/3550	10/3350	10/3200	9/3000	9/2850	8/2650	8/2500
	DIST/SPD	81/415	77/414	72/414	69/413	65/413	61/413	58/412	54/412	51/411	48/411	45/410
32000	TIME/FUEL	13/4250	12/4050	12/3850	11/3650	11/3450	10/3300	9/3100	9/2950	8/2750	8/2600	7/2450
	DIST/SPD	77/411	73/411	69/411	65/410	62/410	58/409	55/409	52/409	49/408	46/408	43/407
31000	TIME/FUEL	12/4150	12/3950	11/3750	11/3550	10/3350	10/3200	9/3000	9/2850	8/2700	8/2550	7/2400
	DIST/SPD	72/407	69/407	65/406	62/406	58/406	55/405	52/405	49/405	46/404	43/404	40/403
30000	TIME/FUEL	12/4000	11/3800	11/3600	10/3450	10/3250	9/3100	9/2900	8/2750	8/2600	7/2450	7/2300
	DIST/SPD	67/403	64/402	61/402	57/402	54/401	51/401	48/401	46/400	43/400	40/399	38/399
29000	TIME/FUEL	11/3850	11/3650	10/3500	10/3300	9/3150	9/3000	8/2800	8/2650	7/2500	7/2350	6/2250
	DIST/SPD	63/398	60/398	57/398	54/397	51/397	48/397	45/396	43/396	40/396	38/395	35/395
28000	TIME/FUEL	11/3700	10/3550	10/3350	9/3200	9/3050	8/2900	8/2750	7/2600	7/2450	7/2300	6/2150
	DIST/SPD	59/394	56/394	53/393	50/393	48/393	45/392	42/392	40/392	38/391	35/391	33/390
27000	TIME/FUEL	10/3600	10/3400	9/3250	9/3100	8/2950	8/2800	8/2650	7/2500	7/2350	6/2200	6/2100
	DIST/SPD	55/390	52/390	49/389	47/389	44/389	42/388	40/388	37/388	35/387	33/387	31/386
26000	TIME/FUEL	10/3450	9/3300	9/3150	8/3000	8/2850	8/2700	7/2550	7/2400	6/2300	6/2150	6/2000
	DIST/SPD	51/386	49/386	46/385	44/385	41/385	39/384	37/384	35/384	33/383	31/383	29/382
25000	TIME/FUEL	9/3350	9/3200	8/3000	8/2900	8/2750	7/2600	7/2450	6/2350	6/2200	6/2050	5/1950
	DIST/SPD	48/382	45/382	43/381	41/381	39/381	37/381	35/380	33/380	31/379	29/379	27/378
24000	TIME/FUEL	9/3200	8/3050	8/2900	8/2750	7/2650	7/2500	6/2350	6/2250	6/2100	5/2000	5/1900
	DIST/SPD	44/378	42/378	40/378	38/377	36/377	34/377	32/376	30/376	29/376	27/375	25/375
23000	TIME/FUEL	8/3100	8/2950	8/2800	7/2650	7/2550	7/2400	6/2300	6/2150	6/2050	5/1950	5/1800
	DIST/SPD	41/374	39/374	37/374	35/374	33/373	32/373	30/373	28/372	27/372	25/371	23/371
22000	TIME/FUEL	8/3000	8/2850	7/2700	7/2550	7/2450	6/2350	6/2200	6/2100	5/1950	5/1850	5/1750
	DIST/SPD	38/371	36/371	34/370	33/370	31/370	29/369	28/369	26/369	25/368	23/368	22/367
21000	TIME/FUEL	8/2850	7/2750	7/2600	7/2500	6/2350	6/2250	6/2100	5/2000	5/1900	5/1800	4/1700
	DIST/SPD	35/367	34/367	32/367	30/367	29/366	27/366	26/366	24/365	23/365	21/364	20/364
20000	TIME/FUEL	7/2750	7/2600	7/2500	6/2400	6/2250	6/2150	5/2050	5/1950	5/1850	4/1750	4/1600
	DIST/SPD	33/364	31/364	30/363	28/363	27/363	25/363	24/362	23/362	21/361	20/361	19/360
18000	TIME/FUEL	6/2550	6/2400	6/2300	6/2200	5/2100	5/2000	5/1900	5/1800	4/1700	4/1600	4/1500
	DIST/SPD	28/357	26/357	25/357	24/357	23/356	22/356	20/356	19/355	18/355	17/354	16/354
16000	TIME/FUEL	6/2300	6/2200	5/2100	5/2000	5/1900	5/1800	4/1750	4/1650	4/1550	4/1450	3/1400
	DIST/SPD	23/351	22/351	21/351	20/350	19/350	18/350	17/349	16/349	15/349	14/348	13/347
14000	TIME/FUEL	5/2100	5/2000	5/1900	4/1850	4/1750	4/1650	4/1600	4/1500	3/1400	3/1350	3/1250
	DIST/SPD	19/345	18/345	18/345	17/345	16/344	15/344	14/344	13/343	13/343	12/342	11/341
10000	TIME/FUEL	4/1700	4/1650	4/1550	3/1500	3/1400	3/1350	3/1300	3/1200	3/1150	3/1100	2/1000
	DIST/SPD	12/334	12/334	11/334	11/334	10/333	9/333	9/333	8/332	8/331	7/331	7/330
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-150	-300	-450	-600	-750	-950

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 10°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD										27/7100 194/458	22/6050 151/451
39000	TIME/FUEL DIST/SPD									25/6800 172/453	21/6100 145/448	19/5600 129/445
38000	TIME/FUEL DIST/SPD								24/6750 161/448	21/6150 141/445	19/5700 127/442	18/5300 117/440
37000	TIME/FUEL DIST/SPD						27/7650 184/450	23/6750 153/444	21/6200 137/441	19/5800 125/439	18/5450 115/438	17/5100 107/436
36000	TIME/FUEL DIST/SPD					25/7450 167/444	22/6800 147/440	20/6300 133/438	19/5900 123/436	18/5550 114/435	17/5250 107/434	16/4950 100/433
35000	TIME/FUEL DIST/SPD			29/8500 194/447	25/7500 162/440	22/6900 144/437	20/6400 132/435	19/6000 122/433	18/5650 114/432	17/5350 107/431	16/5050 100/430	15/4800 94/430
34000	TIME/FUEL DIST/SPD		27/8350 181/441	24/7600 159/437	22/7000 143/434	21/6550 131/432	19/6150 121/430	18/5800 114/429	17/5500 107/428	16/5200 100/428	15/4950 95/427	14/4650 89/426
33000	TIME/FUEL DIST/SPD	27/8350 174/437	24/7700 156/433	22/7150 142/431	21/6700 131/429	19/6300 121/427	18/5950 113/426	17/5600 107/425	16/5300 101/425	15/5050 95/424	15/4800 90/424	14/4550 85/423
32000	TIME/FUEL DIST/SPD	24/7800 154/429	23/7300 141/427	21/6850 131/426	20/6450 122/424	18/6100 114/423	17/5750 107/422	17/5450 101/422	16/5200 95/421	15/4900 88/421	14/4650 85/420	13/4450 81/420
31000	TIME/FUEL DIST/SPD	22/7350 138/422	21/6950 129/421	20/6550 121/420	19/6200 113/419	18/5850 106/418	17/5550 100/418	16/5250 94/417	15/5000 89/417	14/4750 84/416	13/4500 80/416	13/4300 76/415
30000	TIME/FUEL DIST/SPD	21/7000 125/416	20/6600 118/415	19/6250 111/415	18/5950 104/414	17/5600 98/413	16/5300 92/413	15/5050 87/412	14/4800 83/412	13/4600 78/411	13/4350 74/411	12/4150 71/411
29000	TIME/FUEL DIST/SPD	20/6650 115/411	19/6300 108/410	18/6000 102/410	17/5700 96/409	16/5400 91/408	15/5100 86/408	14/4850 81/407	13/4650 77/407	13/4400 73/407	12/4200 69/406	12/4000 66/406
28000	TIME/FUEL DIST/SPD	18/6350 106/406	17/6050 100/405	17/5750 95/405	16/5450 89/404	15/5200 84/404	14/4900 80/403	13/4700 76/403	13/4450 72/403	12/4250 68/402	12/4050 65/402	11/3850 61/402
27000	TIME/FUEL DIST/SPD	17/6100 98/401	17/5800 92/401	16/5500 88/400	15/5250 83/400	14/5000 78/399	13/4750 74/399	13/4500 70/399	12/4300 67/398	12/4100 63/398	11/3900 60/398	10/3700 57/397
26000	TIME/FUEL DIST/SPD	16/5850 90/397	16/5550 85/396	15/5300 81/396	14/5050 77/395	13/4800 72/395	13/4550 69/395	12/4350 65/394	12/4150 62/394	11/3950 59/394	10/3750 56/394	10/3600 53/393
25000	TIME/FUEL DIST/SPD	15/5600 83/392	15/5300 79/392	14/5100 75/392	13/4850 71/391	13/4600 67/391	12/4400 64/391	12/4200 61/390	11/4000 58/390	10/3800 55/390	10/3600 52/390	9/3450 50/389
24000	TIME/FUEL DIST/SPD	15/5350 77/388	14/5100 73/388	13/4850 69/387	13/4650 66/387	12/4400 62/387	11/4200 59/386	11/4000 56/386	10/3850 54/386	10/3650 51/386	9/3500 49/386	9/3300 46/385
23000	TIME/FUEL DIST/SPD	14/5100 71/384	13/4900 67/384	13/4650 64/383	12/4450 61/383	11/4250 58/383	11/4050 55/383	10/3850 52/382	10/3700 50/382	9/3500 47/382	9/3350 45/382	9/3200 43/382
22000	TIME/FUEL DIST/SPD	13/4900 65/380	12/4700 62/380	12/4500 59/380	11/4250 56/379	11/4050 53/379	10/3900 51/379	10/3700 48/379	9/3550 46/378	9/3400 44/378	9/3250 42/378	8/3100 40/378
21000	TIME/FUEL DIST/SPD	12/4700 60/376	12/4500 57/376	11/4300 54/376	11/4100 52/376	10/3900 49/375	10/3750 47/375	9/3550 45/375	9/3400 43/375	9/3250 41/375	8/3100 39/374	8/2950 37/374
20000	TIME/FUEL DIST/SPD	12/4500 55/373	11/4300 53/372	11/4100 50/372	10/3900 48/372	10/3750 45/372	9/3600 43/372	9/3400 41/371	8/3250 39/371	8/3100 38/371	8/3000 36/371	7/2850 34/371
18000	TIME/FUEL DIST/SPD	10/4100 46/366	10/3950 44/366	10/3750 42/365	9/3600 40/365	9/3450 39/365	8/3300 37/365	8/3150 35/365	8/3000 33/365	7/2850 32/364	7/2750 30/364	7/2600 29/364
16000	TIME/FUEL DIST/SPD	9/3750 39/359	9/3550 37/359	8/3400 35/359	8/3250 34/359	8/3150 32/359	7/3000 31/358	7/2850 29/358	7/2750 28/358	6/2600 27/358	6/2500 26/358	6/2400 24/358
14000	TIME/FUEL DIST/SPD	8/3350 32/353	8/3250 30/353	8/3100 29/353	7/2950 28/353	7/2850 27/353	7/2700 25/352	6/2600 24/352	6/2500 23/352	6/2400 22/352	6/2250 21/352	5/2150 20/352
10000	TIME/FUEL DIST/SPD	6/2700 20/342	6/2600 19/342	6/2500 18/342	6/2400 17/342	5/2300 17/341	5/2200 16/341	5/2100 15/341	5/2000 14/341	4/1900 13/341	4/1850 13/341	4/1750 13/340
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)		2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)		-250	-500	-750	-1050	-1300	-1550

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 10°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL				24/5900	20/5150	18/4700	16/4350	15/4050	14/3800	13/3500	12/3300
	DIST/SPD				174/461	139/455	122/452	110/450	100/449	92/448	85/447	79/446
42000	TIME/FUEL			23/5950	20/5300	18/4850	16/4500	15/4200	14/3900	13/3650	12/3450	11/3200
	DIST/SPD			163/457	137/453	121/450	110/448	101/447	93/446	86/445	80/444	74/444
41000	TIME/FUEL		22/6000	20/5400	18/4950	16/4650	15/4350	14/4050	13/3800	12/3550	11/3350	11/3150
	DIST/SPD		157/454	135/451	120/448	110/446	101/445	94/444	87/443	81/442	75/442	70/441
40000	TIME/FUEL	22/6050	19/5500	18/5100	16/4750	15/4450	14/4200	13/3950	12/3700	12/3500	11/3250	10/3050
	DIST/SPD	151/451	132/448	119/446	109/444	101/443	94/442	88/441	82/440	76/440	71/439	66/438
39000	TIME/FUEL	19/5600	18/5200	16/4900	15/4600	14/4300	14/4050	13/3850	12/3600	11/3400	10/3200	10/3000
	DIST/SPD	129/445	118/443	109/442	101/440	94/440	88/439	83/438	77/437	72/437	67/436	63/436
38000	TIME/FUEL	18/5300	17/5000	15/4700	15/4450	14/4200	13/3950	12/3750	11/3500	11/3300	10/3100	9/2900
	DIST/SPD	117/440	108/439	101/438	94/437	88/436	83/436	78/435	73/435	68/434	64/433	59/433
37000	TIME/FUEL	17/5100	16/4800	15/4550	14/4300	13/4100	12/3850	12/3650	11/3450	10/3250	10/3050	9/2850
	DIST/SPD	107/436	100/435	94/435	89/434	83/433	78/433	74/432	69/432	65/431	60/431	56/430
36000	TIME/FUEL	16/4950	15/4650	14/4450	13/4200	12/3950	12/3750	11/3550	10/3350	10/3150	9/2950	9/2750
	DIST/SPD	100/433	94/432	89/431	83/431	79/430	74/430	70/429	65/429	61/428	57/428	54/427
35000	TIME/FUEL	15/4800	14/4550	13/4300	13/4100	12/3850	11/3650	11/3450	10/3250	9/3100	9/2900	8/2700
	DIST/SPD	94/430	89/429	84/428	79/428	75/427	70/427	66/427	62/426	59/426	55/425	51/425
34000	TIME/FUEL	14/4650	14/4450	13/4200	12/4000	12/3800	11/3600	10/3400	10/3200	9/3000	9/2850	8/2650
	DIST/SPD	89/426	84/426	80/425	75/425	71/424	67/424	63/424	59/423	56/423	52/422	49/422
33000	TIME/FUEL	14/4550	13/4300	12/4100	12/3900	11/3700	11/3500	10/3300	9/3100	9/2950	8/2750	8/2600
	DIST/SPD	85/423	80/423	76/422	72/422	68/421	64/421	60/421	57/420	53/420	50/419	47/419
32000	TIME/FUEL	13/4450	13/4200	12/4000	11/3800	11/3600	10/3400	10/3250	9/3050	9/2900	8/2700	8/2550
	DIST/SPD	81/420	76/419	72/419	68/419	65/418	61/418	58/417	54/417	51/417	48/416	44/416
31000	TIME/FUEL	13/4300	12/4100	11/3900	11/3700	10/3500	10/3300	9/3150	9/2950	8/2800	8/2650	7/2450
	DIST/SPD	76/415	72/415	68/415	64/414	61/414	57/414	54/413	51/413	48/412	45/412	42/411
30000	TIME/FUEL	12/4150	12/3950	11/3750	10/3550	10/3400	9/3200	9/3050	8/2850	8/2700	7/2550	7/2400
	DIST/SPD	71/411	67/410	63/410	60/410	57/409	54/409	51/409	48/408	45/408	42/407	39/407
29000	TIME/FUEL	12/4000	11/3800	10/3600	10/3450	9/3250	9/3100	8/2950	8/2750	7/2600	7/2450	7/2300
	DIST/SPD	66/406	62/406	59/405	56/405	53/405	50/404	47/404	45/404	42/403	39/403	37/402
28000	TIME/FUEL	11/3850	10/3650	10/3500	9/3300	9/3150	8/3000	8/2850	8/2700	7/2500	7/2400	6/2250
	DIST/SPD	61/402	58/401	55/401	52/401	50/401	47/400	44/400	42/399	39/399	37/399	34/398
27000	TIME/FUEL	10/3700	10/3550	9/3350	9/3200	9/3050	8/2900	8/2750	7/2600	7/2450	6/2300	6/2150
	DIST/SPD	57/397	54/397	52/397	49/397	46/396	44/396	41/396	39/395	37/395	34/394	32/394
26000	TIME/FUEL	10/3600	9/3400	9/3250	9/3100	8/2950	8/2800	7/2650	7/2500	7/2350	6/2200	6/2100
	DIST/SPD	53/393	51/393	48/393	46/393	43/392	41/392	39/392	36/391	34/391	32/390	30/390
25000	TIME/FUEL	9/3450	9/3300	9/3150	8/3000	8/2850	7/2700	7/2550	7/2400	6/2250	6/2150	5/2000
	DIST/SPD	50/389	47/389	45/389	43/389	40/388	38/388	36/388	34/387	32/387	30/386	28/386
24000	TIME/FUEL	9/3300	9/3150	8/3000	8/2850	7/2750	7/2600	7/2450	6/2300	6/2200	6/2050	5/1950
	DIST/SPD	46/385	44/385	42/385	40/385	38/384	36/384	34/384	32/383	30/383	28/382	26/382
23000	TIME/FUEL	9/3200	8/3050	8/2900	7/2750	7/2650	7/2500	6/2350	6/2250	6/2100	5/2000	5/1850
	DIST/SPD	43/382	41/381	39/381	37/381	35/381	33/380	31/380	29/379	28/379	26/379	24/378
22000	TIME/FUEL	8/3100	8/2950	7/2800	7/2650	7/2550	6/2400	6/2300	6/2150	5/2050	5/1900	5/1800
	DIST/SPD	40/378	38/378	36/377	34/377	32/377	31/376	29/376	27/376	26/375	24/375	23/374
21000	TIME/FUEL	8/2950	7/2800	7/2700	7/2550	6/2450	6/2300	6/2200	5/2100	5/1950	5/1850	4/1750
	DIST/SPD	37/374	35/374	33/374	32/373	30/373	28/373	27/373	25/372	24/372	22/371	21/371
20000	TIME/FUEL	7/2850	7/2700	7/2600	6/2450	6/2350	6/2200	5/2100	5/2000	5/1900	5/1800	4/1650
	DIST/SPD	34/371	32/370	31/370	29/370	28/370	26/369	25/369	24/369	22/368	21/368	19/367
18000	TIME/FUEL	7/2600	6/2500	6/2350	6/2250	5/2150	5/2050	5/1950	5/1850	4/1750	4/1650	4/1550
	DIST/SPD	29/364	28/364	26/364	25/363	24/363	22/363	21/362	20/362	19/361	18/361	17/360
16000	TIME/FUEL	6/2400	6/2250	5/2150	5/2050	5/1950	5/1850	4/1800	4/1700	4/1600	4/1500	3/1400
	DIST/SPD	24/358	23/357	22/357	21/357	20/357	19/356	18/356	17/356	16/355	15/354	14/354
14000	TIME/FUEL	5/2150	5/2050	5/1950	5/1900	4/1800	4/1700	4/1600	4/1550	3/1450	3/1350	3/1300
	DIST/SPD	20/352	19/351	18/351	17/351	17/351	16/350	15/350	14/349	13/349	12/348	12/348
10000	TIME/FUEL	4/1750	4/1650	4/1600	4/1500	3/1450	3/1350	3/1300	3/1250	3/1150	3/1100	2/1050
	DIST/SPD	13/340	12/340	12/340	11/340	10/339	10/339	9/339	9/339	8/337	8/337	7/336
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-150	-300	-500	-650	-800	-950

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 15°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											25/6500 177/458
39000	TIME/FUEL DIST/SPD										24/6500 169/454	22/5900 148/450
38000	TIME/FUEL DIST/SPD								28/7450 196/456	24/6550 163/450	21/6000 145/447	20/5600 132/445
37000	TIME/FUEL DIST/SPD							26/7350 182/451	23/6600 158/447	21/6150 143/444	20/5700 131/443	18/5350 121/441
36000	TIME/FUEL DIST/SPD					30/8200 204/452	25/7250 172/446	23/6700 154/443	21/6250 140/441	20/5850 130/440	18/5500 121/438	17/5200 113/438
35000	TIME/FUEL DIST/SPD				28/8150 193/447	25/7400 169/443	23/6800 152/440	21/6350 140/438	20/5950 130/437	19/5650 121/436	18/5300 113/435	17/5050 107/434
34000	TIME/FUEL DIST/SPD		33/9450 229/451	28/8250 190/444	25/7500 167/440	23/6950 152/437	21/6500 139/436	20/6100 130/434	19/5750 121/433	18/5450 114/432	17/5150 107/432	16/4900 101/431
33000	TIME/FUEL DIST/SPD	32/9250 214/445	28/8350 186/440	25/7700 167/437	23/7150 152/434	22/6650 140/433	20/6250 130/431	19/5900 122/430	18/5600 114/430	17/5300 108/429	16/5000 102/428	15/4750 96/428
32000	TIME/FUEL DIST/SPD	28/8450 182/436	26/7850 166/433	24/7300 152/431	22/6850 141/429	21/6450 131/428	19/6050 122/427	18/5750 115/427	17/5450 108/426	16/5150 102/425	16/4900 96/425	15/4650 91/424
31000	TIME/FUEL DIST/SPD	25/7900 161/428	24/7400 150/426	22/6950 139/425	21/6550 130/424	20/6150 121/423	18/5850 114/422	17/5550 107/422	16/5250 101/421	16/5000 96/421	15/4700 90/420	14/4500 85/420
30000	TIME/FUEL DIST/SPD	24/7450 146/421	22/7050 136/420	21/6650 128/420	20/6250 119/419	18/5900 112/418	17/5600 105/417	16/5300 99/417	16/5050 94/416	15/4800 89/416	14/4550 84/415	13/4300 80/415
29000	TIME/FUEL DIST/SPD	22/7100 133/416	21/6700 125/415	20/6350 118/414	18/6000 110/414	17/5650 104/413	16/5350 98/412	16/5100 92/412	15/4850 87/411	14/4600 83/411	13/4400 78/411	13/4150 74/410
28000	TIME/FUEL DIST/SPD	21/6750 123/411	20/6400 115/410	18/6100 109/409	17/5750 102/409	16/5450 96/408	16/5150 91/408	15/4900 86/407	14/4650 81/407	13/4450 77/407	13/4200 73/406	12/4000 69/406
27000	TIME/FUEL DIST/SPD	19/6450 113/406	18/6150 106/405	17/5800 100/405	16/5500 94/404	16/5200 89/404	15/4950 84/403	14/4700 80/403	13/4500 76/402	13/4250 72/402	12/4050 68/402	11/3850 64/402
26000	TIME/FUEL DIST/SPD	18/6150 104/401	17/5850 98/401	16/5550 93/400	16/5300 87/400	15/5000 82/399	14/4750 78/399	13/4550 74/398	13/4300 70/398	12/4100 67/398	11/3900 63/398	11/3700 60/397
25000	TIME/FUEL DIST/SPD	17/5900 95/396	16/5600 90/396	16/5350 86/396	15/5050 81/395	14/4800 76/395	13/4600 72/395	13/4350 69/394	12/4150 65/394	11/3950 62/394	11/3750 59/394	10/3600 56/393
24000	TIME/FUEL DIST/SPD	16/5650 88/392	15/5350 83/392	15/5100 79/391	14/4850 75/391	13/4600 71/391	13/4400 67/390	12/4200 64/390	11/4000 61/390	11/3800 58/390	10/3600 55/390	10/3450 52/389
23000	TIME/FUEL DIST/SPD	15/5400 81/388	15/5150 77/388	14/4900 73/387	13/4650 69/387	13/4450 65/387	12/4200 62/387	11/4000 59/386	11/3850 56/386	10/3650 53/386	10/3500 51/386	9/3300 48/385
22000	TIME/FUEL DIST/SPD	14/5150 74/384	14/4900 71/384	13/4700 67/383	12/4450 64/383	12/4250 60/383	11/4050 57/383	11/3850 55/383	10/3700 52/382	10/3500 50/382	9/3350 47/382	9/3200 45/382
21000	TIME/FUEL DIST/SPD	14/4900 68/380	13/4700 65/380	12/4500 62/380	12/4250 59/379	11/4050 56/379	11/3900 53/379	10/3700 51/379	10/3550 48/379	9/3350 46/378	9/3200 44/378	8/3050 41/378
20000	TIME/FUEL DIST/SPD	13/4700 63/376	12/4500 60/376	12/4300 57/376	11/4100 54/376	11/3900 52/376	10/3700 49/375	10/3550 47/375	9/3400 45/375	9/3250 42/375	8/3100 40/375	8/2950 38/375
18000	TIME/FUEL DIST/SPD	11/4300 53/369	11/4100 51/369	10/3900 48/369	10/3750 46/369	9/3550 44/369	9/3400 41/369	9/3250 40/368	8/3100 38/368	8/2950 36/368	7/2850 34/368	7/2700 33/368
16000	TIME/FUEL DIST/SPD	10/3900 44/363	10/3700 42/363	9/3550 40/363	9/3400 38/362	8/3250 36/362	8/3100 35/362	8/2950 33/362	7/2850 32/362	7/2700 30/362	7/2600 29/361	6/2450 27/361
14000	TIME/FUEL DIST/SPD	9/3500 36/357	8/3350 35/356	8/3200 33/356	8/3050 31/356	7/2950 30/356	7/2800 29/356	7/2700 27/356	6/2550 26/356	6/2450 25/356	6/2350 24/355	6/2250 23/355
10000	TIME/FUEL DIST/SPD	7/2800 22/345	6/2650 21/345	6/2550 21/345	6/2450 20/345	6/2350 19/345	5/2250 18/345	5/2150 17/344	5/2050 16/344	5/1950 15/344	4/1850 15/344	4/1800 14/344
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)		2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)		-250	-550	-800	-1100	-1350	-1650

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 15°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD					23/5500 162/461	20/4950 139/458	18/4550 124/456	16/4250 113/454	15/3950 103/453	14/3650 95/452	13/3400 88/451
42000	TIME/FUEL DIST/SPD				22/5600 158/459	20/5100 138/456	18/4700 124/453	16/4400 113/452	15/4100 104/451	14/3800 96/450	13/3550 89/449	12/3350 83/448
41000	TIME/FUEL DIST/SPD		27/6600 192/462	22/5700 155/456	20/5250 136/453	18/4850 124/451	17/4550 114/450	15/4250 105/449	14/3950 97/448	13/3700 90/447	12/3500 84/446	12/3250 78/446
40000	TIME/FUEL DIST/SPD	25/6500 177/458	22/5800 151/453	20/5350 135/451	18/5000 123/449	17/4650 114/448	16/4400 106/447	15/4100 98/446	14/3850 91/445	13/3600 85/444	12/3400 79/444	11/3150 74/443
39000	TIME/FUEL DIST/SPD	22/5900 148/450	20/5500 134/448	18/5100 123/446	17/4800 114/445	16/4500 106/444	15/4250 99/443	14/4000 92/443	13/3750 86/442	12/3550 81/441	11/3300 75/441	11/3100 70/440
38000	TIME/FUEL DIST/SPD	20/5600 132/445	18/5250 122/444	17/4950 113/443	16/4650 106/442	15/4400 99/441	14/4150 93/440	13/3900 87/440	12/3650 81/439	12/3450 76/439	11/3250 71/438	10/3000 66/438
37000	TIME/FUEL DIST/SPD	18/5350 121/441	17/5050 113/440	16/4750 106/439	15/4500 100/439	14/4250 93/438	13/4000 88/437	13/3800 82/437	12/3550 77/436	11/3350 72/436	10/3150 67/435	10/2950 63/435
36000	TIME/FUEL DIST/SPD	17/5200 113/438	16/4900 106/437	15/4600 100/436	15/4350 94/435	14/4150 88/435	13/3900 83/434	12/3700 78/434	11/3500 73/433	11/3250 69/433	10/3050 64/432	9/2900 60/432
35000	TIME/FUEL DIST/SPD	17/5050 107/434	16/4750 100/434	15/4500 94/433	14/4250 89/432	13/4050 84/432	12/3800 79/432	12/3600 74/431	11/3400 70/431	10/3200 65/430	10/3000 61/430	9/2800 57/429
34000	TIME/FUEL DIST/SPD	16/4900 101/431	15/4650 95/430	14/4400 90/430	13/4150 85/430	13/3950 80/429	12/3700 75/429	11/3500 71/428	11/3300 67/428	10/3150 63/427	9/2950 58/427	9/2750 55/426
33000	TIME/FUEL DIST/SPD	15/4750 96/428	14/4500 90/427	14/4300 85/427	13/4050 81/426	12/3850 76/426	12/3650 72/426	11/3450 68/425	10/3250 64/425	10/3050 60/424	9/2850 56/424	8/2700 52/423
32000	TIME/FUEL DIST/SPD	15/4650 91/424	14/4400 86/424	13/4150 81/423	12/3950 77/423	12/3750 73/423	11/3550 69/422	11/3350 65/422	10/3150 61/422	9/3000 57/421	9/2800 53/421	8/2650 50/420
31000	TIME/FUEL DIST/SPD	14/4500 85/420	13/4250 81/419	13/4050 76/419	12/3850 72/419	11/3650 68/418	11/3450 65/418	10/3250 61/418	10/3050 57/417	9/2900 54/417	8/2700 50/417	8/2550 47/416
30000	TIME/FUEL DIST/SPD	13/4300 80/415	13/4100 75/415	12/3900 71/414	11/3700 68/414	11/3500 64/414	10/3300 60/413	10/3150 57/413	9/2950 53/413	9/2800 50/412	8/2650 47/412	8/2450 44/411
29000	TIME/FUEL DIST/SPD	13/4150 74/410	12/3950 70/410	11/3750 67/410	11/3550 63/409	10/3400 60/409	10/3200 56/409	9/3050 53/409	9/2850 50/408	8/2700 47/408	8/2550 44/407	7/2400 41/407
28000	TIME/FUEL DIST/SPD	12/4000 69/406	11/3800 66/406	11/3600 62/405	10/3450 59/405	10/3250 56/405	9/3100 53/404	9/2950 50/404	8/2750 47/404	8/2600 44/403	7/2450 41/403	7/2300 38/403
27000	TIME/FUEL DIST/SPD	11/3850 64/402	11/3700 61/401	10/3500 58/401	10/3300 55/401	9/3150 52/401	9/3000 49/400	8/2850 46/400	8/2650 44/400	7/2500 41/399	7/2350 39/399	7/2250 36/398
26000	TIME/FUEL DIST/SPD	11/3700 60/397	10/3550 57/397	10/3350 54/397	9/3200 51/397	9/3050 49/396	8/2900 46/396	8/2750 43/396	7/2600 41/395	7/2450 38/395	7/2300 36/395	6/2150 34/394
25000	TIME/FUEL DIST/SPD	10/3600 56/393	10/3400 53/393	9/3250 50/393	9/3100 48/393	8/2950 45/392	8/2800 43/392	8/2650 40/392	7/2500 38/391	7/2350 36/391	6/2200 34/391	6/2100 31/390
24000	TIME/FUEL DIST/SPD	10/3450 52/389	9/3300 49/389	9/3100 47/389	8/2950 44/389	8/2800 42/388	8/2700 40/388	7/2550 38/388	7/2400 35/387	6/2250 33/387	6/2150 31/387	6/2000 29/386
23000	TIME/FUEL DIST/SPD	9/3300 48/385	9/3150 46/385	8/3000 44/385	8/2850 41/385	8/2700 39/385	7/2600 37/384	7/2450 35/384	6/2300 33/384	6/2200 31/383	6/2050 29/383	5/1950 27/382
22000	TIME/FUEL DIST/SPD	9/3200 45/382	8/3050 43/382	8/2900 40/381	8/2750 38/381	7/2600 36/381	7/2500 34/381	6/2350 33/380	6/2250 31/380	6/2100 29/380	5/2000 27/379	5/1850 25/379
21000	TIME/FUEL DIST/SPD	8/3050 41/378	8/2900 39/378	8/2800 37/378	7/2650 36/377	7/2500 34/377	7/2400 32/377	6/2250 30/377	6/2150 28/376	6/2000 27/376	5/1900 25/375	5/1800 23/375
20000	TIME/FUEL DIST/SPD	8/2950 38/375	8/2800 36/374	7/2650 35/374	7/2550 33/374	7/2400 31/374	6/2300 30/373	6/2150 28/373	6/2050 26/373	5/1950 25/372	5/1850 23/372	5/1700 22/371
18000	TIME/FUEL DIST/SPD	7/2700 33/368	7/2550 31/368	6/2450 29/367	6/2350 28/367	6/2200 27/367	6/2100 25/367	5/2000 24/366	5/1900 22/366	5/1800 21/366	4/1700 20/365	4/1600 19/364
16000	TIME/FUEL DIST/SPD	6/2450 27/361	6/2350 26/361	6/2250 25/361	5/2150 24/361	5/2050 22/360	5/1950 21/360	5/1850 20/360	4/1750 19/359	4/1650 18/359	4/1550 17/359	4/1450 16/358
14000	TIME/FUEL DIST/SPD	6/2250 23/355	5/2150 21/355	5/2050 20/355	5/1950 19/355	5/1850 18/354	4/1750 17/354	4/1650 16/353	4/1550 15/353	4/1500 14/352	4/1400 13/352	3/1300 13/352
10000	TIME/FUEL DIST/SPD	4/1800 14/344	4/1700 13/344	4/1650 13/343	4/1550 12/343	4/1500 12/343	3/1400 11/343	3/1350 10/342	3/1250 9/342	3/1200 9/341	3/1150 9/341	3/1050 8/340
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-150	-350	-500	-700	-850	-1000

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 20°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD										30/7300 214/463	25/6400 175/457
38000	TIME/FUEL DIST/SPD									28/7250 199/458	24/6500 171/454	22/5950 153/451
37000	TIME/FUEL DIST/SPD							33/8350 235/461	27/7250 190/454	24/6550 167/450	22/6100 151/448	21/5700 139/447
36000	TIME/FUEL DIST/SPD						30/8000 209/454	26/7250 182/450	24/6650 164/447	22/6200 150/445	21/5800 139/444	19/5450 129/443
35000	TIME/FUEL DIST/SPD					29/8100 203/450	26/7350 179/447	24/6800 163/444	22/6350 150/442	21/5950 139/441	20/5600 130/440	18/5300 122/439
34000	TIME/FUEL DIST/SPD			34/9350 240/453	29/8200 201/447	27/7500 178/444	24/6950 162/441	23/6500 150/440	21/6150 140/438	20/5800 131/437	19/5450 122/437	18/5150 115/436
33000	TIME/FUEL DIST/SPD		34/9350 231/448	30/8400 201/444	27/7700 179/440	25/7150 163/438	23/6700 150/437	22/6300 140/436	20/5950 131/435	19/5600 123/434	18/5300 116/433	17/5000 109/433
32000	TIME/FUEL DIST/SPD	33/9350 222/443	30/8550 199/440	27/7950 180/437	25/7350 164/435	23/6850 152/434	22/6450 141/432	21/6100 132/432	19/5750 116/430	18/5450 110/430	17/5150 103/429	16/4850 103/429
31000	TIME/FUEL DIST/SPD	29/8600 192/434	27/8000 177/432	25/7500 163/431	24/7000 151/429	22/6600 140/428	21/6200 131/427	19/5850 123/427	18/5550 116/426	17/5250 109/425	16/4950 103/425	16/4700 97/424
30000	TIME/FUEL DIST/SPD	27/8050 172/427	25/7600 160/426	24/7150 149/425	22/6700 138/424	21/6300 129/423	19/5950 121/422	18/5600 114/421	17/5300 107/421	16/5050 96/420	16/4800 96/420	15/4550 90/420
29000	TIME/FUEL DIST/SPD	25/7650 157/421	24/7200 146/420	22/6800 137/419	21/6400 128/418	20/6000 119/418	18/5700 112/417	17/5400 105/416	16/5100 100/416	16/4850 94/416	15/4600 89/415	14/4350 84/415
28000	TIME/FUEL DIST/SPD	24/7250 144/416	22/6850 134/415	21/6500 126/414	20/6100 118/413	18/5750 110/413	17/5450 104/412	16/5150 98/412	16/4900 93/411	15/4650 88/411	14/4450 83/411	13/4200 78/410
27000	TIME/FUEL DIST/SPD	22/6900 132/411	21/6550 123/410	20/6200 116/409	18/5850 109/409	17/5500 102/408	16/5250 96/408	16/4950 91/407	15/4700 86/407	14/4500 81/406	13/4250 77/406	13/4050 73/406
26000	TIME/FUEL DIST/SPD	21/6600 121/406	20/6250 114/405	18/5900 107/405	17/5600 100/404	16/5300 94/403	16/5000 89/403	15/4750 84/403	14/4550 80/402	13/4300 76/402	13/4100 72/402	12/3900 68/402
25000	TIME/FUEL DIST/SPD	19/6300 111/401	18/5950 104/400	17/5650 99/400	16/5350 93/400	16/5050 87/399	15/4800 83/399	14/4600 78/398	13/4350 74/398	13/4150 70/398	12/3950 67/398	11/3750 63/397
24000	TIME/FUEL DIST/SPD	18/6000 102/396	17/5700 96/396	16/5400 91/396	15/5100 86/395	15/4850 81/395	14/4600 76/395	13/4400 72/394	13/4200 69/394	12/4000 65/394	11/3800 62/394	11/3600 59/393
23000	TIME/FUEL DIST/SPD	17/5700 93/392	16/5450 88/392	15/5150 84/391	15/4900 79/391	14/4650 75/391	13/4450 71/391	12/4200 67/390	12/4000 64/390	11/3800 61/390	11/3650 57/390	10/3450 54/389
22000	TIME/FUEL DIST/SPD	16/5450 86/388	15/5200 81/388	15/4950 77/387	14/4700 73/387	13/4450 69/387	12/4250 65/387	12/4050 62/386	11/3850 59/386	11/3650 56/386	10/3500 53/386	10/3300 50/386
21000	TIME/FUEL DIST/SPD	15/5200 79/384	14/4950 75/384	14/4700 71/384	13/4500 67/383	12/4250 64/383	12/4050 60/383	11/3850 57/383	11/3700 55/383	10/3500 52/382	10/3350 49/382	9/3200 47/382
20000	TIME/FUEL DIST/SPD	14/4950 72/380	14/4750 69/380	13/4500 65/380	12/4300 62/380	12/4100 59/379	11/3900 56/379	11/3700 53/379	10/3550 50/379	10/3350 48/379	9/3200 45/379	9/3050 43/378
18000	TIME/FUEL DIST/SPD	13/4500 61/373	12/4300 58/373	11/4100 55/373	11/3900 52/373	10/3700 50/372	10/3550 47/372	9/3400 45/372	9/3250 43/372	9/3100 41/372	8/2950 39/372	8/2800 37/372
16000	TIME/FUEL DIST/SPD	11/4050 50/366	11/3900 48/366	10/3700 46/366	10/3550 43/366	9/3400 41/366	9/3200 39/366	8/3100 37/366	8/2950 36/365	8/2800 34/365	7/2650 32/365	7/2550 31/365
14000	TIME/FUEL DIST/SPD	10/3650 41/360	9/3500 39/360	9/3350 37/360	8/3200 36/360	8/3050 34/359	8/2900 32/359	7/2800 31/359	7/2650 29/359	7/2550 28/359	6/2400 27/359	6/2300 25/359
10000	TIME/FUEL DIST/SPD	7/2850 25/348	7/2750 24/348	7/2650 23/348	6/2500 22/348	6/2400 21/348	6/2300 20/348	5/2200 19/348	5/2100 18/347	5/2000 17/347	5/1900 17/347	5/1850 16/347
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)		2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)		-300	-550	-850	-1150	-1450	-1750

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 20°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL					28/6200	23/5300	20/4850	18/4450	17/4150	15/3850	14/3600
	DIST/SPD					209/471	164/465	143/462	129/460	118/458	108/457	99/456
42000	TIME/FUEL				27/6250	23/5450	20/5000	18/4650	17/4300	16/4000	15/3750	13/3500
	DIST/SPD				199/468	162/462	143/459	130/458	119/456	110/455	101/454	93/454
41000	TIME/FUEL			26/6250	22/5600	20/5150	19/4800	17/4450	16/4150	15/3900	14/3650	13/3400
	DIST/SPD			187/464	160/460	142/457	130/455	120/454	111/453	102/452	95/452	88/451
40000	TIME/FUEL		25/6300	22/5700	20/5300	19/4950	17/4600	16/4300	15/4050	14/3800	13/3550	12/3300
	DIST/SPD		180/460	157/457	142/455	130/453	120/452	112/451	104/450	96/449	90/449	83/448
39000	TIME/FUEL	25/6400	22/5850	20/5400	19/5050	18/4750	16/4450	15/4200	14/3950	13/3700	13/3450	12/3250
	DIST/SPD	175/457	155/454	141/452	130/451	121/449	112/449	105/448	97/447	91/447	85/446	79/445
38000	TIME/FUEL	22/5950	20/5550	19/5200	18/4900	17/4600	16/4350	15/4100	14/3850	13/3600	12/3350	11/3150
	DIST/SPD	153/451	140/449	130/448	121/447	113/446	105/445	98/445	92/444	86/444	80/443	75/443
37000	TIME/FUEL	21/5700	19/5350	18/5050	17/4750	16/4450	15/4200	14/3950	13/3750	12/3500	12/3300	11/3100
	DIST/SPD	139/447	129/445	121/444	113/444	106/443	99/442	93/442	87/441	81/441	76/440	71/440
36000	TIME/FUEL	19/5450	18/5150	17/4850	16/4600	15/4350	14/4100	13/3850	13/3650	12/3400	11/3200	10/3000
	DIST/SPD	129/443	121/442	113/441	106/440	100/440	94/439	88/439	83/438	77/438	72/437	67/437
35000	TIME/FUEL	18/5300	17/5000	16/4750	15/4450	15/4250	14/4000	13/3750	12/3550	11/3350	11/3150	10/2950
	DIST/SPD	122/439	114/439	107/438	101/437	95/437	89/436	84/436	79/436	74/435	69/435	64/434
34000	TIME/FUEL	18/5150	17/4850	16/4600	15/4350	14/4100	13/3900	12/3700	12/3450	11/3250	10/3050	10/2850
	DIST/SPD	115/436	108/435	102/435	96/434	90/434	85/433	80/433	75/433	70/432	66/432	61/431
33000	TIME/FUEL	17/5000	16/4750	15/4500	14/4250	14/4000	13/3800	12/3600	11/3400	11/3200	10/3000	9/2800
	DIST/SPD	109/433	103/432	97/432	91/431	86/431	81/430	76/430	72/430	67/429	63/429	59/428
32000	TIME/FUEL	16/4850	15/4600	15/4350	14/4150	13/3900	12/3700	12/3500	11/3300	10/3100	10/2900	9/2750
	DIST/SPD	93/429	98/429	92/428	87/428	82/427	77/427	73/427	68/426	64/426	60/425	56/425
31000	TIME/FUEL	16/4700	15/4450	14/4250	13/4000	12/3800	12/3600	11/3400	10/3200	10/3000	9/2850	9/2650
	DIST/SPD	97/424	92/424	87/424	82/423	77/423	73/423	68/422	64/422	60/422	57/421	53/421
30000	TIME/FUEL	15/4550	14/4300	13/4100	13/3850	12/3650	11/3450	11/3300	10/3100	9/2900	9/2750	8/2550
	DIST/SPD	90/420	85/419	81/419	76/418	72/418	68/418	64/417	60/417	56/417	53/416	49/416
29000	TIME/FUEL	14/4350	13/4150	13/3950	12/3750	11/3550	11/3350	10/3150	9/3000	9/2800	8/2650	8/2500
	DIST/SPD	84/415	80/414	75/414	71/414	67/414	63/413	60/413	56/413	53/412	49/412	46/411
28000	TIME/FUEL	13/4200	13/4000	12/3800	11/3600	11/3400	10/3250	10/3050	9/2900	8/2700	8/2550	7/2400
	DIST/SPD	78/410	74/410	70/410	66/409	63/409	59/409	56/409	53/408	49/408	46/407	43/407
27000	TIME/FUEL	13/4050	12/3850	11/3650	11/3450	10/3300	10/3100	9/2950	9/2800	8/2600	8/2450	7/2300
	DIST/SPD	73/406	69/406	65/405	62/405	59/405	55/405	52/404	49/404	46/404	43/403	40/403
26000	TIME/FUEL	12/3900	11/3700	11/3500	10/3350	10/3150	9/3000	9/2850	8/2700	8/2550	7/2400	7/2250
	DIST/SPD	68/402	64/401	61/401	58/401	55/401	52/400	49/400	46/400	43/399	40/399	38/399
25000	TIME/FUEL	11/3750	11/3550	10/3400	10/3200	9/3050	9/2900	8/2750	8/2600	7/2450	7/2300	6/2150
	DIST/SPD	63/397	60/397	57/397	54/397	51/396	48/396	45/396	43/396	40/395	38/395	35/394
24000	TIME/FUEL	11/3600	10/3400	10/3250	9/3100	9/2950	8/2800	8/2650	7/2500	7/2350	7/2200	6/2100
	DIST/SPD	59/393	56/393	53/393	50/393	47/392	45/392	42/392	40/392	37/391	35/391	33/391
23000	TIME/FUEL	10/3450	10/3300	9/3150	9/2950	8/2800	8/2700	7/2550	7/2400	7/2250	6/2150	6/2000
	DIST/SPD	54/389	52/389	49/389	47/389	44/389	42/388	39/388	37/388	35/387	33/387	30/387
22000	TIME/FUEL	10/3300	9/3150	9/3000	8/2850	8/2700	7/2550	7/2450	7/2300	6/2200	6/2050	6/1900
	DIST/SPD	50/386	48/385	46/385	43/385	41/385	39/385	36/384	34/384	32/384	30/383	28/383
21000	TIME/FUEL	9/3200	9/3050	8/2900	8/2750	7/2600	7/2450	7/2350	6/2200	6/2100	6/1950	5/1850
	DIST/SPD	47/382	44/382	42/382	40/381	38/381	36/381	34/381	32/380	30/380	28/380	26/379
20000	TIME/FUEL	9/3050	8/2900	8/2750	7/2650	7/2500	7/2350	6/2250	6/2150	6/2000	5/1900	5/1800
	DIST/SPD	43/378	41/378	39/378	37/378	35/378	33/377	31/377	30/377	28/376	26/376	24/376
18000	TIME/FUEL	8/2800	7/2650	7/2550	7/2400	6/2300	6/2200	6/2050	5/1950	5/1850	5/1750	4/1650
	DIST/SPD	37/372	35/371	33/371	31/371	30/371	28/370	27/370	25/370	24/370	22/369	21/369
16000	TIME/FUEL	7/2550	7/2400	6/2300	6/2200	6/2100	5/2000	5/1900	5/1800	5/1700	4/1600	4/1500
	DIST/SPD	31/365	29/365	28/365	26/364	25/364	24/364	22/364	21/363	20/363	19/363	17/362
14000	TIME/FUEL	6/2300	6/2200	5/2100	5/2000	5/1900	5/1800	4/1700	4/1600	4/1550	4/1450	4/1350
	DIST/SPD	25/359	24/358	23/358	22/358	21/358	19/358	18/357	17/357	16/357	15/356	14/356
10000	TIME/FUEL	5/1850	4/1750	4/1650	4/1600	4/1500	4/1450	3/1350	3/1300	3/1250	3/1150	3/1100
	DIST/SPD	16/347	15/347	14/347	14/346	13/346	12/346	12/346	11/345	10/345	10/344	9/344
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

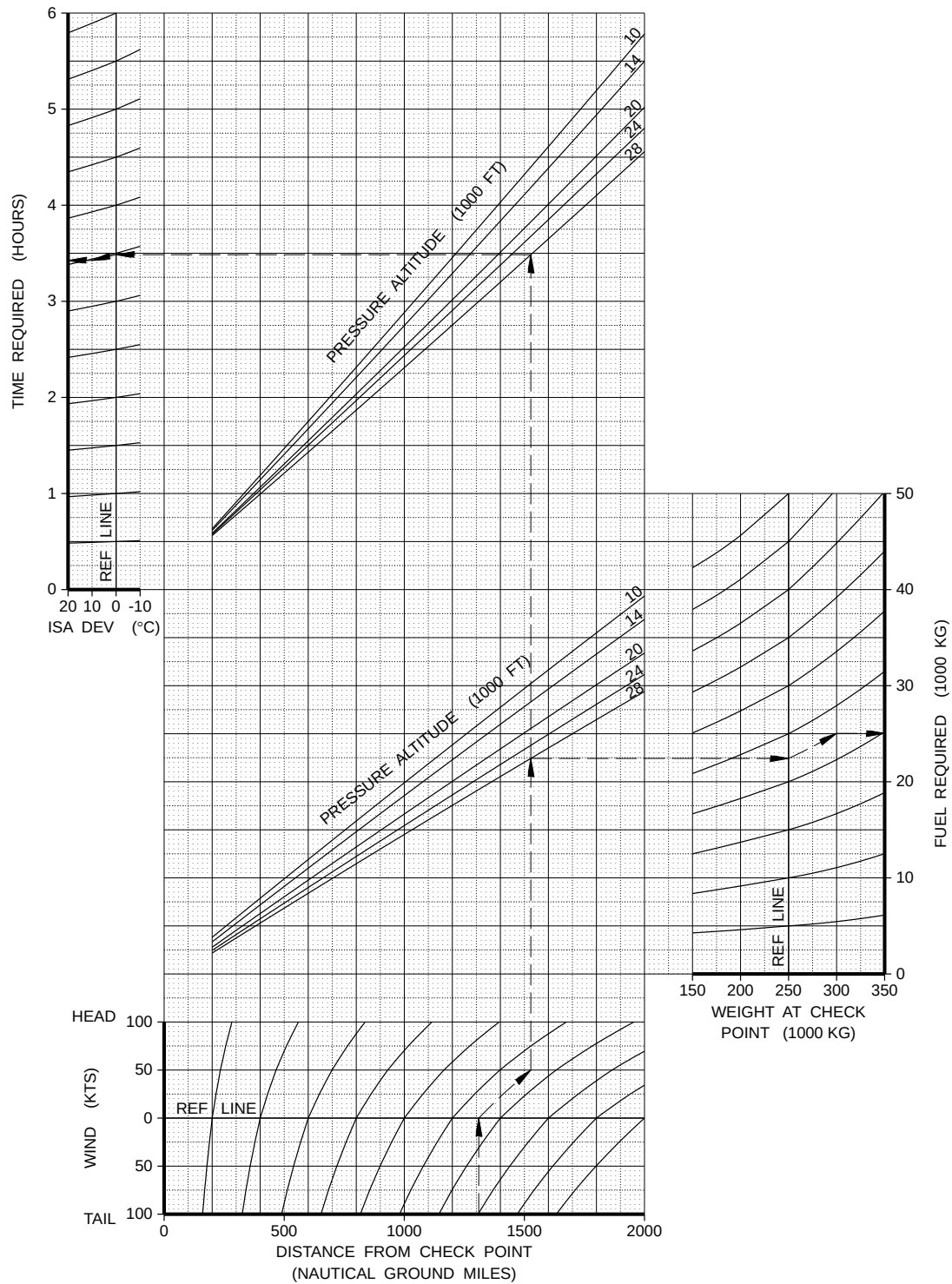
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-200	-350	-550	-700	-900	-1050

Shaded area approximates optimum altitude at LRC/.84.

Long Range Cruise Enroute Fuel and Time

0 to 2000 NM Distance

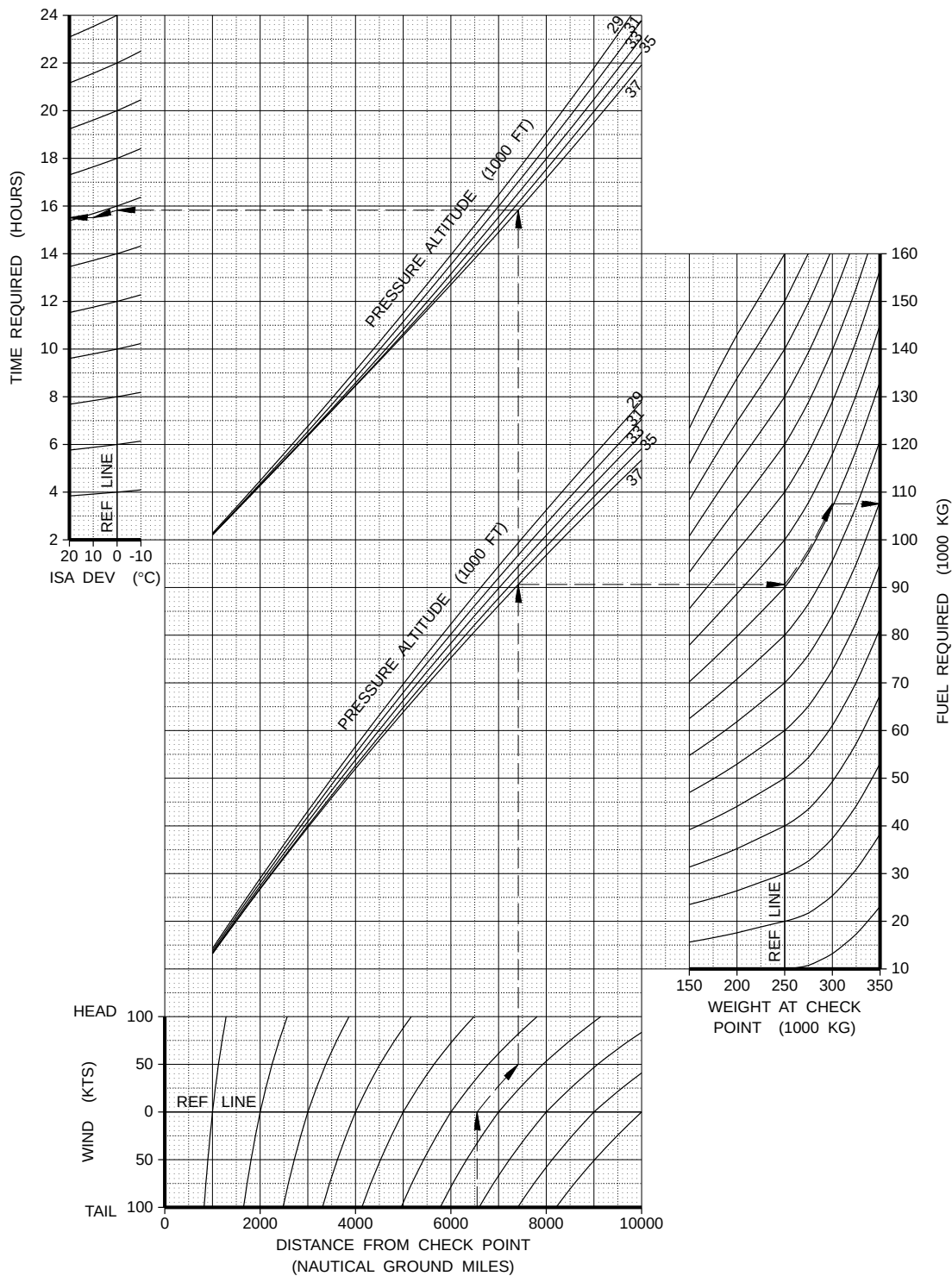
Based on .84/310/250 descent



Long Range Cruise Enroute Fuel and Time

1000 to 10000 NM Distance

Based on .84/310/250 descent



Long Range Cruise Table

43000 FT to 37000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
42	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
41	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
40	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
39	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
38	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
37 (-26)	%N1 MAX TAT KIAS MACH FF/ENG KTAS											86.6 272 .834 3726 478

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5
37	88.3	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.6	95.8	95.2	94.5

With engine anti-ice on, decrease limit %N1 by 0.3.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Long Range Cruise Table

43000 FT to 37000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43 (-26)	%N1									84.8	83.6	82.5
	MAX TAT											
	KIAS									238	239	238
	MACH									.839	.840	.838
	FF/ENG KTAS									2609 481	2482 482	2356 481
42 (-26)	%N1								84.9	83.7	82.6	81.3
	MAX TAT											
	KIAS								244	244	244	242
	MACH								.838	.840	.839	.834
	FF/ENG KTAS								2745 481	2615 482	2490 481	2365 479
41 (-26)	%N1							84.9	83.8	82.7	81.5	80.2
	MAX TAT											
	KIAS							249	250	250	249	246
	MACH							.838	.840	.839	.836	.828
	FF/ENG KTAS							2879 481	2748 482	2624 481	2499 479	2379 475
40 (-26)	%N1					86.1	84.8	83.8	82.7	81.6	80.4	79.3
	MAX TAT											
	KIAS					254	255	256	256	255	252	249
	MACH					.836	.838	.840	.840	.837	.830	.819
	FF/ENG KTAS					3177 479	3007 481	2876 482	2752 482	2627 480	2508 476	2382 470
39 (-27)	%N1				86.0	84.7	83.7	82.7	81.6	80.4	79.4	78.1
	MAX TAT											
	KIAS				260	261	262	262	261	259	255	250
	MACH				.836	.838	.840	.840	.837	.831	.821	.806
	FF/ENG KTAS				3301 479	3132 481	3002 482	2878 482	2754 480	2634 477	2512 471	2372 462
38 (-27)	%N1			85.7	84.5	83.6	82.6	81.6	80.4	79.5	78.3	76.8
	MAX TAT											
	KIAS			267	267	268	268	267	265	262	257	250
	MACH			.836	.839	.840	.840	.837	.832	.823	.809	.790
	FF/ENG KTAS			3422 480	3255 481	3127 482	3004 482	2881 480	2761 477	2640 472	2504 464	2355 453
37 (-27)	%N1	86.6	85.4	84.3	83.4	82.5	81.5	80.4	79.5	78.4	77.0	75.5
	MAX TAT											
	KIAS	272	273	274	274	274	273	271	268	264	258	249
	MACH	.834	.837	.839	.840	.840	.837	.832	.824	.812	.794	.772
	FF/ENG KTAS	3726 478	3540 480	3378 481	3252 482	3130 482	3008 480	2888 477	2769 473	2636 466	2489 455	2335 443

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5
43	87.9	88.9	90.0	91.0	92.0	93.0	94.0	94.9	95.9	96.9	96.3	95.6	94.9	94.4
42	88.0	89.0	90.1	91.1	92.1	93.1	94.1	95.0	96.0	97.0	96.5	95.8	95.0	94.6
41	88.1	89.1	90.1	91.2	92.2	93.2	94.2	95.1	96.1	97.1	96.6	95.9	95.2	94.7
40	88.2	89.2	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	96.7	96.1	95.3	94.8
39	88.3	89.4	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5	94.9
38	88.3	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.8	96.0	95.4	94.7
37	88.3	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.6	95.8	95.2	94.5

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.



Flight Planning and Performance Manual

Long Range Cruise Table
36000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
36 (-26)	%N1									87.5	86.2	85.1
	MAX TAT											
	KIAS									278	279	280
	MACH									.832	.835	.837
	FF/ENG KTAS									4030 477	3838 479	3657 480
35 (-24)	%N1								87.4	86.2	85.1	84.2
	MAX TAT											
	KIAS								284	285	286	287
	MACH								.833	.836	.838	.839
	FF/ENG KTAS								4165 480	3972 482	3795 483	3653 484
34 (-21)	%N1						88.4	87.3	86.1	85.1	84.3	83.5
	MAX TAT											
	KIAS						290	291	292	293	294	294
	MACH						.831	.834	.836	.838	.840	.840
	FF/ENG KTAS						4484 481	4292 483	4103 484	3933 485	3801 486	3677 486
33 (-19)	%N1				89.5	88.3	87.1	86.1	85.1	84.4	83.6	82.8
	MAX TAT				12							
	KIAS				296	297	298	299	300	300	300	300
	MACH				.830	.833	.835	.837	.839	.840	.840	.839
	FF/ENG KTAS				4842 483	4633 484	4417 486	4232 487	4075 488	3948 489	3825 489	3703 488
32 (-17)	%N1		90.4	89.4	88.2	87.1	86.0	85.2	84.4	83.7	82.8	81.9
	MAX TAT		11	15								
	KIAS		302	304	305	305	306	307	307	307	306	305
	MACH		.829	.831	.834	.836	.838	.839	.840	.840	.838	.835
	FF/ENG KTAS		5178 484	4989 486	4777 487	4560 488	4365 489	4222 490	4096 491	3974 491	3853 490	3729 488
31 (-15)	%N1	90.1	89.1	88.1	87.0	86.0	85.2	84.5	83.7	82.9	82.1	81.3
	MAX TAT	14										
	KIAS	310	311	312	313	313	314	314	314	313	311	309
	MACH	.830	.833	.835	.837	.839	.840	.840	.839	.838	.834	.830
	FF/ENG KTAS	5303 487	5113 489	4910 490	4709 491	4523 492	4376 493	4248 493	4126 493	4004 492	3880 490	3758 487
30 (-13)	%N1	88.8	87.8	86.9	86.1	85.3	84.5	83.7	82.9	82.2	81.5	80.8
	MAX TAT											
	KIAS	318	319	320	320	321	321	320	319	318	316	313
	MACH	.834	.836	.838	.839	.840	.840	.839	.837	.833	.828	.821
	FF/ENG KTAS	5226 492	5033 493	4857 494	4697 495	4548 495	4406 495	4282 494	4158 493	4033 491	3912 488	3786 484

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
36	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.4	95.8	95.1	94.4	93.8	93.2
35	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.6	94.8	94.2	93.5
34	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.2	96.4	95.7	94.9	94.2	93.5
33	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	96.6	95.9	95.1	94.4	93.6
32	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	96.9	96.2	95.3	94.6	93.8
31	88.7	89.7	90.7	91.7	92.7	93.7	94.6	95.6	96.6	97.2	96.4	95.5	94.7	94.0
30	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	96.7	95.8	94.9	94.1

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

Flight Planning and Performance Manual

Long Range Cruise Table

36000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
36 (-27)	%N1	85.1	84.1	83.2	82.3	81.3	80.3	79.4	78.4	77.1	75.7	74.2
	MAX TAT											
	KIAS	280	280	281	280	280	278	275	271	265	257	248
	MACH	.837	.839	.840	.840	.837	.832	.825	.814	.797	.776	.753
	FF/ENG	3657	3505	3380	3258	3137	3017	2899	2769	2625	2471	2314
35 (-26)	KTAS	480	481	482	482	480	478	473	467	457	445	432
	%N1	84.2	83.4	82.5	81.5	80.6	79.7	78.8	77.5	76.2	74.8	73.3
	MAX TAT											
	KIAS	287	287	287	286	284	281	277	272	264	256	248
	MACH	.839	.840	.839	.837	.832	.825	.814	.799	.780	.758	.735
34 (-24)	FF/ENG	3653	3528	3406	3285	3165	3046	2918	2776	2622	2464	2308
	KTAS	484	484	484	482	480	476	469	461	450	437	424
	%N1	83.5	82.7	81.7	80.8	80.0	79.1	77.9	76.6	75.3	73.9	72.6
	MAX TAT											
	KIAS	294	293	292	291	288	284	278	271	263	255	248
33 (-23)	MACH	.840	.839	.837	.832	.825	.815	.801	.782	.762	.740	.721
	FF/ENG	3677	3554	3433	3312	3193	3065	2924	2770	2612	2454	2310
	KTAS	486	486	484	482	478	472	464	453	441	428	417
	%N1	82.8	81.8	81.0	80.2	79.3	78.2	77.0	75.7	74.4	73.1	71.9
	MAX TAT											
32 (-21)	KIAS	300	299	297	294	290	285	278	271	263	255	250
	MACH	.839	.836	.831	.824	.815	.801	.784	.764	.744	.725	.710
	FF/ENG	3703	3581	3460	3340	3211	3070	2917	2758	2599	2449	2321
	KTAS	488	486	484	480	474	466	456	445	433	422	413
	%N1	81.9	81.2	80.4	79.5	78.5	77.3	76.1	74.8	73.5	72.4	71.3
31 (-20)	MAX TAT											
	KIAS	305	303	300	297	291	285	277	270	262	256	252
	MACH	.835	.831	.824	.814	.801	.785	.766	.746	.728	.713	.701
	FF/ENG	3729	3608	3487	3356	3215	3062	2903	2743	2589	2455	2341
	KTAS	488	485	481	476	468	458	448	436	425	416	409
30 (-19)	%N1	81.3	80.6	79.7	78.7	77.6	76.4	75.2	74.0	72.8	71.8	70.7
	MAX TAT											
	KIAS	309	307	303	298	291	284	276	269	263	258	253
	MACH	.830	.823	.813	.801	.785	.767	.748	.730	.715	.703	.691
	FF/ENG	3758	3635	3503	3360	3207	3048	2886	2729	2592	2472	2356
30 (-19)	KTAS	487	483	477	470	461	450	439	428	420	413	405
	%N1	80.8	79.8	78.9	77.8	76.7	75.5	74.3	73.2	72.2	71.2	69.9
	MAX TAT											
	KIAS	313	309	304	297	290	283	276	270	265	260	255
	MACH	.821	.812	.800	.784	.768	.750	.732	.718	.705	.694	.680
30 (-19)	FF/ENG	3786	3651	3508	3353	3193	3030	2870	2731	2607	2492	2369
	KTAS	484	478	471	462	452	442	431	423	416	409	401

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
36	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.4	95.8	95.1	94.4	93.8
35	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.6	94.8	94.2
34	88.9	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.2	96.4	95.7	94.9	94.2
33	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	96.6	95.9	95.1	94.4
32	88.1	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	96.9	96.2	95.3	94.6
31	87.7	88.7	89.7	90.7	91.7	92.7	93.7	94.6	95.6	96.6	97.2	96.4	95.5	94.7
30	87.4	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	96.7	95.8	94.9

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.



Flight Planning and Performance Manual

Long Range Cruise Table
29000 FT to 23000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
29 (-10)	%N1	87.6	86.8	86.1	85.4	84.6	83.7	82.9	82.3	81.6	80.9	80.0
	MAX TAT											
	KIAS	326	327	328	328	327	327	326	324	322	319	315
	MACH	.837	.839	.840	.840	.840	.838	.836	.832	.827	.820	.810
	FF/ENG	5162	5003	4875	4731	4585	4445	4316	4191	4069	3941	3803
28 (-9)	KTAS	495	496	497	497	497	496	495	492	489	485	480
	%N1	86.7	86.1	85.5	84.7	83.8	83.0	82.3	81.7	80.9	80.1	79.1
	MAX TAT											
	KIAS	334	335	335	334	334	332	330	328	325	321	315
	MACH	.839	.840	.840	.839	.837	.835	.831	.825	.818	.808	.796
27 (-7)	FF/ENG	5167	5040	4915	4773	4626	4480	4353	4229	4099	3957	3808
	KTAS	499	499	499	499	498	496	494	490	486	480	473
	%N1	86.0	85.4	84.7	83.9	83.1	82.4	81.8	81.0	80.1	79.2	78.3
	MAX TAT											
	KIAS	342	342	341	340	339	337	334	331	326	321	315
26 (-5)	MACH	.840	.840	.839	.836	.833	.829	.823	.815	.806	.794	.780
	FF/ENG	5211	5085	4959	4813	4662	4521	4391	4257	4112	3959	3796
	KTAS	502	501	501	499	497	495	491	487	481	474	466
	%N1	85.2	84.6	83.9	83.3	82.6	81.8	81.0	80.2	79.3	78.4	77.4
	MAX TAT											
25 (-4)	KIAS	348	348	347	345	343	340	337	332	327	321	314
	MACH	.837	.837	.835	.831	.827	.821	.813	.803	.791	.777	.763
	FF/ENG	5229	5121	4995	4851	4705	4556	4414	4265	4108	3943	3775
	KTAS	502	502	501	498	496	492	487	481	474	466	457
	%N1	84.0	83.5	83.0	82.5	81.9	81.0	80.2	79.3	78.4	77.5	76.6
24 (-3)	MAX TAT											
	KIAS	346	346	346	346	346	342	337	332	326	320	313
	MACH	.819	.819	.819	.819	.818	.810	.800	.788	.775	.760	.746
	FF/ENG	5139	5035	4943	4844	4735	4572	4416	4255	4088	3918	3751
	KTAS	493	493	493	493	492	487	481	474	466	458	449
23 (-2)	%N1	83.2	82.6	82.1	81.5	80.9	80.2	79.3	78.5	77.6	76.7	75.7
	MAX TAT											
	KIAS	345	345	345	345	345	343	337	331	325	319	313
	MACH	.801	.801	.801	.801	.801	.796	.784	.771	.758	.744	.731
	FF/ENG	5086	4986	4896	4799	4699	4564	4396	4228	4058	3892	3733
23 (-2)	KTAS	484	484	484	484	484	481	474	466	458	450	442
	%N1	82.2	81.6	81.1	80.6	80.0	79.3	78.5	77.6	76.7	75.9	75.0
	MAX TAT											
	KIAS	344	344	344	344	344	342	336	330	324	318	313
	MACH	.784	.784	.784	.784	.784	.780	.768	.755	.741	.729	.719
23 (-2)	FF/ENG	5037	4940	4851	4756	4658	4537	4366	4197	4032	3875	3735
	KTAS	476	476	476	476	476	474	466	458	450	442	436

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
29	89.7	90.7	91.6	92.6	93.5	94.5	95.4	96.3	96.5	95.5	94.7	94.0	93.2	92.4
28	89.0	90.0	90.9	91.9	92.8	93.7	94.7	95.6	96.3	95.3	94.5	93.8	93.0	92.2
27	88.3	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.7	95.1	94.4	93.6	92.9	92.1
26	87.7	88.6	89.6	90.5	91.4	92.3	93.2	94.1	95.0	95.0	94.2	93.5	92.7	92.0
25	87.6	88.5	89.5	90.4	91.3	92.2	93.1	94.0	94.9	95.0	94.1	93.4	92.6	91.8
24	87.4	88.4	89.3	90.2	91.2	92.1	93.0	93.9	94.7	94.9	94.1	93.2	92.3	91.3
23	87.0	87.9	88.9	89.8	90.7	91.6	92.5	93.4	94.2	95.0	94.2	93.2	92.0	90.8

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

Long Range Cruise Table

29000 FT to 23000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
29 (-17)	%N1	80.0	79.0	78.0	76.9	75.8	74.7	73.6	72.6	71.7	70.5	69.1
	MAX TAT											
	KIAS	315	310	303	297	289	282	277	272	267	262	255
	MACH	.810	.798	.783	.767	.750	.733	.719	.707	.697	.684	.667
	FF/ENG	3803	3657	3501	3339	3175	3013	2872	2746	2631	2509	2375
28 (-16)	KTAS	480	472	464	454	444	434	426	419	412	405	395
	%N1	79.1	78.2	77.1	76.1	75.0	73.9	73.0	72.1	71.0	69.7	68.3
	MAX TAT											
	KIAS	315	309	303	296	289	283	278	274	269	263	255
	MACH	.796	.782	.766	.750	.734	.720	.709	.699	.686	.672	.653
27 (-15)	FF/ENG	3808	3649	3485	3319	3157	3014	2887	2772	2651	2519	2381
	KTAS	473	465	455	446	436	428	421	415	408	399	388
	%N1	78.3	77.3	76.3	75.2	74.2	73.3	72.5	71.4	70.2	68.9	67.4
	MAX TAT											
	KIAS	315	308	302	295	289	284	280	276	270	262	254
26 (-13)	MACH	.780	.765	.749	.733	.721	.709	.700	.689	.675	.658	.639
	FF/ENG	3796	3630	3464	3302	3158	3030	2915	2794	2665	2524	2386
	KTAS	466	457	447	438	430	423	418	411	403	393	381
	%N1	77.4	76.4	75.4	74.5	73.6	72.8	71.8	70.7	69.4	68.0	66.6
	MAX TAT											
25 (-12)	KIAS	314	307	301	295	291	287	282	277	270	262	254
	MACH	.763	.748	.733	.721	.710	.701	.690	.678	.662	.644	.625
	FF/ENG	3775	3608	3446	3303	3174	3059	2938	2812	2671	2529	2388
	KTAS	457	448	439	432	426	420	414	406	397	386	375
	%N1	76.6	75.6	74.7	73.8	73.1	72.1	71.1	69.9	68.6	67.2	65.8
24 (-11)	MAX TAT											
	KIAS	313	307	302	297	293	289	284	277	270	262	254
	MACH	.746	.732	.720	.710	.701	.691	.680	.665	.648	.630	.612
	FF/ENG	3751	3590	3448	3318	3203	3083	2958	2818	2673	2529	2392
	KTAS	449	441	434	427	422	416	409	400	390	379	369
23 (-9)	%N1	75.7	74.9	74.1	73.3	72.4	71.4	70.3	69.0	67.7	66.4	65.0
	MAX TAT											
	KIAS	313	308	303	299	295	290	284	277	269	261	254
	MACH	.731	.720	.710	.702	.692	.681	.668	.652	.635	.617	.600
	FF/ENG	3733	3592	3463	3347	3228	3104	2965	2819	2675	2534	2399
23 (-9)	KTAS	442	435	429	424	418	412	403	394	384	373	363
	%N1	75.0	74.3	73.5	72.6	71.7	70.6	69.4	68.2	66.9	65.6	64.2
	MAX TAT											
	KIAS	313	309	305	301	297	291	284	276	269	261	254
	MACH	.719	.709	.701	.692	.682	.669	.654	.638	.621	.605	.589
23 (-9)	FF/ENG	3735	3607	3492	3373	3250	3112	2967	2822	2678	2541	2406
	KTAS	436	431	426	420	414	406	397	387	377	367	357

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	88.7	89.7	90.7	91.6	92.6	93.5	94.5	95.4	96.3	96.5	95.5	94.7	94.0	93.2
28	88.0	89.0	90.0	90.9	91.9	92.8	93.7	94.7	95.6	96.3	95.3	94.5	93.8	93.0
27	87.3	88.3	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.7	95.1	94.4	93.6	92.9
26	86.7	87.7	88.6	89.6	90.5	91.4	92.3	93.2	94.1	95.0	95.0	94.2	93.5	92.7
25	86.6	87.6	88.5	89.5	90.4	91.3	92.2	93.1	94.0	94.9	95.0	94.1	93.4	92.6
24	86.5	87.4	88.4	89.3	90.2	91.2	92.1	93.0	93.9	94.7	94.9	94.1	93.2	92.3
23	86.0	87.0	87.9	88.9	89.8	90.7	91.6	92.5	93.4	94.2	95.0	94.2	93.2	92.0

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

Long Range Cruise Table
22000 FT to 16000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
22 (-1)	%N1	81.3	80.7	80.2	79.7	79.1	78.5	77.6	76.8	75.9	75.2	74.4
	MAX TAT											
	KIAS	343	343	343	343	343	341	335	329	324	319	315
	MACH	.768	.768	.768	.768	.768	.764	.751	.739	.727	.717	.709
	FF/ENG	4994	4900	4813	4719	4624	4506	4336	4171	4018	3880	3753
21 (0)	KTAS	468	468	468	468	468	466	458	450	443	437	432
	%N1	80.4	79.9	79.4	78.8	78.3	77.6	76.8	76.0	75.3	74.6	73.9
	MAX TAT											
	KIAS	342	342	342	342	342	340	334	329	325	321	318
	MACH	.752	.752	.752	.752	.752	.748	.735	.725	.716	.708	.701
20 (1)	FF/ENG	4960	4869	4785	4693	4598	4480	4312	4164	4027	3902	3789
	KTAS	460	460	460	460	460	457	450	444	438	433	429
	%N1	79.5	79.0	78.5	78.0	77.4	76.8	76.1	75.4	74.7	74.0	73.2
	MAX TAT											
	KIAS	341	341	341	341	341	340	335	331	327	323	319
19 (3)	MACH	.736	.736	.736	.736	.736	.732	.723	.714	.707	.700	.691
	FF/ENG	4940	4851	4767	4674	4579	4463	4314	4179	4055	3941	3819
	KTAS	452	452	452	452	452	450	444	439	434	430	425
	%N1	78.6	78.1	77.7	77.2	76.6	76.1	75.4	74.8	74.1	73.3	72.5
	MAX TAT											
18 (4)	KIAS	340	340	340	340	340	340	336	333	329	325	321
	MACH	.721	.721	.721	.721	.721	.720	.712	.705	.698	.690	.682
	FF/ENG	4931	4842	4757	4663	4566	4475	4338	4215	4100	3976	3851
	KTAS	445	445	445	445	445	444	439	435	431	426	420
	%N1	77.8	77.3	76.9	76.3	75.8	75.3	74.9	74.2	73.4	72.6	71.8
17 (5)	MAX TAT											
	KIAS	340	340	340	340	340	340	339	335	331	327	322
	MACH	.706	.706	.706	.706	.706	.706	.704	.697	.689	.681	.670
	FF/ENG	4922	4833	4748	4653	4556	4468	4382	4264	4139	4011	3870
	KTAS	437	437	437	437	437	437	436	432	427	422	415
16 (6)	%N1	76.9	76.5	76.0	75.5	75.0	74.5	74.0	73.5	72.7	71.9	71.0
	MAX TAT											
	KIAS	339	339	339	339	339	339	339	337	333	327	321
	MACH	.692	.692	.692	.692	.692	.692	.692	.688	.679	.669	.658
	FF/ENG	4909	4821	4737	4642	4547	4459	4394	4303	4172	4029	3880
16 (6)	KTAS	430	430	430	430	430	430	430	428	422	416	409
	%N1	76.1	75.7	75.2	74.7	74.1	73.6	73.2	72.8	72.0	71.1	70.2
	MAX TAT											
	KIAS	338	338	338	338	338	338	338	338	333	327	321
	MACH	.678	.678	.678	.678	.678	.678	.678	.678	.668	.657	.645
16 (6)	FF/ENG	4892	4806	4723	4631	4537	4450	4386	4330	4186	4034	3883
	KTAS	423	423	423	423	423	423	423	423	417	410	402

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
22	88.4	89.4	90.3	91.1	92.0	92.9	93.8	94.6	94.2	93.4	91.9	90.3	88.9	87.6
21	88.1	89.1	90.0	90.8	91.7	92.6	93.5	94.3	94.2	93.1	91.9	90.5	89.0	87.9
20	87.8	88.7	89.6	90.5	91.4	92.3	93.1	94.0	94.2	92.9	91.8	90.7	89.3	88.2
19	87.5	88.4	89.2	90.1	91.0	91.9	92.7	93.6	94.4	93.2	92.0	90.8	89.3	88.1
18	87.1	88.0	88.8	89.7	90.6	91.4	92.3	93.1	94.0	93.4	92.2	90.9	89.4	88.1
17	86.7	87.6	88.4	89.3	90.2	91.0	91.9	92.7	93.5	93.6	92.5	91.1	89.5	88.0
16	86.4	87.3	88.1	89.0	89.9	90.7	91.6	92.4	93.2	93.7	92.6	91.5	90.0	88.4

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

Long Range Cruise Table

22000 FT to 16000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
22 (-8)	%N1	74.4	73.7	72.9	72.0	70.9	69.8	68.6	67.4	66.2	64.8	63.5
	MAX TAT											
	KIAS	315	312	307	303	297	290	283	276	269	261	254
	MACH	.709	.701	.692	.683	.670	.656	.641	.625	.609	.593	.578
	FF/ENG	3753	3639	3519	3396	3259	3115	2971	2825	2685	2547	2412
21 (-6)	KTAS	432	427	422	416	409	400	391	381	371	362	352
	%N1	73.9	73.0	72.2	71.2	70.1	69.0	67.8	66.6	65.4	64.0	62.7
	MAX TAT											
	KIAS	318	313	309	303	297	290	283	276	268	262	255
	MACH	.701	.692	.683	.671	.657	.643	.627	.612	.597	.582	.567
20 (-5)	FF/ENG	3789	3667	3544	3408	3264	3120	2974	2832	2691	2551	2418
	KTAS	429	423	418	411	402	393	384	375	365	356	347
	%N1	73.2	72.4	71.4	70.4	69.3	68.2	67.0	65.9	64.6	63.3	61.9
	MAX TAT											
	KIAS	319	315	310	303	297	289	282	276	269	262	255
19 (-4)	MACH	.691	.682	.671	.658	.644	.629	.615	.600	.586	.572	.558
	FF/ENG	3819	3695	3558	3414	3270	3123	2979	2836	2693	2557	2429
	KTAS	425	419	412	404	396	387	378	369	360	351	343
	%N1	72.5	71.6	70.6	69.6	68.5	67.4	66.3	65.1	63.8	62.5	61.2
	MAX TAT											
18 (-2)	KIAS	321	316	309	303	296	289	282	276	269	262	256
	MACH	.682	.671	.658	.645	.631	.617	.603	.589	.576	.562	.549
	FF/ENG	3851	3713	3567	3422	3273	3127	2982	2839	2700	2568	2444
	KTAS	420	414	406	398	389	381	372	363	355	347	338
	%N1	71.8	70.8	69.8	68.8	67.7	66.7	65.5	64.3	63.0	61.8	60.5
17 (-1)	MAX TAT											
	KIAS	322	316	309	302	296	289	282	276	270	263	257
	MACH	.670	.658	.646	.632	.618	.605	.592	.579	.566	.553	.540
	FF/ENG	3870	3723	3576	3426	3277	3131	2986	2846	2711	2584	2462
	KTAS	415	408	400	391	383	375	367	358	350	342	334
16 (1)	%N1	71.0	70.0	69.0	68.0	67.0	65.9	64.7	63.5	62.3	61.1	59.9
	MAX TAT											
	KIAS	321	315	309	302	296	289	283	276	270	264	257
	MACH	.658	.645	.632	.619	.607	.594	.581	.569	.556	.544	.531
	FF/ENG	3880	3730	3578	3428	3281	3135	2994	2857	2726	2600	2475
16 (1)	KTAS	409	401	393	385	377	369	361	354	346	338	330
	%N1	70.2	69.2	68.2	67.3	66.2	65.1	63.9	62.8	61.6	60.4	59.2
	MAX TAT											
	KIAS	321	315	308	302	296	289	283	277	271	265	258
	MACH	.645	.633	.620	.608	.595	.583	.571	.559	.547	.535	.522
16 (1)	FF/ENG	3883	3729	3577	3429	3284	3141	3003	2869	2740	2615	2486
	KTAS	402	395	387	379	372	364	357	349	342	334	326

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
22	87.5	88.4	89.4	90.3	91.1	92.0	92.9	93.8	94.6	94.2	93.4	91.9	90.3	88.9
21	87.2	88.1	89.1	90.0	90.8	91.7	92.6	93.5	94.3	94.2	93.1	91.9	90.5	89.0
20	86.9	87.8	88.7	89.6	90.5	91.4	92.3	93.1	94.0	94.2	92.9	91.8	90.7	89.3
19	86.6	87.5	88.4	89.2	90.1	91.0	91.9	92.7	93.6	94.4	93.2	92.0	90.8	89.3
18	86.2	87.1	88.0	88.8	89.7	90.6	91.4	92.3	93.1	94.0	93.4	92.2	90.9	89.4
17	85.8	86.7	87.6	88.4	89.3	90.2	91.0	91.9	92.7	93.5	93.6	92.5	91.1	89.5
16	85.5	86.4	87.3	88.1	89.0	89.9	90.7	91.6	92.4	93.2	93.7	92.6	91.5	90.0

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

Long Range Cruise Table
15000 FT to 6000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
15 (8)	%N1	75.3	74.8	74.3	73.8	73.2	72.7	72.3	72.0	71.2	70.3	69.4
	MAX TAT											
	KIAS	337	337	337	337	337	337	337	337	333	327	321
	MACH	.664	.664	.664	.664	.664	.664	.664	.664	.655	.644	.632
	FF/ENG	4872	4788	4707	4617	4525	4439	4375	4319	4185	4032	3877
14 (9)	KTAS	416	416	416	416	416	416	416	416	411	403	396
	%N1	74.4	73.9	73.5	72.9	72.4	71.9	71.5	71.1	70.4	69.5	68.6
	MAX TAT											
	KIAS	337	337	337	337	337	337	337	337	332	326	320
	MACH	.651	.651	.651	.651	.651	.651	.651	.651	.643	.631	.620
13 (10)	FF/ENG	4851	4769	4690	4601	4510	4425	4360	4303	4176	4020	3867
	KTAS	409	409	409	409	409	409	409	409	404	397	390
	%N1	73.6	73.1	72.6	72.1	71.6	71.1	70.7	70.4	69.7	68.8	67.9
	MAX TAT											
	KIAS	336	336	336	336	336	336	336	336	332	326	320
12 (12)	MACH	.638	.638	.638	.638	.638	.638	.638	.638	.630	.619	.608
	FF/ENG	4833	4751	4673	4585	4493	4408	4343	4286	4160	4007	3859
	KTAS	403	403	403	403	403	403	403	403	398	391	384
	%N1	72.7	72.3	71.8	71.3	70.8	70.3	69.9	69.6	68.9	68.1	67.2
	MAX TAT											
10 (14)	KIAS	335	335	335	335	335	335	335	335	331	326	320
	MACH	.626	.626	.626	.626	.626	.626	.626	.626	.618	.608	.597
	FF/ENG	4815	4733	4655	4567	4476	4390	4324	4266	4145	3998	3854
	KTAS	396	396	396	396	396	396	396	396	392	385	379
	%N1	71.2	70.7	70.3	69.8	69.3	68.8	68.4	68.1	67.4	66.6	65.6
8 (17)	MAX TAT											
	KIAS	334	334	334	334	334	334	334	334	331	326	320
	MACH	.602	.602	.602	.602	.602	.602	.602	.602	.596	.587	.577
	FF/ENG	4780	4698	4620	4532	4440	4354	4286	4227	4125	3987	3852
	KTAS	384	384	384	384	384	384	384	384	381	375	368
6 (20)	%N1	69.6	69.2	68.8	68.2	67.7	67.2	66.8	66.4	65.9	65.1	64.2
	MAX TAT											
	KIAS	333	333	333	333	333	333	333	333	332	327	322
	MACH	.579	.579	.579	.579	.579	.579	.579	.579	.577	.568	.559
	FF/ENG	4745	4663	4585	4496	4404	4317	4249	4189	4113	3982	3853
	KTAS	372	372	372	372	372	372	372	372	371	365	359
	%N1	68.1	67.6	67.2	66.7	66.1	65.6	65.1	64.7	64.4	63.7	62.9
	MAX TAT											
	KIAS	332	332	332	332	332	332	332	332	332	328	323
	MACH	.557	.557	.557	.557	.557	.557	.557	.557	.557	.551	.543
	FF/ENG	4703	4623	4544	4456	4364	4277	4209	4148	4094	3984	3865
	KTAS	361	361	361	361	361	361	361	361	361	357	351

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
15	87.8	88.7	89.5	90.4	91.2	92.0	92.8	93.6	92.7	91.9	90.5	88.8	86.8	84.3
14	87.5	88.3	89.2	90.0	90.8	91.7	92.5	93.3	92.8	92.0	90.8	89.3	87.7	85.6
13	87.1	87.9	88.8	89.6	90.4	91.3	92.1	92.9	92.9	92.0	91.0	89.8	88.4	86.6
12	86.6	87.5	88.3	89.2	90.0	90.8	91.6	92.4	93.0	92.1	91.2	90.1	89.0	87.4
10	85.7	86.5	87.3	88.2	89.0	89.8	90.6	91.4	92.1	92.3	91.4	90.4	89.3	88.0
8	84.7	85.6	86.4	87.2	88.0	88.8	89.6	90.3	91.1	91.8	91.1	90.2	89.1	87.8
6	84.1	84.9	85.7	86.5	87.3	88.1	88.9	89.6	90.4	91.1	91.3	90.3	89.2	88.1

With engine anti-ice on, decrease limit %N1 by 0.5.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.

Long Range Cruise Table

15000 FT to 6000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
15 (2)	%N1	69.4	68.5	67.5	66.5	65.4	64.3	63.2	62.0	60.9	59.7	58.5
	MAX TAT											
	KIAS	321	314	308	302	296	290	284	278	272	265	258
	MACH	.632	.620	.608	.597	.585	.573	.562	.550	.539	.526	.513
	FF/ENG	3877	3724	3576	3430	3287	3148	3013	2882	2756	2626	2499
14 (4)	KTAS	396	388	381	374	366	359	352	345	338	330	321
	%N1	68.6	67.7	66.7	65.7	64.6	63.6	62.5	61.4	60.3	59.1	57.9
	MAX TAT											
	KIAS	320	314	308	302	296	290	284	279	272	266	259
	MACH	.620	.609	.597	.586	.575	.564	.553	.542	.530	.517	.504
13 (5)	FF/ENG	3867	3719	3573	3431	3292	3156	3024	2897	2768	2640	2515
	KTAS	390	383	376	369	362	355	348	341	333	325	317
	%N1	67.9	67.0	66.0	64.9	63.9	62.8	61.8	60.7	59.6	58.5	57.3
	MAX TAT											
	KIAS	320	314	308	302	297	291	285	279	273	266	259
12 (7)	MACH	.608	.597	.587	.576	.565	.555	.544	.533	.521	.509	.496
	FF/ENG	3859	3715	3573	3435	3299	3167	3040	2913	2784	2657	2534
	KTAS	384	377	370	364	357	350	344	337	329	321	313
	%N1	67.2	66.2	65.2	64.2	63.2	62.2	61.2	60.1	59.0	57.9	56.7
	MAX TAT											
10 (10)	KIAS	320	314	309	303	297	292	286	280	273	267	260
	MACH	.597	.587	.577	.567	.556	.546	.536	.524	.512	.500	.488
	FF/ENG	3854	3714	3576	3441	3310	3183	3058	2929	2801	2677	2555
	KTAS	379	372	365	359	353	346	340	332	325	317	309
	%N1	65.6	64.7	63.8	62.9	62.0	61.0	60.0	59.0	57.9	56.7	55.5
8 (13)	MAX TAT											
	KIAS	320	315	310	304	299	293	287	281	274	268	261
	MACH	.577	.568	.558	.549	.540	.529	.518	.507	.496	.484	.472
	FF/ENG	3852	3719	3590	3464	3341	3214	3087	2962	2839	2718	2598
	KTAS	368	362	356	350	344	338	331	324	316	309	301
6 (17)	%N1	64.2	63.4	62.5	61.6	60.7	59.8	58.8	57.7	56.6	55.5	54.3
	MAX TAT											
	KIAS	322	317	312	306	300	294	288	282	276	269	262
	MACH	.559	.550	.542	.532	.522	.512	.502	.491	.480	.469	.457
	FF/ENG	3853	3729	3607	3484	3359	3236	3114	2996	2879	2764	2651
	KTAS	359	354	348	342	336	329	323	316	309	301	294
	%N1	62.9	62.1	61.2	60.4	59.5	58.5	57.5	56.5	55.4	54.3	53.2
	MAX TAT											
	KIAS	323	318	313	307	301	295	289	283	277	270	264
	MACH	.543	.534	.525	.516	.506	.496	.486	.476	.465	.454	.444
	FF/ENG	3865	3746	3624	3504	3386	3270	3158	3049	2939	2829	2716
	KTAS	351	346	340	334	328	321	315	308	301	294	287

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
15	86.9	87.8	88.7	89.5	90.4	91.2	92.0	92.8	93.6	92.7	91.9	90.5	88.8	86.8
14	86.6	87.5	88.3	89.2	90.0	90.8	91.7	92.5	93.3	92.8	92.0	90.8	89.3	87.7
13	86.2	87.1	87.9	88.8	89.6	90.4	91.3	92.1	92.9	92.9	92.0	91.0	89.8	88.4
12	85.8	86.6	87.5	88.3	89.2	90.0	90.8	91.6	92.4	93.0	92.1	91.2	90.1	89.0
10	84.8	85.7	86.5	87.3	88.2	89.0	89.8	90.6	91.4	92.1	92.3	91.4	90.4	89.3
8	83.9	84.7	85.6	86.4	87.2	88.0	88.8	89.6	90.3	91.1	91.8	91.1	90.2	89.1
6	83.3	84.1	84.9	85.7	86.5	87.3	88.1	88.9	89.6	90.4	91.1	91.3	90.3	89.2

With engine anti-ice on, decrease limit %N1 by 0.6.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.



Flight Planning and Performance Manual

.84M Cruise Table
43000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
43													
42													
41													
40													
39													
38													
37	274 -26 482	%N1 MAX TAT FF/ENG										87.1 3805	
36	281 -26 482	%N1 MAX TAT FF/ENG								88.1 4150	86.6 3911	85.2 3693	
35	287 -23 484	%N1 MAX TAT FF/ENG							87.9 4268	86.5 4038	85.2 3824	84.2 3660	
34	294 -21 486	%N1 MAX TAT FF/ENG					89.1 12 4632	87.7 4383	86.4 4158	85.2 3956	84.3 3804	83.5 3675	
33	300 -19 489	%N1 MAX TAT FF/ENG			90.5 9 5043	88.9 4756	87.5 4499	86.2 4275	85.2 4091	84.4 3947	83.6 3825	82.8 3715	
32	307 -17 491	%N1 MAX TAT FF/ENG		91.5 7 5430	90.1 12 5154	88.7 4881	87.4 4627	86.1 4397	85.2 4231	84.4 4095	83.7 3976	82.9 3870	82.2 3769
31	314 -14 493	%N1 MAX TAT FF/ENG	91.0 11 5509	89.7 17 5244	88.4 5000	87.2 4759	86.1 4545	85.2 4378	84.5 4246	83.8 4132	83.0 4028	82.3 3926	81.7 3836
30	321 -12 495	%N1 MAX TAT FF/ENG	89.2 20 5335	88.1 5104	87.1 4893	86.1 4709	85.3 4546	84.5 4406	83.8 4293	83.1 4191	82.4 4088	81.9 4003	81.5 3933

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
37	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5	94.9	94.5	94.0
36	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.9	96.2	95.5	94.9	94.5	94.0
35	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.7	96.8	96.2	95.5	95.0	94.6
34	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.9	97.1	96.5	95.7	95.2	94.7
33	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	97.4	96.8	96.0	95.4	94.9
32	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	97.8	97.0	96.3	95.6	95.1
31	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	97.3	96.6	95.9	95.3
30	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	97.7	96.9	96.2	95.5

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.6.

.84M Cruise Table**43000 FT to 30000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
43	239	%N1									84.9	83.6	82.5
	-26	MAX TAT									2620	2480	2366
	482	FF/ENG											
42	244	%N1								85.0	83.7	82.7	81.5
	-26	MAX TAT								2759	2614	2497	2394
	482	FF/ENG											
41	250	%N1							85.0	83.8	82.7	81.7	80.7
	-26	MAX TAT							2896	2747	2628	2523	2437
	482	FF/ENG											
40	256	%N1					86.5	84.9	83.8	82.8	81.8	80.7	80.1
	-26	MAX TAT					3228	3025	2875	2755	2650	2558	2492
	482	FF/ENG											
39	262	%N1				86.3	84.8	83.7	82.7	81.8	80.8	80.1	79.6
	-26	MAX TAT				3351	3150	3001	2881	2775	2681	2612	2555
	482	FF/ENG											
38	268	%N1			86.0	84.6	83.6	82.6	81.7	80.7	80.1	79.6	79.1
	-26	MAX TAT			3469	3272	3126	3007	2901	2806	2734	2676	2623
	482	FF/ENG											
37	274	%N1	87.1	85.6	84.4	83.4	82.5	81.6	80.7	80.0	79.5	79.1	78.6
	-26	MAX TAT											
	482	FF/ENG	3805	3582	3393	3251	3133	3029	2932	2859	2799	2746	2696
36	281	%N1	85.2	84.1	83.2	82.4	81.5	80.6	80.0	79.5	79.1	78.6	78.1
	-26	MAX TAT											
	482	FF/ENG	3693	3516	3378	3262	3159	3063	2988	2928	2874	2823	2777
35	287	%N1	84.2	83.3	82.6	81.7	80.9	80.3	79.8	79.4	78.9	78.5	78.0
	-23	MAX TAT											
	484	FF/ENG	3660	3527	3412	3310	3213	3138	3077	3023	2971	2924	2881
34	294	%N1	83.5	82.7	81.9	81.1	80.5	80.1	79.7	79.2	78.8	78.4	78.0
	-21	MAX TAT											
	486	FF/ENG	3675	3563	3461	3365	3291	3229	3174	3122	3073	3029	2990
33	300	%N1	82.8	82.0	81.3	80.8	80.4	80.0	79.5	79.1	78.7	78.4	78.0
	-19	MAX TAT											
	489	FF/ENG	3715	3614	3519	3445	3383	3328	3275	3225	3180	3139	3103
32	307	%N1	82.2	81.5	81.0	80.6	80.2	79.8	79.4	79.0	78.7	78.4	78.1
	-17	MAX TAT											
	491	FF/ENG	3769	3675	3603	3541	3485	3431	3381	3335	3293	3255	3222
31	314	%N1	81.7	81.3	80.9	80.5	80.0	79.7	79.3	79.0	78.7	78.4	78.1
	-14	MAX TAT											
	493	FF/ENG	3836	3765	3703	3647	3593	3542	3495	3452	3413	3378	3347
30	321	%N1	81.5	81.1	80.7	80.3	79.9	79.6	79.3	79.0	78.7	78.5	78.2
	-12	MAX TAT											
	495	FF/ENG	3933	3872	3815	3760	3709	3662	3618	3579	3543	3510	3482

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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.

.84M Cruise Table

43000 FT to 30000 FT - Low Weights

Max Cruise %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
43	88.9	90.0	91.0	92.0	93.0	94.0	94.9	95.9	96.9	96.3	95.6	94.9	94.4	94.0
42	89.0	90.1	91.1	92.1	93.1	94.1	95.0	96.0	97.0	96.5	95.8	95.0	94.6	94.1
41	89.1	90.1	91.2	92.2	93.2	94.2	95.1	96.1	97.1	96.7	95.9	95.2	94.7	94.3
40	89.2	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	96.8	96.1	95.4	94.8	94.4
39	89.4	90.4	91.4	92.4	93.5	94.4	95.4	96.4	97.4	97.0	96.3	95.5	95.0	94.5
38	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.0	96.2	95.5	94.9	94.5
37	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5	94.9	94.5
36	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.9	96.2	95.5	94.9	94.5
35	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.7	96.8	96.2	95.5	95.0
34	88.9	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.9	97.1	96.5	95.7	95.2
33	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	97.4	96.8	96.0	95.4
32	88.1	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	97.8	97.0	96.3	95.6
31	87.7	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	97.3	96.6	95.9
30	87.4	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	97.7	96.9	96.2

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Wind-Altitude Trade

LRC

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43							120	55	17	1	3
41						105	50	17	2	1	12
39					87	43	15	2	1	10	25
37			119	68	33	11	1	1	9	22	40
35		89	50	24	8	1	1	9	21	36	54
33	64	35	15	4	0	2	9	21	35	50	67
31	22	9	2	0	4	11	21	34	49	64	79
29	4	0	1	5	13	23	35	48	62	76	89
27	0	3	8	16	25	36	48	61	74	86	97
25	5	11	19	28	38	50	61	73	84	94	104

.84M

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43							180	88	30	3	3
41						160	81	30	4	1	17
39					134	69	26	4	0	13	38
37				107	55	21	3	0	11	33	65
35		137	81	40	14	2	1	11	31	58	93
33		57	27	8	0	2	12	30	55	86	122
31	38	16	4	0	4	15	32	55	82	114	149
29	8	1	0	6	18	35	56	81	110	141	175
27	0	2	10	22	38	58	82	108	137	167	200
25	6	15	27	43	62	84	108	135	163	192	

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, 240000 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 240000 kg are 9 (33000 ft) and 1 (37000 ft). Difference is -8 so break-even wind is -20 plus -8, i.e. -28 knots (headwind).

B) Similarly, wind factors are 9 (33000 ft) and 35 (29000 ft). Difference is +26 so break-even wind is -20 plus +26, i.e. +6 knots (tailwind).

Descent**.84/280/250**

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			150	190	230
43000	29	890	131	150	160
41000	29	880	125	144	154
39000	28	870	120	138	149
37000	27	860	115	133	143
35000	26	840	110	126	136
33000	25	830	104	119	128
31000	24	810	98	112	121
29000	23	790	92	105	113
27000	22	770	86	98	105
25000	21	750	80	91	97
23000	20	720	74	84	89
21000	19	700	68	77	82
19000	18	670	62	70	74
17000	16	640	56	63	67
15000	15	600	50	56	59
10000	11	480	32	36	37
5000	7	350	16	17	17
1500	4	250	4	4	4

.84/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			150	190	230
43000	32	950	148	163	168
41000	32	940	142	157	162
39000	31	930	135	149	154
37000	29	910	127	140	146
35000	28	890	120	132	137
33000	27	870	113	124	129
31000	26	850	106	117	121
29000	25	830	99	109	113
27000	23	810	92	101	105
25000	22	780	85	93	97
23000	21	750	77	85	89
21000	19	710	71	78	81
19000	18	680	64	70	73
17000	16	640	57	62	65
15000	15	600	50	55	57
10000	11	480	32	36	37
5000	7	350	16	17	17
1500	4	250	4	4	4

Descent .84/310/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			150	190	230
43000	27	830	119	138	150
41000	26	820	113	132	145
39000	26	810	108	126	139
37000	25	800	103	121	133
35000	24	790	99	116	128
33000	24	780	95	111	123
31000	23	770	91	106	117
29000	22	760	86	100	110
27000	21	740	81	94	103
25000	20	720	76	88	96
23000	19	700	71	82	89
21000	18	680	66	75	82
19000	17	660	61	69	75
17000	16	630	56	63	68
15000	15	600	51	57	61
10000	11	480	32	36	37
5000	7	350	16	17	17
1500	4	250	4	4	4

Allowances for a straight-in approach are included.

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
43000	%N1								92.1	87.4	84.1	81.1
	KIAS								231	231	226	217
	FF/ENG								3530	3010	2610	2280
40000	%N1						93.7	88.6	85.6	82.8	79.9	77.1
	KIAS						247	247	247	237	223	217
	FF/ENG						4260	3640	3220	2830	2500	2230
35000	%N1			91.3	88.0	85.6	83.5	81.2	78.9	76.3	73.4	71.0
	KIAS			278	278	278	269	258	246	233	220	217
	FF/ENG			4980	4430	4030	3630	3290	2980	2670	2370	2160
30000	%N1	88.2	86.4	84.4	82.3	80.5	78.5	76.2	73.9	71.3	68.7	66.5
	KIAS	310	307	297	287	276	265	254	242	226	217	217
	FF/ENG	5300	4890	4480	4130	3810	3500	3190	2890	2570	2320	2170
25000	%N1	83.1	81.6	79.6	77.6	75.7	73.7	71.1	68.7	66.3	64.3	62.3
	KIAS	312	302	293	283	272	262	228	217	217	217	217
	FF/ENG	5020	4680	4320	3990	3690	3400	3010	2740	2520	2380	2220
20000	%N1	78.3	76.7	74.9	72.6	70.7	68.6	66.5	64.3	62.2	60.1	58.2
	KIAS	308	299	289	259	238	229	223	217	217	217	217
	FF/ENG	4840	4540	4210	3800	3500	3240	2990	2740	2530	2360	2250
15000	%N1	73.3	71.7	69.8	67.9	66.1	64.3	62.3	60.1	58.0	56.2	54.5
	KIAS	269	260	253	244	238	229	223	217	217	217	217
	FF/ENG	4590	4310	4020	3740	3480	3230	2990	2760	2570	2400	2300
10000	%N1	69.0	67.5	65.7	63.9	62.1	60.1	58.2	56.2	54.4	52.7	51.0
	KIAS	265	260	253	244	238	229	223	217	217	217	217
	FF/ENG	4570	4310	4030	3760	3510	3270	3030	2800	2610	2450	2370
5000	%N1	64.9	63.4	61.5	59.7	58.0	56.3	54.5	52.7	50.9	49.1	47.4
	KIAS	264	260	253	244	238	229	223	217	217	217	217
	FF/ENG	4620	4360	4080	3810	3570	3330	3110	2890	2710	2550	2470
1500	%N1	62.0	60.5	58.8	57.2	55.6	53.9	52.2	50.4	48.4	46.6	45.1
	KIAS	264	260	253	244	238	229	223	217	217	217	217
	FF/ENG	4660	4410	4130	3860	3630	3390	3180	2970	2790	2630	2560

Flaps 1

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
20000	%N1	81.7	79.9	78.0	76.1	74.0	71.8	69.4	66.7	64.0	61.6	59.2
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	5270	4920	4580	4260	3930	3620	3310	3010	2720	2480	2330
15000	%N1	76.7	74.9	73.1	71.3	69.1	66.9	64.6	62.3	59.8	57.4	55.2
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	5150	4810	4490	4190	3880	3600	3300	3010	2730	2510	2380
10000	%N1	72.3	70.3	68.5	66.6	64.7	62.8	60.6	58.2	55.9	53.8	51.8
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	5110	4790	4480	4190	3890	3600	3310	3030	2770	2550	2430
5000	%N1	67.6	66.0	64.4	62.6	60.6	58.6	56.6	54.5	52.3	50.3	48.4
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	5130	4810	4510	4220	3930	3650	3370	3100	2860	2650	2540
1500	%N1	64.8	63.2	61.5	59.7	57.9	56.1	54.2	52.1	50.1	47.9	45.9
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	5150	4840	4540	4250	3970	3700	3430	3170	2940	2740	2630

These tables include 5% additional fuel for holding in a racetrack pattern.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	15600	14200	12700
350	16000	14700	13200
340	16900	15200	13700
330	17800	16300	14600
320	18800	17300	15600
310	19800	18300	16600
300	20500	19300	17700
290	21100	20200	18700
280	21800	20800	19800
270	22700	21500	20600
260	23600	22300	21200
250	24600	23400	21900
240	25800	24600	23100
230	27100	25900	24300
220	28500	27300	25600
210	29900	28600	27100
200	30900	30000	28500
190	31900	31200	30100
180	32900	32500	31400
170	34000	33700	32800
160	35200	35100	34300

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	7800	5400	2700
350	8700	6200	3500
340	9600	6900	4300
330	10700	7700	5200
320	11700	8800	6200
310	13600	10300	7100
300	15100	11900	8600
290	16600	13600	10500
280	18100	15100	12200
270	19600	16800	13900
260	21000	18400	15500
250	22300	20100	17200
240	23700	21600	19100
230	25000	23200	20900
220	26600	24700	22500
210	28200	26400	24300
200	29800	28100	26200
190	30800	29900	28100
180	31800	31100	30000
170	32900	32400	31400
160	34000	33700	32900

With engine anti-ice on, decrease altitude capability by 200 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Altitude Capability**Max Continuous Thrust, 100 ft/min residual rate of climb**

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	17000	16200	15100
350	17700	17000	15900
340	18500	17800	16700
330	19500	18800	17600
320	20400	19700	18600
310	21100	20400	19500
300	21800	21100	20200
290	22600	21700	20900
280	23500	22500	21500
270	24400	23500	22200
260	25300	24300	23000
250	26300	25200	23900
240	27200	26200	24700
230	28300	27200	25700
220	29300	28100	26700
210	30300	29100	27700
200	30900	29900	28500
190	31600	30700	29400
180	32200	31400	30300
170	32900	32200	31000
160	33600	32900	31700

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	11900	9200	6300
350	13200	10700	7600
340	14700	12000	9400
330	16000	13500	11000
320	17300	14900	12500
310	18400	16300	13900
300	19400	17600	15200
290	20400	18800	16400
280	21400	19900	17600
270	22500	21100	18800
260	23500	22100	20000
250	24500	23100	21200
240	25400	24100	22300
230	26400	25000	23400
220	27500	26100	24500
210	28600	27200	25600
200	29600	28200	26600
190	30400	29200	27700
180	31100	30100	28700
170	31700	30800	29700
160	32300	31500	30500

With engine anti-ice on, decrease altitude capability by 400 ft.

With engine and wing anti-ice on, decrease altitude capability by 600 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	17400	16300	15100
350	18100	17100	15900
340	18900	17800	16600
330	19700	18600	17400
320	20500	19600	18400
310	21100	20300	19200
300	21700	20900	19900
290	22300	21400	20500
280	23000	21900	21000
270	23700	22600	21500
260	24400	23400	22100
250	25200	24100	22800
240	26100	24900	23500
230	26900	25700	24300
220	27800	26400	25000
210	28700	27300	25900
200	29500	28000	26600
190	30200	28800	27300
180	30800	29500	28000
170	31300	30100	28600
160	31800	30600	29200

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	11900	9000	6200
350	13200	10400	7300
340	14400	11700	8700
330	15700	13100	10500
320	17000	14500	11900
310	18000	15700	13200
300	19000	16800	14400
290	19900	17800	15400
280	20700	18700	16400
270	21500	19700	17300
260	22400	20700	18400
250	23300	21700	19600
240	24100	22500	20600
230	24900	23400	21500
220	25800	24200	22400
210	26800	25100	23300
200	27700	26000	24200
190	28500	26700	24900
180	29300	27500	25700
170	30000	28300	26400
160	30500	29000	27100

With engine anti-ice on, decrease altitude capability by 300 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	17400	16100	14900
350	18000	16700	15500
340	18600	17400	16100
330	19300	18100	16800
320	20100	18800	17500
310	20600	19600	18300
300	21100	20200	19000
290	21500	20700	19700
280	22000	21100	20200
270	22600	21500	20700
260	23200	21900	21100
250	23800	22600	21500
240	24400	23200	21900
230	25100	23900	22500
220	25800	24400	23100
210	26500	25100	23700
200	27200	25700	24200
190	27800	26200	24700
180	28400	26700	25200
170	28900	27200	25600
160	29300	27600	26000

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	11300	8000	5300
350	12400	9400	6400
340	13400	10600	7400
330	14500	11800	8800
320	15600	13000	10400
310	16700	14100	11500
300	17500	15000	12500
290	18400	15900	13500
280	19200	16900	14400
270	20000	17800	15200
260	20800	18600	16100
250	21500	19500	17000
240	22300	20400	18000
230	23000	21100	18900
220	23600	21800	19800
210	24300	22500	20500
200	24900	23000	21100
190	25500	23600	21700
180	26200	24200	22200
170	26700	24700	22700
160	27200	25200	23100

With engine anti-ice on, decrease altitude capability by 300 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16600	15300	13800
350	17100	15800	14400
340	17700	16400	15000
330	18400	17100	15700
320	19100	17700	16300
310	19800	18400	16900
300	20200	18900	17500
290	20600	19500	18100
280	21000	20100	18800
270	21400	20400	19400
260	21700	20800	19900
250	22100	21100	20300
240	22600	21500	20600
230	23100	21800	20900
220	23500	22100	21100
210	24000	22500	21400
200	24400	23000	21700
190	24800	23300	21900
180	25200	23600	22100
170	25500	23900	22400
160	25900	24200	22700

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	9500	6600	3800
350	10500	7400	4700
340	11400	8400	5600
330	12500	9700	6700
320	13600	10800	7800
310	14600	11800	9100
300	15500	12700	10100
290	16200	13600	11000
280	17000	14500	11800
270	17700	15200	12600
260	18400	15900	13500
250	19100	16600	14200
240	19800	17200	14800
230	20300	17900	15400
220	20800	18400	15900
210	21300	19000	16400
200	21800	19500	16900
190	22200	20000	17400
180	22500	20400	17800
170	22900	20700	18300
160	23200	21000	18700

With engine anti-ice on, decrease altitude capability by 400 ft.

With engine and wing anti-ice on, decrease altitude capability by 1000 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 30000 FT to 25000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
30 (-23)	%N1					100.0	97.4	94.8	92.5	90.4	88.7	87.0
	MAX TAT					-9	-5	0	5			
	KIAS					273	266	259	254	250	245	239
	MACH					.725	.708	.691	.679	.667	.655	.642
	FF/ENG					7027	6509	6030	5654	5325	5011	4703
	KTAS					427	417	407	400	393	386	378
29 (-22)	%N1					97.8	95.2	93.0	91.1	89.3	87.8	86.1
	MAX TAT					-4	0	5	10			
	KIAS					272	265	260	256	251	246	240
	MACH					.708	.692	.680	.669	.658	.645	.631
	FF/ENG					6820	6340	5957	5623	5309	4998	4689
	KTAS					419	410	402	396	389	382	373
28 (-20)	%N1				98.1	95.6	93.4	91.6	89.9	88.4	86.9	85.3
	MAX TAT				-3	1	6	10				
	KIAS				278	271	266	262	258	253	247	241
	MACH				.708	.692	.681	.670	.660	.648	.635	.620
	FF/ENG				7126	6647	6260	5923	5607	5294	4984	4678
	KTAS				421	412	405	398	392	385	377	368
27 (-18)	%N1			98.3	95.9	93.8	92.0	90.4	89.0	87.5	86.0	84.5
	MAX TAT			-2	2	6	10					
	KIAS			283	277	272	268	264	259	254	248	242
	MACH			.707	.692	.681	.671	.661	.650	.638	.624	.609
	FF/ENG			7427	6950	6563	6223	5906	5591	5279	4970	4673
	KTAS			422	413	407	401	395	388	381	372	364
26 (-16)	%N1		98.4	96.1	94.2	92.4	90.8	89.5	88.1	86.6	85.2	83.7
	MAX TAT		-2	3	7	11	15					
	KIAS		289	283	278	274	270	265	260	255	249	243
	MACH		.706	.692	.681	.671	.662	.651	.640	.627	.613	.599
	FF/ENG		7723	7250	6864	6523	6204	5888	5575	5264	4963	4670
	KTAS		423	415	408	403	397	391	384	376	368	359
25 (-14)	%N1	98.4	96.3	94.5	92.7	91.2	89.9	88.6	87.2	85.8	84.4	82.7
	MAX TAT	-1	4	8	12	16						
	KIAS	294	288	284	280	276	271	267	261	256	250	243
	MACH	.704	.691	.681	.672	.663	.653	.642	.629	.616	.603	.589
	FF/ENG	8011	7544	7163	6822	6501	6184	5870	5558	5254	4960	4658
	KTAS	424	416	410	404	399	393	386	379	371	363	354

Max TAT not shown where %N1 can be set in ISA + 30°C conditions

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
30	94.1	95.2	96.3	97.4	98.4	99.5	100.5	101.5	102.0	100.5	98.8	97.4	96.2	95.3
29	93.7	94.8	95.9	96.9	98.0	99.0	100.1	101.1	101.9	100.7	99.1	97.5	96.4	95.5
28	92.9	94.0	95.0	96.1	97.1	98.1	99.2	100.1	101.1	100.9	99.3	97.6	96.5	95.7
27	92.2	93.2	94.3	95.3	96.3	97.3	98.3	99.3	100.3	101.1	99.5	97.9	96.6	95.8
26	91.5	92.5	93.5	94.5	95.5	96.5	97.5	98.5	99.4	100.4	99.7	98.0	96.8	95.9
25	90.7	91.8	92.8	93.8	94.8	95.7	96.7	97.7	98.6	99.5	99.8	98.2	97.0	96.0

With engine anti-ice on, no %N1 adjustment is required.

With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 24000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
24 (-9)	%N1										98.4	96.4
	MAX TAT										1	6
	KIAS										300	294
	MACH										.702	.690
	FF/ENG KTAS										8283 424	7832 417
23 (-8)	%N1									98.3	96.4	94.7
	MAX TAT									4	8	11
	KIAS									305	299	295
	MACH									.700	.688	.679
	FF/ENG KTAS									8544 425	8113 418	7747 412
22 (-6)	%N1								98.1	96.4	94.8	93.3
	MAX TAT								6	9	13	16
	KIAS								310	305	301	297
	MACH								.697	.687	.678	.670
	FF/ENG KTAS								8804 425	8395 419	8037 413	7700 408
21 (-4)	%N1							97.9	96.3	94.8	93.4	92.3
	MAX TAT							10	14	17	20	23
	KIAS							315	310	306	303	299
	MACH							.694	.685	.677	.669	.662
	FF/ENG KTAS							9073 425	8682 419	8332 414	7995 409	7676 405
20 (-2)	%N1					99.7	97.8	96.2	94.8	93.5	92.4	91.3
	MAX TAT					11	14	18	21	24	27	30
	KIAS					325	320	315	312	308	305	301
	MACH					.702	.691	.683	.676	.668	.661	.653
	FF/ENG KTAS					9870 431	9371 425	8980 420	8632 415	8295 410	7976 406	7654 401
19 (0)	%N1				99.6	97.7	96.1	94.7	93.6	92.6	91.5	90.5
	MAX TAT				13	16	20	23	26	28		
	KIAS				329	325	321	317	314	310	306	302
	MACH				.698	.689	.681	.674	.667	.660	.652	.643
	FF/ENG KTAS				10242 431	9735 425	9302 420	8944 416	8607 411	8284 407	7960 402	7642 397

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
24	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	98.7	97.4	96.2	95.6	94.9	94.2
23	93.1	94.1	95.0	96.0	96.9	97.9	98.8	99.8	99.2	97.8	96.5	95.9	95.2	94.5
22	92.8	93.7	94.7	95.7	96.6	97.5	98.5	99.4	99.8	98.2	97.0	96.2	95.5	94.9
21	93.3	94.2	95.2	96.2	97.1	98.1	99.0	100.0	100.9	99.7	98.3	97.0	96.1	95.0
20	93.5	94.5	95.5	96.5	97.4	98.4	99.3	100.2	101.2	101.3	99.6	98.1	96.8	95.5
19	93.2	94.1	95.1	96.1	97.0	98.0	98.9	99.8	100.8	101.7	100.2	98.6	97.2	96.0

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 24000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
24 (-13)	%N1	96.4	94.6	93.0	91.5	90.3	89.0	87.7	86.4	85.0	83.5	81.8
	MAX TAT	6	10	13	17							
	KIAS	294	290	286	282	277	273	268	262	256	250	244
	MACH	.690	.680	.671	.663	.653	.643	.631	.619	.606	.593	.578
	FF/ENG	7832	7457	7117	6795	6478	6164	5851	5545	5250	4952	4644
23 (-11)	KTAS	417	411	406	401	395	389	382	374	367	358	349
	%N1	94.7	93.1	91.8	90.6	89.4	88.1	86.9	85.6	84.2	82.5	81.0
	MAX TAT	11	15	18								
	KIAS	295	291	288	283	279	274	268	263	257	251	244
	MACH	.679	.671	.663	.654	.644	.633	.621	.609	.596	.582	.567
22 (-10)	FF/ENG	7747	7409	7088	6770	6456	6143	5836	5540	5244	4938	4636
	KTAS	412	407	402	397	391	384	377	370	362	353	344
	%N1	93.3	92.1	90.9	89.7	88.5	87.3	86.1	84.8	83.2	81.7	80.2
	MAX TAT	16	20	23								
	KIAS	297	293	289	285	280	275	269	264	258	251	245
21 (-8)	MACH	.670	.662	.654	.644	.634	.622	.611	.599	.586	.572	.558
	FF/ENG	7700	7381	7062	6748	6435	6127	5830	5537	5231	4926	4635
	KTAS	408	404	398	393	386	379	372	365	357	348	340
	%N1	92.3	91.1	90.0	88.9	87.7	86.5	85.3	83.8	82.3	80.9	79.3
	MAX TAT	23										
20 (-7)	KIAS	299	295	291	286	281	276	270	264	258	252	246
	MACH	.662	.653	.644	.634	.623	.612	.601	.589	.575	.562	.548
	FF/ENG	7676	7356	7041	6728	6419	6121	5829	5523	5215	4922	4637
	KTAS	405	400	394	388	381	375	368	360	352	344	335
	%N1	91.3	90.3	89.2	88.1	86.9	85.7	84.3	82.9	81.6	80.0	78.4
19 (-5)	MAX TAT	301	296	292	287	282	277	271	265	259	253	246
	KIAS	.653	.644	.634	.624	.613	.603	.591	.578	.565	.552	.539
	FF/ENG	7654	7338	7024	6714	6414	6120	5815	5506	5207	4919	4638
	KTAS	401	396	390	383	377	370	363	355	347	339	331
	%N1	90.5	89.4	88.3	87.2	86.1	84.8	83.4	82.1	80.7	79.2	77.6
	MAX TAT	302	298	293	288	283	277	271	265	259	253	247
	KIAS	.643	.634	.624	.614	.604	.593	.581	.568	.556	.543	.530
	FF/ENG	7642	7326	7013	6710	6413	6107	5795	5491	5198	4913	4632
	KTAS	397	391	385	379	372	366	358	350	343	335	327
	%N1											

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
24	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	98.7	97.4	96.2	95.6	94.9
23	92.1	93.1	94.1	95.0	96.0	96.9	97.9	98.8	99.8	99.2	97.8	96.5	95.9	95.2
22	91.8	92.8	93.7	94.7	95.7	96.6	97.5	98.5	99.4	99.8	98.2	97.0	96.2	95.5
21	92.3	93.3	94.2	95.2	96.2	97.1	98.1	99.0	100.0	100.9	99.7	98.3	97.0	96.1
20	92.5	93.5	94.5	95.5	96.5	97.4	98.4	99.3	100.2	101.2	101.3	99.6	98.1	96.8
19	92.2	93.2	94.1	95.1	96.1	97.0	98.0	98.9	99.8	100.8	101.7	100.2	98.6	97.2

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
18000 FT to 13000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
18 (2)	%N1			99.4	97.7	96.2	94.7	93.6	92.6	91.6	90.6	89.6
	MAX TAT			15	18	21	25	27	30			
	KIAS			334	330	326	322	319	316	312	308	303
	MACH			.694	.686	.679	.672	.665	.658	.651	.642	.633
	FF/ENG			10612	10126	9679	9273	8928	8601	8273	7952	7632
	KTAS			430	425	420	416	412	408	403	398	392
17 (3)	%N1		99.0	97.6	96.2	94.8	93.7	92.7	91.7	90.8	89.8	88.8
	MAX TAT		18	20	23	26	29	32	34			
	KIAS		338	335	331	328	324	321	317	313	309	304
	MACH		.691	.683	.677	.670	.664	.657	.649	.641	.633	.623
	FF/ENG		10939	10505	10071	9644	9259	8919	8589	8264	7940	7619
	KTAS		429	425	421	416	412	408	404	399	393	387
16 (5)	%N1	98.0	97.2	96.2	94.9	93.8	92.8	91.8	90.9	90.0	89.0	88.0
	MAX TAT	21	23	25	28	31	34	36				
	KIAS	338	338	336	333	330	326	323	319	314	310	305
	MACH	.678	.678	.674	.668	.662	.655	.648	.640	.632	.623	.614
	FF/ENG	10999	10755	10435	10022	9625	9241	8901	8573	8246	7920	7607
	KTAS	423	423	421	417	413	409	404	399	394	389	383
15 (7)	%N1	96.3	95.5	94.9	94.0	92.9	91.9	91.0	90.1	89.2	88.2	87.2
	MAX TAT	27	28	30	33	36						
	KIAS	337	337	337	335	332	328	324	320	315	311	306
	MACH	.664	.664	.664	.660	.653	.646	.638	.630	.622	.613	.605
	FF/ENG	10778	10555	10338	9987	9589	9211	8874	8545	8218	7903	7593
	KTAS	416	416	416	413	409	405	400	395	389	384	379
14 (8)	%N1	94.9	94.3	93.8	93.1	92.1	91.1	90.2	89.3	88.4	87.4	86.3
	MAX TAT	32	33	35	37	40						
	KIAS	337	337	337	337	333	329	325	320	316	312	307
	MACH	.651	.651	.651	.651	.644	.637	.629	.620	.612	.604	.595
	FF/ENG	10599	10391	10182	9939	9549	9175	8839	8511	8196	7883	7563
	KTAS	409	409	409	409	405	400	395	390	385	380	374
13 (9)	%N1	93.8	93.3	92.7	92.1	91.3	90.3	89.4	88.5	87.6	86.4	85.3
	MAX TAT	36	38	40	42							
	KIAS	336	336	336	336	334	330	326	321	317	312	307
	MACH	.638	.638	.638	.638	.635	.627	.619	.611	.603	.595	.585
	FF/ENG	10446	10240	10037	9805	9506	9135	8802	8486	8172	7850	7526
	KTAS	403	403	403	403	401	396	391	386	381	375	369

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	94.7	95.6	96.6	97.5	98.4	99.4	100.3	101.2	100.8	99.1	97.7	96.5	95.4	94.3
17	94.3	95.2	96.2	97.1	98.0	98.9	99.8	100.8	101.5	99.6	98.0	97.0	96.0	94.9
16	94.2	95.1	96.0	97.0	97.9	98.8	99.7	100.6	101.5	100.0	98.5	97.4	96.3	95.3
15	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.5	100.6	99.0	97.7	96.6	95.6
14	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.3	101.2	100.8	99.3	98.0	96.9	95.9
13	93.7	94.7	95.6	96.5	97.4	98.3	99.2	100.1	101.0	101.1	99.5	98.2	97.2	96.2

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 18000 FT to 13000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
18 (-4)	%N1	89.6	88.6	87.5	86.5	85.2	83.8	82.6	81.2	79.8	78.3	76.8
	MAX TAT											
	KIAS	303	298	294	289	283	278	272	266	260	254	248
	MACH	.633	.624	.614	.604	.594	.582	.570	.559	.547	.534	.522
	FF/ENG	7632	7316	7009	6708	6400	6084	5773	5475	5185	4899	4617
17 (-2)	KTAS	392	386	380	374	368	361	353	346	338	331	323
	%N1	88.8	87.8	86.8	85.5	84.2	83.0	81.7	80.3	78.9	77.5	76.0
	MAX TAT											
	KIAS	304	299	295	290	284	278	272	267	261	255	249
	MACH	.623	.614	.605	.595	.584	.572	.561	.549	.538	.526	.514
16 (0)	FF/ENG	7619	7309	7005	6693	6372	6055	5752	5457	5167	4880	4596
	KTAS	387	382	376	370	363	356	349	342	334	327	319
	%N1	88.0	87.0	85.8	84.5	83.4	82.2	80.8	79.4	78.0	76.6	75.1
	MAX TAT											
	KIAS	305	300	295	290	284	279	273	267	262	256	250
15 (1)	MACH	.614	.605	.595	.585	.574	.563	.552	.541	.529	.518	.506
	FF/ENG	7607	7300	6984	6661	6339	6031	5731	5438	5147	4860	4579
	KTAS	383	377	371	365	358	351	344	337	330	323	316
	%N1	87.2	86.0	84.8	83.7	82.5	81.2	79.9	78.5	77.2	75.7	74.3
	MAX TAT											
14 (3)	KIAS	306	301	296	290	285	279	274	268	263	257	251
	MACH	.605	.595	.585	.575	.564	.554	.543	.532	.521	.510	.498
	FF/ENG	7593	7274	6949	6624	6314	6012	5717	5425	5135	4849	4574
	KTAS	379	373	367	360	353	347	340	333	326	319	312
	%N1	86.3	85.1	84.0	82.9	81.6	80.3	79.1	77.8	76.4	75.0	73.6
13 (4)	MAX TAT											
	KIAS	307	302	296	291	286	280	275	269	263	258	252
	MACH	.595	.585	.575	.565	.555	.545	.534	.524	.513	.502	.491
	FF/ENG	7563	7237	6913	6603	6302	6007	5716	5426	5140	4860	4593
	KTAS	374	368	362	355	349	343	336	329	323	316	309
	%N1	85.3	84.3	83.2	82.0	80.8	79.5	78.3	77.0	75.6	74.3	73.0
	MAX TAT											
	KIAS	307	302	297	292	286	281	276	270	264	259	253
	MACH	.585	.575	.566	.556	.546	.536	.526	.516	.505	.495	.484
	FF/ENG	7526	7204	6895	6597	6305	6017	5730	5445	5165	4894	4634
	KTAS	369	363	357	351	345	338	332	326	319	312	305

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	93.7	94.7	95.6	96.6	97.5	98.4	99.4	100.3	101.2	100.8	99.1	97.7	96.5	95.4
17	93.3	94.3	95.2	96.2	97.1	98.0	98.9	99.8	100.8	101.5	99.6	98.0	97.0	96.0
16	93.2	94.2	95.1	96.0	97.0	97.9	98.8	99.7	100.6	101.5	100.0	98.5	97.4	96.3
15	93.1	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.5	100.6	99.0	97.7	96.6
14	92.9	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.3	101.2	100.8	99.3	98.0	96.9
13	92.8	93.7	94.7	95.6	96.5	97.4	98.3	99.2	100.1	101.0	101.1	99.5	98.2	97.2

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 12000 FT to 7000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
12 (11)	%N1	92.8	92.3	91.8	91.2	90.5	89.5	88.6	87.7	86.6	85.5	84.5
	MAX TAT	41	43									
	KIAS	335	335	335	335	335	331	327	323	318	313	308
	MACH	.626	.626	.626	.626	.625	.618	.610	.602	.594	.585	.575
	FF/ENG	10294	10095	9906	9690	9460	9096	8773	8458	8136	7813	7494
	KTAS	396	396	396	396	396	391	386	382	376	371	365
11 (12)	%N1	91.8	91.3	90.8	90.2	89.6	88.7	87.8	86.7	85.7	84.8	83.8
	MAX TAT											
	KIAS	335	335	335	335	335	332	328	323	318	313	308
	MACH	.613	.613	.613	.613	.613	.608	.601	.593	.584	.575	.566
	FF/ENG	10167	9979	9797	9586	9367	9059	8739	8417	8098	7783	7483
	KTAS	390	390	390	390	390	387	382	377	371	366	360
10 (14)	%N1	90.9	90.4	89.9	89.3	88.7	87.8	86.8	85.9	85.0	84.0	82.9
	MAX TAT											
	KIAS	334	334	334	334	334	333	329	324	319	314	309
	MACH	.602	.602	.602	.602	.602	.600	.592	.583	.574	.566	.557
	FF/ENG	10070	9880	9696	9486	9267	9018	8693	8378	8068	7772	7484
	KTAS	384	384	384	384	384	383	378	372	367	361	356
9 (15)	%N1	90.0	89.5	89.0	88.3	87.6	86.9	86.0	85.2	84.2	83.2	82.1
	MAX TAT											
	KIAS	334	334	334	334	334	334	329	324	320	315	310
	MACH	.590	.590	.590	.590	.590	.590	.582	.574	.565	.557	.549
	FF/ENG	9973	9779	9594	9384	9164	8960	8645	8341	8050	7766	7488
	KTAS	378	378	378	378	378	378	373	367	362	357	351
8 (17)	%N1	89.2	88.6	88.0	87.3	86.6	86.1	85.3	84.3	83.3	82.4	81.4
	MAX TAT											
	KIAS	333	333	333	333	333	333	330	325	320	315	311
	MACH	.579	.579	.579	.579	.579	.579	.572	.565	.556	.548	.540
	FF/ENG	9876	9684	9501	9292	9077	8877	8605	8319	8040	7764	7491
	KTAS	372	372	372	372	372	372	368	363	358	353	347
7 (18)	%N1	88.1	87.5	87.0	86.4	85.8	85.3	84.5	83.5	82.5	81.6	80.6
	MAX TAT											
	KIAS	333	333	333	333	333	333	330	326	321	316	312
	MACH	.568	.568	.568	.568	.568	.568	.564	.556	.548	.540	.532
	FF/ENG	9800	9612	9433	9229	9018	8819	8589	8312	8039	7766	7493
	KTAS	367	367	367	367	367	367	364	359	354	349	343

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
12	94.4	95.4	96.3	97.2	98.1	99.0	99.9	100.8	101.5	99.8	98.6	97.5	96.4	95.5
11	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.2	101.0	100.0	98.8	97.7	96.6	95.7
10	93.3	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.4	100.1	99.0	97.9	96.9	95.9
9	93.0	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.1	100.4	99.3	98.2	97.1	96.2
8	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.8	100.6	99.6	98.5	97.4	96.6
7	92.2	93.1	94.0	94.9	95.8	96.6	97.5	98.4	99.2	100.0	99.6	98.6	97.6	96.7

With engine anti-ice on, decrease limit %N1 by 0.5.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 12000 FT to 7000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
12 (6)	%N1	84.5	83.5	82.3	81.2	80.0	78.8	77.6	76.3	75.0	73.7	72.3
	MAX TAT											
	KIAS	308	303	298	292	287	282	276	271	265	260	254
	MACH	.575	.566	.557	.547	.538	.528	.518	.508	.498	.487	.477
	FF/ENG	7494	7190	6895	6607	6323	6040	5758	5479	5207	4944	4690
11 (8)	KTAS	365	359	353	347	341	334	328	322	315	309	302
	%N1	83.8	82.7	81.5	80.4	79.3	78.1	76.9	75.6	74.4	73.1	71.7
	MAX TAT											
	KIAS	308	303	298	293	288	283	277	272	267	261	255
	MACH	.566	.557	.548	.539	.529	.520	.510	.501	.491	.481	.470
10 (9)	FF/ENG	7483	7192	6908	6628	6348	6070	5793	5522	5257	4999	4749
	KTAS	360	354	349	343	337	331	325	318	312	306	299
	%N1	82.9	81.9	80.8	79.7	78.6	77.4	76.2	75.0	73.8	72.4	71.0
	MAX TAT											
	KIAS	309	304	299	294	289	284	278	273	268	262	257
9 (11)	MACH	.557	.548	.540	.531	.522	.512	.503	.493	.484	.474	.464
	FF/ENG	7484	7203	6926	6649	6372	6097	5827	5561	5301	5046	4797
	KTAS	356	350	344	339	333	327	321	315	309	303	296
	%N1	82.1	81.1	80.0	79.0	77.8	76.7	75.5	74.3	73.1	71.7	70.4
	MAX TAT											
8 (13)	KIAS	310	305	300	295	290	285	280	274	269	263	258
	MACH	.549	.540	.531	.523	.514	.505	.496	.486	.477	.468	.458
	FF/ENG	7488	7213	6937	6662	6388	6117	5851	5589	5331	5078	4831
	KTAS	351	346	340	335	329	323	318	312	306	300	293
	%N1	81.4	80.3	79.3	78.2	77.1	76.0	74.8	73.6	72.3	71.0	69.7
7 (14)	MAX TAT											
	KIAS	311	306	301	296	291	286	281	275	270	265	259
	MACH	.540	.532	.524	.515	.506	.498	.489	.480	.471	.461	.452
	FF/ENG	7491	7217	6942	6669	6399	6134	5871	5610	5353	5102	4859
	KTAS	347	342	337	331	326	320	314	308	303	297	291
	%N1	80.6	79.6	78.6	77.5	76.4	75.3	74.2	72.9	71.6	70.4	69.2
	MAX TAT											
	KIAS	312	307	302	297	292	287	282	277	271	266	261
	MACH	.532	.524	.516	.508	.499	.491	.482	.473	.464	.456	.447
	FF/ENG	7493	7219	6946	6677	6412	6148	5885	5625	5371	5125	4890
	KTAS	343	338	333	328	322	317	311	305	300	294	288

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
12	94.4	95.4	96.3	97.2	98.1	99.0	99.9	100.8	101.5	99.8	98.6	97.5	96.4	95.5
11	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.2	101.0	100.0	98.8	97.7	96.6	95.7
10	93.3	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.4	100.1	99.0	97.9	96.9	95.9
9	93.0	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.1	100.4	99.3	98.2	97.1	96.2
8	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.8	100.6	99.6	98.5	97.4	96.6
7	92.2	93.1	94.0	94.9	95.8	96.6	97.5	98.4	99.2	100.0	99.6	98.6	97.6	96.7

With engine anti-ice on, decrease limit %N1 by 0.5.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS	WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
29												
28												
27	260 -19 389	%N1 MAX TAT FF/ENG										99.4 -8 7483
26	260 -17 383	%N1 MAX TAT FF/ENG									99.1 -7 7669	97.1 -1 7262
25	260 -16 377	%N1 MAX TAT FF/ENG								99.0 -6 7876	96.9 0 7427	94.9 4 7070
24	260 -14 371	%N1 MAX TAT FF/ENG							98.9 -4 8085	96.8 1 7633	94.7 6 7242	93.0 10 6943
23	260 -13 366	%N1 MAX TAT FF/ENG						98.8 -2 8299	96.7 3 7840	94.6 7 7456	92.8 12 7115	91.4 16 6851
22	260 -12 360	%N1 MAX TAT FF/ENG					98.6 0 8497	96.5 5 8038	94.5 9 7667	92.7 14 7328	91.3 18 7025	90.3 6776
21	260 -10 354	%N1 MAX TAT FF/ENG				98.4 4 8717	96.2 9 8243	94.3 13 7868	92.6 17 7542	91.3 7234	90.2 6952	89.2 6708
20	260 -9 349	%N1 MAX TAT FF/ENG			98.6 8 9014	96.0 13 8469	94.1 17 8077	92.4 21 7746	91.3 7445	90.2 7151	89.2 6883	88.3 6655
19	260 -7 344	%N1 MAX TAT FF/ENG	101.0 4 9884	98.7 9 9308	96.1 14 8746	94.0 19 8301	92.4 23 7953	91.3 7642	90.2 7351	89.2 7072	88.2 6830	87.3 6613

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
27	94.0	95.0	96.1	97.1	98.1	99.1	100.1	101.1	101.1	99.9	98.4	97.1	96.1	95.4
26	93.6	94.6	95.6	96.7	97.7	98.7	99.7	100.6	101.1	100.1	98.5	97.3	96.2	95.5
25	93.2	94.2	95.3	96.3	97.3	98.3	99.2	100.2	101.1	100.2	98.6	97.4	96.2	95.6
24	93.1	94.1	95.1	96.1	97.1	98.1	99.1	100.1	101.0	100.5	99.0	97.6	96.5	95.8
23	93.0	94.0	95.0	96.0	97.0	98.0	99.0	99.9	100.9	100.9	99.5	98.0	96.7	96.0
22	92.8	93.8	94.8	95.8	96.8	97.8	98.8	99.7	100.7	101.2	100.0	98.4	97.1	96.3
21	93.4	94.4	95.4	96.4	97.4	98.4	99.4	100.4	101.3	102.2	101.4	99.8	98.4	97.1
20	93.8	94.9	95.9	96.9	97.9	98.9	99.9	100.9	101.8	102.7	102.6	101.3	99.7	98.3
19	93.7	94.8	95.8	96.8	97.8	98.8	99.8	100.7	101.7	102.6	103.1	102.0	100.2	98.8

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table**29000 FT to 19000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	260	%N1			100.1	98.1	96.2	94.4	93.0	91.7	90.4	89.6	88.8
	-21	MAX TAT			-11	-6	-2	2	5	9			
	402	FF/ENG			7138	6794	6465	6170	5948	5741	5545	5379	5233
28	260	%N1		99.7	97.8	95.9	94.1	92.6	91.3	90.2	89.3	88.5	87.7
	-20	MAX TAT		-10	-5	-1	3	7	10				
	396	FF/ENG		7306	6955	6615	6319	6070	5869	5673	5487	5330	5187
27	260	%N1	99.4	97.5	95.6	93.8	92.3	90.9	90.0	89.1	88.2	87.4	86.8
	-19	MAX TAT	-8	-3	1	5	8	12					
	389	FF/ENG	7483	7113	6765	6477	6222	5997	5805	5616	5439	5287	5151
26	260	%N1	97.1	95.3	93.6	92.1	90.8	89.8	88.9	88.0	87.2	86.5	85.9
	-17	MAX TAT	-1	2	6	10	14						
	383	FF/ENG	7262	6914	6631	6379	6148	5937	5750	5567	5398	5253	5122
25	260	%N1	94.9	93.3	91.8	90.6	89.7	88.7	87.9	87.1	86.3	85.6	85.0
	-16	MAX TAT	4	8	12	15							
	377	FF/ENG	7070	6784	6533	6302	6085	5884	5700	5527	5366	5223	5098
24	260	%N1	93.0	91.5	90.5	89.5	88.6	87.8	87.0	86.2	85.4	84.7	84.0
	-14	MAX TAT	10	14									
	371	FF/ENG	6943	6688	6455	6235	6028	5837	5660	5495	5337	5198	5075
23	260	%N1	91.4	90.4	89.4	88.5	87.7	86.9	86.1	85.3	84.5	83.7	83.0
	-13	MAX TAT	16										
	366	FF/ENG	6851	6612	6389	6177	5983	5802	5629	5467	5312	5172	5052
22	260	%N1	90.3	89.3	88.4	87.6	86.8	86.0	85.2	84.3	83.4	82.7	82.1
	-12	MAX TAT											
	360	FF/ENG	6776	6545	6332	6134	5950	5771	5601	5440	5286	5148	5032
21	260	%N1	89.2	88.3	87.5	86.7	85.9	85.1	84.2	83.3	82.5	81.9	81.3
	-10	MAX TAT											
	354	FF/ENG	6708	6489	6292	6102	5919	5742	5573	5412	5261	5127	5015
20	260	%N1	88.3	87.4	86.6	85.8	85.0	84.0	83.1	82.4	81.7	81.0	80.4
	-9	MAX TAT											
	349	FF/ENG	6655	6450	6258	6067	5885	5709	5543	5386	5238	5109	5001
19	260	%N1	87.3	86.5	85.7	84.8	83.9	83.0	82.3	81.6	80.7	80.0	79.4
	-7	MAX TAT											
	344	FF/ENG	6613	6408	6216	6027	5846	5674	5512	5358	5214	5087	4981

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	95.2	96.3	97.3	98.4	99.4	100.5	101.5	102.3	101.1	99.6	98.1	97.0	96.0	95.1
28	94.6	95.6	96.7	97.7	98.8	99.8	100.8	101.7	101.1	99.8	98.2	97.0	96.1	95.3
27	94.0	95.0	96.1	97.1	98.1	99.1	100.1	101.1	101.1	99.9	98.4	97.1	96.1	95.4
26	93.6	94.6	95.6	96.7	97.7	98.7	99.7	100.6	101.1	100.1	98.5	97.3	96.2	95.5
25	93.2	94.2	95.3	96.3	97.3	98.3	99.2	100.2	101.1	100.2	98.6	97.4	96.2	95.6
24	93.1	94.1	95.1	96.1	97.1	98.1	99.1	100.1	101.0	100.5	99.0	97.6	96.5	95.8
23	93.0	94.0	95.0	96.0	97.0	98.0	99.0	99.9	100.9	100.9	99.5	98.0	96.7	96.0
22	92.8	93.8	94.8	95.8	96.8	97.8	98.8	99.7	100.7	101.2	100.0	98.4	97.1	96.3
21	93.4	94.4	95.4	96.4	97.4	98.4	99.4	100.4	101.3	102.2	101.4	99.8	98.4	97.1
20	93.8	94.9	95.9	96.9	97.9	98.9	99.9	100.9	101.8	102.7	102.6	101.3	99.7	98.3
19	93.7	94.8	95.8	96.8	97.8	98.8	99.8	100.7	101.7	102.6	103.1	102.0	100.2	98.8

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

260 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	261	%N1	100.5	98.3	96.2	94.1	92.5	91.3	90.2	89.2	88.2	87.3	86.5
	-6	MAX TAT	7	12	16	21	24						
	339	FF/ENG	10063	9497	9013	8556	8172	7844	7538	7262	7009	6778	6561
17	261	%N1	97.8	95.8	94.1	92.6	91.3	90.2	89.2	88.2	87.3	86.4	85.6
	-4	MAX TAT	15	18	22	26							
	334	FF/ENG	9675	9207	8796	8412	8063	7740	7443	7190	6946	6718	6504
16	261	%N1	95.4	93.8	92.6	91.4	90.3	89.2	88.2	87.3	86.3	85.4	84.5
	-2	MAX TAT	21	25	28								
	329	FF/ENG	9398	8995	8638	8292	7960	7649	7367	7122	6878	6656	6447
15	261	%N1	93.5	92.4	91.3	90.3	89.2	88.2	87.2	86.2	85.3	84.3	83.4
	-1	MAX TAT	27										
	324	FF/ENG	9209	8855	8524	8190	7875	7580	7304	7059	6819	6604	6400
14	261	%N1	92.3	91.3	90.4	89.3	88.3	87.3	86.2	85.3	84.3	83.4	82.5
	1	MAX TAT											
	319	FF/ENG	9103	8769	8445	8124	7824	7529	7257	7016	6783	6573	6372
13	261	%N1	91.3	90.4	89.5	88.4	87.4	86.3	85.3	84.3	83.4	82.5	81.6
	2	MAX TAT											
	314	FF/ENG	9036	8705	8400	8095	7791	7493	7233	6999	6770	6565	6368
12	261	%N1	90.4	89.5	88.6	87.5	86.4	85.4	84.4	83.5	82.5	81.6	80.7
	4	MAX TAT											
	310	FF/ENG	8978	8673	8381	8073	7763	7474	7225	6994	6773	6573	6379
11	261	%N1	89.5	88.6	87.7	86.6	85.5	84.5	83.5	82.6	81.7	80.8	79.9
	5	MAX TAT											
	305	FF/ENG	8951	8655	8357	8045	7744	7463	7221	6995	6780	6585	6394
10	261	%N1	88.6	87.7	86.7	85.7	84.6	83.6	82.6	81.7	80.7	79.9	79.1
	7	MAX TAT											
	301	FF/ENG	8923	8618	8318	8015	7721	7448	7212	6990	6781	6587	6395
9	261	%N1	87.7	86.7	85.8	84.8	83.7	82.6	81.7	80.7	79.8	79.0	78.2
	9	MAX TAT											
	296	FF/ENG	8870	8566	8274	7976	7692	7425	7193	6976	6768	6571	6376
8	261	%N1	86.7	85.8	84.9	83.8	82.7	81.7	80.7	79.8	79.0	78.1	77.3
	10	MAX TAT											
	292	FF/ENG	8812	8515	8229	7939	7662	7398	7169	6953	6745	6543	6347

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.7	97.7	98.7	99.7	100.7	101.6	102.6	103.5	102.7	100.9	99.2	97.8	96.7	95.6
17	96.7	97.7	98.7	99.6	100.6	101.6	102.5	103.4	103.2	101.6	99.7	98.1	97.1	96.1
16	96.6	97.6	98.5	99.5	100.5	101.4	102.4	103.3	103.6	102.2	100.2	98.6	97.5	96.5
15	96.5	97.5	98.5	99.4	100.4	101.3	102.3	103.2	104.0	102.8	100.8	99.1	97.8	96.8
14	96.2	97.2	98.2	99.1	100.1	101.0	102.0	102.9	103.8	103.1	101.1	99.5	98.2	97.1
13	96.0	97.0	98.0	98.9	99.9	100.8	101.8	102.7	103.6	103.4	101.5	99.8	98.5	97.4
12	95.6	96.6	97.5	98.5	99.4	100.3	101.3	102.2	103.2	103.7	101.8	100.1	98.8	97.7
11	94.7	95.6	96.6	97.5	98.5	99.4	100.3	101.2	102.2	103.1	101.8	100.2	98.9	97.8
10	93.8	94.7	95.7	96.6	97.6	98.5	99.4	100.3	101.2	102.1	101.8	100.3	99.1	98.0
9	93.1	94.0	94.9	95.9	96.8	97.7	98.6	99.5	100.4	101.3	101.8	100.5	99.4	98.2
8	92.4	93.4	94.3	95.2	96.1	97.0	97.9	98.8	99.7	100.6	101.4	100.7	99.6	98.5

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table

18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	260	%N1	86.5	85.6	84.7	83.8	83.0	82.2	81.4	80.6	79.8	79.1	78.5
	-6 338	MAX TAT FF/ENG	6561	6358	6167	5981	5802	5633	5476	5325	5183	5057	4952
17	260	%N1	85.6	84.6	83.7	82.9	82.1	81.2	80.4	79.6	78.8	78.1	77.5
	-4 333	MAX TAT FF/ENG	6504	6303	6115	5932	5755	5586	5434	5288	5146	5018	4913
16	260	%N1	84.5	83.6	82.7	81.9	81.0	80.2	79.4	78.6	77.9	77.2	76.6
	-3 328	MAX TAT FF/ENG	6447	6251	6065	5884	5707	5539	5392	5248	5105	4976	4872
15	260	%N1	83.4	82.6	81.8	80.9	80.0	79.1	78.4	77.6	76.9	76.2	75.6
	-1 323	MAX TAT FF/ENG	6400	6208	6024	5843	5668	5503	5357	5213	5070	4942	4839
14	260	%N1	82.5	81.7	80.8	79.9	79.1	78.2	77.5	76.8	76.0	75.3	74.7
	1 318	MAX TAT FF/ENG	6372	6185	6002	5821	5647	5484	5339	5195	5052	4925	4826
13	260	%N1	81.6	80.7	79.9	79.0	78.2	77.4	76.7	75.9	75.1	74.5	73.9
	2 314	MAX TAT FF/ENG	6368	6182	5999	5818	5643	5482	5340	5197	5054	4930	4833
12	260	%N1	80.7	79.9	79.0	78.2	77.3	76.5	75.8	75.1	74.3	73.7	73.2
	4 309	MAX TAT FF/ENG	6379	6193	6009	5825	5650	5492	5352	5213	5072	4950	4855
11	260	%N1	79.9	79.1	78.2	77.3	76.5	75.7	75.0	74.3	73.6	73.0	72.4
	5 305	MAX TAT FF/ENG	6394	6206	6018	5834	5660	5505	5367	5232	5094	4974	4881
10	260	%N1	79.1	78.2	77.4	76.5	75.6	74.9	74.2	73.5	72.8	72.1	71.5
	7 300	MAX TAT FF/ENG	6395	6205	6017	5833	5661	5508	5373	5239	5104	4987	4895
9	260	%N1	78.2	77.3	76.5	75.6	74.8	74.0	73.4	72.6	71.9	71.2	70.7
	9 296	MAX TAT FF/ENG	6376	6187	5999	5816	5646	5495	5362	5228	5095	4982	4891
8	260	%N1	77.3	76.5	75.6	74.7	73.9	73.2	72.5	71.7	71.0	70.4	69.8
	10 291	MAX TAT FF/ENG	6347	6161	5973	5791	5624	5474	5342	5206	5076	4967	4877

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.7	97.7	98.7	99.7	100.7	101.6	102.6	103.5	102.7	100.9	99.2	97.8	96.7	95.6
17	96.7	97.7	98.7	99.6	100.6	101.6	102.5	103.4	103.2	101.6	99.7	98.1	97.1	96.1
16	96.6	97.6	98.5	99.5	100.5	101.4	102.4	103.3	103.6	102.2	100.2	98.6	97.5	96.5
15	96.5	97.5	98.5	99.4	100.4	101.3	102.3	103.2	104.0	102.8	100.8	99.1	97.8	96.8
14	96.2	97.2	98.2	99.1	100.1	101.0	102.0	102.9	103.8	103.1	101.1	99.5	98.2	97.1
13	96.0	97.0	98.0	98.9	99.9	100.8	101.8	102.7	103.6	103.4	101.5	99.8	98.5	97.4
12	95.6	96.6	97.5	98.5	99.4	100.3	101.3	102.2	103.2	103.7	101.8	100.1	98.8	97.7
11	94.7	95.6	96.6	97.5	98.5	99.4	100.3	101.2	102.2	103.1	101.8	100.2	98.9	97.8
10	93.8	94.7	95.7	96.6	97.6	98.5	99.4	100.3	101.2	102.1	101.8	100.3	99.1	98.0
9	93.1	94.0	94.9	95.9	96.8	97.7	98.6	99.5	100.4	101.3	101.8	100.5	99.4	98.2
8	92.4	93.4	94.3	95.2	96.1	97.0	97.9	98.8	99.7	100.6	101.4	100.7	99.6	98.5

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26	280 -14 411	%N1 MAX TAT FF/ENG										98.8 -4 7740	
25	280 -13 404	%N1 MAX TAT FF/ENG									98.3 -2 7882	96.7 2 7552	
24	280 -12 398	%N1 MAX TAT FF/ENG								97.8 1 8007	96.2 5 7687	94.7 8 7410	
23	280 -10 392	%N1 MAX TAT FF/ENG						98.8 0 8482	97.2 4 8125	95.7 7 7824	94.3 10 7551	93.0 14 7301	
22	280 -9 386	%N1 MAX TAT FF/ENG					98.4 3 8624	96.6 6 8252	95.2 10 7958	93.8 13 7691	92.5 16 7446	91.7 19 7215	
21	280 -8 380	%N1 MAX TAT FF/ENG				98.2 7 8835	96.2 11 8411	94.7 14 8099	93.3 18 7835	92.3 21 7592	91.4 24 7361	90.6 7142	
20	280 -6 375	%N1 MAX TAT FF/ENG			100.2 6 9608	98.2 10 9103	96.0 14 8631	94.3 19 8262	92.9 22 7985	92.0 25 7740	91.2 7509	90.4 7288	89.6 7079
19	280 -5 369	%N1 MAX TAT FF/ENG		99.8 8 9785	98.0 12 9328	96.0 16 8898	94.1 20 8478	92.7 24 8151	91.8 91.0 7893	91.0 90.2 7659	90.2 89.4 7436	89.4 88.7 7227	88.7 7034

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
26	93.8	94.9	95.9	96.9	97.9	98.8	99.8	100.7	100.4	99.1	97.8	96.7	96.0	95.2
25	93.4	94.4	95.4	96.4	97.3	98.3	99.2	100.2	100.3	99.3	97.9	96.7	96.0	95.3
24	93.2	94.2	95.2	96.2	97.2	98.2	99.1	100.1	100.7	99.6	98.2	97.0	96.2	95.6
23	93.1	94.1	95.1	96.1	97.1	98.0	99.0	99.9	100.9	99.9	98.5	97.2	96.4	95.8
22	93.0	94.0	95.0	96.0	96.9	97.9	98.9	99.8	100.7	100.2	98.8	97.5	96.6	96.0
21	93.7	94.7	95.7	96.7	97.7	98.7	99.6	100.6	101.5	101.6	100.2	98.7	97.5	96.8
20	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.4	102.3	103.0	101.6	99.9	98.7	97.5
19	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.3	102.3	103.2	102.2	100.5	99.0	97.7

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table**29000 FT to 19000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	280	FF/ENG					98.9	97.6	96.2	94.8	93.8	93.0	92.3
	-18	%N1					-6	-3	0	3	6	8	10
	431	MAX TAT					7115	6856	6614	6413	6237	6096	5974
28	280	FF/ENG				98.4	97.0	95.4	94.2	93.3	92.3	91.6	91.0
	-17	%N1				-4	-1	3	5	8	11	13	15
	424	MAX TAT				7202	6954	6704	6493	6318	6159	6031	5915
27	280	FF/ENG		99.3	97.8	96.3	95.0	93.7	92.7	91.7	91.0	90.4	89.9
	-16	%N1		-5	-2	1	5	8	10	13	15		
	417	MAX TAT		7597	7309	7049	6814	6591	6402	6243	6095	5974	5864
26	280	FF/ENG	98.8	97.2	95.7	94.4	93.3	92.1	91.2	90.5	89.9	89.4	88.9
	-14	%N1	-4	0	4	7	10	13	15				
	411	MAX TAT	7740	7423	7149	6924	6710	6504	6330	6178	6038	5921	5814
25	280	FF/ENG	96.7	95.2	93.9	92.8	91.7	90.8	90.1	89.5	88.9	88.4	87.9
	-13	%N1	2	6	9	12	15	18					
	404	MAX TAT	7552	7269	7034	6826	6625	6433	6268	6119	5984	5872	5769
24	280	FF/ENG	94.7	93.4	92.2	91.4	90.5	89.8	89.1	88.5	87.9	87.4	87.0
	-12	%N1	8	11	14	17							
	398	MAX TAT	7410	7156	6942	6745	6552	6369	6210	6066	5937	5830	5732
23	280	FF/ENG	93.0	91.9	91.1	90.3	89.5	88.8	88.1	87.6	87.0	86.6	86.1
	-10	%N1	14	17	20								
	392	MAX TAT	7301	7069	6867	6675	6488	6314	6162	6025	5903	5799	5704
22	280	FF/ENG	91.7	90.8	90.0	89.3	88.5	87.9	87.2	86.7	86.1	85.7	85.3
	-9	%N1	19	22									
	386	MAX TAT	7215	6997	6801	6614	6436	6272	6126	5993	5877	5778	5685
21	280	FF/ENG	90.6	89.8	89.0	88.3	87.6	87.0	86.3	85.8	85.3	84.7	84.2
	-8	%N1											
	380	MAX TAT	7142	6935	6745	6568	6400	6240	6097	5968	5855	5757	5665
20	280	FF/ENG	89.6	88.8	88.1	87.4	86.8	86.1	85.5	84.8	84.2	83.7	83.3
	-6	%N1											
	375	MAX TAT	7079	6887	6706	6534	6369	6213	6070	5942	5831	5736	5646
19	280	FF/ENG	88.7	87.9	87.2	86.5	85.9	85.1	84.4	83.8	83.3	82.9	82.5
	-5	%N1											
	369	MAX TAT	7034	6851	6670	6502	6340	6183	6039	5914	5808	5715	5628

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)														
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	
29	94.4	95.4	96.5	97.5	98.6	99.6	100.6	101.6	101.5	100.2	98.6	97.6	96.6	95.7	
28	93.9	94.9	96.0	97.0	98.0	99.0	100.0	101.0	101.6	100.3	98.8	97.7	96.6	95.8	
27	93.3	94.4	95.4	96.4	97.4	98.4	99.4	100.4	101.3	100.4	99.0	97.7	96.6	95.9	
26	92.8	93.8	94.9	95.9	96.9	97.9	98.8	99.8	100.7	100.4	99.1	97.8	96.7	96.0	
25	92.3	93.4	94.4	95.4	96.4	97.3	98.3	99.2	100.2	100.3	99.3	97.9	96.7	96.0	
24	92.2	93.2	94.2	95.2	96.2	97.2	98.2	99.1	100.1	100.7	99.6	98.2	97.0	96.2	
23	92.1	93.1	94.1	95.1	96.1	97.1	98.0	99.0	99.9	100.9	99.9	98.5	97.2	96.4	
22	92.0	93.0	94.0	95.0	96.0	96.9	97.9	98.9	99.8	100.7	100.2	98.8	97.5	96.6	
21	92.7	93.7	94.7	95.7	96.7	97.7	98.7	99.6	100.6	101.5	101.6	100.2	98.7	97.5	
20	93.4	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.4	102.3	103.0	101.6	99.9	98.7	
19	93.4	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.3	102.3	103.2	102.2	100.5	99.0	

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table 18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	280	%N1	99.3	97.5	95.8	94.1	92.7	91.6	90.7	89.9	89.2	88.5	87.7
	-3	MAX TAT	11	15	18	22	26						
	363	FF/ENG	9930	9497	9118	8734	8359	8055	7808	7583	7377	7179	6991
17	280	%N1	96.9	95.4	93.9	92.7	91.5	90.5	89.7	89.0	88.3	87.5	86.8
	-2	MAX TAT	17	21	24	27							
	358	FF/ENG	9657	9285	8949	8600	8255	7965	7729	7519	7322	7127	6942
16	280	%N1	95.0	93.6	92.6	91.5	90.5	89.5	88.8	88.0	87.3	86.6	85.8
	0	MAX TAT	23	26	29								
	353	FF/ENG	9451	9119	8812	8483	8160	7886	7661	7457	7263	7071	6886
15	280	%N1	93.4	92.4	91.5	90.5	89.5	88.6	87.8	87.1	86.3	85.5	84.7
	1	MAX TAT	29	32									
	347	FF/ENG	9301	8990	8696	8383	8084	7822	7600	7398	7206	7015	6830
14	280	%N1	92.3	91.3	90.5	89.5	88.6	87.7	86.9	86.1	85.3	84.5	83.8
	3	MAX TAT											
	342	FF/ENG	9195	8888	8607	8315	8032	7772	7553	7352	7160	6971	6788
13	280	%N1	91.3	90.4	89.6	88.7	87.7	86.8	85.9	85.1	84.4	83.7	83.0
	4	MAX TAT											
	337	FF/ENG	9116	8815	8557	8278	7996	7739	7522	7323	7132	6946	6765
12	280	%N1	90.4	89.5	88.7	87.7	86.8	85.8	85.0	84.3	83.6	82.9	82.1
	6	MAX TAT											
	332	FF/ENG	9063	8784	8535	8251	7972	7720	7507	7311	7122	6939	6759
11	280	%N1	89.5	88.7	87.8	86.9	85.9	85.0	84.2	83.5	82.8	82.0	81.2
	7	MAX TAT											
	328	FF/ENG	9043	8768	8511	8227	7955	7709	7500	7309	7123	6941	6762
10	280	%N1	88.7	87.9	87.1	86.0	85.1	84.2	83.5	82.7	81.9	81.2	80.4
	9	MAX TAT											
	323	FF/ENG	9014	8737	8483	8204	7939	7699	7495	7308	7124	6941	6762
9	280	%N1	87.8	87.0	86.1	85.1	84.2	83.4	82.5	81.8	81.0	80.3	79.5
	10	MAX TAT											
	318	FF/ENG	8964	8698	8450	8178	7921	7686	7484	7299	7114	6929	6748
8	280	%N1	86.8	86.0	85.1	84.2	83.3	82.4	81.6	80.9	80.1	79.4	78.6
	12	MAX TAT											
	314	FF/ENG	8913	8657	8415	8152	7901	7669	7470	7281	7092	6904	6721

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.4	97.4	98.3	99.3	100.3	101.2	102.2	103.1	102.8	101.1	99.5	98.0	97.0	96.0
17	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.4	101.8	100.0	98.4	97.3	96.3
16	96.1	97.1	98.1	99.0	100.0	100.9	101.9	102.8	103.7	102.4	100.5	98.9	97.7	96.7
15	96.0	97.0	97.9	98.9	99.8	100.8	101.7	102.6	103.6	102.9	101.1	99.5	98.1	97.1
14	95.7	96.6	97.6	98.6	99.5	100.4	101.4	102.3	103.2	103.3	101.5	99.8	98.4	97.4
13	95.4	96.4	97.3	98.3	99.2	100.2	101.1	102.0	102.9	103.7	101.9	100.1	98.8	97.7
12	95.3	96.2	97.2	98.1	99.1	100.0	100.9	101.8	102.8	103.7	102.4	100.5	99.1	98.1
11	94.8	95.7	96.7	97.6	98.6	99.5	100.4	101.3	102.3	103.2	102.8	100.7	99.4	98.3
10	94.3	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.6	103.1	101.0	99.7	98.5
9	93.6	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.9	102.8	101.3	99.8	98.7
8	92.8	93.7	94.7	95.6	96.5	97.4	98.3	99.2	100.1	101.0	101.9	101.5	100.0	98.8

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	280	%N1	87.7	87.0	86.3	85.6	84.8	84.0	83.5	83.0	82.5	82.1	81.6
	-3	MAX TAT											
	363	FF/ENG	6991	6810	6633	6466	6302	6147	6008	5887	5784	5692	5606
17	280	%N1	86.8	86.1	85.3	84.5	83.8	83.2	82.6	82.1	81.6	81.1	80.7
	-2	MAX TAT											
	358	FF/ENG	6942	6763	6587	6420	6259	6108	5972	5856	5756	5665	5581
16	280	%N1	85.8	85.0	84.2	83.6	82.9	82.3	81.6	81.1	80.6	80.1	79.7
	0	MAX TAT											
	353	FF/ENG	6886	6707	6534	6371	6213	6066	5934	5823	5724	5633	5550
15	280	%N1	84.7	84.0	83.3	82.7	82.0	81.3	80.6	80.1	79.6	79.2	78.7
	1	MAX TAT											
	347	FF/ENG	6830	6653	6485	6326	6172	6028	5899	5789	5691	5601	5518
14	280	%N1	83.8	83.1	82.4	81.7	81.0	80.3	79.7	79.2	78.7	78.3	77.9
	3	MAX TAT											
	342	FF/ENG	6788	6613	6448	6294	6144	6001	5872	5762	5665	5576	5495
13	280	%N1	83.0	82.2	81.5	80.8	80.1	79.4	78.8	78.3	77.8	77.4	77.0
	4	MAX TAT											
	337	FF/ENG	6765	6591	6428	6281	6133	5990	5858	5747	5652	5565	5486
12	280	%N1	82.1	81.3	80.6	79.9	79.3	78.6	78.0	77.4	77.0	76.6	76.2
	6	MAX TAT											
	332	FF/ENG	6759	6586	6427	6282	6136	5991	5857	5747	5654	5569	5493
11	280	%N1	81.2	80.5	79.8	79.1	78.5	77.8	77.2	76.6	76.2	75.8	75.5
	7	MAX TAT											
	328	FF/ENG	6762	6592	6435	6290	6143	5997	5865	5756	5667	5586	5513
10	280	%N1	80.4	79.7	79.0	78.4	77.7	77.0	76.4	75.9	75.5	75.1	74.8
	9	MAX TAT											
	323	FF/ENG	6762	6593	6437	6293	6147	6001	5870	5764	5679	5603	5531
9	280	%N1	79.5	78.8	78.2	77.5	76.8	76.2	75.6	75.1	74.7	74.4	74.0
	10	MAX TAT											
	318	FF/ENG	6748	6579	6426	6283	6139	5994	5865	5762	5679	5605	5534
8	280	%N1	78.6	77.9	77.2	76.6	76.0	75.3	74.8	74.3	73.9	73.5	73.1
	12	MAX TAT											
	314	FF/ENG	6721	6554	6403	6262	6122	5978	5852	5750	5668	5593	5523

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.4	97.4	98.3	99.3	100.3	101.2	102.2	103.1	102.8	101.1	99.5	98.0	97.0	96.0
17	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.4	101.8	100.0	98.4	97.3	96.3
16	96.1	97.1	98.1	99.0	100.0	100.9	101.9	102.8	103.7	102.4	100.5	98.9	97.7	96.7
15	96.0	97.0	97.9	98.9	99.8	100.8	101.7	102.6	103.6	102.9	101.1	99.5	98.1	97.1
14	95.7	96.6	97.6	98.6	99.5	100.4	101.4	102.3	103.2	103.3	101.5	99.8	98.4	97.4
13	95.4	96.4	97.3	98.3	99.2	100.2	101.1	102.0	102.9	103.7	101.9	100.1	98.8	97.7
12	95.3	96.2	97.2	98.1	99.1	100.0	100.9	101.8	102.8	103.7	102.4	100.5	99.1	98.1
11	94.8	95.7	96.7	97.6	98.6	99.5	100.4	101.3	102.3	103.2	102.8	100.7	99.4	98.3
10	94.3	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.6	103.1	101.0	99.7	98.5
9	93.6	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.9	102.8	101.3	99.8	98.7
8	92.8	93.7	94.7	95.6	96.5	97.4	98.3	99.2	100.1	101.0	101.9	101.5	100.0	98.8

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26													
25													
24	300 -9 425	%N1 MAX TAT FF/ENG									98.4 1 8299	97.2 4 8049	
23	300 -7 419	%N1 MAX TAT FF/ENG								97.6 5 8370	96.5 7 8134	95.4 10 7910	
22	300 -6 412	%N1 MAX TAT FF/ENG							98.3 5 8766	96.9 8 8474	95.7 10 8225	94.7 13 8009	93.7 16 7798
21	300 -5 406	%N1 MAX TAT FF/ENG					99.3 6 9273	97.7 9 8897	96.3 13 8607	95.1 16 8343	94.0 18 8114	93.1 21 7911	92.4 23 7708
20	300 -4 400	%N1 MAX TAT FF/ENG			100.5 7 9866	98.9 10 9459	97.2 14 9082	95.7 17 8752	94.5 20 8486	93.4 23 8242	92.7 25 8028	92.0 28 7832	91.3 7636
19	300 -2 394	%N1 MAX TAT FF/ENG		99.8 10 9987	98.3 13 9626	96.8 16 9275	95.3 19 8938	94.0 23 8637	93.1 25 8392	92.3 28 8164	91.6 7959	90.9 7767	90.3 7578

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
24	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	99.9	98.7	97.6	96.7	96.0
23	92.3	93.3	94.3	95.2	96.2	97.2	98.1	99.0	100.0	100.2	99.0	97.8	96.9	96.2
22	92.2	93.2	94.1	95.1	96.1	97.0	98.0	98.9	99.9	100.7	99.2	98.0	97.1	96.4
21	92.9	93.9	94.9	95.8	96.8	97.8	98.7	99.7	100.6	101.6	100.5	99.2	98.0	97.1
20	93.6	94.6	95.6	96.6	97.6	98.5	99.5	100.4	101.4	102.3	101.9	100.4	99.1	97.9
19	93.5	94.5	95.5	96.5	97.5	98.4	99.4	100.3	101.3	102.2	102.5	100.8	99.4	98.1

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table**29000 FT to 19000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	300	%N1								99.0	98.1	97.4	96.9
	-15	MAX TAT								-3	-2	0	1
	459	FF/ENG								7336	7163	7022	6927
28	300	%N1						99.0	98.1	97.3	96.4	95.6	95.1
	-14	MAX TAT						-3	-1	1	3	5	6
	452	FF/ENG						7547	7349	7185	7037	6920	6833
28	300	%N1					98.4	97.2	96.1	95.4	94.7	94.2	93.8
	-12	MAX TAT					0	2	4	6	8	9	11
	445	FF/ENG					7597	7391	7218	7077	6946	6841	6758
26	300	%N1			98.7	97.5	96.3	95.4	94.6	94.0	93.3	92.8	92.4
	-11	MAX TAT			-1	2	5	7	9	11	13	14	15
	438	FF/ENG			7891	7658	7453	7268	7113	6983	6861	6765	6688
25	300	%N1		98.0	96.7	95.6	94.7	93.9	93.1	92.5	92.0	91.6	91.3
	-10	MAX TAT		1	5	7	10	12	14	15	17	18	19
	432	FF/ENG		7979	7728	7519	7338	7169	7028	6907	6793	6703	6628
24	300	%N1	97.2	96.1	94.9	94.0	93.1	92.4	91.9	91.4	91.0	90.6	90.3
	-9	MAX TAT	4	7	10	13	15	17	19	20	22	23	
	425	FF/ENG	8049	7820	7594	7405	7240	7086	6955	6840	6733	6646	6572
23	300	%N1	95.4	94.3	93.3	92.5	91.9	91.3	90.8	90.4	90.0	89.7	89.4
	-7	MAX TAT	10	13	16	18	20	22	24				
	419	FF/ENG	7910	7695	7486	7313	7157	7011	6887	6776	6672	6589	6517
22	300	%N1	93.7	92.8	92.0	91.4	90.8	90.3	89.8	89.4	89.0	88.7	88.5
	-6	MAX TAT	16	18	21	23	25						
	412	FF/ENG	7798	7595	7401	7236	7085	6944	6824	6717	6619	6541	6473
21	300	%N1	92.4	91.7	91.0	90.4	89.8	89.3	88.9	88.5	88.1	87.9	87.6
	-5	MAX TAT	23	26									
	406	FF/ENG	7708	7514	7330	7171	7025	6890	6777	6674	6580	6507	6442
20	300	%N1	91.3	90.6	90.0	89.4	88.9	88.4	88.0	87.6	87.3	87.0	86.7
	-4	MAX TAT											
	400	FF/ENG	7636	7448	7274	7123	6983	6855	6747	6646	6557	6487	6424
19	300	%N1	90.3	89.7	89.1	88.5	88.0	87.5	87.1	86.7	86.4	86.1	85.8
	-2	MAX TAT											
	394	FF/ENG	7578	7400	7237	7092	6956	6833	6729	6631	6544	6475	6410

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
29	94.4	95.5	96.5	97.5	98.5	99.5	100.4	101.4	100.6	99.2	98.1	97.2	96.3	95.4
28	94.0	95.1	96.1	97.1	98.1	99.0	100.0	101.0	100.8	99.3	98.2	97.3	96.4	95.5
27	93.6	94.7	95.7	96.7	97.6	98.6	99.6	100.5	100.9	99.4	98.3	97.3	96.4	95.6
26	93.2	94.2	95.2	96.2	97.1	98.1	99.1	100.0	100.9	99.5	98.5	97.3	96.4	95.7
25	92.6	93.6	94.6	95.6	96.5	97.5	98.4	99.4	100.3	99.6	98.5	97.4	96.5	95.8
24	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	99.9	98.7	97.6	96.7	96.0
23	92.3	93.3	94.3	95.2	96.2	97.2	98.1	99.0	100.0	100.2	99.0	97.8	96.9	96.2
22	92.2	93.2	94.1	95.1	96.1	97.0	98.0	98.9	99.9	100.7	99.2	98.0	97.1	96.4
21	92.9	93.9	94.9	95.8	96.8	97.8	98.7	99.7	100.6	101.6	100.5	99.2	98.0	97.1
20	93.6	94.6	95.6	96.6	97.6	98.5	99.5	100.4	101.4	102.3	101.9	100.4	99.1	97.9
19	93.5	94.5	95.5	96.5	97.5	98.4	99.4	100.3	101.3	102.2	102.5	100.8	99.4	98.1

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

300 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	300	%N1	99.1	97.6	96.3	95.0	93.7	92.8	92.0	91.3	90.6	90.0	89.4
	-1	MAX TAT	13	16	19	22	25	28	30				
	388	FF/ENG	10112	9754	9445	9126	8820	8541	8310	8095	7898	7713	7535
17	300	%N1	96.9	95.7	94.5	93.5	92.6	91.7	91.0	90.3	89.7	89.1	88.5
	1	MAX TAT	19	22	24	27	29						
	383	FF/ENG	9886	9572	9294	9004	8719	8454	8235	8034	7845	7667	7495
16	300	%N1	95.1	94.1	93.3	92.4	91.5	90.7	90.1	89.4	88.8	88.2	87.6
	2	MAX TAT	25	27	29	32							
	377	FF/ENG	9703	9426	9172	8898	8626	8374	8168	7979	7794	7618	7452
15	300	%N1	93.7	92.9	92.2	91.4	90.6	89.8	89.1	88.5	87.9	87.3	86.6
	3	MAX TAT	30	32	34								
	371	FF/ENG	9561	9304	9062	8800	8542	8304	8107	7921	7740	7568	7401
14	300	%N1	92.6	91.9	91.2	90.4	89.6	88.9	88.2	87.6	86.9	86.2	85.5
	5	MAX TAT	35										
	366	FF/ENG	9446	9197	8964	8717	8472	8240	8047	7865	7685	7511	7344
13	300	%N1	91.6	90.9	90.2	89.5	88.7	88.0	87.3	86.6	85.9	85.2	84.6
	6	MAX TAT											
	361	FF/ENG	9348	9110	8891	8656	8415	8186	7994	7810	7630	7460	7296
12	300	%N1	90.7	90.0	89.4	88.6	87.8	87.0	86.3	85.6	85.0	84.4	83.8
	8	MAX TAT											
	356	FF/ENG	9282	9058	8844	8610	8370	8141	7947	7765	7590	7424	7264
11	300	%N1	89.8	89.1	88.5	87.7	86.9	86.0	85.4	84.8	84.2	83.6	82.9
	9	MAX TAT											
	350	FF/ENG	9251	9026	8809	8575	8335	8106	7915	7736	7565	7403	7247
10	300	%N1	89.0	88.3	87.7	86.8	86.0	85.2	84.6	84.0	83.3	82.7	82.1
	11	MAX TAT											
	345	FF/ENG	9224	8996	8780	8547	8309	8085	7896	7718	7549	7393	7241
9	300	%N1	88.2	87.5	86.7	85.9	85.2	84.4	83.7	83.1	82.4	81.8	81.2
	12	MAX TAT											
	340	FF/ENG	9189	8965	8752	8521	8287	8066	7877	7701	7533	7382	7232
8	300	%N1	87.3	86.5	85.8	85.1	84.4	83.6	82.8	82.2	81.5	81.0	80.4
	14	MAX TAT											
	336	FF/ENG	9152	8933	8724	8498	8267	8047	7858	7682	7515	7366	7216

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	96.5	97.4	98.4	99.4	100.3	101.2	102.2	103.1	101.4	99.8	98.3	97.4	96.5	95.6
17	96.5	97.5	98.4	99.4	100.3	101.3	102.2	103.1	102.0	100.2	98.7	97.6	96.6	95.8
16	96.5	97.4	98.4	99.3	100.3	101.2	102.1	103.1	102.8	100.9	99.3	98.0	97.0	96.1
15	96.3	97.3	98.2	99.2	100.1	101.0	102.0	102.9	103.4	101.5	99.9	98.4	97.4	96.5
14	95.9	96.9	97.8	98.8	99.7	100.6	101.6	102.5	103.4	101.8	100.2	98.7	97.7	96.8
13	95.5	96.5	97.4	98.4	99.3	100.2	101.1	102.1	103.0	102.2	100.5	99.0	98.0	97.1
12	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.7	102.7	100.8	99.3	98.3	97.4
11	94.7	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.9	101.0	99.5	98.4	97.5
10	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.4	102.2	101.2	99.8	98.6	97.6
9	93.7	94.6	95.5	96.5	97.4	98.3	99.2	100.1	100.9	101.8	101.5	100.0	98.8	97.8
8	93.2	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.5	101.3	101.9	100.3	98.9	98.0

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	300	%N1	89.4	88.8	88.2	87.6	87.1	86.7	86.2	85.8	85.3	85.0	84.7
	-1 388	MAX TAT FF/ENG	7535	7365	7207	7064	6932	6814	6712	6614	6527	6458	6394
17	300	%N1	88.5	87.9	87.3	86.7	86.2	85.6	85.2	84.7	84.4	84.2	83.9
	1 383	MAX TAT FF/ENG	7495	7329	7175	7033	6901	6784	6684	6588	6503	6436	6373
16	300	%N1	87.6	87.0	86.3	85.7	85.1	84.7	84.3	84.0	83.7	83.4	83.2
	2 377	MAX TAT FF/ENG	7452	7289	7133	6988	6859	6747	6650	6556	6474	6408	6347
15	300	%N1	86.6	85.9	85.2	84.7	84.3	83.9	83.5	83.1	82.8	82.5	82.2
	3 371	MAX TAT FF/ENG	7401	7235	7080	6939	6815	6706	6612	6520	6441	6377	6316
14	300	%N1	85.5	84.9	84.4	83.9	83.5	83.0	82.6	82.2	81.8	81.5	81.2
	5 366	MAX TAT FF/ENG	7344	7181	7030	6894	6774	6669	6576	6486	6409	6346	6286
13	300	%N1	84.6	84.1	83.6	83.0	82.5	82.0	81.6	81.2	80.9	80.6	80.3
	6 361	MAX TAT FF/ENG	7296	7137	6991	6858	6744	6642	6549	6460	6384	6320	6261
12	300	%N1	83.8	83.2	82.6	82.1	81.6	81.1	80.7	80.4	80.0	79.7	79.5
	8 356	MAX TAT FF/ENG	7264	7108	6966	6837	6726	6625	6532	6443	6367	6304	6243
11	300	%N1	82.9	82.3	81.7	81.2	80.7	80.3	79.9	79.5	79.2	78.9	78.6
	9 350	MAX TAT FF/ENG	7247	7096	6955	6827	6717	6616	6524	6435	6360	6296	6235
10	300	%N1	82.1	81.5	80.9	80.4	79.9	79.5	79.1	78.7	78.4	78.1	77.8
	11 345	MAX TAT FF/ENG	7241	7092	6950	6820	6708	6608	6517	6430	6357	6293	6232
9	300	%N1	81.2	80.6	80.0	79.5	79.0	78.6	78.2	77.9	77.6	77.3	77.0
	12 340	MAX TAT FF/ENG	7232	7084	6937	6805	6692	6594	6505	6421	6349	6286	6225
8	300	%N1	80.4	79.8	79.2	78.7	78.2	77.8	77.4	77.1	76.8	76.5	76.2
	14 336	MAX TAT FF/ENG	7216	7066	6917	6785	6673	6578	6492	6412	6341	6277	6216

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	96.5	97.4	98.4	99.4	100.3	101.2	102.2	103.1	101.4	99.8	98.3	97.4	96.5	95.6
17	96.5	97.5	98.4	99.4	100.3	101.3	102.2	103.1	102.0	100.2	98.7	97.6	96.6	95.8
16	96.5	97.4	98.4	99.3	100.3	101.2	102.1	103.1	102.8	100.9	99.3	98.0	97.0	96.1
15	96.3	97.3	98.2	99.2	100.1	101.0	102.0	102.9	103.4	101.5	99.9	98.4	97.4	96.5
14	95.9	96.9	97.8	98.8	99.7	100.6	101.6	102.5	103.4	101.8	100.2	98.7	97.7	96.8
13	95.5	96.5	97.4	98.4	99.3	100.2	101.1	102.1	103.0	102.2	100.5	99.0	98.0	97.1
12	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.7	102.7	100.8	99.3	98.3	97.4
11	94.7	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.9	101.0	99.5	98.4	97.5
10	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.4	102.2	101.2	99.8	98.6	97.6
9	93.7	94.6	95.5	96.5	97.4	98.3	99.2	100.1	100.9	101.8	101.5	100.0	98.8	97.8
8	93.2	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.5	101.3	101.9	100.3	98.9	98.0

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26													
25													
24													
23													
22	320 -3 438	%N1 MAX TAT FF/ENG										97.3 9 8740	96.5 11 8547
21	320 -2 432	%N1 MAX TAT FF/ENG							98.6 9 9280	97.6 12 9054	96.6 14 8826	95.7 17 8613	94.9 19 8435
20	320 -1 425	%N1 MAX TAT FF/ENG					99.1 12 9683	97.8 14 9389	96.8 17 9154	95.9 20 8935	94.9 22 8715	94.0 24 8517	93.5 26 8349
19	320 0 419	%N1 MAX TAT FF/ENG			99.9 11 10229	98.5 14 9872	97.1 17 9552	96.0 20 9277	95.1 22 9051	94.2 24 8839	93.5 27 8632	92.9 29 8447	92.4 30 8286

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
22	92.1	93.1	94.1	95.0	95.9	96.9	97.8	98.7	99.7	99.6	98.5	97.5	96.8	96.2
21	93.0	93.9	94.9	95.9	96.8	97.8	98.7	99.6	100.6	101.0	99.6	98.6	97.6	96.9
20	93.8	94.7	95.7	96.7	97.6	98.6	99.5	100.5	101.5	102.4	100.8	99.7	98.4	97.7
19	93.6	94.6	95.5	96.5	97.5	98.4	99.3	100.3	101.2	102.2	101.2	99.8	98.5	97.7

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table**29000 FT to 19000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29													
28													
27	320 -9 472	%N1 MAX TAT FF/ENG											98.6 2 7872
26	320 -8 465	%N1 MAX TAT FF/ENG								98.2 3 7986	97.7 4 7899	97.3 5 7820	96.9 6 7748
25	320 -7 458	%N1 MAX TAT FF/ENG						97.6 5 8121	96.9 7 7988	96.4 8 7889	96.0 9 7805	95.7 10 7729	95.4 11 7661
24	320 -6 451	%N1 MAX TAT FF/ENG				97.2 6 8287	96.6 8 8143	96.0 10 8009	95.5 11 7889	95.1 13 7796	94.7 14 7714	94.4 15 7639	94.1 15 7573
23	320 -5 445	%N1 MAX TAT FF/ENG		97.2 8 8496	96.4 10 8313	95.8 12 8157	95.2 13 8025	94.6 15 7898	94.1 16 7788	93.7 18 7703	93.3 18 7626	93.0 19 7556	92.8 20 7492
22	320 -3 438	%N1 MAX TAT FF/ENG	96.5 11 8547	95.7 13 8368	94.9 15 8199	94.2 17 8055	93.7 18 7931	93.2 20 7811	92.9 21 7708	92.6 22 7627	92.3 23 7553	92.0 24 7485	91.8 25 7424
21	320 -2 432	%N1 MAX TAT FF/ENG	94.9 19 8435	94.1 21 8268	93.5 23 8111	93.0 24 7977	92.6 26 7859	92.2 27 7745	91.9 28 7647	91.6 29 7568	91.3 31 7495	91.1 32 7428	90.9 33 7368
20	320 -1 425	%N1 MAX TAT FF/ENG	93.5 26 8349	93.0 28 8191	92.4 29 8043	92.0 31 7916	91.6 33 7802	91.2 35 7692	90.9 37 7599	90.6 39 7523	90.4 41 7451	90.2 43 7387	90.0 45 7331
19	320 0 419	%N1 MAX TAT FF/ENG	92.4 30 8286	91.9 32 8133	91.4 34 7991	91.0 36 7869	90.6 38 7759	90.3 40 7655	90.0 42 7567	89.7 44 7495	89.5 46 7427	89.3 48 7365	89.1 50 7312

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
27	93.8	94.7	95.7	96.7	97.7	98.6	99.6	100.5	100.1	98.7	97.8	97.0	96.2	95.4
26	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	100.2	98.8	97.9	97.0	96.2	95.5
25	93.0	94.0	94.9	95.9	96.8	97.8	98.7	99.7	100.2	98.9	98.0	97.0	96.2	95.5
24	92.6	93.5	94.5	95.5	96.4	97.3	98.3	99.2	100.2	99.1	98.2	97.2	96.4	95.8
23	92.3	93.2	94.2	95.2	96.1	97.0	98.0	98.9	99.8	99.3	98.3	97.3	96.6	96.0
22	92.1	93.1	94.1	95.0	95.9	96.9	97.8	98.7	99.7	99.6	98.5	97.5	96.8	96.2
21	93.0	93.9	94.9	95.9	96.8	97.8	98.7	99.6	100.6	101.0	99.6	98.6	97.6	96.9
20	93.8	94.7	95.7	96.7	97.6	98.6	99.5	100.5	101.5	102.4	100.8	99.7	98.4	97.7
19	93.6	94.6	95.5	96.5	97.5	98.4	99.3	100.3	101.2	102.2	101.2	99.8	98.5	97.7

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

320 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	320	%N1	100.4	99.1	97.9	96.6	95.4	94.4	93.7	93.1	92.4	91.9	91.4
	2	MAX TAT	12	14	17	20	23	25	27	29	31	33	
	413	FF/ENG	10704	10366	10063	9736	9437	9179	8963	8761	8566	8391	8235
17	320	%N1	98.3	97.2	96.1	94.9	94.0	93.3	92.6	92.0	91.4	90.9	90.4
	3	MAX TAT	18	20	22	25	27	30	32	34			
	407	FF/ENG	10492	10193	9913	9612	9338	9093	8885	8691	8506	8340	8191
16	320	%N1	96.5	95.4	94.6	93.7	92.9	92.2	91.6	91.0	90.5	90.0	89.5
	4	MAX TAT	23	25	28	30	32	35					
	401	FF/ENG	10305	10034	9781	9506	9247	9010	8809	8624	8450	8292	8148
15	320	%N1	94.9	94.1	93.4	92.7	91.9	91.3	90.7	90.1	89.6	89.1	88.6
	6	MAX TAT	29	31	33	35							
	395	FF/ENG	10142	9897	9663	9405	9155	8925	8735	8559	8392	8238	8096
14	320	%N1	93.8	93.1	92.5	91.7	91.0	90.4	89.8	89.3	88.7	88.2	87.8
	7	MAX TAT	33	35	37								
	390	FF/ENG	10008	9776	9554	9309	9069	8849	8667	8495	8332	8182	8041
13	320	%N1	92.7	92.1	91.5	90.9	90.2	89.5	88.9	88.4	87.9	87.3	86.7
	9	MAX TAT	38										
	384	FF/ENG	9888	9665	9457	9228	8996	8779	8602	8435	8272	8119	7977
12	320	%N1	91.8	91.2	90.7	90.0	89.3	88.6	88.1	87.4	86.8	86.2	85.8
	10	MAX TAT											
	379	FF/ENG	9781	9575	9381	9159	8928	8715	8540	8370	8207	8054	7916
11	320	%N1	90.9	90.3	89.7	89.1	88.4	87.6	87.0	86.4	85.9	85.4	85.0
	12	MAX TAT											
	373	FF/ENG	9708	9510	9318	9096	8866	8652	8476	8307	8148	8000	7866
10	320	%N1	90.0	89.4	88.8	88.2	87.4	86.6	86.1	85.6	85.1	84.6	84.1
	13	MAX TAT											
	368	FF/ENG	9653	9453	9260	9037	8808	8596	8423	8258	8103	7959	7829
9	320	%N1	89.1	88.6	87.9	87.2	86.4	85.8	85.3	84.8	84.2	83.7	83.2
	14	MAX TAT											
	363	FF/ENG	9595	9394	9200	8979	8755	8548	8378	8216	8064	7924	7798
8	320	%N1	88.2	87.6	86.9	86.3	85.6	85.0	84.4	83.9	83.3	82.8	82.4
	16	MAX TAT											
	358	FF/ENG	9539	9340	9147	8931	8713	8510	8342	8183	8034	7894	7770

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	101.7	100.1	98.7	97.8	96.9	96.1
17	95.4	96.3	97.3	98.2	99.1	100.0	101.0	101.9	102.3	100.5	99.0	97.9	97.0	96.2
16	95.3	96.2	97.1	98.1	99.0	99.9	100.8	101.8	102.7	101.1	99.6	98.3	97.4	96.5
15	95.2	96.1	97.1	98.0	98.9	99.8	100.7	101.7	102.6	101.8	100.1	98.7	97.7	96.9
14	94.9	95.9	96.8	97.8	98.7	99.6	100.5	101.4	102.3	102.2	100.5	99.0	98.1	97.2
13	94.6	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.6	100.9	99.3	98.3	97.4
12	94.3	95.3	96.2	97.1	98.0	99.0	99.9	100.8	101.6	102.5	101.2	99.7	98.6	97.6
11	93.7	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.8	101.3	99.8	98.6	97.7
10	93.0	94.0	94.9	95.8	96.7	97.6	98.5	99.4	100.3	101.1	101.3	100.0	98.8	97.8
9	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.9	100.7	101.6	100.2	98.9	97.9
8	92.3	93.2	94.1	95.0	95.9	96.8	97.7	98.6	99.5	100.3	101.1	100.4	99.1	98.1

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table

18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	320	%N1	91.4	90.9	90.4	90.1	89.7	89.4	89.1	88.8	88.6	88.4	88.2
	2	MAX TAT											
	413	FF/ENG	8235	8087	7952	7836	7730	7630	7548	7478	7412	7354	7303
17	320	%N1	90.4	90.0	89.5	89.2	88.8	88.5	88.2	87.9	87.7	87.5	87.3
	3	MAX TAT											
	407	FF/ENG	8191	8049	7920	7809	7705	7609	7530	7464	7400	7343	7294
16	320	%N1	89.5	89.1	88.6	88.3	87.9	87.6	87.3	87.0	86.8	86.5	86.3
	4	MAX TAT											
	401	FF/ENG	8148	8010	7886	7780	7679	7586	7508	7441	7376	7319	7270
15	320	%N1	88.6	88.2	87.8	87.4	87.0	86.6	86.3	86.0	85.7	85.5	85.4
	6	MAX TAT											
	395	FF/ENG	8096	7965	7845	7740	7639	7544	7467	7400	7336	7280	7232
14	320	%N1	87.8	87.2	86.8	86.4	86.0	85.6	85.4	85.2	85.0	84.8	84.6
	7	MAX TAT											
	390	FF/ENG	8041	7909	7791	7687	7588	7496	7422	7356	7294	7239	7192
13	320	%N1	86.7	86.2	85.8	85.5	85.2	84.9	84.7	84.5	84.3	84.0	83.8
	9	MAX TAT											
	384	FF/ENG	7977	7848	7735	7635	7539	7450	7378	7314	7253	7200	7154
12	320	%N1	85.8	85.4	85.1	84.7	84.4	84.1	83.8	83.6	83.3	83.1	82.9
	10	MAX TAT											
	379	FF/ENG	7916	7793	7684	7587	7493	7407	7337	7274	7215	7163	7118
11	320	%N1	85.0	84.6	84.2	83.9	83.5	83.2	82.9	82.6	82.4	82.2	82.0
	12	MAX TAT											
	373	FF/ENG	7866	7747	7642	7547	7455	7371	7303	7240	7182	7130	7086
10	320	%N1	84.1	83.7	83.3	82.9	82.6	82.3	82.0	81.7	81.5	81.3	81.2
	13	MAX TAT											
	368	FF/ENG	7829	7715	7612	7518	7426	7343	7276	7213	7154	7102	7059
9	320	%N1	83.2	82.8	82.4	82.1	81.7	81.4	81.1	80.9	80.7	80.5	80.3
	14	MAX TAT											
	363	FF/ENG	7798	7686	7584	7489	7397	7315	7246	7182	7123	7071	7027
8	320	%N1	82.4	82.0	81.6	81.2	80.9	80.6	80.3	80.0	79.8	79.6	79.5
	16	MAX TAT											
	358	FF/ENG	7770	7659	7556	7460	7367	7285	7216	7151	7091	7040	6996

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	101.7	100.1	98.7	97.8	96.9	96.1
17	95.4	96.3	97.3	98.2	99.1	100.0	101.0	101.9	102.3	100.5	99.0	97.9	97.0	96.2
16	95.3	96.2	97.1	98.1	99.0	99.9	100.8	101.8	102.7	101.1	99.6	98.3	97.4	96.5
15	95.2	96.1	97.1	98.0	98.9	99.8	100.7	101.7	102.6	101.8	100.1	98.7	97.7	96.9
14	94.9	95.9	96.8	97.8	98.7	99.6	100.5	101.4	102.3	102.2	100.5	99.0	98.1	97.2
13	94.6	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.6	100.9	99.3	98.3	97.4
12	94.3	95.3	96.2	97.1	98.0	99.0	99.9	100.8	101.6	102.5	101.2	99.7	98.6	97.6
11	93.7	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.8	101.3	99.8	98.6	97.7
10	93.0	94.0	94.9	95.8	96.7	97.6	98.5	99.4	100.3	101.1	101.3	100.0	98.8	97.8
9	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.9	100.7	101.6	100.2	98.9	97.9
8	92.3	93.2	94.1	95.0	95.9	96.8	97.7	98.6	99.5	100.3	101.1	100.4	99.1	98.1

With engine anti-ice on, decrease limit %N1 by 0.4.

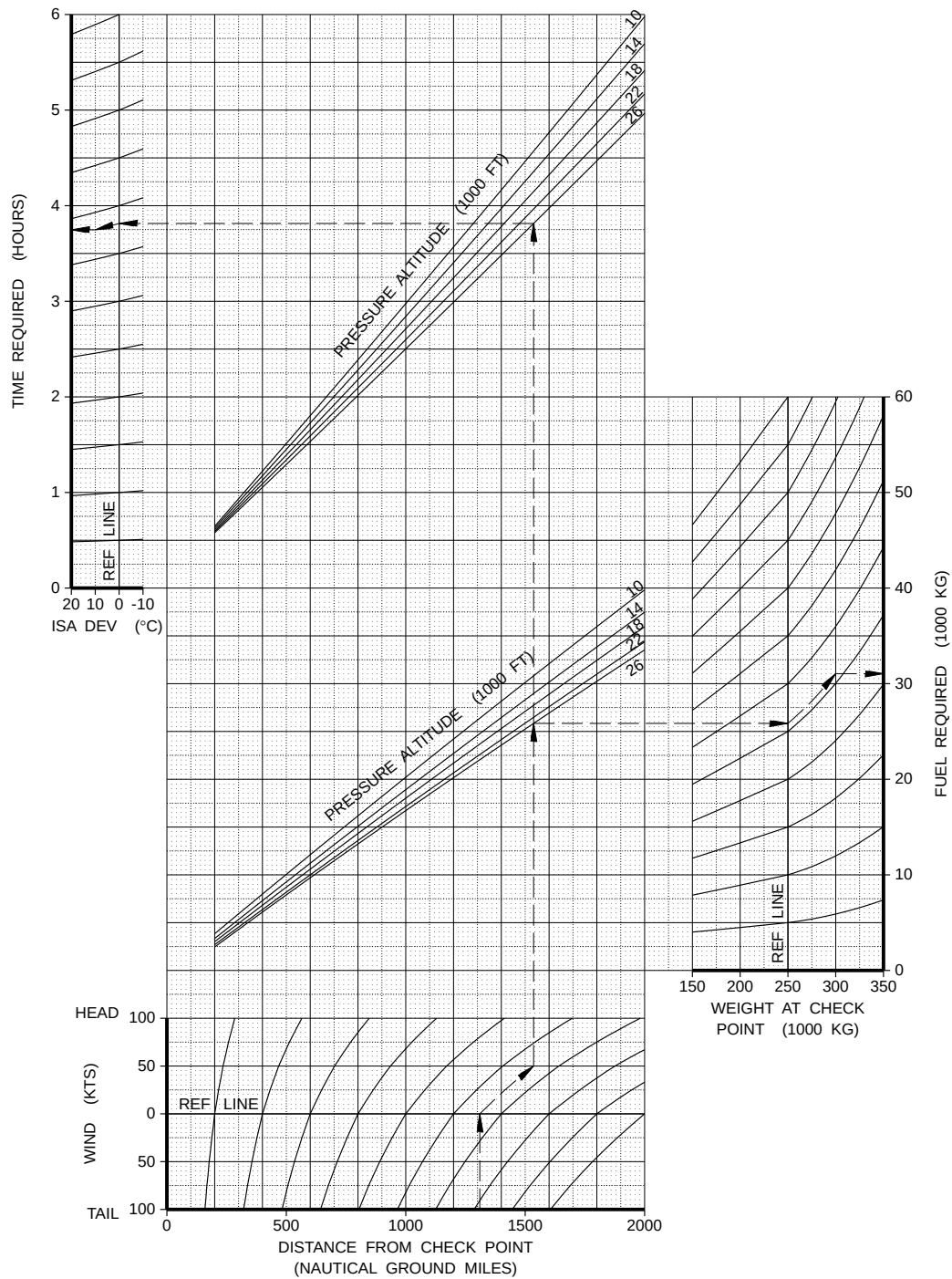
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on 310/250 descent and includes APU fuel burn

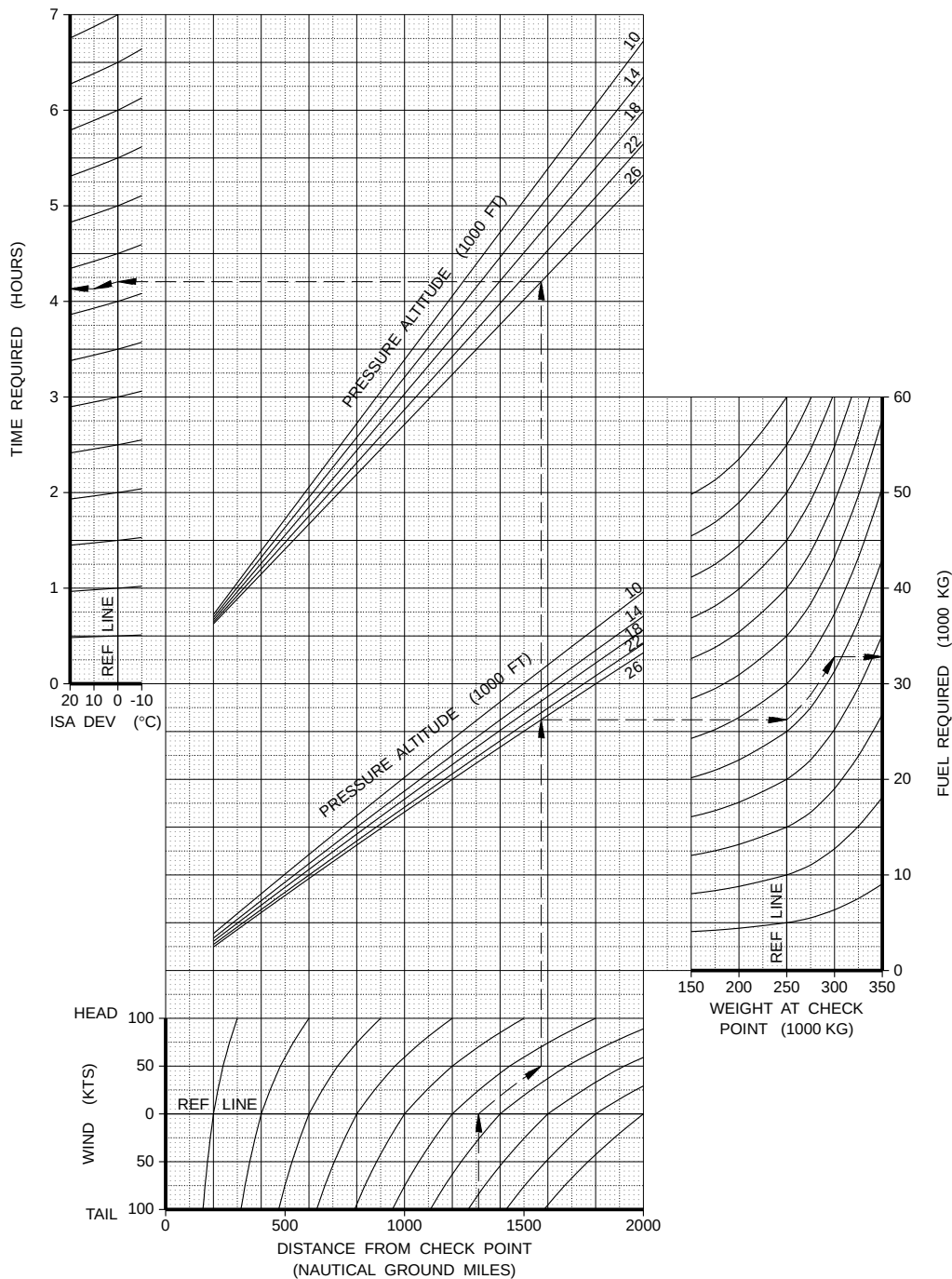


ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Diversion Fuel and Time

Based on 260/250 descent and includes APU fuel burn

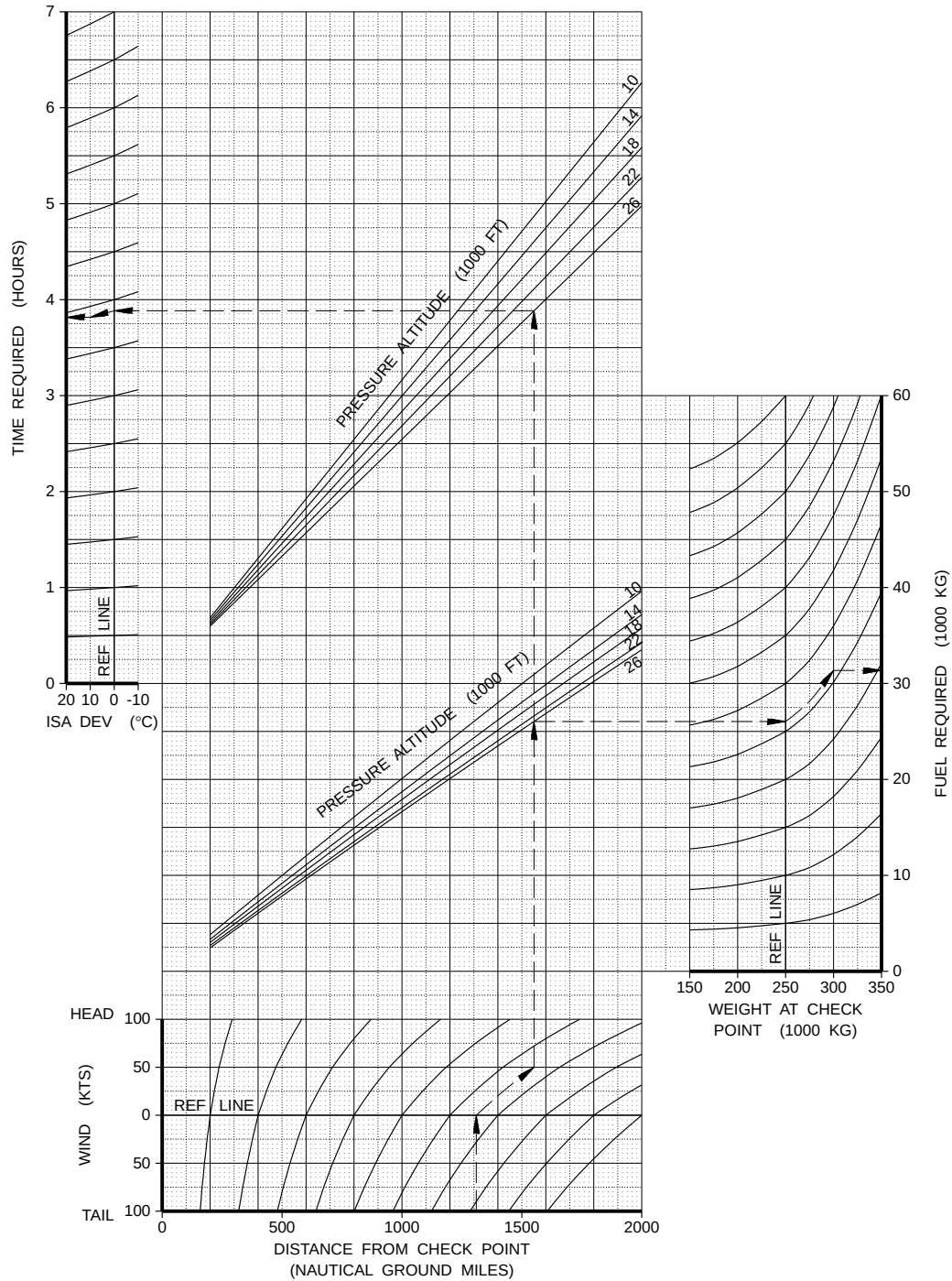


ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Diversion Fuel and Time

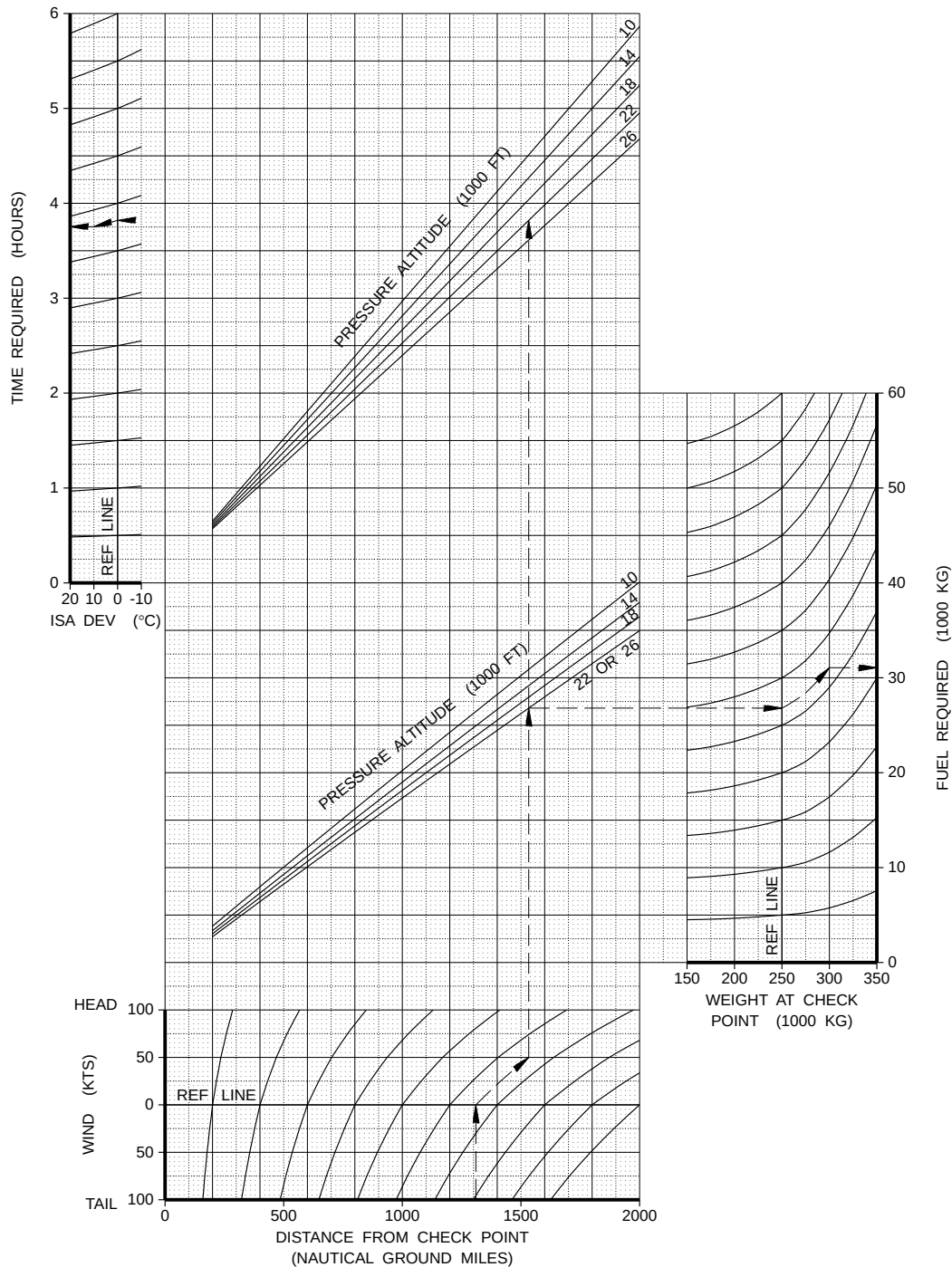
Based on 280/250 descent and includes APU fuel burn



ENGINE INOP MAX CONTINUOUS THRUST

300 KIAS Diversion Fuel and Time

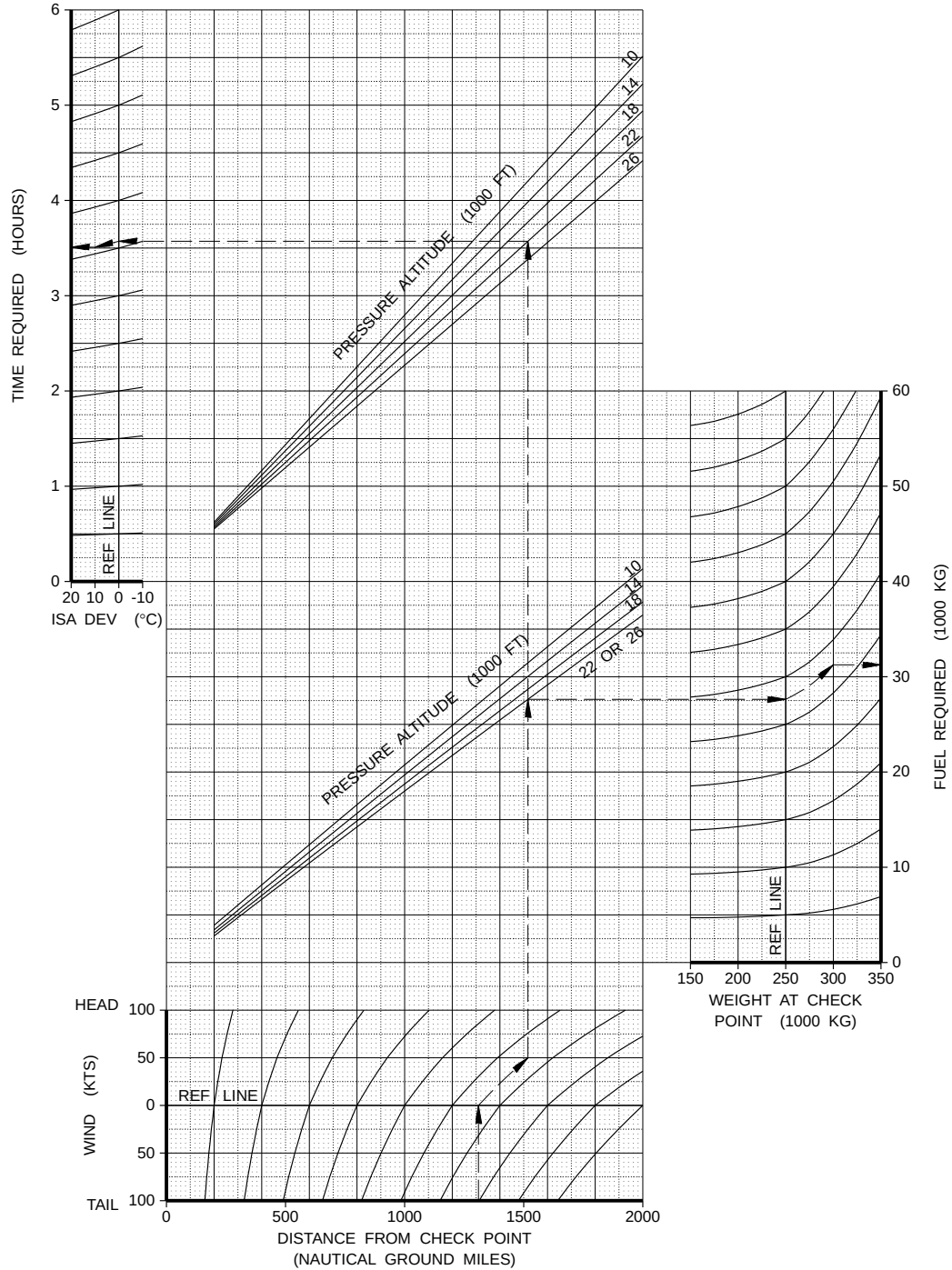
Based on 300/250 descent and includes APU fuel burn



ENGINE INOP MAX CONTINUOUS THRUST

320 KIAS Diversion Fuel and Time

Based on 320/250 descent and includes APU fuel burn



ENGINE INOP

MAX CONTINUOUS THRUST

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
30000	%N1								96.7	91.2	87.2	84.7
	KIAS								242	226	217	217
	FF/ENG								6550	5550	4880	4450
25000	%N1						95.1	90.5	87.7	85.0	82.5	80.0
	KIAS						262	228	217	217	217	217
	FF/ENG						7470	6420	5760	5200	4730	4340
20000	%N1		100.4	96.4	92.4	90.1	87.8	85.4	82.8	80.1	77.6	75.2
	KIAS		299	289	259	238	229	223	217	217	217	217
	FF/ENG		10320	9240	8120	7350	6690	6110	5530	5040	4630	4250
15000	%N1	93.4	91.4	89.2	87.1	85.0	82.8	80.3	77.7	75.3	72.9	70.7
	KIAS	269	260	253	244	238	229	223	217	217	217	217
	FF/ENG	9670	8950	8210	7550	6950	6380	5850	5350	4900	4500	4140
10000	%N1	88.6	86.7	84.6	82.3	80.1	77.8	75.6	73.2	71.0	68.6	66.3
	KIAS	265	260	253	244	238	229	223	217	217	217	217
	FF/ENG	9370	8730	8050	7430	6880	6330	5820	5330	4910	4520	4160
5000	%N1	83.9	81.9	79.7	77.7	75.7	73.6	71.5	69.1	66.7	64.6	62.6
	KIAS	264	260	253	244	238	229	223	217	217	217	217
	FF/ENG	9130	8560	7940	7360	6850	6340	5870	5400	4970	4580	4240
1500	%N1	80.5	78.7	76.7	74.7	72.8	70.7	68.5	66.2	64.1	62.0	59.9
	KIAS	264	260	253	244	238	229	223	217	217	217	217
	FF/ENG	9070	8520	7930	7380	6880	6380	5910	5440	5010	4630	4300

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

NON-STANDARD CONFIGURATION

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Intentionally
Blank

Gear Down

Introduction

This section contains performance data for airplane operation with landing gear extended for all phases of flight. 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 10°C.

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.

Obstacle Limit

Obstacle clearance charts are provided for each certified takeoff flap setting based on normal air conditioning operation. 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 and can account for air conditioning packs off. 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 correct for OAT as necessary. Repeat this procedure to correct for airport pressure altitude and wind, then continue vertically to read obstacle limit weight.

Net Level Off Weight

This chart is used to determine the dispatch maximum weight for terrain clearance based on the Approved Flight Manual net engine inoperative, gear down performance at speed for optimum climb gradient. Refer to Chapter 2 text for description of net level off weight 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 enroute terrain clearance. Data is based on gear down net performance, Max Continuous thrust following engine failure and level flight deceleration to optimum driftdown speed (speed for optimum climb gradient). Refer to Chapter 2 for description of chart usage.

Long Range Cruise Trip Fuel and Time

A Long Range Cruise Trip Fuel and Time 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.

All Engines

Long Range Cruise Altitude Capability

Long Range Cruise altitude capability is provided at Max Climb thrust with 300 ft/min residual rate of climb.

220 KIAS Max Climb %N1

Max Climb %N1 based on normal air conditioning bleed is shown for a 220 KIAS climb schedule which approximates economy climb and turbulent air penetration speed, VREF 30+80 KIAS with the landing gear extended. Max Climb %N1 may be read directly from the table for the desired pressure altitude and TAT.

Long Range Cruise Table

LRC 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

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 VREF 30+80 KIAS and straight in approach.

Holding

%N1 required, ISA and fuel flow with gear down are shown as described in Chapter 3 with a minimum maneuver speed of VREF30+80 KIAS for Flaps Up and VREF30+60 for Flaps 1.

Engine Inoperative

Driftdown/LRC Cruise Range Capability

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

Long Range Cruise Altitude Capability

Altitude capability is provided in the same format as the gear up data shown in Chapter 3 for Max Climb Thrust and Long Range Cruise speed with 300 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+80 KIAS.

Alternate Mode EEC

Introduction

No takeoff speed adjustments or other performance adjustments are required for operation of EEC in the ALTERNATE mode. Power setting adjustments are only required for the takeoff thrust rating.

Max Takeoff %N1

Takeoff power settings are presented for normal air condition bleed. Max Takeoff %N1 may be read directly from the tables for the desired pressure altitude and airport OAT.

The EEC ALTERNATE mode schedule provides equal or greater thrust than the normal mode for the same lever position. Thrust protection is not provided in the ALTERNATE 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.

GEAR DOWN

Takeoff Climb Limit

Flaps 5

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	251.4	247.0	236.8	231.0	226.1	219.3	210.3	200.5	189.5	174.8	159.7	
52	126	256.5	252.8	242.3	232.1	226.0	221.4	216.1	206.2	195.0	181.0	166.8	160.9
50	122	261.8	258.3	248.1	237.7	227.2	221.3	217.1	211.6	200.5	186.4	173.2	168.2
48	118	266.6	263.6	254.0	243.3	232.8	222.5	217.0	212.1	205.7	191.7	178.3	173.3
46	115	271.3	268.8	259.8	248.9	238.3	227.9	218.1	212.0	206.0	196.8	183.5	178.5
44	111	277.1	274.2	264.7	254.5	243.7	233.1	223.0	213.1	205.9	199.3	188.5	183.4
42	108	282.7	279.6	269.1	259.9	248.9	238.3	227.8	217.7	207.1	199.2	191.2	188.0
40	104	288.5	285.4	273.8	264.5	254.4	243.5	232.9	222.4	211.6	200.4	191.1	187.9
38	100	294.6	291.4	279.9	269.2	260.1	249.1	238.4	227.5	216.3	204.9	192.2	187.8
36	97	300.2	297.1	286.1	274.6	264.9	254.8	243.9	232.9	221.4	209.5	196.7	191.6
34	93	305.9	303.0	292.4	280.6	269.6	260.4	249.5	238.2	226.7	214.5	201.3	196.2
32	90	311.7	308.8	298.2	286.7	274.7	265.0	255.0	243.7	231.8	219.6	206.1	200.9
30	86	317.7	314.7	303.6	293.0	280.8	269.6	260.4	249.0	237.1	224.5	211.1	205.8
28	82	318.0	316.0	309.0	298.2	286.7	274.8	265.1	254.4	242.4	229.7	215.8	210.6
26	79	318.2	316.1	313.9	303.2	292.2	280.2	269.3	259.6	247.6	234.8	220.9	215.4
24	75	318.5	316.3	314.0	308.0	297.4	285.4	273.5	263.7	252.6	239.9	225.8	220.2
22	72	318.6	316.4	314.1	308.1	301.5	290.1	277.9	267.1	256.6	244.6	230.9	225.4
20	68	318.8	316.6	314.2	308.2	301.5	293.2	281.7	270.1	259.9	248.3	235.4	230.1
18	64	319.1	316.7	314.3	308.3	301.6	293.2	285.2	272.7	262.6	251.2	238.9	234.0
16	61	319.3	316.8	314.4	308.3	301.6	293.3	285.5	275.4	264.4	253.9	242.0	237.1
14	57	319.4	317.0	314.5	308.4	301.7	293.3	285.6	276.4	266.1	255.5	244.7	240.1
12	54	319.6	317.1	314.6	308.5	301.8	293.3	285.6	276.3	266.7	257.0	246.0	241.8
10	50	319.7	317.2	314.7	308.5	301.8	293.4	285.6	276.2	266.6	257.2	246.3	242.0
-40	-40	320.4	317.8	315.0	308.5	301.7	293.3	283.6	273.0	263.9	254.6	244.9	241.1

With engine bleed for packs off, increase weight by 750 kg.

With engine anti-ice on, decrease weight by 1850 kg.

With engine and wing anti-ice on, decrease weight by 3850 kg.

Flaps 15

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	251.4	247.1	236.9	231.0	225.2	217.4	209.9	200.6	189.5	174.8	159.7	
52	126	256.6	252.9	242.3	232.1	226.1	221.4	214.7	206.2	195.1	181.1	166.9	161.0
50	122	261.9	258.4	248.1	237.7	227.3	221.4	217.1	211.6	200.5	186.5	173.2	168.3
48	118	266.7	263.6	254.1	243.3	232.9	222.6	217.0	212.2	205.8	191.8	178.4	173.4
46	115	271.3	268.9	259.9	248.9	238.4	228.0	218.2	212.1	206.1	196.9	183.5	178.5
44	111	277.1	274.3	264.7	254.5	243.7	233.2	223.0	213.2	206.0	199.4	188.5	183.4
42	108	282.7	279.7	269.1	260.0	249.0	238.4	227.9	217.7	207.1	199.3	191.2	188.1
40	104	288.5	285.4	273.8	264.6	254.4	243.6	233.0	222.4	211.6	200.4	191.1	188.0
38	100	294.6	291.4	280.0	269.2	260.2	249.1	238.4	227.6	216.4	204.9	192.3	187.9
36	97	300.2	297.2	286.2	274.6	264.9	254.9	243.9	232.9	221.5	209.6	196.7	191.7
34	93	305.9	303.1	292.5	280.6	269.6	260.5	249.6	238.3	226.7	214.5	201.3	196.3
32	90	311.8	308.9	298.3	286.7	274.8	265.0	255.0	243.7	231.8	219.6	206.2	200.9
30	86	312.5	310.5	303.7	293.1	280.9	269.7	260.5	249.1	237.2	224.6	211.1	205.9
28	82	312.7	310.7	308.6	298.2	286.8	274.8	265.2	254.5	242.4	229.8	215.9	210.6
26	79	312.9	310.8	308.7	302.8	292.3	280.3	269.3	259.6	247.6	234.9	221.0	215.5
24	75	313.1	311.0	308.8	302.8	296.1	285.4	273.6	263.7	252.7	239.9	225.9	220.3
22	72	313.3	311.1	308.9	302.9	296.2	288.2	278.0	267.1	256.7	244.7	231.0	225.4
20	68	313.5	311.2	309.0	303.0	296.2	288.2	280.6	270.2	260.0	248.4	235.5	230.2
18	64	313.7	311.4	309.1	303.0	296.3	288.3	280.7	272.7	262.7	251.3	239.0	234.1
16	61	313.9	311.5	309.2	303.1	296.3	288.3	280.7	273.0	263.7	252.8	240.7	236.0
14	57	314.0	311.7	309.3	303.2	296.4	288.3	280.7	273.0	263.7	252.9	242.0	237.4
12	54	314.2	311.8	309.4	303.2	296.4	288.3	280.7	273.0	263.7	252.9	242.1	237.8
10	50	314.3	311.9	309.5	303.3	296.5	288.4	280.7	273.0	263.7	252.9	242.1	237.9
-40	-40	315.0	312.4	309.8	303.4	296.5	288.5	280.9	273.0	263.7	252.8	242.0	237.8

With engine bleed for packs off, increase weight by 800 kg.

With engine anti-ice on, decrease weight by 900 kg.

With engine and wing anti-ice on, decrease weight by 2250 kg.

GEAR DOWN

Takeoff Climb Limit

Flaps 20

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	251.4	247.2	236.9	231.1	223.0	215.3	207.8	200.6	189.5	174.9	159.8	
52	126	256.6	252.9	242.4	232.2	226.1	220.3	212.6	205.1	195.1	181.1	166.9	161.0
50	122	261.9	258.4	248.2	237.8	227.3	221.4	217.2	209.5	200.6	186.5	173.2	168.3
48	118	266.7	263.6	254.1	243.4	232.9	222.6	217.1	212.2	205.7	191.8	178.4	173.4
46	115	271.3	268.9	260.0	249.0	238.4	228.0	218.2	212.1	206.1	196.9	183.6	178.5
44	111	277.2	274.3	264.8	254.6	243.8	233.2	223.0	213.2	206.0	199.4	188.5	183.5
42	108	282.8	279.7	269.2	260.0	249.0	238.4	227.9	217.8	207.1	199.3	191.3	188.1
40	104	288.6	285.5	273.9	264.6	254.5	243.6	233.0	222.4	211.7	200.4	191.1	188.0
38	100	294.7	291.4	280.1	269.2	260.2	249.1	238.5	227.6	216.4	204.9	192.3	187.9
36	97	300.3	297.2	286.2	274.7	265.0	254.9	243.9	233.0	221.5	209.6	196.7	191.7
34	93	305.9	303.1	292.5	280.7	269.7	260.5	249.6	238.3	226.7	214.6	201.4	196.3
32	90	309.3	307.4	298.3	286.8	274.9	265.1	255.1	243.8	231.9	219.7	206.2	200.9
30	86	309.5	307.6	303.7	293.1	280.9	269.7	260.6	249.1	237.2	224.6	211.2	205.9
28	82	309.7	307.7	305.8	298.3	286.9	274.9	265.2	254.5	242.5	229.8	215.9	210.7
26	79	309.9	307.9	305.9	300.0	292.4	280.3	269.4	259.7	247.7	234.9	221.0	215.5
24	75	310.1	308.0	306.0	300.1	293.3	285.5	273.7	263.8	252.7	240.0	225.9	220.3
22	72	310.3	308.2	306.1	300.1	293.3	285.5	278.0	267.2	256.7	244.7	231.0	225.5
20	68	310.5	308.3	306.2	300.2	293.4	285.6	278.0	270.2	259.6	247.4	234.9	229.7
18	64	310.7	308.4	306.3	300.2	293.4	285.6	278.0	270.5	261.2	248.9	237.0	232.4
16	61	310.8	308.6	306.4	300.3	293.5	285.6	278.1	270.6	261.3	250.5	238.4	233.7
14	57	311.0	308.7	306.5	300.4	293.5	285.6	278.1	270.6	261.3	250.5	239.7	235.0
12	54	311.1	308.8	306.6	300.4	293.6	285.7	278.1	270.6	261.3	250.6	239.7	235.5
10	50	311.2	308.9	306.7	300.5	293.6	285.7	278.1	270.5	261.3	250.6	239.8	235.5
-40	-40	311.9	309.5	306.9	300.6	293.7	285.8	278.2	270.6	261.3	250.5	239.7	235.4

With engine bleed for packs off, increase weight by 800 kg.

With engine and wing anti-ice on, decrease weight by 1850 kg.

GEAR DOWN

Landing Climb Limit

Flaps 30

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

AIRPORT OAT		LANDING CLIMB LIMIT WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	266.2	258.0	249.4									
52	126	273.8	265.8	256.6	245.7								
50	122	280.5	273.2	264.0	252.2	241.5							
48	118	287.1	279.5	272.0	258.8	247.4	237.9						
46	115	293.8	286.5	278.7	266.9	254.0	243.7	234.8					
44	111	301.0	293.1	285.5	274.3	260.6	249.9	240.6	231.7				
42	108	307.9	299.7	291.8	280.5	268.0	256.1	246.3	237.3	227.7			
40	104	314.5	306.6	298.7	286.9	274.5	262.5	252.1	242.6	232.7	220.2		
38	100	321.3	313.9	305.4	292.7	280.9	269.4	257.9	248.1	237.6	224.7	211.3	
36	97	323.8	320.1	312.2	299.2	286.5	275.2	263.0	252.8	241.7	229.2	215.6	210.3
34	93	324.1	322.3	318.6	305.3	292.0	280.4	268.8	257.3	245.7	232.9	219.8	214.5
32	90	324.3	322.4	320.7	311.3	297.6	285.3	273.8	261.5	249.3	236.4	223.5	218.4
30	86	324.5	322.6	320.8	314.7	302.8	290.1	278.7	266.7	253.2	239.7	226.8	221.8
28	82	324.8	322.8	320.9	314.8	307.5	294.0	283.1	272.2	257.2	243.3	230.1	225.0
26	79	325.0	322.9	321.1	314.9	307.6	297.6	286.4	276.4	261.7	247.1	233.4	228.2
24	75	325.3	323.1	321.2	315.0	307.7	298.1	288.9	279.2	266.2	251.2	237.0	231.3
22	72	325.5	323.3	321.3	315.1	307.7	298.1	289.9	280.8	269.2	254.5	240.7	235.2
20	68	325.7	323.4	321.4	315.2	307.8	298.2	290.0	282.0	271.0	256.7	243.8	238.5
18	64	326.0	323.6	321.5	315.2	307.9	298.2	290.0	282.1	272.8	258.3	246.0	241.2
16	61	326.2	323.7	321.6	315.3	308.0	298.3	290.1	282.1	272.8	260.0	247.5	242.7
14	57	326.4	323.9	321.8	315.4	308.0	298.4	290.1	282.2	272.9	260.0	248.9	244.1
12	54	326.5	324.0	321.9	315.5	308.1	298.4	290.1	282.2	272.9	260.1	249.0	244.6
10	50	326.7	324.2	322.0	315.6	308.2	298.4	290.2	282.2	272.9	260.1	249.0	244.6
-40	-40	327.7	324.9	322.5	315.9	308.5	298.8	290.5	282.5	273.1	260.3	249.2	244.8

With engine bleed for packs off, increase weight 1600 kg.

With engine and wing anti-ice on, decrease weight by 2150 kg.

When operating in icing conditions during any part of the flight when forecast landing temperature is below 10°C, decrease weight by 29150 kg.

Flaps 25

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

AIRPORT OAT		LANDING CLIMB LIMIT WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	269.9	262.5	253.7									
52	126	276.7	269.6	261.0	250.0								
50	122	283.4	276.1	267.9	256.6	245.7							
48	118	290.1	282.4	274.7	263.1	251.7	241.8						
46	115	296.8	289.4	281.4	270.1	258.4	247.8	238.4					
44	111	303.4	296.0	288.2	276.8	265.1	254.0	244.3	235.2				
42	108	309.7	302.2	294.7	283.0	271.3	260.3	250.1	240.8	231.1			
40	104	315.8	308.4	301.2	289.5	277.3	266.5	255.9	246.2	236.0	223.6		
38	100	322.1	315.1	307.4	295.6	283.8	272.4	261.9	251.8	240.9	228.2	214.6	
36	97	324.6	321.0	313.5	301.7	289.6	278.0	266.9	256.8	245.4	232.7	218.9	213.6
34	93	324.8	323.1	319.5	307.3	295.3	283.4	272.0	261.4	249.6	236.6	223.2	217.8
32	90	325.1	323.3	321.5	312.8	300.7	288.3	276.6	265.7	253.4	240.3	227.1	221.8
30	86	325.3	323.4	321.7	315.9	305.4	293.3	281.7	270.1	257.3	243.8	230.6	225.4
28	82	325.5	323.6	321.8	316.1	309.5	297.2	286.1	274.9	261.4	247.4	234.0	228.8
26	79	325.8	323.8	321.9	316.2	309.6	300.5	289.4	279.2	265.9	251.2	237.3	232.1
24	75	326.0	323.9	322.1	316.2	309.7	300.9	292.0	282.1	269.7	255.3	240.9	235.2
22	72	326.2	324.1	322.2	316.3	309.7	301.0	293.1	283.7	272.3	258.7	244.7	239.2
20	68	326.4	324.2	322.3	316.4	309.8	301.0	293.2	284.9	273.9	261.1	248.0	242.5
18	64	326.7	324.4	322.4	316.5	309.9	301.1	293.2	284.9	275.5	262.7	250.2	245.4
16	61	326.9	324.5	322.5	316.6	310.0	301.2	293.3	285.0	275.6	264.3	251.8	246.9
14	57	327.1	324.7	322.6	316.6	310.0	301.2	293.3	285.0	275.6	264.4	253.3	248.4
12	54	327.2	324.8	322.7	316.7	310.1	301.3	293.3	285.1	275.7	264.4	253.3	248.9
10	50	327.4	325.0	322.8	316.8	310.1	301.3	293.4	285.1	275.7	264.4	253.4	249.0
-40	-40	328.4	325.7	323.4	317.1	310.4	301.6	293.7	285.4	275.9	264.7	253.6	249.2

With engine bleed for packs off, increase weight 1650 kg.

With engine and wing anti-ice on, decrease weight by 2100 kg.

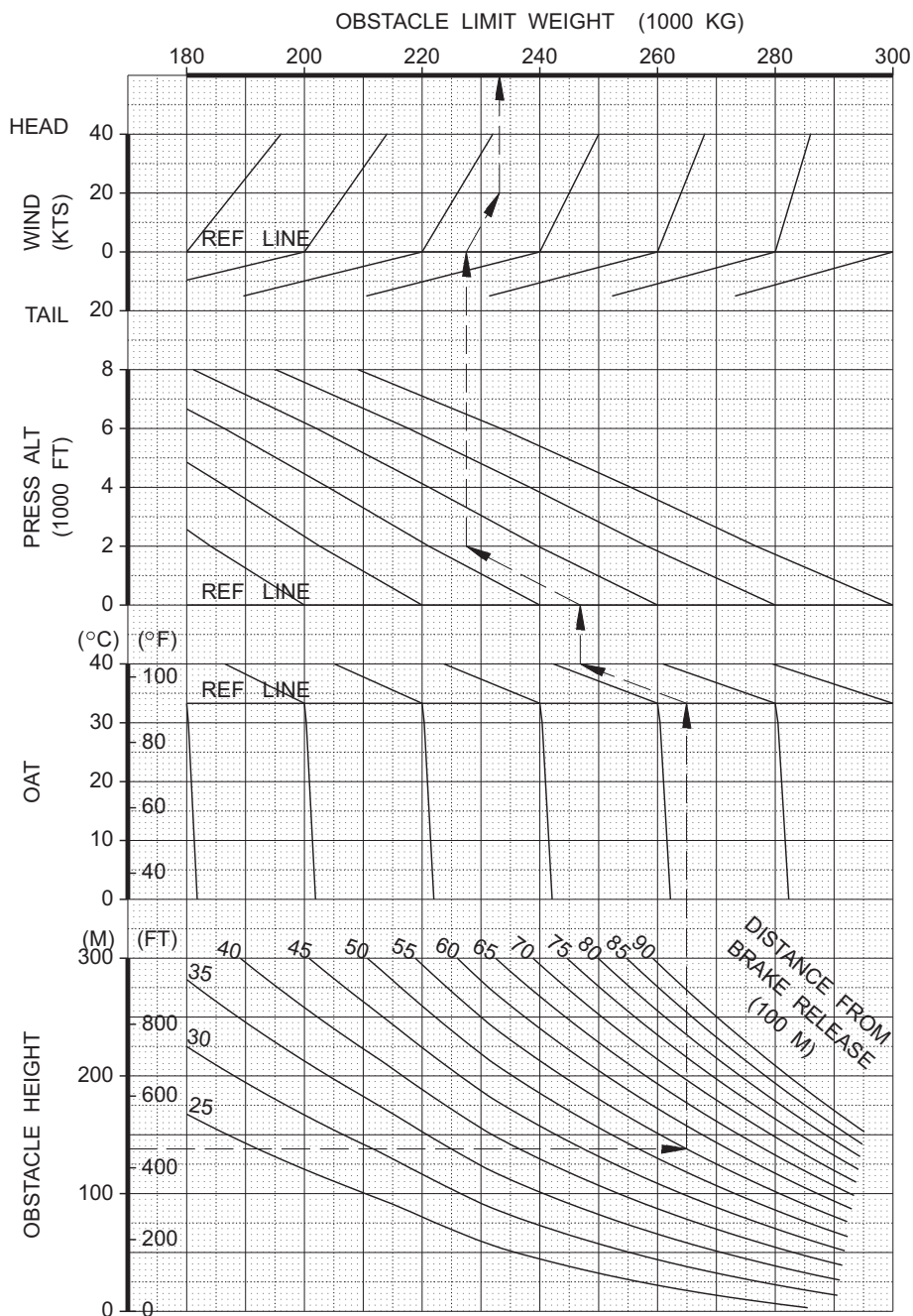
When operating in icing conditions during any part of the flight when forecast landing temperature is below 10°C, decrease weight by 29000 kg.

GEAR DOWN

Obstacle Limit

Flaps 5

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



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 500 kg.

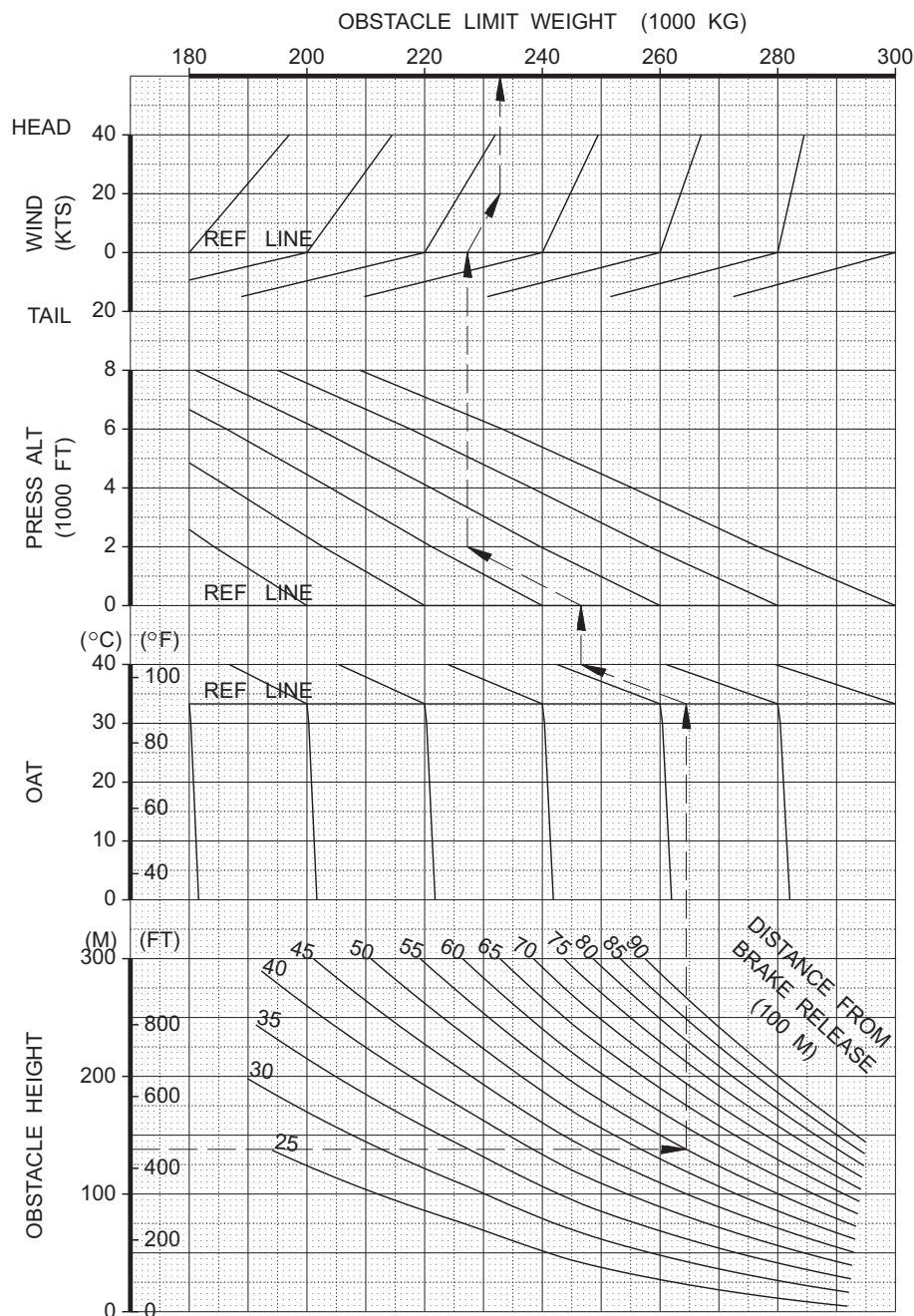
With engine and wing anti-ice on, decrease weight by 3000 kg.

GEAR DOWN

Obstacle Limit

Flaps 15

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



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 500 kg.

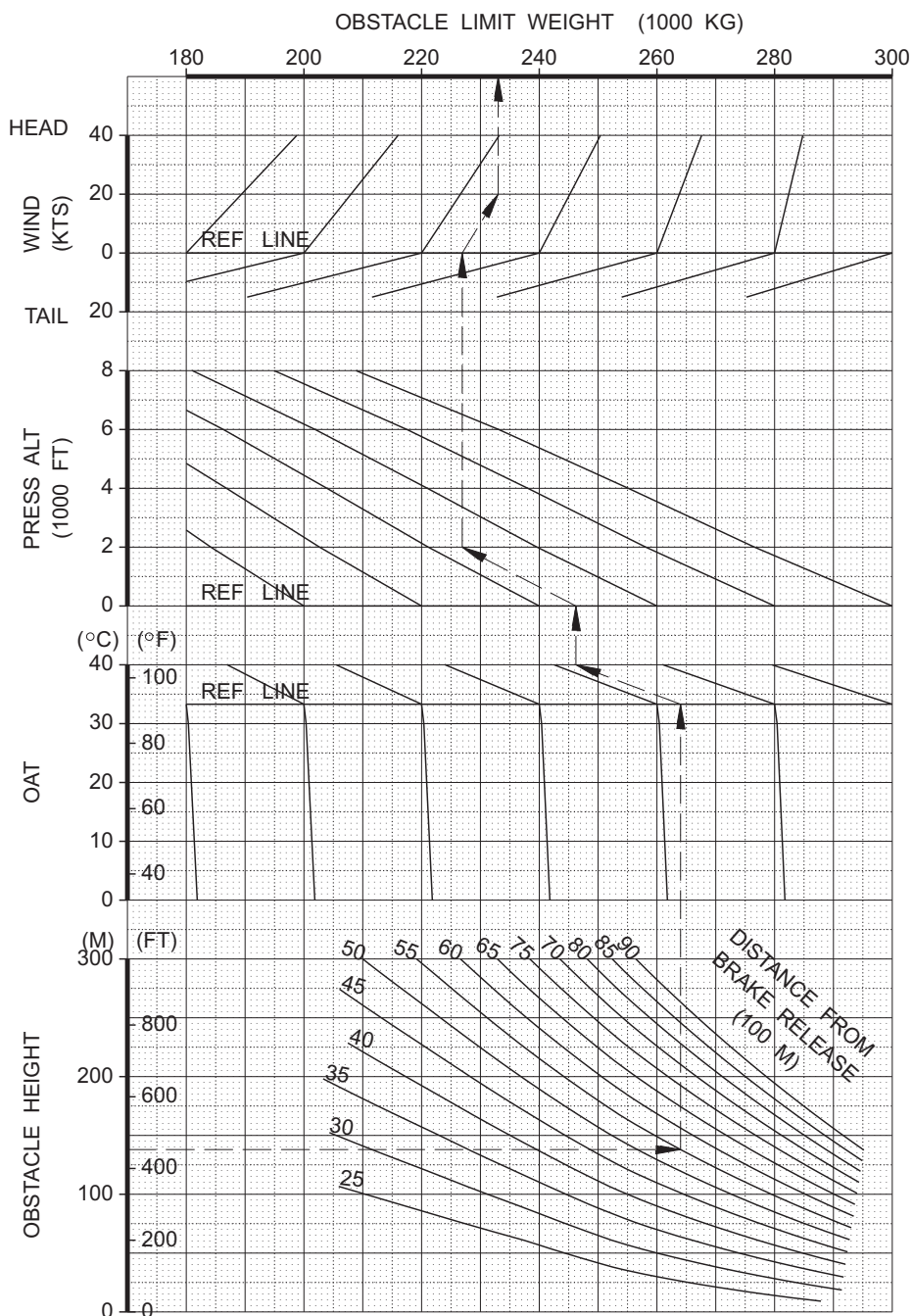
With engine and wing anti-ice on, decrease weight by 3000 kg.

GEAR DOWN

Obstacle Limit

Flaps 20

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



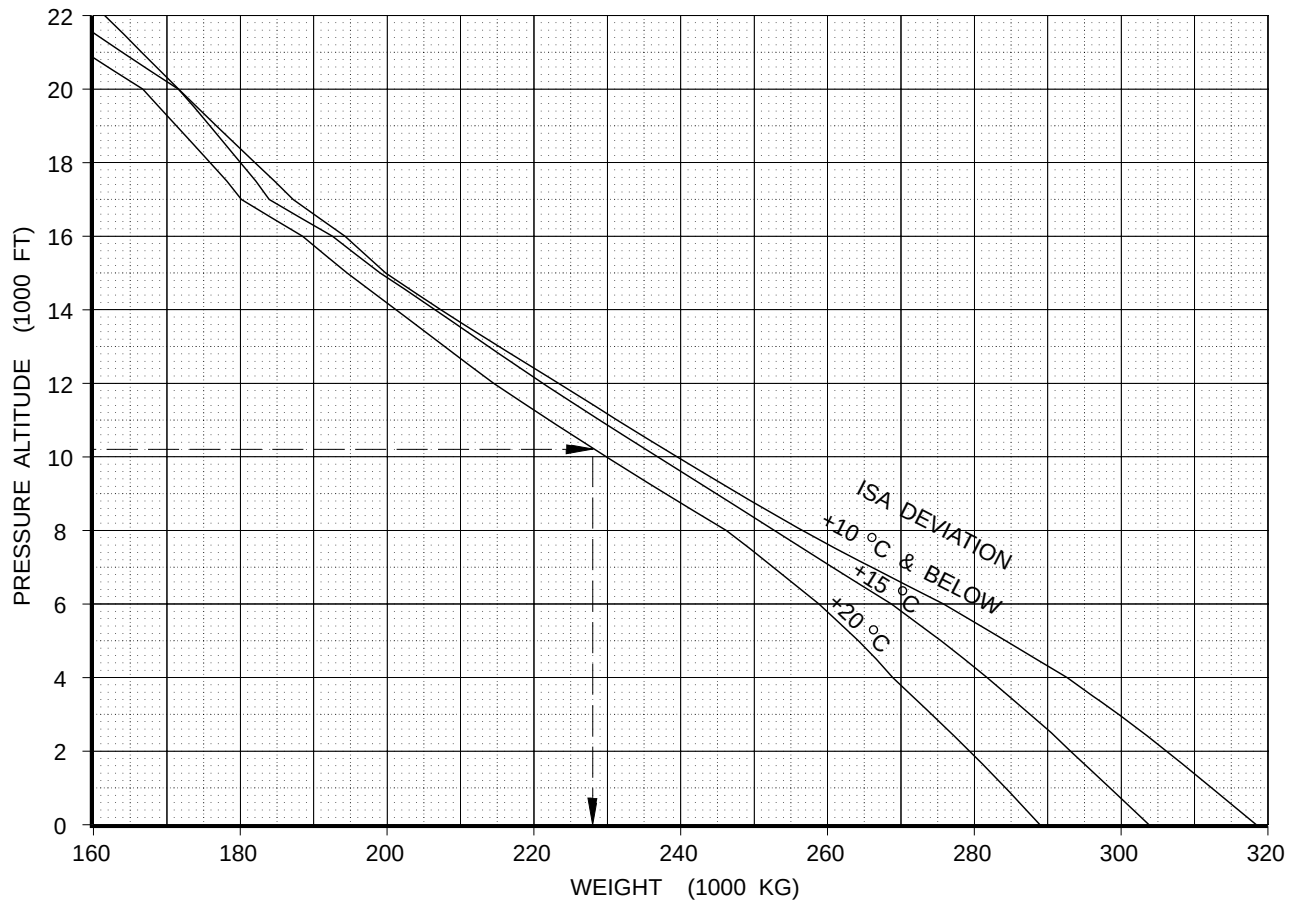
Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.

With engine bleed for packs off, increase weight by 500 kg.

With engine and wing anti-ice on, decrease weight by 3000 kg.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Net Level Off Weight

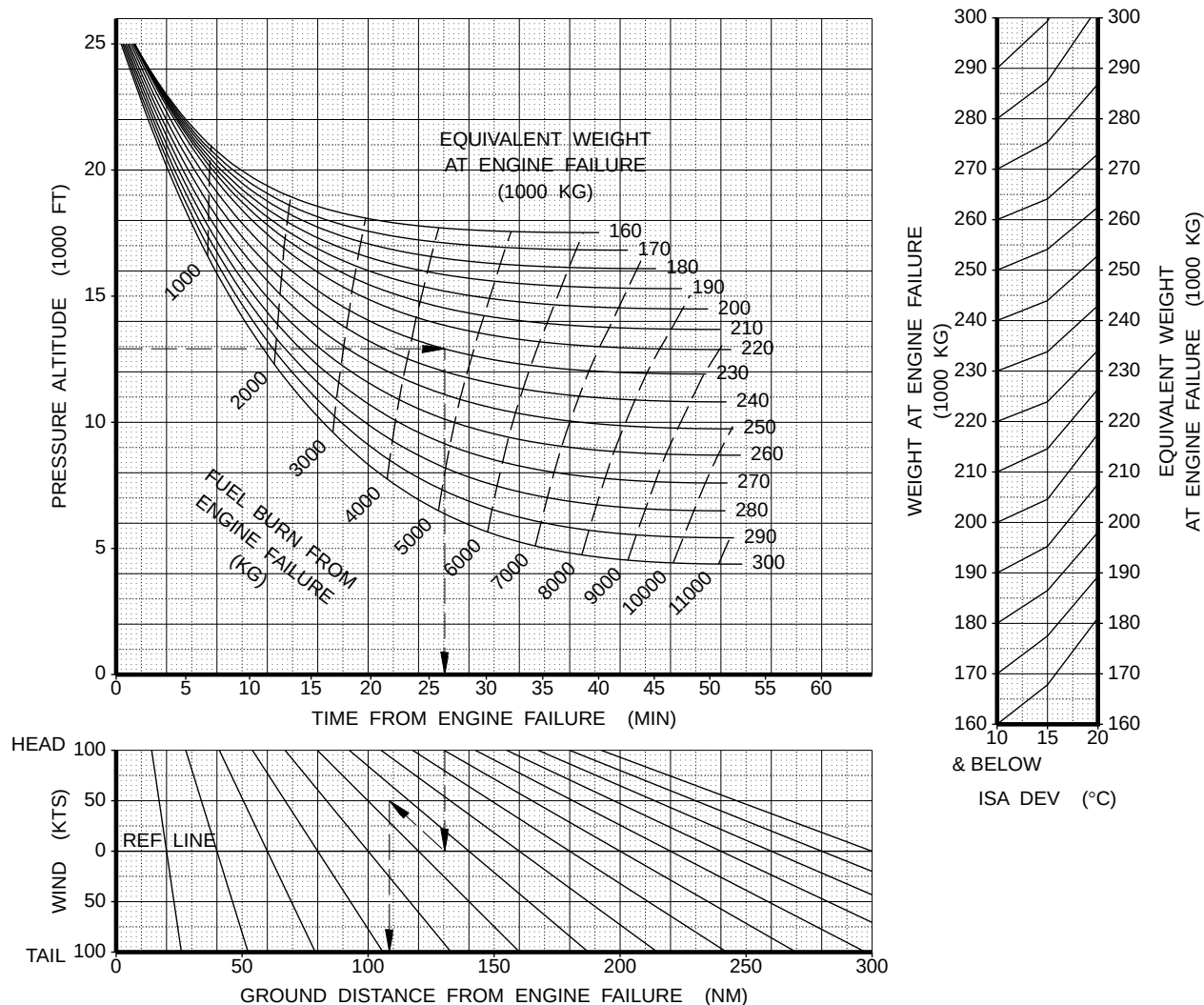


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)										
	PRESSURE ALTITUDE (1000 FT)										
	0	2	4	6	8	10	12	14	16	18	20
ENGINE ONLY	0.0	-0.7	-1.2	-1.2	-1.1	-0.9	-0.7	-0.2	0.0	0.0	0.0
ENGINE AND WING	-2.3	-3.0	-3.0	-3.2	-2.7	-2.4	-1.9	-1.6	-1.3	-1.0	-0.7

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path
25000 FT and Above

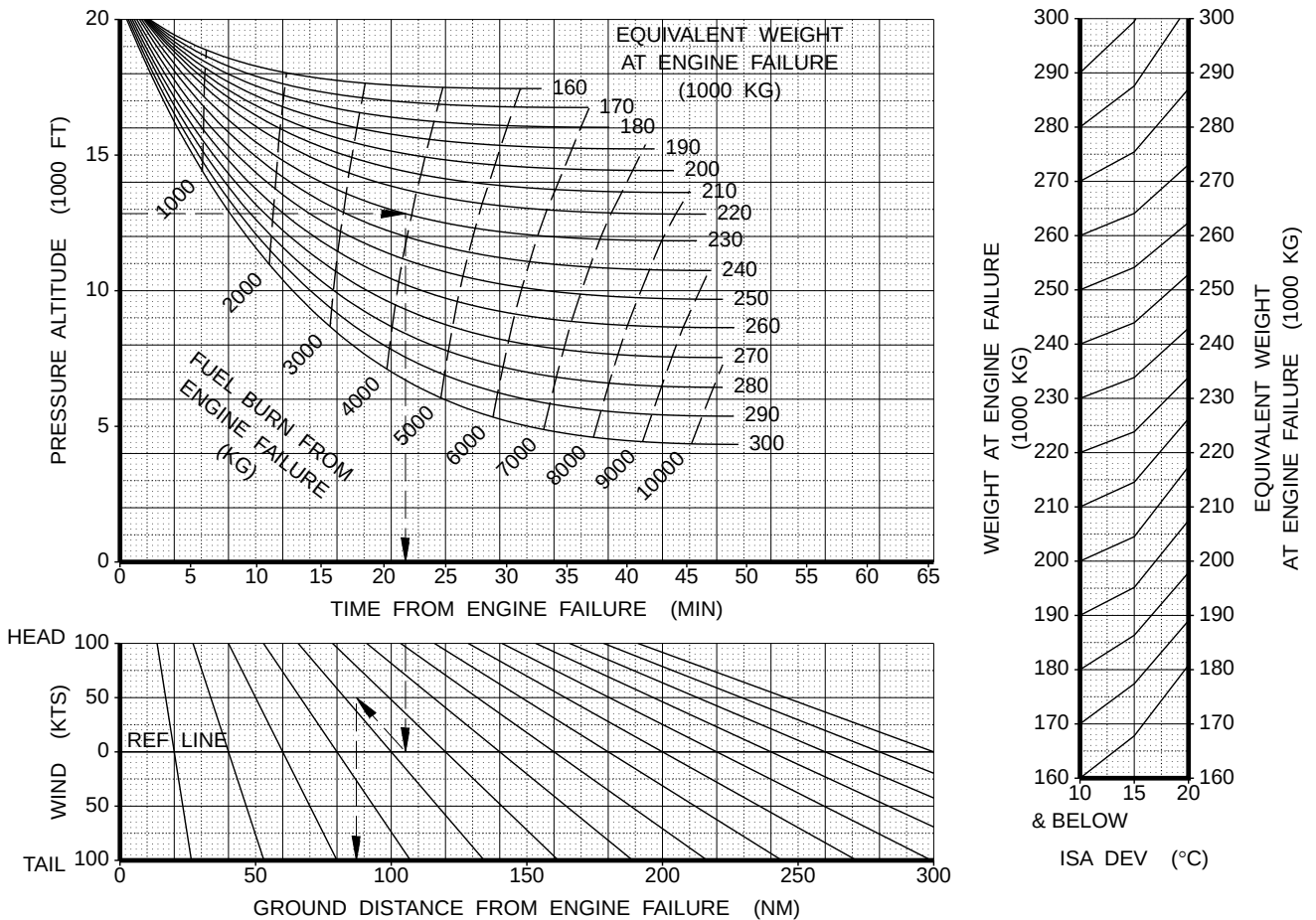


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)											
	PRESSURE ALTITUDE (1000 FT)											
	0	2	4	6	8	10	12	14	16	18	20	
ENGINE ONLY	0.0	0.7	1.2	1.2	1.1	0.9	0.7	0.2	0.0	0.0	0.0	
ENGINE AND WING	2.3	3.0	3.0	3.2	2.7	2.4	1.9	1.6	1.3	1.0	0.7	

**GEAR DOWN
ENGINE INOP**
MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path
Below 25000 FT



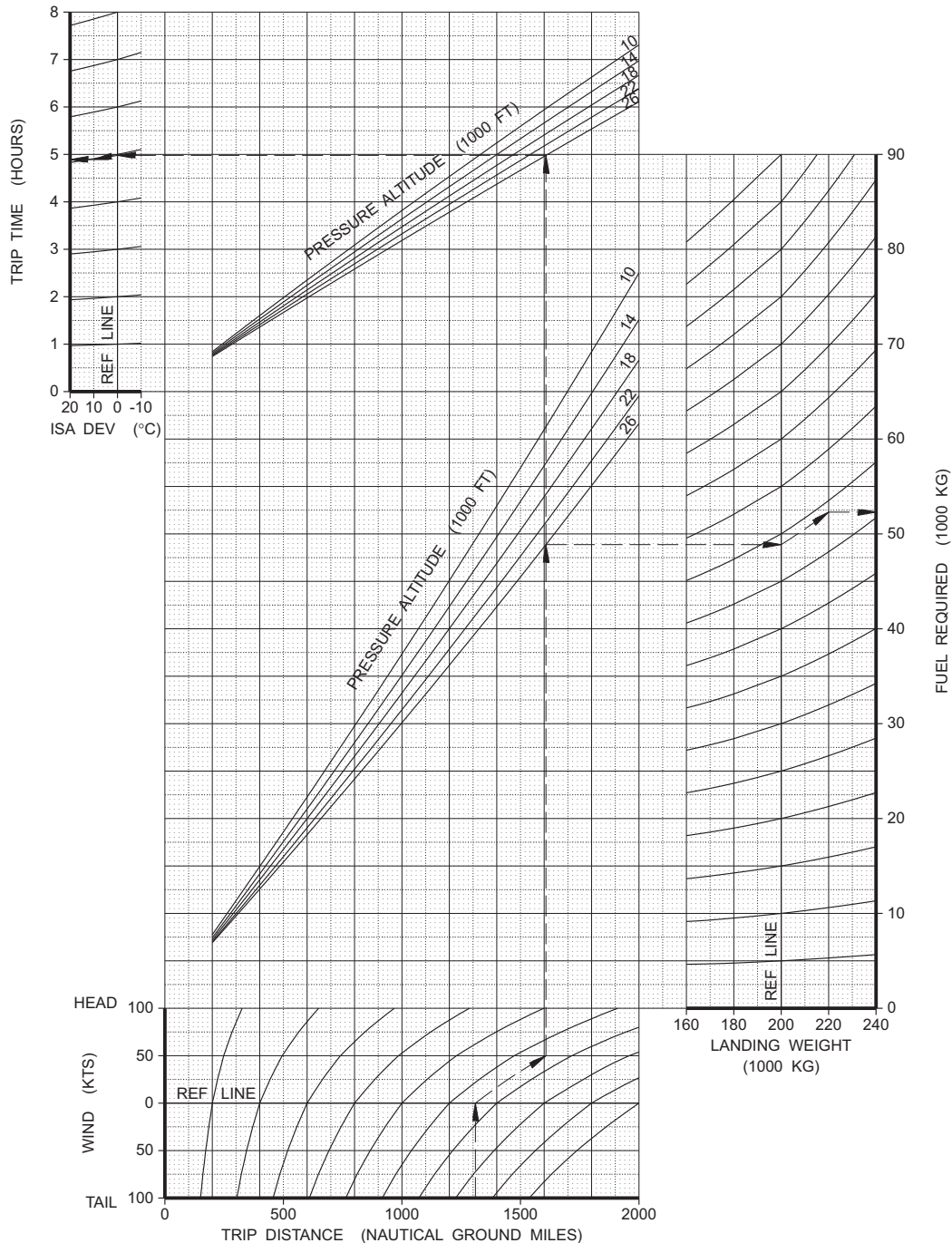
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)											
	PRESSURE ALTITUDE (1000 FT)											
	0	2	4	6	8	10	12	14	16	18	20	
ENGINE ONLY	0.0	0.7	1.2	1.2	1.1	0.9	0.7	0.2	0.0	0.0	0.0	
ENGINE AND WING	2.3	3.0	3.0	3.2	2.7	2.4	1.9	1.6	1.3	1.0	0.7	

GEAR DOWN

Long Range Cruise Trip Fuel and Time

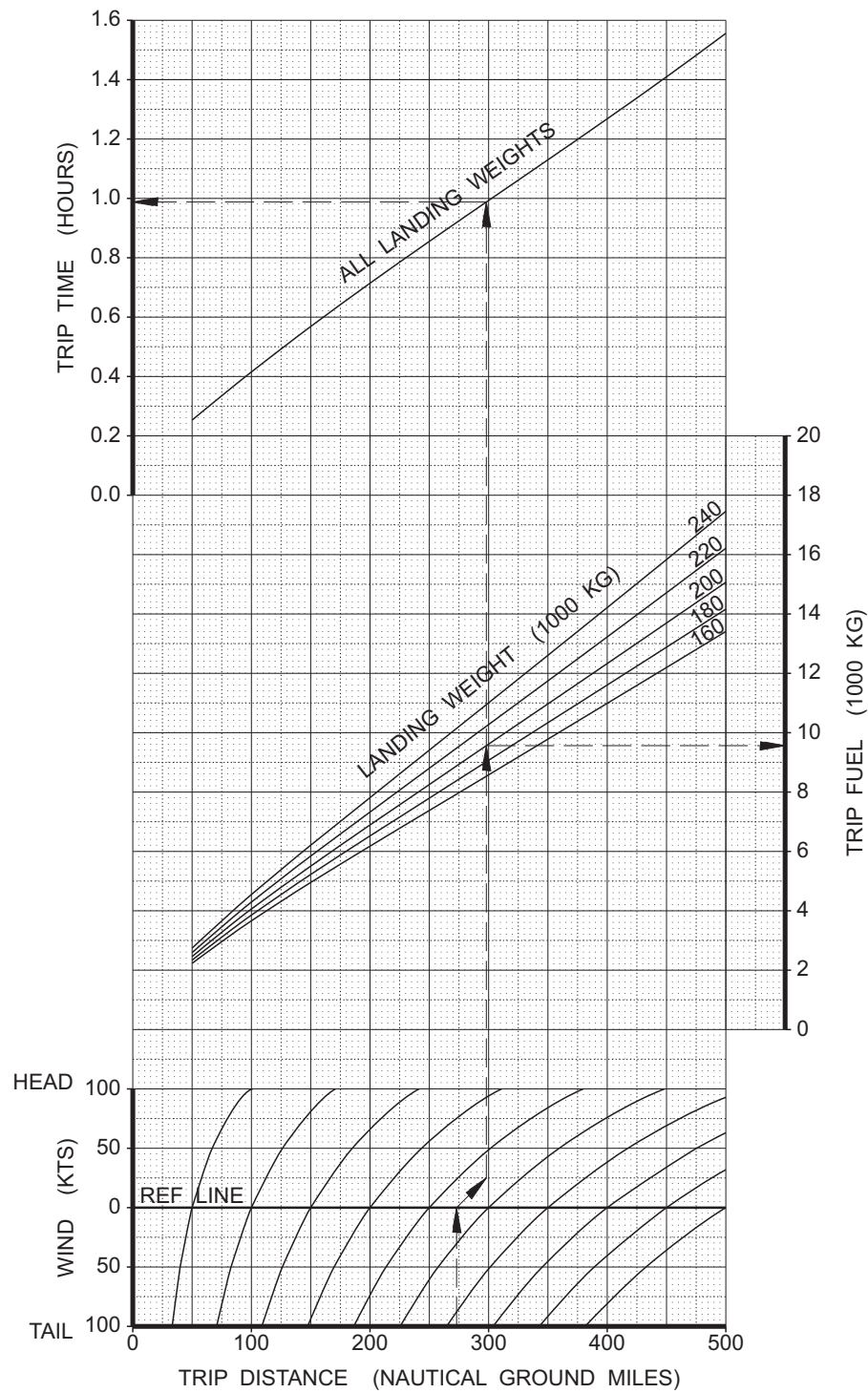
Based on VREF30+80 climb and descent



GEAR DOWN

Long Range Cruise Short Trip Fuel and Time

Based on VREF30+80 climb and descent at short trip cruise altitude



Intentionally
Blank

GEAR DOWN

Long Range Cruise Altitude Capability Max Climb Thrust, 300 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	18500	16600	14200
350	19200	17300	14800
340	19700	18000	15500
330	20600	18900	16300
320	21700	20100	17600
310	22800	21300	19000
300	23900	22400	20300
290	25000	23500	21800
280	26000	24600	23000
270	27100	25900	24300
260	28200	27200	25700
250	29400	28600	27100
240	30400	30000	28500
230	31200	30800	29900
220	32000	31700	31000
210	32800	32600	32000
200	33500	33200	32700
190	34000	33900	33400
180	34600	34500	34100
170	35200	35100	34700
160	35800	35700	35300

220 KIAS Max Climb %N1

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

TAT (°C)	PRESSURE ALTITUDE (FT)														
	0	5000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000
55	88.2	88.3	91.4	91.1	92.1	91.3	94.0	95.2	95.4	98.1	99.9	101.1	102.4	102.9	103.4
50	89.5	88.8	90.7	90.4	91.4	92.1	93.3	94.5	94.7	97.3	99.2	100.3	101.6	102.1	102.6
45	90.5	90.1	90.0	89.7	90.7	91.4	92.6	93.8	93.9	96.6	98.4	99.6	100.8	101.3	101.8
40	91.6	91.2	91.2	89.7	89.9	90.7	91.9	93.0	93.2	95.8	97.6	98.8	100.0	100.5	101.0
35	92.6	92.3	92.2	92.1	90.6	89.9	91.1	92.3	92.5	95.0	96.8	98.0	99.2	99.7	100.2
30	93.0	93.2	93.2	93.0	92.2	91.2	90.9	91.5	91.7	94.3	96.0	97.2	98.4	98.9	99.4
25	92.2	94.2	94.1	94.0	93.7	92.8	92.1	92.0	91.1	93.5	95.2	96.4	97.6	98.0	98.5
20	91.4	94.2	95.1	95.0	94.9	94.4	93.4	93.0	92.8	93.6	94.4	95.6	96.8	97.2	97.7
15	90.7	93.4	96.7	96.4	96.3	96.1	94.8	94.1	94.5	94.8	95.2	95.3	96.0	96.4	96.9
10	89.9	92.6	96.3	97.9	98.1	98.1	96.8	95.5	96.5	96.2	96.4	96.4	96.6	96.1	96.0
5	89.1	91.7	95.4	97.1	98.9	100.3	99.0	97.9	98.2	97.8	97.8	97.9	97.9	97.3	96.8
0	88.3	90.9	94.6	96.2	98.0	100.1	100.8	100.3	100.1	99.7	99.4	99.4	99.5	98.6	98.1
-5	87.4	90.1	93.7	95.3	97.1	99.1	99.9	100.8	101.9	101.5	101.1	101.1	101.1	100.2	99.6
-10	86.6	89.2	92.8	94.4	96.1	98.2	98.9	99.8	101.4	102.8	102.6	102.6	103.0	101.6	100.8
-15	85.8	88.4	91.9	93.5	95.2	97.3	98.0	98.9	100.4	101.8	102.5	103.2	103.8	102.5	101.4
-20	85.0	87.5	91.1	92.6	94.3	96.3	97.0	97.9	99.4	100.8	101.5	102.2	103.3	102.4	101.3

Anti-Ice Adjustments

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)							
	0	5000	10000	15000	20000	25000	30000	35000
2 PACKS ON - 1 BLEED SOURCE	-0.4	-0.5	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4
1 PACK ON - 1 OR 2 BLEED SOURCES	-0.4	-0.5	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4
ENGINE ANTI-ICE ON	-0.3	-0.5	-0.4	-0.3	-0.1	-0.2	-0.2	-0.2
ENGINE AND WING ANTI-ICE ON*	-0.6	-0.8	-0.7	-0.5	-0.2	-0.3	-0.3	-0.4
ENGINE AND WING ANTI-ICE ON**	-1.1	-0.9	-0.9	-0.6	-0.3	-0.4	-0.5	-0.5

*Packs on or off with 2 bleed sources.

**Packs off with 1 bleed source.



GEAR DOWN

Long Range Cruise Table 35000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
35	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
34	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
33	%N1 MAX TAT KIAS MACH FF/ENG KTAS		PERFORMANCE THRUST LIMITED									
32	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
31	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
30	%N1 MAX TAT KIAS MACH FF/ENG KTAS											

GEAR DOWN

Long Range Cruise Table 35000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
35 (-36)	%N1										92.3	91.2
	MAX TAT										-14	-11
	KIAS										217	217
	MACH										.649	.649
	FF/ENG KTAS										4446	4324
34 (-35)	%N1								92.8	91.4	90.3	89.5
	MAX TAT								-14	-10	-6	-3
	KIAS								217	217	217	217
	MACH								.635	.635	.635	.635
	FF/ENG KTAS								4653	4489	4366	4264
33 (-33)	%N1						93.7	92.0	90.7	89.6	88.7	88.0
	MAX TAT						-16	-10	-6	-3		
	KIAS						217	217	217	217	217	217
	MACH						.622	.622	.622	.622	.622	.622
	FF/ENG KTAS						4921	4710	4552	4420	4316	4223
32 (-32)	%N1					93.7	91.4	90.1	88.9	88.1	87.5	86.9
	MAX TAT					-13	-7	-3				
	KIAS					220	217	217	217	217	217	217
	MACH					.619	.609	.609	.609	.609	.609	.609
	FF/ENG KTAS					5117	4786	4623	4488	4372	4276	4188
31 (-30)	%N1				94.0	91.5	89.5	88.5	87.7	87.0	86.4	85.9
	MAX TAT				-11	-5	0					
	KIAS				225	220	217	217	217	217	217	217
	MACH				.618	.606	.596	.596	.596	.596	.596	.596
	FF/ENG KTAS				5350	4983	4707	4565	4440	4335	4244	4159
30 (-28)	%N1		96.6	94.2	91.8	89.7	88.1	87.3	86.6	86.0	85.4	84.9
	MAX TAT		-15	-8	-3	2						
	KIAS		235	230	225	220	217	217	217	217	217	217
	MACH		.629	.617	.605	.593	.584	.584	.584	.584	.584	.584
	FF/ENG KTAS		6015	5579	5217	4908	4650	4520	4404	4305	4218	4139
			371	364	357	350	344	344	344	344	344	344

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
35	87.6	88.7	89.7	90.8	91.8	92.8	93.8	94.8	95.8	96.7	96.8	96.2	95.6	94.6
34	87.8	88.9	90.0	91.0	92.0	93.1	94.1	95.1	96.1	96.7	96.9	96.4	95.7	94.7
33	88.1	89.2	90.3	91.3	92.4	93.4	94.4	95.4	96.4	97.1	97.2	96.7	95.8	95.0
32	88.4	89.5	90.5	91.6	92.6	93.7	94.7	95.7	96.7	97.6	97.7	97.1	96.0	95.2
31	88.7	89.7	90.8	91.9	92.9	93.9	95.0	96.0	97.0	98.0	98.3	97.6	96.4	95.5
30	88.9	90.0	91.1	92.2	93.2	94.2	95.3	96.3	97.3	98.3	98.9	98.2	96.9	95.8

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.6.



GEAR DOWN

Long Range Cruise Table

29000 FT to 24000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
29 (-24)	%N1											96.7
	MAX TAT											-14
	KIAS											239
	MACH											.628
	FF/ENG KTAS											6239 371
28 (-23)	%N1											94.3
	MAX TAT											-7
	KIAS											239
	MACH											.614
	FF/ENG KTAS											6033 365
27 (-21)	%N1										94.3	92.3
	MAX TAT										-6	-1
	KIAS										243	239
	MACH										.612	.602
	FF/ENG KTAS										6257 366	5910 359
26 (-19)	%N1									94.2	92.3	90.5
	MAX TAT									-5	0	3
	KIAS									248	243	239
	MACH									.610	.600	.590
	FF/ENG KTAS									6478 366	6137 360	5832 354
25 (-18)	%N1								94.1	92.3	90.7	89.4
	MAX TAT								-4	0	4	8
	KIAS								252	248	244	239
	MACH								.608	.598	.589	.579
	FF/ENG KTAS								6695 366	6361 360	6060 354	5778 349
24 (-16)	%N1							94.0	92.3	90.8	89.6	88.4
	MAX TAT							-2	2	5	9	12
	KIAS							256	252	248	244	240
	MACH							.605	.596	.587	.578	.569
	FF/ENG KTAS							6909 366	6584 360	6286 355	6004 349	5734 344

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
29	90.5	91.5	92.6	93.6	94.6	95.6	96.6	97.6	98.5	98.1	96.8	95.6	94.6	93.9
28	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	98.0	97.9	96.8	95.6	94.5	93.8
27	89.3	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	97.7	96.7	95.6	94.4	93.7
26	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	96.7	95.6	94.4	93.6
25	88.1	89.1	90.1	91.1	92.1	93.1	94.0	95.0	95.9	96.9	96.9	95.7	94.4	93.5
24	87.5	88.5	89.5	90.5	91.4	92.4	93.4	94.3	95.3	96.2	97.1	95.7	94.5	93.4

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
29000 FT to 24000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
29 (-27)	%N1	96.7	94.2	92.0	90.0	88.4	87.0	86.3	85.6	85.1	84.5	84.1
	MAX TAT	-14	-8	-3	2							
	KIAS	239	234	230	225	221	217	217	217	217	217	217
	MACH	.628	.616	.605	.593	.582	.571	.571	.571	.571	.571	.571
	FF/ENG	6239	5807	5450	5141	4859	4604	4481	4374	4283	4202	4125
28 (-25)	KTAS	371	365	358	351	344	338	338	338	338	338	338
	%N1	94.3	92.2	90.2	88.7	87.3	86.0	85.3	84.7	84.2	83.7	83.2
	MAX TAT	-7	-2	2								
	KIAS	239	234	230	225	221	217	217	217	217	217	217
	MACH	.614	.603	.593	.582	.571	.561	.560	.560	.560	.560	.560
27 (-24)	FF/ENG	6033	5681	5373	5090	4824	4573	4451	4355	4269	4186	4108
	KTAS	365	359	352	346	339	333	333	333	333	333	333
	%N1	92.3	90.4	89.0	87.7	86.4	85.2	84.4	83.9	83.3	82.8	82.4
	MAX TAT	-1	3	7								
	KIAS	239	235	230	226	222	218	216	216	216	216	216
26 (-22)	MACH	.602	.592	.581	.571	.561	.551	.548	.548	.548	.548	.548
	FF/ENG	5910	5603	5320	5053	4799	4569	4432	4338	4249	4166	4088
	KTAS	359	353	347	341	335	329	327	327	327	327	327
	%N1	90.5	89.2	88.0	86.8	85.6	84.4	83.6	83.0	82.5	81.9	81.4
	MAX TAT	3	7									
25 (-20)	KIAS	239	235	231	227	223	219	217	217	217	217	217
	MACH	.590	.580	.571	.561	.552	.542	.537	.537	.537	.537	.537
	FF/ENG	5832	5550	5281	5025	4793	4574	4410	4315	4228	4146	4069
	KTAS	354	348	342	336	331	325	322	322	322	322	322
	%N1	89.4	88.2	87.1	85.9	84.9	83.7	82.7	82.1	81.5	81.0	80.5
24 (-19)	MAX TAT	8	11									
	KIAS	239	235	231	228	224	220	217	217	217	217	217
	MACH	.579	.570	.561	.552	.543	.533	.526	.526	.526	.526	.526
	FF/ENG	5778	5508	5252	5019	4799	4574	4387	4294	4208	4128	4053
	KTAS	349	343	338	332	327	321	317	317	317	317	317
24 (-19)	%N1	88.4	87.3	86.3	85.2	84.1	83.0	81.8	81.2	80.6	80.1	79.6
	MAX TAT	12										
	KIAS	240	236	232	228	224	220	217	217	217	217	217
	MACH	.569	.560	.552	.543	.534	.524	.516	.516	.516	.516	.516
	FF/ENG	5734	5479	5246	5025	4800	4574	4367	4277	4193	4115	4041
24 (-19)	KTAS	344	339	333	328	323	317	312	312	312	312	312

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)												
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	10
29	90.5	91.5	92.6	93.6	94.6	95.6	96.6	97.6	98.5	98.1	96.8	95.6	94.6
28	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	98.0	97.9	96.8	95.6	94.5
27	89.3	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	97.7	96.7	95.6	94.4
26	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	96.7	95.6	94.4
25	88.1	89.1	90.1	91.1	92.1	93.1	94.0	95.0	95.9	96.9	96.9	95.7	94.4
24	87.5	88.5	89.5	90.5	91.4	92.4	93.4	94.3	95.3	96.2	97.1	95.7	94.5

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.6.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table

23000 FT to 18000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
23 (-14)	%N1						93.8	92.1	90.9	89.7	88.6	87.6
	MAX TAT						0	3	6	10	12	15
	KIAS						260	256	252	248	244	241
	MACH						.602	.594	.585	.576	.568	.559
	FF/ENG KTAS						7126 366	6806 360	6511 355	6230 350	5960 345	5706 340
22 (-12)	%N1					93.7	92.0	90.9	89.8	88.8	87.8	86.8
	MAX TAT					1	5	8	11	14	15	15
	KIAS					264	260	256	253	249	245	242
	MACH					.599	.591	.583	.574	.566	.558	.550
	FF/ENG KTAS					7359 365	7029 360	6735 355	6455 350	6186 345	5935 340	5705 335
21 (-11)	%N1				93.5	92.1	90.9	89.9	88.9	87.9	87.0	86.0
	MAX TAT				3	6	9	11	14	16	18	18
	KIAS				268	264	261	257	253	250	246	243
	MACH				.596	.588	.580	.572	.565	.557	.549	.542
	FF/ENG KTAS				7597 365	7267 360	6960 355	6679 350	6411 346	6164 341	5935 336	5711 331
20 (-9)	%N1		93.9	93.0	92.1	91.0	89.9	89.0	88.1	87.2	86.3	85.3
	MAX TAT		3	5	8	10	12	14	16	18	20	20
	KIAS		270	270	268	265	261	258	254	251	247	243
	MACH		.589	.589	.585	.578	.570	.563	.556	.548	.541	.533
	FF/ENG KTAS		7924 362	7745 362	7508 360	7198 355	6904 350	6637 346	6394 341	6166 337	5940 332	5710 327
19 (-7)	%N1	93.0	92.4	91.8	91.0	90.0	89.1	88.2	87.3	86.4	85.5	84.6
	MAX TAT	6	8	10	11	14	16	18	20	21	21	21
	KIAS	270	270	270	269	265	262	258	255	252	248	244
	MACH	.578	.578	.578	.575	.568	.561	.554	.547	.540	.532	.525
	FF/ENG KTAS	7993 356	7806 356	7646 356	7437 355	7142 350	6865 346	6623 342	6396 337	6168 333	5938 328	5709 324
18 (-5)	%N1	91.8	91.2	90.7	90.1	89.2	88.3	87.4	86.6	85.7	84.8	83.7
	MAX TAT	10	12	13	15	17	19	21	23	23	23	23
	KIAS	270	270	270	269	266	263	260	256	253	249	245
	MACH	.567	.567	.567	.566	.559	.552	.545	.538	.531	.524	.516
	FF/ENG KTAS	7874 351	7707 351	7558 351	7383 350	7108 346	6856 342	6626 338	6396 333	6166 329	5938 324	5715 320

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
23	89.8	90.8	91.7	92.7	93.6	94.6	95.5	96.4	95.9	94.6	93.5	92.2	91.0	89.5
22	89.2	90.2	91.1	92.1	93.0	93.9	94.9	95.8	96.1	94.8	93.7	92.2	90.6	88.8
21	88.8	89.7	90.7	91.6	92.5	93.5	94.4	95.3	96.2	94.4	93.3	92.1	90.9	89.6
20	88.4	89.3	90.3	91.2	92.1	93.1	94.0	94.9	95.7	94.3	92.9	91.9	90.9	89.8
19	87.9	88.9	89.8	90.7	91.7	92.6	93.5	94.3	95.2	94.9	93.3	92.1	91.0	89.8
18	87.5	88.5	89.4	90.3	91.2	92.1	93.0	93.9	94.8	95.3	93.8	92.4	91.1	89.8

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
23000 FT to 18000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
23 (-17)	%N1	87.6	86.5	85.5	84.5	83.4	82.1	80.9	80.3	79.8	79.3	78.7
	MAX TAT	15										
	KIAS	241	237	233	229	225	221	217	217	217	217	217
	MACH	.559	.551	.543	.534	.525	.516	.506	.505	.505	.505	.505
	FF/ENG	5706	5475	5253	5026	4800	4578	4360	4264	4182	4104	4031
22 (-16)	KTAS	340	335	329	324	319	313	307	307	307	307	307
	%N1	86.8	85.8	84.8	83.8	82.6	81.3	80.1	79.4	78.9	78.3	77.8
	MAX TAT											
	KIAS	242	238	234	230	226	222	218	217	217	217	217
	MACH	.550	.542	.534	.525	.516	.507	.497	.495	.495	.495	.495
21 (-14)	FF/ENG	5705	5482	5254	5027	4804	4585	4371	4256	4174	4097	4024
	KTAS	335	331	325	320	315	309	303	302	302	302	302
	%N1	86.0	85.1	84.1	82.9	81.7	80.6	79.3	78.4	77.9	77.4	76.9
	MAX TAT											
	KIAS	243	239	235	231	227	223	218	217	217	217	217
20 (-12)	MACH	.542	.534	.525	.517	.508	.499	.489	.485	.485	.485	.485
	FF/ENG	5711	5482	5254	5031	4811	4596	4384	4251	4170	4093	4019
	KTAS	331	327	321	316	311	305	299	297	297	297	297
	%N1	85.3	84.4	83.2	82.1	81.0	79.8	78.4	77.4	76.9	76.4	75.9
	MAX TAT											
19 (-11)	KIAS	243	240	236	232	228	223	219	217	217	217	217
	MACH	.533	.525	.517	.508	.500	.490	.481	.476	.476	.476	.476
	FF/ENG	5710	5482	5258	5038	4822	4610	4397	4246	4165	4088	4014
	KTAS	327	323	318	312	307	301	295	292	292	292	292
	%N1	84.6	83.5	82.4	81.4	80.2	78.9	77.5	76.5	75.9	75.4	74.9
18 (-9)	MAX TAT											
	KIAS	244	241	237	233	228	224	219	217	217	217	217
	MACH	.525	.517	.508	.500	.491	.482	.473	.466	.466	.466	.466
	FF/ENG	5709	5486	5266	5049	4836	4623	4408	4240	4159	4080	4006
	KTAS	324	319	314	308	303	297	292	288	288	288	288
18 (-9)	%N1	83.7	82.7	81.7	80.5	79.3	78.0	76.7	75.5	75.0	74.5	74.0
	MAX TAT											
	KIAS	245	241	237	233	229	225	220	217	217	217	217
	MACH	.516	.508	.500	.492	.483	.474	.465	.457	.457	.457	.457
	FF/ENG	5715	5494	5277	5063	4849	4633	4415	4231	4149	4072	3999
18 (-9)	KTAS	320	315	310	305	299	294	288	283	283	283	283

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
23	88.8	89.8	90.8	91.7	92.7	93.6	94.6	95.5	96.4	95.9	94.6	93.5	92.2	91.0
22	88.3	89.2	90.2	91.1	92.1	93.0	93.9	94.9	95.8	96.1	94.8	93.7	92.2	90.6
21	87.8	88.8	89.7	90.7	91.6	92.5	93.5	94.4	95.3	96.2	94.4	93.3	92.1	90.9
20	87.4	88.4	89.3	90.3	91.2	92.1	93.1	94.0	94.9	95.7	94.3	92.9	91.9	90.9
19	87.0	87.9	88.9	89.8	90.7	91.7	92.6	93.5	94.3	95.2	94.9	93.3	92.1	91.0
18	86.6	87.5	88.5	89.4	90.3	91.2	92.1	93.0	93.9	94.8	95.3	93.8	92.4	91.1

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

GEAR DOWN

Long Range Cruise Table

17000 FT to 12000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
17 (-4)	%N1	90.7	90.2	89.7	89.2	88.3	87.5	86.6	85.8	84.9	83.9	82.9
	MAX TAT	14	16	17	19	21	23	24	26			
	KIAS	270	270	270	270	267	264	260	257	253	250	246
	MACH	.556	.556	.556	.556	.550	.544	.537	.530	.523	.516	.508
	FF/ENG	7775	7623	7486	7344	7101	6857	6624	6394	6167	5945	5724
16 (-2)	KTAS	346	346	346	346	342	338	334	329	325	320	316
	%N1	89.7	89.2	88.8	88.3	87.6	86.7	85.8	84.9	83.9	83.0	82.0
	MAX TAT	18	20	21	22	24	26	28				
	KIAS	270	270	270	270	268	265	261	258	254	251	247
	MACH	.546	.546	.546	.546	.542	.535	.529	.522	.515	.507	.500
15 (-1)	FF/ENG	7701	7565	7439	7304	7103	6856	6625	6398	6176	5955	5737
	KTAS	340	340	340	340	338	334	330	326	321	317	312
	%N1	88.7	88.3	87.8	87.3	86.7	85.8	84.9	84.0	83.1	82.1	81.1
	MAX TAT	22	24	25	26	28	30					
	KIAS	270	270	270	270	269	266	262	259	255	251	248
14 (1)	MACH	.535	.535	.535	.535	.534	.527	.520	.514	.507	.499	.492
	FF/ENG	7653	7527	7405	7270	7105	6860	6632	6410	6189	5970	5754
	KTAS	335	335	335	335	334	330	326	322	317	313	308
	%N1	87.8	87.4	86.9	86.4	86.0	85.0	84.1	83.2	82.3	81.3	80.3
	MAX TAT	26	27	28	30	31						
13 (3)	KIAS	270	270	270	270	270	267	263	260	256	252	248
	MACH	.525	.525	.525	.525	.525	.519	.512	.506	.499	.491	.484
	FF/ENG	7618	7495	7373	7239	7112	6871	6646	6424	6204	5987	5769
	KTAS	330	330	330	330	330	326	322	318	314	309	304
	%N1	86.9	86.5	86.0	85.5	85.0	84.2	83.3	82.5	81.5	80.5	79.5
12 (4)	MAX TAT	29	31	32	33							
	KIAS	270	270	270	270	270	267	264	260	257	253	249
	MACH	.516	.516	.516	.516	.516	.511	.504	.498	.491	.484	.476
	FF/ENG	7585	7463	7344	7214	7092	6885	6660	6441	6223	6004	5784
	KTAS	326	326	326	326	326	323	318	314	310	305	301
12 (4)	%N1	86.1	85.6	85.2	84.7	84.2	83.5	82.7	81.7	80.8	79.8	78.8
	MAX TAT	33	34									
	KIAS	270	270	270	270	270	268	265	261	257	254	250
	MACH	.506	.506	.506	.506	.506	.503	.497	.490	.483	.476	.469
	FF/ENG	7558	7438	7321	7194	7074	6901	6679	6460	6241	6021	5800
12 (4)	KTAS	321	321	321	321	321	319	315	310	306	302	297

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
17	89.1	90.0	90.9	91.8	92.7	93.5	94.4	95.2	94.3	92.9	91.4	89.9	88.5	87.2
16	88.4	89.3	90.2	91.1	92.0	92.9	93.7	94.5	94.4	93.2	91.9	90.4	88.7	87.3
15	87.9	88.8	89.7	90.6	91.4	92.3	93.2	94.0	94.5	93.4	92.4	91.0	89.1	87.4
14	87.4	88.3	89.1	90.0	90.9	91.7	92.6	93.4	94.2	93.5	92.5	91.3	89.7	88.0
13	86.9	87.8	88.6	89.5	90.4	91.2	92.1	92.9	93.7	93.6	92.5	91.5	90.2	88.6
12	86.4	87.3	88.1	89.0	89.9	90.7	91.5	92.4	93.2	93.6	92.5	91.6	90.6	89.2

With engine anti-ice on, decrease limit %N1 by 0.5.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
17000 FT to 12000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
17 (-7)	%N1	82.9	81.9	80.8	79.6	78.4	77.1	75.8	74.6	74.1	73.6	73.1
	MAX TAT											
	KIAS	246	242	238	234	230	225	220	217	217	217	217
	MACH	.508	.500	.492	.484	.475	.466	.456	.448	.448	.448	.448
	FF/ENG	5724	5506	5292	5076	4859	4640	4418	4222	4141	4065	3994
16 (-6)	KTAS	316	311	306	301	295	290	284	279	279	279	279
	%N1	82.0	81.0	79.9	78.7	77.5	76.3	75.0	73.7	73.2	72.7	72.2
	MAX TAT											
	KIAS	247	243	239	235	230	226	221	217	217	217	217
	MACH	.500	.492	.484	.476	.467	.458	.448	.440	.440	.440	.440
15 (-4)	FF/ENG	5737	5522	5305	5087	4867	4644	4419	4216	4137	4062	3992
	KTAS	312	307	302	297	292	286	280	274	274	274	274
	%N1	81.1	80.1	79.0	77.8	76.7	75.5	74.1	72.8	72.2	71.8	71.3
	MAX TAT											
	KIAS	248	244	240	235	231	226	221	217	217	217	217
14 (-2)	MACH	.492	.484	.476	.468	.459	.450	.441	.431	.431	.431	.431
	FF/ENG	5754	5536	5317	5096	4872	4647	4425	4216	4138	4064	3995
	KTAS	308	303	298	293	288	282	276	270	270	270	270
	%N1	80.3	79.3	78.2	77.1	75.9	74.6	73.3	71.9	71.4	70.9	70.5
	MAX TAT											
13 (-1)	KIAS	248	244	240	236	231	226	222	217	217	217	217
	MACH	.484	.476	.468	.460	.451	.442	.433	.423	.423	.423	.423
	FF/ENG	5769	5550	5328	5104	4879	4655	4435	4220	4142	4069	4000
	KTAS	304	300	295	289	284	278	272	266	266	266	266
	%N1	79.5	78.5	77.4	76.3	75.1	73.8	72.4	71.1	70.5	70.0	69.5
12 (1)	MAX TAT											
	KIAS	249	245	241	236	232	227	222	217	217	217	217
	MACH	.476	.469	.461	.452	.444	.435	.425	.415	.415	.415	.415
	FF/ENG	5784	5563	5338	5113	4888	4666	4446	4226	4145	4072	4004
	KTAS	301	296	291	285	280	274	268	262	262	262	262
	%N1	78.8	77.7	76.6	75.5	74.2	72.9	71.6	70.2	69.6	69.1	68.6
	MAX TAT											
	KIAS	250	245	241	237	232	227	222	217	217	217	217
	MACH	.469	.461	.453	.445	.436	.427	.418	.408	.407	.407	.407
	FF/ENG	5800	5575	5349	5123	4900	4677	4456	4235	4147	4074	4006
	KTAS	297	292	287	282	276	271	265	259	258	258	258

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
17	88.1	89.1	90.0	90.9	91.8	92.7	93.5	94.4	95.2	94.3	92.9	91.4	89.9	88.5
16	87.5	88.4	89.3	90.2	91.1	92.0	92.9	93.7	94.5	94.4	93.2	91.9	90.4	88.7
15	87.0	87.9	88.8	89.7	90.6	91.4	92.3	93.2	94.0	94.5	93.4	92.4	91.0	89.1
14	86.5	87.4	88.3	89.1	90.0	90.9	91.7	92.6	93.4	94.2	93.5	92.5	91.3	89.7
13	86.0	86.9	87.8	88.6	89.5	90.4	91.2	92.1	92.9	93.7	93.6	92.5	91.5	90.2
12	85.5	86.4	87.3	88.1	89.0	89.9	90.7	91.5	92.4	93.2	93.6	92.5	91.6	90.6

With engine anti-ice on, decrease limit %N1 by 0.5.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.



GEAR DOWN

Long Range Cruise Table 11000 FT to 5000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
11 (6)	%N1	85.3	84.8	84.4	83.9	83.4	82.9	81.9	81.0	80.0	79.0	78.0
	MAX TAT	36										
	KIAS	270	270	270	270	270	269	266	262	258	254	250
	MACH	.497	.497	.497	.497	.497	.495	.489	.482	.475	.468	.461
	FF/ENG	7537	7418	7304	7180	7062	6922	6700	6481	6261	6040	5815
10 (7)	KTAS	316	316	316	316	316	315	311	307	302	298	293
	%N1	84.4	84.0	83.5	83.1	82.6	82.1	81.2	80.2	79.3	78.2	77.2
	MAX TAT											
	KIAS	270	270	270	270	270	270	266	263	259	255	251
	MACH	.488	.488	.488	.488	.488	.488	.481	.475	.468	.461	.453
9 (9)	FF/ENG	7524	7408	7296	7174	7058	6946	6725	6505	6283	6058	5831
	KTAS	311	311	311	311	311	311	307	303	299	294	289
	%N1	83.5	83.1	82.6	82.1	81.7	81.2	80.4	79.4	78.5	77.5	76.4
	MAX TAT											
	KIAS	270	270	270	270	270	270	267	263	259	255	251
8 (11)	MACH	.479	.479	.479	.479	.479	.479	.474	.467	.460	.453	.446
	FF/ENG	7523	7407	7296	7176	7061	6954	6754	6531	6306	6079	5850
	KTAS	307	307	307	307	307	307	304	299	295	290	286
	%N1	82.6	82.2	81.7	81.2	80.8	80.3	79.6	78.6	77.7	76.6	75.6
	MAX TAT											
7 (12)	KIAS	270	270	270	270	270	270	268	264	260	256	251
	MACH	.470	.470	.470	.470	.470	.470	.466	.460	.453	.446	.438
	FF/ENG	7531	7417	7306	7188	7073	6964	6785	6560	6331	6102	5873
	KTAS	302	302	302	302	302	302	300	295	291	286	282
	%N1	81.7	81.2	80.8	80.3	79.9	79.4	78.8	77.9	76.9	75.8	74.7
5 (16)	MAX TAT											
	KIAS	270	270	270	270	270	270	268	264	260	256	252
	MACH	.462	.462	.462	.462	.462	.462	.459	.452	.445	.438	.431
	FF/ENG	7547	7433	7323	7205	7089	6979	6816	6587	6357	6127	5896
	KTAS	298	298	298	298	298	298	296	292	287	283	278
	%N1	79.9	79.4	79.0	78.6	78.2	77.7	77.2	76.2	75.2	74.2	73.2
	MAX TAT											
	KIAS	270	270	270	270	270	270	269	265	261	257	252
	MACH	.446	.446	.446	.446	.446	.446	.444	.437	.431	.424	.416
	FF/ENG	7569	7455	7345	7227	7109	7000	6868	6636	6404	6171	5938
	KTAS	290	290	290	290	290	290	289	284	280	275	271

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)														
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	
11	87.7	88.6	89.4	90.3	91.1	91.9	92.7	93.5	92.6	91.6	90.6	89.4	87.8	85.3	
10	87.3	88.2	89.0	89.9	90.7	91.5	92.3	93.1	92.6	91.7	90.7	89.5	88.4	86.7	
9	86.7	87.6	88.4	89.2	90.0	90.8	91.6	92.4	92.5	91.6	90.7	89.5	88.3	86.8	
8	86.0	86.9	87.7	88.5	89.3	90.1	90.9	91.7	92.4	91.5	90.6	89.5	88.2	86.8	
7	85.6	86.5	87.3	88.1	88.9	89.7	90.5	91.3	92.0	91.5	90.7	89.5	88.4	87.0	
5	84.8	85.6	86.4	87.2	88.0	88.8	89.6	90.4	91.1	91.7	90.8	89.7	88.6	87.3	

With engine anti-ice on, decrease limit %N1 by 0.6.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
11000 FT to 5000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
11 (3)	%N1	78.0	76.9	75.8	74.6	73.4	72.1	70.8	69.3	68.7	68.2	67.7
	MAX TAT											
	KIAS	250	246	241	237	232	227	222	217	217	217	217
	MACH	.461	.453	.445	.437	.428	.419	.410	.401	.400	.400	.400
	FF/ENG	5815	5589	5362	5137	4912	4688	4466	4242	4148	4076	4009
10 (4)	KTAS	293	288	283	278	272	267	261	255	254	254	254
	%N1	77.2	76.1	75.0	73.8	72.6	71.3	69.9	68.4	67.8	67.3	66.8
	MAX TAT											
	KIAS	251	246	242	237	232	228	223	217	217	217	217
	MACH	.453	.446	.438	.429	.421	.412	.403	.394	.392	.392	.392
9 (6)	FF/ENG	5831	5604	5377	5151	4925	4700	4476	4249	4152	4079	4013
	KTAS	289	284	279	274	269	263	257	251	250	250	250
	%N1	76.4	75.3	74.1	73.0	71.8	70.4	69.0	67.6	66.9	66.5	66.0
	MAX TAT											
	KIAS	251	247	242	237	233	228	223	217	217	217	217
8 (8)	MACH	.446	.438	.430	.422	.414	.405	.396	.387	.385	.385	.385
	FF/ENG	5850	5623	5395	5167	4941	4715	4488	4257	4158	4087	4021
	KTAS	286	281	276	270	265	260	254	248	247	247	247
	%N1	75.6	74.4	73.3	72.2	70.9	69.5	68.1	66.7	66.1	65.6	65.2
	MAX TAT											
7 (10)	KIAS	251	247	242	238	233	228	223	217	217	217	217
	MACH	.438	.431	.423	.415	.407	.398	.389	.380	.378	.378	.378
	FF/ENG	5873	5644	5415	5186	4958	4730	4499	4266	4168	4097	4032
	KTAS	282	277	272	267	261	256	250	244	243	243	243
	%N1	74.7	73.7	72.6	71.3	70.0	68.7	67.3	65.9	65.3	64.9	64.5
5 (13)	MAX TAT											
	KIAS	252	247	243	238	233	228	223	217	217	217	217
	MACH	.431	.423	.416	.408	.400	.391	.382	.372	.371	.371	.371
	FF/ENG	5896	5666	5435	5206	4976	4744	4509	4275	4179	4108	4044
	KTAS	278	273	268	263	258	252	246	240	240	240	240
	%N1	73.2	72.0	70.8	69.6	68.3	67.0	65.7	64.3	63.8	63.3	62.9
	MAX TAT											
	KIAS	252	248	243	238	233	228	223	217	217	217	217
	MACH	.416	.409	.402	.394	.386	.377	.368	.359	.358	.358	.358
	FF/ENG	5938	5705	5473	5238	5001	4763	4525	4289	4200	4131	4069
	KTAS	271	266	261	256	251	245	239	233	233	233	233

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

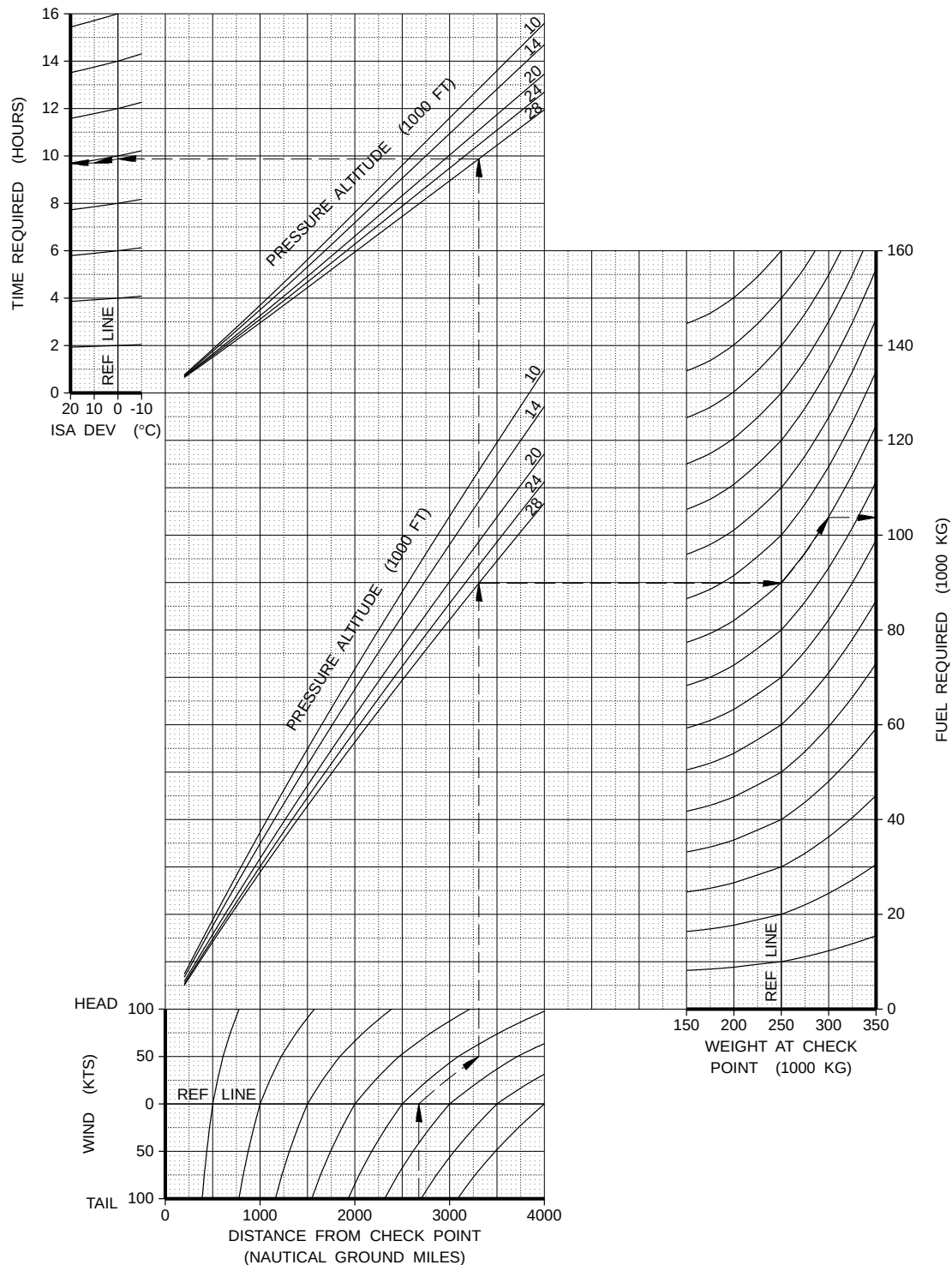
PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
11	86.9	87.7	88.6	89.4	90.3	91.1	91.9	92.7	93.5	92.6	91.6	90.6	89.4	87.8
10	86.5	87.3	88.2	89.0	89.9	90.7	91.5	92.3	93.1	92.6	91.7	90.7	89.5	88.4
9	85.9	86.7	87.6	88.4	89.2	90.0	90.8	91.6	92.4	92.5	91.6	90.7	89.5	88.3
8	85.2	86.0	86.9	87.7	88.5	89.3	90.1	90.9	91.7	92.4	91.5	90.6	89.5	88.2
7	84.8	85.6	86.5	87.3	88.1	88.9	89.7	90.5	91.3	92.0	91.5	90.7	89.5	88.4
5	84.0	84.8	85.6	86.4	87.2	88.0	88.8	89.6	90.4	91.1	91.7	90.8	89.7	88.6

With engine anti-ice on, decrease limit %N1 by 0.6.
With engine and wing anti-ice on, decrease limit %N1 by 0.9.

GEAR DOWN

Long Range Cruise Enroute Fuel and Time

Based on VREF30+80 descent



GEAR DOWN

Descent

Based on VREF30 + 80

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)
35000	18	640	74
33000	18	630	69
31000	17	620	65
29000	16	600	61
27000	15	590	57
25000	15	570	52
23000	14	550	48
21000	13	530	44
19000	12	510	40
17000	11	480	35
15000	10	460	31
10000	8	390	21
5000	5	310	11
1500	4	250	4

Allowances for a straight-in approach are included.



GEAR DOWN

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
30000	%N1										86.0	84.9
	KIAS										217	217
	FF/ENG										4520	4350
25000	%N1									82.7	81.5	80.5
	KIAS									217	217	217
	FF/ENG									4610	4420	4260
20000	%N1								79.4	78.0	76.9	75.9
	KIAS								217	217	217	217
	FF/ENG								4770	4550	4370	4210
15000	%N1						78.6	76.7	74.6	73.3	72.2	71.3
	KIAS						229	223	217	217	217	217
	FF/ENG						5490	5100	4730	4520	4350	4190
10000	%N1				78.1	76.3	74.1	72.2	70.1	68.8	67.8	66.8
	KIAS				244	238	229	223	217	217	217	217
	FF/ENG				6340	5920	5470	5100	4730	4520	4360	4210
5000	%N1		77.7	75.8	73.7	72.0	69.7	67.7	65.8	64.7	63.8	62.9
	KIAS		260	253	244	238	229	223	217	217	217	217
	FF/ENG		7350	6870	6370	5960	5510	5130	4770	4570	4410	4270
1500	%N1	76.1	74.6	72.8	70.6	68.8	66.7	64.9	63.1	61.9	61.0	60.1
	KIAS	264	260	253	244	238	229	223	217	217	217	217
	FF/ENG	7750	7360	6890	6380	5970	5520	5150	4800	4610	4450	4320

Flaps 1

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
20000	%N1	94.3	91.8	89.7	87.6	85.6	83.3	81.0	78.4	76.5	74.9	73.5
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	8200	7630	7040	6450	5980	5460	5020	4610	4310	4070	3860
15000	%N1	88.3	86.8	84.9	82.9	80.6	78.1	75.9	73.6	71.8	70.3	69.0
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	7810	7350	6830	6320	5870	5400	4970	4550	4270	4050	3860
10000	%N1	83.8	82.1	80.0	77.8	75.8	73.5	71.4	69.0	67.3	65.8	64.6
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	7690	7250	6770	6270	5820	5340	4930	4530	4260	4040	3860
5000	%N1	79.0	77.4	75.5	73.4	71.5	69.1	66.9	64.7	63.2	61.8	60.7
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	7700	7260	6780	6270	5840	5370	4960	4570	4310	4100	3920
1500	%N1	75.9	74.3	72.5	70.3	68.3	66.0	64.1	62.0	60.5	59.1	57.9
	KIAS	244	240	233	224	218	209	203	197	197	197	197
	FF/ENG	7660	7240	6770	6270	5840	5380	4980	4600	4350	4140	3970

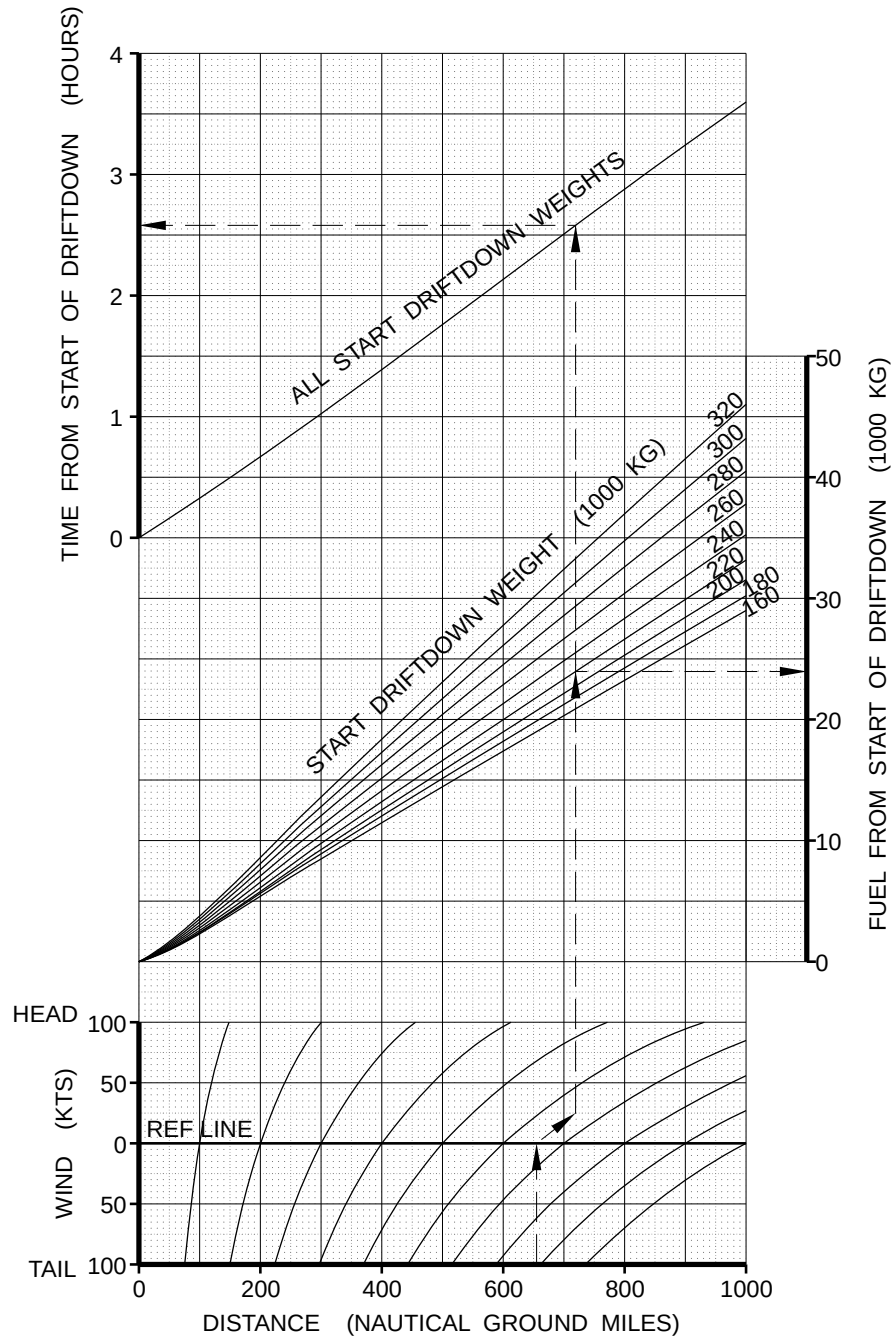
These tables include 5% additional fuel for holding in a racetrack pattern.

GEAR DOWN ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown/LRC Cruise Range Capability

Includes APU fuel burn





GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

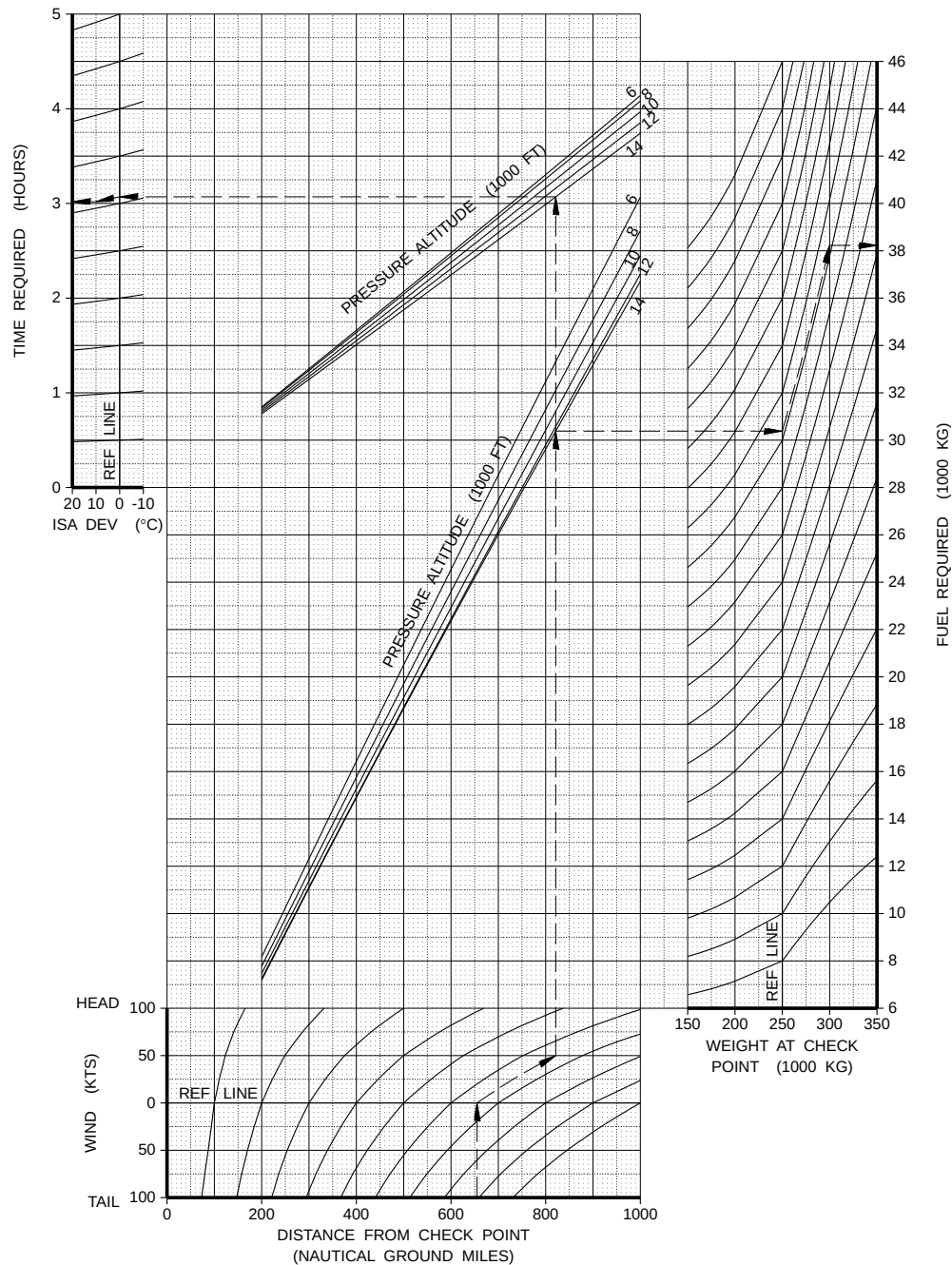
WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
340	1800		
330	3300	1000	
320	4500	2700	
310	5700	4400	1900
300	6800	5700	3800
290	7800	7000	5300
280	8800	8100	6700
270	9800	9100	8100
260	11100	10400	9300
250	12100	11400	10300
240	13100	12500	11300
230	14000	13600	12400
220	15100	14600	13600
210	15900	15400	14400
200	16700	16100	15100
190	17400	16700	15800
180	18000	17500	16400
170	18700	18200	16900
160	19300	18900	17700

GEAR DOWN ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on VREF30 + 80 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)													
		290	280	270	260	250	240	230	220	210	200	190	180	170	160
20 (-13)	%N1														100.1
	MAX TAT														1
	KIAS														217
	MACH														.476
	FF/ENG KTAS														8933 292
19 (-12)	%N1												100.2	99.0	97.7
	MAX TAT												0	5	8
	KIAS												217	217	217
	MACH												.466	.466	.466
	FF/ENG KTAS												9239 288	8949 288	8670 288
18 (-10)	%N1											99.1	97.8	96.6	95.4
	MAX TAT											5	8	11	13
	KIAS											217	217	217	217
	MACH											.457	.457	.457	.457
	FF/ENG KTAS											9257 283	8962 283	8691 283	8450 283
17 (-8)	%N1								99.5	98.1	96.8	95.5	94.4	93.5	
	MAX TAT								3	8	11	14	16	18	
	KIAS								217	217	217	217	217	217	
	MACH								.448	.448	.448	.448	.448	.448	
	FF/ENG KTAS								9635 279	9300 279	8996 279	8740 279	8521 279	8310 279	
16 (-7)	%N1								98.8	97.1	95.8	94.6	93.7	92.9	92.1
	MAX TAT								7	12	14	17	19	21	23
	KIAS								217	217	217	217	217	217	217
	MACH								.441	.440	.440	.440	.440	.440	.440
	FF/ENG KTAS								9781 276	9372 274	9080 274	8832 274	8609 274	8412 274	8222 274
15 (-5)	%N1							98.8	96.4	95.0	94.0	93.1	92.3	91.6	90.9
	MAX TAT							10	15	18	20	22	24		
	KIAS							220	217	217	217	217	217	217	217
	MACH							.439	.433	.431	.431	.431	.431	.431	.431
	FF/ENG KTAS							10129 275	9542 271	9205 270	8956 270	8734 270	8533 270	8350 270	8168 270

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
20	95.2	96.2	97.2	98.3	99.3	100.3	101.2	102.2	102.9	102.4	100.7	98.6	97.0	95.7
19	94.9	95.9	97.0	98.0	98.9	99.9	100.9	101.8	102.6	102.5	101.0	99.0	97.5	96.0
18	94.5	95.5	96.5	97.5	98.5	99.5	100.4	101.4	102.3	102.3	101.1	99.3	97.8	96.4
17	93.9	94.9	95.9	96.9	97.9	98.8	99.8	100.7	101.6	101.8	101.0	99.4	98.0	96.7
16	93.3	94.3	95.3	96.3	97.3	98.2	99.2	100.1	101.0	101.6	101.2	99.9	98.3	97.0
15	92.7	93.7	94.6	95.6	96.6	97.5	98.4	99.4	100.3	101.1	101.3	100.3	98.6	97.3

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
14000 FT to 6000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)													
		290	280	270	260	250	240	230	220	210	200	190	180	170	160
14 (-3)	%N1						98.7	96.5	94.5	93.4	92.6	91.8	91.2	90.5	89.9
	MAX TAT						11	16	20	22	25	26			
	KIAS						223	220	217	217	217	217	217	217	217
	MACH						.436	.431	.425	.423	.423	.423	.423	.423	.423
	FF/ENG KTAS						10472	9897	9405	9108	8888	8680	8489	8311	8136
13 (-2)	%N1					98.6	96.5	94.6	93.1	92.1	91.4	90.8	90.2	89.6	89.0
	MAX TAT					13	18	21	25	27					
	KIAS					226	223	220	217	217	217	217	217	217	217
	MACH					.434	.428	.423	.417	.415	.415	.415	.415	.415	.415
	FF/ENG KTAS					10825	10245	9763	9323	9053	8844	8643	8458	8284	8115
12 (0)	%N1				98.5	96.4	94.7	93.3	91.9	91.1	90.5	89.8	89.3	88.7	88.1
	MAX TAT				15	19	23	26	29						
	KIAS				229	226	223	220	217	217	217	217	217	217	217
	MACH				.431	.426	.420	.415	.409	.407	.407	.407	.407	.407	.407
	FF/ENG KTAS				11175	10595	10108	9679	9268	9009	8806	8610	8430	8257	8090
10 (4)	%N1		98.8	96.8	94.8	93.5	92.2	91.1	90.0	89.3	88.6	88.0	87.5	87.0	86.4
	MAX TAT		16	22	27	30	32								
	KIAS		238	234	229	226	223	220	217	217	217	217	217	217	217
	MACH		.430	.424	.415	.410	.405	.399	.394	.392	.392	.392	.392	.392	.392
	FF/ENG KTAS		12057	11448	10802	10368	9961	9572	9188	8942	8743	8546	8365	8191	8029
8 (7)	%N1	96.7	95.4	94.0	92.5	91.5	90.4	89.4	88.5	87.6	87.0	86.3	85.7	85.1	84.5
	MAX TAT	26	30	33	37										
	KIAS	240	238	234	229	226	223	220	218	217	217	217	217	217	217
	MACH	.419	.415	.409	.400	.395	.390	.385	.381	.378	.378	.378	.378	.378	.378
	FF/ENG KTAS	12123	11654	11194	10653	10265	9897	9534	9204	8904	8704	8509	8330	8160	8005
6 (11)	%N1	94.2	93.1	92.1	90.9	90.2	89.3	88.4	87.4	86.1	85.1	84.4	83.8	83.2	82.6
	MAX TAT	35	38	41											
	KIAS	240	238	234	230	229	227	225	222	218	217	217	217	217	217
	MACH	.404	.400	.394	.388	.385	.382	.378	.373	.367	.364	.364	.364	.364	.364
	FF/ENG KTAS	11913	11520	11116	10695	10416	10107	9768	9396	8983	8696	8506	8332	8167	8018

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
14	94.0	94.9	95.9	96.8	97.8	98.7	99.6	100.5	100.9	100.3	98.9	97.6	96.4	95.3
13	93.4	94.4	95.3	96.2	97.2	98.1	99.0	99.9	100.6	100.4	99.2	97.8	96.6	95.6
12	92.9	93.8	94.7	95.7	96.6	97.5	98.4	99.3	100.3	100.4	99.4	98.1	96.8	95.8
10	92.1	93.1	94.0	94.9	95.8	96.7	97.6	98.5	99.4	100.1	100.0	99.1	97.8	96.6
8	91.9	92.8	93.7	94.6	95.5	96.4	97.3	98.2	99.1	100.0	100.4	100.0	99.0	97.8
6	91.1	92.0	92.9	93.8	94.7	95.6	96.5	97.4	98.2	99.1	99.9	100.0	99.1	98.1

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.



Flight Planning and Performance Manual

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Holding

Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		340	320	300	280	260	240	220	200	180	160
15000	%N1							96.4	94.0	92.3	90.9
	KIAS							217	217	217	217
	FF/ENG							10020	9400	8960	8580
10000	%N1				98.8	94.8	92.2	90.0	88.6	87.5	86.4
	KIAS				238	229	223	217	217	217	217
	FF/ENG				12660	11340	10460	9650	9180	8780	8430
5000	%N1		97.2	94.3	92.3	90.0	88.0	85.7	84.2	82.9	81.7
	KIAS		253	244	238	229	223	217	217	217	217
	FF/ENG		14120	12940	12090	11180	10380	9590	9130	8750	8420
1500	%N1	95.5	93.4	91.1	89.3	86.8	84.6	82.3	80.8	79.6	78.6
	KIAS	260	253	244	238	229	223	217	217	217	217
	FF/ENG	14970	13980	12970	12100	11100	10310	9540	9080	8700	8380

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



Flight Planning and Performance Manual

ALTERNATE MODE EEC

Alternate Mode EEC Max Takeoff %N1

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
55	131	95.7	96.0	96.2	96.1	96.0	96.1	96.1	96.1	96.1	95.5	94.6	94.2
50	122	97.1	97.5	98.0	97.6	97.3	97.4	97.5	97.5	97.4	96.8	95.9	95.6
45	113	98.5	98.9	99.4	99.1	98.8	98.7	98.8	98.8	98.7	98.2	97.3	96.9
40	104	99.6	100.2	100.9	100.4	100.2	100.0	99.9	100.0	99.9	99.4	98.6	98.2
35	95	99.3	100.8	102.8	102.3	101.8	101.4	101.2	101.3	101.0	100.4	99.6	99.3
30	86	98.5	99.9	102.7	104.0	104.0	103.8	103.4	103.4	102.6	101.5	100.7	100.3
25	77	97.7	99.1	101.8	103.1	104.4	105.5	105.8	106.3	105.3	103.8	102.4	101.8
20	68	96.9	98.3	101.0	102.3	103.5	104.6	105.8	106.8	106.8	105.9	104.8	104.3
15	59	96.0	97.4	100.1	101.4	102.6	103.7	104.9	105.9	106.4	106.1	105.6	105.3
10	50	95.2	96.6	99.2	100.5	101.7	102.8	103.9	105.0	105.5	105.2	104.9	104.8
5	41	94.4	95.7	98.4	99.6	100.8	101.9	103.0	104.1	104.5	104.2	104.0	103.8
0	32	93.5	94.9	97.5	98.7	99.9	101.0	102.1	103.1	103.6	103.3	103.0	102.9
-10	14	91.8	93.1	95.7	96.9	98.1	99.1	100.2	101.2	101.7	101.4	101.1	101.0
-20	-4	90.0	91.3	93.8	95.0	96.2	97.2	98.3	99.3	99.7	99.4	99.2	99.0
-30	-22	88.2	89.5	92.0	93.1	94.3	95.3	96.3	97.3	97.7	97.5	97.2	97.1
-40	-40	86.4	87.6	90.1	91.2	92.3	93.3	94.3	95.3	95.7	95.4	95.2	95.1
-50	-58	84.5	85.7	88.1	89.2	90.3	91.3	92.3	93.2	93.6	93.4	93.1	93.0

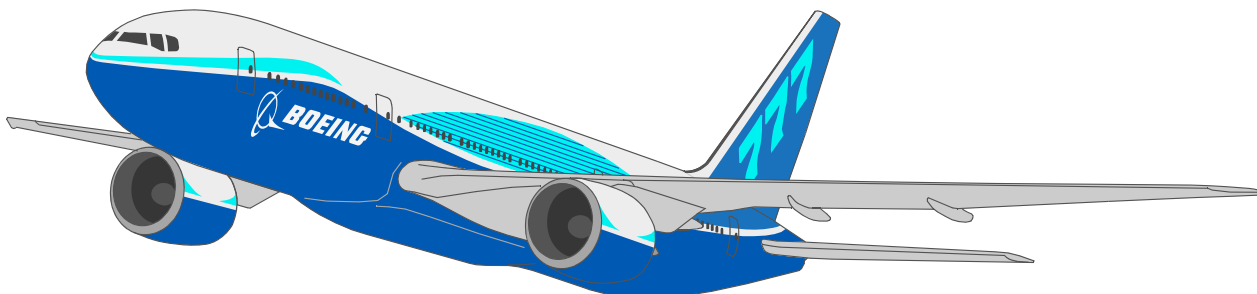
%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (1000 FT)											
	-2	-1	0	1	2	3	4	5	6	7	8	8.4
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

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FLIGHT PLANNING AND PERFORMANCE MANUAL



777-300ER
GE90-115BL
FAA
KG/°C/M

OPTIONS

Crew Oxygen / 2 Bottles
Derate TO1-10%
Derate TO2-20%
Gear Down Dispatch

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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 D632W003-WY068.

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
Init	June 12, 2006	
02	December 20, 2007	
4	December 11, 2009	

No.	Revision Date	Date Filed
01	December 11, 2006	
3	December 19, 2008	
5	December 10, 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 3 - ENROUTE

Section 1 - Text

Introduction

- 3.1.1 - Revised text to correct buffet related maneuver margin information.

Preface

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Chapter 0

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* 4.4.1-6	December 10, 2010
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Page	Date
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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.

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TAKEOFF AND LANDING

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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 correction. 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 correction 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.

Field Length Limit

Maximum field length limited brake release weights are presented for the certified takeoff flap settings for dry and wet runways. 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 for a dry runway or 15 ft for a wet runway. These field limited weights do not account for clearway or stopway.

The reference takeoff condition for a given flap position is zero slope and wind. To determine the field length limit brake release weight, enter the appropriate chart for the desired flap position and runway condition at 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, correct for slope and wind, then 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 to account for the appropriate engine bleed configuration. When finding a maximum weight for a wet runway, the dry runway limit weight must also be found and the lower of the two weights used.

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 the appropriate flap position chart with OAT, move vertically to airport pressure altitude and read the climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate engine bleed configuration.

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 correct for OAT as necessary. Repeat this procedure to correct 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 to account for the appropriate engine bleed configuration.

Tire Speed Limit

Maximum tire speed limited weights are presented for 235 MPH tires. To determine the tire speed limit weight, enter the chart with OAT, move vertically to airport pressure altitude and read the tire speed limit weight to the left. Adjust the tire speed limit weight according to the notes below the chart to account for wind.

Brake Energy Limit

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 appropriate chart for the desired flap position and runway condition at the left horizontal scale with the 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 for normal climb limit weight. The horizontal lines indicate the maximum climb weight improvement for normal climb limited weights. These values are based on the maximum allowable improved climb for each flap position. 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

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 assume 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 Determination:

1. Determine the dry field/obstacle limit weight for the takeoff flap setting.

2. Enter the Weight Adjustment table with the dry 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. 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 the “poor” data reflects a runway 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 as well as FMC computed takeoff speeds can be used for all performance conditions except where adjustments must be made to V1 for clearway, stopway, brake deactivation, improved climb, contaminated runway situations, unbalanced for brake energy or obstacle clearance with unbalanced V1. These speeds may be used for weights less than or equal to the performance limited weight.

The FMC will protect for minimum control speeds by increasing V1, VR and V2 as required. However, the FMC will not compute takeoff speeds for weights where the required speed increase exceeds the maximum certified speed increase. This typically occurs at full rated thrust and light weights. In this case, the message “V SPEEDS UNAVAILABLE” will appear on the FMC scratchpad and the takeoff speed entries will be blank. Takeoff is not permitted in this condition as certified limits have been exceeded. The options are to select a smaller flap setting, select derate thrust and/or add weight (fuel). Selecting derate thrust is the preferred method as this will reduce the minimum control speeds. Note that the assumed temperature method may not help this condition as the minimum control speeds are determined at the actual temperature and therefore are not reduced.

Normal takeoff speeds, V1, VR, and V2 are read from the table by entering with takeoff flap setting and brake release weight. Use the tables provided to correct takeoff speeds for altitude and actual temperature or assumed temperature for reduced thrust takeoffs. Slope and wind corrections to V1 are obtained by entering the Slope and Wind V1 Adjustment Table.

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 on the takeoff speeds page are provided for guidance when more precise data is unavailable.

Minimum Control Speeds

Regulations prohibit scheduling takeoff with a V1 less than minimum V1 for control on the ground, V1(MCG), and VR less than minimum VR, (1.05) VMCA. It is therefore necessary to compare the adjusted V1 and VR to V1(MCG) and Min VR respectively. To find V1(MCG) and Min VR, enter the V1(MCG) and Min VR table with airport pressure altitude and actual OAT. If the adjusted V1 is less than V1(MCG), set V1 equal to V1(MCG). If the adjusted VR is less than Min VR, set VR equal to Min VR and determine a new V2 by adding the difference between the normal VR and Min VR to the normal V2. No weight adjustment is required provided that the field length available exceeds the minimum field length required shown on the Field Length Limit charts.

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 limited weight by 3800 kg for a dry runway or 2250 kg for a wet runway and the V1 associated with the reduced weight by 2 knots. With two brakes deactivated, reduce the normal runway limited weight by 7700 kg for a dry runway or 4700 kg for a wet runway and the V1 associated with the reduced weight by 5 knots for a dry runway or 3 knots for a wet runway. If the resulting V1 is less than minimum V1, takeoff is permitted with V1 set equal to V1(MCG) provided the dry accelerate stop distance corrected for wind and slope exceeds approximately 1500m for one brake deactivated or 1550m for two brakes deactivated. For wet runways, the corrected accelerate stop distance should exceed approximately 1900m for one brake deactivated or 1950m for two brakes deactivated.

For brake(s) 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 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 from the Airplane Flight Manual may yield a less restrictive penalty.

One Thrust Reverser Inoperative

Wet runway takeoff performance presented for all brakes operating is based on the use of one thrust reverser during deceleration. When operating with a thrust reverser inoperative, the runway/obstacle limited takeoff weight and V1 speed must be reduced to account for the reduced deceleration capability. A simplified method which conservatively accounts for this is to reduce the normal wet runway/obstacle limited weight by 5350 kg and the V1 associated with the reduced weight by 3 knots.

If the resulting V1 is less than minimum V1, takeoff is permitted with V1 set equal to V1(MCG) provided the accelerate stop distance available corrected for wind and slope exceeds approximately 1950 m.

Takeoff %N1

To find Max Takeoff %N1 based on normal engine bleed for air conditioning (2 bleeds/2 packs) enter Max Takeoff %N1 Table with airport pressure altitude and airport OAT and read %N1. For packs off or wing

anti-ice operation, apply the %N1 correction shown below the table. No takeoff %N1 correction is required for engine anti-ice.

Stab Trim Setting

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

Takeoff Derates

This section contains tabulated takeoff weight penalties, thrust setting, takeoff speeds and stabilizer trim setting for takeoff at derated engine ratings. Derate 1 (TO1) and Derate 2 (TO2).

Takeoff Performance (TO1 and TO2)

Takeoff limit weights are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. Weights are shown for takeoff field, climb, obstacle, tire speed and brake energy limits. Each full rated thrust limiting weight must be adjusted for derate operation and then the most restrictive weight used for planning.

Slush/Standing Water

Slush/standing water runway limit weight and V1 speed adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. The procedures for determining contaminated runway limit weight and speeds are the same as those discussed for full rated thrust. Adjustments are applied to the derated thrust dry runway limits.

Slippery Runway

Slippery runway limit weight and V1 speed adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. The procedures for determining slippery runway limit weight and speeds are the same as those discussed for full rated thrust. Adjustments are applied to the derated thrust dry runway limits.

Takeoff Speeds

Balanced takeoff speeds V1, VR and V2 reflecting the FMC display are presented for TO1 or TO2 derated thrust. Speeds may require correction for the effects of minimum control speeds.

Minimum Control Speeds, Stab Trim

Tables of minimum control speed V1(MCG) and stabilizer trim setting are provided for TO1 or TO2 thrust levels as appropriate.

Brakes Deactivated

Takeoff field length/obstacle weight and V1 speed adjustments are the same as those shown previously in this chapter for full rated takeoff.

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 field limit chart with field length available, correct for runway condition and wind. Proceed vertically to the airport pressure altitude and read the field length limit weight at the right. Adjust the field length limit weight according to the notes below the chart to account for the appropriate brake configuration.

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 climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate engine bleed configuration. When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, make the appropriate ice correction as shown on the chart.

Go-Around Climb Gradient

To determine go-around climb gradient, enter the chart with airport OAT and pressure altitude and then proceed vertically to find airplane weight. Continue down the chart to the proper airspeed in terms of deviation from VREF, following the reference lines as appropriate. Read the go-around climb gradient directly from the chart and then apply the necessary corrections for A/C and icing conditions as noted. Note that data is for one engine inoperative.

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. For brakes deactivated, reduce the maximum quick turnaround weight by the amount shown on the chart. As an alternate procedure,

if the BRAKE TEMP advisory message on EICAS is not displayed 10 to 15 minutes after parking, then no waiting period is required.

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 Weight table takes precedence over the 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. If operating with one brake deactivated increase the brake energy per brake by 10 percent. If operating with two brakes deactivated increase the brake energy per brake by 20 percent. 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, corrected for wind, then vertically downwards correcting 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 wind, airport pressure altitude and OAT corrections.

The chart is based on a rejected takeoff with maximum manual braking effort. Make the corrections 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 to the next page with 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. An EICAS advisory message, BRAKE TEMP, will appear when any brake registers 5.0 or higher on the EICAS indication and disappear as the hottest brake cools with an EICAS indication of 3.5. Note that even without an EICAS advisory message, brake cooling is recommended.

CAT III Automatic Landing

The following advisory information is presented 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. These values are actual landing distances and do not include the 1.67 regulatory factor. Therefore, they cannot be used to determine the dispatch required landing field length.

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

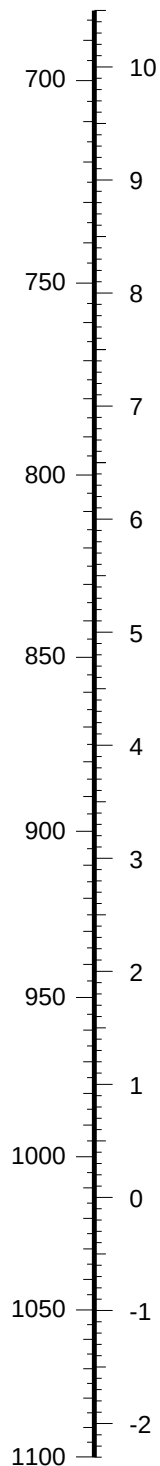
consistent with wet runway testing done on early Boeing jets. The performance level used to calculate "poor" data reflects runways covered with wet ice.

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

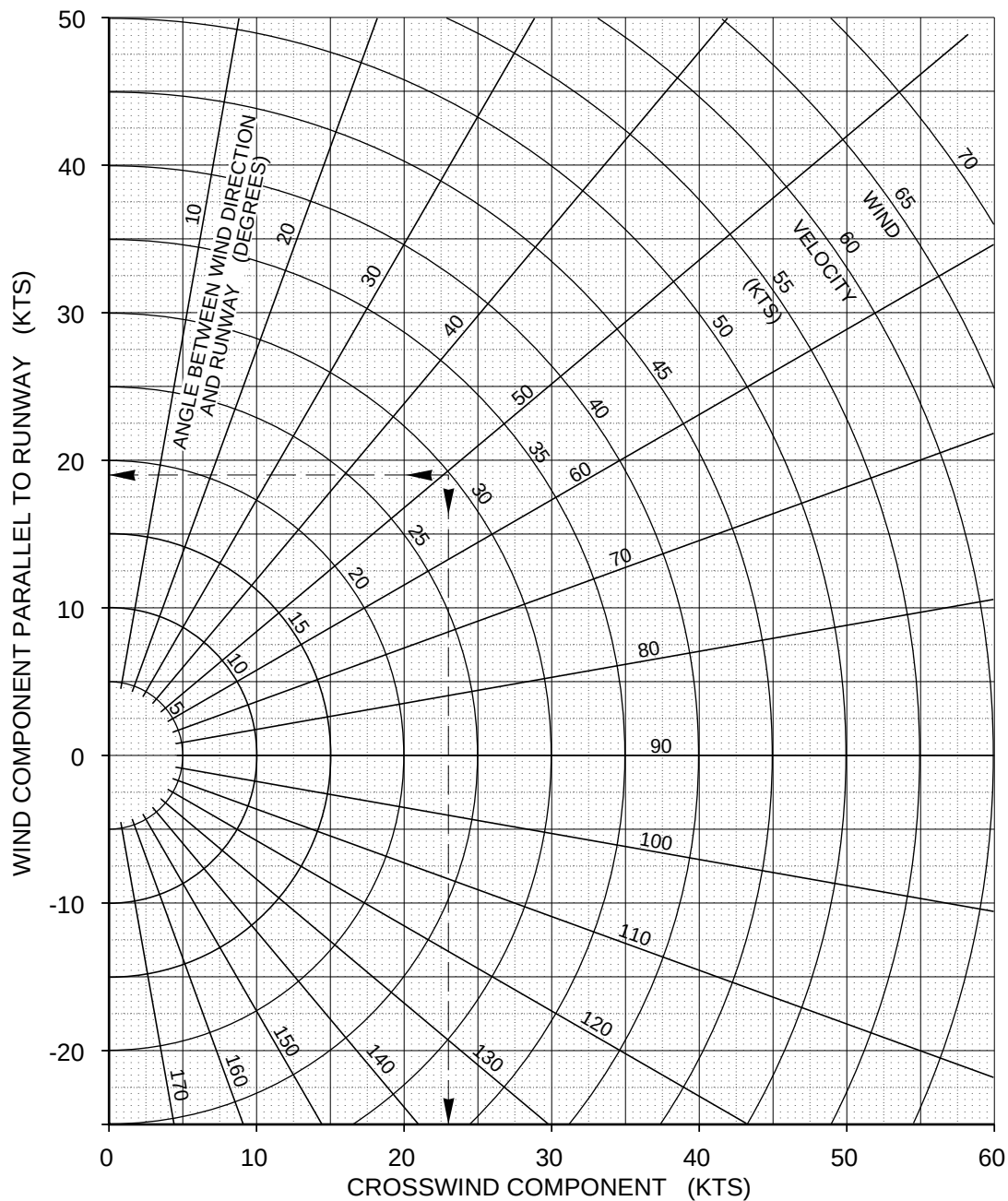


QNH to Pressure Altitude

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

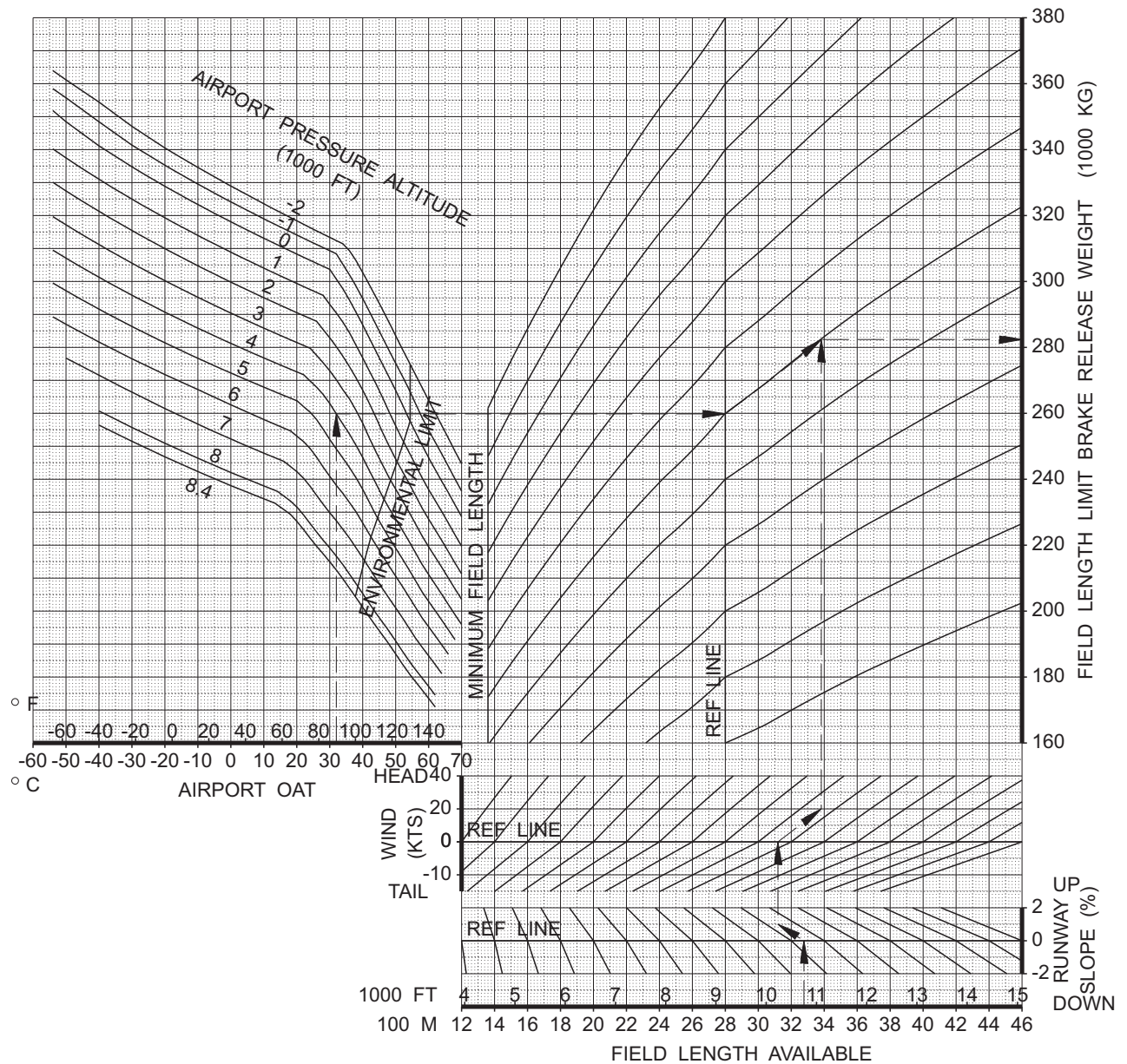
Wind Component



Takeoff Field Limit - Dry Runway

Flaps 5

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

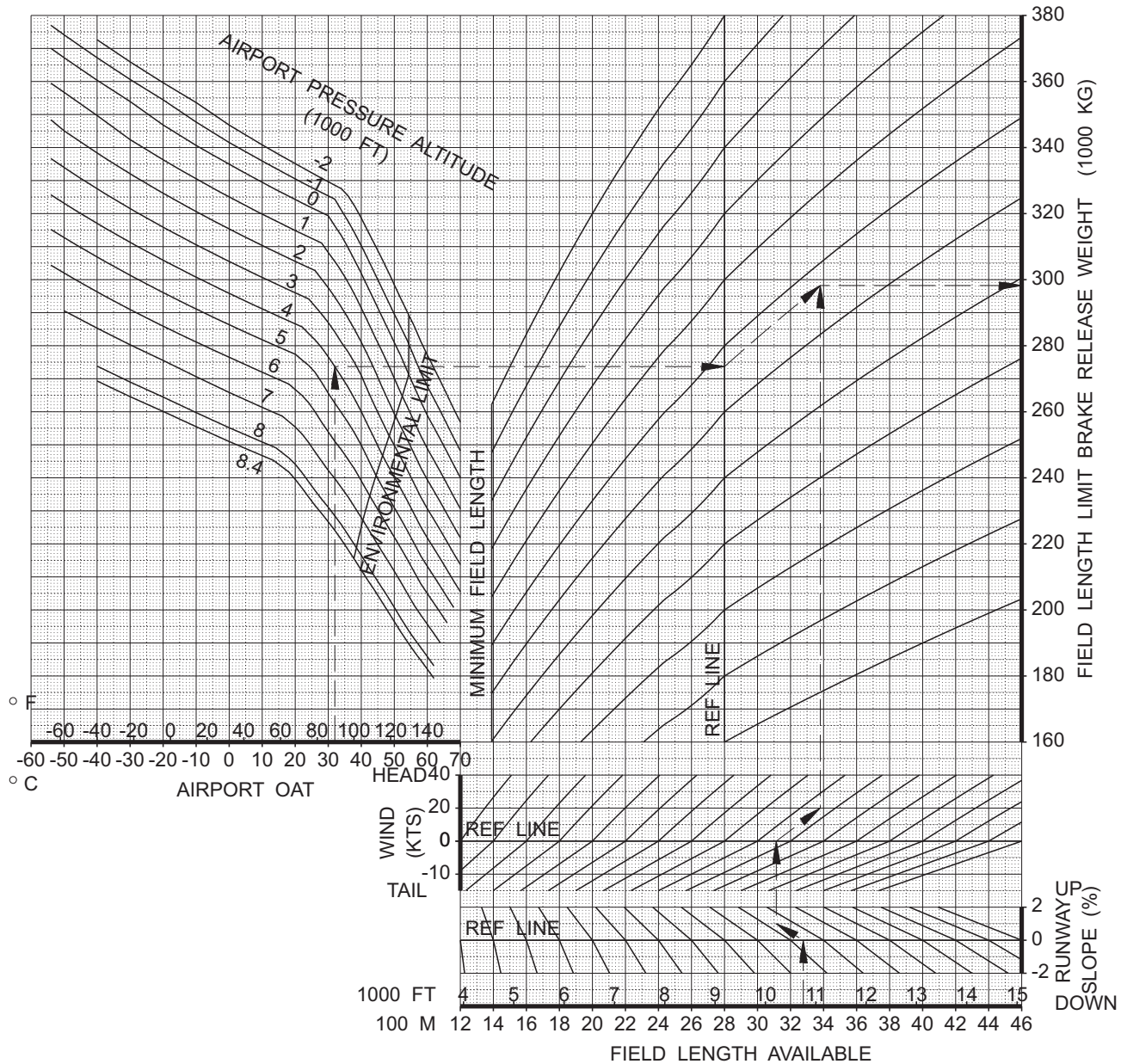


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 950 kg.

Takeoff Field Limit - Dry Runway

Flaps 15

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

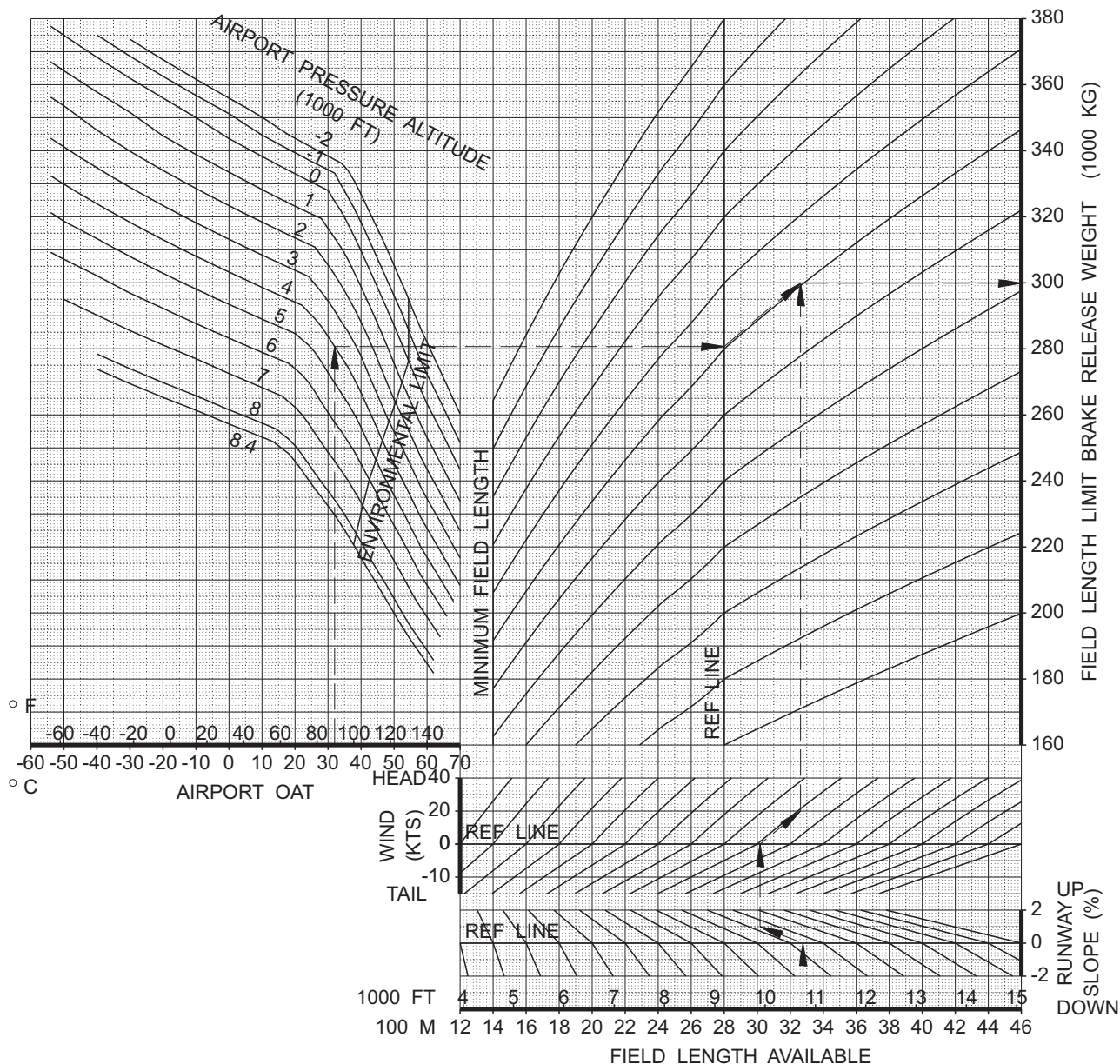


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 950 kg.

Takeoff Field Limit - Dry Runway

Flaps 20

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

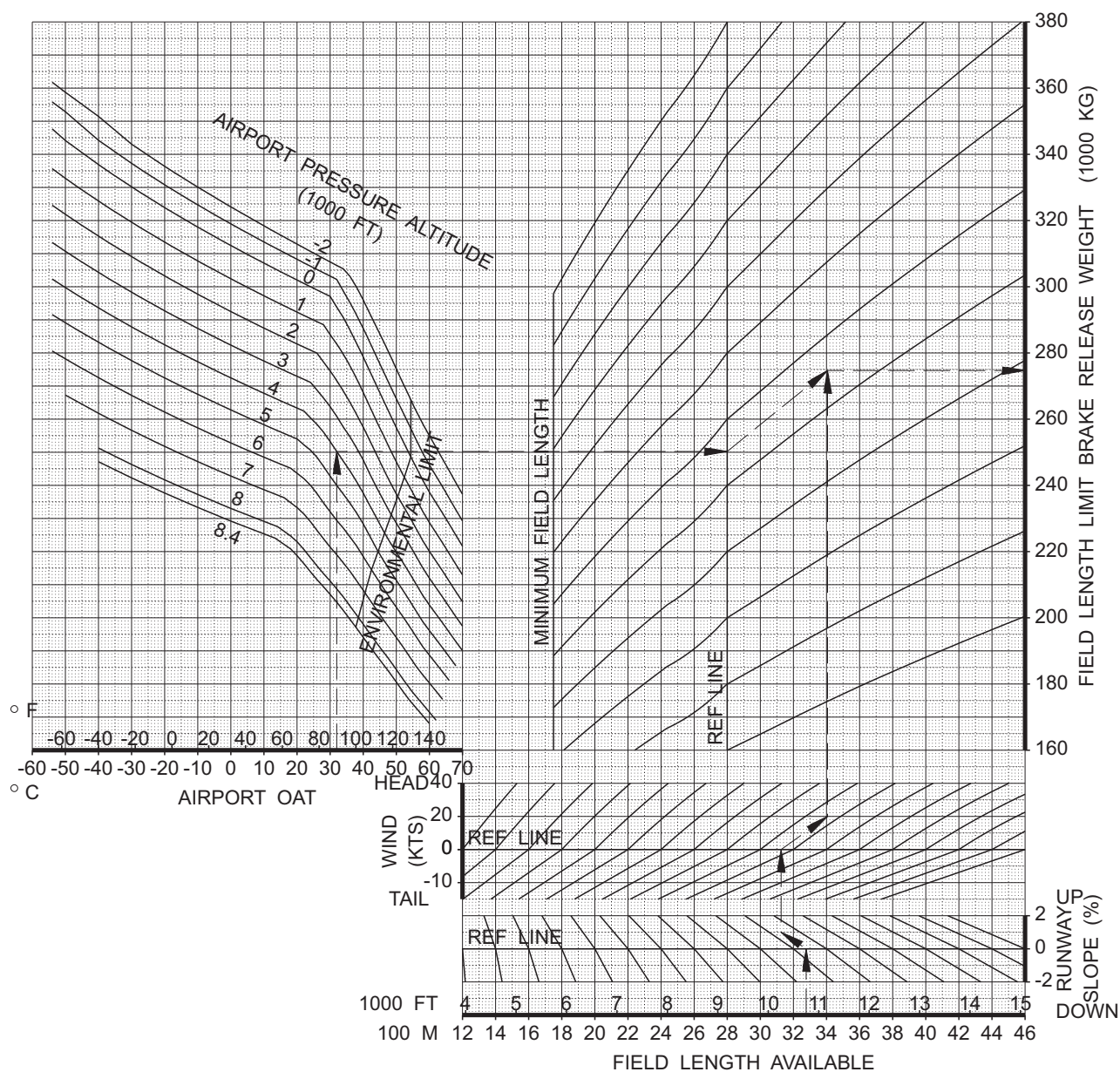


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1000 kg.

Takeoff Field Limit - Wet Runway

Flaps 5

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

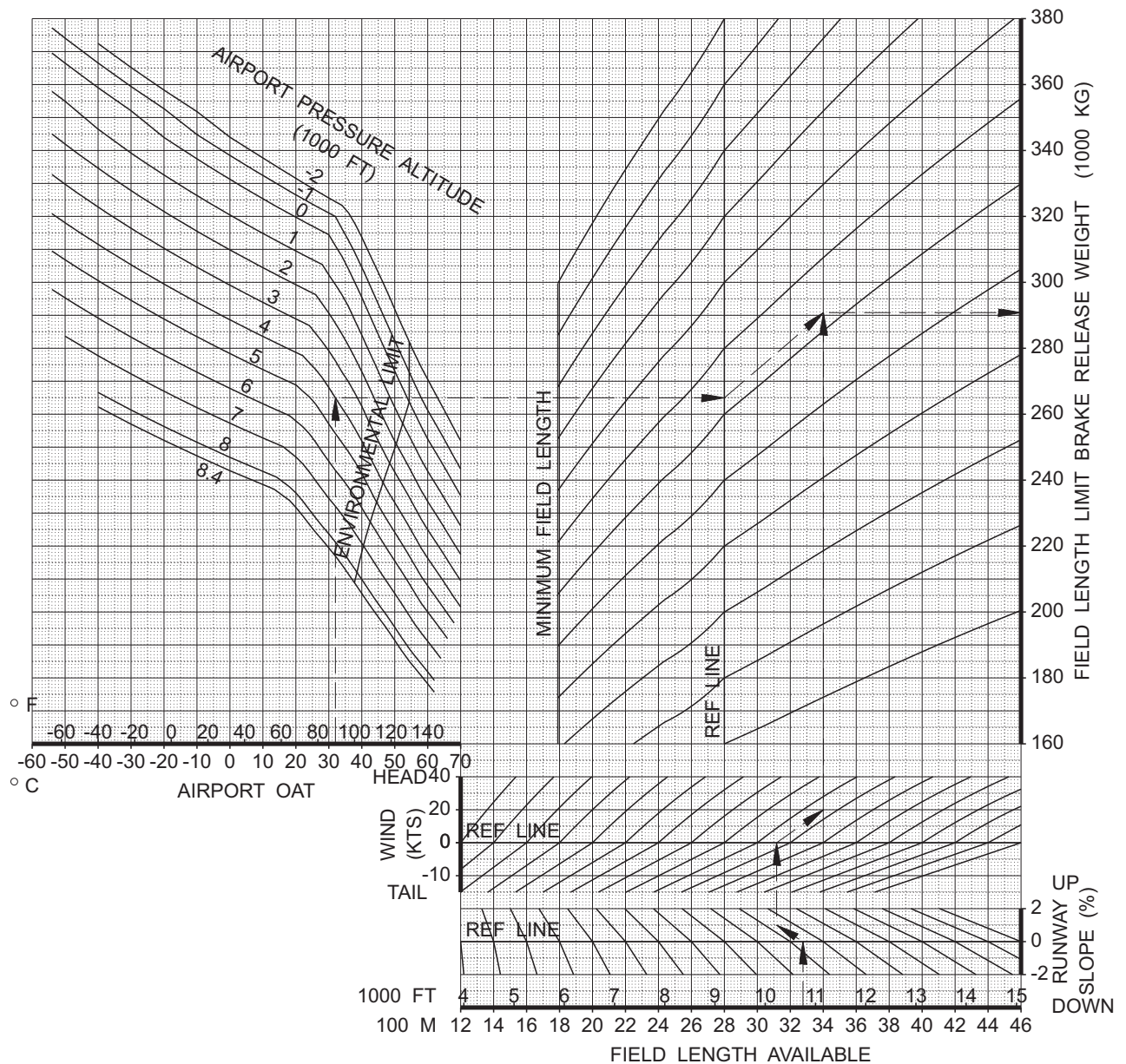


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1100 kg.

Takeoff Field Limit - Wet Runway

Flaps 15

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

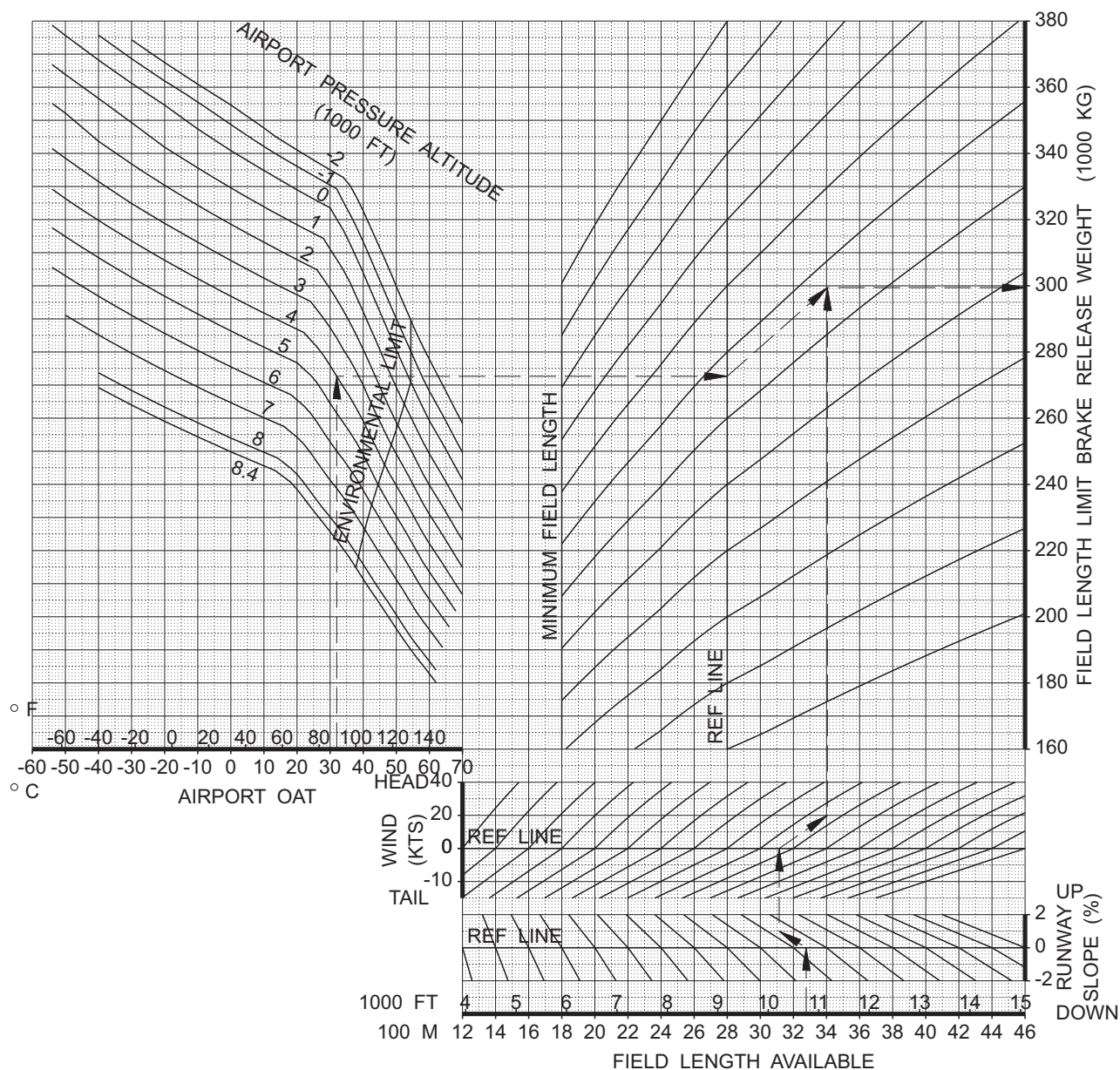


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1100 kg.

Takeoff Field Limit - Wet Runway

Flaps 20

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

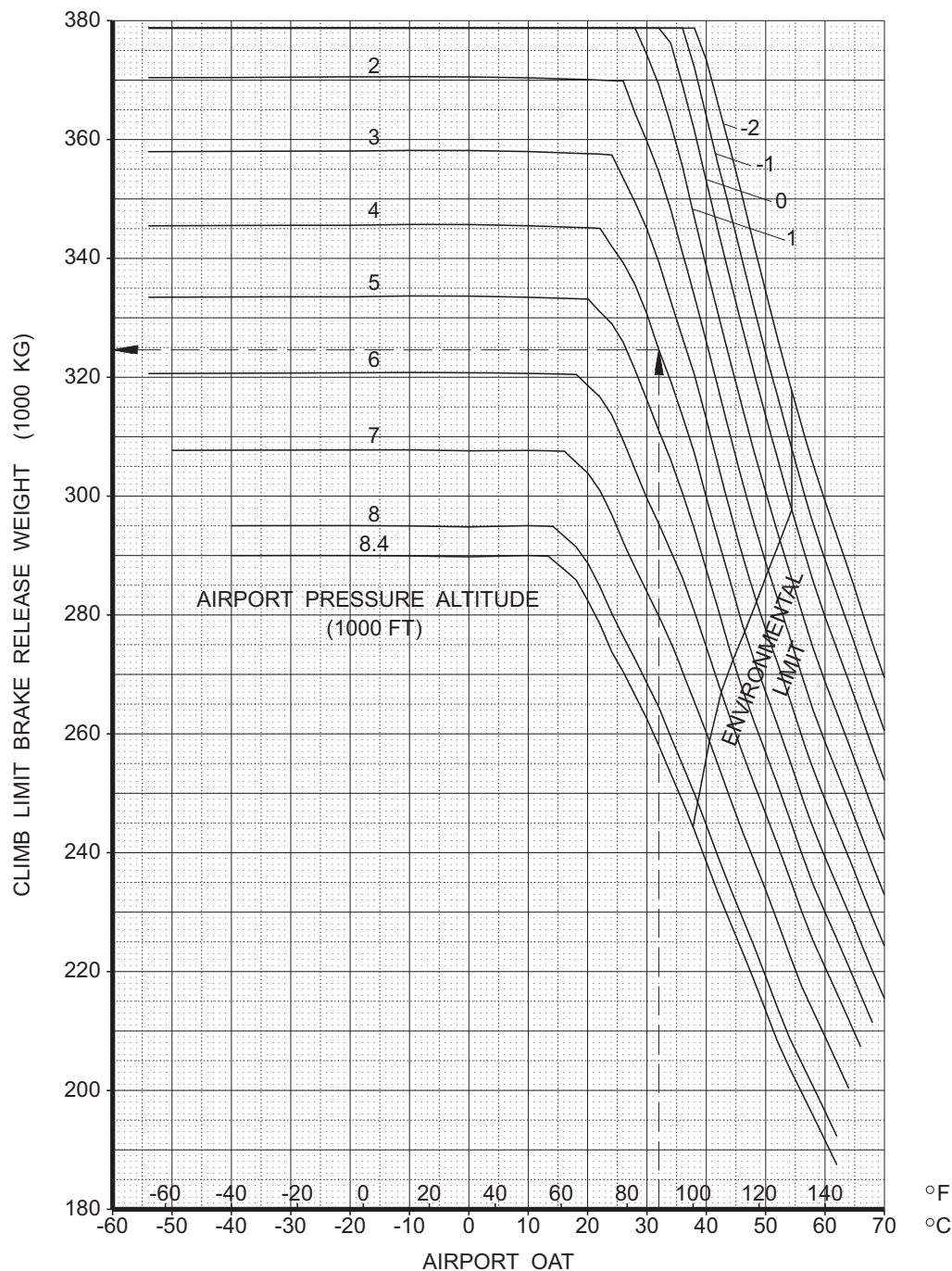


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1100 kg.

Takeoff Climb Limit

Flaps 5

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

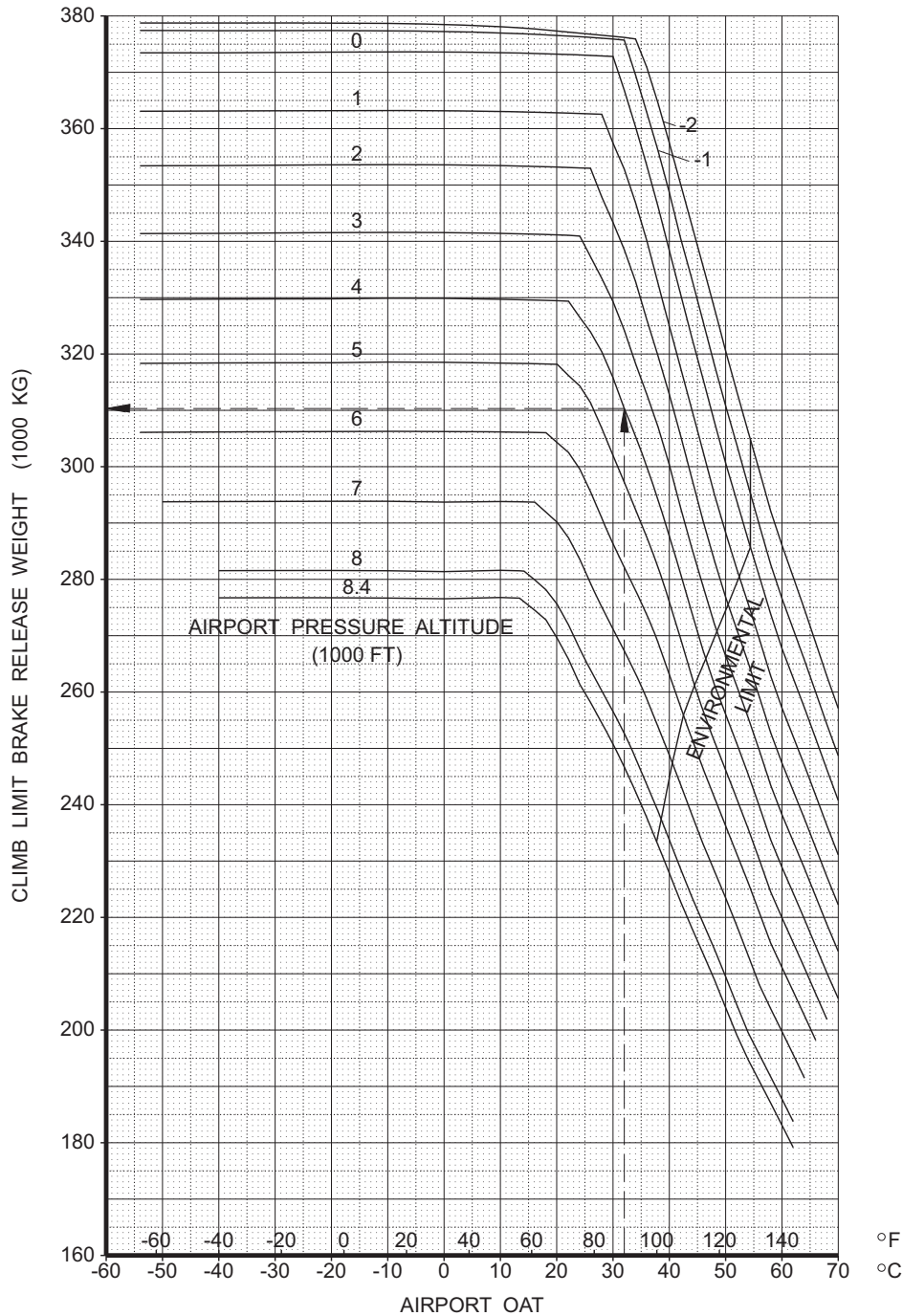


With engine bleed for packs off, increase weight by 1950 kg.
With engine and wing anti-ice on, decrease weight by 1900 kg.

Takeoff Climb Limit

Flaps 15

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

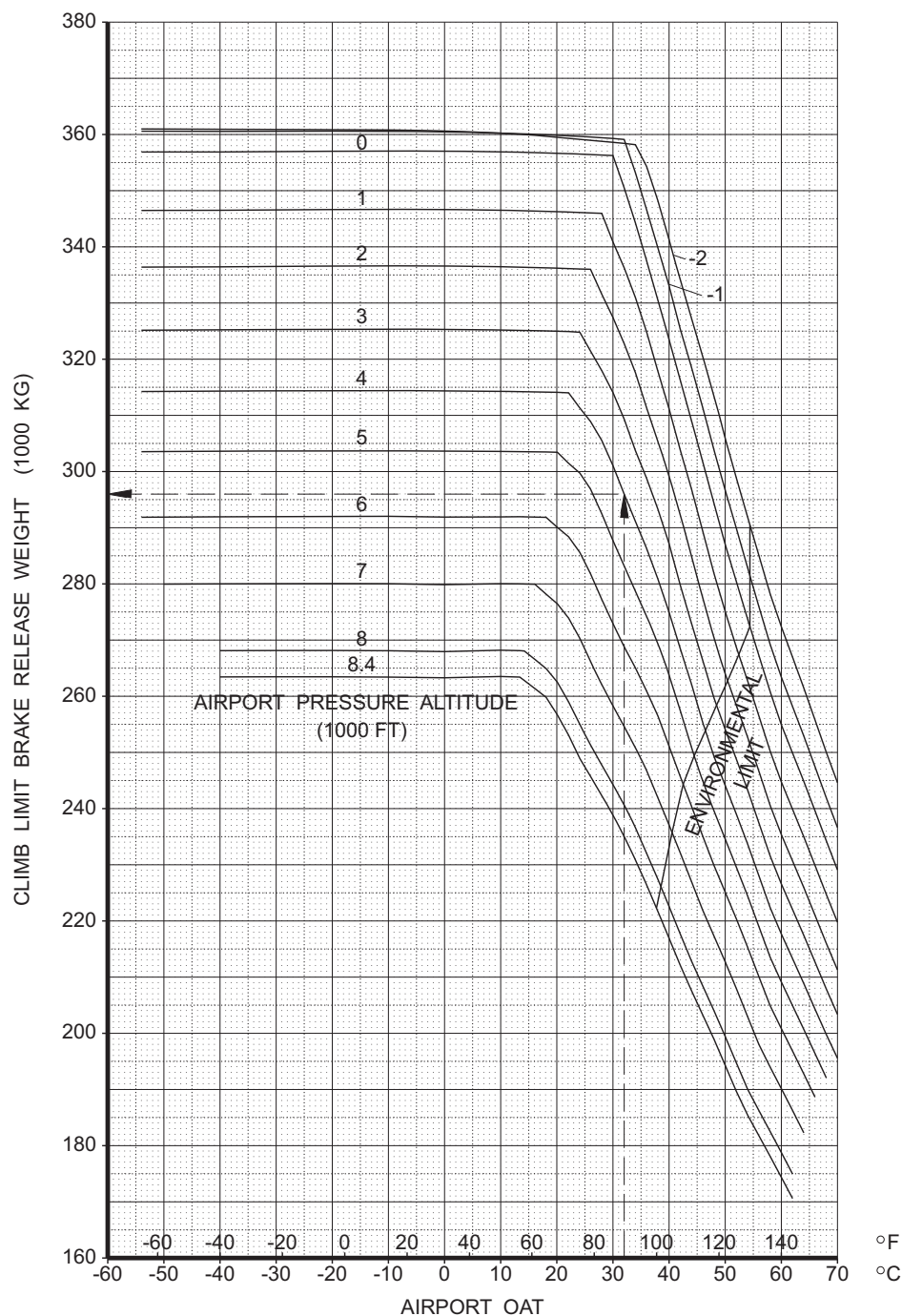


With engine bleed for packs off, increase weight by 1900 kg.
With engine and wing anti-ice on, decrease weight by 1750 kg.

Takeoff Climb Limit

Flaps 20

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

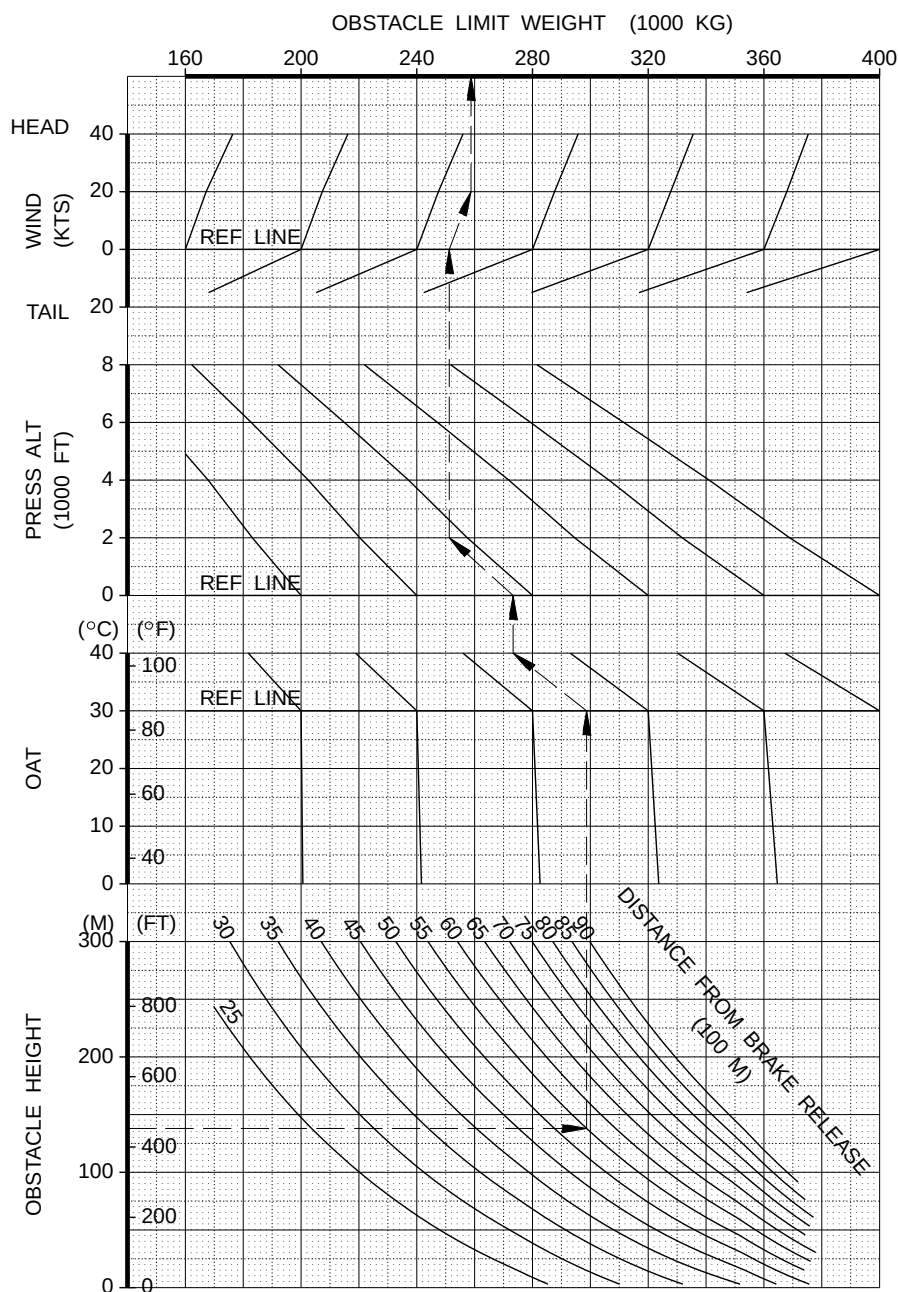


With engine bleed for packs off, increase weight by 1800 kg.
With engine and wing anti-ice on, decrease weight by 1700 kg.

Obstacle Limit

Flaps 5

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



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

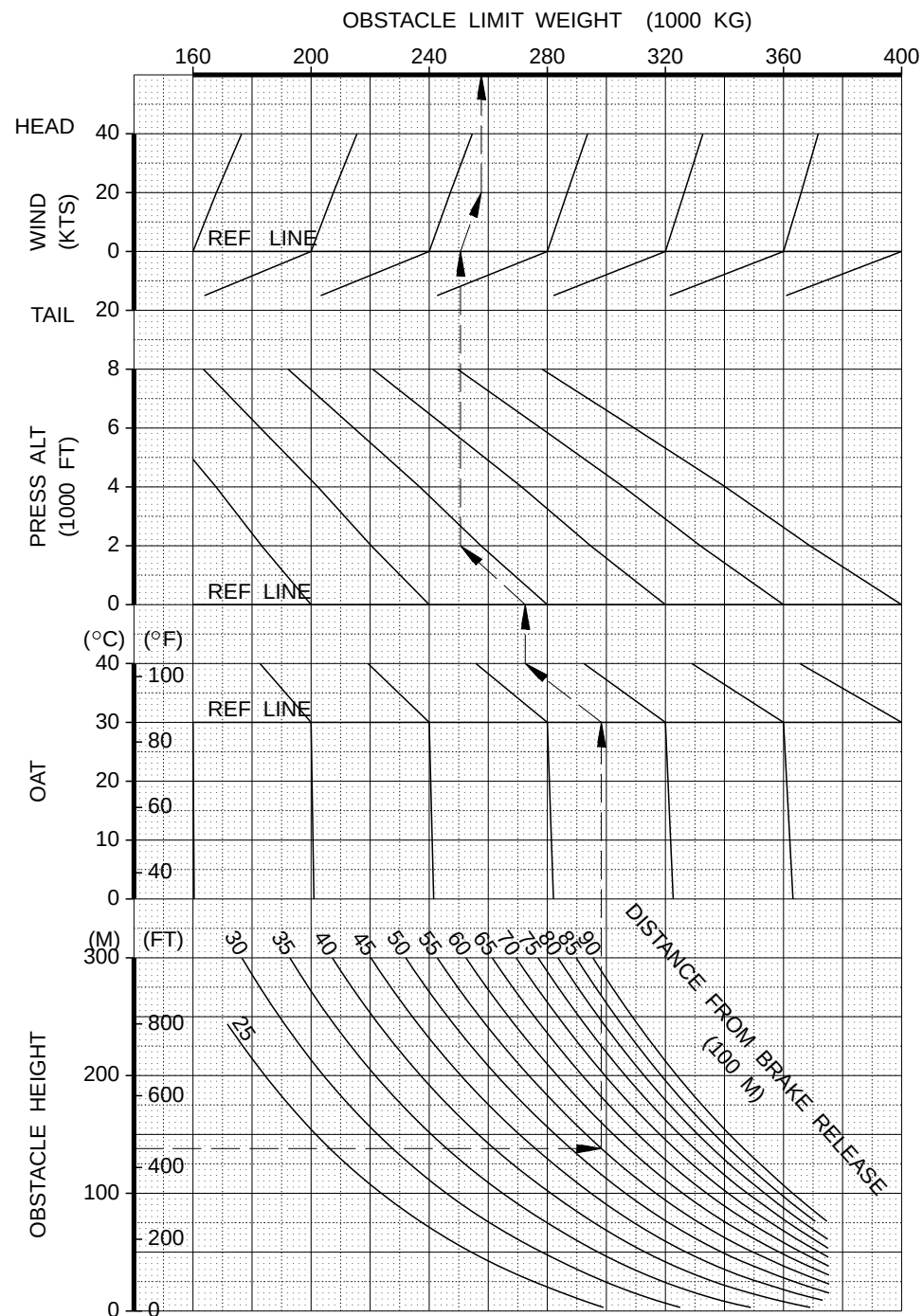
With engine bleed for packs off, increase weight by 900 kg.

With engine and wing anti-ice on, decrease weight by 2000 kg.

Obstacle Limit

Flaps 15

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



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

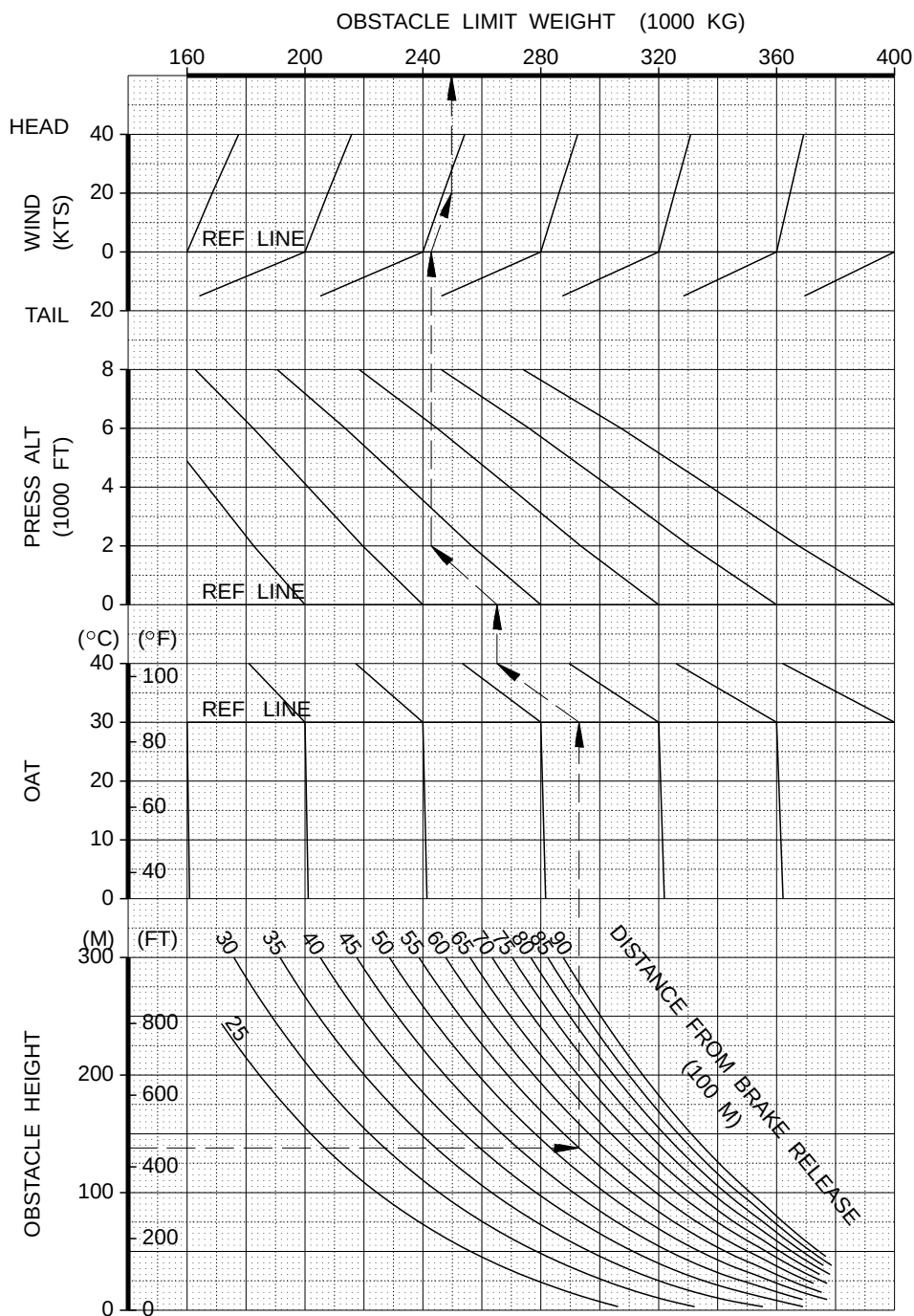
With engine bleed for packs off, increase weight by 900 kg.

With engine and wing anti-ice on, decrease weight by 2000 kg.

Obstacle Limit

Flaps 20

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

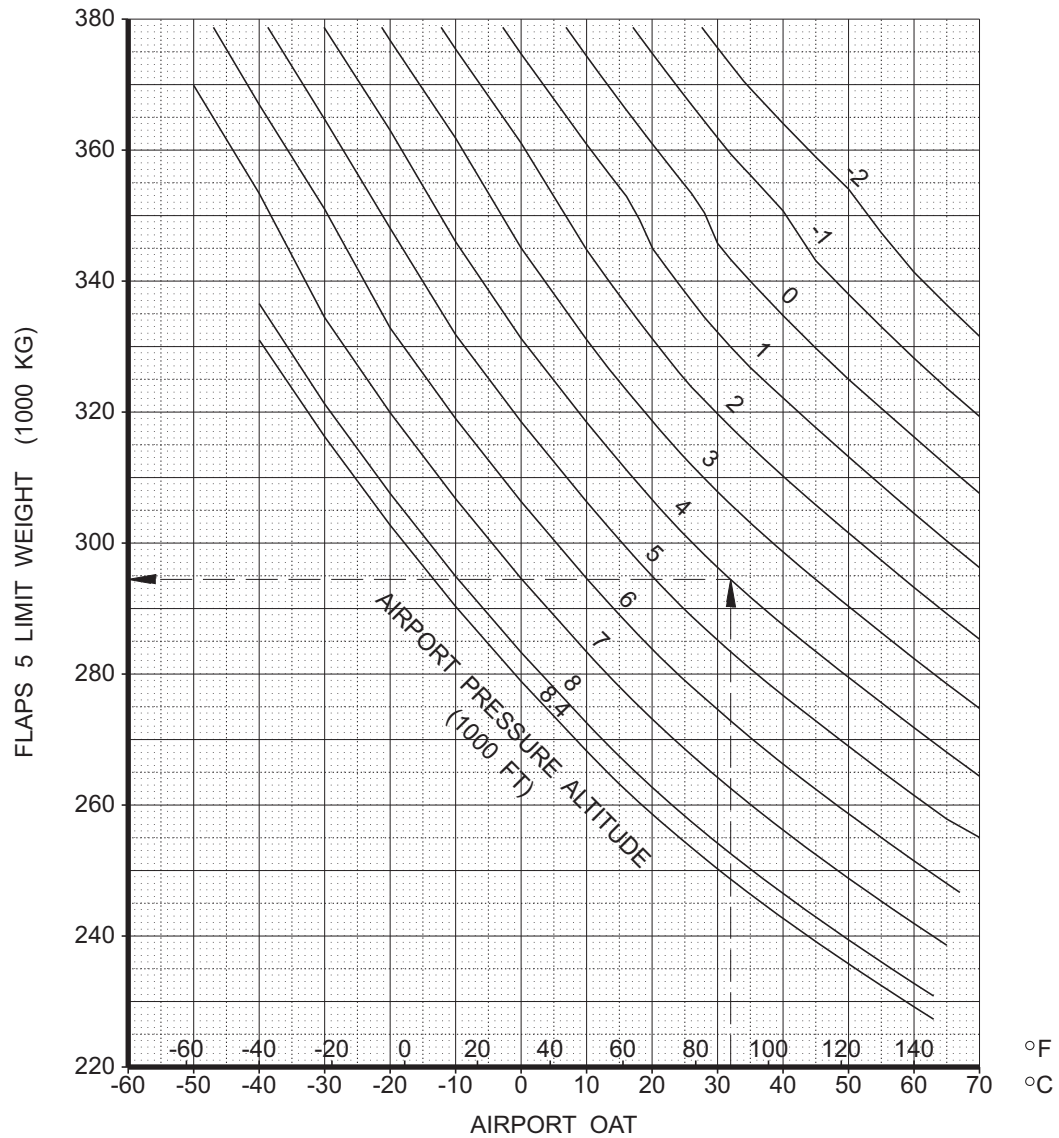


Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.

With engine bleed for packs off, increase weight by 900 kg.

With engine and wing anti-ice on, decrease weight by 2000 kg.

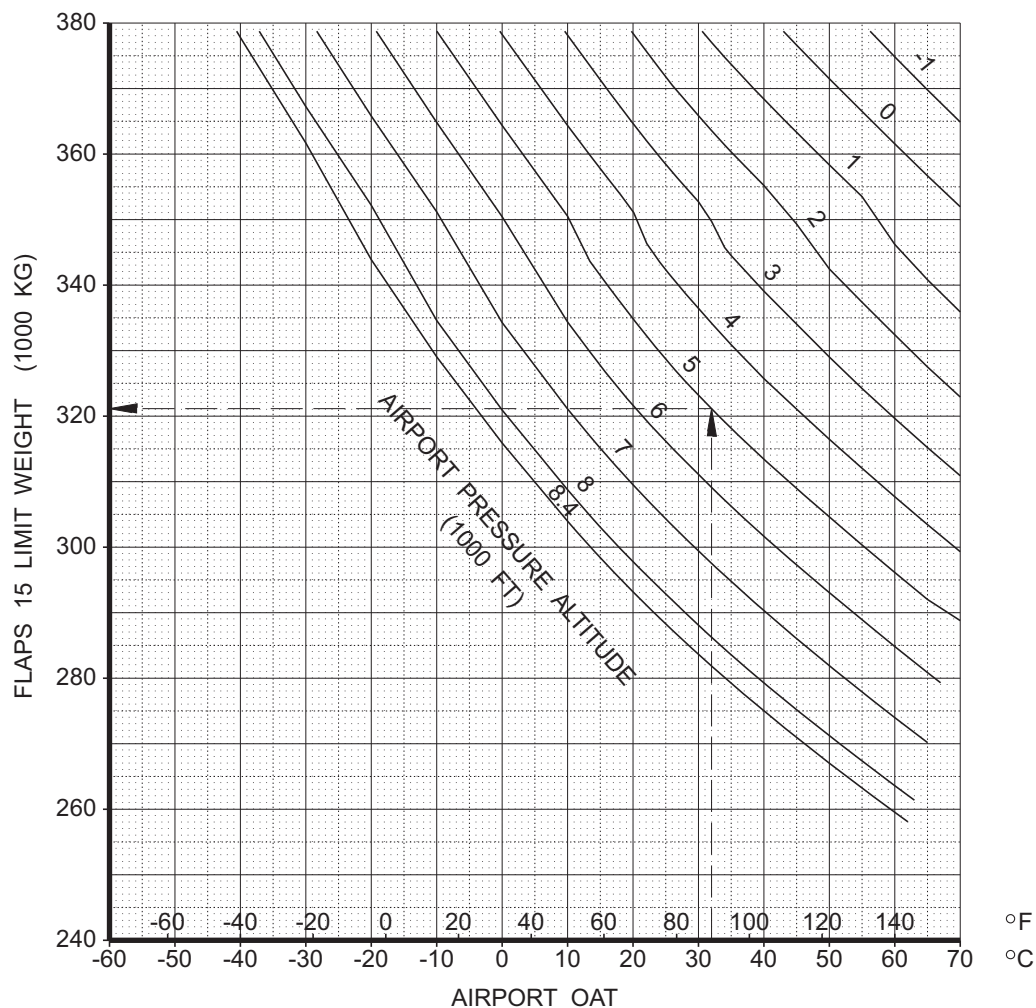
Tire Speed Limit Flaps 5



Increase tire speed limit weight by 2250 kg per knot headwind.
Decrease tire speed limit weight by 5400 kg per knot tailwind.

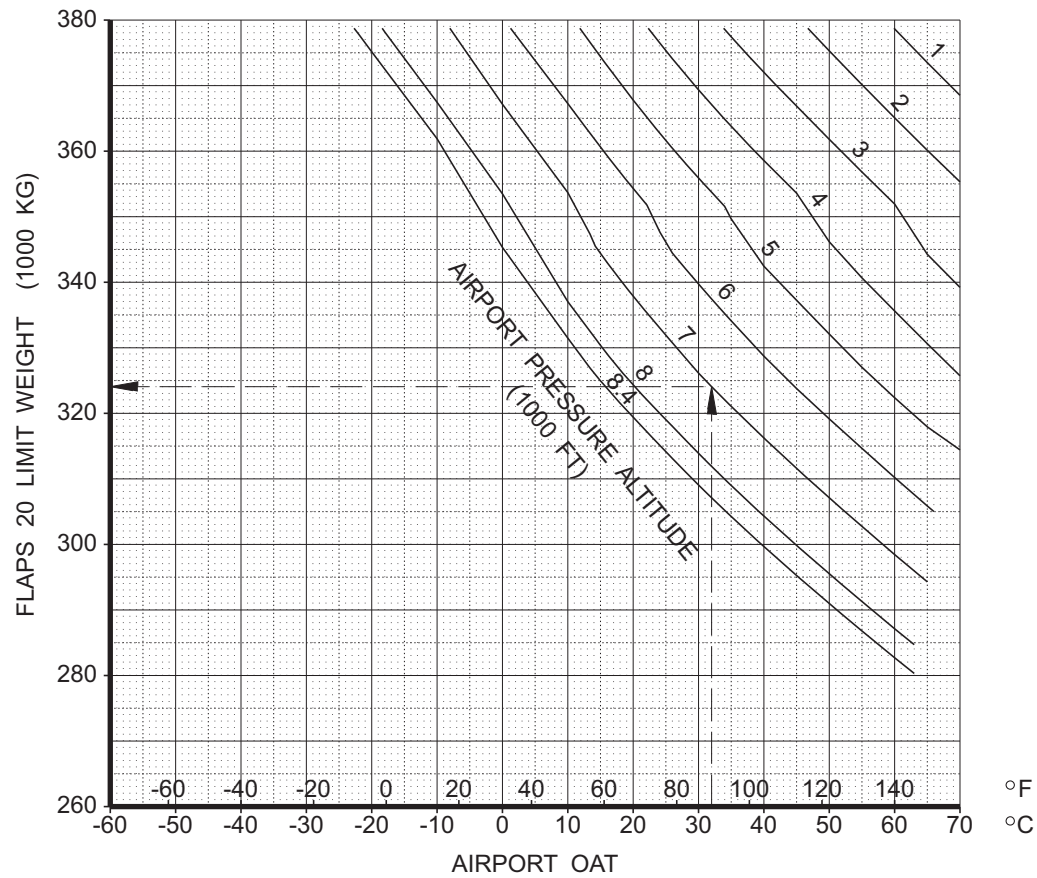
Tire Speed Limit

Flaps 15



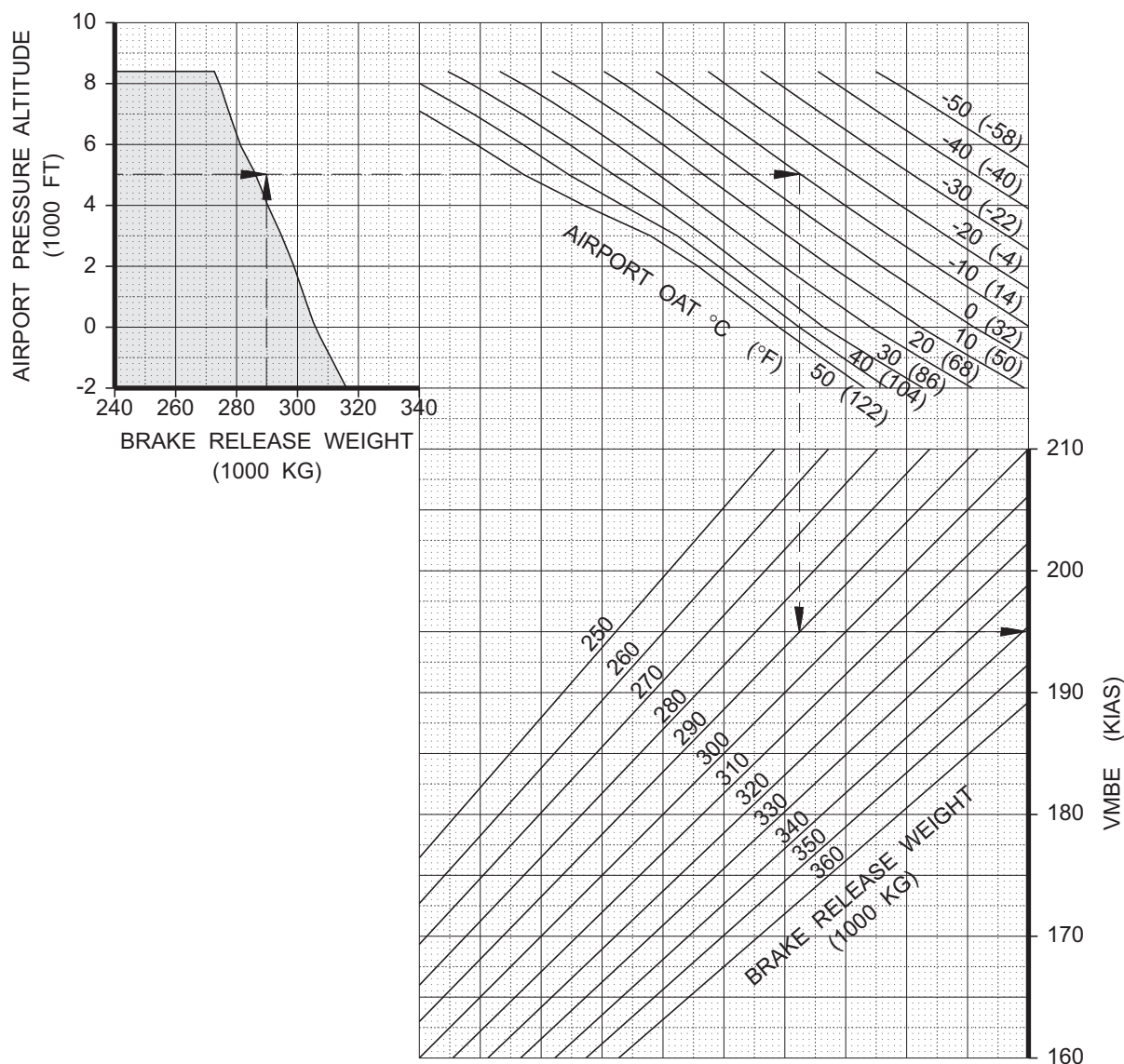
Increase tire speed limit weight by 2550 kg per knot headwind.
Decrease tire speed limit weight by 5400 kg per knot tailwind.

Tire Speed Limit Flaps 20



Increase tire speed limit weight by 2750 kg per knot headwind.
Decrease tire speed limit weight by 5400 kg per knot tailwind.

Brake Energy Limit VMBE



Check VMBE when outside shaded area, operating with tailwind, or using improved climb.

Adjust VMBE for slope, wind and brake configuration.

Increase VMBE by 2 knots per 1% uphill runway slope. Decrease VMBE by 5 knots per 1% downhill runway slope.

Increase VMBE by 4 knots per 10 knots headwind. Decrease VMBE by 20 knots per 10 knots tailwind.

Decrease VMBE by 10 knots for one brake deactivated and 21 knots for two brakes deactivated.

Normal takeoff:

Decrease brake release weight by 2100 kg for each knot V1 exceeds VMBE.

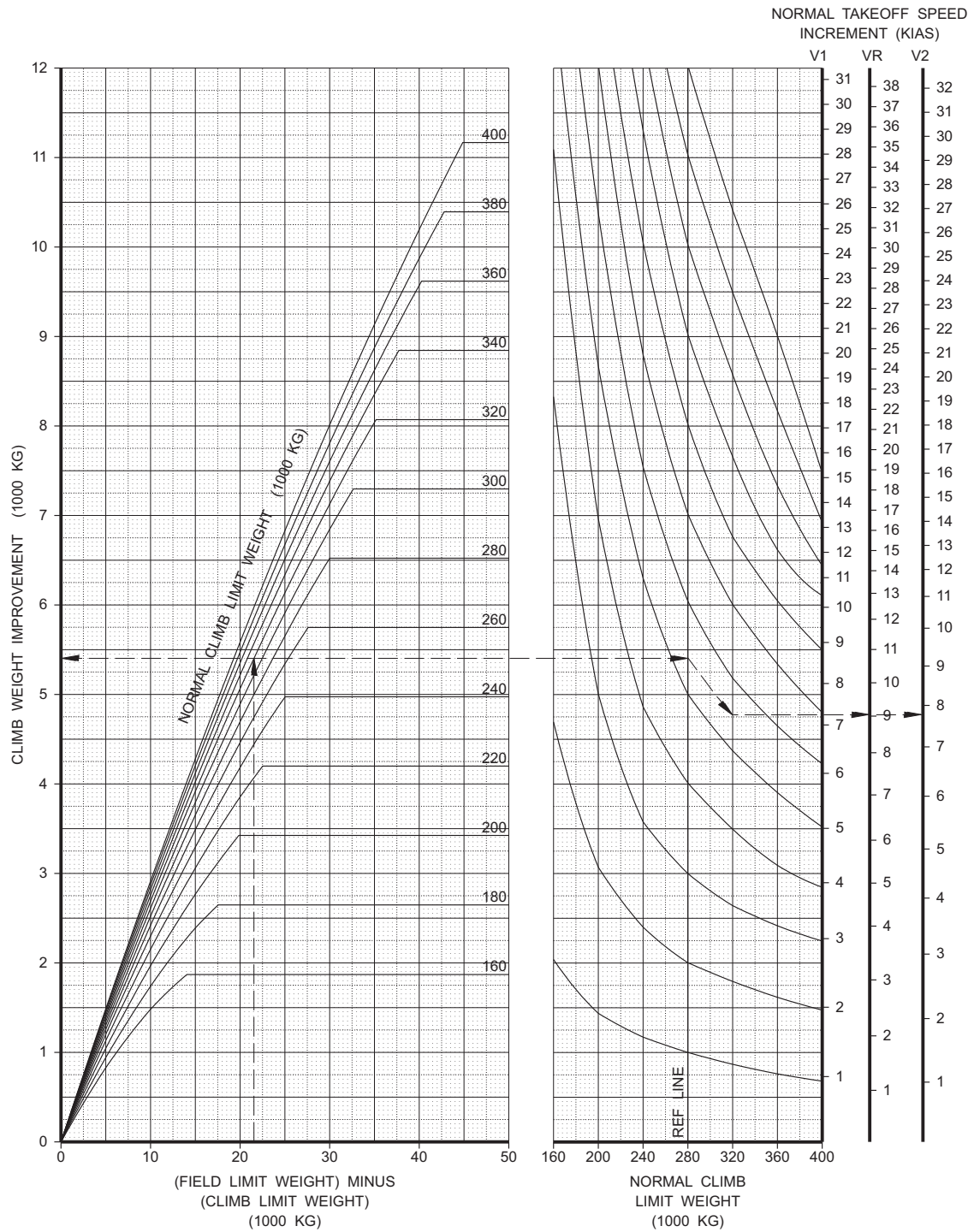
Determine normal V1, VR, V2 speeds for lower brake release weight.

Improved climb takeoff:

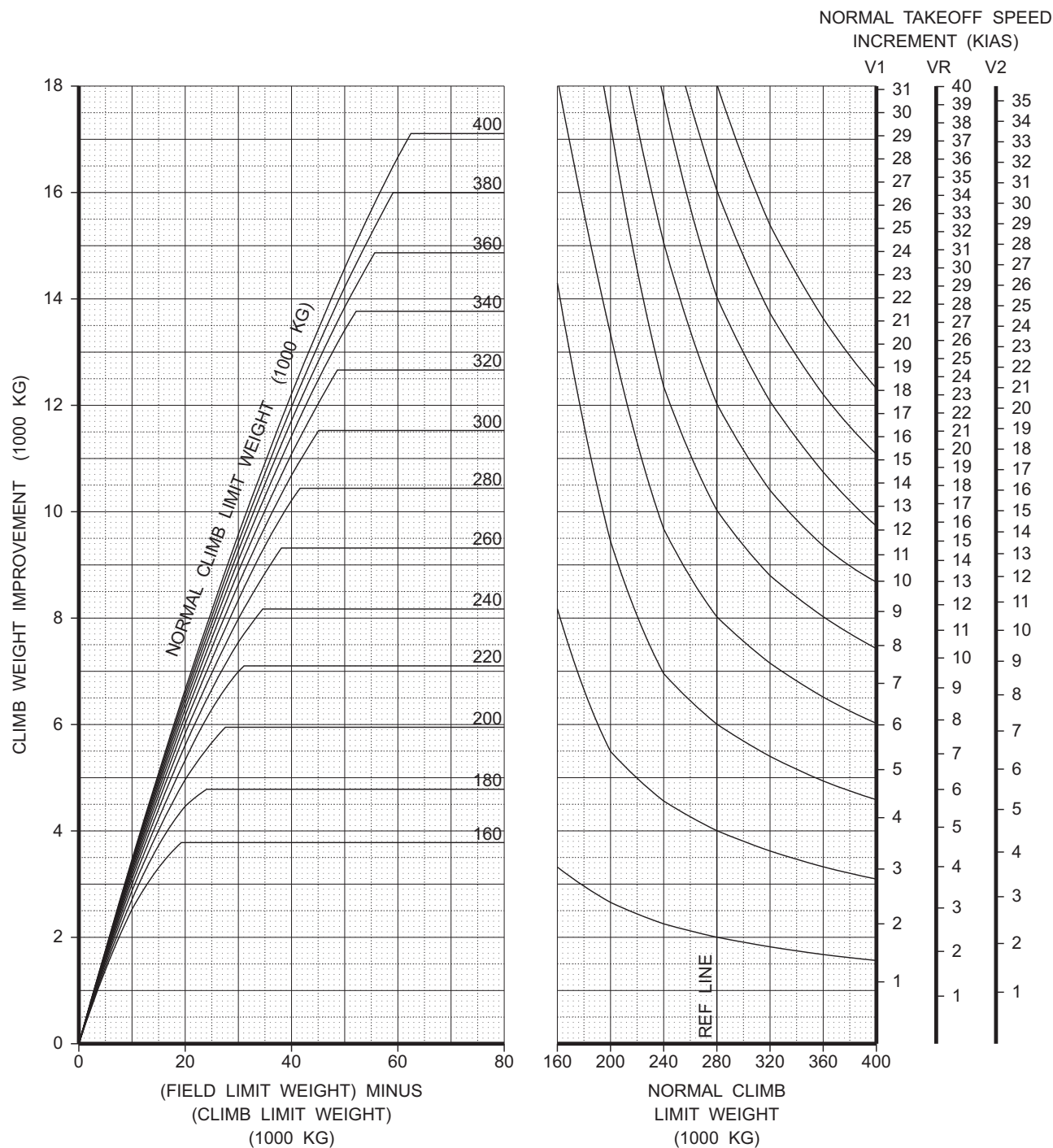
Decrease climb weight improvement by 850 kg for each knot V1 exceeds VMBE.

Determine V1, VR, V2 speed increments for the lower climb weight improvement.

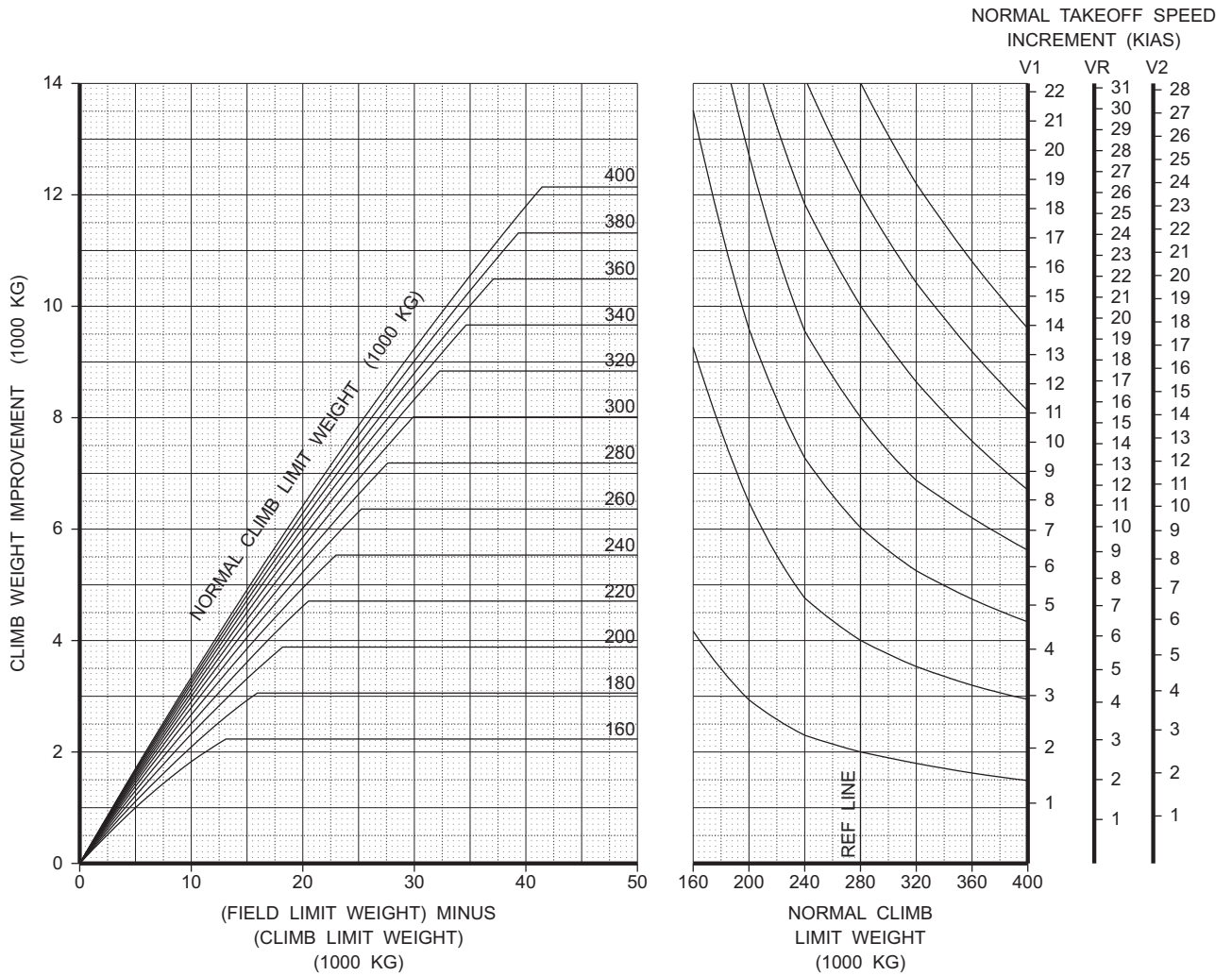
Improved Climb Field Length Limit - Dry Runway Flaps 5



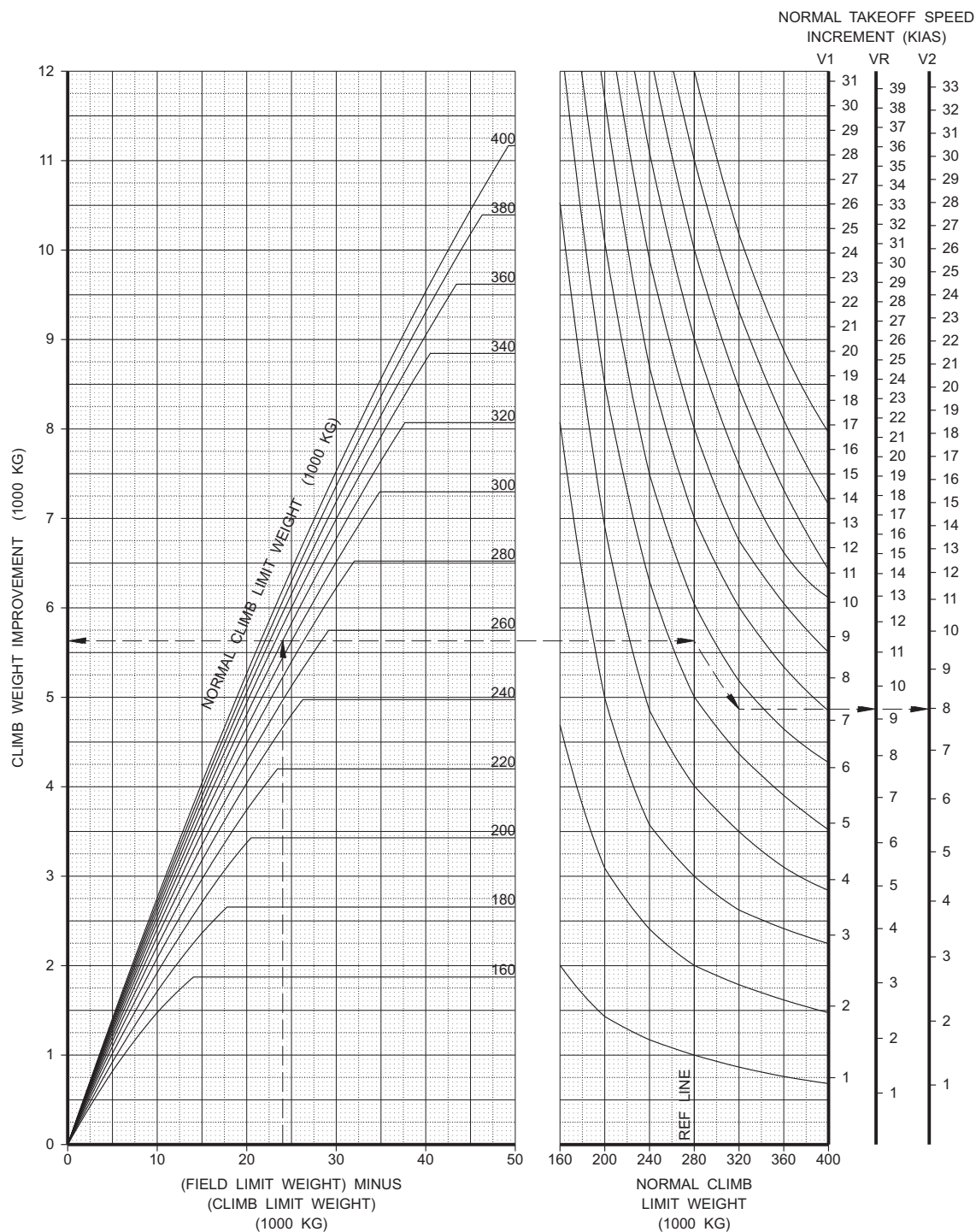
Improved Climb Field Length Limit - Dry Runway Flaps 15



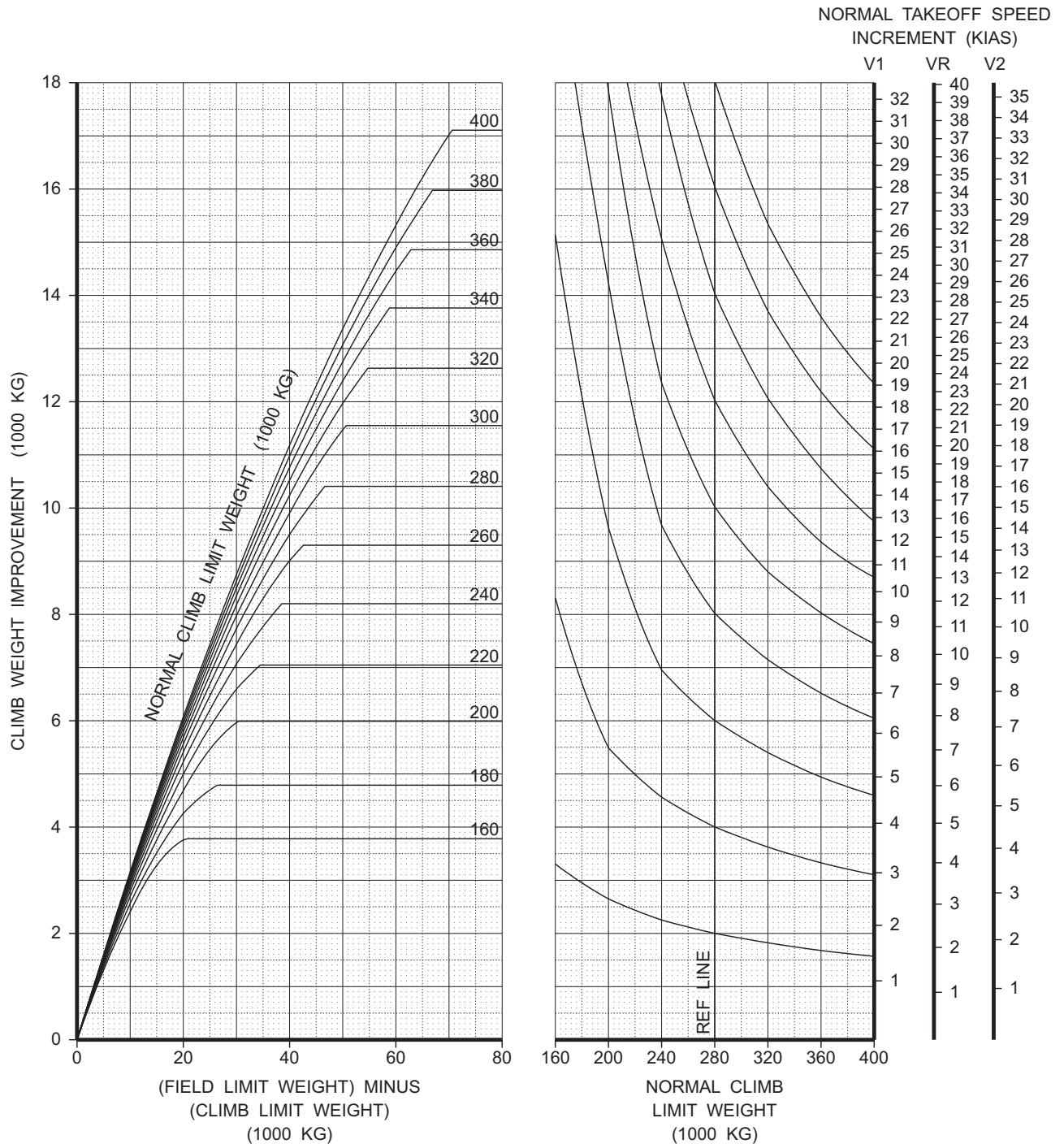
Improved Climb Field Length Limit - Dry Runway Flaps 20



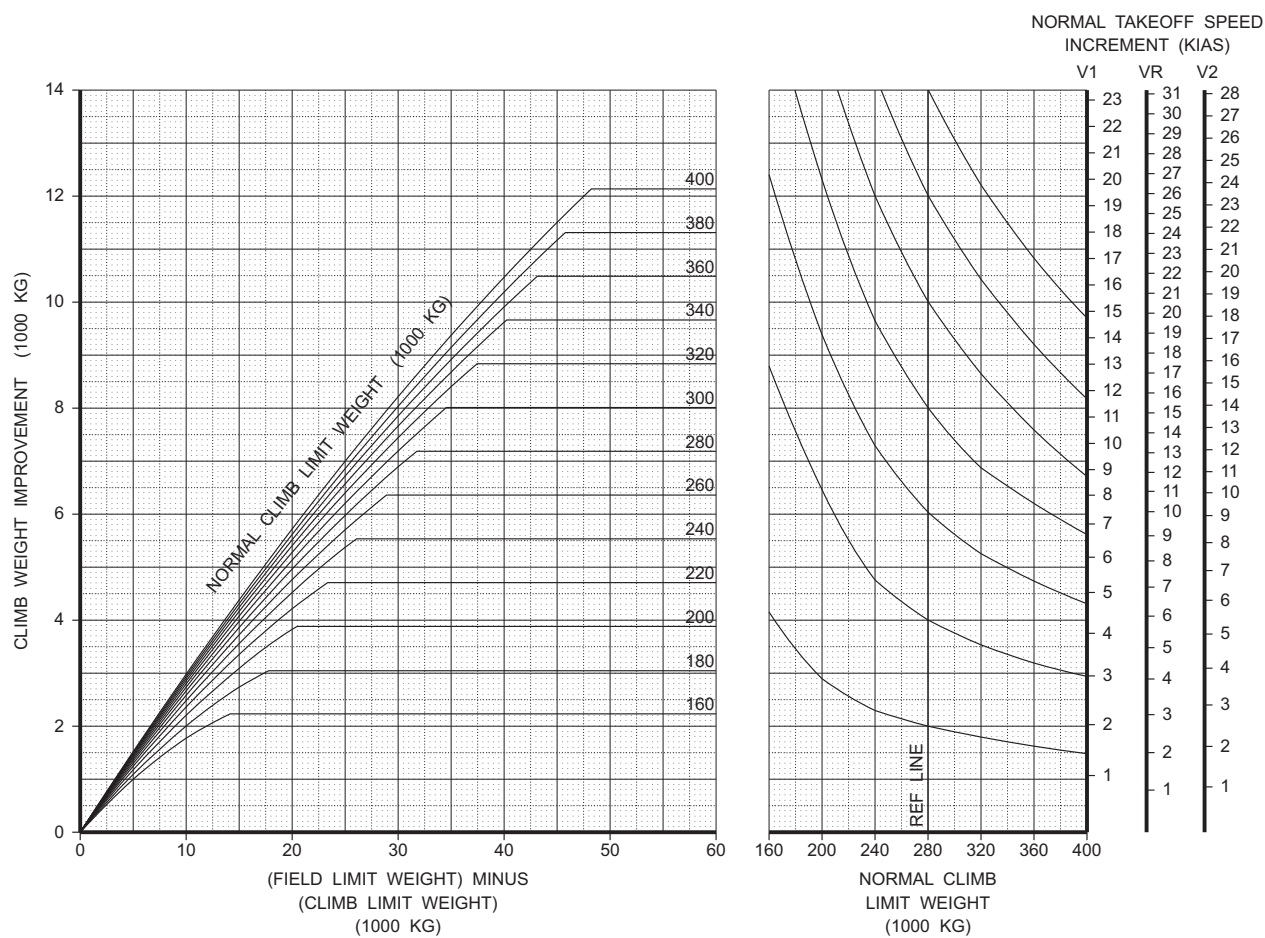
Improved Climb Field Length Limit - Wet Runway Flaps 5



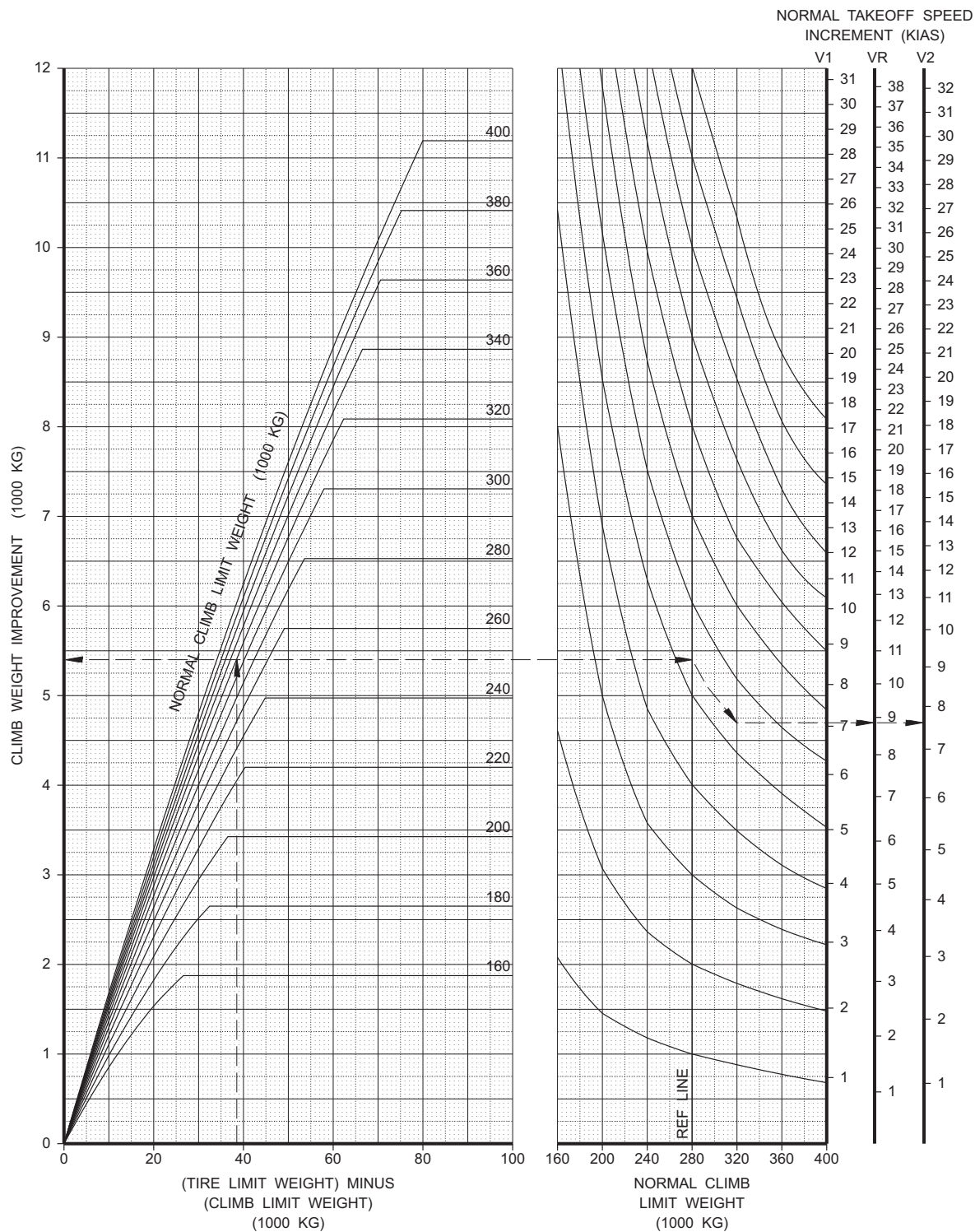
Improved Climb Field Length Limit - Wet Runway Flaps 15



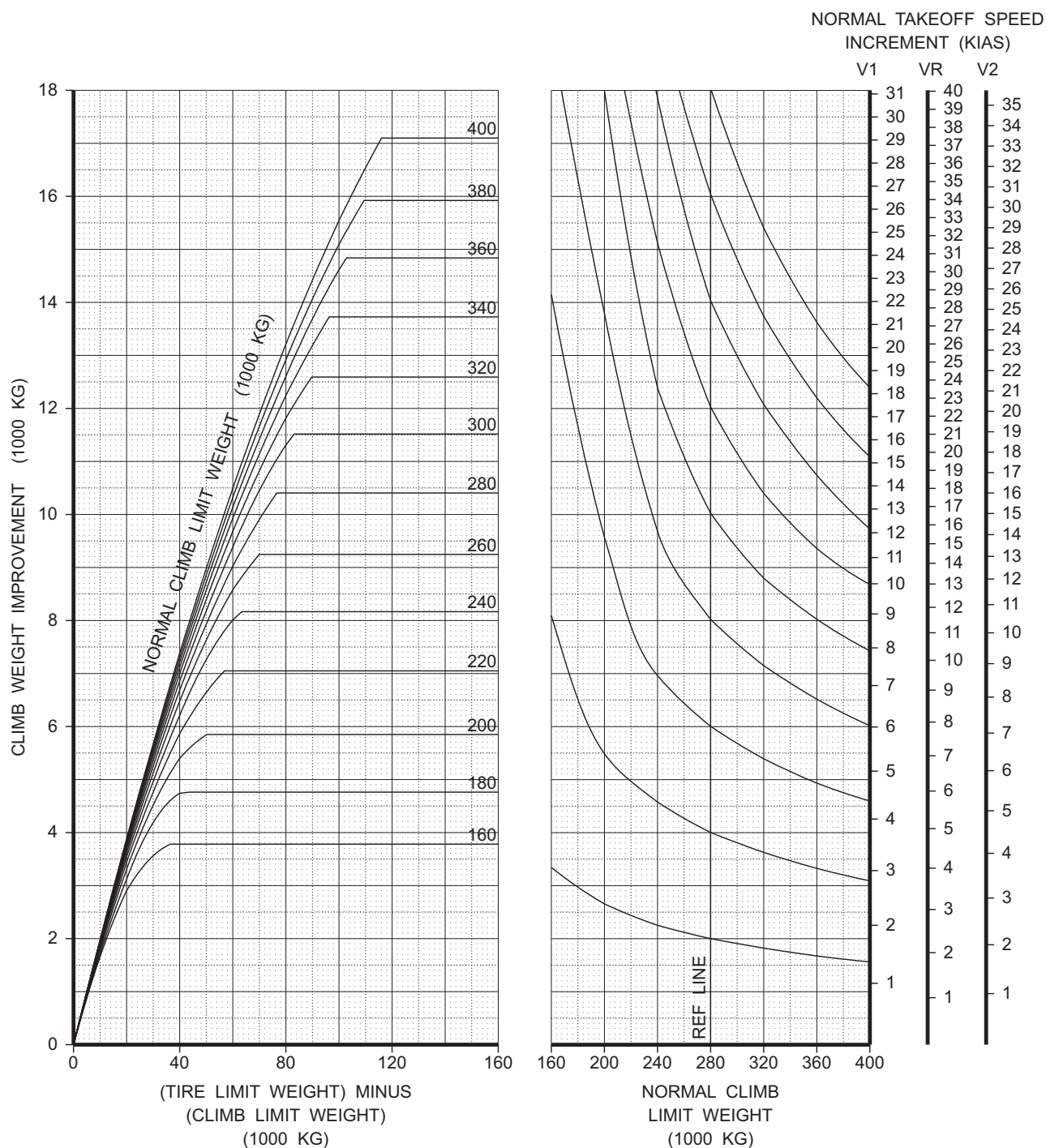
Improved Climb Field Length Limit - Wet Runway Flaps 20



Improved Climb Tire Speed Limit - Dry Runway Flaps 5

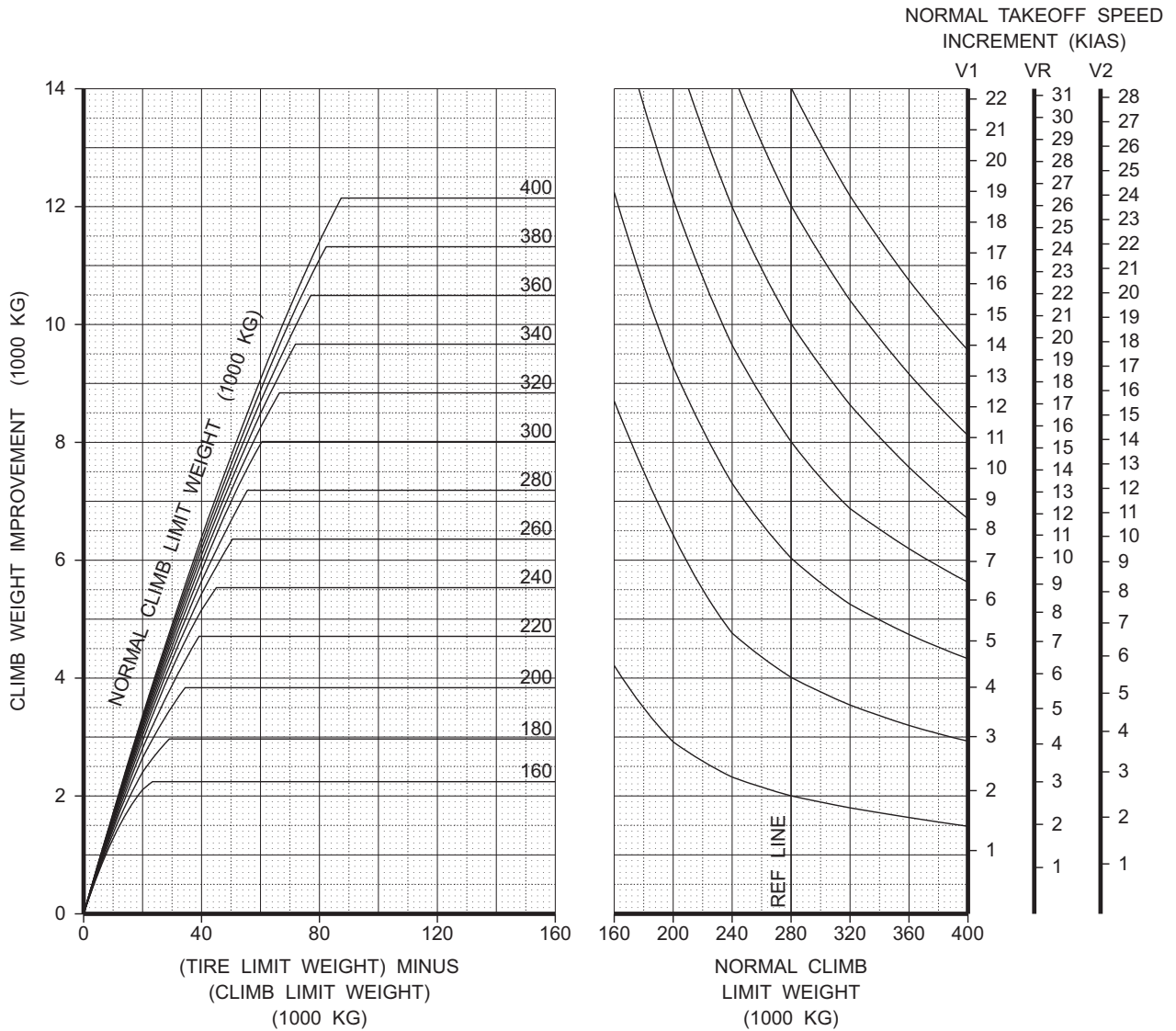


Improved Climb Tire Speed Limit - Dry Runway Flaps 15

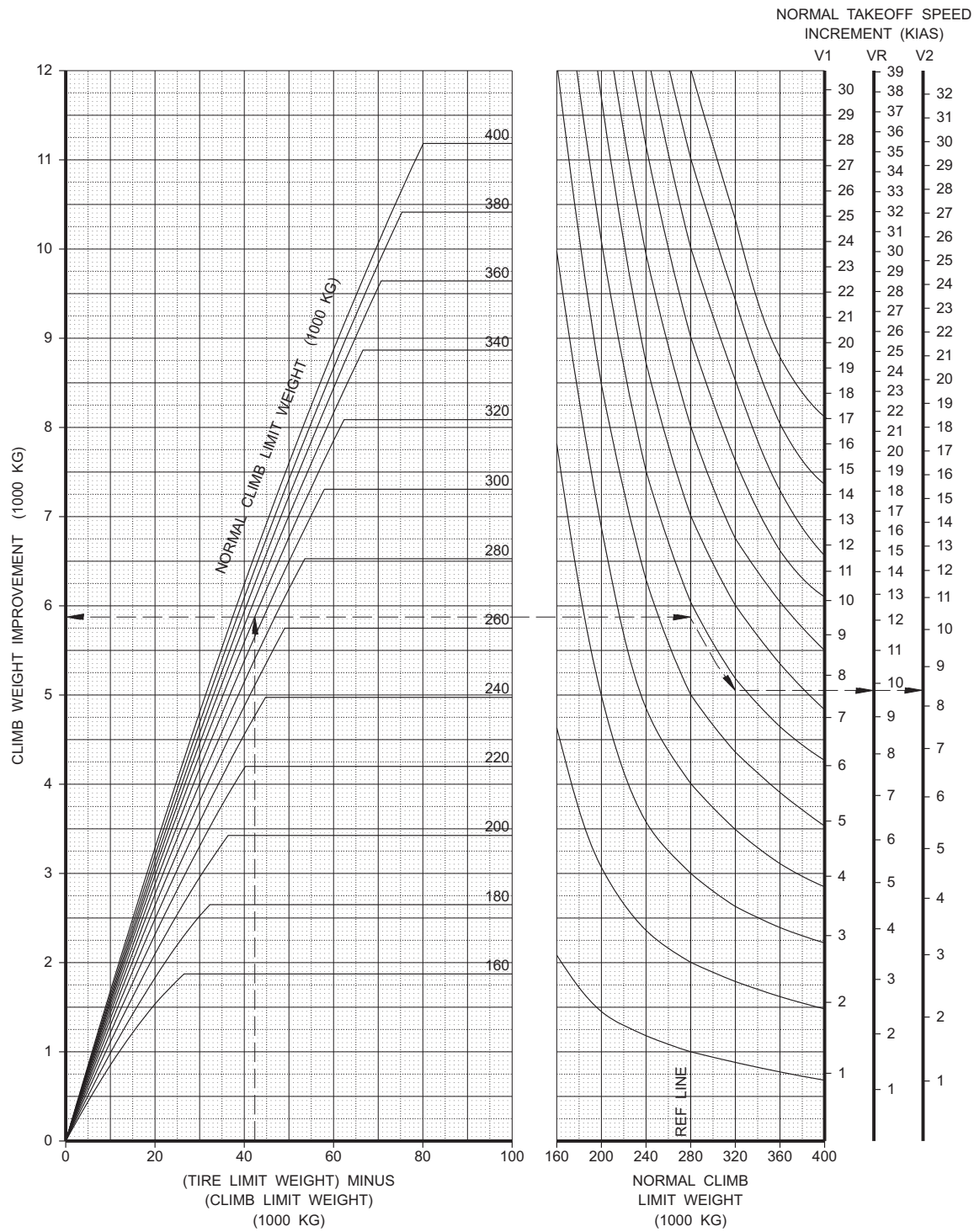


Improved Climb Tire Speed Limit - Dry Runway

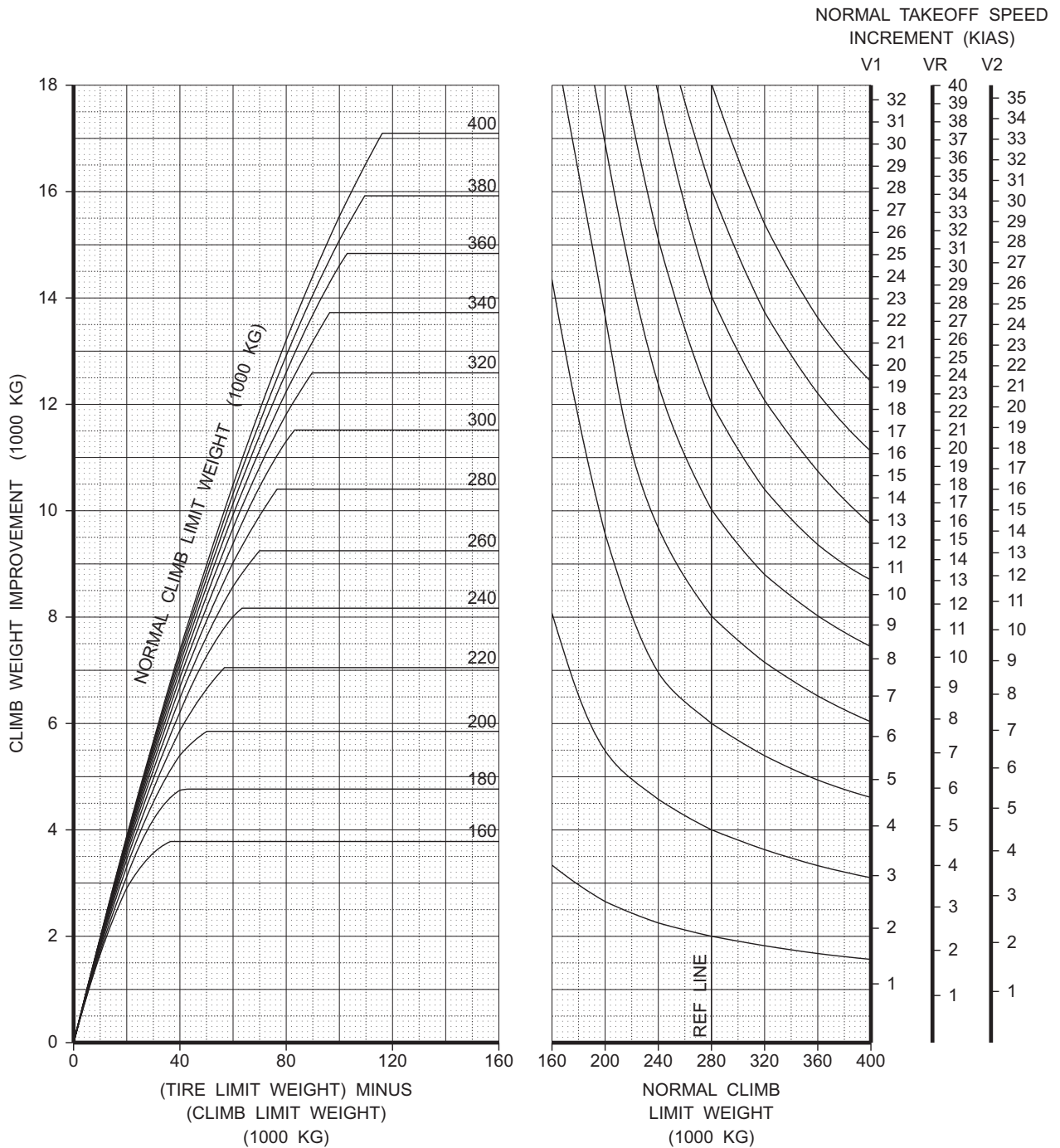
Flaps 20



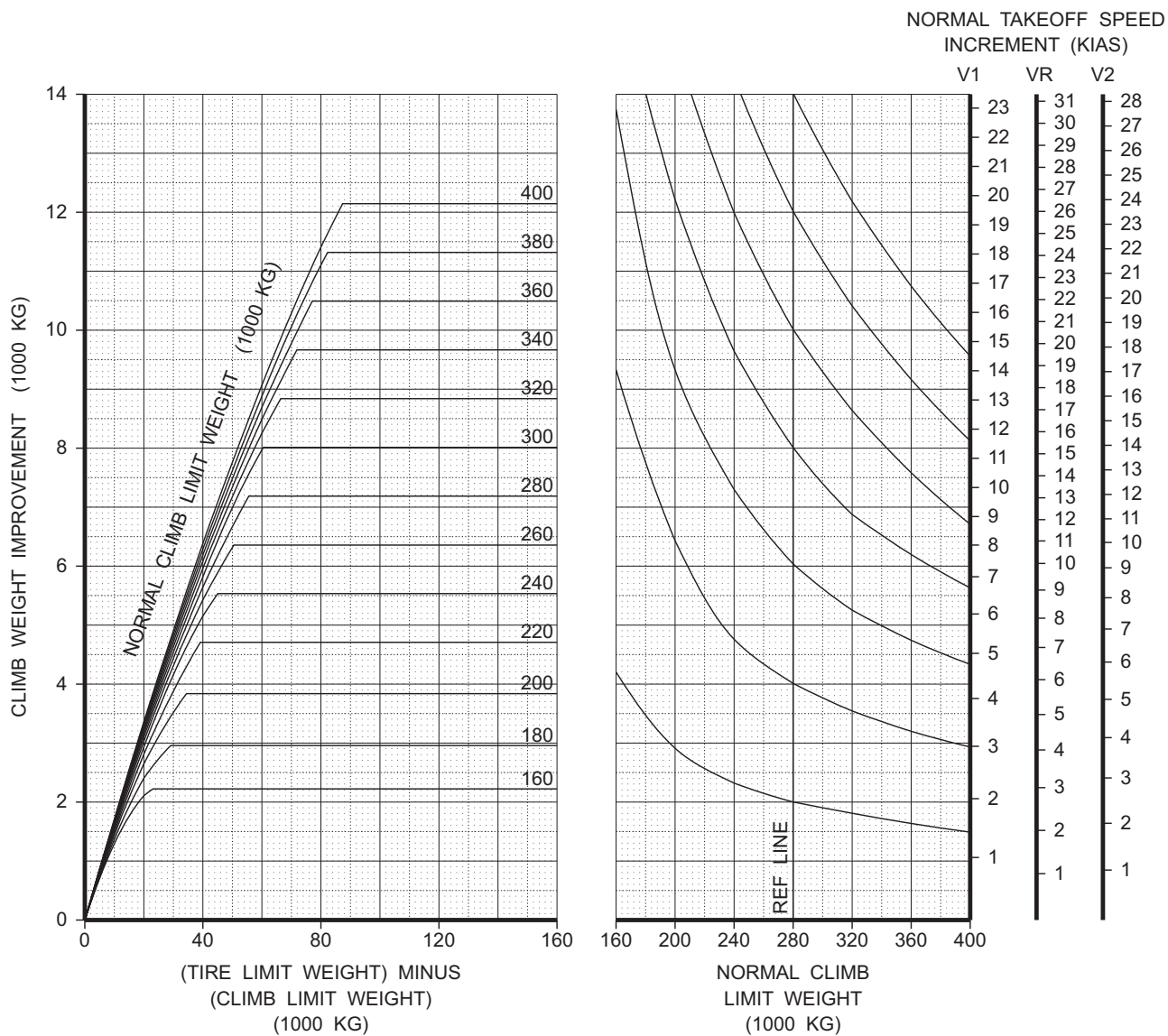
Improved Climb Tire Speed Limit - Wet Runway Flaps 5



Improved Climb Tire Speed Limit - Wet Runway Flaps 15



Improved Climb Tire Speed Limit - Wet Runway Flaps 20



ADVISORY INFORMATION

Slush/Standing Water Takeoff

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-39.2	-44.3	-49.4	-46.7	-51.8	-56.9	-59.3	-64.3	-69.4
380	-37.7	-42.8	-47.9	-44.7	-49.8	-54.9	-56.3	-61.4	-66.5
360	-36.3	-41.3	-46.4	-42.7	-47.8	-52.9	-53.3	-58.4	-63.5
340	-34.6	-39.7	-44.8	-40.6	-45.6	-50.7	-50.2	-55.3	-60.4
320	-32.6	-37.7	-42.8	-38.0	-43.1	-48.2	-46.6	-51.7	-56.8
300	-30.3	-35.4	-40.4	-35.1	-40.1	-45.2	-42.7	-47.8	-52.8
280	-27.5	-32.6	-37.7	-31.7	-36.8	-41.9	-38.3	-43.3	-48.4
260	-24.4	-29.5	-34.6	-28.0	-33.1	-38.1	-33.4	-38.5	-43.6
240	-20.9	-26.0	-31.1	-23.8	-28.9	-34.0	-28.2	-33.2	-38.3
220	-17.1	-22.2	-27.2	-19.3	-24.4	-29.4	-22.5	-27.6	-32.6
200	-12.8	-17.9	-23.0	-14.3	-19.4	-24.5	-16.4	-21.5	-26.5
180	-8.2	-13.3	-18.4	-9.0	-14.1	-19.2	-9.8	-14.9	-20.0
160	-3.5	-8.6	-13.7	-3.5	-8.6	-13.7	-3.1	-8.2	-13.3

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2000				141.8			163.2		
2200	169.0			181.8			204.0	156.8	
2400	209.0	162.8		222.7	175.5		246.2	197.5	150.4
2600	251.0	202.6	156.5	265.7	216.1	169.2	290.3	239.4	191.0
2800	295.6	244.2	196.2	311.1	258.8	209.6	336.6	283.2	232.7
3000	343.2	288.4	237.5	359.4	303.8	251.9	384.9	329.1	276.2
3200	393.6	335.5	281.2		351.5	296.5		377.2	321.7
3400		385.6	327.8			343.8			369.5
3600			377.6			393.4			

1. Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -55 m/+50 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-26	-24	-22	-21	-19	-17	-14	-12	-10
340	-28	-26	-24	-24	-22	-20	-15	-13	-11
320	-30	-28	-26	-25	-23	-21	-17	-15	-13
300	-30	-28	-26	-27	-25	-23	-18	-16	-14
280	-31	-29	-27	-27	-25	-23	-20	-18	-16
260	-31	-29	-27	-28	-26	-24	-21	-19	-17
240	-31	-29	-27	-28	-26	-24	-22	-20	-18
220	-30	-28	-26	-28	-26	-24	-23	-21	-19
200	-29	-27	-25	-28	-26	-24	-24	-22	-20
180	-28	-26	-24	-27	-25	-23	-24	-22	-20
160	-28	-26	-24	-26	-24	-22	-24	-22	-20

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

Slush/Standing Water Takeoff
No Reverse Thrust
Weight Adjustment (1000 KG)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-54.8	-60.4	-66.0	-64.0	-69.6	-75.2	-79.3	-84.9	-90.5
380	-52.2	-57.8	-63.5	-60.7	-66.3	-71.9	-74.5	-80.1	-85.7
360	-49.7	-55.3	-60.9	-57.4	-63.0	-68.6	-69.7	-75.3	-81.0
340	-47.0	-52.6	-58.3	-53.9	-59.6	-65.2	-64.8	-70.5	-76.1
320	-44.0	-49.6	-55.3	-50.2	-55.8	-61.4	-59.7	-65.3	-70.9
300	-40.7	-46.3	-51.9	-46.1	-51.7	-57.4	-54.2	-59.8	-65.5
280	-37.0	-42.7	-48.3	-41.7	-47.3	-53.0	-48.5	-54.1	-59.7
260	-33.1	-38.7	-44.3	-37.0	-42.6	-48.2	-42.5	-48.1	-53.7
240	-28.7	-34.4	-40.0	-32.0	-37.6	-43.2	-36.2	-41.8	-47.5
220	-24.1	-29.7	-35.4	-26.6	-32.2	-37.9	-29.6	-35.3	-40.9
200	-19.1	-24.8	-30.4	-20.9	-26.6	-32.2	-22.8	-28.4	-34.0
180	-13.9	-19.5	-25.1	-14.9	-20.6	-26.2	-15.7	-21.3	-26.9
160	-8.4	-14.1	-19.7	-8.8	-14.5	-20.1	-8.4	-14.1	-19.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
3000				126.7			168.9		
3200				177.0	124.9		217.0	167.2	
3400							267.2	215.2	165.5
3600	165.9			228.7	175.2	123.0	320.1	265.4	213.5
3800	219.2	164.0		284.3	226.8	173.4	375.9	318.2	263.5
4000	277.6	217.2	162.1	344.8	282.2	224.9		373.8	316.2
4200	343.4	275.3	215.2	409.4	342.5	280.1			371.8
4400	415.8	340.8	273.1		407.0	340.2			
4600		413.2	338.3			404.7			

1. Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -85 m/+85 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-42	-38	-34	-36	-32	-28	-24	-20	-16
340	-44	-40	-36	-38	-34	-30	-26	-22	-18
320	-45	-41	-37	-40	-36	-32	-28	-24	-20
300	-46	-42	-38	-42	-38	-34	-30	-26	-22
280	-47	-43	-39	-43	-39	-35	-33	-29	-25
260	-47	-43	-39	-44	-40	-36	-35	-31	-27
240	-47	-43	-39	-44	-40	-36	-37	-33	-29
220	-47	-43	-39	-44	-40	-36	-39	-35	-31
200	-46	-42	-38	-44	-40	-36	-40	-36	-32
180	-45	-41	-37	-44	-40	-36	-40	-36	-32
160	-45	-41	-37	-43	-39	-35	-41	-37	-33

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

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

DRY 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
400	0.0	-1.5	-2.9	-20.1	-21.6	-23.0	-39.9	-41.3	-42.8
380	0.0	-1.5	-2.9	-20.6	-22.1	-23.5	-38.8	-40.2	-41.7
360	0.0	-1.5	-2.9	-21.1	-22.6	-24.0	-37.7	-39.1	-40.6
340	-1.8	-3.2	-4.7	-21.5	-23.0	-24.4	-36.5	-37.9	-39.4
320	-4.2	-5.6	-7.1	-21.7	-23.1	-24.6	-35.2	-36.6	-38.1
300	-5.6	-7.1	-8.5	-21.5	-23.0	-24.4	-33.7	-35.2	-36.6
280	-6.2	-7.7	-9.1	-21.0	-22.4	-23.9	-31.9	-33.4	-34.8
260	-6.3	-7.7	-9.2	-19.7	-21.1	-22.6	-29.4	-30.8	-32.3
240	-5.8	-7.3	-8.7	-17.7	-19.1	-20.6	-26.1	-27.5	-29.0
220	-4.8	-6.3	-7.7	-15.0	-16.4	-17.9	-22.0	-23.4	-24.9
200	-3.3	-4.8	-6.2	-11.5	-13.0	-14.4	-17.1	-18.6	-20.0
180	-1.3	-2.7	-4.2	-7.3	-8.8	-10.2	-11.5	-13.0	-14.4
160	0.0	-0.5	-2.0	-2.8	-4.3	-5.7	-5.6	-7.1	-8.5

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1400	125.7								
1600	212.9	159.7							
1800	299.1	246.6	193.7						
2000	384.4	332.5	280.3	174.3	126.3				
2200		417.5	365.7	232.1	182.7	134.7			
2400				294.0	240.9	191.1	150.3		
2600				361.2	303.6	249.9	184.5	138.6	
2800					371.6	313.3	219.9	172.9	127.0
3000						382.0	257.6	207.6	161.2
3200							298.1	244.5	195.6
3400							342.2	284.0	231.7
3600							389.8	326.7	270.2
3800								373.5	311.8
4000									357.3

1. Enter Weight Adjustment table with reported braking action and dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+25 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+55 m 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
360	-7	-5	-3	-19	-17	-15	-33	-31	-29
340	-9	-7	-5	-21	-19	-17	-35	-33	-31
320	-11	-9	-7	-23	-21	-19	-38	-36	-34
300	-12	-10	-8	-25	-23	-21	-39	-37	-35
280	-12	-10	-8	-26	-24	-22	-40	-38	-36
260	-13	-11	-9	-26	-24	-22	-41	-39	-37
240	-13	-11	-9	-27	-25	-23	-42	-40	-38
220	-13	-11	-9	-27	-25	-23	-42	-40	-38
200	-14	-12	-10	-27	-25	-23	-42	-40	-38
180	-14	-12	-10	-28	-26	-24	-42	-40	-38
160	-15	-13	-11	-29	-27	-25	-41	-39	-37

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

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

DRY 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
400	-0.5	-0.5	-0.5	-34.3	-34.3	-34.3	-59.7	-59.7	-59.7
380	-3.0	-3.0	-3.0	-33.8	-33.8	-33.8	-57.1	-57.1	-57.1
360	-5.6	-5.6	-5.6	-33.2	-33.2	-33.2	-54.5	-54.5	-54.5
340	-7.9	-7.9	-7.9	-32.7	-32.7	-32.7	-51.9	-51.9	-51.9
320	-9.9	-9.9	-9.9	-32.3	-32.3	-32.3	-49.7	-49.7	-49.7
300	-11.4	-11.4	-11.4	-32.0	-32.0	-32.0	-47.7	-47.7	-47.7
280	-12.4	-12.4	-12.4	-31.4	-31.4	-31.4	-45.7	-45.7	-45.7
260	-12.6	-12.6	-12.6	-29.9	-29.9	-29.9	-42.7	-42.7	-42.7
240	-12.0	-12.0	-12.0	-27.4	-27.4	-27.4	-38.9	-38.9	-38.9
220	-10.7	-10.7	-10.7	-23.8	-23.8	-23.8	-34.1	-34.1	-34.1
200	-8.6	-8.6	-8.6	-19.2	-19.2	-19.2	-28.4	-28.4	-28.4
180	-5.7	-5.7	-5.7	-13.5	-13.5	-13.5	-21.7	-21.7	-21.7
160	-2.1	-2.1	-2.1	-6.8	-6.8	-6.8	-14.1	-14.1	-14.1

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1800	149.2								
2000	300.8	237.4	153.9						
2200	405.7	356.5	303.6						
2400			408.1						
3000				287.0	184.8				
3200				400.6	327.4	239.5			
3400					436.1	364.0			
...									
4800							246.9		
5000							368.0	292.4	188.8
5200								402.3	331.8
5400									436.6

1. Enter Weight Adjustment table with reported braking action and dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+80 m 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
360	-10	-6	-2	-27	-23	-19	-52	-48	-44
340	-13	-9	-5	-30	-26	-22	-56	-52	-48
320	-15	-11	-7	-33	-29	-25	-59	-55	-51
300	-16	-12	-8	-35	-31	-27	-63	-59	-55
280	-17	-13	-9	-37	-33	-29	-66	-62	-58
260	-18	-14	-10	-39	-35	-31	-68	-64	-60
240	-19	-15	-11	-41	-37	-33	-70	-66	-62
220	-20	-16	-12	-42	-38	-34	-71	-67	-63
200	-21	-17	-13	-44	-40	-36	-71	-67	-63
180	-22	-18	-14	-46	-42	-38	-71	-67	-63
160	-23	-19	-15	-48	-44	-40	-71	-67	-63

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

Takeoff Speeds - Dry Runway

V1, VR, V2 for Max Takeoff Thrust

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
380	185	196	201	175	184	190	171	176	182
360	179	190	196	170	179	185	166	171	178
340	175	185	192	165	174	181	162	166	174
320	169	179	187	160	168	177	156	161	170
300	164	172	182	154	162	172	151	155	165
280	157	165	177	148	155	167	145	148	160
260	150	158	171	142	149	162	138	142	155
240	142	151	166	134	142	156	131	135	150
220	133	143	160	126	134	151	122	128	145
200	123	135	154	117	127	145	113	121	139
180	114	126	147	107	118	139	103	113	133
160	104	117	139	97	110	131	93	105	126

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	12	14					7	8					-4	-4				
60	140	8	10	12	14			4	6	7	8			-3	-3	-4	-4		
50	122	5	6	8	10	13	16	3	4	5	6	8	9	-2	-2	-3	-3	-4	-5
40	104	1	3	5	7	10	13	1	2	3	5	6	8	-1	-1	-2	-2	-3	-4
30	86	0	0	2	5	8	11	0	0	2	3	5	7	0	0	-1	-2	-2	-3
20	68	0	0	2	4	6	9	0	0	1	2	4	6	0	0	-1	-1	-2	-3
-60	-76	0	0	2	4	6	8	0	0	1	2	4	5	0	0	-1	-1	-2	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
380	-4	-1	0	3	5	-2	-1	0	0	1	3	4	4	
360	-4	-1	0	3	5	-2	-1	0	0	1	3	3	4	
340	-3	-1	0	3	4	-2	-1	0	0	1	2	3	3	
320	-3	-1	0	2	4	-2	-1	0	0	1	2	3	3	
300	-3	-1	0	2	4	-2	-1	0	0	1	2	2	3	
280	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3	
260	-2	0	0	2	3	-2	-1	0	0	1	2	2	3	
240	-2	0	0	2	3	-1	-1	0	0	1	2	2	3	
220	-1	0	0	2	3	-1	-1	0	0	1	2	3	3	
200	-1	0	0	3	4	-1	0	0	0	1	2	3	4	
180	-1	0	0	3	4	-1	0	1	0	1	3	3	4	
160	-1	1	0	3	4	-1	0	1	0	2	3	4	5	

Max Allowable Clearway for V1 Adjustment

FIELD LENGTH (M)	1500	2000	2500	3000	3500	4000	4500
MAX ALLOWABLE CLEARWAY (M)	140	180	210	230	250	280	310

Clearway and Stopway V1 Adjustments*

NORMAL V1 (KIAS)	CLEARWAY MINUS STOPWAY (M)					
	300	200	100	0	-100	-300
100	-3	-3	-2	0	4	8
120	-3	-3	-2	0	4	8
140	-3	-3	-1	0	4	5
160	-3	-2	-1	0	3	3
180	-3	-2	-1	0	2	3

*V1 not to exceed VR



Takeoff Speeds - Dry Runway

V1(MCG), Minimum VR

Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)											
		-2000		0		2000		4000		6000		8000	
°C	°F	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR
60	140	116	118	113	115	111	113	109	111				
50	122	119	121	116	118	111	113	109	111	106	109	103	106
40	104	126	127	123	124	118	120	113	115	108	111	103	106
30	86	128	130	128	130	123	125	118	120	112	115	106	109
20	68	129	130	129	130	125	126	120	122	116	118	110	113
-60	-76	130	130	130	130	126	126	121	122	117	118	112	114

Takeoff Speeds - Wet Runway

V1, VR, V2 for Max Takeoff Thrust

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
380	180	196	201	169	184	190	165	176	182
360	173	190	196	163	179	185	158	171	178
340	167	185	192	157	174	181	153	166	174
320	160	179	187	151	168	177	147	161	170
300	153	172	182	144	162	172	140	155	165
280	146	165	177	137	155	167	133	148	160
260	138	158	171	130	149	162	126	142	155
240	130	151	166	122	142	156	119	135	150
220	121	143	160	114	134	151	111	128	145
200	112	135	154	106	127	145	103	121	139
180	102	126	147	96	118	139	93	113	133
160	92	117	139	88	110	131	84	105	126

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	14	16					7	8					-4	-4				
60	140	10	11	14	16			4	6	7	8			-3	-3	-4	-4		
50	122	5	7	9	12	14	17	3	4	5	6	8	9	-2	-2	-3	-3	-4	-5
40	104	2	3	6	8	11	14	1	2	3	5	6	8	-1	-1	-2	-2	-3	-4
30	86	0	0	3	5	8	12	0	0	2	3	5	7	0	0	-1	-2	-2	-3
20	68	0	0	2	4	7	10	0	0	1	2	4	6	0	0	-1	-1	-2	-3
-60	-76	0	0	2	4	6	9	0	0	1	2	4	5	0	0	-1	-1	-2	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
380	-6	-3	0	3	6	-3	-2	-1	0	1	2	3	4	
360	-6	-3	0	3	6	-4	-3	-1	0	1	2	3	4	
340	-6	-3	0	3	5	-4	-3	-1	0	1	2	3	4	
320	-5	-3	0	3	5	-5	-3	-2	0	1	2	3	4	
300	-5	-3	0	2	5	-5	-3	-2	0	1	2	3	4	
280	-5	-2	0	2	5	-5	-3	-2	0	1	2	3	4	
260	-4	-2	0	2	4	-5	-3	-1	0	1	2	3	4	
240	-4	-2	0	2	4	-5	-3	-1	0	1	3	4	5	
220	-3	-1	0	3	4	-5	-3	-1	0	1	3	4	5	
200	-2	-1	0	3	5	-4	-2	-1	0	2	3	4	5	
180	-2	0	0	3	5	-4	-2	0	0	2	4	5	6	
160	-1	1	0	4	5	-3	-2	0	0	2	4	6	7	

Stopway V1 Adjustments*

NORMAL V1 (KIAS)	STOPWAY (M)			
	0	100	200	300
100	0	3	5	7
120	0	3	4	7
140	0	2	2	4
160	0	1	2	3
180	0	1	2	3

Use of clearway not allowed on wet runways.

*V1 not to exceed VR

V1(MCG), Minimum VR Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)											
		-2000		0		2000		4000		6000		8000	
°C	°F	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR
60	140	116	118	113	115	111	113	109	111				
50	122	119	121	116	118	111	113	109	111	106	109	103	106
40	104	126	127	123	124	118	120	113	115	108	111	103	106
30	86	128	130	128	130	123	125	118	120	112	115	106	109
20	68	129	130	129	130	125	126	120	122	116	118	110	113
-60	-76	130	130	130	130	126	126	121	122	117	118	112	114

Takeoff %N1**Max Takeoff Thrust****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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
70	158	92.2	92.4	92.8	92.5	92.3	92.3	92.2	92.0	91.8	91.2	90.3	89.9
60	140	95.1	95.3	95.7	95.4	95.2	95.2	95.0	94.9	94.7	94.1	93.2	92.8
55	131	96.4	96.7	97.0	96.7	96.5	96.6	96.4	96.3	96.1	95.5	94.6	94.2
50	122	97.8	98.1	98.6	98.2	97.9	97.9	97.8	97.6	97.4	96.8	95.9	95.6
45	113	99.3	99.6	100.1	99.8	99.4	99.3	99.1	98.9	98.8	98.2	97.3	96.9
40	104	100.6	101.2	101.9	101.4	101.0	100.8	100.6	100.4	100.0	99.4	98.6	98.2
35	95	101.3	102.7	104.7	104.2	103.1	102.6	102.1	101.7	101.1	100.4	99.6	99.3
30	86	100.5	103.7	106.9	106.4	105.6	105.0	104.3	103.7	102.6	101.5	100.7	100.3
25	77	99.7	102.8	106.0	106.7	107.3	107.2	106.7	106.5	105.3	103.8	102.4	101.8
20	68	98.8	101.9	105.1	105.8	106.4	106.8	107.1	107.5	106.8	105.9	104.8	104.3
15	59	98.0	101.1	104.2	104.9	105.5	105.8	106.2	106.5	106.4	106.1	105.6	105.3
10	50	97.1	100.2	103.3	104.0	104.6	104.9	105.3	105.6	105.5	105.2	104.9	104.8
5	41	96.3	99.3	102.4	103.0	103.7	104.0	104.3	104.7	104.5	104.2	104.0	103.8
0	32	95.4	98.4	101.4	102.1	102.7	103.1	103.4	103.7	103.6	103.3	103.0	102.9
-10	14	93.6	96.6	99.6	100.2	100.8	101.2	101.5	101.8	101.7	101.4	101.1	101.0
-20	-4	91.8	94.7	97.7	98.3	98.9	99.2	99.5	99.9	99.7	99.5	99.2	99.1
-30	-22	90.0	92.8	95.7	96.3	96.9	97.2	97.5	97.9	97.7	97.5	97.2	97.1
-40	-40	88.1	90.9	93.7	94.3	94.9	95.2	95.5	95.8	95.7	95.4	95.2	95.1
-50	-58	86.2	88.9	91.7	92.3	92.9	93.1	93.4	93.8	93.6	93.4	93.1	93.0

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
1 PACK ON	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

Stab Trim Setting

Max Takeoff Thrust

Flaps 5

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	9 3/4	8 1/4	7	6	5	3 3/4	3	2 1/4
340	9 3/4	8	7	5 3/4	5	3 1/2	3	2 1/4
320	9 1/4	7 3/4	6 1/2	5 3/4	4 3/4	3 1/2	3	2
300	9	7 1/4	6 3/4	5 1/2	4 1/2	3 1/2	2 3/4	2
280	8 3/4	7 1/4	6	5 1/4	4 1/4	3 1/4	2 3/4	2
260	8 1/2	7	6	5 1/4	4 1/4	3 1/4	2 3/4	2
240	8 1/4	7	5 3/4	5 1/4	4 1/4	3 1/4	2 3/4	2
220	7 3/4	7	5 1/2	5	4	3 1/4	2 1/2	1 3/4
200	7 1/2	6 1/2	5 1/4	4 1/2	4	3	2 1/2	1 3/4
180	7	6	5	4 1/2	3 3/4	2 3/4	2 1/4	1 3/4

Flaps 15

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	10 1/4	9	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 3/4
340	10 1/4	9	7 1/2	6 1/2	5 1/4	4 1/2	3 1/4	2 1/2
320	9 3/4	8 1/4	7	6	5	4	3	2 1/2
300	9 1/2	7 3/4	6 3/4	5 3/4	4 3/4	3 3/4	3	2 1/4
280	9 1/4	7 3/4	6 3/4	5 1/2	4 1/4	3 1/2	3	2
260	9	7 1/4	6 1/2	5	4	3 1/4	2 3/4	2
240	8 1/2	7	5 3/4	4 1/2	3 3/4	3	2 1/2	1 3/4
220	7 1/2	6 1/4	5	4	3 1/4	2 3/4	2 1/4	1 1/2
200	6	5	3 3/4	3	2 1/2	2 1/4	2	1 1/4
180	4 1/2	4	3	2 1/2	2	2	1 3/4	1 1/4

Flaps 20

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	12	10 1/2	8 3/4	7 1/2	6 1/2	4 3/4	3 1/2	2 3/4
340	11 3/4	10 1/4	8 1/2	7 1/4	6 1/4	4 1/2	3 1/4	2 1/2
320	11 1/4	10	8 1/4	6 3/4	5 3/4	4	3	2 1/2
300	11	9 1/4	8	6 1/2	5 1/4	3 3/4	3	2 1/4
280	10 1/2	8 3/4	7 1/2	6	4 3/4	3 1/2	2 3/4	2
260	10	8 1/4	7	5 1/2	4 1/2	3 1/4	2 3/4	2
240	9 1/4	7 3/4	6 1/4	5	4 1/4	3	2 1/2	1 3/4
220	8 1/2	7	5 1/2	4 1/4	3 3/4	2 1/2	2 1/4	1 1/2
200	6 3/4	5 1/2	4 1/4	3 1/2	3	2 1/4	2	1 1/4
180	5 1/2	4	3 1/4	2 3/4	2 1/2	2	1 1/2	1 1/4

Intentionally
Blank



Flight Planning and Performance Manual

TO1 Takeoff Weights

10% Thrust Reduction

PERFORMANCE LIMIT	TO1 LIMIT WEIGHT (1000 KG)										
	FULL RATED LIMIT WEIGHT (1000 KG)										
	160	180	200	220	240	260	280	300	320	340	360
FIELD (Dry)*	148.1	166.6	185.1	203.6	222.1	240.7	259.2	277.7	296.2	314.7	333.2
FIELD (Wet)*	150.7	169.2	187.8	206.4	224.9	243.5	262.0	280.6	299.2	317.7	336.3
CLIMB	146.2	163.3	180.4	197.5	214.6	231.7	248.8	265.9	283.0	300.1	317.2
OBSTACLE	146.2	163.6	181.0	198.4	215.8	233.2	250.6	268.0	285.4	302.8	320.2
TIRE SPEED	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0
BRAKE ENERGY	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	310.1	327.7	345.3

* If the takeoff is limited by minimum control speeds, V1 may be increased to be equal to V1(MCG) provided the accelerate stop distance corrected for wind and slope exceeds approximately:

Dry runway: 1300 m for normal operation, 1350 m with one brake deactivated and 1400 m with two brakes deactivated

Wet runway: 1600 m for normal operation, 1650 m with one brake deactivated and 1750 m with two brakes deactivated

ADVISORY INFORMATION

TO1 Slush/Standing Water Takeoff

10% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-37.0	-42.1	-47.1	-44.4	-49.5	-54.6	-57.0	-62.1	-67.1
380	-35.5	-40.6	-45.7	-42.4	-47.5	-52.6	-54.0	-59.1	-64.2
360	-34.0	-39.1	-44.2	-40.5	-45.5	-50.6	-51.2	-56.3	-61.3
340	-32.7	-37.8	-42.9	-38.7	-43.7	-48.8	-48.5	-53.6	-58.7
320	-31.4	-36.5	-41.6	-36.9	-42.0	-47.1	-45.8	-50.9	-56.0
300	-29.8	-34.8	-39.9	-34.7	-39.8	-44.9	-42.7	-47.8	-52.9
280	-27.6	-32.7	-37.8	-32.0	-37.1	-42.2	-39.0	-44.1	-49.2
260	-25.1	-30.2	-35.2	-28.9	-34.0	-39.0	-34.8	-39.9	-45.0
240	-22.1	-27.2	-32.2	-25.3	-30.4	-35.4	-30.2	-35.2	-40.3
220	-18.6	-23.7	-28.8	-21.2	-26.3	-31.4	-25.0	-30.1	-35.1
200	-14.8	-19.9	-24.9	-16.6	-21.7	-26.8	-19.3	-24.4	-29.4
180	-10.5	-15.6	-20.6	-11.6	-16.7	-21.8	-13.1	-18.2	-23.3
160	-5.8	-10.9	-16.0	-6.2	-11.3	-16.4	-6.5	-11.5	-16.6

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
1800				128.2			149.5		
2000	159.3			172.0	121.3		193.9	142.5	
2200	203.0	152.5		216.6	165.1		239.9	186.8	135.5
2400	249.2	196.0	145.6	263.8	209.4	158.1	288.4	232.5	179.8
2600	298.6	241.7	189.0	314.2	256.2	202.3	339.7	280.5	225.1
2800	352.1	290.5	234.2	368.3	306.0	248.6	393.5	331.4	272.8
3000	408.6	343.4	282.6	424.0	359.5	297.9		385.0	323.1
3200		399.7	334.7		415.2	350.8		439.3	376.4
3400			390.7			406.4			430.7

1. Enter Weight Adjustment table with slush/standing water depth and TO1 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -55 m/+50 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-22	-20	-18	-18	-16	-14	-9	-7	-5
340	-25	-23	-21	-20	-18	-16	-11	-9	-7
320	-27	-25	-23	-22	-20	-18	-13	-11	-9
300	-28	-26	-24	-23	-21	-19	-14	-12	-10
280	-28	-26	-24	-24	-22	-20	-16	-14	-12
260	-28	-26	-24	-25	-23	-21	-18	-16	-14
240	-28	-26	-24	-25	-23	-21	-19	-17	-15
220	-27	-25	-23	-25	-23	-21	-20	-18	-16
200	-26	-24	-22	-24	-22	-20	-20	-18	-16
180	-25	-23	-21	-24	-22	-20	-20	-18	-16
160	-24	-22	-20	-23	-21	-19	-20	-18	-16

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slush/Standing Water Takeoff

10% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-52.9	-58.6	-64.2	-62.4	-68.0	-73.6	-78.3	-83.9	-89.5
380	-50.4	-56.0	-61.6	-59.1	-64.7	-70.3	-73.6	-79.2	-84.8
360	-47.9	-53.5	-59.2	-55.9	-61.5	-67.1	-69.0	-74.6	-80.2
340	-45.5	-51.2	-56.8	-52.7	-58.4	-64.0	-64.4	-70.0	-75.7
320	-43.1	-48.8	-54.4	-49.6	-55.2	-60.9	-59.9	-65.5	-71.1
300	-40.4	-46.0	-51.7	-46.1	-51.8	-57.4	-55.0	-60.6	-66.2
280	-37.3	-42.9	-48.5	-42.3	-47.9	-53.5	-49.8	-55.4	-61.0
260	-33.8	-39.4	-45.0	-38.1	-43.7	-49.3	-44.2	-49.9	-55.5
240	-29.9	-35.5	-41.2	-33.5	-39.1	-44.7	-38.4	-44.0	-49.6
220	-25.7	-31.3	-36.9	-28.5	-34.1	-39.7	-32.1	-37.8	-43.4
200	-21.0	-26.6	-32.3	-23.1	-28.8	-34.4	-25.6	-31.2	-36.8
180	-16.0	-21.6	-27.2	-17.4	-23.0	-28.7	-18.7	-24.3	-30.0
160	-10.6	-16.3	-21.9	-11.3	-17.0	-22.6	-11.5	-17.1	-22.8

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2600							131.4		
2800							186.0		
3000				153.5			243.4	129.5	127.5
3200	152.1			214.6	151.3		305.8	241.3	182.1
3400	217.3	149.8		282.4	212.3	149.2	374.0	303.4	239.2
3600	292.3	214.9	147.5	359.9	279.8	210.0		371.5	301.1
3800	382.5	289.4	212.4		356.9	277.3			369.0
4000		379.0	286.5			354.0			
4200			375.5			438.2			

1. Enter Weight Adjustment table with slush/standing water depth and TO1 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -85 m/+85 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-37	-33	-29	-30	-26	-22	-16	-12	-8
340	-39	-35	-31	-33	-29	-25	-18	-14	-10
320	-41	-37	-33	-35	-31	-27	-21	-17	-13
300	-42	-38	-34	-37	-33	-29	-24	-20	-16
280	-43	-39	-35	-38	-34	-30	-27	-23	-19
260	-43	-39	-35	-39	-35	-31	-29	-25	-21
240	-43	-39	-35	-40	-36	-32	-32	-28	-24
220	-43	-39	-35	-40	-36	-32	-33	-29	-25
200	-42	-38	-34	-40	-36	-32	-35	-31	-27
180	-41	-37	-33	-39	-35	-31	-35	-31	-27
160	-40	-36	-32	-39	-35	-31	-36	-32	-28

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slippery Runway Takeoff**10% Thrust Reduction****Maximum Reverse Thrust****Weight Adjustment (1000 KG)**

TO1 DRY 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
400	0.0	-1.5	-2.9	-17.2	-18.7	-20.2	-37.1	-38.5	-40.0
380	0.0	-1.5	-2.9	-17.7	-19.2	-20.7	-36.0	-37.4	-38.9
360	0.0	-1.5	-2.9	-18.2	-19.7	-21.2	-34.9	-36.4	-37.8
340	0.0	-1.5	-2.9	-18.8	-20.2	-21.7	-34.0	-35.5	-36.9
320	-1.4	-2.8	-4.3	-19.4	-20.9	-22.3	-33.2	-34.7	-36.1
300	-3.9	-5.3	-6.8	-19.8	-21.3	-22.7	-32.2	-33.7	-35.2
280	-5.3	-6.7	-8.2	-19.9	-21.3	-22.8	-31.1	-32.5	-34.0
260	-5.8	-7.3	-8.7	-19.4	-20.9	-22.3	-29.5	-30.9	-32.4
240	-5.8	-7.3	-8.7	-18.2	-19.6	-21.1	-27.0	-28.5	-29.9
220	-5.3	-6.7	-8.2	-16.1	-17.6	-19.0	-23.7	-25.2	-26.6
200	-4.1	-5.6	-7.0	-13.2	-14.7	-16.1	-19.5	-21.0	-22.4
180	-2.5	-3.9	-5.4	-9.6	-11.0	-12.5	-14.5	-16.0	-17.4
160	-0.3	-1.8	-3.2	-5.2	-6.7	-8.1	-8.7	-10.1	-11.6

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1400	164.6								
1600	256.5	200.6	144.2						
1800	347.4	292.1	236.4	149.8					
2000	437.5	382.5	327.5	210.0	158.5				
2200			417.7	274.1	219.0	167.2	139.6		
2400				343.9	283.9	228.2	176.0	127.1	
2600				418.3	354.6	293.8	213.2	163.5	
2800					429.2	365.5	252.9	200.2	151.1
3000							295.8	239.0	187.5
3200							342.8	280.7	225.4
3400							393.8	326.2	266.1
3600								376.2	310.2
3800								427.5	358.7
4000									409.9

1. Enter Weight Adjustment table with reported braking action and TO1 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+25 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+55 m 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

TO1 Slippery Runway Takeoff

10% Thrust Reduction

Maximum 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
360	-6	-4	-2	-17	-15	-13	-30	-28	-26
340	-8	-6	-4	-19	-17	-15	-32	-30	-28
320	-10	-8	-6	-21	-19	-17	-34	-32	-30
300	-11	-9	-7	-22	-20	-18	-36	-34	-32
280	-11	-9	-7	-23	-21	-19	-37	-35	-33
260	-12	-10	-8	-24	-22	-20	-38	-36	-34
240	-12	-10	-8	-24	-22	-20	-38	-36	-34
220	-12	-10	-8	-24	-22	-20	-38	-36	-34
200	-12	-10	-8	-25	-23	-21	-38	-36	-34
180	-13	-11	-9	-25	-23	-21	-38	-36	-34
160	-13	-11	-9	-26	-24	-22	-38	-36	-34

1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.

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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slippery Runway Takeoff**10% Thrust Reduction****No Reverse Thrust****Weight Adjustment (1000 KG)**

TO1 DRY 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
400	0.0	0.0	0.0	-31.4	-31.4	-31.4	-57.1	-57.1	-57.1
380	0.0	0.0	0.0	-30.9	-30.9	-30.9	-54.5	-54.5	-54.5
360	-2.0	-2.0	-2.0	-30.4	-30.4	-30.4	-52.0	-52.0	-52.0
340	-4.5	-4.5	-4.5	-30.0	-30.0	-30.0	-49.8	-49.8	-49.8
320	-7.0	-7.0	-7.0	-29.8	-29.8	-29.8	-47.6	-47.6	-47.6
300	-9.1	-9.1	-9.1	-29.7	-29.7	-29.7	-45.8	-45.8	-45.8
280	-10.6	-10.6	-10.6	-29.6	-29.6	-29.6	-44.2	-44.2	-44.2
260	-11.6	-11.6	-11.6	-29.2	-29.2	-29.2	-42.4	-42.4	-42.4
240	-11.8	-11.8	-11.8	-27.7	-27.7	-27.7	-39.6	-39.6	-39.6
220	-11.1	-11.1	-11.1	-25.1	-25.1	-25.1	-35.7	-35.7	-35.7
200	-9.6	-9.6	-9.6	-21.3	-21.3	-21.3	-30.8	-30.8	-30.8
180	-7.3	-7.3	-7.3	-16.4	-16.4	-16.4	-24.8	-24.8	-24.8
160	-4.0	-4.0	-4.0	-10.2	-10.2	-10.2	-17.8	-17.8	-17.8

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1800	260.2	177.1							
2000	382.5	327.5	263.7						
2200		438.9	385.1						
2600				131.3					
2800				307.3	201.6				
3000				429.0	349.4	258.1			
3200						388.7			
4400							250.8		
4600							382.7	300.5	186.2
4800								421.1	343.0

1. Enter Weight Adjustment table with reported braking action and TO1 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+80 m 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
360	-10	-6	-3	-25	-22	-18	-48	-44	-41
340	-12	-9	-5	-28	-24	-21	-51	-48	-44
320	-14	-10	-7	-31	-27	-23	-55	-51	-47
300	-15	-12	-8	-33	-29	-25	-58	-54	-50
280	-16	-13	-9	-34	-31	-27	-61	-57	-53
260	-17	-14	-10	-36	-32	-29	-63	-59	-55
240	-18	-14	-11	-37	-34	-30	-65	-61	-57
220	-19	-15	-12	-39	-35	-32	-65	-62	-58
200	-19	-16	-12	-41	-37	-33	-66	-62	-58
180	-20	-17	-13	-42	-39	-35	-66	-62	-58
160	-22	-18	-14	-44	-41	-37	-66	-62	-58

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.



Flight Planning and Performance Manual

TO1 Takeoff Speeds - Dry Runway

10% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
380	193	198	201						
360	184	192	195	175	179	183			
340	179	187	191	170	175	180	167	167	173
320	174	181	186	165	170	176	161	162	169
300	168	174	181	159	164	171	155	157	164
280	162	167	176	153	157	166	150	151	159
260	155	160	170	147	151	160	143	144	154
240	147	153	164	139	144	155	135	138	149
220	138	145	158	131	137	149	127	131	143
200	129	137	152	122	129	143	119	123	138
180	118	128	145	113	121	137	109	115	131
160	109	117	139	102	112	130	100	107	125

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	10	12					6	7					-3	-4				
60	140	7	8	10	12			4	5	6	7			-2	-3	-3	-4		
50	122	3	5	7	9	11	14	2	3	4	6	7	9	-1	-2	-2	-3	-4	-5
40	104	1	2	4	6	8	11	1	1	3	4	6	7	0	-1	-1	-2	-3	-4
30	86	0	0	2	4	6	9	0	0	1	3	4	6	0	0	-1	-1	-2	-3
20	68	0	0	1	3	5	8	0	0	1	2	3	5	0	0	0	-1	-2	-2
-60	-76	0	0	1	3	5	7	0	0	1	2	3	5	0	0	0	-1	-1	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
380	-4	-1	0	3	5	-4	-2	-1	0	1	3	3	4	
360	-3	-1	0	2	4	-3	-2	-1	0	1	2	3	3	
340	-3	-1	0	2	4	-3	-2	-1	0	1	2	2	3	
320	-3	-1	0	2	3	-3	-2	-1	0	1	1	2	2	
300	-3	-1	0	2	3	-2	-2	-1	0	1	1	2	2	
280	-3	-1	0	1	3	-2	-1	-1	0	0	1	2	2	
260	-3	-1	0	1	2	-2	-1	-1	0	0	1	1	2	
240	-2	-1	0	1	2	-2	-1	0	0	1	1	2	2	
220	-2	-1	0	1	3	-2	-1	0	0	1	1	2	2	
200	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3	
180	-2	-1	0	2	3	-2	-1	0	0	1	2	3	3	
160	-2	0	0	2	3	-2	-1	0	0	1	2	3	4	

*V1 not to exceed VR.

TO1 V1(MCG), Minimum VR

TEMP		PRESSURE ALTITUDE (FT)											
		-2000		0		2000		4000		6000		8000	
°C	°F	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR
60	140	111	112	107	110	105	107	103	106				
50	122	113	115	110	112	105	108	103	106	101	104	98	101
40	104	119	121	117	119	112	114	107	110	103	105	98	101
30	86	122	123	121	123	116	118	112	114	107	109	101	104
20	68	122	124	121	123	118	119	114	116	110	112	104	107
-60	-76	124	124	123	123	119	120	115	116	111	112	106	108

TO1 Takeoff Speeds - Wet Runway**10% Thrust Reduction****V1, VR, V2**

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
380	187	198	201						
360	178	192	195	167	179	183			
340	172	187	191	162	175	180	158	167	173
320	165	181	186	156	170	176	151	162	169
300	158	174	181	149	164	171	145	157	164
280	151	167	176	142	157	166	138	151	159
260	143	160	170	135	151	160	131	144	154
240	135	153	164	127	144	155	124	138	149
220	127	145	158	119	137	149	116	131	143
200	117	137	152	111	129	143	108	123	138
180	108	128	145	102	121	137	100	115	131
160	91	117	139	91	112	130	90	107	125

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	13	14					6	7					-3	-4				
60	140	8	10	12	14			4	5	6	7			-2	-3	-3	-4		
50	122	4	6	8	10	12	16	2	3	4	6	7	9	-1	-2	-2	-3	-4	-5
40	104	1	2	5	7	10	13	1	1	3	4	6	7	0	-1	-1	-2	-3	-4
30	86	0	0	2	5	7	10	0	0	1	3	4	6	0	0	-1	-1	-2	-3
20	68	0	0	1	3	6	9	0	0	1	2	3	5	0	0	0	-1	-2	-2
-60	-76	0	0	1	3	6	8	0	0	1	2	3	5	0	0	0	-1	-1	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
380	-5	-2	0	4	7	-3	-2	0	0	1	3	4	4	
360	-5	-2	0	3	6	-4	-2	-1	0	1	2	3	4	
340	-5	-2	0	3	6	-4	-2	-1	0	1	2	3	4	
320	-5	-3	0	3	5	-4	-3	-1	0	1	2	3	4	
300	-5	-3	0	2	5	-4	-3	-1	0	1	2	3	3	
280	-5	-2	0	2	4	-5	-3	-2	0	1	2	3	3	
260	-5	-2	0	2	4	-5	-3	-2	0	1	2	3	4	
240	-4	-2	0	2	4	-5	-3	-1	0	1	2	3	4	
220	-4	-2	0	2	4	-5	-3	-1	0	1	2	3	4	
200	-3	-1	0	2	4	-4	-3	-1	0	1	3	4	5	
180	-2	-1	0	3	4	-4	-2	-1	0	2	3	4	5	
160	-1	0	0	3	4	-4	-2	0	0	2	4	5	6	

*V1 not to exceed VR.

TO1 V1(MCG), Minimum VR

TEMP		PRESSURE ALTITUDE (FT)											
		-2000		0		2000		4000		6000		8000	
°C	°F	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR
60	140	111	112	107	110	105	107	103	106				
50	122	113	115	110	112	105	108	103	106	101	104	98	101
40	104	119	121	117	119	112	114	107	110	103	105	98	101
30	86	122	123	121	123	116	118	112	114	107	109	101	104
20	68	122	124	121	123	118	119	114	116	110	112	104	107
-60	-76	124	124	123	123	119	120	115	116	111	112	106	108



Flight Planning and Performance Manual

TO1 Takeoff %N1

10% Thrust Reduction

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
70	158	88.4	88.6	89.0	88.7	88.5	88.5	88.4	88.2	88.0	87.4	86.6	86.2
60	140	91.2	91.4	91.8	91.5	91.2	91.3	91.1	90.9	90.8	90.2	89.3	89.0
55	131	92.7	93.0	93.3	93.1	92.9	92.9	92.7	92.6	92.4	91.7	90.7	90.3
50	122	94.0	94.2	94.7	94.3	94.0	94.1	93.9	93.8	93.6	93.1	92.3	91.9
45	113	95.3	95.6	96.1	95.8	95.4	95.3	95.2	95.0	94.8	94.2	93.4	93.1
40	104	96.5	97.0	97.5	97.1	96.8	96.6	96.4	96.3	95.9	95.4	94.6	94.3
35	95	96.9	97.7	98.4	98.2	97.7	97.5	97.3	97.2	96.7	96.1	95.5	95.3
30	86	96.1	97.6	98.7	98.5	98.2	98.0	97.8	97.6	97.1	96.7	96.2	96.0
25	77	95.3	96.8	97.9	98.2	98.5	98.4	98.2	98.1	97.6	97.1	96.6	96.4
20	68	94.5	96.0	97.1	97.3	97.6	97.8	97.9	98.1	97.8	97.4	97.0	96.8
15	59	93.7	95.2	96.3	96.5	96.8	96.9	97.1	97.3	97.2	97.1	96.9	96.7
10	50	92.9	94.3	95.4	95.7	95.9	96.1	96.3	96.4	96.4	96.2	96.1	96.1
5	41	92.1	93.5	94.6	94.8	95.1	95.2	95.4	95.6	95.5	95.4	95.3	95.2
0	32	91.3	92.6	93.7	94.0	94.2	94.4	94.5	94.7	94.7	94.5	94.4	94.3
-10	14	89.6	90.9	92.0	92.2	92.5	92.6	92.8	93.0	92.9	92.8	92.7	92.6
-20	-4	87.9	89.2	90.2	90.5	90.7	90.9	91.0	91.2	91.1	91.0	90.9	90.8
-30	-22	86.1	87.4	88.4	88.6	88.9	89.0	89.2	89.4	89.3	89.2	89.1	89.0
-40	-40	84.3	85.6	86.6	86.8	87.1	87.2	87.3	87.5	87.5	87.3	87.2	87.2
-50	-58	82.5	83.7	84.7	84.9	85.2	85.3	85.5	85.6	85.6	85.4	85.3	85.3

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
1 PACK ON	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

TO1 Stab Trim Setting

10% Thrust Reduction

Flaps 5

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	9 3/4	8 1/4	7	6	5	3 3/4	3	2 1/4
340	9 3/4	8	7	5 3/4	5	3 1/2	3	2 1/4
320	9 1/4	7 3/4	6 1/2	5 3/4	4 3/4	3 1/2	3	2
300	9	7 1/4	6 3/4	5 1/2	4 1/2	3 1/2	2 3/4	2
280	8 3/4	7 1/4	6	5 1/4	4 1/4	3 1/4	2 3/4	2
260	8 1/2	7	6	5 1/4	4 1/4	3 1/4	2 3/4	2
240	8 1/4	7	5 3/4	5 1/4	4 1/4	3 1/4	2 3/4	2
220	7 3/4	7	5 1/2	5	4	3 1/4	2 1/2	1 3/4
200	7 1/2	6 1/2	5 1/4	4 1/2	4	3	2 1/2	1 3/4
180	7	6	5	4 1/2	3 3/4	2 3/4	2 1/4	1 3/4

Flaps 15

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	10 1/4	9	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 3/4
340	10 1/4	9	7 1/2	6 1/2	5 1/4	4 1/2	3 1/4	2 1/2
320	9 3/4	8 1/4	7	6	5	4	3	2 1/2
300	9 1/2	7 3/4	6 3/4	5 3/4	4 3/4	3 3/4	3	2 1/4
280	9 1/4	7 3/4	6 3/4	5 1/2	4 1/4	3 1/2	3	2
260	9	7 1/4	6 1/2	5	4	3 1/4	2 3/4	2
240	8 1/2	7	5 3/4	4 1/2	3 3/4	3	2 1/2	1 3/4
220	7 1/2	6 1/4	5	4	3 1/4	2 3/4	2 1/4	1 1/2
200	6	5	3 3/4	3	2 1/2	2 1/4	2	1 1/4
180	4 1/2	4	3	2 1/2	2	2	1 3/4	1 1/4

Flaps 20

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	12	10 1/2	8 3/4	7 1/2	6 1/2	4 3/4	3 1/2	2 3/4
340	11 3/4	10 1/4	8 1/2	7 1/4	6 1/4	4 1/2	3 1/4	2 1/2
320	11 1/4	10	8 1/4	6 3/4	5 3/4	4	3	2 1/2
300	11	9 1/4	8	6 1/2	5 1/4	3 3/4	3	2 1/4
280	10 1/2	8 3/4	7 1/2	6	4 3/4	3 1/2	2 3/4	2
260	10	8 1/4	7	5 1/2	4 1/2	3 1/4	2 3/4	2
240	9 1/4	7 3/4	6 1/4	5	4 1/4	3	2 1/2	1 3/4
220	8 1/2	7	5 1/2	4 1/4	3 3/4	2 1/2	2 1/4	1 1/2
200	6 3/4	5 1/2	4 1/4	3 1/2	3	2 1/4	2	1 1/4
180	5 1/2	4	3 1/4	2 3/4	2 1/2	2	1 1/2	1 1/4

TO2 Takeoff Weights

20% Thrust Reduction

PERFORMANCE LIMIT	TO2 LIMIT WEIGHT (1000 KG)										
	FULL RATED LIMIT WEIGHT (1000 KG)										
	160	180	200	220	240	260	280	300	320	340	360
FIELD (Dry)*	140.4	157.0	173.7	190.3	207.0	223.7	240.3	257.0	273.6	290.3	307.0
FIELD (Wet)*	142.0	159.3	176.6	193.9	211.2	228.5	245.8	263.1	280.4	297.7	315.0
CLIMB	131.7	146.8	161.9	177.0	192.1	207.1	222.2	237.3	252.4	267.5	282.5
OBSTACLE	130.4	146.2	162.0	177.8	193.6	209.4	225.2	241.0	256.8	272.6	288.4
TIRE SPEED	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0
BRAKE ENERGY	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	308.1	324.7	341.4

* If the takeoff is limited by minimum control speeds, V1 may be increased to be equal to V1(MCG) provided the accelerate stop distance corrected for wind and slope exceeds approximately:

Dry runway: 1200 m for normal operation, 1200 m with one brake deactivated and 1300 m with two brakes deactivated

Wet runway: 1450 m for normal operation, 1500 m with one brake deactivated and 1550 m with two brakes deactivated

ADVISORY INFORMATION

TO2 Slush/Standing Water Takeoff

20% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-35.4	-40.5	-45.5	-42.8	-47.9	-53.0	-55.6	-60.6	-65.7
380	-33.9	-39.0	-44.1	-40.8	-45.9	-51.0	-52.6	-57.7	-62.7
360	-32.4	-37.5	-42.6	-38.8	-43.9	-49.0	-49.6	-54.7	-59.8
340	-30.9	-36.0	-41.1	-36.8	-41.9	-47.0	-46.8	-51.9	-56.9
320	-29.6	-34.7	-39.8	-35.1	-40.2	-45.3	-44.2	-49.3	-54.4
300	-28.6	-33.7	-38.8	-33.6	-38.7	-43.8	-41.9	-47.0	-52.1
280	-27.2	-32.2	-37.3	-31.7	-36.8	-41.9	-39.1	-44.1	-49.2
260	-25.2	-30.3	-35.4	-29.2	-34.3	-39.4	-35.6	-40.7	-45.8
240	-22.7	-27.8	-32.9	-26.2	-31.3	-36.3	-31.5	-36.6	-41.7
220	-19.8	-24.9	-29.9	-22.6	-27.7	-32.8	-26.9	-32.0	-37.1
200	-16.3	-21.4	-26.5	-18.5	-23.6	-28.6	-21.7	-26.8	-31.9
180	-12.4	-17.4	-22.5	-13.9	-18.9	-24.0	-15.9	-21.0	-26.1
160	-7.9	-13.0	-18.1	-8.7	-13.8	-18.8	-9.5	-14.6	-19.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
1600							132.1		
1800	146.9			159.5			181.1	124.3	
2000	195.1	139.4		208.5	151.8		231.6	173.4	
2200	245.8	187.4	131.8	260.4	200.6	144.1	284.9	223.4	165.6
2400	300.6	237.6	179.8	316.2	252.0	192.8	341.7	276.3	215.3
2600	360.4	291.6	229.4	376.5	307.1	243.6	401.5	332.5	267.7
2800	423.1	350.5	282.8	438.2	366.7	298.1		392.0	323.3
3000		413.2	340.9		428.4	357.0			382.5
3200			403.2			418.7			

1. Enter Weight Adjustment table with slush/standing water depth and TO2 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -55 m/+50 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-20	-18	-16	-15	-13	-11	-6	-4	-2
340	-23	-21	-19	-18	-16	-14	-8	-6	-4
320	-25	-23	-21	-20	-18	-16	-10	-8	-6
300	-26	-24	-22	-21	-19	-17	-11	-9	-7
280	-26	-24	-22	-22	-20	-18	-13	-11	-9
260	-26	-24	-22	-23	-21	-19	-15	-13	-11
240	-26	-24	-22	-23	-21	-19	-16	-14	-12
220	-25	-23	-21	-23	-21	-19	-17	-15	-13
200	-24	-22	-20	-22	-20	-18	-18	-16	-14
180	-23	-21	-19	-22	-20	-18	-18	-16	-14
160	-22	-20	-18	-21	-19	-17	-18	-16	-14

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.



Flight Planning and Performance Manual

ADVISORY INFORMATION

TO2 Slush/Standing Water Takeoff

20% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-52.1	-57.7	-63.3	-61.8	-67.4	-73.1	-78.5	-84.1	-89.7
380	-49.5	-55.2	-60.8	-58.5	-64.1	-69.8	-73.7	-79.3	-85.0
360	-47.0	-52.6	-58.3	-55.2	-60.8	-66.4	-69.0	-74.6	-80.2
340	-44.5	-50.1	-55.7	-52.0	-57.6	-63.2	-64.4	-70.0	-75.6
320	-42.1	-47.7	-53.4	-48.9	-54.5	-60.1	-59.8	-65.5	-71.1
300	-39.8	-45.4	-51.0	-45.8	-51.4	-57.0	-55.4	-61.0	-66.6
280	-37.1	-42.7	-48.4	-42.4	-48.0	-53.7	-50.6	-56.2	-61.8
260	-34.0	-39.7	-45.3	-38.6	-44.2	-49.8	-45.4	-51.0	-56.7
240	-30.5	-36.2	-41.8	-34.4	-40.0	-45.6	-39.9	-45.5	-51.1
220	-26.6	-32.2	-37.9	-29.7	-35.3	-41.0	-34.0	-39.6	-45.2
200	-22.3	-27.9	-33.5	-24.7	-30.3	-35.9	-27.7	-33.3	-38.9
180	-17.5	-23.1	-28.8	-19.2	-24.8	-30.4	-21.0	-26.7	-32.3
160	-12.3	-17.9	-23.6	-13.3	-18.9	-24.5	-14.0	-19.6	-25.2

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2400							141.6		
2600							207.3		
2800	126.3			189.2			279.7	139.3	137.0
3000	205.8	123.6		270.4	186.5		362.2	277.0	202.4
3200	300.4	202.8	120.8	368.1	267.2	183.8		359.0	274.2
3400	421.2	296.6	199.8		364.3	264.1			355.9
3600		416.6	292.8			360.5			
3800			412.1						

1. Enter Weight Adjustment table with slush/standing water depth and TO2 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -85 m/+85 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-33	-29	-25	-25	-21	-17	-9	-5	-1
340	-36	-32	-28	-28	-24	-20	-11	-7	-3
320	-38	-34	-30	-30	-26	-22	-15	-11	-7
300	-39	-35	-31	-33	-29	-25	-18	-14	-10
280	-40	-36	-32	-34	-30	-26	-21	-17	-13
260	-40	-36	-32	-35	-31	-27	-24	-20	-16
240	-40	-36	-32	-36	-32	-28	-27	-23	-19
220	-39	-35	-31	-36	-32	-28	-29	-25	-21
200	-39	-35	-31	-36	-32	-28	-30	-26	-22
180	-38	-34	-30	-36	-32	-28	-31	-27	-23
160	-37	-33	-29	-35	-31	-27	-31	-27	-23

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slippery Runway Takeoff

20% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY 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
400	0.0	-1.5	-2.9	-15.0	-16.4	-17.9	-35.3	-36.7	-38.2
380	0.0	-1.5	-2.9	-15.5	-16.9	-18.4	-34.2	-35.6	-37.1
360	0.0	-1.5	-2.9	-16.0	-17.4	-18.9	-33.0	-34.5	-36.0
340	0.0	-1.5	-2.9	-16.5	-17.9	-19.4	-31.9	-33.4	-34.9
320	0.0	-1.5	-2.9	-17.0	-18.5	-19.9	-31.1	-32.6	-34.0
300	-1.2	-2.6	-4.1	-17.8	-19.3	-20.7	-30.6	-32.0	-33.5
280	-3.7	-5.1	-6.6	-18.3	-19.8	-21.2	-29.8	-31.3	-32.7
260	-5.0	-6.5	-7.9	-18.5	-19.9	-21.4	-28.8	-30.3	-31.7
240	-5.5	-7.0	-8.4	-18.0	-19.5	-20.9	-27.3	-28.7	-30.2
220	-5.4	-6.8	-8.3	-16.7	-18.1	-19.6	-24.7	-26.2	-27.6
200	-4.7	-6.1	-7.6	-14.4	-15.9	-17.3	-21.3	-22.7	-24.2
180	-3.4	-4.8	-6.3	-11.4	-12.8	-14.3	-16.9	-18.3	-19.8
160	-1.5	-2.9	-4.4	-7.4	-8.8	-10.3	-11.5	-13.0	-14.4

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1400	205.8	146.0							
1600	302.9	243.8	184.3	120.5					
1800	399.1	340.5	281.7	184.1	129.7				
2000		436.5	377.9	250.4	193.4	139.0	126.5		
2200				322.7	260.5	202.9	165.3		
2400				401.5	333.9	270.8	204.6	152.0	
2600					413.2	345.2	246.6	190.9	138.7
2800						424.8	292.1	231.8	177.6
3000							342.3	276.1	217.5
3200							397.1	324.5	260.5
3400								378.2	307.4
3600								433.3	359.4
3800									414.5

1. Enter Weight Adjustment table with reported braking action and TO2 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+25 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+55 m 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
360	-7	-5	-3	-16	-14	-12	-28	-26	-24
340	-9	-7	-5	-18	-16	-14	-30	-28	-26
320	-10	-8	-6	-20	-18	-16	-32	-30	-28
300	-11	-9	-7	-21	-19	-17	-34	-32	-30
280	-11	-9	-7	-22	-20	-18	-35	-33	-31
260	-12	-10	-8	-23	-21	-19	-36	-34	-32
240	-12	-10	-8	-23	-21	-19	-36	-34	-32
220	-12	-10	-8	-23	-21	-19	-36	-34	-32
200	-12	-10	-8	-23	-21	-19	-36	-34	-32
180	-13	-11	-9	-24	-22	-20	-36	-34	-32
160	-13	-11	-9	-24	-22	-20	-36	-34	-32

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slippery Runway Takeoff

20% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY 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
400	0.0	0.0	0.0	-29.6	-29.6	-29.6	-55.9	-55.9	-55.9
380	0.0	0.0	0.0	-29.0	-29.0	-29.0	-53.3	-53.3	-53.3
360	0.0	0.0	0.0	-28.5	-28.5	-28.5	-50.7	-50.7	-50.7
340	-1.3	-1.3	-1.3	-28.0	-28.0	-28.0	-48.2	-48.2	-48.2
320	-3.9	-3.9	-3.9	-27.6	-27.6	-27.6	-46.1	-46.1	-46.1
300	-6.4	-6.4	-6.4	-27.5	-27.5	-27.5	-44.1	-44.1	-44.1
280	-8.5	-8.5	-8.5	-27.5	-27.5	-27.5	-42.5	-42.5	-42.5
260	-10.1	-10.1	-10.1	-27.6	-27.6	-27.6	-41.1	-41.1	-41.1
240	-11.0	-11.0	-11.0	-27.2	-27.2	-27.2	-39.3	-39.3	-39.3
220	-11.0	-11.0	-11.0	-25.5	-25.5	-25.5	-36.4	-36.4	-36.4
200	-10.1	-10.1	-10.1	-22.6	-22.6	-22.6	-32.3	-32.3	-32.3
180	-8.3	-8.3	-8.3	-18.4	-18.4	-18.4	-27.1	-27.1	-27.1
160	-5.6	-5.6	-5.6	-13.0	-13.0	-13.0	-20.7	-20.7	-20.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1600	193.5								
1800	348.6								
2000		282.4	198.4						
		410.8	351.6						
2400				130.9					
2600				321.0	207.6				
2800					365.8	268.4			
3000						409.1			
4000							230.4		
4200							382.7	289.3	147.6
4400								425.6	338.1

1. Enter Weight Adjustment table with reported braking action and TO2 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+80 m 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
360	-9	-6	-3	-23	-19	-16	-43	-40	-37
340	-11	-8	-5	-25	-22	-19	-46	-43	-40
320	-13	-10	-7	-28	-24	-21	-49	-46	-43
300	-14	-11	-8	-29	-26	-23	-53	-49	-46
280	-15	-12	-9	-31	-28	-25	-55	-52	-48
260	-16	-13	-10	-33	-29	-26	-57	-54	-50
240	-17	-14	-11	-34	-31	-28	-59	-56	-52
220	-17	-14	-11	-36	-32	-29	-60	-56	-53
200	-18	-15	-12	-37	-34	-31	-60	-57	-53
180	-19	-16	-13	-39	-35	-32	-60	-57	-53
160	-20	-17	-14	-41	-37	-34	-60	-57	-53

- 1 Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
- 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). V1 not to exceed VR.

TO2 Takeoff Speeds - Dry Runway**20% Thrust Reduction****V1, VR, V2**

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
320	177	182	185	168	171	175			
300	171	176	180	163	165	170	158	158	163
280	165	169	175	157	159	165	152	152	158
260	159	162	169	150	153	160	146	146	153
240	151	155	163	143	146	154	139	139	148
220	142	147	157	135	138	148	131	133	142
200	133	139	151	126	131	142	123	125	137
180	123	131	144	117	123	136	114	117	130
160	111	121	137	108	114	129	104	110	124

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1							VR							V2						
		PRESSURE ALTITUDE (1000 FT)							PRESSURE ALTITUDE (1000 FT)							PRESSURE ALTITUDE (1000 FT)						
°C	°F	-2	0	2	4	6	8		-2	0	2	4	6	8		-2	0	2	4	6	8	
70	158	9	11						5	6						-3	-3					
60	140	6	7	9	11				3	4	6	7				-2	-2	-3	-4			
50	122	3	4	6	8	10	13		2	3	4	5	6	8		-1	-2	-2	-3	-3	-4	
40	104	1	2	4	6	8	10		1	1	3	4	5	7		0	-1	-1	-2	-3	-3	
30	86	0	0	2	4	6	8		0	0	1	3	4	6		0	0	-1	-1	-2	-3	
20	68	0	0	1	3	5	7		0	0	1	2	3	5		0	0	0	-1	-2	-2	
-60	-76	0	0	1	3	5	7		0	0	1	2	3	4		0	0	0	-1	-1	-2	

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
320	-3	-1	0	2	2	-3	-1	0	0	1	1	2	2	
300	-3	-1	0	1	2	-2	-1	-1	0	0	1	1	2	
280	-3	-1	0	1	2	-2	-1	-1	0	0	1	1	2	
260	-3	-1	0	1	2	-2	-1	-1	0	0	1	1	2	
240	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	2	
220	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	2	
200	-2	-1	0	1	2	-2	-1	-1	0	0	1	2	2	
180	-2	-1	0	1	2	-2	-1	-1	0	1	1	2	2	
160	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3	

*V1 not to exceed VR.

TO2 V1(MCG), Minimum VR

TEMP		PRESSURE ALTITUDE (FT)											
		-2000		0		2000		4000		6000		8000	
°C	°F	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR
60	140	105	107	102	104	100	102	98	101				
50	122	107	109	104	107	100	103	98	101	96	99	93	96
40	104	113	115	110	112	106	108	102	104	97	100	93	96
30	86	115	117	114	116	110	112	106	108	101	104	96	99
20	68	116	117	115	116	111	113	108	110	104	106	99	102
-60	-76	117	118	116	117	113	114	109	111	105	107	101	103



Flight Planning and Performance Manual

TO2 Takeoff Speeds - Wet Runway

20% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
320	170	182	185	160	171	175			
300	163	176	180	153	165	170	149	158	163
280	155	169	175	146	159	165	142	152	158
260	148	162	169	139	153	160	135	146	153
240	140	155	163	132	146	154	128	139	148
220	132	147	157	124	138	148	121	133	142
200	123	139	151	116	131	142	113	125	137
180	113	131	144	107	123	136	104	117	130
160	101	121	137	96	114	129	95	110	124

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1							VR							V2						
		PRESSURE ALTITUDE (1000 FT)							PRESSURE ALTITUDE (1000 FT)							PRESSURE ALTITUDE (1000 FT)						
°C	°F	-2	0	2	4	6	8		-2	0	2	4	6	8		-2	0	2	4	6	8	
70	158	11	13						5	6						-3	-3					
60	140	7	9	11	13				3	4	6	7				-2	-2	-3	-4			
50	122	4	5	7	9	12	15		2	3	4	5	6	8		-1	-2	-2	-3	-3	-4	
40	104	1	2	4	7	9	12		1	1	3	4	5	7		0	-1	-1	-2	-3	-3	
30	86	0	0	2	5	7	10		0	0	1	3	4	6		0	0	-1	-1	-2	-3	
20	68	0	0	1	3	6	8		0	0	1	2	3	5		0	0	0	-1	-2	-2	
-60	-76	0	0	1	3	5	8		0	0	1	2	3	4		0	0	0	-1	-1	-2	

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
320	-5	-2	0	3	5	-4	-2	-1	0	1	2	3	4	
300	-5	-2	0	2	5	-4	-3	-1	0	1	2	3	3	
280	-5	-2	0	2	4	-4	-3	-1	0	1	2	2	3	
260	-5	-2	0	2	4	-4	-3	-1	0	1	2	2	3	
240	-4	-2	0	2	4	-4	-3	-1	0	1	2	3	3	
220	-4	-2	0	2	4	-4	-3	-1	0	1	2	3	4	
200	-3	-1	0	2	4	-4	-3	-1	0	1	2	3	4	
180	-2	-1	0	2	4	-4	-2	-1	0	1	3	4	5	
160	-2	0	0	3	4	-4	-2	0	0	2	3	4	5	

*V1 not to exceed VR.

TO2 V1(MCG), Minimum VR

TEMP		PRESSURE ALTITUDE (FT)											
		-2000		0		2000		4000		6000		8000	
°C	°F	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR
60	140	105	107	102	104	100	102	98	101				
50	122	107	109	104	107	100	103	98	101	96	99	93	96
40	104	113	115	110	112	106	108	102	104	97	100	93	96
30	86	115	117	114	116	110	112	106	108	101	104	96	99
20	68	116	117	115	116	111	113	108	110	104	106	99	102
-60	-76	117	118	116	117	113	114	109	111	105	107	101	103

TO2 Takeoff %N1

20% Thrust Reduction

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
70	158	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4
60	140	86.9	87.2	87.5	87.2	87.0	87.0	86.9	86.7	86.5	86.0	85.2	84.9
55	131	88.4	88.7	89.0	88.8	88.5	88.6	88.4	88.3	88.1	87.4	86.5	86.1
50	122	89.8	90.0	90.5	90.1	89.8	89.8	89.7	89.6	89.4	88.9	88.0	87.6
45	113	91.2	91.5	92.1	91.7	91.3	91.2	91.1	90.9	90.7	90.1	89.3	88.9
40	104	92.4	92.8	93.2	92.8	92.6	92.5	92.3	92.2	91.9	91.4	90.6	90.2
35	95	92.7	93.3	94.0	93.8	93.3	93.2	93.0	92.8	92.4	92.0	91.5	91.3
30	86	91.9	93.2	94.3	94.1	93.8	93.6	93.4	93.2	92.8	92.3	92.0	91.7
25	77	91.1	92.5	93.5	93.7	93.9	93.9	93.7	93.7	93.2	92.8	92.3	92.0
20	68	90.4	91.7	92.7	92.9	93.1	93.3	93.4	93.6	93.3	93.0	92.6	92.4
15	59	89.6	90.9	91.9	92.1	92.3	92.5	92.6	92.8	92.7	92.6	92.4	92.3
10	50	88.8	90.1	91.1	91.3	91.5	91.7	91.8	91.9	91.9	91.8	91.7	91.6
5	41	88.0	89.3	90.3	90.5	90.7	90.9	91.0	91.1	91.1	91.0	90.9	90.8
0	32	87.2	88.5	89.5	89.7	89.9	90.0	90.2	90.3	90.3	90.2	90.1	90.0
-10	14	85.6	86.9	87.8	88.0	88.3	88.4	88.5	88.6	88.6	88.5	88.4	88.4
-20	-4	84.0	85.2	86.1	86.3	86.6	86.7	86.8	86.9	86.9	86.8	86.7	86.7
-30	-22	82.3	83.5	84.4	84.6	84.8	84.9	85.1	85.2	85.2	85.1	85.0	84.9
-40	-40	80.6	81.8	82.7	82.8	83.1	83.2	83.3	83.4	83.4	83.3	83.2	83.2
-50	-58	78.8	80.0	80.9	81.0	81.3	81.4	81.5	81.6	81.6	81.5	81.4	81.4

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
1 PACK ON	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

TO2 Stab Trim Setting

20% Thrust Reduction

Flaps 5

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	10 3/4	9 1/4	7 3/4	6 3/4	5 1/4	4	3	2 3/4
340	10 3/4	9	7 3/4	6 3/4	5 1/4	4	3	2 3/4
320	10 1/4	8 3/4	7 3/4	6 1/2	5	3 3/4	3	2 1/2
300	10	8 1/2	7 1/2	6 1/4	5	3 3/4	2 3/4	2 1/2
280	10	8 1/2	7 1/4	6 1/4	5	3 1/2	2 3/4	2 1/4
260	10	8 1/2	7 1/4	6 1/4	5	3 1/2	2 3/4	2 1/4
240	10	8 1/2	7 1/4	6 1/4	5	3 1/4	2 3/4	2 1/4
220	9 3/4	8 1/4	7 1/4	6 1/4	4 3/4	3 1/4	2 3/4	2
200	9 3/4	8 1/4	7	6	4 3/4	3 1/4	2 1/2	2
180	9 1/2	8	7	6	4 1/2	3 1/4	2 1/2	2

Flaps 15

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	11 3/4	10 3/4	9 3/4	8 3/4	7 1/4	5 3/4	4 1/2	3 1/4
340	11 1/2	10 1/2	9 3/4	8 1/2	7 1/4	5 1/2	4 1/4	3
320	11 1/2	10 1/4	9 1/2	8 1/4	7	5 1/4	4	3
300	11 1/4	9 3/4	9 1/4	7 3/4	6 3/4	5	3 3/4	3
280	11	9 1/2	8 3/4	7 1/4	6 1/4	4 3/4	3 3/4	2 3/4
260	10 3/4	9 1/4	8 1/4	7	5 3/4	4 1/4	3 1/2	2 3/4
240	10 1/4	8 3/4	7 3/4	6 1/2	5 1/4	3 3/4	3	2 1/2
220	9 1/2	8 1/4	7 1/4	6	5	3 1/2	2 3/4	2 1/2
200	8 1/2	7 1/2	6 1/2	5 1/4	4	3	2 1/2	2 1/4
180	7 1/2	6	5 1/4	4	2 3/4	2 1/2	2 1/4	1 3/4

Flaps 20

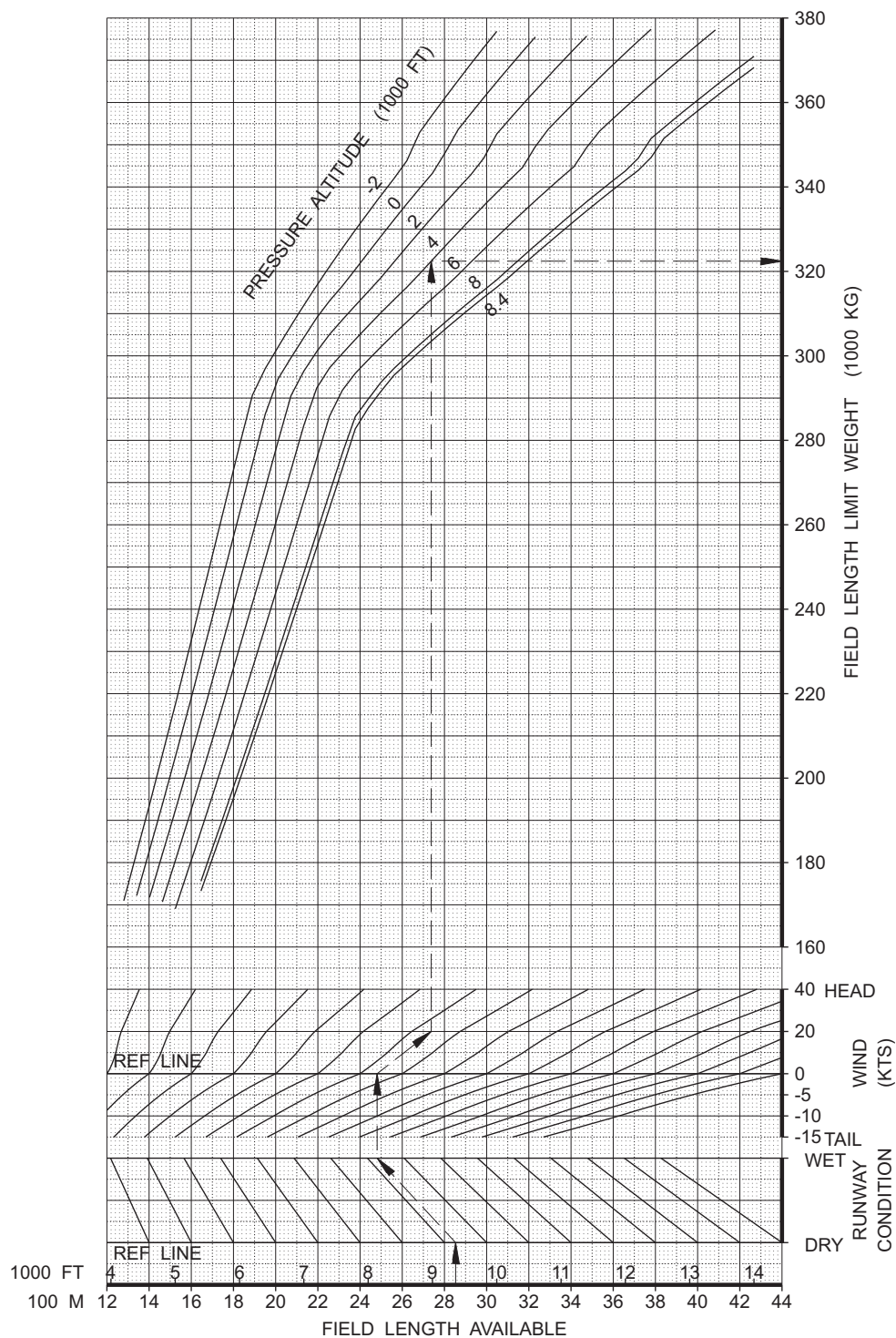
WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	12 1/2	11 1/2	10 1/4	9 1/4	7 3/4	6	4 3/4	3 1/4
340	12 1/2	11 1/2	10	9	7 1/2	6	4 1/2	3
320	12 1/4	11	9 3/4	8 3/4	7 1/2	5 1/2	4 1/4	3
300	12	10 1/2	9 1/2	8	7 1/4	5 1/4	4	3
280	11 3/4	10 1/4	9	7 3/4	6 3/4	5	3 3/4	3
260	11 1/2	10	8 3/4	7 1/4	6 1/4	4 3/4	3 1/2	2 3/4
240	11	9 1/2	8 1/4	7	5 3/4	4 1/4	3 1/4	2 1/2
220	10 1/4	9	7 3/4	6 1/2	5 1/4	4	3	2 1/2
200	9 1/4	8 1/4	7	5 1/2	4 1/2	3 1/2	2 1/2	2 1/4
180	8 1/4	6 3/4	5 3/4	4 1/2	4	3	2 1/4	1 3/4

Intentionally
Blank

Landing Field Length Limit

Flaps 30

Based on automatic speedbrakes

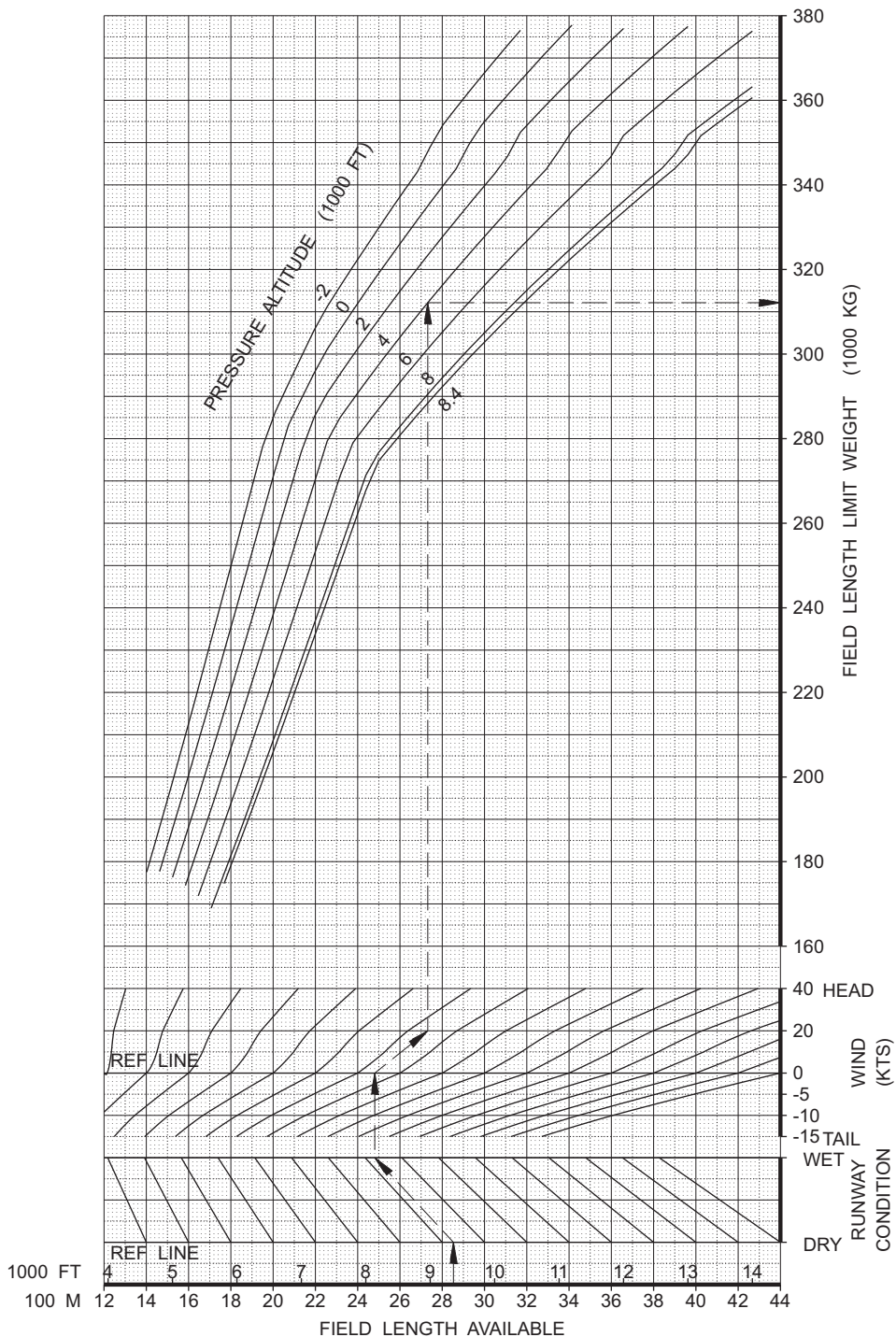


With manual speedbrakes, decrease weight by 21700 kg.
With 1 brake deactivated, decrease weight by 22800 kg.
With 2 brakes deactivated, decrease weight by 46300 kg.

Landing Field Length Limit

Flaps 25

Based on automatic speedbrakes



With manual speedbrakes, decrease weight by 20800 kg.

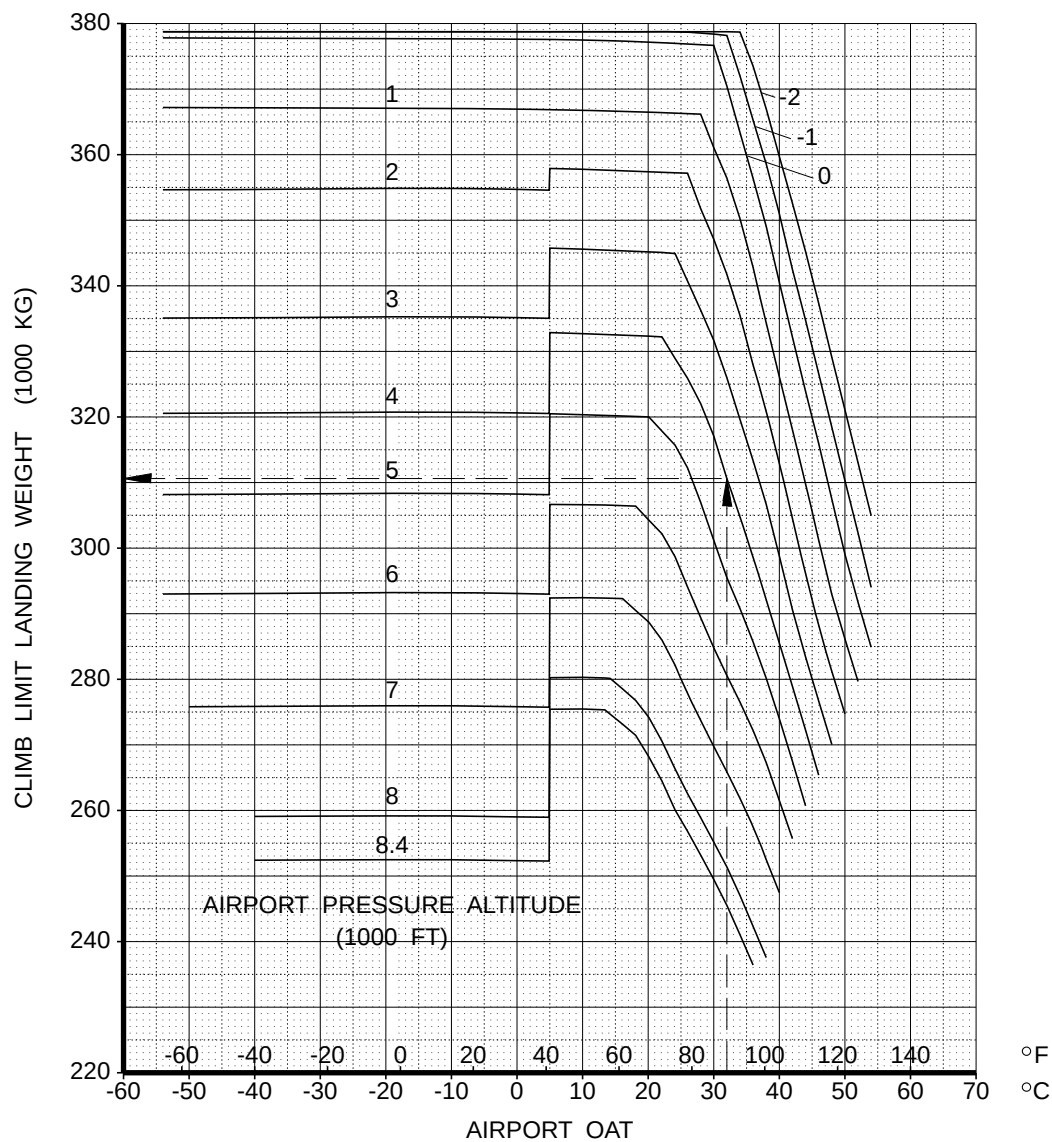
With 1 brake deactivated, decrease weight by 21800 kg.

With 2 brakes deactivated, decrease weight by 44400 kg.

Landing Climb Limit Weight

Valid for approach with flaps 20 and landing with flaps 30

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



With engine bleed for packs off, increase weight by 1350 kg.

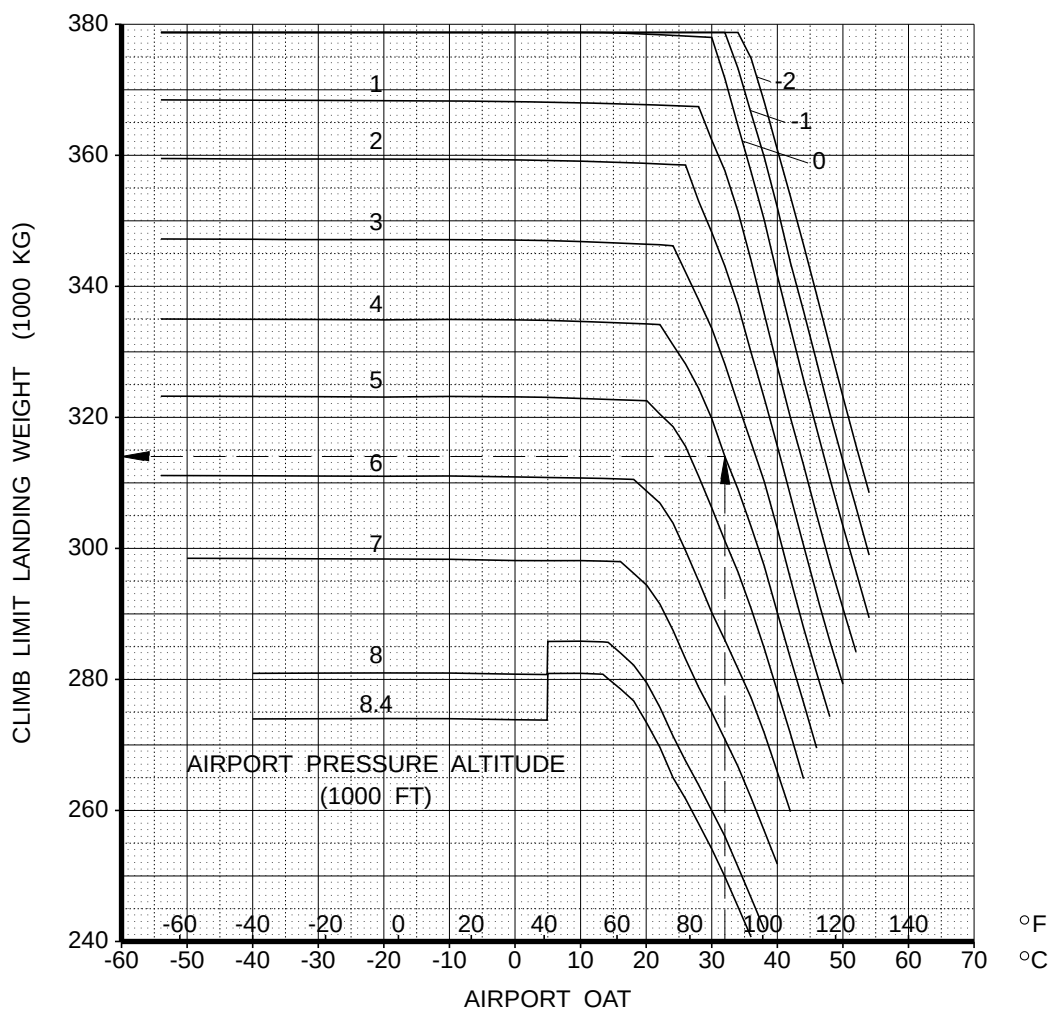
With engine and wing anti-ice on, decrease weight by 2200 kg.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 21950 kg.

Landing Climb Limit Weight

Valid for approach with flaps 20 and landing with flaps 25

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



With engine bleed for packs off, increase weight by 1450 kg.

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

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 22250 kg.

ENGINE INOP

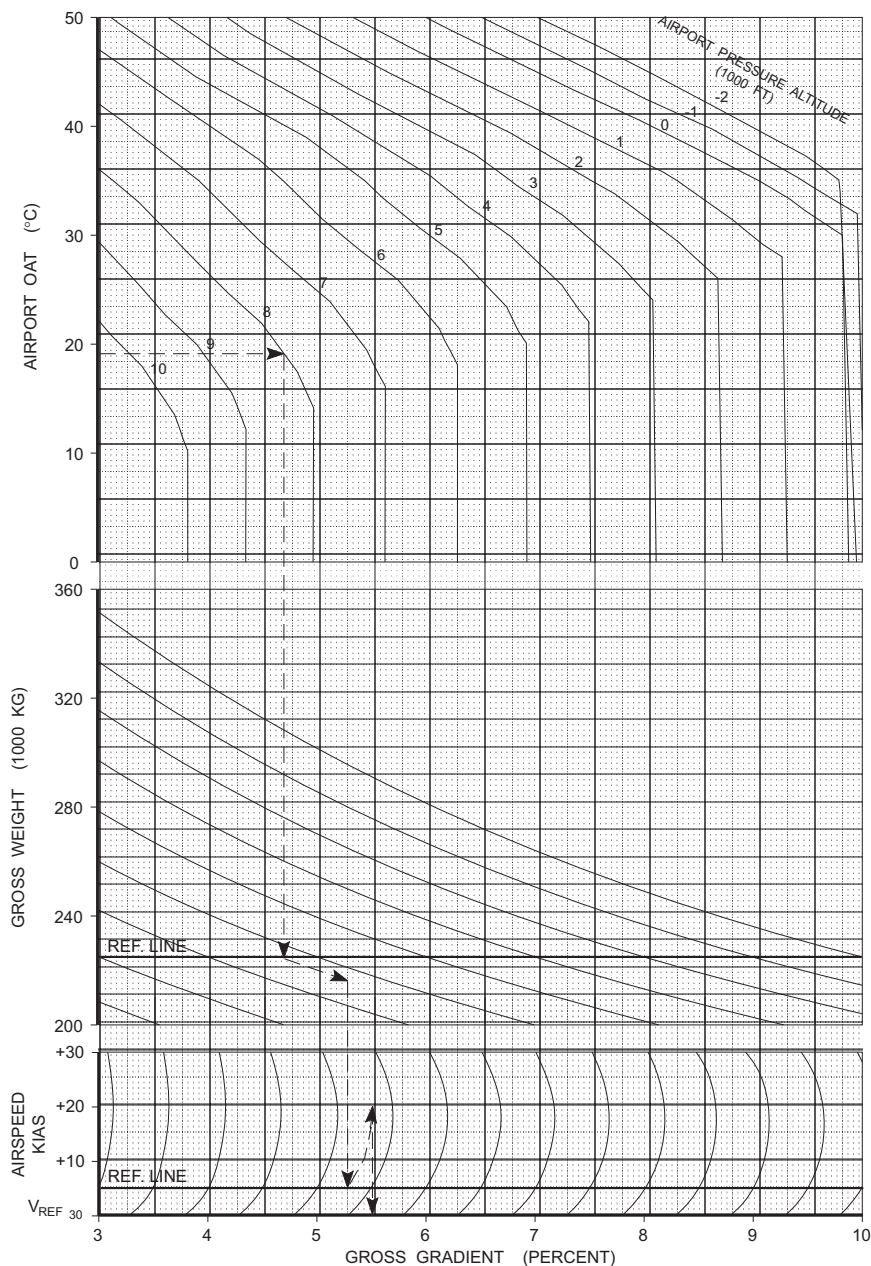
ADVISORY INFORMATION

GO-AROUND THRUST

Go-Around Climb Gradient

Flaps 20, Gear Up

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



With engine bleed for packs off, increase gradient by 0.1%.
With engine and wing anti-ice on, decrease gradient by 0.1%.
When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease gradient by 0.7%.

Quick Turnaround Limit

Flaps 30 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	239.8	235.6	231.5									
50	122	241.4	237.2	233.0	228.6	224.3							
45	113	243.3	239.1	234.9	230.4	226.1	221.8	217.6					
40	104	245.3	241.1	236.8	232.4	227.9	223.6	219.4	215.2	210.9	206.7		
35	95	247.4	243.1	238.8	234.3	229.9	225.5	221.2	217.0	212.7	208.5	204.3	202.7
30	86	249.5	245.1	240.9	236.3	231.8	227.4	223.1	218.8	214.6	210.3	206.1	204.4
25	77	251.7	247.3	242.9	238.4	233.9	229.4	225.0	220.7	216.5	212.2	207.9	206.2
20	68	253.9	249.5	245.1	240.5	235.9	231.4	227.0	222.6	218.4	214.1	209.8	208.1
15	59	256.2	251.7	247.3	242.7	238.1	233.5	229.0	224.6	220.3	216.0	211.7	210.0
10	50	258.6	254.0	249.5	244.9	240.3	235.7	231.1	226.7	222.3	218.0	213.7	211.9
5	41	261.0	256.4	251.9	247.1	242.5	237.9	233.3	228.8	224.3	220.0	215.7	213.9
0	32	263.5	258.9	254.3	249.5	244.8	240.1	235.5	230.9	226.4	222.0	217.7	216.0
-5	23	266.1	261.4	256.7	251.9	247.1	242.4	237.8	233.2	228.6	224.1	219.8	218.1
-10	14	268.7	264.0	259.3	254.4	249.5	244.8	240.1	235.5	230.9	226.3	221.9	220.2
-15	5	271.4	266.6	261.9	257.0	252.1	247.2	242.5	237.9	233.2	228.6	224.1	222.4
-20	-4	274.1	269.4	264.6	259.6	254.7	249.8	245.0	240.3	235.6	231.0	226.4	224.6
-30	-22	279.7	274.9	270.2	265.1	260.1	255.1	250.2	245.4	240.6	235.9	231.2	229.4
-40	-40	285.7	280.8	275.9	270.9	265.8	260.7	255.7	250.8	245.9	241.1	236.3	234.4
-50	-58	292.3	287.1	282.1	276.9	271.9	266.7	261.6	256.5	251.5	246.6	241.7	239.6
-54	-65	295.1	289.8	284.7	279.5	274.3	269.2	264.1	259.0	253.9	248.8	243.9	241.7

Flaps 25 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	227.2	223.3	219.3									
50	122	228.7	224.7	220.7	216.6	212.6							
45	113	230.6	226.5	222.6	218.4	214.3	210.3	206.2					
40	104	232.5	228.4	224.4	220.2	216.0	212.0	207.9	203.9	199.9	196.0		
35	95	234.5	230.4	226.3	222.0	217.8	213.7	209.7	205.6	201.6	197.6	193.8	192.3
30	86	236.4	232.3	228.3	223.9	219.7	215.5	211.4	207.4	203.3	199.3	195.4	193.9
25	77	238.5	234.4	230.2	225.9	221.6	217.4	213.2	209.2	205.1	201.0	197.1	195.5
20	68	240.6	236.4	232.3	227.9	223.6	219.3	215.1	211.0	206.9	202.8	198.8	197.2
15	59	242.8	238.5	234.4	230.0	225.6	221.3	217.0	212.9	208.8	204.6	200.6	199.0
10	50	245.0	240.7	236.5	232.1	227.7	223.3	219.0	214.8	210.7	206.5	202.4	200.8
5	41	247.3	243.0	238.7	234.2	229.8	225.4	221.0	216.8	212.6	208.5	204.3	202.7
0	32	249.7	245.3	240.9	236.4	232.0	227.5	223.1	218.8	214.6	210.5	206.3	204.6
-5	23	252.1	247.7	243.3	238.7	234.2	229.7	225.3	220.9	216.6	212.5	208.3	206.6
-10	14	254.6	250.1	245.7	241.1	236.5	232.0	227.5	223.1	218.8	214.5	210.4	208.7
-15	5	257.2	252.7	248.2	243.5	238.9	234.3	229.8	225.4	221.0	216.6	212.4	210.8
-20	-4	259.8	255.3	250.7	246.0	241.3	236.7	232.2	227.7	223.2	218.8	214.6	212.9
-30	-22	265.2	260.7	256.1	251.2	246.4	241.7	237.1	232.6	228.0	223.5	219.1	217.3
-40	-40	270.9	266.3	261.7	256.8	251.9	247.0	242.3	237.6	233.0	228.5	223.9	222.1
-50	-58	277.0	272.2	267.5	262.6	257.6	252.7	247.9	243.1	238.3	233.7	229.0	227.0
-54	-65	279.5	274.7	269.9	265.0	260.1	255.1	250.2	245.4	240.6	235.9	231.1	229.0

Increase weight by 2150 kg per 1% uphill slope. Decrease weight by 3450 kg per 1% downhill slope.

Increase weight by 5950 kg per 10 knots headwind. Decrease weight by 31550 kg per 10 knots tailwind.

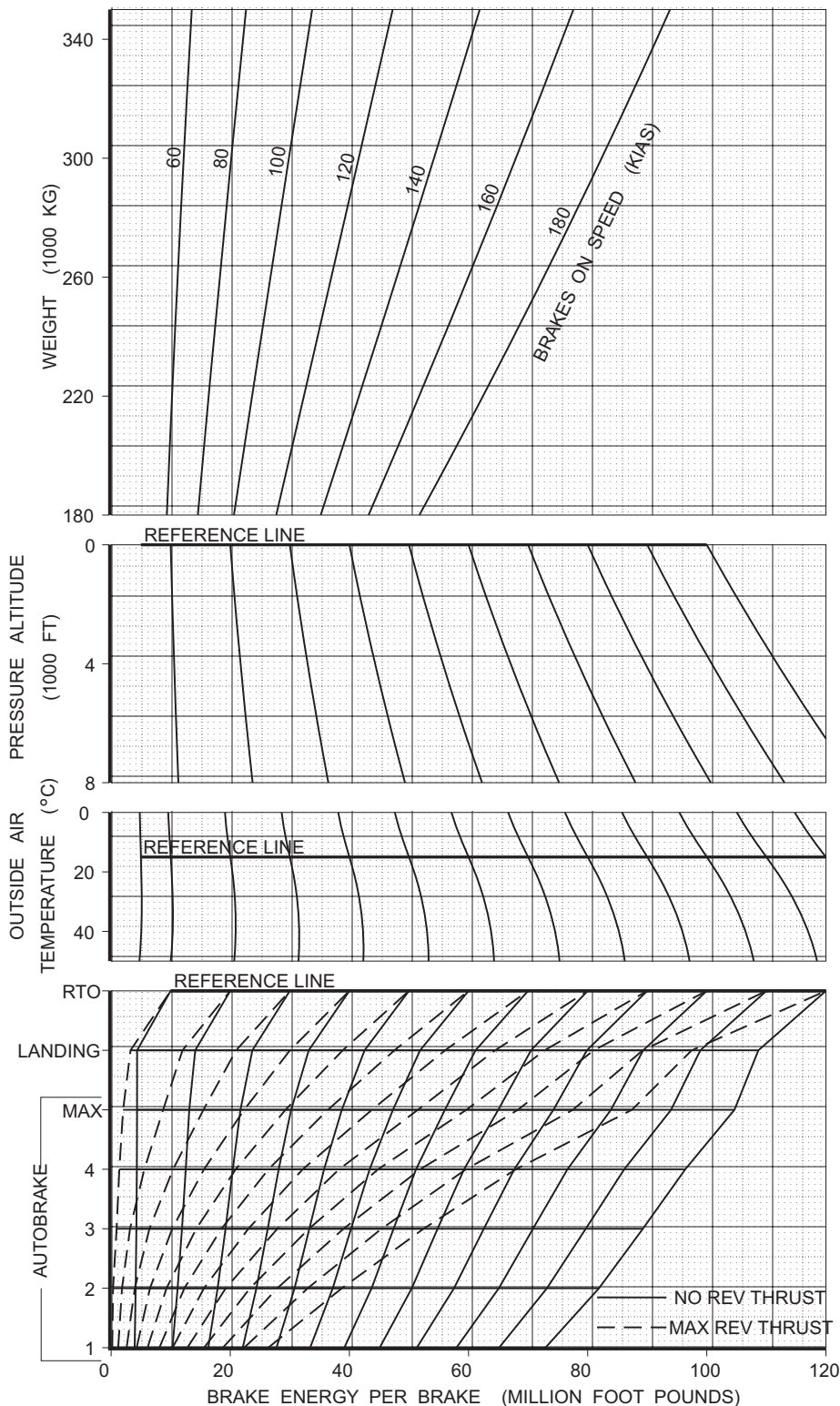
Decrease weight by 12500 kg when one brake is deactivated. Decrease weight by 25450 kg when two brakes are deactivated.

After landing at weights exceeding those shown above, adjusted for slope and wind, wait at least 65 minutes and check that wheel thermal plugs have not melted before executing a takeoff.

As an alternate procedure, no waiting period is required if the BRAKE TEMP advisory message on EICAS is not displayed 10 to 15 minutes after parking.

ADVISORY INFORMATION

Recommended Brake Cooling Schedule



GUIDANCE INFORMATION ONLY

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 10 PERCENT

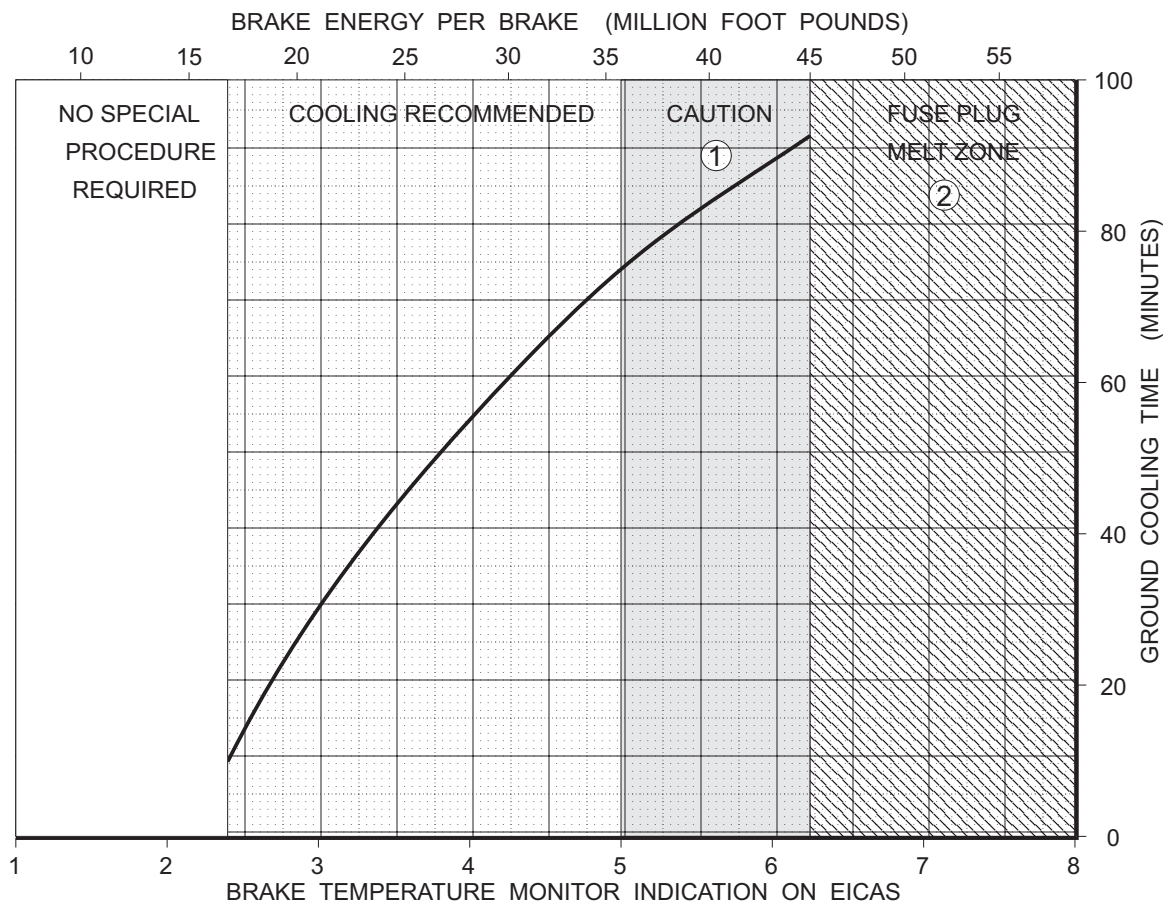
FOR TWO BRAKES DEACTIVATED
INCREASE BRAKE ENERGY PER
BRAKE BY 20 PERCENT

IF GROUND SPEED IS USED FOR
BRAKES ON SPEED, IGNORE WIND,
ALTITUDE, AND OAT EFFECTS

RTO AND LANDING BRAKE
ENERGY BASED ON MAXIMUM
MANUAL BRAKING

ADVISORY INFORMATION

Recommended Brake Cooling Schedule



OBSERVE MAXIMUM QUICK TURNAROUND LIMITATION

FOR INFLIGHT GEAR EXTENDED COOLING TIME, DIVIDE GROUND COOLING TIME BY 10.

- ① WHEEL FUSE PLUGS MAY MELT. DELAY TAKEOFF AND INSPECT AFTER ONE HOUR. IF OVERHEAT OCCURS AFTER TAKEOFF, EXTEND GEAR SOON FOR AT LEAST 8 MINUTES.
- ② CLEAR RUNWAY IMMEDIATELY. UNLESS REQUIRED, DO NOT SET PARKING BRAKE. DO NOT APPROACH GEAR OR ATTEMPT TAXI FOR ONE HOUR. TIRE WHEEL AND BRAKE REPLACEMENT MAY BE REQUIRED. IF OVERHEAT OCCURS AFTER TAKEOFF, EXTEND GEAR SOON FOR AT LEAST 12 MINUTES.

BRAKE TEMPERATURE MONITOR SYSTEM (BTMS) INDICATION ON EICAS MAY BE USED 10 TO 15 MINUTES AFTER AIRPLANE HAS COME TO A COMPLETE STOP, OR INFLIGHT WITH GEAR RETRACTED, TO DETERMINE RECOMMENDED COOLING SCHEDULE. (WHEN INFLIGHT WITH GEAR EXTENDED, THE BTMS INDICATION MAY VARY BETWEEN INDIVIDUAL BRAKES DUE TO AIRSTREAM EFFECTS.)



Flight Planning and Performance Manual

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 30

Dry Runway

BRAKING CONFIGURATION	LANDING DISTANCE AND ADJUSTMENTS (M)											
	REF DIST*	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		APPROACH SPEED ADJ	REVERSE THRUST ADJ	
	225000 KG LANDING WT	PER 5000 KG ABOVE/ BELOW 225000 KG	PER 1000 FT ABOVE S.L.	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABOVE ISA	BELOW ISA	PER 10 KTS ABOVE VREF30	ONE REV	NO REV
MAX MANUAL	915	+25/-15	20	-40	140	10	-10	20	-20	75	20	45
MAX AUTO	1235	+20/-15	30	-55	190	0	0	30	-30	125	0	0
AUTOBRAKE 4	1600	+30/-20	45	-75	270	0	-5	45	-45	175	5	5
AUTOBRAKE 3	1885	+40/-30	55	-95	335	5	-20	55	-55	180	10	15
AUTOBRAKE 2	2125	+45/-35	65	-105	380	30	-50	55	-60	155	90	100
AUTOBRAKE 1	2345	+50/-40	75	-120	445	70	-70	65	-65	155	250	335

Good Reported Braking Action

MAX MANUAL	1275	+25/-20	35	-65	235	30	-25	35	-35	105	85	195
MAX AUTO	1370	+25/-20	35	-60	235	25	-15	35	-35	120	90	215
AUTOBRAKE 4	1595	+30/-30	45	-75	275	5	-5	45	-45	175	10	45
AUTOBRAKE 3	1880	+40/-35	55	-95	335	5	-20	55	-55	180	10	15

Medium Reported Braking Action

MAX MANUAL	1695	+35/-30	55	-95	375	75	-55	50	-50	130	225	590
MAX AUTO	1760	+35/-30	50	-90	365	75	-50	45	-45	135	225	595
AUTOBRAKE 4	1805	+40/-35	50	-95	375	55	-35	50	-50	175	205	585
AUTOBRAKE 3	1955	+40/-35	55	-105	400	40	-40	55	-55	180	115	425

Poor Reported Braking Action

MAX MANUAL	2125	+50/-45	75	-135	570	160	-105	65	-65	145	475	1435
MAX AUTO	2225	+50/-45	70	-130	560	160	-105	65	-65	145	485	1460
AUTOBRAKE 4	2225	+50/-45	75	-130	560	160	-95	65	-65	155	480	1450
AUTOBRAKE 3	2255	+50/-45	70	-135	570	135	-90	70	-65	180	425	1410

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

Max Manual braking data valid for auto speedbrakes. For manual speedbrakes, increase reference landing distance by 60 meters.

Autobrake data valid for both auto and manual speedbrakes.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 25

Dry Runway

BRAKING CONFIGURATION	LANDING DISTANCE AND ADJUSTMENTS (M)											
	REF DIST*	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		APPROACH SPEED ADJ	REVERSE THRUST ADJ	
	225000 KG LANDING WT	PER 5000 KG ABOVE/ BELOW 225000 KG	PER 1000 FT ABOVE S.L.	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABOVE ISA	BELOW ISA	PER 10 KTS ABOVE VREF25	ONE REV	NO REV
MAX MANUAL	960	+25/-15	20	-40	140	10	-10	20	-20	75	20	50
MAX AUTO	1325	+20/-15	35	-55	195	0	0	35	-35	130	0	0
AUTOBRAKE 4	1725	+30/-20	45	-80	280	5	-5	50	-50	185	5	5
AUTOBRAKE 3	2045	+35/-30	60	-100	350	5	-30	60	-60	180	20	25
AUTOBRAKE 2	2290	+40/-40	70	-110	395	35	-55	65	-65	160	125	135
AUTOBRAKE 1	2510	+50/-45	80	-125	460	75	-75	70	-70	160	295	410

Good Reported Braking Action

MAX MANUAL	1350	+20/-25	35	-65	240	35	-30	35	-35	105	95	220
MAX AUTO	1455	+25/-25	35	-65	240	25	-15	35	-35	130	95	235
AUTOBRAKE 4	1725	+30/-30	45	-80	285	5	-5	50	-50	185	15	45
AUTOBRAKE 3	2035	+35/-40	60	-100	350	5	-30	60	-60	180	20	25

Medium Reported Braking Action

MAX MANUAL	1795	+35/-35	55	-100	385	80	-60	50	-50	130	250	660
MAX AUTO	1865	+35/-35	55	-95	375	75	-50	50	-50	140	250	665
AUTOBRAKE 4	1920	+35/-35	55	-100	390	55	-35	55	-55	185	210	635
AUTOBRAKE 3	2110	+40/-40	65	-110	415	40	-45	60	-60	180	130	455

Poor Reported Braking Action

MAX MANUAL	2255	+50/-45	80	-140	585	165	-110	70	-70	150	520	1595
MAX AUTO	2360	+50/-45	80	-135	575	170	-105	70	-70	145	530	1620
AUTOBRAKE 4	2360	+50/-45	80	-135	575	170	-100	70	-70	165	530	1615
AUTOBRAKE 3	2410	+50/-50	80	-140	585	135	-95	70	-70	180	450	1555

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

Max Manual braking data valid for auto speedbrakes. For manual speedbrakes, increase reference landing distance by 60 meters.

Autobrake data valid for both auto and manual speedbrakes.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 20

Dry Runway

BRAKING CONFIGURATION	LANDING DISTANCE AND ADJUSTMENTS (M)											
	REF DIST*	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		APPROACH SPEED ADJ	REVERSE THRUST ADJ	
	225000 KG LANDING WT	PER 5000 KG ABOVE/ BELOW 225000 KG	PER 1000 FT ABOVE S.L.	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABOVE ISA	BELOW ISA	PER 10 KTS ABOVE VREF20	ONE REV	NO REV
MAX MANUAL	1050	+30/-15	25	-40	135	15	-10	25	-25	75	30	60
MAX AUTO	1465	+20/-25	35	-60	200	0	0	40	-40	140	0	0
AUTOBRAKE 4	1925	+30/-35	55	-85	285	5	-5	55	-55	195	5	5
AUTOBRAKE 3	2265	+40/-45	70	-105	355	15	-30	65	-65	195	30	35
AUTOBRAKE 2	2445	+50/-50	80	-120	400	45	-60	70	-70	175	165	175
AUTOBRAKE 1	2635	+55/-60	95	-135	465	90	-95	80	-80	170	380	515

Good Reported Braking Action

MAX MANUAL	1490	+25/-25	40	-65	235	35	-30	35	-40	105	115	275
MAX AUTO	1540	+25/-25	40	-70	240	20	-15	40	-40	140	110	280
AUTOBRAKE 4	1930	+30/-35	55	-85	295	10	-5	55	-55	195	15	50
AUTOBRAKE 3	2265	+40/-45	70	-105	355	15	-30	65	-65	195	30	35

Medium Reported Braking Action

MAX MANUAL	1995	+40/-40	65	-105	380	85	-70	55	-55	135	300	800
MAX AUTO	1995	+40/-40	65	-100	375	80	-60	55	-55	145	300	795
AUTOBRAKE 4	2080	+40/-40	65	-105	385	55	-35	60	-60	195	230	750
AUTOBRAKE 3	2335	+45/-45	70	-115	420	45	-50	65	-65	195	140	530

Poor Reported Braking Action

MAX MANUAL	2515	+55/-55	90	-150	570	180	-125	70	-70	155	615	1910
MAX AUTO	2515	+55/-50	90	-145	565	180	-120	70	-70	155	620	1925
AUTOBRAKE 4	2515	+55/-50	90	-145	565	180	-110	70	-70	180	620	1915
AUTOBRAKE 3	2595	+55/-55	90	-150	580	145	-105	75	-75	195	520	1835

*Reference distance is for sea level, standard day, no wind or slope, VREF20 approach speed and 2 engine reverse thrust.

Max Manual braking data valid for auto speedbrakes. For manual speedbrakes, increase reference landing distance by 70 meters.

Autobrake data valid for both auto and manual speedbrakes.

Actual (unfactored) distances are shown.

Includes distance from 50 ft above threshold (305 meters of air distance).

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FLIGHT PLANNING

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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 rate for normal operation is 240 kg per hour on the ground.

Taxi fuel allowance is approximately 33 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)				
	300	260	220	180	140
43				160	140
39			180	160	145
35		200	190	170	140
31	230	220	195	165	140
25	230	220	195	175	155
20	235	230	205	185	165
15	235	235	215	200	185
10	240	240	230	220	200
5	270	270	255	240	220

Climb

Trip Fuel and Time charts are based on 310/.84 climb speed. Local ATC may require that 250 KIAS not be exceeded below 10000 ft. Approximately 100 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	.84M	CI 180
2000 FT ABOVE	3	3	3
OPTIMUM ALTITUDE	0	0	0
2000 FT BELOW	2	2	2
4000 FT BELOW	5	6	6
6000 FT BELOW	7	10	10
8000 FT BELOW	9	14	13
10000 FT BELOW	11	19	17
12000 FT BELOW	14	24	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 LRC may be approximated by a constant .84M or Cost Index 180.

Increase total fuel flow during cruise approximately 25 kg/hr for engine anti-ice on or 125 kg/hr for engine and wing anti-ice on.

Every 500 kg reduction in landing weight decreases trip fuel at optimum altitude by approximately 0.16%.

Descent

Optimum descent speeds for minimum trip fuel are a function of weight. Trip Fuel and Time charts are based on .84/310/250 descent speed, and include straight in approach allowances only. Each additional minute of flaps down maneuvering consumes approximately 140 kg of additional fuel with the gear retracted and 165 kg with the gear extended.

Missed Approach

Approximately 430 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.

Optimum Altitude/Short Trip Cruise Altitude

Optimum altitude for best fuel mileage is presented for LRC/.84M speed schedule. Fuel mileage penalties for flying off-optimum altitude are tabulated under Altitude Selection.

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.

Trip Fuel and Time

Trip Fuel and Time charts are provided for Long Range Cruise and .84M at constant altitude to determine trip fuel and time from brake release to touchdown. A similar chart for a cost index of 180 (which approximates Long Range Cruise) is also shown. APU usage, taxi, inflight flaps down maneuvering (other than straight in approach) and reserve fuel should be added to the 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 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 correction guidelines. Adjusted ground distance is ground distance multiplied by the ratio $\text{Average TAS}/(\text{Average TAS} + \text{Wind Component})$, where headwind is negative and tailwind is positive.

Step Climb 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 continually increases as the airplane weight decreases, a step climb procedure bracketing optimum altitude is necessary.

The Step Climb Planning charts provide trip fuel and time for Long Range Cruise, .84M or Cost Index 180 from brake release to touchdown, similar to the constant altitude Trip Fuel and Time charts. The charts are based on 4000 ft step climbs to 2000 ft above optimum altitude.

Short Trip Fuel and Time

Short Trip Fuel and Time charts include fuel and time for climb to cruise altitude, cruise, descent and straight in approach. The charts are 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, adjusted 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

These tables provide total fuel flow information necessary for planning holding and reserve fuel requirements. The tables are 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 table values by 5%.

Fuel Tankering

The Fuel Tankering table below is provided for LRC/.84M cruise schedule based on a step climb procedure to bracket optimum altitude. When a fuel price differential exists between two stations, this table may be used to determine if fuel may be economically transported for a subsequent flight sector.

Enter the table with the trip distance to read the break-even fuel price ratio. As noted, the break-even fuel price is the fuel price at departure multiplied by the break-even fuel price ratio. To justify tanker operation, economically, the fuel price at destination must be greater than the break-even fuel price.

TRIP DISTANCE (NM)	BREAK-EVEN PRICE RATIO
200	1.011
400	1.023
600	1.034
800	1.046
1000	1.057
2000	1.116
3000	1.178
4000	1.244
5000	1.314
6000	1.386

Oxygen Requirements

Passenger Oxygen System - Chemical

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. 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.

Flight Crew System

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. The oxygen quantity associated with these requirements is achieved with the minimum dispatch oxygen cylinder pressure. Enter the Flight Crew System oxygen table with the number of crew plus observers using oxygen and read the minimum cylinder pressure required for the appropriate bottle temperature.

An additional quantity of oxygen is required when flight altitudes above 41000 ft are planned. Regulations require that one active duty pilot must don the oxygen mask and breathe diluted oxygen for the duration of the flight above 41000 ft. The additional quantity of oxygen required is 2.05 liters/person/minute (0.6 psi/person/minute for the dual cylinder system), or 13 liters/person/minute (4 psi/person/minute) if 100% oxygen is selected during normal usage.

Driftdown

Net Level Off Weight

This chart is used to determine the maximum weight for terrain clearance based on the Approved Flight Manual net engine inoperative performance at 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. 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 anti-ice operation with the weight adjustment shown on 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 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 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.

To determine fuel required, enter with the desired ground distance, correct 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

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 diversion airport comply with rules set up specifically for extended range operation with two engine airplanes. 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 driftdown/cruise speed schedules. The information is based on drifting down using Max Continuous thrust at the Mach number shown until reaching the corresponding airspeed and maintaining that airspeed throughout the remainder of the driftdown and level cruise. Based on route requirements, operators may select any one of these

speeds for their operation, or may elect to use an entirely different speed which is not contained in this section.

Flight Planning

The following information is shown for flight planning purposes and is intended for use mainly by ground personnel.

Data is included for five basic schedules (Long Range Cruise, .82/260, .84/280, .84/300 and .84/320) throughout this section to allow the operator to evaluate the effect of using speeds up to 320 KIAS.

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 range operation. The distance to the diversion airport from any point along the intended route must be covered within the approved time using the single engine cruise speed (assuming still air and ISA conditions) selected by the operator.

Enter the chart with the appropriate weight using the speed schedule and time selected and read the 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 flight profiles as described on the charts. This information is shown for All-Engines operation at Long Range Cruise, as well as Engine-Inop operation at Long Range Cruise, 260, 280, 300 and 320 KIAS. There are two separate Engine-Inop scenarios; one assumes a loss of pressurization and subsequent cruise at 10000 ft, the other assumes only an engine failure with the airplane drifting down to an applicable level-off altitude for the remainder of the diversion. The ETOPS Critical Fuel required is the greater of All-Engine fuel or Engine-Inop fuel for the speed schedule selected. This fuel is compared to the amount of fuel normally onboard the airplane at that point in the route. If the fuel required by critical fuel reserves exceeds the amount of fuel normally expected, fuel load must be adjusted accordingly.

To determine the fuel required, enter the appropriate chart with desired diversion distance, adjust for forecast wind (factored if applicable), proceed vertically to the weight at critical point and read the fuel required to the right. If the operator is 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 at the bottom of the chart. If the operator is not using an acceptable wind forecasting model, the calculated diversion fuel is to be increased by 5% instead of factoring the forecast wind values.

Adjustments for non-standard conditions are shown at the bottom of the page.

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.

Net Level Off Weight

These charts are used to determine the maximum weight for terrain clearance based on net engine inoperative performance for the speed schedules shown and is for planning purposes only. Regulations require terrain clearance flight planning based on net performance which is the gross (or actual) gradient performance degraded by 1.1%.

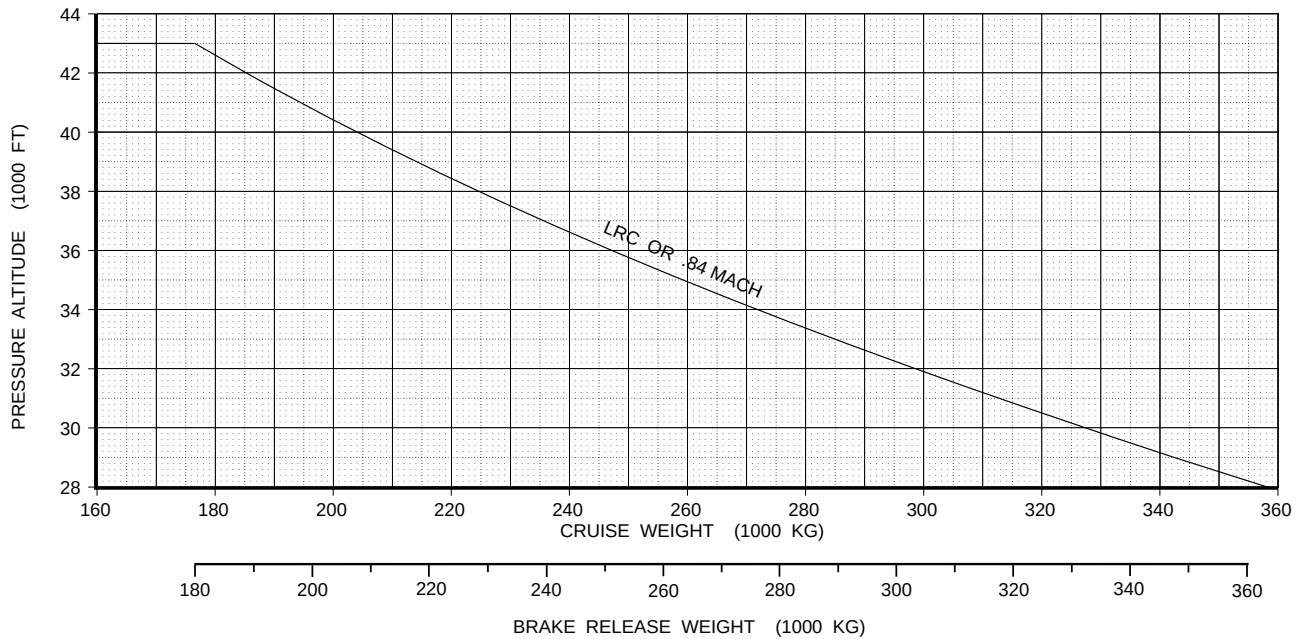
Net level off weight is determined by entering the appropriate chart at the left with the desired level off pressure altitude, correcting for anti-ice as shown, proceeding across to the correct ISA deviation line and reading the allowable weight at the bottom. The net level off altitude may be obtained by entering the chart with weight and proceeding up to the correct ISA deviation line and reading across to the altitude on the left.

Driftdown/Cruise Range Capability

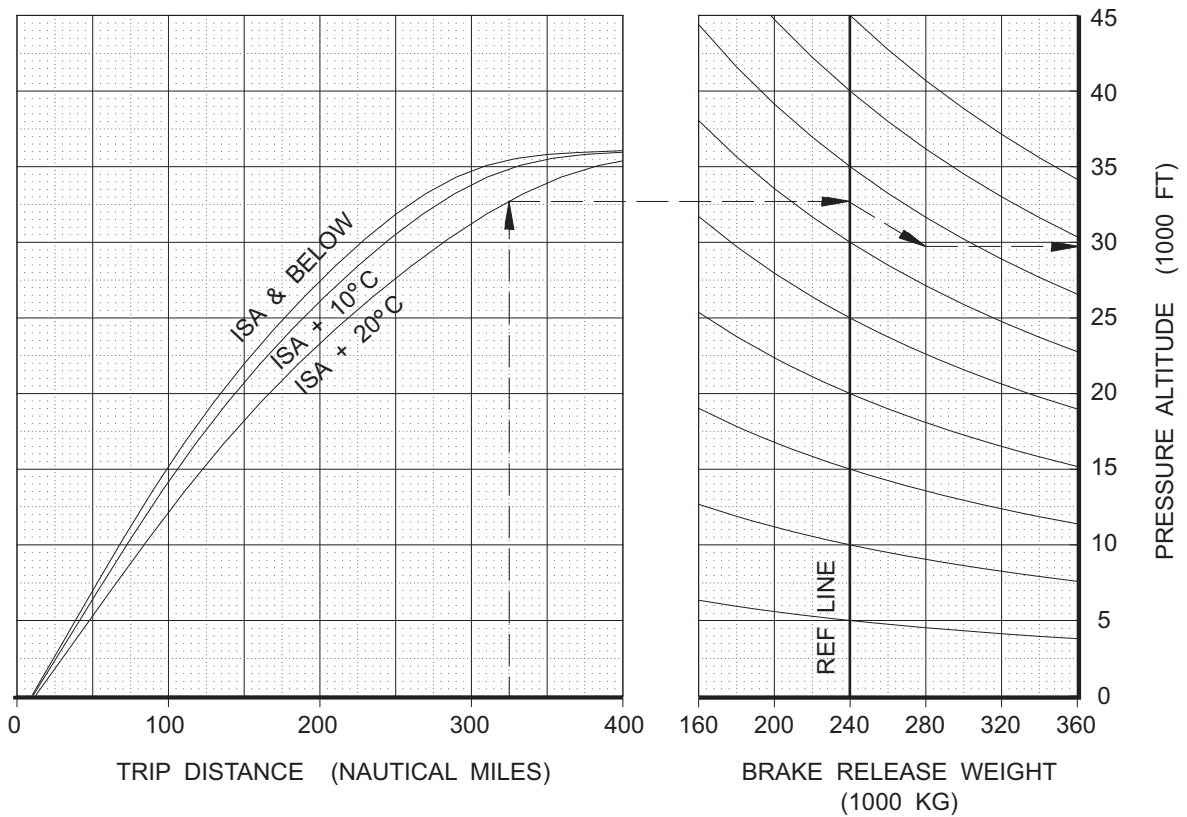
These charts show range capability from the start of driftdown/cruise when the driftdown/cruise procedure outlined in this section is followed. Charts are shown for each of the speed schedules discussed previously.

To determine the fuel required, enter 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.

Optimum Altitude



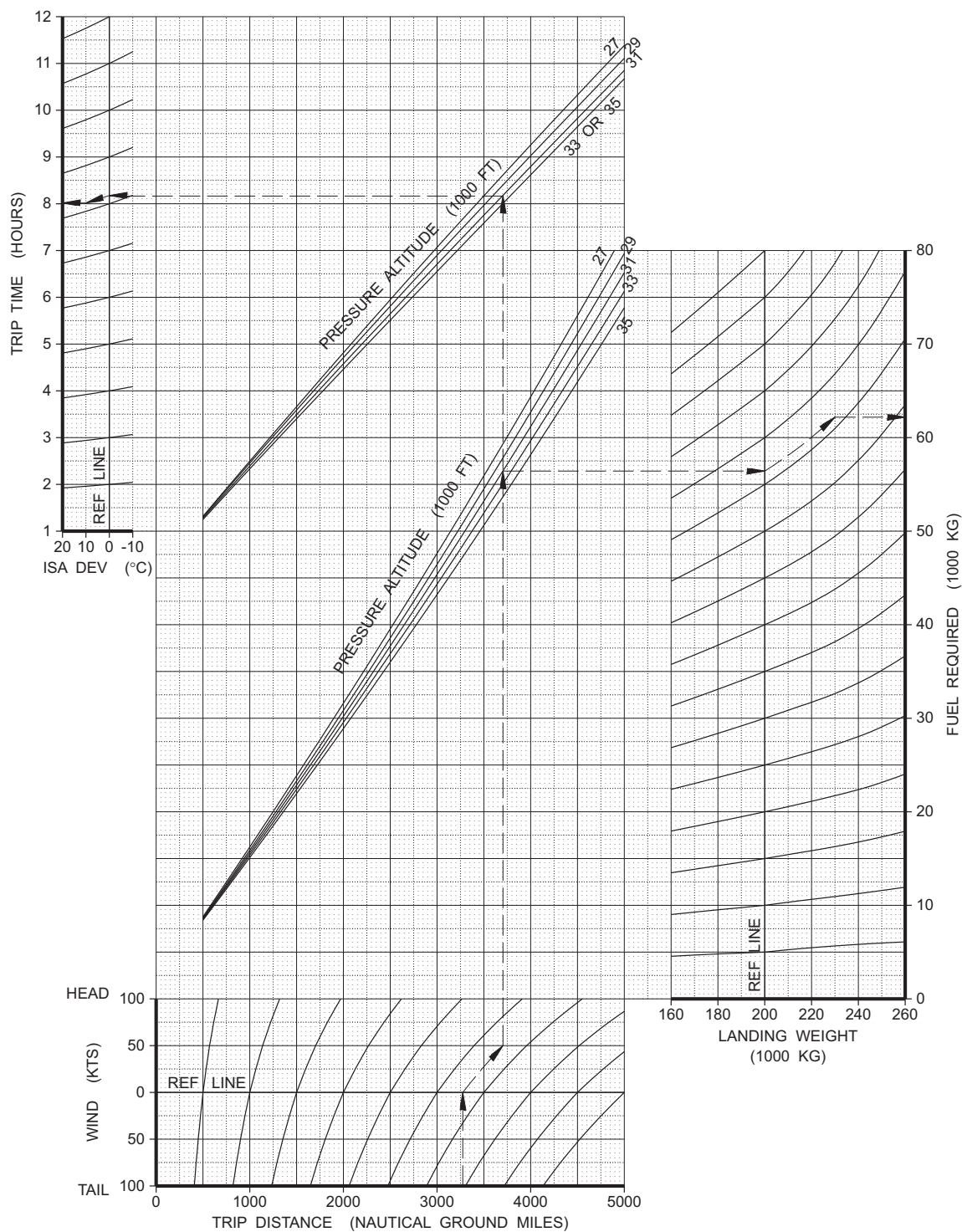
Short Trip Cruise Altitude



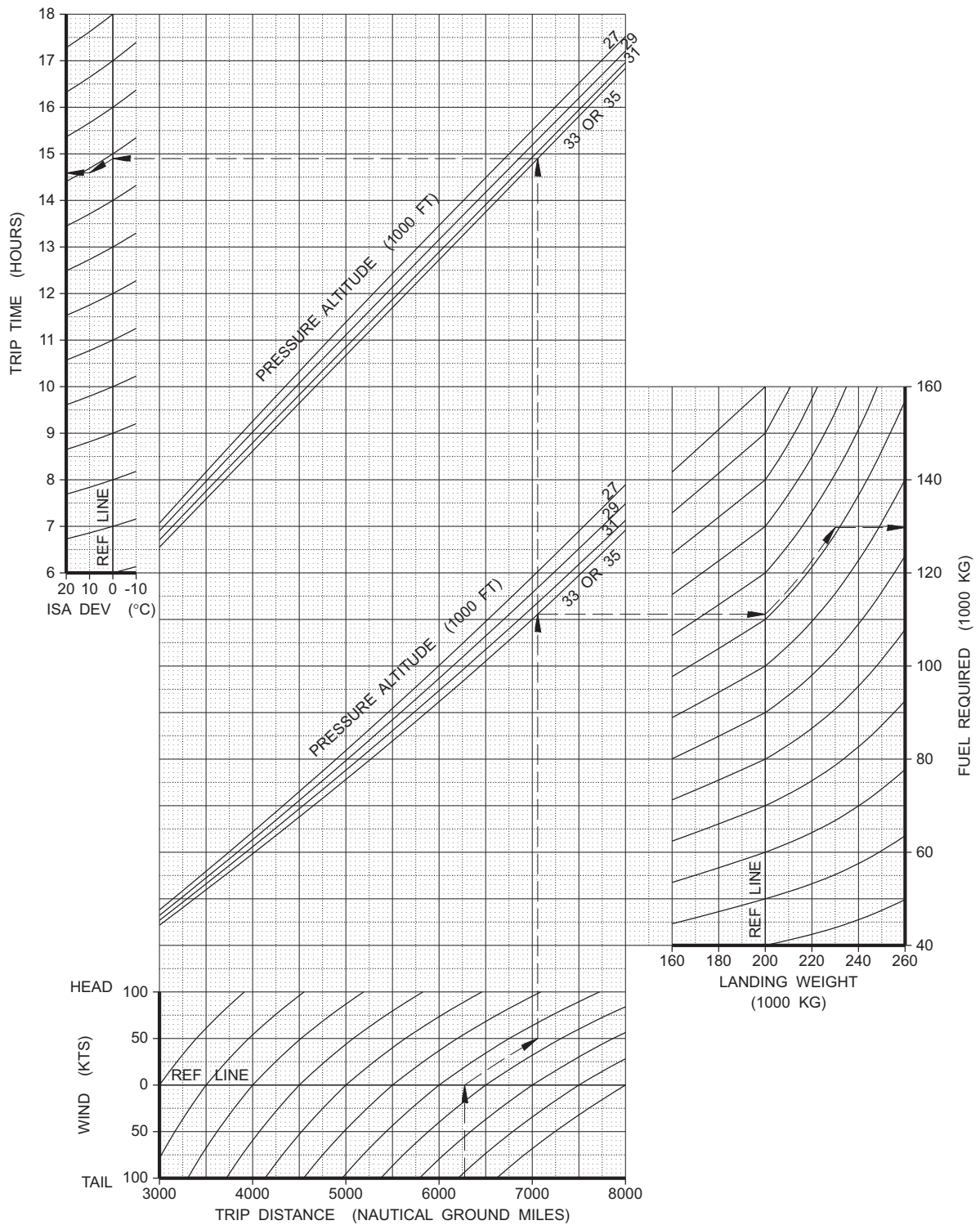
Long Range Cruise Trip Fuel and Time

0 to 5000 NM Trip Distance

Based on .310/.84 climb and .84/310/250 descent



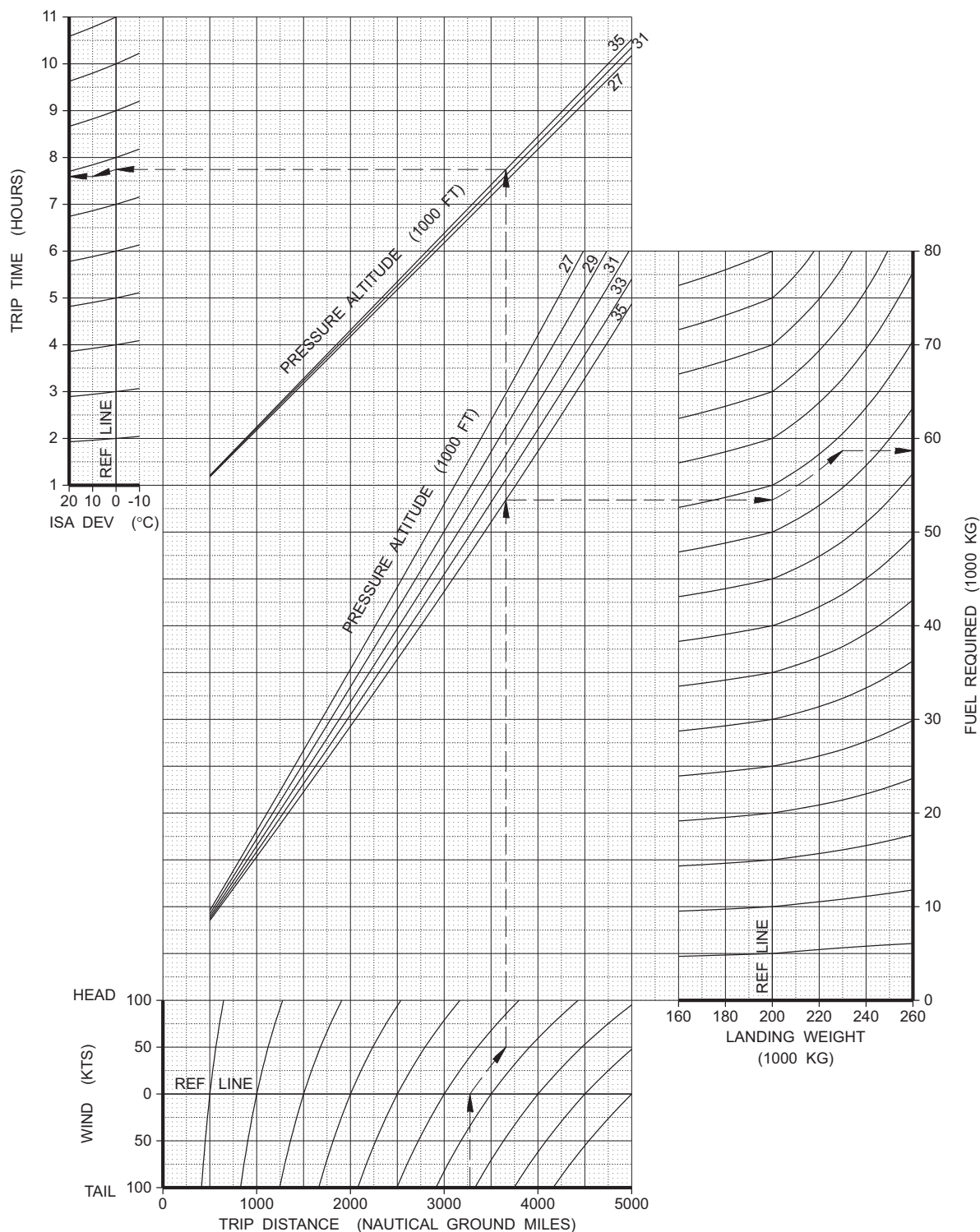
Long Range Cruise Trip Fuel and Time 3000 to 8000 NM Trip Distance Based on .310/.84 climb and .84/.310/250 descent



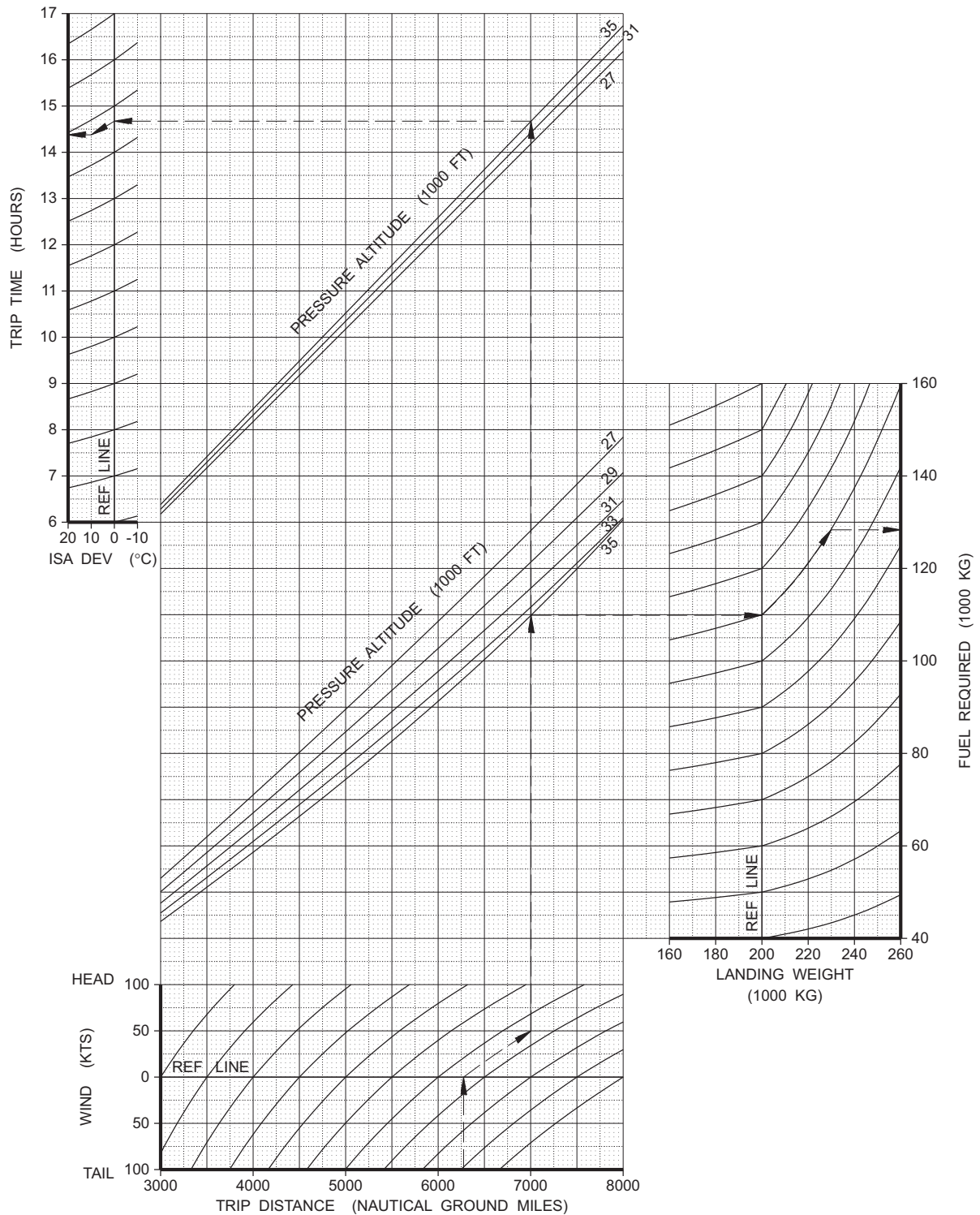
.84M Trip Fuel and Time

0 to 5000 NM Trip Distance

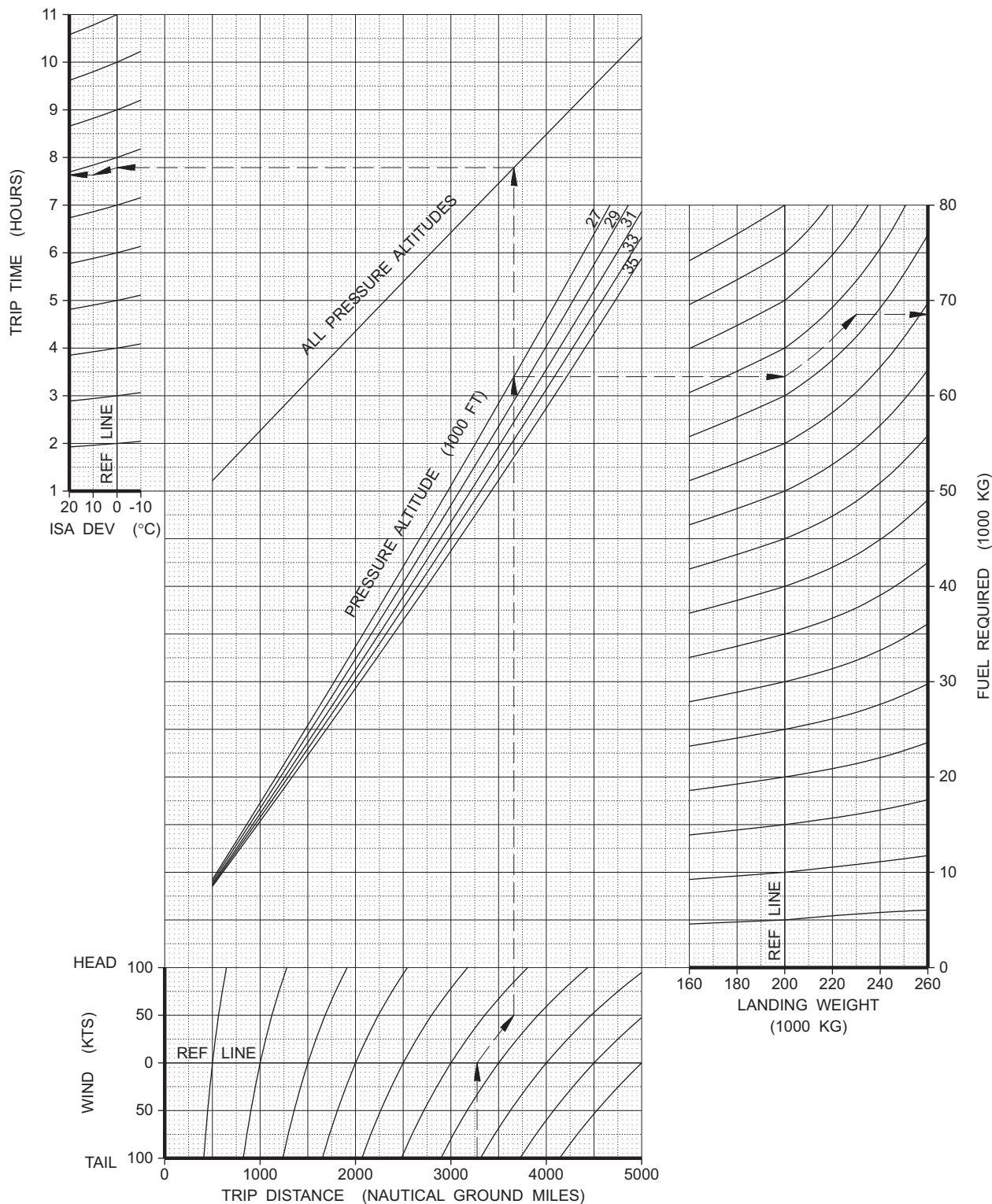
Based on 310/.84 climb and .84/310/250 descent



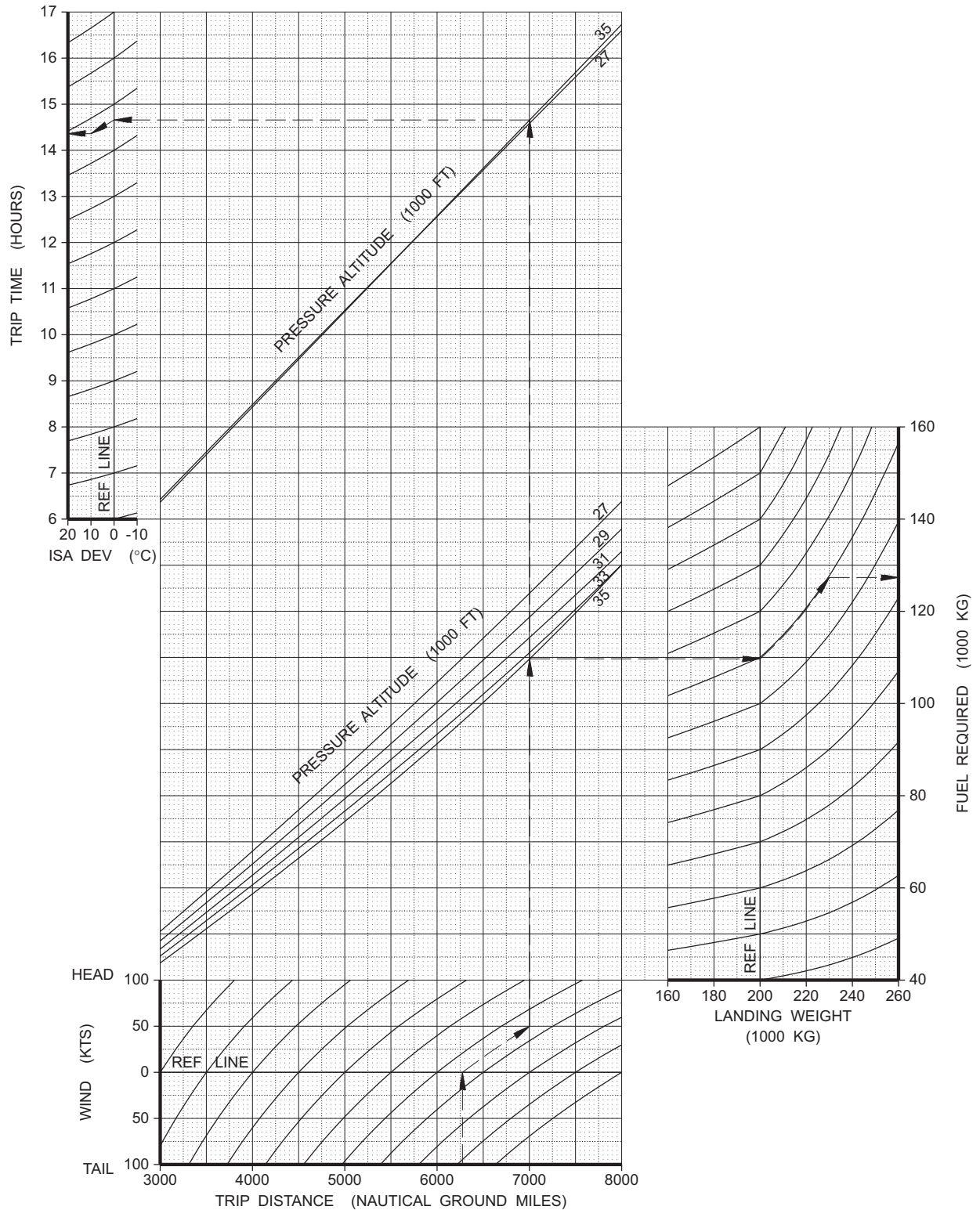
.84M Trip Fuel and Time
3000 to 8000 NM Trip Distance
Based on 310/.84 climb and .84/310/250 descent



Cost Index 180 Trip Fuel and Time 0 to 5000 NM Trip Distance

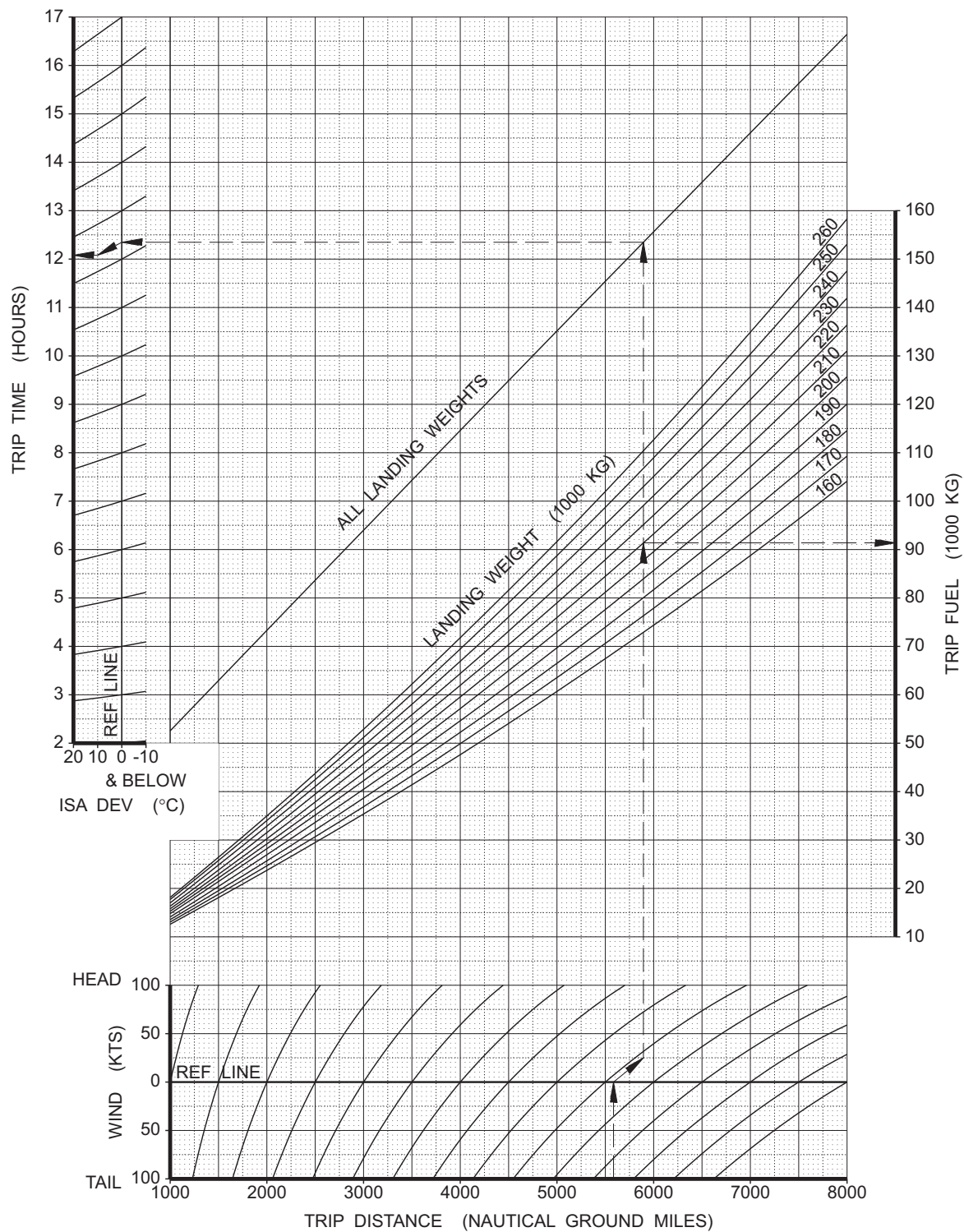


Cost Index 180 Trip Fuel and Time 3000 to 8000 NM Trip Distance



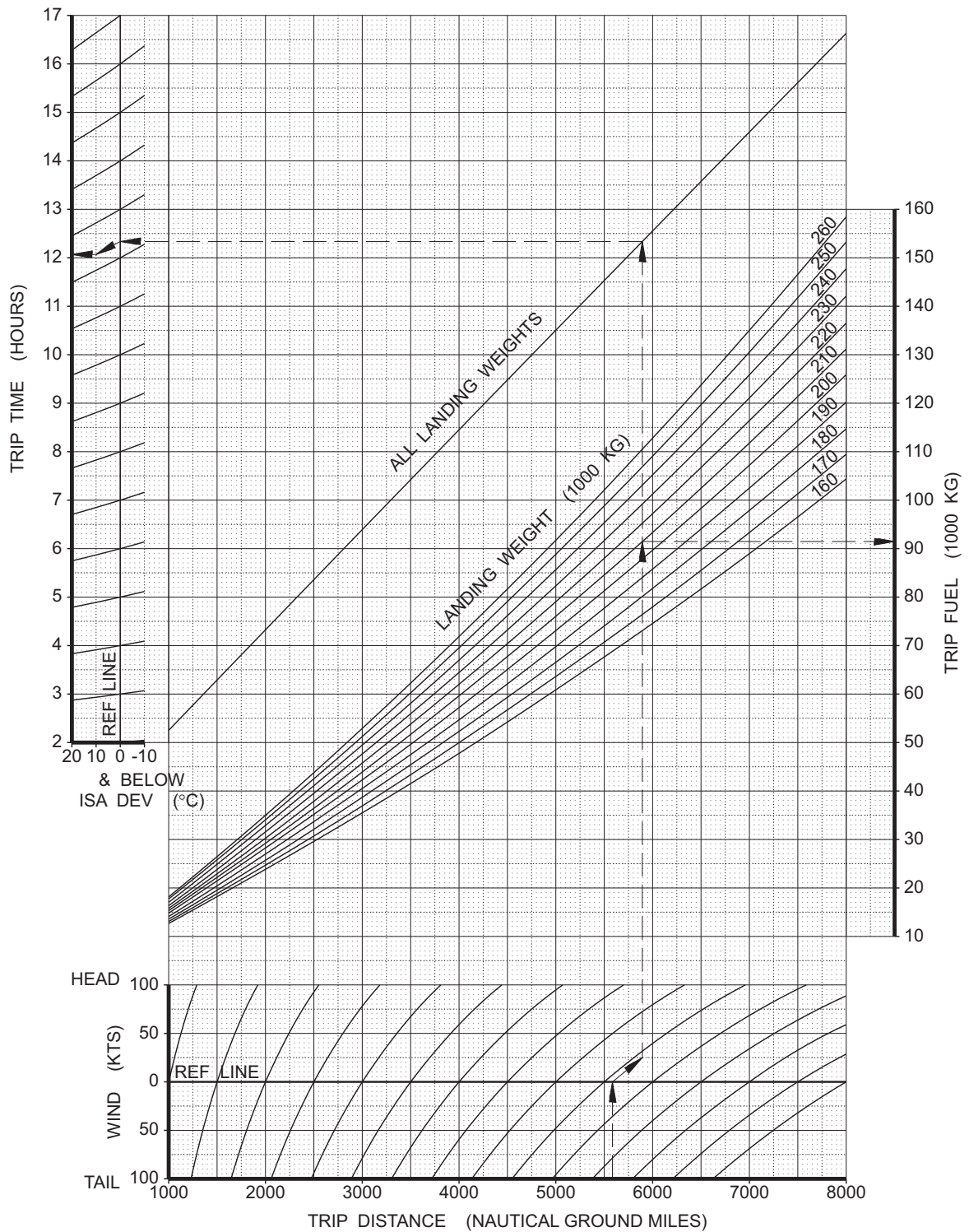
Long Range Cruise Step Climb Trip Fuel and Time

Based on 310/.84 climb and .84/310/250 descent

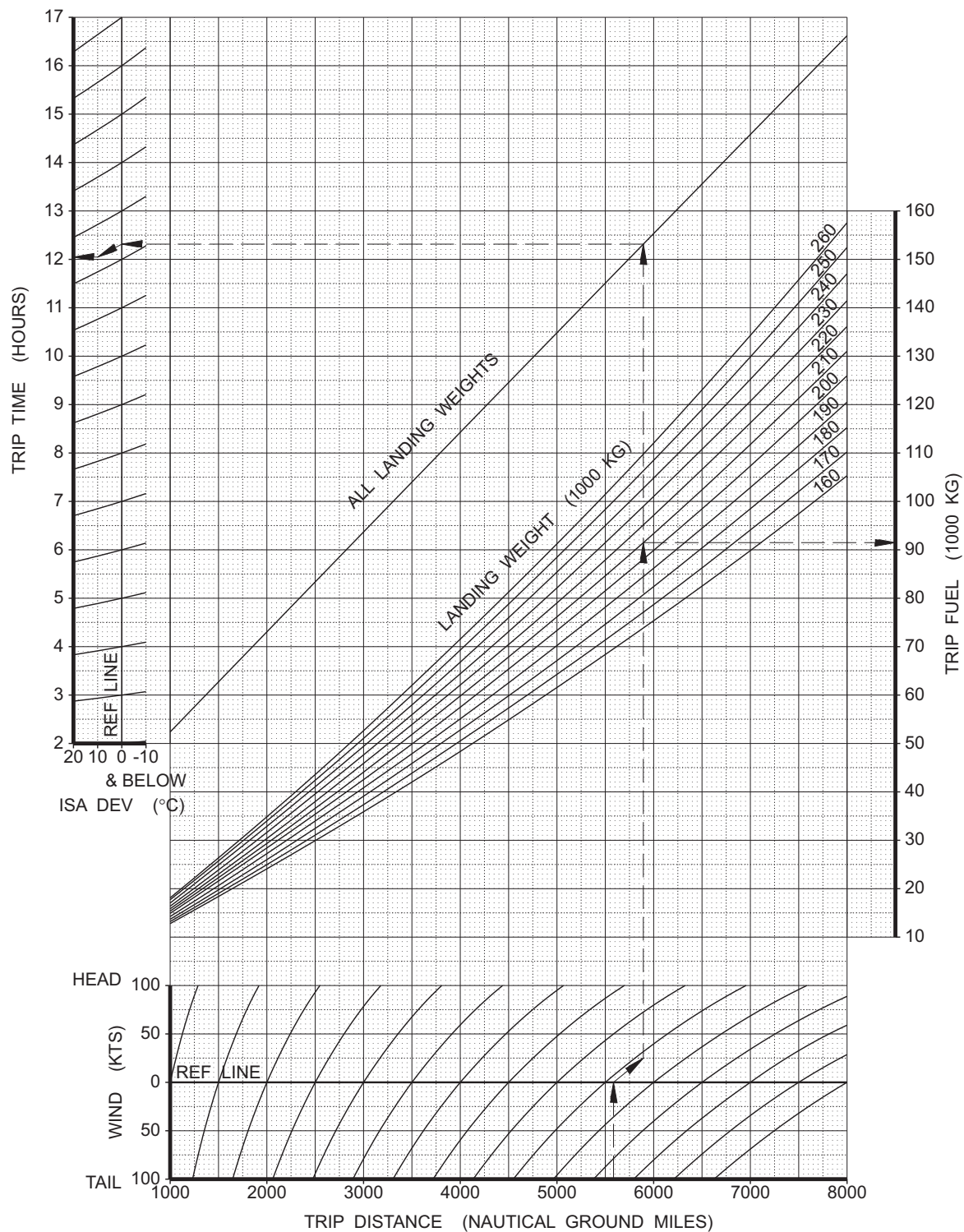


.84M Step Climb Trip Fuel and Time

Based on 310/.84 climb and .84/310/250 descent

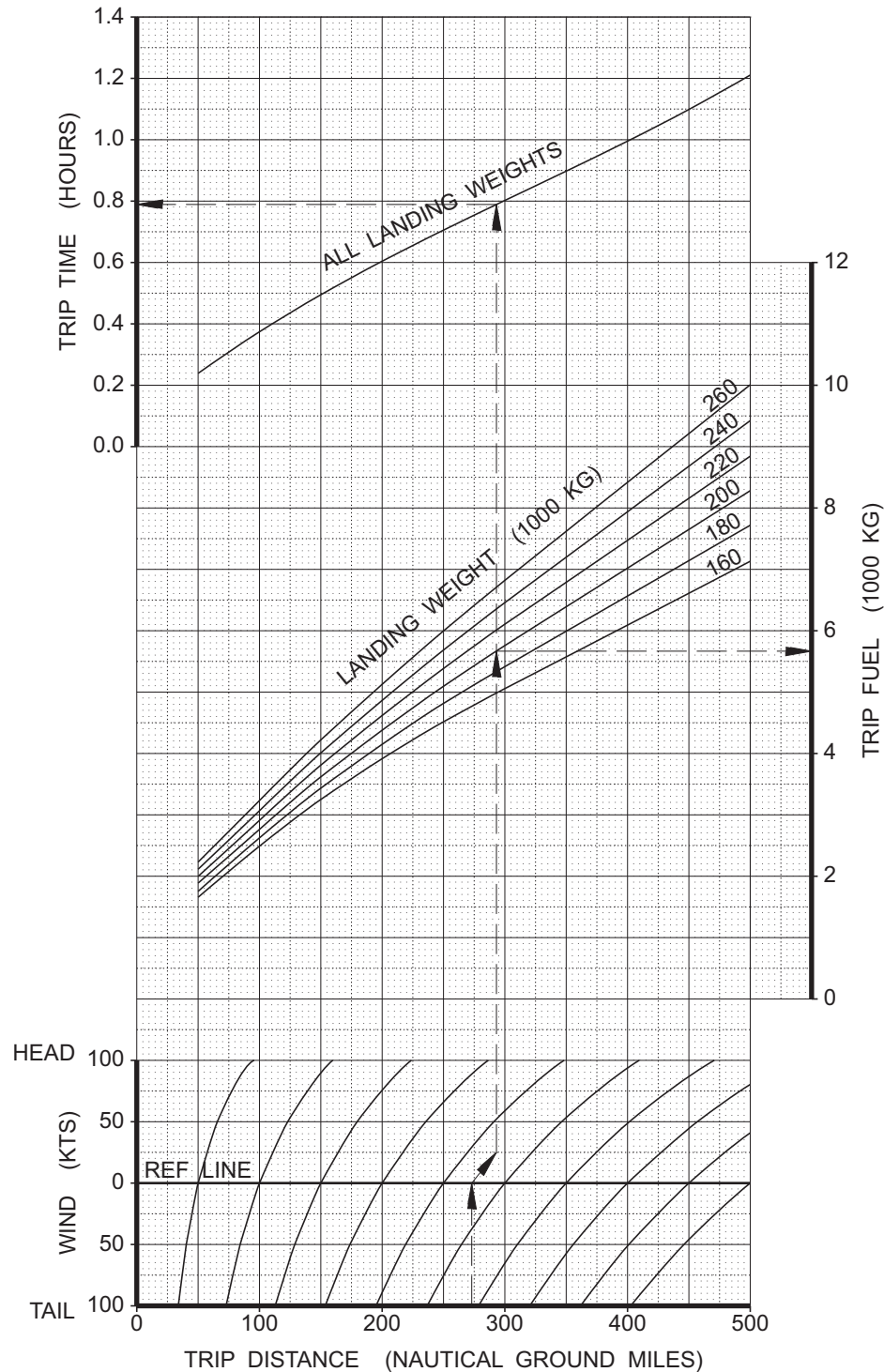


Cost Index 180 Step Climb Trip Fuel and Time

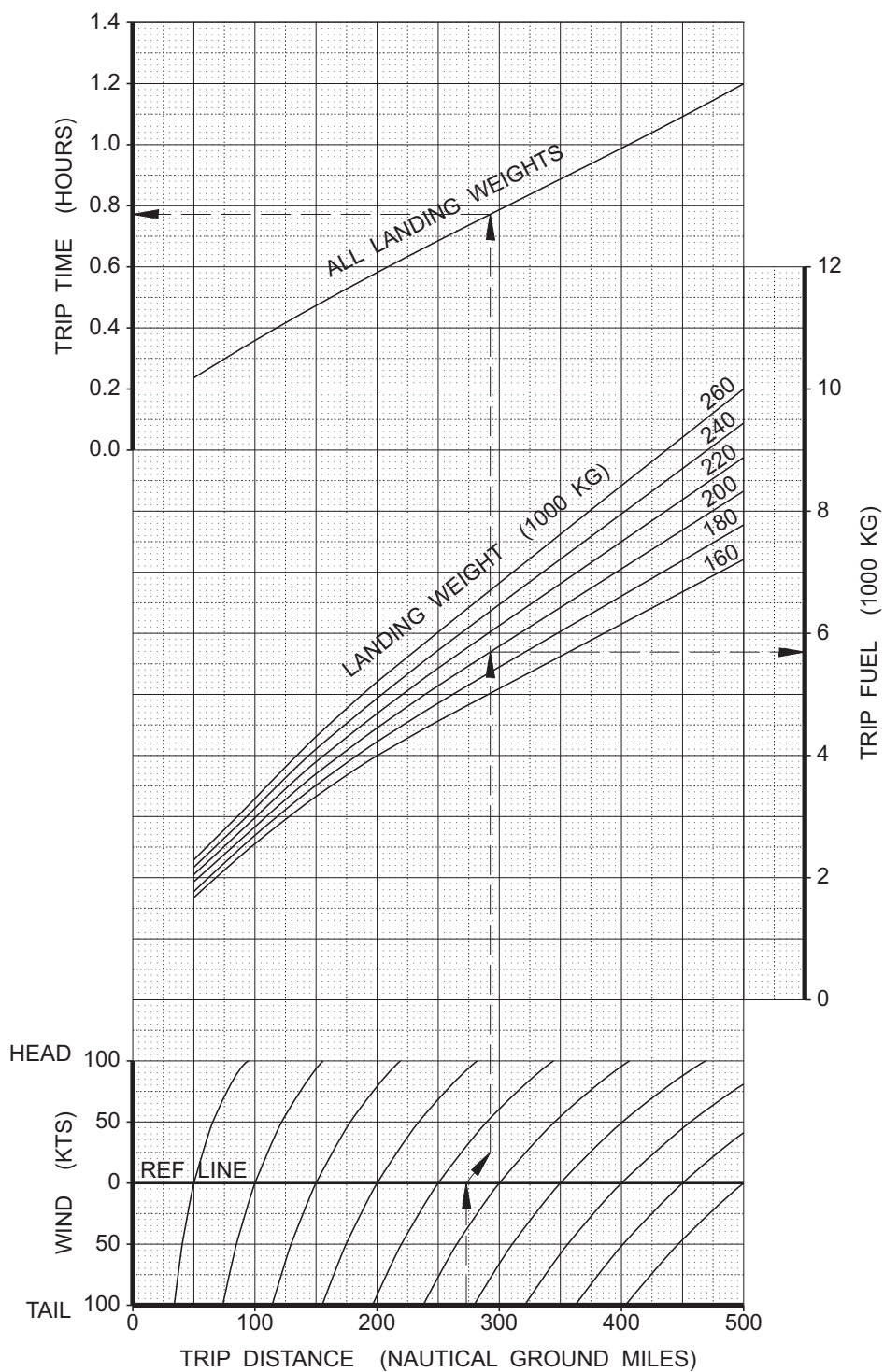


Long Range Cruise Short Trip Fuel and Time

Based on .310/.84 climb and .84/.310/250 descent at short trip cruise altitude



Cost Index 180 Short Trip Fuel and Time



Holding Planning

Flaps Up

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)										
	WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43000											4670
40000									5850	5180	4540
35000						7490	6810	6170	5540	4930	4360
30000	10770	9950	9200	8540	7890	7250	6610	6000	5390	4700	4320
25000	10280	9600	8910	8270	7660	7070	6390	5710	5150	4780	4340
20000	9920	9320	8720	8040	7340	6690	6140	5640	5170	4730	4410
15000	9600	8910	8260	7700	7180	6660	6140	5660	5230	4820	4520
10000	9290	8770	8250	7730	7220	6710	6210	5740	5310	4900	4630
5000	9380	8880	8360	7840	7330	6830	6360	5920	5500	5110	4840
1500	9490	8960	8440	7930	7430	6940	6490	6070	5670	5270	5010

Flaps 1

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)										
	WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
20000	10610	9890	9220	8570	7900	7270	6660	6060	5480	4940	4550
15000	10380	9670	9030	8420	7810	7220	6630	6060	5500	4990	4620
10000	10290	9630	9020	8420	7820	7230	6660	6110	5580	5090	4730
5000	10330	9690	9080	8490	7920	7340	6780	6250	5750	5280	4950
1500	10360	9740	9140	8560	7980	7430	6890	6390	5910	5460	5120

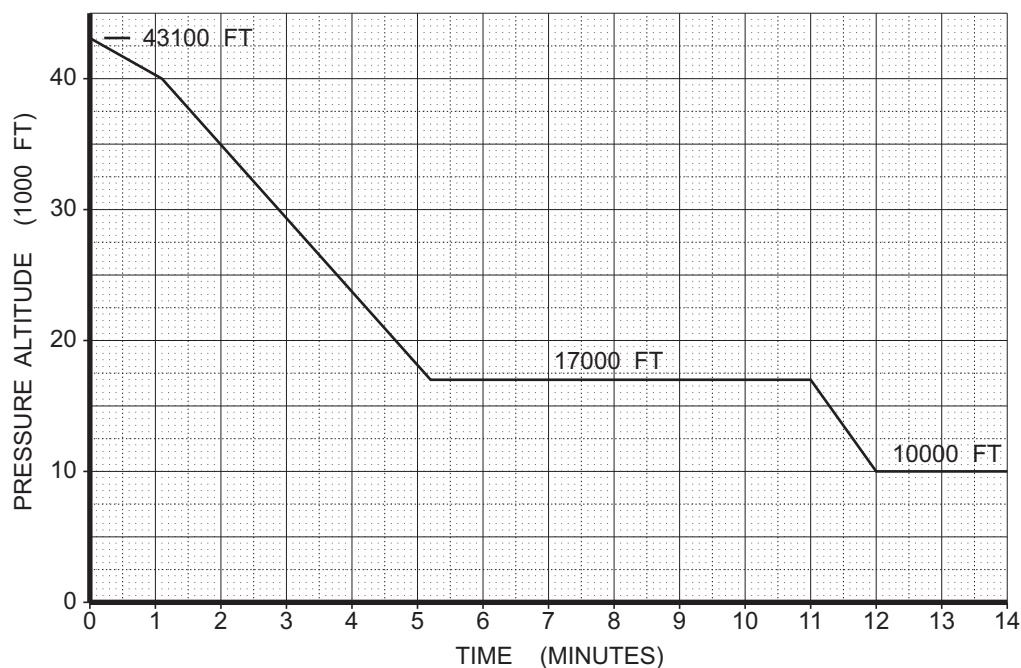
These tables include 5% additional fuel for holding in a racetrack pattern.

Oxygen Requirements

Passenger Oxygen System - Chemical

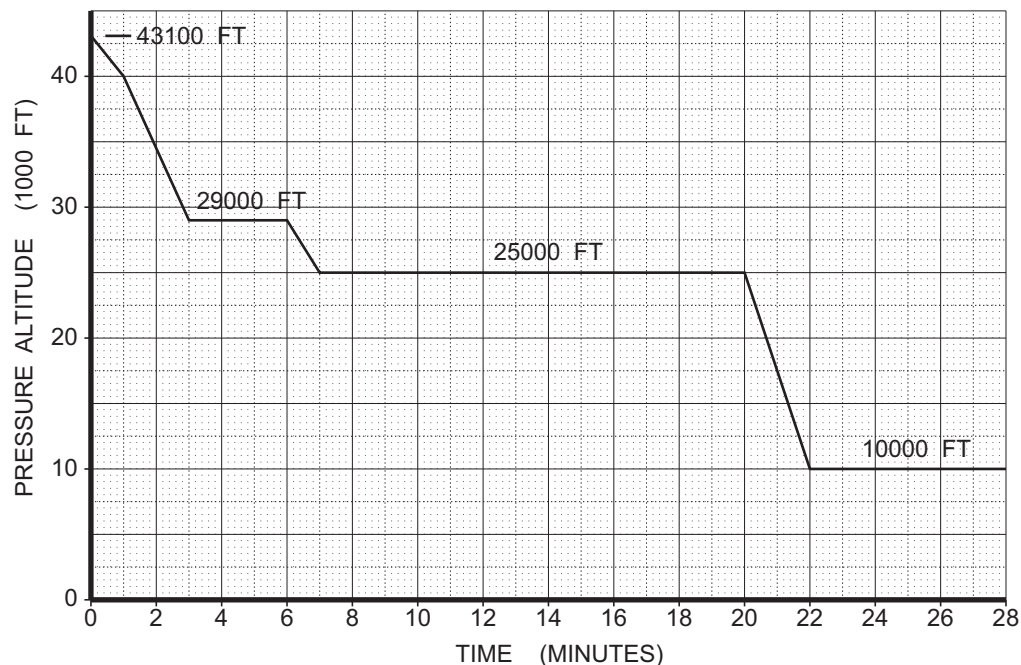
Maximum Altitude Envelope

Based on 12 Minute System



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

Based on 22 Minute System



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

Oxygen Requirements

Flight Crew System

Required Pressure (PSI) for Two 114/115 Cubic Ft. Cylinders

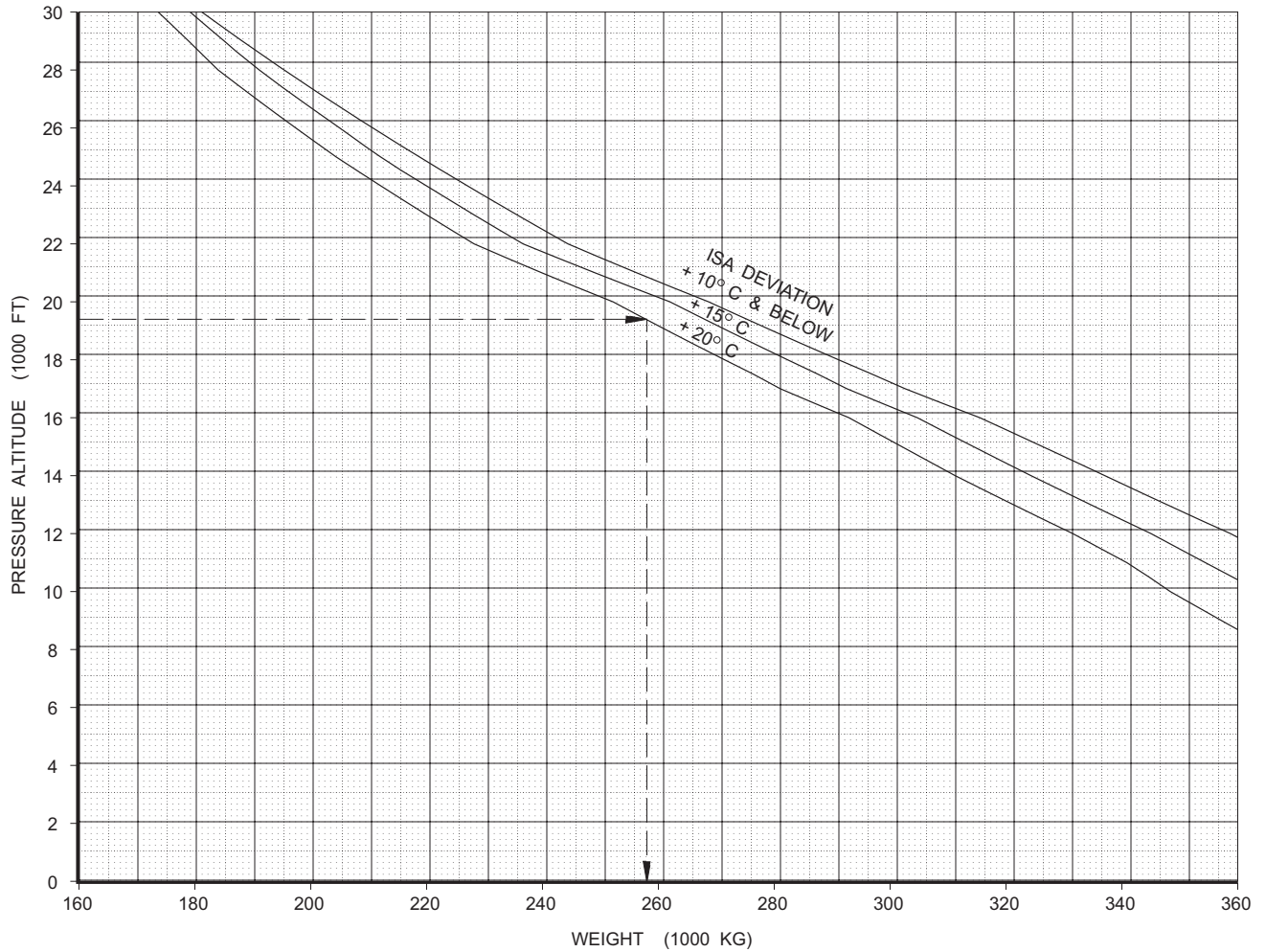
BOTTLE TEMPERATURE		NUMBER OF CREW USING OXYGEN		
°C	°F	2	3	4
50	122	325	435	545
45	113	320	430	540
40	104	315	420	530
35	95	310	415	520
30	86	305	410	510
25	77	300	400	505
20	68	295	395	495
15	59	290	390	485
10	50	285	380	480
5	41	280	375	470
0	32	275	370	460
-5	23	270	360	455
-10	14	265	355	445

For more extensive than normal crew usage, add 0.6 psi/person/minute.

Intentionally
Blank

ENGINE INOP MAX CONTINUOUS THRUST

Net Level Off Weight

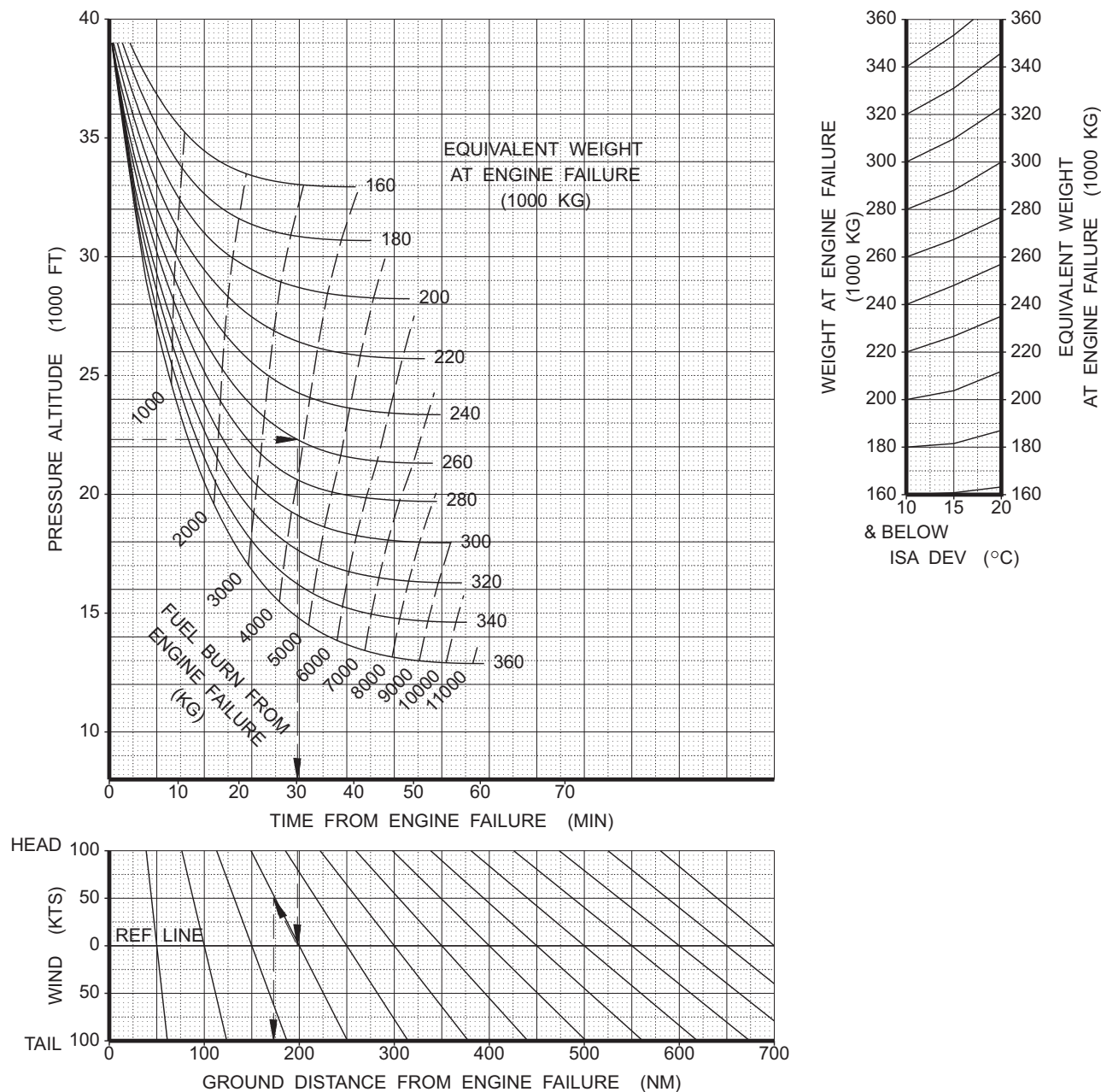


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	-0.7	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.6	-1.8	-1.5	-1.0	-1.2	-1.2	-1.2	-1.3	-1.2

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 39000 FT and Above

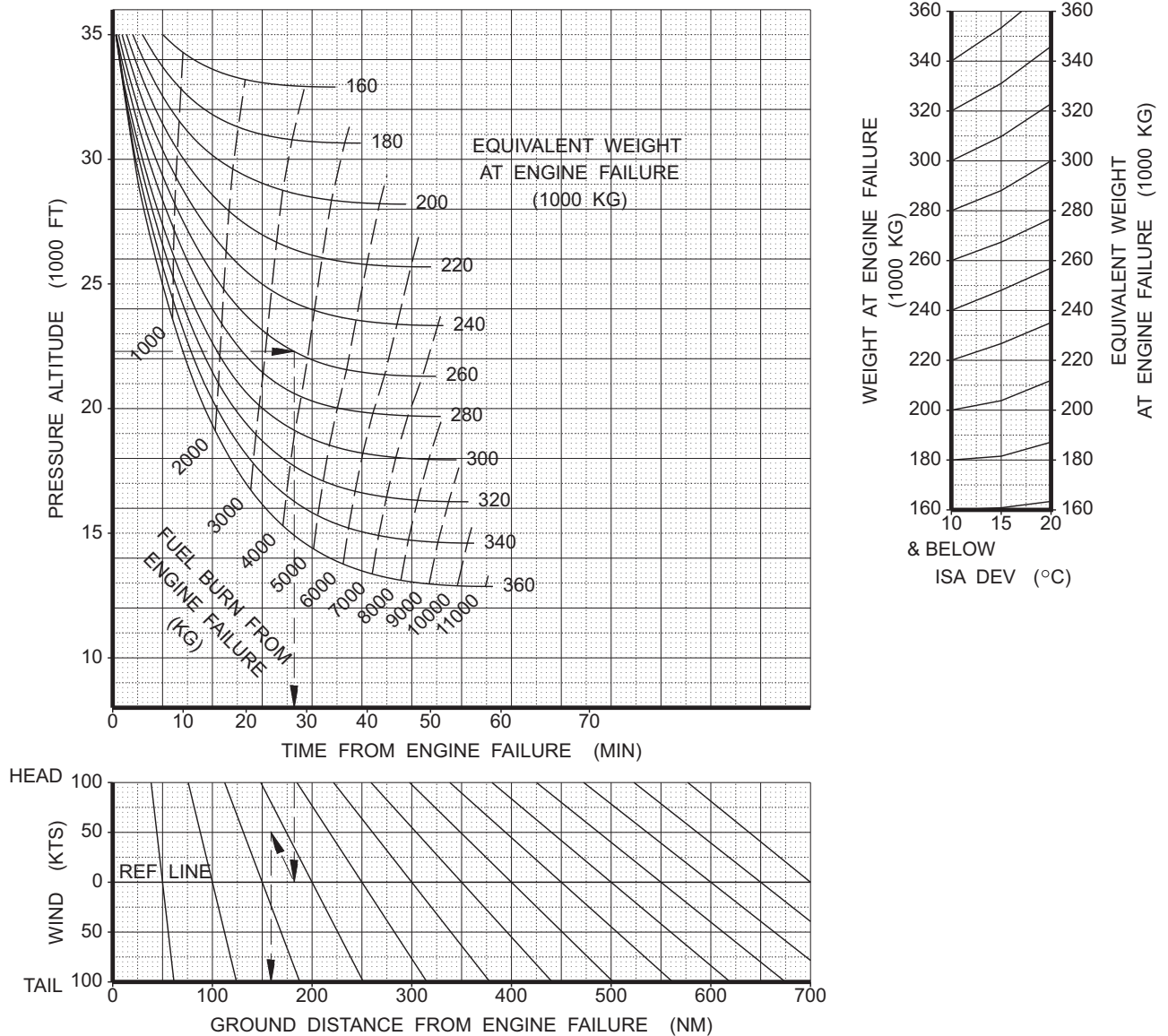


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.6	1.8	1.5	1.0	1.2	1.2	1.2	1.3	1.2

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 35000 FT to 37000 FT

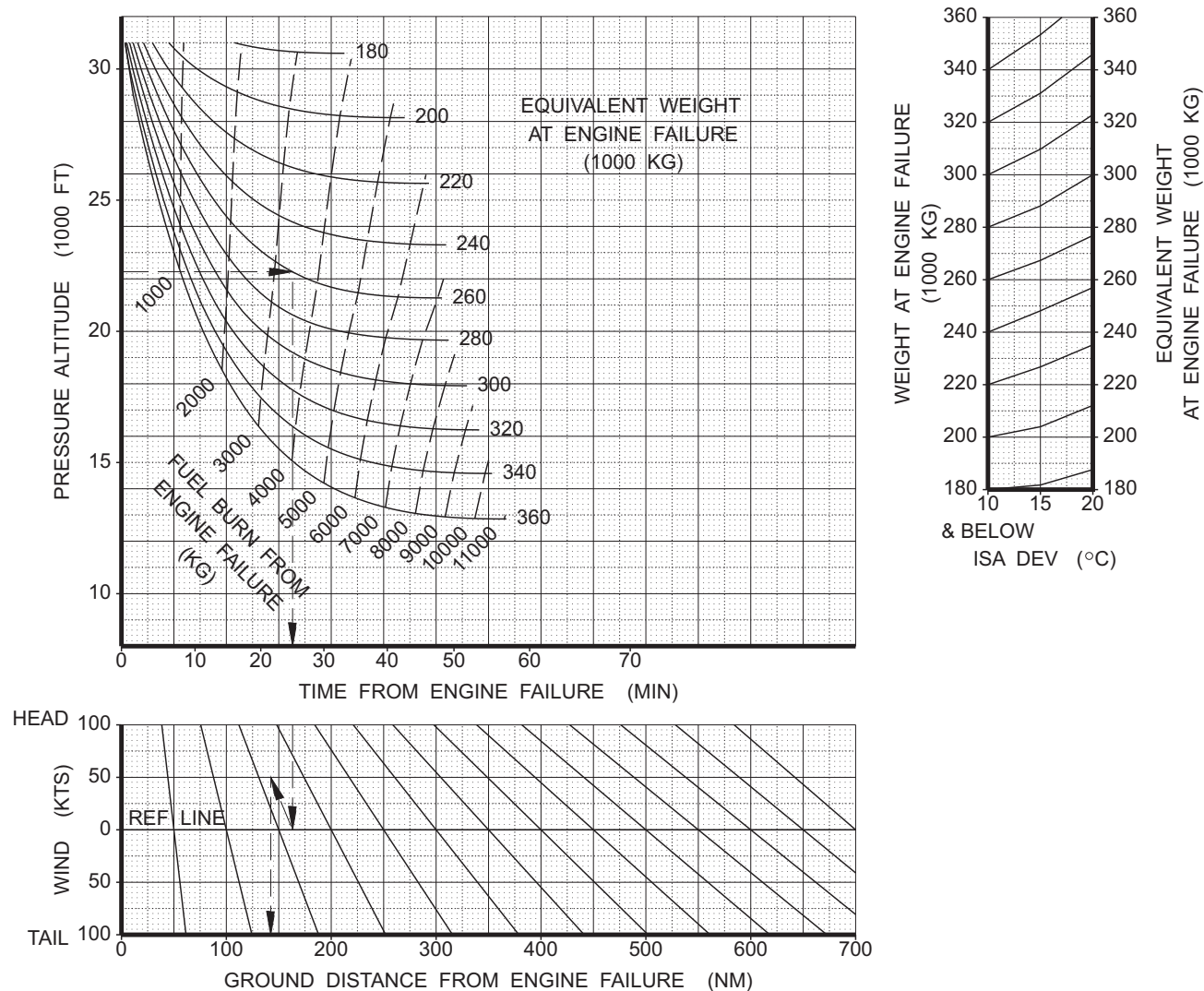


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.6	1.8	1.5	1.0	1.2	1.2	1.2	1.3	1.2

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 31000 FT to 33000 FT



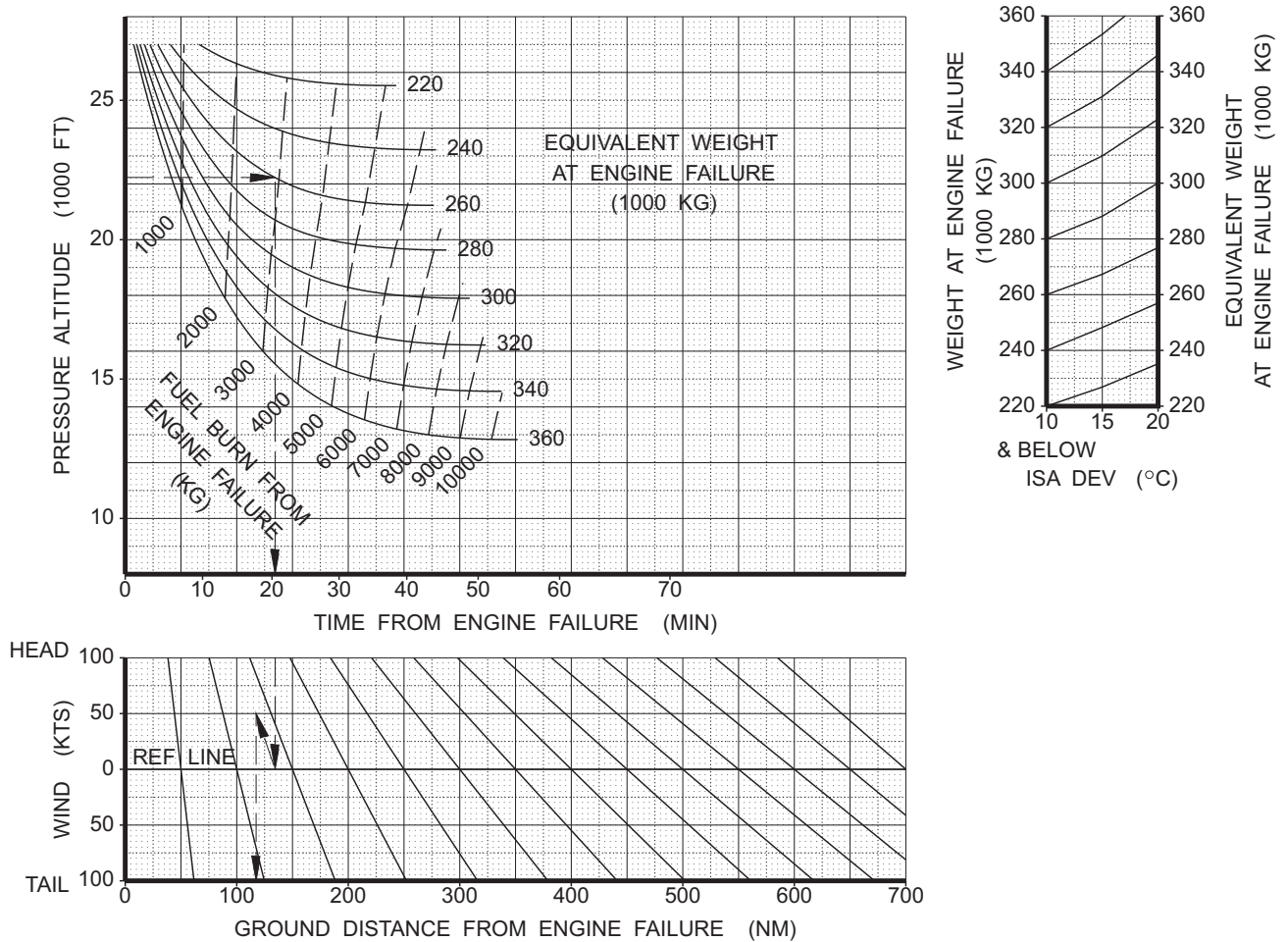
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.6	1.8	1.5	1.0	1.2	1.2	1.2	1.3	1.2

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 27000 FT to 29000 FT



Anti-Ice Adjustments

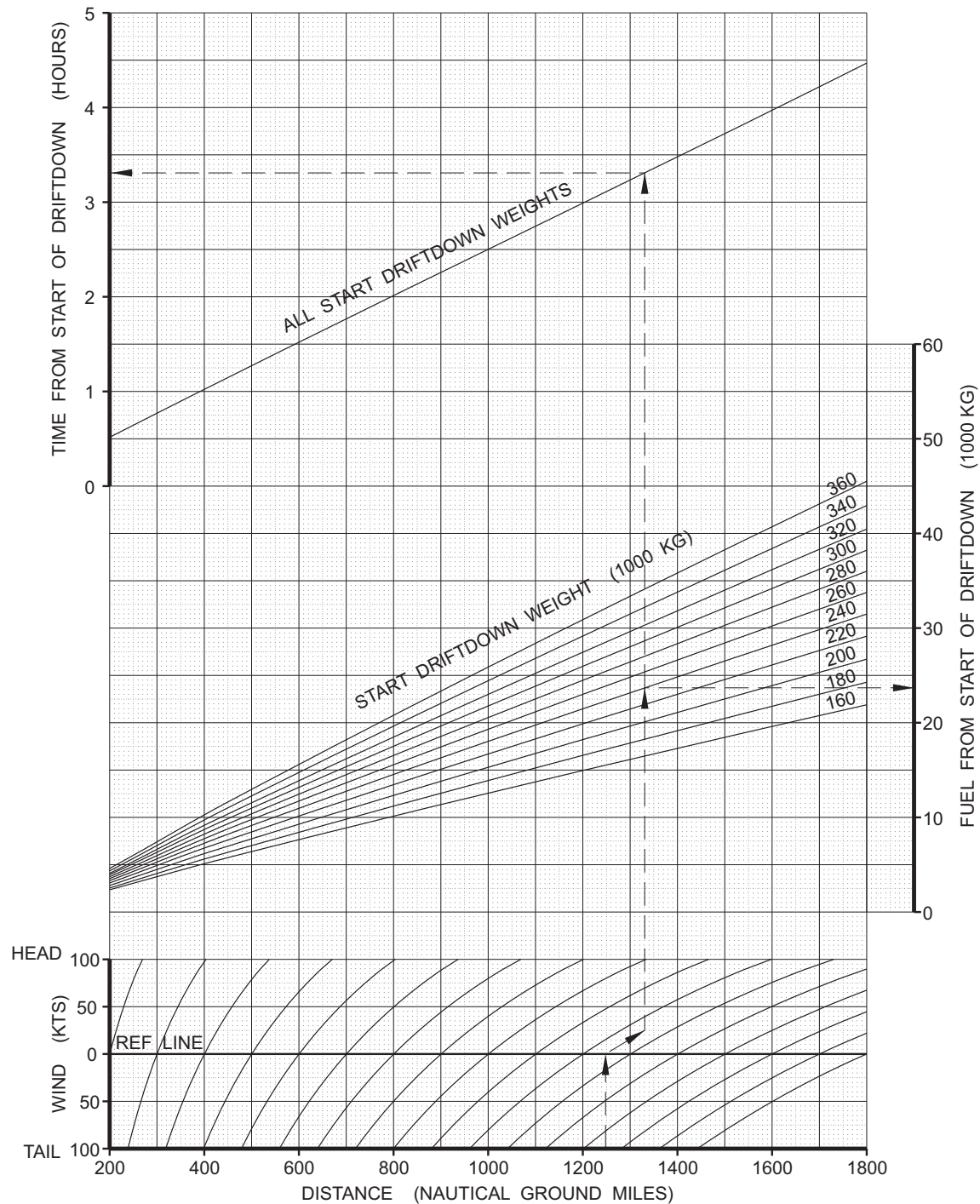
ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.6	1.8	1.5	1.0	1.2	1.2	1.2	1.3	1.2

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

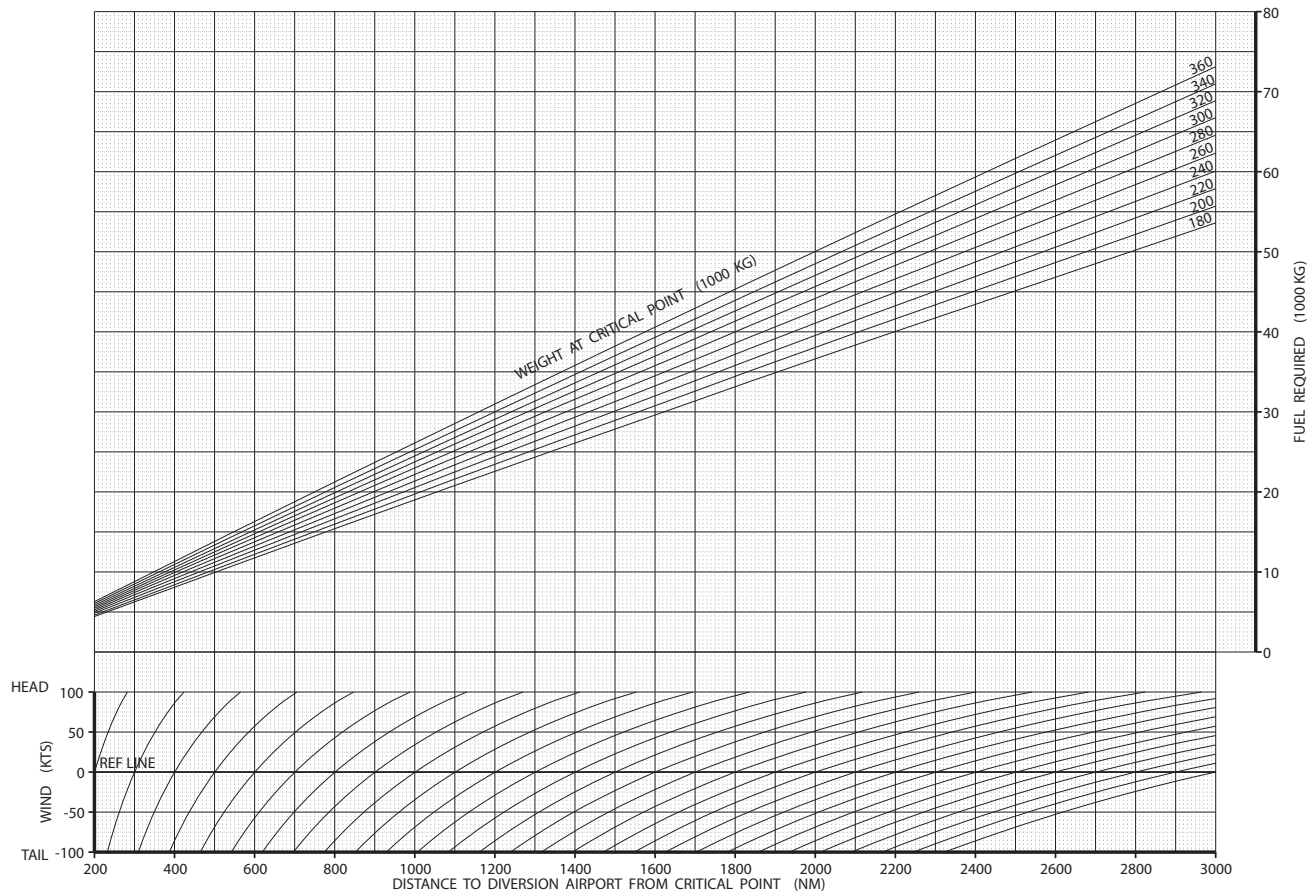
MAX CONTINUOUS THRUST

Area of Operation

SPEED (M/KIAS)	WEIGHT AT DIVERSION (1000 KG)	DIVERSION DISTANCE (NM)										
		TIME (MINUTES)										
		60	75	90	120	138	180	207	240	270	300	330
.82/260	360	359	445	531	702	804	1042	1195	1383	1553	1723	1893
	340	364	451	539	713	818	1062	1219	1411	1586	1760	1935
	320	372	461	550	728	835	1085	1246	1442	1620	1799	1977
	300	380	472	563	746	856	1112	1276	1478	1661	1843	2026
	280	390	484	578	766	879	1142	1312	1519	1707	1895	2083
	260	400	497	594	788	904	1175	1350	1563	1757	1951	2145
	240	411	511	612	812	932	1212	1392	1612	1812	2012	2212
	220	421	524	627	833	956	1244	1429	1655	1861	2066	2272
	200	431	536	641	850	976	1271	1459	1690	1900	2110	2320
	180	440	547	654	869	997	1298	1491	1727	1941	2156	2370
	160	447	557	667	886	1017	1324	1522	1763	1982	2202	2421
.84/280	360	382	474	566	751	861	1119	1285	1488	1672	1857	2041
	340	389	483	577	765	878	1142	1311	1518	1706	1894	2083
	320	396	492	588	779	894	1163	1335	1546	1737	1929	2120
	300	404	502	599	795	912	1186	1362	1576	1772	1967	2163
	280	413	513	613	813	933	1212	1392	1612	1812	2012	2211
	260	423	525	627	832	955	1241	1425	1650	1855	2060	2264
	240	433	538	643	853	980	1274	1463	1694	1904	2114	2324
	220	442	550	658	873	1003	1304	1498	1735	1951	2166	2382
	200	450	560	670	890	1022	1330	1528	1770	1990	2210	2430
	180	457	569	681	905	1039	1352	1554	1800	2024	2247	2471
	160	462	576	690	917	1054	1372	1577	1827	2054	2282	2509
.84/300	360	405	503	601	798	916	1191	1368	1584	1781	1978	2174
	340	412	512	612	812	932	1212	1393	1613	1813	2013	2213
	320	419	520	622	825	947	1231	1413	1637	1840	2043	2246
	300	425	528	631	837	960	1248	1433	1660	1865	2071	2277
	280	433	538	643	852	978	1271	1459	1690	1899	2108	2318
	260	441	548	654	868	996	1294	1486	1721	1934	2147	2361
	240	449	558	667	885	1015	1320	1516	1756	1973	2191	2409
	220	457	568	679	902	1035	1346	1547	1791	2013	2236	2458
	200	464	577	690	917	1053	1370	1574	1823	2049	2276	2502
	180	469	584	699	929	1067	1390	1597	1850	2080	2310	2540
	160	472	589	705	938	1077	1403	1612	1868	2101	2334	2566
.84/320	360	425	529	632	839	963	1252	1438	1665	1872	2079	2285
	340	433	538	643	853	979	1273	1462	1693	1903	2113	2323
	320	439	545	652	865	993	1291	1483	1718	1931	2144	2357
	300	444	551	659	875	1004	1306	1500	1736	1952	2167	2383
	280	450	559	668	885	1016	1321	1517	1757	1974	2192	2410
	260	456	566	677	897	1030	1339	1537	1780	2001	2221	2442
	240	462	574	686	910	1044	1358	1559	1806	2030	2254	2478
	220	467	581	694	922	1058	1376	1580	1830	2057	2284	2512
	200	472	587	702	933	1071	1393	1600	1853	2083	2313	2543
	180	475	591	708	940	1079	1405	1614	1870	2102	2334	2567
	160	477	595	712	946	1086	1414	1625	1883	2117	2351	2585
LRC	360	439	545	652	863	989	1282	1470	1697	1903	2108	2312
	340	438	544	650	861	987	1279	1466	1693	1898	2103	2306
	320	436	542	647	858	983	1274	1460	1686	1891	2094	2297
	300	432	536	641	849	973	1262	1446	1670	1873	2074	2275
	280	430	534	638	845	968	1255	1438	1661	1862	2062	2262
	260	429	533	636	842	965	1250	1432	1654	1854	2054	2252
	240	429	533	636	842	965	1251	1433	1655	1855	2054	2253
	220	427	531	634	840	963	1248	1430	1652	1851	2050	2248
	200	422	525	627	831	952	1234	1414	1633	1831	2028	2223
	180	418	520	620	821	941	1220	1397	1613	1809	2003	2196
	160	412	512	611	810	928	1203	1378	1591	1784	1976	2166

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:

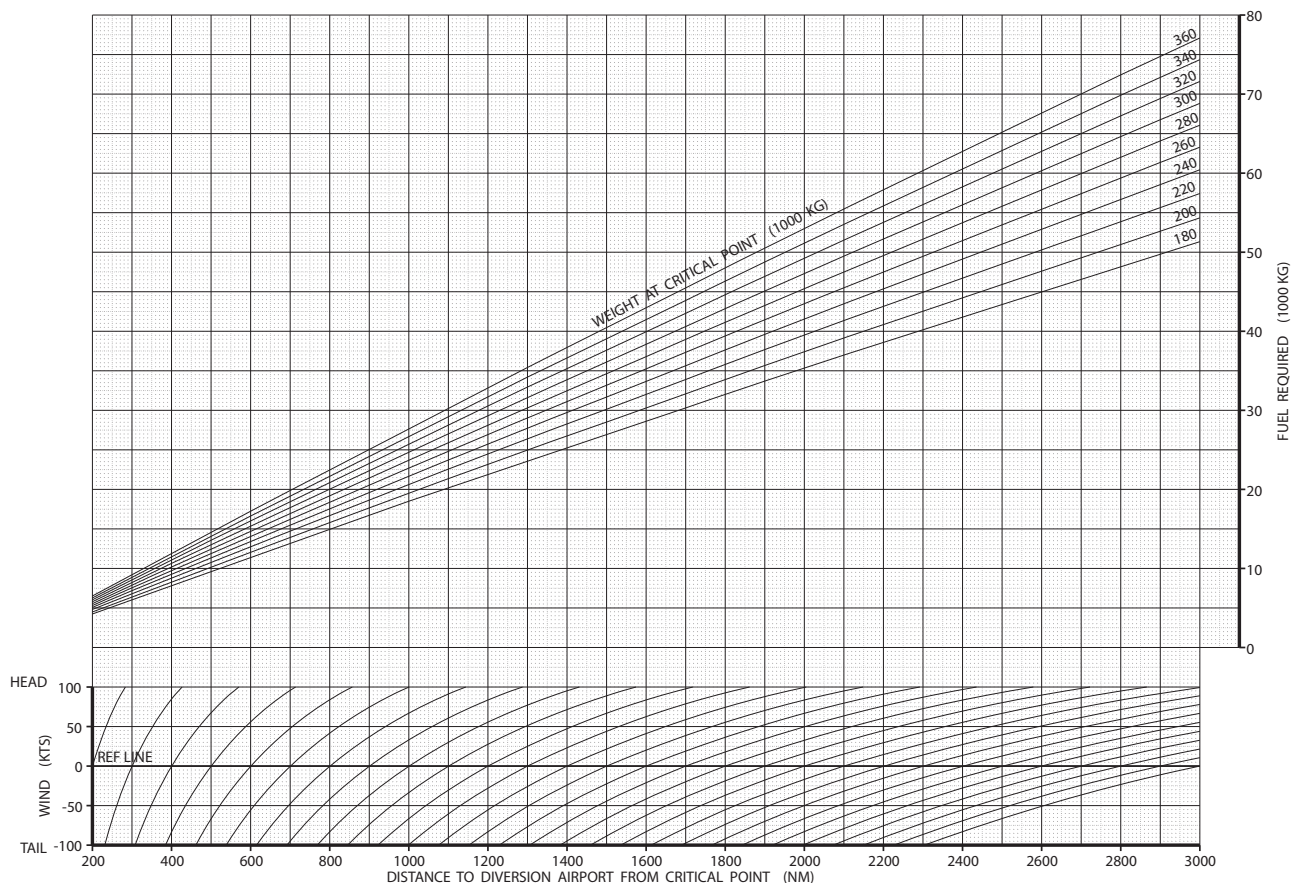
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (3%) for the total forecast time or engine and wing anti-ice on and ice drag (8%) 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

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:

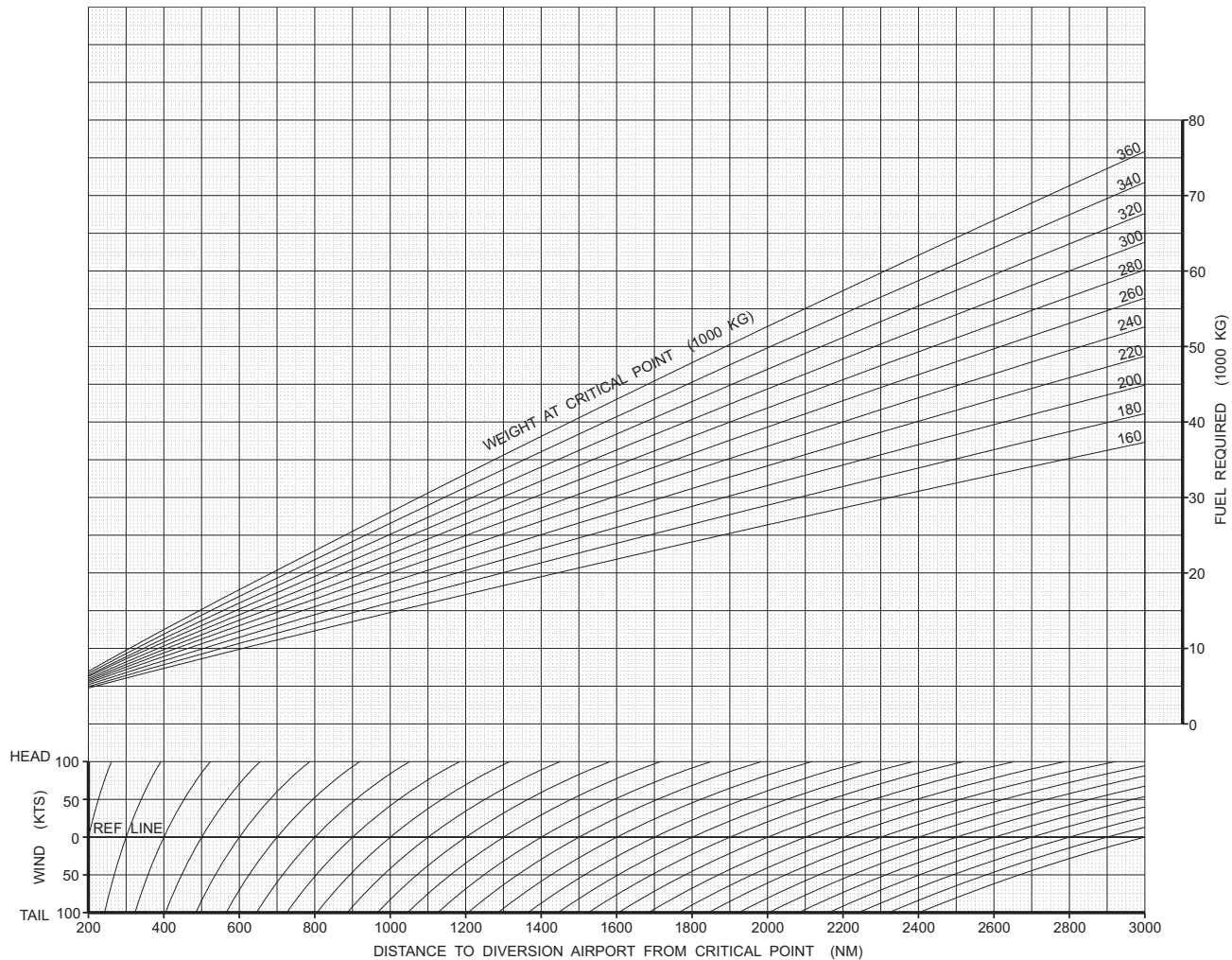
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

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.

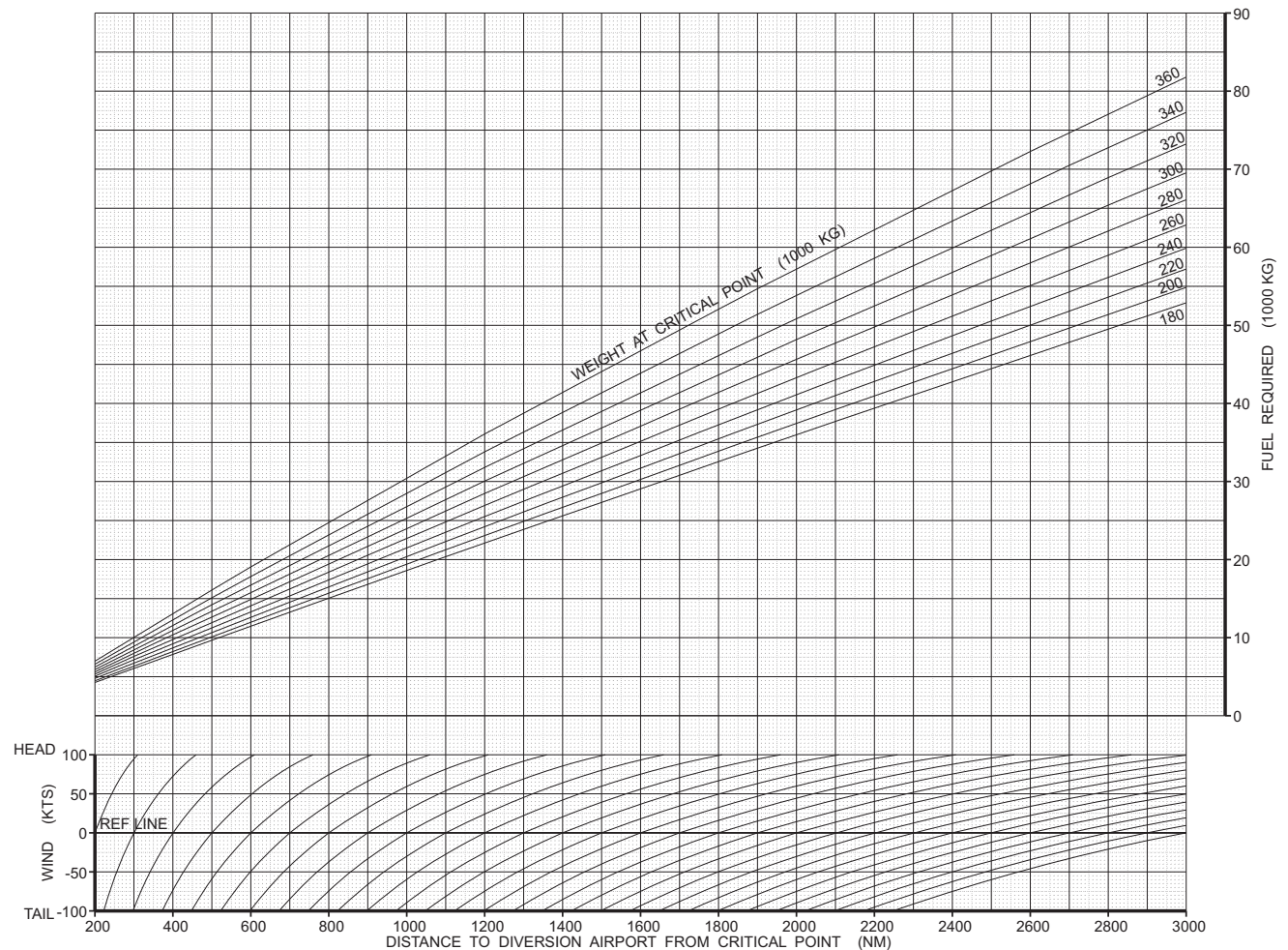
Adjustments:

- 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 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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 MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 260 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:

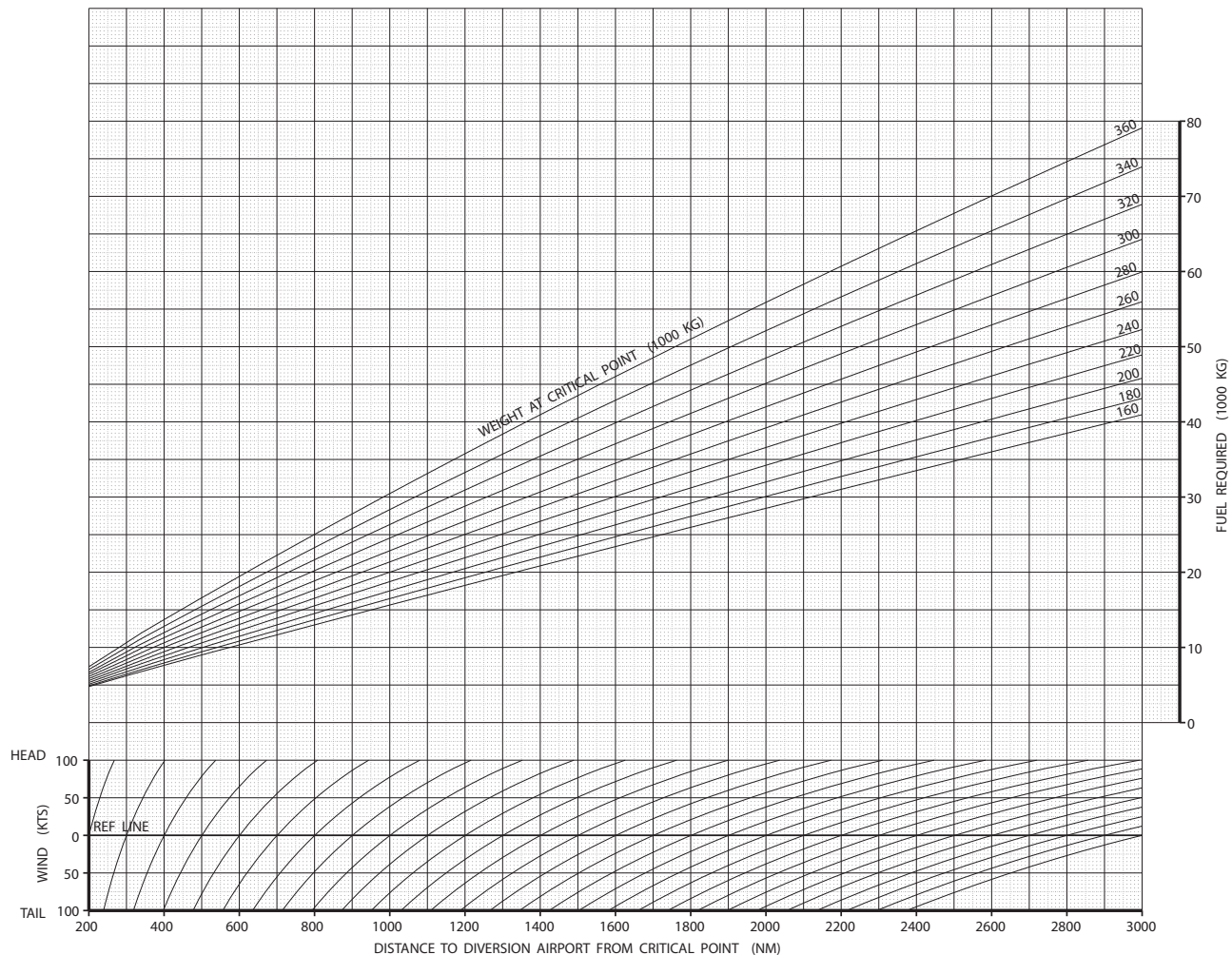
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Driftdown Critical Fuel Reserves - .82M/260 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:

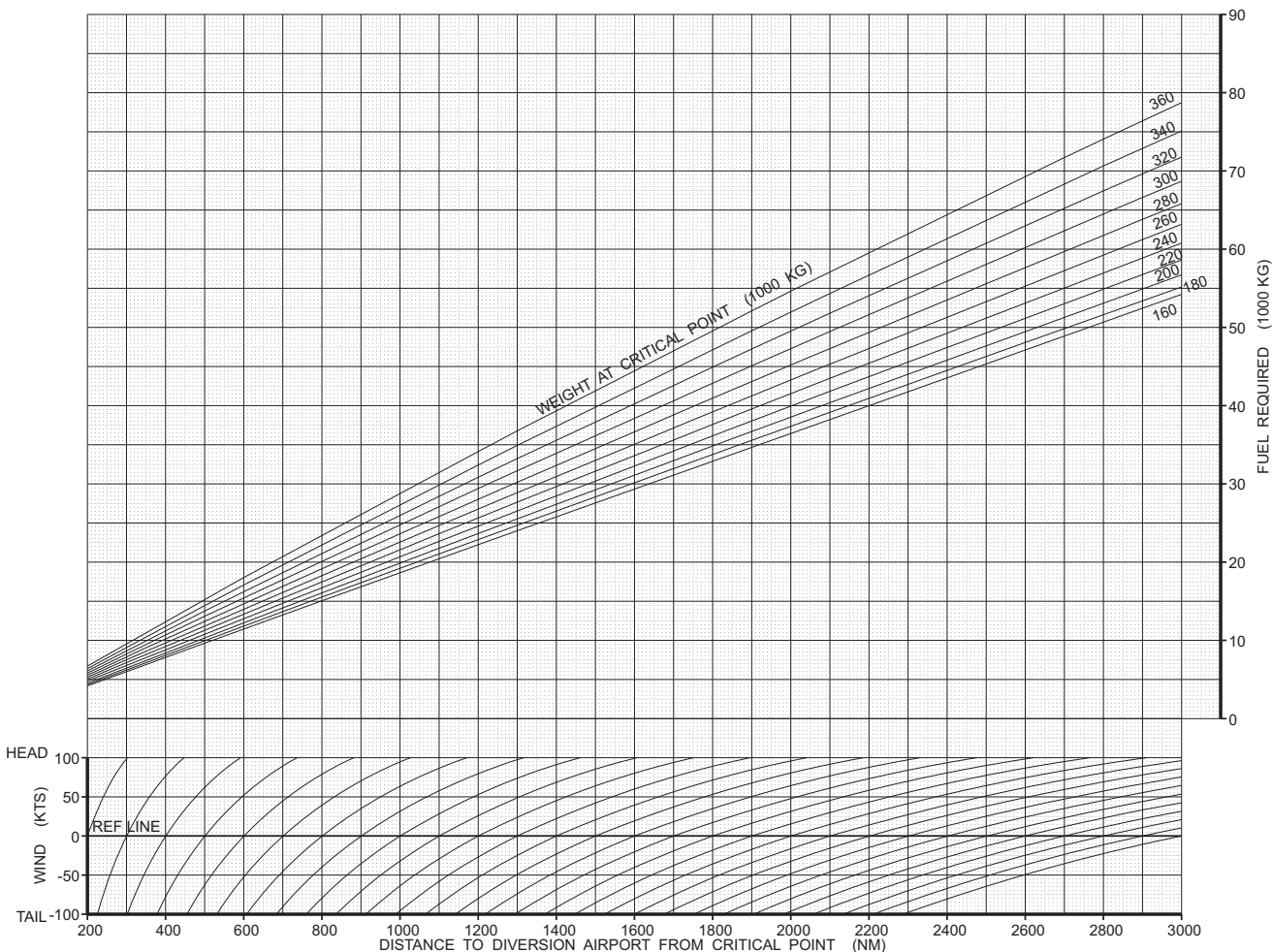
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 280 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:

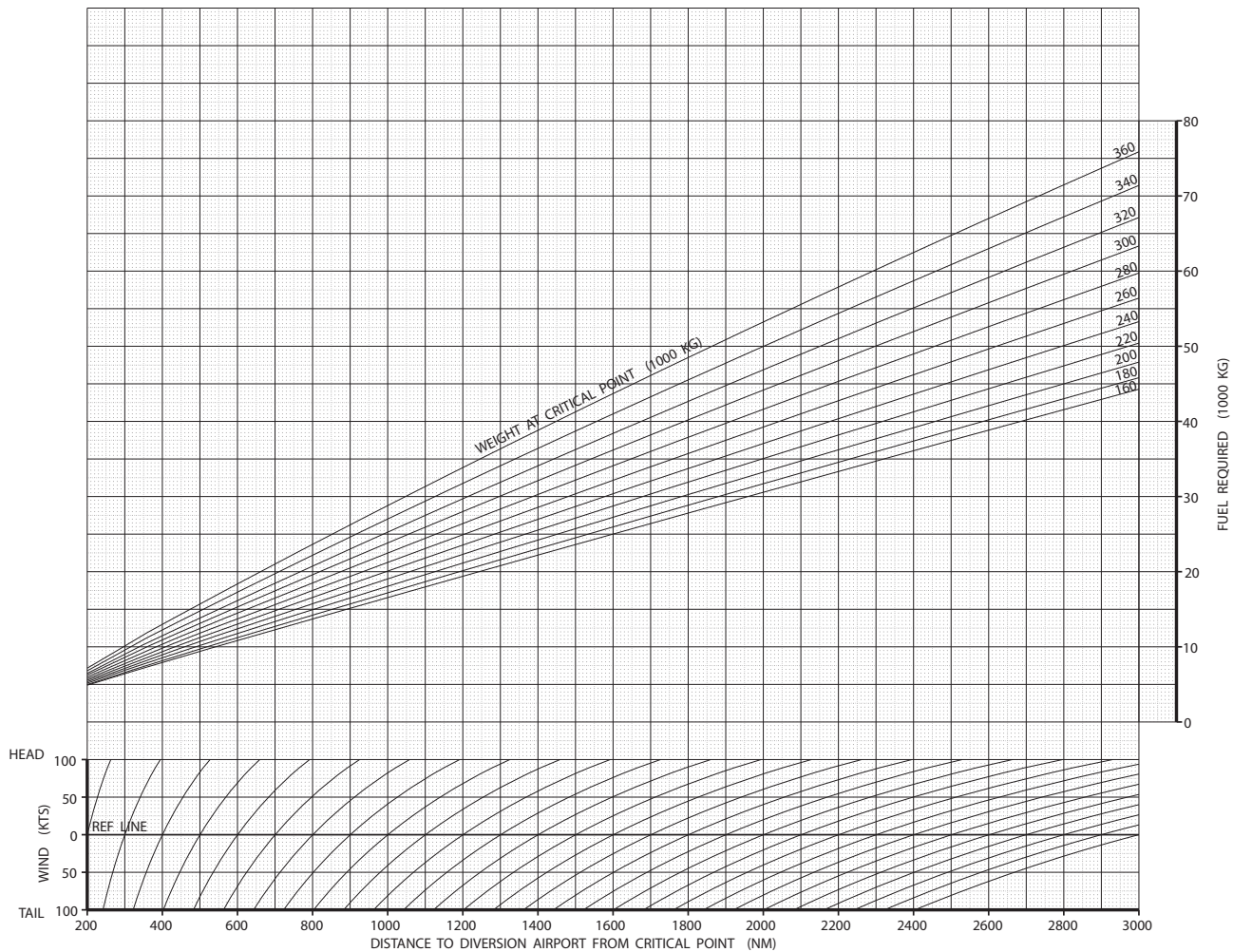
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Driftdown Critical Fuel Reserves - .84M/280 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:

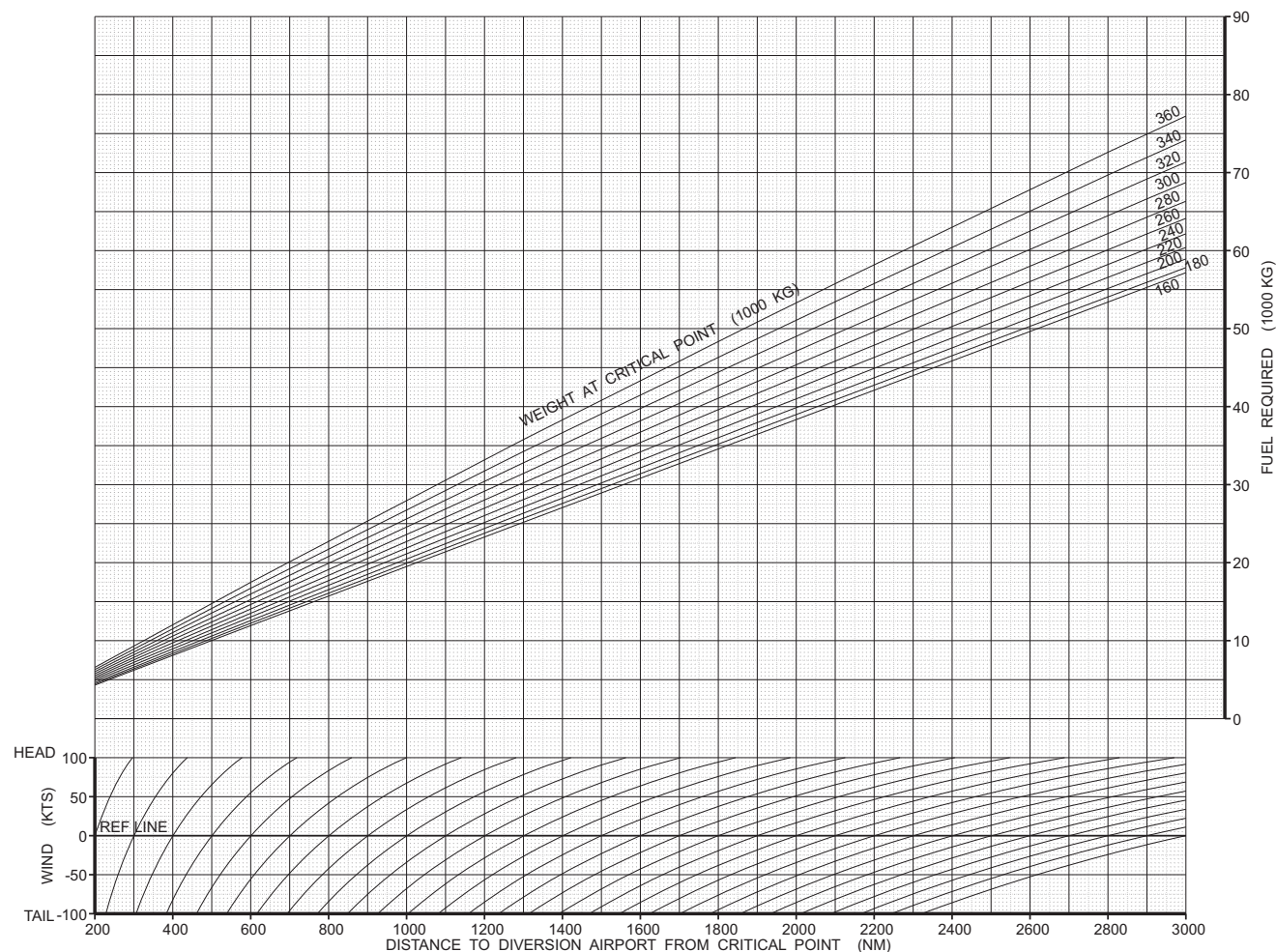
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 300 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:

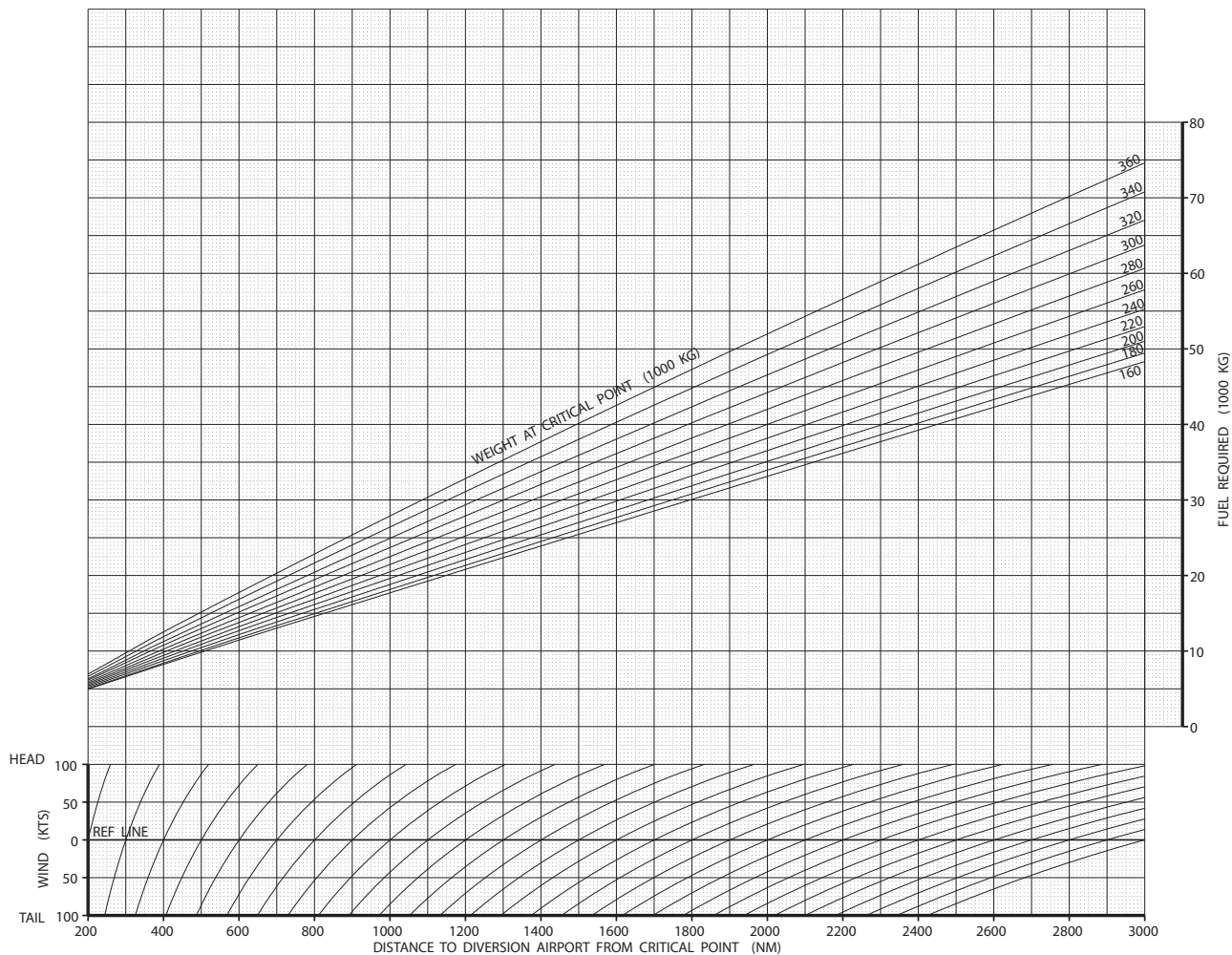
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Driftdown Critical Fuel Reserves - .84M/300 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:

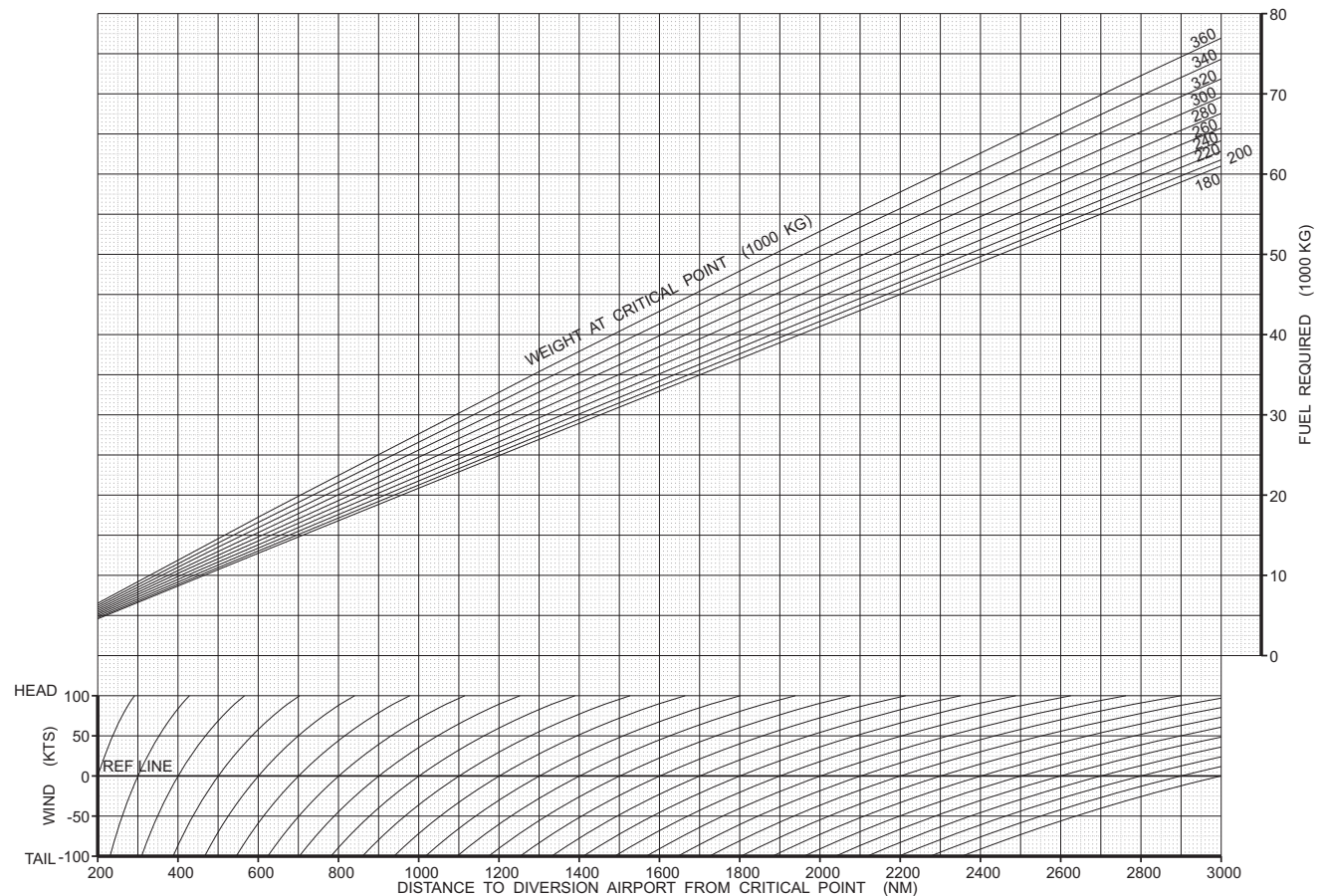
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 320 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:

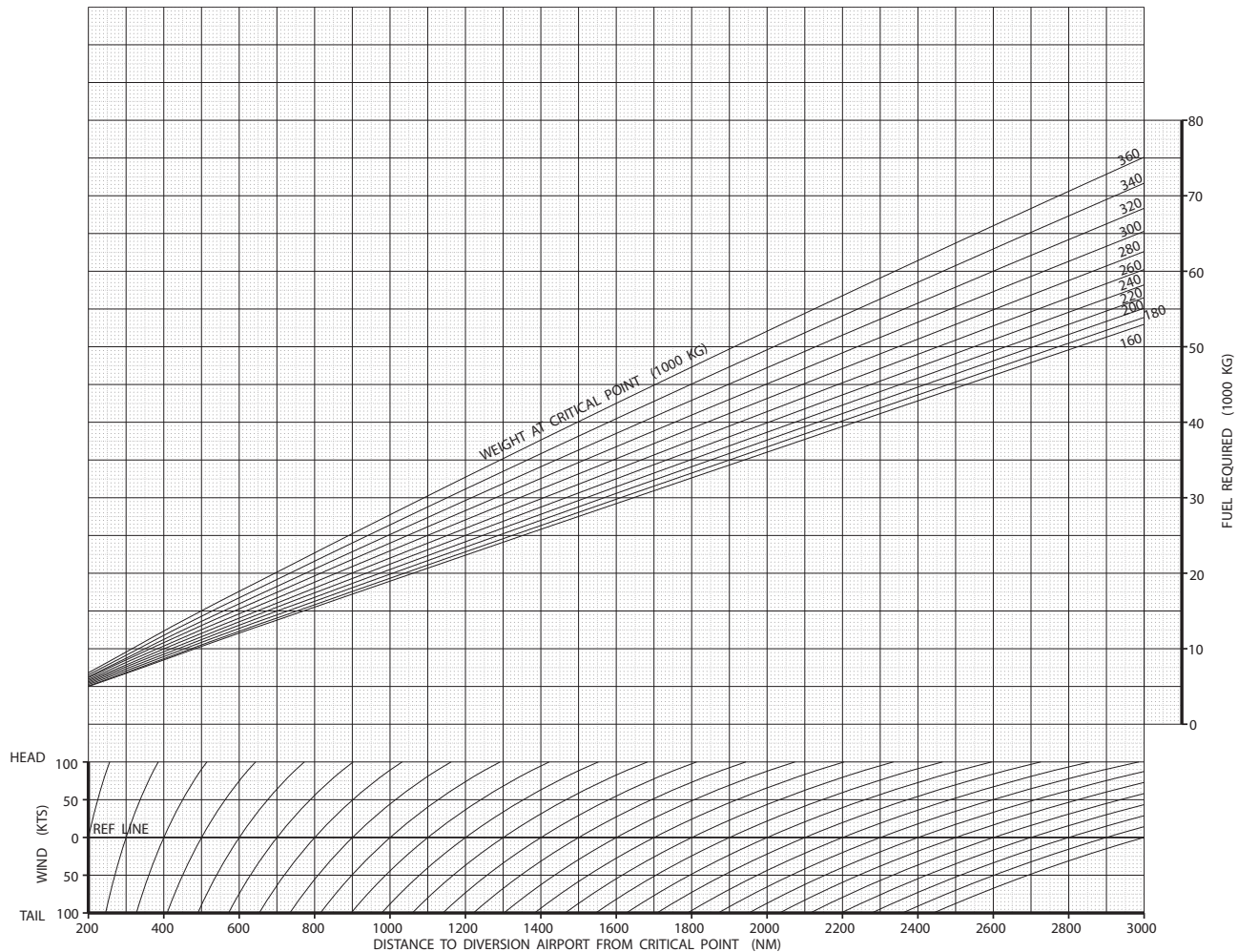
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Driftdown Critical Fuel Reserves - .84M/320 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:

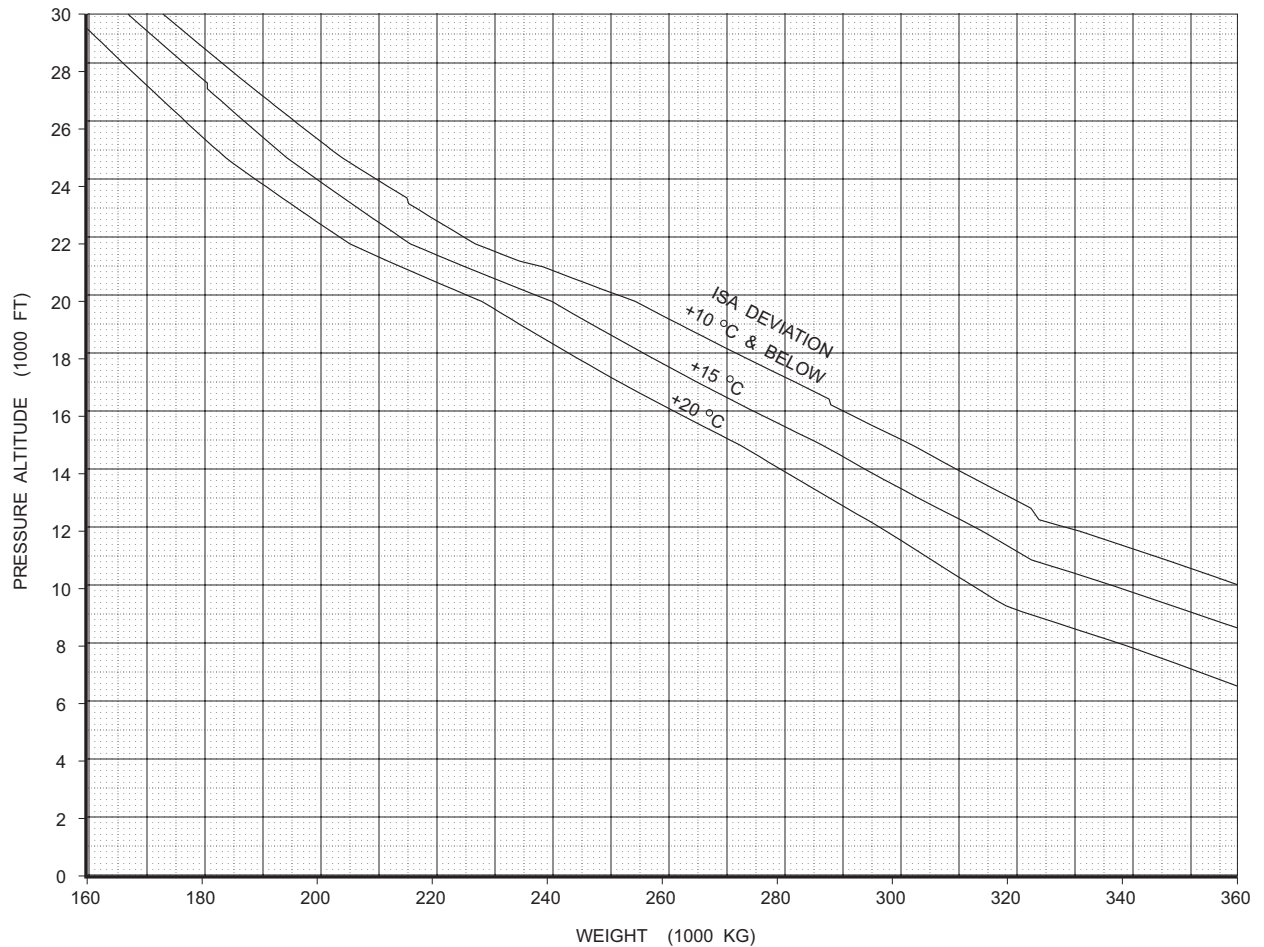
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Long Range Cruise Net Level Off Weight



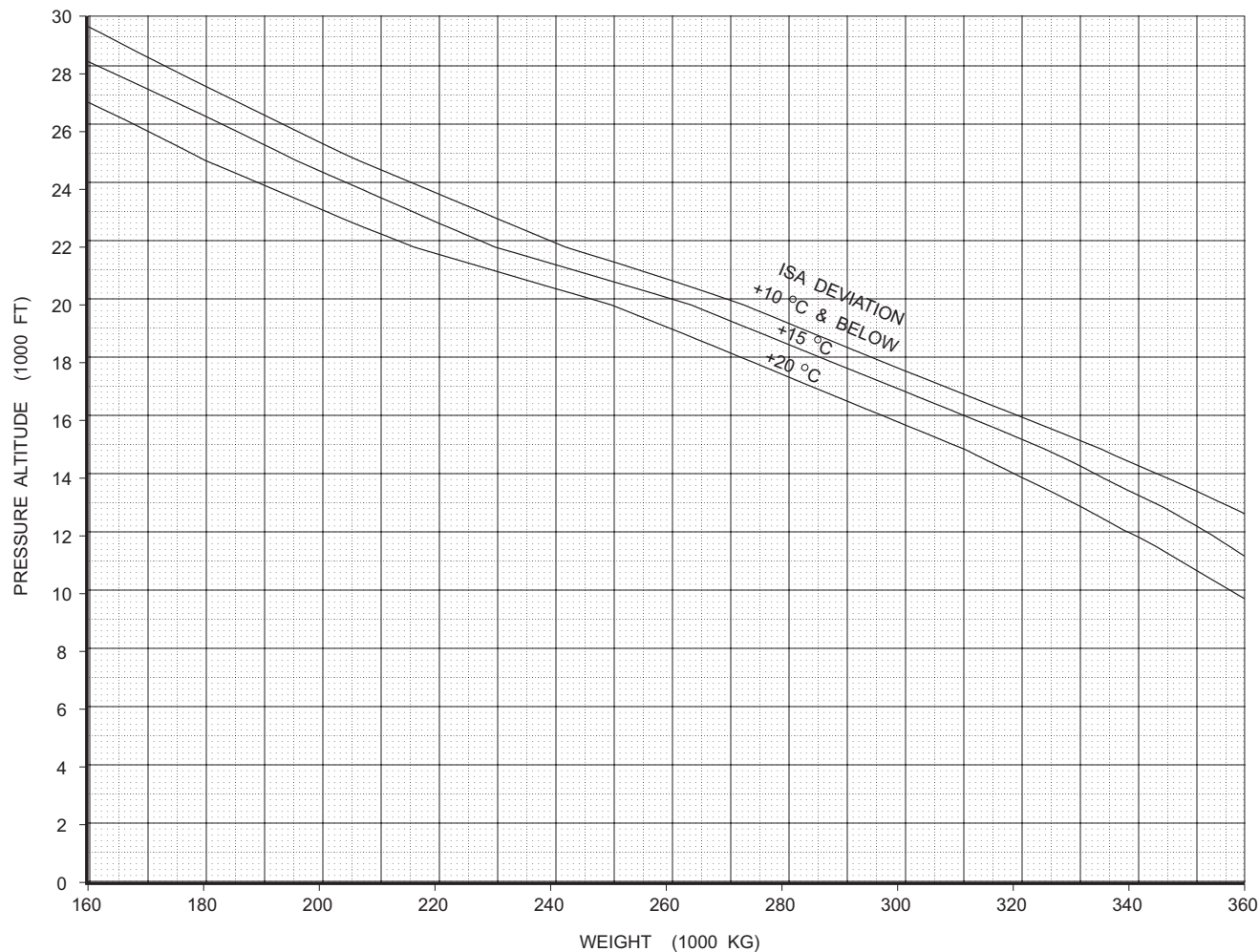
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
	12	14	16	18	20	22	24	26
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.7	-2.2	-2.1	-1.7	-1.3	-1.5	-1.5	-1.5

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Net Level Off Weight

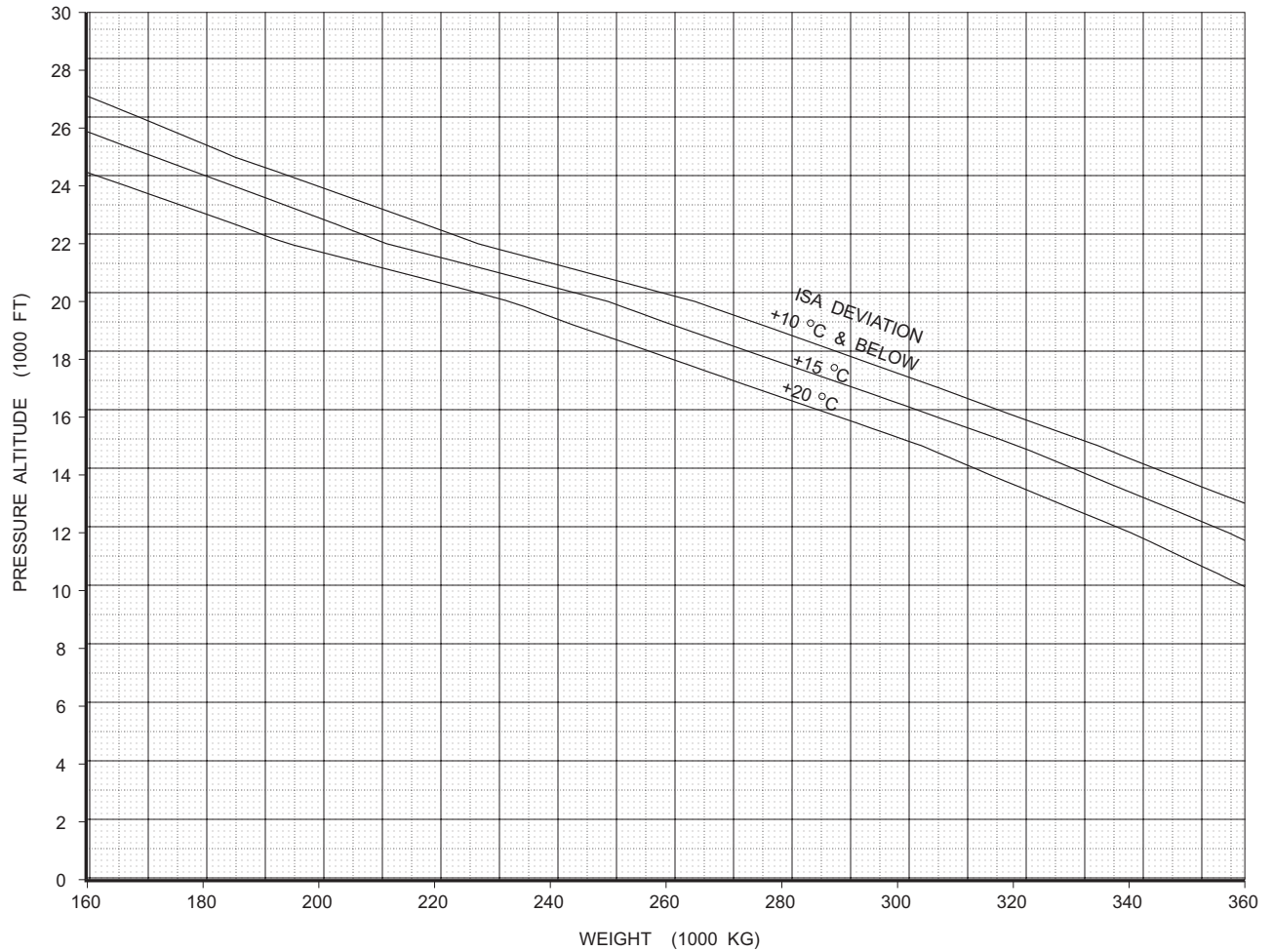


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)					
	PRESSURE ALTITUDE (1000 FT)					
	14	16	18	20	22	24
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.0	-2.0	-1.7	-1.4	-1.9	-2.2

ENGINE INOP MAX CONTINUOUS THRUST

280 KIAS Net Level Off Weight



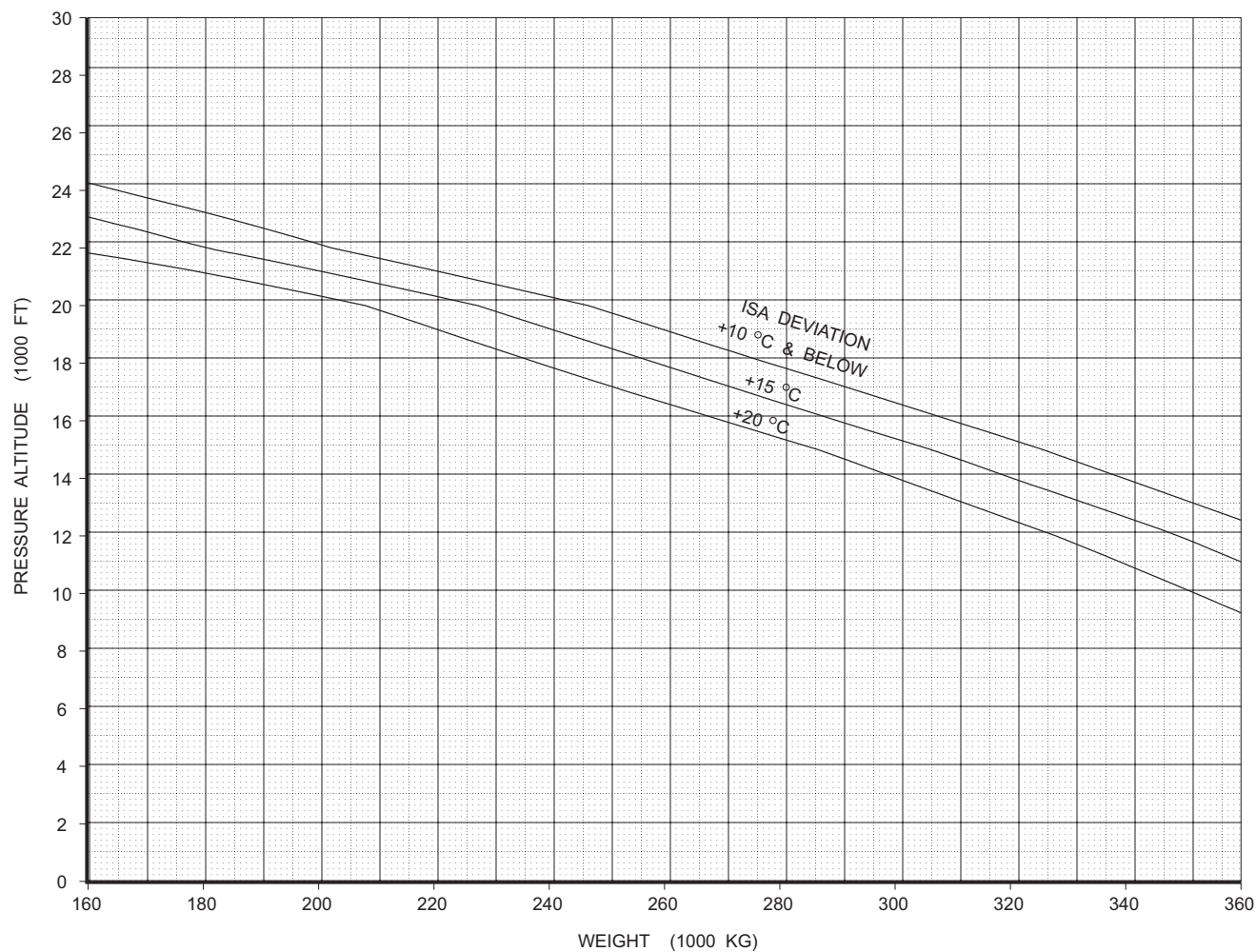
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)				
	PRESSURE ALTITUDE (1000 FT)				
	14	16	18	20	22
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.3	-2.3	-2.1	-1.7	-2.5

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Net Level Off Weight



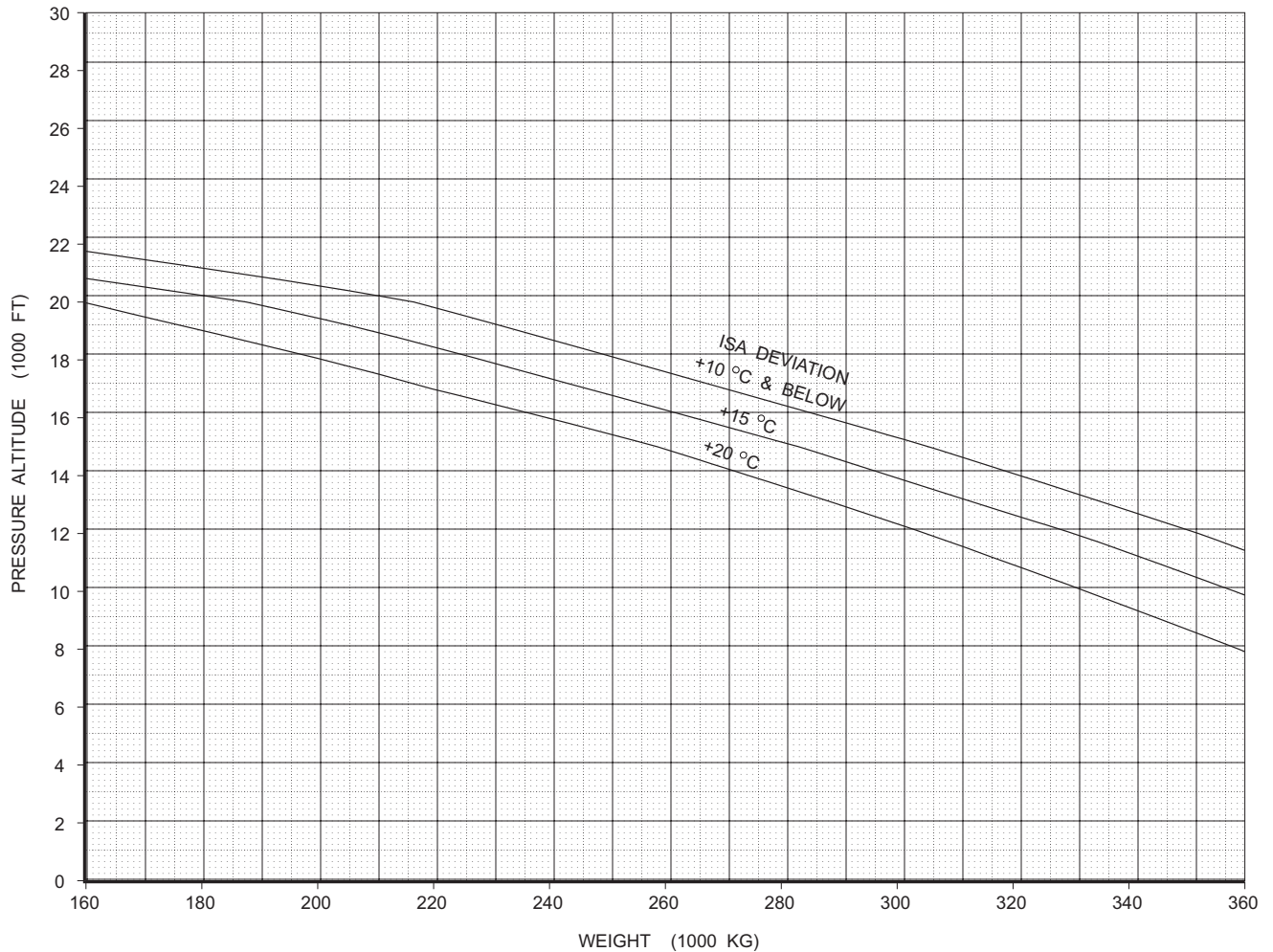
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)				
	PRESSURE ALTITUDE (1000 FT)				
	14	16	18	20	22
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.8	-2.7	-2.4	-1.9	-3.0

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Net Level Off Weight



Anti-Ice Adjustments

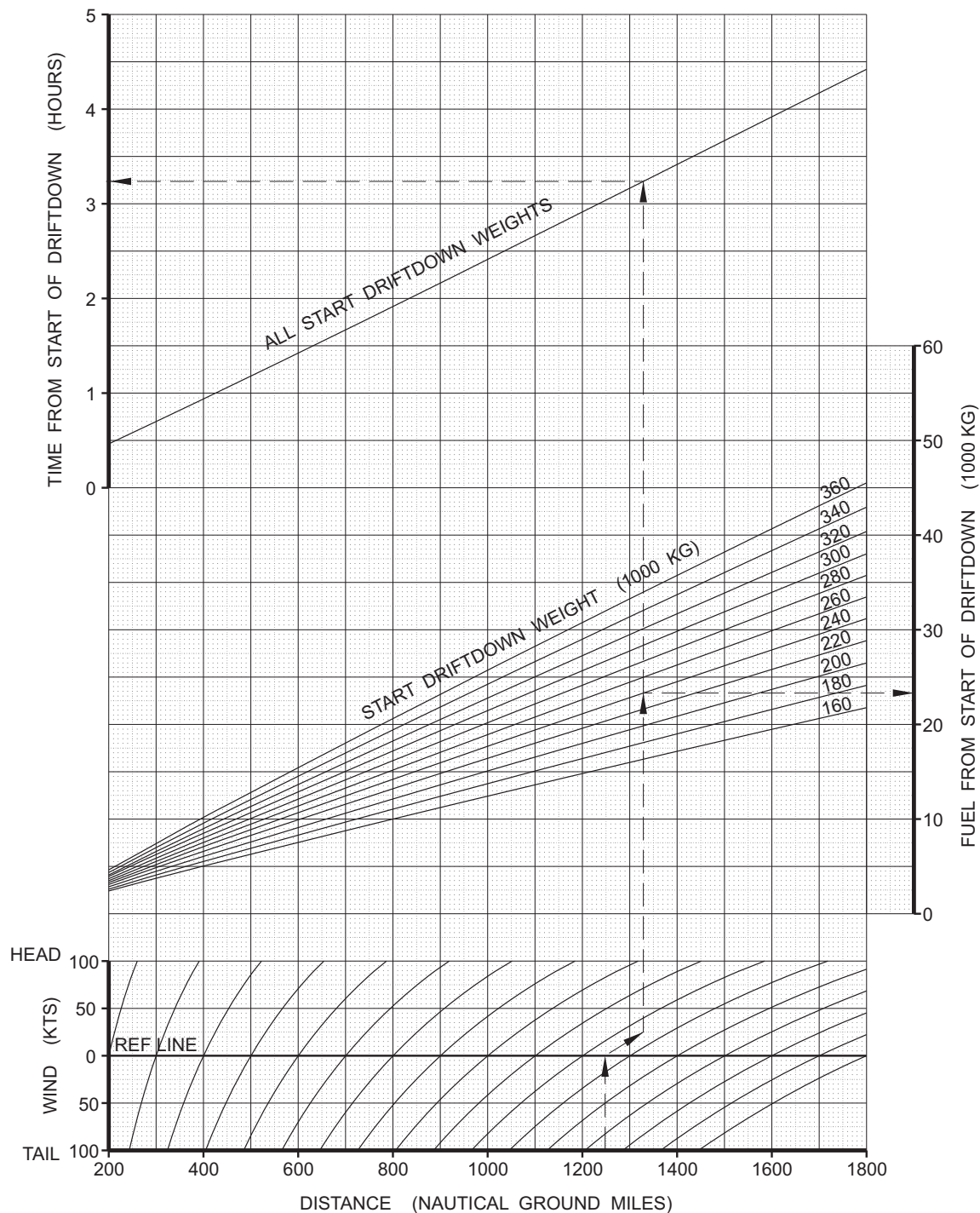
ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)				
	PRESSURE ALTITUDE (1000 FT)				
	14	16	18	20	22
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.9	-3.1	-3.0	-2.6	-2.5

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Driftdown/Cruise Range Capability

Includes APU fuel burn

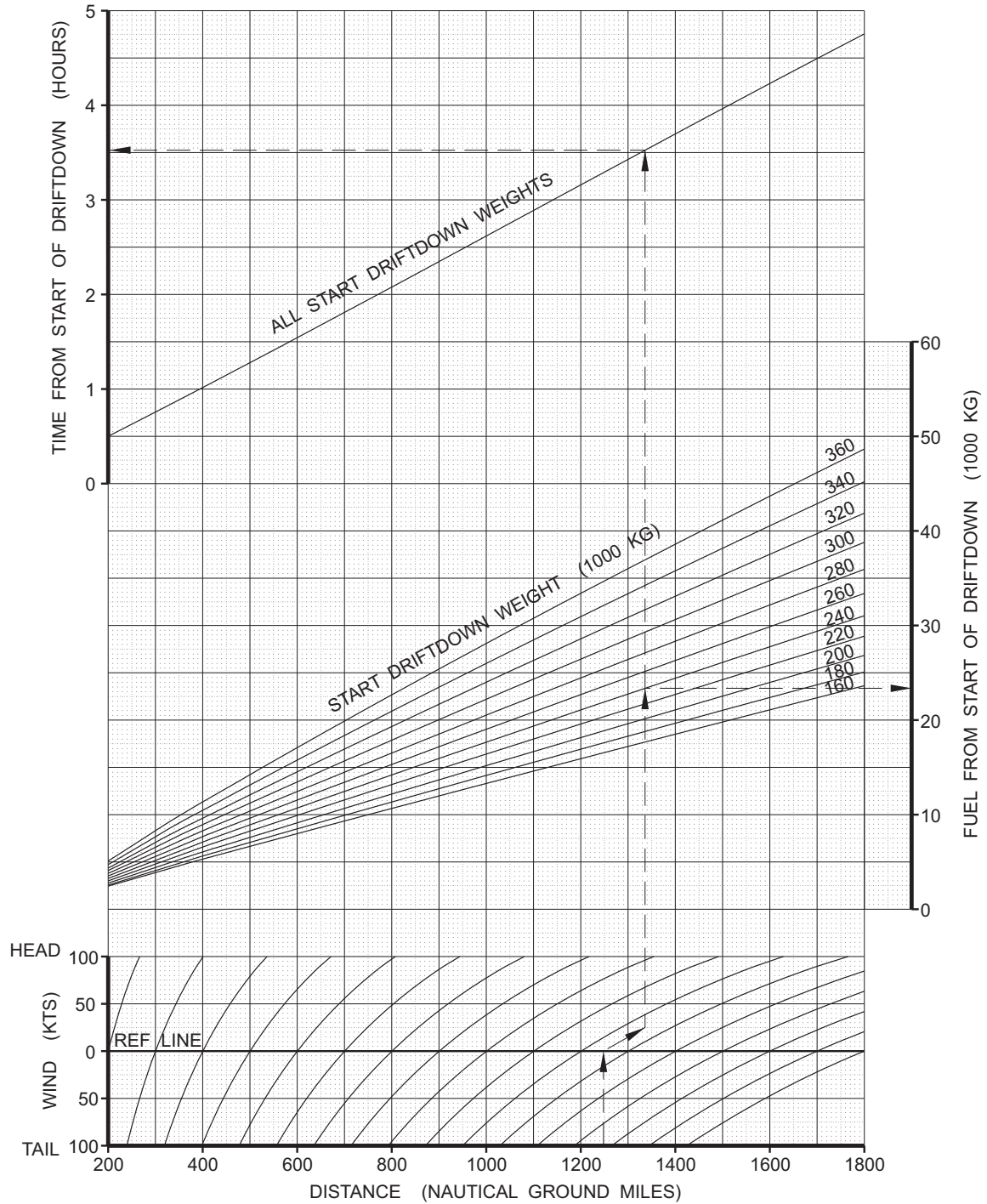


ENGINE INOP

MAX CONTINUOUS THRUST

.82M/260 KIAS Driftdown/Cruise Range Capability

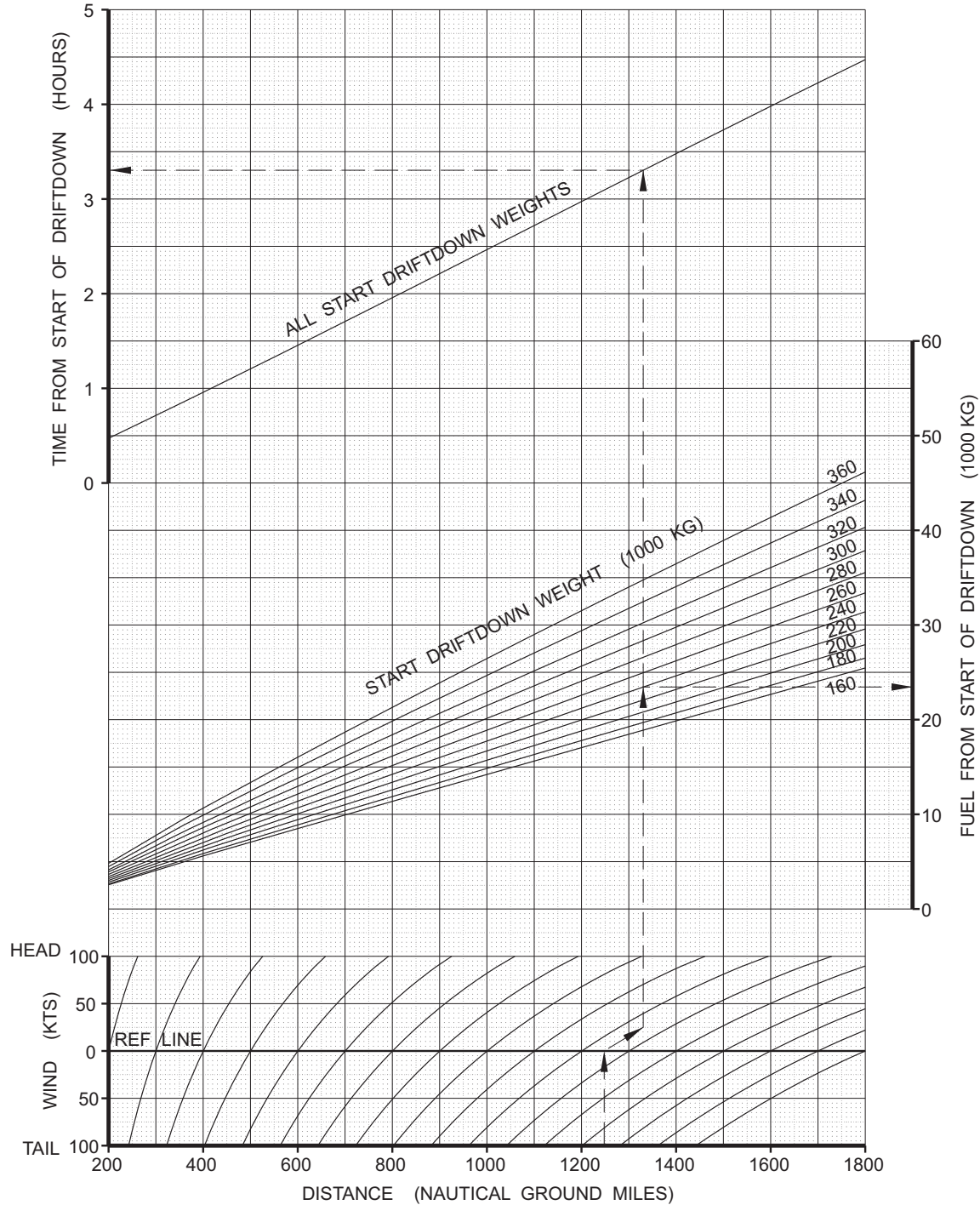
Includes APU fuel burn



ENGINE INOP MAX CONTINUOUS THRUST

.84M/280 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn

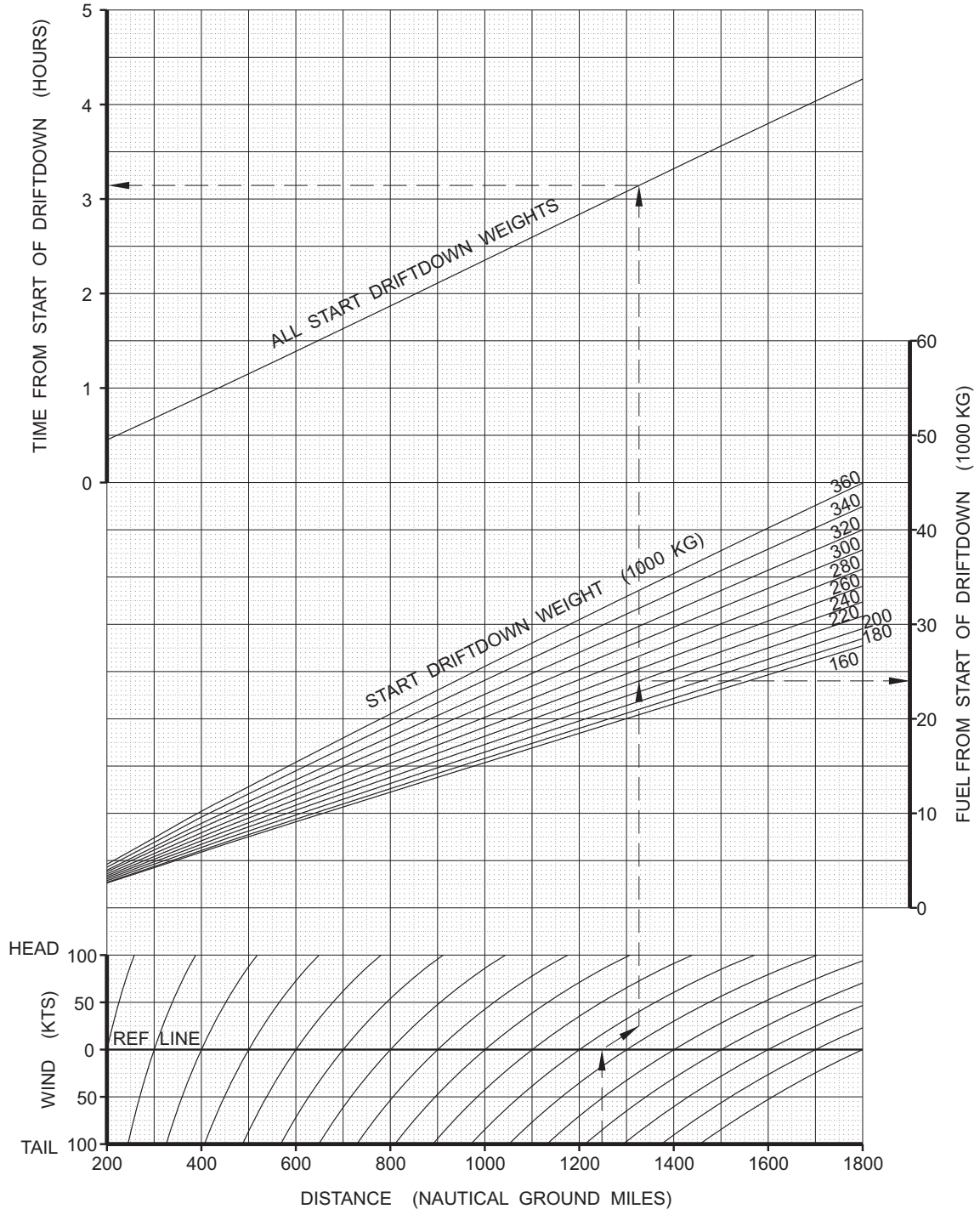


ENGINE INOP

MAX CONTINUOUS THRUST

.84M/300 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn

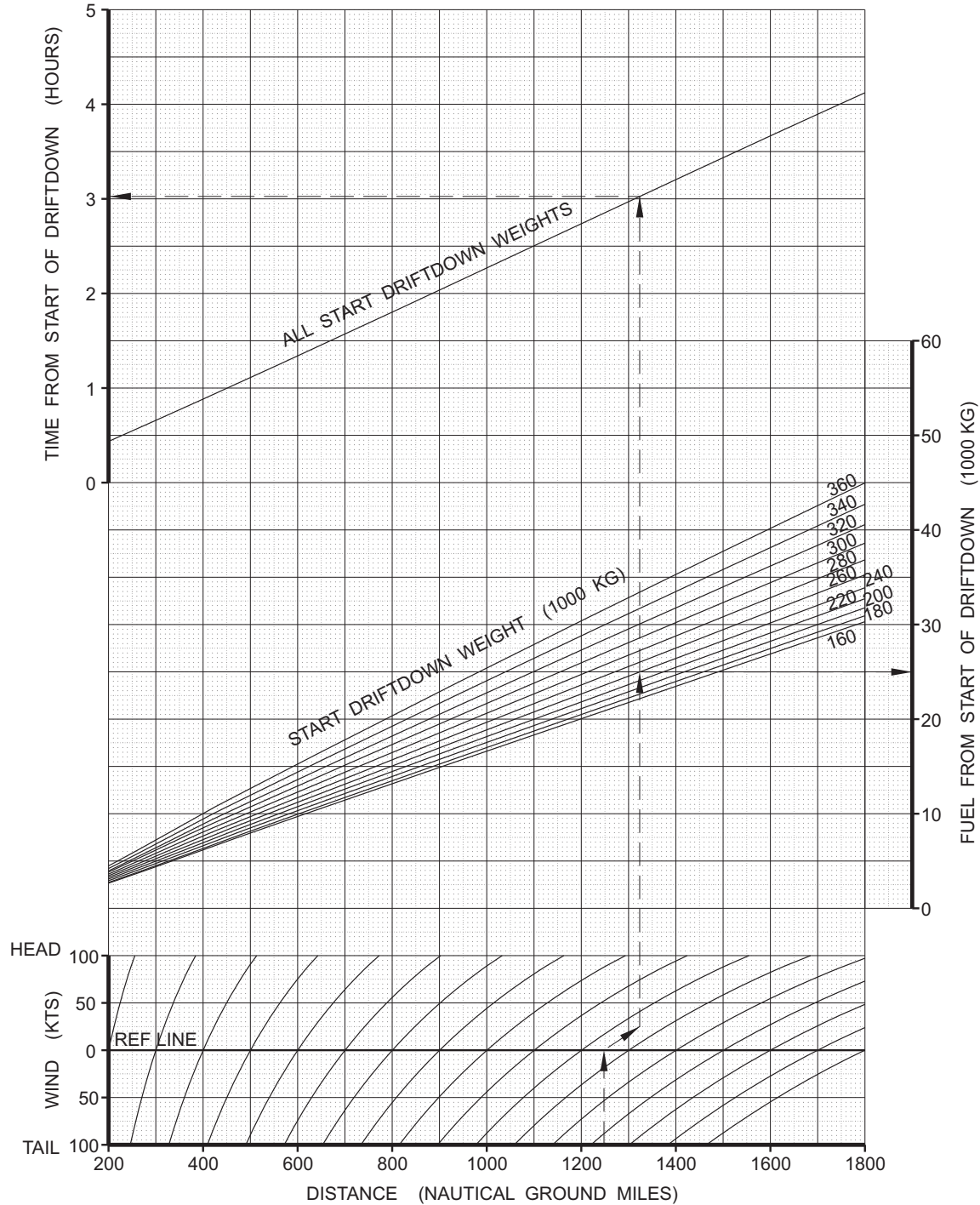


ENGINE INOP

MAX CONTINUOUS THRUST

.84M/320 KIAS Driftdown/Cruise Range Capability

Includes APU fuel burn



ENROUTE

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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 300 ft/min residual rate of climb. Flying above these altitudes with sustained banks in excess of approximately 21° 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 approximately 1.3g (39° bank) or more. The altitudes shown in the table are limited to the maximum certified altitude of 43100 ft.

Enroute Climb

The Enroute Climb tables are based on 310/.84 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 tables are provided for Long Range Cruise and .84M 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 QRH and are expanded to include true airspeed and Max Cruise thrust setting information.

To account for APU fuel burn, refer to the APU Operation 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 .84M. 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 three descent speed schedules. 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

%N1, indicated airspeed and fuel flow information are tabulated for holding at flaps up and flaps 1 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

Altitude Capability

The Engine Inoperative Altitude Capability tables are based on the thrust limited capability with 100 ft/min residual rate of climb. For the engine inoperative case, buffet capability is not considered limiting. Tables are shown for Long Range Cruise and constant speeds of 260, 280, 300, and 320 KIAS for both Max Continuous and Max Cruise Thrust. Adjust the table values for thermal anti-ice operation as shown 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 constant speeds of 260, 280, 300 and 320 KIAS. The fuel flow values in these tables reflect only the engine fuel burn. To conservatively account for APU fuel burn, refer to the APU Operation 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 are shown for Long Range Cruise and constant speeds of 260, 280, 300 and 320 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

%N1 required, ISA 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.



Flight Planning and Performance Manual

Long Range Cruise Maximum Operating Altitude

Max Climb Thrust

ISA + 10°C and Below

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	4	30400	28700	27200
350	28500	3	31000	29400	27800
340	29200	1	31600	30000	28500
330	29800	0	32100	30500	29000
320	30500	-2	32600	31000	29500
310	31200	-3	33200	31600	30000
300	31900	-5	33700	32100	30600
290	32600	-7	34300	32700	31200
280	33400	-8	34900	33300	31800
270	34100	-10	35500	33900	32400
260	34900	-12	36100	34500	33100
250	35800	-14	36800	35200	33800
240	36600	-15	37500	35900	34500
230	37500	-15	38200	36600	35200
220	38400	-15	39000	37400	36000
210	39400	-15	39700	38200	36800
200	40400	-15	40600	39100	37700
190	41500	-15	41500	39900	38600
180	42600	-15	42400	40900	39600
170	43100	-15	43100	42100	40800
160	43100	-15	43100	43100	42100

ISA + 15°C

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	10	30400	28700	27200
350	28500	8	31000	29400	27800
340	29200	7	31600	30000	28500
330	29800	5	32100	30500	29000
320	30500	4	32600	31000	29500
310	31200	2	33200	31600	30000
300	31900	1	33700	32100	30600
290	32600	-1	34300	32700	31200
280	33400	-3	34900	33300	31800
270	34100	-4	35500	33900	32400
260	34900	-6	36100	34500	33100
250	35800	-8	36800	35200	33800
240	36600	-9	37500	35900	34500
230	37500	-9	38200	36600	35200
220	38400	-9	39000	37400	36000
210	39400	-9	39700	38200	36800
200	40400	-9	40600	39100	37700
190	41500	-9	41500	39900	38600
180	42600	-9	42400	40900	39600
170	43100	-9	43100	42100	40800
160	43100	-9	43100	43100	42100



Long Range Cruise Maximum Operating Altitude

Max Climb Thrust

ISA + 20°C

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	15	30400	28700	27200
350	28500	14	31000	29400	27800
340	29200	13	31600	30000	28500
330	29800	11	32100	30500	29000
320	30500	10	32600	31000	29500
310	31200	8	33200	31600	30000
300	31900	6	33700	32100	30600
290	32600	5	34300	32700	31200
280	33400	3	34900	33300	31800
270	34100	1	35500	33900	32400
260	34900	-1	36100	34500	33100
250	35800	-2	36800	35200	33800
240	36600	-3	37500	35900	34500
230	37500	-3	38200	36600	35200
220	38400	-3	39000	37400	36000
210	39400	-3	39700	38200	36800
200	40400	-3	40600	39100	37700
190	41500	-3	41500	39900	38600
180	42600	-3	42400	40900	39600
170	43100	-3	43100	42100	40800
160	43100	-3	43100	43100	42100



Flight Planning and Performance Manual

310/.84 Enroute Climb

ISA and Below - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD											
38000	TIME/FUEL DIST/SPD											18/5250 115/432
37000	TIME/FUEL DIST/SPD									19/5700 123/430	18/5350 113/429	17/5050 106/428
36000	TIME/FUEL DIST/SPD							20/6200 131/429	19/5800 121/427	18/5450 112/426	17/5150 105/425	16/4850 99/424
35000	TIME/FUEL DIST/SPD						20/6300 129/426	19/5900 120/425	18/5600 112/424	17/5250 105/423	16/5000 99/422	15/4750 93/421
34000	TIME/FUEL DIST/SPD				22/6850 139/425	21/6400 128/423	19/6050 119/422	18/5700 112/421	17/5400 105/420	16/5100 99/419	15/4850 93/419	14/4600 88/418
33000	TIME/FUEL DIST/SPD			22/6950 137/422	21/6550 128/420	19/6200 119/419	18/5850 112/418	17/5550 105/417	16/5250 99/417	15/5000 94/416	14/4700 88/416	13/4450 84/415
32000	TIME/FUEL DIST/SPD	24/7600 149/421	22/7100 137/418	21/6700 127/417	20/6300 119/416	19/5950 112/415	18/5650 105/414	17/5400 99/414	16/5100 94/413	15/4850 89/413	14/4600 84/412	13/4350 79/412
31000	TIME/FUEL DIST/SPD	22/7200 134/414	21/6750 125/413	20/6400 117/412	19/6050 110/411	18/5750 104/410	17/5450 98/410	16/5200 93/409	15/4950 88/409	14/4700 83/408	13/4450 79/408	12/4100 74/408
30000	TIME/FUEL DIST/SPD	21/6850 122/408	20/6450 115/407	18/6100 108/407	17/5800 102/406	16/5500 96/406	15/5050 91/405	14/4800 86/405	13/4550 81/404	12/4300 77/404	11/3900 73/403	10/3500 69/403
29000	TIME/FUEL DIST/SPD	20/6500 112/403	18/6200 106/403	17/5850 100/402	16/5600 94/401	15/5300 89/401	14/4900 85/400	13/4600 80/400	12/4400 76/400	11/4100 72/399	10/3800 68/399	9/3400 65/398
28000	TIME/FUEL DIST/SPD	18/6250 103/398	17/5900 98/398	16/5650 92/397	15/5350 87/397	14/4950 83/396	13/4700 79/396	12/4450 74/396	11/4150 71/395	10/3850 67/395	9/3450 64/394	8/3050 60/394
27000	TIME/FUEL DIST/SPD	17/5950 95/394	16/5650 90/393	15/5400 85/393	14/5000 81/392	13/4700 77/392	12/4400 73/392	11/4150 69/391	10/3850 66/391	9/3450 62/391	8/3050 59/390	7/2800 56/390
26000	TIME/FUEL DIST/SPD	16/5700 88/389	15/5450 83/389	14/5200 79/388	13/4950 75/388	12/4650 71/388	11/4300 68/387	10/3950 64/387	9/3550 61/387	8/3200 58/387	7/2850 55/386	6/2450 52/386
25000	TIME/FUEL DIST/SPD	15/5450 81/385	14/5000 77/385	13/4750 73/384	12/4500 69/384	11/4300 66/384	10/4000 63/383	9/3650 60/383	8/3300 57/383	7/2900 54/383	6/2500 51/382	5/2150 49/382
24000	TIME/FUEL DIST/SPD	15/5250 75/381	14/4800 71/381	13/4500 67/380	12/4300 64/380	11/4100 61/380	10/3900 58/379	9/3600 55/379	8/3250 53/379	7/2850 50/379	6/2450 48/378	5/2100 45/378
23000	TIME/FUEL DIST/SPD	14/5000 69/377	13/4800 65/377	12/4550 62/376	11/4300 59/376	10/4050 56/376	9/3700 54/376	8/3350 51/375	7/2950 49/375	6/2550 46/375	5/2200 44/375	4/1750 42/374
22000	TIME/FUEL DIST/SPD	13/4800 63/373	12/4600 60/373	11/4400 57/373	10/4200 55/372	9/3900 52/372	8/3450 50/372	7/3000 47/372	6/2600 45/371	5/2250 43/371	4/1800 41/371	3/1600 39/371
21000	TIME/FUEL DIST/SPD	12/4600 58/369	11/4400 56/369	10/4200 53/369	9/4000 51/369	8/3800 48/369	7/3500 46/368	6/3050 44/368	5/2650 42/368	4/2200 40/368	3/1750 38/368	2/1300 36/367
20000	TIME/FUEL DIST/SPD	12/4400 54/366	11/4200 51/366	10/4050 49/365	9/3850 47/365	8/3650 44/365	7/3350 42/365	6/2950 41/365	5/2600 39/365	4/2250 37/364	3/1800 35/364	2/1350 33/364
18000	TIME/FUEL DIST/SPD	10/4000 45/359	9/3850 43/359	8/3700 41/359	7/3550 39/359	6/3350 38/358	5/3050 36/358	4/2700 34/358	3/2300 33/358	2/1900 31/358	1/1450 30/358	0/1000 28/357
16000	TIME/FUEL DIST/SPD	9/3650 38/353	8/3500 36/353	7/3350 34/352	6/3200 33/352	5/3000 32/352	4/2750 30/352	3/2400 29/352	2/2000 28/352	1/1550 26/352	0/1100 25/351	0/700 24/351
14000	TIME/FUEL DIST/SPD	8/3300 31/347	7/3200 30/347	6/3050 28/347	5/2900 27/346	4/2750 26/346	3/2500 25/346	2/2200 24/346	1/1850 23/346	0/1400 22/346	0/900 21/346	0/500 20/345
10000	TIME/FUEL DIST/SPD	6/2650 19/336	6/2550 19/336	5/2450 18/336	4/2350 17/336	3/2200 16/335	2/2050 15/335	1/1900 14/335	0/1700 13/335	0/1500 12/335	0/1300 11/335	0/1100 10/335
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-250	-500	-750	-1000	-1250	-1550

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA and Below - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD								15/3950 99/440	14/3700 91/439	13/3450 84/438	12/3200 78/437
42000	TIME/FUEL DIST/SPD						16/4400 108/439	15/4100 99/438	14/3850 92/437	13/3600 85/436	12/3350 79/436	11/3150 73/435
41000	TIME/FUEL DIST/SPD					16/4550 108/437	15/4250 100/436	14/4000 92/435	13/3750 86/435	12/3500 80/434	11/3300 74/433	11/3050 69/432
40000	TIME/FUEL DIST/SPD				16/4650 108/435	15/4400 100/434	14/4100 93/433	13/3850 86/432	13/3650 81/432	12/3400 75/431	11/3200 70/430	10/3000 65/430
39000	TIME/FUEL DIST/SPD		18/5100 116/434	16/4800 107/433	15/4500 100/432	14/4250 93/431	14/4000 87/430	13/3750 81/430	12/3550 76/429	11/3350 71/428	10/3100 66/428	10/2900 61/427
38000	TIME/FUEL DIST/SPD	18/5250 115/432	17/4900 106/430	16/4650 99/429	15/4350 93/429	14/4100 87/428	13/3900 82/427	12/3650 77/427	11/3450 72/426	11/3250 67/426	10/3050 62/425	9/2850 58/424
37000	TIME/FUEL DIST/SPD	17/5050 106/428	16/4750 99/427	15/4500 93/426	14/4250 87/426	13/4000 82/425	12/3800 77/424	12/3550 72/424	11/3350 68/423	10/3150 63/423	10/2950 59/422	9/2750 55/422
36000	TIME/FUEL DIST/SPD	16/4850 99/424	15/4600 93/424	14/4350 87/423	13/4100 82/423	13/3900 77/422	12/3700 73/422	11/3500 68/421	10/3300 64/421	10/3100 60/420	9/2900 56/420	9/2700 52/419
35000	TIME/FUEL DIST/SPD	15/4750 93/421	14/4500 88/421	13/4250 83/420	13/4000 78/420	12/3800 73/419	11/3600 69/419	11/3400 65/418	10/3200 61/418	9/3000 57/417	9/2850 53/417	8/2650 50/416
34000	TIME/FUEL DIST/SPD	14/4600 88/418	14/4350 83/418	13/4150 79/417	12/3900 74/417	12/3700 70/416	11/3500 66/416	10/3300 62/416	10/3150 58/415	9/2950 54/415	9/2750 51/414	8/2600 48/414
33000	TIME/FUEL DIST/SPD	14/4500 84/415	13/4250 79/415	12/4050 75/414	12/3850 71/414	11/3600 67/413	11/3450 63/413	10/3250 59/413	9/3050 55/412	9/2900 52/412	8/2700 49/411	8/2550 45/411
32000	TIME/FUEL DIST/SPD	13/4350 79/412	13/4150 75/411	12/3950 71/411	11/3750 67/411	11/3550 63/410	10/3350 60/410	10/3150 56/409	9/3000 53/409	9/2800 50/409	8/2650 46/408	7/2500 43/408
31000	TIME/FUEL DIST/SPD	13/4250 74/408	12/4000 71/407	11/3800 67/407	11/3600 63/406	10/3450 60/406	10/3250 56/406	9/3050 53/405	9/2900 50/405	8/2750 47/404	8/2550 44/404	7/2400 41/403
30000	TIME/FUEL DIST/SPD	12/4100 69/403	12/3850 66/403	11/3700 62/402	10/3500 59/402	10/3300 56/401	9/3150 52/401	9/2950 49/401	8/2800 47/400	8/2650 44/400	7/2500 41/399	7/2350 38/399
29000	TIME/FUEL DIST/SPD	12/3950 65/398	11/3750 61/398	10/3550 58/398	10/3350 55/397	9/3200 52/397	9/3050 49/397	8/2850 46/396	8/2700 44/396	7/2550 41/396	7/2400 38/395	7/2250 36/395
28000	TIME/FUEL DIST/SPD	11/3800 60/394	10/3600 57/394	10/3450 54/394	9/3250 51/393	9/3100 49/393	8/2950 46/393	8/2750 43/392	8/2600 41/392	7/2450 38/391	7/2300 36/391	6/2200 33/390
27000	TIME/FUEL DIST/SPD	10/3650 56/390	10/3500 53/390	9/3300 51/389	9/3150 48/389	9/3000 45/389	8/2850 43/389	8/2700 40/388	7/2550 38/388	7/2400 36/387	6/2250 33/387	6/2100 31/386
26000	TIME/FUEL DIST/SPD	10/3500 52/386	9/3350 50/386	9/3200 47/385	9/3050 45/385	8/2900 42/385	8/2750 40/385	7/2600 38/384	7/2450 36/384	6/2300 33/383	6/2150 31/383	6/2050 29/382
25000	TIME/FUEL DIST/SPD	9/3400 49/382	9/3250 46/382	9/3100 44/382	8/2900 42/381	8/2800 39/381	7/2650 37/381	7/2500 35/380	7/2350 33/380	6/2250 31/380	6/2100 29/379	5/1950 27/378
24000	TIME/FUEL DIST/SPD	9/3250 45/378	9/3100 43/378	8/2950 41/378	8/2800 39/377	7/2700 37/377	7/2550 35/377	7/2400 33/377	6/2300 31/376	6/2150 29/376	6/2000 27/375	5/1900 25/375
23000	TIME/FUEL DIST/SPD	9/3150 42/374	8/3000 40/374	8/2850 38/374	7/2700 36/374	7/2600 34/373	7/2450 32/373	6/2300 31/373	6/2200 29/372	6/2050 27/372	5/1950 25/372	5/1850 24/371
22000	TIME/FUEL DIST/SPD	8/3050 39/371	8/2900 37/371	7/2750 35/370	7/2600 33/370	7/2500 32/370	6/2350 30/370	6/2250 28/369	6/2100 27/369	5/2000 25/368	5/1900 24/368	5/1750 22/367
21000	TIME/FUEL DIST/SPD	8/2900 36/367	7/2800 34/367	7/2650 33/367	7/2500 31/367	6/2400 29/366	6/2250 28/366	6/2150 26/366	5/2050 25/365	5/1900 23/365	5/1800 22/364	4/1700 20/364
20000	TIME/FUEL DIST/SPD	7/2800 33/364	7/2650 32/364	7/2550 30/364	6/2400 29/363	6/2300 27/363	6/2200 26/363	5/2050 24/362	5/1950 23/362	5/1850 22/362	5/1750 20/361	4/1650 19/360
18000	TIME/FUEL DIST/SPD	7/2550 28/357	6/2450 27/357	6/2350 26/357	6/2250 24/357	5/2100 23/356	5/2000 22/356	5/1900 21/356	5/1800 20/355	4/1700 18/355	4/1600 17/354	4/1500 16/354
16000	TIME/FUEL DIST/SPD	6/2350 24/351	6/2250 23/351	5/2150 22/351	5/2050 21/351	5/1950 20/350	5/1850 18/350	4/1750 17/350	4/1650 16/349	4/1550 15/349	4/1500 15/348	3/1400 14/347
14000	TIME/FUEL DIST/SPD	5/2150 20/345	5/2050 19/345	5/1950 18/345	5/1850 17/345	4/1750 16/344	4/1700 15/344	4/1600 14/344	4/1500 14/343	3/1450 13/343	3/1350 12/342	3/1250 11/341
10000	TIME/FUEL DIST/SPD	4/1750 12/335	4/1650 12/334	4/1550 11/334	4/1500 11/334	3/1450 10/333	3/1350 10/333	3/1300 9/333	3/1200 8/332	3/1150 8/331	3/1100 7/331	2/1050 7/330
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-150	-300	-450	-650	-800	-950

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 10°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD											
38000	TIME/FUEL DIST/SPD											18/5450 120/441
37000	TIME/FUEL DIST/SPD									20/5950 128/439	18/5550 119/438	17/5250 111/437
36000	TIME/FUEL DIST/SPD							21/6450 137/438	19/6050 126/436	18/5700 118/435	17/5350 110/434	16/5050 103/433
35000	TIME/FUEL DIST/SPD						21/6550 135/435	20/6150 126/434	18/5800 117/432	17/5500 110/431	16/5200 103/431	15/4900 97/430
34000	TIME/FUEL DIST/SPD				23/7150 145/434	21/6700 134/432	20/6300 125/431	19/5950 117/430	17/5650 110/429	17/5350 104/428	16/5050 98/427	15/4800 92/427
33000	TIME/FUEL DIST/SPD			23/7250 144/430	21/6800 134/429	20/6450 125/428	19/6100 117/427	18/5750 110/426	17/5450 104/425	16/5200 98/425	15/4900 93/424	14/4650 87/424
32000	TIME/FUEL DIST/SPD	25/7900 156/429	23/7400 143/427	21/6950 133/426	20/6550 125/424	19/6200 117/424	18/5900 110/423	17/5600 104/422	16/5300 98/422	15/5050 93/421	14/4800 88/421	14/4550 83/420
31000	TIME/FUEL DIST/SPD	23/7500 141/422	21/7050 131/421	20/6650 123/420	19/6300 115/419	18/6000 109/419	17/5700 103/418	16/5400 97/418	15/5150 92/417	15/4850 87/417	14/4600 82/416	13/4400 78/416
30000	TIME/FUEL DIST/SPD	21/7100 128/417	20/6700 120/416	19/6350 113/415	18/6050 107/414	17/5750 101/414	16/5450 95/413	15/5200 90/413	15/4950 85/412	14/4700 81/412	13/4450 77/411	12/4250 73/411
29000	TIME/FUEL DIST/SPD	20/6750 118/411	19/6400 111/411	18/6100 104/410	17/5800 99/409	16/5500 93/409	15/5250 88/408	15/5000 84/408	14/4750 79/407	13/4500 75/407	12/4300 71/407	12/4100 68/406
28000	TIME/FUEL DIST/SPD	19/6450 108/406	18/6150 102/406	17/5850 96/405	16/5550 91/405	15/5300 87/404	14/5050 82/404	14/4800 78/403	13/4550 74/403	12/4350 70/403	12/4150 66/402	11/3950 63/402
27000	TIME/FUEL DIST/SPD	18/6200 100/401	17/5900 94/401	16/5600 89/400	15/5350 85/400	14/5100 80/400	14/4850 76/399	13/4600 72/399	12/4400 69/399	12/4200 65/398	11/4000 62/398	11/3800 59/398
26000	TIME/FUEL DIST/SPD	17/5900 92/397	16/5650 87/396	15/5350 82/396	14/5100 78/396	14/4900 74/395	13/4650 71/395	12/4450 67/395	12/4200 64/394	11/4000 61/394	11/3850 58/394	10/3650 55/393
25000	TIME/FUEL DIST/SPD	16/5650 85/392	15/5400 80/392	14/5150 76/392	14/4900 72/391	13/4700 69/391	12/4450 66/391	12/4250 62/390	11/4050 59/390	11/3850 56/390	10/3700 54/390	10/3500 51/389
24000	TIME/FUEL DIST/SPD	15/5400 78/388	14/5150 74/388	13/4950 70/388	13/4700 67/387	12/4500 64/387	12/4300 61/387	11/4100 58/386	11/3900 55/386	10/3700 52/386	10/3550 50/386	9/3400 47/385
23000	TIME/FUEL DIST/SPD	14/5200 72/384	13/4950 68/384	13/4750 65/383	12/4500 62/383	12/4300 59/383	11/4100 56/383	11/3950 54/383	10/3750 51/382	10/3600 49/382	9/3400 46/382	9/3250 44/382
22000	TIME/FUEL DIST/SPD	13/4950 66/380	13/4750 63/380	12/4550 60/380	12/4350 57/379	11/4150 55/379	11/3950 52/379	10/3800 50/379	10/3600 47/379	9/3450 45/378	9/3300 43/378	8/3150 41/378
21000	TIME/FUEL DIST/SPD	12/4750 61/376	12/4550 58/376	11/4350 55/376	11/4150 53/376	10/3950 50/375	10/3800 48/375	10/3600 46/375	9/3450 44/375	9/3300 42/375	8/3150 40/374	8/3000 38/374
20000	TIME/FUEL DIST/SPD	12/4550 56/373	11/4350 53/372	11/4150 51/372	10/4000 49/372	10/3800 46/372	9/3650 44/372	9/3500 42/372	9/3300 40/371	8/3150 38/371	8/3050 37/371	7/2900 35/371
18000	TIME/FUEL DIST/SPD	11/4150 47/366	10/3950 45/366	10/3800 43/365	9/3650 41/365	9/3500 39/365	8/3350 38/365	8/3200 36/365	8/3050 34/365	7/2900 33/364	7/2800 31/364	7/2650 30/364
16000	TIME/FUEL DIST/SPD	9/3750 39/359	9/3600 38/359	9/3450 36/359	8/3300 34/359	8/3150 33/359	8/3050 31/359	7/2900 30/358	7/2800 29/358	7/2650 27/358	6/2550 26/358	6/2400 25/358
14000	TIME/FUEL DIST/SPD	8/3400 32/353	8/3250 31/353	8/3150 30/353	7/3000 28/353	7/2850 27/353	7/2750 26/353	6/2650 25/352	6/2500 24/352	6/2400 23/352	6/2300 22/352	5/2200 21/352
10000	TIME/FUEL DIST/SPD	6/2700 20/342	6/2600 19/342	6/2500 19/342	6/2400 18/342	5/2300 17/341	5/2200 16/341	5/2100 15/341	5/2000 14/341	5/1950 14/341	4/1850 13/341	4/1750 13/341
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-250	-550	-800	-1050	-1350	-1600

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 10°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD								15/4150 103/450	14/3850 95/449	13/3600 88/448	12/3350 81/447
42000	TIME/FUEL DIST/SPD						17/4600 113/449	15/4300 104/448	14/4000 96/447	13/3750 89/446	12/3500 83/445	11/3250 76/444
41000	TIME/FUEL DIST/SPD					17/4750 113/447	15/4450 104/446	14/4150 97/445	13/3900 90/444	13/3650 84/443	12/3400 78/442	11/3200 72/442
40000	TIME/FUEL DIST/SPD				17/4850 113/444	16/4550 104/443	15/4300 97/442	14/4050 91/442	13/3800 84/441	12/3550 79/440	11/3350 73/440	10/3100 68/439
39000	TIME/FUEL DIST/SPD		18/5350 121/443	17/5000 112/442	16/4700 104/441	15/4450 97/440	14/4150 91/439	13/3900 85/439	12/3700 79/438	11/3450 74/437	11/3250 69/437	10/3050 64/436
38000	TIME/FUEL DIST/SPD	18/5450 120/441	17/5100 111/439	16/4850 104/438	15/4550 97/438	14/4300 91/437	13/4050 86/436	12/3800 80/436	12/3600 75/435	11/3350 70/435	10/3150 65/434	10/2950 61/433
37000	TIME/FUEL DIST/SPD	17/5250 111/437	16/4950 104/436	15/4650 97/435	14/4400 91/434	13/4150 86/434	13/3950 81/433	12/3700 76/433	11/3500 71/432	10/3300 66/432	10/3100 62/431	9/2900 58/431
36000	TIME/FUEL DIST/SPD	16/5050 103/433	15/4800 97/433	14/4550 91/432	14/4300 86/431	13/4050 81/431	12/3850 76/430	11/3600 72/430	11/3400 67/429	10/3200 63/429	9/3000 59/428	9/2800 56/428
35000	TIME/FUEL DIST/SPD	15/4900 97/430	15/4650 92/429	14/4400 87/429	13/4200 82/428	12/3950 77/428	12/3750 72/427	11/3550 68/427	10/3350 64/426	10/3150 60/426	9/2950 56/425	8/2750 52/425
34000	TIME/FUEL DIST/SPD	15/4800 93/427	14/4550 87/426	13/4300 82/426	13/4100 78/425	12/3850 73/425	11/3650 69/424	11/3450 65/424	10/3250 61/424	9/3050 57/423	9/2900 53/423	8/2700 50/422
33000	TIME/FUEL DIST/SPD	14/4650 87/424	13/4400 83/423	13/4200 78/423	12/4000 74/422	11/3750 70/422	11/3550 66/421	10/3350 62/421	10/3200 58/421	9/3000 54/420	8/2800 51/420	8/2650 47/419
32000	TIME/FUEL DIST/SPD	14/4550 83/420	13/4300 79/420	12/4100 74/419	12/3900 70/419	11/3650 66/418	10/3500 62/418	10/3300 59/418	9/3100 55/417	9/2900 52/417	8/2750 49/416	8/2550 45/416
31000	TIME/FUEL DIST/SPD	13/4400 78/416	12/4150 74/415	12/3950 70/415	11/3750 66/415	11/3550 62/414	10/3350 59/414	9/3200 55/413	9/3000 52/413	8/2850 49/413	8/2650 46/412	7/2500 43/412
30000	TIME/FUEL DIST/SPD	12/4250 73/411	12/4000 69/411	11/3800 65/410	11/3600 62/410	10/3450 58/409	9/3250 55/409	9/3100 52/409	8/2900 49/408	8/2750 46/408	7/2600 43/407	7/2400 40/407
29000	TIME/FUEL DIST/SPD	12/4100 68/406	11/3900 64/406	11/3700 61/406	10/3500 57/405	10/3300 54/405	9/3150 51/405	9/2950 48/404	8/2800 46/404	8/2650 43/403	7/2500 40/403	7/2350 37/402
28000	TIME/FUEL DIST/SPD	11/3950 63/402	11/3750 60/402	10/3550 57/401	10/3350 54/401	9/3200 51/401	9/3050 48/400	8/2850 45/400	8/2700 43/400	7/2550 40/399	7/2400 37/399	6/2250 35/398
27000	TIME/FUEL DIST/SPD	11/3800 59/398	10/3600 56/397	10/3450 53/397	9/3250 50/397	9/3100 47/396	8/2950 45/396	8/2750 42/396	7/2600 40/395	7/2450 37/395	6/2350 35/394	6/2200 33/394
26000	TIME/FUEL DIST/SPD	10/3650 55/393	10/3450 52/393	9/3300 49/393	9/3150 47/393	8/3000 44/392	8/2850 42/392	7/2700 39/392	7/2550 37/391	7/2400 35/391	6/2250 33/390	6/2100 31/390
25000	TIME/FUEL DIST/SPD	10/3500 51/389	9/3350 48/389	9/3200 46/389	8/3050 44/389	8/2850 41/388	7/2750 39/388	7/2600 37/388	7/2450 35/387	6/2300 33/387	6/2150 30/386	6/2050 28/386
24000	TIME/FUEL DIST/SPD	9/3400 47/385	9/3200 45/385	8/3050 43/385	8/2900 41/385	7/2750 38/384	7/2650 36/384	7/2500 34/384	6/2350 32/383	6/2200 30/383	6/2100 28/382	5/1950 27/382
23000	TIME/FUEL DIST/SPD	9/3250 44/382	8/3100 42/381	8/2950 40/381	8/2800 38/381	7/2650 36/381	7/2550 34/380	6/2400 32/380	6/2250 30/380	6/2150 28/379	5/2000 26/379	5/1900 25/378
22000	TIME/FUEL DIST/SPD	8/3150 41/378	8/3000 39/378	8/2850 37/377	7/2700 35/377	7/2550 33/377	6/2450 31/377	6/2300 30/376	6/2200 28/376	5/2050 26/375	5/1950 25/375	5/1800 23/374
21000	TIME/FUEL DIST/SPD	8/3000 38/374	7/2850 36/374	7/2750 34/374	7/2600 32/374	6/2450 31/373	6/2350 29/373	6/2200 27/373	5/2100 26/372	5/2000 24/372	5/1850 23/371	5/1750 21/371
20000	TIME/FUEL DIST/SPD	7/2900 35/371	7/2750 33/371	7/2600 32/370	6/2500 30/370	6/2350 28/370	6/2250 27/370	5/2150 25/369	5/2000 24/369	5/1900 23/368	5/1800 21/368	4/1700 20/367
18000	TIME/FUEL DIST/SPD	7/2650 30/364	6/2550 28/364	6/2400 27/364	6/2300 26/363	6/2200 24/363	5/2050 23/363	5/1950 22/362	5/1850 20/362	4/1750 19/362	4/1650 18/361	4/1550 17/360
16000	TIME/FUEL DIST/SPD	6/2400 25/358	6/2300 24/358	5/2200 23/357	5/2100 21/357	5/2000 20/357	5/1900 19/356	4/1800 18/356	4/1700 17/356	4/1600 16/355	4/1500 15/355	4/1450 14/354
14000	TIME/FUEL DIST/SPD	5/2200 21/352	5/2100 20/352	5/2000 19/351	5/1900 18/351	4/1800 17/351	4/1700 16/350	4/1650 15/350	4/1550 14/350	4/1450 13/349	3/1400 13/348	3/1300 12/348
10000	TIME/FUEL DIST/SPD	4/1750 13/341	4/1700 12/340	4/1600 12/340	4/1550 11/340	3/1450 11/339	3/1400 10/339	3/1300 9/339	3/1250 8/338	3/1200 8/337	3/1100 7/336	2/1050 7/336
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-150	-350	-500	-650	-800	-1000

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 15°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD											
38000	TIME/FUEL DIST/SPD											20/5750 137/446
37000	TIME/FUEL DIST/SPD									22/6300 147/445	20/5900 135/443	19/5500 126/442
36000	TIME/FUEL DIST/SPD							24/6850 158/443	22/6400 145/442	20/6000 134/440	19/5650 125/439	18/5350 117/438
35000	TIME/FUEL DIST/SPD						24/7000 157/440	22/6550 145/439	21/6150 134/437	19/5800 125/436	18/5450 118/436	17/5150 111/435
34000	TIME/FUEL DIST/SPD				26/7650 170/440	24/7150 156/437	22/6700 144/436	21/6300 134/435	19/5950 126/434	18/5600 118/433	17/5300 111/432	16/5050 105/432
33000	TIME/FUEL DIST/SPD			26/7800 169/436	24/7300 155/434	22/6850 144/433	21/6450 135/432	20/6100 126/431	19/5750 119/430	18/5450 112/429	17/5150 105/429	16/4900 99/428
32000	TIME/FUEL DIST/SPD	28/8550 185/435	26/7950 169/433	24/7450 155/431	23/7000 144/430	21/6600 135/429	20/6250 127/428	19/5900 119/427	18/5600 112/426	17/5300 106/426	16/5000 100/425	15/4750 94/425
31000	TIME/FUEL DIST/SPD	26/8050 165/428	24/7550 153/427	23/7100 142/425	21/6700 133/424	20/6350 125/424	19/6000 118/423	18/5700 111/422	17/5400 105/422	16/5100 99/421	15/4850 93/421	14/4600 88/420
30000	TIME/FUEL DIST/SPD	24/7600 150/422	23/7150 139/421	21/6750 131/420	20/6400 123/419	19/6050 116/418	18/5750 109/418	17/5450 103/417	16/5200 97/417	15/4900 92/416	14/4650 87/416	14/4400 82/415
29000	TIME/FUEL DIST/SPD	23/7250 137/416	21/6850 128/415	20/6450 120/415	19/6150 113/414	18/5800 107/413	17/5500 101/413	16/5250 95/412	15/4950 90/412	14/4700 85/411	14/4500 81/411	13/4250 76/411
28000	TIME/FUEL DIST/SPD	21/6900 125/411	20/6500 118/410	19/6200 111/410	18/5850 105/409	17/5550 99/409	16/5300 94/408	15/5050 89/408	14/4800 84/407	13/4300 79/407	12/4100 75/406	11/3800 71/406
27000	TIME/FUEL DIST/SPD	20/6550 115/406	19/6250 108/405	18/5900 102/405	17/5600 97/404	16/5350 92/404	15/5100 87/404	14/4850 82/403	13/4350 78/403	12/4150 74/402	11/3900 70/402	10/3650 66/402
26000	TIME/FUEL DIST/SPD	19/6250 106/401	18/5950 100/401	17/5650 95/400	16/5400 90/400	15/5150 85/399	14/4900 80/399	13/4450 76/399	12/4250 72/398	11/3900 69/398	10/3700 65/398	9/3450 62/398
25000	TIME/FUEL DIST/SPD	18/6000 97/397	17/5700 92/396	16/5400 87/396	15/5150 83/395	14/4900 79/395	13/4450 75/395	12/4250 71/395	11/3900 67/394	10/3750 64/394	9/3300 60/394	8/3000 57/393
24000	TIME/FUEL DIST/SPD	16/5700 90/392	16/5450 85/392	15/5200 81/392	14/4950 76/391	13/4700 73/391	12/4300 69/391	11/3950 66/390	10/3600 62/390	9/3300 59/390	8/3000 56/390	7/2750 53/389
23000	TIME/FUEL DIST/SPD	16/5450 82/388	15/5200 78/388	14/4950 74/387	13/4750 71/387	12/4350 67/387	11/3950 64/387	10/3800 61/386	9/3450 58/386	8/3150 55/386	7/2900 52/386	6/2500 50/386
22000	TIME/FUEL DIST/SPD	15/5200 76/384	14/5000 72/384	13/4750 69/384	12/4350 65/383	11/3950 62/383	10/3800 59/383	9/3450 56/383	8/3150 53/382	7/2900 51/382	6/2500 48/382	5/2100 46/382
21000	TIME/FUEL DIST/SPD	14/5000 70/380	13/4750 66/380	12/4350 63/380	11/4150 60/380	10/3650 57/379	9/3450 55/379	8/3150 52/379	7/2900 49/379	6/2500 47/379	5/2100 45/378	4/1800 43/378
20000	TIME/FUEL DIST/SPD	13/4750 64/376	12/4550 61/376	11/4150 58/376	10/3800 55/376	9/3450 53/376	8/3150 50/376	7/2900 48/375	6/2500 46/375	5/2100 43/375	4/1800 41/375	3/1450 39/375
18000	TIME/FUEL DIST/SPD	12/4350 54/369	11/4150 51/369	10/3950 49/369	9/3600 47/369	8/3300 45/369	7/2850 43/369	6/2350 41/369	5/2150 39/368	4/1850 37/368	3/1450 35/368	2/1050 33/368
16000	TIME/FUEL DIST/SPD	10/3950 45/363	10/3750 43/363	9/3600 41/363	8/3450 39/362	7/3000 37/362	6/2350 36/362	5/2150 34/362	4/1850 32/362	3/1450 31/362	2/1050 29/362	1/750 28/361
14000	TIME/FUEL DIST/SPD	9/3550 37/357	9/3400 35/356	8/3250 34/356	7/3100 32/356	6/3000 31/356	5/2250 29/356	4/2100 28/356	3/2000 27/356	2/1500 25/356	1/1000 24/355	0/500 23/355
10000	TIME/FUEL DIST/SPD	7/2800 23/345	6/2700 22/345	6/2600 21/345	6/2450 20/345	6/2350 19/345	5/2250 18/345	5/2150 17/344	5/2100 16/344	5/2000 15/344	5/1900 15/344	4/1800 15/344
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-300	-550	-850	-1100	-1400	-1700

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 15°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD								17/4350 116/455	15/4050 107/454	14/3750 98/453	13/3500 91/452
42000	TIME/FUEL DIST/SPD						18/4850 128/454	17/4500 117/453	16/4200 108/452	15/3900 100/451	13/3650 92/450	12/3400 85/449
41000	TIME/FUEL DIST/SPD					18/5000 128/452	17/4650 117/450	16/4350 109/449	15/4050 101/449	14/3800 94/448	13/3550 87/447	12/3300 80/446
40000	TIME/FUEL DIST/SPD				19/5100 127/449	17/4800 118/448	16/4500 109/447	15/4200 102/446	14/3950 95/446	13/3700 88/445	12/3450 82/444	11/3250 76/444
39000	TIME/FUEL DIST/SPD		20/5650 138/448	19/5250 127/447	17/4950 118/446	16/4650 110/445	15/4350 102/444	14/4100 95/443	13/3850 89/443	12/3600 83/442	12/3400 77/442	11/3150 72/441
38000	TIME/FUEL DIST/SPD	20/5750 137/446	19/5400 126/444	18/5050 118/443	16/4750 110/442	15/4500 103/442	15/4250 96/441	14/4000 90/440	13/3750 84/440	12/3500 78/439	11/3300 73/439	10/3100 68/438
37000	TIME/FUEL DIST/SPD	19/5500 126/442	18/5200 117/441	17/4900 110/440	16/4600 103/439	15/4350 97/439	14/4100 91/438	13/3850 85/437	12/3650 79/437	11/3400 74/436	11/3200 69/436	10/3000 64/435
36000	TIME/FUEL DIST/SPD	18/5350 117/438	17/5050 110/437	16/4750 103/437	15/4500 97/436	14/4250 91/436	13/4000 86/435	12/3750 80/434	12/3550 75/434	11/3350 70/433	10/3150 66/433	10/2950 61/432
35000	TIME/FUEL DIST/SPD	17/5150 111/435	16/4900 104/434	15/4650 98/434	14/4350 92/433	14/4150 87/433	13/3900 81/432	12/3700 76/432	11/3450 72/431	11/3250 67/431	10/3050 63/430	9/2850 58/430
34000	TIME/FUEL DIST/SPD	16/5050 105/432	15/4750 99/431	15/4500 93/431	14/4250 88/430	13/4050 82/430	12/3800 78/429	12/3600 73/429	11/3400 68/428	10/3200 64/428	10/3000 60/427	9/2800 56/427
33000	TIME/FUEL DIST/SPD	16/4900 99/428	15/4650 94/428	14/4400 88/427	13/4150 83/427	13/3950 78/426	12/3700 74/426	11/3500 69/426	10/3300 65/425	10/3100 61/425	9/2900 57/424	9/2750 53/424
32000	TIME/FUEL DIST/SPD	15/4750 94/425	14/4500 89/424	14/4250 84/424	13/4050 79/424	12/3850 75/423	11/3600 70/423	11/3400 66/422	10/3200 62/422	10/3050 58/421	9/2850 54/421	8/2650 51/421
31000	TIME/FUEL DIST/SPD	14/4600 88/420	14/4350 83/420	13/4150 79/419	12/3900 74/419	12/3700 70/419	11/3500 66/418	10/3300 62/418	10/3150 58/418	9/2950 55/417	9/2750 51/417	8/2600 48/416
30000	TIME/FUEL DIST/SPD	14/4400 82/415	13/4200 78/415	12/4000 73/415	12/3800 69/414	11/3600 65/414	10/3400 62/414	10/3200 58/413	9/3000 55/413	9/2850 51/412	8/2650 48/412	8/2500 45/412
29000	TIME/FUEL DIST/SPD	13/4250 76/411	12/4050 72/410	12/3850 68/410	11/3650 65/410	10/3450 61/409	10/3250 58/409	9/3100 54/409	9/2900 51/408	8/2750 48/408	8/2600 45/408	7/2400 42/407
28000	TIME/FUEL DIST/SPD	12/4100 71/406	12/3900 67/406	11/3700 64/406	11/3500 60/405	10/3350 57/405	9/3150 54/405	9/3000 51/404	8/2800 48/404	8/2650 45/404	7/2500 42/403	7/2350 39/403
27000	TIME/FUEL DIST/SPD	12/3950 66/402	11/3750 63/401	11/3550 60/401	10/3400 56/401	9/3200 53/401	9/3050 50/400	8/2900 47/400	8/2700 45/400	8/2550 42/399	7/2400 39/399	7/2250 37/398
26000	TIME/FUEL DIST/SPD	11/3800 62/398	11/3600 59/397	10/3450 55/397	10/3250 53/397	9/3100 50/396	9/2950 47/396	8/2750 44/396	8/2600 42/396	7/2450 39/395	7/2300 37/395	6/2200 34/394
25000	TIME/FUEL DIST/SPD	11/3650 57/393	10/3500 54/393	10/3300 52/393	9/3150 49/393	9/3000 46/392	8/2850 44/392	8/2650 41/392	7/2550 39/391	7/2400 36/391	6/2250 34/391	6/2100 32/390
24000	TIME/FUEL DIST/SPD	10/3500 53/389	10/3350 51/389	9/3200 48/389	9/3050 46/389	8/2850 43/388	8/2700 41/388	7/2600 38/388	7/2450 36/388	6/2300 34/387	6/2150 32/387	6/2050 30/386
23000	TIME/FUEL DIST/SPD	10/3400 50/386	9/3200 47/385	9/3050 45/385	8/2900 42/385	8/2750 40/385	7/2600 38/384	7/2500 36/384	7/2350 34/384	6/2200 32/383	6/2100 30/383	5/1950 28/382
22000	TIME/FUEL DIST/SPD	9/3250 46/382	9/3100 44/382	8/2950 41/381	8/2800 39/381	7/2650 37/381	7/2500 35/381	7/2400 33/380	6/2250 31/380	6/2150 29/380	6/2000 28/379	5/1900 26/379
21000	TIME/FUEL DIST/SPD	9/3100 43/378	8/2950 40/378	8/2850 38/378	7/2700 36/378	7/2550 34/377	7/2400 33/377	6/2300 31/377	6/2150 29/376	6/2050 27/376	5/1950 26/376	5/1800 24/375
20000	TIME/FUEL DIST/SPD	8/3000 39/375	8/2850 37/374	7/2700 36/374	7/2600 34/374	7/2450 32/374	6/2350 30/374	6/2200 29/373	6/2100 27/373	5/1950 25/372	5/1850 24/372	5/1750 22/371
18000	TIME/FUEL DIST/SPD	7/2750 33/368	7/2600 32/368	7/2500 30/367	6/2350 29/367	6/2250 27/367	6/2150 26/367	5/2050 24/366	5/1900 23/366	5/1800 21/366	4/1700 20/365	4/1600 19/365
16000	TIME/FUEL DIST/SPD	6/2500 28/361	6/2400 27/361	6/2250 25/361	6/2150 24/361	5/2050 23/361	5/1950 22/360	5/1850 20/360	5/1750 19/360	4/1650 18/359	4/1550 17/359	4/1450 16/358
14000	TIME/FUEL DIST/SPD	6/2250 23/355	5/2150 22/355	5/2050 21/355	5/1950 20/355	5/1850 19/354	4/1750 18/354	4/1700 17/354	4/1600 16/353	4/1500 15/353	4/1400 14/352	3/1350 13/352
10000	TIME/FUEL DIST/SPD	4/1800 15/344	4/1750 14/344	4/1650 13/343	4/1550 12/343	4/1500 12/343	3/1400 11/343	3/1350 11/342	3/1300 10/342	3/1200 9/341	3/1150 9/341	3/1100 8/340
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-150	-350	-500	-700	-850	-1050

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 20°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD											
38000	TIME/FUEL DIST/SPD											23/6150 159/452
37000	TIME/FUEL DIST/SPD									25/6750 173/451	23/6300 157/449	21/5850 145/447
36000	TIME/FUEL DIST/SPD							27/7450 188/450	25/6900 170/447	23/6400 156/446	21/6000 144/444	20/5650 135/443
35000	TIME/FUEL DIST/SPD					30/8250 208/450	27/7600 186/447	25/7050 169/445	23/6550 156/443	22/6150 145/442	20/5800 135/441	19/5500 127/440
34000	TIME/FUEL DIST/SPD				30/8400 204/446	27/7700 184/444	25/7200 169/442	23/6750 156/440	22/6350 146/439	21/5950 136/438	19/5650 128/437	18/5300 120/437
33000	TIME/FUEL DIST/SPD			30/8550 203/443	27/7900 183/440	25/7350 169/438	24/6900 157/437	22/6500 146/436	21/6150 137/435	20/5800 128/435	19/5450 121/434	18/5150 113/433
32000	TIME/FUEL DIST/SPD	33/9500 225/442	30/8700 202/439	28/8050 184/437	26/7550 169/435	24/7050 157/434	23/6650 147/433	21/6300 138/432	20/5950 129/431	19/5600 121/431	18/5300 114/430	17/5000 107/430
31000	TIME/FUEL DIST/SPD	30/8800 198/434	28/8200 181/432	26/7650 167/431	24/7200 156/430	23/6800 146/429	21/6400 136/428	20/6050 128/427	19/5700 120/427	18/5400 113/426	17/5100 107/425	16/4850 101/425
30000	TIME/FUEL DIST/SPD	28/8250 178/427	26/7750 164/426	24/7250 153/425	23/6850 143/424	21/6450 134/423	20/6100 126/423	19/5800 118/422	18/5500 111/421	17/5200 105/421	16/4900 99/420	15/4650 93/420
29000	TIME/FUEL DIST/SPD	26/7850 162/421	24/7350 150/420	23/6950 140/420	21/6550 132/419	20/6200 124/418	19/5850 116/418	18/5550 110/417	17/5250 103/416	16/5000 98/416	15/4700 92/416	14/4500 87/415
28000	TIME/FUEL DIST/SPD	24/7450 147/416	23/7000 138/415	21/6600 129/414	20/6250 121/414	19/5950 114/413	18/5600 108/413	17/5300 102/412	16/5050 96/412	15/4800 91/411	14/4550 86/411	14/4300 81/411
27000	TIME/FUEL DIST/SPD	22/7050 135/411	21/6650 126/410	20/6300 119/409	19/6000 112/409	18/5650 106/408	17/5400 100/408	16/5100 94/408	15/4850 89/407	14/4600 84/407	14/4350 80/406	13/4150 75/406
26000	TIME/FUEL DIST/SPD	21/6700 124/406	20/6350 116/405	19/6050 109/405	18/5700 103/404	17/5450 98/404	16/5150 92/403	15/4900 87/403	14/4650 83/403	14/4400 78/402	13/4200 74/402	12/4000 70/402
25000	TIME/FUEL DIST/SPD	20/6400 113/401	19/6050 107/401	18/5750 101/400	17/5450 95/400	16/5200 90/399	15/4950 85/399	14/4700 81/399	14/4450 77/398	13/4250 72/398	12/4050 69/398	12/3850 65/398
24000	TIME/FUEL DIST/SPD	19/6100 104/397	18/5800 98/396	17/5500 93/396	16/5250 88/395	15/4950 83/395	14/4750 79/395	14/4500 75/395	13/4300 71/394	12/4050 67/394	12/3850 64/394	11/3700 60/394
23000	TIME/FUEL DIST/SPD	17/5800 95/392	16/5500 90/392	16/5250 86/392	15/5000 81/391	14/4750 77/391	13/4550 73/391	13/4300 69/390	12/4100 66/390	12/3900 62/390	11/3700 59/390	10/3550 56/390
22000	TIME/FUEL DIST/SPD	16/5550 88/388	16/5250 83/388	15/5000 79/388	14/4800 75/387	13/4550 71/387	13/4350 67/387	12/4150 64/387	12/3950 61/386	11/3750 58/386	10/3550 55/386	10/3400 52/386
21000	TIME/FUEL DIST/SPD	15/5300 80/384	15/5050 76/384	14/4800 72/384	13/4550 69/383	13/4350 65/383	12/4150 62/383	11/3950 59/383	11/3750 56/383	10/3600 53/382	10/3400 51/382	9/3250 48/382
20000	TIME/FUEL DIST/SPD	14/5050 74/380	14/4800 70/380	13/4600 67/380	12/4350 63/380	12/4150 60/380	11/3950 57/379	11/3800 54/379	10/3600 52/379	10/3450 49/379	9/3250 47/379	9/3100 44/379
18000	TIME/FUEL DIST/SPD	13/4550 62/373	12/4350 59/373	12/4150 56/373	11/3950 53/373	11/3800 51/373	10/3600 48/372	10/3450 46/372	9/3300 44/372	9/3150 42/372	8/3000 40/372	8/2850 38/372
16000	TIME/FUEL DIST/SPD	11/4100 51/366	11/3950 49/366	10/3750 47/366	10/3600 44/366	9/3450 42/366	9/3300 40/366	8/3150 38/366	8/3000 37/365	8/2850 35/365	7/2700 33/365	7/2600 32/365
14000	TIME/FUEL DIST/SPD	10/3700 42/360	9/3550 40/360	9/3400 38/360	9/3250 36/360	8/3100 35/360	8/2950 33/359	7/2800 32/359	7/2700 30/359	7/2550 29/359	6/2450 27/359	6/2350 26/359
10000	TIME/FUEL DIST/SPD	7/2900 26/348	7/2800 25/348	7/2650 24/348	6/2550 23/348	6/2450 22/348	6/2350 21/348	6/2250 20/348	5/2150 19/348	5/2050 18/347	5/1950 17/347	5/1850 16/347
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-300	-600	-900	-1200	-1500	-1800

Shaded area approximates optimum altitude at LRC/.84.

310/.84 Enroute Climb
ISA + 20°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD								19/4600 134/460	17/4250 122/459	16/3950 112/458	15/3700 103/457
42000	TIME/FUEL DIST/SPD						21/5150 148/460	19/4750 135/458	18/4450 124/457	16/4150 114/456	15/3850 105/455	14/3600 97/454
41000	TIME/FUEL DIST/SPD					21/5300 148/458	19/4900 135/456	18/4600 124/455	16/4300 115/454	15/4000 106/453	14/3750 98/452	13/3500 91/452
40000	TIME/FUEL DIST/SPD				21/5450 147/455	19/5100 135/454	18/4750 117/447	17/4450 116/452	16/4150 107/451	15/3900 100/450	14/3650 93/449	13/3400 86/449
39000	TIME/FUEL DIST/SPD		23/6000 161/454	21/5600 146/453	20/5250 135/451	18/4900 125/450	17/4600 117/449	16/4300 109/449	15/4050 101/448	14/3800 94/447	13/3550 87/447	12/3300 81/446
38000	TIME/FUEL DIST/SPD	23/6150 159/452	21/5750 146/450	20/5350 135/449	18/5050 126/448	17/4750 117/447	16/4450 109/446	15/4200 102/446	14/3950 95/445	13/3700 89/444	12/3450 83/444	11/3200 77/443
37000	TIME/FUEL DIST/SPD	21/5850 145/447	20/5500 135/446	19/5200 126/445	17/4900 118/444	16/4600 110/444	15/4350 103/443	14/4050 96/442	14/3800 90/442	13/3600 84/441	12/3350 78/441	11/3150 73/440
36000	TIME/FUEL DIST/SPD	20/5650 135/443	19/5300 126/442	18/5000 118/442	17/4750 111/441	16/4450 104/441	15/4200 97/440	14/3950 91/439	13/3700 85/439	12/3500 79/438	11/3250 74/438	11/3050 69/437
35000	TIME/FUEL DIST/SPD	19/5500 127/440	18/5150 119/439	17/4900 112/439	16/4600 105/438	15/4350 98/438	14/4100 92/437	13/3850 87/437	12/3650 81/436	12/3400 76/436	11/3200 71/435	10/3000 66/435
34000	TIME/FUEL DIST/SPD	18/5300 120/437	17/5000 113/436	16/4750 106/436	15/4500 100/435	14/4250 94/434	14/4000 88/434	13/3750 82/434	12/3550 77/433	11/3350 72/433	11/3100 67/432	10/2900 63/432
33000	TIME/FUEL DIST/SPD	18/5150 113/433	17/4900 107/433	16/4600 100/432	15/4350 95/432	14/4150 89/431	13/3900 84/431	12/3650 78/430	12/3450 74/430	11/3250 69/429	10/3050 64/429	9/2850 60/429
32000	TIME/FUEL DIST/SPD	17/5000 107/430	16/4750 101/429	15/4500 95/429	14/4250 90/428	13/4000 85/428	13/3800 80/427	12/3600 75/427	11/3350 70/427	10/3150 66/426	10/2950 61/426	9/2800 57/425
31000	TIME/FUEL DIST/SPD	16/4850 101/425	15/4600 95/425	14/4350 89/424	14/4100 84/424	13/3900 79/423	12/3650 75/423	11/3450 70/423	11/3250 66/422	10/3050 62/422	9/2900 58/421	9/2700 54/421
30000	TIME/FUEL DIST/SPD	15/4650 81/411	14/4400 88/420	14/4200 83/419	13/3950 79/419	12/3750 74/418	11/3550 61/418	11/3350 66/418	10/3150 62/417	10/2950 58/417	9/2800 54/417	8/2600 50/416
29000	TIME/FUEL DIST/SPD	14/4500 87/415	14/4250 82/415	13/4050 78/414	12/3800 73/414	12/3600 69/414	11/3400 65/413	10/3200 61/413	10/3050 58/413	9/2850 54/412	9/2700 50/412	8/2500 47/412
28000	TIME/FUEL DIST/SPD	14/4300 81/411	13/4100 76/410	12/3900 72/410	12/3650 68/410	11/3500 64/409	10/3300 61/409	10/3100 57/409	9/2950 54/408	9/2750 50/408	8/2600 47/408	8/2450 44/407
27000	TIME/FUEL DIST/SPD	13/4150 75/406	12/3950 71/406	12/3750 67/405	11/3550 64/405	10/3350 60/405	10/3150 57/405	9/3000 53/404	9/2850 50/404	8/2650 47/404	8/2500 44/403	7/2350 41/403
26000	TIME/FUEL DIST/SPD	12/4000 70/402	12/3800 66/401	11/3600 63/401	10/3400 59/401	10/3250 56/401	9/3050 53/400	9/2900 50/400	8/2750 47/400	8/2550 44/399	7/2400 41/399	7/2250 38/399
25000	TIME/FUEL DIST/SPD	12/3850 65/398	11/3650 62/397	10/3450 58/397	10/3300 55/397	9/3100 52/397	9/2950 49/396	8/2800 46/396	8/2650 44/396	7/2500 41/395	7/2350 38/395	7/2200 36/395
24000	TIME/FUEL DIST/SPD	11/3700 60/394	10/3500 57/393	10/3300 54/393	9/3150 51/393	9/3000 49/393	8/2850 46/392	8/2700 43/392	8/2550 41/392	7/2400 38/391	7/2250 36/391	6/2100 33/391
23000	TIME/FUEL DIST/SPD	10/3550 56/390	10/3350 53/389	9/3200 50/389	9/3050 48/389	8/2900 45/389	8/2750 43/388	8/2600 40/388	7/2450 38/388	7/2300 35/388	6/2150 33/387	6/2050 31/387
22000	TIME/FUEL DIST/SPD	10/3400 52/386	9/3250 49/386	9/3050 47/385	8/2900 44/385	8/2750 42/385	8/2600 40/385	7/2500 37/384	7/2350 35/384	6/2200 33/384	6/2100 31/383	6/1950 29/383
21000	TIME/FUEL DIST/SPD	9/3250 48/382	9/3100 46/382	8/2950 43/382	8/2800 41/381	8/2650 39/381	7/2500 37/381	7/2400 35/381	6/2250 33/380	6/2100 31/380	6/2000 29/380	5/1900 27/379
20000	TIME/FUEL DIST/SPD	9/3100 44/379	8/2950 42/378	8/2800 40/378	8/2700 38/378	7/2550 36/378	7/2400 34/377	6/2300 32/377	6/2150 30/377	6/2050 28/377	5/1900 27/376	5/1800 25/376
18000	TIME/FUEL DIST/SPD	8/2850 38/372	8/2700 36/371	7/2600 34/371	7/2450 32/371	6/2350 31/371	6/2200 29/371	6/2100 27/370	5/2000 26/370	5/1850 24/370	5/1750 23/369	5/1650 21/369
16000	TIME/FUEL DIST/SPD	7/2600 32/365	7/2450 30/365	6/2350 28/365	6/2250 27/364	6/2150 26/364	5/2000 24/364	5/1900 23/364	5/1800 22/363	5/1700 20/363	4/1600 19/363	4/1500 18/362
14000	TIME/FUEL DIST/SPD	6/2350 26/359	6/2250 25/359	6/2150 23/358	5/2000 22/358	5/1900 21/358	5/1850 20/358	5/1750 19/357	4/1650 18/357	4/1550 17/357	4/1450 16/356	4/1350 15/356
10000	TIME/FUEL DIST/SPD	5/1850 16/347	4/1750 15/347	4/1700 15/347	4/1600 14/347	4/1550 13/346	4/1450 13/346	3/1400 12/346	3/1300 11/345	3/1250 10/345	3/1150 10/345	3/1100 9/344
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

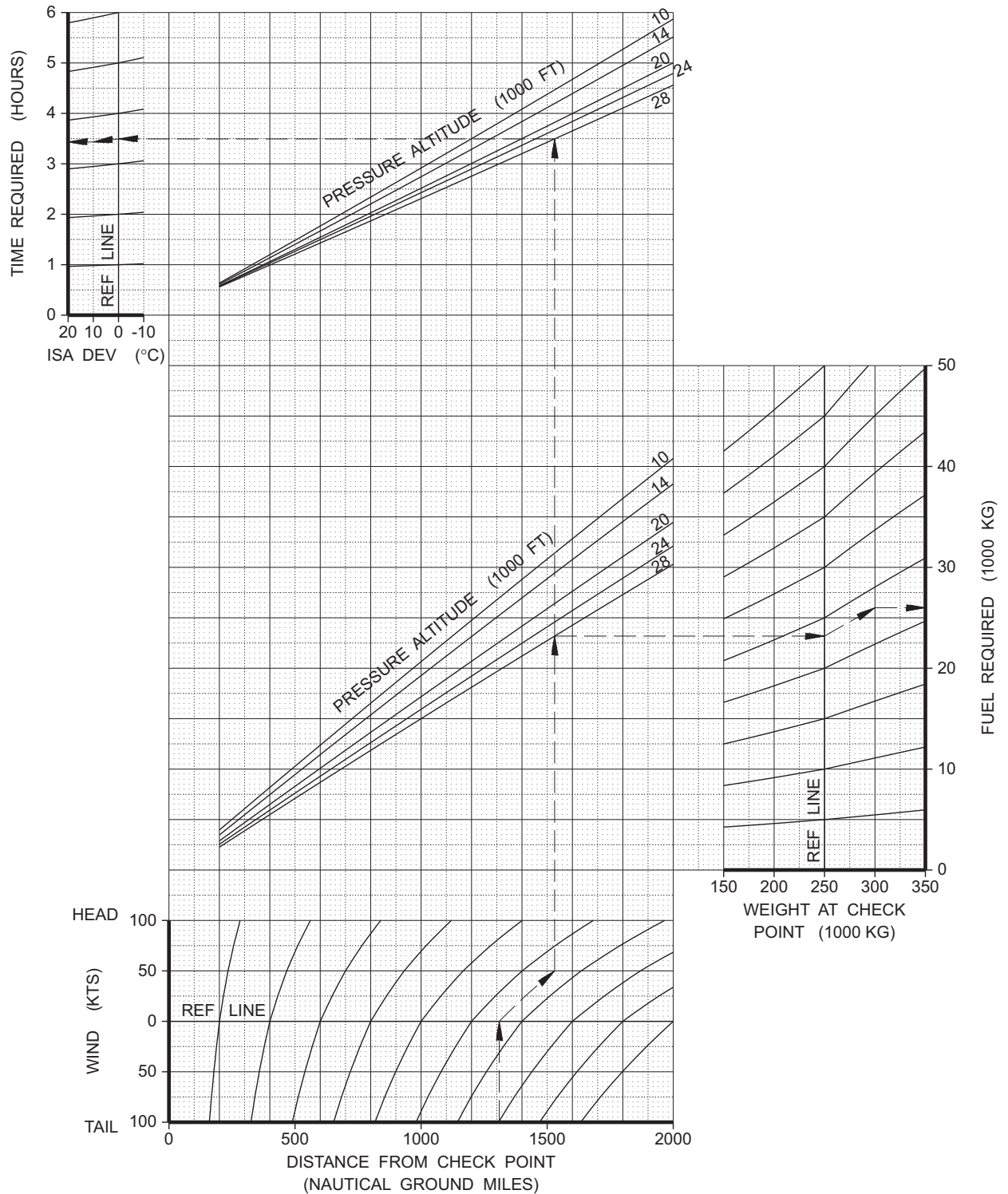
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-200	-350	-550	-700	-900	-1100

Shaded area approximates optimum altitude at LRC/.84.

Long Range Cruise Enroute Fuel and Time

0 to 2000 NM Distance

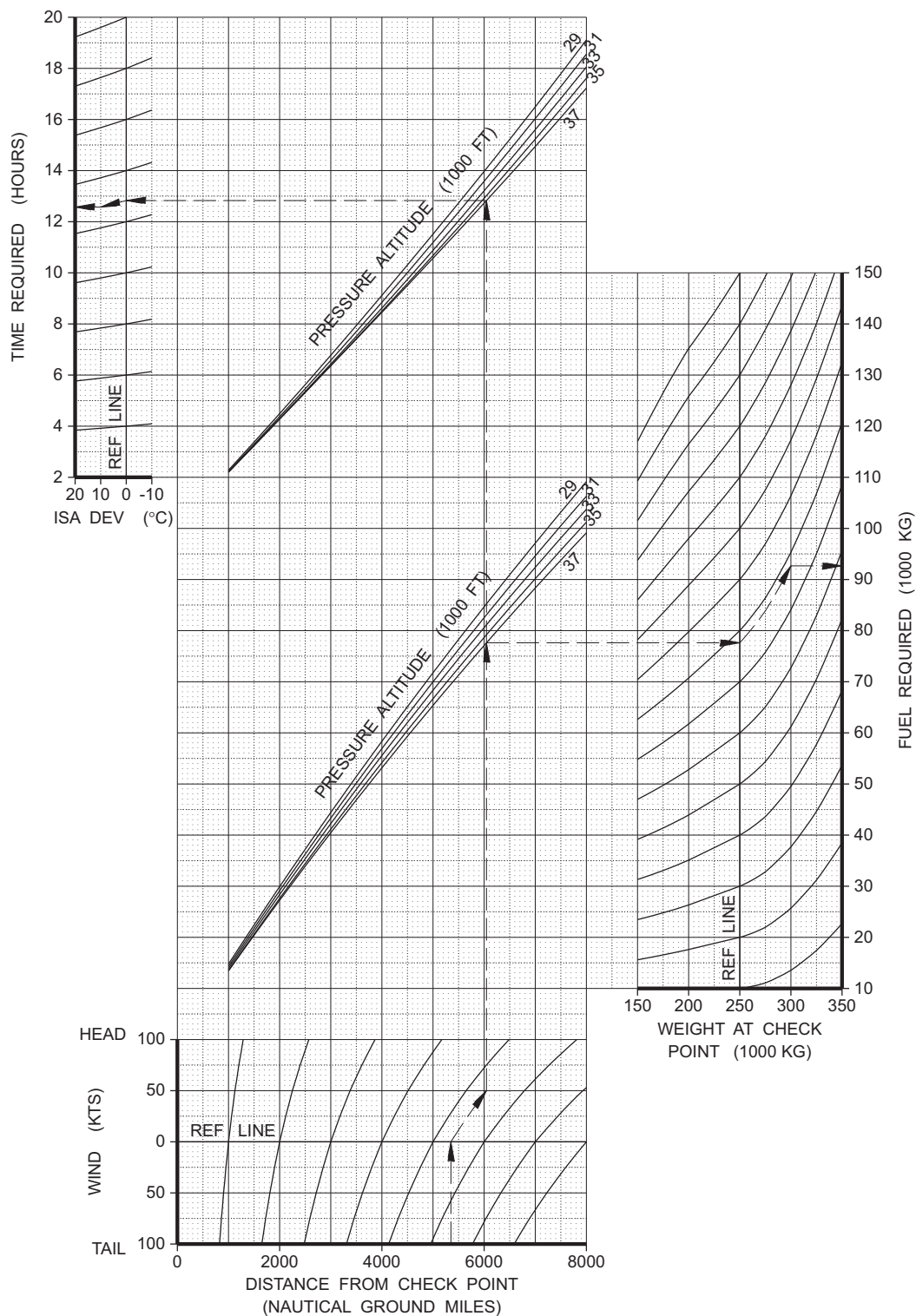
Based on .84/310/250 descent



Long Range Cruise Enroute Fuel and Time

1000 to 8000 NM Distance

Based on .84/310/250 descent



Long Range Cruise Table

43000 FT to 37000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
42	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
41	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
40	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
39	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
38	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
37 (-26)	%N1 MAX TAT KIAS MACH FF/ENG KTAS											87.0 274 .838 3802 481

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5
37	88.3	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.5	95.8	95.2	94.5

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Long Range Cruise Table

43000 FT to 37000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43 (-26)	%N1									85.2	84.1	83.1
	MAX TAT											
	KIAS									239	239	238
	MACH									.840	.840	.838
	FF/ENG									2659	2533	2423
42 (-26)	KTAS									482	482	481
	%N1								85.3	84.2	83.2	82.2
	MAX TAT											
	KIAS								244	244	244	242
	MACH								.840	.840	.839	.834
41 (-26)	FF/ENG								2798	2667	2557	2443
	KTAS								482	482	481	478
	%N1							85.3	84.2	83.3	82.3	81.1
	MAX TAT											
	KIAS							250	250	250	248	245
40 (-26)	MACH							.840	.840	.839	.835	.826
	FF/ENG							2935	2801	2690	2578	2457
	KTAS							482	482	481	479	474
	%N1						85.2	84.2	83.3	82.4	81.3	80.0
	MAX TAT											
39 (-27)	KIAS						256	256	256	254	252	247
	MACH						.840	.840	.839	.836	.828	.815
	FF/ENG						3065	2930	2820	2708	2590	2454
	KTAS						482	482	481	480	475	467
	%N1				86.4	85.1	84.1	83.2	82.4	81.3	80.2	78.9
38 (-27)	MAX TAT											
	KIAS				261	262	262	262	261	258	254	248
	MACH				.839	.840	.840	.839	.837	.830	.818	.801
	FF/ENG				3368	3192	3058	2947	2836	2721	2590	2441
	KTAS				481	482	482	481	480	476	469	460
37 (-27)	%N1			86.1	84.9	84.0	83.2	82.3	81.3	80.2	79.1	77.6
	MAX TAT											
	KIAS			268	268	268	268	267	265	261	256	249
	MACH			.839	.840	.840	.839	.837	.831	.820	.805	.787
	FF/ENG			3490	3318	3185	3075	2965	2852	2724	2578	2424
36 (-27)	KTAS			481	482	482	481	480	476	470	462	451
	%N1	87.0	85.8	84.7	83.8	83.0	82.2	81.3	80.2	79.2	77.8	76.3
	MAX TAT											
	KIAS	274	274	274	274	274	273	271	267	262	256	249
	MACH	.838	.839	.840	.840	.839	.837	.831	.821	.808	.791	.770
35 (-27)	FF/ENG	3802	3609	3442	3313	3204	3095	2983	2857	2713	2561	2404
	KTAS	481	481	482	482	481	480	477	471	463	453	442

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5
43	87.9	88.9	90.0	91.0	92.0	93.0	94.0	94.9	95.9	96.9	96.3	95.6	94.9	94.4
42	88.0	89.0	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	96.5	95.8	95.0	94.5
41	88.1	89.1	90.1	91.2	92.2	93.2	94.2	95.1	96.1	97.1	96.6	95.9	95.2	94.7
40	88.2	89.2	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	96.7	96.1	95.3	94.8
39	88.3	89.4	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5	94.9
38	88.3	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.8	96.0	95.3	94.7
37	88.3	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.5	95.8	95.2	94.5

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.



Flight Planning and Performance Manual

Long Range Cruise Table

36000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
36 (-26)	%N1										86.6	85.4
	MAX TAT											
	KIAS										280	280
	MACH										.839	.839
	FF/ENG KTAS										3916 481	3727 482
35 (-24)	%N1								87.8	86.6	85.5	84.6
	MAX TAT											
	KIAS								286	287	287	287
	MACH								.838	.839	.839	.840
	FF/ENG KTAS								4252 483	4052 483	3867 484	3718 484
34 (-21)	%N1						88.9	87.7	86.5	85.5	84.7	84.0
	MAX TAT											
	KIAS						293	293	293	293	294	294
	MACH						.838	.838	.839	.840	.840	.840
	FF/ENG KTAS						4592 485	4378 485	4183 486	4006 486	3868 486	3753 486
33 (-19)	%N1				89.9 11	88.6	87.5	86.4	85.5	84.8	84.1	83.4
	MAX TAT											
	KIAS				299	299	300	300	300	300	300	300
	MACH				.837	.838	.839	.839	.840	.840	.840	.838
	FF/ENG KTAS				4935 487	4709 487	4503 488	4312 488	4149 488	4019 489	3908 488	3799 488
32 (-17)	%N1		90.8 10	89.5 15	88.4	87.4	86.3	85.5	84.8	84.2	83.6	82.8
	MAX TAT											
	KIAS		306	306	306	307	307	307	307	307	306	305
	MACH		.837	.838	.838	.839	.839	.840	.840	.840	.838	.835
	FF/ENG KTAS		5281 489	5042 489	4825 490	4627 490	4442 490	4295 491	4173 491	4064 490	3956 490	3846 488
31 (-15)	%N1	90.3 14	89.2 18	88.2	87.1	86.3	85.6	84.9	84.3	83.7	82.9	82.1
	MAX TAT											
	KIAS	313	313	313	313	314	314	314	313	313	311	309
	MACH	.837	.838	.839	.839	.840	.840	.840	.839	.837	.834	.828
	FF/ENG KTAS	5376 491	5150 492	4942 492	4748 492	4581 493	4448 493	4332 493	4223 492	4115 491	4006 489	3885 486
30 (-13)	%N1	88.9	87.9	87.0	86.2	85.6	85.0	84.4	83.7	83.0	82.3	81.6
	MAX TAT											
	KIAS	320	320	320	321	321	321	320	319	317	315	311
	MACH	.838	.839	.839	.840	.840	.840	.839	.836	.832	.826	.818
	FF/ENG KTAS	5260 494	5061 494	4878 495	4731 495	4606 495	4497 495	4388 494	4280 493	4168 491	4044 487	3907 482

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
36	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.4	95.8	95.1	94.4	93.8	93.2
35	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.0	96.2	95.6	94.8	94.2	93.5
34	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.2	96.4	95.8	94.9	94.3	93.5
33	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	96.6	96.0	95.1	94.4	93.6
32	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	96.9	96.2	95.3	94.6	93.8
31	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.2	96.4	95.5	94.7	94.0
30	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	96.7	95.8	94.9	94.1

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Long Range Cruise Table

36000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
36 (-27)	%N1	85.4	84.4	83.6	82.9	82.1	81.2	80.2	79.2	78.0	76.5	75.0
	MAX TAT											
	KIAS	280	281	281	280	279	277	274	269	263	256	249
	MACH	.839	.840	.840	.839	.837	.831	.822	.809	.794	.775	.753
	FF/ENG	3727	3569	3445	3336	3228	3117	2992	2850	2701	2544	2383
35 (-26)	KTAS	482	482	482	482	480	477	472	464	455	444	432
	%N1	84.6	83.8	83.1	82.3	81.4	80.5	79.5	78.4	77.0	75.6	74.1
	MAX TAT											
	KIAS	287	287	287	286	284	280	276	270	264	256	248
	MACH	.840	.840	.839	.836	.831	.822	.810	.795	.778	.757	.737
34 (-24)	FF/ENG	3718	3598	3490	3381	3269	3144	3003	2855	2699	2536	2382
	KTAS	484	484	484	482	479	474	467	459	448	437	425
	%N1	84.0	83.3	82.5	81.7	80.8	79.9	78.7	77.4	76.0	74.7	73.3
	MAX TAT											
	KIAS	294	293	292	290	287	282	277	271	263	256	249
33 (-23)	MACH	.840	.839	.836	.831	.822	.811	.797	.780	.761	.741	.723
	FF/ENG	3753	3644	3535	3422	3296	3155	3008	2852	2689	2531	2388
	KTAS	486	486	484	481	476	469	461	452	441	429	419
	%N1	83.4	82.7	81.8	81.0	80.1	79.0	77.8	76.5	75.2	73.9	72.7
	MAX TAT											
32 (-21)	KIAS	300	298	296	293	289	283	277	270	263	256	250
	MACH	.838	.835	.830	.822	.810	.797	.782	.763	.745	.727	.712
	FF/ENG	3799	3690	3576	3448	3306	3159	3003	2840	2680	2532	2399
	KTAS	488	486	483	478	471	464	455	444	433	423	414
	%N1	82.8	82.0	81.2	80.4	79.3	78.1	76.9	75.6	74.3	73.2	72.1
31 (-20)	MAX TAT											
	KIAS	305	303	299	295	290	284	277	270	263	257	252
	MACH	.835	.829	.821	.810	.797	.782	.765	.747	.730	.715	.702
	FF/ENG	3846	3730	3600	3457	3309	3154	2991	2828	2676	2540	2417
	KTAS	488	484	479	473	466	457	447	436	426	418	410
30 (-19)	%N1	82.1	81.4	80.6	79.5	78.4	77.2	75.9	74.7	73.6	72.6	71.5
	MAX TAT											
	KIAS	309	305	301	296	290	284	277	270	264	259	254
	MACH	.828	.819	.809	.797	.783	.766	.749	.732	.718	.705	.692
	FF/ENG	3885	3752	3608	3459	3304	3141	2976	2821	2682	2555	2432
30 (-19)	KTAS	486	481	475	467	459	450	439	430	421	414	406
	%N1	81.6	80.7	79.7	78.6	77.5	76.3	75.1	74.0	73.0	72.0	70.8
	MAX TAT											
	KIAS	311	307	302	296	290	283	277	271	266	261	255
	MACH	.818	.808	.796	.782	.767	.750	.734	.720	.707	.695	.681
30 (-19)	FF/ENG	3907	3762	3612	3455	3291	3125	2967	2825	2696	2573	2448
	KTAS	482	476	469	461	452	442	432	424	417	410	401

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
36	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.4	95.8	95.1	94.4	93.8
35	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.0	96.2	95.6	94.8	94.2
34	88.9	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.2	96.4	95.8	94.9	94.3
33	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	96.6	96.0	95.1	94.4
32	88.1	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	96.9	96.2	95.3	94.6
31	87.7	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.2	96.4	95.5	94.7
30	87.4	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	96.7	95.8	94.9

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.



Flight Planning and Performance Manual

Long Range Cruise Table
29000 FT to 23000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
29 (-11)	%N1	87.7	86.9	86.2	85.6	85.1	84.5	83.8	83.1	82.4	81.7	80.9
	MAX TAT											
	KIAS	327	327	328	328	327	327	326	324	321	317	313
	MACH	.839	.840	.840	.840	.839	.838	.835	.831	.824	.816	.806
	FF/ENG	5185	5024	4892	4775	4667	4559	4449	4334	4205	4066	3919
28 (-9)	KTAS	497	497	497	497	497	496	494	492	488	483	477
	%N1	86.8	86.2	85.6	85.1	84.5	83.8	83.1	82.5	81.8	80.9	80.0
	MAX TAT											
	KIAS	335	335	335	334	333	332	330	327	323	319	314
	MACH	.840	.840	.840	.839	.837	.834	.829	.822	.814	.804	.793
27 (-7)	FF/ENG	5185	5062	4953	4844	4735	4624	4502	4371	4227	4078	3923
	KTAS	499	499	499	499	498	496	493	489	484	478	471
	%N1	86.2	85.7	85.1	84.5	83.8	83.2	82.6	81.9	81.0	80.1	79.1
	MAX TAT											
	KIAS	342	341	341	340	338	336	333	329	325	320	314
26 (-5)	MACH	.840	.839	.838	.836	.832	.827	.820	.811	.802	.790	.778
	FF/ENG	5242	5134	5026	4914	4799	4673	4537	4390	4238	4079	3915
	KTAS	501	501	500	499	497	494	489	484	478	472	464
	%N1	85.6	85.0	84.4	83.8	83.3	82.6	81.9	81.0	80.1	79.2	78.2
	MAX TAT											
25 (-4)	KIAS	348	348	346	344	342	338	335	330	325	320	314
	MACH	.837	.837	.834	.830	.824	.817	.809	.799	.788	.776	.762
	FF/ENG	5296	5206	5094	4973	4843	4702	4552	4396	4234	4066	3893
	KTAS	502	502	500	498	494	490	485	479	472	465	457
	%N1	84.5	84.0	83.6	83.2	82.7	81.9	81.0	80.2	79.2	78.3	77.3
24 (-3)	MAX TAT											
	KIAS	346	346	346	346	344	340	336	331	325	319	313
	MACH	.819	.819	.819	.819	.814	.805	.796	.785	.773	.760	.747
	FF/ENG	5246	5154	5069	4988	4864	4711	4551	4386	4216	4040	3870
	KTAS	493	493	493	493	490	485	479	473	465	457	450
23 (-2)	%N1	83.7	83.3	82.8	82.3	81.8	81.0	80.2	79.3	78.3	77.4	76.5
	MAX TAT											
	KIAS	345	345	345	345	345	341	336	331	325	319	313
	MACH	.801	.801	.801	.801	.801	.793	.782	.770	.757	.745	.733
	FF/ENG	5206	5112	5023	4937	4856	4700	4532	4360	4184	4016	3858
23 (-2)	KTAS	484	484	484	484	484	479	473	465	458	450	443
	%N1	82.9	82.3	81.8	81.3	80.8	80.2	79.3	78.4	77.5	76.7	75.8
	MAX TAT											
	KIAS	344	344	344	344	344	341	336	330	325	319	314
	MACH	.784	.784	.784	.784	.784	.778	.767	.755	.743	.731	.721
23 (-2)	FF/ENG	5159	5065	4974	4886	4803	4674	4500	4325	4160	4005	3864
	KTAS	476	476	476	476	476	472	465	458	451	444	437

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
29	89.7	90.7	91.6	92.6	93.5	94.5	95.4	96.3	96.5	95.5	94.7	94.0	93.2	92.4
28	89.0	90.0	90.9	91.9	92.8	93.7	94.7	95.6	96.3	95.3	94.6	93.8	93.1	92.3
27	88.3	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.7	95.1	94.4	93.7	92.9	92.1
26	87.7	88.6	89.6	90.5	91.4	92.3	93.2	94.1	95.0	95.0	94.3	93.5	92.8	92.0
25	87.6	88.5	89.5	90.4	91.3	92.2	93.1	94.0	94.9	95.0	94.1	93.4	92.7	91.9
24	87.4	88.4	89.3	90.2	91.2	92.1	93.0	93.9	94.7	94.9	94.2	93.2	92.3	91.4
23	87.0	87.9	88.9	89.8	90.7	91.6	92.5	93.4	94.2	95.0	94.2	93.2	92.0	90.8

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

Long Range Cruise Table

29000 FT to 23000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
29 (-17)	%N1	80.9	79.9	78.8	77.7	76.6	75.5	74.4	73.4	72.4	71.3	70.0
	MAX TAT											
	KIAS	313	308	303	296	290	283	277	272	268	262	256
	MACH	.806	.794	.781	.766	.750	.735	.721	.709	.698	.685	.669
	FF/ENG	3919	3766	3608	3442	3274	3114	2971	2840	2717	2592	2460
28 (-16)	KTAS	477	470	462	453	444	435	427	420	413	405	396
	%N1	80.0	79.0	77.9	76.8	75.8	74.7	73.8	72.9	71.8	70.6	69.2
	MAX TAT											
	KIAS	314	308	302	296	289	284	279	274	269	263	256
	MACH	.793	.780	.765	.750	.735	.722	.710	.700	.688	.674	.657
27 (-15)	FF/ENG	3923	3761	3593	3424	3263	3119	2986	2863	2738	2607	2472
	KTAS	471	463	455	446	437	429	422	416	409	400	390
	%N1	79.1	78.1	77.0	76.0	75.0	74.1	73.2	72.2	71.1	69.8	68.4
	MAX TAT											
	KIAS	314	308	302	296	290	285	281	276	270	264	256
26 (-13)	MACH	.778	.764	.749	.735	.723	.711	.701	.690	.677	.661	.643
	FF/ENG	3915	3744	3573	3412	3267	3134	3011	2885	2757	2621	2483
	KTAS	464	456	447	439	431	425	419	412	404	395	384
	%N1	78.2	77.2	76.2	75.3	74.4	73.5	72.6	71.5	70.3	69.0	67.6
	MAX TAT											
25 (-12)	KIAS	314	308	302	296	292	287	283	277	271	264	256
	MACH	.762	.748	.735	.723	.712	.702	.691	.679	.665	.648	.630
	FF/ENG	3893	3722	3561	3417	3283	3159	3034	2907	2771	2631	2489
	KTAS	457	449	440	433	427	421	414	407	399	389	377
	%N1	77.3	76.4	75.5	74.6	73.8	72.9	71.9	70.8	69.5	68.2	66.8
24 (-11)	MAX TAT											
	KIAS	313	309	304	300	295	291	285	278	271	263	254
	MACH	.733	.722	.712	.703	.693	.683	.670	.655	.639	.621	.601
	FF/ENG	3858	3715	3582	3458	3333	3207	3072	2933	2788	2640	2490
	KTAS	443	436	430	425	419	413	405	396	386	375	363
23 (-9)	%N1	75.8	75.1	74.3	73.5	72.5	71.5	70.4	69.2	67.9	66.6	65.1
	MAX TAT											
	KIAS	314	310	306	302	297	292	285	278	271	262	253
	MACH	.721	.711	.703	.693	.683	.671	.658	.643	.626	.607	.588
	FF/ENG	3864	3731	3607	3482	3357	3223	3084	2941	2793	2643	2490
	KTAS	437	432	427	421	415	408	399	390	380	368	357

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	88.7	89.7	90.7	91.6	92.6	93.5	94.5	95.4	96.3	96.5	95.5	94.7	94.0	93.2
28	88.0	89.0	90.0	90.9	91.9	92.8	93.7	94.7	95.6	96.3	95.3	94.6	93.8	93.1
27	87.3	88.3	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.7	95.1	94.4	93.7	92.9
26	86.7	87.7	88.6	89.6	90.5	91.4	92.3	93.2	94.1	95.0	95.0	94.3	93.5	92.8
25	86.6	87.6	88.5	89.5	90.4	91.3	92.2	93.1	94.0	94.9	95.0	94.1	93.4	92.7
24	86.5	87.4	88.4	89.3	90.2	91.2	92.1	93.0	93.9	94.7	94.9	94.2	93.2	92.3
23	86.0	87.0	87.9	88.9	89.8	90.7	91.6	92.5	93.4	94.2	95.0	94.2	93.2	92.0

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

Long Range Cruise Table
22000 FT to 16000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
22 (-1)	%N1	81.9	81.4	80.9	80.3	79.9	79.3	78.4	77.6	76.7	76.0	75.2
	MAX TAT											
	KIAS	343	343	343	343	343	341	335	330	325	320	316
	MACH	.768	.768	.768	.768	.768	.763	.751	.740	.729	.720	.711
	FF/ENG	5113	5020	4928	4838	4755	4639	4468	4305	4153	4013	3882
21 (0)	KTAS	468	468	468	468	468	465	458	451	444	439	433
	%N1	81.0	80.5	80.0	79.4	79.0	78.4	77.6	76.8	76.1	75.4	74.7
	MAX TAT											
	KIAS	342	342	342	342	342	341	335	330	326	322	318
	MACH	.752	.752	.752	.752	.752	.748	.737	.727	.718	.710	.702
20 (1)	FF/ENG	5075	4983	4890	4799	4718	4615	4453	4305	4166	4035	3913
	KTAS	460	460	460	460	460	458	451	445	439	434	429
	%N1	80.1	79.6	79.0	78.5	78.1	77.6	76.9	76.2	75.5	74.8	74.0
	MAX TAT											
	KIAS	341	341	341	341	341	341	336	332	328	324	320
19 (3)	MACH	.736	.736	.736	.736	.736	.734	.725	.716	.708	.701	.692
	FF/ENG	5047	4955	4863	4772	4693	4609	4462	4324	4193	4070	3943
	KTAS	452	452	452	452	452	451	445	440	435	431	425
	%N1	79.2	78.7	78.1	77.7	77.2	76.8	76.2	75.6	74.9	74.2	73.4
	MAX TAT											
18 (4)	KIAS	340	340	340	340	340	340	337	334	330	326	322
	MACH	.721	.721	.721	.721	.721	.721	.714	.707	.700	.691	.683
	FF/ENG	5033	4939	4847	4757	4680	4611	4489	4359	4234	4105	3978
	KTAS	445	445	445	445	445	445	441	436	431	426	421
	%N1	78.3	77.8	77.3	76.8	76.4	76.1	75.7	75.0	74.3	73.5	72.6
17 (5)	MAX TAT											
	KIAS	340	340	340	340	340	340	339	336	332	328	323
	MACH	.706	.706	.706	.706	.706	.706	.705	.698	.690	.682	.672
	FF/ENG	5021	4926	4834	4748	4672	4604	4531	4403	4273	4143	4007
	KTAS	437	437	437	437	437	437	437	432	427	422	416
16 (7)	%N1	77.4	76.9	76.5	76.0	75.6	75.3	74.9	74.4	73.6	72.8	71.9
	MAX TAT											
	KIAS	339	339	339	339	339	339	339	338	333	328	323
	MACH	.692	.692	.692	.692	.692	.692	.692	.689	.681	.671	.661
	FF/ENG	5006	4911	4822	4738	4664	4596	4530	4443	4311	4172	4030
16 (7)	KTAS	430	430	430	430	430	430	430	428	423	417	411
	%N1	76.6	76.1	75.7	75.2	74.8	74.4	74.0	73.6	72.9	72.1	71.2
	MAX TAT											
	KIAS	338	338	338	338	338	338	338	338	334	329	323
	MACH	.678	.678	.678	.678	.678	.678	.678	.678	.670	.660	.649
16 (7)	FF/ENG	4989	4895	4808	4728	4656	4589	4524	4461	4336	4192	4044
	KTAS	423	423	423	423	423	423	423	423	418	412	405

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
22	88.4	89.4	90.3	91.1	92.0	92.9	93.8	94.6	94.2	93.3	91.8	90.3	88.8	87.5
21	88.1	89.1	90.0	90.8	91.7	92.6	93.5	94.3	94.1	93.1	91.8	90.5	89.0	87.8
20	87.8	88.7	89.6	90.5	91.4	92.3	93.1	94.0	94.1	92.8	91.7	90.6	89.2	88.1
19	87.5	88.4	89.2	90.1	91.0	91.9	92.7	93.6	94.3	93.0	91.9	90.7	89.2	88.0
18	87.1	88.0	88.8	89.7	90.6	91.4	92.3	93.1	94.0	93.3	92.1	90.8	89.3	88.0
17	86.7	87.6	88.4	89.3	90.2	91.0	91.9	92.7	93.5	93.6	92.3	91.0	89.4	87.9
16	86.4	87.3	88.1	89.0	89.9	90.7	91.6	92.4	93.2	93.6	92.6	91.4	89.9	88.2

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

Long Range Cruise Table

22000 FT to 16000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
22 (-8)	%N1	75.2	74.5	73.7	72.8	71.8	70.8	69.6	68.4	67.1	65.8	64.2
	MAX TAT											
	KIAS	316	312	308	303	298	292	285	278	270	261	253
	MACH	.711	.702	.693	.684	.672	.660	.645	.629	.612	.593	.575
	FF/ENG	3882	3759	3633	3508	3375	3237	3094	2948	2798	2642	2488
21 (-6)	KTAS	433	428	423	417	410	402	393	383	373	362	350
	%N1	74.7	73.9	73.0	72.1	71.1	70.0	68.8	67.6	66.3	64.9	63.4
	MAX TAT											
	KIAS	318	314	310	304	299	292	285	277	269	261	252
	MACH	.702	.693	.684	.673	.661	.647	.632	.616	.598	.580	.562
20 (-5)	FF/ENG	3913	3786	3661	3528	3391	3249	3103	2953	2797	2639	2483
	KTAS	429	424	418	412	404	396	387	377	366	355	344
	%N1	74.0	73.2	72.3	71.3	70.3	69.2	68.0	66.8	65.5	64.0	62.6
	MAX TAT											
	KIAS	320	316	311	305	299	292	284	276	268	260	252
19 (-3)	MACH	.692	.684	.673	.661	.648	.634	.619	.602	.585	.568	.551
	FF/ENG	3943	3817	3683	3546	3405	3259	3109	2952	2792	2633	2485
	KTAS	425	420	414	406	398	390	380	370	359	349	338
	%N1	73.4	72.5	71.6	70.6	69.5	68.4	67.3	66.0	64.6	63.2	61.8
	MAX TAT											
18 (-2)	KIAS	322	317	311	305	298	291	283	275	267	259	252
	MACH	.683	.673	.662	.649	.636	.621	.605	.589	.572	.556	.541
	FF/ENG	3978	3843	3705	3562	3415	3264	3108	2947	2786	2632	2493
	KTAS	421	415	408	400	392	383	373	363	353	343	333
	%N1	72.6	71.8	70.8	69.8	68.7	67.6	66.4	65.1	63.8	62.4	61.1
17 (-1)	MAX TAT											
	KIAS	323	317	311	305	298	290	282	275	267	259	252
	MACH	.672	.662	.650	.637	.622	.607	.592	.576	.560	.545	.531
	FF/ENG	4007	3867	3722	3574	3422	3264	3102	2941	2784	2640	2506
	KTAS	416	410	402	394	385	376	366	357	347	338	329
16 (1)	%N1	71.9	71.0	70.0	69.0	68.0	66.8	65.6	64.3	63.0	61.6	60.4
	MAX TAT											
	KIAS	323	317	311	304	297	289	282	274	267	260	253
	MACH	.661	.650	.637	.624	.609	.594	.579	.564	.549	.535	.522
	FF/ENG	4030	3884	3733	3579	3421	3259	3097	2938	2790	2651	2520
15 (2)	KTAS	411	404	396	388	379	369	360	350	341	333	324
	%N1	71.2	70.3	69.3	68.3	67.2	66.0	64.7	63.4	62.2	60.9	59.7
	MAX TAT											
	KIAS	323	317	310	303	296	288	281	274	267	260	254
	MACH	.649	.637	.624	.610	.596	.582	.567	.553	.539	.526	.513
14 (3)	FF/ENG	4044	3892	3736	3577	3414	3253	3093	2941	2799	2664	2535
	KTAS	405	398	389	381	372	363	354	345	337	328	320

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
22	87.5	88.4	89.4	90.3	91.1	92.0	92.9	93.8	94.6	94.2	93.3	91.8	90.3	88.8
21	87.2	88.1	89.1	90.0	90.8	91.7	92.6	93.5	94.3	94.1	93.1	91.8	90.5	89.0
20	86.9	87.8	88.7	89.6	90.5	91.4	92.3	93.1	94.0	94.1	92.8	91.7	90.6	89.2
19	86.6	87.5	88.4	89.2	90.1	91.0	91.9	92.7	93.6	94.3	93.0	91.9	90.7	89.2
18	86.2	87.1	88.0	88.8	89.7	90.6	91.4	92.3	93.1	94.0	93.3	92.1	90.8	89.3
17	85.8	86.7	87.6	88.4	89.3	90.2	91.0	91.9	92.7	93.5	93.6	92.3	91.0	89.4
16	85.5	86.4	87.3	88.1	89.0	89.9	90.7	91.6	92.4	93.2	93.6	92.6	91.4	89.9

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

Long Range Cruise Table
15000 FT to 6000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
15 (8)	%N1	75.8	75.3	74.8	74.3	73.9	73.5	73.1	72.8	72.2	71.3	70.4
	MAX TAT											
	KIAS	337	337	337	337	337	337	337	337	335	329	323
	MACH	.664	.664	.664	.664	.664	.664	.664	.664	.659	.648	.637
	FF/ENG	4969	4878	4794	4717	4646	4580	4515	4454	4350	4200	4047
14 (9)	KTAS	416	416	416	416	416	416	416	416	413	406	399
	%N1	74.9	74.4	74.0	73.5	73.1	72.7	72.3	72.0	71.4	70.6	69.7
	MAX TAT											
	KIAS	337	337	337	337	337	337	337	337	335	329	322
	MACH	.651	.651	.651	.651	.651	.651	.651	.651	.647	.636	.624
13 (10)	FF/ENG	4948	4860	4780	4705	4634	4568	4504	4443	4352	4197	4040
	KTAS	409	409	409	409	409	409	409	409	407	400	392
	%N1	74.1	73.6	73.1	72.7	72.3	71.9	71.5	71.2	70.7	69.8	68.9
	MAX TAT											
	KIAS	336	336	336	336	336	336	336	336	334	328	321
12 (12)	MACH	.638	.638	.638	.638	.638	.638	.638	.638	.635	.623	.611
	FF/ENG	4929	4844	4766	4692	4622	4555	4492	4431	4345	4187	4027
	KTAS	403	403	403	403	403	403	403	403	401	393	386
	%N1	73.3	72.8	72.4	71.9	71.5	71.2	70.8	70.4	70.0	69.1	68.2
	MAX TAT											
10 (14)	KIAS	335	335	335	335	335	335	335	335	334	327	320
	MACH	.626	.626	.626	.626	.626	.626	.626	.626	.622	.611	.598
	FF/ENG	4912	4830	4753	4679	4609	4542	4478	4418	4331	4171	4009
	KTAS	396	396	396	396	396	396	396	396	394	387	379
	%N1	71.7	71.3	70.8	70.4	70.1	69.7	69.3	69.0	68.4	67.5	66.5
8 (17)	MAX TAT											
	KIAS	334	334	334	334	334	334	334	334	332	325	319
	MACH	.602	.602	.602	.602	.602	.602	.602	.602	.597	.586	.574
	FF/ENG	4881	4803	4726	4653	4582	4514	4450	4390	4290	4135	3981
	KTAS	384	384	384	384	384	384	384	384	381	374	366
6 (20)	%N1	70.1	69.7	69.3	69.0	68.6	68.2	67.8	67.4	66.8	65.8	64.9
	MAX TAT											
	KIAS	333	333	333	333	333	333	333	333	330	324	318
	MACH	.579	.579	.579	.579	.579	.579	.579	.579	.573	.563	.552
	FF/ENG	4851	4774	4698	4625	4553	4485	4420	4360	4252	4101	3958
	KTAS	372	372	372	372	372	372	372	372	369	362	355
	%N1	68.7	68.2	67.8	67.4	67.0	66.6	66.2	65.8	65.2	64.3	63.4
	MAX TAT											
	KIAS	332	332	332	332	332	332	332	332	329	324	318
	MACH	.557	.557	.557	.557	.557	.557	.557	.557	.552	.543	.534
	FF/ENG	4815	4738	4663	4590	4519	4450	4386	4326	4221	4087	3958
	KTAS	361	361	361	361	361	361	361	361	357	352	346

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
15	87.8	88.7	89.5	90.4	91.2	92.0	92.8	93.6	92.6	91.8	90.3	88.7	86.5	84.1
14	87.5	88.3	89.2	90.0	90.8	91.7	92.5	93.3	92.8	91.9	90.7	89.2	87.6	85.4
13	87.1	87.9	88.8	89.6	90.4	91.3	92.1	92.9	92.9	92.0	91.0	89.7	88.3	86.4
12	86.6	87.5	88.3	89.2	90.0	90.8	91.6	92.4	93.0	92.1	91.2	90.1	89.0	87.2
10	85.7	86.5	87.3	88.2	89.0	89.8	90.6	91.4	92.1	92.3	91.4	90.4	89.3	88.0
8	84.7	85.6	86.4	87.2	88.0	88.8	89.6	90.3	91.1	91.8	91.1	90.2	89.1	87.9
6	84.1	84.9	85.7	86.5	87.3	88.1	88.9	89.6	90.4	91.1	91.4	90.4	89.3	88.2

With engine anti-ice on, decrease limit %N1 by 0.6.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.

Long Range Cruise Table

15000 FT to 6000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
15 (2)	%N1	70.4	69.5	68.5	67.5	66.3	65.1	63.9	62.6	61.4	60.2	59.0
	MAX TAT											
	KIAS	323	316	309	302	295	288	281	274	267	261	254
	MACH	.637	.624	.611	.597	.583	.569	.556	.543	.530	.517	.505
	FF/ENG	4047	3890	3730	3566	3406	3246	3092	2947	2809	2678	2553
14 (4)	KTAS	399	391	383	374	365	357	348	340	332	324	316
	%N1	69.7	68.7	67.7	66.6	65.5	64.3	63.1	61.9	60.7	59.6	58.4
	MAX TAT											
	KIAS	322	316	308	301	294	287	281	274	268	261	255
	MACH	.624	.611	.598	.585	.571	.558	.545	.533	.521	.509	.498
13 (5)	FF/ENG	4040	3880	3716	3556	3397	3242	3096	2956	2823	2696	2575
	KTAS	392	384	376	368	359	351	343	335	328	320	313
	%N1	68.9	68.0	66.9	65.8	64.6	63.5	62.3	61.2	60.1	59.0	57.9
	MAX TAT											
	KIAS	321	314	308	301	294	287	281	275	268	262	257
12 (7)	MACH	.611	.598	.586	.573	.560	.548	.536	.524	.513	.502	.491
	FF/ENG	4027	3864	3705	3547	3392	3245	3105	2970	2841	2719	2601
	KTAS	386	378	370	361	353	346	338	331	324	317	310
	%N1	68.2	67.1	66.1	64.9	63.8	62.8	61.7	60.6	59.5	58.5	57.4
	MAX TAT											
10 (10)	KIAS	320	314	307	300	294	287	281	275	269	263	258
	MACH	.598	.586	.574	.561	.549	.538	.527	.516	.505	.494	.484
	FF/ENG	4009	3851	3694	3540	3394	3254	3119	2989	2864	2745	2630
	KTAS	379	371	363	355	348	341	334	327	320	313	307
	%N1	66.5	65.5	64.5	63.5	62.5	61.5	60.5	59.6	58.6	57.5	56.4
8 (13)	MAX TAT											
	KIAS	319	312	306	300	294	288	283	277	271	266	261
	MACH	.574	.563	.552	.541	.531	.520	.510	.500	.491	.481	.472
	FF/ENG	3981	3829	3685	3546	3412	3282	3155	3034	2916	2802	2693
	KTAS	366	359	352	345	339	332	326	319	313	307	301
6 (16)	%N1	64.9	64.0	63.0	62.1	61.2	60.3	59.4	58.4	57.4	56.4	55.4
	MAX TAT											
	KIAS	318	312	306	301	295	290	285	279	274	269	264
	MACH	.552	.542	.533	.523	.514	.505	.496	.487	.478	.469	.461
	FF/ENG	3958	3821	3689	3560	3435	3315	3198	3085	2977	2871	2768
	KTAS	355	349	343	337	330	325	319	313	307	302	296
	%N1	63.4	62.6	61.7	60.9	60.0	59.2	58.3	57.3	56.4	55.5	54.5
	MAX TAT											
	KIAS	318	313	308	302	297	292	287	282	278	273	268
	MACH	.534	.525	.516	.508	.499	.491	.482	.474	.466	.458	.451
	FF/ENG	3958	3833	3711	3593	3478	3369	3263	3161	3061	2961	2860
	KTAS	346	340	334	329	323	318	313	307	302	297	292

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
15	86.9	87.8	88.7	89.5	90.4	91.2	92.0	92.8	93.6	92.6	91.8	90.3	88.7	86.5
14	86.6	87.5	88.3	89.2	90.0	90.8	91.7	92.5	93.3	92.8	91.9	90.7	89.2	87.6
13	86.2	87.1	87.9	88.8	89.6	90.4	91.3	92.1	92.9	92.9	92.0	91.0	89.7	88.3
12	85.8	86.6	87.5	88.3	89.2	90.0	90.8	91.6	92.4	93.0	92.1	91.2	90.1	89.0
10	84.8	85.7	86.5	87.3	88.2	89.0	89.8	90.6	91.4	92.1	92.3	91.4	90.4	89.3
8	83.9	84.7	85.6	86.4	87.2	88.0	88.8	89.6	90.3	91.1	91.8	91.1	90.2	89.1
6	83.3	84.1	84.9	85.7	86.5	87.3	88.1	88.9	89.6	90.4	91.1	91.4	90.4	89.3

With engine anti-ice on, decrease limit %N1 by 0.6.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.



Flight Planning and Performance Manual

.84M Cruise Table
43000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS	WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43												
42												
41												
40												
39												
38												
37	274 -26 482	%N1 MAX TAT FF/ENG										87.2
36	281 -26 482	%N1 MAX TAT FF/ENG									86.7	85.5
35	287 -23 484	%N1 MAX TAT FF/ENG							88.0	86.7	85.5	84.6
34	294 -21 486	%N1 MAX TAT FF/ENG					89.1 12 4634	87.8 4404	86.6 4198	85.5 4014	84.7 3868	84.0 3754
33	300 -19 489	%N1 MAX TAT FF/ENG			90.1 10 4990	88.8 4745	87.6 4525	86.5 4324	85.5 4154	84.8 4019	84.1 3910	83.5 3812
32	307 -17 491	%N1 MAX TAT FF/ENG		89.7 14 5088	88.5 4855	87.4 4645	86.4 4452	85.6 4298	84.9 4173	84.2 4069	83.7 3974	83.1 3891
31	314 -14 493	%N1 MAX TAT FF/ENG	90.6 13 5432	89.3 18 5187	88.3 4966	87.2 4763	86.3 4588	85.6 4448	84.9 4333	84.4 4232	83.8 4141	83.2 4060
30	321 -12 495	%N1 MAX TAT FF/ENG	89.0 5290	88.0 5080	87.0 4889	86.2 4735	85.6 4606	85.0 4500	84.5 4402	83.9 4314	83.4 4236	82.9 4165
												4098

Max TAT not shown where %N1 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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
37	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5	94.9	94.5
36	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.9	96.2	95.5	94.9	94.5
35	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.7	96.8	96.2	95.5	95.0
34	88.9	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.9	97.1	96.5	95.7	95.2
33	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	97.4	96.8	96.0	95.4
32	88.1	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	97.8	97.0	96.3	95.6
31	87.7	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	97.3	96.6	95.9
30	87.4	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	97.7	96.9	96.2

With engine anti-ice on, decrease limit %N1 by 0.3.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

.84M Cruise Table**43000 FT to 30000 FT - Low Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
43	239	%N1									85.2	84.1	83.2
	-26	MAX TAT									2663	2534	2434
	482	FF/ENG											
42	244	%N1								85.3	84.2	83.3	82.4
	-26	MAX TAT								2802	2667	2565	2477
	482	FF/ENG											
41	250	%N1							85.3	84.2	83.3	82.5	81.8
	-26	MAX TAT							2940	2801	2696	2606	2533
	482	FF/ENG											
40	256	%N1						85.2	84.2	83.3	82.5	81.8	81.1
	-26	MAX TAT						3071	2930	2824	2733	2657	2593
	482	FF/ENG											
39	262	%N1				86.4	85.1	84.1	83.3	82.5	81.8	81.1	80.5
	-26	MAX TAT				3381	3198	3058	2951	2859	2781	2717	2654
	482	FF/ENG											
38	268	%N1			86.2	84.9	84.0	83.2	82.5	81.8	81.1	80.5	79.9
	-26	MAX TAT			3503	3323	3185	3080	2987	2909	2844	2781	2721
	482	FF/ENG											
37	274	%N1	87.2	85.9	84.7	83.8	83.0	82.4	81.7	81.0	80.4	79.9	79.5
	-26	MAX TAT											
	482	FF/ENG	3824	3620	3446	3313	3209	3117	3039	2974	2910	2850	2794
36	281	%N1	85.5	84.5	83.6	82.9	82.3	81.6	81.0	80.4	79.9	79.5	79.0
	-26	MAX TAT											
	482	FF/ENG	3738	3572	3445	3342	3252	3174	3108	3045	2984	2927	2875
35	287	%N1	84.6	83.8	83.1	82.5	81.8	81.3	80.7	80.3	79.8	79.4	78.9
	-23	MAX TAT											
	484	FF/ENG	3720	3599	3497	3408	3331	3265	3201	3139	3081	3028	2978
34	294	%N1	84.0	83.3	82.7	82.1	81.5	81.0	80.6	80.1	79.7	79.3	78.9
	-21	MAX TAT											
	486	FF/ENG	3754	3654	3566	3490	3424	3359	3296	3238	3184	3133	3086
33	300	%N1	83.5	82.9	82.3	81.8	81.3	80.9	80.4	80.1	79.6	79.2	78.8
	-19	MAX TAT											
	489	FF/ENG	3812	3727	3652	3586	3521	3457	3398	3343	3291	3243	3200
32	307	%N1	83.1	82.5	82.0	81.6	81.1	80.7	80.4	79.9	79.5	79.2	78.9
	-17	MAX TAT											
	491	FF/ENG	3891	3818	3752	3686	3622	3562	3505	3453	3403	3359	3320
31	314	%N1	82.7	82.2	81.8	81.4	81.0	80.6	80.2	79.8	79.5	79.2	78.9
	-14	MAX TAT											
	493	FF/ENG	3988	3922	3855	3791	3730	3673	3620	3569	3524	3483	3448
30	321	%N1	82.4	82.0	81.7	81.3	80.9	80.5	80.1	79.8	79.5	79.2	79.0
	-12	MAX TAT											
	495	FF/ENG	4098	4031	3966	3905	3848	3794	3742	3695	3654	3617	3584

Max TAT not shown where %N1 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.

.84M Cruise Table

43000 FT to 30000 FT - Low Weights

Max Cruise %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
43	88.9	90.0	91.0	92.0	93.0	94.0	94.9	95.9	96.9	96.3	95.6	94.9	94.4	94.0
42	89.0	90.1	91.1	92.1	93.1	94.1	95.0	96.0	97.0	96.5	95.8	95.0	94.6	94.1
41	89.1	90.1	91.2	92.2	93.2	94.2	95.1	96.1	97.1	96.7	95.9	95.2	94.7	94.3
40	89.2	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	96.8	96.1	95.4	94.8	94.4
39	89.4	90.4	91.4	92.4	93.5	94.4	95.4	96.4	97.4	97.0	96.3	95.5	95.0	94.5
38	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.0	96.2	95.5	94.9	94.5
37	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5	94.9	94.5
36	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.9	96.2	95.5	94.9	94.5
35	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.7	96.8	96.2	95.5	95.0
34	88.9	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.9	97.1	96.5	95.7	95.2
33	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	97.4	96.8	96.0	95.4
32	88.1	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	97.8	97.0	96.3	95.6
31	87.7	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	97.3	96.6	95.9
30	87.4	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	97.7	96.9	96.2

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Wind-Altitude Trade**LRC**

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43							156	68	18	1	6
41						136	61	18	1	3	19
39						51	15	1	3	15	34
37			156	85	38	11	1	3	14	31	49
35		114	61	26	7	0	3	14	29	46	62
33	79	40	16	3	0	5	15	29	44	59	72
31	24	8	1	1	7	17	30	44	58	70	78
29	3	0	3	10	20	32	45	57	68	77	81
27	1	5	13	23	34	46	58	68	76	80	81
25	9	17	27	37	48	59	68	75	80	82	79

.84M

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43							172	77	22	1	7
41						151	70	22	1	4	25
39					124	58	18	1	3	20	49
37				96	44	13	1	3	18	43	76
35		127	69	31	8	0	4	19	41	69	102
33		47	19	4	0	6	20	41	66	96	127
31	29	10	1	1	9	23	42	66	92	120	149
29	4	0	3	12	27	45	67	91	117	143	169
27	1	7	17	31	49	69	92	115	139	163	186
25	12	23	37	54	73	94	115	137	159	181	

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, 240000 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 240000 kg are 15 (33000 ft) and 1 (37000 ft). Difference is -14 so break-even wind is -20 plus -14, i.e. -34 knots (headwind).
B) Similarly, wind factors are 15 (33000 ft) and 45 (29000 ft). Difference is +30 so break-even wind is -20 plus +30, i.e. +10 knots (tailwind).

Descent

.84/280/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			160	210	260
43000	29	880	131	151	157
41000	28	870	126	145	153
39000	28	860	121	139	148
37000	27	850	116	133	142
35000	26	840	110	127	135
33000	25	820	104	120	127
31000	24	800	98	113	120
29000	23	790	92	105	112
27000	22	770	86	98	104
25000	21	740	80	91	96
23000	20	720	73	84	88
21000	19	690	67	77	81
19000	17	660	61	69	73
17000	16	630	55	62	66
15000	15	590	49	55	58
10000	11	480	32	35	36
5000	7	350	15	17	17
1500	4	250	4	4	4

.84/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			160	210	260
43000	31	930	146	161	161
41000	31	920	141	155	156
39000	30	910	133	147	149
37000	29	890	126	139	141
35000	28	870	118	131	133
33000	26	860	111	123	126
31000	25	840	104	115	118
29000	24	820	97	107	110
27000	23	790	90	100	102
25000	22	760	83	92	95
23000	20	730	76	84	87
21000	19	700	69	76	79
19000	18	670	62	69	71
17000	16	630	56	61	63
15000	15	590	49	54	55
10000	11	480	32	35	36
5000	7	350	15	17	17
1500	4	250	4	4	4

**Descent**
.84/310/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			160	210	260
43000	27	830	120	140	150
41000	26	820	115	135	145
39000	26	810	109	129	140
37000	25	800	104	123	135
35000	24	790	100	118	129
33000	24	780	96	113	124
31000	23	770	92	108	118
29000	22	760	87	102	111
27000	21	740	82	95	104
25000	20	720	76	89	96
23000	19	700	71	82	89
21000	18	680	66	76	82
19000	17	650	61	70	75
17000	16	630	55	63	67
15000	15	600	50	57	60
10000	11	480	32	35	36
5000	7	350	15	17	17
1500	4	250	4	4	4

Allowances for a straight-in approach are included.



Flight Planning and Performance Manual

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
43000	%N1											81.8
	KIAS											215
	FF/ENG											2340
40000	%N1									83.5	80.8	77.7
	KIAS									241	227	213
	FF/ENG									2930	2590	2270
35000	%N1						84.1	82.0	79.6	77.2	74.3	71.3
	KIAS						274	262	249	237	224	210
	FF/ENG						3750	3410	3090	2770	2470	2180
30000	%N1	88.5	86.6	85.0	83.2	81.3	79.3	77.1	74.7	72.3	69.1	66.1
	KIAS	312	312	302	291	280	269	258	246	233	208	199
	FF/ENG	5380	4980	4600	4270	3950	3620	3310	3000	2690	2350	2160
25000	%N1	83.5	82.1	80.3	78.5	76.6	74.6	72.3	69.6	67.0	64.5	62.0
	KIAS	317	307	297	287	277	266	248	226	213	206	199
	FF/ENG	5140	4800	4460	4130	3830	3540	3200	2850	2580	2390	2170
20000	%N1	78.9	77.3	75.7	73.8	71.6	69.3	67.2	64.9	62.7	60.2	57.5
	KIAS	313	303	294	277	258	240	226	220	213	206	199
	FF/ENG	4960	4660	4360	4020	3670	3340	3070	2820	2580	2360	2210
15000	%N1	74.3	72.3	70.4	68.6	66.8	64.9	62.9	60.7	58.4	56.1	53.8
	KIAS	298	282	265	252	243	234	226	220	213	206	199
	FF/ENG	4800	4450	4130	3850	3590	3330	3070	2830	2610	2410	2260
10000	%N1	69.5	67.9	66.3	64.6	62.8	60.8	58.8	56.8	54.8	52.6	50.4
	KIAS	275	267	259	251	242	233	226	220	213	206	199
	FF/ENG	4650	4380	4120	3870	3610	3360	3110	2870	2650	2450	2320
5000	%N1	65.4	63.8	62.1	60.4	58.7	56.9	55.1	53.2	51.3	49.2	46.7
	KIAS	273	266	257	249	241	232	226	220	213	206	199
	FF/ENG	4690	4440	4180	3920	3670	3420	3180	2960	2750	2550	2420
1500	%N1	62.4	60.9	59.4	57.8	56.2	54.4	52.7	50.9	48.8	46.6	44.3
	KIAS	272	264	257	249	240	232	226	220	213	206	199
	FF/ENG	4740	4480	4220	3960	3710	3470	3250	3040	2830	2640	2500

Flaps 1

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
20000	%N1	81.9	80.0	78.2	76.3	74.1	71.8	69.5	66.8	64.2	61.5	58.4
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5300	4940	4610	4280	3950	3630	3330	3030	2740	2470	2280
15000	%N1	76.9	75.0	73.2	71.5	69.3	67.0	64.8	62.5	60.0	57.2	54.5
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5190	4840	4520	4210	3910	3610	3320	3030	2750	2500	2310
10000	%N1	72.4	70.5	68.6	66.8	64.9	62.9	60.7	58.4	56.0	53.6	51.0
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5150	4810	4510	4210	3910	3620	3330	3060	2790	2550	2370
5000	%N1	67.8	66.1	64.5	62.7	60.8	58.7	56.7	54.7	52.5	50.2	47.6
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5170	4840	4540	4250	3960	3670	3390	3130	2880	2640	2470
1500	%N1	65.0	63.3	61.6	59.8	58.0	56.2	54.3	52.3	50.2	47.8	45.1
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5180	4870	4570	4280	3990	3710	3450	3200	2960	2730	2560

These tables include 5% additional fuel for holding in a racetrack pattern.

Intentionally
Blank

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	15000	13600	12000
350	15500	14200	12600
340	16400	14900	13100
330	17200	15700	13900
320	18100	16600	14900
310	19000	17500	15800
300	19900	18400	16700
290	20600	19400	17800
280	21200	20200	18800
270	21900	20900	19900
260	22800	21600	20600
250	23800	22500	21400
240	24900	23700	22100
230	26200	24900	23400
220	27600	26300	24600
210	29100	27700	26000
200	30400	29100	27600
190	31400	30500	29100
180	32400	31700	30600
170	33400	33000	32000
160	34600	34400	33500

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	6800	4200	1500
350	7500	5000	2300
340	8300	5800	3100
330	9200	6500	3800
320	10100	7200	4500
310	11900	8700	5600
300	13500	10500	7200
290	15100	12000	9000
280	16600	13600	10900
270	18300	15200	12600
260	19900	16900	14300
250	21200	18500	15800
240	22600	20300	17500
230	24000	21900	19500
220	25500	23600	21200
210	27000	25200	22900
200	28700	27000	24800
190	30200	28800	26900
180	31200	30400	28900
170	32200	31600	30600
160	33300	32900	32100

With engine anti-ice on, decrease altitude capability by 300 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Altitude Capability**Max Continuous Thrust, 100 ft/min residual rate of climb**

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16200	15400	14000
350	17100	16300	15100
340	17900	17100	16000
330	18800	18000	16900
320	19600	18900	17800
310	20400	19700	18600
300	21100	20400	19500
290	21800	21100	20200
280	22600	21700	20900
270	23600	22500	21500
260	24400	23400	22200
250	25300	24300	23000
240	26300	25200	23800
230	27300	26200	24700
220	28300	27200	25600
210	29300	28100	26600
200	30200	29000	27600
190	30900	29900	28500
180	31500	30600	29400
170	32200	31400	30200
160	32900	32100	30900

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	10700	7600	5000
350	12100	9400	6600
340	13500	11000	7900
330	15100	12500	10000
320	16300	13900	11400
310	17400	15200	12700
300	18400	16400	14000
290	19400	17600	15300
280	20500	18800	16500
270	21400	19900	17600
260	22400	21000	18700
250	23400	22100	19900
240	24400	23000	21100
230	25400	24000	22200
220	26400	25000	23300
210	27500	26100	24400
200	28500	27100	25500
190	29600	28100	26500
180	30400	29100	27500
170	31000	30000	28500
160	31700	30700	29600

With engine anti-ice on, decrease altitude capability by 400 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16800	15800	14500
350	17600	16500	15300
340	18300	17300	16100
330	19100	18000	16800
320	19900	18800	17600
310	20500	19500	18300
300	21000	20200	19000
290	21600	20700	19800
280	22100	21300	20400
270	22900	21800	20900
260	23600	22400	21400
250	24300	23200	21900
240	25000	24000	22600
230	25900	24700	23400
220	26700	25500	24100
210	27600	26300	24800
200	28500	27100	25600
190	29300	27800	26400
180	30100	28600	27100
170	30600	29300	27800
160	31100	29900	28400

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	11100	8000	5400
350	12300	9500	6600
340	13500	10800	7700
330	14700	12000	9300
320	15900	13300	10700
310	17000	14400	11800
300	17900	15500	12900
290	18700	16500	14000
280	19700	17500	15000
270	20500	18500	16000
260	21300	19400	17000
250	22200	20400	18000
240	23100	21400	19200
230	23900	22300	20200
220	24700	23100	21100
210	25600	24000	22000
200	26500	24800	22900
190	27400	25700	23800
180	28300	26500	24600
170	29100	27200	25300
160	29800	28000	26100

With engine anti-ice on, decrease altitude capability by 300 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16800	15500	14200
350	17500	16200	14900
340	18100	16800	15600
330	18700	17500	16200
320	19400	18100	16800
310	20000	18700	17400
300	20500	19400	18000
290	20900	20000	18700
280	21400	20500	19400
270	21800	20900	20000
260	22400	21300	20500
250	23000	21800	20900
240	23600	22300	21300
230	24200	22900	21700
220	24800	23500	22200
210	25500	24200	22800
200	26200	24700	23300
190	26900	25300	23800
180	27400	25900	24300
170	28000	26400	24800
160	28400	26800	25200

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 200 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	10300	7100	4400
350	11400	8100	5400
340	12400	9500	6400
330	13400	10600	7400
320	14400	11600	8600
310	15300	12600	10000
300	16300	13600	11000
290	17200	14500	11900
280	18000	15400	12900
270	18800	16400	13800
260	19700	17300	14600
250	20400	18100	15400
240	21200	19000	16300
230	21900	19800	17100
220	22600	20600	18100
210	23300	21300	19000
200	23900	22000	19900
190	24500	22600	20500
180	25200	23200	21200
170	25700	23700	21700
160	26200	24200	22200

With engine anti-ice on, decrease altitude capability by 400 ft.

With engine and wing anti-ice on, decrease altitude capability by 1000 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16000	14700	13100
350	16600	15300	13800
340	17200	15800	14400
330	17700	16400	15000
320	18300	16900	15600
310	18900	17500	16100
300	19500	18100	16600
290	20000	18600	17200
280	20400	19200	17700
270	20800	19700	18300
260	21100	20200	18900
250	21500	20500	19500
240	21800	20900	20000
230	22300	21200	20300
220	22700	21500	20600
210	23200	21800	20900
200	23600	22200	21200
190	24000	22500	21400
180	24300	22900	21600
170	24700	23200	21800
160	25000	23500	22000

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 200 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	8100	5500	2600
350	9300	6400	3500
340	10400	7200	4400
330	11300	8100	5300
320	12200	9200	6200
310	13100	10200	7000
300	14000	11100	7800
290	14800	11900	8900
280	15600	12700	9900
270	16400	13600	10700
260	17100	14400	11600
250	17800	15100	12300
240	18500	15800	13200
230	19200	16500	13900
220	19800	17100	14500
210	20400	17800	15100
200	20800	18400	15600
190	21300	18900	16100
180	21700	19300	16500
170	22100	19800	16900
160	22400	20200	17400

With engine anti-ice on, decrease altitude capability by 400 ft.

With engine and wing anti-ice on, decrease altitude capability by 1100 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 30000 FT to 25000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
30	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
29	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
28	%N1 MAX TAT KIAS MACH FF/ENG KTAS		PERFORMANCE THRUST LIMITED									
27	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
26	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
25	%N1 MAX TAT KIAS MACH FF/ENG KTAS											

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 30000 FT to 25000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
30 (-24)	%N1						99.0	96.5	94.0	91.7	89.7	88.0
	MAX TAT						-9	-4	1	6		
	KIAS						263	258	253	248	244	239
	MACH						.701	.688	.676	.664	.652	.640
	FF/ENG						6792	6329	5887	5520	5196	4891
	KTAS						413	406	398	391	384	377
29 (-22)	%N1					99.4	97.0	94.5	92.3	90.3	88.8	87.1
	MAX TAT					-8	-3	1	6			
	KIAS					269	264	259	254	250	245	240
	MACH					.701	.689	.677	.666	.654	.643	.629
	FF/ENG					7112	6652	6208	5833	5502	5196	4878
	KTAS					415	408	401	394	387	381	372
28 (-20)	%N1				99.7	97.4	95.0	92.9	90.9	89.4	87.8	86.2
	MAX TAT				-7	-3	2	6	11			
	KIAS				275	270	265	261	256	252	247	240
	MACH				.701	.690	.678	.667	.656	.646	.633	.617
	FF/ENG				7428	6973	6527	6147	5811	5499	5186	4860
	KTAS				417	410	403	396	390	384	376	367
27 (-19)	%N1				97.7	95.4	93.4	91.5	89.9	88.5	86.9	85.3
	MAX TAT				-2	2	7	11				
	KIAS				276	271	267	262	258	253	247	240
	MACH				.690	.679	.668	.658	.648	.636	.622	.605
	FF/ENG				7289	6844	6461	6120	5804	5494	5168	4837
	KTAS				412	405	399	393	387	380	371	361
26 (-17)	%N1			97.9	95.8	93.8	91.9	90.4	89.1	87.6	86.1	84.4
	MAX TAT			-1	3	7	11					
	KIAS			282	277	273	268	264	260	254	247	240
	MACH			.689	.679	.668	.659	.649	.639	.625	.610	.592
	FF/ENG			7601	7158	6773	6429	6110	5802	5476	5146	4811
	KTAS			413	407	401	395	389	383	375	365	355
25 (-15)	%N1		98.0	96.0	94.1	92.3	90.9	89.6	88.2	86.7	85.2	83.6
	MAX TAT		-1	4	8	12	16					
	KIAS		287	283	278	274	270	266	261	254	247	240
	MACH		.688	.678	.669	.659	.650	.640	.628	.613	.597	.581
	FF/ENG		7905	7467	7083	6737	6416	6109	5783	5453	5118	4797
	KTAS		414	408	402	397	391	385	378	369	359	350

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
30	94.6	95.8	96.9	97.9	99.0	100.1	101.1	102.1	102.0	100.5	98.8	97.4	96.2	95.3
29	93.8	94.9	96.0	97.1	98.1	99.2	100.2	101.2	101.9	100.7	99.1	97.5	96.3	95.5
28	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.3	100.9	99.3	97.6	96.5	95.6
27	92.4	93.5	94.5	95.5	96.6	97.6	98.6	99.6	100.5	101.1	99.4	97.8	96.5	95.7
26	91.7	92.7	93.8	94.8	95.8	96.8	97.8	98.8	99.7	100.7	99.6	98.0	96.7	95.8
25	91.0	92.0	93.0	94.0	95.0	96.0	97.0	98.0	98.9	99.8	99.7	98.1	96.9	95.9

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 24000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
24 (-10)	%N1											98.1
	MAX TAT											1
	KIAS											293
	MACH											.687
	FF/ENG											8197
23 (-8)	KTAS											415
	%N1										98.1	96.3
	MAX TAT										4	7
	KIAS										298	294
	MACH										.686	.677
22 (-6)	FF/ENG										8479	8065
	KTAS										416	411
	%N1									98.0	96.3	94.7
	MAX TAT									6	9	13
	KIAS									304	300	296
21 (-4)	MACH									.684	.676	.667
	FF/ENG									8762	8361	7990
	KTAS									417	412	406
	%N1								97.9	96.3	94.7	93.2
	MAX TAT								10	13	17	20
20 (-2)	KIAS								309	305	301	297
	MACH								.683	.674	.666	.658
	FF/ENG								9052	8659	8294	7953
	KTAS								418	412	408	403
	%N1						99.4	97.8	96.2	94.8	93.4	92.3
19 (-1)	MAX TAT						11	14	17	21	24	27
	KIAS						318	314	310	307	303	299
	MACH						.689	.681	.673	.665	.657	.650
	FF/ENG						9778	9357	8967	8603	8263	7940
	KTAS						423	418	413	408	404	399
19 (-1)	%N1					99.2	97.6	96.1	94.7	93.5	92.5	91.5
	MAX TAT					13	16	19	22	25	28	
	KIAS					323	319	316	312	308	305	301
	MACH					.686	.678	.671	.663	.656	.649	.642
	FF/ENG					10098	9679	9287	8923	8583	8258	7948
19 (-1)	KTAS					423	418	414	409	405	400	396

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
24	92.7	93.7	94.7	95.7	96.6	97.6	98.5	99.5	100.2	98.6	97.4	96.2	95.5	94.8
23	92.4	93.4	94.3	95.3	96.3	97.2	98.2	99.1	100.1	99.2	97.8	96.5	95.8	95.1
22	92.0	93.0	94.0	95.0	95.9	96.9	97.8	98.7	99.7	99.7	98.2	96.9	96.1	95.4
21	92.5	93.5	94.5	95.5	96.4	97.4	98.3	99.3	100.2	101.2	99.7	98.2	96.9	95.9
20	92.8	93.8	94.8	95.8	96.8	97.7	98.7	99.6	100.6	101.5	101.3	99.6	98.0	96.6
19	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	101.1	102.0	100.1	98.5	97.1

With engine anti-ice on, no %N1 adjustment is required.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
24000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
24 (-13)	%N1	98.1	96.2	94.4	92.6	91.2	90.0	88.7	87.3	85.9	84.3	82.6
	MAX TAT	1	6	10	13	17						
	KIAS	293	288	284	280	276	272	267	261	254	247	240
	MACH	.687	.678	.668	.659	.650	.641	.630	.616	.601	.585	.570
	FF/ENG	8197	7769	7389	7043	6720	6414	6089	5759	5426	5099	4785
	KTAS	415	410	404	399	393	388	381	372	363	354	344
23 (-12)	%N1	96.3	94.5	92.9	91.6	90.4	89.1	87.8	86.4	85.0	83.4	81.7
	MAX TAT	7	11	15	18							
	KIAS	294	290	286	282	278	273	267	261	254	247	241
	MACH	.677	.668	.659	.651	.642	.631	.618	.604	.589	.574	.559
	FF/ENG	8065	7690	7345	7023	6717	6393	6064	5733	5402	5086	4774
	KTAS	411	405	400	395	390	383	375	367	357	348	339
22 (-10)	%N1	94.7	93.1	91.9	90.7	89.5	88.3	87.0	85.6	84.1	82.4	80.9
	MAX TAT	13	16	20								
	KIAS	296	292	288	284	279	274	267	261	254	248	241
	MACH	.667	.659	.651	.643	.632	.620	.607	.592	.578	.563	.548
	FF/ENG	7990	7648	7325	7020	6696	6368	6038	5704	5387	5074	4765
	KTAS	406	401	396	392	385	378	370	361	352	343	334
21 (-9)	%N1	93.2	92.1	91.0	89.9	88.7	87.4	86.1	84.7	83.1	81.6	80.1
	MAX TAT	20	23									
	KIAS	297	294	290	285	280	274	267	261	254	248	241
	MACH	.658	.650	.643	.633	.621	.608	.594	.581	.567	.553	.538
	FF/ENG	7953	7630	7324	7000	6672	6344	6007	5688	5374	5063	4758
	KTAS	403	398	393	387	380	372	364	355	347	338	329
20 (-7)	%N1	92.3	91.3	90.2	89.0	87.8	86.5	85.2	83.7	82.3	80.8	79.2
	MAX TAT	27										
	KIAS	299	296	291	286	280	273	267	261	255	248	241
	MACH	.650	.642	.633	.622	.610	.596	.583	.570	.557	.543	.528
	FF/ENG	7940	7633	7307	6979	6649	6312	5988	5671	5359	5051	4750
	KTAS	399	395	389	382	375	366	358	350	342	333	325
19 (-6)	%N1	91.5	90.4	89.3	88.2	86.9	85.7	84.2	82.8	81.5	79.9	78.3
	MAX TAT											
	KIAS	301	297	292	286	280	274	267	261	255	248	242
	MACH	.642	.633	.622	.610	.598	.585	.572	.560	.546	.533	.519
	FF/ENG	7948	7619	7288	6956	6617	6288	5967	5652	5340	5035	4735
	KTAS	396	390	384	376	369	361	353	345	337	329	320

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)												
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
24	92.7	93.7	94.7	95.7	96.6	97.6	98.5	99.5	100.2	98.6	97.4	96.2	95.5
23	92.4	93.4	94.3	95.3	96.3	97.2	98.2	99.1	100.1	99.2	97.8	96.5	95.8
22	92.0	93.0	94.0	95.0	95.9	96.9	97.8	98.7	99.7	99.7	98.2	96.9	96.1
21	92.5	93.5	94.5	95.5	96.4	97.4	98.3	99.3	100.2	101.2	99.7	98.2	96.9
20	92.8	93.8	94.8	95.8	96.8	97.7	98.7	99.6	100.6	101.5	101.3	99.6	98.0
19	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	101.1	102.0	100.1	98.5

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 18000 FT to 13000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
18 (1)	%N1				98.9	97.4	96.0	94.7	93.6	92.6	91.6	90.6
	MAX TAT				16	18	21	24	27	29		
	KIAS				328	325	321	317	314	310	307	302
	MACH				.684	.676	.669	.662	.655	.648	.641	.632
	FF/ENG				10435	10012	9618	9252	8910	8584	8269	7936
	KTAS				423	419	414	410	406	401	397	391
17 (3)	%N1			98.6	97.2	95.9	94.6	93.7	92.7	91.8	90.8	89.8
	MAX TAT			18	21	23	26	28	31	33		
	KIAS			333	330	326	323	319	316	312	308	303
	MACH			.681	.674	.667	.660	.653	.647	.640	.631	.621
	FF/ENG			10771	10344	9949	9583	9239	8912	8592	8255	7916
	KTAS			423	419	415	410	406	402	398	392	386
16 (5)	%N1	99.2	98.2	97.0	95.7	94.6	93.7	92.8	91.9	91.0	90.0	89.0
	MAX TAT	19	21	23	26	28	31	33	35			
	KIAS	338	338	335	331	328	325	321	318	313	309	303
	MACH	.678	.678	.671	.665	.658	.652	.646	.639	.630	.621	.610
	FF/ENG	11368	11084	10666	10273	9911	9566	9238	8911	8570	8227	7881
	KTAS	423	423	419	415	411	407	403	399	393	387	381
15 (6)	%N1	97.3	96.5	95.5	94.6	93.7	92.9	92.0	91.1	90.1	89.1	88.1
	MAX TAT	24	26	28	31	33	35	38				
	KIAS	337	337	337	333	330	327	323	319	314	309	303
	MACH	.664	.664	.662	.656	.650	.644	.637	.629	.619	.609	.599
	FF/ENG	11118	10862	10586	10227	9884	9557	9222	8878	8533	8184	7830
	KTAS	416	416	415	411	407	404	399	394	388	382	375
14 (8)	%N1	95.7	95.1	94.5	93.8	93.0	92.1	91.2	90.3	89.3	88.3	87.2
	MAX TAT	29	31	33	35	37	40					
	KIAS	337	337	337	335	332	328	324	319	314	308	303
	MACH	.651	.651	.651	.648	.643	.635	.627	.618	.608	.598	.587
	FF/ENG	10908	10681	10462	10197	9871	9526	9180	8833	8482	8127	7782
	KTAS	409	409	409	408	404	400	394	389	383	376	369
13 (9)	%N1	94.6	94.0	93.4	92.9	92.2	91.3	90.4	89.5	88.4	87.4	86.2
	MAX TAT	34	36	38	39	41						
	KIAS	336	336	336	336	334	329	324	319	314	308	303
	MACH	.638	.638	.638	.638	.633	.625	.617	.607	.597	.587	.577
	FF/ENG	10741	10525	10316	10115	9825	9478	9130	8777	8422	8077	7741
	KTAS	403	403	403	403	400	395	389	383	377	370	364

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.0	95.9	96.9	97.8	98.7	99.7	100.6	101.6	100.8	99.1	97.6	96.4	95.4	94.3
17	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.1	101.4	99.5	98.0	96.9	95.9	94.8
16	94.2	95.1	96.0	97.0	97.9	98.8	99.7	100.6	101.5	99.8	98.3	97.2	96.1	95.0
15	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.5	100.2	98.6	97.4	96.3	95.3
14	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.3	101.2	100.5	99.0	97.7	96.6	95.6
13	93.7	94.7	95.6	96.5	97.4	98.3	99.2	100.1	101.0	100.8	99.2	98.0	96.9	95.9

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.6.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
18000 FT to 13000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
18 (-4)	%N1	90.6	89.6	88.5	87.3	86.1	84.7	83.3	82.0	80.6	79.0	77.5
	MAX TAT											
	KIAS	302	297	292	286	280	274	268	262	255	249	242
	MACH	.632	.622	.611	.599	.586	.574	.562	.549	.536	.523	.510
	FF/ENG	7936	7602	7265	6922	6588	6262	5942	5625	5314	5010	4711
17 (-2)	KTAS	391	385	378	371	363	356	348	340	332	324	316
	%N1	89.8	88.7	87.6	86.4	85.1	83.8	82.5	81.1	79.6	78.2	76.6
	MAX TAT											
	KIAS	303	298	292	286	280	274	268	262	255	249	243
	MACH	.621	.611	.599	.587	.576	.564	.552	.540	.527	.514	.501
16 (-1)	FF/ENG	7916	7574	7227	6888	6557	6232	5910	5594	5285	4981	4682
	KTAS	386	380	372	365	358	351	343	335	328	320	312
	%N1	89.0	87.9	86.7	85.4	84.1	82.9	81.6	80.2	78.7	77.2	75.7
	MAX TAT											
	KIAS	303	297	292	286	280	274	268	262	256	250	243
15 (1)	MACH	.610	.599	.588	.577	.566	.554	.542	.530	.518	.505	.493
	FF/ENG	7881	7530	7187	6852	6523	6197	5877	5564	5257	4953	4658
	KTAS	381	374	367	360	353	346	338	331	323	315	308
	%N1	88.1	86.9	85.7	84.4	83.3	82.0	80.6	79.2	77.8	76.3	74.8
	MAX TAT											
14 (2)	KIAS	303	297	292	286	280	275	269	262	256	250	244
	MACH	.599	.588	.577	.567	.555	.544	.532	.521	.509	.497	.485
	FF/ENG	7830	7485	7147	6817	6489	6166	5852	5543	5237	4937	4648
	KTAS	375	368	362	355	348	341	334	326	319	311	304
	%N1	87.2	85.9	84.8	83.6	82.4	81.1	79.7	78.4	77.0	75.5	74.1
13 (4)	MAX TAT											
	KIAS	303	298	292	287	281	275	269	263	258	252	245
	MACH	.577	.567	.557	.547	.536	.525	.514	.503	.492	.481	.470
	FF/ENG	7741	7415	7091	6773	6462	6157	5855	5554	5259	4971	4692
	KTAS	364	358	352	345	338	332	325	318	311	304	297

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
18	93.0	94.0	95.0	95.9	96.9	97.8	98.7	99.7	100.6	101.6	100.8	99.1	97.6	96.4
17	92.6	93.6	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.1	101.4	99.5	98.0	96.9
16	92.2	93.2	94.2	95.1	96.0	97.0	97.9	98.8	99.7	100.6	101.5	99.8	98.3	97.2
15	92.2	93.1	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.5	100.2	98.6	97.4
14	92.0	92.9	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.3	101.2	100.5	99.0	97.7
13	91.8	92.8	93.7	94.7	95.6	96.5	97.4	98.3	99.2	100.1	101.0	100.8	99.2	98.0

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 12000 FT to 7000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
12 (11)	%N1	93.5	93.0	92.4	91.9	91.4	90.5	89.6	88.6	87.5	86.4	85.3
	MAX TAT	39	40	42								
	KIAS	335	335	335	335	334	329	324	319	314	309	303
	MACH	.626	.626	.626	.626	.623	.615	.605	.596	.586	.577	.567
	FF/ENG	10583	10373	10175	9991	9770	9423	9069	8712	8371	8038	7716
	KTAS	396	396	396	396	395	389	384	377	371	365	359
11 (12)	%N1	92.5	92.0	91.5	91.0	90.5	89.6	88.7	87.6	86.5	85.5	84.6
	MAX TAT	43	44									
	KIAS	335	335	335	335	334	329	324	319	314	309	304
	MACH	.613	.613	.613	.613	.613	.604	.594	.585	.576	.567	.558
	FF/ENG	10437	10246	10065	9892	9708	9354	8998	8662	8334	8017	7702
	KTAS	390	390	390	390	390	384	378	372	366	361	355
10 (14)	%N1	91.6	91.1	90.6	90.2	89.7	88.8	87.7	86.7	85.7	84.8	83.8
	MAX TAT											
	KIAS	334	334	334	334	334	329	324	319	314	309	304
	MACH	.602	.602	.602	.602	.602	.592	.584	.575	.566	.557	.548
	FF/ENG	10335	10154	9977	9802	9633	9281	8949	8626	8313	8003	7698
	KTAS	384	384	384	384	384	378	373	367	362	356	350
9 (15)	%N1	90.8	90.2	89.8	89.3	88.8	87.8	86.8	85.9	85.0	84.0	82.9
	MAX TAT											
	KIAS	334	334	334	334	334	329	324	320	315	309	304
	MACH	.590	.590	.590	.590	.590	.582	.574	.565	.557	.548	.539
	FF/ENG	10250	10064	9884	9710	9542	9225	8908	8600	8294	7993	7696
	KTAS	378	378	378	378	378	373	368	362	357	351	345
8 (16)	%N1	89.9	89.4	88.9	88.3	87.8	86.9	86.1	85.2	84.2	83.2	82.1
	MAX TAT											
	KIAS	333	333	333	333	333	330	325	320	315	310	304
	MACH	.579	.579	.579	.579	.579	.572	.564	.556	.547	.538	.530
	FF/ENG	10163	9974	9795	9625	9460	9181	8879	8579	8281	7986	7695
	KTAS	372	372	372	372	372	368	363	357	352	346	341
7 (18)	%N1	89.0	88.4	87.9	87.3	86.9	86.2	85.3	84.4	83.4	82.4	81.3
	MAX TAT											
	KIAS	333	333	333	333	333	330	325	320	315	310	305
	MACH	.568	.568	.568	.568	.568	.563	.555	.546	.538	.530	.521
	FF/ENG	10089	9906	9731	9565	9403	9159	8862	8567	8274	7984	7693
	KTAS	367	367	367	367	367	363	358	353	347	342	336

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
12	94.4	95.4	96.3	97.2	98.1	99.0	99.9	100.8	101.1	99.5	98.3	97.2	96.2	95.3
11	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.2	101.0	99.7	98.5	97.4	96.4	95.5
10	93.3	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.4	99.9	98.8	97.6	96.6	95.7
9	93.0	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.1	100.2	99.1	98.0	96.9	96.0
8	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.8	100.4	99.5	98.4	97.3	96.4
7	92.2	93.1	94.0	94.9	95.8	96.6	97.5	98.4	99.2	100.0	99.4	98.4	97.4	96.5

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 12000 FT to 7000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
12 (5)	%N1	85.3	84.3	83.2	81.9	80.7	79.5	78.2	76.9	75.5	74.1	72.7
	MAX TAT											
	KIAS	303	298	293	287	281	276	270	264	258	252	246
	MACH	.567	.558	.547	.537	.527	.516	.506	.495	.485	.474	.463
	FF/ENG	7716	7397	7084	6777	6476	6178	5879	5584	5295	5012	4736
	KTAS	359	353	347	340	334	327	321	314	307	300	293
11 (7)	%N1	84.6	83.5	82.3	81.1	80.0	78.7	77.5	76.1	74.8	73.4	72.0
	MAX TAT											
	KIAS	304	298	293	287	282	276	270	265	259	253	247
	MACH	.558	.548	.538	.528	.518	.508	.498	.487	.477	.466	.456
	FF/ENG	7702	7393	7091	6795	6500	6204	5910	5620	5334	5053	4778
	KTAS	355	348	342	336	329	323	317	310	303	297	290
10 (9)	%N1	83.8	82.7	81.5	80.4	79.3	78.1	76.7	75.4	74.1	72.7	71.2
	MAX TAT											
	KIAS	304	299	293	288	282	277	271	265	260	254	248
	MACH	.548	.538	.529	.519	.510	.500	.490	.480	.470	.460	.449
	FF/ENG	7698	7399	7105	6813	6519	6225	5935	5648	5363	5083	4809
	KTAS	350	344	338	331	325	319	313	306	300	293	287
9 (10)	%N1	82.9	81.9	80.8	79.6	78.5	77.2	76.0	74.7	73.4	71.9	70.5
	MAX TAT											
	KIAS	304	299	294	288	283	277	272	266	261	255	249
	MACH	.539	.529	.520	.511	.501	.492	.482	.473	.463	.453	.443
	FF/ENG	7696	7404	7113	6820	6526	6236	5947	5659	5376	5098	4828
	KTAS	345	339	333	327	321	315	309	303	296	290	284
8 (12)	%N1	82.1	81.1	80.0	78.9	77.7	76.5	75.2	74.0	72.6	71.2	69.8
	MAX TAT											
	KIAS	304	299	294	289	283	278	273	267	262	256	251
	MACH	.530	.521	.512	.503	.494	.484	.475	.466	.456	.446	.437
	FF/ENG	7695	7405	7112	6818	6527	6237	5948	5661	5381	5109	4846
	KTAS	341	335	329	323	317	311	305	299	293	287	281
7 (14)	%N1	81.3	80.3	79.2	78.1	76.9	75.7	74.5	73.2	71.9	70.5	69.1
	MAX TAT											
	KIAS	305	300	295	289	284	279	274	268	263	257	252
	MACH	.521	.512	.504	.495	.486	.477	.468	.459	.450	.440	.431
	FF/ENG	7693	7399	7105	6813	6522	6232	5943	5660	5387	5124	4871
	KTAS	336	331	325	319	314	308	302	296	290	284	278

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
12	93.5	94.4	95.4	96.3	97.2	98.1	99.0	99.9	100.8	101.1	99.5	98.3	97.2	96.2
11	92.9	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.2	101.0	99.7	98.5	97.4	96.4
10	92.4	93.3	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.4	99.9	98.8	97.6	96.6
9	92.1	93.0	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.1	100.2	99.1	98.0	96.9
8	91.8	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.8	100.4	99.5	98.4	97.3
7	91.3	92.2	93.1	94.0	94.9	95.8	96.6	97.5	98.4	99.2	100.0	99.4	98.4	97.4

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table

29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26	260 -17 383	%N1 MAX TAT FF/ENG											99.1 -7 7701
25	260 -16 377	%N1 MAX TAT FF/ENG										98.9 -6 7893	97.0 0 7469
24	260 -14 371	%N1 MAX TAT FF/ENG									98.8 -4 8108	96.8 2 7646	94.8 5 7292
23	260 -13 366	%N1 MAX TAT FF/ENG								98.8 -2 8326	96.7 3 7854	94.6 7 7478	93.0 11 7172
22	260 -12 360	%N1 MAX TAT FF/ENG							98.6 0 8535	96.5 5 8066	94.5 9 7685	92.7 14 7361	91.4 17 7084
21	260 -10 354	%N1 MAX TAT FF/ENG						98.4 4 8749	96.3 9 8283	94.3 13 7897	92.6 17 7568	91.4 7276	90.3 7009
20	260 -9 349	%N1 MAX TAT FF/ENG				100.6 3 9528	98.3 8 8963	96.1 13 8501	94.2 17 8115	92.5 21 7777	91.3 7476	90.3 7198	89.3 6940
19	260 -7 344	%N1 MAX TAT FF/ENG			100.5 5 9777	98.1 11 9186	95.8 15 8713	94.0 19 8326	92.5 23 7987	91.3 7675	90.2 7385	89.3 7118	88.4 6884

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
26	93.6	94.6	95.7	96.7	97.7	98.7	99.7	100.6	101.1	100.1	98.5	97.3	96.2	95.5
25	93.2	94.3	95.3	96.3	97.3	98.3	99.2	100.2	101.1	100.2	98.6	97.4	96.2	95.6
24	93.1	94.1	95.2	96.2	97.2	98.1	99.1	100.1	101.0	100.5	99.0	97.6	96.5	95.8
23	93.0	94.0	95.0	96.0	97.0	98.0	99.0	99.9	100.9	100.9	99.5	98.0	96.7	96.0
22	92.8	93.8	94.8	95.8	96.8	97.8	98.8	99.7	100.7	101.2	100.0	98.4	97.1	96.3
21	93.4	94.4	95.4	96.4	97.4	98.4	99.4	100.4	101.3	102.2	101.4	99.8	98.4	97.1
20	93.9	94.9	95.9	96.9	97.9	98.9	99.9	100.9	101.8	102.7	102.6	101.3	99.7	98.3
19	93.8	94.8	95.8	96.8	97.8	98.8	99.8	100.8	101.7	102.7	103.1	102.0	100.2	98.8

With engine anti-ice on, no %N1 adjustment is required.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



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ENGINE INOP
MAX CONTINUOUS THRUST

260 KIAS Cruise Table
29000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	260	%N1				100.1	98.1	96.4	94.7	93.1	91.9	90.7	89.8
	-21	MAX TAT				-11	-6	-3	1	5	8		
	402	FF/ENG				7166	6833	6522	6231	5996	5792	5612	5450
28	260	%N1			99.7	97.8	96.0	94.3	92.8	91.5	90.4	89.5	88.8
	-20	MAX TAT			-10	-5	-1	3	6	10			
	396	FF/ENG			7335	6987	6657	6370	6129	5919	5732	5562	5407
27	260	%N1		99.4	97.5	95.7	94.0	92.5	91.2	90.2	89.3	88.5	87.8
	-19	MAX TAT		-9	-3	1	4	8	11				
	389	FF/ENG		7518	7149	6801	6518	6271	6056	5858	5683	5520	5371
26	260	%N1	99.1	97.2	95.4	93.7	92.2	90.9	90.0	89.1	88.3	87.5	86.9
	-17	MAX TAT	-7	-2	2	6	10	13					
	383	FF/ENG	7701	7311	6956	6672	6423	6199	5997	5810	5642	5485	5343
25	260	%N1	97.0	95.1	93.4	91.9	90.8	89.8	88.9	88.1	87.4	86.7	86.0
	-16	MAX TAT	0	3	7	11	15						
	377	FF/ENG	7469	7121	6830	6579	6351	6140	5947	5769	5609	5459	5322
24	260	%N1	94.8	93.2	91.6	90.6	89.7	88.8	88.0	87.2	86.5	85.8	85.2
	-14	MAX TAT	5	9	13	17							
	371	FF/ENG	7292	6996	6737	6505	6289	6089	5905	5736	5582	5437	5305
23	260	%N1	93.0	91.5	90.5	89.6	88.7	87.9	87.1	86.4	85.6	85.0	84.3
	-13	MAX TAT	11	15									
	366	FF/ENG	7172	6906	6663	6442	6236	6047	5873	5711	5560	5419	5289
22	260	%N1	91.4	90.4	89.5	88.6	87.8	87.0	86.2	85.5	84.8	84.0	83.3
	-12	MAX TAT	17										
	360	FF/ENG	7084	6832	6601	6389	6195	6016	5847	5689	5541	5401	5273
21	260	%N1	90.3	89.4	88.5	87.7	86.9	86.1	85.4	84.6	83.8	83.0	82.4
	-10	MAX TAT											
	354	FF/ENG	7009	6766	6550	6353	6166	5988	5824	5668	5520	5385	5261
20	260	%N1	89.3	88.4	87.6	86.8	86.0	85.2	84.4	83.6	82.8	82.2	81.7
	-9	MAX TAT											
	349	FF/ENG	6940	6714	6514	6322	6135	5961	5798	5644	5500	5368	5248
19	260	%N1	88.4	87.5	86.7	85.9	85.1	84.2	83.4	82.7	82.0	81.4	80.8
	-7	MAXTAT											
	344	FF/ENG	6884	6674	6476	6283	6099	5928	5768	5617	5477	5348	5231

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	95.2	96.3	97.4	98.4	99.5	100.5	101.5	102.3	101.1	99.6	98.1	97.0	96.0	95.1
28	94.6	95.7	96.7	97.7	98.8	99.8	100.8	101.7	101.1	99.8	98.2	97.0	96.1	95.3
27	94.0	95.1	96.1	97.1	98.1	99.1	100.1	101.1	101.1	99.9	98.4	97.1	96.1	95.4
26	93.6	94.6	95.7	96.7	97.7	98.7	99.7	100.6	101.1	100.1	98.5	97.3	96.2	95.5
25	93.2	94.3	95.3	96.3	97.3	98.3	99.2	100.2	101.1	100.2	98.6	97.4	96.2	95.6
24	93.1	94.1	95.2	96.2	97.2	98.1	99.1	100.1	101.0	100.5	99.0	97.6	96.5	95.8
23	93.0	94.0	95.0	96.0	97.0	98.0	99.0	99.9	100.9	100.9	99.5	98.0	96.7	96.0
22	92.8	93.8	94.8	95.8	96.8	97.8	98.8	99.7	100.7	101.2	100.0	98.4	97.1	96.3
21	93.4	94.4	95.4	96.4	97.4	98.4	99.4	100.4	101.3	102.2	101.4	99.8	98.4	97.1
20	93.9	94.9	95.9	96.9	97.9	98.9	99.9	100.9	101.8	102.7	102.6	101.3	99.7	98.3
19	93.8	94.8	95.8	96.9	97.9	98.8	99.8	100.8	101.7	102.7	103.1	102.0	100.2	98.8

With engine anti-ice on, no %N1 adjustment is required.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table

18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	260	%N1		100.2	98.0	95.7	93.9	92.4	91.3	90.2	89.2	88.3	87.5
	-6	MAX TAT		8	13	17	21	25					
	339	FF/ENG		9992	9425	8934	8527	8185	7870	7571	7295	7053	6832
17	260	%N1	100.2	97.6	95.6	93.8	92.4	91.2	90.2	89.2	88.3	87.4	86.6
	-4	MAXTAT	10	15	19	23	26						
	334	FF/ENG	10259	9641	9169	8742	8379	8056	7752	7473	7222	6991	6772
16	260	%N1	97.5	95.3	93.7	92.3	91.2	90.1	89.1	88.2	87.3	86.4	85.6
	-2	MAXTAT	17	21	25								
	329	FF/ENG	9905	9393	8976	8592	8249	7937	7653	7395	7153	6925	6710
15	260	%N1	95.3	93.5	92.3	91.1	90.1	89.1	88.1	87.2	86.3	85.4	84.5
	-1	MAXTAT	23	27									
	324	FF/ENG	9669	9217	8839	8472	8140	7849	7583	7330	7088	6865	6658
14	260	%N1	93.6	92.3	91.2	90.1	89.1	88.1	87.2	86.3	85.3	84.4	83.6
	1	MAXTAT	28										
	319	FF/ENG	9520	9106	8740	8383	8074	7798	7534	7281	7045	6830	6627
13	260	%N1	92.5	91.3	90.2	89.2	88.2	87.2	86.2	85.3	84.4	83.5	82.7
	2	MAXTAT											
	314	FF/ENG	9430	9025	8668	8338	8043	7764	7500	7255	7028	6818	6618
12	260	%N1	91.4	90.3	89.3	88.3	87.3	86.3	85.3	84.4	83.5	82.7	81.8
	4	MAXTAT											
	310	FF/ENG	9354	8962	8635	8319	8016	7738	7484	7246	7026	6822	6626
11	260	%N1	90.5	89.4	88.4	87.4	86.4	85.4	84.4	83.5	82.7	81.8	80.9
	5	MAXTAT											
	305	FF/ENG	9289	8934	8615	8290	7988	7721	7474	7241	7029	6829	6637
10	260	%N1	89.6	88.5	87.5	86.4	85.4	84.5	83.5	82.6	81.7	80.9	80.0
	7	MAXTAT											
	301	FF/ENG	9250	8902	8573	8250	7959	7699	7457	7231	7024	6828	6638
9	260	%N1	88.7	87.5	86.5	85.5	84.5	83.5	82.6	81.7	80.8	80.0	79.1
	9	MAXTAT											
	296	FF/ENG	9202	8842	8516	8204	7922	7668	7431	7211	7007	6811	6619
8	260	%N1	87.7	86.6	85.6	84.6	83.5	82.6	81.6	80.7	79.9	79.1	78.3
	10	MAXTAT											
	292	FF/ENG	9132	8776	8460	8157	7885	7633	7401	7185	6981	6784	6588

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.8	97.8	98.8	99.7	100.7	101.7	102.6	103.5	102.7	100.9	99.2	97.8	96.7	95.6
17	96.8	97.7	98.7	99.7	100.7	101.6	102.6	103.5	103.2	101.6	99.7	98.1	97.1	96.1
16	96.6	97.6	98.6	99.6	100.5	101.5	102.4	103.3	103.6	102.2	100.2	98.6	97.5	96.5
15	96.6	97.6	98.5	99.5	100.4	101.4	102.3	103.2	104.0	102.8	100.8	99.1	97.8	96.8
14	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.9	103.1	101.1	99.5	98.2	97.1
13	96.1	97.0	98.0	99.0	99.9	100.9	101.8	102.7	103.7	103.4	101.5	99.8	98.5	97.4
12	95.6	96.5	97.5	98.5	99.4	100.3	101.3	102.2	103.2	103.7	101.8	100.1	98.8	97.7
11	94.7	95.6	96.6	97.5	98.5	99.4	100.3	101.2	102.2	103.1	101.8	100.2	98.9	97.8
10	93.8	94.7	95.7	96.6	97.6	98.5	99.4	100.3	101.2	102.1	101.8	100.3	99.1	98.0
9	93.1	94.0	94.9	95.9	96.8	97.7	98.6	99.5	100.4	101.3	101.8	100.5	99.4	98.2
8	92.4	93.4	94.3	95.2	96.1	97.0	97.9	98.8	99.7	100.6	101.4	100.7	99.6	98.5

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

260 KIAS Cruise Table
18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	260	%N1	87.5	86.6	85.8	85.0	84.1	83.3	82.6	81.9	81.2	80.5	79.8
	-6 338	MAXTAT FF/ENG	6832	6624	6427	6236	6055	5887	5732	5585	5447	5321	5205
17	260	%N1	86.6	85.7	84.9	83.9	83.1	82.4	81.7	80.9	80.2	79.5	78.9
	-4 333	MAXTAT FF/ENG	6772	6566	6370	6184	6007	5841	5690	5546	5411	5285	5170
16	260	%N1	85.6	84.7	83.8	83.0	82.2	81.4	80.6	79.9	79.2	78.6	77.9
	-3 328	MAXTAT FF/ENG	6710	6508	6316	6134	5959	5794	5647	5507	5373	5247	5132
15	260	%N1	84.5	83.6	82.8	82.0	81.2	80.4	79.6	78.9	78.2	77.6	77.0
	-1 323	MAXTAT FF/ENG	6658	6461	6272	6092	5919	5758	5613	5474	5341	5215	5102
14	260	%N1	83.6	82.7	81.9	81.1	80.2	79.4	78.7	78.0	77.4	76.7	76.1
	1 318	MAXTAT FF/ENG	6627	6434	6249	6069	5897	5740	5596	5457	5324	5201	5090
13	260	%N1	82.7	81.8	81.0	80.1	79.3	78.6	77.9	77.2	76.5	75.9	75.3
	2 314	MAXTAT FF/ENG	6618	6429	6245	6066	5895	5740	5597	5458	5327	5205	5095
12	260	%N1	81.8	80.9	80.1	79.3	78.5	77.7	77.0	76.4	75.7	75.1	74.5
	4 309	MAXTAT FF/ENG	6626	6438	6255	6075	5904	5749	5607	5472	5344	5222	5113
11	260	%N1	80.9	80.1	79.3	78.4	77.6	76.9	76.2	75.5	74.9	74.3	73.7
	5 305	MAXTAT FF/ENG	6637	6450	6266	6085	5914	5760	5621	5489	5362	5241	5134
10	260	%N1	80.0	79.2	78.4	77.6	76.8	76.1	75.4	74.7	74.1	73.5	73.0
	7 300	MAXTAT FF/ENG	6638	6450	6264	6083	5914	5762	5625	5494	5368	5250	5145
9	260	%N1	79.1	78.3	77.5	76.7	75.9	75.2	74.5	73.9	73.3	72.7	72.0
	9 296	MAXTAT FF/ENG	6619	6431	6245	6064	5896	5747	5613	5480	5356	5240	5137
8	260	%N1	78.3	77.5	76.6	75.8	75.0	74.4	73.7	73.1	72.4	71.7	71.2
	10 291	MAXTAT FF/ENG	6588	6401	6215	6035	5870	5723	5591	5457	5333	5220	5118

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.8	97.8	98.8	99.7	100.7	101.7	102.6	103.5	102.7	100.9	99.2	97.8	96.7	95.6
17	96.8	97.7	98.7	99.7	100.7	101.6	102.6	103.5	103.2	101.6	99.7	98.1	97.1	96.1
16	96.6	97.6	98.6	99.6	100.5	101.5	102.4	103.3	103.6	102.2	100.2	98.6	97.5	96.5
15	96.6	97.6	98.5	99.5	100.4	101.4	102.3	103.2	104.0	102.8	100.8	99.1	97.8	96.8
14	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.9	103.1	101.1	99.5	98.2	97.1
13	96.1	97.0	98.0	99.0	99.9	100.9	101.8	102.7	103.7	103.4	101.5	99.8	98.5	97.4
12	95.6	96.5	97.5	98.5	99.4	100.3	101.3	102.2	103.2	103.7	101.8	100.1	98.8	97.7
11	94.7	95.6	96.6	97.5	98.5	99.4	100.3	101.2	102.2	103.1	101.8	100.2	98.9	97.8
10	93.8	94.7	95.7	96.6	97.6	98.5	99.4	100.3	101.2	102.1	101.8	100.3	99.1	98.0
9	93.1	94.0	94.9	95.9	96.8	97.7	98.6	99.5	100.4	101.3	101.8	100.5	99.4	98.2
8	92.4	93.4	94.3	95.2	96.1	97.0	97.9	98.8	99.7	100.6	101.4	100.7	99.6	98.5

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table**29000 FT to 19000 FT - High Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26													
25	280 -13 404	%N1 MAX TAT FF/ENG											98.6 -3 7975
24	280 -12 398	%N1 MAX TAT FF/ENG										98.1 0 8099	96.6 4 7777
23	280 -10 392	%N1 MAX TAT FF/ENG									97.6 3 8220	96.0 6 7909	94.6 10 7638
22	280 -9 386	%N1 MAX TAT FF/ENG							98.7 2 8726	97.1 5 8359	95.5 9 8051	94.2 12 7779	92.9 15 7534
21	280 -8 380	%N1 MAX TAT FF/ENG					100.0 2 9314	98.2 6 8870	96.5 10 8508	95.1 13 8202	93.7 17 7928	92.5 20 7682	91.7 23 7453
20	280 -6 375	%N1 MAX TAT FF/ENG				99.7 7 9508	97.8 11 9043	96.1 14 8676	94.6 18 8362	93.3 21 8086	92.3 24 7833	91.5 26 7601	90.6 29 7383
19	280 -5 369	%N1 MAX TAT FF/ENG		101.3 5 10178	99.4 9 9683	97.5 13 9237	95.7 17 8855	94.3 20 8533	93.0 23 8251	92.1 26 7994	91.2 28 7753	90.4 30 7531	89.7 32 7324

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
25	93.4	94.4	95.4	96.4	97.3	98.3	99.2	100.2	100.3	99.3	97.9	96.7	96.0	95.3
24	93.3	94.3	95.3	96.2	97.2	98.2	99.1	100.1	100.7	99.6	98.2	97.0	96.2	95.6
23	93.1	94.1	95.1	96.1	97.1	98.0	99.0	99.9	100.9	99.9	98.5	97.2	96.4	95.8
22	93.0	94.0	95.0	96.0	97.0	97.9	98.9	99.8	100.7	100.2	98.8	97.5	96.6	96.0
21	93.7	94.7	95.7	96.7	97.7	98.7	99.6	100.6	101.5	101.6	100.2	98.7	97.5	96.8
20	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.4	102.3	103.0	101.6	99.9	98.7	97.5
19	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.3	102.3	103.2	102.2	100.5	99.0	97.7

With engine anti-ice on, no %N1 adjustment is required.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

280 KIAS Cruise Table
29000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	280	%N1						99.4	98.0	96.7	95.3	94.3	93.5
	-18	MAX TAT						-7	-4	-1	2	5	7
	431	FF/ENG						7223	6960	6716	6505	6332	6189
28	280	%N1					98.8	97.4	95.9	94.7	93.6	92.8	92.0
	-17	MAX TAT					-5	-2	2	4	7	9	11
	424	FF/ENG					7316	7049	6804	6588	6406	6253	6123
27	280	%N1			98.3		96.8	95.4	94.2	93.1	92.2	91.4	90.8
	-16	MAX TAT			-3		1	4	7	9	12	14	16
	417	FF/ENG			7427		7147	6899	6689	6501	6337	6196	6072
26	280	%N1			97.7		94.8	93.6	92.6	91.6	90.9	90.3	89.7
	-14	MAX TAT			-1		3	6	9	11	14	16	
	411	FF/ENG			7543		7255	7013	6798	6606	6433	6279	6141
25	280	%N1	98.6	97.1	95.7	94.3	93.1	92.0	91.2	90.5	89.9	89.3	88.7
	-13	MAX TAT	-3	1	5	8	11	14	16	19			
	404	FF/ENG	7975	7657	7377	7132	6916	6721	6542	6378	6229	6094	5976
24	280	%N1	96.6	95.1	93.8	92.6	91.7	90.9	90.2	89.5	88.9	88.4	87.9
	-12	MAX TAT	4	7	10	13	16	19					
	398	FF/ENG	7777	7503	7258	7038	6837	6655	6485	6327	6184	6058	5947
23	280	%N1	94.6	93.3	92.2	91.4	90.6	89.9	89.2	88.6	88.0	87.5	87.1
	-10	MAX TAT	10	13	16	19							
	392	FF/ENG	7638	7390	7168	6963	6771	6598	6435	6284	6150	6031	5927
22	280	%N1	92.9	91.9	91.1	90.3	89.6	88.9	88.3	87.7	87.2	86.7	86.2
	-9	MAX TAT	15	18	21								
	386	FF/ENG	7534	7305	7096	6900	6718	6553	6398	6254	6126	6012	5912
21	280	%N1	91.7	90.8	90.1	89.4	88.7	88.1	87.4	86.9	86.3	85.8	85.4
	-8	MAX TAT	23										
	380	FF/ENG	7453	7236	7036	6849	6678	6522	6373	6233	6109	5999	5901
20	280	%N1	90.6	89.9	89.2	88.5	87.8	87.2	86.6	86.0	85.5	84.9	84.4
	-6	MAX TAT											
	375	FF/ENG	7383	7178	6989	6814	6651	6498	6352	6217	6094	5984	5886
19	280	%N1	89.7	89.0	88.3	87.6	87.0	86.4	85.8	85.1	84.5	83.9	83.5
	-5	MAX TAT											
	369	FF/ENG	7324	7133	6955	6786	6625	6475	6332	6197	6075	5966	5870

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	94.4	95.5	96.5	97.6	98.6	99.6	100.6	101.6	101.5	100.2	98.6	97.6	96.6	95.7
28	93.9	95.0	96.0	97.0	98.0	99.0	100.0	101.0	101.6	100.3	98.8	97.7	96.6	95.8
27	93.4	94.4	95.4	96.5	97.5	98.5	99.4	100.4	101.3	100.4	99.0	97.7	96.6	95.9
26	92.8	93.9	94.9	95.9	96.9	97.9	98.8	99.8	100.7	100.4	99.1	97.8	96.7	96.0
25	92.4	93.4	94.4	95.4	96.4	97.3	98.3	99.2	100.2	100.3	99.3	97.9	96.7	96.0
24	92.2	93.3	94.3	95.3	96.2	97.2	98.2	99.1	100.1	100.7	99.6	98.2	97.0	96.2
23	92.1	93.1	94.1	95.1	96.1	97.1	98.0	99.0	99.9	100.9	99.9	98.5	97.2	96.4
22	92.0	93.0	94.0	95.0	96.0	97.0	97.9	98.9	99.8	100.7	100.2	98.8	97.5	96.6
21	92.7	93.7	94.7	95.7	96.7	97.7	98.7	99.6	100.6	101.5	101.6	100.2	98.7	97.5
20	93.5	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.4	102.3	103.0	101.6	99.9	98.7
19	93.4	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.3	102.3	103.2	102.2	100.5	99.0

With engine anti-ice on, no %N1 adjustment is required.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table

18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	280	%N1	100.8	98.9	97.0	95.4	93.9	92.8	91.9	91.0	90.2	89.5	88.7
	-3	MAX TAT	8	12	16	19	22	25					
	363	FF/ENG	10360	9850	9420	9043	8711	8420	8154	7908	7681	7473	7279
17	280	%N1	98.4	96.6	95.0	93.6	92.6	91.6	90.8	90.0	89.3	88.6	87.9
	-2	MAX TAT	15	18	21	25	27						
	358	FF/ENG	10022	9598	9222	8890	8594	8316	8061	7829	7620	7423	7231
16	280	%N1	96.1	94.6	93.4	92.4	91.4	90.6	89.8	89.0	88.3	87.6	86.9
	0	MAX TAT	21	24	27	30							
	353	FF/ENG	9771	9401	9068	8763	8482	8218	7979	7763	7563	7367	7179
15	280	%N1	94.3	93.2	92.2	91.2	90.4	89.6	88.8	88.1	87.4	86.7	85.9
	1	MAX TAT	26	29									
	347	FF/ENG	9582	9252	8942	8652	8382	8138	7915	7706	7507	7312	7126
14	280	%N1	93.0	92.0	91.1	90.3	89.5	88.7	88.0	87.2	86.5	85.7	84.9
	3	MAX TAT	32										
	342	FF/ENG	9452	9139	8840	8565	8315	8085	7866	7659	7460	7267	7083
13	280	%N1	91.9	91.0	90.2	89.4	88.6	87.8	87.0	86.3	85.5	84.7	84.0
	4	MAX TAT											
	337	FF/ENG	9353	9047	8770	8517	8279	8050	7833	7626	7428	7239	7058
12	280	%N1	91.0	90.1	89.3	88.5	87.7	86.9	86.1	85.3	84.6	83.9	83.2
	6	MAX TAT											
	332	FF/ENG	9275	8996	8739	8492	8252	8026	7813	7609	7414	7229	7051
11	280	%N1	90.1	89.2	88.4	87.6	86.9	86.0	85.3	84.5	83.8	83.1	82.4
	7	MAX TAT											
	328	FF/ENG	9241	8978	8718	8465	8230	8010	7801	7602	7412	7229	7052
10	280	%N1	89.2	88.4	87.6	86.8	86.0	85.2	84.5	83.8	83.1	82.3	81.6
	9	MAX TAT											
	323	FF/ENG	9218	8946	8683	8436	8208	7993	7790	7598	7410	7228	7052
9	280	%N1	88.4	87.6	86.7	85.9	85.1	84.3	83.6	82.9	82.1	81.4	80.7
	10	MAX TAT											
	318	FF/ENG	9168	8897	8643	8404	8182	7975	7775	7585	7399	7217	7041
8	280	%N1	87.4	86.6	85.7	84.9	84.2	83.5	82.7	81.9	81.2	80.5	79.8
	12	MAX TAT											
	314	FF/ENG	9108	8847	8599	8370	8156	7953	7756	7566	7379	7195	7016

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.4	97.4	98.3	99.3	100.3	101.2	102.2	103.1	102.8	101.1	99.5	98.0	97.0	96.0
17	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.4	101.8	100.0	98.4	97.3	96.3
16	96.1	97.1	98.1	99.0	100.0	100.9	101.9	102.8	103.7	102.4	100.5	98.9	97.7	96.7
15	96.0	97.0	97.9	98.9	99.8	100.8	101.7	102.6	103.6	102.9	101.1	99.5	98.1	97.1
14	95.7	96.6	97.6	98.6	99.5	100.4	101.4	102.3	103.2	103.3	101.5	99.8	98.4	97.4
13	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	102.9	103.7	101.9	100.1	98.8	97.7
12	95.2	96.2	97.2	98.1	99.1	100.0	100.9	101.8	102.8	103.7	102.4	100.5	99.1	98.1
11	94.8	95.7	96.7	97.6	98.6	99.5	100.4	101.3	102.3	103.2	102.8	100.7	99.4	98.3
10	94.3	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.6	103.1	101.0	99.7	98.5
9	93.6	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.9	102.8	101.3	99.8	98.7
8	92.8	93.7	94.7	95.6	96.5	97.4	98.4	99.2	100.1	101.0	101.9	101.5	100.0	98.8

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	280	%N1	88.7	88.1	87.4	86.7	86.1	85.4	84.7	84.1	83.6	83.1	82.7
	-3	MAX TAT											
	363	FF/ENG	7279	7094	6919	6755	6598	6448	6306	6175	6056	5947	5851
17	280	%N1	87.9	87.2	86.5	85.8	85.1	84.4	83.8	83.3	82.8	82.3	81.9
	-2	MAX TAT											
	358	FF/ENG	7231	7048	6878	6717	6560	6412	6275	6149	6031	5922	5827
16	280	%N1	86.9	86.2	85.5	84.8	84.1	83.5	83.0	82.5	81.9	81.4	80.9
	0	MAX TAT											
	353	FF/ENG	7179	7000	6830	6670	6516	6372	6239	6116	6001	5895	5801
15	280	%N1	85.9	85.2	84.4	83.8	83.2	82.7	82.0	81.5	80.9	80.4	79.9
	1	MAX TAT											
	347	FF/ENG	7126	6949	6783	6626	6475	6334	6204	6084	5972	5868	5775
14	280	%N1	84.9	84.2	83.6	83.0	82.4	81.7	81.1	80.5	80.0	79.5	79.1
	3	MAX TAT											
	342	FF/ENG	7083	6909	6746	6593	6446	6308	6181	6062	5951	5849	5757
13	280	%N1	84.0	83.4	82.8	82.1	81.4	80.8	80.2	79.7	79.1	78.7	78.2
	4	MAX TAT											
	337	FF/ENG	7058	6886	6726	6578	6435	6300	6172	6053	5943	5841	5750
12	280	%N1	83.2	82.5	81.8	81.2	80.6	80.0	79.4	78.8	78.3	77.9	77.4
	6	MAX TAT											
	332	FF/ENG	7051	6880	6723	6580	6439	6305	6177	6057	5948	5849	5759
11	280	%N1	82.4	81.7	81.0	80.4	79.8	79.2	78.6	78.1	77.6	77.1	76.7
	7	MAX TAT											
	328	FF/ENG	7052	6886	6733	6590	6450	6316	6188	6070	5964	5867	5778
10	280	%N1	81.6	80.9	80.2	79.6	79.0	78.4	77.9	77.3	76.8	76.4	76.0
	9	MAX TAT											
	323	FF/ENG	7052	6889	6738	6595	6454	6321	6195	6079	5975	5882	5794
9	280	%N1	80.7	80.0	79.4	78.8	78.2	77.6	77.0	76.5	76.0	75.6	75.2
	10	MAX TAT											
	318	FF/ENG	7041	6879	6727	6584	6445	6313	6188	6074	5972	5880	5794
8	280	%N1	79.8	79.1	78.5	77.9	77.3	76.7	76.1	75.6	75.2	74.8	74.4
	12	MAX TAT											
	314	FF/ENG	7016	6853	6701	6560	6424	6294	6170	6057	5956	5865	5780

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.4	97.4	98.3	99.3	100.3	101.2	102.2	103.1	102.8	101.1	99.5	98.0	97.0	96.0
17	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.4	101.8	100.0	98.4	97.3	96.3
16	96.1	97.1	98.1	99.0	100.0	100.9	101.9	102.8	103.7	102.4	100.5	98.9	97.7	96.7
15	96.0	97.0	97.9	98.9	99.8	100.8	101.7	102.6	103.6	102.9	101.1	99.5	98.1	97.1
14	95.7	96.6	97.6	98.6	99.5	100.4	101.4	102.3	103.2	103.3	101.5	99.8	98.4	97.4
13	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	102.9	103.7	101.9	100.1	98.8	97.7
12	95.2	96.2	97.2	98.1	99.1	100.0	100.9	101.8	102.8	103.7	102.4	100.5	99.1	98.1
11	94.8	95.7	96.7	97.6	98.6	99.5	100.4	101.3	102.3	103.2	102.8	100.7	99.4	98.3
10	94.3	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.6	103.1	101.0	99.7	98.5
9	93.6	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.9	102.8	101.3	99.8	98.7
8	92.8	93.7	94.7	95.6	96.5	97.4	98.4	99.2	100.1	101.0	101.9	101.5	100.0	98.8

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26													
25													
24													
23	300 -7 419	%N1 MAX TAT FF/ENG										98.3 3 8541	97.1 6 8273
22	300 -6 412	%N1 MAX TAT FF/ENG									97.6 6 8636	96.3 9 8376	95.2 12 8142
21	300 -5 406	%N1 MAX TAT FF/ENG						99.5 5 9357	98.2 8 9033	96.9 11 8751	95.7 14 8494	94.6 17 8258	93.6 19 8042
20	300 -4 400	%N1 MAX TAT FF/ENG				100.3 7 9838	98.8 10 9475	97.5 13 9161	96.2 16 8883	95.1 19 8623	94.0 22 8387	93.1 24 8170	92.4 27 7964
19	300 -2 394	%N1 MAX TAT FF/ENG			99.6 10 9970	98.2 13 9611	96.8 16 9301	95.6 19 9021	94.5 21 8765	93.5 24 8526	92.7 26 8306	92.0 29 8100	91.3 7904

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
23	93.3	94.3	95.2	96.2	97.2	98.1	99.0	100.0	100.2	99.0	97.8	96.9	96.2	95.6
22	93.2	94.2	95.1	96.1	97.0	98.0	98.9	99.9	100.7	99.2	98.0	97.1	96.4	95.8
21	93.9	94.9	95.8	96.8	97.8	98.7	99.7	100.6	101.6	100.5	99.2	98.0	97.1	96.5
20	94.6	95.6	96.6	97.6	98.5	99.5	100.4	101.4	102.3	101.9	100.4	99.1	97.9	97.2
19	94.5	95.5	96.5	97.5	98.4	99.4	100.3	101.3	102.2	102.5	100.8	99.4	98.1	97.3

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 29000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	300	%N1										98.9	98.2
	-15	MAX TAT										-3	-2
	459	FF/ENG										7341	7216
28	300	%N1								98.8	98.0	97.2	96.5
	-14	MAX TAT								-2	0	1	3
	452	FF/ENG								7512	7339	7195	7080
27	300	%N1						98.9	98.0	96.9	95.9	95.3	94.8
	-12	MAX TAT						-2	1	3	5	6	8
	445	FF/ENG						7746	7539	7360	7207	7083	6983
26	300	%N1					98.1	96.9	95.9	95.1	94.5	93.9	93.4
	-11	MAX TAT					1	3	6	8	10	11	12
	438	FF/ENG					7806	7589	7403	7244	7107	6994	6904
25	300	%N1				97.3	96.2	95.2	94.4	93.7	93.0	92.5	92.1
	-10	MAX TAT				3	6	8	11	13	14	16	17
	432	FF/ENG				7877	7655	7463	7297	7153	7029	6924	6838
24	300	%N1		97.8	96.6	95.5	94.6	93.7	92.9	92.3	91.9	91.5	91.1
	-9	MAX TAT		3	6	9	11	14	16	17	19	20	21
	425	FF/ENG		8191	7950	7737	7542	7369	7218	7085	6968	6867	6782
23	300	%N1	97.1	95.9	94.9	93.9	93.0	92.3	91.8	91.3	90.8	90.4	90.1
	-7	MAX TAT	6	9	12	14	16	19	21	22	24		
	419	FF/ENG	8273	8039	7825	7631	7453	7292	7148	7018	6904	6807	6727
22	300	%N1	95.2	94.2	93.2	92.5	91.9	91.3	90.8	90.3	89.8	89.5	89.2
	-6	MAX TAT	12	14	17	19	22	24					
	412	FF/ENG	8142	7929	7732	7551	7382	7228	7086	6958	6846	6756	6682
21	300	%N1	93.6	92.8	92.1	91.5	90.9	90.3	89.8	89.4	89.0	88.6	88.4
	-5	MAX TAT	19	22	24	26							
	406	FF/ENG	8042	7843	7659	7486	7324	7175	7041	6920	6815	6729	6657
20	300	%N1	92.4	91.7	91.1	90.5	89.9	89.4	89.0	88.5	88.2	87.8	87.5
	-4	MAX TAT	27										
	400	FF/ENG	7964	7775	7600	7434	7279	7140	7014	6902	6803	6717	6645
19	300	%N1	91.3	90.7	90.1	89.6	89.0	88.6	88.1	87.7	87.3	87.0	86.7
	-2	MAX TAT											
	394	FF/ENG	7904	7724	7558	7400	7254	7121	7001	6893	6797	6715	6643

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
29	94.5	95.5	96.5	97.5	98.5	99.5	100.4	101.4	100.6	99.2	98.1	97.2	96.3	95.4
28	94.1	95.1	96.1	97.1	98.1	99.0	100.0	101.0	100.8	99.3	98.2	97.3	96.4	95.5
27	93.7	94.7	95.7	96.7	97.6	98.6	99.6	100.5	100.9	99.4	98.3	97.3	96.4	95.6
26	93.2	94.2	95.2	96.2	97.1	98.1	99.1	100.0	100.9	99.5	98.5	97.3	96.4	95.7
25	92.6	93.6	94.6	95.6	96.5	97.5	98.4	99.4	100.3	99.6	98.5	97.4	96.5	95.8
24	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	99.9	98.7	97.6	96.7	96.0
23	92.3	93.3	94.3	95.2	96.2	97.2	98.1	99.0	100.0	100.2	99.0	97.8	96.9	96.2
22	92.2	93.2	94.2	95.1	96.1	97.0	98.0	98.9	99.9	100.7	99.2	98.0	97.1	96.4
21	92.9	93.9	94.9	95.8	96.8	97.8	98.7	99.7	100.6	101.6	100.5	99.2	98.0	97.1
20	93.6	94.6	95.6	96.6	97.6	98.5	99.5	100.4	101.4	102.3	101.9	100.4	99.1	97.9
19	93.5	94.5	95.5	96.5	97.5	98.4	99.4	100.3	101.3	102.2	102.5	100.8	99.4	98.1

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	300	%N1	100.4	98.9	97.5	96.2	95.0	93.9	93.1	92.4	91.7	91.0	90.4
	-1	MAX TAT	10	13	16	19	22	24	26	29			
	388	FF/ENG	10508	10094	9750	9441	9161	8907	8671	8446	8237	8041	7856
17	300	%N1	98.3	96.8	95.6	94.4	93.6	92.8	92.1	91.4	90.7	90.1	89.5
	1	MAX TAT	16	19	22	24	27	29	31				
	383	FF/ENG	10233	9886	9578	9300	9045	8810	8587	8374	8176	7991	7817
16	300	%N1	96.3	95.1	94.1	93.3	92.5	91.8	91.1	90.4	89.8	89.2	88.7
	2	MAX TAT	22	25	27	29	32						
	377	FF/ENG	10026	9717	9440	9183	8942	8718	8507	8309	8122	7945	7776
15	300	%N1	94.6	93.7	92.9	92.1	91.5	90.8	90.2	89.5	88.9	88.4	87.8
	3	MAX TAT	27	30	32	34							
	371	FF/ENG	9860	9581	9321	9077	8848	8637	8437	8248	8068	7895	7733
14	300	%N1	93.4	92.6	91.9	91.2	90.5	89.9	89.3	88.7	88.0	87.5	86.9
	5	MAX TAT	32	35									
	366	FF/ENG	9733	9465	9214	8984	8771	8572	8378	8191	8014	7847	7686
13	300	%N1	92.3	91.6	90.9	90.3	89.6	89.0	88.4	87.7	87.1	86.5	85.9
	6	MAX TAT	37										
	361	FF/ENG	9626	9365	9130	8917	8716	8520	8327	8143	7967	7801	7641
12	300	%N1	91.4	90.7	90.0	89.4	88.8	88.1	87.5	86.8	86.1	85.5	85.0
	8	MAX TAT											
	356	FF/ENG	9537	9300	9082	8877	8675	8477	8286	8103	7930	7766	7609
11	300	%N1	90.5	89.8	89.2	88.5	87.9	87.2	86.5	85.9	85.3	84.7	84.2
	9	MAX TAT											
	350	FF/ENG	9493	9271	9054	8846	8642	8444	8254	8075	7906	7746	7593
10	300	%N1	89.7	89.0	88.4	87.7	87.0	86.3	85.7	85.1	84.5	84.0	83.4
	11	MAX TAT											
	345	FF/ENG	9472	9244	9025	8816	8614	8419	8233	8057	7891	7735	7586
9	300	%N1	88.8	88.2	87.5	86.8	86.1	85.5	84.9	84.3	83.7	83.1	82.5
	12	MAX TAT											
	340	FF/ENG	9436	9208	8992	8785	8587	8398	8215	8041	7875	7725	7578
8	300	%N1	88.0	87.3	86.6	85.9	85.3	84.7	84.1	83.4	82.8	82.2	81.7
	14	MAX TAT											
	336	FF/ENG	9392	9171	8959	8756	8563	8377	8195	8022	7860	7712	7567

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	96.5	97.5	98.4	99.4	100.3	101.2	102.2	103.1	101.4	99.8	98.3	97.4	96.5	95.6
17	96.5	97.5	98.4	99.4	100.3	101.3	102.2	103.1	102.0	100.2	98.7	97.6	96.6	95.8
16	96.5	97.4	98.4	99.3	100.3	101.2	102.1	103.1	102.8	100.9	99.3	98.0	97.0	96.1
15	96.3	97.3	98.2	99.2	100.1	101.0	102.0	102.9	103.4	101.5	99.9	98.4	97.4	96.5
14	95.9	96.9	97.8	98.8	99.7	100.6	101.6	102.5	103.4	101.8	100.2	98.7	97.7	96.8
13	95.5	96.5	97.4	98.4	99.3	100.2	101.1	102.1	103.0	102.2	100.5	99.0	98.0	97.1
12	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.7	102.7	100.8	99.3	98.3	97.4
11	94.7	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.9	101.0	99.5	98.4	97.5
10	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.4	102.2	101.2	99.8	98.6	97.6
9	93.7	94.6	95.6	96.5	97.4	98.3	99.2	100.1	100.9	101.8	101.5	100.0	98.8	97.8
8	93.2	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.5	101.3	101.9	100.3	98.9	98.0

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	300	%N1	90.4	89.8	89.3	88.7	88.2	87.7	87.3	86.9	86.5	86.1	85.8
	-1 388	MAXTAT FF/ENG	7856	7687	7530	7378	7236	7107	6991	6887	6793	6710	6637
17	300	%N1	89.5	89.0	88.4	87.9	87.3	86.9	86.4	85.9	85.5	85.1	84.8
	1 383	MAXTAT FF/ENG	7817	7655	7501	7354	7216	7090	6975	6870	6775	6692	6621
16	300	%N1	88.7	88.1	87.6	87.0	86.5	85.9	85.4	84.9	84.6	84.3	84.0
	2 377	MAXTAT FF/ENG	7776	7617	7468	7324	7186	7059	6944	6840	6748	6667	6597
15	300	%N1	87.8	87.2	86.6	86.0	85.4	84.9	84.5	84.2	83.8	83.5	83.3
	3 371	MAXTAT FF/ENG	7733	7577	7427	7282	7146	7022	6909	6806	6715	6636	6567
14	300	%N1	86.9	86.2	85.6	85.1	84.6	84.2	83.8	83.4	83.0	82.6	82.3
	5 366	MAXTAT FF/ENG	7686	7529	7379	7240	7109	6988	6875	6773	6683	6606	6540
13	300	%N1	85.9	85.3	84.7	84.3	83.8	83.4	82.9	82.5	82.1	81.7	81.4
	6 361	MAXTAT FF/ENG	7641	7486	7341	7206	7080	6961	6850	6749	6661	6586	6519
12	300	%N1	85.0	84.5	84.0	83.5	83.0	82.5	82.0	81.6	81.2	80.9	80.6
	8 356	MAXTAT FF/ENG	7609	7458	7317	7185	7063	6947	6839	6739	6652	6576	6509
11	300	%N1	84.2	83.7	83.1	82.6	82.1	81.6	81.2	80.8	80.4	80.1	79.8
	9 350	MAXTAT FF/ENG	7593	7445	7307	7179	7059	6945	6838	6739	6652	6575	6506
10	300	%N1	83.4	82.8	82.3	81.8	81.3	80.8	80.4	80.0	79.6	79.3	79.0
	11 345	MAXTAT FF/ENG	7586	7441	7306	7179	7059	6945	6839	6741	6653	6575	6506
9	300	%N1	82.5	82.0	81.4	80.9	80.5	80.0	79.6	79.2	78.8	78.5	78.2
	12 340	MAXTAT FF/ENG	7578	7437	7301	7172	7051	6937	6831	6734	6647	6569	6500
8	300	%N1	81.7	81.1	80.6	80.1	79.6	79.2	78.8	78.4	78.0	77.7	77.4
	14 336	MAXTAT FF/ENG	7567	7425	7289	7158	7036	6923	6820	6725	6638	6560	6490

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	96.5	97.5	98.4	99.4	100.3	101.2	102.2	103.1	101.4	99.8	98.3	97.4	96.5	95.6
17	96.5	97.5	98.4	99.4	100.3	101.3	102.2	103.1	102.0	100.2	98.7	97.6	96.6	95.8
16	96.5	97.4	98.4	99.3	100.3	101.2	102.1	103.1	102.8	100.9	99.3	98.0	97.0	96.1
15	96.3	97.3	98.2	99.2	100.1	101.0	102.0	102.9	103.4	101.5	99.9	98.4	97.4	96.5
14	95.9	96.9	97.8	98.8	99.7	100.6	101.6	102.5	103.4	101.8	100.2	98.7	97.7	96.8
13	95.5	96.5	97.4	98.4	99.3	100.2	101.1	102.1	103.0	102.2	100.5	99.0	98.0	97.1
12	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.7	102.7	100.8	99.3	98.3	97.4
11	94.7	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.9	101.0	99.5	98.4	97.5
10	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.4	102.2	101.2	99.8	98.6	97.6
9	93.7	94.6	95.6	96.5	97.4	98.3	99.2	100.1	100.9	101.8	101.5	100.0	98.8	97.8
8	93.2	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.5	101.3	101.9	100.3	98.9	98.0

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table

29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26													
25													
24													
23													
22	320 -3 438	%N1 MAX TAT FF/ENG										98.0 7 8928	
21	320 -2 432	%N1 MAX TAT FF/ENG									98.3 10 9229	97.3 12 9006	96.4 15 8799
20	320 -1 425	%N1 MAX TAT FF/ENG						99.7 11 9847	98.5 13 9575	97.5 15 9331	96.5 18 9106	95.6 20 8899	94.8 22 8705
19	320 0 419	%N1 MAX TAT FF/ENG				100.0 11 10267	98.8 14 9969	97.7 16 9701	96.7 18 9455	95.7 21 9228	94.9 23 9017	94.1 25 8822	93.5 27 8640

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
22	92.1	93.1	94.1	95.0	96.0	96.9	97.8	98.7	99.7	99.6	98.5	97.5	96.8	96.2
21	93.0	94.0	94.9	95.9	96.8	97.8	98.7	99.6	100.6	101.0	99.6	98.6	97.6	96.9
20	93.8	94.8	95.7	96.7	97.7	98.6	99.5	100.5	101.5	102.4	100.8	99.7	98.4	97.7
19	93.6	94.6	95.6	96.5	97.5	98.4	99.3	100.3	101.2	102.2	101.2	99.8	98.5	97.7

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.



Flight Planning and Performance Manual

ENGINE INOP
MAX CONTINUOUS THRUST

320 KIAS Cruise Table
29000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29													
28													
27													
26	320 -8 465	%N1 MAX TAT FF/ENG											98.2 3 8022
25	320 -7 458	%N1 MAX TAT FF/ENG								97.8 4 8185	97.3 6 8079	96.7 7 7986	96.4 8 7904
24	320 -6 451	%N1 MAX TAT FF/ENG					98.1 5 8469	97.2 7 8311	96.6 8 8176	96.2 10 8063	95.8 11 7969	95.4 12 7885	95.1 13 7807
23	320 -5 445	%N1 MAX TAT FF/ENG			97.9 6 8670	97.1 8 8487	96.4 10 8326	95.8 12 8182	95.2 13 8058	94.7 15 7956	94.3 16 7869	94.0 17 7792	93.6 18 7718
22	320 -3 438	%N1 MAX TAT FF/ENG	98.0 7 8928	97.1 9 8718	96.3 11 8530	95.5 13 8363	94.9 15 8215	94.3 17 8084	93.7 18 7969	93.4 20 7872	93.1 21 7790	92.8 22 7715	92.5 23 7644
21	320 -2 432	%N1 MAX TAT FF/ENG	96.4 15 8799	95.5 17 8607	94.8 19 8434	94.1 21 8279	93.5 22 8141	93.1 24 8016	92.7 25 7907	92.4 26 7812	92.1 27 7730	91.8 28 7655	91.6 29 7587
20	320 -1 425	%N1 MAX TAT FF/ENG	94.8 22 8705	94.0 24 8526	93.5 26 8364	93.0 28 8216	92.5 29 8082	92.1 31 7961	91.7 7855	91.4 7765	91.1 7686	90.9 7614	90.7 7548
19	320 0 419	%N1 MAX TAT FF/ENG	93.5 27 8640	92.9 29 8470	92.4 30 8313	91.9 32 8169	91.5 91.5 8036	91.1 91.1 7917	90.7 90.7 7816	90.5 90.5 7733	90.2 90.2 7662	90.0 90.0 7596	89.8 89.8 7535

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
25	93.0	94.0	94.9	95.9	96.8	97.8	98.7	99.7	100.2	98.9	98.0	97.0	96.2	95.5
24	92.6	93.5	94.5	95.5	96.4	97.3	98.3	99.2	100.2	99.1	98.2	97.2	96.4	95.8
23	92.3	93.3	94.2	95.2	96.1	97.0	98.0	98.9	99.8	99.3	98.3	97.3	96.6	96.0
22	92.1	93.1	94.1	95.0	96.0	96.9	97.8	98.7	99.7	99.6	98.5	97.5	96.8	96.2
21	93.0	94.0	94.9	95.9	96.8	97.8	98.7	99.6	100.6	101.0	99.6	98.6	97.6	96.9
20	93.8	94.8	95.7	96.7	97.7	98.6	99.5	100.5	101.5	102.4	100.8	99.7	98.4	97.7
19	93.6	94.6	95.6	96.5	97.5	98.4	99.3	100.3	101.2	102.2	101.2	99.8	98.5	97.7

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table

18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	320	%N1		100.3	99.1	97.9	96.9	95.9	95.0	94.2	93.6	93.0	92.4
	2	MAX TAT		12	15	17	19	21	24	26	28	29	31
	413	FF/ENG		10713	10388	10100	9832	9582	9353	9142	8947	8763	8589
17	320	%N1	99.4	98.3	97.2	96.2	95.2	94.4	93.7	93.1	92.5	92.0	91.5
	3	MAX TAT	15	18	20	22	24	26	28	30	32	34	
	407	FF/ENG	10821	10510	10221	9952	9706	9479	9265	9066	8882	8707	8541
16	320	%N1	97.5	96.5	95.5	94.6	93.9	93.3	92.7	92.1	91.6	91.1	90.6
	4	MAX TAT	21	23	25	27	29	31	33	35			
	401	FF/ENG	10613	10331	10067	9822	9598	9386	9183	8994	8820	8654	8496
15	320	%N1	95.8	94.9	94.2	93.5	92.9	92.3	91.7	91.2	90.7	90.2	89.7
	6	MAX TAT	26	28	31	33	34	36					
	395	FF/ENG	10429	10176	9936	9708	9496	9295	9103	8925	8761	8603	8451
14	320	%N1	94.5	93.8	93.1	92.5	92.0	91.4	90.9	90.3	89.9	89.4	88.9
	7	MAX TAT	31	33	35	37							
	390	FF/ENG	10285	10049	9821	9604	9401	9210	9031	8863	8705	8550	8403
13	320	%N1	93.4	92.8	92.2	91.6	91.1	90.6	90.0	89.5	89.0	88.5	88.1
	9	MAX TAT	36	38	40								
	384	FF/ENG	10158	9931	9714	9511	9322	9142	8970	8805	8649	8498	8353
12	320	%N1	92.5	91.9	91.3	90.8	90.2	89.7	89.2	88.7	88.2	87.6	87.1
	10	MAX TAT	40										
	379	FF/ENG	10040	9827	9628	9439	9258	9081	8912	8750	8594	8443	8298
11	320	%N1	91.5	91.0	90.4	89.9	89.3	88.8	88.3	87.7	87.2	86.6	86.1
	12	MAX TAT											
	373	FF/ENG	9957	9760	9568	9380	9199	9026	8859	8697	8541	8392	8252
10	320	%N1	90.7	90.1	89.5	89.0	88.5	87.9	87.3	86.8	86.2	85.8	85.4
	13	MAX TAT											
	368	FF/ENG	9911	9714	9517	9328	9147	8976	8811	8651	8498	8355	8220
9	320	%N1	89.8	89.3	88.7	88.1	87.5	86.9	86.4	86.0	85.5	85.1	84.7
	14	MAX TAT											
	363	FF/ENG	9865	9662	9464	9277	9099	8931	8769	8612	8464	8324	8193
8	320	%N1	89.0	88.4	87.8	87.2	86.6	86.1	85.7	85.2	84.7	84.2	83.8
	16	MAX TAT											
	358	FF/ENG	9811	9609	9416	9234	9060	8896	8737	8583	8437	8300	8171

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	101.7	100.1	98.7	97.8	96.9	96.1
17	95.3	96.3	97.3	98.2	99.1	100.0	101.0	101.9	102.3	100.5	99.0	97.9	97.0	96.2
16	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.8	102.7	101.1	99.6	98.3	97.4	96.5
15	95.2	96.1	97.1	98.0	98.9	99.8	100.7	101.7	102.6	101.8	100.1	98.7	97.7	96.9
14	94.9	95.9	96.8	97.8	98.7	99.6	100.5	101.4	102.3	102.2	100.5	99.0	98.1	97.2
13	94.6	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.6	100.9	99.3	98.3	97.4
12	94.3	95.3	96.2	97.1	98.0	99.0	99.9	100.8	101.6	102.5	101.2	99.7	98.6	97.6
11	93.7	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.8	101.3	99.8	98.6	97.7
10	93.1	94.0	94.9	95.8	96.7	97.6	98.5	99.4	100.3	101.1	101.3	100.0	98.8	97.8
9	92.7	93.6	94.5	95.5	96.4	97.3	98.1	99.0	99.9	100.7	101.6	100.2	98.9	97.9
8	92.3	93.2	94.1	95.0	95.9	96.8	97.7	98.6	99.5	100.3	101.1	100.4	99.1	98.1

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	320	%N1	92.4	91.9	91.4	91.0	90.6	90.2	89.9	89.6	89.4	89.2	89.0
	2	MAX TAT	31	33									
	413	FF/ENG	8589	8426	8276	8137	8011	7899	7804	7724	7655	7592	7534
17	320	%N1	91.5	91.0	90.5	90.1	89.7	89.4	89.1	88.8	88.5	88.3	88.1
	3	MAX TAT											
	407	FF/ENG	8541	8386	8245	8116	7999	7893	7800	7720	7650	7587	7533
16	320	%N1	90.6	90.1	89.7	89.3	88.9	88.5	88.2	87.9	87.7	87.5	87.3
	4	MAX TAT											
	401	FF/ENG	8496	8349	8215	8092	7979	7878	7789	7710	7640	7578	7523
15	320	%N1	89.7	89.3	88.8	88.4	88.0	87.7	87.4	87.1	86.8	86.5	86.3
	6	MAX TAT											
	395	FF/ENG	8451	8308	8178	8059	7951	7852	7763	7683	7612	7548	7493
14	320	%N1	88.9	88.4	88.0	87.6	87.2	86.8	86.4	86.1	85.8	85.6	85.4
	7	MAX TAT											
	390	FF/ENG	8403	8264	8137	8020	7910	7811	7721	7642	7572	7509	7456
13	320	%N1	88.1	87.6	87.1	86.6	86.2	85.9	85.6	85.3	85.1	84.9	84.7
	9	MAX TAT											
	384	FF/ENG	8353	8215	8087	7969	7861	7764	7677	7600	7532	7471	7418
12	320	%N1	87.1	86.6	86.1	85.8	85.4	85.1	84.9	84.6	84.4	84.2	84.0
	10	MAX TAT											
	379	FF/ENG	8298	8162	8037	7922	7816	7721	7636	7561	7494	7434	7383
11	320	%N1	86.1	85.7	85.4	85.0	84.7	84.3	84.0	83.7	83.5	83.2	83.0
	12	MAX TAT											
	373	FF/ENG	8252	8121	7999	7884	7779	7685	7602	7529	7464	7405	7356
10	320	%N1	85.4	85.0	84.6	84.2	83.8	83.4	83.1	82.9	82.6	82.4	82.2
	13	MAX TAT											
	368	FF/ENG	8220	8093	7973	7859	7754	7661	7579	7507	7443	7385	7336
9	320	%N1	84.7	84.2	83.8	83.3	82.9	82.6	82.3	82.0	81.8	81.6	81.4
	14	MAX TAT											
	363	FF/ENG	8193	8069	7950	7838	7735	7642	7560	7487	7422	7364	7315
8	320	%N1	83.8	83.3	82.9	82.5	82.1	81.8	81.5	81.2	81.0	80.7	80.5
	16	MAX TAT											
	358	FF/ENG	8171	8049	7932	7821	7718	7625	7541	7467	7400	7341	7291

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

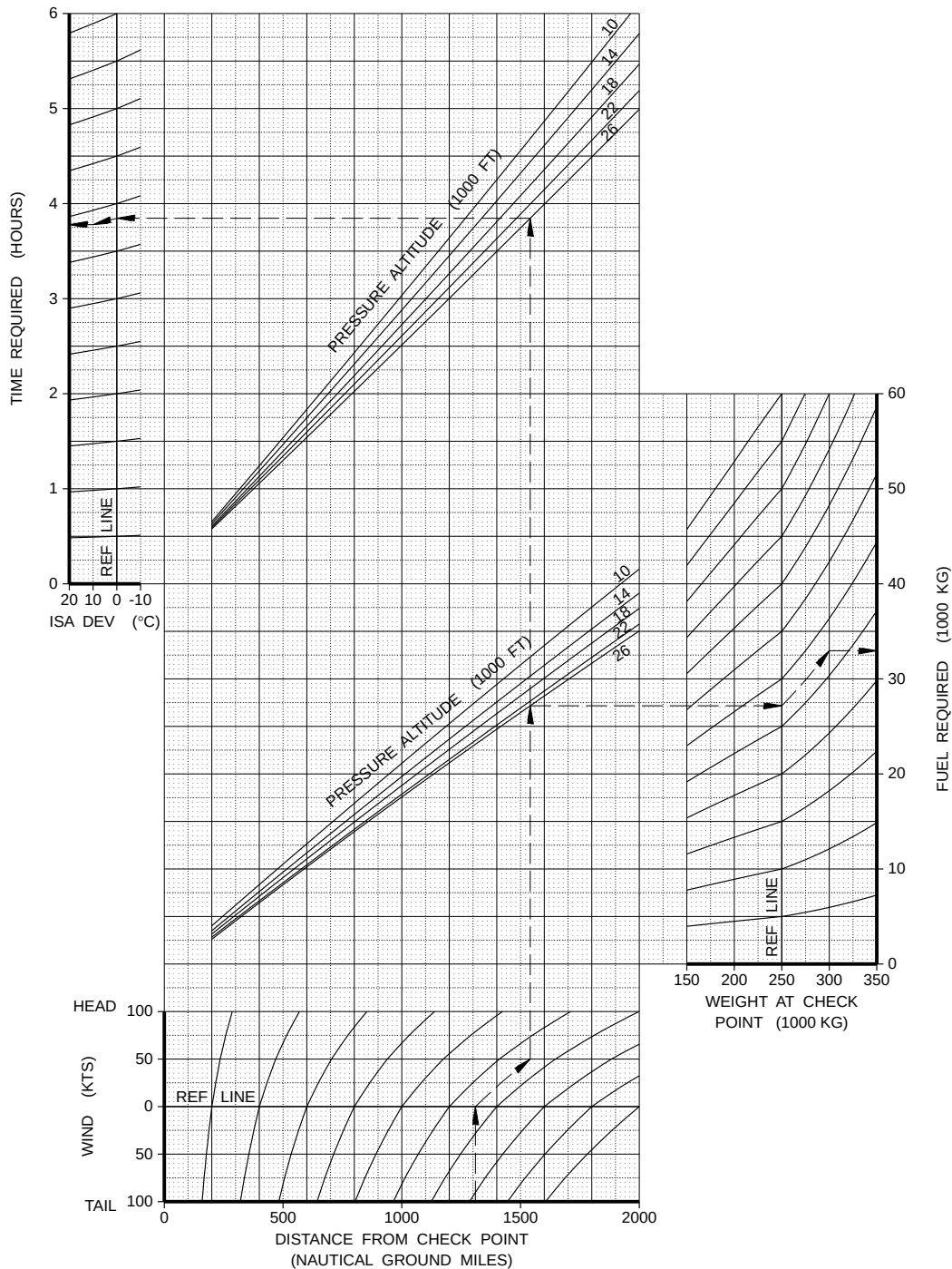
PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	101.7	100.1	98.7	97.8	96.9	96.1
17	95.3	96.3	97.3	98.2	99.1	100.0	101.0	101.9	102.3	100.5	99.0	97.9	97.0	96.2
16	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.8	102.7	101.1	99.6	98.3	97.4	96.5
15	95.2	96.1	97.1	98.0	98.9	99.8	100.7	101.7	102.6	101.8	100.1	98.7	97.7	96.9
14	94.9	95.9	96.8	97.8	98.7	99.6	100.5	101.4	102.3	102.2	100.5	99.0	98.1	97.2
13	94.6	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.6	100.9	99.3	98.3	97.4
12	94.3	95.3	96.2	97.1	98.0	99.0	99.9	100.8	101.6	102.5	101.2	99.7	98.6	97.6
11	93.7	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.8	101.3	99.8	98.6	97.7
10	93.1	94.0	94.9	95.8	96.7	97.6	98.5	99.4	100.3	101.1	101.3	100.0	98.8	97.8
9	92.7	93.6	94.5	95.5	96.4	97.3	98.1	99.0	99.9	100.7	101.6	100.2	98.9	97.9
8	92.3	93.2	94.1	95.0	95.9	96.8	97.7	98.6	99.5	100.3	101.1	100.4	99.1	98.1

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on 310/250 descent and includes APU fuel burn

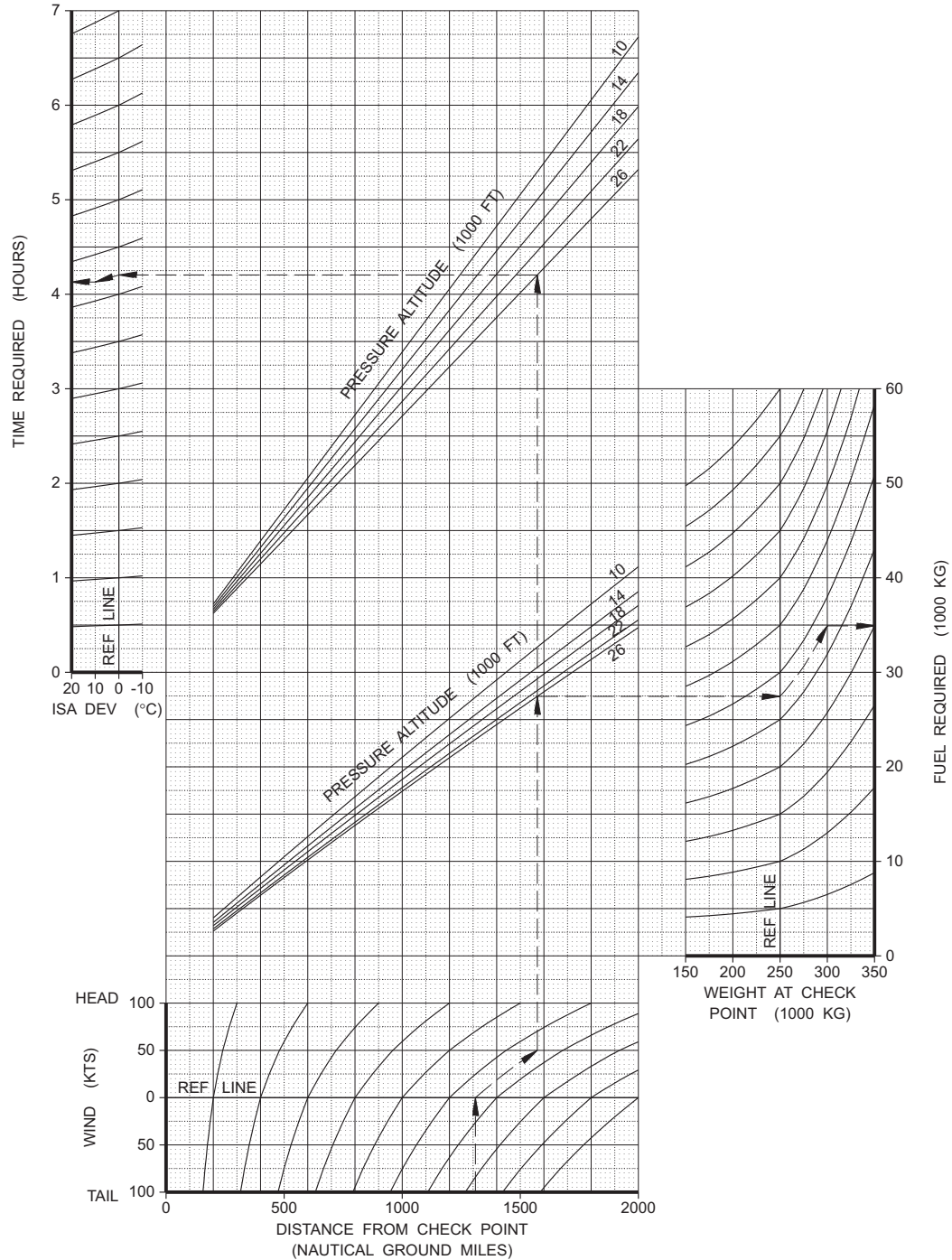


ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Diversion Fuel and Time

Based on 260/250 descent and includes APU fuel burn

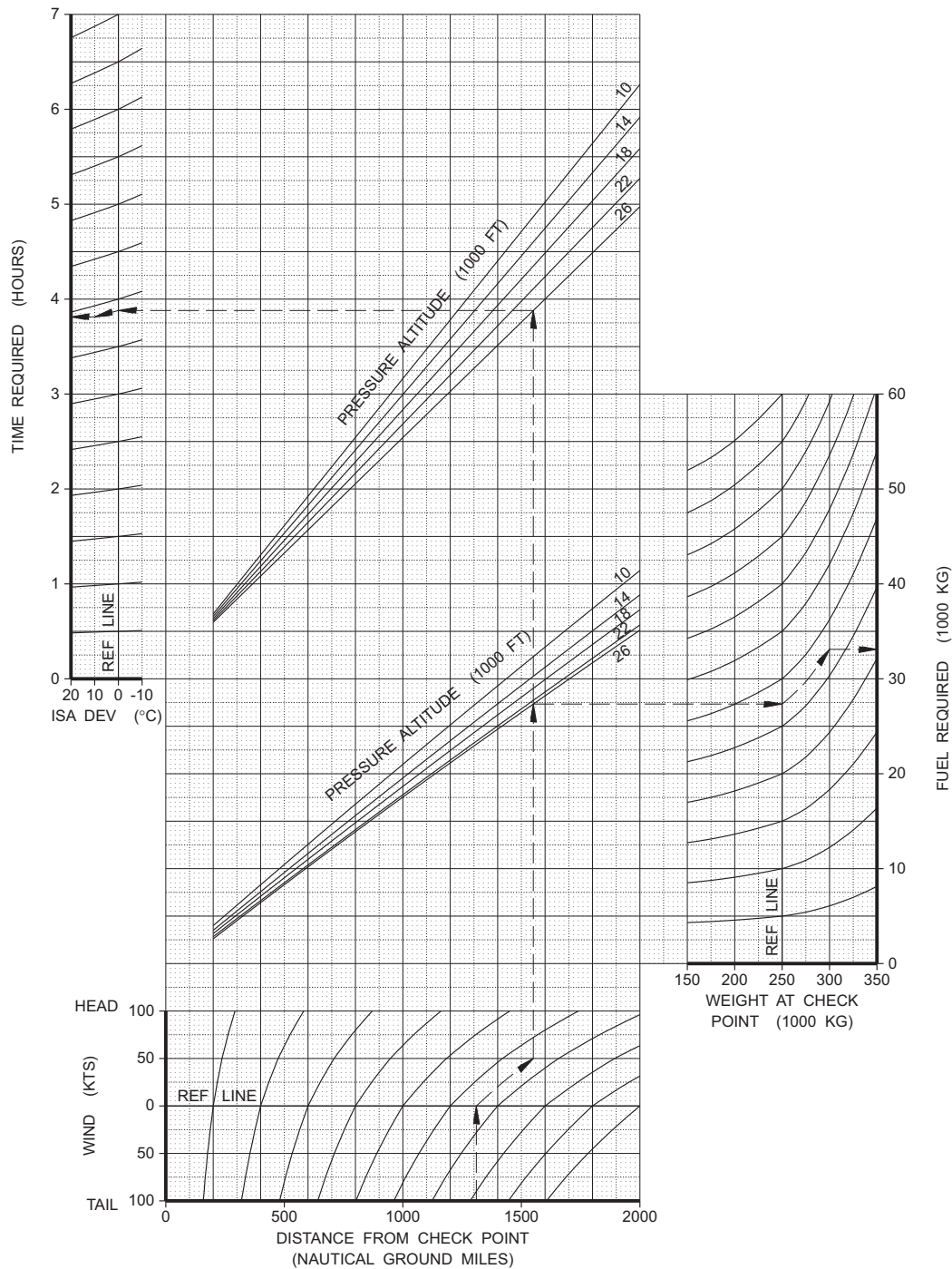


ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Diversion Fuel and Time

Based on 280/250 descent and includes APU fuel burn

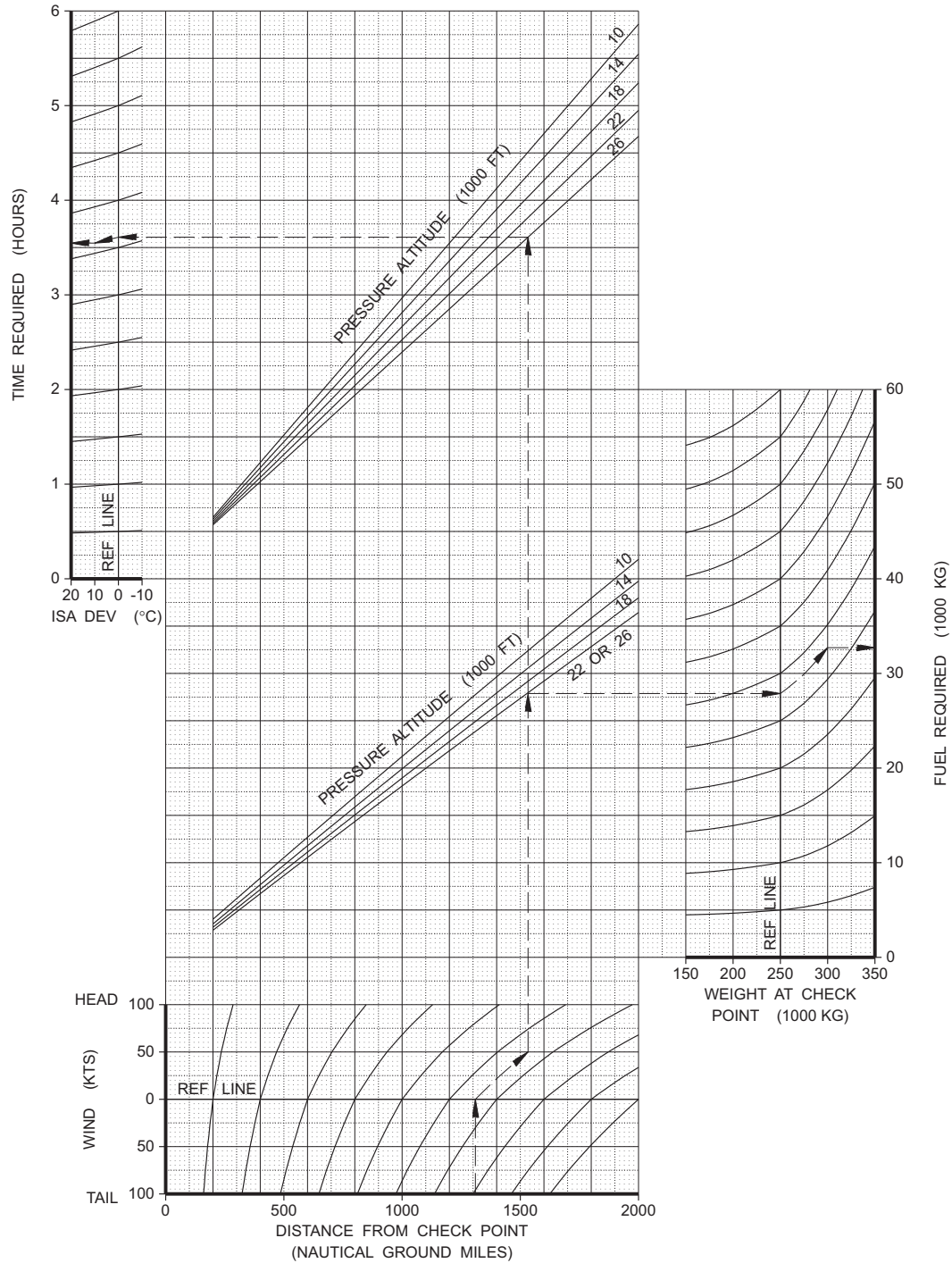


ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Diversion Fuel and Time

Based on 300/250 descent and includes APU fuel burn



ENGINE INOP

MAX CONTINUOUS THRUST

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
30000	%N1								99.1	93.5	88.0	84.5
	KIAS								246	233	208	199
	FF/ENG								7020	5950	5000	4360
25000	%N1						97.3	92.6	88.8	85.8	83.0	79.8
	KIAS						266	248	226	213	206	199
	FF/ENG						7980	6920	6060	5360	4780	4230
20000	%N1			98.4	94.5	91.3	88.8	86.3	83.8	80.9	77.9	74.7
	KIAS			294	277	258	240	226	220	213	206	199
	FF/ENG			9780	8730	7830	7030	6360	5750	5180	4640	4150
15000	%N1	94.5	92.2	90.1	88.1	86.0	83.7	81.3	78.6	76.0	73.2	70.3
	KIAS	298	282	265	252	243	234	226	220	213	206	199
	FF/ENG	10310	9410	8590	7890	7250	6640	6080	5540	5040	4560	4100
10000	%N1	89.2	87.4	85.4	83.4	81.1	78.8	76.5	74.1	71.6	68.9	65.9
	KIAS	275	267	259	251	242	233	226	220	213	206	199
	FF/ENG	9640	8990	8350	7740	7150	6570	6040	5530	5030	4560	4110
5000	%N1	84.5	82.6	80.6	78.6	76.6	74.5	72.3	69.9	67.4	64.8	62.1
	KIAS	273	266	257	249	241	232	226	220	213	206	199
	FF/ENG	9350	8760	8190	7640	7090	6570	6060	5570	5090	4620	4170
1500	%N1	81.1	79.3	77.6	75.6	73.7	71.6	69.3	67.0	64.7	62.2	59.5
	KIAS	272	264	257	249	240	232	226	220	213	206	199
	FF/ENG	9270	8720	8170	7640	7120	6600	6090	5600	5130	4670	4230

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

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NON-STANDARD CONFIGURATION

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Gear Down

Introduction

This section contains performance data for airplane operation with landing gear extended for all phases of flight. 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 10°C.

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.

Obstacle Limit

Obstacle clearance charts are provided for each certified takeoff flap setting based on normal air conditioning operation. 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 and can account for air conditioning packs off. 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 correct for OAT as necessary. Repeat this procedure to correct for airport pressure altitude and wind, then continue vertically to read obstacle limit weight.

Net Level Off Weight

This chart is used to determine the dispatch maximum weight for terrain clearance based on the Approved Flight Manual net engine inoperative, gear down performance at speed for optimum climb gradient. Refer to Chapter 2 text for description of net level off weight 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 enroute terrain clearance. Data is based on gear down net performance, Max Continuous thrust following engine failure and level flight deceleration to optimum driftdown speed (speed for optimum climb gradient). Refer to Chapter 2 for description of chart usage.

Long Range Cruise Trip Fuel and Time

A Long Range Cruise Trip Fuel and Time 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.

All Engines

Long Range Cruise Altitude Capability

Long Range Cruise altitude capability is provided at Max Climb thrust with 300 ft/min residual rate of climb.

220 KIAS Max Climb %N1

Max Climb %N1 based on normal air conditioning bleed is shown for a 220 KIAS climb schedule which approximates economy climb and turbulent air penetration speed, VREF 30+80 KIAS with the landing gear extended. Max Climb %N1 may be read directly from the table for the desired pressure altitude and TAT.

Long Range Cruise Table

LRC 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

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 VREF 30+80 KIAS and straight in approach.

Holding

%N1 required, ISA and fuel flow with gear down are shown as described in Chapter 3 with a minimum maneuver speed of VREF30+80 KIAS for Flaps Up and VREF30+60 for Flaps 1.

Engine Inoperative

Driftdown/LRC Cruise Range Capability

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

Long Range Cruise Altitude Capability

Altitude capability is provided in the same format as the gear up data shown in Chapter 3 for Max Climb Thrust and Long Range Cruise speed with 300 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+80 KIAS.

Alternate Mode EEC

Introduction

No takeoff speed adjustments or other performance adjustments are required for operation of EEC in the ALTERNATE mode. Power setting adjustments are only required for the takeoff thrust rating.

Max Takeoff %N1

Takeoff power settings are presented for normal air condition bleed. Max Takeoff %N1 may be read directly from the tables for the desired pressure altitude and airport OAT.

The EEC ALTERNATE mode schedule provides equal or greater thrust than the normal mode for the same lever position. Thrust protection is not provided in the ALTERNATE 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.



Flight Planning and Performance Manual

GEAR DOWN

Takeoff Climb Limit

Flaps 5

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	251.4	245.0	234.8	228.9	224.0	217.9	208.0	197.9	187.1	173.8		
52	126	257.1	250.8	240.2	230.0	223.9	219.2	213.9	203.5	192.6	178.9		
50	122	263.0	257.0	245.9	235.6	225.1	219.1	214.7	209.0	197.9	184.1	171.0	
48	118	269.6	263.3	251.9	241.1	230.7	220.3	214.7	209.7	203.0	189.3	176.2	171.2
46	115	276.0	269.4	257.8	246.7	236.2	225.7	215.8	209.6	203.5	194.3	181.3	176.3
44	111	281.9	275.2	263.7	252.3	241.5	230.9	220.7	210.7	203.4	196.9	186.2	181.1
42	108	287.5	280.6	269.2	257.9	246.8	236.2	225.7	215.4	204.6	196.8	188.8	185.7
40	104	293.3	286.4	274.7	263.5	252.3	241.4	230.8	220.2	209.2	197.9	188.7	185.6
38	100	298.8	292.6	280.9	269.2	258.1	246.9	236.2	225.3	214.0	202.3	189.9	185.5
36	97	304.7	298.5	287.1	275.4	263.8	252.6	241.6	230.7	219.1	207.0	194.2	189.3
34	93	310.5	304.2	293.4	281.4	269.7	258.3	247.3	235.9	224.4	212.0	198.7	193.8
32	90	316.2	309.6	299.0	287.6	275.6	263.9	252.8	241.4	229.5	217.2	203.5	198.3
30	86	321.8	315.3	304.3	293.9	281.6	269.7	258.3	246.8	234.8	222.2	208.5	203.2
28	82	324.8	320.7	309.7	298.9	287.6	275.5	264.1	252.2	240.1	227.4	213.3	208.0
26	79	325.1	323.4	314.5	303.9	293.1	281.0	269.3	257.5	245.3	232.5	218.5	212.9
24	75	325.3	323.5	317.0	308.4	297.9	285.9	274.0	262.0	250.1	237.3	223.2	217.6
22	72	325.5	323.6	317.1	310.9	302.2	290.7	278.4	266.3	254.2	242.0	228.3	222.8
20	68	325.7	323.7	317.1	310.9	304.3	295.0	282.2	270.1	257.7	245.8	232.8	227.5
18	65	325.9	323.8	317.2	311.0	304.3	296.8	285.7	273.1	260.8	248.8	236.4	231.5
16	61	326.2	323.9	317.3	311.0	304.3	296.8	287.4	275.9	263.1	251.6	239.5	234.7
14	58	326.4	324.0	317.3	311.1	304.4	296.8	287.4	277.1	265.1	253.2	242.3	237.6
10	50	326.7	324.1	317.4	311.1	304.4	296.8	287.3	276.8	265.9	255.4	245.0	240.7
-40	-40	327.8	322.4	315.7	309.2	302.4	294.1	284.3	273.6	262.6	252.4	242.6	238.8

With engine bleed for packs off, increase weight by 800 kg.

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

With engine and wing anti-ice on, decrease weight by 4200 kg.

Flaps 15

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	251.0	245.1	234.8	228.9	224.0	218.0	208.0	198.0	187.2	173.8		
52	126	256.5	250.8	240.2	230.0	223.9	219.2	213.9	203.5	192.6	178.9		
50	122	262.4	257.0	246.0	235.6	225.1	219.1	214.8	209.0	198.0	184.2	171.1	
48	118	269.1	263.3	252.0	241.2	230.7	220.3	214.7	209.7	203.1	189.4	176.2	171.2
46	115	275.5	269.5	257.9	246.8	236.2	225.8	215.8	209.6	203.6	194.4	181.3	176.4
44	111	281.5	275.3	263.7	252.4	241.5	231.0	220.8	210.8	203.5	196.9	186.2	181.2
42	108	287.2	280.7	269.2	258.0	246.8	236.2	225.7	215.4	204.6	196.8	188.9	185.8
40	104	293.1	286.5	274.8	263.6	252.3	241.4	230.8	220.2	209.2	198.0	188.8	185.7
38	100	298.6	292.7	281.0	269.3	258.1	246.9	236.2	225.4	214.0	202.4	189.9	185.6
36	97	304.5	298.5	287.2	275.5	263.9	252.7	241.7	230.7	219.1	207.1	194.3	189.3
34	93	310.1	304.2	293.5	281.5	269.8	258.4	247.3	236.0	224.4	212.1	198.8	193.8
32	90	315.6	309.6	299.1	287.6	275.6	264.0	252.8	241.4	229.5	217.2	203.6	198.3
30	86	321.2	315.4	304.4	294.0	281.7	269.8	258.4	246.8	234.9	222.2	208.6	203.2
28	82	324.3	320.8	309.8	299.0	287.7	275.6	264.1	252.2	240.1	227.4	213.4	208.0
26	79	324.5	323.5	314.6	304.0	293.2	281.0	269.3	257.5	245.3	232.5	218.5	213.0
24	75	324.8	323.6	317.0	308.5	298.0	285.9	274.1	262.1	250.1	237.3	223.3	217.7
22	72	325.0	323.7	317.1	311.0	302.3	290.8	278.5	266.4	254.3	242.1	228.4	222.8
20	68	325.3	323.8	317.2	311.0	304.4	295.1	282.3	270.2	257.8	245.9	232.9	227.6
18	65	325.5	323.9	317.3	311.1	304.4	296.9	285.8	273.2	260.9	248.9	236.5	231.6
16	61	325.8	324.0	317.4	311.1	304.4	296.9	287.5	276.0	263.2	251.7	239.6	234.7
14	58	326.0	324.1	317.4	311.1	304.4	296.9	287.5	277.2	265.2	253.3	242.3	237.7
10	50	326.4	324.2	317.5	311.2	304.5	296.8	287.4	276.9	266.0	255.5	245.1	240.8
-40	-40	327.6	322.5	315.7	309.3	302.5	294.2	284.4	273.6	262.7	252.5	242.7	238.8

With engine bleed for packs off, increase weight by 800 kg.

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

With engine and wing anti-ice on, decrease weight by 4200 kg.



GEAR DOWN

Takeoff Climb Limit

Flaps 20

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	250.8	245.2	234.9	229.0	224.1	218.0	208.1	198.0	187.2	173.9		
52	126	256.0	250.9	240.3	230.1	224.0	219.2	214.0	203.6	192.7	178.9		
50	122	261.9	257.1	246.1	235.7	225.2	219.1	214.8	209.1	198.0	184.2	171.1	
48	118	268.6	263.4	252.0	241.2	230.8	220.4	214.7	209.8	203.1	189.4	176.3	171.3
46	115	275.1	269.5	257.9	246.8	236.3	225.8	215.9	209.7	203.6	194.4	181.3	176.4
44	111	281.1	275.3	263.8	252.4	241.6	231.0	220.8	210.8	203.5	197.0	186.2	181.2
42	108	286.8	280.7	269.3	258.0	246.9	236.2	225.8	215.5	204.6	196.9	188.9	185.8
40	104	292.6	286.6	274.9	263.6	252.4	241.5	230.9	220.2	209.2	198.0	188.8	185.7
38	100	298.2	292.7	281.0	269.3	258.2	247.0	236.3	225.4	214.0	202.4	190.0	185.6
36	97	303.9	298.6	287.2	275.5	263.9	252.7	241.7	230.7	219.2	207.1	194.3	189.4
34	93	309.7	304.3	293.5	281.6	269.8	258.4	247.4	236.0	224.5	212.1	198.8	193.8
32	90	315.2	309.7	299.1	287.7	275.7	264.0	252.9	241.5	229.6	217.3	203.6	198.4
30	86	320.7	315.5	304.4	294.1	281.8	269.9	258.5	246.9	234.9	222.3	208.6	203.3
28	82	323.8	320.9	309.8	299.0	287.7	275.6	264.2	252.3	240.2	227.5	213.4	208.1
26	79	324.0	323.6	314.7	304.1	293.2	281.1	269.4	257.6	245.4	232.6	218.6	213.0
24	75	324.3	323.7	317.1	308.6	298.0	286.0	274.1	262.1	250.2	237.4	223.3	217.7
22	72	324.5	323.8	317.2	311.0	302.4	290.8	278.6	266.4	254.4	242.2	228.4	222.9
20	68	324.8	323.9	317.3	311.1	304.5	295.2	282.4	270.3	257.8	245.9	233.0	227.6
18	65	325.0	324.0	317.4	311.1	304.5	295.5	285.7	273.3	261.0	248.9	236.6	231.6
16	61	325.3	324.1	317.4	311.2	304.5	295.6	285.8	276.1	263.3	251.7	239.7	234.8
14	58	325.5	324.2	317.5	311.2	304.5	295.6	285.8	276.1	265.2	253.4	242.4	237.7
10	50	325.9	324.2	317.5	311.2	304.5	295.6	285.7	276.0	265.4	254.5	243.6	239.3
-40	-40	327.2	322.6	315.8	309.3	302.5	294.3	284.5	273.7	262.8	252.5	242.7	238.9

With engine bleed for packs off, increase weight by 800 kg.

With engine anti-ice on, decrease weight by 1750 kg.

With engine and wing anti-ice on, decrease weight by 3700 kg.

GEAR DOWN

Landing Climb Limit

Flaps 30

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

AIRPORT OAT		LANDING CLIMB LIMIT WEIGHT (1000 KG)											
(°C)	(°F)	AIRPORT PRESSURE ALTITUDE (FT)											
		-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	273.0	264.5	256.3									
52	126	279.5	271.2	262.6	251.5								
50	122	286.2	277.6	268.8	257.6	247.1							
48	118	293.1	284.2	275.6	263.9	253.2	243.1						
46	115	300.3	291.3	282.7	271.0	259.8	249.4	239.0					
44	111	307.0	298.3	289.4	278.1	266.9	255.6	245.5	234.8				
42	108	313.4	304.9	296.4	284.6	273.8	262.0	251.4	241.1	230.2			
40	104	320.2	312.5	303.7	291.7	280.5	269.1	257.6	247.1	235.4	222.5		
38	100	326.8	319.1	310.6	298.2	286.2	275.0	263.3	252.5	240.7	227.0	213.4	
36	97	332.6	325.3	317.2	305.2	292.0	280.2	268.4	257.3	244.9	231.6	217.7	212.4
34	93	336.7	331.4	323.8	311.3	298.1	284.8	273.0	261.6	248.8	235.4	222.1	216.6
32	90	336.9	337.4	329.9	316.7	303.4	290.2	277.6	265.7	252.3	239.0	225.8	220.7
30	86	337.1	337.5	335.7	321.1	308.2	294.6	282.4	270.0	256.2	242.5	229.3	224.1
28	82	337.3	337.7	335.8	325.9	312.3	298.6	286.6	274.5	260.3	246.1	232.6	227.4
26	79	337.5	337.8	335.9	325.9	316.9	302.3	289.9	278.7	264.7	250.0	235.9	230.7
24	75	337.7	337.9	336.0	326.0	316.9	305.8	292.3	281.5	268.5	254.1	239.6	233.9
22	72	337.9	338.0	336.1	326.1	317.0	305.9	294.9	283.1	271.0	257.4	243.4	237.8
20	68	338.1	338.2	336.1	326.1	317.1	306.0	294.9	284.9	272.6	259.8	246.7	241.2
18	64	338.3	338.3	336.2	326.2	317.2	306.0	295.0	285.0	274.2	261.4	248.9	244.1
16	61	338.5	338.4	336.3	326.3	317.2	306.1	295.0	285.1	274.3	263.0	250.5	245.6
14	57	338.7	338.5	336.4	326.3	317.3	306.1	295.1	285.1	274.3	263.1	251.9	247.0
12	54	338.8	338.6	336.4	326.4	317.4	306.2	295.1	285.1	274.3	263.1	252.0	247.5
10	50	338.9	338.7	336.5	326.5	317.4	306.2	295.1	285.1	274.3	263.1	252.0	247.6
-40	-40	339.7	339.1	336.7	326.7	317.7	306.6	295.5	285.4	274.6	263.3	252.2	247.7

With engine bleed for packs off, increase weight by 1750 kg.

With engine and wing anti-ice on, decrease weight by 1700 kg.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 30650 kg.

Flaps 25

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

AIRPORT OAT		LANDING CLIMB LIMIT WEIGHT (1000 KG)											
(°C)	(°F)	AIRPORT PRESSURE ALTITUDE (FT)											
		-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	274.7	266.0	257.7									
52	126	281.3	272.7	263.9	252.9								
50	122	287.9	279.1	270.1	258.8	248.4							
48	118	294.7	285.6	276.8	265.0	254.3	244.1						
46	115	301.5	292.6	283.7	271.9	260.7	250.2	239.8					
44	111	307.9	299.4	290.4	278.9	267.7	256.3	246.1	235.5				
42	108	314.1	305.7	297.4	285.4	274.6	262.9	252.1	241.7	230.9			
40	104	320.6	313.0	304.4	292.5	281.3	270.0	258.4	247.7	236.3	223.4		
38	100	327.2	319.5	311.2	299.2	287.5	276.1	264.4	253.4	241.6	228.0	214.3	
36	97	333.0	325.7	317.7	306.0	293.5	281.5	269.7	258.4	246.1	232.6	218.7	213.3
34	93	337.3	331.8	324.1	312.1	299.7	286.4	274.6	263.1	250.1	236.6	223.0	217.5
32	90	337.5	337.6	330.3	317.4	304.7	291.8	279.1	267.4	253.8	240.3	227.0	221.6
30	86	337.7	337.8	336.0	321.6	309.2	296.5	284.2	271.8	257.6	243.9	230.5	225.2
28	82	337.9	337.9	336.1	326.3	313.2	300.2	288.4	276.2	261.9	247.4	233.9	228.7
26	79	338.1	338.1	336.2	326.4	317.8	303.8	291.7	280.4	266.1	251.3	237.3	232.0
24	75	338.3	338.2	336.3	326.5	317.8	307.2	294.3	283.2	270.0	255.4	240.9	235.1
22	72	338.5	338.3	336.4	326.6	317.9	307.3	296.8	284.9	272.7	258.9	244.8	239.2
20	68	338.6	338.4	336.5	326.6	318.0	307.3	296.9	286.7	274.2	261.3	248.1	242.6
18	64	338.8	338.5	336.6	326.7	318.0	307.4	297.0	286.7	275.8	262.9	250.4	245.5
16	61	339.0	338.6	336.6	326.7	318.1	307.5	297.0	286.8	275.9	264.5	252.0	247.1
14	57	339.2	338.8	336.7	326.8	318.2	307.5	297.1	286.8	275.9	264.6	253.4	248.5
12	54	339.3	338.8	336.7	326.8	318.3	307.6	297.1	286.9	276.0	264.6	253.5	249.1
10	50	339.5	338.9	336.8	326.9	318.3	307.6	297.2	286.9	276.0	264.7	253.5	249.1
-40	-40	340.2	339.4	337.0	327.2	318.6	307.9	297.4	287.2	276.2	264.9	253.7	249.3

With engine bleed for packs off, increase weight by 1800 kg.

With engine and wing anti-ice on, decrease weight by 1600 kg.

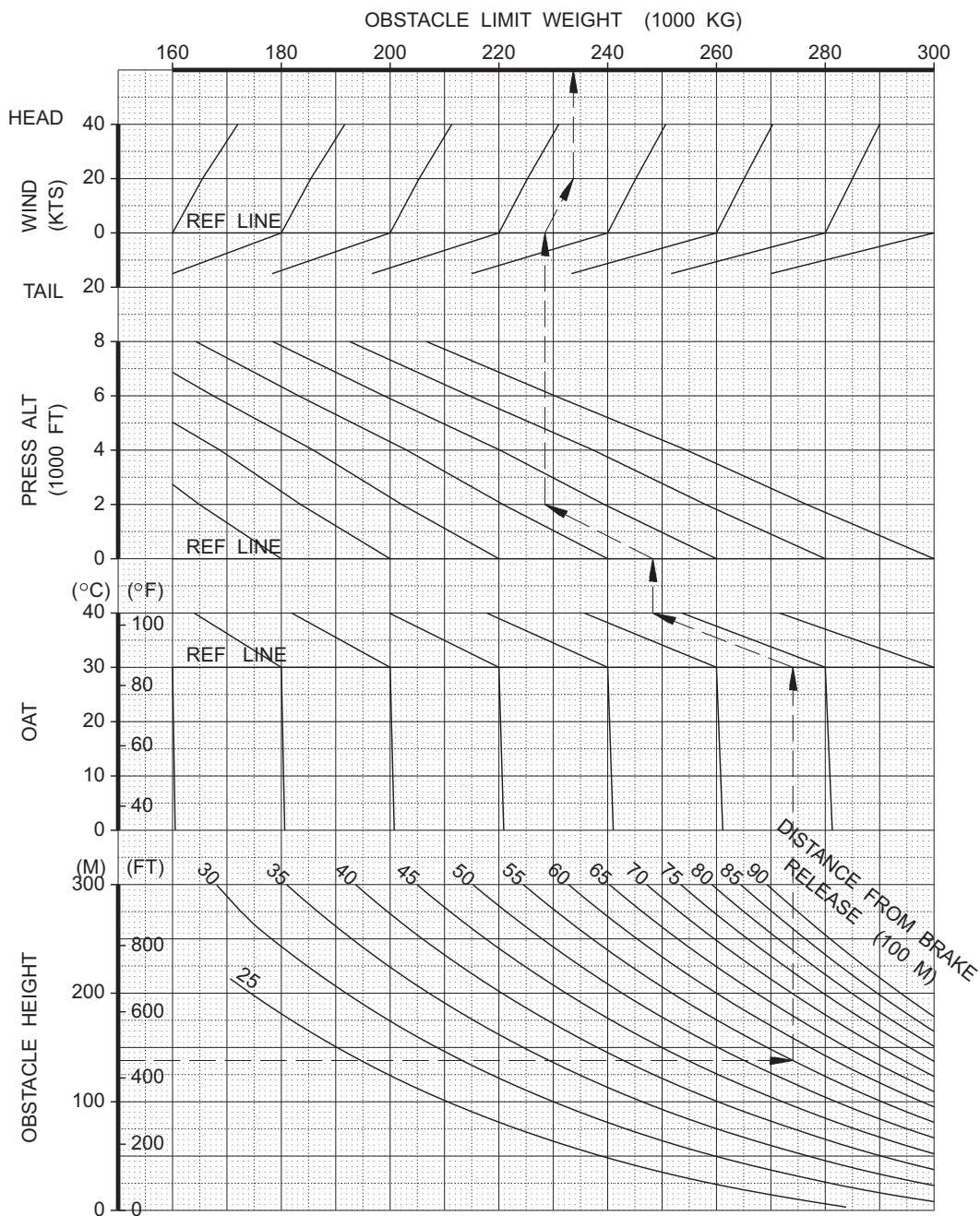
When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 31550 kg.

GEAR DOWN

Obstacle Limit

Flaps 5

Based on engine bleed for packs on, 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 950 kg.

With engine anti-ice on, decrease weight by 1600 kg.

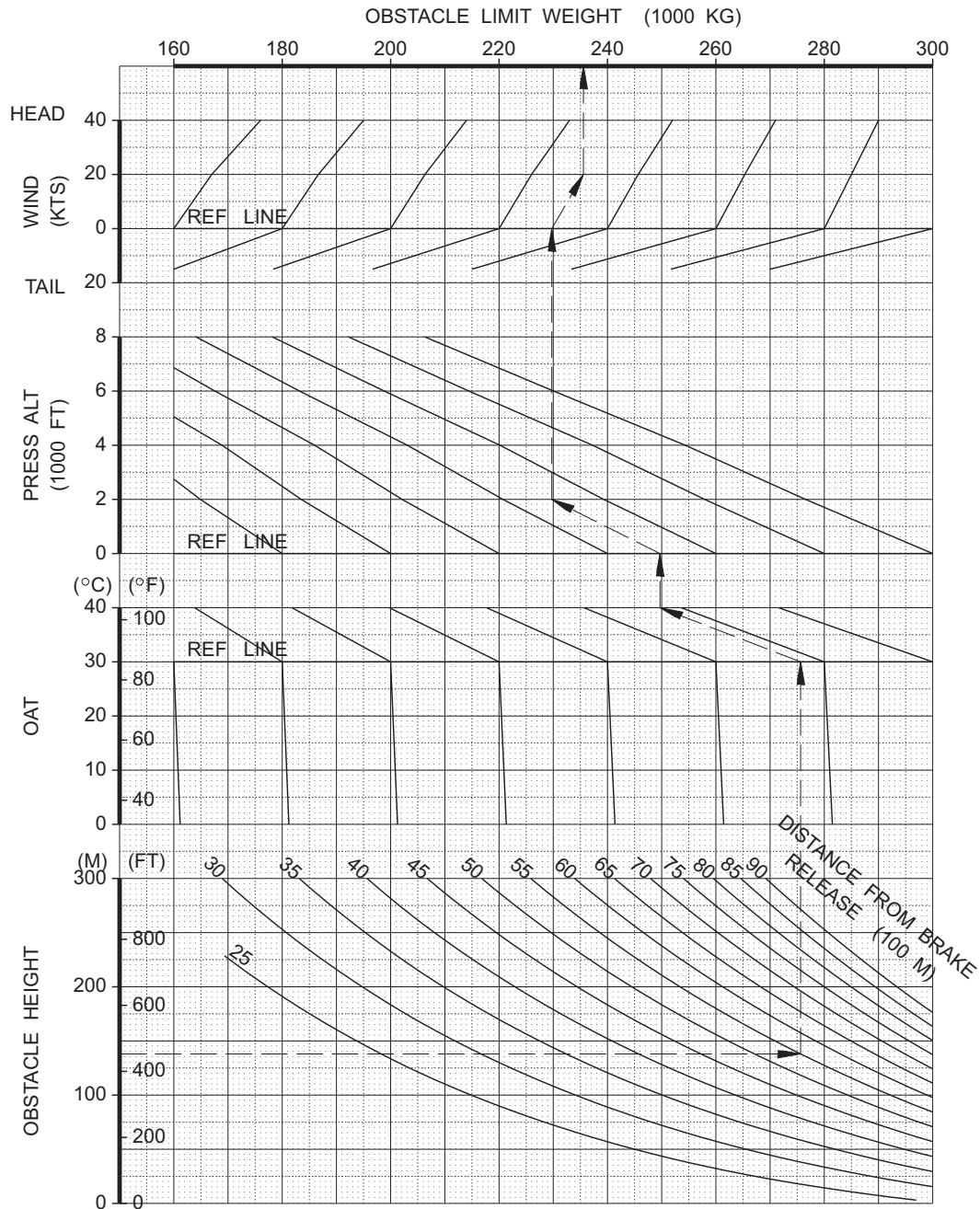
With engine and wing anti-ice on, decrease weight by 3950 kg.

GEAR DOWN

Obstacle Limit

Flaps 15

Based on engine bleed for packs on, 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 950 kg.

With engine anti-ice on, decrease weight by 1600 kg.

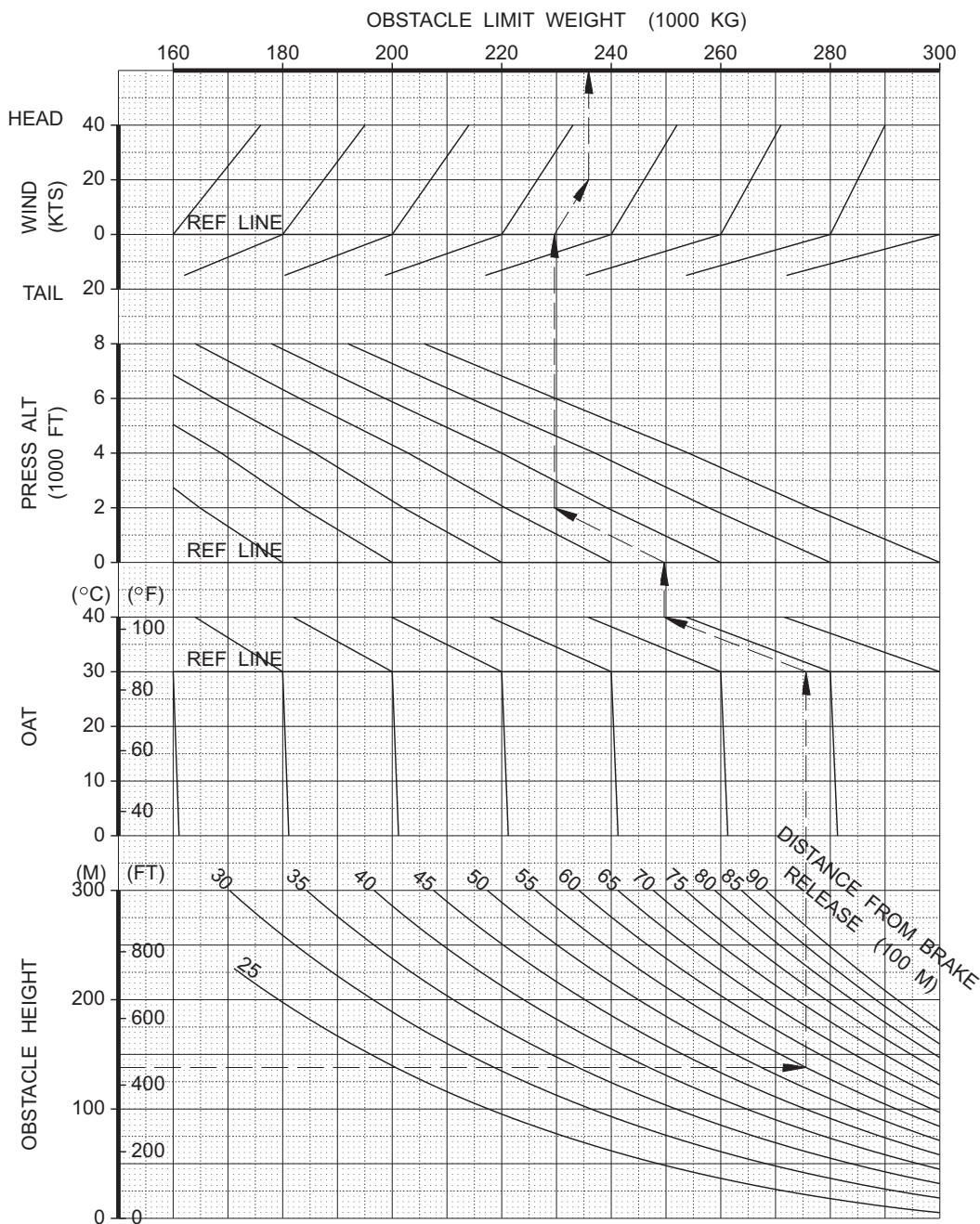
With engine and wing anti-ice on, decrease weight by 3950 kg.

GEAR DOWN

Obstacle Limit

Flaps 20

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



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

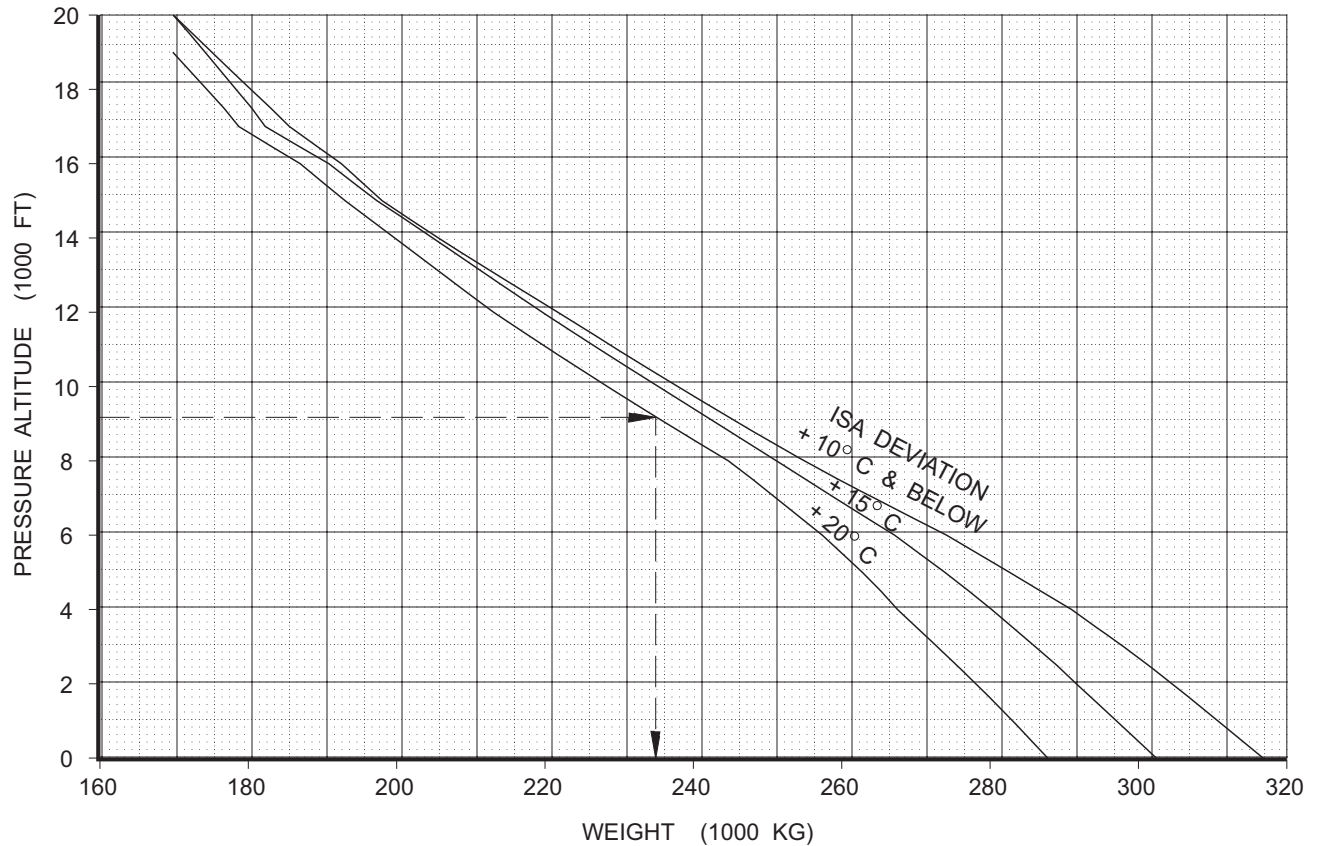
With engine bleed for packs off, increase weight by 950 kg.

With engine anti-ice on, decrease weight by 1600 kg.

With engine and wing anti-ice on, decrease weight by 3950 kg.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Net Level Off Weight

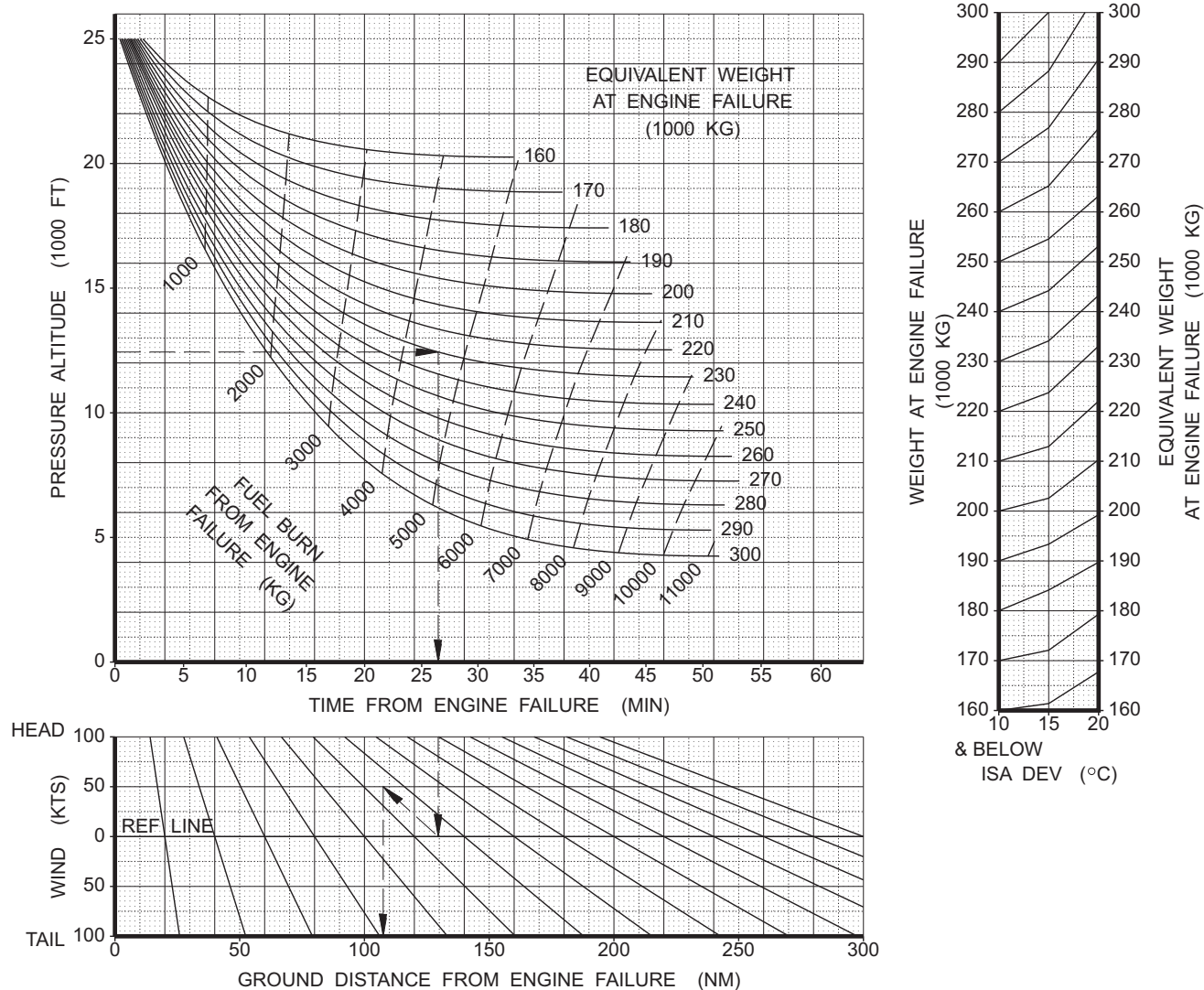


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)									
	PRESSURE ALTITUDE (1000 FT)									
	0	2	4	6	8	10	12	14	16	18
ENGINE ONLY	0.0	-0.6	-1.0	-1.1	-1.0	-0.8	-0.7	-0.1	0.0	0.0
ENGINE AND WING	-2.2	-2.9	-2.9	-3.0	-2.6	-2.3	-1.9	-1.5	-1.2	-1.0

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path
25000 FT and Above

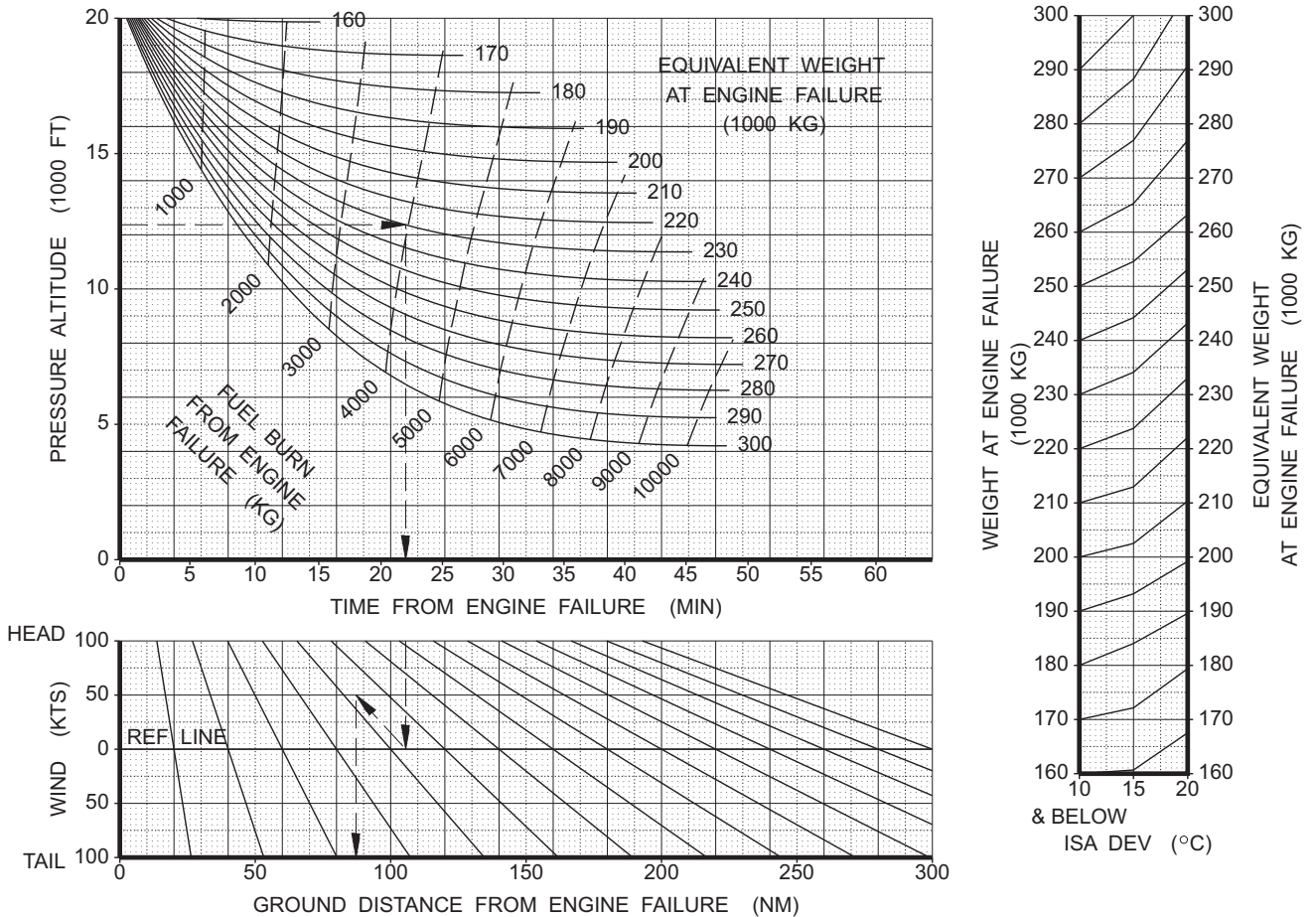


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
	4	6	8	10	12	14	16	18
ENGINE ONLY	1.0	1.1	1.0	0.8	0.7	0.1	0.0	0.0
ENGINE AND WING	2.9	3.0	2.6	2.3	1.9	1.5	1.2	1.0

**GEAR DOWN
ENGINE INOP**
MAX CONTINUOUS THRUST

**Driftdown Profiles Net Flight Path
Below 25000 FT**



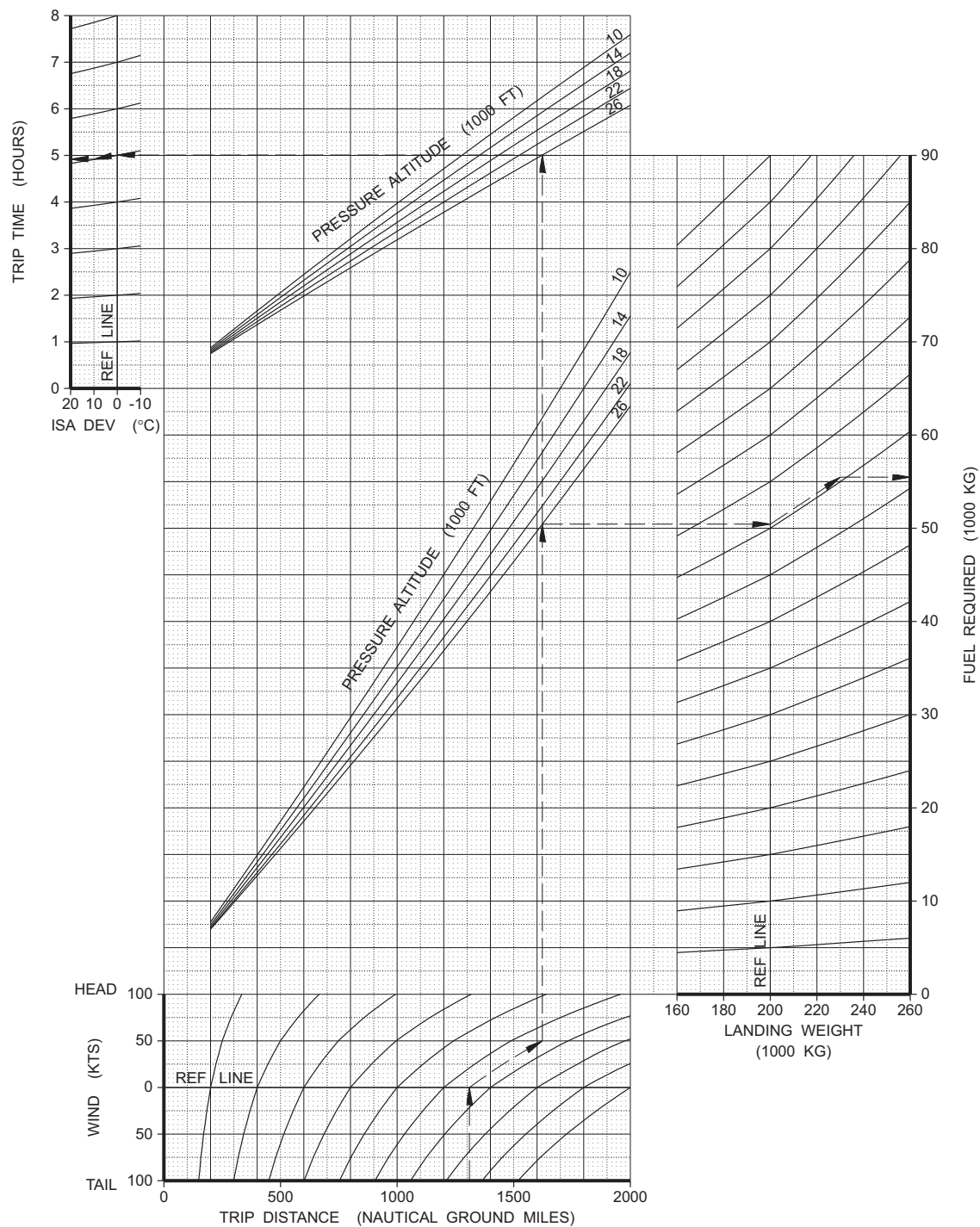
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
	4	6	8	10	12	14	16	18
ENGINE ONLY	1.0	1.1	1.0	0.8	0.7	0.1	0.0	0.0
ENGINE AND WING	2.9	3.0	2.6	2.3	1.9	1.5	1.2	1.0

GEAR DOWN

Long Range Cruise Trip Fuel and Time

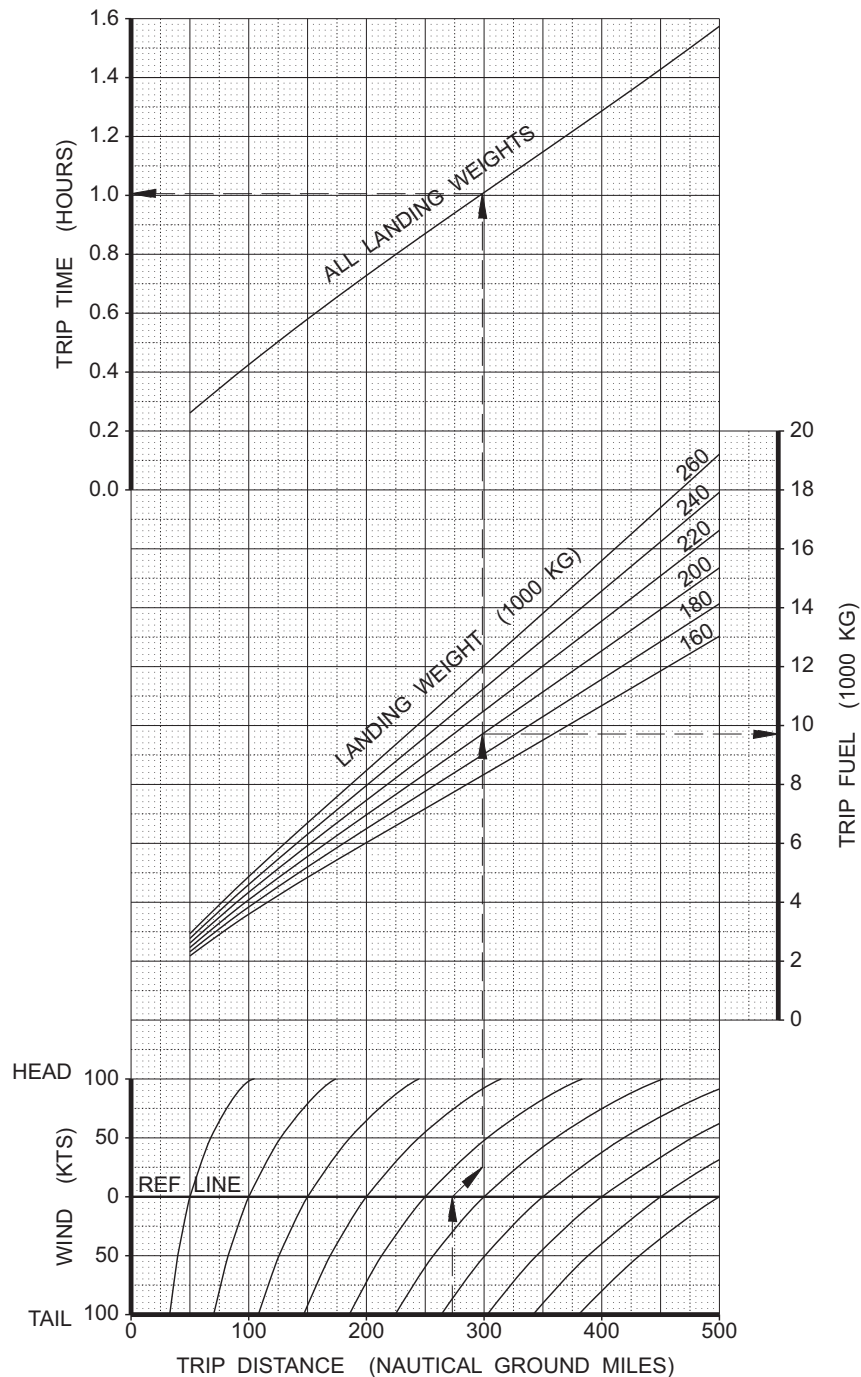
Based on VREF30+80 climb and descent



GEAR DOWN

Long Range Cruise Short Trip Fuel and Time

Based on VREF30+80 climb and descent at short trip cruise altitude



Intentionally
Blank

GEAR DOWN

Long Range Cruise Altitude Capability Max Climb Thrust, 300 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	18200	16100	13700
350	18800	16900	14400
340	19400	17600	15100
330	20000	18200	15800
320	20700	19100	16800
310	21800	20300	18000
300	22800	21400	19300
290	24000	22500	20600
280	25100	23700	22000
270	26200	24800	23300
260	27300	26100	24600
250	28500	27500	26000
240	29700	28900	27400
230	30600	30200	28900
220	31400	31100	30300
210	32300	32000	31400
200	33200	33000	32500
190	34100	34000	33700
180	35000	34900	34800
170	36000	36000	35800
160	37000	37000	36800

220 KIAS Max Climb %N1

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

TAT (°C)	PRESSURE ALTITUDE (FT)														
	0	5000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000
55	88.2	88.3	91.4	91.1	92.1	91.3	94.0	95.2	95.4	98.1	99.9	101.1	102.4	102.9	103.4
50	89.5	88.8	90.7	90.4	91.4	92.1	93.3	94.5	94.7	97.3	99.2	100.3	101.6	102.1	102.6
45	90.5	90.1	90.0	89.7	90.7	91.4	92.6	93.8	93.9	96.6	98.4	99.6	100.8	101.3	101.8
40	91.6	91.2	91.2	89.7	89.9	90.7	91.9	93.0	93.2	95.8	97.6	98.8	100.0	100.5	101.0
35	92.6	92.3	92.2	92.1	90.6	89.9	91.1	92.3	92.5	95.0	96.8	98.0	99.2	99.7	100.2
30	93.0	93.2	93.2	93.0	92.2	91.2	90.9	91.5	91.7	94.3	96.0	97.2	98.4	98.9	99.4
25	92.2	94.2	94.1	94.0	93.7	92.8	92.1	92.0	91.1	93.5	95.2	96.4	97.6	98.0	98.5
20	91.4	94.2	95.1	95.0	94.9	94.4	93.4	93.0	92.8	93.6	94.4	95.6	96.8	97.2	97.7
15	90.7	93.4	96.7	96.4	96.3	96.1	94.8	94.1	94.5	94.8	95.2	95.3	96.0	96.4	96.9
10	89.9	92.6	96.3	97.9	98.1	98.1	96.8	95.5	96.5	96.2	96.4	96.4	96.6	96.1	96.0
5	89.1	91.7	95.4	97.1	98.9	100.3	99.0	97.9	98.2	97.8	97.8	97.9	97.9	97.3	96.8
0	88.3	90.9	94.6	96.2	98.0	100.1	100.8	100.3	100.1	99.7	99.4	99.4	99.5	98.6	98.1
-5	87.4	90.1	93.7	95.3	97.1	99.1	99.9	100.8	101.9	101.5	101.1	101.1	101.1	100.2	99.6
-10	86.6	89.2	92.8	94.4	96.1	98.2	98.9	99.8	101.4	102.8	102.6	102.6	103.0	101.6	100.8
-15	85.8	88.4	91.9	93.5	95.2	97.3	98.0	98.9	100.4	101.8	102.5	103.2	103.8	102.5	101.4
-20	85.0	87.5	91.1	92.6	94.3	96.3	97.0	97.9	99.4	100.8	101.5	102.2	103.3	102.4	101.3

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)							
	0	5000	10000	15000	20000	25000	30000	35000
2 PACKS ON - 1 BLEED SOURCE	-0.4	-0.5	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4
1 PACK ON - 1 OR 2 BLEED SOURCES	-0.4	-0.5	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4
ENGINE ANTI-ICE ON	-0.3	-0.5	-0.4	-0.3	-0.1	-0.2	-0.2	-0.2
ENGINE & WING ANTI-ICE ON*	-0.6	-0.8	-0.7	-0.5	-0.2	-0.3	-0.3	-0.4
ENGINE & WING ANTI-ICE ON**	-1.1	-0.9	-0.9	-0.6	-0.3	-0.4	-0.5	-0.5

*Packs on or off with 2 bleed sources.

**Packs off with 1 bleed source.



GEAR DOWN

Long Range Cruise Table 35000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
35	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
34	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
33	%N1 MAX TAT KIAS MACH FF/ENG KTAS		PERFORMANCE THRUST LIMITED									
32	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
31	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
30	%N1 MAX TAT KIAS MACH FF/ENG KTAS											



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
35000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
35 (-38)	%N1									91.9	89.4	87.2
	MAX TAT									-14		
	KIAS									206	203	199
	MACH									.621	.610	.600
	FF/ENG KTAS									4337 358	4045 352	3800 346
34 (-36)	%N1								92.1	89.8	87.6	86.1
	MAX TAT								-13	-6		
	KIAS								210	206	203	199
	MACH								.617	.608	.597	.587
	FF/ENG KTAS								4536 357	4245 352	3994 346	3768 340
33 (-35)	%N1							92.5	90.0	88.0	86.4	85.0
	MAX TAT							-12	-5			
	KIAS							214	210	206	203	199
	MACH							.616	.604	.595	.584	.574
	FF/ENG KTAS							4761 358	4438 351	4190 346	3956 340	3741 334
32 (-33)	%N1						93.0	90.4	88.3	86.8	85.4	84.0
	MAX TAT						-11	-4				
	KIAS						219	214	210	206	203	199
	MACH						.617	.602	.591	.582	.572	.562
	FF/ENG KTAS						5015 360	4648 352	4379 345	4147 340	3925 334	3718 328
31 (-31)	%N1				96.0	93.4	90.8	88.6	87.1	85.7	84.4	83.1
	MAX TAT				-17	-9	-3					
	KIAS				230	225	219	214	210	206	203	199
	MACH				.630	.617	.603	.589	.579	.570	.560	.550
	FF/ENG KTAS				5716 370	5264 362	4894 354	4578 346	4333 340	4112 334	3899 328	3702 323
30 (-29)	%N1			96.2	93.6	91.2	89.0	87.4	86.0	84.8	83.5	82.3
	MAX TAT			-13	-7	-2						
	KIAS			235	229	224	219	214	210	206	203	199
	MACH			.629	.616	.603	.590	.576	.567	.558	.548	.538
	FF/ENG KTAS			5959 371	5509 363	5139 355	4820 348	4525 339	4295 334	4084 329	3882 323	3684 317

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
35	87.4	88.4	89.5	90.5	91.6	92.6	93.6	94.6	95.4	96.4	96.7	96.0	95.1	93.9
34	87.8	88.9	89.9	90.9	92.0	93.0	94.0	95.0	95.9	96.5	96.9	96.1	95.3	94.2
33	88.1	89.2	90.2	91.3	92.3	93.4	94.4	95.4	96.4	96.9	97.1	96.4	95.5	94.5
32	88.4	89.4	90.5	91.5	92.6	93.6	94.6	95.6	96.6	97.3	97.4	96.7	95.8	94.8
31	88.5	89.6	90.7	91.7	92.8	93.8	94.8	95.8	96.8	97.6	97.9	97.3	96.2	95.2
30	88.8	89.9	90.9	92.0	93.0	94.1	95.1	96.1	97.1	98.0	98.6	98.1	96.7	95.6

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.6.



GEAR DOWN

Long Range Cruise Table

29000 FT to 24000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
29	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
28 (-22)	%N1 MAX TAT KIAS MACH FF/ENG KTAS											96.4 -12 244 .626 6428 372
27 (-21)	%N1 MAX TAT KIAS MACH FF/ENG KTAS											94.0 -5 243 .613 6228 366
26 (-19)	%N1 MAX TAT KIAS MACH FF/ENG KTAS										94.0 -4 248 .611 6460 366	92.1 0 243 .600 6100 359
25 (-17)	%N1 MAX TAT KIAS MACH FF/ENG KTAS									94.0 -3 252 .609 6688 366	92.1 1 247 .598 6334 360	90.4 5 243 .587 6014 353
24 (-16)	%N1 MAX TAT KIAS MACH FF/ENG KTAS								93.9 -2 256 .606 6911 366	92.1 2 252 .596 6564 360	90.6 6 247 .585 6247 354	89.3 9 243 .575 5944 348

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
28	90.8	91.9	92.9	93.9	94.9	95.9	96.9	97.8	97.6	96.6	95.4	94.3	93.5	92.6
27	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	97.6	96.7	95.4	94.3	93.5	92.6
26	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	96.7	95.4	94.2	93.5	92.6
25	89.1	90.1	91.1	92.1	93.1	94.0	95.0	95.9	96.9	97.0	95.5	94.2	93.4	92.7
24	88.5	89.5	90.4	91.4	92.4	93.3	94.3	95.2	96.2	97.1	95.7	94.3	93.3	92.3

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
29000 FT to 24000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
29 (-27)	%N1		96.4	93.8	91.5	89.4	87.8	86.3	85.1	83.9	82.7	81.4
	MAX TAT		-13	-7	-2	3						
	KIAS		239	234	229	224	219	213	210	206	203	199
	MACH		.628	.615	.603	.590	.577	.564	.555	.546	.537	.527
	FF/ENG KTAS		6197 372	5751 364	5383 357	5062 349	4764 342	4480 334	4265 329	4066 323	3863 318	3663 312
28 (-25)	%N1	96.4	94.0	91.8	89.8	88.2	86.7	85.3	84.2	83.0	81.8	80.5
	MAX TAT	-12	-6	-1	3							
	KIAS	244	239	234	229	224	219	213	210	206	203	199
	MACH	.626	.614	.602	.590	.577	.565	.552	.544	.535	.525	.516
	FF/ENG KTAS	6428 372	5991 365	5625 358	5302 351	5003 343	4714 336	4447 328	4245 323	4045 318	3841 312	3644 307
27 (-24)	%N1	94.0	92.0	90.0	88.6	87.1	85.8	84.4	83.3	82.2	80.8	79.5
	MAX TAT	-5	-1	4	8							
	KIAS	243	238	234	229	224	218	213	210	206	203	199
	MACH	.613	.601	.589	.577	.565	.553	.541	.532	.524	.515	.505
	FF/ENG KTAS	6228 366	5864 359	5541 352	5240 345	4949 337	4674 330	4426 323	4223 318	4021 313	3821 307	3628 302
26 (-22)	%N1	92.1	90.3	88.9	87.5	86.2	84.8	83.6	82.5	81.2	79.9	78.6
	MAX TAT	0	4	8								
	KIAS	243	238	233	228	223	218	213	210	206	203	199
	MACH	.600	.588	.577	.565	.553	.541	.530	.521	.513	.504	.495
	FF/ENG KTAS	6100 359	5779 353	5477 346	5183 339	4905 332	4648 324	4402 318	4197 313	4000 308	3805 302	3618 297
25 (-21)	%N1	90.4	89.1	87.8	86.5	85.3	84.0	82.7	81.5	80.2	79.0	77.7
	MAX TAT	5	9									
	KIAS	243	238	233	228	223	218	213	210	206	203	199
	MACH	.587	.576	.565	.554	.542	.530	.519	.511	.503	.494	.485
	FF/ENG KTAS	6014 353	5711 347	5416 340	5137 333	4878 326	4620 319	4375 312	4176 308	3984 303	3796 297	3612 292
24 (-19)	%N1	89.3	88.0	86.8	85.6	84.4	83.1	81.7	80.5	79.4	78.1	76.8
	MAX TAT	9	12									
	KIAS	243	238	233	228	223	218	213	210	206	203	199
	MACH	.575	.564	.553	.542	.531	.519	.508	.501	.492	.484	.475
	FF/ENG KTAS	5944 348	5648 341	5368 334	5109 328	4850 321	4590 314	4354 307	4160 303	3975 298	3789 292	3606 287

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)												
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	10
29	90.5	91.5	92.6	93.6	94.6	95.6	96.6	97.6	98.2	97.8	96.6	95.5	94.4
28	89.8	90.8	91.9	92.9	93.9	94.9	95.9	96.9	97.8	97.6	96.6	95.4	94.3
27	89.3	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	97.6	96.7	95.4	94.3
26	88.6	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	96.7	95.4	94.2
25	88.1	89.1	90.1	91.1	92.1	93.1	94.0	95.0	95.9	96.9	97.0	95.5	94.2
24	87.4	88.5	89.5	90.4	91.4	92.4	93.3	94.3	95.2	96.2	97.1	95.7	94.3

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.6.



GEAR DOWN

Long Range Cruise Table

23000 FT to 18000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
23 (-14)	%N1							93.8	92.0	90.7	89.5	88.3
	MAX TAT							0	4	7	10	13
	KIAS							260	256	252	247	242
	MACH							.603	.593	.584	.573	.563
	FF/ENG KTAS							7132 366	6793 360	6478 354	6175 348	5878 342
22 (-12)	%N1						93.6	92.0	90.8	89.6	88.4	87.3
	MAX TAT						2	5	8	11	14	16
	KIAS						265	260	256	251	247	242
	MACH						.600	.591	.581	.572	.562	.552
	FF/ENG KTAS						7352 366	7020 360	6708 354	6404 348	6107 342	5831 336
21 (-10)	%N1				94.5	93.3	91.9	90.8	89.7	88.6	87.5	86.4
	MAX TAT				1	3	7	9	12	14	17	
	KIAS				270	269	264	260	256	251	247	242
	MACH				.600	.597	.588	.579	.570	.560	.551	.541
	FF/ENG KTAS				7807 367	7571 365	7245 360	6934 354	6631 349	6335 343	6062 337	5802 331
20 (-9)	%N1			93.6	92.7	91.9	90.8	89.7	88.7	87.7	86.6	85.6
	MAX TAT			4	6	8	11	13	15	17	19	
	KIAS			270	270	268	264	260	255	251	247	242
	MACH			.589	.589	.585	.577	.567	.558	.549	.540	.530
	FF/ENG KTAS			7869 362	7692 362	7468 360	7158 354	6854 349	6562 343	6292 337	6032 332	5766 326
19 (-7)	%N1	93.6	92.8	92.2	91.6	90.8	89.8	88.8	87.8	86.8	85.8	84.7
	MAX TAT	5	7	8	10	12	14	16	18	20		
	KIAS	270	270	270	270	268	264	260	255	251	246	242
	MACH	.578	.578	.578	.578	.574	.565	.556	.547	.538	.529	.520
	FF/ENG KTAS	8126 356	7939 356	7762 356	7599 356	7378 354	7076 348	6789 343	6521 338	6258 332	5992 326	5728 320
18 (-6)	%N1	92.3	91.7	91.1	90.5	89.8	88.8	87.9	86.9	85.9	84.9	83.7
	MAX TAT	9	11	12	14	16	18	20	22	24		
	KIAS	270	270	270	270	268	264	260	255	251	246	242
	MACH	.567	.567	.567	.567	.562	.554	.545	.537	.528	.519	.509
	FF/ENG KTAS	8010 351	7837 351	7670 351	7516 351	7297 348	7015 343	6747 338	6483 332	6217 327	5954 321	5701 315

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
23	89.8	90.8	91.7	92.7	93.6	94.5	95.5	96.4	96.0	94.5	93.2	92.0	90.8	89.4
22	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.8	96.1	94.6	93.3	91.9	90.4	88.8
21	88.7	89.7	90.6	91.6	92.5	93.4	94.3	95.2	95.7	94.1	93.0	91.8	90.6	89.3
20	88.4	89.3	90.3	91.2	92.1	93.1	94.0	94.9	95.3	93.6	92.5	91.5	90.6	89.3
19	87.9	88.9	89.8	90.7	91.7	92.6	93.5	94.3	95.2	94.2	92.8	91.7	90.6	89.4
18	87.5	88.5	89.4	90.3	91.2	92.1	93.0	93.9	94.8	94.8	93.3	91.9	90.7	89.3

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
23000 FT to 18000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
23 (-18)	%N1	88.3	87.1	85.9	84.7	83.5	82.1	80.8	79.7	78.5	77.2	75.9
	MAX TAT	13										
	KIAS	242	238	233	228	223	218	213	210	206	203	199
	MACH	.563	.553	.542	.531	.520	.509	.498	.490	.482	.474	.465
	FF/ENG	5878	5600	5340	5080	4819	4566	4339	4152	3969	3784	3602
22 (-16)	KTAS	342	335	329	322	316	309	302	298	293	288	282
	%N1	87.3	86.2	85.1	83.9	82.6	81.2	79.9	78.7	77.5	76.3	75.0
	MAX TAT	16										
	KIAS	242	238	233	228	223	218	213	210	206	203	199
	MACH	.552	.542	.531	.520	.510	.498	.488	.481	.473	.464	.456
21 (-15)	FF/ENG	5831	5572	5310	5047	4793	4549	4330	4145	3964	3779	3597
	KTAS	336	330	324	317	311	304	298	293	288	283	278
	%N1	86.4	85.3	84.2	82.9	81.6	80.3	78.9	77.7	76.5	75.2	74.0
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
20 (-13)	MACH	.541	.531	.520	.510	.499	.488	.479	.471	.463	.455	.447
	FF/ENG	5802	5539	5275	5021	4775	4539	4323	4139	3959	3774	3591
	KTAS	331	325	318	312	306	299	293	288	284	278	273
	%N1	85.6	84.5	83.3	82.0	80.7	79.3	77.9	76.7	75.4	74.2	72.8
	MAX TAT											
19 (-11)	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.520	.510	.500	.490	.480	.469	.460	.453	.445	.437	.429
	FF/ENG	5728	5474	5227	4990	4756	4524	4310	4127	3945	3762	3585
	KTAS	320	315	308	302	296	289	284	279	275	270	265
	%N1	83.7	82.6	81.3	80.1	78.7	77.3	76.0	74.8	73.6	72.3	71.0
18 (-10)	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.509	.500	.490	.481	.471	.460	.451	.444	.437	.429	.421
	FF/ENG	5701	5454	5216	4981	4747	4514	4301	4117	3938	3758	3584
	KTAS	315	310	304	298	291	285	279	275	270	265	261

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
23	88.8	89.8	90.8	91.7	92.7	93.6	94.5	95.5	96.4	96.0	94.5	93.2	92.0	90.8
22	88.2	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.8	96.1	94.6	93.3	91.9	90.4
21	87.8	88.7	89.7	90.6	91.6	92.5	93.4	94.3	95.2	95.7	94.1	93.0	91.8	90.6
20	87.4	88.4	89.3	90.3	91.2	92.1	93.1	94.0	94.9	95.3	93.6	92.5	91.5	90.6
19	87.0	87.9	88.9	89.8	90.7	91.7	92.6	93.5	94.3	95.2	94.2	92.8	91.7	90.6
18	86.6	87.5	88.5	89.4	90.3	91.2	92.1	93.0	93.9	94.8	94.8	93.3	91.9	90.7

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.



GEAR DOWN

Long Range Cruise Table

17000 FT to 12000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
17 (-4)	%N1	91.1	90.6	90.0	89.5	88.8	87.9	87.0	86.0	85.0	83.9	82.7
	MAX TAT	13	15	16	18	19	21	23	25			
	KIAS	270	270	270	270	268	264	259	255	251	246	242
	MACH	.556	.556	.556	.556	.552	.543	.535	.526	.517	.509	.500
	FF/ENG	7912	7747	7589	7448	7240	6973	6706	6441	6179	5927	5680
16 (-2)	KTAS	346	346	346	346	343	338	332	327	322	316	311
	%N1	90.1	89.6	89.1	88.6	87.9	87.0	86.0	85.0	83.9	82.8	81.7
	MAX TAT	17	18	20	21	23	25	27				
	KIAS	270	270	270	270	268	263	259	255	251	246	242
	MACH	.546	.546	.546	.546	.541	.533	.524	.516	.508	.499	.490
15 (-1)	FF/ENG	7829	7675	7530	7401	7197	6930	6665	6406	6154	5908	5669
	KTAS	340	340	340	340	338	332	327	322	317	311	306
	%N1	89.1	88.6	88.1	87.7	86.9	86.0	84.9	83.9	82.9	81.8	80.7
	MAX TAT	21	22	24	26	27	29					
	KIAS	270	270	270	270	268	263	259	255	251	246	242
14 (1)	MACH	.535	.535	.535	.535	.531	.523	.514	.506	.498	.489	.481
	FF/ENG	7771	7624	7485	7362	7156	6892	6634	6382	6136	5897	5659
	KTAS	335	335	335	335	332	327	322	317	312	307	301
	%N1	88.2	87.7	87.2	86.7	86.0	85.0	84.0	83.0	82.0	80.9	79.8
	MAX TAT	25	26	28	29	31						
13 (2)	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.525	.525	.525	.525	.520	.513	.505	.497	.488	.480	.472
	FF/ENG	7730	7583	7446	7328	7121	6863	6612	6366	6125	5887	5648
	KTAS	330	330	330	330	327	322	317	312	307	302	297
	%N1	87.3	86.8	86.3	85.8	85.1	84.1	83.1	82.2	81.1	80.0	78.9
12 (4)	MAX TAT	28	30	31	32							
	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.516	.516	.516	.516	.511	.503	.495	.487	.479	.471	.463
	FF/ENG	7693	7547	7413	7299	7094	6842	6596	6355	6115	5877	5639
	KTAS	326	326	326	326	322	318	313	308	303	297	292
12 (4)	%N1	86.4	85.9	85.4	85.0	84.2	83.3	82.3	81.3	80.2	79.1	78.0
	MAX TAT	32	33	35								
	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.506	.506	.506	.506	.501	.494	.486	.478	.470	.462	.454
	FF/ENG	7659	7517	7388	7277	7072	6827	6585	6345	6106	5869	5633
12 (4)	KTAS	321	321	321	321	318	313	308	303	298	293	288

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
17	88.1	89.1	90.0	90.9	91.8	92.7	93.5	94.4	95.2	93.9	92.3	90.9	89.4	88.1
16	87.5	88.4	89.3	90.2	91.1	92.0	92.9	93.7	94.5	94.1	92.8	91.4	89.8	88.2
15	87.0	87.9	88.8	89.7	90.6	91.4	92.3	93.2	94.0	94.3	93.1	92.0	90.3	88.4
14	86.5	87.4	88.3	89.1	90.0	90.9	91.7	92.6	93.4	94.2	93.3	92.2	90.9	89.2
13	86.0	86.9	87.8	88.6	89.5	90.4	91.2	92.1	92.9	93.7	93.4	92.3	91.2	89.8
12	85.5	86.4	87.3	88.1	89.0	89.9	90.7	91.5	92.4	93.2	93.5	92.4	91.4	90.4

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
17000 FT to 12000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
17 (-8)	%N1	82.7	81.6	80.3	79.0	77.7	76.3	75.0	73.8	72.6	71.3	70.1
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.500	.490	.481	.471	.461	.451	.442	.435	.428	.420	.413
	FF/ENG	5680	5442	5206	4971	4736	4503	4290	4109	3933	3757	3584
16 (-6)	KTAS	311	305	299	293	287	280	275	271	266	261	257
	%N1	81.7	80.5	79.3	78.0	76.7	75.4	74.1	72.9	71.7	70.5	69.2
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.490	.481	.472	.462	.452	.443	.434	.427	.420	.412	.405
15 (-5)	FF/ENG	5669	5432	5195	4959	4724	4492	4283	4106	3933	3758	3585
	KTAS	306	300	294	288	282	276	271	266	262	257	253
	%N1	80.7	79.5	78.3	77.1	75.8	74.5	73.1	72.0	70.8	69.6	68.2
	MAX TAT											
	KIAS	242	237	232	228	223	218	213	210	206	203	199
14 (-3)	MACH	.481	.472	.463	.453	.444	.434	.425	.419	.412	.404	.397
	FF/ENG	5659	5421	5184	4948	4715	4487	4281	4107	3935	3759	3585
	KTAS	301	296	290	284	278	272	267	262	258	253	249
	%N1	79.8	78.6	77.5	76.2	74.9	73.5	72.2	71.1	70.0	68.6	67.3
	MAX TAT											
13 (-1)	KIAS	242	237	232	228	223	218	213	210	206	203	199
	MACH	.463	.454	.445	.436	.427	.418	.409	.403	.396	.389	.382
	FF/ENG	5639	5402	5168	4937	4711	4489	4284	4108	3934	3756	3580
	KTAS	292	287	281	275	270	264	258	254	250	246	241
	%N1	78.0	76.9	75.7	74.4	73.1	71.8	70.6	69.3	68.1	66.8	65.6
12 (0)	MAX TAT											
	KIAS	242	237	232	228	223	218	213	210	206	203	199
	MACH	.454	.446	.437	.428	.419	.410	.402	.395	.389	.382	.375
	FF/ENG	5633	5397	5165	4938	4713	4492	4283	4107	3933	3755	3581
	KTAS	288	282	277	271	266	260	255	250	246	242	237

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
17	88.1	89.1	90.0	90.9	91.8	92.7	93.5	94.4	95.2	93.9	92.3	90.9	89.4	88.1
16	87.5	88.4	89.3	90.2	91.1	92.0	92.9	93.7	94.5	94.1	92.8	91.4	89.8	88.2
15	87.0	87.9	88.8	89.7	90.6	91.4	92.3	93.2	94.0	94.3	93.1	92.0	90.3	88.4
14	86.5	87.4	88.3	89.1	90.0	90.9	91.7	92.6	93.4	94.2	93.3	92.2	90.9	89.2
13	86.0	86.9	87.8	88.6	89.5	90.4	91.2	92.1	92.9	93.7	93.4	92.3	91.2	89.8
12	85.5	86.4	87.3	88.1	89.0	89.9	90.7	91.5	92.4	93.2	93.5	92.4	91.4	90.4

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

GEAR DOWN

Long Range Cruise Table 11000 FT to 5000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
11 (5)	%N1	85.6	85.1	84.6	84.2	83.4	82.5	81.4	80.4	79.3	78.2	77.1
	MAX TAT	36										
	KIAS	270	270	270	270	267	263	259	255	250	246	242
	MACH	.497	.497	.497	.497	.492	.485	.477	.469	.462	.454	.446
	FF/ENG	7632	7495	7369	7260	7059	6817	6577	6339	6102	5865	5630
10 (7)	KTAS	316	316	316	316	313	308	303	299	294	289	283
	%N1	84.7	84.2	83.8	83.4	82.6	81.6	80.5	79.5	78.4	77.3	76.2
	MAX TAT											
	KIAS	270	270	270	270	267	263	259	255	250	246	242
	MACH	.488	.488	.488	.488	.483	.476	.468	.461	.453	.445	.437
9 (9)	FF/ENG	7616	7482	7360	7252	7053	6813	6575	6338	6101	5865	5630
	KTAS	311	311	311	311	308	304	299	294	289	284	279
	%N1	83.9	83.4	82.9	82.4	81.6	80.6	79.6	78.6	77.5	76.5	75.3
	MAX TAT											
	KIAS	270	270	270	270	267	263	259	255	250	246	242
8 (10)	MACH	.479	.479	.479	.479	.474	.467	.460	.452	.445	.437	.429
	FF/ENG	7612	7481	7360	7252	7054	6817	6580	6342	6105	5869	5636
	KTAS	307	307	307	307	304	299	295	290	285	280	275
	%N1	82.9	82.4	81.9	81.5	80.7	79.7	78.7	77.7	76.7	75.6	74.4
	MAX TAT											
7 (12)	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.470	.470	.470	.470	.466	.459	.451	.444	.437	.429	.422
	FF/ENG	7618	7488	7369	7262	7064	6827	6589	6350	6113	5878	5646
	KTAS	302	302	302	302	299	295	290	286	281	276	271
	%N1	82.0	81.5	81.0	80.6	79.8	78.8	77.8	76.8	75.8	74.7	73.6
5 (15)	MAX TAT											
	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.462	.462	.462	.462	.457	.450	.443	.436	.429	.422	.414
	FF/ENG	7632	7504	7385	7277	7077	6838	6597	6359	6123	5889	5658
	KTAS	298	298	298	298	295	291	286	282	277	272	267
	%N1	80.1	79.7	79.2	78.8	78.1	77.1	76.1	75.1	74.1	73.0	71.9
	MAX TAT											
	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.446	.446	.446	.446	.441	.434	.428	.421	.414	.407	.400
	FF/ENG	7653	7524	7404	7295	7091	6850	6612	6377	6144	5912	5681
	KTAS	290	290	290	290	287	282	278	274	269	264	260

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
11	86.9	87.7	88.6	89.4	90.3	91.1	91.9	92.7	93.5	92.5	91.5	90.5	89.2	87.2
10	86.5	87.3	88.2	89.0	89.9	90.7	91.5	92.3	93.1	92.5	91.5	90.5	89.4	88.0
9	85.9	86.7	87.6	88.4	89.2	90.0	90.8	91.6	92.4	92.4	91.4	90.5	89.4	88.0
8	85.2	86.0	86.9	87.7	88.5	89.3	90.1	90.9	91.7	92.3	91.3	90.3	89.4	88.0
7	84.8	85.6	86.5	87.3	88.1	88.9	89.7	90.5	91.3	92.0	91.4	90.4	89.4	88.1
5	84.0	84.8	85.6	86.4	87.2	88.0	88.8	89.6	90.4	91.1	91.6	90.5	89.5	88.3

With engine anti-ice on, decrease limit %N1 by 0.6.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.



Flight Planning and Performance Manual

GEAR DOWN

Long Range Cruise Table
11000 FT to 5000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
11 (2)	%N1	77.1	76.0	74.7	73.5	72.2	71.0	69.6	68.4	67.2	66.0	64.7
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.446	.437	.429	.420	.412	.403	.394	.388	.381	.375	.368
	FF/ENG	5630	5396	5167	4940	4716	4494	4283	4106	3933	3757	3585
10 (4)	KTAS	283	278	273	267	262	256	251	247	243	238	234
	%N1	76.2	75.0	73.8	72.6	71.4	70.0	68.7	67.5	66.3	65.1	64.0
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.437	.429	.421	.413	.404	.395	.387	.381	.374	.368	.361
9 (5)	FF/ENG	5630	5399	5171	4945	4720	4497	4284	4109	3937	3762	3592
	KTAS	279	274	269	263	258	252	247	243	239	235	230
	%N1	75.3	74.2	73.0	71.8	70.5	69.1	67.8	66.6	65.5	64.3	63.2
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
8 (7)	MACH	.429	.422	.413	.405	.397	.388	.380	.374	.367	.361	.354
	FF/ENG	5636	5406	5178	4952	4728	4505	4290	4116	3944	3770	3601
	KTAS	275	270	265	260	254	249	243	239	235	231	227
	%N1	74.4	73.3	72.2	70.9	69.6	68.2	66.9	65.8	64.7	63.6	62.4
	MAX TAT											
7 (9)	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.422	.414	.406	.398	.390	.381	.373	.367	.361	.354	.348
	FF/ENG	5646	5416	5189	4962	4738	4516	4299	4125	3954	3781	3612
	KTAS	271	266	261	256	251	245	240	236	232	228	223
	%N1	73.6	72.5	71.3	70.0	68.7	67.4	66.1	65.0	63.9	62.8	61.6
5 (12)	MAX TAT											
	KIAS	242	237	233	228	223	218	214	210	206	203	199
	MACH	.414	.407	.399	.391	.383	.374	.366	.360	.354	.348	.341
	FF/ENG	5658	5429	5201	4975	4751	4529	4310	4135	3965	3792	3625
	KTAS	267	262	257	252	247	242	236	232	229	224	220
	%N1	71.9	70.7	69.5	68.3	67.0	65.8	64.6	63.5	62.4	61.2	60.0
	MAX TAT											
	KIAS	242	237	233	228	224	219	214	210	206	203	199
	MACH	.400	.392	.385	.377	.369	.362	.354	.347	.341	.335	.329
	FF/ENG	5681	5452	5224	4998	4774	4554	4338	4155	3987	3817	3650
	KTAS	260	255	250	245	240	235	230	226	222	218	214

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

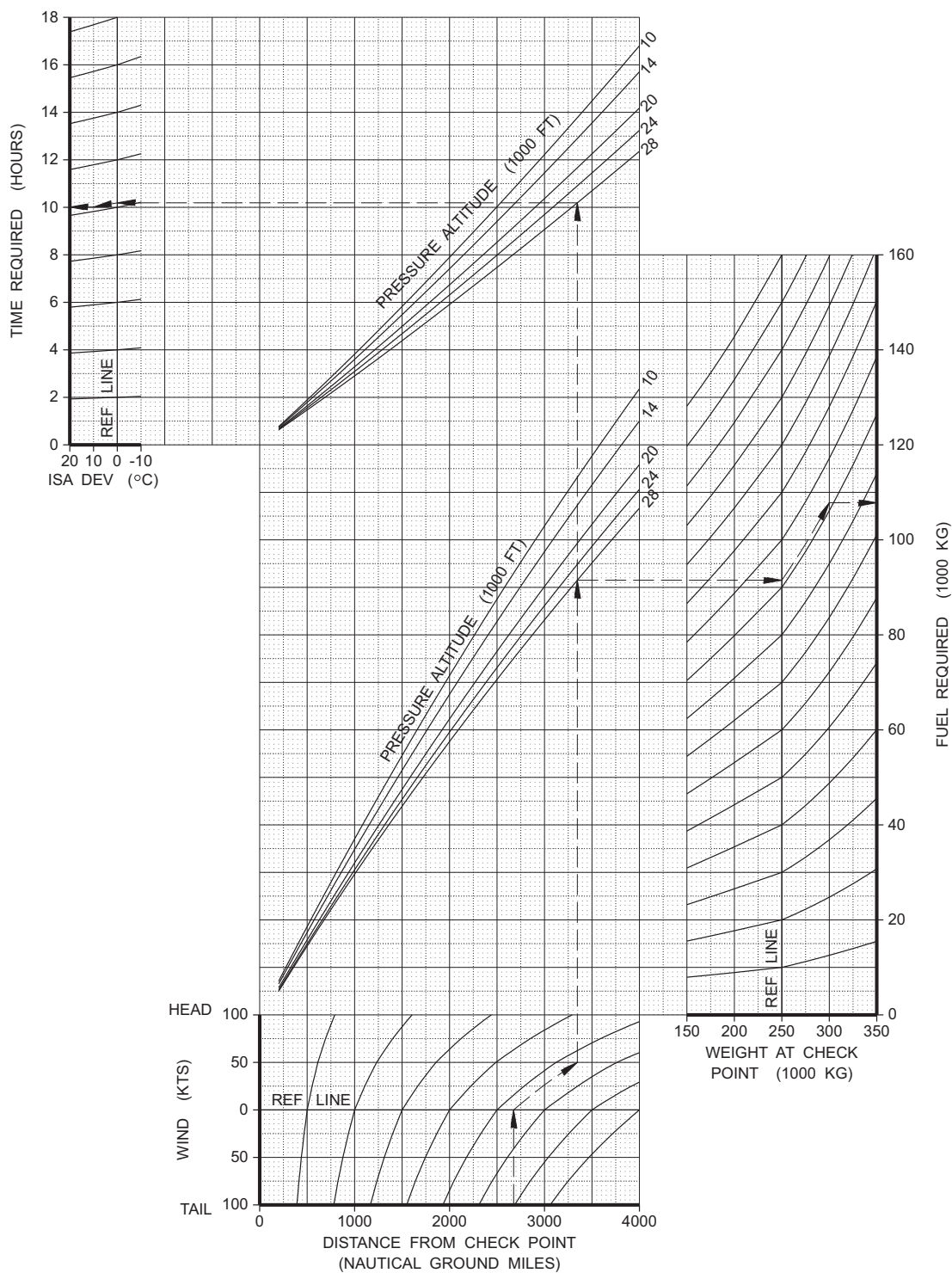
PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
11	86.9	87.7	88.6	89.4	90.3	91.1	91.9	92.7	93.5	92.5	91.5	90.5	89.2	87.2
10	86.5	87.3	88.2	89.0	89.9	90.7	91.5	92.3	93.1	92.5	91.5	90.5	89.4	88.0
9	85.9	86.7	87.6	88.4	89.2	90.0	90.8	91.6	92.4	92.4	91.4	90.5	89.4	88.0
8	85.2	86.0	86.9	87.7	88.5	89.3	90.1	90.9	91.7	92.3	91.3	90.3	89.4	88.0
7	84.8	85.6	86.5	87.3	88.1	88.9	89.7	90.5	91.3	92.0	91.4	90.4	89.4	88.1
5	84.0	84.8	85.6	86.4	87.2	88.0	88.8	89.6	90.4	91.1	91.6	90.5	89.5	88.3

With engine anti-ice on, decrease limit %N1 by 0.6.
With engine and wing anti-ice on, decrease limit %N1 by 0.9.

GEAR DOWN

Long Range Cruise Enroute Fuel and Time

Based on VREF30+80 descent



GEAR DOWN

Descent

Based on VREF30 + 80

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)
35000	17	610	73
33000	17	600	69
31000	16	590	64
29000	15	580	60
27000	15	560	56
25000	14	550	52
23000	13	530	48
21000	12	510	43
19000	12	490	39
17000	11	470	35
15000	10	450	31
10000	8	380	21
5000	5	310	11
1500	4	250	4

Allowances for a straight-in approach are included.



GEAR DOWN

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		340	320	300	280	260	240	220	200	180	160
30000	%N1									84.8	82.3
	KIAS									206	199
	FF/ENG									4290	3870
25000	%N1								82.7	80.2	77.7
	KIAS								213	206	199
	FF/ENG								4590	4180	3790
20000	%N1						82.4	80.3	77.9	75.4	72.8
	KIAS						226	220	213	206	199
	FF/ENG						5320	4930	4530	4150	3770
15000	%N1					79.5	77.5	75.4	73.1	70.8	68.2
	KIAS					232	226	220	213	206	199
	FF/ENG					5670	5270	4880	4500	4130	3760
10000	%N1			78.7	76.8	74.9	72.9	71.0	68.7	66.3	64.0
	KIAS			244	238	232	226	220	213	206	199
	FF/ENG			6470	6040	5640	5250	4880	4500	4130	3770
5000	%N1	78.1	76.3	74.3	72.5	70.5	68.5	66.5	64.5	62.4	60.0
	KIAS	260	253	244	238	232	226	220	213	206	199
	FF/ENG	7470	7000	6490	6070	5680	5290	4920	4540	4190	3830
1500	%N1	75.0	73.3	71.2	69.2	67.4	65.6	63.8	61.8	59.6	57.3
	KIAS	260	253	244	238	232	226	220	213	206	199
	FF/ENG	7470	7010	6510	6080	5680	5300	4940	4580	4230	3880

Flaps 1

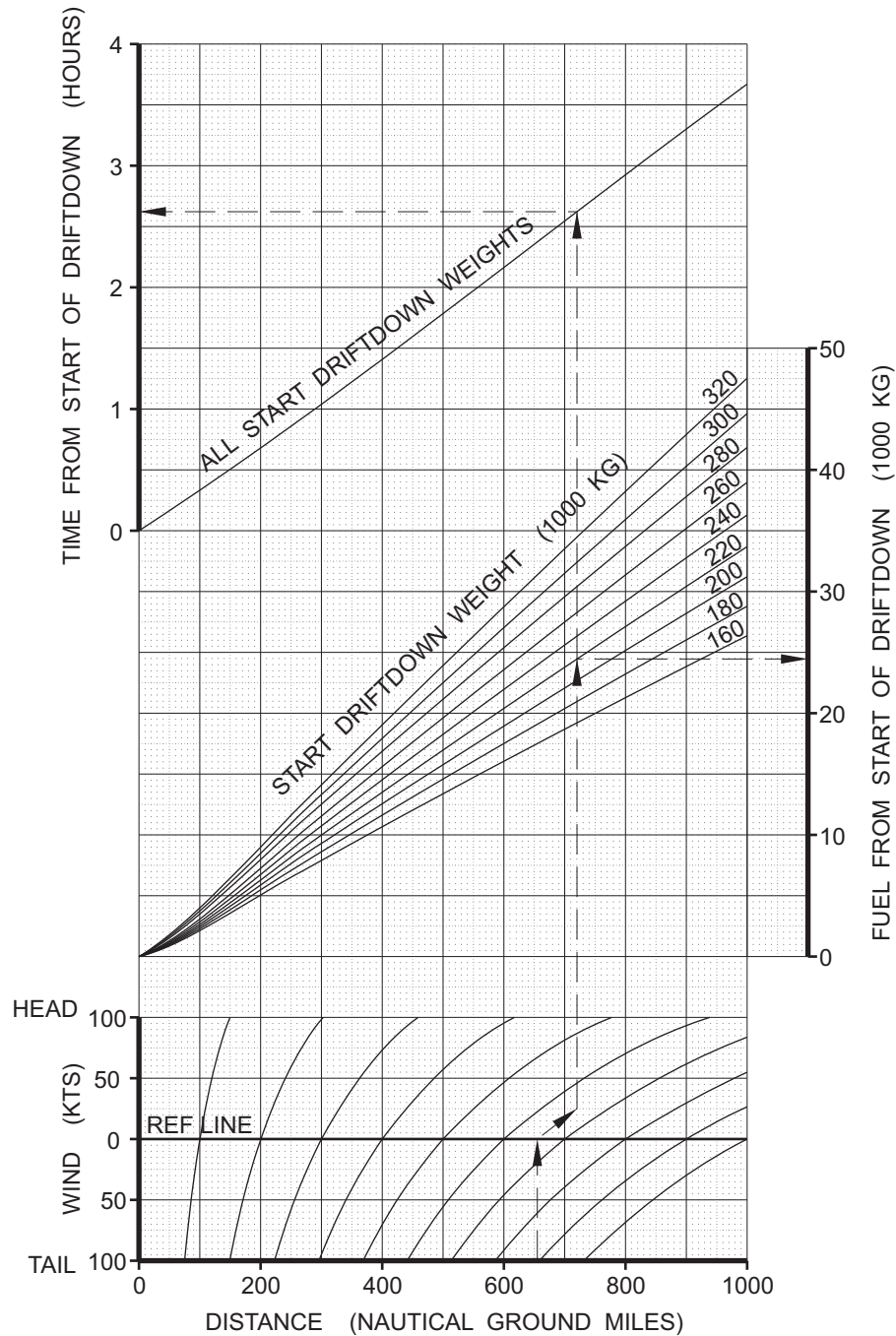
PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		340	320	300	280	260	240	220	200	180	160
20000	%N1	92.0	89.9	87.8	85.7	83.7	81.4	79.0	76.2	73.5	70.5
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7690	7100	6490	6010	5550	5110	4690	4270	3860	3460
15000	%N1	86.9	85.1	83.0	80.8	78.6	76.3	74.0	71.5	68.9	65.9
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7400	6880	6360	5910	5480	5060	4640	4230	3830	3430
10000	%N1	82.2	80.2	78.0	76.0	73.9	71.8	69.6	67.0	64.4	61.8
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7300	6820	6300	5850	5430	5020	4620	4220	3830	3460
5000	%N1	77.6	75.7	73.6	71.6	69.5	67.3	65.2	62.9	60.5	57.8
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7310	6820	6310	5870	5460	5050	4660	4260	3890	3520
1500	%N1	74.5	72.7	70.5	68.4	66.4	64.5	62.5	60.2	57.7	55.2
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7290	6820	6310	5870	5470	5070	4690	4310	3940	3580

These tables include 5% additional fuel for holding in a racetrack pattern.

GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown/LRC Cruise Range Capability
 Includes APU fuel burn





GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

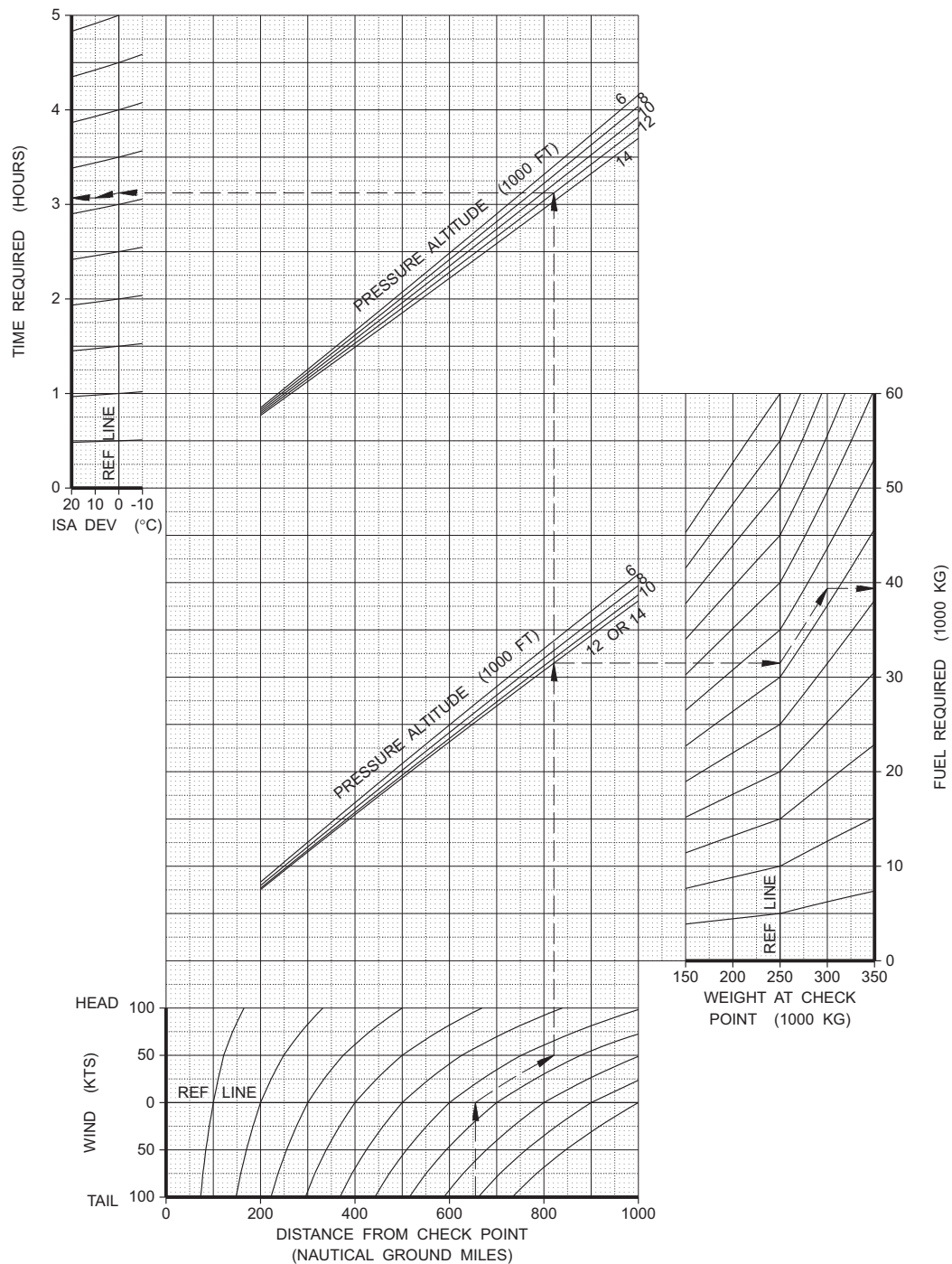
WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
340	200		
330	1700		
320	3200	600	
310	4500	2400	
300	5500	4200	1300
290	6600	5500	3200
280	7800	6800	5000
270	8900	8200	6700
260	10100	9400	8300
250	11200	10500	9400
240	12300	11600	10400
230	13200	12700	11500
220	14300	13800	12600
210	15400	14900	13800
200	16500	16000	15100
190	17800	17100	16200
180	19000	18700	17400
170	20300	20100	19000
160	21600	21100	20400

GEAR DOWN ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on VREF30 + 80 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)													
		290	280	270	260	250	240	230	220	210	200	190	180	170	160
20 (-15)	%N1												99.8	96.9	94.0
	MAX TAT												1	7	11
	KIAS												206	203	199
	MACH												.454	.446	.438
	FF/ENG KTAS												8840 279	8170 274	7588 269
19 (-13)	%N1											100.2	97.4	94.6	92.2
	MAX TAT											-2	7	11	16
	KIAS											210	206	203	199
	MACH											.453	.445	.437	.429
	FF/ENG KTAS											9225 279	8570 275	7970 270	7481 265
18 (-11)	%N1											97.8	95.1	92.7	90.8
	MAX TAT											7	12	16	
	KIAS											210	206	203	199
	MACH											.444	.437	.429	.421
	FF/ENG KTAS											8943 275	8354 270	7853 265	7411 261
17 (-9)	%N1										98.1	95.4	93.2	91.3	89.7
	MAX TAT										7	12	17		
	KIAS										213	210	206	203	199
	MACH										.442	.435	.428	.420	.413
	FF/ENG KTAS										9313 275	8721 271	8230 266	7780 261	7359 257
16 (-8)	%N1									98.3	95.8	93.6	91.8	90.2	88.7
	MAX TAT									9	14	18	22		
	KIAS									217	213	210	206	203	199
	MACH									.441	.434	.427	.420	.412	.405
	FF/ENG KTAS									9689 275	9090 271	8595 266	8155 262	7730 257	7325 253
15 (-6)	%N1								98.4	96.0	93.9	92.2	90.6	89.2	87.8
	MAX TAT								11	16	19	23			
	KIAS								220	217	213	210	206	203	199
	MACH								.439	.432	.425	.419	.412	.404	.397
	FF/ENG KTAS								10067 275	9467 271	8965 267	8520 262	8106 258	7694 253	7299 249

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
20	94.0	95.0	96.1	97.1	98.1	99.1	100.1	101.1	102.0	102.7	101.8	99.5	97.5	96.0
19	93.4	94.4	95.4	96.4	97.4	98.4	99.4	100.3	101.3	101.9	101.5	99.8	97.8	96.4
18	92.6	93.6	94.6	95.6	96.6	97.6	98.5	99.5	100.4	101.1	101.0	99.8	98.0	96.7
17	91.7	92.7	93.7	94.7	95.7	96.6	97.6	98.5	99.4	100.3	100.1	99.5	98.1	96.9
16	91.0	92.0	93.0	93.9	94.9	95.8	96.8	97.7	98.6	99.5	99.9	99.7	98.5	97.2
15	90.3	91.3	92.3	93.2	94.2	95.1	96.1	97.0	97.9	98.8	99.6	100.0	99.1	97.6

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.9.



Flight Planning and Performance Manual

GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table
14000 FT to 6000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)													
		290	280	270	260	250	240	230	220	210	200	190	180	170	160
14 (-4)	%N1							98.5	96.2	94.2	92.5	91.0	89.7	88.3	86.9
	MAX TAT							12	17	21	24				
	KIAS							223	220	217	213	210	206	203	199
	MACH							.436	.431	.424	.417	.411	.404	.397	.389
	FF/ENG KTAS							10432 274	9850 271	9343 267	8891 262	8472 258	8070 254	7666 249	7267 245
13 (-2)	%N1						98.4	96.3	94.4	92.8	91.4	90.1	88.8	87.4	86.1
	MAX TAT						14	18	22	25					
	KIAS						226	223	220	217	213	210	206	203	199
	MACH						.434	.428	.422	.416	.409	.403	.396	.389	.382
	FF/ENG KTAS						10806 274	10216 270	9723 267	9269 263	8843 258	8435 254	8039 250	7633 246	7230 241
12 (0)	%N1					98.4	96.3	94.6	93.1	91.7	90.4	89.1	87.9	86.5	85.1
	MAX TAT					15	20	23	27	30					
	KIAS					229	226	223	220	217	213	210	206	203	199
	MACH					.431	.426	.420	.414	.408	.402	.395	.389	.382	.375
	FF/ENG KTAS					11175 273	10585 270	10086 266	9647 263	9218 259	8803 255	8402 250	8004 246	7594 242	7195 237
10 (4)	%N1			98.6	96.4	94.8	93.4	92.1	91.0	89.8	88.6	87.4	86.1	84.6	83.1
	MAX TAT			17	23	27	30	33							
	KIAS			237	233	229	226	223	220	217	213	210	206	203	199
	MACH			.429	.422	.415	.410	.405	.399	.393	.387	.381	.374	.368	.361
	FF/ENG KTAS			12015 274	11346 269	10810 265	10366 262	9946 258	9546 255	9142 251	8738 247	8334 243	7937 239	7536 235	7153 230
8 (7)	%N1	98.9	96.9	95.3	93.8	92.5	91.4	90.3	89.3	88.1	86.9	85.6	84.2	82.7	81.2
	MAX TAT	19	25	30	34	37									
	KIAS	245	241	237	233	229	226	223	220	217	213	210	206	203	199
	MACH	.428	.421	.414	.407	.400	.395	.390	.385	.379	.373	.367	.361	.354	.348
	FF/ENG KTAS	12853 275	12219 271	11655 266	11144 262	10664 257	10264 254	9882 251	9502 247	9098 244	8693 240	8298 236	7913 232	7529 228	7155 223
6 (11)	%N1	95.8	94.4	93.2	92.0	90.8	89.7	88.7	87.6	86.3	85.0	83.7	82.3	80.8	79.3
	MAX TAT	31	34	38	41										
	KIAS	246	242	238	234	230	226	223	220	217	213	210	206	203	199
	MACH	.413	.407	.400	.394	.387	.381	.376	.371	.365	.359	.354	.348	.341	.335
	FF/ENG KTAS	12530 268	12029 264	11558 259	11107 255	10671 251	10258 247	9868 243	9478 240	9077 237	8680 233	8297 229	7920 225	7537 221	7160 217

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
14	93.1	94.0	95.0	95.9	96.8	97.8	98.6	99.5	100.2	99.6	98.1	96.8	95.7	94.7
13	93.0	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.1	99.8	98.6	97.3	96.1	95.1
12	92.8	93.8	94.7	95.7	96.6	97.5	98.4	99.3	100.1	100.1	99.1	97.8	96.6	95.5
10	92.5	93.5	94.4	95.3	96.2	97.1	98.0	98.9	99.8	100.3	100.1	99.0	97.7	96.5
8	92.0	92.9	93.9	94.8	95.7	96.6	97.5	98.4	99.2	100.1	100.7	100.2	98.9	97.7
6	91.1	92.0	93.0	93.9	94.8	95.7	96.5	97.4	98.3	99.1	100.0	100.1	99.1	98.0

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.



GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Holding
Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		340	320	300	280	260	240	220	200	180	160
15000	%N1							98.4	93.9	90.6	87.8
	KIAS							220	213	206	199
	FF/ENG							10570	9410	8510	7660
10000	%N1					96.3	93.4	91.0	88.6	86.1	83.1
	KIAS					232	226	220	213	206	199
	FF/ENG					11870	10880	10020	9170	8330	7510
5000	%N1		98.2	95.1	92.9	90.9	88.9	86.7	84.1	81.3	78.4
	KIAS		253	244	238	232	226	220	213	206	199
	FF/ENG		14490	13280	12370	11580	10760	9940	9110	8310	7510
1500	%N1	96.1	94.0	91.8	89.9	87.9	85.6	83.3	80.8	78.2	75.5
	KIAS	260	253	244	238	232	226	220	213	206	199
	FF/ENG	15250	14280	13280	12380	11520	10680	9870	9060	8270	7490

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



Flight Planning and Performance Manual

ALTERNATE MODE EEC

Alternate Mode EEC Max Takeoff %N1

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
55	131	94.3	96.7	97.0	96.7	96.5	96.6	96.4	96.3	96.1	95.5	94.6	94.2
50	122	95.7	98.1	98.6	98.2	97.9	97.9	97.8	97.6	97.4	96.8	95.9	95.6
45	113	97.2	99.6	100.1	99.8	99.4	99.3	99.1	98.9	98.8	98.2	97.3	96.9
40	104	98.9	101.2	101.9	101.4	101.0	100.8	100.6	100.4	100.0	99.4	98.6	98.2
35	95	100.9	102.7	104.7	104.2	103.1	102.6	102.1	101.7	101.1	100.4	99.6	99.3
30	86	100.5	103.7	106.9	106.4	105.6	105.0	104.3	103.7	102.6	101.5	100.7	100.3
25	77	99.7	102.8	106.0	106.7	107.3	107.2	106.7	106.5	105.3	103.8	102.4	101.8
20	68	98.8	101.9	105.1	105.8	106.4	106.8	107.1	107.5	106.8	105.9	104.8	104.3
15	59	98.0	101.1	104.2	104.9	105.5	105.8	106.2	106.5	106.4	106.1	105.6	105.3
10	50	97.1	100.2	103.3	104.0	104.6	104.9	105.3	105.6	105.5	105.2	104.9	104.8
5	41	96.3	99.3	102.4	103.0	103.7	104.0	104.3	104.7	104.5	104.2	104.0	103.8
0	32	95.4	98.4	101.4	102.1	102.7	103.1	103.4	103.7	103.6	103.3	103.0	102.9
-10	14	93.6	96.6	99.6	100.2	100.8	101.2	101.5	101.8	101.7	101.4	101.1	101.0
-20	-4	91.8	94.7	97.7	98.3	98.9	99.2	99.5	99.9	99.7	99.5	99.2	99.0
-30	-22	90.0	92.8	95.7	96.3	96.9	97.2	97.5	97.9	97.7	97.5	97.2	97.1
-40	-40	88.1	90.9	93.7	94.3	94.9	95.2	95.5	95.8	95.7	95.4	95.2	95.0
-50	-58	86.2	88.9	91.7	92.3	92.9	93.1	93.4	93.8	93.6	93.4	93.1	93.0

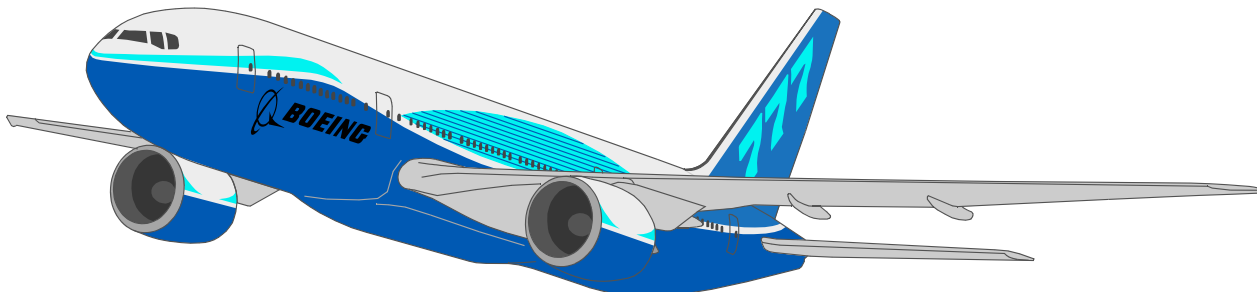
%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

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FLIGHT PLANNING AND PERFORMANCE MANUAL



777-300ER
GE90-115BL
JAA
KG/°C/M

OPTIONS

Crew Oxygen / 2 Bottles
Derate TO1-10%
Derate TO2-20%
Gaseous Passenger Oxygen
Gear Down Dispatch

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Preface

Introduction

Chapter 0

Section 1

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 D632W003-WY136.

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 19, 2016	

No.	Revision Date	Date Filed

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.

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Preface

Revision Highlights

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No revision highlights.

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Preface

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* 3.2.21	April 19, 2016	* 4.2.3	April 19, 2016				
* 3.2.22	April 19, 2016	* 4.2.4	April 19, 2016				
* 3.2.23	April 19, 2016	* 4.2.5	April 19, 2016				
* 3.2.24	April 19, 2016	* 4.2.6	April 19, 2016				
* 3.2.25	April 19, 2016	* 4.2.7	April 19, 2016				
* 3.2.26	April 19, 2016	* 4.2.8	April 19, 2016				
* 3.2.27	April 19, 2016	* 4.2.9	April 19, 2016				
* 3.2.28	April 19, 2016	* 4.2.10	April 19, 2016				
* 3.3.1	April 19, 2016	* 4.2.11	April 19, 2016				
* 3.3.2	April 19, 2016	* 4.2.12	April 19, 2016				
* 3.3.3	April 19, 2016	* 4.3.1	April 19, 2016				
* 3.3.4	April 19, 2016	* 4.3.2	April 19, 2016				
* 3.3.5	April 19, 2016	* 4.3.3	April 19, 2016				
* 3.3.6	April 19, 2016	* 4.3.4	April 19, 2016				
* 3.3.7	April 19, 2016	* 4.3.5	April 19, 2016				



Chapter 0

Section 4

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.

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.

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Number	Subject	Date	Status

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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 correction. 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 correction 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.

Field Length Limit

Maximum field length limited brake release weights are presented for the certified takeoff flap settings for dry and wet runways. 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 for a dry runway or 15 ft for a wet runway. These field limited weights do not account for clearway or stopway.

The reference takeoff condition for a given flap position is zero slope and wind. To determine the field length limit brake release weight, enter the appropriate chart for the desired flap position and runway condition at 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, correct for slope and wind, then 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 to account for the appropriate engine bleed configuration. When finding a maximum weight for a wet runway, the dry runway limit weight must also be found and the lower of the two weights used.

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 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
TORA & TODA	25	68
ASDA	56	99

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 the appropriate flap position chart with OAT, move vertically to airport pressure altitude and read the climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate engine bleed configuration.

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 correct for OAT as necessary. Repeat this procedure to correct 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 to account for the appropriate engine bleed configuration.

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

Tire Speed Limit

Maximum tire speed limited weights are presented for 235 MPH tires. To determine the tire speed limit weight, enter the chart with OAT, move vertically to airport pressure altitude and read the tire speed limit weight to the left. Adjust the tire speed limit weight according to the notes below the chart to account for wind.

Brake Energy Limit

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 appropriate chart for the desired flap position and runway condition at the left horizontal scale with the 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 for normal climb limit weight. The horizontal lines indicate the maximum climb weight improvement for normal climb limited weights. These values are based on the maximum allowable improved climb for each flap position. 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

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 assume 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 Determination:

1. Determine the dry field/obstacle limit weight for the takeoff flap setting.
2. Enter the Weight Adjustment table with the dry 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. 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 the "poor" data reflects a runway 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 as well as FMC computed takeoff speeds can be used for all performance conditions except where adjustments must be made to V1 for clearway, stopway, brake deactivation, improved climb, contaminated runway situations, unbalanced for brake energy or obstacle clearance with unbalanced V1. These speeds may be used for weights less than or equal to the performance limited weight.

The FMC will protect for minimum control speeds by increasing V1, VR and V2 as required. However, the FMC will not compute takeoff speeds for weights where the required speed increase exceeds the maximum certified speed increase. This typically occurs at full rated thrust and light weights. In this case, the message "V SPEEDS UNAVAILABLE" will appear on the FMC scratchpad and the takeoff speed entries will be blank. Takeoff is not permitted in this condition as certified limits have been exceeded. The options are to select a smaller flap setting, select derate thrust and/or add weight (fuel). Selecting derate thrust is the preferred method as this will reduce the minimum control speeds. Note that the assumed temperature method may not help this condition as the minimum control speeds are determined at the actual temperature and therefore are not reduced.

Normal takeoff speeds, V1, VR, and V2 are read from the table by entering with takeoff flap setting and brake release weight. Use the tables provided to correct takeoff speeds for altitude and actual temperature or assumed temperature for reduced thrust takeoffs. Slope and wind corrections to V1 are obtained by entering the Slope and Wind V1 Adjustment Table.

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 on the takeoff speeds page are provided for guidance when more precise data is unavailable.

Minimum Control Speeds

Regulations prohibit scheduling takeoff with a V1 less than minimum V1 for control on the ground, V1(MCG), and VR less than minimum VR, (1.05) VMCA. It is therefore necessary to compare the adjusted V1 and VR to V1(MCG) and Min VR respectively. To find V1(MCG) and Min VR, enter the V1(MCG) and Min VR table with airport pressure altitude and actual OAT. If the adjusted V1 is less than V1(MCG), set V1 equal to V1(MCG). If the adjusted VR is less than Min VR, set VR equal to Min VR and determine a new V2 by adding the difference between the normal VR and Min VR to the normal V2. No weight adjustment is required provided that the field length available exceeds the minimum field length required shown on the Field Length Limit charts.

Brakes Deactivated

When operating with brakes deactivated, the runway/obstacle 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 3800 kg for a dry runway or 2250 kg for a wet runway and the V1 associated with the reduced weight by 2 knots. With two brakes deactivated, reduce the normal runway/obstacle limited weight by 7700 kg for a dry runway or 4700 kg for a wet runway and the V1 associated with the reduced weight by 5 knots for a dry runway or 3 knots for a wet runway. If the resulting V1 is less than minimum V1, takeoff is permitted with V1 set equal to V1(MCG) provided the dry accelerate stop distance corrected for wind and slope exceeds approximately 1500m for one brake deactivated or 1550m for two brakes deactivated. For wet runways, the corrected accelerate stop distance should exceed approximately 1900m for one brake deactivated or 1950m for two brakes deactivated.

For brake(s) 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 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 from the Airplane Flight Manual may yield a less restrictive penalty.

One Thrust Reverser Inoperative

Wet runway takeoff performance presented for all brakes operating is based on the use of one thrust reverser during deceleration. When operating with a

thrust reverser inoperative, the runway/obstacle limited takeoff weight and V1 speed must be reduced to account for the reduced deceleration capability. A simplified method which conservatively accounts for this is to reduce the normal wet runway/obstacle limited weight by 5350 kg and the V1 associated with the reduced weight by 3 knots.

If the resulting V1 is less than minimum V1, takeoff is permitted with V1 set equal to V1(MCG) provided the accelerate stop distance available corrected for wind and slope exceeds approximately 1950 m.

Takeoff %N1

To find Max Takeoff %N1 based on normal engine bleed for air conditioning (2 bleeds/2 packs) enter Max Takeoff %N1 Table with airport pressure altitude and airport OAT and read %N1. For packs off or wing anti-ice operation, apply the %N1 correction shown below the table. No takeoff %N1 correction is required for engine anti-ice.

Stab Trim Setting

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

Takeoff Derates

This section contains tabulated takeoff weight penalties, thrust setting, takeoff speeds and stabilizer trim setting for takeoff at derated engine ratings. Derate 1 (TO1) and Derate 2 (TO2).

Takeoff Performance (TO1 and TO2)

Takeoff limit weights are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. Weights are shown for takeoff field, climb, obstacle, tire speed and brake energy limits. Each full rated thrust limiting weight must be adjusted for derate operation and then the most restrictive weight used for planning.

Slush/Standing Water

Slush/standing water runway limit weight and V1 speed adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. The procedures for determining contaminated runway limit weight and speeds are the same as those discussed for full rated thrust. Adjustments are applied to the derated thrust dry runway limits.

Slippery Runway

Slippery runway limit weight and V1 speed adjustments are provided for Derate 1 (TO1) and Derate 2 (TO2) operation. The procedures for determining slippery runway limit weight and speeds are the same as those discussed for full rated thrust. Adjustments are applied to the derated thrust dry runway limits.

Takeoff Speeds

Balanced takeoff speeds V1, VR and V2 reflecting the FMC display are presented for TO1 or TO2 derated thrust. Speeds may require correction for the effects of minimum control speeds.

Minimum Control Speeds, Stab Trim

Tables of minimum control speed V1(MCG) and stabilizer trim setting are provided for TO1 or TO2 thrust levels as appropriate.

Brakes Deactivated

Takeoff field length/obstacle weight and V1 speed adjustments are the same as those shown previously in this chapter for full rated takeoff.

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 field limit chart with field length available, correct for runway condition and wind. Proceed vertically to the airport pressure altitude and read the field length limit weight at the right. Adjust the field length limit weight according to the notes below the chart to account for the appropriate brake configuration.

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 climb limit weight to the left. Adjust the climb limit weight according to the notes below the chart to account for the appropriate engine bleed configuration. When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, make the appropriate ice correction as shown on the chart.

Go-Around Climb Gradient

To determine go-around climb gradient, enter the chart with airport OAT and pressure altitude and then proceed vertically to find airplane weight. Continue down the chart to the proper airspeed in terms of deviation from VREF, following the reference lines as appropriate. Read the go-around climb gradient directly from the chart and then apply the necessary corrections for A/C and icing conditions as noted. Note that data is for one engine inoperative.

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. For brakes deactivated, reduce the maximum quick turnaround weight by the amount shown on the chart. As an alternate procedure, if the BRAKE TEMP advisory message on EICAS is not displayed 10 to 15 minutes after parking, then no waiting period is required.

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 Weight table takes precedence over the 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. If operating with one brake deactivated increase the brake energy per brake by 10 percent. If operating with two brakes deactivated increase the brake energy per brake by 20 percent. 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, corrected for wind, then vertically downwards correcting 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 wind, airport pressure altitude and OAT corrections.

The chart is based on a rejected takeoff with maximum manual braking effort. Make the corrections 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 to the next page with 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. An EICAS advisory message, BRAKE TEMP, will appear when any brake registers 5.0 or higher on the EICAS indication and disappear as the hottest brake cools with an EICAS indication of 3.5. Note that even without an EICAS advisory message, brake cooling is recommended.

CAT III Automatic Landing

The following advisory information is presented to assist operators in determining landing field length corrections with CAT III Autoland. This guidance information may be used to comply with NPA JAR-AWO-2, All Weather Operations.

To obtain CAT III Autoland field lengths, enter the Landing Field Length Limit chart for the selected flap, read field length required for a given weight, then add 70m (230 ft) to this field length to obtain JAA Autoland Landing field length required. To determine the maximum CAT III Autoland weight when landing field length available is known, subtract 70m (230 ft) from field length available and enter the Landing Field Length Limit chart for the selected flap to read maximum landing weight.

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.

TALPA ARC

The following text section describes the Reported Braking Action table and Advisory Landing Distance tables that have been modified to meet the intent of the Takeoff and Landing Performance Assessment Aviation Rulemaking Committee (TALPA ARC) recommendations.

Reported Braking Action

When landing on slippery runways or runways contaminated with ice, snow, slush, or standing water, the reported braking action must be considered. A table is provided that correlates a runway description to a reported braking action that can then be used to

determine the appropriate Normal Configuration
Landing Distance or Non-Normal Configuration
Landing Distance.

Normal Configuration Landing Distance

Tables are provided as advisory information for normal configuration landing distances on dry runways and runways with good, good-to-medium, medium, medium-to-poor, and poor reported braking action. Landing distances (reference distances plus adjustments) are 115% of the actual landing distance. The Normal Configuration Landing Distance tables should be used enroute to make a landing distance assessment for time of arrival.

The reference landing distance is the distance from threshold to complete stop. It includes an air distance allowance of 1500 ft from threshold to touchdown. The reference distance is based on a reference landing weight and speed at sea level, standard day, zero wind, zero slope, two-engine detent No. 2 reverse thrust, and auto speedbrakes.

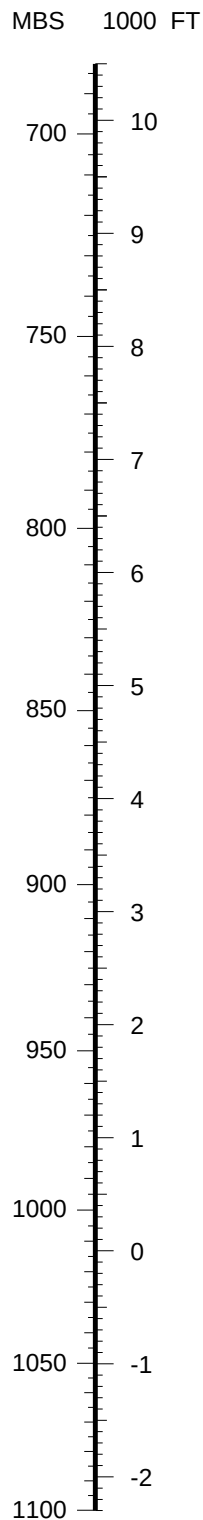
To use these tables, determine the reference landing distance for the selected braking configuration and reported braking action. Adjust this reference distance for landing weight, altitude, wind, slope, temperature, approach speed, and the number of operative thrust reversers. Each correction is applied independently to the reference landing distance. A correction for use of manual speedbrakes is provided in the table notes.

Use of the autobrake system commands the airplane to a constant deceleration rate. In some conditions, such as a runway with "poor" reported 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.

Intentionally
Blank

Altimeter Setting to Station Pressure

QFE Station Pressure

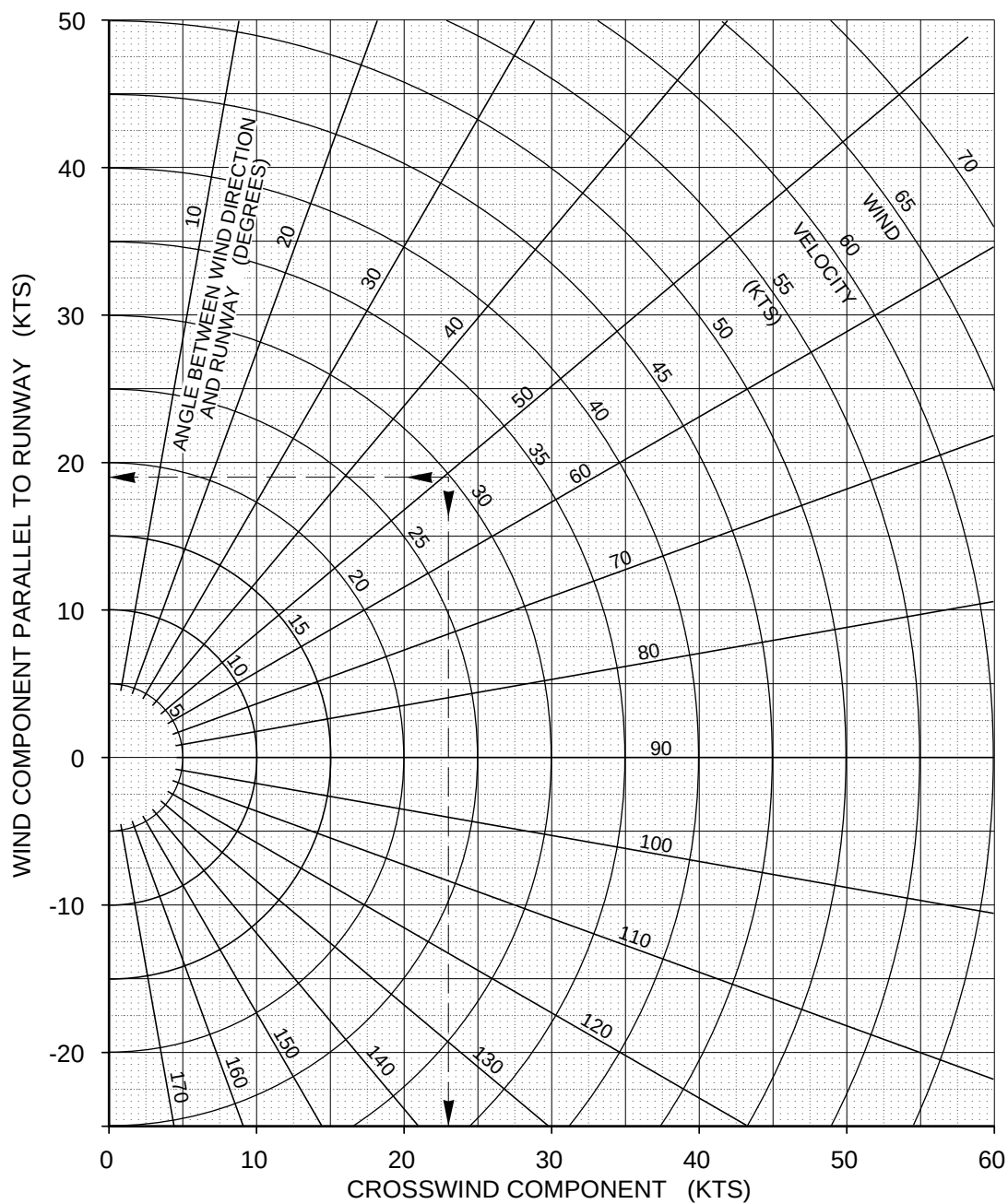


QNH to Pressure Altitude

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

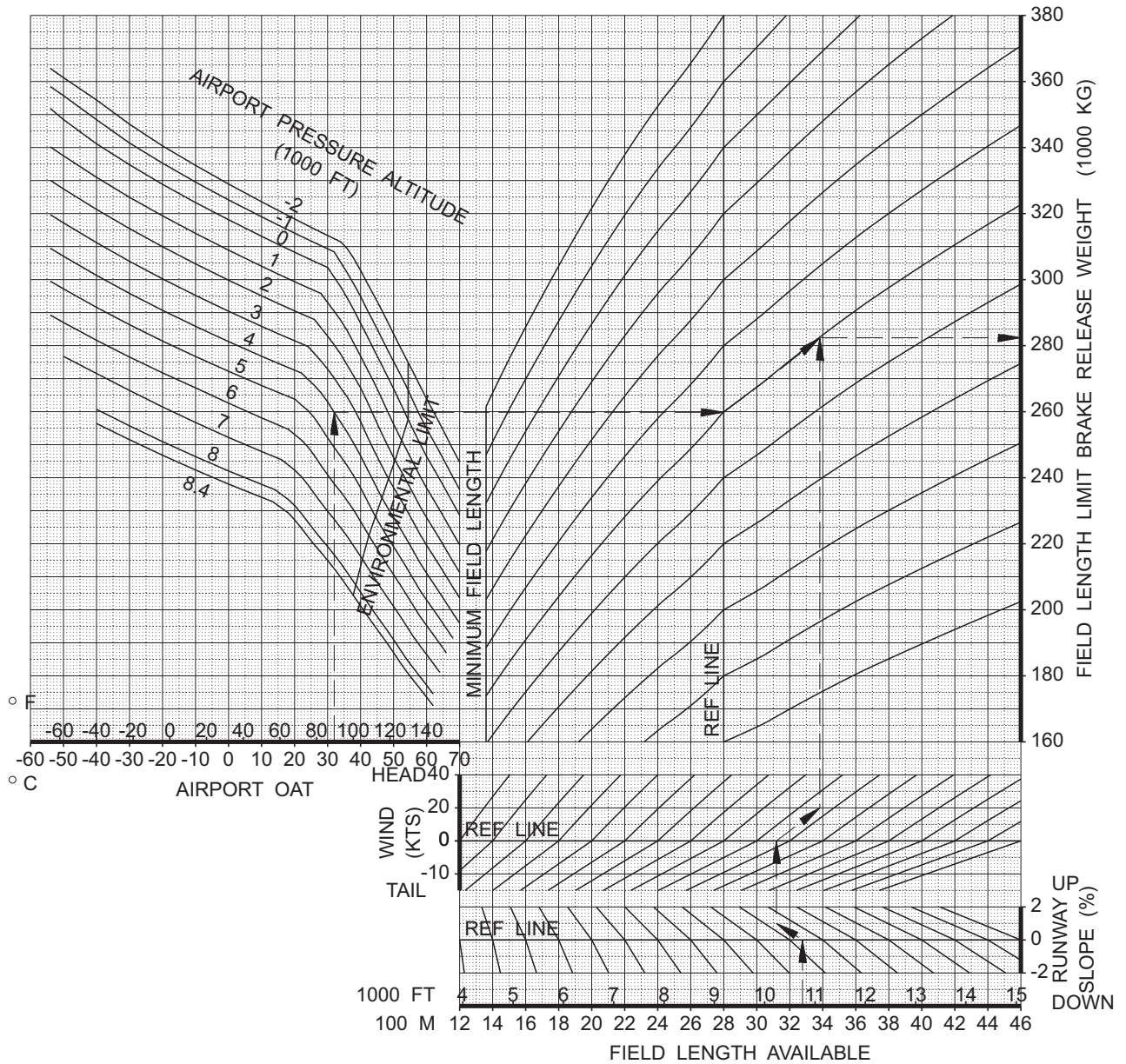
Wind Component



Takeoff Field Limit - Dry Runway

Flaps 5

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

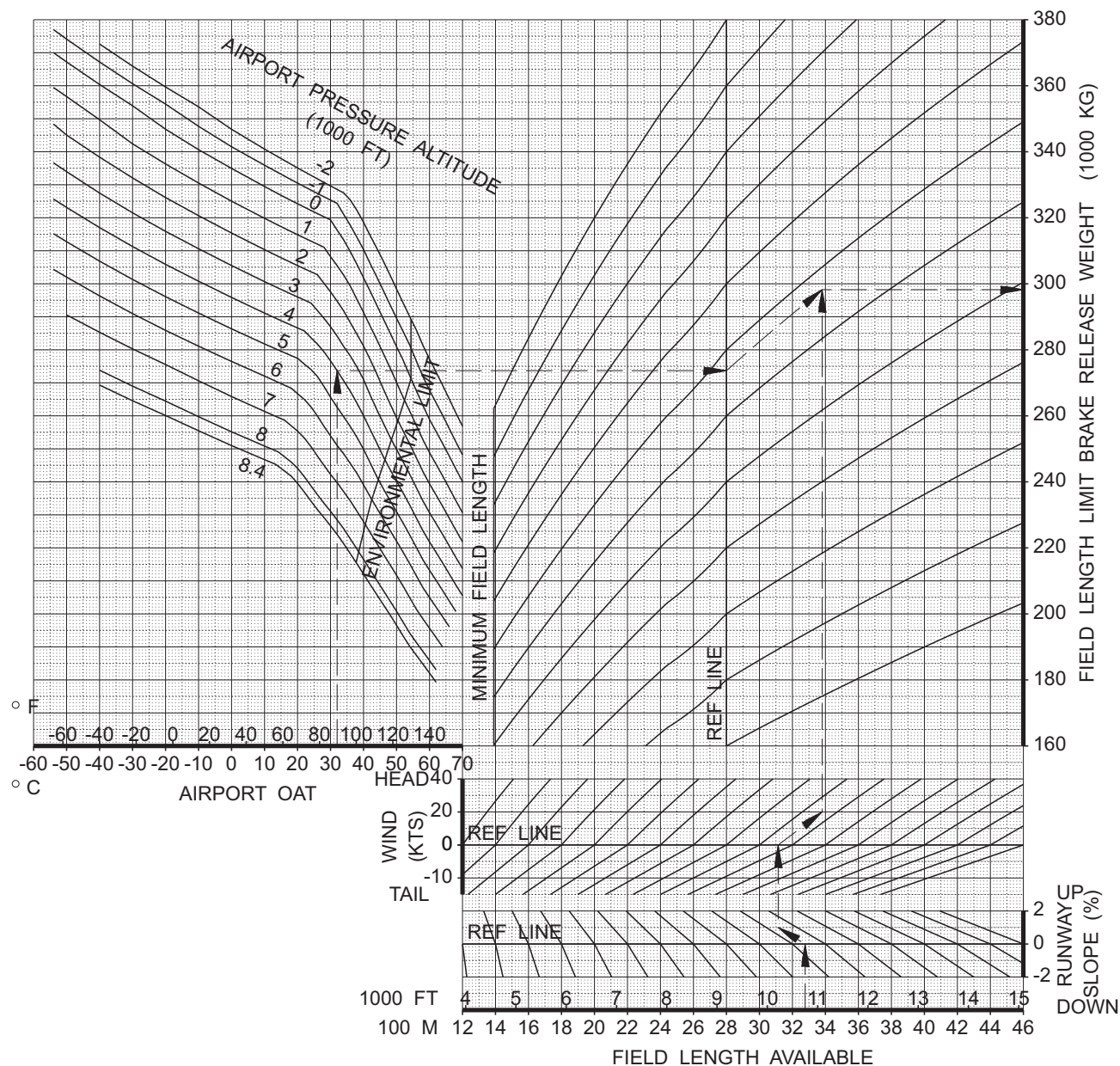


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 950 kg.

Takeoff Field Limit - Dry Runway

Flaps 15

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

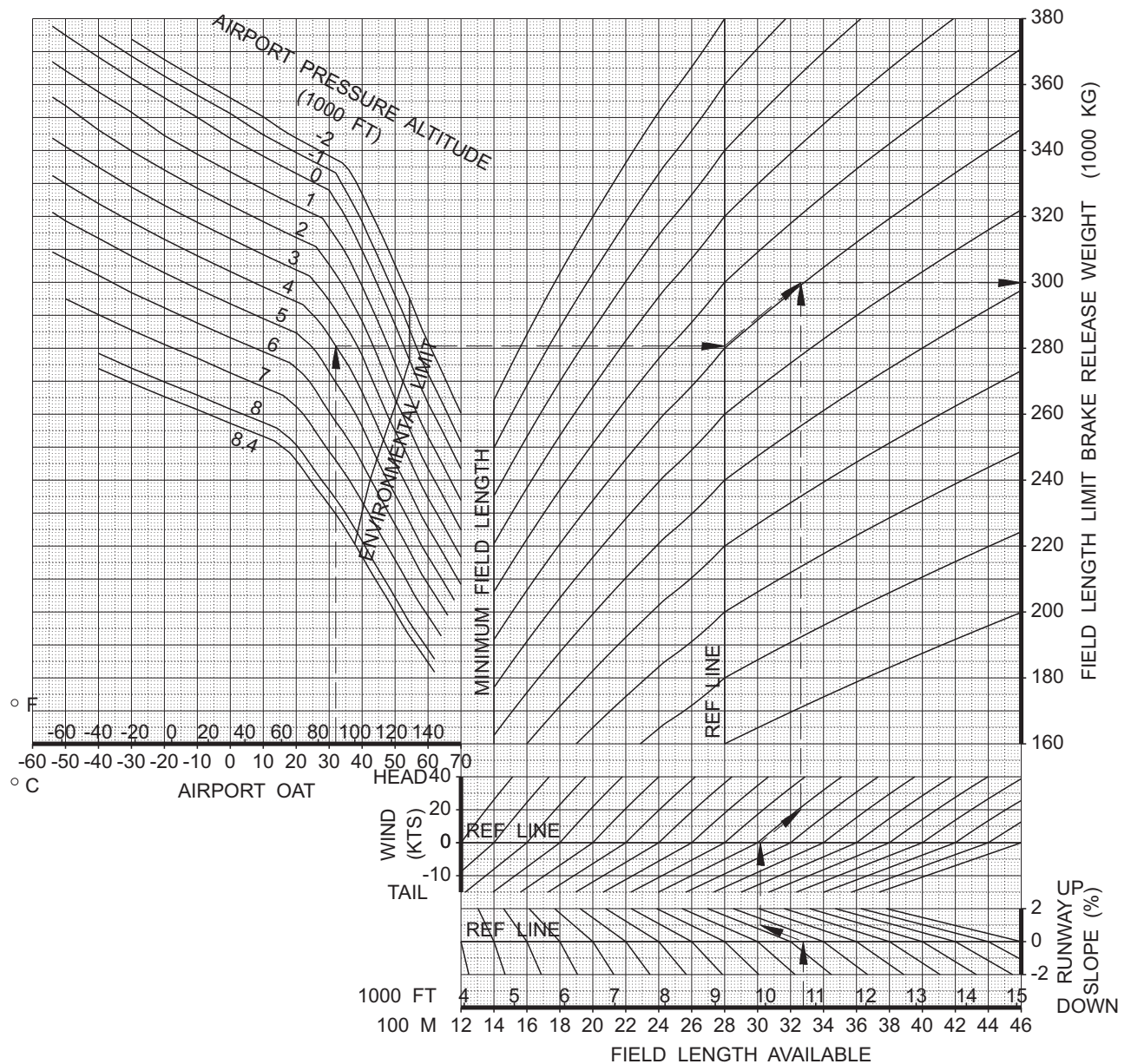


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1000 kg.

Takeoff Field Limit - Dry Runway

Flaps 20

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

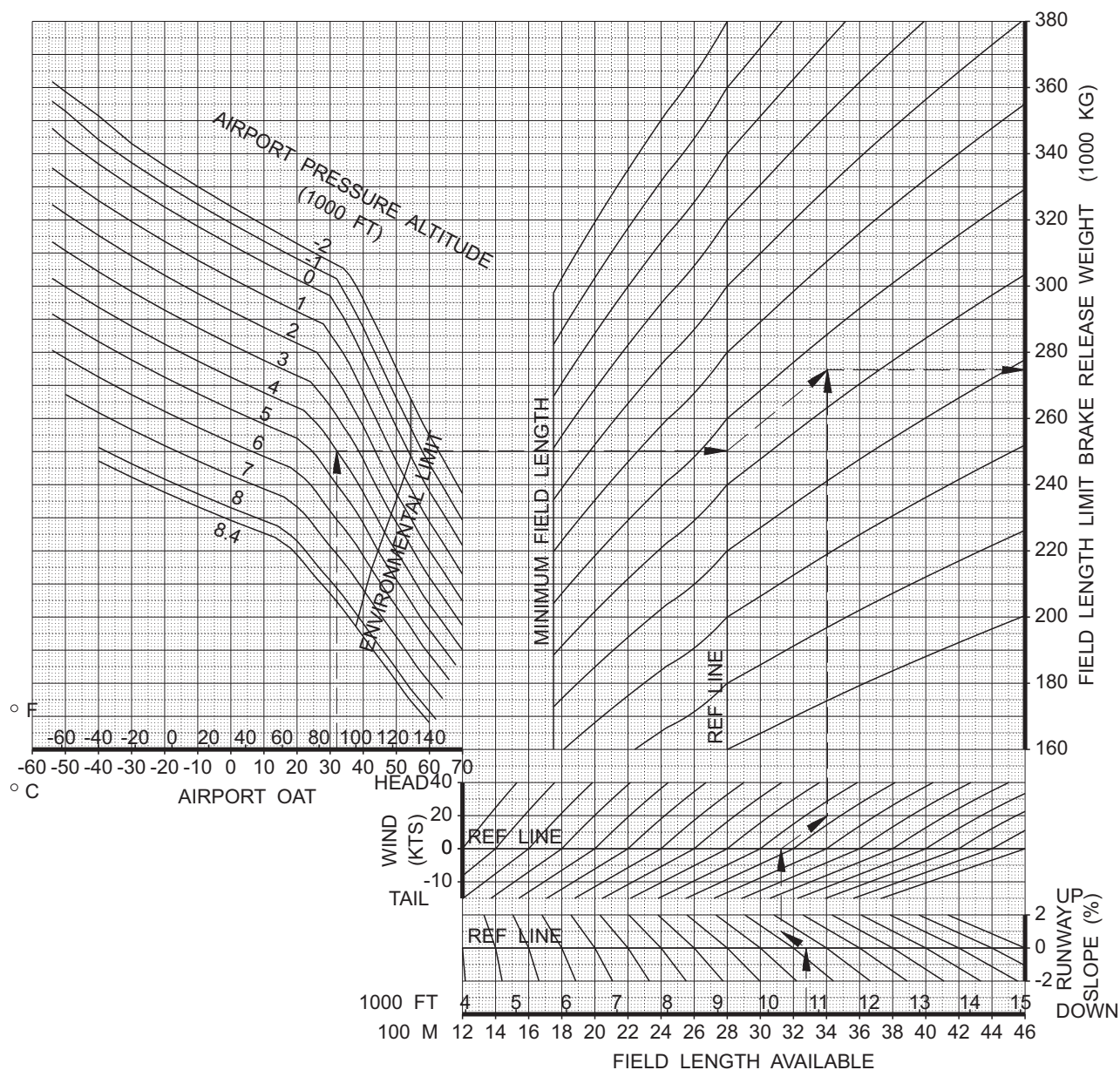


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1000 kg.

Takeoff Field Limit - Wet Runway

Flaps 5

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

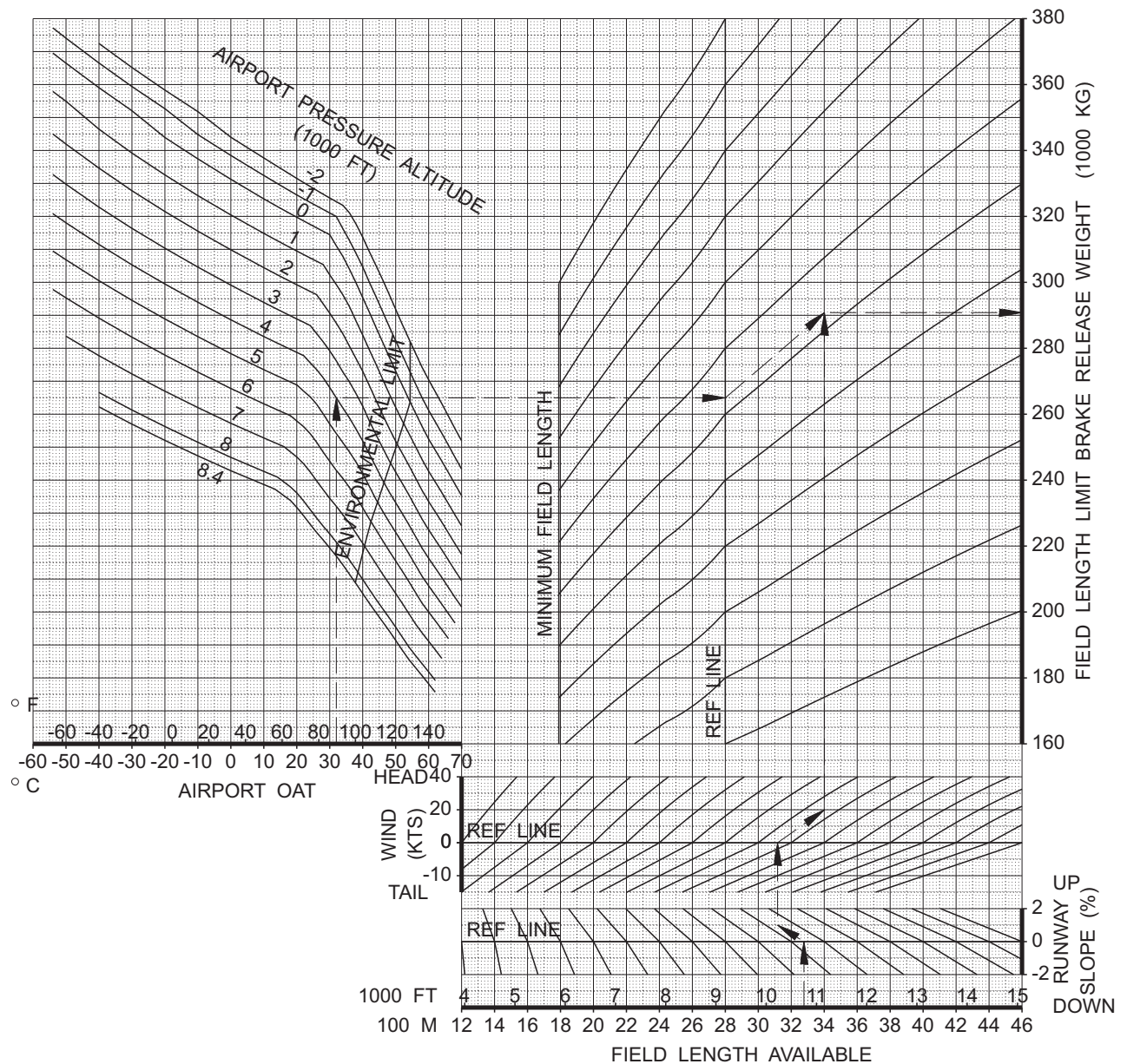


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1100 kg.

Takeoff Field Limit - Wet Runway

Flaps 15

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

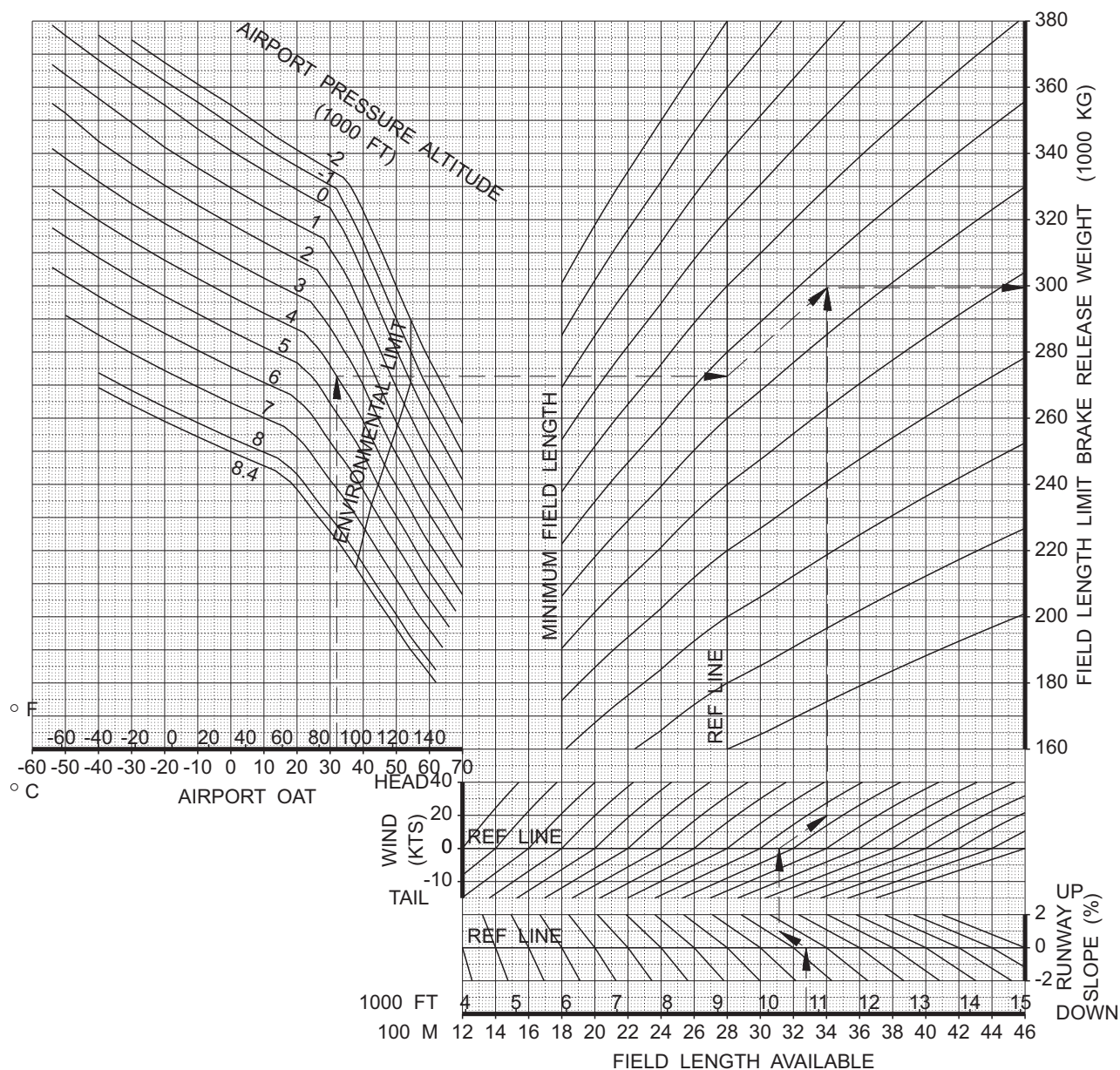


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1100 kg.

Takeoff Field Limit - Wet Runway

Flaps 20

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

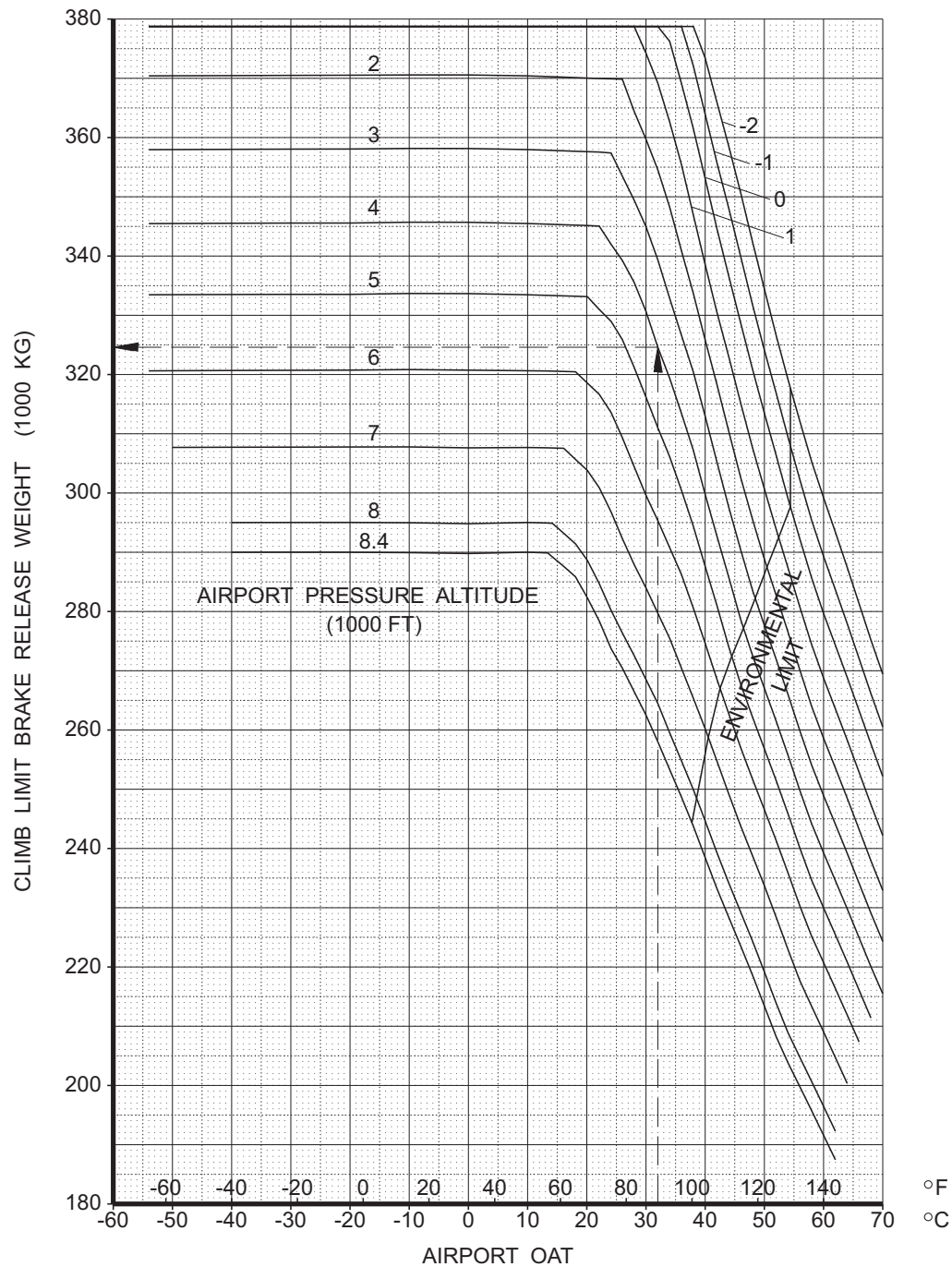


With engine bleed for packs off, increase weight by 500 kg.
With engine and wing anti-ice on, decrease weight by 1100 kg.

Takeoff Climb Limit

Flaps 5

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

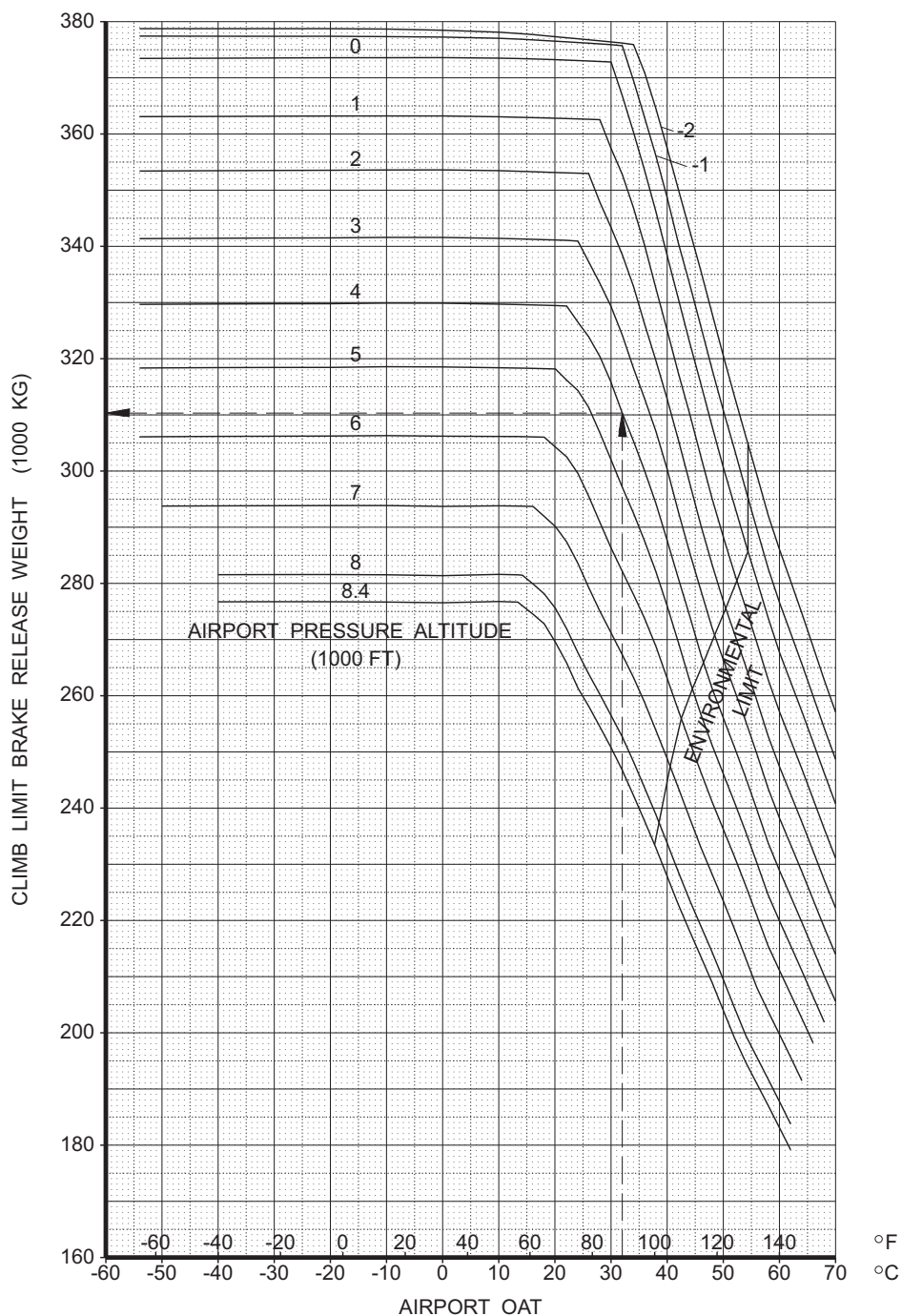


With engine bleed for packs off, increase weight by 1950 kg.
With engine and wing anti-ice on, decrease weight by 1900 kg.

Takeoff Climb Limit

Flaps 15

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

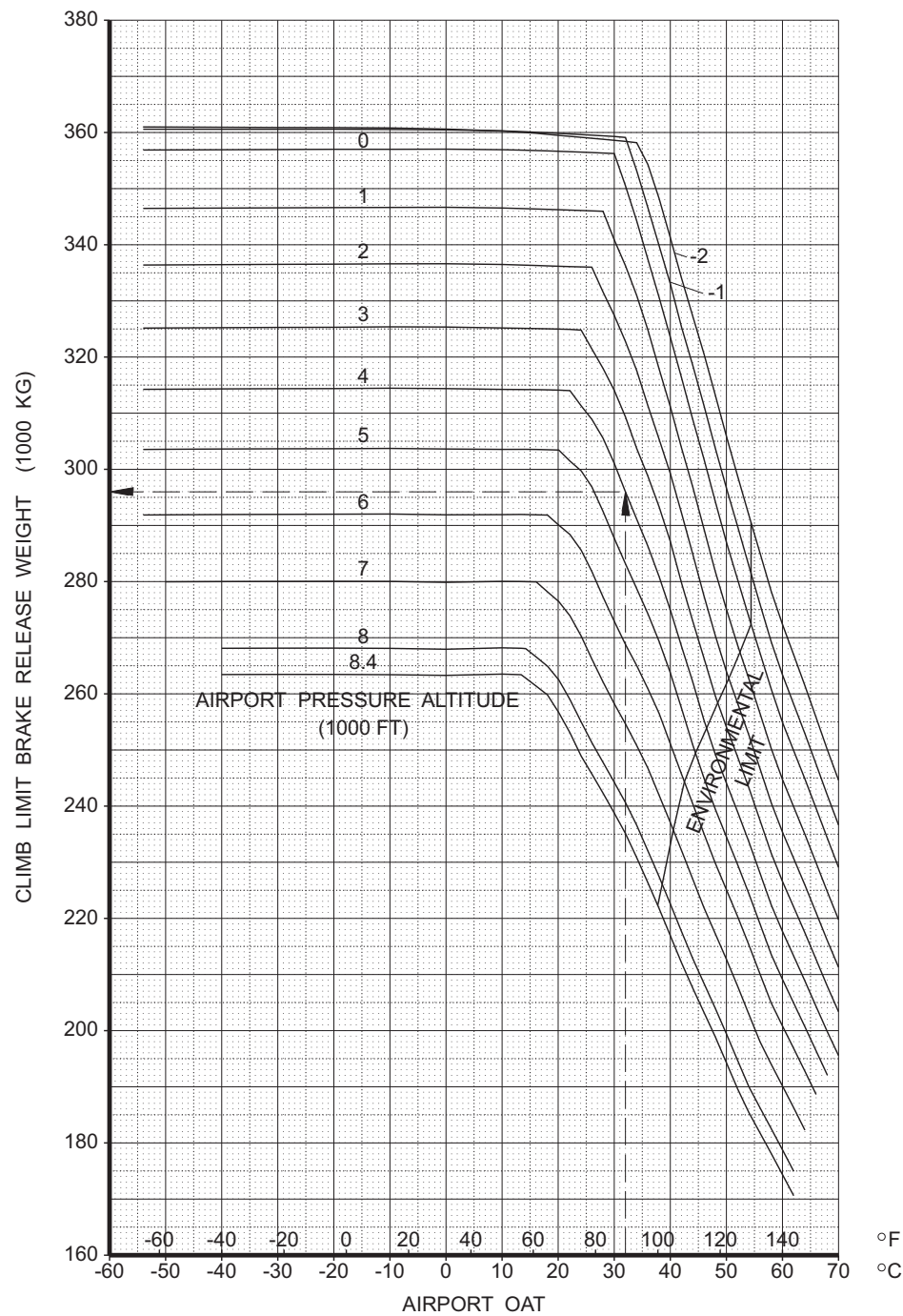


With engine bleed for packs off, increase weight by 1900 kg.
With engine and wing anti-ice on, decrease weight by 1750 kg.

Takeoff Climb Limit

Flaps 20

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



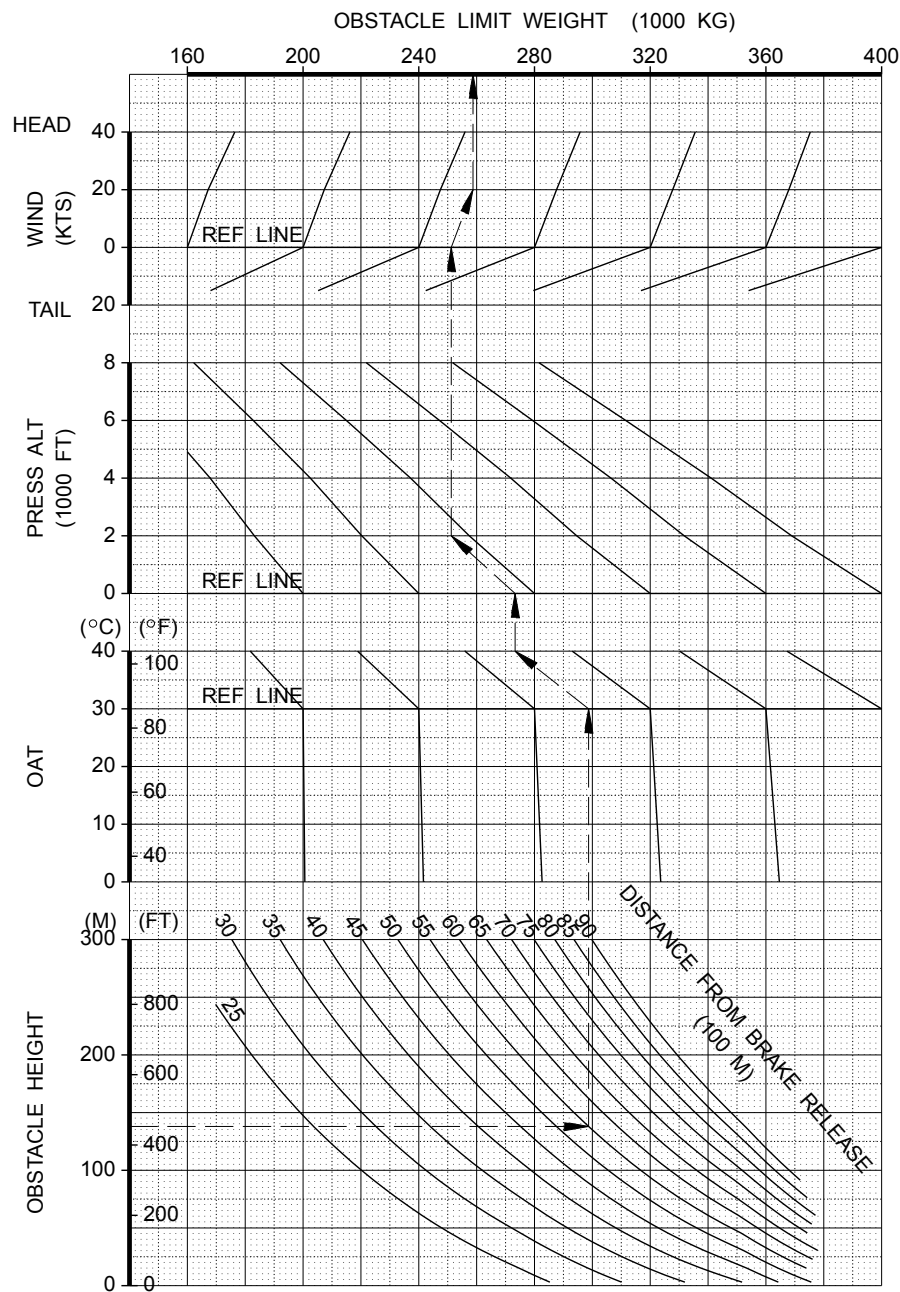
With engine bleed for packs off, increase weight by 1800 kg.

With engine and wing anti-ice on, decrease weight by 1700 kg.

Obstacle Limit

Flaps 5

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



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

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

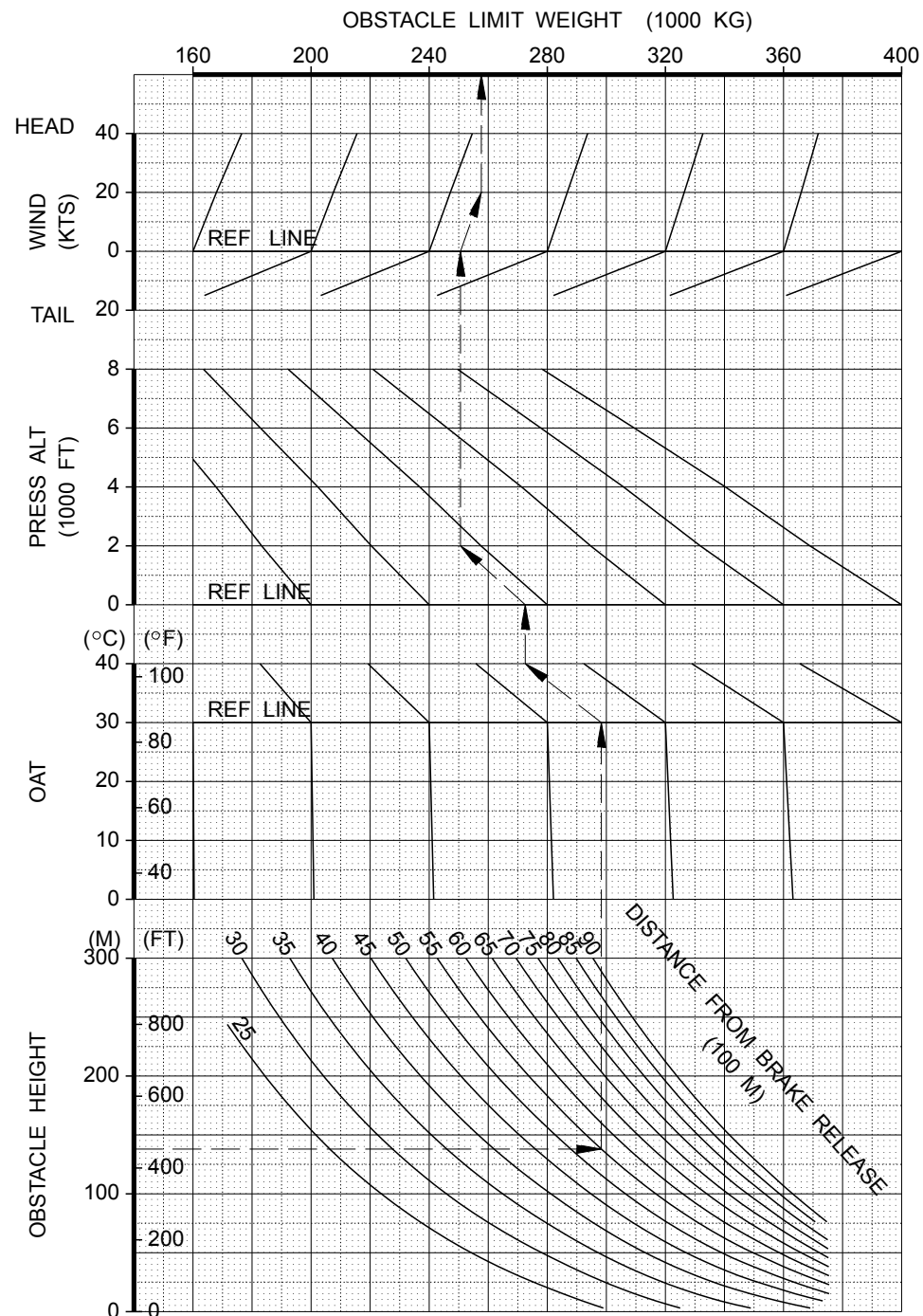
With engine bleed for packs off, increase weight by 900 kg.

With engine and wing anti-ice on, decrease weight by 2000 kg.

Obstacle Limit

Flaps 15

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

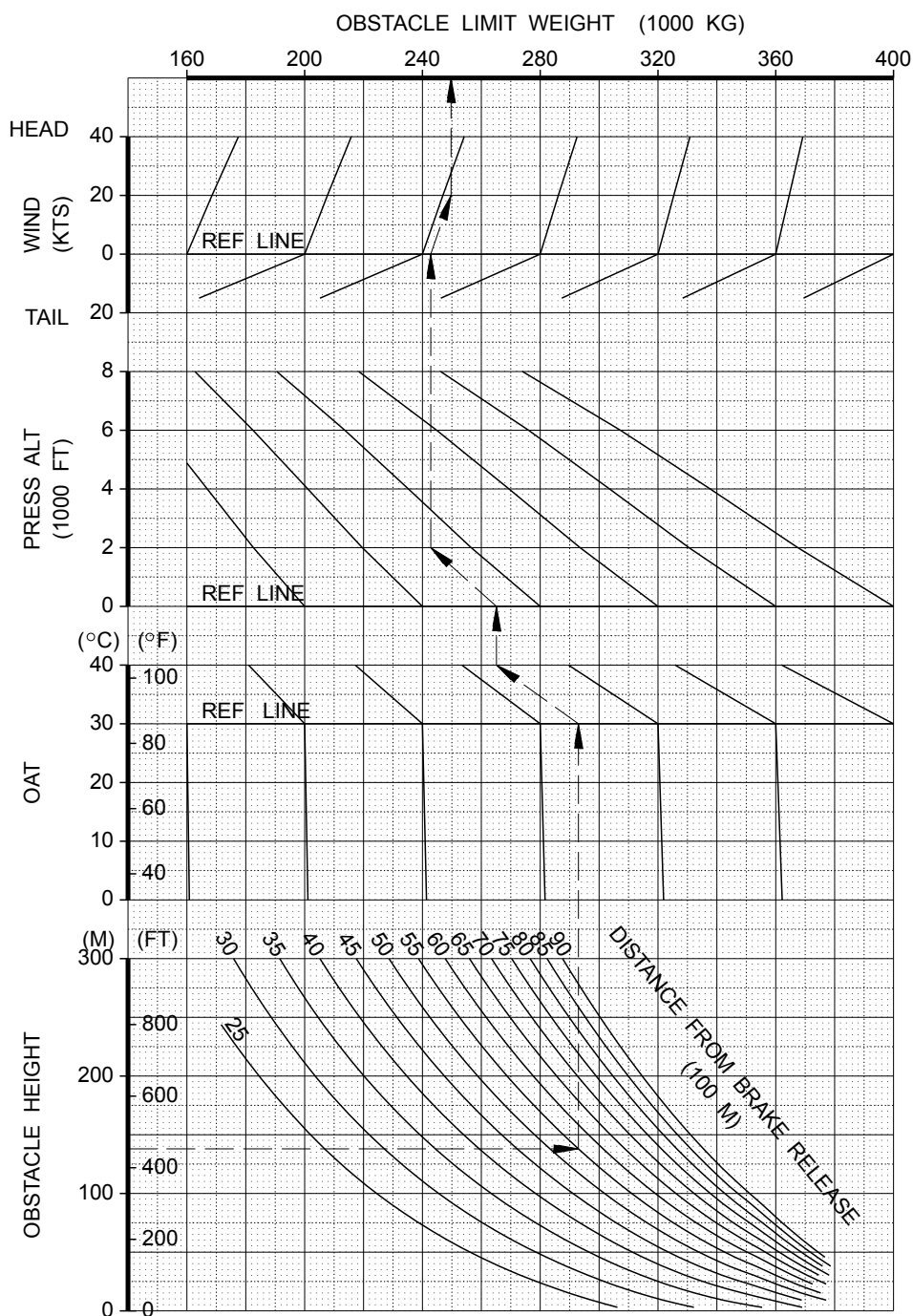


When using line-up allowances, the obstacle distance from brake release must be reduced by the ASDA adjustment.
Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.
With engine bleed for packs off, increase weight by 900 kg.
With engine and wing anti-ice on, decrease weight by 2000 kg.

Obstacle Limit

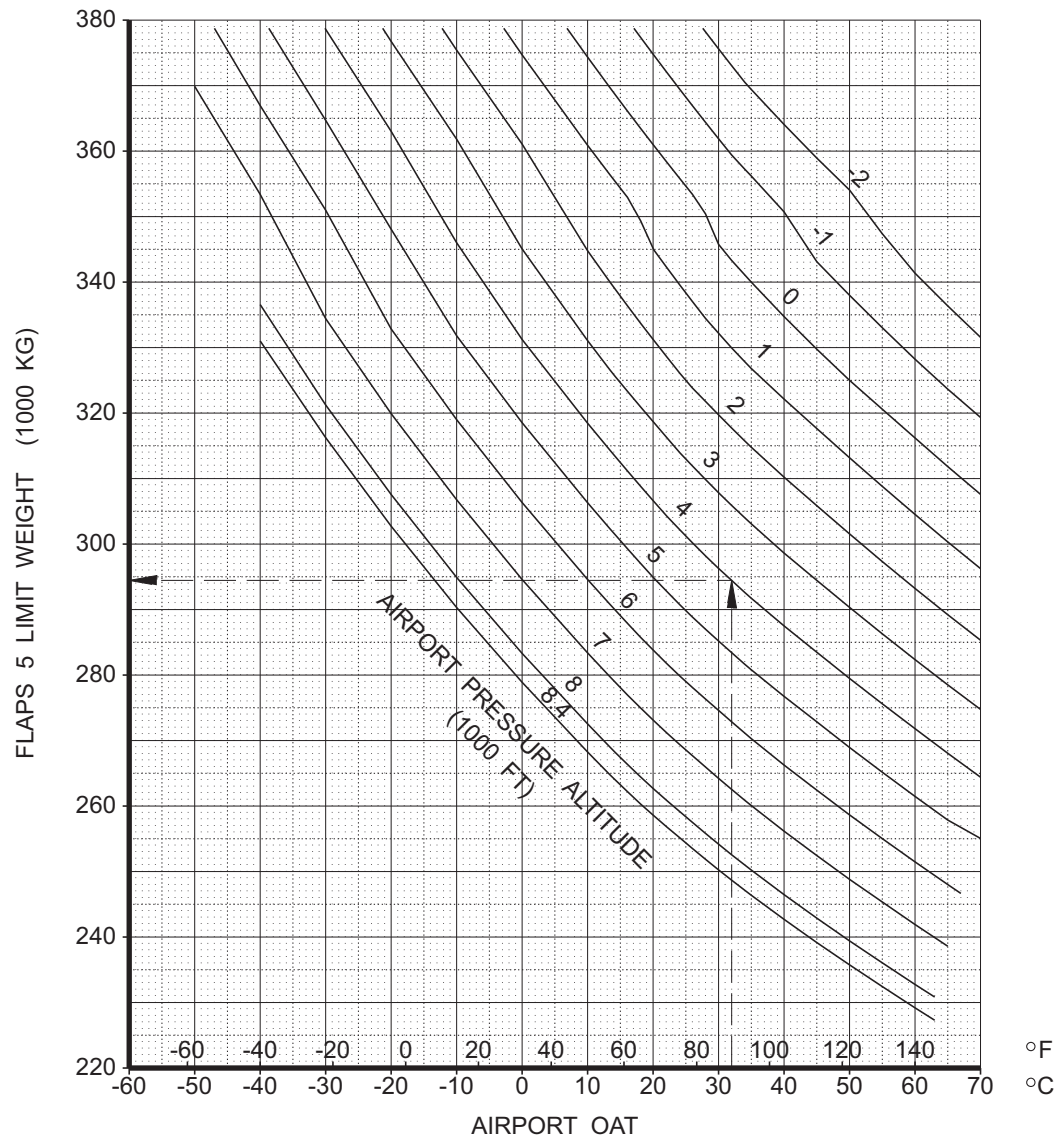
Flaps 20

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



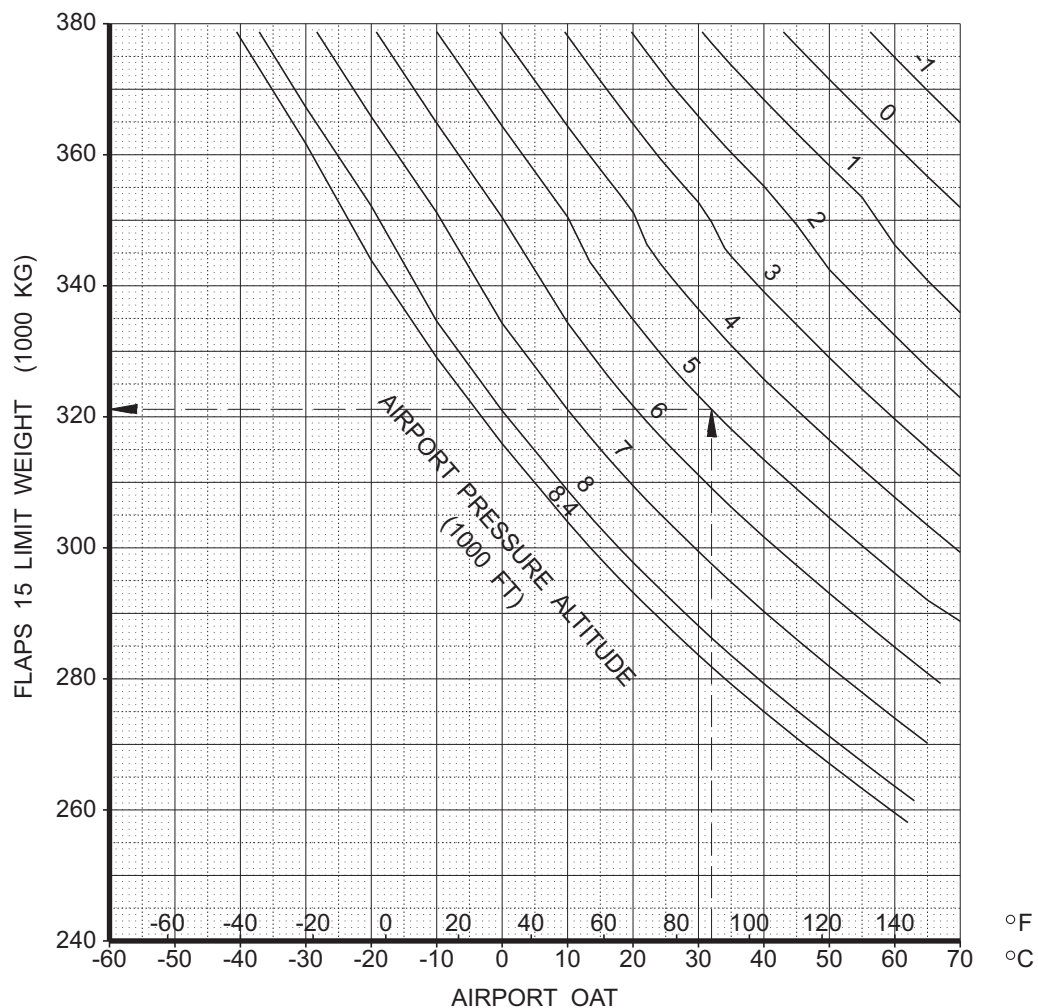
When using line-up allowances, the obstacle distance from brake release must be reduced by the ASDA adjustment.
Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.
With engine bleed for packs off, increase weight by 900 kg.
With engine and wing anti-ice on, decrease weight by 2000 kg.

Tire Speed Limit Flaps 5



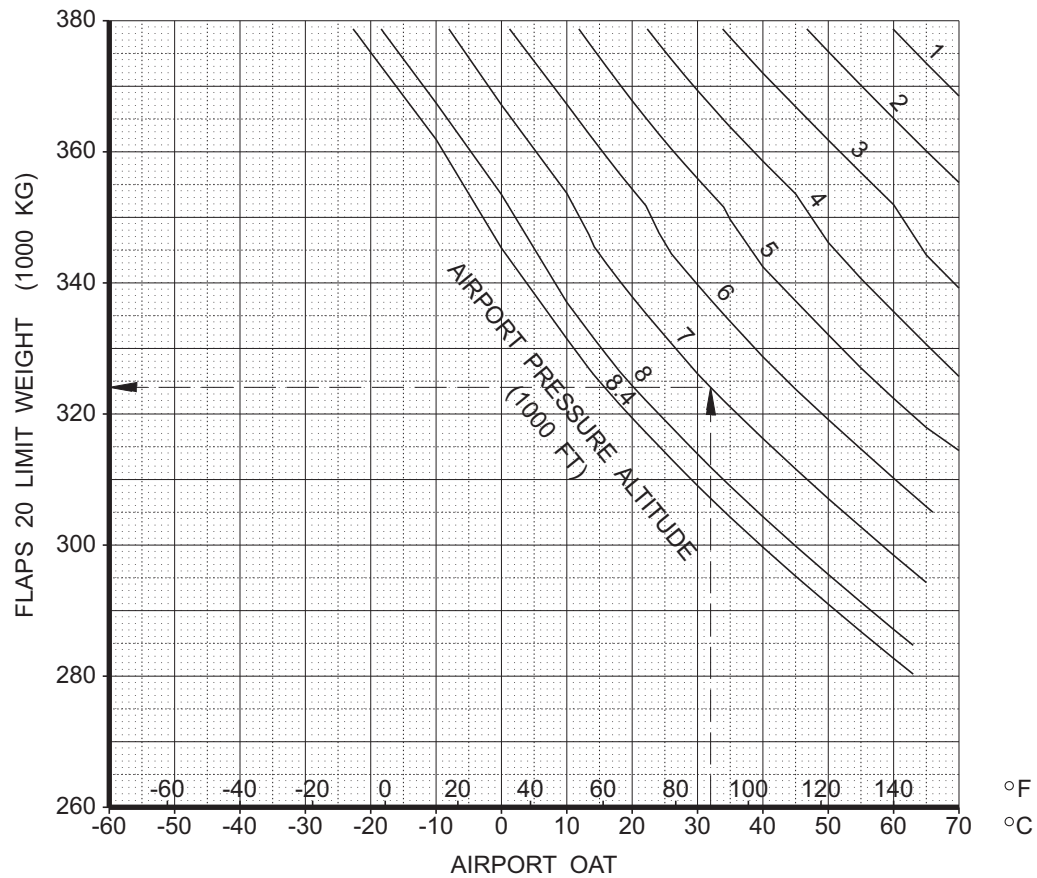
Increase tire speed limit weight by 2250 kg per knot headwind.
Decrease tire speed limit weight by 5400 kg per knot tailwind.

Tire Speed Limit
Flaps 15



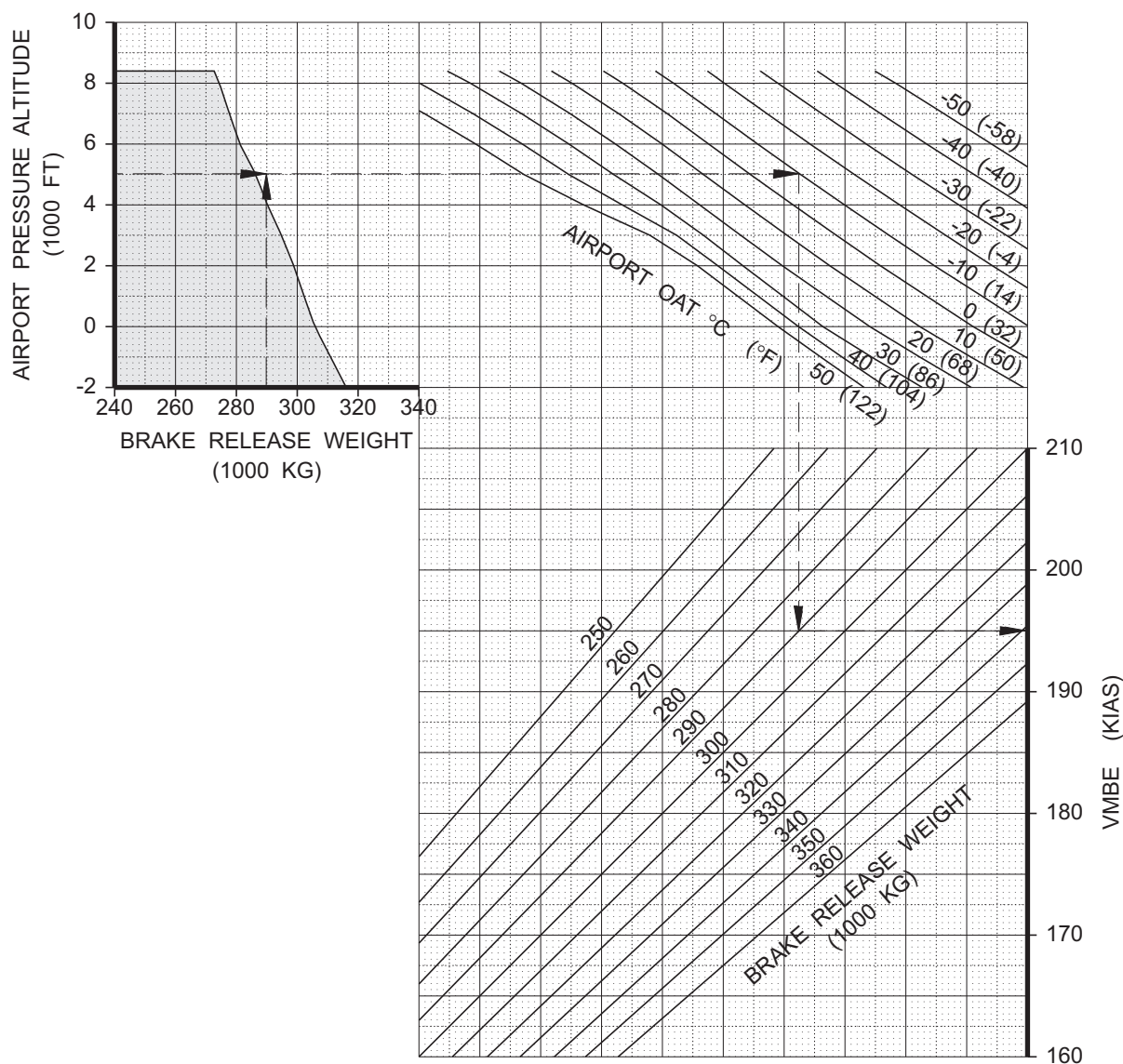
Increase tire speed limit weight by 2550 kg per knot headwind.
Decrease tire speed limit weight by 5400 kg per knot tailwind.

Tire Speed Limit Flaps 20



Increase tire speed limit weight by 2750 kg per knot headwind.
Decrease tire speed limit weight by 5400 kg per knot tailwind.

Brake Energy Limit VMBE



Check VMBE when outside shaded area, operating with tailwind, or using improved climb.

Adjust VMBE for slope, wind and brake configuration.

Increase VMBE by 2 knots per 1% uphill runway slope. Decrease VMBE by 5 knots per 1% downhill runway slope.

Increase VMBE by 4 knots per 10 knots headwind. Decrease VMBE by 20 knots per 10 knots tailwind.

Decrease VMBE by 10 knots for one brake deactivated and 21 knots for two brakes deactivated.

Normal takeoff:

Decrease brake release weight by 2100 kg for each knot V1 exceeds VMBE.

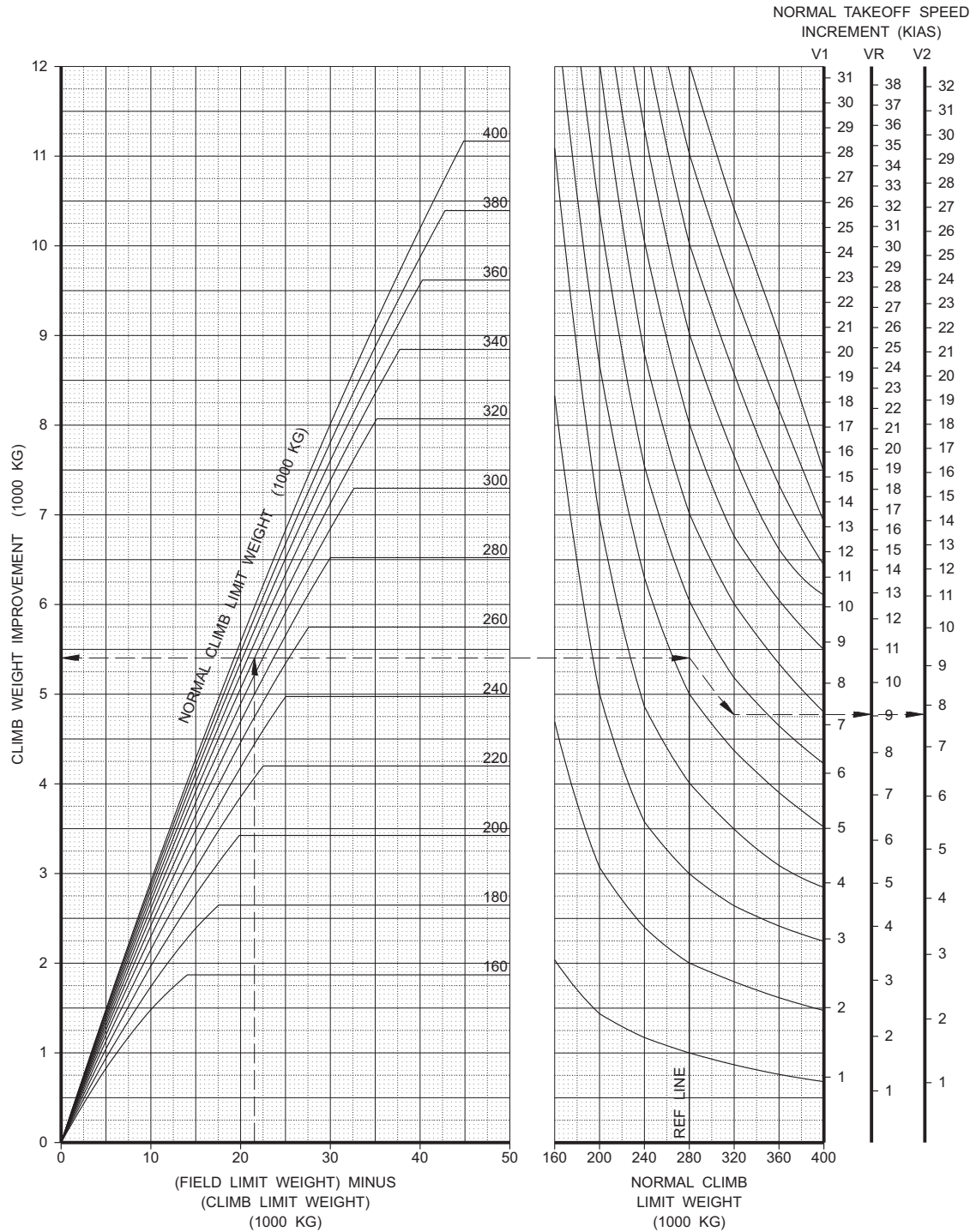
Determine normal V1, VR, V2 speeds for lower brake release weight.

Improved climb takeoff:

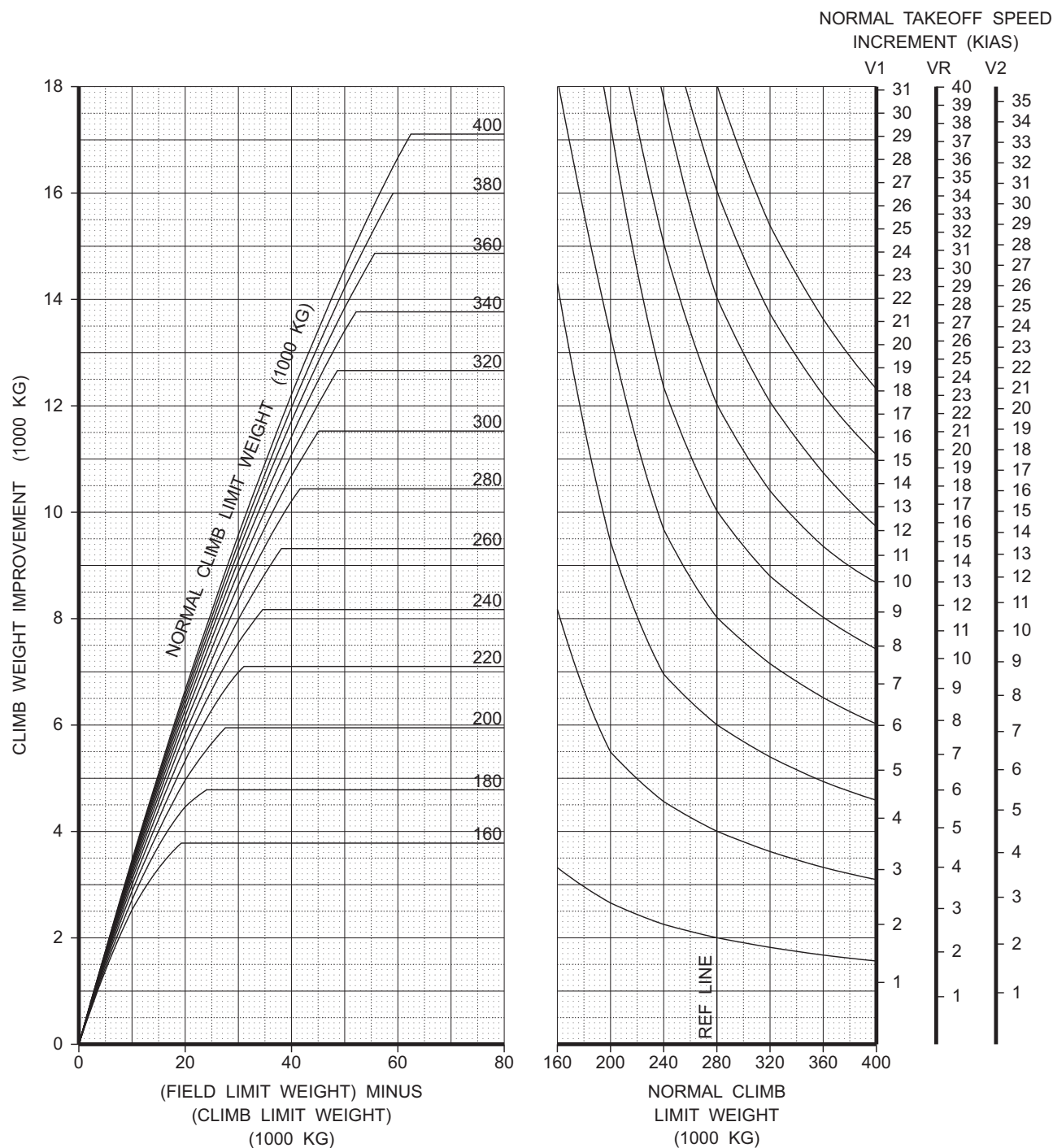
Decrease climb weight improvement by 850 kg for each knot V1 exceeds VMBE.

Determine V1, VR, V2 speed increments for the lower climb weight improvement.

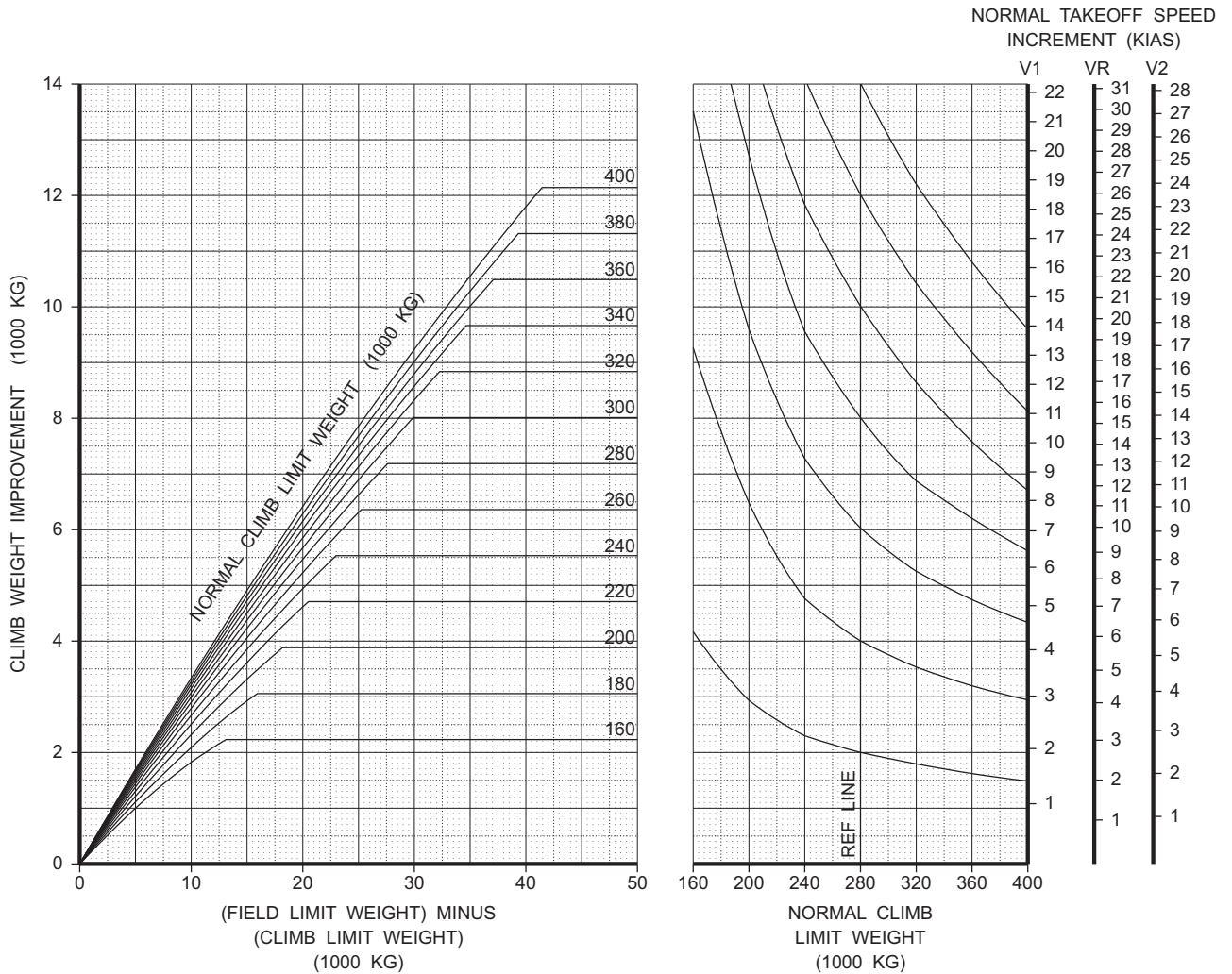
**Improved Climb Field Length Limit - Dry Runway
Flaps 5**



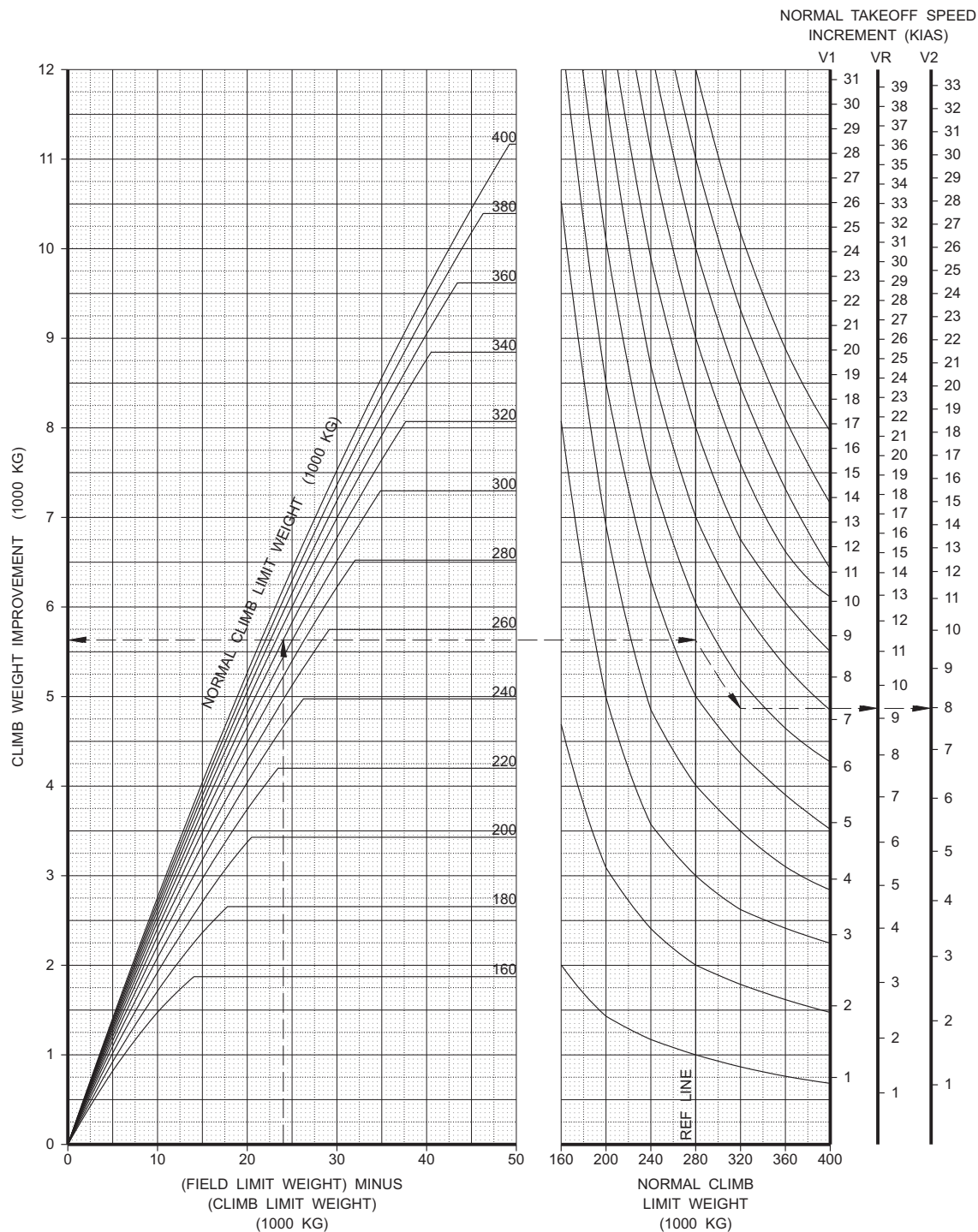
**Improved Climb Field Length Limit - Dry Runway
Flaps 15**



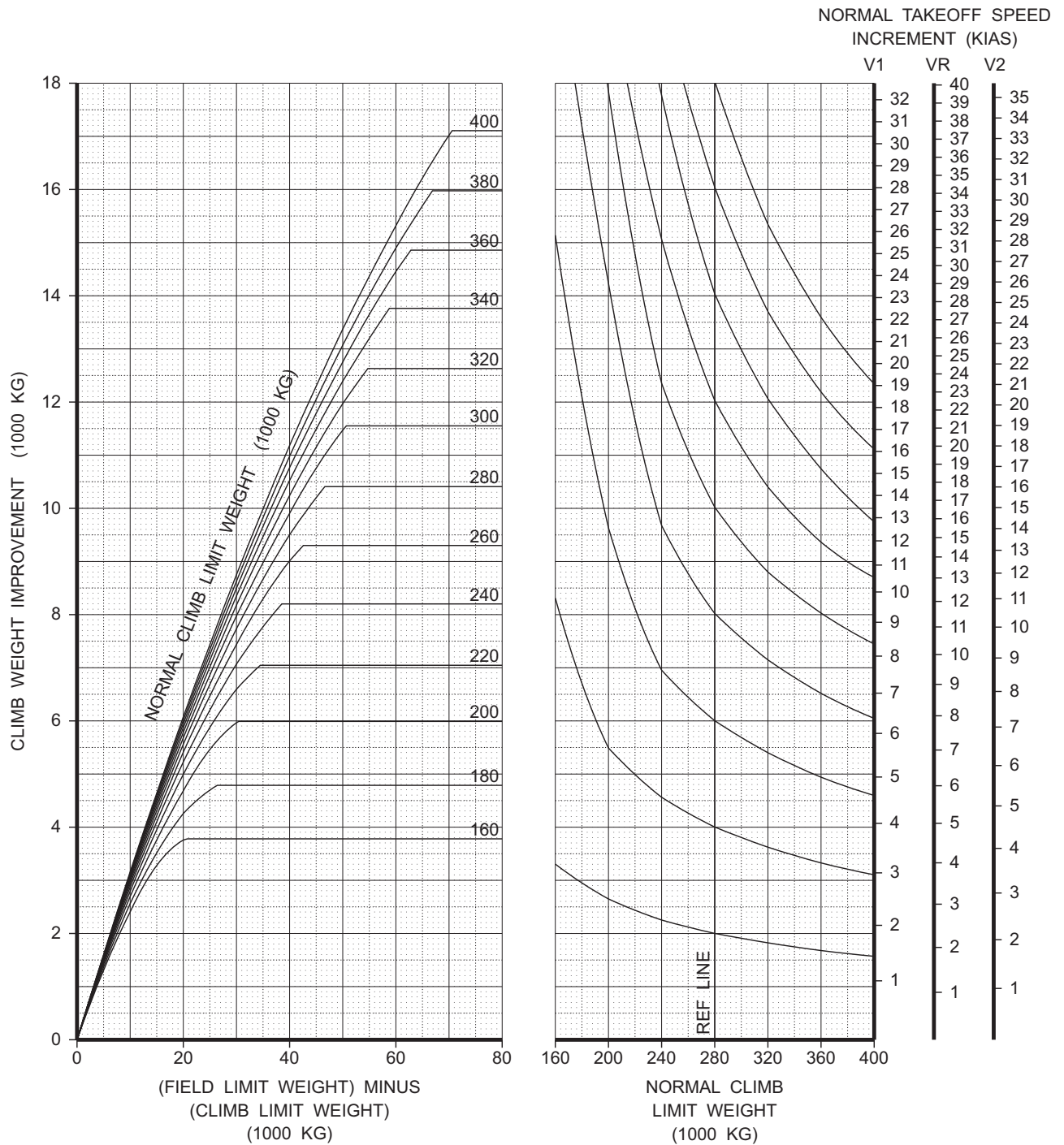
**Improved Climb Field Length Limit - Dry Runway
Flaps 20**



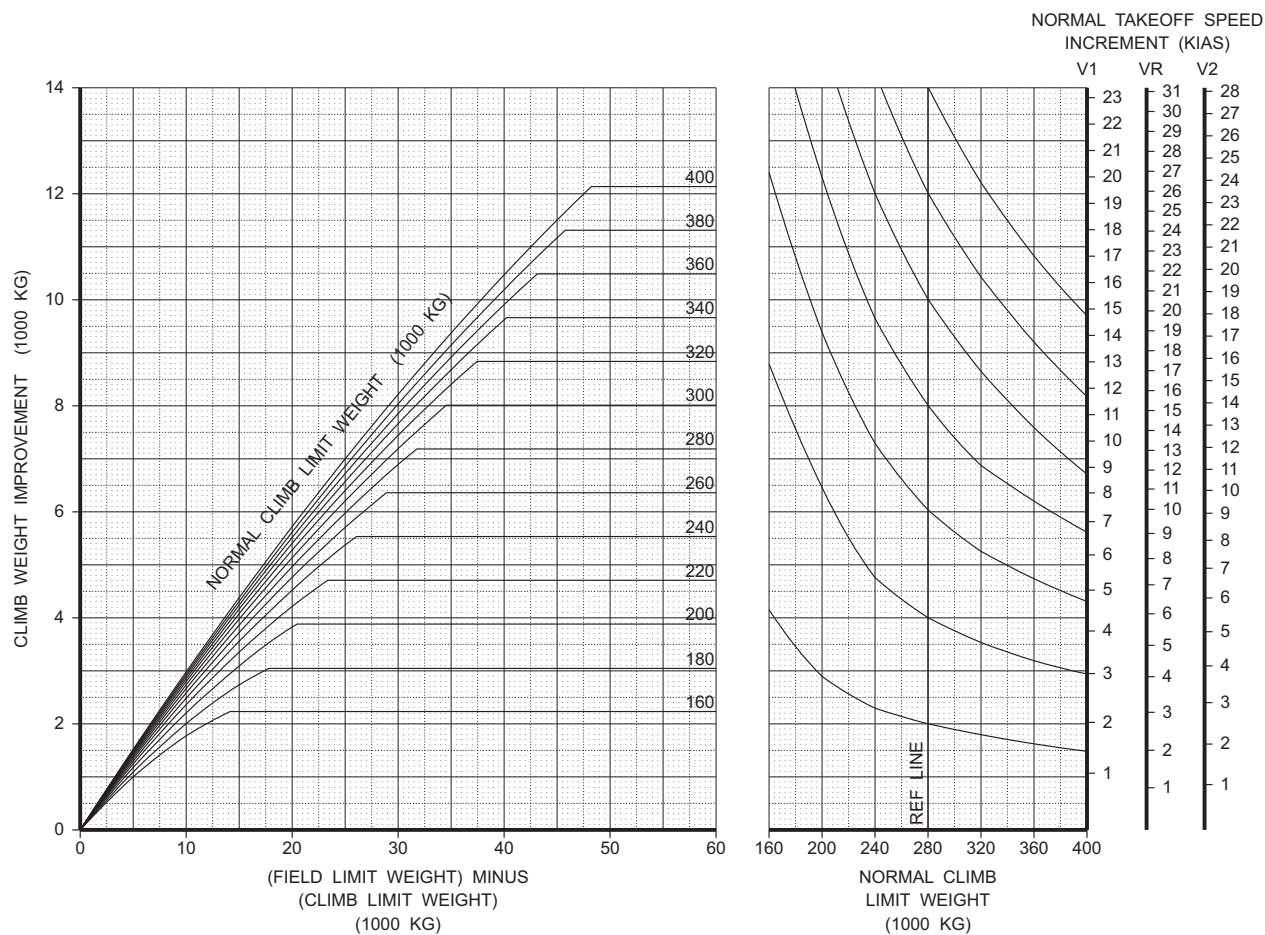
**Improved Climb Field Length Limit - Wet Runway
Flaps 5**



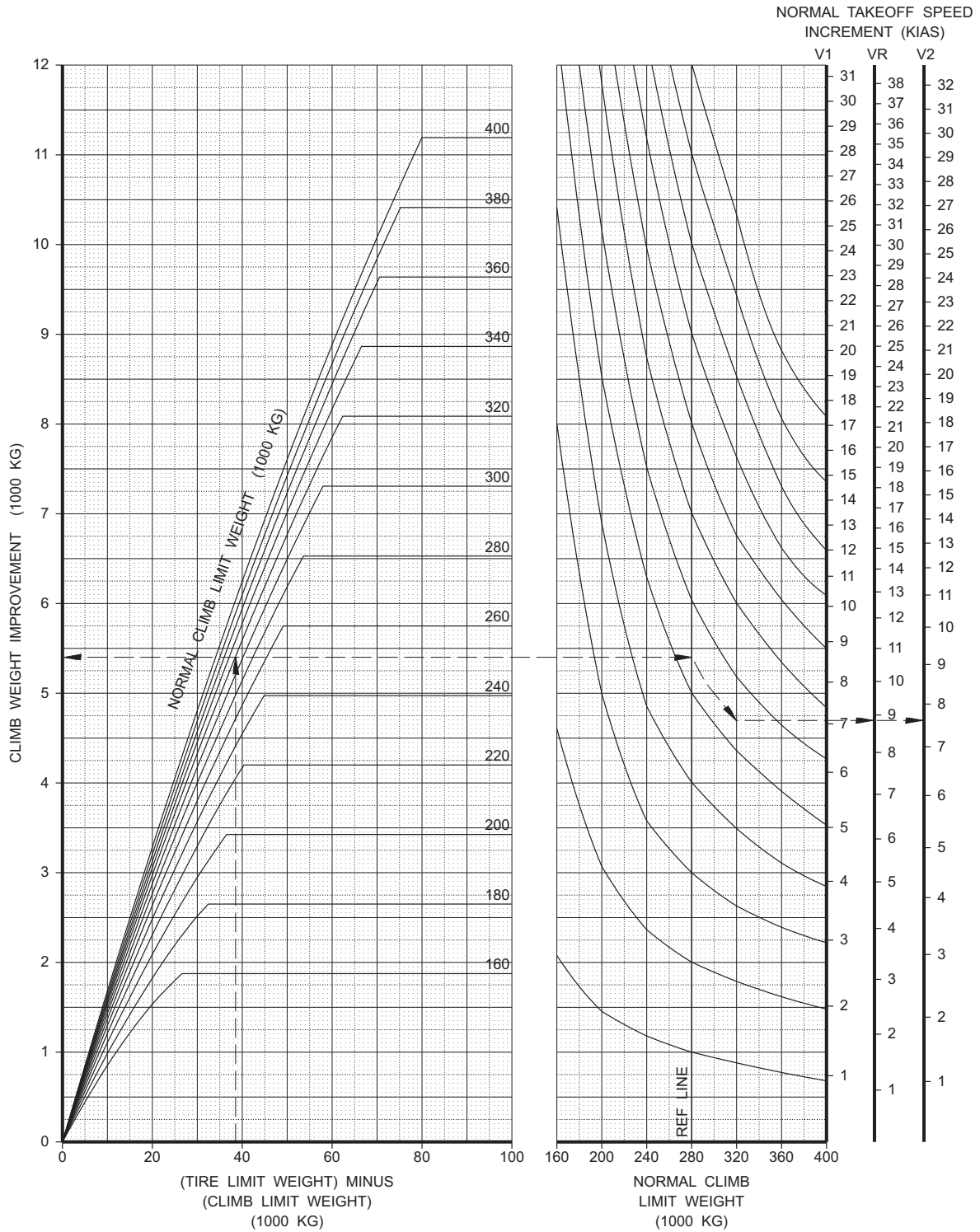
**Improved Climb Field Length Limit - Wet Runway
Flaps 15**



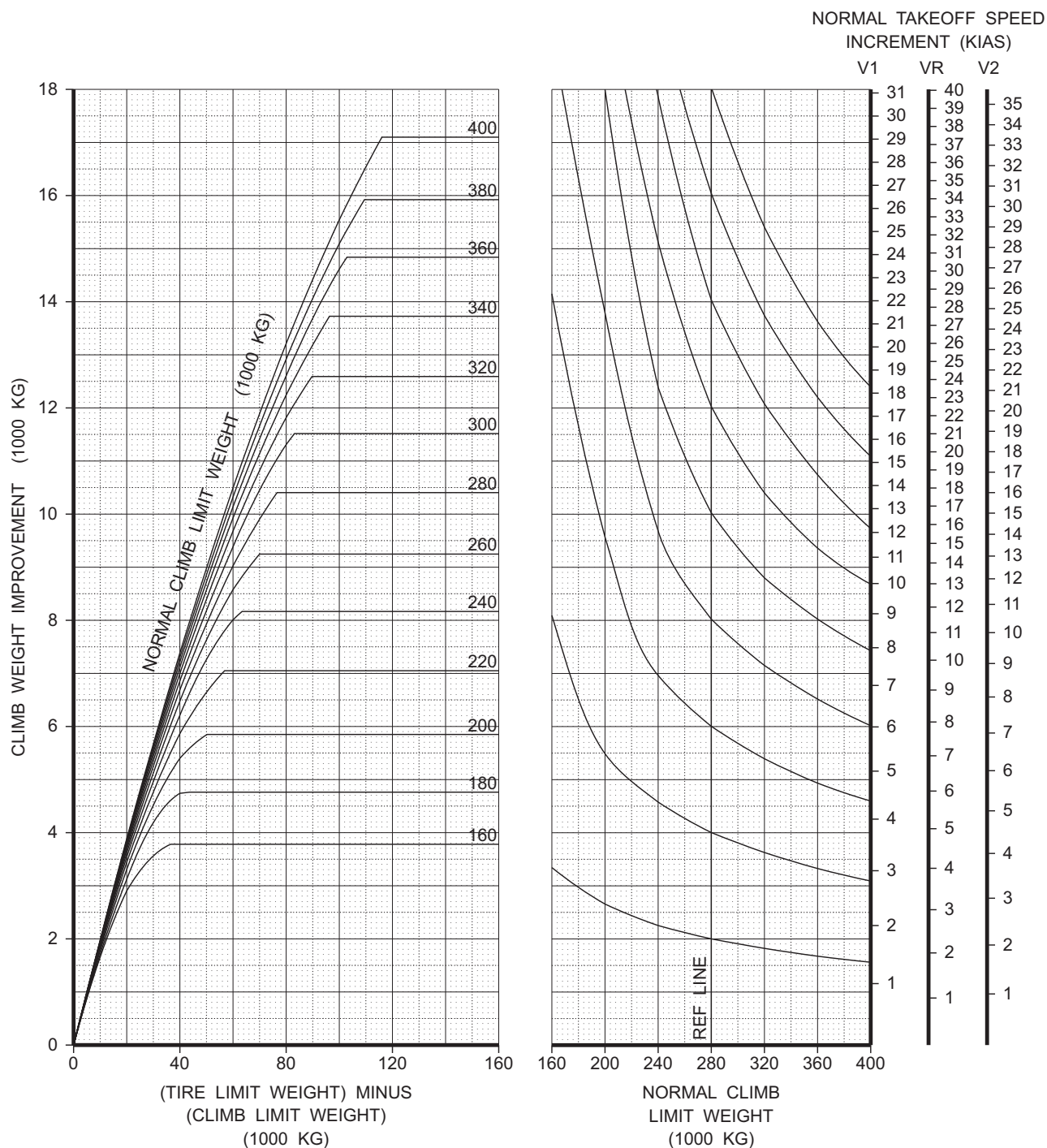
Improved Climb Field Length Limit - Wet Runway Flaps 20



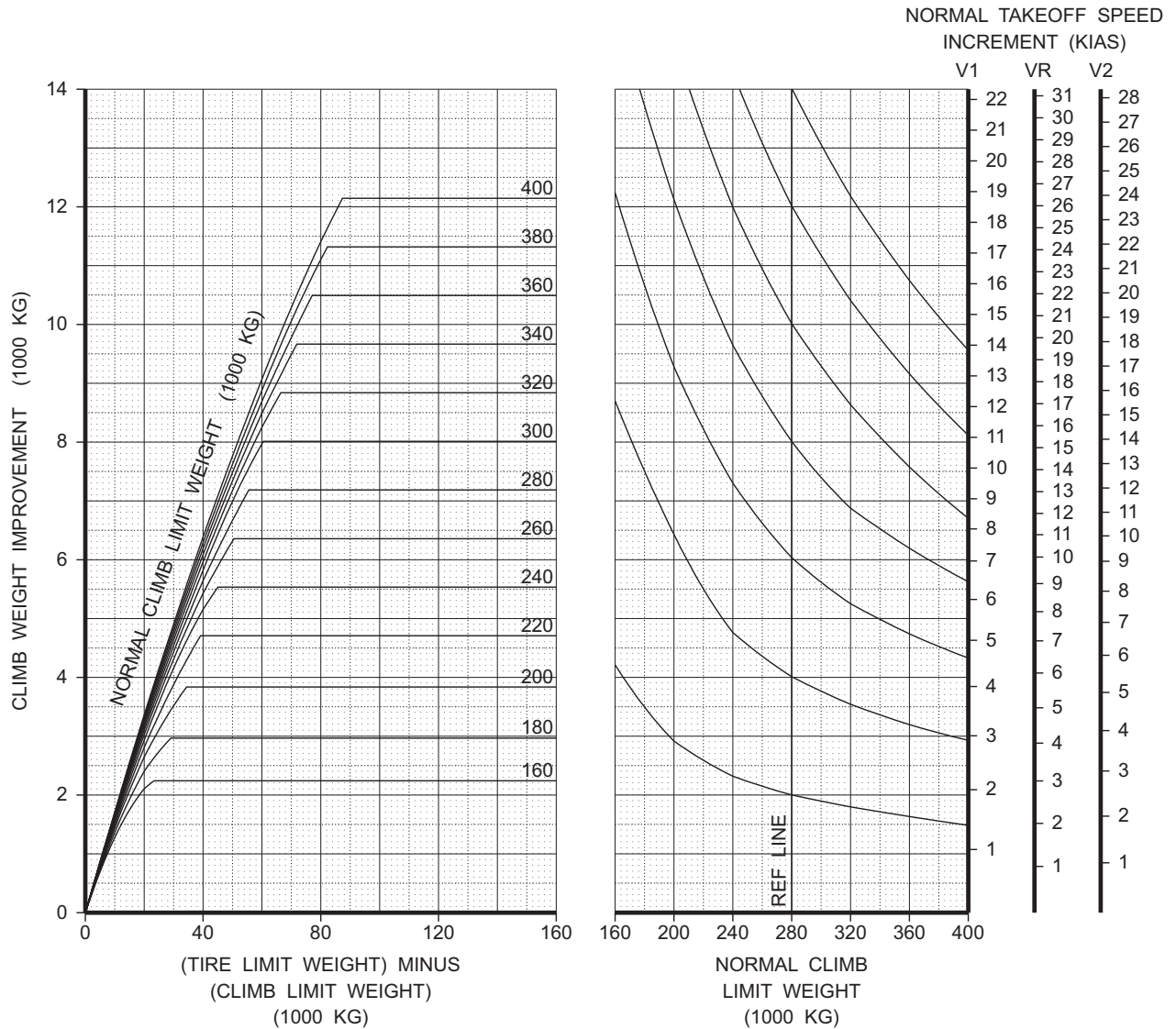
**Improved Climb Tire Speed Limit - Dry Runway
Flaps 5**



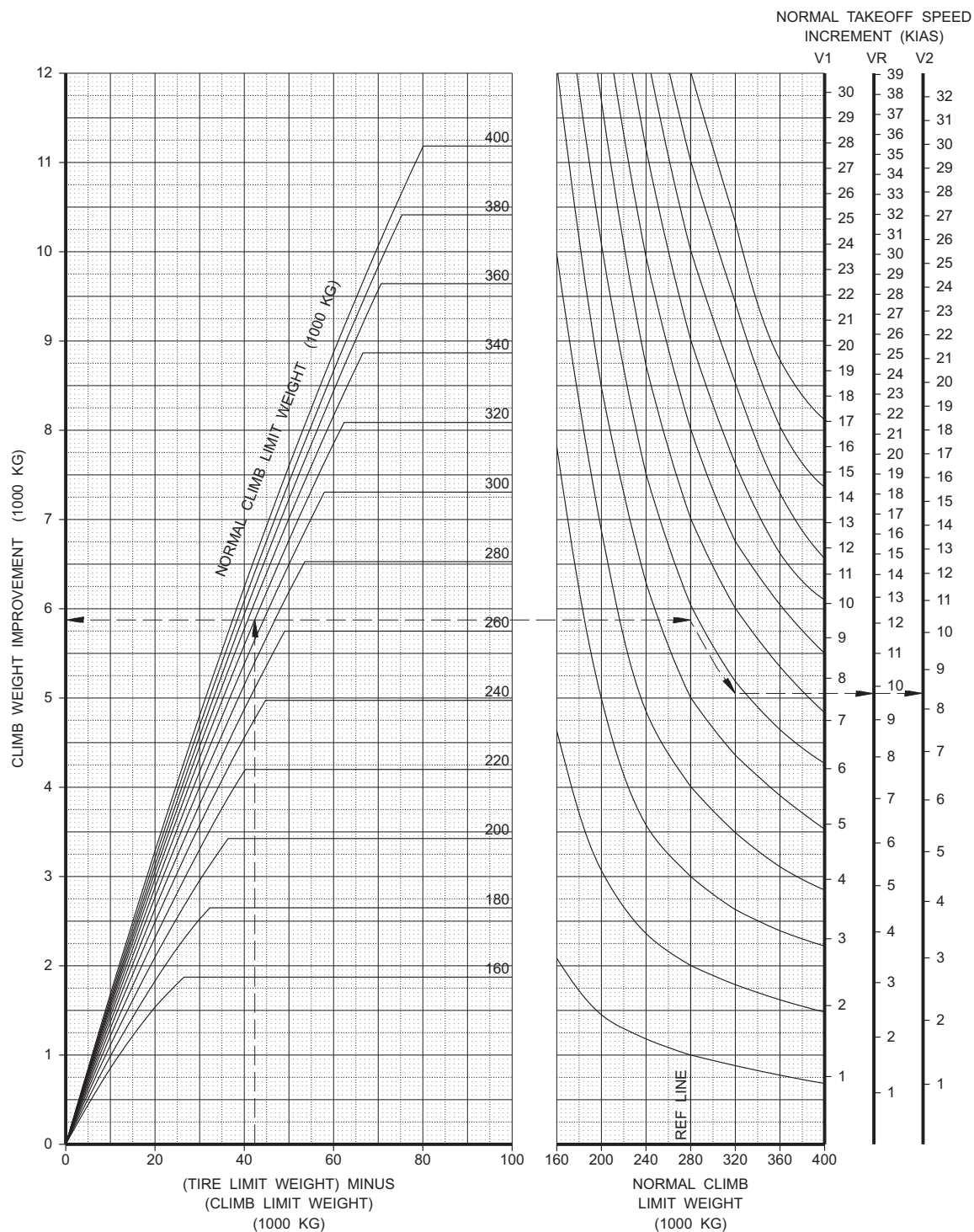
**Improved Climb Tire Speed Limit - Dry Runway
Flaps 15**



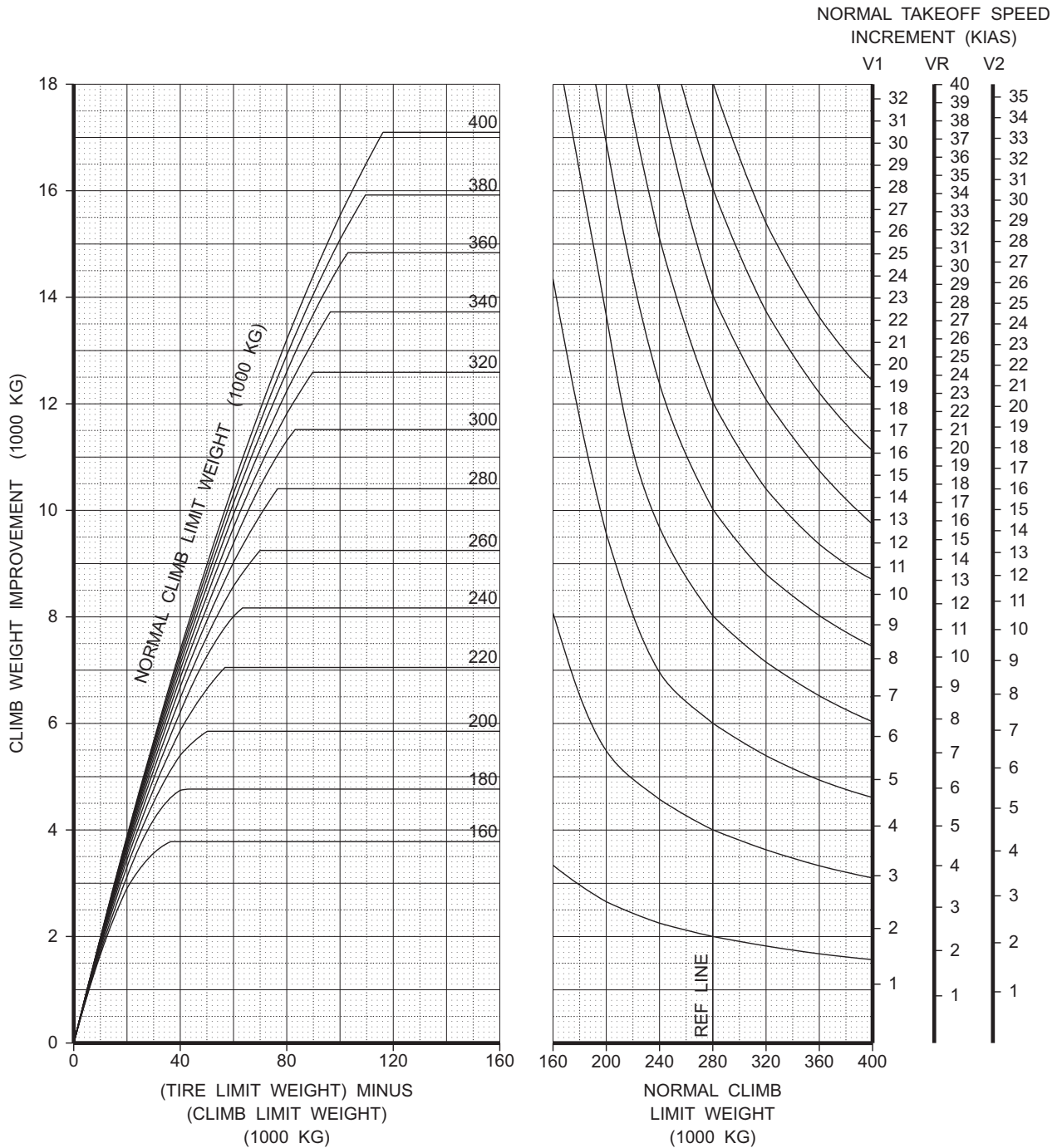
Improved Climb Tire Speed Limit - Dry Runway
Flaps 20



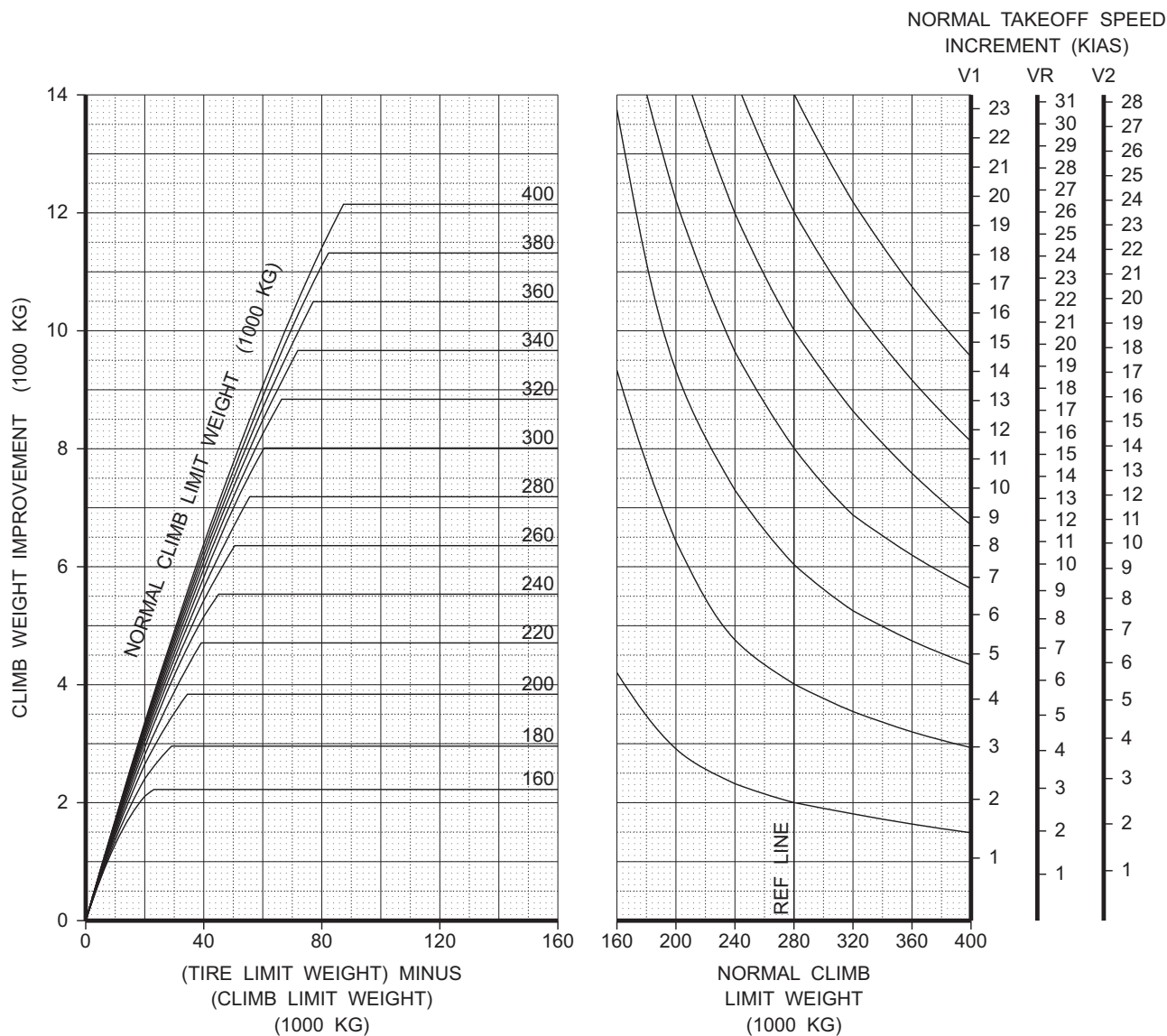
**Improved Climb Tire Speed Limit - Wet Runway
Flaps 5**



**Improved Climb Tire Speed Limit - Wet Runway
Flaps 15**



Improved Climb Tire Speed Limit - Wet Runway
Flaps 20



Slush/Standing Water Takeoff
Maximum Reverse Thrust
Weight Adjustment (1000 KG)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-39.2	-44.3	-49.4	-46.7	-51.8	-56.9	-59.3	-64.3	-69.4
380	-37.7	-42.8	-47.9	-44.7	-49.8	-54.9	-56.3	-61.4	-66.5
360	-36.3	-41.3	-46.4	-42.7	-47.8	-52.9	-53.3	-58.4	-63.5
340	-34.6	-39.7	-44.8	-40.6	-45.6	-50.7	-50.2	-55.3	-60.4
320	-32.6	-37.7	-42.8	-38.0	-43.1	-48.2	-46.6	-51.7	-56.8
300	-30.3	-35.4	-40.4	-35.1	-40.1	-45.2	-42.7	-47.8	-52.8
280	-27.5	-32.6	-37.7	-31.7	-36.8	-41.9	-38.3	-43.3	-48.4
260	-24.4	-29.5	-34.6	-28.0	-33.1	-38.1	-33.4	-38.5	-43.6
240	-20.9	-26.0	-31.1	-23.8	-28.9	-34.0	-28.2	-33.2	-38.3
220	-17.1	-22.2	-27.2	-19.3	-24.4	-29.4	-22.5	-27.6	-32.6
200	-12.8	-17.9	-23.0	-14.3	-19.4	-24.5	-16.4	-21.5	-26.5
180	-8.2	-13.3	-18.4	-9.0	-14.1	-19.2	-9.8	-14.9	-20.0
160	-3.5	-8.6	-13.7	-3.5	-8.6	-13.7	-3.1	-8.2	-13.3

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2000				141.8			163.2		
2200	169.0			181.8			204.0	156.8	
2400	209.0	162.8		222.7	175.5		246.2	197.5	150.4
2600	251.0	202.6	156.5	265.7	216.1	169.2	290.3	239.4	191.0
2800	295.6	244.2	196.2	311.1	258.8	209.6	336.6	283.2	232.7
3000	343.2	288.4	237.5	359.4	303.8	251.9	384.9	329.1	276.2
3200	393.6	335.5	281.2		351.5	296.5		377.2	321.7
3400		385.6	327.8			343.8			369.5
3600			377.6			393.4			

1. Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -55 m/+50 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-26	-24	-22	-21	-19	-17	-14	-12	-10
340	-28	-26	-24	-24	-22	-20	-15	-13	-11
320	-30	-28	-26	-25	-23	-21	-17	-15	-13
300	-30	-28	-26	-27	-25	-23	-18	-16	-14
280	-31	-29	-27	-27	-25	-23	-20	-18	-16
260	-31	-29	-27	-28	-26	-24	-21	-19	-17
240	-31	-29	-27	-28	-26	-24	-22	-20	-18
220	-30	-28	-26	-28	-26	-24	-23	-21	-19
200	-29	-27	-25	-28	-26	-24	-24	-22	-20
180	-28	-26	-24	-27	-25	-23	-24	-22	-20
160	-28	-26	-24	-26	-24	-22	-24	-22	-20

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

Flight Planning and Performance Manual

Slush/Standing Water Takeoff
No Reverse Thrust
Weight Adjustment (1000 KG)

DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-54.8	-60.4	-66.0	-64.0	-69.6	-75.2	-79.3	-84.9	-90.5
380	-52.2	-57.8	-63.5	-60.7	-66.3	-71.9	-74.5	-80.1	-85.7
360	-49.7	-55.3	-60.9	-57.4	-63.0	-68.6	-69.7	-75.3	-81.0
340	-47.0	-52.6	-58.3	-53.9	-59.6	-65.2	-64.8	-70.5	-76.1
320	-44.0	-49.6	-55.3	-50.2	-55.8	-61.4	-59.7	-65.3	-70.9
300	-40.7	-46.3	-51.9	-46.1	-51.7	-57.4	-54.2	-59.8	-65.5
280	-37.0	-42.7	-48.3	-41.7	-47.3	-53.0	-48.5	-54.1	-59.7
260	-33.1	-38.7	-44.3	-37.0	-42.6	-48.2	-42.5	-48.1	-53.7
240	-28.7	-34.4	-40.0	-32.0	-37.6	-43.2	-36.2	-41.8	-47.5
220	-24.1	-29.7	-35.4	-26.6	-32.2	-37.9	-29.6	-35.3	-40.9
200	-19.1	-24.8	-30.4	-20.9	-26.6	-32.2	-22.8	-28.4	-34.0
180	-13.9	-19.5	-25.1	-14.9	-20.6	-26.2	-15.7	-21.3	-26.9
160	-8.4	-14.1	-19.7	-8.8	-14.5	-20.1	-8.4	-14.1	-19.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
3000							168.9		
3200				126.7			217.0		
3400				177.0	124.9		267.2	215.2	165.5
3600	165.9			228.7	175.2	123.0	320.1	265.4	213.5
3800	219.2	164.0		284.3	226.8	173.4	375.9	318.2	263.5
4000	277.6	217.2	162.1	344.8	282.2	224.9		373.8	316.2
4200	343.4	275.3	215.2	409.4	342.5	280.1			371.8
4400	415.8	340.8	273.1		407.0	340.2			
4600		413.2	338.3			404.7			

1. Enter Weight Adjustment table with slush/standing water depth and dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -85 m/+85 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-42	-38	-34	-36	-32	-28	-24	-20	-16
340	-44	-40	-36	-38	-34	-30	-26	-22	-18
320	-45	-41	-37	-40	-36	-32	-28	-24	-20
300	-46	-42	-38	-42	-38	-34	-30	-26	-22
280	-47	-43	-39	-43	-39	-35	-33	-29	-25
260	-47	-43	-39	-44	-40	-36	-35	-31	-27
240	-47	-43	-39	-44	-40	-36	-37	-33	-29
220	-47	-43	-39	-44	-40	-36	-39	-35	-31
200	-46	-42	-38	-44	-40	-36	-40	-36	-32
180	-45	-41	-37	-44	-40	-36	-40	-36	-32
160	-45	-41	-37	-43	-39	-35	-41	-37	-33

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

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

DRY 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
400	0.0	-1.5	-2.9	-20.1	-21.6	-23.0	-39.9	-41.3	-42.8
380	0.0	-1.5	-2.9	-20.6	-22.1	-23.5	-38.8	-40.2	-41.7
360	0.0	-1.5	-2.9	-21.1	-22.6	-24.0	-37.7	-39.1	-40.6
340	-1.8	-3.2	-4.7	-21.5	-23.0	-24.4	-36.5	-37.9	-39.4
320	-4.2	-5.6	-7.1	-21.7	-23.1	-24.6	-35.2	-36.6	-38.1
300	-5.6	-7.1	-8.5	-21.5	-23.0	-24.4	-33.7	-35.2	-36.6
280	-6.2	-7.7	-9.1	-21.0	-22.4	-23.9	-31.9	-33.4	-34.8
260	-6.3	-7.7	-9.2	-19.7	-21.1	-22.6	-29.4	-30.8	-32.3
240	-5.8	-7.3	-8.7	-17.7	-19.1	-20.6	-26.1	-27.5	-29.0
220	-4.8	-6.3	-7.7	-15.0	-16.4	-17.9	-22.0	-23.4	-24.9
200	-3.3	-4.8	-6.2	-11.5	-13.0	-14.4	-17.1	-18.6	-20.0
180	-1.3	-2.7	-4.2	-7.3	-8.8	-10.2	-11.5	-13.0	-14.4
160	0.0	-0.5	-2.0	-2.8	-4.3	-5.7	-5.6	-7.1	-8.5

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1400	125.7								
1600	212.9	159.7							
1800	299.1	246.6	193.7						
2000	384.4	332.5	280.3	174.3	126.3				
2200		417.5	365.7	232.1	182.7	134.7			
2400				294.0	240.9	191.1	150.3		
2600				361.2	303.6	249.9	184.5	138.6	
2800					371.6	313.3	219.9	172.9	127.0
3000						382.0	257.6	207.6	161.2
3200							298.1	244.5	195.6
3400							342.2	284.0	231.7
3600							389.8	326.7	270.2
3800								373.5	311.8
4000									357.3

1. Enter Weight Adjustment table with reported braking action and dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+25 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+55 m 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
360	-7	-5	-3	-19	-17	-15	-33	-31	-29
340	-9	-7	-5	-21	-19	-17	-35	-33	-31
320	-11	-9	-7	-23	-21	-19	-38	-36	-34
300	-12	-10	-8	-25	-23	-21	-39	-37	-35
280	-12	-10	-8	-26	-24	-22	-40	-38	-36
260	-13	-11	-9	-26	-24	-22	-41	-39	-37
240	-13	-11	-9	-27	-25	-23	-42	-40	-38
220	-13	-11	-9	-27	-25	-23	-42	-40	-38
200	-14	-12	-10	-27	-25	-23	-42	-40	-38
180	-14	-12	-10	-28	-26	-24	-42	-40	-38
160	-15	-13	-11	-29	-27	-25	-41	-39	-37

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

Flight Planning and Performance Manual

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

DRY 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
400	-0.5	-0.5	-0.5	-34.3	-34.3	-34.3	-59.7	-59.7	-59.7
380	-3.0	-3.0	-3.0	-33.8	-33.8	-33.8	-57.1	-57.1	-57.1
360	-5.6	-5.6	-5.6	-33.2	-33.2	-33.2	-54.5	-54.5	-54.5
340	-7.9	-7.9	-7.9	-32.7	-32.7	-32.7	-51.9	-51.9	-51.9
320	-9.9	-9.9	-9.9	-32.3	-32.3	-32.3	-49.7	-49.7	-49.7
300	-11.4	-11.4	-11.4	-32.0	-32.0	-32.0	-47.7	-47.7	-47.7
280	-12.4	-12.4	-12.4	-31.4	-31.4	-31.4	-45.7	-45.7	-45.7
260	-12.6	-12.6	-12.6	-29.9	-29.9	-29.9	-42.7	-42.7	-42.7
240	-12.0	-12.0	-12.0	-27.4	-27.4	-27.4	-38.9	-38.9	-38.9
220	-10.7	-10.7	-10.7	-23.8	-23.8	-23.8	-34.1	-34.1	-34.1
200	-8.6	-8.6	-8.6	-19.2	-19.2	-19.2	-28.4	-28.4	-28.4
180	-5.7	-5.7	-5.7	-13.5	-13.5	-13.5	-21.7	-21.7	-21.7
160	-2.1	-2.1	-2.1	-6.8	-6.8	-6.8	-14.1	-14.1	-14.1

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1800	149.2								
2000	300.8	237.4	153.9						
2200	405.7	356.5	303.6						
2400			408.1						
3000				287.0	184.8				
3200				400.6	327.4	239.5			
3400					436.1	364.0			
4800							246.9		
5000							368.0	292.4	188.8
5200								402.3	331.8
5400									436.6

1. Enter Weight Adjustment table with reported braking action and dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+80 m 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
360	-10	-6	-2	-27	-23	-19	-52	-48	-44
340	-13	-9	-5	-30	-26	-22	-56	-52	-48
320	-15	-11	-7	-33	-29	-25	-59	-55	-51
300	-16	-12	-8	-35	-31	-27	-63	-59	-55
280	-17	-13	-9	-37	-33	-29	-66	-62	-58
260	-18	-14	-10	-39	-35	-31	-68	-64	-60
240	-19	-15	-11	-41	-37	-33	-70	-66	-62
220	-20	-16	-12	-42	-38	-34	-71	-67	-63
200	-21	-17	-13	-44	-40	-36	-71	-67	-63
180	-22	-18	-14	-46	-42	-38	-71	-67	-63
160	-23	-19	-15	-48	-44	-40	-71	-67	-63

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

Flight Planning and Performance Manual

Takeoff Speeds - Dry Runway
V1, VR, V2 for Max Takeoff Thrust

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
380	185	196	201	175	184	190	172	176	182
360	179	190	196	170	179	185	166	171	178
340	175	185	192	165	174	181	162	166	174
320	169	179	187	160	168	177	156	161	170
300	164	172	182	154	162	172	151	155	165
280	157	165	177	149	155	167	145	148	160
260	150	158	171	142	149	162	138	142	155
240	141	151	166	134	142	156	131	135	150
220	133	143	160	126	134	151	122	128	145
200	123	135	154	117	127	145	113	121	139
180	113	126	147	107	118	138	103	113	133
160	104	117	139	97	109	132	94	105	126

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	12	14					7	8					-4	-4				
60	140	8	10	12	14			4	6	7	8			-3	-3	-4	-4		
50	122	5	6	8	10	13	16	3	4	5	6	8	9	-2	-2	-3	-3	-4	-5
40	104	1	3	5	7	10	13	1	2	3	5	6	8	-1	-1	-2	-2	-3	-4
30	86	0	0	2	5	8	11	0	0	2	3	5	7	0	0	-1	-2	-2	-3
20	68	0	0	2	4	6	9	0	0	1	2	4	6	0	0	-1	-1	-2	-3
-60	-76	0	0	2	4	6	8	0	0	1	2	4	5	0	0	-1	-1	-2	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
380	-4	-1	0	3	5	-2	-1	0	0	1	3	4	4	
360	-4	-1	0	3	5	-2	-1	0	0	1	3	3	4	
340	-3	-1	0	3	4	-2	-1	0	0	1	2	3	3	
320	-3	-1	0	2	4	-2	-1	0	0	1	2	3	3	
300	-3	-1	0	2	4	-2	-1	0	0	1	2	2	3	
280	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3	
260	-2	0	0	2	3	-2	-1	0	0	1	2	2	3	
240	-2	0	0	2	3	-1	-1	0	0	1	2	2	3	
220	-1	0	0	2	3	-1	-1	0	0	1	2	3	3	
200	-1	0	0	3	4	-1	0	0	0	1	2	3	4	
180	-1	0	0	3	4	-1	0	1	0	1	3	3	4	
160	-1	1	0	3	4	-1	0	1	0	2	3	4	5	

Max Allowable Clearway for V1 Adjustment

FIELD LENGTH (M)	1500	2000	2500	3000	3500	4000	4500
MAX ALLOWABLE CLEARWAY (M)	140	180	210	230	250	280	310

Clearway and Stopway V1 Adjustments*

NORMAL V1 (KIAS)	CLEARWAY MINUS STOPWAY (M)						
	300	200	100	0	-100	-200	-300
100	-3	-3	-2	0	4	8	8
120	-3	-3	-2	0	4	7	8
140	-3	-3	-1	0	4	5	5
160	-3	-2	-1	0	3	3	3
180	-3	-2	-1	0	2	3	3

*V1 not to exceed VR

V1(MCG), Minimum VR

Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)											
		-2000		0		2000		4000		6000		8000	
°C	°F	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR
60	140	116	118	113	115	111	113	109	111				
50	122	119	121	116	118	111	113	109	111	106	109	103	106
40	104	126	127	123	124	118	120	113	115	108	111	103	106
30	86	128	130	128	130	123	125	118	120	112	115	106	109
20	68	129	130	129	130	125	126	120	122	116	118	110	113
-60	-76	130	130	130	130	126	126	121	122	117	118	112	114

Takeoff Speeds - Wet Runway
V1, VR, V2 for Max Takeoff Thrust

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
380	180	196	201	169	184	190	165	176	182
360	173	190	196	163	179	185	158	171	178
340	167	185	192	157	174	181	153	166	174
320	160	179	187	151	168	177	147	161	170
300	153	172	182	144	162	172	140	155	165
280	146	165	177	137	155	167	133	148	160
260	138	158	171	130	149	162	126	142	155
240	130	151	166	122	142	156	119	135	150
220	121	143	160	114	134	151	111	128	145
200	112	135	154	106	127	145	103	121	139
180	102	126	147	96	118	138	93	113	133
160	92	117	139	84	109	132	84	105	126

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1						VR						V2					
		PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)						PRESSURE ALTITUDE (1000 FT)					
°C	°F	-2	0	2	4	6	8	-2	0	2	4	6	8	-2	0	2	4	6	8
70	158	14	16					7	8					-4	-4				
60	140	10	11	14	16			4	6	7	8			-3	-3	-4	-4		
50	122	5	7	9	12	14	17	3	4	5	6	8	9	-2	-2	-3	-3	-4	-5
40	104	2	3	6	8	11	14	1	2	3	5	6	8	-1	-1	-2	-2	-3	-4
30	86	0	0	3	5	8	12	0	0	2	3	5	7	0	0	-1	-2	-2	-3
20	68	0	0	2	4	7	10	0	0	1	2	4	6	0	0	-1	-1	-2	-3
-60	-76	0	0	2	4	6	9	0	0	1	2	4	5	0	0	-1	-1	-2	-2

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)						WIND (KTS)							
	-2	-1	0	1	2		-15	-10	-5	0	10	20	30	40
380	-6	-2	0	4	6		-3	-2	-1	0	1	2	3	4
360	-6	-3	0	3	6		-4	-3	-1	0	1	2	3	4
340	-6	-3	0	3	5		-4	-3	-1	0	1	2	3	4
320	-5	-3	0	2	5		-5	-3	-2	0	1	2	3	4
300	-5	-3	0	2	5		-5	-3	-2	0	1	2	3	4
280	-5	-2	0	2	5		-5	-3	-2	0	1	2	3	4
260	-4	-2	0	2	4		-5	-3	-1	0	1	2	3	4
240	-4	-2	0	2	4		-5	-3	-1	0	1	3	4	5
220	-3	-1	0	3	5		-5	-3	-1	0	1	3	4	5
200	-2	0	0	3	5		-4	-2	0	0	2	4	5	6
180	-1	0	0	4	5		-4	-2	0	0	2	4	5	6
160	0	1	0	4	5		-3	-1	1	0	2	5	6	7

Stopway V1 Adjustments*

NORMAL V1 (KIAS)	STOPWAY (M)			
	0	100	200	300
100	0	3	5	7
120	0	3	4	7
140	0	2	2	4
160	0	1	2	3
180	0	1	2	3

Use of clearway not allowed on wet runways.

*V1 not to exceed VR

V1(MCG), Minimum VR**Max Takeoff Thrust**

TEMP		PRESSURE ALTITUDE (FT)											
		-2000		0		2000		4000		6000		8000	
°C	°F	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR	V1(MCG)	Min VR
60	140	116	118	113	115	111	113	109	111				
50	122	119	121	116	118	111	113	109	111	106	109	103	106
40	104	126	127	123	124	118	120	113	115	108	111	103	106
30	86	128	130	128	130	123	125	118	120	112	115	106	109
20	68	129	130	129	130	125	126	120	122	116	118	110	113
-60	-76	130	130	130	130	126	126	121	122	117	118	112	114

Flight Planning and Performance Manual

Takeoff %N1

Max Takeoff Thrust

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
70	158	92.2	92.4	92.8	92.5	92.3	92.3	92.2	92.0	91.8	91.2	90.3	89.9
60	140	95.1	95.3	95.7	95.4	95.2	95.2	95.0	94.9	94.7	94.1	93.2	92.8
55	131	96.4	96.7	97.0	96.7	96.5	96.6	96.4	96.3	96.1	95.5	94.6	94.2
50	122	97.8	98.1	98.6	98.2	97.9	97.9	97.8	97.6	97.4	96.8	95.9	95.6
45	113	99.3	99.6	100.1	99.8	99.4	99.3	99.1	98.9	98.8	98.2	97.3	96.9
40	104	100.6	101.2	101.9	101.4	101.0	100.8	100.6	100.4	100.0	99.4	98.6	98.2
35	95	101.3	102.7	104.7	104.2	103.1	102.6	102.1	101.7	101.1	100.4	99.6	99.3
30	86	100.5	103.7	106.9	106.4	105.6	105.0	104.3	103.7	102.6	101.5	100.7	100.3
25	77	99.7	102.8	106.0	106.7	107.3	107.2	106.7	106.5	105.3	103.8	102.4	101.8
20	68	98.8	101.9	105.1	105.8	106.4	106.8	107.1	107.5	106.8	105.9	104.8	104.3
15	59	98.0	101.1	104.2	104.9	105.5	105.8	106.2	106.5	106.4	106.1	105.6	105.3
10	50	97.1	100.2	103.3	104.0	104.6	104.9	105.3	105.6	105.5	105.2	104.9	104.8
5	41	96.3	99.3	102.4	103.0	103.7	104.0	104.3	104.7	104.5	104.2	104.0	103.8
0	32	95.4	98.4	101.4	102.1	102.7	103.1	103.4	103.7	103.6	103.3	103.0	102.9
-10	14	93.6	96.6	99.6	100.2	100.8	101.2	101.5	101.8	101.7	101.4	101.1	101.0
-20	-4	91.8	94.7	97.7	98.3	98.9	99.2	99.5	99.9	99.7	99.5	99.2	99.1
-30	-22	90.0	92.8	95.7	96.3	96.9	97.2	97.5	97.9	97.7	97.5	97.2	97.1
-40	-40	88.1	90.9	93.7	94.3	94.9	95.2	95.5	95.8	95.7	95.4	95.2	95.1
-50	-58	86.2	88.9	91.7	92.3	92.9	93.1	93.4	93.8	93.6	93.4	93.1	93.0

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
1 PACK ON	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

Stab Trim Setting**Max Takeoff Thrust****Flaps 5**

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	9 3/4	8 1/4	7	6	5	3 3/4	3	2 1/4
340	9 3/4	8	7	5 3/4	5	3 1/2	3	2 1/4
320	9 1/4	7 3/4	6 1/2	5 3/4	4 3/4	3 1/2	3	2
300	9	7 1/4	6 3/4	5 1/2	4 1/2	3 1/2	2 3/4	2
280	8 3/4	7 1/4	6	5 1/4	4 1/4	3 1/4	2 3/4	2
260	8 1/2	7	6	5 1/4	4 1/4	3 1/4	2 3/4	2
240	8 1/4	7	5 3/4	5 1/4	4 1/4	3 1/4	2 3/4	2
220	7 3/4	7	5 1/2	5	4	3 1/4	2 1/2	1 3/4
200	7 1/2	6 1/2	5 1/4	4 1/2	4	3	2 1/2	1 3/4
180	7	6	5	4 1/2	3 3/4	2 3/4	2 1/4	1 3/4

Flaps 15

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	10 1/4	9	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 3/4
340	10 1/4	9	7 1/2	6 1/2	5 1/4	4 1/2	3 1/4	2 1/2
320	9 3/4	8 1/4	7	6	5	4	3	2 1/2
300	9 1/2	7 3/4	6 3/4	5 3/4	4 3/4	3 3/4	3	2 1/4
280	9 1/4	7 3/4	6 3/4	5 1/2	4 1/4	3 1/2	3	2
260	9	7 1/4	6 1/2	5	4	3 1/4	2 3/4	2
240	8 1/2	7	5 3/4	4 1/2	3 3/4	3	2 1/2	1 3/4
220	7 1/2	6 1/4	5	4	3 1/4	2 3/4	2 1/4	1 1/2
200	6	5	3 3/4	3	2 1/2	2 1/4	2	1 1/4
180	4 1/2	4	3	2 1/2	2	2	1 3/4	1 1/4

Flaps 20

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	12	10 1/2	8 3/4	7 1/2	6 1/2	4 3/4	3 1/2	2 3/4
340	11 3/4	10 1/4	8 1/2	7 1/4	6 1/4	4 1/2	3 1/4	2 1/2
320	11 1/4	10	8 1/4	6 3/4	5 3/4	4	3	2 1/2
300	11	9 1/4	8	6 1/2	5 1/4	3 3/4	3	2 1/4
280	10 1/2	8 3/4	7 1/2	6	4 3/4	3 1/2	2 3/4	2
260	10	8 1/4	7	5 1/2	4 1/2	3 1/4	2 3/4	2
240	9 1/4	7 3/4	6 1/4	5	4 1/4	3	2 1/2	1 3/4
220	8 1/2	7	5 1/2	4 1/4	3 3/4	2 1/2	2 1/4	1 1/2
200	6 3/4	5 1/2	4 1/4	3 1/2	3	2 1/4	2	1 1/4
180	5 1/2	4	3 1/4	2 3/4	2 1/2	2	1 1/2	1 1/4



Flight Planning and Performance Manual

TO1 Takeoff Weights
10% Thrust Reduction

PERFORMANCE LIMIT	TO1 LIMIT WEIGHT (1000 KG)										
	FULL RATED LIMIT WEIGHT (1000 KG)										
	160	180	200	220	240	260	280	300	320	340	360
FIELD (Dry)	148.1	166.6	185.1	187.0	205.8	224.6	243.4	262.1	280.9	299.7	318.5
FIELD (Wet)	150.7	169.2	184.0	187.0	205.8	224.6	243.4	262.1	280.9	299.7	318.5
CLIMB	146.2	163.3	180.4	197.5	214.6	231.7	248.8	265.9	283.0	300.1	317.2
OBSTACLE	146.2	163.6	181.0	198.4	215.8	233.2	250.6	268.0	285.4	302.8	320.2
TIRE SPEED	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0
BRAKE ENERGY	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	310.1	327.7	345.3

* If the takeoff is limited by minimum control speeds, V1 may be increased to be equal to V1(MCG) provided the accelerate stop distance corrected for wind and slope exceeds approximately:

- Dry runway: 1300 m for normal operation, 1350 m with one brake deactivated and 1400 m with two brakes deactivated
- Wet runway: 1600 m for normal operation, 1650 m with one brake deactivated and 1750 m with two brakes deactivated

ADVISORY INFORMATION

TO1 Slush/Standing Water Takeoff

10% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-37.0	-42.1	-47.1	-44.4	-49.5	-54.6	-57.0	-62.1	-67.1
380	-35.5	-40.6	-45.7	-42.4	-47.5	-52.6	-54.0	-59.1	-64.2
360	-34.0	-39.1	-44.2	-40.5	-45.5	-50.6	-51.2	-56.3	-61.3
340	-32.7	-37.8	-42.9	-38.7	-43.7	-48.8	-48.5	-53.6	-58.7
320	-31.4	-36.5	-41.6	-36.9	-42.0	-47.1	-45.8	-50.9	-56.0
300	-29.8	-34.8	-39.9	-34.7	-39.8	-44.9	-42.7	-47.8	-52.9
280	-27.6	-32.7	-37.8	-32.0	-37.1	-42.2	-39.0	-44.1	-49.2
260	-25.1	-30.2	-35.2	-28.9	-34.0	-39.0	-34.8	-39.9	-45.0
240	-22.1	-27.2	-32.2	-25.3	-30.4	-35.4	-30.2	-35.2	-40.3
220	-18.6	-23.7	-28.8	-21.2	-26.3	-31.4	-25.0	-30.1	-35.1
200	-14.8	-19.9	-24.9	-16.6	-21.7	-26.8	-19.3	-24.4	-29.4
180	-10.5	-15.6	-20.6	-11.6	-16.7	-21.8	-13.1	-18.2	-23.3
160	-5.8	-10.9	-16.0	-6.2	-11.3	-16.4	-6.5	-11.5	-16.6

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
1800				128.2			149.5		
2000	159.3			172.0	121.3		193.9	142.5	
2200	203.0	152.5		216.6	165.1		239.9	186.8	135.5
2400	249.2	196.0	145.6	263.8	209.4	158.1	288.4	232.5	179.8
2600	298.6	241.7	189.0	314.2	256.2	202.3	339.7	280.5	225.1
2800	352.1	290.5	234.2	368.3	306.0	248.6	393.5	331.4	272.8
3000	408.6	343.4	282.6	424.0	359.5	297.9		385.0	323.1
3200		399.7	334.7		415.2	350.8		439.3	376.4
3400			390.7			406.4			430.7

1. Enter Weight Adjustment table with slush/standing water depth and TO1 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -55 m/+50 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-22	-20	-18	-18	-16	-14	-9	-7	-5
340	-25	-23	-21	-20	-18	-16	-11	-9	-7
320	-27	-25	-23	-22	-20	-18	-13	-11	-9
300	-28	-26	-24	-23	-21	-19	-14	-12	-10
280	-28	-26	-24	-24	-22	-20	-16	-14	-12
260	-28	-26	-24	-25	-23	-21	-18	-16	-14
240	-28	-26	-24	-25	-23	-21	-19	-17	-15
220	-27	-25	-23	-25	-23	-21	-20	-18	-16
200	-26	-24	-22	-24	-22	-20	-20	-18	-16
180	-25	-23	-21	-24	-22	-20	-20	-18	-16
160	-24	-22	-20	-23	-21	-19	-20	-18	-16

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slush/Standing Water Takeoff

10% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-52.9	-58.6	-64.2	-62.4	-68.0	-73.6	-78.3	-83.9	-89.5
380	-50.4	-56.0	-61.6	-59.1	-64.7	-70.3	-73.6	-79.2	-84.8
360	-47.9	-53.5	-59.2	-55.9	-61.5	-67.1	-69.0	-74.6	-80.2
340	-45.5	-51.2	-56.8	-52.7	-58.4	-64.0	-64.4	-70.0	-75.7
320	-43.1	-48.8	-54.4	-49.6	-55.2	-60.9	-59.9	-65.5	-71.1
300	-40.4	-46.0	-51.7	-46.1	-51.8	-57.4	-55.0	-60.6	-66.2
280	-37.3	-42.9	-48.5	-42.3	-47.9	-53.5	-49.8	-55.4	-61.0
260	-33.8	-39.4	-45.0	-38.1	-43.7	-49.3	-44.2	-49.9	-55.5
240	-29.9	-35.5	-41.2	-33.5	-39.1	-44.7	-38.4	-44.0	-49.6
220	-25.7	-31.3	-36.9	-28.5	-34.1	-39.7	-32.1	-37.8	-43.4
200	-21.0	-26.6	-32.3	-23.1	-28.8	-34.4	-25.6	-31.2	-36.8
180	-16.0	-21.6	-27.2	-17.4	-23.0	-28.7	-18.7	-24.3	-30.0
160	-10.6	-16.3	-21.9	-11.3	-17.0	-22.6	-11.5	-17.1	-22.8

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2600							131.4		
2800							186.0	129.5	
3000				153.5			243.4	184.1	127.5
3200	152.1			214.6	151.3		305.8	241.3	182.1
3400	217.3	149.8		282.4	212.3	149.2	374.0	303.4	239.2
3600	292.3	214.9	147.5	359.9	279.8	210.0		371.5	301.1
3800	382.5	289.4	212.4		356.9	277.3			369.0
4000		379.0	286.5			354.0			
4200			375.5			438.2			

1. Enter Weight Adjustment table with slush/standing water depth and TO1 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -85 m/+85 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-37	-33	-29	-30	-26	-22	-16	-12	-8
340	-39	-35	-31	-33	-29	-25	-18	-14	-10
320	-41	-37	-33	-35	-31	-27	-21	-17	-13
300	-42	-38	-34	-37	-33	-29	-24	-20	-16
280	-43	-39	-35	-38	-34	-30	-27	-23	-19
260	-43	-39	-35	-39	-35	-31	-29	-25	-21
240	-43	-39	-35	-40	-36	-32	-32	-28	-24
220	-43	-39	-35	-40	-36	-32	-33	-29	-25
200	-42	-38	-34	-40	-36	-32	-35	-31	-27
180	-41	-37	-33	-39	-35	-31	-35	-31	-27
160	-40	-36	-32	-39	-35	-31	-36	-32	-28

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

Flight Planning and Performance Manual

TO1 Slippery Runway Takeoff

10% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY 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
400	0.0	-1.5	-2.9	-17.2	-18.7	-20.2	-37.1	-38.5	-40.0
380	0.0	-1.5	-2.9	-17.7	-19.2	-20.7	-36.0	-37.4	-38.9
360	0.0	-1.5	-2.9	-18.2	-19.7	-21.2	-34.9	-36.4	-37.8
340	0.0	-1.5	-2.9	-18.8	-20.2	-21.7	-34.0	-35.5	-36.9
320	-1.4	-2.8	-4.3	-19.4	-20.9	-22.3	-33.2	-34.7	-36.1
300	-3.9	-5.3	-6.8	-19.8	-21.3	-22.7	-32.2	-33.7	-35.2
280	-5.3	-6.7	-8.2	-19.9	-21.3	-22.8	-31.1	-32.5	-34.0
260	-5.8	-7.3	-8.7	-19.4	-20.9	-22.3	-29.5	-30.9	-32.4
240	-5.8	-7.3	-8.7	-18.2	-19.6	-21.1	-27.0	-28.5	-29.9
220	-5.3	-6.7	-8.2	-16.1	-17.6	-19.0	-23.7	-25.2	-26.6
200	-4.1	-5.6	-7.0	-13.2	-14.7	-16.1	-19.5	-21.0	-22.4
180	-2.5	-3.9	-5.4	-9.6	-11.0	-12.5	-14.5	-16.0	-17.4
160	-0.3	-1.8	-3.2	-5.2	-6.7	-8.1	-8.7	-10.1	-11.6

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1400	164.6								
1600	256.5	200.6	144.2						
1800	347.4	292.1	236.4	149.8					
2000	437.5	382.5	327.5	210.0	158.5				
2200			417.7	274.1	219.0	167.2	139.6		
2400				343.9	283.9	228.2	176.0	127.1	
2600				418.3	354.6	293.8	213.2	163.5	
2800					429.2	365.5	252.9	200.2	151.1
3000							295.8	239.0	187.5
3200							342.8	280.7	225.4
3400							393.8	326.2	266.1
3600								376.2	310.2
3800								427.5	358.7
4000									409.9

1. Enter Weight Adjustment table with reported braking action and TO1 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+25 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+55 m 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
360	-6	-4	-2	-17	-15	-13	-30	-28	-26
340	-8	-6	-4	-19	-17	-15	-32	-30	-28
320	-10	-8	-6	-21	-19	-17	-34	-32	-30
300	-11	-9	-7	-22	-20	-18	-36	-34	-32
280	-11	-9	-7	-23	-21	-19	-37	-35	-33
260	-12	-10	-8	-24	-22	-20	-38	-36	-34
240	-12	-10	-8	-24	-22	-20	-38	-36	-34
220	-12	-10	-8	-24	-22	-20	-38	-36	-34
200	-12	-10	-8	-25	-23	-21	-38	-36	-34
180	-13	-11	-9	-25	-23	-21	-38	-36	-34
160	-13	-11	-9	-26	-24	-22	-38	-36	-34

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

ADVISORY INFORMATION

TO1 Slippery Runway Takeoff

10% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO1 DRY 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
400	0.0	0.0	0.0	-31.4	-31.4	-31.4	-57.1	-57.1	-57.1
380	0.0	0.0	0.0	-30.9	-30.9	-30.9	-54.5	-54.5	-54.5
360	-2.0	-2.0	-2.0	-30.4	-30.4	-30.4	-52.0	-52.0	-52.0
340	-4.5	-4.5	-4.5	-30.0	-30.0	-30.0	-49.8	-49.8	-49.8
320	-7.0	-7.0	-7.0	-29.8	-29.8	-29.8	-47.6	-47.6	-47.6
300	-9.1	-9.1	-9.1	-29.7	-29.7	-29.7	-45.8	-45.8	-45.8
280	-10.6	-10.6	-10.6	-29.6	-29.6	-29.6	-44.2	-44.2	-44.2
260	-11.6	-11.6	-11.6	-29.2	-29.2	-29.2	-42.4	-42.4	-42.4
240	-11.8	-11.8	-11.8	-27.7	-27.7	-27.7	-39.6	-39.6	-39.6
220	-11.1	-11.1	-11.1	-25.1	-25.1	-25.1	-35.7	-35.7	-35.7
200	-9.6	-9.6	-9.6	-21.3	-21.3	-21.3	-30.8	-30.8	-30.8
180	-7.3	-7.3	-7.3	-16.4	-16.4	-16.4	-24.8	-24.8	-24.8
160	-4.0	-4.0	-4.0	-10.2	-10.2	-10.2	-17.8	-17.8	-17.8

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1800	260.2	177.1							
2000	382.5	327.5	263.7						
2200		438.9	385.1						
2600				131.3					
2800				307.3	201.6				
3000				429.0	349.4	258.1			
3200						388.7			
4400							250.8		
4600							382.7	300.5	186.2
4800								421.1	343.0

1. Enter Weight Adjustment table with reported braking action and TO1 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+80 m 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
360	-10	-6	-3	-25	-22	-18	-48	-44	-41
340	-12	-9	-5	-28	-24	-21	-51	-48	-44
320	-14	-10	-7	-31	-27	-23	-55	-51	-47
300	-15	-12	-8	-33	-29	-25	-58	-54	-50
280	-16	-13	-9	-34	-31	-27	-61	-57	-53
260	-17	-14	-10	-36	-32	-29	-63	-59	-55
240	-18	-14	-11	-37	-34	-30	-65	-61	-57
220	-19	-15	-12	-39	-35	-32	-65	-62	-58
200	-19	-16	-12	-41	-37	-33	-66	-62	-58
180	-20	-17	-13	-42	-39	-35	-66	-62	-58
160	-22	-18	-14	-44	-41	-37	-66	-62	-58

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

TO1 Takeoff Speeds - Dry Runway**10% Thrust Reduction****V1, VR, V2**

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
360	183	191	194						
340	179	187	191	170	175	180			
320	174	181	186	165	170	176	161	162	169
300	168	174	181	159	164	171	155	157	164
280	162	167	176	154	157	166	150	151	159
260	155	160	170	147	151	160	143	144	154
240	147	153	164	139	144	155	135	138	149
220	138	145	158	131	137	149	127	131	143
200	129	137	152	122	129	143	118	123	138
180	119	128	145	113	121	137	109	115	131
160	105	117	139	102	112	130	99	107	125

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1								VR								V2							
		PRESSURE ALTITUDE (1000 FT)								PRESSURE ALTITUDE (1000 FT)								PRESSURE ALTITUDE (1000 FT)							
°C	°F	-2	0	2	4	6	8	10	-2	0	2	4	6	8	10	-2	0	2	4	6	8	10			
70	158	11	12						6	7						-3	-4								
60	140	7	8	10	12				4	5	6	7				-2	-3	-3	-4						
50	122	3	5	7	9	11	14	19	2	3	4	6	7	9	10	-1	-2	-2	-3	-4	-5	-6			
40	104	1	2	4	6	9	12	15	1	1	3	4	6	7	9	0	-1	-2	-2	-3	-4	-5			
30	86	0	0	2	4	7	9	12	0	0	1	3	4	6	8	0	0	-1	-1	-2	-3	-4			
20	68	0	0	1	3	5	8	10	0	0	1	2	3	5	7	0	0	0	-1	-2	-2	-3			
-60	-76	0	0	1	3	5	7	9	0	0	1	2	3	5	6	0	0	0	-1	-2	-2	-3			

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)									
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40		
380	-3	0	0	3	5	-4	-2	0	0	2	3	4	4		
360	-3	-1	0	3	5	-3	-2	0	0	1	3	3	4		
340	-3	-1	0	2	4	-3	-2	0	0	1	2	3	3		
320	-3	-1	0	2	3	-3	-2	0	0	1	2	2	3		
300	-3	-1	0	2	3	-3	-2	-1	0	1	1	2	2		
280	-3	-1	0	1	3	-2	-1	-1	0	0	1	1	2		
260	-3	-1	0	1	2	-2	-1	-1	0	0	1	1	2		
240	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	2		
220	-2	-1	0	1	2	-2	-1	0	0	1	1	2	2		
200	-2	-1	0	2	3	-2	-1	0	0	1	2	2	3		
180	-2	0	0	2	3	-2	-1	0	0	1	2	3	3		
160	-1	0	0	3	4	-2	-1	0	0	1	3	3	4		

*V1 not to exceed VR.

TO1 V1(MCG), Minimum VR

TEMP		PRESSURE ALTITUDE (FT)													
		-2000		0		2000		4000		6000		8000		10000	
°C	°F	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR
70	158	110	112	107	110										
60	140	110	112	107	110	105	107	103	106						
50	122	113	115	110	112	105	108	103	106	101	104	98	101	94	97
40	104	120	121	117	119	112	114	107	110	103	105	98	101	94	97
30	86	122	123	121	123	116	118	112	114	107	109	102	104	96	99
20	68	122	123	121	123	118	120	114	116	110	112	105	107	100	102
-60	-76	124	124	123	123	119	120	115	116	111	113	106	108	102	104

TO1 Takeoff Speeds - Wet Runway

10% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
360	177	191	194						
340	172	187	191	162	175	180			
320	165	181	186	156	170	176	151	162	169
300	158	174	181	149	164	171	145	157	164
280	151	167	176	142	157	166	138	151	159
260	143	160	170	135	151	160	131	144	154
240	135	153	164	127	144	155	124	138	149
220	127	145	158	120	137	149	116	131	143
200	117	137	152	111	129	143	108	123	138
180	108	128	145	102	121	137	100	115	131
160	89	117	139	91	112	130	89	107	125

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1								VR								V2							
		PRESSURE ALTITUDE (1000 FT)								PRESSURE ALTITUDE (1000 FT)								PRESSURE ALTITUDE (1000 FT)							
°C	°F	-2	0	2	4	6	8	10	-2	0	2	4	6	8	10	-2	0	2	4	6	8	10			
70	158	13	15						6	7						-3	-4								
60	140	8	10	12	14				4	5	6	7				-2	-3	-3	-4						
50	122	4	6	8	10	13	16	21	2	3	4	6	7	9	10	-1	-2	-2	-3	-4	-5	-6			
40	104	1	2	5	7	10	13	16	1	1	3	4	6	7	9	0	-1	-2	-2	-3	-4	-5			
30	86	0	0	2	5	7	10	13	0	0	1	3	4	6	8	0	0	-1	-1	-2	-3	-4			
20	68	0	0	1	3	6	9	11	0	0	1	2	3	5	7	0	0	0	-1	-2	-2	-3			
-60	-76	0	0	1	3	6	8	10	0	0	1	2	3	5	6	0	0	0	-1	-2	-2	-3			

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)						WIND (KTS)							
	-2	-1	0	1	2		-15	-10	-5	0	10	20	30	40
380	-4	-1	0	4	7		-3	-2	0	0	2	3	4	5
360	-5	-2	0	4	6		-4	-2	0	0	1	3	4	5
340	-5	-2	0	3	6		-4	-2	-1	0	1	3	3	4
320	-5	-2	0	3	5		-4	-3	-1	0	1	2	3	4
300	-5	-2	0	2	5		-5	-3	-1	0	1	2	3	4
280	-5	-2	0	2	4		-5	-3	-2	0	1	2	3	4
260	-5	-2	0	2	4		-5	-3	-2	0	1	2	3	4
240	-4	-2	0	2	4		-5	-3	-1	0	1	2	3	4
220	-4	-2	0	2	4		-5	-3	-1	0	1	2	3	4
200	-3	-1	0	2	4		-4	-3	-1	0	1	3	4	4
180	-2	-1	0	3	4		-4	-2	-1	0	2	3	4	5
160	-1	0	0	3	4		-4	-2	0	0	2	4	5	6

*V1 not to exceed VR.

TO1 V1(MCG), Minimum VR

TEMP		PRESSURE ALTITUDE (FT)													
		-2000		0		2000		4000		6000		8000		10000	
°C	°F	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR
70	158	110	112	107	110										
60	140	110	112	107	110	105	107	103	106						
50	122	113	115	110	112	105	108	103	106	101	104	98	101	94	97
40	104	120	121	117	119	112	114	107	110	103	105	98	101	94	97
30	86	122	123	121	123	116	118	112	114	107	109	102	104	96	99
20	68	122	123	121	123	118	120	114	116	110	112	105	107	100	102
-60	-76	124	124	123	123	119	120	115	116	111	113	106	108	102	104



TO1 Takeoff %N1

10% Thrust Reduction

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400	9000	9800
70	158	88.4	88.6	89.0	88.7	88.5	88.5	88.4	88.2	88.0	87.4	86.6	86.2	85.7	85.4
60	140	91.2	91.4	91.8	91.5	91.2	91.3	91.1	90.9	90.8	90.2	89.3	89.0	88.5	87.8
55	131	92.7	93.0	93.3	93.1	92.9	92.9	92.7	92.6	92.4	91.7	90.7	90.3	89.8	89.2
50	122	94.0	94.2	94.7	94.3	94.0	94.1	93.9	93.8	93.6	93.1	92.3	91.9	91.3	90.6
45	113	95.3	95.6	96.1	95.8	95.4	95.3	95.2	95.0	94.8	94.2	93.4	93.1	92.7	92.1
40	104	96.5	97.0	97.5	97.1	96.8	96.6	96.4	96.3	95.9	95.4	94.6	94.3	93.8	93.2
35	95	96.9	97.7	98.4	98.2	97.7	97.5	97.3	97.2	96.7	96.1	95.5	95.3	94.9	94.4
30	86	96.1	97.6	98.7	98.5	98.2	98.0	97.8	97.6	97.1	96.7	96.2	96.0	95.6	95.2
25	77	95.3	96.8	97.9	98.2	98.5	98.4	98.2	98.1	97.6	97.1	96.6	96.4	96.0	95.8
20	68	94.5	96.0	97.1	97.3	97.6	97.8	97.9	98.1	97.8	97.4	97.0	96.8	96.5	96.1
15	59	93.7	95.2	96.3	96.5	96.8	96.9	97.1	97.3	97.2	97.1	96.9	96.7	96.6	96.4
10	50	92.9	94.3	95.4	95.7	95.9	96.1	96.3	96.4	96.4	96.2	96.1	96.1	96.0	96.0
5	41	92.1	93.5	94.6	94.8	95.1	95.2	95.4	95.6	95.5	95.4	95.3	95.2	95.1	95.1
0	32	91.3	92.6	93.7	94.0	94.2	94.4	94.5	94.7	94.7	94.5	94.4	94.3	94.3	94.3
-10	14	89.6	90.9	92.0	92.2	92.5	92.6	92.8	93.0	92.9	92.8	92.7	92.6	92.5	92.5
-20	-4	87.9	89.2	90.2	90.5	90.7	90.9	91.0	91.2	91.1	91.0	90.9	90.8	90.8	90.7
-30	-22	86.1	87.4	88.4	88.6	88.9	89.0	89.2	89.4	89.3	89.2	89.1	89.0	89.0	88.9
-40	-40	84.3	85.6	86.6	86.8	87.1	87.2	87.3	87.5	87.5	87.3	87.2	87.2	87.1	87.1
-50	-58	82.5	83.7	84.7	84.9	85.2	85.3	85.5	85.6	85.6	85.4	85.3	85.3	85.2	85.2

%N1 Adjustments for Engine Bleed

Flight Planning and Performance Manual

TO1 Stab Trim Setting

10% Thrust Reduction

Flaps 5

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	9 3/4	8 1/4	7	6	5	3 3/4	3	2 1/4
340	9 3/4	8	7	5 3/4	5	3 1/2	3	2 1/4
320	9 1/4	7 3/4	6 1/2	5 3/4	4 3/4	3 1/2	3	2
300	9	7 1/4	6 3/4	5 1/2	4 1/2	3 1/2	2 3/4	2
280	8 3/4	7 1/4	6	5 1/4	4 1/4	3 1/4	2 3/4	2
260	8 1/2	7	6	5 1/4	4 1/4	3 1/4	2 3/4	2
240	8 1/4	7	5 3/4	5 1/4	4 1/4	3 1/4	2 3/4	2
220	7 3/4	7	5 1/2	5	4	3 1/4	2 1/2	1 3/4
200	7 1/2	6 1/2	5 1/4	4 1/2	4	3	2 1/2	1 3/4
180	7	6	5	4 1/2	3 3/4	2 3/4	2 1/4	1 3/4

Flaps 15

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	10 1/4	9	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 3/4
340	10 1/4	9	7 1/2	6 1/2	5 1/4	4 1/2	3 1/4	2 1/2
320	9 3/4	8 1/4	7	6	5	4	3	2 1/2
300	9 1/2	7 3/4	6 3/4	5 3/4	4 3/4	3 3/4	3	2 1/4
280	9 1/4	7 3/4	6 3/4	5 1/2	4 1/4	3 1/2	3	2
260	9	7 1/4	6 1/2	5	4	3 1/4	2 3/4	2
240	8 1/2	7	5 3/4	4 1/2	3 3/4	3	2 1/2	1 3/4
220	7 1/2	6 1/4	5	4	3 1/4	2 3/4	2 1/4	1 1/2
200	6	5	3 3/4	3	2 1/2	2 1/4	2	1 1/4
180	4 1/2	4	3	2 1/2	2	2	1 3/4	1 1/4

Flaps 20

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	12	10 1/2	8 3/4	7 1/2	6 1/2	4 3/4	3 1/2	2 3/4
340	11 3/4	10 1/4	8 1/2	7 1/4	6 1/4	4 1/2	3 1/4	2 1/2
320	11 1/4	10	8 1/4	6 3/4	5 3/4	4	3	2 1/2
300	11	9 1/4	8	6 1/2	5 1/4	3 3/4	3	2 1/4
280	10 1/2	8 3/4	7 1/2	6	4 3/4	3 1/2	2 3/4	2
260	10	8 1/4	7	5 1/2	4 1/2	3 1/4	2 3/4	2
240	9 1/4	7 3/4	6 1/4	5	4 1/4	3	2 1/2	1 3/4
220	8 1/2	7	5 1/2	4 1/4	3 3/4	2 1/2	2 1/4	1 1/2
200	6 3/4	5 1/2	4 1/4	3 1/2	3	2 1/4	2	1 1/4
180	5 1/2	4	3 1/4	2 3/4	2 1/2	2	1 1/2	1 1/4

TO2 Takeoff Weights 20% Thrust Reduction

PERFORMANCE LIMIT	TO2 LIMIT WEIGHT (1000 KG)										
	FULL RATED LIMIT WEIGHT (1000 KG)										
	160	180	200	220	240	260	280	300	320	340	360
FIELD (Dry)*	140.4	157.0	173.7	178.8	183.9	189.0	210.2	231.4	252.6	273.8	295.0
FIELD (Wet)*	142.0	159.3	176.6	181.5	186.4	191.3	212.9	234.6	256.2	277.9	299.5
CLIMB	131.7	146.8	161.9	177.0	192.1	207.1	222.2	237.3	252.4	267.5	282.5
OBSTACLE	130.4	146.2	162.0	177.8	193.6	209.4	225.2	241.0	256.8	272.6	288.4
TIRE SPEED	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0
BRAKE ENERGY	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	308.1	324.7	341.4

* If the takeoff is limited by minimum control speeds, V1 may be increased to be equal to V1(MCG) provided the accelerate stop distance corrected for wind and slope exceeds approximately:

- Dry runway: 1200 m for normal operation, 1200 m with one brake deactivated and 1300 m with two brakes deactivated
- Wet runway: 1450 m for normal operation, 1500 m with one brake deactivated and 1550 m with two brakes deactivated

ADVISORY INFORMATION

TO2 Slush/Standing Water Takeoff

20% Thrust Reduction

Maximum Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-35.4	-40.5	-45.5	-42.8	-47.9	-53.0	-55.6	-60.6	-65.7
380	-33.9	-39.0	-44.1	-40.8	-45.9	-51.0	-52.6	-57.7	-62.7
360	-32.4	-37.5	-42.6	-38.8	-43.9	-49.0	-49.6	-54.7	-59.8
340	-30.9	-36.0	-41.1	-36.8	-41.9	-47.0	-46.8	-51.9	-56.9
320	-29.6	-34.7	-39.8	-35.1	-40.2	-45.3	-44.2	-49.3	-54.4
300	-28.6	-33.7	-38.8	-33.6	-38.7	-43.8	-41.9	-47.0	-52.1
280	-27.2	-32.2	-37.3	-31.7	-36.8	-41.9	-39.1	-44.1	-49.2
260	-25.2	-30.3	-35.4	-29.2	-34.3	-39.4	-35.6	-40.7	-45.8
240	-22.7	-27.8	-32.9	-26.2	-31.3	-36.3	-31.5	-36.6	-41.7
220	-19.8	-24.9	-29.9	-22.6	-27.7	-32.8	-26.9	-32.0	-37.1
200	-16.3	-21.4	-26.5	-18.5	-23.6	-28.6	-21.7	-26.8	-31.9
180	-12.4	-17.4	-22.5	-13.9	-18.9	-24.0	-15.9	-21.0	-26.1
160	-7.9	-13.0	-18.1	-8.7	-13.8	-18.8	-9.5	-14.6	-19.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
1600							132.1		
1800	146.9			159.5			181.1	124.3	
2000	195.1	139.4		208.5	151.8		231.6	173.4	
2200	245.8	187.4	131.8	260.4	200.6	144.1	284.9	223.4	165.6
2400	300.6	237.6	179.8	316.2	252.0	192.8	341.7	276.3	215.3
2600	360.4	291.6	229.4	376.5	307.1	243.6	401.5	332.5	267.7
2800	423.1	350.5	282.8	438.2	366.7	298.1		392.0	323.3
3000		413.2	340.9		428.4	357.0			382.5
3200			403.2			418.7			

1. Enter Weight Adjustment table with slush/standing water depth and TO2 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -55 m/+50 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-20	-18	-16	-15	-13	-11	-6	-4	-2
340	-23	-21	-19	-18	-16	-14	-8	-6	-4
320	-25	-23	-21	-20	-18	-16	-10	-8	-6
300	-26	-24	-22	-21	-19	-17	-11	-9	-7
280	-26	-24	-22	-22	-20	-18	-13	-11	-9
260	-26	-24	-22	-23	-21	-19	-15	-13	-11
240	-26	-24	-22	-23	-21	-19	-16	-14	-12
220	-25	-23	-21	-23	-21	-19	-17	-15	-13
200	-24	-22	-20	-22	-20	-18	-18	-16	-14
180	-23	-21	-19	-22	-20	-18	-18	-16	-14
160	-22	-20	-18	-21	-19	-17	-18	-16	-14

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slush/Standing Water Takeoff

20% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY FIELD/OBSTACLE LIMIT WEIGHT (1000 KG)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
400	-52.1	-57.7	-63.3	-61.8	-67.4	-73.1	-78.5	-84.1	-89.7
380	-49.5	-55.2	-60.8	-58.5	-64.1	-69.8	-73.7	-79.3	-85.0
360	-47.0	-52.6	-58.3	-55.2	-60.8	-66.4	-69.0	-74.6	-80.2
340	-44.5	-50.1	-55.7	-52.0	-57.6	-63.2	-64.4	-70.0	-75.6
320	-42.1	-47.7	-53.4	-48.9	-54.5	-60.1	-59.8	-65.5	-71.1
300	-39.8	-45.4	-51.0	-45.8	-51.4	-57.0	-55.4	-61.0	-66.6
280	-37.1	-42.7	-48.4	-42.4	-48.0	-53.7	-50.6	-56.2	-61.8
260	-34.0	-39.7	-45.3	-38.6	-44.2	-49.8	-45.4	-51.0	-56.7
240	-30.5	-36.2	-41.8	-34.4	-40.0	-45.6	-39.9	-45.5	-51.1
220	-26.6	-32.2	-37.9	-29.7	-35.3	-41.0	-34.0	-39.6	-45.2
200	-22.3	-27.9	-33.5	-24.7	-30.3	-35.9	-27.7	-33.3	-38.9
180	-17.5	-23.1	-28.8	-19.2	-24.8	-30.4	-21.0	-26.7	-32.3
160	-12.3	-17.9	-23.6	-13.3	-18.9	-24.5	-14.0	-19.6	-25.2

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	SLUSH/STANDING WATER DEPTH								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
2400							141.6		
2600							207.3	139.3	
2800	126.3			189.2			279.7	204.9	137.0
3000	205.8	123.6		270.4	186.5		362.2	277.0	202.4
3200	300.4	202.8	120.8	368.1	267.2	183.8		359.0	274.2
3400	421.2	296.6	199.8		364.3	264.1			355.9
3600		416.6	292.8			360.5			
3800			412.1						

1. Enter Weight Adjustment table with slush/standing water depth and TO2 dry field/obstacle limit weight to obtain slush/standing water weight adjustment.
2. Adjust field length available by -85 m/+85 m 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								
	3 mm (0.12 INCHES)			6 mm (0.25 INCHES)			13 mm (0.50 INCHES)		
	PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)			PRESSURE ALTITUDE (FT)		
	S.L.	4000	8000	S.L.	4000	8000	S.L.	4000	8000
360	-33	-29	-25	-25	-21	-17	-9	-5	-1
340	-36	-32	-28	-28	-24	-20	-11	-7	-3
320	-38	-34	-30	-30	-26	-22	-15	-11	-7
300	-39	-35	-31	-33	-29	-25	-18	-14	-10
280	-40	-36	-32	-34	-30	-26	-21	-17	-13
260	-40	-36	-32	-35	-31	-27	-24	-20	-16
240	-40	-36	-32	-36	-32	-28	-27	-23	-19
220	-39	-35	-31	-36	-32	-28	-29	-25	-21
200	-39	-35	-31	-36	-32	-28	-30	-26	-22
180	-38	-34	-30	-36	-32	-28	-31	-27	-23
160	-37	-33	-29	-35	-31	-27	-31	-27	-23

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slippery Runway Takeoff 20% Thrust Reduction Maximum Reverse Thrust Weight Adjustment (1000 KG)

TO2 DRY 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
400	0.0	-1.5	-2.9	-15.0	-16.4	-17.9	-35.3	-36.7	-38.2
380	0.0	-1.5	-2.9	-15.5	-16.9	-18.4	-34.2	-35.6	-37.1
360	0.0	-1.5	-2.9	-16.0	-17.4	-18.9	-33.0	-34.5	-36.0
340	0.0	-1.5	-2.9	-16.5	-17.9	-19.4	-31.9	-33.4	-34.9
320	0.0	-1.5	-2.9	-17.0	-18.5	-19.9	-31.1	-32.6	-34.0
300	-1.2	-2.6	-4.1	-17.8	-19.3	-20.7	-30.6	-32.0	-33.5
280	-3.7	-5.1	-6.6	-18.3	-19.8	-21.2	-29.8	-31.3	-32.7
260	-5.0	-6.5	-7.9	-18.5	-19.9	-21.4	-28.8	-30.3	-31.7
240	-5.5	-7.0	-8.4	-18.0	-19.5	-20.9	-27.3	-28.7	-30.2
220	-5.4	-6.8	-8.3	-16.7	-18.1	-19.6	-24.7	-26.2	-27.6
200	-4.7	-6.1	-7.6	-14.4	-15.9	-17.3	-21.3	-22.7	-24.2
180	-3.4	-4.8	-6.3	-11.4	-12.8	-14.3	-16.9	-18.3	-19.8
160	-1.5	-2.9	-4.4	-7.4	-8.8	-10.3	-11.5	-13.0	-14.4

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1400	205.8	146.0							
1600	302.9	243.8	184.3	120.5					
1800	399.1	340.5	281.7	184.1	129.7				
2000		436.5	377.9	250.4	193.4	139.0	126.5		
2200				322.7	260.5	202.9	165.3		
2400				401.5	333.9	270.8	204.6	152.0	
2600					413.2	345.2	246.6	190.9	138.7
2800						424.8	292.1	231.8	177.6
3000							342.3	276.1	217.5
3200							397.1	324.5	260.5
3400								378.2	307.4
3600								433.3	359.4
3800									414.5

1. Enter Weight Adjustment table with reported braking action and TO2 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+25 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -40 m/+35 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -60 m/+55 m 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
360	-7	-5	-3	-16	-14	-12	-28	-26	-24
340	-9	-7	-5	-18	-16	-14	-30	-28	-26
320	-10	-8	-6	-20	-18	-16	-32	-30	-28
300	-11	-9	-7	-21	-19	-17	-34	-32	-30
280	-11	-9	-7	-22	-20	-18	-35	-33	-31
260	-12	-10	-8	-23	-21	-19	-36	-34	-32
240	-12	-10	-8	-23	-21	-19	-36	-34	-32
220	-12	-10	-8	-23	-21	-19	-36	-34	-32
200	-12	-10	-8	-23	-21	-19	-36	-34	-32
180	-13	-11	-9	-24	-22	-20	-36	-34	-32
160	-13	-11	-9	-24	-22	-20	-36	-34	-32

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

ADVISORY INFORMATION

TO2 Slippery Runway Takeoff

20% Thrust Reduction

No Reverse Thrust

Weight Adjustment (1000 KG)

TO2 DRY 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
400	0.0	0.0	0.0	-29.6	-29.6	-29.6	-55.9	-55.9	-55.9
380	0.0	0.0	0.0	-29.0	-29.0	-29.0	-53.3	-53.3	-53.3
360	0.0	0.0	0.0	-28.5	-28.5	-28.5	-50.7	-50.7	-50.7
340	-1.3	-1.3	-1.3	-28.0	-28.0	-28.0	-48.2	-48.2	-48.2
320	-3.9	-3.9	-3.9	-27.6	-27.6	-27.6	-46.1	-46.1	-46.1
300	-6.4	-6.4	-6.4	-27.5	-27.5	-27.5	-44.1	-44.1	-44.1
280	-8.5	-8.5	-8.5	-27.5	-27.5	-27.5	-42.5	-42.5	-42.5
260	-10.1	-10.1	-10.1	-27.6	-27.6	-27.6	-41.1	-41.1	-41.1
240	-11.0	-11.0	-11.0	-27.2	-27.2	-27.2	-39.3	-39.3	-39.3
220	-11.0	-11.0	-11.0	-25.5	-25.5	-25.5	-36.4	-36.4	-36.4
200	-10.1	-10.1	-10.1	-22.6	-22.6	-22.6	-32.3	-32.3	-32.3
180	-8.3	-8.3	-8.3	-18.4	-18.4	-18.4	-27.1	-27.1	-27.1
160	-5.6	-5.6	-5.6	-13.0	-13.0	-13.0	-20.7	-20.7	-20.7

V1(MCG) Limit Weight (1000 KG)

ADJUSTED FIELD LENGTH (M)	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
1600	193.5								
1800	348.6	282.4	198.4						
2000		410.8	351.6						
2400				130.9					
2600				321.0	207.6				
2800					365.8	268.4			
3000						409.1			
4000							230.4		
4200							382.7	289.3	147.6
4400								425.6	338.1

1. Enter Weight Adjustment table with reported braking action and TO2 dry field/obstacle limit weight to obtain slippery runway weight adjustment.
2. Adjust "Good" field length available by -30 m/+30 m for every 5°C above/below 4°C.
Adjust "Medium" field length available by -50 m/+45 m for every 5°C above/below 4°C.
Adjust "Poor" field length available by -85 m/+80 m 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
360	-9	-6	-3	-23	-19	-16	-43	-40	-37
340	-11	-8	-5	-25	-22	-19	-46	-43	-40
320	-13	-10	-7	-28	-24	-21	-49	-46	-43
300	-14	-11	-8	-29	-26	-23	-53	-49	-46
280	-15	-12	-9	-31	-28	-25	-55	-52	-48
260	-16	-13	-10	-33	-29	-26	-57	-54	-50
240	-17	-14	-11	-34	-31	-28	-59	-56	-52
220	-17	-14	-11	-36	-32	-29	-60	-56	-53
200	-18	-15	-12	-37	-34	-31	-60	-57	-53
180	-19	-16	-13	-39	-35	-32	-60	-57	-53
160	-20	-17	-14	-41	-37	-34	-60	-57	-53

1. Obtain V1, VR and V2 for the actual weight using the Dry Runway Takeoff Speeds table.
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). V1 not to exceed VR.

TO2 Takeoff Speeds - Dry Runway

20% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
320	177	182	185	168	171	175			
300	171	176	180	163	165	170	159	159	163
280	165	169	175	157	159	165	152	152	158
260	159	162	169	150	153	159	146	146	153
240	151	155	163	143	146	154	139	139	148
220	142	147	157	135	139	148	131	133	142
200	133	139	151	126	131	142	123	125	137
180	123	131	144	117	123	136	114	117	130
160	113	121	137	108	114	129	104	109	124

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1								VR								V2							
		PRESSURE ALTITUDE (1000 FT)								PRESSURE ALTITUDE (1000 FT)								PRESSURE ALTITUDE (1000 FT)							
°C	°F	-2	0	2	4	6	8	10		-2	0	2	4	6	8	10		-2	0	2	4	6	8	10	
70	158	9	11							5	6							-3	-4						
60	140	6	7	9	11					4	5	6	7					-2	-3	-3	-4				
50	122	3	4	6	8	10	13	17		2	3	4	5	6	8	9		-1	-2	-2	-3	-3	-4	-6	
40	104	1	2	4	6	8	10	13	1	1	3	4	5	7	8			0	-1	-1	-2	-3	-4	-4	
30	86	0	0	2	4	6	8	11	0	0	1	3	4	6	7	0	0	0	-1	-1	-2	-3	-4	-4	
20	68	0	0	1	3	5	7	9	0	0	1	2	3	5	6	0	0	0	0	-1	-2	-2	-3	-3	
-60	-76	0	0	1	3	5	7	9	0	0	1	2	3	4	6	0	0	0	0	-1	-1	-2	-3	-3	

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)									
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40		
380	-2	-1	0	2	2	-3	-1	0	0	1	2	2	2		
360	-2	-1	0	2	2	-3	-1	0	0	1	1	2	2		
340	-2	-1	0	2	2	-2	-1	0	0	1	1	2	2		
320	-2	-1	0	2	2	-2	-1	0	0	1	1	1	2		
300	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	2		
280	-3	-1	0	1	2	-2	-1	-1	0	0	1	1	2		
260	-3	-1	0	1	2	-2	-1	-1	0	0	1	1	2		
240	-3	-1	0	1	2	-2	-1	-1	0	0	1	1	2		
220	-2	-1	0	1	2	-2	-1	-1	0	0	1	1	2		
200	-2	-1	0	1	2	-2	-1	-1	0	1	1	2	2		
180	-2	-1	0	1	2	-2	-1	0	0	1	1	2	2		
160	-2	0	0	2	3	-2	-1	0	0	1	2	2	3		

*V1 not to exceed VR.

TO2 V1(MCG), Minimum VR

TEMP		PRESSURE ALTITUDE (FT)															
		-2000		0		2000		4000		6000		8000		10000			
°C	°F	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR		
70	158	105	107	102	104												
60	140	105	107	102	104	100	102	98	101								
50	122	107	109	105	107	100	103	98	101	96	99	93	96	89	92		
40	104	113	115	111	113	106	108	102	104	97	100	93	96	89	92		
30	86	115	117	115	117	110	112	106	108	101	104	96	99	91	94		
20	68	115	117	115	117	112	114	108	110	104	106	99	102	94	97		
-60	-76	117	117	116	117	113	114	109	111	105	107	101	103	97	99		

Flight Planning and Performance Manual

TO2 Takeoff Speeds - Wet Runway

20% Thrust Reduction

V1, VR, V2

WEIGHT (1000 KG)	FLAPS 5			FLAPS 15			FLAPS 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
320	170	182	185	160	171	175			
300	163	176	180	153	165	170	149	159	163
280	155	169	175	146	159	165	142	152	158
260	148	162	169	139	153	159	135	146	153
240	140	155	163	132	146	154	128	139	148
220	132	147	157	124	139	148	121	133	142
200	123	139	151	116	131	142	113	125	137
180	113	131	144	107	123	136	104	117	130
160	100	121	137	97	114	129	94	109	124

Check V1(MCG), Minimum VR.

V1, VR, V2 Adjustments*

TEMP		V1								VR								V2							
		PRESSURE ALTITUDE (1000 FT)								PRESSURE ALTITUDE (1000 FT)								PRESSURE ALTITUDE (1000 FT)							
°C	°F	-2	0	2	4	6	8	10		-2	0	2	4	6	8	10		-2	0	2	4	6	8	10	
70	158	11	13							5	6							-3	-4						
60	140	7	9	11	13					4	5	6	7					-2	-3	-3	-4				
50	122	4	5	7	9	12	15	20		2	3	4	5	6	8	9		-1	-2	-2	-3	-3	-4	-6	
40	104	1	2	4	7	9	12	15	1	1	3	4	5	7	8	9	0	-1	-1	-2	-3	-4	-4	-4	
30	86	0	0	2	5	7	10	12	0	0	1	3	4	6	7	8	0	0	-1	-1	-2	-3	-4	-4	
20	68	0	0	1	3	6	8	10	0	0	1	2	3	5	6	7	0	0	0	-1	-2	-2	-3	-3	
-60	-76	0	0	1	3	5	8	10	0	0	1	2	3	4	6	7	0	0	0	-1	-1	-2	-3	-3	

Slope and Wind V1 Adjustments*

WEIGHT (1000 KG)	SLOPE (%)					WIND (KTS)									
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40		
380	-4	-1	0	4	7	-3	-1	0	0	1	3	4	4		
360	-4	-2	0	4	6	-3	-2	0	0	1	3	3	4		
340	-4	-2	0	3	6	-3	-2	-1	0	1	2	3	4		
320	-4	-2	0	3	5	-4	-2	-1	0	1	2	3	4		
300	-4	-2	0	3	5	-4	-3	-1	0	1	2	3	4		
280	-5	-2	0	2	4	-4	-3	-1	0	1	2	3	3		
260	-4	-2	0	2	4	-4	-3	-1	0	1	2	3	3		
240	-4	-2	0	2	4	-4	-3	-1	0	1	2	3	3		
220	-4	-2	0	2	4	-4	-3	-1	0	1	2	3	4		
200	-3	-1	0	2	4	-4	-3	-1	0	1	2	3	4		
180	-3	-1	0	2	4	-4	-2	-1	0	1	3	3	4		
160	-2	0	0	3	4	-4	-2	0	0	1	3	4	5		

*V1 not to exceed VR.

TO2 V1(MCG), Minimum VR

TEMP		PRESSURE ALTITUDE (FT)															
		-2000		0		2000		4000		6000		8000		10000			
°C	°F	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR	V1 (MCG)	Min VR		
70	158	105	107	102	104												
60	140	105	107	102	104	100	102	98	101								
50	122	107	109	105	107	100	103	98	101	96	99	93	96	89	92		
40	104	113	115	111	113	106	108	102	104	97	100	93	96	89	92		
30	86	115	117	115	117	110	112	106	108	101	104	96	99	91	94		
20	68	115	117	115	117	112	114	108	110	104	106	99	102	94	97		
-60	-76	117	117	116	117	113	114	109	111	105	107	101	103	97	99		



Flight Planning and Performance Manual

TO2 Takeoff %N1

20% Thrust Reduction

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400	9000	9800
70	158	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4
60	140	86.9	87.2	87.5	87.2	87.0	87.0	86.9	86.7	86.5	86.0	85.2	84.9	84.4	84.2
55	131	88.4	88.7	89.0	88.8	88.5	88.6	88.4	88.3	88.1	87.4	86.5	86.1	85.6	85.0
50	122	89.8	90.0	90.5	90.1	89.8	89.8	89.7	89.6	89.4	88.9	88.0	87.6	87.1	86.4
45	113	91.2	91.5	92.1	91.7	91.3	91.2	91.1	90.9	90.7	90.1	89.3	88.9	88.5	87.9
40	104	92.4	92.8	93.2	92.8	92.6	92.5	92.3	92.2	91.9	91.4	90.6	90.2	89.7	89.0
35	95	92.7	93.3	94.0	93.8	93.3	93.2	93.0	92.8	92.4	92.0	91.5	91.3	90.9	90.4
30	86	91.9	93.2	94.3	94.1	93.8	93.6	93.4	93.2	92.8	92.3	92.0	91.7	91.5	91.1
25	77	91.1	92.5	93.5	93.7	93.9	93.9	93.7	93.7	93.2	92.8	92.3	92.0	91.7	91.5
20	68	90.4	91.7	92.7	92.9	93.1	93.3	93.4	93.6	93.3	93.0	92.6	92.4	92.2	91.8
15	59	89.6	90.9	91.9	92.1	92.3	92.5	92.6	92.8	92.7	92.6	92.4	92.3	92.2	92.0
10	50	88.8	90.1	91.1	91.3	91.5	91.7	91.8	91.9	91.9	91.8	91.7	91.6	91.6	91.6
5	41	88.0	89.3	90.3	90.5	90.7	90.9	91.0	91.1	91.1	91.0	90.9	90.8	90.8	90.8
0	32	87.2	88.5	89.5	89.7	89.9	90.0	90.2	90.3	90.3	90.2	90.1	90.0	90.0	89.9
-10	14	85.6	86.9	87.8	88.0	88.3	88.4	88.5	88.6	88.6	88.5	88.4	88.4	88.3	88.3
-20	-4	84.0	85.2	86.1	86.3	86.6	86.7	86.8	86.9	86.9	86.8	86.7	86.7	86.6	86.6
-30	-22	82.3	83.5	84.4	84.6	84.8	84.9	85.1	85.2	85.2	85.1	85.0	84.9	84.9	84.9
-40	-40	80.6	81.8	82.7	82.8	83.1	83.2	83.3	83.4	83.4	83.3	83.2	83.2	83.1	83.1
-50	-58	78.8	80.0	80.9	81.0	81.3	81.4	81.5	81.6	81.6	81.5	81.4	81.4	81.3	81.3

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)													
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400	9000	9800
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
1 PACK ON	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4



TO2 Stab Trim Setting

20% Thrust Reduction

Flaps 5

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	10 3/4	9 1/4	7 3/4	6 3/4	5 1/4	4	3	2 3/4
340	10 3/4	9	7 3/4	6 3/4	5 1/4	4	3	2 3/4
320	10 1/4	8 3/4	7 3/4	6 1/2	5	3 3/4	3	2 1/2
300	10	8 1/2	7 1/2	6 1/4	5	3 3/4	2 3/4	2 1/2
280	10	8 1/2	7 1/4	6 1/4	5	3 1/2	2 3/4	2 1/4
260	10	8 1/2	7 1/4	6 1/4	5	3 1/2	2 3/4	2 1/4
240	10	8 1/2	7 1/4	6 1/4	5	3 1/4	2 3/4	2 1/4
220	9 3/4	8 1/4	7 1/4	6 1/4	4 3/4	3 1/4	2 3/4	2
200	9 3/4	8 1/4	7	6	4 3/4	3 1/4	2 1/2	2
180	9 1/2	8	7	6	4 1/2	3 1/4	2 1/2	2

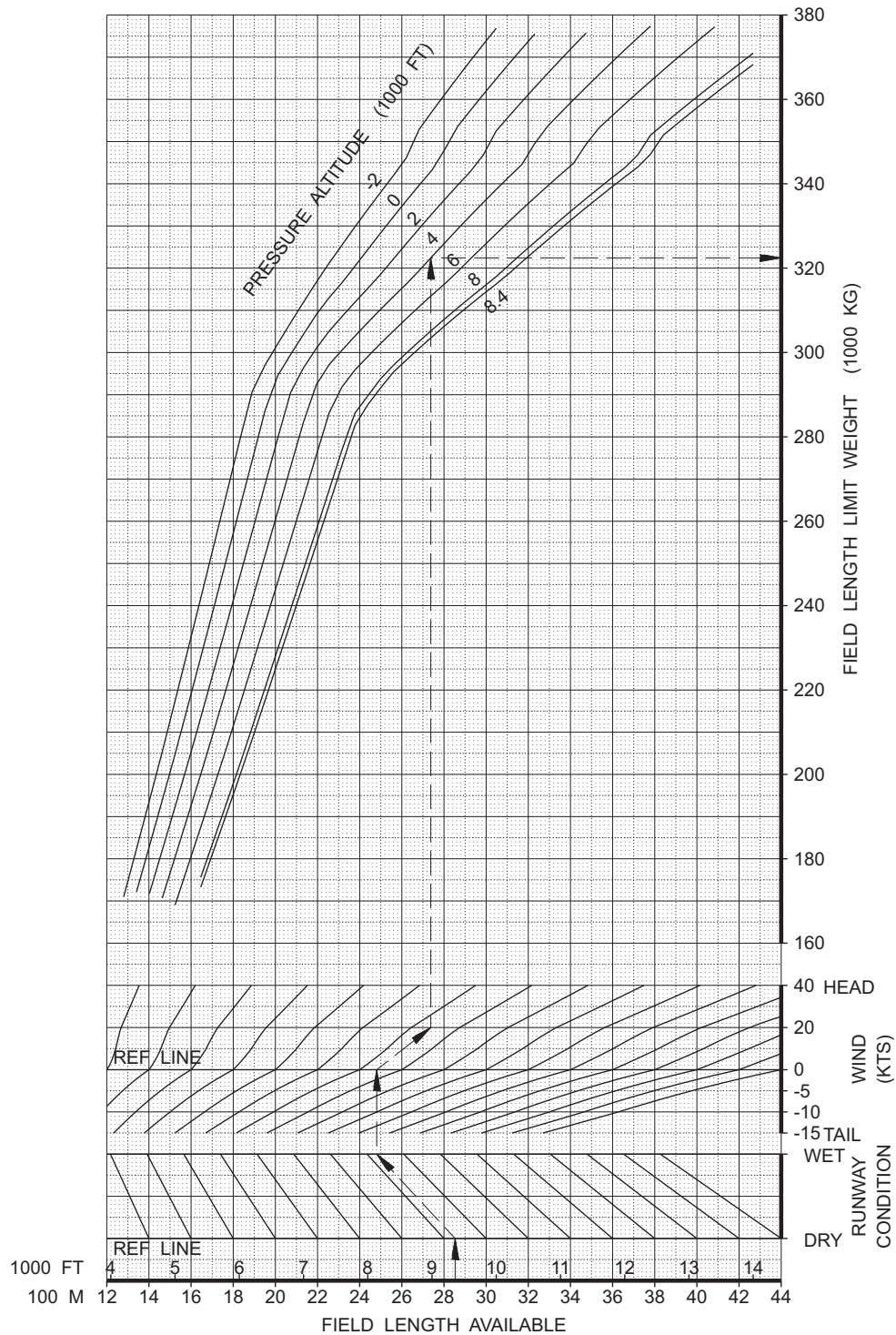
Flaps 15

WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	11 3/4	10 3/4	9 3/4	8 3/4	7 1/4	5 3/4	4 1/2	3 1/4
340	11 1/2	10 1/2	9 3/4	8 1/2	7 1/4	5 1/2	4 1/4	3
320	11 1/2	10 1/4	9 1/2	8 1/4	7	5 1/4	4	3
300	11 1/4	9 3/4	9 1/4	7 3/4	6 3/4	5	3 3/4	3
280	11	9 1/2	8 3/4	7 1/4	6 1/4	4 3/4	3 3/4	2 3/4
260	10 3/4	9 1/4	8 1/4	7	5 3/4	4 1/4	3 1/2	2 3/4
240	10 1/4	8 3/4	7 3/4	6 1/2	5 1/4	3 3/4	3	2 1/2
220	9 1/2	8 1/4	7 1/4	6	5	3 1/2	2 3/4	2 1/2
200	8 1/2	7 1/2	6 1/2	5 1/4	4	3	2 1/2	2 1/4
180	7 1/2	6	5 1/4	4	2 3/4	2 1/2	2 1/4	1 3/4

Flaps 20

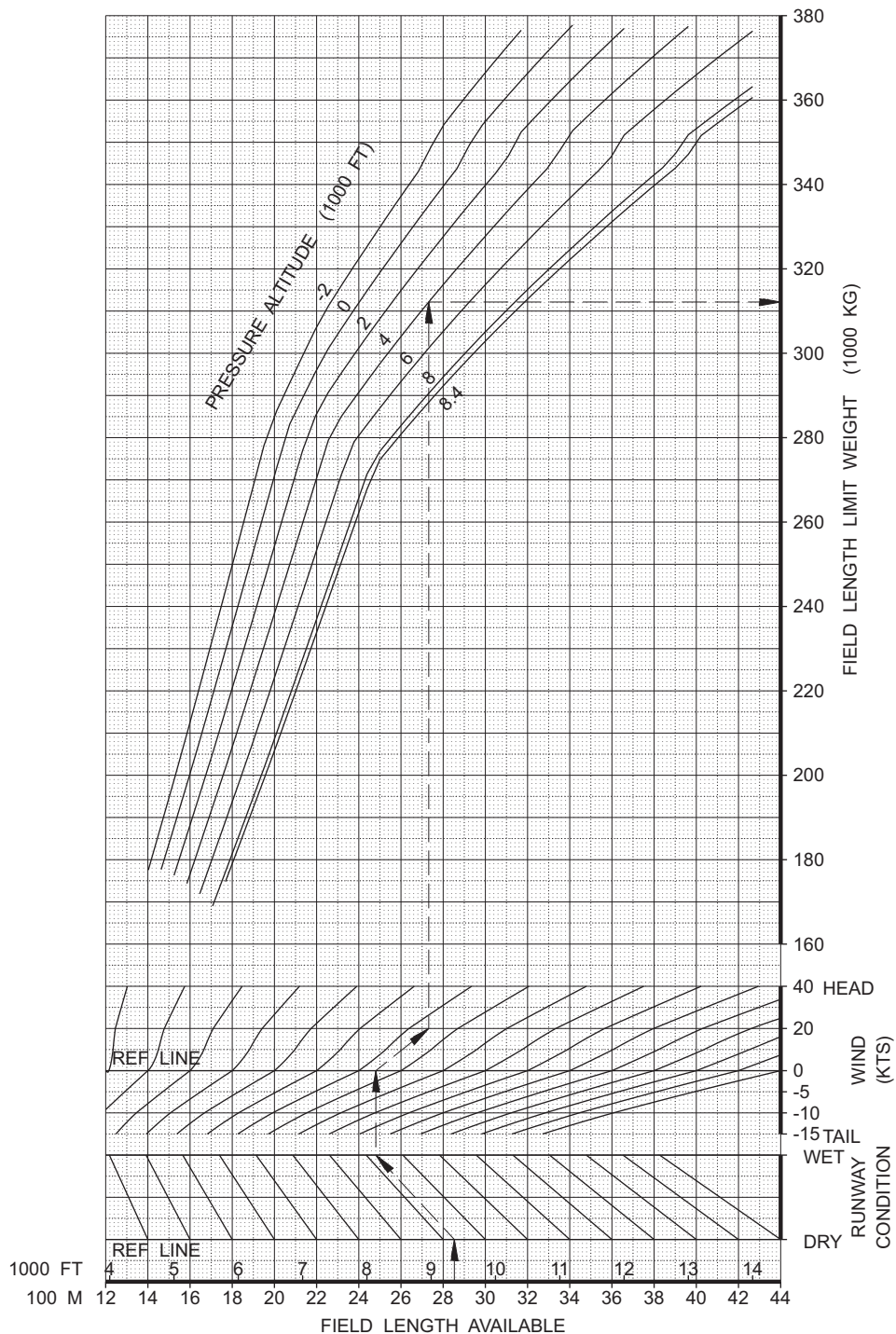
WEIGHT (1000 KG)	C.G. (% MAC)							
	7.5	14	19	24	29	34	39	44
350	12 1/2	11 1/2	10 1/4	9 1/4	7 3/4	6	4 3/4	3 1/4
340	12 1/2	11 1/2	10	9	7 1/2	6	4 1/2	3
320	12 1/4	11	9 3/4	8 3/4	7 1/2	5 1/2	4 1/4	3
300	12	10 1/2	9 1/2	8	7 1/4	5 1/4	4	3
280	11 3/4	10 1/4	9	7 3/4	6 3/4	5	3 3/4	3
260	11 1/2	10	8 3/4	7 1/4	6 1/4	4 3/4	3 1/2	2 3/4
240	11	9 1/2	8 1/4	7	5 3/4	4 1/4	3 1/4	2 1/2
220	10 1/4	9	7 3/4	6 1/2	5 1/4	4	3	2 1/2
200	9 1/4	8 1/4	7	5 1/2	4 1/2	3 1/2	2 1/2	2 1/4
180	8 1/4	6 3/4	5 3/4	4 1/2	4	3	2 1/4	1 3/4

Landing Field Length Limit
Flaps 30
Based on automatic speedbrakes



With manual speedbrakes, decrease weight by 21700 kg.
With 1 brake deactivated, decrease weight by 22800 kg.
With 2 brakes deactivated, decrease weight by 46300 kg.

Landing Field Length Limit
Flaps 25
Based on automatic speedbrakes

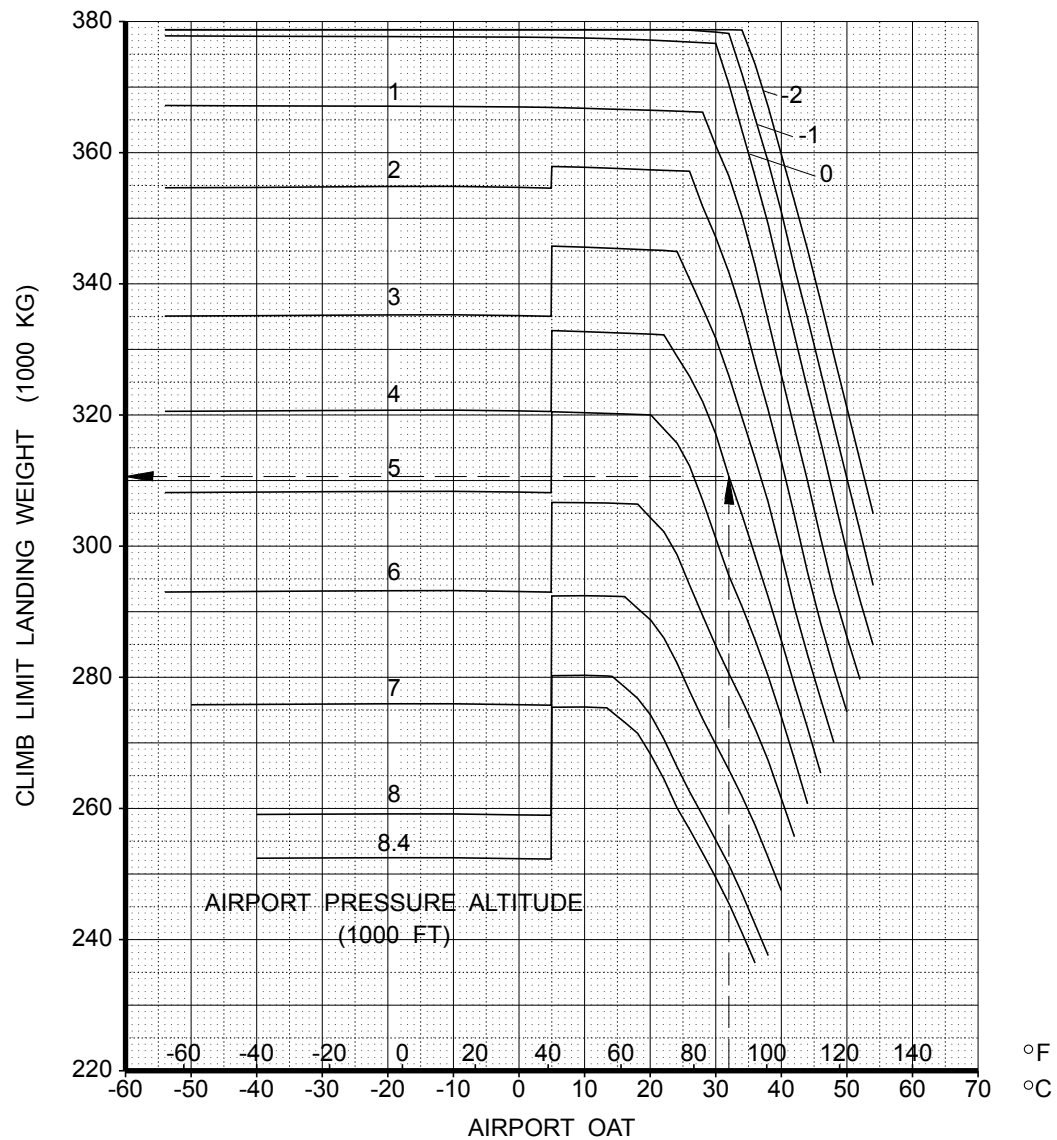


With manual speedbrakes, decrease weight by 20800 kg.
With 1 brake deactivated, decrease weight by 21800 kg.
With 2 brakes deactivated, decrease weight by 44400 kg.

Landing Climb Limit Weight

Valid for approach with flaps 20 and landing with flaps 30

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



With engine bleed for packs off, increase weight by 1350 kg.

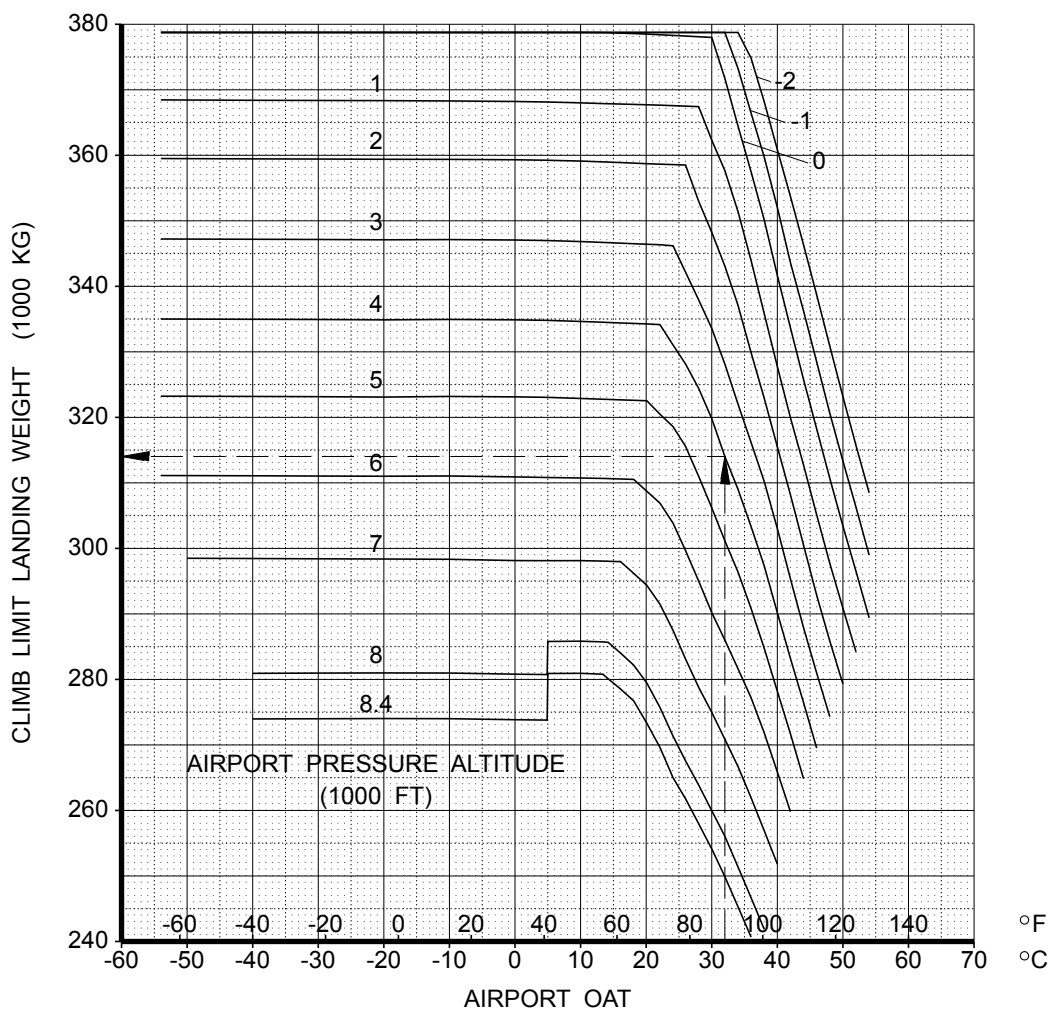
With engine and wing anti-ice on, decrease weight by 2200 kg.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 21950 kg.

Landing Climb Limit Weight

Valid for approach with flaps 20 and landing with flaps 25

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



With engine bleed for packs off, increase weight by 1450 kg.

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

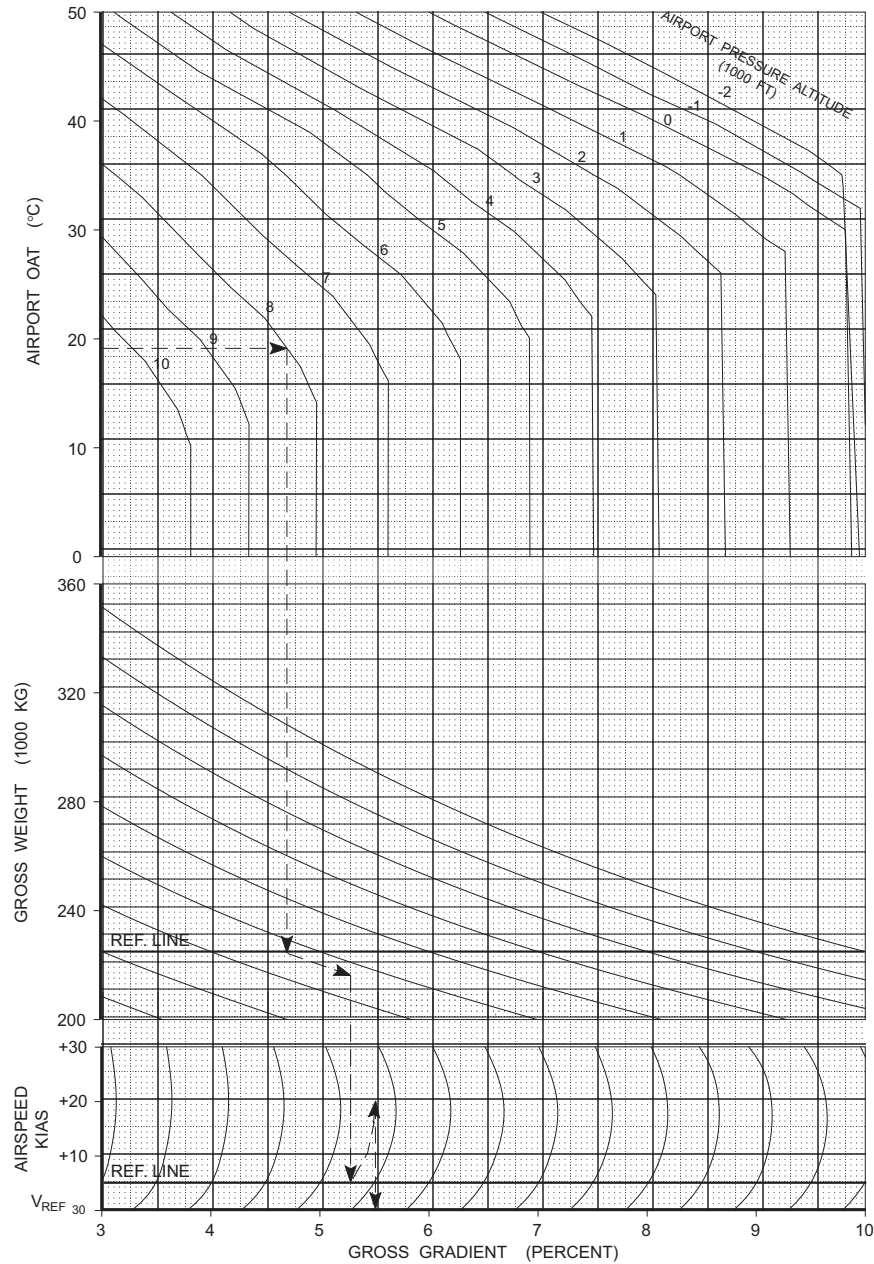
When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 22250 kg.

ENGINE INOP GO-AROUND THRUST

Go-Around Climb Gradient

Flaps 20, Gear Up

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



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

With engine and wing anti-ice on, decrease gradient by 0.1%.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease gradient by 0.7%.

Quick Turnaround Limit**Flaps 30 Limit Weight (1000 KG)**

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	239.8	235.6	231.5									
50	122	241.4	237.2	233.0	228.6	224.3							
45	113	243.3	239.1	234.9	230.4	226.1	221.8	217.6					
40	104	245.3	241.1	236.8	232.4	227.9	223.6	219.4	215.2	210.9	206.7		
35	95	247.4	243.1	238.8	234.3	229.9	225.5	221.2	217.0	212.7	208.5	204.3	202.7
30	86	249.5	245.1	240.9	236.3	231.8	227.4	223.1	218.8	214.6	210.3	206.1	204.4
25	77	251.7	247.3	242.9	238.4	233.9	229.4	225.0	220.7	216.5	212.2	207.9	206.2
20	68	253.9	249.5	245.1	240.5	235.9	231.4	227.0	222.6	218.4	214.1	209.8	208.1
15	59	256.2	251.7	247.3	242.7	238.1	233.5	229.0	224.6	220.3	216.0	211.7	210.0
10	50	258.6	254.0	249.5	244.9	240.3	235.7	231.1	226.7	222.3	218.0	213.7	211.9
5	41	261.0	256.4	251.9	247.1	242.5	237.9	233.3	228.8	224.3	220.0	215.7	213.9
0	32	263.5	258.9	254.3	249.5	244.8	240.1	235.5	230.9	226.4	222.0	217.7	216.0
-5	23	266.1	261.4	256.7	251.9	247.1	242.4	237.8	233.2	228.6	224.1	219.8	218.1
-10	14	268.7	264.0	259.3	254.4	249.5	244.8	240.1	235.5	230.9	226.3	221.9	220.2
-15	5	271.4	266.6	261.9	257.0	252.1	247.2	242.5	237.9	233.2	228.6	224.1	222.4
-20	-4	274.1	269.4	264.6	259.6	254.7	249.8	245.0	240.3	235.6	231.0	226.4	224.6
-30	-22	279.7	274.9	270.2	265.1	260.1	255.1	250.2	245.4	240.6	235.9	231.2	229.4
-40	-40	285.7	280.8	275.9	270.9	265.8	260.7	255.7	250.8	245.9	241.1	236.3	234.4
-50	-58	292.3	287.1	282.1	276.9	271.9	266.7	261.6	256.5	251.5	246.6	241.7	239.6
-54	-65	295.1	289.8	284.7	279.5	274.3	269.2	264.1	259.0	253.9	248.8	243.9	241.7

Flaps 25 Limit Weight (1000 KG)

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	227.2	223.3	219.3									
50	122	228.7	224.7	220.7	216.6	212.6							
45	113	230.6	226.5	222.6	218.4	214.3	210.3	206.2					
40	104	232.5	228.4	224.4	220.2	216.0	212.0	207.9	203.9	199.9	196.0		
35	95	234.5	230.4	226.3	222.0	217.8	213.7	209.7	205.6	201.6	197.6	193.8	192.3
30	86	236.4	232.3	228.3	223.9	219.7	215.5	211.4	207.4	203.3	199.3	195.4	193.9
25	77	238.5	234.4	230.2	225.9	221.6	217.4	213.2	209.2	205.1	201.0	197.1	195.5
20	68	240.6	236.4	232.3	227.9	223.6	219.3	215.1	211.0	206.9	202.8	198.8	197.2
15	59	242.8	238.5	234.4	230.0	225.6	221.3	217.0	212.9	208.8	204.6	200.6	199.0
10	50	245.0	240.7	236.5	232.1	227.7	223.3	219.0	214.8	210.7	206.5	202.4	200.8
5	41	247.3	243.0	238.7	234.2	229.8	225.4	221.0	216.8	212.6	208.5	204.3	202.7
0	32	249.7	245.3	240.9	236.4	232.0	227.5	223.1	218.8	214.6	210.5	206.3	204.6
-5	23	252.1	247.7	243.3	238.7	234.2	229.7	225.3	220.9	216.6	212.5	208.3	206.6
-10	14	254.6	250.1	245.7	241.1	236.5	232.0	227.5	223.1	218.8	214.5	210.4	208.7
-15	5	257.2	252.7	248.2	243.5	238.9	234.3	229.8	225.4	221.0	216.6	212.4	210.8
-20	-4	259.8	255.3	250.7	246.0	241.3	236.7	232.2	227.7	223.2	218.8	214.6	212.9
-30	-22	265.2	260.7	256.1	251.2	246.4	241.7	237.1	232.6	228.0	223.5	219.1	217.3
-40	-40	270.9	266.3	261.7	256.8	251.9	247.0	242.3	237.6	233.0	228.5	223.9	222.1
-50	-58	277.0	272.2	267.5	262.6	257.6	252.7	247.9	243.1	238.3	233.7	229.0	227.0
-54	-65	279.5	274.7	269.9	265.0	260.1	255.1	250.2	245.4	240.6	235.9	231.1	229.0

Increase weight by 2150 kg per 1% uphill slope. Decrease weight by 3450 kg per 1% downhill slope.

Increase weight by 5950 kg per 10 knots headwind. Decrease weight by 31550 kg per 10 knots tailwind.

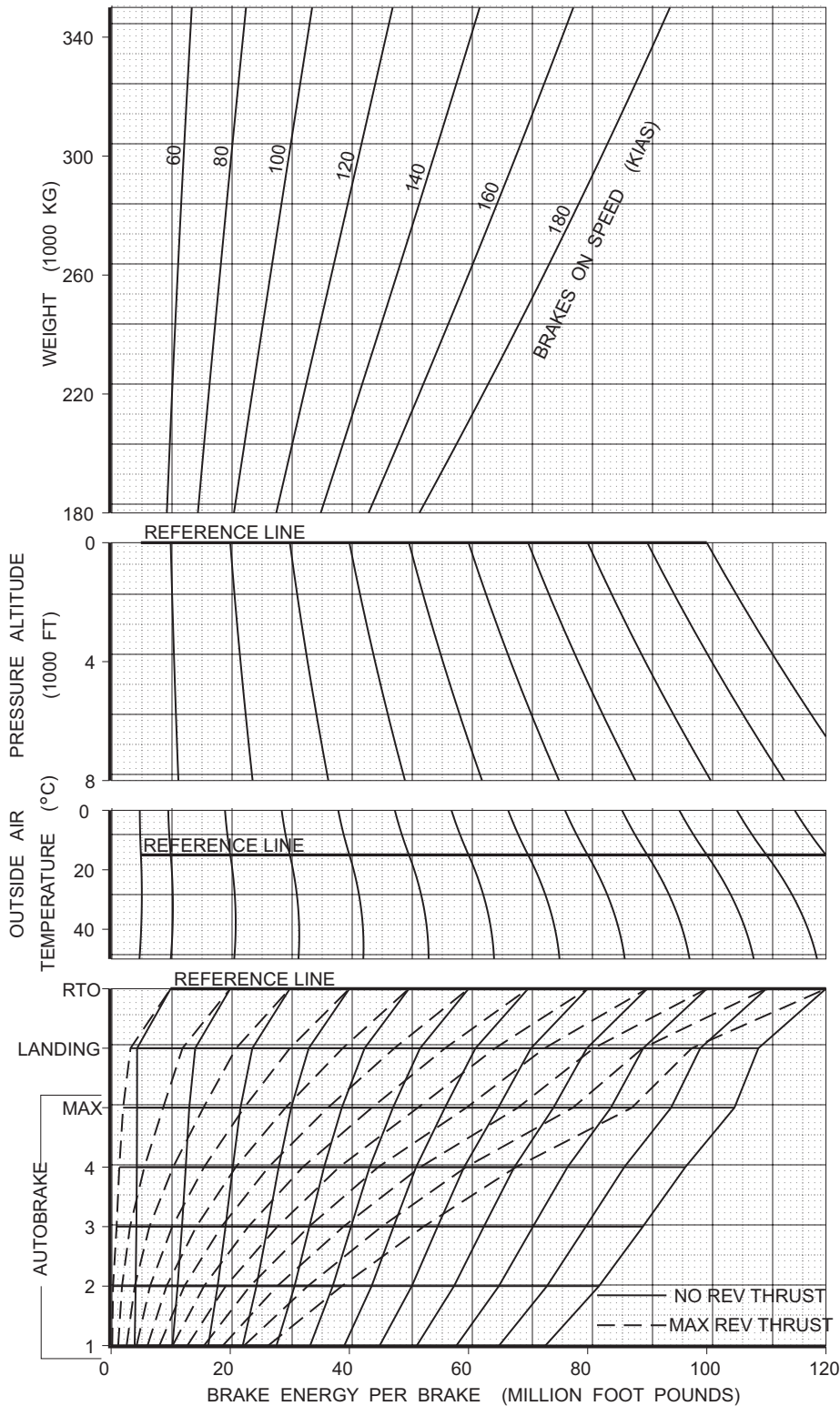
Decrease weight by 12500 kg when one brake is deactivated. Decrease weight by 25450 kg when two brakes are deactivated.

After landing at weights exceeding those shown above, adjusted for slope and wind, wait at least 65 minutes and check that wheel thermal plugs have not melted before executing a takeoff.

As an alternate procedure, no waiting period is required if the BRAKE TEMP advisory message on EICAS is not displayed 10 to 15 minutes after parking.

ADVISORY INFORMATION

Recommended Brake Cooling Schedule



GUIDANCE INFORMATION ONLY

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 10 PERCENT

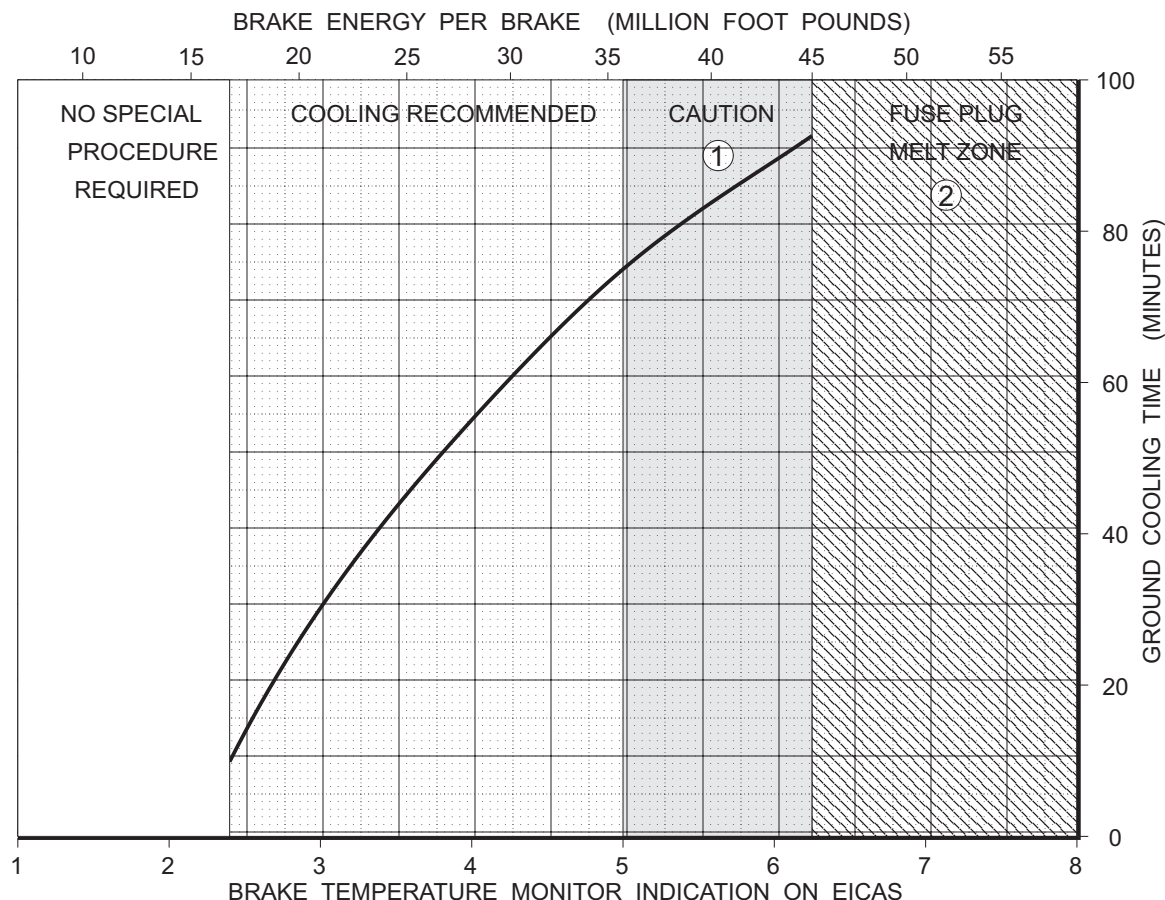
FOR TWO BRAKES DEACTIVATED
INCREASE BRAKE ENERGY PER
BRAKE BY 20 PERCENT

IF GROUND SPEED IS USED FOR
BRAKES ON SPEED, IGNORE WIND,
ALTITUDE, AND OAT EFFECTS

RTO AND LANDING BRAKE
ENERGY BASED ON MAXIMUM
MANUAL BRAKING

ADVISORY INFORMATION

Recommended Brake Cooling Schedule



OBSERVE MAXIMUM QUICK TURNAROUND LIMITATION

FOR INFLIGHT GEAR EXTENDED COOLING TIME, DIVIDE GROUND COOLING TIME BY 10.

- ① WHEEL FUSE PLUGS MAY MELT. DELAY TAKEOFF AND INSPECT AFTER ONE HOUR. IF OVERHEAT OCCURS AFTER TAKEOFF, EXTEND GEAR SOON FOR AT LEAST 8 MINUTES.
- ② CLEAR RUNWAY IMMEDIATELY. UNLESS REQUIRED, DO NOT SET PARKING BRAKE. DO NOT APPROACH GEAR OR ATTEMPT TAXI FOR ONE HOUR. TIRE WHEEL AND BRAKE REPLACEMENT MAY BE REQUIRED. IF OVERHEAT OCCURS AFTER TAKEOFF, EXTEND GEAR SOON FOR AT LEAST 12 MINUTES.

BRAKE TEMPERATURE MONITOR SYSTEM (BTMS) INDICATION ON EICAS MAY BE USED 10 TO 15 MINUTES AFTER AIRPLANE HAS COME TO A COMPLETE STOP, OR INFLIGHT WITH GEAR RETRACTED, TO DETERMINE RECOMMENDED COOLING SCHEDULE. (WHEN INFLIGHT WITH GEAR EXTENDED, THE BTMS INDICATION MAY VARY BETWEEN INDIVIDUAL BRAKES DUE TO AIRSTREAM EFFECTS.)



Flight Planning and Performance Manual

ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 30

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	250000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 250000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF30	ONE REV	NO REV

Dry Runway

MAX MANUAL	980	+25/-10	20	-40/+130	+10/-10	+20/-20	35	20	50
AUTOBRAKE MAX	1330	+25/-20	30	-55/+190	+0/0	+35/-35	65	0	0
AUTOBRAKE 4	1740	+35/-25	45	-80/+270	+0/0	+45/-50	95	0	0
AUTOBRAKE 3	2060	+40/-35	60	-100/+335	+0/-10	+60/-60	105	0	0
AUTOBRAKE 2	2285	+45/-40	70	-115/+385	+30/-50	+65/-65	85	65	65
AUTOBRAKE 1	2485	+55/-45	85	-130/+450	+75/-80	+70/-70	85	255	320

Good Reported Braking Action

MAX MANUAL	1600	+30/-25	40	-75/+265	+40/-35	+40/-40	60	105	245
AUTOBRAKE MAX	1660	+30/-25	45	-75/+270	+35/-30	+40/-40	70	110	260
AUTOBRAKE 4	2005	+40/-30	50	-90/+315	+10/-5	+60/-60	110	5	45
AUTOBRAKE 3	2370	+45/-40	70	-115/+385	+5/-10	+70/-70	120	0	0
AUTOBRAKE 2	2630	+50/-45	80	-130/+445	+35/-60	+75/-75	100	75	75
AUTOBRAKE 1	2860	+65/-50	100	-150/+520	+85/-90	+80/-80	100	295	370

Medium Reported Braking Action

MAX MANUAL	2145	+40/-35	70	-115/+420	+90/-75	+60/-60	75	280	720
AUTOBRAKE MAX	2145	+45/-35	70	-115/+420	+100/-75	+60/-60	80	275	715
AUTOBRAKE 4	2220	+45/-35	70	-120/+430	+75/-45	+60/-65	110	260	705
AUTOBRAKE 3	2475	+50/-40	70	-125/+460	+45/-40	+70/-70	120	120	485
AUTOBRAKE 2	2685	+50/-45	80	-140/+495	+70/-80	+75/-75	100	140	375
AUTOBRAKE 1	2870	+65/-50	100	-150/+530	+110/-100	+80/-80	100	315	495

Poor Reported Braking Action

MAX MANUAL	2720	+60/-50	90	-165/+645	+200/-140	+75/-75	85	580	1710
AUTOBRAKE MAX	2725	+60/-50	90	-165/+645	+205/-145	+75/-75	85	580	1710
AUTOBRAKE 4	2725	+65/-50	90	-165/+645	+205/-130	+75/-75	100	580	1710
AUTOBRAKE 3	2820	+65/-50	90	-175/+655	+175/-115	+80/-80	120	525	1655
AUTOBRAKE 2	2940	+65/-50	100	-180/+665	+180/-140	+80/-80	100	465	1550
AUTOBRAKE 1	3045	+65/-60	105	-185/+690	+200/-150	+85/-85	100	545	1490

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

For Max Manual braking and manual speedbrakes, increase reference landing distance by 70 m.

For autobrake and manual speedbrakes, increase reference landing distance by 60 m.

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

Includes distance from 50 ft above threshold (305 meters of unfactored air distance).

ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 25

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	250000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 250000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF25	ONE REV	NO REV

Dry Runway

MAX MANUAL	1030	+25/-15	25	-40/+135	+15/-10	+25/-25	35	25	55
AUTOBRAKE MAX	1430	+20/-20	35	-60/+195	+0/0	+35/-35	70	0	0
AUTOBRAKE 4	1880	+25/-30	50	-85/+280	+0/0	+50/-50	100	0	0
AUTOBRAKE 3	2235	+35/-40	65	-105/+350	+0/-20	+65/-65	105	5	5
AUTOBRAKE 2	2460	+40/-45	80	-120/+400	+35/-60	+70/-70	90	100	100
AUTOBRAKE 1	2665	+50/-50	90	-135/+465	+85/-85	+75/-80	90	305	395

Good Reported Braking Action

MAX MANUAL	1690	+25/-25	45	-75/+270	+40/-35	+40/-40	65	115	270
AUTOBRAKE MAX	1760	+25/-30	45	-80/+275	+35/-25	+45/-45	80	120	290
AUTOBRAKE 4	2175	+30/-35	60	-100/+335	+10/-5	+60/-65	115	5	45
AUTOBRAKE 3	2570	+40/-45	75	-120/+400	+5/-25	+75/-75	120	5	5
AUTOBRAKE 2	2830	+45/-50	90	-140/+460	+40/-70	+80/-80	105	115	115
AUTOBRAKE 1	3065	+60/-60	105	-155/+535	+100/-100	+85/-90	105	350	455

Medium Reported Braking Action

MAX MANUAL	2275	+40/-40	75	-120/+430	+100/-80	+65/-65	75	310	800
AUTOBRAKE MAX	2275	+40/-40	75	-120/+430	+100/-75	+65/-65	85	310	800
AUTOBRAKE 4	2385	+40/-40	75	-120/+445	+70/-45	+65/-65	115	260	765
AUTOBRAKE 3	2680	+40/-45	80	-130/+475	+45/-50	+75/-75	120	125	510
AUTOBRAKE 2	2880	+45/-50	90	-145/+510	+80/-85	+80/-80	105	180	430
AUTOBRAKE 1	3075	+60/-60	105	-155/+550	+120/-105	+90/-90	105	375	585

Poor Reported Braking Action

MAX MANUAL	2890	+60/-50	105	-175/+660	+215/-150	+80/-80	90	640	1905
AUTOBRAKE MAX	2900	+60/-50	105	-175/+660	+220/-150	+80/-80	90	645	1905
AUTOBRAKE 4	2900	+60/-50	105	-175/+660	+215/-140	+80/-80	100	645	1910
AUTOBRAKE 3	3025	+60/-60	105	-180/+675	+180/-125	+85/-85	120	550	1825
AUTOBRAKE 2	3140	+60/-60	110	-185/+690	+195/-145	+85/-85	100	530	1725
AUTOBRAKE 1	3260	+65/-65	115	-190/+705	+215/-155	+90/-90	105	615	1675

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

For Max Manual braking and manual speedbrakes, increase reference landing distance by 80 m.

For autobrake and manual speedbrakes, increase reference landing distance by 70 m.

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

Includes distance from 50 ft above threshold (305 meters of unfactored air distance).

Flight Planning and Performance Manual

ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 20

	LANDING DISTANCE AND ADJUSTMENT (M)								
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS	SLOPE ADJ PER 1%	TEMP ADJ PER 10°C	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	250000 KG LANDING WT	PER 5000 KG ABOVE/BELOW 250000 KG	PER 1000 FT ABOVE SEA LEVEL	HEAD/ TAIL WIND	DOWN/ UP HILL	ABOVE/ BELOW ISA	PER 5 KTS ABOVE VREF20	ONE REV	NO REV

Dry Runway

MAX MANUAL	1120	+30/-15	25	-40/+140	+15/-15	+25/-25	40	30	65
AUTOBRAKE MAX	1585	+20/-25	40	-60/+210	+0/0	+40/-40	75	0	0
AUTOBRAKE 4	2100	+30/-35	60	-90/+300	+0/0	+60/-60	105	0	0
AUTOBRAKE 3	2500	+40/-45	75	-110/+370	+5/-25	+75/-75	115	10	10
AUTOBRAKE 2	2750	+45/-50	90	-125/+425	+45/-65	+80/-80	95	130	130
AUTOBRAKE 1	2975	+55/-60	105	-145/+490	+95/-100	+90/-90	95	370	485

Good Reported Braking Action

MAX MANUAL	1855	+30/-30	50	-80/+280	+45/-40	+45/-45	65	140	330
AUTOBRAKE MAX	1940	+30/-30	50	-85/+295	+40/-25	+50/-50	85	140	340
AUTOBRAKE 4	2420	+35/-40	70	-105/+350	+10/0	+70/-70	120	5	50
AUTOBRAKE 3	2875	+45/-50	85	-125/+425	+5/-30	+85/-85	130	10	10
AUTOBRAKE 2	3160	+50/-60	105	-145/+490	+50/-75	+90/-90	110	150	150
AUTOBRAKE 1	3420	+65/-70	120	-165/+565	+110/-115	+105/-105	110	425	560

Medium Reported Braking Action

MAX MANUAL	2520	+45/-45	80	-125/+455	+110/-85	+70/-70	80	370	960
AUTOBRAKE MAX	2515	+45/-45	80	-125/+455	+110/-80	+70/-70	90	360	955
AUTOBRAKE 4	2645	+45/-45	80	-130/+465	+75/-50	+75/-75	120	295	905
AUTOBRAKE 3	2980	+45/-50	90	-145/+505	+60/-60	+85/-85	125	150	610
AUTOBRAKE 2	3215	+60/-60	105	-155/+540	+85/-90	+90/-90	110	225	525
AUTOBRAKE 1	3435	+65/-70	120	-165/+580	+130/-120	+105/-105	110	455	705

Poor Reported Braking Action

MAX MANUAL	3195	+65/-65	115	-185/+690	+230/-160	+85/-85	90	755	2270
AUTOBRAKE MAX	3205	+65/-65	115	-185/+690	+235/-165	+90/-90	100	755	2270
AUTOBRAKE 4	3205	+65/-65	115	-185/+690	+235/-150	+90/-90	110	755	2275
AUTOBRAKE 3	3350	+65/-65	115	-190/+700	+190/-140	+100/-100	125	640	2170
AUTOBRAKE 2	3485	+65/-70	120	-195/+720	+205/-160	+100/-100	110	620	2060
AUTOBRAKE 1	3615	+70/-70	125	-200/+740	+230/-175	+105/-105	110	725	1995

Reference distance is for sea level, standard day, no wind or slope, VREF20 approach speed, 2 engine reverse thrust, and auto speedbrakes.

For Max Manual braking and manual speedbrakes, increase reference landing distance by 80 m.

For autobrake and manual speedbrakes, increase reference landing distance by 70 m.

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

Includes distance from 50 ft above threshold (305 meters of unfactored air distance).



ADVISORY INFORMATION

Data has been modified to meet the intent of TALPA-ARC recommendations

Reported Braking Action

REPORTED BRAKING ACTION	RUNWAY DESCRIPTION
Dry	Dry
Good	Wet (Smooth, Grooved or PFC) or Frost 3 mm (0.12 inches) or less of: Water, Slush, Dry Snow or Wet Snow
Good to Medium	Compacted Snow at or below -15°C OAT
Medium	Wet (Slippery), Dry Snow or Wet Snow (any depth) over Compacted Snow Greater than 3 mm (0.12 inches) of : Dry Snow or Wet Snow Compacted Snow at OAT warmer than -15°C
Medium to Poor	Greater than 3 mm (0.12 inches) of: Water or Slush
Poor	Ice
Nil	Wet Ice, Water on top of Compacted Snow, Dry Snow or Wet Snow over Ice

Flight Planning and Performance Manual

ADVISORY INFORMATION

Data has been modified to meet the intent of TALPA-ARC recommendations

Normal Configuration Landing Distance

Flaps 30

BRAKING CONFIGURATION	LANDING DISTANCE AND ADJUSTMENTS (M)							
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ
	250000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 250000 KG	PER 1000 FT ABOVE SEA LEVEL	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF30	ONE REV NO REV

Dry Runway

MAX MANUAL	1300	30/-10	25	-45/150	10/-10	25/-25	40	25	60
AUTOBRAKE MAX	1705	30/-25	35	-65/220	0/0	40/-40	75	0	0
AUTOBRAKE 4	2175	40/-30	50	-90/310	0/0	50/-60	110	0	0
AUTOBRAKE 3	2545	45/-40	70	-115/385	0/-10	70/-70	120	0	0
AUTOBRAKE 2	2805	50/-45	80	-130/445	35/-60	75/-75	100	75	75
AUTOBRAKE 1	3035	65/-50	100	-150/520	85/-90	80/-80	100	295	370

Good Reported Braking Action

MAX MANUAL	1775	30/-25	40	-75/265	40/-35	40/-40	60	105	245
AUTOBRAKE MAX	1835	30/-25	45	-75/270	35/-30	40/-40	70	110	260
AUTOBRAKE 4	2180	40/-30	50	-90/315	10/-5	60/-60	110	5	45
AUTOBRAKE 3	2545	45/-40	70	-115/385	5/-10	70/-70	120	0	0
AUTOBRAKE 2	2805	50/-45	80	-130/445	35/-60	75/-75	100	75	75
AUTOBRAKE 1	3035	65/-50	100	-150/520	85/-90	80/-80	100	295	370

Good To Medium Reported Braking Action

MAX MANUAL	2045	35/-30	55	-95/340	65/-55	50/-50	65	195	485
AUTOBRAKE MAX	2080	35/-30	60	-95/345	65/-50	50/-50	75	195	485
AUTOBRAKE 4	2290	45/-30	60	-105/375	45/-25	60/-60	110	130	375
AUTOBRAKE 3	2595	50/-40	70	-120/425	25/-25	70/-70	120	60	240
AUTOBRAKE 2	2830	50/-45	80	-135/470	50/-70	75/-75	100	105	225
AUTOBRAKE 1	3040	65/-50	100	-150/525	100/-95	80/-80	100	305	430

Medium Reported Braking Action

MAX MANUAL	2320	40/-35	70	-115/420	90/-75	60/-60	75	280	720
AUTOBRAKE MAX	2320	45/-35	70	-115/420	100/-75	60/-60	80	275	715
AUTOBRAKE 4	2395	45/-35	70	-120/430	75/-45	60/-65	110	260	705
AUTOBRAKE 3	2650	50/-40	70	-125/460	45/-40	70/-70	120	120	485
AUTOBRAKE 2	2860	50/-45	80	-140/495	70/-80	75/-75	100	140	375
AUTOBRAKE 1	3045	65/-50	100	-150/530	110/-100	80/-80	100	315	495

Medium To Poor Reported Braking Action

MAX MANUAL	2610	50/-45	80	-140/530	145/-105	65/-65	80	430	1215
AUTOBRAKE MAX	2610	50/-45	80	-140/530	150/-110	65/-65	85	430	1210
AUTOBRAKE 4	2650	55/-45	80	-145/540	140/-90	65/-70	105	420	1210
AUTOBRAKE 3	2820	60/-45	80	-150/560	110/-80	75/-75	120	320	1070
AUTOBRAKE 2	2985	60/-50	90	-160/580	125/-110	80/-80	100	300	965
AUTOBRAKE 1	3135	65/-55	100	-165/610	155/-125	85/-85	100	430	990

Poor Reported Braking Action

MAX MANUAL	2895	60/-50	90	-165/645	200/-140	75/-75	85	580	1710
AUTOBRAKE MAX	2900	60/-50	90	-165/645	205/-145	75/-75	85	580	1710
AUTOBRAKE 4	2900	65/-50	90	-165/645	205/-130	75/-75	100	580	1710
AUTOBRAKE 3	2995	65/-50	90	-175/655	175/-115	80/-80	120	525	1655
AUTOBRAKE 2	3115	65/-50	100	-180/665	180/-140	80/-80	100	465	1555
AUTOBRAKE 1	3225	65/-60	105	-185/690	200/-150	85/-85	100	545	1490

Reference distance is based on sea level, standard day, no wind or slope, VREF30 approach speed, two-engine maximum reverse thrust, and auto speedbrakes.

For max manual braking and manual speedbrakes, increase reference landing distance by 75 m.

For autobrake and manual speedbrakes, increase reference landing distance by 60 m.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

All reference distances and adjustments shown have been increased by 15%.

ADVISORY INFORMATION

Data has been modified to meet the intent of TALPA-ARC recommendations

Normal Configuration Landing Distance

Flaps 25

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	250000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 250000 KG	PER 1000 FT ABOVE SEA LEVEL	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF25	ONE REV	NO REV

Dry Runway

MAX MANUAL	1360	30/-15	30	-45/155	15/-10	30/-30	40	30	65
AUTOBRAKE MAX	1820	25/-25	40	-70/225	0/0	40/-40	80	0	0
AUTOBRAKE 4	2335	30/-35	60	-100/320	0/0	60/-60	115	0	0
AUTOBRAKE 3	2745	40/-45	75	-120/405	0/-25	75/-75	120	5	5
AUTOBRAKE 2	3005	45/-50	90	-140/460	40/-70	80/-80	105	115	115
AUTOBRAKE 1	3240	60/-60	105	-155/535	100/-100	85/-90	105	350	455

Good Reported Braking Action

MAX MANUAL	1865	25/-25	45	-75/270	40/-35	40/-40	65	115	270
AUTOBRAKE MAX	1935	25/-30	45	-80/275	35/-25	45/-45	80	120	290
AUTOBRAKE 4	2350	30/-35	60	-100/335	10/-5	60/-65	115	5	45
AUTOBRAKE 3	2745	40/-45	75	-120/405	5/-25	75/-75	120	5	5
AUTOBRAKE 2	3005	45/-50	90	-140/460	40/-70	80/-80	105	115	115
AUTOBRAKE 1	3240	60/-60	105	-155/535	100/-100	85/-90	105	350	455

Good To Medium Reported Braking Action

MAX MANUAL	2160	30/-30	60	-100/350	70/-60	50/-50	70	215	535
AUTOBRAKE MAX	2195	30/-35	60	-100/355	65/-50	55/-55	85	215	545
AUTOBRAKE 4	2455	35/-35	65	-110/390	40/-25	60/-65	115	130	405
AUTOBRAKE 3	2800	40/-45	80	-125/440	25/-35	75/-75	120	65	260
AUTOBRAKE 2	3030	45/-50	90	-140/485	60/-80	80/-80	105	145	275
AUTOBRAKE 1	3245	60/-60	105	-155/545	110/-100	90/-90	105	360	520

Medium Reported Braking Action

MAX MANUAL	2450	40/-40	75	-120/430	100/-80	65/-65	75	310	800
AUTOBRAKE MAX	2450	40/-40	75	-120/430	100/-75	65/-65	85	310	800
AUTOBRAKE 4	2560	40/-40	75	-120/445	70/-45	65/-65	115	260	765
AUTOBRAKE 3	2855	40/-45	80	-130/475	45/-50	75/-75	120	125	510
AUTOBRAKE 2	3055	45/-50	90	-145/510	80/-85	80/-80	105	180	430
AUTOBRAKE 1	3250	60/-60	105	-155/550	120/-105	90/-90	105	375	585

Medium To Poor Reported Braking Action

MAX MANUAL	2760	50/-45	90	-145/545	155/-115	70/-70	85	475	1350
AUTOBRAKE MAX	2765	50/-45	90	-145/545	160/-110	70/-70	90	475	1350
AUTOBRAKE 4	2815	50/-45	90	-145/550	140/-90	70/-70	105	450	1335
AUTOBRAKE 3	3025	50/-50	90	-155/575	110/-90	80/-80	120	340	1165
AUTOBRAKE 2	3185	50/-55	100	-165/600	140/-115	85/-85	100	355	1080
AUTOBRAKE 1	3345	60/-60	110	-175/630	165/-130	90/-90	105	495	1130

Poor Reported Braking Action

MAX MANUAL	3070	60/-50	105	-175/660	215/-150	80/-80	90	640	1905
AUTOBRAKE MAX	3075	60/-50	105	-175/660	220/-150	80/-80	90	645	1905
AUTOBRAKE 4	3075	60/-50	105	-175/660	215/-140	80/-80	100	645	1910
AUTOBRAKE 3	3200	60/-60	105	-180/675	180/-125	85/-85	120	550	1825
AUTOBRAKE 2	3315	60/-60	110	-185/690	195/-145	85/-85	100	530	1725
AUTOBRAKE 1	3435	65/-65	115	-190/705	215/-155	90/-90	105	615	1675

Reference distance is based on sea level, standard day, no wind or slope, VREF25 approach speed, two-engine maximum reverse thrust, and auto speedbrakes.

For max manual braking and manual speedbrakes, increase reference landing distance by 80 m.

For autobrake and manual speedbrakes, increase reference landing distance by 65 m.

Reference distance includes an air distance allowance of 455 m from threshold to touchdown.

All reference distances and adjustments shown have been increased by 15%.

Flight Planning and Performance Manual

ADVISORY INFORMATION

Data has been modified to meet the intent of TALPA-ARC recommendations

Normal Configuration Landing Distance

Flaps 20

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	250000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 250000 KG	PER 1000 FT ABOVE SEA LEVEL	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF20	ONE REV	NO REV

Dry Runway

MAX MANUAL	1465	35/-15	30	-45/160	15/-15	30/-30	45	35	75
AUTOBRAKE MAX	2000	25/-30	45	-70/240	0/0	45/-45	85	0	0
AUTOBRAKE 4	2590	35/-40	70	-105/345	0/0	70/-70	120	0	0
AUTOBRAKE 3	3050	45/-50	85	-125/425	5/-30	85/-85	130	10	10
AUTOBRAKE 2	3340	50/-60	105	-145/490	50/-75	90/-90	110	150	150
AUTOBRAKE 1	3595	65/-70	120	-165/565	110/-115	105/-105	110	425	560

Good Reported Braking Action

MAX MANUAL	2035	30/-30	50	-80/280	45/-40	45/-45	65	140	330
AUTOBRAKE MAX	2115	30/-30	50	-85/295	40/-25	50/-50	85	140	340
AUTOBRAKE 4	2595	35/-40	70	-105/350	10/0	70/-70	120	5	50
AUTOBRAKE 3	3050	45/-50	85	-125/425	5/-30	85/-85	130	10	10
AUTOBRAKE 2	3340	50/-60	105	-145/490	50/-75	90/-90	110	150	150
AUTOBRAKE 1	3595	65/-70	120	-165/565	110/-115	105/-105	110	425	560

Good To Medium Reported Braking Action

MAX MANUAL	2365	35/-35	65	-105/370	80/-65	60/-60	70	255	645
AUTOBRAKE MAX	2400	35/-35	65	-105/375	75/-50	60/-60	90	250	645
AUTOBRAKE 4	2710	40/-45	75	-120/410	45/-25	70/-70	120	150	475
AUTOBRAKE 3	3100	45/-50	90	-135/465	30/-45	85/-85	130	80	310
AUTOBRAKE 2	3365	55/-60	105	-150/515	70/-85	90/-90	110	185	335
AUTOBRAKE 1	3600	65/-70	120	-165/570	120/-120	105/-105	110	440	635

Medium Reported Braking Action

MAX MANUAL	2695	45/-45	80	-125/455	110/-85	70/-70	80	370	960
AUTOBRAKE MAX	2695	45/-45	80	-125/455	110/-80	70/-70	90	360	955
AUTOBRAKE 4	2820	45/-45	80	-130/465	75/-50	75/-75	120	295	905
AUTOBRAKE 3	3155	45/-50	90	-145/505	60/-60	85/-85	125	150	610
AUTOBRAKE 2	3390	60/-60	105	-155/540	85/-90	90/-90	110	225	525
AUTOBRAKE 1	3610	65/-70	120	-165/580	130/-120	105/-105	110	455	705

Medium To Poor Reported Braking Action

MAX MANUAL	3035	55/-55	100	-155/570	170/-125	80/-80	85	560	1615
AUTOBRAKE MAX	3035	55/-55	100	-155/570	175/-125	80/-80	95	560	1615
AUTOBRAKE 4	3100	55/-55	100	-160/580	155/-100	85/-85	115	525	1590
AUTOBRAKE 3	3340	55/-60	105	-165/605	125/-100	90/-90	125	395	1390
AUTOBRAKE 2	3525	60/-65	110	-175/630	145/-125	95/-95	110	425	1290
AUTOBRAKE 1	3700	65/-70	125	-185/660	180/-145	105/-105	110	590	1350

Poor Reported Braking Action

MAX MANUAL	3370	65/-65	115	-185/690	230/-160	85/-85	90	755	2270
AUTOBRAKE MAX	3380	65/-65	115	-185/690	235/-165	90/-90	100	755	2270
AUTOBRAKE 4	3380	65/-65	115	-185/690	235/-150	90/-90	110	755	2275
AUTOBRAKE 3	3530	65/-65	115	-190/700	190/-140	100/-100	125	640	2170
AUTOBRAKE 2	3660	65/-70	120	-195/720	205/-160	100/-100	110	620	2060
AUTOBRAKE 1	3790	70/-70	125	-200/740	230/-175	105/-105	110	725	1995

Reference distance is based on sea level, standard day, no wind or slope, VREF20 approach speed, two-engine maximum reverse thrust, and auto speedbrakes.

For max manual braking and manual speedbrakes, increase reference landing distance by 85 m.

For autobrake and manual speedbrakes, increase reference landing distance by 70 m.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

All reference distances and adjustments shown have been increased by 15%.

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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 rate for normal operation is 240 kg per hour on the ground.

Taxi fuel allowance is approximately 33 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)				
	300	260	220	180	140
43				160	140
39			180	160	145
35		200	190	170	140
31	230	220	195	165	140
25	230	220	195	175	155
20	235	230	205	185	165
15	235	235	215	200	185
10	240	240	230	220	200
5	270	270	255	240	220

Climb

Trip Fuel and Time charts are based on 310/.84 climb speed. Local ATC may require that 250 KIAS not be exceeded below 10000 ft. Approximately 100 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	.84M	CI 180
2000 FT ABOVE	3	3	3
OPTIMUM ALTITUDE	0	0	0
2000 FT BELOW	2	2	2
4000 FT BELOW	5	6	6
6000 FT BELOW	7	10	10
8000 FT BELOW	9	14	13
10000 FT BELOW	11	19	17
12000 FT BELOW	14	24	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 LRC may be approximated by a constant .84M or Cost Index 180.

Increase total fuel flow during cruise approximately 25 kg/hr for engine anti-ice on or 125 kg/hr for engine and wing anti-ice on.

Every 500 kg reduction in landing weight decreases trip fuel at optimum altitude by approximately 0.16%.

Descent

Optimum descent speeds for minimum trip fuel are a function of weight. Trip Fuel and Time charts are based on .84/310/250 descent speed, and include straight in approach allowances only. Each additional minute of flaps down maneuvering consumes approximately 140 kg of additional fuel with the gear retracted and 165 kg with the gear extended.

Missed Approach

Approximately 430 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.

Optimum Altitude/Short Trip Cruise Altitude

Optimum altitude for best fuel mileage is presented for LRC. This chart also closely approximates the optimum altitude for .84M. For flight planning purposes, a single line is sufficiently accurate for both speeds. Fuel mileage penalties for flying off-optimum altitude are tabulated under Altitude Selection.

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.

Trip Fuel and Time

Trip Fuel and Time charts are provided for Long Range Cruise and .84M at constant altitude to determine trip fuel and time from brake release to touchdown. A similar chart for a cost index of 180 (which approximates Long Range Cruise) is also shown. APU usage, taxi, inflight flaps down maneuvering (other than straight in approach) and reserve fuel should be added to the 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 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 correction guidelines. Adjusted ground distance is ground distance multiplied by the ratio $\text{Average TAS} / (\text{Average TAS} + \text{Wind Component})$, where headwind is negative and tailwind is positive.

Step Climb 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 continually increases as the airplane weight decreases, a step climb procedure bracketing optimum altitude is necessary.

The Step Climb Planning charts provide trip fuel and time for Long Range Cruise, .84M or Cost Index 180 from brake release to touchdown, similar to the constant altitude Trip Fuel and Time charts. The charts are based on 4000 ft step climbs to 2000 ft above optimum altitude.

Short Trip Fuel and Time

Short Trip Fuel and Time charts include fuel and time for climb to cruise altitude, cruise, descent and straight in approach. The charts are 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, adjusted 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

These tables provide total fuel flow information necessary for planning holding and reserve fuel requirements. The tables are 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 table values by 5%.

Fuel Tankering

The Fuel Tankering table below is provided for LRC/.84M cruise schedule based on a step climb procedure to bracket optimum altitude. When a fuel price differential exists between two stations, this table may be used to determine if fuel may be economically transported for a subsequent flight sector.

Enter the table with the trip distance to read the break-even fuel price ratio. As noted, the break-even fuel price is the fuel price at departure multiplied by the break-even fuel price ratio. To justify tanker operation, economically, the fuel price at destination must be greater than the break-even fuel price.

TRIP DISTANCE (NM)	BREAK-EVEN PRICE RATIO
200	1.011
400	1.023
600	1.034
800	1.046
1000	1.057
2000	1.116
3000	1.178
4000	1.244
5000	1.314
6000	1.386

Oxygen Requirements

Passenger Oxygen System - Gaseous

Data is provided to determine minimum oxygen cylinder pressure dispatch requirements. Table 1 shows oxygen quantity required to complete an emergency descent to 14000 ft, level off and continue for the duration of the post decompression time period to 10000 ft. The minimum oxygen quantity required for a particular flight is obtained by entering Table 1 with the

total number of passenger cabin outlets intended to be used, and planned cruise altitude, and reading oxygen volume required for the projected post decompression time above 10000 ft. Total number of passenger cabin outlets shall include all outlets intended to be used located on the main cabin as well as overhead rests (if installed).

Table 2 shows adjustments which must be applied to the Table 1 values in situations where the minimum enroute altitude after decompression exceeds 14000 ft. The Table 2 adjustments reflect only the incremental increase in oxygen quantity associated with periods of post decompression flight at altitudes above 14000 ft. Consequently, time spent holding at higher than 14000 ft must also be included in the total post decompression time used in Table 1.

After determining the total volume (liters) required from Tables 1 and 2, isolate the passenger oxygen system cylinder configuration on the Cylinder Volume to Pressure Conversion table and read dispatch pressure required. Adjust this reading for cylinder temperature as required, using the adjustments given.

Flight Crew System

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.

Tables are provided to determine the flight crew oxygen dispatch requirements. Table 1 shows minimum oxygen quantity necessary to ensure that protective breathing requirements are satisfied. Table 2 shows the supplemental oxygen requirement for loss of pressurization, emergency descent and total post decompression flight time above 10000 ft. Table 3 gives adjustments that must be applied to Table 2 crew member supplemental requirements in situations where the enroute altitude after decompression will exceed 14000 ft. The increments shown in Table 3 reflect only the increase in oxygen flow rate associated with periods of post decompression flight at altitudes other than 14000 ft. Hence, this time must also be included in the Table 2 time value used.

Table 2 and Table 3 values are based on “NORMAL” regulator setting. Table 3 also shows “100%” regulator setting adjustments that can be used if the operator chooses to schedule oxygen dispatch requirements based on pure oxygen availability.

Additional adjustments for more extensive than normal crew usage can be made by adding 2.05 liters/person/minute (0.6 psi/person/minute for the dual

cylinder system) or 13 liters/person/minute (4 psi/person/minute) if 100% oxygen is selected during normal usage.

After determining the total volume (liters) required for the flight crew by using the larger value from Table 1 or Table 2, isolate the crew oxygen system cylinder configuration on the Cylinder Volume to Pressure Conversion table and read dispatch pressure required. Adjust this reading for cylinder temperature as required, using the adjustments given.

Driftdown

Net Level Off Weight

This chart is used to determine the maximum weight for terrain clearance based on the Approved Flight Manual net engine inoperative performance at 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. 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 anti-ice operation with the weight adjustment shown on 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 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 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.

To determine fuel required, enter with the desired ground distance, correct 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

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 diversion airport comply with rules set up specifically for extended range operation with two engine airplanes. 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 driftdown/cruise speed schedules. The information is based on drifting down using Max Continuous thrust at the Mach number shown until reaching the corresponding airspeed and maintaining that airspeed throughout the remainder of the driftdown and level cruise. Based on route requirements, operators may select any one of these speeds for their operation, or may elect to use an entirely different speed which is not contained in this section.

Flight Planning

The following information is shown for flight planning purposes and is intended for use mainly by ground personnel.

Data is included for five basic schedules (Long Range Cruise, .82/260, .84/280, .84/300 and .84/320) throughout this section to allow the operator to evaluate the effect of using speeds up to 320 KIAS.

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 range operation. The distance to the diversion airport from any point along the intended route must be covered within the approved time using the single engine cruise speed (assuming still air and ISA conditions) selected by the operator.

Enter the chart with the appropriate weight using the speed schedule and time selected and read the 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 flight profiles as described on the charts. This information is shown for All-Engines operation at Long Range Cruise, as well as Engine-Inop operation at Long Range Cruise, 260, 280, 300 and 320 KIAS. There are two separate Engine-Inop scenarios; one assumes a loss of pressurization and subsequent cruise at 10000 ft, the other assumes only an engine failure with the airplane drifting down to an applicable level-off altitude for the remainder of the diversion. The ETOPS Critical Fuel required is the greater of All-Engine fuel or Engine-Inop fuel for the speed schedule selected. This fuel is compared to the amount of fuel normally onboard the airplane at that point in the route. If the fuel required by critical fuel reserves exceeds the amount of fuel normally expected, fuel load must be adjusted accordingly.

To determine the fuel required, enter the appropriate chart with desired diversion distance, adjust for forecast wind (factored if applicable), proceed vertically to the weight at critical point and read the fuel required to the right. If the operator is 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 at the bottom of the chart. If the operator is not using an acceptable wind forecasting model, the calculated diversion fuel is to be increased by 5% instead of factoring the forecast wind values.

Adjustments for non-standard conditions are shown at the bottom of the page.

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.

Net Level Off Weight

These charts are used to determine the maximum weight for terrain clearance based on net engine inoperative performance for the speed schedules shown and is for planning purposes only. Regulations require terrain clearance flight planning based on net performance which is the gross (or actual) gradient performance degraded by 1.1%.

Net level off weight is determined by entering the appropriate chart at the left with the desired level off pressure altitude, correcting for anti-ice as shown, proceeding across to the correct ISA deviation line and reading the allowable weight at the bottom. The net level off altitude may be obtained by entering the chart with weight and proceeding up to the correct ISA deviation line and reading across to the altitude on the left.

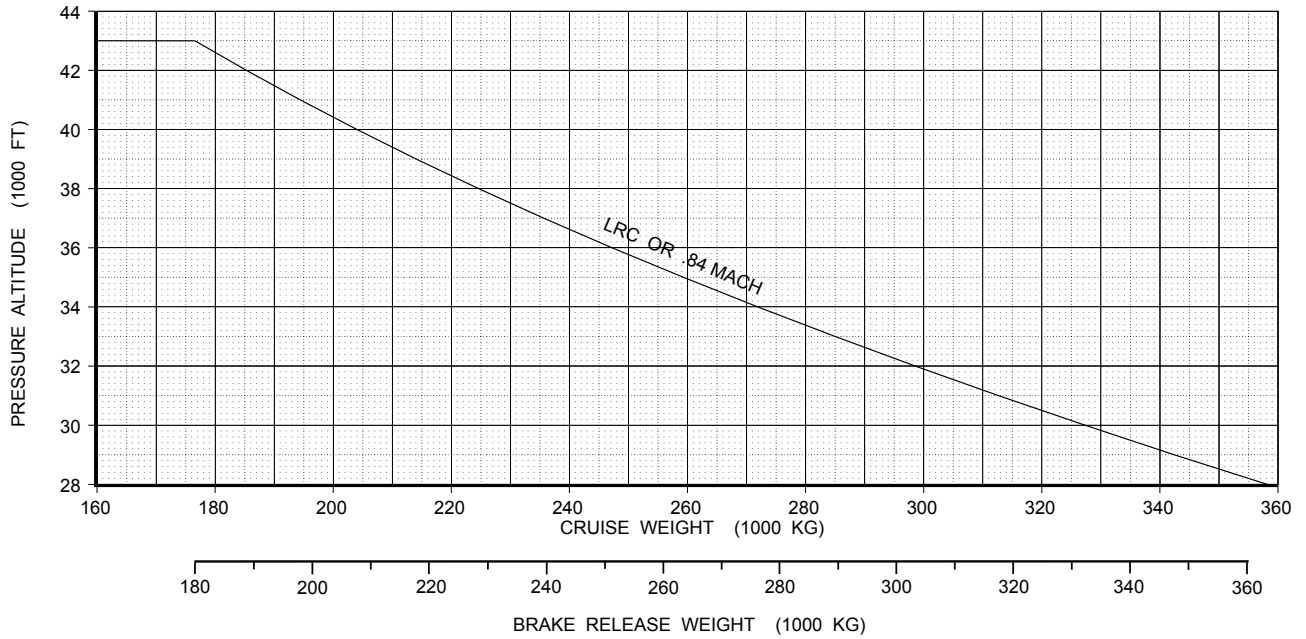
Driftdown/Cruise Range Capability

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.

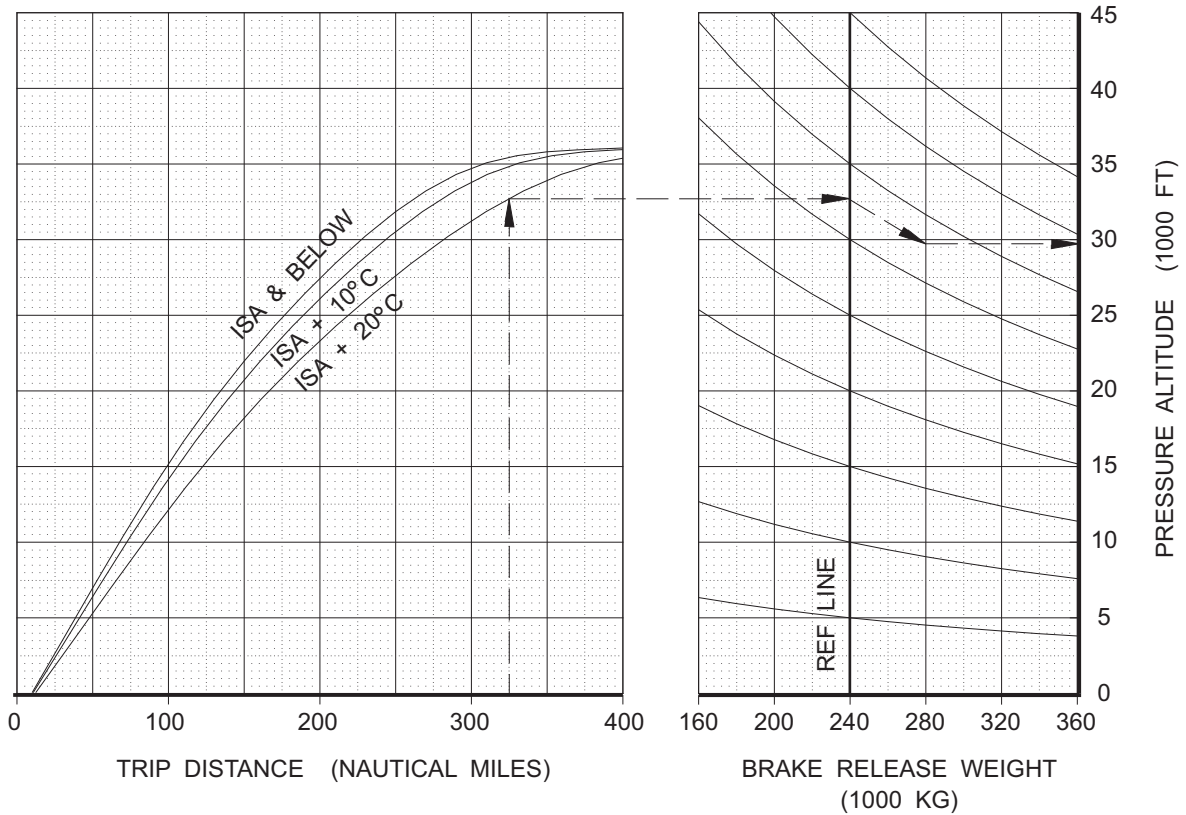
To determine the fuel required, enter with the desired ground distance, adjust for the anticipated wind, and proceed vertically to the start of driftdown weight and read the fuel required to the right. The time required is read to the left from the single weight line on top. The chart may be used in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

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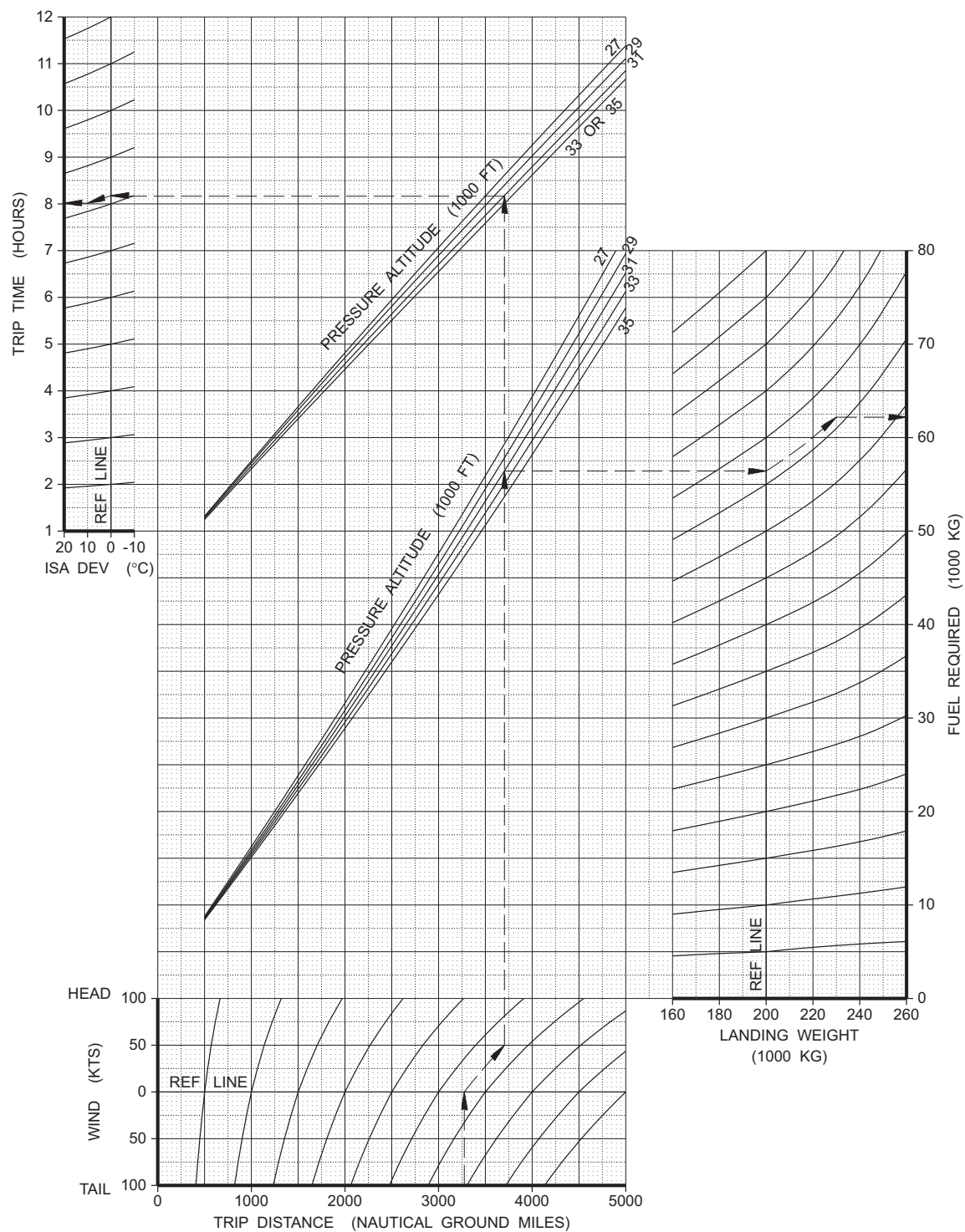
Optimum Altitude



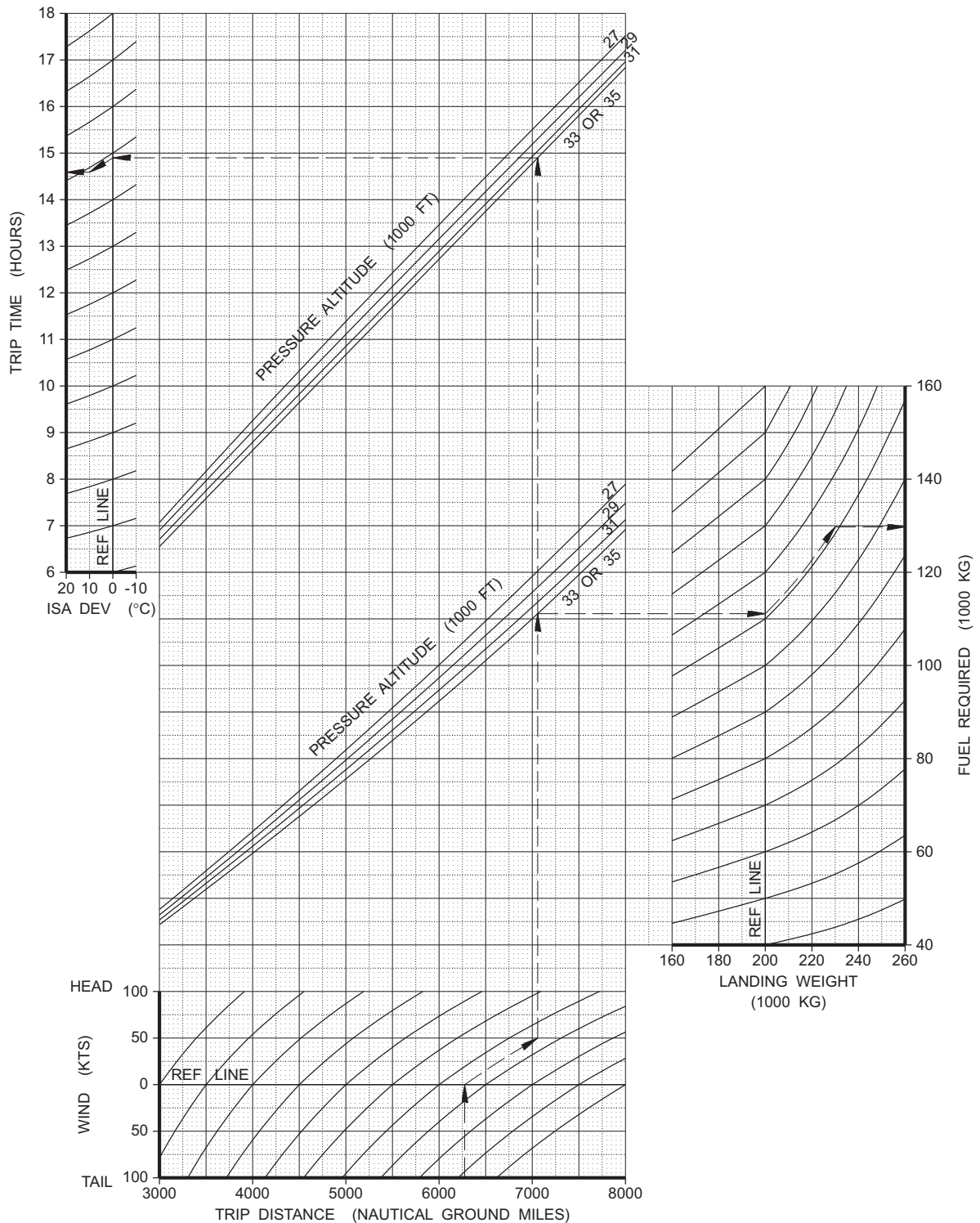
Short Trip Cruise Altitude



Long Range Cruise Trip Fuel and Time
0 to 5000 NM Trip Distance
Based on 310/.84 climb and .84/310/250 descent



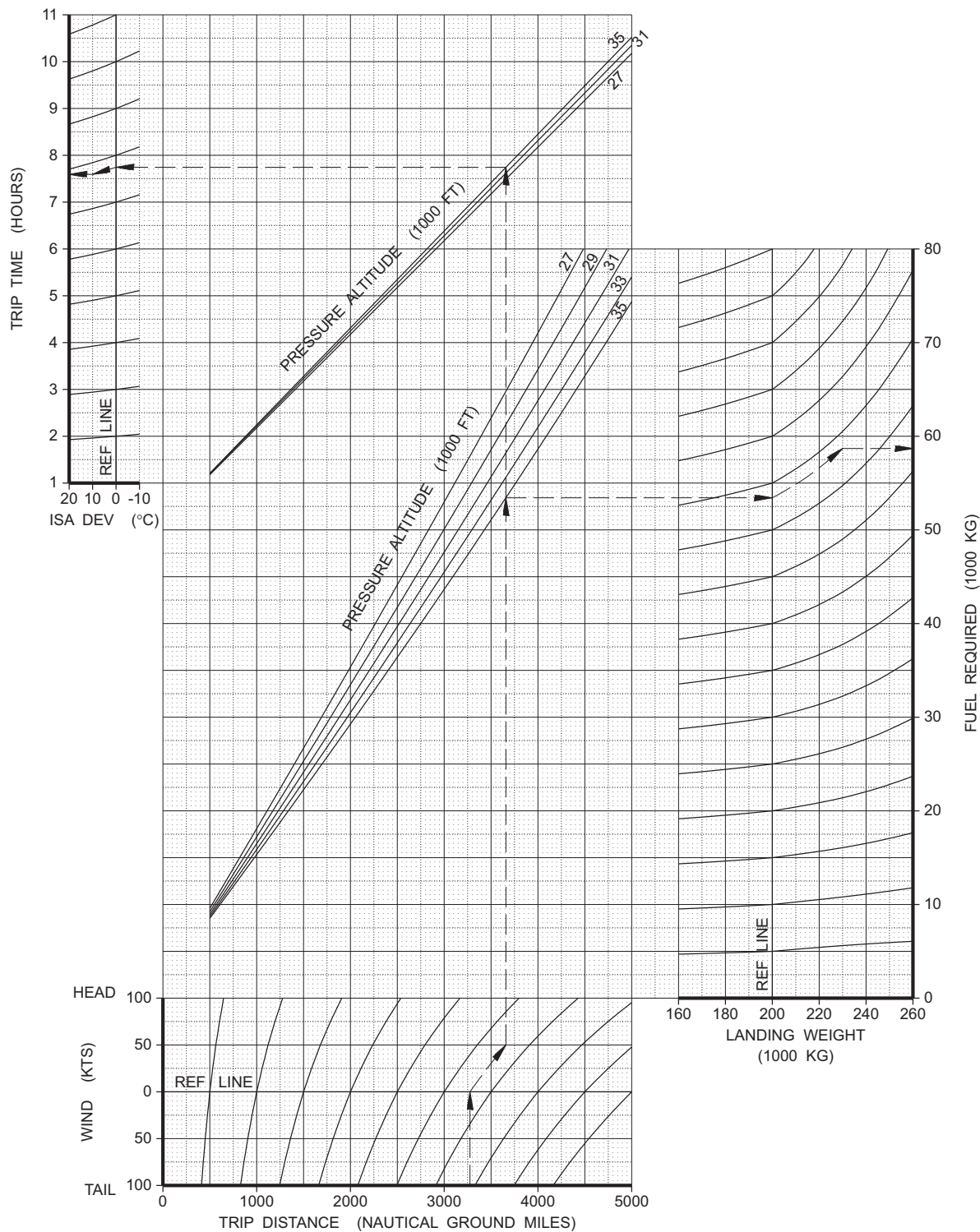
Long Range Cruise Trip Fuel and Time
3000 to 8000 NM Trip Distance
Based on 310/.84 climb and .84/310/250 descent



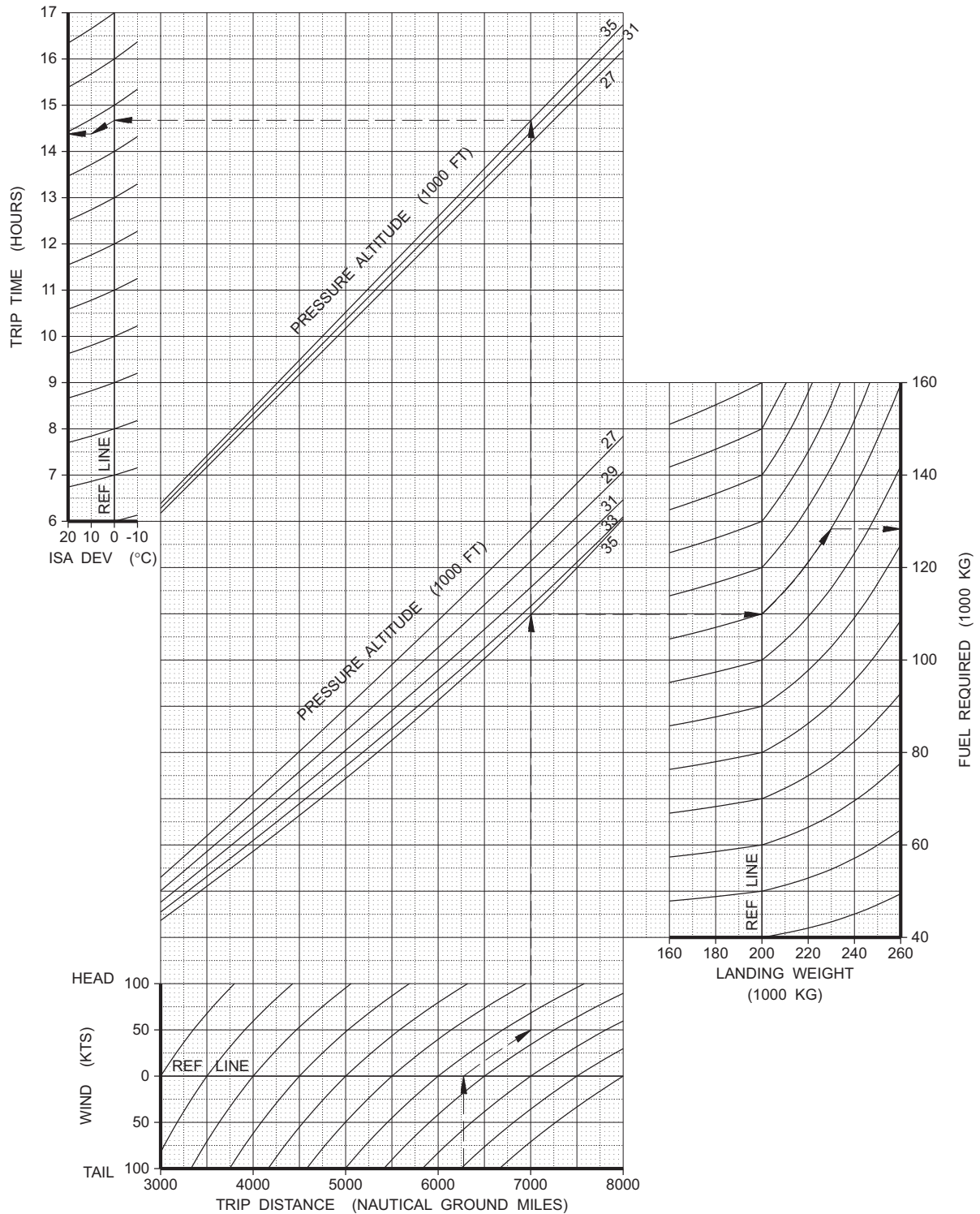
.84M Trip Fuel and Time

0 to 5000 NM Trip Distance

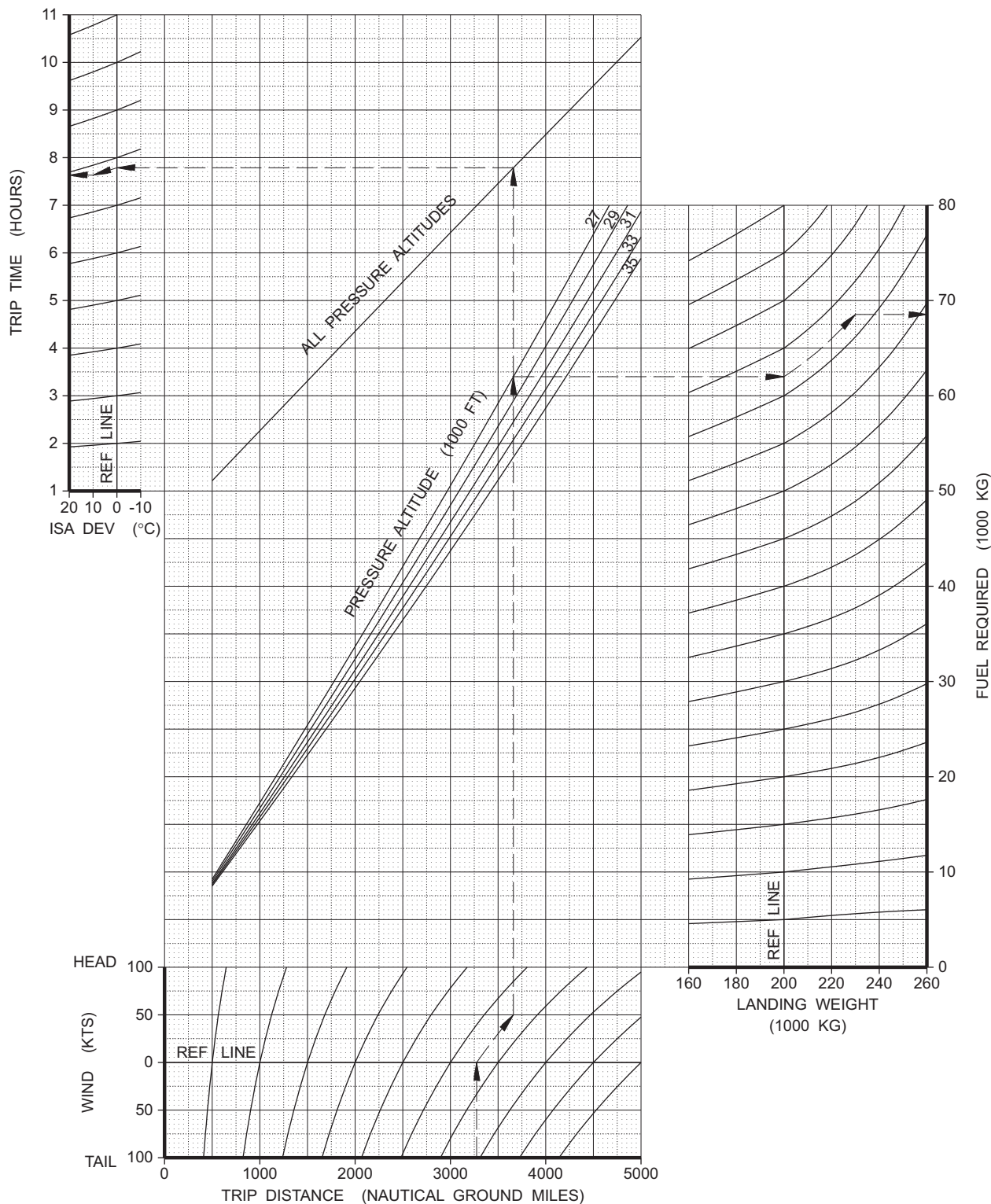
Based on .310/.84 climb and .84/310/250 descent



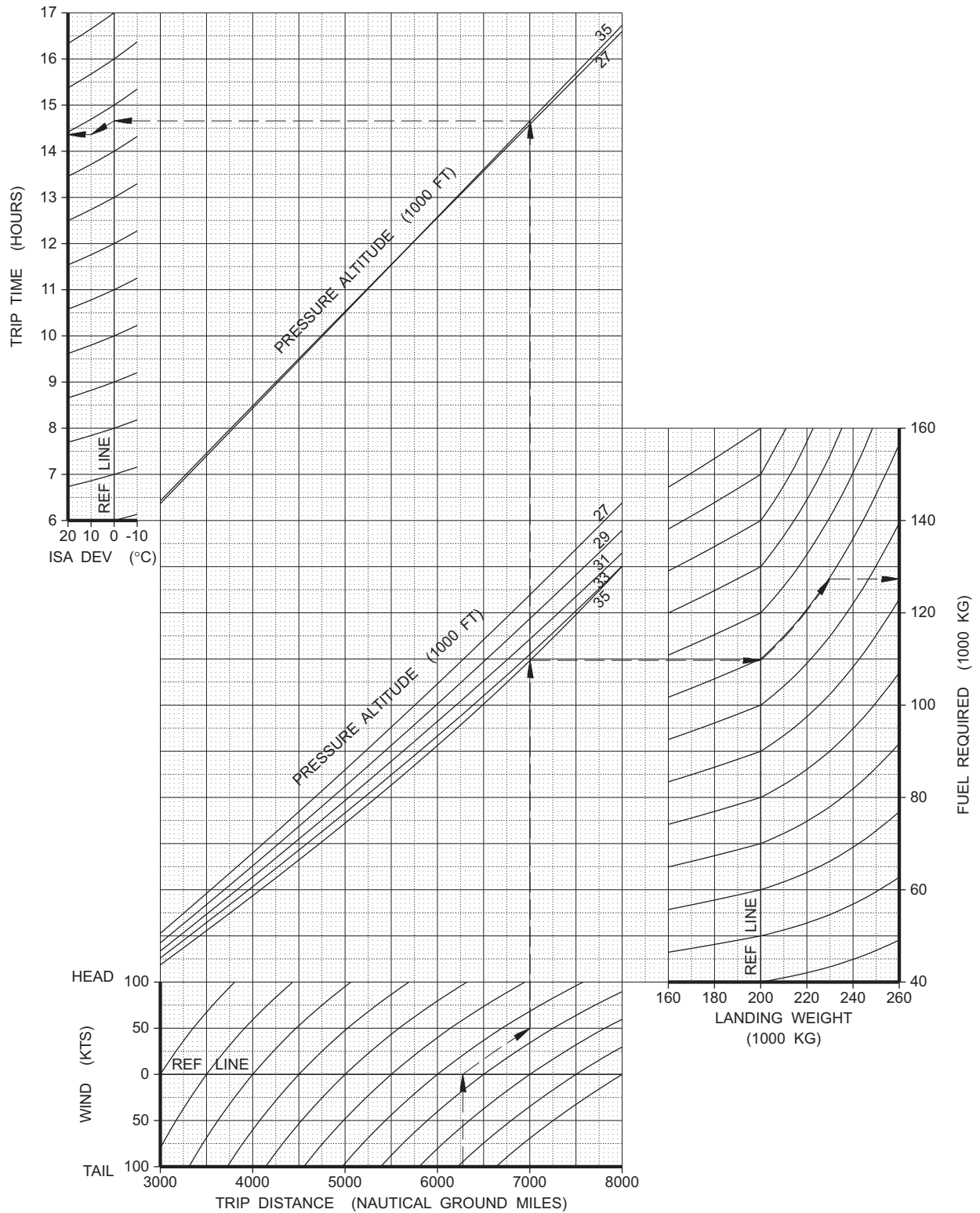
.84M Trip Fuel and Time
3000 to 8000 NM Trip Distance
Based on 310/.84 climb and .84/310/250 descent



**Cost Index 180 Trip Fuel and Time
0 to 5000 NM Trip Distance**

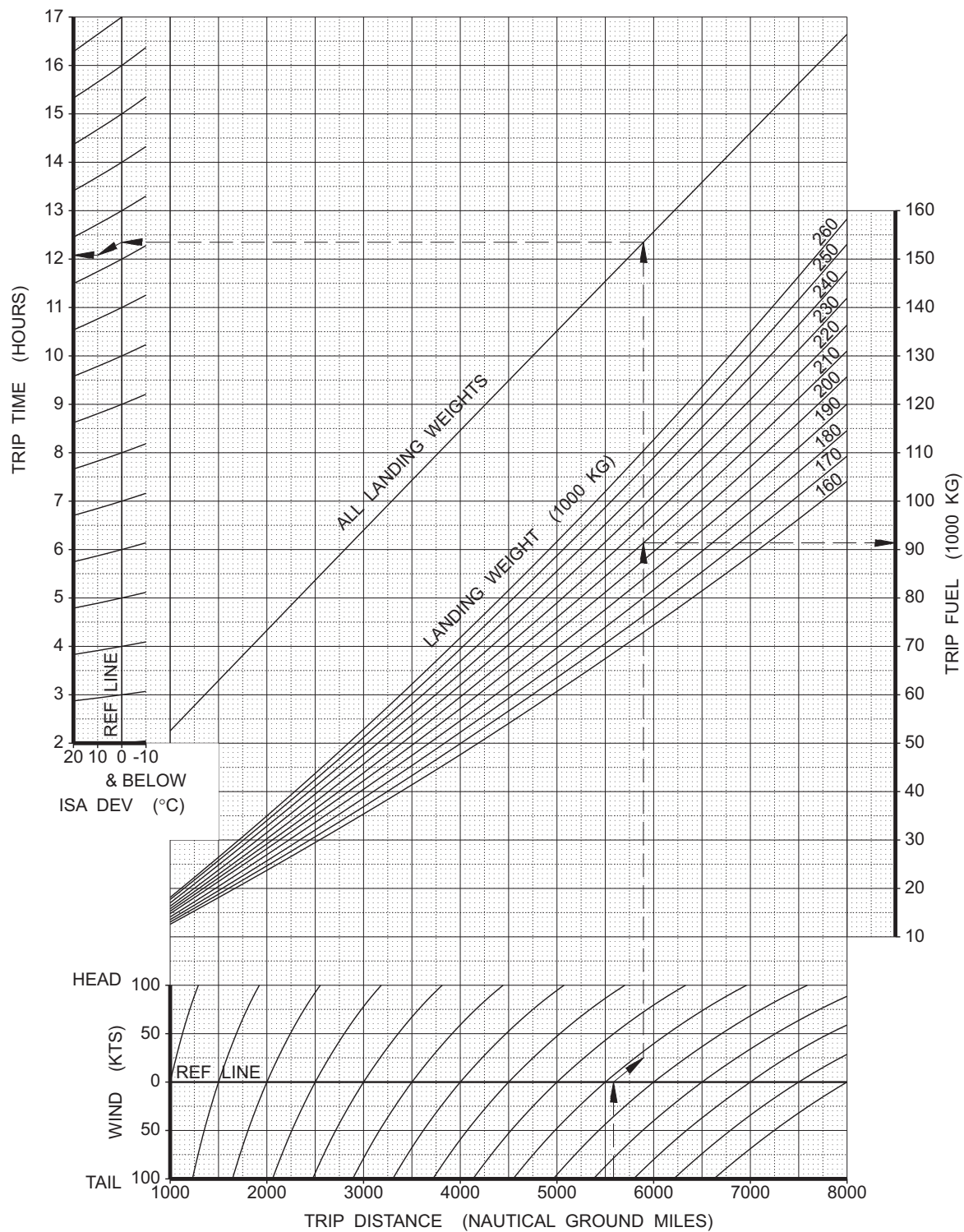


Cost Index 180 Trip Fuel and Time
3000 to 8000 NM Trip Distance

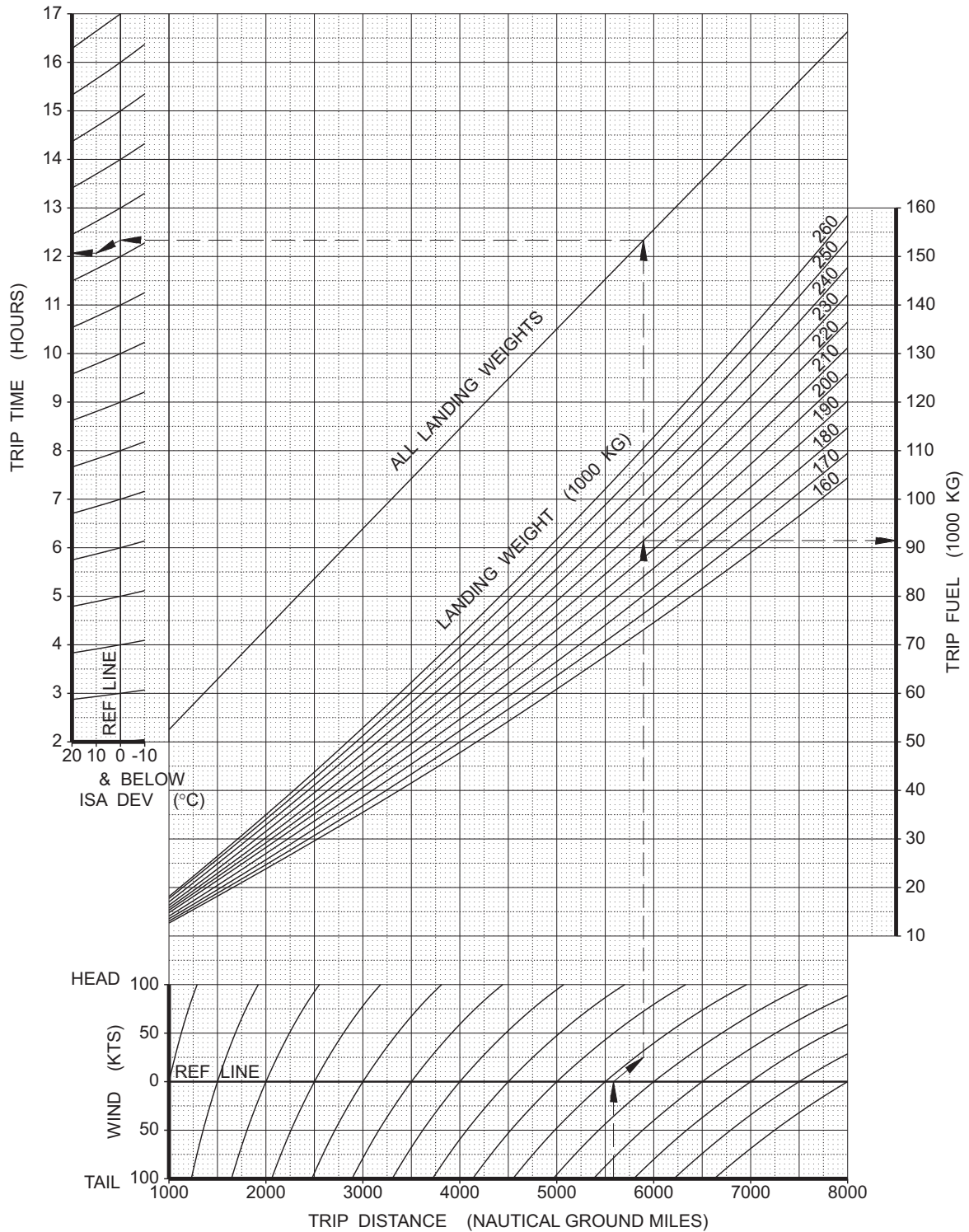


Long Range Cruise Step Climb Trip Fuel and Time

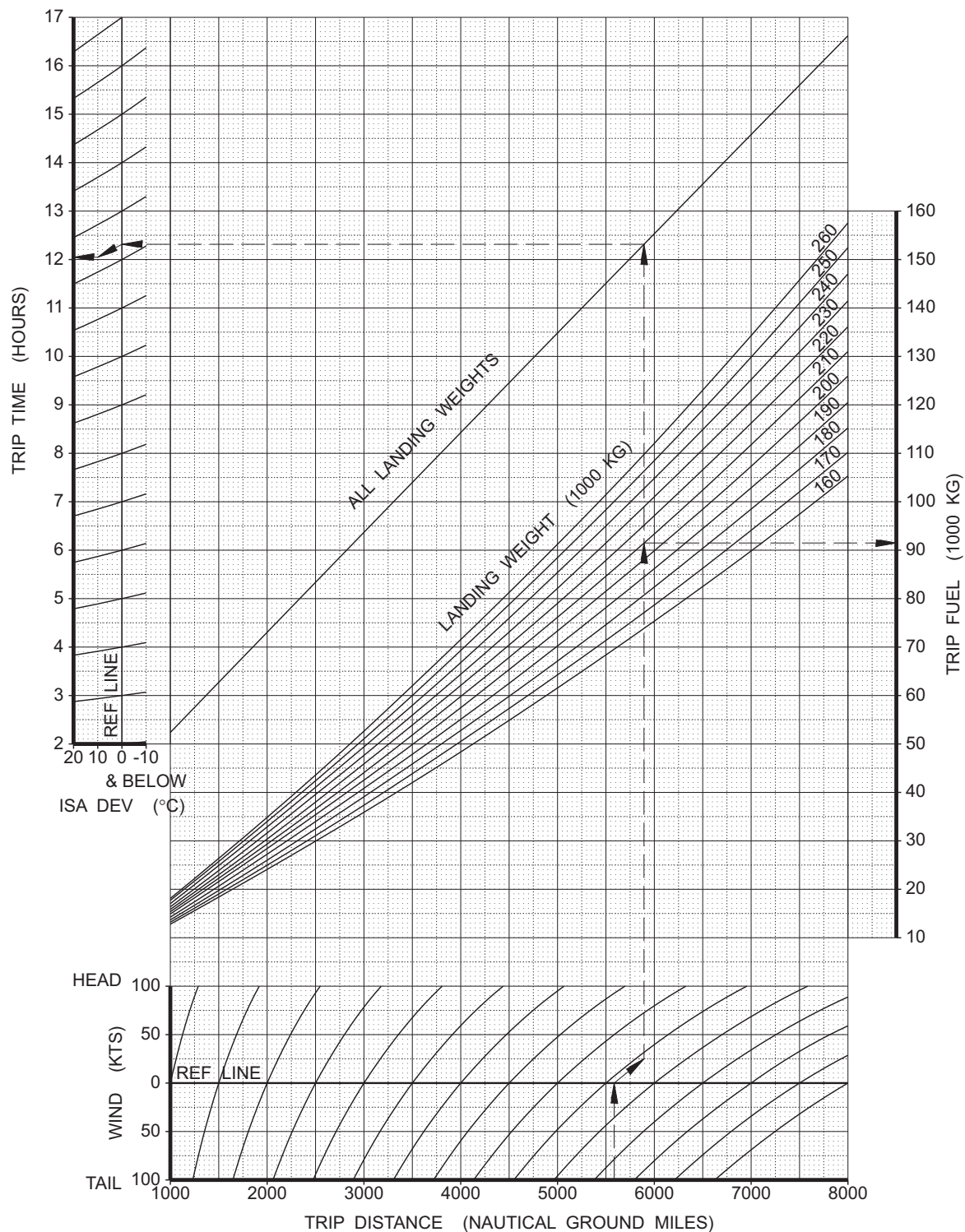
Based on 310/.84 climb and .84/310/250 descent



.84M Step Climb Trip Fuel and Time
Based on 310/.84 climb and .84/310/250 descent

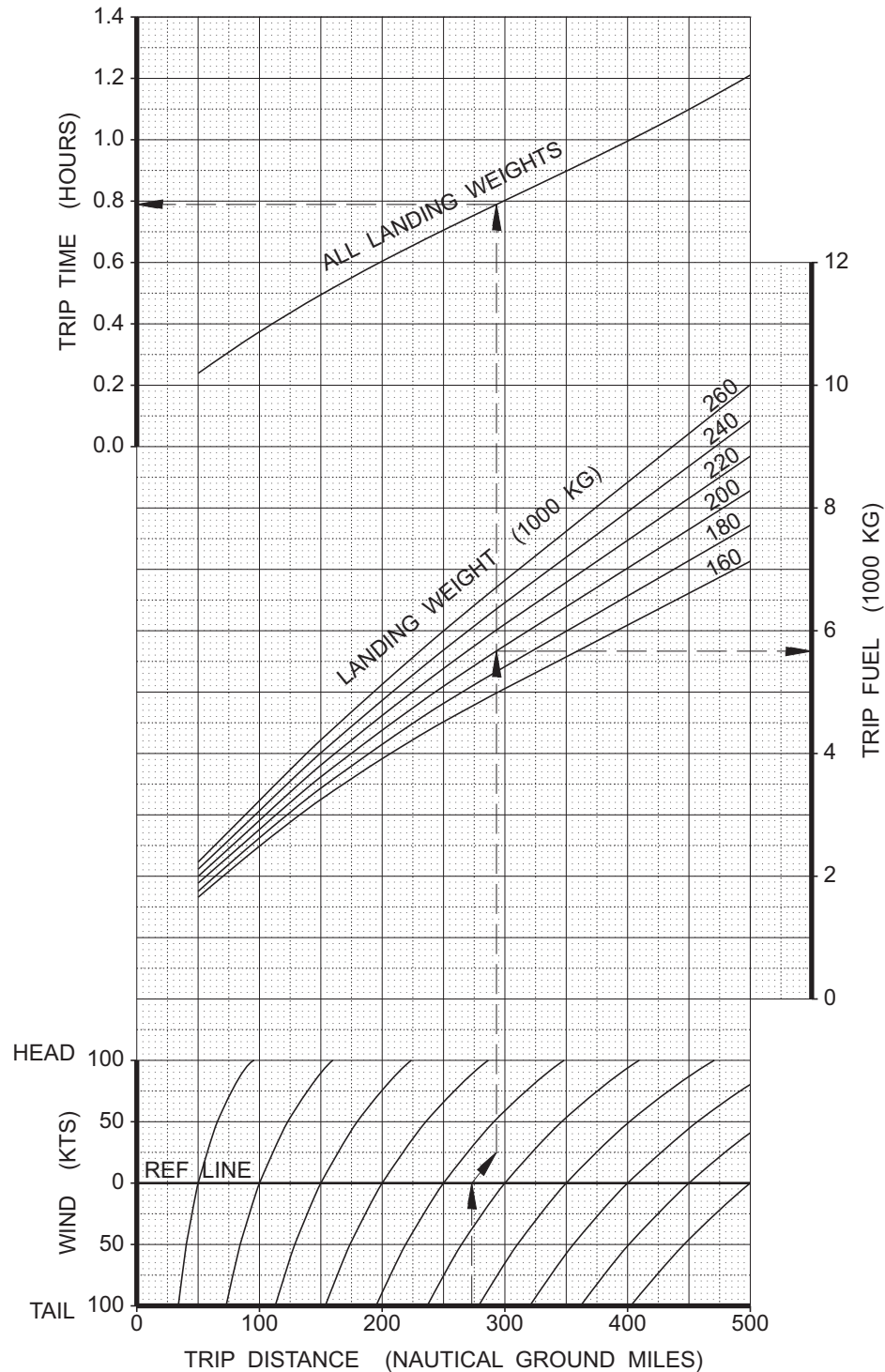


Cost Index 180 Step Climb Trip Fuel and Time

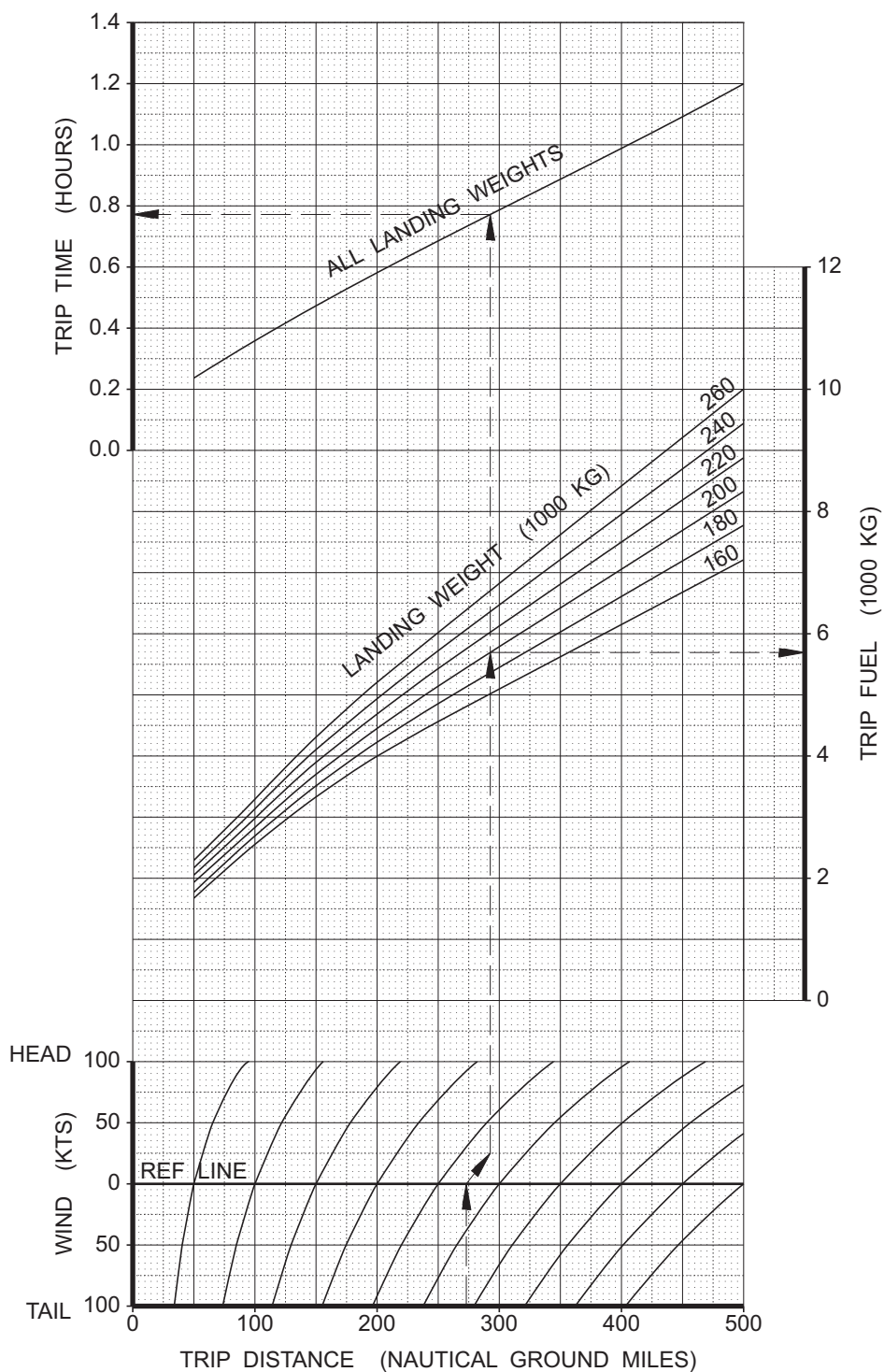


Long Range Cruise Short Trip Fuel and Time

Based on 310/.84 climb and .84/310/250 descent at short trip cruise altitude



Cost Index 180 Short Trip Fuel and Time





Flight Planning and Performance Manual

Holding Planning
Flaps Up

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)										
	WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43000											4670
40000									5850	5180	4540
35000						7490	6810	6170	5540	4930	4360
30000	10770	9950	9200	8540	7890	7250	6610	6000	5390	4700	4320
25000	10280	9600	8910	8270	7660	7070	6390	5710	5150	4780	4340
20000	9920	9320	8720	8040	7340	6690	6140	5640	5170	4730	4410
15000	9600	8910	8260	7700	7180	6660	6140	5660	5230	4820	4520
10000	9290	8770	8250	7730	7220	6710	6210	5740	5310	4900	4630
5000	9380	8880	8360	7840	7330	6830	6360	5920	5500	5110	4840
1500	9490	8960	8440	7930	7430	6940	6490	6070	5670	5270	5010

Flaps 1

PRESSURE ALTITUDE (FT)	TOTAL FUEL FLOW (KG/HR)										
	WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
20000	10610	9890	9220	8570	7900	7270	6660	6060	5480	4940	4550
15000	10380	9670	9030	8420	7810	7220	6630	6060	5500	4990	4620
10000	10290	9630	9020	8420	7820	7230	6660	6110	5580	5090	4730
5000	10330	9690	9080	8490	7920	7340	6780	6250	5750	5280	4950
1500	10360	9740	9140	8560	7980	7430	6890	6390	5910	5460	5120

These tables include 5% additional fuel for holding in a racetrack pattern.

Oxygen Requirements
Passenger Oxygen System - Gaseous
Table 1

NUMBER OF OUTLETS USED	TOTAL POST DECOMPRESSION TIME (HOURS)	OXYGEN REQUIRED (LITERS)				
		PRESSURE ALTITUDE AT DECOMPRESSION (FT)				
		27000	31000	35000	39000	43000
100	0.17*	1180	1260	1350	1490	1660
	1	1490	1620	1780	1970	2220
	2	2150	2280	2440	2630	2880
	3	2810	2940	3100	3290	3540
200	0.17*	2350	2490	2670	2930	3240
	1	2960	3220	3520	3900	4360
	2	4280	4540	4840	5220	5680
	3	5600	5860	6160	6540	7000
300	0.17*	3510	3730	4000	4380	4820
	1	4430	4820	5270	5830	6500
	2	6410	6800	7250	7810	8480
	3	8390	8780	9230	9790	10460
400	0.17*	4680	4970	5320	5820	6400
	1	5910	6420	7010	7750	8640
	2	8550	9060	9650	10390	11280
	3	11190	11700	12290	13030	13920
500	0.17*	5840	6200	6640	7260	7980
	1	7380	8020	8760	9680	10780
	2	10680	11320	12060	12980	14080
	3	13980	14620	15360	16280	17380
600	0.17*	7000	7440	7960	8710	9570
	1	8850	9610	10510	11610	12930
	2	12810	13570	14470	15570	16890
	3	16770	17530	18430	19530	20850

Total post decompression time includes descent, level-off at intermediate altitude (if applicable) and flight at final level-off altitude.

Time to shut down 90% of masks at or below 14000 ft pressure altitude is 11 minutes.

*Minimum post decompression time (10 min) approximates direct descent to 10000 ft pressure altitude.

Table 2

NUMBER OF OUTLETS USED	ADDITIONAL OXYGEN REQUIRED (LITERS PER MINUTE ABOVE 14000 FT PRESSURE ALTITUDE)			
	INTERMEDIATE PRESSURE ALTITUDE			
	15000**	17000	21000	25000
100	33	120	165	230
200	66	240	330	460
300	99	360	495	690
400	132	480	660	920
500	165	600	825	1150
600	198	720	990	1380

Total oxygen quantity required is:

Emergency descent and level-off at or below 14000 ft pressure altitude (from table 1) plus cruise above 14000 ft pressure altitude (from table 2).

**30% of cabin outlets using oxygen.

Oxygen Requirements

Flight Crew System - Gaseous

Table 1

NUMBER OF CREW	OXYGEN REQUIRED (LITERS)
2	660
3	990
4	1320

Table 2

NUMBER OF CREW	OXYGEN REQUIRED FOR LEVEL OFF AT 14000 FT (LITERS)			
	TOTAL POST DECOMPRESSION TIME (HR)			
	2	3	4	5
2	660	960	1270	1570
3	980	1440	1900	2360
4	1310	1920	2530	3140

Table 3

NUMBER OF CREW	ADDITIONAL LITERS REQUIRED FOR EACH MINUTE HELD AT INTERMEDIATE ALTITUDE OTHER THAN 14000 FT				
	INTERMEDIATE PRESSURE ALTITUDE (FT)				
	UP TO 13999	14000	14001 TO 17999	18000 TO 21999	22000 TO 25000
	REGULATOR ON "NORMAL" OR (100%)				
2	0 (22)	0 (17)	1 (16)	3 (12)	6 (10)
3	0 (33)	0 (25)	2 (24)	5 (18)	8 (15)
4	0 (44)	0 (34)	2 (32)	6 (24)	11 (20)

For more extensive than normal crew usage, add 2.05 liters/person/min for each crew member at 8000 ft cabin altitude when regulator setting is NORMAL; or 13 liters/person/min when regulator setting is 100%.

Instructions:

1. Determine protective breathing requirements from Table 1.
2. Determine supplemental requirements for level off at 14000 ft from Table 2 and correct for level off altitudes other than 14000 ft using Table 3.
3. Flight crew system oxygen requirements are the larger of protective breathing (Table 1) or supplemental requirements (Table 2).

Oxygen Requirements

Cylinder Volume to Pressure Conversion

CYLINDER PRESSURE AT 21°C (PSI)	OXYGEN VOLUME (1000 LITERS)																					
	NUMBER OF 115 CUBIC FOOT CYLINDERS INSTALLED																					
	1	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
100			.1	.1	.1	.1	.2	.2	.2	.2	.3	.3	.3	.3	.4	.4	.4	.4	.5	.5	.5	
200	.1	.3	.7	.9	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1	4.3	
300	.3	.7	1.4	1.8	2.2	2.6	2.9	3.3	3.7	4.0	4.4	4.8	5.2	5.5	5.9	6.3	6.7	7.0	7.4	7.8	8.1	
400	.5	1.0	2.1	2.7	3.2	3.8	4.3	4.9	5.4	6.0	6.5	7.0	7.6	8.1	8.7	9.2	9.8	10.3	10.9	11.4	12.0	
500	.7	1.4	2.8	3.5	4.3	5.0	5.7	6.4	7.1	7.9	8.6	9.3	10.0	10.7	11.5	12.2	12.9	13.6	14.3	15.1	15.8	
600	.8	1.7	3.5	4.4	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.4	13.3	14.2	15.1	16.0	16.9	17.8	18.7	19.6	
700	1.0	2.1	4.2	5.3	6.3	7.4	8.5	9.5	10.6	11.7	12.7	13.8	14.9	15.9	17.0	18.1	19.1	20.2	21.3	22.3	23.4	
800	1.2	2.4	4.9	6.1	7.4	8.6	9.9	11.1	12.3	13.6	14.8	16.1	17.3	18.5	19.8	21.0	22.3	23.5	24.7	26.0	27.2	
900	1.4	2.8	5.6	7.0	8.4	9.8	11.3	12.7	14.1	15.5	16.9	18.3	19.7	21.1	22.6	24.0	25.4	26.8	28.2	29.6	31.0	
1000	1.5	3.1	6.3	7.9	9.5	11.1	12.6	14.2	15.8	17.4	19.0	20.6	22.2	23.7	25.3	26.9	28.5	30.1	31.7	33.3	34.8	
1100	1.7	3.5	7.0	8.7	10.5	12.3	14.0	15.8	17.5	19.3	21.1	22.8	24.6	26.3	28.1	29.9	31.6	33.4	35.1	36.9	38.7	
1200	1.9	3.8	7.7	9.6	11.5	13.5	15.4	17.3	19.3	21.2	23.1	25.1	27.0	28.9	30.9	32.8	34.7	36.7	38.6	40.5	42.5	
1300	2.1	4.2	8.4	10.5	12.6	14.7	16.8	18.9	21.0	23.1	25.2	27.3	29.4	31.5	33.6	35.8	37.9	40.0	42.1	44.2	46.3	
1400	2.2	4.5	9.1	11.3	13.6	15.9	18.2	20.5	22.7	25.0	27.3	29.6	31.9	34.1	36.4	38.7	41.0	43.3	45.5	47.8	50.1	
1500	2.4	4.9	9.8	12.2	14.7	17.1	19.6	22.0	24.5	26.9	29.4	31.8	34.3	36.7	39.2	41.6	44.1	46.5	49.0	51.5	53.9	
1600	2.6	5.2	10.5	13.1	15.7	18.3	21.0	23.6	26.2	28.8	31.5	34.1	36.7	39.3	42.0	44.6	47.2	49.8	52.5	55.1	57.7	
1700	2.7	5.5	11.1	13.9	16.7	19.5	22.3	25.1	27.9	30.7	33.5	36.3	39.1	41.9	44.7	47.5	50.3	53.1	55.9	58.7	61.5	
1800	2.9	5.9	11.8	14.8	17.8	20.8	23.7	26.7	29.7	32.6	35.6	38.6	41.6	44.5	47.5	50.5	53.5	56.4	59.4	62.4	65.3	
1900	3.1	6.2	12.5	15.7	18.8	22.0	25.1	28.3	31.4	34.6	37.7	40.8	44.0	47.1	50.3	53.4	56.6	59.7	62.9	66.0	69.2	
2000	3.3	6.6	13.2	16.5	19.9	23.2	26.5	29.8	33.1	36.5	39.8	43.1	46.4	49.7	53.1	56.4	59.7	63.0	66.3	69.7	73.0	
	CREW SYSTEM		PASSENGER SYSTEM																			

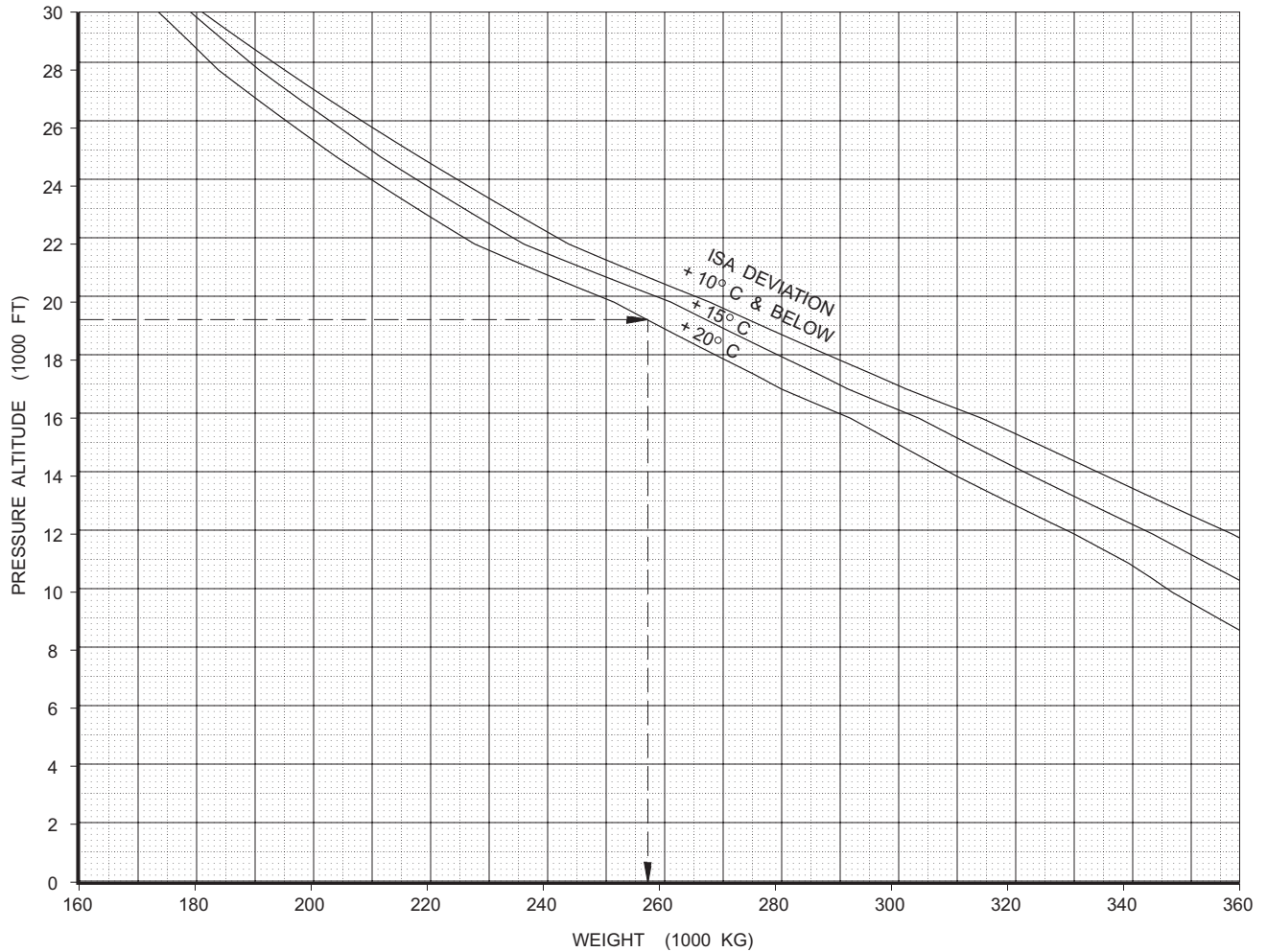
Check maximum pressure in shaded area. Maximum cylinder pressure = 1850 PSI at 21°C. For maximum cylinder pressure at hotter or colder temperatures, add or subtract 32 PSI per 5°C, respectively.

Temperature Corrections

CYLINDER PRESSURE AT 21°C (PSI)	PRESSURE CORRECTION FOR EACH 5°C ABOVE/BELOW 21°C (PSI)
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

ENGINE INOP MAX CONTINUOUS THRUST

Net Level Off Weight

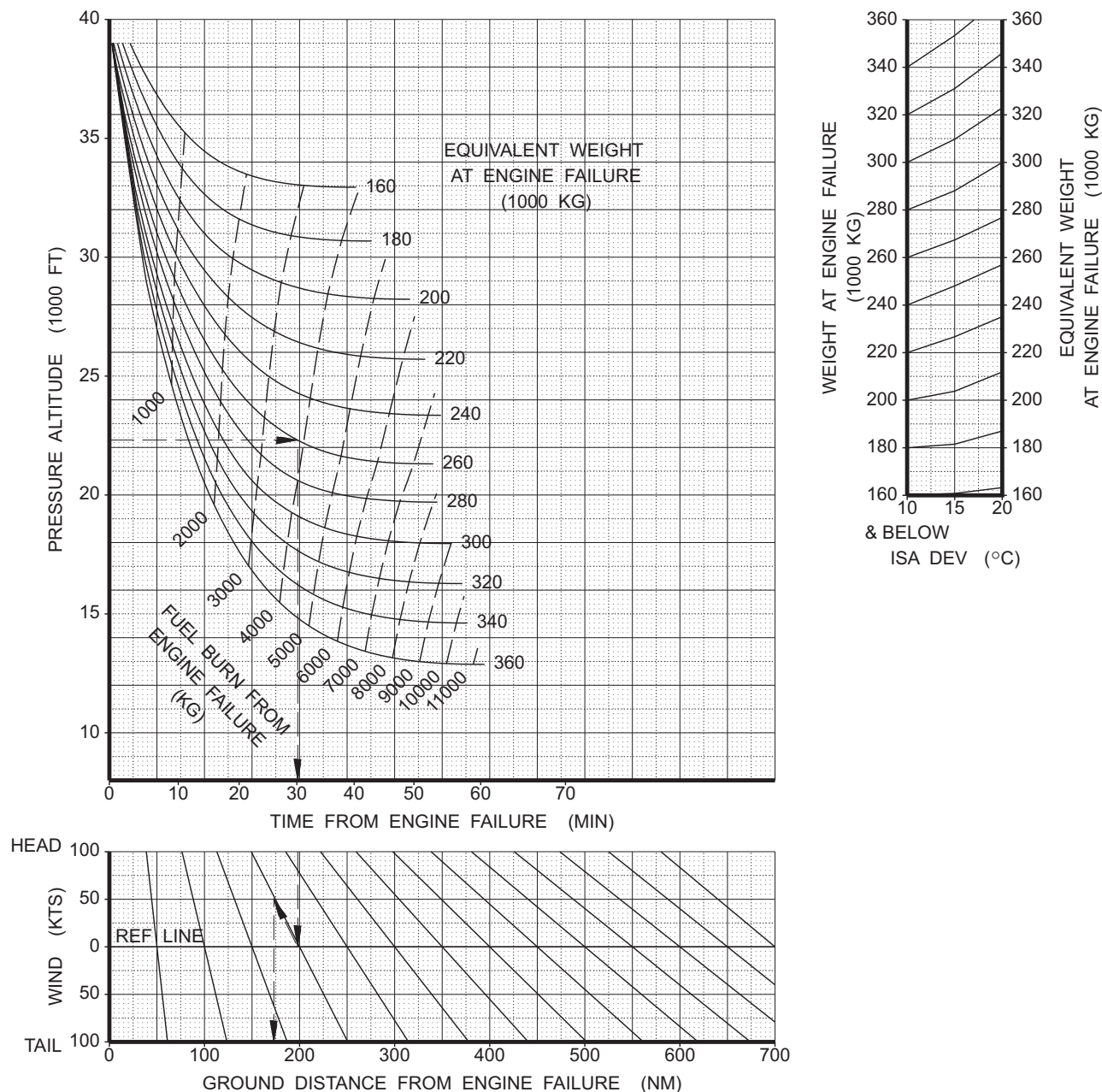


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	-0.7	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.6	-1.8	-1.5	-1.0	-1.2	-1.2	-1.2	-1.3	-1.2

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 39000 FT and Above

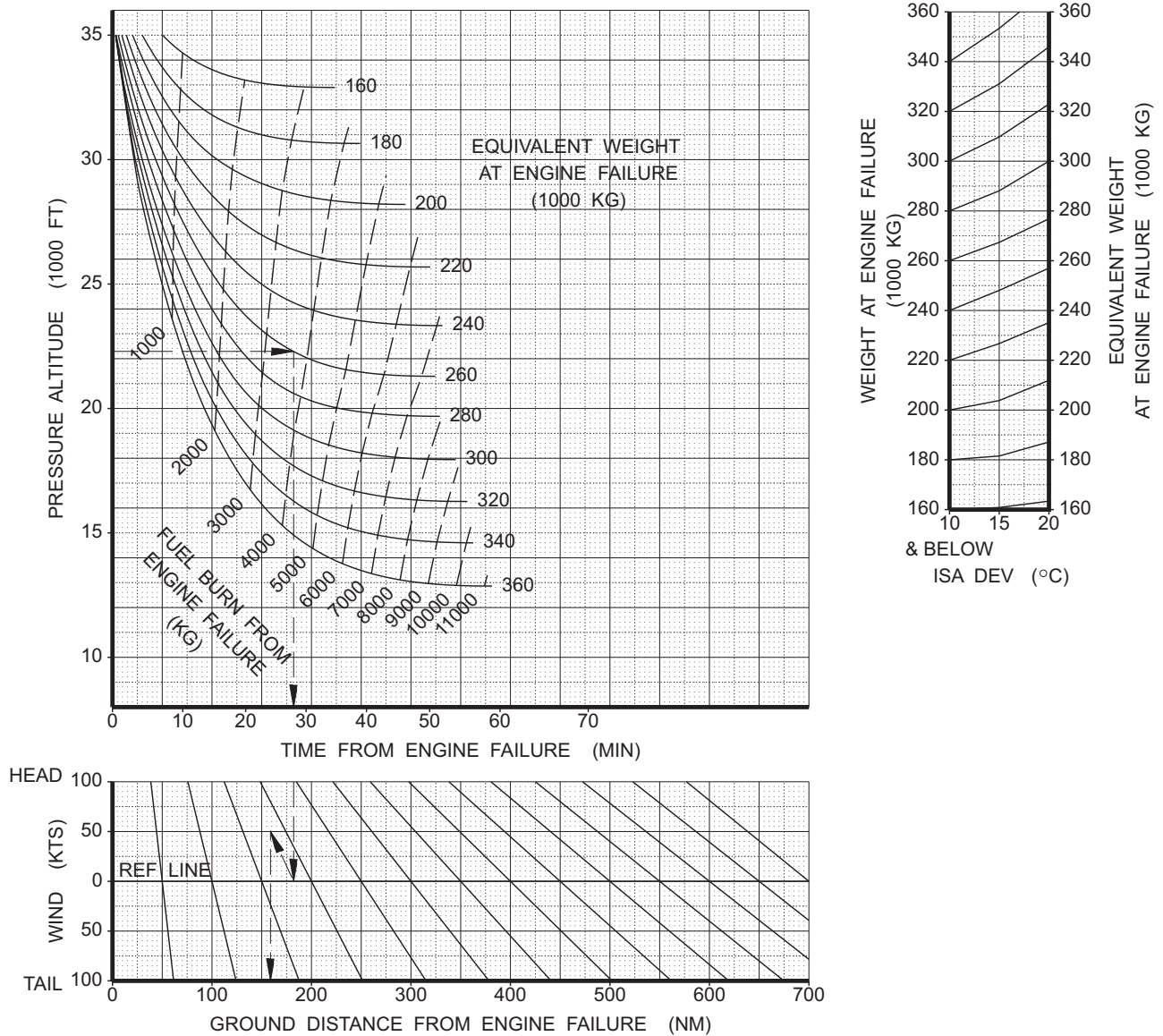


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.6	1.8	1.5	1.0	1.2	1.2	1.2	1.3	1.2

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 35000 FT to 37000 FT

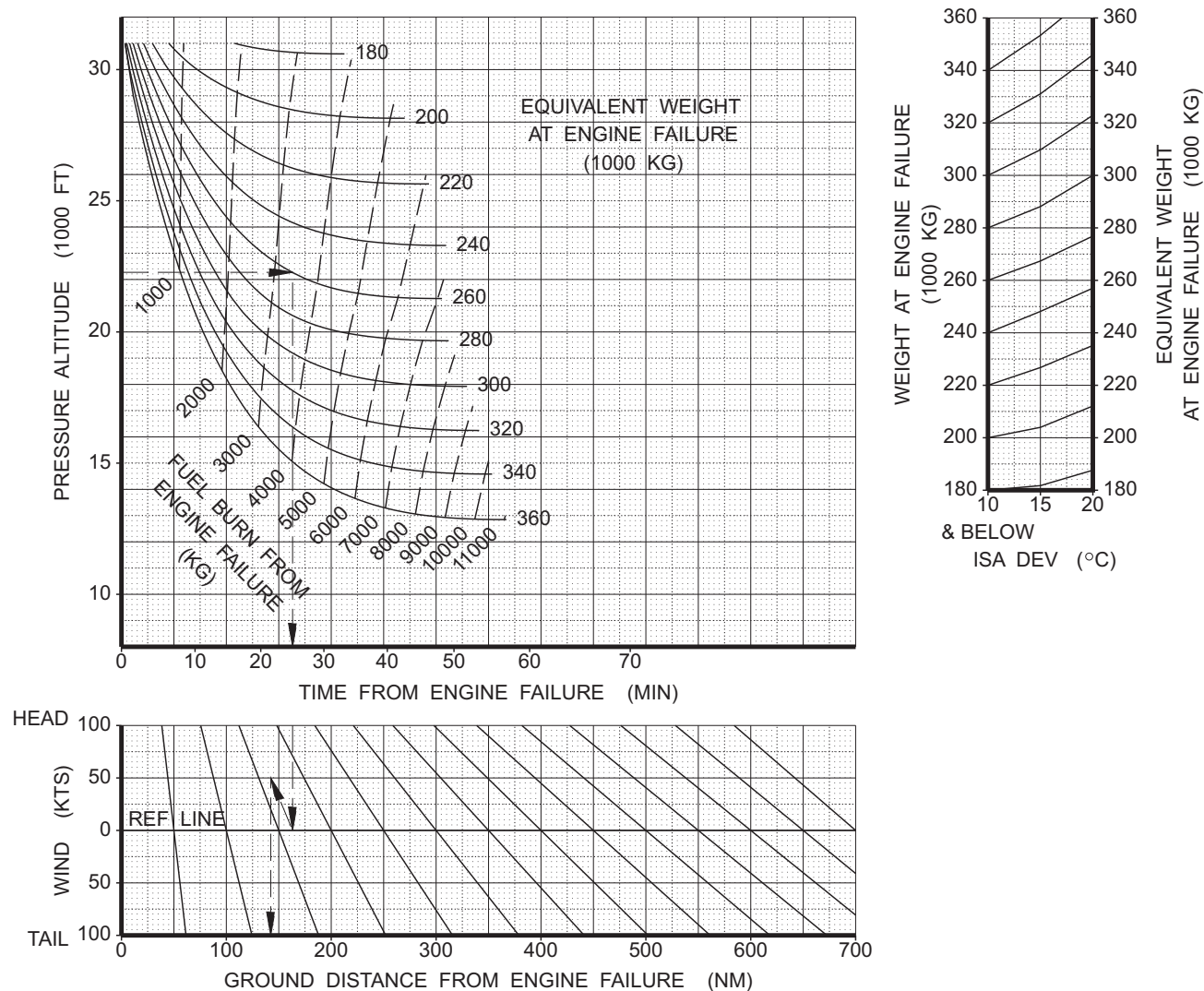


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.6	1.8	1.5	1.0	1.2	1.2	1.2	1.3	1.2

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 31000 FT to 33000 FT

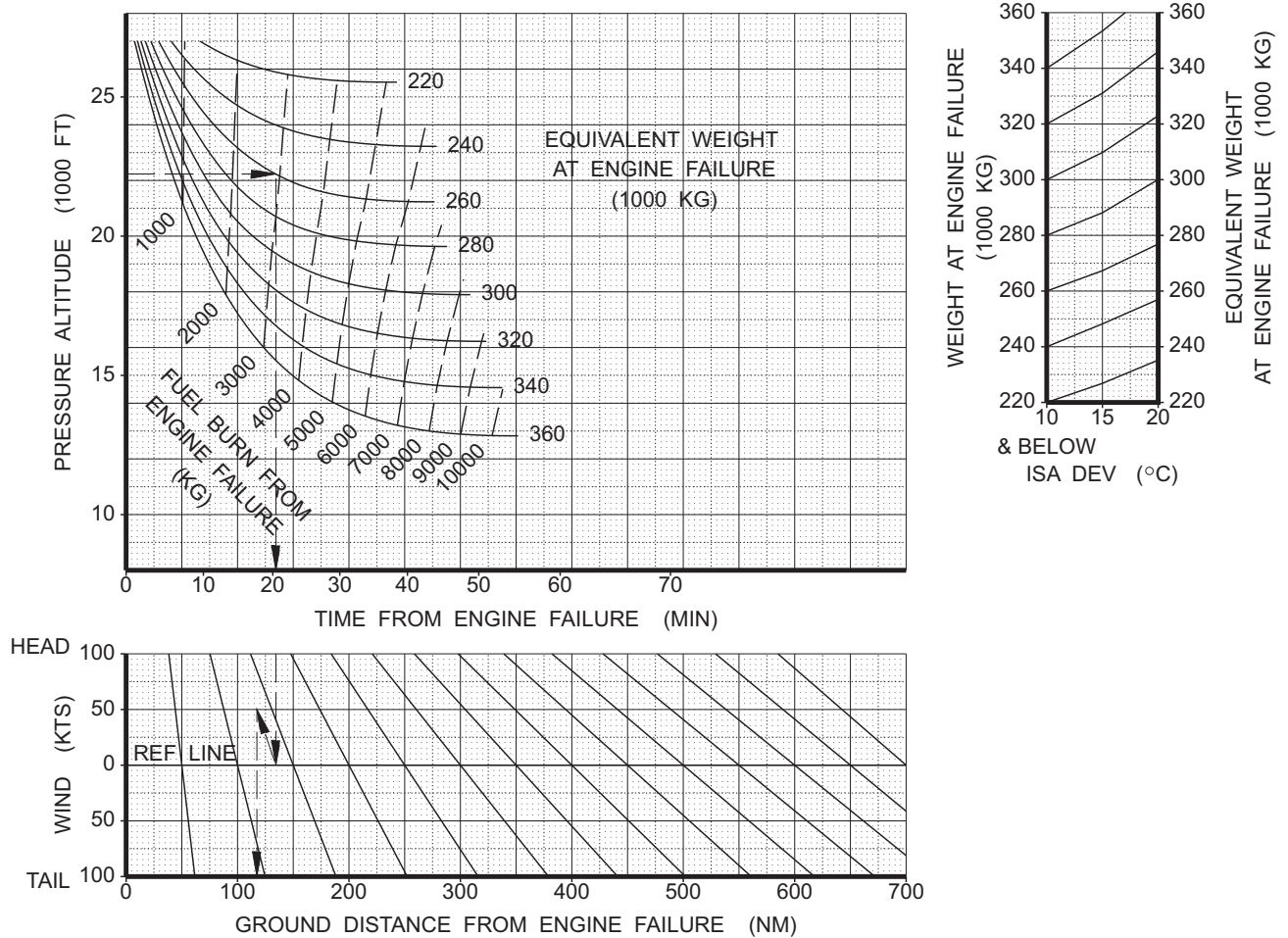


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.6	1.8	1.5	1.0	1.2	1.2	1.2	1.3	1.2

ENGINE INOP MAX CONTINUOUS THRUST

Driftdown Profiles Net Flight Path 27000 FT to 29000 FT



Anti-Ice Adjustments

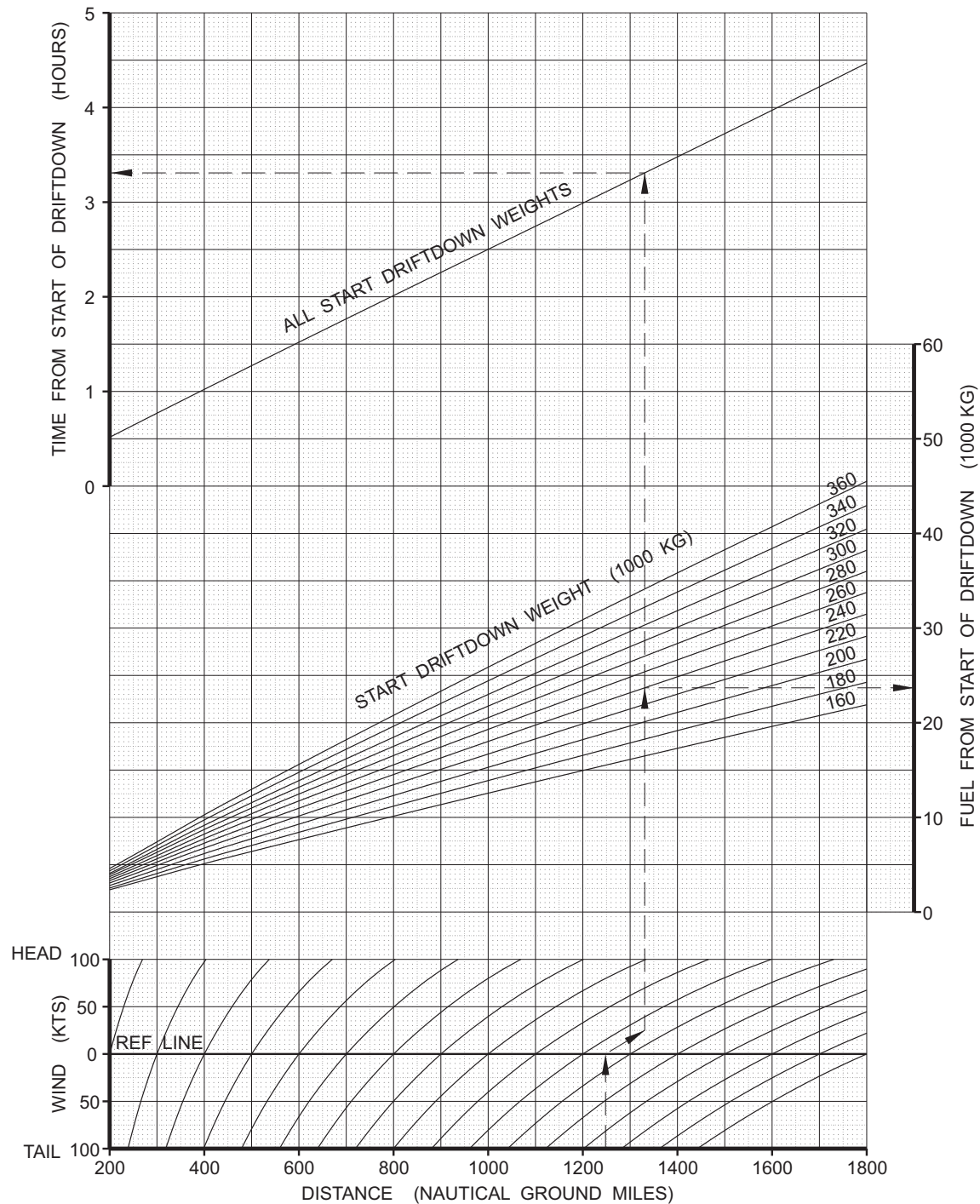
ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)								
	PRESSURE ALTITUDE (1000 FT)								
	14	16	18	20	22	24	26	28	30
ENGINE ONLY	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	2.6	1.8	1.5	1.0	1.2	1.2	1.2	1.3	1.2

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

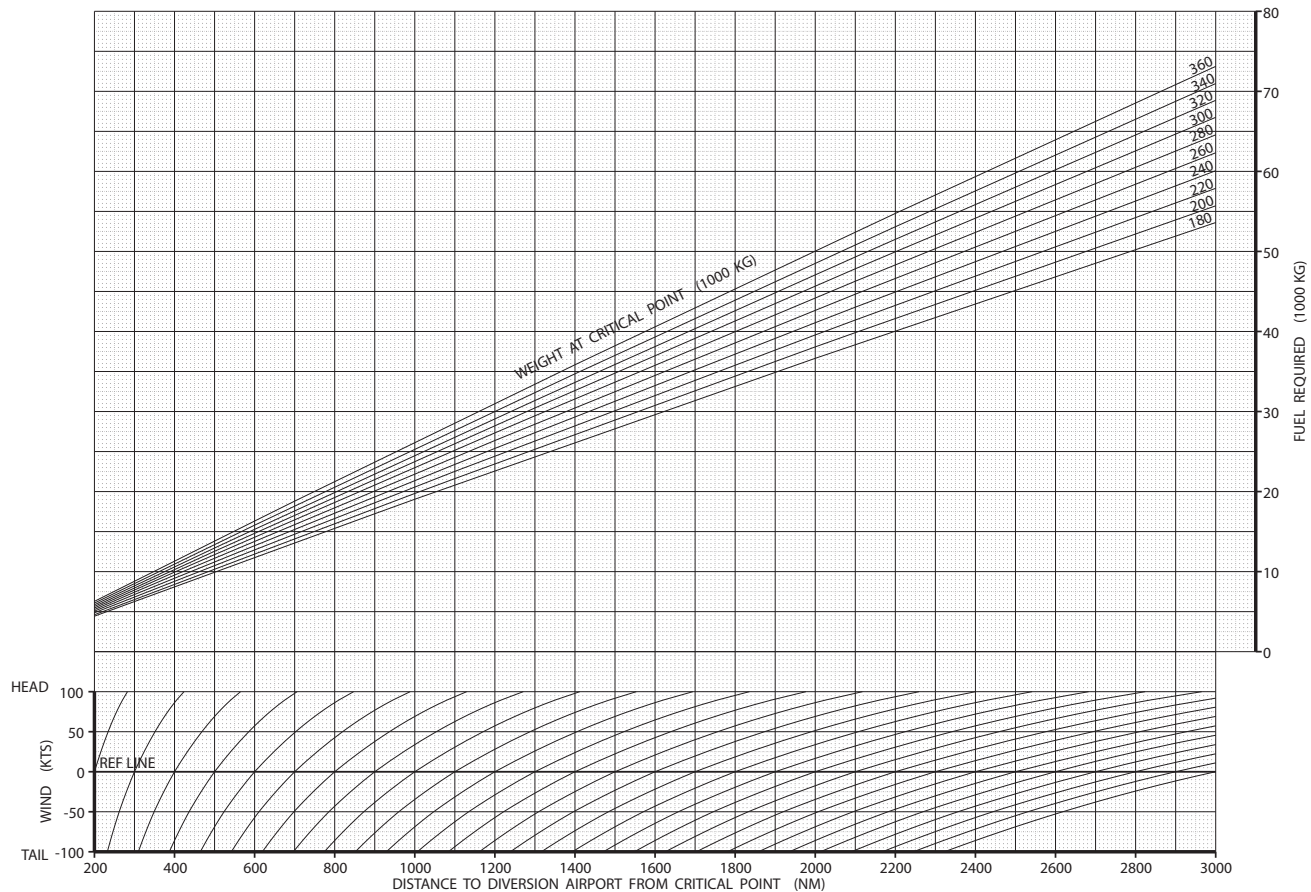
MAX CONTINUOUS THRUST

Area of Operation

SPEED (M/KIAS)	WEIGHT AT DIVERSION (1000 KG)	DIVERSION DISTANCE (NM)										
		TIME (MINUTES)										
		60	75	90	120	138	180	207	240	270	300	330
.82/260	360	359	445	531	702	804	1042	1195	1383	1553	1723	1893
	340	364	451	539	713	818	1062	1219	1411	1586	1760	1935
	320	372	461	550	728	835	1085	1246	1442	1620	1799	1977
	300	380	472	563	746	856	1112	1276	1478	1661	1843	2026
	280	390	484	578	766	879	1142	1312	1519	1707	1895	2083
	260	400	497	594	788	904	1175	1350	1563	1757	1951	2145
	240	411	511	612	812	932	1212	1392	1612	1812	2012	2212
	220	421	524	627	833	956	1244	1429	1655	1861	2066	2272
	200	431	536	641	850	976	1271	1459	1690	1900	2110	2320
	180	440	547	654	869	997	1298	1491	1727	1941	2156	2370
	160	447	557	667	886	1017	1324	1522	1763	1982	2202	2421
.84/280	360	382	474	566	751	861	1119	1285	1488	1672	1857	2041
	340	389	483	577	765	878	1142	1311	1518	1706	1894	2083
	320	396	492	588	779	894	1163	1335	1546	1737	1929	2120
	300	404	502	599	795	912	1186	1362	1576	1772	1967	2163
	280	413	513	613	813	933	1212	1392	1612	1812	2012	2211
	260	423	525	627	832	955	1241	1425	1650	1855	2060	2264
	240	433	538	643	853	980	1274	1463	1694	1904	2114	2324
	220	442	550	658	873	1003	1304	1498	1735	1951	2166	2382
	200	450	560	670	890	1022	1330	1528	1770	1990	2210	2430
	180	457	569	681	905	1039	1352	1554	1800	2024	2247	2471
	160	462	576	690	917	1054	1372	1577	1827	2054	2282	2509
.84/300	360	405	503	601	798	916	1191	1368	1584	1781	1978	2174
	340	412	512	612	812	932	1212	1393	1613	1813	2013	2213
	320	419	520	622	825	947	1231	1413	1637	1840	2043	2246
	300	425	528	631	837	960	1248	1433	1660	1865	2071	2277
	280	433	538	643	852	978	1271	1459	1690	1899	2108	2318
	260	441	548	654	868	996	1294	1486	1721	1934	2147	2361
	240	449	558	667	885	1015	1320	1516	1756	1973	2191	2409
	220	457	568	679	902	1035	1346	1547	1791	2013	2236	2458
	200	464	577	690	917	1053	1370	1574	1823	2049	2276	2502
	180	469	584	699	929	1067	1390	1597	1850	2080	2310	2540
	160	472	589	705	938	1077	1403	1612	1868	2101	2334	2566
.84/320	360	425	529	632	839	963	1252	1438	1665	1872	2079	2285
	340	433	538	643	853	979	1273	1462	1693	1903	2113	2323
	320	439	545	652	865	993	1291	1483	1718	1931	2144	2357
	300	444	551	659	875	1004	1306	1500	1736	1952	2167	2383
	280	450	559	668	885	1016	1321	1517	1757	1974	2192	2410
	260	456	566	677	897	1030	1339	1537	1780	2001	2221	2442
	240	462	574	686	910	1044	1358	1559	1806	2030	2254	2478
	220	467	581	694	922	1058	1376	1580	1830	2057	2284	2512
	200	472	587	702	933	1071	1393	1600	1853	2083	2313	2543
	180	475	591	708	940	1079	1405	1614	1870	2102	2334	2567
	160	477	595	712	946	1086	1414	1625	1883	2117	2351	2585
LRC	360	439	545	652	863	989	1282	1470	1697	1903	2108	2312
	340	438	544	650	861	987	1279	1466	1693	1898	2103	2306
	320	436	542	647	858	983	1274	1460	1686	1891	2094	2297
	300	432	536	641	849	973	1262	1446	1670	1873	2074	2275
	280	430	534	638	845	968	1255	1438	1661	1862	2062	2262
	260	429	533	636	842	965	1250	1432	1654	1854	2054	2252
	240	429	533	636	842	965	1251	1433	1655	1855	2054	2253
	220	427	531	634	840	963	1248	1430	1652	1851	2050	2248
	200	422	525	627	831	952	1234	1414	1633	1831	2028	2223
	180	418	520	620	821	941	1220	1397	1613	1809	2003	2196
	160	412	512	611	810	928	1203	1378	1591	1784	1976	2166

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.

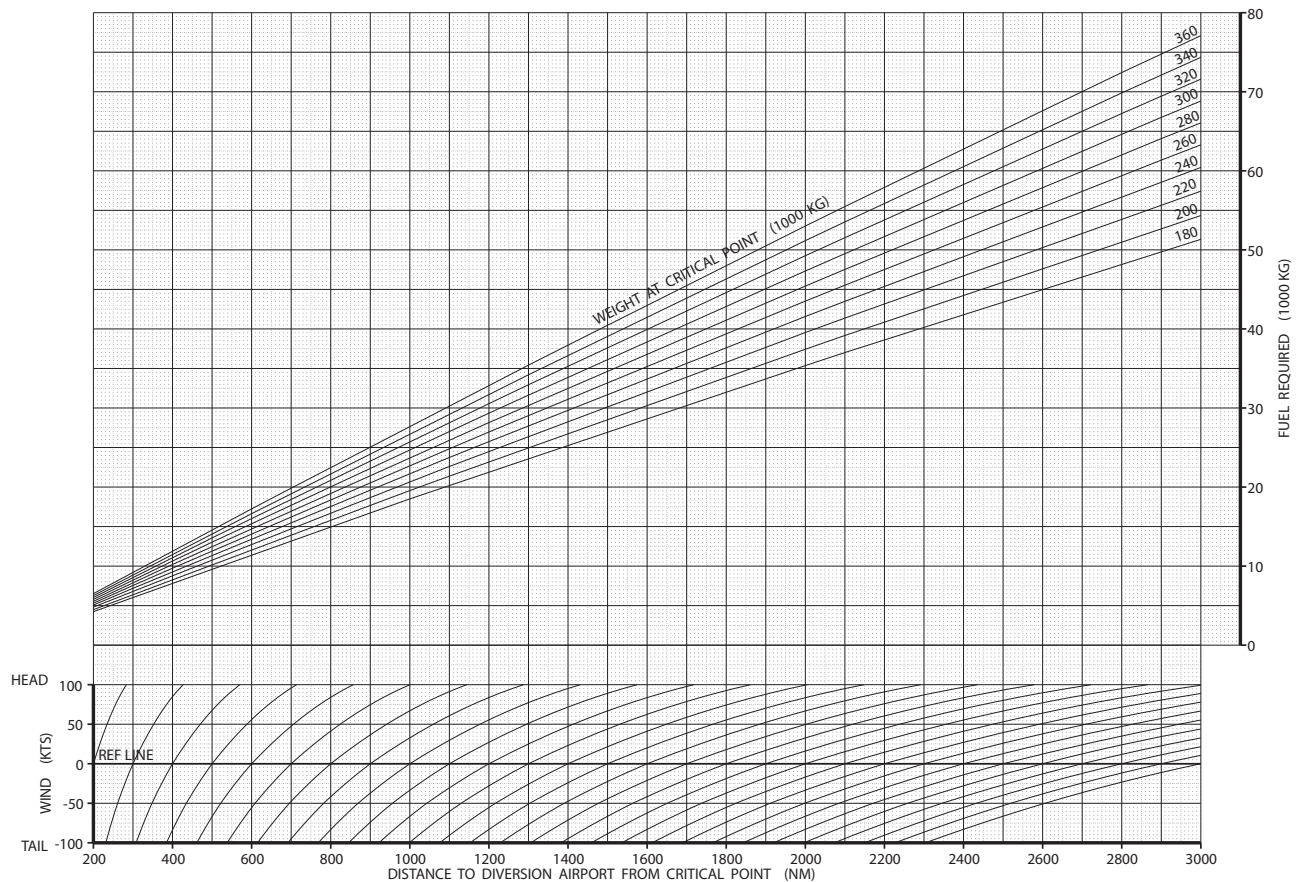
Adjustments:

- 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 0.7% 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 (8%) 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

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:

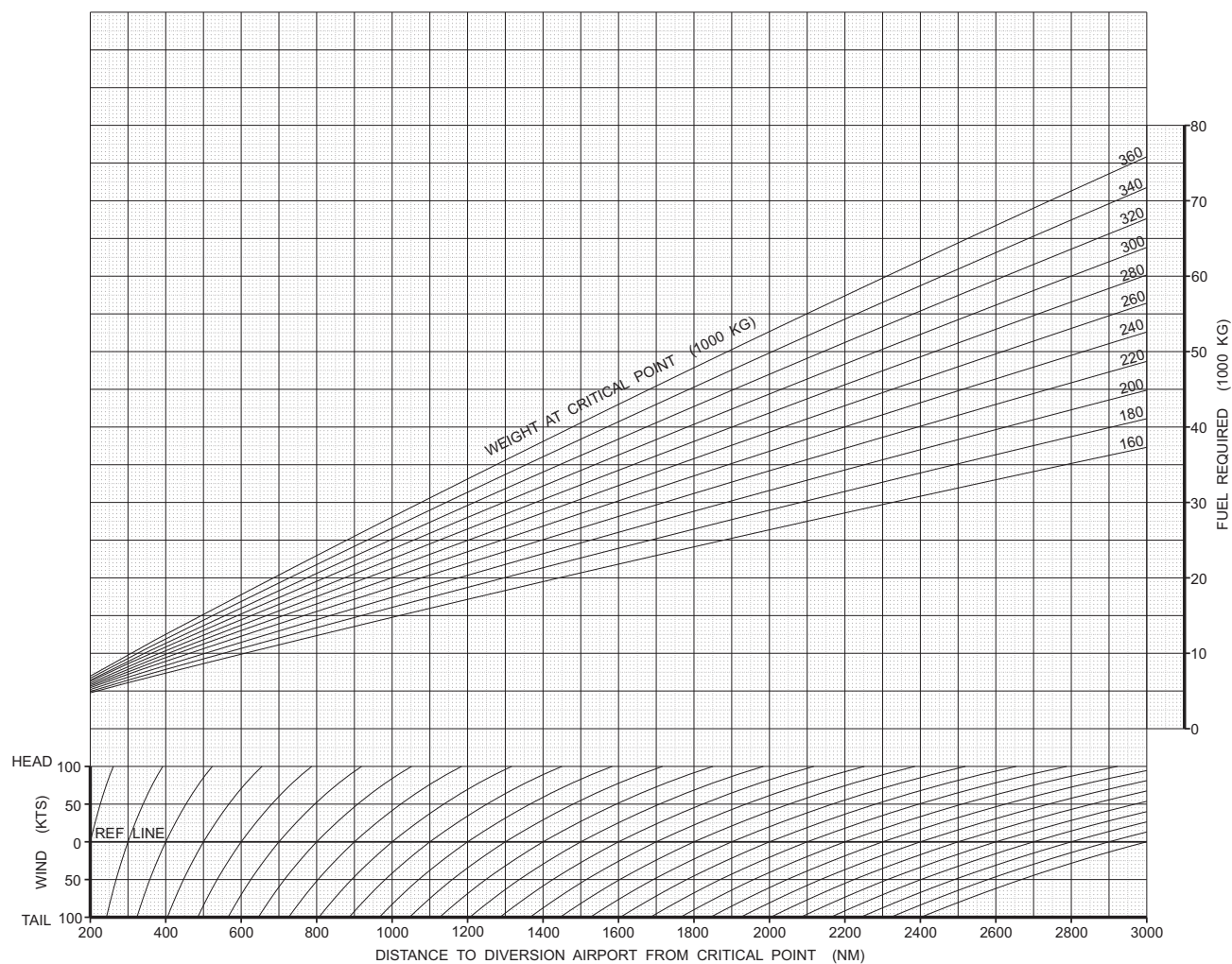
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

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:

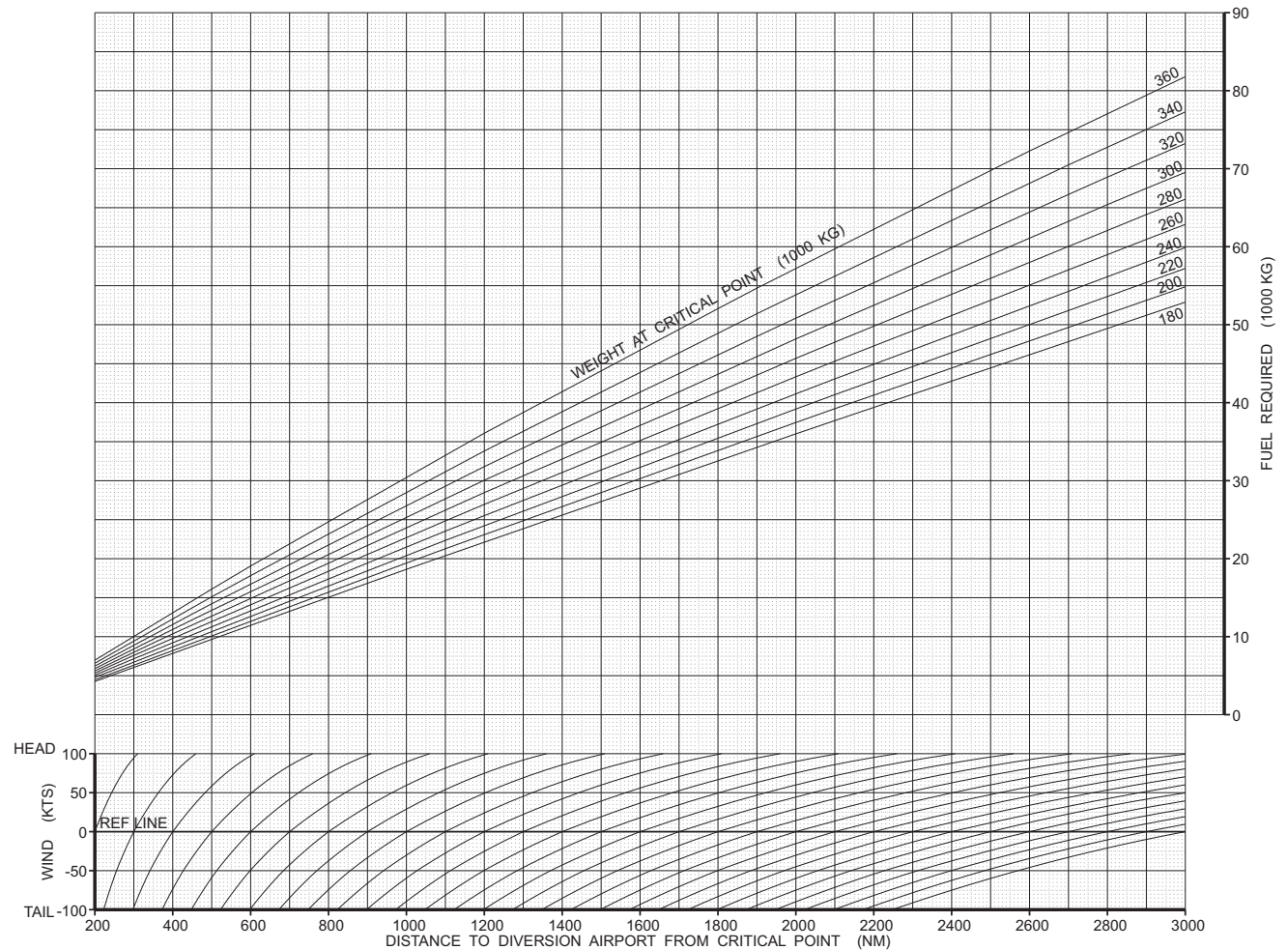
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 260 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.

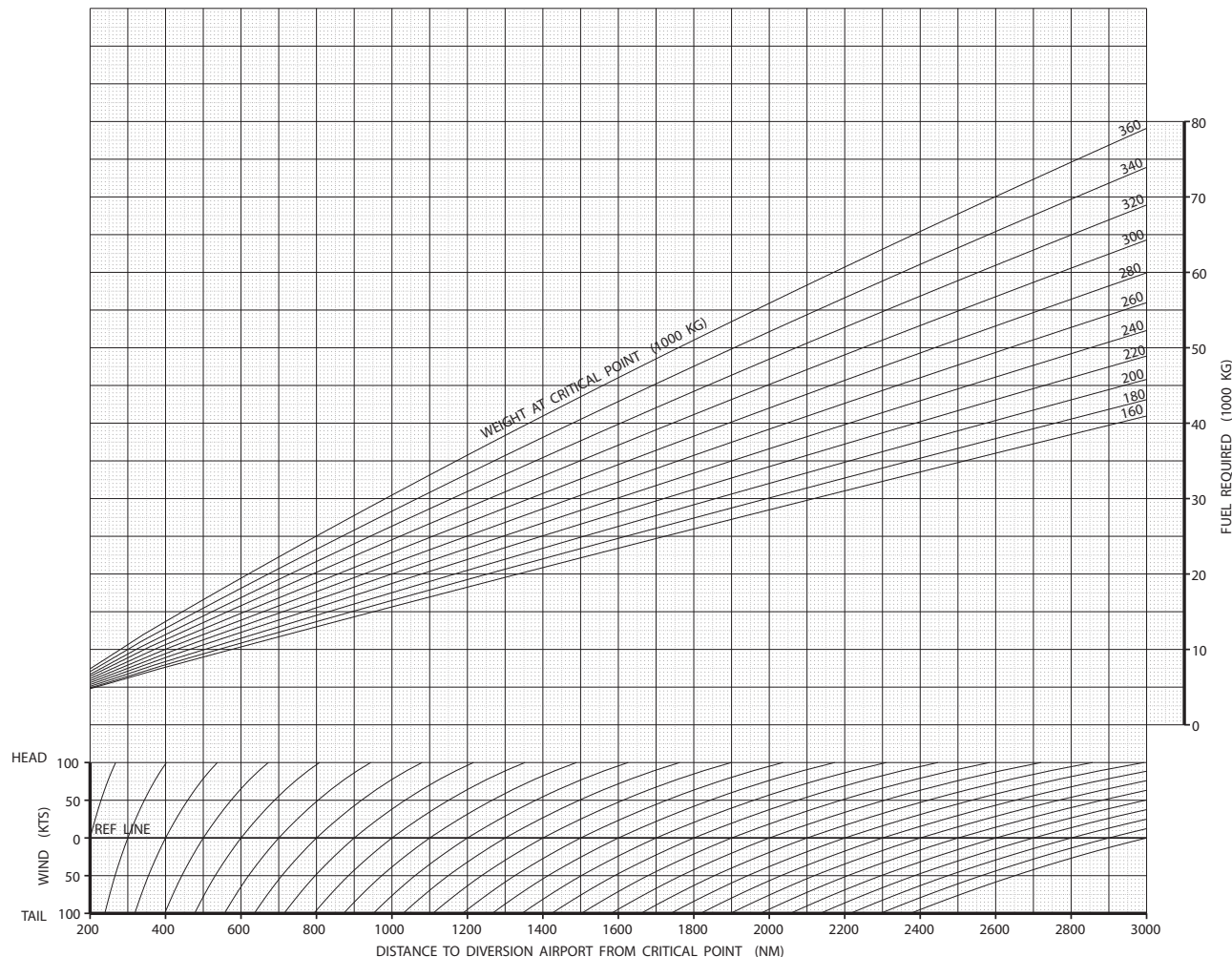
Adjustments:

- 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 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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 MAX CONTINUOUS THRUST

Driftdown Critical Fuel Reserves - .82M/260 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.

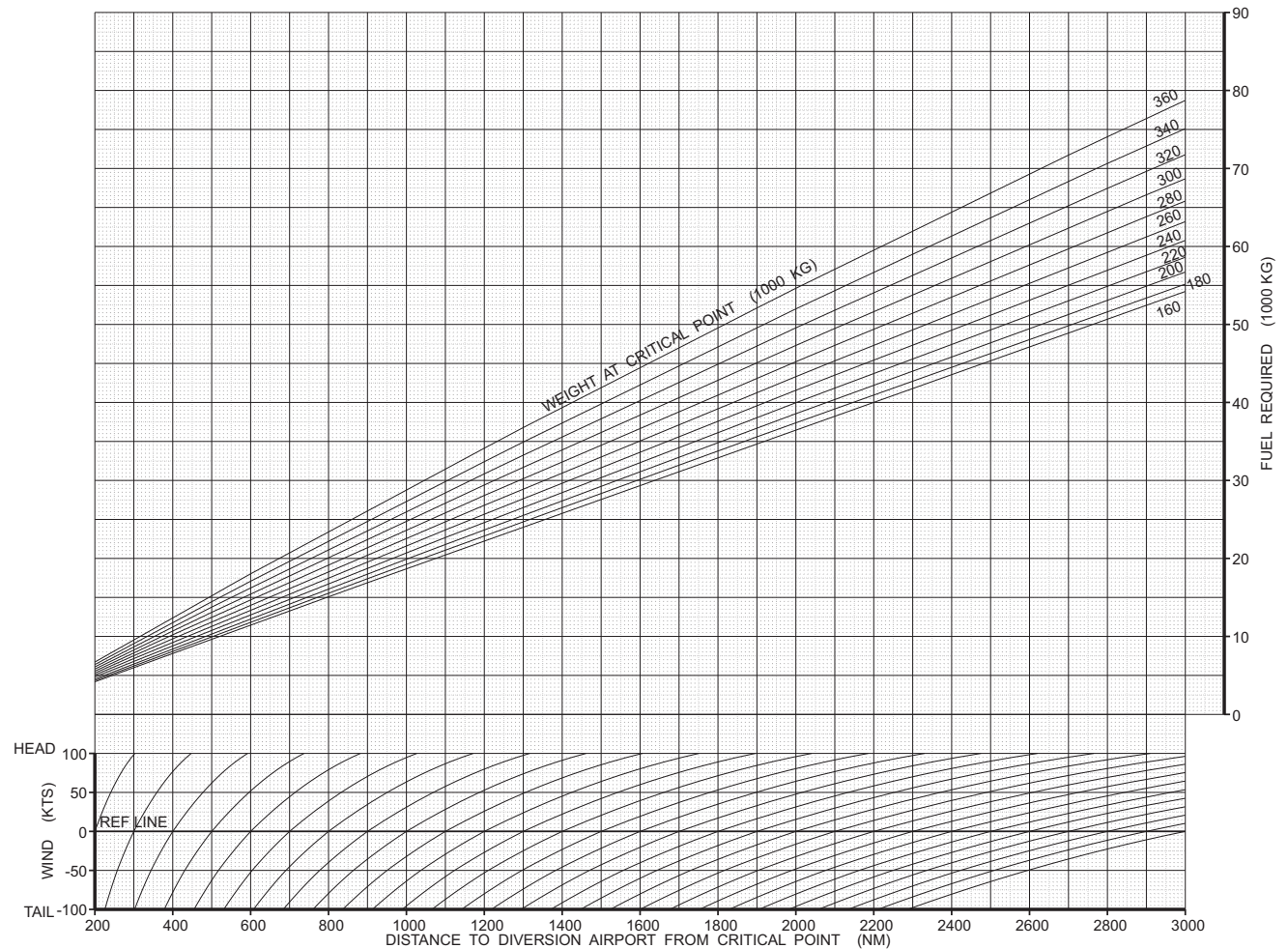
Adjustments:

- 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 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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 MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 280 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.

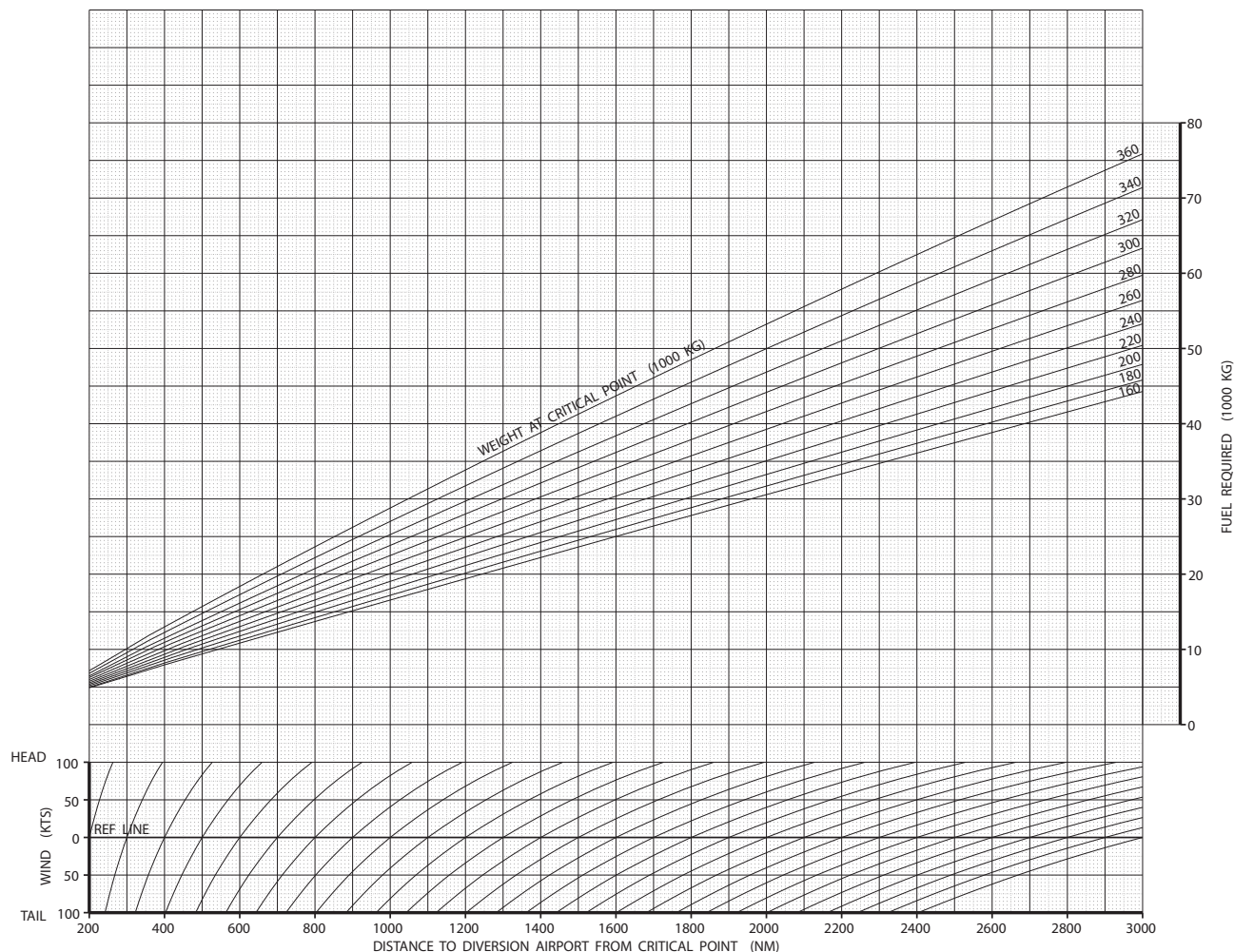
Adjustments:

- 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 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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 MAX CONTINUOUS THRUST

Driftdown Critical Fuel Reserves - .84M/280 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:

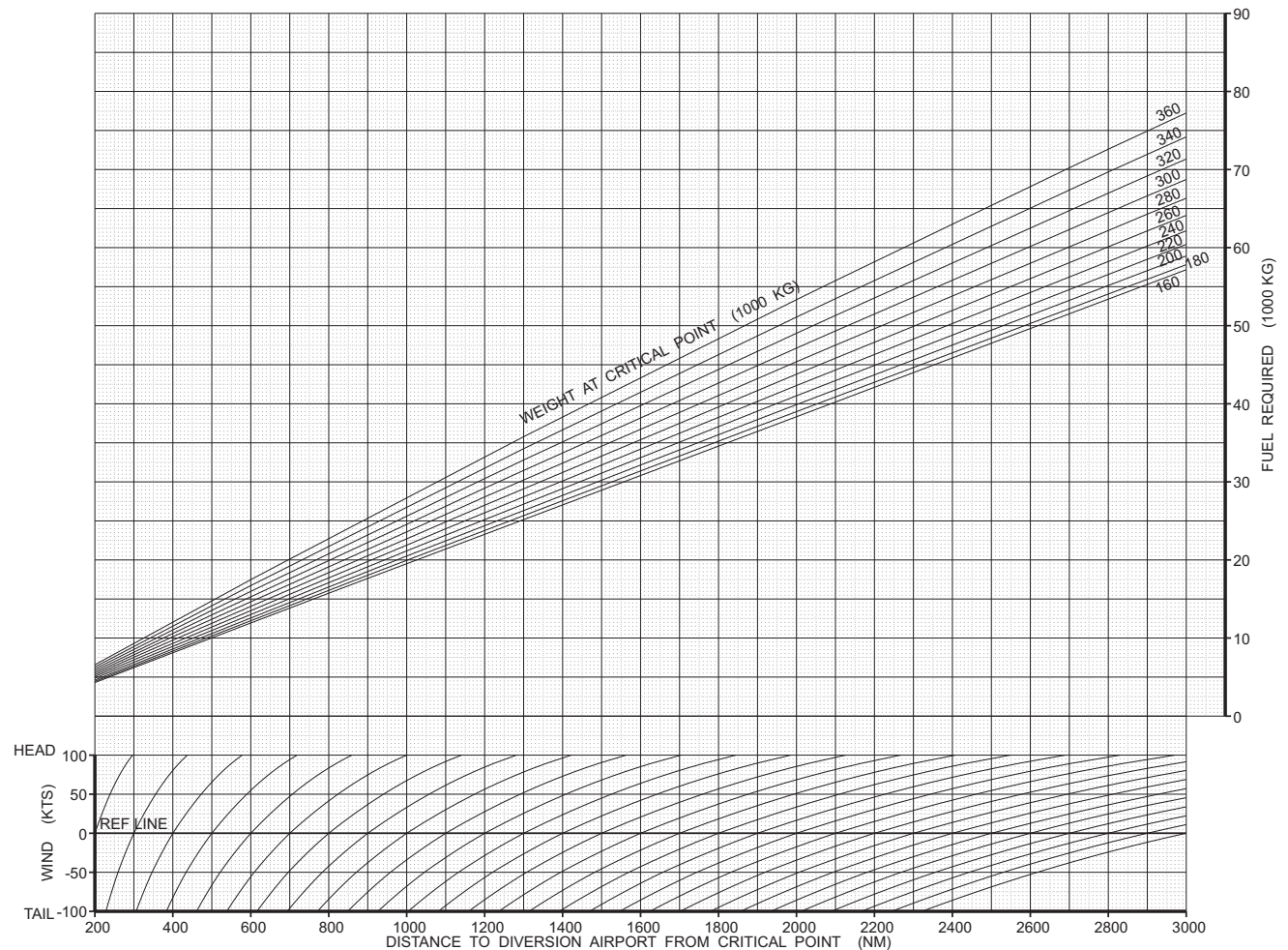
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 300 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.

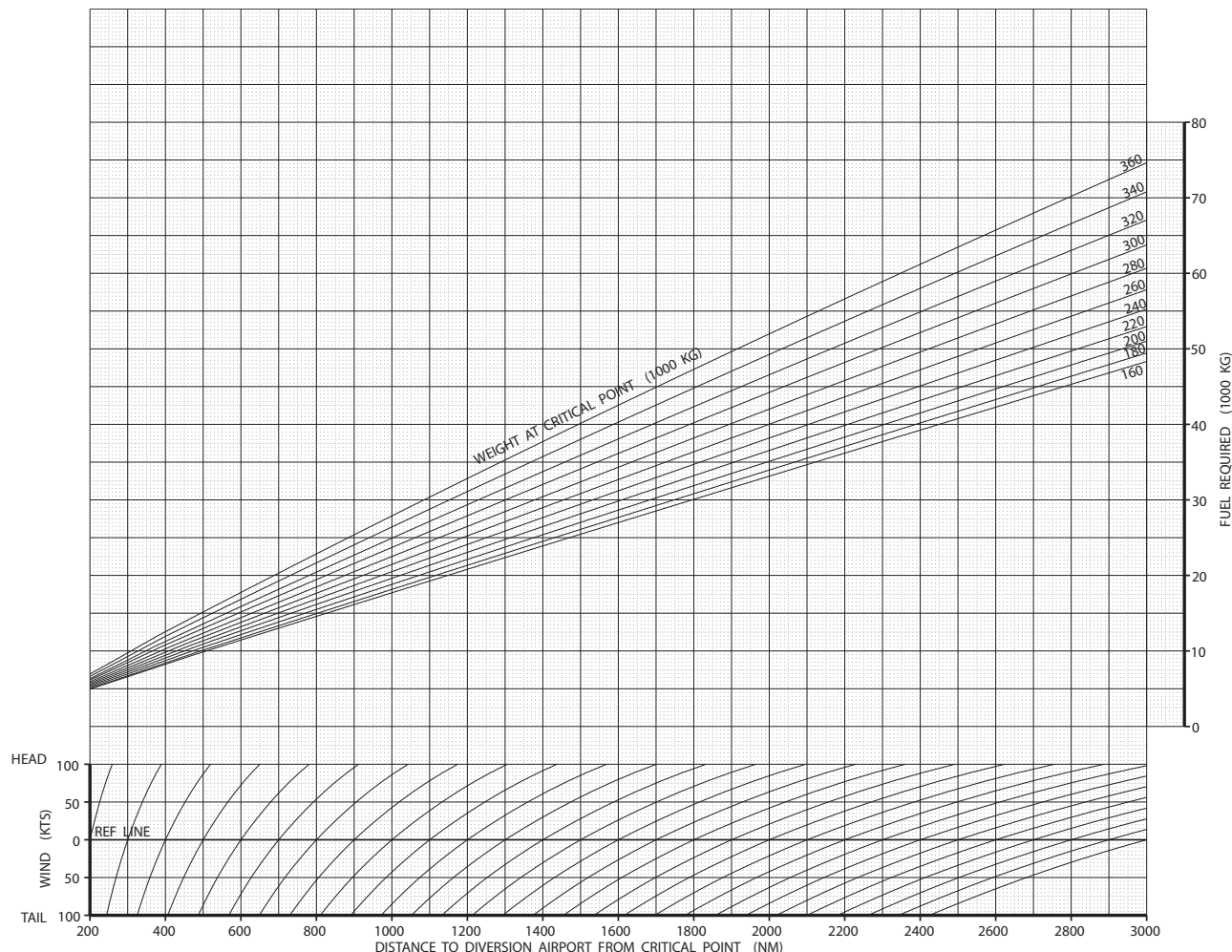
Adjustments:

- 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 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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 MAX CONTINUOUS THRUST

Driftdown Critical Fuel Reserves - .84M/300 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:

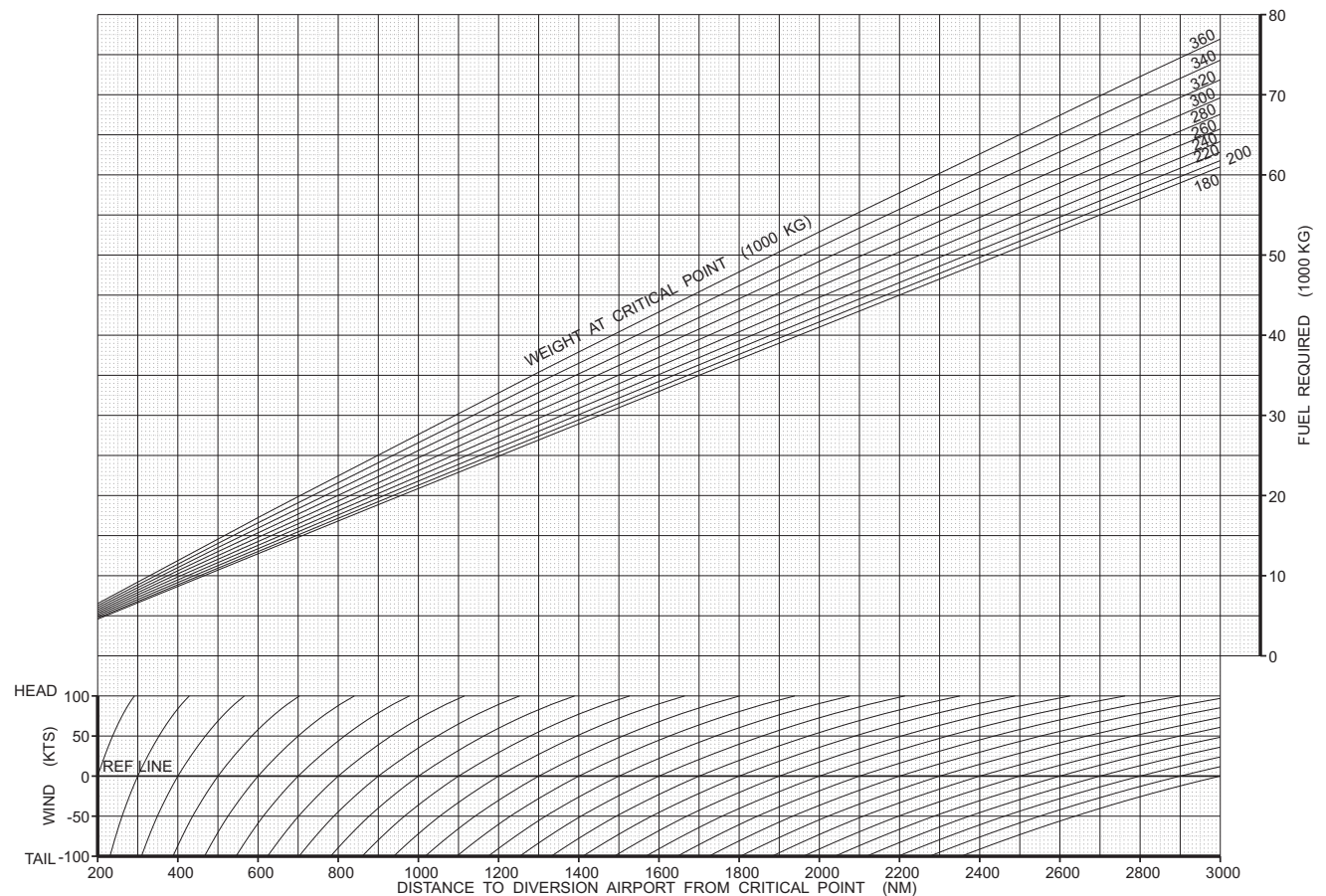
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Decompression Critical Fuel Reserves - 320 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.

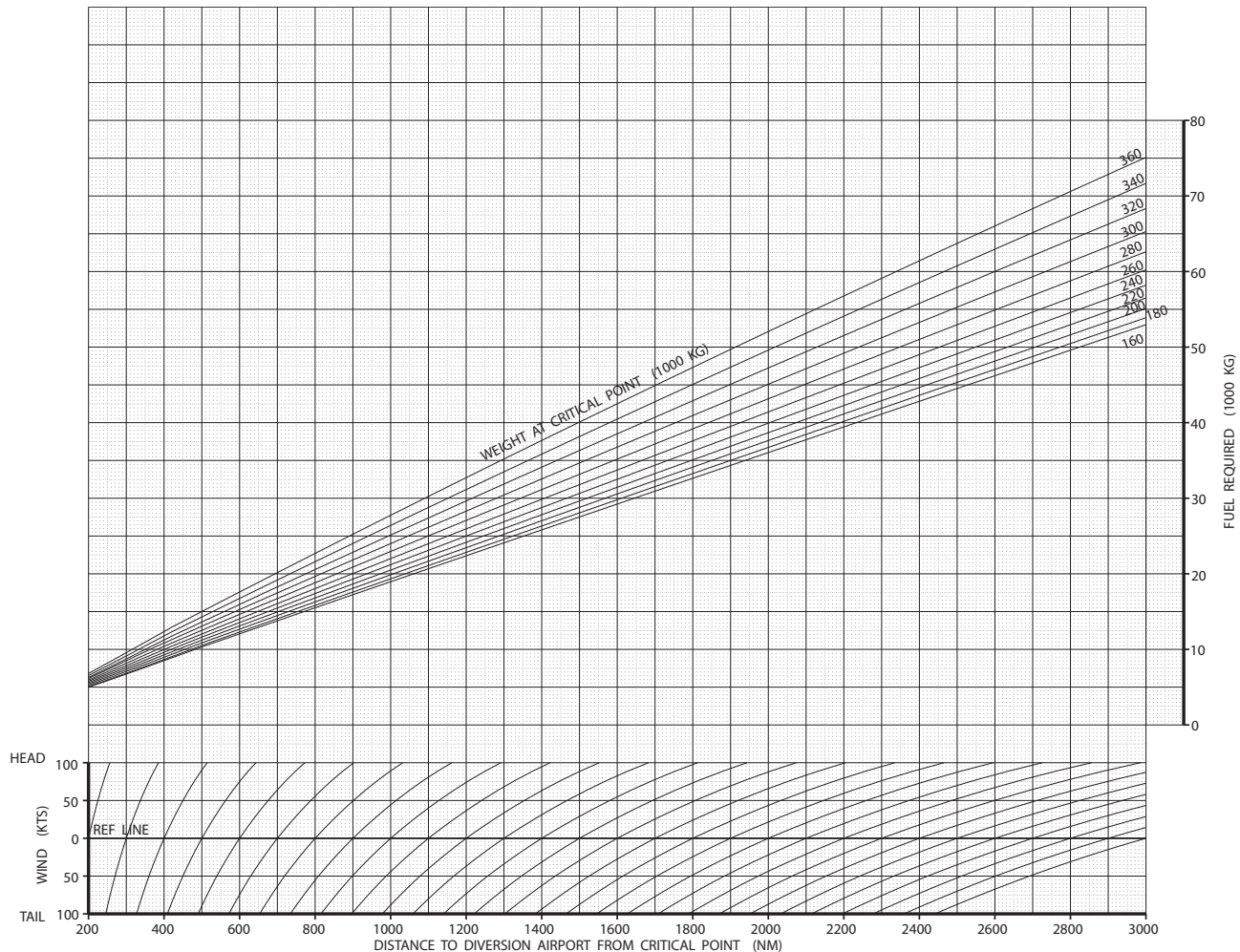
Adjustments:

- 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 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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 MAX CONTINUOUS THRUST

Driftdown Critical Fuel Reserves - .84M/320 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:

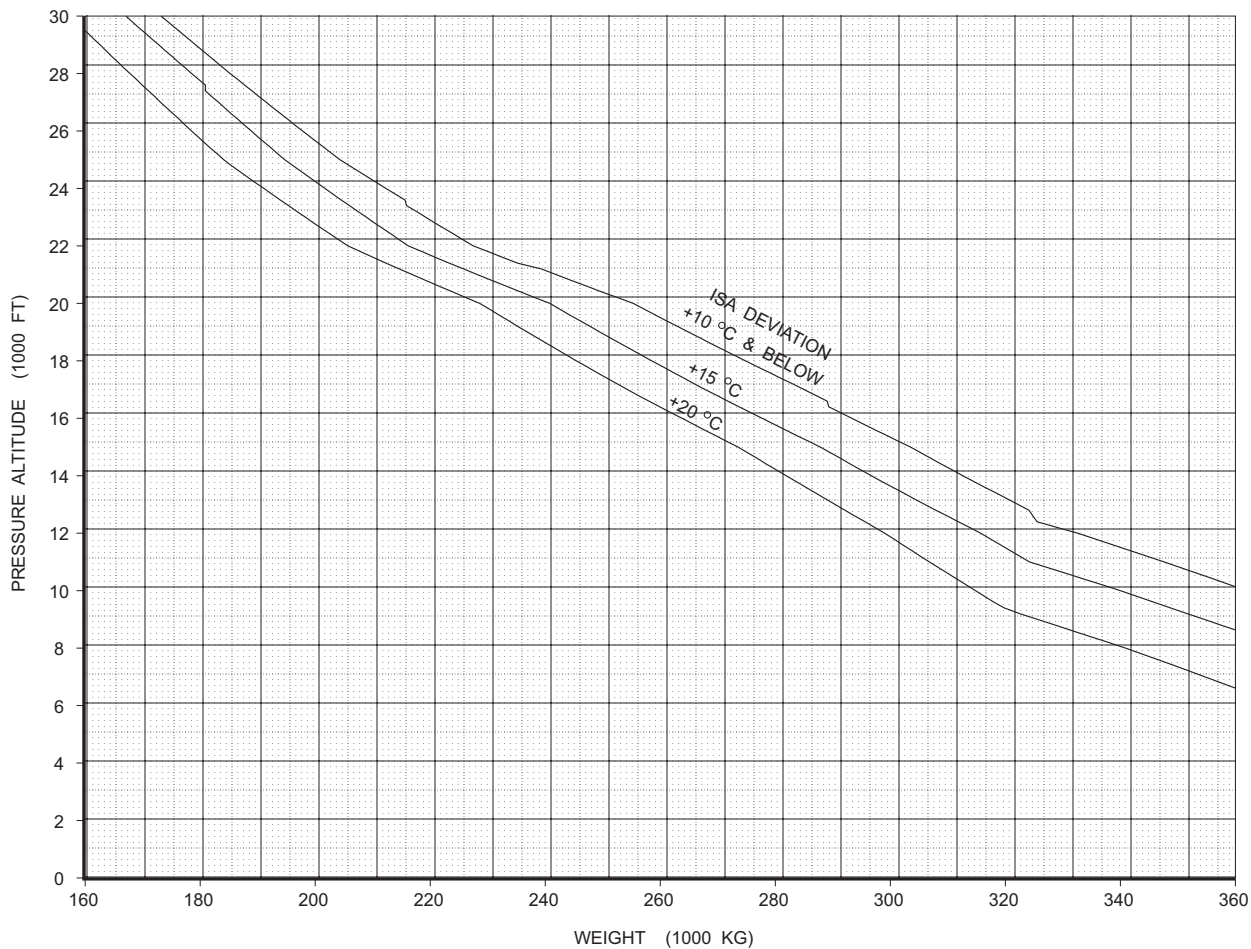
- Increase forecast headwind or decrease forecast tailwind by 5% if an acceptable wind forecasting model is used; otherwise, increase diversion fuel by 5% to account for wind errors.
- Increase fuel required by 0.7% per 10°C above ISA.
- When icing conditions are forecast, use the greater of engine and wing anti-ice on (1%) 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

MAX CONTINUOUS THRUST

Long Range Cruise Net Level Off Weight



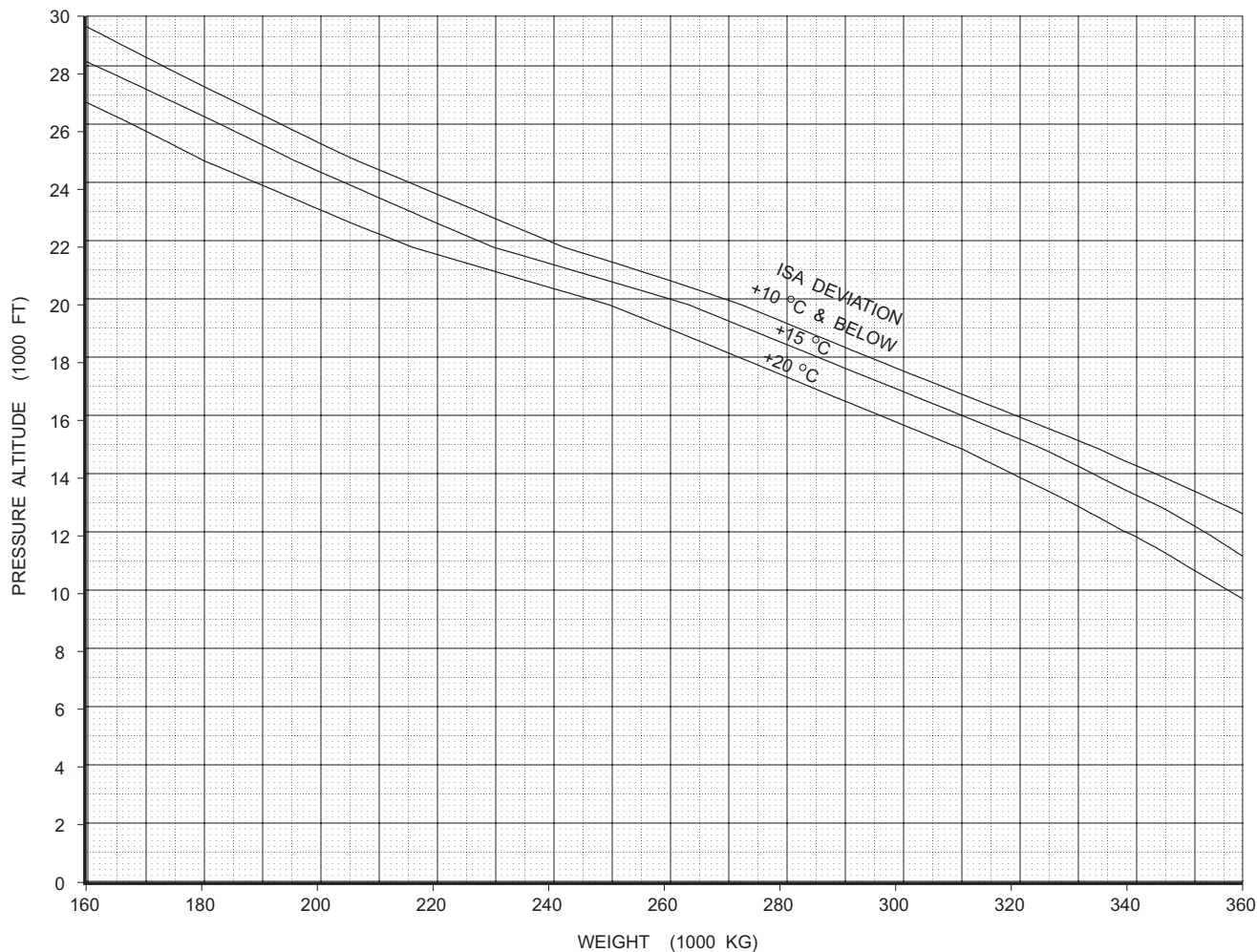
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
	12	14	16	18	20	22	24	26
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.7	-2.2	-2.1	-1.7	-1.3	-1.5	-1.5	-1.5

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Net Level Off Weight

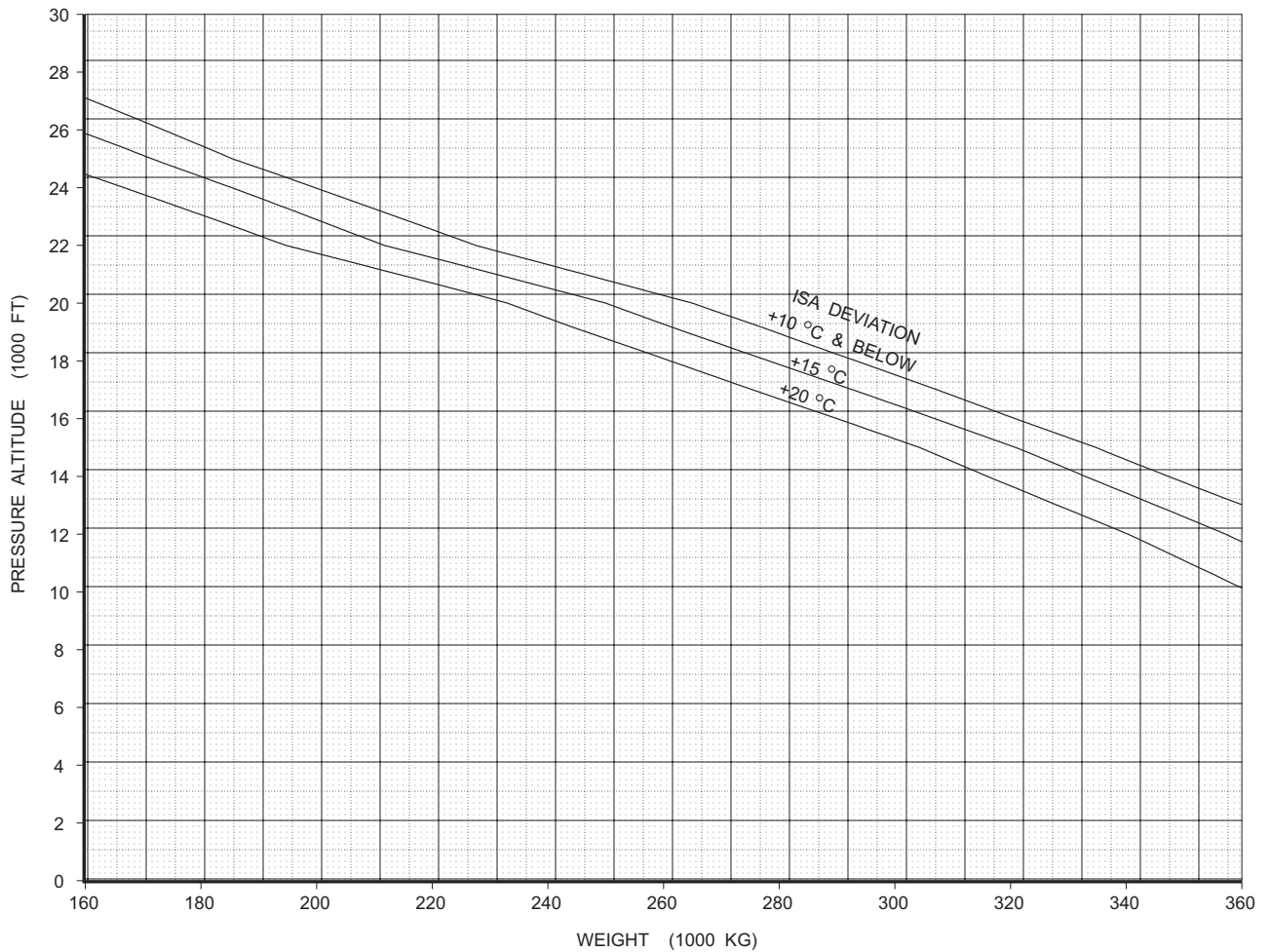


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)					
	PRESSURE ALTITUDE (1000 FT)					
	14	16	18	20	22	24
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.0	-2.0	-1.7	-1.4	-1.9	-2.2

ENGINE INOP MAX CONTINUOUS THRUST

280 KIAS Net Level Off Weight



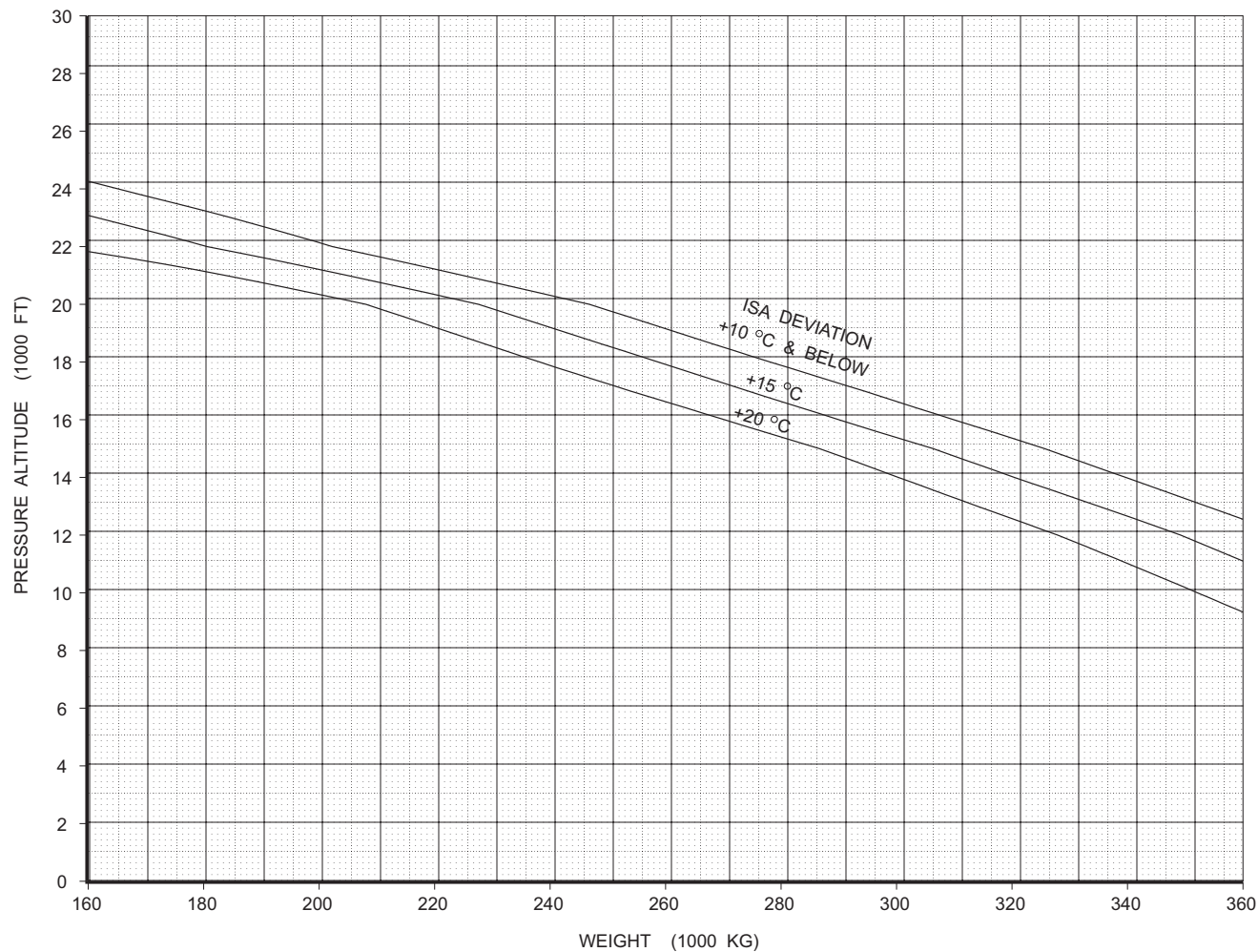
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)				
	PRESSURE ALTITUDE (1000 FT)				
	14	16	18	20	22
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.3	-2.3	-2.1	-1.7	-2.5

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Net Level Off Weight

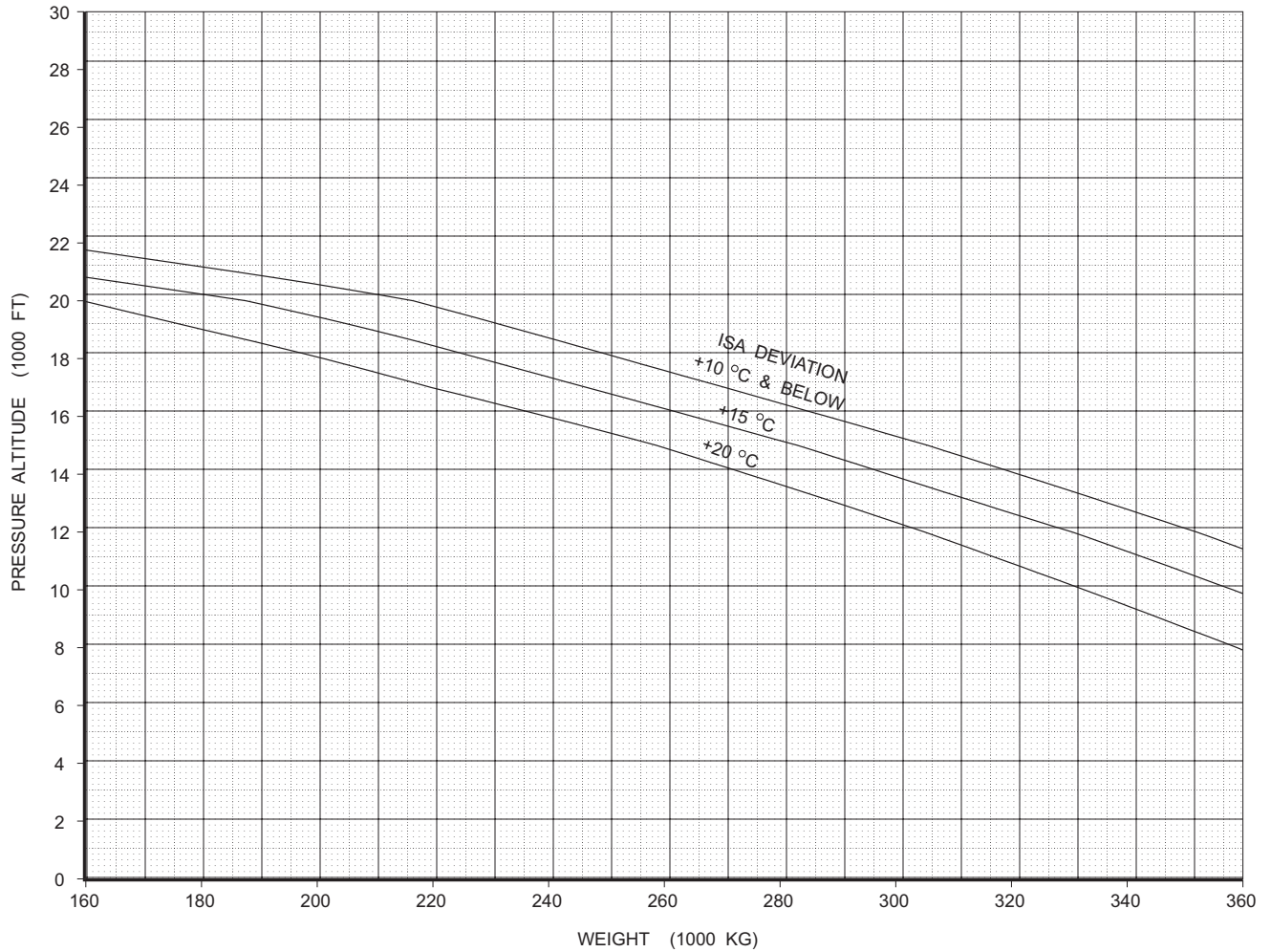


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)				
	PRESSURE ALTITUDE (1000 FT)				
	14	16	18	20	22
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.8	-2.7	-2.4	-1.9	-3.0

ENGINE INOP MAX CONTINUOUS THRUST

320 KIAS Net Level Off Weight



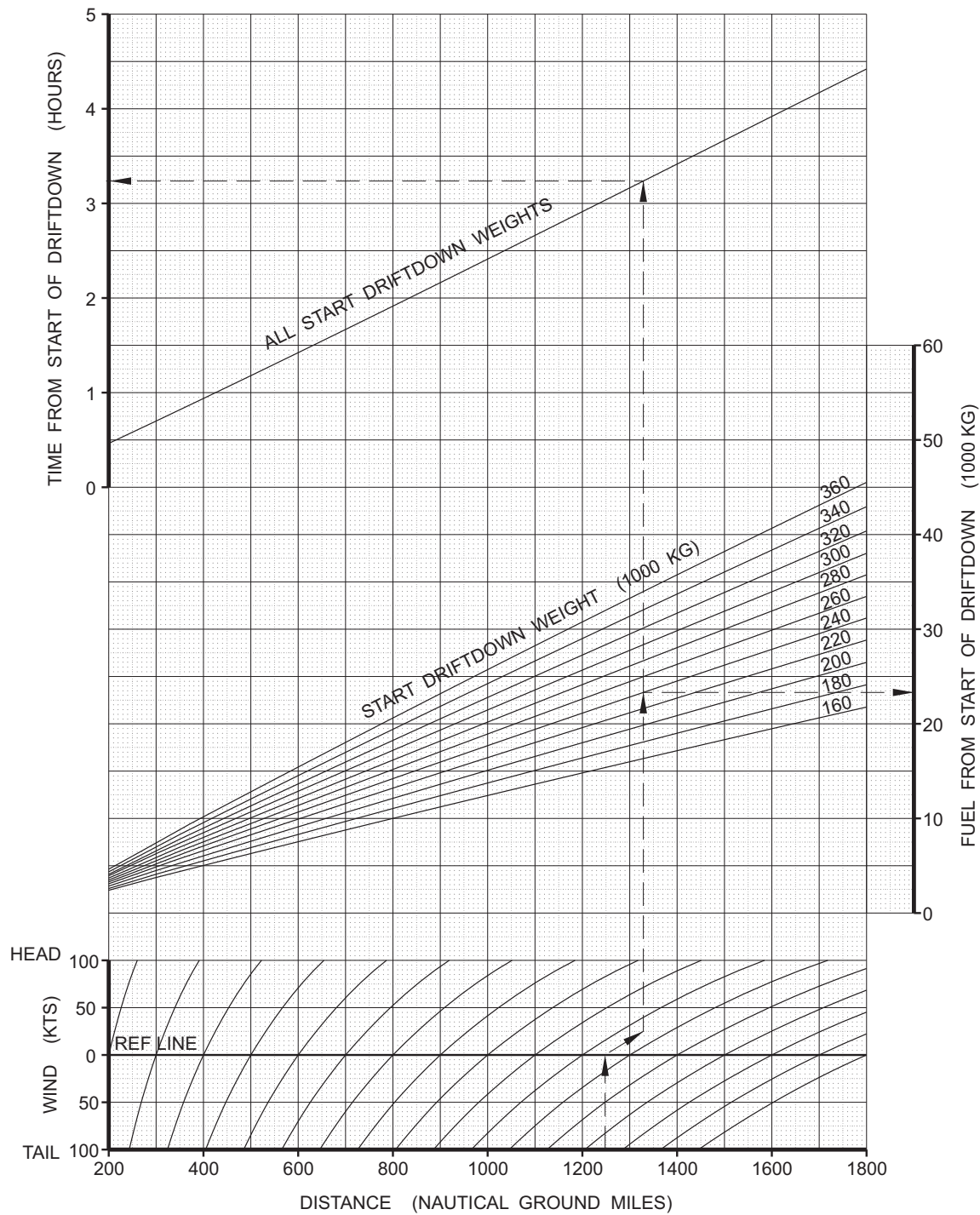
Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)				
	PRESSURE ALTITUDE (1000 FT)				
	14	16	18	20	22
ENGINE ONLY	0.0	0.0	0.0	0.0	0.0
ENGINE AND WING	-2.9	-3.1	-3.0	-2.6	-2.5

ENGINE INOP

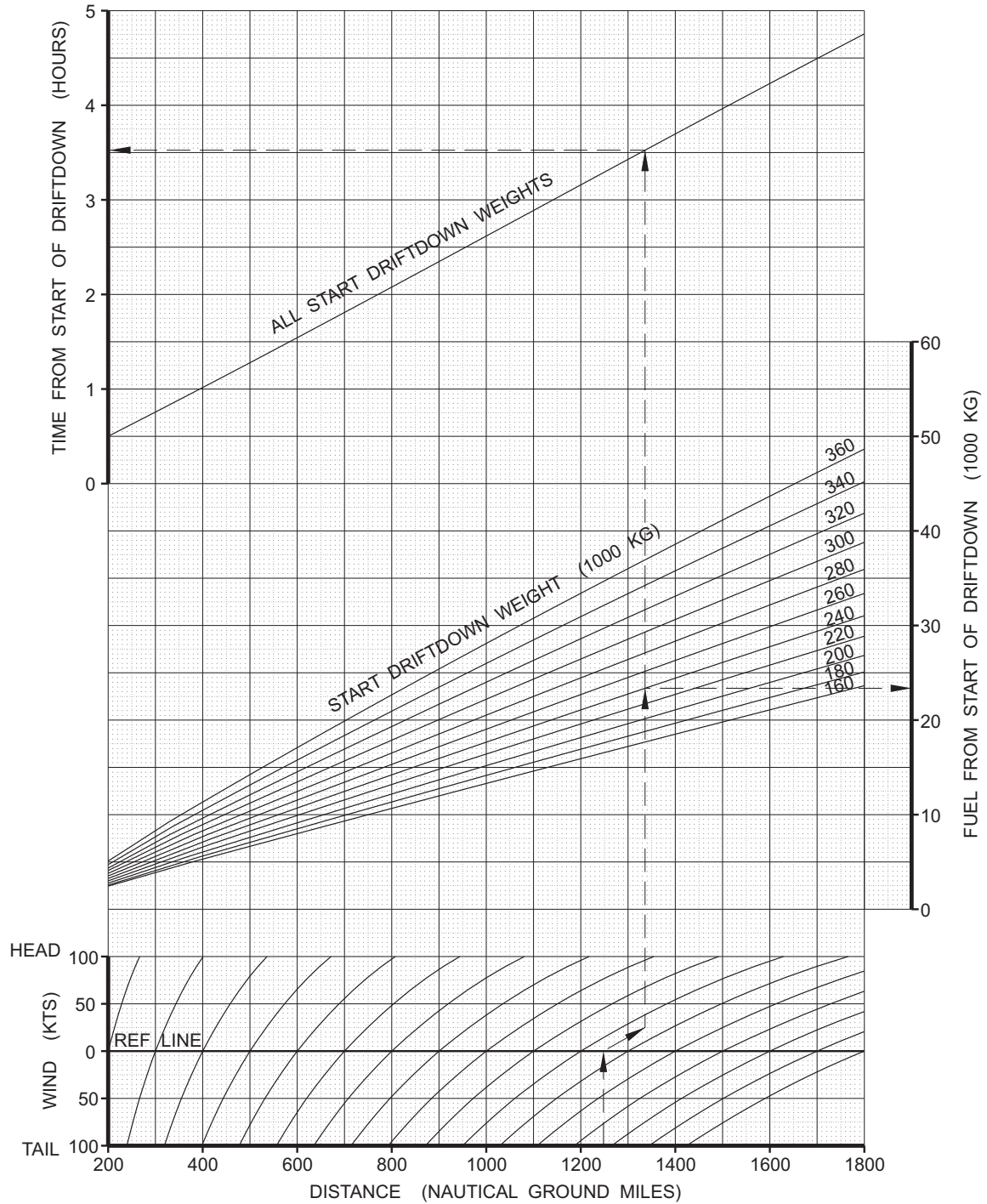
MAX CONTINUOUS THRUST

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



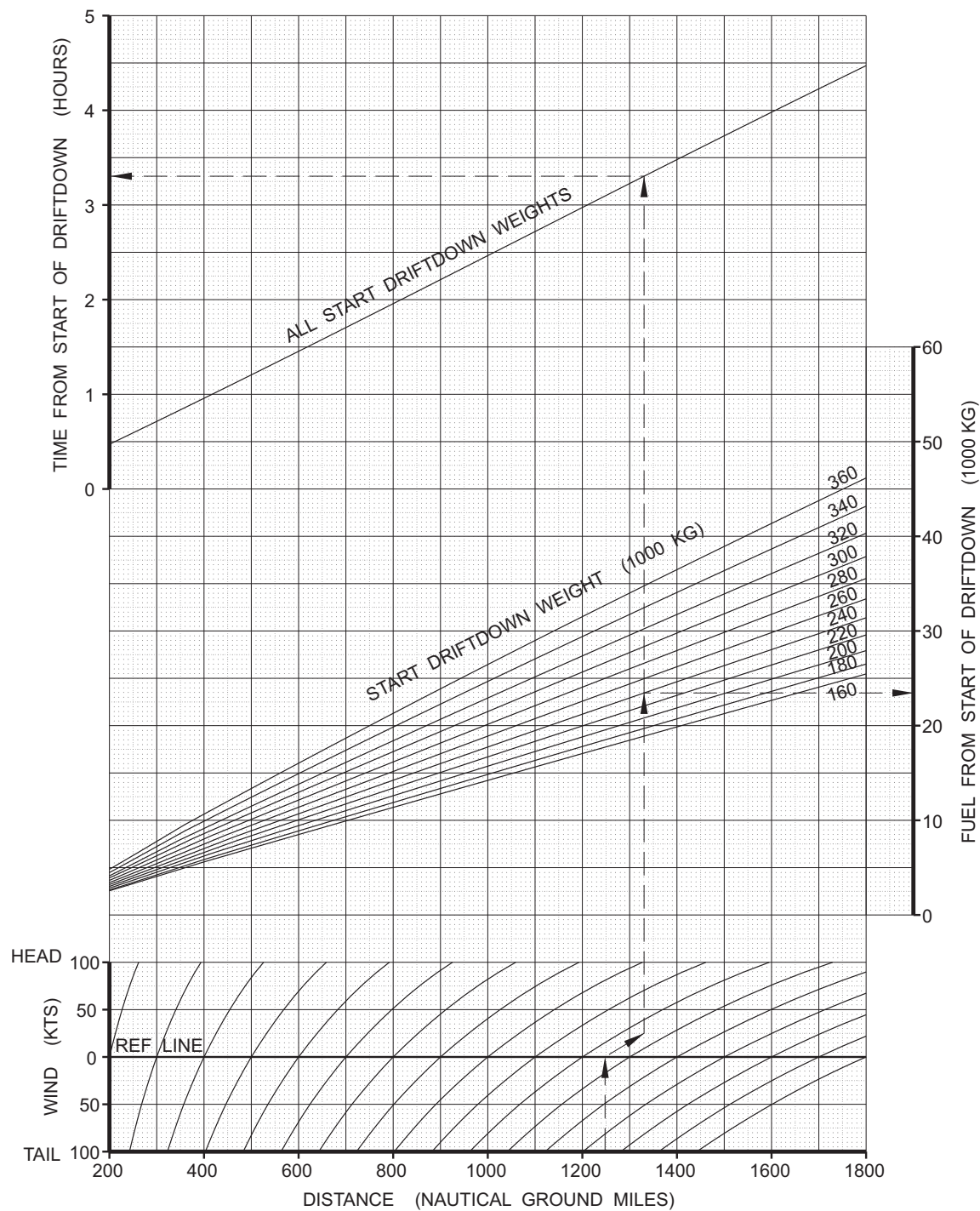
ENGINE INOP MAX CONTINUOUS THRUST

.82M/260 KIAS Driftdown/Cruise Range Capability
Includes APU fuel burn



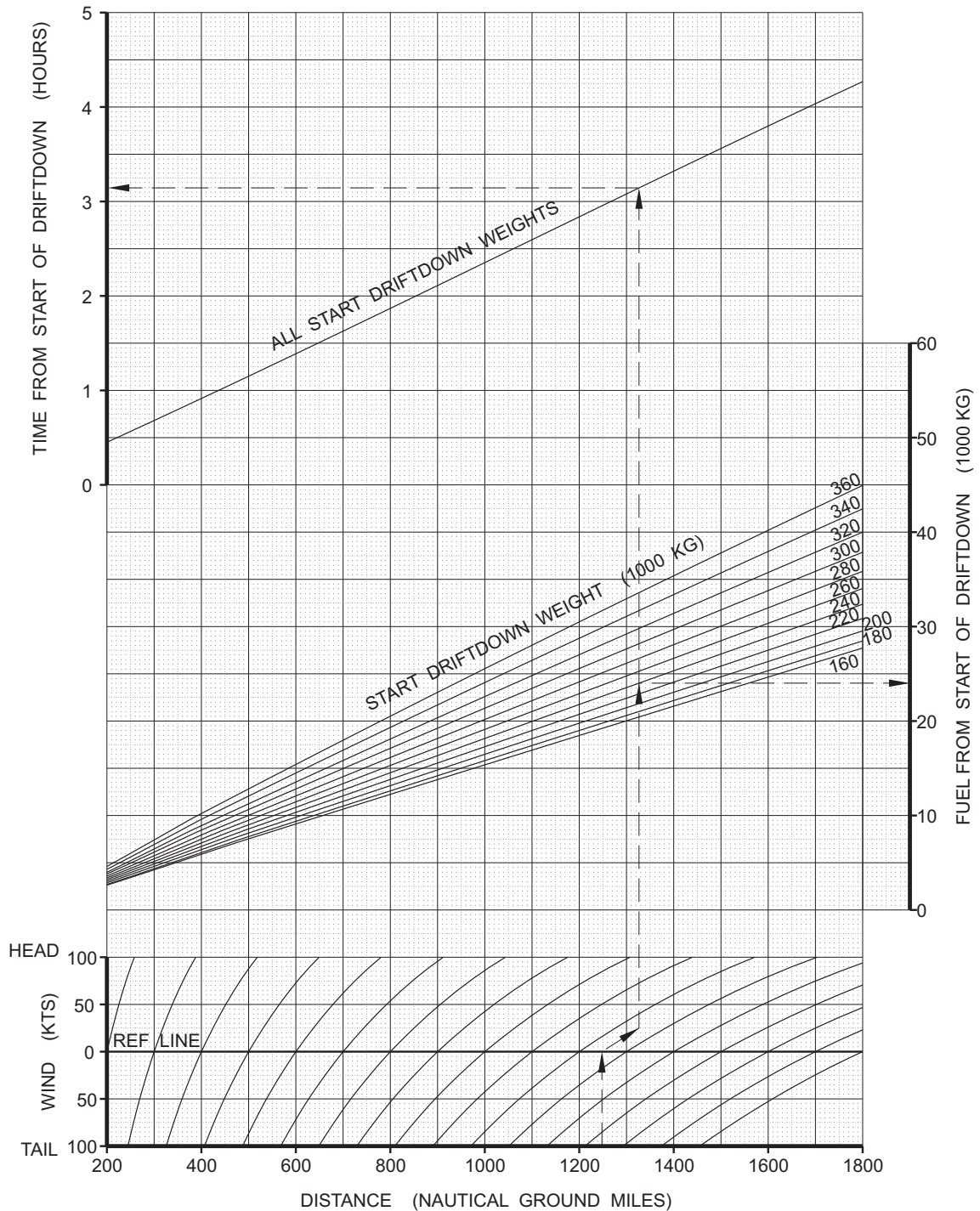
ENGINE INOP MAX CONTINUOUS THRUST

.84M/280 KIAS Driftdown/Cruise Range Capability
Includes APU fuel burn



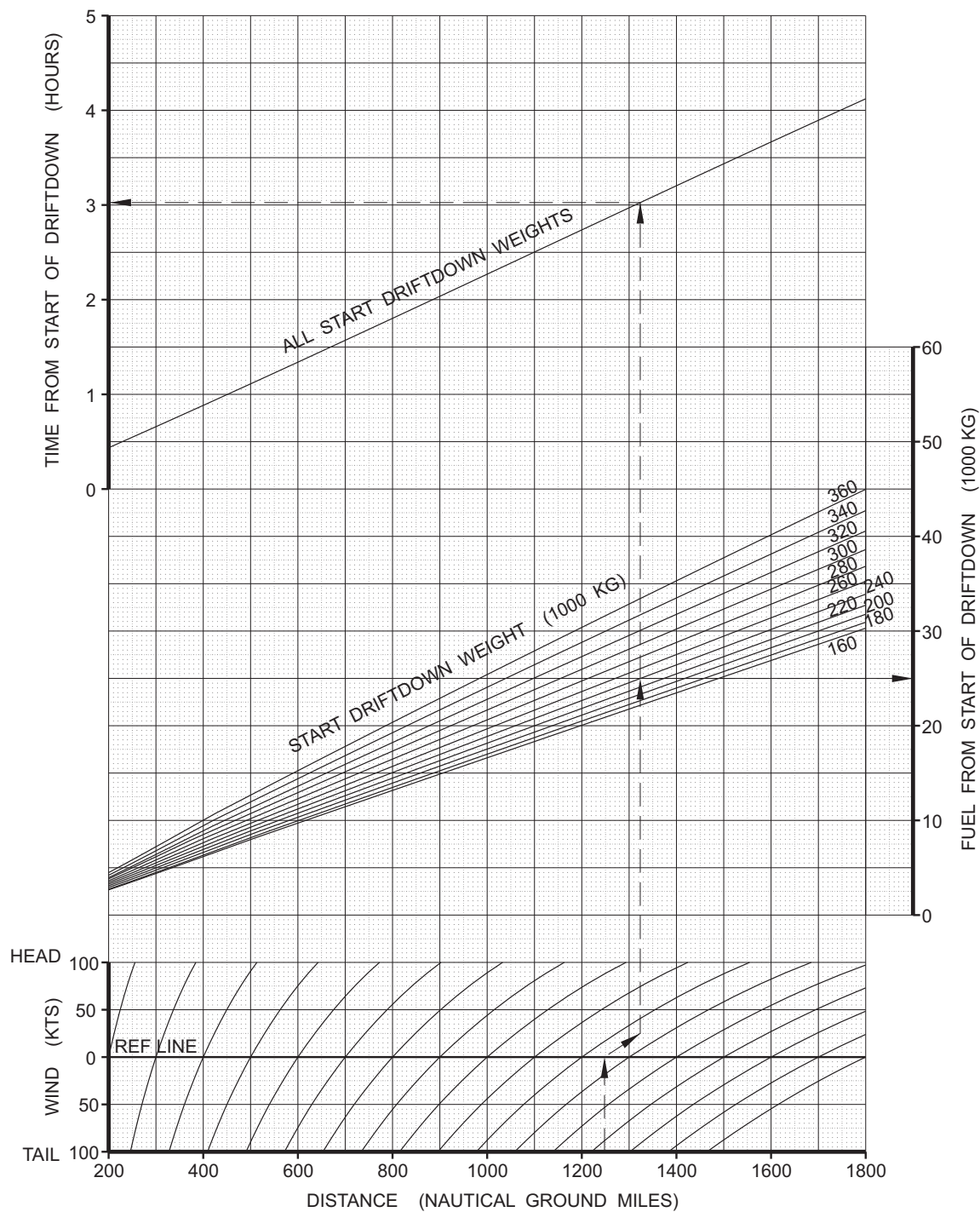
ENGINE INOP MAX CONTINUOUS THRUST

.84M/300 KIAS Driftdown/Cruise Range Capability
Includes APU fuel burn



ENGINE INOP MAX CONTINUOUS THRUST

.84M/320 KIAS Driftdown/Cruise Range Capability
Includes APU fuel burn



**ENROUTE**
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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 at two center of gravity positions: 7.5% MAC (FMC default) for use when no center of gravity is entered on the PERF INIT page, and 30% MAC (typical mid cruise center of gravity) for use when 30% MAC is entered. Crews may interpolate between these values to determine the airplane's capability at other specific center of gravity positions. 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 300 ft/min residual rate of climb. Flying above these altitudes with sustained banks in excess of approximately 21° 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 approximately 1.3g (39° bank) or more. The altitudes shown in the table are limited to the maximum certified altitude of 43100 ft.

Enroute Climb

The Enroute Climb tables are based on 310/.84 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 tables are provided for Long Range Cruise and .84M 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 QRH and are expanded to include true airspeed and Max Cruise thrust setting information.

To account for APU fuel burn, refer to the APU Operation 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 .84M. 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 three descent speed schedules. 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

%N1, indicated airspeed and fuel flow information are tabulated for holding at flaps up and flaps 1 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

The chart provides one-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

The Engine Inoperative Altitude Capability tables are based on the thrust limited capability with 100 ft/min residual rate of climb. For the engine inoperative case,

buffet capability is not considered limiting. Tables are shown for Long Range Cruise and constant speeds of 260, 280, 300, and 320 KIAS for both Max Continuous and Max Cruise Thrust. Adjust the table values for thermal anti-ice operation as shown 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 constant speeds of 260, 280, 300 and 320 KIAS. The fuel flow values in these tables reflect only the engine fuel burn. To conservatively account for APU fuel burn, refer to the APU Operation 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 are shown for Long Range Cruise and constant speeds of 260, 280, 300 and 320 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

%N1 required, ISA 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

Max Climb Thrust

Forward C.G. (7.5% MAC - FMC Default)

ISA + 10°C and Below

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	4	30400	28700	27200
350	28500	3	31000	29400	27800
340	29200	1	31600	30000	28500
330	29800	0	32100	30500	29000
320	30500	-2	32600	31000	29500
310	31200	-3	33200	31600	30000
300	31900	-5	33700	32100	30600
290	32600	-7	34300	32700	31200
280	33400	-8	34900	33300	31800
270	34100	-10	35500	33900	32400
260	34900	-12	36100	34500	33100
250	35800	-14	36800	35200	33800
240	36600	-15	37500	35900	34500
230	37500	-15	38200	36600	35200
220	38400	-15	39000	37400	36000
210	39400	-15	39700	38200	36800
200	40400	-15	40600	39100	37700
190	41500	-15	41500	39900	38600
180	42600	-15	42400	40900	39600
170	43100	-15	43100	42100	40800
160	43100	-15	43100	43100	42100

ISA + 15°C

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	10	30400	28700	27200
350	28500	8	31000	29400	27800
340	29200	7	31600	30000	28500
330	29800	5	32100	30500	29000
320	30500	4	32600	31000	29500
310	31200	2	33200	31600	30000
300	31900	1	33700	32100	30600
290	32600	-1	34300	32700	31200
280	33400	-3	34900	33300	31800
270	34100	-4	35500	33900	32400
260	34900	-6	36100	34500	33100
250	35800	-8	36800	35200	33800
240	36600	-9	37500	35900	34500
230	37500	-9	38200	36600	35200
220	38400	-9	39000	37400	36000
210	39400	-9	39700	38200	36800
200	40400	-9	40600	39100	37700
190	41500	-9	41500	39900	38600
180	42600	-9	42400	40900	39600
170	43100	-9	43100	42100	40800
160	43100	-9	43100	43100	42100

Long Range Cruise Maximum Operating Altitude**Max Climb Thrust****Forward C.G. (7.5% MAC - FMC Default)****ISA + 20°C**

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	15	30400	28700	27200
350	28500	14	31000	29400	27800
340	29200	13	31600	30000	28500
330	29800	11	32100	30500	29000
320	30500	10	32600	31000	29500
310	31200	8	33200	31600	30000
300	31900	6	33700	32100	30600
290	32600	5	34300	32700	31200
280	33400	3	34900	33300	31800
270	34100	1	35500	33900	32400
260	34900	-1	36100	34500	33100
250	35800	-2	36800	35200	33800
240	36600	-3	37500	35900	34500
230	37500	-3	38200	36600	35200
220	38400	-3	39000	37400	36000
210	39400	-3	39700	38200	36800
200	40400	-3	40600	39100	37700
190	41500	-3	41500	39900	38600
180	42600	-3	42400	40900	39600
170	43100	-3	43100	42100	40800
160	43100	-3	43100	43100	42100

Long Range Cruise Maximum Operating Altitude**Max Climb Thrust****Mid C.G. (30% MAC)****ISA + 10°C and Below**

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	4	31400	29800	28300
350	28500	3	32000	30400	28900
340	29200	1	32700	31000	29500
330	29800	0	33200	31500	30000
320	30500	-2	33700	32100	30500
310	31200	-3	34200	32600	31100
300	31900	-5	34700	33100	31600
290	32600	-7	35300	33700	32200
280	33400	-8	35900	34300	32800
270	34100	-10	36500	34900	33400
260	34900	-12	37100	35500	34100
250	35800	-14	37800	36200	34800
240	36600	-15	38500	36900	35500
230	37500	-15	39200	37600	36200
220	38400	-15	40000	38400	37000
210	39400	-15	40700	39200	37800
200	40400	-15	41600	40000	38600
190	41500	-15	42500	40900	39500
180	42600	-15	43100	41900	40500
170	43100	-15	43100	43100	41700
160	43100	-15	43100	43100	43000

Long Range Cruise Maximum Operating Altitude

Max Climb Thrust

Mid C.G. (30% MAC)

ISA + 15°C

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	10	31400	29800	28300
350	28500	8	32000	30400	28900
340	29200	7	32700	31000	29500
330	29800	5	33200	31500	30000
320	30500	4	33700	32100	30500
310	31200	2	34200	32600	31100
300	31900	1	34700	33100	31600
290	32600	-1	35300	33700	32200
280	33400	-3	35900	34300	32800
270	34100	-4	36500	34900	33400
260	34900	-6	37100	35500	34100
250	35800	-8	37800	36200	34800
240	36600	-9	38500	36900	35500
230	37500	-9	39200	37600	36200
220	38400	-9	40000	38400	37000
210	39400	-9	40700	39200	37800
200	40400	-9	41600	40000	38600
190	41500	-9	42500	40900	39500
180	42600	-9	43100	41900	40500
170	43100	-9	43100	43100	41700
160	43100	-9	43100	43100	43000

ISA + 20°C

WEIGHT (1000 KG)	OPTIMUM ALT (FT)	TAT (°C)	MARGIN TO INITIAL BUFFET 'G' (BANK ANGLE)		
			1.30 (39°)	1.40 (44°)	1.50 (48°)
360	27900	15	31400	29800	28300
350	28500	14	32000	30400	28900
340	29200	13	32700	31000	29500
330	29800	11	33200	31500	30000
320	30500	10	33700	32100	30500
310	31200	8	34200	32600	31100
300	31900	6	34700	33100	31600
290	32600	5	35300	33700	32200
280	33400	3	35900	34300	32800
270	34100	1	36500	34900	33400
260	34900	-1	37100	35500	34100
250	35800	-2	37800	36200	34800
240	36600	-3	38500	36900	35500
230	37500	-3	39200	37600	36200
220	38400	-3	40000	38400	37000
210	39400	-3	40700	39200	37800
200	40400	-3	41600	40000	38600
190	41500	-3	42500	40900	39500
180	42600	-3	43100	41900	40500
170	43100	-3	43100	43100	41700
160	43100	-3	43100	43100	43000

*Denotes altitude thrust limited in level flight, 300 fpm residual rate of climb.

310/.84 Enroute Climb
ISA and Below - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD											
38000	TIME/FUEL DIST/SPD											18/5250 115/432
37000	TIME/FUEL DIST/SPD									19/5700 123/430	18/5350 113/429	17/5050 106/428
36000	TIME/FUEL DIST/SPD							20/6200 131/429	19/5800 121/427	18/5450 112/426	17/5150 105/425	16/4850 99/424
35000	TIME/FUEL DIST/SPD						20/6300 129/426	19/5900 120/425	18/5600 112/424	17/5250 105/423	16/5000 99/422	15/4750 93/421
34000	TIME/FUEL DIST/SPD				22/6850 139/425	21/6400 128/423	19/6050 119/422	18/5700 112/421	17/5400 105/420	16/5100 99/419	15/4850 93/419	14/4600 88/418
33000	TIME/FUEL DIST/SPD			22/6950 137/422	21/6550 128/420	19/6200 119/419	18/5850 112/418	17/5550 105/417	16/5250 99/417	15/5000 94/416	14/4700 88/416	13/4350 84/415
32000	TIME/FUEL DIST/SPD	24/7600 149/421	22/7100 137/418	21/6700 127/417	20/6300 119/416	19/5950 112/415	18/5650 105/414	17/5400 99/414	16/5100 94/413	15/4850 89/413	14/4600 84/412	13/4350 79/412
31000	TIME/FUEL DIST/SPD	22/7200 134/414	21/6750 125/413	20/6400 117/412	19/6050 110/411	18/5750 104/410	17/5450 98/410	16/5200 93/409	15/4950 88/409	14/4700 83/408	13/4450 79/408	12/4250 74/408
30000	TIME/FUEL DIST/SPD	21/6850 122/408	20/6450 115/407	18/6100 108/407	17/5800 102/406	16/5500 96/406	15/5050 91/405	14/4800 86/405	13/4550 82/404	12/4350 77/404	11/4150 73/403	10/3950 69/403
29000	TIME/FUEL DIST/SPD	20/6500 112/403	18/6200 106/403	17/5850 100/402	16/5600 94/401	15/5300 89/401	14/5050 85/400	13/4800 80/400	12/4550 76/400	11/4350 72/399	10/4150 68/399	9/3950 65/398
28000	TIME/FUEL DIST/SPD	18/6250 103/398	17/5900 98/398	16/5650 92/397	15/5350 87/397	14/5100 83/396	13/4850 79/396	12/4600 74/396	11/4400 71/395	10/4200 67/395	9/4000 64/394	8/3800 60/394
27000	TIME/FUEL DIST/SPD	17/5950 95/394	16/5650 90/393	15/5400 85/393	14/5150 81/392	13/4900 77/392	12/4650 73/392	11/4450 69/391	10/4250 66/391	9/4050 62/391	8/3850 59/390	7/3650 56/390
26000	TIME/FUEL DIST/SPD	16/5700 88/389	15/5450 83/389	14/5200 79/388	13/4950 75/388	12/4700 71/388	11/4450 68/387	10/4300 64/387	9/4100 61/387	8/3900 58/387	7/3700 55/386	6/3500 52/386
25000	TIME/FUEL DIST/SPD	15/5450 81/385	14/5200 77/385	13/4950 73/384	12/4750 69/384	11/4500 66/384	10/4300 63/383	9/4100 60/383	8/3900 57/383	7/3750 54/383	6/3550 51/382	5/3400 49/382
24000	TIME/FUEL DIST/SPD	15/5250 75/381	14/5000 71/381	13/4750 67/380	12/4550 64/380	11/4450 61/380	10/4300 58/379	9/4150 55/379	8/3950 53/379	7/3800 50/379	6/3600 48/378	5/3450 45/378
23000	TIME/FUEL DIST/SPD	14/5000 69/377	13/4800 65/377	12/4550 62/376	11/4400 59/376	10/4300 56/376	9/4150 54/376	8/3950 51/375	7/3800 49/375	6/3650 46/375	5/3450 44/375	4/3300 42/374
22000	TIME/FUEL DIST/SPD	13/4800 63/373	12/4600 60/373	11/4400 57/373	10/4200 55/372	9/4000 52/372	8/3850 50/372	7/3700 47/372	6/3500 45/371	5/3350 43/371	4/3200 41/371	3/3050 39/371
21000	TIME/FUEL DIST/SPD	12/4600 58/369	11/4400 56/369	10/4200 53/369	9/4000 51/369	8/3850 48/369	7/3700 46/368	6/3500 44/368	5/3350 42/368	4/3200 40/368	3/3050 38/368	2/2900 36/367
20000	TIME/FUEL DIST/SPD	12/4400 54/366	11/4200 51/366	10/4050 49/365	9/3850 47/365	8/3700 44/365	7/3500 42/365	6/3350 41/365	5/3200 39/365	4/3050 37/364	3/2900 35/364	2/2800 33/364
18000	TIME/FUEL DIST/SPD	10/4000 45/359	9/3850 43/359	8/3700 41/359	7/3500 39/359	6/3400 38/358	5/3250 36/358	4/3100 34/358	3/2950 33/358	2/2800 31/358	1/2700 30/358	0/2550 28/357
16000	TIME/FUEL DIST/SPD	9/3650 38/353	8/3500 36/353	7/3350 34/352	6/3200 33/352	5/3100 32/352	4/2950 30/352	3/2800 29/352	2/2650 28/352	1/2500 26/352	0/2350 25/351	0/2150 24/351
14000	TIME/FUEL DIST/SPD	8/3300 31/347	7/3200 30/347	6/3050 28/347	5/2900 27/346	4/2800 26/346	3/2650 25/346	2/2500 24/346	1/2350 23/346	0/2200 22/346	0/2050 21/346	0/1900 20/345
10000	TIME/FUEL DIST/SPD	6/2650 19/336	5/2550 19/336	4/2450 18/336	3/2350 17/336	2/2250 16/335	1/2150 15/335	0/2050 14/335	0/1950 13/335	0/1850 12/335	0/1750 11/335	0/1650 10/335
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-250	-500	-750	-1000	-1250	-1550

Shaded area approximates optimum altitude at LRC/.84.

Flight Planning and Performance Manual

310/84 Enroute Climb
ISA and Below - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD								15/3950 99/440	14/3700 91/439	13/3450 84/438	12/3200 78/437
42000	TIME/FUEL DIST/SPD						16/4400 108/439	15/4100 99/438	14/3850 92/437	13/3600 85/436	12/3350 79/436	11/3150 73/435
41000	TIME/FUEL DIST/SPD					16/4550 108/437	15/4250 100/436	14/4000 92/435	13/3750 86/435	12/3500 80/434	11/3300 74/433	11/3050 69/432
40000	TIME/FUEL DIST/SPD				16/4650 108/435	15/4400 100/434	14/4100 93/433	13/3850 86/432	13/3650 81/432	12/3400 75/431	11/3200 70/430	10/3000 65/430
39000	TIME/FUEL DIST/SPD		18/5100 116/434	16/4800 107/433	15/4500 100/432	14/4250 93/431	14/4000 87/430	13/3750 81/430	12/3550 76/429	11/3350 71/428	10/3100 66/428	10/2900 61/427
38000	TIME/FUEL DIST/SPD	18/5250 115/432	17/4900 106/430	16/4650 99/429	15/4350 93/429	14/4100 87/428	13/3900 82/427	12/3650 77/427	11/3450 72/426	11/3250 67/426	10/3050 62/425	9/2850 58/424
37000	TIME/FUEL DIST/SPD	17/5050 106/428	16/4750 99/427	15/4500 93/426	14/4250 87/426	13/4000 82/425	12/3800 77/424	12/3550 72/424	11/3350 68/423	10/3150 63/423	10/2950 59/422	9/2750 55/422
36000	TIME/FUEL DIST/SPD	16/4850 99/424	15/4600 93/424	14/4350 87/423	13/4100 82/423	13/3900 77/422	12/3700 73/422	11/3500 68/421	10/3300 64/421	10/3100 60/420	9/2900 56/420	9/2700 52/419
35000	TIME/FUEL DIST/SPD	15/4750 93/421	14/4500 88/421	13/4250 83/420	13/4000 78/420	12/3800 73/419	11/3600 69/419	11/3400 65/418	10/3200 61/418	9/3000 57/417	9/2850 53/417	8/2650 50/416
34000	TIME/FUEL DIST/SPD	14/4600 88/418	14/4350 83/418	13/4150 79/417	12/3900 74/417	12/3700 70/416	11/3500 66/416	10/3300 62/416	10/3150 58/415	9/2950 54/415	9/2750 51/414	8/2600 48/414
33000	TIME/FUEL DIST/SPD	14/4500 84/415	13/4250 79/415	12/4050 75/414	12/3850 71/414	11/3600 67/413	11/3450 63/413	10/3250 59/413	9/3050 55/412	9/2900 52/412	8/2700 49/411	8/2550 45/411
32000	TIME/FUEL DIST/SPD	13/4350 79/412	13/4150 75/411	12/3950 71/411	11/3750 67/411	11/3550 63/410	10/3350 60/410	10/3150 56/409	9/3000 53/409	9/2800 50/409	8/2650 46/408	7/2500 43/408
31000	TIME/FUEL DIST/SPD	13/4250 74/408	12/4000 71/407	11/3800 67/407	11/3600 63/406	10/3450 60/406	10/3250 56/406	9/3050 53/405	9/2900 50/405	8/2750 47/404	8/2550 44/404	7/2400 41/403
30000	TIME/FUEL DIST/SPD	12/4100 69/403	12/3850 66/403	11/3700 62/402	10/3500 59/402	10/3300 56/401	9/3150 52/401	9/2950 49/401	8/2800 47/400	8/2650 44/400	7/2500 41/399	7/2350 38/399
29000	TIME/FUEL DIST/SPD	12/3950 65/398	11/3750 61/398	10/3550 58/398	10/3350 55/397	9/3200 52/397	9/3050 49/397	8/2850 46/396	8/2700 44/396	7/2550 41/396	7/2400 38/395	7/2250 36/395
28000	TIME/FUEL DIST/SPD	11/3800 60/394	10/3600 57/394	10/3450 54/394	9/3250 51/393	9/3100 49/393	8/2950 46/393	8/2750 43/392	8/2600 41/392	7/2450 38/391	7/2300 36/391	6/2200 33/390
27000	TIME/FUEL DIST/SPD	10/3650 56/390	10/3500 53/390	9/3300 51/389	9/3150 48/389	9/3000 45/389	8/2850 43/389	8/2700 40/388	7/2550 38/388	7/2400 36/387	6/2250 33/387	6/2100 31/386
26000	TIME/FUEL DIST/SPD	10/3500 52/386	9/3350 50/386	9/3200 47/385	9/3050 45/385	8/2900 42/385	8/2750 40/385	7/2600 38/384	7/2450 36/384	6/2300 33/383	6/2150 31/383	6/2050 29/382
25000	TIME/FUEL DIST/SPD	9/3400 49/382	9/3250 46/382	9/3100 44/382	8/2900 42/381	8/2800 39/381	7/2650 37/381	7/2500 35/380	7/2350 33/380	6/2250 31/380	6/2100 29/379	5/1950 27/378
24000	TIME/FUEL DIST/SPD	9/3250 45/378	9/3100 43/378	8/2950 41/378	8/2800 39/377	7/2700 37/377	7/2550 35/377	7/2400 33/377	6/2300 31/376	6/2150 29/376	6/2000 27/375	5/1900 25/375
23000	TIME/FUEL DIST/SPD	9/3150 42/374	8/3000 40/374	8/2850 38/374	7/2700 36/374	7/2600 34/373	7/2450 32/373	6/2300 31/373	6/2200 29/372	6/2050 27/372	5/1950 25/372	5/1850 24/371
22000	TIME/FUEL DIST/SPD	8/3050 39/371	8/2900 37/371	7/2750 35/370	7/2600 33/370	7/2500 32/370	6/2350 30/370	6/2250 28/369	6/2100 27/369	5/2000 25/368	5/1900 24/368	5/1750 22/367
21000	TIME/FUEL DIST/SPD	8/2900 36/367	7/2800 34/367	7/2650 33/367	7/2500 31/367	6/2400 29/366	6/2250 28/366	6/2150 26/366	5/2050 25/365	5/1900 23/365	5/1800 22/364	4/1700 20/364
20000	TIME/FUEL DIST/SPD	7/2800 33/364	7/2650 32/364	7/2550 30/364	6/2400 29/363	6/2300 27/363	6/2200 26/363	5/2050 24/362	5/1950 23/362	5/1850 22/362	5/1750 20/361	4/1650 19/360
18000	TIME/FUEL DIST/SPD	7/2550 28/357	6/2450 27/357	6/2350 26/357	6/2250 24/357	5/2100 23/356	5/2000 22/356	5/1900 21/356	5/1800 20/355	4/1700 18/355	4/1600 17/354	4/1500 16/354
16000	TIME/FUEL DIST/SPD	6/2350 24/351	6/2250 23/351	5/2150 22/351	5/2050 21/351	5/1950 20/350	5/1850 18/350	4/1750 17/350	4/1650 16/349	4/1550 15/349	4/1500 15/348	3/1400 14/347
14000	TIME/FUEL DIST/SPD	5/2150 20/345	5/2050 19/345	5/1950 18/345	5/1850 17/345	4/1750 16/344	4/1700 15/344	4/1600 14/344	4/1500 14/343	3/1450 13/343	3/1350 12/342	3/1250 11/341
10000	TIME/FUEL DIST/SPD	4/1750 12/335	4/1650 12/334	4/1550 11/334	4/1500 11/334	3/1450 10/333	3/1350 10/333	3/1300 9/333	3/1200 9/332	3/1150 8/332	3/1100 8/331	2/1050 7/330
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-150	-300	-450	-650	-800	-950

Shaded area approximates optimum altitude at LRC/84.

310/.84 Enroute Climb
ISA + 10°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD											
38000	TIME/FUEL DIST/SPD											18/5450 120/441
37000	TIME/FUEL DIST/SPD									20/5950 128/439	18/5550 119/438	17/5250 111/437
36000	TIME/FUEL DIST/SPD							21/6450 137/438	19/6050 126/436	18/5700 118/435	17/5350 110/434	16/5050 103/433
35000	TIME/FUEL DIST/SPD						21/6550 135/435	20/6150 126/434	18/5800 117/432	17/5500 110/431	16/5200 103/431	15/4900 97/430
34000	TIME/FUEL DIST/SPD				23/7150 145/434	21/6700 134/432	20/6300 125/431	19/5950 117/430	17/5650 110/429	16/5300 104/428	15/5050 98/427	14/4800 92/427
33000	TIME/FUEL DIST/SPD			23/7250 144/430	21/6800 134/429	20/6450 125/428	19/6100 117/427	18/5750 110/426	17/5450 104/425	16/5200 98/425	15/4900 93/424	14/4650 87/424
32000	TIME/FUEL DIST/SPD	25/7900 156/429	23/7400 143/427	21/6950 133/426	20/6550 125/424	19/6200 117/424	18/5900 110/423	17/5600 104/422	16/5300 98/422	15/5050 93/421	14/4800 88/421	13/4550 83/420
31000	TIME/FUEL DIST/SPD	23/7500 141/422	21/7050 131/421	20/6650 123/420	19/6300 115/419	18/6000 109/419	17/5700 103/418	16/5400 97/418	15/5150 92/417	14/4850 87/417	13/4600 82/416	12/4400 78/416
30000	TIME/FUEL DIST/SPD	21/7100 128/417	20/6700 120/416	19/6350 113/415	18/6050 107/414	17/5750 101/414	16/5450 95/413	15/5200 90/413	14/4950 85/412	13/4700 81/412	12/4450 77/411	11/4250 73/411
29000	TIME/FUEL DIST/SPD	20/6750 118/411	19/6400 111/411	18/6100 104/410	17/5800 99/409	16/5500 93/409	15/5250 88/408	14/5000 84/408	13/4750 79/407	12/4500 75/407	11/4300 71/407	10/4100 68/406
28000	TIME/FUEL DIST/SPD	19/6450 108/406	18/6150 102/406	17/5850 96/405	16/5550 91/405	15/5300 87/404	14/5050 82/404	13/4800 78/403	12/4550 74/403	11/4350 70/403	10/4150 66/402	9/3950 63/402
27000	TIME/FUEL DIST/SPD	18/6200 100/401	17/5900 94/401	16/5600 89/400	15/5350 85/400	14/5100 80/400	13/4850 76/399	12/4600 72/399	11/4400 69/399	10/4200 65/398	9/4000 62/398	8/3800 59/398
26000	TIME/FUEL DIST/SPD	17/5900 92/397	16/5650 87/396	15/5350 82/396	14/5100 78/396	13/4900 74/395	12/4650 71/395	11/4450 67/395	10/4250 64/394	9/4050 61/394	8/3850 58/394	7/3650 55/393
25000	TIME/FUEL DIST/SPD	16/5650 85/392	15/5400 80/392	14/5150 76/392	13/4900 72/391	12/4700 69/391	11/4450 66/391	10/4250 62/390	9/4050 59/390	8/3850 56/390	7/3700 54/390	6/3500 51/389
24000	TIME/FUEL DIST/SPD	15/5400 78/388	14/5150 74/388	13/4950 70/388	12/4700 67/387	11/4450 64/387	10/4250 61/387	9/4050 58/386	8/3850 55/386	7/3700 52/386	6/3550 50/386	5/3400 47/385
23000	TIME/FUEL DIST/SPD	14/5200 72/384	13/4950 68/384	12/4750 65/383	11/4450 62/383	10/4300 59/383	9/4100 56/383	8/3950 54/383	7/3750 51/382	6/3600 49/382	5/3400 46/382	4/3250 44/382
22000	TIME/FUEL DIST/SPD	13/4950 66/380	12/4750 63/380	11/4350 60/380	10/4350 57/379	9/3950 55/379	8/3800 52/379	7/3600 50/379	6/3450 47/379	5/3300 45/378	4/3150 43/378	3/3000 41/378
21000	TIME/FUEL DIST/SPD	12/4750 61/376	11/4350 58/376	10/4350 55/376	9/3950 53/376	8/3800 50/375	7/3600 48/375	6/3450 46/375	5/3300 44/375	4/3150 42/375	3/3000 40/374	2/2800 38/374
20000	TIME/FUEL DIST/SPD	12/4550 56/373	11/4350 53/372	10/4150 51/372	9/4000 49/372	8/3800 46/372	7/3650 44/372	6/3500 42/372	5/3300 40/371	4/3150 38/371	3/3050 37/371	2/2900 35/371
18000	TIME/FUEL DIST/SPD	11/4150 47/366	10/3950 45/366	9/3800 43/365	8/3650 41/365	7/3500 39/365	6/3350 38/365	5/3200 36/365	4/3050 34/365	3/2900 33/364	2/2800 31/364	1/2650 30/364
16000	TIME/FUEL DIST/SPD	9/3750 39/359	8/3600 38/359	7/3450 36/359	6/3300 34/359	5/3150 33/359	4/3050 31/359	3/2900 30/358	2/2800 29/358	1/2650 27/358	0/2500 26/358	0/2400 25/358
14000	TIME/FUEL DIST/SPD	8/3400 32/353	7/3250 31/353	6/3150 30/353	5/3000 28/353	4/2850 27/353	3/2750 26/353	2/2650 25/352	1/2500 24/352	0/2400 23/352	0/2300 22/352	0/2200 21/352
10000	TIME/FUEL DIST/SPD	6/2700 20/342	5/2600 19/342	4/2500 19/342	3/2400 18/342	2/2300 17/341	1/2200 16/341	0/2100 15/341	0/2000 14/341	0/1950 14/341	0/1850 14/341	0/1750 13/341
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-250	-550	-800	-1050	-1350	-1600

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/84 Enroute Climb
ISA + 10°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD								15/4150 103/450	14/3850 95/449	13/3600 88/448	12/3350 81/447
42000	TIME/FUEL DIST/SPD						17/4600 113/449	15/4300 104/448	14/4000 96/447	13/3750 89/446	12/3500 83/445	11/3250 76/444
41000	TIME/FUEL DIST/SPD					17/4750 113/447	15/4450 104/446	14/4150 97/445	13/3900 90/444	13/3650 84/443	12/3400 78/442	11/3200 72/442
40000	TIME/FUEL DIST/SPD				17/4850 113/444	16/4550 104/443	15/4300 97/442	14/4050 91/442	13/3800 84/441	12/3550 79/440	11/3350 73/440	10/3100 68/439
39000	TIME/FUEL DIST/SPD		18/5350 121/443	17/5000 112/442	16/4700 104/441	15/4450 97/440	14/4150 91/439	13/3900 85/439	12/3700 79/438	11/3450 74/437	11/3250 69/437	10/3050 64/436
38000	TIME/FUEL DIST/SPD	18/5450 120/441	17/5100 111/439	16/4850 104/438	15/4550 97/438	14/4300 91/437	13/4050 86/436	12/3800 80/436	12/3600 75/435	11/3350 70/435	10/3150 65/434	10/2950 61/433
37000	TIME/FUEL DIST/SPD	17/5250 111/437	16/4950 104/436	15/4650 97/435	14/4400 91/434	13/4150 86/434	13/3950 81/433	12/3700 76/433	11/3500 71/432	10/3300 66/432	10/3100 62/431	9/2900 58/431
36000	TIME/FUEL DIST/SPD	16/5050 103/433	15/4800 97/433	14/4550 91/432	14/4300 86/431	13/4050 81/431	12/3850 76/430	11/3600 72/430	11/3400 67/429	10/3200 63/429	9/3000 59/428	9/2800 55/428
35000	TIME/FUEL DIST/SPD	15/4900 97/430	15/4650 92/429	14/4400 87/429	13/4200 82/428	12/3950 77/428	12/3750 72/427	11/3550 68/427	10/3350 64/426	10/3150 60/426	9/2950 56/425	8/2750 52/425
34000	TIME/FUEL DIST/SPD	15/4800 92/427	14/4550 87/426	13/4300 82/426	12/4100 78/425	12/3850 73/425	11/3650 69/424	11/3450 65/424	10/3250 61/424	9/3050 57/423	9/2900 53/423	8/2700 50/422
33000	TIME/FUEL DIST/SPD	14/4650 87/424	13/4400 83/423	13/4200 78/423	12/4000 74/422	11/3750 70/422	11/3550 66/421	10/3350 62/421	10/3200 58/421	9/3000 54/420	8/2800 51/420	8/2650 47/419
32000	TIME/FUEL DIST/SPD	14/4550 83/420	13/4300 79/420	12/4100 74/419	12/3900 70/419	11/3650 66/418	10/3500 62/418	9/3100 59/418	9/2900 55/417	9/2700 52/417	8/2550 49/416	8/2400 45/416
31000	TIME/FUEL DIST/SPD	13/4400 78/416	12/4150 74/415	12/3950 70/415	11/3750 66/415	11/3550 62/414	10/3350 59/414	9/3200 55/413	9/3000 52/413	8/2850 49/413	8/2650 46/412	7/2500 43/412
30000	TIME/FUEL DIST/SPD	12/4250 73/411	12/4000 69/411	11/3800 65/410	11/3600 62/410	10/3450 58/409	9/3250 55/409	9/3100 52/409	8/2900 49/408	8/2750 46/408	7/2600 43/407	7/2400 40/407
29000	TIME/FUEL DIST/SPD	12/4100 68/406	11/3900 64/406	11/3700 61/406	10/3500 57/405	10/3300 54/405	9/3150 51/405	9/2950 48/404	8/2800 46/404	8/2650 43/403	7/2500 40/403	7/2350 37/402
28000	TIME/FUEL DIST/SPD	11/3950 63/402	11/3750 60/402	10/3550 57/401	10/3350 54/401	9/3200 51/401	9/3050 48/400	8/2850 45/400	8/2700 43/400	7/2550 40/399	7/2400 37/399	6/2250 35/398
27000	TIME/FUEL DIST/SPD	11/3800 59/398	10/3600 56/397	10/3450 53/397	9/3250 50/397	9/3100 47/396	8/2950 45/396	8/2750 42/396	7/2600 40/395	7/2450 37/395	6/2350 35/394	6/2200 33/394
26000	TIME/FUEL DIST/SPD	10/3650 55/393	10/3450 52/393	9/3300 49/393	9/3150 47/393	8/3000 44/392	8/2850 42/392	7/2700 39/392	7/2550 37/391	7/2400 35/391	6/2250 33/390	6/2100 31/390
25000	TIME/FUEL DIST/SPD	10/3500 51/389	9/3350 48/389	9/3200 46/389	8/3050 44/389	8/2850 41/388	7/2750 39/388	7/2600 37/388	7/2450 35/387	6/2300 33/387	6/2150 30/386	6/2050 28/386
24000	TIME/FUEL DIST/SPD	9/3400 47/385	9/3200 45/385	8/3050 43/385	8/2900 41/385	7/2750 38/384	7/2650 36/384	7/2500 34/384	6/2350 32/383	6/2200 30/383	6/2100 28/382	5/1950 27/382
23000	TIME/FUEL DIST/SPD	9/3250 44/382	8/3100 42/381	8/2950 40/381	8/2800 38/381	7/2650 36/381	7/2550 34/380	6/2400 32/380	6/2250 30/380	6/2150 28/379	5/2000 26/379	5/1900 25/378
22000	TIME/FUEL DIST/SPD	8/3150 41/378	8/3000 39/378	8/2850 37/377	7/2700 35/377	7/2550 33/377	6/2450 31/377	6/2300 30/376	6/2200 28/376	5/2050 26/375	5/1950 25/375	5/1800 23/374
21000	TIME/FUEL DIST/SPD	8/3000 38/374	7/2850 36/374	7/2750 34/374	7/2600 32/374	6/2450 31/373	6/2350 29/373	6/2200 27/373	5/2100 26/372	5/2000 24/372	5/1850 23/371	5/1750 21/371
20000	TIME/FUEL DIST/SPD	7/2900 35/371	7/2750 33/371	7/2600 32/370	6/2500 30/370	6/2350 28/370	6/2250 27/370	5/2150 25/369	5/2000 24/369	5/1900 23/368	5/1800 21/368	4/1700 20/367
18000	TIME/FUEL DIST/SPD	7/2650 30/364	6/2550 28/364	6/2400 27/364	6/2300 26/363	6/2200 24/363	5/2050 23/363	5/1950 22/362	5/1850 20/362	4/1750 19/362	4/1650 18/361	4/1550 17/360
16000	TIME/FUEL DIST/SPD	6/2400 25/358	6/2300 24/358	5/2200 23/357	5/2100 21/357	5/2000 20/357	5/1900 19/356	4/1800 18/356	4/1700 17/356	4/1600 16/355	4/1500 15/355	4/1450 14/354
14000	TIME/FUEL DIST/SPD	5/2200 21/352	5/2100 20/352	5/2000 19/351	5/1900 18/351	4/1800 17/351	4/1700 16/350	4/1650 15/350	4/1550 14/350	4/1450 13/349	3/1400 13/348	3/1300 12/348
10000	TIME/FUEL DIST/SPD	4/1750 13/341	4/1700 12/340	4/1600 12/340	4/1550 11/340	3/1450 11/339	3/1400 10/339	3/1300 10/339	3/1250 9/338	3/1200 8/338	3/1100 8/337	2/1050 7/336
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-150	-350	-500	-650	-800	-1000

Shaded area approximates optimum altitude at LRC/84.

310/.84 Enroute Climb
ISA + 15°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD											
38000	TIME/FUEL DIST/SPD											20/5750 137/446
37000	TIME/FUEL DIST/SPD									22/6300 147/445	20/5900 135/443	19/5500 126/442
36000	TIME/FUEL DIST/SPD							24/6850 158/443	22/6400 145/442	20/6000 134/440	19/5650 125/439	18/5350 117/438
35000	TIME/FUEL DIST/SPD						24/7000 157/440	22/6550 145/439	21/6150 134/437	19/5800 125/436	18/5450 118/436	17/5150 111/435
34000	TIME/FUEL DIST/SPD				26/7650 170/440	24/7150 156/437	22/6700 144/436	21/6300 134/435	19/5950 126/434	18/5600 118/433	17/5300 111/432	16/5050 105/432
33000	TIME/FUEL DIST/SPD			26/7800 169/436	24/7300 155/434	22/6850 144/433	21/6450 135/432	20/6100 126/431	19/5750 119/430	18/5450 112/429	17/5150 105/429	16/4900 99/428
32000	TIME/FUEL DIST/SPD	28/8550 185/435	26/7950 169/433	24/7450 155/431	23/7000 144/430	21/6600 135/429	20/6250 127/428	19/5900 119/427	18/5600 112/426	17/5300 106/426	16/5000 100/425	15/4750 94/425
31000	TIME/FUEL DIST/SPD	26/8050 165/428	24/7550 153/427	23/7100 142/425	21/6700 133/424	20/6350 125/424	19/6000 118/423	18/5700 111/422	17/5400 105/422	16/5100 99/421	15/4850 93/421	14/4600 88/420
30000	TIME/FUEL DIST/SPD	24/7600 150/422	23/7150 139/421	21/6750 131/420	20/6400 123/419	19/6050 116/418	18/5750 109/418	17/5450 103/417	16/5200 97/417	15/4900 92/416	14/4650 87/416	14/4400 82/415
29000	TIME/FUEL DIST/SPD	23/7250 137/416	21/6850 128/415	20/6450 120/415	19/6150 113/414	18/5800 107/413	17/5500 101/413	16/5250 95/412	15/4950 90/412	14/4700 85/411	14/4500 81/411	13/4250 76/411
28000	TIME/FUEL DIST/SPD	21/6900 125/411	20/6500 118/410	19/6200 111/410	18/5850 105/409	17/5550 99/409	16/5300 94/408	15/5050 89/408	14/4800 84/407	14/4550 79/407	13/4300 75/406	12/4100 71/406
27000	TIME/FUEL DIST/SPD	20/6550 115/406	19/6250 108/405	18/5900 102/405	17/5600 97/404	16/5350 92/404	15/5100 87/404	14/4850 82/403	14/4600 78/403	13/4350 74/402	12/4150 70/402	12/3950 66/402
26000	TIME/FUEL DIST/SPD	19/6250 106/401	18/5950 100/401	17/5650 95/400	16/5400 90/400	15/5150 85/399	14/4900 80/399	14/4650 76/399	13/4400 72/398	12/4200 69/398	12/4000 65/398	11/3800 62/398
25000	TIME/FUEL DIST/SPD	18/6000 97/397	17/5700 92/396	16/5400 87/396	15/5150 83/395	14/4900 79/395	14/4700 75/395	13/4450 71/395	12/4250 67/394	12/4050 64/394	11/3850 60/394	11/3650 57/393
24000	TIME/FUEL DIST/SPD	16/5700 90/392	16/5450 85/392	15/5200 81/392	14/4950 76/391	14/4700 73/391	13/4500 69/391	12/4300 66/390	12/4100 62/390	11/3900 59/390	11/3700 56/390	10/3500 53/389
23000	TIME/FUEL DIST/SPD	16/5450 82/388	15/5200 78/388	14/4950 74/387	13/4750 71/387	13/4500 67/387	12/4300 64/387	12/4100 61/386	11/3900 58/386	11/3750 55/386	10/3550 52/386	10/3400 50/386
22000	TIME/FUEL DIST/SPD	15/5200 76/384	14/5000 72/384	13/4750 69/384	13/4550 65/383	12/4350 62/383	12/4150 59/383	11/3950 56/383	10/3750 53/382	10/3600 51/382	9/3400 48/382	9/3250 46/382
21000	TIME/FUEL DIST/SPD	14/5000 70/380	13/4750 66/380	13/4550 63/380	12/4350 60/380	11/4150 57/379	11/3950 55/379	10/3800 52/379	10/3600 49/379	9/3450 47/379	9/3300 45/378	9/3100 43/378
20000	TIME/FUEL DIST/SPD	13/4750 64/376	12/4550 61/376	12/4350 58/376	11/4150 55/376	11/3950 53/376	10/3800 50/376	10/3600 48/375	9/3450 46/375	9/3300 43/375	9/3150 41/375	8/3000 39/375
18000	TIME/FUEL DIST/SPD	12/4350 54/369	11/4150 51/369	11/3950 49/369	10/3800 47/369	10/3650 45/369	9/3450 43/369	9/3300 41/369	8/3150 39/368	8/3000 37/368	8/2900 35/368	7/2750 33/368
16000	TIME/FUEL DIST/SPD	10/3950 45/363	10/3750 43/363	9/3600 41/363	9/3450 39/362	9/3300 37/362	8/3150 36/362	8/3000 34/362	7/2900 32/362	7/2750 31/362	7/2600 29/362	6/2500 28/361
14000	TIME/FUEL DIST/SPD	9/3550 37/357	9/3400 35/356	8/3250 34/356	8/3100 32/356	8/3000 31/356	7/2850 29/356	7/2700 28/356	7/2600 27/356	6/2500 25/356	6/2350 24/355	6/2250 23/355
10000	TIME/FUEL DIST/SPD	7/2800 23/345	6/2700 22/345	6/2600 21/345	6/2450 20/345	6/2350 19/345	5/2250 18/345	5/2150 17/344	5/2100 16/344	5/2000 15/344	5/1900 15/344	4/1800 15/344
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-300	-550	-850	-1100	-1400	-1700

Shaded area approximates optimum altitude at LRC/.84.



Flight Planning and Performance Manual

310/.84 Enroute Climb
ISA + 15°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD								17/4350 116/455	15/4050 107/454	14/3750 98/453	13/3500 91/452
42000	TIME/FUEL DIST/SPD						18/4850 128/454	17/4500 117/453	16/4200 108/452	15/3900 100/451	13/3650 92/450	12/3400 85/449
41000	TIME/FUEL DIST/SPD					18/5000 128/452	17/4650 117/450	16/4350 109/449	15/4050 101/449	14/3800 94/448	13/3550 87/447	12/3300 80/446
40000	TIME/FUEL DIST/SPD				19/5100 127/449	17/4800 118/448	16/4500 109/447	15/4200 102/446	14/3950 95/446	13/3700 88/445	12/3450 82/444	11/3250 76/444
39000	TIME/FUEL DIST/SPD		20/5650 138/448	19/5250 127/447	17/4950 118/446	16/4650 110/445	15/4350 102/444	14/4100 95/443	13/3850 89/443	12/3600 83/442	12/3400 77/442	11/3150 72/441
38000	TIME/FUEL DIST/SPD	20/5750 137/446	19/5400 126/444	18/5050 118/443	16/4750 110/442	15/4500 103/442	14/4250 96/441	13/4000 90/440	12/3750 84/440	12/3500 78/439	11/3300 73/439	10/3100 68/438
37000	TIME/FUEL DIST/SPD	19/5500 126/442	18/5200 117/441	17/4900 110/440	16/4600 103/439	15/4350 97/439	14/4100 91/438	13/3850 85/437	12/3650 79/437	11/3400 74/436	11/3200 69/436	10/3000 64/435
36000	TIME/FUEL DIST/SPD	18/5350 117/438	17/5050 110/437	16/4750 103/437	15/4500 97/436	14/4250 91/436	13/4000 86/435	12/3750 80/434	12/3550 75/434	11/3350 70/433	10/3150 66/433	10/2950 61/432
35000	TIME/FUEL DIST/SPD	17/5150 111/435	16/4900 104/434	15/4650 98/434	14/4350 92/433	14/4150 87/433	13/3900 81/432	12/3700 76/432	11/3450 72/431	11/3250 67/431	10/3050 63/430	9/2850 58/430
34000	TIME/FUEL DIST/SPD	16/5050 105/432	15/4750 99/431	15/4500 93/431	14/4250 88/430	13/4050 82/430	12/3800 78/429	12/3600 73/429	11/3400 68/428	10/3200 64/428	10/3000 60/427	9/2800 56/427
33000	TIME/FUEL DIST/SPD	16/4900 99/428	15/4650 94/428	14/4400 88/427	13/4150 83/427	13/3950 78/426	12/3700 74/426	11/3500 69/426	10/3300 65/425	10/3100 61/425	9/2900 57/424	9/2750 53/424
32000	TIME/FUEL DIST/SPD	15/4750 94/425	14/4500 89/424	14/4250 84/424	13/4050 79/424	12/3850 75/423	11/3600 70/423	10/3400 66/422	10/3200 62/422	10/3050 58/421	9/2850 54/421	9/2650 51/421
31000	TIME/FUEL DIST/SPD	14/4600 88/420	14/4350 83/420	13/4150 79/419	12/3900 74/419	12/3700 70/419	11/3500 66/418	10/3300 62/418	10/3150 58/418	9/2950 55/417	9/2750 51/417	8/2600 48/416
30000	TIME/FUEL DIST/SPD	14/4400 82/415	13/4200 78/415	12/4000 73/415	12/3800 69/414	11/3600 65/414	10/3400 62/414	10/3200 58/413	9/3000 55/413	9/2850 51/412	8/2650 48/412	8/2500 45/412
29000	TIME/FUEL DIST/SPD	13/4250 76/411	12/4050 72/410	12/3850 68/410	11/3650 65/410	10/3450 61/409	10/3250 58/409	9/3100 54/409	9/2900 51/408	8/2750 48/408	8/2600 45/408	7/2400 42/407
28000	TIME/FUEL DIST/SPD	12/4100 71/406	12/3900 67/406	11/3700 64/406	11/3500 60/405	10/3350 57/405	9/3150 54/405	9/3000 51/404	8/2800 48/404	8/2650 45/404	7/2500 42/403	7/2350 39/403
27000	TIME/FUEL DIST/SPD	12/3950 66/402	11/3750 63/401	11/3550 60/401	10/3400 56/401	9/3200 53/401	9/3050 50/400	8/2900 47/400	8/2700 45/400	8/2550 42/399	7/2400 39/399	7/2250 37/398
26000	TIME/FUEL DIST/SPD	11/3800 62/398	11/3600 59/397	10/3450 55/397	10/3250 53/397	9/3100 50/396	9/2950 47/396	8/2750 44/396	8/2600 42/396	7/2450 39/395	7/2300 37/395	6/2200 34/394
25000	TIME/FUEL DIST/SPD	11/3650 57/393	10/3500 54/393	10/3300 52/393	9/3150 49/393	9/3000 46/392	8/2850 44/392	8/2650 41/392	7/2550 39/391	7/2400 36/391	6/2250 34/391	6/2100 32/390
24000	TIME/FUEL DIST/SPD	10/3500 53/389	10/3350 51/389	9/3200 48/389	9/3050 46/389	8/2850 43/388	8/2700 41/388	7/2600 38/388	7/2450 36/388	6/2300 34/387	6/2150 32/387	6/2050 30/386
23000	TIME/FUEL DIST/SPD	10/3400 50/386	9/3200 47/385	9/3050 45/385	8/2900 42/385	8/2750 40/385	7/2600 38/384	7/2500 36/384	7/2350 34/384	6/2200 32/383	6/2100 30/383	5/1950 28/382
22000	TIME/FUEL DIST/SPD	9/3250 46/382	9/3100 44/382	8/2950 41/381	8/2800 39/381	7/2650 37/381	7/2500 35/381	7/2400 33/380	6/2250 31/380	6/2150 29/380	6/2000 28/379	5/1900 26/379
21000	TIME/FUEL DIST/SPD	9/3100 43/378	8/2950 40/378	8/2850 38/378	7/2700 36/378	7/2550 34/377	7/2400 33/377	6/2300 31/377	6/2150 29/376	6/2050 27/376	5/1950 26/376	5/1800 24/375
20000	TIME/FUEL DIST/SPD	8/3000 39/375	8/2850 37/374	7/2700 36/374	7/2600 34/374	7/2450 32/374	6/2350 30/374	6/2200 29/373	6/2100 27/373	5/1950 25/372	5/1850 24/372	5/1750 22/371
18000	TIME/FUEL DIST/SPD	7/2750 33/368	7/2600 32/368	7/2500 30/367	6/2350 29/367	6/2250 27/367	6/2150 26/367	5/2050 24/366	5/1900 23/366	5/1800 21/366	4/1700 20/365	4/1600 19/365
16000	TIME/FUEL DIST/SPD	6/2500 28/361	6/2400 27/361	6/2250 25/361	6/2150 24/361	5/2050 23/361	5/1950 22/360	5/1850 20/360	5/1750 19/360	4/1650 18/359	4/1550 17/359	4/1450 16/358
14000	TIME/FUEL DIST/SPD	6/2250 23/355	5/2150 22/355	5/2050 21/355	5/1950 20/355	5/1850 19/354	4/1750 18/354	4/1700 17/354	4/1600 16/353	4/1500 15/353	4/1400 14/352	3/1350 13/352
10000	TIME/FUEL DIST/SPD	4/1800 15/344	4/1750 14/344	4/1650 13/343	4/1550 12/343	4/1500 12/343	3/1400 11/343	3/1350 11/342	3/1300 10/342	3/1200 9/341	3/1150 9/341	3/1100 8/340
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-150	-350	-500	-700	-850	-1050

Shaded area approximates optimum altitude at LRC/.84.

310/84 Enroute Climb
ISA + 20°C - High Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43000	TIME/FUEL DIST/SPD											
42000	TIME/FUEL DIST/SPD											
41000	TIME/FUEL DIST/SPD											
40000	TIME/FUEL DIST/SPD											
39000	TIME/FUEL DIST/SPD											
38000	TIME/FUEL DIST/SPD											23/6150 159/452
37000	TIME/FUEL DIST/SPD									25/6750 173/451	23/6300 157/449	21/5850 145/447
36000	TIME/FUEL DIST/SPD							27/7450 188/450	25/6900 170/447	23/6400 156/446	21/6000 144/444	20/5650 135/443
35000	TIME/FUEL DIST/SPD					30/8250 208/450	27/7600 186/447	25/7050 169/445	23/6550 156/443	22/6150 145/442	20/5800 135/441	19/5500 127/440
34000	TIME/FUEL DIST/SPD				30/8400 204/446	27/7700 184/444	25/7200 169/442	23/6750 156/440	22/6350 146/439	21/5950 136/438	19/5650 128/437	18/5300 120/437
33000	TIME/FUEL DIST/SPD			30/8550 203/443	27/7900 183/440	25/7350 169/438	24/6900 157/437	22/6500 146/436	21/6150 137/435	20/5800 128/435	19/5450 121/434	18/5150 113/433
32000	TIME/FUEL DIST/SPD	33/9500 225/442	30/8700 202/439	28/8050 184/437	26/7550 169/435	24/7050 157/434	23/6650 147/433	21/6300 138/432	20/5950 129/431	19/5600 121/431	18/5300 114/430	17/5000 107/430
31000	TIME/FUEL DIST/SPD	30/8800 198/434	28/8200 181/432	26/7650 167/431	24/7200 156/430	23/6800 146/429	21/6400 136/428	20/6050 128/427	19/5700 120/427	18/5400 113/426	17/5100 107/425	16/4850 101/425
30000	TIME/FUEL DIST/SPD	28/8250 178/427	26/7750 164/426	24/7250 153/425	23/6850 143/424	21/6450 134/423	20/6100 126/423	19/5800 118/422	18/5500 111/421	17/5200 105/421	16/4900 99/420	15/4650 93/420
29000	TIME/FUEL DIST/SPD	26/7850 162/421	24/7350 150/420	23/6950 140/420	21/6550 132/419	20/6200 124/418	19/5850 116/418	18/5550 110/417	17/5250 103/416	16/5000 98/416	15/4700 92/416	14/4500 87/415
28000	TIME/FUEL DIST/SPD	24/7450 147/416	23/7000 138/415	21/6600 129/414	20/6250 121/414	19/5950 114/413	18/5600 108/413	17/5300 102/412	16/5050 96/412	15/4800 91/411	14/4550 86/411	14/4300 81/411
27000	TIME/FUEL DIST/SPD	22/7050 135/411	21/6650 126/410	20/6300 119/409	19/6000 112/409	18/5650 106/408	17/5400 100/408	16/5100 94/408	15/4850 89/407	14/4600 84/407	14/4350 80/406	13/4150 75/406
26000	TIME/FUEL DIST/SPD	21/6700 124/406	20/6350 116/405	19/6050 109/405	18/5700 103/404	17/5450 98/404	16/5150 92/403	15/4900 87/403	14/4650 83/403	14/4400 78/402	13/4200 74/402	12/4000 70/402
25000	TIME/FUEL DIST/SPD	20/6400 113/401	19/6050 107/401	18/5750 101/400	17/5450 95/400	16/5200 90/399	15/4950 85/399	14/4700 81/399	14/4450 77/398	13/4250 72/398	12/4050 69/398	12/3850 65/398
24000	TIME/FUEL DIST/SPD	19/6100 104/397	18/5800 98/396	17/5500 93/396	16/5250 88/395	15/4950 83/395	14/4750 79/395	14/4500 75/395	13/4300 71/394	12/4050 67/394	12/3850 64/394	11/3700 60/394
23000	TIME/FUEL DIST/SPD	17/5800 95/392	16/5500 90/392	16/5250 86/392	15/5000 81/391	14/4750 77/391	13/4550 73/391	13/4300 69/390	12/4100 66/390	12/3900 62/390	11/3700 59/390	10/3550 56/390
22000	TIME/FUEL DIST/SPD	16/5550 88/388	16/5250 83/388	15/5000 79/388	14/4800 75/387	13/4550 71/387	13/4350 67/387	12/4150 64/387	12/3950 61/386	11/3750 58/386	10/3550 55/386	10/3400 52/386
21000	TIME/FUEL DIST/SPD	15/5300 80/384	15/5050 76/384	14/4800 72/384	13/4550 69/383	13/4350 65/383	12/4150 62/383	11/3950 59/383	11/3750 56/383	10/3600 53/382	10/3400 51/382	9/3250 48/382
20000	TIME/FUEL DIST/SPD	14/5050 74/380	14/4800 70/380	13/4600 67/380	12/4350 63/380	12/4150 60/380	11/3950 57/379	11/3800 54/379	10/3600 52/379	10/3450 49/379	9/3250 47/379	9/3100 44/379
18000	TIME/FUEL DIST/SPD	13/4550 62/373	12/4350 59/373	12/4150 56/373	11/3950 53/373	11/3800 51/373	10/3600 48/372	10/3450 46/372	9/3300 44/372	9/3150 42/372	8/3000 40/372	8/2850 38/372
16000	TIME/FUEL DIST/SPD	11/4100 51/366	11/3950 49/366	10/3750 47/366	10/3600 44/366	9/3450 42/366	9/3300 40/366	8/3150 38/366	8/3000 37/365	8/2850 35/365	7/2700 33/365	7/2600 32/365
14000	TIME/FUEL DIST/SPD	10/3700 42/360	9/3550 40/360	9/3400 38/360	9/3250 36/360	8/3100 35/360	8/2950 33/359	7/2800 32/359	7/2700 30/359	7/2550 29/359	6/2450 27/359	6/2350 26/359
10000	TIME/FUEL DIST/SPD	7/2900 26/348	7/2800 25/348	7/2650 24/348	6/2550 23/348	6/2450 22/348	6/2350 21/348	6/2250 20/348	5/2150 19/348	5/2050 18/347	5/1950 17/347	5/1850 16/347
1500	TIME/FUEL	3/1350	3/1250	3/1200	2/1150	2/1150	2/1100	2/1050	2/1000	2/950	2/900	2/850

FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
FUEL ADJUSTMENT (KG)		-300	-600	-900	-1200	-1500	-1800

Shaded area approximates optimum altitude at LRC/84.



Flight Planning and Performance Manual

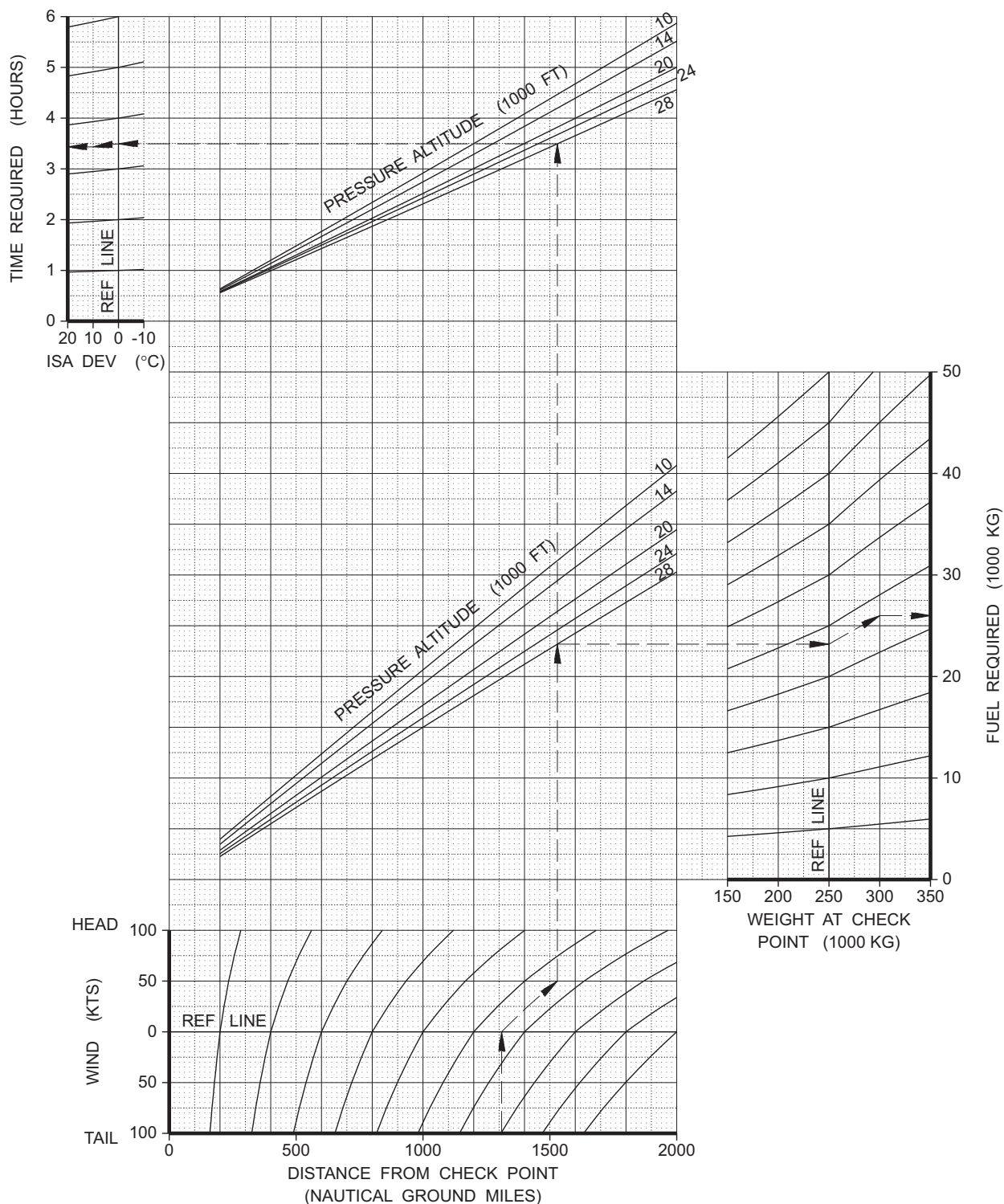
310/.84 Enroute Climb
ISA + 20°C - Low Weights

PRESSURE ALTITUDE (FT)	UNITS MIN/KG NM/KTAS	BRAKE RELEASE WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43000	TIME/FUEL DIST/SPD								19/4600 134/460	17/4250 122/459	16/3950 112/458	15/3700 103/457
42000	TIME/FUEL DIST/SPD						21/5150 148/460	19/4750 135/458	18/4450 124/457	16/4150 114/456	15/3850 105/455	14/3600 97/454
41000	TIME/FUEL DIST/SPD					21/5300 148/458	19/4900 135/456	18/4600 124/455	16/4300 115/454	15/4000 106/453	14/3750 98/452	13/3500 91/452
40000	TIME/FUEL DIST/SPD				21/5450 147/455	19/5100 135/454	18/4750 125/453	17/4450 116/452	16/4150 107/451	15/3900 100/450	14/3650 93/449	13/3400 86/449
39000	TIME/FUEL DIST/SPD		23/6000 161/454	21/5600 146/453	20/5250 135/451	18/4900 125/450	17/4600 117/449	16/4300 109/449	15/4050 101/448	14/3800 94/447	13/3550 87/447	12/3300 81/446
38000	TIME/FUEL DIST/SPD	23/6150 159/452	21/5750 146/450	20/5350 135/449	18/5050 126/448	17/4750 117/447	16/4450 109/446	15/4200 102/446	14/3950 95/445	13/3700 89/444	12/3450 83/444	11/3200 77/443
37000	TIME/FUEL DIST/SPD	21/5850 145/447	20/5500 135/446	19/5200 126/445	17/4900 118/444	16/4600 110/444	15/4350 103/443	14/4050 96/442	14/3800 90/442	13/3600 84/441	12/3350 78/441	11/3150 73/440
36000	TIME/FUEL DIST/SPD	20/5650 135/443	19/5300 126/442	18/5000 118/442	17/4750 111/441	16/4450 104/441	15/4200 97/440	14/3950 91/439	13/3700 85/439	12/3500 79/438	11/3250 74/438	10/3050 69/437
35000	TIME/FUEL DIST/SPD	19/5500 127/440	18/5150 119/439	17/4900 112/439	16/4600 105/438	15/4350 98/438	14/4100 92/437	13/3850 87/437	12/3650 81/436	12/3400 76/436	11/3200 71/435	10/3000 66/435
34000	TIME/FUEL DIST/SPD	18/5300 120/437	17/5000 113/436	16/4750 106/436	15/4500 100/435	14/4250 94/434	14/4000 88/434	13/3750 82/434	12/3550 77/433	11/3350 72/433	10/3100 67/432	9/2900 63/432
33000	TIME/FUEL DIST/SPD	18/5150 113/433	17/4900 107/433	16/4600 100/432	15/4350 95/432	14/4150 89/431	13/3900 84/431	12/3650 78/430	12/3450 74/430	11/3250 69/429	10/3050 64/429	9/2850 60/429
32000	TIME/FUEL DIST/SPD	17/5000 107/430	16/4750 101/429	15/4500 95/429	14/4250 90/428	13/4000 85/428	13/3800 80/427	12/3600 75/427	11/3350 70/427	10/3150 66/426	9/2950 61/426	8/2800 57/425
31000	TIME/FUEL DIST/SPD	16/4850 101/425	15/4600 95/425	14/4350 89/424	14/4100 84/424	13/3900 79/423	12/3650 75/423	11/3450 70/423	11/3250 66/422	10/3050 62/422	9/2900 58/421	8/2700 54/421
30000	TIME/FUEL DIST/SPD	15/4650 93/420	14/4400 88/420	14/4200 83/419	13/3950 79/419	12/3750 74/418	11/3550 70/418	11/3350 66/418	10/3150 62/417	10/2950 58/417	9/2800 54/417	8/2600 50/416
29000	TIME/FUEL DIST/SPD	14/4500 87/415	14/4250 82/415	13/4050 78/414	12/3800 73/414	12/3600 69/414	11/3400 65/413	10/3200 61/413	10/3050 58/413	9/2850 54/412	9/2700 50/412	8/2500 47/412
28000	TIME/FUEL DIST/SPD	14/4300 81/411	13/4100 76/410	12/3900 72/410	12/3650 68/410	11/3500 64/409	10/3300 61/409	10/3100 57/409	9/2950 54/408	9/2750 50/408	8/2600 47/408	8/2450 44/407
27000	TIME/FUEL DIST/SPD	13/4150 75/406	12/3950 71/406	12/3750 67/405	11/3550 64/405	10/3350 60/405	10/3150 57/405	9/3000 53/404	9/2850 50/404	8/2650 47/404	8/2500 44/403	7/2350 41/403
26000	TIME/FUEL DIST/SPD	12/4000 70/402	12/3800 66/401	11/3600 63/401	10/3400 59/401	10/3250 56/401	9/3050 53/400	9/2900 50/400	8/2750 47/400	8/2550 44/399	7/2400 41/399	7/2250 38/399
25000	TIME/FUEL DIST/SPD	12/3850 65/398	11/3650 62/397	10/3450 58/397	10/3300 55/397	9/3100 52/397	9/2950 49/396	8/2800 46/396	8/2650 44/396	7/2500 41/395	7/2350 38/395	7/2200 36/395
24000	TIME/FUEL DIST/SPD	11/3700 60/394	10/3500 57/393	10/3300 54/393	9/3150 51/393	9/3000 49/393	8/2850 46/392	8/2700 43/392	8/2550 41/392	7/2400 38/391	7/2250 36/391	6/2100 33/391
23000	TIME/FUEL DIST/SPD	10/3550 56/390	10/3350 53/389	9/3200 50/389	9/3050 48/389	8/2900 45/389	8/2750 43/388	8/2600 40/388	7/2450 38/388	7/2300 35/388	6/2150 33/387	6/2050 31/387
22000	TIME/FUEL DIST/SPD	10/3400 52/386	9/3250 49/386	9/3050 47/385	8/2900 44/385	8/2750 42/385	8/2600 40/385	7/2500 37/384	7/2350 35/384	6/2200 33/384	6/2100 31/383	6/1950 29/383
21000	TIME/FUEL DIST/SPD	9/3250 48/382	9/3100 46/382	8/2950 43/382	8/2800 41/381	8/2650 39/381	7/2500 37/381	7/2400 35/381	6/2250 33/380	6/2100 31/380	6/2000 29/380	5/1900 27/379
20000	TIME/FUEL DIST/SPD	9/3100 44/379	8/2950 42/378	8/2800 40/378	8/2700 38/378	7/2550 36/378	7/2400 34/377	6/2300 32/377	6/2150 30/377	6/2050 28/377	5/1900 27/376	5/1800 25/376
18000	TIME/FUEL DIST/SPD	8/2850 38/372	8/2700 36/371	7/2600 34/371	7/2450 32/371	6/2350 31/371	6/2200 29/371	6/2100 27/370	5/2000 26/370	5/1850 24/370	5/1750 23/369	5/1650 21/369
16000	TIME/FUEL DIST/SPD	7/2600 32/365	7/2450 30/365	6/2350 28/365	6/2250 27/364	6/2150 26/364	5/2000 24/364	5/1900 23/364	5/1800 22/363	5/1700 20/363	4/1600 19/363	4/1500 18/362
14000	TIME/FUEL DIST/SPD	6/2350 26/359	6/2250 25/359	6/2150 23/358	5/2000 22/358	5/1900 21/358	5/1850 20/358	5/1750 19/357	4/1650 18/357	4/1550 17/357	4/1450 16/356	4/1350 15/356
10000	TIME/FUEL DIST/SPD	5/1850 16/347	4/1750 15/347	4/1700 15/347	4/1600 14/347	4/1550 13/346	4/1450 13/346	3/1400 12/346	3/1300 11/345	3/1250 10/345	3/1150 10/345	3/1100 9/344
1500	TIME/FUEL	2/850	2/850	2/800	2/750	2/700	1/700	1/650	1/650	1/600	1/550	1/550

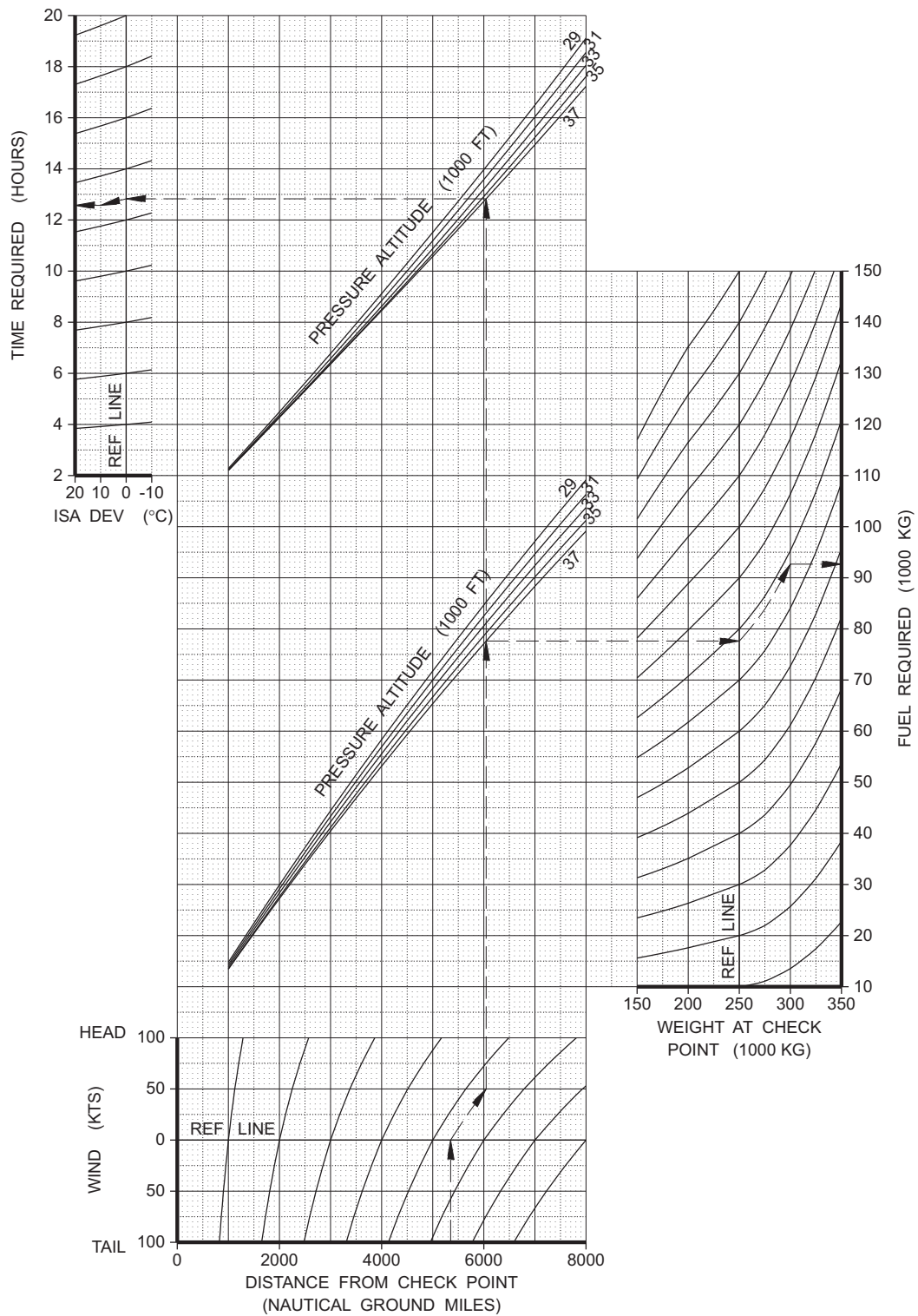
FUEL ADJUSTMENT FOR HIGH ELEVATION AIRPORTS EFFECT ON TIME AND DISTANCE IS NEGLIGIBLE	AIRPORT ELEVATION (FT)	2000	4000	6000	8000	10000	12000
	FUEL ADJUSTMENT (KG)	-200	-350	-550	-700	-900	-1100

Shaded area approximates optimum altitude at LRC/.84.

Long Range Cruise Enroute Fuel and Time
0 to 2000 NM Distance
Based on .84/310/250 descent



Long Range Cruise Enroute Fuel and Time
1000 to 8000 NM Distance
Based on .84/310/250 descent



Long Range Cruise Table
43000 FT to 37000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
43	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
42	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
41	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
40	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
39	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
38	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
37 (-26)	%N1 MAX TAT KIAS MACH FF/ENG KTAS											87.0 274 .838 3802 481

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5
37	88.3	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.5	95.8	95.2	94.5

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.



Flight Planning and Performance Manual

Long Range Cruise Table
43000 FT to 37000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
43 (-26)	%N1									85.2	84.1	83.1
	MAX TAT											
	KIAS									239	239	238
	MACH									.840	.840	.838
	FF/ENG KTAS									2659 482	2533 482	2423 481
42 (-26)	%N1								85.3	84.2	83.2	82.2
	MAX TAT											
	KIAS								244	244	244	242
	MACH								.840	.840	.839	.834
	FF/ENG KTAS								2798 482	2667 482	2557 481	2443 478
41 (-26)	%N1							85.3	84.2	83.3	82.3	81.1
	MAX TAT											
	KIAS							250	250	250	248	245
	MACH							.840	.840	.839	.835	.826
	FF/ENG KTAS							2935 482	2801 482	2690 481	2578 479	2457 474
40 (-26)	%N1						85.2	84.2	83.3	82.4	81.3	80.0
	MAX TAT											
	KIAS						256	256	256	254	252	247
	MACH						.840	.840	.839	.836	.828	.815
	FF/ENG KTAS						3065 482	2930 482	2820 481	2708 480	2590 475	2454 467
39 (-27)	%N1				86.4	85.1	84.1	83.2	82.4	81.3	80.2	78.9
	MAX TAT											
	KIAS				261	262	262	262	261	258	254	248
	MACH				.839	.840	.840	.839	.837	.830	.818	.801
	FF/ENG KTAS				3368 481	3192 482	3058 482	2947 481	2836 480	2721 476	2590 469	2441 460
38 (-27)	%N1			86.1	84.9	84.0	83.2	82.3	81.3	80.2	79.1	77.6
	MAX TAT											
	KIAS			268	268	268	268	267	265	261	256	249
	MACH			.839	.840	.840	.839	.837	.831	.820	.805	.787
	FF/ENG KTAS			3490 481	3318 482	3185 482	3075 481	2965 480	2852 476	2724 470	2578 462	2424 451
37 (-27)	%N1	87.0	85.8	84.7	83.8	83.0	82.2	81.3	80.2	79.2	77.8	76.3
	MAX TAT											
	KIAS	274	274	274	274	274	273	271	267	262	256	249
	MACH	.838	.839	.840	.840	.839	.837	.831	.821	.808	.791	.770
	FF/ENG KTAS	3802 481	3609 481	3442 482	3313 482	3204 481	3095 480	2983 477	2857 471	2713 463	2561 453	2404 442

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)												
	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
43	87.9	88.9	90.0	91.0	92.0	93.0	94.0	94.9	95.9	96.9	96.3	95.6	94.9
42	88.0	89.0	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	96.5	95.8	95.0
41	88.1	89.1	90.1	91.2	92.2	93.2	94.2	95.1	96.1	97.1	96.6	95.9	95.2
40	88.2	89.2	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	96.7	96.1	95.3
39	88.3	89.4	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5
38	88.3	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.8	96.0	95.3
37	88.3	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.5	95.8	95.2

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Long Range Cruise Table
36000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
36 (-26)	%N1										86.6	85.4
	MAX TAT											
	KIAS										280	280
	MACH										.839	.839
	FF/ENG KTAS										3916 481	3727 482
35 (-24)	%N1								87.8	86.6	85.5	84.6
	MAX TAT											
	KIAS								286	287	287	287
	MACH								.838	.839	.839	.840
	FF/ENG KTAS								4252 483	4052 483	3867 484	3718 484
34 (-21)	%N1						88.9	87.7	86.5	85.5	84.7	84.0
	MAX TAT											
	KIAS						293	293	293	293	294	294
	MACH						.838	.838	.839	.840	.840	.840
	FF/ENG KTAS						4592 485	4378 485	4183 486	4006 486	3868 486	3753 486
33 (-19)	%N1				89.9	88.6	87.5	86.4	85.5	84.8	84.1	83.4
	MAX TAT				11							
	KIAS				299	299	300	300	300	300	300	300
	MACH				.837	.838	.839	.839	.840	.840	.840	.838
	FF/ENG KTAS				4935 487	4709 487	4503 488	4312 488	4149 488	4019 489	3908 488	3799 488
32 (-17)	%N1		90.8	89.5	88.4	87.4	86.3	85.5	84.8	84.2	83.6	82.8
	MAX TAT		10	15								
	KIAS		306	306	306	307	307	307	307	307	306	305
	MACH		.837	.838	.838	.839	.839	.840	.840	.840	.838	.835
	FF/ENG KTAS		5281 489	5042 489	4825 490	4627 490	4442 490	4295 491	4173 491	4064 490	3956 490	3846 488
31 (-15)	%N1	90.3	89.2	88.2	87.1	86.3	85.6	84.9	84.3	83.7	82.9	82.1
	MAX TAT	14	18									
	KIAS	313	313	313	313	314	314	314	313	313	311	309
	MACH	.837	.838	.839	.839	.840	.840	.840	.839	.837	.834	.828
	FF/ENG KTAS	5376 491	5150 492	4942 492	4748 492	4581 493	4448 493	4332 493	4223 492	4115 491	4006 489	3885 486
30 (-13)	%N1	88.9	87.9	87.0	86.2	85.6	85.0	84.4	83.7	83.0	82.3	81.6
	MAX TAT											
	KIAS	320	320	320	321	321	321	320	319	317	315	311
	MACH	.838	.839	.839	.840	.840	.840	.839	.836	.832	.826	.818
	FF/ENG KTAS	5260 494	5061 494	4878 495	4731 495	4606 495	4497 495	4388 494	4280 493	4168 491	4044 487	3907 482

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
36	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.4	95.8	95.1	94.4	93.8	93.2
35	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.0	96.2	95.6	94.8	94.2	93.5
34	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.2	96.4	95.8	94.9	94.3	93.5
33	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	96.6	96.0	95.1	94.4	93.6
32	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	96.9	96.2	95.3	94.6	93.8
31	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.2	96.4	95.5	94.7	94.0
30	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	96.7	95.8	94.9	94.1

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Long Range Cruise Table 36000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
36 (-27)	%N1	85.4	84.4	83.6	82.9	82.1	81.2	80.2	79.2	78.0	76.5	75.0
	MAX TAT											
	KIAS	280	281	281	280	279	277	274	269	263	256	249
	MACH	.839	.840	.840	.839	.837	.831	.822	.809	.794	.775	.753
	FF/ENG	3727	3569	3445	3336	3228	3117	2992	2850	2701	2544	2383
35 (-26)	KTAS	482	482	482	482	480	477	472	464	455	444	432
	%N1	84.6	83.8	83.1	82.3	81.4	80.5	79.5	78.4	77.0	75.6	74.1
	MAX TAT											
	KIAS	287	287	287	286	284	280	276	270	264	256	248
	MACH	.840	.840	.839	.836	.831	.822	.810	.795	.778	.757	.737
34 (-24)	FF/ENG	3718	3598	3490	3381	3269	3144	3003	2855	2699	2536	2382
	KTAS	484	484	484	482	479	474	467	459	448	437	425
	%N1	84.0	83.3	82.5	81.7	80.8	79.9	78.7	77.4	76.0	74.7	73.3
	MAX TAT											
	KIAS	294	293	292	290	287	282	277	271	263	256	249
33 (-23)	MACH	.840	.839	.836	.831	.822	.811	.797	.780	.761	.741	.723
	FF/ENG	3753	3644	3535	3422	3296	3155	3008	2852	2689	2531	2388
	KTAS	486	486	484	481	476	469	461	452	441	429	419
	%N1	83.4	82.7	81.8	81.0	80.1	79.0	77.8	76.5	75.2	73.9	72.7
	MAX TAT											
32 (-21)	KIAS	300	298	296	293	289	283	277	270	263	256	250
	MACH	.838	.835	.830	.822	.810	.797	.782	.763	.745	.727	.712
	FF/ENG	3799	3690	3576	3448	3306	3159	3003	2840	2680	2532	2399
	KTAS	488	486	483	478	471	464	455	444	433	423	414
	%N1	82.8	82.0	81.2	80.4	79.3	78.1	76.9	75.6	74.3	73.2	72.1
31 (-20)	MAX TAT											
	KIAS	305	303	299	295	290	284	277	270	263	257	252
	MACH	.835	.829	.821	.810	.797	.782	.765	.747	.730	.715	.702
	FF/ENG	3846	3730	3600	3457	3309	3154	2991	2828	2676	2540	2417
	KTAS	488	484	479	473	466	457	447	436	426	418	410
30 (-19)	%N1	82.1	81.4	80.6	79.5	78.4	77.2	75.9	74.7	73.6	72.6	71.5
	MAX TAT											
	KIAS	309	305	301	296	290	284	277	270	264	259	254
	MACH	.828	.819	.809	.797	.783	.766	.749	.732	.718	.705	.692
	FF/ENG	3885	3752	3608	3459	3304	3141	2976	2821	2682	2555	2432
30 (-19)	KTAS	486	481	475	467	459	450	439	430	421	414	406
	%N1	81.6	80.7	79.7	78.6	77.5	76.3	75.1	74.0	73.0	72.0	70.8
	MAX TAT											
	KIAS	311	307	302	296	290	283	277	271	266	261	255
	MACH	.818	.808	.796	.782	.767	.750	.734	.720	.707	.695	.681
30 (-19)	FF/ENG	3907	3762	3612	3455	3291	3125	2967	2825	2696	2573	2448
	KTAS	482	476	469	461	452	442	432	424	417	410	401

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
36	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.4	95.8	95.1	94.4	93.8
35	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.0	96.2	95.6	94.8	94.2
34	88.9	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.2	96.4	95.8	94.9	94.3
33	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	96.6	96.0	95.1	94.4
32	88.1	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	96.9	96.2	95.3	94.6
31	87.7	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.2	96.4	95.5	94.7
30	87.4	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	96.7	95.8	94.9

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Long Range Cruise Table
29000 FT to 23000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
29 (-11)	%N1	87.7	86.9	86.2	85.6	85.1	84.5	83.8	83.1	82.4	81.7	80.9
	MAX TAT											
	KIAS	327	327	328	328	327	327	326	324	321	317	313
	MACH	.839	.840	.840	.840	.839	.838	.835	.831	.824	.816	.806
	FF/ENG	5185	5024	4892	4775	4667	4559	4449	4334	4205	4066	3919
28 (-9)	KTAS	497	497	497	497	497	496	494	492	488	483	477
	%N1	86.8	86.2	85.6	85.1	84.5	83.8	83.1	82.5	81.8	80.9	80.0
	MAX TAT											
	KIAS	335	335	335	334	333	332	330	327	323	319	314
	MACH	.840	.840	.840	.839	.837	.834	.829	.822	.814	.804	.793
27 (-7)	FF/ENG	5185	5062	4953	4844	4735	4624	4502	4371	4227	4078	3923
	KTAS	499	499	499	499	498	496	493	489	484	478	471
	%N1	86.2	85.7	85.1	84.5	83.8	83.2	82.6	81.9	81.0	80.1	79.1
	MAX TAT											
	KIAS	342	341	341	340	338	336	333	329	325	320	314
26 (-5)	MACH	.840	.839	.838	.836	.832	.827	.820	.811	.802	.790	.778
	FF/ENG	5242	5134	5026	4914	4799	4673	4537	4390	4238	4079	3915
	KTAS	501	501	500	499	497	494	489	484	478	472	464
	%N1	85.6	85.0	84.4	83.8	83.3	82.6	81.9	81.0	80.1	79.2	78.2
	MAX TAT											
25 (-4)	KIAS	348	348	346	344	342	338	335	330	325	320	314
	MACH	.837	.837	.834	.830	.824	.817	.809	.799	.788	.776	.762
	FF/ENG	5296	5206	5094	4973	4843	4702	4552	4396	4234	4066	3893
	KTAS	502	502	500	498	494	490	485	479	472	465	457
	%N1	84.5	84.0	83.6	83.2	82.7	81.9	81.0	80.2	79.2	78.3	77.3
24 (-3)	MAX TAT											
	KIAS	346	346	346	346	344	340	336	331	325	319	313
	MACH	.819	.819	.819	.819	.814	.805	.796	.785	.773	.760	.747
	FF/ENG	5246	5154	5069	4988	4864	4711	4551	4386	4216	4040	3870
	KTAS	493	493	493	493	490	485	479	473	465	457	450
23 (-2)	%N1	83.7	83.3	82.8	82.3	81.8	81.0	80.2	79.3	78.3	77.4	76.5
	MAX TAT											
	KIAS	345	345	345	345	345	341	336	331	325	319	313
	MACH	.801	.801	.801	.801	.801	.793	.782	.770	.757	.745	.733
	FF/ENG	5206	5112	5023	4937	4856	4700	4532	4360	4184	4016	3858
23 (-2)	KTAS	484	484	484	484	484	479	473	465	458	450	443
	%N1	82.9	82.3	81.8	81.3	80.8	80.2	79.3	78.4	77.5	76.7	75.8
	MAX TAT											
	KIAS	344	344	344	344	344	341	336	330	325	319	314
	MACH	.784	.784	.784	.784	.784	.778	.767	.755	.743	.731	.721
23 (-2)	FF/ENG	5159	5065	4974	4886	4803	4674	4500	4325	4160	4005	3864
	KTAS	476	476	476	476	476	472	465	458	451	444	437

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)														
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	
29	89.7	90.7	91.6	92.6	93.5	94.5	95.4	96.3	96.5	95.5	94.7	94.0	93.2	92.4	
	89.0	90.0	90.9	91.9	92.8	93.7	94.7	95.6	96.3	95.3	94.6	93.8	93.1	92.3	
	88.3	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.7	95.1	94.4	93.7	92.9	92.1	
28	87.7	88.6	89.6	90.5	91.4	92.3	93.2	94.1	95.0	95.0	94.3	93.5	92.8	92.0	
	87.6	88.5	89.5	90.4	91.3	92.2	93.1	94.0	94.9	95.0	94.1	93.4	92.7	91.9	
	87.4	88.4	89.3	90.2	91.2	92.1	93.0	93.9	94.7	94.9	94.2	93.2	92.3	91.4	
	87.0	87.9	88.9	89.8	90.7	91.6	92.5	93.4	94.2	95.0	94.2	93.2	92.0	90.8	
	86.8	87.7	88.7	89.6	90.5	91.4	92.3	93.2	94.0	94.8	94.0	93.0	92.0	91.0	

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

Long Range Cruise Table 29000 FT to 23000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
29 (-17)	%N1	80.9	79.9	78.8	77.7	76.6	75.5	74.4	73.4	72.4	71.3	70.0
	MAX TAT											
	KIAS	313	308	303	296	290	283	277	272	268	262	256
	MACH	.806	.794	.781	.766	.750	.735	.721	.709	.698	.685	.669
	FF/ENG	3919	3766	3608	3442	3274	3114	2971	2840	2717	2592	2460
28 (-16)	KTAS	477	470	462	453	444	435	427	420	413	405	396
	%N1	80.0	79.0	77.9	76.8	75.8	74.7	73.8	72.9	71.8	70.6	69.2
	MAX TAT											
	KIAS	314	308	302	296	289	284	279	274	269	263	256
	MACH	.793	.780	.765	.750	.735	.722	.710	.700	.688	.674	.657
27 (-15)	FF/ENG	3923	3761	3593	3424	3263	3119	2986	2863	2738	2607	2472
	KTAS	471	463	455	446	437	429	422	416	409	400	390
	%N1	79.1	78.1	77.0	76.0	75.0	74.1	73.2	72.2	71.1	69.8	68.4
	MAX TAT											
	KIAS	314	308	302	296	290	285	281	276	270	264	256
26 (-13)	MACH	.778	.764	.749	.735	.723	.711	.701	.690	.677	.661	.643
	FF/ENG	3915	3744	3573	3412	3267	3134	3011	2885	2757	2621	2483
	KTAS	464	456	447	439	431	425	419	412	404	395	384
	%N1	78.2	77.2	76.2	75.3	74.4	73.5	72.6	71.5	70.3	69.0	67.6
	MAX TAT											
25 (-12)	KIAS	314	308	302	296	292	287	283	277	271	264	256
	MACH	.762	.748	.735	.723	.712	.702	.691	.679	.665	.648	.630
	FF/ENG	3893	3722	3561	3417	3283	3159	3034	2907	2771	2631	2489
	KTAS	457	449	440	433	427	421	414	407	399	389	377
	%N1	77.3	76.4	75.5	74.6	73.8	72.9	71.9	70.8	69.5	68.2	66.8
24 (-11)	MAX TAT											
	KIAS	313	308	303	298	294	289	284	278	271	264	255
	MACH	.747	.734	.723	.712	.703	.692	.681	.668	.652	.635	.616
	FF/ENG	3870	3710	3566	3433	3309	3184	3057	2922	2782	2637	2490
	KTAS	450	442	435	429	423	417	410	402	393	382	371
23 (-9)	%N1	76.5	75.7	74.9	74.1	73.2	72.2	71.2	70.0	68.7	67.4	66.0
	MAX TAT											
	KIAS	313	309	304	300	295	291	285	278	271	263	254
	MACH	.733	.722	.712	.703	.693	.683	.670	.655	.639	.621	.601
	FF/ENG	3858	3715	3582	3458	3333	3207	3072	2933	2788	2640	2490
23 (-9)	KTAS	443	436	430	425	419	413	405	396	386	375	363
	%N1	75.8	75.1	74.3	73.5	72.5	71.5	70.4	69.2	67.9	66.6	65.1
	MAX TAT											
	KIAS	314	310	306	302	297	292	285	278	271	262	253
	MACH	.721	.711	.703	.693	.683	.671	.658	.643	.626	.607	.588
23 (-9)	FF/ENG	3864	3731	3607	3482	3357	3223	3084	2941	2793	2643	2490
	KTAS	437	432	427	421	415	408	399	390	380	368	357

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	88.7	89.7	90.7	91.6	92.6	93.5	94.5	95.4	96.3	96.5	95.5	94.7	94.0	93.2
28	88.0	89.0	90.0	90.9	91.9	92.8	93.7	94.7	95.6	96.3	95.3	94.6	93.8	93.1
27	87.3	88.3	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.7	95.1	94.4	93.7	92.9
26	86.7	87.7	88.6	89.6	90.5	91.4	92.3	93.2	94.1	95.0	95.0	94.3	93.5	92.8
25	86.6	87.6	88.5	89.5	90.4	91.3	92.2	93.1	94.0	94.9	95.0	94.1	93.4	92.7
24	86.5	87.4	88.4	89.3	90.2	91.2	92.1	93.0	93.9	94.7	94.9	94.2	93.2	92.3
23	86.0	87.0	87.9	88.9	89.8	90.7	91.6	92.5	93.4	94.2	95.0	94.2	93.2	92.0

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

Long Range Cruise Table
22000 FT to 16000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
22 (-1)	%N1	81.9	81.4	80.9	80.3	79.9	79.3	78.4	77.6	76.7	76.0	75.2
	MAX TAT											
	KIAS	343	343	343	343	343	341	335	330	325	320	316
	MACH	.768	.768	.768	.768	.768	.763	.751	.740	.729	.720	.711
	FF/ENG	5113	5020	4928	4838	4755	4639	4468	4305	4153	4013	3882
21 (0)	KTAS	468	468	468	468	468	465	458	451	444	439	433
	%N1	81.0	80.5	80.0	79.4	79.0	78.4	77.6	76.8	76.1	75.4	74.7
	MAX TAT											
	KIAS	342	342	342	342	342	341	335	330	326	322	318
	MACH	.752	.752	.752	.752	.752	.748	.737	.727	.718	.710	.702
20 (1)	FF/ENG	5075	4983	4890	4799	4718	4615	4453	4305	4166	4035	3913
	KTAS	460	460	460	460	460	458	451	445	439	434	429
	%N1	80.1	79.6	79.0	78.5	78.1	77.6	76.9	76.2	75.5	74.8	74.0
	MAX TAT											
	KIAS	341	341	341	341	341	341	336	332	328	324	320
19 (3)	MACH	.736	.736	.736	.736	.736	.734	.725	.716	.708	.701	.692
	FF/ENG	5047	4955	4863	4772	4693	4609	4462	4324	4193	4070	3943
	KTAS	452	452	452	452	452	451	445	440	435	431	425
	%N1	79.2	78.7	78.1	77.7	77.2	76.8	76.2	75.6	74.9	74.2	73.4
	MAX TAT											
18 (4)	KIAS	340	340	340	340	340	340	337	334	330	326	322
	MACH	.721	.721	.721	.721	.721	.721	.714	.707	.700	.691	.683
	FF/ENG	5033	4939	4847	4757	4680	4611	4489	4359	4234	4105	3978
	KTAS	445	445	445	445	445	445	441	436	431	426	421
	%N1	78.3	77.8	77.3	76.8	76.4	76.1	75.7	75.0	74.3	73.5	72.6
17 (5)	MAX TAT											
	KIAS	340	340	340	340	340	340	339	336	332	328	323
	MACH	.706	.706	.706	.706	.706	.706	.705	.698	.690	.682	.672
	FF/ENG	5021	4926	4834	4748	4672	4604	4531	4403	4273	4143	4007
	KTAS	437	437	437	437	437	437	437	432	427	422	416
16 (7)	%N1	77.4	76.9	76.5	76.0	75.6	75.3	74.9	74.4	73.6	72.8	71.9
	MAX TAT											
	KIAS	339	339	339	339	339	339	339	338	333	328	323
	MACH	.692	.692	.692	.692	.692	.692	.692	.689	.681	.671	.661
	FF/ENG	5006	4911	4822	4738	4664	4596	4530	4443	4311	4172	4030
15 (9)	KTAS	430	430	430	430	430	430	430	428	423	417	411
	%N1	76.6	76.1	75.7	75.2	74.8	74.4	74.0	73.6	72.9	72.1	71.2
	MAX TAT											
	KIAS	338	338	338	338	338	338	338	338	334	329	323
	MACH	.678	.678	.678	.678	.678	.678	.678	.678	.670	.660	.649
14 (11)	FF/ENG	4989	4895	4808	4728	4656	4589	4524	4461	4336	4192	4044
	KTAS	423	423	423	423	423	423	423	423	418	412	405

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
22	88.4	89.4	90.3	91.1	92.0	92.9	93.8	94.6	94.2	93.3	91.8	90.3	88.8	87.5
21	88.1	89.1	90.0	90.8	91.7	92.6	93.5	94.3	94.1	93.1	91.8	90.5	89.0	87.8
20	87.8	88.7	89.6	90.5	91.4	92.3	93.1	94.0	94.1	92.8	91.7	90.6	89.2	88.1
19	87.5	88.4	89.2	90.1	91.0	91.9	92.7	93.6	94.3	93.0	91.9	90.7	89.2	88.0
18	87.1	88.0	88.8	89.7	90.6	91.4	92.3	93.1	94.0	93.3	92.1	90.8	89.3	88.0
17	86.7	87.6	88.4	89.3	90.2	91.0	91.9	92.7	93.5	93.6	92.3	91.0	89.4	87.9
16	86.4	87.3	88.1	89.0	89.9	90.7	91.6	92.4	93.2	93.6	92.6	91.4	89.9	88.2

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

Long Range Cruise Table
22000 FT to 16000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
22 (-8)	%N1	75.2	74.5	73.7	72.8	71.8	70.8	69.6	68.4	67.1	65.8	64.2
	MAX TAT											
	KIAS	316	312	308	303	298	292	285	278	270	261	253
	MACH	.711	.702	.693	.684	.672	.660	.645	.629	.612	.593	.575
	FF/ENG	3882	3759	3633	3508	3375	3237	3094	2948	2798	2642	2488
21 (-6)	KTAS	433	428	423	417	410	402	393	383	373	362	350
	%N1	74.7	73.9	73.0	72.1	71.1	70.0	68.8	67.6	66.3	64.9	63.4
	MAX TAT											
	KIAS	318	314	310	304	299	292	285	277	269	261	252
	MACH	.702	.693	.684	.673	.661	.647	.632	.616	.598	.580	.562
20 (-5)	FF/ENG	3913	3786	3661	3528	3391	3249	3103	2953	2797	2639	2483
	KTAS	429	424	418	412	404	396	387	377	366	355	344
	%N1	74.0	73.2	72.3	71.3	70.3	69.2	68.0	66.8	65.5	64.0	62.6
	MAX TAT											
	KIAS	320	316	311	305	299	292	284	276	268	260	252
19 (-3)	MACH	.692	.684	.673	.661	.648	.634	.619	.602	.585	.568	.551
	FF/ENG	3943	3817	3683	3546	3405	3259	3109	2952	2792	2633	2485
	KTAS	425	420	414	406	398	390	380	370	359	349	338
	%N1	73.4	72.5	71.6	70.6	69.5	68.4	67.3	66.0	64.6	63.2	61.8
	MAX TAT											
18 (-2)	KIAS	322	317	311	305	298	291	283	275	267	259	252
	MACH	.683	.673	.662	.649	.636	.621	.605	.589	.572	.556	.541
	FF/ENG	3978	3843	3705	3562	3415	3264	3108	2947	2786	2632	2493
	KTAS	421	415	408	400	392	383	373	363	353	343	333
	%N1	72.6	71.8	70.8	69.8	68.7	67.6	66.4	65.1	63.8	62.4	61.1
17 (-1)	MAX TAT											
	KIAS	323	317	311	305	298	290	282	275	267	259	252
	MACH	.672	.662	.650	.637	.622	.607	.592	.576	.560	.545	.531
	FF/ENG	4007	3867	3722	3574	3422	3264	3102	2941	2784	2640	2506
	KTAS	416	410	402	394	385	376	366	357	347	338	329
16 (1)	%N1	71.9	71.0	70.0	69.0	68.0	66.8	65.6	64.3	63.0	61.6	60.4
	MAX TAT											
	KIAS	323	317	311	304	297	289	282	274	267	260	253
	MACH	.661	.650	.637	.624	.609	.594	.579	.564	.549	.535	.522
	FF/ENG	4030	3884	3733	3579	3421	3259	3097	2938	2790	2651	2520
16 (1)	KTAS	411	404	396	388	379	369	360	350	341	333	324
	%N1	71.2	70.3	69.3	68.3	67.2	66.0	64.7	63.4	62.2	60.9	59.7
	MAX TAT											
	KIAS	323	317	310	303	296	288	281	274	267	260	254
	MACH	.649	.637	.624	.610	.596	.582	.567	.553	.539	.526	.513
16 (1)	FF/ENG	4044	3892	3736	3577	3414	3253	3093	2941	2799	2664	2535
	KTAS	405	398	389	381	372	363	354	345	337	328	320

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
22	87.5	88.4	89.4	90.3	91.1	92.0	92.9	93.8	94.6	94.2	93.3	91.8	90.3	88.8
21	87.2	88.1	89.1	90.0	90.8	91.7	92.6	93.5	94.3	94.1	93.1	91.8	90.5	89.0
20	86.9	87.8	88.7	89.6	90.5	91.4	92.3	93.1	94.0	94.1	92.8	91.7	90.6	89.2
19	86.6	87.5	88.4	89.2	90.1	91.0	91.9	92.7	93.6	94.3	93.0	91.9	90.7	89.2
18	86.2	87.1	88.0	88.8	89.7	90.6	91.4	92.3	93.1	94.0	93.3	92.1	90.8	89.3
17	85.8	86.7	87.6	88.4	89.3	90.2	91.0	91.9	92.7	93.5	93.6	92.3	91.0	89.4
16	85.5	86.4	87.3	88.1	89.0	89.9	90.7	91.6	92.4	93.2	93.6	92.6	91.4	89.9

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

Long Range Cruise Table
15000 FT to 6000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
15 (8)	%N1	75.8	75.3	74.8	74.3	73.9	73.5	73.1	72.8	72.2	71.3	70.4
	MAX TAT											
	KIAS	337	337	337	337	337	337	337	337	335	329	323
	MACH	.664	.664	.664	.664	.664	.664	.664	.664	.659	.648	.637
	FF/ENG	4969	4878	4794	4717	4646	4580	4515	4454	4350	4200	4047
14 (9)	KTAS	416	416	416	416	416	416	416	416	413	406	399
	%N1	74.9	74.4	74.0	73.5	73.1	72.7	72.3	72.0	71.4	70.6	69.7
	MAX TAT											
	KIAS	337	337	337	337	337	337	337	337	335	329	322
	MACH	.651	.651	.651	.651	.651	.651	.651	.651	.647	.636	.624
13 (10)	FF/ENG	4948	4860	4780	4705	4634	4568	4504	4443	4352	4197	4040
	KTAS	409	409	409	409	409	409	409	409	407	400	392
	%N1	74.1	73.6	73.1	72.7	72.3	71.9	71.5	71.2	70.7	69.8	68.9
	MAX TAT											
	KIAS	336	336	336	336	336	336	336	336	334	328	321
12 (12)	MACH	.638	.638	.638	.638	.638	.638	.638	.638	.635	.623	.611
	FF/ENG	4929	4844	4766	4692	4622	4555	4492	4431	4345	4187	4027
	KTAS	403	403	403	403	403	403	403	403	401	393	386
	%N1	73.3	72.8	72.4	71.9	71.5	71.2	70.8	70.4	70.0	69.1	68.2
	MAX TAT											
10 (14)	KIAS	335	335	335	335	335	335	335	335	334	327	320
	MACH	.626	.626	.626	.626	.626	.626	.626	.626	.622	.611	.598
	FF/ENG	4912	4830	4753	4679	4609	4542	4478	4418	4331	4171	4009
	KTAS	396	396	396	396	396	396	396	396	394	387	379
	%N1	71.7	71.3	70.8	70.4	70.1	69.7	69.3	69.0	68.4	67.5	66.5
8 (17)	MAX TAT											
	KIAS	334	334	334	334	334	334	334	334	332	325	319
	MACH	.602	.602	.602	.602	.602	.602	.602	.602	.597	.586	.574
	FF/ENG	4881	4803	4726	4653	4582	4514	4450	4390	4290	4135	3981
	KTAS	384	384	384	384	384	384	384	384	381	374	366
6 (20)	%N1	70.1	69.7	69.3	69.0	68.6	68.2	67.8	67.4	66.8	65.8	64.9
	MAX TAT											
	KIAS	333	333	333	333	333	333	333	333	330	324	318
	MACH	.579	.579	.579	.579	.579	.579	.579	.579	.573	.563	.552
	FF/ENG	4851	4774	4698	4625	4553	4485	4420	4360	4252	4101	3958
	KTAS	372	372	372	372	372	372	372	372	369	362	355
	%N1	68.7	68.2	67.8	67.4	67.0	66.6	66.2	65.8	65.2	64.3	63.4
	MAX TAT											
	KIAS	332	332	332	332	332	332	332	332	329	324	318
	MACH	.557	.557	.557	.557	.557	.557	.557	.557	.552	.543	.534
	FF/ENG	4815	4738	4663	4590	4519	4450	4386	4326	4221	4087	3958
	KTAS	361	361	361	361	361	361	361	361	357	352	346

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
15	87.8	88.7	89.5	90.4	91.2	92.0	92.8	93.6	92.6	91.8	90.3	88.7	86.5	84.1
14	87.5	88.3	89.2	90.0	90.8	91.7	92.5	93.3	92.8	91.9	90.7	89.2	87.6	85.4
13	87.1	87.9	88.8	89.6	90.4	91.3	92.1	92.9	92.9	92.0	91.0	89.7	88.3	86.4
12	86.6	87.5	88.3	89.2	90.0	90.8	91.6	92.4	93.0	92.1	91.2	90.1	89.0	87.2
10	85.7	86.5	87.3	88.2	89.0	89.8	90.6	91.4	92.1	92.3	91.4	90.4	89.3	88.0
8	84.7	85.6	86.4	87.2	88.0	88.8	89.6	90.3	91.1	91.8	91.1	90.2	89.1	87.9
6	84.1	84.9	85.7	86.5	87.3	88.1	88.9	89.6	90.4	91.1	91.4	90.4	89.3	88.2

With engine anti-ice on, decrease limit %N1 by 0.6.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.

Long Range Cruise Table

15000 FT to 6000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
15 (2)	%N1	70.4	69.5	68.5	67.5	66.3	65.1	63.9	62.6	61.4	60.2	59.0
	MAX TAT											
	KIAS	323	316	309	302	295	288	281	274	267	261	254
	MACH	.637	.624	.611	.597	.583	.569	.556	.543	.530	.517	.505
	FF/ENG	4047	3890	3730	3566	3406	3246	3092	2947	2809	2678	2553
14 (4)	KTAS	399	391	383	374	365	357	348	340	332	324	316
	%N1	69.7	68.7	67.7	66.6	65.5	64.3	63.1	61.9	60.7	59.6	58.4
	MAX TAT											
	KIAS	322	316	308	301	294	287	281	274	268	261	255
	MACH	.624	.611	.598	.585	.571	.558	.545	.533	.521	.509	.498
13 (5)	FF/ENG	4040	3880	3716	3556	3397	3242	3096	2956	2823	2696	2575
	KTAS	392	384	376	368	359	351	343	335	328	320	313
	%N1	68.9	68.0	66.9	65.8	64.6	63.5	62.3	61.2	60.1	59.0	57.9
	MAX TAT											
	KIAS	321	314	308	301	294	287	281	275	268	262	257
12 (7)	MACH	.611	.598	.586	.573	.560	.548	.536	.524	.513	.502	.491
	FF/ENG	4027	3864	3705	3547	3392	3245	3105	2970	2841	2719	2601
	KTAS	386	378	370	361	353	346	338	331	324	317	310
	%N1	68.2	67.1	66.1	64.9	63.8	62.8	61.7	60.6	59.5	58.5	57.4
	MAX TAT											
10 (10)	KIAS	320	314	307	300	294	287	281	275	269	263	258
	MACH	.598	.586	.574	.561	.549	.538	.527	.516	.505	.494	.484
	FF/ENG	4009	3851	3694	3540	3394	3254	3119	2989	2864	2745	2630
	KTAS	379	371	363	355	348	341	334	327	320	313	307
	%N1	66.5	65.5	64.5	63.5	62.5	61.5	60.5	59.6	58.6	57.5	56.4
8 (13)	MAX TAT											
	KIAS	319	312	306	300	294	288	283	277	271	266	261
	MACH	.574	.563	.552	.541	.531	.520	.510	.500	.491	.481	.472
	FF/ENG	3981	3829	3685	3546	3412	3282	3155	3034	2916	2802	2693
	KTAS	366	359	352	345	339	332	326	319	313	307	301
6 (16)	%N1	64.9	64.0	63.0	62.1	61.2	60.3	59.4	58.4	57.4	56.4	55.4
	MAX TAT											
	KIAS	318	312	306	301	295	290	285	279	274	269	264
	MACH	.552	.542	.533	.523	.514	.505	.496	.487	.478	.469	.461
	FF/ENG	3958	3821	3689	3560	3435	3315	3198	3085	2977	2871	2768
	KTAS	355	349	343	337	330	325	319	313	307	302	296
	%N1	63.4	62.6	61.7	60.9	60.0	59.2	58.3	57.3	56.4	55.5	54.5
	MAX TAT											
	KIAS	318	313	308	302	297	292	287	282	278	273	268
	MACH	.534	.525	.516	.508	.499	.491	.482	.474	.466	.458	.451
	FF/ENG	3958	3833	3711	3593	3478	3369	3263	3161	3061	2961	2860
	KTAS	346	340	334	329	323	318	313	307	302	297	292

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
15	86.9	87.8	88.7	89.5	90.4	91.2	92.0	92.8	93.6	92.6	91.8	90.3	88.7	86.5
14	86.6	87.5	88.3	89.2	90.0	90.8	91.7	92.5	93.3	92.8	91.9	90.7	89.2	87.6
13	86.2	87.1	87.9	88.8	89.6	90.4	91.3	92.1	92.9	92.9	92.0	91.0	89.7	88.3
12	85.8	86.6	87.5	88.3	89.2	90.0	90.8	91.6	92.4	93.0	92.1	91.2	90.1	89.0
10	84.8	85.7	86.5	87.3	88.2	89.0	89.8	90.6	91.4	92.1	92.3	91.4	90.4	89.3
8	83.9	84.7	85.6	86.4	87.2	88.0	88.8	89.6	90.3	91.1	91.8	91.1	90.2	89.1
6	83.3	84.1	84.9	85.7	86.5	87.3	88.1	88.9	89.6	90.4	91.1	91.4	90.4	89.3

With engine anti-ice on, decrease limit %N1 by 0.6.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.

.84M Cruise Table**43000 FT to 30000 FT - High Weights**

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
43													
42													
41													
40													
39													
38													
37	274	%N1											87.2
	-26	MAX TAT											
36	482	FF/ENG											3824
	281	%N1										86.7	85.5
35	-26	MAX TAT											
	482	FF/ENG										3936	3738
34	287	%N1								88.0	86.7	85.5	84.6
	-23	MAX TAT											
33	484	FF/ENG								4282	4069	3876	3720
	294	%N1						89.1	87.8	86.6	85.5	84.7	84.0
32	-21	MAX TAT						12					
	486	FF/ENG						4634	4404	4198	4014	3868	3754
31	300	%N1				90.1	88.8	87.6	86.5	85.5	84.8	84.1	83.5
	-19	MAX TAT				10							
30	489	FF/ENG				4990	4745	4525	4324	4154	4019	3910	3812
	307	%N1			89.7	88.5	87.4	86.4	85.6	84.9	84.2	83.7	83.1
29	-17	MAX TAT			14								
	491	FF/ENG			5088	4855	4645	4452	4298	4173	4069	3974	3891
28	314	%N1	90.6	89.3	88.3	87.2	86.3	85.6	84.9	84.4	83.8	83.2	82.7
	-14	MAX TAT	13	18									
27	493	FF/ENG	5432	5187	4966	4763	4588	4448	4333	4232	4141	4060	3988
	321	%N1	89.0	88.0	87.0	86.2	85.6	85.0	84.5	83.9	83.4	82.9	82.4
26	-12	MAX TAT											
	495	FF/ENG	5290	5080	4889	4735	4606	4500	4402	4314	4236	4165	4098

Max TAT not shown where %N1 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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
37	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5	94.9	94.5
36	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.9	96.2	95.5	94.9	94.5
35	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.7	96.8	96.2	95.5	95.0
34	88.9	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.9	97.1	96.5	95.7	95.2
33	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	97.4	96.8	96.0	95.4
32	88.1	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	97.8	97.0	96.3	95.6
31	87.7	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	97.3	96.6	95.9
30	87.4	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	97.7	96.9	96.2

With engine anti-ice on, decrease limit %N1 by 0.3.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

.84M Cruise Table
43000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
43	239	%N1									85.2	84.1	83.2
	-26	MAX TAT									2663	2534	2434
	482	FF/ENG											
42	244	%N1								85.3	84.2	83.3	82.4
	-26	MAX TAT								2802	2667	2565	2477
	482	FF/ENG											
41	250	%N1							85.3	84.2	83.3	82.5	81.8
	-26	MAX TAT							2940	2801	2696	2606	2533
	482	FF/ENG											
40	256	%N1						85.2	84.2	83.3	82.5	81.8	81.1
	-26	MAX TAT						3071	2930	2824	2733	2657	2593
	482	FF/ENG											
39	262	%N1				86.4	85.1	84.1	83.3	82.5	81.8	81.1	80.5
	-26	MAX TAT											
	482	FF/ENG				3381	3198	3058	2951	2859	2781	2717	2654
38	268	%N1			86.2	84.9	84.0	83.2	82.5	81.8	81.1	80.5	79.9
	-26	MAX TAT											
	482	FF/ENG			3503	3323	3185	3080	2987	2909	2844	2781	2721
37	274	%N1	87.2	85.9	84.7	83.8	83.0	82.4	81.7	81.0	80.4	79.9	79.5
	-26	MAX TAT											
	482	FF/ENG	3824	3620	3446	3313	3209	3117	3039	2974	2910	2850	2794
36	281	%N1	85.5	84.5	83.6	82.9	82.3	81.6	81.0	80.4	79.9	79.5	79.0
	-26	MAX TAT											
	482	FF/ENG	3738	3572	3445	3342	3252	3174	3108	3045	2984	2927	2875
35	287	%N1	84.6	83.8	83.1	82.5	81.8	81.3	80.7	80.3	79.8	79.4	78.9
	-23	MAX TAT											
	484	FF/ENG	3720	3599	3497	3408	3331	3265	3201	3139	3081	3028	2978
34	294	%N1	84.0	83.3	82.7	82.1	81.5	81.0	80.6	80.1	79.7	79.3	78.9
	-21	MAX TAT											
	486	FF/ENG	3754	3654	3566	3490	3424	3359	3296	3238	3184	3133	3086
33	300	%N1	83.5	82.9	82.3	81.8	81.3	80.9	80.4	80.1	79.6	79.2	78.8
	-19	MAX TAT											
	489	FF/ENG	3812	3727	3652	3586	3521	3457	3398	3343	3291	3243	3200
32	307	%N1	83.1	82.5	82.0	81.6	81.1	80.7	80.4	79.9	79.5	79.2	78.9
	-17	MAX TAT											
	491	FF/ENG	3891	3818	3752	3686	3622	3562	3505	3453	3403	3359	3320
31	314	%N1	82.7	82.2	81.8	81.4	81.0	80.6	80.2	79.8	79.5	79.2	78.9
	-14	MAX TAT											
	493	FF/ENG	3988	3922	3855	3791	3730	3673	3620	3569	3524	3483	3448
30	321	%N1	82.4	82.0	81.7	81.3	80.9	80.5	80.1	79.8	79.5	79.2	79.0
	-12	MAX TAT											
	495	FF/ENG	4098	4031	3966	3905	3848	3794	3742	3695	3654	3617	3584

Max TAT not shown where %N1 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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
43	88.9	90.0	91.0	92.0	93.0	94.0	94.9	95.9	96.9	96.3	95.6	94.9	94.4	94.0
42	89.0	90.1	91.1	92.1	93.1	94.1	95.0	96.0	97.0	96.5	95.8	95.0	94.6	94.1
41	89.1	90.1	91.2	92.2	93.2	94.2	95.1	96.1	97.1	96.7	95.9	95.2	94.7	94.3
40	89.2	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	96.8	96.1	95.4	94.8	94.4
39	89.4	90.4	91.4	92.4	93.5	94.4	95.4	96.4	97.4	97.0	96.3	95.5	95.0	94.5
38	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.0	96.2	95.5	94.9	94.5
37	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	96.9	96.2	95.5	94.9	94.5
36	89.3	90.3	91.4	92.4	93.4	94.4	95.4	96.4	97.3	96.9	96.2	95.5	94.9	94.5
35	89.3	90.4	91.4	92.4	93.4	94.4	95.4	96.4	97.4	97.7	96.8	96.2	95.5	95.0
34	88.9	89.9	91.0	92.0	93.0	94.0	95.0	96.0	97.0	97.9	97.1	96.5	95.7	95.2
33	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.4	97.4	96.8	96.0	95.4
32	88.1	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.0	97.0	97.8	97.0	96.3	95.6
31	87.7	88.7	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	97.3	96.6	95.9
30	87.4	88.4	89.4	90.4	91.3	92.3	93.3	94.2	95.2	96.1	97.1	97.7	96.9	96.2

With engine anti-ice on, decrease limit %N1 by 0.3.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

Wind-Altitude Trade
LRC

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43							156	68	18	1	6
41						136	61	18	1	3	19
39						51	15	1	3	15	34
37			156	85	38	11	1	3	14	31	49
35		114	61	26	7	0	3	14	29	46	62
33	79	40	16	3	0	5	15	29	44	59	72
31	24	8	1	1	7	17	30	44	58	70	78
29	3	0	3	10	20	32	45	57	68	77	81
27	1	5	13	23	34	46	58	68	76	80	81
25	9	17	27	37	48	59	68	75	80	82	79

.84M

PRESSURE ALTITUDE (1000 FT)	CRUISE WEIGHT (1000 KG)										
	360	340	320	300	280	260	240	220	200	180	160
43							172	77	22	1	7
41						151	70	22	1	4	25
39					124	58	18	1	3	20	49
37				96	44	13	1	3	18	43	76
35		127	69	31	8	0	4	19	41	69	102
33		47	19	4	0	6	20	41	66	96	127
31	29	10	1	1	9	23	42	66	92	120	149
29	4	0	3	12	27	45	67	91	117	143	169
27	1	7	17	31	49	69	92	115	139	163	186
25	12	23	37	54	73	94	115	137	159	181	

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, 240000 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 240000 kg are 15 (33000 ft) and 1 (37000 ft). Difference is -14 so break-even wind is -20 plus -14, i.e. -34 knots (headwind).
B) Similarly, wind factors are 15 (33000 ft) and 45 (29000 ft). Difference is +30 so break-even wind is -20 plus +30, i.e. +10 knots (tailwind).

Flight Planning and Performance Manual

Descent

.84/280/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			160	210	260
43000	29	880	131	151	157
41000	28	870	126	145	153
39000	28	860	121	139	148
37000	27	850	116	133	142
35000	26	840	110	127	135
33000	25	820	104	120	127
31000	24	800	98	113	120
29000	23	790	92	105	112
27000	22	770	86	98	104
25000	21	740	80	91	96
23000	20	720	73	84	88
21000	19	690	67	77	81
19000	17	660	61	69	73
17000	16	630	55	62	66
15000	15	590	49	55	58
10000	11	480	32	35	36
5000	7	350	15	17	17
1500	4	250	4	4	4

.84/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			160	210	260
43000	31	930	146	161	161
41000	31	920	141	155	156
39000	30	910	133	147	149
37000	29	890	126	139	141
35000	28	870	118	131	133
33000	26	860	111	123	126
31000	25	840	104	115	118
29000	24	820	97	107	110
27000	23	790	90	100	102
25000	22	760	83	92	95
23000	20	730	76	84	87
21000	19	700	69	76	79
19000	18	670	62	69	71
17000	16	630	56	61	63
15000	15	590	49	54	55
10000	11	480	32	35	36
5000	7	350	15	17	17
1500	4	250	4	4	4

.84/310/250

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)		
			LANDING WEIGHT (1000 KG)		
			160	210	260
43000	27	830	120	140	150
41000	26	820	115	135	145
39000	26	810	109	129	140
37000	25	800	104	123	135
35000	24	790	100	118	129
33000	24	780	96	113	124
31000	23	770	92	108	118
29000	22	760	87	102	111
27000	21	740	82	95	104
25000	20	720	76	89	96
23000	19	700	71	82	89
21000	18	680	66	76	82
19000	17	650	61	70	75
17000	16	630	55	63	67
15000	15	600	50	57	60
10000	11	480	32	35	36
5000	7	350	15	17	17
1500	4	250	4	4	4

Allowances for a straight-in approach are included.

**Holding
Flaps Up**

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
43000	%N1											81.8
	KIAS											215
	FF/ENG											2340
	%N1									83.5	80.8	77.7
	KIAS									241	227	213
40000	FF/ENG									2930	2590	2270
	%N1						84.1	82.0	79.6	77.2	74.3	71.3
	KIAS						274	262	249	237	224	210
35000	FF/ENG						3750	3410	3090	2770	2470	2180
	%N1	88.5	86.6	85.0	83.2	81.3	79.3	77.1	74.7	72.3	69.1	66.1
	KIAS	312	312	302	291	280	269	258	246	233	208	199
30000	FF/ENG	5380	4980	4600	4270	3950	3620	3310	3000	2690	2350	2160
	%N1	83.5	82.1	80.3	78.5	76.6	74.6	72.3	69.6	67.0	64.5	62.0
	KIAS	317	307	297	287	277	266	248	226	213	206	199
25000	FF/ENG	5140	4800	4460	4130	3830	3540	3200	2850	2580	2390	2170
	%N1	78.9	77.3	75.7	73.8	71.6	69.3	67.2	64.9	62.7	60.2	57.5
	KIAS	313	303	294	277	258	240	226	220	213	206	199
20000	FF/ENG	4960	4660	4360	4020	3670	3340	3070	2820	2580	2360	2210
	%N1	74.3	72.3	70.4	68.6	66.8	64.9	62.9	60.7	58.4	56.1	53.8
	KIAS	298	282	265	252	243	234	226	220	213	206	199
15000	FF/ENG	4800	4450	4130	3850	3590	3330	3070	2830	2610	2410	2260
	%N1	69.5	67.9	66.3	64.6	62.8	60.8	58.8	56.8	54.8	52.6	50.4
	KIAS	275	267	259	251	242	233	226	220	213	206	199
10000	FF/ENG	4650	4380	4120	3870	3610	3360	3110	2870	2650	2450	2320
	%N1	65.4	63.8	62.1	60.4	58.7	56.9	55.1	53.2	51.3	49.2	46.7
	KIAS	273	266	257	249	241	232	226	220	213	206	199
5000	FF/ENG	4690	4440	4180	3920	3670	3420	3180	2960	2750	2550	2420
	%N1	62.4	60.9	59.4	57.8	56.2	54.4	52.7	50.9	48.8	46.6	44.3
	KIAS	272	264	257	249	240	232	226	220	213	206	199
1500	FF/ENG	4740	4480	4220	3960	3710	3470	3250	3040	2830	2640	2500

Flaps 1

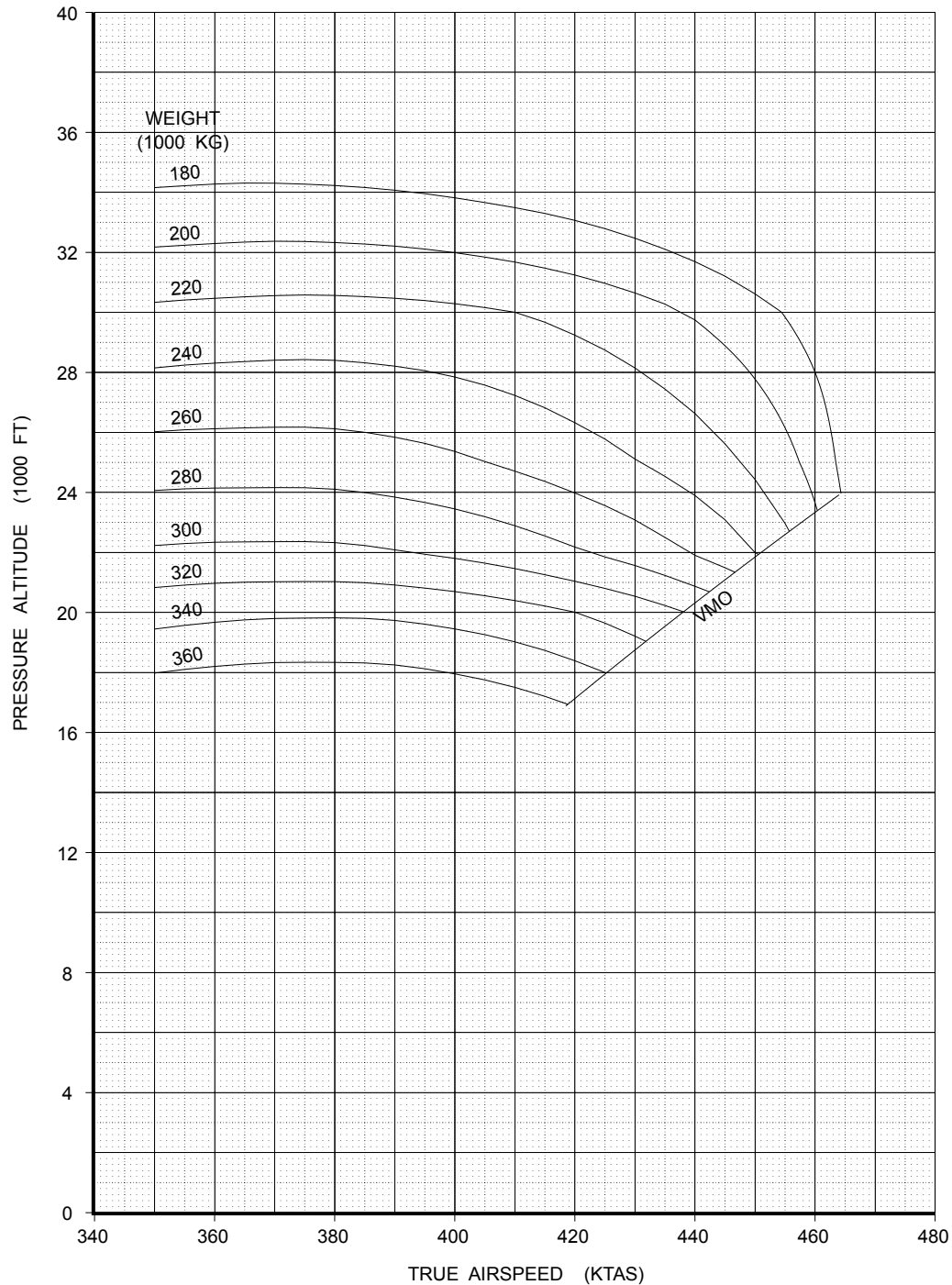
PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
20000	%N1	81.9	80.0	78.2	76.3	74.1	71.8	69.5	66.8	64.2	61.5	58.4
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5300	4940	4610	4280	3950	3630	3330	3030	2740	2470	2280
15000	%N1	76.9	75.0	73.2	71.5	69.3	67.0	64.8	62.5	60.0	57.2	54.5
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5190	4840	4520	4210	3910	3610	3320	3030	2750	2500	2310
10000	%N1	72.4	70.5	68.6	66.8	64.9	62.9	60.7	58.4	56.0	53.6	51.0
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5150	4810	4510	4210	3910	3620	3330	3060	2790	2550	2370
5000	%N1	67.8	66.1	64.5	62.7	60.8	58.7	56.7	54.7	52.5	50.2	47.6
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5170	4840	4540	4250	3960	3670	3390	3130	2880	2640	2470
1500	%N1	65.0	63.3	61.6	59.8	58.0	56.2	54.3	52.3	50.2	47.8	45.1
	KIAS	242	240	233	224	218	212	206	200	193	186	179
	FF/ENG	5180	4870	4570	4280	3990	3710	3450	3200	2960	2730	2560

These tables include 5% additional fuel for holding in a racetrack pattern.

ENGINE INOP MAX CONTINUOUS THRUST

Speed Capability

Max Continuous Thrust, standard day with A/C on



ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability**Max Continuous Thrust, 100 ft/min residual rate of climb**

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	15000	13600	12000
350	15500	14200	12600
340	16400	14900	13100
330	17200	15700	13900
320	18100	16600	14900
310	19000	17500	15800
300	19900	18400	16700
290	20600	19400	17800
280	21200	20200	18800
270	21900	20900	19900
260	22800	21600	20600
250	23800	22500	21400
240	24900	23700	22100
230	26200	24900	23400
220	27600	26300	24600
210	29100	27700	26000
200	30400	29100	27600
190	31400	30500	29100
180	32400	31700	30600
170	33400	33000	32000
160	34600	34400	33500

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	6800	4200	1500
350	7500	5000	2300
340	8300	5800	3100
330	9200	6500	3800
320	10100	7200	4500
310	11900	8700	5600
300	13500	10500	7200
290	15100	12000	9000
280	16600	13600	10900
270	18300	15200	12600
260	19900	16900	14300
250	21200	18500	15800
240	22600	20300	17500
230	24000	21900	19500
220	25500	23600	21200
210	27000	25200	22900
200	28700	27000	24800
190	30200	28800	26900
180	31200	30400	28900
170	32200	31600	30600
160	33300	32900	32100

With engine anti-ice on, decrease altitude capability by 300 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

260 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16200	15400	14000
350	17100	16300	15100
340	17900	17100	16000
330	18800	18000	16900
320	19600	18900	17800
310	20400	19700	18600
300	21100	20400	19500
290	21800	21100	20200
280	22600	21700	20900
270	23600	22500	21500
260	24400	23400	22200
250	25300	24300	23000
240	26300	25200	23800
230	27300	26200	24700
220	28300	27200	25600
210	29300	28100	26600
200	30200	29000	27600
190	30900	29900	28500
180	31500	30600	29400
170	32200	31400	30200
160	32900	32100	30900

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	10700	7600	5000
350	12100	9400	6600
340	13500	11000	7900
330	15100	12500	10000
320	16300	13900	11400
310	17400	15200	12700
300	18400	16400	14000
290	19400	17600	15300
280	20500	18800	16500
270	21400	19900	17600
260	22400	21000	18700
250	23400	22100	19900
240	24400	23000	21100
230	25400	24000	22200
220	26400	25000	23300
210	27500	26100	24400
200	28500	27100	25500
190	29600	28100	26500
180	30400	29100	27500
170	31000	30000	28500
160	31700	30700	29600

With engine anti-ice on, decrease altitude capability by 400 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

280 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16800	15800	14500
350	17600	16500	15300
340	18300	17300	16100
330	19100	18000	16800
320	19900	18800	17600
310	20500	19500	18300
300	21000	20200	19000
290	21600	20700	19800
280	22100	21300	20400
270	22900	21800	20900
260	23600	22400	21400
250	24300	23200	21900
240	25000	24000	22600
230	25900	24700	23400
220	26700	25500	24100
210	27600	26300	24800
200	28500	27100	25600
190	29300	27800	26400
180	30100	28600	27100
170	30600	29300	27800
160	31100	29900	28400

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 300 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	11100	8000	5400
350	12300	9500	6600
340	13500	10800	7700
330	14700	12000	9300
320	15900	13300	10700
310	17000	14400	11800
300	17900	15500	12900
290	18700	16500	14000
280	19700	17500	15000
270	20500	18500	16000
260	21300	19400	17000
250	22200	20400	18000
240	23100	21400	19200
230	23900	22300	20200
220	24700	23100	21100
210	25600	24000	22000
200	26500	24800	22900
190	27400	25700	23800
180	28300	26500	24600
170	29100	27200	25300
160	29800	28000	26100

With engine anti-ice on, decrease altitude capability by 300 ft.

With engine and wing anti-ice on, decrease altitude capability by 700 ft.

ENGINE INOP

300 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16800	15500	14200
350	17500	16200	14900
340	18100	16800	15600
330	18700	17500	16200
320	19400	18100	16800
310	20000	18700	17400
300	20500	19400	18000
290	20900	20000	18700
280	21400	20500	19400
270	21800	20900	20000
260	22400	21300	20500
250	23000	21800	20900
240	23600	22300	21300
230	24200	22900	21700
220	24800	23500	22200
210	25500	24200	22800
200	26200	24700	23300
190	26900	25300	23800
180	27400	25900	24300
170	28000	26400	24800
160	28400	26800	25200

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 200 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	10300	7100	4400
350	11400	8100	5400
340	12400	9500	6400
330	13400	10600	7400
320	14400	11600	8600
310	15300	12600	10000
300	16300	13600	11000
290	17200	14500	11900
280	18000	15400	12900
270	18800	16400	13800
260	19700	17300	14600
250	20400	18100	15400
240	21200	19000	16300
230	21900	19800	17100
220	22600	20600	18100
210	23300	21300	19000
200	23900	22000	19900
190	24500	22600	20500
180	25200	23200	21200
170	25700	23700	21700
160	26200	24200	22200

With engine anti-ice on, decrease altitude capability by 400 ft.

With engine and wing anti-ice on, decrease altitude capability by 1000 ft.

ENGINE INOP

320 KIAS Altitude Capability

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	16000	14700	13100
350	16600	15300	13800
340	17200	15800	14400
330	17700	16400	15000
320	18300	16900	15600
310	18900	17500	16100
300	19500	18100	16600
290	20000	18600	17200
280	20400	19200	17700
270	20800	19700	18300
260	21100	20200	18900
250	21500	20500	19500
240	21800	20900	20000
230	22300	21200	20300
220	22700	21500	20600
210	23200	21800	20900
200	23600	22200	21200
190	24000	22500	21400
180	24300	22900	21600
170	24700	23200	21800
160	25000	23500	22000

With engine anti-ice on, no altitude capability adjustment is required.

With engine and wing anti-ice on, decrease altitude capability by 200 ft.

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

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	8100	5500	2600
350	9300	6400	3500
340	10400	7200	4400
330	11300	8100	5300
320	12200	9200	6200
310	13100	10200	7000
300	14000	11100	7800
290	14800	11900	8900
280	15600	12700	9900
270	16400	13600	10700
260	17100	14400	11600
250	17800	15100	12300
240	18500	15800	13200
230	19200	16500	13900
220	19800	17100	14500
210	20400	17800	15100
200	20800	18400	15600
190	21300	18900	16100
180	21700	19300	16500
170	22100	19800	16900
160	22400	20200	17400

With engine anti-ice on, decrease altitude capability by 400 ft.

With engine and wing anti-ice on, decrease altitude capability by 1100 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table
30000 FT to 25000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
30	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
29	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
28	%N1 MAX TAT KIAS MACH FF/ENG KTAS		PERFORMANCE THRUST LIMITED									
27	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
26	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
25	%N1 MAX TAT KIAS MACH FF/ENG KTAS											

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table
30000 FT to 25000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
30 (-24)	%N1						99.0	96.5	94.0	91.7	89.7	88.0
	MAX TAT						-9	-4	1	6		
	KIAS						263	258	253	248	244	239
	MACH						.701	.688	.676	.664	.652	.640
	FF/ENG KTAS						6792 413	6329 406	5887 398	5520 391	5196 384	4891 377
29 (-22)	%N1					99.4	97.0	94.5	92.3	90.3	88.8	87.1
	MAX TAT					-8	-3	1	6			
	KIAS					269	264	259	254	250	245	240
	MACH					.701	.689	.677	.666	.654	.643	.629
	FF/ENG KTAS					7112 415	6652 408	6208 401	5833 394	5502 387	5196 381	4878 372
28 (-20)	%N1				99.7	97.4	95.0	92.9	90.9	89.4	87.8	86.2
	MAX TAT				-7	-3	2	6	11			
	KIAS				275	270	265	261	256	252	247	240
	MACH				.701	.690	.678	.667	.656	.646	.633	.617
	FF/ENG KTAS				7428 417	6973 410	6527 403	6147 396	5811 390	5499 384	5186 376	4860 367
27 (-19)	%N1				97.7	95.4	93.4	91.5	89.9	88.5	86.9	85.3
	MAX TAT				-2	2	7	11				
	KIAS				276	271	267	262	258	253	247	240
	MACH				.690	.679	.668	.658	.648	.636	.622	.605
	FF/ENG KTAS				7289 412	6844 405	6461 399	6120 393	5804 387	5494 380	5168 371	4837 361
26 (-17)	%N1			97.9	95.8	93.8	91.9	90.4	89.1	87.6	86.1	84.4
	MAX TAT			-1	3	7	11					
	KIAS			282	277	273	268	264	260	254	247	240
	MACH			.689	.679	.668	.659	.649	.639	.625	.610	.592
	FF/ENG KTAS			7601 413	7158 407	6773 401	6429 395	6110 389	5802 383	5476 375	5146 365	4811 355
25 (-15)	%N1		98.0	96.0	94.1	92.3	90.9	89.6	88.2	86.7	85.2	83.6
	MAX TAT		-1	4	8	12	16					
	KIAS		287	283	278	274	270	266	261	254	247	240
	MACH		.688	.678	.669	.659	.650	.640	.628	.613	.597	.581
	FF/ENG KTAS		7905 414	7467 408	7083 402	6737 397	6416 391	6109 385	5783 378	5453 369	5118 359	4797 350

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
30	94.6	95.8	96.9	97.9	99.0	100.1	101.1	102.1	102.0	100.5	98.8	97.4	96.2	95.3
29	93.8	94.9	96.0	97.1	98.1	99.2	100.2	101.2	101.9	100.7	99.1	97.5	96.3	95.5
28	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.3	100.9	99.3	97.6	96.5	95.6
27	92.4	93.5	94.5	95.5	96.6	97.6	98.6	99.6	100.5	101.1	99.4	97.8	96.5	95.7
26	91.7	92.7	93.8	94.8	95.8	96.8	97.8	98.8	99.7	100.7	99.6	98.0	96.7	95.8
25	91.0	92.0	93.0	94.0	95.0	96.0	97.0	98.0	98.9	99.8	99.7	98.1	96.9	95.9

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table
24000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
24 (-10)	%N1											98.1
	MAX TAT											1
	KIAS											293
	MACH											.687
	FF/ENG KTAS											8197 415
23 (-8)	%N1										98.1	96.3
	MAX TAT										4	7
	KIAS										298	294
	MACH										.686	.677
	FF/ENG KTAS										8479 416	8065 411
22 (-6)	%N1									98.0	96.3	94.7
	MAX TAT									6	9	13
	KIAS									304	300	296
	MACH									.684	.676	.667
	FF/ENG KTAS									8762 417	8361 412	7990 406
21 (-4)	%N1								97.9	96.3	94.7	93.2
	MAX TAT								10	13	17	20
	KIAS								309	305	301	297
	MACH								.683	.674	.666	.658
	FF/ENG KTAS								9052 418	8659 412	8294 408	7953 403
20 (-2)	%N1						99.4	97.8	96.2	94.8	93.4	92.3
	MAX TAT						11	14	17	21	24	27
	KIAS						318	314	310	307	303	299
	MACH						.689	.681	.673	.665	.657	.650
	FF/ENG KTAS						9778 423	9357 418	8967 413	8603 408	8263 404	7940 399
19 (-1)	%N1					99.2	97.6	96.1	94.7	93.5	92.5	91.5
	MAX TAT					13	16	19	22	25	28	
	KIAS					323	319	316	312	308	305	301
	MACH					.686	.678	.671	.663	.656	.649	.642
	FF/ENG KTAS					10098 423	9679 418	9287 414	8923 409	8583 405	8258 400	7948 396

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
24	92.7	93.7	94.7	95.7	96.6	97.6	98.5	99.5	100.2	98.6	97.4	96.2	95.5	94.8
23	92.4	93.4	94.3	95.3	96.3	97.2	98.2	99.1	100.1	99.2	97.8	96.5	95.8	95.1
22	92.0	93.0	94.0	95.0	95.9	96.9	97.8	98.7	99.7	99.7	98.2	96.9	96.1	95.4
21	92.5	93.5	94.5	95.5	96.4	97.4	98.3	99.3	100.2	101.2	99.7	98.2	96.9	95.9
20	92.8	93.8	94.8	95.8	96.8	97.7	98.7	99.6	100.6	101.5	101.3	99.6	98.0	96.6
19	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	101.1	102.0	100.1	98.5	97.1

With engine anti-ice on, no %N1 adjustment is required.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table
24000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
24 (-13)	%N1	98.1	96.2	94.4	92.6	91.2	90.0	88.7	87.3	85.9	84.3	82.6
	MAX TAT	1	6	10	13	17						
	KIAS	293	288	284	280	276	272	267	261	254	247	240
	MACH	.687	.678	.668	.659	.650	.641	.630	.616	.601	.585	.570
	FF/ENG	8197	7769	7389	7043	6720	6414	6089	5759	5426	5099	4785
23 (-12)	KTAS	415	410	404	399	393	388	381	372	363	354	344
	%N1	96.3	94.5	92.9	91.6	90.4	89.1	87.8	86.4	85.0	83.4	81.7
	MAX TAT	7	11	15	18							
	KIAS	294	290	286	282	278	273	267	261	254	247	241
	MACH	.677	.668	.659	.651	.642	.631	.618	.604	.589	.574	.559
22 (-10)	FF/ENG	8065	7690	7345	7023	6717	6393	6064	5733	5402	5086	4774
	KTAS	411	405	400	395	390	383	375	367	357	348	339
	%N1	94.7	93.1	91.9	90.7	89.5	88.3	87.0	85.6	84.1	82.4	80.9
	MAX TAT	13	16	20								
	KIAS	296	292	288	284	279	274	267	261	254	248	241
21 (-9)	MACH	.667	.659	.651	.643	.632	.620	.607	.592	.578	.563	.548
	FF/ENG	7990	7648	7325	7020	6696	6368	6038	5704	5387	5074	4765
	KTAS	406	401	396	392	385	378	370	361	352	343	334
	%N1	93.2	92.1	91.0	89.9	88.7	87.4	86.1	84.7	83.1	81.6	80.1
	MAX TAT	20	23									
20 (-7)	KIAS	297	294	290	285	280	274	267	261	254	248	241
	MACH	.658	.650	.643	.633	.621	.608	.594	.581	.567	.553	.538
	FF/ENG	7953	7630	7324	7000	6672	6344	6007	5688	5374	5063	4758
	KTAS	403	398	393	387	380	372	364	355	347	338	329
	%N1	92.3	91.3	90.2	89.0	87.8	86.5	85.2	83.7	82.3	80.8	79.2
19 (-6)	MAX TAT	27										
	KIAS	299	296	291	286	280	273	267	261	255	248	241
	MACH	.650	.642	.633	.622	.610	.596	.583	.570	.557	.543	.528
	FF/ENG	7940	7633	7307	6979	6649	6312	5988	5671	5359	5051	4750
	KTAS	399	395	389	382	375	366	358	350	342	333	325
19 (-6)	%N1	91.5	90.4	89.3	88.2	86.9	85.7	84.2	82.8	81.5	79.9	78.3
	MAX TAT											
	KIAS	301	297	292	286	280	274	267	261	255	248	242
	MACH	.642	.633	.622	.610	.598	.585	.572	.560	.546	.533	.519
	FF/ENG	7948	7619	7288	6956	6617	6288	5967	5652	5340	5035	4735
19 (-6)	KTAS	396	390	384	376	369	361	353	345	337	329	320

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
 Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
 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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
24	92.7	93.7	94.7	95.7	96.6	97.6	98.5	99.5	100.2	98.6	97.4	96.2	95.5	94.8
23	92.4	93.4	94.3	95.3	96.3	97.2	98.2	99.1	100.1	99.2	97.8	96.5	95.8	95.1
22	92.0	93.0	94.0	95.0	95.9	96.9	97.8	98.7	99.7	99.7	98.2	96.9	96.1	95.4
21	92.5	93.5	94.5	95.5	96.4	97.4	98.3	99.3	100.2	101.2	99.7	98.2	96.9	95.9
20	92.8	93.8	94.8	95.8	96.8	97.7	98.7	99.6	100.6	101.5	101.3	99.6	98.0	96.6
19	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	101.1	102.0	100.1	98.5	97.1

With engine anti-ice on, decrease limit %N1 by 0.1.
 With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP MAX CONTINUOUS THRUST

Long Range Cruise Table
18000 FT to 13000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
18 (1)	%N1				98.9	97.4	96.0	94.7	93.6	92.6	91.6	90.6
	MAX TAT				16	18	21	24	27	29		
	KIAS				328	325	321	317	314	310	307	302
	MACH				.684	.676	.669	.662	.655	.648	.641	.632
	FF/ENG KTAS				10435 423	10012 419	9618 414	9252 410	8910 406	8584 401	8269 397	7936 391
17 (3)	%N1			98.6	97.2	95.9	94.6	93.7	92.7	91.8	90.8	89.8
	MAX TAT			18	21	23	26	28	31	33		
	KIAS			333	330	326	323	319	316	312	308	303
	MACH			.681	.674	.667	.660	.653	.647	.640	.631	.621
	FF/ENG KTAS			10771 423	10344 419	9949 415	9583 410	9239 406	8912 402	8592 398	8255 392	7916 386
16 (5)	%N1	99.2	98.2	97.0	95.7	94.6	93.7	92.8	91.9	91.0	90.0	89.0
	MAX TAT	19	21	23	26	28	31	33	35			
	KIAS	338	338	335	331	328	325	321	318	313	309	303
	MACH	.678	.678	.671	.665	.658	.652	.646	.639	.630	.621	.610
	FF/ENG KTAS	11368 423	11084 423	10666 419	10273 415	9911 411	9566 407	9238 403	8911 399	8570 393	8227 387	7881 381
15 (6)	%N1	97.3	96.5	95.5	94.6	93.7	92.9	92.0	91.1	90.1	89.1	88.1
	MAX TAT	24	26	28	31	33	35	38				
	KIAS	337	337	337	333	330	327	323	319	314	309	303
	MACH	.664	.664	.662	.656	.650	.644	.637	.629	.619	.609	.599
	FF/ENG KTAS	11118 416	10862 416	10586 415	10227 411	9884 407	9557 404	9222 399	8878 394	8533 388	8184 382	7830 375
14 (8)	%N1	95.7	95.1	94.5	93.8	93.0	92.1	91.2	90.3	89.3	88.3	87.2
	MAX TAT	29	31	33	35	37	40					
	KIAS	337	337	337	335	332	328	324	319	314	308	303
	MACH	.651	.651	.651	.648	.643	.635	.627	.618	.608	.598	.587
	FF/ENG KTAS	10908 409	10681 409	10462 409	10197 408	9871 404	9526 400	9180 394	8833 389	8482 383	8127 376	7782 369
13 (9)	%N1	94.6	94.0	93.4	92.9	92.2	91.3	90.4	89.5	88.4	87.4	86.2
	MAX TAT	34	36	38	39	41						
	KIAS	336	336	336	336	334	329	324	319	314	308	303
	MACH	.638	.638	.638	.638	.633	.625	.617	.607	.597	.587	.577
	FF/ENG KTAS	10741 403	10525 403	10316 403	10115 403	9825 400	9478 395	9130 389	8777 383	8422 377	8077 370	7741 364

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.0	95.9	96.9	97.8	98.7	99.7	100.6	101.6	100.8	99.1	97.6	96.4	95.4	94.3
17	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.1	101.4	99.5	98.0	96.9	95.9	94.8
16	94.2	95.1	96.0	97.0	97.9	98.8	99.7	100.6	101.5	99.8	98.3	97.2	96.1	95.0
15	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.5	100.2	98.6	97.4	96.3	95.3
14	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.3	101.2	100.5	99.0	97.7	96.6	95.6
13	93.7	94.7	95.6	96.5	97.4	98.3	99.2	100.1	101.0	100.8	99.2	98.0	96.9	95.9

With engine anti-ice on, decrease limit %N1 by 0.3.
With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table
18000 FT to 13000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
18 (-4)	%N1	90.6	89.6	88.5	87.3	86.1	84.7	83.3	82.0	80.6	79.0	77.5
	MAX TAT											
	KIAS	302	297	292	286	280	274	268	262	255	249	242
	MACH	.632	.622	.611	.599	.586	.574	.562	.549	.536	.523	.510
	FF/ENG	7936	7602	7265	6922	6588	6262	5942	5625	5314	5010	4711
17 (-2)	KTAS	391	385	378	371	363	356	348	340	332	324	316
	%N1	89.8	88.7	87.6	86.4	85.1	83.8	82.5	81.1	79.6	78.2	76.6
	MAX TAT											
	KIAS	303	298	292	286	280	274	268	262	255	249	243
	MACH	.621	.611	.599	.587	.576	.564	.552	.540	.527	.514	.501
16 (-1)	FF/ENG	7916	7574	7227	6888	6557	6232	5910	5594	5285	4981	4682
	KTAS	386	380	372	365	358	351	343	335	328	320	312
	%N1	89.0	87.9	86.7	85.4	84.1	82.9	81.6	80.2	78.7	77.2	75.7
	MAX TAT											
	KIAS	303	297	292	286	280	274	268	262	256	250	243
15 (1)	MACH	.610	.599	.588	.577	.566	.554	.542	.530	.518	.505	.493
	FF/ENG	7881	7530	7187	6852	6523	6197	5877	5564	5257	4953	4658
	KTAS	381	374	367	360	353	346	338	331	323	315	308
	%N1	88.1	86.9	85.7	84.4	83.3	82.0	80.6	79.2	77.8	76.3	74.8
	MAX TAT											
14 (2)	KIAS	303	297	292	286	280	275	269	262	256	250	244
	MACH	.599	.588	.577	.567	.555	.544	.532	.521	.509	.497	.485
	FF/ENG	7830	7485	7147	6817	6489	6166	5852	5543	5237	4937	4648
	KTAS	375	368	362	355	348	341	334	326	319	311	304
	%N1	87.2	85.9	84.8	83.6	82.4	81.1	79.7	78.4	77.0	75.5	74.1
13 (4)	MAX TAT											
	KIAS	303	297	292	286	281	275	269	263	257	251	245
	MACH	.587	.577	.567	.557	.546	.534	.523	.512	.501	.489	.477
	FF/ENG	7782	7444	7115	6788	6466	6152	5844	5539	5237	4944	4660
	KTAS	369	363	357	350	343	336	329	322	315	307	300
	%N1	86.2	85.0	84.0	82.8	81.5	80.2	78.9	77.6	76.2	74.8	73.3
	MAX TAT											
	KIAS	303	298	292	287	281	275	269	263	258	252	245
	MACH	.577	.567	.557	.547	.536	.525	.514	.503	.492	.481	.470
	FF/ENG	7741	7415	7091	6773	6462	6157	5855	5554	5259	4971	4692
	KTAS	364	358	352	345	338	332	325	318	311	304	297

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
 Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
 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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
18	93.0	94.0	95.0	95.9	96.9	97.8	98.7	99.7	100.6	101.6	100.8	99.1	97.6	96.4
17	92.6	93.6	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.1	101.4	99.5	98.0	96.9
16	92.2	93.2	94.2	95.1	96.0	97.0	97.9	98.8	99.7	100.6	101.5	99.8	98.3	97.2
15	92.2	93.1	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.5	100.2	98.6	97.4
14	92.0	92.9	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.3	101.2	100.5	99.0	97.7
13	91.8	92.8	93.7	94.7	95.6	96.5	97.4	98.3	99.2	100.1	101.0	100.8	99.2	98.0

With engine anti-ice on, decrease limit %N1 by 0.3.
 With engine and wing anti-ice on, decrease limit %N1 by 0.6.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table
12000 FT to 7000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
12 (11)	%N1	93.5	93.0	92.4	91.9	91.4	90.5	89.6	88.6	87.5	86.4	85.3
	MAX TAT	39	40	42								
	KIAS	335	335	335	335	334	329	324	319	314	309	303
	MACH	.626	.626	.626	.626	.623	.615	.605	.596	.586	.577	.567
	FF/ENG	10583	10373	10175	9991	9770	9423	9069	8712	8371	8038	7716
11 (12)	KTAS	396	396	396	396	395	389	384	377	371	365	359
	%N1	92.5	92.0	91.5	91.0	90.5	89.6	88.7	87.6	86.5	85.5	84.6
	MAX TAT	43	44									
	KIAS	335	335	335	335	334	329	324	319	314	309	304
	MACH	.613	.613	.613	.613	.613	.604	.594	.585	.576	.567	.558
10 (14)	FF/ENG	10437	10246	10065	9892	9708	9354	8998	8662	8334	8017	7702
	KTAS	390	390	390	390	390	384	378	372	366	361	355
	%N1	91.6	91.1	90.6	90.2	89.7	88.8	87.7	86.7	85.7	84.8	83.8
	MAX TAT											
	KIAS	334	334	334	334	334	329	324	319	314	309	304
9 (15)	MACH	.602	.602	.602	.602	.602	.592	.584	.575	.566	.557	.548
	FF/ENG	10335	10154	9977	9802	9633	9281	8949	8626	8313	8003	7698
	KTAS	384	384	384	384	384	378	373	367	362	356	350
	%N1	90.8	90.2	89.8	89.3	88.8	87.8	86.8	85.9	85.0	84.0	82.9
	MAX TAT											
8 (16)	KIAS	334	334	334	334	334	329	324	320	315	309	304
	MACH	.590	.590	.590	.590	.590	.582	.574	.565	.557	.548	.539
	FF/ENG	10250	10064	9884	9710	9542	9225	8908	8600	8294	7993	7696
	KTAS	378	378	378	378	378	373	368	362	357	351	345
	%N1	89.9	89.4	88.9	88.3	87.8	86.9	86.1	85.2	84.2	83.2	82.1
7 (18)	MAX TAT											
	KIAS	333	333	333	333	333	330	325	320	315	310	304
	MACH	.579	.579	.579	.579	.579	.572	.564	.556	.547	.538	.530
	FF/ENG	10163	9974	9795	9625	9460	9181	8879	8579	8281	7986	7695
	KTAS	372	372	372	372	372	368	363	357	352	346	341
	%N1	89.0	88.4	87.9	87.3	86.9	86.2	85.3	84.4	83.4	82.4	81.3
	MAX TAT											
	KIAS	333	333	333	333	333	330	325	320	315	310	305
	MACH	.568	.568	.568	.568	.568	.563	.555	.546	.538	.530	.521
	FF/ENG	10089	9906	9731	9565	9403	9159	8862	8567	8274	7984	7693
	KTAS	367	367	367	367	367	363	358	353	347	342	336

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45
12	94.4	95.4	96.3	97.2	98.1	99.0	99.9	100.8	101.1	99.5	98.3	97.2	96.2	95.3
11	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.2	101.0	99.7	98.5	97.4	96.4	95.5
10	93.3	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.4	99.9	98.8	97.6	96.6	95.7
9	93.0	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.1	100.2	99.1	98.0	96.9	96.0
8	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.8	100.4	99.5	98.4	97.3	96.4
7	92.2	93.1	94.0	94.9	95.8	96.6	97.5	98.4	99.2	100.0	99.4	98.4	97.4	96.5

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Table 12000 FT to 7000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
12 (5)	%N1	85.3	84.3	83.2	81.9	80.7	79.5	78.2	76.9	75.5	74.1	72.7
	MAX TAT											
	KIAS	303	298	293	287	281	276	270	264	258	252	246
	MACH	.567	.558	.547	.537	.527	.516	.506	.495	.485	.474	.463
	FF/ENG	7716	7397	7084	6777	6476	6178	5879	5584	5295	5012	4736
11 (7)	KTAS	359	353	347	340	334	327	321	314	307	300	293
	%N1	84.6	83.5	82.3	81.1	80.0	78.7	77.5	76.1	74.8	73.4	72.0
	MAX TAT											
	KIAS	304	298	293	287	282	276	270	265	259	253	247
	MACH	.558	.548	.538	.528	.518	.508	.498	.487	.477	.466	.456
10 (9)	FF/ENG	7702	7393	7091	6795	6500	6204	5910	5620	5334	5053	4778
	KTAS	355	348	342	336	329	323	317	310	303	297	290
	%N1	83.8	82.7	81.5	80.4	79.3	78.1	76.7	75.4	74.1	72.7	71.2
	MAX TAT											
	KIAS	304	299	293	288	282	277	271	265	260	254	248
9 (10)	MACH	.548	.538	.529	.519	.510	.500	.490	.480	.470	.460	.449
	FF/ENG	7698	7399	7105	6813	6519	6225	5935	5648	5363	5083	4809
	KTAS	350	344	338	331	325	319	313	306	300	293	287
	%N1	82.9	81.9	80.8	79.6	78.5	77.2	76.0	74.7	73.4	71.9	70.5
	MAX TAT											
8 (12)	KIAS	304	299	294	288	283	277	272	266	261	255	249
	MACH	.539	.529	.520	.511	.501	.492	.482	.473	.463	.453	.443
	FF/ENG	7696	7404	7113	6820	6526	6236	5947	5659	5376	5098	4828
	KTAS	345	339	333	327	321	315	309	303	296	290	284
	%N1	82.1	81.1	80.0	78.9	77.7	76.5	75.2	74.0	72.6	71.2	69.8
7 (14)	MAX TAT											
	KIAS	304	299	294	289	283	278	273	267	262	256	251
	MACH	.530	.521	.512	.503	.494	.484	.475	.466	.456	.446	.437
	FF/ENG	7695	7405	7112	6818	6527	6237	5948	5661	5381	5109	4846
	KTAS	341	335	329	323	317	311	305	299	293	287	281
	%N1	81.3	80.3	79.2	78.1	76.9	75.7	74.5	73.2	71.9	70.5	69.1
	MAX TAT											
	KIAS	305	300	295	289	284	279	274	268	263	257	252
	MACH	.521	.512	.504	.495	.486	.477	.468	.459	.450	.440	.431
	FF/ENG	7693	7399	7105	6813	6522	6232	5943	5660	5387	5124	4871
	KTAS	336	331	325	319	314	308	302	296	290	284	278

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
 Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
 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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
12	93.5	94.4	95.4	96.3	97.2	98.1	99.0	99.9	100.8	101.1	99.5	98.3	97.2	96.2
11	92.9	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.2	101.0	99.7	98.5	97.4	96.4
10	92.4	93.3	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.4	99.9	98.8	97.6	96.6
9	92.1	93.0	93.9	94.8	95.7	96.6	97.5	98.4	99.3	100.1	100.2	99.1	98.0	96.9
8	91.8	92.7	93.6	94.5	95.4	96.3	97.2	98.1	99.0	99.8	100.4	99.5	98.4	97.3
7	91.3	92.2	93.1	94.0	94.9	95.8	96.6	97.5	98.4	99.2	100.0	99.4	98.4	97.4

With engine anti-ice on, decrease limit %N1 by 0.4.
 With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP MAX CONTINUOUS THRUST

260 KIAS Cruise Table
29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26	260 -17 383	%N1 MAX TAT FF/ENG											99.1 -7 7701
25	260 -16 377	%N1 MAX TAT FF/ENG										98.9 -6 7893	97.0 0 7469
24	260 -14 371	%N1 MAX TAT FF/ENG									98.8 -4 8108	96.8 2 7646	94.8 5 7292
23	260 -13 366	%N1 MAX TAT FF/ENG								98.8 -2 8326	96.7 3 7854	94.6 7 7478	93.0 11 7172
22	260 -12 360	%N1 MAX TAT FF/ENG							98.6 0 8535	96.5 5 8066	94.5 9 7685	92.7 14 7361	91.4 17 7084
21	260 -10 354	%N1 MAX TAT FF/ENG						98.4 4 8749	96.3 9 8283	94.3 13 7897	92.6 17 7568	91.4 7276	90.3 7009
20	260 -9 349	%N1 MAX TAT FF/ENG				100.6 3 9528	98.3 8 8963	96.1 13 8501	94.2 17 8115	92.5 21 7777	91.3 7476	90.3 7198	89.3 6940
19	260 -7 344	%N1 MAX TAT FF/ENG			100.5 5 9777	98.1 11 9186	95.8 15 8713	94.0 19 8326	92.5 23 7987	91.3 7675	90.2 7385	89.3 7118	88.4 6884

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
26	93.6	94.6	95.7	96.7	97.7	98.7	99.7	100.6	101.1	100.1	98.5	97.3	96.2	95.5
25	93.2	94.3	95.3	96.3	97.3	98.3	99.2	100.2	101.1	100.2	98.6	97.4	96.2	95.6
24	93.1	94.1	95.2	96.2	97.2	98.1	99.1	100.1	101.0	100.5	99.0	97.6	96.5	95.8
23	93.0	94.0	95.0	96.0	97.0	98.0	99.0	99.9	100.9	100.9	99.5	98.0	96.7	96.0
22	92.8	93.8	94.8	95.8	96.8	97.8	98.8	99.7	100.7	101.2	100.0	98.4	97.1	96.3
21	93.4	94.4	95.4	96.4	97.4	98.4	99.4	100.4	101.3	102.2	101.4	99.8	98.4	97.1
20	93.9	94.9	95.9	96.9	97.9	98.9	99.9	100.9	101.8	102.7	102.6	101.3	99.7	98.3
19	93.8	94.8	95.8	96.8	97.8	98.8	99.8	100.8	101.7	102.7	103.1	102.0	100.2	98.8

With engine anti-ice on, no %N1 adjustment is required.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table
29000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	260	%N1				100.1	98.1	96.4	94.7	93.1	91.9	90.7	89.8
	-21	MAX TAT				-11	-6	-3	1	5	8		
	402	FF/ENG				7166	6833	6522	6231	5996	5792	5612	5450
28	260	%N1			99.7	97.8	96.0	94.3	92.8	91.5	90.4	89.5	88.8
	-20	MAX TAT			-10	-5	-1	3	6	10			
	396	FF/ENG			7335	6987	6657	6370	6129	5919	5732	5562	5407
27	260	%N1		99.4	97.5	95.7	94.0	92.5	91.2	90.2	89.3	88.5	87.8
	-19	MAX TAT		-9	-3	1	4	8	11				
	389	FF/ENG		7518	7149	6801	6518	6271	6056	5858	5683	5520	5371
26	260	%N1	99.1	97.2	95.4	93.7	92.2	90.9	90.0	89.1	88.3	87.5	86.9
	-17	MAX TAT	-7	-2	2	6	10	13					
	383	FF/ENG	7701	7311	6956	6672	6423	6199	5997	5810	5642	5485	5343
25	260	%N1	97.0	95.1	93.4	91.9	90.8	89.8	88.9	88.1	87.4	86.7	86.0
	-16	MAX TAT	0	3	7	11	15						
	377	FF/ENG	7469	7121	6830	6579	6351	6140	5947	5769	5609	5459	5322
24	260	%N1	94.8	93.2	91.6	90.6	89.7	88.8	88.0	87.2	86.5	85.8	85.2
	-14	MAX TAT	5	9	13	17							
	371	FF/ENG	7292	6996	6737	6505	6289	6089	5905	5736	5582	5437	5305
23	260	%N1	93.0	91.5	90.5	89.6	88.7	87.9	87.1	86.4	85.6	85.0	84.3
	-13	MAX TAT	11	15									
	366	FF/ENG	7172	6906	6663	6442	6236	6047	5873	5711	5560	5419	5289
22	260	%N1	91.4	90.4	89.5	88.6	87.8	87.0	86.2	85.5	84.8	84.0	83.3
	-12	MAX TAT	17										
	360	FF/ENG	7084	6832	6601	6389	6195	6016	5847	5689	5541	5401	5273
21	260	%N1	90.3	89.4	88.5	87.7	86.9	86.1	85.4	84.6	83.8	83.0	82.4
	-10	MAX TAT											
	354	FF/ENG	7009	6766	6550	6353	6166	5988	5824	5668	5520	5385	5261
20	260	%N1	89.3	88.4	87.6	86.8	86.0	85.2	84.4	83.6	82.8	82.2	81.7
	-9	MAX TAT											
	349	FF/ENG	6940	6714	6514	6322	6135	5961	5798	5644	5500	5368	5248
19	260	%N1	88.4	87.5	86.7	85.9	85.1	84.2	83.4	82.7	82.0	81.4	80.8
	-7	MAX TAT											
	344	FF/ENG	6884	6674	6476	6283	6099	5928	5768	5617	5477	5348	5231

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	95.2	96.3	97.4	98.4	99.5	100.5	101.5	102.3	101.1	99.6	98.1	97.0	96.0	95.1
28	94.6	95.7	96.7	97.7	98.8	99.8	100.8	101.7	101.1	99.8	98.2	97.0	96.1	95.3
27	94.0	95.1	96.1	97.1	98.1	99.1	100.1	101.1	101.1	99.9	98.4	97.1	96.1	95.4
26	93.6	94.6	95.7	96.7	97.7	98.7	99.7	100.6	101.1	100.1	98.5	97.3	96.2	95.5
25	93.2	94.3	95.3	96.3	97.3	98.3	99.2	100.2	101.1	100.2	98.6	97.4	96.2	95.6
24	93.1	94.1	95.2	96.2	97.2	98.1	99.1	100.1	101.0	100.5	99.0	97.6	96.5	95.8
23	93.0	94.0	95.0	96.0	97.0	98.0	99.0	99.9	100.9	100.9	99.5	98.0	96.7	96.0
22	92.8	93.8	94.8	95.8	96.8	97.8	98.8	99.7	100.7	101.2	100.0	98.4	97.1	96.3
21	93.4	94.4	95.4	96.4	97.4	98.4	99.4	100.4	101.3	102.2	101.4	99.8	98.4	97.1
20	93.9	94.9	95.9	96.9	97.9	98.9	99.9	100.9	101.8	102.7	102.6	101.3	99.7	98.3
19	93.8	94.8	95.8	96.9	97.9	98.8	99.8	100.8	101.7	102.7	103.1	102.0	100.2	98.8

With engine anti-ice on, no %N1 adjustment is required.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	260	%N1		100.2	98.0	95.7	93.9	92.4	91.3	90.2	89.2	88.3	87.5
	-6	MAX TAT		8	13	17	21	25					
	339	FF/ENG		9992	9425	8934	8527	8185	7870	7571	7295	7053	6832
17	260	%N1	100.2	97.6	95.6	93.8	92.4	91.2	90.2	89.2	88.3	87.4	86.6
	-4	MAX TAT	10	15	19	23	26						
	334	FF/ENG	10259	9641	9169	8742	8379	8056	7752	7473	7222	6991	6772
16	260	%N1	97.5	95.3	93.7	92.3	91.2	90.1	89.1	88.2	87.3	86.4	85.6
	-2	MAX TAT	17	21	25								
	329	FF/ENG	9905	9393	8976	8592	8249	7937	7653	7395	7153	6925	6710
15	260	%N1	95.3	93.5	92.3	91.1	90.1	89.1	88.1	87.2	86.3	85.4	84.5
	-1	MAX TAT	23	27									
	324	FF/ENG	9669	9217	8839	8472	8140	7849	7583	7330	7088	6865	6658
14	260	%N1	93.6	92.3	91.2	90.1	89.1	88.1	87.2	86.3	85.3	84.4	83.6
	1	MAX TAT	28										
	319	FF/ENG	9520	9106	8740	8383	8074	7798	7534	7281	7045	6830	6627
13	260	%N1	92.5	91.3	90.2	89.2	88.2	87.2	86.2	85.3	84.4	83.5	82.7
	2	MAX TAT											
	314	FF/ENG	9430	9025	8668	8338	8043	7764	7500	7255	7028	6818	6618
12	260	%N1	91.4	90.3	89.3	88.3	87.3	86.3	85.3	84.4	83.5	82.7	81.8
	4	MAX TAT											
	310	FF/ENG	9354	8962	8635	8319	8016	7738	7484	7246	7026	6822	6626
11	260	%N1	90.5	89.4	88.4	87.4	86.4	85.4	84.4	83.5	82.7	81.8	80.9
	5	MAX TAT											
	305	FF/ENG	9289	8934	8615	8290	7988	7721	7474	7241	7029	6829	6637
10	260	%N1	89.6	88.5	87.5	86.4	85.4	84.5	83.5	82.6	81.7	80.9	80.0
	7	MAX TAT											
	301	FF/ENG	9250	8902	8573	8250	7959	7699	7457	7231	7024	6828	6638
9	260	%N1	88.7	87.5	86.5	85.5	84.5	83.5	82.6	81.7	80.8	80.0	79.1
	9	MAX TAT											
	296	FF/ENG	9202	8842	8516	8204	7922	7668	7431	7211	7007	6811	6619
8	260	%N1	87.7	86.6	85.6	84.6	83.5	82.6	81.6	80.7	79.9	79.1	78.3
	10	MAX TAT											
	292	FF/ENG	9132	8776	8460	8157	7885	7633	7401	7185	6981	6784	6588

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.8	97.8	98.8	99.7	100.7	101.7	102.6	103.5	102.7	100.9	99.2	97.8	96.7	95.6
17	96.8	97.7	98.7	99.7	100.7	101.6	102.6	103.5	103.2	101.6	99.7	98.1	97.1	96.1
16	96.6	97.6	98.6	99.6	100.5	101.5	102.4	103.3	103.6	102.2	100.2	98.6	97.5	96.5
15	96.6	97.6	98.5	99.5	100.4	101.4	102.3	103.2	104.0	102.8	100.8	99.1	97.8	96.8
14	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.9	103.1	101.1	99.5	98.2	97.1
13	96.1	97.0	98.0	99.0	99.9	100.9	101.8	102.7	103.7	103.4	101.5	99.8	98.5	97.4
12	95.6	96.5	97.5	98.5	99.4	100.3	101.3	102.2	103.2	103.7	101.8	100.1	98.8	97.7
11	94.7	95.6	96.6	97.5	98.5	99.4	100.3	101.2	102.2	103.1	101.8	100.2	98.9	97.8
10	93.8	94.7	95.7	96.6	97.6	98.5	99.4	100.3	101.2	102.1	101.8	100.3	99.1	98.0
9	93.1	94.0	94.9	95.9	96.8	97.7	98.6	99.5	100.4	101.3	101.8	100.5	99.4	98.2
8	92.4	93.4	94.3	95.2	96.1	97.0	97.9	98.8	99.7	100.6	101.4	100.7	99.6	98.5

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Cruise Table
18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	260	%N1	87.5	86.6	85.8	85.0	84.1	83.3	82.6	81.9	81.2	80.5	79.8
	-6	MAX TAT											
	338	FF/ENG	6832	6624	6427	6236	6055	5887	5732	5585	5447	5321	5205
17	260	%N1	86.6	85.7	84.9	83.9	83.1	82.4	81.7	80.9	80.2	79.5	78.9
	-4	MAX TAT											
	333	FF/ENG	6772	6566	6370	6184	6007	5841	5690	5546	5411	5285	5170
16	260	%N1	85.6	84.7	83.8	83.0	82.2	81.4	80.6	79.9	79.2	78.6	77.9
	-3	MAX TAT											
	328	FF/ENG	6710	6508	6316	6134	5959	5794	5647	5507	5373	5247	5132
15	260	%N1	84.5	83.6	82.8	82.0	81.2	80.4	79.6	78.9	78.2	77.6	77.0
	-1	MAX TAT											
	323	FF/ENG	6658	6461	6272	6092	5919	5758	5613	5474	5341	5215	5102
14	260	%N1	83.6	82.7	81.9	81.1	80.2	79.4	78.7	78.0	77.4	76.7	76.1
	1	MAX TAT											
	318	FF/ENG	6627	6434	6249	6069	5897	5740	5596	5457	5324	5201	5090
13	260	%N1	82.7	81.8	81.0	80.1	79.3	78.6	77.9	77.2	76.5	75.9	75.3
	2	MAX TAT											
	314	FF/ENG	6618	6429	6245	6066	5895	5740	5597	5458	5327	5205	5095
12	260	%N1	81.8	80.9	80.1	79.3	78.5	77.7	77.0	76.4	75.7	75.1	74.5
	4	MAX TAT											
	309	FF/ENG	6626	6438	6255	6075	5904	5749	5607	5472	5344	5222	5113
11	260	%N1	80.9	80.1	79.3	78.4	77.6	76.9	76.2	75.5	74.9	74.3	73.7
	5	MAX TAT											
	305	FF/ENG	6637	6450	6266	6085	5914	5760	5621	5489	5362	5241	5134
10	260	%N1	80.0	79.2	78.4	77.6	76.8	76.1	75.4	74.7	74.1	73.5	73.0
	7	MAX TAT											
	300	FF/ENG	6638	6450	6264	6083	5914	5762	5625	5494	5368	5250	5145
9	260	%N1	79.1	78.3	77.5	76.7	75.9	75.2	74.5	73.9	73.3	72.7	72.0
	9	MAX TAT											
	296	FF/ENG	6619	6431	6245	6064	5896	5747	5613	5480	5356	5240	5137
8	260	%N1	78.3	77.5	76.6	75.8	75.0	74.4	73.7	73.1	72.4	71.7	71.2
	10	MAX TAT											
	291	FF/ENG	6588	6401	6215	6035	5870	5723	5591	5457	5333	5220	5118

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.8	97.8	98.8	99.7	100.7	101.7	102.6	103.5	102.7	100.9	99.2	97.8	96.7	95.6
17	96.8	97.7	98.7	99.7	100.7	101.6	102.6	103.5	103.2	101.6	99.7	98.1	97.1	96.1
16	96.6	97.6	98.6	99.6	100.5	101.5	102.4	103.3	103.6	102.2	100.2	98.6	97.5	96.5
15	96.6	97.6	98.5	99.5	100.4	101.4	102.3	103.2	104.0	102.8	100.8	99.1	97.8	96.8
14	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.9	103.1	101.1	99.5	98.2	97.1
13	96.1	97.0	98.0	99.0	99.9	100.9	101.8	102.7	103.7	103.4	101.5	99.8	98.5	97.4
12	95.6	96.5	97.5	98.5	99.4	100.3	101.3	102.2	103.2	103.7	101.8	100.1	98.8	97.7
11	94.7	95.6	96.6	97.5	98.5	99.4	100.3	101.2	102.2	103.1	101.8	100.2	98.9	97.8
10	93.8	94.7	95.7	96.6	97.6	98.5	99.4	100.3	101.2	102.1	101.8	100.3	99.1	98.0
9	93.1	94.0	94.9	95.9	96.8	97.7	98.6	99.5	100.4	101.3	101.8	100.5	99.4	98.2
8	92.4	93.4	94.3	95.2	96.1	97.0	97.9	98.8	99.7	100.6	101.4	100.7	99.6	98.5

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table
29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26													
25	280 -13 404	%N1 MAX TAT FF/ENG											98.6 -3 7975
24	280 -12 398	%N1 MAX TAT FF/ENG										98.1 0 8099	96.6 4 7777
23	280 -10 392	%N1 MAX TAT FF/ENG									97.6 3 8220	96.0 6 7909	94.6 10 7638
22	280 -9 386	%N1 MAX TAT FF/ENG							98.7 2 8726	97.1 5 8359	95.5 9 8051	94.2 12 7779	92.9 15 7534
21	280 -8 380	%N1 MAX TAT FF/ENG					100.0 2 9314	98.2 6 8870	96.5 10 8508	95.1 13 8202	93.7 17 7928	92.5 20 7682	91.7 23 7453
20	280 -6 375	%N1 MAX TAT FF/ENG				99.7 7 9508	97.8 11 9043	96.1 14 8676	94.6 18 8362	93.3 21 8086	92.3 24 7833	91.5 26 7601	90.6 29 7383
19	280 -5 369	%N1 MAX TAT FF/ENG		101.3 5 10178	99.4 9 9683	97.5 13 9237	95.7 17 8855	94.3 20 8533	93.0 23 8251	92.1 26 7994	91.2 28 7753	90.4 31 7531	89.7 34 7324

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
25	93.4	94.4	95.4	96.4	97.3	98.3	99.2	100.2	100.3	99.3	97.9	96.7	96.0	95.3
24	93.3	94.3	95.3	96.2	97.2	98.2	99.1	100.1	100.7	99.6	98.2	97.0	96.2	95.6
23	93.1	94.1	95.1	96.1	97.1	98.0	99.0	99.9	100.9	99.9	98.5	97.2	96.4	95.8
22	93.0	94.0	95.0	96.0	97.0	97.9	98.9	99.8	100.7	100.2	98.8	97.5	96.6	96.0
21	93.7	94.7	95.7	96.7	97.7	98.7	99.6	100.6	101.5	101.6	100.2	98.7	97.5	96.8
20	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.4	102.3	103.0	101.6	99.9	98.7	97.5
19	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.3	102.3	103.2	102.2	100.5	99.0	97.7

With engine anti-ice on, no %N1 adjustment is required.
With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table
29000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	280	%N1						99.4	98.0	96.7	95.3	94.3	93.5
	-18	MAX TAT						-7	-4	-1	2	5	7
	431	FF/ENG						7223	6960	6716	6505	6332	6189
28	280	%N1					98.8	97.4	95.9	94.7	93.6	92.8	92.0
	-17	MAX TAT					-5	-2	2	4	7	9	11
	424	FF/ENG					7316	7049	6804	6588	6406	6253	6123
27	280	%N1				98.3	96.8	95.4	94.2	93.1	92.2	91.4	90.8
	-16	MAX TAT				-3	1	4	7	9	12	14	16
	417	FF/ENG				7427	7147	6899	6689	6501	6337	6196	6072
26	280	%N1			97.7	96.2	94.8	93.6	92.6	91.6	90.9	90.3	89.7
	-14	MAX TAT			-1	3	6	9	11	14	16		
	411	FF/ENG			7543	7255	7013	6798	6606	6433	6279	6141	6020
25	280	%N1	98.6	97.1	95.7	94.3	93.1	92.0	91.2	90.5	89.9	89.3	88.7
	-13	MAX TAT	-3	1	5	8	11	14	16	19			
	404	FF/ENG	7975	7657	7377	7132	6916	6721	6542	6378	6229	6094	5976
24	280	%N1	96.6	95.1	93.8	92.6	91.7	90.9	90.2	89.5	88.9	88.4	87.9
	-12	MAX TAT	4	7	10	13	16	19					
	398	FF/ENG	7777	7503	7258	7038	6837	6655	6485	6327	6184	6058	5947
23	280	%N1	94.6	93.3	92.2	91.4	90.6	89.9	89.2	88.6	88.0	87.5	87.1
	-10	MAX TAT	10	13	16	19							
	392	FF/ENG	7638	7390	7168	6963	6771	6598	6435	6284	6150	6031	5927
22	280	%N1	92.9	91.9	91.1	90.3	89.6	88.9	88.3	87.7	87.2	86.7	86.2
	-9	MAX TAT	15	18	21								
	386	FF/ENG	7534	7305	7096	6900	6718	6553	6398	6254	6126	6012	5912
21	280	%N1	91.7	90.8	90.1	89.4	88.7	88.1	87.4	86.9	86.3	85.8	85.4
	-8	MAX TAT	23										
	380	FF/ENG	7453	7236	7036	6849	6678	6522	6373	6233	6109	5999	5901
20	280	%N1	90.6	89.9	89.2	88.5	87.8	87.2	86.6	86.0	85.5	84.9	84.4
	-6	MAX TAT											
	375	FF/ENG	7383	7178	6989	6814	6651	6498	6352	6217	6094	5984	5886
19	280	%N1	89.7	89.0	88.3	87.6	87.0	86.4	85.8	85.1	84.5	83.9	83.5
	-5	MAX TAT											
	369	FF/ENG	7324	7133	6955	6786	6625	6475	6332	6197	6075	5966	5870

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
29	94.4	95.5	96.5	97.6	98.6	99.6	100.6	101.6	101.5	100.2	98.6	97.6	96.6	95.7
28	93.9	95.0	96.0	97.0	98.0	99.0	100.0	101.0	101.6	100.3	98.8	97.7	96.6	95.8
27	93.4	94.4	95.4	96.5	97.5	98.5	99.4	100.4	101.3	100.4	99.0	97.7	96.6	95.9
26	92.8	93.9	94.9	95.9	96.9	97.9	98.8	99.8	100.7	100.4	99.1	97.8	96.7	96.0
25	92.4	93.4	94.4	95.4	96.4	97.3	98.3	99.2	100.2	100.3	99.3	97.9	96.7	96.0
24	92.2	93.3	94.3	95.3	96.2	97.2	98.2	99.1	100.1	100.7	99.6	98.2	97.0	96.2
23	92.1	93.1	94.1	95.1	96.1	97.1	98.0	99.0	99.9	100.9	99.9	98.5	97.2	96.4
22	92.0	93.0	94.0	95.0	96.0	97.0	97.9	98.9	99.8	100.7	100.2	98.8	97.5	96.6
21	92.7	93.7	94.7	95.7	96.7	97.7	98.7	99.6	100.6	101.5	101.6	100.2	98.7	97.5
20	93.5	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.4	102.3	103.0	101.6	99.9	98.7
19	93.4	94.5	95.5	96.5	97.5	98.5	99.4	100.4	101.3	102.3	103.2	102.2	100.5	99.0

With engine anti-ice on, no %N1 adjustment is required.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	280	%N1	100.8	98.9	97.0	95.4	93.9	92.8	91.9	91.0	90.2	89.5	88.7
	-3	MAX TAT	8	12	16	19	22	25					
	363	FF/ENG	10360	9850	9420	9043	8711	8420	8154	7908	7681	7473	7279
17	280	%N1	98.4	96.6	95.0	93.6	92.6	91.6	90.8	90.0	89.3	88.6	87.9
	-2	MAX TAT	15	18	21	25	27						
	358	FF/ENG	10022	9598	9222	8890	8594	8316	8061	7829	7620	7423	7231
16	280	%N1	96.1	94.6	93.4	92.4	91.4	90.6	89.8	89.0	88.3	87.6	86.9
	0	MAX TAT	21	24	27	30							
	353	FF/ENG	9771	9401	9068	8763	8482	8218	7979	7763	7563	7367	7179
15	280	%N1	94.3	93.2	92.2	91.2	90.4	89.6	88.8	88.1	87.4	86.7	85.9
	1	MAX TAT	26	29									
	347	FF/ENG	9582	9252	8942	8652	8382	8138	7915	7706	7507	7312	7126
14	280	%N1	93.0	92.0	91.1	90.3	89.5	88.7	88.0	87.2	86.5	85.7	84.9
	3	MAX TAT	32										
	342	FF/ENG	9452	9139	8840	8565	8315	8085	7866	7659	7460	7267	7083
13	280	%N1	91.9	91.0	90.2	89.4	88.6	87.8	87.0	86.3	85.5	84.7	84.0
	4	MAX TAT											
	337	FF/ENG	9353	9047	8770	8517	8279	8050	7833	7626	7428	7239	7058
12	280	%N1	91.0	90.1	89.3	88.5	87.7	86.9	86.1	85.3	84.6	83.9	83.2
	6	MAX TAT											
	332	FF/ENG	9275	8996	8739	8492	8252	8026	7813	7609	7414	7229	7051
11	280	%N1	90.1	89.2	88.4	87.6	86.9	86.0	85.3	84.5	83.8	83.1	82.4
	7	MAX TAT											
	328	FF/ENG	9241	8978	8718	8465	8230	8010	7801	7602	7412	7229	7052
10	280	%N1	89.2	88.4	87.6	86.8	86.0	85.2	84.5	83.8	83.1	82.3	81.6
	9	MAX TAT											
	323	FF/ENG	9218	8946	8683	8436	8208	7993	7790	7598	7410	7228	7052
9	280	%N1	88.4	87.6	86.7	85.9	85.1	84.3	83.6	82.9	82.1	81.4	80.7
	10	MAX TAT											
	318	FF/ENG	9168	8897	8643	8404	8182	7975	7775	7585	7399	7217	7041
8	280	%N1	87.4	86.6	85.7	84.9	84.2	83.5	82.7	81.9	81.2	80.5	79.8
	12	MAX TAT											
	314	FF/ENG	9108	8847	8599	8370	8156	7953	7756	7566	7379	7195	7016

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.4	97.4	98.3	99.3	100.3	101.2	102.2	103.1	102.8	101.1	99.5	98.0	97.0	96.0
17	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.4	101.8	100.0	98.4	97.3	96.3
16	96.1	97.1	98.1	99.0	100.0	100.9	101.9	102.8	103.7	102.4	100.5	98.9	97.7	96.7
15	96.0	97.0	97.9	98.9	99.8	100.8	101.7	102.6	103.6	102.9	101.1	99.5	98.1	97.1
14	95.7	96.6	97.6	98.6	99.5	100.4	101.4	102.3	103.2	103.3	101.5	99.8	98.4	97.4
13	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	102.9	103.7	101.9	100.1	98.8	97.7
12	95.2	96.2	97.2	98.1	99.1	100.0	100.9	101.8	102.8	103.7	102.4	100.5	99.1	98.1
11	94.8	95.7	96.7	97.6	98.6	99.5	100.4	101.3	102.3	103.2	102.8	100.7	99.4	98.3
10	94.3	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.6	103.1	101.0	99.7	98.5
9	93.6	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.9	102.8	101.3	99.8	98.7
8	92.8	93.7	94.7	95.6	96.5	97.4	98.4	99.2	100.1	101.0	101.9	101.5	100.0	98.8

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Cruise Table
18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	280	%N1	88.7	88.1	87.4	86.7	86.1	85.4	84.7	84.1	83.6	83.1	82.7
	-3	MAX TAT											
	363	FF/ENG	7279	7094	6919	6755	6598	6448	6306	6175	6056	5947	5851
17	280	%N1	87.9	87.2	86.5	85.8	85.1	84.4	83.8	83.3	82.8	82.3	81.9
	-2	MAX TAT											
	358	FF/ENG	7231	7048	6878	6717	6560	6412	6275	6149	6031	5922	5827
16	280	%N1	86.9	86.2	85.5	84.8	84.1	83.5	83.0	82.5	81.9	81.4	80.9
	0	MAX TAT											
	353	FF/ENG	7179	7000	6830	6670	6516	6372	6239	6116	6001	5895	5801
15	280	%N1	85.9	85.2	84.4	83.8	83.2	82.7	82.0	81.5	80.9	80.4	79.9
	1	MAX TAT											
	347	FF/ENG	7126	6949	6783	6626	6475	6334	6204	6084	5972	5868	5775
14	280	%N1	84.9	84.2	83.6	83.0	82.4	81.7	81.1	80.5	80.0	79.5	79.1
	3	MAX TAT											
	342	FF/ENG	7083	6909	6746	6593	6446	6308	6181	6062	5951	5849	5757
13	280	%N1	84.0	83.4	82.8	82.1	81.4	80.8	80.2	79.7	79.1	78.7	78.2
	4	MAX TAT											
	337	FF/ENG	7058	6886	6726	6578	6435	6300	6172	6053	5943	5841	5750
12	280	%N1	83.2	82.5	81.8	81.2	80.6	80.0	79.4	78.8	78.3	77.9	77.4
	6	MAX TAT											
	332	FF/ENG	7051	6880	6723	6580	6439	6305	6177	6057	5948	5849	5759
11	280	%N1	82.4	81.7	81.0	80.4	79.8	79.2	78.6	78.1	77.6	77.1	76.7
	7	MAX TAT											
	328	FF/ENG	7052	6886	6733	6590	6450	6316	6188	6070	5964	5867	5778
10	280	%N1	81.6	80.9	80.2	79.6	79.0	78.4	77.9	77.3	76.8	76.4	76.0
	9	MAX TAT											
	323	FF/ENG	7052	6889	6738	6595	6454	6321	6195	6079	5975	5882	5794
9	280	%N1	80.7	80.0	79.4	78.8	78.2	77.6	77.0	76.5	76.0	75.6	75.2
	10	MAX TAT											
	318	FF/ENG	7041	6879	6727	6584	6445	6313	6188	6074	5972	5880	5794
8	280	%N1	79.8	79.1	78.5	77.9	77.3	76.7	76.1	75.6	75.2	74.8	74.4
	12	MAX TAT											
	314	FF/ENG	7016	6853	6701	6560	6424	6294	6170	6057	5956	5865	5780

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
18	96.4	97.4	98.3	99.3	100.3	101.2	102.2	103.1	102.8	101.1	99.5	98.0	97.0	96.0
17	96.3	97.3	98.3	99.2	100.2	101.1	102.1	103.0	103.4	101.8	100.0	98.4	97.3	96.3
16	96.1	97.1	98.1	99.0	100.0	100.9	101.9	102.8	103.7	102.4	100.5	98.9	97.7	96.7
15	96.0	97.0	97.9	98.9	99.8	100.8	101.7	102.6	103.6	102.9	101.1	99.5	98.1	97.1
14	95.7	96.6	97.6	98.6	99.5	100.4	101.4	102.3	103.2	103.3	101.5	99.8	98.4	97.4
13	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	102.9	103.7	101.9	100.1	98.8	97.7
12	95.2	96.2	97.2	98.1	99.1	100.0	100.9	101.8	102.8	103.7	102.4	100.5	99.1	98.1
11	94.8	95.7	96.7	97.6	98.6	99.5	100.4	101.3	102.3	103.2	102.8	100.7	99.4	98.3
10	94.3	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.6	103.1	101.0	99.7	98.5
9	93.6	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.9	102.8	101.3	99.8	98.7
8	92.8	93.7	94.7	95.6	96.5	97.4	98.4	99.2	100.1	101.0	101.9	101.5	100.0	98.8

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26													
25													
24													
23	300 -7 419	%N1 MAX TAT FF/ENG										98.3 3 8541	97.1 6 8273
22	300 -6 412	%N1 MAX TAT FF/ENG									97.6 6 8636	96.3 9 8376	95.2 12 8142
21	300 -5 406	%N1 MAX TAT FF/ENG						99.5 5 9357	98.2 8 9033	96.9 11 8751	95.7 14 8494	94.6 17 8258	93.6 19 8042
20	300 -4 400	%N1 MAX TAT FF/ENG				100.3 7 9838	98.8 10 9475	97.5 13 9161	96.2 16 8883	95.1 19 8623	94.0 22 8387	93.1 24 8170	92.4 27 7964
19	300 -2 394	%N1 MAX TAT FF/ENG			99.6 10 9970	98.2 13 9611	96.8 16 9301	95.6 19 9021	94.5 21 8765	93.5 24 8526	92.7 26 8306	92.0 29 8100	91.3 91.3 7904

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
23	93.3	94.3	95.2	96.2	97.2	98.1	99.0	100.0	100.2	99.0	97.8	96.9	96.2	95.6
22	93.2	94.2	95.1	96.1	97.0	98.0	98.9	99.9	100.7	99.2	98.0	97.1	96.4	95.8
21	93.9	94.9	95.8	96.8	97.8	98.7	99.7	100.6	101.6	100.5	99.2	98.0	97.1	96.5
20	94.6	95.6	96.6	97.6	98.5	99.5	100.4	101.4	102.3	101.9	100.4	99.1	97.9	97.2
19	94.5	95.5	96.5	97.5	98.4	99.4	100.3	101.3	102.2	102.5	100.8	99.4	98.1	97.3

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table
29000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29	300	%N1										98.9	98.2
	-15	MAX TAT										-3	-2
	459	FF/ENG										7341	7216
28	300	%N1								98.8	98.0	97.2	96.5
	-14	MAX TAT								-2	0	1	3
	452	FF/ENG								7512	7339	7195	7080
27	300	%N1						98.9	98.0	96.9	95.9	95.3	94.8
	-12	MAX TAT						-2	1	3	5	6	8
	445	FF/ENG						7746	7539	7360	7207	7083	6983
26	300	%N1					98.1	96.9	95.9	95.1	94.5	93.9	93.4
	-11	MAX TAT					1	3	6	8	10	11	12
	438	FF/ENG					7806	7589	7403	7244	7107	6994	6904
25	300	%N1				97.3	96.2	95.2	94.4	93.7	93.0	92.5	92.1
	-10	MAX TAT				3	6	8	11	13	14	16	17
	432	FF/ENG				7877	7655	7463	7297	7153	7029	6924	6838
24	300	%N1		97.8	96.6	95.5	94.6	93.7	92.9	92.3	91.9	91.5	91.1
	-9	MAX TAT		3	6	9	11	14	16	17	19	20	21
	425	FF/ENG		8191	7950	7737	7542	7369	7218	7085	6968	6867	6782
23	300	%N1	97.1	95.9	94.9	93.9	93.0	92.3	91.8	91.3	90.8	90.4	90.1
	-7	MAX TAT	6	9	12	14	16	19	21	22	24		
	419	FF/ENG	8273	8039	7825	7631	7453	7292	7148	7018	6904	6807	6727
22	300	%N1	95.2	94.2	93.2	92.5	91.9	91.3	90.8	90.3	89.8	89.5	89.2
	-6	MAX TAT	12	14	17	19	22	24					
	412	FF/ENG	8142	7929	7732	7551	7382	7228	7086	6958	6846	6756	6682
21	300	%N1	93.6	92.8	92.1	91.5	90.9	90.3	89.8	89.4	89.0	88.6	88.4
	-5	MAX TAT	19	22	24	26							
	406	FF/ENG	8042	7843	7659	7486	7324	7175	7041	6920	6815	6729	6657
20	300	%N1	92.4	91.7	91.1	90.5	89.9	89.4	89.0	88.5	88.2	87.8	87.5
	-4	MAX TAT	27										
	400	FF/ENG	7964	7775	7600	7434	7279	7140	7014	6902	6803	6717	6645
19	300	%N1	91.3	90.7	90.1	89.6	89.0	88.6	88.1	87.7	87.3	87.0	86.7
	-2	MAX TAT											
	394	FF/ENG	7904	7724	7558	7400	7254	7121	7001	6893	6797	6715	6643

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
29	94.5	95.5	96.5	97.5	98.5	99.5	100.4	101.4	100.6	99.2	98.1	97.2	96.3	95.4
28	94.1	95.1	96.1	97.1	98.1	99.0	100.0	101.0	100.8	99.3	98.2	97.3	96.4	95.5
27	93.7	94.7	95.7	96.7	97.6	98.6	99.6	100.5	100.9	99.4	98.3	97.3	96.4	95.6
26	93.2	94.2	95.2	96.2	97.1	98.1	99.1	100.0	100.9	99.5	98.5	97.3	96.4	95.7
25	92.6	93.6	94.6	95.6	96.5	97.5	98.4	99.4	100.3	99.6	98.5	97.4	96.5	95.8
24	92.4	93.4	94.4	95.4	96.3	97.3	98.2	99.2	100.1	99.9	98.7	97.6	96.7	96.0
23	92.3	93.3	94.3	95.2	96.2	97.2	98.1	99.0	100.0	100.2	99.0	97.8	96.9	96.2
22	92.2	93.2	94.2	95.1	96.1	97.0	98.0	98.9	99.9	100.7	99.2	98.0	97.1	96.4
21	92.9	93.9	94.9	95.8	96.8	97.8	98.7	99.7	100.6	101.6	100.5	99.2	98.0	97.1
20	93.6	94.6	95.6	96.6	97.6	98.5	99.5	100.4	101.4	102.3	101.9	100.4	99.1	97.9
19	93.5	94.5	95.5	96.5	97.5	98.4	99.4	100.3	101.3	102.2	102.5	100.8	99.4	98.1

With engine anti-ice on, decrease limit %N1 by 0.1.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	300	%N1	100.4	98.9	97.5	96.2	95.0	93.9	93.1	92.4	91.7	91.0	90.4
	-1	MAX TAT	10	13	16	19	22	24	26	29			
	388	FF/ENG	10508	10094	9750	9441	9161	8907	8671	8446	8237	8041	7856
17	300	%N1	98.3	96.8	95.6	94.4	93.6	92.8	92.1	91.4	90.7	90.1	89.5
	1	MAX TAT	16	19	22	24	27	29	31				
	383	FF/ENG	10233	9886	9578	9300	9045	8810	8587	8374	8176	7991	7817
16	300	%N1	96.3	95.1	94.1	93.3	92.5	91.8	91.1	90.4	89.8	89.2	88.7
	2	MAX TAT	22	25	27	29	32						
	377	FF/ENG	10026	9717	9440	9183	8942	8718	8507	8309	8122	7945	7776
15	300	%N1	94.6	93.7	92.9	92.1	91.5	90.8	90.2	89.5	88.9	88.4	87.8
	3	MAX TAT	27	30	32	34							
	371	FF/ENG	9860	9581	9321	9077	8848	8637	8437	8248	8068	7895	7733
14	300	%N1	93.4	92.6	91.9	91.2	90.5	89.9	89.3	88.7	88.0	87.5	86.9
	5	MAX TAT	32	35									
	366	FF/ENG	9733	9465	9214	8984	8771	8572	8378	8191	8014	7847	7686
13	300	%N1	92.3	91.6	90.9	90.3	89.6	89.0	88.4	87.7	87.1	86.5	85.9
	6	MAX TAT	37										
	361	FF/ENG	9626	9365	9130	8917	8716	8520	8327	8143	7967	7801	7641
12	300	%N1	91.4	90.7	90.0	89.4	88.8	88.1	87.5	86.8	86.1	85.5	85.0
	8	MAX TAT											
	356	FF/ENG	9537	9300	9082	8877	8675	8477	8286	8103	7930	7766	7609
11	300	%N1	90.5	89.8	89.2	88.5	87.9	87.2	86.5	85.9	85.3	84.7	84.2
	9	MAX TAT											
	350	FF/ENG	9493	9271	9054	8846	8642	8444	8254	8075	7906	7746	7593
10	300	%N1	89.7	89.0	88.4	87.7	87.0	86.3	85.7	85.1	84.5	84.0	83.4
	11	MAX TAT											
	345	FF/ENG	9472	9244	9025	8816	8614	8419	8233	8057	7891	7735	7586
9	300	%N1	88.8	88.2	87.5	86.8	86.1	85.5	84.9	84.3	83.7	83.1	82.5
	12	MAX TAT											
	340	FF/ENG	9436	9208	8992	8785	8587	8398	8215	8041	7875	7725	7578
8	300	%N1	88.0	87.3	86.6	85.9	85.3	84.7	84.1	83.4	82.8	82.2	81.7
	14	MAX TAT											
	336	FF/ENG	9392	9171	8959	8756	8563	8377	8195	8022	7860	7712	7567

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	96.5	97.5	98.4	99.4	100.3	101.2	102.2	103.1	104.1	105.1	106.1	107.1	108.1	109.1
17	96.5	97.5	98.4	99.4	100.3	101.3	102.2	103.1	104.0	105.0	106.0	107.0	108.0	109.0
16	96.5	97.4	98.4	99.3	100.3	101.2	102.1	103.1	104.0	105.0	106.0	107.0	108.0	109.0
15	96.3	97.3	98.2	99.2	100.1	101.0	102.0	102.9	103.4	104.0	104.6	105.2	105.8	106.4
14	95.9	96.9	97.8	98.8	99.7	100.6	101.6	102.5	103.4	104.3	105.2	106.1	107.0	107.9
13	95.5	96.5	97.4	98.4	99.3	100.2	101.1	102.1	103.0	104.0	105.0	106.0	107.0	108.0
12	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.7	103.6	104.5	105.5	106.5	107.5
11	94.7	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.9	103.8	104.7	105.6	106.5
10	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.4	102.2	103.1	104.0	104.9	105.8
9	93.7	94.6	95.6	96.5	97.4	98.3	99.2	100.1	101.0	101.8	102.7	103.6	104.5	105.4
8	93.2	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.5	101.3	102.2	103.1	104.0	104.9

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

300 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	300	%N1	90.4	89.8	89.3	88.7	88.2	87.7	87.3	86.9	86.5	86.1	85.8
	-1	MAX TAT											
	388	FF/ENG	7856	7687	7530	7378	7236	7107	6991	6887	6793	6710	6637
17	300	%N1	89.5	89.0	88.4	87.9	87.3	86.9	86.4	85.9	85.5	85.1	84.8
	1	MAX TAT											
	383	FF/ENG	7817	7655	7501	7354	7216	7090	6975	6870	6775	6692	6621
16	300	%N1	88.7	88.1	87.6	87.0	86.5	85.9	85.4	84.9	84.6	84.3	84.0
	2	MAX TAT											
	377	FF/ENG	7776	7617	7468	7324	7186	7059	6944	6840	6748	6667	6597
15	300	%N1	87.8	87.2	86.6	86.0	85.4	84.9	84.5	84.2	83.8	83.5	83.3
	3	MAX TAT											
	371	FF/ENG	7733	7577	7427	7282	7146	7022	6909	6806	6715	6636	6567
14	300	%N1	86.9	86.2	85.6	85.1	84.6	84.2	83.8	83.4	83.0	82.6	82.3
	5	MAX TAT											
	366	FF/ENG	7686	7529	7379	7240	7109	6988	6875	6773	6683	6606	6540
13	300	%N1	85.9	85.3	84.7	84.3	83.8	83.4	82.9	82.5	82.1	81.7	81.4
	6	MAX TAT											
	361	FF/ENG	7641	7486	7341	7206	7080	6961	6850	6749	6661	6586	6519
12	300	%N1	85.0	84.5	84.0	83.5	83.0	82.5	82.0	81.6	81.2	80.9	80.6
	8	MAX TAT											
	356	FF/ENG	7609	7458	7317	7185	7063	6947	6839	6739	6652	6576	6509
11	300	%N1	84.2	83.7	83.1	82.6	82.1	81.6	81.2	80.8	80.4	80.1	79.8
	9	MAX TAT											
	350	FF/ENG	7593	7445	7307	7179	7059	6945	6838	6739	6652	6575	6506
10	300	%N1	83.4	82.8	82.3	81.8	81.3	80.8	80.4	80.0	79.6	79.3	79.0
	11	MAX TAT											
	345	FF/ENG	7586	7441	7306	7179	7059	6945	6839	6741	6653	6575	6506
9	300	%N1	82.5	82.0	81.4	80.9	80.5	80.0	79.6	79.2	78.8	78.5	78.2
	12	MAX TAT											
	340	FF/ENG	7578	7437	7301	7172	7051	6937	6831	6734	6647	6569	6500
8	300	%N1	81.7	81.1	80.6	80.1	79.6	79.2	78.8	78.4	78.0	77.7	77.4
	14	MAX TAT											
	336	FF/ENG	7567	7425	7289	7158	7036	6923	6820	6725	6638	6560	6490

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	96.5	97.5	98.4	99.4	100.3	101.2	102.2	103.1	101.4	99.8	98.3	97.4	96.5	95.6
17	96.5	97.5	98.4	99.4	100.3	101.3	102.2	103.1	102.0	100.2	98.7	97.6	96.6	95.8
16	96.5	97.4	98.4	99.3	100.3	101.2	102.1	103.1	102.8	100.9	99.3	98.0	97.0	96.1
15	96.3	97.3	98.2	99.2	100.1	101.0	102.0	102.9	103.4	101.5	99.9	98.4	97.4	96.5
14	95.9	96.9	97.8	98.8	99.7	100.6	101.6	102.5	103.4	101.8	100.2	98.7	97.7	96.8
13	95.5	96.5	97.4	98.4	99.3	100.2	101.1	102.1	103.0	102.2	100.5	99.0	98.0	97.1
12	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.7	102.7	102.7	100.8	99.3	98.3	97.4
11	94.7	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.9	101.0	99.5	98.4	97.5
10	94.1	95.0	96.0	96.9	97.8	98.7	99.6	100.5	101.4	102.2	101.2	99.8	98.6	97.6
9	93.7	94.6	95.6	96.5	97.4	98.3	99.2	100.1	100.9	101.8	101.5	100.0	98.8	97.8
8	93.2	94.2	95.1	96.0	96.9	97.8	98.7	99.6	100.5	101.3	101.9	100.3	98.9	98.0

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP MAX CONTINUOUS THRUST

320 KIAS Cruise Table
29000 FT to 19000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
29													
28													
27													
26													
25													
24													
23													
22	320 -3 438	%N1 MAX TAT FF/ENG											98.0 7 8928
21	320 -2 432	%N1 MAX TAT FF/ENG									98.3 10 9229	97.3 12 9006	96.4 15 8799
20	320 -1 425	%N1 MAX TAT FF/ENG						99.7 11 9847	98.5 13 9575	97.5 15 9331	96.5 18 9106	95.6 20 8899	94.8 22 8705
19	320 0 419	%N1 MAX TAT FF/ENG				100.0 11 10267	98.8 14 9969	97.7 16 9701	96.7 18 9455	95.7 21 9228	94.9 23 9017	94.1 25 8822	93.5 27 8640

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
22	92.1	93.1	94.1	95.0	96.0	96.9	97.8	98.7	99.7	99.6	98.5	97.5	96.8	96.2
21	93.0	94.0	94.9	95.9	96.8	97.8	98.7	99.6	100.6	101.0	99.6	98.6	97.6	96.9
20	93.8	94.8	95.7	96.7	97.7	98.6	99.5	100.5	101.5	102.4	100.8	99.7	98.4	97.7
19	93.6	94.6	95.6	96.5	97.5	98.4	99.3	100.3	101.2	102.2	101.2	99.8	98.5	97.7

With engine anti-ice on, decrease limit %N1 by 0.1.

With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table 29000 FT to 19000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
29													
28													
27													
26	320 -8 465	%N1 MAX TAT FF/ENG											98.2 3 8022
25	320 -7 458	%N1 MAX TAT FF/ENG								97.8 4 8185	97.3 6 8079	96.7 7 7986	96.4 8 7904
24	320 -6 451	%N1 MAX TAT FF/ENG					98.1 5 8469	97.2 7 8311	96.6 8 8176	96.2 10 8063	95.8 11 7969	95.4 12 7885	95.1 13 7807
23	320 -5 445	%N1 MAX TAT FF/ENG			97.9 6 8670	97.1 8 8487	96.4 10 8326	95.8 12 8182	95.2 13 8058	94.7 15 7956	94.3 16 7869	94.0 17 7792	93.6 18 7718
22	320 -3 438	%N1 MAX TAT FF/ENG	98.0 7 8928	97.1 9 8718	96.3 11 8530	95.5 13 8363	94.9 15 8215	94.3 17 8084	93.7 18 7969	93.4 20 7872	93.1 21 7790	92.8 22 7715	92.5 23 7644
21	320 -2 432	%N1 MAX TAT FF/ENG	96.4 15 8799	95.5 17 8607	94.8 19 8434	94.1 21 8279	93.5 22 8141	93.1 24 8016	92.7 25 7907	92.4 26 7812	92.1 27 7730	91.8 28 7655	91.6 29 7587
20	320 -1 425	%N1 MAX TAT FF/ENG	94.8 22 8705	94.0 24 8526	93.5 26 8364	93.0 28 8216	92.5 29 8082	92.1 31 7961	91.7 31 7855	91.4 31 7765	91.1 31 7686	90.9 31 7614	90.7 31 7548
19	320 0 419	%N1 MAX TAT FF/ENG	93.5 27 8640	92.9 29 8470	92.4 30 8313	91.9 32 8169	91.5 32 8036	91.1 32 7917	90.7 32 7816	90.5 32 7733	90.2 32 7662	90.0 32 7596	89.8 32 7535

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
 Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
 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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
25	93.0	94.0	94.9	95.9	96.8	97.8	98.7	99.7	100.2	98.9	98.0	97.0	96.2	95.5
24	92.6	93.5	94.5	95.5	96.4	97.3	98.3	99.2	100.2	99.1	98.2	97.2	96.4	95.8
23	92.3	93.3	94.2	95.2	96.1	97.0	98.0	98.9	99.8	99.3	98.3	97.3	96.6	96.0
22	92.1	93.1	94.1	95.0	96.0	96.9	97.8	98.7	99.7	99.6	98.5	97.5	96.8	96.2
21	93.0	94.0	94.9	95.9	96.8	97.8	98.7	99.6	100.6	101.0	99.6	98.6	97.6	96.9
20	93.8	94.8	95.7	96.7	97.7	98.6	99.5	100.5	101.5	102.4	100.8	99.7	98.4	97.7
19	93.6	94.6	95.6	96.5	97.5	98.4	99.3	100.3	101.2	102.2	101.2	99.8	98.5	97.7

With engine anti-ice on, decrease limit %N1 by 0.1.
 With engine and wing anti-ice on, decrease limit %N1 by 0.4.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table
18000 FT to 8000 FT - High Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			360	350	340	330	320	310	300	290	280	270	260
18	320	%N1		100.3	99.1	97.9	96.9	95.9	95.0	94.2	93.6	93.0	92.4
	2	MAX TAT		12	15	17	19	21	24	26	28	29	31
	413	FF/ENG		10713	10388	10100	9832	9582	9353	9142	8947	8763	8589
17	320	%N1	99.4	98.3	97.2	96.2	95.2	94.4	93.7	93.1	92.5	92.0	91.5
	3	MAX TAT	15	18	20	22	24	26	28	30	32	34	
	407	FF/ENG	10821	10510	10221	9952	9706	9479	9265	9066	8882	8707	8541
16	320	%N1	97.5	96.5	95.5	94.6	93.9	93.3	92.7	92.1	91.6	91.1	90.6
	4	MAX TAT	21	23	25	27	29	31	33	35			
	401	FF/ENG	10613	10331	10067	9822	9598	9386	9183	8994	8820	8654	8496
15	320	%N1	95.8	94.9	94.2	93.5	92.9	92.3	91.7	91.2	90.7	90.2	89.7
	6	MAX TAT	26	28	31	33	34	36					
	395	FF/ENG	10429	10176	9936	9708	9496	9295	9103	8925	8761	8603	8451
14	320	%N1	94.5	93.8	93.1	92.5	92.0	91.4	90.9	90.3	89.9	89.4	88.9
	7	MAX TAT	31	33	35	37							
	390	FF/ENG	10285	10049	9821	9604	9401	9210	9031	8863	8705	8550	8403
13	320	%N1	93.4	92.8	92.2	91.6	91.1	90.6	90.0	89.5	89.0	88.5	88.1
	9	MAX TAT	36	38	40								
	384	FF/ENG	10158	9931	9714	9511	9322	9142	8970	8805	8649	8498	8353
12	320	%N1	92.5	91.9	91.3	90.8	90.2	89.7	89.2	88.7	88.2	87.6	87.1
	10	MAX TAT	40										
	379	FF/ENG	10040	9827	9628	9439	9258	9081	8912	8750	8594	8443	8298
11	320	%N1	91.5	91.0	90.4	89.9	89.3	88.8	88.3	87.7	87.2	86.6	86.1
	12	MAX TAT											
	373	FF/ENG	9957	9760	9568	9380	9199	9026	8859	8697	8541	8392	8252
10	320	%N1	90.7	90.1	89.5	89.0	88.5	87.9	87.3	86.8	86.2	85.8	85.4
	13	MAX TAT											
	368	FF/ENG	9911	9714	9517	9328	9147	8976	8811	8651	8498	8355	8220
9	320	%N1	89.8	89.3	88.7	88.1	87.5	86.9	86.4	86.0	85.5	85.1	84.7
	14	MAX TAT											
	363	FF/ENG	9865	9662	9464	9277	9099	8931	8769	8612	8464	8324	8193
8	320	%N1	89.0	88.4	87.8	87.2	86.6	86.1	85.7	85.2	84.7	84.2	83.8
	16	MAX TAT											
	358	FF/ENG	9811	9609	9416	9234	9060	8896	8737	8583	8437	8300	8171

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	101.7	100.1	98.7	97.8	96.9	96.1
17	95.3	96.3	97.3	98.2	99.1	100.0	101.0	101.9	102.3	100.5	99.0	97.9	97.0	96.2
16	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.8	102.7	101.1	99.6	98.3	97.4	96.5
15	95.2	96.1	97.1	98.0	98.9	99.8	100.7	101.7	102.6	101.8	100.1	98.7	97.7	96.9
14	94.9	95.9	96.8	97.8	98.7	99.6	100.5	101.4	102.3	102.2	100.5	99.0	98.1	97.2
13	94.6	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.6	100.9	99.3	98.3	97.4
12	94.3	95.3	96.2	97.1	98.0	99.0	99.9	100.8	101.6	102.5	101.2	99.7	98.6	97.6
11	93.7	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.8	101.3	99.8	98.6	97.7
10	93.1	94.0	94.9	95.8	96.7	97.6	98.5	99.4	100.3	101.1	101.3	100.0	98.8	97.8
9	92.7	93.6	94.5	95.5	96.4	97.3	98.1	99.0	99.9	100.7	101.6	100.2	98.9	97.9
8	92.3	93.2	94.1	95.0	95.9	96.8	97.7	98.6	99.5	100.3	101.1	100.4	99.1	98.1

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.7.

ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Cruise Table 18000 FT to 8000 FT - Low Weights

PRESS ALT (1000 FT)	KIAS STD TAT KTAS		WEIGHT (1000 KG)										
			260	250	240	230	220	210	200	190	180	170	160
18	320	%N1	92.4	91.9	91.4	91.0	90.6	90.2	89.9	89.6	89.4	89.2	89.0
	2	MAX TAT	31	33									
	413	FF/ENG	8589	8426	8276	8137	8011	7899	7804	7724	7655	7592	7534
17	320	%N1	91.5	91.0	90.5	90.1	89.7	89.4	89.1	88.8	88.5	88.3	88.1
	3	MAX TAT											
	407	FF/ENG	8541	8386	8245	8116	7999	7893	7800	7720	7650	7587	7533
16	320	%N1	90.6	90.1	89.7	89.3	88.9	88.5	88.2	87.9	87.7	87.5	87.3
	4	MAX TAT											
	401	FF/ENG	8496	8349	8215	8092	7979	7878	7789	7710	7640	7578	7523
15	320	%N1	89.7	89.3	88.8	88.4	88.0	87.7	87.4	87.1	86.8	86.5	86.3
	6	MAX TAT											
	395	FF/ENG	8451	8308	8178	8059	7951	7852	7763	7683	7612	7548	7493
14	320	%N1	88.9	88.4	88.0	87.6	87.2	86.8	86.4	86.1	85.8	85.6	85.4
	7	MAX TAT											
	390	FF/ENG	8403	8264	8137	8020	7910	7811	7721	7642	7572	7509	7456
13	320	%N1	88.1	87.6	87.1	86.6	86.2	85.9	85.6	85.3	85.1	84.9	84.7
	9	MAX TAT											
	384	FF/ENG	8353	8215	8087	7969	7861	7764	7677	7600	7532	7471	7418
12	320	%N1	87.1	86.6	86.1	85.8	85.4	85.1	84.9	84.6	84.4	84.2	84.0
	10	MAX TAT											
	379	FF/ENG	8298	8162	8037	7922	7816	7721	7636	7561	7494	7434	7383
11	320	%N1	86.1	85.7	85.4	85.0	84.7	84.3	84.0	83.7	83.5	83.2	83.0
	12	MAX TAT											
	373	FF/ENG	8252	8121	7999	7884	7779	7685	7602	7529	7464	7405	7356
10	320	%N1	85.4	85.0	84.6	84.2	83.8	83.4	83.1	82.9	82.6	82.4	82.2
	13	MAX TAT											
	368	FF/ENG	8220	8093	7973	7859	7754	7661	7579	7507	7443	7385	7336
9	320	%N1	84.7	84.2	83.8	83.3	82.9	82.6	82.3	82.0	81.8	81.6	81.4
	14	MAX TAT											
	363	FF/ENG	8193	8069	7950	7838	7735	7642	7560	7487	7422	7364	7315
8	320	%N1	83.8	83.3	82.9	82.5	82.1	81.8	81.5	81.2	81.0	80.7	80.5
	16	MAX TAT											
	358	FF/ENG	8171	8049	7932	7821	7718	7625	7541	7467	7400	7341	7291

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
18	95.4	96.4	97.3	98.3	99.2	100.1	101.1	102.0	101.7	100.1	98.7	97.8	96.9	96.1
17	95.3	96.3	97.3	98.2	99.1	100.0	101.0	101.9	102.3	100.5	99.0	97.9	97.0	96.2
16	95.2	96.2	97.1	98.1	99.0	99.9	100.8	101.8	102.7	101.1	99.6	98.3	97.4	96.5
15	95.2	96.1	97.1	98.0	98.9	99.8	100.7	101.7	102.6	101.8	100.1	98.7	97.7	96.9
14	94.9	95.9	96.8	97.8	98.7	99.6	100.5	101.4	102.3	102.2	100.5	99.0	98.1	97.2
13	94.6	95.6	96.5	97.5	98.4	99.3	100.2	101.1	102.0	102.6	100.9	99.3	98.3	97.4
12	94.3	95.3	96.2	97.1	98.0	99.0	99.9	100.8	101.6	102.5	101.2	99.7	98.6	97.6
11	93.7	94.6	95.5	96.5	97.4	98.3	99.2	100.1	101.0	101.8	101.3	99.8	98.6	97.7
10	93.1	94.0	94.9	95.8	96.7	97.6	98.5	99.4	100.3	101.1	101.3	100.0	98.8	97.8
9	92.7	93.6	94.5	95.5	96.4	97.3	98.1	99.0	99.9	100.7	101.6	100.2	98.9	97.9
8	92.3	93.2	94.1	95.0	95.9	96.8	97.7	98.6	99.5	100.3	101.1	100.4	99.1	98.1

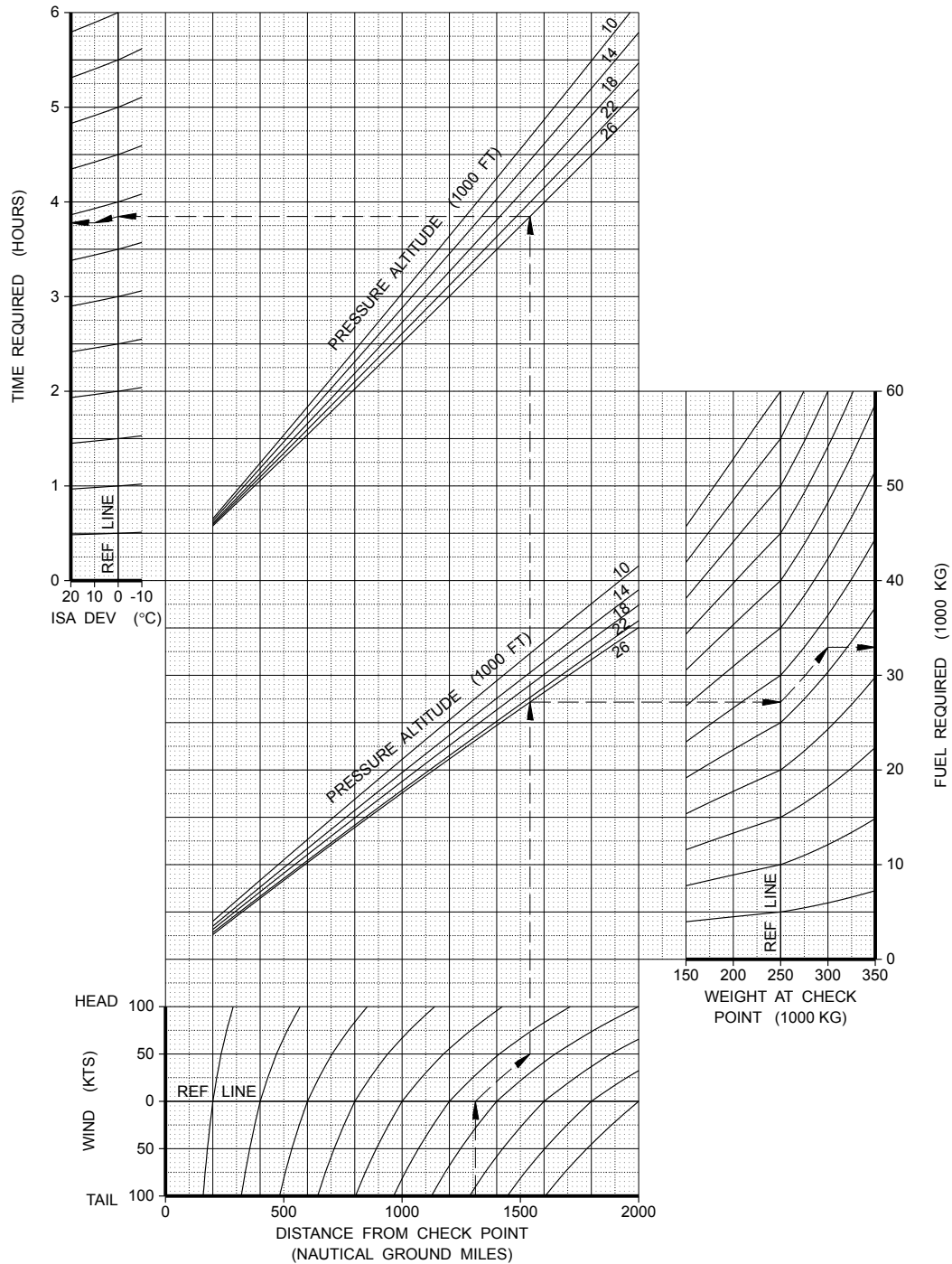
With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time
Based on 310/250 descent and includes APU fuel burn

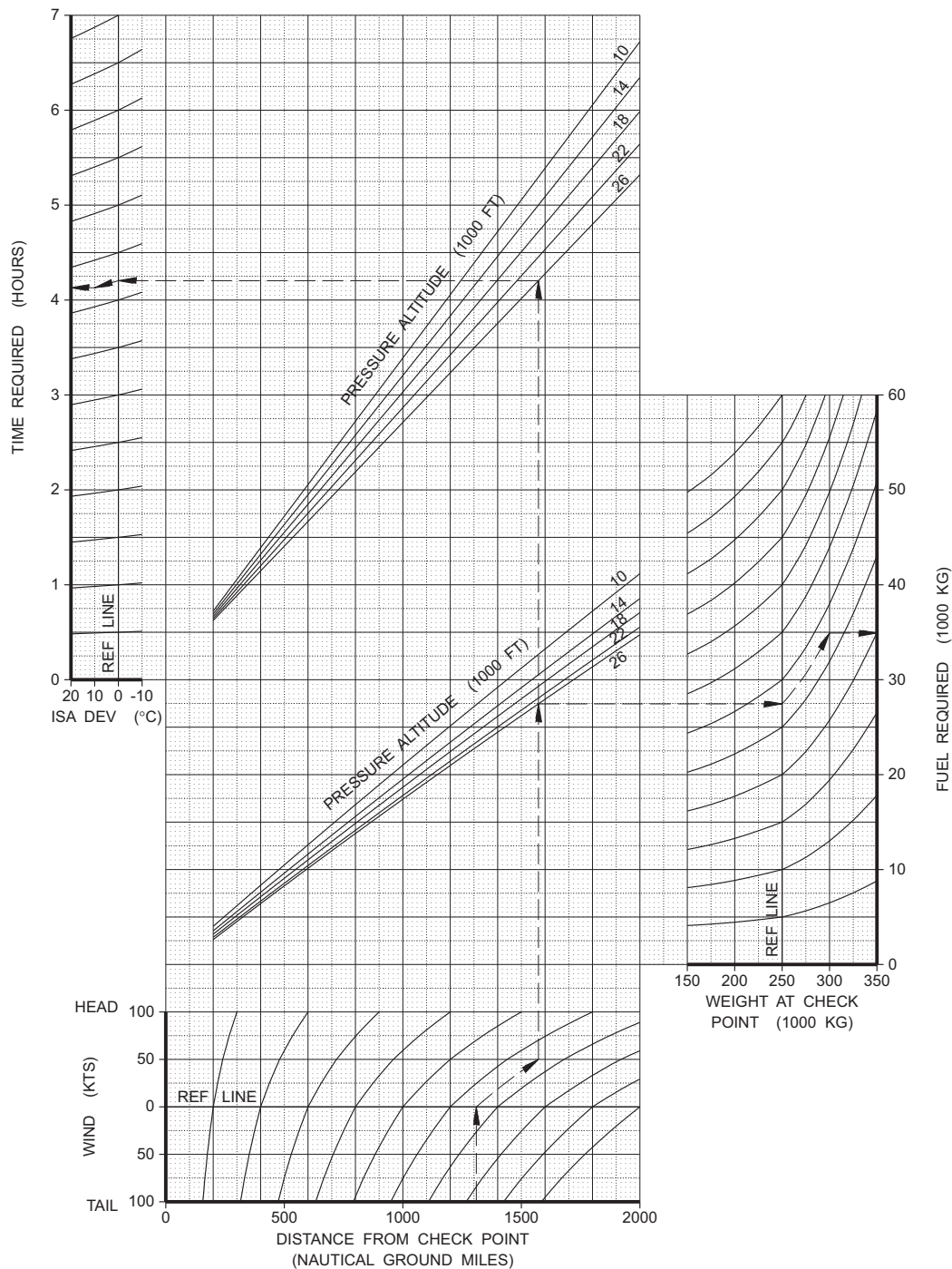


ENGINE INOP

MAX CONTINUOUS THRUST

260 KIAS Diversion Fuel and Time

Based on 260/250 descent and includes APU fuel burn

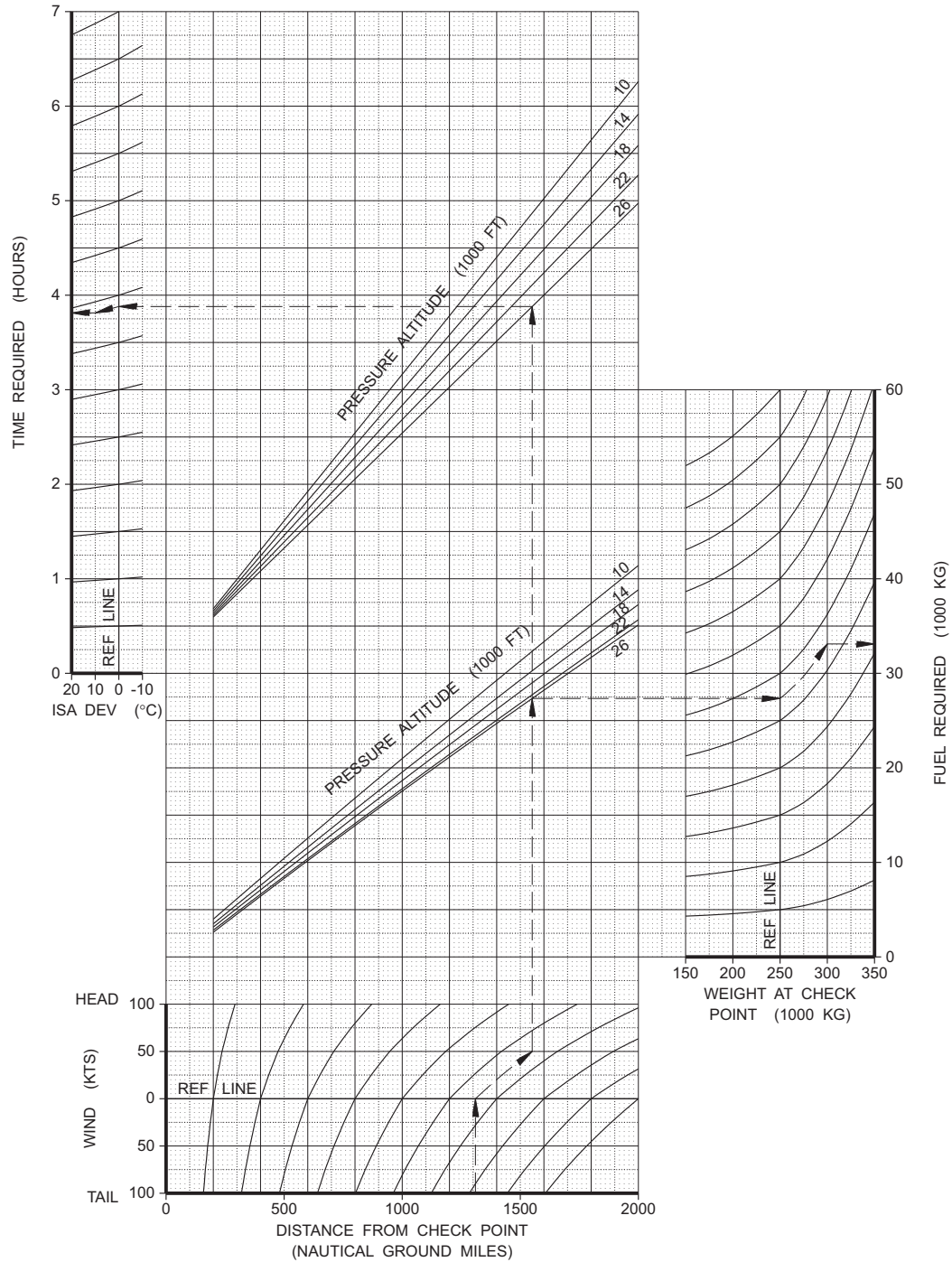


ENGINE INOP

MAX CONTINUOUS THRUST

280 KIAS Diversion Fuel and Time

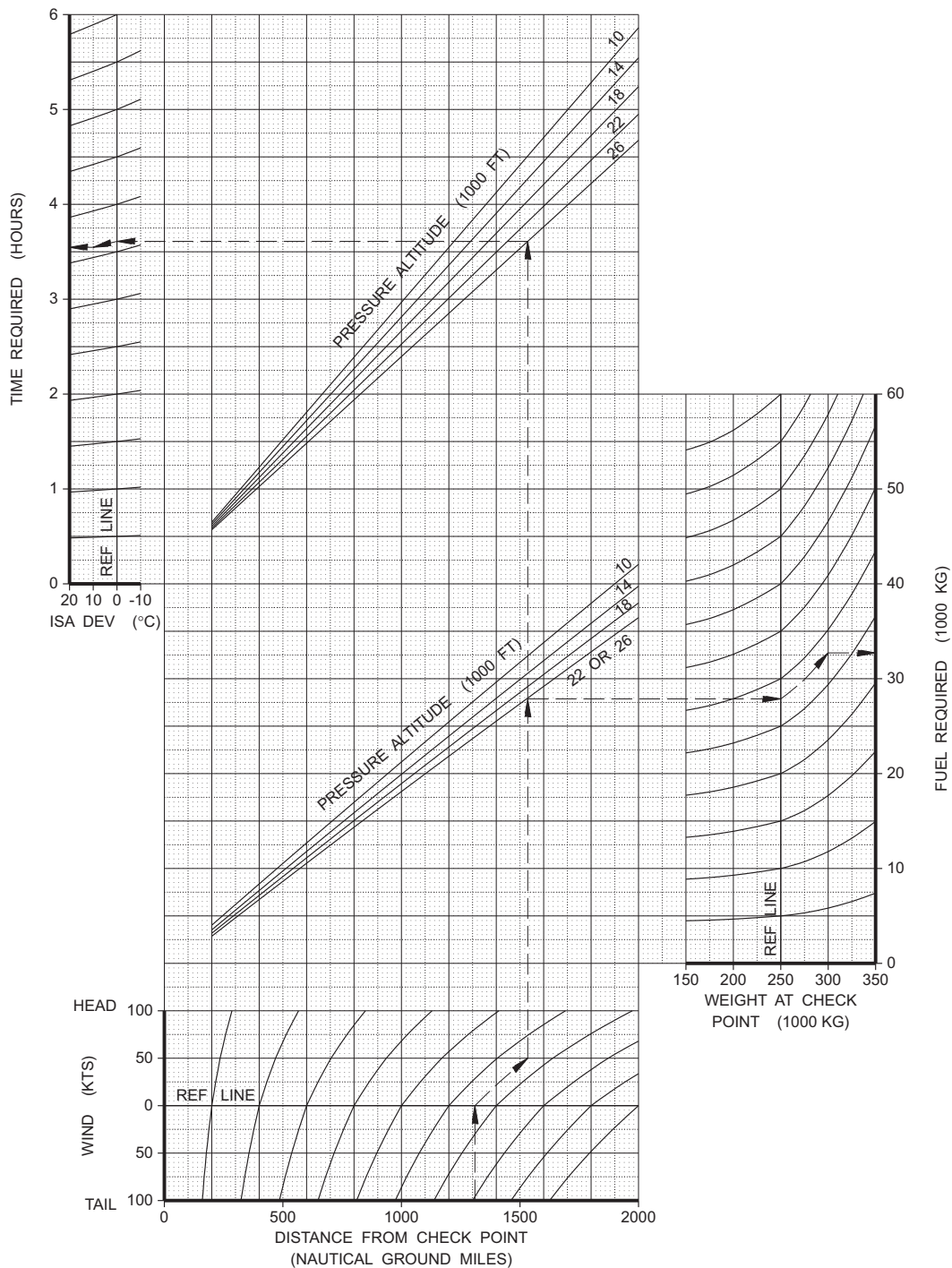
Based on 280/250 descent and includes APU fuel burn



ENGINE INOP MAX CONTINUOUS THRUST

300 KIAS Diversion Fuel and Time

Based on 300/250 descent and includes APU fuel burn

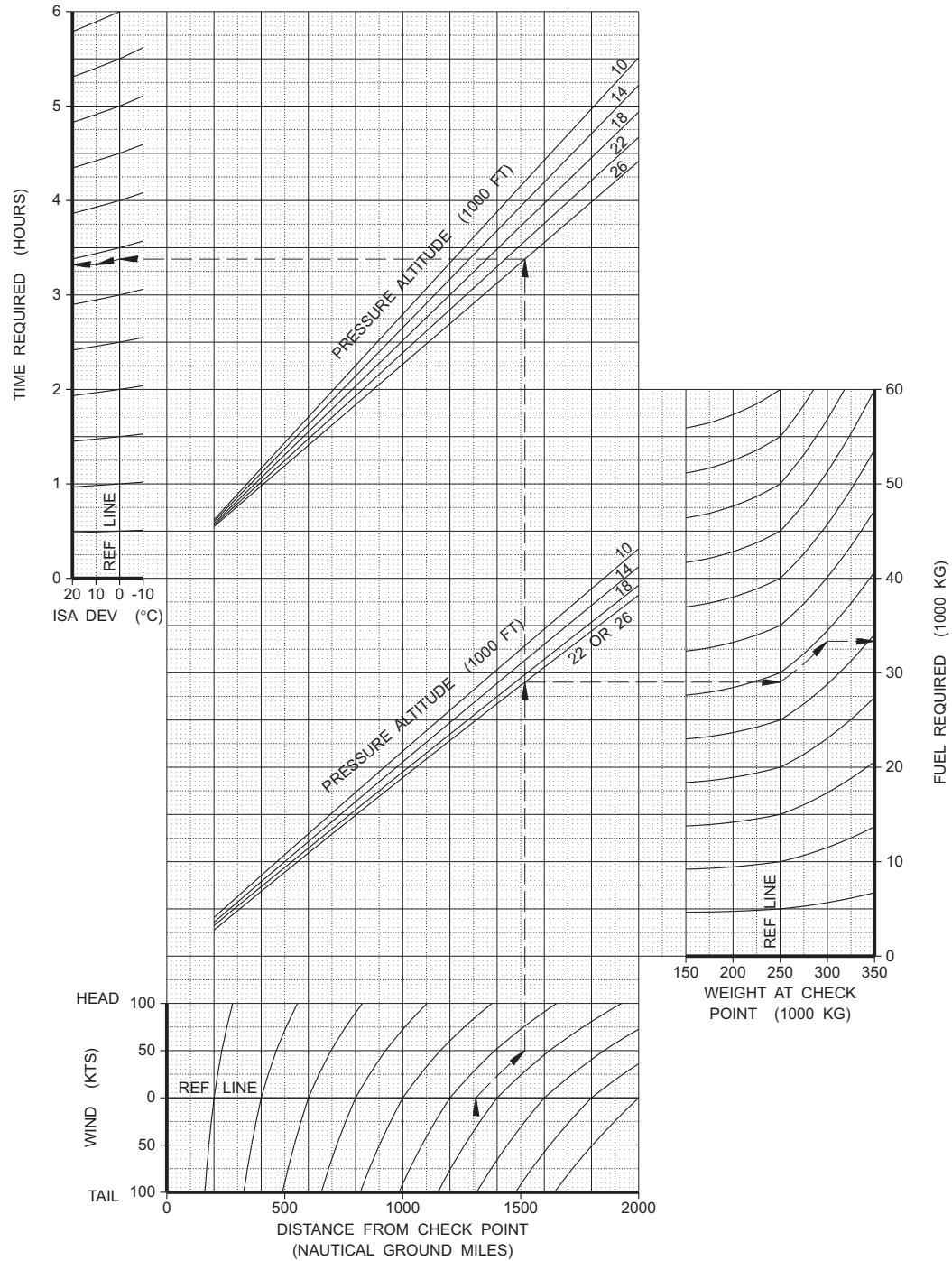


ENGINE INOP

MAX CONTINUOUS THRUST

320 KIAS Diversion Fuel and Time

Based on 320/250 descent and includes APU fuel burn





ENGINE INOP

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)										
		360	340	320	300	280	260	240	220	200	180	160
30000	%N1								99.1	93.5	88.0	84.5
	KIAS								246	233	208	199
	FF/ENG								7020	5950	5000	4360
25000	%N1						97.3	92.6	88.8	85.8	83.0	79.8
	KIAS						266	248	226	213	206	199
	FF/ENG						7980	6920	6060	5360	4780	4230
20000	%N1			98.4	94.5	91.3	88.8	86.3	83.8	80.9	77.9	74.7
	KIAS			294	277	258	240	226	220	213	206	199
	FF/ENG			9780	8730	7830	7030	6360	5750	5180	4640	4150
15000	%N1	94.5	92.2	90.1	88.1	86.0	83.7	81.3	78.6	76.0	73.2	70.3
	KIAS	298	282	265	252	243	234	226	220	213	206	199
	FF/ENG	10310	9410	8590	7890	7250	6640	6080	5540	5040	4560	4100
10000	%N1	89.2	87.4	85.4	83.4	81.1	78.8	76.5	74.1	71.6	68.9	65.9
	KIAS	275	267	259	251	242	233	226	220	213	206	199
	FF/ENG	9640	8990	8350	7740	7150	6570	6040	5530	5030	4560	4110
5000	%N1	84.5	82.6	80.6	78.6	76.6	74.5	72.3	69.9	67.4	64.8	62.1
	KIAS	273	266	257	249	241	232	226	220	213	206	199
	FF/ENG	9350	8760	8190	7640	7090	6570	6060	5570	5090	4620	4170
1500	%N1	81.1	79.3	77.6	75.6	73.7	71.6	69.3	67.0	64.7	62.2	59.5
	KIAS	272	264	257	249	240	232	226	220	213	206	199
	FF/ENG	9270	8720	8170	7640	7120	6600	6090	5600	5130	4670	4230

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

**NON-STANDARD CONFIGURATION****Table of Contents****Chapter 4****Section TOC**

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Intentionally
Blank

Gear Down

Introduction

This section contains performance data for airplane operation with landing gear extended for all phases of flight. 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 10°C.

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.

Obstacle Limit

Obstacle clearance charts are provided for each certified takeoff flap setting based on normal air conditioning operation. 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 and can account for air conditioning packs off. 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 correct for OAT as necessary. Repeat this procedure to correct for airport pressure altitude and wind, then continue vertically to read obstacle limit weight.

Net Level Off Weight

This chart is used to determine the dispatch maximum weight for terrain clearance based on the Approved Flight Manual net engine inoperative, gear down performance at speed for optimum climb gradient. Refer to Chapter 2 text for description of net level off weight 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 enroute terrain clearance. Data is based on gear down net performance, Max Continuous thrust following engine failure and level flight deceleration to optimum driftdown speed (speed for optimum climb gradient). Refer to Chapter 2 for description of chart usage.

Long Range Cruise Trip Fuel and Time

A Long Range Cruise Trip Fuel and Time 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.

All Engines

Long Range Cruise Altitude Capability

Long Range Cruise altitude capability is provided at Max Climb thrust with 300 ft/min residual rate of climb.

220 KIAS Max Climb %N1

Max Climb %N1 based on normal air conditioning bleed is shown for a 220 KIAS climb schedule which approximates economy climb and turbulent air penetration speed, VREF 30+80 KIAS with the landing gear extended. Max Climb %N1 may be read directly from the table for the desired pressure altitude and TAT.

Long Range Cruise Table

LRC 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

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 VREF 30+80 KIAS and straight in approach.

Holding

%N1 required, ISA and fuel flow with gear down are shown as described in Chapter 3 with a minimum maneuver speed of VREF30+80 KIAS for Flaps Up and VREF30+60 for Flaps 1.

Engine Inoperative

Driftdown/LRC Cruise Range Capability

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

Long Range Cruise Altitude Capability

Altitude capability is provided in the same format as the gear up data shown in Chapter 3 for Max Climb Thrust and Long Range Cruise speed with 300 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+80 KIAS.

Alternate Mode EEC

Introduction

For most conditions, no takeoff speed adjustments or other performance adjustments other than takeoff power setting adjustments are required for operation of EEC in the ALTERNATE mode. For pressure altitudes between

-2000 feet and -1000 feet and temperatures greater than ISA + 15°C, a thrust reduction occurs with EEC in the ALTERNATE mode. Performance software must be used to account for appropriate takeoff performance in this environmental region.

Max Takeoff %N1

Takeoff power settings are presented for normal air condition bleed. Max Takeoff %N1 may be read directly from the tables for the desired pressure altitude and airport OAT.

The EEC ALTERNATE mode schedule provides equal or greater thrust than the normal mode for the same lever position. Thrust protection is not provided in the ALTERNATE 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.

GEAR DOWN

Takeoff Climb Limit

Flaps 5

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	251.4	245.0	234.8	228.9	224.0	217.9	208.0	197.9	187.1	173.8		
52	126	257.1	250.8	240.2	230.0	223.9	219.1	213.9	203.5	192.6	178.9		
50	122	263.0	257.0	245.9	235.6	225.1	219.1	214.7	209.0	197.9	184.1	171.0	
48	118	269.6	263.3	251.9	241.1	230.7	220.3	214.7	209.7	203.0	189.3	176.2	171.2
46	115	276.0	269.4	257.8	246.7	236.2	225.7	215.8	209.6	203.5	194.3	181.3	176.3
44	111	281.9	275.2	263.7	252.3	241.5	230.9	220.7	210.7	203.4	196.9	186.2	181.1
42	108	287.5	280.6	269.2	257.9	246.8	236.2	225.7	215.4	204.6	196.8	188.8	185.7
40	104	293.3	286.4	274.7	263.5	252.3	241.4	230.8	220.2	209.2	197.9	188.7	185.6
38	100	298.8	292.6	280.9	269.2	258.1	246.9	236.2	225.3	214.0	202.3	189.9	185.5
36	97	304.7	298.5	287.1	275.4	263.8	252.6	241.6	230.7	219.1	207.0	194.2	189.3
34	93	310.5	304.2	293.4	281.4	269.7	258.3	247.3	235.9	224.4	212.0	198.7	193.8
32	90	316.2	309.6	299.0	287.6	275.6	263.9	252.8	241.4	229.5	217.2	203.5	198.3
30	86	321.8	315.3	304.3	293.9	281.6	269.7	258.3	246.8	234.8	222.2	208.5	203.2
28	82	324.8	320.7	309.7	298.9	287.6	275.5	264.1	252.2	240.1	227.4	213.3	208.0
26	79	325.1	323.4	314.5	303.9	293.1	281.0	269.3	257.5	245.3	232.5	218.5	212.9
24	75	325.3	323.5	317.0	308.4	297.9	285.9	274.0	262.0	250.1	237.3	223.2	217.6
22	72	325.5	323.6	317.1	310.9	302.2	290.7	278.4	266.3	254.2	242.0	228.3	222.8
20	68	325.7	323.7	317.1	310.9	304.3	295.0	282.2	270.1	257.7	245.8	232.8	227.5
18	65	325.9	323.8	317.2	311.0	304.3	296.8	285.7	273.1	260.8	248.8	236.4	231.5
16	61	326.2	323.9	317.3	311.0	304.3	296.8	287.4	275.9	263.1	251.6	239.5	234.7
14	58	326.4	324.0	317.3	311.1	304.4	296.8	287.4	277.1	265.1	253.2	242.3	237.6
10	50	326.7	324.1	317.4	311.1	304.4	296.8	287.3	276.8	265.9	255.4	245.0	240.7
-40	-40	327.8	322.4	315.7	309.2	302.4	294.1	284.3	273.6	262.6	252.4	242.6	238.8

With engine bleed for packs off, increase weight by 800 kg.

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

With engine and wing anti-ice on, decrease weight by 4200 kg.

Flaps 15

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	251.0	245.1	234.8	228.9	224.0	218.0	208.0	198.0	187.2	173.8		
52	126	256.5	250.8	240.2	230.0	223.9	219.2	213.9	203.5	192.6	178.9		
50	122	262.4	257.0	246.0	235.6	225.1	219.1	214.8	209.0	198.0	184.2	171.1	
48	118	269.1	263.3	252.0	241.2	230.7	220.3	214.7	209.7	203.1	189.4	176.2	171.2
46	115	275.5	269.5	257.9	246.8	236.2	225.8	215.8	209.6	203.6	194.4	181.3	176.4
44	111	281.5	275.3	263.7	252.4	241.5	231.0	220.8	210.8	203.5	196.9	186.2	181.2
42	108	287.2	280.7	269.2	258.0	246.8	236.2	225.7	215.4	204.6	196.8	188.9	185.8
40	104	293.1	286.5	274.8	263.6	252.3	241.4	230.8	220.2	209.2	198.0	188.8	185.7
38	100	298.6	292.7	281.0	269.3	258.1	246.9	236.2	225.4	214.0	202.4	189.9	185.6
36	97	304.5	298.5	287.2	275.5	263.9	252.7	241.7	230.7	219.1	207.1	194.3	189.3
34	93	310.1	304.2	293.5	281.5	269.8	258.4	247.3	236.0	224.4	212.1	198.8	193.8
32	90	315.6	309.6	299.1	287.6	275.6	264.0	252.8	241.4	229.5	217.2	203.6	198.3
30	86	321.2	315.4	304.4	294.0	281.7	269.8	258.4	246.8	234.9	222.2	208.6	203.2
28	82	324.3	320.8	309.8	299.0	287.7	275.6	264.1	252.2	240.1	227.4	213.4	208.0
26	79	324.5	323.5	314.6	304.0	293.2	281.0	269.3	257.5	245.3	232.5	218.5	213.0
24	75	324.8	323.6	317.0	308.5	298.0	285.9	274.1	262.1	250.1	237.3	223.3	217.7
22	72	325.0	323.7	317.1	311.0	302.3	290.8	278.5	266.4	254.3	242.1	228.4	222.8
20	68	325.3	323.8	317.2	311.0	304.4	295.1	282.3	270.2	257.8	245.9	232.9	227.6
18	65	325.5	323.9	317.3	311.1	304.4	296.9	285.8	273.2	260.9	248.9	236.5	231.6
16	61	325.8	324.0	317.4	311.1	304.4	296.9	287.5	276.0	263.2	251.7	239.6	234.7
14	58	326.0	324.1	317.4	311.1	304.4	296.9	287.5	277.2	265.2	253.3	242.3	237.7
10	50	326.4	324.2	317.5	311.2	304.5	296.8	287.4	276.9	266.0	255.5	245.1	240.8
-40	-40	327.6	322.5	315.7	309.3	302.5	294.2	284.4	273.6	262.7	252.5	242.7	238.8

With engine bleed for packs off, increase weight by 800 kg.

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

With engine and wing anti-ice on, decrease weight by 4200 kg.

GEAR DOWN

Takeoff Climb Limit

Flaps 20

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

AIRPORT OAT		TAKEOFF CLIMB WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	250.8	245.2	234.9	229.0	224.1	218.0	208.1	198.0	187.2	173.9		
52	126	256.0	250.9	240.3	230.1	224.0	219.2	214.0	203.6	192.7	178.9		
50	122	261.9	257.1	246.1	235.7	225.2	219.1	214.8	209.1	198.0	184.2	171.1	
48	118	268.6	263.4	252.0	241.2	230.8	220.4	214.7	209.8	203.1	189.4	176.3	171.3
46	115	275.1	269.5	257.9	246.8	236.3	225.8	215.9	209.7	203.6	194.4	181.3	176.4
44	111	281.1	275.3	263.8	252.4	241.6	231.0	220.8	210.8	203.5	197.0	186.2	181.2
42	108	286.8	280.7	269.3	258.0	246.9	236.2	225.8	215.5	204.6	196.9	188.9	185.8
40	104	292.6	286.6	274.9	263.6	252.4	241.5	230.9	220.2	209.2	198.0	188.8	185.7
38	100	298.2	292.7	281.0	269.3	258.2	247.0	236.3	225.4	214.0	202.4	190.0	185.6
36	97	303.9	298.6	287.2	275.5	263.9	252.7	241.7	230.7	219.2	207.1	194.3	189.4
34	93	309.7	304.3	293.5	281.6	269.8	258.4	247.4	236.0	224.5	212.1	198.8	193.8
32	90	315.2	309.7	299.1	287.7	275.7	264.0	252.9	241.5	229.6	217.3	203.6	198.4
30	86	320.7	315.5	304.4	294.1	281.8	269.9	258.5	246.9	234.9	222.3	208.6	203.3
28	82	323.8	320.9	309.8	299.0	287.7	275.6	264.2	252.3	240.2	227.5	213.4	208.1
26	79	324.0	323.6	314.7	304.1	293.2	281.1	269.4	257.6	245.4	232.6	218.6	213.0
24	75	324.3	323.7	317.1	308.6	298.0	286.0	274.1	262.1	250.2	237.4	223.3	217.7
22	72	324.5	323.8	317.2	311.0	302.4	290.8	278.6	266.4	254.4	242.2	228.4	222.9
20	68	324.8	323.9	317.3	311.1	304.5	295.2	282.4	270.3	257.8	245.9	233.0	227.6
18	65	325.0	324.0	317.4	311.1	304.5	295.5	285.7	273.3	261.0	248.9	236.6	231.6
16	61	325.3	324.1	317.4	311.2	304.5	295.6	285.8	276.1	263.3	251.7	239.7	234.8
14	58	325.5	324.2	317.5	311.2	304.5	295.6	285.8	276.1	265.2	253.4	242.4	237.7
10	50	325.9	324.2	317.5	311.2	304.5	295.6	285.7	276.0	265.4	254.5	243.6	239.3
-40	-40	327.2	322.6	315.8	309.3	302.5	294.3	284.5	273.7	262.8	252.5	242.7	238.9

With engine bleed for packs off, increase weight by 800 kg.

With engine anti-ice on, decrease weight by 1750 kg.

With engine and wing anti-ice on, decrease weight by 3700 kg.

GEAR DOWN

Landing Climb Limit

Flaps 30

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

AIRPORT OAT		LANDING CLIMB LIMIT WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
(°C)	(°F)	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	273.0	264.5	256.3									
52	126	279.5	271.2	262.6	251.5								
50	122	286.2	277.6	268.8	257.6	247.1							
48	118	293.1	284.2	275.6	263.9	253.2	243.1						
46	115	300.3	291.3	282.7	271.0	259.8	249.4	239.0					
44	111	307.0	298.3	289.4	278.1	266.9	255.6	245.5	234.8				
42	108	313.4	304.9	296.4	284.6	273.8	262.0	251.4	241.1	230.2			
40	104	320.2	312.5	303.7	291.7	280.5	269.1	257.6	247.1	235.4	222.5		
38	100	326.8	319.1	310.6	298.2	286.2	275.0	263.3	252.5	240.7	227.0	213.4	
36	97	332.6	325.3	317.2	305.2	292.0	280.2	268.4	257.3	244.9	231.6	217.7	212.4
34	93	336.7	331.4	323.8	311.3	298.1	284.8	273.0	261.6	248.8	235.4	222.1	216.6
32	90	336.9	337.4	329.9	316.7	303.4	290.2	277.6	265.7	252.3	239.0	225.8	220.7
30	86	337.1	337.5	335.7	321.1	308.2	294.6	282.4	270.0	256.2	242.5	229.3	224.1
28	82	337.3	337.7	335.8	325.9	312.3	298.6	286.6	274.5	260.3	246.1	232.6	227.4
26	79	337.5	337.8	335.9	325.9	316.9	302.3	289.9	278.7	264.7	250.0	235.9	230.7
24	75	337.7	337.9	336.0	326.0	316.9	305.8	292.3	281.5	268.5	254.1	239.6	233.9
22	72	337.9	338.0	336.1	326.1	317.0	305.9	294.9	283.1	271.0	257.4	243.4	237.8
20	68	338.1	338.2	336.1	326.1	317.1	306.0	294.9	284.9	272.6	259.8	246.7	241.2
18	64	338.3	338.3	336.2	326.2	317.2	306.0	295.0	285.0	274.2	261.4	248.9	244.1
16	61	338.5	338.4	336.3	326.3	317.2	306.1	295.0	285.1	274.3	263.0	250.5	245.6
14	57	338.7	338.5	336.4	326.3	317.3	306.1	295.1	285.1	274.3	263.1	251.9	247.0
12	54	338.8	338.6	336.4	326.4	317.4	306.2	295.1	285.1	274.3	263.1	252.0	247.5
10	50	338.9	338.7	336.5	326.5	317.4	306.2	295.1	285.1	274.3	263.1	252.0	247.6
-40	-40	339.7	339.1	336.7	326.7	317.7	306.6	295.5	285.4	274.6	263.3	252.2	247.7

With engine bleed for packs off, increase weight by 1750 kg.

With engine and wing anti-ice on, decrease weight by 1700 kg.

When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 30650 kg.

Flaps 25

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

AIRPORT OAT		LANDING CLIMB LIMIT WEIGHT (1000 KG)											
		AIRPORT PRESSURE ALTITUDE (FT)											
(°C)	(°F)	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
54	129	274.7	266.0	257.7									
52	126	281.3	272.7	263.9	252.9								
50	122	287.9	279.1	270.1	258.8	248.4							
48	118	294.7	285.6	276.8	265.0	254.3	244.1						
46	115	301.5	292.6	283.7	271.9	260.7	250.2	239.8					
44	111	307.9	299.4	290.4	278.9	267.7	256.3	246.1	235.5				
42	108	314.1	305.7	297.4	285.4	274.6	262.9	252.1	241.7	230.9			
40	104	320.6	313.0	304.4	292.5	281.3	270.0	258.4	247.7	236.3	223.4		
38	100	327.2	319.5	311.2	299.2	287.5	276.1	264.4	253.4	241.6	228.0	214.3	
36	97	333.0	325.7	317.7	306.0	293.5	281.5	269.7	258.4	246.1	232.6	218.7	213.3
34	93	337.3	331.8	324.1	312.1	299.7	286.4	274.6	263.1	250.1	236.6	223.0	217.5
32	90	337.5	337.6	330.3	317.4	304.7	291.8	279.1	267.4	253.8	240.3	227.0	221.6
30	86	337.7	337.8	336.0	321.6	309.2	296.5	284.2	271.8	257.6	243.9	230.5	225.2
28	82	337.9	337.9	336.1	326.3	313.2	300.2	288.4	276.2	261.9	247.4	233.9	228.7
26	79	338.1	338.1	336.2	326.4	317.8	303.8	291.7	280.4	266.1	251.3	237.3	232.0
24	75	338.3	338.2	336.3	326.5	317.8	307.2	294.3	283.2	270.0	255.4	240.9	235.1
22	72	338.5	338.3	336.4	326.6	317.9	307.3	296.8	284.9	272.7	258.9	244.8	239.2
20	68	338.6	338.4	336.5	326.6	318.0	307.3	296.9	286.7	274.2	261.3	248.1	242.6
18	64	338.8	338.5	336.6	326.7	318.0	307.4	297.0	286.7	275.8	262.9	250.4	245.5
16	61	339.0	338.6	336.6	326.7	318.1	307.5	297.0	286.8	275.9	264.5	252.0	247.1
14	57	339.2	338.8	336.7	326.8	318.2	307.5	297.1	286.8	275.9	264.6	253.4	248.5
12	54	339.3	338.8	336.7	326.8	318.3	307.6	297.1	286.9	276.0	264.6	253.5	249.1
10	50	339.5	338.9	336.8	326.9	318.3	307.6	297.2	286.9	276.0	264.7	253.5	249.1
-40	-40	340.2	339.4	337.0	327.2	318.6	307.9	297.4	287.2	276.2	264.9	253.7	249.3

With engine bleed for packs off, increase weight by 1800 kg.

With engine and wing anti-ice on, decrease weight by 1600 kg.

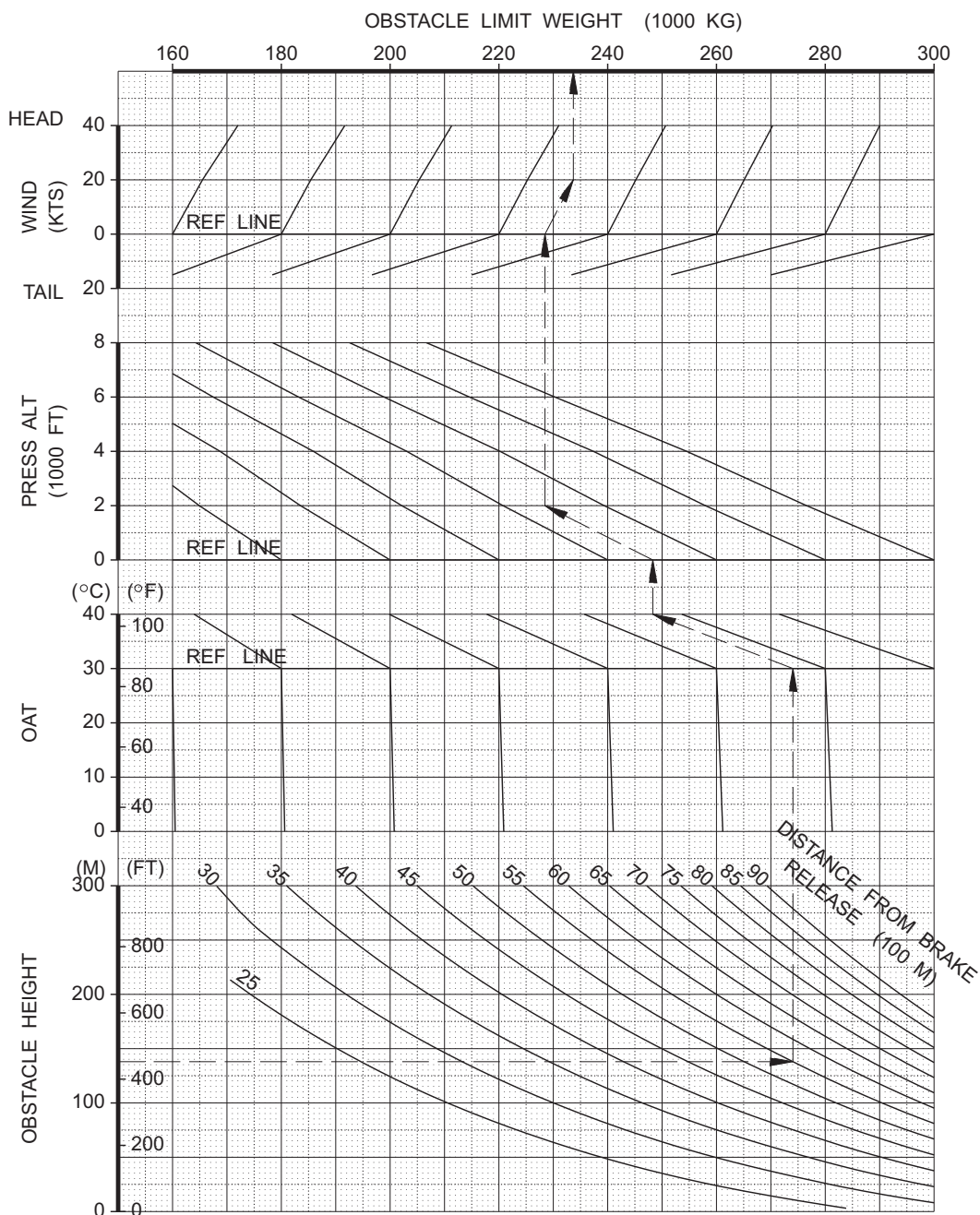
When operating in icing conditions during any part of the flight with forecast landing temperature below 10°C, decrease weight by 31550 kg.

GEAR DOWN

Obstacle Limit

Flaps 5

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



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

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 950 kg.

With engine anti-ice on, decrease weight by 1600 kg.

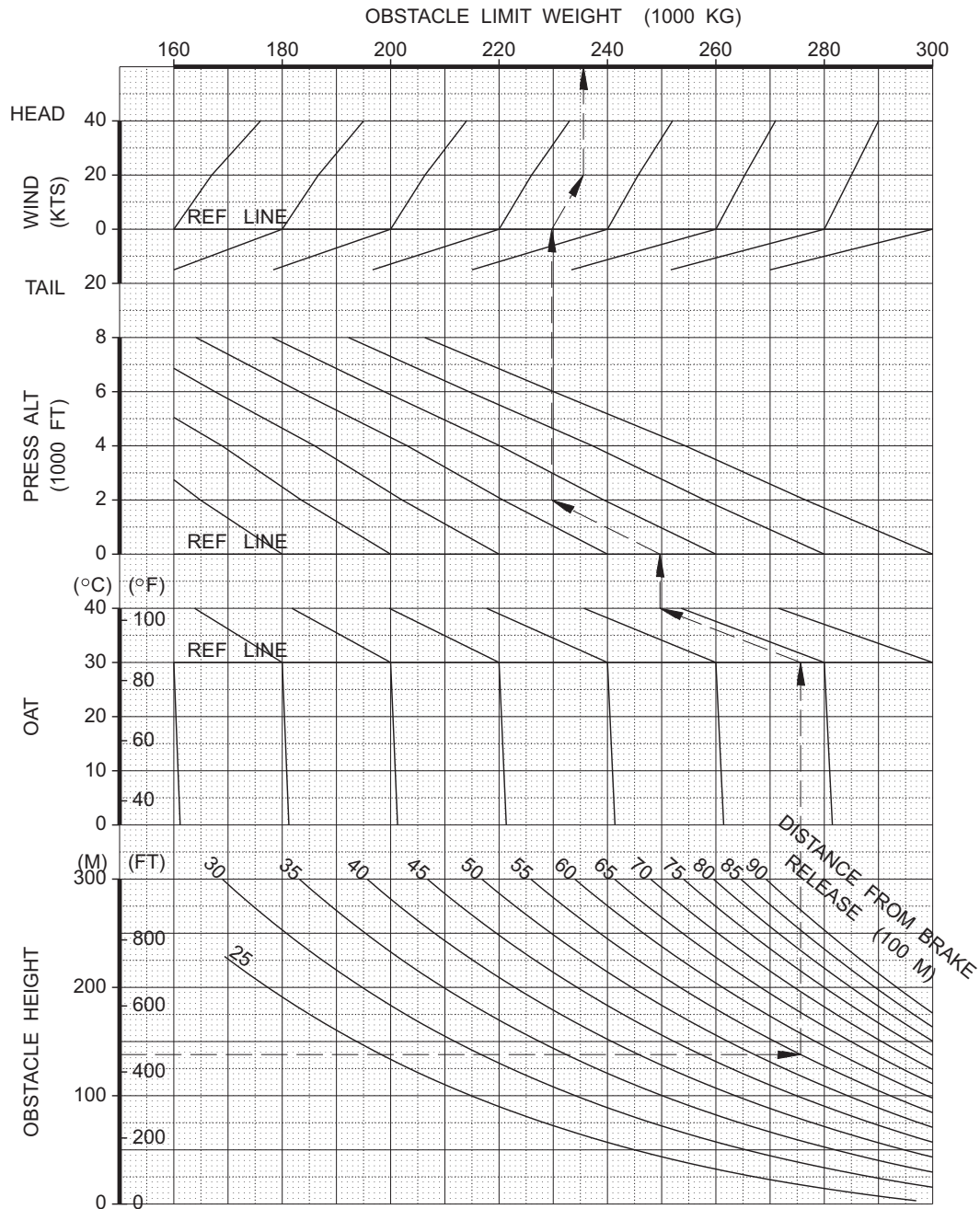
With engine and wing anti-ice on, decrease weight by 3950 kg.

GEAR DOWN

Obstacle Limit

Flaps 15

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



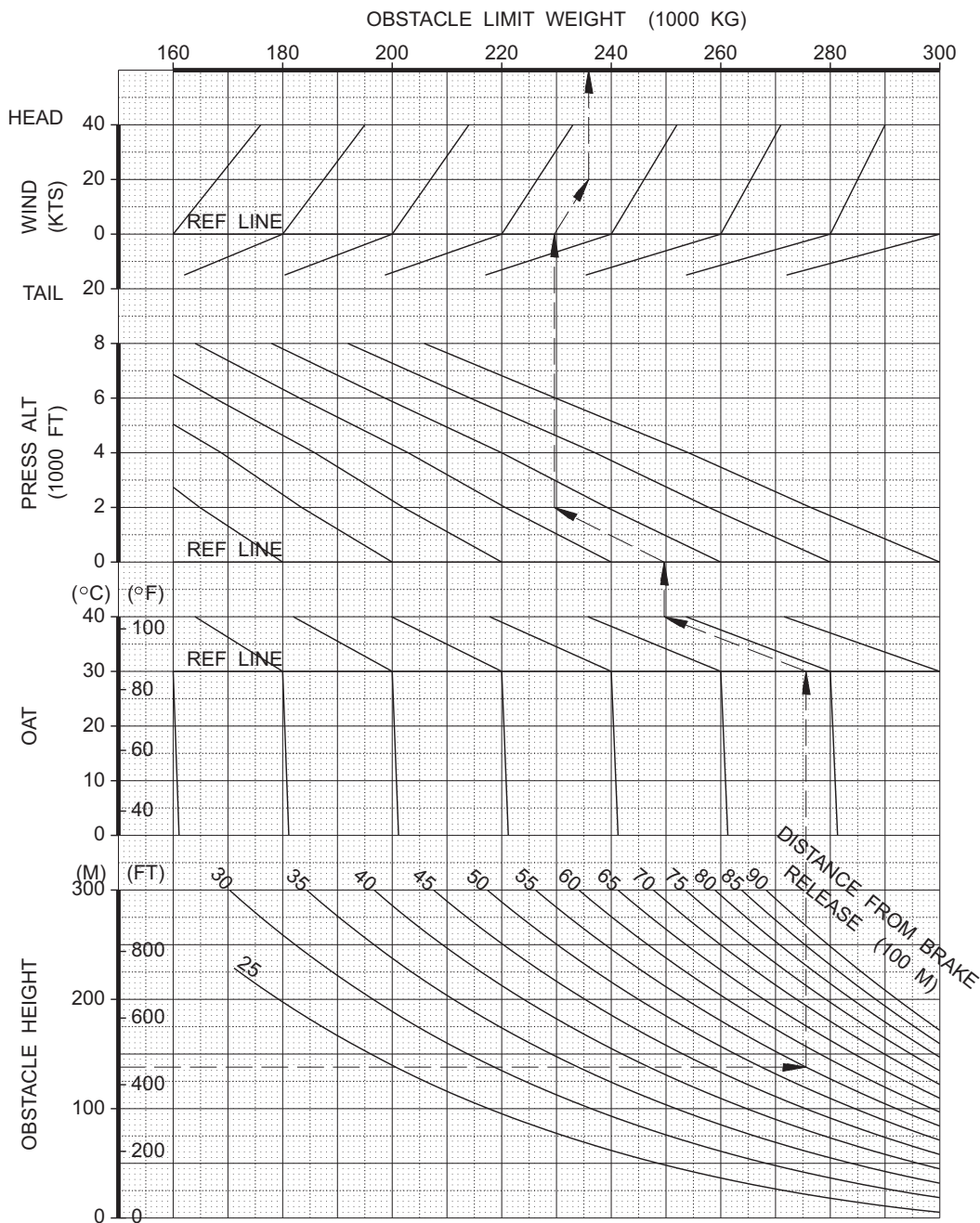
When using line-up allowances, the obstacle distance from brake release must be reduced by the ASDA adjustment.
Obstacle height must be calculated from the lowest point of the runway to conservatively account for runway slope.
With engine bleed for packs off, increase weight by 950 kg.
With engine anti-ice on, decrease weight by 1600 kg.
With engine and wing anti-ice on, decrease weight by 3950 kg.

GEAR DOWN

Obstacle Limit

Flaps 20

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



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

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

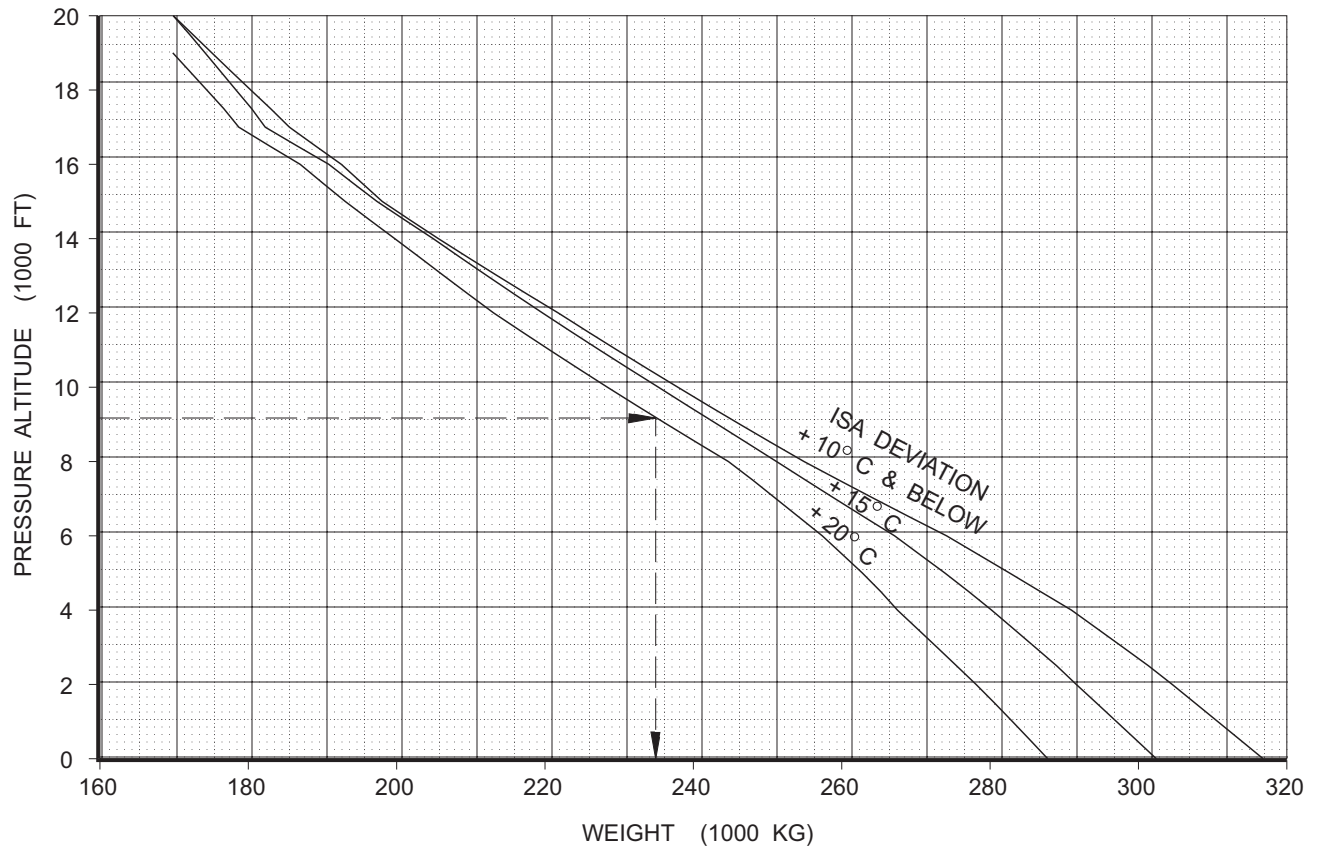
With engine bleed for packs off, increase weight by 950 kg.

With engine anti-ice on, decrease weight by 1600 kg.

With engine and wing anti-ice on, decrease weight by 3950 kg.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Net Level Off Weight

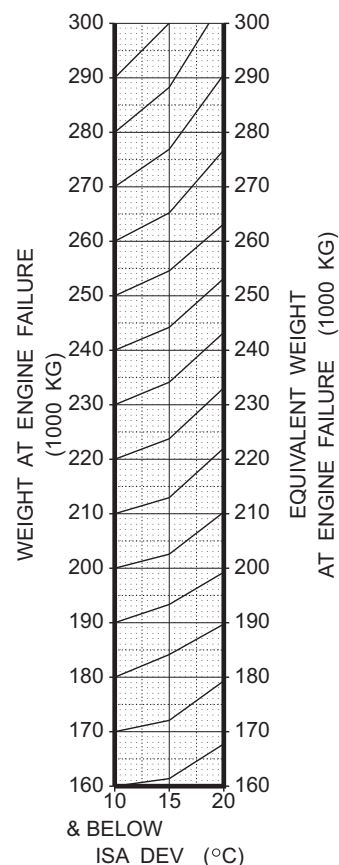
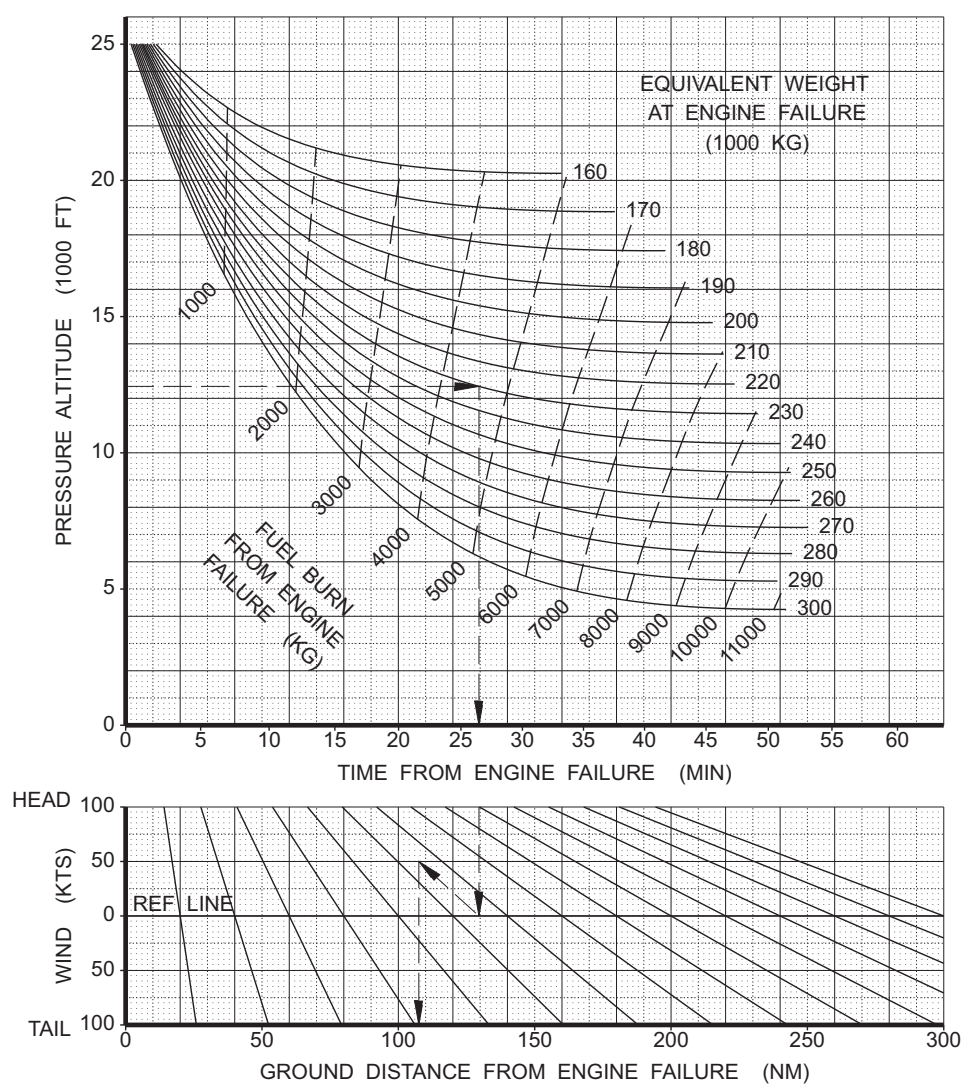


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	LEVEL OFF WEIGHT ADJUSTMENT (1000 KG)									
	PRESSURE ALTITUDE (1000 FT)									
	0	2	4	6	8	10	12	14	16	18
ENGINE ONLY	0.0	-0.6	-1.0	-1.1	-1.0	-0.8	-0.7	-0.1	0.0	0.0
ENGINE AND WING	-2.2	-2.9	-2.9	-3.0	-2.6	-2.3	-1.9	-1.5	-1.2	-1.0

GEAR DOWN

Driftdown Profiles Net Flight Path 25000 FT and Above

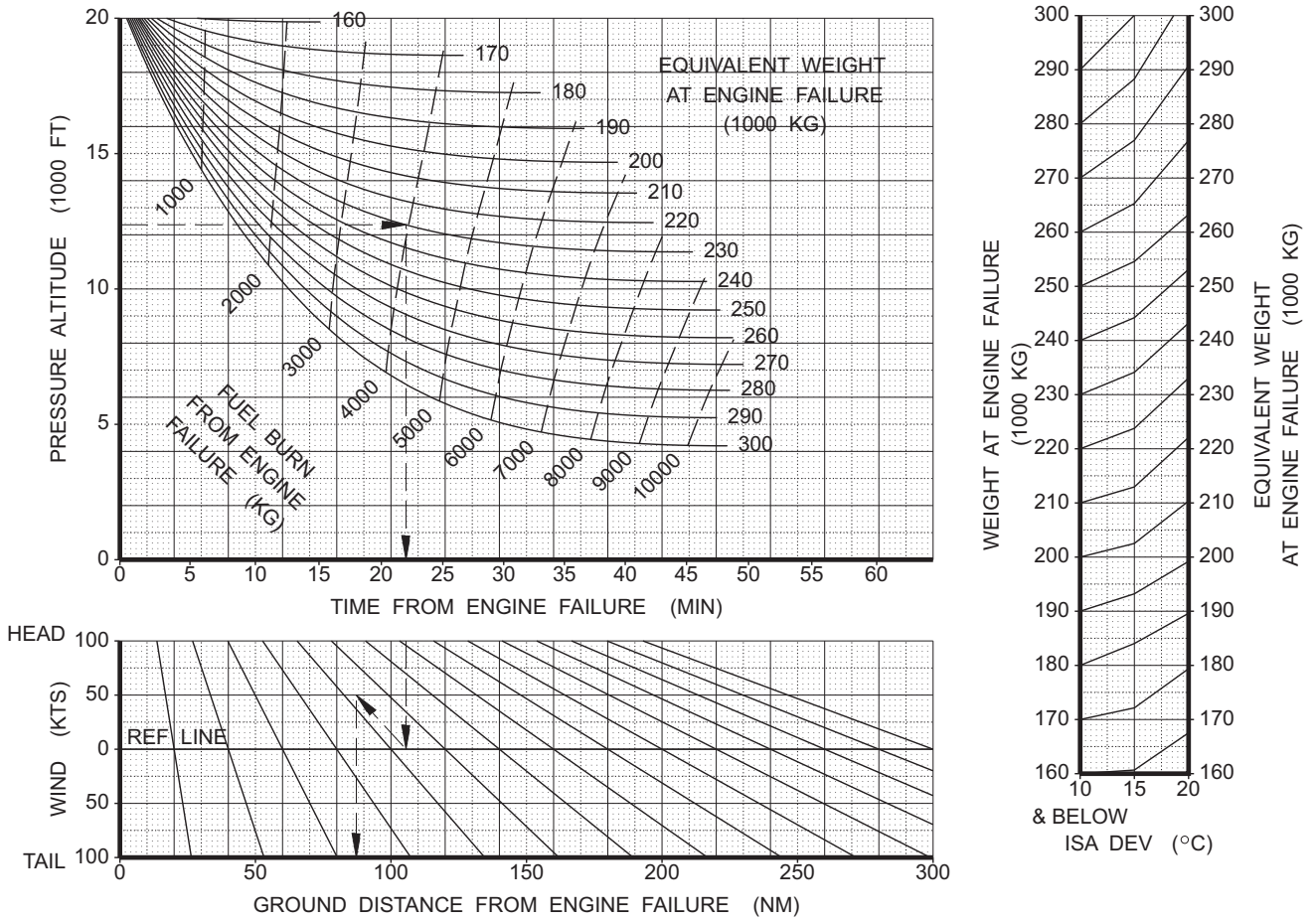


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
	4	6	8	10	12	14	16	18
ENGINE ONLY	1.0	1.1	1.0	0.8	0.7	0.1	0.0	0.0
ENGINE AND WING	2.9	3.0	2.6	2.3	1.9	1.5	1.2	1.0

GEAR DOWN

Driftdown Profiles Net Flight Path Below 25000 FT

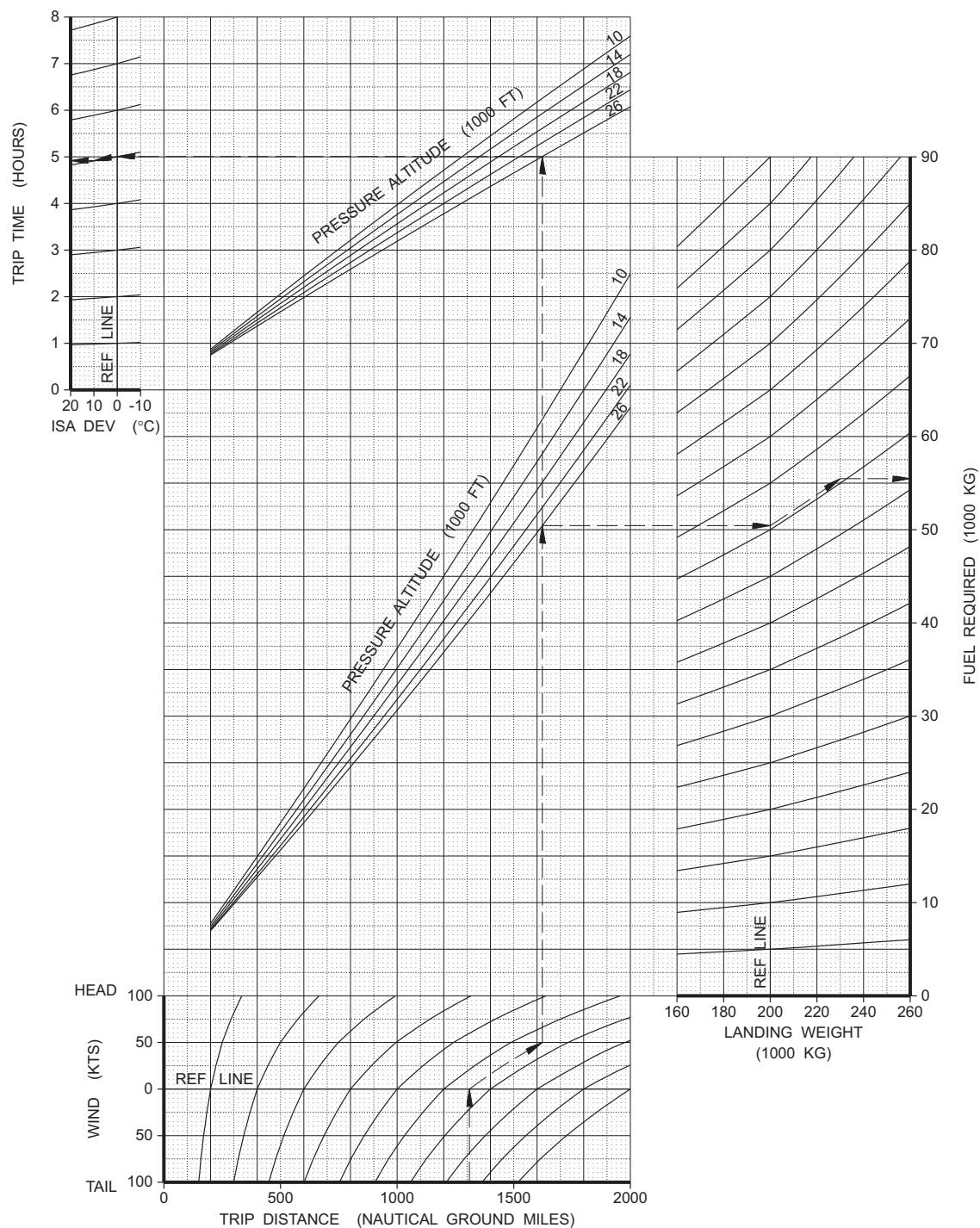


Anti-Ice Adjustments

ANTI-ICE CONFIGURATION	EQUIVALENT WEIGHT ADJUSTMENT (1000 KG)							
	PRESSURE ALTITUDE (1000 FT)							
	4	6	8	10	12	14	16	18
ENGINE ONLY	1.0	1.1	1.0	0.8	0.7	0.1	0.0	0.0
ENGINE AND WING	2.9	3.0	2.6	2.3	1.9	1.5	1.2	1.0

GEAR DOWN

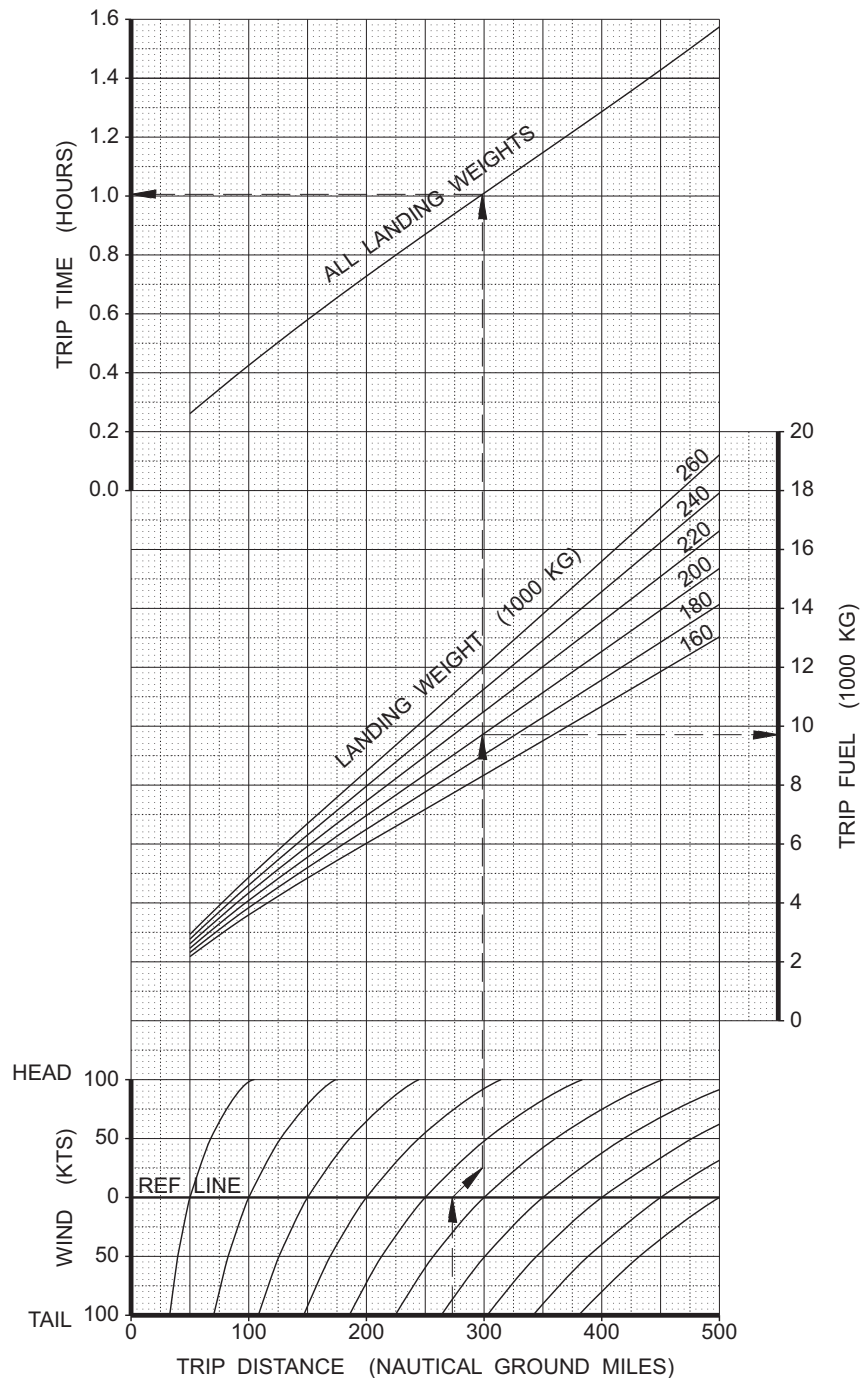
Long Range Cruise Trip Fuel and Time Based on VREF30+80 climb and descent



GEAR DOWN

Long Range Cruise Short Trip Fuel and Time

Based on VREF30+80 climb and descent at short trip cruise altitude



Intentionally
Blank

GEAR DOWN

Long Range Cruise Altitude Capability

Max Climb Thrust, 300 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
360	18200	16100	13700
350	18800	16900	14400
340	19400	17600	15100
330	20000	18200	15800
320	20700	19100	16800
310	21800	20300	18000
300	22800	21400	19300
290	24000	22500	20600
280	25100	23700	22000
270	26200	24800	23300
260	27300	26100	24600
250	28500	27500	26000
240	29700	28900	27400
230	30600	30200	28900
220	31400	31100	30300
210	32300	32000	31400
200	33200	33000	32500
190	34100	34000	33700
180	35000	34900	34800
170	36000	36000	35800
160	37000	37000	36800

220 KIAS Max Climb %N1

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

TAT (°C)	PRESSURE ALTITUDE (FT)														
	0	5000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000
55	88.2	88.3	91.4	91.1	92.1	91.3	94.0	95.2	95.4	98.1	99.9	101.1	102.4	102.9	103.4
50	89.5	88.8	90.7	90.4	91.4	92.1	93.3	94.5	94.7	97.3	99.2	100.3	101.6	102.1	102.6
45	90.5	90.1	90.0	89.7	90.7	91.4	92.6	93.8	93.9	96.6	98.4	99.6	100.8	101.3	101.8
40	91.6	91.2	91.2	89.7	89.9	90.7	91.9	93.0	93.2	95.8	97.6	98.8	100.0	100.5	101.0
35	92.6	92.3	92.2	92.1	90.6	89.9	91.1	92.3	92.5	95.0	96.8	98.0	99.2	99.7	100.2
30	93.0	93.2	93.2	93.0	92.2	91.2	90.9	91.5	91.7	94.3	96.0	97.2	98.4	98.9	99.4
25	92.2	94.2	94.1	94.0	93.7	92.8	92.1	92.0	91.1	93.5	95.2	96.4	97.6	98.0	98.5
20	91.4	94.2	95.1	95.0	94.9	94.4	93.4	93.0	92.8	93.6	94.4	95.6	96.8	97.2	97.7
15	90.7	93.4	96.7	96.4	96.3	96.1	94.8	94.1	94.5	94.8	95.2	95.3	96.0	96.4	96.9
10	89.9	92.6	96.3	97.9	98.1	98.1	96.8	95.5	96.5	96.2	96.4	96.4	96.6	96.1	96.0
5	89.1	91.7	95.4	97.1	98.9	100.3	99.0	97.9	98.2	97.8	97.8	97.9	97.9	97.3	96.8
0	88.3	90.9	94.6	96.2	98.0	100.1	100.8	100.3	100.1	99.7	99.4	99.4	99.5	98.6	98.1
-5	87.4	90.1	93.7	95.3	97.1	99.1	99.9	100.8	101.9	101.5	101.1	101.1	101.1	100.2	99.6
-10	86.6	89.2	92.8	94.4	96.1	98.2	98.9	99.8	101.4	102.8	102.6	102.6	103.0	101.6	100.8
-15	85.8	88.4	91.9	93.5	95.2	97.3	98.0	98.9	100.4	101.8	102.5	103.2	103.8	102.5	101.4
-20	85.0	87.5	91.1	92.6	94.3	96.3	97.0	97.9	99.4	100.8	101.5	102.2	103.3	102.4	101.3

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)							
	0	5000	10000	15000	20000	25000	30000	35000
2 PACKS ON - 1 BLEED SOURCE	-0.4	-0.5	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4
1 PACK ON - 1 OR 2 BLEED SOURCES	-0.4	-0.5	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4
ENGINE ANTI-ICE ON	-0.3	-0.5	-0.4	-0.3	-0.1	-0.2	-0.2	-0.2
ENGINE & WING ANTI-ICE ON*	-0.6	-0.8	-0.7	-0.5	-0.2	-0.3	-0.3	-0.4
ENGINE & WING ANTI-ICE ON**	-1.1	-0.9	-0.9	-0.6	-0.3	-0.4	-0.5	-0.5

*Packs on or off with 2 bleed sources.

**Packs off with 1 bleed source.



GEAR DOWN

Long Range Cruise Table 35000 FT to 30000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
35	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
34	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
33	%N1 MAX TAT KIAS MACH FF/ENG KTAS	PERFORMANCE THRUST LIMITED										
32	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
31	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
30	%N1 MAX TAT KIAS MACH FF/ENG KTAS											

GEAR DOWN

Long Range Cruise Table 35000 FT to 30000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
35 (-38)	%N1									91.9	89.4	87.2
	MAX TAT									-14		
	KIAS									206	203	199
	MACH									.621	.610	.600
	FF/ENG KTAS									4337 358	4045 352	3800 346
34 (-36)	%N1								92.1	89.8	87.6	86.1
	MAX TAT								-13	-6		
	KIAS								210	206	203	199
	MACH								.617	.608	.597	.587
	FF/ENG KTAS								4536 357	4245 352	3994 346	3768 340
33 (-35)	%N1							92.5	90.0	88.0	86.4	85.0
	MAX TAT							-12	-5			
	KIAS							214	210	206	203	199
	MACH							.616	.604	.595	.584	.574
	FF/ENG KTAS							4761 358	4438 351	4190 346	3956 340	3741 334
32 (-33)	%N1						93.0	90.4	88.3	86.8	85.4	84.0
	MAX TAT						-11	-4				
	KIAS						219	214	210	206	203	199
	MACH						.617	.602	.591	.582	.572	.562
	FF/ENG KTAS						5015 360	4648 352	4379 345	4147 340	3925 334	3718 328
31 (-31)	%N1				96.0	93.4	90.8	88.6	87.1	85.7	84.4	83.1
	MAX TAT				-17	-9	-3					
	KIAS				230	225	219	214	210	206	203	199
	MACH				.630	.617	.603	.589	.579	.570	.560	.550
	FF/ENG KTAS				5716 370	5264 362	4894 354	4578 346	4333 340	4112 334	3899 328	3702 323
30 (-29)	%N1			96.2	93.6	91.2	89.0	87.4	86.0	84.8	83.5	82.3
	MAX TAT			-13	-7	-2						
	KIAS			235	229	224	219	214	210	206	203	199
	MACH			.629	.616	.603	.590	.576	.567	.558	.548	.538
	FF/ENG KTAS			5959 371	5509 363	5139 355	4820 348	4525 339	4295 334	4084 329	3882 323	3684 317

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0
35	87.4	88.4	89.5	90.5	91.6	92.6	93.6	94.6	95.4	96.4	96.7	96.0	95.1	93.9
34	87.8	88.9	89.9	90.9	92.0	93.0	94.0	95.0	95.9	96.5	96.9	96.1	95.3	94.2
33	88.1	89.2	90.2	91.3	92.3	93.4	94.4	95.4	96.4	96.9	97.1	96.4	95.5	94.5
32	88.4	89.4	90.5	91.5	92.6	93.6	94.6	95.6	96.6	97.3	97.4	96.7	95.8	94.8
31	88.5	89.6	90.7	91.7	92.8	93.8	94.8	95.8	96.8	97.6	97.9	97.3	96.2	95.2
30	88.8	89.9	90.9	92.0	93.0	94.1	95.1	96.1	97.1	98.0	98.6	98.1	96.7	95.6

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.6.

GEAR DOWN

Long Range Cruise Table 29000 FT to 24000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
29	%N1 MAX TAT KIAS MACH FF/ENG KTAS											
28 (-22)	%N1 MAX TAT KIAS MACH FF/ENG KTAS											96.4 -12 244 .626 6428 372
27 (-21)	%N1 MAX TAT KIAS MACH FF/ENG KTAS											94.0 -5 243 .613 6228 366
26 (-19)	%N1 MAX TAT KIAS MACH FF/ENG KTAS										94.0 -4 248 .611 6460 366	92.1 0 243 .600 6100 359
25 (-17)	%N1 MAX TAT KIAS MACH FF/ENG KTAS									94.0 -3 252 .609 6688 366	92.1 1 247 .598 6334 360	90.4 5 243 .587 6014 353
24 (-16)	%N1 MAX TAT KIAS MACH FF/ENG KTAS								93.9 -2 256 .606 6911 366	92.1 2 252 .596 6564 360	90.6 6 247 .585 6247 354	89.3 9 243 .575 5944 348

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
28	90.8	91.9	92.9	93.9	94.9	95.9	96.9	97.8	97.6	96.6	95.4	94.3	93.5	92.6
27	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	97.6	96.7	95.4	94.3	93.5	92.6
26	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	96.7	95.4	94.2	93.5	92.6
25	89.1	90.1	91.1	92.1	93.1	94.0	95.0	95.9	96.9	97.0	95.5	94.2	93.4	92.7
24	88.5	89.5	90.4	91.4	92.4	93.3	94.3	95.2	96.2	97.1	95.7	94.3	93.3	92.3

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

GEAR DOWN

Long Range Cruise Table 29000 FT to 24000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
29 (-27)	%N1		96.4	93.8	91.5	89.4	87.8	86.3	85.1	83.9	82.7	81.4
	MAX TAT		-13	-7	-2	3						
	KIAS		239	234	229	224	219	213	210	206	203	199
	MACH		.628	.615	.603	.590	.577	.564	.555	.546	.537	.527
	FF/ENG		6197	5751	5383	5062	4764	4480	4265	4066	3863	3663
28 (-25)	KTAS		372	364	357	349	342	334	329	323	318	312
	%N1	96.4	94.0	91.8	89.8	88.2	86.7	85.3	84.2	83.0	81.8	80.5
	MAX TAT	-12	-6	-1	3							
	KIAS	244	239	234	229	224	219	213	210	206	203	199
	MACH	.626	.614	.602	.590	.577	.565	.552	.544	.535	.525	.516
27 (-24)	FF/ENG	6428	5991	5625	5302	5003	4714	4447	4245	4045	3841	3644
	KTAS	372	365	358	351	343	336	328	323	318	312	307
	%N1	94.0	92.0	90.0	88.6	87.1	85.8	84.4	83.3	82.2	80.8	79.5
	MAX TAT	-5	-1	4	8							
	KIAS	243	238	234	229	224	218	213	210	206	203	199
26 (-22)	MACH	.613	.601	.589	.577	.565	.553	.541	.532	.524	.515	.505
	FF/ENG	6228	5864	5541	5240	4949	4674	4426	4223	4021	3821	3628
	KTAS	366	359	352	345	337	330	323	318	313	307	302
	%N1	92.1	90.3	88.9	87.5	86.2	84.8	83.6	82.5	81.2	79.9	78.6
	MAX TAT	0	4	8								
25 (-21)	KIAS	243	238	233	228	223	218	213	210	206	203	199
	MACH	.600	.588	.577	.565	.553	.541	.530	.521	.513	.504	.495
	FF/ENG	6100	5779	5477	5183	4905	4648	4402	4197	4000	3805	3618
	KTAS	359	353	346	339	332	324	318	313	308	302	297
	%N1	90.4	89.1	87.8	86.5	85.3	84.0	82.7	81.5	80.2	79.0	77.7
24 (-19)	MAX TAT	5	9									
	KIAS	243	238	233	228	223	218	213	210	206	203	199
	MACH	.587	.576	.565	.554	.542	.530	.519	.511	.503	.494	.485
	FF/ENG	6014	5711	5416	5137	4878	4620	4375	4176	3984	3796	3612
	KTAS	353	347	340	333	326	319	312	308	303	297	292
	%N1	89.3	88.0	86.8	85.6	84.4	83.1	81.7	80.5	79.4	78.1	76.8
	MAX TAT	9	12									
	KIAS	243	238	233	228	223	218	213	210	206	203	199
	MACH	.575	.564	.553	.542	.531	.519	.508	.501	.492	.484	.475
	FF/ENG	5944	5648	5368	5109	4850	4590	4354	4160	3975	3789	3606
	KTAS	348	341	334	328	321	314	307	303	298	292	287

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)												
	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5
29	90.5	91.5	92.6	93.6	94.6	95.6	96.6	97.6	98.2	97.8	96.6	95.5	94.4
28	89.8	90.8	91.9	92.9	93.9	94.9	95.9	96.9	97.8	97.6	96.6	95.4	94.3
27	89.3	90.3	91.3	92.3	93.3	94.3	95.3	96.3	97.3	97.6	96.7	95.4	94.3
26	88.6	89.7	90.7	91.7	92.7	93.7	94.7	95.6	96.6	97.5	96.7	95.4	94.2
25	88.1	89.1	90.1	91.1	92.1	93.1	94.0	95.0	95.9	96.9	97.0	95.5	94.2
24	87.4	88.5	89.5	90.4	91.4	92.4	93.3	94.3	95.2	96.2	97.1	95.7	94.3

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.6.

GEAR DOWN

Long Range Cruise Table 23000 FT to 18000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
23 (-14)	%N1							93.8	92.0	90.7	89.5	88.3
	MAX TAT							0	4	7	10	13
	KIAS							260	256	252	247	242
	MACH							.603	.593	.584	.573	.563
	FF/ENG KTAS							7132 366	6793 360	6478 354	6175 348	5878 342
22 (-12)	%N1						93.6	92.0	90.8	89.6	88.4	87.3
	MAX TAT						2	5	8	11	14	16
	KIAS						265	260	256	251	247	242
	MACH						.600	.591	.581	.572	.562	.552
	FF/ENG KTAS						7352 366	7020 360	6708 354	6404 348	6107 342	5831 336
21 (-10)	%N1				94.5	93.3	91.9	90.8	89.7	88.6	87.5	86.4
	MAX TAT				1	3	7	9	12	14	17	
	KIAS				270	269	264	260	256	251	247	242
	MACH				.600	.597	.588	.579	.570	.560	.551	.541
	FF/ENG KTAS				7807 367	7571 365	7245 360	6934 354	6631 349	6335 343	6062 337	5802 331
20 (-9)	%N1			93.6	92.7	91.9	90.8	89.7	88.7	87.7	86.6	85.6
	MAX TAT			4	6	8	11	13	15	17	19	
	KIAS			270	270	268	264	260	255	251	247	242
	MACH			.589	.589	.585	.577	.567	.558	.549	.540	.530
	FF/ENG KTAS			7869 362	7692 362	7468 360	7158 354	6854 349	6562 343	6292 337	6032 332	5766 326
19 (-7)	%N1	93.6	92.8	92.2	91.6	90.8	89.8	88.8	87.8	86.8	85.8	84.7
	MAX TAT	5	7	8	10	12	14	16	18	20		
	KIAS	270	270	270	270	268	264	260	255	251	246	242
	MACH	.578	.578	.578	.578	.574	.565	.556	.547	.538	.529	.520
	FF/ENG KTAS	8126 356	7939 356	7762 356	7599 356	7378 354	7076 348	6789 343	6521 338	6258 332	5992 326	5728 320
18 (-6)	%N1	92.3	91.7	91.1	90.5	89.8	88.8	87.9	86.9	85.9	84.9	83.7
	MAX TAT	9	11	12	14	16	18	20	22	24		
	KIAS	270	270	270	270	268	264	260	255	251	246	242
	MACH	.567	.567	.567	.567	.562	.554	.545	.537	.528	.519	.509
	FF/ENG KTAS	8010 351	7837 351	7670 351	7516 351	7297 348	7015 343	6747 338	6483 332	6217 327	5954 321	5701 315

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
23	89.8	90.8	91.7	92.7	93.6	94.5	95.5	96.4	96.0	94.5	93.2	92.0	90.8	89.4
22	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.8	96.1	94.6	93.3	91.9	90.4	88.8
21	88.7	89.7	90.6	91.6	92.5	93.4	94.3	95.2	95.7	94.1	93.0	91.8	90.6	89.3
20	88.4	89.3	90.3	91.2	92.1	93.1	94.0	94.9	95.3	93.6	92.5	91.5	90.6	89.3
19	87.9	88.9	89.8	90.7	91.7	92.6	93.5	94.3	95.2	94.2	92.8	91.7	90.6	89.4
18	87.5	88.5	89.4	90.3	91.2	92.1	93.0	93.9	94.8	94.8	93.3	91.9	90.7	89.3

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.5.

GEAR DOWN

Long Range Cruise Table 23000 FT to 18000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
23 (-18)	%N1	88.3	87.1	85.9	84.7	83.5	82.1	80.8	79.7	78.5	77.2	75.9
	MAX TAT	13										
	KIAS	242	238	233	228	223	218	213	210	206	203	199
	MACH	.563	.553	.542	.531	.520	.509	.498	.490	.482	.474	.465
	FF/ENG	5878	5600	5340	5080	4819	4566	4339	4152	3969	3784	3602
22 (-16)	KTAS	342	335	329	322	316	309	302	298	293	288	282
	%N1	87.3	86.2	85.1	83.9	82.6	81.2	79.9	78.7	77.5	76.3	75.0
	MAX TAT	16										
	KIAS	242	238	233	228	223	218	213	210	206	203	199
	MACH	.552	.542	.531	.520	.510	.498	.488	.481	.473	.464	.456
21 (-15)	FF/ENG	5831	5572	5310	5047	4793	4549	4330	4145	3964	3779	3597
	KTAS	336	330	324	317	311	304	298	293	288	283	278
	%N1	86.4	85.3	84.2	82.9	81.6	80.3	78.9	77.7	76.5	75.2	74.0
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
20 (-13)	MACH	.541	.531	.520	.510	.499	.488	.479	.471	.463	.455	.447
	FF/ENG	5802	5539	5275	5021	4775	4539	4323	4139	3959	3774	3591
	KTAS	331	325	318	312	306	299	293	288	284	278	273
	%N1	85.6	84.5	83.3	82.0	80.7	79.3	77.9	76.7	75.4	74.2	72.8
	MAX TAT											
19 (-11)	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.520	.510	.500	.490	.480	.469	.460	.453	.445	.437	.429
	FF/ENG	5728	5474	5227	4990	4756	4524	4310	4127	3945	3762	3585
	KTAS	320	315	308	302	296	289	284	279	275	270	265
	%N1	83.7	82.6	81.3	80.1	78.7	77.3	76.0	74.8	73.6	72.3	71.0
18 (-10)	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.509	.500	.490	.481	.471	.460	.451	.444	.437	.429	.421
	FF/ENG	5701	5454	5216	4981	4747	4514	4301	4117	3938	3758	3584
	KTAS	315	310	304	298	291	285	279	275	270	265	261

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
23	88.8	89.8	90.8	91.7	92.7	93.6	94.5	95.5	96.4	96.0	94.5	93.2	92.0	90.8
22	88.2	89.2	90.2	91.1	92.1	93.0	93.9	94.8	95.8	96.1	94.6	93.3	91.9	90.4
21	87.8	88.7	89.7	90.6	91.6	92.5	93.4	94.3	95.2	95.7	94.1	93.0	91.8	90.6
20	87.4	88.4	89.3	90.3	91.2	92.1	93.1	94.0	94.9	95.3	93.6	92.5	91.5	90.6
19	87.0	87.9	88.9	89.8	90.7	91.7	92.6	93.5	94.3	95.2	94.2	92.8	91.7	90.6
18	86.6	87.5	88.5	89.4	90.3	91.2	92.1	93.0	93.9	94.8	94.8	93.3	91.9	90.7

With engine anti-ice on, decrease limit %N1 by 0.2.

With engine and wing anti-ice on, decrease limit %N1 by 0.5.

GEAR DOWN

Long Range Cruise Table 17000 FT to 12000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
17 (-4)	%N1	91.1	90.6	90.0	89.5	88.8	87.9	87.0	86.0	85.0	83.9	82.7
	MAX TAT	13	15	16	18	19	21	23	25			
	KIAS	270	270	270	270	268	264	259	255	251	246	242
	MACH	.556	.556	.556	.556	.552	.543	.535	.526	.517	.509	.500
	FF/ENG	7912	7747	7589	7448	7240	6973	6706	6441	6179	5927	5680
16 (-2)	KTAS	346	346	346	346	343	338	332	327	322	316	311
	%N1	90.1	89.6	89.1	88.6	87.9	87.0	86.0	85.0	83.9	82.8	81.7
	MAX TAT	17	18	20	21	23	25	27				
	KIAS	270	270	270	270	268	263	259	255	251	246	242
	MACH	.546	.546	.546	.546	.541	.533	.524	.516	.508	.499	.490
15 (-1)	FF/ENG	7829	7675	7530	7401	7197	6930	6665	6406	6154	5908	5669
	KTAS	340	340	340	340	338	332	327	322	317	311	306
	%N1	89.1	88.6	88.1	87.7	86.9	86.0	84.9	83.9	82.9	81.8	80.7
	MAX TAT	21	22	24	26	27	29					
	KIAS	270	270	270	270	268	263	259	255	251	246	242
14 (1)	MACH	.535	.535	.535	.535	.531	.523	.514	.506	.498	.489	.481
	FF/ENG	7771	7624	7485	7362	7156	6892	6634	6382	6136	5897	5659
	KTAS	335	335	335	335	332	327	322	317	312	307	301
	%N1	88.2	87.7	87.2	86.7	86.0	85.0	84.0	83.0	82.0	80.9	79.8
	MAX TAT	25	26	28	29	31						
13 (2)	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.525	.525	.525	.525	.520	.513	.505	.497	.488	.480	.472
	FF/ENG	7730	7583	7446	7328	7121	6863	6612	6366	6125	5887	5648
	KTAS	330	330	330	330	327	322	317	312	307	302	297
	%N1	87.3	86.8	86.3	85.8	85.1	84.1	83.1	82.2	81.1	80.0	78.9
12 (4)	MAX TAT	28	30	31	32							
	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.516	.516	.516	.516	.511	.503	.495	.487	.479	.471	.463
	FF/ENG	7693	7547	7413	7299	7094	6842	6596	6355	6115	5877	5639
	KTAS	326	326	326	326	322	318	313	308	303	297	292
11 (5)	%N1	86.4	85.9	85.4	85.0	84.2	83.3	82.3	81.3	80.2	79.1	78.0
	MAX TAT	32	33	35								
	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.506	.506	.506	.506	.501	.494	.486	.478	.470	.462	.454
	FF/ENG	7659	7517	7388	7277	7072	6827	6585	6345	6106	5869	5633
10 (6)	KTAS	321	321	321	321	318	313	308	303	298	293	288

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
17	88.1	89.1	90.0	90.9	91.8	92.7	93.5	94.4	95.2	93.9	92.3	90.9	89.4	88.1
16	87.5	88.4	89.3	90.2	91.1	92.0	92.9	93.7	94.5	94.1	92.8	91.4	89.8	88.2
15	87.0	87.9	88.8	89.7	90.6	91.4	92.3	93.2	94.0	94.3	93.1	92.0	90.3	88.4
14	86.5	87.4	88.3	89.1	90.0	90.9	91.7	92.6	93.4	94.2	93.3	92.2	90.9	89.2
13	86.0	86.9	87.8	88.6	89.5	90.4	91.2	92.1	92.9	93.7	93.4	92.3	91.2	89.8
12	85.5	86.4	87.3	88.1	89.0	89.9	90.7	91.5	92.4	93.2	93.5	92.4	91.4	90.4

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

GEAR DOWN

Long Range Cruise Table 17000 FT to 12000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
17 (-8)	%N1	82.7	81.6	80.3	79.0	77.7	76.3	75.0	73.8	72.6	71.3	70.1
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.500	.490	.481	.471	.461	.451	.442	.435	.428	.420	.413
	FF/ENG	5680	5442	5206	4971	4736	4503	4290	4109	3933	3757	3584
16 (-6)	KTAS	311	305	299	293	287	280	275	271	266	261	257
	%N1	81.7	80.5	79.3	78.0	76.7	75.4	74.1	72.9	71.7	70.5	69.2
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.490	.481	.472	.462	.452	.443	.434	.427	.420	.412	.405
15 (-5)	FF/ENG	5669	5432	5195	4959	4724	4492	4283	4106	3933	3758	3585
	KTAS	306	300	294	288	282	276	271	266	262	257	253
	%N1	80.7	79.5	78.3	77.1	75.8	74.5	73.1	72.0	70.8	69.6	68.2
	MAX TAT											
	KIAS	242	237	232	228	223	218	213	210	206	203	199
14 (-3)	MACH	.481	.472	.463	.453	.444	.434	.425	.419	.412	.404	.397
	FF/ENG	5659	5421	5184	4948	4715	4487	4281	4107	3935	3759	3585
	KTAS	301	296	290	284	278	272	267	262	258	253	249
	%N1	79.8	78.6	77.5	76.2	74.9	73.5	72.2	71.1	70.0	68.6	67.3
	MAX TAT											
13 (-1)	KIAS	242	237	232	228	223	218	213	210	206	203	199
	MACH	.472	.463	.454	.445	.435	.426	.417	.411	.404	.397	.389
	FF/ENG	5648	5411	5174	4940	4711	4487	4283	4108	3936	3758	3583
	KTAS	297	291	285	280	274	268	262	258	254	249	245
	%N1	78.9	77.8	76.6	75.3	74.0	72.7	71.4	70.3	69.0	67.7	66.4
12 (0)	MAX TAT											
	KIAS	242	237	232	228	223	218	213	210	206	203	199
	MACH	.463	.454	.445	.436	.427	.418	.409	.403	.396	.389	.382
	FF/ENG	5639	5402	5168	4937	4711	4489	4284	4108	3934	3756	3580
	KTAS	292	287	281	275	270	264	258	254	250	246	241
	%N1	78.0	76.9	75.7	74.4	73.1	71.8	70.6	69.3	68.1	66.8	65.6
	MAX TAT											
	KIAS	242	237	232	228	223	218	213	210	206	203	199
	MACH	.454	.446	.437	.428	.419	.410	.402	.395	.389	.382	.375
	FF/ENG	5633	5397	5165	4938	4713	4492	4283	4107	3933	3755	3581
	KTAS	288	282	277	271	266	260	255	250	246	242	237

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
17	88.1	89.1	90.0	90.9	91.8	92.7	93.5	94.4	95.2	93.9	92.3	90.9	89.4	88.1
16	87.5	88.4	89.3	90.2	91.1	92.0	92.9	93.7	94.5	94.1	92.8	91.4	89.8	88.2
15	87.0	87.9	88.8	89.7	90.6	91.4	92.3	93.2	94.0	94.3	93.1	92.0	90.3	88.4
14	86.5	87.4	88.3	89.1	90.0	90.9	91.7	92.6	93.4	94.2	93.3	92.2	90.9	89.2
13	86.0	86.9	87.8	88.6	89.5	90.4	91.2	92.1	92.9	93.7	93.4	92.3	91.2	89.8
12	85.5	86.4	87.3	88.1	89.0	89.9	90.7	91.5	92.4	93.2	93.5	92.4	91.4	90.4

With engine anti-ice on, decrease limit %N1 by 0.4.
With engine and wing anti-ice on, decrease limit %N1 by 0.7.

GEAR DOWN

Long Range Cruise Table 11000 FT to 5000 FT - High Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		360	350	340	330	320	310	300	290	280	270	260
11 (5)	%N1	85.6	85.1	84.6	84.2	83.4	82.5	81.4	80.4	79.3	78.2	77.1
	MAX TAT	36										
	KIAS	270	270	270	270	267	263	259	255	250	246	242
	MACH	.497	.497	.497	.497	.492	.485	.477	.469	.462	.454	.446
	FF/ENG	7632	7495	7369	7260	7059	6817	6577	6339	6102	5865	5630
10 (7)	KTAS	316	316	316	316	313	308	303	299	294	289	283
	%N1	84.7	84.2	83.8	83.4	82.6	81.6	80.5	79.5	78.4	77.3	76.2
	MAX TAT											
	KIAS	270	270	270	270	267	263	259	255	250	246	242
	MACH	.488	.488	.488	.488	.483	.476	.468	.461	.453	.445	.437
9 (9)	FF/ENG	7616	7482	7360	7252	7053	6813	6575	6338	6101	5865	5630
	KTAS	311	311	311	311	308	304	299	294	289	284	279
	%N1	83.9	83.4	82.9	82.4	81.6	80.6	79.6	78.6	77.5	76.5	75.3
	MAX TAT											
	KIAS	270	270	270	270	267	263	259	255	250	246	242
8 (10)	MACH	.479	.479	.479	.479	.474	.467	.460	.452	.445	.437	.429
	FF/ENG	7612	7481	7360	7252	7054	6817	6580	6342	6105	5869	5636
	KTAS	307	307	307	307	304	299	295	290	285	280	275
	%N1	82.9	82.4	81.9	81.5	80.7	79.7	78.7	77.7	76.7	75.6	74.4
	MAX TAT											
7 (12)	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.470	.470	.470	.470	.466	.459	.451	.444	.437	.429	.422
	FF/ENG	7618	7488	7369	7262	7064	6827	6589	6350	6113	5878	5646
	KTAS	302	302	302	302	299	295	290	286	281	276	271
	%N1	82.0	81.5	81.0	80.6	79.8	78.8	77.8	76.8	75.8	74.7	73.6
5 (15)	MAX TAT											
	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.462	.462	.462	.462	.457	.450	.443	.436	.429	.422	.414
	FF/ENG	7632	7504	7385	7277	7077	6838	6597	6359	6123	5889	5658
	KTAS	298	298	298	298	295	291	286	282	277	272	267
	%N1	80.1	79.7	79.2	78.8	78.1	77.1	76.1	75.1	74.1	73.0	71.9
	MAX TAT											
	KIAS	270	270	270	270	267	263	259	255	251	246	242
	MACH	.446	.446	.446	.446	.441	.434	.428	.421	.414	.407	.400
	FF/ENG	7653	7524	7404	7295	7091	6850	6612	6377	6144	5912	5681
	KTAS	290	290	290	290	287	282	278	274	269	264	260

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
11	86.9	87.7	88.6	89.4	90.3	91.1	91.9	92.7	93.5	92.5	91.5	90.5	89.2	87.2
10	86.5	87.3	88.2	89.0	89.9	90.7	91.5	92.3	93.1	92.5	91.5	90.5	89.4	88.0
9	85.9	86.7	87.6	88.4	89.2	90.0	90.8	91.6	92.4	92.4	91.4	90.5	89.4	88.0
8	85.2	86.0	86.9	87.7	88.5	89.3	90.1	90.9	91.7	92.3	91.3	90.3	89.4	88.0
7	84.8	85.6	86.5	87.3	88.1	88.9	89.7	90.5	91.3	92.0	91.4	90.4	89.4	88.1
5	84.0	84.8	85.6	86.4	87.2	88.0	88.8	89.6	90.4	91.1	91.6	90.5	89.5	88.3

With engine anti-ice on, decrease limit %N1 by 0.6.
With engine and wing anti-ice on, decrease limit %N1 by 0.9.

GEAR DOWN

Long Range Cruise Table 11000 FT to 5000 FT - Low Weights

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)										
		260	250	240	230	220	210	200	190	180	170	160
11 (2)	%N1	77.1	76.0	74.7	73.5	72.2	71.0	69.6	68.4	67.2	66.0	64.7
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.446	.437	.429	.420	.412	.403	.394	.388	.381	.375	.368
	FF/ENG	5630	5396	5167	4940	4716	4494	4283	4106	3933	3757	3585
10 (4)	KTAS	283	278	273	267	262	256	251	247	243	238	234
	%N1	76.2	75.0	73.8	72.6	71.4	70.0	68.7	67.5	66.3	65.1	64.0
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.437	.429	.421	.413	.404	.395	.387	.381	.374	.368	.361
9 (5)	FF/ENG	5630	5399	5171	4945	4720	4497	4284	4109	3937	3762	3592
	KTAS	279	274	269	263	258	252	247	243	239	235	230
	%N1	75.3	74.2	73.0	71.8	70.5	69.1	67.8	66.6	65.5	64.3	63.2
	MAX TAT											
	KIAS	242	237	233	228	223	218	213	210	206	203	199
8 (7)	MACH	.429	.422	.413	.405	.397	.388	.380	.374	.367	.361	.354
	FF/ENG	5636	5406	5178	4952	4728	4505	4290	4116	3944	3770	3601
	KTAS	275	270	265	260	254	249	243	239	235	231	227
	%N1	74.4	73.3	72.2	70.9	69.6	68.2	66.9	65.8	64.7	63.6	62.4
	MAX TAT											
7 (9)	KIAS	242	237	233	228	223	218	213	210	206	203	199
	MACH	.422	.414	.406	.398	.390	.381	.373	.367	.361	.354	.348
	FF/ENG	5646	5416	5189	4962	4738	4516	4299	4125	3954	3781	3612
	KTAS	271	266	261	256	251	245	240	236	232	228	223
	%N1	73.6	72.5	71.3	70.0	68.7	67.4	66.1	65.0	63.9	62.8	61.6
5 (12)	MAX TAT											
	KIAS	242	237	233	228	224	219	214	210	206	203	199
	MACH	.414	.407	.399	.391	.383	.374	.366	.360	.354	.348	.341
	FF/ENG	5658	5429	5201	4975	4751	4529	4310	4135	3965	3792	3625
	KTAS	267	262	257	252	247	242	236	232	229	224	220
	%N1	71.9	70.7	69.5	68.3	67.0	65.8	64.6	63.5	62.4	61.2	60.0
	MAX TAT											
	KIAS	242	237	233	228	224	219	214	210	206	203	199
	MACH	.400	.392	.385	.377	.369	.362	.354	.347	.341	.335	.329
	FF/ENG	5681	5452	5224	4998	4774	4554	4338	4155	3987	3817	3650
	KTAS	260	255	250	245	240	235	230	226	222	218	214

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

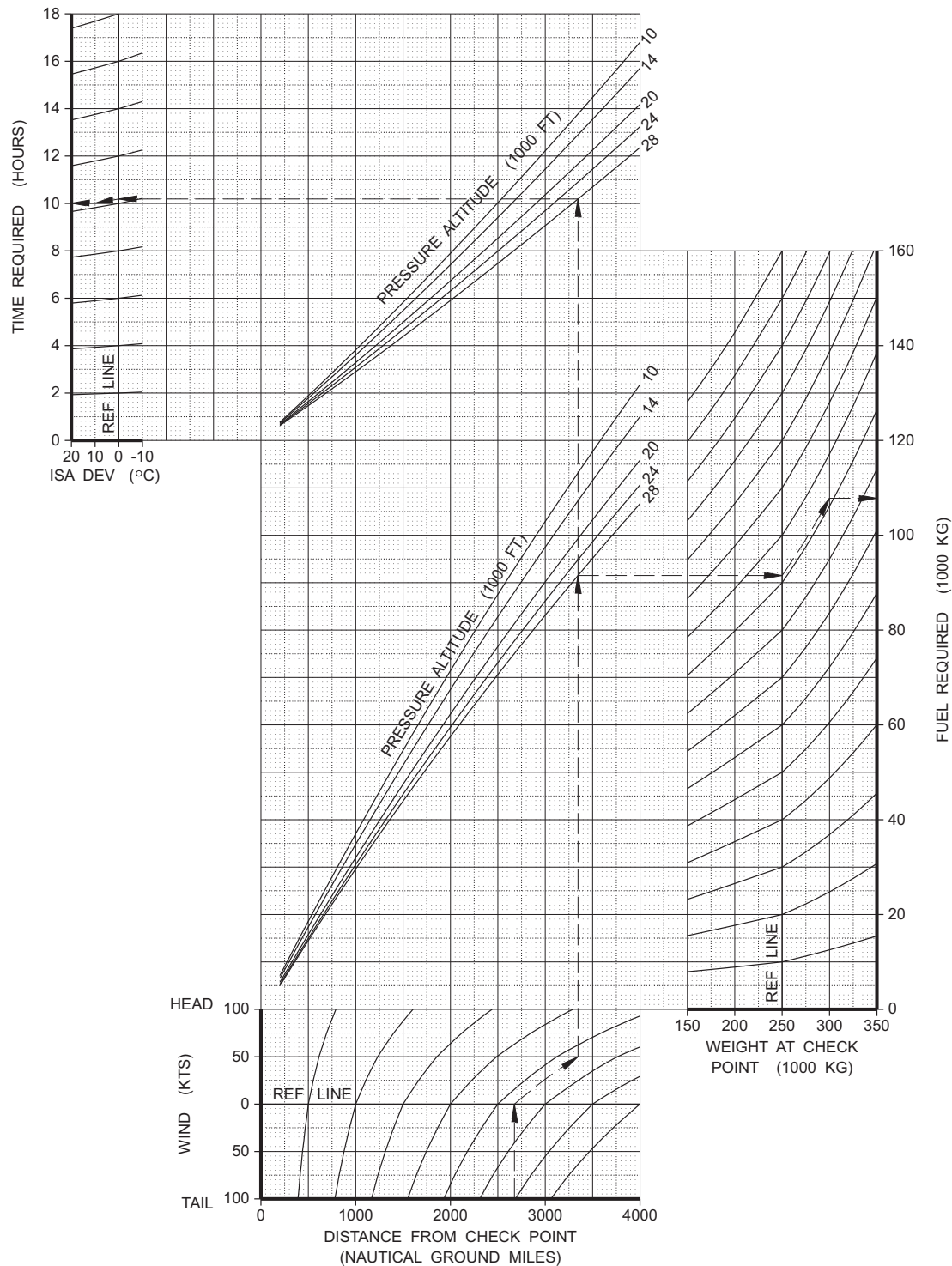
PRESS ALT (1000 FT)	TAT (°C)													
	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
11	86.9	87.7	88.6	89.4	90.3	91.1	91.9	92.7	93.5	92.5	91.5	90.5	89.2	87.2
10	86.5	87.3	88.2	89.0	89.9	90.7	91.5	92.3	93.1	92.5	91.5	90.5	89.4	88.0
9	85.9	86.7	87.6	88.4	89.2	90.0	90.8	91.6	92.4	92.4	91.4	90.5	89.4	88.0
8	85.2	86.0	86.9	87.7	88.5	89.3	90.1	90.9	91.7	92.3	91.3	90.3	89.4	88.0
7	84.8	85.6	86.5	87.3	88.1	88.9	89.7	90.5	91.3	92.0	91.4	90.4	89.4	88.1
5	84.0	84.8	85.6	86.4	87.2	88.0	88.8	89.6	90.4	91.1	91.6	90.5	89.5	88.3

With engine anti-ice on, decrease limit %N1 by 0.6.

With engine and wing anti-ice on, decrease limit %N1 by 0.9.

GEAR DOWN

Long Range Cruise Enroute Fuel and Time Based on VREF30+80 descent



GEAR DOWN

Descent

Based on VREF30 + 80

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)
35000	17	610	73
33000	17	600	69
31000	16	590	64
29000	15	580	60
27000	15	560	56
25000	14	550	52
23000	13	530	48
21000	12	510	43
19000	12	490	39
17000	11	470	35
15000	10	450	31
10000	8	380	21
5000	5	310	11
1500	4	250	4

Allowances for a straight-in approach are included.

GEAR DOWN

Holding Flaps Up

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		340	320	300	280	260	240	220	200	180	160
30000	%N1									84.8	82.3
	KIAS									206	199
	FF/ENG									4290	3870
25000	%N1								82.7	80.2	77.7
	KIAS								213	206	199
	FF/ENG								4590	4180	3790
20000	%N1						82.4	80.3	77.9	75.4	72.8
	KIAS						226	220	213	206	199
	FF/ENG						5320	4930	4530	4150	3770
15000	%N1					79.5	77.5	75.4	73.1	70.8	68.2
	KIAS					232	226	220	213	206	199
	FF/ENG					5670	5270	4880	4500	4130	3760
10000	%N1			78.7	76.8	74.9	72.9	71.0	68.7	66.3	64.0
	KIAS			244	238	232	226	220	213	206	199
	FF/ENG			6470	6040	5640	5250	4880	4500	4130	3770
5000	%N1	78.1	76.3	74.3	72.5	70.5	68.5	66.5	64.5	62.4	60.0
	KIAS	260	253	244	238	232	226	220	213	206	199
	FF/ENG	7470	7000	6490	6070	5680	5290	4920	4540	4190	3830
1500	%N1	75.0	73.3	71.2	69.2	67.4	65.6	63.8	61.8	59.6	57.3
	KIAS	260	253	244	238	232	226	220	213	206	199
	FF/ENG	7470	7010	6510	6080	5680	5300	4940	4580	4230	3880

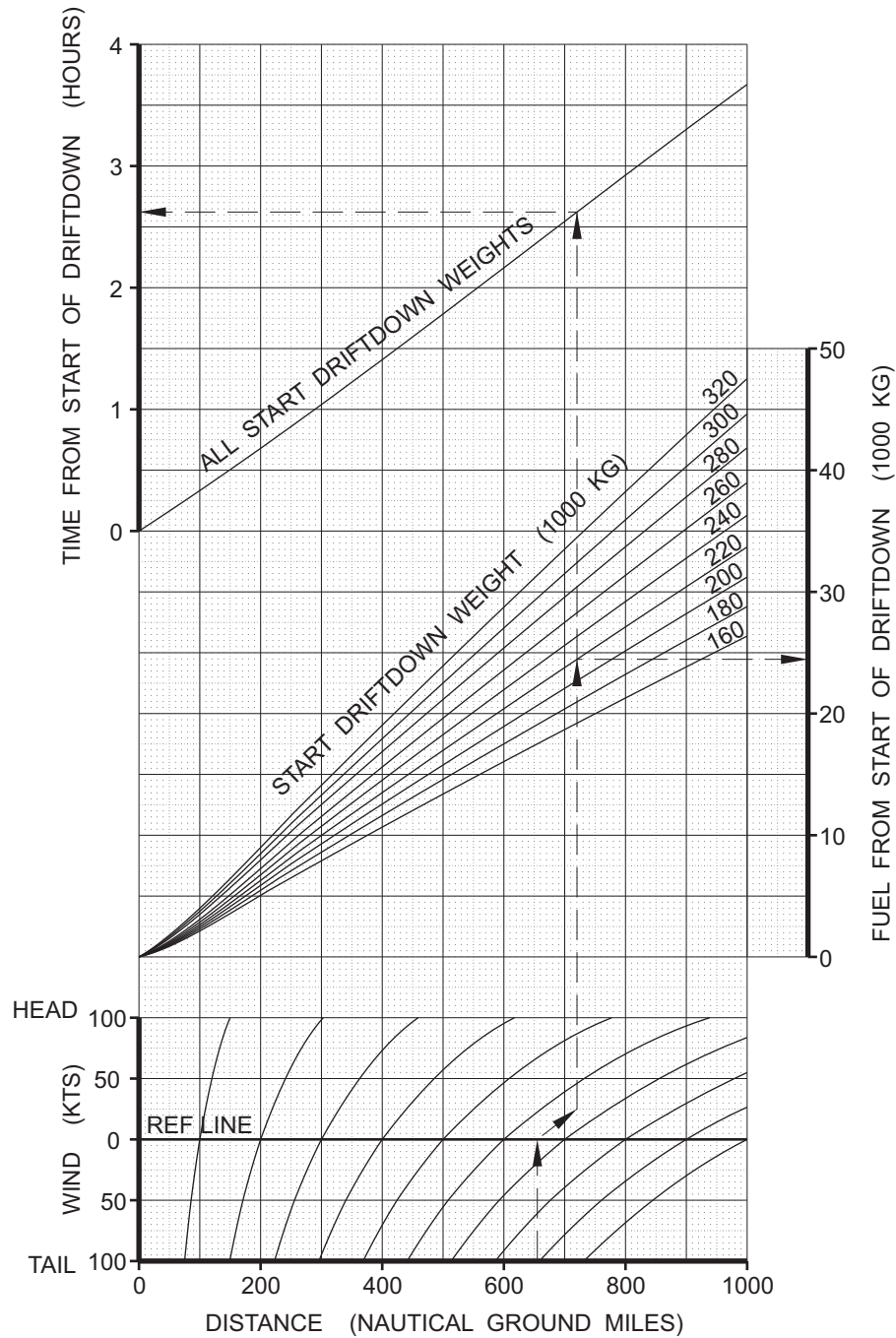
Flaps 1

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		340	320	300	280	260	240	220	200	180	160
20000	%N1	92.0	89.9	87.8	85.7	83.7	81.4	79.0	76.2	73.5	70.5
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7690	7100	6490	6010	5550	5110	4690	4270	3860	3460
15000	%N1	86.9	85.1	83.0	80.8	78.6	76.3	74.0	71.5	68.9	65.9
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7400	6880	6360	5910	5480	5060	4640	4230	3830	3430
10000	%N1	82.2	80.2	78.0	76.0	73.9	71.8	69.6	67.0	64.4	61.8
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7300	6820	6300	5850	5430	5020	4620	4220	3830	3460
5000	%N1	77.6	75.7	73.6	71.6	69.5	67.3	65.2	62.9	60.5	57.8
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7310	6820	6310	5870	5460	5050	4660	4260	3890	3520
1500	%N1	74.5	72.7	70.5	68.4	66.4	64.5	62.5	60.2	57.7	55.2
	KIAS	240	233	224	218	212	206	200	193	186	179
	FF/ENG	7290	6820	6310	5870	5470	5070	4690	4310	3940	3580

These tables include 5% additional fuel for holding in a racetrack pattern.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Driftdown/LRC Cruise Range Capability
Includes APU fuel burn





GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability
100 ft/min residual rate of climb

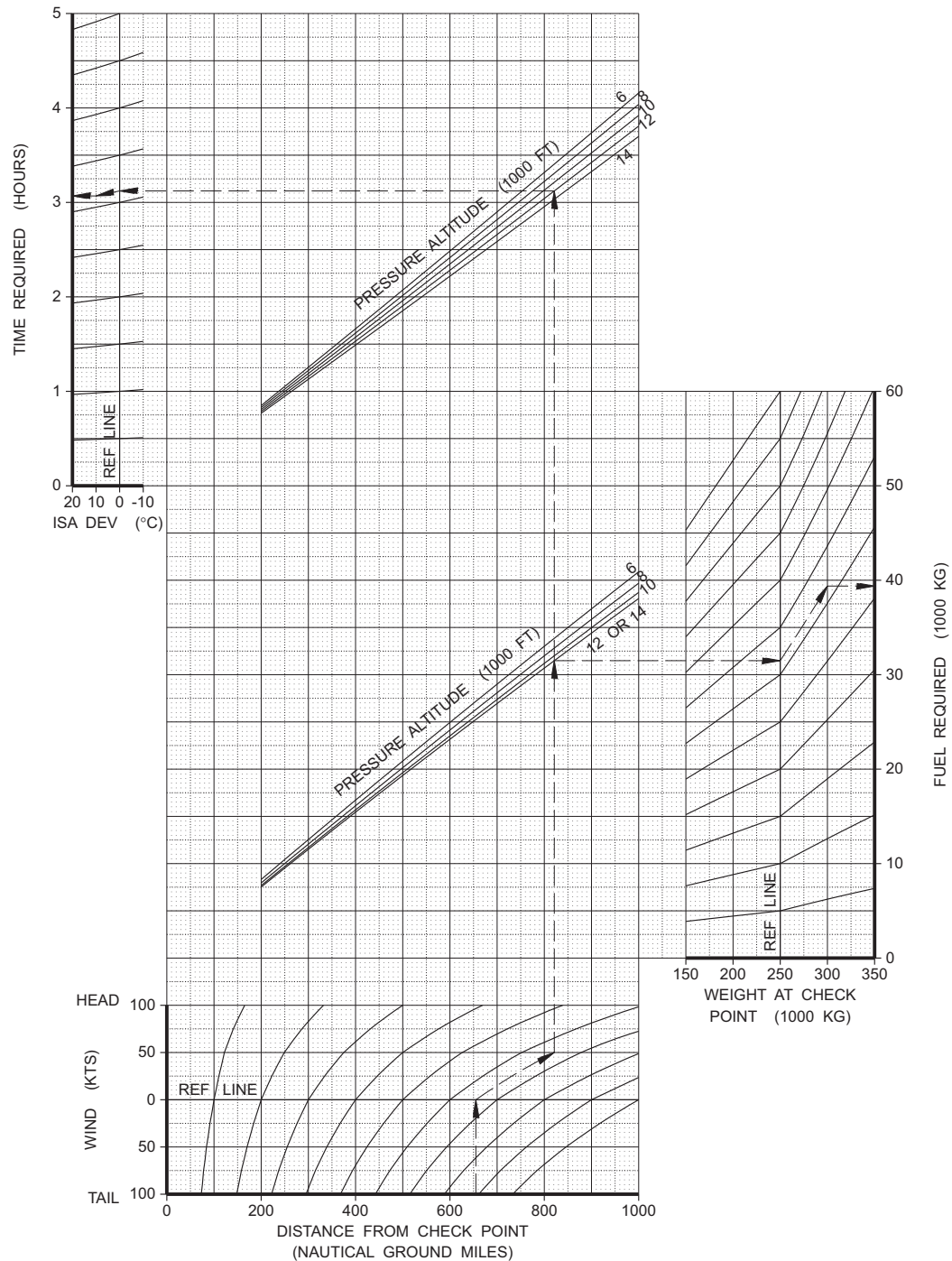
WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
340	200		
330	1700		
320	3200	600	
310	4500	2400	
300	5500	4200	1300
290	6600	5500	3200
280	7800	6800	5000
270	8900	8200	6700
260	10100	9400	8300
250	11200	10500	9400
240	12300	11600	10400
230	13200	12700	11500
220	14300	13800	12600
210	15400	14900	13800
200	16500	16000	15100
190	17800	17100	16200
180	19000	18700	17400
170	20300	20100	19000
160	21600	21100	20400

GEAR DOWN ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Based on VREF30 + 80 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)													
		290	280	270	260	250	240	230	220	210	200	190	180	170	160
20 (-15)	%N1												99.8	96.9	94.0
	MAX TAT												1	7	11
	KIAS												206	203	199
	MACH												.454	.446	.438
	FF/ENG KTAS												8840 279	8170 274	7588 269
19 (-13)	%N1											100.2	97.4	94.6	92.2
	MAX TAT											-2	7	11	16
	KIAS											210	206	203	199
	MACH											.453	.445	.437	.429
	FF/ENG KTAS											9225 279	8570 275	7970 270	7481 265
18 (-11)	%N1											97.8	95.1	92.7	90.8
	MAX TAT											7	12	16	
	KIAS											210	206	203	199
	MACH											.444	.437	.429	.421
	FF/ENG KTAS											8943 275	8354 270	7853 265	7411 261
17 (-9)	%N1										98.1	95.4	93.2	91.3	89.7
	MAX TAT										7	12	17		
	KIAS										213	210	206	203	199
	MACH										.442	.435	.428	.420	.413
	FF/ENG KTAS										9313 275	8721 271	8230 266	7780 261	7359 257
16 (-8)	%N1									98.3	95.8	93.6	91.8	90.2	88.7
	MAX TAT									9	14	18	22		
	KIAS									217	213	210	206	203	199
	MACH									.441	.434	.427	.420	.412	.405
	FF/ENG KTAS									9689 275	9090 271	8595 266	8155 262	7730 257	7325 253
15 (-6)	%N1								98.4	96.0	93.9	92.2	90.6	89.2	87.8
	MAX TAT								11	16	19	23			
	KIAS								220	217	213	210	206	203	199
	MACH								.439	.432	.425	.419	.412	.404	.397
	FF/ENG KTAS								10067 275	9467 271	8965 267	8520 262	8106 258	7694 253	7299 249

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.
Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.
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 %N1

PRESS ALT (1000 FT)	TAT (°C)														
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	
20	94.0	95.0	96.1	97.1	98.1	99.1	100.1	101.1	102.0	102.7	101.8	99.5	97.5	96.0	
19	93.4	94.4	95.4	96.4	97.4	98.4	99.4	100.3	101.3	101.9	101.5	99.8	97.8	96.4	
18	92.6	93.6	94.6	95.6	96.6	97.6	98.5	99.5	100.4	101.1	101.0	99.8	98.0	96.7	
17	91.7	92.7	93.7	94.7	95.7	96.6	97.6	98.5	99.4	100.3	100.1	99.5	98.1	96.9	
16	91.0	92.0	93.0	93.9	94.9	95.8	96.8	97.7	98.6	99.5	99.9	99.7	98.5	97.2	
15	90.3	91.3	92.3	93.2	94.2	95.1	96.1	97.0	97.9	98.8	99.6	100.0	99.1	97.6	

With engine anti-ice on, decrease limit %N1 by 0.2.
With engine and wing anti-ice on, decrease limit %N1 by 0.9.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Table
14000 FT to 6000 FT

PRESS ALT (1000 FT) (STD TAT)		WEIGHT (1000 KG)													
		290	280	270	260	250	240	230	220	210	200	190	180	170	160
14 (-4)	%N1							98.5	96.2	94.2	92.5	91.0	89.7	88.3	86.9
	MAX TAT							12	17	21	24				
	KIAS							223	220	217	213	210	206	203	199
	MACH							.436	.431	.424	.417	.411	.404	.397	.389
	FF/ENG KTAS							10432	9850	9343	8891	8472	8070	7666	7267
13 (-2)	%N1						98.4	96.3	94.4	92.8	91.4	90.1	88.8	87.4	86.1
	MAX TAT						14	18	22	25					
	KIAS						226	223	220	217	213	210	206	203	199
	MACH						.434	.428	.422	.416	.409	.403	.396	.389	.382
	FF/ENG KTAS						10806	10216	9723	9269	8843	8435	8039	7633	7230
12 (0)	%N1					98.4	96.3	94.6	93.1	91.7	90.4	89.1	87.9	86.5	85.1
	MAX TAT					15	20	23	27	30					
	KIAS					229	226	223	220	217	213	210	206	203	199
	MACH					.431	.426	.420	.414	.408	.402	.395	.389	.382	.375
	FF/ENG KTAS					11175	10585	10086	9647	9218	8803	8402	8004	7594	7195
10 (4)	%N1			98.6	96.4	94.8	93.4	92.1	91.0	89.8	88.6	87.4	86.1	84.6	83.1
	MAX TAT			17	23	27	30	33							
	KIAS			237	233	229	226	223	220	217	213	210	206	203	199
	MACH			.429	.422	.415	.410	.405	.399	.393	.387	.381	.374	.368	.361
	FF/ENG KTAS			12015	11346	10810	10366	9946	9546	9142	8738	8334	7937	7536	7153
8 (7)	%N1	98.9	96.9	95.3	93.8	92.5	91.4	90.3	89.3	88.1	86.9	85.6	84.2	82.7	81.2
	MAX TAT	19	25	30	34	37									
	KIAS	245	241	237	233	229	226	223	220	217	213	210	206	203	199
	MACH	.428	.421	.414	.407	.400	.395	.390	.385	.379	.373	.367	.361	.354	.348
	FF/ENG KTAS	12853	12219	11655	11144	10664	10264	9882	9502	9098	8693	8298	7913	7529	7155
6 (11)	%N1	95.8	94.4	93.2	92.0	90.8	89.7	88.7	87.6	86.3	85.0	83.7	82.3	80.8	79.3
	MAX TAT	31	34	38	41										
	KIAS	246	242	238	234	230	226	223	220	217	213	210	206	203	199
	MACH	.413	.407	.400	.394	.387	.381	.376	.371	.365	.359	.354	.348	.341	.335
	FF/ENG KTAS	12530	12029	11558	11107	10671	10258	9868	9478	9077	8680	8297	7920	7537	7160

Max TAT not shown where %N1 can be set in ISA + 30°C conditions.

Increase/decrease %N1 required by 1% per 5°C above/below standard TAT.

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 %N1

PRESS ALT (1000 FT)	TAT (°C)													
	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35
14	93.1	94.0	95.0	95.9	96.8	97.8	98.6	99.5	100.2	99.6	98.1	96.8	95.7	94.7
13	93.0	93.9	94.8	95.8	96.7	97.6	98.5	99.4	100.1	99.8	98.6	97.3	96.1	95.1
12	92.8	93.8	94.7	95.7	96.6	97.5	98.4	99.3	100.1	100.1	99.1	97.8	96.6	95.5
10	92.5	93.5	94.4	95.3	96.2	97.1	98.0	98.9	99.8	100.3	100.1	99.0	97.7	96.5
8	92.0	92.9	93.9	94.8	95.7	96.6	97.5	98.4	99.2	100.1	100.7	100.2	98.9	97.7
6	91.1	92.0	93.0	93.9	94.8	95.7	96.5	97.4	98.3	99.1	100.0	100.1	99.1	98.0

With engine anti-ice on, decrease limit %N1 by 0.4.

With engine and wing anti-ice on, decrease limit %N1 by 0.8.



GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

**Holding
Flaps Up**

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)									
		340	320	300	280	260	240	220	200	180	160
15000	%N1 KIAS FF/ENG							98.4 220 10570	93.9 213 9410	90.6 206 8510	87.8 199 7660
10000	%N1 KIAS FF/ENG					96.3 232 11870	93.4 226 10880	91.0 220 10020	88.6 213 9170	86.1 206 8330	83.1 199 7510
5000	%N1 KIAS FF/ENG		98.2 253 14490	95.1 244 13280	92.9 238 12370	90.9 232 11580	88.9 226 10760	86.7 220 9940	84.1 213 9110	81.3 206 8310	78.4 199 7510
1500	%N1 KIAS FF/ENG	96.1 260 15250	94.0 253 14280	91.8 244 13280	89.9 238 12380	87.9 232 11520	85.6 226 10680	83.3 220 9870	80.8 213 9060	78.2 206 8270	75.5 199 7490

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



Flight Planning and Performance Manual

ALTERNATE MODE EEC

Alternate Mode EEC Max Takeoff %N1

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	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
55	131	94.3	96.7	97.0	96.7	96.5	96.6	96.4	96.3	96.1	95.5	94.6	94.2
50	122	95.7	98.1	98.6	98.2	97.9	97.9	97.8	97.6	97.4	96.8	95.9	95.6
45	113	97.2	99.6	100.1	99.8	99.4	99.3	99.1	98.9	98.8	98.2	97.3	96.9
40	104	98.9	101.2	101.9	101.4	101.0	100.8	100.6	100.4	100.0	99.4	98.6	98.2
35	95	100.9	102.7	104.7	104.2	103.1	102.6	102.1	101.7	101.1	100.4	99.6	99.3
30	86	100.5	103.7	106.9	106.4	105.6	105.0	104.3	103.7	102.6	101.5	100.7	100.3
25	77	99.7	102.8	106.0	106.7	107.3	107.2	106.7	106.5	105.3	103.8	102.4	101.8
20	68	98.8	101.9	105.1	105.8	106.4	106.8	107.1	107.5	106.8	105.9	104.8	104.3
15	59	98.0	101.1	104.2	104.9	105.5	105.8	106.2	106.5	106.4	106.1	105.6	105.3
10	50	97.1	100.2	103.3	104.0	104.6	104.9	105.3	105.6	105.5	105.2	104.9	104.8
5	41	96.3	99.3	102.4	103.0	103.7	104.0	104.3	104.7	104.5	104.2	104.0	103.8
0	32	95.4	98.4	101.4	102.1	102.7	103.1	103.4	103.7	103.6	103.3	103.0	102.9
-10	14	93.6	96.6	99.6	100.2	100.8	101.2	101.5	101.8	101.7	101.4	101.1	101.0
-20	-4	91.8	94.7	97.7	98.3	98.9	99.2	99.5	99.9	99.7	99.5	99.2	99.0
-30	-22	90.0	92.8	95.7	96.3	96.9	97.2	97.5	97.9	97.7	97.5	97.2	97.1
-40	-40	88.1	90.9	93.7	94.3	94.9	95.2	95.5	95.8	95.7	95.4	95.2	95.0
-50	-58	86.2	88.9	91.7	92.3	92.9	93.1	93.4	93.8	93.6	93.4	93.1	93.0

%N1 Adjustments for Engine Bleed

BLEED CONFIGURATION	AIRPORT PRESSURE ALTITUDE (FT)											
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	8400
PACKS OFF	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
WING ANTI-ICE ON	-0.2	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

Intentionally
Blank